THE MASTER CAR BUILDERS' ASSOCIATION

CAR BUILDERS' DICTIONARY

1912 Edition

CAR BUILDERS' DICTIONARY

DEFINITIONS AND ILLUSTRATIONS
OF AMERICAN RAILWAY CARS,
THEIR PARTS AND
EQUIPMENT

COMPILED AND EDITED FOR
THE MASTER CAR BUILDERS' ASSOCIATION

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PREFACE

A number of important improvements have been made in this, the seventh edition of The Car Builders' Dictionary. The definition section has been thoroughly revised to cover the new details and designs that have come into use during recent years and to eliminate references to those parts which were used on the older types of equipment, but have become obsolete. In the Illustrated Section only a very few of the photographs and drawings which were used in the previous edition have been retained. Progress in passenger car construction, including the development of all-steel designs, has been exceedingly rapid and is fully covered up to date. Necessarily the awakening of the railroads to the importance of building freight cars so as to more fully protect the lading from damage has emphasized the importance of better construction and improved details. This development has been thoroughly covered. The captions accompanying the general views have been made more comprehensive and complete. An attempt has been made to balance the Illustrated Section to better advantage by eliminating a considerable number of more or less unimportant details and utilizing the space for more important matters. This has required 77 more pages than in the 1909 edition. Among the important additions are the complete details and specifications for postal cars as required by the United States government; also a considerable addition to the section on electric motor cars and an entirely new section on wrecking equipment and tools. The drawings for the M. C. B. Standards and Recommended Practice have been entirely redrawn, thus not only greatly improving their appearance but making them much more legible. This feature will undoubtedly be appreciated by those who have reason to refer to these standards and recommended practices.

New York, December, 1912.

A DICTIONARY OF AMERICAN

RAILWAY CAR PRACTICE

A

"A" Car Roof. A car roof with straight carlines, meeting at a point like rafters in the center of the upper deck.

"A" Frame. A strut in the form of the sides of the letter A, to which the boom guys of a steam shovel are fastened.

"A" Frame Step. The supports of the bottom ends of the "A" Frame of a steam shovel.

Accelerator. Fig. 1968. A special fitting used in connection with the hot water circulation heating system to quicken the circulation of hot water.

Accordion Hood. 124, Figs. 552-555. A term sometimes applied to the top transverse portion of a vestibule diaphragm.

Acetone. A colorless liquid, obtained from the destructive distillation of wood, which resembles alcohol and which has the property of absorbing acetylene gas under pressure in a high degree. It is used in the storage tanks of the system of acetylene gas lighting shown in Figs. 2227-2239.

Acetylene Gas. A colorless gas, C_2H_2, produced when water is brought in contact with calcium carbide. It has a distinctive odor and burns with a bright, luminous flame. It is used in car lighting with success. It may be generated in the car, as in the system shown in Figs. 2240-2263; under the car, as in the system shown in Figs. 2264-2269; or carried in tanks filled with acetone and asbestos under pressure, as in the system shown in Figs. 2227-2239.

Acetylene Gas Lamps and Fixtures. Figs. 2216-2269.

Acetylene Gas Lighting Systems. Figs. 2227-2239. This system uses acetylene gas stored in tanks filled with asbestos and charged with 4/10 of a volume of acetone, a colorless liquid obtained from the dry distillation of wood which absorbs large quantities of acetylene under pressure. When the pressure is relieved the acetylene is given off and the acetone remains in the tank and may be used over again on recharging; 2,000 cubic feet of acetylene may be stored under a pressure of 150 lbs. in a tank 114 in. by 20 in. and may not be exploded by any known means when in the tanks filled with asbestos bricks. Such a supply is sufficient for more than one month's lighting of an ordinary car. The gas is generated in stations at terminals, and the tanks, when empty, are replaced by full tanks supplied from the charging stations or charged from yard lines. The lamps and piping for the car are similar to those used with the Pintsch gas system.

Figs. 2240-2263. In this system the gas is generated in the apparatus shown in Figs. 2244-46, which is enclosed in one end of a car. The carbide is contained in cartridges, pockets or baskets. The water flowing down and coming into contact with the carbide generates acetylene gas, which is stored in the receiving tank under the car as shown in Fig. 2253. The piping and arrangements through the car are similar to those of the Pintsch system. The form of the lamp is shown in Fig. 2251.

Figs. 2264-69. This system employs a gas generator mounted under the car. The carbide is put in a cartridge which is put in or removed from the generator as shown in Figs. 2268-69.

Adjustable Foot Rest. A sliding foot rest, supported by various mechanical devices—as by a ratchet arc or on rabbet pieces. A foot rest or rail under a seat, which can be adjusted to suit the passenger using it. See Foot Rest.

Admission Valve. (Car Heating). Figs. 2006, 2009-10. Used in connection with steam heat system.

Advertising Rack Rail (Street Cars). A strip of wood to which the frames for advertising cards are screwed or otherwise fastened.

Agasote. A substitute for wood; used extensively in place of wood for headlinings, side panels, floors and outside roofs. Its composition is secret, but it does not contain rosin or any acid compound injurious to paint or steel. Panels made from this material can be scraped, planed, molded or sawed on any wood working machine and will not split under various changes of temperature and humidity. Used extensively for interior finish of steel cars, owing to its insulating and sound-deadening properties. The material used in steel cars is fire resisting.

Air Brake. Any brake operated by air pressure, but usually restricted to systems of continuous brakes operated by compressed air, in distinction from Vacuum Brakes, which see, which are operated by creating a vacuum. The air is compressed by some form of pump on the locomotive, or a motor compressor on electric cars, and is conveyed by pipes and flexible hose between the cars to cylinders and pistons under each car, by which the pressure is transmitted to the brake levers, and thence to the brake shoes. This system is what is now termed the straight-air brake. It is now obsolete in steam road practice, having been replaced by the Automatic Air Brake. See also Electro-Pneumatic Brake, Traction Air Brake, Vacuum Brake, Empty and Load Brake Equipment, High Speed Brake, Quick Action Automatic Air Brake.

Air Brake (General arrangement and details). Figs. 1262-1376; M. C. B. Standards, Fig. 2702.

The general arrangement and details of brake gear for air-brake cars, as shown, are standard. The following standards have also been adopted in this connection:

1. Maximum train-pipe pressure, 70 pounds per square inch.

2. Maximum brake power on freight cars, 70 per cent. of the light weight of car.

3. All levers 1 inch in thickness; all pins to be 1 3-32

inches in diameter; all jaws or clevises made of ¾-inch by 2½-inch iron; all rods ¾ inch diameter.

4. Angle of brake beam lever, 40 degrees with vertical.

The revision made in 1896 consisted in the omission of such detail dimensions as could not be used in all cases, such as the length and proportions of main levers, and the omission of some of the smaller parts from the drawing, such as the pipe clamps, staples, etc. The dimensions of the cross-section of the malleable iron truck lever connection were increased, and the letters W. I., M. I., C. I., etc., indicating the material of which the parts were to be made, were omitted from the drawing.

In 1898 the following changes were made:

Diameter of truck lever connection for outside hung brakes changed from ¾ inch to ⅞ inch, and a note to this effect was added under title on the drawing.

Diameter of hole for cotter in air-brake pin was first indicated as 7-16 inch.

Addition was made to note under drawing of truck lever connection for inside hung brakes, as follows: "If made of round iron or steel, must not be less than 1⅝ inches diameter."

Dummy coupling was omitted from drawing and air hose was shown as hanging down.

The words "33 inches or" were omitted from height shown for air-brake pipe above rail.

Diameter of release-valve rod was changed from ¼ inch to ⅜ inch.

In 1900 a standard brake pipe nipple, 10 inches long, was ordered shown located directly back of the angle cock.

In 1904 the location of the main air pipe and angle cock was changed from Recommended Practice to Standard.

In 1911 the following specifications were adopted:

Brake chain shall be of not less than ⅜-inch, preferably 7-16-inch, wrought iron or steel, with a link on the brake-rod end of not less than 7-16-inch, preferably ½-inch, wrought iron or steel, and shall be secured to brake-shaft drum by not less than ½-inch hexagon or square head bolt. Nut on said bolt shall be secured by riveting end of bolt over nut.

In 1908 the diameter of the holes in the different levers, guides, brackets and connections were omitted, and a note added to drawing reading as follows: "All holes for brake pins not less than 1 3-32 inches diameter nor more than 1⅛ inches diameter."

In 1909, in order to suit the different types of air-brake equipment and particularly to provide for the 10-inch brake cylinder, a note was added to the drawing, as follows:

For brake cylinders larger than 8 inches or for brake-cylinder pressures above 50 pounds per square inch, the size of brake rods and levers should be increased, if necessary, so that the fiber stress shall not exceed 15,000 pounds per square inch for rods and 23,000 pounds per square inch for levers.

In 1909 the use of malleable-iron construction was discontinued, and provision made that the truck connections be made of round iron or steel not less than 1⅝ inches diameter.

In 1911 the use of cast steel for truck-lever connections was permitted.

In 1911 a standard bottom rod for use with all steel or steel-tired wheels with inside hung brakes was adopted as shown on the drawing.

In 1912 the drawing was revised to show an additional lever, in order that the hand brake and air brake will work in harmony on double hand-brake cars.

Air Brake Appliances (M. C. B. Recommended Practice). Figs 2764, 2768.

In 1899 a Recommended Practice for the location of air-brake parts on different classes of cars was adopted, as follows:

1. Location of air-brake cylinders and triple valves on box cars and other clear bottom cars.
2. Location of air-brake cylinders and triple valves on hopper gondola cars and drop bottom gondola cars.
3. Arrangement of piping for clear bottom cars, or cars of the box car type.
4. Location of main air pipe at ends of cars.
5. As to the manner of fastening air-cylinder reservoirs, retaining valves, etc., to the framework of cars, the bolts fastening the cylinders and reservoirs should be either double-nutted or cottered, so as to prevent the same from working loose. The air pipes should be fastened to the framework of the car with a liberal number of clamps.

One elbow should be applied to the retaining valve pipe, it being located at the end sill of the car, where pipe turns upward.

One union should be applied as close to the triple valve as practicable to permit the easy removal of same, the pipe to be carried along under side of the intermediate sill when practicable, from the triple valve to end of car, and be supported by either staples or clamps, not to exceed six feet apart.

6. In 1902 the label for air-brake hose to show dates of application and removal, manufacturer's name and name of railroad company was advanced to standard.

In 1904 the location of main air pipe and angle cock was changed to standard.

Air Brake, Cleaning and Testing (M. C. B. Standard). In 1902 the following method for cleaning air brakes was adopted as Recommended Practice. Revised and advanced to Standard in 1911.

ANNUAL REPAIRS TO FREIGHT-CAR AIR BRAKES.

TRIPLE VALVE.

Inspection, Cleaning and Lubrication.

The triple valve should be removed from the car for cleaning in the shop, and should be replaced by a triple in good condition. It should be dismantled and all the internal parts, except those with rubber seats and gaskets, cleaned with gasoline, then blown off with compressed air and wiped dry with a cloth.

The slide valve and graduating valve must be removed from the triple piston and retarded-release parts from the body in order that the service ports in the slide valve and other parts may be properly cleaned.

No hard metals should be used to remove gum or dirt or to loosen the piston-packing ring in its groove.

The feed groove should be cleaned with a piece of wood, pointed similar to a lead pencil. Rags or cloth should be used for cleaning purposes rather than waste, as waste invariably leaves lint on the parts on which it is used.

In removing the emergency-valve seat, care must be exercised not to bruise or distort it.

Particular attention should be given the triple-piston packing ring. It should have a neat fit in its groove in the piston, and also in the triple-piston bushing; once removed from the piston, or distorted in any manner, it should be scraped. The fit of the packing ring in its groove and bushing and the condition of the bushing should be such as to pass the prescribed tests.

The graduating stem should work freely in the guide nut. The graduating spring and the retarded-release spring in retarded-release triple valves must conform to standard dimensions and be free from corrosion. The thread portion of the graduating-stem guide should be coated with oil and graphite before reapplying it to the triple cap.

The triple-valve piston and the emergency valve must be tested on centers provided for the purpose to insure same being straight. The emergency-valve rubber seat should invariably be renewed unless it can plainly be seen to be in first-class condition, which is seldom the case. A check-valve case having cast-iron seat should be replaced with a case having a brass seat.

The cylinder-cap gasket and check-valve case gasket to be carefully examined and cleaned with a cloth, but should not be scraped. All hard or cracked gaskets to be replaced with new ones.

Standard gaskets as furnished by the air-brake manufacturers should be used. The use of home-made gaskets should be avoided, as the irregular thickness results in leakage and causes triple-piston stem to bend or break.

The tension of the slide-valve spring should be regulated so that the contour of same is such as will bring the outer end ⅛ inch higher than the bore of the bushing when the outside end of the spring touches bushing when entering.

Before assembling the parts after cleaning, the castings and ports in the body of the triple valve should be thoroughly blown out with compressed air, and all parts of the triple, not elsewhere provided, known to be in good condition.

Lubricate the seat and face of the slide valve and slide-valve graduating valve with high-grade very fine dry graphite, rubbing it onto the surface and the upper portion of the bushing where the slide-valve spring bears, so as to make as much as possible adhere to and fill up the pores of the brass, leaving a very thin coating of free graphite. The parts to be lubricated with graphite must be free from oil or grease.

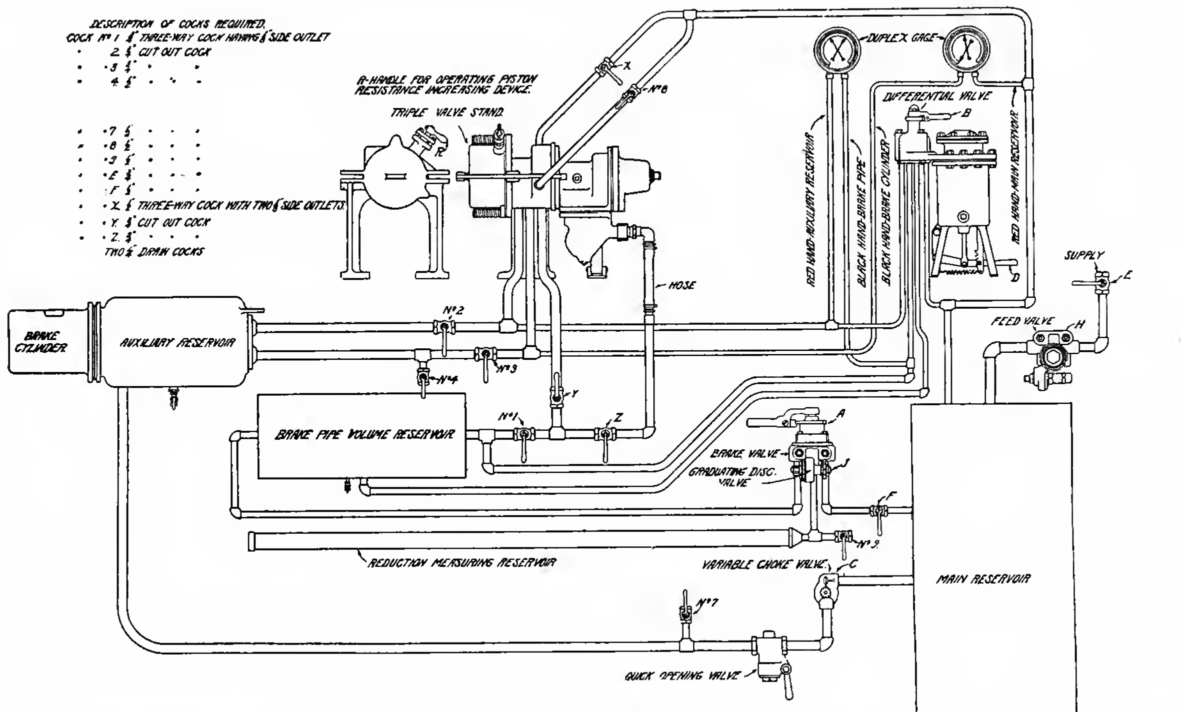
Rub in the graphite with a flat-pointed stick, over the end of which a piece of chamois skin has been glued. At completion of the rubbing operation, a few light blows on the side valve will leave the desired light coating of loose graphite.

The triple-valve piston-packing ring and its cylinder should be lubricated with either a light anti-friction oil or a suitable graphite grease, as follows:

Apply a light coating to the packing ring and insert the piston and its valves in the body, leaving them in release position, then lubricate the piston cylinder and move the piston back and forth several times, after which remove the surplus from the outer edge of the cylinder to avoid leaving sufficient lubricant to run on the slide valve or seat while the valve is being handled or stored ready for use.

No lubrication to be applied to the emergency piston, emergency valve or check valve.

All triple valves, after being cleaned or repaired, must be tested, preferably on a rack conforming to the accompanying drawing, and pass the test prescribed under the subject of "Triple Valve Tests" before being placed in service.



ASSEMBLY DIAGRAM, TRIPLE VALVE TEST RACK

Should any of the triple-valve bushings require renewing, such work should be done by the air-brake manufacturers.

Triples in which packing rings are to be renewed, slide valve or graduating valves renewed or faced, if the latter are of slide type, should be sent to a central point or general repair station for repairs.

When applying the triple valve to the auxiliary reservoir, the gasket should be placed on the triple valve, not the reservoir.

BRAKE CYLINDERS.

Cleaning, Lubricating and Inspecting.

First, secure the piston rod firmly to the cylinder head, then, after removing the non-pressure head, piston rod, piston head and release spring, scrape off all deposits of gum and dirt with a putty knife or its equivalent, and thoroughly clean the removed parts and the interior of the cylinder with waste saturated with kerosene.

Packing leathers must not be soaked in kerosene oil, as it destroys the oil filler placed in the leather by the manufacturers, opening the pores of the leather and causing them to become hard.

Particular attention to be paid to cleaning the leakage groove and the auxiliary tube. Triple valve must be removed when the auxiliary tube is being cleaned.

The expanding ring when applied in the packing leather should be a true circle and fit the entire circumference, and have an opening of from 3-16 to 1/4 inch; when removed from the cylinder the ring opening should be 1½ to 19-16 inches, and with this opening, of course, will not be a true circle.

A packing leather which is worn more on one side than the other should be replaced with a new one of uniform thickness, or turned so as to bring the thin side away from the bottom of the cylinder. The piston should be turned each time the cylinder is cleaned. In putting a packing leather on piston, it should be so placed as to bring the flesh side of the leather next to the cylinder walls.

Follower studs to be firmly screwed into the piston heads, and nuts on same to be drawn up tight before replacing the piston.

The inside of the cylinder and packing leather to be lightly coated with a suitable lubricant, using not more than 4 ounces nor less than 3 ounces per cylinder.

Part of the lubricant should be placed on the expander ring and the adjacent side of the packing leather, thus permitting the air pressure to force the lubricant into the leather at each application of the brake.

No sharp tools should be used in placing the packing leather in the cylinder.

After the piston is entered, and before the cylinder head is replaced, the piston rod should be slightly rotated in all directions, about 3 inches from the center line of the cylinder, in order to be certain that the expanding ring is not out of place.

In forcing the piston to its proper position in the cylinder, the packing leather will skim from the inner walls of the cylinder any surplus lubricant that may have been applied. It has been found good practice to again extract the piston and remove the surplus lubricant.

All stencil marks to be scraped off or painted over with black paint. The place of cleaning, day, month and year to be stenciled with white paint, preferably on both sides of the cylinder or auxiliary reservoir, or if same is not readily visible, in a convenient location near the handle of the release rod.

The bolts and nuts holding the cylinder and reservoir to their respective plates and the latter to the car, to be securely tightened.

The brake cylinder to be tested for leakage after cleaning, preferably with an air gauge, which can be done by attaching the gauge to the exhaust port of the triple valve before connecting the retainer pipe, or where the latest type retainers are used the gauge can be connected to the exhaust port of the retaining valve. In either case, the gauge will indicate cylinder leakage on releasing the triple valve after making an application, and when attached to the retainer valve it will also test the retainer and retaining-valve pipe.

Brake-cylinder leakage should not exceed five pounds per minute, from an initial pressure of fifty pounds.

Each time the triple valve and the brake cylinder are cleaned, the brake pipe, brake-pipe strainer and branch pipe should be thoroughly blown out and the triple-valve strainer cleaned before recoupling the branch pipe to the triple valve. If a dirt collector is used, the plug should be removed, the accumulation blown out and the threaded portion of the plug coated with oil and graphite before replacing.

All union gaskets should be made of oil-tanned leather. The use of rubber in unions should not be permitted.

Piston travel should be adjusted to not less than 5½ nor more than 7 inches.

ADDITIONAL INSPECTION AND REPAIRS TO CARS.

When the brake cylinder and triple valve are cleaned, the following additional work should be done to the car:

Retaining valve cleaned by removing the cap, wiping or blowing out all dirt and seeing that the valve and its seat are in good condition, the retaining position exhaust port open and that the valve proper is well secured to the car in a vertical position, pipe clamps applied where missing and tightened where loose, hose and angle cocks turned to their proper position. Pipe joints, air hose, release valves, angle and stop cocks should be tested by painting the parts with soapsuds while under an air pressure of not less than 70 pounds, preferably 80 pounds, and defective parts repaired or removed.

See that there are no broken or missing brake shoes, brake beams or foundation brake gear, and if the car belongs to a foreign road, a repair card should be made out covering all work that has been done and attached to the car, as per M. C. B. Rules.

The inspection and repairs which have been mentioned should be made to all cars at least once in twelve months.

TRIPLE-VALVE TESTS AND INSTRUCTIONS FOR OPERATING TRIPLE-VALVE TEST RACK.

Mounting Triple Valves for Testing.

With the triple-valve gasket applied to the face of the triple-valve flange, place the latter against the face of the stand in a vertical position and open cock "X," as shown on the piping diagram. Connect the brake pipe to the triple, then open cock "Z."

Before attaching triple valves suitable for use with 8-inch brake cylinders, insert in the auxiliary reservoir end of the valve the friction-increaser extension piece, suitable for the valve under test.

Two triple-valve stand face plates are required for each test rack to permit the testing of all types of freight triple valves.

If it is found necessary to repeat any test which has necessitated a reduction of auxiliary reservoir pressure, valve "B" may be moved to position No. 2, which provides a by-pass around the triple valve from the brake pipe to the auxiliary reservoir, thereby permitting a quick recharge.

Test No. 1.—Charging Test for Triple Valves.

Commencing the tests with cocks 2, 3, 7 and 9 open, all other numbered cocks closed, valve "B" in position No. 3 (lap), valve "A" in position No. 1, auxiliary reservoir empty and main reservoir pressure 80 pounds pressure, proceed as follows:

Close cock No. 7 and open No. 1, and with 80 pounds pressure in the brake pipe note the time required to charge the auxiliary reservoir to specified pressure, as given in the following table:

(NOTE.—If, during this test or Test No. 2 (Leakage Test), any considerable leakage is discovered, the charging test must be repeated.)

With brake-pipe pressure maintained at 80 pounds, the triple valves should charge the auxiliary reservoir as follows:

Charging Auxiliary Reservoir.

Westinghouse Triple Valve.	From 0 to 30 Lbs. Seconds.		From 0 to 70 Lbs. Seconds.	
	Min.	Max.	Min.	Max.
8-inch non-quick service......	21	28	58	78
10-inch non-quick service......	13	17	34	44
8-inch quick service..........	32	42	100	120
10-inch quick service..........	19	24	60	72

New York Triple Valve.	From 0 to 30 Lbs. Seconds. Min.	Max.	From 0 to 70 Lbs. Seconds. Min.	Max.
18-inch non-quick service......	..	..	61	82
80-inch non-quick service......	..	..	46	61
1-inch quick service..........	..	..	100	120
0-inch quick service..........	..	..	65	80

These tests give practically the same results, and the time of charging from 0 to 30 pounds is given simply to save time in making the test.

Test No. 2.—Leakage Test.

Commencing each of the sections of Test No. 2 with cocks 1, 2, 3 and 9 open, all other numbered cocks closed, valve "B" in position No. 3 (lap), valve "A" in position No. 1 and auxiliary reservoir charged to 80 pounds, proceed as follows:

Sec. "A," Test No. 2.—Westinghouse Triple Valves and New York Quick-service Triple Valves. Leakage at Exhaust in Emergency. Check Valve and Cylinder-cap Gasket Leakage.

Operate the triple valve two or three times in quick action by closing and opening cock No. 1; finally leaving it closed.

Coat the exhaust port of triple valve with soapsuds to ascertain if leakage exists past the slide valve or bushing to the exhaust with the piston and slide valve in emergency position.

Close cocks 2 and 3 and note the rate of fall of pressure indicated by the brake-cylinder gauge hand, which is now connected only with the small volume between cocks 2 and 3 and the triple valve. A leakage greater than 5 pounds in 10 seconds indicates either excessive check-valve leakage or that the piston does not seal against the cylinder-cap gasket.

At the completion of this test, open cocks 2 and 3 in the order given.

Sec. "B," Test No. 2.—Leakage at Exhaust in Release Slide Valve of Emergency-valve Leaking.

Open cock 1, and after the brake-cylinder pressure is exhausted close cock 3 and again coat the exhaust port with soapsuds to determine if there is any leakage from the auxiliary reservoir to the brake cylinder past the slide valve when the triple valve is in release position, or from the brake pipe to the brake cylinder past the emergency valve or its seat, when the differential on the emergency valve is high. Open cock 3, then paint the body of the triple valve with soapsuds to determine if leakage exists direct to the atmosphere through castings or gaskets.

If leakage is discovered at the triple exhaust in release position, determine if it is from the auxiliary reservoir or brake pipe in the following manner:

Move valve "A" to position No. 8 and open cock 7 until the brake pipe and auxiliary reservoir are empty; then with the valve "J" in position No. 3, place a soap bubble on the exhaust port and place valve "A" in position No. 2. If no leakage is found at the exhaust, advance valve "J" by stages from position to position until a brake-pipe pressure of 10 pounds is obtained. Any leakage from the exhaust while the auxiliary reservoir is without pressure must be from the brake pipe, past the emergency valve. Therefore, if no exhaust leakage is found and leakage did exist while the auxiliary reservoir was charged, it indicates defective slide valve. At the completion of this test, close cock No. 7 and move valve "A" to position No. 1, recharging auxiliary reservoir.

Sec. "C," Test No. 2.—Graduating-valve Leakage.

Move valve "A" to position No. 7 until a brake-cylinder pressure of from 20 to 30 pounds is obtained. Then return valve "A" to position No. 3 and close cock 3. If the brake-cylinder pressure then increases without leakage at the exhaust port, it is proper to assume that the graduating valve is leaking, providing it has been determined by the preceding tests that the emergency valve is tight. If leakage at the exhaust occurs during this test, which will be determined by placing a soap bubble on the exhaust, the leakage may be either from slide valve or graduating valve. The rate of rise of pressure on the brake-cylinder gauge, resulting from graduating-valve leakage, must not exceed 5 pounds in 20 seconds. This comparatively rapid rate of rise is permissible owing to the extremely small volume of the section of brake-cylinder pipe into which the leakage is occurring.

At the completion of test, open cock 3 and move valve "A" to position No. 1.

Sec. "A," Test No. 2.—Non-quick Service. New York Triple Valve Leakage at Exhaust in Emergency. Check-valve, Quick-action Valve and Cylinder-cap Gasket Leakage.

Operate the triple valve two or three times in quick action by closing and opening cock 1, finally leaving it closed.

Coat the exhaust port of triple valve with soapsuds to ascertain if leakage exists past the exhaust valve or bushing, with the piston and slide valve in emergency position. Close cocks 2 and 3. If the brake-cylinder gauge now indicates leakage greater than 5 pounds in 10 seconds the leakage is excessive, and is usually due to imperfect seating of the check valve or quick-action valve, or to the main piston not making a tight joint on the main cylinder gasket. To locate the defect, place soap bubbles on the vent ports. No leakage at these points indicates that the leakage is past the main cylinder gasket. If leakage is found at the vent ports, open cocks 1; 2 and 3 and recharge the auxiliary reservoir to 80 pounds, then move valve "A" to position No. 7 until the brake-pipe pressure is reduced 10 pounds and return valve "A" to position No. 3. Close cock 2, and if the quick-action valve is leaking the brake will immediately release. If it does not, the leakage is past the check valve.

At the completion of this test, if no leakage is found, open cocks 1, 2 and 3, and if leakage is discovered open cock 2 and move valve "A" to position No. 1.

Sec. "B," Test No. 2.—Exhaust-valve Leakage in Release; also Vent-valve and Quick-action Valve Leakage.

Close cock 3 and coat the exhaust port with soapsuds to determine if there is any leakage from the auxiliary reservoir past the exhaust valve, or graduating valve or triples having this valve tandem with the exhaust valve, when the triple is in release position. If exhaust leakage is found, and the triple under test has tandem exhaust and graduating valves, determine which valve is leaking by making graduating-valve leakage test.

Sec. "C," Test No. 2.—Graduating-valve Leakage.

Move valve "A" to position No. 7 until a brake-cylinder pressure of from 20 to 30 pounds is obtained. Then return valve "A" to position No. 3 and close cock 3. If the brake-cylinder pressure then increases without leakage at the exhaust port, it is proper to assume that the graduating valve is leaking. The rate of rise of pressure on the brake-cylinder gauge, resulting from graduating-valve leakage, must not exceed 5 pounds in 20 seconds. This comparatively rapid rise is permissible owing to the extremely small volume of the section of brake-cylinder pipe into which the leakage is occurring.

If leakage at the exhaust occurs during this test, which will be determined by placing a soap bubble on the exhaust, the leakage is by the exhaust valve instead of the graduating valve.

At the completion of the test open cock 3 and move valve "A" to position No. 1.

Test No. 3.—Test of Type "K" Triple Valves for Retarded-release Feature; for Both Westinghouse and New York Triple Valves.

Commencing the test with cocks 1, 2, 3 and 9 open, all other numbered cocks closed, auxiliary reservoir changed to 80 pounds, valve "B" in position No. 3 (lap), lever "D" in position No. 2 and valve "A" in position No. 3 (lap), proceed as follows:

Move valve "A" to position No. 7 until brake-pipe pressure is reduced 20 pounds, then return it to position No. 3; place valve "J" in position No. 4; valve "B" in position No. 1 and valve "A" in position No. 2. This should move the triple-valve parts to normal (full release) position.

If the triple valve moves to retarded-release position, which is indicated by a contracted exhaust and slow release of brake-cylinder pressure, it indicates a weak or broken retarded-release spring, or undue friction in the retarding device.

Following this test, recharge the system to 80 pounds by moving valve "A" to position No. 1 and valve "B" to position No. 2.

When the brake pipe and auxiliary reservoir are charged to 80 pounds move valve "A" to position No. 7 until brake-pipe pressure is reduced 20 pounds, then return it to position No. 3. Place valve "J" in notch No. 8, lever "D" in notch No. 4, valve "B" in position No. 1 and valve "A" in position No. 2.

Under these conditions the triple-valve piston and slide valve should be forced to retarded-release position. If this does not occur it indicates that the retarded-release spring is not standard, or the retarding devices have excessive friction. Completing test, place valve "B" in position 3 and valve "A" in position 1.

Sec. "A," Test No. 4.—Application Test for Both Westinghouse and New York Triple Valves.

If for any reason it is desired to make this test following an application and release produced by closing and opening cock 1, or the auxiliary reservoir has just been charged by opening cock 1, this test should be preceded by an application and release with valve "A," for the purpose of insuring the slide valve being in its normal position.

Commencing the test with cocks 1, 2, 3 and 9 open, all other numbered cocks closed, valve "A" in position No. 1, valve "B" in position No. 2 and lever "D" in notch 3, then with the auxiliary reservoir charged to 80 pounds, proceed as follows:

To test triple valves for 8-inch cylinder, place valve "B" in position No. 4 and valve "A" in position No. 5.

To test triple valves for 10-inch cylinder, place valve "B" in position No. 4 and valve "A" in position No. 6.

In all of these tests the triple valve should move to application position without causing a discharge of air from the vent port of valve "B."

A failure to apply under the conditions specified indicates either excessive friction, which will be shown by an exhaust from the vent port or valve "B"; a leaky packing ring, which will be discovered later by the packing-ring leakage test; too large a feed groove in the cylinder, or a combination of two or more of these defects. Should the triple valve fail to apply and no exhaust occur from valve "B," the indications are that the back flow of air from the auxiliary reservoir to the brake-pipe is too rapid to permit the required differential.

At the completion of this test move valve "B" to position No. 3 and valve "A" to position No. 1.

Sec. "B."—Quick-service Test (for Quick-service Triple Valves Only) for Both Westinghouse and New York Triple Valves.

Commencing the test with cocks 1, 2, 3 and 9 open, all other numbered cocks closed, valve "A" in position No. 1, valve "B" in position No. 3 and auxiliary reservoir charged to 80 pounds, proceed as follows:

Close cock 9 and move valve "A" to position No. 7 for all 8-inch and 10-inch triple valves. The brake-cylinder pressure obtained should not be less than 5 pounds greater than that which will be obtained by subjecting to the same test triple valves which do not contain the quick-service features.

At the completion of this test move valve "A" to position No. 1 and open cock 9.

Test No. 5.—Packing-ring Leakage Test for Both Westinghouse and New York Triples.

Release Test, Sec. 1.—Commencing with cocks 1, 2, 3 and 9 open, all other numbered cocks closed, valve "A" in position No. 1, valve "B" in position No. 3 and the auxiliary reservoir charged to 80 pounds, proceed as follows:

Place the valve "A" in position No. 7 until the brake-pipe pressure is reduced 15 pounds, then return to position No. 3 (lap). Place valve "J" in position No. 2, lever "D" in notch No. 1 and valve "B" in position No. 1; close cocks 2 and 3 and move valve "A" to position No. 2. If the discharge does not occur promptly from the vent port of valve "B," advance valve "J" from position to position until the discharge begins, then note the rate of increase of pressure on the auxiliary reservoir gauge, which must not exceed 5 pounds in 30 seconds.

During this test there must be a steady exhaust of air from the vent port of valve "B" to insure the proper differential being maintained on the triple-valve piston. If, in making this test, the triple valve for the 8-inch cylinder releases or indicates excessive ring leakage, make another test, beginning with moving handle "R" to the right after making the proper brake-pipe reduction and before starting to increase the brake-pipe pressure. Immediately after the test is completed, handle "R" should return to its normal left position.

Should it occur that the friction of the triple valves for the 10-inch brake cylinder is so low as to continue to permit the triple to release, the reduction for the application may be changed from 15 to 10 pounds. When this is done, special attention should be given to determine if the graduating valve is right, as it must be, to permit an accurate test.

At the completion of this test place valve "B" in position No. 3, open cocks 2 and 3 and place valve "A" in position No. 1.

Test No. 6, Sec. 2.—Friction Test. Release Test for Both Westinghouse and New York Valves.

Commencing the test with cocks 1, 2, 3 and 9 open and all other numbered cocks closed, valve "A" in position No. 1, valve "B" in position No. 3, auxiliary reservoir charged to 80 pounds.

Place lever "D" in notch 3 for all triple valves undergoing the test; proceed as follows:

Place valve "A" in position No. 7 until the brake-pipe pressure is reduced 10 pounds, then return it to position No. 3. Place valve "J" in position No. 1, valve "B" in position No. 1, and move valve "A" to position No. 2. Under these conditions the triple valve should release. A failure to release should be accompanied by a discharge at the vent port of valve "B," which indicates that the frictional resistance to the movement of the packing ring and slide valve is excessive.

If the triple valve docs not release and valve "B" fails to open its exhaust, leakage is occurring from the brake pipe, which will necessitate advancing valve "J" from position to position, remaining in each position 30 seconds, until the triple valve releases or the exhaust in valve "B" opens.

At the completion of the test place valve "B" in position No. 3 and valve "A" in position No. 1.

Test No. 7, Sec. "A."—Service-port Capacity Test for Westinghouse Triple Valves and Quick-service New York Triple Valves.

Commencing with cocks 1, 2, 3, 4 and 9 open, valve "A" in position No. 1, valve "B" in position No. 3, place valve "C" in position required for the triple valve under test, as indicated:

Notch No. 1.—For 8-inch triple valves.

Notch No. 2.—For 10-inch triple valves.

During this test the brake-pipe pressure should not drop, except that in the case of the quick-service triple valves there will, of necessity, be a slight drop, which must not exceed 2 pounds.

Place valve "B" in position No. 2 and move valve "A" to position No. 3, open cock 7 until brake-pipe and auxiliary-reservoir pressures are reduced to 50 pounds, then close cock 7. Move valve "B" to position No. 3 and open combination cock 6 and quick-opening valve, leaving it open 3 seconds. This test should not produce quick action. If it does, it indicates a restriction in the service port, or a weak or graduating spring.

Sec. B.—Duplicate the tests specified under Sec. A, placing the wheel of valve "C" in the position as indicated.

Notch No. 3.—For 8-inch triple valves.

Notch No. 5.—For 10-inch triple valves, excepting Westinghouse non-quick service, with which use notch 7.

This should result in the triple valve moving to emergency position. Failure to do so indicates too close a fit of the emergency piston.

At the completion of the test close cock 4 and combination cock 6 and quick-opening valve, move valve "A" to position No. 1.

Test No. 7, Sec. "A."—Service-port Capacity Test for New York Non-quick Service Triple Valves.

Commencing with cocks 1, 2, 3, 4 and 9 open, valve "A" in position No. 1, valve "B" in position No. 3, place valve "C" in position required for the triple valve under test, as indicated.

Notch No. 1.—For 8-inch triple valves.

Notch No. 2.—For 10-inch triple valves.

Place valve "B" in position No. 2 and move valve "A" to position No. 3. Open cock 7 until brake pipe and auxiliary reservoir pressure are reduced to 50 pounds, then move valve "B" to position No. 3 and open cock 6 quickly.

Note.—During this test the triple valve should move to service position, the brake-pipe pressure must not drop and there must be no discharge of air from the vent ports.

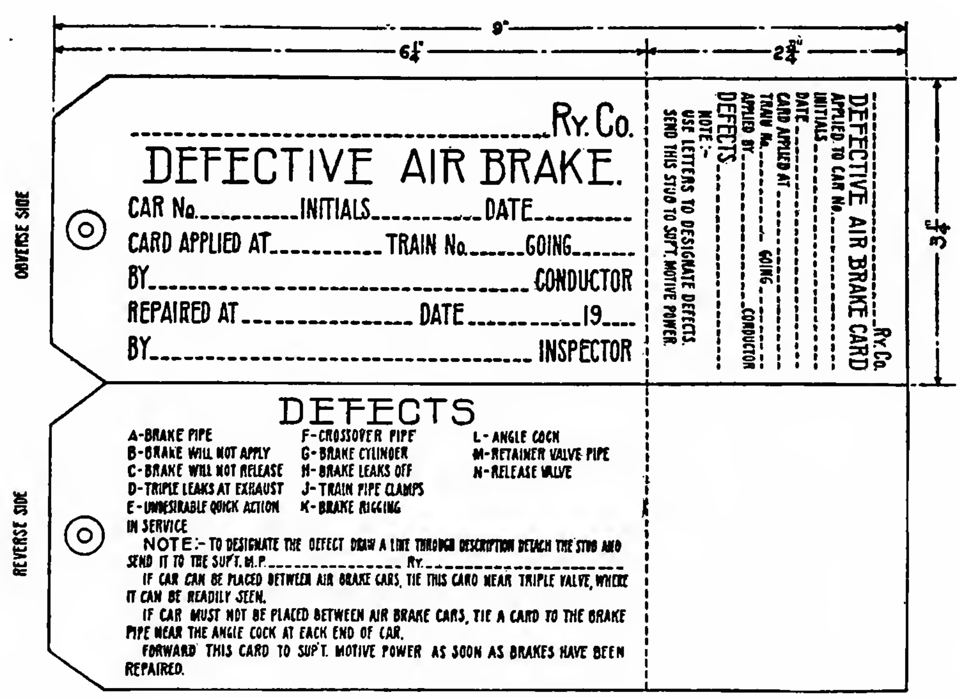
Should the triple valve move to emergency position, it indicates a restriction in the service ports or a weak vent-valve spring.

Sec. B.—Duplicate the test specified under Sec. A, placing the wheel of valve "C" in the position as indicated for the triple valve under test.

Notch No. 3.—For 8-inch triple valves.

Notch No. 5.—For 10-inch triple valves.

This should result in the triple valve moving to emergency position, causing a strong blast of air from the vent ports and a brake-pipe reduction of at least 3 pounds. Failure to do so indicates a too loose fit of the vent-valve piston packing.



Air Brake Cut-Out and Defect Card (M. C. B. Recommended Practice). See Air Brake Defect Card.

Air Brake Defect Card (M. C. B. Standard). In 1894 a Recommended Practice was adopted to use an air-brake repair card to report to division terminals such defects as are found by trainmen which require brake to be cut out. This was revised in 1898, and is now, as shown in the illustration, to be attached as near to the car number as possible.

In 1902 this was made a Standard of the Association.

In 1903 letters were substituted for figures to indicate the various defects.

In 1911 a revised defective air brake card was adopted and the use of the card defined as follows:

If car can be placed between air brake cars, wire this card near triple valve where it can be readily seen.

If car must not be placed between air brake cars, wire card to brake-pipe near angle cock at each end of car.

The color of defective air brake card to be red.

The size of defective air brake card to be 3¼ by 9 inches, including the stub, which is 3¼ by 2¾ inches.

Card to be fitted with eyelet, as shown, and each card supplied with suitable wire for attaching to car.

Air Brake Hose. Laminated rubber and canvas tubing which is attached to a nipple that screws in the angle cock at the end of the brake pipe. The other end of the hose is fitted with a coupling which engages with a similar coupling on the adjoining car and thus forms a flexible connection between the brake pipes of the two cars through which the compressed air for operating the brakes is conducted. See ARMORED BRAKE HOSE.

Air Brake Hose Clamp. See HOSE CLAMP.

Air Brake Hose Coupling. Figs. 1306-1311, 1344. A contrivance for coupling or connecting the ends of a pair of brake hose together, so that the air by which the brakes are operated can pass from one vehicle in a train to another. The couplings for train air signal apparatus are similar to brake hose couplings, but are arranged so that they will not couple to the latter.

Air Brake Hose Coupling Case. A hollow casting which joins the main part of a coupling to which the hose is attached.

Air Brake Hose Coupling and Ring (M. C. B. Standard). Fig. 2704. In 1911 standard dimensions and contour for air brake hose couplings and packing rings were adopted.

Air Brake Hose Label (M. C. B. Standard). Fig. 2704. In 1902 the label for hose, as shown, was made a standard. Revised in 1903, 1911 and 1912. The specification for its use is as follows:

Each length of hose must have vulcanized to it a standard air brake hose label of white or red rubber as shown. The following information must be branded on the label: On the top of the badge the initials or name of road or purchaser and the size, 1⅜ inches; on the bottom the name of manufacturer; on the left-hand end the month and year of manufacture; on the right-hand end the serial number and 2 inches removed therefrom a separate badge consisting of a band 1 inch wide encircling the hose and bearing in triplicate the letters "M. C. B. Std."; in the center field the letters "A" and "R" and the numerals for the month to show the date of application and removal. These letters must be clear and distinct, not less than ¼ inch in height, excepting name of manufacturer, which must not be less than ⅛ inch in height and stand in relief not less than 1/32 inch.

Letters and figures covering the application and removal of the hose must be so applied that they can be removed by cutting without endangering the cover.

Dimensions of label to be 3 9/16 by 2½ inches, as shown on the illustration, also a band 1 inch wide encircling the hose 2 inches to the right. Extensions may be made on right-hand end.

Air Brake Hose Label, Location of (M. C. B. Recommended Practice). In 1911 a recommended practice that air-brake hose should be so mounted that the label will show toward the side of car in such a position that the car inspector can readily read it.

In 1912 the drawing showing position of air brake hose label on mounted hose was altered to correspond with the new design of hose label. See Fig 2764.

Air Brake Hose Nipple. Figs. 1307, 1341. A short metal tube fitting into the end of the brake hose and fastened by a suitable clamp and screws. One end is threaded and screws into the angle cock.

Air Brake Hose Specifications (M. C. B. Standard).

In 1901 specifications and tests for air brake hose were adopted as Recommended Practice. Advanced to Standard in 1903. Revised 1905.

In 1911 detailed specifications of label were placed under the heading "Label for Air Brake Hose."

1. All air brake hose must be soft and pliable, and not less than two-ply nor more than four-ply. They must be made of rubber and cotton fabric, each of the best of its kind made for the purpose. No rubber substitutes or short-fiber cotton to be used.

2. The tube must be hand-made, composed of three calendars of rubber. It must be free from holes and imperfections, and in joining must be so firmly united to the cotton fabric that it can not be separated without breaking or splitting the tube. The tube must be of such composition and so cured as to successfully meet the requirements of the stretching test given below; the tube to be not less than 3/32 inch thick at any point.

3. The canvas or woven fabric used as wrapping for the hose to be made of long-fiber cotton, loosely woven, and to be from 38 to 40 inches wide, and to weigh not less than 20 and 22 ounces per yard, respectively. The wrapping must be frictioned on both sides, and must have, in addition, a distinct coating or layer of gum between each ply of wrapping. The canvas wrapping must be applied on the bias. Woven or braided covering should be so loose in texture that the rubber on either side will be firmly united.

4. The cover must be of the same quality of gum as the tube, and must not be less than 1/16 inch thick.

5. Hose is to be furnished in 22-inch lengths. Variations exceeding ¼ inch in length will not be permitted. Rubber caps not less than 1/16 inch nor more than ⅛ inch must be vulcanized on each end.

6. The inside diameter of hose must not be less than 1⅜ inches nor more than 1 7/16 inches, nor must the outside diameter exceed 2⅛ inches. Hose must be smooth and regular in size throughout its entire length, except at a point 2½ inches from either end, where the inside calendar of rubber may be increased 1/16 inch for the distance of ¼ inch toward either end and then tapering to the regular diameter.

7. Each length of hose must have vulcanized on it the label for air brake hose of white or red rubber, as shown under the specifications for "Label for Air Brake Hose." Each lot of two hundred or less must bear the manufacturer's serial number, commencing at one on the first of the year and continuing consecutively until the end of the year. For each lot of two hundred, one extra hose must be furnished free of cost.

8. Test hose will be subject to the following tests:

BURSTING TEST.

The hose selected for test will have a section five (5) inches long cut from one end and the remaining seventeen (17) inches will then be subjected to a hydraulic pressure of 100 pounds per square inch, under which pressure it must not expand more than ¼ inch nor develop any small leaks or defects. The section will then be subjected to a hydraulic pressure of 400 pounds per square inch for ten minutes, without bursting.

FRICTION TEST.

A section one (1) inch long will be taken from the five (5) inch piece previously cut off, and the quality determined by suspending a 20-pound weight to the separated end, the force being applied radially, and the time of unwinding must not exceed eight (8) inches in ten minutes.

STRETCHING TEST.

Another section one (1) inch long will be cut from the balance of the five (5) inch piece, and the rubber tube or lining will be separated from the ply and cut at the lap. Marks two inches apart will be placed on this section, and then the section will be quickly stretched until the marks are eight (8) inches apart and immediately released. The section will then be remarked as at first and stretched to eight (8) inches and will remain so stretched ten (10) minutes. It will then be released, and ten (10) minutes later the distance between the marks last applied will be measured. In no case must the test piece break or show a permanent elongation of more than ¼ inch between the marks last applied. Small strips taken from the cover or friction will be subjected to the same tests.

9. If the test hose fails to meet the required tests, the lot from which it was taken may be rejected without further examination and returned to the manufacturer, who shall pay the freight charges in both directions. If the test hose is satisfactory the entire lot will be examined, and those complying with the specifications will be accepted.

SPECIFICATIONS AND TESTS FOR WOVEN AND COMBINATION WOVEN AND WRAPPED AIR BRAKE HOSE.

In 1907 the following specifications were adopted for Woven and Combination Woven and Wrapped Air Brake Hose, as Recommended Practice. In 1908 they were advanced to Standard. In 1911 detailed specifications for label were placed under the heading "Label for Air Brake Hose."

All air-brake hose under this specification is to consist of not less than three plies of woven, braided or knitted fabric, or of two or more plies of canvas wrapping surrounded by at least one ply of woven, knitted or braided fabric. The hose should be flexible without kinking easily. The rubber, fabric or duck should be the best of its kind made for the purpose, and no rubber substitute or short fiber fabric will be allowed.

The inner tubes should be composed of three calendars of rubber and not less than 3/32 inch thick at any point. Should a machine-made tube be used, it must not be less than ⅛ inch thick at any point. It must be free from holes and imperfections, and in joining it must be so firmly united to the cotton fabric that it can not be separated without breaking or splitting the tube. Each ply of the hose should be separated by a distinct layer of rubber, and over this is to be a cover 1/16 inch thick, and at each end a 1/16 inch cap should be vulcanized on, the cover and the cap to be of the same material as the inner tube.

The hose is to be furnished in 22-inch lengths, and variations exceeding ¼ inch from this length will not be permitted. The rubber caps at each end are not to be less than 1/16 inch nor more than ⅛ inch thick. The inside diameter of the hose must not be less than 1⅜ inches nor more than 1 7/16 inches, nor must the outside diameter be less than 2 1/32 inches nor greater than 2 3/32 inches. The hose must be smooth and regular in size throughout its entire length.

Each length of hose must have vulcanized on it the label for air-brake hose of white or red rubber, as shown under the specifications entitled "Label for Air Brake Hose."

Each lot of 200 or less must bear the manufacturer's serial number, commencing at "1" on the first of the year and continuing consecutively until the end of the year, and the serial number should not be duplicated, even though the hose bearing the original numbers be rejected. For each lot of 200, one extra hose must be furnished free of cost.

TESTS TO WHICH SAMPLES WILL BE SUBJECTED.

Bursting Test.—All hose selected for test will have a section 5 inches long cut from one end and the remaining 17 inches will then be subjected to a hydraulic bursting pressure of 400 pounds per square inch for ten minutes, which it must stand without failure. At a pressure of 100 pounds per square inch it must not expand more than ¼ inch in diameter or change in length more than ¼ inch, nor develop any small leaks or defects.

Friction Test.—A section 1 inch long will be taken from the 5-inch piece previously cut off, and the quality determined by suspending a 20-pound weight to the separated end, the force being applied radially, and the time of unwinding must not exceed 8 inches in ten minutes.

Stretching Test.—Another section 1 inch long will be cut from the balance of the 5-inch piece and the inner tube or lining will be separated from the ply and cut at the lap. Marks two inches apart will be placed on this section, and then the section will be quickly stretched until the marks are 8 inches apart and immediately released. The section will then be remarked as at first and stretched to 8 inches and will remain so stretched ten minutes. It will then be released and ten minutes later the distance between the marks last applied will be measured. In no case must the test piece break or show a permanent elongation of more than ¼ inch between the marks last applied. One-inch strips will also be taken from the cover and will be subjected to the same test.

Tensile Test.—Another section 1 inch long will be cut from the remainder of the 5-inch piece and the rubber tube or lining will be separated from the ply and cut at the lap. It will then be reduced in the middle for a distance of 2 inches by ½ inch wide parallel. The parallel section shall be spread to the full width of 1 inch at the end by curves of ½ inch radius. This specimen shall be stretched uniformly by gripping the enlarged ends, and in no case should the tensile strength per square inch be less than 400 pounds, nor the elongation at the time of failure less than 8 inches, measured by marks placed originally 2 inches apart before breaking.

If the test hose fails to meet the required tests the lot from which it was taken may be rejected without further examination and returned to the manufacturer, who shall pay the freight charge in both directions. If the test hose is satisfactory the entire lot will be examined and those complying with the specifications will be accepted.

Air Brake Inspection. See AIR BRAKE, CLEANING AND TESTING.

Air Brake Instruction Car. Figs. 214, 215 and 252. A car, usually a passenger equipment car, in which is mounted the apparatus necessary to illustrate and explain the construction and operation of the air brake. It is used for the instruction of railroad employees and is stationed at different points along the line for a week or two at a time. Regular classes are conducted and lectures given by the instructor in charge, who is usually provided with living quarters in the car. See CAR, M. C. B., Class I.

Air Brakes for Street Cars. See TRACTION AIR BRAKE.

Air Brake, Testing. See AIR BRAKE, CLEANING and TESTING.

Air Compressor. Figs. 1321-2; 1370-1. A motor driven air pump which supplies compressed air for operating the air brakes on electrically operated cars.

Air Compressor Cylinder (Motor Compressor). Fig. 1321. A hollow cast iron cylinder with a piston, which piston compresses the air required to operate the brakes. The pistons in the air cylinders are connected with connecting rods to a crank shaft geared to a small motor.

Air Compressor Cylinder Head (Motor Compressor). The cover for the lower end of the air cylinder of a motor driven air pump for an air brake.

Air Compressor Governor. Figs. 1330-32; 1335, 1368-9. An adjunct to the electrically driven air compressor, designed to open or close automatically the motor circuit when the air pressure in the reservoir exceeds or falls below certain predetermined limits; these limits are usually 95 and 80 pounds for automatic brake service and 65 and 50 pounds for straight-air brake equipments.

Air Compressor Governor Synchronizing System. Figs. 1318-1319.

An arrangement for insuring an equal division of work of furnishing compressed air for braking and other purposes among all the motor-driven air compressors in a train. The current supply to the motor of the motor-driven air compressor is controlled by a compressor switch operated by air pressure, as in the ordinary form of compressor governors, except that the cutting-in and cutting-out of this switch is controlled by the operation of a magnet valve. In addition, a master governor is used on each motor car or locomotive, similar in all respects to a compressor governor except that instead of controlling the current supplied to the motors of the motor-driven air compressors, it acts simply as a pilot or master switch to control the current to the magnets which operate the compressor switches. The magnets of the compressor switches are connected in parallel between the trolley (or positive battery terminal) and the synchronizing wire which runs the entire length of the train. The cutting-in of any master governor connects the synchronizing wire to ground (or negative battery terminal) and thereby operates all the compressor switch magnets. With all the compressors cut out and the pressures in the main reservoir line equalized, as soon as this pressure is decreased to a point at which any one of the master governor controlling mechanisms operates, the closing of this master governor switch supplies current to the magnets of each compressor switch in the train, causing them to operate so as to cut-in these switches and start all the compressors simultaneously. Whether one or more of the master governors cut-in at the same time is immaterial since the compressor will continue to operate and raise the pressure in the main reservoirs on each vehicle and in the main reservoir line throughout the train, until the controlling portion of the last master governor remaining cut-in operates to open the circuit to the compressor switch magnets, which causes all the compressor switches to cut out and stop the operation of all the compressors simultaneously. In this manner, all the compressors operate the same length of time, thus avoiding a condition in which some compressors are overworked while others are not working up to their full capacity.

Air Compressor Switch. See ELECTRO-PNEUMATIC COMPRESSOR SWITCH.

Air Connections. See STEAM AND AIR CONNECTIONS FOR PASSENGER EQUIPMENT CARS.

Air Gage (Air Brake). Fig. 1338. A gage to register the pressure of air in the reservoirs, brake pipe or brake cylinders, similar to an ordinary steam pressure gage. They are made either with a single pointer, or with two pointers, to indicate on one dial both the reservoir pressure and the brake pipe pressure. The latter type is called a duplex gage.

Air Gaps (Generators). The clearance between the body or iron core of the rotating armature and the stationary field poles or pieces of a generator. Small air gaps are beneficial in that they permit of smaller, lighter, slower speed and cheaper machines than is the case with large air gaps. On the other hand, the bearings of machines with small air gaps require closer attention and more frequent renewals and are more apt to give trouble at the commutators and brushes than machines with large air gaps.

Air Inlet. An opening for the admission of air to an air compressor or to a refrigerator car. The term includes both the air strainer and air pipe.

Air Pipe (Air Brake.) More properly brake pipe. Often called train pipe.

Air Pipe Strainer. See BRAKE PIPE AIR STRAINER.

Air Pump. See AIR COMPRESSOR.

Air Pump Governor. See AIR COMPRESSOR GOVERNOR.

Air Signal. See BACK-UP AIR SIGNAL, TRAIN AIR SIGNAL.

Air Signal Reducing Valve. See REDUCING VALVE.

Air Space (Refrigerator Cars). C, Figs. 374-75. A space left between the linings to aid in insulation. It is sometimes called dead air space in distinction from the ventilating passages, as the air in it is confined or dead and is not being constantly changed. Unless air is confined so that it does not continually change it is a poor insulator.

Air Strainer. See BRAKE PIPE AIR STRAINER.

Air Valve (Steam Heating). A small outlet valve which will pass air but not water, applied to the ends of storage heaters to allow the air to escape when the steam or hot water is turned on.

Aisle. The longitudinal passageway through a passenger car, between the seats.

Aisle Seat End. The end or arm of a transverse car seat next the aisle. See also WALL SEAT END.

Alcohol Burner. Fig. 849. Used for heating refrigerator or produce cars when transporting perishable products during cold weather.

Alcohol Stove. See STOVE.

Alcove. A recess. See WATER ALCOVE.

Alcove Faucet. A faucet in a water alcove connected with a water cooler to supply drinking water.

Alcove Lamp. A lamp placed in a recess in the side of a car. Also called Panel Lamp, as it is usually covered by a panel.

Alley Apartment. Fig. 256. A compartment in a passenger equipment car, reserved for mail, and serving the same purpose as a postal car on runs where an entire car is not required for mail. It occupies only a part of the width of the car and has an alley or passageway at one side.

Alleyway. More properly a corridor. A narrow passage at the side of staterooms or compartments in parlor or sleeping cars.

American Continuous Draft and Buffing Apparatus. An apparatus by which the drawbars at both ends of the car are connected by two rods with loops at the ends, that hook over the ends of a bar or key passing through the shank of each drawbar. Each car is in this manner pushed from the rear end and all the pull is transmitted through the train by the draft rods. It has two buffer springs and two follower plates at each end of the car. Not now used in new construction.

Ammeter. An instrument for measuring electric current in amperes.

Ampere. The unit of electric current.

Angle Cock (Air Brakes). Figs. 1301, 1341, 1355-6. A cock placed in the brake pipe under each end of the car just back of the hose connection. This must always be open except at the rear end of the last car, where it must always be closed to prevent escape of air from the brake line and setting of the brakes.

Angle Cock Holder. Figs. 1393, 1399, 1400. A clamp or bracket for securing the angle cock at the end of a car.

Angle Iron or **Angle.** A general term applied by makers to iron or steel rolled in the form of an L.

Angle Manifold (Car Heating). See Fig. 2086 for typical example.

Angle Valve. See Fig. 2039 for a special type used in car heating.

Anti-Friction Car Door Hanger. See DOOR HANGER.

Anti-Friction Center Plate. Devised to reduce the friction between the body and truck in curving. See ROLLER CENTER PLATE and BALL BEARING CENTER PLATE.

Anti-Friction Side Bearing. Devised to reduce the friction between body and truck in curving. See ROLLER SIDE BEARINGS, BALL BEARING SIDE BEARINGS, GRAVITY SIDE BEARINGS and ROCKER SIDE BEARING.

Anti-Slip Surface. See SAFETY TREAD.

Anti-Telescoping Device. Fig. 526. A type of end framing in which the end sill is greatly strengthened by an end sill stiffening plate, an end sill stiffening angle bar, corner angle posts, and end plate strengthening angles or knee irons. Its object is to prevent one car from entering or telescoping another in a collision. An anti-telescoping plate is intended for the same purpose. A device in use for this purpose on the New York subways has a corrugated face, into which the corresponding corrugations on the next car are forced.

Anti-Telescoping Plate. Fig. 526. See ANTI-TELESCOPING DEVICE.

Anvil (of Track Torpedoes). Interior pieces of iron placed directly over the fulminating powder to insure its ignition. Some track torpedoes have three anvils.

Arbor. "A spindle or axle for a wheel or pinion; a mandrel on which a ring or wheel is turned in a lathe."—Knight.

Arch (Elliptic Spring). The height from the center of the scrolls at the ends of the elliptics to the under side of the main leaf of the spring. Twice the arch of an elliptic spring, less the thickness of the spring bands, is the set and is the maximum amount which an elliptic spring can be compressed. In a half elliptic spring the arch and set differ only in the thickness of the spring band.

Arch Bars. 14 and 15, Fig. 945; Fig. 1086. The wrought iron or steel bars which form the top and bottom members of a diamond arch bar truck side frame. They are attached to the bolster guides or truck columns by column bolts and to the journal boxes by the journal box bolts. See also CENTER BEARING ARCH BAR.

Arch Bars, Column and Journal Box Bolts (M. C. B. Standard). Fig. 2703.

80,000-POUND CAPACITY CARS.—In 1897 a committee on this subject reported designs which were subsequently adopted by letter ballot as Recommended Practice.

In 1901 these were, by letter ballot, changed from Recommended Practice to Standard. Modified 1907.

In 1907 the following changes were made:

The journal bearing centers spaced to 5 feet 6 inches, the additional four inches being added to the total length.

The spacing of bends increased to 20-inch centers, and the horizontal distance between bends increased to 17½ inches.

The turned up lip on the ends of the tie bar was eliminated, the total length of tie bar remaining the same as arch bar, as follows: 78 inches over all.

The addition to the drawing of the following note:

A single nut with nut-lock or cotter may be used instead of double nuts.

Modified 1909.

100,000-POUND CAPACITY CARS.—In 1909 a design for arch bars, column and journal-box bolts for 100,000-pound capacity cars was adopted as standard.

Arch Plate (Wide Vestibule). 46 and 91, Figs. 552-555.

Arch Plate Band (Wide Vestibule). 49, Figs. 552-555.

Arch Rail (British). See END ARCH RAIL.

Arched Roof. Figs. 896, 908. A roof, the surface of which is curved, and which has no upper deck or clear story. It is sometimes used for passenger cars. See TURTLE BACK ROOF.

Argand Lamp. A lamp invented by Argand, a native of Geneva, about the year 1784. The burner consists of two concentric cylindrical tubes in which is the annular wick. The tube inclosing the wick is closed at the bottom and communicates by a pipe with the oil reservoir. The interior tube being open, free access of air is allowed to the interior and exterior of the flame, insuring more perfect and equal combustion. Some gas lamps are constructed on this principle.

Arm Cap. A metal plate, wooden cap, or piece of upholstery with which the top of a seat end, arm rest or chair arm is covered.

Arm Holder (British). See ARM SLING.

Arm Pivot. See SEAT ARM PIVOT.

Arm Rest. A wooden or metal bar or ledge attached to the side of a car, and not, like an arm cap, to the top of a seat end, for passengers to rest their arms on.

Arm Rest Bracket. See ARM REST. A bracket supporting the arm rest.

Armature. Fig. 2313. The rotating part of a motor or dynamo. It consists of a laminated iron cylinder or core keyed to a shaft, and in the slots of which are wound the armature coils of insulated copper wire or ribbon. At one end of the core on the shaft is mounted the commutator, a copper cylinder composed of insulated segments, which are connected to corresponding armature coils.

Armature Spider (Electric Motor). Fig. 2534. A skeleton center fastened to the armature shaft and surrounded by the laminated iron core in which the armature coils are imbedded.

Armored Brake Hose. Fig. 1390. Brake hose covered with a woven wire fabric, steel, or other material, to protect it from injury or abrasion. Vacuum brake hose, for vacuum brakes, is usually lined with coiled wires on the inside to prevent collapsing, but such is not properly termed an armored brake hose. The M. C. B. standard brake hose is not armored.

Asbestos Felt. A preparation of asbestos in loose sheets similar to felt, for use as a non-conductor. It is largely used in refrigerator cars and is manufactured for that purpose in rolls about 42 in. wide, and weighs about 1 lb. per square yard. It must be handled with care to prevent tearing.

Asbestos Protected Metal. A material for use as roofing, side walls, partitions and ceilings in buildings; also for inside box car roofs, passenger car and locomotive cab roofs, head linings and interior finish for passenger cars.

Ash Receiver. Figs. 1880-1.

Asphalt Car Roofing. A saturated and coated felt applied in sheets.

Atmospheric Brake. See AIR BRAKE, VACUUM BRAKE. This term, but little used, includes both the air brake and the vacuum brake.

Automatic Air Brake. An air brake system with which the brake will be applied automatically in case of an accident which permits air to escape from the system. To accomplish this there is added to each vehicle equipped with the STRAIGHT AIR BRAKE (1) a reservoir called an auxiliary reservoir, in which a supply of compressed air is stored sufficient to operate the brake on that vehicle; (2) a device called a triple valve to which the brake pipe, auxiliary reservoir and brake cylinder are all connected. The brake is applied by reducing the pressure in the brake pipe below that in the auxiliary reservoirs. Such a reduction is caused by an opening made from the brake pipe, or its connections, to the atmosphere, and may be intentional, as when the engineer opens the brake pipe to the atmosphere through the brake valve, or accidental, as in case of a burst hose or broken pipe. The reduction in brake pipe pressure thus made destroys the equality of brake pipe and auxiliary reservoir pressures, which existed when the brake system was fully charged, and the auxiliary reservoir pressure, which is then higher than that in the brake pipe, causes the triple valve on each car to operate so as to apply the brakes by admitting compressed air from the auxiliary reservoir to the brake cylinder, where it exerts its pressure on a piston, pushing it outward and thus applying the brakes. The brake is released by admitting compressed air from the main reservoir on the locomotive through the brake valve into the brake pipe, thus increasing its pressure above that remaining in the auxiliary reservoir. This causes the triple valve parts to return to their original positions, again opening communication from the brake pipe to the auxiliary reservoir to recharge the latter and making a connection through which the compressed air in the brake cylinder escapes to the atmosphere, thus permitting the release spring in the brake cylinder to return the piston to its former position, thereby releasing the brakes.

Automatic Car Coupler (M. C. B. Standard). Fig. 2713. A form adopted as standard in 1887. Further details adopted in 1889 and 1893. Action of the Association in 1889 permits the use of a coupler 28 inches long instead of 30 inches, for use only on cars already in service and requiring such length coupler.

In 1909 a note was added that "The dimensions from the back of butt to inside face of knuckle be 30½ inches."

Automatic Car Coupler (M. C. B. Recommended Practice). Area of Lock-Bearing Surface on Tail of Coupler Knuckle. In 1910 a recommended practice was adopted that the minimum effective area of lock-bearing surface on knuckle tail shall not be less than 4 square inches.

Area of Bearing Surface of Lock on Coupler Wall. In 1910 a recommended practice was adopted that the effective area of bearing surface between the lock block and coupler wall shall be equal to or greater than the effective area of lock-block bearing on knuckle tail.

Automatic Car Coupler (Miscellaneous M. C. B. Standards). Figs. 2711, 2713.

SIDE CLEARANCE.—In 1889 the Association decided that the opening in carrier iron, where coupler enters, should be 5¾ inches vertically and 5½ inches horizontally.

Drawing revised in 1896.

The revision made in 1896 consisted in the elimination of the carrier iron from the drawing.

In 1899 the play of the shank of the coupler in the carry arm was changed to not less than ½ inch on each side.

In 1905 the total coupler side clearance was increased to 2½ inches.

In 1907 was modified to read: "That the total side clearance of the coupler be not less than 2½ inches," and adopted as standard. In 1909 was modified to read: "Total side clearance of coupler to be 2½ inches."

COUPLER YOKES.—In 1905 coupler yokes were adopted as Recommended Practice.

In 1907 the opening between the gibs of the yoke for 9⅛-inch butt coupler was made 6¾ inches instead of 7¾ inches, in order to increase the bearing of the present yoke on the coupler butt.

In 1909 a 1/8-inch radius was added to the inside of yoke lip. Advanced to Standard 1911.

Yoke Rivets.—In 1905 the use of 1 1/4-inch rivets for attaching yokes to coupler butts was adopted as Recommended Practice. Advanced to Standard in 1908.

In 1908 the diameter of rivet holes in coupler butts was changed from 1 3-16 inches to 1 5-16 inches.

Lock Set.—In 1903 a recommendation was made that for new equipment purchased after January 1, 1904, only such couplers as have a lock set on or within the head and which do not depend upon the uncoupling lever to hold up the lock should be specified. By letter ballot this was adopted as a standard.

Coupler Shank.—In 1901 a design of shank 5 by 7 inches back of the head was adopted as standard.

In 1905 an additional dimension "Not less than 20 3/4 inches" was added to plan view of 5 by 7 inch coupler to definitely locate the point at which shank shall measure 7 inches. Also the note, "Tail end for Continuous Draft," under the drawing of slotted-tail coupler, was omitted as being unsuited for present approved practice.

In 1907 a note was added to the effect that there should be no projections on the bottom of the shank from the line of the horn back for 12 inches, to provide for proper movement of shank on carrier iron.

In 1911 the clear surface without projection on bottom of coupler shank was increased 1/2 inch forward toward head of coupler.

Coupler Butt.—In 1905 a butt 5 by 5 1/2 by 9 1/8 inches for friction draft gear was adopted as recommended practice. Advanced to standard in 1907.

In 1907 the back wall of butt was changed to 3/4 inch thick, owing to the fact that the tail pin had fallen into disuse.

The width of butt was changed to 5 inches on both sizes of coupler shanks to properly provide for securing yokes.

A dimension of not less than 1 1/4 inches was shown for the yoke gib shoulder of the 9 1/8-inch butt to provide for the increased length of gib.

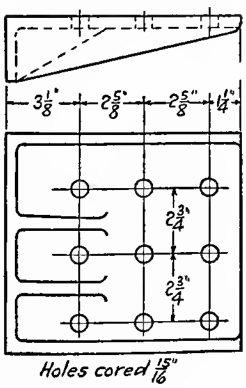
In 1909 a radius of 3-16 inch on the yoke gib shoulder of coupler butt was adopted.

Key Slot.—In 1910 the key-slot dimensions in the coupler butt were modified, making it available for use on all standard sizes of coupler butts.

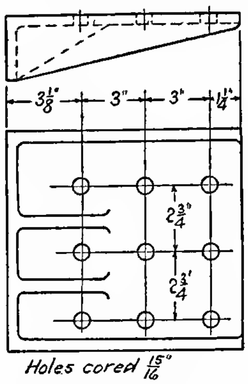
In 1910 a recommendation was adopted that coupler manufacturers use a key 5 by 1 1/8 inches as a gage in order to secure correctness and uniformity in the size of the key slot.

In 1911 design of key slot in coupler shank was changed.

Front and Back Stop.—In 1905, that front and back stops with rivet holes 15-16 inch in diameter be spaced,



Holes cored 15/16"



Holes cored 15/16"

as shown herewith, was adopted as recommended practice. Advanced to standard in 1907.

Spacing Between Coupler Horn and Buffer Beam.—In 1905, that the spacing between coupler horn and buffer beam be 1 3/4 inches for all spring gear, and 2 3/4 inches for all friction gear, was adopted as recommended practice. Advanced to standard in 1907.

Automatic Car Coupler Contour Line and Limit Gages (M. C. B. Standard). Figs. 2712-13. Standard contour line was announced by Executive Committee under instructions from the Association, April 8, 1888. Limit gages for preserving standard contour line adopted in 1891.

These gages, properly proven by master gages, may be procured from Pratt & Whitney Company, of Hartford, Conn. A duplicate set of master gages is held in the office of the Secretary for reference when desired.

In 1899 the contour line showing the length of the guard arm was extended about 1 inch.

In 1899 the M. C. B. standard limit gage for new couplers was changed by moving the screw to a new position.

In 1902 the contour gage was strengthened by the use of a solid web in the weak part of the frame, and part of the outside flange increased to 1/4 inch in thickness. The handhold was also reduced in size to give greater strength.

In 1903 the contour line of the M. C. B. coupler was changed as now shown on the drawing.

In 1904 the coupler and knuckle limit gages were changed to conform to the contour lines adopted in 1903 and to have raised figures "1904" cast on them.

Automatic Car Coupler Guard Arm (M. C. B. Standard.) In 1899 the vertical dimensions of the end of guard arm was fixed at 7 1/2 inches as a minimum.

Automatic Car Coupler Head (M. C. B. Standard). In 1899 the recommendation of the coupler committee that the horizontal plane containing the axis of the shank of the coupler bisect the vertical dimensions of the knuckle and end of guard arm was adopted as a standard of the Association.

In 1908 the following note was added:

That all new types of couplers put on the market after January 1, 1909, have a dimension of 9 1/4 inches from back of coupler horn to inside face of knuckle, and that the face or front wall of coupler have a minimum thickness of 1 1/4 inches.

Temporary Standard Coupler—Head. In 1911, by special letter ballot, the length of coupler head from back of striking horn to coupling face of closed knuckle was fixed at 12 1/4 inches for the M. C. B. Temporary Standard Coupler for existing cars.

Automatic Car Coupler, Height of (M. C. B. Standard). The standard height of couplers for passenger equipment cars is 35 inches from top of rail when car is light. Adopted in 1890.

In 1911 the order of the Interstate Commerce Commission, dated October 10, 1910, regarding the standard height of couplers, was adopted, reading as follows:

The maximum height of drawbars for freight cars measured perpendicularly from the level of top of rails to the center of drawbars for standard-gage railroads shall be 34 1/2 inches and the minimum height of drawbars for freight cars on such standard-gage railroads measured in the same manner, shall be 31 1/2 inches, and on narrow-gage railroads the maximum height of drawbars for freight cars measured from the level of tops of rails to the center of drawbars shall be 26 inches, and the minimum height of drawbars for freight cars on such narrow-gage railroads, measured in the same manner, shall be 23 inches, and on 2-foot gage railroads the maximum height of drawbars for freight cars measured from the level of the tops of rails to center of drawbars shall be 17½ inches, and the minimum height of drawbars for freight cars on such 2-foot gage railroads, measured in the same manner, shall be 14½ inches.

Adjusting Height of Couplers.—(M. C. B. Standard). In 1896 it was decided that in adjusting the height of couplers to meet the requirements of the United States law fixing the height from the top of rail to center of coupler for standard gage cars in interstate traffic, cars should be adjusted when empty, as far as possible. In order to justify a bill for work done under the Rules of Interchange, an empty car should be adjusted to 34½ inches, or within ¼ inch thereof, and when it is necessary to alter a loaded car it should be adjusted to 33½ inches or within ¼ inch thereof, or as near as possible to such height as will bring it to 34½ inches when the car is unloaded.

In 1901 this was changed from Recommended Practice to Standard, as a result of letter ballot.

This standard conforms to the order of the Interstate Commerce Commission dated October 10, 1910.

Automatic Car Coupler Knuckle. See KNUCKLE.

Automatic Car Coupler Knuckle Lock Lift. See COUPLER LOCK LIFTER.

Automatic Car Coupler, M. C. B. Standard Specification. In 1899 specifications and tests for M. C. B. automatic couplers were adopted as Recommended Practice. In 1903 they were revised.

In 1905 they were revised and adopted as Standard. Revised 1909.

In 1911 the word "coupler" was defined to include the bar and contained parts within the head.

In 1911 the manufacturer's mark was required on head of knuckle pin.

In 1912 the specifications were changed to permit of an underneath unlocking device operating with an upward movement.

For drop testing machine and details, see Figs. 2731-2744.

The couplers furnished under this specification must be made of steel in accordance with the best foundry methods and must not be painted. The word "couplers," as here used, includes the bar itself and the contained parts within the head, such as locks, knuckle throws, etc.

1. Couplers will be subject to the inspection and test of the above named company as to their mechanical workings, general condition and strength. The tests and inspection will be made at the place of manufacture, where assistance and labor necessary to make satisfactory and prompt inspection and shipment must be furnished free by the manufacturer. The testing machine and gauges approved by the M. C. B. Association must be used in the test and inspection of couplers.

2. Couplers will be ordered as far as practicable in lots of one thousand; for each one thousand ordered the manufacturer shall furnish 1,014 and six additional knuckle pivot pins, and in the event of additional couplers or knuckle pivot pins being required to carry out the prescribed tests, they shall be furnished free of cost by the manufacturers.

3. Bars, knuckles, locking pins or blocks and knuckle pivot pins must be accurately made to gauges furnished by the manufacturer. These gauges must govern all dimensions representing fitting surfaces, thereby insuring absolute interchangeability and freedom of motion between the assembled parts without further adjustment or machining. When assembled, knuckles and locking pins or blocks must work freely, but the lost motion between knuckles and bars must not permit more than ⅛ inch vertical play, or between knuckles and locks must not permit the knuckle to drop forward beyond the proper contour line, but ¼ or ⅜ of an inch lost motion in opposite direction is desirable.

4. Couplers must conform to M. C. B. standard drawings and contour lines and must have a lock set within the head of the coupler; they must be so designed as not to part when the knuckle pin is removed or broken. They must couple and uncouple with each other (with either or both knuckles open) and also with the master or sample coupler; they should lock easily when the knuckle is pushed in by hand. They must have steel pivot pins 1⅝ inches in diameter of sufficient length to permit applying a ⅜-inch cotter pin through the pin below the coupler lug, and in every way conforming to the requirements as stated in the specifications for knuckle pivot pins.

The lock lift must be in the central longitudinal vertical plane of the coupler, located between the vertical plane of the striking horn and contour lines, and must operate either from the top or bottom by an upward movement. The total lift of locking pin shall not be more than 6 inches.

5. Bars and knuckles shall not be accepted if distorted by improperly matched flasks or any other defects due to molding. They must be free from injurious shrinkage cracks, flaws, checks, sand, sand holes or blow holes. The holes for pivot pins in lugs of bars and knuckles should be drilled or, if cored, must be broached out, and must not be more than 1-32 inch larger than pin, and the rivet holes in the butts must be drilled, or if cored, must be broached out. The holes must be parallel to the face of the bar or knuckle and at right angles to the axis of bar or knuckle. As many bars and knuckles as possible must be cast from the same heat of steel. All parts must be well annealed throughout.

6. The pulling and contact faces of coupler and knuckle must be clean, smooth and at right angles to axis of the bar. The dimensions of butt and shank must be within the limits of variation shown by the M. C. B. Standard drawings and inspectors' gauges.

7. The name of coupler must be legibly cast on the top side of head of the bar. Each knuckle and each drawbar must bear a serial number legibly stamped or cast upon it. The knuckle must also bear the name of the coupler and the manufacturer's name or identification mark legibly cast or stamped at some point where it will not be worn off.

Knuckle pins must bear the manufacturer's mark on head of pin.

8. Every coupler and knuckle made to comply with these specifications must have a slightly raised plate or flat surface cast upon the head in plain view, where it will not be subject to wear. After a lot of complete couplers have successfully passed the inspection and tests prescribed below, the letters M. C. B. must be legibly stamped upon the plate on each coupler and knuckle; this mark to be evidence that the complete coupler is an M. C. B. standard.

INSPECTION.

1. The couplers, after having been thoroughly inspected by the manufacturer to see that they meet the requirements as to interchangeability, soundness and dimensions of parts, etc., herein specified, should be arranged in lots of 101 and 102, so as to provide for the necessary 1,014 couplers and, where possible, care should be taken to put all couplers of the same heat number or numbers in the same lot or lots. The inspector shall then inspect and gauge each coupler as to its compliance with drawing sizes, and for surface defects and proper contour lines. Any irregularities or swollen parts on the working or bearing faces must be ground or chipped off before the couplers are accepted. Standard M. C. B. gauges must be used in gauging all parts for which gauges are provided.

After this inspection the inspector shall select one complete coupler taken at random from each of the lots as provided for above and subject them to test No. 1, hereafter specified. If the coupler fails to stand the prescribed tests but, before failing, stands a sufficient number of blows to make a retest admissible, a second coupler shall be taken from the same lot from which the first coupler was taken. If it stands the test, that lot of couplers shall be accepted as far as test No. 1 is concerned; otherwise that lot of couplers shall be rejected and another lot substituted and tested in the same way.

If the lot of 1,000 couplers is accepted on previous test, the inspector shall take at random from the accepted couplers, five pivot pins, and from the extra six pivot pins, one, making a total of six, which shall be subjected to the requirements of the specifications for knuckle pivot pins. If these pins pass the required inspection and tests, the couplers complete may be accepted. If the pins do not pass the inspection and tests prescribed in the specifications for knuckle pivot pins, the manufacturer will be required to present a new lot of 1,000 pivot pins, which shall be tested in accordance with the requirements of the specifications for knuckle pivot pins. If these are accepted, then the manufacturer will be required to remove all of the former lots of pins in the couplers otherwise acceptable, and substitute the lot of pins which has been accepted.

2. From each 1,004 couplers accepted by test No. 1, four complete couplers shall be selected by the inspector, two of which shall be subjected to test No. 2, one to test No. 3 and one to test No. 4 hereafter specified. If any coupler fails to stand the prescribed test, but before failing stands a sufficient number of blows to make a retest admissible, a second coupler shall be taken from the same lot or lots from which the first was taken. For instance, if the coupler selected for test No. 3 has been taken from the fourth 100 couplers and the failure allows a retest, a second coupler shall be taken from the fourth 100 couplers. If it stands the test, that lot of 1,000 couplers shall be accepted as far as that test is concerned, otherwise that lot shall be rejected and another lot of 1,000 couplers substituted. Any part of any coupler which has been subjected to test is condemned for service.

PHYSICAL TESTS.

TEST NO. 1.—STRIKING TEST ON CLOSED KNUCKLE OF COMPLETE COUPLER.—As a preliminary, the coupler must be marked on bottom of butt with a center-punched line parallel to axis of shank, this line to extend to the inner face of knuckle (see Fig. 1); the coupler must then be rigidly fixed in the machine in a vertical position, with the axis of coupler in the center line of drop, the pivot pin hole parallel to line through center of legs of the machine and the butt blocked solidly on the anvil to prevent lateral motion by means of steel fillers and wedges, the latter sledged down tight and this sledging repeated after each blow. The heights of support from bottom of butt end should not be greater than 19½ inches.

Blows to be struck directly on knuckle.

Three blows of 1,640 pounds falling five (5) feet.

Three blows of 1,640 pounds falling ten (10) feet.

The coupler shall be considered as having failed to stand this test if it is broken before it has received three blows at 5 feet and three blows at 10 feet, or if any cracks appear more than one inch long or open more than 1-16 inch, or the center-punched line measured at contour is distorted more than 1⅞ inches after having received three blows at 10 feet, or if the knuckle is closed more than ¾ of an inch from its original position when pulled out against the lock by hand after receiving three blows at 5 feet, or if the knuckle will not open, or if the locking device is inoperative after test. For measuring axial distortion and knuckle closure, see Figs. 1 and 2. Should the coupler before failing stand three blows at 5 feet and one blow at 10 feet, another complete coupler shall be provided and tested as per Section 2 under "inspection" governing retest.

TEST NO. 2.—FACE TEST.—As a preliminary, pivot pin, knuckle and locking device having been removed, the coupler must be marked on bottom with a center-punched line (see points 1, 2 and 3 in Figs. 3 and 4) parallel to axis of shank and extending to the contour face. Center-punched marks must also be placed at the end of guard arm and on the lug (see Fig. 3). The base-block casting having been placed in the drop-test machine, the coupler must be set in the casting in a vertical position. The bolts must be drawn tight against the sides of the coupler shank and must be so adjusted that the central vertical plane of coupler shank parallel to the axis is 2 1-16 inches from line through centers of legs of machine. Wedges and fillers must be placed between bottom of coupler shank and sloping wall of hole in base-block casting and sledged down tight, the top of coupler shank to bear directly on vertical wall of hole in base-block casting. The striking horn of coupler must rest firmly on top of base-block and the butt end must be so lined up as to have a solid bearing on the anvil. The bolts must be tightened and the sledging repeated after each blow. The wedging block, after having been gauged to see that its contour line is correct, must be so placed in the coupler head as to have a bearing on lugs and guard arm, and must be readjusted after each blow.

Blows to be struck on wedging block:

Three blows of 1,640 pounds falling five (5) feet.

Two blows of 1,640 pounds falling ten (10) feet.

The coupler shall be considered as having failed to stand this test if it is broken before it has received three blows at 5 feet and two blows at 10 feet, or if any crack appears more than one inch long or open more than 1-16 inch, or if the center-punched line is distorted more than 7-16 inch for 5 by 7 inch shank or 9-16 inch for 5 by 5 inch shank coupler, or if the distance between center-punched marks on bottom of head has widened more than ¾ inch. For method of measuring these distortions see Figs. 3 and 4. Should the coupler, before failing, stand three blows at 5 feet another coupler shall be provided and tested as per Section 2 under "inspection" governing retest.

TEST NO. 3.—JERK TEST OF COMPLETE COUPLERS.—One coupler shall be placed in an inverted position in the yoke forging of test machine and equalizer bar placed so as to rest level, one end in the closed knuckle, the other resting central on the spring follower cap. The weight must strike the equalizer bar midway between the center line of coupler and the center line of the spring follower cap.

Three blows of 1,640 pounds falling five (5) feet.

Three blows of 1,640 pounds falling ten (10) feet.

A coupler shall be considered as having failed to stand this test if it is broken before it has received three blows at 5 feet and three blows at 10 feet, or if cracks appear more than one inch long or open more than 1-16 inch, or if the knuckle is open more than ¾ inch from its original position after third blow at 10 feet, or if the equalizer bar will not stay in place when struck, or if the knuckle will not open, or if the locking device is inoperative after receiving the full test. Should the coupler fail to stand the prescribed test, but stand three blows at 5 feet and one blow at 10 feet, another complete coupler shall be provided and tested as per Section 2 under "inspection" governing retest.

Test No. 4.—Pulling Test of Complete Coupler.—One complete coupler shall be supported in the machine by yoke forgings and locked as in running position to a dummy, the axes of the coupler and dummy to be in the same straight line. The dummy must have the contour lines of an M. C. B. coupler, with the exception of the guard arm, which may be omitted. The coupler must stand a steady pull of 150,000 pounds. A coupler shall be considered as having failed to stand this test if it is broken before it has been pulled the prescribed number of pounds, or if any cracks appear more than one inch long or open more than 1-16 inch, or if the knuckle has opened more than ⅝ inch from the original position when pulled out against the lock. The measurement of the knuckle opening must be obtained after the pressure is released. The coupler shall be considered as having failed to stand this test if it slips apart from the dummy in the machine, or if the knuckle will not open, or if the locking device is inoperative after the test. Should the coupler fail to stand the prescribed test, but before failing stand a pull of 100,000 pounds, another complete coupler shall be provided and tested as per Section 2 under "inspection" governing retest.

10. The final failure of any part to meet test shall not condemn the complete coupler but only that part which fails, and such part in all couplers presented shall be replaced, after which the test shall be proceeded with, using new couplers, as if no part of the test had been made.

SPECIFICATIONS FOR SEPARATE KNUCKLES—STANDARD.

In 1904, specifications were adopted as Recommended Practice for separate knuckles, and in 1907 advanced to standard, as follows:

The knuckles furnished under this specification must be made of steel in accordance with the best foundry methods and must not be painted.

1. Knuckles will be subject to the inspection and test of the above named company as to their general condition and strength. The tests and inspection will be made at the place of manufacture, where assistance and labor necessary to make satisfactory and prompt inspection and shipment must be furnished free by the manufacturer. The testing machine and gauges approved by the M. C. B. Association must be used in the test and inspection of knuckles.

2. Knuckles will be ordered as far as practicable in lots of 100; for each 100 ordered the manufacturer shall furnish 102, and in the event of additional knuckles being required to carry out the prescribed tests, they shall be furnished free of cost by the manufacturers.

3. Knuckles must be accurately made to gages furnished by the manufacturer. These gauges must govern all dimensions representing fitting surfaces, thereby insuring absolute interchangeability without machining.

4. Knuckles shall not be accepted if distorted by improperly matched flasks or any other defects due to

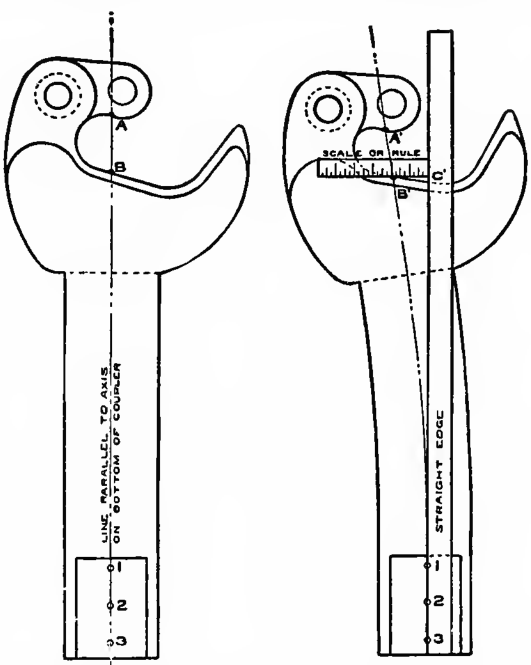


FIG. 1. BEFORE TEST — FIG. 2 AFTER TEST

METHOD OF MEASURING DEFLECTION IN TEST NO
B' C' MEASURES AXIAL DEFLECTION AND MUST NOT EXCEED 1⅞".
AB–A'B' MEASURES KNUCKLE CLOSURE AND MUST NOT EXCEED ¾

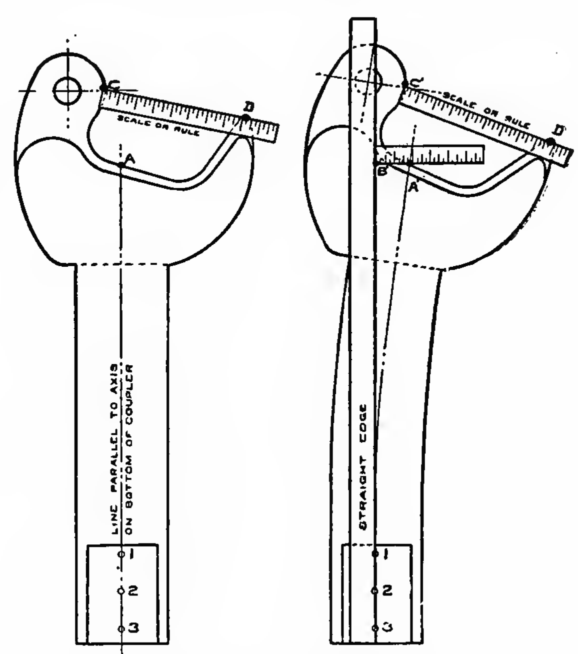


FIG. 3 BEFORE TEST — FIG. 4. AFTER TEST

METHOD OF MEASURING DEFLECTION IN TEST NO 2.
A B' MEASURES AXIAL DEFLECTION AND MUST NOT EXCEED 1½" FOR COUPLERS WITH 5×7" SHANK OR 1⅞" FOR COUPLERS WITH 6×8" SHANK
C'D–CD MEASURES GUARD ARM DISTORTION AND MUST NOT EXCEED 7/16"

molding. They must be free from injurious shrinkage cracks, flaws, checks, sand, sand holes or blow holes. The holes for pivot pins in knuckles should be drilled or, if cored, must be broached out, and must not be more than 1-32 inch larger than 1⅝-inch diameter pivot pin. The holes must be parallel to the face of the knuckle, and at right angles to the axis of knuckle. As many knuckles as possible must be cast from the same heat of steel. All parts must be well annealed throughout.

5. The pulling and contact faces of knuckle must be clean and smooth.

6. Each knuckle must bear the name of the coupler, a serial number and the manufacturer's name or identification mark legibly cast at some point where it will not be subject to wear.

7. Every knuckle made to comply with these specifications must have a slightly raised plate or flat surface cast upon the head in plain view, where it will not be subject to wear. After a lot of knuckles have successfully passed the inspection and tests prescribed below, the letters M. C. B. must be legibly stamped upon the plate on each knuckle; this mark to be evidence that the knuckle is an M. C. B. standard.

INSPECTION.

The knuckles, after having been thoroughly inspected by the manufacturer to see that they meet the requirements as to interchangeability, soundness and dimensions of parts, etc., herein specified, should be arranged in lots of 102 and, where possible, care should be taken to put all knuckles of the same heat number or numbers in the same lot or lots. The inspector shall then inspect and gauge each knuckle as to its compliance with drawing sizes, and for surface defects and proper contour lines. Any irregularities or swollen parts on the working or bearing faces must be ground or chipped off before the knuckles are accepted.

After this inspection the inspector shall select two knuckles taken at random from the lot or lots as provided for above, and subject one of them to Test No. 1 and the other to Test No. 2, hereafter specified. If one of these knuckles fails to stand prescribed Test No. 1, but before failing, stands a sufficient number of blows to make retest admissible, another knuckle shall be taken from the same lot from which the first knuckles were taken. If it stands the test, that lot of knuckles shall be accepted as far as Test No. 1 is concerned; otherwise that lot of knuckles shall be rejected and another lot substituted and tested in the same way.

The other knuckle selected by the inspector shall be subjected to Test No. 2. If this knuckle fails to stand prescribed Test No. 2, hereafter specified, but before failing, stands a sufficient number of blows to make a retest admissible, another knuckle shall be taken from the same lot from which the first knuckles were taken. If it stands the test, that lot of knuckles shall be accepted; otherwise that lot of knuckles shall be rejected and another lot substituted and tested in the same way.

PHYSICAL TEST.

Test No. 1. Striking Test.

The striking test back block and knuckle supports are placed in the housing against the back and sides, the knuckle dropped in between the supports and held by inserting the pin through the holes in the knuckle supports. The knuckle is then adjusted by means of liners between the back block and the knuckle supports, and between the knuckle supports and the housing. The striking block is then placed in the housing casting resting upon the knuckle. A fitting piece made to suit the type of knuckle is slipped in position between the tail and housing casting so that the striking face of the knuckle is in a horizontal position.

Blows to be struck on striking block through which they are transmitted to knuckle.

Three blows of 1,640 pounds falling four (4) feet.

Three blows of 1,640 pounds falling eight (8) feet.

The knuckle shall be considered as having failed to stand this test if it is broken before it has received three blows at 4 feet and three blows at 8 feet, or if any cracks appear more than 1 inch long or open more than 1-16 inch. Should the knuckle before failing stand three blows at 4 feet and one blow at 8 feet, another knuckle shall be provided and tested as per Section 7 governing retest.

Test No. 2. Jerk Test.

The jerk test back block and knuckle supports are placed in the housing against the back and sides, the knuckle dropped in between the supports and held by inserting the pin through the hole in the knuckle supports. The knuckle is then adjusted by means of liners between the back block and the knuckle supports, and between the knuckle supports and the housing. The striking block is then inserted resting on the inner face of the knuckle, and a block of suitable size inserted between the tail of the knuckle and striking block so that the striking face of the knuckle is in a horizontal position.

If preferred by manufacturers, an old coupler and lock of the same kind, in which the knuckle fits properly, and which may be suitably reinforced in order to endure as many tests as possible, may be used in place of the supporting casting for this test.

Blows to be struck on the striking block through which they are transmitted to the knuckle.

Three blows of 1,640 pounds falling three (3) feet.

Two blows of 1,640 pounds falling six (6) feet.

The knuckle shall be considered as having failed to stand this test if it is broken before it has received three blows at 3 feet and two blows at 6 feet, or if any cracks appear more than 1 inch long or open more than 1-16 inch. Should the knuckle before failing stand three blows at 3 feet, another knuckle shall be provided and tested as per Section 7 governing retest.

SPECIFICATIONS FOR KNUCKLE PIVOT PINS—STANDARD.

In 1907 the following specifications for Knuckle Pivot Pins were adopted as Recommended Practice, and made Standard 1909:

In 1911 the manufacturer's mark was required on head of knuckle pin.

"All knuckle pivot pins ordered under these specifications must be made from open-hearth steel properly forged and then annealed, must not be painted and must have manufacturer's mark on head of pin.

"1. Knuckle pivot pins will be subject to the inspection and test of the above-named company as to their general condition and strength. The test and inspection will be preferably made at the place of manufacture, where assistance and labor necessary to make satisfactory and prompt inspection and shipment must be furnished free by the manufacturer. The testing machine, approved by the M. C. B. Association, must be used in the test of knuckle pivot pins.

"2. Knuckle pivot pins will be ordered as far as practicable in lots of 500; for each lot ordered the manufacturer shall furnish three extra pins, and in the event of additional pins being required to carry out the prescribed tests, they shall be furnished free of cost by the manufacturer.

"3. All pins must not be more than 1 41-64 inches or less than 1 39-64 inches in diameter, determined by a suitable gauge, and must not vary more than ⅛ inch above or below the proper length. The lower end of the pin must be cut off square and have at least ¼-inch bevel or chamfer. The cotter-pin hole to be properly drilled for ⅜-inch cotter. The head must be well formed, and pins which are not straight and true and those which have blisters or surface defects of any kind will be rejected.

INSPECTION.

"Knuckle pivot pins, after having been thoroughly inspected by the manufacturer to see that they meet the requirements as to interchangeability, soundness, dimensions of parts, etc., herein specified, should be arranged in lots of 503. The inspector shall then inspect and gauge each pin as to its compliance with drawing sizes and for surface defects.

"After this inspection the inspector shall select three pins taken at random from each lot or lots, as provided for above, and subject them to the cross-bending drop test as hereafter specified. If one of the pins fails to stand the test as prescribed below, and the other two pass, three more pins shall be selected at random from the same lot from which the first pins were taken; if all three of these pins stand the prescribed test, that lot of pins shall be accepted, otherwise that lot of pins shall be rejected, and another lot substituted and tested in the same way. If two or more pins fail to stand the test, originally, the lot represented will be rejected without further consideration.

PHYSICAL TEST.

"The cross-bending test will be made in a standard M. C. B. drop-testing machine, the pins resting on rounded supports, held rigidly 10 inches center to center, to be subjected to a blow by the standard weight of 1,640 pounds falling a height of three feet. The blow of the weight should be transmitted to the specimen by a block having a round lower edge resting on the specimen. The radius of all these round edges is to be ¾ inch. All pins are to be tested cold, and must not show any cracks or fractures. The bend must be directly under the nose of the plunger. Pins will be rejected if they break, or crack, or show a deflection less than 15 degrees or greater than 35 degrees."

Automatic Car Coupler Striking Horn (M. C. B. Standard). In 1899 the vertical height of the stop shoulder, or horn of coupler was fixed at not less than 3½ inches.

In 1899 the recommendation of the Coupler Committee that the horn of the coupler be arranged to touch the striking plate before the back of the head of the coupler strikes the ends of the draft timbers, was adopted as a standard of the Association.

Automatic Car Coupler, Uncoupling Arrangements for. See UNCOUPLING ARRANGEMENTS.

Automatic Car Coupler and Yoke Gages (M C. B. Standard). Figs. 2695, 2714. In 1909 gages to insure proper fitting were adopted for both the coupler and yoke. Gage No. 1 is used on 6½-inch butt couplers to gage rivet holes and lug for yoke fitting, also length and height of butt. Gage No. 2 is used on 9⅛-inch butt couplers. Gage No. 3 gages the width and height of shank and width of butt on both 5 by 5 in. and 5 by 7 in. shank couplers. Gage No. 4 gages the length of shank from back of striking horn to back of butt on both 5 by 5 in. and 5 by 7 in. shank couplers. Gage No. 5 gages the rivet holes and the lips on all yokes.

GAGE FOR WORN COUPLERS.—In 1899 the Coupler Committee recommended a form of gage to define the contour lines more fully when worn. This gage was adopted as Recommended Practice.

In 1904 the committee on M. C. B. couplers recommended a modification of the wheel defect gage, which would make a more satisfactory worn limit coupler gage, which was adopted by letter ballot. Modified and adopted as Standard in 1905. Modified 1907.

Automatic Connector (Steam and Air Pipes). Figs. 1377-82. A device by means of which the steam, air brake and signal pipes are automatically coupled by impact. Allowance is made for vertical and lateral movement, and arrangement is provided for interchange with cars not equipped with the device. See EMERGENCY HEAD BACK-UP CONNECTION.

Automatic Lubricator. A device for feeding at regular intervals a certain quantity of oil or lubricant to a cylinder or some mechanism requiring lubrication. See LUBRICATOR.

Automatic Reducing Valve. See REDUCING VALVE, AUTOMATIC.

Automatic Slack Adjuster. See SLACK ADJUSTER.

Automatic Switch (Electric Lighting). Figs. 2274, 75, etc. A device connected to the armature of the generator, by which the current is automatically turned onto the lights and batteries when the armature has reached a predetermined speed of rotation and consequent voltage output.

Automatic Ventilator. Figs. 893-919. A ventilator which is self-adjusting, so as to exhaust air from a car if the train runs in either direction. See VENTILATOR.

Automatic Window Catch. A device to hold a window sash from being shoved up or down. See SASH LOCK.

Automobile Car. Figs. 12-15, 272, 280-284. A box car for carrying automobiles and having exceptionally large side or end doors. See CAR, M. C. B. CLASS XA.

Auxiliary Belt Rail. 65a, Figs. 423-425. A strip of wood nailed to the BELT RAIL as a reinforcement.

Auxiliary Brake Equalizing Lever (Six-Wheel Truck). A short lever to which the brake lever connecting rod is fastened, and which divides the power equally between the center pair of wheels and the outside pair of wheels.

Auxiliary Compression Beam Brace. 164b, Figs. 423-25. The same as a CENTER COMPRESSION BEAM BRACE.

Auxiliary Contactor (Motor Cars). Fig. 2545. A CONTRACTOR applied to a control system to open and close the main motor circuits at a point remote from the platform controller, thus eliminating heavy arcing in the controller. See Fig 2549 for a single jaw line switch of the unit-switch type for use with auxiliary contactor equipments.

Auxiliary Reservoir. A, Figs. 281-288, 1270, 1294, etc. A cylindrical reservoir attached to the under side of a car or tender. It serves to hold a supply of compressed air to operate the brakes of each car, and is supplied from the main reservoir on the engine through the brake pipe.

Auxiliary Reservoir Hanger. A support for the reservoir.

Axle. See below and also CAR AXLE.

Axle (M. C. B. Standard). Fig. 2693. In 1899 it was decided that the standard axles should be known by letters.

In 1901 a designation was given the standard axles, whereby each shall be known to carry a definite weight instead of for cars of particular capacity.

AXLE.—A. With journals, 3¾ by 7 inches. Designed to carry 15,000 pounds.

This axle is the standard of the Association for cars of 40,000 pounds capacity.

In 1873 a standard for car axle was recommended, the form and dimensions of which, excepting the diameter in the middle, were substantially the same as shown in this sheet. In 1884 the diameter at the middle was increased from 3⅞ inches to 4¼ inches, by letter ballot.

In 1901 the diameter of wheel seat was changed from 4⅞ to 5⅛ inches.

In 1901 a notation was added to the drawing of this axle showing a straight taper between certain points on the axle; also a diagram showing location of borings to be taken from steel axles for analysis.

In 1902 further changes were made in the diameter of the tapered portion where it joins the fillet next to the rough collar; also in the diameter of the rough collar.

In 1907 the radius between the wheel seat and the rough collar on the inside of the hub of the wheel was changed to ¾ inch, with the center from which the radius is struck coincident with the inside face of the hub of the wheel.

The radius between the dust guard and wheel seat was changed to ¼ inch.

AXLE—B. With journals, 4¼ by 8 inches. Designed to carry 22,000 pounds.

This axle was adopted as a standard of the Association for cars of 60,000 pounds capacity, by letter ballot, in 1889.

In 1901 the diameter of wheel seat was changed from 5⅜ inches to 5¾ inches.

In 1901 a notation was added to the drawing of this axle, showing a straight taper between certain points on the axle; also a diagram showing location of borings to be taken from steel axles for analysis.

In 1901 the diameter of the middle was increased from 4⅝ inches to 4¾ inches.

In 1902 changes were made in the diameter of the tapered portion of the axle where it joins the fillet next to collar.

In 1907 the radius between the wheel seat and the rough collar on the inside of the hub of the wheel was changed to ¾ inch, with the center from which the radius is struck coincident with the inside face of the hub of the wheel.

The radius between the dust guard and wheel seat was changed to ¼ inch.

In 1910 the radius of dust-guard fillet was increased from ¼ inch to ⅝ inch, and the wheel seat fillet from ¾ inch to ⅝ inch.

AXLE.—C. With journals, 5 by 9 inches. Designed to carry 31,000 pounds.

This axle was adopted as recommended practice in 1896, and was made a standard of the Association in 1898.

In 1901 the diameter of wheel seat was changed from 6⅜ inches to 6½ inches.

In 1901 a notation was added to the drawing of this axle showing a straight taper between certain points on the axle; also a diagram showing the location of borings to be taken from steel axles for analysis.

In 1902 changes were made in the diameter of the tapered portion of the axle where it joins the fillet next to collar; also in the diameter of the rough collar.

In 1907 the radius between the wheel seat and the rough collar on the inside of the hub of the wheel was changed to ¾ inch, with the center from which the radius is struck coincident with the inside face of the hub of the wheel.

The radius between the dust guard and wheel seat was changed to ¼ inch.

In 1910 the radius of the dust-guard fillet was increased from ¼ inch to ¾ inch.

AXLE.—D. With journals, 5½ by 10 inches. Designed to carry 38,000 pounds.

This axle was adopted as a standard of the Association in 1899.

In 1901 the diameter of wheel seat was changed from 6⅞ inches to 7 inches.

In 1901 a notation was added to the drawing of this axle showing a straight taper between certain points on the axle; also a diagram showing the location of borings to be taken from steel axles for analysis.

In 1902 changes were made in the diameter of the tapered portion of the axle where it joins the fillet next to collar; also in the diameter of the rough collar.

In 1906 a ¾-inch radius was adopted between the wheel fit and the rough collar adjoining the inside hub of the wheel; also the radius between the dust guard and wheel fit was increased to ¼ inch.

In 1907 the center from which the radius of ¾ inch is struck was made coincident with the inside face of the hub of the wheel.

In 1910 the radius of the dust-guard fillet was increased from ¼ inch to ¾ inch.

Axle (M. C. B. Recommended Practice). Fig. 2750. AXLE E. With journals 6 by 11 inches. Designed to carry 50,000 pounds.

In 1910 an axle of the design and carrying capacity shown in the drawing was adopted as Recommended Practice.

Axle Collar. A rim or enlargement on the end of a car axle, which takes the end thrust of the journal bearing.

Axle Gages. Gages for fixing the lengths and diameters of an axle. Were at one time standards of the M. C. B. Association.

Axle Generator (Electric Lighting). Figs. 2270-72, 83, 86-89, 92, 93, 96-98; 2302-06, 11-13, 21, 23 and 24. A small direct current generator usually mounted on a car or tender truck and driven by a belt, gear, or chain from the axle. These generators are always provided with some automatic device, forming either a part of the machine itself or being in the form of an auxiliary device mounted inside the car, for preserving the polarity of the terminals or leads of the generator. The fact that a car may run in either direction and thereby cause rotation in either direction of the armature of the generator renders an automatic device of this kind absolutely necessary.

Axle Guard. 51 and 60, Figs. 947, 966; Figs. 974 and 976. A beam or bar supported by a truck frame and extending over the axles. Iron straps attached to this beam form a support for the axle in case of breakage. See END AXLE GUARD.

Axle Guard Truss. Fig. 977. A wrought iron forged bar connecting the iron transoms of a six-wheel truck, and carrying the middle axle guard.

Axle Lighting. See ELECTRIC LIGHTING.

Axle Pulley. Fig. 2320. The belt pulley mounted upon the car axle for driving the axle generator. When a chain is used the pulley is commonly termed a sprocket wheel.

Axle Pulley Bushing. A bushing or sleeve, split longitudinally and bored conically inside to fit the tapering car axle and turned cylindrically outside to fit the hub of the axle pulley.

Axle Safety Bearing (Passenger Car Trucks). The axle guard of a truck above the axle and the axle safety hanger below it, together forming a circle around the axle, are sometimes called axle safety bearing.

Axle Safety Hanger. 55 Figs. 947 and 966. A strap connected to an axle guard and passing under the axle to support it in case of breakage. See AXLE GUARD.

Axle Seat. The inside surface of the hole in a car wheel which comes in contact with the axle, and not the hole itself. The corresponding part of an axle is called the wheel seat or wheel fit.

Axle Specifications (M. C. B. Recommended Practice). Figs. 2750, 2766, 2767.

SPECIFICATIONS FOR IRON AXLES.

In 1899 the following specifications, including tests for iron axles, were adopted as Recommended Practice:

Car axles for the use of this company will be ordered subject to the following conditions:

1. All axles must conform in shape and size to the dimensions shown on the blue-prints, which will be furnished by the.............. R. R. Co.

2. All axles must be cut off and faced to exact lengths, and be centered with 60 degree centers in the manner indicated in blue-prints, so as to prevent lathe centers from bottoming. Axles must tbe made of double-work fagoted scrap, 16 per cent of new bar iron worked into the center of the axles being allowed if desired. Axles must be well hammered and free from any clearly defined open seams. They must finish in the lathe with journal free from flaws in the shape of holes, pieces shelled out, or open seams large enough, so that with a knife blade scale or dirt can be removed from such seams, or open seams showing a clear opening of 1-32 inch or over, and being more than 1 inch long. The maker's name or initials must be stamped plainly on each axle.

3. All axles are to be inspected and tested at the works where they are made. The..............shall be notified when they are ready for inspection. Under no circumstances shall car axles be shipped from the works where they are made until they have been tested, inspected and accepted by a proper representative of the company.

4. For each one hundred axles or fraction thereof ordered, one additional axle must be furnished for test. This axle will be selected at random from the pile, and subjected to the prescribed drop test for iron axles of its class. If it stands the test the one hundred axles, or fractional part thereof that it represents, will be inspected, and only those accepted that are made in a workmanlike manner and are free from defects mentioned in these specifications. All axles received are subject to rejection if they do not finish in the lathe in accordance with the requirements herein given. The manufacturer must furnish, free of charge, the axles that are to be tested, the testing apparatus, and the assistance necessary to enable the inspector to make a satisfactory inspection test. Axles will not be accepted if the diameters fall below the dimensions for forged sizes given in the blue-prints, or if exceeding those dimensions by more than 1/8 inch. Car axles in the rough must not have less than the prescribed minimum weight, nor more than the prescribed maximum weight for axles of their class.

AXLE DROP TEST.

5. All axles will be tested physically by drop test. The testing machine must conform in its essential parts to the drawings adopted by the Master Car Builders' Association. These essential parts are: The points of supports on which the axle rests during tests must be three (3) feet apart from center to center; the tup must weigh 1,640 pounds; the anvil, which is supported on springs, must weigh 17,500 pounds; it must be free to move in a vertical direction; the springs upon which it rests must be twelve in number, of the kind described on drawing, and the radius of the supports and of the striking face on the tup in the direction of the axis of the axle must be five (5) inches. When an axle is tested it must be so placed in the machine that the tup will strike it midway between the ends, and it must be turned over after the first and third blows, and when required after the fifth blow. After the first blow the deflection of the axle under test will be measured in the manner specified below.

6. It is desired that the axles when tested as specified above shall stand the number of blows at the heights specified in the following table without rupture, and without exceeding, as the result of the first blow, the deflections given:

Axle.	No. Blows.	Height of Drop.	Deflection.
M. C. B. 4¼ by 8 inch journals...	5	21½ feet	7⅛ inches
M. C. B. 5 by 9 inch journals.....	5	29 feet	6 1/16 inches
M. C. B. 5½ by 10 inch journals...	5	36 feet	5 7/16 inches

7. Axles will be considered as having failed on drop test and will be rejected if they rupture or fracture in any way, or if the deflection resulting from the first blow exceeds the following:

M. C. B. axle, 4¼ by 8 inch journals.... 8 1/8 inches.
M. C. B. axles, 5 by 9 inch journals...... 8 1/16 inches.
M. C. B. axle, 5½ by 10 inch journals.... 6 1/16 16 inches.

In order to measure the deflection, prepare a straight-edge as long as the axle by reinforcing it on one side, equally at each end, so that when it is laid on the axles the reinforced parts will rest on the collars of the axle, and the balance of the straight-edge not touch the axle at any place. Next place the axle in position for test, lay the straight-edge on it, and measure the distance from the straight-edge to the axle at the middle point of the latter. Then after the first blow, place the straight-edge on the now bent axle in the same manner as before, and measure the distance from it to that side of the axle next to the straight-edge at the point farthest away from the latter. The difference of the two measurements is the deflection.

SPECIFICATIONS FOR STEEL AXLES.

In 1899 the following specifications, including tests for steel axles, were adopted as Recommended Practice:

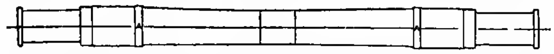
1. Axles will be ordered not less than 100 on one order. All axles must be made and finished in a workmanlike manner, and must be free from cracks, or seams, or flaws which can be detected by the eye. All parts must be rough turned, except at point "A" on the accompanying diagram.

2. All axles must be made of steel, and the material desired have the following composition:

Carbon	0.40 per cent.
Manganese, not above.............	0.50 per cent.
Silicon	0.05 per cent.
Phosphorus, not above............	0.05 per cent.
Sulphur, not above.................	0.04 per cent.

3. All axles must conform in sizes, shapes and limiting weights to the requirements given on the order or print sent with it. The rough turning must be done with a tool so shaped as to leave the surface free from ridges; and in centering them 60-degree centers must be used with proper clearance for lathe centers. All axles must be legibly stamped when offered for test, on the unfinished

portion, "A" on the diagram, with the blow or heat number and the date, and on the cylindrical portion at center they must be stamped with the name of the maker.



Portions marked "A" to be unfinished and to have stamped upon either of them blow number and date.

4. Manufacturers must notify........................ when they are ready to ship not less than 100 axles; must have all the axles made from each heat, and no others, in a pile by themselves; must furnish the testing machine referred to in Section 6, and the proper appliances for checking the dimensions and weights; must have a car or cars ready to receive shipment; must furnish the labor and power necessary to enable the inspector to promptly inspect and test; and ship or store the axles when tests are finished. Axles which, when offered for test, are so rusty as to hide defects will not be considered.

5. A shipment of axles being ready for test, the inspector will first make a list of the heat numbers in the various piles of axles offered, and the number of axles bearing the same heat number in each pile. If he finds in any pile axles bearing different heat numbers he must, before going further, have the pile rearranged, so that only those axles having the same heat number will be in the same pile. Also, if he finds in any pile any axles having evidence of changed or defaced heat numbers, or any axles having heat numbers not clearly ligible, or any bearing heat numbers previously rejected, he will exclude such axles from further consideration. He will then examine the axles in each pile or heat, as to workmanship and defects visible to the eye, and as to whether they conform to dimensions and directions on the order, or tracing, or in these specifications. All axles not satisfactory in these respects must be laid aside and will not be further considered. This being done, if less than thirty axles in any heat are left, he will refuse to consider that heat further. If in this inspection defects are found which the manufacturer can remedy while the inspector is at the works, he may allow such defects to be cured and may count the axles which are successfully treated in this way as a part of the thirty above mentioned. Not less than thirty axles from any one heat having passed the foregoing inspection, the inspector will select from each pile or heat, one axle at random, and subject it to the physical test prescribed for such axles as may be under consideration. If the test axle fails to fill the physical requirements, all the axles from that heat of steel will be regarded as rejected, and none of them will at any time be considered again. If the test axle passes physical test, the inspector will draw a straight line parallel with the axis of this test axle ten (10) inches long, starting from one end of it, and prick-punch this line at several points. He will then have a piece about six (6) inches long cut off from the same axle, so as to leave some of the prick-punch marks on each piece of the axle. The 6-inch piece must be sent at once, properly tagged, to................. The piles of axles which have passed physical test will be allowed to remain as the inspector leaves them, until the results of the chemical test are known. The 6-inch piece being received at the laboratory, a line will be drawn from the prick-punch line above described, through the center of the axle across the cut-off end, and a prick-punch mark made on this line, 40 per cent of the distance from the center to the circumference of the axle. Borings for analysis will be taken by means of a ⅝-inch diameter drill, acting parallel to the axis of the axle, and starting with its center in the last described prick-punch mark. The borings will be analyzed in accordance with standard methods, and the results of analysis will be communicated to the inspector, who will at once proceed to the works, and reject, or accept and ship, or mark and store, as the case may be, the axles in question. If the analysis of any test axle shows that the steel does not meet the chemical requirements, all of the axles of that heat will be regarded as rejected, and none of them will at any time be considered again. If the analysis of any test axle shows that the steel meets the chemical requirements, all of the axles of that heat which have passed inspection and physical test will be regarded as accepted. The inspector will proceed to load and ship from the accepted axles as many as may be required to fill the order. If, as the result of inspection and the physical and chemical tests, more axles are accepted than the order calls for, such accepted axles in excess will be stamped by the inspector with his own name, and will then be piled and allowed to remain at the works, subject to further orders from the purchasing agent. On receipt of further orders, axles once accepted will, of course, not be subject to further test, but in no case will even accepted axles be loaded and shipped except in the presence of the inspector. In all cases the inspector will keep an accurate record of the heat numbers, of the number of axles in each heat which are rejected, or stored, and will transmit this information with each report.

6. All axles will be tested physically by drop test. The testing machine must conform in its essential parts to the drawings adopted by the Master Car Builders' Association. These essential parts are: The points of supports on which the axle rests during tests must be three feet apart from center to center; the tup must weigh 1,640 pounds; the anvil, which is supported on springs, must weigh 17,500 pounds; it must be free to move in a vertical direction; the springs upon which it rests must be twelve in number, of the kind described on the drawing; and the radius of supports and of the striking face on the tup in the direction of the axis of the axle must be five (5) inches. When an axle is tested it must be so placed in the machine that the tup will strike it midway between the ends, and it must be turned over after the first and third blows, and when required, after the fifth blow. After the first blow, the deflection of the axle under test will be measured in the manner specified below.

7. It is desired that the axles, when tested under the drop test as specified above, shall stand the number of blows at the height specified in the following table without rupture and without exceeding as the result of the first blow the deflections given:

Axle.	No. Blows.	Height of Drop.	Deflection.
M. C. B. 4¼ by 8 inch journals for 60,000-pound cars	5	34 feet	7 inches
M. C. B. 5 by 9 inch journals for 80,000-pound cars	5	43 "	5¾ "
M. C. B. 5½ by 10 inch journals for 100,000 pound cars............	7	43 "	4 "

8. Axles will be considered as having failed on physical test and will be rejected if they rupture or fracture in any way, or if the deflection resulting from the first blow exceeds the following:

M. C. B. axle, 4¼ by 8 inch journals.. 7½ inches.
M. C. B. axle, 5 by 9 inch journals.... 6¼ inches.
M. C. B. axle, 5½ by 10 inch journals. 4½ inches.

9. Axles will be considered to have failed on chemical test and will be rejected if the analysis of the borings taken as above described gives figures for the various constituents below, outside the following limits, namely:

Carbon..below 0.35 per cent, or above 0.50 per cent.
Manganese ....above 0.60 per cent.
Phosphorus ....above 0.07 per cent.

In order to measure the deflection, prepare a straightedge as long as the axle, by reinforcing it on one side, equally at each end, so that when it is laid on the axle, the reinforced parts will rest on the collars of the axle, and the balance of the straight-edge not touch the axle at any place. Next place the axle in position for test, lay the straight-edge on it and measure the distance from the straight-edge to the axle at the middle point of the latter. Then, after the first blow, place the straight-edge on the now bent axle in the same manner as before, and measure the distance from it to that side of the axle next to the straight-edge at the point farthest away from the latter. The difference in the two measurements is the deflection.

Axle System of Lighting. See ELECTRIC LIGHTING.

B

Babbitt Metal. "An alloy, consisting of 9 parts of tin and 1 of copper, used for journal boxes; so called from its inventor, Isaac Babbitt, of Boston. Some variations have been made, and among the published formulae are:

Copper	1	1
Antimony	1	5
Tin	10	50

Another formula substitutes zinc for antimony.

The term is commonly applied to any white alloy for bearings, as distinguished from the box metals or brasses in which copper predominates."—Knight.

Babbitt Metal Bearings. A style of bearing of which a great variety of forms exist, which in effect substitutes Babbitt metal in some of its many forms for brass as a bearing surface. Lead lined bearings are different in that they merely use a thin sheet of lead over the brass, to correct slight irregularities and give an even bearing surface.

Back Cylinder Head (Air Brake Cylinder). See NON-PRESSURE HEAD.

Back Face Plate (Steel Tired Wheels). The inner one of the two plates connecting the tire with the hub.

Back Guy (Steam Shovel). An iron rod running from the top of the "A" frame to an anchor over the body bolster under the boiler.

Back Seat Bottom Rail (Longitudinal Seat). A horizontal wooden strip at the back edge, to which a wooden seat bottom is attached.

Back Stop Timber. See BUFFING SUB-SILL.

Back-Up Air Brake. Fig. 1385. A device on the rear end of the train by which the brakeman can blow a warning whistle or apply the brakes when backing up.

Back-Up Air Brake Cock. Fig. 1386. A cock which is operated by the brakeman in applying the back-up air brake.

Back-Up Air Signal. Fig. 1385. A warning signal which can be operated at the rear of the train when backing up.

Baggage Car. Figs. 126-27, 133-34, 170, 231-32 and 387. See CAR, M. C. B. CLASS B. A car run in passenger service, having wide side doors for the admittance of baggage and with or without windows and end doors.

Baggage Car Generator. See ELECTRIC LIGHTING.

Baggage and Express Car. Fig. 133. See CAR, M. C. B. CLASS BE. A car similar to a baggage car, used for either baggage or express matter.

Baggage Rack. See BASKET RACK.

Baggage Truck. A vehicle with a frame or rack for carrying baggage, used to move the latter by hand about railway stations.

Bail. A curved handle of a more or less semi-circular form for a pail, bucket, lantern or other utensil.

Baker Car Heater. Figs. 1937-47. A heater arranged to heat water in a coil of pipe in the inside of the stove, and cause it to circulate through a series of pipes laid near the floor of the car. The fireproof heater has a single coil, 30 feet in length, or a double coil, in a flexible steel, jointless, fireproof safe, with no apertures large enough to permit the escape of live coals. This inner fire pot or safe is enclosed in a flexible steel outside casing, with asbestos sheets between the safe and casing, and between the ash pit bottom and sheet iron bottom; a safety plate covers the feed chute at the top, and a cinder-proof door effectually closes the ash pit at the bottom. The smoke pipe and smoke flue base may be destroyed and leave the fire pot practically fireproof.

Balance Hanger. Fig. 975. See BRAKE BEAM ADJUSTING HANGER.

Balance Spring (Passenger Truck Brake Gear). Figs. 975-77. A flat spring from which the brake beam adjusting hanger is suspended and which keeps the brake head balanced in its proper position.

Balance Valve Pressure Regulator. A valve for automatically regulating the pressure in the steam pipes in a car-heating system.

Balanced Side Bearing Truck. See SIDE BEARING TRUCK.

Ball-Bearing Butt Hinge. A butt hinge, the washer of which is a ball-bearing.

Ball-Bearing Center Plate. Figs. 1026, 1028. A center plate fitted with ball-bearings to reduce the friction in turning.

Ball-Bearing Side Bearing. A side bearing fitted with ball-bearings to reduce the friction in curving. See SIDE BEARING.

Ballast Car. Figs. 35, 37-40. See CAR, M. C. B. Class M. W. B. A car for carrying ballast for repair and construction work, usually of either the flat or gondola type.

Ballast Plow. Figs. 221, 225-6. See also BALLAST SPREADER. A plow for removing ballast either from cars or from the track. The plows shown in Figs. 221 and 225 are used on the tops of flat cars or gondola cars which have side doors and are hauled over the cars either by a locomotive and cable or a special winding engine which takes steam from the locomotive. The plow shown in Fig. 226 is for plowing and spreading ballast from the center of the track and is drawn by a locomotive. The plows are raised or lowered by hand adjustment.

Ballast Spreader. Fig. 220. A flat car equipped with wings, usually operated by compressed air, for spreading ballast over the right of way after it is dumped from the cars.

Band (for Seat Backs). More properly SEAT BACK MOLDING.

Bar Sash Lift. A sash lift having a short horizontal metal bar attached to two flanged studs or stanchions; used for the large sashes of sleeping and parlor cars.

Bar Shackle (of a Padlock). A rectangular, instead of U-shaped, shackle.

Barrel Car. A flat car, racked so as to carry many empty barrels. They are made long, and the racks are very high in order to make up a carload weight.

Barrel Door Bolt. Fig. 1662. A door bolt made of a round metal bar and held in a round tube or "barrel."

It is constructed so that when it is either engaged or disengaged from its keeper it can be turned by a short lever or knob and held in either position by suitable stops.

Barrow Truck. A term sometimes used to designate a two-wheel baggage truck.

Base Board Corner Molding. A light molding at the junction of the base board and the floor.

Base Plate (of a Derrick or Crane). A large plate placed on the floor of the car for supporting the mast. Another method of support is by mast pocket.

Base Washer (Passenger Equipment Car Platform Posts). A metal ring or plate, which forms a bearing for the post on the platform end timber.

Basin. Figs. 1614-16, 1619, 1622-3. A hollow vessel made of porcelain or metal, and in cars usually fixed in a suitable stand with pipes and other attachments for filling it with water and emptying it. Such basins are used as lavatories in sleeping and other passenger cars. They are emptied at the bottom through a pipe connected to the basin by a basin coupling, or basin bushing, which is closed by a basin plug. The basin plug is attached to a basin chain, which again is fastened to a stanchion called the basin chain holder. For standard postal car basin see Fig. 1712. See also FOLDING LAVATORY.

Basin Bushing and Plug. Figs. 1587, 1589. See BASIN.

Basin Plug. Figs. 1587-88. See BASIN.

Basin Pump. Figs. 1611, 1612. A pump of peculiar construction for supplying the basin of sleeping and parlor cars from the tank carried under the slab. It is called single or double acting, according as the upward stroke only, or both the upward and downward strokes, eject water. Double acting is most used. The use of basin pumps has been practically discontinued on standard sleeping cars, the water being carried in tanks under the car and forced through the pipes by compressed air. They are still in general use, however, on tourist sleeping cars, chair cars and many day coaches.

Basin Valve. 5, Fig. 1616. See BASIN. The valve which allows the water to escape from the basin is usually in the form of a plug or WASTE COCK.

Basket Rack (British, PARCEL NET). 17, Fig. 1450; Figs. 1700-10. A receptacle made of metal ends and rods, or a combination of rods and wire netting for holding parcels and hand baggage. They are attached to the sides of passenger cars, above the heads of the passengers, so as to be out of the way. Continuous basket racks extend the full length of the car, and are increasing in favor.

Basket Rack Bracket. 18, Fig. 1450. A light metal support for the end or center of a basket rack.

Basket Rack Netting. Wire netting with very large meshes, which forms the bottom or back of a basket rack.

Basket Rack Rod. Small round metal bars which form the main portion of a basket rack, and to which the netting, when used, is fastened.

Batten. "A piece of board or scantling of a few inches in breadth."—Webster.

Battery. See STORAGE BATTERY.

Bayonet Catch. A general term derived from the manner of fastening on a bayonet to a gun, applied to the mode used in many forms of hardware and mechanical construction for connecting separate parts so as to be firmly united and yet easily removable. Many lamps are held in place by a form of bayonet catch.

Bead. "A small salient molding of semi-circular section. Also the strips on the sash frame which form a guide for the sash. These beads are known as the inside bead, outside bead and parting bead."—Knight. The term is frequently applied to any form of small, light molding of simple outline.

Beam. "The term beam is generally applied to any piece of material of considerable scantling, whether subject to transverse strain or not; as, for example, 'collar beam,' 'tie beam,' 'Brestsummer beam,' the two former being subject to longitudinal strains of compression and tension, respectively, and the latter to transverse strain."—Stoney.

"Any large piece of timber, large in proportion to its thickness and squared or hewed for use."—Webster.

A bar of metal of similar proportions is also called a beam.

"A bar supported at two points and loaded in a direction perpendicular or oblique to its length is called a beam."—Rankine.

By analogy the term has of late years come to be applied to similar pieces or bars of iron and steel. Thus we have iron I-BEAMS and DECK BEAMS to take the place of wooden beams in structures. The term is also used to designate such things as the beam of a balance or scales, a plow beam, the walking-beam of a steam engine, brake beam, etc.

Bearing. That which supports or rests on something, and is in contact with it. Thus a block or stone on which the end of a timber rests is called a bearing. The metal block or bushing in contact with a journal is called a bearing.

For M. C. B. Standard journal bearing see Figs. 2678, 2682, 2685, 2688.

Bearing Casting (Tip Cars). A casting, one of a pair, attached to either the car body or to the truck which supports the car body and its loads. In tip cars it is pivoted or hinged so as to permit the body to tip or rock laterally and to thus discharge its load.

Bearings, Journal. See JOURNAL BOXES AND DETAILS.

Bell Cord. See SIGNAL CORD.

Bell Crank. An L-shaped rectangular lever, often with the two extremities connected so as to be of triangular form, for changing the direction of motion by 90 degrees, more or less.

(Hand Car.) A crank attached to the propelling lever shaft, giving more favorable direction to the power applied to the levers.

Bell Rope. See SIGNAL CORD.

Belt Aligning Device (Electric Lighting). Mechanism consisting of screws and slip collars for adjusting the alignment of the belt, by shifting the generator so that its pulley shall be in the same vertical plane with the axle pulley.

Belt Molding. A molding passing entirely around the interior of a passenger car directly above the windows.

Belt Rail. 49 and 50, Figs. 285-88; 49, Fig. 368; 49a and 49c, Figs. 374-375; 30, Fig. 410; 65, Figs. 423-25; Fig. 495. A part of a passenger or street car frame below the windows on the outside, extending the whole length of the car body and attached to each post. It is usually framed into the posts and supports the window sills. The UPPER BELT RAIL is a similar strip directly above the window. See AUXILIARY BELT RAIL.

Belt Rail Cap. 81, Figs. 423-425. A strip of wood nailed to the top of a belt rail, and forming a seat for the window sill.

Belt Rail Stiffener. Fig. 495. A reinforcing member riveted to a belt rail in steel passenger cars.

Belt Tension. Mechanism consisting of springs, rods and nuts for adjusting and maintaining the tension of a belt used for driving an axle generator.

Bench Cap. Transverse timbers resting upon the side sills of a coal or ore car, to tie the sills together and prevent spreading, and also to support the doors or winding shaft about which the winding shaft chain is wound.

Berth. Fig. 1456; 1, 2, Figs. 1458 and 1459. A bed in a sleeping car; also, the shelf or support on which the bed rests. There are two such beds in the space occupied by two double seats, which is called a section. The lower berth is made up on the seats and the upper one on a shelf, which can be raised or folded up out of the way in daytime.

Berth Arm. A Berth Brace.

Berth Brace. A metal rod, chain, or wire rope sometimes attached to the side and near the top of a sleeping car, and at the other end to the outer edge of a berth, which is supported by the brace. In the later designs it is done away with, the berth being supported by the berth chain.

Berth Brace Eye. A metal plate with suitable lugs for fastening the brace to the top of the car or to the berth.

Berth Bracket. A bracket on which an upper berth of a sleeping car rests when lowered.

Berth Chain. 25, Figs. 1458, 1459; C, Fig. 1472. A chain passing from the berth spring through the overhead pulley and to the corner of the upper berth to support it. The berth spring is attached to the chain to counteract the weight of the berth. The berth chain does the service of the berth spring rope and berth brace.

Berth Chain Pulley. 24, Figs. 1458, 1459, Fig. 1472. A pulley attached to the roof of a sleeping car, over which a berth chain runs.

Berth Curtain. 17, Figs. 1458, 1459. A curtain hung in front of a sleeping car section to afford privacy to occupants. A single curtain covers both berths, and is hung from the berth curtain rod.

Berth Curtain Hook. Figs. 1467, 1469. A metal hook attached to a berth curtain, and by which the latter is hung on a rod above the berths; usually covered with leather to prevent rattling.

Berth Curtain Pole. See Berth Curtain Rod.

Berth Curtain Rod. 16, Figs. 1458, 1459. A rod usually made of metal tubing, fastened above a section of a sleeping car to support the berth curtains. They are now made in sections, supported by folding brackets, and swing into the upper-berth out of sight, except when berths are made up. See Berth Curtain Rod Bracket.

Berth Curtain Rod Bolt. A small vertical bolt, usually tipped with an ornament fastening the curtain rod in the coupling on the bracket.

Berth Curtain Rod Bracket. 15, Figs. 1458, 1459; Fig. 1474. A metal bracket attached to the deck of a sleeping car, which forms a support for a berth curtain rod. Such brackets usually have a coat and hat hook attached to them. A hanger is sometimes used as a substitute for a bracket at certain points. The stationary bracket has been replaced by the folding curtain rod bracket, which folds, with the rod attached, into the upper berth and out of sight when the curtains are not in use. See Curtain Rod Folding Bracket.

Berth Curtain Rod Coupling. A fastening by which a berth curtain rod of a sleeping car is secured to a bracket. It usually consists of a bolt or screw.

Berth Curtain Rod Socket. A metal flanged ring which supports the berth curtain rod. Also called berth curtain rod bushing.

Berth Front. 4, 5 and 6, Figs. 1458-59. The bottom or front of an upper berth.

Berth Headboard. See Headboard.

Berth Hinge. Fig. 1462. A hinge or joint by which the back edge of an upper berth of a sleeping car is attached to the side of a car.

Berth Hinge Bushing. A hollow metal socket in which the spindle of a loose berth hinge works.

Berth Hinge Plate. A plate which takes the place of a berth hinge bushing.

Berth Lamp. Figs. 2451-53, 2504, 2507, 2516, 2523. A lamp for lighting a sleeping car berth.

Berth Latch. 47 and 48, Figs. 1458-59; Figs. 1457, 72. A device for holding the upper berth of a sleeping car up in its place when not in use. To obviate the danger of the berth shutting up in case of overturning of the car, the safety berth rope and attachments, 26, Figs. 1458-59, are used. Safety berth latches have also been used to obviate the necessity of using a safety rope. See Safety Berth Latch.

Berth Latch Bolt. 48, Figs. 1458-59; Fig. 1472. A bar or pin of an upper berth latch which engages in a corresponding strike plate or keeper to hold the berth up.

Berth Latch Keeper. Also called Strike Plate. See Berth Latch Bolt.

Berth Latch Lever. The part by which the berth latch handle operates the berth latch bolt; also called a berth latch rocker plate.

Berth Latch Rocker Plate. See Berth Latch Lever.

Berth Lock. See Berth Latch.

Berth Lock or Latch Handle. Figs. 1457 and 1465.

Berth Lock or Latch Rods. Figs. 1457 and 1465.

Berth Mattress. The mattresses which cover the seat cushions of the lower berth and the springs of the upper berth. When the berths are made up for day travel the mattresses are stored in the upper berth.

Berth Numbers. Figs. 1473. Figures or numbers, usually made of metal or porcelain, for numbering the berths or sections of sleeping cars. They are frequently sewed to plush panels and hung from the berth curtain rods.

Berth Partition. 8, Figs. 1458, 1459. The partition between the upper berths of two adjacent sleeping car sections. It is of the same outline as the upper berth's cross-section.

Berth Safety Rope. 26, Figs. 1458-59. A wire rope fastening the upper berth of a sleeping car to the fixed arms of the lower berth, to prevent accidental closing up of the upper berth in case of overturning of the car. The rope is fastened to the upper berth by a berth safety rope fastener and to the lower berth by inserting a knob into a berth safety rope holder. See SAFETY BERTH LATCH.

Berth Safety Rope Hook. Fig. 1468. A hook for holding a berth safety rope.

Berth Spring. 23, Figs. 1458-59; Fig. 1472. A spring usually made in a spiral form, like a watch spring, coiled within a device called the berth spring fusee and attached to the upper berth of a sleeping car by a berth chain so as to counteract the weight of the latter and make it easy to raise and lower.

Berth Spring Frame. 23, Figs. 1458-59; Fig. 1472. A metal support which holds a berth spring and fusee.

Berth Spring Fusee. See FUSEE.

Berth Spring Lug or **Clip.** M, Fig. 1472. The means by which the end of a berth chain is fastened to the upper berth, sometimes called a berth chain end plate.

Berth Striker Plate. A BERTH LATCH KEEPER.

Beveled Washer. A washer used to give an even bearing for rods which stand at an acute angle to the surface on which the nut or bolt head bears. Sometimes two such washers which come near together are cast in one piece, and are then called double beveled washers. See TRIANGULAR WASHER.

Bezel. "A term applied by watchmakers and jewelers to the groove and projecting flange or lip by which the crystal of a watch is retained in its setting. An ouch."—Knight.

Bibb Cock. Fig. 1602. Literally, a cock with a curved nozzle or spout, but commonly restricted to a cock with a plain valve without springs, moved by the hand only.

Billet Car. A low side gondola car, built of steel throughout for transportation of hot steel billets or other heavy material.

Bit (of a Key). The part of a key which enters the lock and acts upon the bolt and tumblers: The bit consists of the web and wards. The web is the portion left after the wards are cut out. The wards (of a key) consequently are those spaces which fit over the wards of a lock. Some bits have no wards.

Bleeding Valve or **Bleeding Cock.** Another term for RELEASE VALVE or RELEASE COCK. The operation of releasing the brakes when applied upon a car detached from the locomotive is sometimes called bleeding. The bleeding valve is located on the auxiliary reservoir, and the brakes may be released by opening it and allowing the air in the brake cylinder and auxiliary reservoir to escape.

Blind. A WINDOW BLIND. They are sometimes single, but usually double, distinguished as lower and upper. Flexible window blinds are rarely used now, having been displaced by window shades.

Blind Ceiling (Refrigerator Car). L, Figs. 374, 375. A layer of light boards next above the inside ceiling in the roof of the car.

Blind End Car (Passenger Equipment). Figs. 100 and 102. A term sometimes used to designate non-vestibuled cars, but more properly a car without end doors, either non-vestibuled (dummy) or with open platforms.

Blind Floor (Refrigerator Cars). I, Figs. 374 and 375 A layer of boards under the sub-floor and fastened to nailing strips secured to the bottom of the sills.

Blind Lining (Refrigerator Cars). E, Figs. 374 and 375. A thin layer of boards between the outside sheathing and the inside lining; also sometimes called intermediate lining.

Block. "A heavy piece of timber or wood, usually with one plane surface; or it is rectangular and rather thick than long."—Webster.

A pulley or system of pulleys mounted on its frame or shell, with its band or strap. A block consists of one or more pulleys or sheaves, in a groove of which the rope runs, fastened in a shell or frame by pins, on which they revolve.

The interior wheels are termed sheaves, which latter term is often used to designate the whole block or pulley. A snatch block is a block with only one sheave, and with an opening at the side for the ready insertion and removal of the rope. Blocks without this opening, however, are also sometimes termed snatch blocks.

Block and Tackle. A general term applied to a pair or more of pulleys and accompanying rope. Also termed fall and tackle, or simply tackle.

Blocking. A mode of fastening together the vertical angles of woodwork by blocks of wood glued or nailed in the inside angle. The method is largely used in every form of carpentry, where great strength is not required in the joint. In car work, generally known as furring blocks.

Blocking, Continuous (Passenger Equipment Car Framing). 67, Figs. 423-25. A term used to designate planks or blocking used to strengthen the side frame.

Board. "A piece of timber sawed thin, and of considerable length and breadth, compared with the thickness, used for building and other purposes."—Webster.

Boarding Car. Fig. 2673. A term commonly applied to a car used as a place of lodging for workmen. In the case of wreck trains they are more often called dining and sleeping cars.

Body (Of a Car). The main or principal part in or on which the load is placed. American cars usually consist of a body carried on two trucks.

(Of a Valve, Cylinder, etc.) The main or principal part, to which the other parts are attached, as cylinder body, etc.

Body Bolster. 12, Figs. 285-88, 320, 355, 368, 374-5; Fig. 297; 4, Fig. 342; 5, Fig. 383; Figs. 417, 498-523, 1067. The transverse members of the underframe over the trucks which transmit the loads carried by the longitudinal sills to the trucks through the center plates. A double body bolster is a wide bolster with two transverse members, and is used on cars equipped with six-wheel trucks.

Body Bolster Bottom Cover Plate. 12b, Figs. 285-88; 7, Fig. 410; Fig. 490; 2, Fig. 505. The bottom cover plate used on a bolster of the built-up type. Also known as the Body Bolster Compression Bar and Body Bolster Tie Plate.

Body Bolster Compression Bar. 12b, Figs. 285-88. The lower or compression member of a built-up body bolster. Also designated as the Body Bolster Bottom Cover Plate.

Body Bolster Cover Plate. Fig. 490. See BODY BOLSTER TOP COVER PLATE and BODY BOLSTER BOTTOM COVER PLATE.

Body Bolster End Pocket Casting. A cast cap that fits over the end of a combined wood and steel body bolster, through which the truss rods pass, and on which the truss rod nuts bear. It is a body bolster truss rod washer enlarged so as to cover the entire end of the bolster.

Body Bolster Filler. Fig. 490; 19, Fig. 505. A plate or casting forming the filling piece between the cover plates of a built-up body bolster. The term also applies to Truck Bolsters. Also frequently called Diaphragm and sometimes Spider.

Body Bolster Flitch Plates. Plates of iron or steel sandwiched between pieces of wood and bolted together to give a wooden bolster greater strength. Frequently called body bolster sandwich plates.

Body Bolster Sandwich Plates. See Body Bolster Flitch Plates.

Body Bolster Tension Bar. 12a, Figs. 285-88, etc. The upper or tension member of a built-up body bolster. Also designated as the Body Bolster Top Cover Plate.

Body Bolster Tie Plate. 7, Fig. 410; Fig. 490. See Body Bolster Bottom Cover Plate.

Body Bolster Top Cover Plate. 12a, Figs. 285-88; Fig. 490; Fig. 505. The top cover plate used on a body bolster of the built-up type. Also known as the Body Bolster Tension Bar.

Body Bolster Truss Block. A block of wood or distance piece on the top of a wooden body bolster between the center floor timbers and underneath the bolster truss rods.

Body Bolster Truss Rod. A metal rod, used on some built-up body bolsters, which is tied to the ends and passes above the center of the bolster over the truss rod bearing, so as to form a truss; generally two are used for each bolster.

Body Bolster Truss Rod Bearing. See Body Bolster Truss Rod.

Body Bolster Truss Rod Washer. An iron bearing plate on the end of a body bolster; often made to take two or more rods.

Body Brace. 33, Figs. 285-88; 33, 35 and 37, Figs. 374 and 375; 12 and 13, Fig. 383. An inclined member of the body side or end framing. In the usual form of side framing for freight cars the braces are inserted in the panels between the bolster and the center of the car, inclining toward the center of the car, while the counter braces are framed in the panel between the bolster and the end of the car, inclining toward the end of the car. See Brace and Counterbrace.

Body Brace Rod. An inclined iron rod in the side or end of a car body frame, which acts as a brace. They are distinguished as end and side body brace rods. A brace straining rod is a short vertical rod in the side of a passenger car under the window.

Body Center Plate. 6, Fig. 297; 17, Figs. 285-88; 31, Fig. 383; Fig. 490; 11, Fig. 505. The center plate attached to the under side of the body bolster. See Center Plate.

Body Check or Safety Chain Eye. An eye bolt or clevis for fastening a truck check chain or safety chain to the car body.

Body Check or Safety Chain Hook. An iron hook on the check chain, which enters into the check chain eye.

Body Counter Brace Rod. Usually an inclined iron rod in the side frame of a car body, between the bolster and the end of the car. It may be a diagonal brace rod in a Pratt truss, which runs counterwise with those rods which carry the load. It may then be between the bolsters.

Body Cross Tie. 31, Fig. 297. A metal bar extending across a hopper or other form of open-top freight car and fastened to the sides to prevent their bulging.

Body End Furring. Furring in the end of a car. See Furring.

Body End Plate. A transverse member in the end of a car connecting the side plates. See End Plate.

Body End Rail See End Rail.

Body Framing. Figs. 465-75 and General Drawings. The framework of that part of a car above the underframe, so called to distinguish it from the underframe. It is commonly subdivided into side, end and roof framing.

Body Post (Freight Car Bodies). An upright timber which is framed into the sill and plate of a freight car. The body posts and corner posts form the vertical members of the side frame of a car body. See Post and Side Post.

Body Queen Post. See Queen Post.

Body Side Bearing. 16, Figs. 285-88; 8, Fig. 410; Fig. 493; 9, Fig. 505. The upper one of the two side bearings, which is attached to the body bolster. See Side Bearings.

Body Transom. A name sometimes given to a Needle-beam or Cross Tie.

Body Truss Rod. 19, Figs. 285-88; 355, 368, 374-75; 33, Fig. 383; 20, Figs, 423-25; 15, Fig. 505. A rod extending from end sill to end sill, passing over the body bolsters on truss rod saddles and under the truss rod queen posts hung from the cross tie timbers. With the sills they form a truss and support the car body, preventing the sills from sagging between the bolsters. In passenger cars truss rod anchor irons are sometimes used, which are fastened to the sills near the bolsters. The truss rods are then attached to these anchors and are not brought out through the end sills. Truss rods are distinguished as center, intermediate and side or outside truss rods.

Body Truss Rod Bearing. See Queen Post.

Body Truss Rod Hopper Strap. A term applied to a strap passing under and supporting the hopper of a gondola car, the ends of which are fastened to the body truss rods, which carry the stress to the end sills.

Body Truss Rod Saddle. 20, Figs. 285-88, 374-75; 14, Fig. 505. A block of wood or a casting which forms a distance piece on top of a bolster, and on which a continuous body truss rod bears. Properly speaking, a saddle means a common bearing for a pair of rods with a central support, but it is not restricted to such use.

Body Truss Rod Washer. A heavy iron washer on the outside face of the end sill, on which the nut on the end of the body truss rod bears.

Bogie (British). A swiveling car truck. American eight-wheel cars are what are termed in Great Britain bogie carriages, or wagons.

Bogus Plate (Refrigerator Cars). A horizontal timber attached to the posts on the inside of the car, a short distance below the plate. The bogus plates support horizontal cross timbers, called meat timbers, or hanging bars, to which hooks are attached for hanging meat.

Bolster. A cross timber or beam on the under side of a car body and in the center of a truck, through which the weight is transmitted. The bolsters carry the body and truck center plates, the body bolster resting on the truck bolster.

Truck bolsters are either swing bolsters, admitting of lateral motion to mitigate shocks, or rigid bolsters, which permit no lateral motion. All passenger trucks have swing bolsters. In freight car service the rigid bolster has the preference, and rigid bolster trucks are the more numerous. See BODY BOLSTER, DOUBLE BODY BOLSTER, SWING BOLSTER and TRUCK BOLSTER.

Bolster Bridge (Six-Wheel Truck). See SIDE BEARING ARCH.

Bolster Center Casting. 16, Fig. 410; Fig. 491. A hollow rectangular-shaped casting placed between the center sills and body bolster plates; the king bolt passes through it. Sometimes called a bolster center filler.

Bolster Center Filler. See BOLSTER CENTER CASTING.

Bolster Chafing Plate. Figs. 974 and 977. An iron plate attached to the side of the transom to prevent wear from abrasion by movement of the bolster. More properly, transom chafing plate. The corresponding casting on the side of the bolster, which is, strictly speaking, the bolster chafing plate, is commonly called friction block or friction plate.

Bolster Diaphragm. Fig. 490. See BODY BOLSTER FILLER.

Bolster Flitch Plate. The iron or steel plates of a built-up bolster, sandwiched between wood pieces. Rarely used now.

Bolster Guide Bars (Diamond Arch Bar Trucks). 37, Fig. 945. More commonly called columns. Posts between the arch bars, held in place by column bolts, which form a guide for the end of the bolster. These columns are sometimes also required to perform the office of a brake hanger carrier. An offset shoulder is then cast on the column near the top and on the inside with a jaw, to which the brake hanger is fastened by a pin. They are also often combined in one casting with the spring seats. (See Figs. 1100 and 1101.)

Bolster Hanger. See SWING HANGER.

Bolster Hanger Carrier. A SWING HANGER PIN BEARING.

Bolster Jack Screw (Wreck Cranes). A jack screw attached to the spring plank for the purpose of taking the load off the springs and making the entire truck and car body one rigid structure when the derrick of the crane is in use.

Bolster Plate (Passenger Equipment Trucks). Fig. 978. Wrought iron plates bolted to the sides of wooden bolsters to strengthen them.

Bolster Sandwich Plate. See BOLSTER FLITCH PLATE.

Bolster, Specifications for Cast Steel (M. C. B. Recommended Practice).

In 1912 the following specifications were adopted for cast-steel bolsters:

MANUFACTURE.

1. Castings furnished under these specifications must be made of open-hearth steel in accordance with the best foundry methods. They must conform to the dimensions shown on drawings and must be free from rust, scale, blow holes and shrinkage cracks.

2. Each casting must have the following markings cast upon it in raised figures and letters:

a — Initials of the railway company.

b — Month and year in which cast, thus: 6-12.

c — Manufacturer's serial number and trade mark (or other designation).

d — M. C. B. S.

3. The manufacturer shall have cast upon each bolster two test coupons having a cross section of 1⅛ inch by 1⅛ inch and 6 inches long. These coupons are to be used for the physical and chemical tests, and their location upon the casting shall be as specified by the purchaser. There shall be two additional coupons of a cross section not less than the average cross section of the casting, which coupons are to be used to determine the character of the annealing as specified in Section 7.

4. The manufacturer shall protect all castings so that they do not become covered with rust. They must not be painted before inspection unless so specified.

5. Bolsters shall not vary more than 3 per cent. above nor 2 per cent. below what has been determined upon as the normal weight of the casting, except that in case the casting has met all requirements save that of overweight, it may be accepted as of the maximum allowable weight here specified. For the purposes of this requirement, the normal weight shall be previously agreed upon between the purchaser and the manufacturer.

6. When the manufacturer is ready to make shipment of the material he shall notify the purchaser of that fact and await the arrival of the purchaser's inspector, to whom he must furnish free any assistance and labor needed to make satisfactory inspection, tests and prompt shipment.

7. All castings shall be thoroughly annealed. Test coupons shall be annealed with the casting before they are detached. To determine the quality of the annealing, the inspector will have one of the test coupons, mentioned in Section 3, cut half-way through and broken off from the casting for examination of the fracture. If, in his opinion, the annealing has not been properly done, he may require the castings to be reannealed, using the second test coupon for examination in this case. If, after annealing or reannealing, any casting is so much out of gage as to require heating in order to bring it within the gage, it shall again be annealed before it may be accepted.

CHEMICAL PROPERTIES.

8. The chemical composition of the steel shall conform to the following requirements:

Carbon..........from 0.20 per cent to 0.30 per cent.
Manganese ....not over 0.70 per cent.
Phosphorus ....not over 0.05 per cent.
Sulphur ....not over 0.05 per cent.

PHYSICAL PROPERTIES.

9. The physical properties of the steel shall be as follows:

Ultimate tensile strength, pounds per square inch.............................not under 60,000
Yield point (by "drop of the beam")..........
not under 50 per cent. of the ultimate strength
Elongation in 2 ins., per cent....not less than the quotient of 1,400,000 divided by the ultimate strength

10. For the purpose of determining whether the physical and chemical requirements are complied with, the inspector shall select at random one casting from each heat. From this casting, the two physical and chemical test coupons (referred to in Section 3) shall be removed by the inspector. One of them shall be subjected to physical tests, but if the coupon casting proves unsound, the other coupon shall be used in its stead for this purpose. From the coupon which has satisfactorily passed the physical requirements, borings shall be made for chemical analysis. In case the test pieces selected do not meet the specifications, all castings from the entire heat represented shall be rejected.

11. At his option, the inspector may require that any or all castings be subjected to sand blast in order to make an examination of the surface for checks or cracks.

12. From each casting rejected by the inspector under

these specifications he shall cause to be chipped the "S" of the letters M. C. B. S. which are specified in paragraph 2.

Bolster Spring. 80, Figs. 945, 947, 966; Figs. 1102-09; 1111-14. The main spring of a car, carried on the spring plank and supporting the truck bolster, on which the weight of the car body rests.

Bolster Spring Cap. See SPRING CAP and SPRING SEAT.

Bolster Spring Seat. See SPRING SEAT.

Bolster Thimble. 4, Fig. 505. A small filler sometimes used between the cover plates of a bolster when the main filler or web does not extend clear to the end of the bolster.

Bolt. A pin, rod or bar of metal used to hold or fasten anything in its place; ordinarily a bolt has a head on one end and a screw and nut on the other, while a rod has a nut on both ends.

Bolt Heads and Nuts. See SCREW THREADS, BOLT HEADS AND NUTS.

Bolt Heads, Square. In 1899 the following dimensions for square bolt heads were adopted as Recommended Practice:

The side of the head shall be one and one-half times the diameter of the bolt, and the thickness of the head shall be one-half the side of the head.

In 1900 these dimensions were adopted as a Standard.

Bolted Commutator (Motor Cars). Fig. 2535. A motor commutator in which the segments and mica insulation are held in place between two retaining rings by bolts.

Bonnet (Passenger Cars). A PLATFORM HOOD.

Boom (Steam Shovel). The heavy swinging arm which carries the boom engine and ratchet beam. It is stepped at the foot of the "A" frame and held in its inclined position by boom guys.

Boom Cap Clevis (of a Derrick, Steam Shovel or Crane). A clevis sometimes attached to the upper end of the boom, to which the fixed end of the hoisting rope is attached. In other cases the clevis for this purpose is carried on the hoisting block.

Boom Engine (Steam Shovel). An engine mounted on the boom to operate the ratchet beam.

Boom Foot Sheave (Steam Shovel). A fixed sheave or pulley at the bottom of the boom over which the hoisting chain is passed.

Boom Guys (Steam Shovel). Iron rods from the point of the boom to the top of the "A" frame, holding the boom in its inclined position.

Boom Idler Sheave (Steam Shovel). A fixed sheave mounted on the boom, the purpose of which is to slightly change the direction of the hoisting chain.

Boom Point Sheave (Steam Shovel). The pulley at the outer end of the boom over which the hoisting chain runs. See BOOM SHEAVE.

Boom Sheave (of a Derrick, Steam Shovel or Crane). A sheave carried at the upper extremity of the boom, over which the hoisting chain passes.

Boom Shoe (of a Derrick or Crane). A casting carried at the foot of the mast and constructed so as to be able to revolve against the boom base. It is supported by boom shoe rods.

Boom Shoe Rods (of a Derrick or Crane). Iron rods attached to the head block or cap at the top of the mast and supporting the boom shoe.

Boom Shoe Rollers (of a Derrick or Crane). Rollers at the foot of the mast upon which the boom shoe revolves.

Boom Step and Trunnion (Steam Shovel). The socket in which the boom is seated and about which it turns.

Booster. A direct electro-motive force generator arranged to add its E. M. F. to that of another circuit, or "boost" the same. Direct opposite of bucker.

Boss or Hub (of a Steel Tired Wheel). The central portion, through which the axle passes. Boss is the usual British term, but little used in the United States.

Bottom Arch Bar. See ARCH BARS.

Bottom Chord (of Trusses). See LOWER CHORD. Neither term is regularly used to designate any part of car trusses, but the side sills are bottom chords in trussed side frames.

Bottom Connecting Rod. 97, Figs. 945, 947, 966. The brake rod connecting the bottom ends of the live and dead truck brake levers.

Bottom Door Rail. 5, Figs. 805 and 809. The lower transverse piece of a door frame.

Bottom Door Track. 66, Figs. 285-88. A door track below a sliding door. Usually a metal bar. Sliding doors are often provided with rollers or slides, which rest on the track. Freight car doors usually slide on a TOP DOOR TRACK.

Bottom Rod. See BRAKE ROD and BOTTOM CONNECTING ROD.

Bottom Truck Connection. See BOTTOM CONNECTING ROD.

Bow. See PLATFORM HOOD BOW.

Bowl. Figs. 2386, etc. A glass bowl used on center and vestibule gas lamps. See, also BASIN.

Box. See JOURNAL BOX.

Box Car. Figs. 1-15, 261-89 and 489-94. A car with sides enclosed and with a roof; doors are placed in the sides or sides and ends. Used for general service and especially for lading which should be protected from the weather. See CAR, M. C. B. Class XM.

Box Car Details. Figs. 489-94.

Box Car Door. Figs. 764-97. See DOOR. Used on both the sides and ends of the car. See END DOOR.

Box Car Side and End Door Fixtures. See DOOR FIXTURES.

Box Car, Ventilated. See VENTILATED BOX CAR.

Box Cars, Framing for (M. C. B. Recommended Practice). Fig. 2762.

In 1904 the style of framing shown on the drawing for cars of 60,000 pounds capacity was adopted as Recommended Practice.

In 1904 the style of framing shown on the drawing for cars of 80,000 pounds and 100,000 pounds capacity was adopted as Recommended Practice.

In 1904 the style of end framing shown on the drawing for cars of 60,000 pounds, 80,000 pounds and 100,000 pounds capacity, was adopted as Recommended Practice.

In 1904 the use of a plank lining 1¾ inches thick, on the inside of the ends of cars, extending from the floor to the underside of the carline, was adopted as a Recommended Practice.

Box Cars, Height and Width of (M. C. B. Recommended Practice).

In 1904 the following dimensions for box cars built on low trucks (3 feet 6 inches to top of floor) were adopted as Recommended Practice:

Height from top of rail to upper edge of eaves, 12 feet ¾ inch; width at eaves at above height, maximum, 9 feet 7 inches.

Box Cars, Inside Dimensions of (M. C. B. Recommended Practice).

In 1904 the inside dimensions of box cars approved by the American Railway Association, namely, 36 feet long, 8 feet 6 inches wide and 8 feet high, were adopted as a Recommended Practice.

Box Cover. See JOURNAL BOX LID.

Box Cushion. A cushion for passenger car seats made on a wooden frame. In distinction from a squab cushion, now little used, which is a loose pad on the seat. Box cushions are sometimes stuffed with hair or other elastic material alone, but usually steel springs are used in addition.

Box Fruit Car. See VENTILATED BOX CAR.

Box Guide. See PEDESTAL.

Box Lid. See JOURNAL BOX COVER or LID.

Box Packing. JOURNAL PACKING.

Box Section Bolster. Fig. 498. A bolster whose cross-section has a box or rectangular shape.

Box Steps. A term sometimes used to distinguish platform steps made with wooden stringers or sides from open steps.

Box Stock Car. An ordinary box car with large grated openings for ventilation, but excluding rain. Little used except for horses. See STOCK CAR.

Boxes, Journal and Details. See JOURNAL BOXES AND DETAILS.

Brace. 33, Figs. 285-88; 33 and 37, Fig. 368; 33, 35 and 37; Figs. 374-75; 12 and 13, Fig. 383; 51, Figs. 423-25. An inclined beam, rod, or bar of a frame, truss, girder, etc., which unites two or more of the points where other members of the structure are connected together, and which prevents them from turning about their joints. A brace thus makes the structure incapable of altering its form from this cause, and it also distributes or transmits part of the strain at one or more of the joints toward the point or points of support, or resistance to that strain. A brace may be subjected to either a strain of compression or tension. In the former case, in car construction it is called simply a brace; in the latter it is called a brace rod. They are called right or left handed, according to the inclination of their top to a person standing facing the car. See BERTH BRACE, BODY BRACE, BRAKE LEVER BRACKET BRACE, BRAKE SHAFT STEP BRACE, COMPRESSION BEAM BRACE, DOOR BRACE, END BRACE, ROOF BRACE, SIDE BRACE, SIDE BODY BRACE, SIDE LAMP BRACE.

Brace Pocket. A casting which forms a socket for holding the ends of the braces in the car body framing. See POST POCKET.

Brace Rod. 34 and 37a, Figs. 285-88, 374-75. An inclined iron rod which acts as a brace. A vertical rod acting in conjunction with a brace is called a sill and plate-tie rod, or, in passenger cars, for short rods below the window, brace straining rod. See BODY BRACE ROD, COUNTERBRACE ROD.

Brace Rod Washer. 38, Figs. 285-88; 374-75; Fig. 494. A bearing plate for the nut or head of a brace rod, sometimes made in a triangular or beveled shape, and sometimes a flat bar of iron bent to fit into a notch cut in the timber.

Brace Straining Rod (Passenger Car Framing). A vertical iron rod in the side or end frame of a car body by which the upper end of a brace is connected or tied to the sill of the car. The brace rods are members of the truss, of which the sill, braces, posts or plates, etc., form parts. Such rods often have hook heads at the upper ends, against which the braces bear, and nuts at the lower ends by which they are screwed up, and are thus brought into a state of tension and the braces into compression. An equivalent in freight service is the sill and plate-tie rod.

Brace and Tie Rod Washer. Fig. 494. See BRACE ROD WASHER.

Bracket. "An angular stay in the form of a knee to support shelves and the like."—Webster.

(Framing for Bridges or Cars.) An L-shaped angle plate riveted to each of two members which it is desired to connect at right angles to each other, as an end sill bracket or sill knee iron. A stronger form, now used in car construction, is called a gusset plate.

(Cast Iron Wheels). The stiffening ribs cast on the plate.

Bracket Gas Burner. A gas burner attached to the side of a car. See BRACKET LAMP.

Bracket Lamp. Figs. 2118, 2124, 2132, 2166, 2228, 2250, etc. A lamp attached to a wall by a suspension in the form of a bracket.

Bracket Steps (Hopper Cars). Steps secured to the side of the car on the inside to serve as a substitute for a running board.

Brake or Brake Gear. The whole combination of parts by which the motion of a car is retarded or arrested. The foundation brake gear includes all the parts by which the pressure of the air in the brake cylinder is transmitted to the wheels. See HIGH SPEED AIR BRAKE, QUICK ACTION BRAKE, STRAIGHT-AIR BRAKE, FOUNDATION BRAKE GEAR, TRACTION AIR BRAKE, VACUUM BRAKE.

Brake Beam. Figs. 1154-1222; 84, Figs. 945, 947, 966. Transverse members to which the brake heads and shoes are attached. They are either inside hung or outside hung, and are often trussed, especially in passenger service.

Brake Beam Adjusting Hanger. A link sometimes attached to a brake beam to cause the latter and the brake head and shoe to maintain the same relative positions when the brakes are released, so as to prevent the ends of the brake shoes from coming in contact with the wheel when the brakes are released. It is attached to the truck frame or truck bolster by a projecting brake beam adjusting hanger carrier, and to the brake beam by an eye or clip. Sometimes called a parallel brake hanger.

Brake Beam Chafing Plate. A plate attached to a brake beam against which a brake spring bears, designed to resist the wear due to the action of the spring.

Brake Beam Details (M. C. B. Recommended Practice).

In 1907 the following details regarding brake beams were adopted as Recommended Practice:

That brake hangers shall have an angle as near as possible to 90 degrees from a line drawn from the center of the brake shoe to the center of the axle when the shoes are half worn.

In 1910 a Recommended Practice was adopted that all beams be inside hung beams.

In 1912 the practice was adopted that, in order to designate an M. C. B. brake beam, the letters "M. C. B." and the numerals "No. 1" or "No. 2," as the case may be, be cast, forged or stamped on the fulcrum, and that after January 1, 1913, this be cast on the fulcrum if the fulcrum be a casting, or forged on the fulcrum if the fulcrum be a forging.

Brake Beam, Details and Capacities (M. C. B. Standard). Fig. 2701.

Certain dimensions and capacities of brake beams were adopted as standard of the association, by letter ballot, in 1889, and these standards, as modified by subsequent action, are shown on the drawing for iron brake beams.

Standard heights of brake beams, when measured from the tops of the rails to the center of the face of new shoes, were adopted in 1894, as follows:

For inside hung beams, 13 inches.

For outside hung beams, 14½ inches.

In 1907 the following details for brake beams and gages were adopted as standard:

All brake beams shall be 60¼ inches in length from center to center of brake head, with an allowable variation of ⅛ inch in either direction.

All brake beams shall be proven by gage shown on the drawing, which shall be the standard gage for that purpose.

Attachments for safety hangers shall be 51 inches from center to center.

The angle of the lever fulcrum shall be 40 degrees from the vertical.

The lever pin hole shall be either 2 inches or 3 inches in front of the top of the brake-head lugs. The variations in either direction from above measurements shall not exceed 1-16 inch. Holes should be made straight and true by drilling, reaming or broaching, and shall be not less than 1 3-32 inches nor more than 1⅛ inches in diameter.

All lever pin holes shall be proven by gage shown on the drawing, which shall be the standard gage for that purpose.

In 1908 the following detail regarding brake beams was advanced from Recommended Practice to Standard:

Brake beam hangers shall be ⅞ inch in diameter.

In 1908 two brake beams were adopted as standard, as follows:

Brake beam No. 1 to be suitable for cars weighing not over 35,000 pounds light weight.

Brake beam No. 2 to be suitable for cars exceeding 35,000 pounds light weight.

In 1909 the following was adopted to establish a uniform practice for designating right and left-hand brake beams:

When facing back of brake beam with center strut pointing away from observer, where the top of lever slot inclines toward the right it shall be known as right-hand beam, and where top of lever inclines toward the left it shall be known as left-hand beam.

On cars built after September 1, 1909, it will not be permissible to hang brake beams from any portion of the body of the car.

In 1910 the drawing of the brake head was modified as regards the size and shape of the hanger hole.

In 1910 the following Recommended Practice was advanced to Standard:

The brake beam hanger bracket shall be attached to some rigid portion of the truck.

In 1911 the use of brake beam No. 2 was extended as follows: Beam No. 2 must be used on cars of more than 35,000 pounds light weight, and it may be used on cars of 35,000 pounds light weight or less.

Brake Beam Eye Bolt. An eye bolt in the brake beam to which the safety hanger is attached.

Brake Beam Fulcrum. See BRAKE LEVER FULCRUM.

Brake Beam Gage. A metal templet for ascertaining or regulating the several dimensions of brake beams.

Brake Beam Gage (M. C. B. Recommended Practice). Fig. 2757. In 1907 a brake beam gage was adopted as standard. In 1912 this gage was redesigned and adopted as Recommended Practice. It determines the following dimensions and adjustments: (1) Limiting outline of brake beam; (2) length of beam; (3) proper alignment of the heads in relation to each other; (4) proper location of pin hole and center of strut; (5) angle of lever fulcrum.

Brake Beam Gage Limiting Outlines (M. C. B. Standard). Fig. 2700. In 1911 a limiting outline gage shown for No. 2 brake beams used on cars built after January 1, 1908, was adopted as standard.

Brake Beam Hanger. Figs. 975 and 978. A link or bar used in suspending a brake beam from a truck frame.

Brake Beam King Post. See BRAKE BEAM STRUT.

Brake Beam Release Spring. See RELEASE SPRING.

Brake Beam Safety Chain. A chain sometimes attached by eye bolts to a brake beam to act as a safety device in the same manner as a brake beam safety hanger.

Brake Beam Safety Chain Eye Bolt. An eye bolt attached to a truck or car body to hold a brake beam safety chain.

Brake Beam Safety Hanger. 90, Figs. 945, 947 and 966. A metal strap suspended from a truck frame and surrounding a brake beam, so that in case of a broken brake beam hanger the beam will not drop to the track.

Brake Beam Specifications and Tests (M. C. B. Standard).

For each 500 brake beams or less, which pass inspection and are ready for shipment, one representative beam shall be taken at random and subjected by the company manufacturing the beams, and in the presence of the railroad company's inspector, to the following test in a suitable machine:

The beams shall be equipped with suitable heads and shoes, and the shoes placed in contact with castings representing the tread of the wheel; when mounted in this manner the load shall be applied to the fulcrum in the normal line of pull.

a. *Beam No. 1:*

Apply an initial load of 4,000 pounds, then reduce it to zero.

Apply a test load of 6,500 pounds and under this load measure the deflection which is desired to be 1-16 inch or .0625, but shall not exceed 0.07 inch.

If desired, the beam may then be loaded until failure occurs. Under this test the maximum load borne by the beam shall not be less than 20,000 pounds.

b. *Beam No. 2:*

Apply an initial load of 6,000 pounds, then reduce it to zero.

Apply a test load of 12,000 pounds and under this load measure the deflection which is desired to be 1-16 inch or .0625, but shall not exceed 0.07 in.

If desired, the beam may then be loaded until failure occurs. Under this test the maximum load borne by the beam shall not be less than 38,000 pounds.

In case a beam shall fail in this test, then a second beam shall be taken from the same lot and similarly tested. If the second beam stands the test it shall be optional with the inspector whether he shall test a third beam or not. If he does not do so, or if he does, and the third beam stands the test, the 500 beams or less shall be accepted as filling the requirements of this test.

Individual beams will not be accepted which (1) do not conform to standard dimensions, and (2) those that have physical defects. Any lot of 500 beams, or less, submitted for test that fail to meet the prescribed test will not be accepted.

Brake Beam Strut. A post or distance piece which forms a bearing for the truss rods of a brake beam. In metal brake beams the brake lever is attached to it, and it then becomes a brake lever fulcrum. For application to brake beams, see Fig. 1158, etc.

Brake Beam Truss Rod. A rod used to truss or strengthen a brake beam.

Brake Block. Another name for a BRAKE HEAD.

Brake Carrier. See BRAKE HANGER CARRIER.

Brake Chain. See BRAKE SHAFT CHAIN.

Brake Chain (M. C. B. Standard). Fig. 2709. In 1909 dimensions for brake chains were adopted as Recommended Practice. Advanced to Standard in 1911. See HAND BRAKE CHAIN.

Brake Chain Connecting Rod. An iron rod connecting the hand brake chain to one of the brake levers, usually the floating lever.

Brake Chain Sheave. An iron wheel or pulley around which the brake chain passes.

Brake Chain Worm. A conical casting attached to the brake shaft with a screw-shaped groove for the brake chain. Its object is to produce a rapid motion at first and increase the power when the brake shoes are brought to a bearing.

A cylindrical casting with a screw-shaped groove, intended only to make the chain wind evenly.

Brake Clevis. A BRAKE LEVER FULCRUM.

Brake Connection. See BRAKE ROD.

Brake Connection Pin. Fig. 977. A pin used for connecting brake rods and levers.

Brake Cord Guide. A guide similar to a signal cord guide for the air-brake cord, which passes through cars fitted with automatic air brake apparatus, and operates the conductor's valve.

Brake Cut-out Cock. Figs. 1300, 1339, 1359. A valve inserted in the branch pipe from the brake pipe to the triple valve, which can be closed and the brakes on that one car put out of action in case they are not working properly. The closing of this valve does not interfere with the operation of the brakes under any other car in the train.

Brake Cylinder (Air Brake). C, Figs. 285-88; Figs. 1286-98, 1337. A cast-iron cylinder attached to the frame of the car, containing a piston which is forced outwardly by the compressed air to apply the brakes, and when the air pressure is released is returned to its normal position by a release spring coiled about the piston rod inside the cylinder. On passenger cars the brake cylinder is fitted with two heads, the pressure head and the non-pressure head. For freight cars the brake cylinder and the auxiliary reservoir are usually combined, the reservoir being bolted to one end of the cylinder and forming one of the cylinder heads. The piston rod of the passenger brake cylinder, Fig 1286, has a crosshead at its outer end, to which is attached the cylinder lever. The piston rod of the freight brake cylinder, Fig. 1289, is hollow and loosely encloses a push rod, which is attached to the cylinder lever. In the vacuum brake a somewhat similar cylinder is used.

Brake Cylinder Block. A block of wood shaped to fit over the curved surface of a brake cylinder and act as a filler between the cylinder and the sill to which it is attached.

Brake Cylinder Lever. Fig. 489. See CYLINDER LEVER.

Brake Cylinder Lubricator. Fig. 1398. A device for lubricating the brake cylinder.

Brake Cylinder Pipe (Air Brake). The pipe which connects the brake cylinder with the triple valve.

Brake Cylinder Plate. The steel plate to which a brake cylinder is bolted and by which it is attached to the sills.

Brake Cylinders, Cleaning and Lubricating. See AIR BRAKES, CLEANING AND TESTING OF.

Brake Dog. A BRAKE PAWL.

Brake Foot Board. A BRAKE STEP.

Brake Gear. See AIR BRAKES, GENERAL ARRANGEMENTS AND DETAILS; FOUNDATION BRAKE GEAR.

Brake Gear, Foundation. See FOUNDATION BRAKE GEAR.

Brake Guard Rail. 190, Fig. 368. A rail sometimes placed around the hand brake wheel on box and other house cars to prevent the brakeman falling off in case he misses his footing while applying the hand brakes.

Brake Hanger. 144, Figs. 285-88; 86, Figs. 945, 947 and 966; Fig. 975. A link or bar by which brake beams and attachments are suspended from a truck frame or car body. It is attached to the truck or car body by a brake hanger carrier.

Brake Hanger Carrier. 87, Figs. 947 and 966; Figs. 975 and 977. An eye or U-bolt, a casting or other fastening by which a brake hanger is attached to the truck or body of a car.

Brake Hanger Pin or **Bolt.** Fig. 975. A pin passing through the brake hanger carrier and brake hanger and supporting the hanger.

Brake Head. 142, Figs. 285-88; 83, Figs. 945, 947, 966, 1223-1227; 1229. A casting attached to a brake beam which carries the detachable brake shoe. For application to brake beams see Fig. 1154, etc.

Brake Head Gage (M. C. B. Standard). Fig. 2697.

In 1907 a brake-head gage was adopted as standard. In 1912 a brake-head gage was adopted for gaging the top and bottom slot in the head.

Brake Head and Shoe (M. C. B. Standard). Figs. 2698-99.

The brake head and shoe shown on this drawing, known as the Christie brake head and shoe, were adopted as a standard of the Association, by letter ballot, in 1886, with the exception of some slight modification in details made since that date. Drawing revised in 1896, 1898 and 1907.

The revision made in 1896 consisted in the modification of the designs of brake head and shoe so as to secure increased clearance at the ends of shoe and equal clearance both above and below the central lug on the back of the shoe; also, the addition of brackets to support the lower bridge lug of brake head similar to the brackets formerly used to support the upper bridge lug. The taper of the shoe was altered so that it would correspond with the taper of the standard wheel tread, by increasing the thickness of the inner edge of the shoe from 1 3-16 inches to 1 5-16 inches.

The revision made in 1898 consisted in reducing the clearance allowed on either side (above and below) the central lug of brake shoe and adjacent lugs of brake head from ⅛ inch to 1-16 inch—the change being made wholly in the head and no change in the shoe.

In 1907 the drawing was further revised to show only the standard dimensions of the brake head, and also in the combined drawing of the brake head and shoe.

The drawing showing the shoe was also revised in part, as well as the drawing showing the relation of ends of head and shoe.

In 1908 the projection, top and bottom, at back of brake shoe, which forms spacer between lugs of brake head, was increased to 9-16 inch in depth.

In 1909 the center lug, and recess for same, in brake head was changed so that the width of lug comes flush with side face of shoe to provide better bearing for center lug of brake shoe and also to prevent twisting of head.

In 1910 a standard was adopted that all inserts in brake shoes must extend in new shoes to a depth equal to at least one-half of the total shoe depth.

In 1912 the drawing was redrawn.

Brake Hose. See AIR BRAKE HOSE.

Brake Jaw. Fig. 1240, etc. Jaws which may be fastened to standard rods to form brake rods.

Brake Lever (Air Brakes). Fig. 489, 92, Figs. 945, 947, 966, 975, 1237, 1243, 1254. A general term designating all the levers in the FOUNDATION BRAKE GEAR. Also a lever used for applying the hand brake in vestibuled passenger-equipment cars where there is not room for the use of a brake wheel. See also DEAD LEVER, LIVE LEVER, FLOATING LEVER, CYLINDER LEVER.

Brake Lever Bracket. A wrought iron knee on the under side of a car, to which the fulcrum of a brake lever is sometimes attached.

Brake Lever Bracket Brace. A diagonal wrought iron brace to stiffen the brake lever bracket.

Brake Lever Clevis. A BRAKE LEVER FULCRUM.

Brake Lever Coupling Bar (Inside Hung Brakes). See BOTTOM CONNECTING ROD.

Brake Lever, Designation of. See FOUNDATION BRAKE GEAR.

Brake Lever Fulcrum. Fig. 490; 93 Figs. 945, 947, 966; Figs. 977, 1255. A forked iron attached to a brake beam, by means of which a brake lever is connected to the beam. The form shown in Fig. 977 forms a fulcrum for and also connects the two center levers of a six-wheel truck. In a trussed metal brake beam the king post of the brake beam becomes the brake lever fulcrum. For application of brake lever fulcrums, see Fig. 1154, etc.

Also a bracket attached to an underframe to support a brake lever, and to which the lever is held by a pin in such a manner that it moves about the pin.

Brake Lever Fulcrum Tie Plate. Fig. 490. A U-shaped plate, riveted at both ends to a plate which acts as a bracket. The brake lever is inserted in the opening between the two and held in place by a pin passing through all three. See BRAKE LEVER FULCRUM.

Brake Lever Guide. An iron bar which guides the upper end of a brake lever. Further distinguished as live lever and dead lever guides, the latter provided with pins for readjustment as the brake shoes wear, and also called a brake lever stop. See DEAD LEVER GUIDE.

Brake Lever Jaw. A BRAKE LEVER FULCRUM.

Brake Lever, Marking of. See FOUNDATION BRAKE GEAR.

Brake Lever Pin Hole Gage (M. C. B. Standard). Fig. 2700. In 1907 the lever pin hole gage shown on the drawing was adopted as standard.

Brake Lever Stop. See DEAD LEVER GUIDE.

Brake Lever Strut. A brake lever coupling bar or bottom rod connection.

Brake Mast. 14, Fig. 297. See BRAKE SHAFT.

Brake Pawl (Hand Brake). Fig. 494. A small pivoted iron bar for engaging in the teeth of a brake ratchet wheel to prevent the wheel turning backward, and thus releasing the brakes. It is placed in such a position as to be worked into engagement by the foot or a brake pawl weight, and out by the foot.

Brake Pawl Carrier. See BRAKE PAWL and BRAKE RATCHET WHEEL.

Brake Pawl Weight. Fig. 494. A pivoted casting serving as a weight to throw up the brake pawl so that it will engage with the ratchet when the latter is located on the under side of the brake ratchet wheel. Also sometimes applied to an eccentric which holds a pawl against a ratchet wheel.

Brake Pin or **Brake Lever Pin.** A small metal pin used in the brake lever connections.

Brake Pipe (Air Brake). P, Figs. 285-88. A pipe extending from one end of the car to the other under the car body and connected to the pipes on adjoining cars by flexible brake hose. The air from the air pump or compressor is conveyed through the brake pipe to the auxiliary reservoir under each car. The brake pipe is normally filled with compressed air at 70 pounds pressure and the auxiliary reservoirs with air at the same pressure. A reduction of this pressure in the brake pipe of from 5 to 20 pounds causes the triple valves to open communication between the auxiliary reservoir and the brake cylinder, so that the compressed air stored in the reservoir acts on the piston and brake levers and applies the brakes. This is called a service application. In case the train parts or a hose bursts, the air is suddenly and completely released from the brake pipe and the triple valves automatically apply the brakes as before, only with more speed and greater power at first. In an emergency application the full main reservoir pressure of 90 to 110 pounds is turned into the brake pipe and this increase of pressure causes the triple valves to open communication from the brake pipe direct to the brake cylinder, applying the brakes with great force and very suddenly. To release the brakes the brake pipe pressure is restored to normal and the triple valves equalize the pressures in the auxiliary reservoirs and the brake pipe, at the same time opening the brake cylinder to the atmosphere and releasing the brakes. This pipe is sometimes called train pipe, train line, or train brake pipe, but its proper name is brake pipe to distinguish it from the signal and steam heating pipes.

Brake Pipe Air Strainer. Figs. 1303, 1358. A wire strainer inserted in the brake pipe to prevent foreign matter from entering the brake apparatus under the car. See also CENTRIFUGAL DIRT COLLECTOR.

Brake Ratchet Wheel (Hand Brake). 103, Figs. 285-88; 26, Fig. 297; Figs. 494, 1405-7, 1409-10, 1420-21. A wheel attached to a brake shaft, having teeth shaped somewhat like saw teeth, into which a pawl engages, thus preventing the wheel and shaft from running backward. In some forms the ratchet wheel has the ratchet on the under side, instead of on the edge, the brake pawl being automatically pressed upward against the teeth by a Brake Pawl Weight, and without being adjusted by the foot of the brakeman. The brake pawl is pivoted in the Brake Pawl Carrier, the latter being bolted to the roof of the car.

In 1879 the M. C. B. Convention recommended that the practice of placing the ratchet gear on a small platform or brake step be discontinued, and that it be fastened to a suitable casting on the roof. Their recommendation has not been universally adopted, though it is a very common practice.

Brake Rod. Fig. 490; 97, Figs. 945, 947, 966; Figs. 977, 1251. A rod connecting brake levers and through which the braking force is transmitted.

Brake Rod Guide. Fig. 492. A wrought iron bracket attached to an underframe as a support for a brake rod.

Brake Rods and Levers, Designation of. See FOUNDATION BRAKE GEAR.

Brake Safety Strap. See BRAKE BEAM SAFETY HANGER.

Brake Shaft. 94 and 95, Figs. 285-88; 14, Fig. 297; 94, Figs. 320, 368, 374 and 375; Fig. 489. An iron shaft, usually vertical, and having a hand wheel on one end, by means of which a chain connected to the brake levers may be wound on the shaft and the brakes applied. It is sometimes made horizontal. See also SAFETY APPLIANCES, DROP BRAKE SHAFT, and BRAKE STAFF HEIGHT.

Brake Shaft Bearing. 96, Figs. 285-88; Fig. 493. A metal eye by which a brake shaft is held in its place, and in which it turns. Sometimes called brake shaft guide. See BRAKE SHAFT STEP, LOWER BRAKE SHAFT BEARING, UPPER BRAKE SHAFT BEARING.

Brake Shaft Bevel Gear Wheel. A bevel gear on the lower end of the brake shaft engaging with a similar gear on the horizontal brake chain worm.

Brake Shaft Bracket. Fig. 1411. A support for holding a brake shaft in its place.

Brake Shaft Chain. 104, Figs. 285-88; Fig. 489. A chain connecting the brake shaft with the brake levers through the brake shaft connecting rods, to the end of which it is attached. The force exerted on the shaft is transmitted by this chain.

Brake Shaft Chain Sheave. 105, Figs. 285-88. A roller over which a brake shaft chain passes. A sheave attached to the end sill for the chain of a horizontal brake shaft to work in.

A sheave or pulley is sometimes attached to the end of the hand brake connection and the brake chain, secured at one end to the end sill of the car, is passed around this sheave and back to the brake shaft winding drum. It thus doubles the power of the hand brake, but also doubles the amount of chain to be wrapped and is objectionable from this standpoint.

Brake Shaft Connecting Rod. A rod which is attached at one end to a brake chain and at the other to one of the levers in the foundation brake gear.

Brake Shaft Gear Wheel. A bevel gear wheel attached to the brake shaft, by which the power applied to the brake hand wheel is conveyed to a horizontal winding shaft or worm, called a brake chain guide casting.

Brake Shaft Guide. See BRAKE SHAFT BEARING.

Brake Shaft Holder. See BRAKE SHAFT BEARING.

Brake Shaft Sleeve. Figs. 1408, 1414-5. That part of a brake shaft on which the brake chain is wound.

Brake Shaft Step. 98, Figs. 285-88; 97, Figs. 374 and 375; Figs. 492, 1408, 1414. A bearing which holds the lower end of a brake shaft. It usually consists of a U-shaped bar of iron, the upper ends of which are fastened to the car body, with a hole in the bar which receives the end of the shaft. The brake shaft step should not be confounded with a brake step, which latter is a shelf on which the brakeman may step when applying brakes.

Brake Shaft Step Brace. A wrought iron brace sometimes attached to the brake shaft step to resist the pull of the brake chain.

Brake Shaft Thimble. An iron bushing attached to the end of the car to form a bearing for a brake shaft.

Brake Shoe. 98, Figs. 947, 966; Figs. 1258-61. A piece of metal shaped to fit the tread of a car wheel and attached by a key or otherwise to a brake block or brake head. The brake shoe rubs against the tread of the wheel when the brakes are applied. See also WHEEL TRUING BRAKE SHOE.

Brake Shoe Back. Figs. 1259, etc. Steel backs are often used for cast shoes to reinforce and strengthen them.

Brake Shoe Gage (M. C. B. Standard). Fig. 2697. In 1910 a brake shoe gage shown on the drawing was adopted as standard.

Brake Shoe Key. A key or wedge by which a brake shoe is fastened to a brake head.

Brake Shoe, Specifications for (M. C. B. Standard).

In 1901 specifications for brake shoes were adopted as standard as a result of letter ballot. In 1910 they were replaced by the following:

a. Shoes shall be tested for coefficient of friction and for wear upon the Master Car Builders' Association testing machine, or upon a machine with equivalent characteristics.

Coefficient of Friction.

b. Shoes shall develop upon the *cast-iron wheel,* in effecting stops from an initial speed of 40 miles per hour, a mean coefficient of friction of not less than
22 per cent. when the brake-shoe pressure is 2,808 lbs.
16 per cent when the brake-shoe pressure is 6,840 lbs.

c. Shoes shall develop upon the steel or *steel-tired wheel,* in effecting stops from an initial speed of 65 miles per hour, a mean coefficient of friction of not less than
12½ per cent when the brake-shoe pressure is 6,840 pounds.
11 per cent when the brake-shoe pressure is 12,000 pounds.

d. No limitation is placed upon the rise in coefficient of friction at the end of the stop.

Shoe Wear.

e. Shoe wear shall be determined upon the *cast-iron wheel* by making not less than 100 applications of the shoe to the wheel, under a pressure of 2,808 pounds, and at a constant peripheral speed of the wheel of twenty miles per hour. At each application the shoe shall remain in contact with the wheel during 190 revolutions of the latter, and between applications the shoe shall remain out of contact during 610 revolutions of the wheel.

Under these conditions, the shoe shall lose in weight not more than 0.8 of a pound for each 100,000,000 foot-pounds of work done.

f. Shoe wear shall be determined upon the steel or *steel-tired wheel* by making not less than ten stops from an initial speed of sixty-five miles per hour and under a pressure of 12,000 pounds. Ten minutes shall intervene between successive applications of the shoe.

Under these conditions, the shoe shall lose in weight not more than 4.0 pounds for each 100,000,000 foot-pounds of work done.

g. When a shoe not entirely metallic in its composition is tested for wear, its actual loss in weight shall be increased in the ratio which the density of cast iron bears to the mean density of the abraded parts of the shoe, in order to determine the weight which is to be compared with the specifications.

2. That the back of the shoe be made to conform to the gage shown in Fig. 2697.

In 1912 the drawing of the brake head was changed to show the hanger hole straight with a radius of 3/8 inch at each end, to accommodate the straight hanger with filleted corners.

Brake Slack Adjusters. A device to take up any slack in the brake gear between the air brake cylinder and the brake shoe, so that the piston travel shall not be too great. See SLACK ADJUSTER.

Brake Spool. See BRAKE SHAFT SLEEVE.

Brake Spool Step (Logging Cars). A U-shaped strap inclosing the brake spool, and equivalent to a brake shaft step.

Brake Spring. See RELEASE SPRING.

Brake Staff. See BRAKE SHAFT.

Brake Staff Carrier Iron (M. C. B. Standard). In 1908 a Recommended Practice was adopted to use a "U"-shaped carrier iron for brake shaft bow for new cars, so that the half yoke now largely used would not be extended to new cars. Advanced to Standard in 1910.

Brake Staff, Height of (M. C. B. Standard). In 1907 a standard maximum height of brake staff, for standard box cars, from top of rail to top of brake staff of 14 feet was adopted.

Brake Step. 100, Figs. 285-88; 25, Fig. 297; Fig. 320. A small shelf or ledge on the end of a freight car near the top, on which the brakeman stands when applying the brake from the top of a car. Also called a brake footboard. A brake step should not be confounded with a BRAKE SHAFT STEP, which is a bearing for the lower end of a brake shaft.

Brake Step Bracket. 101, Figs. 285-88; Fig. 492. An iron bracket to support a brake step.

Brake Strut. Fig. 1238. A compression bar or strut between the live and dead levers of a truck with inside hung brakes. Probably the term brake strut is more common than brake lever coupling bar. Brake strut should not be confused with brake beam strut. A bottom connection rod.

Brake Treadle (Hand Cars). A lever for applying brakes with the foot.

Brake Valve (Air Brakes). Figs. 1323-28; 1372-3. The valve operated by the motorman to apply and release the brakes. Also called operating valve and motorman's brake valve.

Brake Van (British). American equivalent, caboose, or baggage car. A covered vehicle in which the guard (conductor) of a train travels, and which is fitted with a powerful screw hand brake. On passenger trains it carries the passengers' luggage (baggage), etc. On goods (freight) trains it is weighted with pig iron, and is primarily used as a source of brake power. Also called guard's van.

Brake Wheel. See HAND BRAKE WHEEL.

Brake Windlass. A term sometimes used to designate the brake shaft, with all its attached parts.

Brakeman's Step. Fig. 599. A step on the inside of a wide vestibule for the use of trainmen in applying hand brakes.

Branch Pipe (Air Brake). Fig. 1264. A pipe extending from the triple valve to the brake or train pipe.

Branch Pipe Strainer. Figs. 1358, 1363. A strainer used in the branch pipe.

Branch Pipe Tee (Air Brake). Fig. 1304. A tee used to connect the branch pipe to the brake or train pipe.

Branding Steel Wheels. See WHEELS, STEEL; BRANDING OF.

Brass. An alloy of copper and zinc. A term commonly used to designate a JOURNAL BEARING.

Bridge. In car construction the term bridge means a timber, bar or beam which is supported at each end.

Bridging (Passenger Equipment Car Framing). Short transverse distance blocks between the sills of an underframe to keep the sills from displacement or buckling. A sill tie rod is usually employed to keep the sills drawn tightly against the bridging. It is toe-nailed and sometimes tenoned into the sills with small tenons.

Broad Gage. A term applied to a gage when the distance between the head of the rails is greater than 4 ft. 9 in. See NARROW GAGE, STANDARD GAGE.

Broiler and Oven. Figs. 1575-6, 1579. Those illustrated are adapted for use in parlor and buffet cars and use gas as a fuel.

Bronze. An alloy composed of copper and tin, sometimes with a little zinc and lead.

Brush. A device bearing on an armature, and through which current is supplied to an electric motor and received from an electric dynamo or generator.

Brush Holder. A support for the brushes of an electric motor, providing by means of springs for a constant pressure of the brushes on the commutator.

Brush Rigging. Figs. 2305-06. The apparatus pertaining to the brushes of a motor or generator.

Bucker (Electric Lighting). A machine somewhat like a small dynamo which has a field and a revolving armature and which is used for automatically maintaining a constant predetermined voltage in the lamp circuit regardless of the speed of the dynamo or the demand for lights.

Buffer. Figs. 524-535. An elastic apparatus or cushion attached to the end of a car to receive and absorb the shocks caused by other cars running against it. The term is generally applied to those attachments in which springs are used to give the apparatus elasticity.

Buffer Beam (Freight Cars). See DEAD WOOD.
(Passenger Cars.) See PLATFORM END SILL.

Buffer Beam Extension. 22, Fig. 410. A buffer block on the platform end sill of a passenger car.

Buffer Block. 32, Figs. 320, 374, 375. Usually one of a pair of buffing devices placed on either side of the coupler to receive severe shocks and prevent damage to the car. It also acts in the same capacity as a Dead Wood, the latter sometimes being termed Buffer Block. See DEAD WOOD.

Buffer Block Face Plate. A metal plate bolted to the face of a wooden buffer block or dead wood to protect the wood from wear. Usually called striking plate.

Buffer Plate (Passenger Equipment Cars). An iron or steel plate (usually bolted to the end of the buffer stems) which bears and rubs against the opposing plate of the next car of the train. The vestibule face plate is bolted or riveted to, and carried by, the buffer plate.

Buffer Safety Lug. A projecting horn cast on top of freight couplers to bear against a buffer block and relieve the draw gear from excessive compressive strains. COUPLER HORN is the more common name.

Buffer Shank. The square part between the buffer head and buffer stem.

Buffer Sill. Figs. 524-526. See BUFFER and PLATFORM END SILL.

Buffer Spring (Passenger Equipment Cars). The springs that resist the compression of a train or the impact when they come together as in coupling. In passenger equipment this thrust is not taken by the drawbar alone, but by the buffers, which transmit it to the buffer springs, which absorb or transmit it to the car body.

(Freight Cars.) A draft spring.

Buffer Stem (Three-Stem Couplers). The round bar which passes through the buffer springs. The term is sometimes applied to the buffer bar, which includes the round stem and the square shank.

Buffer Stem Guides. Iron bushings inserted in the platform end sill, in which the buffer stems work. They are to protect the wood from abrasion and wear.

Buffet Car. Figs. 174, 185, 187. See CAR, M. C. B. Class D. B. The cars in which a buffet is most used are parlor, sleeping, observation, library and smoking cars, and in such cases the cars are termed buffet-sleeping, buffet-observation, or observation-buffet, buffet-library and buffet-smoking cars.

Buffing Sub-Sill. A sub-sill bolted to the center sills on the underside and forming a continuous buffing sill in conjunction with the draft timbers. They are bolted and keyed to the center sills with key blocks and bolts. Also called back stop timber.

Bulkhead (Refrigerator Car). Fig. 837. A partition which separates the ice chamber from the part of the car in which the lading is placed.

Passenger Equipment Cars. Figs. 1451 and 1455. A partition which divides the car into rooms or compartments.

Bull's-Eye. A convex glass lens, which is placed in front of a lamp to concentrate the light so as to make it more conspicuous for a signal.

Bumper. A term sometimes used to designate a buffer.

Bunk. A rough form of sleeping berth permanently built against the side of a car.

(Logging Cars.) Fig. 1080. A cross piece similar to a body bolster, on which timber is loaded.

Bunk Apron. A board attached to the deck sill of a sleeping car and projecting below it to cover the edge of the upper berth when it is closed. In the later sleeping cars it is not used.

Bunk Panel. 21, Figs. 1458 and 1459. A panel below the cornice and behind the upper berth in sleeping cars, shutting off the upper part of the side windows.

Bunk Truss (Logging Cars). An iron strap to stiffen the bunk.

Burlap. A coarse canvas used in upholstery.

Burner. "That part of a lighting apparatus at which combustion takes place."—Knight. Fig. 2239. See LAMP BURNER.

Burner Cock (Pintsch System of Gas Lighting). Fig. 2111. A cock used for wall lamps. It is opened and closed with a key.

Bushing. Usually a metal cylindrical ring which is inserted in an opening and forms a bearing for some other object, as a shaft or valve. Often contracted to bush.

(Pipe Fitting.) A short tube with a screw cut inside and outside, used to screw into a pipe to reduce its diameter. Generally, a bushing has a hexagonal head by which it is turned, and is more commonly termed reducer.

Business Car. Figs. 152, 155, 251. A term frequently applied to a car used by railway officials while travelling. See also CAR, M. C. B., Classes CB and PV, and PRIVATE CAR.

Butt Hinge. Figs. 1828, 1829, etc. A hinge for hanging doors, etc., which is fastened with screws to the edge of a door, so that when the latter is closed the hinge is folded up between the door and its frame. A hinge the two parts of which are so fastened together that they cannot readily be detached is called a fast joint butt hinge. A loose pin butt hinge (Fig. 1828) is one having a removable hinge pin, and a loose joint butt hinge (Fig. 1829) is one with which the doors may be lifted off of the hinges when desired.

By-Pass Piston (Triple Valve). 25, Fig. 1275.

By-Pass Valve. Fig. 1936. A valve which, either through manual control or automatically, will pass a gas or fluid through a direct route or an alternate route, as may become necessary in connection with the operation of the particular apparatus to which it is applied.

(Triple Valve.) 27, Fig. 1275.

C

Cabin Car. Figs. 119-25, 382-86. A term sometimes applied to CABOOSE CARS, but more particularly to the four-wheel type. See CABOOSE.

Cabin Door Hooks. Fig. 1669. See DOOR HOOK.

Cabinet Lock. Figs. 1657-1659. It may be applied either to the inner edge of the door or drawer or be set into a mortise. Cabinet locks vary from the cheapest type to the pin-tumbler type which gives the highest possible security.

Caboose or **Caboose Car.** Figs. 119-125 and 382-386. A car which is attached to the rear of freight trains for the accommodation of the conductor and trainmen, and for carrying the various stores, tools, etc., required on freight trains. Sometimes called conductor's car, cabin car, train car, way car or van. See CAR, M. C. B. Class N, and WAY CAR.

Caboose Deck or **Cupola Lamp.** Figs. 1890, 1898, 1905, 1908. A signal lamp used in a caboose cupola.

Café Car. Figs. 178, 179, 245, 246. A passenger equipment car having a kitchen, usually in the center, and one end arranged as a café or dining room, the other being generally fitted for use as a parlor or smoking room. See CAR, M. C. B. Class DC.

Café Coach. A combined day coach and café car. See KITCHEN CAR.

Café-Parlor Car or **Parlor-Café Car.** A combined café and parlor car.

Cam. A device used to convert rotary into reciprocating motion; commonly an eccentric disc.

Camber. The upward deflection or bend of a beam, girder, or truss.

Candelabra. Figs. 2499, 2503. A term applied to an ornamental lamp; sometimes shaped like a candle stick.

Candle. A special candle of large diameter called car candle was at one time used for lighting passenger cars and burned in CANDLE LAMPS.

Candle Bracket Lamp (Pintsch System). Fig. 2121. For use in emergency, as in case gas gives out. May be attached to wall or to any center lamp at will.

Candle Lamp. A lamp for burning candles, sometimes elaborated into a chandelier with two or three burners. Candles, however, are now almost never used except in emergency bracket lamps, to be used when the gas or electric lights fail.

Canopy. See LAMP CANOPY. A term sometimes applied to the SMOKE BELL of a lamp. A platform hood is sometimes called a canopy.

Cant Rail (British). American equivalent, plate. A horizontal timber running along the top of the upright pieces in the sides of the body, and supporting the roof and roof timbers. Its upper edge is cut to

Cantilever. Fig. 495. A term sometimes, but not desirably, applied to a Cross Bearer. See CROSS the bevel of the roof; hence its name. BEARER.

Cantilever Cover Plate. Fig. 495. See CROSS BEARER or CROSS TIE COVER PLATE.

Cantilever Diaphragm. Fig. 496. See CROSS BEARER DIAPHRAGM.

Cantilever Truss (Overhang of Underframe). An inverted truss which bears upon the side sill directly over the body bolster. The inner end is connected by a tie rod to the inner end of the truss at the other end of the car body, while the outer end supports the overhang of the underframe by a vertical tie rod and by a diagonal brace rod similar to the overhang truss rod of the old Pullman wooden framing.

Canvas. A coarse cloth, made of cotton, used for upholstering seats, and sometimes for the finish of the ceiling of passenger cars when it is painted or otherwise decorated. Roofing canvas is also used for covering passenger equipment cars.

Car. A vehicle used on railways for the transportation of passengers or material.

M. C. B. Recommended Classification of Cars. In 1910 a committee considered the question of harmonizing the terms used in designating the different kinds of cars in each class according to their physical requirements and submitted the following definitions, which were adopted by letter ballot as Recommended Practice.

In 1912 the designations RS, RA, RB, VS and VA were adopted.

DEFINITIONS AND DESIGNATING LETTERS OF GENERAL SERVICE PASSENGER EQUIPMENT CARS.

CLASS B.

"BA"—Baggage Car. A car run in passenger service, having wide side doors for the admittance of baggage, with or without windows or end doors.

"BE"—Baggage Express. A car similar to baggage, used for either baggage or express matter.

"BH"—Horse or Horse and Carriage Express. A car run in passenger service for the transporting of fine stock, fitted with stalls (movable or stationary) and space left for carriage or horse equipment.

"BR"—Refrigerator Express. A car run exclusively in passenger service and fitted with ice bunkers or boxes, and suitable to carry produce, oysters, fish or any commodity requiring icing in transit.

"BX"—Express Car. Exclusively for express matter, having suitable side doors, with or without end doors or windows.

CLASS C.

"CA"—Combined Car, Baggage and Passenger. A car having two compartments, one suitable for transporting baggage, the other fitted with seats for passengers, the two compartments separated by bulkheads.

"CS"—Combined Smoking and Baggage Car (Club Car). A car having two compartments, separated by bulkheads, one compartment suitable for transporting baggage, the other fitted with seats or chairs and used as smoking car; at times equipped with buffet or bar.

"CO"—Combined car having three separate compartments, separated by bulkheads, one compartment suitable for transporting baggage, one for mail fitted with suitable apparatus for sorting and classifying mail, and the other fitted with seats for the transportation of passengers.

"CB"—Business Car. A special type of car for the convenience of business men, used as smoker and fitted with tables or desks, carrying stationery and fitted with typewriters and carrying regular stenographers.

CLASS D.

"DA"—Dining Car. Regular dining car, for the use of passengers in transit, fitted with regular kitchen, tables, chairs or seats, with or without bar, carrying cooks and waiters.

"DB"—Buffet Car. Car for the transportation of passengers and fitted with small broiler or buffet to serve simple meals to passengers; cooking and serving done on removable tables by regular porter in charge of car. With or without facilities for serving liquor.

"DC"—Café Car. A car fitted with kitchen, usually in center of car, one end used as café where meals are served, also liquor and smoking allowed, the other end of car fitted with either regular dining room or smoking and card room; carrying cooks and waiters.

"DG"—Grill Room Car. Very similar to café car.

"DO"—Café Observation Car. Car fitted with café at one end, kitchen in center or extreme end, having observation compartment fitted with stationary or movable tables and observation platform at rear.

"DP"—Dining and Parlor Car. A car fitted with dining compartment, kitchen and compartment for passengers, fitted with chairs, stationary or otherwise, carrying regular cooks and waiters.

CLASS E.

"EA"—Electric Street Railway Service Car, direct current, for transportation of passengers; without automatic couplings.

"EP"—Electric Passenger Car, for long hauls or suburban service, multiple unit and fitted with automatic couplings and air brakes. Third rail, trolley or pantagraph contact.

"EB"—Electric Baggage Car, for long hauls or suburban service, multiple unit with automatic couplings and air brakes and suitable for the transportation of baggage. Third rail, trolley or pantagraph contact.

"EM"—Electric Mail Car, for use in United States Mail Service, fitted with side doors, with or without mail hook, and suitable apparatus for the sorting and classifying of mail en route. With or without end doors or windows.

"EC"—Electric Combined. A car for long hauls or suburban service, multiple unit with automatic couplings and air brakes. This car is made up of two compartments, separated by bulkhead, one suitable for the transportation of baggage and the other fitted with seats or chairs for the use of passengers. Third rail, trolley or pantagraph contact.

"EG"—Gasoline Motor Propelled Car, for inspection or private use, or use in suburban service, hauling one or more trailers.

"ED"—Gasoline Motor Car. Gasoline engine or engine serving to run dynamo to furnish electricity for axle motors. Car to be used for inspection, private use, or as motive power to haul trailer or trailers; fitted with storage cells and with or without booster.

CLASS M.

"MA"—Postal Car. For use of United States Mail Service, fitted with side doors, with or without mail-bag hook, and having suitable apparatus for the sorting and classifying of mail in transit, with or without end doors or windows.

"MB"—Baggage and Mail. A car having two compartments, one for baggage and one for mail, separated by bulkheads; the mail end fitted with suitable apparatus for sorting and classifying mail, and with or without mail-bag catchers, with or without end doors or windows, and having suitable side doors.

"MP"—Postal Car. Suitable for transporting newspapers or large mail packages for United States Mail Service, having side doors and fitted with stanchions, with or without end doors or windows.

"MR"—Postal Storage Cars. For United States Mail Service, suitable to carry mail in bulk, without appliances for sorting or classifying, fitted with side doors and stanchions and with or without end doors or windows.

"MS"—Mail and Smoker. A combined car having two separate compartments, separated by bulkheads, one compartment suitable for the transportation, sorting and classifying of mail, the other fitted with seats or chairs to be used by passengers as smoking cars.

CLASS P.

"PA"—Passenger Car. A car for ordinary short haul suburban service, with seats and open platforms.

"PB"—Passenger Car. A vestibule (wide or narrow) car for through service, fitted with seats or reclining seats, and having toilet rooms for men and women, also wash basins.

"PE"—Emigrant or Colonist Car. A second-class passenger car, with floors either bare or fitted with matting, used expressly for emigrant trade on trains where low rate of fare is charged.

"PS"—Sleeping Car. A car for passenger service having seats that can be made up into berths, and usually having one or more separate stateroom compartments, also toilet and washroom facilities for men and women, and smoking compartment for men. Some cars of this class are all compartments, and some compartment and observation combined.

"PN"—Passenger car used exclusively as smoking car, with seats or chairs and fitted with cuspidors or having matting or bare floor.

"PO"—Observation Car. A car having observation compartment at one end and fitted with either berth facilities, parlor chairs or compartments, usually run in first-class service.

"PV"—Private cars used as officers' or private individual's car and railroad pay car—usually composed of sleeping compartments, dining corpartments, observation end and with kitchen, servant's quarters and toilet and bathroom.

"PT"—Tourist Car. A second-class sleeping car, fitted usually with cane seats convertible into berths and used mostly on trans-continental trains; cars fitted with smoking compartment, toilet and washroom.

"PC"—Passenger, Parlor or Chair Car. A car fitted with individual stationary or movable chairs, used on trains for daylight runs and having toilet and washrooms.

CLASS I.

"IA"—Instruction Cars for use of employees, usually run from one point to another in passenger trains.

NOTE.—If it is so desired, a small letter "E" can be placed after the larger designating letters to indicate electric lighting, and small "G" for gas lighting, also figures showing approximate length of car or length of baggage or mail compartment.

GENERAL SERVICE FREIGHT EQUIPMENT CARS.

CLASS X.

"XM"—Box Car. General service, suitable to lading which should be kept from the weather. A box car is a closed car having side and end housings and roof, with doors in sides or sides and ends.

"XA"—Automobile Car. Box car of similar design to general service car, having exceptionally large side doors or end doors.

"XF"—Furniture Car. Box car of similar design to general service car, except usually greater capacity in cubic feet.

"XV"—Box Car, Ventilated. Similar to ordinary box, only having ventilation, and suitable for the transportation of produce or other foodstuffs not needing refrigeration.

CLASS R.

"RA"—Meat and Provision Refrigerator. A car equipped with insulation and brine ice tanks without ventilating devices.

"RB"—Beer and Ice Refrigerator. A car with body and doors equipped with insulation, having no ice tanks or ventilating devices.

"RM"—Refrigerator or Produce Car. A car suitable for carrying commodities that need icing in transit. This car is equipped with two or more ice bunkers or baskets and suitable means for draining off melted ice or briny water. This car has side and end housings, roof and side doors, usually insulated, with trap doors in roof for admittance of ice and salt; also water seals inside of car.

"RS"—Standard Refrigerator. A car equipped with insulation, ice tanks and ventilating devices.

CLASS V.

"VA"—Vegetable Ventilator. A car equipped with insulation, but having common box car end and side doors which afford no protection against heat or cold.

"VS"—Standard Ventilator. A car equipped with insulation, including insulated side, end and top openings, and ventilating devices without ice tanks.

CLASS S.

"SM"—Stock Car. This car is for transportation of stock on the hoof, and is equipped with roof, slatted sides and side doors, and single or double deck. With or without feed or feed and water troughs.

"SD"—Stock Car. Composite having drop doors in floor and means of housing in sides and making drop-bottom box car.

"SP"—Stock Car. Used in poultry trade, fitted with roof and sides usually of wire netting, fitted with shelves for storing crates of poultry and leaving space for poultrymen, feed bag and watering facilities.

CLASS G.

"GA"—Gondola Car. This car has sides and ends; open at top, and drop bottom; suitable for general coal or ore trade, stone or general trade.

"GE"—Gondola car having drop bottoms and drop ends; suitable for general coal or ore or mill trade.

"GC"—Gondola Coke Car. Gondola car fitted with coke racks and having drop bottoms.

"GD"—Gondola car having side-dump arrangement.

"GM"—Gondola Car. Suited to mill trade, having solid bottom, low sides and drop ends to facilitate twin shipments.

CLASS H.

"HM"—Hopper Car. Similar in general design to gondola car, having sides and bottom ends and open at top, equipped with hopper bottom and self-cleaning.

"HT"—Hopper (Twin). Similar to ordinary hopper, only equipped with two or more hopper doors instead of one.

"HD"—Hopper car equipped with side-dump hoppers.

"HC"—Hopper car equipped with coke racks.

CLASS F.

"FM"—Ordinary flat car for general service. This car has flooring laid over sills and without sides or ends.

"FG"—Flat or gun truck car for special transportation of heavy ordnance

"FW"—Flat well-hole car for special transportation of plate glass, etc. This car is a flat car with hole in middle to enable lading to be dropped down on account of clearance limits.

"FB"—Flat car having skeleton superstructure, suitable for carrying barrels, known as "Barrel Rack Car."

"FL"—Flat logging car or logging truck. This is either an ordinary flat car, or car consisting of two trucks fitted with cross supports over truck bolsters; the trucks connected by a skeleton of flexible frame and logs loaded lengthwise on cross supports.

CLASS T.

"TM"—Tank car for general service. This car is for general oil or liquid service, and consists of a steel tank mounted on frame or mounted directly on cradles over truck bolsters. It is equipped with one or two safety release valves, and is emptied by valves or valve at bottom. At the top is a dome, with or without manhole, and openings through which the tank may be filled.

"TA"—Acid Tank. Of same general construction as oil tanks.

"TG"—Tank car having glass or glass-lined tanks, for use in hauling mineral waters and other special products.

"TS"—Tanks for special commercial service.

"TW"—Tank car having wooden tank, instead of steel, and used for water, pickles, etc.

CLASS N.

"NM"—Freight train service caboose for convenience of trainmen. This caboose is mounted on four wheels and has lookout at top over roof. It is fitted with bunks or benches and a stove for cooking and heating purposes, also tank for storage of drinking and washing water, and small tool storage boxes.

"NE"—Caboose mounted on eight wheels and longer than four-wheel caboose, but of the same general design.

CLASS Y.

"YM"—Yard Poling Car. This car used in hump classification and flat-yard classification. This car is usually fitted with small house or protection and benches, tool box and stove, a counterweighted pole on each side and running board or step near the ground for convenience of yardmen. It is protected with safety appliances and, when in use, coupled to an engine.

"YA"—Yard pick-up car for use of car droppers and yardmen in performance of their duty. It might be termed a "Car Dropper's Car." It is protected by house, around which runs a platform and railing, a long running board on sides near ground and is fitted with benches, tool box and stove.

NOTE.—The capacity of car can be shown by affixing two figures after designating letter: for instance, "80" would mean 80,000 pounds capacity; "10" would mean 100,000 pounds capacity; "60" would mean 60,000 pounds capacity. Where tanks are in question the capacity numbers should indicate capacity in gallons instead of pounds.

GENERAL SERVICE MAINTENANCE OF WAY EQUIPMENT CARS.

"MWB"—Ballast Cars. All descriptions of cars used for the purpose of carrying ballast for the laying of new right of way and repairs. The car used generally for this work is of the gondola type, with side or center dump.

"MWD"—Dump Cars. On the type of contractors' car used for building up fills; the body of the car dumps, being raised by means of counterweight, air or hand power.

"MWF"—Flat Car. Used for transporting rails, ties or ballast and for storage of wrecking trucks, or gathering scraps along right of way. These cars are at times equipped with low sides, about 10 or 12 inches high.

"MWS"—Steam Shovel. Car equipped with donkey engine housed in. Having a boom of wood or steel and the end of which is a shovel or scoop. It may be propelled by its own power or by means of a locomotive and run as a car in freight trains, being equipped with safety appliances. The cubic capacity of shovels, in yards, can be indicated by figures after classification letters.

"MWW"—Wrecking Derrick. A derrick used for wrecking purposes, having donkey engine to raise and lower booms and hoists; engine housed in and on separate platform with boom, is pivoted in center of car frame in order that it can be worked on either sides or ends; usually fitted with anchor beams to be used for heavy lifting. Fitted with safety appliances and propelled by means of locomotive. Lifting capacity in tons shown by means of figures.

"MWU"—Wrecking Derrick. This derrick has boom and hoist fitted to frame of flat car and lifting done by means of hand power; propelled by locomotive.

"MWV"—Wrecking Derrick. This derrick has boom and hoist fitted to flat car and drum at one end to furnish means of hoisting; steam furnished to donkey engine, running drum, by means of flexible steam line from attached locomotive; propelled by locomotive.

"MWT"—Tool and Block Car. A car used for carrying all descriptions of tool equipment and blocking. This car has side and end housings and roof, also end platforms. There are doors in sides and ends and usually windows. It is fitted inside with proper racks and boxes for storage of tools.

"MWC"—Caboose and Tool Car. Similar to tool car, but having one end fitted up as a caboose, with bunks, stove and water storage, with or without lookout, and is used in either work or wrecking trains.

"MWH"—Hand Car. This car is flat and mounted on four wheels and propelled by means of pushing; known as "Push Car."

"MWL"—Hand Car. This is a small flat car, with or without seats, mounted on four wheels and propelled by means of cranks or hand levers.

"MWG"—Section Gang or Track Inspection Car. Flat car, with or without seats or tool boxes, and equipped with single or double cylinder gasolene engine serving as motive power.

Car Axle. 2, Figs. 947, 966. A shaft made of wrought iron or steel to which a pair of car wheels is attached.

The wheels are usually rigidly fastened to the axle by making a hydraulic press fit. The following are the names of the parts of an axle: Center of Axle, Neck of Axle, Wheel Seat or Fit, Dust Guard Bearing, Collar, Journal.

In a few cases in steam railroad service where roller bearings have been used the axle does not rotate but is fixed and the wheels turn on the roller bearings, Figs. 1022-1024. See also AXLE.

Car Box. A JOURNAL BOX.

Car Closet. See DRY CLOSET and WATER CLOSET.

Car Discharge Valve (Train Air Signal Apparatus). Fig. 1320. A valve placed in the end of the car and connected with the signal cord. When the cord is pulled the car discharge valve is opened and air escapes, resulting, through the construction of the apparatus, in the blowing of the signal whistle in the locomotive or motorman's cab. See TRAIN AIR SIGNAL APPARATUS.

Car Door Sheave. See DOOR SHEAVE.

Car Drain Cup (Air Brake). An attachment to the brake pipe of a car to collect the water of condensation, which is drawn off from time to time through a hole at the bottom closed by a plug; it is usually combined with an air strainer and so called.

Car Filler's Lantern (Pintsch Gas Lighting). Fig. 2372.

Car Heater. Figs. 2044, 2096, 2104. Any apparatus for heating cars by convection; that is, by conveying hot water, steam or warmed air into, or through, the car. It generally refers to any arrangement for warming cars other than stoves. With most steam heating systems the steam is taken from the locomotive, but in many cases a heater is supplied to the car to take care of emergencies. See BAKER CAR HEATER.

Car Inspectors, Rules for Examination of. See EXAMINATION OF CAR INSPECTORS.

Car, Lettering. See LETTERING CARS.

Car Moldings. See MOLDINGS.

Car Receptacle. Fig. 2369. A device placed on a car for use in charging storage batteries. The connector shown in Fig. 2374 carries the current from the charging plug, Fig. 2370, to the car receptacle, from which it enters the batteries.

Car Replacer. Figs. 2644-48; 2650. A device for getting a derailed truck back on the track. It usually consists of an inclined plane or a curved surface, by which the wheels are raised when the car is pulled so that the flange of the outside wheel can ride upon and over the rail.

Car Roof. 86, Figs. 285-88; 35, Fig. 383; Figs. 405, 490, 859-887. A covering for a car supported by carlines and purlins. Several types of roofs are used on freight cars. A double board roof may be built, with or without felt or other material between the boards. Inside metal roofs are formed of metal protected by a covering of roughly matched boards. Outside metal roofs have a metal covering over a single layer of roof boards. Metallic or all-metal roofs use metal only in their construction. See PLASTIC CAR ROOF.

Passenger car roofs are usually covered with canvas, tin, galvanized iron or steel sheets. See ARCHED ROOF, "A" CAR ROOF.

Car Seal. A device to secure freight car doors against opening by making it impossible without destroying the seal.

Car Seat. Figs. 1510, 1512-64. The complete set of fixtures on which passengers sit in a car. It ordinarily consists of a seat frame, seat cushions, seat back, arm rest, foot rest, and their attachments. Ordinarily, the seats in American cars are placed crosswise of the car, and are made for two passengers. The backs of the seats are generally made reversible. The seats of parlor cars are commonly called chairs, and are usually revolving. In private and parlor cars, sofas, placed longitudnially against the side of the car, are sometimes used. In order to give an inclination to the seats which makes them more comfortable, various devices have been introduced. See GLIDEOVER SEAT, PARLOR CAR CHAIR, RECLINING CHAIR, REVERSIBLE CAR SEAT, ROCKER CAR SEAT, WALKOVER SEAT.

Car Seat Moldings. Metal bands, usually used to finish seat backs. See MOLDINGS.

Car Signal Valve (Train Air Signal Apparatus). A CAR DISCHARGE VALVE.

Car Sills, Uniformity for Section of. See SILLS, UNIFORMITY FOR SECTION OF.

Car Spring. A general term applied to springs on which the weight of a car rests. See BOLSTER SPRING, ELLIPTIC SPRING, SPIRAL SPRING, SPRING.

Car Steps. See PLATFORM STEPS.

Car Washer. A brush made for washing the outside of passenger cars.

Car Wheel. 28, Fig. 297; Figs. 1115-1153. See WHEEL.

Carburetor. Fig. 2208. See VAPOR SYSTEM.

Card Rack. A small receptacle on the outside of a freight car to receive cards giving shipping directions.

Carline. 81, Figs. 285-88, 368; 18, Fig. 383; 82, Figs. 374-75; 35 and 36, Fig. 410; Fig. 495; 2, Fig. 859; Figs. 861, 877, 881, 883-86. A bar of wood or iron which extends across the top of a car or from one side to the other, and which supports the roof. In passenger cars carlines are divided into main carlines, passing entirely across the car; short carlines or deck carlines, which are confined to the upper deck, and rafters, which are confined to the lower deck. The main carlines are usually compound, i. e., built up of wood and iron. They sometimes pass directly from side to side of the car across and under the upper deck, when they are termed continuous or straight carlines, but usually they are bent to the outline of the clear story and are termed profile carlines. Other carlines having special names are: COMPOUND CARLINE, END CARLINE, PLATFORM HOOD CARLINE, PLATFORM ROOF CARLINE, PLATFORM ROOF END CARLINE.

Carline Knee Iron. An angle iron which connects the end carline to the plate. Also termed inside corner iron.

Carpet Eyelet. Figs. 1570, 1571. See EYELET.

Carpet Knob. An EYELET NAIL.

Carriage Bolt. A bolt made square under the head so as to prevent it from turning when in its place. They have button-shaped heads and are used for fastening wooden pieces together.

Carrier Iron, Brake Staff. See BRAKE STAFF CARRIER IRON.

Carry Iron. See DRAWBAR CARRY IRON, DRAFT GEAR CARRY IRON.

Carrying Case (Fusees and Torpedoes). Fig. 1915. A metal receptacle sometimes kept in cabooses for the use of flagmen.

Cartridge (Acetylene Gas Lighting). Fig. 2244. A cylinder used for holding carbide in the generation of the gas.

Casing. See Window Casing.

Cast Steel Bolsters, M. C. B. Specifications for. See Bolster Specifications.

Caster. Fig. 1493. A small wheel on a swivel attached to furniture and on which it is rolled on the floor.

Caster Holder (Dining Cars). A shelf or tray for holding bottles of condiments.

Casting. Any piece of metal which has been cast in a mold.

Catch. A device to prevent a gate, door or window from opening.

Catch Lever (Three-Stem Coupler). A crank lever passing vertically through the catch, by means of which it is caused to release the knuckle for uncoupling.

Catch Spring (Three-Stem Coupler). A coiled spring on the catch spring bolt operating the catch.

Cattle Car. More properly Stock Car.

Ceiling. The inside or under surface of the roof or covering of a car. This term is sometimes used to mean Sheathing. The ceiling of a passenger car is generally termed Head Lining. Deafening Ceiling is boarding under the sills of a car, the space between it and the floor being either left empty or filled with shavings or some similar substance to deaden the noise of the wheels. See Agasote, Head Lining, Lignomur.

Ceiling Furring. Strips or pieces fastened to the carlines overhead, to which the paneling or veneering of the ceiling is applied.

Ceiling Hook. Fig. 1853.

Ceiling Veneers. Thin boards with which the ceilings of passenger cars are covered. The term is also misapplied to the thin preparations of papier maché etc., in imitation of natural wood veneers. See Veneer.

Cell. Figs. 2326, etc. An electro-chemical device for producing electrical energy, consisting of two metaloid elements immersed in a liquid electrolyte. When the two plates are connected by an exterior conductor a current of electricity is caused to flow from one element to the other through the liquid electrolyte and the exterior circuit. Such a device is called a voltaic or primary cell. A group of such cells connected is called a battery and a single cell is also commonly referred to as a battery. The parts of the elements are referred to as a plate or electrode. See Storage Battery.

Center Axle Guard. Fig. 976. The axle guard for the center axle of a six-wheel truck. See Axle Guard.

Center Bearing. The place in the center of a truck where the weight of the body rests. A body center plate attached to the car body here rests on a truck center plate attached to the truck. The general term center bearing is used to designate the whole arrangement and the functions which it performs, in distinction from Side Bearing. See also Center Plate.

Center Bearing Arch Bar. 66 and 67, Fig. 966. See Center Bearing Bridge.

Center Bearing Beam. See Center Bearing Bridge.

Center Bearing Bridge (Six-Wheel Trucks). 66 and 67, Fig. 966. A structure formed by the top and bottom center bearing arch bars to support the center plate block or center bearing beam and transmit the weight of the car to the bolsters, on which its extremities rest.

Center Block Column. A column placed on top of the center plate block or bearing beam, and between it and the center bearing arch bar.

Center Buffer Spring. A spiral spring situated above the draft springs in some forms of passenger draft gear and intended for buffing purposes only.

Center Buffer Stem. See Buffer Stem.

Center Compression Beam Brace. In wooden passenger equipment car framing, a brace for the compression beam in the center of the side truss.

Center Counterbrace. A counterbrace in the body of the car between the trucks, to stiffen a compression beam brace. See also Counterbrace.

Center Cross Beam. A cross timber framed into the two intermediate sills of a coal or ore car, to which the center doors are hung.

Center Cross Beam Cap. A cap piece to cover the center cross beam.

Center Cross Tie Timber. A cross tie timber in the middle of a car, generally placed between the double drop doors of a gondola car.

Center Door Rail. See Middle Door Rail.

Center Draft Drawbar. A drawbar which is connected directly with the king bolt of a truck. It is a style specially designed for use on the very sharp curves (of 90 and 100 ft. radius) of elevated railroads and subways, and is confined to those lines. Sometimes termed radial draw gear.

Center Draft Tube (Argand Lamp). The hollow passage for air in the center of the burner.

Center Dump Car. Figs. 32-34, 36, 39, 309, 311, 312, 314, 326, 327. A car which will discharge its entire load between the rails. See also Convertible Car.

Center Floor Timbers. The Center Sills.

Center Frame. Figs. 1096 and 1097. See Truck Center Frame.

Center Girth. See Door Center Girth.

Center Lamp. Figs. 2526, etc.

Center Pin or **King Bolt.** 18, Figs. 285-88, 374, 375; 32, Fig. 383. A large bolt which passes through the center plates on the body bolster and truck bolster. The truck turns about the bolt, but the stress is taken by the center plates. It is, therefore, a mere pin and not a bolt in the usual sense. The name king bolt is derived from the name of the corresponding part for the front wheels of a wagon. Center pin, however, is the more common term.

Center Pin Floor Plate. An ornamental casting set into the floor of a passenger equipment car to cover the head of the center pin.

Center Plate. 17, Figs. 285-88; 6, Fig. 297; 5, Fig. 342; 31, Fig. 383; 63, Figs, 947, 966; Figs. 974, 1026-33. One of a pair of plates which fit one into the other and which support the car body on the trucks, allowing them to turn freely under the car. The center pin or king bolt passes through both, but does not really serve as a pivot. The body center plate or male center plate is attached to the under side of the body bolster or in cast steel bolsters is made an integral part of the casting. The female or truck center plate is attached to the top side of, or cast integral with, the truck bolster. When the car is tilted, as on a curve, part of the weight is carried on the Side Bearings. See Anti Friction, Ball Bearing and Roller Center Plates.

Center Plate (M. C. B. Standard). Fig. 2706. In 1903 the center plate shown in the drawing was adopted as a standard.

Center Plate Block. 64, Fig. 966. The member supporting the center plate of a six-wheel truck. It is in turn supported by the center bearing arch bars.

Center Rod (Postal Car). Fig. 1717. A device which fits in a socket at the top of the pedestals, and to which the ends of the two rods, which support the distributing trays, etc., near the center of the car, are fastened.

Center Sill. 4, Figs. 285-88; 2, Fig. 297, 320, 342, 355, 368, 374, 375, 383, 423-425. The central main longitudinal members of the underframe of a car which are usually close together in the center of the car. They form as it were the back-bone of the underframe and transmit most of the buffing shocks from end to end of the car. In steel underframe cars the center sills are usually heavy I-beams, channels, deep built-up fish-belly girders or pressed steel fish-belly girders, often with reinforcing flange angles. See CENTER SILL WEB PLATE, CENTER SILL BOTTOM ANGLE, CENTER SILL TOP ANGLE, and CENTER SILL COVER PLATE.

(Hand Car.) The corresponding member in the floor framing of a hand car.

Center Sill Bottom Angle. 2, Fig. 410. The angle at the bottom of a center sill of the built-up type.

Center Sill Bottom Cover Plate. See CENTER SILL COVER PLATE.

Center Sill Cover Plate. 3, Fig. 297; 121, Fig. 320; 13, Fig. 342; 4, Fig. 410. A flat plate riveted across steel center sills, either above or below, to give additional strength.

Center Sill, Splicing of. See SILL, SPLICING OF.

Center Sill Stiffener. Fig. 492. A filling piece riveted between the center sills to act as a brace tor holding them rigid.

Center Sill Top Angle. 3, Fig. 410. The angle at the top of a center sill of the built-up type.

Center Sill Top Cover Plate. See CENTER SILL COVER PLATE.

Center Sill Web Plate. 1, Fig. 410. The plate which forms the web of a center sill of the built-up type.

Center Sills, Spacing Between (M. C. B. Standard). In 1905, the spacing between steel center sills of 12⅞ inches was adopted as recommended practice. Advanced to standard in 1907.

Center Stay (of a Chandelier). The central support around which the lamps are grouped. In some cases it is the only method of attaching the chandelier to the ceiling, and in others there are several inclined roof braces or vertical lamp arms in addition.

Center Stop (Tip Car). A bracket or block attached to a draw timber to restrain the body from moving longitudinally.

Centering Devices. See DRAWBAR CENTERING DEVICE.

Centering Gage. A gage to fix the middle point of an axle.

Central Filling Piece (Steel Tired Wheels). The part surrounding the hub and connecting it with the tire. Also termed the skeleton. A wheel center is a hub and central filing piece combined.

Centrifugal Dirt Collector. Figs. 1302, 1358. A device connected in the branch pipe between the brake pipe and distributing valve, or triple valve, and so constructed that due to the combined action of centrifugal force and gravity, all dirt and foreign material is automatically eliminated from the air flowing through the collector chamber and by means of a plug may be removed without breaking any pipe connections whatever. When this device is used, the brake pipe air strainer may be omitted.

Chafing Plate. A metal plate to resist wear, used on truck transoms, etc.

Chain. "A series of links or rings connected, or fitted into one another, usually made of some kind of metal."—Webster. See BERTH CHAIN, BRAKE CHAIN, HAND BRAKE CHAIN, SAFETY CHAIN, etc.

Electric Lighting. See Fig. 2371.

Chain Holder (for Basin Plug). A stanchion provided with a screw thread and nut for passing through the marble slab. Also called a chain post, or chain stay.

Chain Post or Stay. Fig. 1591. See CHAIN HOLDER.

Chair. The usual designation for the seats of parlor cars. Ordinary chairs are used in dining cars. See RECLINING CHAIR, REVOLVING CHAIR.

Chair Arm Plate. A metal plate for the top of a chair arm. If for passenger car seats, it is called an arm cap.

Chair Car. Figs. 148, 151, 153, 240. A day coach or passenger car equipped with reclining chairs, providing more comforts than a day coach for passengers travelling at night who do not desire to use a sleeping car. See PASSENGER CAR.

Chandelier. Figs. 2258-61, 2264-65. A lamp or lamps having an elaborate form of suspension from a root or ceiling.

Channel. A rolled steel commercial bar shaped like a trough or channel. It is commonly used in steel car construction.

Channel Section Bolster. Fig. 502. A bolster whose cross section has the shape like that of a trough or channel.

Chaplet. A piece of iron used in a mold for casting, to hold a core in its place.

Charging Plug. Fig. 2370. An electric fitting or connection device to which wires leading to a yard charging plant or electric-light circuit are attached. The plug is made to fit the receptacle in such a manner that the positive wire from the charging plant will invariably be connected to the positive battery wire. By inserting the plug in the receptacle the battery on the car may be connected with and charged from the stationary charging plant. These devices are used principally in straight storage work where no generating plant is carried on the car.

Charging Receptacle. Fig. 2369. An electric fitting or connection device attached to the under side of the car body from which wires lead to the storage battery. There is generally one on each side of a car.

Check Chain or Safety Chain. 68, Figs. 947, 966; Figs. 975, 977. A chain attached to a truck and the body of a car to prevent the former from swinging crosswise on the track in case of derailment. Such chains are usually attached either to two or to each of the four corners of a truck and to the sills of the cars.

At the eighth Annual M. C. B. Convention, Cincinnati, 1874, it was

"Resolved, That truck and car body check chains are, when properly applied, a valuable acquisition on passenger equipment, and your committee recommend their general use." In 1893 the use of truck and car body check chains, properly applied, was adopted as a Recommended Practice. In 1896 it was agreed that this recommendation referred to passenger equipment only.

A difficulty with check chains has been that the eyes by which they are attached to the body and truck were not strong enough to resist the strain, and that the chains themselves have been too long to come to a bearing soon enough to have the trucks controllable.

Check Chain Chafing Plate. A plate attached to a truck timber to resist the wear of a CHECK CHAIN.

Check Valve (Triple Valve). 15, Figs. 1273-1275. The valve under the emergency valve which prevents the escape of brake cylinder pressure back into the train line when a hose bursts or the train parts. In an emergency application the emergency valve opens and allows the brake pipe pressure to enter the brake cylinder through the check valve which is raised off its seat.

Check Valve Case (Triple Valve). 13, Figs. 1273-1275. See CHECK VALVE.

Check Valve Case Gasket (Triple Valve). 14, Figs. 1273-1275.

Check Valve Spring (Triple Valve). 12, Fig. 1273-1275.

Cheek Casting. 5, Fig. 297; Figs. 693, 714, 724, 742. One of a pair of castings riveted or bolted to the draft sills and transmitting to them the stresses received from the draft gear. The draft gear lies between the cheek castings and the ends of its follower plates rest against shoulders on the castings.

Chill. A kind of crystallization produced when melted cast iron is cooled suddenly. It is usually accomplished by bringing the molten iron in contact with a cold metal (usually iron) mold. The hardened part of a cast iron car wheel is called the chill. The mold in which a chill is produced is sometimes called a chill, but the name chill mold has been given to this. See WHEELS, SPECIFICATIONS FOR.

Chill Crack. An irregular crack developed in casting upon the chilled surface of the tread of car wheels. See WHEELS, SPECIFICATIONS FOR.

Chimney (Gas Lamps). Figs. 2373, 2377, etc. See MICA CHIMNEY.

Chipping (of Chilled Car Wheels). A scaling off of small portions of the chilled metal, due to imperfect or irregular crystallization. See WHEELS, SPECIFICATIONS FOR.

Chock or **Chock Piece.** "In shipbuilding a wedge or triangular-shaped block or timber used to unite the head and heel of consecutive timbers."—Century. Also intended as a filling piece to give form or shape. Hence in a snow plow a timber which joins successive timbers, and fills out to give shape.

Chock Block. Fig. 944. A triangular piece used on the bunk of a logging truck to hold the logs in place.

Chord (of a Truss). The long horizontal members at the top and bottom of a truss. The side sills and plates of a car body are top and bottom chords of the side trusses, but the terms are not used in car building. In Great Britain the chords are sometimes termed booms.

Cinder Deflector. See DUST DEFLECTOR.

Circuit Breaker. Figs. 2552-4; 2286, 2290, 2294. A device for automatically opening the circuit from the trolley or third rail shoe to the controller when the current exceeds a predetermined amount.

Circulating Drum (Baker Heater). Fig. 1939. A cast iron vessel with hemispherical ends, on top or inside of the car, filled with water, and connected by two pipes with the coil in the stove and with the pipes which extend through the car. As the water in the coil becomes heated it ascends to the drum, and from there it descends through the other pipe to the radiating pipes in the car. After passing through them it is brought back by return pipes to the coil, when it is again heated. Thus a continuous circulation is kept up. It is also called the expansion drum.

Circulating Pipes (Car Heaters). A general name for the pipes which carry the steam or heated water through the car and return it again to the heater. The term radiating pipes is also used.

Circumference Measure (M. C. B. Standard). See WHEEL CIRCUMFERENCE MEASURE.

Clam Shell Bucket. Fig. 213. A form of digging or shovelling apparatus, operated by power, and taking its name from its similarity to a clam shell.

Clamp. A device for holding or binding two or more parts together. See PIPE CLAMP, HOSE CLAMP.

(Carpentry.) "A frame with two tightening screws, by which two portions of an article are tightly compressed together, either while being formed or while their glue joint is drying."—Knight.

Clamp Lock (Steam Couplers). A COUPLER LATCH.

Clasp Brake. Figs. 954-956, 972 and 1236. An application of brakes in which two brake shoes are used on each wheel, and opposite to each other, instead of one brake shoe per wheel as is the ordinary practice. The brake pressure per square inch of bearing service is thus greatly reduced. Used on heavy high speed passenger train cars.

Claw Jack. A jack having a step or projection at the bottom of the movable column, used when a bearing close to the ground is required. A foot lift jack.

Cleaning Air Brakes. See AIR BRAKE, CLEANING AND TESTING OF.

Clearance or **Clearance Limit.** British equivalent, loading gage. The limiting dimensions of height and width for cars in order that they may safely clear all bridges, tunnels, station platforms and other structures.

Clearance Car. A car with a light frame built out on all sides to the extreme width and height required for any car that is to pass over the road. It is run over the road first to ascertain if the car can with safety be sent over the read. The clearance car may also be used to ascertain what is the maximum cross-section of tunnels, bridges, etc., over a road so that cars can be built within the limits determined by the clearance car.

Clearance, Couplers, Side. See AUTOMATIC CAR COUPLERS.

Cleat. A strip of wood or iron fastened across other material.

Clere-Story. See DECK.

Clevis. "A stirrup-shaped metallic strap used in connection with a pin to connect a draft chain or tree to a plow or other tool."—Knight. The term is applied to various kinds of irons resembling a plow clevis in shape, and also to bolts with forked ends.

Clinch Nail. A wrought iron forged nail, so named because it can be bent or clinched without breaking. Cut nails, the common and cheapest kind, although of wrought iron, will not clinch.

Clip. A U-shaped strap for attaching any body, more particularly a pipe, to the side of a partition. See PIPE CLIP. More broadly a device permanently attached to one part, whose function it is to hold another part in place which can readily be slipped into position. See Release Spring Clip.

Close Return Bend. A short cast iron tube made of a U shape, for uniting the ends of two pipes. It differs from an open return bend in having the two branches in contact with each other.

Closet. A small room, usually for storage.
A retiring room for sanitary purposes, more commonly called a Saloon. See also Dry Closet and Water Closet.

Closet Hopper. See Hopper.

Club Car. Figs. 188, 255. See Lounging Car.

Coach. A term commonly used to designate passenger cars which are used for day travel. See Passenger Car.

Coach Screw (British). American equivalent, lag screw, but coach screw is also used. A square-headed screw with a pointed end used to screw into wood.

Coal Car. A car for carrying coal; usually a hopper or gondola car, but box and stock cars are frequently used for this purpose. See also Car.

Coat Hook. Fig. 1850-55.

Cock. "A spout; an instrument to draw out or discharge liquor from a cask, vat or pipe."—Webster. See Bibb Cock, Main Cock, etc.

Coil. See Fig. 1960 for coils used with hot water circulation heating system.

Coil Spring. See Helical Spring.

Coke Car. Figs. 26-30, 294, 296, 297, 301-307, 309. A car of large cubic capacity for carrying coke. Modified forms of hopper cars with doors which discharge the load to one or both sides of the track are commonly used. Frequently a coke rack is applied to the sides of gondola cars. Box and stock cars are often used for carrying coke. See Car, and Coke Rack.

Coke Quenching Car. Fig. 207. A car with an inclined floor, into which coke is discharged from the furnace and quenched with water.

Coke Rack. A slatted frame or box applied above the sides and ends of gondola cars to increase the cubic capacity for the purpose of carrying coke or other freight in which the bulk is large relative to the weight.

Coke Rack Angle. 27 and 32, Fig. 297. A commercial angle used in forming the coke rack on a steel coke car. Commonly termed end and side coke rack angles, and further designated top, center, intermediate or bottom, as the case may be.

Coke Rack Stake Pocket. A metal socket fastened to the sides and ends of a gondola car to receive the stakes of a coke rack.

Cold Shot. Small globules of iron resembling ordinary gun shot, which are found in the chilled portion of cast iron wheels.

Collar. "A ring or round flange upon or against an object."—Knight.
(Of a Journal.) A rim or enlargement on the end of the car axle which takes the end thrust of the journal bearing.

Colonist Sleeping Car. See Emigrant Sleeping Car, Sleeping Car, and Car, M. C. B., Class PE.

Color Coat (Painting). The coat or coats which follows the rough stuff or scraping filling coat in painting passenger car bodies. See Finishing Varnish and Painting.

Column (Diamond and Other Trucks). Figs. 1100-1101. Another name for a Bolster Guide Bar.
(Of Crane.) Another name for the mast, particularly when entirely supported from below.

Column Bolt. 109, Fig. 945. A bolt passing through the arch bars and holding the truck column or bolster guide bar in place and the truck frame together.

Column Bolt (M. C. B. Standard). See Arch Bars, Column and Journal Box Bolts. (M. C. B. Standard).

Comb and Brush Rack or **Case.** Fig. 1609.

Combination Baggage Car. A baggage car having compartments for express or mail, or both, as well as for baggage. See Combination Car.

Combination Car or **Combined Car.** Figs. 133, 134, 141, 170, 197, 200, 202, 234-36, 394. A passenger train car divided into two or more compartments for the accommodation of different classes of traffic. See Car, M. C. B., Classes B, C, D, E and M.

Combination Cock (Baker Heater). A cock with funnel attached, used at the top of the water tank for filling. When opened with the key it allows the inward passage of the water, and at the same time the outward passage of air through a separate channel, hence the name.

Combination Lamp. Figs. 2118, 2127, etc. A lamp arranged for two lighting systems, as gas and electricity.

Combination Valve (Steam Heating). Figs. 2050, 2092.

Combined Platform and Double Body Bolster. Figs. 504, 507, 520-523. A passenger equipment car platform frame and double body bolster made in one piece.

Combined Stop and Lock. Fig. 494. See Door Stop.

Combined Triple Valve, Reservoir and Brake Cylinder (Freight Air Brake). Fig. 1288, etc. To lessen the complication and reduce the cost of freight brake gear these three parts, which are separate in passenger brake gear, are combined.

Commutator. See Armature, Bolted Commutator.

Commutating Pole Motor. Figs. 2535, 2537, 2541, 2548. A railway motor in which four auxiliary coils and pole pieces, called commutating poles, are mounted between the four main field poles. The windings of these poles are connected in series with each other and with the armature. The commutation is improved and the poles perform their functions equally well regardless of the direction in which the motor is run.

Compartment. A subdivision of a passenger car. In British carriages it usually runs entirely across the car. In American parlor and sleeping cars, when used, it runs only partially across, leaving room for a passage or corridor at the side. Often called Stateroom.

Compartment Sleeping Car. Figs. 184, 186, 250, 255. A sleeping car which is divided into staterooms all opening into a common corridor which runs the whole length of the car. See Sleeping Car.

Compensating Valve. Fig. 1351. Designed for use on high speed trains to regulate the brake cylinder pressure so that the maximum retarding power may be obtained without injury to the wheels.
In service applications, with both plain and quick action triple valves, it acts as a safety valve, to relieve the cylinder of surplus pressure. In emergency applications part of the vented brake pipe air passes from the side cap of the triple into the spring box of the compensating valve and, exerting a pressure on the diaphragm in addition to the spring, prevents the valve from opening. After a few seconds the pressure

of air in the spring box has become so reduced by back leakage through the small hole in the check valve that the brake cylinder pressure is able to force the piston down, permitting brake cylinder air to escape until the pressure becomes reduced to that at which the valve is adjusted, when the spring moves the piston back and closes the exhaust. With this valve the maximum brake cylinder pressure in emergencies is gradually reduced to that at which the valve is adjusted.

Composite Car. Another name for COMBINATION CAR. A freight car with a combination steel and wood frame.

Composite Framing. A type of framing which combines iron and wood, in the sills, posts, plates, etc. The sills and plates of the body and deck consist of two pieces of wood with an iron or steel flitch plate between, the three pieces being bolted together as one.

Compound Carline. 100, Figs. 423-25. A carline having the main or central portion of wrought iron, with a piece of wood on each side. Commonly used for wooden cars with clere stories, and sometimes called profile carline, owing to their following the shape of the clere-story.

Compressed Air Jack. See PNEUMATIC JACK.

Compression Beam. 163, Figs. 423-25. A horizontal timber in the side framing of a wooden passenger-equipment car body, which acts as the compression member of a truss. The compression beam brace abuts it. The compression beam is sometimes made double, one piece above the other, with separate braces (main compression brace and center compression brace) acting upon each. See END COMPRESSION BEAM.

Compression Beam Brace. 164, Figs. 423-25. A timber used in connection with a compression beam to form a truss in the side framing of a wooden passenger-equipment car. It is sometimes stiffened by a center counter brace, and sometimes two or more braces are used. It is then termed main compression brace.

Compression Faucet. A spring faucet with a flat disk on top. The valve is opened by pressing this disc and closed by a spring when the pressure is removed.

Compression Member. Any bar, beam, brace, etc., which is subjected to strains of compression, and forms part of a frame truss, beam, girder, etc. Struts, body braces, etc., are compression members. Similarly a tension member is used for tensile strains.

Concealing Water Closet. A form of closet covered with a small seat and sometimes placed in the corner of compartments or staterooms in private and sleeping cars.

Condensation Meter (Car Heating). Fig. 2105. A device for measuring the steam consumption of car heating systems.

Conductor (Refrigerator Car). The drip pipe from the ice pan.

Conductor's Car. A CABOOSE CAR.

Conductor's Lantern. One with an extra-sized bail attached to it by which it can be held on the arm, leaving the hands free.

Conductor's Valve. Figs. 1299, 1340, 1367. A valve for applying the train brakes and placed at some convenient point in each passenger car, usually in the saloon.

Conductor's Valve Discharge Pipe. A pipe leading from the conductor's valve down through the floor of the car to carry off the escaping air.

Conductor's Valve Pipe. Connects the brake pipe with the conductor's valve.

Connecting Chain (Steam Shovel). A pitch chain, connecting the pitch gear on the two axles of a truck, used for making the car self-propelling.

Connecting Rod. A rod which connects two or more parts or objects.

(Hand Car.) The iron rod which connects the bell crank and the crank shaft.

Connection Angle. Figs. 491, 492. A piece of commercial angle or a bent plate riveted to two members of a steel frame to hold them rigidly together.

Connection Clip. Fig. 492. See CONNECTION ANGLE.

Construction Car. A car used in building a new line of railroad or making repairs to roadbed and structures. The cars used as eating and sleeping cars for the men employed on construction work are frequently placed under this heading, as well as ballast cars, etc. See BALLAST CAR and CONTRACTOR'S CAR.

Contactor. Figs. 1764, 2589. A magnetic switch used to make or break a circuit in a motor control system. See AUXILIARY CONTACTOR and CONTROL SYSTEM.

Continuous Basket Rack. 17, Fig. 1450. See BASKET RACK.

Continuous Brake. A system of brakes so arranged that by connecting the brake apparatus on the different cars forming a train it can be operated on all of them from the engine or from any of the cars. See AIR BRAKE, VACUUM BRAKE.

Continuous Carline. A carline, which passes directly from side to side of the car, across and under the clere story or upper deck, in distinction from a profile carline, which is bent to follow the outline of the clere story.

Continuous Draft Gear. A draft gear, having a continuous rod or rods extending throughout the length of the car from the drawbar at one end to the drawbar at the other end, whose office is to transmit the tractive stresses and relieve the draft timbers. See AMERICAN CONTINUOUS DRAFT AND BUFFING APPARATUS.

Continuous Truck Frame. An iron bar which is welded together in a rectangular shape so as to form the sides and ends of a truck frame.

Contour Line. See AUTOMATIC CAR COUPLER.

Contractor's Car. Figs. 58-67. A car used by contractors in construction work; usually a dump car.

Control. See MULTIPLE UNIT CONTROL, UNIT SWITCH SYSTEM.

Control Valve. Fig. 1276. A device which performs all the functions of the triple valve and, in addition, provides a maintained brake cylinder pressure; automatic emergency should the brake pipe pressure be depleted below a predetermined point; full emergency braking power at any time during or following a service application, and maximum braking power more quickly than by the use of the triple valve.

Controller (Electric Motor Car). Fig. 2542-43, 2527, 2575, 2579, 2580. A device for regulating the speed and direction of rotation of the electric motors.

Convertible Car. Figs. 35, 37-40, 92, 93, 356-59. A car so built that it may be converted, without reconstruction, from one type to another, as stock to box or center dump gondola to side dump gondola. See also CAR, M. C. B. Class SD.

This term is also applied to a type of street cars which may be used either as open or closed cars.

Conveyor Car. Fig. 308. A freight car equipped with motors for moving freight under special conditions, as on a coal wharf.

Cooking Utensils. Figs. 1574-83. For use on dining, café-parlor, buffet cars, etc.

Cope. The upper portion of a mold or flash used in making metal castings.

Coping (British). A bar of iron secured to the top of the sides and ends of a gondola car (open wagon), and protecting them from local distortion.

Corner Angle Post. A corner post in the body framing of a car which consists of an angle bar, sometimes in combination with a wooden post.

Corner Brace. A diagonal member in the underframe between the end sill and transverse floor member or bolster. See END SILL DIAGONAL BRACE.

Corner Brace or **Corner Plate** (Freight Car Bodies). 55, 56, 57, Figs. 285-288, Fig. 489. A wrought or cast iron angle plate or knee on the outside corner, to strenghten and protect the frame. There are usually three corner plates, upper, lower and middle. Very commonly a push pole pocket is combined with lower corner plate.

(Passenger Equipment Car End Framing.) An angle iron applied to the corner of the deck end plate to keep it from abrasion and strengthen it.

Corner Casting. Usually a CORNER PLATE or PUSH POLE POCKET.

Corner Handle. More commonly a HAND HOLD or GRAB IRON.

Corner Plate. Fig. 489. See CORNER BRACE PLATE.

Corner Post. 43, Figs. 285-88, 374-375; 29, Fig. 297; 36, Fig. 383; 23, Figs. 410; 61, Figs. 423-25. The vertical member which forms the corner of the frame of a car body.

Corner Post Grab Iron. 23, Fig. 297. See GRAB IRONS.

Corner Post Knee Iron (Passenger Equipment Car End Framing.) A metal angle brace used to connect the foot of the corner post to the side sill.

(Vestibule.) An iron angle brace for the outside corner post of a vestibule resting upon the platform end sill.

Corner Post Pocket. The pocket for the corner post. See POST POCKET.

Corner Seat. A seat for the corner of a car, the back of which is not reversible.

Corner Seat End. A seat end bracket secured to the wall of a passenger car for supporting the outer end of a CORNER SEAT.

Cornice. 36, Fig. 1450. The moldings where the ceiling or headlining joins the sides and ends of the car inside.

Cornice Sub-Fascia or **Panel.** 37, Fig. 1450. A board or panel directly below a cornice.

Corridor (Sleeping and Compartment Cars). A passage running at one side of a car affording access to the compartments. All sleeping, dining and private cars have corridors to pass the staterooms, smoking compartments, etc.

Corridor Carriage (British). A passenger vehicle having a passage from end to end along one side, the various compartments having doors which open into this passage.

Corrugated Metal Car Roof (Freight Cars). A roof consisting of iron, steel or zinc plates usually covered with boards, and resting on roof strips on top of the rafters and carlines.

Corticine. A form of floor covering much like LINOLEUM.

Cotter Pin. See SPLIT KEY.

Counter Bore. An enlargement, for a certain portion of its length, of a hole bored in any substance.

Counterbrace. 165, Figs. 423-25. In passenger equipment car framing, the timber framed into the top of the side sill near the needle beam and supporting the compression beam brace into which it is also framed.

Counterbrace Rod. An inclined rod which acts as a counterbrace.

Counterbrace Rod Plate Washers. Washers that rest upon the plate and receive the end of the counterbrace rod.

Coupler. 13, Fig. 297; 23, Figs. 320, 355, 625-664. The term applied to the modern drawbar. The coupler proper is the head of the drawbar, which is so constructed as to automatically connect with or couple to the drawbar head on another car. The drawbar and its head, together with its knuckle and locking devices, is commonly termed coupler. See AUTOMATIC CAR COUPLER.

Coupler or coupling is also commonly applied to the connector which is used on air brake and steam heat hose. See also AUTOMATIC CONNECTOR.

Coupler, Automatic. For M. C. B. Rules for Interchange of Traffic with regard to couplers see INTERCHANGE OF TRAFFIC.

Coupler Carrier. 22, Fig. 297; Fig. 493. See DRAWBAR CARRY IRON.

Coupler Carry Iron. 22, Fig. 297; Fig. 493. See DRAWBAR CARRY IRON.

Coupler Centering Device. See DRAWBAR CENTERING DEVICE.

Coupler, Electric. Figs. 2581-82. A device attached to the end of a car including insulated metallic contacts for the connection of electric circuits between cars, generally used for connection of trail car lighting, heating or signal circuits to the motor car. See CONTROL SYSTEM.

Coupler, Emergency. See EMERGENCY COUPLING DEVICE.

Coupler Gage. See AUTOMATIC CAR COUPLER.

Coupler Horn. The projecting lug cast on the head of the coupler which bears on the face of the end sill or dead wood when the draft gear is closed solid. See AUTOMATIC CAR COUPLER.

Coupler Jumper. Two coupler plugs connected by an insulated flexible cable. See CONTROL SYSTEM.

Coupler Latch (Steam Coupler). A catch to lock the steam hose couplers together and prevent accidental parting in rounding sharp curves.

Coupler Knuckle. See KNUCKLE.

Coupler Knuckle Kicker. Figs. 636, 651. A knuckle opener.

Coupler Knuckle Lock (Automatic Couplers). Figs. 628-664. The block which drops into position when the knuckle closes and holds it in place, preventing uncoupling.

Coupler Knuckler Opener (Automatic Couplers). The device which throws the knuckle open when the lock is lifted so that a coupling can be made. With couplers not having a knuckle opener it is necessary to go in between the cars and pull the knuckle open by hand after the lock has been lifted.

Coupler Knuckle Pin. See KNUCKLE PIN.

Coupler Lock Lifter. (Automatic Coupler.) Figs. 628-664. The part of the mechanism inside the coupler head in some types of M. C. B. couplers which is moved by the uncoupling rod and in moving lifts the knuckle lock so that the knuckle can open. Also designated as COUPLER LOCK LIFT.

Coupler Lock Set (Automatic Couplers). Fig. 645. A feature of most M. C. B. couplers whereby the knuckle lock when lifted is held in a raised position until the knuckle is opened, when it allows the lock to drop back into position for automatically coupling when the cars are brought together.

Coupler Plug. A movable coupler designed to engage and connect to a coupler socket. See CONTROL SYSTEM.

Coupler Socket. A fixed electric coupler. See CONTROL SYSTEM.

Coupler Yoke. Figs. 494, 663, 679-82, 689-91, 696, 700, 703, 714. The yoke or strap that surrounds the draft gear and is riveted or keyed to the end of the coupler shank or drawbar. See AUTOMATIC CAR COUPLERS (Miscellaneous M. C. B. Standards).

Couplet (of Springs). Two ELLIPTIC SPRINGS placed side by side, to act as one spring. Three springs united in this way form a triplet, four a quadruplet, five a quintuplet, six a sextuplet.

Coupling. That which couples or connects, as a hook, chain or bar.

Coupling Link. A wrought iron link or open bar by which freight cars are coupled together by coupling pins. Chain coupling links are used with draw hooks. In consequence of the danger to trainmen attending the use of coupling links, and legislation forbidding their use in Interstate traffic after January 1, 1898, automatic car couplers have almost entirely replaced them. See AUTOMATIC CAR COUPLER.

Coupling Pin. A round bar of iron with which a coupling link is connected to a drawbar. Now almost obsolete because of the use of automatic couplers.

Coupling Pin Chain. A small chain attached to the car by a suitable eye to prevent the coupling pin from being lost.

Cover. See JOURNAL BOX COVER, MANHOLE COVER, etc.

Cover Plate. In metal underframes for cars a plate which is riveted to the flanges of the center sills to give them additional vertical strength as a box girder. The plate riveted to the top flanges is called a top cover plate and one riveted to the bottom flanges a bottom cover plate. See CENTER SILL BOTTOM COVER PLATE and CENTER SILL TOP COVER PLATE.

Cover Strip (Refrigerator Car). Metal plates covering a gutter in the floor.

A strip of metal, or sometimes wood, to cover a joint in the roof sheets.

Crabs or **Tongs** (Pile Driver and Wreck Crane). See TONGS. Also called rail clips or rail clamps. A pair of loose bent iron bars fastened at the top with a ring and intended to firmly clamp to the under side of the rail head when an upward pull is applied to the ring. They are used to anchor a pile driver car, steam shovel or wreck crane to the rails and prevent them from overturning when a heavy load is being lifted.

Crane. See WRECKING CRANE.

Crane Post. The post of a crane, which corresponds to the mast of a derrick.

Crank. "A device for causing rotation of an axis, or for converting rotary into reciprocating motion, or vice versa."—Standard Dict.

Crank Shaft (Hand Cars). A short wrought iron shaft to which a crank of a hand car is attached, which is turned by suitable levers and is connected by gear wheels with one of the axles of the car.

Cricket Iron. A seat stand.

Cross Bar (Swing Link Hanger). The iron bar supporting the cross bar casting which carries the spring plank. Also called mandrel pin and lower swing hanger pin.

Cross Beam. A transverse floor member placed upon the sills to support the inclined floor of a coal or ore car.

Cross Bearer. 196, Figs. 285-88; 8, Fig. 297; 6, Fig. 342; 22, Fig. 355; 28, Fig. 383; 26, Figs. 423-25; Figs. 495, 496, 497. A transverse member of the underframe, placed between the bolsters, acting as a tie between the various sills and helping to distribute the weight of the car. Cross bearers on steel cars are sometimes termed Needle Beams, but the term Cross Bearer is preferable. In steel car construction the term Cross Tie is commonly applied only to those members which tie the center and side sills together, the Cross Bearer usually having a filler between the center sills and thus extending across the car.

Cross Bearer or **Cross Tie Cover Plate.** Fig. 490, 492. The member which forms the top or bottom flange, to which the diaphragms are riveted in a built-up cross tie. The bottom cover plate is sometimes called Tie Plate.

Cross Bearer Diaphragm or **Cross Tie Diaphragm.** Fig. 490. The web plate or filling piece, outside the center sills, to which the cover or tie plates are riveted in a built-up Cross Tie.

Cross Tie. Fig. 497. See CROSS BEARER.

Cross Tie Timber. See CROSS BEARER.

Cross Tie Timber Truss Rod. An iron truss rod under the cross tie timber, serving to strengthen it. See NEEDLE BEAM TRUSS ROD.

Cross Tie Timber Truss Rod Bearing. 26p, Figs. 423-425. A QUEEN POST for the cross tie timber truss rod of a built-up Needle Beam.

Cross Timber Hopper Ends. In a wooden hopper car, a transverse floor timber framed between the intermediate sills, to which the lower end of the inclined floor is spiked and to which the outer hopper doors are hung. The ends of the draft timbers are bolted to it, and the short center sills abut it.

Crosshead (Air Brake Cylinder). A forked casting or forging attached to the end of a piston rod, to which the brake levers are connected.

Cup Holder or **Tumbler Holder.** A stand or rack for holding a drinking cup.

Cup Washer. A SOCKET WASHER.

Cupboard Bolt. See DOOR BOLT.

Cupboard Catch. An indifinite term for a light spring catch nearly or quite flush with the surface to which it is attached. It has a beveled bolt which snaps shut. See FLUSH BOLT.

Cupola. 22, Fig. 383. A small cabin built on the roof of a caboose to afford a means of lookout for the train crew and also to facititate passage from the caboose to the top of the train. Cupolas are also commonly used on dynamometer cars.

Cupola Hand Rail. 19, Fig. 383. A rail attached to a cupola to prevent trainmen from falling when entering or leaving through the cupola windows.

Cupola Inside Step. 25, Fig. 383. A step attached to the inside of a caboose to enable trainmen to enter and leave the cupola.

Cupola Marker Lamp. See CUPOLA SIGNAL LAMP.

Cupola Signal Lamp. 21, Fig. 383. A signal lamp mounted on the cupola of a caboose.

Current Director (Car Heating). Fig. 1997. A device for controlling the flow of steam or hot water in the pipes, working on the principle of an injector.

Curtain. A piece of cloth or other material hung in front of or around any space or object, as a window or sleeping-car berth, and which may be contracted or spread at will. The term, however, is usually restricted to loosely hung drapery, suspended on a curtain rod by curtain hooks or rings, in distinction from a shade, which is flat and rolls up. Curtains in cars are chiefly used for sleeping-car berths (BERTH CURTAINS). Window curtains are used in dining, parlor and private cars. Except in the saloons, blinds have been abandoned, and window shades are in almost universal use on steam railroads. Blinds are still in general use in street cars. The protecting shield used over vestibule diaphragms is called a curtain.

Curtain Fixtures. Fig. 1808-1826.

Curtain Hook (Sleeping Berths). See BERTH CURTAIN HOOK.

Curtain Rod. A bar to carry a curtain hung upon rings and sliding freely along the rod.

Curtain Rod Bracket. Figs. 1857-1858, etc.

Curtain Rod Bushing. Fig. 1862. A socket or bushing for the end of a curtain rod where it abuts a wall or partition.

Curtain Rod Folding Bracket (Sleeping Car). 15, Figs. 1458-59. A bracket for a curtain rod in a sleeping car which may be folded into the upper berth in such a manner that it is out of sight when the upper berth is shut up. See BERTH CURTAIN ROD BRACKET.

Cushion. Fig. 1507. Cushions used in passenger car upholstery are of the box type, being built upon and connected with a wooden framework (cushion frame).

Cushion Frame. A wooden frame to which the seat springs and upholstery of a car seat are attached.

Cuspidor. Figs. 1873-4. A vessel to receive discharges of spittle, and having a wide rim so that if it is upset its contents will not be spilled.

Cut-Out. A switch or fuse in a branch electric circuit or loop, used to disconnect the branch circuit from the main circuit.

Cut-Out Cock. Figs. 1300, 1339, 1359. See BRAKE CUT-OUT COCK.

Cut-Out Valve (Car Heating). Figs. 2079, 2081, 2093. Used for controlling admission of steam to radiator pipes.

Cylinder. A chamber or vessel whose ends are circular, and with straight parallel sides, as the cylinder of a steam engine. See BRAKE CYLINDER.

A name sometimes given to the fire pot of a stove or heater.

A type of lock is called a cylinder lock, Fig. 1655.

Cylinder Cap (Triple Valve). 19, Figs. 1273-74; 18, Fig. 1275.

Cylinder Cap Gasket (Triple Valves). 23, Figs. 1273-74.

Cylinder Head. A metal cover for the end of a cylinder, held on by cylinder bolts or cylinder studs. The cylinder head through which the piston passes is commonly termed the back cylinder head, and the other the front cylinder head, corresponding to locomotive practice. Brake cylinder heads are called Pressure and Non-Pressure Heads.

Cylinder Levers. Fig. 489. In passenger brake equipment, two levers which are connected by a rod attached near their centers. One end of one lever is attached to the crosshead of the brake cylinder, and the corresponding end of the other is attached to a bracket on the brake cylinder head at the opposite end of the cylinder. The other ends of the levers are connected with the floating levers by rods.

In freight brake equipment there is no second cylinder lever, the term applying only to the lever which receives the braking force direct from the push rod.

Cylinder Lever Bracket (Air Brakes). A T-shaped piece of iron bolted to the front cylinder head, to which one of the brake levers is attached.

Cylinder Lever Guide. A guide or support for the cylinder lever.

Cylinder Lever Support (Air Brakes). A wrought iron bar bolted to one of the center sills, on which the ends of the cylinder levers rest.

Cylinder Support. Fig. 490. A bracket attached to a brake cylinder for holding it in place on a car.

Cylindrical Gages. Gages made for measuring the size of cylinders and cylindrical holes, often called Whitworth gages. They consist of steel cylinders and rings hardened and ground very accurately to standard sizes. These fit into each other. The former is used for measuring the size of holes, and the latter for measuring the outside of cylindrical objects, and they are called internal and external cylindrical gages. They are generally used as standards alone, from which other tools and gages are made of the proper size.

D

Dairy Car. Fig. 117. A refrigerator car used for carrying butter, cheese, milk and other dairy products.

Damper. A valve in the stove pipe or in the bottom of a stove for regulating the draft.

Day Coach. See PASSENGER CAR.

Dead Air Space (Insulation of Refrigerator Cars). Air spaces which have no communication with the atmospheric air outside, so there can be no free circulation or change of air as there is in a free air space.

Dead Block. See DEAD WOOD.

Dead Lever (of Brake Gear). Fig. 489. The one of a pair of truck brake levers to which the brake connecting rod is not attached. The upper end of the dead lever is confined within a dead lever guide, or brake lever stop, which is provided with pins to adjust the end of the brake lever, and consequently the slack in the brakes, as the brake shoes wear. The lever to which the power is first applied through the brake connecting rod is termed the live lever.

Dead Lever Guide. Fig. 491; 95, Figs. 947, 966; Figs. 975, 1244, 1250. An iron bar or loop attached to a truck or car frame which holds the upper end of a fixed or dead brake lever. It usually has holes in it in which a fulcrum pin is inserted. By moving the pin from one hole to another the lever is adjusted so as to take up the wear of the brake shoes. Also called BRAKE LEVER STOP.

Dead Lever Guide Lug. Fig. 493. A lug or bracket attached to a truck bolster to support the dead lever guide.

Dead Lock. A lock in which the bolt is thrown each way by the key, and not in one direction by a spring, as with a spring lock or night latch.

Dead Padlock. A padlock in which neither the lock, bolt, nor hasp has a spring, but the former is thrown each way by the key, and the hasp must be opened by the hand.

Dead Wood. 32, Figs. 285-88, 355, 368, 374, 375, 22, Fig. 410. 11, Fig. 342. A single wooden block or stick of timber attached to the end sill of freight cars to protect persons between the cars from injury, by preventing the cars from coming together in case the drawbar or its attachments should give way. See BUFFER BLOCK.

Deadening or **Deafening.** The filling placed between the floor and the deafening ceiling of a passenger car to serve as a non-conductor of heat and noise. Mineral wool, is sometimes used for deadening, but commonly shavings, when anything at all is used. An intermediate floor (between the sills) and deafening ceiling (under the sills) is used in refrigerator cars.

Deafening Ceiling. Boarding on the under side of the sills of a passenger car to exclude or deaden the noise of the car.

Deafening Floor. See DEAFENING CEILING.

Deck. A term applied to the roof of a car which has a clere-story. The deck or upper deck is properly the clere-story, but the entire roof is commonly called the deck and subdivided into lower deck or main roof, and upper deck.

Deck Beam. A beam in the form of an inverted T with a round knob on the upper end, used in some forms of steel car construction.

Deck Bottom Rail. 111, Figs. 423-425. See DECK SILL.

Deck Bridging. Bridging or blocking used in the upper deck or clere story.

Deck Caboose Lamp. See CUPOLA SIGNAL LAMP.

Deck Carline. See UPPER DECK CARLINE.

Deck Collar (Heaters). A sheet metal ring to line the smoke pipe opening through the roof.

Deck Eaves Molding or **Upper Deck Eaves Molding.** A molding under the outside edge of the upper deck.

Deck End Panel. A narrow panel in the end of the upper deck.

Deck End Plate. A member that fulfills the same office for a clere-story that the body end plate does for the body. See END PLATE.

Deck End Sill. A horizontal timber connecting the ends of the deck sills, and forming the base for the end of the upper deck.

Deck Inside Cornice. A molding which fills the interior angle where the upper deck joins the deck side.

Deck Lamp. Figs. 2128, 2131, 2139, 2144, 2212, 2236, 2254, 2432, etc. A lamp which is fastened to the deck or ceiling of a car.

Deck Plate. Fig. 496. A plate used in constructing the roof or deck of a steel passenger equipment car. 117 Figs. 423-25. A longitudinal member of the roof frame at the top of the deck posts and upon which the ends of the upper deck carlines rest. It has the same relation to the deck sill as the side plate has to the side sill.

Deck Post. 115, Figs. 423-25. An upright member which connects the deck plate with the deck sill.

Deck Roof. 102, Figs. 423-25. The roof of the upper deck or clere-story, itself sometimes called the deck or upper deck. See DECK.

Deck Sash. Fig. 1793, etc. A glazed sash in the sides of the upper deck. See SASH.

Deck Sash Catch. See DECK SASH LATCH.

Deck Sash Flush Catch. A deck sash latch mortised into the sash rail flush with the sash.

Deck Sash Latch. Fig. 1804. A spring bolt attached to a deck sash, which engages with a deck sash latch keeper or strike plate.

Deck Sash Opener. Figs. 1797-1799, 1807. A lever attached to a revolving rod by which a deck sash is opened and held in any desired position. A great variety of forms exist. The pull hook, a rod with a hook at one end, which is used for opening the deck sash, is also called a deck sash opener.

Deck Sash, Outer. A deck sash which carries the screen, and prevents the admission of dust and cinders.

Deck Sash Pivot. Figs. 1791, 1795, 1801-1803, 1806. Roughly a metal stud or spindle attached to a suitable flange by which it is fastened to a deck sash, an on which the latter turns. See DECK SASH RATCHET CATCH.

Deck Sash Pivot Plate. A plate attached to the window casing, with a hole or eye in which a deck sash pivot works. Sometimes they are provided with springs to prevent the sash from rattling.

Deck Sash Pull. Fig. 1800. A ring attached to a deck sash to open and close it.

Deck Sash Quadrant. A curved bar or plate of metal used as a guide or stop to control the movement of a deck sash. See DECK SASH RATCHET CATCH.

Deck Sash Ratchet Catch. Figs. 1791-1796, 1801, 1805. Usually combined with a deck sash pivot and stop. A ratchet makes it possible to hold the window open in any one of several positions.

Deck Sash Ratchet Plate. A part usually attached to the side of the car, but sometimes to the sash, carrying a ratchet in which the ratchet catch engages.

Deck Sash Spring Pivot. A DECK SASH PIVOT provided with a spring to make the sash removable.

Deck Screen Bottom Rail. A rail running the entire length of the clere-story, and closing the space between the bottom of the screen and the roof.

Deck Screen Post. An upright stick forming the side pieces of a frame to hold a wire screen put on outside of the deck windows to exclude dust and cinders.

Deck Side. The entire part, consisting of a plate, rail, posts, and panels, or sashes, which forms the side which occupies the vertical space between the lower and upper deck.

Deck Side Ventilator. This term is used to designate the sash or valves and their attachments for opening and closing the aperture.

Deck Sill. 111, Figs. 423-25. A longitudinal member of the roof frame at the top of the lower deck or main roof carlines and forming the lower sill of the deck or clere-story.

Deck Sill Facing. 7, Figs. 1458-59. The facing or finishing material applied to the inner side of the deck sill.

Deck Sill Sub-Facing. A thin board sometimes used below the Deck Sill Facing.

Deck Soffit Board. A board on the under side of the overhanging cornice of an upper deck.

Deck Top Rail. A DECK PLATE.

Deck Ventilator. See DECK SIDE VENTILATOR. The deck sash are frequently hung and operated as deck side ventilators.

Deck Window. 41, Figs. 1458-59; Fig. 1730. A window in the upper deck or clere-story. More commonly a deck sash.

Deck Window Screen. An outside sash with a screen over it to exclude dust and cinders.

Defect Card. See AIR BRAKE DEFECT CARD.

Deflector. See DUST DEFLECTOR.

Deflector Springs (of Ventilators). Springs controlling the movement of the deflectors.

Dental Lavatory. Fig. 1606. A basin with the necessary faucet, tumbler holder, etc., used in connection with cleansing the teeth.

Derrick Car. A strong platform car which carries a derrick crane which is used for removing wrecked cars and engines, erecting bridges, or handling any heavy objects. Also called wrecking car.

Designation of Brake Rods and Levers. See FOUNDATION BRAKE GEAR.

Detective Wire (for Car Seals). A flat twisted wire or other equivalent device to prevent the seal being stripped from the wire without destroying one or both.

Diagonal Brace. 9, Fig. 297; Fig. 491. See END SILL DIAGONAL BRACE.

Diagonal Floor Timber. A floor timber which is placed in a position diagonal to the sills.

Diameter Testing Gage (for Car Wheels). A gage for testing the diameter of wheels and axles. See WHEELS.

Diameter of Wheels. See WHEELS, DIAMETER OF.

Diamond Arch Bar Truck. Figs. 923, 928, 929, 934, 940, 943 and 945. A car truck with iron side frames consisting of two or more ARCH BARS, and a pedestal tie bar. The spaces between the arch bars are diamond shaped, hence the name. The journal boxes are rigidly bolted to the side frames. The cross members of the truck, bolster, spring plank, etc., are either of wood or metal, or of both wood and metal combined, but the modern truck is almost always of metal throughout.

At the Master Car Builders' Convention (1884) it was voted that this form should be the type used in preparing designs for a standard freight car truck, to have a 5-ft. wheel base, channel bar transoms, and either SWING or RIGID BOLSTER. For many years it was the type almost universally used, but latterly trucks with cast steel side frames have come into common use for freight service.

Diaphragm. Usually a thin wall or partition.

(Valves.) Some valves are regulated by diaphragms or diaphragm plates, to which are attached springs, nuts, stems, etc., whose names explain themselves. These diaphragms are commonly spring plates, which guide the rod and, assisted by spiral springs, cause the attached valves to seat or unseat at a fixed pressure.

(Of a Vestibule.) Figs. 556-561. A device usually of some combination of rubber and canvas, arranged in folds and connecting the vestibule face plate with the vestibule to exclude the dust and cinders, and at the same time to allow the face plate free movement to adjust itself to the motion of the cars.

Diaphragm Face Plate. See VESTIBULE FACE PLATE.

Dining Car. Figs. 156, 158-169, 241-44, 406 and 407. A car operated in passenger trains and equipped with kitchen and utensils, dining tables, etc., for serving meals to passengers. See CAR, M. C. B. CLASS D.

Dining Car Chair. Figs. 1540, 1542.

Dipper (Steam Shovel). Also called bucket or shovel. The heavy iron scoop or bucket which removes the earth or rock and transfers it to the cars.

Dipper Bail (Steam Shovel). The link fastened to the top of the dipper and to the dipper block.

Dipper Block (Steam Shovel). The block at the point of the boom around which the hoisting chain passes.

Dipper Teeth (Steam Shovel). Heavy iron cutters or teeth projecting from the dipper to break the earth.

Direct Steam Heating System. Figs. 1949, etc., 1986-1990, 2021, 2062, 2097-8. A system of car heating in which the steam from the locomotive is carried directly to the radiators or heating pipes. The term is used to distinguish the system from those in which the steam is employed to heat the water which circulates in the radiators or heating pipes.

Dirt Collector. See CENTRIFUGAL DIRT COLLECTOR.

Discharge Pipe (Air Compressor). Also called reservoir pipe. A pipe by which the compressed air is conveyed from the air compressor to the main air reservoir.

Discharge Valve. (Of Car Signal Valve). The valve in the attachment called the car signal valve. The whole device is also sometimes so called.

(Of Air Compressor) The valve through which the air as compressed passes to the main reservoir.

Distance Block. A short, thick piece of wood placed between two or more objects to keep them apart, or to preserve an interval of space between them, as floor timber distance block, truck bolster distance block, etc.

Distributing Table (Postal Car). Fig. 1714. A table upon which the mail bags are emptied of their contents, and from which they are distributed to the various boxes or pouches.

Distributing Table Hinge. Fig. 1714. A strap hinge for the table on which mail is sorted in postal cars.

Ditcher. A small steam shovel, usually mounted on a flat car, for digging the ditches in railroad cuts.

Dividing Attachment (Vacuum Brake). A device to regulate the application of the brakes to the locomotive or train, or both. See EJECTOR.

Division Arm (Twin Seats). The middle seat arm between the two seats.

Dog. A general term in mechanics for all devices which bite or take hold of or give motion to other parts.

(For Pawl of Winding Shaft.) A disk or button eccentrically pivoted in such a way as to hold the ratchet wheel pawl of a winding shaft in its place. The pawl itself of a ratchet gear is also sometimes termed the dog in other forms of ratchet gear where no dog to hold the pawl is necessary. A brake pawl-dog is similar.

Dome. A spherical roof or covering. A vertical cylinder attached to the top of the tank on tank cars and to the top of steam boilers. See TANK DOME.

Dome Head (Tank Car). 109, Fig. 355. The top of a TANK DOME.

Dome Lamp Shade. A LAMP SHADE of curved or spherical outline.

Door. Fig. 752. A frame of boards or plates of metal for closing a doorway, as BOX CAR DOOR, DROP DOOR, PLATFORM TRAP DOOR, etc. See DOOR FRAME for names of parts.

Door Bolt or Bar. 74b, Figs. 374-75. An iron bar, actuated by a handle, which slides into a bracket or eye and locks the door. Used chiefly on the swing doors of refrigerator cars.

Figs. 1660-1662, etc. A metal bar attached to a slide and fastened to a door so as to hold it shut from the inside. They are either round, or barrel, or square. A square neck door bolt is one with an angle or shoulder in it. Flush door bolts are gained in so as to be flush with the surface. A cupboard catch is a form of door bolt having a beveled latch and actuated by a spring; but bolts so formed are commonly termed latches. See also BARREL DOOR BOLT, FLUSH BOLT, SQUARE DOOR BOLT.

Door Bolt Bracket. 72, Figs. 374-75. An iron eye attached to the body of the car into which the door bolt or bar is forced, to hold the door in a closed position. Used chiefly on freight cars which are equipped with swing side doors.

Door Bolt Keeper. See KEEPER.

Door Bottom Rail. See DOOR FRAME.

Door Brace (Freight Car Doors). A diagonal piece of timber framed into the door frame to stiffen the door.

Door Butt. A BUTT HINGE.

Door Button. "A small piece of wood or metal swiveled by a screw through the middle, and used as a fastening for a door or gate."—Knight.

Door Cap (Freight Car Doors). A horizontal board across the top of the door.

Door Case. The frame which incloses or surrounds the sides and top of a door. The separate parts are the door jambs or door posts, door sill and door lintel.

Door Case Top Rail. A timber parallel with the DOOR LINTEL.

Door Center Girth (Freight Car Doors). A horizontal board across the middle of the door. A middle door rail, except that it is not framed into the door, but simply nailed on.

Door Chain Bolt. A device which permits a door to be opened a short distance, yet not far enough to gain admission.

Door Check. Fig. 815, 816. A pneumatic or hydraulic dash pot and spring attached with suitable levers to the top of a swinging door and to the door lintel. The spring tends to close the door, and the dash pot checks its motion sufficiently to prevent the door slamming shut.

Door, Door Jamb and All Other Inside Exposed Corners of Stock Cars, Rounding Corners (M. C. B. Recommended Practice). Fig. 2756. In 1910 a Recommended Practice was adopted that doors, door jambs and all other inside exposed corners of stock cars be rounded to prevent injury to cattle.

Door Fastener. Figs. 788, 789. The common term for the device by which a car door is locked with the aid of a seal.

Door Fixtures, Box Car (M. C. B. Standard). Figs. 2745-49. Side door fixtures. In 1897 a committee on this subject reported with details which were afterward adopted by letter ballot as Recommended Practice of the Association.

In 1910 an outside hung side door and a flush side door were adopted as Recommended Practice as representing the minimum requirements in door construction.

Also that the door hood coverings be omitted from new cars, and as much as possible in repairs to old cars.

In 1911 the location of center of hasp or sealing eye was made preferably 5 feet from top of rail and not more than 5 feet 9 inches from top of rail.

In 1912 the door hasp staple was increased from 5⅜ inches to 16 inches and provided with four bolt holes.

In 1912 the drawings and details were advanced to standard.

Door Fixtures, End (M. C. B. Recommended Practice). Fig. 2755.

In 1912 the box car side door fixtures were transferred to standard, the end door fixtures remaining as a recommended practice.

Door Frame. Figs. 805-809. The structure in which the panels of a door are fitted. It is composed, as is also a window sash, of the stiles, or upright pieces at the sides; the mullions, or central upright pieces; the bottom rail; the lock, or central rail, and the top rail. The DOOR CASE surrounds it.

Door Friction Roller. See SLIDING DOOR FRICTION ROLLER.

Door Guards (Baggage and Freight Car Sliding Doors). 23, Figs. 805, 809. Strips of wood which inclose the space occupied by the door when open to keep the freight from interfering with its movement.

Door Guide. Fig. 494. See SIDE DOOR BOTTOM GUIDE.

Door Handle. Figs. 494, 1865. A handle, commonly of a D-shape, attached to a door as a means of opening and closing it.

Door Hanger. Fig. 797; 21, Figs. 805-809; 819, 820, 832, 835. A device by which a sliding door is suspended at its top, and which slides on a track. Most modern freight car door hangers are fitted with rollers which run on a door track.

Door Hanger Sheave. See Sheave.

Door Hasp. 73, Figs. 374, 375; Figs. 494, 787, 1663, 1716. A metal clasp attached to a door, by which it is fastened to a staple on the body of the car. A pin or a car seal is passed through the staple after the hasp is placed over it. Used chiefly on freight car doors. Generally made of malleable iron and the pin attached so that it cannot be lost. Padlocks are rarely used on freight cars.

Door Hasp Holder. Fig. 494. A metal strap, usually malleable iron, bolted to a freight car side door, and having a hook or eye to which the hasp is attached.

Door Hasp Staple. Fig. 1663. A ring or U-shaped staple over which the slotted part of the door hasp fits and through which the door pin is passed.

Door Head. Figs. 495 and 497. A steel plate or combination of steel plates placed across the top of a door opening.

Door Hinge. See Hinge.

Door Holder. Figs. 830, 831, 833. A device for holding a door open or shut. Also called door stop, as it is also intended to check the momentum of the door when swung open violently.

Door Holder Catch or **Door Holder Stop.** A metal bracket attached to the floor (floor stop) or side (partition stop) of a car, with which a door holder engages, to hold a door open.

Door Hook. 77, Figs. 374, 375; 22, Figs. 805, 809; Fig. 1664. A hook for holding a door open or shut.

Door Jamb. The side piece or post of a door case. Also called door post. Not to be confused with the stiles of the door itself. See Door, Door Jam, etc.

Door Knob. Fig. 1676. A ball attached to the end of the spindle of a door latch to take hold of in moving the latch or opening the door. The knob is often made in various peculiar forms.

Door Latch. Fig. 769. An attachment to hold the door shut. See Latch. A door latch is often made in combination with a lock, having a separate bolt and key to secure or fasten the door from the outside.

Door Latch Bolt. See Latch.

Door Latch Keeper. See Keeper.

Door Latch Rose or **Escutcheon.** Fig. 1679. A plate fastened to a door as a guard or bearing for the latch spindle. A rose is frequently called a rosette. See Escutcheon.

Door Latch Spindle. B, Fig. 1676. A small metal shaft to which the door handle or knob is attached, and by which the latch is turned.

Door Latch Spring. A spring which acts on the latch hook or bolt and causes it to engage with its keeper; usually made of a flat piece of steel.

Door Lintel. 99, Figs. 423-25. The horizontal part of a door casing above the door. See Door Frame.

Door Lock. Figs. 785, 792, 796. See Lock.. A Latch is usually combined with a passenger car door lock.

Door Lock Bolt. See Lock.

Door Lock Keeper or **Nosing.** See Keeper.

Door Mullion. 2, Figs. 805, 809. A vertical bar of wood between the panels of a door. See Door Frame, Door Window Mullion.

Door Name Plate. A metal plate on the inside of a passenger car door with the name of the builder inscribed on it. The name is now more commonly painted on.

Door Notice Plate. See Notice Plate.

Door Operating Apparatus. 17, Fig. 297. The mechanism used to open and close the type of doors, commonly known as drop doors, which are used on hopper, gondola and other types of drop-bottom cars.

Figs. 826-829. A power arrangement for controlling the opening and closing of sliding doors on suburban or street railway cars.

Door Panel. 10 and 11, Figs. 805, 809. "A piece of board whose edges are inserted into the groove of a thicker surrounding frame of a door."—Webster. They are distinguished as lower, middle and upper. Any panel, but especially the lower, is sometimes cut up into two twin panels by a door mullion.

Door Pin (Freight Car Doors). A pin used to fasten a hasp to a staple.

Door Pin Chain. A metal chain by which a door pin is attached to a car.

Door Plate. A notice plate. See Door Name Plate.

Door Post or Door Jamb. 44, Figs. 285-88, 374, 375; 37, Fig. 383; Fig. 409; 62, Figs. 423-25; Figs. 486, 487; 1, Figs. 805, 809. A vertical post which forms the side of a doorway.

Door Post Plate. A metal plate laid over the door post to protect it from damage.

Door Post Pocket. 44, Figs. 285-88. The pocket for the door post. See Post Pocket.

Door Protection Plate. Fig. 496. A plate placed at the side of a door way to act as a reinforcing member in case of shocks, as when trunks, etc., are thrown against the frame.

Door Pull. See Door Handle.

Door Rail. Figs. 805, 809. A horizontal member or bar of the framing of a door. The upper one, 4, is called the top rail; the lower one, 5, the bottom rail; 6, the middle or lock rail; 7, the parting rail.

Door Rail Bracket (Car Doors). A bracket to carry a top door rail, serving as a guide for the door. See Door Track Bracket.

Door Roller. Fig. 822. Also called a door sheave. The term door roller is applied to a flat tread wheel pivoted in a bracket and attached to the bottom of a door to roll upon a flat surface rather than a narrow track.

Door Sash. 12 and 13, Figs. 805, 809. A wooden frame containing one or more panes of glass, placed in a door. In some cases one of these sashes is made to slide, so that it can be opened for ventilation. They are distinguished as lower and upper door sash.

Door Sash Bolt. A metal pin attached to a sliding door sash to hold it in any desired position.

Door Sheave or **Sliding Door Sheave.** A small wheel on which a sliding door rolls. It is usually placed at the top of the door, and sometimes at the bottom also. It is carried in a door sheave holder. A grooved casting called a door shoe or door slide is sometimes used as a substitute on freight car doors, especially when the load does not rest upon the lower door track. See also Door Roller.

Door Shoe. See Door Sheave.

Door Sill. A cross piece attached to the floor on the under side of a door opening.

Door Slide. See Door Sheave.

Door, Sliding. See Sliding Door.

Door Spindle. The bar passing through the door which carries the door knobs.

Door Spring. An attachment to make doors self-closing.

Door Stile. 8, Figs. 805, 809. One of the two upright pieces on the outer edges of a Door Frame.

Door Stop. Fig. 830. A peg or block against which a passenger car door strikes when opened, often provided with a rubber cushion, especially for swinging doors. Door holders, which both stop the door and retain it, are often called door stops, as Figs. 830, 831, 833.

Freight Car Sliding Doors. 42, Fig. 368; Figs. 494, 776, 777. A block of wood or an iron casting placed on the side of the car to limit the distance that the door can be moved. A Combined Stop and Lock is a door stop with an attachment for locking the door.

Door Threshold Plate. A plate on the threshold of the door.

Door Track. 65, 66, Figs. 285-88; Fig. 489. A guide which supports a sliding door, and upon which it moves, or by which it is held in its place. They are either top door tracks or bottom door tracks. The former usually carry the weight of freight car doors, which are hung thereon by door hangers. The lower track serves only as a guide for the door shoes.

Door Track Bracket. A bracket for securing a side-door track to the car. See also, Door Rail Bracket.

Door Track Support. Fig. 492. See Door Track Bracket.

Door Window Mullion. A middle upright bar in the door window frame. See Door Frame.

Doorway. The passage or opening formed by a door casing, which is closed by a door.

Dope. A mixture of waste and oil, placed in journal boxes to lubricate the journals.

Double Board Roof. The upper layer of grooved boards is sometimes laid with the grooves under, so as to form a kind of tube between the two layers See Roof.

Double Body Bolster. Figs. 504, 507, 519-523. See Body Bolster.

Double Chair. Fig. 1541. A twin car seat.

Double Coil Draft Spring. See Draft Spring.

Double Coil Jet System (Car Heating). A system of car heating which combines the drum or jacket features with the jet or commingler system of injecting steam into the hot water circulation. The steam is first sent through the inner or steam coil of the double coil in the heater, and then through an annulus, into the circulating pipe. The jet is so directed as to aid the circulation in the pipes. It is claimed to be noiseless.

Double Coil Nest Spring. A spiral spring with another inside of it.

Double Deck (Stock Car). 28, Fig. 368. A second floor in a stock car half way between the ordinary floor and the roof, to increase the carrying capacity of the car for small live stock, such as pigs, etc. See Upper Floor, and Car, M. C. B., Class S.

(Automobile Car.) Fig. 283. A similar arrangement fitted in an automobile car.

Double Door. A door made in two parts. These are sometimes fastened together by hinges, so as to fold back on each other, and sometimes each part is hinged to one of the door posts. Sliding doors are also sometimes made in two parts.

(Fruit Car.) Doors in pairs, one inside the other, as in refrigerator cars, etc., are also called double doors.

Double Lip Retaining Ring (Steel Tired Wheels). One of the common methods of attaching a steel tire to the body of the wheel.

Double Pipe Clip. An iron band made with two bends for holding two pipes (as heater pipes) in their place. See Clip.

Double Pressure Retaining Valve. See Pressure Retaining Valve.

Double Track Snow Plow. Fig. 228. A snow plow for use on railroads having two or more tracks, and so constructed that it throws the snow to one side only.

Double Transom Truck. A four-wheel passenger truck with two bolsters, designed to give the same easy-riding qualities as the six-wheel truck.

Double Washer. A washer that serves two bolts.

Double Web Bolster. Fig. 515. A single bolster consisting of two beams. The term is not a desirable one, as it is likely to be confused with Double Body Bolster.

Dovetail. "A flaring tenon adapted to fit into a mortise having receding sides so as to prevent the withdrawal of the tenon in the directions to which it will be exposed to strain."—Knight.

Draft Arm. Fig. 677, 678. See Draft Sill.

Draft Beam. Fig. 676. A substitute for draft timbers and stops, being cast in one piece and bolted on the inside of the center sills.

Draft Door (Baker Heater). A door in the smoke flue base, automatically opened and closed by the fire regulator, by which the fire is regulated.

Draft Gear. 24, Fig. 320; Figs. 682-746. A term used to designate the apparatus which connects the coupler or drawbar with the car sills. It receives and dissipates the shocks received by the coupler, thus tending to prevent their damaging the car. See Friction Draft Gear, Tandem Spring Draft Gear, Twin Spring Draft Gear.

(Passenger Equipment Car). See Three-Stem Equipment.

Draft Gear Carry Iron. Figs. 699, 702, 724. A plate which extends underneath the draft sills and supports the draft gear.

Draft Gear Cheek Casting. See Cheek Casting.

Draft Gear Followers. See Followers.

Draft Gear Tie Rod. A rod which connects an end sill or platform end sill with a body bolster or other cross timber to tie them together. The term is sometimes applied to the draft rods of continuous draft gear.

Draft Key. Figs. 693, 699, 702. A key used with some forms of draft gear.

Draft Lug Angle. 44, Fig. 410. An angle riveted to the bottom of the center sill at the draft gear, to which the lower part of the cheek casting is fastened.

Draft Plate. See Cheek Casting.

Draft Regulator. See Fire Regulator.

Draft Rod (Continuous Draft Gear). A rod which unites two drawbars at opposite ends of a car, and relieves the draft timber attachments from tensile stress.

raft Sill. 26, Figs. 285-88; 1, Fig. 297; 26, Figs. 355, 368, 374, 375; Figs. 673, 674, 677, 678. More commonly designated as Draft Timber. The center sills which transmit the draft stresses from end to end of the car are sometimes termed the draft sills. When metal draft members are used the term draft sill is almost universally applied.
See SILLS, SPLICING OF (Wooden Sills).

'raft Sill Tie Plate. Fig. 492. A plate riveted to the draft sills to help in holding them rigid.

'raft Spring. A spring attached to a coupler or drawbar to give elasticity. They are usually so arranged by means of follower plates at each end as to resist either tension or compression.

'raft Spring Pocket. A DRAWBAR SPRING POCKET.

'raft Spring Stop. A metal sleeve or thimble in the center of a spiral draft spring to resist excessive compression. Not to be confused with a drawbar stop.

'raft Spring Thimble. A projection riveted to the follower plates and fitting inside the draft spring to hold it in place.

'raft Timber. 26, Figs. 285-88. A pair of timbers, carrying the drawbar attachments, placed below the center sills, and usually extending from the platform end timber of passenger-equipment cars, or the end sill of freight cars, to the body bolster.

'raft Timber Bolt. A bolt used to secure a draft sill to a center sill.

'raft Timber Pocket. A casting attached to the body bolster or center sills of a car to receive the end of a draft timber.

'raft Timber Tie Bar. A transverse iron bar attached to the under sides of a pair of draft timbers to tie them together.

rain Cock. See RESERVOIR DRAIN COCK.

rain Cup or **Drip Cup** (Air Brake). A globular receptacle under a triple valve to collect water of condensation.

rain Valve (Car Heating). Fig. 2041. A valve for draining off the water condensed in the steam pipes where an automatic trap is not used.

raw Head. The head of an M. C. B. automatic coupler, exclusive of the knuckle, knuckle pin and lock.

raw Spring. See DRAFT SPRING.

raw Timbers. See DRAFT TIMBERS.

rawbar. Used synonymously with COUPLER. It has been used indiscriminately to designate both the old link and pin drawbar and the modern automatic car coupler. There has been in the past an effort to confine the name drawbar to the old link and pin type, but in the proceedings of the M. C. B. Association, in speaking of the height of drawbars, the term is applied to the M. C. B. standard automatic coupler. See AUTOMATIC CAR COUPLER.

rawbar Carry Iron. 25, Figs. 285-88; 22, Fig. 297; 28, Fig. 410; Figs. 493, 665-68. A U-shaped strap fastened to the under side of the end sill and supporting the outer end of the drawbar. Often contracted to carry iron or carrier iron. Also called stirrup.

rawbar Centering Device. Figs. 669-672, 675. A device for maintaining the drawbar normally in the center line of draft, but allowing it to move to either side when the car is rounding a curve and is coupled to another car.

Drawbar Safety Lug. See COUPLER HORN.

Drawbar Stirrup. See DRAWBAR CARRY IRON.

Drawbar Stop. See CHEEK CASTING.

Drawer Pull. A wooden or metal attachment on a drawer to take hold of in pulling it out.

Drawing Room. A small room or compartment in a drawing-room car. See STATEROOM.

Drawing Room Car. See PARLOR CAR. A term at one time applied to parlor cars, but now usually restricted to certain types of sleeping cars which have one or more separate compartments or drawing rooms containing a double-berth section and a sofa or lounge, in addition to which they are usually supplied with a private toilet. Such a car is termed a Drawing Room Sleeping Car.

Draw-Off Cock (Baker Heater). A cock for emptying the pipes.

Dressing Room. Another name for a saloon, particularly one provided with wash bowl and toilet facilities.

Drip Coupling or **Basin Coupling** (Wash Basin). The connection of the waste pipe or drip pipe with the basin.

Drip Cup (Air Brake). A receptacle inserted in the brake pipe to receive water condensing therein. A drain cup.

Drip Pan (Refrigerator Car). A dish or pan at one corner or end of the car for receiving the water from the melting ice, usually permitting it to escape by a trap.

Drip Tray. An enameled piece of iron placed directly under the seat of a closet, and over the bowl.

Drip Valve. See RESERVOIR DRAIN COCK.

Drip Valve, Automatic. Fig. 1381. Used in connection with an automatic connector.

Driving Chain (Steam Shovel). A pitch chain, used to make the steam shovel self-propelling, by engaging with the pitch gear attached to one of the axles.

Drop (of Lamp). The drop of a center lamp is its extreme length, measured from the ceiling to the lowest part of the lamp.

Drop Bottom. See DROP DOOR.

Drop Bottom Car. Figs. 41-43, 45-51, 92, 93, 316-325, 328-333, 335-340, 356-359. A car with a level floor or bottom, equipped with a number of drop doors, for discharging the load. See also CAR and HOPPER BOTTOM GONDOLA CAR.

Drop Brake Shaft. Fig. 1419. A brake shaft which is normally in a vertical position, but can be dropped to a horizontal position and still remain operative should conditions of lading require this to be done.

Drop Door. 61, Fig. 320; Figs. 752-763. A door at the bottom of a drop bottom or hopper bottom car for unloading it quickly by allowing the load to fall through the opening. Drop doors are usually in pairs, and are supported by a chain wound upon a winding shaft or by a lever arrangement. Frequently a drop door beam extends across the car above the winding shaft to assist in supporting it and to stiffen the car.

Drop Door Beam. See DROP DOOR.

Drop Door Chain. 64, Fig. 320; Fig. 752. A chain attached to a drop door, and usually connecting it with a winding shaft, for the purpose of controlling the door. Also sometimes termed hopper chain.

Drop Door Chain Ring. An iron ring to which are fastened the single chain passing around the door winding shaft and the two chains which are attached to eye bolts in each of the double drop doors.

Drop Door Eye Bolt. An iron bolt with an eye in the upper end which is fastened to a drop door near the edge away from the hinge and to which is secured the drop door chain.

Drop Door Gear. See Door Operating Apparatus.

Drop Door Hinge. 62, Fig. 320. A hinge on which a drop door swings; usually made of flat bar iron, bent to form an eye, through which a hinge pin passes.

Drop End Door. Fig. 791. Used on gondola cars. The entire end is arranged to swing down at right angles to its normal position, for loading long material.

Drop End Gondola Car. Figs. 52, 54. A gondola car with the ends in the form of doors, which can be dropped when the car is used for shipping long material which extends over more than one car. See also Car.

Drop Forging. One made by a die under a power hammer.

Drop Suspension (Electric Lighting). Fig. 2324. A drop or bent frame is used, attached to the truck frame. As the belt or chain is adjusted by sliding the generator, this is of the sliding type of suspension. See Suspension.

Drop Table. A table hinged to the wall so as to drop against it out of the way when desired.

Drop Test Machine (M. C. B. Standard). Fig. 2736. A machine for testing couplers, etc., by means of a heavy weight being dropped on them. In 1900 the drop-testing machine was modified and a further modification made in 1901. Further modification in 1903. Modified in 1911 and advanced to standard.

Drop Testing Machine. See Figs. 2731-44.

Dropper Bar. Fig. 414. A special rolled steel bar.

Drum. A cylinder over which a belt or band passes.

"A chamber of a cylindrical form used in heaters, stoves and flues. It is hollow and thin, and generally forms a mere casing, but in some cases, as steam drums, is adapted to stand considerable pressure."—Knight. See Steam Drum.

(Hoisting Gear.) The main cylinder upon which the hoisting rope is coiled. The spur wheel is carried on the same shaft.

Drum Cover (Baker Heater). A sheet iron covering for the circulating drum on the outside of the car.

Drum Shaft (of a Derrick or Crane). The shaft on which the winding drum is carried.

Drum Support (Baker Heater). A bracket on the roof to hold the circulating drum.

Drum System of Car Heating. This method of heating employs a hot water circulation within the car, to which a Baker or other similar heater is attached. To provide a means for maintaining heat in the car when steam from the locomotive is used, a drum is employed to transfer the heat of the steam to the water of circulation. Simple forms of drums consist simply of a cylinder or pipe within another pipe of larger cross section, provision being made for the unequal expansion of the pipes, and outlet and inlet orifices being provided for the circulation of the steam and water.

Another type is the coil drum or coil jacket, which generally consists of a large sized pipe or casting capped at both ends. In this drum is placed a coil of copper pipe, which coil is made a part of the hot water circuit within the car. Steam from the locomotive is admitted to this drum around the copper coil, through which heat is imparted to the water of circulation. That part of the circuit above this drum becoming relatively lighter than the water of the circuit, a movement of the circulating medium is produced, creating a steady flow up through the coil. The amount of heat communicated to the circulating medium depends upon the surface of the coil and upon its conductive power to heat. A pressure of from 10 to 20 pounds of steam is carried in the drum.

Dry Closet. Figs. 1638, 1647, 1648, 1652-1654. A closet, so called in distinction from a water closet, which is not flushed with water.

Duck. A cotton fabric, lighter and finer than canvas, for use in car upholstery.

Dummy End (Passenger Equipment). Figs. 134, 137, 138, 411, etc. A term applied to the end construction commonly used on baggage, express and postal cars, which have no external platform or vestibule.

Dummy Hose Coupling. Fig. 1309. A casting of the same shape as a hose coupling, into which the coupling may be hooked and prevent dirt and debris getting in the brake pipe, as well as to prevent the coupling being damaged when hanging down.

Dump Car. Figs. 56-67. A car from which the load is discharged either through doors or by tipping the car body. See also Car, Center Dump Car and Side Dump Car.

Dumping Tray (Postal Car). Fig. 1714. A tray used in a postal car for handling mail.

Duplex Air Gage (Air Brake). Fig. 1338. A gage to register simultaneously on the same dial the main reservoir pressure and brake pipe pressure. For this purpose a red hand for the reservoir and black hand for brake pipe pressures are provided.

Dust Arrester (of Pintsch Gas Pressure Regulator). A cavity closed at each end by a perforated plate to prevent dust entering to clog the regulating valve.

Dust Deflector (Windows). Figs. 1734, 1735, 1739. A device for deflecting dust and cinders and preventing them from entering the car, particularly through the windows.

Dust Guard. Figs. 979, 991, 995, 1000, 1016. A thin piece of wood, leather, felt, asbestos or other material inserted in the dust guard chamber at the back of a journal box, and fitting closely around the dust guard bearing of the axle. It is to exclude dust and prevent the escape of oil and waste. Sometimes called axle packing or box packing. See also Dust Deflector, Journal Box and Details.

Dust Guard (M. C. B. Standard). Fig. 2694. In 1909 standard dimensions for dust guards were adopted for the four standard journal boxes.

Dutchman. A block or wedge of wood driven into a crevice to hide the consequences of bad fitting in construction. A kind of shim. Also a piece of metal placed under the opening in a pipe clamp to prevent the cutting of the hose when the clamp is tightened.

Dynamo (Electric Lighting). A generator of electric current. See Generator.

Dynamometer. A machine for measuring the drawbar pull of locomotives. See Dynamometer Car.

Dynamometer Car. Figs. 217, 254, 426-430. A car equipped with apparatus for measuring and recording drawbar pull and such other data as may be desired in connection therewith. Used for the testing of locomotives.

E

Ear Bail (Lanterns). An attachment formed of wire connected with the wire guard, to which the bail is attached, instead of to the body of the lantern.

Eaves Molding (Freight Cars). A plain strip sometimes used outside the fascia.

(Passenger Equipment Cars.) 93, Figs, 423-425. An ornamental finish to the lower edge of the lower deck or main roof outside of and above the fascia. A similar deck eaves molding is used for the upper deck.

Eccentric Pivot Plate (for Seat Arms). A seat arm pivot plate, made eccentric only to get room for screw holes.

Egg Poacher. Fig. 1577. For use on parlor and buffet cars.

Egg-Shaped Stove. A stove resembling an egg in form. It is commonly known simply as a cast iron stove, and is very largely used for cabooses, etc., where appearance is not important.

Ejector. An appliance for operating a vacuum brake by exhausting or "ejecting" air. It consists essentially of a pipe placed in the center of a surrounding shell or casing, with an annular opening between the pipe and the casing. When the current of steam is admitted at the lower end and escapes at the upper end, the air in the casing is drawn out through the annular opening by the current of the escaping steam. The space is connected by a pipe with the appliances on the cars for operating the brakes. Suitable valves are also used in connection with the ejector to shut off and admit steam and air. A muffler is used to render noiseless the escaping steam. It consists simply of a box of small round balls, like shot, through which the steam must pass to escape. In the latest type a combination ejector is used having two ejector pipes, one a small one, which is kept in action continuously to maintain the vacuum in the brake pipe, and a large one for use in quickly releasing the brakes after a stop.

Elbow. Fig. 1946. A short L-shaped tube for uniting the ends of two pipes, generally at right angles to each other.

Electric Car. An ELECTRIC MOTOR CAR.

Electric Cell Filler. Fig. 2364. A device for supplying storage battery cells with water.

Electric Compressor Governor. See AIR COMPRESSOR GOVERNOR.

Electric Heater. Figs. 1977-85, 2016, 2019. Heaters used on electrically operated cars, where electric current is available for their operation. Usually placed under the seats. Heat is developed by passing current through resistance coils and is controlled by regulating switches. (Fig. 1976.)

Electric Lamps. Figs. 2432-2524.

Electric Lighting. Figs. 2270-2371, 2374, 2432-2524.

Storage System. Figs. 2326, etc. In this system each car is provided with a storage battery, which must be charged at terminals during the layover period.

Head-End System. Figs. 2290-91. The head-end system consists essentially of a steam-driven generator located in the baggage car or on the locomotive. Proper controlling apparatus is provided and train lines are run from the generator through the entire length of the train, flexible connections being used between cars. It comprises the following apparatus: A generator, usually steam turbine-driven, placed in the baggage car or on the locomotive, and furnished with steam from the locomotive; the necessary indicating, regulating and controlling apparatus placed near the generator and in an accessible position; train line wires of the proper size on each car and running the entire length of the train, flexible connections being made between cars, in the vestibule; batteries, consisting of a suitable number of cells connected in series and placed in battery boxes attached to the under side of the cars; lamp regulators are sometimes installed in the cars to compensate for the line drop and to maintain constant voltage at the lamps.

Axle Generator System. Figs. 2270-73; 2383, 2386, 2389, 2392-2305, 2311, etc. The axle generator systems used in this country comprise the following principal parts: An axle-driven generator mounted on the car truck. (Abroad where rigid trucks are used the axle generator is frequently secured to the under side of the car body.) A suspension by which the axle generator is supported from the truck frame. A drive, connecting the armature shaft to the axle. A regulator for controlling the voltage and output of the generator at all train speeds. An automatic switch designed to open on reverse current for the purpose of preventing discharge of the battery through the generator. A regulator for controlling the voltage impressed on the lamp circuits. A battery of a suitable number of cells to supply current when generator current is not available.

For the successful operation of the system, the following requirements must be met: The polarity of the generator terminals must remain unchanged with a movement of the car in either direction. At all train speeds, from the cutting-in speed of the generator to the maximum, the generator output and voltage must be maintained within the desired working limits. The generator must be automatically connected and disconnected from the battery circuit as the train speed rises above or falls below the critical speed. The lights may be burned at any time and the transfer of this load from the battery to the generator and vice versa must result in no appreciable change in the candle power of the lamps. The voltage impressed on the lamp circuit must be maintained within such limits as will give satisfactory illumination and reasonable life of lamps.

Electric Lighting (M. C. B. Recommended Practice). Figs. 2775-82.

In 1912 the following specifications were adopted for electric lighting of passenger equipment cars:

GENERAL.

1. That in electrically lighted cars the following voltages should be used:

60 volts (nominal) for straight storage, head-end and axle-dynamo systems.

30 volts (nominal) for straight storage and axle-dynamo systems.

2. That each electrically lighted car be provided with a notice giving the following information, and that this notice shall be posted in the switchboard locker:

*System.

Type of generator

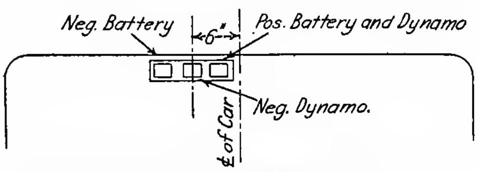
*State whether axle dynamo, straight storage, and if used on head-end system.

Type of regulator.
Voltage of system.
Ampere hours capacity of battery at 8-hour rate.
Number of sets of battery in parallel.
Nominal charging rate ...... amps ...... max. amps.
Size of train line wires — B. & S.
Number of train line wires — (2 or 3).
Capacity of generator ...... amps.
Axle pulley ...... in. diam.
Generator pulley ...... in. diam.
Length of belt ...... ft. ...... in.
Wiring diagram (show location and capacity of fuses).

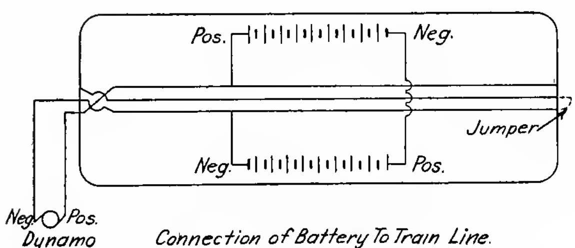
3. That the rules of fire underwriters shall cover all car wiring.

4. That all wiring under car to the switchboard shall be run in conduits.

5. Standard lamps for car-lighting service should



Location of Connector and Arrangement of Terminals When Facing Car.
Fig. 1.



Connection of Battery To Train Line.
Fig. 2.

be in accordance with dimensions as shown on the drawings.

6. That where train-line connectors are used, a connector having dimensions as shown on the drawings shall be used and located as shown on Fig. 1, with connections to dynamo, battery and jumper as shown on Fig. 2. If only two wires are used they shall be connected to the outside terminals and the female connector on each end of the car shall be stenciled: "Not for use on head-end system."

7. That each electrically lighted car equipped with batteries shall be provided with two charging receptacles with swivel supports, as shown in detail on the drawings, installed on each side of the car as shown, the outside annular ring to be the positive.

CONTROL AND PROTECTION OF PARTS.

8. That each electrically lighted car shall be provided with a switchboard upon which shall be mounted switches, fused switches or terminals. The switches, fuses or terminals to protect and completely disconnect the following parts:

(a) Train line.
(b) Battery.
(c) Axle dynamo.
(d) Circuits for lamps, fans, etc.

The axle-dynamo terminals to control the positive and negative armatures and the positive field of the dynamo. Each of the above switches, fuses or terminals to be plainly marked, designating the part controlled, the positive terminal to be on the right side facing the board.

9. Where a main lamp switch is used, or where fuses controlling all lamps are used, they shall be so stenciled in plain letters.

10. The switchboard or regulator panels of electrically lighted cars shall be provided with fuses for the protection of the parts given below and with the type of terminal as specified.

(A) Train Line.—Terminals for reception of flat fuses shall be provided 2½ inches between centers; stud or screw to be ¼ inch diameter with 20 threads per inch.
(B) Battery.—Optional. Fuse terminals, if used, shall be same as for train line.
(C) Main Line Switch.—Optional. Fuse terminals, if used, shall be same as for train line.
(D) Circuits.—For lamps, fans, etc., fuse shall be of the Edison screw-shell type for both positive and negative.
(E) Axle Generator.—Positive armature fuse terminal; terminals to have N. E. C. code standard 150 amperes knife-blade contact clips mounted with 4-inch clearance between clips.
(a) Axle Generator.—Negative armature fuse terminal optional. If used, terminal shall be same as positive.
(b) Axle Generator.—Positive field optional. If used, to have ferrule type clip mounted with 1-inch clear space between clips and and to take N. E. C. code standard, 0 to 30 amperes.

NOTE.—Capacity of fuses, as designated above, to be such as to properly protect the parts in question.

11. That each electrically lighted car equipped with battery box or boxes shall have provided a fuse block, mounted in a suitable metal box at the positive and negative terminals of each set of batteries, and that the fuse block shall be in accordance with the detail as shown and installed on the car substantially as shown on the drawing. Knife-blade fuses shall be provided with a capacity of between 101 and 200 amperes.

12. That where axle dynamos are used, negative, positive and dynamo field shall be fused as close as possible to the dynamo and prior to the said leads either entering the conduits or being secured to the bottom of the car. The above fuses to be used for emergency service only and to be at least one hundred per cent. above the capacity of the fuses on the switchboards protecting the same leads.

13. All wires or terminals must be marked for identification.

BATTERIES.

14. That batteries as a set shall be connected up with a positive pole to the right, facing the car as shown in Fig. 2.

15. Where lead storage batteries are used they shall be preferably installed in double compartment tanks substantially as shown.

16. That where double compartment tanks are used, the connections and arrangements of battery terminals are to be as shown on Fig. 3.

17. Battery boxes shall have provided in each door a vent, substantially as shown on the drawing.

AXLE DYNAMO.

18. That a straight pulley seat be provided for the axle pulley. That if a bushing or sleeve be used it should preferably be secured to the axle, independent of the pulley. Bushing to have an external diameter of 7½ inches and to be 8½ inches long, turned straight. That the pulley hub have a uniform internal

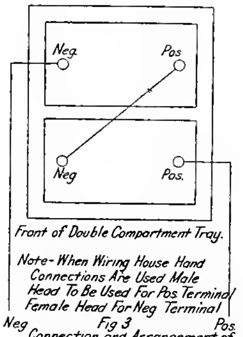


Fig 3
Connection and Arrangement of Terminals in Double Compartm't Tray.

diameter of 7½ inches, the length of the hub to be 6½ inches, the face of the pulley to be 9 inches or wider if flangeless, and 8 inches if flanged. That the generator pulley be flanged, crowned and perforated, and have a 7-inch face.

19. That when facing the end of the truck on which axle generator is mounted, the pulley or sprocket shall be on the right-hand side.

Electric Motor. Figs. 2533-35, 2541, 2548, 2561-7. See Motor, Electric.

Electric Motor Car. Figs. 189-197, 204, 308, 419, 421, 422. A car which is propelled by electric motors. See Motor Car and Car.

Electric Motor Car Equipment. See Fig. 2536 for arrangement of apparatus.

Electric Motor Truck. Figs. 948, 952-954, 960, 962, 963.

Electric Shovel. A power shovel operated by electric power.

Electric Train Line Coupler (Electric Lighting). Figs. 2284-85. A device somewhat like a steam or air brake hose coupler which is used to connect the electric light circuits on adjoining cars.

Electro-Pneumatic Brake. For long high speed electric trains, such as used in subway service. In addition to the functions performed by a quick action automatic air brake means are provided for applying and releasing the brakes on each car through the action of electro-pneumatic valves energized by current taken from contacts on the motorman's brake valve and continuous train wires. Brakes on long trains can be applied instantaneously and simultaneously with this device, eliminating any tendency to surging.

Electro-Pneumatic Compressor Switch. Fig. 1333. A device used in conjunction with the electric compressor governor in the governor synchronizing system for insuring uniform compressor labor. Its operation is controlled by the governor and its function is to automatically open or close the circuit to the motor-driven air compressor when the pressure in the main reservoir line falls below a predetermined minimum or rises to a predetermined maximum, respectively, which pressures are determined by the setting of the governor.

Electrode. Figs. 2347, etc. A term sometimes used to designate the individual elements or plates of a storage battery.

Electrolier. A chandelier of electric lights.

Elevated Car. An electric motor car for use on elevated railways in large cities.

Ell. A short term for elbow.

Elliptic Spring. Figs. 1104-1109, 1111. A spring of elliptical form made of two sets of parallel steel plates of constantly decreasing length. Such springs are generally used for bolster springs for passenger cars.

The set of elliptic springs is the total amount of bend or compression of which the spring is capable. Elliptic springs in service are termed double or duplicate, triplets or triplicate, quadruple, quintuple, sextuple, etc., according to the number of springs used side by side and connected by a single eye bolt, so as to constitute practically one spring.

Emergency Coupler Knuckle. Figs. 642 and 643. A knuckle which is designed for use in case of damage to the knuckle of automatic couplers.

Emergency Coupling Device. Fig. 746. A short shank coupler which can be chained in place if the standard coupler is pulled out or broken.

Emergency Head Back-Up Connection. Fig. 1383. A device for application to an automatic connector in order that a back-up cock, brake or signal hose may be coupled to it.

Emergency Valve (Air Brake). 10, Figs. 1273-1275. Fig. 1375. A valve used for making emergency applications of the brakes with the straight air system. See Triple Valve.

Emergency Valve Nut (Triple Valve). 28, Fig. 1273.

Emergency Valve Piston (Triple Valve). 8, Figs. 1273-1275.

Emergency Valve Piston Packing Ring (Triple Valve). 30, Fig. 1273.

Emergency Valve Seat (Triple Valve). 9, Figs. 1273-1275.

Emigrant Sleeping Car. A plainly finished sleeping car for the use of emigrants. See Sleeping Car.

Empire Deck. A form of roof used in passenger car construction in which both the lower deck and upper deck are curved. Double deck sash, usually half elliptic, are used and the upper deck is vaulted over each deck window. See Vaulted Deck Window.

Empty and Load Brake Equipment (Freight). Fig. 1268. This equipment not only operates to materially increase the total braking power controlling train units on grades, but gives a practically uniform braking power on car units—whether empty or loaded—in any service. In addition to the standard brake cylinder, auxiliary reservoir, and other details now used with the standard freight brake, this equipment comprises: (1) An extra brake cylinder, called the "load" cylinder (Fig. 1297), with notched push rod and enclosed locking mechanism, which operates when the equipment is set in load position; (2) suitable connections, levers, etc., to form the connection and required multiplication of power from the "load" cylinder to the "empty" cylinder lever system; (3) a triple valve, slightly modified, to handle the extra volumes and cylinder; (4) a change-over valve, whereby the equipment may be placed in either the empty or load position, as desired; (5) additional reservoir capacity to furnish the air supply for the "load" brake.

End Axle Guard. Fig. 976. The axle guard at the end of a six-wheel truck, to support the outer axle in case of breakage. See AXLE GUARD.

End Belt Rail. See BELT RAIL.

End Brace. 35, Figs. 285-88, 374, 375. See BRACE.

End Brace Pocket. See POST POCKET.

End Brace Rod. See BRACE ROD.

End Carline. A carline at the end of a car body. See CARLINE.

End Chute Plank. The planking of an inclined floor of a car which discharges its load longitudinally from the end toward the middle of a car.

End Compression Beam (Passenger Equipment Car Framing). A timber directly above the sills over the body bolster against which the compression beam brace and the end counterbrace abut. The compression beam proper is situated at the middle of the car, directly under the window sills. The end compression beam is sometimes omitted.

End Counterbrace (Passenger Equipment Car Framing). More commonly counterbrace. A brace in the side of a car body, between its ends and the body bolster. See COUNTERBRACE.

End Door. 38, Fig. 383; Figs. 474, 773, 793, 804, 805. A door in the end of a car.

In box cars this door, when used, is small and generally about half way up to the roof. It is used for loading and unloading long material, which cannot be handled through the side doors. See DOOR FIXTURES, END.

On some classes of automobile cars one end of the car is arranged in the form of a double swing door.

The term is used in connection with passenger cars to differentiate from the vestibule side door.

End Fascia. A plain board on the end of a car covering the upper ends of the sheathing boards and extending to the roof line.

End Frame. Figs. 479, 480, 482, 483. The frame which forms the end of a car body. It includes the posts, braces, belt rail and end plate. See BODY FRAMING and FRAME.

End Girth. See BELT RAIL.

End Girth Tie Rod. An end belt rail tie rod.

End Grab Iron. See GRAB IRON.

End Hook (Signal Cord). A hook sometimes used on the ends of passenger equipment cars, high up under the platform roof, for fastening the end of the signal cord.

End Panel. A panel at the end and on the outside of a passenger equipment car below the window.

End Piece (Wooden Truck Frame). 17, Figs. 947, 966; Figs. 974-976. A transverse timber or bar by which the ends of the two-wheel pieces of a truck frame are tied together. A crooked end piece is one cut away on top to clear the draft gear. The inside end piece is the one nearest the center of the car, in distinction from the outside end piece. They are frequently designated as the front and back end pieces.

End Piece Corner Plate (Passenger Equipment Trucks). Figs. 947, 966, 974, 976. A plate or casting used to connect the wheel and end pieces and stiffen the truck frame.

End Piece Plate. Figs. 974, 975, 976, 978. A plate used to stiffen the end piece of a wooden passenger equipment truck.

End Plank (Gondola Car). The planks in the end of the car body. They often form a door, which is hinged to the car floor so as to drop down upon it, and is called a drop end or drop end door.

End Plate. 48, Figs. 285-88, 368, 374, 375; 37, Fig. 410; 260, Figs. 423-425 and 887. A member across the end and connecting the tops of the end posts of a car body and fastened at the ends to the two side plates. It is usually made of the proper form to serve as an end carline.

End Play (Of an Axle). The movement, or space left for movement, endwise.

(Of a Truck Bolster.) Usually called lateral motion. See SWING BOLSTER.

End Post. 42b, Figs. 285-88; 37, Fig. 383; 24 and 25, Fig. 410. The vertical members in the end body framing between the corner posts.

(Hopper Cars.) A vertical support for the overhang of the hopper floor, resting on the end sill. Ladder rounds are usually secured to the two end posts in the center.

End Post Pocket. 35a, Figs. 285-288. A pocket for the end posts. See POST POCKET.

End Rafter. A term sometimes erroneously applied to an end carline.

End Rail. See WAINSCOT RAIL (Lower and Upper).

End Sheet. 19, Fig. 297. A plate used in closing in the end of a steel car.

End Sill. 2, Figs. 285-88; 4, Fig. 297; Fig. 320; 8, Fig. 342; Figs. 355, 368, 374, 375; 42, 43 and 45, Fig. 410; Figs. 478, 481. The transverse member of the underframe of a car framed across the ends of all the longitudinal sills. In wooden underframe cars a heavy timber, approximately square in cross-section and in steel underframe cars a rolled or cast section, or a pressed plate. In passenger cars the end sill comes directly under the end door, the platform (which see), with its various parts, usually being a separate construction. The British equivalent is head stock.

End Sill Angle. Figs. 489, 491. A commercial angle used on an end sill which is built up of several members.

End Sill Brackets (of Steel Frame Cars). Angle plates used to connect the longitudinal sills and the end sill. In bridge building such plates are termed brackets. When of triangular section they are termed gussets.

End Sill Diagonal Brace. 195, Figs. 285-88; 9, Fig. 297; Fig. 491. A horizontal brace extending from the end sill diagonally back to or beyond the bolster.

End Sill Flitch Plates. The iron or steel plates sandwiched between the wood members of a composite end sill.

End Sill Plate. Fig. 491. A plate extending the full length and width of a built-up end sill, and riveted to the other members.

An iron or steel plate bolted on the face of the end sill of some passenger cars to give added strength.

End Sill and Plate Tie Rod. Tie rod joining the end sill with the end plate.

End Sill Stiffening Angle (Anti-Telescoping Device). An angle riveted or bolted to the end sill stiffening plate and to the end sill on the inside. The inner body truss rods pass through it, the end sill and the truss rod washer plate.

End Sill Tie Rod. An iron rod passing through the end sill and the bolster to tie the two together.

End Slope. The sloping floor from the end of a hopper car to the hopper door. See HOPPER SLOPE SHEET.

End Stiffener. Fig. 888. A reinforcing member extending across the end of a freight car to prevent it from bulging or breaking out due to shifting of the load or end shocks. An end tie band is a member of this kind, but with the ends bent and fastened to the side of the car, thus tying the end of the car securely together.

End Stud. See STUD.

End Tie Band. Fig. 888. See END STIFFENER.

End Timber. See BUFFER BEAM, END SILL, PLATFORM END SILL.

End Train Pipe Valve (Steam Heating). Figs. 1975, 1992-3, 1995, 2011, 2051-4, 2060, 2068, 2087, 2089, 2094, 2102. A valve in the train steam pipe at the end of the car by which the entire car may be cut out. Usually operated by an extension handle extending up to the platform or out to the side of the car. For an extension handle for operating this valve see Figs. 2052 and 2094.

End Truss Plank. See TRUSS PLANK.

End Ventilator. An aperture for the admission or escape of air at the end of a car.

End Window Panel. A panel at the end and on the outside of a passenger car along side the window, in distinction from the end panel proper, which is below the window. See PANEL.

Equalizer. A short term for an EQUALIZING BAR.

(Vestibule.) A bar in the hood of a platform which equalizes the pressure of the two upper face plate springs and keeps the opposing face plates in contact, so as to maintain frictional contact and exclude dust and smoke.

Equalizer Connecting Chain (Vestibule). Three links of a chain connecting the upper ends of the vertical equalizing levers with the ends of the horizontal equalizing lever.

Equalizer Spring. 79, Figs. 947, 966. A spring which rests on an equalizing bar and carries part of the weight of a car. Single or double coil spiral or helical springs are generally used for this purpose.

Equalizer Spring Block (Passenger Equipment Trucks). 76, Fig. 966. A casting bolted to the wheel piece and resting on the equalizer spring cap.

Equalizer Spring Cap. 72, Figs. 947, 966; Figs. 974, 976. A casting which fits over the top of the equalizer spring and transmits to it the weight received from the wheel piece.

Equalizer Spring Seat. 73, Figs. 947, 966; Figs. 974, 976. A casting which rests on an equalizing bar and supports the spring.

Equalizing Bar (Passenger Equipment Trucks). 71, Figs. 947, 966; Figs. 975, 978. Commonly abbreviated into equalizer. A wrought iron bar which bears on top of the journal boxes and extends longitudinally from one to the other. Equalizer springs rest on it between the two boxes. It is used to transfer part of the weight on one axle to the other, and thus equalize it on both; hence its name.

Equalizing Bar Pedestal (Four-Wheel Caboose Cars). A casting serving to give a fulcrum to the center of a lever, called an equalizing lever, which distributes the weight of the car evenly on the two axles.

Equalizing Bar Seat. The surface on top of a journal box on which an equalizer rests. See EQUALIZING BAR.

Equalizing Brake Lever. Fig. 1345. A floating brake lever is also called an equalizing lever.

Escutcheon. Fig. 1679. A plate or guard for a keyhole of a lock.

Examination of Car Inspectors, Rules for (M. C. B. Recommended Practice).

In 1902 the following rules for examination of car inspectors were adopted as a Recommended Practice of the Association:

REQUIREMENTS.

One year at oiling cars.
Two years at car repairing.
Age limit for new men, thirty years.
Age limit for promoted men, forty years.
Vision, 20-20 in one eye and not less than 20-40 in the other, without glasses.

METHOD OF TESTING.—*Acuity of Vision.*—The test card should be hung in a good light and the party to be examined should, if possible, be seated with his back to the window. Each eye should be examined separately, using, for the purpose of excluding one eye, a folded handkerchief. The lowest line that can be read should be determined by exposing only one letter at a time through a hole cut in a strip of cardboard. In making out the report in each case, the visual acuity of each eye should be denoted by a fraction of which the numerator represents the number of feet at which the applicant is seated from the card, while the denominator represents the number of feet at which the lowest line which he can read should be read. Thus, if at 20 feet he reads the line marked 20 feet, his vision—20-20 or 1, which is the normal standard. If at the same distance he only can read the line marked 70 feet, his vision—20-70. If at 20 feet he reads the 15-foot line, the vision—20-15, or more than normal. If a room 20 feet long can not be used, a testing distance of 15 or 10 feet should be employed, in which case normal vision would be represented by 15-15 or 10-10 respectively, and lower grades of vision by such fractions as 15-20, 10-70 and so on.

Field of Vision.—Test should be made by having the applicant and examiner stand about three feet apart, each with one eye shut, looking each other steadily in the eye. The examiner should then bring his hand in from the edge of the field toward the center of the space between them, until the applicant sees it coming. This should be done from different directions, up, down and from each side. The applicant should see the hand coming about as soon as the examiner does. If not, this should be noted on the report.

Hearing.—Test should be made in a quiet room. First, the examiner should hold the watch opposite the ear to be examined not less than 48 inches distant, then gradually approach the ear until the applicant hears the tick, the stop being used to satisfy the examiner that the applicant is not deceiving. The distance at which the applicant hears the watch should be noted in inches. The normal ear should hear the tick of the watch at 48 inches. Then the hearing power will be denoted by a fraction whose numerator represents the number of inches at which the watch is heard. Thus, if he hears the watch at 48 inches, his hearing—48-48, or normal. If he hears it at only 10 inches distant, his hearing—10-48, and so on.

Color.—The committee does not think it essential that inspectors should be rejected on account of imperfect color sense. It is, however, believed that inspectors should be tested as to their color sense so that they, as well as their employer, may know their condition in this respect.

Educational.—The applicant should be able to write a legible hand in English, and also to read manuscript matter as well as printed matter.

Car Knowledge.—The inspectors should be able to name each part of the cars in general use, in preference using M. C. B. dictionary terms.

M. C. B. Rules.—Inspectors must pass a satisfactory examination on M. C. B. Rules, answering 75 per cent. of the questions submitted. These questions should be of about the following character:

1. What are the Master Car Builders' Rules?
2. What is the object of the M. C. B. Rules?
3. What is the underlying idea or principle of these rules?
4. When is a company, operating the cars of another company, responsible for defects of such cars?
5. When a company is thus responsible, what should it do?
6. What care should be given to foreign cars by the company hauling them?
7. What cars must be accepted in interchange?
8. What is a defect card and how is it used?
9. Under what conditions is a road obliged to accept a car which is carded for defects for which the owner is not responsible?
10. What are the defects of wheels and axles for which owners and delivering companies are responsible?
11. Describe the form and use of the M. C. B. wheel gage.
12. What are the rules which apply to the cleaning of triple valves and cylinders?
13. What does the limit of height of drawbars mean?
14. When a company is obliged to make improper repairs, what must it do to call attention to such repairs?
15. What does the term unfair usage mean?
16. What are the rules regarding splicing sills?
17. What is the purpose of the repair card?
18. How do these rules apply to switching roads?
19. Are switching roads allowed to render bills against owners direct for repairs of any other than those named in Section 23 of Rule 5?

Exhaust Muffler (Traction Air Brake). A device for subduing the sound of air discharging to the atmosphere during operation of the brakes.

Expanded Metal. A perforated metal screen which is made by slotting a sheet of iron or steel and then drawing it out so that the slots form diamond-shaped holes in the plate. It is largely used in composite concrete construction as a binder and for lockers and window guards.

Express Car. Figs. 112, 113, 128, 129, 133, 198, 200 and 202. A car operated in passenger trains for carrying express freight. See CAR, M. C. B. Classes B and C.

Extension Bracket. See RUNNING BOARD BRACKET.

Extension Reach (Logging Cars). The reach is a long bar connecting the two trucks. The extension reach is adjustable.

Extension Reach End (Logging Cars). A strap for the end of the extension reach.

External Cylinder Gage. A steel ring with a cylindrical hole, which is very accurately made of a precise size, and used as a standard of measurement for the diameters of solid cylindrical objects.

External Screw Gage. A steel ring with a very accurate screw thread in the inside for testing screw threads. See INTERNAL SCREW GAGE.

Extra Transom (Passenger Equipment Trucks). 20a, Figs. 947, 976; Fig. 974. An extra or auxiliary member placed alongside the transom to further strengthen the truck frame.

Extra Transom Tie Rod. 23a, Figs. 947, 966. See SILL TIE ROD.

Eye. "A small hole or aperture."—Webster. See EYE BOLT.

Eye Bolt. Fig. 977. "A bolt having an eye or loop at one end for the reception of a ring, hook or rope, as may be required."—Knight.

Eye Bolt Link Hanger. A special form of SWING HANGER having a very short link attached to an eye bolt passing through the transoms.

Eyelet. Fig. 1570, 1571. A short metallic tube, the ends of which are flanged over against the object through which it passes. Used as a bushing or reinforcement for holes. In metallic eyelets of the usual form the two halves which when compressed together form the eyelet are known as grommets. See CARPET EYELETS.

(Window Shade.) A slot in the window shade leather to fit over the sash lift to hold the shade fast.

Eyelet Nail. A wire nail with turned knob for use with carpet eyelets.

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Fabrikoid. An artificial leather made by coating a cloth fabric with a secret compound which gives it the texture and appearance of leather.

Face (of Rim of Car Wheel). The vertical surface of the outside of the rim.

Face Plate. (Steel Tired Wheels). Figs. 1115, etc. The plates connecting the tire and hub. They are distinguished as front and back face plates.

See VESTIBULE FACE PLATE.

Face Plate Buffer. A buffer plate to which a vestibule face plate is attached. See VESTIBULE FACE PLATE.

Face Plate Buffing Stem (Vestibule). See FACE PLATE PISTON.

Face Plate Piston (Vestibule). A face plate buffing stem corresponding to the side buffer stem, beneath the platform floor. The end is contained in a face plate piston guide.

Fall (Hoisting Tackle). That part of the rope to which power is applied.

Fall and Tackle. Another name for BLOCK AND TACKLE.

Fascia. 90 and 91, Figs. 285-88; 91, Figs. 374, 375; 11, Fig. 383. A plain board running the length or width of the car, directly under the roof. Is designated as side fascia and end fascia, depending on location. In passenger equipment cars the eaves molding is placed on the upper edge of the fascia.

Fastener. That which fastens or secures one thing to another.

Faucet. Figs. 1590, etc. A synonymous term with COCK, which see for fuller definition. See PUSH BUTTON FAUCET, BIBB COCK, TELEGRAPH COCK.

Faucet Alcove. A WATER ALCOVE.

Feed Door (Baker Heater). A door for closing the aperture, giving access to the fire pot or (in base burners) the magazine.

Feed Tube (Oil Lamp). The tube connecting the reservoir with the burner. The standard by which the entire lamp is supported passes through it.

Feed Valve. Also called slide valve feed valve.

(Traction Air Brake.) A valve which automatically maintains the pressure of air supplied through the brake valve to the automatic brake system. It may be attached either to the brake valve or placed in the piping between the main reservoir and the brake valve.

(Train Air Signal.) See REDUCING VALVE.

Felt Edge (Car Seats). A device for building up the edges of car seat cushions. It is simply a roll of felt stitched in such a manner as to fit over a cleat; and when tacked down it forms an even elastic face to the cushion.

Female Center Plate. The body and truck center plates are sometimes called male and female plates, respectively. See CENTER PLATE.

Female Gage. An external gage. See EXTERNAL CYLINDER GAGE.

Fender Board. A board at the end of passenger car steps to prevent mud and dirt from being thrown on them by the wheels. More commonly, string board. The splash board, if used, goes on the back side of the steps.

Feralun. Figs. 610, 621. A metal cast with one or more incorporated wear, heat and acid-resistant strata, exposed as one or several faces, or embodied at a desired depth. A stratum may be so exposed as to give a gritty surface of extreme durability and any desired degree of roughness for an anti-slip surface. See SAFETY TREAD.

Ferry Push Car. A very long platform car used for pushing or pulling other cars on or off a ferry boat when the latter is approached by an incline too steep for locomotives, so that the latter can push or pull the cars without running on the incline.

Field Coils. Coils of insulated copper wire or ribbon surrounding the iron poles of a motor field magnet. Standard motors have four poles. Current passing through these coils produces the magnetic flux in which the armature rotates.

Filler Block. E, Fig. 355. A block fitted into the space between the tank head and the end sill of a tank car to prevent the tanks moving on the frame. See TANK HEAD BLOCK.

Filler Cover. Fig. 1595. The cover for the opening to the water tank supply on cars.

Fillet. A small light molding, more generally termed a bead. A rounded corner left on the inside of the angle where two surfaces join.

Filling Cock (Car Heating). Figs. 1961, 1996. A cock used for supplying water to the hot water circulation heating system. In some cases has a funnel attachment, as in Fig. 1961.

Filling Device (Car Heating). Figs. 1963, 2091. Used in connection with hot water heating systems.

Filling Funnel (Baker Heater). A funnel attached to the combination cock for filling the circulating drum with brine.

Filling Piece. Any piece of timber or metal used to close a gap.

Filling Spider. See BODY BOLSTER FILLER.

Filling Valve (Acetylene Gas Storage System). Fig. 2239.

Filling Valve (Pintsch System). Figs. 2108, 2115. This valve is a soft metallic seated valve of pecular construction. Is handled with key, and is a left-handed valve. One is placed on each side of a car, bolted to an iron bracket. The pipe connection (1¼ in.) is made to a connection piece which is slipped through the bracket from the outside and screwed to the pipe. The filling valve is then bolted back against this flange connection piece, a lead and rubber gasket forming the tight joint. The valve has a sheet iron cover secured to it by four screws.

Finger Guard (Brake Beams). Fig. 1201. A projecting rod or finger which prevents the brake beam from being excessively displaced laterally by bearing on the inside of the wheel. A wheel guard.

Finishing Varnish (Painting). An elastic (oily) varnish applied in two coats. See PAINTING.

Fire Extinguisher. Fig. 1914. Usually a small receptacle carried in a corner of passenger cars, and containing some chemical which will extinguish fire.

Fire Regulator and Pressure Indicator (Baker Heater). Fig. 1938. This device is attached to the hot water circulating pipes at a point a little above the coils, and is somewhat like the old ball and lever safety valve, the ball or weight in this case being the draft door. The fire regulator bowl consists of two concave plates bolted together, with a corrugated steel diaphragm and two copper duplicates, top and bottom, between (for preservation). On this set of diaphragms rests a piston connected with a lever, on one end of which hangs the counter draft damper in the base of the smoke flue. On the front end of this lever is the spiral adjusting spring, and the figures denoting the pressure within the heater. The "adjusting spring" is to be hooked into the hole at the figures denoting the pressure and consequent temperature desired.

First Class Car. The ordinary American day coach used by the great bulk of short trip passengers. So called to distinguish it, on the one hand, from those of an inferior grade, as emigrant and (rarely) second-class cars, and on the other hand from sleeping and parlor cars, in which an extra charge, in addition to the ordinary fare, is made. Second-class cars are used in Canada.

First Class Carriage (British). Nearest American equivalent, parlor or drawing-room car. A coach for passengers paying the highest rate of fare. It is divided into four or more compartments.

Fixed Brake Lever. More commonly, Dead Lever.

Flag Holder (for Corner Post of Passenger Car). Fig. 1883, etc. A cast or malleable iron receptacle for a signal flag staff.

Flag and Lamp Socket. See SIGNAL LAMP SOCKET.

Flange. A projecting rim for attaching a part to any surface by screws or bolts.

(Of a Car Wheel.) A projecting edge or rim on the periphery for keeping it on the rail. See WHEELS, and INTERCHANGE OF TRAFFIC.

Flange Brake Shoes. Figs. 1256, 1257, 1261. BRAKE SHOES so constructed that they bear on both the tread and flange of a wheel.

Flange Fittings (Pintsch System). Figs. 2108 and 2110. Special fittings required for the Pintsch system are all flanged and made of brass, the flanges held together by screws. The joints are made tight by the use of special lead and rubber washers.

Flange for Steel and Steel-Tired Wheels. See WHEEL TREAD AND FLANGE FOR STEEL AND STEEL-TIRED WHEELS.

Flange Thickness Gages. See WHEEL FLANGE THICKNESS GAGES.

Flange and Wheel Tread, Form of. See WHEEL TREAD AND FLANGE, FORM OF.

Flanges, Wheel, Distance Between the Backs of. See WHEEL FLANGES, distance between backs of.

Flanger. Fig. 224. A form of plow, sometimes placed under a special car, called a flanger car, but usually under a snow plow, for clearing ice and snow from the inside of the rails to provide a clear passage for the wheel flanges. Flanges are also frequently attached to locomotives, either on or just behind the pilot.

Flashing (Plumbing). "A lap joint used in sheet metal roofing, where the edges of the sheets meet on a projecting ridge. A strip of lead leading the drip of a wall into a gutter."—Knight. Hence, extended to mean any strip of sheet metal of an L section used to make a water-tight joint.

Flat Car. Figs. 68-81, 342-348. A freight car having a floor laid over the sills, and without any housing or body above. See CAR, M. C. B. CLASS F.

Flexible Joint. See FLEXIBLE METALLIC JOINT.

Flexible Metallic Joint. Figs. 1926, 1928-1929. A metallic joint so designed as to provide for flexibility. For a swing joint, see Fig. 1931.

Flexible Truck. Fig. 920. A truck with a more or less flexible connection between bolster and side frame.

Flitch Plate. An iron or steel plate sandwiched between pieces of wood and bolted together to give the member which they comprise greater strength. Also called sandwich plates.

Floating Connecting Rod (Foundation Brake Gear). A rod which connects a cylinder lever with a floating lever.

Floating Lever. A lever, one end of which is fastened to the fulcrum bracket, the other end connected to the live truck lever, and the middle to the cylinder lever, to which latter is connected the push rod.

Floating Lever Bracket. A bracket bolted to the underframe of a car to carry the floating lever of the brake gear.

Floating Lever Hanger. A square bracket or hanger supporting the FLOATING LEVER.

Floor. 27, Figs. 285-88, 320; 12, Fig. 342; 39, Fig. 368; G, H, and I, Figs. 374, 375. Fig. 404; 12 and 13, Fig. 410; Fig. 490. The boards, plates, or other material which cover the sills of a car. In passenger cars the floor consists of two, and sometimes three, courses of boards, called respectively the flooring, intermediate floor and deafening ceiling, the latter being on the under side of the sills. With the introduction of steel passenger cars has come the use of floors of concrete and other mixtures (see Figs. 1565-1569). An intermediate or upper floor, 28, Fig. 368; Fig. 416; 27, Figs. 423-425, more commonly called the double deck, is used in stock cars for carrying sheep and hogs. See FLOOR NAILING STRIP, FLOOR SUPPORT.

Floor Beam. 7, Fig. 342. A beam for supporting the nailing strips or floor stringer in a steel car, and also acting to a certain extent as a tie between the side and center sills.

Floor Chute. See HOPPER TUBE.

Floor Mat. Fig. 1572. A texture or structure of hemp, cocoa fiber, rattan, india rubber, wood or other material, laid on the floor of a car for passengers to clean their shoes on.

Floor Nailing Strip. 14, Fig. 342; J, Figs. 374, 375; 21, Fig. 383; 9, 10 and 11, Fig. 410; 6, Figs. 423-425. A strip of wood placed between the sills, to which the floor boards are nailed. See NAILING STRIP.

Floor Nailing Strip Stiffener. 17 and 18, Fig. 410. A metal reinforcing strip on a floor railing strip.

Floor Pipe. See HOPPER TUBE.

Floor Plate. See CENTER PIN FLOOR PLATE.

Floor, Refrigerator Cars, Height of. See REFRIGERATOR CARS, FLOORS AND ICE TANKS.

Floor Stop (for Door Holder). A catch for a door holder attached to the floor, in distinction from a partition stop attached to the wall or partition. See DOOR HOLDER.

Floor Stringer. See STRINGER.

Floor Strip. The strips that make the grated floor of a street car.

Floor Support. 14, Fig. 410. See FLOOR BEAM.

Flooring. See SIDING, FLOORING, ROOFING AND LINING.

Flush Bolt. Fig. 1661. A bolt attached to a slide which is let into a door, sash or window, so as to be flush with its surface. A spring flush bolt is commonly called a cupboard catch. Fig. 1666.

Flush Bolt Keeper. A plate which is attached to a door, sash or window frame, and has a suitable hole, in which a flush bolt engages.

Flush Handle. A handle for a lock or latch which is placed in a recess, as of a door, sash or berth, and which does not project beyond the surface of the object to which it is attached.

Flush Sash Lift. A metal sash lift with a recess which is let into a sash so as to be flush with its surface.

Folding Door. Fig. 800. A door made in two or more sections hinged together to close by folding up.

Folding Lavatory. Figs. 1614, 1618, 1619. A wash stand for the staterooms of sleeping, private and business cars, which can be folded out of the way and out of sight.

Folding Platform Tail Gate. See TAIL GATE.

Folding Table Leg. 28, Figs. 1458, 1459. See TABLE.

Folding Wash Stand. See FOLDING LAVATORY.

Follower Block. Fig. 693. A special form of draft gear follower plate.

Follower Bolt. A piston follower bolt. See PISTON.

Follower, Draft Gear (M. C. B. Standard). Decided in 1905 that flat followers made of wrought iron or open-hearth steel 1⅝ in. thick for tandem spring gear and 2¼ inches thick for twin spring and friction gear be adopted as recommended practice. Advanced to Standard in 1907.

Follower Lug. See CHEEK CASTING.

Follower Plate. Figs. 702, 703, 714, 724, 742. Plates which bear against each end of a draft spring and transmit the tension and compression on the drawbar to the draft springs and to the draft timbers. See also FOLLOWERS.

Follower Plate Support. Fig. 496. A support or guide placed across the center or draft sills, for the draft gear followers.

Follower Stop. See CHEEK CASTING.

Foot Board (Freight Cars.) See BRAKE STEP.

Foot Plate (Three Stem Coupler). A cast iron wearing plate on the upper side of the passenger platform end sill. In platforms with vestibules a sliding foot plate is attached to the buffer plate and works or slides back and forth in a foot plate housing.

Foot Plate Housing. See FOOT PLATE.

Foot Rail. A horizontal wooden bar underneath a car seat for the passengers who occupy the next seat to rest their feet on. A foot rest.

Foot Rest. A movable support for the feet of passengers, commonly two horizontal wooden bars underneath a car seat, and attached to two iron rockers, called foot rest carriers, pivoted in the center so that it can be adjusted to a comfortable position for the passengers occupying the next seat, or moved out of the way if desired. Another style is an adjustable foot rest sliding in a grooved channel. A portable stuffed carpet foot rest is usually termed an ottoman or hassock.

Forefoot Sheave (Steam Shovel). A fixed pulley located below the floor under the boom foot sheave about which the hoisting chain runs before being carried to the hoisting drum.

Foreign Car. Any car not belonging to the particular railway on which it is running. See INTERCHANGE OF TRAFFIC.

Foundation Brake Gear. The levers, rods, brake beams, etc., by which the piston rod of the brake cylinder is connected to the brake shoes in such a manner that when air pressure forces the piston out the brake shoes are forced against the wheels.

Foundation Brake Gear, High Speed, for Passenger Service (M. C. B. Recommended Practice). Figs. 2761-63. In 1903 the schedules for high speed foundation brake gear, as shown on the drawings were adopted as Recommended Practice. Modified in 1907. In 1912 the drawings were revised to permit the hand and power brake to work in harmony. In preparing these schedules the following fundamentals of design were adopted:

FUNDAMENTALS.

Braking power to be 90 per cent. of the light weight of the car.

Equalized pressure in brake cylinder, sixty pounds per square inch.

Maximum pressure in brake cylinder, eighty-five pounds per square inch.

Maximum stress in levers, 23,000 pounds per square inch.

Maximum stress in rods, except jaws, 15,000 pounds per square inch; no rod to be less than ⅞ inch in diameter.

Maximum stress in jaws, 10,000 pounds per square inch.

Maximum shear on pins, 10,000 pounds per square inch.

Diameter of pins to provide a bearing value not to exceed 23,000 pounds per square inch.

The reduction of stresses in rods, levers and jaws due to friction of the foundation brake, and the reduction of braking power due to the same cause and to the action of release springs should be neglected, because it is considered to be too difficult to determine their value even with a fair degree of accuracy.

SIX-WHEEL TRUCKS.

The committee submits schedule "A-1" herewith for cars weighing 80,000 to 100,000 pounds and having six-wheel trucks, and schedule "A" for cars weighing 100,000 to 137,000 pounds and having six-wheel trucks; the difference between these schedules is that a sixteen-inch brake cylinder is to be used for schedule "A" and a fourteen-inch brake cylinder is to be used for schedule "A-1," otherwise they are the same. The location of the fulcrum hole in the cylinder lever is made to vary by quarters of the inch to suit the weight of the cars, but only one fulcrum hole shall be drilled in each lever.

With schedule "A" there should be used a brake beam suitable for a load of 28,000 pounds, and with schedule "A-1" there should be used a brake beam suitable for a load of 22,000 pounds imposed at the middle of the beam.

FOUR-WHEEL TRUCKS.

Schedule "B-1," submitted herewith, is for cars weighing 50,000 to 70,000 pounds and having four-wheel trucks, and schedule "B" is for cars weighing from 70,000 to 90,000 pounds and having four-wheel trucks, the differences between the two being that a fourteen-inch brake cylinder is to be used with schedule "B," cars weighing 70,000 to 90,000 pounds, and a twelve-inch brake cylinder is to be used with schedule "B-1," cars weighing 50,000 to 70,000 pounds; also that with schedule "B" there should be used a brake beam suitable for a load at the middle of 28,000 pounds, the same as for schedule "A," and with schedule "B-1" there should be used a brake beam suitable for a load at the middle of 22,000 pounds, the same as for schedule "A-1."

The proper braking power for the weight of car is obtained by the location of fulcrum hole in the cylinder lever.

Schedule "C" was designed for cars weighing 50,000 pounds and less and equipped with four-wheel trucks. A ten-inch brake cylinder is to be used with this schedule and a brake beam suitable for a load at the middle of 15,200 pounds.

DESIGNATION OF RODS AND LEVERS.

On the drawings, the location of levers and rods are designated by letters; the first letter in the designation distinguishes between body and truck. The second letter distinguishes between the levers and the connections. The figure following the second letter is the distinctive number for the lever or connection; and following this figure is the schedule letter to which the lever or connection belongs. Thus B-C2-B means body connection number two (second from cylinder piston rod), of schedule "B"; also T-L2-B would mean truck lever number two for schedule "B."

STENCILING LIGHT WEIGHT OF CAR.

The committee recommends that the light weight of car be stenciled on each car. The cross frame tie, when exposed, furnishes a convenient place on which to show the weight, but when this place is not available some other means should be provided. In addition to this the length of the cylinder end of the cylinder lever should be shown so that no calculation would be necessary to determine the proper cylinder lever for the car.

MARKING LEVERS.

It may be found desirable by some railroad companies to mark each lever in a manner to indicate the schedule to which each belongs and the location of each in the brake rigging, and if this is done it is suggested that the marking be the same as indicated on the drawings.

TABLE I.

Schedule Designation.	Light Weights of Cars. (Lbs.)	Type of Truck.	Size of Brake Cylinder.	Maximum Load at Middle of Brake Beam.
A.	100,000 to 137,000	6-wheel	16 inches	28,000 lbs.
A-1.	80,000 to 100,000	6-wheel	14 inches	22,000 lbs.
B.	70,000 to 90,000	4-wheel	14 inches	28,000 lbs.

B-1.	50,000 to 70,000	4-wheel	12 inches	22,000 lbs.
C.	50,000 and less.	4-wheel	10 inches	15,200 lbs.

Three have been brought together in Table 1 the distinctive data of each schedule so that by referring to the table there can be found quickly the correct schedule for any particular car.

Fount. The oil receptacle of a lamp.

Frame. A structure composed of a number of members designed and arranged to withstand the stresses set up in the particular part of a car for which it is intended. See UNDERFRAME, ETC.

Free Air Space (Refrigerator Car Insulation). An air space which has free communication with the outside air so that the air can circulate through it.

Freight Car. Figs. 1-118, 203-207, 261-381. A general term used to designate all kinds of cars which carry goods, merchandise, produce, minerals, etc., to distinguish them from those which carry passengers. British term, wagon. See also CAR.

Freight Car Lock. Figs. 764-803. A lock for fastening the doors of freight cars.

Freight Equipment Car. See CAR and FREIGHT TRAIN CAR.

Freight Equipment Cars, Marking on. See MARKING ON FREIGHT EQUIPMENT CARS.

Freight Train Car. A car ordinarily operated in freight trains. See CAR.

Freight Truck. Figs. 920-945. A freight car truck.

Fresnel Lens. A lens formed of concentric rings of glass or other transparent substances, one or both sides of which are bounded by spherical surfaces.

Friction Block. 27, Fig. 966; Fig. 977. A casting attached to the truck bolster as a guide and to prevent wear between the bolster and transom.

Friction Buffer. Figs. 527, 528, 530, 531. A buffer in which shocks are absorbed by friction.

Friction Draft Gear. Figs. 689, 695, 696, 699-710, 712-720, 723-727, 730-744. Any form of DRAFT GEAR which makes use of friction for absorbing and dissipating the energy of buffing and tension shocks transmitted through the couplers.

Friction Draft Spring. Fig. 687. A special spring, the design of which is such as to increase its capacity by friction between the coils. See SPRING DAMPENER.

Friction Plate. A place to prevent wear, as a plate screwed to the wall to protect the wood work from chafing by the seat back arms when the seat back is tilted.

Fig. 974. See BOLSTER CHAFING PLATE.

Friction Roller. A wheel or pulley interposed between a sliding object and the surface on which it slides to diminish the friction.

Frieze. A kind of plush or cloth used in upholstering. Commonly used for covering car seats.

Frog Wing Gage. See GUARD RAIL and FROG WING GAGE.

Fruit Car. Fig. 116. A box car equipped with some means of ventilation, for carrying produce which does not require refrigeration. Used commonly for fruit. See VENTILATED BOX CAR.

Frying Pan. Fig. 1581. For use on parlor and buffet cars.

Fulcrum. "In mechanics, that by which a lever is sustained, or the point about which it moves."—Webster. See BRAKE LEVER FULCRUM.

Fulcrum Hanger Bar. Fig. 978. A support for the brake lever fulcrum of a six-wheel truck.

Funnel. "A vessel for conveying fluids into close vessels; a kind of inverted hollow cone with a pipe; a tunnel."—Webster. See FILLING FUNNEL.

Furniture Car. A large box car, particularly designed for carrying furniture or other light freight which is bulky. See CAR.

Furring. 59, 59b, 59e and 66, Figs. 423-425. Pieces of wood placed in a wall or between sills to which to nail sheathing or flooring. The term is also applied to angle blocks glued or nailed in the inside angles of wood work, where strength and stiffness are required. See BLOCKING and NAILING STRIP.

Furring Brace Blocks. Blocks of triangular cross section glued in the angles between the sheathing and furring to give it greater stiffness.

Fuse. A wire strip or bar of fusible metal or alloy placed in series with an electric circuit and designed to melt and open the circuit when the current exceeds a predetermined value. It performs a function similar to that of a circuit breaker.

Fuse Box. A support for fuses, containing contacts for readily attaching the same, and usually provided with magnetic blow-out.

Fusee. The cone or conical part of a watch or clock, round which is wound the chain or cord. It is a very ancient mechanical contrivance, and is made of a cone form in order to equalize the power of the spring, the leverage of the cord increasing as the resistance of the spring increases and vice versa. See BERTH SPRING FUSEE.

Also a term applied to a signaling device used after being lighted, to drop from the rear of trains to warn following trains and prevent rear end collisions.

G

Gage. A tool or instrument used as a standard of measurement of pressure or size. See CYLINDRICAL GAGE, DUPLEX AIR GAGE, PRESSURE GAGE, STEAM GAGE, etc.

(Back-Up Air Brake). Fig. 1385. An air gage to guide the brakeman in setting the brakes with the back-up brake apparatus.

(Of Track.) The distance in the clear between the heads of the rails of a railway; 4 ft. 8½ in. is the standard gage; if greater than this by more than ½ in., a broad gage; if smaller, a narrow gage. Wide gage usually means a minor and irregular or exceptional enlargement of a given fixed gage, in distinction from tight gage, a corresponding contraction. See WHEELS and TRACK, etc.

Gage, Guard-Rail and Frog Wing. See GUARD-RAIL and FROG WING GAGE.

Gages, Journal Bearing and Wedge. See JOURNAL BEARING and WEDGE GAGES.

Gages, Limit, for Inspecting Second-Hand Wheels. See WHEELS, LIMIT GAGES for INSPECTING.

Gage for Measuring Thickness of Rim of Steel Wheels. See WHEELS, STEEL, GAGE FOR MEASURING THICKNESS OF RIM.

Gage, Plane, for Solid Steel Wheels. See WHEELS, SOLID STEEL, PLANE GAGE FOR.

Gages for Round Iron. See LIMIT GAGES FOR ROUND IRON.

Gage, Rotundity. See WHEELS, SOLID STEEL, ROTUNDITY GAGE FOR.

Gage, Wheel-Check. See WHEEL-CHECK GAGE.

Gage, Wheel Defect. See WHEEL DEFECT GAGE.

Gages, Wheel Flange Thickness. See WHEEL FLANGE THICKNESS GAGES.

Gain. "In architecture, a beveling shoulder, a lapping of timbers, or the cut that is made for receiving a timber."—Webster. In car work the term generally means a notching of one piece of timber into another.

Galvanized Iron. Sheet iron covered with sal ammoniac, after first being cleaned in a bath of dilute acid and then coated with zinc by immersing it in a bath of the liquid metal. An amalgam of 11.5 zinc and 1 mercury is sometimes used. It is usually made in sheets about 2 feet wide by 6 to 9 feet long, and its thickness is measured by its number, wire gage (W. G.). See KALAMINED IRON.

Gas Arm. A GAS WAY TUBE.

Gas Broiler and Utensils. Figs. 1575-1581. A small cook stove heated by gas for use on parlor and sleeping cars in preparing light meals.

Gas Burner. Fig. 2111. "The jet piece of a gas lighting apparatus, at which the gas issues and combustion takes place."—Knight.

Gas Lamps. Figs. 2118-2266.

Gas Pipe. See PIPE.

Gas Pipe Fittings. Fig. 2110.

Gas Plate. See Fig. 1712 and U. S. POSTAL CAR specification for standard gas plate for postal car use.

Gas-Way (Pintsch Lamp). 327, Figs. 2131-2141.

Gas-Way Tube (Pintsch Lamp). 309, Figs. 2131-2141.

Gasket. A thin sheet of rubber, cloth or sheet metal put in a joint between two pieces of metal to prevent leakage. For a special form of gasket used with a car heating apparatus, see Figs. 1955, 2057, 2059, 2080, 2082, 2100; see Fig. 2065 for steam hose gasket remover.

Gasolene Motor Car and Gas-Electric Motor Car. See MOTOR CAR.

Gate. See PLATFORM GATE.

(Of a Casting Mold.) The opening through which the melted metal is poured.

Gauze. See WIRE GAUZE.

Gear. In mechanics the term is used to designate a combination of appliances for effecting some result, as valve gear. See BRAKE GEAR, DRAFT GEAR, etc.

Wheels are said to be in gear when they have cogs interlocking or intermeshed.

Gear Case (Electric Motor). Fig. 2539. A case enclosing the gear and pinion of a railway motor to exclude dirt and water.

Gear Wheel. A cogged or toothed wheel. A spur wheel.

General Service Car. Figs. 92, 93, 356-359. A car suitable for carrying a variety of classes of freight. See also CAR, M. C. B. CLASSES X M and S D, and CONVERTIBLE CAR.

Generator (Electric Lighting). Figs. 2271, 2283, 2286, 2288, 2290-92, 2297-98, 2303-4, 2311. A machine for generating an electric current, driven by a belt, chain or gear from an axle or by an engine or steam turbine mounted in a baggage car or on a locomotive. See ELECTRIC LIGHTING, AXLE GENERATOR.

Generator Apartment. Fig. 231. An apartment in a passenger equipment car in which the electric lighting generator is located.

Generator Coils (Heaters). Figs. 1937, etc.; 1960. Wrought iron pipe coiled into a spiral shape and put into the fire pot of a heater, to heat the water they contain and create a circulation through the hot water pipes of the car. Among the different types is the expanding generator coil in which the diameter of the pipe increases as the heated water ascends in it.

Generator Regulator. Figs. 2273-4, etc.; 2307, 2309, 2316, 2994-5. An automatic device for controlling the action or output of the axle driven generator. As it is desirable to arrange the generator to become operative or generate its full voltage at a low speed, provision must be made for taking care of the output of the generator when it runs at very high speed. Generator regulators are generally designed to control the field of the axle generator, weakening it at high speeds and strengthening it at low speeds. They are made in various ways, the three principal types being rheostatic type, contacting type and counter electro motive force type. The rheostatic type consists of a rheostat of some form in the shunt field circuit of the generator. The resistance of this rheostat is generally varied by means of some motive power device, such as a solenoid or small motor. The action of the motive power device is controlled by the electrical conditions that obtain in the system. The contacting type employs a fixed resistance in the field circuit of the generator, which is intermittently cut in and out, depending upon the conditions. In fact, such a regulator acts substantially like a rheostatic device and accomplishes the same purpose. The counter electro motive force type consists of a small motor-driven generator which generates counter electro motive force or back pressure in the field circuit of the main generator. The counter electro motive force is controlled in the same manner as the operating device of the rheostatic or contacting types of regulator and it accomplishes the same end. See ELECTRIC LIGHTING.

Gib and Key. A fastening to connect a bar and strap together by a slot common to both, in which a gib with a beveled back is first inserted and then driven fast by a taper key.

Gimlet Pointed Screw. A common wood screw, which has its screw cut to a point like a gimlet, so that it can force its own way into wood.

Girder. "The term girder is restricted to beams subject to transverse strain, and exerting a vertical pressure merely on their points of support."—Stoney. The term is almost synonymous with truss. Thus engineers speak of a "Howe truss," a "Pratt truss," a "Warren girder" and a "lattice girder." The distinction is that a truss consists of separate parts held together by pins, or even simply by pressure, which may be taken down and re-erected; whereas a girder is a single solid structure, either all one solid piece (rolled girder), or of plates riveted together (plate girder), or of combined plates and riveted lattice work (lattice girder).

Girth. See BELT RAIL.

Girth Tie Rod. A BELT RAIL TIE ROD.

Gland. A stuffing box, as of a piston rod, valve rod, etc.

Glass Water Gage. A gage consisting essentially of a vertical glass tube connected at the top and bottom with a boiler so as to indicate the height of water therein.

Glassware (Car Lighting). Figs. 2377, 2378, etc.

Glideover Seat. Fig. 1554. See Walkover Seat.

Globe (of Pintsch Gas Lamp). Figs. 2128, etc.; 2386, etc. A globe of hemispherical form, admitting air only from the top. It is almost a universal type of car lamp globe in Europe.
A glass bowl.

Globe Holder. A device for holding a globe on a lamp. Usually it consists of a metal ring at the base of the globe, on which the latter rests, and to which it is fastened with springs, screws, or by the pressure of the globe chimney on top, when the latter is adjustable.

Globe Valve. See Fig. 2038 for type used in car heating.

Glue Size. One pound of glue in a gallon of water. Double size has about twice this quantity of glue. Patent size is a kind of gelatine.

Gondola Car. Figs. 35, 37-55, 316-341. A car with sides and ends, but without a top covering, for the transportation of freight in bulk. Gondola cars are sometimes distinguished as high side, low side, drop bottom and hopper bottom. The floor or bottom is level. See also Car, Hopper Bottom Gondola Car and Drop Bottom Car.

Goods Wagon (British). American equivalent, freight car. The general name for vehicles used in transporting merchandise, as distinguished from a passenger carriage.

Governor (Air Brake). See Air Compressor Governor.

Grab Irons. 60, Figs. 285-88, 374, 375; 23, Fig. 297; 102, Fig. 320; 9 and 10, Fig. 383; 607, 611, 612-614, 619, 620, 623. Also termed hand holds and grab handles. They are attached to freight cars for the use of trainmen in boarding the cars, and are often more definitely specified as roof, side or end grab irons. They are attached to the ends of passenger equipment cars, both for the use of trainmen and for passengers while boarding a train. See Safety Appliances. Similar parts on passenger cars are called Hand Rails.

Graduated Spring. A form of compound spring in which only a certain number of the individual spirals come into action with a light load, and the others only under a heavy load. Another method of accomplishing the same end, graduating the resistance of the spring to the load placed upon it, is the use of the keg-shaped or spool-shaped spring. Under a load the part of larger diameter closes first and that of smaller diameter is much stiffer. Graduated springs have been constructed by combining rubber and spiral springs, but they are now out of use. Graduated springs have been superseded by single and double nest coil springs of equal length, and few, if any, are being applied.

Graduating Spring (Triple Valve). 22, Fig. 1273, 1274; 21, Fig. 1275. A spiral spring which acts against a collar on the graduating stem to restrain the triple valve piston from moving beyond service position when a gradual brake pipe reduction is made, but which is compressed by the piston when a sudden brake pipe reduction is made.

Graduating Stem (Triple Valve). 21, Figs. 1273, 1274. See Graduating Spring.

Graduating Stem Nut (Triple Valve). 20, Figs. 1273, 1274.

Graduating Valve (Triple Valve). 7, Figs. 1273-1275. A device attached to the piston stem by a pin and whose movements are controlled by the piston. Its office is to open and close the service port in the slide valve, feeding air from the auxiliary reservoir to the brake cylinder when a service application of the brakes is made.
(Car Heating) Figs. 1991, 1994, 2042-3. Used for regulating the steam supply.

Graduating Valve Spring (Triple Valve). 35, Fig. 1274; 17, Fig. 1275.

Grain Door. Fig. 781. A close fitting movable door on the inside of a box car by which the lower part of the door opening is closed when the car is loaded with grain, to prevent the latter from leaking out. Such doors are usually made so that they can be thrown over on one side of the doorway or be suspended from the roof, and thus be out of the way when they are not used. Very few cars, however, are fitted with such doors, and ordinarily a temporary arrangement is used which is nailed in place. On the Frisco a burlap covering is used to insure the grain from leaking out at the joints.

Grain Door Rod. An iron rod attached to the door posts on the inside of a box car, to which a grain door is fastened or hinged. The door and rod are generally arranged so that the former can be moved to one side and out of the way when the car is not loaded with grain.

Grated Door. A door consisting of a wooden frame with iron or wooden bars, used on cars for carrying fruit, live stock, etc.

Grating. A perforated or slatted covering for an opening.

Gravel Car. A car for carrying gravel; usually either a dump car or a flat car, the latter most used. See Ballast Car, Contractor's Car.

Gravity Relief Trap (Steam Coupler). Figs. 1956, 1957. An auxiliary trap, automatic in its action, which is closed by the escape of steam and held closed by the steam pressure. When the pressure is removed the weight of the valve stem tips the valve and allows the escape of the water of condensation. The pressure under which it closes is dependent on the weight of the valve stem.

Gravity Side Bearing. Figs. 1046, 1049. A side bearing which is returned to its normal position by gravity.

Grease Box. A Journal Box.

Grille (Interior Decoration). Figs. 1866, 1869. Fret work for decoration. Used in the place of panels, over doorways and in bulkheads and sometimes employed as brackets.

Grommet. Fig. 1571. The separate parts of any metallic eyelet are known as grommets. The two grommets, when compressed together (with a setting die), form the eyelet.

Ground Glass. Glass the surface of which has been roughened by mechanical or chemical process so as to break up the light passing through it and destroy its transparency. Several processes exist; by the wheel, sand blast, rotating with pebbles, or by fluoric acid.

Group Spring. A spiral car spring formed of a number of separate springs, single or nested, united by a common pair of spring plates.

Guard. See Dust Guard, etc.

(British.) American equivalent, conductor. A railway official traveling with and having charge of a railway train.

(For Lanterns.) The exterior wire cover surrounding the globe and protecting it from accident.

Guard Lining Strips. Horizontal bars or strips placed in a car to keep freight from a door, ice box, ventilator, etc.

Guard Posts (Fruit Car). A row of posts standing inside of the ventilators and serving as a fender for the load packed within so as to prevent obstruction to the ventilators.

Guard-Rail and Frog Wing Gage (M. C. B. Standard). Fig. 2695. The guard-rail and frog wing gage was adopted as standard in 1894, to define the dimensions of track to which M. C. B. standard wheel and flange gages have been made to conform. Modified 1907. Modified 1909.

Gudgeon. The bearing portion of a shaft, particularly an upright wooden shaft. The crosshead or wrist pin of a steam engine is sometimes called a gudgeon pin.

Guide. See Dead Lever Guide, etc.

Guide Bar. See Bolster Guide Bar or Column.

Guide Casting. A strip or plate of metal screwed to the wall or arm rest of a seat for the striker arms to rub against to save the wood. Also called Friction Plate.

Guide Rail. A door track.

Gurring Piece (Snow Plow). Probably from gurr, a fort, hence a piece built out to protect or fortify a structure. In a snow plow, timbers bolted to the posts to build out and give shape to the sides.

Gusset Plate. 192, Figs. 285-88; 30, Fig. 297; 38 and 40, Fig. 410; Figs. 492, 497. A flat plate used to fasten two parts of a metal underframe together by riveting through each member and the plate, or to stiffen a joint between two pieces which are fastened together by angle plates, in which case the gusset plate is riveted to the flanges of the adjoining pieces.

Guy. A rope used as a stay.

Guy Rings (of a Derrick or Crane). Rings attached to the head block at the top of the mast to which guy ropes may be attached.

H

Hair Felt (Refrigerator Car Insulation.) A heavy non-conductor of heat made of hair, placed between the inner and outer linings to prevent absorption of heat.

Half Elliptic Spring. See Elliptic Spring.

Hammer (Pile Driver). The heavy weight by which piles are driven. It falls between the leaders and is provided with a hammer eye or clevis, to which the shears of the hoisting rope or hammer rope are attached. Also called a Tup.

Hammock (Sleeping Car Berth). 52, Figs. 1458, 1459. A light hammock of twine hung lengthwise across a sleeping car berth to hold day wearing apparel.

Hand Brake. Figs. 1405-1407. The name applied to the brake apparatus with which all cars are equipped, which permits of the brakes being applied by hand. When cars are being switched in yards they are frequently in motion when no locomotive is coupled to them and a hand brake is necessary so that the trainmen may control them. See Safety Appliances.

Hand Brake Chain. Fig. 489. One of the hand brake connections. See Brake Chain, Brake Shaft Chain.

Hand Brake Chain Carrier. Fig. 497. A guide for the hand brake chain, riveted to the underframe.

Hand Brake Connections. Fig. 489. The rods and chains connecting the hand brake shaft with the brake levers.

Hand Brake Guide. Fig. 492. See Brake Rod Guide.

Hand Brake Pawl. Fig. 494. See Brake Pawl.

Hand Brake Rod Guide. Fig. 489. See Lower Brake Shaft Bearing.

Hand Brake Shaft. Fig. 489. See Brake Shaft.

Hand Brake Wheel. 93, Figs. 285-288, 374 and 375; 15, Fig. 297; 8, Fig. 383; Figs. 493, 1412, 1416, 1418. A wheel attached to the upper end of the brake shaft, by which the latter is turned to apply the brakes by hand.

Hand Car. Figs. 2612, etc. A small and light car arranged with cranks or levers and gearing so that it can be propelled by hand by persons riding on the car. They are commonly used by section or track repair gangs.

Hand Car Truss Rod. A transverse or longitudinal rod by which the floor frame of a hand car is trussed.

Hand Holds (Interstate Commerce Commission and M. C. B. Standard). See Safety Appliances.

Hand Rail. 121, Fig. 355; Figs. 607, 611, 612, 614, 619, 623. A bar or rail to be grasped with the hand as a help in boarding and alighting from cars, and also to prevent trainmen from being thrown from cars, due to their motion or sudden shocks.

Hand Rail Post (Tank Car). 122, Fig. 355. A support for the Hand Rail.

Handle Latch Spring (Motorman's Air Brake Valve). A spring carrying a latch or dog to hold the handle in any desired position.

Hanger. "That by which a thing is suspended."—Webster.

"A means for supporting shafting of machinery."—Knight. See Berth Curtain Rod Hanger, Brake Beam Adjusting Hanger, etc.

Hanger Link. A Swing Hanger.

Hanging Boards or **Meat Timbers** (Refrigerator Car). Transverse bars, resting usually on bogus plates, to which the load of meat is suspended from hooks.

Hard Hair. A quality of curled hair which is very stiff or rigid.

Hash Browner. Fig. 1580. For use on parlor and buffet cars.

Hasp. A bar which fits over a staple and is fastened thereon by passing the shackle of a padlock through the staple, or by a pin. The other end of the hasp is attached by a pin or another staple to the door. See Door Hasp.

Hat Hook. 55, Figs. 1458, and 1459; 1474, 1850-1852. A metal hook on which to hang hats.

Hat Rack. A basket rack.

Head Block (Of a Derrick or Crane). The casting carried at the top of the mast to which the boom rods, tension rods, guy rings, etc., are attached. It usually revolves upon a head block pin. See also Tank Head Block.

Head Board. 9, Figs. 1458, 1459. A light partition which separates one berth in a sleeping car from that next to it. It is stowed away by day in the pocket between the upper berth, when closed up, and the roof. It is secured in place at the back and front by head board bolts entering at the back into a bushing, fixed to the stop of the stationary seat back; and along the upper inside edge by a head board coupling, entering into a head board coupling keeper. The head board bolt for the front corner of the head board is of peculiar construction, designed to avoid all interruption of a flush surface by day, while still giving a secure attachment.

Head Board Bolt. Fig. 1460; 54, Figs. 1458, 1459. See Head Board.

Head Board Bolt Bushing. Figs. 1460, 1461, 1463. See Head Board.

Head Board Coupling. A metal hasp and keeper by which a head board is fastened to the side of the car.

Head Board Fastener. Figs. 1460, 1461, 1463.

Head Board Plates. Fig. 1464. Reinforcing plates for a head board.

Head Board Pocket. 32, Figs. 1458, 1459. A pocket formed at the bottom of the head board by pulling out the head rest of a sleeping car seat. It is used for holding wearing apparel while the lower berth is in use.

Head End System. A system of electrically lighting a complete railway train from a single generating plant, located either on the locomotive, tender or on one of the cars of the train. Head end generators may be steam or axle-driven. If located on the locomotive, they are driven by steam. If located on the tender or on one of the cars, they may be axle-driven or steam-driven. The head end generator is connected to the train line system of the train by a suitable set of connections, and current is supplied to each car through the taps to the train lines. In this system it is not essential to equip each car with a storage battery, although it is generally advisable, for when so equipped the train can be broken up and separated into its units without destroying the continuity of the light on any car. See Electric Lighting.

Head Lining. A lining with which the ceilings of passenger cars are covered.

Head Lining Nail. A nail with a large button-shaped head especially made for fastening head linings to the ceilings of wooden passenger cars.

Head Rest. 32, Figs. 1458, 1459. The padded upper part of a seat back, against which the passenger's head rests. Also called Head Roll.

Head Roll (of a Seat). See Head Rest.

Headlight (Motor Cars). Figs. 2583, 2597.

Headstock (British). American equivalent, end sill.

Heat Guard. A sheet metal covering for the woodwork of a passenger car, to protect it from the heat of a stove.

Heater. Figs. 849-858. Any apparatus for warming a car, room, or building by convection; that is, by conveying hot water, steam, or warmed air into or through the apartments. The term generally refers to any arrangements for warming apartments other than stoves, which heat by direct radiation. See Car Heater.

Heaters of various types are often applied to refrigerator cars during cold weather, when it is desired to transport perishable products. See Heater Car.

(For Lamps or Lanterns.) A metallic attachment passing around and above the flame or otherwise immediately adjacent to it, by which heat is conveyed to the oil in the reservoir below, to prevent freezing, or, in some cases to assist combustion by heating or volatilizing the oil.

Heater Box. Fig. 850. A box applied to refrigerator cars and containing the burners for heating during cold weather while transporting perishable products.

Heater Car. Figs. 109, 114, 118, 848-858. A car, equipped with heating apparatus, for carrying fruits, vegetables, and other perishable products during cold weather. Refrigerator cars are frequently converted to heater cars by adding heating apparatus.

Heater Coil. A Generator Coil.

Heater Pipe Casing. A wooden or iron shelf over a heater pipe in a passenger car to prevent the feet of passengers from coming in contact with the hot pipes. The casing also forms a foot rest.

Heater Room. A small closet, cased with sheet metal interior heat guards, to contain the heater and prevent all direct radiation.

Heater Switch. See Electric Heater.

Heating Apparatus (Passenger Train Cars). See Figs. 1937-2107. See Direct Steam Heating System; Drum System of Car Heating; Pressure and Vapor Heating System; Hot Water Circulation Heating System.

Helical Spring. Figs. 1102, 1103, 1113, 1114. A spring made of bar steel bent in the form of a helix. A coil or spiral spring.

High Back Seat. A class of seats with extra high back and frequently a head roll or head rest. See Seat.

High Side Gondola Car. A gondola car with extra high sides and ends, for carrying coal or minerals.

High Speed Brake. Fig. 1269, etc. The principles involved in the high speed brake were demonstrated by a series of experiments known as the Westinghouse-Galton tests. These showed that a greater pressure not only could be safely applied to the wheels by the brake shoes at high speeds, but also that such considerably greater brake shoe pressure must be applied to the wheels at high speeds in order to then resist the motion of the train as effectively as it is resisted with a more moderate brake shoe pressure at low speeds. This was accomplished by the use of a higher brake pipe air pressure with the standard quick action apparatus, with only the addition of a high speed reducing valve attached directly to the brake cylinders. The purpose of this device was to limit the brake cylinder pressure obtainable during a service application of the brakes to what was considered safe and necessary, but when an emergency application of the brakes was made, to permit the brake cylinder pressure to rise to a considerably higher value than the maximum permitted in a service application, and then to cause a gradual reduction of brake cylinder pressure so as to proportion, as far as possible, the blow-down of brake cylinder pressure to the reduction in speed as the stopping point is approached.

High Speed Foundation Brake Gear. See Foundation Brake Gear (M. C. B. Recommended Practice).

High Window. Fig. 1454. A term sometimes applied to the small windows, located high in the side of a car, commonly used in saloons and dining car kitchens.

Hinge. Figs. 1827-1841. A hook or joint on which a door, gate, etc., turns. It is provided with a tube-like knuckle through which the Hinge Pin passes. See Drop Door Hinge, Sofa Hinge, etc.

The common door hinge is usually a butt or butt hinge, the varieties of which are the acorn butt, a large ornamental hinge, the Blake butt and the hopper butt, so called from its pointed form. The parliament hinge is a sort of T-shaped butt hinge to afford more room for screws. It is little used except for ornamental purposes. The strap hinge is a common form of rough hinge for heavy doors, but it is sometimes made very elaborate and ornamental. A T-hinge is a combination of the butt and strap hinge, one-half being of each form. Butt hinges are either fast joint, loose joint or loose pin. A double acting hinge is one which permits the door to swing either way.

Hinge Pin. The pin passing through the knuckle of a hinge and holding the two parts together.

Hog Chain "(Shipbuilding). A chain in the nature of a tension rod passing from the stern of a vessel, and over posts nearer amidships; designed to prevent the vessel from dropping at the ends."—Knight.

Hence applied to a certain form of trusses in car construction. A hog chain is an inverted truss rod, and usually so called when applied in connection with and in similar form to a body truss rod, the object of a truss rod being to prevent a beam from sinking in the middle, and of a hog chain to prevent sinking at the ends when supported at the middle. Also called an overhang truss rod.

Hog Chain Queen Post. A strut over which a hog chain passes.

Hog Chain Rod (of a Passenger Equipment Car). More properly a continuous counterbrace rod or an overhang truss rod.

Hoisting Block (of a Derrick or Crane). The main block at the lower end of the hoisting chains carrying the sheave hook, or hoisting hook, to which the load is attached.

Hoisting Block Clevis. A clevis carried at the top of a hoisting block to which the fixed end of the hoisting chain is attached. In some cases it is attached to a clevis at the upper end of the boom. See CLEVIS.

Hoisting Chain (of a Derrick, Steam Shovel or Crane). The chain attached to the hoisting drum at one end and to the hoisting block or boom clevis at the other, by which the loads are raised.

Hoisting Chain Sheave. A pulley placed in some wrecking cars at the foot of the mast, when the hoisting gear is at some distance from it. The term is equally applicable to the mast sheave and boom sheave at the top of those parts of a derrick, but the latter are generally otherwise distinguished.

Hoisting Drum (Steam Shovel). The barrel about which is wound the chain cable attached to the dipper block.

Hoisting Engine (Steam Shovel). The engine geared to the hoisting drum.

Hoisting Gear (Steam Shovel). The gear wheel on the hoisting drum.

Hoisting Hook. See HOISTING BLOCK.

Holder (Pintsch Gas). Fig. 2108. A tank, hung below a passenger equipment car, to hold a supply of gas for lighting.

Holder Valve (Pintsch System). Figs. 2108, 2116. A valve which controls the supply of gas from the holders to the pipes.

Hollow Piston Rod (Freight Brakes). A brake cylinder piston rod which is hollow to receive the PUSH ROD.

Hood. See PLATFORM HOOD, VENTILATOR HOOD.

(Heater.) More properly a ventilator or wind scoop. A horizontal tube or covering on the outside of a car, and on top of the cold air pipe, so as to give the latter a T-shape. The air is admitted to the pipe through the ends of the hood, which are covered with wire netting to exclude cinders. It has a valve which is moved by the current of air so as to admit it whichever way the car runs.

Hook Bolt. Fig. 1159. A bolt having a hook at one end.

Hoop (for Oil Lamps). A ferrule with an interior thread into which the burner screws.

Hopper. (Passenger Cars). Fig. 1637, etc. A closet hopper, water, or soil hopper.

(Freight Cars.) See HOPPER BOTTOM CAR.

Hopper-Bottom Gondola Car. Figs. 47, 320, 332, 333, 337-339. A gondola car having a level floor or bottom and one or more hoppers equipped with drop doors for discharging the load. See also DROP BOTTOM CAR.

Hopper Car. Figs. 16-34, 36, 290-315. A car with the floor sloping from the ends and sides to one or more hoppers, which will discharge its entire load by gravity through the hopper doors. See CAR.

Hopper Carry Iron. A HOPPER SUPPORTING STRAP.

Hopper Chain. See DROP CHAIN.

Hopper Deflector. See HOPPER VENTILATOR.

Hopper Door. 16, Fig. 297. A door at the bottom of the slope or hopper of a hopper car which when opened permits the load to discharge. See also DROP DOOR.

Hooper Door Locking Pawl. In a hopper door gear, the catch which when thrown into engagement with the toggle arms, prevents the arms from moving from the closed position and opening the hopper doors.

Hopper Door Toggle Arm (Hopper Cars). A link in drop door mechanism which is fastened to the door and forces it shut when the toggle link is forced down.

Hopper Door Toggle Link (Hopper Cars). The arm in drop door mechanism which forces down the toggle arms when the winding shaft is revolved and closes the doors.

Hopper Ore Car. See ORE CAR.

Hopper Plates. The metal sheets constituting the bottom of a hopper bottom car. Also termed inclined floor or hopper slope. The term hopper plate is generally confined to the metal lining plate used in wooden hopper cars. See HOPPER SLOPE SHEET.

Hopper Siding. The planking that forms the side of a box hopper.

Hopper Slope Sheet. 18, Fig. 297; 27c, Fig. 320. A metal sheet used in the sloped floor of a hopper car.

Hopper Stayrods. Inclined rods passing through the center sill of a wooden car and to the hopper supporting strap at the hinged end of the doors to prevent the hopper from sagging in the middle.

Hopper Support (Hopper Cars). An angle riveted to the ridge of the hopper at the center and the top of the side sheet, forming a support for the hopper. It serves the same purpose as the HOPPER SUPPORTING STRAP in a wooden car.

Hopper Supporting Strap. A heavy U-shaped iron strap bent to the shape of the hopper of a wooden gondola car, and with the ends bolted to the side sills. Its office is to support the hopper, and it is usually applied at the end of the inclined floor, and in the middle of the hopper at which point the doors are hinged.

Hopper Tube. Figs. 1649-1650. The tube or chute leading from the hopper of a closet.

Hopper Ventilator. A device for exhausting air from the closet hopper to the outside of the car. For postal cars, see Fig. 1715, where it is designated as hopper deflector.

Horizontal Brake Shaft. 95, Figs. 285-288. See BRAKE SHAFT.

Horse Car. Figs. 99-105. A car, usually of the passenger equipment type, fitted with stalls, and water and feed facilities, for carrying horses. See CAR M. C. B. CLASS B. H.,

Horse Car Door. Fig. 800. Specially designed to suit the conditions, and larger than standard side doors.

Hose. Flexible tubing for conveying water, air, or other fluids. For metal hose see Figs. 1925, 1927. See also AIR BRAKE and METAL HOSE.

Hose Bracket. See BRAKE HOSE BRACKET.

Hose Chain. A light chain to hold up the steam hose when uncoupled and prevent its dropping to the track.

Hose Clamp. Figs. 1312, 1388, 1389, 1391, 1392, 1967, 2058, 2078. A clamp to bind the hose to the hose nipple and coupling. Sometimes called a hose band.

Hose Couplings. See AIR BRAKE HOSE COUPLINGS.

Hose Nipple. See BRAKE HOSE NIPPLE.

Hose Protector. Figs. 1384, 1387. A device to protect the air brake, signal or steam heat hose from injury. See also ARMORED BRAKE HOSE.

Hospital Car. Fig. 253. A car fitted with hospital appliances for use in treating injuries caused by railroad accidents. Such cars are usually run to the scene of accidents with the wreck train.

Hot Water Circulation Heating System. Figs. 1951, 2022-24, 2097-8. A system by which the car is heated by the circulation of hot water, the water being heated either by fire in a heater, or by steam from the locomotive, or by a combination of both.

Hot Water Heater. See BAKER HEATER.

Hot Water Pipes. Pipes running alongside of a car under the seats, which contain hot water, and by which the car is heated. Between the seats the pipes on the side of the car have a hot water pipe guard rail running over and above them.

House Car. An enclosed freight car.

Housing. A, Fig. 531; 100, Figs. 552-555. A term frequently applied to any part of a device which encases some or all of the working parts.

Housing Box. A JOURNAL BOX.

Hub (of a Car Wheel). The central portion into which the axle is fitted.

Hub Bolts (Steel-Tired Wheels). Bolts fastening the face plates to the hub.

Hydraulic Jack. Figs. 2626, 2628, 2630-1, 2634. A machine in which the power is exerted by means of the pressure of some liquid acting against a piston or plunger, for raising heavy weights, as a car.

I

I-Beam. A rolled steel commercial bar whose cross section has the form of the letter I.

I-Beam Type Bolster. Figs. 499, 500, 510. A bolster whose cross section has the shape of the letter I.

I-Section Bolster. See I-BEAM TYPE BOLSTER.

Ice Bunker (Refrigerator Car). Fig. 844. The receptacle in which the ice is placed in a refrigerator car.

Ice Car. Figs. 376, 377, 379. A car for transporting ice, usually constructed with insulation similar to a refrigerator car, but without ice tanks or ventilators.

Ice Pan (Refrigerator Cars). A receptacle for carrying ice in cars which do not have end ice bunkers.

Ice Tanks, Refrigerator Car. See REFRIGERATOR CARS, FLOORS AND ICE TANKS.

Icing Door. 61r, Figs. 374, 375. A door in the roof of a refrigerator car through whose opening ice and salt are placed in the ice tanks.

Imperial Gallon. An Imperial gallon contains 277.274 cubic inches and an Imperial gallon of water weighs 10 lbs.

Inclined Floor Timbers (Hopper Car). The wooden sills to which the sloped floor of a hopper car is nailed.

Indicator (Car Heating). Figs. 2029, 2047-8. Used in connection with the regulation of the hot water circulation heating system.

Indirect Lighting. Figs. 2456-57. A system of lighting in which the light is not thrown directly on an object but thrown up and reflected.

Injector (Car Heating). Fig. 2029, 2046-48. Used in connection with the regulation of the hot water circulation heating system.

Inlet Valve (Steam Heating). Fig. 2040. The valve controlling the inflow of steam to the heater pipes.

Inside Casing (Baker Heater). Sheet iron or steel plate bent and riveted into the shape of a frustum of a cone, which forms the top of the fire pot.

Inside Ceiling (Refrigerator Car). K, Figs. 374, 375. The inside layer of light boards in the roof of the car. More properly, CEILING.

Inside Corner Brace Plate. 222, Figs. 285-288. See CORNER BRACE PLATE.

Inside Cornice (Passenger Car Interiors). A molding filling the angle where the roof joins the side of the car.

Inside Cornice Fascia. A projecting board which forms a molding or ornament under the inside cornice.

Inside End Piece (Passenger Truck Frame). The end piece which is nearest to the center of the car. It is usually straight, while the outer one is cut away on top so as to make room for the draft rigging.

Inside Hung Brakes. Brake attachments for trucks in which the brake shoes and beams are between the wheels. When attached on the outside they are OUTSIDE HUNG BRAKE.

Inside Lining. 53, Figs. 285-288, 368; 27, Fig. 383; Fig. 490 A; Figs. 374, 375. The lining which is nailed to the insides of the posts of freight, baggage and other cars. In box cars it extends half way up only, to the girth. Inside lining becomes sometimes inside sheathing when it is carried up to the roof, and is the only sheathing for the car, the frame being left exposed. See SIDING, FLOORING, ROOFING AND LINING.

Inside Lining Stud. A vertical strip or post extending from the side sill to the girth to serve as a nailing strip for the inside lining.

Inside Roof. 86c, Figs. 285-288. A light board roof or ceiling under the main roof and separated from it by the purlins.

Inside Window Panel. 10, Figs. 1458, 1459. A panel inside of a passenger car between the windows.

Inside Window Sill. A horizontal piece of wood or metal under the window on the inside.

Inside Window Stop. A wooden or metal strip attached to a window post on the inside of a window blind or an inner sash of a double window. It forms a groove in which the blind or window sash slides. Also called window casing. Sometimes the window molding forms a stop on the inside.

Inspection Car. Figs. 2599-2611; 2619-25. A car used for inspecting track and right-of-way. See HAND CAR, VELOCIPEDE CAR.

Instruction Car. Figs. 214, 215, 252. A car used for the instruction of railway employees in matters pertaining to their work. See AIR BRAKE INSTRUCTION CAR.

Insulating Paper (Refrigerator Cars). B, Figs. 374, 375. A heavy paper specially prepared to make it a poor conductor of heat, placed between the linings as part of the insulation of the car.

Insulation (Refrigerator and Heater Cars). A-P, Figs. 374, 375; Figs. 837-839, 841, 843. A system of walls, and dead air-space used in the construction of the

Send bill and this check card to

M. C. B. ASSOCIATION—AUTHORITY FOR TRANSFER OR ADJUSTMENT OF LADING.

(NAME OF ROAD)

Date

Lading

Transferred or Lading Adjusted. Account of

Issued to R. R.

Car No. Initial

Inspector at

NOTE.—To be printed in black on white paper in duplicate form, filled out with ink or black indelible pencil. Original to accompany bill and duplicate retained for record.

sides, ends, roof and floor to make them poor conductors of heat, thus facilitating the keeping of the contents of the car cool or warm, as may be desired.

The proper insulation of all-steel passenger cars is also an important matter.

Interchange of Traffic, M. C. B. Rules for.

The following code of rules governing the condition of, and repairs to, freight cars has been revised to agree with the result of the special letter ballot of September 28, 1912, which resulted in the abrogation of penalty defects and the addition of 10 per cent. to car repair bills in the Rules of Interchange. It took effect November 1, 1912. Where numbers are vacant the rules have been dropped from time to time as the code has been revised.

PREFACE.—These rules make car owners responsible for, and therefore chargeable with, the repairs to their cars necessitated by ordinary wear and tear in fair service, so that defect cards will not be required for any defects thus arising.

Railroad companies handling cars are responsible for damage done to any car by unfair usage, derailment or accident, and for improper repairs made by them, and they must make proper repairs at their own expense, or issue defect card covering all such damage or improper repairs.

Inspection of freight cars for interchange and method of loading will be in accordance with this Code of Rules, the Specifications for Tank Cars, and the Rules for Loading Materials, issued by this Association.

CARE OF FOREIGN FREIGHT CARS.

RULE 1. Each railway company shall give to foreign cars, while on its line, the same care as to oiling, packing, inspection and adjusting brakes, that it gives to its own cars.

INTERCHANGING FREIGHT CARS.

RULE 2. Cars having defects for which delivering company is responsible must be properly carded when offered in interchange.

Empty cars offered in interchange must be accepted if in safe and serviceable condition, the receiving road to be the judge in cases not provided for in Rules 3 and 4, and 32 to 88, inclusive. Owners must receive their own

RETURN CARD.

.... Car No. ....

from .... Ry.,

to .... Ry.

for the following defects: ....

....

....

....

....

....

....

Inspector.

cars when offered home for repairs, subject to the provisions of these rules.

Loaded cars offered in interchange must be accepted, with the following exceptions:

(a) Cars (whether loaded or empty) having defects in violation of the Safety Appliance Acts, should not be offered in interchange.

(b) Leaking tank cars containing inflammable liquid must be repaired or transferred without any unnecessary movement, or at nearest available point with least possible risk. Also, cars loaded with explosives shall be handled in accordance with the Regulations of the Interstate Commerce Commission.

(c) Cars improperly loaded, when not complying with the Rules for Loading Material.

(d) Lading of open cars when dimensions of lading are in excess of published clearances of roads over which the shipment is destined.

(e) When cars cannot pass approved third rail clearances of American Railway Association.

A. R. A. Car Service Rule 15 to apply when transfer or rearrangement of lading is necessary.

The car transfer check authorizing transfer or rearrangement of lading to be of the form shown herewith.

When the lading is transferred by the receiving line, the ar, when empty, may be returned to the delivering line. In case cars are rejected by the receiving road and reurned to the delivering company, all of the defects obected to must be designated on a return card of the orm shown herewith, filled with ink or black indelible encil, and placed on car adjacent to the destination card.

Use of Defect, Repair and Joint Evidence Cards.

(*Use of Defect Card—Rules* 3-6.)

Rule 3. If a car has defects for which the owners are ot responsible, the receiving line shall require that a de-

Note.—Fill in defects on both sides with ink or black indelible pencil. Attach this card with four tacks on outside face of intermediate sill, between cross-tie timbers.

M. C. B. DEFECT CARD
(*Name of Road.*)

Date.....................

Car specified below will be received at any point on this company's line with the following defects:

....

....

....

Car No............ Initials.....................

Inspector at.....................

ect card be securely attached to the car, as per Rule 14. Defect cards shall not be required for any damage that s so slight that no repairs are necessary.

Rule 4. Defect cards shall not be required for mate-

TO BE SECURELY ATTACHED TO CAR.

M. C. B. ASSOCIATION—REPAIR CARD
(NAME OF RAILROAD)

Why Made	Cast Steel	Springs	Lumber	Chain	Iron: Mall.	Iron: Wrot.	Iron: Cast		Repairs Made	End

Labor ________ Hours

Kind ________

Inspector ________

19___ Repaired at ________

Initial or Name ________

Date ________

Car No. ________

Printing on back of repair card should be the reverse of that shown above.
3½ by 8 inches.

ial missing from cars offered in interchange, except as rovided for in Rules 33, 46, 55 and 57; neither shall they e required of the delivering company for improper repairs that were not made by it, with the exception of cases provided for in Rules 35, 58, 66 and 70.

Rule 5. Defect cards shall be of the form shown herewith. They should be of cardboard, printed in red ink on both sides, and shall be filled in on both sides with ink or black indelible pencil. The cards must plainly specify in full each item for which charges are authorized, indicating the location of defects, as provided for in Rule 14.

Rule 6. Any road making partial repairs of defects on a car which are covered by defect cards will have the defects repaired crossed off the original card with ink or indelible pencil and card replaced on car. A copy of the

TO BE ATTACHED TO BILL

M. C. B. ASSOCIATION—BILLING REPAIR CARD
(NAME OF RAILROAD)

Why Made	Cast Steel	Springs	Lumber	Chain	Iron: Mall.	Iron: Wrot.	Iron: Cast		Repairs Made	End

Labor ________ Hours

Kind ________

Inspector ________

19___ Repaired at ________

Initial or Name ________

Date ________

Car No. ________

Billing repair card must not have carbonized back.
3½ by 8 inches.

card accompanying the bill with the defects which were not repaired crossed off will be sufficient authority to bill.

(*Use of Repair Card—Rules* 7-11.)

Rule 7. When repairs of any kind are made to foreign cars a repair card must be securely attached to car, as per Rule 14. This card must specify fully the repairs made, and reason for same, the date and place where made, and name of road making repairs; also show location of parts repaired or renewed, as per Rule 14.

If no bill is to be rendered, the billing repair card must be attached to the monthly bill, with the words "no bill" written across the face of the card. In case no bill is to be rendered, the words "no bill" shall be written across the face of the repair card.

Rule 8. The Repair Card shall be of the forms shown herewith, made in triplicate, to be known as Repair Card, Billing Repair Card and Record Repair Card. The Repair Card, to be securely attached to car, shall be of cardboard, printed on both sides in black ink, and shall be filled in on both sides, one side of which must be filled in with ink or black indelible pencil. The items of repairs must be in writing. The Billing Repair Card shall be printed on one side and show the same information as the Repair Card, and shall be attached to bill as authority for charge. The Record Repair Card shall be retained by party making repairs.

RULE 9. The following information must be specified on repair cards:

M. C. B. couplers, or parts thereof, R. and R.	New or secondhand. Steel or malleable body, applied and removed. Size of shank. Size of butt. Open or solid knuckle. Yoke, stem or key attachment.
Wheels and axles, R. and R.	Cast-iron, cast-steel, rolled or forged steel or steel-tired wheels. New or secondhand. Cause of removal (see Rule 10). Trucks: Solid pedestal or arch-bar type.
Journal bearings, R. and R.	Solid, filled or other kind. Length of bearings. Box number (see Rule 14).
Metal brake beams, or parts thereof, R. and R.	Make or name of beam. New or secondhand. Complete, or part or parts. Cause of renewal. Part or parts scrapped.
Brake shoes, applied	Cast or reinforced back.
Triple valve, R. and R.	Kind.

When triple valve or cylinder is cleaned, the initial of road and date of last previous cleaning must be shown.

TO BE RETAINED BY PARTY MAKING REPAIRS

M. C. B. ASSOCIATION—RECORD REPAIR CARD
(NAME OF RAILROAD)

End	Repairs Made		Iron Cast	Iron Wrot.	Iron Mall.	Chain	Lumber	Spring	Cast Steel	Why Made

Date ____ 19____ Repaired at ____ Inspector ____ Labor Hours ____

Car No. ____ Initial or Name ____ Kind ____

Record repair card may have carbonized back. 3½ by 8 inches. SEE RULE 8.

If necessary to remove load to make repairs, as specified in Rule 107, it must be plainly stated.

RULE 10. In noting the cause of removal of wheels and axles, the terms used in Rules 68 to 86, inclusive, shall be used.

In all cases of forged or rolled steel wheels, the actual thickness of tread must be shown before and after turning off, measured from base line of tread to the condemning limit of tread, which is ¼ inch above the witness groove; also show actual thickness of tread on other wheels applied. This information must be reported to car owners regardless of whether repairs are chargeable or not.

RULE 11. Journal bearings having a babbitt lining ⅜ inch thick or thicker, shall be charged as filled journal bearings, and not as solid journal bearings.

(*Use of Joint Evidence Card—Rules* 12-13.)

RULE 12. The evidence of a joint inspector, or the joint evidence of two inspectors, one representing the owner of the car and the other representing a railroad company, that the repairs are not proper, shall be final; the evidence to be signed only after an actual inspection has been made.

A joint evidence card shall be used for this purpose, which shall describe and show location of parts repaired or renewed, as per Rule 14. This card shall be of the form shown herewith.

If repairs are not corrected at time of the inspection, the joint evidence card shall be attached to the car, as per Rule 14.

RULE 13. The joint evidence card, accompanied by a proper repair card, upon which a bill has been made, shall be used as authority for rendering bill, but if unaccompanied by such repair card, the joint evidence card shall be sent to the company against which the evidence has been presented, and it shall furnish a defect card covering the wrong repairs if it made them.

RULE 14. The end of car toward which the cylinder push rod travels shall be known as B end, and the opposite end shall be known as A end.

Facing the B end of car, in their order on the right side of car, the journal boxes and contained parts shall be known as R1, R2, R3 and R4, and similarly those on the left side of car shall be known as L1, L2, L3 and L4.

Defect and repair cards (and joint evidence cards, as per Rule 12) must be securely attached to the car, preferably on the outside face of intermediate sill between cross-tie timbers on wooden cars, and on steel cars to cardboard located either on cross-tie under car or on inside of side sill at the end of car.

RULE 15. Duplicate defect or repair cards must be furnished promptly on request for lost or illegible cards.

GENERAL INSTRUCTIONS.

RULE 16. Any car having defects which render it unsafe to run, unsafe to trainmen, or to any lading suitable to the car, may be repaired.

Repairs to foreign cars shall be promptly made, and the work shall conform in detail to the original construction, and with the quality of material originally used, except as provided for in Rules 17 and 18.

RULE 17. In repairing foreign cars, M. C. B. Standards may be used when of dimensions that do not impair the strength of cars, in lieu of the parts forming their original construction.

When using materials for repairs to foreign cars for which the Master Car Builders' Association has adopted specifications as a standard, the materials must comply with the requirements of these specifications.

Malleable iron M. C. B. Standards may be substituted for gray iron M. C. B. Standards, but the net cost to the car owner in such cases must be no greater than if the original kind and weight of material had been applied. Gray iron M. C. B. Standards may be substituted for malleable M. C. B. Standards, but in such cases the debits and credits must be for what is actually applied and removed. Repair card must state kind of material applied and removed.

When necessary to renew brake beams, any metal brake beam meeting M. C. B. specifications may be used, provided that the beam applied is as strong as the beam standard to the car and does not require any change in hangers or other details.

Cast-iron brake shoes may be replaced with brake shoes with reinforced back, in repairs to foreign cars.

White pine, yellow pine, fir or cypress may be used when repairing siding on foreign cars when of equal grade or quality to the material standard to the car. Fir or oak may be substituted for pine when splicing longitudinal sills.

Rule 18. Couplers of the vertical plane type, other than M. C. B. Standard, when replaced with M. C. B. Standard, the expense of alteration thus necessitated shall be chargeable to car owners.

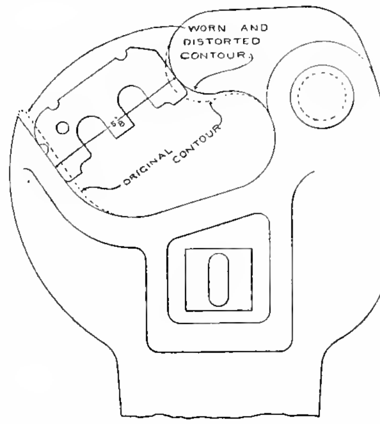
Couplers with stem attachments may be replaced with pocket attachment.

Cars having couplers with stem or spindle attachments or American continuous draft rods will not be accepted in interchange after September 1, 1914.

Couplers that exceed the distance of 5⅛ inches between point of knuckle and guard arm, measured perpendicularly to guard arm, must have the defective part or parts renewed to bring coupler within gage, in which case owners are responsible. (See drawing.)

When M. C. B. couplers of another make are applied to a car, the uncoupling arrangement shall be made operative at the expense of the company making the repairs.

Rule 19. In making repairs to foreign cars, the following materials shall not be used: Malleable iron couplers, open knuckles, malleable or steel-backed journal bearings.



Rule 20. Any company finding cars not within the limits of standard height for couplers, may make repairs and charge to owners.

Cars must be maintained within the limits of standard height for couplers, measured from the top of the rails to the center line of coupler head. Any company finding cars not within the limits of standard height for couplers may repair and charge to owners. As far as possible, cars should be adjusted when empty.

Empty cars measuring 32½ inches or less shall be adjusted to 34½ inches, or as near as practicable thereto, but not exceeding 34½ inches. Loaded cars measuring 31½ inches or less shall be adjusted to 33½ inches, or as near as practicable thereto, but not exceeding 33½ inches. When bill is to be rendered, the height of car before and after altering must be shown on repair cards.

THE ....RAILWAY CO.

REPORT OF IMPROPER REPAIRS TO..............CARS

Station..............................190..

Car No . . . Initial . . . . Received from..............Ry. At.............. Date..............190..

Description of wrong Repairs .... *How Repairs should be made* ....

....

....

....

....

....

....

Show how Carded on other Side.
We Certify Above to be Correct. { ....*Inspector for*..............Ry
..............*Inspector for*..............Ry

THE ....RAILWAY CO.

M. C. B. DEFECT CARD. *Issued by*..............*Ry. At*..............*Date*..............*190..*

Inspector..............*Reading as follows*..............

....

....

....

M. C. B. REPAIR CARD. *Issued by*..............*Ry. At*..............*Date*..............*190..*

Inspector..............*Reading as follows*..............

....

....

....

DISPOSITION OF CAR. *Carded to*..............*Shop; Repaired; went forward without Repairs.*

FORM OF JOINT EVIDENCE CARD.

RULE 21. Bills may be rendered against car owners for the cost of applying temporary running boards and hand rails to cars originally equipped with roofs or running boards to make such cars safe for trainmen.

RULE 22. Draft timbers must not be spliced. Longitudinal sills may be spliced at both ends, except that not more than two adjacent sills may be spliced at same end of car. The splicing of any sill between cross-tie timbers will not be allowed.

The splice may be located either side of body bolster, but the nearest point of any splice must not be within 12 inches of the same, excepting center sills, which must be spliced between body bolster and cross-tie timber, but not within 24 inches of body bolster.

In splicing longitudinal sills other than center sills, if

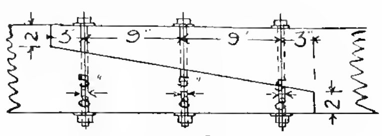
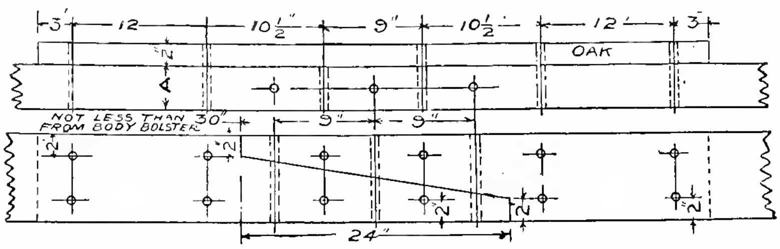


FIG 8

same are less than 12 inches in depth, the plan shown in either Fig. 8 or 9C shall be followed. If the sills are 12 inches or more in depth, the plan shown in either Fig. 9 or 9C shall be followed. In splicing center sills the



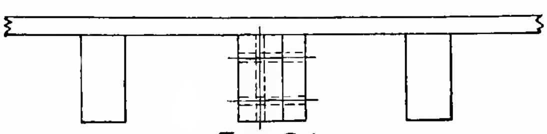


FIG. 9A.

The size of horizontal or cross bolts to be ⅝ inches.

plan shown in Fig. 9B shall be followed. (9C is shown in Fig. 2728.)

The size of horizontal or cross bolts should be ⅝ inch.

Sills of foreign cars shall be spliced as above provided.

Cars delivered in interchange with center sills spliced in accordance with Fig. 9A will be accepted.

Steel sills may be spliced in the most convenient loca-

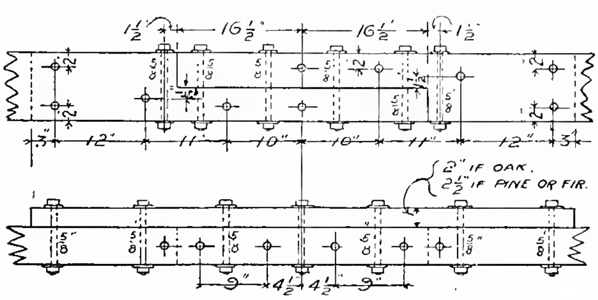


FIG. 9B.—ALL BOLTS ⅝-INCH DIAMETER.

tion, in accordance with A, B and C, Fig. 2728. Adjacent steel sills may be spliced. The thickness of each splice must not be less than the thickness of the web of the section spliced.

RULE 23. In making repairs for which owners are responsible, wheels other than 33-inch may be replaced with 33-inch wheels, if practicable. If changes are necessary in order to bring the car to the proper height, the cost of so doing shall also be chargeable to the car owner.

RULE 24. Wheels on the same axle must be of the same circumference.

In no case should two wheels be mounted on the same axle when the thickness of the two flanges together will exceed the thickness of one normal and one maximum flange, or 2 17/32 inches.

RULE 25. New wheels must not be mated with secondhand wheels.

RULE 26. Prick punching or shimming the wheel fit must not be allowed.

RULE 27. The wheel seats of foreign axles must not

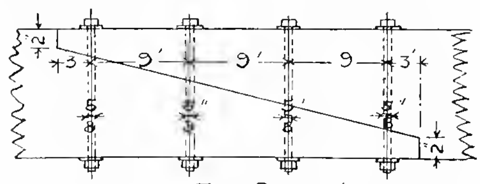


FIG. 9.

be reduced more than 1/16 inch to fit the wheels, and in no case must they be reduced below the limits given in Rule 86.

RULE 28. Any company repairing foreign cars with wrong material, and not in compliance with the Rules 17 to 27, inclusive, shall be liable to the owners for the cost of changing such car to the original standard, or to the requirements of these rules, except that companies applying axles smaller than the limits given in Rule 86 shall not be held responsible for improper repairs if the car is not stenciled showing the capacity, maximum or minimum weight.

RULE 29. When secondhand axles are applied under conditions which make them chargeable to the owners, the diameters of the wheel seats and center must not be less than, and the diameter of the journal must be ⅛ inch greater than the limiting diameters given in Rule 86. If cars are marked with the word "Capacity," the first set of limits must be followed. If cars are marked "Maximum Weight," the second set of limits must be followed. If tank cars are marked limit weight I or II, the corresponding limits must be followed.

RULE 30. (a) The date (month and year), also weight and capacity, should be stenciled on each new car as it comes from the car works, under the supervision of the owner's inspector. The scales used for this purpose should be tested by the railroad company's inspector, provision to this effect to be incorporated in the contract covering purchase of the equipment.

(b) Wooden and steel underframe cars one year old should be reweighed and restenciled, the weight to be followed by one star; cars two years old should be again weighed and stenciled, the weight to be followed by two stars; cars three or more years old should be again weighed and stenciled, the weight to be followed by three stars, which will indicate final weight.

(c) Steel cars should be reweighed and restenciled after they have been in service twelve months, the weight to be followed by three stars, indicating final weight.

(d) If cars are materially changed by reason of new appliances or general repairs, they should be reweighed and restenciled without change in the number of stars.

(e) Unless the owner instructs otherwise, any car without stenciling, or with a variation of 500 pounds, should be immediately reweighed and restenciled and car owner notified of old and new weights. The Official Railway Equipment Register will designate the proper officer to whom these special reports should be made.

(f) The date (month and year) of each reweighing should be stenciled the same as provided for new cars in paragraph (a).

Rule 31. The relightweighing of cars, as provided above, to be charged to car owners in accordance with Rule No. 107, except when the weight of the car is changed on account of repairs due to unfair usage; when such repairs are made on authority of defect card, charge for relightweighing may be included on same authority.

Cars must be cleaned before reweighing.

PARTS OF CARS WHICH JUSTIFY REPAIRS IF OWNERS ARE RESPONSIBLE, OR REPAIRS OR CARDING IF DELIVERING COMPANY IS RESPONSIBLE.

Bodies.

(Delivering Company Responsible, Rule 32.)

Rule 32. Damage of any kind to the body of the car due to unfair usage, derailment or accident. Defect cards shall not be required for any damage so slight that no repairs are necessary, the receiving line to be the judge.

Rule 33. Cars offered in interchange with missing couplers, including yokes, springs and followers, when missing with the couplers, *delivering company responsible for material only; car owner responsible for labor.*

(Delivering Company Responsible, Rule 35.)

Rule 35. Cars equipped with M. C. B. couplers having pocket rear-end attachments and so stenciled, if found with stem or spindle attachments instead of pocket.

After September 1, 1914, cars equipped with couplers having stem or spindle attachments, or American continuous draft rods, will not be accepted in interchange.

COMBINATIONS OF DAMAGES TO CARS WITH WOODEN UNDERFRAMES OR COMPOSITE WOOD AND METAL UNDERFRAMES WHICH DENOTE UNFAIR USAGE, IF EXISTING AT THE SAME END OF CAR AND REQUIRING REPAIRS OR RENEWALS. (Rules 37 to 42, inclusive.)

(Delivering Company Responsible, Rule 37, to and Including First Paragraph Rule 43.)

Rule 37. Damaged coupler body accompanied by damage to draft timber (or its substitute), and end sill.

Rule 38. Damaged coupler pocket, accompanied by damage to draft timber (or its substitute), and end sill.

Rule 39. Damaged end sill, accompanied by damage to draft timber (or its substitute) or longitudinal sill, and damage to either coupler body or pocket.

Rule 40. Damaged end sill, accompanied by damage to two longitudinal sills.

Rule 41. Damaged longitudinal sills, if necessitating replacement or splicing of more than two sills.

Rule 42. Damaged corner and end posts, if necessitating the renewal of more than three posts. This will include damage to upper structure of cars with metal underframes.

An American continuous draft key and rod shall not enter into a combination of defects denoting unfair usage.

It will be assumed that a missing coupler and attachments are damaged unless shown to the contrary. This only refers to cases where the coupler if broken would enter into the combination of defects.

Damage, as used in the above combinations, is understood to mean injury so serious as to render renewal or repairs necessary to the part or parts mentioned.

All-steel or All-steel Underframe Cars.

Rule 43. Damage to bodies of all-steel cars, or damage to underframe of all-steel underframe cars, when necessary to repair, if caused by unfair usage.

(Owners Responsible.)

Longitudinal sills, end sills and other steel parts of cars which become defective due to corrosion and which were not damaged in accident or by unfair usage.

When repairs exceed the combinations as covered by Rules 37 to 42, inclusive, owner's authority must be obtained before repairs are made.

(Delivering Company Responsible, Rules 44-45.)

Rule 44. Improperly loaded or overloaded cars. (See "Rules for Loading Materials.")

The transfer or rearrangement of lading, as prescribed in American Railway Association Car Service, Rule 15, which reads as follows:

Unless otherwise agreed, the cost of transferring the lading of freight cars or rearrangement of lading at junction points shall be settled as follows:

First—The delivering road shall pay cost of transfer or rearrangement—

(*a*) When transfer is due to defective equipment that is not safe to run according to M. C. B. Rules.

(*b*) When transfer or rearrangement of load is due to contents being improperly loaded or overloaded, according to M. C. B. Rules, or the Interstate Commerce Commission Regulations for the Transportation of Explosives and Other Dangerous Articles by Freight and by Express, or when dimensions of the lading of open cars are in excess of the published clearances of any of the roads covered by the routing.

(*c*) When transfer is due to delivering line not desiring its equipment to go beyond junction points.

(*d*) When cars can not pass approved third rail clearances of The American Railway Association.

Second—The receiving road shall pay cost of transfer or rearrangement—

(*e*) When cars can not pass clearances, except as provided in paragraph (*d*), or when cars and lading exceed load limit or can not be moved through on account of any other disability of receiving line.*

*Note to Rule 15 (*e*).—The word "cars" covers both closed and open cars, but not lading on open cars. The words "load limit" refer to the limits placed on bridges, tracks, etc., and not to car capacity.

(*f*) When receiving road desires transfer to save cost of mileage or Per Diem.

Rule 45. Temporary advertisements tacked, glued, pasted or varnished on cars.

The size and character of cards which may be used on freight cars may be divided into four classes, viz.:

1. Routing Cards. Cards bearing information required by the railroads, such as initial and number of cars, consignee, consignor, destination, contents, point of shipment, route, etc. These cards may be issued by consignor.

To be of cardboard size, vertical dimension maximum 5 inches, horizontal dimension maximum 8 inches.

To be permitted on all loaded cars.

No picture or trade-mark to be permitted.

Space for railroad information to occupy lower three-fifths of card.

Any printing on the upper two-fifths to be limited to letters not exceeding one-half inch in any dimension.

All printing to be in black ink.

A copy of card, in reduced form, is shown herewith.

2. Special Cards: Required by the Regulations for the Transportation of Explosives formulated by the Interstate Commerce Commission and the Regulations for the Transportation of Inflammable Articles and Acids prescribed by the American Railway Association. They shall

(*Name of Consignor, etc.*)
(*Name of Consignor, etc., in letters not more than one-half inch in any dimension*)

....

Initial and No............ Contents..........

Point of Shipment........................R. R.

Consignee and Destination......................

Via.......................................

Date........................

be used, be of the text and size described, and be attached to cars as prescribed by said regulations.

3. Symbol (e. g., fast freight line, manifest freight, etc.) and various M. C. B. cards: Cards prescribed by individual roads for special purposes. Their size, use, text and method of application will be prescribed by each individual road to suit its requirements. These cards may only be issued by railroads and may include same information as routing cards except name of consignor.

4. Special Cards: Cards required by United States Customs Regulations or by State authorities, such, for example, as quarantine regulations, and must be used as prescribed by the United States Customs Regulations.

Rule 46. If the car has air-signal or train-line steam pipes, the hose, pipes and couplings are at owner's risk, unless the car is stenciled that it is so equipped.

Rule 47. When two or more cars chained together, or any cars which require switch chains to handle them, are delivered at an interchange point, the receiving road shall deliver to the delivering road at the time an equivalent number of switch chains of the same size as the chains so used on the cars delivered, or, in lieu thereof, furnish a defect card for such chains.

(*Owners Responsible, Rules* 48-52.)

Rule 48. Failure or loss under fair usage of any part of the body of the car; inside parts or concealed parts at owner's risk.

Rule 49. Steel cars not equipped with cardboards for repair and defect cards.

Rule 50. Cars not within the limits of standard height for couplers, 31½ inches minimum to 34½ inches maximum for standard gage cars, as provided for in Rule 20.

Rule 51. Couplers that exceed the distance of 5⅛ inches between point of knuckle and guard arm, as described in Rule 18.

Rule 52. Running boards in bad order or insecurely fastened.

Sill steps, ladders, grabirons, bent, broken, missing or insecurely fastened, except when car has been wrecked, cornered or raked.

Handholds or grabirons must be of wrought iron or steel and secured by bolts, rivets or lag screws.

On cars stenciled "United States Safety Appliances Standard," or on cars stenciled "United States Safety Appliances," lag screws must not be used where bolts or rivets are required by law.

Brakes.

(*Delivering Company Responsible, Rules* 53-54.)

Rule 53. All freight cars offered in interchange must be equipped with air brakes having 1¼-inch air brake pipe and angle cocks, also quick-action triple valve and pressure retaining valve.

Rule 54. Damage to any part of the brake apparatus caused by unfair usage, derailment or accident that requires repairs or renewal.

Rule 55. Cars offered in interchange with missing brake beams, including shoes, heads, jaws and hangers, when missing with the brake beam, *delivering company responsible for material only; car owner responsible for labor.*

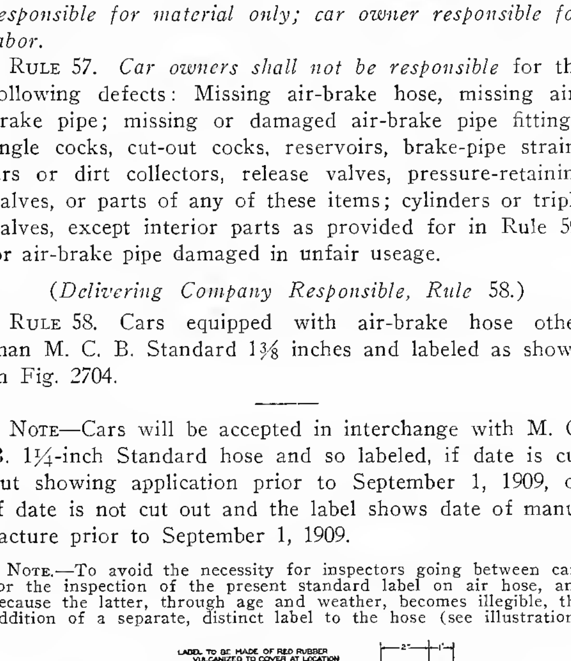
Rule 57. *Car owners shall not be responsible* for the following defects: Missing air-brake hose, missing air-brake pipe; missing or damaged air-brake pipe fittings, angle cocks, cut-out cocks, reservoirs, brake-pipe strainers or dirt collectors, release valves, pressure-retaining valves, or parts of any of these items; cylinders or triple valves, except interior parts as provided for in Rule 59, or air-brake pipe damaged in unfair useage.

(*Delivering Company Responsible, Rule* 58.)

Rule 58. Cars equipped with air-brake hose other than M. C. B. Standard 1⅜ inches and labeled as shown in Fig. 2704.

Note—Cars will be accepted in interchange with M. C. B. 1¼-inch Standard hose and so labeled, if date is cut out showing application prior to September 1, 1909, or if date is not cut out and the label shows date of manufacture prior to September 1, 1909.

Note.—To avoid the necessity for inspectors going between cars for the inspection of the present standard label on air hose, and because the latter, through age and weather, becomes illegible, the addition of a separate, distinct label to the hose (see illustration)



will be submitted to letter ballot. It is incorporated herewith for the information of the members, with the suggestion that if the label be adopted as standard that it be accepted as a part of these rules, and that on and after September 1, 1914, the delivering line be held responsible for hose not so labeled. (Editor's Note.—Adopted as standard. See Fig. 2704.)

(*Owners Responsible, Rules* 59-62.)

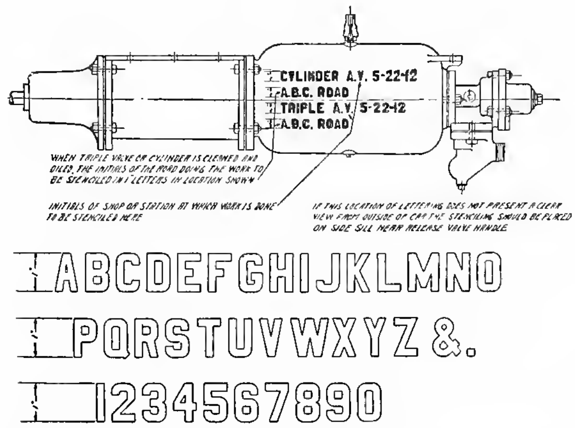
Rule 59. Damage to interior portion of cylinder or triple valve, leaky pipes account of rust or seams, broken air-brake pipes and cross-over pipes due to insecure fastenings, air hose burst from air pressure, air hose torn or with labels missing or illegible; and defective, missing or worn-out parts of brakes, except as provided for in Rules 53, 55 and 57.

Rule 60. Cylinders or triple valves of airbrake cars not cleaned, oiled and tested within twelve months, and the initial of road, together with date of last cleaning, oiling and testing, preferably stenciled on the brake cylinder or auxiliary reservoir, or if same is not readily visible, in a convenient location at release rod, with white paint.

Triple valves cleaned must be tested in accordance with the M. C. B. code of tests for repaired triple valves.

A method of marking brake apparatus which has been cleaned, oiled and tested, is shown herewith. In order to condense the stenciling as much as possible, the words "cleaned and oiled" and "tested" have been omitted, as their significance is well known.

RULE 62. In replacing airbrake hose on foreign cars



for which bills are made, new M. C. B. 1⅜-inch Standard hose, and so labeled, must be used.

TRUCKS.

(Delivering Company Responsible, Rules 63-66.)

RULE 63. Damage of any kind to the truck due to unfair usage, derailment or accident that requires renewal or repairs.

RULE 65. Journal bearings and journal box bolts which require renewal by reason of change of wheels or axles for which the delivering company is responsible, regardless of the previous condition of the bearings.

RULE 66. Cars intended to be equipped with metal brake beams and so stenciled, if found with wooden brake beams.

After September 1, 1915, cars equipped with brake beams other than all metal will not be accepted in interchange.

(Owner Responsible.)

RULE 67. Defective, missing or worn-out parts of trucks not elsewhere provided for, which have failed

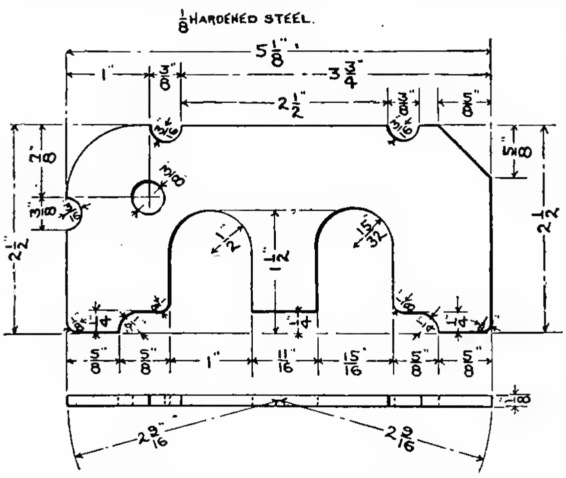


FIG. 1.—WHEEL DEFECT AND WORN COUPLER LIMIT GAGE.

under fair usage, or if any part of the truck frame or attachments is less than 2½ inches above the top of the rail.

WHEELS.

(Delivering Company Responsible, Rules 68-70.)

RULE 68. Flat-sliding, cast-iron wheels: if the spot caused by sliding is 2½ inches or over in length. (Care should be taken to distinguish this defect from *worn through chill.*) See Fig. 2.

Flat sliding, steel or steel-tired wheels: if the spot

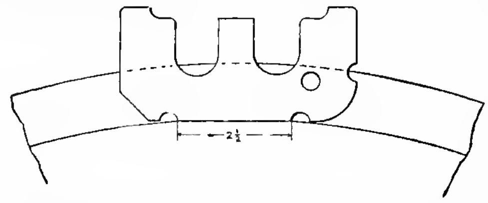


FIG. 2.—METHOD OF GAGING SHELLED AND FLAT SPOTS.

caused by sliding is 2½ inches or over in length; a separate defect card to be furnished.

RULE 69. Broken flange, except as in Rule 78; chipped flange, if chip is on throat side of flange, and exceeds 1½ inches in length and ½ inch in width; broken rim, if not

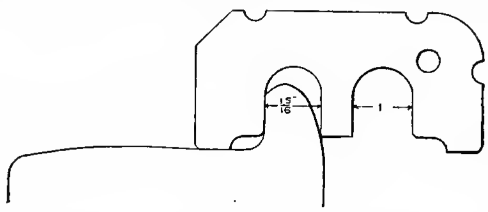


FIG. 3.

METHOD OF GAGING WORN FLANGES. SEE RULE 74.

For cast-iron or cast-steel wheels under cars of less than 80,000 pounds capacity, and forged-steel or steel-tired wheels with flanges 15-16 inch thick or less; cast-iron or cast-steel wheels under cars of 80,000 pounds capacity or over, with flanges 1 inch thick or less.

caused by defective casting, if the tread, measured from the flange at a point ⅝ inch above tread, is less than 3¾ inches in width (see Fig. 5), or any breakage caused by unfair usage, derailment or accident.

RULE 70. Cars equipped with forged steel or steel-tired

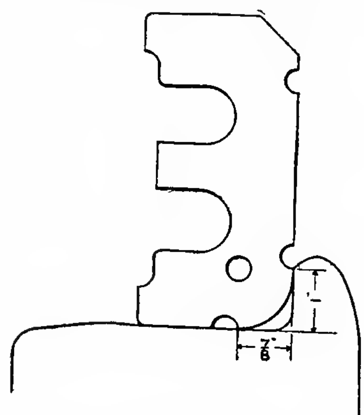


FIG. 4.

METHOD OF GAGING WORN FLANGES. SEE RULE 74.

For cast-iron or cast-steel wheels under cars of less than 80,000 pounds capacity, and forged-steel or steel-tired wheels 1 inch or more from tread; for cast-iron or cast-steel wheels under cars of 80,000 pounds capacity or over, ⅞ inch or more from tread.

wheels and so stenciled, if found with cast-iron or cast-steel wheels.

Cars equipped with cast-steel wheels and so stenciled, if found with cast-iron wheels.

Forged steel wheels may be substituted for cast-steel wheels.

(Owners Responsible, Rules 71-82.)

RULE 71. Shelled out: wheels with defective treads on account of cracks or shelled-out spots 2½ inches or over, or so numerous as to endanger the safety of the wheel.

Brake burn: wheels having defective treads on account of cracks or shelling out due to heating.

Rule 72. Seams ½ inch long or over at a distance of ½ inch or less from the throat of the flange, or seams 3

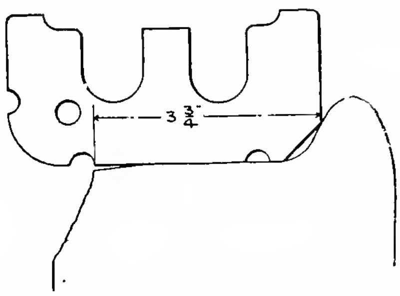
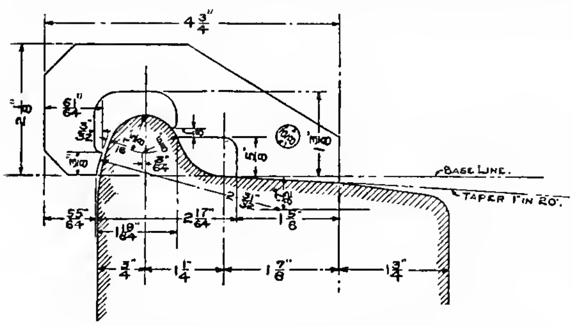


FIG. 5.—METHOD OF GAGING CHIPPED RIMS.

or more inches long, if such seams are within the limits of 3¾ inches, as shown in Fig. 5.

Rule 73. Worn through chill: when the worn spot is 2½ inches or over in length. Care must be taken to distinguish this defect from flat spots caused by sliding wheels.

Rule 74. Worn flanges—cast-iron or cast-steel wheels: wheels under cars of less than 80,000 pounds capacity,



MAXIMUM FLANGE THICKNESS GAUGE.

FIG. 6.—FOR ALL WHEELS CAST AFTER JAN. 1, 1908.

with flanges having flat vertical surfaces extending 1 inch or more from tread, or flanges 15/16 inch thick or less, gaged at a point ⅜ inch above tread. Wheels under cars of 80,000 pounds capacity or over, with flanges having flat vertical surfaces extending ⅞ inch or more from tread, or flanges 1 inch thick or less, gaged at a point ⅜ inch above tread. (See Figs. 3 and 4.)

Worn flanges—forged steel or steel-tired wheels:

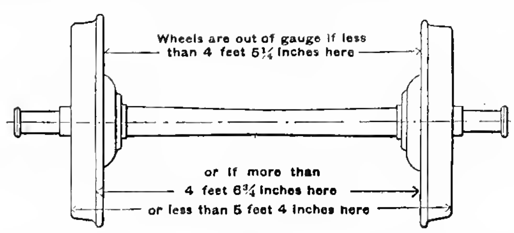


FIG. 7.

Measurements to be made at the same height on the wheels as the center of the axle.

For wheels cast prior to the M. C. B. Standard tread and flange adopted in 1907.

flanges having flat vertical surfaces extending 1 inch or more from tread, or flanges 15/16 inch thick or less. (See Figs. 3 and 4.)

Rule 75. Thick flange: flange over 1 19/64 inches thick for cast-iron wheels having increased flange and tread standards of 1907 and 1909. (See Fig. 6.)

Rule 76. Tread worn hollow: if the tread is worn sufficiently hollow to render the flange or rim liable to breakage.

Rule 77. Burst: if the wheel is cracked from the wheel fit, outward, by pressure from the axle.

Rule 78. Cracked or broken flange, caused by seams, worn through chill or worn flange. (See also Rules 69 and 83.)

Rule 79. Broken or chipped rim, caused by defective casting, if the tread, measured from the flange at a point

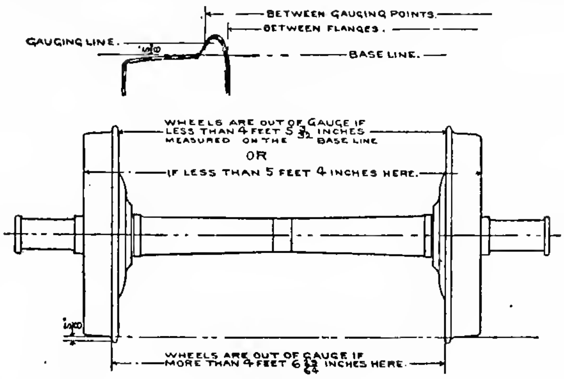


FIG. 8.

Measurements to be made at the same height on the wheels as the center of the axle.

For wheels cast after January 1, 1908.

⅝ inch above tread, is less than 3¾ inches in width. (See Fig. 5.) See also Rules 69 and 83.

Rule 80. Cracked tread, cracked plate, one or more cracked brackets, or broken in pieces under fair usage. See also Rule 69.

Forged steel or steel-tired wheels loose, broken or cracked hubs, plates, bolts, retaining ring or tire under fair usage.

Rule 81. Wheels loose or out of gage. (See Fig. 7 for wheels cast prior to the M. C. B. Standard tread and flange adopted in 1907, and Fig. 8 for wheels cast after January 1, 1908.)

Rule 82. Chipped flange: if chip is on the opposite side from throat of flange and exceeds 1½ inches in length and ½ inch in width.

Rule 83. The determination of flat spots, worn flanges and chipped treads shall be made by a gage, as shown in Fig. 1, and its application to defective wheels, as shown in Figs. 2, 3, 4 and 5. The determination of thick flanges for all wheels cast after January 1, 1908, shall be made by a gage shown in Fig. 6.

Axles.

(Delivering Company Responsible.)

Rule 84. Cut journals, axles bent or axles rendered unsafe by unfair usage, derailment or accident.

(Owners Responsible, Rules 85 and 86.)

Rule 85. Axles broken or having seamy journals, fillets in back shoulder worn out, the length of journal increased ½ inch over standard length, or collars broken off or worn to ¼ inch or less under fair usage.

Rule 86. Axles less than the following prescribed limits:

FOR CARS MARKED WITH "CAPACITY."

CAPACITY OF CAR.	JOURNAL.	WHEEL SEAT.	CENTER.
100,000	5 inches.	6¾ inches.	5⅞ inches.
80,000	4½ "	6¼ "	5 5/16 "
70,000	4 "	5⅝ "	4⅞ "
60,000	3¾ "	5 "	4⅜ "
50,000	3½ "	4¾ "	4⅛ "
40,000	3¼ "	4⅝ "	3⅞ "
30,000	3 "	4¼ "	3½ "

FOR CARS MARKED "MAXIMUM WEIGHT."

MAXIMUM WEIGHT.	JOURNAL.	WHEEL SEAT.	CENTER.
161,000	5 inches.	6¾ inches	5⅞ inches.
132,000	4½ "	6¼ "	5⅜ "
112,000	4¼ "	6 "	5¼ "
95,000	3¾ "	5½ "	4¾ "
79,000	3½ "	5¼ "	4⅝ "
66,000	3¼ "	4⅞ "	4¼ "
58,000	3 "	4¾ "	4⅛ "

TABLE I.

FOR TANK CARS MARKED LIMIT WEIGHT I.

LIMIT WEIGHT I. IN POUNDS.	JOURNAL.	WHEEL SEAT.	CENTER.
161,000	5 inches.	6¾ inches.	5⅞ inches.
132,000	4½ "	6¼ "	5 5/16 "
112,000	4 "	5⅝ "	4⅞ "
95,000	3¾ "	5 "	4⅜ "
79,000	3½ "	4¾ "	4⅛ "
66,000	3¼ "	4⅝ "	3⅞ "
58,000	3 "	4¼ "	3½ "

TABLE II.

FOR TANK CARS MARKED LIMIT WEIGHT II.

LIMIT WEIGHT II. IN POUNDS.	JOURNAL.	WHEEL SEAT.	CENTER.
161,000	5 inches.	6¾ inches.	5⅞ inches.
132,000	4½ "	6¼ "	5⅜ "
112,000	4¼ "	6 "	5¼ "
95,000	3¾ "	5½ "	4¾ "
79,000	3½ "	5¼ "	4⅝ "
66,000	3¼ "	4⅞ "	4¼ "
58,000	3 "	4¾ "	4⅛ "

All cars, except tank cars, to have their light weight and capacity, or their light weight and maximum weight stenciled on them.

All tank cars to have Limit Weight I or Limit Weight II stenciled on them.

IMPROPER REPAIRS.

(Company Making Repairs Responsible.)

Rule 87. Any company making improper repairs is solely responsible to the owners, with the exception of the cases provided for in Rules 35, 58, 66 and 70.

Rule 88. The company making such improper repairs shall place upon the car, at the time and place the work is done, an M. C. B. defect card, which card must state the wrong material used.

Rule 89. When improper repairs of owner's defects have been made and bill rendered, the owner may counter-bill against the company making the wrong repairs for the cost of changing the car to the original standard, or to the requirements of Rules 17 to 27, inclusive, and 29 to 31, inclusive, if the work is done.

Rule 90. When improper repairs of defects for which owners are not responsible are made, the owner may make bill against the company making the improper repairs for the cost of changing the car to the original standard, or to the requirements of Rules 17 to 27, inclusive, and 29 to 31, inclusive, if the work is done.

If an intermediate road finds it necessary for safety to standardize wrong repairs, it may render bill against the car owner for the expense, except as provided in Rules 35, 58, 66 and 70. The billing repair card of such intermediate line shall be final as to the fact that such wrong repairs existed and shall perform the same function as a joint evidence card.

If the car carries repair card covering such wrong repairs, such repair card must accompany bill against the car owner. If such repair card covers items other than those corrected, the items corrected must be crossed off and the card replaced on car, but a copy of such repair card must accompany the bill against the car owner.

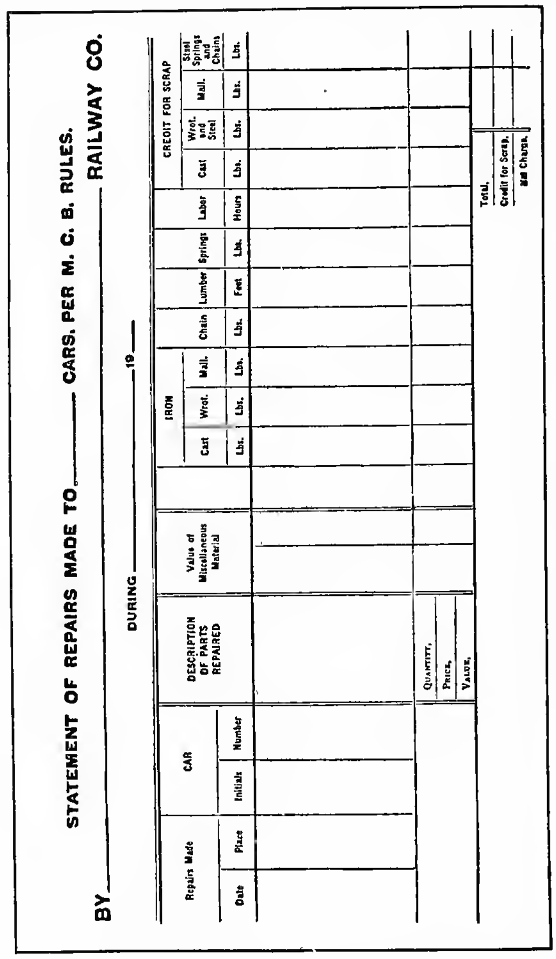
Instructions for Billing.

Rule 91. Bills may be rendered for work done under Rule 16, except in cases where owners are not responsible and the car bears no defect card covering the defects repaired, stating upon the bill the date and place where the repairs were made; the billing repair card or defect card to accompany the bill.

Note.—The following rules of the Association of American Railway Accounting Officers should be observed when rendering or correcting bills:

Bills shall not be rendered for amounts less than 25 cents in aggregate, but charges for items less than 25 cents may be held until they amount to that sum, provided said aggregate is rendered within 60 days. No bill shall be returned for correction on account of error for less than 100 cents in aggregate of bill, but said bill shall be passed for payment at once, and the alleged error brought to the attention of the road rendering the same within sixty days from date of bill. The receiving road shall at once issue a letter of authority for counter-bill to cover the acknowledged error, said letter to be attached to the bill as authority.

No bills shall be returned for correction on account of



wrong car numbers, but road rendering bill should be communicated with by letter, and if, after investigation, it is found to be a fact that wrong car number has been given, correct number shall be furnished or credit covering amount of charge allowed on next month's bill.

When necessary to return bills for correction, all defect cards and billing repair cards should be detached, except those covering repairs to cars, the charge for which there may be some question as to its correctness.

Rule 92. In rendering bills, cars shall be treated as belonging to companies or individuals whose name or initials they bear, except in case of Line Cars where the equipment list of the general officers of the Line designates a party to make settlement.

Rule 93. All companies rendering bills should consolidate all charges against any one company into one monthly bill.

RULE 94. For repairs made on defect cards, the card must accompany the bill as a voucher for the work done, but no bill shall be rendered for repairs which have not been made.

RULE 95. Bills may be rendered against car owners for the labor only of replacing the following material when lost on the line of the company making the repairs, viz.:

Brake beams, including shoes, heads, jaws and hangers, when lost with the brake beam.

Couplers, including yokes, springs and followers, when lost with the coupler.

RULE 96. In making bills under these rules, the information necessary should be embodied on the forms shown

..........Company,
Address..........

To..........Railroad Company, Dr.
For Wheels and Axles put under..........Cars, Month of..........191

		WHEELS AND AXLES REMOVED.					WHEELS OR AXLES APPLIED.							
Date and Place.	Initial, Kind and Number of Car.	Maker.	Date Cast.	Ry. Co.'s Initials or Name on Wheel.	No. on Wheel or Axle	Cause of Removal	Maker	Date Cast.	Ry. Co.'s Initials or Name on Wheel.	No. on Wheel or Axle	New or Second Hand.	Material Net Charge.	Labor Charge.	Total Net Charge.

Date..........190
Received payment, $..........

herewith, whether the same is made as a bill or a statement to accompany a bill.

In exchanging wheels and axles under foreign cars, reports on repair cards, of M. C. B. Standard size, embodying all information required by the statement shown herewith, will be accepted.

RULE 97. Bills or statements for wheel and axle work must make specific mention of each wheel and axle removed and applied. If no marks are found on wheels or axles removed, a notation to that effect must be made.

RULE 98. Bills rendered for wheels and axles shall be in accordance with the following schedule of prices for material, with the proper debits and credits:

	New.	Second-hand.	Scrap.
One 36-in. cast-iron wheel	$10.50	$7.75	$5.25
One 33-in. cast-iron wheel	9.00	7.00	4.75
One 33-in. forged or rolled steel wheel	21.00	.....	4.50
One axle, 100,000 lbs	20.00	12.00	7.50
One axle, 80,000 lbs	$16.00	$10.00	$6.50
One axle, 60,000 lbs	14.00	7.75	5.25
One axle, 50,000 lbs. (or under)	10.00	5.00	3.00
And with an additional charge for all labor for each pair of wheels and axles removed from all arch bar trucks of	2.00	.....	.....
And from all solid pedestal trucks of	2.25	.....	.....

If new wheels and axles are substituted for secondhand wheels and axles, proper charges and credits shall be allowed, although such substitutions be made on account of only one loose or defective wheel or a defective axle, with the following exceptions: In case the owner of a car removes a damaged wheel or axle, no charge shall be made for any difference in value between the parts used and those removed that are not damaged.

Removing, turning and replacing a pair of forged steel or steel-tired wheels; $3.50 for pedestal type of truck and $3.25 for arch bar truck.

The price for new forged or rolled steel wheels shall only apply to such wheels having treads 1⅜ inches thick or over, measured from base line of tread to the condemning limit, which is ¼ inch above witness groove. For wheels having treads less than 1⅜ inches thick as described, a reduction shall be made in price at the rate of 75 cents per 1/16 inch thickness (on radius) of tread.

Any loss or increase of service metal on forged or rolled steel wheels shall be credited or charged at the rate of 75 cents per 1/16 inch thickness (on radius) of tread.

IN CASE OF OWNER'S DEFECTS.

No credit will be allowed owner for loss of service metal due to turning off wheels. Should there be a further loss of service metal, however, due to the application of other wheels, the proper credit for such additional loss must be given the owner. Any increase in the amount of service metal, due to the application of other wheels, may be charged to the owner.

DELIVERING LINE DEFECTS.

When repairs are not covered by a defect card, the proper credit for any loss of service metal must be given the owner; but no charge shall be made against the owner for any increase in the amount of service metal, due to application of other wheels.

When the repairs are covered by the defect card of another company, charge covering such repairs shall be made against the owner of the car, the defect card and the billing repair card to be attached to the bill. The owner to render counter-bill on the authority of the defect card against the company issuing same, including an additional charge to cover the loss of service metal, on account of the defects covered by the card. Should there be an additional loss of service metal, on account of the application of other wheels, the company making the repairs shall allow the proper credit to the owner to cover such additional loss of metal. Should there be an increase in the amount of service metal, due to the application of other wheels, such increase may be charged to the owner and included in the owner's counter-bill against the company issuing the defect card, except when repairs are made by the owner.

The above provisions shall govern any loss or increase of service metal on account of the mate wheel, even if same is not defective, when both wheels are turned off to correspond.

The necessary information must be given in all cases, as provided in Rule 10.

In cases of slid-flat wheels ⅛ inch for loss of service metal will be allowed for flat spots 2½ inches long and 1/16 inch for each additional inch or fraction thereof.

RULE 99. If car owner elects on account of improper repairs to remove M. C. B. Standard axles suitable to the capacity of the car, he shall make charge for secondhand axles and allow credit for secondhand axles if they are in good order. Axles removed below the journal limit of 100,000 pounds, 80,000 pounds, 60,000 pounds and 40,000 pounds capacity, to be credited as scrap when removed.

RULE 100. Bills or statements which do not embody all the information called for by the headings of the columns may be declined until made to conform to the requirements of the rule.

In all cases of forged or rolled steel wheels, the repair card must show the actual thickness of tread before and after turning off, measured from base line of tread to the condemning limit of tread, which is ¼ inch above the witness groove; also show actual thickness of tread on other wheels applied. This information must be reported to car owners regardless of whether repairs are chargeable or not.

RULE 101. Bill for repairs made under these rules and for material furnished shall be in conformity with schedule of prices and credits for the articles enumerated below:

MATERIAL.	8-inch.	10-inch.
Air-brake Equipment:		
Air-brake hose, 1⅜-inch M. C. B. standard, complete with fittings, applied to car, charge	$2.00	$2.00
Air-brake hose, M. C. B. standard, credit for fittings for same	.80	.80
Angle cock, plain handle	1.50	1.50
Angle cock, self-locking handle	1.80	1.80
Angle cock handle, plain	.08	.08
Angle cock handle, self-locking, complete	.40	.40
Angle cock handle, self-locking	.25	.25
Auxiliary reservoir, detachable type	2.75	6.25
Auxiliary reservoir, combined type	2.75	6.25
Brake pipe air strainer, 1¼-inch	.60	.60
Brake pipe air strainer union nut	.12	.12
Brake pipe air strainer union nut and swivel	.12	.12
Centrifugal dust collector, 1-inch	1.20	1.20
Centrifugal dust collector, 1¼-inch	1.50	1.50
Centrifugal dust collector deflector and plug	.30	.30
Check valve cap	.25	.25
Cut-out cock	1.30	1.30
Cut-out cock handle	.07	.07
Cylinder body	2.00	3.50
Cylinder piston and rod	1.00	1.50
Cylinder piston follower	.08	.25
Cylinder piston packing leather	.60	1.00
Cylinder piston packing leather expander	.05	.06
Cylinder piston release spring	.50	.50
Cylinder non-pressure head	.60	1.25
Cylinder pressure head, plain	.50	.75
Cylinder pressure head with lever brackets, lugs and bolts	1.50	1.75
Cylinder gasket	.06	.08
Exhaust piston	.20	.20
Exhaust piston head	.40	.40
Exhaust piston seat	.10	.10
Gasket, air hose coupling	.04	.04
Gasket, leather, union, all sizes	.04	.04
Pipe nipple on end of train line	.12	.12
Piston stop	.10	.10
Pressure-retaining valve, 2 position	1.00	1.00
Pressure-retaining valve, 3 position	3.00	3.00
Release valve	.60	.60
Release valve handle	.10	.10
Release valve rubber seat	.02	.02
Release valve vent valve, complete	.10	.10
Release rod	.10	.10
Retaining valve handle	.05	.05
Retaining valve cock key, two position	.15	.15
Retaining valve cock key, three position	.20	.20
Retaining valve case, two position	.10	.10
Retaining valve case, three position	.40	.40
Retaining valve spring	.03	.03
Retarding device body	.80	.80
Retarding device screws (each)	.04	.04
Retarding device stem	.50	.50
Retarding device spring	.05	.05
Rubber seat, for triple emergency valve, check valve or vent valve	.05	.05
Side cap	.20	.20
Train pipe air strainer (1¼-inch)	.60	.60
Triple check-valve case	1.00	1.00
Triple cylinder cap (drain cup)	.75	.75
Triple cylinder front cap, type K-3, 4, 5, 6,-N. Y.	.75	.75
Triple cylinder front cap, type F and H, N. Y.	.60	.60
Triple cylinder or main cylinder gasket	.40	.40
Triple emergency valve, all classes	.60	.60
Triple emergency valve seat	.55	.55
Triple emergency valve piston	.50	.50
Triple emergency valve piston ring only	.15	.15
Triple emergency check valve, metal	.25	.25
Triple emergency check valve spring	.02	.02
Triple emergency check case gasket	.10	.10
Triple graduating spring	.05	.05
Triple graduating stem	.15	.15
Triple graduating stem nut	.20	.20
Triple graduating valve, round type	$0.05	$0.05
Triple graduating valve, flat type	.25	.25
Triple graduating valve spring	.02	.02
Triple piston and ring	2.00	2.00
Triple piston K type	3.00	3.00
Triple piston ring (only)	.25	.25
Triple slide valve, old type, W. A. B. Co	.75	.75
Triple slide valve, F-1, N. Y.	.75	.75
Triple slide valve, H-1, N. Y.	.90	.90
Triple slide valve, K type	1.50	1.50
Triple slide valve spring	.03	.03
Triple union nut	.10	.10
Triple union swivel	.10	.10
Triple valve body, complete, old style W. A. B.	5.50	5.50
Triple valve body, complete, old style N. Y.	6.00	6.00
Triple valve body, K type	8.00	8.00
Triple valve seat, metal	1.50	1.50
Triple valve strainer	.05	.05
Triple valve gasket	.20	.20
Triple vent piston	.70	.70

MATERIAL.	Charge.	Credit.
Altering height of one end of car, by adjusting center plates or body bolster, net	$1.25	....
Altering height of one end of car, shimming springs, net	.75	....
Bolts, nuts and forgings, finished, per lb	.03	$0.00¾
Brake shoe applied; no credit for scrap	.30	....
Brake shoe, reinforced back, applied; no credit for scrap	.40	....
Brake shoe key applied; no credit for scrap	.05	....
Castings, rough iron, per lb	.02	.006
Castings, rough malleable, per lb	.04	.00½
Castings, rough steel, per lb	.05	.00¾
Chain, per lb	.05	.01
Coupler, M. C. B., complete, new, steel 5 by 5 shank	8.75	....
Coupler, M. C. B., complete, new steel 5 by 7 shank	9.50	....
Coupler body, one, new steel 5 by 5 shank	5.75	1.05
Coupler body, one, malleable, 5 by 5 shank	....	.90
Coupler body, one, new steel 5 by 7 shank	6.50	1.15
Coupler body, one, malleable, 5 by 7 shank	....	1.00
Coupler knuckle, one, new, open	....	.40
Coupler knuckle, one, new, solid	2.25	.45
Coupler knuckle pin, one, new	.25	.05
Coupler lock, one, new	.50	.06
Coupler release clevis, applied, net	.03	....
Coupler release clevis link, applied, net	.03	....
Other individual malleable, wrought or steel parts, per lb.	.04	....
Door, for end of box or stock car, wooden, each, applied; no credit for scrap	1.95	....
Door, for end of box or stock car, ventilated (wooden frame with iron rods), each, applied; no credit for scrap	3.30	....
Door, for side of box or stock car, wooden, each, applied; no credit for scrap	4.75	....
Door, for side of box or stock car, ventilated (wooden frame with iron rods), each, applied; no credit for scrap	6.50	....
Door, for side of carriage, automobile or furniture car, wooden, each, applied; no credit for scrap.	6.00	....
Door for side of stock car, with iron rods, each, applied; no credit for scrap	5.50	....
Door, for roof of coke car, wooden, each, applied; no credit for scrap	1.75	....
Door, for roof of stock car, wooden, each, applied; no credit for scrap	1.25	....
Half door, for side of box or stock car, each, applied; no credit for scrap	3.00	....
Half door, for end of furniture, carriage or automobile car, each, applied; no credit for scrap	6.00	....
Handhold, one, applied, net	.40	....
Hatch cover, for roof of refrigerator car, wooden, each, applied; no credit for scrap	1.50	....
Hatch plug, for refrigerator car, wooden, each, applied; no credit for scrap	2.00	....
Iron, galvanized, per lb	.04	....
Journal bearings, brass or bronze, lined or unlined, per lb., applied	.18	.13
Journal bearings, filled brass or bronze shell, per lb., applied	.14	.10
Journal bearings; weight to be charged and credited as follows:	LBS.	LBS.
For journals 7 in. long and over, but not 8 in	.10	.06
For journals 8 in. long and over, but not 9 in	.13	.08
For journals 9 in. long and over, but not 10 in	.20	.12
For journals 10 in. long, but not 11 in	.25	.15
Journal bearings, cast steel, or malleable iron back, credit for scrap, per lb	....	.02
Janney key, one, applied; net	.02	....
Key ring, one, applied; net	.03	....
Labor, per hour	.24	....
Lumber—Yellow, White and Norway Pine, Poplar, Oak, Hickory and Elm, dressed and framed, per foot B.-M. required to make the part	.04	....
Nails, per lb	.03	....
Nut-lock, one, applied; net	.03	....
Paint, lead, freight car, mixed, per lb	.15	....
Paint, mineral, freight car, mixed, per lb	.07	....
Pipe, ⅜-inch, per ft	.03	....
Pipe, 1-inch, per ft	.05	....
Pipe, 1¼-inch, per ft	.07	....
Ratchet wheel key, one, applied; net	.03	....
Spring cotters or spring keys, separately or in connection with other repairs, each, applied	.02	....
Steel for springs, rough, per lb	.05	00¾
Steel helical springs, per lb	.03½	.00¾
Steel, pressed and flanged, per lb	.04½	.00½
Steel, plate and structural, per lb	.03	.00½
Stenciling side and end when done to preserve identity of car, when not necessitated by other repairs, net (per Rule 102)	.50	....

Rule 102. Not more than one pound of mineral paint can be charged for 15 square feet of surface covered, and not more than one pound of lead paint for 12 square feet of surface covered. No charge to be made for lettering except when done to preserve the identity of the car and not necessitated by other repairs.

Rule 103. Whenever scrap credits are allowable the weights of scrap credited shall be equal to the weights of the new metal applied, except as otherwise provided in the rules, and except in the case of scrap M. C. B. couplers, and parts of same, and material applied on defect cards, in which cases the weight and kind of metal removed shall be credited.

Rule 104. When M. C. B. coupler parts or metal brake beams are replaced, good secondhand material may be used, but they must be charged at seventy-five per cent of the prices when new. The credits for coupler parts released from service in good condition must be seventy-five per cent of the prices when new, and similarly the credits for metal brake beams must be fifty per cent of the prices when new.

In the case of defective couplers, when another make is applied, credits shall be confined to the body, lock, knuckle and knuckle pin.

Rule 105. Manufactured articles not included in Rules 98 and 101 must be charged at current market prices.

Rule 106. No percentage shall be added to either material or labor used in repairs to cars prior to November 1, 1912. For repairs made on and after that date, 10 per cent. shall be added to the net total amount of the bill, for material and labor; this provision to apply to all charges authorized in these rules, with the following exceptions:

No percentage to be added to charges for repairs made on authority of defect cards issued prior to November 1, 1912, regardless of date of repairs.

No percentage to be added to bills rendered by car owners for material furnished by them for repairs to their cars on foreign lines.

No percentage to be added to bills covering settlement for destroyed cars or trucks, under Rules 116 and 118.

The Arbitration Committee has received a great many inquiries as to the proper interpretation of Rule 122, and it is frank to say that under the present reading of the rule it is practically impossible to carry out the provisions of the rule in regard to reclaiming for prepaid freight charges, especially where the repairing company is responsible. Your committee, therefore, believes it would be better to have the freight charges follow the shipment, and would, therefore, change the rule to read as follows, with the understanding that it shall apply also to unsettled cases:

Rule 107. The following table shows the number of hours which may be charged for labor in doing the various items of work enumerated, which includes all work necessary to complete each item of repairs, except in so far as labor is already included in charges for material:

	Ordinary Cars.		Refrigerator Cars.	
	Hours.	Charge for Labor.	Hours.	Charge for Labor.
Advertisements, temporary, tacked on car, removing, per car	..	$0.50	..	$0.50
Advertisements, temporary, pasted, glued or varnished on cars, removing, per car	..	1.00	..	1.00
Air-brake equalizer or fulcrum, one, renewed	½	.12	½	.12
Air-brake block or plate (plus labor charge for R. and R. cylinder when necessary to do so), one, renewed	1½	.36	1½	.36
American continuous draft rods, one rod, welding	2½	.60	2½	.60
Anchor rod (bolster and deadwood), one, renewed	¾	.18	¾	.18
Anchor rod (bolster and deadwood), blacksmith labor repairing	¾	$0.18	¾	$0.18
Anchor rod, head block tank car or Gould draft, one, renewed	1¼	.30	1¼	.30
Anchor rod, head block tank car or Gould draft, blacksmith labor, repairing	¾	.18	¾	.18
Anchor tank, one, renewed	1	.24	..	..
Anchor tank band, blacksmith labor, repairing	¾	.18	..	..
Anchor tank band "Y" bolt, one, renewed	½	.12	..	..
Anchor tank band "Y" bolt, blacksmith labor, repairing	½	.12	..	..
Anchor or lug straps, one, renewed	1	.24	1	.24
Anchor or lug straps, blacksmith labor, repairing	½	.12	½	.12
Arch bars, 1 or 2 replaced on same side of truck	3½	.84	3½	.84
Arch bar, blacksmith labor, each, reforming	1½	.36	1½	.36
Arch bar, drawing down	¾	.18	¾	.18
Arch bar tie straps, one, renewed	1	.24	1	.24
Arch bar tie straps, blacksmith labor, one, repairing	½	.12	½	.12
Belt rail or girth (end), when two posts or braces are renewed	1	.24	1	.24
Belt rail or girth (end), when not associated with renewal of posts or braces.	4	.96	4	.96
Belt rail plank (end), when renewed separately	1½	.36	1½	.36
Belt rail plank (side), when renewed separately	2	.48	2	.48
Bolster, body, composite, one, replaced	12	2.88	14	3.36
Bolster, body, plain metal or wood, one, replaced	8	1.92	10	2.40
Bolster, body, metal, one replaced when draft timbers extend through same	16	3.84	18	4.32
Bolster, body, plain metal or wood, one, replaced when one or more defective sills are replaced	2	.48	2	.48
Bolster, composite, one, replaced when one or more defective sills are replaced	4	.96	4	.96
Bolster truck, one, replaced	10	2.40	10	2.40
Bolster, truck, one, and one spring plank in same truck, replaced	12	2.88	12	2.88
Body truss rod bearing or queen post, closed, one, renewed	1	.24	1	.24
Body truss rod bearing or queen post, closed, two on same rod, renewed	1½	.36	1½	.36
Body truss rod bearing or saddle block, open, one, renewed	½	.12	½	.12
Body truss rod, full length, renewed	3	.72	3	.72
Body truss rod, per section, renewed	1½	.36	1½	.36
Body truss rod, per section, or full length, blacksmith labor, repairing	1	.24	1	.24
Body truss rod, tightening and replacing on saddle	½	.12	½	.12
Braces, side or end, one, renewed	3	.72	6	1.44
Braces, side or end, each, renewed, when associated with the renewal of posts	2	.48	3½	.84
Brake beam, one, replaced, including attachments and connections	2	.48	2	.48
Brake beam, one, metal, blacksmith labor, repairing	2½	.60	2½	.60
Brake beam, wooden truss, repairing	1½	.36	1½	.36
Brake beam guide or finger guard, one, renewed	¼	.06	¼	.06
Brake beam head (wooden beam), one renewed	1	.24	1	.24
Brake beam head (wooden beam), two on same beam, renewed	1½	.36	1½	.36
Brake beam safety chain, separately, one renewed	¼	.06	¼	.06
Brake beam suspension spring hanger or link, one, renewed	¼	.06	¼	.06
Brake beam hook bolt, one, renewed	½	.12	½	.12
Brake chain, one, renewed	½	.12	½	.12
Brake connection rod or lever, one or both applied	½	.12	½	.12
Brake connection repaired and replaced	1	.24	1	.24
Brake hanger, repaired and replaced	1	.24	1	.24
Brake hanger, separately, one, renewed	½	.12	½	.12
Brake hanger shackle box or bearing and cap, one, renewed	¾	.18	¾	.18
Brake hanger trimmer block, one, renewed	1½	.36	1½	.36
Brake hanger eye bolt, separately, one, renewed	½	.12	½	.12
Brake lever guide or carrier, one, renewed	½	.12	½	.12
Brake lever bracket, one, renewed	½	.12	½	.12
Brake pawl, one, renewed	¼	.06	¼	.06
Brake pin or key bolt, separately, one, renewed	¼	.06	¼	.06
Brake rod carrier, one, renewed	¼	.06	¼	.06
Brake shaft, one, renewed	1	.24	1	.24
Brake shaft, blacksmith labor, repairing.	½	.12	½	.12
Brake shaft brace or support, one, renewed	½	.12	½	.12
Brake shaft brace or support, blacksmith labor, repairing	½	.12	½	.12
Brake shaft carrier or bow, one, renewed	½	.12	½	.12
Brake shaft carrier or bow, blacksmith labor, repairing	½	.12	½	.12
Brake shaft step board plate, only, one, renewed	1	.24	1	.24
Brake shoe, applied on authority of defect card when brake beam is not replaced	½	.12	½	.12
Brake step board, one, renewed	1½	.36	1½	.36
Brake wheel, one, renewed	½	.12	½	.12

	Ordinary Cars. Hours.	Ordinary Cars. Charge for Labor.	Refrigerator Cars. Hours.	Refrigerator Cars. Charge for Labor.
Buffer block, one, cast-iron, replacing	1	$0.24	1	$0.24
Bolts—				
Carrier iron bolts, three or less at one end of car, applied	2	.48	2	.48
Carrier iron bolts, all at one end of car, applied	3	.72	3	.72
Carrier iron bolts, 6-inch or less, each	¼	.06	¼	.06
Center plate bolts, where same do not pass through draft timber, one or more, or all at same end	3	.72	4	.96
Center plate bolt or bolts, and center plate, replacing on one end of car	3	.72	4	.96
NOTE.—If center plate bolt or bolts pass through draft timbers it must be termed center plate bolt and charged three hours on ordinary cars and four hours on refrigerator cars.				
Column bolts, one or more, replaced in same truck	2	.48	2	.48
Coupler stop bolts, lug strap bolts or draft timber cross-tie bolts, 5 or less, at same end of car, when coupler is not replaced, each	½	.12	½	.12
Coupler stop bolts, lug strap bolts or draft timber cross-tie bolts, 6 or more, at same end of car when coupler is not replaced	3	.72	3	.72
Draft timber bolts or carrier iron bolts, either or both, three or less, at one end of car, replacing	2	.48	2	.48
Draft timber bolts or carrier iron bolts, either or both, four or more, at one end of car, replacing	3	.72	3	.72
Journal box bolt, one or two, replaced, same box	1	.24	1	.24
Bolts, 6-inch or less (other than those provided for), each, applied	¼	.06	¼	.06
Bolts, over 6 inch in length (other than those provided for), each, applied	½	.12	½	.12
Card board, one, renewed	½	.12	½	.12
Carlin, one, replaced	4	.96	..	..
Carrier iron, one, renewed	1	.24	1	.24
Carrier iron, blacksmith labor, repairing	½	.12	½	.12
Carrier iron, one, tightened	¼	.06	¼	.06
Chute plank, top, middle or bottom, side, each, renewed	1½	.36	..	..
Chute plank, end, each, renewed	1	.24	..	..
Column casting, one or both, replaced on same side of truck	3	.72	3	.72
Column casting, two, replaced on opposite sides of same truck	5	1.20	5	1.20
Column guide, one, renewed	1	.24	1	.24
Column guide, two at same end of bolster, renewed	1¼	.30	1¼	.30
Center pin (head), applied, empty car	1	.24	1	.24
Center pin (head), applied, loaded car	4	.96	4	.96
Center pin (head), applied, empty car, and putting same end on center	2	.48	2	.48
Center pin (head), applied, loaded car, and putting same end on center	6	1.44	6	1.44
Center pin (key), applied, empty car, including placing the same end on center, if necessary	1½	.36	1½	.36
Center pin (key), applied, loaded car, including placing same end on center, if necessary	2½	.60	2½	.60
Center plates, one or two, at same end, replacing	3	.72	3	.72
Corner iron, one, replaced	1	.24	1	.24
Coupler, with stem attachments, coupler springs, one or more follower plates, American continuous draft key, American continuous draft rods, one or more coupler stops, renewing or replacing one or all, at same end of car, at same time	4	.96	4	.96
Coupler, with pocket attachments, coupler springs, one or more follower plates, one or more coupler stops, coupler pockets, coupler pocket rivets, renewing or replacing any or all, at same end of car, at same time	5	1.20	5	1.20
(This does not include coupler stops riveted, which should be charged for on a per rivet basis in addition to the cost of removing and replacing coupler when it is necessary to do the riveting.)				
Coupler, with key attachments, renewing or replacing	2	.48	2	.48
Coupler yoke bolts, applied, one or two, at same end of car (coupler not R. & R.)	1	.24	1	.24
Coke rack cleat (wooden rack), each, renewed	¾	.18	..	..
Coke rack gate (2 bars), renewed	¾	.18	..	..
Coke rack gate (3 bars), renewed	1	.24	..	..
Coke rack gate guide, each, renewed	¾	.18	..	..
Coke rack gate slat, each, renewed	¾	.18	..	..
Coke rack stake clamp, each, renewed	½	.12	..	..
Coke rack stake clip, each, renewed	¼	.06	..	..
Coke rack thimble or catch, each, renewed	¼	.06	..	..
Cross-tie timber, one, replaced	5	1.20	6	1.44
Cross-tie timber, one, replaced when one or more defective sills are replaced	1½	.36	2	.48
Dead block, wooden, replacing at one end of car	3	.72	3	.72
Dead block, metal, renewed at one end of car	3	.72	3	.72
Deck bearer upper (stock car), one, renewed	1	.24	..	..
Deck, upper, flooring, per board, renewed	¼	.06	..	..
Door, end, old, rehanging	½	.12	..	..
Door, side, old, rehanging	1½	.36	2	.48

	Ordinary Cars. Hours.	Ordinary Cars. Charge for Labor.	Refrigerator Cars. Hours.	Refrigerator Cars. Charge for Labor.
Door bar (stock car), renewed	¾	$0.18	..	..
Door batten or stile (nailed door), not including R. & R. door, renewed	¾	.18	¾	$0.18
Door rail or stile (frame door), not including R. & R. door, renewed	1	.24	1	.24
Door cap or housing (wood), renewed	1¼	.30	1¼	.30
Door cap or housing (metal), renewed	1½	.36	1½	.36
Door hanger or roller, either or both, renewed	¾	.18	..	..
Door hinge, one, renewed	¾	.18	¾	.18
Door guide, one, renewed	½	.12	..	..
Door guide rail, bracket, one, renewed	¼	.06	..	..
Door hasp or keeper, one or both, renewed	½	.12	½	.12
Door seal hook and chain, one, renewed	..	..	¼	.06
Door stop, iron, one, renewed	½	.12	..	..
Door stop, wood, one, renewed	1	.24	..	..
Door rod (lock), one, renewed	1½	.36	..	..
Door rod (lock), blacksmith labor, repairing	1	.24	..	..
Door rod bearing, only, one, renewed	½	.12	..	..
Door rod shoe, only, one, renewed	½	.12	..	..
Door track, top or bottom, one, renewed	1½	.36	..	..
Door track, top or bottom, blacksmith labor, repairing	1	.24	..	..
Door track, repaired on car	¾	.18	..	..
Draft timber, one, replaced	9	2.16	10	2.40
Draft timbers, two, on same end, replaced	12	2.88	13	3.12
Draft timbers, one, extending beyond body bolster, renewed	11	2.64	12	2.88
Draft timbers, two, extending beyond body bolster, renewed	14	3.36	15	3.60
Draft timber, one, renewed, when its center sill is renewed or spliced, at same end of car	2	.48	2	.48
Draft timber, one, renewed, when its opposite center sill at same end of car is renewed or spliced	3	.72	3	.72
Draft rod key, repaired	1	.24	1	.24
Draft timber filler block, renewed, when draft timbers are not renewed	2	.48	2	.48
Draft timbers, tightened, one end, no additional labor for tightening when draft bolt or bolts are applied	½	.12	½	.12
Drop end gate, replacing on authority of defect card	½	.12	..	..
Drop end gate (1 plank), plain, renewed	1	.24	..	..
Drop end gate (1 plank), metal bound, renewed	2	.48	..	..
Drop end gate (3 plank), plain, renewed	2	.48	..	..
Drop end gate (3 plank), metal bound, renewed	6	1.44	..	..
Drop end gate plank, plain, one, renewed	1	.24	..	..
Drop end gate plank, plain, two, same end, renewed	1½	.36	..	..
Drop end gate plank, metal bound, one, renewed	3	.72	..	..
Drop end gate plank, metal bound, two, same end, renewed	4½	1.08	..	..
Drop end gate cleat or stop, one, renewed	½	.12	6	..
Drop end gate hinge, one, renewed	1	.24	..	..
Drop end gate keeper or latch, one, renewed	½	.12	..	..
Drop door chain, one, renewed	½	.12	..	..
Drop door plank, each, renewed	1	.24	..	..
Drop door shaft and ratchet, either or both, renewed	1½	.36	..	..
Drop door shaft, blacksmith labor, repairing	1	.24	..	..
Drop door shaft pawl, one, renewed	½	.12	..	..
Drop door shaft key, one, renewed	¼	.06	..	..
End plank, one, renewed on Gondola car, without angle irons	2	.48	..	..
With angle irons, bolted	3	.72	..	..
With angle irons, riveted	5	1.20	..	..
End planks, two, renewed on same end:				
Without angle irons	2½	.60	..	..
With angle irons, bolted	3½	.84	..	..
With angle irons, riveted	5½	1.32	..	..
End planks, three, renewed on same end:				
Without angle irons	3	.72	..	..
With angle irons, bolted	4	.96	..	..
With angle irons, riveted	6	1.44	..	..
End planks, four, renewed on same end:				
Without angle irons	3½	.84	..	..
With angle irons, bolted	4½	1.08	..	..
With angle irons, riveted	6½	1.56	..	..
End plate, one, replaced	12	2.88	18	4.32
Flooring boards, renewed, per lineal foot	..	.20	..	.20
Follower tie strap, one, renewed	½	.12	½	.12
Fascia or drip moulding, renewed, per lineal foot	..	.025	..	.025
Hand hold, removed and straightened, one	1	.24	1	.24
Hand hold, straightened on car, one or two	¼	.06	¼	.06
Hand rail rod or pipe, per side, separately, renewed	1½	.36	..	..
Hand rail post, including rail removed and replaced	2	.48	..	..
Hand rail post, each, additional	¾	.18	..	..
Hay box, complete, renewed	3½	.84	..	..
Hay box door, one, renewed	2	.48	..	..
Head block casting (tank car), one, renewed	3	.72	..	..
Journal box, one, replaced	2½	.60	3	.72
Journal boxes, two on same axle, replaced	4	.96	5	1.20
Journal box, one or two, replaced on same axle, solid pedestal truck	4	.96	5	1.20
Journal box, three or four, replaced on same truck, solid pedestal truck	5	1.20	6	1.44

	Ordinary Cars. Hours.	Ordinary Cars. Charge for Labor.	Refrigerator Cars. Hours.	Refrigerator Cars. Charge for Labor.
Journal truing up, one or two, on same axle	2	$0.48	2	$0.48
Journal wedge, renewed or replaced, separately	¾	.18	¾	.18
Ladder complete (wood), renewed	1½	.36	1½	.36
Ladder stile (wood), one, renewed	1	.24	1	.24
Ladder tread (wood), one, renewed	¼	.06	¼	.06
Letter or number board, one, renewed	1	.24	1	.24
Lining, renewed, per square foot	..	.03	..	.04
Nuts, only, ⅞-inch and under, replacing four or less	¼	.06	¼	.06
Nuts, only, 1-inch to 1⅜-inch, inclusive, replacing one or two	¼	.06	¼	.06
Nuts, only, 1½-inch and over, replacing one	¼	.06	¼	.06
Pedestal tie bolt or casting, either one or both, renewed	½	.12	½	.12
Pedestal tie strap, one, renewed	½	.12	½	.12
Pipe hanger cap or clamp, one, renewed	¼	.06	¼	.06
Pipe hanger, complete, renewed	½	.12	½	.12
Pipe hanger, blacksmith labor, repairing	½	.12	½	.12
Pipe hanger tightened, one or two	¼	.06	¼	.06
Platform plank, one, replaced	2	.48	2	.48
Post, corner, door, end or side, each, renewed on empty car	3	.72	6	1.44
Post, corner, door, end or side, each, renewed, where associated with renewal of side sill or inside end sill, side or end plate	2	.48	3½	.84
Post, corner, door, end or side, one, renewed on loaded car	4	.96	6	1.44
Push rod guide, one, renewed	½	.12	½	.12
Push pole pocket (bolted), one, renewed	½	.12	½	.12
Push pole pocket, blacksmith labor repairing	½	.12	½	.12
Releasing lever for M. C. B. coupler, one, replaced	½	.12	½	.24
Release lever (coupler), repaired, on car	¼	.06	¼	.06
Release lever bracket (coupler), one, renewed	¼	.06	¼	.06
Re-nailing roofing and siding, per lineal foot	..	.01	..	.01
Replacing truck spring, when out of place, empty car	¼	.06	¼	.06
Replacing truck spring, when out of place, loaded car	1	.24	1	.24
Rod, vertical tie rod, one, renewed	¾	.18	¾	.18
Rod, vertical tie rod, blacksmith labor repairing	½	.12	½	.12
Rod or pipe, side or center hitch (stock car), one, renewed	¾	.18	..	..
Roof boards, single, including removing and replacing running boards, per lineal foot	..	.09	..	.09
Roof boards, double board roof, including removing and replacing running board, per lineal foot	..	.13	..	.13
Roof purline, one, renewed	1	.24	1	.24
Roping staple, one, renewed	½	.12	½	.12
Roping staple, blacksmith labor repairing	½	.12	½	.12
Running board, complete, applied	7	1.68	7	1.68
Running board, renewed, per lineal foot, per single board	..	.015	..	.015
Running board saddle, separately, one, renewed	½	.12	½	.12
Running board bracket, one, renewed	½	.12	½	.12
Running board bracket, blacksmith labor repairing	½	.12	½	.12
Running board extension block, renewed	½	.12	½	.12
Safety chain hook or link (end sill), one, renewed	½	.12	½	.12
Safety valves, one or two, per tank, testing and stenciling only	1	.24	..	..
Safety valve, one, per tank, adjusting, testing and stenciling	2	.48	..	..
Safety valves, two, per tank, adjusting, testing and stenciling	3	.72	..	..
Side bearing, one, renewed	1	.24	1	.24
Side bearing, each additional, at same end of car, renewed	½	.12	½	.12
Spring plank, one, replaced	8	1.92	8	1.92
Side planks on gondola car (with corner bands), spliced, one	4	.96	..	..
Side planks on gondola cars (without corner bands), spliced, one	3	.72	..	..
Side planks on gondola cars, renewed:				
Without corner bands, one plank	7	1.68	..	..
Without corner bands, each additional plank	4	.96	..	..
With corner bands, bolted or riveted, one plank	10	2.40	..	..
With corner bands, bolted or riveted, each additional plank	5	1.20	..	..
Side slat or end slat (stock car), nailed, one, renewed	½	.12	..	..
Side slat (stock car), inside or outside, bolted, one, renewed	1	.24	..	..
Slat, end (stock car), bolted or riveted, one, renewed	1	.24	..	..
Sheave wheel in brake rod, one, renewed	½	.12	½	.12
Sill step, bolted, one, renewed	½	.12	½	.12
Sill step, blacksmith labor, repairing	½	.12	½	.12
Sill steps, handholds and ladder treads, tightened, four or less	¼	.06	¼	.06
Side plate, one, applied	29	6.96	39	9.36
Side plate, one, spliced	10	2.40	17	4.08
Siding removed and replaced, per lineal foot	..	.16	..	.18

	Ordinary Cars. Hours.	Ordinary Cars. Charge for Labor.	Refrigerator Cars. Hours.	Refrigerator Cars. Charge for Labor.
Siding removed and replaced, per lineal foot, where nails are set and holes puttied	..	..	..	$0.22
1 center sill spliced, per end	20	$4.80	26	6.24
2 center sills, spliced, same end	26	6.24	32	7.68
1 center sill, renewed	38	9.12	51	12.24
2 center sills, renewed	44	10.56	66	15.84
1 end sill under siding, renewed	17	4.08	19	4.56
1 end sill outside siding, renewed	8	1.92	8	1.92
1 end sill under siding, renewed, when one or more defective sills are renewed or spliced	5	1.20	7	1.68
1 end sill outside siding, renewed, when one or more defective sills are renewed or spliced	3	.72	3	.72
1 intermediate sill, renewed	32	7.68	45	10.80
2 intermediate sills, renewed	37	8.88	63	15.12
3 intermediate sills. renewed	42	10.08	75	18.00
4 intermediate sills, renewed	47	11.28	86	20.64
1 intermediate sill and 1 center sill, renewed	43	10.32	69	16.56
1 intermediate sill and 2 center sills, renewed	49	11.76	82	19.68
2 intermediate sills and 1 center sill, renewed	48	11.52	81	19.44
2 intermediate sills and 2 center sills, renewed	54	12.96	93	22.32
3 intermediate sills and 1 center sill, renewed	53	12.72	92	22.08
3 intermediate sills and 2 center sills, renewed	59	14.16	98	23.52
4 intermediate sills and 1 center sill, renewed	58	13.92	103	24.72
4 intermediate sills and 2 center sills, renewed	64	15.36	109	26.16
1 intermediate sill, spliced	13	3.12	19	4.56
1 side sill and 1 center sill, renewed	54	12.96	74	17.76
1 side sill and 2 center sills, renewed	60	14.40	86	20.64
2 side sills and 1 center sill, renewed	70	16.80	96	23.04
2 side sills and 2 center sills, renewed	76	18.24	108	25.92
1 side sill, spliced	14	3.36	17	4.08
1 side sill, renewed	29	6.96	49	11.76
2 side sills, renewed	50	12.00	70	16.80
1 side sill and 1 intermediate sill, renewed	48	11.52	68	16.32
1 side sill and 2 intermediate sills, renewed	53	12.72	79	18.96
1 side sill and 3 intermediate sills, renewed	58	13.92	98	23.52
1 side sill and 4 intermediate sills, renewed	63	15.12	115	27.60
2 side sills and 1 intermediate sill, renewed	64	15.36	110	26.40
2 side sills and 2 intermediate sills, renewed	69	16.56	116	27.84
2 side sills and 3 intermediate sills, renewed	74	17.76	122	29.28
2 side sills and 4 intermediate sills, renewed	79	18.96	128	30.72
1 side, 1 intermediate and 1 center sill, renewed	59	14.16	98	23.52
2 side, 1 intermediate and 1 center sill, renewed	75	18.00	118	28.32
1 side, 2 intermediate and 1 center sill, renewed	64	15.36	105	25.20
2 side, 2 intermediate and 1 center sill, renewed	80	19.20	125	30.00
1 side, 3 intermediate and 1 center sill, renewed	69	16.56	111	26.64
2 side, 3 intermediate and 1 center sill, renewed	85	20.40	131	31.44
1 side, 4 intermediate and 1 center sill, renewed	74	17.76	117	28.08
2 side, 4 intermediate and 1 center sill, renewed	90	21.60	137	32.88
1 side, 1 intermediate and 2 center sills, renewed	65	15.60	105	25.20
2 side, 1 intermediate and 2 center sills, renewed	81	19.44	125	30.00
1 side, 2 intermediate and 2 center sills, renewed	70	16.80	111	26.64
1 side, 3 intermediate and 2 center sills, renewed	75	18.00	117	28.08
1 side, 4 intermediate and 2 center sills, renewed	80	19.20	124	29.76
2 side, 2 intermediate and 2 center sills, renewed	86	20.64	132	31.68
2 side, 3 intermediate and 2 center sills, renewed	91	21.84	138	33.12
2 side, 4 intermediate and 2 center sills, renewed	96	23.04	145	34.80
Each side or intermediate sill, spliced, when longitudinal sills have to be renewed, or when other sills are spliced at same end	5	1.20	8	1.92
Each center sill, spliced, when intermediate or side sills have to be renewed	10	2.40	13	3.12
1 center sill, spliced, when other center sill has to be renewed	6	1.44	9	2.16
Sill stiffener or furring strip, bolted, per section, renewed	1	.24	1	.24
Sill stiffener or furring strip, nailed, per section, renewed	½	.12	½	.12
Stakes, end or side, on gondola cars, applied, each	1½	.36	..	..
Stake pocket (wooden car), each, renewed	½	.12	..	..
Stake pocket, blacksmith labor, repairing	¼	.06	..	..
Stake pocket "U" bolt, one, renewed	¼	.06	..	..
Stake pocket "U" bolt, blacksmith labor, repairing	¼	.06	..	..

	Ordinary Cars. Hours.	Ordinary Cars. Charge for Labor.	Refrigerator Cars. Hours.	Refrigerator Cars. Charge for Labor.
Strap or anchor bolt, one, renewed.....	½	$0.12	¾	$0.12
Strap or anchor bolt, blacksmith labor, repairing	½	.12	½	.12
Striking plate, one renewed............	1	.24	1	.24
Striking plate, blacksmith labor, repairing	½	.12	½	.12
Sub-flooring, including cleats, when not associated with sill renewals, per lineal foot	..	.03	..	.03
Tank head block, not including casting, one, renewed	4	.96	..	..
Tank head block casting, one, renewed..	3	.72	..	..
Tank, raised to apply draft bolts, empty car, per end	4	.96	..	..
Tank, raised to apply draft bolts, loaded car, per end	6	1.44	..	..
Train pipe, replaced and tightened, when shifted	1	.24	1	.24
Truck hanger (swing motion truck), renewed	3	.72	3	.72
Truck hanger, blacksmith labor, repairing	1½	.36	1½	.36
Truck hanger, two, same end of car (swing motion truck), renewed.......	4	.96	4	.96
Truck hanger pin, separately (swing motion truck), renewed	2	.48	2	.48
Truck hanger pin, blacksmith labor, repairing	½	.12	½	.12
Truck hanger pin seat, one, renewed.....	1	.24	1	.24
Truck springs, one or all, in same truck, replacing	2	.48	2	.48
Truck transom, one, wood, replaced....	10	2.40	10	2.40
Truck transom, two, wood, replaced in same truck	12	2.88	12	2.88
Truck truss rod, outside, one, renewed..	1½	.36	1½	.36
Truck truss rod, center, one, renewed...	10	2.40	10	2.40
Truck truss rod, blacksmith labor, repairing	1	.24	1	.24
Truck truss rod saddle, one, renewed....	1	.24	1	.24
Truss rod, body bolster, one, renewed...	1½	.36	1½	.36
Truss rod, body bolster, blacksmith labor, repairing	1	.24	1	.24
Trussing car, empty..........	1	.24	1	.24
Trussing car, loaded..........	1¾	.42	1¾	.42
Truss rod, across end of car, one, renewed	1	.24	1	.24
Trussing truck bolster, empty car.......	1	.24	1	.24
Trussing truck bolster, loaded car.......	1½	.36	1½	.36
Truss rod turnbuckle, one, renewed.....	¾	.18	¾	.18
Turnbuckle lock, one, renewed.........	¼	.06	¼	.06
Weighing and re-stenciling stock cars, net	..	1.00	..	..
Weighing and re-stenceling other cars, net	..	.75	..	.75
When necessary to remove load to make repairs at one end of car (except items of posts and head center pins)........	3	.72	3	.72

REPAIRS OF STEEL OR STEEL PARTS OF COMPOSITE CARS.

All rivets ½ inch diameter or over, 12 cents net per rivet, which covers removal and replacing of rivets, including removing, fitting, punching or drilling holes when applying patches or splicing and replacing damaged parts, not to include straightening.

All rivets ¼ inch diameter and less than ½ inch diameter, 7 cents net per rivet, which covers removal and replacing of rivets, including removing, fitting, punching or drilling holes when applying patches or splices and replacing damaged parts, not to include straightening.

Straightening or repairing parts removed from damaged car, 60 cents per 100 pounds.

Straightening or repairing parts in place on damaged car; also any part that requires straightening, repairing or renewing, not included on rivet basis, 24 cents per hour.

In making repairs to cars on a rivet basis, the cost of removing and replacing fixtures not secured by rivets, but necessarily removed in order to repair or renew adjacent defective parts, should be in addition to the rivet basis; rules covering wood-car repairs to govern.

RULE 108. No charge to be made for labor of replacing or applying M. C. B. knuckles, knuckle locks, knuckle pins, clevises, clevis pins, lift chains, brake shoes or brake-shoe keys, or applying side and end doors, except on the authority of a defect card.

No charge to be made for adjusting brakes, angle cocks or tightening unions.

RULE 109. When it is necessary to apply an M. C. B. coupler complete, on account of a broken or missing knuckle or lock, the usual labor charge for replacing a coupler can be made.

When one or more carrier iron bolts over six inches long are replaced, where pocket coupler at same end of car is removed and replaced, the regular labor charge should be reduced one hour, except when one or both draft timbers are replaced.

RULE 110. No additional labor to be charged for:

Applying end sheathing when end plate or end sill under sheathing is renewed or replaced, also side sheathing when side sill or side plate is removed or replaced.

Applying center pins or friction rollers or putting car on center when center plates or center-plate bolts are applied at the same end.

Applying dead block or platform plank when end sill is applied at same end.

Applying coupler when draft timber, one or both, is applied at the same end.

Applying brake hangers when brake beam is applied.

Applying center plate or center-plate bolts when car is raised to standard height by adjusting center plates or body bolster, at same end of car.

RULE 111. The following table shows the labor charges allowable for air-brake repair work. The letters "R. & R." mean "removed and replaced."

	Cents.
Air hose, R. & R..........	4
Angle cock, R. & R..........	8
Angle cock handle, renewed..........	4
Angle cock, grinding in, R. & R..........	28
Check valve case, spring gasket, or all, R. & R....	10

DETAILS.	Cents.
Disconnecting union..........	3
Check valve case (2 cap screws)..........	2
Emergency valve seat..........	5
Total	10

	Cents.
Coupler dummy R. & R. (1 lag screw)..........	1
Cut-out cock R. & R..........	9

DETAILS.	Cents.
1 pipe union disconnected..........	3
2 pipe connections	6
Total	9

Cut-out cock, grinding in, R. & R..........	30
Cut-out cock handle, renewed..........	4
Cylinder, R. & R., combined type..........	30
Cylinder, R. & R., detachable..........	23

DETAILS.	Cents.
Push rod (1 connecting pin)..........	3
Clamping piston (1 cap screw)..........	2
Cylinder head, R. & R. (4 nuts, ½ inch, 1 cent each)	4
Disconnecting cylinder from reservoir (7 nuts, ½ inch, 1 cent each)	7
Reclamping cylinder piston (1 cap screw)..........	2
Removing cylinder from car (6 nuts, ⅝ inch, 2 cents each)	12
Total	30

Cylinder and reservoir, R. & R..........	41

DETAILS.	Cents.
Removing push rod (1 connecting pin)..........	3
Removing cylinder head (4 nuts, ½ inch, 1 cent each)	4
Removing cylinder from car (6 nuts, ⅝ inch, 2 cents each)	12
Removing reservoir from car (2 nuts, ⅝ inch, 2 cents each)	4
Removing release rods (2 spring cotters)..........	4
Removing release valve	2
Removing 2 plugs..........	2
Removing triple (2 nuts, ⅝ inch, 2 cents each)...	4
Disconnecting train pipe union	3
Disconnecting retaining pipe union..........	3
Total	41

Cylinder and reservoir, tightened when loose (8 nuts, 1 cent each)	8
Cylinder cleaned, oiled, tested and stenciled, including obliterating old stencil marks..........	38

DETAILS.	Cents.
Removing push rod (1 connecting pin)..........	3
Clamping cylinder piston (1 cap screw)..........	2
Removing cylinder head (4 nuts, ½ inch, 1 cent each)	4
Cleaning, testing and stenciling..........	29
Total	38

Cylinder release springs, R. & R..........	11

DETAILS.	Cents.
Removing push rod (1 connecting pin)	3
Clamping cylinder piston (1 cap screw)	2
Removing cylinder head (4 nuts, ½ inch, 1 cent each)	4
Reclamping cylinder head (1 cap screw)	2
Total	11

Cylinder gasket, R. & R. 25

DETAILS.	Cents.
Disconnecting triple union	3
Disconnecting retaining pipe union	3
Disconnecting reservoir block (2 nuts, ⅝ inch, 2 cents each)	4
Disconnecting reservoir from cylinder (7 nuts, ½ inch, 1 cent each)	7
Removing push rod (connecting pin)	3
Clamping cylinder piston	1
Removing release rod (2 spring cotters)	4
Total	25

Cents.

Emergency check valve, grinding in 10

Emergency valve piston, R. & R. 10

DETAILS.	Cents.
Disconnecting union	3
Removing check valve case (2 cap screws)	2
Removing emergency valve seat	5
Total	10

Emergency valve seat R. & R. (see E. V. piston) .. 10

Emergency valve, rubber seat, R. & R. 10

DETAILS.	Cents.
Disconnecting union	3
Removing check valve case (2 cap screws)	2
Removing riveted pin	4
Removing emergency valve nut	1
Total	10

Cylinder piston packing, R. & R. 13

DETAILS.	Cents.
Removing push rod (1 connecting pin)	3
Clamping cylinder piston (1 cap screw)	2
Removing cylinder head (4 nuts, ½ inch, 1 cent each)	4
Removing leather packing (4 nuts, ½ inch, 1 cent each)	4
Total	13

Cylinder piston, R. & R. 15

DETAILS.	Cents.
Removing push rod (1 connecting pin)	3
Clamping cylinder piston (1 cap screw)	2
Removing cylinder head (4 nuts, ½ inch, 1 cent each)	4
Removing leather packing (4 nuts, ½ inch, 1 cent each)	4
Reclamping cylinder piston (1 cap screw)	2
Total	15

Cents.

Dirt collector in branch pipe, cleaned, drained and stenciled 5

Gasket, air hose, coupling, renewed 2

Graduating valve, reground, round type, 8-inch or 10-inch, each 15

Graduating valve, reground flat type, 8-inch or 10-inch, each 25

Oil plugs, R. & R., each 2

Packing leather expander, renewed (see cylinder piston) 7

Pipe, train or branch, R. & R., for each connection made 3

Push rod, R. & R. (1 connecting pin) 3

Release valve, renewed 6

tinguish this defect from flat spots caused by sliding

DETAILS.	Cents.
Disconnecting release rod (2 spring cotters)	4
Disconnecting release valve	2
Total	6

Release valve, removed, repaired and replaced (R. & R. 4 cents) 9

Release valve rod, removed, repaired and replaced .. 3

DETAILS.	Cents.
1 spring cotter	2
Removing staple	1
Total	3

Reservoir, R. & R. 29

DETAILS.	Cents.
Removing from car (2 nuts, ⅝ inch, 2 cents each)	4
Disconnecting from cylinder (7 nuts, ½ inch, 1 cent each)	7
Removing release rods (2 spring cotters)	4
Removing release valve	2
Removing 2 plugs	2
Removing triple valve (2 nuts, ⅝ inch, 2 cents each)	4
Disconnecting unions	3
Disconnecting union, retaining pipe	3
Total	29

Cents.

Removing cylinder cap (3 nuts, ½-inch, 1 cent each) 3

Removing slide valve (3 nuts, ½-inch, 1 cent each). 3

Retaining valve, repaired 25

DETAILS.	Cents.
Retaining valve handle, R. & R.	2
Retaining valve case, R. & R.	1
Retaining valve, ground in	5
Retaining valve, cock key, ground in	15
Retaining valve, cock key and springs, R. & R.	2
Total	25

Retaining valve, R. & R. (2 lag screws, 2 cents, valve 3 cents) 5

Slide valve, removed, ground in and replaced 33

Slide valve spring, R. & R. 6

DETAILS.	Cents.
Cylinder cap (3 cap screws)	2
Removing riveted pin	4
Total	6

Cents.

Slide valve spring, R. & R., removing riveted pin 4

Strainer, renewed (disconnecting union) 3

Triple cylinder bushing, reground or refitted $1.12

Triple cylinder cap, R. & R. (3 nuts, ½-inch, 1 cent each) 3

Triple cylinder cap gasket, renewed, 3 nuts, ½-inch, 1 cent each, gasket, 2 cents 5

Triple piston packing ring, renewed 22

Triple valve removed, cleaned, oiled, tested and stenciled 45

DETAILS.	Cents.
Train pipe union, disconnected	3
Retaining pipe union, disconnected	3
Removing triple (2 nuts, ⅝ inch, 2 cents each)	4
Check valve case (2 cap screws)	2
Emergency valve seats	5
Cylinder cap (3 bolts)	3
Cleaning, testing and stenciling	25
Total	45

Triple valve gasket, renewed 10

NOTE.—Not to be allowed when triple valve is oiled, cleaned or removed for other repairs.

DETAILS.	Cents.
Disconnecting branch pipe union	3
Disconnecting retaining pipe union	3
Removing triple (2 nuts, ⅝ inch, 2 cents each)	4
Total	10

Union, disconnected and connected 3

The following basic units were used in determining the details of prices given above. These units are not to be used in rendering bills, but may be used in the determination of cost of other combinations of air-brake repairs not above mentioned.

DETAILS.	Cents.
Cap screws or bolts, R. & R., 1 or more	2
Cylinder cleaning, testing and stenciling	29
Emergency valve seat, R. & R.	5
Graduating stem nut, R. & R.	2
Lag or wood screws, R. & R., each	1
Nuts tightened when loose, each	1
Nuts, ½ inch or less, R. & R., 1 or 2 on same bolt.	1
Nuts, ⅝ inch or over, R. & R., 1 or 2 on same bolt.	2
Pins connecting R. & R. (including split key)	3
Pins riveted, R. & R., each	4
Plugs, oil, R. & R., each	1
Spring cotters, R. & R., each	2
Staples, R. & R., each	1
Testing air (after repairs)	5
Threads on pipe, cutting, per coupling	5
Train or branch pipe, disconnected and connected, or only connected, each connection	3
Triple valve, cleaning, testing and stenciling	25
Unions disconnected and connected	3

Settlement for Cars.

Rule 112. The company on whose line the bodies or trucks are destroyed shall report the fact to the owner immediately after their destruction, and shall have its option whether to rebuild or settle for the same.

Rule 113. For the mutual advantage of railway companies interested, the settlement for a car owned or controlled by a railway company, when damaged or destroyed upon a private track, shall be assumed by the railway company delivering the car upon such tracks.

Rule 114. If the company on whose line the car is destroyed elects to rebuild either body or trucks, or both, the original plan of construction must be followed, and the original kind and quality of materials used. In such cases no allowance shall be made for betterments.

Rule 115. If only the body of a car is destroyed, and the company destroying it elects to return the trucks, they shall be put in good order, or accompanied by a defect card, covering all defects or improper repairs made by them for which owners are not responsible, and forwarded, within 60 days, free of freight or other charges, to the designated point on the line of the company owning or operating the car, and the number, line and class of car destroyed shall be stenciled or painted on each truck so returned.

Except in cases of trucks of 50,000 pounds capacity or less, when the railroad company destroying the body of car may elect to retain the trucks and settle for them at their scrap value, except that such of the wheels, axles or all metal brake beams as are good for further service must be credited at their secondhand value under the M. C. B. rules. This paragraph will not apply to trucks belonging to individual ownership.

The underframes of damaged steel and steel underframe cars, when intact and in serviceable condition, may be forwarded to the owner on defect card.

Rule 116. The settlement price of new eight-wheel cars shall be as follows, with an addition of $27.50 for each car equipped with 8-inch air-brake equipment and $35 for 10-inch air-brake equipment. The road destroying a car with air brakes may elect to return the air-brake apparatus, including such attachments as are usually furnished by the air-brake manufacturer, complete and in good condition:

Bodies of 8-Wheel Cars.

Wood.

Box, 40 feet long or over	$440.00
Box, 36 feet long or over, but under 40 feet	385.00
Box, 34 feet long or over, but under 36 feet	360.00
Box, 32 feet long or over, but under 34 feet	330.00
Box, under 32 feet long	265.00
Box, ventilated, 40 feet long or over	470.00
Box, ventilated, 36 feet long, but under 40 feet	415.00
Box, ventilated, 34 feet long, but under 36 feet	385.00
Flat, plain, 40 feet long or over	200.00
Flat, plain, 32 feet long or over, but under 40 feet	155.00
Flat, plain, under 32 feet long	110.00
Gondola, drop-bottom, 40 tons capacity or over	330.00
Gondola, drop-bottom, 30 tons capacity or over, but under 40 tons	300.00
Gondola, drop-bottom, 25 tons capacity or over, but under 30 tons	275.00
Gondola, drop-bottom, 20 tons capacity or under	200.00
Gondola, hopper-bottom, 50 tons capacity	440.00
Gondola, hopper-bottom, 40 tons capacity or over, but under 50 tons	360.00
Gondola, hopper-bottom, 30 tons capacity or over, but under 40 tons	330.00
Gondola, hopper-bottom, 25 tons capacity or over, but under 30 tons	290.00
Gondola, hopper-bottom, 20 tons capacity or less	220.00
Gondola, plain, 50 tons capacity and over	350.00
Gondola, plain, 40 tons capacity, but under 50 tons	300.00
Gondola, plain, 30 tons capacity, but under 40 tons	275.00
Gondola, plain, 25 tons capacity, but under 30 tons	250.00
Gondola, plain, under 25 tons	140.00
Stock, 34 feet long or over	330.00
Stock, 32 feet long or over, but under 34 feet	300.00
Stock, under 32 feet long	265.00

The lengths of cars above mentioned refer to the lengths over the end sills.

In the case of double-deck stock cars, $25.00 may be added to the prices given above for stock cars.

Where the capacity of any car other than a gondola is 60,000 pounds or over 10 per cent should be added to the above prices for the car bodies.

When cars of 60,000 pounds capacity or over, and so stenciled, have trucks with journals 4 inches or over in diameter when new, $40 per car shall be added to the figure as given above for the values of car bodies, when equipped with metal body bolsters.

When cars are equipped with metal center sills, the following prices shall be added to the values of bodies for cost of such metal sills:

10 inches or less	$ 60.00
Over 10 inches	80.00

When a car is equipped with two metal draft members not less than 7 inches in depth continuous from end to end of car, in combination with metal needle beams, $40.00 shall be added to the value of the body of the car for the cost of such metal draft members.

Steel.

Box, wooden body, metal underframe, 50 tons capacity, 38 feet 6 inches or over, over end sills	$825.00
Box, wooden body, metal underframe, less than 50 tons capacity, 36 feet long or over	740.00
Flat, wooden floor, metal underframe, 30 tons capacity, 34 feet long or over	500.00
Flat, wooden floor, metal underframe, 50 tons capacity, 40 feet over end sills	770.00
Flat, wooden floor, metal underframe, 40 tons capacity, 40 feet over end sills	590.00
Flat, wooden floor, metal underframe, 40 tons or over, but under 50 tons, 34 feet long over end sills, but under 40 feet	510.00
Gondola, all metal, twin-drop bottom, 40 tons capacity, but less than 50 tons capacity, 36 feet, but under 40 feet	790.00
Gondola, all metal, hopper-bottom, 50 tons capacity, 33 feet over end sills	825.00
Gondola, all metal, drop-bottom, 50 tons capacity, 40 feet over end sills	815.00
Gondola, all metal, plain, 50 tons capacity, 40 feet over end sills	790.00
Gondola, wooden body, metal underframe, flat-bottom, 40 feet over end sills	790.00
Gondola, wooden body, metal underframe, hopper-bottom, 32 feet over end sills, but under 40 feet	650.00
Stock, wooden body, metal underframe, less than 50 tons capacity, 36 feet long or over	715.00

Trucks.

50,000 pounds capacity and less with metal transoms and wooden bolster, per pair	$215.00
60,000 pounds capacity or under, with wooden bolster, per pair	215.00
50,000 pounds capacity, all metal trucks, per pair	225.00
60,000 pounds capacity, but under 80,000 pounds, all metal, per pair	315.00
70,000 pounds capacity, but under 80,000 pounds, with wooden bolster, per pair	215.00
80,000 pounds capacity, but under 100,000 pounds, all metal, per pair	400.00
100,000 pounds capacity, or over, all metal, per pair	425.00

Prices include brake beams, complete, truck levers, deadlever guides and bottom-connection rods.

For trucks with steel or steel-tired wheels an additional allowance of $112 per car shall be made.

All trucks in service of 60,000 pounds capacity or over, which consist entirely of metal, with the exception of the spring plank, shall be known hereafter as all-metal trucks.

Rule 117. In the case of wooden car bodies the depreciation due to age shall be figured at 6 per cent per annum upon the yearly depreciated value of such car bodies.

In the case of all-steel car bodies the depreciation shall be figured at 5 per cent per annum.

In the case of car bodies with steel underframes the depreciation shall be figured at 5½ per cent per annum, with the exception of steel underframe flat cars having wooden floors, which shall be figured at 5 per cent per annum.

The depreciation on the tanks of tank cars for handling non-corrosive substances shall be 4 per cent per annum; for tanks of tank cars handling corrosive substances the depreciation shall be 5 per cent per annum.

The depreciation on trucks other than all-metal shall be figured at 6 per cent per annum.

The depreciation on all-metal trucks shall be figured at 5 per cent per annum.

Allowances for depreciation shall in no case exceed 60 per cent of the value new.

The amounts $27.50 and $35.00 for air brakes shall not be subject to any depreciation.

Rule 118. The bodies of refrigerator cars, stock cars permanently fitted for all shipments, and other freight cars, designed for special purposes, not referred to above, shall be settled for at the present cost price, as may be agreed to by the parties in interest, less the deduction for depreciation due to age, which shall be on the same basis as for regular freight equipment.

In the case of cars equipped with racks for carrying coke and for other such purposes, and also stock cars other than those permanently fitted for stall shipments with feeding and watering attachments, the actual cost of these equipments shall be added to the standard settlement price for such cars.

Rule 119. The company on whose line the body or trucks of a car are seriously damaged, but not destroyed, may notify the owner and ask an appraisement on the damage done to the car as a basis for the disposal of the damaged car.

Sending Home Worn out and Damaged Cars.

Rule 120. A car unsafe to load on account of general wornout condition, due to age or decay, shall be reported to its owner, who must be advised of all existing defects. If the owner elects to have it sent home, he shall furnish two home cards, noting upon them existing defects and the route over which the car is to be returned to its owner.

Such cards shall be attached to each side of the body of the car, and of the form shown herewith. They shall be

FROM

.... R. R.

TO

.... R. R.

VIA

....

....

Car No .... Initials ....

To be shopped for ....

....

....

....

(Head of Car Department.)

3½ by 8 inches.

printed on both sides, and shall be filled in on both sides with ink or black indelible pencil.

Rule 121. A car which is safe to run, but unsafe to load on account of serious damage caused by wreck or accident, shall be reported to the owners for appraisement and disposition, and disposed of as provided in Rule 120, if the owner so elects.

Furnishing Materials.

Rule 122. Companies shall promptly furnish to each other, upon requisition and forward, freight charges collect from point of shipment, materials for repairs of their cars on foreign lines. If the material is for repairs of car owner's defects, the foreign company may bill car owner for the entire freight charges, and in such case the car owner may reclaim freight charges for that portion of the movement over its own line. If the material is for repairs of user's defects, the foreign line may reclaim only for that portion of the movement over its line.

The company repairing the car shall provide from its own stock the following:

Lumber, forgings, hardware stock, paint, hairfelt, piping, air-brake material and all M. C. B. Standard material.

Requisitions for such material shall specify that same is for repairs of cars, giving car number and initial of such car, together with pattern number or other data, to enable correct filing of requisition.

Settlement of Disputes.

Rule 123. In order to settle disputes arising under the rules, and to facilitate the revision of the rules at the annual conventions of the Association, an Arbitration Committee of five representative members shall be appointed annually by the Executive Committee; three members of this committee to constitute a quorum.

In case of any dispute or question arising under the rules between the subscribers to said rules, the same may be submitted to this committee, through the Secretary, to receive consideration by the Arbitration Committee.

The abstract should set forth:

1. An agreed statement of facts.
2. Argument of plaintiff.
3. Argument of defendant.

The abstract should consist of not more than three typewritten pages, letter size, single space, and should be signed by both parties to the dispute.

Should one of the parties refuse or fail to furnish the necessary information, the committee shall use its judgment as to whether, with the information furnished, it can properly give its opinion. The decisions of the committee shall be final and binding upon the parties concerned. This committee shall report its decisions to the Association, and its report shall be incorporated in the annual report of proceedings of the Association.

Revision of this Code of Rules.

Rule 124. The Arbitration Committee shall ask for suggestions of changes, amendments and additions to these rules prior to each annual convention, which it shall consider, and it shall report its recommendations to the succeeding annual convention.

Rule 125. In the revision of these rules by the Association, a two-thirds vote shall be necessary for adoption.

Rule 126. Voting powers shall be the same as prescribed in the Constitution of the Master Car Builders' Association on matters pertaining to the adoption of standards and the expenditure of money.

Rule 127. This Code of Rules shall be introduced for the discussion and revision at one session of the Master Car Builders' Association convention each year.

Conditions of Acceptance of this Code.

Rule 128. Any car owner or railway company may become a party to this Code of Rules by giving notice through one of its general officers to the Secretary of the Master Car Builders' Association.

Railroad companies becoming subscribers to this Code of Rules must have a representative member in the Master Car Builders' Association.

Rule 129. Any car owner or railway company that is a party to this Code of Rules shall be bound by same through its successive revisions, until one of its general officers files with the Secretary of the Master Car Builders' Association its notification of withdrawal.

Rule 130. Acceptance or rejection of this Code of Rules must be as a whole, and no exception to an individual rule or rules shall be valid.

Passenger Equipment.

1. Each Railway Company shall give to foreign cars, while on its line, *the same care as to oiling, packing, inspection and adjusting brakes that it gives its own cars,* except in case of cars on which work is done under special

agreement existing between the company owning the cars and the road operating the same.

2. The expenses of maintenance of passenger equipment operated in interchange or line service shall be divided into three classes, namely:

(a) Owner's defects.

(b) Delivering Company's defects.

(c) Line expenses proratable against the roads comprising the lines on a mileage basis.

3. (a) Owner's defects are those due to ordinary wear and tear.

(b) Delivering company's defects are those due to unfair usage, derailment or accident. Delivering company is solely responsible to car owners for any improper repairs made by it.

(c) Line expenses shall consist of the expense of terminal cleaning, icing, lubrication (oil, waste, tallow and labor):

Oil lighting (oil, chimneys, wicks, burners, shades).

Gas lighting (gas, mantles, tips, domes, globes, bulbs, bowls).

Electric lighting (fuses, incandescent bulbs, charging current, shades and belts).

Heating (terminal heating and coal furnished for individual car heaters en route).

Candles and broken glass.

4. The railway making the repairs for the defects not proratable against the line is privileged to bill the car owner for these repairs, unless there is evidence to indicate that the damage was occasioned by unfair handling on the part of the delivering company.

5. Information as to mileage made by cars must be furnished promptly on request of owners by railways over which cars are run.

6. Only one journal bearing per journal may be charged per trip.

7. No labor charge shall be made for applying brake shoes, incandescent bulbs, journal bearings, hose (air, steam or signal), mantles, tips, or for icing, filling lamps, charging batteries, gasing tanks or coaling cars.

8. No credit to be allowed for burned-out incandescent bulbs, burned-out fuses or scrap brake shoes removed.

NOTE.—Steel back brake shoes not to be removed if over one-half (½) inch thick; gray iron shoes not to be removed if over three-quarters (¾) inch thick.

9. Loss of metal from tires of steel-tired wheels, caused by flat sliding, is chargeable to the company on whose road the damage occurs.

NOTE.—Loss of service metal from steel-tired wheels as a result of sliding to be measured from point where slide begins. One-sixteenth (1/16) inch of metal to be allowed for flat spots under two and one-half (2½) inches long and one-eighth (⅛) inch of metal to be allowed for flat spots two and one-half (2½) to three and one-half (3½) inches in length, both inclusive.

10. (a) Axles broken under fair usage or having journals one-half (½) inch or more under the standard for car (except for three and three-quarters by seven (3¾ by 7) inches which will be condemned at three and one-half (3½) inches may be renewed at the expense of the car owner. Size of journal should be stenciled on truck.

(b) Cut journals, axles bent or broken or rendered unsafe by unfair usage, derailment or accident, shall be renewed at the expense of the railway on whose line the damage occurs.

(c) Where necessary to true up axles in cases of cut journals, where the journal is reduced below the limit as prescribed in Rule 10-a, axle must be changed at the expense of company cutting journal.

11. (a) Charge for terminal car heating to be 25 cents per day of 24 hours or less.

(b) Cars lying at stations for over forty-eight hours, expense of heating to be borne by railway in whose possession cars may be.

12. (a) Brakes must be in perfect working order. Cylinders, triple valves and slack adjusters must have been cleaned and oiled within six (6) months, and in case of cars equipped with high-speed brakes, triple and high-speed valves must be cleaned every three (3) months and date of last cleaning and oiling stenciled on brake cylinder and triple valve with white paint.

(b) The adjustment of piston travel based on not less than seventy (70) pounds initial pressure must not be less than five (5) inches nor more than eight (8) inches.

On electrically lighted cars equipped with storage bat-

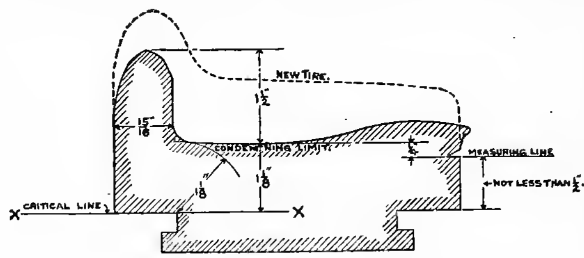


FIG. 1.—STEEL TIRE, RETAINING RING FASTENING.

teries or axle device, furnished to foreign roads, where no agreement is made, a charge of 75 cents per day shall be made for the use of electrical equipment.

DEFECTS IN WHEELS—OWNERS RESPONSIBLE.

13. (a) Loose wheels.

(b) Variation from gage.

WHEELS—CAST IRON.

14. (a) Shelled out; wheels with defective treads on account of pieces shelling out; if the spots are over one (1) inch or so numerous as to endanger the safety of the wheel.

(b) Tread worn hollow; if tread is worn hollow ⅛ inch or over.

(c) Worn flanges; flanges having flat vertical sur-

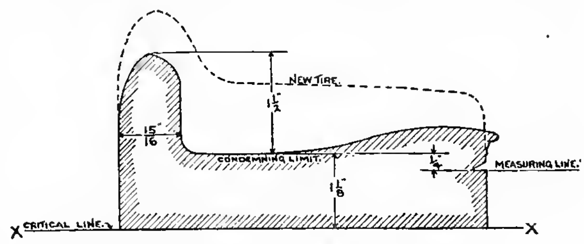


FIG. 2.—STEEL TIRE, SHRINKAGE FASTENING ONLY.

faces extending ⅞ inch or more from tread, or, flanges 1 inch thick or less, gaged at a point ⅜ inch above tread.

(d) Gage: for condemning worn flanges of cast-iron wheels under passenger cars to be the same as is used for condemning worn flanges of cast-iron wheels under freight cars of 80,000 pounds capacity or over.

(e) Burst; if wheel is cracked from wheel fit outward by pressure from axle.

(f) Flange, rim, tread, plate brackets or any other part of wheel, either cracked, chipped or broken under fair usage.

WHEELS—STEEL TIRED.

15. (a) Loose, broken or cracked hubs, plates, bolts, retaining ring or tire, occurring under fair usage.

(b) Worn flange or tire; with flange 15/16 inch thick or less, or having flat vertical spot extending 1 inch or more from tread, or with tire thinner than shown in Figs. 1, 2, 3 and 4.

(c) Gage for condemning worn flanges of steel and steel-tired wheels under passenger cars to be the same as is used for condemning worn flanges of steel and steel-tired wheels under freight cars.

DELIVERING COMPANY RESPONSIBLE.

16. Flat spots; if flat spots, caused by sliding, exceed one inch in length.

17. (a) If a car not in line service is transferred from one railroad to another, the receiving road shall issue gas

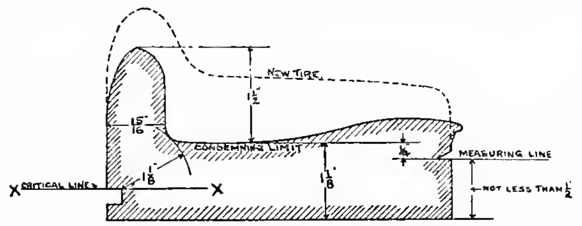


FIG. 3.—STEEL TIRE, RETAINING RING FASTENING.

certificate authorizing the delivering road to bill against it for the number of atmospheres of gas and number of holders at the time car was received.

(Name of Road.)
GAS CERTIFICATE.

....

Car Number ....Initial ....

Number of Atmospheres...

Number of Holders...

Size of Holders...

.... Station, ...19...

................................Inspector.

(b) Cars not in line service in interchange requiring holders to be filled, the receiving road shall be charged for the quantity of gas supplied.

(c) For cars stored in shops for repairs the company

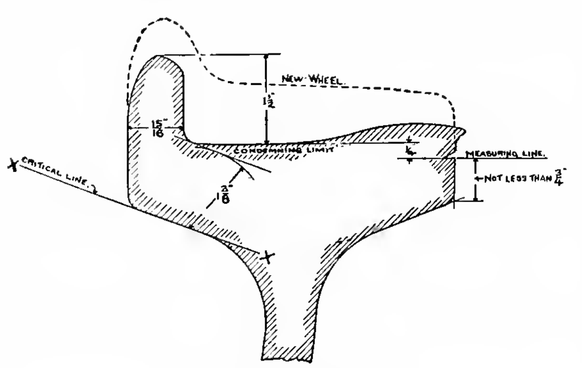


FIG. 4.—STEEL WHEEL.

having car in its possession shall be responsible to the delivering company for the gas in holders. This will apply to sleeping-car companies when cars are in their possession and out of service.

(d) Private or other cars, except regular line cars, when offered in interchange equipped with steam hose couplings that will not couple with the standard on the receiving line must be changed by receiving company; the hose removed to accompany car and be reapplied when car leaves the line.

18. The depreciation of all passenger equipment cars due to age shall be figured at 3 per cent per annum upon the yearly depreciated value of same, to continue not to exceed 50 per cent of its original value. The above method of depreciation applies equally to either bodies or trucks of such cars. No depreciation shall be allowed on the value of air brakes.

19. This code of rules is to apply to all equipment interchanged in passenger trains

20. Bills for line charges shall be made and rendered monthly and prices for materials and labor shall be in accordance with accompanying schedule.

21. Air-brake hose applied must be made in accordance with specifications for M. C. B. standard 1⅜-inch hose, and so labeled.

22. This Code of Rules shall take effect September 1, 1912.

LIST OF PRICES FOR MAINTENANCE OF PASSENGER EQUIPMENT IN INTERCHANGE.

MATERIAL.	NEW.	SECOND-HAND.	SCRAP.
Axle, 40,000 lbs	$11.50	$ 6.25	$4.25
Axle, 60,000 lbs	14.00	7.75	5.25
Axle, 80,000 lbs	17.75	10.00	6.50

MATERIAL.	CHARGE.	CREDIT.
Air-brake hose, M. C. B. Standard, 1⅜", complete with fittings, applied to car	$2.00	....
Air-brake or signal hose, credit for fittings	....	$0.80
Air-signal hose, 1", complete with fittings, applied to car	1.75	....
Backs of seats, and cushions of passenger cars, either vestibule or common, removing and beating, per car	.65	....
Bell or signal cord and couplings, per car	.75	....
Bolts, nuts and forgings, per lb	.03	.00¾
Bowls, gas	At cost.	....
Brake shoes, Diamond S, applied, each no credit for scrap	.50	.
Bulbs, gas	At cost.	....
Burners, dual wicks, each	.30	....
Burners, round wick, each	.50	....
Candles, per lb.	.15	....
Carpets, seats, draperies, etc., parlor and sleeping cars, removing and beating, per car	1.00	....
Chain, per lb	.05	.01
Chimneys, dual wick, each	.06	....
Chimneys, round wick, each	.11	....
Cleaning baggage cars, each	.50	....
Cleaning common passenger and combination cars, each	.70	....
Cleaning mail cars, each	1.00	....
Cleaning parlor and sleeping cars, exclusive of bedding, per car	1.75	....
Cleaning vestibuled passenger and combination cars, each	1.00	....
Coal (including labor), per ton	6.00	....
Cushions and backs of seats of passenger cars, vestibule or common, removing and beating, per car	.65	....
Domes, gas, each	.50	....
Draperies, seats, carpets, etc., parlor and sleeping cars, removing and beating, per car	1.00	....
Electric current for charging batteries	At cost.	....
Electric lighting material, incandescent bulbs, fuses, etc.	At cost.	....
Elm lumber, per foot	.04	....
Forgings, bolts and nuts, per lb	.03	.00¾
Fuses	At cost.	....
Gas bowls	At cost.	....
Gas bulbs	At cost.	....
Gas mantels	At cost.	....
Gas, Pintsch, per receiver	.85	....
Gas tips	At cost.	....
Glass, per light	At cost.	....
Glass, setting, per light	.30	....
Globes, gas	At cost.	....
Hickory, lumber, per ft	.04	....
Hose, air brake or signal, complete with fittings, applied to car, each:		
1" signal hose, applied	1.75	....
1⅜" M. C. B. Standard hose, applied	2.00	....
Hose, air brake or signal, credit for fittings	....	.80
Hose, 1⅝", straight port, steam, complete with fittings, applied to car	6.50	....
Hose, as above, 1½"	6.50	....
Hose, as above, 1"	5.00	....
Hose, as above, 1⅝" and 1½", credit for fittings	....	5.25
Hose, as above, 1", credit for fittings	....	4.00
Ice (including labor), per cwt	.30	....
Incandescent bulbs	At cost.	....
Iron, cast, per lb	.02	.006
Iron, malleable, per lb	.04	.00½
Journal bearings, brass or bronze, lined or unlined, per. lb., applied	.18	.13
Journal bearings, cast steel or malleable iron back, credit for scrap, per lb	....	.02
Journal bearings, filled brass or bronze shell, per lb., applied	.14	.10

Journal bearings. Weights to be charged and credited as follows:	Lbs.	Lbs.
7" long and over, but not 8" long	10	6
8" long and over, but not 9" long	13	8
9" long and over, but not 10" long	20	12
10" long and over	25	15

	Lbs.	Lbs.
Labor, changing wheels, per pair	$2.00	....
Labor, on lubrication, per hour	.24	....
Labor, on repairs, per hour	.30	....
Loss of metal from steel or steel-tired wheels, per 1-16″	1.50	....
Lumber (oak, pine, hickory, poplar and elm), per ft.	.04	....
Mantels, gas	At cost.	....
Nuts, bolts and forgings, per lb	.03	.00¾
Oak lumber, per ft	.04	....
Oil, Galena, car, per gallon	.22	....
Oil, Galena, coach, per gallon	.35	....
Oil, illuminating, American roads, per gal	.11	....
Oil, illuminating, Canadian roads, per gal	.16	....
Pine lumber, per ft	.04	....
Poplar lumber, per ft	.04	....
Removing, turning and replacing same, pair steel-tired wheels	5.00	....
Seat backs and cushions of passenger cars, either vestibule or common, removing and beating, per car	.65	....
Seats, carpets, draperies, etc., parlor and sleeping cars, removing and beating, per car	1.00	....
Shades, Acme lamp, each	.45	....
Shades, common lamp, each	.25	....
Signal or bell cord and coupling, per car	.75	....
Steam hose, 1⅝″, straight port, complete with fittings, applied to car	6.50	....
Steam hose, 1½″, straight port, complete with fittings, applied to car	6.50	....
Steam hose, 1″, straight port, complete with fittings applied to car	5.00	....
Steam hose, 1⅝ or 1½″, credit for fittings	....	5.25
Steam hose, 1″, credit for fittings	....	4.00
Steel castings, per lb	.05	.00¾
Steel, spring (not springs), per lb	.05	.00¾
Taking out and beating cushions and backs of seats of passenger cars, either vestibule or common, per car	.65	....
(Note.—No additional charge for cleaning trucks of parlor or sleeping cars.)		
Taking out carpets, seats, draperies, etc., from parlor and sleeping cars and beating them, per car	1.00	....
Tallow, per lb	.06	....
Turning steel-tired wheels, per pair	1.50	....
Waste, woolen, per lb	.12½	....
Waste, cotton, per lb	.06	....
Wicks, dual, each	.00½	....
Wicks, round, each	.02	....

Material.	New.	Second-hand.	Scrap.
Wheels, cast, 36″	$10.50	$7.75	$5.25
Wheels, cast, 33″	9.00	7.00	4.75

Material.	Charge.	Credit.
Wheels, labor changing, per pair	$2.00	....
Wheels, solid steel or steel-tired, new or re-tired	At cost.	....
Wheels, steel or steel-tired, loss of metal from, per 1-16″	$1.50	....
Wheels, steel-tired, removing, turning and replacing same, per pair	5.00	....
Wheels, steel-tired, turning, per pair	1.50	....

Note.—Cost price to be charged for material not in list above.

Interior Finish or **Inside Finish** (Passenger Cars). Figs. 1443-1455. A term used to designate the fine wood or metal paneling and sheathing used on the walls, to distinguish it from the outside sheathing.

Intermediate Cross Tie. A timber sometimes framed across the longitudinal sills of wooden cars about half way between the cross tie timbers and the body bolster.

Intermediate Floor (Passenger Cars). A floor consisting of boards placed between the sills and between the deafening ceiling, or under floor, and the upper or main floor. Its purpose is to exclude noise and cold.

Intermediate Lining (Refrigerator Car). See Blind Lining.

Intermediate Sill. 3 and 3a, Figs. 285-288; 3, Figs. 368, 374, 375, 383, 423-425. The main longitudinal members of the underframe between the side sills and the center sills.

Internal Cylindrical Gage. A very accurately made solid steel cylinder, used as a standard of measurement of cylindrical holes.

Internal Screw Gage. A solid steel cylinder with a screw thread on it, for testing the diameter of female screws.

Inverted Arch Bar. A bottom arch bar.

Inverted Body Queen Post. A post in the side of a car body which supports the inverted body truss rod or overhang truss rod. See Queen Post.

Inverted Body Truss Rod. A truss rod used as a Hog Chain.

J

Jack. Figs. 2626-43. A machine for raising heavy weights, as a car. It commonly consists of one or more screws, turned by a lever and working in a case, which rests upon the floor or ground, as shown in the illustrations. See Screw Jack, Ratchet Jack.

Jacks take various names from their forms, sizes and shapes, and are designated as bell base, broad base, claw, low, ball-bearing, etc., and also from the uses for which they are designed, as journal box jacks, traversing jacks, track jacks, etc. See Hydraulic Jack.

(Storage Battery.) Fig. 2360. A device used for breaking contacts when disconnecting cells.

Jack Arms (Steam Shovel). Heavy beams with jack screws at the ends which are put out on each side of the shovel at the forward bolster and supported on blocking. They prevent the car body from overturning due to the reaction of the dipper when digging.

Jack Screw (Pile Driver and Steam Shovel). A jack screw working on a jack screw pin or jack arms attached to the body, for relieving the springs of the cars from action and making the platform a rigid body. Tongs or crabs attached to the track are used to prevent the car body from rising when on the jack screws. Another device for this same purpose is a bolster jack screw.

Jacket for Steam Heating. Figs. 2032-34. The illustrations show in detail the construction of the single jacket and double jackets. The inner or the water circulation pipes are of brass or copper, and therefore most efficient conductors of heat. Leakage of steam from the steam spaces past the water pipes is prevented by the packed glands.

Jacking Plate. Fig. 489. A plate commonly applied to a steel side sill to protect it from damage when the car is being raised on jacks.

Jamb (of a Door). The door post on each side of the door proper.

Jaw Bolt. A bolt with a forked end.

Jib (of a Derrick or Crane). More properly Boom.

Joint Bolt. A bolt used for fastening two timbers when the end of one joins the side of another. The lug bolt is another form for the same purpose.

Journal. The part of an axle or shaft on which the journal bearing rests.

Journal Bearing. Figs. 999-1003, 1021. A block of metal, usually some kind of brass or bronze, in contact with a journal, on which the load rests. In car construction the term when unqualified means a car axle journal bearing. A standard shape has been adopted by the Master Car Builders' Association, but its composition is not specified. A lead-lined journal bearing is one coated on the inside with a thin sheet of lead to make it self-fitting on the journal. Babbitt metal in some of its many forms is used for car journal bearings occasionally, and almost universally for the bearings of machinery. In order that the journal bearing may be more easily removable, and to distribute the load more equally, a journal bearing key, or wedge, is used to hold the bearing in place.

Roller bearings have been used to some extent on light cars. Figs. 1022-1024.

Journal Bearing Key. See JOURNAL BOX WEDGE.

Journal Bearing and Wedge Gages (M. C. B. Standard). Fig. 2691. JOURNALS, 3¾ by 7, 4¼ by 8, 5 by 9 and 5½ by 10 inches.

In 1900 gages for journal bearings and wedges for journals 5 by 9 inches and 5½ by 10 inches were adopted as standard.

In 1903 gages for journal bearings and wedges for journals 3¾ by 7 inches and 4¼ by 8 inches were advanced from recommended practice to standard.

Journal Box. 165, Figs. 285-288; 3, Figs. 947, 966; Figs. 980-1025. A metal box or case which incloses the journal of a car axle, the journal bearing and key, and which holds the packing for lubricating the journal. Also called an axle box, car box, grease box, housing box, oil box, and pedestal box. British, usually axle box.

Journal Box Bolts. The bolts on either side of the journal box which secure it between the arch bars and the pedestal tie bar.

See ARCH BARS, COLUMN AND JOURNAL BOX BOLTS. (M. C. B. Standard.)

Journal Box Cover. See JOURNAL BOX LID.

Journal Box Cover Bolt. A bolt used to fasten covers which have no hinge, to the box.

Journal Boxes and Details (M. C. B. Standard). Figs. 2675-90.

For Journals 3¾ by 7 Inches.

The journal box and details as shown in these drawings were adopted as standards of the Association, by letter ballot, in 1893, and revised in 1894 and 1896.

The revision made in 1894 consisted in correcting the drawing at the top of the journal box, and in leaving off the lugs at sides of arch bars. Also in changing the wedge and bearing so as to make the latter flat on top instead of curved, as theretofore, and in curving the top of the wedge, thus making this construction similar in general arrangement to the standard forms for the 4¼ by 8-inch journal box.

The revision made in 1896 consisted in the elimination of the dust guard and the addition of notes providing that any suitable dust guard might be used, and that a rivet or nut might be used instead of the cotter, if preferred, in the hinge pin of the lid. Also in the addition to the drawing of a similar note to the latter, and of notes concerning the lid spring and the wedge. At the same time the side lugs on the brass were increased so as to measure 1⅛ inches long, instead of 1 inch long, as they were formerly.

Additional notes were made on the drawings in 1898.

In 1899 the size of bolt hole was increased from 1 inch to 1 1-16 inches.

In 1905 the addition of a rib ⅜ inch deep on the back face of the lid immediately within the inside of the oil box was adopted.

In 1908 a dimension of 3-16 inch was shown, it being the distance from the center line of bolt hole to inside bearing face of lid.

For Journals 4¼ by 8 Inches.

The journal box and details as shown in these drawings were adopted as standards of the Association, by letter ballot, in 1893, and revised in 1896.

The revision of the drawings made in 1896 consisted in the elimination of the dust guard therefrom; also in removing the arch bar seat lugs and making the arch bar seat 4½ inches wide. Also in the addition of notes providing that any suitable dust guard might be used, and that a rivet or nut might be used instead of a cotter, if preferred, in the hinge pin of the lid. Also in the addition of a similar note to the latter, and of notes concerning the lid spring and the wedge. At the same time the side lugs on the brass were increased so as to measure 1⅛ inches long instead of ¾ inch long, as they were formerly.

The revision in 1901 consisted of cutting out entirely the inner dust guard wall at the top.

In 1905 the addition of a rib ⅜ inch deep on the back face of the lid immediately within the inside of the oil box was adopted.

In 1908 the inside dust guard was restored at the top and joined to the inside side wall with an opening of 2¾ inches radius, the center being located one inch above the horizontal center line of the box.

In 1908 the distance from center line of box to edge of wedge stop was increased from 4⅝ inches to 4 11-16 inches to allow ⅛-inch clearance between wedge and stop.

In 1909 the vertical clearance of 1-16 inch between the side lugs on the journal bearing and the journal wedge was increased to ⅛ inch, to conform with the other standard journal boxes, the side lugs being reduced from ⅞ inch to 13-16 inch.

For Journal 5 by 9 Inches.

The journal box and details shown in these drawings were adopted as Recommended Practice in 1896. In 1898 they were adopted as standards of the Association.

In 1900 the opening at the back end of the box, corresponding with the dust guard, was increased from 3 3-16 inches to 3⅜ inches radius, making the opening 6¾ inches wide, instead of 6⅜ inches, the height remaining unchanged.

The revision in 1901 consisted of cutting out entirely the inner dust guard wall at the top.

In 1902 the wedge stop lugs were increased in size and extended laterally to the sides of box.

In 1905 the addition of a rib ⅜ inch deep on the back face of the lid immediately within the inside of the oil box was adopted.

In 1907 the inside dust guard was restored at the top and joined to the inside side wall with a 3-inch radius, with the center located 1 inch above the horizontal center line of the box. The opening in the outside wall was enlarged at the side and struck with a 4-inch radius all around. The distance from the center of the box to the inside of the lug for the journal bearing key, located in the top wall of the box, was increased to 5 3-16 inches. The width of the inside side lugs for the journal bearings was decreased to 2⅝ inches.

In 1908 the center of box from which the lower half of the circle is struck was raised ¼ inch, increasing the depth to 1⅝ inches.

In 1909 the vertical clearance of 1-16 inch between the side lugs of journal bearing and wedge was increased to ⅛ inch, to conform to the other standard boxes, the side lugs being reduced from 1⅛ to 1 1-16 inches.

In 1909 the dust-guard opening in this box was modified and words "cast steel" were omitted from the drawing of the wedge.

In 1912 the wedge was changed in design to provide increased bearing surface against side lugs.

For Journals 5½ by 10 Inches.

The journal box and details shown in these drawings were adopted as standard in 1900.

In 1901 the inner dust-guard wall at the top was cut out entirely to avoid all danger of the journal bearing striking the wall of the box at the rear.

In 1902 the wedge stop lugs were extended laterally to the sides of box.

In 1903 the radius of the dust-guard opening was changed to 3⅜ inches, and the diameter to 7¼ inches, to allow proper play for the wheel fit.

In 1905 the addition of a rib ⅜ inch deep on the back face of the lid immediately within the inside of the oil box was adopted.

In 1907 the inside dust guard was restored at the top and joined to the inside side wall with a 3-inch radius located 1½ inches above the horizontal center line of the box. The opening in the outside back wall was enlarged at the side and struck with two 4-inch radii, the lower one-half having its center line on the center line of box, the center of the upper one-half being ⅛ inch above the center line of the box. The distance from center of the box to the inside of the lug for the journal box key was increased to 5 11-16 inches. The width of the inside side lugs for journal bearings was decreased to 2⅝ inches.

In 1908 the distance from center line of box to face of wedge stop was increased from 5 11-16 inches to 5¾ inches, thus allowing ⅛ inch clearance between wedge and stop.

In 1908 the note reading "the total lateral [extreme positions of axle] equals ⅜ inch," was eliminated.

In 1909 the word "malleable" was stricken out and the words "drop forged" substituted for journal bearing wedge.

In 1911 the use of pressed or cast steel for journal box was authorized and reduction in thickness of metal and coring to lighten weight permitted, provided that the essential dimensions affecting interchangeability and the fitting of contained parts are adhered to.

In 1911 the note on the drawing referring to placing of letters "M. C. B." on top of box was changed from "arch bar seat" to "seat of truck sides."

In 1912 the wedge was changed in design to provide increased bearing surface against side lugs.

Passenger Car Journal Box and Contained Parts for Journals 4¼ by 8 Inches.

In 1898 a Recommended Practice was adopted for passenger car journal box and contained parts for journals 4¼ by 8 inches. In 1901, as a result of letter ballot, this was changed to standard.

Passenger Car Journal Box and Contained Parts for Journals 5 by 9 Inches.

In 1911 the mouth and dust guard opening was changed to conform to similar journal box for freight car, and advanced to standard.

Journal Box Guide. See Pedestal.

Journal Box Jack. See Journal Jack.

Journal Box Lid. 4, Figs. 947, 966; Figs. 981-1025. A door or lid covering an opening in the end of the journal box, by means of which oil and packing are supplied and journal bearings are inserted or removed. Such covers are made of cast iron, malleable iron, pressed steel, and sometimes of wood. They are usually closed by a spring.

Journal Box Lid Spring. Fig. 1020. A flat spring to hold the lid in place.

Journal Box Wedge. Figs. 985-1002. A device used to hold the journal bearing in place, to distribute the load evenly over the bearing and to allow it to be removed easily. Also called a journal box key. See Journal Boxes and Details.

Journal Brass. A Journal Bearing.

Journal Jack. Figs. 2626, 2627, 2629, 2632, 2635-37. A small jack used for relieving the weight from car journals for the purpose of changing bearings or brasses. See Jack.

Journal Packing. Waste, wool, or other fibrous material saturated with oil or grease, with which a journal box is filled to lubricate the journal. Commonly termed dope.

Journal Spring. A spring supporting part of the weight of a car which is placed directly over the journal, and which usually rests on the journal box under the truck frame.

Jumper. Fig. 2355. A short conductor cable used to connect two electric circuits.

Jute. A course fiber raised in India for making bags, matting, ropes, etc.

K

Kalamined Iron. Sheet iron, coated with an alloy of zinc, lead, tin and nickel in the proportion of 29 lbs. of tin, 50 to 75 lbs. of zinc, 100 lbs. of lead, and three to six ounces of nickel. The alloy melts at a lower temperature than common zinc, and is claimed to give a more durable compound as well as a thinner and more adhesive coating. Galvanized iron is sheet iron coated in the same way with pure zinc.

Keeper. "A ring, strap, pocket, or the like device for detaining an object; as

"The box on a door jamb into which the bolt of a lock protrudes when shut. When the keeper is for a beveled latch bolt, which is moved by contact with it, it is more commonly called a strike plate. They are also further designated by the name of the lock or latch which they accompany. See illustrated section on Locks.

"The latch of a hook, which prevents its accidental disengagement."—Knight.

Key. In a general sense, a fastener; that which fastens; as a piece of wood in a frame of a building. Hence a pin inserted in a hole in a bolt, and used to secure the bolt or its nut. A Split Key is a special form.

"An instrument for opening or shutting a lock by pushing the bolt one way or the other." See Lock and Bit.

A block over the top of a journal bearing, called in full Journal Bearing Key. This part is also commonly called a wedge.

A beveled bar used with a gib to form a Gib and Key. See also King Bolt Key.

(For Lamps and Valves of Pintsch Gas Apparatus.) A substitute for the ordinary cocks of gas fixtures to prevent unauthorized tampering.

Key Bolt. A bolt slotted near the end to receive a key, which takes the place of a nut.

Key Hole Plate. An Escutcheon or Escutcheon Plate.

Key Pin (of a Lock). The pivot on which the key turns when inserted in the lock.

Key Ring Tire Fastening. A mode of securing the tire to the wheel, composed of two rings, one of U-section and the other nearly rectangular. The former ring holds the tire and wheel together, and the latter ring holds the former in place, filling up the groove in the tire. When both rings are in place the outer lip of the groove in the tire is slightly hammered over, thus gripping the second or key ring, and retaining it in place.

Kicker. See Coupler Knuckle Kicker.

Kicking Coil. A coil of wire consisting of about ten turns wound on a wooden core; it is located in the feed circuit between the lightning arrester and controller, and acts as an inductive resistance to the passage of lightning discharge through the apparatus. See Lightning Arrester.

Kilowatt. One thousand watts.

King Bolt or King Pin. See Center Pin.

King Post (of a Truss). A single post or distance piece between a truss rod and the chord of a truss or beam. If two such posts are used they are called queen posts.

Kitchen (Dining Car). A large compartment at one end of the car provided with all the facilities of a well-organized kitchen. For ranges and other equipment, see Figs. 1574-1582.

Kitchen Car. A combined day coach and dining car for use on trains where a regular dining car could not be profitably run. More commonly Café Car or Café Coach.

Knee Iron. An L-shaped or angle iron casting or forging which is fastened to the corner where two timbers are joined to strengthen the joint.

Knuckle (M. C. B. Couplers). Figs. 628-664. The rotating coupling hook by means of which coupling is effected when the knuckle is locked by the catch or lock. It must conform to certain contour lines adopted by the M. C. B. Association.

(Of a Hinge.) The central tubular projections which carry the hinge pin. The term is of wide and general application in mechanics to many similar parts.

Knuckle (M. C. B. Standard Specifications). See Automatic Car Couplers, Specifications.

Knuckle, Automatic Car Coupler (M. C. B. Standards). Fig. 2713.

In 1899 the vertical dimension of the knuckle was fixed at 9 inches as a minimum.

In 1903 the solid knuckle was adopted as a standard of the Association to be used for all repairs and in all new couplers after January 1, 1904.

In 1907 a limiting dimension of not more than 1 inch was shown for the diameter of core hole in lug of knuckle to prevent a recurrence of the slotted knuckle weakness.

Knuckle Throw.—In 1905 the following Recommended Practice was adopted: "That the use of a knuckle-throwing device which will throw the knuckle completely open and operate under all conditions of wear is favored by the Association. Advanced to standard in 1910.

Knuckle Pivot Pin.—In 1899 the sizes of pivot pins were fixed as follows:

1½ inches or 1⅝ inches in diameter and 13½ inches from the under side of head to center of pin hole for ⅜-inch cotter.

In 1904, as a result of the letter ballot, the note in the lower left-hand corner of the drawing, relating to pivot pins, was changed to read as follows:

"Pivot pin must be of steel, 1⅝ inches in diameter, of sufficient length to permit applying a ⅜-inch cotter pin below the coupling lug."

Lock Lift.—In 1905 a recommendation was adopted that the knuckle lock lift be in the central longitudinal vertical plane of the coupler, located between the striking horn and contour lines and operate from the top by an upward movement. Advanced to standard in 1907.

In 1908 the following notes were added to the drawing:

That the total lift of locking pin be not more than 6 inches.

That all couplers must have a 1 1-16-inch eyelet for locking device located immediately above locking pin hole.

Knuckle, Contour Line and Limit Gages. See Automatic Car Coupler.

Knuckle, Emergency. See Emergency Coupler Knuckle.

Knuckle Joint. "A joint in which a projection on each leg or leaf of a device is inserted between corresponding recesses in the other, the two being connected by a pin or pivot on which they mutually turn. The legs of dividers and the leaves of door hinges are examples of true knuckle joints. The term, however, has been somewhat commonly restricted to compound or universal joints designed to act in any direction."—Knight.

Knuckle Kicker. See Coupler Knuckle Kicker.

Knuckle Lock. See Coupler Knuckle Lock.

Knuckle Opener. See Coupler Knuckle Opener.

Knuckle Pin (M. C. B. Coupler). Figs. 628-664. The steel pin holding the knuckle in the jaws of the coupler. Sometimes called pivot pin.

Knuckle Pin Plate. Fig. 658. Used in connection with three-stem coupler.

Knuckle Pivot Pin Testing Machine (M. C. B. Standard). Fig. 2739.

In 1907 a design of apparatus for testing knuckle pivot pins was adopted as Recommended Practice, and is shown on the drawing.

L

Label. See Air Brake Hose, Label for.

Label Box (Postal Car). Fig. 1716. A small box in which the labels for letter pouches are carried.

Ladder. 59, Figs. 285-288; 103, Fig. 355; 23, Fig. 383; Figs. 890, 891. Bars of wood or iron attached to the side or end of a freight car or caboose so as to form steps by which persons may climb to and from the top of the car. The individual bars, whether of wood or iron, and whether round or square, are termed ladder rounds. They are sometimes fastened at their ends to Ladder Side Rails. The handles alongside of the ladder are termed grab irons, or hand holds, or sometimes corner handles; the one placed on the roof near the ladder is called the roof grab iron or ladder hand rail. See Safety Appliances.

Ladder Bolt. Fig. 892. A bolt designed especially for securing the ladder rounds at the corner post when two rounds are directly in line on the side and end of the car.

Ladder Round. 59, Figs. 285-88, 374, 375. A round cross bar or step of a ladder. See Safety Appliances.

Ladder Side Rails. The vertical side pieces to which the ladder rounds are attached.

Lag Screw. An iron bolt with a square or hexagonal head, and with a wood screw thread cut on it, intended to screw into wood.

Lamp. See Alcove Lamp, Argand Lamp, Berth Lamp, Caboose Deck Lamp, Deck Lamp, Electric Lamp, Gas Lamp, Oil Lamp, Side Deck Lamp.

Lamp Alcove. A metal casing or lining for a recess in the side of a car to contain an alcove lamp.

Lamp Arms. Rods by which a lamp is attached to the ceiling of a car. Some lamp arms have bracket angles to support the shade, and are then called bracket arms.

Lamp Bottom. The lower portion of a lamp which is removable. Contains the wick, burner and oil.

Lamp Burner. Figs. 1892, 1897, 1906, 1907, 2111, 2239. That portion of a lamp by which the opening on the top of the reservoir is closed, which holds the wick, and by which the latter is adjusted. In gas lighting, the burner is the tip where the gas escapes and is ignited.

Lamp Canopy. A large and elaborate SMOKE BELL.

Lamp Chimney. Fig. 2377. A glass tube which incloses the flame of a lamp, conducts away the smoke and gases and produces the necessary draft.

Lamp Chimney Bracket. A projecting metal arm attached to the side of a car and carrying a chimney holder, by which a lamp chimney is held in place.

Lamp Chimney Reflector. Usually a reflector with a hole in the center in which the chimney is inserted.

Lamp Fount. The receptacle for the oil burned in a lamp. Also called lamp reservoir.

Lamp Globe. Figs. 2408, etc. A glass or porcelain case or vessel inclosing or surrounding the flame of a lamp or candle, and intended to protect the latter from wind. Lamp globes are approximately globular in form, in distinction from a lamp shade, which flares at the bottom, but are often made of different shapes, as round, pear-shaped, etc.

Lamp Globe Chimney. A metal tube attached to the top of a lamp globe for conducting away the smoke. A shade cap is an equivalent device for a lamp shade.

Lamp Hoop. A ring with an interior screw thread for attaching to cheap oil lamps to receive the burner.

Lamp House Hinge. Figs. 1839-1841.

Lamp Jack. Fig. 909. A cap or covering over a lamp vent on the outside of a car to exclude rain and prevent downward currents of air.

Lamp Key (Gas). A substitute for the ordinary cock of gas fixtures, used to prevent unauthorized tampering with the burners.

Lamp Panel. A small switchboard placed generally in some locker of an electrically lighted car, upon which are mounted switches for controlling the lamps and ventilating fans.

Lamp Reflector. Figs. 2379, etc.

Lamp Regulator (Electric Lighting). Figs. 2278, 2308, etc. An automatic electrical device for maintaining constant voltage upon the lamps or, more popularly expressed, a device for insuring the constant brilliancy or candle power of the lamps. The lamp regulator is usually mounted underneath the car body where the heat which is dissipated in it may be easily taken care of and radiated. The lamp regulator may be of the rheostatic or counter electro motive force type. As a rheostatic device it varies resistance in series with all the lamps, responding to variations in lamp voltage and having a tendency toward maintaining constant lamp voltage. If it is of the counter electro motive force type, it acts in the same way as far as the lamps are concerned, but varies a counter electro motive force in series with the lamps instead of varying a resistance. In either case, the lamp regulator is governed by an auxiliary relay or equivalent device, generally placed inside of the car with the other electrical apparatus. See ELECTRIC LIGHTING.

Lamp Regulator Relay (Electric Lighting). An automatic and very sensitive electrical device for controlling the action of the lamp regulator. Such device must be very sensitive in operation and robust enough in construction to withstand railway service. It is generally enclosed for protection against dust and accident, but when once adjusted should not require attention for long periods.

Lamp Reservoir. See LAMP FOUNT.

Lamp Shade. Figs. 2386, etc. A conical shaped reflector placed over a lamp to reflect the light downward.

Lamp Socket. 2572, 2573, 2583. A socket which holds an electric lamp.

A bracket for supporting a tail lamp. See SIGNAL LAMP SOCKET.

Lamp Stay. A horizontal bar, usually reaching from side to side of the clere-story, by which a car lamp is steadied, and also made more ornamental.

Lamp Switch (Electric Lighting). A switch for controlling the lamp circuit of the car and which, by opening or closing, turns off or throws on all of the lights. This switch is generally mounted on or near the lamp panel.

Lamp Vent. An opening in the roof through which the gases from a lamp escape.

Lantern. Figs. 1887, 1893, 1899, 1911. A portable lamp the flame in which is protected from wind and rain by glass, usually in the form of a globe surrounded by wires, called guards. According to the number of these wires the lantern is called single, double or triple guard. The conductor's lantern is one with a large bail or handle, so as to be carried on the arm, leaving both hands free.

Lantern and Flag Holder. Figs. 1883; 1884-1886; 1888, 1891. A device for displaying signals on rear of trains. See MARKER BRACKET.

Lantern Globe. Fig. 1887.

Latch. Fig. 1655, etc. The primary sense of this word is—to catch, to close, stop, or make fast; hence, an attachment to a door, window, etc., to hold it open or shut, is called a latch. The ordinary distinction between a latch and a lock is that a lock is closed and opened with a separate key, and usually has a square bolt; whereas, a latch has no separate key, and usually has a beveled bolt which snaps shut automatically by contact with the keeper or strike plate. The most exact distinction between a latch and lock seems to be the form of the bolt, and not the use or disuse of a key. See SASH LOCK. Latches named from the use which they subserve are the following, which see: BERTH LATCH, DECK SASH LATCH, SAFETY BERTH LATCH, SPRING DOOR LATCH, etc.

A sliding door latch, or lift latch, has a beveled hook instead of a beveled bolt, but operates upon substantially the same principle. Nearly all forms of latches are spring latches. A night latch is a large and carefully made form of an ordinary latch, which can be opened from the outside by a key. A cupboard latch is any form of small latch. A rim latch, like a rim lock, is one attached simply to the inside of the door, in distinction from a mortise or rabbeted latch (both rarely used), which is boxed into the door.

Latch Pull. J, Fig. 1676.

Lateral Motion (Truck). Fig. 1052. A movement sidewise. Rollers between the journal box and spring seat provide for this on pedestal trucks.

Lateral Motion Spring. A spring sometimes used to check lateral motion in trucks.

Lavatory. A room provided with washbowl, towels, combs, brushes, etc., in which passengers may make their toilet. Parlor and sleeping cars are provided with separate lavatories for men and women, which are separated from the saloons. The best and most modern coaches have a lavatory. A saloon is sometimes termed a lavatory. For the arrangement of water piping in a men's wash room see Fig. 1633, and for a Pullman drawing room sleeper see Figs. 1634 and 1635. See WATER SUPPLY and FOLDING LAVATORY.

The term is also used in a more restricted sense to designate the WASH BASINS and their equipment (see Basin), or the basin for dental purposes, which is termed a DENTAL LAVATORY.

Lead-Lined Journal Bearing. A journal bearing which has its inner surface covered with a thin layer of lead, so that it may fit itself to the journal as soon as subjected to wear.

Leader (of Pile-Driver). The long vertical timbers serving to guide the HAMMER in its fall.

Leader Cap (Pile Driver). A cross piece connecting the two leaders at the top and carrying the main sheave and pile hoisting sheave of the hoisting gear.

Leader Stay. An oblique diagonal brace, attached at the upper end to top stringers, serving to stiffen the leaders.

Leakage Groove (Air Brake Cylinder). A small passage past the brake piston to prevent application of the brakes by trifling leakages of air.

Leatheroid. A substance somewhat resembling leather, and somewhat similar to vulcanized fiber in its general character and appearance. It is made by treating paper with sulphate of zinc.

Leg Rest (Reclining Seats). A bracketed and adjustable shelf, which may be used on a chair seat to support the limbs when the seat or chair is in a reclining position. It is adjusted by a leg rest ratchet and leg rest pivot casting, or by a leg rest slide fitting in a leg rest socket casting.

Lens. An optical instrument for conveying rays of light upon a fixed path or fixed point. See FRESNAL LENS.

Letter Board (Passenger Equipment Car Exteriors). A horizontal board under the cornice, extending the whole length, on which the name of the company to which the car belongs is usually painted. The letter board occupies the frieze of the car, and is sometimes so called.

Letter Case (Postal Car). Figs. 1718, 1720, 1728. Used for the distributing of letters.

Letter Drop (Postal Car). Fig. 1713. A plate with a spring flap for receiving letters for the post. A letter box lid.

Letter Drop Chute (Postal Car). Fig. 1713. The chute extending from the letter drop on the outside of a postal car to the floor inside of the car.

Lettering. See also MARKING ON FREIGHT EQUIPMENT CARS.

Lettering Cars (M. C. B. Standard). Fig. 2729. In 1896 it was decided:

That on all box cars standing more than twelve (12) feet from top of rail to eaves, the height and width at eaves be stenciled in 3-inch letters on side of car, as near the bottom as convenient.

That all classes of cars have size of coupler, style of rear attachments, kind of draft gear and style of brake beams stenciled in 2 or 3-inch letters on each side of car at opposite ends, or on each end of car directly above coupler, where design of car permits it. Where the kind of draft gear implies the style of rear attachments, the marking for the latter may be omitted.

That where the construction of the truck permits, trucks shall be stenciled on each side, giving the size of journal, and the letters "M. C. B." if the axle is M. C. B. standard axle. If the axle is not M. C. B. standard, use dimensions from center to center of journal in place of M. C. B. This stenciling to be in 1 or 2-inch letters, and to be put on end or side of bolster in Diamond trucks, and on side truck frame in center on pedestal type of trucks.

Initials of the road should also appear in letters 1 or 2 inches high on one side of bolster or transom of each truck.

In 1901 this was changed from Recommended Practice to Standard, as a result of letter ballot. Modified in 1906 by the elimination of fractional sizes of figures and letters. Modified in 1908 and 1909.

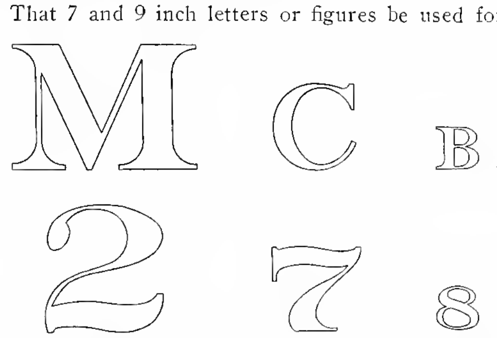
In 1909 the following was adopted:

Flat cars should be stenciled with the length of car over end sills, measured at the center. The stencil, "Length 00 feet," to be located on side of car.

Drop end gondola cars should be stenciled with length of car inside of drop end doors, measured at the center; this stencil, "Inside length 00 feet," to be located on side of car.

As a result of a special letter ballot in March, 1906, certain sized letters and numerals were adopted as Recommended Practice for the uniform lettering of cars, as follows:

1. That Roman letters and figures of the design shown on the drawing be used.
2. That the sizes of these letters and figures be confined to 1, 2, 3, 4, 7 and 9 inches.
3. That 7 and 9 inch letters or figures be used for the



initials, names and numbers for the sides of cars, and 4-inch letters or figures for the lettering on the doors and ends of cars.

4. That for other car-body markings on sides and ends, such as capacity, couplers, brake beams, class of car, date built, outside and inside dimensions, and markings inside of car, 2 or 3 inch letters and figures be used, with the following exceptions:

(a) All weight marks to be 3 or 4 inch letters or figures.

(b) Trust marks, patent marks and other private marks should be 1-inch letters or figures.

5. That all marks on trucks be confined to 1 or 2 inch letters or figures.

6. That stenciling on air-brake cylinders or reservoirs be 1-inch letters or figures.

In 1911 these were advanced to Standard.

Lever. "In mechanics, a bar of metal, wood or other substance, turning on a support called a fulcrum." —Webster. See BRAKE LEVER, UNCOUPLING LEVER, etc.

Lever Faucet. A self-closing faucet, shut by a spring and opened by the movement of a handle or lever. Also called telegraph faucet. They are called vertical or horizontal according to the direction of the pipe or opening into which they are fastened.

Lever Frame (Hand Car). A wooden frame shaped somewhat like a letter A, on top of a hand car, which supports the lever shaft and lever.

Lever Frame Cap (Hand Car). A short horizontal piece of timber, to which the lever journal bearings are fastened.

Lever Frame Tie Rod (Hand Car). A vertical rod by which the lever frame cap is bolted to the floor frame.

Lever Guard. A guide on a platform rail for a platform uncoupling lever.

Lever Guide. See LEVER GUARD and DEAD LEVER GUIDE.

Lever Shaft (Hand Car). A short iron shaft to which the propelling levers are attached.

Levers, Marking of. See FOUNDATION BRAKE GEAR.

Library Car. Fig. 170, 174, 236. Generally a parlor or observation car equipped with a small library containing books and periodicals for the use of passengers.

Lift. A finger hold attached to windows and window blinds to grasp in raising or lowering them. See SASH LIFT.

Lift Latch or **Sliding Door Latch.** A lock, the latch of which is lifted by turning a knob, instead of drawing it backward.

Light Weight of Car, Stenciling of. See FOUNDATION BRAKE GEAR.

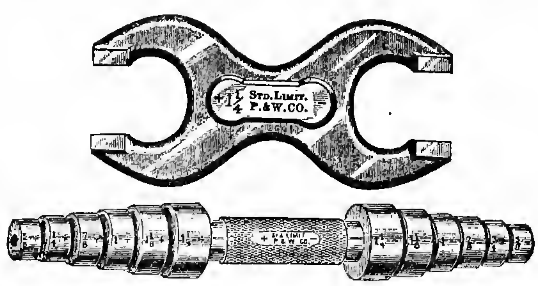
Lighting. See ACETYLENE GAS, ELECTRIC LIGHTING, PINTSCH GAS, VAPOR SYSTEM.

Lightning Arrester. Figs. 2555, 2588. A device for protecting the electrical apparatus from damage by lightning.

Lignomur. A decorative head lining made from strawboard or paper, with figures stamped or embossed upon it. The figures are usually light colored, while the background is darker. It is glued to a thin narrow matched ceiling or may be applied directly to an old veneered ceiling.

Limit Gage. A term applied to many forms of gages which are used for determining whether pieces do not exceed or fall below a certain specified range of dimension. See AUTOMATIC CAR COUPLER.

Limit Gages for Round Iron (M. C. B. Recommended Practice). In 1893 limit gages and diameters for round iron were adopted as a Recommended Practice; these had formerly been Standard of the Association.



In 1911 the limiting dimensions for 1½ inch and 1⅝ inch round iron were modified and limits for 1¾ inches and larger sizes added.

Limit gages such as shown herewith for 1¼ inch iron are recommended for use in procuring round iron to take the Sellers' standard screw threads; round iron used to be of such size as will enter the large or + end of the gage intended for that size, in any way, and also of such size as will not enter the small or — end in any way.

The limiting diameters for certain nominal sizes of iron, together with the maximum variation allowable by such use of these gages, are given in the following table:

SIZES OF LIMIT GAGES FOR ROUND IRON.

Nominal Diameter of Iron.—Inches.	Large Size, + end. Inches.	Small Size, — end. Inches	Total Variation. Inches.
¼	.2550	.2450	.010
5/16	.3180	.3070	.011
⅜	.3810	.3690	.012
7/16	.4440	.4310	.013
½	.5070	.4930	.014
9/16	.5700	.5550	.015
⅝	.6330	.6170	.016
¾	.7585	.7415	.017
⅞	.8840	.8660	.018
1	1.0095	.9905	.019
1⅛	1.1350	1.1150	.020
1¼	1.2605	1.2395	.021
1⅜	1.3860	1.3640	.022
1½	1.5115	1.4885	.023
1⅝	1.6370	1.6130	.024
1¾	1.7625	1.7375	.025
1⅞	1.8880	1.8620	.026

Round iron 2 inches in diameter and over should be rolled to nominal diameter.

Limit Gages for Inspecting Second-Hand Wheels. See WHEELS, LIMIT GAGES for INSPECTING.

Line Car. A short term to designate cars belonging to the various fast freight lines which run over several roads between the leading shipping points east and west.

Line Switch. Figs. 2538, 2549. A combination of one or two unit-switches, assembled in a case, for handling main power currents.

Lining. See INSIDE LINING, LUMBER SPECIFICATIONS; also SIDING, FLOORING, ROOFING and LINING.

Lining Strips. Wooden or metal strips put on the inside of freight or baggage cars to protect the inside of the car from being injured by freight or baggage.

Lining Stud. 54, Figs. 374, 375. Vertical studs placed between the posts and over or under the braces, and to which the lining is nailed. See NAILING STRIP.

Link. "A short connecting piece, of circular or other equivalent shape; as one of the oval rings for divisions of a chain."—Knight.

Link Hanger. A SWING HANGER in the form of a link.

Link Hanger Eye Bolt. A bolt passing through the truck transoms, from which a short swing hanger is suspended.

Link Pin. A coupling pin.

Link and Pin Coupler. An old type of drawbar by which cars were connected by a link and a pin.

Link Suspension (Electric Lighting). A system in which the axle generator is suspended on a pair of parallel links supported on the truck frame, the adjusting of the driving belt or chain being accomplished by a device which swings the links slightly. See SUSPENSION.

Linoleum. A form of floor covering manufactured from linseed oil, prepared by a special process, mixed with ground cork and backed with canvas. Another floor covering of substantially the same nature as linoleum is known as corticine.

Lintel. The horizontal part of a door or window frame above the sash.

Lip Lamp Chimney. One with an indented ring near the bottom, for use with screw lamp burners.

Liquid Soap Fixture. Fig. 1617. A container placed above the wash basin for holding the liquid soap.

Live Lever. The one of a pair of truck brake levers to which the brake power is applied from the cylinder.

Loading Gage (British). American equivalent, CLEARANCE. The limiting dimensions of carriages or wagons as to height and width, in order that they may clear tunnels, bridges, station platforms, etc.

Loading Materials, Rules for. See RULES FOR LOADING MATERIALS.

Lock. Figs. 785, 792, 796, 1657, etc. Generally, a fastening of any kind operated by a key. Specifically, one having a dead bolt as distinguished from one having a spring latch bolt, the latter being technically termed a latch. A rim lock is one applied to the surface of a door. A mortise lock is one designed to be mortised into the edge of a door. A rabbeted lock is one with an offset front to conform in shape to a rabbeted door. A dead lock is one in which a bolt is moved by a key and not a spring. A latch is a lock with a spring bolt. A night latch is a lock with a spring bolt operated from the outside only by a key and from the inside usually by a knob. A padlock is a detached lock provided with a shackle adapted for engagement with a hasp or staple. According to their uses, locks are divided into berth locks, door locks, freight car locks, grain door locks, seat locks, sliding door locks, etc. See also SASH LOCK.

(M. C. B. Automatic Coupler.) The catch which drops in front of the knuckle horn and holds it shut, thus locking the couplers together.

Lock Case. The outside or covering part of a lock, more particularly a padlock.

Lock Chain. A chain by which a padlock is fastened to prevent its being lost.

Lock Keeper. See KEEPER

Lock Lifter. See COUPLER LOCK LIFTER.

Lock Nut. Figs. 1429, etc. The outer one of a pair of nuts on one bolt, which, by screwing up separately to a tight bearing, locks the inner one. A large number of special forms of lock nuts and nut locks, which serve the same purpose, are in use which are not strictly included under the above definition.

Lock Seal. A piece of glass, lead or paper, which forms a seal for a lock, so that the latter cannot be opened without its being known.

Lock Set. See COUPLER LOCK SET.

Lock Washer. Figs. 1438-1440. A washer for locking the nut in place while it is being tightened or drawn up.

Locker. A small compartment or closet for storage.

Locomotive Crane. Fig. 213. A self-propelling car with a steam crane mounted upon it. See WRECKING CRANE.

Locomotive Valve (Steam Heating). The valve on the locomotive which admits live steam to the train line.

Lodging Car. A passenger or box car fitted up with sleeping accommodations for men at work on the line of a road. More commonly called boarding car.

Logging Car. Figs. 77-81. A special type of car for carrying logs, usually consisting of two trucks and a skeleton frame. See CAR, M. C. B. CLASS F L.

Logging Truck. Figs. 936, 943, 944. A truck used in logging cars. The member corresponding to the body bolster in other types of trucks is called a Bunk and is so arranged that timber or logs may be chained in place on it.

Lookout (Caboose). See CUPOLA.

Loose Berth Hinge. A berth hinge, the two parts of which are detachable.

Lorry. Small push cars used in construction for moving rails, ties, etc.

Lounging Car. Figs. 188, 255. A term applied by some railways to a special type of parlor car arranged in two or more compartments, such as reception room, smoking room, etc., and generally having movable instead of fixed seats. Also called Club Car.

Lower Berth (Sleeping Cars). The bed nearest the floor made up by pulling out the seats and dropping down the seat backs. The mattress for it is carried by day in the pocket formed by the upper berth. See BERTH.

Lower Brake Shaft Bearing. Figs. 489, 490. An eye or guide for a vertical brake shaft, near the lower end. The support at the lower end is preferably called the brake shaft step, although the form shown in 97, Fig. 375, is sometimes called a bearing.

Lower Chord (of a Truss). The lower outside member. In the side trussing of a freight or passenger car the side sill is the lower chord.

Lower Deck. The main roof of a passenger equipment car on each side of the clere-story or upper deck.

Lower Deck Carline. 101, Figs. 423-425. A short carline extending under the lower deck or main roof only.

Lower Deck Headlining. 22, Figs. 1458, 1459. The inside finish of the lower deck. It forms the top finish for the upper berth in sleeping cars. See HEADLINING.

Lower Deck Roof Support. Fig. 477. See LOWER DECK CARLINE.

Lower Wainscot Rail (Passenger Car Interiors). A longitudinal rail immediately above the truss plank The upper wainscot rail comes directly below the window.

Lubricator. Fig. 1398. An instrument used for applying a lubricant to a journal or other moving part. Also called oiler.

Lug. A propecting stud or ear to afford a bearing or point of attachment.

Lug Bolt. A STRAP BOLT with a lug turned up at one end to enter a mortise in the timber and in part to relieve the attaching bolts from strain.

Lumber Specifications.

In 1910 a joint committee of the American Railway Master Mechanics' Association and the Master Car Builders' Association working in conjunction with the Railway Storekeepers' Association and the various Lumber Manufacturers' Associations, submitted specifications and grading rules for car and locomotive lumber, which, on motion, were ordered submitted to letter ballot and adopted as Recommended Practice.

In order to have standard descriptions of the various woods used by railroads, the following standard names for car and locomotive lumber were agreed upon by the Joint Committee:

Description of various woods used by railroad companies for car and locomotive lumber.

1. *Ash* ....To cover White, Black, Blue, Green and Red Ash.
2. *Basswood* ....To cover Linden, Linn, Lind or Lime-tree.
3. *Beech* ....To cover Red and White Beech.
4. *Birch* ....To cover Red, White, Yellow and Black Birch.
5. *Buckeye* ....To cover wood from Horse chestnut tree.
6. *Butternut* ....To cover wood from tree of that name, also known as White Walnut.
7. *Cherry* ....To cover Sweet, Sour, Red, Black and Wild Cherry.
8. *Chestnut* ....To cover wood from tree of that name.
9. *Cottonwood* ....To cover wood from tree of that name. (Do not confuse with Popple or Poplar.)
10. *Cypress* ....To cover Red, Gulf, Yellow and East Coast Cypress, also known as Bald Cypress.
11. *Elm—soft* ....To cover White, Water, Gray, Red or Slippery and Winged Elm.
12. *Elm—rock* ....To cover Rock or Cork Elm.
13. *Douglas Fir*...........To cover Yellow, Red, Western, Washington, Oregon, Puget Sound Fir or Pine, Norwest and West Coast Fir.
14. *Gum* ....To cover Red Gum, Sweet Gum or Satin Walnut.
15. *Hemlock* ....To cover Southern and Eastern Hemlock; that is, Hemlock from all States east of and including Minnesota.
16. *Western Hemlock*.....To cover Hemlock from the Pacific Coast.
17. *Hickory* ....To cover Shellbark, Kingnut, Mockernut, Pignut, Black, Shagbark and Bitternut.
18. *Western Larch*........To cover the species of Larch or Tamarack from the Rocky Mountain and Pacific Coast regions.
19. *Maple—soft* ....To cover Soft and White Maple.
20. *Maple—hard* ....To cover Hard, Red, Rock and Sugar Maple.
21. *White Oak* ....To cover White, Burr or Mossy Cup, Rock, Post or Iron, Overcup, Swamp Post, Live, Chestnut or Tan Bark, Yellow or Chinquapin and Basket or Cow Oak.
22. *Red Oak* ....To cover Red, Pin, Black, Water, Willow, Spanish, Scarlet, Turkey, Black Jack or Barn and Shingle or Laurel Oak.
23. *Pecan* ....To cover wood from tree of that name.
24. *Southern Yellow Pine*.To cover Long-leaf and Short-leaf Yellow Pine grown in the Southern States.
25. *White Pine*...........To cover wood from tree of that name grown in Maine, Michigan, Wisconsin, Minnesota and Canada.
26. *Norway Pine*.........To cover Norway or Red Pine grown in Michigan, Minnesota, Wisconsin and Canada.
27. *Idaho White Pine*.....To cover variety of White Pine grown in western Montana, northern Idaho and eastern Washington.
28. *Western Pine*.........To cover timber known as White Pine grown in Arizona, California, New Mexico, Colorado, Oregon and Washington; sometimes known as Western Yellow or Ponderosa Pine, or California White Pine or Western White Pine.
29. *Poplar* ....To cover wood from the Tulip Tree, otherwise known as Whitewood, Yellow Poplar and Canary Wood.
30. *Redwood* ....To cover wood from tree of that name.
31. *Spruce* ....To cover Eastern Spruce; that is, the Spruce timber coming from points east of and including Minnesota and Canada, covering White, Red and Black Spruce.
32. *Western Spruce*.......To cover the Spruce timber from the Pacific Coast.
33. *Sycamore* ....To cover wood from tree of that name, otherwise known as Buttonwood.
34. *Tamarack* ....To cover Tamarack or Eastern Tamarack, grown in States east of and including Minnesota.
35. *Tupelo* ....To cover Tupelo Gum and Bay Poplar.
36. *Walnut* ....To cover Black Walnut (for White Walnut, see Butternut).

CLASSIFICATION, GRADING AND DRESSING RULES FOR NORTHERN PINE CAR MATERIAL, INCLUDING WHITE AND NORWAY PINE AND EASTERN SPRUCE.

1. *Norway Pine.* To cover Norway or Red Pine grown in Michigan, Minnesota, Wisconsin and Canada.

White Pine to cover wood from tree of that name grown in Maine, Michigan, Wisconsin, Minnesota and Canada.

Spruce to cover Eastern Spruce; that is, the Spruce timber coming from points east of and including Minnesota and Canada, covering White, Red and Black Spruce.

2. *Northern Pine Lumber* shall be graded and classified according to the following rules and specifications as to quality, and dressed stock shall conform to the subjoined table of standard sizes, *except where otherwise expressly stipulated between buyer and seller.*

3. Recognized defects in Northern Pine are knots, knotholes, splits, shake, wane, wormholes, pitch pockets, torn grain, loosened grain, sap, sap stain, checks and rot.

KNOTS.

4. Knots shall be classified as pin, small and large or coarse, as to size, and round or spike, as to form, and as sound, loose, encased, pith and rotten, as to quality.

5. A pin knot is sound and shall not exceed ½ inch in diameter.

6. A small knot is larger than a pin knot and shall not exceed 1½ inches in diameter.

7. A large or coarse knot is one of any size over 1½ inches in diameter.

8. A round knot is oval or circular in form.

9. A spike knot is one sawn in a lengthwise direction. The mean or average diameter of knots shall be considered in applying and construing these rules.

10. A sound knot is one solid across its face; is as hard as the wood it is in and is so fixed by growth or position that it will retain its place in the piece.

11. A loose knot is not firmly set, but still retains its place in the piece.

12. A pith knot is a sound knot with a pith hole not more than ¼ inch in diameter.

13. An encased knot is one surrounded wholly by bark or pitch.

14. A rotten knot is one not as hard as the wood it is in.

PITCH.

15. Pitch pockets are openings between the grain of the wood containing more or less pitch or bark, and shall be classified as small, standard and large pitch pockets.

16. A small pitch pocket is one not over ⅛ of an inch wide.

17. A standard pitch pocket is one not over ⅜ of an inch wide, or 3 inches in length.

18. A large pitch pocket is one over ⅜ of an inch wide or over 3 inches in length.

19. A pitch pocket showing open on both sides of the piece ⅛ of an inch or more in width shall be considered the same as a knothole.

WANE.

20. Wane is bark, or the lack of wood, from any cause, on edge.

SAP.

21. White or bright sap shall not be considered a defect in any of the grades provided for and described in these rules, except where stipulated.

MISCELLANEOUS.

22. Defects in rough stock caused by improper manufacture and drying will reduce grade, unless they can be removed in dressing such stock to standard sizes.

23. All lumber for uses described in these rules shall be inspected on the face side to determine the grade, and the face side is the side showing the best quality or appearance.

24. Chipped grain consists in a part of the surface being chipped or broken out in small particles below the line of the cut, and as usually found should not be classed as torn grain, and shall not be considered a defect.

25. Torn grain consists in a part of the wood being torn out in the dressing. It occurs around knots and curly places, and is of four distinct characters; slight, medium, heavy and deep.

Slight torn grain shall not exceed 1/32 of an inch in depth, medium 1/16 of an inch, and heavy ⅛ of an inch. Any torn grain heavier than ⅛ of an inch shall be termed deep.

26. The grade of all regular stock shall be determined by the number, character and position of the defects visible in any piece. The enumerated defects herein described admissible in any grade are intended to be descriptive of the coarsest pieces *such grades may contain,* but the average quality of the grade shall be midway between the highest and lowest pieces allowed in the grade.

27. Lumber and timber sawed for specific purposes must be inspected with a view to its adaptability for the use intended.

28. *All dressed stock shall be measured strip count, viz.: Full size of rough material necessarily used in its manufacture.*

29. Lumber must be accepted on grade in the form in which it was shipped. Any subsequent change in manufacture or mill work will prohibit an inspection for the adjustment of claims, except with the consent of all parties interested.

30. The foregoing general observations shall apply to and govern the application of the following rules. The rules referred to under Sections 31, 32, 33, 34 and 35 govern 4 or 6 inch strips, and are intended to cover strips used for car siding, car lining and car roofing.

B and Better White Pine.

31. Material of this grade shall be practically clear and free of all defects, except will admit of not exceeding four pin knots, and bright sap not to exceed 25 per cent. of the face of the piece.

C and Better Norway Pine.

32. Bright sap is no defect in this grade and stained sap will be admitted to the extent of not exceeding ⅕ the surface of the face of the piece, if not in combination with other defects. This grade shall be free from shake, rot and splits, but will admit of not exceeding four pin knots.

No. 1 Common White Pine, Norway Pine and Eastern Spruce.

33. This grade admits of small sound knots, but shall be free from large or coarse knots, knotholes, should have practically no shake, wane or rot, but will admit of bright sap to any extent.

No. 2 Common White Pine, Norway Pine and Eastern Spruce.

34. This grade is similar to No. 1 described above, except that it will admit of spike knots, bright or stained sap, slight shake, slight wane on reverse side, but not a serious combination of any of these defects.

No. 3 Common White Pine, Norway Pine and Eastern Spruce.

35. This grade, in addition to the defects mentioned in No. 2, described above, will also admit of large or coarse knots, more shake, sap, wane on reverse side that does not affect the tongue or groove and torn or loosened grain, checks, pin wormholes and splits, but no loose knots or knotholes, nor a serious combination of the defects named.

No. 1 Common Norway Pine Car Decking or Flooring.

36. This grade will admit of sound knots, any amount of sap, and shall be free from shake, wane, rot and large or coarse spike knots.

37. STANDARD LENGTHS.

CAR SIDING—8, 9, 10 and 12 feet or multiples.

CAR ROOFING—5 feet or multiples.

CAR LINING—8, 9, 10, 12, 14, 16, 18 and 20 feet or multiples.

CAR DECKING—9 and 10 feet or multiples.

All orders shall be shipped in standard lengths, unless otherwise specified, but no lengths of either car siding, lining or roofing shall be shipped except in the lengths specified or multiples thereof. Those who do not desire stock shipped in multiple lengths should so specify.

CLASSIFICATION, GRADING AND DRESSING RULES FOR SOUTHERN YELLOW PINE CAR MATERIAL.

1. *Southern Yellow Pine.*—To cover Long-leaf and Short-leaf Yellow Pine grown in the Southern States.

2. *Southern Yellow Pine Lumber* shall be graded and classified according to the following rules and specifications as to quality, and dressed stock shall conform to the subjoined table of standard sizes, *except where otherwise expressly stipulated between buyer and seller.*

3. Recognized defects in Southern Yellow Pine are knots, knotholes, splits (either from seasoning, ring hearts or rough handling), shake, wane, red heart, pith, rot, rotten streaks, dote, red heart, wormholes pitch streaks, pitch pockets, torn grain, loosened grain, seasoning of kiln checks and sap, sap stains and imperfect manufacture.

KNOTS.

4. Knots shall be classified as pin, standard and large, as to size; and round and spike, as to form; and as sound, loose, encased, pith and rotten, as to quality.

5. A pin knot is sound and not over ½ inch in diameter.

6. A standard knot is sound and not over 1½ inches in diameter.

7. A large knot is one any size over 1½ inches in diameter.

8. A round knot is oval or circular in form.

9. A spike knot is one sawn in a lengthwise direction.

The mean or average diameter of knots shall be considered in applying and construing these rules.

10. A sound knot is one solid across its face; is as hard as the wood it is in and is so fixed by growth or position that it will retain its place in the piece.

11. A loose knot is one not held firmly in place by growth or position.

12. A pith knot is a sound knot with a pithhole not more than ¼ inch in diameter.

13. An encased knot is one surrounded wholly or in part by bark or pitch. Where the encasement is less than ⅛ of an inch in width on both sides, not exceeding one-half the circumference of the knot, it shall be considered a sound knot. (See Sections 10 and 17.)

14. A rotten knot is one not as hard as the wood it is in.

PITCH.

15. Pitch pockets are openings between the grain of the wood containing more or less pitch or bark, and shall be classified as small, standard and large pitch pockets.

16. A small pitch pocket is one not over ⅛ of an inch wide.

A standard pitch pocket is one not over ⅜ of an inch wide or 3 inches in length.

A large pitch pocket is one over ⅜ of an inch wide or over 3 inches in length.

17. A pitch pocket showing open on both sides of the piece ⅛ of an inch or more in width shall be considered the same as a knothole.

18. A pitch streak is a well-defined accumulation of pitch at one point in the piece, and when not sufficient to develop a well-defined streak, or where fiber between grains is not saturated with pitch, it shall not be considered a defect.

19. A small pitch streak shall be equivalent to not over one-twelfth the width and one-sixth the length of the piece it is in.

A standard pitch streak shall be equivalent to not over one-sixth the width and one-third of the length of the piece it is in.

WANE.

20. Wane is bark, or the lack of wood, from any cause, on the edge.

SAP.

21. Bright sap shall not be considered a defect in any of the grades provided for and described in these rules, except where stipulated.

SHAKE.

22. Shakes are splits or checks in timbers which usually cause a separation of the wood between annual rings.

Through Shake: A shake which extends between two faces of a timber.

Ring Shake: An opening between the annual rings.

MISCELLANEOUS.

23. Defects in rough stock caused by improper manufacture and drying will reduce grade, unless they can be removed in dressing such stock to standard sizes.

24. All stock except car sills and framing shall be inspected on the face side to determine the grade. Stock surfaced one side, the dressed surface shall be considered the face side. Stock rough or dressed two sides, the best side shall be considered the face, but the reverse side of all such stock shall not be more than one grade lower.

25. Pieces of siding, lining or roofing with 3/16 of an inch or more of tongue will be admitted in any grade, provided it does not run more than one-third the length of the piece.

26. In all grades lower than B and better, wane on the reverse side, not exceeding one-third the width and one-sixth the length of any piece is admissible; provided the wane does not extend into the tongue, or over one-half the thickness below the groove.

27. Chipped grain consists in a part of the surface being chipped or broken out in small particles below the line of the cut, and as usually found shall not be classed as torn grain and shall not be considered a defect.

28. Torn grain consists in a part of the wood being torn out in dressing. It occurs around knots and curly places, and is of four distinct characters—slight, medium, heavy and deep.

Slightly torn grain shall not exceed 1/32 of an inch in depth; medium, 1/16 of an inch; heavy, ⅛ of an inch; any torn grain heavier than ⅛ of an inch shall be termed deep.

29. Loosened grain consists in a point of one grain being torn loose from the next grain. It occurs on the heart side of the piece and is a serious defect, especially in flooring.

30. *Rot, Dote and Red Heart:* Any form of decay which may be evident either as a dark-red discoloration not found in the sound wood, or the presence of white or red rotten spots, shall be considered as a defect

Firm red heart shall not be considered a defect in any of the grades of Common Lumber.

31. The grade of all regular stock shall be determined by the number, character and position of the defects visible in any piece. The enumerated defects herein described admissible in any grade are intended to be descriptive of the coarsest pieces *such grades may contain*, but the average quality of the grade shall be midway between the highest and lowest pieces allowed in the grade

32. Lumber and timber sawed for specific purposes must be inspected with a view to its adaptability for the use intended.

33. *All dressed stock shall be measured strip count, viz.: Full size of rough material necessarily used in its manufacture.*

34. Equivalent means equal, and in construing and applying these rules, the defects, whether specified or not, are understood to be equivalent in damaging effect to those mentioned applying to stock under consideration.

35. Lumber must be accepted on grade in the form in which it was shipped. Any subsequent change in manufacture or millwork will prohibit an inspection for the adjustment of claims, except with the consent of all parties interested.

36. The foregoing general observations shall apply to and govern the application of the following rules:

37. *B and Better Car Siding, Lining and Roofing* will admit any two of the following, or their equivalent of combined defects: Sap stain not to exceed five per cent; firm red heart not to exceed fifteen per cent of the face; three pin knots; one standard knot; three small pitch pockets; one standard pitch pocket; one standard pitch streak; slight torn grain, or small kiln or season checks. Where no other defects are contained, six small pin wormholes will be admitted.

38. *Select Car Siding* will admit of one standard pitch streak, one standard pitch pocket, or their equivalent; and, in addition, will admit of not exceeding five pin knots and two standard knots, or their equivalent; ten per cent sap stain; firm red heart; slight shake; heavy torn grain; defects in manufacture or seasoning checks. Pieces otherwise good enough for B, but containing a limited number of pin wormholes shall be graded *select*. This grade is intended to be accumulated from running B and Better stock, and will consist of all the droppings which do not contain defects in excess of those mentioned in this paragraph.

39. *No. 1 Common Car Siding* will admit of the following defects or their equivalent: Sound knots, not over one-half of cross section of the piece at any point throughout its width; three pin knots or their equivalent; wane ½ inch deep on edge not exceeding 1½ inches wide and one-half the length of the piece; torn grain; pitch pockets; pitch; sap stain; seasoning checks; slight shakes; firm red heart and a limited number of small wormholes well scattered. This grade is intended to be worked from fencing stock, either kiln or air dried.

40. *Select Car Lining and Roofing* will admit of one standard pitch streak; one standard pitch pocket, or their equivalent, and, in addition, sound knots not over one-half the width of the piece in the rough; ten per cent. sap stain; firm red heart; slight shakes; heavy torn grain; defects in manufacture, or seasoning checks. Pieces otherwise good enough for B, but containing a limited number of pin wormholes shall be graded *select*. This grade is intended to be accumulated from running B and Better stock, and will consist of all the droppings which do not contain defects in excess of those mentioned in this paragraph.

41. *No. 1 Common Car Lining and Roofing* will admit of the following defects or their equivalent: Sound knots not over one-half the cross section of the piece at any point throughout its length; three pin knots or their equivalent; torn grain; pitch pockets; sap stains; seasoning checks; firm red heart, and a limited number of pin or small wormholes well scattered. This grade is intended to be worked from fencing stock, either kiln or air dried.

42. *Standard Patterns.* (Insert B/P reference, showing net sizes after working.)

43. *All-heart Car Decking or Flooring* will admit sound knots not over one-third of the cross section of the piece at any point throughout its length, provided they are not in groups; pitch pockets; firm red heart; shake and seasoning checks which do not go through the piece; loose or heavy torn grain, or other machine defects, which will lay without waste or will not cause a leakage in cars when loaded with grain. Must be strictly *all heart* on both sides and both edges.

44. *Heart Face Car Decking or Flooring* will admit of sound knots not over one-third the cross section of the piece at any point throughout its length; provided they are not in groups; pitch pockets; firm red heart; shake and seasoning checks which do not go through the piece; loosened or heavy torn grain, or other machine defects, which will lay without waste, or will not cause a leakage in cars when loaded with grain. Will admit of any amount of sap provided all of the face side of the piece is strictly all heart.

45. *No. 1 Common Car Decking or Flooring* will admit of sound knots not over one-half the cross section of the piece at any point throughout its length, provided they are not in groups; pitch pockets; sap stain; firm red heart; shake and seasoning checks which do not go through the piece; a limited number of pin wormholes; loosened or heavy torn grain, or other machine defects, which lay without waste, or will not cause a leakage in cars when loaded with grain.

46. Standard Lengths:

Car Siding—8, 9, 10 and 12 feet or multiples.

Car Lining—8, 9, 10, 12, 14, 16, 18 and 20 feet or multiples.

Car Roofing—5 feet or multiples.

Car Decking or Flooring—9 and 10 feet or multiples.

All orders shall be shipped in standard lengths, unless otherwise specified, but no lengths of either car siding, lining or roofing shall be shipped, except in the lengths specified or multiples thereof. Those who do not desire stock shipped in multiple lengths should so specify.

CAR SILLS AND FRAMING.

47. *No. 1 Common Heart Car Sills and Framing* will admit of sound knots, provided they are not in groups, the mean or average diameter of which shall not exceed two (2) inches; pitch; pitch pockets; slight shake; seasoning checks, or other defects which will not impair its strength more than the defects aforementioned. Must be sawed from sound timber, free from doty or rotten red heart and true to measurements, or at least the measurements at no point on the sill shall be less than the size required.

Measurement of the girth at any point throughout the length of the piece must show at least 75 per cent heartwood.

Cubical contents shall not be used as basis for obtaining percentage of heartwood under this rule.

48. *No. 1 Common Car Sills and Framing* will admit of sound knots, provided they are not in groups, the mean or average diameter of which shall not exceed two (2) inches; pitch; pitch pockets; slight shake; seasoning checks; sap; sap stain, or other defects which will not impair its strength more than the defects aforementioned. Must be sawed true to measurements and from sound timber free from doty or rotten red heart; must be square cornered, except that one (1) inch of wane on one corner or one-half (½) inch of wane on two corners is admissible.

49. *Sizes* up to 6 inches in width shall measure full when green, and not more than ⅛ inch scant when dry or part dry. Sizes 6 to 12 inches in width shall measure full when green and not more than ¼ inch scant when dry or part dry. Sizes 12 to 16 inches in width shall measure full when green and not more than ⅜ inch scant

when dry or part dry. Unless otherwise specified, one-fourth inch shall be allowed for each side which is to be dressed. In pieces 3 by 6 inches and under when ordered in lengths exceeding 30 feet, sound knots shall not exceed one-quarter the width of the face through which they project, and the grain shall not cross sufficiently to impair the strength.

CLASSIFICATION AND GRADING RULES FOR LOCOMOTIVE, FREIGHT AND PASSENGER CAR OAK.

GENERAL INSTRUCTIONS.

Those who are not familiar with the anatomy of the oak tree should, when reading over these rules, take into consideration that the rule describes the poorest piece that goes into the grade and that a large percentage is above the grade described.

The term "Construction Oak" means all such products of Oak in which the strength and durability of the timber is the controlling element in its selection and use. The following is a list of products which are recommended for consideration as "Construction Oak":

I.—Construction Oak.

(A), (B), (C) — Cover Maintenance of Way Material.

(D) *Locomotive Timbers:* Sills, End and Truck Timbers.

(E) *Car Timbers:* Car Framing, including Upper Framing, Car Sills, End and Truck Timbers, Car Decking, Inside Lining.

(F), (G), (H), (I), (J), (K), (L) — Cover Maintenance of Way Material.

II.—Standard Defects.

Definition of "Defect."—Fault, Blemish, Mark of Imperfection that will materially injure the strength.

Measurements which refer to the diameter of knots or holes shall be considered as referring to the mean or average diameter.

II.—(A) Knots.

(1) *Sound Knot.* A sound knot is one which is solid across its face, and which is as hard as the wood surrounding it; it may be any color and contain checks.

(2) *Loose Knot.* A loose knot is one not firmly held in place by growth or position.

(3) *Pith Knot.* A pith knot is a sound knot with a pith hole not more than ¼ inch in diameter in the center.

(4) *Rotten Knot.* A rotten knot is one that is not sound and not as hard as the wood surrounding it.

(5) *Pin Knot.* A pin knot is a sound knot not over ¾ inch in diameter.

(6) *Standard Knot.* A standard knot is a knot not over 2 inches in diameter.

(7) *Large Knot.* A large knot is a sound knot more than 2 inches in diameter.

(8) *Round Knot.* A round knot is one which is oval or circular in form.

(9) *Spike Knot.* A spike knot is one sawn in lengthwise direction. The mean or average width shall be considered in measuring this knot.

(10) *Bird Peck.* Bruises apparently caused by bird pecks during the growth process of the timber. Considered no defect.

II.—(B) Worm Defects.

(1) *Pin Wormholes.* Pin wormholes are very small holes caused by minute insects or worms. These holes usually are not over 1/16 inch in diameter, or smaller, and the wood surrounding them is sound and does not show any evidences of the wormhole having any effect on the wood other than the opening.

(2) *Spot Worm Defects.* (Also known as Flag Worm Defects.) Spot worm defects are caused, like pin wormholes, by minute insects or worms working on the timber during its growth. The size of the hole is about the same as pin wormholes, but the surrounding wood shows a colored spot as evidence of the defect. This spot is usually sound and does not affect the strength of the piece.

(3) *Grub Wormholes.* Grub wormholes are usually from about ⅛ to 3/16 inch in width and vary in length from about 3/16 inch to 1 inch, and are caused by grub worms working in the wood.

(4) *Wooden Rafting Pinholes.* This defect sometimes appears on river timber which has been rafted and holes bored in the solid wood for tying the timber, and a solid plug or pin driven in the hole filling it completely. These defects must be treated and considered the same as knot defects. Ordinary metal rafting pin or chain dog hole is considered no defect.

II.—(C) Sap.

Definition of "Sap."—The alburnum of a tree—the exterior part of the wood next to the bark; sap wood not considered a defect.

Sound Heart. The term sound heart is used in these rules whenever heart of piece is split or opened and shows on outside of piece and its condition is sound and solid, not decayed. Openings between annual rings are checks not considered a defect.

II.—(D) Wane.

Wane is bark or lack of wood from any cause on edges of timber.

II.—(E) Shakes.

Definition of "Shakes."—Shakes are splits or checks in timber which usually cause a separation of the wood between the annual rings.

(1) *Ring Shakes.* Ring shakes are openings between the annual rings usually showing only on the end of the timber.

(2) *Through Shakes.* Through shakes are shakes which extend between two faces of the timber.

(3) *Checks.* A small crack in the wood due to seasoning; not considered a defect.

II.—(F) Grain.

Crooked or Cross Grain. Crooked or cross grain occurs where the grain crosses the piece within a section of 24 inches in running length of the piece. This is only considered a defect in certain smaller sizes of dimension for specific purposes.

II.—(G) Rot.

Any form of decay which may be detected as giving the timber a doty or rotten texture is a rot defect, including what is commonly known as dry rot. Water stain, or what are sometimes called scalded or burned spots, usually caused by timber lying in the water under certain conditions before it is sawed, and burned spots where the timber is improperly piled green, not considered defects, as they do not affect the strength of the piece.

III.—Standard Names for Construction Oak.

Standard names for Construction Oak timbers; White

Oak and Red Oak. Unless specially mentioned, these terms include the following:

White Oak.	*Red Oak.*
White Oak.	Red Oak.
Burr or Mossy Cup Oak.	Pin Oak.
Rock Oak.	Black Oak.
Post or Iron Oak.	Water Oak.
Overcup.	Willow Oak.
Swamp Post Oak.	Spanish Oak.
Live Oak.	Scarlet Oak.
Chestnut or Tan Bark Oak.	Turkey Oak.
Basket or Cow Oak.	Black Jack or Barn Oak.
Yellow or Chinquapin Oak.	Shingle or Laurel Oak.

Term: Mixed Oak means any kind of oak.

IV.—STANDARD SPECIFICATIONS FOR STRUCTURAL OAK TIMBERS.

(1) *General Requirements.* Except as noted, all structural timbers shall be white oak, to be sound timber and sawed specified sizes; free from ring shakes, crooked grain, rotten knots, large knots in groups, rot, dote and wane in amounts greater than allowed in these specifications.

(2) *Boxed Hearts.* Boxed hearts are permitted in pieces 5 by 5 square and larger. The center of the heart shall be boxed as near the center of the piece as practical, and not to exceed 30 per cent of the pieces can have the center of the heart nearer than 1½ inches from any face; 20 per cent may show one heart face, corner or edge, not to exceed 75 per cent of the length of the piece.

IV.—(3) WANE.

EXPLANATION.

The term 20 per cent of number of pieces or amount shipped refers to each item and size of each car shipped.

(a) Pieces 5 by 5 to 8 by 8 square may show 1 inch wane, side measurement on any two corners or edges, and this wane not to exceed more than 25 per cent of the length of the piece singly, or 50 per cent in aggregate. In the absence of wane on all corners excepting one, the one corner may contain wane 50 per cent of the length of the piece as above described; not to exceed 20 per cent of number of pieces may have this defect.

(b) Pieces over 8 by 8, including 12 by 12, square may show 1½ inches wane, side measurement, edge of any two corners or edges, and this wane not to exceed more than 33⅓ per cent of the length of the piece singly, or 66⅔ per cent in aggregate. In the absence of wane on all corners excepting one, the one corner may contain wane 66⅔ per cent of the length of the piece as above described; not to exceed 20 per cent of number of pieces may have this defect.

(c) Pieces over 12 by 12 square may show 1¾ inches, side measurement, any two corners or edges, and this wane not to extend more than 40 per cent of the length of the piece singly, or 80 per cent in aggregate. In the absence of wane on all corners excepting one, the one corner may contain wane 80 per cent of the length of the piece as above described; not to exceed 20 per cent of number of pieces may have this defect.

(d) In event that pieces have two faces as wide as above described and two faces narrower, the proportion of the amount of wane is admissible.

(e) Pieces 1 inch to 5 inches thick, not exceeding 8 inches wide, are governed by defect specifications above mentioned, with the exception that they shall not contain wane, and not to exceed 20 per cent of pieces 2 inches and thicker may show sound heart on one face; pieces under 2 inches thick must be free of heart. Pieces 8 inches and wider may contain wane as per paragraphs b and d.

(f) Rough sizes of structural timber shall not vary more than ¼ inch scant of specified size. Dressed sizes may be ½ inch scant after dressing.

V.—(B) LOCOMOTIVE TIMBER OAK. PASSENGER CAR DIMENSION OAK. REFRIGERATOR CAR DIMENSION OAK.

Thickness cut to order, widths cut to order, lengths cut to order. Unless otherwise noted, must be cut from white oak. This stock, wherever practical, should be cut outside the heart and must be free of heart shake in pieces under 6 by 6 square. No attempt should be made to box the heart in pieces smaller than 5 by 7, unless heart is very small and tight. When heart is well boxed it must be firm and tight, and the center of the heart must not be nearer than 2 inches from any face. Must be sawed full to sizes with square edges, and cut from sound timber and free from wormholes, with the exception of a few small pin wormholes well scattered, and an occasional spot worm. None of these defects, however, to affect the serviceability of the piece for the purpose intended. Must be free from split, rot or dote, large, loose, rotten or unsound knots, or, in other words, free of all defects affecting the strength and durability of the piece. Sound standard knots well scattered not considered a defect.

V.—(C) FREIGHT CAR TIMBER.

Freight car dimensions, including all cars other than refrigerator and passenger cars. Sizes cut to order. Unless otherwise ordered, must be sawed from good merchantable white or red oak timber. This stock must be free of rot, shakes and splits, large, loose, rotten or unsound knots, any of which will materially impair the strength and durability of the piece for the purpose intended. This stock is intended to work full size and length without waste for side posts, braces and end sills, end plates, drafting timbers, cross ties, etc., used in the construction of ordinary freight or stock cars. On pieces 3 by 4 inches or equivalent girth measurement and larger (nothing under 2 inches thick), heart check showing on one corner, admitted on twenty per cent of the pieces in each car shipment. Well-boxed, sound hearts admitted in this material in pieces 5 by 6 and larger.

On pieces 3 by 4 to 6 by 6, inclusive, or equivalent girth measurement and larger (nothing under 2 inches thick), in absence of heart defects, wane on one corner, ¾ inch side measurement, admitted on not to exceed twenty per cent of the number of pieces in each car shipment.

Pieces over 6 by 6 square may contain 1 inch wane, side measurement, on one corner, with other conditions same as 3 by 4 to 6 by 6 sizes.

CLASSIFICATION AND GRADING RULES FOR DOUGLAS FIR CAR AND LOCOMOTIVE MATERIAL.

1. The term "Douglas Fir" will cover the timber known likewise as Yellow, Red, Western, Washington, Oregon or Puget Sound Fir or Pine, Norwest and West Coast Fir.

2. *Douglas Fir Lumber* shall be graded and classified according to the following rules and specifications as to quality, and dressed stock shall conform to the subjoined table of standard sizes, *except where otherwise expressly stipulated between buyer and seller.*

3. Recognized defects in Douglas Fir are knots, knotholes, splits, checks, wane, rot, rotten streaks, wormholes, dog or picaroon holes, pitch seams, shake, pitch pockets, chipped grain, torn grain, loose grain, solid pitch, stained heart, sap stain and imperfect manufacture.

KNOTS.

4. Knots shall be classified as pin, small, standard and large, as to size; round and spike, as to form, and tight, loose and rotten, as to quality.

5. A pin knot is tight and not over ½ inch in diameter.

6. A small knot is tight and not over ¾ inch in diameter.

7. A standard knot is tight and not over 1½ inches in diameter.

8. A large knot is tight and any size over 1½ inches in diameter.

9. A round knot is oval or circular in form.

10. A spike knot is one sawn in a lengthwise direction. The mean or average diameter of knots shall be considered in applying and construing these rules.

11. A tight knot or sound knot is one solid across its face, is as hard as the wood it is in, and is so fixed by growth or position that it will retain its place in the piece.

12. A loose knot is one not held firmly in place by growth or position.

13. A rotten knot is one not as hard as the wood it is in.

PITCH.

14. Pitch pockets are openings between the grain of the wood, containing more or less pitch and surrounded by sound grain wood; they shall be classified as small, standard and large pitch pockets.

15. A small pitch pocket is one not over ⅛ of an inch wide.

16. A standard pitch pocket is one not over ⅜ of an inch wide, or 3 inches in length.

17. A large pitch pocket is one over ⅜ of an inch wide or over 3 inches in length.

18. A pitch shake or seam is a clearly defined opening between the grain of the wood and may be either filled with granulated pitch or not, but in either case is considered a defect in any of the grades hereinafter described.

19. A pitch streak is a well-defined accumulation of pitch at one point in the piece, and when not sufficient to develop a well-defined streak, or where fiber between grains is not saturated with pitch it shall not be considered a defect.

20. A small pitch streak shall be equivalent to not over one-twelfth the width and one-sixth the length of the piece it is in.

21. A standard pitch streak shall be equivalent to not over one-sixth the width and one-third of the length of the piece it is in.

WANE.

22. Wane is bark, or the lack of wood, from any cause on edge.

SAP.

23. Bright sap shall not be considered a defect in any of the grades provided for and described in these rules, except where stipulated.

24. Sap stain shall not be considered a defect, except as provided herein.

25. Discoloration of the heart of the wood, or stained heart, must not be confounded with rot or rotten streaks. The presence of rot is indicated by decided softness of the wood where it is discolored or by small white spots resembling pin wormholes.

MISCELLANEOUS.

26. Defects in rough stock caused by improper manufacture and drying will reduce grade, unless they can be removed in dressing such stock to standard sizes.

27. All stock, except car sills and framing, shall be inspected on the face side to determine the grade. Stock surfaced one side, the dressed surface shall be considered the face side. Stock rough or dressed two sides, the best side shall be considered the face, but the reverse side of all such stock shall not be more than one grade lower.

28. Chipped grain consists in a part of the surface being chipped or broken out in small particles below the line of the cut, and as usually found, should not be classed as torn grain, and shall be considered a defect only when it unfits the piece for use intended.

29. Torn grain consists of a part of the wood being torn out in dressing. It occurs around knots and curly places, and is of four distinct characters—slight, medium, heavy and deep.

30. Slight torn grain shall not exceed 1/32 of an inch in depth; medium 1/16 of an inch, and heavy ⅛ of an inch. Any torn grain heavier than ⅛ of an inch shall be termed deep.

31. Loosened grain consists in a point of one grain being torn loose from the next grain. It occurs on the heart side of the piece, and is a serious defect, especially in flooring.

32. The grade of all regular stock shall be determined by the number, character and position of the defects, visible in any piece. The enumerated defects herein described admissible in any grade are intended to be descriptive of the *coarsest* piece *such grades may contain,* but the average quality of the grade shall be midway between the highest and lowest pieces allowed in the grade.

33. Lumber and timber sawed for specific purposes must be inspected with a view to its adaptability for the use intended.

34. *All dressed stock shall be measured strip count, viz.: Full size of rough material necessarily used in its manufacture.*

35. Equivalent means equal, and in construing and applying these rules, the defects allowed, whether specified or not, are understood to be equivalent in damaging effect to those mentioned applying to stock under consideration.

36. Lumber must be accepted on grade in the form in which it was shipped. Any subsequent change in manufacture or millwork will prohibit an inspection for the adjustment of claims, except with the consent of all parties interested.

37. The foregoing general observations shall apply to and govern the application of the following rules:

The rules referred to under Sections 38, 39 and 40 govern 4-inch or 6-inch strips, and are intended to cover strips used for car siding, car roofing and car lining.

The term "Edge Grain" is here used and synonymous with vertical grain, rift-sawn, or quarter-sawed. The term "Flat Grain" is synonymous with slash grain or plain sawed.

No. 2 Clear and Better Edge Grain.

38. Material of this grade shall be well manufactured, with angle of grain not less than forty-five degrees. This stock shall be kiln-dried and practically free from all defects, but will admit of bright sap on the face; not exceeding three small close pitch pockets not over 2 inches long, one pin knot, slight roughness in dressing, but not a serious combination of these defects.

No. 2 Clear and Better Flat Grain.

39. Material of this grade shall be well manufactured. The stock shall be kiln-dried and practically free from all defects, but will admit of bright sap on the face; not exceeding three small close pitch pockets not over 2 inches long, one pin knot, slight roughness in dressing, but not a serious combination of these defects.

No. 3 Clear.

40. Material of this grade shall be sound common lumber and will admit of roughness in dressing, bright sap,

and also may contain five pin, three small and one standard knot and five pitch pockets in any continuous 5 feet of length of the piece; or any combination of tight knots or pitch pockets equivalent to those mentioned above. This grade particularly refers to stock used for inside lining of freight cars.

Standard Car Decking or Flooring.

41. Material of this grade shall be well manufactured from sound, live timber and shall be free from splits, shakes, rot, bark or waney edges, and unsound knots, or pitch pockets, pitch seams or large knots which would weaken the piece for the use intended. This grade will admit of sound knots not to exceed one-third width of the piece, provided they are not in clusters, and sap.

Common Car Sills and Framing.

42. Material of this grade shall be well manufactured from sound live timber, sawed full size to sizes ordered and free from rot, unsound knots, cross grain, bark or waney edges or shakes, but will admit of sap and any number of sound knots, provided they are not in clusters, and do not exceed one-third width of piece; pitch pockets or pitch seams that would not weaken the piece for the purpose intended.

43. *Sizes* up to 6 inches in width shall measure full when green, and not more than ⅛ inch scant when dry or part dry. Sizes 6 to 12 inches in width shall measure full when green and not more than ¼ inch scant why dry or part dry. Sizes 12 to 16 inches in width shall measure full when green and not more than ⅜ inch scant when dry or part dry. Unless otherwise specified ¼ inch shall be allowed for each side which is to be dressed. In pieces 3 by 6 inches and under when ordered in lengths exceeding 30 feet, sound knots shall not exceed one-quarter the width of the face through which they project, and the grain shall not cross sufficiently to impair the strength.

44. Standard Lengths.

Car Siding—8, 9, 10 and 12 feet or multiples.

Car Roofing—5 feet or multiples.

Car Lining—8, 9, 10, 12, 14, 16, 18 and 20 feet or multiples.

Car Decking—9 and 10 feet or multiples.

All orders shall be shipped in standard lengths, unless otherwise specified, but no lengths of either car siding, lining or roofing shall be shipped, except in the lengths specified or multiples thereof. Those who do not desire stock shipped in multiple lengths should so specify.

CLASSIFICATION AND GRADING RULES FOR CYPRESS CAR MATERIAL.

1. *Cypress* to cover Red, Gulf, Yellow and East Coast Cypress, also known as Bald Cypress.

2. *Cypress Lumber* shall be graded and classified according to the following rules and specifications as to quality, and dressed stock shall conform to the subjoined table of standard sizes, *except where otherwise expressly stipulated between buyer and seller.*

3. Recognized defects in Cypress are knots, knothholes, sap, wormholes, shake, season checks, splits and wane.

KNOTS.

4. Knots shall be classified as standard and small, as to size, and sound or rotten, as to quality.

5. A standard knot is sound and not to exceed 1¼ inches in diameter.

6. A small knot is one not exceeding ¾ inch in diameter.

7. A sound knot is one solid across its face, is as hard as the wood it is in.

8. A rotten knot is one not as hard as the wood it is in.

SAP.

9. Stained sap or bright sap shall not be considered a defect in the material specified in these rules.

SEASON CHECKS.

10. Ordinary season checks are such as occur in lumber properly covered on yard or season checks of equal size in kiln-dried lumber.

WANE.

11. Wane is bark or lack of wood from any cause on edge.

MISCELLANEOUS.

12. The grade of all regular stock shall be determined by the number, character and position of the defects visible in any piece. The enumerated defects herein described admissible in any grade are intended to be descriptive of the *coarsest* pieces *such grade may contain,* but the average quality of the grade shall be better than the coarsest pieces allowed in the grade.

13. Lumber sawed for specific purposes must be inspected with a view to its adaptability for the use intended.

14. *All dressed stock shall be measured strip count, viz.: Full size of rough material necessarily used in its manufacture.*

15. Lumber must be accepted on grade in the form in which it was shipped. Any subsequent change in manufacture or millwork will prohibit an inspection for the adjustment of claims, except with the consent of all parties interested.

16. The foregoing general observations shall apply to and govern the application of the following rule. The rule referred to in the following section is intended to govern 4-inch or 6-inch strips and to cover strips used for car siding, car roofing and car lining.

CAR ROOFING AND SIDING.

"C and Better" Grade.—This grade will admit sound knots, stained sap, pin worm holes, very slight shake and other defects, but none that will prevent the use of each piece in its full width and length for car roofing and car siding; may be random or specified lengths and may be worked to pattern specified and graded from pattern side or S2S and C. M. and graded from the better side.

CAR LINING.

Shall be specified widths and 8 to 20 inches in length. Will admit tight knots, stained sap, pin wormholes, slight shake and other defects, but none that will prevent the use of each piece in its full width and length for car lining purposes.

Lunch Counter Car. A passenger equipment car fitted up with a lunch counter for serving light meals.

M

Magazine (Base Burning Stove). A general term for a receptacle for coal before it reaches the fire-pot proper, usually situated directly above the latter.

Magnets, Application and Release. Fig. 1336. Used in connection with electro-pneumatic brakes. See Electro-Pneumatic Brake.

Mail Apartment. Figs. 259, 260. Similar to an alley apartment, but extending the full width of the car. See Alley Apartment.

Mail Bag Hook (Postal Car). Fig. 1719. A hook for securing the mail bags to the mail bag rack.

Mail Bag Rack (Postal Car). Fig. 1719. A rack for mail bags, etc.

Mail Car. See Postal Car.

Mail Car Lamp. Figs. 2204, 2495-97, 2519, 2520, etc. A lamp used for lighting mail or postal cars.

Mail Catcher or Collector. Fig. 1715. A contrivance consisting of a bent iron bar attached to the door of a postal car for taking up or "catching" mail bags while the train is in motion.

Mail Catcher Bracket. Fig. 1715. The brackets or sockets on either side of the postal door which hold the mail catcher.

Main Cock (Pintsch Gas Lighting). Figs. 2110, 2112. A cock usually placed in the saloon for the control of the low pressure supply. It regulates all the burners at once, in addition to which there are separate cocks to each.

Main Cock Cover (Pintsch System). Figs. 2110, 3111. A cast-iron cover with hinged lid to fit over the key shaft of the main cock. It is screwed to the side of a car or to a bulkhead.

Main Floor (Refrigerator Car). G, Figs. 374, 375. The top layer of boards in the floor of the car.

Main Reservoir (Air Brake). A cylindrical tank, carried on the locomotive, or motor car, to hold a supply of compressed air. So called in distinction from the auxiliary reservoirs under each car.

Main Roof (Refrigerator Cars). P, Figs. 374, 375. The outside roof. See Car Roof. On cars with clere-stories, the lower deck, or that part of the roof over the sides of the car and on either side of the deck or clere-story.

Male Center Plate. The body center plate is sometimes called a male center plate. See Center Plate.

Malleable Iron. Cast iron which has been annealed and the brittleness greatly decreased by packing the castings in iron pots containing forge scale, hematite ore or some other oxide of iron and subjecting them to a continued red heat for from four to six days. They are then allowed to cool slowly. The change which takes place is internal, and while little or no carbon is removed its physical condition is changed from graphitic to amorphous or cement carbon and the iron is rendered less brittle. Malleable castings can be bent within moderate limits, but are not truly malleable like wrought iron.

Manhole. An opening in a boiler or tank to enable a man to enter and make inspection or repairs.

Manhole Cover. 111, Fig. 355. A plate or lid to close a manhole.

Manhole Cover Chain. A chain with which a manhole cover is fastened to a tank to prevent it from falling when the manhole is open.

Manhole Hinge. A hinge by which a manhole cover is attached to the manhole ring.

Manhole Ladder (Tank Cars). 103, Fig. 355. An iron ladder extending down into the tank under the manhole to allow workmen to descend for purposes of cleaning, inspection or repairs.

Manhole Ladder Brace (Tank Cars). 104, Fig. 355. A wrought iron piece attached to the inside of the tank and to the manhole ladder to keep the latter in a vertical position.

Manhole Ring. A metal ring riveted around a manhole, and forming a seat for the cover.

Manifold. See Three-Pipe Manifold.

Mansell Retaining Ring. Figs. 1121-1125; 1131-1134. A mode of connecting steel tires to the wheel centers by a ring of an approximate L or U cross-section, which secures the tire to the wheel, so that every part of the tire is securely held, into however many pieces it may be ruptured. This ring is almost universally used in English passenger service.

Mantle. Figs. 2375, 2376. A device used as a burner in mantle gas lamps, so constructed that when the gas is ignited the mantle becomes incandescent. See Pintsch Mantle Lamp.

Mantle Lamp. See Pintsch Mantle Lamp and Vapor System.

Marker. A lamp or flag used to indicate the rear end of a train. See Tail Lamp.

Marker Bracket. Figs. 1883-1886; 1888, 1891. A term used to indicate both the bracket or socket on a car which supports marker or tail lamps as well as flags; and the bracket or arm which fits into the socket and supports the tail lamp.

Marking on Freight Equipment Cars (M. C. B. Recommended Practice). Fig. 2758 See also Lettering Cars.

In 1909 the following was adopted:

1. Freight Equipment Cars that have a superstructure which will permit should be stenciled with markings on sides of car, in the following order:

Lettering (Initials or name of Road),
Number,
Capacity,
Light Weight.

This marking is to be located as nearly over the truck as the lettering will permit, preferably to the left of center line of side of car. On box and other house cars where doors slide to the left, the above marking may be placed to the right of center line of side of car. On any other cars where the construction makes it necessary, this marking may be placed either to the right of center line of side of car, or in the center of side of car. The distance from the center line of coupler to the bottom of car number to be normally 2 feet 4½ inches, with a minimum dimension of 1 foot 10½ inches, and a maximum of 2 feet 10½ inches. The spacing of the remaining marking to be as shown on diagram.

The ends to show the initials or name of road, car number and light weight, in the upper half of end of car. On box or other house cars having end doors this lettering should be so located that it will not be obscured when doors are open.

Flat and low-sided gondola cars should show the lettering (initials or name of road), number, capacity and light weight on the side of car in the best available location offered by the construction of the car. Suggestions as to the arrangement of this lettering are shown on the diagrams. When possible the sizes of lettering and figures should correspond with present Recommended Practice. The end marking on flat cars may be omitted.

Side and end doors should be stenciled with the initials or name of road either on the outside or inside of door. If placed on the inside the stenciling should be so located that it will not be defaced by the sliding of the door.

In 1911 it was agreed that the "date weighed" should include the station symbol where weighed.

In 1911 designating marks for cars equipped with United States Safety Appliance Standards were adopted as follows:

For cars built on or after July 1, 1911:

UNITED STATES
SAFETY APPLIANCES,
STANDARD

For cars built prior to July 1, 1911:

UNITED STATES
SAFETY APPLIANCES.

The above markings to be used on each side of the car: letters, if stenciled, to be not less than 1 inch in height and as per M. C. B. standards for lettering for freight cars; letters, if on a metal badge plate, to be not less than 1/16 inch and have not less than ⅛-inch bar or staff. The arrangement of the words to be as near as possible as shown above.

A metal badge plate, 3½ by 10 inches, with the proper marking is preferred, one plate to be secured on each side of the car by four bolts or rivets, if on metal cars, and by four bolts or screws, if on wooden cars, the bolts, rivets or screws to be not less than ¼-inch diameter. The badge

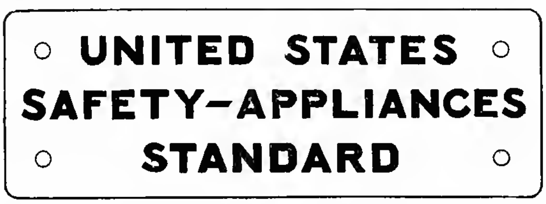


plate to be of metal as shown on drawing herewith.

In 1912 the following paragraphs were incorporated under this head and the star indication added to the drawing:

Wooden and steel underframe cars one year old should be reweighed and restenciled, the weight to be followed by one star; cars two years old should be again weighed and stenciled, the weight to be followed by two stars; cars three or more years old should be again weighed and stenciled, the weight to be followed by three stars, which will indicate final weight.

Steel cars should be reweighed and restenciled after they have been in service twelve months, the weight to be followed by three stars, indicating final weight.

In 1912 the minimum height of number on steel underframe gondola cars above the center line of the coupler was changed from 1 foot 10½ inches to 1 foot 5 inches, and the drawing changed accordingly.

Mast (Of a Derrick or Crane). The main upright member against which the boom abuts.

(Of Brake Gear.) A Brake Shaft.

Mast Pocket (Derrick or Wrecking Car). A heavy casting under the car floor serving as a socket for supporting the mast of a derrick to hold it upright.

M. C. B. Standards. See Air Brake Appliances; Air Brakes, Cleaning and Testing; Air Brakes, General Arrangement and Details; Air Brake Hose Coupling and Ring; Air Brake Hose Label; Air Brake Hose Specifications; Arch Bars, Column and Journal Box Bolts; Automatic Car Coupler; Automatic Car Coupler Contour Line and Limit Gages; Automatic Car Coupler Guard Arm; Automatic Car Coupler Head; Automatic Car Coupler, Height of; Automatic Car Coupler Specifications (Include Separate Knuckle and Knuckle Pivot Pin Specifications); Automatic Car Coupler and Yoke Gages; Axles; Brake Beam Details and Capacities; Brake Beam Specifications and Tests; Brake Chain; Brake Head Gage; Brake Head and Shoe; Brake Lever Pin Hole Gage; Brake Shoe Specifications; Brake Staff Carrier Iron; Brake Staff Height; Center Plate; Center Sills Spacing; Door Fixtures, Box Car; Drop Test Machine; Followers, Draft Gear; Guard Rail and Frog Wing Gage; Journal Bearing and Wedge Gages; Journal Boxes and Details; Knuckle, Automatic Car Coupler; Knuckle Contour Line and Limit Gages; Knuckle Pivot Pin Testing Machine; Knuckle Specifications; Lettering Cars; M. C. B. Pamphlet and Stationery Sizes; Pedestals; Pipe Unions; Rules for Loading Materials; Screw Threads, Bolt Heads and Nuts; Siding, Flooring, Roofing and Lining; Signal Lamp Socket; Sills, Uniformity for Section; Tank Cars, Specifications; Wheel Check Gages; Wheel Circumference Measure; Wheel Defect Gage; Wheel Flanges, Distance Between; Wheel Flange Thickness Gages; Wheels, Limit Gages; Wheels and Track Gaging Points; Wheel Tread and Flange Form.

M. C. B. Recommended Practice. See Air Brake Defect Card; Air Brake Hose, Location of Label; Automatic Car Couplers (Area of Lock Bearing Surface); Axles; Axle Specifications; Bolster Specifications; Bolt Heads, Square; Box Car Framing; Box Cars, Height and Width; Box Cars, Inside Dimensions; Brake Beam Details; Brake Beam Gage; Brake Beam Gage Limiting Outlines; Car Classifications; Door, Door Jamb, Etc., of Stock Cars, Rounding Corners; Door Fixtures, End; Electric Lighting; Examination of Car Inspectors, Rules; Foundation Brake Gear, High Speed; Limit Gages for Round Iron; Marking on Freight Equipment Cars; Refrigerator Cars, Floors and Ice Tanks; Safety Chains, Platform; Safety Chains for Steel and Wooden Freight Cars; Spring and Spring Caps for Freight Car Trucks; Stake Pockets, Temporary; Stake Pockets, Temporary Longitudinal Spacing; Stake Pockets, Permanent; Steam and Air Connections for Passenger Equipment Cars; Temporary Safety Chains; Tires, Minimum Thickness; Truck Sides, Cast Steel, Specifications; Wheels, Cast Iron; Wheels, Mounting; Wheels, Solid Steel, Sizes; Wheels, Solid Steel, Plane Gage; Wheels, Solid Steel, Rotundity Gage; Wheels, Specifications; Wheels, Steel, Branding; Wheels, Steel, Gage for Rim Thickness; Wheels, Steel Tired, Tire Fastening; Wheels, Steel and Steel Tired, Diameter; Wheel Tread and Flange for Steel and Steel Tired Wheels; Wheels, Wrought Steel, Specifications.

Master Car Builders' Association Pamphlet and Stationery Sizes (M. C. B. Standard). In 1893 a standard size of 6 inches by 9 inches was adopted for M. C. B. reports.

PAMPHLETS, CATALOGS, SPECIFICATIONS, ETC.

In 1894 standard sizes for publications of this nature were adopted and the size of postal card circular was changed in 1895 so that they are now as follows:

For postal card circulars, 3½ inches by 5 ½ inches.

For pamphlets and trade catalogs, 3½ inches by 6 inches, 6 inches by 9 inches, 9 inches by 12 inches.

For specifications and letter paper, 8 inches by 10½ inches.

In connection with these standards it was decided that a standard practice should be to have the proper standard dimensions, and the word "standard" printed on the upper left-hand corner of title-page or cover whenever practicable.

In 1912 the standard size of specifications and letter paper was changed to the Government standard, namely, 8 by 10½ inches.

Master Controller. Figs. 2575, 2580. See Control System.

Master Key. A key which commands many locks of a certain set, the keys of which are not interchangeable.

Match Box Holder. Fig. 1879.

Match Striker. Figs. 1878, 1882. A metal plate with a rough surface.

Match Striker Frame. A metal frame for holding a piece of sand or emery paper on which to strike matches.

Materials, Rules for Loading of. See RULES FOR LOADING MATERIALS.

Mattress (Sleeping Cars). Figs. 1504.

Meat Timbers (Refrigerator Car). The vertical and horizontal timbers inside the refrigerating chamber on which the meat is suspended.

Mercury Vapor Lamp. Fig. 2520. A lamp consisting of a tube containing mercury through which the electric current is passed, vaporizing the mercury and giving out a greenish light.

Metal Hose. Figs. 1926, 1927. See HOSE.

Metal Screw Thread. A form of screw thread used when both the male and female screws are made of metal. Metal threads are made of the same size as the spaces between them, whereas the spaces between wood screw threads are made wider than the projections. See also SELLERS SYSTEM OF SCREW THREADS.

Meter. See CONDENSATION METER.

Mica Chimney (Pintsch Lamp). Fig. 2373. A chimney for use on all center lamps, being placed immediately above the ring reflector, allowing a portion of the light to be directed toward the roof of the car. (LANTERN), Fig. 1887.

Micrometer Gage. A form of gage for very minute and exact measurements.

Middle Door Rail. A horizontal bar in a door frame intermediate between the top and bottom rails. See DOOR FRAME.

Middle Transom (Six-Wheel Trucks). 21, Fig. 966; Fig. 977. The term applied to the two transoms nearest the center of the truck, in distinction from the two outside transoms.

Milk Car. Figs. 378 and 381. A car similar to a refrigerator car, but generally built for operation in passenger trains for carrying fresh milk in cans.

Miller Coupler. A form of automatic coupler for passenger cars largely in use before the general adoption of the M. C. B. type of vertical plane coupler. It consisted of a shank and a head with a fixed projection or hook which engaged with a corresponding hook when cars were brought together, by side displacement of the drawbars. To uncouple, one or both of the drawbars were pulled to one side by an uncoupling lever and chain operated from the platform. A strong spring kept the drawbars normally in the center line of draft.

Mine Car. Figs. 203, 205, 206. A small car for carrying minerals in mines, usually having four wheels, and provided with a dumping device by which the load may be quickly and completely discharged.

Mineral Wool. A substance having much the appearance which its name implies, manufactured from the slag of iron furnaces by throwing against it while in the molten state a strong blast of air. It is used for deadening in passenger cars and also largely as a non-conductor for coating steam pipes and boilers.

Molding. Figs. 1444, 1446, 1447. "A mode or ornamentation by grooved or swelling bands or forms, following the line of the object."—Knight. Small moldings are often termed beads and also fillets. A cove molding is one of concave section. There are a great variety of other special technical terms for different forms of moldings. Moldings are either straight or waved. See also DECK EAVES MOLDING, EAVES MOLDING, WINDOW COVE MOLDING, WINDOW MOLDING, WINDOW SILL MOLDING.

(For Car Seats.) Also called seat back bands or seat molding. A metal band to finish the edge of the seat back. Plush or leather covered strips are also used.

Molding Joint Cover. A piece of wood or metal in some ornamental form for covering the joints of two pieces of molding.

Monitor Top. A CLERE-STORY.

Mortise Lock. Fig. 1674. A lock adapted to be inserted into a mortise in the edge of a door, so as only to expose the selvage or edge plate. See LOCK.

Motor (Electric). Figs. 2533-35; 2541, 2548, 2561, 2567. A machine for converting electrical energy into mechanical energy of rotation. May be operated by either alternating or direct current.

(Gasolene). Figs. 2598, 2601, etc. An internal combustion engine, using gasolene as the means of power.

Motor Bearing. See Fig. 2546 for the details of railway electric motor bearing.

Motor Cut-Out. Fig. 2558. A switch in the bottom of a controller which, when opened, cuts out one motor of a two-motor equipment or two motors of a four-motor equipment.

Motor Car. Figs. 189-197, 199-202, 204, 208, 209, 308, 419, 421, 422, 2598, etc. A car driven by some form of motor which is carried by the car itself. The common types of motor cars are electric, which receive current from a third rail, trolley wire or storage batteries; gasolene, which are propelled by internal combustion engines; gasolene-electric or gas-electric, which obtain power from an electric generator driven by an internal combustion engine carried in the car; and steam, which obtain power from a steam boiler and engine located in the car. See CAR, M. C. B. CLASS E and SELF-PROPELLED CAR.

Motor Controller. See CONTROLLER.

Motor-Driven Air Compressor (Air Brake). An air compressor driven by a motor for use on electric cars. See AIR COMPRESSOR.

Motor Inspection Car. Fig. 2599, etc. A small four wheel car with seats, propelled by a gasoline engine.

Motorman's Air Brake Valve. See BRAKE VALVE.

Muck Bar. "Bar iron which has passed once through the rolls. It is usually cut into lengths, piled, and rerolled."—Knight. Certain grades of iron axles are made directly from muck bars and contain no scrap.

Muffler (Vacuum Brake). A device to render noiseless the emission of steam at the ejector when brakes are applied. It is simply a collection of beads or shot, through the interstices of which the steam forces its way.

Muffler Exhaust. See EXHAUST MUFFLER.

Muley Axle. An axle without collars.

Mullion. A bar between panes of glass or panel work. See DOOR MULLION.

Multiple Unit Control (Westinghouse). With the the Westinghouse unit-switch system of automatic multiple-unit control the unit-switches which ...

form the same functions as contactors, are operated by compressed air at 70 lbs. per sq. in., taken from the air-brake system, the pistons being controlled by electro-magnetic needle valves. These switches are interlocked and automatically make the proper combinations of motor connections with the resistances. A limit relay is used for arresting the sequence of switch movements when the main motor current valve rises above a safe amount. The master controller consists of a small box containing a horizontal drum or roller and suitable contact fingers. The operating handle revolves in a vertical plane, and when moved to the right the motors accelerate forward to full speed; when moved to the left the motors accelerate to full speed reverse. There are three points or positions in each direction. The first is the switching point and throws all motors in series with full resistance in cricuit. The second point is the series position and the motors can be operated continuously in series at half speed with the handle in this position. The third point is the parallel position and the motors are connected in multiple with full power. To cut off the current, the pressure on the controller handle is released and a spring returns it to the "off" position. Current for the control circuit is obtained from a small storage battery of 7 cells, giving 14 volts. Multiple-unit control apparatus for single-phase equipments differs but slightly from that used for direct-current motors. The contactors control circuits of varying voltage taken from taps on the auto-transformer. The speed of the motors is thus regulated by varying the voltage impressed on them.

Multiple Unit Control System (Sprague-General Electric). Figs. 2595-6. A system of control where one or more controllers are operated from a distance.

This system has been developed with special reference to the operation of a train consisting of several motor cars coupled together, all motors being controlled simultaneously by a single operator. Each motor car is equipped with a motor controller, one or two master controllers, and control couplers, together with such other apparatus as switches, fuses, rheostats, etc., as constitutes a complete operative motor car equipment.

The motor controller consists of a number of electrically operated switches, called "contactors," which close the various power and motor circuits, and which carry only the current for the operating coils of the contactors. These latter are designed to open the motor circuit contacts by gravity, and are provided with an efficient magnetic blowout for quickly and positively disrupting the arc thus formed. The motor controller also includes an electrically operated reversing switch, called "reverser," the function of which is to connect the motor armatures and fields in the proper relations for giving forward or backward movement of the car. The reverser consists of a drum having two positions and carrying the necessary contacts for engaging fixed contact fingers, together with two operating coils, one for throwing the reverser to each position. The operation of this reverser is also effected by the master controller.

The master controller is similar in construction to the ordinary hand controller, but very small and easily operated. It is provided with separate operating and reversing interlocked handles, and has a magnetic blowout for disrupting the arcs formed on opening the control circuit connections.

The combinations of motors, rheostats, etc., effected by the motor controllers are the same as those accomplished by ordinary hand controllers, giving series and parallel operation of motors and two economical running speeds. (See CONTROLLER.)

Where several cars are coupled in a train the control circuits of the various cars are joined by means of couplers located at the end of each car, so that all motor controller operating circuits and all master controllers are connected together, making all of the motor controllers operative from any master controller. The cars may be coupled into a train without reference to their relative positions, and either end of any car may be coupled to any other car in the train.

The couplings for connecting the control circuits between cars consist of a coupler socket fixed to the end of the car, and a jumper consisting of two coupler plugs connected by a multiple cable. The coupler sockets and plugs contain corresponding metal contacts for the connection of the electrical circuits.

A cut-out switch is provided on each car, by means of which damaged motors or motor controllers may be disconnected from the energizing circuits.

Multiplier (Electric Lighting). Fig. 2322. A device used in connection with a lamp regulator to prevent variations in the current supply to the lamps.

N

Nail. "A small pointed piece of metal, usually with a head, to be driven into a board or other piece of timber, and serving to fasten it to the other timber." —Webster.

The common nails of commerce are divided into cut nails, and clinch nails, and wire nails. They are distinguished in size by the number of pennies, as 10d., 20d., etc., nails.

Nailing Sill. See NAILING STRIP and FLOOR NAILING STRIP.

Nailing Strip. 194 and 194a, Figs. 285-288; 14, Fig. 342; J, Figs. 374, 375; 21, Fig. 383; 9, 10, 11, Fig. 410. A strip of wood laid over a metal frame and bolted to it, to which the boards are nailed in a combined wood and steel car. In refrigerator cars, where there is generally more than one floor course, nailing strips are also used. They are also used in some cases for fastening insulation. See also SIDE NAILING STRIP and FURRING.

Nailing Strip Bracket. 193, Figs. 285-288. A bracket secured to the sills to hold in place the NAILING STRIP.

Nailing Strip Cross Ties. Light members of a metal underframe extending across the sills for the purpose of supporting the nailing strips.

Name Plate. See DOOR NAME PLATE and NOTICE PLATES.

Narrow Gage. The distance in the clear between the heads of the rails of a railroad when less than 4 ft. 8½ in. See GAGE.

Narrow Vestibule. See WIDE VESTIBULE.

Needle Beam. 22, Figs. 285-288, 368, 374, 375; 28, Fig. 383; 26, Figs. 423-425; Figs. 483-485. The transverse members of the underframe of a car between the body bolsters which support the truss rod queen posts. Also act as crossties for the longitudinal sills. The term needle beam is sometimes applied to what is more properly a cross bearer or cross tie.

Needle Beam Bottom Tie Plate. 6, Fig. 410. A plate which extends across the bottom of a needle beam of the built-up type and ties the various members together.

Needle Beam Center Filler. 15, Fig. 410. A casting between the center sills, forming a part of a needle beam of the built-up type.

Needle Beam Truss Rod. A truss rod used in a built-up form of needle beam. Such a needle beam consists of the Cross Tie Timber, Queen Posts and Truss Rod. See also Cross Tie Timber Truss Rod.

Negative. An arbitrary term used in electrical engineering to distinguish the pole or connection toward which current is considered to flow, from the positive pole or connection away from which current flows. Thus direct current always flows from the positive pole or brush of a battery or dynamo through the external circuit and back to the negative pole or brush. Positive poles are distinguished on drawings by a plus (+) sign, and negative poles by a minus (—) sign. In a ground return system the ground connection is always negative.

Nest Spring. A spiral spring with one or more coils of springs inside of it. See Helical Spring.

Night Latch. Fig. 1655, etc. A spring door lock which requires a key to be opened from the outside, but which can be opened from the inside without one. See Latch.

Nipple (Pipe Fittings). Figs. 1946, 1966. A short pipe with a screw thread cut on each end, used for connecting couplings, tees, etc., together or with some other object, as a tank or heater. For combination of strainer and nipple used in car heating apparatus, see Figs. 1970 and 1971. For air brake hose nipple, see Air Brake Hose Nipple.

Non-Pressure Head (Brake Cylinder). The cover for the end of the brake cylinder opposite to that having air pressure against it. It has an opening in the center for the piston rod.

Non-Vestibuled Car (Passenger Equipment). Figs. 99, 100, 102, 105, 112, 126, 129, 130, 133, 134, 137, 138, 141, 157, 411, etc. A car having either open platforms, with hoods, or having dummy ends.

Nosing (of a Lock). A Keeper.

(Of Steps). The part of a tread board which projects beyond the riser, hence the metallic moldings used to protect that part of the tread board. The nosings should be distinguished from the step facings.

Notice Plate. Figs. 1870-1871. Varieties are the platform notice plate, saloon notice plate, etc.

Nozzle. See Tank Nozzle.

Nut. "A small block of metal or wood containing a concave or female screw."—Webster. Nuts take their name from the bolts, rods or other parts to which they are attached. They are usually either square or hexagonal. See Screw Threads.

Nut Fastener. See Nut Lock.

Nut Lock. Figs. 1423, etc. A device for locking the nut in place on the bolt after it has been drawn up. See also Lock Nut. Also called nut fasteners.

Nuts. See Screw Threads, Bolt Heads and Nuts.

O

Oakette. An artificial leather used for curtains and upholstering. It is made by coating a cloth fabric with a compound which gives it the appearance of leather.

Observation-Buffet Car. See Buffet Car and Observation Car.

Observation Car. Fig. 171. A car equipped with an observation end. See Car and Observation End.

A special type of observation car is also in limited use in mountainous regions and generally has open sides and seats arranged in tiers.

Observation End. Figs. 155, 171, 185, 187. That end of a car which is fitted with an extended platform and large windows for the purpose of affording passengers an unobstructed view. Commonly applied to parlor, sleeping and business cars, which are run as the last car in a train, from which passengers may get a view of the country, and especially of the track and structures.

Observation Parlor Car. Fig. 171. A parlor car with an observation end. See Observation End.

Observation Platform Railing. Figs. 582-584.

Observation Sleeping Car. A sleeping car with an Observation End. See Observation End.

Officers' Car. A Business Car.

Oil Box. A Journal Box.

Oil Car. A car made especially for the transportation of mineral oil. Some oil cars are built for carrying barrels of refined oil. Crude oil and refined oil are usually carried in Tank Cars.

Oil Lamp. Figs. 2525-31. A lamp for burning oil. See Tail Lamp.

Open Door Stop. A block of iron or wood fastened to the side of a freight car to prevent a sliding door from sliding too far when opened.

Open Platform. Figs. 100, 102, 119-122, 125, 157, 532, 536-538, 540, etc. A platform covered by a hood or canopy but not enclosed by a vestibule.

Ore Car. Figs. 31-34, 36, 310-315. A hopper car made especially for carrying iron or other ores. Because of the great weight of ore relative to its bulk, ore cars are generally shorter and consequently of less cubic capacity than other forms of hopper cars. See also Car.

Ormolu. A style of bronzing.

Ottoman. A carpet-covered movable cushion serving as a foot rest.

Outer Intermediate Sill. A term applied to the two intermediate sills next to the side-sills, to distinguish them from the two intermediate sills adjacent to the center sills, which are the inner intermediate sills.

Outside Body Truss Rod. When two or more truss rods are used under each side of a car body those farthest from the center are called outside body truss rods, in distinction from the inside truss rods.

Outside End Piece (of Wooden Truck Frame). Fig. 974. The end piece nearest the end of the car, in distinction from the inside end piece. See End Piece.

Outside End Sill. A type of box car framing in which the end sill projects outside the sheathing, forming a narrow platform at the ends of the car.

Outside Hung Brake. Brake gear hung so that the shoes bear on the outer side of the wheels, or the side of the wheels away from the bolster.

Outside Sills. The side sills.

Outside Transom (Six-Wheel Trucks). 22, Fig. 966. The term applied to the two transoms farthest from the center of the truck, in distinction from the middle transoms.

Outside Wheel Piece Plate. An iron plate fastened to the outside of a wheel piece to strengthen it.

Outside Window Sill. A horizontal piece of wood or iron under a window on the outside of a car on which the sash rests.

Outside Window Stop. A wooden or metal strip attached to a window post on the outside of a sash to hold the latter in its place.

Overhang (of a Roof). The projection beyond the sides.

(Of a Car Body.) That part of a car body between the body bolster and end.

Overhang Brace Rod (Passenger Equipment Car Framing). A truss rod extending over the side sills and between the sheathing and wainscoting. Its office is to sustain and stiffen that part of the underframe which overhangs at the ends and outside the bolsters.

Overhead Equalizer Spring (Vestibule). A face plate buffer spring is a more appropriate term, as it corresponds to the side stem buffer spring of a platform equipment.

Overhead Lining (Refrigerator Cars). See Ceiling.

Overhung Door. A sliding door which is hung from or supported on a rail above the door.

P

Package Rack. A basket rack.

Packing. Any substance used to fill a gland to make a tight joint around the valve stem or spindle. Leather, rubber or metal rings used to serve the same purpose on a piston. Also the oiled waste used for lubricating journals.

Packing Blocks. Rectangular blocks gained into the center sills and draft timbers, and serving the purpose of connecting them firmly together longitudinally. The term is borrowed from bridgework, in which the form of packing block is very common. They are called key blocks.

Packing Expander (Air Brake). A spring wire ring for spreading out the leather packing of the brake piston so as to make it fit air-tight.

Packing Leather (of Journal Boxes). A dust guard is sometimes called packing leather.

(Air Brake.) A ring of leather used in connection with brake cylinder pistons to make an air-tight fit. When so used it is always accompanied with a packing leather expander. A packing leather for a piston rod is called a cup leather, and is compressed by a piston spring. See Piston Packing Leather.

Packing Ring (Triple Valve). 5, Figs. 1273-1275. A circular metallic ring of variable rectangular cross-section which is placed in grooves in the edge of the piston to make it fit air-tight in the cylinder. The rings are turned slightly larger than the cylinder and cut apart diagonally at one point so that when compressed they will tend to spring open.

(Hose Coupling.) An India rubber ring in a coupling case which makes a tight joint between the two parts of the coupling.

Padlock. Fig. 1656. A loose lock having a semi-circular shackle jointed at one end so that it can be opened, the other end of the link being locked when desired by the entrance of the sliding bolt into it. Such locks are used to secure a hasp or the like on a staple or similar device by passing the link through the staple. A spring padlock is one which snaps shut and locks by pressure only. A dead padlock has no springs.

Painting (of Passenger Equipment Cars). Consists usually of the priming, rough stuff or scraping filling coats, color coats and varnishing. The care and expense devoted to the process and the order and number of the coats are varied.

Pamphlets, Catalogs, Specifications, etc. See Master Car Builders' Association Reports.

Panel. A board inserted in the space left between the stiles and rails of a frame or between moldings. Sometimes metal plates are used for this purpose. Door panels in passenger cars are usually only the middle and lower or twin door panels. The upper door panel is usually of glass. Window panels come between the windows, and are distinguished as outside and inside. Wainscot panels come below the windows, between the upper and lower wainscot rails. Other interior panels are deck side panels and end panels, the latter sometimes called ventilator panel, and the end roof panel over the door.

(Of a Truss.) The space between two vertical posts or braces and the two chords of a truss.

(Electric Lighting.) Figs. 2274, etc. A board or support for electric switches and other apparatus.

Panel Back Seats. Figs. 1540-1546. A car seat made with a loose panel in the back, pivoted and supported by springs set in the seat back frame. The panel pushes back and accommodates itself to the occupant's back.

Panel Ceiling. Any form of ceiling divided into panels. This term is commonly used synonymously with wood or Agasote ceiling.

Panel Furring. Nailing strips or block for panels.

Panel Lamp. Figs. 2248, 2249, 2257. An Alcove Lamp.

Pantagraph Trolley (Electric Motor Car). Fig. 2557. A current collecting device for an overhead conductor consisting of a diamond shaped jointed frame operated by springs or compressed air, and having a suitable collector at the top.

Pantasote. A substitute for leather used for upholstering and decorating cars and steamships. The material was first made by R. P. Bradley, a chemist, and the ingredients are secret. That it contains rubber or any animal substance is denied. It is made by sheeting two or more pieces of cloth or canvas together, with the warp running in different directions, to give strength. The sheet making the leather side is passed between heavy rollers many times, and each time it receives a very thin coat of pantasote material, and this is kept up until the cloth or canvas is thoroughly saturated and coated. The color is added to the pantasote material and is incorporated into the fabric. It is very like leather, and is not readily distinguished from it.

Paper Box (Postal Car). Fig. 1721. A box used for the distribution of papers.

Parallel. A method of connecting two or more pieces of electrical apparatus of a common circuit so that the positive poles of each are connected to a common positive conductor and the negative poles are connected to a common negative conductor. See Series.

Parallel Brake Hanger. See Brake Beam Adjusting Hanger.

Parcel Rack. See Basket Rack.

Parlor Car. Figs. 170-175, 177-179. A car for day travel, but of a more luxurious character than a day coach, having revolving seats, smoking compartment and other conveniences, and on which an extra fare is charged. Operated on many roads by the Pullman Company and often referred to as Pullman cars. The term chair car is also sometimes used, but incorrectly, as a chair car is properly a day coach with reclining seats, on which no extra fare is charged.

Parlor Car Chair. Figs. 1522-1526; 1535; 1538; 1544-1546; 1557, 1558; 1563; 1564. The most common type of chair for parlor cars is a simple arm chair revolving on a pivot which enters a fixed pedestal. In observation cars, etc., ordinary chairs are commonly used.

Parlor-Café Car. See CAFÉ-PARLOR CAR, CAFÉ CAR and PARLOR CAR.

Parting Bead or **Parting Strip.** A strip which acts as a distance piece between two objects, as a window and a window blind.

Parting Rail (Door Frame). A vertical rail between the bottom and middle or middle and top rails of a door or partition, dividing a panel into twin panels.

Partition Stop (Door Holder). So called in distinction from a floor stop.

Passenger Car. Figs. 140, 142-151, 153, 154, 157, 189-197, 237-240, 402-404, 408, 409, 415, 421, 422. A car used for carrying passengers. This term is, however, generally confined to that class of passenger cars commonly known as day coaches, which are equipped with seats or reclining chairs for day travel. See CAR, M. C. B. CLASSES E and P, and PARLOR CAR.

Passenger Car Journal Box. See JOURNAL BOXES AND DETAILS.

Passenger Equipment Cars, Steam and Air Connections for. See STEAM and AIR CONNECTIONS FOR PASSENGER EQUIPMENT CARS.

Passenger Train Car or **Passenger Equipment Car.** Figs. 99-105, 112, 113, 126-202, 231, etc., 378, 381 and 387-425. A car usually operated in passenger trains. See CAR, M. C. B. CLASSES B, C, D, E, M, P and I.

Pawl. (Brake Ratchet Wheel). Figs. 1409, 1410. A pivoted bar adapted to fall into the notches or teeth of a wheel as it rotates in one direction, and to restrain it from back motion. Used in windlasses, capstans and similar machinery. See RATCHET WHEEL.

Pedestal (Postal Car). Fig. 1717. Standards which are used to carry the two longitudinal rods near the center of the car which support one side of the distributing tray, dumping tray or bridge. The pedestal fits in a socket in a base plate and is usually secured in place by bolts with wing nuts, so that it can be easily removed. Also called a center stand or standard.

(Truck.) 5, Figs. 945, 947, 966; Fig. 1112. A casting of somewhat the form of an inverted letter U, bolted to the wheel piece of a truck frame to hold the journal box in its place, while permitting a vertical movement. The two projections of a pedestal are called pedestal legs, and the space between them a jaw, which is closed at the bottom by a pedestal tie bar. In Great Britain pedestals are called axle guards on cars and horn plates on locomotives.

(Revolving Chairs.) The stand by which the chair is supported; consists of three portions—base, column and seat frame.

Pedestal Jaw. The vertical side member of a truck pedestal. See PEDESTAL.

Pedestal, Passenger Car (M. C. B. Standard). Figs. 2705, 2707-8. For Journal 5 by 9 inches. Adopted as Recommended Practice 1903. Revised 1909. Adopted Standard 1911.

For Journals, 3¾ by 7 inches. The pedestal shown on this drawing was recommended in 1874. See Proceedings 1874, page 40; again approved as standard in 1881; see Proceedings 1881, pages 14, 15 and 27. Also approved by the Master Mechanics' Association in the same year. Again adopted as standard in 1893. Weight, 141 pounds.

For Journals, 4¼ by 8 inches. In 1898 a Recommended Practice was adopted for passenger car pedestal for journal box with 4¼ by 8 inch journal. In 1901, as a result of letter ballot, this was changed to Standard, and is now shown on the drawing.

Pedestal Spring. A spring which rests on a journal box between the jaws of a pedestal.

Pedestal Stay Rod. 7, Figs. 947, 966. A transverse rod connecting the pedestal tie bars on each side of a truck to prevent them from spreading.

Also a rod connecting the pedestal tie bars on four-wheel caboose cars.

Pedestal Strap. Figs. 975, 978. A Pedestal Tie Bar.

Pedestal Tie Bar. 6, Figs. 945, 947, 966, 975, 978. A bar extending across the mouth of a pedestal jaw underneath a journal box and bolted to the jaws of the pedestal. Also a bar sometimes called pedestal strap, connecting two or more pedestals on the same side of a truck or car.

Pedestal Timber (Four-Wheel Cabooses). A longitudinal member sometimes used on four-wheeled cars, which is placed under the floor or alongside the sill and to which the pedestals are bolted.

A term sometimes used to designate the WHEEL PIECE of trucks.

Pedestal Truck. Figs. 924, 925, 926, 927, 933, 936, 944, 946-973. A truck which has its journal boxes held in and guided by pedestals which are either a part of or rigidly attached to the side frames. The axle and boxes can thus move vertically in the pedestals and shocks due to the unevenness of the track are not transmitted to the truck frames to the same extent as in a truck which has the side frames and journal boxes rigidly connected.

Pen Rack. Fig. 1875.

Pendant. Figs. 2482, 2517, etc. A small suspended lamp.

Perforated Veneer. A form of seat covering which consists of three, and sometimes four, layers of wood veneering, glued together and perforated.

Phosphor Bronze. "A term applied to an alloy of bronze or brass, or to a triple alloy of copper, tin and zinc, which has been given special purity and excellence by skillful fluxing with phosphorus. It is supposed that the presence of phosphorus gives the tin a crystalline character which enables it to alloy more completely and strongly with the copper. Whether for this reason or not, the phosphor bronzes, when skillfully made, are greatly superior to unphosphorated alloys."—Thurston.

Pilaster. "A square pier, like a flat column built against a wall, and having cap and base."—Knight.

Pilaster, Cap Bracket and Base. 8, 9, 10 and 25, Fig. 1450. A decorative feature of a car interior, placed between the windows and covering the window post.

Pile Driver Car. Figs. 222, 223. A car used for driving piles in construction or maintenance-of-way repair work. Pile drivers are equipped with long bars, called leaders, which are held erect and act as a guide for a hammer or tup. In driving piles a pile is held between the leaders and driven by the hammer dropping on it after being hoisted by a cable and hoisting engine which are located on the car. For moving from place to place in trains the leaders fold back and the forward end is carried on a flat car. Pile drivers are usually self-propelling for short distances at low speeds, such as moving about yards, etc.

Pile Hoisting Sheave (Pile Driver). A wheel placed at the side of the main sheave, for use in hoisting piles.

Pillow Box (Sleeping Cars). 19, Figs. 1458, 1459. The space under the seat in which pillows are stored when the berth is not made up.

Pillar Crane. A style of crane having the mast supported from below, either by a mast pocket or a base plate.

Pinion. The smaller cog wheel of two wheels in gear.

Pintsch Gas Burner. Fig. 2111. Used on all Pintsch lamps other than the bracket lamps. It consists of a small lava tip of the "fish-tail" type, held in a special brass pillar.

Pintsch Gas Lamp. Figs. 2127, 2129, 2131, etc. A lamp for burning gas, the essential features of which are the closed globe at the bottom, the white porcelain reflector above the flames near the top of the globe, and the peculiar method of supplying air.

Various forms of cutter lamps are made, all on the regenerative principle, the inlet air being highly heated before reaching the flames, thereby producing extreme whiteness and steadiness of light.

Some of these lamps are supported by four ornamental arms, one of which forms the gasway. In all, the interior of the lamp is so constructed that a portion of the light is reflected outward and upward toward the roof of the car, illuminating it.

In all standard center lamps air is admitted to the lamp immediately above the upper dome, 101. Passing thence through the orifice in chimney, 313, it comes in contact with the sheet iron flues, 312, and in its downward passage becomes highly heated. It then issues into a space within the dome, 101, between the dome and the mica chimney, 109, and continuing its course is, by the diaphragm, 315, deflected and constrained to pass close to the mica chimney, where it is still further heated. It now passes outward between diaphragm, 315, and the ring reflector, 110, and through the orifices near the outer rim of this reflector into the bowl and to the flames. In its tortuous course the effect of drafts against the lamp is entirely nullified.

The products of combustion escape directly through the annular space between mica chimney, 109, and the cup reflector, 111. Thence by flues, 312, out through the crown at the top of the lamp, in the case of the four-arm lamps, and through the flues, 333.

In vestibule lamps, two or four-flame, air is admitted to the annular space between the parts of ventilating chimney, 324, through the shielded opening above the roof, immediately below the ventilator. Becoming heated in its downward passage, it passes through the diaphragm, 323a, and through the orifices in the body, 320, to the flames. The products of combustion escape through the flues, 321, and the chimney, 324, to the outside air. Any excess of air over and above what is required for proper combustion of the gas will also be carried off by the ventilating chimney, which the air reaches from the space above the body by means of the passage around the outside of the chimney, 321.

Pintsch Gas Lamps (Method of Securing and Connecting). (Four-Arm Lamps.) Fig. 2136. The arms are secured by means of nipples, 26, passing through the roof; a water-tight joint around the nipples on the roof being made by bedding putty close around the nipple, with a rubber washer, 24, above the putty, and the iron washer, 23, above the rubber. The lock nuts, 27, are then put on and forced down until the excess putty is forced out and the arm drawn firmly up to its place. The gas arm nipple is then supplied with the reducing elbow, 28, the three blank arms with caps, 29. The elbow, 28, is then connected with the ⅛-in. pipe to the flange tee, 16c, on the roof line. The roof around the smoke bell is protected with a tin thimble, large enough to give a ½-in. air space around the smoke bell flue. The upper end of this thimble is made of proper size to receive the ventilator, 204.

Pintsch Mantle Lamp. Figs. 2142, 2209, etc. An improvement on the standard Pintsch gas lamp whereby the same gas is burned with an incandescent mantle enclosed in a bulb, Fig. 2168. The candle power of the lamps is greatly increased with the same consumption of gas. No change is necessary in the piping of the car, but the regulator is adjusted to give a higher pressure in the car piping. The form of lamp used is very similar to the standard Pintsch gas lamp.

Pintsch Pillar. 230, Fig. 2132. Used on bracket lamps below the burner. Where no globe holder is used a mill check is placed immediately below the pillar.

Pintsch System of Gas Lighting. Figs. 2108-2206. A system of car lighting which burns gas taken from a storage tank, where it is carried under a pressure of 150 lbs., or less, per square inch. The gas is an oil gas, made from crude petroleum or similar oils, and is able to withstand a high degree of compression without undue loss of *luminosity*. The pressure of 150 lbs. of the receiver tank is automatically reduced by the Pintsch regulator (Fig. 2110) to a uniform pressure at the burners of about ½ oz., regardless of the pressure in the gas receiver.

The arrangement of the apparatus is shown in Fig. 2109. The receiver or gas holder, A, suspended beneath the car floor, is connected by a system of extra heavy ¼-in. pipes, with soldered joints and special fittings, to the regulator, R. The charging of the receiver is effected (from either side of the car) by means of hose, connecting the charging lines from the gas station with the filling valves, F (Fig. 2108). The gage, G, communicating with the high pressure pipes connecting the various parts of the apparatus below the car, serves the double purpose of registering the amount of pressure in the receiver at any time and of showing the amount of gas consumed in lighting the car for any given period.

From the regulator, R, the gas (with its pressure reduced to about ½ oz. per sq. in.) passes upward through the car toward the roof. At some convenient point, as in a saloon or locker, a main cock (Figs. 2110 and 2112) is placed as shown, whereby the flow of gas to the lamps is controlled.

A ½-inch pipe is run along the roof, with ⅛-inch branches to each lamp or bracket. These branches are made by means of special flanged tees (Fig. 2110). Where ⅛-inch connections are necessary, passing downward from the ½-inch low pressure line on the roof to brackets or vestibule lamps, the flanged elbow or angle fitting (Fig. 2110) is used.

For lamps and methods of suspending and connecting them see Pintsch Gas Lamps.

The burner is of the "fish-tail" type, and from one to six are used in each lamp or light, four being the number generally adopted. See Pintsch Gas Burners.

Pintsch Washers. These washers are of lead and rubber, in three sizes, and are always used in pairs. The rubber is always placed first on the fitting, the lead outside with the collar inward. When pressure is brought upon the washer, the lead collar protects the inner edge of the rubber, the body of the lead washer protects the outside surface of the rubber, and the rib protects the outer edge of rubber. The rubber is entirely enclosed in metal, and protected from the action of the gas, which would otherwise destroy it. The scored surfaces of the flanges entering into the soft lead make a perfectly tight joint. These washers are used on all classes of flanged fittings, whether high or low pressure.

Pipe. "A tube for conveyance of water, air, or other fluids."—Knight. See Brake Pipe, etc.

Pipe Bracket. See Pipe Clamp.

Pipe Bushing. See Bushing.

Pipe Clamp. Figs. 1384, 1394-1397. A clamp for holding the air brake, signal or steam pipes in place under the car.

Pipe Clip or **Strap.** An iron band for fastening a pipe against or to some other object. They are usually single, but sometimes double, for two or more pipes. See Clip.

Pipe Coupling. Fig. 1946. A short tube with a thread cut on the inside at each end, which is screwed on the ends of two pipes and used for uniting them together, or uniting one pipe with another object, as a cock or valve. In some couplings the thread at one end is right hand and the other left hand, but generally they are both right hand threads.

Pipe Fittings. The connections for systems of wrought iron, gas, water, and steam pipes. The more usual pipe fittings are bushings, elbows, tees, return bends (close or open), reducers, couplings, nipples, plugs, etc.

Pipe Hanger. A hanger for supporting a pipe.

Pipe Reducer. See Bushing.

Pipe Screw Threads. Screw threads used for connecting wrought iron pipes. Such screws are cut "tapered"; that is, the end of the pipe, or the inside of the coupling where the thread is cut, forms part of a cone, so that in screwing up the pipe a tight joint can be made. Pipe threads are of a V-shape, sharp at the top and bottom, and their sides stand at the angle of 60° to each other. The following is the number of threads per inch for pipes of different sizes. The size is given by the inside diameter, but the actual bore of the smaller sizes is considerably larger than the nominal. The exterior diameter of ordinary gas pipe is from .27 to .37 inches greater than the inside diameter.

American Standard System of Pipe Threads.

Size of pipe.	Outside diameter. Ins.	Inside diameter. Ins.	Inside. diam. Extra strong. Ins.	Inside diam. Double extra strong. Ins.	Threads per inch.	Whitworth's thread.
⅛ in.	.405	.27	.205		27	28
¼ "	.54	.364	.294		18	19
⅜ "	.675	.494	.421		18	19
½ "	.84	.623	.542	.244	14	14
¾ "	1.05	.824	.736	.422	14	14
1 "	1.315	1.048	.915	.587	11½	11
1¼ "	1.66	1.38	1.272	.884	11½	11
1½ "	1.9	1.611	1.494	1.088	11½	11
2 "	2.375	2.067	1.933	1.491	11½	11
2½ "	2.875	2.468	2.315	1.755	8	
3 "	3.5	3.067	2.892	2.284	8	
3½ "	4.	3.548	3.358	2.716	8	
4 "	4.5	4.026	3.818	3.136	8	
4½ "	5.	4.508			8	
5 "	5.563	5.045			8	
6 "	6.625	6.065			8	
7 "	7.625	7.023			8	
8 "	8.625	7.982			8	
9 "	9.688	9.001			8	
10 "	10.075	10.019			8	

(The European standard is the Whitworth pipe thread, which is quite different.)

Taper of Thread ¾ in. per foot.

Pipe Shield (Steam Heating). A metal covering over the radiator pipes to protect surrounding parts or passengers' clothes from the heat of the pipes.

Pipe Unions (M. C. B. Standard). In 1903 the dimensions for pipe unions as shown on accompanying table were adopted as standard. In 1908 the following specifications were adopted:

That all wrought iron pipe for car work be threaded with a standard total taper of ¾ inch in one foot, and that all pipe fittings be tapped to suit the standard pipe thread with a total taper of ¾ inch in one foot, so that the thread on pipe and fittings will be uniform and taper-tight. See Illustration on Page 117 and Table on Page 168.

Piping. See Lavatory and Water Supply. See also illustrations in section on Passenger Train Heating Apparatus and Air Brakes.

Piston. A metal disk with packing, etc., made to fit in a cylinder, and transmit the power caused by the pressure of a working fluid to the external rod and working parts of some form of engine. In a brake cylinder the piston transfers the pressure of the air to the foundation brake gear. A piston consists of a piston head, attached to a piston rod. The piston follower or follower plate lies at the back of the piston head, inclosing between them the piston packing rings, or (in air brake cylinders) the piston packing leather, which latter is provided with a packing leather expander. The follower plate is secured to the piston with follower bolts.

Piston Packing Expander (Air Brake). A spring wire ring for spreading out the leather packing of the piston so as to make it fit air-tight against the cylinder walls.

Piston Packing Leather (Air Brake). A circular ring of leather used as a substitute for piston packing rings, pressed into the cylinder so as to have an L-section. It is attached to and surrounds the piston and bears against the inside surface of the cylinder being pressed against it by a piston packing expander.

Piston Packing Ring. See Packing Ring.

Piston Rod (Brake Cylinder). A rod attached to the piston of a passenger brake cylinder, by which the pressure against the piston is transmitted to the brake levers and shoes.

A tube attached to the piston of a freight brake cylinder to act as a guide to the piston as it is forced outward by the air pressure. In this case a Push Rod is attached to the levers and is inclosed by the tube. The push rod transmits the pressure on the piston to the levers and brake shoes, while it allows an application of the brakes by hand without pulling out the piston.

Piston Travel (Air Brakes). The amount of movement of the piston when forced outward as the brakes are applied. Running piston travel is the piston travel obtained when the car is in motion and is always greater than the travel obtained when the car is at rest, due to the fact that the slack or lost motion in trucks and brake gear as well as the elasticity of the car body is more easily taken up by the brake shoe pressure when the car is in motion. False travel is that due to some unevenness of the track or to some cause which occasions a momentary change.

Pitch (Of a Screw). The advance made by the thread in one complete revolution, usually expressed by the number of threads in a given space, as (in U. S. and Great Britain) an inch.

(Of a Roof.) The ratio of the rise of a roof to the horizontal distance covered.

Pitching Roof. A roof formed of one or more inclined plane surfaces. When the pitch becomes steep, the term is used to distinguish a roof formed of plane surfaces from one formed of curved or arched surfaces.

Pivot. "A pin or short shaft on which anything turns." —Webster.

Pivot Pin (M. C. B. Coupler). Another name for the Knuckle Pin. It is so called from the fact that the knuckle when opening swings about the pin as a pivot. See Automatic Car Coupler Specifications.

Plane Gage for Solid Steel Wheels. See Wheels, Solid Steel, Plane Gage for.

Plain Triple Valve (Air Brake). A triple valve which has no provision for making emergency applications. See Triple Valve.

Plank. A broad piece of sawed timber, differing from a board only in being thicker.

Plastic Car Roof. Figs. 865, 867. A roofing material the body of which is composed of a very heavy layer of woolen felt, thoroughly saturated with a compound which it is claimed preserves the roofing itself and also the upper and lower boarding with which it comes in contact. See Car Roof.

Plate. (Architecture). "A piece of timber which supports the ends of the rafters."—Webster.

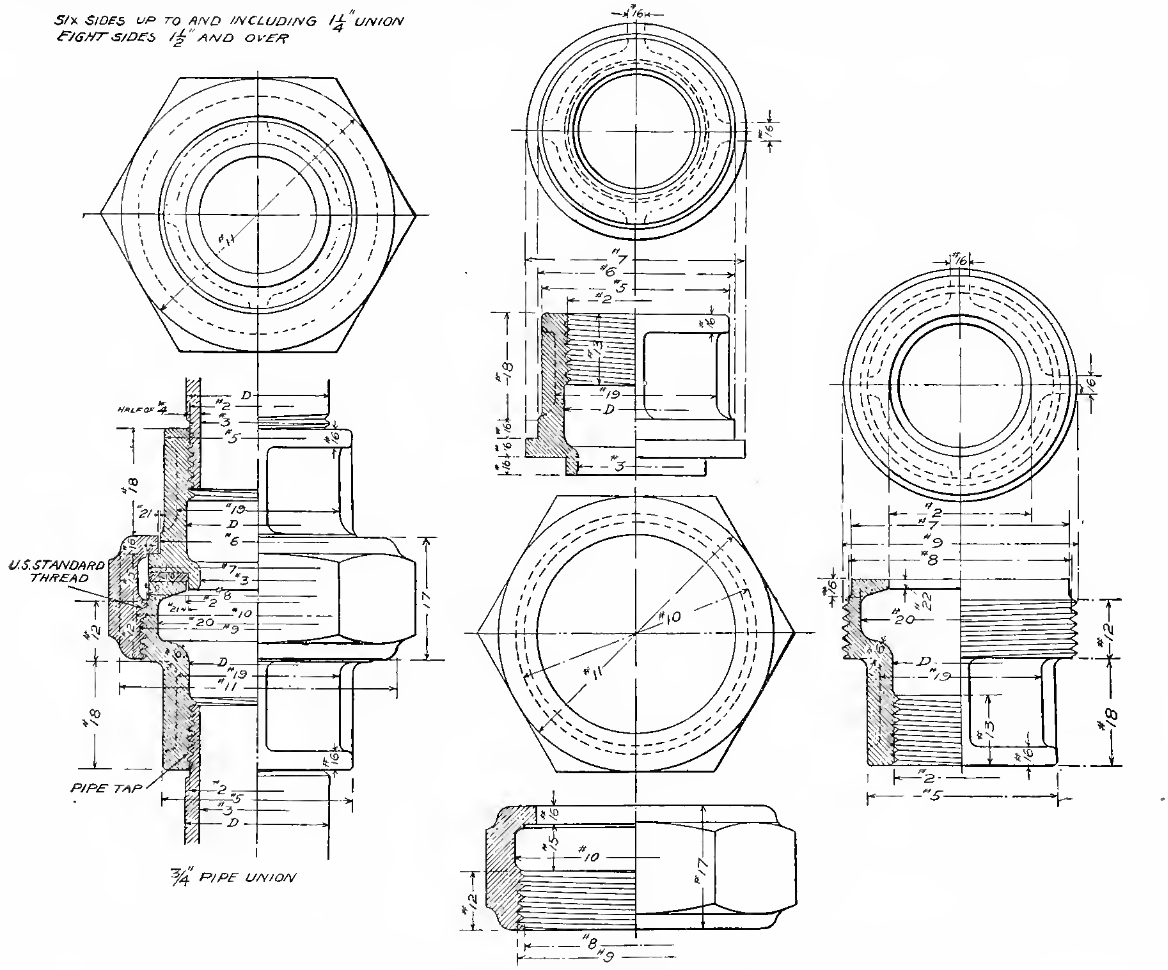
(Car Building.) A horizontal member on top of the posts of a car body supporting the roof car-lines or rafters. Also called side plate, in distinction from an End Plate, which is a similar member across the end of the car. A deck plate is used to cap the deck posts of an upper deck.

(Of a Cast Iron Car Wheel.) The central portion connecting the hub and tread, sometimes single plate, sometimes double plate. The plate is stiffened by brackets.

Plate Facing. An inside cornice fascia.

Plate Rod (Freight Cars). A horizontal metal rod passing across the car through the two side plates to tie them together.

Plate Washer. Usually a wrought iron cut washer, in



THREE-QUARTER INCH PIPE UNION. SEE ALSO PAGE 168 FOR TABLE OF SIZES.

distinction from a cast washer, but also used to designate many forms of large washers or plates serving as double or triple washers. See WASHER.

Plate Wheel. Fig. 1115, etc. A car wheel of which the center portion is formed of a disk or plate instead of spokes. See WHEEL.

Platform (Passenger and Caboose Cars). Figs. 504, 507, 520-523. A floor at the end of a car, supported by projecting timbers below the car body, to facilitate ingress and egress. A narrow platform is sometimes added to freight cars for convenience of train men, but a platform proper is used only on passenger equipment cars and cabooses. The term platform is commonly applied to the frame which supports the platform proper in passenger equipment cars, together with its buffing devices. The term is also commonly used for buffing devices and their framing for non-vestibule cars, which have no platform proper.

Platform Car. A flat car.

Platform Chain. A chain connecting the inner platform railings, posts and rails, closing the passageway between the platforms of two cars coupled together. It is used only on the rear end of the last car, and the front end of the first car when the first car is a passenger car.

Platform Cover Plate. 26, Fig. 410. A steel cover plate over the platform sills.

Platform End Bracket. An ornamental casting attached under the platform roof on each side of the vestibule face plate on narrow vestibule cars.

Platform End Sill. 16, Fig. 383; 21, Fig. 410. The transverse end piece of the platform framing.

Platform End Timber or **Buffer Beam.** A cross timber at the outer end of a car platform. A platform end sill.

Platform Floor. The layer of boards over the platform sills.

Platform Gate. Fig. 580. A gate used to close the side entrance to a platform, in general use only for private cars, suburban cars and street cars. See PLATFORM TAIL GATE.

Platform Hood. A cover or canopy formed by extending a car roof over the platform. Sometimes called CANOPY. It is made of wood, sheet iron or agasote.

Platform Hood Bow. 108, Figs. 423-425. A bent member which forms the outer edge of a platform hood and to which the platform hood carlines are fastened.

Platform Hood Bracket. A bracket or knee iron to connect the hood to the corner post.

Platform Hood Carlines. Transverse members which support the roof of a platform hood.

Platform Hood Ceiling. See PLATFORM HOOD SIDE PIECE.

Platform Hood Post. An upright iron bar or rod sometimes attached to the platform or platform railing, to support a platform hood.

Platform Hood Side Piece. The side piece to which the ceiling is attached.

Platform Lever. A lever for uncoupling cars from the platform.

Platform Lever Pin. The pin on which the platform lever pivots.

Platform Plate or **Buffer.** A steel angle plate bolted to the buffer stems and overlapping the platform end sill. When in contact with the like plate of another car, it makes a continuous floor between them. Being pivoted at the platform end sill, it adjusts itself to all curves of the road. The platform plate also acts as a buffer, and is sometimes so called. See VESTIBULE.

Platform Railing. 7, Fig. 383; Figs. 582-584. An inclosure consisting of iron or brass posts and rails on the end of an open platform to prevent persons from falling off and also to act as a hand hold.

Platform Roof. That portion of a car roof which projects over the platform. See PLATFORM HOOD.

Platform Roof Carline. A carline supporting the platform roof. See CARLINE.

Platform Roof End Carline. The carline at the extreme end of the platform roof. See CARLINE.

Platform Safety Chains. See SAFETY CHAINS, PLATFORM.

Platform Short Sills. Short longitudinal pieces of timber, not extending under the car proper, which are framed into and bolted to the end sills and platform end timbers of a passenger car to sustain the floor of the platform. The longer timbers which extend under the body of the car proper are called platform sills.

Platform Sill. Fig. 418; 34, Figs. 423-425. A sill extending beyond the end of a car to support the platform.

Platform Steps. Figs. 570-576; 610, 621. The stairs at each corner of a passenger equipment or caboose car which afford the means of ingress and egress. Forms of steps have been introduced, but are not in general use, which are folding or extensible, being dropped down into position when the car is stationary, and removed or elevated when the train starts. In modern passenger cars the platform steps usually consist of three and sometimes four separate steps below the platform. Wooden steps are sometimes called box steps.

Platform Tail Gate. Figs. 578 and 581. A gate used to close the passageway at the rear of the last car of a train which is ordinarily used for passage from one car to the other.

Platform Tail Lamp. Figs. 1889, 1900, 1904. A signal lamp which stands on the rear platform of a train.

Platform Tie Rods. Horizontal rods passing through the platform end timber and end sill or body bolster, for the purpose of holding them and the other portions of the frame of the car securely together.

Platform Timber. See PLATFORM SILL.

Platform Trap Door. Figs. 563-569. A door which covers the space occupied by the steps, and thus extends the platform out to the side of the car. It is used on wide vestibuled cars, private cars equipped with open platforms, and suburban, elevated and subway train cars, which commonly make stops at station platforms which are level with the car platform.

Plow. See SNOW PLOW and BALLAST PLOW.

Plug. See REFRIGERATOR CAR PLUG.

(Pipe Fittings.) A short, solid metal cylinder, with a screw on the outside and a square or hexagonal end to take hold of with a wrench, screwed into the end of a pipe or hole in a plate, to close the opening.

Plumbago. Graphite; one of the forms of pure carbon from which pencils, etc., are manufactured.

Plush. A kind of heavy cloth with a velvet nap on one side. Plush is used in car building as a covering for upholstered seats.

Pneumatic Jack. Fig. 2643. A jack operated by compressed air. See JACK.

Pocket (Drawbar Attachment). A yoke.

(Sleeping Car.) A receptacle for the clothing and small baggage of occupants of sleeping berths. Known as the head board pocket for the lower berth and upper berth pocket.

Any object having a cavity or opening which forms a receptacle to hold anything in its place. See PUSH POLE POCKET.

Pocket Hinge. Fig. 1836.

Pole Changer (Electric Lighting). Figs. 2314-15. An automatic device for preserving the polarity of an axle generator. It is made generally in one of three types; rotating, mechanical or electrical type. The rotating type employs the principle of shifting the brushes of the generator automatically when the direction of rotation changes through an angle equal to the pole pitch; that is, the angle between two poles of the generator. If it is a two-pole machine, the brushes must be shifted 180 degs.; if a four-pole machine 90 degs. The latter is the general arrangement. The rotating type employs no switches or contacts that might interfere with the continuity of the armature circuit, and it permits the brushes taking a "lead," advantages not possessed by the other types which necessarily employ fixed brushes. The mechanical type consists of a reversing switch operated mechanically by the rotation of the armature shaft in one direction or the other. When the armature rotates in one direction the switch is automatically closed to make proper connections under these conditions and vice versa. The electrical type consists of a reversing switch, generally operated by solenoids, the entire mechanism being placed inside of the car with the other electrical apparatus. This reversing switch is automatically thrown one way or the other, depending upon the direction of the rotation of the generator armature.

Poling Car. See CAR, M. C. B. Class Y.

Pop Safety Valve. A valve set with a spring so as to open suddenly with a wide opening at a fixed pressure.

Port. An opening in a valve for the passage of steam or air.

Positive. An arbitrary term used in electrical engineering to denote a pole or connection away from which current flows toward a negative pole or conductor. See NEGATIVE.

Post. A piece of timber or metal set upright and intended to support something else, as the posts of a house. See QUEEN POST, etc.

Post Cap. See POST POCKET.

Post Office Car. See POSTAL CAR.

Post Pocket. 34b and 42a, Figs. 285-288; Figs. 492, 493. A casting attached to the top of the side or end sill or the bottom of the side or end plate of a car to receive and hold a post or a post and a brace, in distinction from a stake pocket which is bolted to the outside of the side sill. Such pockets are commonly used with box and stock cars. The post pockets used below the plates are sometimes called post caps. See POCKET.

Postal Car. Figs. 131, 132, 134-139, 141, 256, 257, 259, 260, 388-90, 401. A passenger equipment car for carrying mail. Some postal cars are fitted with pigeon holes, etc., for the distribution of mail, and others are for storage only. See CAR, M. C. B., Classes M and CO; and POSTAL CARS, U. S. GOV'T SPECIFICATIONS.

Postal Cars—United States Government Specifications. Figs. 256, 257, 259, 260 and 1711-1728.

In 1912 the United States Government after a series of conferences with a committee of mechanical engineers appointed by the railroads, issued the specifications given below for postal cars and fixtures. These specifications cover 60 ft., 50 ft., 40 ft., and 30 ft. postal or mail cars; 30 ft., 25 ft., 20 ft., 15 ft., 12 ft., 10 ft. and 8 ft. mail apartments; and 15 ft., 12 ft. 10 ft., 8 ft. and 6 ft. alley apartments. The floor plans shown in Figs. 256, 257, 259 and 260 give the representative sizes of cars and apartments, the others being similar.

The following specification, dated March 28, 1912, and corrected to June 24, 1912, is for the construction of steel and steel underframe full postal cars. It will also govern in the case of steel and steel underframe mail apartment cars.

GENERAL.

1. TYPE.—Postal cars may be built according to any of the following types of construction:

I. Heavy center sill construction, the center sills acting as the main carrying member.

II. Side carrying construction, the sides of the car acting as the main carrying members, having their support at the bolsters.

III. Underframe construction in which the load is carried by all the longitudinal members of the lower frame. The superstructure framing may be of steel or of wood reinforced as per Railway Mail Service specification plan No. 1.

IV. Combination construction in which the side frames carry a part of the load, transferring same to the center sills at points remote from the center plate for the purpose of utilizing uniform center sill area.

Steel castings may be used as parts of the underframe in any of the above types.

2. MATERIALS.—All rolled-steel plates and shapes used in the car framing shall be made by the open-hearth process.

3. The physical and chemical properties of all material used in the car framing shall be in accordance with the latest standard specifications of the American Society for Testing Materials, as follows: The standard specification for structural steel for bridges, for steel plates, shapes, and bars; the standard specification for wrought iron, for iron bars and plates; the standard specifications for steel castings, for malleable castings, and for gray iron castings.

4. WORKMANSHIP.—All workmanship throughout the car shall be first class. The jointing of the car framing shall be made so that the structure as a whole shall be built to dimensions specified, and all joints exposed to the weather shall be made tight against leakage.

5. LIVE LOADS.—The car body shall be designed to carry the specified live load in addition to its own dead weight under service conditions. Where no live load is specified the maximum capacity of car, as determined by wheel loads given in paragraph 45, shall be used as a basis for calculations.

6. BUFFING.—The maximum end shock due to buffing shall be assumed as a static load of 400,000 pounds applied horizontally at the resultant line of the forces acting at the center line of the buffing mechanism and at the center line of draft gear, respectively, and shall be assumed to be resisted by all continuous longitudinal underframe members below floor level, provided such members are sufficiently tied together to act in unison.

7. DETAILS.—All connections, except those specified in paragraph 25, shall be designed for the maximum strain to which the member connected shall be subject, and secondary stresses in any members caused by eccentric loads shall be properly combined with the direct stresses in such

members. The maximum fiber stress in any member subject to both direct and secondary stresses may be taken at 20 per cent. greater than those given in paragraph 28, but the direct stresses considered alone must not exceed the allowable stresses given in said paragraph.

8. The minimum distance between centers of rivet holes shall be three diameters of the rivet, and the minimum distance between the center of the rivet hole and a sheared edge shall be not less than one and one-half times the diameter of the rivet.

9. Below the floor line, framing connections of floor beams, posts, etc., may be of rolled steel, pressed plate, or cast steel, and above the floor line such connections may also be of malleable iron. Connections for I beams, channels, or tees may also be made by coping the flanges and bending the web to form a knee, and for angles by coping one leg and bending the other.

10. The use of fillers in the underframe and superstructure shall be avoided wherever possible.

11. All holes for rivets or bolts in the underframe, superstructure, and outside finish shall be drilled or punched and reamed to size and fairness. No drifting of holes will be allowed. In deducting rivet or bolt holes to obtain the net area of any section they shall be taken at 1-16 inch larger than the diameter of the rivet or bolt. The effective area of a rivet shall be taken as its area before driving.

12. All rivets when driven must completely fill the holes and have full concentric heads or countersunk when required.

13. Center Sills.—The center sills may be built up or composed of rolled or pressed shapes, either with or without cover plates, and cast-steel draft sills or end construction may be used in connection with any of the above types, with suitable riveted connections at splices. Built-up center sills may be either of uniform depth or of the fish-belly shape and may be composed of rolled shapes, web plates, flange angles, and cover plates. If preferred, the web plates may be flanged and angles omitted. When flange angles are used they shall be connected to the webs with a sufficient number of rivets to transfer the total shear at any point in a distance equal to the depth of the sill at that point. When cover plates are used they must extend at least two rows of rivets at each end beyond their theoretical length.

14. Bolsters and Cross Bearers.—The body bolsters and cross bearers may be of either cast steel or built-up construction, with ample connections at center and side sills to transmit the calculated vertical shear.

15. Floor Beams.—Transverse floor beams may be of rolled or press shapes, with suitable connections at center and side sills.

16. Floor Supports.—Longitudinal floor supports shall be supported at each transverse floor member.

17. End Sills.—The end sills may be either of rolled or pressed shapes, built-up construction or cast steel, with ample connections at center and side sills. They must be designed for the maximum vertical loads to which they may be subject and also for the assumed horizontal loads transferred from vertical end members as specified in paragraph 26.

SIDE FRAME.

18. General.—In calculating the stresses in the side frame, its effective depth when designed as a truss or girder may be taken either as the distance between centers of gravity of the side plate and side sill or as the distance between centers of gravity of belt rail and side sill. At the side-door openings the bending moment caused by the vertical shear at doorposts shall be considered as being resisted by the section above and below door openings, and the sum of the direct stresses and those due to bending at such sections shall not exceed the stresses specified in paragraph 28. A sufficient proportion of any reinforcing members added to these sections shall be extended far enough beyond the doorposts at each side that their reaction can be taken care of by the side frame without exceeding the limit specified for stresses.

19. Posts.—The sum of the section moduli taken at any horizontal section between floor line and top line of windows, of all posts and braces on each side of car, located between end posts, shall be not less than 0.30 multiplied by the distance in feet between the centers of end panels, a panel length being considered as the distance between lines of rivets in adjacent vertical posts.

20. Sheathing.—Outside sheathing plates of steel or iron shall be not less than 1/8 inch in thickness.

ROOF.

21. General.—The roof may be of either the clere-story or turtleback type, depending on the standard contour of the railroad for whose service the cars are built. In the clere-story type the deck plates shall be in the form of a continuous plate girder extending from upper-deck eaves to deck sill, and either built up of pressed or rolled shapes or pressed in one piece from steel plates. The carlines may be of either rolled or pressed steel shapes extending in one length across car from side plate to side plate or may extend only across upper deck. In the latter case the lower deck carlines may be formed by cantilever extensions of the side posts or by independent members of pressed or rolled shapes. In the turtleback type the carlines may be of either pressed or rolled shapes extending in one length across car between side plate and side plate or may consist of cantilever extensions of the posts.

22. Carlines.—The projected area of the portion of roof in square feet supported by carlines divided by the sum of the section moduli of the carlines must not be more than 100.

23. Roof Sheets.—Roof sheets, if of steel or iron, shall be of a minimum thickness of 0.05 inch and either riveted or welded at their edges.

END CONSTRUCTION.

24. Vertical End Members.—The sum of the section moduli of all vertical end members at each end shall be not less than 65, and the section moduli of the main members, either forming or adjacent to the door posts, shall be not less than 75 per cent of this amount.

25. The horizontal reactions of all vertical end members at top and bottom shall be calculated from an assumed external horizontal force applied 18 inches above floor line, to all vertical members in the proportions given in above paragraph, such force being of sufficient amount to cause bending of all vertical members acting together, and top and bottom connections of vertical members shall be designed for these reactions.

26. Except where vertical end members shall bear directly against or be attached directly to longitudinal members at either top or bottom, the assumed reactions shall be considered as loads applied to whatever construction is used at end sill or end plate, and both these last-named members shall have section moduli, respectively, sufficient to prevent their failure horizontally before that of the vertical end members.

27. End Plate.—The end plate may be a rolled or pressed section or of built-up construction and shall extend across end of car from side plate to side plate, with ample connections at ends, or shall be of other satisfactory construction to withstand the assumed loads given above.

28. Stresses.—All parts of the car framing shall be so proportioned that the sum of the maximum unit stresses to

which any member is subject shall not exceed the following amounts in pounds per square inch, except as modified in paragraphs 7, 25, and 26. These stresses, unless otherwise stated below, are for steel having an ultimate tensile strength of from 55,000 to 65,000 pounds per square inch. Where other materials are used, they shall bear the same proportion to the ultimate strength of the material used.

Bolsters of Rolled Steel.—Stress shall not exceed 12,500 pounds per square inch.

Sills and Framing of Rolled Steel.—Stress shall not exceed 16,000 pounds per square inch.

When cast steel is used the allowable stresses may be the same as for rolled steel, except tension stresses, which must be at least 20 per cent less than those allowed for rolled steel as specified above.

For members in compression the above stresses shall be reduced in accordance with the usual engineering practice.

Rivets (rivet steel).	*Pounds per square inch,*
Shear other than buffing	10,000
Bearing other than buffing	20,000
Shear, buffing	12,000
Bearing, buffing	24,000

29. Floor.—Subfloor of postal cars to be of iron or steel plate, upper or wearing surface to be of matched wooden flooring, maple or rift-sawed yellow pine or fir, laid longitudinally, or composition, preference in order named. If composition is used, the wearing surface between doors and the standing surface in front of letter tables and paper racks shall be of wood, cork, or other suitable material. Proper insulation, including air space, should be provided between upper and lower courses. Floor strips for wood upper course should be bolted to subfloor. Composition flooring may be secured by corrugated, keystone, or equivalent style of plate or by wire fastening anchored to subfloor.

30. Interior Finish.—Inside, side, and end linings and head lining of postal cars to be of flat or corrugated steel plate, composition board or wood, properly secured to the car framing.

31. Insulation.—Suitable fabric or material shall be used as an insulation against cold or heat in the side and end walls and roof of steel postal cars, securely fastened as the nature of the material may require for efficiency and durability.

The insulating specifications proposed to be used by each railroad company should be submitted to the department for approval.

32. Doors, Windows and Skylights.—Postal cars to be equipped with such side doors, end doors, side windows and skylights as are shown on the standard plans of the Railway Mail Service. Storm or double windows to be provided where required. Doors and windows may be made of wood, combination wood and metal, or metal; preference in order named, and when glazed the glass shall be double strength. Windows should be made of two sash sections. The upper section should be double the area required and should be divided; the lower half to be fitted with glass and the upper half screened, so suspended that glass or screened section may be used as desired. Where design makes this impracticable, any equivalent screen application may be accepted. Doors and windows to have suitable weather stripping. Trimmings and locks to be the railway company's standard.

Skylights shall contain 5 square feet, glazed with not less than ¼ inch thick rough glass.

33. Lighting.—Lighting of postal cars primarily to be with electricity or gas, mantles to be used where practicable, with provision for emergency light. Distribution of light shall be as shown on the standard plans of the Railway Mail Service. Electric-light installations on postal cars shall include distribution, preferably by condulet system with separate circuits, cut-outs, and switchboard regulation. The generator, distribution, battery boxes, and their equipment, train connectors, charging plugs, other accessories, and all wiring to be as per the railway company's standard practice.

Gas-lighting installation on postal cars to be in accordance with the railway company's standard practice.

34. Heating.—Heating of postal cars primarily to be with steam or hot water. Pipes are to have suitable protection guards of wire or perforated metal. Pipes located behind paper-rack sections shall not occupy space exceeding 20 inches in height and 4 inches from wall of car. Where service conditions require, an auxiliary coal-burning stove of safety pattern shall be furnished, complete with coal box and firing tools, smokejack properly screened, and protection guards. The stove and coal box to be securely attached.

The train pipe steam line to be applied and equipped with end valves, steam hose and couplings, as per M. C. B. requirements and the railway company's standard.

Requirements of the Post Office Department embody three main points: First, sufficient heat to keep the postal car or apartment comfortably warm; second, proper distribution of heat, particularly throughout that part of the car occupied by letter cases and paper racks (care should be taken not to have excess of heat around the letter cases), and third, an arrangement of pipes to avoid interference with distributing facilities.

To obtain the results outlined above the Department will require postal cars and apartments to be equipped with sufficient amount of radiation to make the floor of the car comfortable and to obtain a temperature of 65 degrees between the side doors at a point 5 feet above the floor line, and to maintain such temperature under the most adverse weather conditions to which the car is subjected when in service. Sufficient radiation should be provided in the end of the car containing hopper and washstand to maintain a temperature of at least 48 degrees in that location.

All coal-burning stoves furnished as an auxiliary or emergency heat must be of a safety pattern or design, properly guarded by metal casing so as to prevent overheating of closely-surrounding objects and damage which might result therefrom.

35. Ventilation.—Ventilation of postal cars of clere-story design to be accomplished preferably by means of self-acting ventilators, having intake and exhaust working in conjunction. Four such ventilators per side for 70 and 60-foot cars; three per side in 50 and 40-foot cars, and two per side in mail apartments placed to obtain maximum results. Other deck sash to have clear glass and to be placed in fixed position without screens. Trimmings of deck sash to be railway company's standard.

Postal cars not having clere-story roofs are to have a sufficient equipment of self-acting ventilators in the roof.

36. Vestibules.—Postal cars are to be equipped with railway company's standard short vestibule, preferably with outside buffer springs, and with diaphragms when needed for communicating between cars.

37. Couplers and Draft Gears.—The details of the coupler and draft gear to be in accordance with M. C. B., and United States safety appliance requirements, and the practice of the railroad for which the cars are built.

38. Buffing Mechanism.—The details of the buffing mechanism to be in accordance with the practice of the railroad for which the cars are built.

39. Brake and Signal Equipment.—Postal cars to be equipped with automatic air brakes and signal equipment

of the latest design, railway company's standard. Hand brakes in accordance with United States safety-appliance standards. Brakes to be applied to all wheels and to be preferably arranged inside on four-wheeled trucks.

The braking power should not be less than 80 per cent of the light weight of the car, based on 60 pounds air pressure in the air-brake cylinder.

Suitable cord or attachments shall be furnished for convenient operation of the conductor's valve and train-signal system.

40. Steps, Handholds, Signal Brackets.—The details of the steps, handholds, and signal brackets to be in accordance with United States safety appliances and M. C. B. requirements and the practice of the railroad for which the cars are built. Side steps to be full width of door opening where possible. Handholds to be applied to each side doorpost.

41. Stanchions and Screens.—Stanchions in storage ends and at ends of pouch racks, screen frames, and screens to be located as per standard Railway Mail Service plans.

42. Safety Rods and Bars.—Safety rods to be applied in an equivalent manner to that called for in Railway Mail Service interior specifications. Each side door not equipped with catcher arm should be provided with safety bar.

43. Interior Equipment.—The following list of equipment shall be arranged as shown on standard Railway Mail Service drawings, the details to be as per railway company's standards:

Broom.	Mirror.
Catcher arms	Paper boxes.
Cinder guards.	Paper rakes.
Coffee heater when necessary	Portable bins.
Cots when necessary.	Register cages.
Disinfectants.	Sack and pouch racks.
Distributing tables.	Shelf and letter drop.
Deck sash opener.	Slip case.
Drinking cup.	Stepladder.
Dust brush.	Stout stool.
Dumping tray.	Torch for lighting gas.
Fire buckets.	Toilet-paper holder.
Fire extinguishers.	Wardrobe.
Folding wash basin.	Water cooler.
General-order case.	Water tank.
Hopper.	Wrecking tools.
Letter cases.	Wire screen for letter case.
Lock rods.	

TRUCK.

44. General.—Trucks may have either the built-up metal or cast-steel frames and may be either of the four-wheel or six-wheel type, within the limit of wheel loads given below. For cars equipped with one cast-iron brake shoe per wheel the effective maximum emergency brake-shoe pressure must not exceed 18,000 pounds per shoe. When two brake shoes per wheel, or one shoe per wheel having a higher coefficient of friction than cast iron, are used, the wheel loads may be increased to the allowable carrying capacity of the Master Car Builders' standard rules.

45. Wheel Loads.—Maximum weight of loaded cars must not exceed 15,000 pounds per wheel for M. C. B. standard axle having 5 by 9 inch journals, or 18,000 pounds per wheel for M. C. B. standard axle having 5½ by 10 inch journals.

46. Details.—Wheels shall be either all-steel or steel-tired. All other truck details, including body and truck center plates and side bearings, shall be in accordance with M. C. B. requirements and the practice of the railway for whose service the cars are built.

47. Painting.—The painting of car body and trucks shall be in accordance with the railway company's specifications for steel cars. Light-color enamel paint to be used for interior finish.

48. Lettering and Numbers.—The lettering and numbering of postal cars to conform to Railway Mail Service requirements and the railway company's standards.

SPECIFICATION, DATED MARCH 28, 1912, AND CORRECTED TO AUGUST 29, 1912, FOR FIXTURES FOR MAIL CARS. FIGS. 256 257, 259, 260 and 1711-1728.

Section 1.—Distributing Tables Under Letter Cases.

(a) Contour, size, and location are shown on Railway Mail Service floor plans for mail cars.

(b) Tables shall be of 1½-inch finished stock, cherry, birch, or maple preferred in order named, at a uniform level of 28 inches at top from floor. Drawers with hasps for locking shall be installed under tables, as indicated on Railway Mail Service floor plans. If metal construction is adopted, tables shall have an upper surface of ½-inch pressed cork, ⅜-inch elastic rubber, or such other material as will meet departmental approval.

(c) Ten inch by 10 inch canceling pads of high-grade elastic rubber, ½ inch thick, shall be installed in wood or cork-covered letter tables at points indicated on Railway Mail Service floor plans, top surface of pads to be flush with top of tables.

(d) A flat wooden strip, 2½ inches wide, 1 inch thick, half round at top edge, shall be placed on front edge of letter tables to prevent mail slipping off. It should project 1 inch above surface of table, except that a section 2 inches long should be cut out at front, flush with surface of table, to provide for the removal of sweepings, ends of strip at opening to be rounded.

MAIL.

Section 2.—Letter Cases.

(a) Location of letter cases, with number and sizes of boxes to be provided, is shown on Railway Mail Service floor plans.

(b) Cases shall be constructed of aluminum or other metal, or wood when over-all dimensions permit. Vertical partitions shall be not less than 1-32 inch thick (if of aluminum, not less than 1-16 inch), be devoid of shoulders, and present a rounded front not more than 3-16 nor less than 3-32 inch thick. The "Tilley" revolving label holder, a metal holder of equivalent design, or square label holder made of cherry or other suitable wood, shall be applied in front of horizontal partitions and above top row of boxes of all cases. No label holders are required at bottom of cases. If wood holders are used, corners should be beveled 1-16 inch, forming ⅜-inch flat surface, for application of paste labels. The label holders shall be installed so that each face may be turned to the front at will and be held in position by flat springs applied in such manner as to prevent formation of shoulders. Not more than seven label holders should be operated by one spring. Top of label holder shall be level with bottom of box at outer edge.

(c) Cases shall be made 12 rows high, the back of bottom row of boxes to rest on letter table. The seven lower rows and top row of boxes shall each be 4 inches high. The eighth, ninth, tenth, and eleventh rows shall be 3¼ inches high. Short letter boxes shall be 7 inches and long letter boxes 9½ inches deep, front to back (exclusive of label holders), sloping from the front 1½ inches, the bottoms to be of perforated metal not less than 1-32 inch thick, stamped to pattern shown on Railway Mail Service drawings, or of approved equivalent, except lower row of boxes shall have bottoms with perforations at back only, with corresponding openings through letter tables to permit dust to fall through. Bottoms shall be turned at front to meet the ½-inch square label holders in such manner as to prevent formation of shoulders, substantially as indicated on drawings. There shall be a strip 1 inch wide underneath cases, immediately in front of holes through tables, fitted snugly betwen partitions to prevent accumulation of dust under case. Space between bottom of case and top of table shall be closed in by a vertical strip placed flush with face line of case.

Short letter boxes shall be 4¼ inches and long letter boxes 5 inches wide. The register cases for 60-foot cars shall be 8 rows high, occupying same height as letter cases. Boxes in this case to be [illegible] inches deep (exclusive of label holders) and 5¾ inches wide.

(*d*) Figures in preceding paragraph covering height and width of boxes indicate dimensions in the clear at front.

(*e*) Portable screens of suitable wire, not to exceed 1-inch mesh, framed to insure rigidity, shall be applied to front of letter cases, as indicated on Railway Mail Service floor plans. Screens shall be suspended from hooks at top line and arranged to lock below bottom line of cases, except that screen covering back section of register case in 60-foot cars shall be hung at side in such manner as to be easily removable.

(*f*) Back of letter cases shall be covered with sheet metal or 1-16-inch wire. If latter is used, mesh shall not exceed ¼ inch.

(*g*) If metal other than aluminum is used, cases should be given a heavy coating of aluminum paint.

Section 3.—Racks for Sacks and Pouches.

(*a*) Only such type of rack as has been approved by the department shall be installed in any car.

(*b*) Top frame of rack section to consist of four ¾-inch pipes, placed parallel with side of car. The rod nearest wall of car is designated as No. 1; the next, or middle top rod, as No. 2; the outside top rod, nearest center of car, as No. 3. Rods 1 and 2, and 2 and 3 shall be spaced in line 13 inches center to center. Rod No. 4, same size, shall be 2¼ inches below and 1¼ inches forward of rod No. 3 (measuring center to center). This rod is used to support paper-distributing tables, dumping tray, and bridges. Racks should be made in standard sections, 5 feet long, end to end, outside measurement, including ¼ inch clearance at each end, and shall furnish not less than 4 feet 10¼ inches clear hanging space between end members. Rack sections of same construction of less length than the above standard shall be installed when required, as shown on Railway Mail Service floor plans.

(*c*) Racks shall be of such construction as will permit of top frame being raised or lowered at will, that the space may be used for storage purposes.

(*d*) Two parallel rods of ¾-inch pipe, equidistant from center line of car, shall be installed to support paper-distributing tables and bridges. Rods shall be placed 4 inches apart, center to center, shall be 30½ inches from floor to center of rods, and be supported at ends and joints by single standards. Rods shall be made in sections to correspond in length with sections of racks and installed in such manner as to be removable in pairs.

(*e*) Sections of rack as hereinbefore described shall be installed on each side of parallel center rods, 22¾ inches from nearest rod to rod No. 4 of said sections (measuring center to center). The intervening space not occupied by distributing tables and dumping tray shall be filled with bridge sections. Such sections shall be of ¾-inch pipe, and be 22½ inches long and 13 inches wide, with sides elevated 4 inches above ends. Measurements to be made center to center. Rod No. 1 shall be placed 38½ inches from floor to center. This rod will be 2 inches from side wall to center, in cars 9 feet in width, inside measurement, and in wider cars racks shall be similarly located from center line of car, the additional space between wall and rod No. 1 to be taken up by blocking-out brackets. Rod No. 2 shall be 37½ and rod No. 3, 36½ inches from floor to center.

(*f*) Five aluminum, malleable iron, or brass label holders, uniformly spaced, shall be placed on rods No. 1 and No. 2, and one in center on each side of bridges. Label holder shall be 7 inches long, 1¼ inches wide, and have machine-milled slot 1-16 inch deep and 15-16 inch wide, enlarged at ends, into which folded paper labels can be inserted. Face opening of slot shall be 11-16 inch wide. Label holders shall have smooth finish, devoid of cutting edges and sharp points, and be attached to rods through lugs 1 inch from ends at such height as to give 5-16 inch clearance between rod and label holder, permitting free movement of hooks. (There shall be no label holders on rod No. 3.)

(*g*) Revolving-shank hooks shall be placed on the rods as follows: Rod No. 1 to have 20 hooks, all pointing toward rod No. 2. Rod No. 2 to have 40 hooks, pointing alternately toward rods No. 1 and No. 3. Rod No. 3 to have 20 hooks pointing toward rod No. 2. On rods No. 1 and No. 3, one hook should be placed at each end of each label holder and two under middle part, between lugs. On rod No. 2, two hooks pointing alternately toward rod No. 1 and No. 3, should be provided under each end of each label holder, and four hooks similarly applied under middle part, between lugs.

(*h*) Rods and hooks, if painted, should permit free movement.

(*i*) Hinged wire screens to be provided at end of bag racks, adjoining door openings.

Section 4.—Paper-Distributing Tables and Dumping Tray.

Wood preferred to metal construction. For details, see drawings.

Section 5.—Letter Package and Paper Boxes in All Mail Cars, Except 8, 10 and 12-Foot Apartments and 6, 8, 10, 12 and 15-Foot Alley Apartments.

(*a*) Shall be of wood or metal construction sufficiently heavy to prevent deformation.

(*b*) Paper boxes shall be 9 and 12 inches wide, respectively, center to center, as shown on Railway Mail Service floor plans. Shall be not less than 25 inches front to back in the clear, bottom sloping 6 inches toward front. Bottom line at front to be 5 feet 3 inches in clear from floor. Boxes should conform at top to contour of deck, thus providing the largest possible vertical opening.

(*c*) In cars having turtleback tops, paper boxes shall conform to details of measurement and shall have not less than the capacity indicated in paragraph (*b*).

(*d*) Paper boxes shall have sliding fronts not less than 8 nor more than 10 inches high, or approximately one-third the height of front of box. Fronts shall have wire or grill latticework centers, with 4½-inch label holders at bottom and lifts at top of slides.

(*e*) Friction springs, to hold sliding fronts in a raised position, shall be placed in slide grooves in vertical partitions.

(*f*) Double or twin hooks shall be placed under each vertical partition, with points toward side of car, about 1 inch back from face line of boxes.

(*g*) Letter package boxes in apartment cars, and paper boxes in 8, 10 and 12-foot apartments and 6, 8, 10, 12 and 15-foot alley apartments shall be installed as indicated on Railway Mail Service floor plans. These boxes shall follow same general construction as overhead paper boxes described in preceding paragraphs.

Section 6.—Small Cases for Slips.

Small pigeonhole cases for slips and schemes and a small wood or metal box for labels from pouches shall be installed as indicated on Railway Mail Service floor plans.

Section 7.—Portable Bins for Letter Packages.

Portable bins of wire netting, or substantial light wood construction, approximately 14 inches wide, 18 inches long, 14 inches high at back and 10 inches high in front, shall be furnished, as indicated on Railway Mail Service floor plans.

Section 8.—Cage for Registered Mail.

A strong wire netting cage shall be installed in all mail cars and apartments.

Section 9.—Order Box.

A light-weight steel or wood box, 9½ inches by 14 inches and 1½ inches deep, with suitable door and catch, shall be located as indicated on Railway Mail Service floor plans. Box to have three pointed metal pins, about 2 inches from top, on which to file order sheets. Pins should be 1¼ inches long and be slightly curved or pointed upward.

Section 10.—Hoppers.

Flushing or dry hopper, former preferred, shall be installed at location in car indicated on Railway Mail Service floor plans. When dry hopper is used, it shall have double lid, large opening top and bottom, with nearly straight sides, and chute leading through and extending below floor; bottom to be free from obstruction and provided with deflector.

Section 11.—Lavatory.

Lavatory located as indicated on Railway Mail Service floor plans shall be of the folding type, designed to occupy not to exceed 6½ inches front to back when folded; to have basin of not less than 12 inches in diameter, 4½ inches deep, and not less than ½-inch splash rim at top. Top of basin when lowered to be 29 inches from floor. A steam jet shall be introduced into basin or water system to heat water.

Section 12.—Water Tanks and Drinking-Water Containers.

(*a*) Drinking-water container shall be constructed to keep water and ice separate and free from foreign substances when filling, with provisions for draining each compartment through drain cock at bottom, unless container is constructed in such manner as to permit of easy removal for cleaning, and shall be of such capacity as operating conditions may warrant. Only such type of container as has been approved by the department shall be installed in any car.

(*b*) Tanks, insulated when service conditions require to prevent freezing, to contain water for lavatory and hopper, shaped to conform to deck of car, shall be located in deck above hopper, with provision for filling through roof, and shall be securely attached to walls, ceiling, and bulkhead partition.

Section 13.—Wardrobe—Mirror.

(*a*) Wardrobe of substantial construction shall be installed as indicated on Railway Mail Service floor plans. Same shall extend from floor to deck of car, be provided with latch and hasp for locking, shelf 5½ feet from floor, and have a row of wardrobe hooks 6 inches apart, extending around sides and end under shelf. Ventilation should be provided through holes or grill plates at bottom and top of door.

(*b*) A mirror, approximately 12 by 15 inches, should be located on outside of wardrobe door, or most available point near lavatory or wardrobe.

Section 14.—Wrecking Tools—Fire Extinguishers.

Shall be provided in accordance with existing laws and regulations. Extinguishers may be attached to ends of overhead paper boxes adjacent to side doorways. Wrecking tools may be attached vertically to side wall back of wing letter case or as shown on Railway Mail Service floor plans.

Section 15.—Gas Plate, Steam Cooker or Equivalent.

Should be installed when required for use of postal clerks in making coffee and warming lunches, located preferably on bulkhead, as indicated on Railway Mail Service floor plans, approximately 5 feet from floor.

Section 16.—Cots—Stepladder—Stool.

(*a*) Portable cots and stepladder should be furnished in cars where service conditions require their use.

(*b*) A stout stool 18 inches high, or chair, should be placed in all mail cars and apartments.

Section 17.—Deodorants and Disinfectants—Toilet Paper.

Toilet paper required in all cases; deodorants and disinfectants where conditions warrant.

Section 18.—Door Fixtures.

Suitable outside door fixtures shall be applied in such manner that door may be opened to full width between posts, and be locked shut with mail or other lock, as a means of safety.

A device of acceptable design shall be provided to hold sliding doors in an open or closed position as desired.

End doors shall be provided with chain bolt and slide. Other fixtures, standard.

Section 19.—Lighting.

In apartment cars lighted by electricity, a separate circuit should be provided for the mail apartment, to be operated entirely independent from baggage or express apartment of the car. Knife and snap switches only shall be placed in mail apartment; all other mechanism to be placed in adjoining apartment.

Section 20.—Rakes for Paper Boxes.

Two rakes, of light but substantial construction, having crossheads 7 inches long with 5 wood or looped-wire teeth 2½ inches long and handles 24 inches long, with screw eye in ends, shall be furnished each full railway postoffice car, and one such rake each apartment car.

Section 21.—Catcher Arms—Safety Bars—Cinder Guards.

(*a*) Two catcher arms shall be furnished for each car, sockets applied to all side-door posts. Safety bars, to be secured in position by locking device, shall be installed at noncatcher doors in catcher-arm sockets.

(*b*) Four cinder guards shall be furnished for each car, holding brackets to be applied to all side-door posts and at ends of overhead paper boxes.

Section 22.—Safety Rods—Window Protection Rods.

(*a*) Two rods of 1-inch gas pipe shall be suspended 7 feet 3 inches from floor to center of rod and 19 inches from center of car. Rods to extend full length of car, curved to clear lights, and shall be suspended from deck ceiling by hangers of same section, not more than 8 feet apart, which shall be securely attached to re-enforcement or filling blocks between ceiling and roof at each hanger. Hanger and rod attachment shall be a pipe tee. Rods shall be securely side-braced to deck sills at each hanger. A 5/8-inch hand rod, securely attached to side plate, shall be installed over each side door, extending full width of same.

(*b*) Five-eighths-inch rods of hardwood, hickory preferred, spaced 3 inches apart, shall be provided as protection for windows on inside. Windows adjacent side doorways shall be protected by 1/2-inch iron rods outside, if window is located less than 2 feet from door opening.

Section 23.—Letter Drops.

Letter drops of an acceptable design shall be installed as indicated on Railway Mail Service floor plans, and shall conform in detail of construction to Railway Mail Service drawings.

Section 24.—Movable Stanchions.

Shall be made of 1½-inch gas pipe. Floor sockets to be located as shown on Railway Mail Service floor plans. Springs shall be placed in top brackets to prevent stanchions from rattling.

Pouch Catcher. See MAIL CATCHER.

Pouch Hook (Postal Cars). Hooks used for suspending mail bags while assorting the mails.

Pouch Rack (Postal Car). A rack built of standards and horizontal rods to which the pouch hooks are attached and which support the pouches or bags while mail is being distributed into them.

Poultry Car. Figs. 95-98, 369. A form of stock car for carrying live poultry. See CAR, M. C. B. Class S. P.

Pressure Bar (Buffing Apparatus). A stiff iron bar of a cross-shaped (+) cross section, which connects the drawbar to the buffer spring, so that the draft spring reinforces the buffing spring and the buffing spring takes up part of the pull on the drawbar, thus relieving the draft spring. The pressure bar also forces out the buffer stem and plate when the drawbar is pulled out, thus maintaining a continuous platform between the cars.

Pressure Gage (Pintsch Gas Lighting). A gage usually placed in a saloon. It registers atmospheres or pounds and atmospheres, for convenience in computing the volume of gas in the tank.

Pressure Head (Brake Cylinder). The head that covers the end of the brake cylinder into which air pressure is admitted when the brakes are applied.

Pressure Regulator. Figs. 1948, 1965, 1974. A valve designed to regulate the delivery pressure of steam in a steam heating system. It depends entirely upon the elasticity of springs, the pressure of which can be gaged or regulated by screw studs that bear upon one end of the springs.

(Pintsch Gas Lighting Apparatus.) R, Fig. 2109; Fig. 2110. The valve by which the pressure of the compressed gas is reduced for consumption. The pressure regulator is one complete fixture, adjusted by the maker. Names of the principal interior parts are diaphragm, diaghragm connecting rod, diaphragm lever, regulating valve and dust arrester.

Pressure Retaining Valve. Figs. 1282-1284, 1360. A device by means of which a certain part of the brake cylinder pressure may be retained to aid in retarding the acceleration of a train in descending long grades while the brake pipe pressure is increased after one application to recharge the auxiliary reservoirs. It is controlled by a small handle, the position of which causes it to operate or not, as desired. There are four different types, the ordinary, Fig. 1282, the vestibule, Fig. 1284, the double pressure, Fig. 1283, and the driver brake. The first two types may be made to retain 0 or 15 lbs.; the third to retain 0, 15 or 30 lbs. or 0, 25 and 50 lbs.; the fourth to retain 0, 15 lbs., or all cylinder pressure. In descending grades the handle is turned to the proper position to retain the desired pressure, while on the level the handle is turned to allow the air to escape to the atmosphere. Also called retaining valve.

Pressure and Vapor Heating System. Figs. 1950, 1958. A combination of the pressure and vapor heating systems by which it is possible to operate with an open drip and the lowest temperature in the pipes, or by various pressures with the closed drip, up to that on the train line.

Priming (Painting). The first coat in car painting. See also PAINTING.

Private Car. Figs. 152, 155, 251. A car for private use, usually containing eating and sleeping facilities. Private cars used by railway officials are ordinarily termed business cars. Freight cars owned by companies other than the railways are termed private line cars or sometimes simply private cars. See CAR, M. C. B., CLASS PV.

Produce Car. A modified form of refrigerator car, provided with ventilators and ice boxes, for the transportation of fruit, vegetables and perishable produce.

Profile Carline. A carline extending from one plate to the other, bent to conform to the shape of the clere-story.

Propelling Chain (Steam Shovel). A heavy chain passing over a sprocket on an axle of the truck and a sprocket geared to the winding drum. By revolving the winding drum sprocket the shovel is made to move forward or back on the track by its own power.

Propelling Gear (Steam Shovel). The gears which turn from the main winding drum when the propelling chain is to be operated.

Propelling Lever (Hand Car). The main lever, to which power is applied.

Protection Cap. A LAMP JACK.

Protection Strip. Fig. 489. A strip used on a freight car side door to protect it from wear when being opened and closed. Such strips are also used to stiffen the door and to prevent the entrance of sparks. See SPARK STRIP.

Pull. "A catch or lip upon a drawer, door or window, by which it is pulled open."—Knight. See DOOR PULL, etc.

Pull Hook or Deck Sash Opener. Fig. 1799. A rod with a small hook at one end for opening deck sashes. Also called a ventilator staff.

Pull Iron. A roping staple. A U-bolt passing through the side sill for the purpose of attaching ropes in switching. See also PUSH POLE POCKET.

Pull Ring. A metal ring with a screw attached, by which it is fastened to any object, as a sash, drawer, etc., to take hold of in opening it.

Pull Rod Carry Iron. A carry iron for an uncoupling rod.

Pulley. Fig. 2321. "A wheel with a grooved, flat or slightly convex rim, adapted to receive a cord or band which runs over it. Its function is to transmit power or change the direction of motion."—Knight. A sheave is a pulley wheel in a block, but sheave and pulley are used as almost synonymous terms. See SHEAVE and BERTH CHAIN PULLEY.

Pullman Car. Figs. 176, 177, 181, 411-414, 416-418, 420. A name strictly applicable only to cars operated by the Pullman Company, but in common usage frequently applied to sleeping, parlor or drawing-room cars built after the same designs as those adopted by the Pullman Company.

Pump (Wash Rooms). See Basin Pump.

Pump Governor. See Air Compressor Governor.

Purlin. 83, Figs. 285-288, 368, 374, 375; 4, Fig. 859. A longitudinal piece of timber over the carlines, extending from one end of the car roof to the other, to which the roof boards are fastened. Sometimes called a roof strip, but the latter more correctly applies to strips sometimes used above the purlins.

Purlin Bracket. Fig. 493. An iron casting or forging used to connect a purlin to the end plate.

Push Button. Fig. 1385. Used in connection with the whistle of the train signal apparatus.

Push Button Faucet. Fig. 1620. A faucet controlled by a push button.

Push Car or Lorry Car. A four-wheeled car used to carry materials and tools and moved or pushed by hand. See also Ferry Push Car.

Push Pole. A pole or wrought iron tube which is used as a strut to span diagonally the distance between the corners of a locomotive and a car, standing on two parallel tracks to push the car without switching the locomotive onto the same track that the car occupies.

Push Pole Pocket. 191, Figs. 285-288, 320; 10, Fig. 297; 9, Fig. 342; Fig. 494. A plate placed on the corners of freight cars, with a cavity for inserting poles or bars in switching, to enable the car to be moved from the side by an engine on a parallel track. A Roping Staple serves the same purpose when it is desired to use a rope or cable.

Push Rod (Brake Cylinder). Figs. 490, 1239. A round bar which transmits the braking force from the piston of the brake cylinder to the brake levers. It has a crosshead formed on one end, by which it is attached to the cylinder lever. It is guided by a hollow piston rod. As it has not a rigid connection to the piston, but can slide freely in the hollow piston rod, when the brakes are applied by hand it does not become necessary to overcome the friction of the piston in the cylinder.

Pushover Seat. See Walkover Seat.

Putty. A mixture of linseed oil with whiting, which latter is chalk finely pulverized.

Q

Quadrant. A piece of metal curved in the form of the arc of a circle.

(Steam Shovel.) A casting for holding the operating levers.

Quadrant Levers (Steam Shovel). The handles mounted on the quadrant which control the various movements of the shovel.

Quadruplet (of Elliptic Springs). Four springs side by side acting as one.

Quartette (Elliptic Spring). Also called Quadruplet, which see.

Queen Post (of a Truss). 21, Figs. 285-288, 368, 374, 375; 20, Fig. 355; 34, Fig. 383; 22, Figs. 423-425. One of a pair of vertical posts against which the truss rod bears. When one post only is used, it is called a King Post. Such posts are used for the truss rods under car bodies and occasionally trucks.

Queen Post Stay. A bar attached to a queen post to stay it laterally.

Quick Action Automatic Air Brake. Fig. 1283, etc. The triple valve is so modified that when a relatively quick reduction in brake pipe pressure is made, it also opens a direct communication from the brake pipe through the triple valve to the brake cylinder. This not only increases the brake cylinder pressure in proportion to the amount of air flowing into it from the brake pipe locally on each car, but by venting air from the brake pipe locally on each car, hastens and increases the effect of the reduction made at the brake valve. The net result is to shorten the time from the movement of the brake valve handle until a full brake application is obtained on the entire train, and to increase the total braking power obtainable by such an operation (emergency application) about 20 per cent. over the maximum obtainable during ordinary operations (service application), or when using the Plain Automatic Brake.

Quick Action Triple Valve (Air Brake). See Triple Valve.

Quick Service Valve. Fig. 1374. A valve used with the emergency straight air brake system to accelerate the application and release of brakes. Is located between the train line and the emergency valve.

Quill Drive (Motor Cars). Fig. 2550. A flexible connection between motors and driving wheels, providing a spring suspension for the motors and spring transmission of the motor torque.

Quintuplet (of Elliptic Springs). Five springs side by side acting as one.

R

Rabbet. "A rectangular groove made longitudinally along the edge of one piece to receive the edge of another. It is common in paneling, and in door frames for the door to shut into."—Knight.

Rack. "A frame for receiving various articles."—Webster. See Basket Rack, etc.

"In machinery, a rectilineal sliding piece, with teeth cut on its edge for working with a wheel."—Brande. A Ratchet.

Rack Catch (for Head Board of a Sleeping Car Berth). A small cupboard catch to hold the headboard pocket closed.

Radial Yoke. See Figs. 680-682. A special form of coupler yoke.

Radiator (Heating Apparatus). The pipes passing through a car, through which the hot water or steam circulates.

Radiator Stand. A support for a radiator.

Rafter. A timber to support a roof.

Rail. "The horizontal part in any piece of framing or paneling."—Webster.

Railing. See Platform Railing.

Raised Roof. An upper deck or clear story.

Rake (Postal Car). Fig. 1716. Used for handling the papers on postal cars.

Ranges and Cook Stoves. Figs. 1574, 1583. A range is a fixed and more elaborate cook stove attached to the wall, and, in houses, usually built in with brick so as to need no stovepipe to connect with the chimney.

Ratchet. A serrated edge like that of a saw, sometimes straight and sometimes on a wheel, into which a pawl engages, for producing or (more commonly) restraining motion. See Brake Ratchet Wheel, Winding Shaft Ratchet Wheel. An undulating ratchet is one having no sharp edges, so that the ratchet catch will slide over them without removal on the application of force, as in deck sash pivots.

Ratchet Burner (Oil Lamp). One in which the wick is moved up and down by a pointed wheel engaging in it, like mineral oil burners.

Ratchet Jack. A jack operated on the ratchet principle. See Jack.

Ratchet Wheel. A wheel with teeth like a saw cut into the outer edge to engage with a Pawl which prevents the wheel from being turned in one direction while allowing it to turn in the opposite direction. See Brake Ratchet Wheel, Winding Shaft Ratchet Wheel.

Receiver (Pintsch System). A cylindrical steel tank, with riveted and soldered seams, adapted to receive and retain gas at high pressures and hung under a car.

Receiver Filling Valve (Pintsch Gas Lighting). A valve of peculiar construction for the admission of the compressed gas to the receiver, so that it can be transmitted to the regulator for consumption.

Reclining Chair. Figs. 1512; 1549; 1550. A chair the back of which can be inclined, and which is provided with leg and foot rests.

Recording Table. The table on which is placed the recording apparatus of a dynamometer car.

Reducer. See Bushing and Reducing Pipe Coupling.

Reducing Pipe Coupling. Fig. 1946. A coupling for connecting two pipes of different diameters.

Reducing Tee (Pipe Fittings). A pipe fitting having three openings, one of which is smaller or larger than the other two. See Tee.

Reducing Valve (Train Air Signal Apparatus). A valve for reducing the pressure of air admitted to the train signal pipes below that maintained in the brake pipes and main reservoir. In the train air signal apparatus a pressure of from 40 to 45 lbs. is used.

(Air Brake.) See Feed Valve.

(High-Speed Brake.) See Reducing Valve, Automatic.

(Car Heater.) Fig. 2045, 2066. Used for reducing the steam pressure for the steam heating apparatus

Reducing Valve, Automatic (High Speed Brakes). Figs. 1277-1281. A valve attached to the brake cylinder to automatically bleed the pressure down to 60 lbs. after an emergency application, when the pressure in the cylinder rises to 85 lbs. or more. The triangular port gives a graduated reduction. It also prevents the brake cylinder pressure from exceeding 60 lbs. pressure in a service application. The triangular port then gives a wide opening.

Reducing Valve Strainer (Air Brake). Fig. 1361. Strainer for use in connection with reducing valve.

Reflector. Figs. 2379, 2380, 2381, etc. A device placed behind or above a lamp to throw the light in any desired direction.

Refrigerator (of a Refrigerator Car). The chamber, constituting the main body of the car, in which the paying load is placed.

(Fig. 1582.) A box or chest for keeping articles cool by means of ice. Used in dining, buffet and private cars.

Regulator Strap (Pintsch System). Fig. 2110. An Car, M. C. B. Class R. A box car suitable for carrying commodities that need icing in transit, equipped with two or more ice bunkers or baskets and suitable means for draining off melted ice or briny water. Has side doors and doors in the roof for admitting ice and salt. The temperature usually desired in refrigerator cars is about 40 degrees F., or 8 degrees above freezing. Refrigerator cars are often converted to heater cars during cold weather when it is desired to transport perishable products. See Heater Car.

Refrigerator Car Doors. Figs. 798-799a, 801-803. Doors for this class of cars must fit tight and must be of a heavy insulated construction in keeping with the rest of the car.

Refrigerator Car Floors and Ice Tanks (M. C. B. Recommended Practice).

In 1911 a uniform height of refrigerator cars from rail to top of floor was adopted as follows:

Inasmuch as the heights of freight-house platforms of the largest roads and packing houses vary in height from 42 to 44 inches above the rail, and as the American Railway Engineering and Maintenance of Way Association had not adopted any standard height of freight-house platforms, that this Association adopt a minimum of 48 inches as the Recommended Practice of height of refrigerator car floors, and that the Maintenance of Way Association be requested to adopt a maximum height of 44 inches, which will make ample allowance between the bottom of refrigerator car doors and top of platforms to avoid any trouble opening doors at freight houses.

ICE TANKS.

In 1911 a Recommended Practice was adopted that:

For fresh-meat cars, ice tanks of 5,000 pounds ice capacity be the minimum. For fruit and dairy cars, ice tanks of 3,000 pounds minimum, or 6,000 pounds per car.

Refrigerator Car Plug. Fig. 836. A plug which closes the entrance to the ice bunkers of a refrigerator car.

Refrigerator Cars, Salt-Water Drippings. See Salt-Water Drippings, Collection of.

Refrigerator Door Hinge. Fig. 1840.

Refrigerator Express Car. Figs. 112 and 113. An express car fitted with insulation and refrigeration apparatus. See Car, M. C. B. Class BR.

Register. Fig. 898. An aperture for the passage of air, provided with suitable valves, doors and sliding or revolving plates, by which the aperture is opened or closed. See Ventilator Register.

Register Cage (Postal Car). Figs. 1723-1726. A compartment or cage for registered mail.

Register Case (Postal Car). Fig. 1718. For the distribution of registered mail.

Regulating Valve. See Vapor Regulating Valve.

For acetylene gas lighting see Fig. 2239.

(Pintsch Gas Pressure Regulator.) See Pressure Regulator.

Regulator (Electric Car Lighting). Figs. 2273-2275; 2277, 2278, 2281, 2295; 2307-2310, 2316, 2318, 2319, 2322. The device for controlling the generator output and maintaining constant voltage on the lamp circuits. It is a form of automatic rheostat.

(Pintsch System of Gas Lighting.) See Pressure Regulator.

Regulator Straps (Pintsch System). Fig. 2110. An iron strap used to secure the regulator to the under side of the car.

Relay. See LAMP REGULATOR RELAY.

Release Cock. More properly Release Valve.

Release Spring (Passenger Equipment Trucks). 91, Figs. 947, 966; Fig. 977. A spring attached to a truck frame and acting on the brake beams so as to prevent the brake shoes dragging on the wheels when the train is running and the brakes are released.

(Air Brakes.) 9, Fig. 1289. A spiral spring which acts to move the brake piston inward, and thus release the brakes from the wheels after the compressed air is allowed to escape from the cylinders.

Release Spring Clip. Fig. 1156. The clip which holds the release spring.

Release Valve (Air Brake). A cock attached to the auxiliary reservoir for permitting the air pressure to be reduced therein, when the locomotive is detached or when the apparatus is out of order, so as to release or "bleed" the brakes.

Release Valve Rod. Fig. 489. A rod extending from the release valve on the auxiliary reservoir to the side of the car to operate the release valve.

Release Valve Rod Guide. A small iron eye attached below the sills as a guide for the RELEASE VALVE ROD.

Relief Valve. See GRAVITY RELIEF VALVE.

Replacer. See CAR REPLACER.

Reservoir (Air Brake). Main reservoirs (Fig. 1270) of large capacity are placed under all motor cars having air compressors. Auxiliary reservoirs (Fig. 1272) are placed under all cars equipped with automatic air brakes. In freight service a cast iron auxiliary reservoir (Figs. 1294, etc.) is connected directly with the brake cylinder and triple valve.

See LAMP FOUNT.

(Pintsch Gas Lighting Apparatus.) See RECEIVER.

(Car Heating.) See VAPOR RESERVOIR.

Reservoir Drain Cock (Air Brake). Figs. 1305, 1364. A cock for emptying the reservoir of any water condensed from the compressed air.

Reservoir Pipe (Air Brake). Also called air pipe and discharge pipe. The pipe conveying the air from the air compressor to the main reservoir.

Reservoir Support (Air Brake). Fig. 490. A bracket by which a reservoir is attached to a car.

Resistance Coils. See ELECTRIC HEATERS.

Retaining Ring (for Wheel Tires). Fig. 1115, etc. A ring securing the tire to the wheel. See TIRE FASTENING.

Retaining Valve. See PRESSURE RETAINING VALVE.

Retarding Device Body (Triple Valve). 29, Fig. 1274;

Retarding Spring (Triple Valve). 33, Fig. 1274;

Retarding Stem (Triple Valve). 31, Fig. 1274;

Return Bend (Pipe Fittings). Fig. 1946. A short U-shaped tube for uniting the ends of two pipes.

Reversible Car Seat. Figs. 1520, 1530, 1533. A name used to designate the form of car seat in which the back turns over to reverse the seat. A turn over seat.

Revolving Chair. See PARLOR CAR CHAIR.

Rheostat. Fig. 2574. A resistance used in connection with the controller for limiting the current taken by the motors during acceleration. Usually consists of a number of iron grids or strips of iron ribbon properly connected and packed in a substantial frame, the whole being mounted on the under side of the car flooring.

Rib (of a Cast Iron Wheel). A bracket. See WHEEL RIB.

Ridge. See ROOF RIDGE.

Ridge Cap. 5, Fig. 859. A flanged metal strip to cover the ridge joint on a metal car roof.

Ridge Pole. 84, Figs. 285-288, 374, 375; 3, Fig. 859; Fig. 875. A longitudinal member in the center of a roof, supported by the carlines or rafters on which the roof boards rest. In some cases the rafters are framed into the ridge pole, and in some cases the ridge pole is grooved to receive the roof sheets.

Ridge Pole Bracket. Fig. 493. A forging or casting used to connect the ridge pole and the end plate.

Ridge Timber. A timber which caps the intersection of two inclined floors meeting in the center of the car as in side dump or ore cars. If the inclined floors were the two sides of a gable roof the ridge timber would then become a ridge pole.

Rigid Bolster Truck. Figs. 920-924, 927, 933, 939, 940-944. A car truck with a bolster which has no LATERAL or SWING MOTION. See also BOLSTER and TRUCK BOLSTER.

Rim (of a Car Wheel). That portion of a car wheel outside of the plate.

Rim Latch. Figs. 1655, 1665. A latch which is attached to the inside of a door and is not let into it.

Riser. A piece of marble or metal set on edge around about a wash bowl to prevent water from running against the walls. See also STEP RISER.

Rivet. A round piece of metal with a head on one end, used to hold two or more pieces of material together by passing it through them and turning over or upsetting the headless end.

Rim Lock. A lock having an exterior metallic case which projects from the face of the door, differing thus from a mortise lock.

Rocker (Tip Car). A crescent-shaped casting bolted to the rocker timbers of the car body on which the body rests and rolls when the body is tipped.

Rocker Bar (Heaters). A horizontal bar which supports the grate, and on which the latter is attached by a pivot in the center so that it can be turned horizontally and thus shake down the ashes.

Rocker Bearing Timber Hangers (Tip Car). Vertical timbers or iron bars framed and bolted to the end piece, to which the rocker bearing timbers are fastened.

Rocker Car Seat. A seat having the bottom adjustable so as to give it an inclination toward the seat back in all cases, on whichever side the seat back may be placed. All modern car seats have mechanism by which this inclination is automatically given to the seat when the back is reversed or swung back.

Rocker Casting (Car Seats). A casting forming a part of the cushion carrier or stand, which is moved back and forth by the seat back arms, and moves the cushion forward, as well as giving it some inclination toward the back.

Rocker Side Bearing. Fig. 1060. A device somewhat similar to the roller side bearing. Instead of rollers, rockers are used, which tend to offer a gradually increasing resistance to the lateral motion of the bolster and tend to return it to its normal position at all times.

Rolled Axle. An axle made of rolled iron or steel. See AXLE.

Rolled Steel Wheel. Figs. 1139, etc. A car wheel made of rolled steel.

Roller Center Plate. Figs. 1027, 1029-1033. A center plate fitted with rollers to reduce the friction in turning.

Roller Side Bearing Truck. A lateral motion diamond truck the frame of which is very like a swing motion truck with a rigid spring plank. Lateral motion is given to the truck bolster by placing it upon cylindrical rollers resting upon the spring caps. The spring cap and bolster bearing plate are concaved, so that the motion of the rollers is restrained and the truck bolster given stability.

Roller Side Bearings. Figs. 1032-1045, 1047, 1050-1059, 1063-1066. A side bearing fitted with rollers to reduce the friction in curving.

Roof. See Car Roof.

Roof Brace (of a Center Lamp or Chandelier). Diagonal stays passing from the lamp to the roof. Vertical supporting stays are known as lamp arms, with or without a large center stay.

Roof Corner Casting (Passenger Equipment Cars). A cast iron molding for the corners of platform roofs.

Roof Door. See Icing Door.

Roof Framing. Fig. 405. See Body Framing and Frame.

Roof Grab Iron. See Roof Hand Hold.

Roof Hand Hold (Box and Stock Cars). 102, Figs. 285-288, 305-321, etc. An iron bar fastened to the roof to be grasped when ascending the ladder at the end of the car. Also called Roof Grab Iron. See Safety Appliances.

Roof Light. A deck sash.

Roof Panel (End). The panel over the door of a passenger car.

Roof Ridge (Freight Cars). The intersection of the two plane surfaces forming a pitching roof.

Roof Sheet Splice Tee. Fig. 497. A commercial Tee, riveted to two roof sheets so as to form a splice between them and form a continuous surface.

Roof Sheets. 1, Fig. 859. Metallic sheets for covering car roofs. The joints are made in various ways, most of which are illustrated. See Car Roof.

Roof Ventilator. A ventilator in the roof of a car.

Roofing. See Siding, Flooring, Roofing and Lining.

Roping Staple. A U-bolt secured to the side sill near the end of a car into which the hook of a switching rope may be caught, so that a switching locomotive may pull cars on side tracks while it is on the main track, or vice versa.

Rose. A rosette or ornament.

Rotary Snow Plow. Figs. 229, 230. See Snow Plow.

Rotary Strainer. See Centrifugal Dirt Collector.

Rotary Valve (Motorman's Brake Valve). The main valve which rotates when the handle is turned.

Rotundity Gage for Solid Steel Wheels. See Wheels, Solid Steel, Rotundity Gage for.

Round (of a ladder). The horizontal bars on which the foot rests. They are called rounds, whether of wood or iron, and whether round or square.

Round Iron, Limit Gages for. See Limit Gages for Round Iron.

Rubber Tread (for Step). An india rubber covering fastened to a step, or threshold plate, of a car to prevent persons from slipping when ascending or descending the steps.

Rules for Examination of Car Inspectors. See Car Inspectors, Rules for Examination of.

Rules of Interchange. See Interchange of Traffic, Rules for.

Rules for Loading Materials (M. C. B. Standard). Figs. 2715-25. In 1893 a Recommended Practice was adopted for loading logs and poles on cars and for racking cars for loading bark, and in 1896 extended rules governing the loading of lumber and timber on open cars were adopted, replacing the former practice, with the exception of racking cars for loading bark. At the same time rules governing the loading of long structural material, rails, plates, girders, etc., were adopted.

In 1897 some modification of these rules was adopted, with slight changes in the illustrations also. In 1898 still further slight changes were made in the text and in some of the drawings, and a new section was added containing rules for loading large logs, pipe and stone on open cars. In 1900 a further modification was made in both text and illustrations.

Further revision, 1904; also, 1905; also 1906.

In 1908 a further revision was made, and the rules advanced to Standard. Modified in 1910, 1911 and 1912.

A separate pamphlet is issued by the Association containing these rules. Copies may be obtained from the Secretary, Master Car Builders' Association, Old Colony Building, Chicago.

Running Board. 87, Figs. 285-288, 368; 119, Fig. 355; 86, Figs. 374, 375; 17, Fig. 383, etc. A plane surface, made usually of boards, for trainmen to walk or run on. It is placed on the roof of box or stock cars and at the side of tank cars. Gondola and flat cars usually have none.

Running Board Bracket. 89, Figs. 285-288; Fig. 492; 12, Fig. 859. Supports fastened to the end of a box or stock car to carry the Running Board Extension.

Running Board Extension. The part of the running board which extends beyond the end of the car body so as to bring the ends of the running boards on adjoining cars nearer together to facilitate the passage of trainmen from one car to another. See Running Board.

Running Board Extension Bracket. 15, Fig. 859. A bracket to support the Running Board Extension.

Running Board Saddle. 86a, Figs. 374, 375; 7, Fig. 859. A wooden block or an iron casting or forging, shaped on the lower side to fit the angle of a car roof and flat on the upper side, acting as a support for the running board.

Russia Iron. A form of sheet iron manufactured in Russia the exact process for making which has heretofore been kept secret, but which consists essentially in forming a chemical compound of iron upon its surface at the same time that it is highly polished, so that it is not likely to rust. Modern substitutes for this iron are also known as planished iron.

S

Saddle. A block or plate which acts as a bearing or support for a rod, beam, etc.

Safety Appliances (M. C. B. Standard).

In 1911 the United States Safety Appliance Standards, as contained in the order of the

Interstate Commerce Commission, dated March 13, 1911, were adopted as standard.

BOX AND OTHER HOUSE CARS.

HAND BRAKES.

Number. Each box or other house car shall be equipped with an efficient hand brake which shall operate in harmony with the power brake thereon.

The hand brake may be of any efficient design, but must provide the same degree of safety as the design shown on Plate A.

Dimensions. The brake shaft shall not be less than one and one-fourth (1¼) inches in diameter, of wrought iron or steel without weld.

The brake wheel may be flat or dished, not less than fifteen (15), preferably sixteen (16), inches in diameter, of malleable iron, wrought iron or steel.

Location. The hand brake shall be so located that it can be safely operated while car is in motion.

The brake shaft shall be located on end of car, to the left of and not less than seventeen (17) nor more than twenty-two (22) inches from center.

Manner of application. There shall be not less than four (4) inches clearance around rim of brake wheel.

Outside edge of brake wheel shall be not less than four (4) inches from a vertical plane parallel with end of car and passing through the inside face of knuckle when closed with coupler horn against the buffer block or end sill.

Top brake-shaft support shall be fastened with not less than one-half (½) inch bolt or rivets. (See Plate A.)

A brake-shaft step shall support the lower end of brake shaft. A brake-shaft step which will permit the brake chain to drop under the brake shaft shall not be used. U-shaped form of brake-shaft step is preferred. (See Plate A.)

Brake shaft shall be arranged with a square fit at its upper end to secure the hand-brake wheel; said square fit shall be not less than seven-eighths (⅞) of an inch square. Square-fit taper; nominally two (2) in twelve (12) inches. (See Plate A.)

Brake chain shall be of not less than three-eighths (⅜), preferably seven-sixteenths (7-16) inch, wrought iron or steel, with a link on the brake-rod end of not less than seven-sixteenths (7-16), preferably one-half (½) inch, wrought iron or steel, and shall be secured to brake-shaft drum by not less than one-half (½) inch hexagon or square-headed bolt. Nut on said bolt shall be secured by riveting end of bolt over nut. (See Plate A.)

Lower end of brake shaft shall be provided with a trunnion of not less than three-fourths (¾), preferably one (1), inch in diameter, extending through brake-shaft step and held in operating position by a suitable cotter or ring. (See Plate A.)

Brake-shaft drum shall be not less than

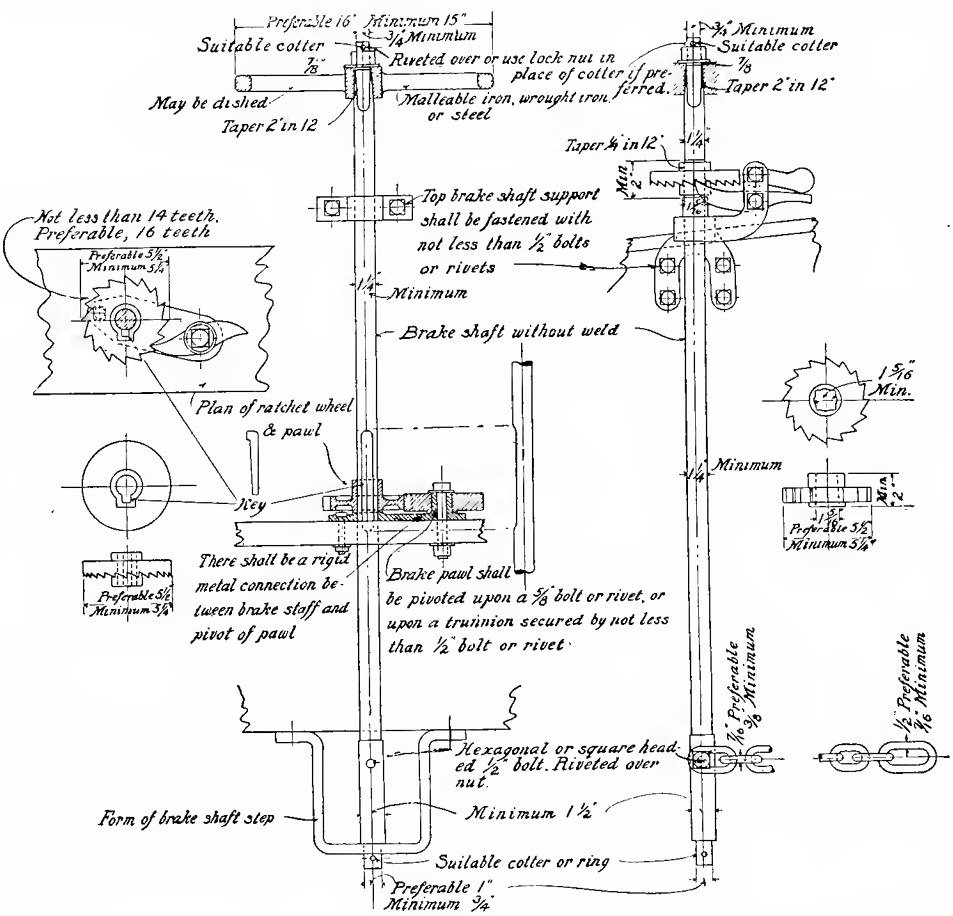


PLATE A.

one and one-half (1½) inches in diameter. (See Plate A.)

Brake ratchet wheel shall be secured to brake shaft by a key or square fit; said square fit shall be not less than one and five-sixteenths (1 5-16) inches square. When ratchet wheel with square fit is used, provision shall be made to prevent ratchet wheel from rising on shaft to disengage brake pawl. (See Plate A.)

Brake ratchet wheel shall be not less than five and one-fourth (5¼), preferably five and one-half (5½), inches in diameter and shall have not less than fourteen (14), preferably sixteen (16), teeth. (See Plate A.)

If brake-ratchet wheel is more than thirty-six (36) inches from brake wheel, a brake-shaft support shall be provided to support this extended upper portion of brake shaft; said brake-shaft support shall be fastened with not less than one-half (½) inch bolts or rivets.

The brake pawl shall be pivoted upon a bolt or rivet not less than five-eighths (⅝) of an inch in diameter, or upon a trunnion secured by not less than one-half (½) inch bolt or rivet, and there shall be a rigid metal connection between brake shaft and pivot of pawl.

Brake wheel shall be held in position on brake shaft by a nut on a threaded extended end of brake-shaft; said threaded portion shall be not less than three-fourths (¾) of an inch in diameter; said nut shall be secured by riveting over or by the use of a lock-nut or suitable cotter.

Brake wheel shall be arranged with a square fit for brake shaft in hub of said wheel; taper of said fit, nominally two (2) in twelve (12) inches. (See Plate A.)

BRAKE STEP.

If brake step is used, it shall be not less than twenty-eight (28) inches in length. Outside edge shall be not less than eight (8) inches from face of car and not less than four (4) inches from a vertical plane parallel with end of car and passing through the inside face of knuckle when closed with coupler horn against the buffer block or end sill.

Manner of application. Brake step shall be supported by not less than two metal braces having a minimum cross-sectional area three-eighths (⅜) by one and one-half (1½) inches or equivalent, which shall be securely fastened to body of car with not less than one-half (½) inch bolts or rivets.

RUNNING BOARDS.

Number. One (1) longitudinal running board.

On outside-metal roof cars two (2) latitudinal extensions.

Dimensions. Longitudinal running board shall be not less than eighteen (18), preferably twenty (20), inches in width.

Latitudinal extensions shall be not less than twenty-four (24) inches in width.

Location. Full length of car, center of roof.

On outside-metal-roof cars there shall be two (2) latitudinal extensions from longitudinal running board to edge of roof above ladder locations, except on refrigerator cars where such latitudinal extensions cannot be applied on account of ice hatches.

Manner of application. Running boards shall be continuous from end to end and not cut or hinged at any point: *Provided,* That the length and width of running boards may be made up of a number of pieces securely fastened to saddle blocks with screws or bolts.

The ends of longitudinal running board shall be not less than six (6) nor more than ten (10) inches from a vertical plane parallel with end of car and passing through the inside face of knuckle when closed with coupler horn against the buffer block or end sill; and if more than four (4) inches from edge of roof of car, shall be securely supported their full width by substantial metal braces.

Running boards shall be made of wood and securely fastened to car.

SILL STEPS.

Number. Four (4).

Dimensions. Minimum cross-sectional area one-half (½) by one and one-half (1½) inches, or equivalent, of wrought iron or steel.

Minimum length of tread, ten (10), preferably twelve (12) inches.

Minimum clear depth, eight (8) inches.

Location. One (1) near each end on each side of car, so that there shall be not more than eighteen (18) inches from end of car to center of tread of sill step.

Outside edge of tread of step shall be not more than four (4) inches inside of face of side of car, preferably flush with side of car.

Tread shall be not more than twenty-four (24), preferably not more than twenty-two (22), inches above the top of rail.

Manner of application. Sill steps exceeding twenty-one (21) inches in depth shall have an additional tread.

Sill steps shall be securely fastened with not less than one-half (½) inch bolts with nuts outside (when possible) and riveted over, or with not less than one-half (½) inch rivets.

LADDERS.

Number. Four (4).

Dimensions. Minimum clear length of tread: Side ladders, sixteen (16) inches; end ladders, fourteen (14) inches.

Maximum spacing between ladder treads, nineteen (19) inches.

Top ladder tread shall be located not less than (12) nor more than eighteen (18) inches from roof at eaves.

Spacing at ladder treads shall be uniform, within a limit of two (2) inches from top ladder tread to top tread of sill step.

Hardwood treads, minimum dimensions one and one-half (1½) by two 2 inches.

Iron or steel treads, minimum diameter five-eighths (⅝) of an inch.

Minimum clearance of treads, two (2), preferably two and one-half (2½), inches.

Location. One (1) on each side, not more than eight (8) inches from right end of car; one (1) on each end, not more than eight (8) inches from left side of car; measured from inside edge of ladder stile or clearance of ladder treads to corner of car.

Manner of application. Metal ladders without stiles near corners of cars shall have foot guards or upward projections not less than two (2) inches in height near inside end of bottom treads.

Stiles of wooden ladders will serve as foot guards.

Ladders shall be securely fastened with not less than one-half (½) inch bolts with nuts outside (when possible) and riveted over, or with not less than one-half (½) inch rivets. Three-eighths (⅜) inch bolts may be used for wooden treads which are gained into stiles.

END-LADDER CLEARANCE.

No part of car above end sills within thirty (30) inches from side of car, *except* buffer block, brake shaft, brake wheel, brake step, running board or uncoupling lever shall extend to within twelve (12) inches of a vertical plane parallel with end of car and passing through the inside face of knuckle when closed with coupler horn against the buffer block or end sill, and no other part of end of car or fixtures on same above end sills, other than exceptions herein noted, shall extend beyond the outer face of buffer block.

ROOF HANDHOLDS.

Number. One (1) over each ladder.

One (1) right-angle handhold may take the place of two (2) adjacent specified roof handholds, provided the dimensions and locations coincide, and that an extra leg is securely fastened to car at point of angle.

Dimensions. Minimum diameter, five-eighths (⅝) of an inch, wrought iron or steel.

Minimum clear length, sixteen (16) inches.

Minimum clearance, two (2), preferably two and one-half (2½), inches.

Location. On roof of car: One (1) in line with, and running parallel to, treads of each ladder, not less than eight (8), nor more than fifteen (15), inches from edge of roof, *except* on refrigerator cars where ice hatches prevent, when location shall be not less than four (4) inches from edge of roof.

Manner of application. Roof handholds shall be securely fastened with not less than one-half (½) inch bolts with nuts outside (when possible) and riveted over, or with not less than one-half (½) inch rivets.

SIDE HANDHOLDS.

Number. Four (4).

[*Tread of side ladder is a side handhold.*]

Dimensions. Minimum diameter, five-eighths (⅝) of an inch, wrought iron or steel.

Minimum clear length, sixteen (16) inches.

Minimum clearance, two (2), preferably two and one-half (2½), inches.

Location. Horizontal: One (1) near each end on each side of car.

Side handholds shall be not less than twenty-four (24) nor more than thirty (30) inches above center line of coupler, *except* as provided above, where tread of ladder is a handhold. Clearance of outer end of handhold shall be not more than eight (8) inches from end of car.

Manner of application. Side handholds shall be securely fastened with not less than one-half (½) inch bolts with nuts outside (when possible) and riveted over, or with not less than one-half (½) inch rivets.

HORIZONTAL END HANDHOLDS.

Number. Eight (8) or more. (Four (4) on each end of car.)

[*Tread of end ladder is an end handhold.*]

Dimensions. Minimum diameter, five-eighths (⅝) of an inch, wrought iron or steel.

Minimum clear length, sixteen (16) inches.

A handhold fourteen (14) inches in length may be used where it is impossible to use one sixteen (16) inches in length on end sills.

Minimum clearance, two (2), preferably two and one-half (2½), inches.

Location. One (1) near each side on each end of car, not less than twenty-four (24) nor more than thirty (30) inches above center line of coupler, *except* as provided above, when tread of end ladder is an end handhold. Clearance of outer end of handhold shall be not more than eight (8) inches from side of car.

One (1) near each side of each end of car on face of end sill or sheathing over end sill, projecting outward or downward. Clearance of outer end of handhold shall be not more than sixteen (16) inches from side of car.

On each end of cars with platform end sills six (6) or more inches in width, measured from end post or siding and extending entirely across end of car, there shall be one additional end handhold not less than twenty-four (24) inches in length, located near center of car, not less than thirty (30) nor more than sixty (60) inches above platform end sill.

Manner of application. Horizontal end handholds shall be securely fastened with not less than one-half (½) inch bolts with nuts outside (when possible) and riveted over, or with not less than one-half (½) inch rivets.

VERTICAL END HANDHOLDS.

Number. Two (2) on full-width platform end-sill cars, as heretofore described.

Dimensions. Minimum diameter, five-eighths (⅝) of an inch, wrought iron or steel.

Minimum clear length, eighteen (18), preferably twenty-four (24), inches.

Minimum clearance, two (2), preferably two and one-half (2½), inches.

Location. One (1) on each end of car opposite ladder, not more than eight (8) inches from side of car; clearance of bottom end of handhold shall be not less than twenty-four (24) nor more than thirty (30) inches above center line of coupler.

Manner of application. Vertical end handholds shall be securely fastened with not less than one-half (½ inch bolts with nuts outside (when possible) and riveted over, or with not less than one-half (½) inch rivets.

UNCOUPLING LEVERS.

Number. Two (2).

Dimensions. Uncoupling levers may be either single or double, and of any efficient design.

Handles of uncoupling levers, *except* those shown on Plate B or of similar designs, shall be not more than six (6) inches from sides of car.

Uncoupling levers of design shown on Plate B and of similar designs shall conform to the following prescribed limits:

Handles shall be not more than twelve (12), preferably nine (9), inches from sides than eighteen (18) inches from top of rail when lock block has released knuckle, and a suitable stop shall be provided to prevent inside arm from flying up in case of breakage.

Outside metal-roof cars shall have longi-

One (1) on each end of car.

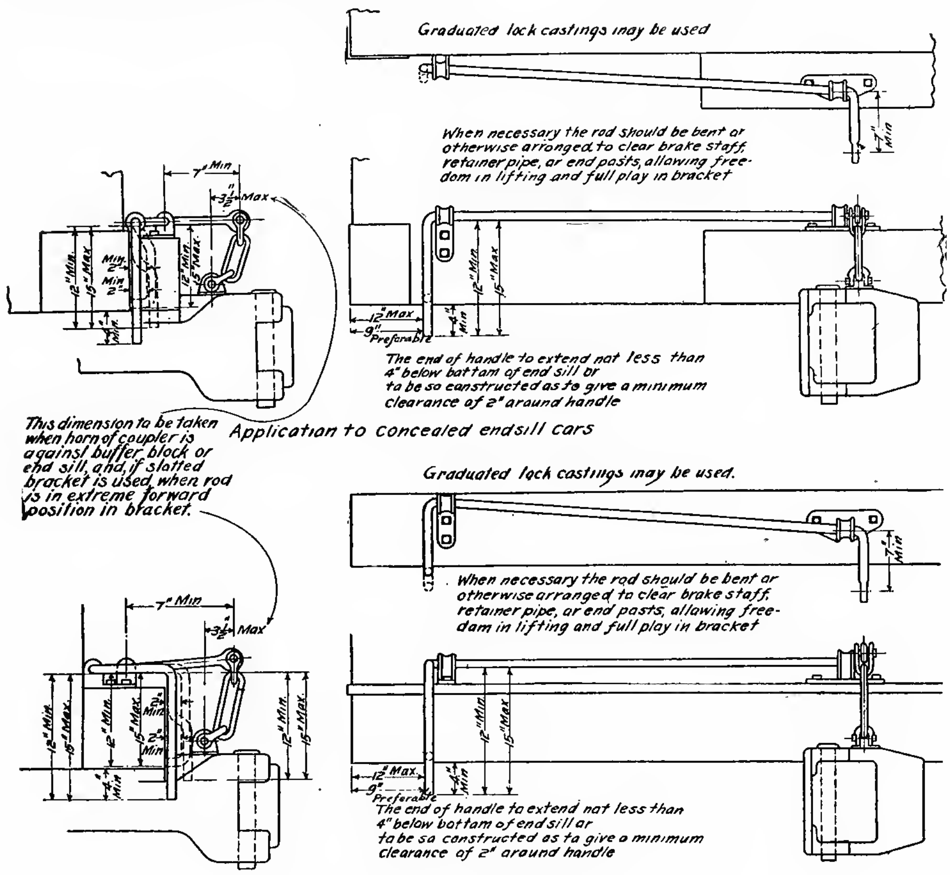
Location. When single lever is used it shall be placed on left side of end of car.

HOPPER CARS AND HIGH-SIDE GONDOLAS WITH FIXED ENDS.

[*Cars with sides more than thirty-six (36) inches above the floor are high-side cars.*]

HAND BRAKES.

Number. Same as specified for "Box and other house cars."



Application to outside endsill cars

PLATE B.

of cars. Center lift arms shall be not less than seven (7) inches long.

Center of eye at end of center lift arm shall be not more than three and one-half (3½) inches beyond center of eye of uncoupling pin of coupler when horn of coupler is against the buffer block or end sill. (See Plate B.)

Ends of handles shall extend not less than four (4) inches below bottom of end sill, or shall be so constructed as to give a minimum clearance of two (2) inches around handle. Minimum drop of handles shall be twelve (12) inches; maximum fifteen (15) inches over all. (See Plate B.)

Handles of uncoupling levers of the "rocking" or "push-down" type shall be not less

Dimensions. Same as specified for "Box and other house cars."

Location. Each hand brake shall be so located that it can be safely operated while car is in motion.

The brake shaft shall be located on end of car to the left of, and not more than twenty-two (22) inches from, center.

Manner of application. Same as specified for "Box and other house cars."

BRAKE STEP.

Same as specified for "Box and other house cars."

SILL STEPS.

Same as specified for "Box and other house cars."

LADDERS.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars," *except* that top ladder tread shall be located not more than four (4) inches from top of car.

Location. Same as specified for "Box and other house cars."

Manner of application. Same as specified for "Box and other house cars."

SIDE HANDHOLDS.

Same as specified for "Box and other house cars."

HORIZONTAL END HANDHOLDS.

Same as specified for "Box and other house cars."

VERTICAL END HANDHOLDS.

Same as specified for "Box and other house cars."

UNCOUPLING LEVERS.

Same as specified for "Box and other house cars."

END-LADDER CLEARANCE.

No part of car above end sills within thirty (30) inches from side of car, *except* buffer block, brake shaft, brake wheel, brake step or uncoupling lever shall extend to within twelve (12) inches of a vertical plane parallel with end of car and passing through the inside face of knuckle when closed with coupler horn against the buffer block or end sill, and no other part of end of car or fixtures on same above end sills, other than exceptions herein noted, shall extend beyond the outer face of buffer block.

DROP-END HIGH-SIDE GONDOLA CARS.

HAND BRAKES.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. Each hand brake shall be so located that it can be safely operated while car is in motion.

The brake shaft shall be located on end of car to the left of center.

Manner of application. Same as specified for "Box and other house cars."

SILL STEPS.

Same as specified for "Box and other house cars."

LADDERS.

Number. Two (2).

Dimensions. Same as specified for "Box and other house cars," *except* that top ladder tread shall be located not more than four (4) inches from top of car.

Location. One (1) on each side, not more than eight (8) inches from right end of car, measured from inside edge of ladder stile or clearance of ladder treads to corner of car.

Manner of application. Same as specified for "Box and other house cars."

SIDE HANDHOLDS.

Same as specified for "Box and other house cars."

HORIZONTAL END HANDHOLDS.

Number. Four (4).

Dimensions. Same as specified for "Box and other house cars."

Location. One (1) near each side of each end of car on face of end sill. Clearance of outer end of handhold shall be not more than sixteen (16) inches from side of car.

Manner of application. Same as specified for "Box and other house cars."

UNCOUPLING LEVERS.

Same as specified for "Box and other house cars."

END-LADDER CLEARANCE.

No part of car above end sills within thirty (30) inches from side of car, *except* buffer block, brake shaft, brake wheel or uncoupling lever, shall extend to within twelve (12) inches of a vertical plane parallel with end of car and passing through the inside face of knuckle when closed with coupler horn against the buffer block or end sill, and no other part of end of car or fixtures on same, other than exceptions herein noted, shall extend beyond the outer face of buffer block.

FIXED-END LOW-SIDE GONDOLA AND LOW-SIDE HOPPER CARS.

[*Cars with sides thirty-six (36) inches or less above the floor are low-side cars.*]

HAND BRAKES.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. Each hand brake shall be so located that it can be safely operated while car is in motion.

The brake shaft shall be located on end of car, to the left of and not more than twenty-two (22) inches from center.

Manner of application. Same as specified for "Box and other house cars."

BRAKE STEP.

Same as specified for "Box and other house cars."

SILL STEPS.

Same as specified for "Box and other house cars."

SIDE HANDHOLDS.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. Horizontal: One (1) near each end on each side of car, not less than twenty-four (24) nor more than thirty (30) inches above center line of coupler, if car construction will permit, but handhold shall not project above top of side. Clearance of outer end of handhold shall be not more than eight (8) inches from end of car.

Manner of application. Same as specified for "Box and other house cars."

HORIZONTAL END HANDHOLDS.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. One (1) near each side on each end of car not less than twenty-four (24) nor more than thirty (30) inches above center line of coupler, if car construction will permit. Clearance of outer end of handhold shall be not more than eight (8) inches from side of car.

One (1) near each side of each end of car on face of end sill, projecting outward or downward. Clearance of outer end of handhold shall be not more than sixteen (16) inches from side of car.

Manner of application. Same as specified for "Box and other house cars."

UNCOUPLING LEVERS.

Same as specified for "Box and other house cars."

END-LADDER CLEARANCE.

No part of car above end sills within thirty (30) inches from side of car, *except* buffer block, brake shaft, brake wheel or uncoupling lever, shall extend to within twelve (12) inches of a vertical plane parallel with end of car and passing through the inside face of knuckle when closed with coupler horn against the buffer block or end sill, and no other part of end of car or fixtures on same, other than exceptions herein noted, shall extend beyond the outer face of buffer block.

DROP END LOW-SIDE GONDOLA CARS.

HAND BRAKES.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. Each hand brake shall be so located that it can be safely operated while car is in motion.

The brake shaft shall be located on end of car to the left of center.

Manner of application. Same as specified for "Box and other house cars."

SILL STEPS.

Same as specified for "Box and other house cars."

SIDE HANDHOLDS.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. Horizontal: One (1) near each end on each side of car, not less than twenty-four (24) nor more than thirty (30) inches above center line of coupler, if car construction will permit, but handhold shall not project above top of side. Clearance of outer end of handhold shall be not more than (8) inches from end of car.

Manner of application. Same as specified for "Box and other house cars."

END HANDHOLDS.

Number. Four (4).

Dimensions. Same as specified for "Box and other house cars."

Location. Horizontal: One (1) near each side of each end of car on face of end sill. Clearance of outer end of handhold shall be not more than sixteen (16) inches from side of car.

Manner of application. Same as specified for "Box and other house cars."

UNCOUPLING LEVERS.

Same as specified for "Box and other house cars."

END-LADDER CLEARANCE.

No part of car above end sills within thirty (30) inches from side of car, *except* buffer block, brake shaft, brake wheel or uncoupling lever, shall extend to within twelve (12) inches of a vertical plane parallel with end of car and passing through the inside face of knuckle when closed with coupler horn against buffer block or end sill, and no other part of end of car or fixtures on same, other than exceptions herein noted, shall extend beyond the outer face of buffer block.

FLAT CARS.

[*Cars with sides twelve (12) inches or less above the floor may be equipped the same as flat cars.*]

HAND BRAKES.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. Each hand brake shall be so located that it can be safely operated while car is in motion.

The brake shaft shall be located on the end of car to the left of center.

Manner of application. Same as specified for "Box and other house cars."

SILL STEPS.

Same as specified for "Box and other house cars."

SIDE HANDHOLDS.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. Horizontal: One (1) on face of each side sill near each end. Clearance of outer end of handhold shall be not more than twelve (12) inches from end of car.

Manner of application. Same as specified for "Box and other house cars."

END HANDHOLDS.

Number. Four (4).

Dimensions. Same as specified for "Box and other house cars."

Location. Horizontal: One (1) near each side of each end of car on face of end sill. Clearance of outer end of handhold shall be not more than sixteen (16) inches from side of car.

Manner of application. Same as specified for "Box and other house cars."

UNCOUPLING LEVERS.

Same as specified for "Box and other house cars."

TANK CARS WITH SIDE PLATFORMS.

HAND BRAKES.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. Each hand brake shall be so located that it can be safely operated while car is in motion.

The brake shaft shall be located on end of car to the left of center.

Manner of application. Same as specified for "Box and other house cars."

SILL STEPS.

Same as specified for "Box and other house cars."

SIDE HANDHOLDS.

Number. Four (4) or more.

Dimensions. Same as specified for "Box and other house cars."

Location. Horizontal: One (1) on face of each side sill near each end. Clearance of outer end of handhold shall be not more than twelve (12) inches from end of car.

If side safety railings are attached to tank bands, four (4) additional vertical handholds shall be applied, one (1) over each sill step and securely fastened to tank or tank bands.

Manner of application. Same as specified for "Box and other house cars."

END HANDHOLDS.

Number. Four (4).

Dimensions. Same as specified for "Box and other house cars."

Location. Horizontal: One (1) near each side of each end of car on face of end sill. Clearance of outer end of handhold shall be not more than sixteen (16) inches from side of car.

Manner of application. Same as specified for "Box and other house cars."

TANK-HEAD HANDHOLDS.

Number. Two (2) [*Not required if safety railing runs around ends of tank.*]

Dimensions. Minimum diameter, five-eighths (5/8) of an inch, wrought iron or steel. Minimum clearance, two (2), preferably two and one-half (2½), inches. Clear length of handholds shall extend to within six (6) inches of outer diameter of tank at point of application.

Location. Horizontal: One (1) across each head of tank, not less than thirty (30) nor more than sixty (60) inches above platform.

Manner of application. Tank-head handholds shall be securely fastened.

SAFETY RAILINGS.

Number. One (1) continuous safety railing running around sides and ends of tank, securely fastened to tank or tank bands at ends and sides of tank; or two (2) running full length of tank at sides of car supported by posts.

Dimensions. Not less than three-fourths (3/4) of an inch, iron.

Location. Running full length of tank, either at side supported by posts or securely fastened to tank or tank bands, not less than thirty (30) nor more than sixty (60) inches above platform.

Manner of application. Safety railings shall be securely fastened to tank body, tank bands or posts.

UNCOUPLING LEVERS.

Same as specified for "Box and other house cars."

END-LADDER CLEARANCE.

No part of car above end sills within thirty (30) inches from side of car *except* buffer block, brake shaft, brake-shaft brackets, brake wheel or uncoupling lever, shall extend to within twelve (12) inches of a vertical plane parallel with end of car and passing through the inside face of knuckle when closed with coupler horn against the buffer block or end sill, and no other part of end of car or fixtures on same above end sills, other than exceptions herein noted, shall extend beyond the outer face of buffer block.

TANK CARS WITHOUT SIDE SILLS AND TANK CARS WITH SHORT SIDE SILLS AND END PLATFORMS.

HAND BRAKES.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. Each hand brake shall be so located that it can be safely operated while car is in motion.

The brake shaft shall be located on end of car to the left of center.

Manner of application. Same as specified for "Box and other house cars."

RUNNING BOARDS.

Number. One (1) continuous running board around sides and ends; or two (2) running full length of tank, one (1) on each side.

Dimensions. Minimum width on sides, ten (10) inches. Minimum width on ends, six (6) inches.

Location. Continuous around sides and ends of cars. On tank cars having end platforms extending to bolsters, running boards shall extend from center to center of bolsters, one (1) on each side.

Manner of application. If side running boards are applied below center of tank, outside edge of running boards shall extend not less than seven (7) inches beyond bulge of tank.

The running boards at ends of car shall be not less than six (6) inches from a point vertically above the inside face of knuckle when closed with coupler horn against the buffer block, end sill or backstop.

Running boards shall be securely fastened to tank or tank bands.

SILL STEPS.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. One (1) near each end on each side under side handhold.

Outside edge of tread of step shall be not more than four (4) inches inside of face of side of car, preferably flush with side of car.

Tread shall be not more than twenty-four (24), preferably not more than twenty-two (22), inches above the top of rail.

Manner of application. Same as specified for "Box and other house cars."

LADDERS.

[If running boards are so located as to make ladders necessary.]

Number. Two (2) on cars with continuous running boards.

Four (4) on cars with side running boards.

Dimensions. Minimum clear length of tread, ten (10) inches.

Maximum spacing of treads, nineteen (19) inches.

Hardwood treads, minimum dimensions one and one-half (1½) by two (2) inches.

Wrought-iron or steel treads, minimum diameter five-eighths (⅝) of an inch.

Minimum clearance, two (2), preferably two and one-half (2½), inches.

Location. On cars with continuous running boards, one (1) at right end of each side.

On cars with side running boards, one (1) at each end of each running board.

Manner of application. Ladders shall be securely fastened with not less than one-half (½) inch bolts or rivets.

SIDE HANDHOLDS.

Number. Four (4) or more.

Dimensions. Same as specified for "Box and other house cars."

Location. Horizontal: One (1) on face of each side sill near each end on tank cars with short side sills, or one (1) attached to top of running board projecting outward above sill steps or ladders on tank cars without side sills. Clearance of outer end of handhold shall be not more than twelve (12) inches from end of car.

If side safety railings are attached to tank or tank bands, four (4) additional vertical handholds shall be applied, one (1) over each sill step and securely fastened to tank or tank bands.

Manner of application. Same as specified for "Box and other house cars."

END HANDHOLDS.

Number. Four (4).

Dimensions. Same as specified for "Box and other house cars."

Location. Horizontal: One (1) near each side of each end of car on face of end sill. Clearance of outer end of handhold shall be not more than sixteen (16) inches from side of car.

Manner of application. Same as specified for "Box and other house cars."

TANK-HEAD HANDHOLDS.

Number. Two (2). *[Not required if safety railing runs around ends of tank.]*

Dimensions. Minimum diameter, five-eighths (⅝) of an inch, wrought iron or steel.

Minimum clearance, two (2), preferably two and one-half (2½), inches.

Location. Horizontal: One (1) across each head of tank, not less than thirty (30) nor more than sixty (60) inches above platform on running board. Clear length of handholds shall extend to within six (6) inches of outer diameter of tank at point of application.

Manner of application. Tank-head handholds shall be securely fastened.

SAFETY RAILINGS.

Number. One (1) running around sides and ends of tank, or two (2) running full length of tank.

Dimensions. Minimum diameter, seven-eighths (⅞) of an inch, wrought iron or steel.

Minimum clearance, two and one-half (2½) inches.

Location. Running full length of tank, not less than thirty (30) nor more than sixty (60) inches above platform or running board.

Manner of application. Safety railings shall be securely fastened to tank or tank bands and secured against end-shifting.

UNCOUPLING LEVERS.

Same as specified for "Box and other house cars."

END-LADDER CLEARANCE.

No part of car above end sills within thirty (30) inches from side of car, *except* buffer block, brake shaft, brake-shaft brackets, brake wheel, running boards or uncoupling lever, shall extend to within twelve (12) inches of a vertical plane parallel with end of car and passing through the inside face of knuckle when closed with coupler horn against the buffer block or end sill, and no other part of end of car or fixtures on same, above end sills, other than exceptions herein noted, shall extend beyond the outer face of buffer block.

TANK CARS WITHOUT END SILLS.

HAND BRAKES.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. Each hand brake shall be so located that it can be safely operated while car is in motion. The brake shaft shall be located on end of car to the left of center.

Manner of application. Same as specified for "Box and other house cars."

BRAKE STEP.

Same as specified for "Box and other house cars."

RUNNING BOARDS.

Number. One (1).

Dimensions. Minimum width on sides, ten (10) inches.

Minimum width on ends, six (6) inches.

Location. Continuous around sides and ends of tank.

Manner of application. If running boards are applied below center of tank, outside edge of running boards shall extend not less than seven (7) inches beyond bulge of tank.

Running boards at ends of car shall be not less than six (6) inches from a point vertically above the inside face of knuckle when closed with coupler horn against the buffer block, end sill or backstop.

Running board shall be securely fastened to tank or tank bands.

SILL STEPS.

Number. Four (4). [*If tank has high running boards, making ladders necessary, sill steps must meet ladder requirements.*]

Dimensions. Same as specified for "Box and other house cars."

Location. One (1) near each end on each side, flush with outside edge of running board, as near end of car as practicable.

Tread not more than twenty-four (24), preferably not more than twenty-two (22), inches above the top of rail.

Manner of application. Steps exceeding eighteen (18) inches in depth shall have an additional tread and be laterally braced.

Sill steps shall be securely fastened with not less than one-half (½) inch bolts with nuts outside (when possible) and riveted over, or with one-half (½) inch rivets.

SIDE HANDHOLDS.

Number. Four (4) or more.

Dimensions. Same as specified for "Box and other house cars."

Location. Horizontal: One (1) near each end on each side of car over sill step, on running board, projecting downward not more than two (2) inches from outside edge of running board.

Where such side handholds are more than eighteen (18) inches from end of car, an additional hanhold must be placed near each end on each side not more than thirty (30) inches above center line of coupler.

Clearance of outer end of handhold shall be not more than twelve (12) inches from end of car.

If safety railings are on tank, four (4) additional vertical handholds shall be applied, one (1) over each sill step on tank.

Manner of application. Same as specified for "Box and other house cars."

END HANDHOLDS.

Number. Four (4).

Dimensions. Same as specified for "Box and other house cars."

Location. Horizontal: One (1) near each side on each end of car on running board, projecting downward not more than two (2) inches from edge of running board, or on end of tank not more than thirty (30) inches above center line of coupler.

Manner of application. Same as specified for "Box and other house cars."

SAFETY RAILINGS.

Number. One (1).

Dimensions. Minimum diameter, seven-eighths (⅞) of an inch, wrought iron or steel.

Minimum clearance, two and one-half (2½) inches.

Location. Safety railings shall be continuous around sides and ends of car, not less than thirty (30) nor more than sixty (60) inches above running board.

Manner of application. Safety railings shall be securely fastened to tank or tank bands, and secured against end-shifting.

UNCOUPLING LEVERS.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other houes cars," *except* that minimum length of uncoupling lever shall be forty-two (42) inches, measured from center line of end of car to handle of lever.

Location. Same as specified for "Box and other house cars," *except* that uncoupling lever shall be not more than thirty (30) inches above center line of coupler.

END-LADDER CLEARANCE.

No part of car above buffer block within thirty (30) inches from side of car, *except* brake shaft, brake-shaft brackets, brake wheel or uncoupling lever, shall extend to within twelve (12) inches of a vertical plane parallel with end of car and passing through the inside face of knuckle when closed with coupler horn against the buffer block or backstop, and no other part of end of car or fixtures on same, above buffer block, other than exceptions herein noted, shall extend beyond the face of buffer block.

CABOOSE CARS WITH PLATFORMS.

HAND BRAKES.

Number. Each caboose car shall be equipped with an efficient hand brake which shall operate in harmony with the power brake thereon.

The hand brake may be of any efficient design, but must provide the same degree of safety as the design shown on Plate A.

Dimensions. Same as specified for "Box and other house cars."

Location. Each hand brake shall be so located that it can be safely operated while car is in motion.

The brake shaft on caboose cars with platforms shall be located on platform to the left of center.

Manner of application. Same as specified for "Box and other house cars."

RUNNING BOARDS.

Number. One (1) longitudinal running board.

Dimensions. Same as specified for "Box and other house cars."

Location. Full length of car, center of roof. [*On caboose cars with cupolas, longitudinal running boards shall extend from cupola to ends of roof.*]

Outside metal-roof cars shall have latitudinal extensions leading to ladder locations.

Manner of application. Same as specified for "Box and other house cars."

LADDERS.

Number. Two (2).

Dimensions. None specified.

Location. One (1) on each end.

Manner of application. Same as specified for "Box and other house cars."

ROOF HANDHOLDS.

Number. One (1) over each ladder.

Where stiles of ladders extend twelve (12) inches or more above roof, no other roof handholds are required.

Dimensions. Same as specified for "Box and other house cars."

Location. On roof of caboose, in line with and running parallel to treads of ladder, not less than eight (8) nor more than fifteen (15) inches from edge of roof.

Manner of application. Same as specified for "Box and other house cars."

CUPOLA HANDHOLDS.

Number. One (1) or more.

Dimensions. Minimum diameter, five-eighths (5/8) of an inch, wrought iron or steel.

Minimum clearance, two (2), preferably two and one-half (2½), inches.

Location. One (1) continuous handhold extending around top of cupola, not more than three (3) inches from edge of cupola roof.

Four (4) right-angle handholds, one (1) at each corner, not less than sixteen (16) inches in clear length from point of angle, may take the place of the one (1) continuous handhold specified, if locations coincide.

Manner of application. Cupola handholds shall be securely fastened with not less than one-half (½) inch bolts with nuts outside and riveted over, or with not less than one-half (½) inch rivets.

SIDE HANDHOLDS.

Number. Four (4).

Dimensions. Minimum diameter, five-eighths (5/8) of an inch, wrought iron or steel.

Minimum clear length, thirty-six (36) inches.

Minimum clearance, two (2), preferably two and one-half (2½) inches.

Location. One (1) near each end on each side of car, curving downward toward center of car from a point not less than thirty (30) inches above platform to a point not more than eight (8) inches from bottom of car. Top end of handhold shall be not more than eight (8) inches from outside face of end sheathing.

Manner of application. Same as specified for "Box and other house cars."

END HANDHOLDS.

Number. Four (4).

Dimensions. Same as specified for "Box and other house cars."

Location. Horizontal: One (1) near each side on each end of car on face of platform end sill. Clearance of outer end of handhold shall be not more than sixteen (16) inches from end of platform end sill.

Manner of application. Same as specified for "Box and other house cars."

END PLATFORM HANDHOLDS.

Number. Four (4).

Dimensions. Minimum diameter, five-eighths (5/8) of an inch, wrought iron or steel.

Minimum clearance, two (2), preferably two and one-half (2½) inches.

Location. One (1) right-angle handhold on each side of each end, extending horizontally from door post to corner of car at approximate height of platform rail, then downward to within twelve (12) inches of bottom of car.

Manner of application. Handholds shall be securely fastened with bolts, screws or rivets.

CABOOSE-PLATFORM STEPS.

Safe and suitable box steps leading to caboose platform shall be provided at each corner of caboose.

Lower tread of step shall be not more than twenty-four (24) inches above top of rail.

UNCOUPLING LEVERS.

Same as specified for "Box and other house cars."

CABOOSE CARS WITHOUT PLATFORMS.

HAND BRAKES.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. Each hand brake shall be so located that it can be safely operated while car is in motion.

The brake shaft on caboose cars without platforms shall be located on end of car to the left of center.

Manner of application. Same as specified for "Box and other house cars."

BRAKE STEP.

Same as specified for "Box and other house cars."

RUNNING BOARDS.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. Full length of car, center of roof. [*On caboose cars with cupolas, longitudinal running boards shall extend from cupola to ends of roof.*]

Outside metal-roof cars shall have latitudinal extensions leading to ladder locations.

Manner of application. Same as specified for "Box and other house cars."

SILL STEPS.

Same as specified for "Box and other house cars."

SIDE-DOOR STEPS.

Number. Two (2) [*if caboose has side doors.*]

Dimensions. Minimum length, five (5) feet.

Minimum width, six (6) inches.

Minimum thickness of tread, one and one-half (1½) inches.

Minimum height of backstop, three (3) inches.

Maximum height from top of rail to top of tread, twenty-four (24) inches.

Location. One (1) under each side door.

Manner of application. Side-door steps shall be supported by two (2) iron brackets having a minimum cross-sectional area seven-eighths (7/8) by three (3) inches or equivalent, each of which shall be securely fastened to car by not less than two (2) three-fourth (¾) inch bolts.

LADDERS.

Number. Four (4).

Dimensions. Same as specified for "Box and other house cars."

Location. Same as specified for "Box and other house cars," *except* when caboose has side doors, then side ladders shall be located not more than eight (8) inches from doors.

Manner of application. Same as specified for "Box and other house cars."

END-LADDER CLEARANCE.

No part of car above end sills within thirty (30) inches from side of car, *except* buffer block, brake shaft, brake wheel, brake step, running board or uncoupling lever, shall extend to within twelve (12) inches of a vertical plane parallel with end of car and passing through the inside face of knuckle when closed with coupler horn against the buffer block or end sill, and no other part of end of car or fixtures on same above end sills, other than exceptions herein noted, shall extend beyond the outer face of buffer block.

ROOF HANDHOLDS.

Number. Four (4).

Dimensions. Same as specified for "Box and other house cars."

Location. One (1) over each ladder, on roof in line with and running parallel to treads of ladder, not less than eight (8) nor more than fifteen (15) inches from edge of roof.

Where stiles of ladders extend twelve (12) inches or more above roof, no other roof handholds are required.

Manner of application. Roof handholds shall be securely fastened with not less than one-half (½) inch bolts with nuts outside (when possible) and riveted over, or with not less than one-half (½) inch rivets.

CUPOLA HANDHOLDS.

Number. One (1) or more.

Dimensions. Minimum diameter, five-eighths (⅝) of an inch, wrought iron or steel.

Minimum clearance, two (2), preferably two and one-half (2½), inches.

Location. One (1) continuous cupola handhold extending around top of cupola, not more than three (3) inches from edge of cupola roof.

Four (4) right-angle handholds, one (1) at each corner, not less than sixteen (16) inches in clear length from point of angle, may take the place of the one (1) continuous handhold specified, if locations coincide.

Manner of application. Cupola handhold shall be securely fastened with not less than one-half (½) inch bolts with nuts outside and riveted over, or with not less than one-half (½) inch rivets.

SIDE HANDHOLDS.

Number. Four (4).

Dimensions. Same as specified for "Box and other house cars."

Location. Horizontal: One (1) near each end on each side of car, not less than twenty-four (24) nor more than thirty (30) inches above center line of coupler. Clearance of outer end of handhold shall be not more than eight (8) inches from end of car.

Manner of application. Same as specified for "Box and other house cars."

SIDE-DOOR HANDHOLDS.

Number. Four (4): Two (2) curved, two (2) straight.

Dimensions. Minimum diameter, five-eighths (⅝) of an inch, wrought iron or steel.

Minimum clearance, two (2), preferably two and one-half (2½), inches.

Location. One (1) curved handhold, from a point at side of each door opposite ladder, not less than thirty-six (36) inches above bottom of car, curving away from door downward to a point not more than six (6) inches above bottom of car.

One (1) vertical handhold at ladder side of each door, from a point not less than thirty-six (36) inches above bottom of car to a point not more than six (6) inches above level of bottom of door.

Manner of application. Side-door handholds shall be securely fastened with not less than one-half (½) inch bolts with nuts outside (when possible) and riveted over, or with not less than one-half (½) inch rivets.

HORIZONTAL END HANDHOLDS.

Number. Same as specified for "Box and other house cars."

Dimensions. Same as specified for "Box and other house cars."

Location. Same as specified for "Box and other house cars," *except* that one (1) additional end handhold shall be on each end of cars with platform end sills as heretofore described, unless car has door in center of end. Said handhold shall be not less than twenty-four (24) inches in length, located near center of car, not less than thirty (30) nor more than sixty (60) inches above platform end sill.

Manner of application. Same as specified for "Box and other house cars."

VERTICAL END HANDHOLDS.

Same as specified for "Box and other house cars."

UNCOUPLING LEVERS.

Same as specified for "Box and other house cars."

PASSENGER-TRAIN CARS WITH WIDE VESTIBULES.

HAND BRAKES.

Number. Each passenger-train car shall be equipped with an efficient hand brake, which shall operate in harmony with the power brake thereon.

Location. Each hand brake shall be so located that it can be safely operated while car is in motion.

SIDE HANDHOLDS.

Number. Eight (8).

Dimensions. Minimum diameter, five-eighths (⅝) of an inch, metal.

Minimum clear length, sixteen (16) inches.

Minimum clearance, one and one-fourth (1¼), preferably one and one-half (1½) inches.

Location. Vertical: One (1) on each vestibule door post.

Manner of application. Side handholds shall be securely fastened with bolts, rivets or screws.

END HANDHOLDS.

Number. Four (4).

Dimensions. Minimum diameter, five-eighths (5/8) of an inch, wrought iron or steel.

Minimum clear length, sixteen (16) inches.

Minimum clearance, two (2), preferably two and one-half (2½) inches.

Handholds shall be flush with or project not more than one (1) inch beyond vestibule face.

Location. Horizontal: One (1) near each side on each end, projecting downward from face of vestibule end sill. Clearance of outer end of handhold shall be not more than sixteen (16) inches from side of car.

Manner of application. End handholds shall be securely fastened with bolts or rivets.

When marker sockets or brackets are located so that they can not be conveniently reached from platforms, suitable steps and handholds shall be provided for men to reach such sockets or brackets.

UNCOUPLING LEVERS.

Uncoupling attachments shall be applied so they can be operated by a person standing on the ground.

Minimum length of ground uncoupling attachment, forty-two (42) inches, measured from center line of end of car to handle of attachment.

On passenger-train cars used in freight or mixed train service, the uncoupling attachments shall be so applied that the coupler can be operated from left side of car.

PASSENGER-TRAIN CARS WITH OPEN END PLATFORMS.

HAND BRAKES.

Number. Each passenger-train car shall be equipped with an efficient hand brake, which shall operate in harmony with the power brake thereon.

Location. Each hand brake shall be so located that it can be safely operated while car is in motion.

END HANDHOLDS.

Number. Four (4).

Dimensions. Minimum diameter, five-eighths (5/8) of an inch, wrought iron or steel.

Minimum clear length, sixteen (16) inches.

Minimum clearance, two (2), preferably two and one-half (2½), inches.

Handholds shall be flush with or project not more than one (1) inch beyond face of end sill.

Location. Horizontal: One (1) near each side of each end on face of platform end sill, projecting downward. Clearance of outer end of handhold shall be not more than sixteen (16) inches from end of end sill.

Manner of application. End handholds shall be securely fastened with bolts or rivets.

END PLATFORM HANDHOLDS.

Number. Four (4). [*Cars equipped with safety gates do not require end platform handholds.*]

Dimensions. Minimum clearance, two (2), preferably two and one-half (2½), inches, metal.

Location. Horizontal from or near door post to a point not more than twelve (12) inches from corner of car, then approximately vertical to a point not more than six (6) inches from top of platform. Horizontal portion shall be not less than twenty-four (24) inches in length nor more than forty (40) inches above platform.

Manner of application. End-platform handholds shall be securely fastened with bolts, rivets or screws.

UNCOUPLING LEVERS.

Uncoupling attachments shall be applied so they can be operated by a person standing on the ground.

Minimum length of ground uncoupling attachment, forty-two (42) inches, measured from center of end of car to handle of attachment.

On passenger-train cars used in freight or mixed train service, the uncoupling attachments shall be so applied that the coupler can be operated from left side of car.

PASSENGER-TRAIN CARS WITHOUT END PLATFORMS.

HAND BRAKES.

Number. Each passenger-train car shall be equipped with an efficient hand brake, which shall operate in harmony with the power brake thereon.

Location. Each hand brake shall be so located that it can be safely operated while car is in motion.

SILL STEPS.

Number. Four (4).

Dimensions. Minimum length of tread, ten (10), preferably twelve (12) inches.

Minimum cross-section area, one-half (½) by one and one-half (1½) inches or equivalent, wrought iron or steel.

Minimum clear depth, eight (8) inches.

Location. One (1) near each end on each side, not more than twenty-four (24) inches from corner of car to center of tread of sill step.

Outside edge of tread of step shall be not more than two (2) inches inside of face of side of car.

Tread shall be not more than twenty-four (24), preferably not more than twenty-two (22), inches above the top of rail.

Manner of application. Steps exceeding eighteen (18) inches in depth shall have an additional tread and be laterally braced.

Sill steps shall be securely fastened with not less than one-half (½) inch bolts with nuts outside (when possible) and riveted over, or with not less than one-half (½) inch rivets.

SIDE HANDHOLDS.

Number. Four (4).

Dimensions. Minimum diameter, five-eighths (5/8) of an inch, wrought iron or steel.

Minimum clear length, sixteen (16), preferably twenty-four (24), inches.

Minimum clearance, two (2), preferably two and one-half (2½), inches.

Location. Horizontal or vertical: One (1) near each end on each side of car over sill step.

If horizontal, not less than twenty-four (24) nor more than thirty (30) inches above center line of coupler.

If vertical, lower end not less than eighteen (18) nor more than twenty-four (24) inches above center line of coupler.

Manner of application. Side handholds shall be securely fastened with bolts, rivets or screws.

END HANDHOLDS.

Number. Four (4).

Dimensions. Minimum diameter, five-eighths (⅝) of an inch, wrought iron or steel.

Minimum clear length, sixteen (16) inches.

Minimum clearance, two (2) preferably two and one-half (2½), inches.

Number. Dimensions. Horizontal: One (1) near each side on each end, projecting downward from face of end sill or sheathing. Clearance of outer end of handhold shall be not more than sixteen (16) inches from side of car.

Handholds shall be flush with or project not more than one (1) inch beyond face of end sill.

End handholds shall be securely fastened with bolts or rivets.

Manner of application. When marker sockets or brackets are located so that they can not be conveniently reached from platform, suitable steps and handholds shall be provided for men to reach such sockets or brackets.

END HANDRAILS.

Number. Four (4). [*On cars with projecting end-sills.*]

Dimensions. Minimum diameter, five-eighths (⅝) of an inch, wrought iron or steel.

Minimum clearance, two (2), preferably two and one-half (2½), inches.

Location. One (1) on each side of each end, extending horizontally from door post or vestibule frame to a point not more than six (6) inches from corner of car, then approximately vertical to a point not more than six (6) inches from top of platform end sill; horizontal portion shall be not less than thirty (30) nor more than sixty (60) inches above platform end sill.

Manner of application. End handrails shall be securely fastened with bolts, rivets or screws.

SIDE-DOOR STEPS.

Number. One (1) under each door.

Dimensions. Minimum length of tread, ten (10), preferably twelve (12), inches.

Minimum cross-sectional area, one-half (½) by one and one-half (1½) inches or equivalent, wrought iron or steel.

Minimum clear depth, eight (8) inches.

Location. Outside edge of tread of step not more than two (2) inches inside of face of side of car.

Tread not more than twenty-four (24), preferably not more than twenty-two (22), inches above the top of rail.

Manner of application. Steps exceeding eighteen (18) inches in depth shall have an additional tread and be laterally braced.

Side-door steps shall be securely fastened with not less than one-half (½) inch bolts with nuts outside (when possible) and riveted over, or with not less than one-half (½) inch rivets.

A vertical handhold not less than twenty-four (24) inches in clear length shall be applied above each side-door step on door post.

UNCOUPLING LEVERS.

Uncoupling attachments shall be applied so they can be operated by a person standing on the ground.

Minimum length of ground uncoupling attachment, forty-two (42) inches, measured from center line of end of car to handle of attachment.

On passenger-train cars used in freight or mixed train service, the uncoupling attachment shall be so applied that the coupler can be operated from the left side of car.

Cars of construction not covered specifically in the foregoing sections, relative to handholds, sill steps, ladders, hand brakes and running boards, may be considered as of special construction, but shall have, as nearly as possible, the same complement of handholds, sill steps, ladders, hand brakes and running boards as are required for cars of the nearest approximate type.

"Right" or "left" refers to side of person when facing end or side of car from ground.

To provide for the usual inaccuracies of manufacturing and for wear, where sizes of metal are specified, a total variation of five (5) per cent. below size given is permitted.

Safety Beam (Six-Wheel Trucks). See Axle Guard.

Safety Berth Latch. A device by which it is made impossible for an upper berth to shut automatically in case of accidental overturning of the cars. These devices enable the Berth Safety Rope to be dispensed with.

Safety Chain. See also Check Chain.

Safety Chain Eye. An iron eye with a broad base bolted to the under side of the side sills of a passenger equipment car to receive the hook on the end of a truck safety or check chain.

Safety Chains, Platform (M. C. B. Recommended Practice). In 1893 a Recommended Practice was adopted for location and details of platform safety chains for passenger equipment cars. In 1896 this was modified as follows: Platform Safety Chains for passenger equipment cars to be located 14½ inches each side of center; to be suitably attached to under side of platform timbers, and to be of such length that when extended horizontally the chain with hook shall measure 12¾ inches from face of end timber to bearing point of hook, and the chain with eye shall measure 2¾ inches from face of end timber to bearing point of eye. The hook shall not be more than 1¼ inches thick transversely, and the eye shall not be less than 1½ inches wide, or less than 4 inches long in its opening. When facing end of car the chain fitted with hook shall be on the left-hand side, and the chain fitted with eye on the right-hand side.

Safety Chains for Steel and Wooden Freight Cars (M. C. B. Recommended Practice). Fig. 2754. In 1894 a Recommended Practice was adopted for Safety Chains for Freight Cars, when such chains are used. The use of safety chains on freight cars was not recommended, but when they are used on cars for special service a location is recommended as shown.

In 1904 a Recommended Practice for safety chains for Steel Freight Cars was adopted.

In 1905, as a result of letter ballot, the two designs of temporary safety chains for chaining together cars carrying double loads, shown on the drawing were adopted as a Recommended Practice.

Safety or Check Chain Eyebolt. 70, Figs. 947, 966. An eyebolt for securing a safety or check chain to a truck or to the car body.

Safety or Check Chain Hook. 69, Figs. 947, 966. A hook on the end of a CHECK CHAIN with which to attach it to an eyebolt on the car body.

Safety Guard (for Spring Plank). An iron strap attached to the truck transoms and passing under the spring plank to hold up the latter in case of accidental breaking of the link hangers. More properly SPRING PLANK SAFETY HANGER.

Safety Hanger. A metal loop or eye surrounding a rod or bar to prevent its falling in case of breakage.

Safety Plate (Baker Heater). An iron plate which covers the hole in the partition between the fire pot and the base of the smoke flue. Its office is to prevent the ignited coals from falling out if the heater be overturned.

Safety Rod (Postal Cars). Fig. 1716. A rod suspended from overhead, over the pouch racks, within easy reach, to serve as a handhold or grabiron in case of derailment, etc.

Safety Rope (Sleeping Car Berths). More properly BERTH SAFETY ROPE. See also SAFETY BERTH LATCH.

Safety Strap. See SAFETY HANGER.

Safety Tread. Figs. 570-576; 610, 621. Rubber or metal coverings for step treads which prevent the foot from slipping.

Safety Valve (Car Heating). Figs. 1962, 1998, 2049, 2095. Used to provide against an accumulation of excess pressure.

(High Speed Brake.) An improved type of relief valve applied to the brake cylinders of such cars in a train as are not equipped with a high speed reducing valve, to relieve the brakes from excessive pressure.

(Passenger Triple Valve.) 33, Fig. 1275; Figs. 1285, 1334, 1353-1354.

(Tank Cars.) See TANK CARS, SPECIFICATIONS FOR.

Saloon. Figs. 1443, 1451. A retiring room, furnished with a dry closet or a water closet. The saloon is commonly also provided with washing facilities. Other terms are lavatory, closet, toilet. See LAVATORY.

One of the smaller subdivisions or staterooms of a sleeping or parlor car.

Salt-Water Drippings, Collection of (M. C. B. Recommended Practice).

In 1898 the subject of rust on trucks and track from salt-water drippings from refrigerator cars was discussed, and a Recommended Practice for the collection of such drippings was adopted.

In 1910 this practice was modified as follows:

1. All salt-water drippings should be retained in the ice tanks and drained off only at icing stations.

2. The total capacity of drain openings should not exceed the capacity of traps, and the capacity of both drains and traps should be sufficient to release all drippings within the time limit of icing the train.

3. The mechanism adopted for handling drain valves should be simple and positive, and so designed as to insure closing the valves before hatch plugs can be returned to their places.

4. Salt drippings should be conducted from ice tanks through the drain valves above described and thence to the outside of cars through the regular traps and drain pipes.

Sand Blast. A process of cutting glass by blowing sand upon it with a strong blast of air.

The same principle is used in larger machines for cleaning the rust and old paint from steel cars.

Sand Plank. A common name for spring plank.

Sandwich Plates. See FLITCH PLATES.

Sash. The frame of a window or blind, in which the glass or slats are set, but commonly used, especially in compound words, as a substitute for window, which means the window and sash complete. The various members used in framing a sash are the same as a DOOR FRAME. See DECK SASH, etc.

Sash Balance. Figs. 1740, 1751, 1755, 1759, 1762, 1813. A spring or weight, with or without a cord, so connected to a sash as to counterbalance its weight and make it easy to raise or lower.

Sash Bars. See SASH LATCH.

Sash Fastener. A sash lock.

Sash Holder. See SASH LOCK.

Sash Latch. Fig. 1792. Similar to a sliding door latch. See LATCH.

Sash Lift. Figs. 1770, 1774, 1777, 1780, 1781. A metal finger hold attached to the bottom rail of a window sash for raising and lowering it. They are sometimes let in flush, but are usually attached on the outside. Sometimes, but rarely, the sash lift is a mere knob, and so called. A WINDOW BLIND LIFT, is a somewhat similar device. See BAR SASH LIFT.

Sash Lock. 22, Fig. 1450; Figs. 1747-1750, 1752-1754, 1758, 1761, 1763, 1764-1767, 1771, 1775-1779, 1782, 1783, 1787, 1788. A spring bolt attached to a window sash, or (rarely) a window blind, provided with thumb lever (sash lock trigger), to withdraw the bolt with by one hand, while the sash is lifted by the other. Both hands must thus be used. To accomplish this end less awkwardly SASH BALANCES have been adopted.

Sash Lock Plate. A sash lock stop.

Sash Lock Rack. Figs. 1747-1750, 1752-1754, 1758. A rack or stop bar used as a SASH LOCK STOP.

Sash Lock Spring. See SASH LOCK.

Sash Lock Stop. Figs. 1747-1750, 1752-1754, 1758, 1765, 1773, 1775-1779, 1783, 1784, 1786. There are two kinds of stops, upper stops for holding the window open, and lower stops to hold it shut. Sash lock bushings, plates, or racks, are substitutes and equivalents for sash lock stops. Sash lock racks are often called stop bars.

Sash Opener. A contrivance, as a lever or rod, for opening a window, used chiefly for the deck sash which are out of reach.

Sash Parting Strip. See Parting Strip.

Sash Pivot. A metal pin or pivot attached to a sash on which the latter turns. See Deck Sash Pivot.

Sash Pull. See Deck Sash Pull.

Sash Rail. A horizontal bar in the frame of a window or blind.

Sash Spring. A metal spring attached to the edge of the stile of a window sash to prevent it from rattling.

Schedule of Prices and Credits. See Interchange of Traffic, Rule 100.

Scheme Rod (Postal Cars). A rod supported upon the scheme rod bracket, and carrying the scheme or schedule of the proper distribution of mail matter for the various post offices; used in distributing mail.

Screen (Window). A wire netting stretched on a frame to admit air but exclude cinders.

Screw. "A cylinder surrounded by a spiral ridge or groove, every part of which forms an equal angle with the axis of the cylinder, so that if developed on a plane surface it would be an inclined plane. It is considered as one of the mechanical powers."—Knight. When used alone the term commonly means a wood screw, having a slotted head and gimlet point, for driving in with a screw driver. Machine screws are similar, except that they have no gimlet point and have a metal screw thread. They are used for uniting metallic parts. All ordinary forms of bolts have screw threads cut on them, but are not commonly called screws. A special form of wood screw is a lag screw, which is a large sized screw with a head like a bolt, so that it may be inserted with a wrench instead of a screw driver. See Screw Thread.

Screw Coupling (British). The means by which passenger train vehicles are coupled together. On the Continent of Europe it is used for both passenger and freight cars. It comprises a right and left-handed screw provided with a hinged weighted handle, which always hangs downward, so that it has no tendency to unscrew and slacken the coupling, and two nuts with gudgeons taking in the eyes of U-shaped coupling links or shackles. The screw coupling may be either loose, or one shackle may be attached to the drawbar.

Screw Gages. Instruments for measuring the diameter or size of screws. They are of two kinds: external, for measuring male screws, and internal, for measuring female screws. See also Screw Pitch Gage, Screw Thread Gage.

Screw Jack. A jack, the power of which depends upon a screw, turned by a lever. See Jack.

Screw Pitch Gage. "A gage for determining the number of threads to the inch on screws and taps. It consists of a number of toothed plates turning on a common pivot, so that the serrated edge of each may be applied to the screw until one is found which corresponds therewith. The figures stamped on the plate indicate the number of threads to the inch."—Knight. In the ordinary single thread screw the pitch is indicated by the number of threads to an inch.

Screw Thread Gage. A steel plate with notches in the edge of the precise form of screw threads, used for giving the proper form to the edges of screw cutting tools. See Screw Thread.

PROPORTIONS FOR SELLERS' STANDARD SCREW-THREADS, NUTS AND BOLTS.

Screw-Threads.				Nuts.				Bolt Heads			
Diameter of screw	Threads per inch.	Diameter at root of thread.	Width of flat.	Short diameter rough.	Short diameter finish.	Thickness rough.	Thickness finish.	Short diameter rough.	Short diameter finish.	Thickness rough.	Thickness finish.
1/4	20	.185	.0062	1/2	7/16	1/4	3/16	1/2	7/16	1/4	3/16
5/16	18	.240	.0074	19/32	17/32	5/16	1/4	19/32	17/32	19/64	1/4
3/8	16	.294	.0078	11/16	5/8	3/8	5/16	11/16	5/8	11/32	5/16
7/16	14	.344	.0089	25/32	23/32	7/16	3/8	25/32	23/32	25/64	3/8
1/2	13	.400	.0096	7/8	13/16	1/2	7/16	7/8	13/16	7/16	7/16
9/16	12	.454	.0104	31/32	29/32	9/16	1/2	31/32	29/32	31/64	1/2
5/8	11	.507	.0113	1 1/16	1	5/8	9/16	1 1/16	1	17/32	9/16
3/4	10	.620	.0125	1 1/4	1 3/16	3/4	11/16	1 1/4	1 3/16	5/8	11/16
7/8	9	.731	.0138	1 7/16	1 3/8	7/8	13/16	1 7/16	1 3/8	23/32	13/16
1	8	.837	.0156	1 5/8	1 9/16	1	15/16	1 5/8	1 9/16	13/16	15/16
1 1/8	7	.940	.0178	1 13/16	1 3/4	1 1/8	1 1/16	1 13/16	1 3/4	29/32	1 1/16
1 1/4	7	1.065	0173	2	1 15/16	1 1/4	1 3/16	2	1 15/16	1	1 3/16
1 3/8	6	1.160	.0208	2 3/16	2 1/8	1 3/8	1 5/16	2 3/16	2 1/8	1 3/32	1 5/16
1 1/2	6	1.284	.0208	2 3/8	2 5/16	1 1/2	1 7/16	2 3/8	2 5/16	1 3/16	1 7/16
1 5/8	5 1/2	1 389	.0227	2 9/16	2 1/2	1 5/8	1 9/16	2 9/16	2 1/2	1 9/32	1 9/16
1 3/4	5	1.491	.0250	2 3/4	2 11/16	1 3/4	1 11/16	2 3/4	2 11/16	1 3/8	1 11/16
1 7/8	5	1.616	.0250	2 15/16	2 7/8	1 7/8	1 13/16	2 15/16	2 7/8	1 15/32	1 13/16
2	4 1/2	1.712	.0277	3 1/8	3 1/16	2	1 15/16	3 1/8	3 1/16	1 9/16	1 15/16

Screw Threads, Bolt Heads and Nuts (M. C. B. Standard). The Sellers or Franklin Institute system of screw threads, bolt heads and nuts is the standard of the Association, and repeated action of the Association has deprecated the use of any other system and encouraged the careful maintenance of these standards.

A set of gages for standard screw threads and a standard inch scale, 2 feet long, are held in the office of the Secretary for reference.

Mr. Sellers, who proposed this system of screw threads, described it in an essay read before the Franklin Institute of Philadelphia, April 21, 1864, as follows:

"The proportions for the proposed thread and its comparative relation to the sharp and rounded threads, will be readily understood from the accompanying diagram in which Figs. 11 and 12—the latter on an exaggerated scale—represent a sharp thread, Figs. 13 and 14 a rounded top and bottom to the English proportion, and Figs. 15 and 16 the flat top and bottom, all of the same pitch.

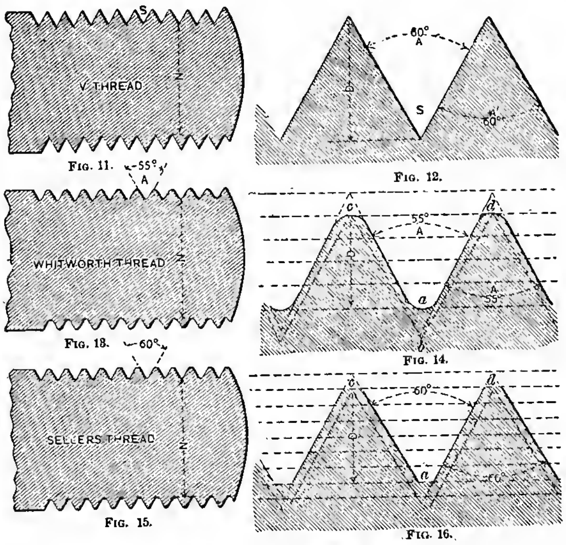


Fig. 11. Fig. 12. Fig. 13. Fig. 14. Fig. 15. Fig. 16.

The angle of the proposed thread is fixed at 60°, the same as the sharp thread, it being more readily obtained than 55°; and more in accordance with the general practice in this country. Divide the pitch, or, which is the same thing, the side of the thread, into eight equal parts, take off one part from the top and fill in one parc in the bottom of the thread, then the flat top and bottom will equal one-eighth of the pitch; the wearing surface will be three-quarters of the pitch, and the diameter of screw at bottom of the thread will be expressed by the formula:

$$\text{Diameter} - \frac{1.299}{\textit{number of threads per inch.}}$$

The accompanying tables are reprinted from Mr. Sellers' essay: they give the proportions of his standard screw threads, nuts and bolt heads:

Scrubber (Acetylene Gas Lighting). Fig. 2253. A device for cleaning the gas.

Sealed Jet (Car Heating). A piece of apparatus in which live steam is brought directly into contact with the circulating water and heats it, at the same time forcing the circulation.

Seat. "That flat portion of a chair or sofa to support the person."—Knight. Figs. 1510, 1512-1564. See CAR SEAT.

In Mechanics: "The part on which another thing rests, as a valve seat."—Knight.

Seat Arm Cap. A piece of metal shaped to the form of the seat arm and screwed to the top to take the wear and as an ornament.

Seat Arm Pivot. Figs. 1476, 1479, 1486. A metal pivot by which a seat arm of a reversible seat is attached to a seat end or the side of a car. In some cases the pivot is made in one piece with the seat arm plate, which is attached to the seat end. The two combined then become a seat arm pivot plate. A seat arm pivot is sometimes called a seat arm rivet.

Seat Arm Plate. A plate fastened to a seat end with a hole in the corner, which receives and holds a seat arm pivot. In some cases the pivot is made in one piece with the plate. The part formed by combining the two is then called a seat arm pivot plate. Sometimes a seat arm pivot plate or washer and a bolt is used.

Seat Arm or **Seat Arm Rest.** 31, Figs. 1458, 1459; Fig. 1489. An arm by which the back of a seat is attached to the seat end or to the side of the car. Such arms are usually attached by a pivot, so that the seat back can be reversed. Sometimes called striker arm, seat back arm, and also seat back reversing arms.

This term is also used to designate the portion of a seat end which supports the arm of a person sitting in the seat, and sometimes, incorrectly, to designate a SEAT ARM CAP.

Seat Arm Rest Bracket. A bracket to be screwed to the wall to carry a wood arm rest.

Seat Arm Rivets. Fig 1476.

Seat Arm Stop. Figs. 1482-1485. A metal lug or bracket attached to a seat end, and sometimes to the side of the car, on which the seat arm rests. Seat stops are either attached to a long plate (curved or straight seat stop), or as in round seat stops, and have a flange entirely surrounding them, by which they are attached to the seat arm or side of the car. They are also called seat stops.

Seat Arm Thimble. Fig. 1478.

Seat Arm Washer. A small washer for the head of a screw, by which a seat arm is fastened to a seat end. Now little used.

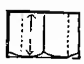
Seat Back. 30, Figs. 1458, 1459. That part of a car seat which forms a support for the back. It has an arm, called the seat back arm, attached to it, by which

PROPORTIONS FOR SELLERS' STANDARD NUTS AND BOLTS


Rough Nut = one and one-half diameter of bolt + ⅛.

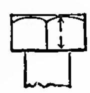

Finished Nut = one and one-half diameter of bolt + $\frac{1}{16}$.

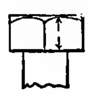

Rough Nut = diameter of bolt.


Finished Nut = diameter of bolt—$\frac{1}{16}$.


Rough Head = one and one-half diameter of bolt + ⅛.


Finished Head = one and one-half diameter of bolt + $\frac{1}{16}$.


Rough Head = one-half distance between parallel sides of head.


Finished Head = diameter of bolt − $\frac{1}{16}$.

NOTE —In 1899 the following dimensions for square bolt heads were adopted as recommended practice: **The side of the head shall be one and one-half times the diameter of the bolt, and the thickness of the head shall be one-half the side of the head.**

it is attached to the seat ends with a seat arm pivot, so that it can be swung over so as to face the other way. In some styles the seat back arm is pivoted below the seat cushion and the seat back swings over the cushion so that both sides are used alternately. In sleeping cars the back does not swing but a part of it pulls out to form the lower berth. See SEAT. On some suburban cars, and commonly on street cars, longitudinal seats are used, with the backs against the side of the car.

Seat Back Arm Lock. See SEAT LOCK.

Seat Back Arm Pivot. Fig. 1490. The swinging joint or seat back pivot in the seat arm. See SEAT ARM PIVOT.

Seat Back Band. A seat back molding.

Seat Back Corner. Fig. 1492. A metallic corner piece to screw to the backs of seats and protect the upholstery from wear.

Seat Back Curved Stop. Figs. 1483, 1491. A seat back stop of a curved form.

Seat Back Molding. A wood, or more usually, metal band or molding fastened around the edge of a seat back to give it a finish and protect it from wear.

Seat Back Paneling. 53, Figs. 1458 and 1459. The panels forming the partition between the seat backs in a sleeping car.

Seat Back Pivot Plate. The plate bearing a seat arm pivot fastened to the seat back.

Seat Back Reversing Arms. A seat back arm of a car seat.

Seat Back Round Stop. Fig. 1485. A round seat stop.

Seat Back Slats. Narrow strips of wood used to form a seat back; used chiefly for seats which are not upholstered.

Seat Back Spring. A weak spring placed in the upholstering in the back of a seat. Usually called simply back spring.

Seat Bracket (Hand Car). A wrought iron knee which supports the seat.

Seat Cover Guard Rail. A strip of wood tacked to the flap of the seat cover to keep it straight.

Seat Cushion. 29, Figs. 1458, 1459. The upholstered part of a car seat. There is ordinarily a separate cushion for the seat and for the back. In sleeping cars the two cushions are used to form the lower berth. Two kinds of cushions are used on cars; a squab cushion, which is a loose pad and is now little used, and box cushion, which is a cushion built upon a cushion frame, with springs, etc.

Seat Division (Longitudinal Seats). A bar of wood or metal to separate the space occupied by a passenger from that adjoining it.

Seat End. 13, Figs. 1458, 1459. A frame of wood or metal at the end of a car seat which supports the arm of the occupant and to which the seat back arm is attached. Seat ends are designated as long or short according to whether they extend entirely to the floor or are supported upon a seat stand. They are also designated as aisle seat ends, or wall seat ends, and, for corner seats, as left-hand or right-hand seat ends.

Seat End Arm. The portion of a seat end which supports the arm of a person sitting in the seat. An arm rest.

Seat End Cross Rail. The end rail between posts of a wood seat end.

Seat Front Rail. A rail fastened to the ends of the seat bearing cross bar and running along at the top of the seat front and under the front seat rail.

Seat Head End. 14 and 33, Figs. 1458, 1459. The upper part of the seat end projecting out beyond the head rest.

Seat Hinge (Sleeping Cars). Fig. 1488. A strap hinge used to connect a seat with the seat back. See also SOFA HINGE.

Seat Joint Bolt. A bolt for fastening a seat rail to aisle seat ends. It is also used at the wall ends.

Seat Leg (Longitudinal Seats). A wooden post which supports a front seat rail.

Seat Leg Plate. A metal plate with which the front of a seat end or leg is covered to protect it from injury.

Seat Lever (Water Closet). A lever projecting backward from the seat lid, to which the connecting rod is attached.

Seat Lid (Water Closet). A cover for the seat.

Seat Lock. Figs. 1477, 1480, 1481. A lock for holding the back of a seat so that its position cannot be rereversed. Such locks are attached either to the seat end, seat back arm or seat back stop. A form for iron seat ends with a small escutcheon, not provided with screw holes, is sometimes distinctively called a barrel lock, although the term is almost equally applicable to any form of seat lock. Seat locks operate by pushing the key inward, turning it a little and then pulling on the key.

Seat Lock Bolt. Fig. 1480. The beveled bolt by which locking is effected.

Seat Pull (Sleeping Cars). Fig. 1494. A flush handle for pulling out the seat in making up the berth so as to drop the back and seat to the same level.

Seat Rail. One of a pair of rails, front and back, resting on and attached to the seat ends, and which support a cushion frame or seat bottom.

Seat Rail Bracket or Socket. Fig. 1487. A support for a wooden seat rail.

Seat Slat. A narrow strip of wood which forms part of a seat bottom, or seat back.

Seat Spring. Fig. 1509. A spiral or other metal spring used to give a seat elasticity. Spiral springs are the most common, the elliptic and spiral-elliptic having become nearly obselete in new seats. A special form of seat springs called back springs, of little resistance, is used for seat backs. British seat springs are called sofa springs, and the back springs back squab sofa springs.

Seat Stand. A support on which an aisle seat end rests.

Seat Stop. See SEAT ARM STOP.

Seat Webbing. Fig. 1509. A form of coarse canvas used in upholstering car seats.

Second Catch (of Car Door Fastener). A double hook or eye placed in the hasp of a car door lock in such manner that the door can, if desired, be locked, leaving a small opening for ventilation.

Second-Class Car. A plainly finished passenger car for carrying passengers who pay a lower rate of fare than first-class passengers. See FIRST-CLASS CAR.

Section (of a Sleeping Car). Two double berths, an upper and a lower, making up into two seats facing each other by day.

Sectional Seat Cushion. One with spiral springs separately attached to narrow slats so that the seat can be made up or repaired in sections.

Self-Clearing or **Self-Cleaning Car.** A car having a floor forming one or more hoppers, with doors at the bottom which, when opened, permit the load to discharge by gravity. Most hopper cars are self-clearing. See also CAR.

Self-Closing Faucet or **Cock.** A faucet having a horizontal bar handle provided with a spring by which it is closed when released.

Self-Propelled Car. Figs. 195, 199-202, 2599, etc. See MOTOR CAR. A car propelled by a motor which is carried entirely by the car itself and does not require power from any outside source.

Sellers System of Screw Threads. A system of screw threads designed by William Sellers of Philadelphia. Often called Franklin Institute or United States Standard Thread. See SCREW THREAD.

Series. A method of connecting two or more pieces of electrical apparatus to a common circuit. The connections are made so that the negative side of one piece of apparatus is connected to the positive of the next and the full current passes successively through each piece of apparatus in the circuit.

Series-Parallel Control. The common method of controlling the speed of direct-current railway motors by connecting them first in series in pairs with external resistance in the circuit. To increase the speed the resistance is cut out by steps, and when entirely cut out the motors are then connected in parallel between the trolley and ground in circuit. The maximum speed is attained when the resistance is entirely cut out and all the motors are receiving full trolley voltage.

Series Parallel Controller. Fig. 2571. See SERIES PARALLEL CONTROL.

Set (of Elliptic Springs). The amount of compression of which the spring is capable. The distance between the spring bands when unloaded. The arch is half the set, plus the thickness of the spring band.

Sextuple (Elliptic Springs). Six elliptic springs coupled together, side by side, to act as one.

Shackle Bar. A coupling link.

Shade. See LAMP SHADE, WINDOW SHADE.

Shade Cap (Oil Lamp) A vertical tube extending the shade upward and constituting in effect an extension of the chimney. A similar part for a lamp globe is called a globe chimney.

Shade Holder (Pintsch Lamp). Figs. 2114, 2117.

Shade Roller (Window Shades). Figs. 1818, etc. A device serving the purpose which its name implies; the only forms now in general use are the automatic and hold the shade in any position desired.

Shaft. "That part of a machine to which motion is communicated by torsion."—Webster. See BRAKE SHAFT, WINDING SHAFT, etc.

Shank (of a Coupler). That part of a coupler or drawbar between the draw head and tail. The body of the coupler.

Shear Beams (Snow Plow Framing). The timbers forming the inclined plane and parting ridge of a plow. They are placed in positions so that they resemble the knives of a pair of shears, hence the name.

Shears (of a Pile Driver). The tongs which grasp the HAMMER.

Sheathing. 52, Figs. 285-288, 374, 375; 27, Fig. 368; 26, Fig. 383; Fig. 490 and Fig. 889. The side and end covering of a car. Tongued and grooved lumber is used on wooden cars and steel plates on all-steel cars. INSIDE LINING is in addition to the ordinary outside sheathing. See LUMBER SPECIFICATIONS.

Sheathing Furring. Wooden strips or blocks to which to nail sheathing.

Sheave. A wheel, roller or pulley, over which a cord or rope runs, or on which any object, as a door or window, rolls. Sheave is often used to designate a block or pulley, but more properly it designates simply the grooved wheel in the block. See PULLEY.

Sheave Hook (Derrick Cars). The hook carried at the lower end of a hoisting block, to which the load is attached.

Sheave Pin or **Pintle.** The axle of a sheave.

Sheet. Fig. 497. The plates used in inclosing all types of steel cars are termed sheets, as end sheet, side sheet, roof sheet, floor sheet, etc.

Sheet Iron. Iron rolled into thin sheets.

Shelled Out (Car Wheels). A term applied to wheels which become rough from circular pieces shelling out of the tread. See INTERCHANGE OF TRAFFIC.

Shim. A thin piece of wood or metal used as a lining or filling piece.

Shipper Shaft (Steam Shovel). The shaft connected to the boom engine and geared to the ratchet beam.

Shoe. A plate, block or piece of any material on or against which an object moves, usually to prevent the latter from being worn. See also BRAKE SHOE.

Short Sill or **Floor Timber.** An auxiliary longitudinal timber sometimes used in a car floor, but not extending its whole length.

Shot (Chilled Car Wheels). See COLD SHOT.

Shovel. See STEAM SHOVEL.

Side Bearing Arch or **Bridge** (Six-Wheel Truck). 62, Fig. 966; Figs. 978, 1040. An iron bar, truss or wooden beam attached to the bolsters to support the truck side bearing.

Side Bearing Truck. Figs. 928, 929, 932. A truck in which the weight of the car is transmitted at the sides instead of the center. The term balanced side bearing truck is also used to indicate that the car body is so balanced on the truck that the weight is equally distributed to all the wheels at all times.

Side Bearings. 16, Figs. 285-288; 8, Fig. 410; Fig. 493. Bearings which are attached to the bolsters, body and truck, near their ends to prevent too much rolling or rocking of the car body on the center plate and to allow the truck to turn freely when the weight of the car is not evenly distributed on the center and the body is tilted over. Usually a plate or block of iron or steel is attached to the body bolster and a corresponding plate, block, roller or ball bearing on the truck bolster. The first is called the body side bearing in distinction from the second which is called the truck side bearing. They are also distinguished as upper and lower side bearings. See ANTI-FRICTION, BALL BEARING, GRAVITY, ROCKER and ROLLER SIDE BEARINGS.

Side Brace. 37, Figs. 285-288; 33, & 37, Figs. 368, 374, 375; 12 & 13, Fig. 383. Commonly designated as simply BODY BRACE or BRACE, except when the end braces are to be distinguished from them.

Side Brace Rod. 34, Figs. 285-288. See BRACE ROD.

Side Casting. A CHEEK CASTING.

Side Chute Plank. The planking of an inclined floor which discharges its load transversely to the car, either toward or from the middle of the car.

Side Deck Lamp. A bracket lamp fastened above the windows and to the deck sill, or to the lower deck ceiling and the deck post.

Side Door. 61s, Figs. 374, 375. Designated thus to distinguish from end doors on both freight and passenger equipment. See DOOR.

(Baggage Car). Figs. 808, 809.

Side Door Bottom Guide. Fig. 494. An iron bracket attached to the side of freight cars with sliding doors to guide the door while it is being opened and shut and also to prevent its swinging away from the car at the bottom.

Side Door Fixtures. See DOOR FIXTURES, BOX CAR.

Side Door Hanger Roller. Fig. 494. See DOOR HANGER.

Side Door Protection Strip. Fig. 489. See PROTECTION STRIP.

Side Door Stiffener. Fig. 489. See STIFFENER.

Side Dump Car. Figs. 37, 41-46, 49, 56-67, 316-319, 324, 325, 328-331, 335, 336, 340. A car so constructed that its contents may be discharged to either side or both sides of the track through doors in the car sides, or drop doors in the floor, by means of an inclined floor and side doors, or by tipping the car body sidewise. See also DUMP CAR and HOPPER CAR.

Side Eave. Figs. 495, 497. A term sometimes used to designate a steel plate running along the eaves or edge of the roof of a steel passenger equipment car.

Side Frame. The frame which forms the side of a car body or truck. It includes the posts, braces, plate and belt rail, etc., for the car body and the side member of a truck frame. See TRUCK SIDES, CAST STEEL, SPECIFICATIONS FOR.

Side Furring. See FURRING.

Side Lamp. Fig. 2525. A lamp attached to the side of a passenger car, in distinction from a center lamp, which hangs from the roof. They are usually made with brackets, by which they can be conveniently fastened.

Side Lamp Braces. Diagonal bars attached to a side lamp and to the side of a car to steady the lamp.

Side Lamp Holder. A metal ring or bowl-shaped receptacle usually attached to a bracket to hold a lamp.

Side Nailing Strip. 194a, Figs. 285-288. A piece of wood bolted outside the side sills of steel underframe cars to which the ends of the floor planks and the bottom ends of the sheathing are nailed. See NAILING STRIP.

Side Piece (Platform Hood). A thin block cut to the curve of the hood.

Side Plank Tie Rod. A vertical rod passing through the side sill and side planking of a wooden gondola car and tying them together.

Side Plate. 46, Figs. 285-288, 368, 374, 375; 15, Fig. 383; 41, Fig. 410; 98, Fig. 423-425. More properly, simply plate. The longitudinal member connecting the tops of the side posts of the car body. So called as distinguished from the end plate.

Side Plate Stiffening Angle (Steel Cars). An angle iron riveted to the side plate, and serving the same purpose as the stakes. Often called stake.

Side Plate Tie Rod. 47, Figs. 285-288. A rod extending across the top of the car and tying the side plates together.

Side Post. Fig. 269; 42, Figs. 285-288; 36, Fig. 368; Figs. 374, 375, 392; 19, 20, Fig. 410. Vertical member used in the side framing of freight and passenger cars.

Side Post Strap Bolt. A strap bolt joining the post to the side sill.

Side Rail. A longitudinal timber extending along the top of the side frame of a coal or ore car. It rests upon posts and braces and connects with end rails, which go across the end of the car. It corresponds to the plate of a box car, but does not carry any rafters or carlines, as does a plate.

Side Seat. A longitudinal car seat, the back of which is against the side of a car.

Side Sheet. 20, Fig. 297; 52, Fig. 320. A plate used in closing in the sides of a steel car.

Side Sill. Fig. 263; 1, Figs. 285-288; Fig. 320; 2, Fig. 342; Figs. 355, 368, 374, 375; 4, Fig. 383; 5, Fig. 410; 1, Figs. 423-425. The outside longitudinal members of the underframe. In some designs of steel cars the side sills are done away with entirely and the entire side of the car is designated as a deep plate girder to carry most of the load to the bolster.

Side Sill Flitch Plank. One of the planks which enclose the flitch plate and make up a composite or built-up side sill.

Side Sill Step. 24, Fig. 297. See SILL STEP and SAFETY APPLIANCES.

Side Slope. That part of the floor which slopes from the side of a hopper to the hopper door. See HOPPER SLOPE SHEET.

Side Stake. 21, Fig. 297. See STAKE.

Side Stem. Figs. 547, 551; 54, Figs. 552-555. A bar attached to the side of a three-stem coupler to transmit part of the force to springs separate from the regular draft springs. See THREE-STEM EQUIPMENT.

Side Straps (Gondola Cars). The straps to which the end planks and sometimes also the side planks, are bolted. They are also called side plank tie straps.

Side Strut for Hopper Floor (Hopper Cars). An inclined strut or support for the hopper floor between the bolster and the end of the car, fastened to the corner of the end sill.

Siding. A side track. See also SHEATHING and LUMBER SPECIFICATIONS.

Siding, Flooring, Roofing and Lining (M. C. B. Standard). Fig. 2726.

In 1901 the following specifications were adopted as standard:

Flooring.

Flooring shall be of three kinds: Square-edged, dressed all over; ship-lapped, dressed all over; or tongued and grooved, dressed all over, in accordance with section shown on the drawing.

In 1908 the dimensions of dressed flooring were increased ¼ inch.

In 1908 a drawing was added showing details of flooring 2⅜ inches thick for use on cars for rough freight.

In 1909 drawing was revised to show flooring of 2⅜-inch finished section.

In 1912 the drawing was revised to show the under shoulder on the tongue edge set back 1-32 inch.

Siding, Roofing and Lining.

Siding, roofing and lining shall be of the section shown on the drawing.

In 1908 drawing was revised to show separate sections for roofing and lining.

In 1912 the drawing was revised to show the under shoulder on the tongue edge set back 1-32 inch.

Signal. See Back-Up Air Signal, and Train Air Signal Apparatus.

Signal Branch Pipe. A pipe leading from the train air signal pipe to the car discharge valve.

Signal Cord. Fig. 1849. Where the train air signal system is used a separate signal cord is used in each car and is attached to the car discharge valve; a pull on the cord releases the air in the signal pipe and blows the signal in the cab.

Signal Cord Bushing. Fig. 1843. A thimble lining a hole through a partition for a signal cord to pass through, in distinction from a signal cord guide, which is attached to the side or roof of the car or to the signal cord hanger and serves solely the purpose which its name implies. For passing the signal cord through inclined surfaces beveled bushings are used, which are frequently provided with one or more pulleys to avoid friction.

Signal Cord Coupling. Fig. 1848. The hook attached to the end of a signal cord to enable it to be connected or disconnected at pleasure with another signal cord.

Signal Cord End Hook. A common metal hook with a screw shank by which it is attached to the end of the car. The hook is used to fasten the end of a bell cord to the last car and thus hold it in its place and prevent it from being drawn out of its guides.

Signal Cord Guide. Figs. 1844-1847. A metal eye or ring attached to the roof or ceiling of a car, or to the end of a Signal Cord Hanger, and by which a signal cord is carried or conducted.

Signal Cord Hanger. Fig. 1842. A guide for the signal cord, hanging usually from the center of the clere story or upper deck.

Signal Cord Pulley or Sheave. Figs. 1843-1846. A wheel in a signal cord guide over which a signal cord runs.

Signal Cord Sheave. A Signal Cord Pulley.

Signal Cord Splice. A metal coupling with right and left hand screws for permanently splicing the ends of a broken cord.

Signal Cord Strap. See Signal Cord Hanger.

Signal Cord Thimble. See Signal Cord Bushing.

Signal Hose. An air hose similar to, but of smaller diameter than, an air brake hose, and used between cars to connect the train air signal lines.

Signal Lamp. See Tail Lamp.

Signal Lamp Bracket. A bracket attached to the car body to hold the signal lamp or marker.

Signal Lamp Socket (M. C. B. Standard). Fig. 2727. In 1903 a form of combination lamp holder and flag bracket was adopted as Recommended Practice. In 1911 the dimensions showing the slot and taper of the socket were advanced to standard and the bracket omitted.

Signal Pipe (Train Air Signal Apparatus). A continuous pipe running from car to car through the train, substantially a duplicate of the brake pipe, but working with a lower pressure of air. The signal pipe couplings are also similar to brake pipe hose couplings, but are arranged so that they will not couple with the latter.

Signal Pipe Cut-out Cock (Train Air Signal Apparatus). A cock placed at each end of every car for closing the signal pipe when desired.

Signal Pipe Strainer. Fig. 1362. Strainer used in signal pipe.

Signal Reservoir (Train Air Signal Apparatus). See Whistle Reservoir.

Signal Valve (Train Air Signal Apparatus). Fig. 1365. A valve attached to a branch from the signal pipe, which, on the opening of the car discharge valve in any car, and the consequent reduction of pressure in the signal pipe, permits the air to escape to blow the signal whistle. On motor cars this valve and whistle are placed in the cab at each end of the car.

Signal Whistle (Train Air Signal Apparatus). See Whistle.

Sill (Car Building). The main longitudinal timbers which are connected transversely by the end sills, body bolsters, and cross ties. Sills are divided into side sills, intermediate sills and center sills. For the splice for broken sills required by the regulations for the interchange of cars see Interchange of Traffic. See also End Sill, Platform End Sill, Side Sill, etc.

The lower horizontal member of the frame surrounding a window or door. See Door Sill, Window Sill.

See Lumber Specifications.

Sill Knee Iron. An L-shaped or right-angled iron casting or forging bolted into the inside corner of a car frame to strengthen it.

Sill and Plate Rod Washer. A large rectangular washer for the ends of the sill and plate tie rod.

Sill and Plate Tie Rod. 36, Figs. 285-288; 14, Fig. 383, A vertical iron rod which passes through the sill and plate of a car body frame and ties the two together. A Brace Straining Rod is a similar part for low passenger car trusses below the windows.

Sill Splice. See Interchange of Traffic, Rule 22.

Sill Splicing (M. C. B. Standard). Fig. 2728.

Steel Center Sills.—At the convention of 1905, the following methods for splicing of center sills on steel cars and cars constructed with steel underframes were adopted as Recommended Practice. In 1911 these splices were advanced to Standard.

The splice for center sills, except as otherwise herein stated, to be located not less than 7 inches from either side of the body bolster, consisting of butt joints. The butt joints to be reinforced by plates on both sides to be not less than twice the length of the protruding end, but not exceeding 24 inches, and not less than same thickness of web plate, with the one on the flange side of channel to include flanges, while the outside plate should only cover the web. The rivets to be spaced as shown on Figs. "A" and "B" of the drawing.

Fig. "A" shows the method of splicing center sills in front of body bolster, and Fig. "B" shows methods of splicing center sills back of body bolster.

Fig. "C" shows method of splicing in cases where cars are damaged to such extent that the center sills have to be cut off less than 8 inches from the front side of the body bolster; this method is not recommended for sills with protruding end less than 3 inches. The outside plate in this splice may be made of pressed steel or a casting. The rivets to be spaced as shown on sketch.

Fig. "D" shows the method of splicing side sills; this splice may be located on either side of the body bolster. The rivets to be spaced as shown on sketch.

In 1909 the illustrations were revised by the addition of end sills to drawing. Advanced to Standard in 1911.

In 1912 the text of standards was changed to show the limit of length of projection for splicing as 7 inches.

WOODEN SILLS.—In 1909 the form of splice shown on the drawing for the splicing of center sills of freight cars was adopted. Five-eighths inch diameter for bolts and 11-16 inch for bolt holes were adopted as Recommended Practice for assembling sill splices for freight cars.

The butt or step splice, without side plank, was adopted for the splicing of all freight-car sills other than center sills.

In 1911 all reference to draft sills was omitted on account of being construed in some quarters to mean draft timbers, and the illustrations advanced to Standard.

Sill Step (Freight Cars). 30, Figs. 285-288; 24, Fig. 297; Figs. 374, 375, 489. A U-shaped iron attached to the sill of a car as a step for trainmen. See SAFETY APPLIANCES.

Sill Strap Bolt. A strap bolt, used to fasten the side and end sills together. When set into the sill it is called a joint bolt.

Sill Tie Rod. A transverse iron tie rod in the floor of a car for holding the sills together.

Sill Timber Key. A metal block let into a gained seat on the sills to relieve the sill bolts from shearing stresses.

Sills, Uniformity for Section of (M. C. B. Standard). In 1899 the following finished sizes for sections of longitudinal car sills were adopted as standard of the Association:

For cars such as box, stock, flat, long gondolas, refrigerators, etc., 32 feet and over in length, but under 40 feet:

4 " x 8"	4 " x 9"	4 " x 10"	4½" x 12"	5" x 14"
4½" x 8"	4½" x 9"	4½" x 10"	5 " x 12"	
5 " x 8"	5 " x 9"	5 " x 10"		

For cars 40 feet long and over, such as furniture and special long gondolas:

4½" x 8"	4½" x 9"	5" x 10"	6" x 12"	6" x 14"
5 " x 8"	5 " x 9"	6" x 10"		
	6 " x 9"			

It is believed that the above recommendations afford a sufficient range of sizes to cover all requirements of design; they are good merchantable sizes, and if used as suggested car repairs will be greatly expedited, as there will be less delay in getting special sizes of lumber, and requisitions for regular sizes can be filled more promptly, as lumbermen can saw in advance of orders with a reasonable certainty of selling their stock.

Single Plate Wheel. A wheel, in which the hub and rim are united by only a single plate, which is strengthened usually by ribs, called brackets, or sometimes by corrugations. See WHEEL.

Single Track Snow Plow. Fig. 227. A snow plow for use on single track railroads and so constructed that it throws the snow to both sides of the track.

Sink (Dining Car). A shallow metallic box to receive and carry off dirty water. See Fig. 1588 for sink plug.

Six-Wheel Truck. Figs. 933, 964-973, 976-978. See TRUCK.

Skid Shoe. Fig. 2649. An iron shoe used to slide broken car wheels to a side track in order to avoid blocking the road.

Slack Adjuster. Figs. 1287, 1401-1404. A device for automatically taking up the slack in the foundation brake gear when normal piston travel is exceeded.

Slat. A narrow strip of board or metal.

Slat Seat. A seat composed of narrow strips of wood.

Sleeping Car. Figs. 176, 180-184, 186, 249, 250, 255, 410-414, 416-418, 420. A car provided with fixed seats, arranged to face each other, which can be used for day travel and at night can be made up into berths. A pair of seats, which makes a lower berth, and its corresponding upper berth, together make up a section. The mattress and bedding are carried in a pocket under the deck, the bottom of the pocket being hinged to lower and form the upper berth, while the seat cushions and backs are arranged on the seat frame to form the lower berth. See FIGS. 1458, 1459.

Most of the sleeping cars in the United States are owned and operated by the Pullman Company and hence are often referred to simply as Pullman cars. The Pullman sleeping cars are commonly referred to either as standard or tourist cars.

EMIGRANT SLEEPING CARS, COLONIST CARS and TOURIST SLEEPING CARS resemble standard sleeping cars, but are without such expensive upholstery. Compartment sleeping cars are divided into compartments, generally with one upper and one lower berth in each. A corridor runs along the side of the car. See also CAR, M. C. B. CLASS P.

Sleeping Car Seat. Fig. 1521.

Sleeping Car Section. Figs. 1458, 1459. The space in a sleeping car occupied by two double seats in daytime and by two berths (a lower berth and its corresponding upper berth) at night.

Slewing Gear (Pile Driver). The means for causing the swinging platform to revolve.

Slewing Rings (of a Derrick). Rings attached to the upper end of the boom for attaching a rope by which to move or steady it when loaded.

Slide Valve (Triple Valve). 3, Figs. 1273-1275. A plain slide valve, controlled in its motion by the piston, by means of which the air is admitted to, and exhausted from, the brake cylinder, applying and releasing the brake.

Slide Valve Feed Valve. See FEED VALVE.

Slide Valve Spring (Triple Valve). 6, Figs. 1273-1275.

Sliding Chair. Figs. 1228, 1232. A casting attached to a brake beam which slides on an inclined member in such a way as to secure a proper adjustment of the brake shoe as it wears.

Sliding Door. A door which opens by sliding sideways instead of swinging on hinges. Such doors are almost universally used on freight cars; also on baggage, express and postal cars, subway trains and tunnel cars. Figs. 810, 812. They are hung by hooks called the door hangers, which slide on a top door track. See also CAR DOOR HANGER.

Sliding Door Bracket. A DOOR TRACK BRACKET.

Sliding Door Friction Roller. A small wheel attached to the top or bottom of a sliding door to make it run easily. It may or may not carry the weight of the door.

Slip Case (Postal Car). Fig. 1716. A small pigeon hole case for use on a postal car.

Sloped Floor Sheet. See HOPPER SLOPE SHEET.

Smoke Bell. Fig. 2530. A cover or screen of glass, porcelain or metal, shaped somewhat like a bell, and placed over a lamp to protect the ceiling of a car or room. Large smoke bells are often called canopies.

Smoke Bell Bracket. A separate carrier for a smoke bell.

Smoke Eell Stem. A tube attached to the upper part of a smoke bell and serving to carry away the gases so as to bring the smoke bell lower and nearer to the lamp.

Smoke Flue. A smoke pipe.

Smoke Jack. 20, Fig. 383. A term commonly applied to the outside portion of a smoke flue when used on caboose and work cars.

Smoke Fipe (Heaters). The pipe by which the smoke is conducted to the outside of the car, usually called stove pipe, but the stove pipe of heaters is called a smoke pipe or smoke flue, to distinguish it from the air pipes.

Smoke Pipe Cap. A covering on top of the smoke pipe to exclude rain and wind. Also called jack.

Smoke Pipe Casing (Heaters). An outside pipe which incloses a smoke pipe, leaving a space between the two through which air is admitted from the top and is thus warmed.

Smoke Screen (Baker Heaters). A conical-shaped box, the front of which is the feed door and the bottom of which is the hole through which the coal enters the fire pot, and which is covered by the safety plate.

Smoke Top (Baker Heater). The upper part of the heater, made of Russia iron, in a conical form.

Smoking Car. Figs. 170, 235, 236. A passenger car reserved for smokers. Combination cars frequently have a smoking compartment. See Car M. C. B. Class P. N.

Smoking Room (Sleeping Cars). A compartment now almost universal in modern sleeping cars and parlor cars.

Snatch Block. Properly a single block which has an opening (notch) in one cheek to receive the rope. The snatch block is usually provided with a swivel hook. The term is also popularly applied to any form of single block provided with a hook, although more properly it applies to only one with an opening at the side for readily inserting or removing the rope.

Snow Flanger. Fig. 224. See Flanger.

Snow Plow. Figs. 227-230. A car so constructed that it will remove snow from railroad tracks. Snow plows are generally of either the wedge or rotary types. What is frequently called a wedge plow has a wedge-shaped front end, and is pushed through the snow by a locomotive. A wing-elevator snow plow has large wings which may be swung out by means of compressed air. Such a plow clears a wider space than one without the wing-elevator, and the sloped surfaces on the wings throw the snow well clear of the track. Snow plows are usually equipped with Flangers. See Double Track Snow Plow, Single Track Snow Plow.

A rotary snow plow has at the front end a wheel, set at right angles to the track, and furnished with blades. This wheel is driven through a horizontal shaft by a steam engine located on the car and when the whole machine is pushed forward by a locomotive the blades cut the snow from before the plow and discharge it through a chute to one side of the track.

Snow Scraper. A Flanger.

Soap. See Liquid Soap Fixture.

Soap Dish. Figs. 1596, 1598.

Soap Holder. A soap dish attached to a partition like a bracket. See Soap Dish and Liquid Soap Fixture.

Socket, Signal Lamp. See Signal Lamp Socket.

Socket Washer. A large washer with a cavity to receive the head or nut of a bolt or rod so that it will not project beyond the surface of the wood to which it is attached. Also called cup washer.

Sofa (Sleeping Cars). A longitudinal seat which makes up as a berth by pulling out sidewise so as to drop the back. Now used only in staterooms.

Sofa Arm Rest Bolt. Figs. 1495, 1496.

Sofa Arm Rest Fixtures. Fig. 1498.

Sofa Back Leg Socket. Fig. 1503.

Sofa Back Pivot Hinge and Bushing. Fig. 1500.

Sofa Bolt (Sleeping Cars). Fig. 1497. A sliding bolt used for holding a sofa in its place. It is operated from the front by a sofa pull working through a sofa crank. Sofas standing against the side of the cars are now little used.

Sofa Caster. Fig. 1493. See Caster.

Sofa Hinge. A hinge by which the seat and back of a sofa are fastened together so that they can be changed from a sofa to a bed.

Sofa Rail End and Socket. Fig. 1502.

Solenoid. A coil of insulated copper wire wound on a spool which, when the electric current flows through it, may draw or attract an iron rod, core or plunger into its interior. A modified form of electro magnet. Used as a means for operating regulators, switches and other electrical apparatus.

Solid Bottom Gondola Car. Figs. 44, 52-55, 334, 341. A gondola car without openings in the floor or bottom for discharging the load. See also Car.

Spanner. A wrench for uncoupling hose, etc., formed like the arc of a circle, with notches or lugs for engaging in dogs or grooves on a spanner nut. An ordinary wrench is termed a spanner in Great Britain.

Spark Strip. A filling strip placed between a box car side door and the car to prevent the entrance of sparks or cinders.

Specifications for Cast Steel Truck Sides. See Truck Sides, Cast Steel, Specifications for.

Specifications for Tank Cars. See Tank Cars, Specifications for.

Specifications for Wheels. See Wheels, Specifications for.

Speed Recorder. Figs. 1913, 1916-1918. A device, usually driven from an axle, which records the speed of a train. Its use is confined practically to official cars, dynamometer cars and locomotives.

Spiral Elliptic Seat Spring. A spring made of a thin band of steel wound in a spiral coil, the transverse section of which is elliptic.

Spiral Seat Spring. The common form of Seat Spring.

Spiral Spring. See Helical Spring.

Spiral Spring Cap. A casting or plate which forms a bearing for the top of a spiral spring, and which also holds it in its place. A similar seat is used at the other end.

Spittoon. See Cuspidor.

Splice Plate. Fig. 492. A plate used to fasten the ends of two members of a frame together, so that they make a continuous member.

Splicing Sills. See Sills, Splicing of.

Split Key. A form of pin which is self-fastening, consisting essentially of two parallel strips or bars of metal, which, when united, constitute one pin, but the ends of which may be forced apart to prevent the pin being withdrawn.

Spoke. "One of the radial arms which connect the hub with the rim of a wheel."—Knight.

Spoke Wheel. A wheel, the rim or tire of which is connected with the hub by spokes instead of one or more plates. See Wheel.

Spool (of Hoisting Gear). The drums on which the hoisting rope or chain is wound.

Spreader. Fig. 220. See Ballast Spreader.

Spring. Figs. 687, 1102, 1103, 1111, 1112, 1113, Elliptic springs, Figs. 1104-1109, 1114. An elastic body to resist concussion. Springs are also used to produce motion in a reverse direction to that caused by some other applied force, as a brake spring and the spring of a door latch. The leading forms of springs are Elliptic Springs and Spiral or Helical Springs. Spiral springs are designated according to the number combined one within the other, as double coil, triple coil, etc., or if the springs are placed side by side, as two group, four group, six group, etc.; elliptic springs, according to the number united to work together as one spring, are designated as double or duplicate, triple or triplicate, quadruple, quintuple and sextuple. The main springs about a car are nearly all spiral springs, except that elliptic springs are almost exclusively used for the bolster springs of passenger cars.

The principal springs of a car supporting its weight are the bolster springs, also called bearing springs or body springs. Equalizing bar or equalizer springs are used in addition on passenger cars, as also sometimes journal springs. Side journal springs are used on street cars, and are sometimes key-shaped or spool-shaped. See also Draft Springs.

See Spring Dampener.

Spring Band (Elliptic Springs). A wrought iron strap which embraces the plates at the center.

Spring Block. See Equalizer Spring Block.

Spring Buffer. See Buffer.

Spring Cap. Figs. 974, 976, 1099; 72 and 75, Figs. 947, 966 A cup-shaped piece of cast or wrought iron for holding the top of a spring and against which the latter bears. They are further distinguished by the name of the spring, as bolster spring cap, etc. The spring seat comes below the spring, but both these parts are very commonly called spring plates, especially in large group springs.

Spring Caps for Freight Car Trucks. See Springs and Spring Caps for Freight Car Trucks.

Spring Controller. Fig. 1102, 1103. A telescopic band which guides or keeps coil springs in proper position.

Spring Dampener. Figs. 1110, 1113. A device to increase the capacity of a spring by bringing into play a certain amount of friction which helps to absorb the load or shock, the friction increasing at a greater rate than the load as the latter increases. Some spring dampeners are intended to retard the sharp vibration of a coil spring and make its motion more like that of an elliptic spring. See also Friction Draft Spring.

Spring Door Latch. A latch, the bolt of which is thrown into contact with a catch by a spring, and is disengaged by a knob or handle. Such latches are not arranged so as to be fastened with a key. See Latch.

Spring Door Lock. A lock usually called a night latch.

Spring Edge (Car Upholstery). A term applied to a method of upholstery which protects the frame work entirely by springs, so that it is not felt by the occupant of the seat.

Spring Hanger. See Swing Hanger.

Spring Hinge. Fig. 1827. A hinge fitted with a spring to make the door self closing. A double acting spring hinge (Fig. 1830) is one which will permit the door to open either way and also to make it self-closing.

Spring Plank. 43, Figs. 947, 966; Figs. 974, 976 and 1074. A transverse member underneath a truck bolster and on which the bolster springs rest. Also called sand plank. A Spring Plank Safety Hanger passes under the spring plank. A swing spring plank is used in passenger and other Swing Motion Trucks. In rigid bolster trucks the spring plank is bolted to the lower arch bar of the truck frame.

Spring Plank Bearing. 44, Figs. 947, 966. A casting on which a spring plank rests.

Spring Plank Bolt. A horizontal bolt connecting the spring plank and truck columns. Rivets are also used.

Spring Plank Safety Hanger (Passenger Equipment Trucks). 45, Figs. 947, 966; Fig. 975. A U-shaped strap of iron attached to the transoms, and passing under the spring plank, so as to hold it up in case the swing hangers or their attachments should break.

Spring Plate. A spring seat or cap.

Spring Pocket or Strap Drawbar. A drawbar with a rectangular strap or "pocket" at the back end, in which the draft spring is placed.

Spring Seat. Figs. 974, 976, 1099-1101; 73 and 74, Figs. 945, 947, 966. A cup-shaped piece of cast or wrought iron, on which the bottom of a spring rests. See Spring Plate. They are further distinguished by the name of the spring for which they serve, as bolster spring seat, equalizer spring seat, etc.

Springs and Spring Caps for Freight-Car Trucks (M. C. B. Recommended Practice). Figs. 2759-60.

In 1898 detail designs of spring coils and caps suitable therefor were adopted as Recommended Practice.

In 1901 a committee presented revised drawings with full details and specifications. They were submitted to letter ballot and adopted as Recommended Practice.

In 1901 designs with full details and specifications for springs for 100,000-pound capacity cars were presented, and as a result of letter ballot were adopted as Recommended Practice.

In 1912 the form of spring caps was changed.

Sprocket. Fig. 2310. A toothed wheel.

Spud. Fig. 1599. A bushing or coupling by which the hole of a sink or water cooler drip is connected with the drain or drain pipe.

Spur Wheel. A toothed wheel.

Square Door Bolt. Fig. 1660. A door bolt made of a square and straight bar of metal. When the bolt has an offset it is termed a square neck door bolt.

Stake. 21, Fig. 297; 43, Fig. 320. A piece of timber inserted in a pocket on the sides and ends of flat cars to hold the load in place. The sides of wooden gondola cars are sometimes held in a similar manner. The side stiffening pieces on steel hopper and gondola cars are frequently called stakes.

Stake Pocket (Gondola and Flat Cars). 39a, Figs. 320; 10, Fig. 342. A metal receptacle or collar, attached to the side and end sills to receive the end of a stake which supports the side or confines the load. Also used near the top of gondola cars to receive the stakes used in applying a coke rack or other appliance for increasing the depth of the car.

Stake Pocket Strap or **U-Bolt.** A U-shaped bolt which sometimes serves as a substitute for the ordinary form of stake pocket, when the stakes are intended as permanent attachments.

Stake Pockets, Permanent (M. C. B. Recommended Practice). In 1905, as a result of letter ballot, the following Recommended Practice was adopted regarding Permanent Stake Pockets:

1. That the method of securing permanent stake pockets to cars of wooden construction be by U bolts.

2. That the method of securing permanent stake pockets to cars of steel construction be by rivets or U bolts.

3. That malleable iron be used in the manufacture of permanent stake pockets.

4. That stakes should be located to suit the construction of the car or the requirements of the service, but should not be placed farther apart than 4 feet from center to center.

Stake Pockets, Temporary (M. C. B. Recommended Practice). In 1905, as a result of the letter ballot, the following dimensions were adopted as Recommended Practice for Temporary Stake Pockets:

For flat cars and gondola cars with sides less than 30 inches high, 4 inches wide by 5 inches deep.

For gondola cars with sides 30 inches and over, 4 inches wide by 4 inches deep.

Stake Pockets, Temporary, Longitudinal Spacing of (M. C. B. Recommended Practice). Fig. 2754. In 1906 a plan for longitudinal spacing of temporary stake pockets for gondola cars was adopted as Recommended Practice.

Stanchion. A prop or support.

A metal post or hanger with an eye in one end, which holds a rod or other object, as a hand rail or curtain rod. The opposite end is usually fastened by a nut, or with a flange or lugs, which form a part of the stanchion.

Movable stanchions are required in postal cars. See Fig. 1716.

Standard Gage. The most common distance between the rails of railroads, which is throughout the world 4 ft. 8½ ins. See GAGE. This gage originated from the use of an even 5 ft. gage, with outside flanges. As inside flanges came to be preferred, and had to run on the same rails (then with much narrower heads than now), the present standard was of necessity used.

Staple. Fig. 789. A U-shaped piece of metal which is pointed at the ends, to be driven into wood to hold a hasp, hook, pin, etc. The term is also applied to the keeper, which is screwed or bolted to the door frame, and which holds the door hasp.

Starting Valve. Fig. 1948. A valve on the locomotive to admit steam to the train line for heating purposes.

Stateroom. A compartment in sleeping and private cars, sometimes containing a stationary bed and in other designs the usual berths.

Stateroom Sleeping Car. A sleeping car having one or more separate compartments or state-rooms in addition to the standard sections or berths in the main part of the car. A drawing-room sleeping car has one or more separate compartments which are larger than a stateroom.

Stay. A beam, bar, rod, etc., by which two or more objects are connected to prevent lateral deviations of one or both of them.

Stay Rod. A rod which acts as a stay.

Steam and Air Connections for Passenger Equipment Cars (M. C. B. Standard). In 1912 the following items were transferred to standard:

Two-inch train line.

End valves with not less than 1½-inch openings.

Steam and Air Connections for Passenger Equipment Cars (M. C. B. Recommended Practice). Fig. 2764 In 1903 the following specifications for steam and air line connections were adopted as Recommended Practice.

Steam hose, 1⅝-inch inside diameter and of such length as to provide 31 inches from face of coupling gasket to end of hose nipple: 1½-inch steam hose couplings of dimensions to agree with those shown, with gaskets having 1½-inch diameter opening, gaskets to be so constructed that the normal diameter of opening will always be maintained; couplings not provided with gravity traps; inlet valves to have reduced openings which should be as small as possible and maintain the volume of steam required by the radiating pipes for the severest weather conditions.

That the steam-heat, air-brake and air-signal connections be located as shown on the drawing.

That the air-brake and air-signal hose should be 1 inch in diameter and 22 inches long.

In 1911 the above dimensions were changed to read: Air-brake hose must be 1⅜ inches inside diameter and 22 inches long, and the air-signal hose must be 1 inch inside diameter and 22 inches long.

In 1911 the angle cock was changed to show 30 degrees from the vertical.

In 1911 the steam and air connections were erroneously shown as standard. In 1912 they were changed to recommended practice.

Steam Car. A term used to designate ordinary railroad cars when it is desired to distinguish them from electric cars.

A self-propelled car using steam as its motive power.

Steam Coupler. See STEAM HOSE COUPLER.

Steam Crane. Figs. 211-213. A crane operated by steam engines. Also frequently provided with gears for propelling itself by means of the same engines that operate the hoisting apparatus.

Steam Drum (Car Heating Apparatus). Figs. 1999-2000. A part of the indirect steam heating system, being the covered coil or nest of tubes in which the circulating water is heated by the steam surrounding the pipes. Also called jacket.

Steam Gage (Steam Heating). Fig. 2106. A dial or gage for recording the pressure of steam in the steam pipes on a car or locomotive.

Steam Hose Clamp Lock. Fig. 2005. Used on the coupler connecting the steam hose between the cars.

Steam Hose Coupler. Figs. 1930-1, 1959, 1972, 2004, 2012-15, 2055-56, 2071, 2073-4, 2099. Couplers for connecting steam hose between passenger train cars. See Fig. 2005 for a clamp lock for steam couplers.

Steam Hose Gasket Remover. Fig. 2065.

Steam Motor Car. See Motor Car.

Steam Pipe. The pipe under passenger cars corresponding to the brake pipe and connected with hose and couplings for conveying steam from the locomotive to heat the cars in the train.

Steam Shovel. Figs. 218, 219, 431. A shovel operated by steam hoisting engines mounted on a car. The shovel or dipper holds from 1 to 6 cu. yds. of dirt and is mounted on the end of a heavy beam, which is carried by the boom. The dipper is operated and controlled by engines in such a manner as to permit of its being filled with earth or rock, lifted and swung over an adjacent car and there dumped. Used in construction work.

Steam Trap (Car Heating). Figs. 1956-7, 2001-2, 2006-8, 2035-37, 2067, 2069, 2077. A device for catching and liberating the water of condensation in any steam pipe line. For vertical steam trap see Figs. 1968, 2031, 2088. For T-trap see Fig. 1973. For half moon steam line trap, see Fig. 2103.

Steel Tired Wheel. Figs. 1115-1138, 1150-1152. A wheel with a steel tire which is usually shrunk on, welded, bolted or fastened with retaining rings.

Step. 6, Fig. 383. A ledge on a stair or round or rung of a ladder. A footpiece for ascending to or descending from a car or for standing in certain places or positions. Passenger car steps are from their location generally called platform steps and sometimes box steps. In freight cars a U-shaped iron, called a Sill Step is used. A small ledge on the end of a freight car near the top for a brakeman to stand on when applying brakes, called the brake step, is also sometimes used. A bracket called a tank step is attached to the tanks of tank cars. Steps in stairs are connected by vertical risers.

Step Hanger. A vertical board or metal plate by which the steps are supported from the corner of a car and from the platform end sill.

Step Iron (Platform Steps). A flat iron bar bent to conform to the shape of the steps and their risers, and to which they are fastened. It is bolted at the upper end to the platform end sill.

Step Ladder (Sleeping Car). A folding step ladder, for use in a sleeping car, to reach the lamps, upper berths, etc.

(Postal Car.) The ladder specified in the U. S. government specifications is shown in Fig. 1714.

Step Nosings. A metallic facing or molding for the tread of steps.

Step Riser. The vertical portion of a step in stairs.

Step Timber. A timber bolted to the end sill and platform end sill, to which the platform steps are hung.

Step Treads. Figs. 570-576.

Stiffener. Figs. 489, 491. A reinforcing member. The term is commonly applied to bars used to strengthen the doors of freight cars.

Stile. The upright pieces on the outer edge of a door or sash, as door stile, sash stile, window stile, etc.

Stirrup. A kind of ring or bent bar of iron resembling somewhat the stirrup of a saddle. A drawbar carry iron is sometimes called a stirrup.

Stock Car. Figs. 90-105, 356-369. A car for the transportation of live stock, equipped with roof, slatted sides and side doors, single or double deck and frequently with feed and water troughs. See Double Deck Stock Car and Car M. C. B., Class S.

Stock Cars, Rounding Corners of Doors, etc. See Doors, Door Jambs and All Other Inside Corners, Etc.

Stop Bar. See Sash Lock Stop.

(Sleeping Car). A bar to connect the two seats on which the seat bottoms may rest when drawn down to make up a lower berth. It rests upon a stop bar plate.

Stop Bar Guide. An attachment to hold a stop bar in place laterally.

Stop Bar Hinge. The hinge which enables the stop bar to swing horizontally.

Stop Bolt (of Car Door Lock). An attachment for throwing a door latch out of gear.

Stop Cock. Fig. 1603. A simple form of Cock having a body and a tapered plug which has an opening through it. When the plug is turned so that the holes in it correspond to the ports in the body the liquid flowing in the pipe can pass through the cock. When the plug is turned so that the openings do not correspond, the flow is stopped.

Stop Key Journal Bearing. A key or wedge with a lug or projection which bears against the end of the axle to restrain lateral motion and thus dispense with a collar on the axle.

Stop Latch. A spring door latch with a stop bolt by which the latch can be fastened on one side so as not to act.

Storage Battery (Electric Lighting). Figs. 2326-68. An electro-chemical device, consisting of a number of cells connected in series when used for car lighting purposes, each cell containing two groups of lead plates peculiarly constructed and prepared, immersed in dilute sulphuric acid, the function and properties of which are to receive and store electrical energy generated by the axle generator and to deliver it to the lighting circuit of the car as occasion may require. Storage batteries are generally carried in boxes attached to the underside of the car body. See Electric Cell Filler.

See Motor Car for cars propelled entirely by electrical current from storage batteries. Such a car is shown in Fig. 195.

Storage Gas Tank (Acetylene Lighting). Fig. 2239. An iron tank filled with asbestos discs saturated with Acetone, into which acetylene gas is forced under pressure.

Storage Heaters (Car Heating). Figs. 856-858.

Storage System of Acetylene Gase Lighting. For details see Fig. 2239.

Storage System of Car Heating. Figs. 856-858. A direct system of car heating, in which the radiating pipes are enlarged and inclose a smaller pipe or tube which is filled with salt water or other heat-retaining substance, and which when heated continues to radiate heat after the steam is shut off.

Stove. An apparatus in which a fire is made for warming a room, house or car by direct radiation. Stoves are out of use for heating passenger cars, but cast iron stoves are largely used for caboose cars.

A cook stove permanently fixed against the side of a room and directly connected with the chimney without the use of stove pipe, is called a range; used in dining cars, etc.

Alcohol (Fig. 848) and oil stoves are used for heating refrigerator cars or produce cars for the transportation of perishable products in cold weather.

Stove Pipe. A tube, usually of sheet iron, for conveying the smoke from a stove or heater, and creating a draft. A SMOKE FLUE.

Stove Pipe Damper. A circular disk in the stove pipe for regulating the draft.

Stove Pipe Jack. A covering or bonnet for the aperture of a stove pipe on the outside of a car.

Stove Pipe Ring. A metal plate or ring attached to the ceiling of a passenger car around the opening through which the stove pipe passes from the inside to the outside of the car. It is used for ornament or to make a finish around the opening for the stove pipe.

"Straight Air" Brake. A term applied to the original form of the Westinghouse air brake, which is still used on street cars. With this form of brake, the compressed air is used as a direct force from the main reservoir supply of the locomotive through direct piping to the brake cylinders on the vehicles to apply the brakes. The valve on the locomotive is used to admit air to the brake pipe and brake cylinders in order to apply the brakes, to hold it there when admitted, and to exhaust it when desiring to release the brakes. This form of brake was superseded by the plain automatic air brake. See AUTOMATIC AIR BRAKE.

Strainer. See BRAKE PIPE AIR STRAINER, REDUCING VALVE STRAINER, SIGNAL PIPE STRAINER, BRANCH PIPE STRAINER. For a combination of a strainer and nipple used in car heating see Figs. 1970 and 1971. See also cross pipe fitted with strainer, Fig. 2090; it prevents sediment, etc., from passing out of the train pipe into the heating apparatus.

(Triple Valve). 16, Fig. 1273, 1274; 32, Fig. 1275.

Strap. Fig. 489. A term commonly applied to long, narrow pieces of wrought iron used to bind members of a structure together.

Strap Bolt or **Lug Bolt.** A round bolt with a flat bar of iron welded to it, and usually with a hook on the end which serves the purpose of a head. The flat bar has holes in it, by which It is attached to a piece of timber or other object by one or more separate bolts or screws.

Strap Brake (Hoisting Gear). A method of controlling the spools by an iron strap which is pressed down upon the spool.

Strap Hinge. A door hinge, the two parts of which are made longer than those of a butt hinge, and of a triangular shape.

Strap Washer or **Washer Plate.** A wrought iron strap which takes the heads of several bolts.

Strike Plate. The keeper for a beveled latch bolt against which it strikes, so as to snap shut automatically.

Striker Arm. A SEAT ARM. The terms striker arm, seat back arm and seat arm are commonly used.

Striker Plate. See STRIKE PLATE.

Striking Casting. See STRIKING PLATE.

Striking Plate. 11, Fig. 297; 29, Fig. 383; Figs. 491, 527, 528, 666-668, 676. A metal plate placed on the end sills of freight cars and against which the horn of the coupler strikes, preventing damage to the end sill.

String Board (Passenger Car Steps). A vertical board which supports the ends of the steps. A step hanger.

Stringer. 3, Fig. 342. A term sometimes applied to a floor nailing strip or a steel member which acts as a support for a nailing strip. A longitudinal floor stringer sometimes occupies a position similar to that of an intermediate sill but is not designed to perform its duties. See NAILING STRIP.

Stringer Support. See FLOOR BEAM.

Strut (of a Truss). A member subjected to a strain of compression. A vertical strut is usually called a post.

Stud. 60 and 60e, Figs. 423-425. A comparatively short vertical wooden post in the side or end framing, usually to act as a brace or support for some other member of the frame. Also used as a nailing strip or furring. See NAILING STRIP and FURRING.

A headless bolt, threaded on both ends. A standing bolt, pin, boss or protuberance designed to hold an attached object in place, especially one formed of a headless bolt permanently screwed into a tapped hole in a casting or forging so as to become a part thereof.

Stud Valve (Acetylene Lighting). Fig. 2239.

Sub-Carline (Refrigerator Car). O, Figs. 374, 375. A strip of wood under the main carline, supporting the sub-roof. See CARLINE.

Sub-Floor (Refrigerator Car). H, Figs. 374, 375. A layer of flooring boards under the main floor, and usually separated from it by an air space and hair felt or some form of special insulation.

Sub-Roof (Refrigerator Car). M, Figs. 374, 375. The inside layer of boards of the roof proper, supported on sub-carlines.

Sub-Sill. 26a, Figs. 285-288, 374, 375; Fig. 455. A sill or timber bolted under another sill to reinforce it. See BUFFING SUB-SILL.

Suburban Car. Figs. 154, 157, 189, 191, 194, 237, 409, 422. A passenger car for use on short runs, particularly between large cities and their suburbs. See PASSENGER CAR and CAR, M. C. B. Classes PA and E.

Subway Car. Figs. 192, 419, 421. An electric motor car for use in subways in large cities.

Sugar Cane Car. Fig. 76. A flat car specially arranged for carrying sugar cane.

Supply Pipe. (Air Compressor). A pipe sometimes connected to the air inlet of an air compressor by means of which the air supply is drawn from a point away from the compressor.

(Lavatory Fittings.) Pipes which carry hot or cold water to the basin faucets.

Supply Valve (Steam Heating). A valve for regulating the supply of steam in the radiator pipes of a car.

Suspension. The method of supporting a railway motor. Except in the case of gearless motors, the suspension is designed to put as little dead weight as possible on the axle.

Figs. 2270, 2283, 2287-89; 2293, 2296; 2302; 2323, 2324. The iron work and fittings which are attached to a truck for supporting or suspending the axle generator and which include the belt tightening and alining devices. The generator is almost invariably carried outside the truck frame, the four most-used systems of suspension being the bottom pivoted, top pivoted, parallel link and sliding. The parallel link is most used.

Sweeping Car or Sweeper. A car with rotary brooms for sweeping snow from a railroad track. The brooms are attached to a horizontal shaft which is connected by suitable gearing with the axles, and the brooms are thus made to revolve. Used on electric roads.

Swing Back Car Seat. A car seat the back of which swings over the cushion, without reversing, top-to-bottom. It requires that both sides of the seat back be upholstered so that either side may be used. Such a seat back requires but one head roll.

Swing Bolster. A truck bolster (so called in distinction from a rigid bolster) which bears on springs that are supported by a transverse timber called a spring plank, which is suspended by hangers or links so that it can swing laterally in relation to the truck. As the springs rest on this plank and they support the bolster, the latter can swing with the spring plank. The object of providing this swinging motion to the bolster is to prevent, as much as possible, lateral blows and shocks from being communicated to the car body, and, vice versa, to prevent the momentum of the car body from acting with its full force on the truck frame and wheel flanges.

Swing Bolster Spring. See LATERAL MOTION SPRING.

Swing Cables (Steam Shovel). The wire ropes passing around the swinging circle and carried back to the swing gear and drum.

Swing Engine (Steam Shovel). The engine geared to the swing drum and used to revolve the swinging circle.

Swing Figurehead (Steam Shovel). The fixed pulley or sheave about which one of the swing cables is passed to be lead back to the swing gear and drum.

Swing Gear (Steam Shovel). The gear and drum about which the swing cables are wound and which controls the movement of the swinging circle.

Swing Hanger. 46, Figs. 945, 947, 966; Figs. 977. Bars or links, attached at their upper ends to the transoms or some other rigid member of a swing motion truck, and carrying the spring plank at their lower ends. Various forms are (1) solid bars with an eye at each end; (2) swing link hangers, made like a long link of a chain; (3) those made with a fork or clevis at one end and an eye at the other, and used commonly on passenger equipment trucks; and (4) those made with a very short link attached to an eye bolt passing through the transom. Also called bolster hanger. See EYE BOLT LINK HANGER.

Swing Hanger Carrier. Figs. 974, 976. A bearing for the upper swing hanger pin.

Swing Hanger Friction Block. A casting or bearing of considerable diameter, on which the upper end of a swing hanger rests.

Swing Hanger Friction Washer (Lower and Upper). A cast iron chafing block serving no other purpose than to take the wear. It is only occasionally used. A friction block is almost synonymous, but is usually a larger casting.

Swing Hanger Pin or Axle (Lower and Upper). 47-48, Figs. 945, 947, 966; Fig. 977. An iron bar by which a swing hanger on a car truck is suspended, or which supports a spring plank. The lower swing hanger pivot is sometimes called a cross bar or mandrel pin or axle. The upper one is carried in a swing hanger pin bearing attached to the transom.

Swing Hanger Pin Bearing. 49, Figs. 947, 966; Fig. 976. A casting acting as a bearing for a swing hanger pin.

Swing Hanger Shaft. See SWING HANGER PIN.

Swing Joint. See FLEXIBLE METALLIC JOINT.

Swing Link. See SWING HANGER.

Swing Link Hanger. A SWING HANGER made in the form of an open link.

Swing Motion. A term applied to an arrangement of hangers and other supports for the springs and truck bolster which enables a car body to swing laterally on the truck. See SWING BOLSTER, SWING HANGER.

Swing Motion Truck. Figs. 925, 926, 937, 938, 946-954, 957-966, 969-973. A truck with a bolster and spring plank suspended on swing hangers so that they can swing laterally in relation to the truck frame. Also called swing bolster truck in distinction from a rigid bolster truck.

Swing Spring Plank. A transverse timber underneath the bolster of a four-wheeled truck, or the spring beam of a six-wheeled truck, on which the bolster springs rest. A swing spring plank differs from an ordinary spring plank in being supported by hangers or links. See SPRING PLANK.

Swinging Circle or **Mast Wheel** (Steam Shovel). A large wheel at the foot of the mast or boom about which is wound a chain for revolving the boom.

Swinging Platform (Pile Driver). A platform carrying the entire pile driving gear in such manner that it can be swung about at right angles to the car so as to project for a considerable distance on either side. It swings upon a center plate, and its movements are controlled by the SLEWING GEAR.

Switch. See LINE SWITCH, ELECTRO-PNEUMATIC COMPRESSOR SWITCH.

Switch Group (Motor Cars). Fig. 2532. A combination of two or more unit-switches or contactors mounted in a suitable frame and protected by a removable cover.

Switch Box Support. Fig. 497. A bracket for securing an electric lighting switch to the underframe or car body.

Switch, Regulating. See ELECTRIC HEATER.

Swivel (of a Chain). A twisting link, consisting of a headed pin, entering an eye or ring in an adjacent link. The object is to avoid kinking. Hence the term is applied to many forms of equivalent devices, consisting essentially of a ring surrounding a headed bolt in such manner as to permit rotation.

T

T or Tee (Pipe Fittings). Figs. 1304, 1946. A T-shaped tube for uniting one pipe at right angles to two others in the same line. The pipes are screwed into the arms of the T. A REDUCING TEE, which see, has the arms of different diameters.

T-Hinge. Fig. 1833. A door hinge, one part of which is made like a strap hinge, and the other like a butt hinge, so that the shape of the whole resembles a letter T.

Table. 27, Figs. 1458, 1459. A removable board attached to the side of the car by inserting a table hook fixed to the table into a table hook plate fixed to the side of the car. The outer end of the table is supported by a table leg, which is sometimes vertical and sometimes slanting and which folds back against the table when not in use. The tables of dining cars are generally permanently fastened to the floor and sides of the car. A drop table is sometimes used in the kitchens of dining cars. See DISTRIBUTING TABLE.

Table Fastener. A latch by which a folding table is fastened up out of the way.

Table Hinge. A hinge for a folding table.

Table Holder. Fig. 1505. A special form of table hook. See TABLE.

Table Hook. 45, Figs. 1458, 1459; Fig. 1475. See TABLE.

Table Leg Hook. Fig. 1505. A metal hook which is attached to a slanting table leg. It engages in a plate attached to the side of the car.

Tail Coupling (Alcove Faucet). Fig. 1593.

Tail Gate. Figs. 578, 581.

Tail Lamp or **Tail Light.** Figs. 1894, 1895, 1901, 1902, 1909, 1910, 1912. A signal used to indicate the rear of a train, and carried on a bracket or socket at the side of the car in order to be visible from the engine. Two are used, one on each side of the train, on the rear of the rear car.

Tail Lamp Socket. See SIGNAL LAMP SOCKET.

Tandem Spring Draft Gear. Figs. 690, 697, 698. A draft gear in which the springs are arranged in tandem.

Tank. (Passenger Cars.) A water tank for the wash room.

(Gas Lighting Apparatus.) More properly RECEIVER or HOLDER.

(Tank Car.) 106a, Fig. 355. The body of a tank car. Usually a metal cylinder, but also made of wood and rectangular. Glass lined tanks are also in use for carrying mineral water and liquids which would attack metal.

Tank Band. An iron strap which passes around the tank of a tank car to hold it in place on the underframe.

Tank Car. Figs. 82-89, 349-355. A car the body of which consists of a tank for carrying liquids, such as oil, molasses, vinegar, etc. See CAR, M. C. B. CLASS T.

Tank Cars, Specifications for (M. C. B. Standard).

In 1903 a report was submitted embodying certain specifications for the repairs of old equipment and the construction of new equipment. These specifications were submitted to letter ballot and adopted as a Recommended Practice.

In 1906 these specifications were modified; also, in 1907. In 1908 a further revision was made. In 1910 they were advanced to Standard.

In 1912 the specifications were rearranged and enlarged to include ordinary tank cars, old tank cars having wooden underframes, special tank cars for liquefied petroleum gas (casing-head naphtha) and special tank cars for liquid chlorine gas.

The modified specifications are as follows:

SPECIFICATION FOR TANK CARS.

DEFINITIONS.

Tank Car. Any car to which one or more tanks, used for carrying liquids or compressed gases, are permanently attached.

Tank cars shall be divided into two classes: Ordinary and special.

Ordinary Tank Car. One used for the transportation of products, the vapor pressure of which, at a temperature of 100° F., does not exceed 10 pounds per square inch.

Special Tank Car. One used for the transportation of products, the vapor pressure of which, at a temperature of 100° F., may exceed 10 pounds per square inch.

GENERAL REQUIREMENTS.

(a) Tank cars offered for movement over the lines of a railroad must conform to the following specification.

(b) Tanks which bear evidence of damage by fire must be withdrawn from transportation service.

SPECIFICATIONS FOR ORDINARY TANK CARS, OTHER THAN WOODEN UNDERFRAME CARS.

1. No tank cars built hereafter shall be accepted for transportation unless equipped with steel underframing or with reinforced shell.

The design and construction of the car throughout must be at least as strong as the following detailed specifications.

2. Steel or iron tanks constructed subsequent to 1903 must be designed for a bursting pressure of not less than 240 pounds per square inch.

3. *Riveted Tank Seams.*—When riveted, all longitudinal and head seams must be double-riveted. Where head blocks are not used, head seams need not be double-riveted.

4. *Dome Heads and Covers.*—Dome heads and covers must be made of either cast or pressed steel, or of malleable iron.

The joint of the dome cap must be made tight against vapor pressure, and when necessary to insure this a satisfactory gasket must be used.

5. *Test.*—Tanks must be carefully inspected and tested with cold-water pressure at least once in ten years.

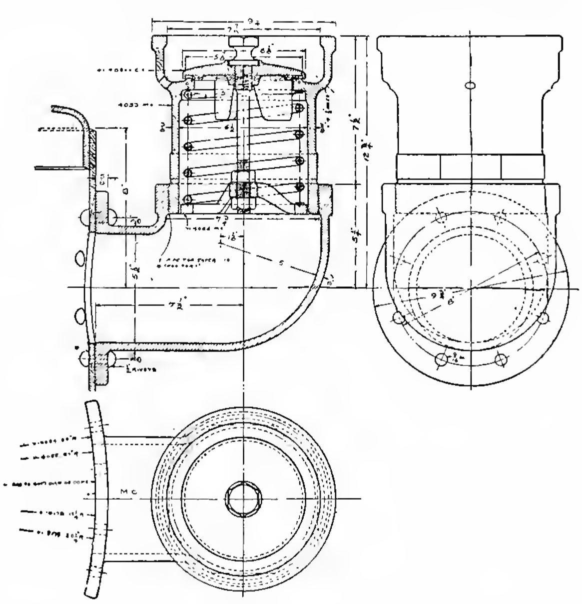
The test for tanks built prior to 1903 shall be at 40 pounds per square inch, and for tanks built since that date at 60 pounds per square inch, cold-water pressure, which they must stand without leak or evidence of distress.

This inspection and test must be made by the tank-car owners.

Tanks when tested must be stenciled with date and place where test was made, and by whom, as follows:

Tested (date) ....
Pressure (pounds per square inch)..........
At (place) ....
By (name of firm)........................

6. *Safety Valves.*—By January 1, 1914, all tanks carrying products that give off volatile inflammable vapors at



STANDARD 5-INCH SAFETY VALVE.

or below a temperature of 80° F., and having a vapor pressure of 10 pounds per square inch at a temperature of 100° F., shall be equipped with 5-inch safety valves of approved design, and these valves shall be set to open at a pressure of 12 pounds per square inch.

Provided, that where the lading is such as not to give off inflammable vapors (as determined by flash point from

Tagliabue's open-cup tester as used for test of burning oils) at a temperature below 80° F., the setting of the 8-pound valves to 12 pounds may be deferred to such time as the valves require removal.

All required pressures for safety valves are subject to a tolerance of 1 pound above or below that specified.

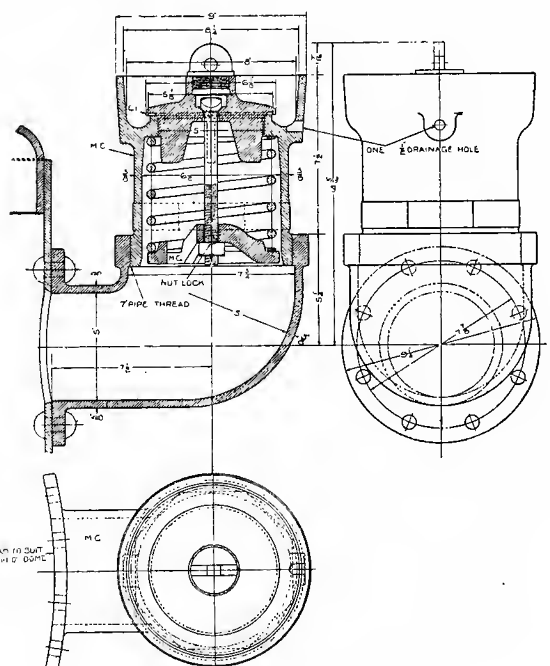
One valve shall be provided for a capacity of 6,500 gallons or less, and two valves for a capacity of more than 6,500 gallons.

Where tanks carrying such products are divided into compartments, each compartment must be provided with a safety valve.

7. *Test of Safety Valves.*—All safety valves must be tested and adjusted, if necessary, by January 1, 1914, and at intervals of not over two years thereafter, and the date of the last test and pressure at which valve is set shall be plainly stenciled on the body of the valve, as follows:

Tested (date) ....
Pressure (pounds per square inch).........
At (place) ....
By (name of firm).........................

The test may be made without the removal of the valve



ALTERNATIVE 5-INCH SAFETY VALVE.

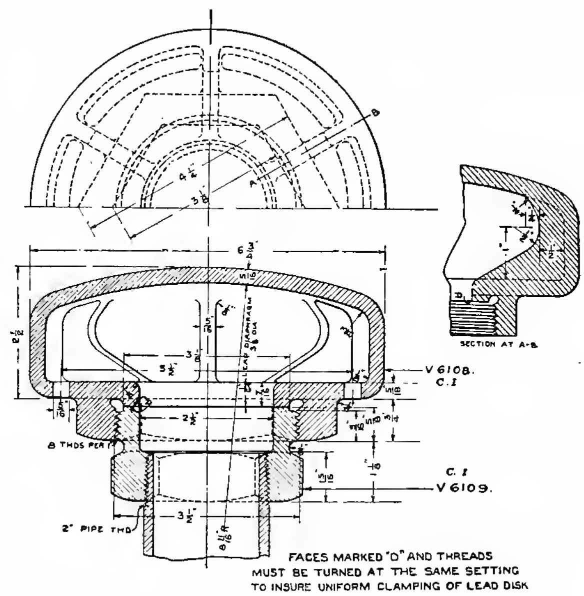
from the car, provided the valve unseats at a total pressure corresponding with the area of the seat multiplied by the required pressure.

Valves improperly set, or not tested and stenciled at proper intervals, shall constitute defects for which owner shall be responsible.

8. *Five-inch Safety Vents with Lead Disks.*—Tank cars carrying volatile non-inflammable products whose vapor pressure at a temperature of 100° F. does not exceed 10 pounds per square inch, may be provided with vents depending on frangible lead disks for safety, which vents shall be of approved design, as shown by the illustration, or the disks to be of a thickness that shall insure rupture at a pressure not higher than 25 pounds per square inch.

9. *Two-inch Vent Hole or Small Valve.*—Tank cars carrying non-inflammable or non-volatile material, such as sulphuric acid, vinegar, linseed oil, cottonseed oil, lard, oil, fish oil, tannery products, glucose, molasses, calcium chloride, caustic soda, silicate of soda, etc., need not be provided with 5-inch safety valves, but each tank must have a small open vent or valve, equal to not less than 2 inches in diameter.

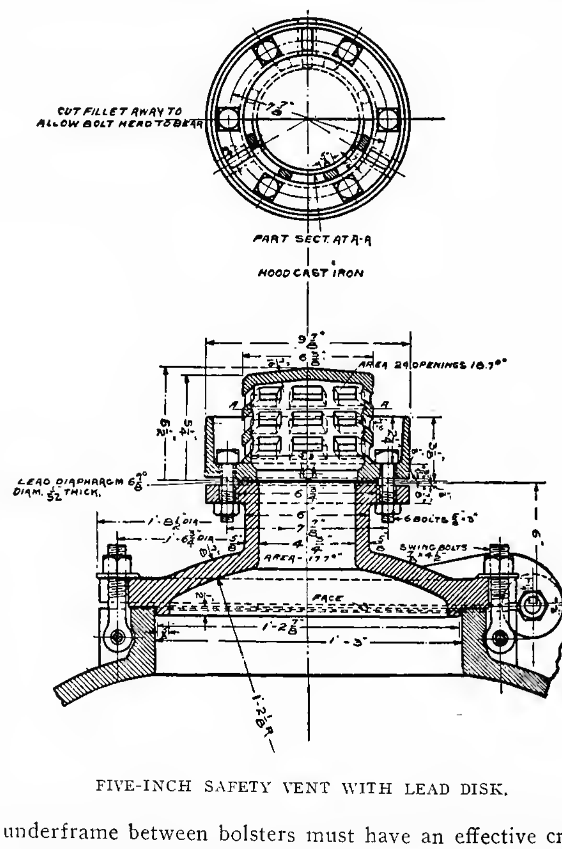
If, for any reason, splashing of the liquid or contamination by moisture is to be avoided, a 2-inch vent with



2" FRANGIBLE LEAD DISK VENT

frangible lead disk, of a thickness which will insure rupture at a pressure not higher than 20 pounds, should be used in place of the 2-inch open vent.

10. *Center Sills.*—The center-sill construction of the



FIVE-INCH SAFETY VENT WITH LEAD DISK.

underframe between bolsters must have an effective cross-sectioned area of at least 30 square inches, and distributed as shown in the illustration.

11. *Bolsters, Draft Gear.*—Each car must be equipped with steel body and truck bolsters, steel couplers and a

draft gear of approved design, having a capacity of at least 60,000 pounds.

12. *Longitudinal Anchoroge.*—Particular attention must be given to the longitudinal anchorage of the tanks, which must be thoroughly substantial, to prevent injurious end-shifting. The preferable method of securing tank against end-shifting is by anchoring the tank to the underframe at or between bolsters, rather than by means of head blocks, inasmuch as the latter method results in damage to underframe forward of body bolster.

MINIMUM REQUIREMENTS FOR LONGITUDINAL ANCHORAGE OF TANK TO UNDERFRAME.

Tank connection:	
Shearing area of rivets, 25 square inches	For tanks of 8,500 gallons capacity or over.
Bearing area of rivets, 20 square inches	
Shearing area of rivets, 18 square inches	For tanks of less than 8,500 gallons capacity.
Bearing area of rivets, 14 square inches	
Frame connection:	
Shearing area of rivets, 12½ square inches	For tanks of 8,500 gallons capacity or over.
Bearing area of rivets, 10 square inches	
Shearing area of rivets, 9 square inches	For tanks of less than 8,500 gallons capacity.
Bearing area of rivets, 7 square inches	

13. *Dome Yokes, Tank Straps, Etc.*—Tanks must be secured from turning on the underframes either by means of an anchorage or by dome yokes, and must also be secured to underframe by means of tank straps, two for tanks not more than 76 inches in diameter, and four for tanks of greater diameter, or their equivalent.

The sectional area of dome yokes and tank bands must at no place be less than ¾ of a square inch, or 1-inch round iron upset to 1⅛ inch at threaded end.

Cars having no underframe, with tank securely riveted to body bolsters, do not require dome yokes or tank bands.

Explanation: A threaded end, 1⅛ inch in diameter or more, with a body consisting of a flat band 2 by ⅜ inch, or equivalent section, or round iron 1 inch in diameter, will be accepted as meeting the requirements.

The dome yoke proper which passes around the dome may be a rod ¾ inch in diameter, or its equivalent, to which is secured the strap or rod which is fastened to the underframe. The sectional area of dome-yoke strap must be the same as required for tank straps.

Where tanks are equipped with a greater number of tank bands than called for, the total sectional area of all bands will be considered as meeting the requirements, if they equal the total sectional area of the rods specified.

14. *Tank Valve Extension Clearance.*—Steel underframe tank cars in which the tank is secured from end-shifting by means of head blocks, must have a longitudinal clearance for tank valve extension of not less than 2½ inches on each side of valve.

15. *Discharge Valve.*—Preferably the top of the discharge-valve handle should be within the tank, but in the event that it is carried through the dome, precaution must be taken by packing and cap nut against leakage.

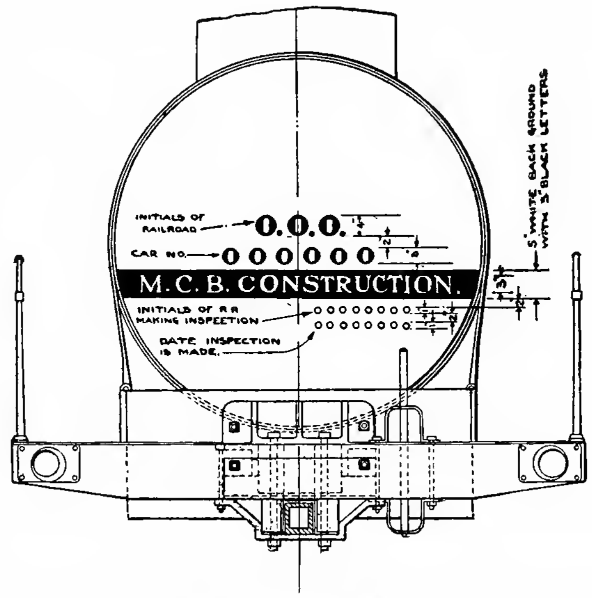
16. *Cars without Underframes.*—If the car has no underframe the tank shell at bottom must be at least ⅝ of an inch thick, and all circumferential seams in bottom sheet, except head seams, must be double-riveted. The sectional area of the additional metal in bottom of tank shell must be at least 20 square inches.

17. *Brakes.*—Each car must be equipped with air brakes of a capacity equal to not less than 70 per cent. of the light weight of car, and at least one hand brake operating the brakes on both trucks.

18. *Push-pole Pockets.*—There shall be a push-pole pocket at every corner of the car. Where, from the construction of the car, the push-pole pockets cannot well be placed on the body, they must be applied to the trucks, so placed above the journal boxes that the push-pole will push toward the center of the truck.

19. *Trucks.*—Each truck must have a strength equal to or greater than the strength of the axles used.

20. All tank cars at home on a railroad must be inspected by inspectors in the employ of that railroad company, and when such tank cars meet the requirements



LEGEND TO SHOW COMPLIANCE WITH M. C. B. SPECIFICATION.

herein set forth, the legend, as illustrated, must be stenciled on each tank head, with the initials of the railroad company making such inspection and the date the inspection is made.

If foreign tank cars and individual tank cars at home on foreign lines, stenciled with the legend "M. C. B. Construction" by a foreign road, are offered for movement over another railroad, and some of the details do not conform to the requirements of the tank-car specification, a report of same should be made through the proper officers to the official in charge of equipment, and the car allowed to proceed until further notice.

SPECIFICATION FOR OLD TANK CARS HAVING WOODEN UNDERFRAMES.

1. Tank cars having wooden underframes, of railroad or individual ownership, will be required to conform to the requirements of the "Specification for Ordinary Tank Cars," relating to test of tanks, safety valves, test of safety valves, 5-inch safety vents with lead disks, 2-inch vent hole or small valve with lead disk, dome yokes, tank straps, etc., brakes, pushpole pockets, trucks, axles, and inspection for compliance with M. C. B. specification, and, in addition, must be as strong as the construction covered by the following detailed specifications:

2. *Dome Heads and Covers.*—Where tank cars are fitted with cast-iron dome heads and covers not sufficiently strong to stand the necessary 40 pounds hydraulic test,

they must be replaced by others of cast or pressed steel, or of malleable iron.

3. *Tank Heads.*—Tank heads less than 7/16 of an inch thick, bearing evidence of damage from impact with head blocks, should be reinforced at bottom by means of steel plate shoes ⅜ inch thick, riveted to head and shell.

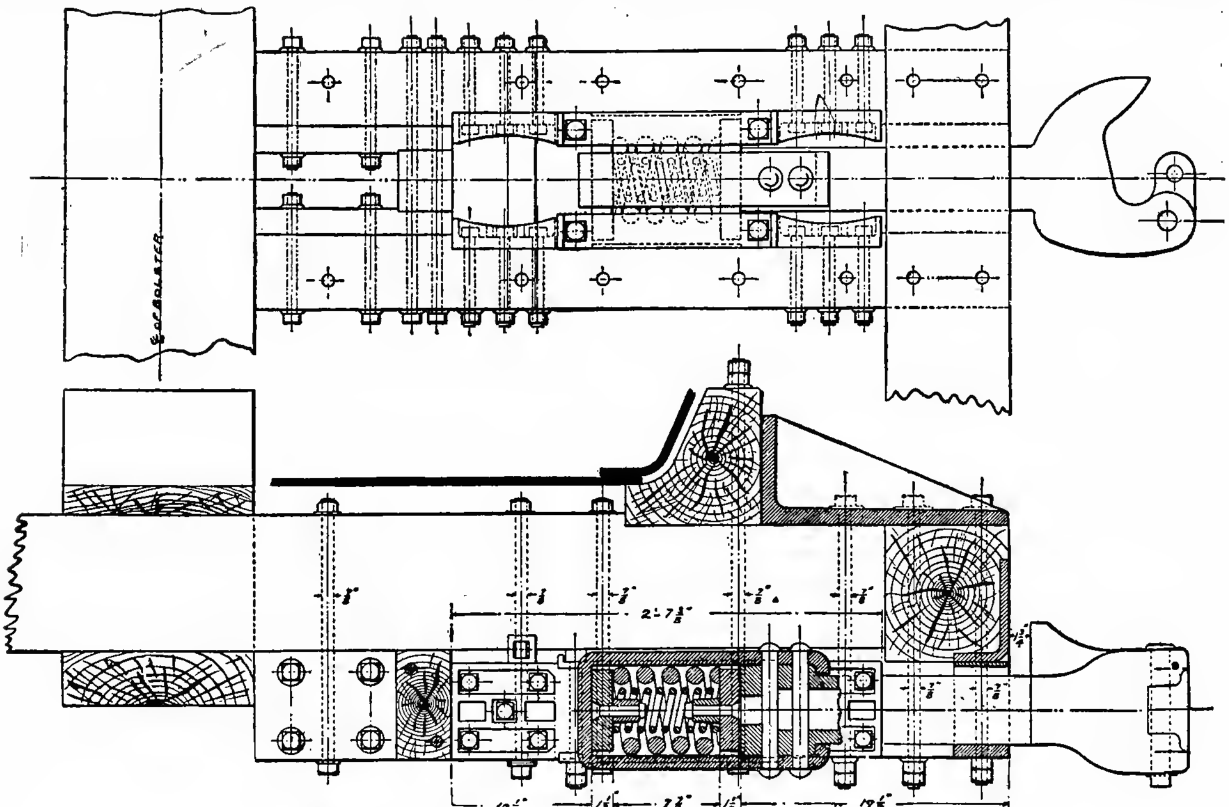
4. *Center Sills.*—If cars are not equipped with intermediate sills, the underframes must have two center sills, each not less than 5 inches wide by 10 inches deep, or the equivalent in strength. If the car is equipped with intermediate sills, the center sills must not be less than 5 inches wide by 9 inches deep, or the equivalent in strength. Center sills must not be spaced more than 18 inches apart.

5. *Center Sill Filling Timber.*—Where draft timbers are underneath the center sills, the space between the center sills must be filled in with timbers not less in depth than center sills, extending from end sill to the center of nearest cross-bearer or cross timber, provided the latter is located not less than 4 feet 6 inches from center of bolster. On cars where the draft arrangement is between center sills, the filler timber must be extended to the cross-tie timber when the cars go to shop for repairs to center sills. Center sills and filling timbers must be securely bolted together by means of ¾-inch bolts. On cars having center or intermediate sills not less than 10 inches wide by 10 inches deep, which may be made up of two 5 by 10-inch sills bolted together, the filling timbers may be omitted.

6. *End Sills.*—End sills not reinforced by buffer blocks must not be less than 9 inches wide by 10 inches deep. End sills 6 inches wide by 12 inches deep, reinforced with buffer blocks not less than 6 inches wide by 10 inches deep and of sufficient length to overlap center sills, will be acceptable as a substitute for 9 by 10 inch end sills.

On existing cars, if buffer blocks are used for the purpose of reinforcing end sills which do not come within the specified requirements, the buffer blocks in no case must be less than 4 inches thick nor end sills less than 6 inches thick. The total strength of the end sill and buffer block must be equal to the strength of the construction specified.

7. *Draft Timbers.*—Draft timbers secured to inside of center sills and extending to cross-bearer or cross-timber will be accepted as a substitute for filling timbers referred to above. Where center sills are 9 inches wide by 10 inches deep, or over, and draft timbers are placed between same, they need not extend farther back than body bolster, provided they are adequately secured to center sills by means of seven ⅞-inch bolts or their equivalent, and butt against body bolster. Draft timbers located underneath the center sills must not be less than 4 inches wide by 8 inches deep, and each draft timber must be held to center sills, end sills and buffer blocks by means of seven or more ⅞-inch bolts or six 1-inch bolts. Where an arrangement for supporting draft timbers is substituted for one or more bolts and the construction is of equal strength, the same will be acceptable. Draft timbers extending beyond bolster must be secured to center sills by additional bolts.



MINIMUM REQUIREMENTS FOR WOODEN UNDERFRAME TANK CARS.

8. *Draft Gear.*—The draft gear and draft attachments must be at least as strong as the design shown in the illustration.

Cars should be provided with draft-gear stops gained into draft timbers or heeled on end sills, filler timber or body bolster, and secured with five ¾-inch bolts; but cars having stops gained into draft timbers or heeled on end sills, filler timber or body bolster, secured with three ¾-inch bolts, may be continued in service until such time as they go to shop for repairs, when five bolt stops must be provided.

In all cases, tail yokes or attachments of equal strength must be used. Tail bolts, tail straps, or American continuous draft gear, will not be accepted.

9. *Head Blocks.*—Head blocks must not be less than 10 inches wide unless reinforced by metal plates, and of sufficient depth to extend at least 6 inches above bottom of

tank, and may be made of two pieces bolted together and bolted to underframe by means of not less than four ⅞-inch vertical bolts. They must be cut out to suit curve of tank. The ends of each head block should preferably be tied to corresponding end of head block at the other end of car by means of rods not less than 1 inch in diameter, with 1⅛-inch threaded ends, and each head block supported at center by means of a substantial casting securely bolted to end and center sills. Where the construction of the car does not permit of this fastening, the following may be substituted:

The ends of each head block tied to corresponding end of head block at the other end of car by rods not less than 1 inch in diameter, with 1⅛-inch threaded ends, and each head block secured by two stay rods 1 inch in diameter anchored to center sills;

Or, head block supported at center by means of a substantial casting securely bolted to end and center sills and two 1-inch rods passing diagonally through head block toward bolster and secured to underframe.

Or, head block secured by two stay rods 1⅜ inch in diameter, anchored to center sills;

Or, head block secured by two stay rods 1 inch in diameter, anchored to center sills, and two 1-inch rods passing diagonally through head block toward bolster and secured to underframe;

Or, head block secured by two stay rods 1 inch in diameter, anchored to center sills, and two straps not less than ¾ inch thick and 3 inches wide, passing over head blocks and securely fastened to underframe.

SPECIFICATION FOR SPECIAL TANK CAR FOR CARRYING VOLATILE INFLAMMABLE PRODUCTS WITH A VAPOR TENSION OF OVER TEN POUNDS PER SQUARE INCH AT A TEMPERATURE OF 100° F.

1. *Tanks.*—For these cars the tanks may be either welded or riveted; with or without steel underframes. The welded tank is preferred on account of tightness.

Where riveted tanks are used, all longitudinal and head seams must be double-riveted.

Heads must be not less than ½ inch thick; and if head blocks are used, heads must not be less than ⅝ inch thick.

2. *Domes.*—Domes of steel plate, preferably drawn without vertical seams, riveted or welded to the shell proper.

Dome must have a capacity to provide for an expansion of 3½ per cent of the contents of the tank, measuring from the inside top of shell to the top of the dome.

Cover for dome may be secured either by screw joint, by bolting, or by yoke with center screw. Lid must be provided with suitable gasket to insure tightness against the escape of gas under pressure.

3. *Safety Valves.*—The safety valves to be of the same pattern as those used for other inflammable products, set to blow at a pressure of 20 pounds gage pressure, with a tolerance of 1 pound above or below that pressure.

4. *Test of Safety Valves.*—The safety valves must be tested and adjusted, if necessary, at intervals of not over six months, and the pressure and date of the last test shall be plainly stenciled on the body of the valve, as follows:

Tested (date) ....
Pressure (pounds per square inch)..........
At (place) ....
By (name) ....

The test may be made without the removal of the valve from the car, provided the valve unseats at a total pressure corresponding with the area of the seat multiplied by 20 pounds.

Valves improperly set, or not tested at proper intervals and stenciled, shall constitute defects for which owner shall be responsible.

5. *Lagging of Tank.*—The barrel, ends and dome to be lagged with a thickness of 2 inches of 85 per cent carbonate of magnesia, or its equivalent, covered with sheet-iron jacket ⅛ inch thick. Tank before lagging to be well painted. The sheets of the jacket to be lapped so as to shed rain and maintain the dryness of the lagging.

6. *Test of Tank.*—Tank to be tested before being put into service and once every two years thereafter with a cold-water pressure of 100 pounds per square inch, which it must stand without leakage or evidence of distress. This test to be made by tank-car owner, and car stenciled with pressure, date and place where test was made, and by whom, as follows:

Tested (date) ....
Pressure (pounds per square inch)..........
At (place) ....
By (name) ....

7. Discharge valves, if used, must be so arranged that the valve shall not project below the bottom of the shell, and the connection pipe must be so arranged that its breakage will not unseat the valve. An alternative arrangement, by which the valve is placed on top of the car and the contents of the car discharged by air, will be accepted.

8. *Stenciling.*—In some convenient location on either the sides or the ends of the car shall be stenciled the words: "For Liquefied Petroleum Gas."

On the side of the dome shall be stenciled: "Caution: Liquefied Petroleum Gas (Casing Head Naphtha): Before removing manhole cover, safety valve must be lifted and held open until the internal pressure, if any, is relieved."

9. All other requirements for these special tank cars to be the same as those for "Ordinary Tank Cars."

10. The designs for these "Special Tank Cars" to be submitted to the Master Car Builders' Association for approval.

SPECIFICATION FOR SPECIAL TANK CAR FOR TRANSPORTATION OF LIQUEFIED CHLORINE GAS.

1. Liquefied chlorine gas may be shipped in a lagged tank car of approved design, which shall be tested before being put into service with a cold-water pressure of 300 pounds per square inch, and stenciled in accordance with the requirement in this respect of the specification for ordinary tank cars.

2. Car shall be provided with an approved design of small safety valve and fusible seal, which must be so located that in case the car became involved in a fire the seal would be exposed.

3. The designs for these "Special Tank Cars" to be submitted to the Master Car Builders' Association for approval.

Tank Dome. 108, Fig. 355. A vertical cylinder attached to the top of a tank on a tank car. It permits of the application of a manhole cover which need not be air tight, and also permits the tank proper to be filled full, which would be impossible if there were no dome.

Tank Head. 106, Fig. 355. The circular end sheet of a cylindrical tank.

Tank Head Block. E, Fig. 355. A block securely bolted to the underframe transverse to the sills at either end of the tank, to prevent any longitudinal motion of the tank with respect to the car. The block is shaped to fit the end of the tank. See FILLER BLOCK and TANK CAR, SPECIFICATIONS FOR.

Tank Nozzle. A short pipe used to empty the tank. It is usually cast in one piece with the TANK VALVE.

Tank Saddle. C, Fig. 355. The bearing which supports the tank. In some tank cars the saddle is the body bolster.

Tank Slabbing. Longitudinal strips or filling pieces between the tank and the saddle of a tank car.

Tank Step (Tank Car). A metal shelf or bracket fastened to the tank to facilitate access to the top of the dome.

Tank Valve (Tank Car). 114, Fig. 355. A valve attached to the bottom of the tank to draw off the contents.

(Water Cooler.) A valve used with water tanks which extend to the roof, and sometimes with other smaller fixed tanks, for enabling them to be completely drained when desired. Also called water cooler valve.

Tank Valve Rod. 117, Fig. 355. An iron rod for opening and closing a tank valve, usually extending from the valve to the top of the dome.

Tank Valve Rod Bracket. 117c, Fig. 355. An iron brace in the tank having a threaded hole or bushing through which the tank valve rod screw passes.

Tank Valve Rod Screw. 117a, Fig. 355. The screw on the upper end of a tank valve rod which passes through the tank valve rod bracket and causes the valve to open or close when the rod is turned.

Taper Charge Vibrator or **Relay** (Electric Lighting). An automatic and sensitive electrical device similar in construction to the battery voltage relay. It acts as an auxiliary regulator in connection with the generator regulator to taper the charging current of the generator after the voltage of the battery has reached a predetermined value, indicating that the latter is fully charged. Its action on the regulation differs from that of the battery voltage relay in that instead of abruptly cutting off the charging current it tapers the same, causing the charging current to decrease gradually to zero. The taper charge vibrator or relay gradually assumes control of the apparatus and finally regulates the axle generator as a constant potential machine.

Telegraph Blank Rack. Fig. 1876.

Telegraph Cock or **Faucet.** Fig. 1601. A self-closing cock, the lever of which resembles the key of a telegraph instrument. See LEVER FAUCET. When the water enters the cock horizontally they are called horizontal telegraph cocks. When it enters vertically they are called vertical telegraph cocks. See FAUCET.

Temperature Regulator. Figs. 1932-6, 1949, 1964, 1977. A device for automatically controlling the supply of steam to maintain any desired temperature in the car.

Temporary Safety Chains. See SAFETY CHAINS FOR STEEL AND WOODEN FREIGHT CARS.

Tenon. The projecting end of a piece of timber fitted for insertion into a mortise by cutting away a portion on one or more sides. Sometimes the tenon is made cylindrical. Tenons are secured in their mortises by pins or by giving them a dove tail.

Tension Bar. Any bar subjected to a tensile stress, as the top cover plate of a body bolster.

Terminal. Fig. 2367. The part of a storage battery plate to which the wires are connected.

Terms and Gaging Points for Wheels and Track. See WHEELS AND TRACK, TERMS AND GAGING POINTS FOR.

Testing Air Brakes. See AIR BRAKES, CLEANING AND TESTING OF.

Texoderm. An artificial leather used for curtains and upholstering. It is made by coating a cloth fabric with a compound which gives it the appearance of leather.

Thermo Jet (Car Heating). Figs. 2025-2028. A direct steam heating system which maintains the car temperature constant by means of an injector with steam supply valve controlled by the expansion or contraction of a part of the radiating pipes, the steam supply valve being set to a position indicating the temperature of radiation desired.

Thermometer. See Fig. 2107 for a recording thermometer used in passenger train cars.

Thermometer, Electric. Fig. 1936. Used in connection with the regulation of steam heat in passenger train cars.

Thermostatic Steam Trap (Car Heating). A device to regulate the escape of steam in proportion to the condensation that has taken place.

Thimble. A bushing. A sleeve or tube through which a bolt passes. A filler. See BODY BOLSTER THIMBLE.

Third Rail Shoe or **Collector.** Figs. 2556, 2568, 2569, 2576, 2577. A metallic sliding contact, usually of cast iron, mounted on the car truck, and insulated therefrom, for collecting current from an insulated third rail located alongside the running rails. Positive contact between shoe and rail is maintained by gravity or by a stiff spring.

Thread. See SCREW THREAD.

Three-Pipe Manifold. A pipe fitting forming a return bend for three pipes instead of two.

Three-Stem Equipment. Fig. 551. An improved form of the original Janney draft gear for passenger equipment cars. The coupler head is connected to the center stem and the two side stems and its movement to either side of the center line of the car is resisted by the side stem springs. The center stem is backed by the draft spring proper which is held in a pocket between the sills and which absorbs most of the shocks. The buffer plate is backed by two buffer stem springs which aid in absorbing buffing shocks.

Threshold or **Threshold Plate.** (Passenger Equipment Cars.) Fig. 496. A plate placed across the bottom of a door opening. See DOOR SILL.

(Vestibule.) The plate which covers the buffer plate and connects it with the platform.

Throat (of a Car Wheel). The interior angle of a flange where it joins the tread of the wheel.

Throat Piece (Snow Plow Framing). The curved ribs connecting the inclined plane of the plow with the deck. Being curved they give a projection to the deck, which lessens the tendency of the snow to ride over the top of the plow.

Thumb Piece. A general term applied to many forms of lugs or projections for moving springs, catches, or other movable mechanical parts.

Thumb Screw. A screw with two projecting flat sided flanges adapted to be turned with the finger and thumb.

Tie. A beam or rod which secures parts together and is subjected to a tensile strain.

Tie Bar. A bar or rod which acts as a tie.

Tie Timber. See CROSS TIE TIMBER.

Timber Key. See SILL TIMBER KEY.

Timber Pocket. Fig. 488. An iron casting used as a seat or pocket at the junction of timbers in wooden car framing. It avoids the necessity of dovetailing or mortising the timbers together. See POST POCKET.

Tip Car. A car from which the load is discharged by tipping the car body. See also DUMP CAR.

Tire. A heavy hoop or band of iron or (usually) steel forming the ring or periphery of a wheel to impart strength to it and to resist wear. See TIRE FASTENING.

Tire Bolt. A bolt for holding a tire on a wheel center. When retaining rings are used the bolts pass through the rings and hold them and the center and tire together.

Tire Fastening. Figs. 1115, etc., show the principal methods of fastening tires to car wheels. See WHEELS.

Tire Fastening for Steel Tired Wheels. See WHEELS, STEEL-TIRED, TIRE FASTENING FOR.

Tires, Minimum Thickness for Steel (M. C. B. Recommended Practice). Fig. 2751. In 1894 a Recommended Practice was adopted for Minimum Thickness for Steel Tires of Car Wheels, to be 1 inch, to be measured normal to the tread and radial to the curved portions of the flange through the thinnest part within 4¼ inches from the back of the flange; the thickness from the latter point to the outer edge of tread to be not less than ½ inch at thinnest part as shown on the drawing.

A further practice was adopted of cutting a small groove, as shown, in the outer face of all tires when wheels are new, at a radius ¼ inch less than that of the tread of tire when worn to the prescribed limit, to facilitate inspection.

Toe Nail. A nail driven in obliquely to fasten the end of a board or other piece of timber to the surface of another. The timber so fastened is said to be toed, or toe nailed.

Toggle Arms (Hopper Doors). The two arms of a toggle joint, which form a strut between the two opposite hopper doors, holding them closed.

Toilet. Another name for a saloon or lavatory.

Toilet Paper Holder. Fig. 1639.

Toilet Rack. Fig. 1605. A rack for toilet articles, etc.

Tongs or **Crabs** (Pile Driver and Wrecking Cars). A device for anchoring the body of the car to the track when in use. A jack screw is used in connection with the tongs to raise the body of the car, so as to bring a strain upon the tongs. See BOLSTER JACK SCREW.

Tool Car (Wreck Train Equipment). Figs. 2652, etc. A car used for carrying chains, cables, blocking, jacks, and all the necessary tools used in clearing wrecks.

Top Chord (of a Truss). The upper outside member of a truss, particularly one divided up into panels. The members of mere trussed beams are not commonly designated as chords.

Top Door Rail. The uppermost horizontal bar or piece of a door frame.

Top Door Track. 65, Figs. 285-288, etc. See DOOR TRACK.

Top Rail (of Door). See TOP DOOR RAIL.

Top Side Bearing. A body side bearing. See SIDE BEARINGS.

Torch (Pintsch System.) Fig. 2112. A special device combining the ordinary wax taper torch, and a key, which fits the cock of any Pintsch lamp, and will open or close the globe of any lamp from the floor of the car.

Tornado Lamp. A general term applied to lamps which receive their supply of air through a long tube, usually connected with the supports or arms of the lamp, so as to check the effect of sudden gusts of wind. Hurricane lamp is another name.

Torpedo. A cylindrical detonating cap provided with clips for folding under the head of the rail for the purpose of making a loud alarm as a signal on the passage of engines over them. The basis of the detonating compound is fulminate of mercury. The interior pieces of iron, to insure the explosion of the fulminate, are termed anvils.

Tourist Sleeping Car or **Tourist Car.** A sleeping car more plainly finished than a standard sleeping car and generally upholstered in rattan or leather, for the accommodation of travelers who cannot afford to use a standard sleeping car. See SLEEPING CAR.

Towel Rack. Fig. 1608. A tray of rods for holding towls.

Towel Rod. Fig. 1584. A rod fitted to the wall with brackets or otherwise, upon which towels may be hung.

Towel Rod Brackets. Figs. 1597, 1860. See TOWEL ROD.

Towel Roller Bracket. A bracket for supporting a towel roller. There are two, the fixed end and loose end bracket. The principal supply of towels, however, is usually carried in a towel rack or hung on towel rods.

Track Laying Car. A low push car, primarily for carrying rails short distances in construction. They are frequently without a floor or platform and are provided with fixed rollers at the side for running the rails forward.

A platform car with a cantilever truss extending out from one end of the car over the track and on which rails may be run out and distributed on the ties. Some track layers are equipped with carriers which carry the rails and ties forward from cars in the rear.

Track Sweeper. See SWEEPING CAR.

Track and Wheels, Terms and Gaging Points for. See WHEELS AND TRACK.

Traction Air Brake. Figs. 1313-1345. The adaptation of air brake equipment to electrically propelled cars or trains. The changed conditions of motive power and method of operating such cars or trains, have necessitated various changes in the details of the equipments. See GOVERNOR SYNCHRONIZING SYSTEM.

Trailer Truck. Figs. 957 and 961. A motor car truck which is not equipped with motors.

Train Air Signal Apparatus. Figs. 1271, 1320. A substitute for the bell cord arranged to give train signals by compressed air. A separate line of signal pipe, similar to the brake pipe, extends throughout the train, connected between the cars by hose and couplings. A car discharge valve, connected to this signal pipe, is located in each car and attached to the bell cord in such manner that pulling on the cord releases air from the signal pipe. In the cab on the engine or motor car is a signal valve, which is also connected with the main signal pipe and a small signal whistle. The supply of air is received from the main reservoir through a reducing valve, which maintains a pressure of about 45 lbs. per square inch in the signal apparatus.

When the car discharge valve is opened, by pulling on the cord, the diaphragm in the signal valve is operated so as to blow the whistle. Signals can be given in this way with rapidity and great certainty.

If the train breaks in two the whistle is blown loudly for a considerable time.

Train Air Signal Stop Cock. A stop cock in the air signal pipe. There is one at each end of a car.

Train Brake Pipe. See Brake Pipe.

Train Car. A Caboose Car.

Train Lighting. (M. C. B. Recommended Practice.) See Electric Lighting.

Train Line (Steam Heat). See Steam and Air Connections for Passenger Equipment Cars.

Train Line (Electric Lighting). A system of heavy conductors, generally three in number, running the entire length of the car either over the roof or under the car body and terminating at each end of the car in a suitable connection device, located either above the vestibule opening or below the platform. Two of these conductors are tapped and connections carried down inside of the car, where connection may be made with the electric lighting system of the car. The other conductor generally has no connection to it in the car. Its purpose is to act as an end feeder or equalizer when a head end generator is employed. The other two conductors or lines may be employed for tying together in parallel the lighting systems of the different cars, irrespective of whether a head end generator is used or not.

Train Line End Valve. See End Train Pipe Valve.

Train Line Connector (Electric). A device for connecting the train lines of one car to those of another in such a manner as to insure the proper connection of the conductors of one car with those of another independently of sequence or end relations of the various cars; that is to say, the conductor must always join wire No. 1 of one car with wire No. 1 of the next car, etc., no matter whether the cars have been turned end for end or in what order they may stand in the train.

Train Line Jumper. A connection made generally at the rear end of the train on the end farthest from the head end generator connecting the conductor which is not tapped in the cars to one of the conductors that is tapped. The current is carried from the generator clear through to the end of the train and by means of the jumper brought back on one of the other wires. This arrangement of train lines, known as the equi-potential or return loop, insures uniform voltage at each of the cars, irrespective of the drop or loss that may take place in the conductors themselves.

Train Pipe (Air Brake). See Brake Pipe.

Train Pipe or **Brake Pipe Bracket.** Fig. 492.

Train Pipe Valve (Car Heating). See End Train Pipe Valve.

Transfer Table. A platform and section of track on wheels, its length being equal to or greater than the length of a car. Its chief use is to transfer cars from one section of a shop to another, connecting with parallel tracks and running transversely to them.

Transom. Primarily, a cross piece.

(Carpentry.) A horizontal piece framed across a door or double light window. The term is also applied in the general sense of a cross piece in other ways.

(Trucks.) 20, Figs. 945, 947, 966; B, Figs. 925, 927; Figs. 974, 976. One of two horizontal cross beams attached to the side frames, between which the swing bolster is placed.

Transom Bearing Block. A piece of wood or iron placed on top of a transom under the bearing of a swing hanger to raise it.

Transom or Bolster Chafing Plate. See Friction Block and Bolster Chafing Plate.

Transom Casting. A casting used to attach a transom to a truck frame.

Transom Corner Plate (Passenger Equipment Trucks). 131, Figs. 947, 966; Figs. 974, 977. A plate or casting connecting and bracing the transom and wheel pieces. See Truck Frame Corner Plate.

Transom Draft Gear. Figs. 683-687. A special arrangement of draft gear.

Transom and End Piece Tie Rod. 59, Figs. 947, 966; Fig. 977. A rod extending through the transom and end piece to stiffen the truck frame.

Transom Opener. A device for opening a transom over a door; very similar to a deck sash opener.

Transom Plate. Figs. 975, 978. Iron plates on both sides of wooden transoms of passenger equipment trucks for strengthening purposes.

Transom Tie Rod or Bar. 23, Figs. 947, 966; Figs. 975, 977. A bar passing across a truck close to the transom to hold the wheel pieces and transoms rigidly together.

Transom Tie Rod Washer. 26, Figs. 947, 966; Figs. 974, 977. A bearing for the nut on a transom tie rod.

Transom Truss Rod. A transverse rod attached at its ends to the wheel pieces, extending alongside the transoms and inclined downward under a central transom truss block, so as to strengthen the transoms. Generally, two such rods are used with each truck. In the Pullman trucks a transom plate is used with a straight transom tie rod.

Transom Truss Rod Seat. A bearing for the transom truss rod on the under side of the transom.

Trap (for Refrigerator Car). An S-shaped pipe, largely used in all forms of plumbing work for permitting the exit of water, while preventing the entrance of air. See Steam Trap.

Trap Door. A door in a floor or roof, closing flush therewith when shut. See Platform Trap Door.

Trap Door Latch (Vestibule). Figs. 1691-1699. The latch for the vestibule trap door.

Trap Door Lock. See Trap Door Latch.

Traversing Jack. Fig. 2627. A jack that can be moved horizontally on a bed or track while under its load.

Tread (of a Step). Figs. 570-576, 610, 621. The part on which the foot is placed. See Tread Board and Safety Tread.

(Of a Car Wheel.) The exterior cylindrical surface of a car wheel inside of the flange which comes in contact with the rail. See Wheel.

Tread Board (of a Step). The horizontal part on which the foot is placed. Usually covered with rubber or metal safety treads to prevent slipping. See Tread and Safety Tread.

Triangular Washer. An iron plate or block, the cross section of which is triangular, and which forms a bearing for the nut or head of an inclined brace rod. Also called beveled washer, but the latter term is chiefly used when the angle between the two faces is small.

Triple Valve (Air Brake). T, Figs. 285-288; Figs. 1273-1275, 1329, 1331, 1347-1350, 1376. A valve device consisting of a body or case, called the triple valve body, which has connections to the brake pipe, the auxiliary reservoir and the brake cylinder, in which a slide valve is operated by a piston, so that when the pressure of the air in the brake pipe is increased the auxiliary reservoir is charged and the air in the brake cylinder is released to the atmosphere; and so that, when the air pressure in the brake pipe is reduced, air from the auxiliary reservoir is discharged into the brake cylinder for applying the brakes. A triple valve performing only these functions is now known as the plain triple valve.

The quick-action triple valve has all the features and performs all the functions of the plain triple valve, and has the additional function of causing a discharge of air from the brake pipe to the brake cylinder, when, in emergencies, the maximum force of the brakes is instantly required. More recent developments have added retarded release and uniform recharge features.

(For Freight Air Brake Gear.) A special form, not differing in principle from the passenger brake valve but generally combined with the reservoir and brake cylinder in one single part for economy and convenience of attachment.

Triple Valve Body. 2, Figs. 1273-1275. See Triple Valve.

Triple Valve Branch Pipe (Air Brake). A short pipe by which the triple valve is connected with the brake pipe.

Triple Valve, Cleaning and Lubricating. See Air Brake, Cleaning and Testing of.

Triple Valve Gasket. A gasket placed in the joint between the triple valve and the brake cylinder.

Triple Valve Piston (Air Brake). 3, Figs. 1273-1275. See Triple Valve.

Triple Valve Tests. See Air Brakes, Cleaning and Testing of.

Truck. Figs. 920-978, 1022. A small, low, four-wheel or six-wheel car, carrying one-half the weight of a car body. The car body is carried on a pair of center plates (truck center plate and body center plate), with a center pin or king bolt passing through them, about which the truck swivels. There are now some types of trucks in use in which the weight of the car is transmitted to the truck through side bearings. The trucks commonly used under freight cars have four wheels, but six-wheel trucks are used in special cases. Passenger equipment cars use either four or six wheel trucks, the latter being generally used under very heavy cars. See Diamond Arch Bar Truck, Flexible Truck, Logging Truck, Pedestal Truck, Rigid Bolster Truck, Roller Side Bearing Truck, Side Bearing Truck, Swing Motion Truck.

The term is applied to different kinds of small vehicles used on and about stations for handling freight and baggage by hand. Many large terminal stations now use motor driven baggage trucks.

Truck Bolster. 16, Fig. 505; Figs. 509, 511-514, 1067-1085; 30, Figs. 945, 947, 966. A cross beam in the center of a truck, to which the lower center plate is fastened, and on which the car body rests. The truck bolster is connected to the body by a center pin, which passes through it.

Truck Bolster Chafing Plate. A plate attached to a wooden swing bolster to protect it from wear.

Truck Bolster Flitch Plate. See Bolster Flitch Plate.

Truck Bolster Guide Bar. See Bolster Guide Bar.

Truck Bolster Guide Block. A cast iron shoe for the end of a truck bolster, which slides vertically between the columns or bolster guide bars.

Truck Bolster Truss Rod (Rigid Bolster Trucks). A rod attached near the ends of a wooden truck bolster and passing over a central truss block. In swing bolster trucks, rods of a similar nature are sometimes used, and are termed transom truss rods.

Truck Car. Figs. 2654 and 2673. A car used in a wreck train for carrying spare trucks.

Truck Center Bearing Truss. The truss formed by the center bearing top and bottom arch bars.

Truck Center Frame. Figs. 1096 and 1098. A frame made in one piece, riveted to the side frames or wheel pieces of steel passenger equipment trucks and taking the place of the transoms in the older types.

Truck Center Plate. 12, Fig. 505; 63, Figs. 947, 966; Figs. 974, 977. See Center Plate.

Truck Details. See Figs. 974-978.

Truck Frame. Figs. 1087, 1098. A structure composed of wooden beams, iron bars or of cast steel in one piece, to which the journal boxes or pedestals, springs and other parts are attached, and which forms the skeleton of a truck.

Truck Frame Corner Plate (Passenger Trucks). See End Piece Corner Plate and Transom Corner Plate.

Truck Frame End Piece or End Sill. 17, Figs. 947, 966; Figs. 974-976. See End Piece.

Truck Frame Knee Iron (Passenger Trucks). An interior angle plate of cast or wrought iron to connect the truck frame together. See End Piece Corner Plate and Transom Corner Plate.

Truck Side Bearing. 10, Fig. 505; 61, Figs. 947, 966. A device attached to the top of the truck bolster, on which a corresponding bearing fastened to the body bolster rests. See Side Bearings.

Truck Side Frame. Figs. 1086-1095. The longitudinal portion of a truck frame, on the outside of the wheels, which extends from one axle to the other, and to which the journal boxes and bolsters or transoms are attached.

Truck Sides, Cast-Steel, Specifications for (M. C. B. Recommended Practice).

In 1912 specifications for cast steel truck sides were adopted as follows:

MANUFACTURE.

1. Castings furnished under these specifications must be made of open-hearth steel in accordance with the best foundry methods. They must conform to the dimensions shown on drawings and must be free from rust, scale, blow holes and shrinkage cracks.

2. Each casting must have the following markings cast upon it in raised figures and letters:

(a) Initials of the railway company.

(b) Month and year in which cast, thus: 6-12.

(c) Manufacturer's serial number and trade mark (or other designation).

(d) M. C. B. S.

3. The manufacturer shall have cast on each truck side two test coupons having a cross section of 1⅛-inch by 1⅛-inch and 6 inches long. These coupons are to be used for the physical and chemical tests and their location upon the casting shall be as specified by the purchaser. There shall be two additional coupons of a cross section not less than the average cross section of the casting, which

coupons are to be used to determine the character of the annealing as specified in Section 7.

4. The manufacturer shall protect all castings so that they do not become covered with rust. They must not be painted before inspection unless so specified.

5. Truck sides shall not vary more that three per cent. above nor two per cent. below what has been determined upon as the normal weight of the casting, except that in case the casting has met all requirements save that of overweight, it may be accepted as of the maximum allowable weight here specified. For the purposes of this requirement, the normal weight shall be previously agreed upon between the purchaser and the manufacturer.

6. When the manufacturer is ready to make shipment of the material he shall notify the purchaser of that fact and await the arrival of the purchaser's inspector, to whom he must furnish free any assistance and labor needed to make satisfactory inspection, tests and prompt shipment.

7. All castings shall be thoroughly annealed. Test coupons shall be annealed with the casting before they are detached. To determine the quality of the annealing, the inspector will have one of the test coupons, mentioned in Section 3, cut half-way through and broken off from the casting for examination of the fracture. If, in his opinion, the annealing has not been properly done, he may require the casting to be reannealed, using the second test coupon for examination in this case. If, after annealing or reannealing, any casting is so much out of gage as to require heating in order to bring it within the gage, it shall again be annealed before it may be accepted.

CHEMICAL PROPERTIES.

8. The chemical composition of the steel shall conform to the following requirements:

Carbon ....from 0.20 per cent. to 0.30 per cent.
Manganese ....not over 0.70 per cent.
Phosphorus ....not over 0.05 per cent.
Sulphur ....not over 0.05 per cent.

PHYSICAL PROPERTIES.

9. The physical properties of the steel shall be as follows:

Ultimate tensile strength, pounds per square inch...................not under 60,000
Yield point (by "drop of the beam")..
not under 50 per cent. of the ultimate strength
Elongation in 2 inches, per cent,....
not less than the quotient of 1,400,000 divided by the ultimate strength.

INSPECTION.

10. For the purpose of determining whether the physical and chemical requirements are complied with, the inspector shall select at random one casting from each heat. From this casting the two physical and chemical test coupons (referred to in Section 3) shall be removed by the inspector. One of them shall be subjected to physical tests, but if the coupon casting proves unsound, the other coupon shall be used in its stead for this purpose. From the coupon which has satisfactorily passed the physical requirements, borings shall be made for chemical analysis. In case the test pieces selected do not meet the specifications, all castings from the entire heat represented shall be rejected.

11. At his option the inspector may require that any or all castings be subjected to sand blast in order to make an examination of the surface for checks or cracks.

12. From each casting rejected by the inspector under these specifications he shall cause to be chipped the "S" of the letters M. C. B. S. which are specified in paragraph 2.

Trunnion. The pivot upon which any body, as a gun, revolves. The term is usually applied to bearings for objects of irregular shape, and having slow or irregular motion, as distinguished from the journals of wheels, etc.

Truss. A frame to which rigidity is given by uniting the parts so that its figure shall be in effect cut up into triangles, making it incapable of distortion by turning of the bars about their joints. The simplest form of truss is that in which a truss rod and king post are put underneath a beam to strengthen it, or two beams are framed together in the form of a letter A, and tied together at their lower ends by a rod or another beam. These are called king post trusses. Another form is that in which two posts are used, which are called queen post trusses. This is not a perfect truss, since it is capable of altering its shape by simply bending without rupturing its parts, when unequally loaded. In order to prevent this counterbalances should be added. This is the usual way of trussing the underframe of cars. The sills resist bending and act as straining beams, thus preventing great distortion. The usual forms of trusses used for the side framing of cars are the Pratt and the Howe types. In the former all the braces are subject to tension, and in the latter the braces are compression members. The Pratt truss is rarely used alone today for side trussing, but is often used in combination with the Howe truss. The Howe truss is rarely used in its simple form, being usually provided with vertical posts alongside of the vertical tension members. The side of a car is not a perfect truss as ordinarily built, for the middle panel, which contains the door, lacks the essential element of braces or counterbraces. Long cars are reinforced with heavy trusses of the bridge or roof type, and further strengthened by body truss rods.

Truss Block. A distance piece between a truss rod and the compression member of a trussed beam, which forms a bearing for both.

Truss Plank (Passenger Car Framing). 63, Figs. 423-425; 1, Fig. 1450. A wide piece of timber, set on edge and bolted to, or sometimes gained into the posts on the inside of the car immediately above the sills.

Truss Plank Cap. A strip of wood attached to the top of a truss plank between the seat frames.

Truss Rod. 19, Figs. 285-288. A rod used in connection with a king or queen post truss, or trussed beam, to resist deflection. It is attached to the ends of the beam, and is supported in the middle by a king post, truss block, or two queen posts between the beam and the rod. See BODY TRUSS ROD.

Truss Rod Anchor. 24, Figs. 423-425. An iron forging or casting bolted to the sills, to which the end of the side truss rod is fastened It is commonly made integral with the body bolster when a double body bolster is used.

Truss Rod Bearing. A bearing used to furnish support to a truss rod at an angle or bend.

The bearing, over the bolster, of a long body truss rod running from end sill to end sill is called a body truss rod saddle, probably in part from its form. See QUEEN POST.

Truss Rod Iron. A bar of iron, having an eye, to which a body truss rod is attached, bolted to the under side of a sill below a body bolster. It is a form of attaching body truss rods almost out of use for freight cars, but in use on wooden passenger cars. A TRUSS ROD ANCHOR.

Truss Rod Saddle. See BODY TRUSS ROD SADDLE and TRUSS ROD BEARING.

Truss Rod Strut. See QUEEN POST.

Truss Rod Washer. A large flat or beveled washer, used under a nut on the end of a truss rod. Sometimes called a skew back.

Tufting Button. A button used in upholstery to hold the cord which passes through the upper covering of the upholstered surface, dividing it into squares or diamonds.

Tumbler. A drinking glass.

(Locksmithing.) "A latch engaging within a notch in a lock, bolt, or otherwise, opposing its motion until it is lifted or arranged by the key so as to remove the obstacle."—Knight.

Tumbler Holder. Figs. 1585-1586, 1712. A bracket or stand for holding glass tumblers or drinking cups. They are either single or double.

Tumbler Holder and Drip. Figs. 1594, 1607. A water cooler drip, the top of which is made large enough to hold a glass.

Tup. See HAMMER.

Turbo-Generator (Electric Car Lighting). Figs. 2290-91. A steam turbine of small size direct-connected to a generator for furnishing electric current to light trains by the head end system. The turbo-generator may be mounted in the baggage car or on top of the locomotive boiler and receives steam from the locomotive.

Turn Over Seat. See REVERSIBLE CAR SEAT.

Turnbuckle. 23, Figs. 423-425; Figs. 1441, 1442. A device inserted in the middle of a long rod for changing its length. A form that has gained much favor for use on cars is that shown in Fig. 1441. They are made the following sizes, and larger in proportion.

Size. D.	A.	B.	C.	L.
1 inch	6 in.	1½ in.	9 in.	25 in.
1⅛ "	6 "	1 11-16 "	9⅜ "	25 "
1¼ "	6 "	1⅞ "	9¾ "	26 "
1⅜ "	6 "	2 1-16 "	10⅛ "	27 "
1½ "	6 "	2¼ "	10½ "	27 "
1⅝ "	6 "	2 7-16 "	10⅞ "	28 "
1¾ "	6 "	2⅝ "	11¼ "	28 "

D. Size = Outside Diameter of Screw.

A. Length in Clear between head = 6 in. first length for all sizes.

B. Length of Tapped Heads = 1½ D.

C. Total Length of Buckle without Bolt Ends.

L. Total Length of Buckle and Stub Ends when open.

Turtle Back Roof. Fig. 908. A roof for a passenger equipment car which is arched, and without a clere story or upper deck.

Twin Car Seat. A seat stand with a division arm, two cushions, two seat backs with two striker arms each, so that they may be turned to bring the occupants face to face. See RECLINING CHAIR.

Twin Hopper Gondola Car. A gondola car with two hoppers. See GONDOLA and HOPPER BOTTOM GONDOLA.

Twin Spring Draft Gear. Figs. 692, 694, 722, 728. A draft gear in which the springs are arranged alongside of one another.

Twin Washer. A DOUBLE WASHER.

Two-Way Dump Car. Figs. 58-67. A car from which the entire load may be dumped to either side of the track. See also SIDE DUMP CAR.

Tyre. See TIRE.

U

U-Bolt. Figs. 489, 975. A double bolt made of a bar of iron bent to the shape of the letter U, with a screw thread on each end.

U-Bolt Casting. Fig. 974. A casting so shaped that a U-bolt can fit around it and connect it to a timber or sill to form a bearing or carrier for a pin or bolt.

Uncoupling Apparatus. See UNCOUPLING LEVER.

Uncoupling Arrangements (M. C. B. Recommended Practice). In 1897 designs showing the details of uncoupling arrangements to concealed end sill cars and outside end sill cars were adopted as Recommended Practice.

In 1905 the shoulder of the bracket for the uncoupling rod was made bevel.

In 1908 these details were revised and changes made to overcome former defects.

The special feature of this uncoupling attachment is the slotted center bracket. By placing the rod back on top of end sill or head block a longer arm is obtained, which gives sufficient lift with ample slack in the chain, and by using a sloping slotted bracket the rod projects 1½ inches in front of coupler lock, which is about the best position for an efficient lift. The slotted bracket allows the rod to slide back 3½ inches and avoids interference when slack of train is bunched.

The handle shown should preferably project below end of car or be bent as shown by dotted lines, in order to protect the operator's hand.

Three links 3¾ inches, 5¾ inches and 7¾ inches long, respectively, are shown. By using one of these three links, therefore, a chain 6½, 8½ or 10½ inches long is obtained, which should fit all cars and M. C. B. couplers. These links should avoid the use of split links, "S" hooks and other temporary repair devices now very common. The arrangement as a whole is applicable to all types of cars, and if properly applied will largely obviate present troubles. Only a few limiting dimensions are shown on the drawing, as the others must be adapted to each particular class of car; but the dimensions for center arm, chain slack and position of lift pin eye should be carefully adhered to.

In 1911 the uncoupling arrangements for M. C. B. coupler were made to conform to the requirements of the U. S. Safety Appliance Act. Details of M. C. B. standard attachments are shown in Fig. 2710. See SAFETY APPLIANCES.

Uncoupling Chain. See UNCOUPLING ARRANGEMENTS.

Uncoupling Lever or Uncoupling Rod. 210, Figs. 283, 284; 12, Fig. 297; 210, Figs. 374, 375; Figs. 588, 747-751. An iron rod with a bent handle forming a lever, usually attached to the end sill, by which the lock of the automatic coupler is opened and the cars uncoupled without going between them. The lever proper is the part attached to the rod and operating the unlocking mechanism, but in the case of freight cars the lever and rod are generally made in one piece. In passenger equipment cars the lever is located on the platform or in the vestibule. The short lever which is directly connected to a passenger coupler is also sometimes called uncoupling lever.

Uncoupling Lever Bracket. Fig. 491. A bracket supporting the uncoupling lever on the end of the car.

Uncoupling Rod. See UNCOUPLING LEVER.

Uncoupling Rod Guide. Fig. 618. A guide or support for the UNCOUPLING SHAFT used on passenger equipment cars having wide vestibules. Preferably uncoupling shaft guide.

Uncoupling Shaft (Passenger Equipment Cars). A vertical rod extending up through the platform floor having a square end at the top to take the uncoupling lever and a crank arm at the bottom to which is attached an uncoupling rod. A partial turn of the uncoupling lever pulls out the uncoupling rod and releases the coupler lock allowing the knuckle to open and the cars to part.

Uncoupling Shaft Bracket. Fig. 491. See UNCOUPLING LEVER BRACKET.

Underframe. Figs. 432-464. A framework, which receives the buffing and pulling stresses and carries the weight of the floor and body of the vehicle. In both freight and passenger cars in America the underframe and body are rigidly connected and mutually stiffen and strengthen one another, but in British carriages the body is framed as an independent structure, and merely rests on the underframe, rubber pads (india rubber body cushions) being interposed to deaden shocks. The only connection is through a body holding-down bolt. Underframe includes all the framing below the floor, and includes the platforms, draft timbers, etc. See general drawings of the various types of cars.

Underhung Door. A sliding door which is supported and slides on a rail below the door.

Union (Pipe Fittings). Figs. 1919, 1920, 1922-1924. A means of uniting the ends of two pipes with a nut. The nut is attached to one pipe by a sleeve with a collar, and is screwed on a sleeve attached to the other pipe. See PIPE FITTINGS and PIPE UNIONS.

See table above and page 117 for illustration.

Union Elbow. Fig. 1924. A union having one section in the from of an elbow.

Unit-Switch Control. (Motor Cars.) Figs. 2040. A control apparatus for single cars and cars operated in multiple unit service. Parts are standardized to per-unit of ready renewal. Main power circuit connections are made by pneumatically operated switches assembled in a switch group underneath the car. See Fig. 2544 for section through a unit switch group. For arrangement of the working parts of the air cylinder of a unit switch, see Fig. 2547. See Fig. 2560 for wiring diagram of unit switch control.

United States Gallon. A U. S. gallon contains 231 cubic inches and a U. S. gallon of water weighs 8⅓ lbs. See IMPERIAL GALLON.

United States Government Specifications for Postal Cars. See POSTAL CARS, U. S. Government Specifications.

United States Safety Appliance Standards. See SAFETY APPLIANCES.

Universal Joint. "A device for connecting the ends of two shafts so as to allow them to have perfect freedom of motion in every direction within certain defined limits."—Knight.

Upholstery. Figs. 1504, 1506-1509, 1511. In passenger car construction, the term includes the cushions, curtains, carpets, beds, etc., and generally the materials from which they are made.

DIMENSIONS FOR STANDARD PIPE UNIONS.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
⅛-inch	.375	.270	.105	.59	.63	.78	.80	.85	89	1.05	.28	¼	27	.2225	.08	.5625	½	.59	.615	006	.05
¼ "	.496	.364	.132	:76	.80	.96	.98	1.05	1.09	1.29	.33	5/16	18	2625	.10	.6925	9/16	.76	76	006	.06
⅜ "	630	.494	.136	.90	.95	1 11	1.13	1.20	1.24	1.45	.34	⅜	18	2825	.11	.7325	⅝	.00	.905	006	.07
½ "	.763	.623	.168	1 16	1 21	1.38	1.40	1.49	1.54	1 78	.40	7/16	14	.3025	.12	.8225	11/16	1 03	1 20	006	.08
¾ "	.992	.824	.168	1.38	1.43	1.61	1.63	1.72	1.77	2.02	.42	½	14	.3225	.13	.8725	¾	1 24	1.43	007	.09
1 "	1 246	1 048	.198	1 74	1.79	1.98	2.01	2.13	2.19	2.49	.49	9/16	11	.3625	.15	1 0025	13/16	1 565	1 76	.007	.10
1¼ "	1.592	1.380	.212	2 12	2.18	2.37	2.40	2.52	2.58	2.90	.53	.6	11	.3825	.16	1.0725	.9	1.91	2 15	007	11
1½ "	1.631	1.610	.221	2.40	2.46	2.66	2.69	2.81	2.87	3.20	.55	.7	11	.4025	.17	1.1225	1.0	2.18	2 40	007	13
2 "	2.306	2.067	.239	2.89	2.95	3.16	3.19	3.31	3.38	3.74	.60	.8	11	.4225	.18	1.2025	1.1	2.66	2 00	008	.14
2½ "	2.775	2.468	.307	3.38	3.45	3.67	3:70	3.86	3.93	4.39	.77	.9	8	.5225	.23	1.5225	1.2	3.16	3.41	008	.16
3 "	3.401	3 067	.334	4.07	4.13	4.36	4.40	4.56	4.63	5.13	.84	1.0	8	.5625	.25	1.6525	1 3	3 81	4.08	006	.18
3½ "	3.901	3.548	.353	4 61	4.68	4.91	4.25	5.11	5.19	5 72	.88	1.1	8	.6025	.27	1 7525	1 4	4 31	4 63	.008	.20
4 "	4.4	4.026	.374	5.15	5.22	5.47	5.51	5.67	5.75	6.31	.94	1.2	8	.6225	.28	1.8425	1 5	4.81	5 19	.008	.22

DESCRIPTION ACCOMPANYING TABLE OF MALLEABLE PIPE UNIONS.

NUMBERS AT THE HEAD OF THE COLUMNS ABOVE ARE THOSE GIVEN IN THE DIMENSION LINES ON TABLE A.

Column No. 1 in table represents the nominal diameter of pipe.

Column No. 2 represents diameter of pipe at one-half the height of full thread nearest solid section of pipe.

Column No. 3 represents the internal diameter of the pipe.

Column No. 4 represents the difference between columns Nos. 2 and 3, and is equal to twice the thickness of metal in pipe measured from inside line to one-half the height of thread, as specified before.

Column No. 5 represents the outside diameter of end of pipe union and is taken as *No. 2, plus twice No. 4*, plus an arbitrary increment.

Column No. 6 is equal to No. 5 plus an increment varying from .04 to .07 of an inch. This increment was allowed for the purpose of being able to slip the nut over upper swivel end of union.

Column No. 7 is No. 6 plus an amount varying between .15 and .25. This lip created is considerably in excess of what exists on present pipe unions for the reason that we find the surface between the lip and the corresponding part of nut is often damaged, and the bearing surface, when the full strength of the man is used on the wrench, is sufficient. We assume that a man would pull about 30 pounds on a wrench, with a possibility of using less force on pipes of small diameters. For that reason we made a variation in the width of lip, which lip, theoretically, would be uniform for all sizes of pipe. The nut itself has been strengthened to prevent the lip from deflecting upward

Column No. 8 is No. 7, plus an increment varying from .02 to .04 of an inch

Column No. 9 is No. 8, plus twice the height of the thread.

Column No. 10 is No. 9, plus an increment varying between .04 and .08 of an inch.

Column No. 11 is No. 10, plus one and one-half times No. 4.

Column No. 12 is two and one-half times No. 4, and was figured especially for bearing surface, so that the thread would not wear away too rapidly when the nut is occasionally removed.

Column No. 13 has been assumed arbitrarily, but in all cases is greater than the length of full thread on standard pipe.

Column No. 14 represents the number of threads per inch in length of nut. This thread, we believe, should be United States Standard form and not sharp thread.

Column No. 15 is taken arbitrarily, but is based on the probable requirements of manufacturers for tapping out the nut.

Column No. 16 is three-fourths of No. 4.

Column No. 17 represents the full height of nut, and is equal to No. 12, plus No. 15, plus No. 16.

Column No. 18 is the amount of projection outside of nut.

Column No. 19 is No. 2, plus No. 4, plus an arbitrary increment.

Column No. 20 is No. 7, less No. 16, with slight modifications.

Column No. 21 represents the clearance at several points, as indicated on print.

Column No. 22 is assumed arbitrarily.

(See page 117 for Illustration with Numbered Dimensions.)

Upper Belt Rail (Passenger Car Exteriors). A horizontal bar attached to the posts on the outside and above the windows. See BELT RAIL.

Upper Berth. Fig. 1456; 2, Figs. 1458, 1459. The top berth in a sleeping car section. It folds up by day against the roof, being secured by a berth latch, and the head board, mattresses and bedding are stored in the pocket between it and the roof. See BERTH.

Upper Berth End. 20, Figs. 1458, 1459. The end piece of a sleeping car upper berth.

Upper Berth Front Panel. 6, Figs. 1458, 1459. The central panel of an upper berth.

Upper Berth Lower Rail. 5, Figs. 1458, 1459. The bottom or rear bar of the frame of a wooden upper berth. See BERTH FRONT.

Upper Berth Pocket. A pocket against the sides of the car which closes up flush therewith when the upper berth is folded up, but drops open when the berth is made up, to afford a receptacle for clothing and baggage. It has been replaced by a hammock. Similar pockets for the lower berth are made by turning up the head rest of the seat.

Upper Berth Rest. See BERTH BRACKET.

Upper Berth Rest Pivot. A pin attached to a plate fastened to an upper berth. The pin engages in a hole in a BERTH BRACKET.

Upper Berth Top Rail. 4, Figs. 1458, 1459. The upper or front bar of the frame of a wooden upper berth. See BERTH FRONT.

Upper Brake Shaft Bearing. 96, Figs. 285-288. A metal eye by which the upper end of a brake shaft is held in place.

Upper Deck (Passenger Equipment Cars). Also called clere-story. The raised central portion of the roof. See DECK.

Upper Deck Carline. 100 and 118, Figs. 423-425. A carline supporting the upper deck or clere-story, usually called simply deck carline. A through carline, extending under both lower and upper decks, is also sometimes called an upper deck carline or profile carline.

Upper Deck Eaves Molding. A molding, usually called simply deck eaves molding, on the outside edge of the roof.

Upper Door Sash. The part of a double window sash in a car door which covers the upper part of the opening. This upper section is usually made movable, so that it can be lowered for ventilation.

Upper Floor (Stock Car). 28, Fig. 368. More commonly called double deck. A deck or floor in a stock car half way between the main floor of the car and the roof, to double the carrying capacity of the car for pigs, sheep, calves, etc.

(Automobile Car.) Fig. 283. A similar arrangement fitted in an automobile car.

Upper Wainscot Rail. A longitudinal wooden bar or rail, fastened to the posts on the inside of a passenger car immediately under the window. See WAINSCOT RAIL.

Urinal. A metal or porcelain receptacle used in saloons, connected to a pipe leading through the floor. They are distinguished as corner or side urinals. A concealing urinal, shutting up flush with the wood work when not in use, is sometimes used.

Urinal Cover. A wooden or sheet metal lid for inclosing a urinal.

Urinal Drip or **Drip Pan.** A pan under a urinal on the floor.

Urinal Handle. A handle in a saloon, placed above the urinal for support.

Urinal Ventilator. A pipe attached to a cap on a urinal, communicating with the top of a car, where some form of wind scoop is often added.

V

V-shaped Screw Thread. A thread with a sharp edge at the top and sharp groove at the root. The Sellers' (U. S.) standard thread is flat at the top and at the root, and the Whitworth is rounded.

Vacuum Brake. A system of continuous brakes which is operated by exhausting the air from some appliance under each car, by which the pressure of the external air is transmitted to the brake levers and shoes. So called in distinction from AIR BRAKES, which are technically understood to refer only to brakes operating with compressed air, although in a literal sense the vacuum brake is also an air brake. An ejector on the engine is ordinarily used for exhausting the air, connected with the rest of the train by pipes and flexible hose between the cars. A continuous pipe is connected through the train between cars by rubber hose, wound with wire to prevent collapsing, and suitable couplings. Under each car is a large cylinder with a piston and rod connected to the brake levers actuating the brake shoes. These cylinders are connected to the train pipe through a simple form of ball valve. An ejector on the locomotive maintains a vacuum of from 20 to 24 inches in the train pipe and in the cylinders under each car. In the release position the piston rests by its own weight in the bottom of the cylinder. To apply the brakes air is admitted to the train pipe and through the ball valve under each car to the space below the piston. The vacuum above the piston permits the atmosphere pressure below the piston to raise it and apply the brakes. A vacuum is always maintained above the piston and is available for applying the brakes at any time. In case the train parts the admittance of air to the broken train pipes applies the brakes in both sections of the train. A valve in the caboose may also be used to admit air to the train pipe and apply the brakes in case of emergency. To release the brakes, the vacuum is restored in the train pipe and under the pistons by working the ejector.

Vacuum Cleaner. Fig. 1921. A device for removing dust from carpets, etc. It usually consists of a motor-driven pump, which creates a vacuum, by means of which the dust is drawn up through a hose and deposited in a receptacle.

Valve. A lid, cover, or plug for opening and closing an aperture or passage.

Valve Body. The shell case or frame of a valve. See TRIPLE VALVE BODY.

Valve Key (Pintsch Gas Lighting Apparatus). A key for opening all the high pressure valves, the lamp key being used for the low pressure valves connected with the burners.

Valve Seat. The surface on which a valve rests.

Valve Stem. A rod attached to a valve, and by which the latter is moved, is called a valve stem or spindle.

Van. See CABOOSE.

Vapor Regulating Valve (Car Heating). Figs. 1952, 1954, 2083-4. A valve by which the amount of steam admitted to the heater pipes is controlled. For a more detailed description of operation of the one used with the PRESSURE AND VAPOR CAR HEATING SYSTEM see VAPOR-RESERVOIR, which acts in conjunction with it. It is possible with this system to combine both the valve and the reservoir, in which case it is called a vapor regulating valve, as above.

Vapor Reservoir. Fig. 1953. Used in the PRESSURE and VAPOR HEATING SYSTEM in conjunction with the VAPOR REGULATING VALVE. It is placed below the blow-off, or drip valve, forming an extension to it, and consists of a spiral coil of copper piping surrounding a pipe which forms an extension to the blow-off valve. This pipe has several slots cut through to allow the hot water escaping from the system to trickle over the spiral copper pipe. This spiral pipe is filled with a liquid that boils at a low temperature and an extension of the pipe is connected to a diaphragm in the frame of the automatic VAPOR REGULATING VALVE. One or more joints are used to connect the coil and the diaphragm. The extension of the diaphragm closes the steam valve by means of the stem as soon as the liquid in the coil reaches a temperature at which it boils, and under which conditions the vapor generated has sufficient force to close the valves against the spring. When the liquid in the coil cools, which follows the cutting off of the steam supplied to the radiating coils, the vapor condenses and the spring forces the valve open, allowing a fresh supply of steam to enter the heating pipes and supply additional heat to the car.

Vapor System (Passenger Train Lighting). Figs. 2207-2215. A system of gas lighting designed for use in localities where Pintsch gas charging plants are not available. The gas is produced by mixing air with the vapor of gasolene. The air is taken from the air brake system and passing through a carburetor charged with gasolene becomes a gas suitable for illuminating purposes. The gas is burned in a mantle lamp and produces a soft white light.

Referring to Fig. 2207, air is taken from the auxiliary reservoir of the brake system through check valve 1020 and into the air storage tank through valve 53-B. It then passes up into the car to shut-off valve 2173, which is placed in some convenient location. From valve 2173 the air is carried to thermostatic regulator 2252, and into the carburetor, where it mixes with the gasolene vapor. The gas thus formed passes through regulator 254 to main cock 25-C inside the car and thence through roof piping to the lamps. Check valve 1020 prevents the stored air from returning to the brake system when the brakes are inoperative. With this arrangement, when the car is cut off from the air supply a sufficient quantity of air is held in the tank to keep the lights burning. The carburetor and air storage tank are combined, the carburetor being placed within the tank so that it will be well protected from puncture in case of a wreck. The tank is made of welded steel and is 24¼ in. in diameter by 8 ft. 11¼ in. long. The carburetor consists of a piece of 12 in. wrought iron pipe and is securely fastened to the air-tank in such a manner that there is no connection between the air storage compartment and the carburetor. The tank is shown in section in Fig. 2208. That there may be no liquid gasoline present in the gas, the carburetor is packed with an absorbent material, consisting of cotton wicking made up in cartridges about 6 in. long and of a diameter to fit tightly in the carburetor. The cartridges are made by rolling up strips of the cotton wicking with wire cloth. The cartridges are placed in the carburetor with baffle plates between them. Each baffle plate has an opening at the outer edge for the passage of the gas and the arrangement is such that the holes in adjoining plates are on opposite sides of the carburetor, thus causing the air to pass through every part of the carburetor and become thoroughly saturated with gasolene vapor.

Vapor Trap. See STEAM TRAP.

Varnish. A liquid for covering paint or woodwork with a hard, impervious and glossy surface.

Vaulted Deck Window. 41, Figs. 1458, 1459. A deck window shaped like an arch.

Velocipede Car. Figs. 2610, 2611, 2617, 2618. Generally a three-wheeled car, in which the rider sits astride and propels the car with his feet (or feet and hands together), after the manner of a velocipede. They comprise a variety of light cars for inspectors, telegraph line repairers, lamp lighters, etc.

Veneer. "A thin leaf of a superior wood for overlaying an inferior wood."—Webster. By trade usage it is a veneer if it covers other materials than inferior wood.

Vent. "A small aperture; a hole or passage for air or other fluid to escape."—Webster.

Ventilated Box Car. Figs. 109, 114, 116, 270, 855. Similar to an ordinary box car, but arranged for ventilation and suitable for the transportation of produce or other food-stuffs not needing refrigeration. See CAR, M. C. B. CLASS XV and FRUIT CAR.

Ventilating Jack (for Saloons). Also called wind scoop. A flaring horizontal tube, constituting a simple form of the ventilating devices which use the current produced by the motion of the cars to cause an exhaust current of air.

Ventilator (Saloon). Fig. 1729. The fixed oval sashes fitted in the saloons of many of the passenger cars are often arranged with a circular ventilator near the center.

Figs. 893-919. A device for admitting or exhausting air to or from a railway car. Ventilators, according to their position, are designed as deck ventilators (end or side), end ventilators, frieze ventilators, etc. They are often designated as automatic or self-acting. Day coaches usually depend upon the deck windows for ventilation, the sash at every other window being hung on different sides, so that the open sash may be hinged on the front end. Sash openers for deck sash hinged in this manner are shown in Fig. 1799. For a report of tests with various ventilators see Proceedings M. C. B. Association, 1894, page 234. See DECK VENTILATOR.

(For Fruit Car.) A system of slats protected by netting at each end of the car, so arranged as to enable the ventilators to be readily opened or closed from the outside.

(Refrigerator Car.) Figs. 836, 840, 846, 847. A current of air must be admitted to refrigerator cars, which passes through the refrigerator and comes in contact with the lading. As it becomes warm it rises upward and passes out. The ventilator controls the admission of air and its circulation.

See HOPPER VENTILATOR.

Ventilator Blower. Figs. 903, 904. A blower used in connection with dining car ventilators.

Ventilator Deflector. A metal plate or board placed in such a position at a ventilator opening that it will cause a current of air to flow into or out of the car when the latter is in motion.

Ventilator Door. A door for closing the aperture of a ventilator.

Ventilator Hood. A shield over the outside of a ventilator to prevent the entrance of sparks, cinders, rain or snow. It is sometimes intended to direct the current of air either into or out of the car.

Ventilator Netting. A wire screen or netting fastened over the outer deck window sash to prevent the entrance of sparks and cinders.

A meeting over the ventilator windows of a fruit car.

Ventilator Opener. See DECK SASH OPENER.

Ventilator Pivot. A pin on which a ventilator door or sash is swung or hinged. It is the same as a deck sash pivot.

Ventilator Register. Fig. 898. A metal plate or frame attached to a ventilator opening, provided with slats arranged so as to turn, or openings which can be controlled, and thus either open or close the ventilator.

Ventilator Sash. Usually a deck sash

Ventilator Staff. A pull hook or DECK SASH OPENER.

Ventilator Valve. A door for opening or closing the aperture of a ventilator, usually made to turn on pivots at or near its center.

Vertical Steam Trap and Blow-Off. A THERMOSTATIC STEAM TRAP, and a blow-off valve combined. It may be operated from inside of the car.

Vestibule. Figs. 413, 537, 538, 540, 545-623. Formerly that part of the car nearest the door, cut off from the main saloon by an interior door. It was occupied by the saloon, washing and heating arrangements, etc. Its purpose was to give protection to the interior of the car against drafts and noise.

Usually a platform enclosure, consisting of a face or buffer plate, constituting an arched doorway, connected with a spring extended rod, a foot plate combined with the buffer stems and face plate, a bellows-like connection called a diaphragm between the face plate and car frame and side doors opening to the steps.

Vestibule Body Corner Post. The inner post of a vestibule, set against the end of the car body and directly over the platform sills.

Vestibule Buffer Plate. 79, Figs. 552-555. An extra long and wide buffer plate, sometimes recessed or chamfered at the ends, where it is connected with the face plate of the vestibule, whose face is flush with the buffer plate.

Vestibule Corner Post. 31, Fig. 410. The outer corner posts of the vestibule.

Vestibule Curtain Handle. Figs. 585, 588, 590, 594, 597, 601. A handle or catch used to secure a vestibule passageway curtain to its hook.

Vestibule Curtain Hook. Figs. 587, 588, 590, 602 and 603. See VESTIBULE CURTAIN.

Vestibule Diaphragm. See DIAPHRAGM.

Vestibule Dome Lamp. A VESTIBULE LAMP.

Vestibule Door. Figs. 806, 807, 813. A door by which the vestibule of a car is entered from the side. In the older or narrow type of vestibule they are double or divided, the two doors being hinged together and swung from the vestibule corner post.

Vestibule Door Hinge. Strap hinges, Fig. 1832, which fasten the double doors of a narrow vestibule together.

Vestibule Door Rod. A bar or rod across the doors of a narrow vestibule to prevent their being pushed in.

Vestibule End Carline. A platform hood end carline. See CARLINE.

Vestibule End Post. See VESTIBULE CORNER POST.

Vestibule End Window. The window in the end of the vestibule enclosure.

Vestibule Face Plate. Fig. 562. An inverted U-shaped forging and forming with the diaphragm a passageway from the platform of one car to that of the next. The weight of it is carried on the buffer plate and it is kept thrust out against the opposing face plate either by springs or by its own weight.

Vestibule Gate. Figs. 578, 581. A gate used to close the vestibule passageway at the rear of the last car in a train.

Vestibule Guard Rail. Figs. 607, 611, 612. A hand rail or hand hold, pivoted at one end and fitting in a socket at the other, and located on the end of the car so that it may be swung across the vestibule door and hold it in an open position.

Vestibule Hood. The platform hood of a vestibuled car.

Vestibule Lamp. Figs. 2125, 2123, 2221, 2240, 2479, 2491, etc. A lamp used for lighting a car vestibule.

Vestibule Passageway Curtain. Figs. 585-597, 601-603. A curtain which is stretched across the inside surface made by the vestibule diaphragms and face plates when two cars are coupled, to protect passengers from injury.

Vestibule Trap Door Bumper. Fig. 617. A step for a trap door to prevent its striking the vestibule wall when opened.

Vestibule Trap Door Latch. See TRAP DOOR LATCH.

Vestibule Trap Door Lift. Fig. 600. A metal device attached to trap doors, with a recess for inserting the fingers to pull the door open.

Vestibuled Car (Passenger Equipment). Figs. 142, 145, 146, 149, 150, etc. A car equipped with covered, enclosed platforms. See VESTIBULE.

Volt. The unit of electric pressure or electro-motive force.

Voltmeter. An instrument for measuring the voltage of electric currents.

W

Wainscot Panel (Passenger Car Interior). 4, Fig. 1450. A panel under the windows between the two wainscot rails.

Wainscot Rail (Passenger Car Interiors). 3, Fig. 1450. A longitudinal wooden strip fastened to the posts and extending from one end of the car to the other. The lower wainscot rail comes immediately above the truss plank; the upper wainscot rail is immediately under the window. The wainscot end rails are the wainscot rails at the end of the car.

Walkover Seat. Figs. 1510, 1513-1519, 1528, 1529. A term used to designate a type of car seats in which the back does not turn over when the seat is reversed Also called GLIDEOVER and PUSHOVER.

Wall Lamp. A lamp to fit in a recess in the wall of a car or corridor.

Wall Seat End. The seat end next to the wall or side of a car, so called in distinction from the aisle seat end.

Wardrobe (Postal Car). Fig. 1722. See also POSTAL CARS, U. S. GOVERNMENT SPECIFICATIONS.

Wards (of a Lock). The interior circular ridges which fit into corresponding recesses in the bit of a key (the latter also termed wards), the surrounding solid parts of the bit being called the web.

Wash Bowl or Wash Basin. See BASIN.

Wash Bowl Pipe. A waste pipe.

Wash Room. A compartment provided with toilet facilities. See LAVATORY.

Wash Room Pump. More properly BASIN PUMP.

Wash Stand (Postal Cars). A cast stand carrying a basin. They are distinguished as corner or side wash stands.

Wash Stand Slab. A stone or metal slab which forms the top for a wash stand.

Washer. Fig. 494. A plate of metal or other material, usually annular, which is placed under a nut or bolt head to give it a better bearing. Two or more washers are sometimes combined and called washer plates, strap washers, double or twin washers, triple washers, etc.; they are sometimes made beveled or triangular for a rod or bolt which is oblique with reference to the bearing surface. A socket washer or flush washer is one provided with a recess for the bolt head, so as to leave it flush with the surface of the adjoining parts. Cut washers or wrought washers are those stamped out of rolled iron plates. Cast washers are made from cast iron. Both are largely used. Washers in car work generally take their name from that of the bolt or rod to which they are attached.

Washer Plate. A STRAP WASHER.

Washometer. Fig. 1643. A device for flushing water closets.

Waste. The spoiled bobbins of cotton or woolen mills, used for wiping machinery and for JOURNAL PACKING. Wool waste is preferable for the latter purpose.

Waste Cock. (Baker Heaters.) A cock attached to the expansion drum or circulating drum of the Baker heater for drawing off or changing the water in the heater pipes.

A cock for drawing off water from a tank or basin. See Fig. 1600.

Water Alcove. Fig. 1613. A recess in the side of a partition of a passenger car to receive the faucet of a water cooler or water pipe and a drinking cup. The term is generally used to designate the metal casing or lining with which the recess is covered. The water tank for supplying water alcoves is usually placed on the other side of the partition, in the saloon, and commonly when so placed extends to the roof.

Water Circulation Heating System. See HOT WATER CIRCULATION HEATING SYSTEM.

Water Closet. Fig. 1636, etc. A commode with water supply to rinse the basin and carry off the contents.

Water Cooler. Figs. 1621, 1622. A tank or vessel for carrying drinking water, which is usually cooled with ice. The sides are generally made double, and the space between filled with some non-conducting substance. They frequently extend to the roof. See WATER ALCOVE, WATER TANK.

Water Drip. A pan or receptacle to receive the waste water from a water cooler. A drip pipe, or waste pipe, connects with it.

A slight projection or raised seam in the roof of a passenger or baggage car over the side doors, or at the end of the car in the platform roof to divert the water so it will not fall upon persons entering the car or passing from one car to the next.

Water Gage. See GLASS WATER GAGE.

Water Seal. See TRAP.

Water Supply. Figs. 1633-1635. The system of water supply used in Pullman sleeping cars is under air pressure, thus doing away with the old method of using pumps for raising water for washing purposes. The system consists of forcing water into the wash bowls by air pressure taken from the air brake system. The water is usually heated by using live steam from the locomotive for this purpose.

Water Tank. A vessel or reservoir for holding water. Those used on cars for drinking water are usually made of sheet iron, and often extend to the roof. They are then usually drawn from by a water alcove, Fig. 1613, the tank being usually in the corner of the saloon, concealed from the interior of the car.

For size and arrangement of water tank in postal cars, see U. S. Government Specification for POSTAL CARS and Fig. 1711.

Watt. The unit of electric power. The product of one ampere multiplied by one volt. It is equal to 1-746 horse-power.

Wattmeter. An instrument for measuring electric power.

Waved Moldings. Moldings which by a special machine are made of a corrugated section longitudinally.

Way Car. See CABOOSE.

Weather Strips. Figs. 1733, 1734, 1736-1738, 1741-1746, 1756, 1764, 1767-1769, 1771. A strip for application around the crevices of windows or doors, for excluding the dust and wind, and for preventing water from entering around the windows.

Web. A term applied to the center portion of a beam, as an I-beam, which ties the flanges together. See BODY BOLSTER FILLER.

(of a Key). The solid portion of a bit of a key, the recesses cut away being termed wards. See BIT.

Web Filler. See BODY BOLSTER FILLER.

Webbing. A strong fabric, made of hemp or other material which is not likely to stretch, used in upholstering car seats.

Wedge. See JOURNAL BOX WEDGE. The metal piece used to keep a journal bearing in its place in the journal box.

Wedge, Journal Box. See JOURNAL BOXES AND DETAILS.

Weight of Car, Light; Stenciling of. See FOUNDATION BRAKE GEAR.

Well Car. Fig. 347. A flat car with an opening in the center to allow the load to extend below the floor level when it could not otherwise come within the overhead clearance limits. See CAR M. C. B. Class FW.

Wheel. A circular frame or solid piece of material which revolves on an axis. See BRAKE RATCHET WHEEL, HAND BRAKE WHEEL, etc.

Figs. 1115-1153. A circular frame or disk, as above defined, serving to support a moving vehicle, as CAR WHEEL, hand car wheel, etc. Car wheels are generally either cast (chilled), forged or steel tired.

The rules for INTERCHANGE OF TRAFFIC give the defects for which wheels may be replaced.

Wheel Bar (Passenger Truck). A wheel piece.

Wheel, Cast-Iron (M. C. B. Recommended Practice). Figs. 2769-71. In 1904 designs of wheels for cars of 60,000 pounds, 80,000 pounds and 100,000 pounds capacity were adopted as Recommended Practice. Revised 1907. Modified 1909. Modified in 1911.

Wheel Center (Steel Tired Wheels). Fig. 1115, etc. The portion of a wheel inside of the tire and between it and the hub or boss. The wheel center is sometimes in one piece and sometimes made up of two parts, the hub or boss and the central filling piece. Face plates, front and back, are also used. The term is seldom applied to chilled or cast wheels.

Wheel-Check Gage (M. C. B. Standard). Fig 2695. In 1896 a standard reference gage for mounting and inspecting wheels was adopted by letter ballot to take the place of the check gage for mounting wheels, and the gage for distance between wheels. At the same date a standard check gage was adopted. In 1907 this was modified. Modified 1909.

In 1911 the mounting and inspection wheel gages were eliminated and a wheel check gage adopted as their substitute.

Wheel Circumference Measure (M. C. B. Standard). Fig. 2696.

By letter ballot in 1893 a Wheel Circumference Measure was adopted as a standard of the Association. Prior to that date it had been recommended for use in all car building shops.

In 1900 a new form of Wheel Circumference Measure was adopted as standard.

In 1910 the brackets used on the wheel circumference measure were replaced with a form to suit the wheel tread and flange contour adopted in 1909. Redesigned in 1911.

Wheel Defect Gage (M. C. B. Standard). Fig. 2695. In 1903 the wheel defect gage shown in the Rules of Interchange was adopted as standard. Modified 1904, 1905, 1907, 1909.

Wheel, Diameter of Steel and Steel-tired (M. C. B. Recommended Practice.). In 1911 a recommended practice of 33 inches was adopted as the diameter for all new steel and steel-tired wheels for freight cars.

In 1911 a recommended practice was also adopted that for high-capacity cars built in the future and likely to be equipped with steel wheels that provisions be made in the construction of car and trucks to permit the use of wheels varying in diameter from 33 inches to 30 inches.

In 1912 specifications covering dimensions and tolerances for solid wrought-steel wheels for freight and passenger car service were adopted as recommended practice.

Wheel Fit. See Wheel Seat.

Wheel Flange. The projecting edge or rim on the periphery of a car wheel for keeping it on the rail.

Wheel Flanges, Distance Between the Backs of (M. C. B. Standard.) In 1883 the standard distance between the backs of flanges of car wheels was made 4 ft. 5⅜ ins.

In 1885 it was decided by letter ballot that in fitting wheels on axles a variation of ⅛ inch each way from the standard distance between flanges would be allowed. Drawing revised in 1896.

In 1907 this standard distance was made 4 ft. 5⅓ ins., owing to increase in width of wheel flange. Modified 1909.

In 1909 the minimum distance between the backs of flanges at base line of tread was fixed at 4 feet 5 3/32 inches.

Wheel Flange Thickness Gages, for New Wheels (M. C. B. Standard). Fig. 2695.

Maximum and minimum wheel flange thickness gages for new wheels were adopted as standard in 1894. Such gages should be used on all new wheels after September 1, 1894, to insure ability to mount them properly to check gage.

In 1907 a modified form of wheel flange thickness gage, applicable to the larger wheel tread then a standard, was adopted as standard. Redesigned in 1909 to suit new tread and flange contour.

In 1911 the minimum flange thickness dimension shown on minimum flange thickness gage as 1 5/32 inches was changed to 1 11/64 inches.

In 1912 the maximum and minimum flange thickness gages were modified so that they can be used for either cast-iron, solid steel or steel-tired wheels; also to limit the maximum and minimum height as well as the throat radius for steel wheels.

Wheel, Limit Gages for Inspecting Second-Hand, for Remounting (M. C. B. Standard). Fig 2696. In 1907 limit gages for use at shops when inspecting second-hand wheels for remounting were adopted as Recommended Practice. Modified in 1909. Advanced to Standard in 1910. In 1911 the method of using gages was shown on above drawing.

In 1911 the note under limit gage on the drawing was changed to cover cast-iron wheels with standard tread and flange adopted prior to 1909 and a new gage added to cover standard tread and flange adopted in 1909.

Wheel, Minimum Thickness for Steel Tire of. See Tires, Minimum Thickness for Steel.

Wheel, Mounting (M. C. B. Recommended Practice). In 1897 the Recommended Practice for mounting wheels was modified by letter ballot by the omission of that part providing, among other things, that wheels with flanges worn to a thickness of 1⅛ inches or less should not be remounted, and the substitution therefor of the following:

First.—That wheels with flanges worn to a thickness of 1 1-16 inches or less shall not be remounted.

Second.—That the thickness of flanges of wheels fitted on the same axle should be equal and should never vary more than 1-16 inch.

Third.—That in mounting wheels, new or secondhand, the standard wheel mounting and check gage be used in the following manner:

After one wheel is pressed into position, place the stop "A" or "B" of the check gage against the inside of the flange of the wheel with the thinner flange with the corresponding tread stop "C" or "D" against the tread of the wheel. Press the other wheel on the axle until the opposite tread stop comes in contact with the tread with the corresponding gage point "E" or "F" in contact with the outside of the thicker flange.

Wheel Piece. 10, Figs. 947, 966; Figs. 974, 976. The upper side member of a pedestal truck, to which the pedestals are attached.

Wheel Piece Plate. 11, 12, Figs. 947, 966. A plate used to strengthen a wooden wheel piece.

Wheel Plate (Cast Iron Wheels.) That part of a plate car wheel which connects the rim and the hub. It occupies the place and fulfills the same purpose as the spokes do in an open or spoke wheel. See Wheel, Plate Wheel.

(Steel Tired Wheels.) Fig. 1115, etc. See Face Plate.

Wheel Ribs (Cast Iron Wheels). Fig. 1143, etc. More commonly, brackets. Projections cast usually on the inner side of plate car wheels to strengthen them.

Wheel Seat or Wheel Fit (of an Axle). The part which is inserted in the hub of a wheel. It is made truly cylindrical and very slightly larger than the axle seat of the wheel. The wheel is pressed on it by hydraulic pressure. See Wheels.

Wheel, Specifications for 33-inch Cast-Iron, for Cars of 60,000, 80,000 and 100,000 Pounds Capacity. (M. C. B. Recommended Practice.)

Adopted 1893. Revised 1899 and 1904. Modified in 1911, in reference to cast date. In 1912 the measuring line for nominal diameter was designated as A B, and the diameter of cores added on drawings. Paragraphs 4 and 9 were modified.

1. Chills must have an inside profile that, in the finished wheel, will produce the exact form of flange and tread contour shown by M. C. B. drawings adopted in 1909. The normal diameter of the wheel produced by the chill must be the M. C. B. Standard of 33 inches, measured at a point 2⅝ inches from outside of tread of wheel.

2. Wheels furnished under this specification must not vary more than one-fourth (¼) of an inch above or below the normal size "measured on the circumference," and the same wheel must not vary more than one-sixteenth (1-16) of an inch in diameter. The body of the wheel must be smooth and free from slag, shrinkage or blowholes. The tread must be free from deep and irregular wrinkles, slag, chill cracks and sweat or beads in throat, and swelled rims.

3. The wheels must show clean gray iron in the plates, except at chaplets, where mottling to not more than one-half (½) inch from same will be permitted. The depth of pure white iron must not exceed one (1) inch nor be less than one-half (½) inch in the middle of the tread.

(A) It shall not exceed one (1) inch in the middle of the tread nor be less than three-eighths (⅜) inch in the throat for wheels having a maximum weight of six hundred and twenty-five (625) pounds.

(B) It shall not exceed one (1) inch in the middle of the tread nor be less than seven-sixteenths (7-16) inch in the throat for wheels having a maximum weight of six hundred and seventy-five (675) pounds.

(C) It shall not exceed one (1) inch in the tread nor be less than one-half ½ inch in the throat for wheels having a maximum weight of seven hundred and twenty-five (725) pounds.

(D) The depth of white iron shall not vary more than one-fourth (¼) of an inch around the tread on the rail line in the same wheel.

4. When ready for inspection, the wheels must be arranged in groups, all wheels of the same date being grouped together, and for each hundred wheels which pass inspection and are ready for shipment, two representative wheels shall be taken at random, one of which shall be subjected to the following tests:

The wheels shall be placed flange downward on an anvil block, weighing not less than seventeen hundred (1,700) pounds, set on rubble masonry at least two (2) feet deep, and having three supports not more than five (5) inches wide to rest upon. It shall be struck centrally on the hub, by a weight of two hundred (200) pounds.

(A) For wheels having a maximum weight of six hundred and twenty-five (625) pounds, ten (10) blows falling from a height of nine (9) feet.

(B) For wheels having a maximum weight of six hundred and seventy-five (675) pounds, twelve (12) blows falling from a height of ten (10) feet.

(C) For wheels having a maximum weight of seven hundred and twenty-five (725) pounds, twelve (12) blows falling from a height of twelve (12) feet.

Should the test wheel stand the given number of blows without breaking in two or more pieces the drop test will be satisfied, and the inspector will then subject the other wheel to the following test:

The wheel must be laid flange down in the sand, and a channel way one and one-half (1½) inches wide and four (4) inches deep must be molded with green sand around the wheel. The clean tread of the wheel must form one side of the channel way, and the clean flange must form as much of the bottom as its width will cover. The channel way must then be filled to the top with molten cast iron, which must be hot enough when poured, so that the ring which is formed, when metal is cold, shall be solid or free from wrinkles or layers. The time when the pouring ceases must be noted, and two minutes later an examination of the wheel must be made. If the wheel is found broken in pieces, or if any crack in the plate extends through or into the tread, all wheels of the same tape size as the broken wheel will be rejected.

5. In the drop tests, should the test wheel break in two or more pieces with less than the required number of blows, then the second wheel shall be taken from the same lot and similarly tested. If the second wheel stands the test it shall be optional with the inspector whether he shall test the third wheel or not; if he does not do so, or if he does, and the third wheel stands the test, the hundred wheels shall be accepted as filling the requirements of the drop test.

6. The lower face of the weight of two hundred (200) pounds shall be eight (8) inches diameter, and have a flat face.

7. The thickness of the flange shall be regulated by the maximum and minimum flange thickness gage adopted by the M. C. B. Association.

All wheels furnished under this specification must conform to the respective sections shown by M. C. B. drawings for the different weights of wheels, and these weights shall be as follows:

(A) Wheels for service under 60,000 pounds capacity cars shall have a maximum weight not exceeding six hundred and twenty-five (625) pounds and a minimum weight not less than six hundred and fifteen (615) pounds.

(B) Wheels for service under 80,000-pounds capacity cars shall have a maximum weight not exceeding six hundred and seventy-five (675) pounds, and a minimum weight not less than six hundred and sixty-five (665) pounds.

(C) Wheels for service under 100,000-pounds capacity cars shall have a maximum weight not exceeding seven hundred and twenty-five (725) pounds, and a minimum weight not less than seven hundred and fifteen (715) pounds.

(D) Weights given for the respective wheels mentioned in sections A, B and C are based on M. C. B. Standard drawings covering wheel design adopted in 1909.

8. All wheels must be numbered consecutively in accordance with instructions from the railroad company purchasing them and must have the initials of such railroad company, also the wheel number, the weight of wheel, and the month, day and year when made, plainly formed on the inside plate in casting. No two wheels shall have the same number. All wheels shall also have the name of the maker and place of manufacture plainly formed on the outside plate in casting.

Wheels conforming to the requirements and furnished under this specification must have the letters "M. C. B., 1909" plainly formed on the outside plate in casting.

9. Individual wheels will not be accepted which:

(1) Do not conform to standard design and measurements.

(2) Are under minimum weight.

(3) Have physical defect described in Section 2.

If in any lot of 100 wheels submitted to test, the test wheel fails to meet the requirements of the drop, chill or thermal test, then all of the wheels in tape number and weight corresponding to the test wheel will be rejected. In case the rejection is for high chill, weak breaking strength, or failure in the thermal test, the test will be continued in the next higher number of tape size; or if the rejection is for low chill, the test will be continued in the next lower number tape size.

In any shipment where the average weight of wheels is above the maximum weight of wheels, the excess weight to be at the expense of the manufacturer.

In case wheels are ordered with cores smaller in diameter than the standard, the additional weight should be considered as an addition to the normal weight and paid for by the purchaser.

10. All wheels must be taped with M. C. B. Standard design of wheel circumference tape having numbers 1, 2, 3, 4, 5 stamped one-eighth (1/8) inch apart, the figure three (3) to represent the normal diameter, 103 6/7 inches circumference. The figure one (1) the smallest diameter and the figure five (5) the largest diameter.

Wheel, Solid Steel, Plane Gage for (M. C. B. Recommended Practice). Fig. 2751. In 1912 a plane gage was adopted for the purpose of measuring how much wheels are out of plane.

Wheel, Solid Steel, Rotundity Gage for (M. C. B. Recommended Practice). Fig 2751. In 1912 a rotundity gage was adopted for the purpose of measuring the maximum distance that wheels are out of round.

Wheel, Solid Steel, Sizes and Dimensions for (M. C. B. Recommended Practice). Figs. 2773-74. In 1912 sizes and dimensions for solid steel wheels for freight and passenger cars were adopted as recommended practice.

Wheel, Steel, Branding of (M. C. B. Recommended Practice). Fig. 2753. In 1912 a method of branding of solid steel wheels was adopted.

Wheel, Steel, Gage for Measuring Thickness of Rim (M. C. B. Recommended Practice). Fig. 2752. In 1912 a gage was adopted for the purpose of measuring the thickness of the rim above the limit of wear groove. With this gage it is possible to measure direct the amount of metal necessary to restore the tread to M. C. B. contour; also to measure direct the amount of service metal remaining above the condemning limit after the tread is restored to M. C. B. contour.

Wheel, Steel-Tired, Tire Fastening for (M. C. B. Recommended Practice). Fig. 2751. In 1912 the form of fastening for steel-tired wheels shown on above sheet was adopted.

Wheel Timber. A term sometimes applied to a wooden WHEEL PIECE.

Wheel and Track, Terms and Gaging Points for. (M. C. B. Standard.) Fig. 2695.

Standard terms and gaging points for wheels and track were adopted in 1894 as follows:

1.—TRACK RAILS are the two main rails forming the track.

2.—GAGE OF TRACK is the shortest distance between the heads of track rails.

3.—BASE LINE, for wheel gages, is a line parallel to the axis of the wheels drawn through the point of intersection of tread with a line perpendicular to the axis, and passing through the center of the throat curve.

4.—INSIDE GAGE OF FLANGES is the distance between backs of flanges of a pair of mounted wheels measured on the base line.

5.—GAGE OF WHEELS is the distance between the outside face of flanges of a pair of mounted wheels measured on a line parallel to the base line, but 5/8 inches farther from the axis of the wheels.

6.—THICKNESS OF FLANGE is the distance measured parallel to the base line between two lines perpendicular thereto, one drawn through the point of measurement of "inside gage of flanges," and the other drawn through the point of measurement of "gage of wheels."

7.—WIDTH OF TREAD is the distance measured parallel to the base line from a line perpendicular thereto, drawn through the point of measurement of "gage of wheels" to the outer edge of tread.

8.—CHECK GAGE DISTANCE is the distance measured parallel to the base line between two lines perpendicular thereto, one drawn through the point of measurement of "inside gage of flanges" on either wheel, and the other drawn through point of measurement of "gage of wheels" on mate wheel.

9.—OVER ALL GAGE is the distance parallel to base line from outer edge of one wheel to the outer edge of mate wheel.

The above mentioned wheel gage distances are either directly or by inference as follows:

	Feet.	Inches.
Inside Gage of Flanges..........	4	5 7-32
Gage of Wheels..................	4	7 11-16
Thickness of Flange.............	—	1 11-32
Width of Tread..................	—	4 11-32
Check Gage Distance............	4	6 29-64
Over All Gage...................	5	4 3/8

Modified 1909.

Wheel Tread and Flange, Form of (M. C. B. Standard). Fig. 2695.

A form of wheel tread and flange was adopted as a standard of the Association, by letter ballot, in 1886. For action of the Association see Proceedings 1882 pages 178 and 179; Proceedings 1886, page 68.

In 1906 a design of wheel tread and flange was adopted as Recommended Practice, having an increase of 1/8 inch on the flange, and a taper in the tread of one in twenty. In 1907 this was advanced to standard, and is shown on the drawing. Modified 1909

In 1910 a maximum allowable height of flange for cast-iron wheels of 1 1/2 inches was adopted as standard.

Wheel Tread and Flange for Steel and Steel-Tired Wheels (M. C. B. Recommended Practice). Fig. 2751.

In 1909 the illustration then shown on the drawing was discarded, and the four illustrations now shown substituted, to govern service operations for both steel and steel-tired wheels under both passenger and freight cars.

Also, that the location of limit of wear of groove be 1/4 inch below the tread face on steel and steel-tired wheels where same have worn to condemning limit, as shown in the illustrations; the shape of the groove to be as shown on these illustrations and measurements to be taken from the horizontal or inside edge of same.

In 1909 the tread and flange contour for steel and steel-tired wheels was revised as shown. It is exactly similar to the new tread and flange contour for cast-iron wheels from the point of the flange to the outside of the tread only, and the development of the flange from the point to the back face of the wheel or tire has been made of such form that the same mounting and inspecting gage used for cast iron wheels can be used for the new section of steel and steel-tired wheels.

In 1912 the thickness of flange for steel and steel-tired wheels was increased 3/32 inch, making the contour to the base line the same as for cast-iron wheels.

Wheel Truing Brake Shoe. Figs. 1256, 1257. A brake shoe with abrasive inserts to grind the wheel tread and flange true to center while in service.

Wheels, Worn and Chipped Flanges and Treads of. See INTERCHANGE OF TRAFFIC, RULES, etc.

Wheels, Wrought Steel, for Freight and Passenger

Service; Specifications Governing Dimensions and Tolerances for (M. C. B. Recommended Practice).

1. Wheels should be furnished rough bored and with faced hubs and have a contour of tread and flange as rolled or machined according to Fig. 2751. They should conform to dimensions specified within the following tolerances:

2. HEIGHT OF FLANGE.—The height of flanges should not be more than ⅛ inch over and must not be under that specified, or 1 inch.

3. THICKNESS OF FLANGE.—The thickness of flange shall not vary more than 1/16 inch over or under that specified.

4. THICKNESS OF RIM.—The thickness of rim to be measured between the limit of wear groove and the top of the tread at the point where it joins the fillet at throat of flange. The thickness must not be less than 1¾ inches, but may exceed this amount.

5. WIDTH OF RIM.—The width of rim shall not be more than ⅛ inch less, nor more than ⅛ inch over that specified.

6. LIMIT OF WEAR GROOVE.—The limit of wear groove to be located as shown in Fig. 2751.

7. DIAMETER OF BORE.—The diameter of rough bore shall not vary more than 1/16 inch above or below that specified. When not specified the rough bore shall be ¼ inch less in diameter than the finished bore, subject to the above limitations.

8. HUB DIAMETER.—The hub may be either ten inches or eleven inches in diameter as specified, with a maximum variation of ⅛ inch above or below. The thickness of the wall of the finished bored hub shall not vary more than ⅜ inch at any two points on the same wheel.

9. HUB LENGTH.—The length of hub shall not vary more than ⅛ inch over or under that specified.

10. DEPRESSION OF HUB.—The depression of the hub must be made so that the distance from the outside face of the hub to the line AB shall not exceed 1 11/16 inches for wheels used on 5½ by 10 inch axles and under and 1 7/16 inches for wheels used on 6 by 11 inch axles.

11. BLACK SPOTS ON HUBS.—Black spots will be allowed within 2 inches of the face of the hub, but must not be of such depth that they will not bore out and give clear metal at finished size of bore.

12. ECCENTRICITY OF BORE.—The eccentricity between the tread at its center line and the rough bore shall not exceed 3/64 inch.

13. BLOCK MARKS ON TREAD.—The maximum height of block marks must not be greater than 1/64 inch.

14. ROTUNDITY.—All wheels shall be gaged with a ring gage and the opening between the gage and tread at any one point shall not exceed 1/16 inch.

15. PLANE.—Wheel shall be gaged with a ring gage placed concentric and perpendicular to the axis of the wheel. All points on the back of the rim equidistant from the center shall be within a variation of 1/16 inch from the plane of the gage when so placed.

16. TAPE SIZES.—Wheels shall not vary more than five tapes under nor nine tapes over the size called for.

17. MATING.—The tape sizes shall be marked in plain figures on each wheel. Wheels must be mated to tape sizes and shipped in pairs.

18. GAGE.—Gages and tape used shall be M. C. B. standard as follows:

Wheel circumference measure, Fig. 2696.
Maximum flange thickness gage, Fig. 2695.
Minimum flange thickness gage, Fig. 2695.
Rotundity gage, Fig. 2751.
Plane gage, Fig. 2751.
Service metal gage, Fig. 2752.

19. BRANDING.—Wheels shall be stamped with date, heat number, maker's serial number and brand, also purchaser's name and serial number, if specified. The branding is to be done according to Fig. 2753.

20. INSPECTION.—The inspector representing the purchaser shall have free entry at all times, while his contract is being executed, to all portions of the manufacturer's plant. All reasonable facilities and necessary gages shall be afforded the inspector by the manufacturer to satisfy him that the wheels are being furnished in accordance with the specifications. All tests and inspection shall be made at the place of manufacture prior to shipment and free of cost to the purchaser. The purchaser shall have the right to make tests to govern the acceptance or rejection in their own test room or elsewhere as may be decided by the purchaser.

Samples of rejected material must be preserved at the laboratory of the purchaser for one month from date of test report. In case of dissatisfaction with the results of the tests, the manufacturer must make claim for a rehearing (should he desire to do so) within that time. Tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the mill.

Whistle (Signal Apparatus). Fig. 1385. An air whistle used with the train signal apparatus.

Whistle Reservoir. A small tank or reservoir to store air for operating a pneumatic signal whistle on electric motor cars.

Whitworth Gages. See CYLINDRICAL GAGES.

Wide Gage. In a general usage, the distance between the heads of the rails of a railroad when it is slightly greater than 4 ft. 8½ in., in distinction from BROAD GAGE, which means a material increase, as to 5 ft. or 6 ft.

Wide Vestibule. The modern vestibule extends the full width of the car. The first vestibule extended over the platform proper (or the width of the end door) only. When the present-used vestibules began to be used they were commonly termed wide vestibules and the older type narrow vestibule. See VESTIBULE.

Wind Guard (Pintsch Gas Lighting System). A perforated brass disc, fitting in globe holder below the opal globe, and supplied with a small covered hole for admitting a match or taper when lighting the gas. Its purpose is, as indicated by its name, to protect the flame from the action of drafts from below the globe.

Wind Scoop. See VENTILATING JACK.

Winding Gear (Pile Driver). Consists of spools and a spur gear of the ordinary form controlled by a strap brake and treadle, so that on the release of the brake the shears attached to the hammer rope will descend by their own weight and engage with the hammer eye.

Winding Shaft (Drop Doors of Coal Cars, etc.). 70, Fig. 320. An iron bar supported by winding shaft plates or bearings, around which the drop door chain or hopper chain is wound. It carries a ratchet wheel and is usually formed with a square end for applying a wrench or handle to turn it. See DOOR OPERATING GEAR.

Winding Shaft Plate. A plate which acts as a bearing for the winding shaft. See WINDING SHAFT.

Winding Shaft Ratchet Wheel and Pawl. 66, 67, Fig. 320. The ratchet wheel and pawl attached to the end of the winding shaft to prevent its turning and allowing the doors to drop.

Window. Figs. 399, 400, 416, 1450, 1729, 1826. An opening for the admission of light and of air when necessary. It has a frame on the sides, in which are set movable sashes containing panes of glass. Hence the window itself, especially in compound words, is often termed simply the sash. In Great Britain carriage windows are technically termed lights. Car windows are now generally made of uniform size throughout. In sleeping and parlor cars double windows are almost always used to inclose an air space between them and prevent radiation of heat and drafts. See also SASH.

Window Balance. Fig. 1740. A device in which a spring is used instead of a weight to counterbalance the weight of the sash and glass. See SASH BALANCE.

Window Blind. A wooden screen composed of a frame called the sash, carrying slats, placed in a window to exclude sunshine. Window shades have nearly displaced blinds in first-class passenger cars, blinds being seldom used except in the saloon or lavatory.

Window Blind Bolt. Fig. 1789. A bolt used for holding a window blind in any desired position. It enters a window blind bolt bushing or plate.

Window Blind Lift. Fig. 1785. Commonly called simply blind lift or blind pull. A metal hook fastened to the blind for raising and lowering it, usually attached to the bottom rail, but in street car blinds, which are lowered below the window, to the top rail.

Window Blind Mullion. An upright bar in the center of a window blind sash.

Window Blind Pull. See WINDOW BLIND LIFT.

Window Blind Rest. A wooden strip to fill up the lower part of the groove in which an upper window blind slides, and on which it rests when down.

Window Blind Sash. The frame in which the inclined thin slats of a window blind are held.

Window Blind Slat. See WINDOW BLIND.

Window Blind Spring. A SASH SPRING.

Window Blind Stile. An upright bar in a window blind sash.

Window Blind Stop. An INSIDE WINDOW STOP.

Window Casing. 7, Fig. 1450. A frame which incloses or surrounds a window.

Window Casing Molding or **Window Cap Molding.** 20, Fig. 1450. A molding above a window casing.

Window Cove Molding. Fig. 1450. A small concave molding around the sides and top of a window on the inside of a passenger car.

Window Curtain. A cloth or some kind of textile material loosely hung over a window to exclude sunshine, and which can be spread or drawn aside at pleasure. Curtains of this kind are now little used. See WINDOW SHADE.

Window Curtain Bracket. More commonly simply curtain brackets, for supporting window shade rollers. A more correct term would be shade or window shade brackets, but in common usage, curtain brackets support shade rollers.

Window Curtain Rings. Fig. 1589. Rings for supporting the curtain from the curtain rod.

Window Curtain Roller. More properly, a SHADE or WINDOW SHADE ROLLER.

Window Deflector Ventilator. See DUST DEFLECTOR and VENTILATOR.

Window Dust Guard or **Deflector.** See DUST DEFLECTOR.

Window Fastener. A SASH LOCK.

Window Frame. Fig. 495. A frame set into the side, end or roof of a car, into which the window sash fits.

Window Glass. 6, Fig. 1450. Panes of glass used for windows.

Window Guards. Small rods to act as fenders for the end windows.

(Postal Cars). Fig. 1715. Metal rods are used on the outside and wooden rods on the inside of all postal car windows.

Window Head. Fig. 495. A steel plate placed across the top of a window opening or a series of window openings.

Window Latch. A SASH LOCK.

Window Lift. See SASH LIFT.

Window Lintel. 90, Figs. 423-425. A horizontal strip on the outside of a passenger equipment car between the posts and over the window openings.

Window Molding. (Passenger Car Interiors). A molding used around, or on each side of, a window, particularly to cover the joint between the panel and post. It sometimes forms a groove in which a window or window blind slides, in place of the inside window stop.

Window Molding Base. An ornament made of wood or metal attached to the lower end of a window molding.

Window Molding Joint Cover. A piece of metal or wood used to cover the joints of window moldings where two pieces join each other.

Window Panel. 35, Fig. 1450. A panel between windows.

Window Panel Furring. Horizontal distance pieces between the window posts to which the panel is fastened.

Window Post (Passenger Equipment Cars). 58, Figs. 423-425. A side post located between windows, sometimes extending only from the belt rail to the side plate and sometimes the entire way between the side sill and side plate.

Window Protection Rod or Bar. See WINDOW GUARDS.

Window Rod Bracket. Figs. 1856, 1853, 1854.

Window Rod Bushing. A support for the ends of a curtain rod.

Window Sash. Figs. 1730-1806. The frame which holds the glass of a window.

Window Sash Balance. See SASH BALANCE.

Window Sash Holder. See SASH LOCK.

Window Sash Lock. See SASH LOCK.

Window Sash Lift. See SASH LIFT.

Window Sash Rail. 12, Fig. 1450. A horizontal bar in a window sash.

Window Sash Spring. See SASH SPRING.

Window Shade. 13, 14, and 15, Fig. 1450; Figs. 1808-1817. A window curtain, which is wound on a roller above the window, in distinction from one which is drawn aside. In passenger cars window blinds have been superseded by shades. An automatic shade roller is always used, the old-fashioned pulleys and cord tighteners being practically obsolete.

Window Shade Bracket. Figs. 1815-1817. One bracket has a circular hole and the other a rectangular one.

Window Shade Roller. Fig. 1818, etc. The cylinder on which the shade is rolled up, containing within it the springs which actuate it.

Window Shade Stop. 19, Fig. 1450. That part of a shade holder which engages with or bears against the window casing and holds the shade.

Window Shade Thumb Latch. 15, Fig. 1450. Usually a pair of short bars which, when pinched together with the thumb and finger, release the mechanism which locks the shade in a stationary position, permitting it to be raised and lowered.

Window Sill. 40, Fig. 383; 5, Fig. 1450. A horizontal piece of wood or metal under a window, on which the sash rests when down.

Window Sill Cornice Board. An ornamental strip placed on the inside of a passenger car under the window sill.

Window Sill Molding. A small wooden molding under an inside window sill. In modern cars it is usually a belt molding.

Window Spring. See Sash Spring.

Window Stile. 11, Fig. 1450. The upright bars of a window sash.

Window Stop. 16, Fig. 1450; Fig. 1769. The strips, or beads, attached to the window posts which hold the sash in place.

Window Ventilator. See Dust Deflector, Ventilator.

Wing Elevator Snow Plow. Fig. 227. See Snow Plow.

Wire Gauze (for Ventilator). A fine netting made of wire, with which the outside of deck windows and ventilator openings is covered to prevent the admission of cinders.

Wiring Diagram (Electric Motor Cars). Fig. 2551. Used for AC-DC operation on the New Haven. See Fig. 2560 for wiring of unit switch control, and Fig. 2591 for wiring of two series-parallel controllers and four motors.

Wood Screw. A small cylindrical bar of iron or steel with a wood screw thread cut on it and a slotted head so that it can be turned with a screw driver. A lag screw is a heavy type of wood screw. It has a square, instead of a slotted head. See Screw.

Wood Screw Thread. A form of screw thread used for screws which are intended to screw into wooden objects. It differs from a metal thread in having the spaces between the projections wider.

Worm. A helix, like a screw thread, for winding a rope or a chain upon or for driving a spur wheel.

Worn Couplers, Gage for. See Automatic Car Coupler.

Worn Flat (Car Wheels). Under the rules for the interchange of traffic this defect is defined to be irregular wear under fair usage, due to unequal hardness of the tread of the wheel, and to be carefully distinguished from slid flat, which is a defect produced by the slipping of the wheels from excessive brake pressure. See Wheels and Interchange of Traffic.

Wreck Chain. Figs. 2659, 2662, 2665, 2670, etc. A chain used for hauling and lifting purposes at wrecks.

Wreck Chain Repair Link. Fig. 2659. A device for making quick temporary repairs to a broken chain.

Wreck Train Equipment. Figs. 2644-74 and Pages 886, 887 and 888. The cars and tools used in clearing wrecks. The train usually consists of a steam wreck crane, a bunk or sleeping car, a kitchen and dining car, cars for carrying spare trucks, and cars for carrying tools and blocking.

Wrecking Crane or **Wreck Crane.** Figs. 210-212. A powerful crane mounted on trucks and operated usually by steam but in some cases by electricity, for use in clearing up wrecks.

Wrecking Frog. Figs. 2648, 2650. A Car Replacer.

Wrecking Hook. Figs. 644, 2655. A hook which can be attached to an automatic coupler and will allow a chain to be used in pulling the car.

Wrench. A contrivance for screwing and unscrewing a nut. A monkey wrench is adjustable to take nuts of various sizes. A socket wrench is one having a cubical cavity to receive a square end. A Spanner is a wrench for use on round or many-sided nuts, like hose couplings, to which lugs or slots are added for engaging with the wrench.

Wrought Steel Wheels, Specifications for. See Wheels, Wrought Steel, Specifications for.

Y

Yale Lock. Fig. 1659. Named after its inventor. It has pin tumblers instead of lever tumblers or other style of lock. The key does not engage the bolt as in other locks, but the bolt is engaged by a cam attached to the rear of the lock, which in turn is actuated by the key. The key is bitted on its upper edge to engage with pin tumblers contained in the cylinder. The original flat key has been superseded by the corrugated and the paracentric forms. The key raises the pin tumblers to the proper height and is then able to rotate the plug in the cylinder, thus to actuate the lock. Advantages of the Yale lock are its compactness, simplicity, security, small size of key and unequaled capacity for key changes. It is made in a great variety of forms adapted to all uses.

Yoke. A pocket strap, U-shaped, which contains the spring and follower plates of a drawbar. It is the means of attaching the drawbar to the draft gear. See Automatic Car Couplers (Miscellaneous M. C. B. Standards), and Coupler Yoke.

ILLUSTRATED SECTION

A synopsis or index of the Illustrated Section is hardly necessary because the items in the Dictionary contain exact references to the illustrations and afford a ready means of referring to them. Roughly, the Illustrated Section is arranged as follows: General photographs of freight and passenger train cars; floor plans of passenger train cars; general drawings of freight and passenger train cars; underframe and framing details for both classes; couplers, draft gear and all exterior parts of the body; trucks and air brakes; interior details; car heating and lighting; motor cars; wrecking equipment and Master Car Builders' standards.

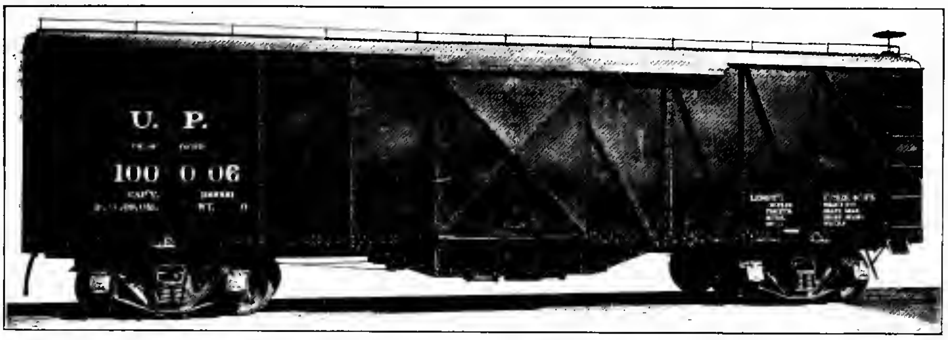


Fig. 1—All-Steel 50-Ton Capacity Box Car. Weight, 37,400 lbs.; Inside Length, 40 ft.; Inside Width, 8 ft. 10⅛ in.; Inside Height, 8 ft. 2 in. Builder, Union Pacific Railroad Company.

(See Figs. 261 and 262 for General Drawings.)

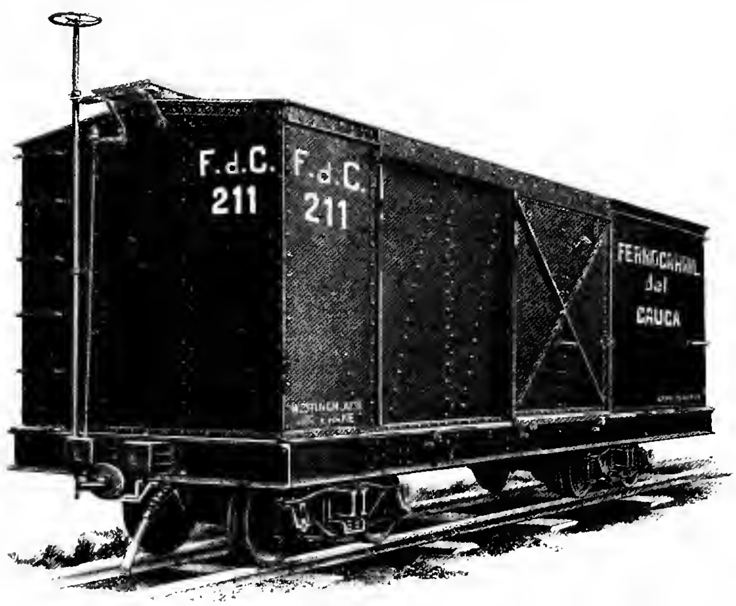


Fig. 2—All-Steel 15-Ton Capacity Box Car. Weight, 20,000 lbs.; Inside Length, 25 ft.; Inside Width, 7 ft. 7 in.; Inside Height, 6 ft. 9 in. Builder, The Gregg Co., Limited.

Fig. 3—All-Steel 50-Ton Capacity Box Car. Weight, 39,000 lbs.; Inside Length, 36 ft.; Inside Width, 9 ft. 6 in.; Inside Height, 8 ft. Builder, Summers Steel Car Co.

(See Figs. 263-266 for General Drawings of Similar Car.)

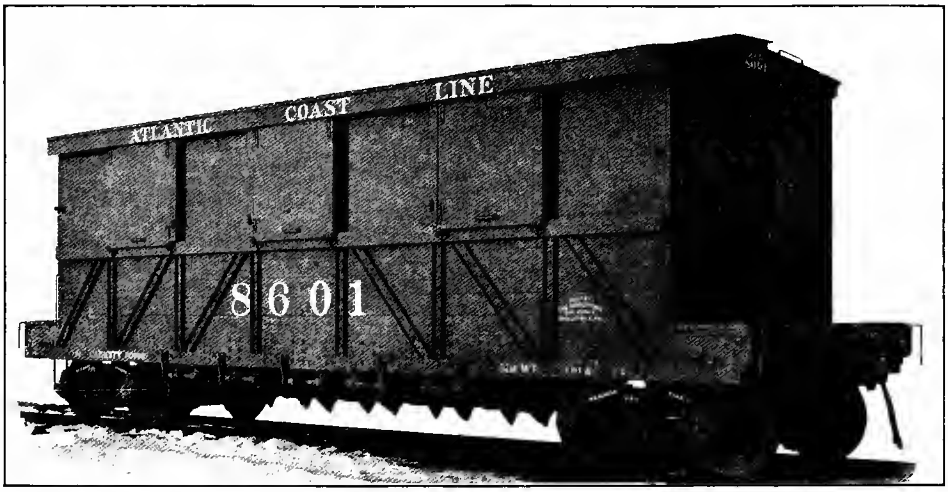


Fig. 4—Steel Frame 40-Ton Capacity Phosphate Box Car. Weight, 46,000 lbs.; Inside Length, 31 ft. 9⅜ in.; Inside Width, 8 ft. 8 in.; Inside Height, 10 ft. 3 in. Builder, Middletown Car Co.

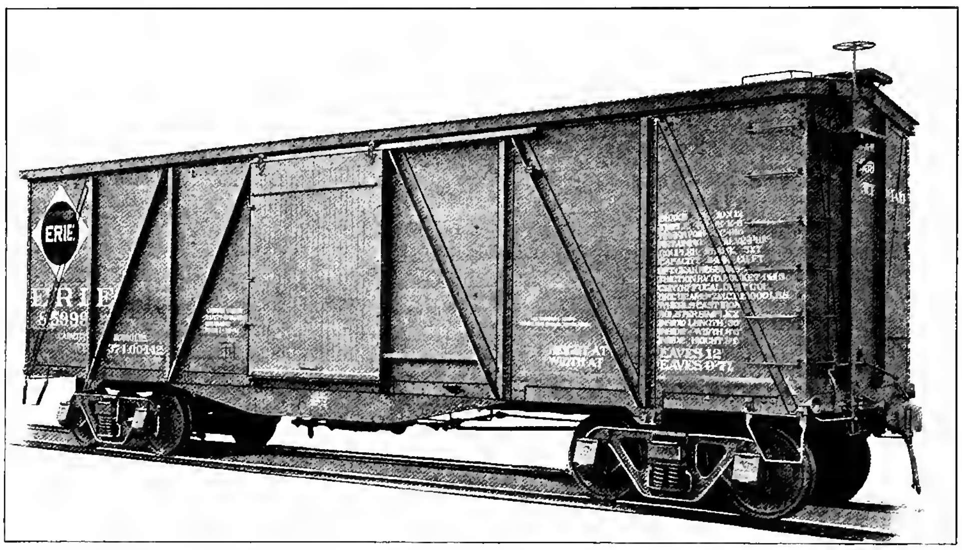


Fig. 5—Steel Frame 40-Ton Capacity Box Car. Weight, 37,100 lbs.; Inside Length, 36 ft.; Inside Width, 8 ft. 6 in.; Inside Height, 8 ft. Builder, American Car & Foundry Co.

Fig. 6—Steel Frame 40-Ton Capacity Box Car, Fowler Patents. Weight, 36,400 lbs.; Inside Length, 36 ft.; Inside Width, 8 ft. 6½ in.; Inside Height, 8 ft. 0½ in. Builder, Canadian Car & Foundry Co.

(See Figs. 267 and 268 for General Drawings.)

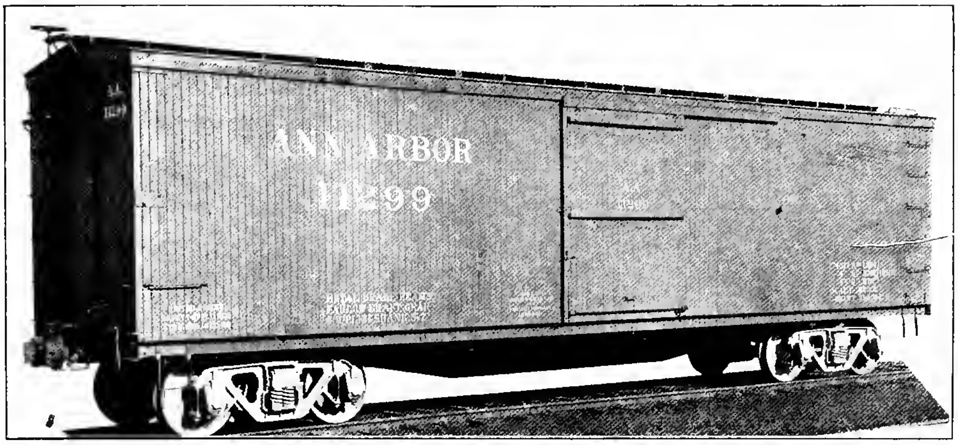


Fig. 7—Steel Underframe 40-Ton Capacity Box Car. Weight, 39,400 lbs.; Inside Length, 40 ft.; Inside Width, 8 ft. 6 in.; Inside Height, 8 ft. 8 in. Builder, Western Steel Car & Foundry Co.

(See Fig. 273 for General Drawings.)

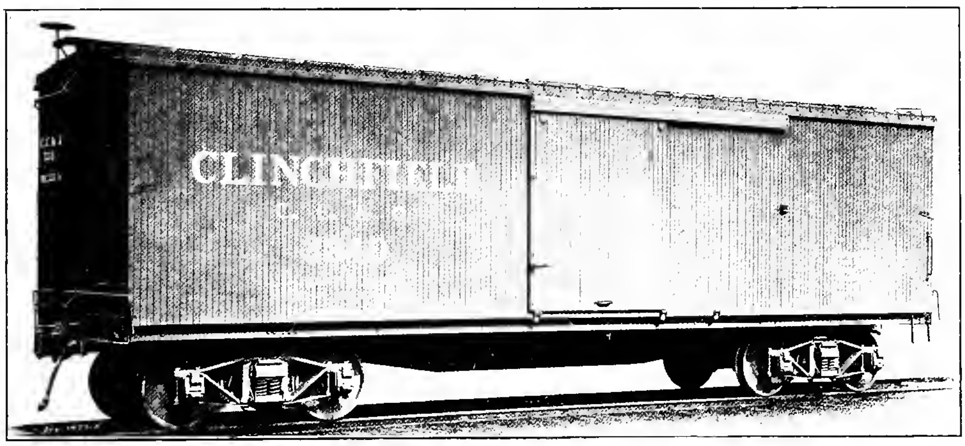


Fig. 8—Steel Underframe 30-Ton Capacity Box Car. Weight, 35,700 lbs.; Inside Length, 36 ft.; Inside Width, 8 ft. 6 in.; Inside Height, 8 ft. Builder, Pressed Steel Car Co.

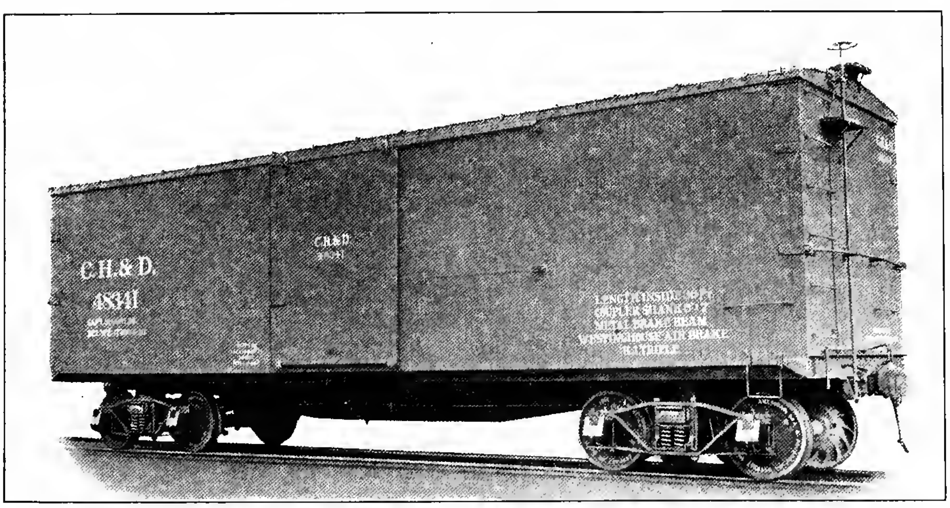


Fig. 9—Steel Underframe 40-Ton Capacity Box Car. Weight, 37,300 lbs.; Inside Length, 36 ft.; Inside Width, 8 ft. 6 in.; Inside Height, 8 ft. Builder, American Car & Foundry Co.

(See Figs. 280 and 281 for General Drawings.)

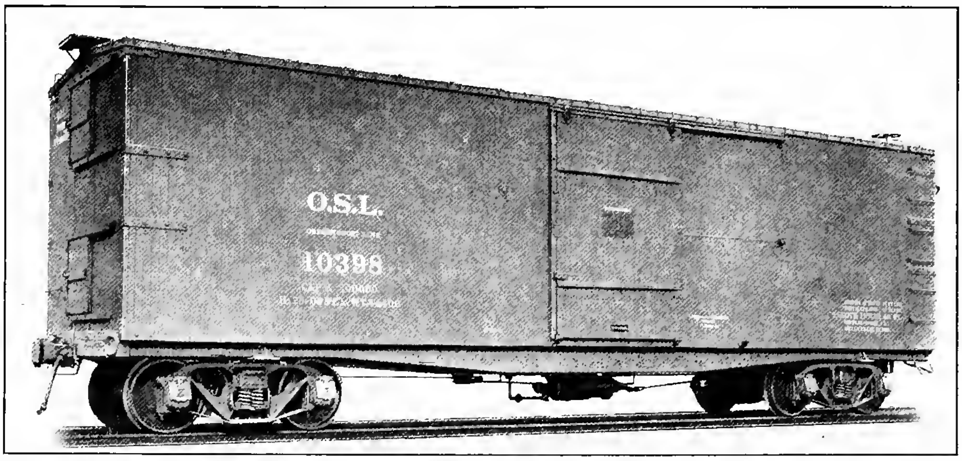


Fig. 10—Steel Underframe 50-Ton Capacity Box Car. Weight, 44,400 lbs.; Inside Length, 40 ft.; Inside Width, 9 ft. 2 in.; Inside Height, 9 ft. 2¼ in. Builder, American Car & Foundry Co.

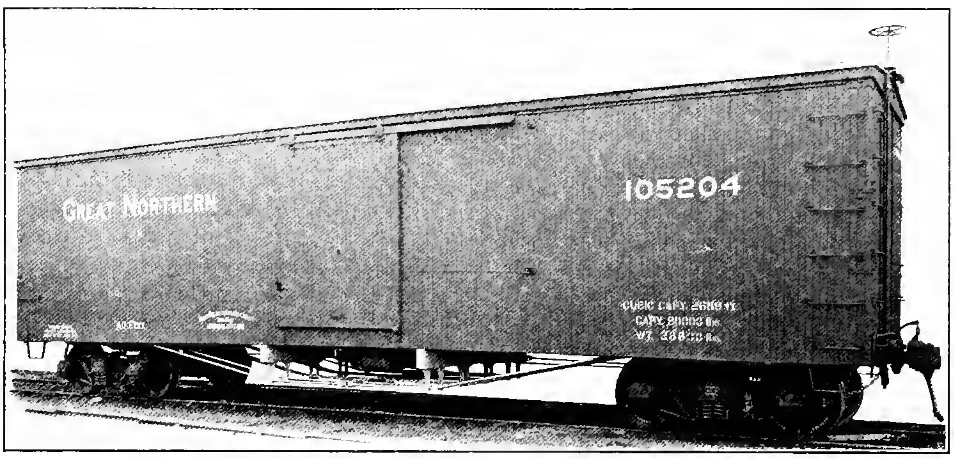


Fig. 11—Wooden 40-Ton Capacity Box Car with Steel Center Sills. Weight, 36,600 lbs.; Inside Length, 40 ft.; Inside Width, 8 ft. 7 in.; Inside Height, 7 ft. 9½ in. Builder Haskell & Barker Car Co.

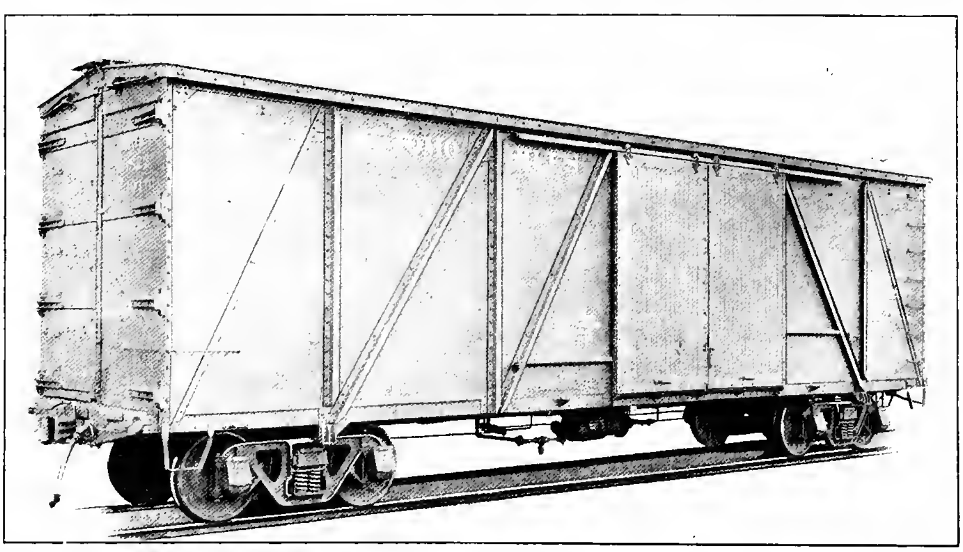


Fig. 12—Steel Frame 40-Ton Capacity Box Car for Automobile Traffic. Weight, 39,100 lbs.; Inside Length, 40 ft. 6 in.; Inside Width, 8 ft. 6 in.; Inside Height, 9 ft. 3 in. Builder, American Car & Foundry Co.

(See Fig. 272 for General Drawings.)

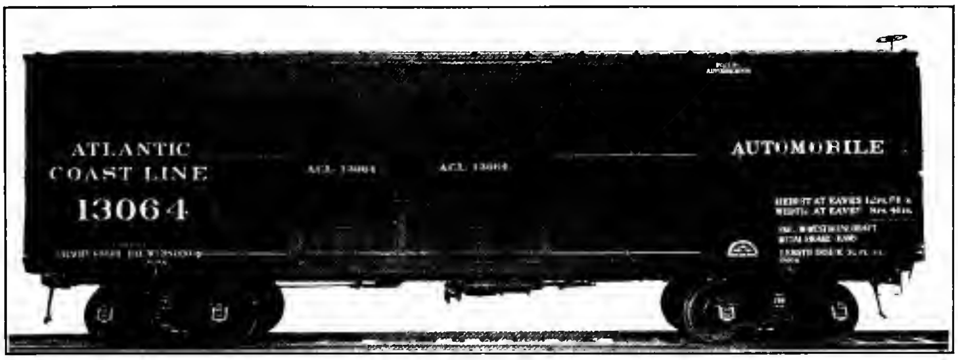


Fig. 13—Steel Underframe 30-Ton Capacity Box Car for Automobile Traffic. Weight, 38,000 lbs.; Inside Length, 36 ft.; Inside Width, 8 ft. 6 in.; Inside Height, 8 ft. Builder, The Barney & Smith Car Co.

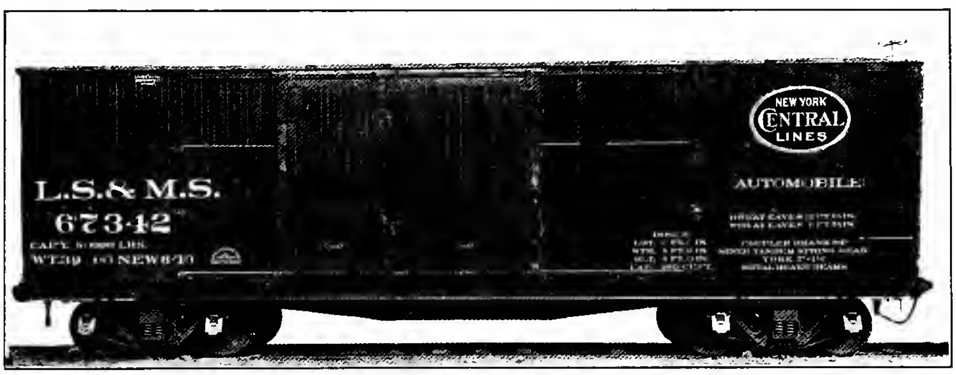


Fig. 14—Steel Underframe 40-Ton Capacity Box Car for Automobile Traffic. Weight, 39,000 lbs.; Inside Length 36 ft.; Inside Width, 8 ft. 6 in.; Inside Height, 8 ft. 6½ in. Builder, The Barney & Smith Car Co.

Fig. 15—Steel Underframe 40-Ton Capacity Box Car for Automobile Traffic. Weight, 41,400 lbs.; Inside Length, 40 ft.; Inside Width, 8 ft. 6 in.; Inside Height, 8 ft. Builder, Haskell & Barker Car Co.

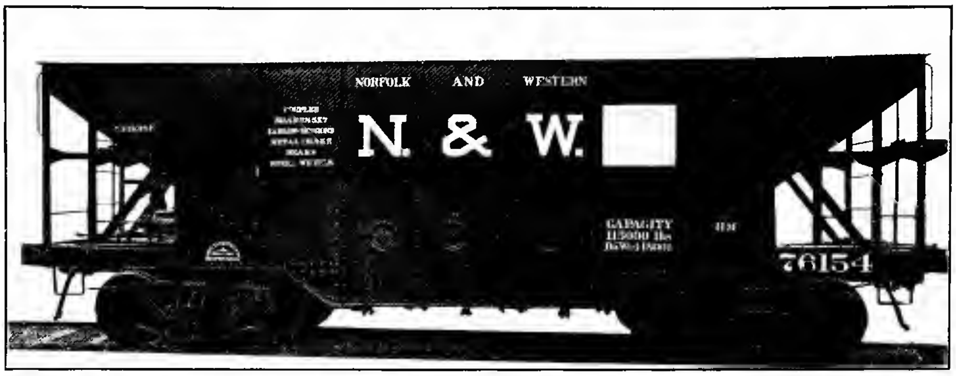


Fig. 16—All-Steel 57½-Ton Capacity Hopper Car. Weight, 41,800 lbs.; Inside Length, 30 ft. 0½ in.; Inside Width, 9 ft. 2 in. Capacity Level Full, Cubic Feet, 1,590. Builder, The Barney & Smith Car Co.

(*See Figs. 290-292 for General Drawings.*)

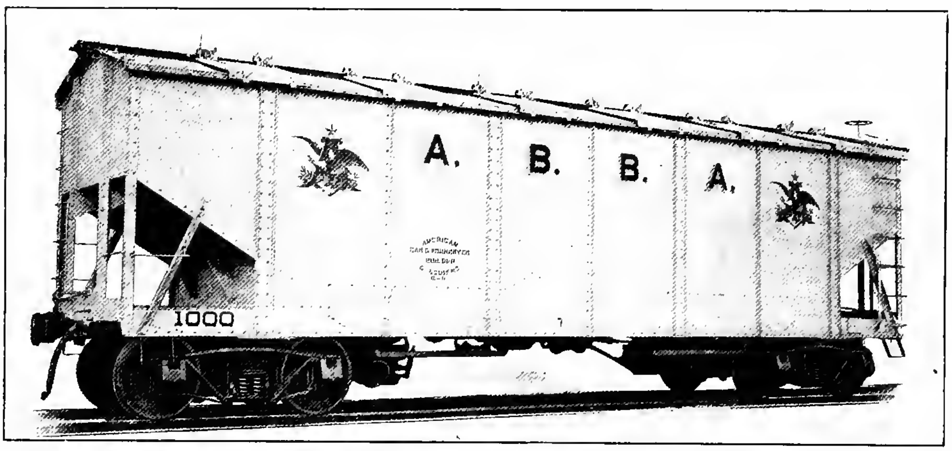


Fig. 17—All-Steel 50-Ton Capacity Covered Hopper Car for Brewery Products. Weight, 43,500 lbs.; Inside Length, 36 ft.; Inside Width, 8 ft. 6 in. Builder, American Car & Foundry Co.

(*See Figs. 293 and 295 for General Drawings.*)

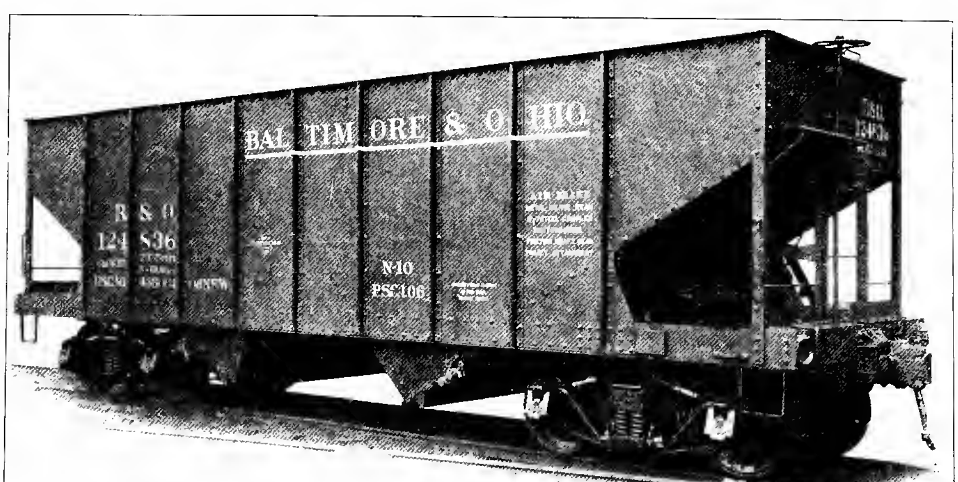


Fig. 18—All-Steel 50-Ton Capacity Hopper Car. Weight, 43,600 lbs.; Inside Length, 31 ft. 6 in.; Inside Width, 9 ft. 4 in. Capacity Level Full, Cubic Feet, 1,790. Builder, Pressed Steel Car Co.

Fig. 19—All-Steel 50-Ton Capacity Hopper Car for Phosphate Traffic. Weight, 42,000 lbs.; Inside Length, 34 ft.; Inside Width, 9 ft. $1\frac{5}{8}$ in; Length Over End Sills, 37 ft. 2 in.; Height, Rail to Top of Body, 9 ft. $8\frac{3}{4}$ in.; Extreme Height, 11 ft. $1\frac{1}{4}$ in. Capacity Level Full, Cubic Feet, 1,615. Builder, The Barney & Smith Car Co.

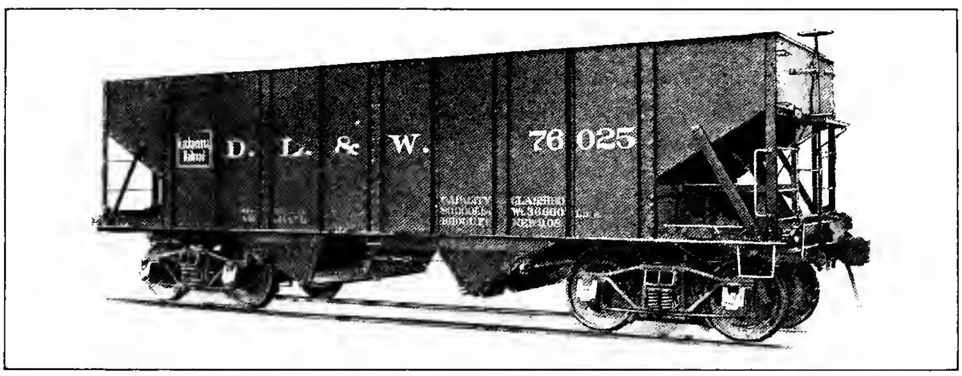


Fig. 20—All-Steel 40-Ton Capacity Hopper Car. Weight, 36,600 lbs.; Inside Length, 30 ft. $0\frac{1}{4}$ in.; Inside Width, 9 ft. $5\frac{1}{2}$ in.; Length Over End Sills, 30 ft. 6 in.; Height, Rail to Top of Body, 9 ft. 10 in.; Extreme Height, 10 ft. $3\frac{1}{2}$ in. Capacity Level Full, Cubic Feet, 1,610. Builder, American Car & Foundry Co.

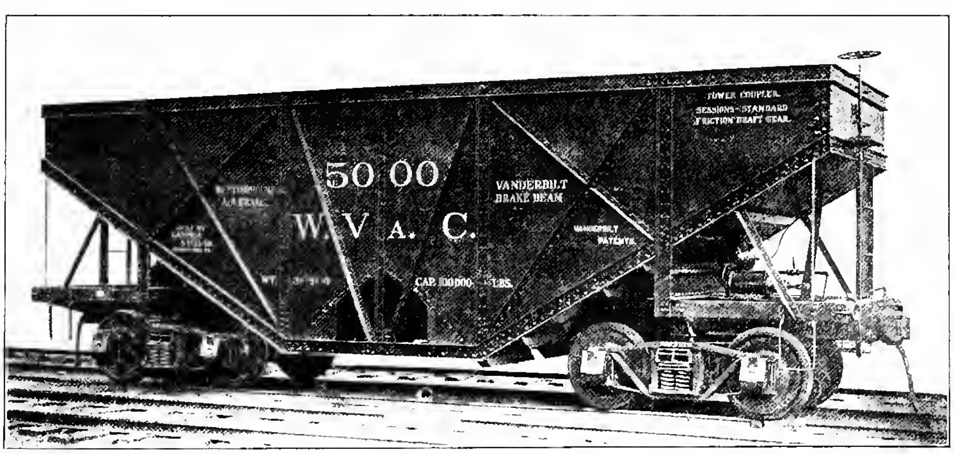


Fig. 21—All-Steel 50-Ton Capacity Hopper Car. Weight, 36,800 lbs.; Inside Length, 30 ft.; Inside Width, 8 ft. 9 in.; Length Over End Sills, 33 ft. 3 in.; Height, Rail to Top of Body, 10 ft. 8 in.; Extreme Height, 11 ft. 4 in. Capacity Level Full, Cubic Feet, 1,858. Builder, Cambria Steel Co.

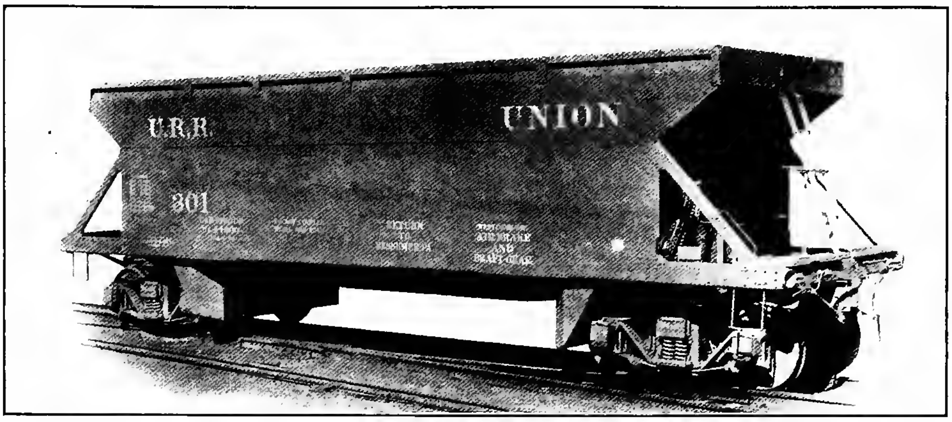


Fig. 22—All-Steel 50-Ton Capacity Hopper Car. Weight, 44,000 lbs.; Inside Length, 32 ft.; Inside Width, 10 ft. Capacity Level Full, Cubic Feet, 1,450. Builder, Summers Steel Car Co.

(See Fig. 299 for General Drawings.)

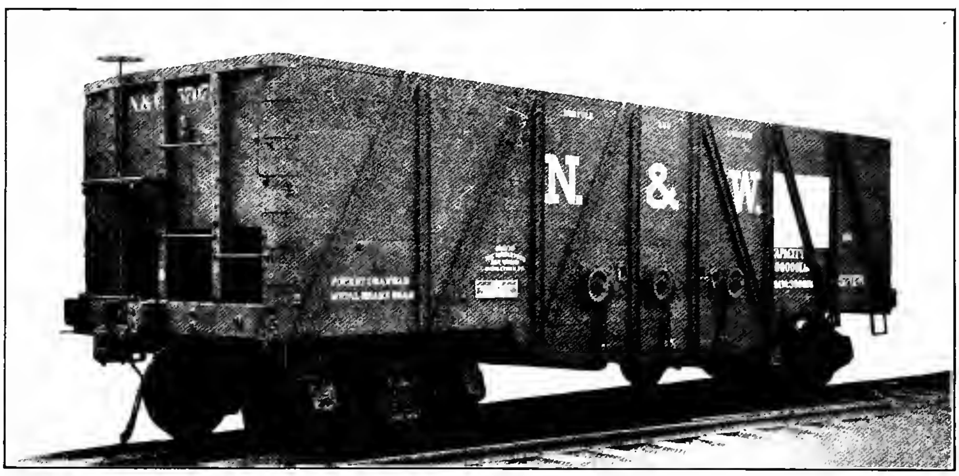


Fig. 23—Steel-Frame 50-Ton Capacity Hopper Car. Weight, 38,600 lbs.; Inside Length, 30 ft. 9 in.; Inside Width, 8 ft. 9½ in. Capacity Level Full Cubic Feet, 1,595. Builder, Middletown Car Co.

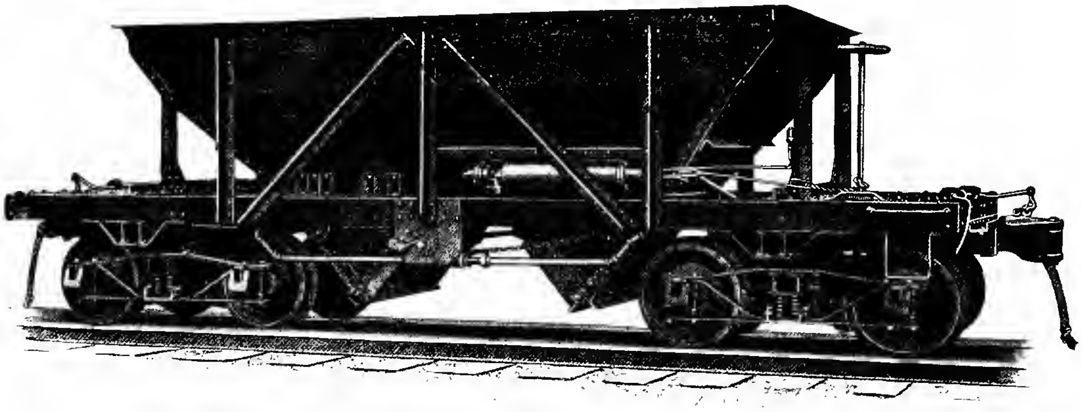


Fig. 24—All-Steel 10-Ton Capacity Twin-Hopper Car. Weight, 14,800 lbs.; Inside Length, 13 ft.; Inside Width, 6 ft. 6 in. Capacity Cubic Feet, 225. Builder, The Kilbourne & Jacobs Mfg. Co.

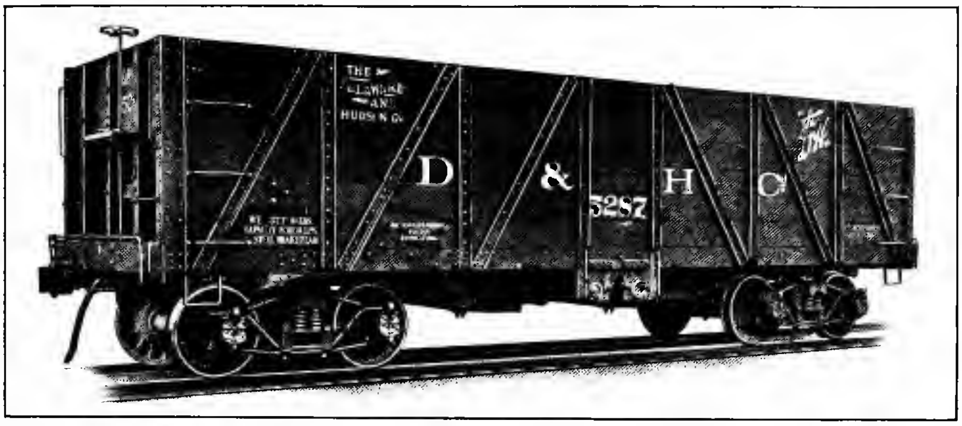


Fig. 25—Steel-Frame 42½-Ton Capacity Hopper Car. Weight, 37,700 lbs.; Inside Length, 32 ft.; Inside Width, 8 ft. 11 in. Capacity Level Full, Cubic Feet, 1,450. Builder, American Car & Foundry Co.

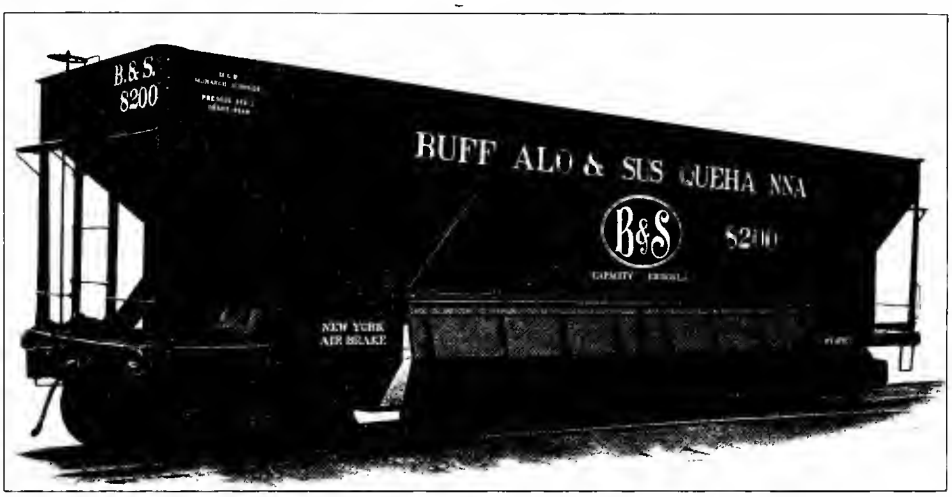


Fig. 26—All-Steel 50-Ton Capacity Hopper Car for Coke Traffic. Weight, 47,500 lbs.; Inside Length, 40 ft. 5 in.; Inside Width, 9 ft. 7 in. Builder, Pressed Steel Car Co.

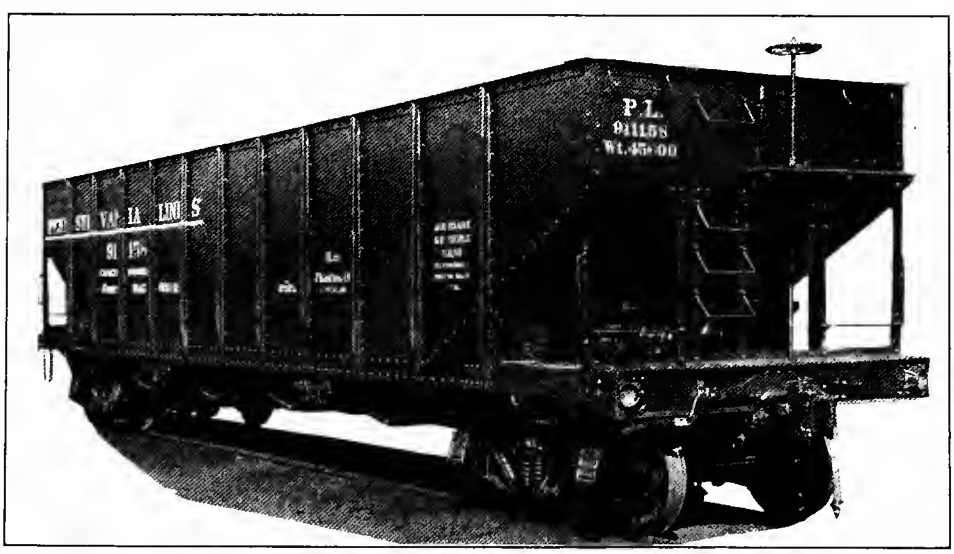


Fig. 27—All-Steel 50-Ton Capacity Hopper Car for Coke Traffic. Weight, 45,600 lbs.; Inside Length, 40 ft. 2 in.; Inside Width, 9 ft. 6 in. Capacity Level Full, Cubic Feet, 2,508. Builder, Cambria Steel Co.

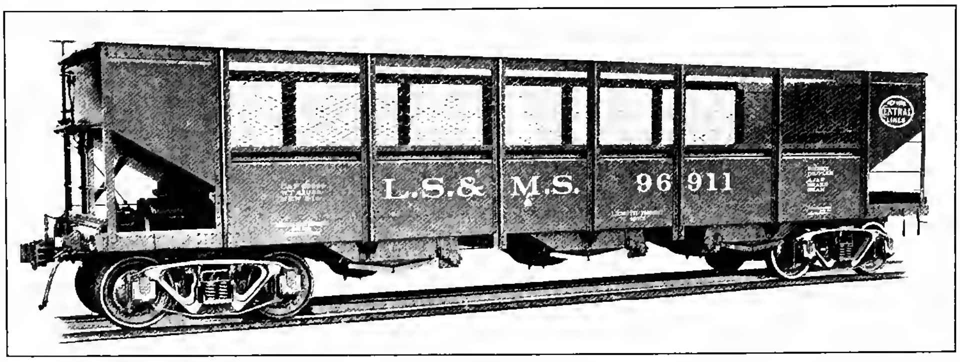


Fig. 28—All-Steel 40-Ton Capacity Hopper Car for Coke Traffic. Weight, 41,000 lbs.; Inside Length, 40 ft. $2\frac{1}{4}$ in.; Inside Width, 9 ft. 5 in. Builder, American Car & Foundry Co.

(See Figs. 294 and 296 for General Drawings.)

Fig. 29—All-Steel 50-Ton Capacity Hopper Car for Coke Traffic. Weight, 46,700 lbs.; Inside Length, 40 ft. $1\frac{7}{8}$ in.; Inside Width, 9 ft. 6 in. Capacity Level Full, Cubic Feet, 2,683. Builder, Cambria Steel Co.

(See Fig. 297 for General Drawings.)

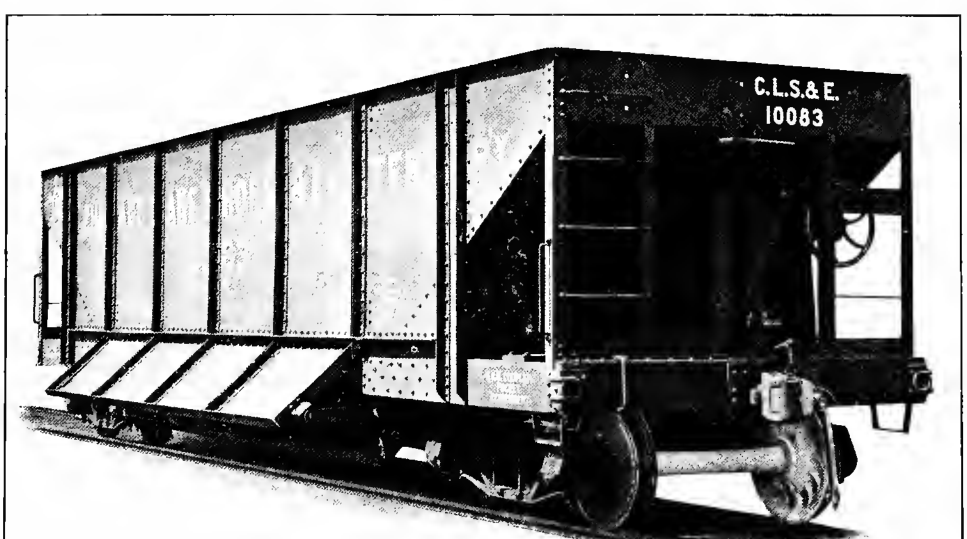


Fig. 30—All-Steel 50-Ton Capacity Hopper Car for Coke Traffic. Weight, 47,600 lbs.; Inside Length, 38 ft. $6\frac{1}{2}$ in.; Inside Width, 9 ft. $3\frac{1}{2}$ in. Capacity Level Full, Cubic Feet, 2,149. Builder, American Car & Foundry Co.

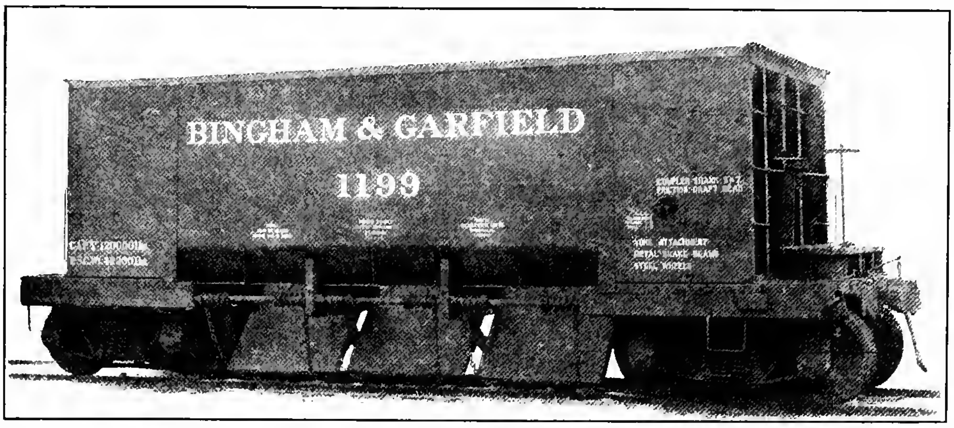


Fig. 31—All-Steel 60-Ton Capacity Ore Car. Weight, 42,300 lbs.; Inside Length, 23 ft. 10⅜ in.; Inside Width, 9 ft. 10 in.; Inside Height, 6 ft. 9½ in. Builder, Pressed Steel Car Co.

(See Fig. 310 for General Drawings.)

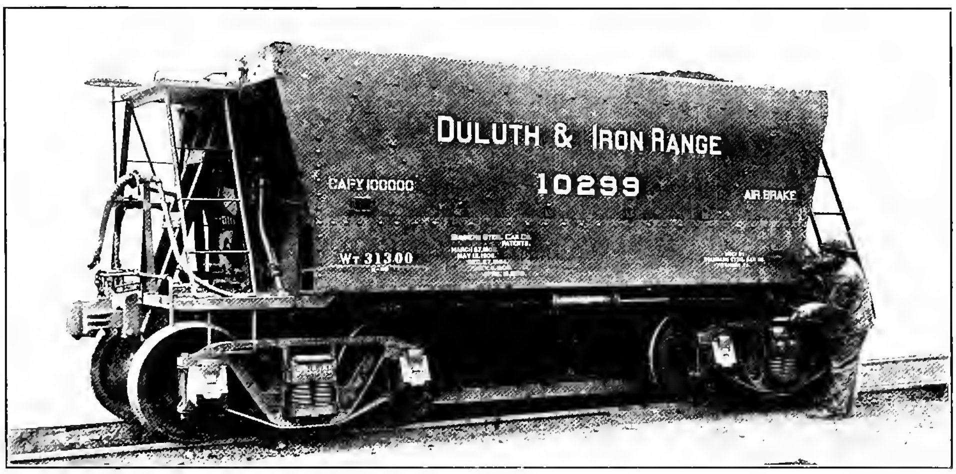


Fig. 32—All-Steel 50-Ton Capacity Ore Car. Weight, 31,300 lbs.; Inside Length, 16 ft. 11 in.; Inside Width, 8 ft. 6 in. Builder, Summers Steel Car Co.

(See Fig. 311 for General Drawings.)

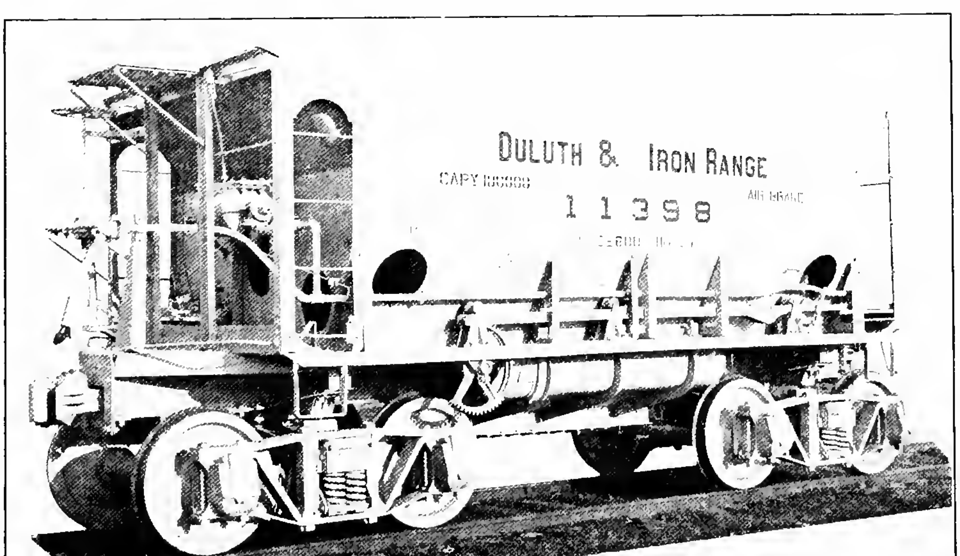


Fig. 33—All-Steel 50-Ton Capacity Ore Car. Weight, 32,600 lbs.; Inside Length, 17 ft. 1 in.; Inside Width, 8 ft. 6 in. Capacity Level Full, Cubic Feet, 650. Builder, Pressed Steel Car Co.

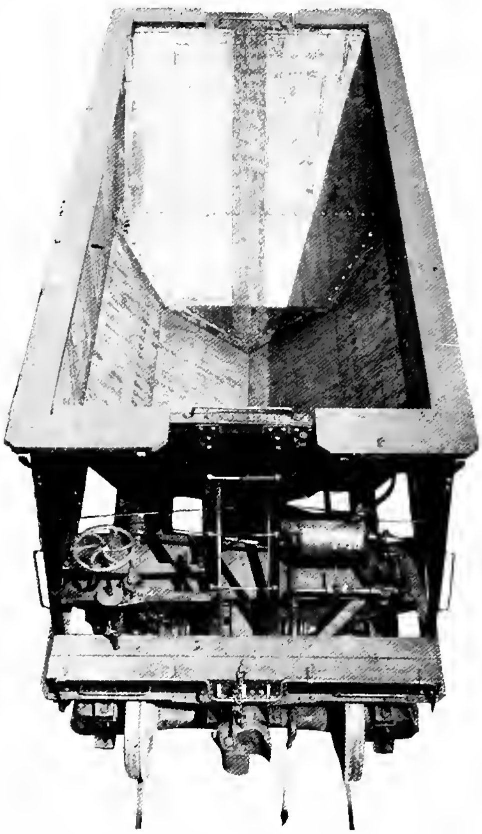


Fig. 34—All-Steel 50-Ton Capacity Ore Car. Weight, 32,000 lbs.; Inside Length, 18 ft. 10 in.; Inside Width, 8 ft. 6 in. Builder, National Dump Car Co.

(See Fig. 312 for General Drawings.)

Fig. 35—Hart Convertible Car with One-Half of Floor Raised, Showing Method of Converting from Side to Center Dump. The End Boards are Moved in so that the Inside Length of Car, When Used as a Center Dump, is the Length of the Raised Portion of Floor.

(See also Fig. 40.)

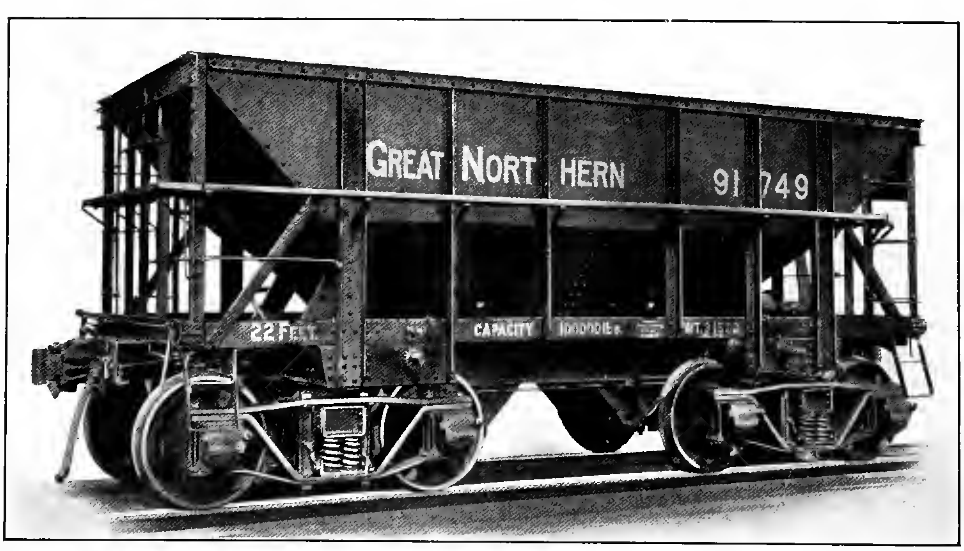


Fig. 36—All-Steel 50-Ton Capacity Ore Car. Weight, 31,500 lbs.; Inside Length, 20 ft. 2 in.; Inside Width, 7 ft. 10 in. Builder, American Car & Foundry Co.

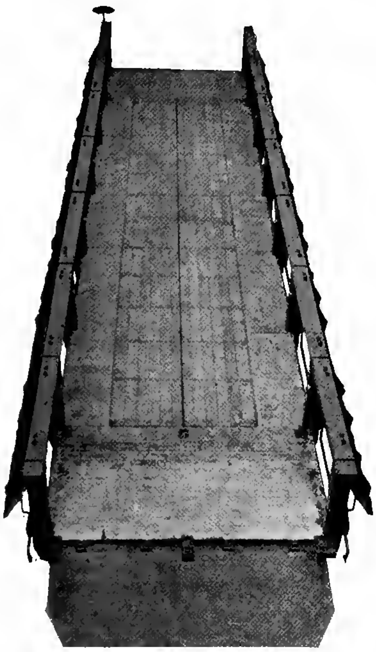


Fig. 37—Hart Convertible Car Arranged for Side Dumping with Ballast Plow.

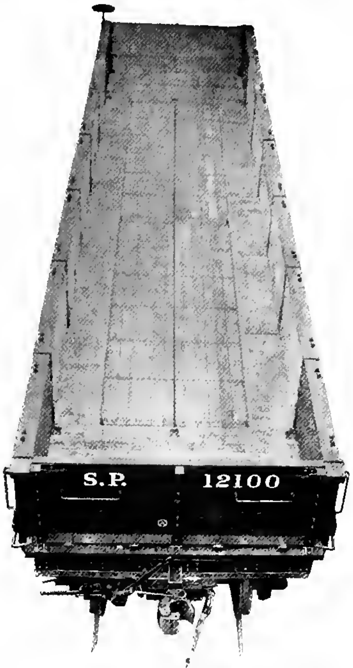


Fig. 38—Hart Convertible Car Arranged as Flat Bottom Gondola.

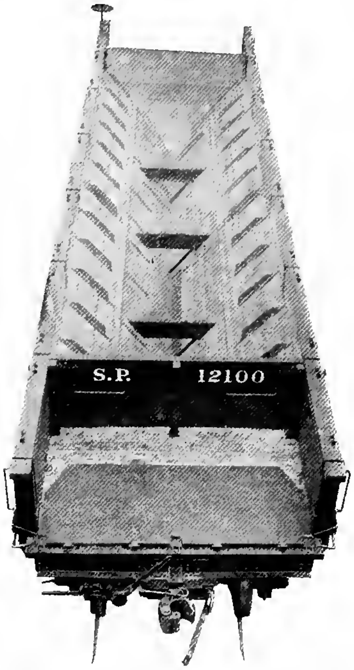


Fig. 39—Hart Convertible Car Arranged for Center Dumping.

When used for Side Dumping Ballast, the Sides, which are Hinged at the Top, may be Unlocked and Locked at the Bottom as Desired. The Steel Apron Shown in Fig. 37 is Hinged to the End Sill of the Car and Bridges the Space to the Next Car, Providing a Continuous Surface for the Plow. The Part of the Floor Shown as Raised in Fig. 39 is Hinged for this Purpose, and the Ends of the Car are Movable, as Shown. The Center Dump Hopper is Permanently Attached to the Car and the Doors are Operated Through a System of Winding Rods and Chains by the Lever Shown on the Left of the End Sill in Figs. 38 and 39. In the Latter the Apron is Shown Turned Back Out of the Way.

(*See also Fig.* 40.)

Fig. 40—Steel Underframe 50-Ton Capacity Hart Convertible Car. Weight, 41,800 lbs.; Inside Length (as Gondola), 40 ft.; Inside Width, 8 ft. 9 in.; Inside Height, 3 ft. 6 in. Builder, Rodger Ballast Car Co.

Fig. 41—All-Steel 50-Ton Capacity Drop-Bottom Gondola Car. Weight, 43,300 lbs.; Inside Length, 40 ft.; Inside Width, 9 ft. 6 in.; Inside Height, 4 ft. 3 in. Builder, National Dump Car Co.

(See Figs. 316 and 318 for General Drawings.)

Fig. 42—Drop-Bottom Gondola Car with Doors Open on One Side.

Fig. 43—Drop-Bottom Gondola Car with all Doors Open. Builder, National Dump Car Co.

(See also Fig. 41.)

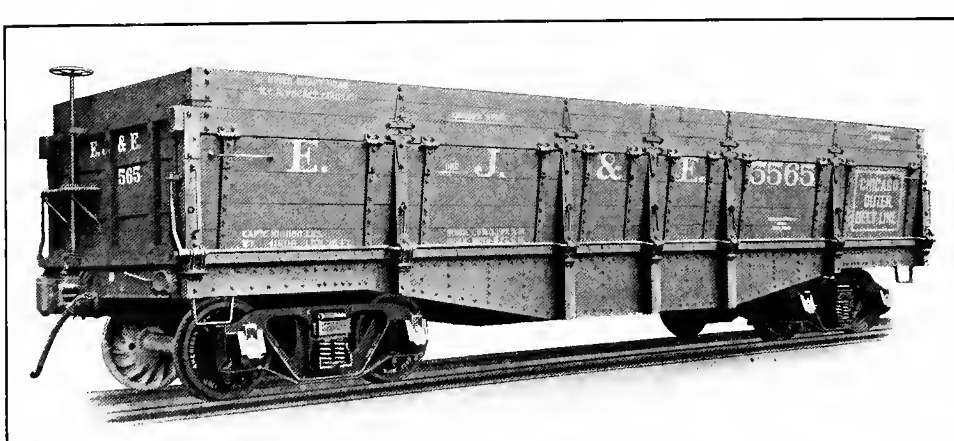


Fig. 44—Steel Underframe 50-Ton Capacity Side-Dump Gondola Car. Weight, 41,600 lbs.; Inside Length, 33 ft. 5 in.; Inside Width, 8 ft. 6 in.; Inside Height, 4 ft. 8 in. Builder, American Car & Foundry Co.

Fig. 45—Steel Underframe 50-Ton Capacity Drop-Bottom Gondola Car. Weight, 41,000 lbs.; Inside Length, 40 ft.; Inside Width, 9 ft. 3 in.; Inside Height, 4 ft. 1 in. Builder, Ralston Steel Car Co.

(See Figs. 317 and 319 for General Drawings.)

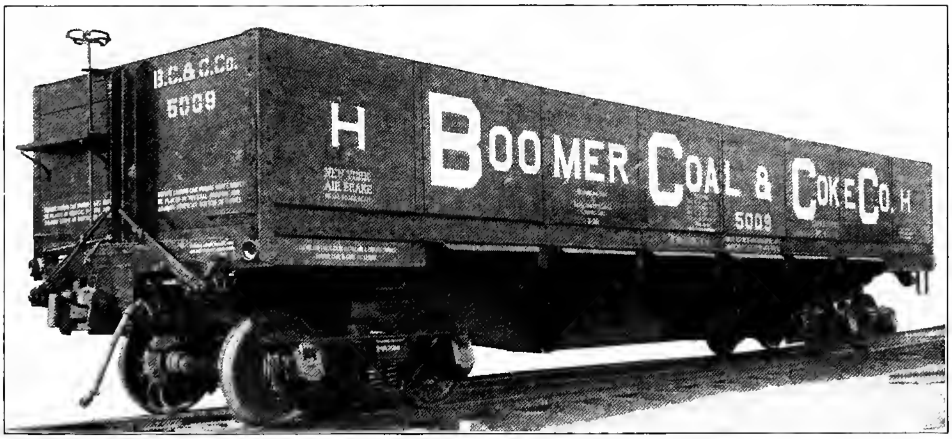


Fig. 46—Steel Underframe 50-Ton Capacity Drop-Bottom Gondola Car. Weight 41,000 lbs.; Inside Length, 40 ft.; Inside Width, 9 ft. 3 in.; Inside Height, 4 ft. 6 in. Builder, Ralston Steel Car Co.

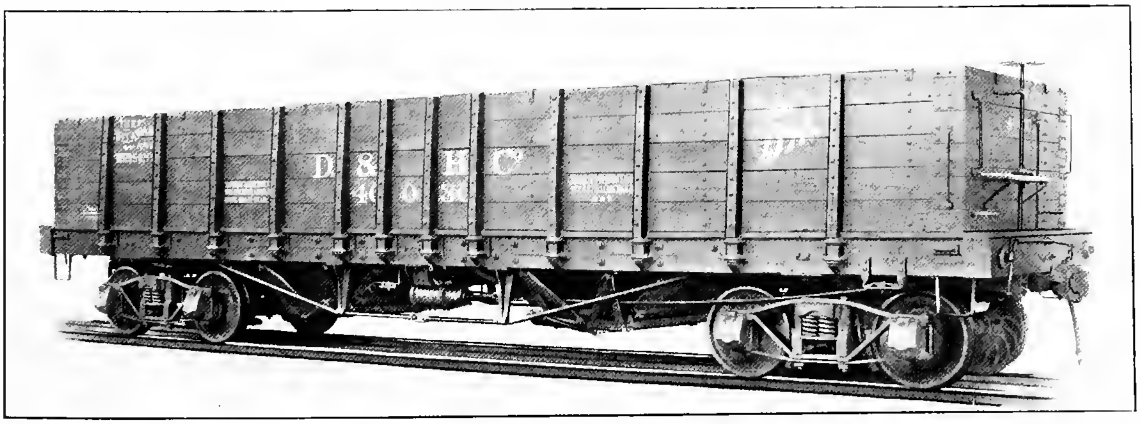


Fig. 47—Wooden 42½-Ton Capacity Hopper-Bottom Gondola Car. Weight, 40,700 lbs.; Inside Length, 36 ft.; Inside Width, 8 ft. 6½ in.; Inside Height, 4 ft. 3 in. Builder, American Car & Foundry Co.

Fig. 48—All-Steel 50-Ton Capacity Drop-Bottom Gondola Car. Weight, 43,200 lbs.; Inside Length, 40 ft.; Inside Width, 9 ft. 4 in.; Inside Height, 4 ft. 6 in. Builder, Pressed Steel Car Co.

Fig. 49—All-Steel 50-Ton Capacity Drop-Bottom Gondola Car. Weight, 40,300 lbs.; Inside Length, 40 ft.; Inside Width, 9 ft. 6¾ in.; Inside Height, 4 ft. 2 in. Builder, Pressed Steel Car Co.

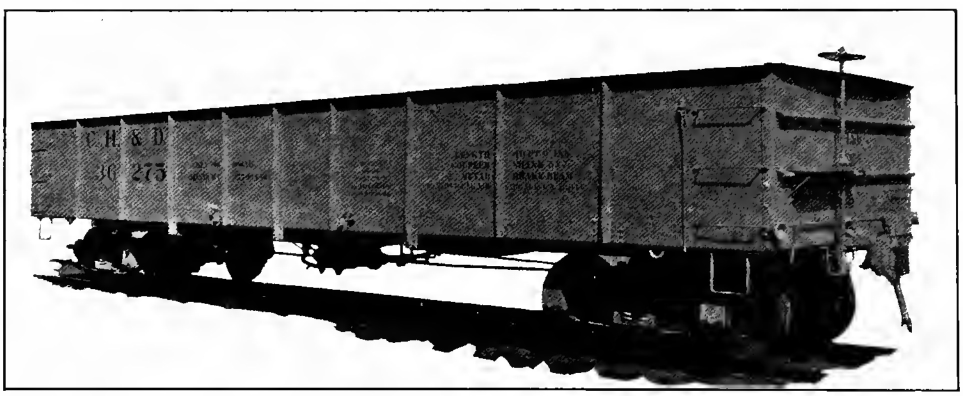


Fig. 50—All-Steel 50-Ton Capacity Drop-Bottom Gondola Car. Weight, 37,700 lbs.; Inside Length, 40 ft.; Inside Width, 9 ft. 7 in.; Inside Height, 4 ft. 2 in. Builder, Cambria Steel Co.

(See Figs. 321-323 for General Drawings.)

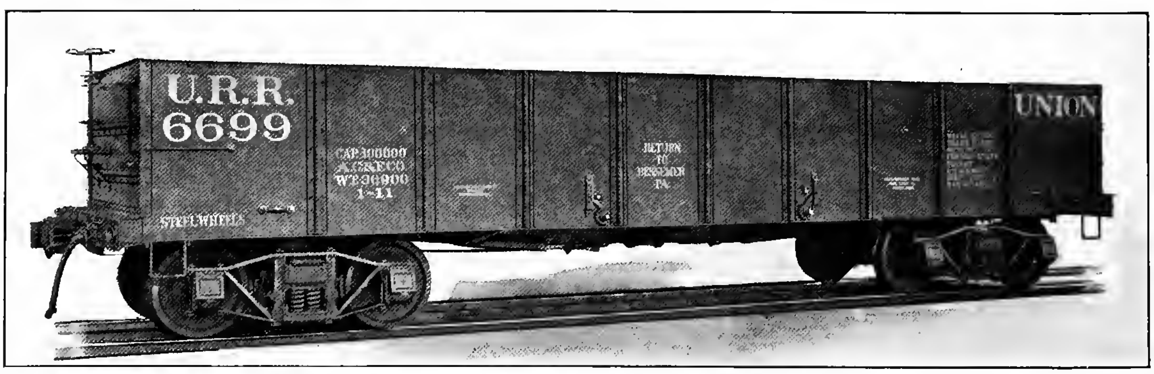


Fig. 51—All Steel 50-Ton Capacity Drop-Bottom Gondola Car. Weight, 36,900 lbs.; Inside Length, 35 ft.; Inside Width, 9 ft. 2 in.; Inside Height, 4 ft. 2 in. Builder, American Car & Foundry Co.

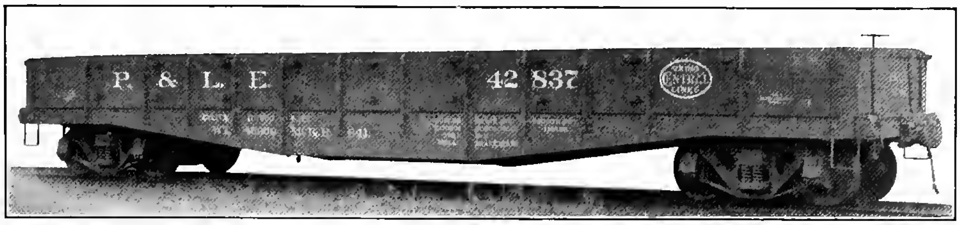


Fig. 52—Steel Frame 55-Ton Capacity Solid Bottom Gondola Car with Drop Ends. Weight, 46,000 lbs.; Inside Length, 46 ft.; Inside Width, 8 ft. 9 in.; Inside Height, 2 ft. 6¼ in.; Capacity Level Full. Cubic Feet, 1,015. Builder, Pressed Steel Car Co.

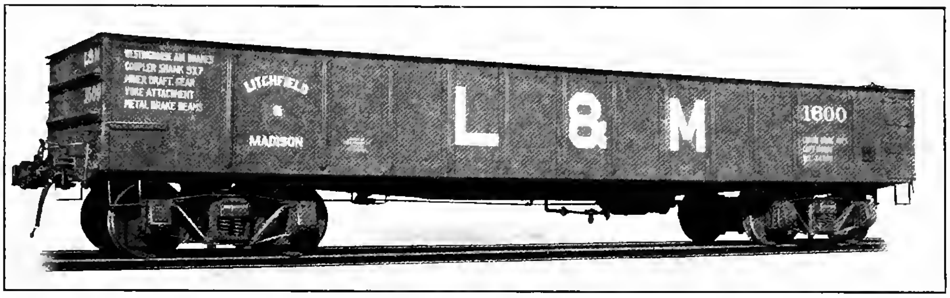


Fig. 53—All-Steel 50-Ton Capacity Solid Bottom Gondola Car. Weight, 34,500 lbs.; Inside Length, 40 ft.; Inside Width, 9 ft. 4⅞ in.; Inside Height, 4 ft. Builder, American Car & Foundry Co.

(See Fig. 334 for General Drawings.)

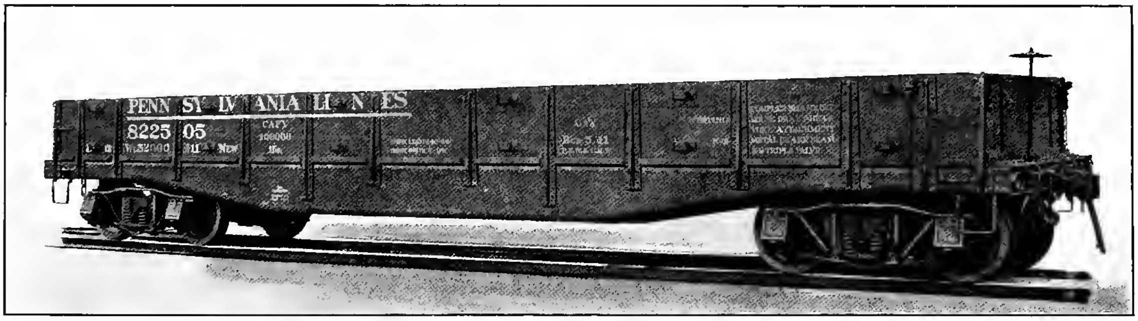


Fig. 54—Steel Frame 50-Ton Capacity Solid Bottom Gondola Car with Drop Ends. Weight, 52,000 lbs.; Inside Length, 40 ft. 8 in.; Inside Width, 8 ft. 9¼ in.; Inside Height, 2 ft. 6¼ in.; Capacity Level Full, Cubic Feet, 897. Builder, American Car & Foundry Co.

Fig. 55—Steel Underframe 50-Ton Capacity Low Side Solid Bottom Gondola Car. Weight, 42,700 lbs.; Inside Length, 36 ft. 4 in.; Inside Width, 8 ft. 9 in.; Inside Height, 1 ft. Capacity Level Full, Cubic Feet, 319. Builder, Middletown Car Co.

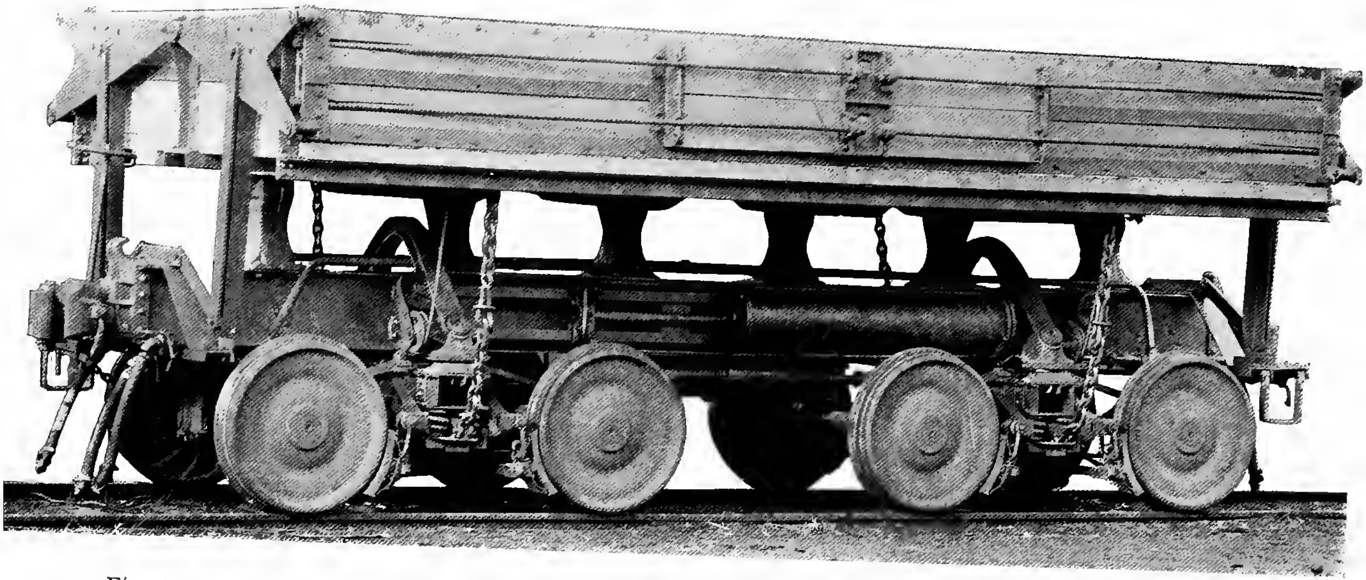


Fig. 56—Steel Underframe 30-Ton Capacity Two-Way Side Dump Car. Weight, 34,000 lbs.; Inside Length, 19 ft. 4 in.; Inside Width, 8 ft. 8 in.; Inside Height, 2 ft. The Dumping Mechanism is Operated by the Cylinder Shown, Using Compressed Air. The Journal Boxes are Placed Inside the Wheels to Avoid Injury when the Load is Discharged. The Chains Hold the Car Body in Position During Transit. Builder, Fitz-Hugh, Luther Co.

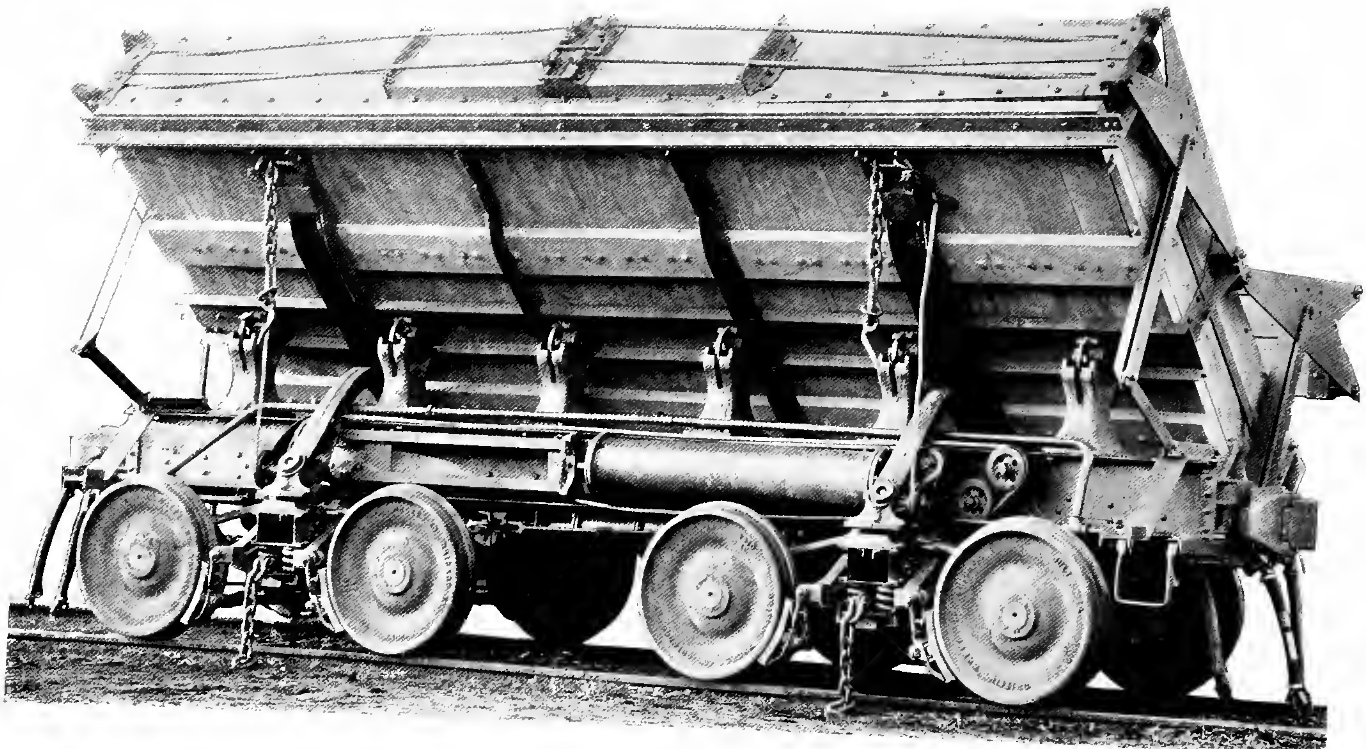


Fig. 57—Dumping Position of the Two-Way Side Dump Car Shown in Fig. 56. The Dumping Angle is 49 Degrees. The Body Bolsters, of Cast Steel, Have Cast Integral with Them Center Plates, Side Bearings and Spring Pockets. The Latter Contain Coil Springs Which Absorb the Shock as the Body Dumps.

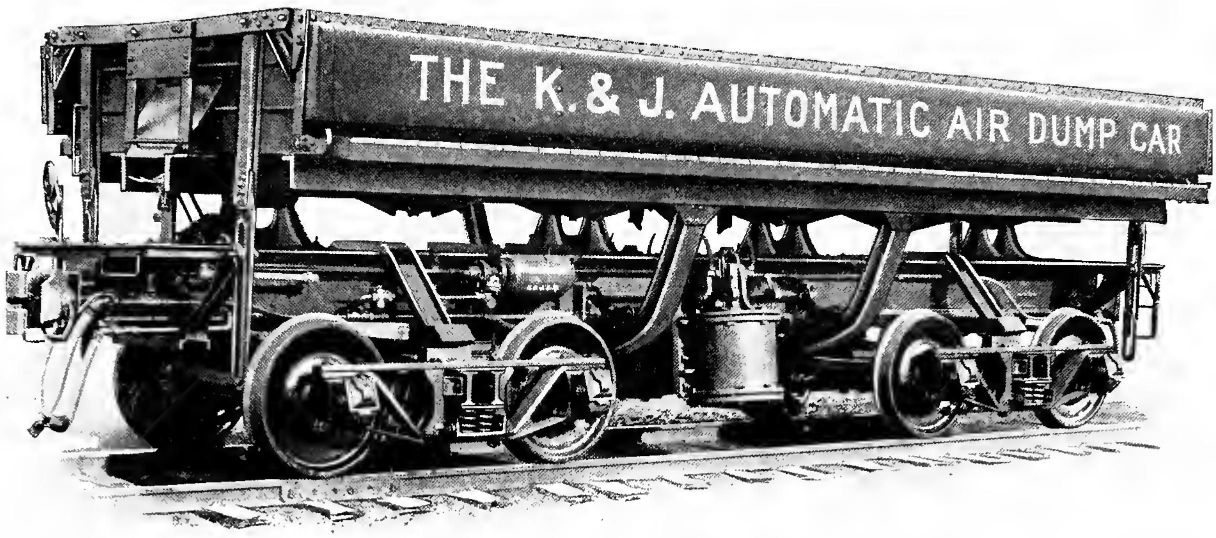


Fig. 58—All-Steel 30-Ton Capacity Two-Way Side Dump Car Operated by Compressed Air. Inside Length, 24 ft.; Inside Width, 9 ft.; Inside Height, 2 ft.; Capacity Level Full, Cubic Feet, 432; Distance Between Truck Centers, 16 ft.; Wheel Base of Trucks, 5 ft. 4 in.; Height, Rail to Top of Car, 7 ft. 9½ in. A storage Reservoir Receives Air Directly from the Air Brake Train Line. Each Dumping Cylinder is Charged with Air Through a Vertical Valve Located on the Side of the Cylinder. An Operating Pipe, Supplied from the Reservoir and Extending Beneath the Car, Has a Port to This Valve. To Admit Air to the Cylinder and Dump the Car This Pipe is Charged With Air, the Pressure Operating the Valve and Allowing Air to Pass from the Reservoir to the Dumping Cylinder. Builder, The Kilbourne & Jacobs Manufacturing Co.

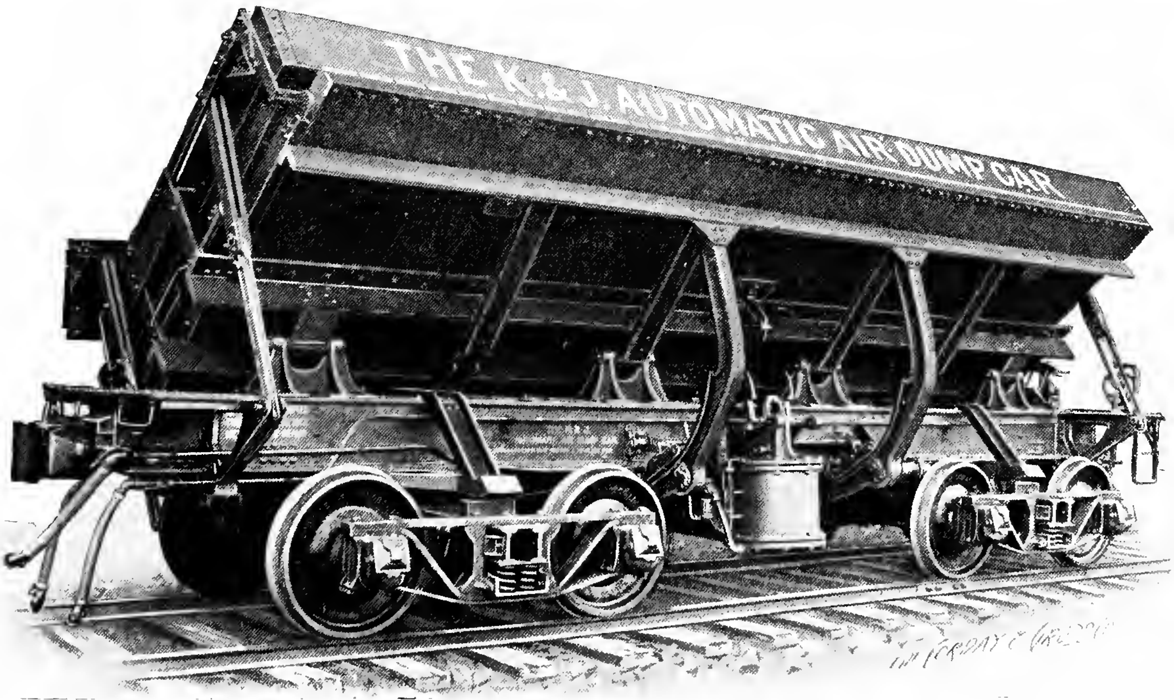


Fig. 59—Dumping Position of the Two-Way Side Dump Car Shown in Fig. 58. The Car is Dumped by the Cylinder on One Side and Righted by the Corresponding Cylinder on the Opposite Side. The Angle of Dump is 44 Degrees. The Body is Locked to the Underframe to Prevent Accidental Dumping While in Transit.

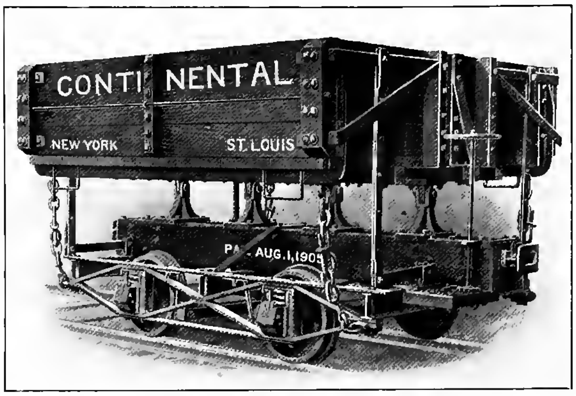


Fig. 60—Position While In Transit.

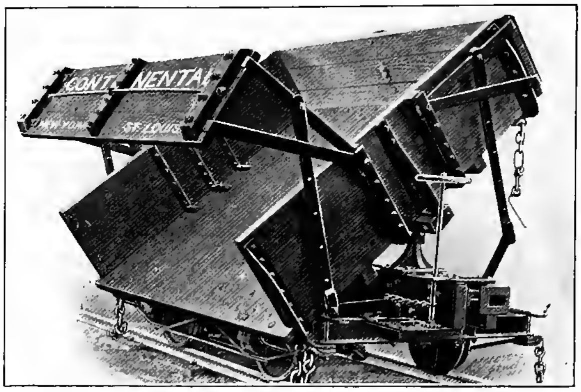


Fig. 61—Dumping Position.

Six Cubic Yards, 8,500 lbs. Capacity Dump Car for Contractor's Service. Builder, Continental Car & Equipment Co.

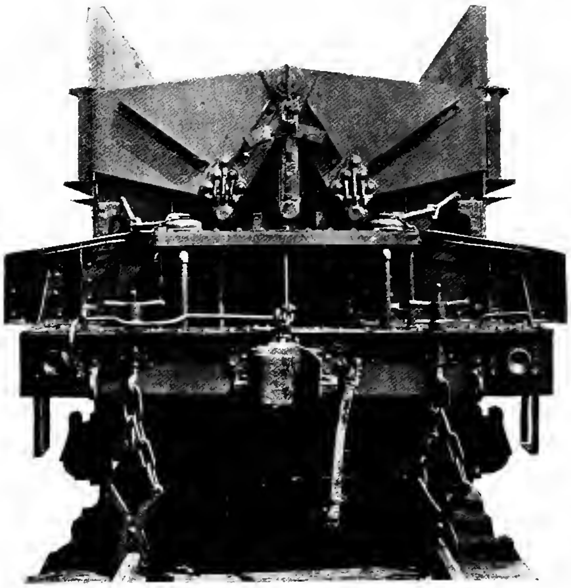


Fig. 62—End View of King-Lawson Dump Car Shown in Fig. 63.

Fig. 63—King-Lawson All-Steel 40-Ton Capacity Two-Way Side Dump Car. Builder, Middletown Car Co.

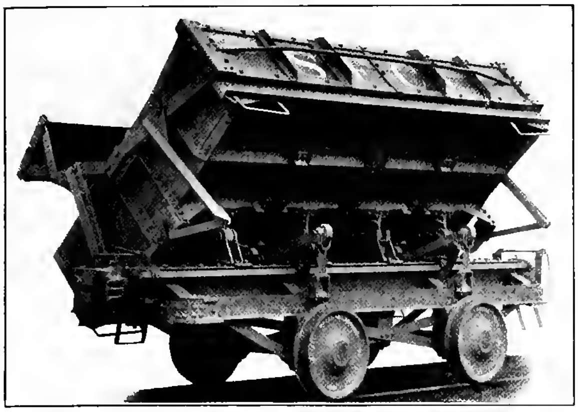


Fig. 64—Dumping Position.

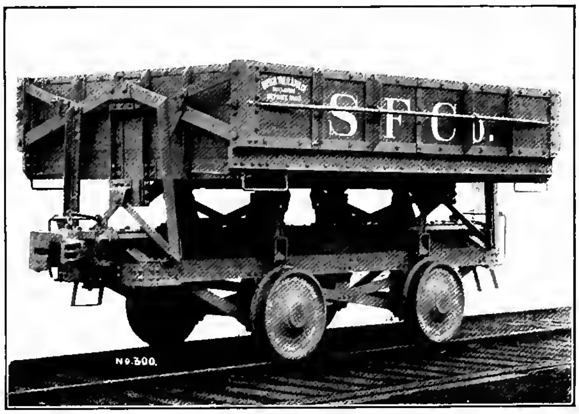


Fig. 65—Position While in Transit.

Seven Cubic Yards Capacity Two-Way Side Dump Car for Contractor's Service. Builder, Russel Wheel & Foundry Co.

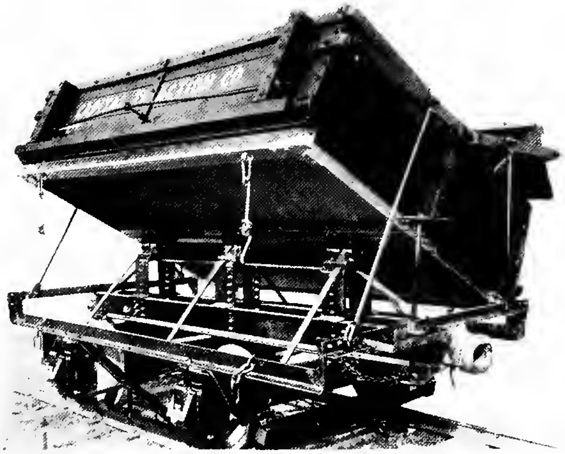


Fig. 66—Dumping Position of Two-Way Side Dump Car for Contractor's Service. Builder, Ralston Steel Car Co.

Fig. 67—All-Steel 12 Cubic Yards Capacity Two-Way Triple Body Side Dump Car. Builder, Arthur Kopple Co.

Fig. 68—Steel Frame 40-Ton Capacity Flat Car. Weight, 33,100 lbs.; Length of Platform, 41 ft. 6 in.; Width of Platform, 9 ft.; Height, Rail to Top of Platform, 4 ft. 2¾ in. Builder, Canadian Car & Foundry Co.

(See Fig. 342 for General Drawings.)

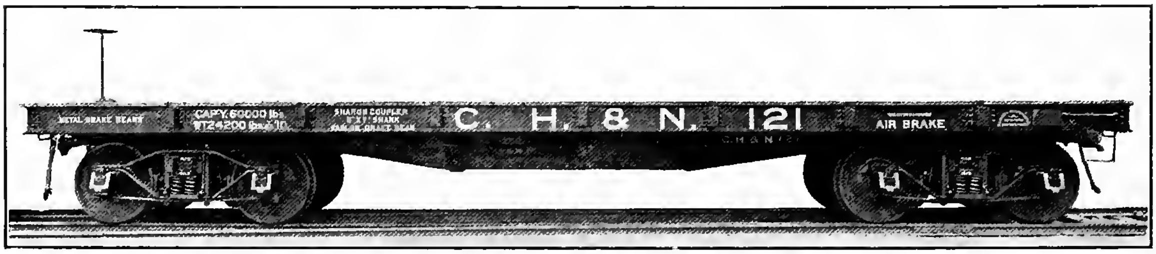


Fig. 69—Steel Frame 30-Ton Capacity Flat Car. Weight, 24,200 lbs. Builder, The Barney & Smith Car Co.

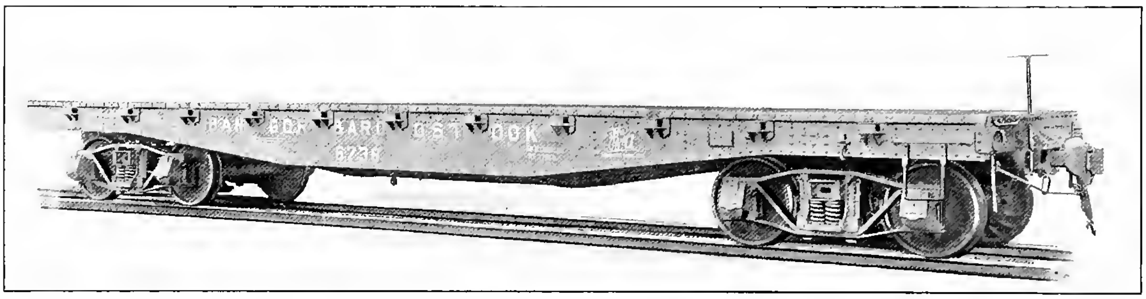


Fig. 70—Steel Frame 50-Ton Capacity Flat Car. Weight, 37,900 lbs.; Length of Platform, 34 ft. 2 in.; Width of Platform, 8 ft. 10 in.; Height, Rail to Top of Platform, 4 ft. 2 in. Builder, American Car & Foundry Co.

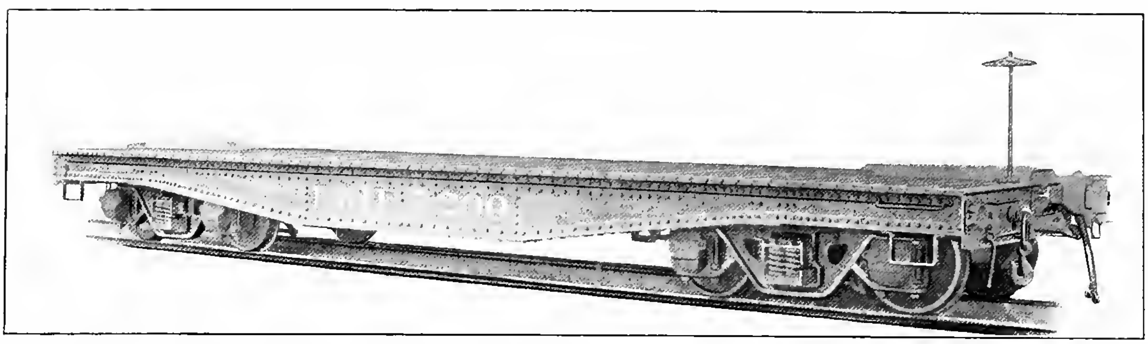


Fig. 71—Steel Frame 75-Ton Capacity Flat Car. Weight, 44,000 lbs.; Length of Platform, 34 ft. 6¾ in.; Width of Platform, 10 ft.; Height, Rail to Top of Platform, 3 ft. 2 in. Builder, American Car & Foundry Co.

Fig. 72—Steel Frame 100-Ton Capacity Four-Truck Flat Car. Weight, 90,000 lbs.; Length of Platform, 70 ft. 7 in.; Width of Platform, 8 ft. 6 in. Builder, McGuire-Cummings Manufacturing Co.

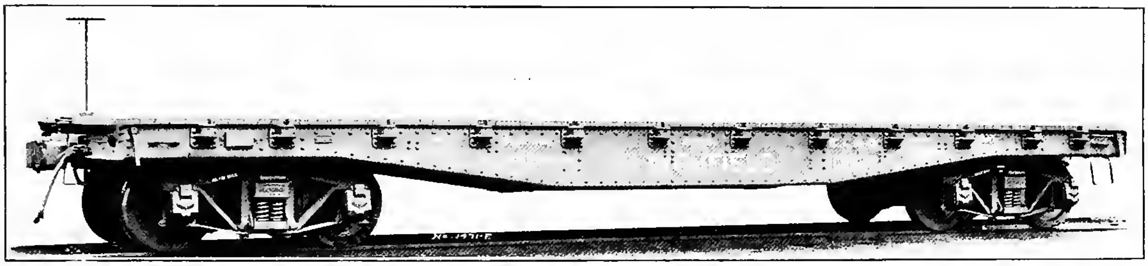


Fig. 73—Steel Frame 50-Ton Capacity Flat Car. Weight, 39,500 lbs.; Length of Platform, 40 ft.; Height, Rail to Top of Platform, 4 ft. 0$\frac{3}{8}$ in. Builder, Pressed Steel Car Co.

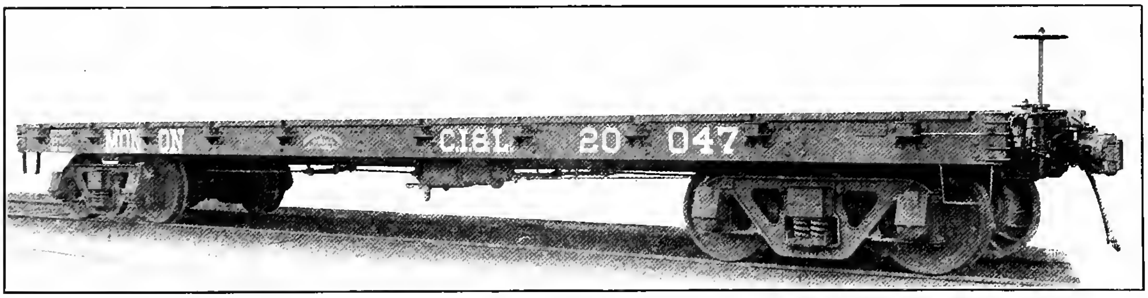


Fig. 74—Steel Frame 40-Ton Capacity Flat Car. Weight, 30,700 lbs.; Length of Platform, 40 ft.; Width of Platform, 8 ft. 6 in. Builder, The Haskell & Barker Car Co.

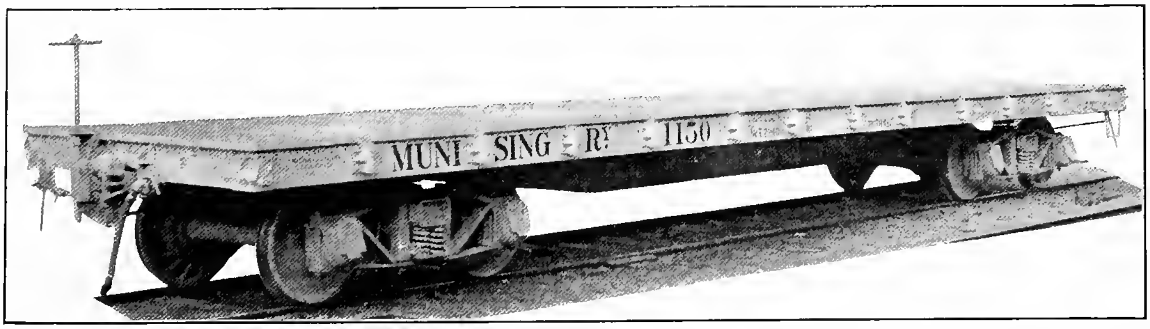


Fig. 75—Steel Frame 40-Ton Capacity Flat Car. Weight, 29,400 lbs.; Length of Platform, 42 ft.; Width of Platform, 9 ft. 6$\frac{3}{4}$ in.; Height, Rail to Top of Platform, 3 ft. 10$\frac{7}{8}$ in. Builder, Western Steel Car & Foundry Co.

(See Fig. 343 for General Drawings.)

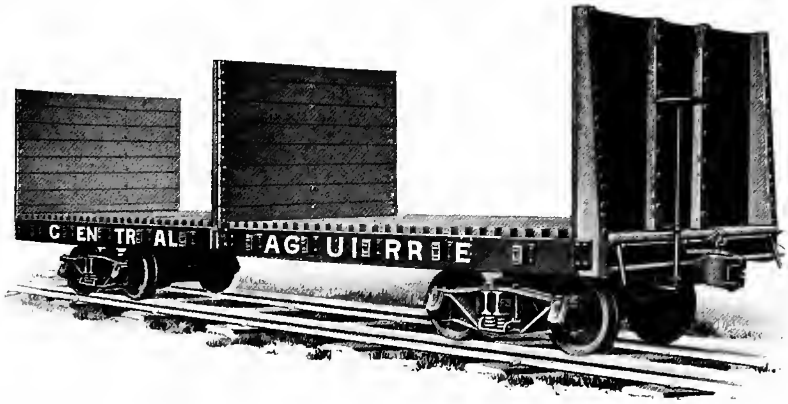


Fig. 76—Steel Frame Flat Car for Transportation of Sugar Cane. Builder, The Gregg Co., Limited.

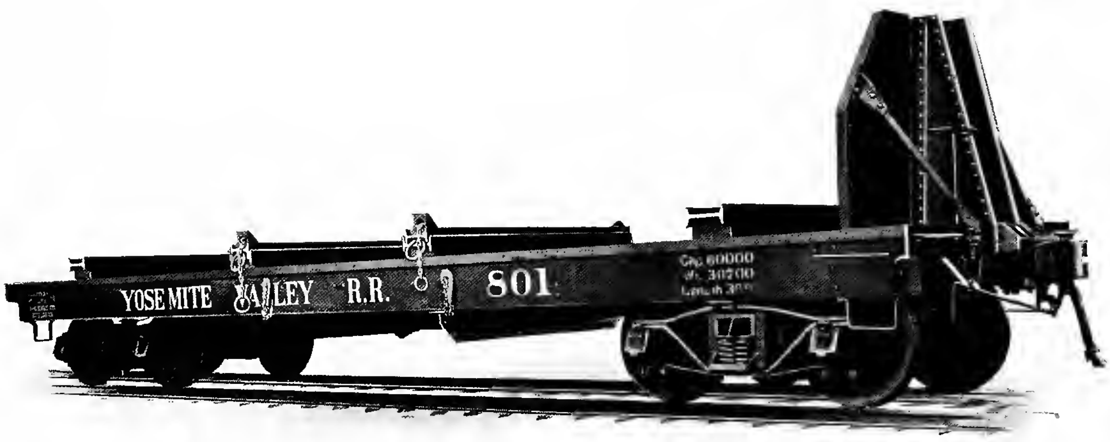


Fig. 77—Steel Frame 30-Ton Capacity Flat Car for Loading Logs from Mountain Side. Weight, 30,700 lbs. Builder, Seattle Car & Foundry Co.

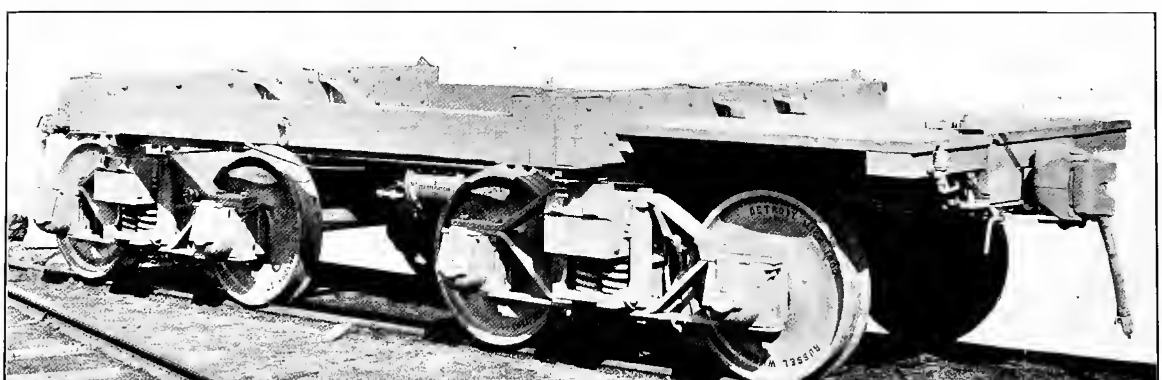


Fig. 78—Wooden Logging Car Constructed for Carrying 20 ft. Logs. Builder, Russel Wheel & Foundry Co.

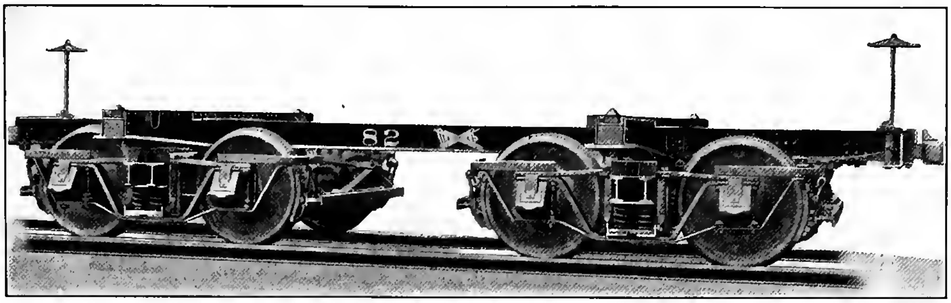


Fig. 79—Steel Frame 30-Ton Capacity Logging Car. Weight, 15,000 lbs. Builder, American Car & Foundry Co.

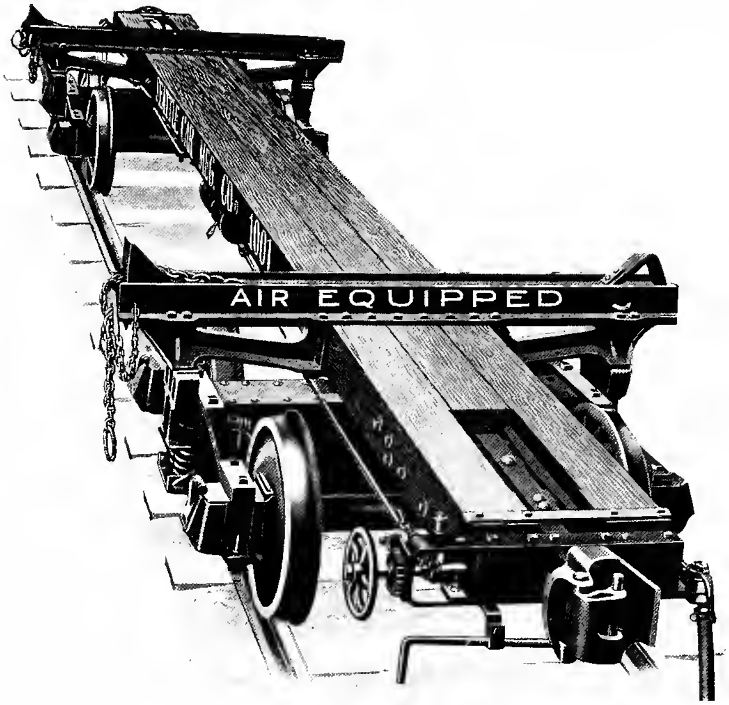


Fig. 80—Forty-Ton Capacity Logging Car. Weight, 19,000 lbs.; Length Over Timber, 40 ft.; Distance Between Bunk Centers, 24 ft. Builder, Seattle Car & Foundry Co.

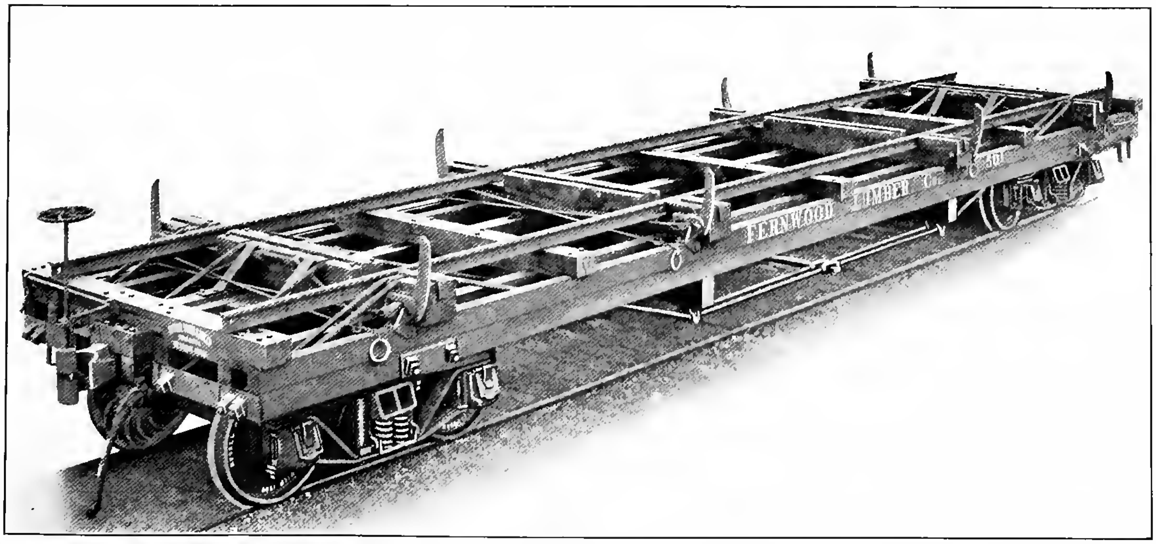


Fig. 81—Wooden Logging Car for Double Length Logs. Builder, Russel Wheel & Foundry Co.

Fig. 82—Steel Frame Tank Car, Capacity, 8,000 Imperial Gallons or 40 Tons. Weight, 44,900 lbs.; Length of Tank, 33 ft. 6 in.; Extreme Height from Rail, 13 ft. 5 in. Builder, Canadian Car & Foundry Co.

(See Fig. 349 for General Drawings.)

Fig. 83—Steel Frame Tank Car, Capacity, 12,000 U. S. Gallons or 100,000 lbs. Weight, 45,400 lbs. Builder, Pressed Steel Car Co.

Fig. 84—Steel Frame Tank Car with Three Compartments. Capacity, 10,000 U. S. Gallons or 80,000 lbs. Builder, McGuire-Cummings Manufacturing Co.

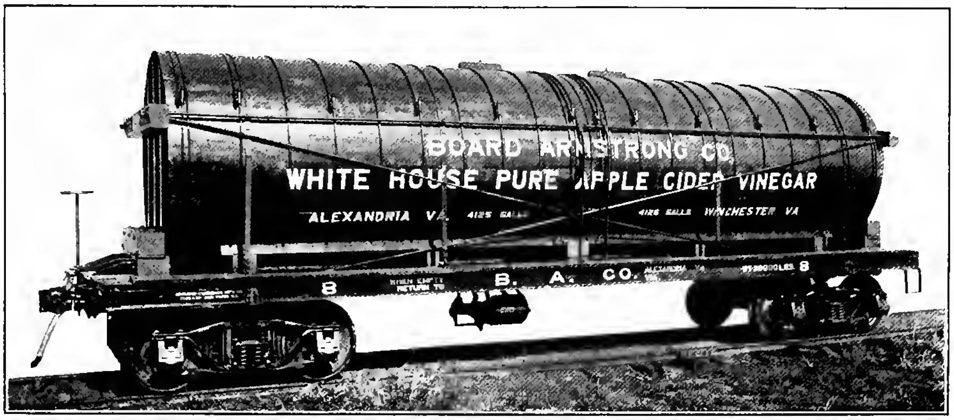


Fig. 85—Steel Frame Tank Car with Wooden Tank for Vinegar Transportation. Capacity, 8,250 U. S. Gallons; Weight, 39,000 lbs. Builder, McGuire-Cummings Manufacturing Co.

Fig. 86—Steel Frame Tank Car. Capacity, 8,000 U. S. Gallons. Builder, Pressed Steel Car Co.

Fig. 87—Steel Frame Tank Car, Capacity, 8,000 U. S. Gallons or 80,000 lbs.; Weight, 35,300 lbs. Builder, The Kennicott Co.

Fig. 88—Van Dyke Patent Tank Car, Capacity, 10,000 U. S. Gallons.

(See Fig. 355 for General Drawings.)

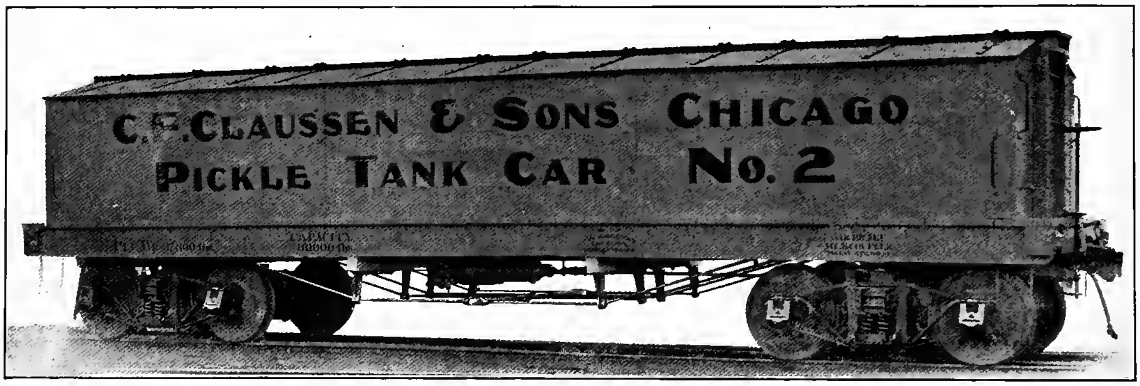


Fig. 89—Three Compartment 30-Ton Capacity Tank Car for Pickle Transportation. Weight, 37,300 lbs. Builder, Middletown Car Co.

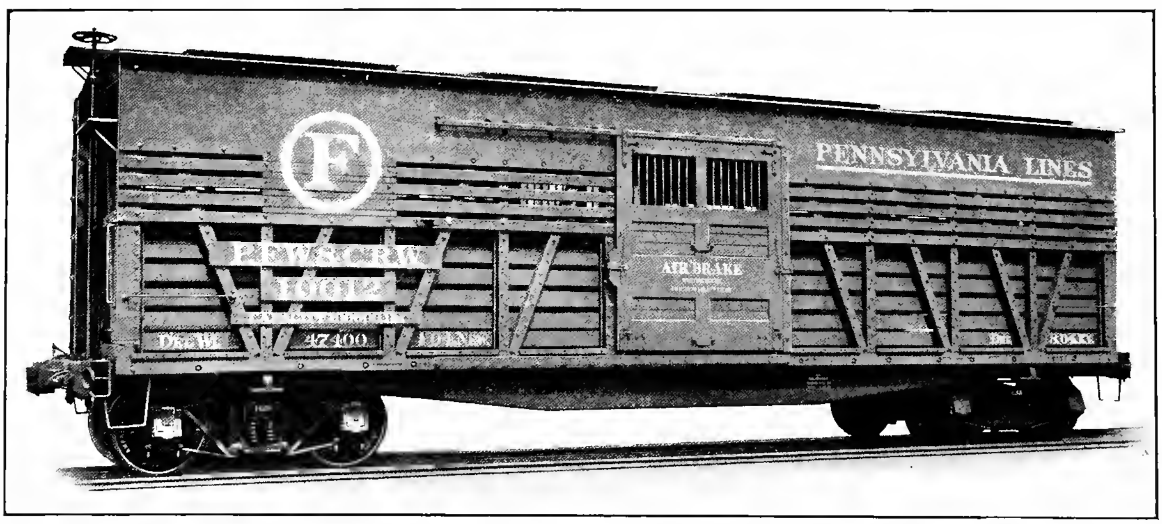


Fig. 90—Steel Underframe 50-Ton Capacity Stock Car. Weight, 47,400 lbs.; Inside Length, 35 ft. 11¼ in.; Inside Width, 8 ft. 5¼ in.; Inside Height, 8 ft. 0¼ in. Builder, American Car & Foundry Co.

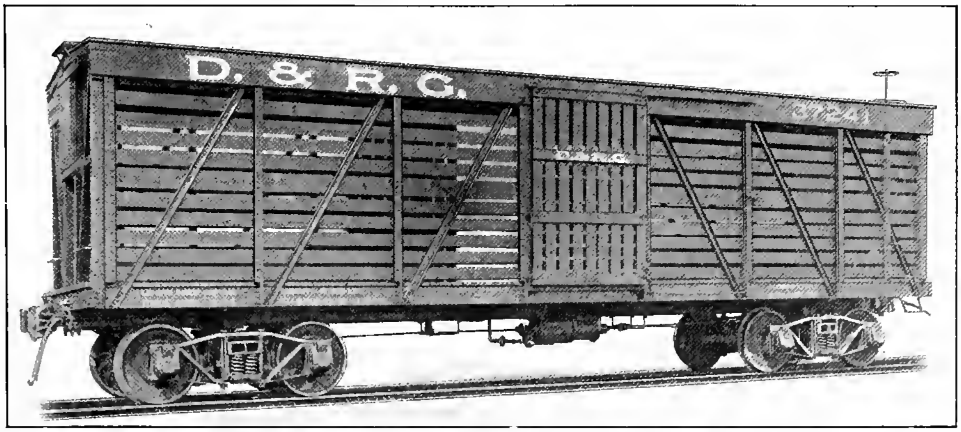


Fig. 91—Steel Frame 40-Ton Capacity Stock Car. Weight, 35,000 lbs.; Inside Length, 36 ft. 6 in.; Inside Width, 8 ft. 6 in.; Inside Height, 7 ft. 3 in. Builder, American Car & Foundry Co.

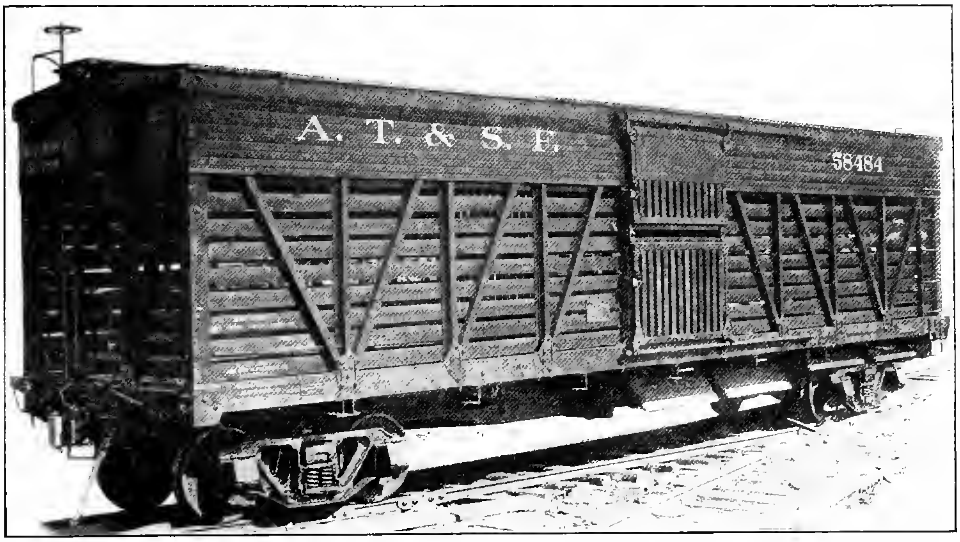


Fig. 92—Steel Frame 40-Ton Capacity Drop Bottom General Service Car. Weight, 45,400 lbs.; Inside Length, 40 ft.; Inside Width, 8 ft. 8 in.; Inside Height, 7 ft. 9 in. Builder, National Dump Car Co.

(See Figs. 356 and 357 for General Drawings.)

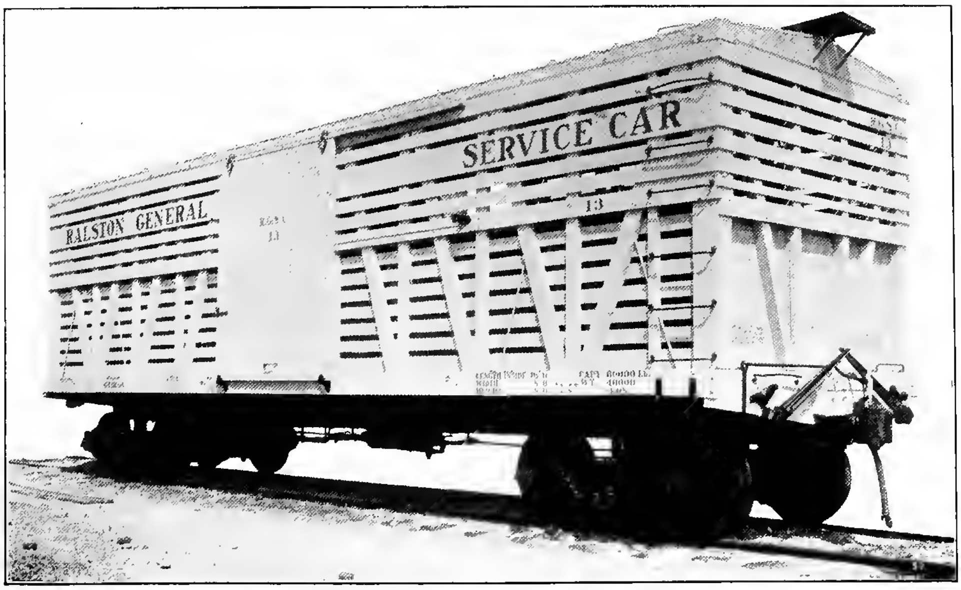


Fig. 93—Steel Underframe 30-Ton Capacity Drop Bottom General Service Car. Weight, 40,000 lbs.; Inside Length, 36 ft.; Inside Width, 8 ft. 6 in.; Inside Height, 8 ft. Builder, Ralston Steel Car Co.

(See Figs. 358 and 359 for General Drawings.)

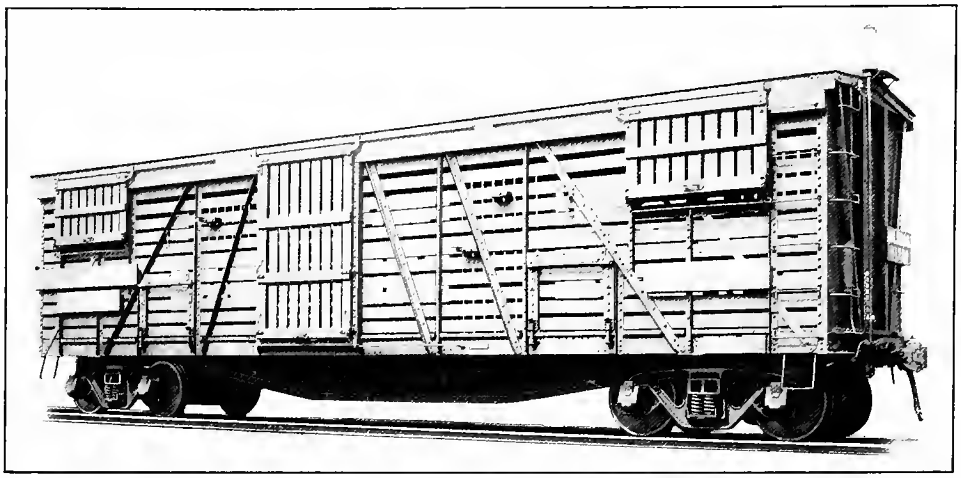


Fig. 94—Steel Frame 40-Ton Capacity Stock Car. Weight, 40,000 lbs.; Inside Length, 40 ft. 0½ in.; Inside Width, 8 ft. 0¼ in.; Inside Height, 8 ft. Builder, American Car & Foundry Co.

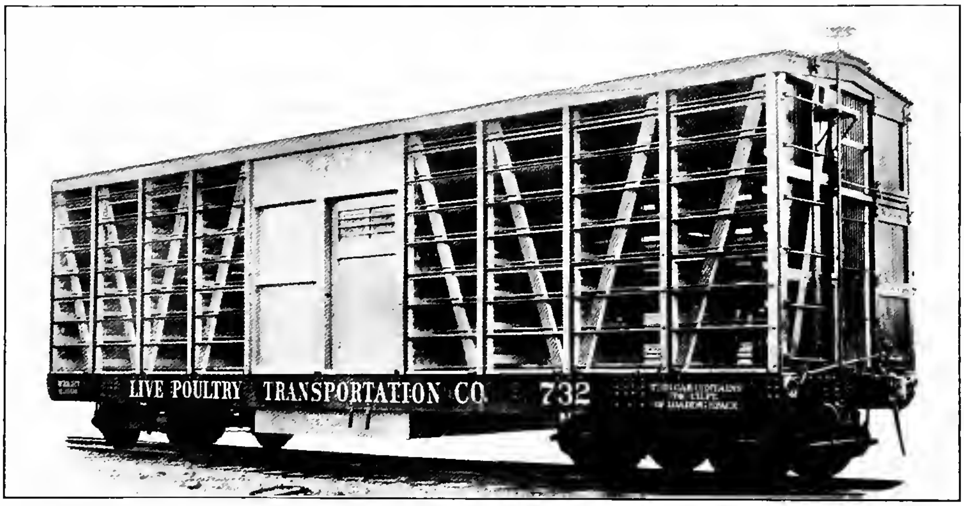


Fig. 95—Steel Underframe 10-Ton Capacity Poultry Car. Weight, 43,000 lbs.; Inside Length, 36 ft.; Number of Coops, 128. Builder, American Car & Foundry Co.

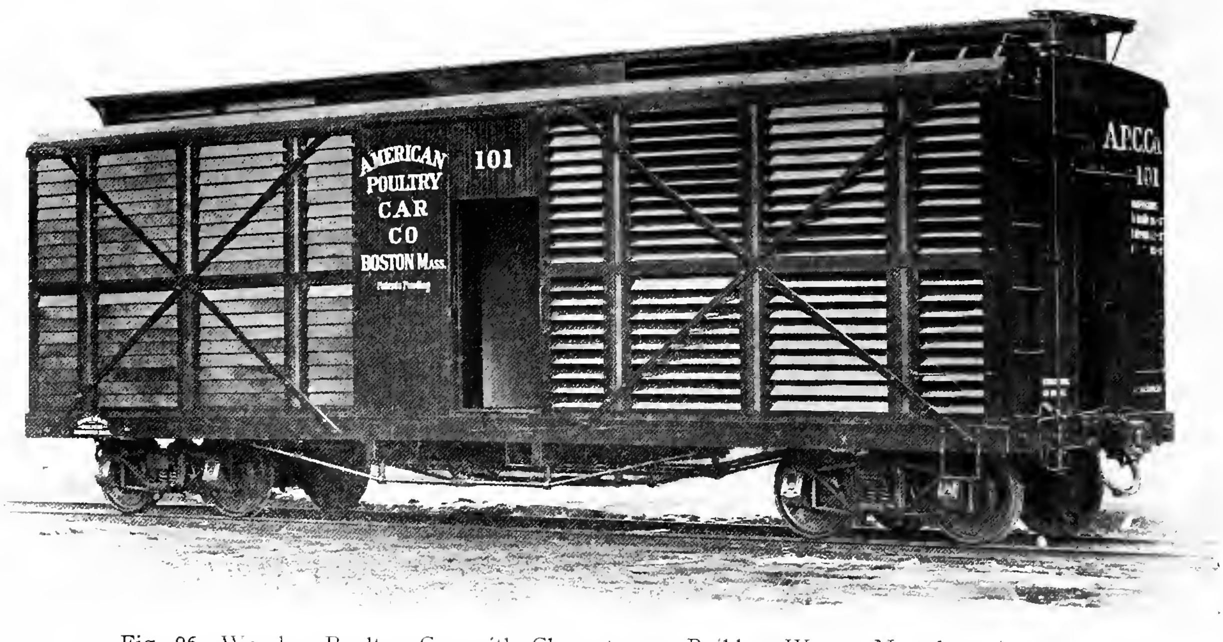


Fig. 96—Wooden Poultry Car with Clere-story. Builder, Wason Manufacturing Co.

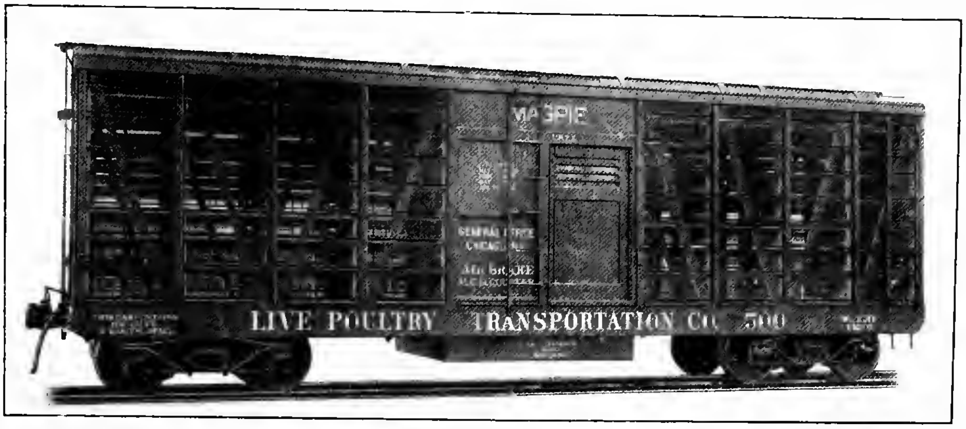


Fig. 97—Steel Underframe 10-Ton Capacity Poultry Car with Clere-story. Weight, 44,200 lbs.; Inside Length, 36 ft.; Number of Coops, 128. Builder, American Car & Foundry Co.

(See Fig. 369 for General Drawings.)

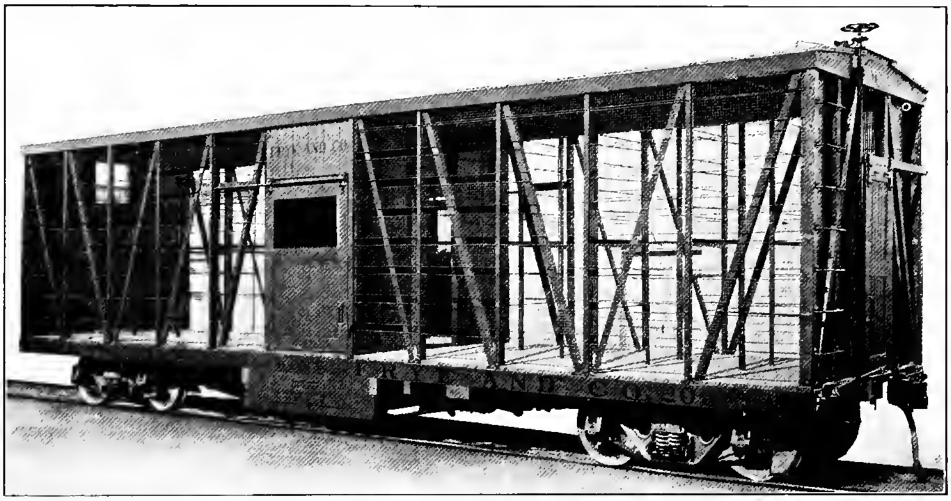


Fig. 98—Wooden Poultry Car without Coops. Builder, Milwaukee Refrigerator Transit & Car Co.

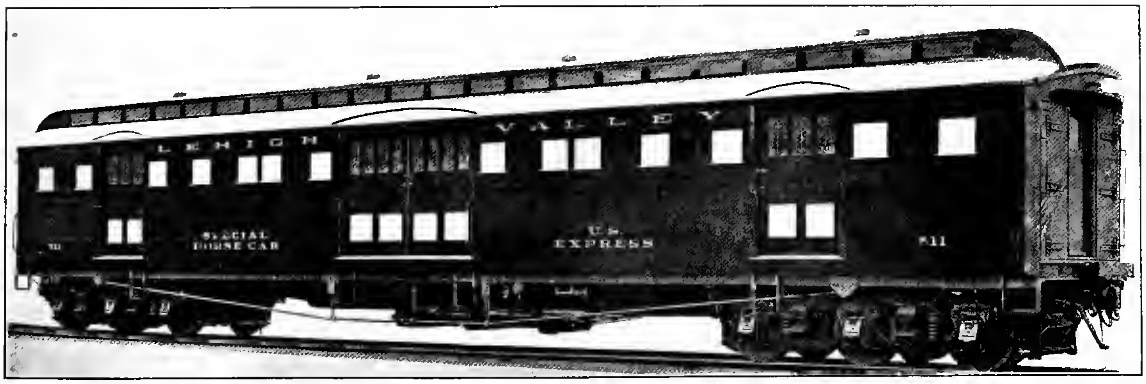


Fig. 99—Steel Underframe Express Car for the Transportation of Horses. Builder, The Wason Manufacturing Co.

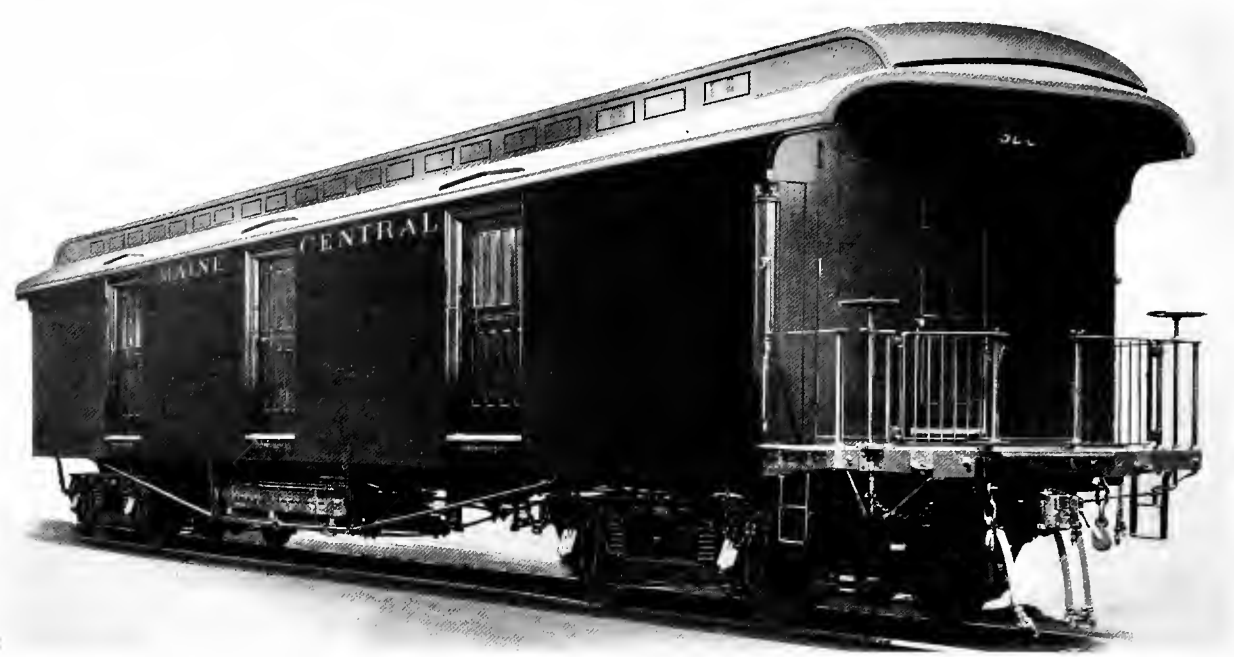


Fig. 100—Wooden Express Car for the Transportation of Horses. Builder, The Wason Manufacturing Co.

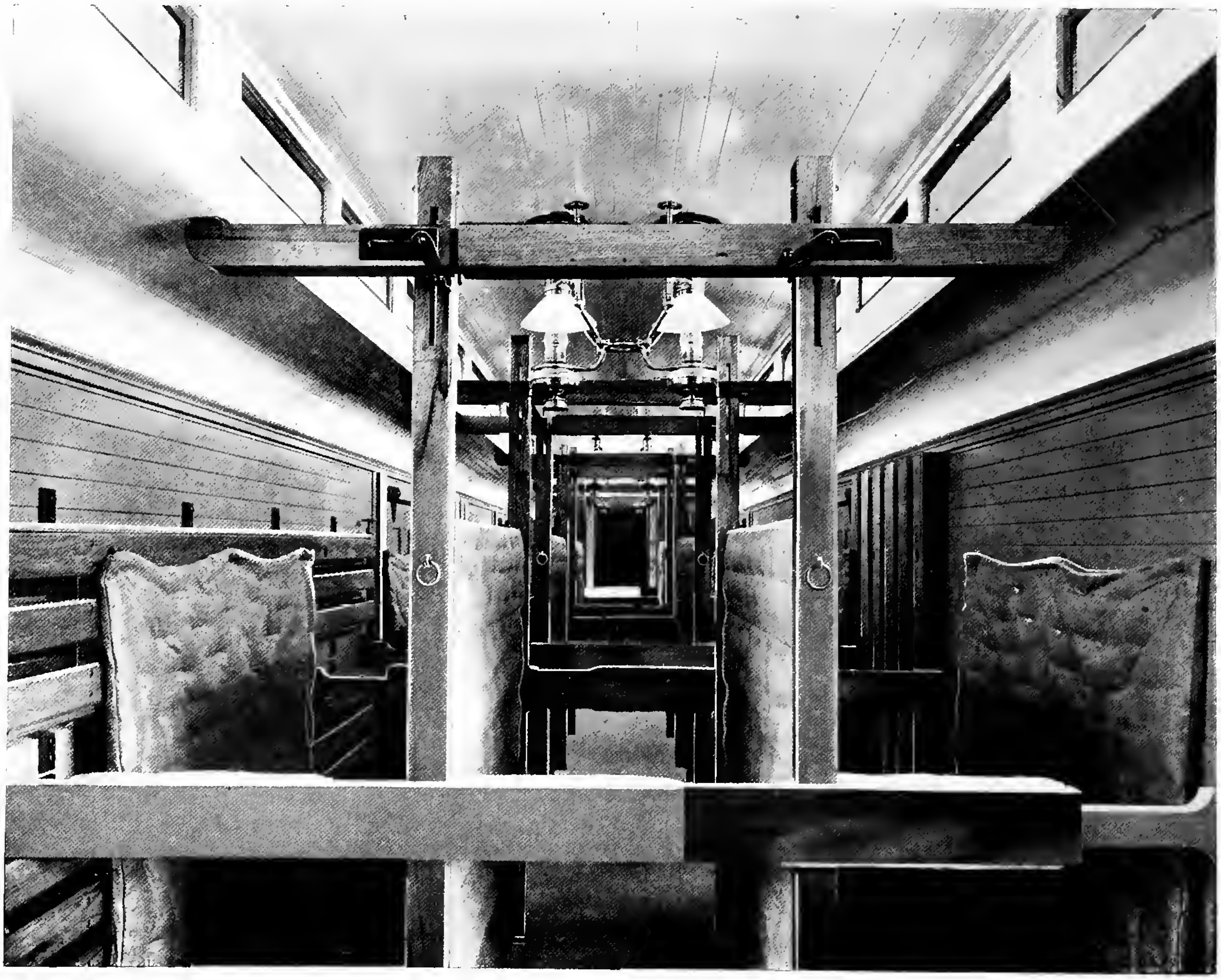


Fig. 101—Interior View of Car Shown in Fig. 100 with Stall Partitions in Place.

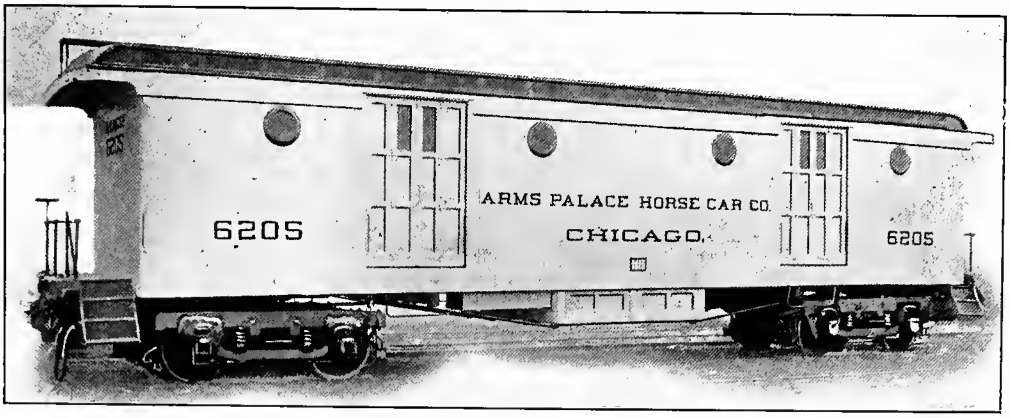


Fig. 102—Arms (Burton) Perfected Horse Car with 16 Adjustable Stalls. Inside Length, 44 ft.

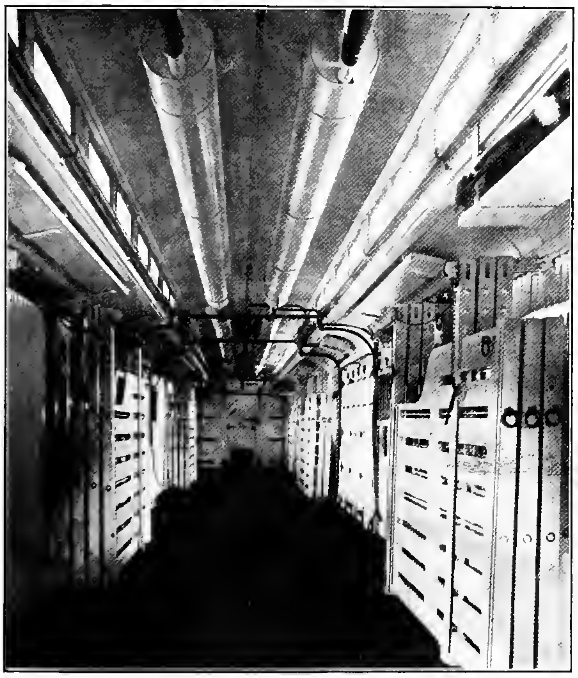


Fig. 103—Interior View of Car Shown in Fig. 105, Showing Stall Partitions Folded.

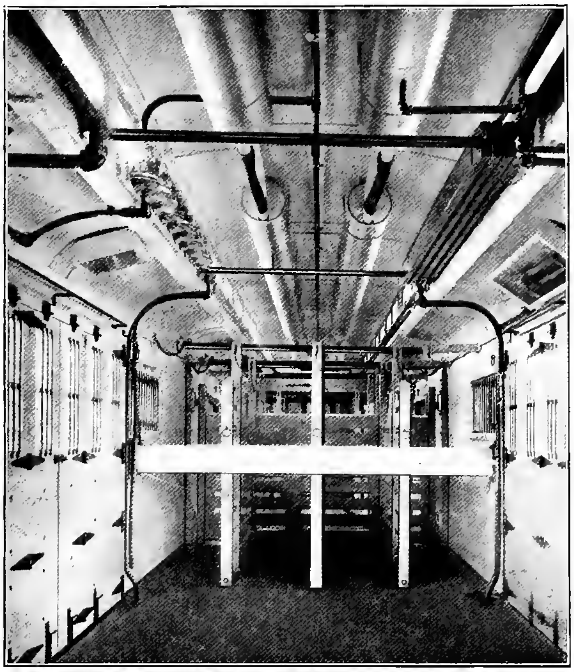


Fig. 104—Interior View of Car Shown in Fig. 105, Showing Stall Partitions as Arranged when Car is Loaded.

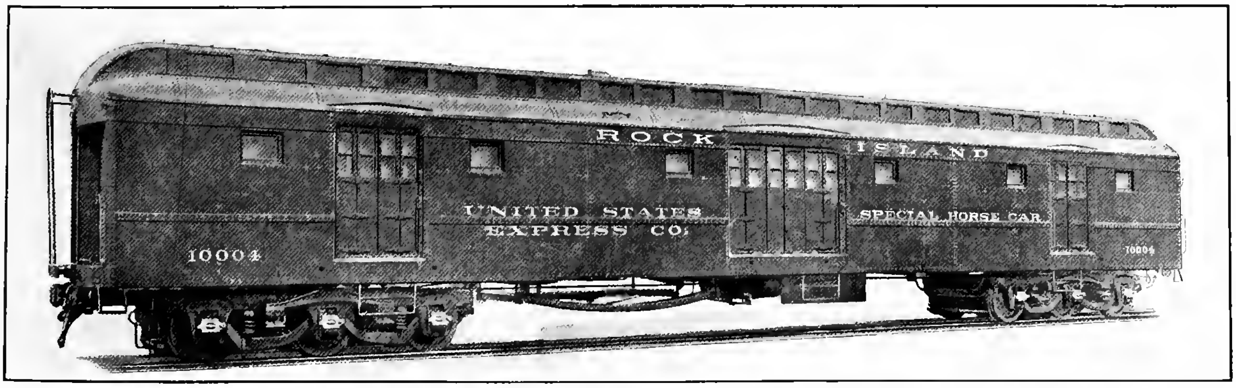


Fig. 105—Steel Express Car for Transportation of Horses. Weight, 126,000 lbs.; Length of Body Outside, 70 ft. Builder, American Car & Foundry Co.

Fig. 106—Steel Underframe 30-Ton Capacity Refrigerator Car. Weight, 47,400 lbs.; Inside Length, 33 ft. 2 in.; Inside Width, 8 ft. 2 in.; Inside Height, 7 ft. 6 in. Builder, Milwaukee Refrigerator Transit & Car Co.

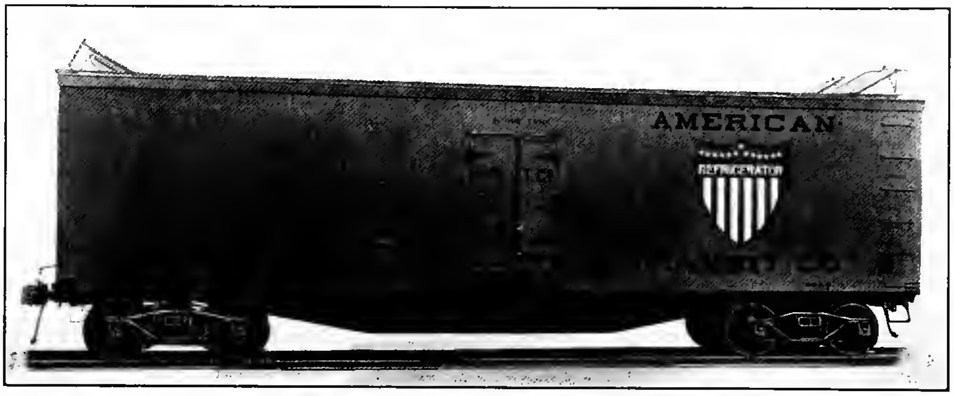


Fig. 107—Steel Underframe 30-Ton Capacity Refrigerator Car. Weight, 49,800 lbs.; Inside Length, 32 ft. 10 in.; Inside Width, 8 ft. 3⅝ in.; Inside Height, 7 ft. 6 in. Builder, American Car & Foundry Co.

(See Figs. 370 and 372 for General Drawings.)

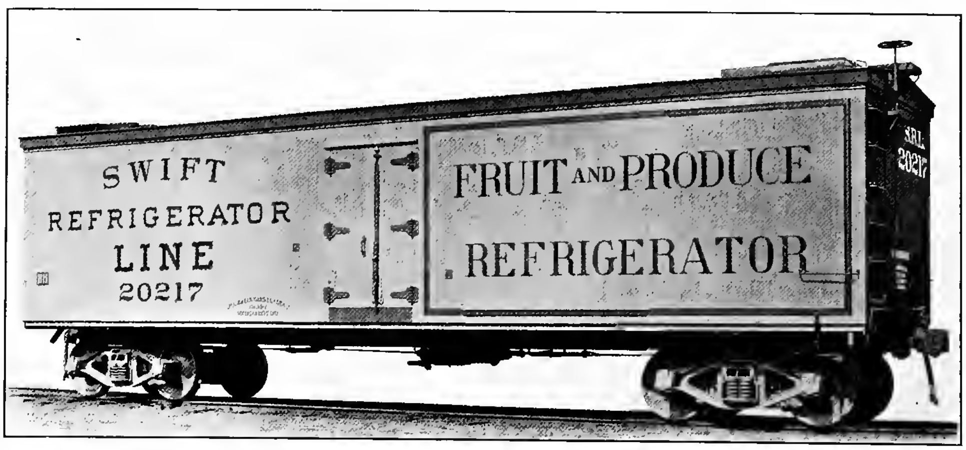


Fig. 108—Steel Underframe 30-Ton Capacity Refrigerator Car. Weight, 51,500 lbs. Builder, The Haskell & Barker Car Co.

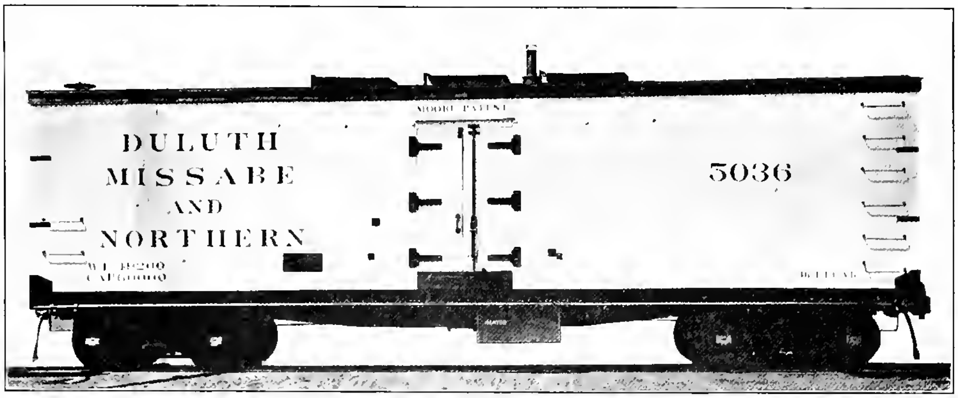


Fig. 109—Steel Underframe 30-Ton Capacity Refrigerator Car. Weight, 49,200 lbs.; Inside Length, 30 ft. 10 in.; Inside Width, 8 ft. 4 in.; Inside Height, 7 ft. 5½ in. This Car can be used as Refrigerator, Ventilator or Heater. Builder, Moore Patent Car Co.

(See Fig. 114 for interior view.)

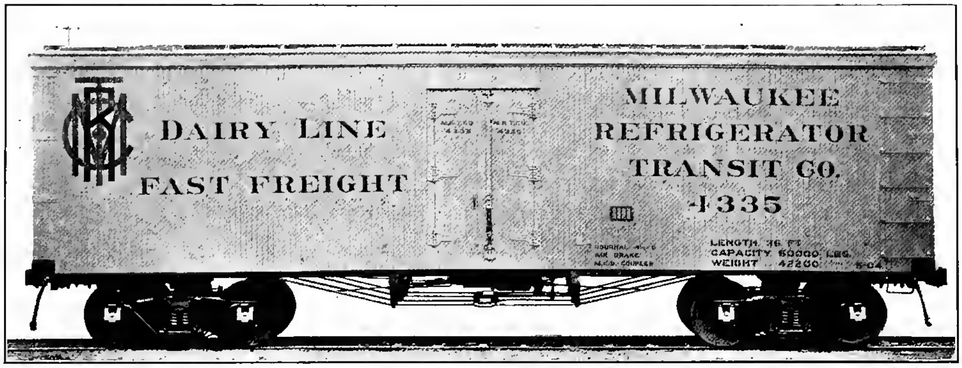


Fig. 110—Wooden 30-Ton Capacity Refrigerator Car. Weight, 42,200 lbs.; Inside Length, 35 ft. 1 in.; Inside Width, 8 ft. 1 in.; Inside Height, 7 ft. 3 in. Builder, Milwaukee Refrigerator Transit & Car Co.

Fig. 111—Wooden 30-Ton Capacity Refrigerator Car with Steel Center Sills. Weight, 45,100 lbs.; Inside Length, 33 ft.; Inside Width, 8 ft. 4 in.; Inside Height, 7 ft. 6 in. Builder, American Car & Foundry Co.

(See Figs. 371 and 373 for General Drawings.)

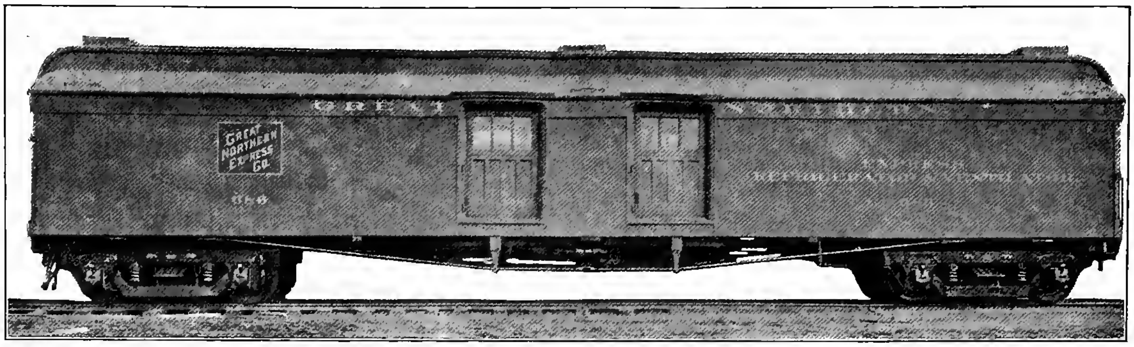


Fig. 112—Wooden Express Refrigerator Car. Builder, The Barney & Smith Car Co.

(See Fig. 113 for Interior View and Fig. 233 for Floor Plan.)

Fig. 113—Interior View of Express Refrigerator Car Shown in Fig. 112.

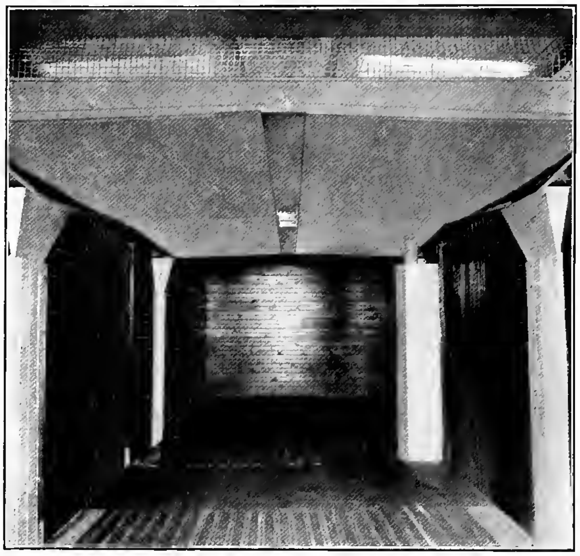


Fig. 114—Interior View of Refrigerator Car Shown in Fig. 109.

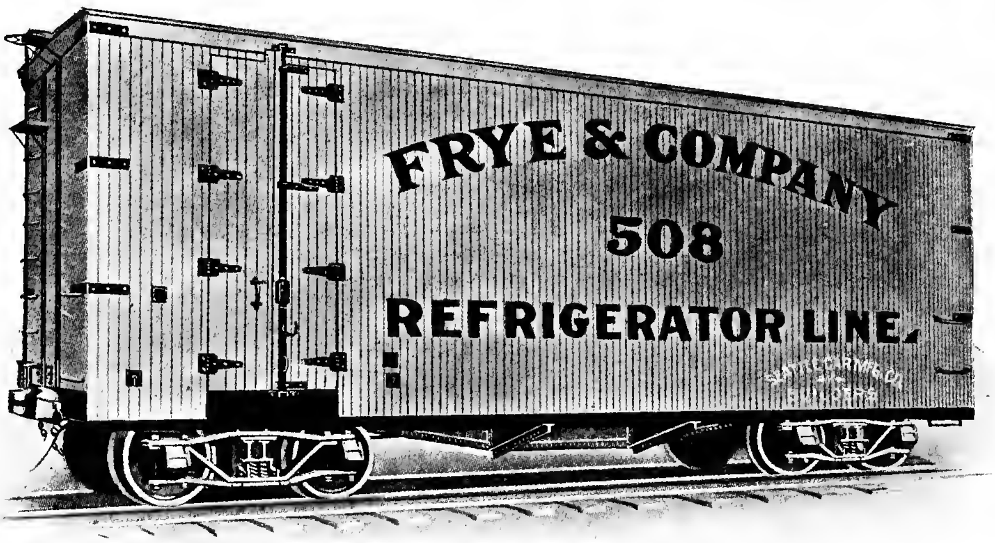


Fig. 115—Steel Underframe 30-Ton Capacity Refrigerator Car. Weight, 48,000 lbs.; Inside Length, 33 ft. 2½ in.; Inside Width, 8 ft. 4½ in.; Inside Height, Floor to Ceiling, 9 ft. 11 in.; Floor to Carlines, 9 ft. 9½ in. Builder, Seattle Car & Foundry Co.

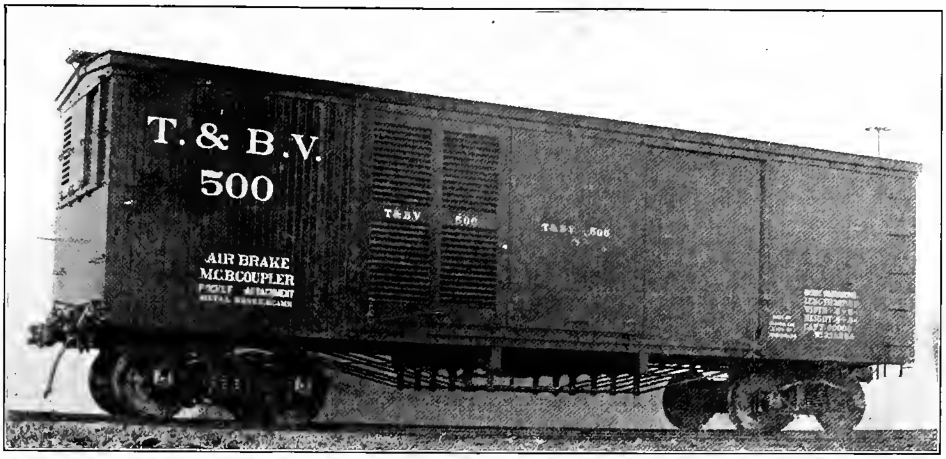


Fig. 116—Wooden 30-Ton Capacity Ventilated Car for Fruit Traffic. Weight, 33,800 lbs.; Inside Length, 36 ft. Builder, Georgia Car & Manufacturing Co.

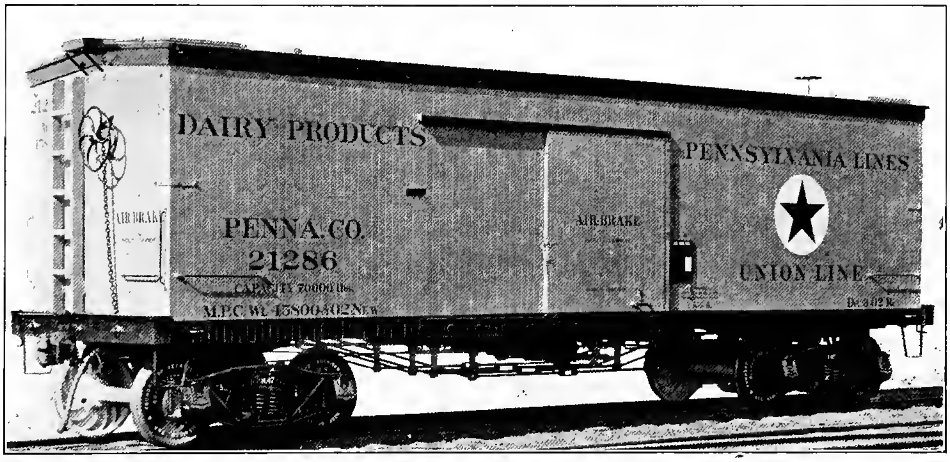


Fig. 117—Wooden 35-Ton Capacity Refrigerator Car for Dairy Products. Weight, 45,800 lbs. Builder, American Car & Foundry Co.

Fig. 118—Steel Underframe 30-Ton Capacity Combined Heater, Ventilator and Refrigerator Car. Weight, 43,400 lbs. This Car is Equipped with the Alcohol Heating & Lighting Co.'s Heater System.

Fig. 119—Steel Underframe Four-Wheel Caboose. Builder, Central Locomotive & Car Works.

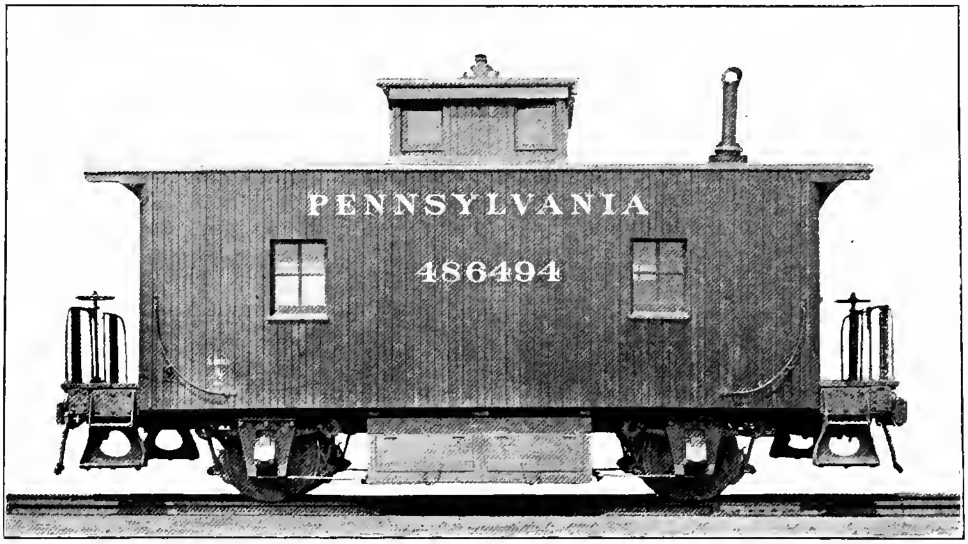


Fig. 120—Steel Underframe Four-Wheel Caboose. Weight, 28,000 lbs. Builder, Pennsylvania Railroad.
(See Fig. 382 for General Drawings.)

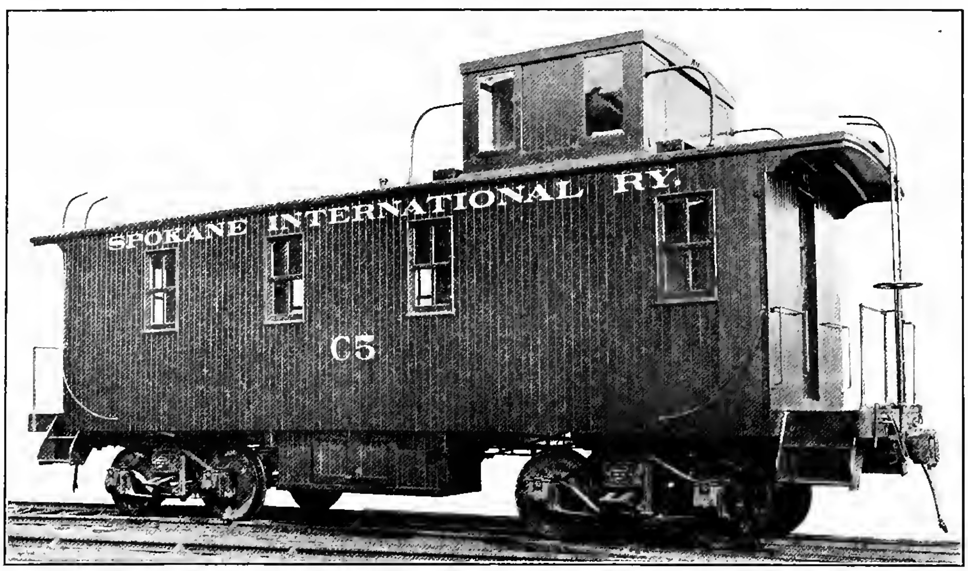


Fig. 121—Wooden Eight-Wheel Caboose. Length over End Sills, 32 ft. 5¾ in. Builder, The Haskell & Barker Car Co.

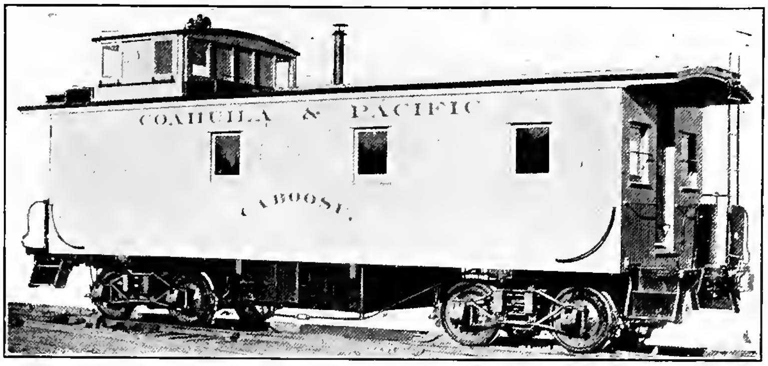


Fig. 122—Wooden Eight-Wheel Caboose. Builder, American Car & Foundry Co.

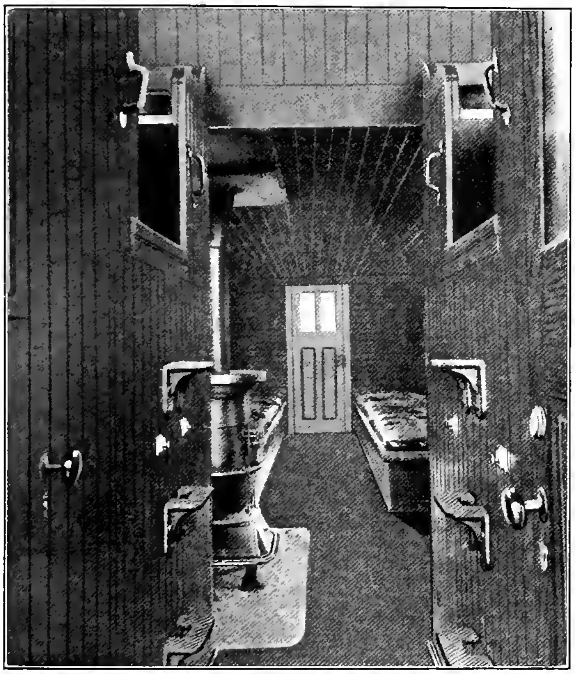


Fig. 123—Interior View of Caboose Shown in Fig. 125, Looking Away from Cupola.

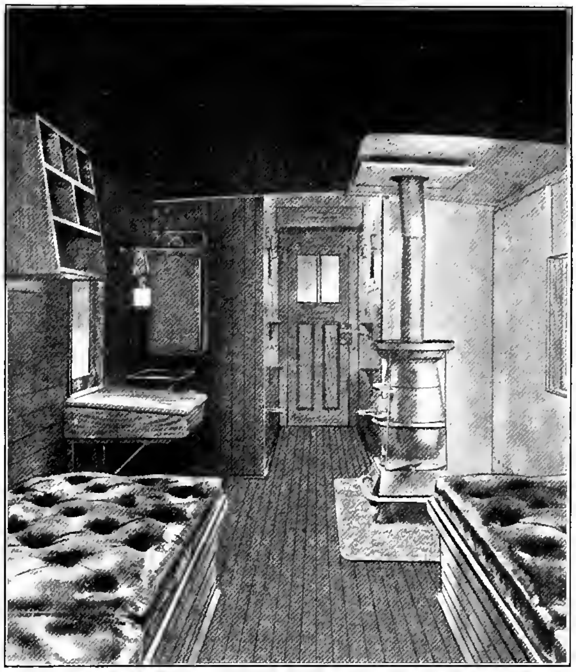


Fig. 124—Interior View of Caboose Shown in Fig. 125, Looking Toward Cupola.

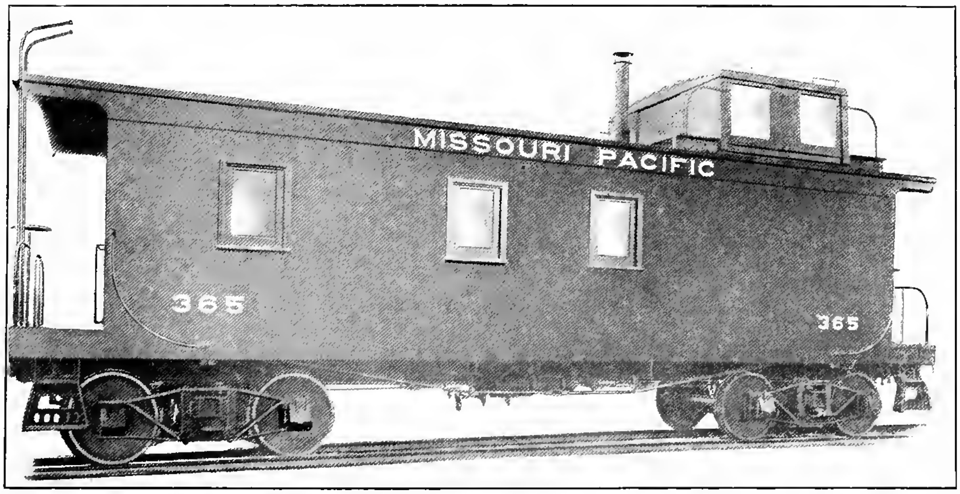


Fig. 125—Steel Underframe Eight-Wheel Caboose. Weight, 35,900 lbs. Builder, American Car & Foundry Co.

(See Figs. 123 and 124 for Interior Views and Fig. 383 for General Drawings.)

Fig. 126—Steel Baggage Car. Weight, 128,600 lbs. Builder, The Barney & Smith Car Co.

(See Fig. 231 for Floor Plan and Fig. 387 for General Drawings.)

Fig. 127—Interior View of Steel Baggage Car Shown in Fig. 126.

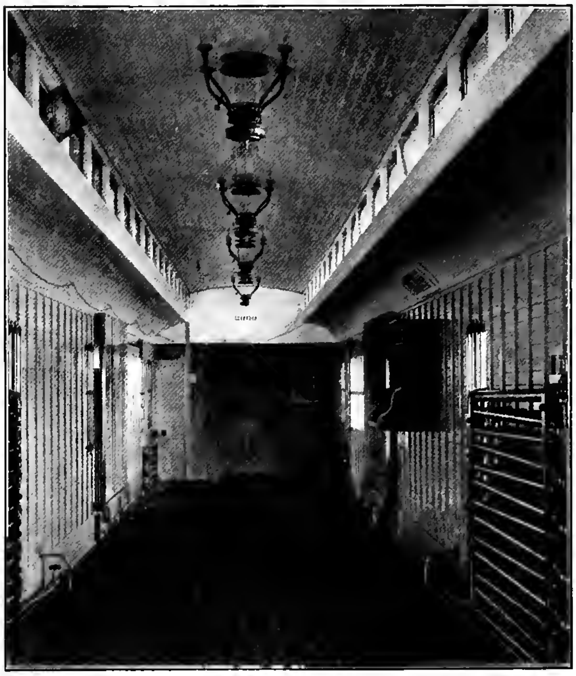


Fig. 128—Interior View of Steel Express Car Shown in Fig. 129.

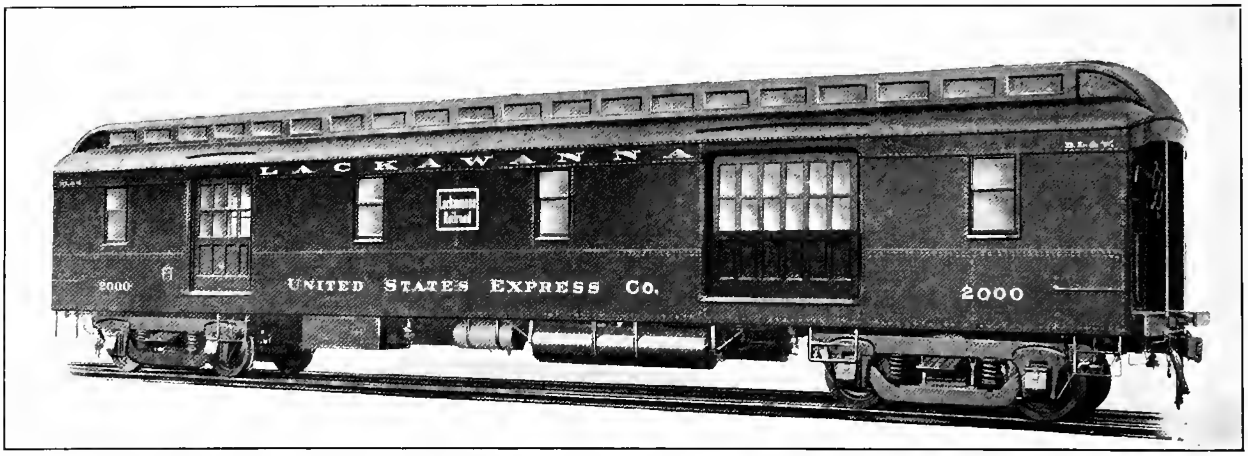


Fig. 129—Steel Express Car. Weight, 94,300 lbs.; Length Over End Sills, 60 ft. 9 in. Builder, American Car & Foundry Co.

Fig. 130—Steel Baggage Car. Builder, The Barney & Smith Car Co.

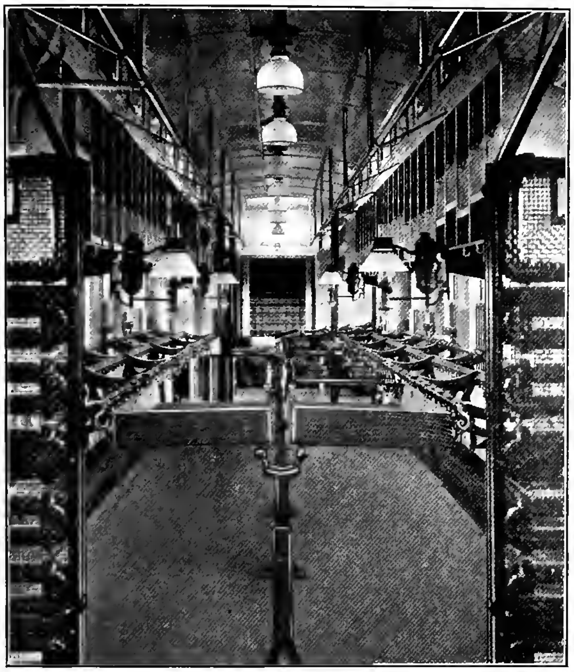


Fig. 131—Interior View of Steel Postal Car for the New York Central Lines. Builder, American Car & Foundry Co.

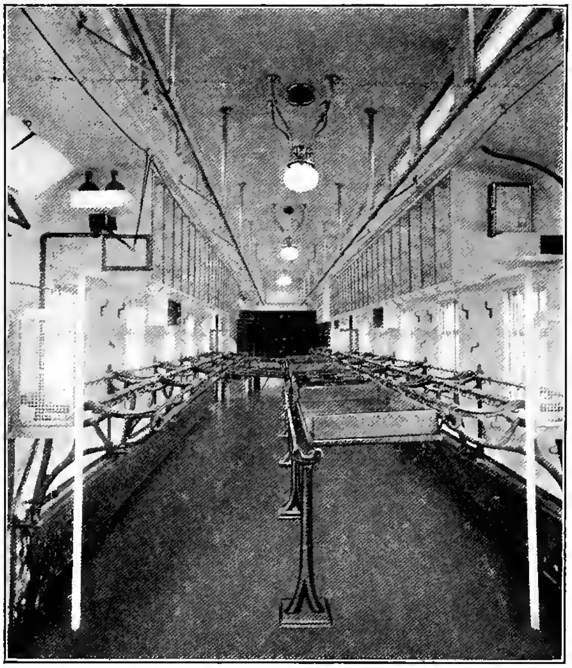


Fig. 132—Interior View of Steel Postal Car for the Missouri Pacific. Builder, American Car & Foundry Co.

Fig. 133—Steel Baggage and Express Car. Weight, 126,000 lbs. Length Over Buffers, 72 ft. 4½ in. Builder, American Car & Foundry Co.

Fig. 134—Steel Baggage and Postal Car. Weight, 118,700 lbs.; Length Over Buffers, 63 ft. 2⅞ in. Builder, The Barney & Smith Car Co.

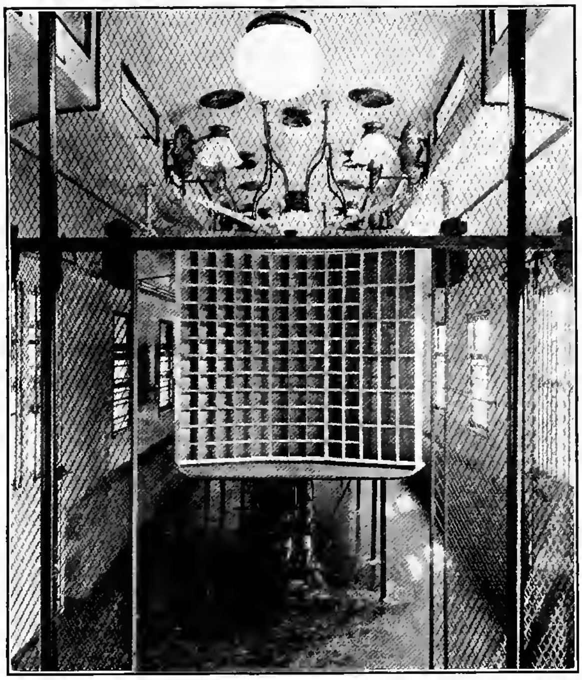


Fig. 135—Interior View of Steel Postal Car for the New York Central Lines. Builder, The Barney & Smith Car Co.

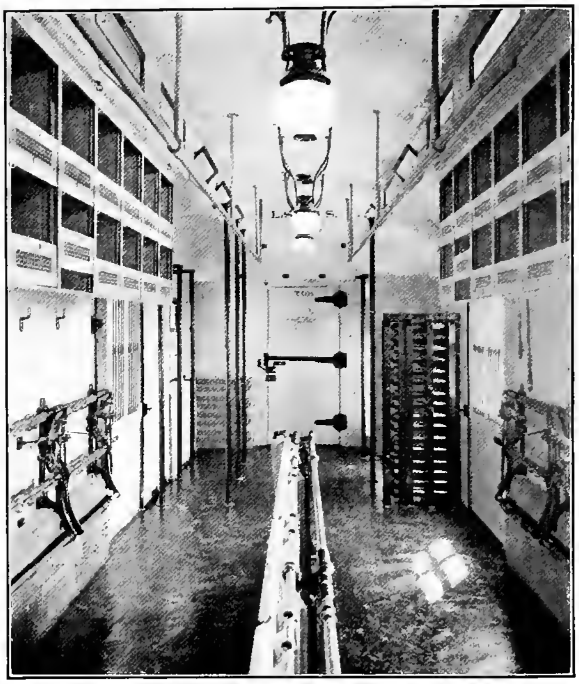


Fig. 136—Interior View of New York Central Lines Postal Car, Looking in Opposite Direction from That in Fig. 135.

Fig. 137—Steel Postal Car. Weight, 113,200 lbs. Builder, Pressed Steel Car Co.

(See Figs. 388, 389 and 390 for General Drawings.)

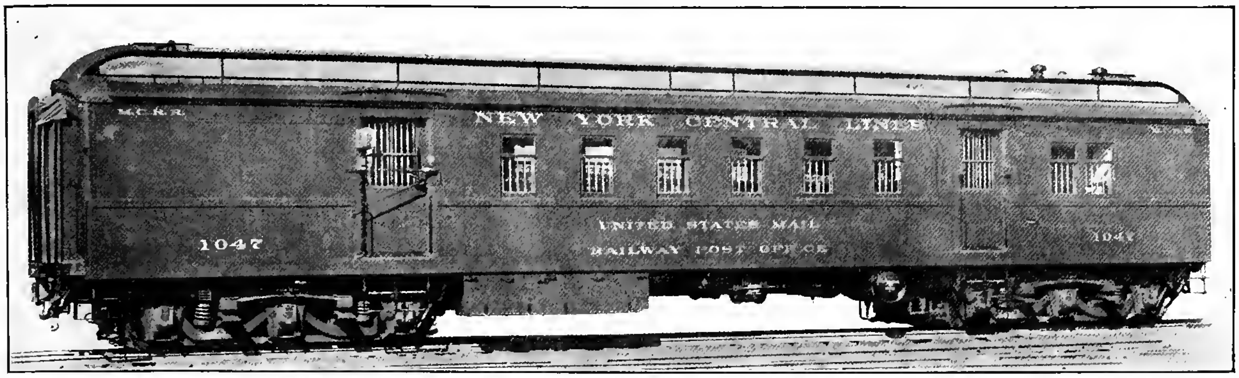


Fig. 138—Steel Postal Car. Weight, 121,700 lbs.; Length Over Buffers, 64 ft. 7¾ in. Builder, Pressed Steel Car Co.

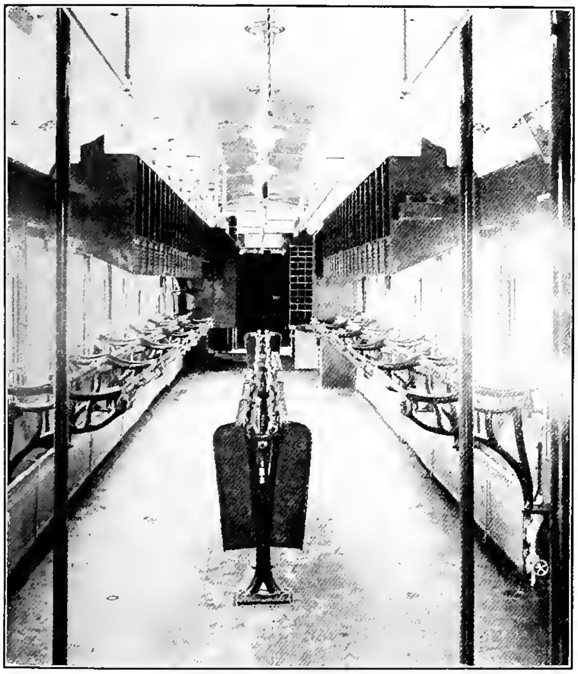


Fig. 139—Interior View of Pennsylvania Railroad Steel Postal Car.

Fig. 140—Interior View of Carolina, Clinchfield & Ohio Day Coach. Builder, The Harlan & Hollingsworth Corporation.

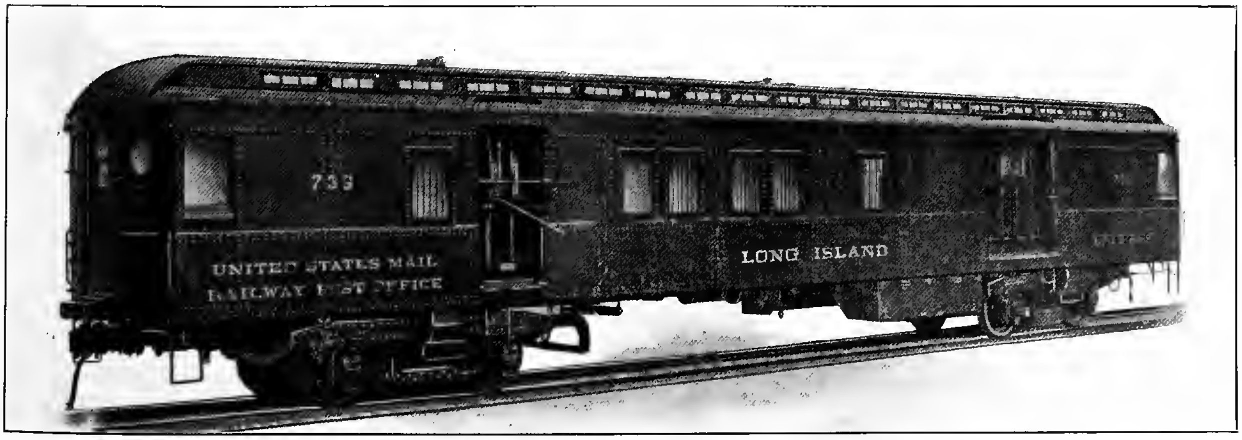


Fig. 141—Steel Postal and Express Car. Weight, 83,500 lbs. Length Over Buffers, 64 ft. 5¾ in. Builder, American Car & Foundry Co.

(See Fig. 401 for General Drawings.)

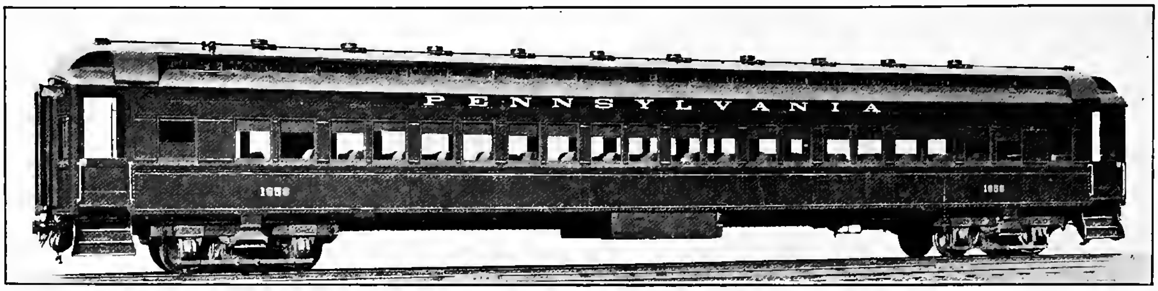


Fig. 142—Steel Vestibuled Day Coach. Weight, 116,000 lbs.; Length Over Body, 70 ft. 5¾ in. Builder, Pressed Steel Car Co.

(See Figs. 391-400 for General Drawings of Pennsylvania Railroad Steel Passenger Train Cars.)

Fig. 143—Interior View of Pennsylvania Steel Day Coach Shown in Fig. 142.

Fig. 144—Interior View of New York Central Lines Day Coach. The Interior Finish is Wood. Builder, The Barney & Smith Car Co.

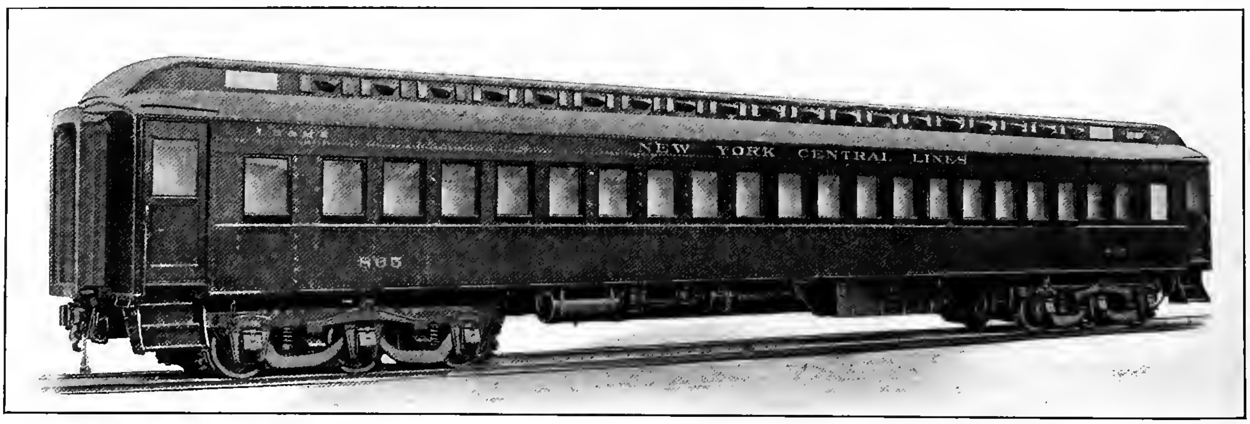


Fig. 145—Steel Vestibuled Day Coach. Weight, 142,000 lbs. Builder, American Car & Foundry Co.

(See Figs. 402-405 for General Drawings.)

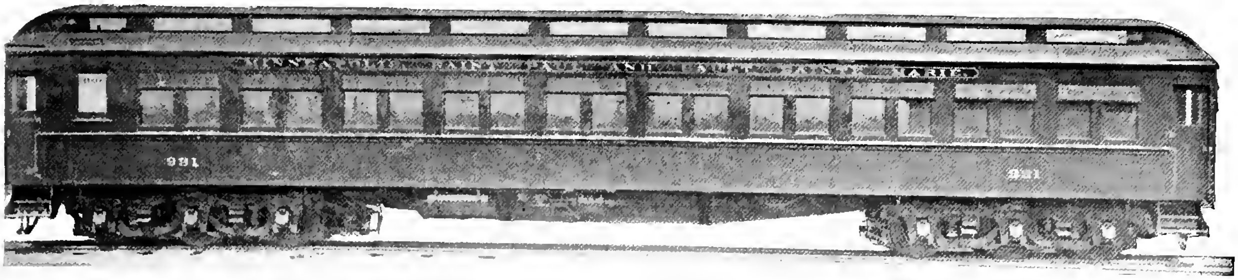


Fig. 146—Steel Vestibuled Day Coach. Weight, 126,500 lbs.; Length Over Buffers, 72 ft. 6¼ in. Builder, The Barney & Smith Car Co.

Fig. 147—Interior View of Baltimore & Ohio Day Coach. Builder, American Car & Foundry Co.

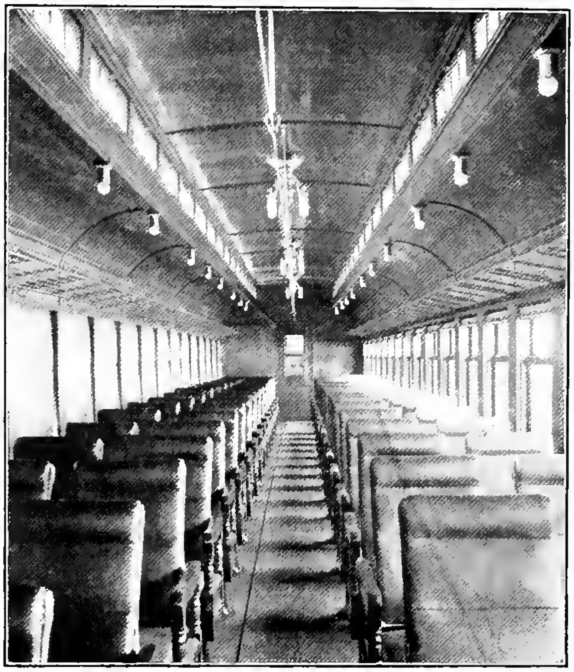


Fig. 148—Interior View of Reclining Chair Car. Builder, The Harlan & Hollingsworth Corporation.

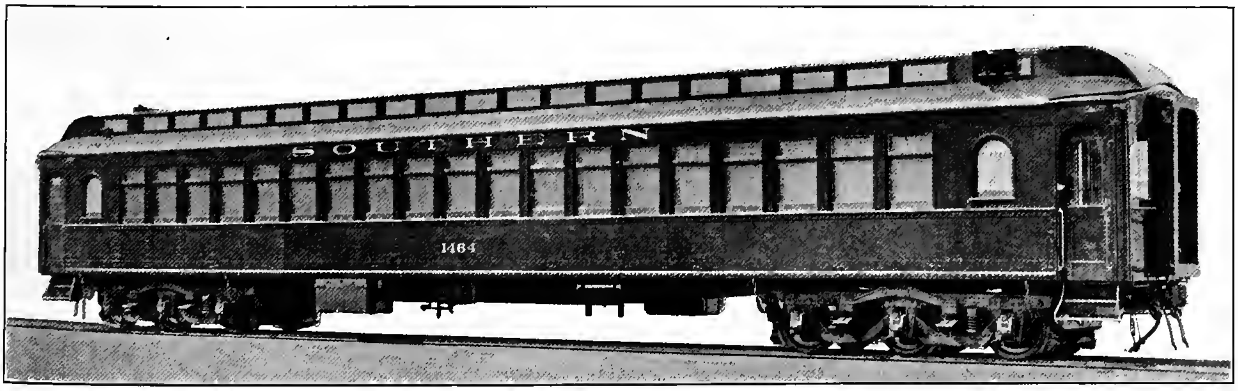


Fig. 149—Steel Frame Vestibuled Day Coach with Steel Sheathing Below Windows. Total Weight, 120,000 lbs.; Weight of Two Trucks, 39,000 lbs. Builder, The Harlan & Hollingsworth Corporation.

(See Fig. 239 for Floor Plan and Fig. 408 for General Drawings.)

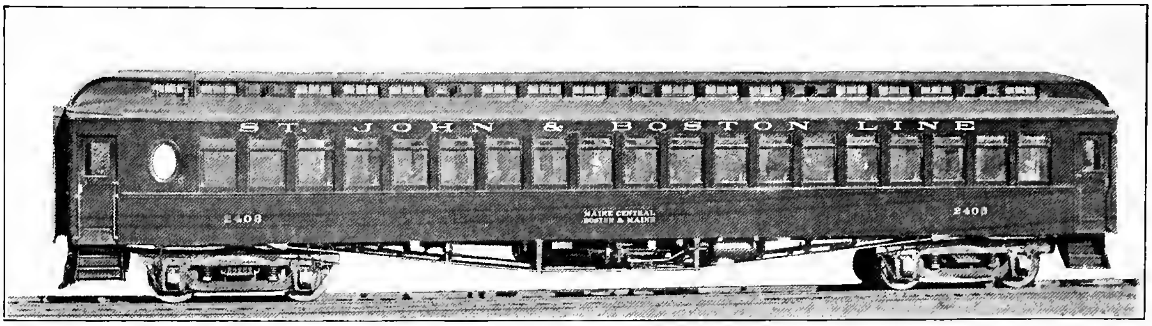


Fig. 150—Wooden Vestibuled Day Coach with Cast Steel Combined Double Body Bolsters and Platforms and 12 in. I-Beam Center Sills. Weight, 95,900 lbs.; Length Over End Sills, 62 ft.; Length Over Buffers, 69 ft. 7 in.; Length, Free, Over Coupling Lines, 70 ft. 2 in.; Seating Capacity, 76. Builder, Laconia Car Co.

Fig. 151—Interior View of Chicago, Burlington & Quincy Chair Car, Similar to the Car Shown in Fig. 153. Builder, The Barney & Smith Car Co.

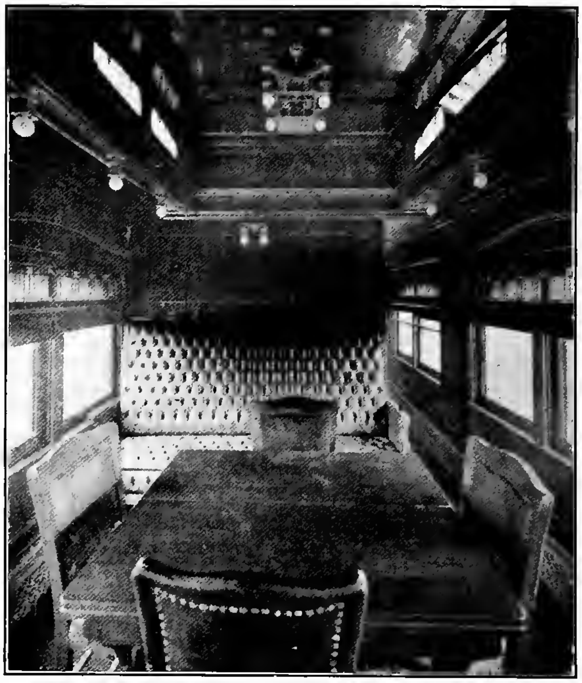


Fig. 152—Interior View of Dining Room of Business Car Shown in Fig. 155. Builder, The Barney & Smith Car Co.

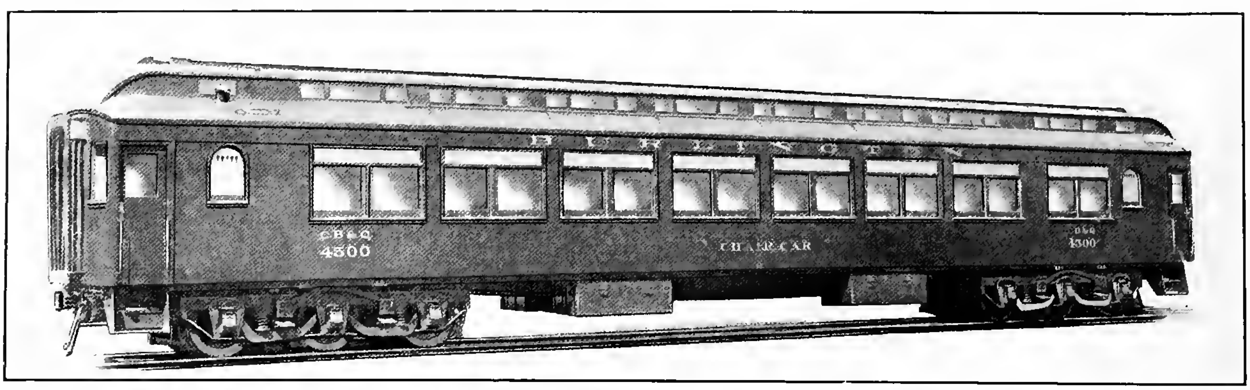


Fig. 153—Steel Underframe Vestibuled Chair Car. Weight, 120,500 lbs.; Length Over End Sills, 70 ft. Builder, American Car & Foundry Co.

(*See Fig. 240 for Floor Plan.*)

Fig. 154—Steel Underframe Vestibuled Coach with Side Doors for Suburban Traffic.

(*See Fig.* 409 *for General Drawings.*)

Fig. 155—Interior View of Observation Room of Western Maryland Business Car. See Also Fig. 152.

(*See Fig.* 251 *for Floor Plan.*)

Fig. 156—Interior View of Grand Trunk Pacific Dining Car, Looking Away from Kitchen. Builder, Canadian Car & Foundry Co.

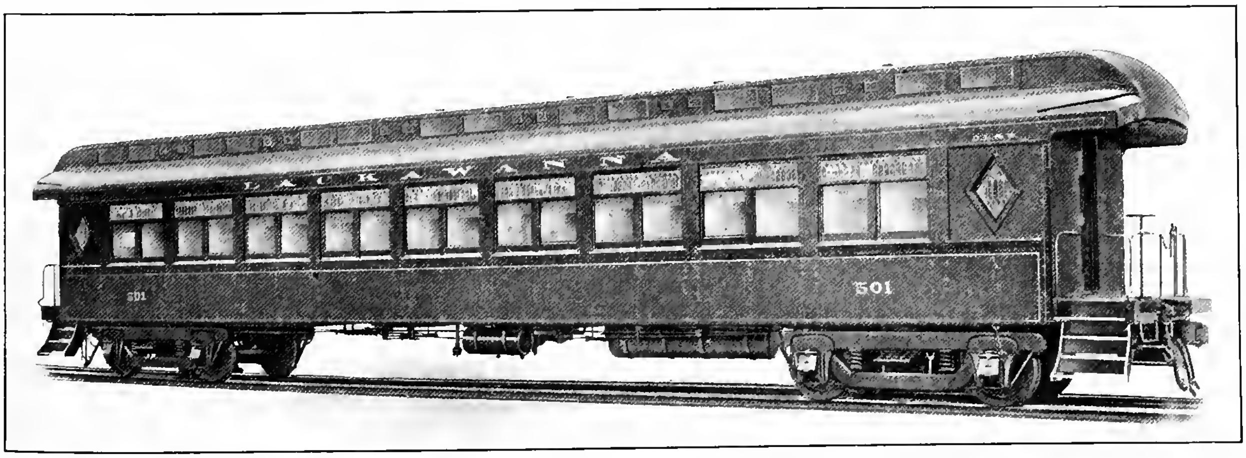


Fig. 157—Steel Open Platform Day Coach. Weight, 100,000 lbs.; Length Over Body, 60 ft. 7½ in. Builder, American Car & Foundry Co.

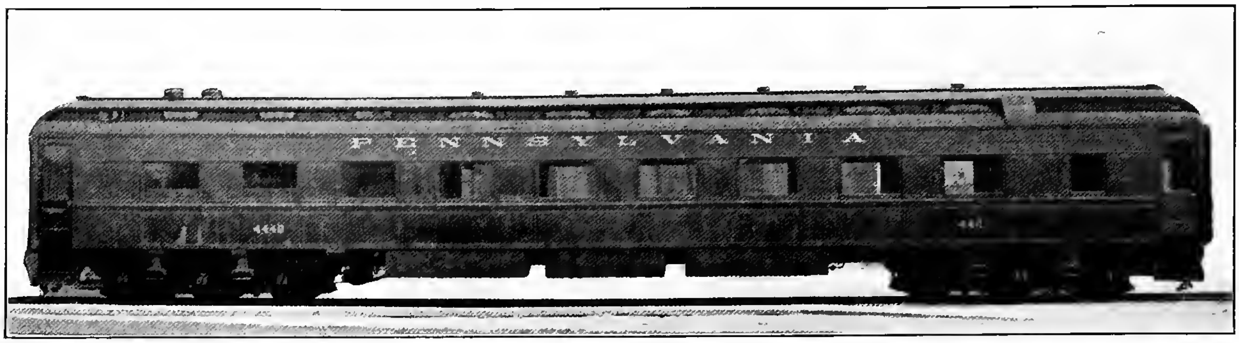


Fig. 158—Steel Vestibuled Dining Car. Weight, 155,000 lbs.; Length Over End Sills, 72 ft.

(See Figs. 391-400 for General Drawings of Pennsylvania Railroad Steel Passenger Train Cars.)

Fig. 159—Entrance from Dining Room to Pantry and Corridor.

Fig. 160—Kitchen, Looking Toward Pantry.

Interior Views of St. Louis & San Francisco Dining Car Shown in Fig. 161.

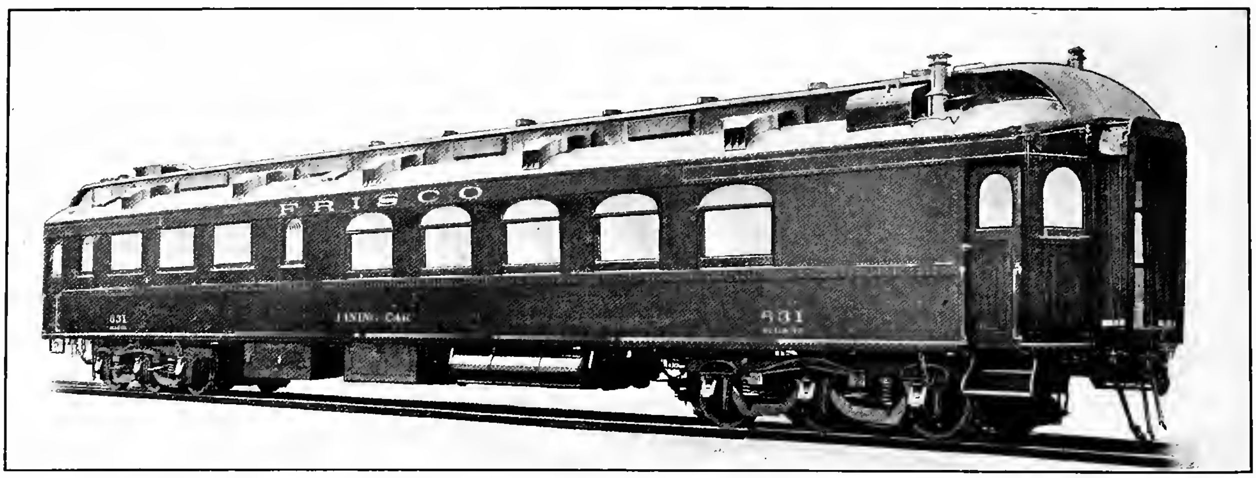


Fig. 161—Steel Vestibuled Dining Car. Builder, American Car & Foundry Co.

(See Figs. 159, 160 and 163 for Interior Views.)

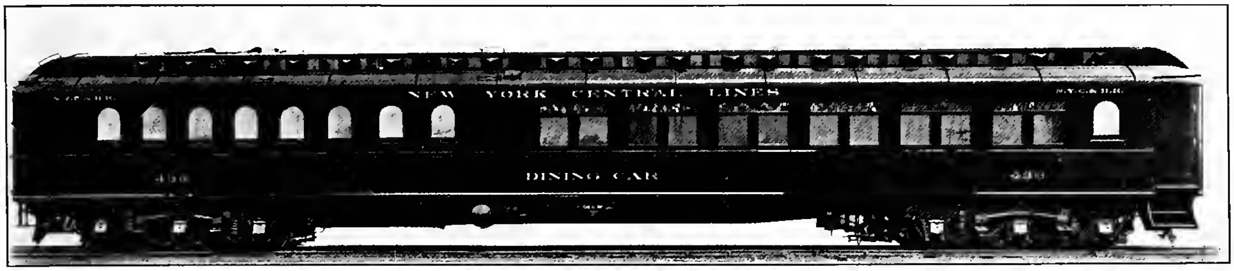


Fig. 162—Steel Vestibuled Dining Car. Weight, 152,500 lbs. Builder, The Barney & Smith Car Company.

(See Figs. 406 and 407 for General Drawings.)

Fig. 163—Interior View of Dining Room of St. Louis & San Francisco Dining Car Shown in Fig. 161.

Fig. 164—Interior View of Northern Pacific Dining Car. Builder, The Barney & Smith Car Company.

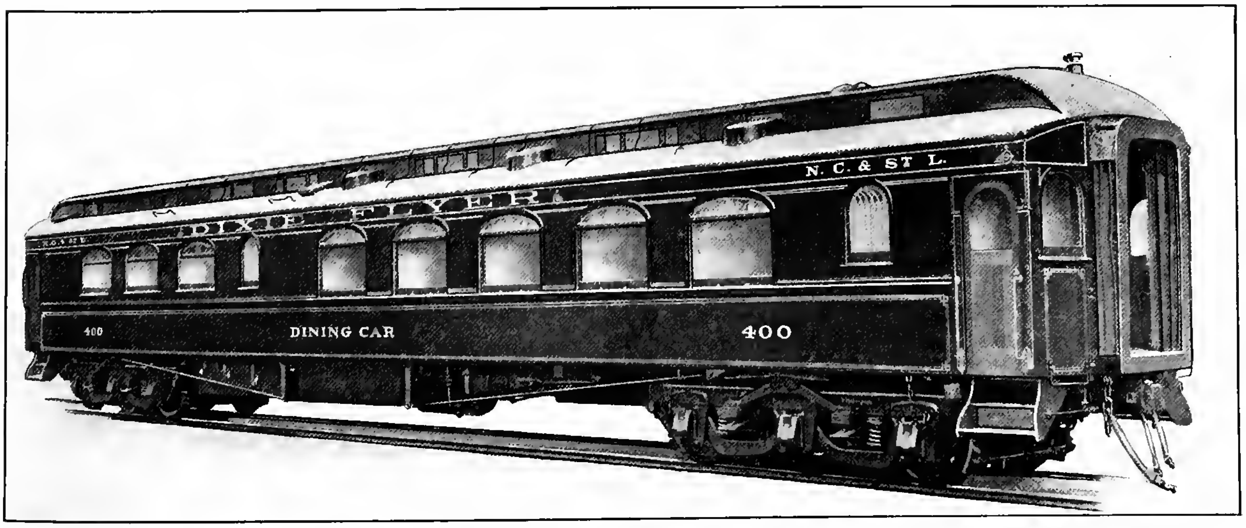


Fig. 165—Steel Underframe Vestibuled Dining Car. Weight, 132,200 lbs.; Length Over End Sills, 70 ft. Builder, American Car & Foundry Company.

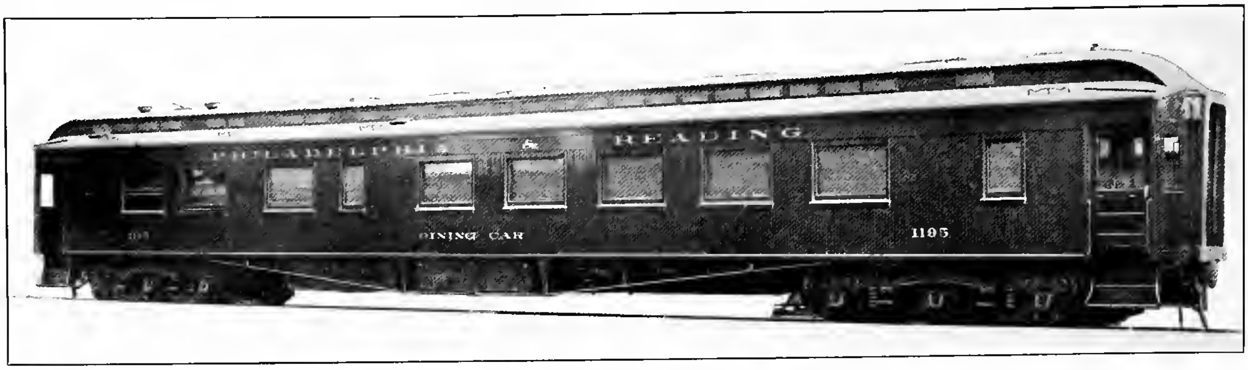
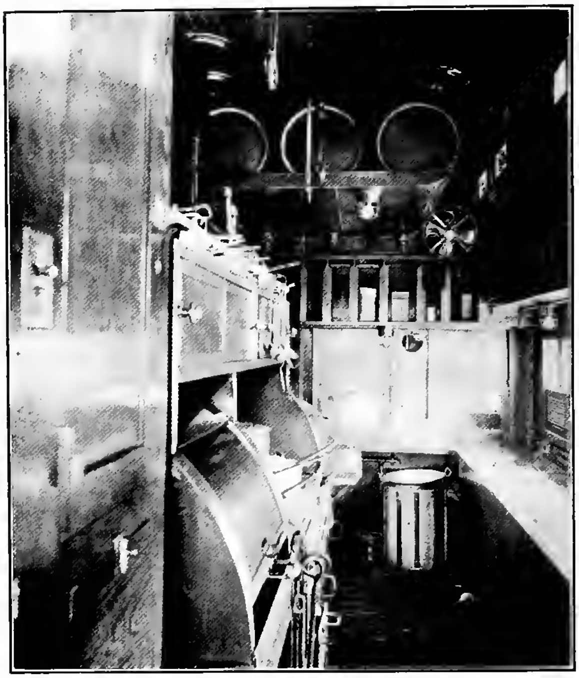


Fig. 166—Vestibuled Dining Car with Steel Frame and Ends. Weight, Complete, 175,000 lbs.; Weight of Trucks, 49,600 lbs. Builder, The Harlan & Hollingsworth Corporation.

(See Fig. 241 for Floor Plan and Figs. 167 and 168 for Interior Views.)



Figs. 167 and 168—Dining Room and Kitchen of Philadelphia & Reading Dining Car Shown in Fig. 166.

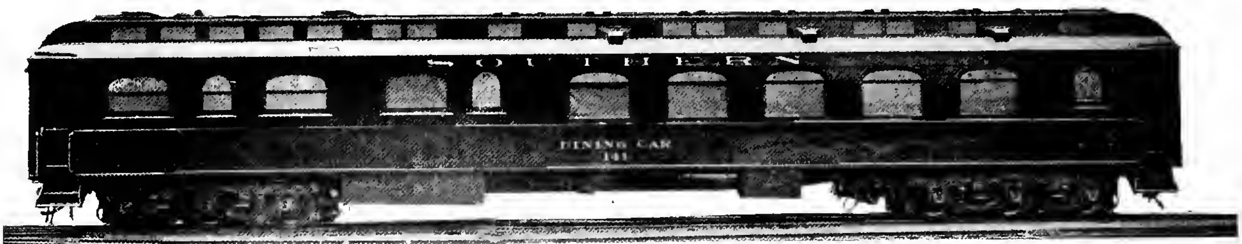


Fig. 169—Vestibuled Dining Car with Steel Frame and Steel Sides Below Windows. Weight, 139,400 lbs.; Length Over Buffers, 80 ft. 3¾ in. Builder, The Barney & Smith Car Company.

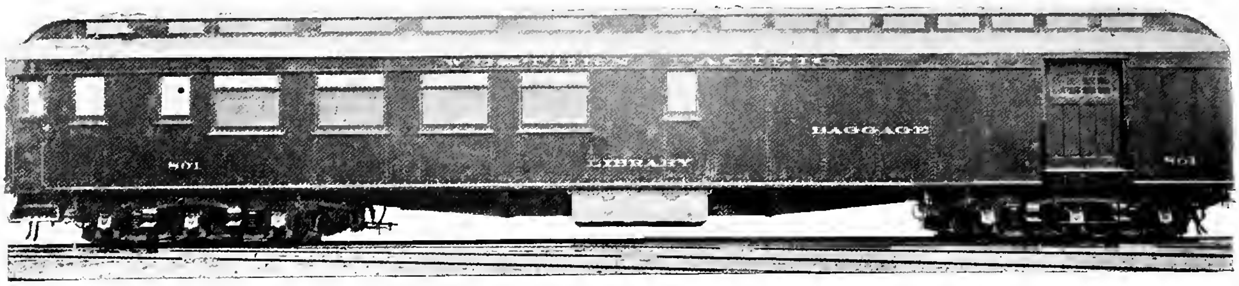


Fig. 170—Steel Vestibuled Combination Baggage, Parlor and Library Car. Weight, 138,500 lbs.; Length Over Buffers, 74 ft. 8¾ in. Builder, The Barney & Smith Car Company. See also Fig. 236.

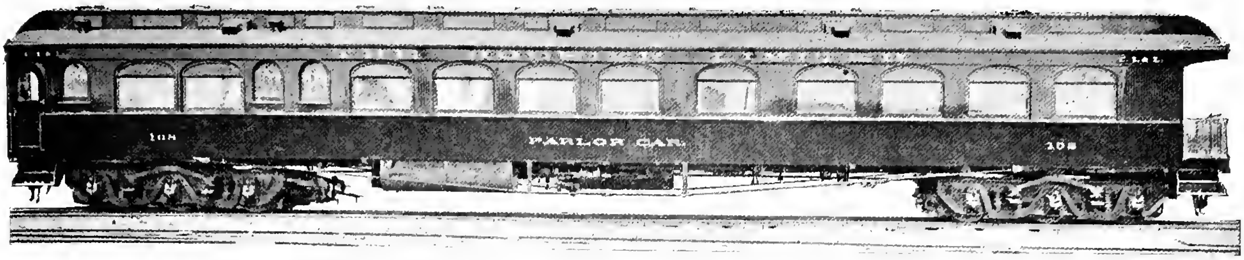


Fig. 171—Wooden Observation Parlor Car. Weight, 131,800 lbs.; Length Over Buffers, 83 ft. 8¼ in. Builder, The Barney & Smith Car Company.

(See Fig. 173 for Interior View.)

Fig. 172—Interior View of Chicago, Burlington & Quincy Dining Car. Builder, The Barney & Smith Car Company.

Fig. 173—Interior View of Chicago, Indianapolis & Louisville Parlor Car Shown in Fig. 171.

Fig. 174—Steel Underframe Vestibuled Buffet-Library Car. Builder, The Barney & Smith Car Company.

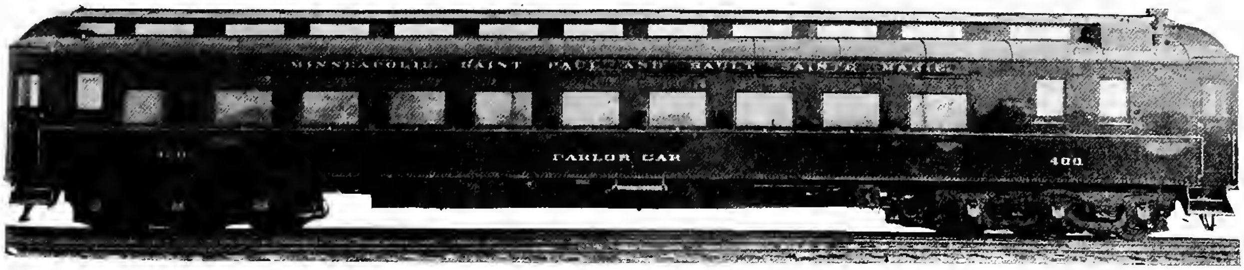


Fig. 175—Steel Vestibuled Parlor Car. Weight, 135,600 lbs.; Length Over Buffers, 80 ft. 4¾ in. Builder, The Barney & Smith Car Company.

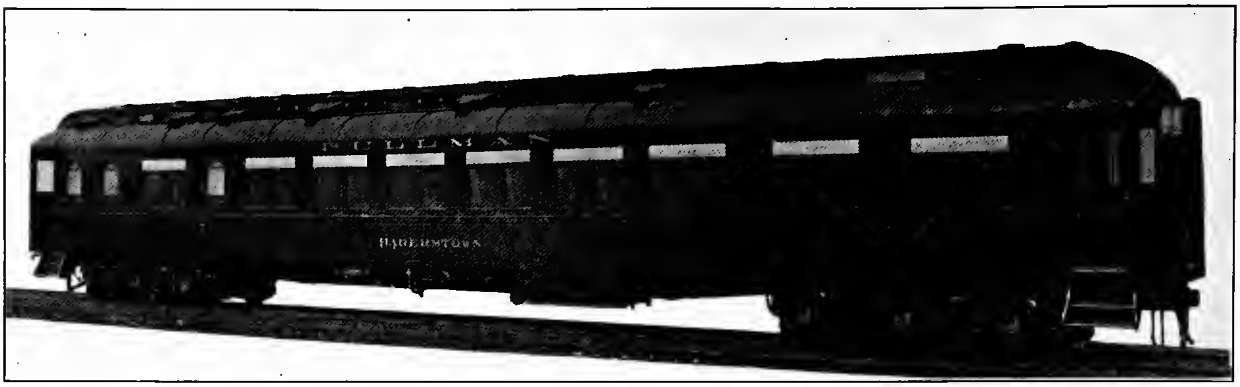


Fig. 176—Steel Vestibuled Sleeping Car. Weight, 150,000 lbs. Builder, The Pullman Company.
(See Fig. 181 for Interior View and Figs. 411-414, 416-418 and 420 for General Drawings.)

Fig. 177—Interior View of Steel Parlor Car. Builder, The Pullman Company.

Fig. 178—Interior View of Canadian Northern Parlor-Cafe Car. Builder, Canadian Car & Foundry Company.

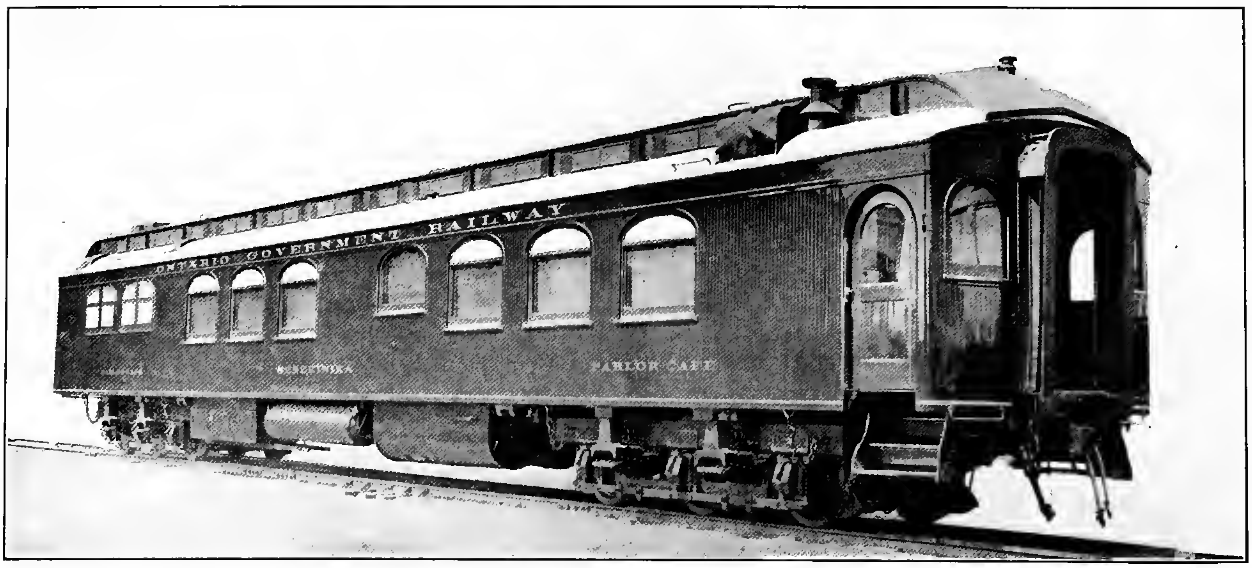


Fig. 179—Steel Frame Vestibuled Parlor-Cafe Car. Weight, 140,000 lbs. Builder, Canadian Car & Foundry Company.
(See Fig. 246 for Floor Plan.)

Fig. 180—Steel Vestibuled Sleeping Car. Weight, 142,300 lbs. Builder, The Barney & Smith Car Company.

(See Fig. 182 for Interior View and Fig. 410 for General Drawings.)

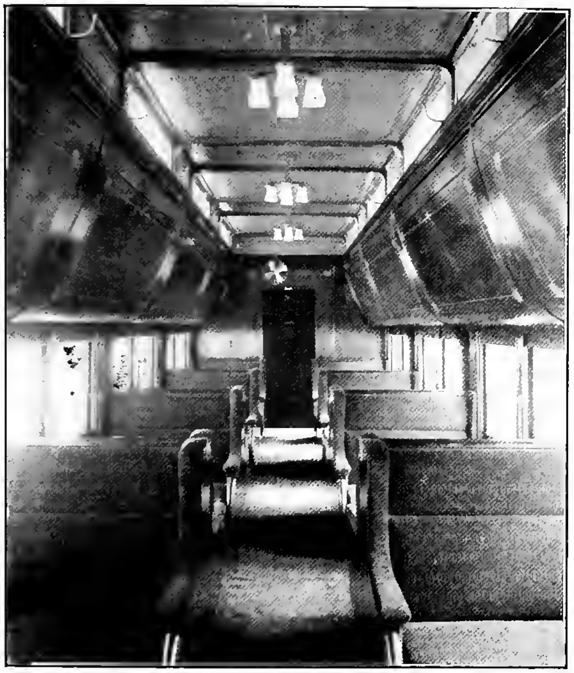


Fig. 181—Interior View of Pullman Steel Sleeping Car Shown in Fig. 176.

Fig. 182—Interior View of Steel Sleeping Car Shown in Fig. 180.

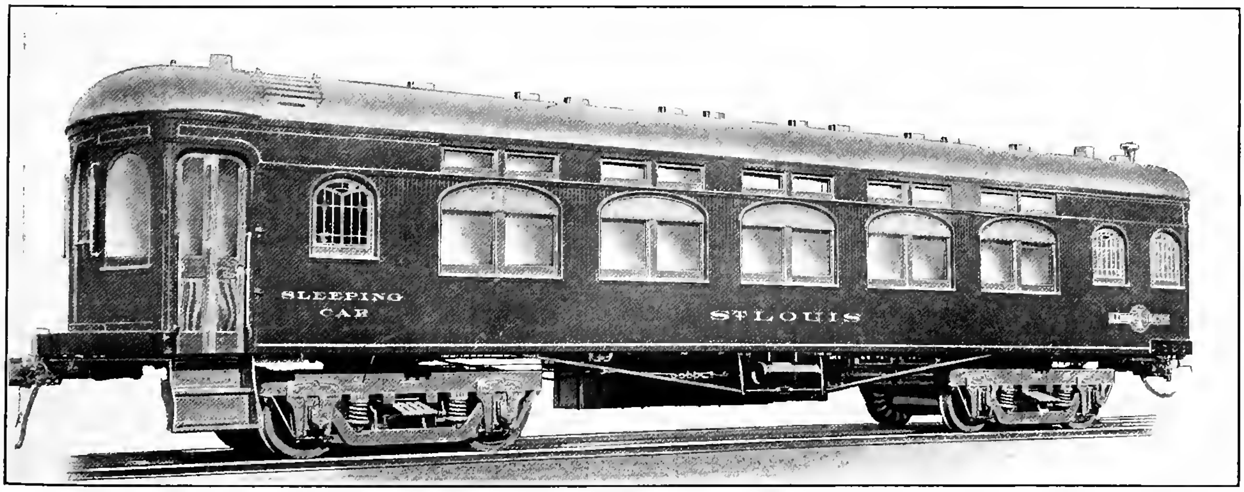


Fig. 183—Wooden Vestibuled Sleeping Car for Electric Interurban Service. Weight, 74,600 lbs.; Length Over End Sills, 51 ft. 4 in. Builder, American Car & Foundry Company.

Fig. 184—Wooden Vestibuled Compartment Sleeping Car. Builder, The Barney & Smith Car Company.

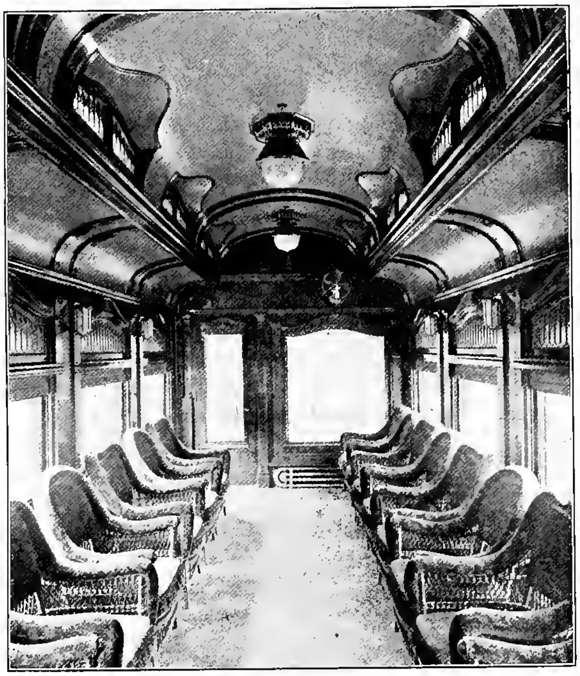


Fig. 185—Observation Room of Chicago, Milwaukee & St. Paul Observation-Buffet Car. Builder, The Barney & Smith Car Company.

Fig. 186—View Through Compartments, Chicago, Milwaukee & St. Paul Compartment Sleeping Car. Builder, The Barney & Smith Car Co.

Fig. 187—Interior of Observation Room, Northern Pacific Observation-Buffet Car. Builder, The Barney & Smith Car Company.

Fig. 188—Interior of Women's Reception Room, Chicago, Burlington & Quincy Lounging Car. Builder, The Barney & Smith Car Company.

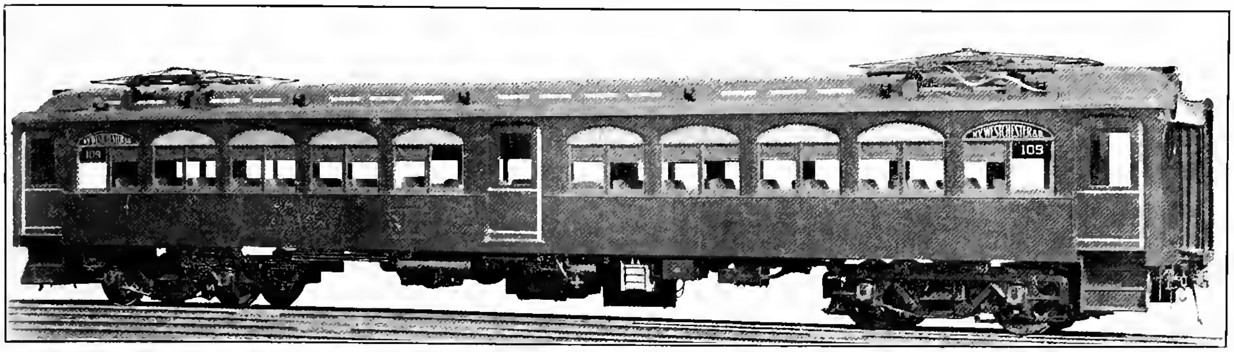


Fig. 189—Steel Vestibuled Electric Motor Car for Suburban Service. Weight Without Motors, 107,200 lbs.; Weight Complete, 120,000 lbs. Builder, Pressed Steel Car Company.

(*See Fig. 422 for General Drawings.*)

Fig. 190—Steel Subway Car Shown in Fig. 192.

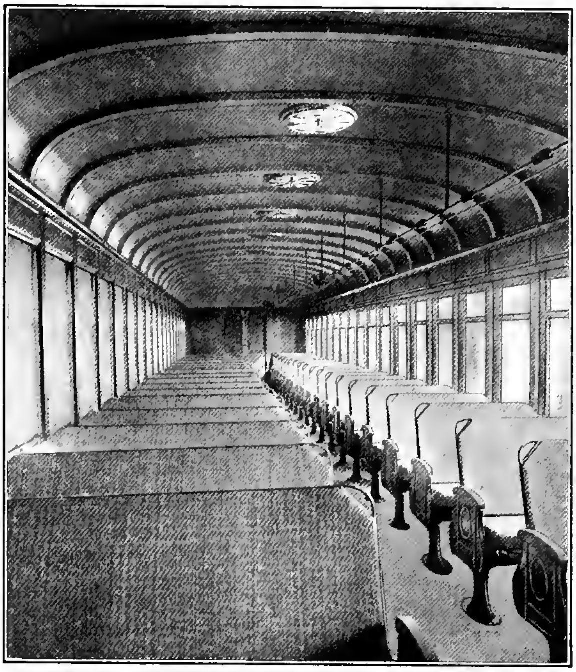


Fig. 191—Steel Suburban Car Shown in Fig. 194.

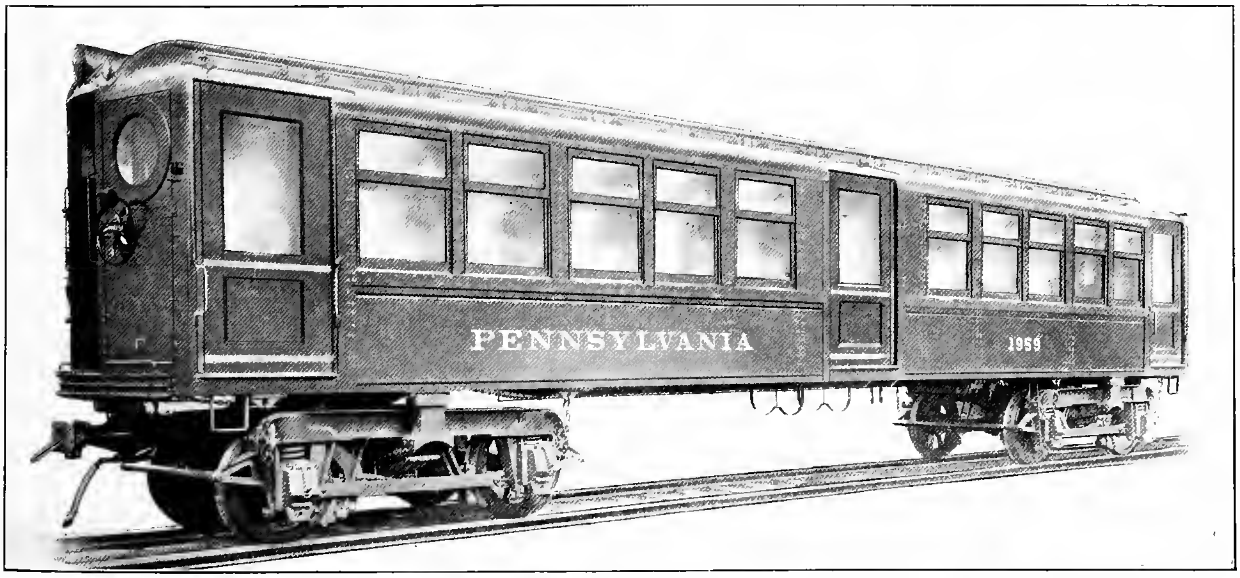


Fig. 192—Steel Vestibuled Electric Motor Car for Subway Service. Weight, 52,900 lbs.; Length Over End Sills, 48 ft. Builder, American Car & Foundry Company.

(*See Fig. 190 for Interior View.*)

Fig. 193—Steel Vestibuled Electric Motor Car for Interurban Service. Builder, St. Louis Car Company.

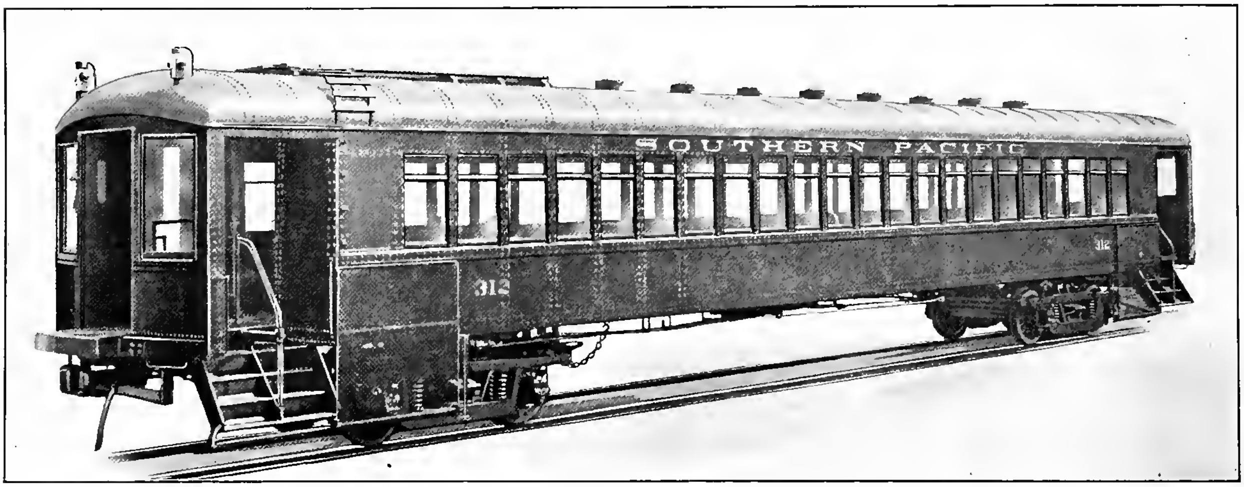


Fig. 194—Steel Vestibuled Electric Motor Car for Suburban Service. Weight, 77,600 lbs.; Length Over Buffers, 69 ft. 10 in. Builder, American Car & Foundry Company.

(See Fig. 191 for Interior View.)

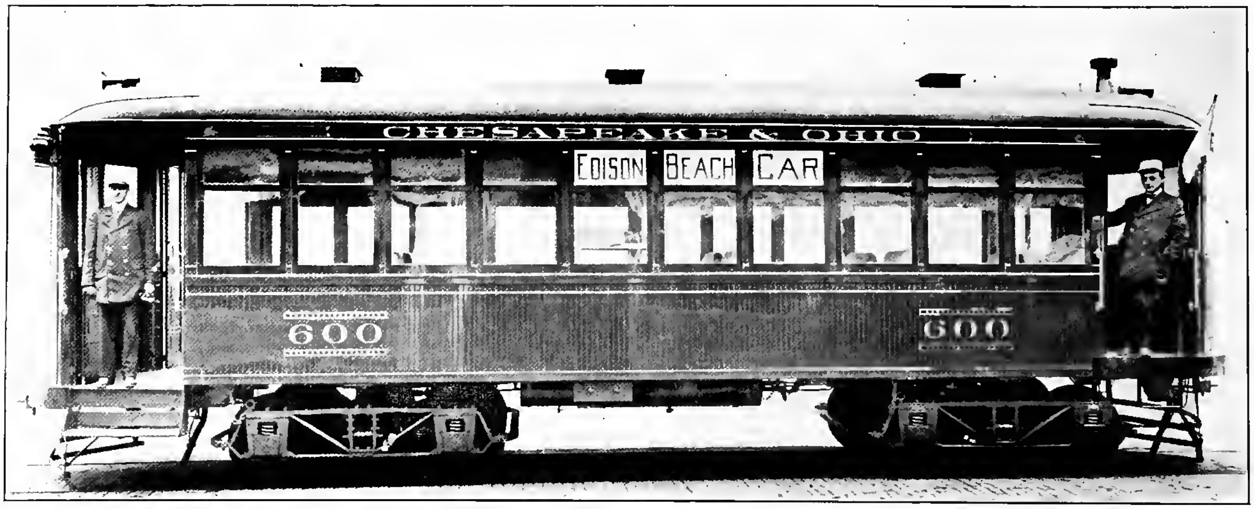


Fig. 195—Wooden Electric Motor Car Operated by Current from Edison Storage Batteries. The Wheels Rotate on the Axles. Weight of Battery, 4,600 lbs.; Weight, Including Battery, 34,600 lbs. Builder, Federal Storage Battery Car Company.

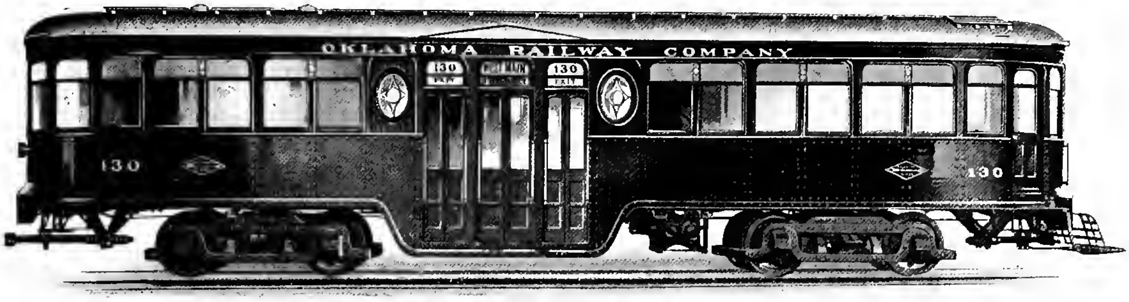


Fig. 196—Steel Electric Motor Car. Weight, Including Motors, 52,000 lbs.; Length Over Buffers, 48 ft. 7⅝ in. Builder, Niles Car & Manufacturing Company.

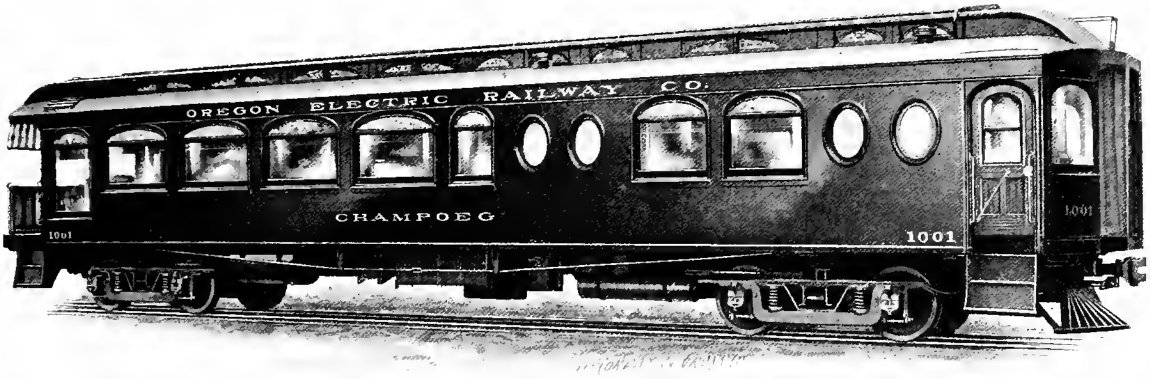


Fig. 197—Wooden Electric Motor Buffet-Observation Parlor Car for Interurban Service. Weight, Including Motors, 88,000 lbs.; Length Over Buffers, 62 ft. 1¾ in. Builder, Niles Car & Manufacturing Company.

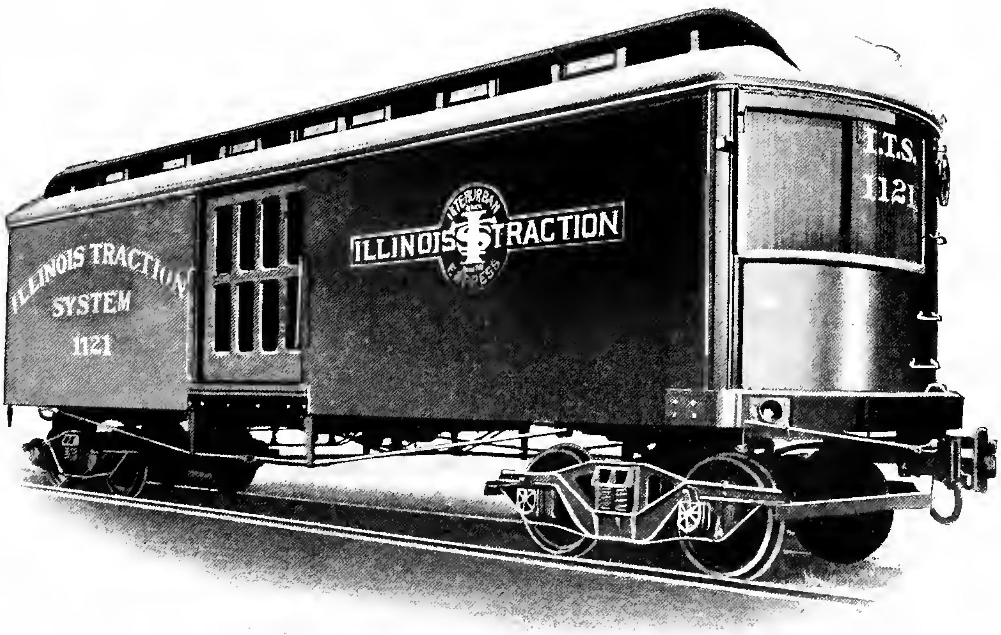


Fig. 198—Wooden Trailer Express Car for Interurban Service. Length Over Buffers, 41 ft. 5 in. Builder, McGuire-Cummings Manufacturing Company.

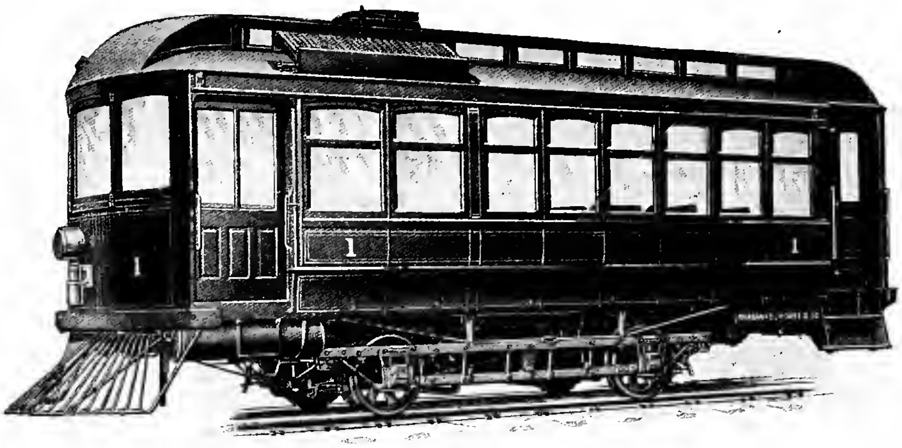


Fig. 199—Wooden Gasolene Motor Car. Weight, 26,000 lbs.; Length Over Vestibules, 32 ft. Seating Capacity, 35. Brake Horse Power of Engine, 50. Builder, Fairbanks, Morse & Co.

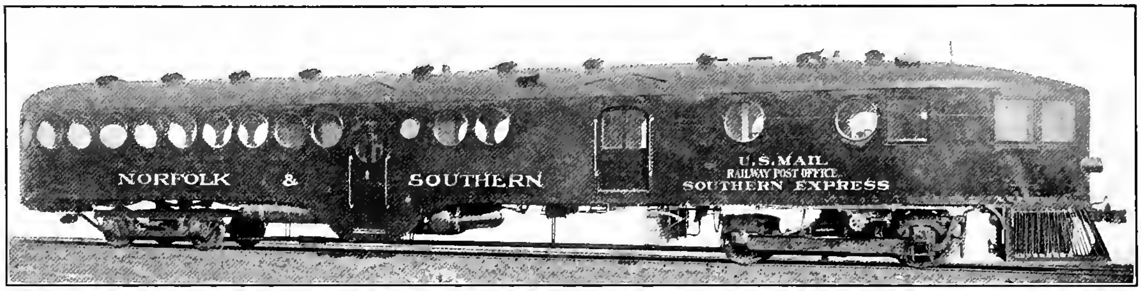


Fig. 200—Steel Gasolene Motor Car. Weight, 68,000 lbs.; Length Over Ends, 70 ft. Seating Capacity, 64. Builder, McKeen Motor Car Company.

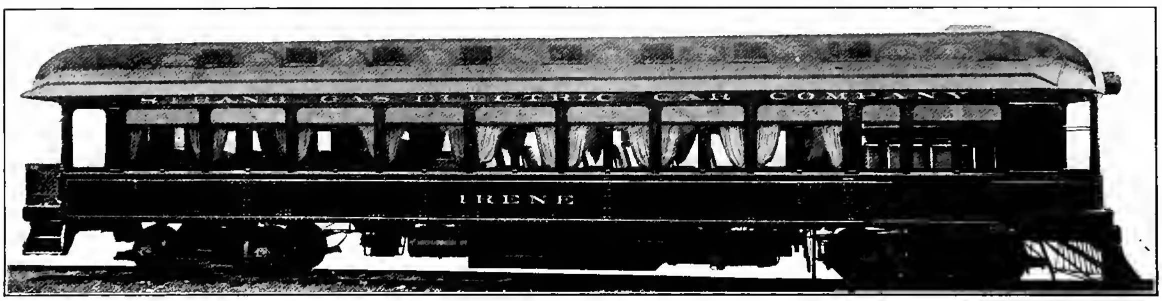


Fig. 201—Steel Gas-Electric Motor Car. Builder, Strang Gas-Electric Car Company.

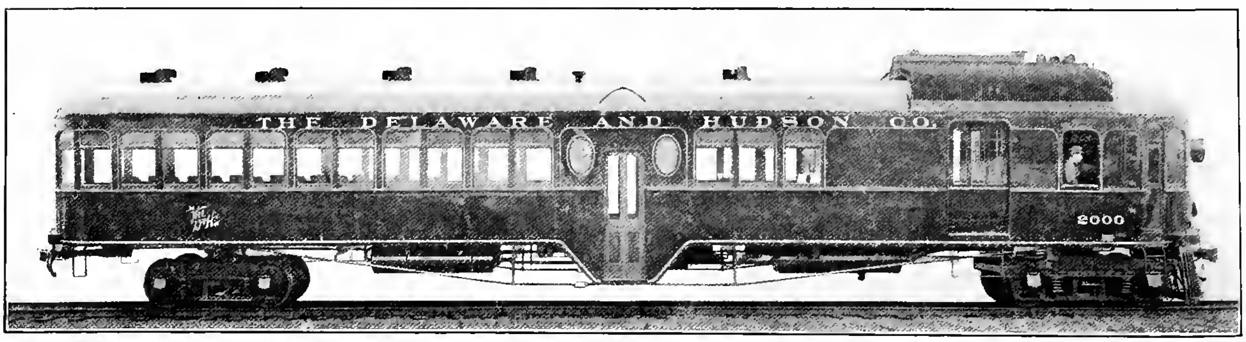


Fig. 202—Steel Gas-Electric Motor Car. Weight, 98,000 lbs.; Length Over Buffers, 68 ft. 7 in.; Seating Capacity, 91; Number of Motors, 2; Total Horse Power, 200; Voltage, 600 Direct Current. Builder, General Electric Company.

Fig. 203—All-Steel Mine Car. Builder, Ralston Steel Car Company.

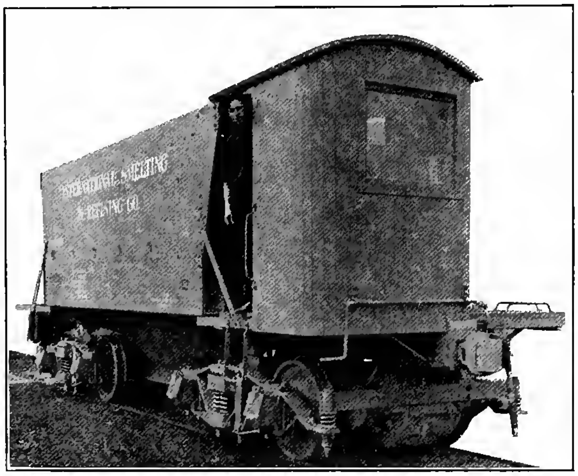


Fig. 204—All-Steel 50-Ton Capacity Ore Car on Motor Trucks. Builder, Summers Steel Car Company.

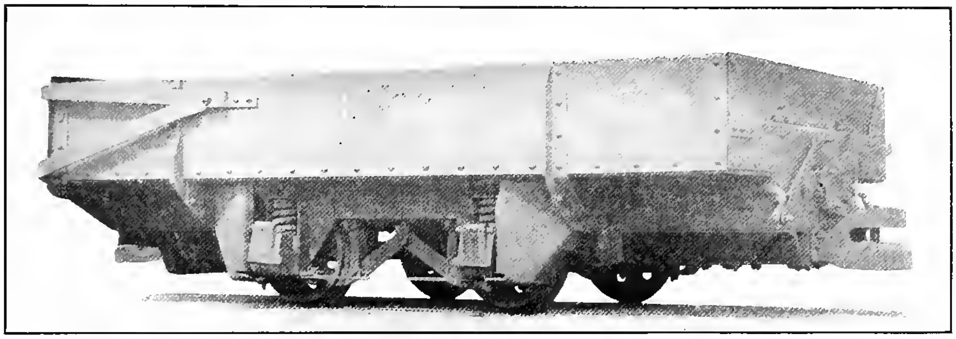


Fig. 205—All-Steel Mine Car. Builder, Pressed Steel Car Company.

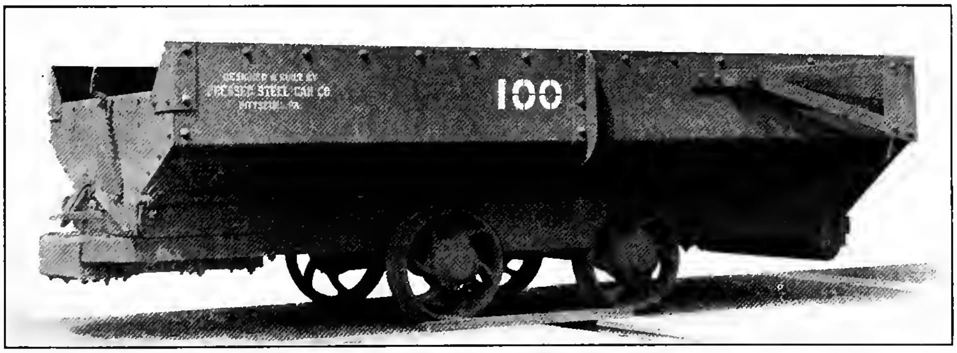


Fig. 206—All-Steel Mine Car. Builder, Pressed Steel Car Company.

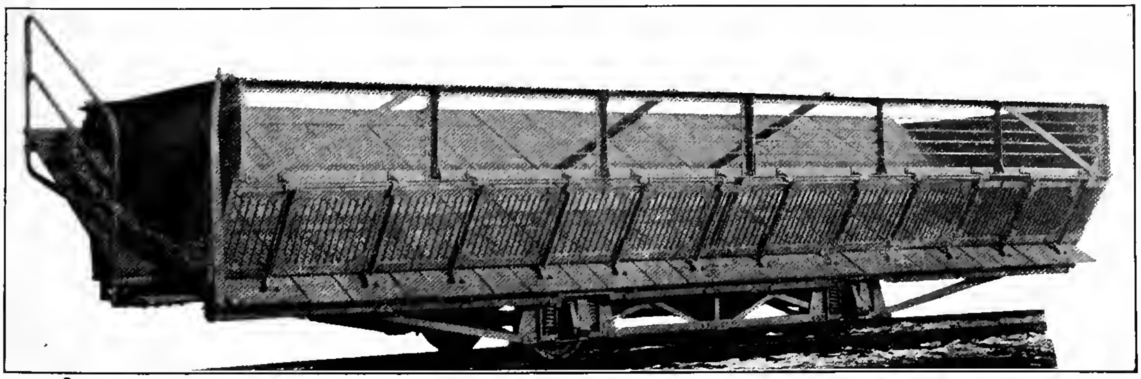


Fig. 207—All-Steel 10-Ton Capacity Car for Quenching Coke. Builder, Middletown Car Company.

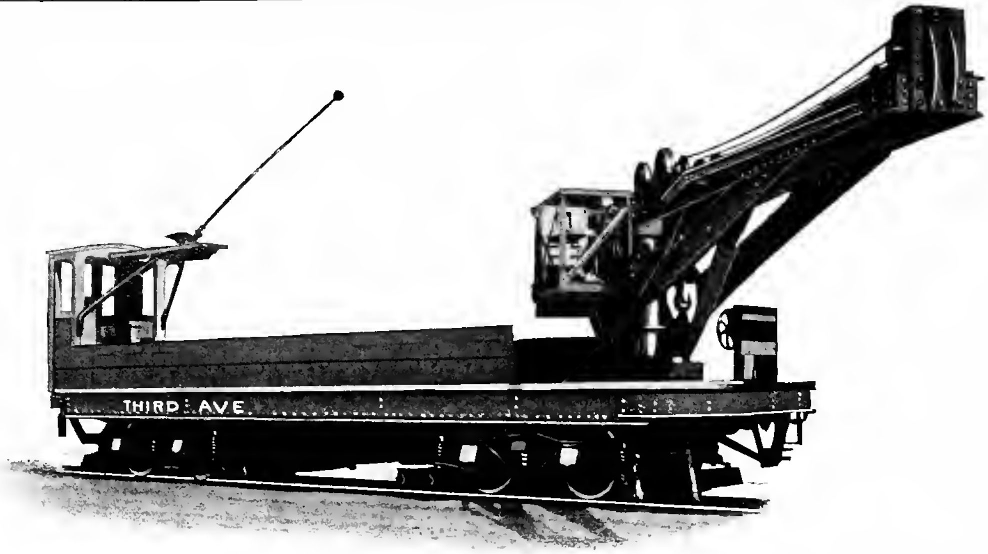


Fig. 208—Electric Motor 30-Ton Capacity Flat Ca r, Equipped with 6-Ton Capacity Electric Crane, Radius, 18 ft. Builder, McGuire-Cummings Manufacturing Company.

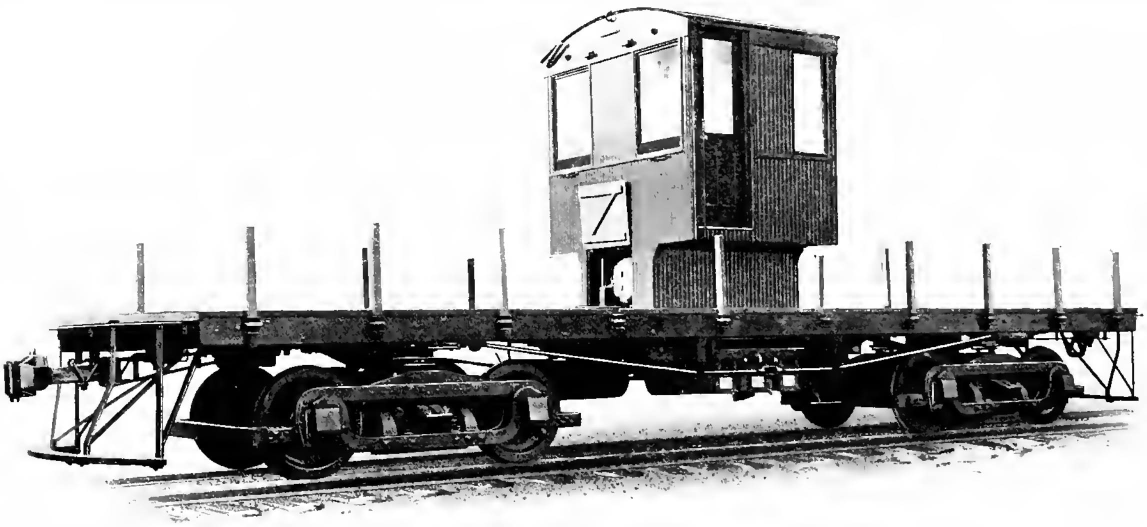


Fig. 209—Electric Motor Flat Car for Construction Work. Builder, Niles Car & Manufacturing Company.

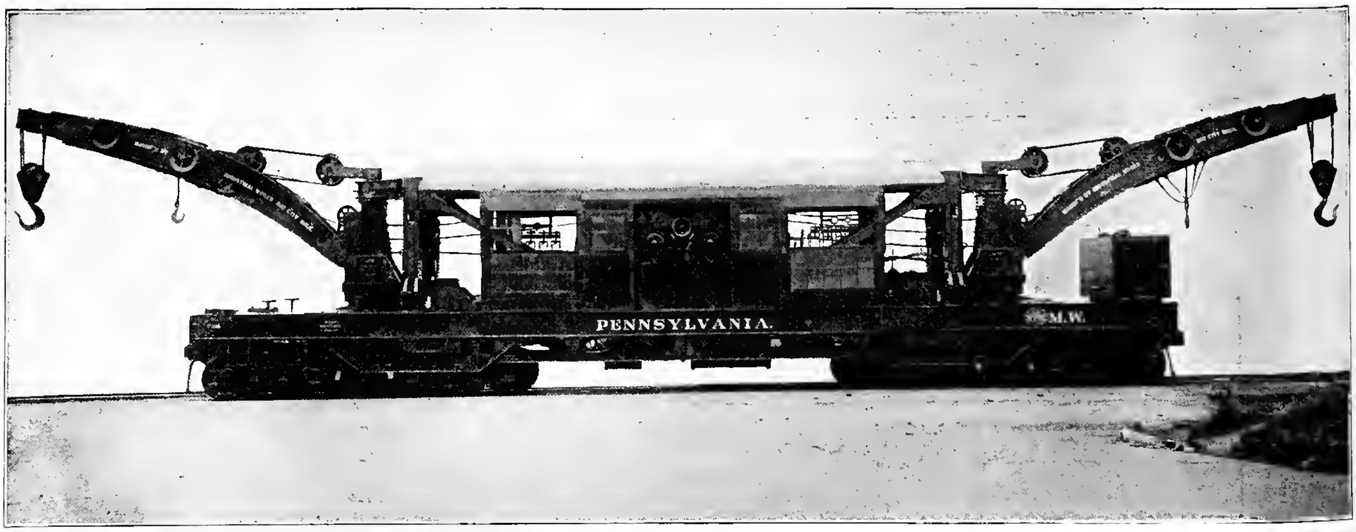


Fig. 210—Electric Wrecking Crane for Use in Tunnels. Weight, 326,000 lbs.; Lifting Capacity at 17 ft. Radius, 50 Tons. Builder, Industrial Works.

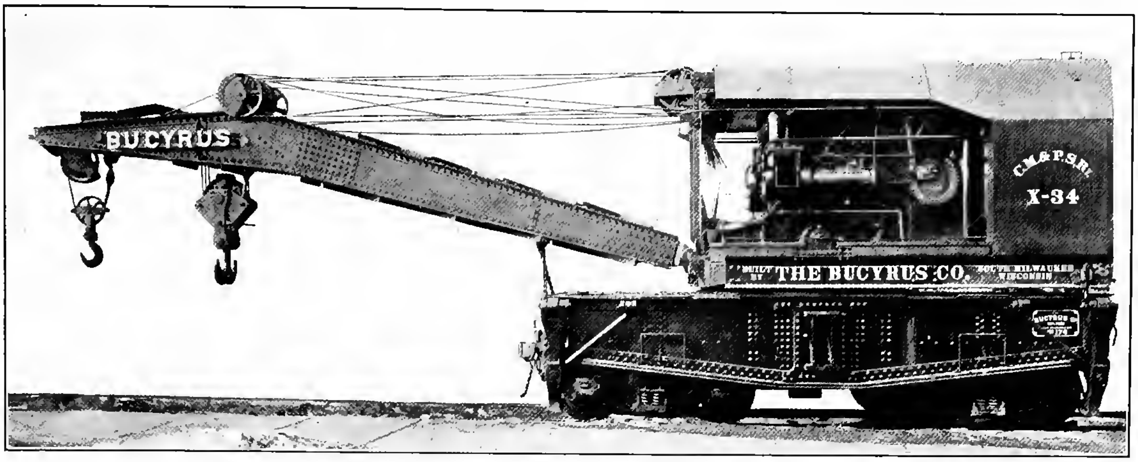


Fig. 211—Steam Wrecking Crane. Lifting Capacity, 100 Tons. Builder, The Bucyrus Company.

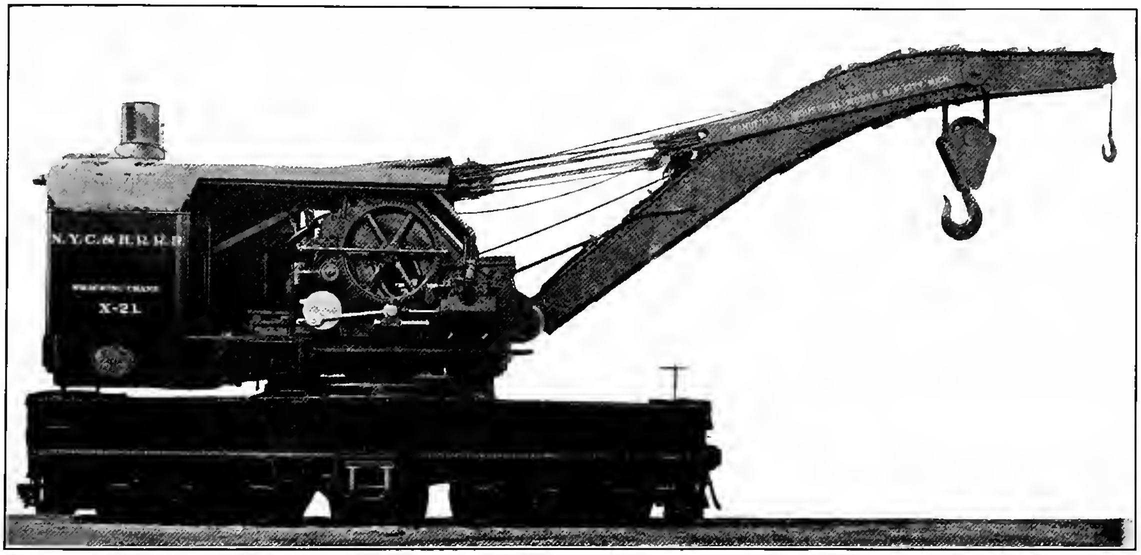


Fig. 212—Steam Wrecking Crane. Weight, 212,000 lbs.; Lifting Capacity, 120 Tons. Builder, Industrial Works.

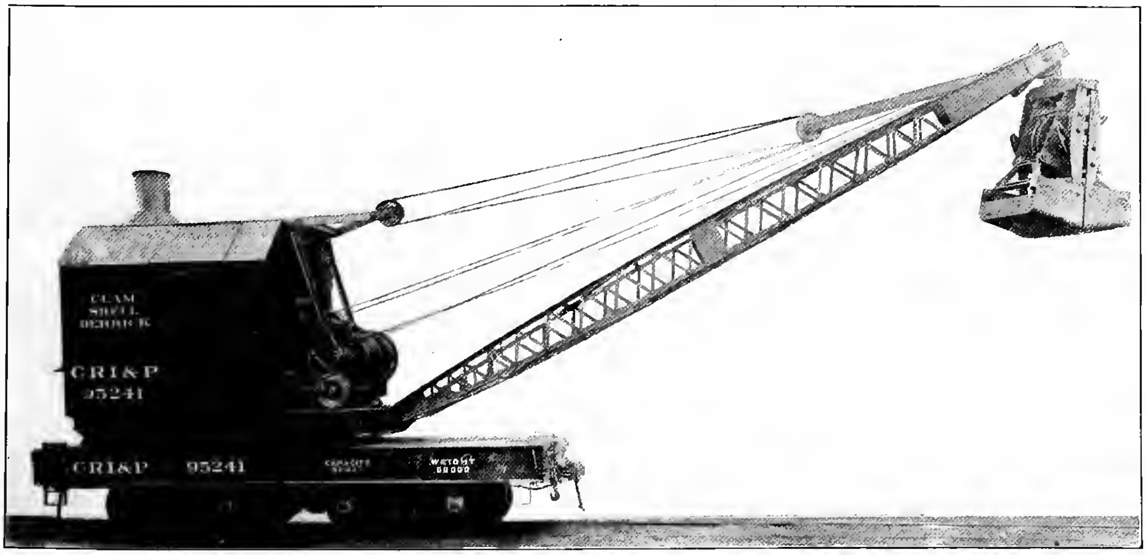


Fig. 213—Steam Crane Fitted with Clam Shell Bucket. Weight, 80,000 lbs.; Lifting Capacity, 20 Tons. Builder, McMyler Interstate Company.

Fig. 214—Interior View of the International Correspondence Schools' Air Brake Instruction Car.

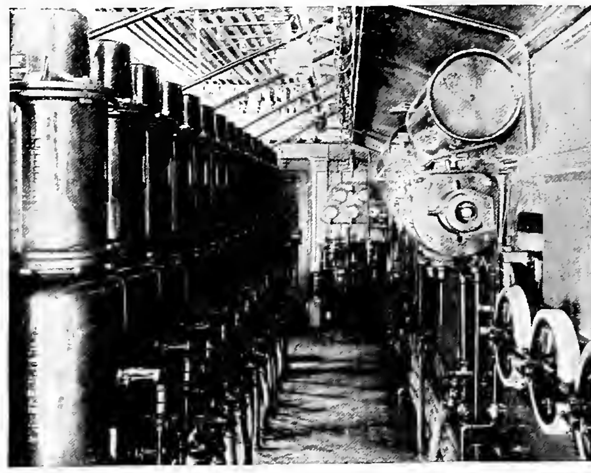


Fig. 215—Interior View of the Westinghouse Air Brake Company's Air Brake Instruction Car.

Fig. 216—Steel Car for Use as a Portable Sub-Station. Builder, McGuire-Cummings Manufacturing Company.

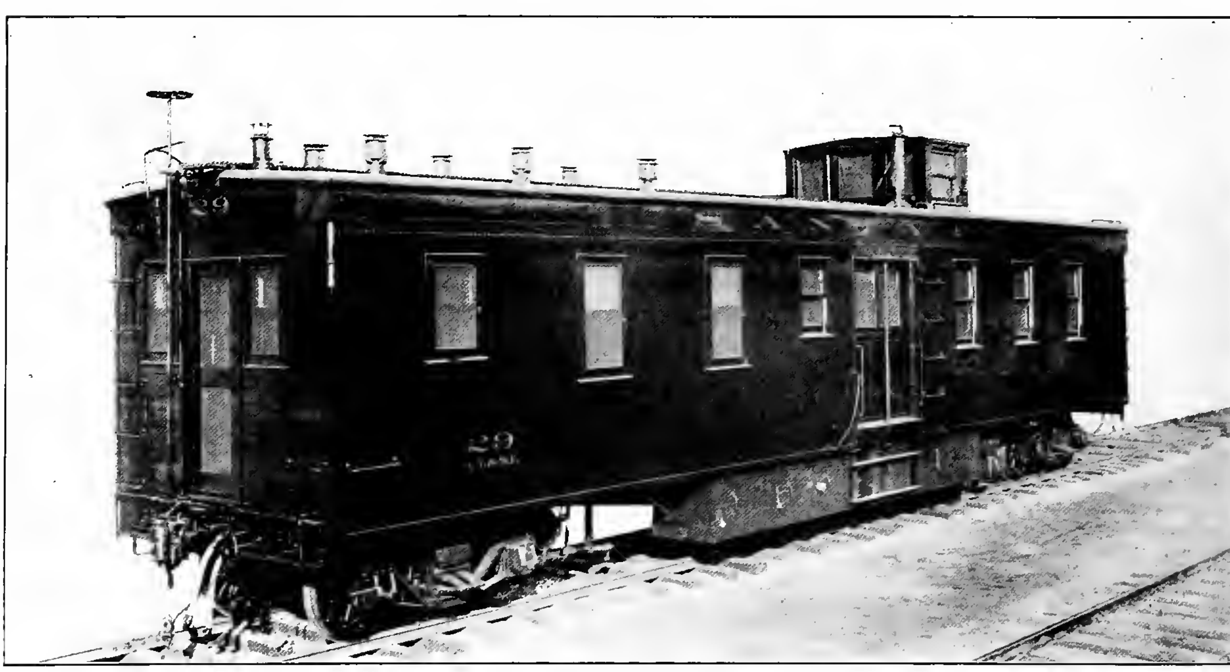


Fig. 217—Steel Frame Dynamometer Car. Weight, 91,000 lbs.; Dynamometer Capacity, 1,000,000 lbs. Builder, Atchison, Topeka & Santa Fe Railway.

(See Fig. 254 for Floor Plan and Figs. 427-430 for General Drawings.)

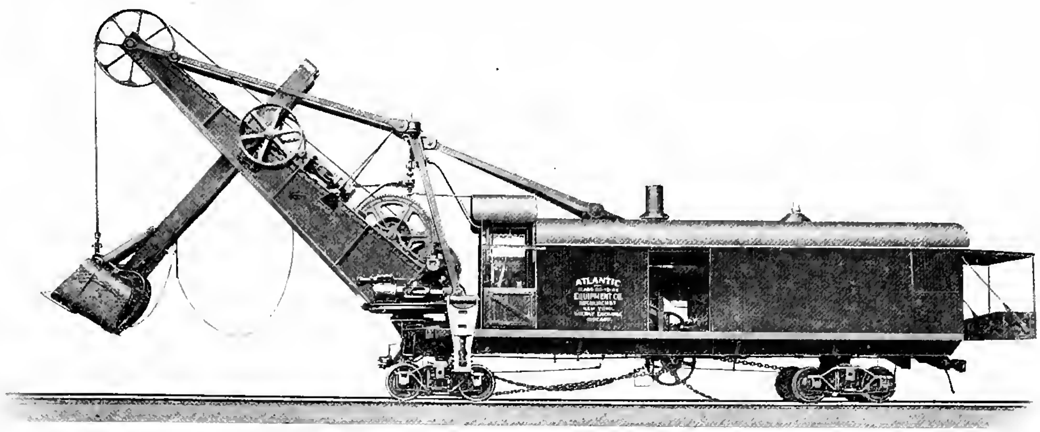


Fig. 218—Atlantic Steam Shovel. Weight in Working Order, 203,000 lbs. Builder, The Bucyrus Company.

(See Fig. 431 for General Drawings.)

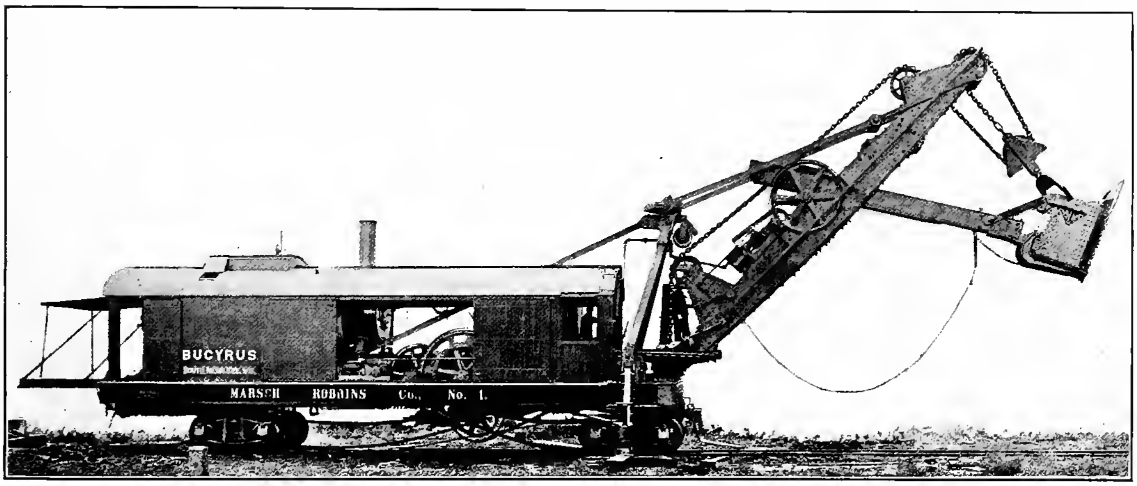


Fig. 219—Type 95-C Bucyrus Steam Shovel. Weight in Working Order, 214,000 lbs. Builder, The Bucyrus Company.

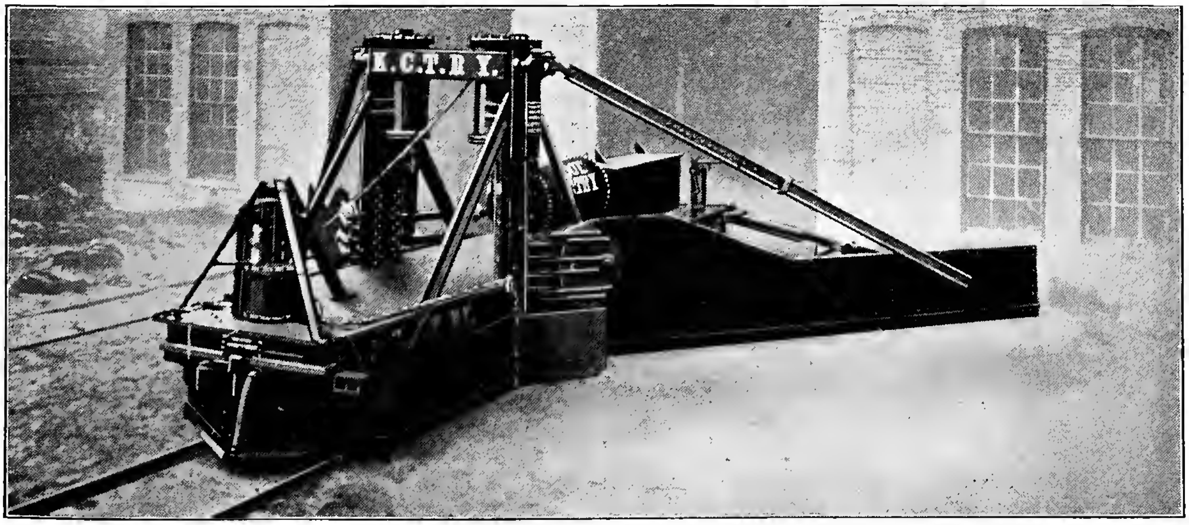


Fig. 220—Ballast Spreader. The Wings are Operated by Compressed Air. Builder, The O. F. Jordan Company.

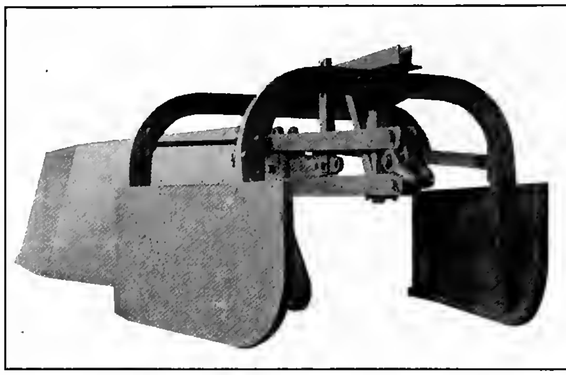


Fig. 221—Center Ballast Plow with Pilot Wings for Plowing from Tops of Cars. Builder, The Bucyrus Company.

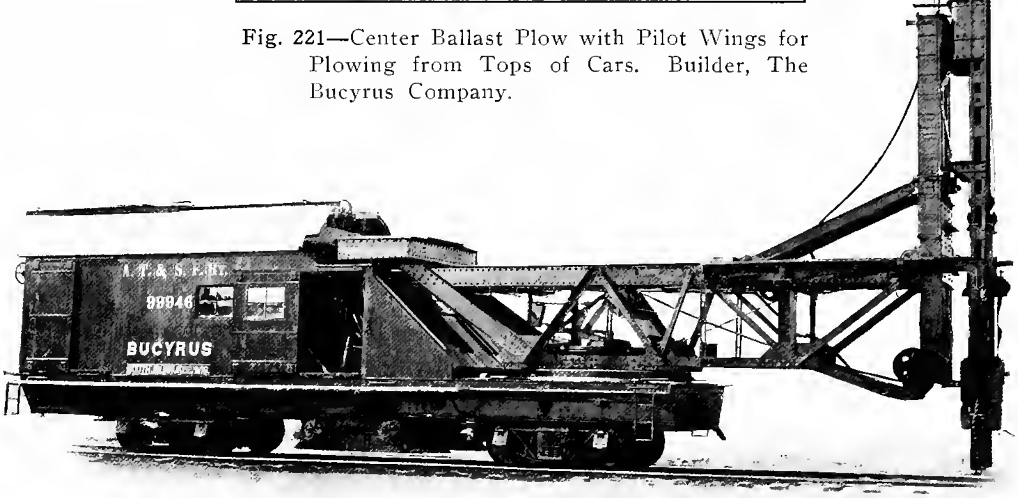


Fig. 222—Self-Propelling Steam Pile Driver. Builder, The Bucyrus Company.

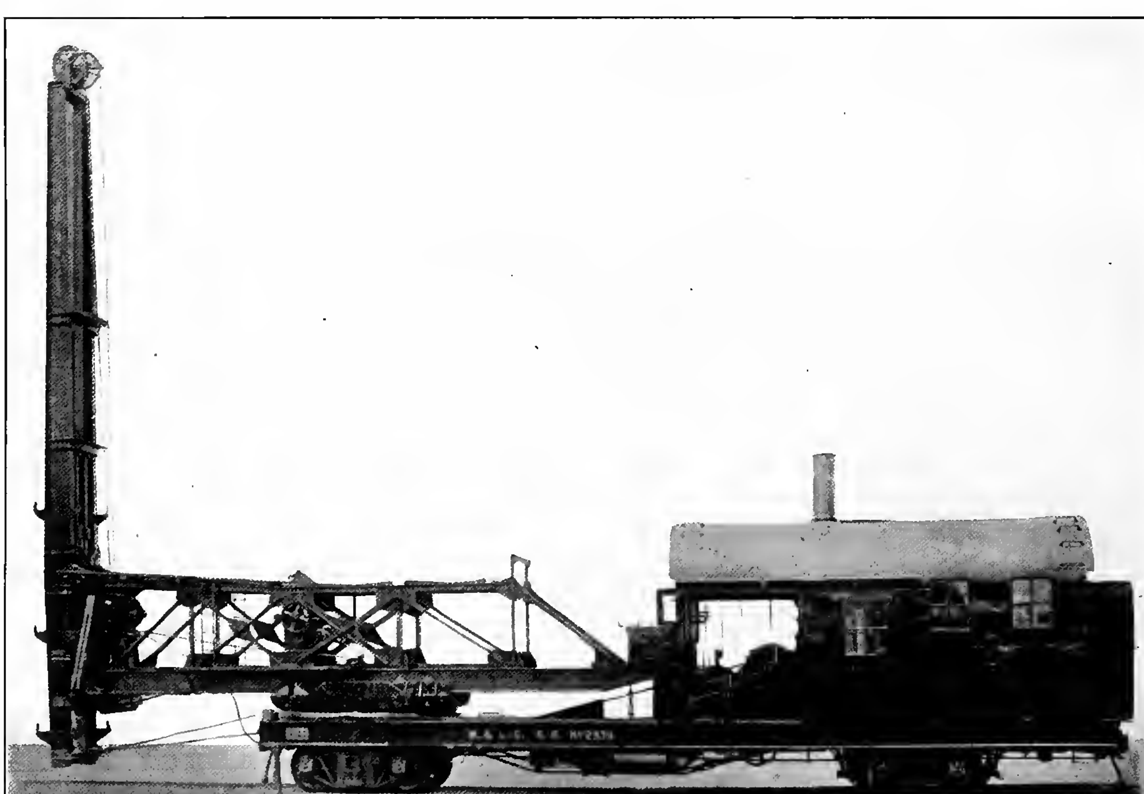


Fig. 223—Self-Propelling Steam Pile Driver. Builder, Industrial Works.

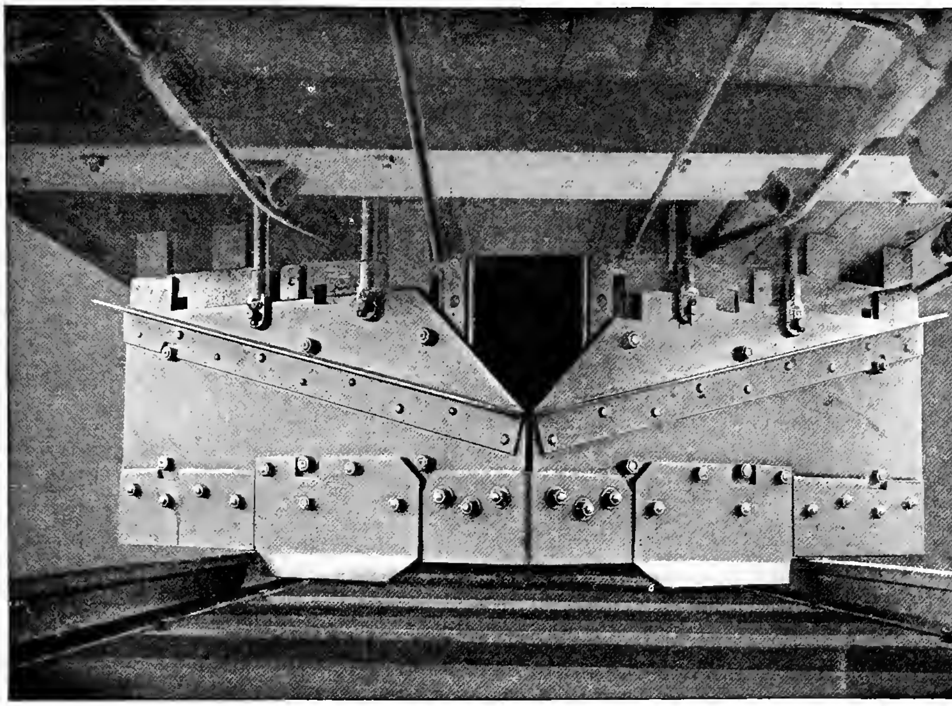


Fig. 224—Single Track Flanger Applied to Snow Plow. Builder, Russell Car & Snow Plow Company.

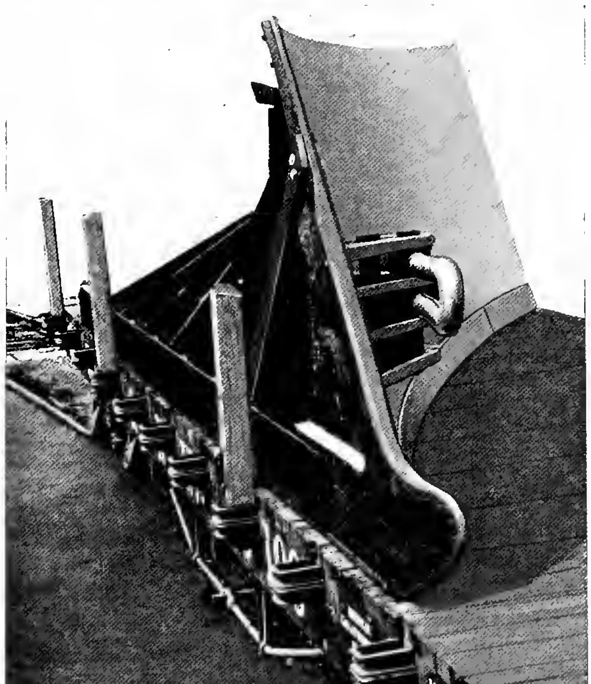


Fig. 225—Side Ballast Plow. Builder, The Bucyrus Company.

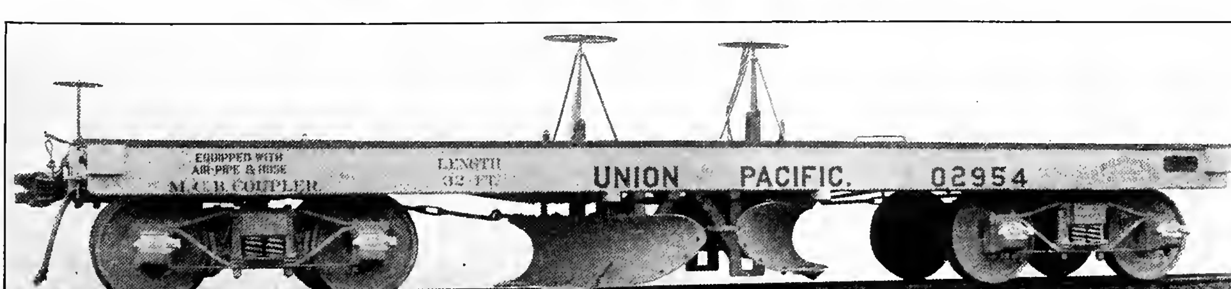


Fig. 226—Ballast Distributing Plow. Builder, Rodger Ballast Car Company.

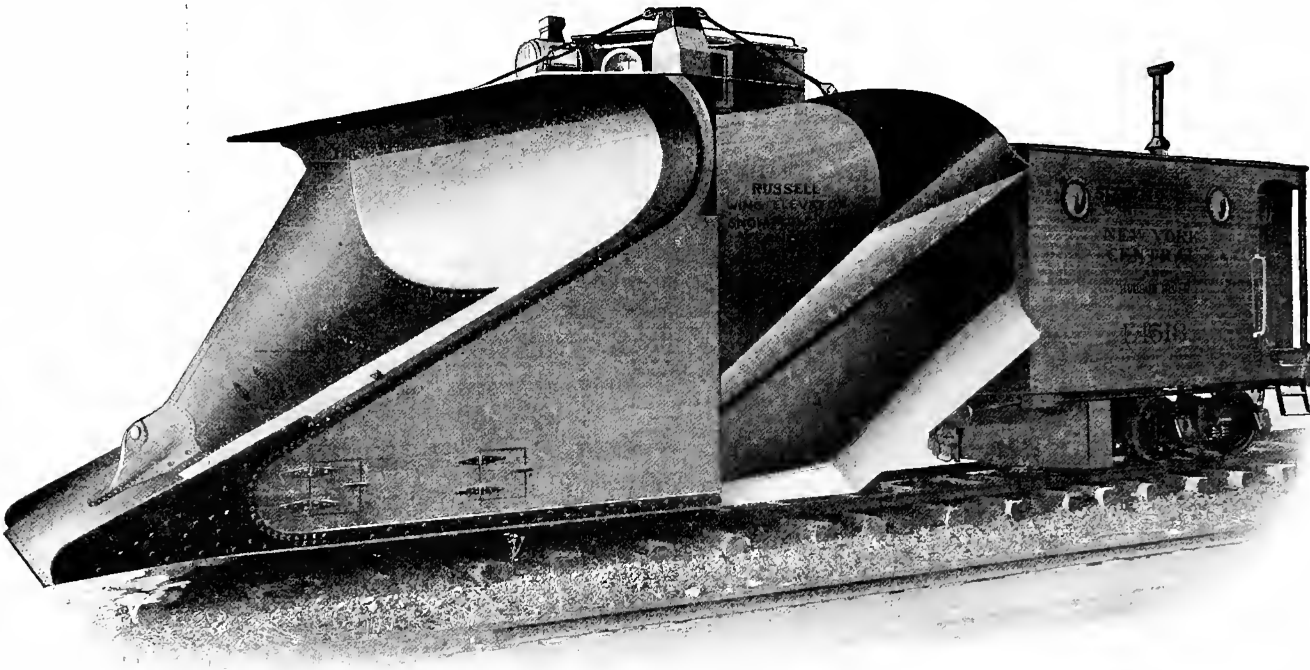


Fig. 227—Single Track Wing Elevator Snow Plow with Flanger. The Side Wings are Swung Out by Compressed Air to Increase the Width of the Cleared Area. Builder, Russell Car & Snow Plow Company.

(See Fig. 224 for Application of Flanges.)

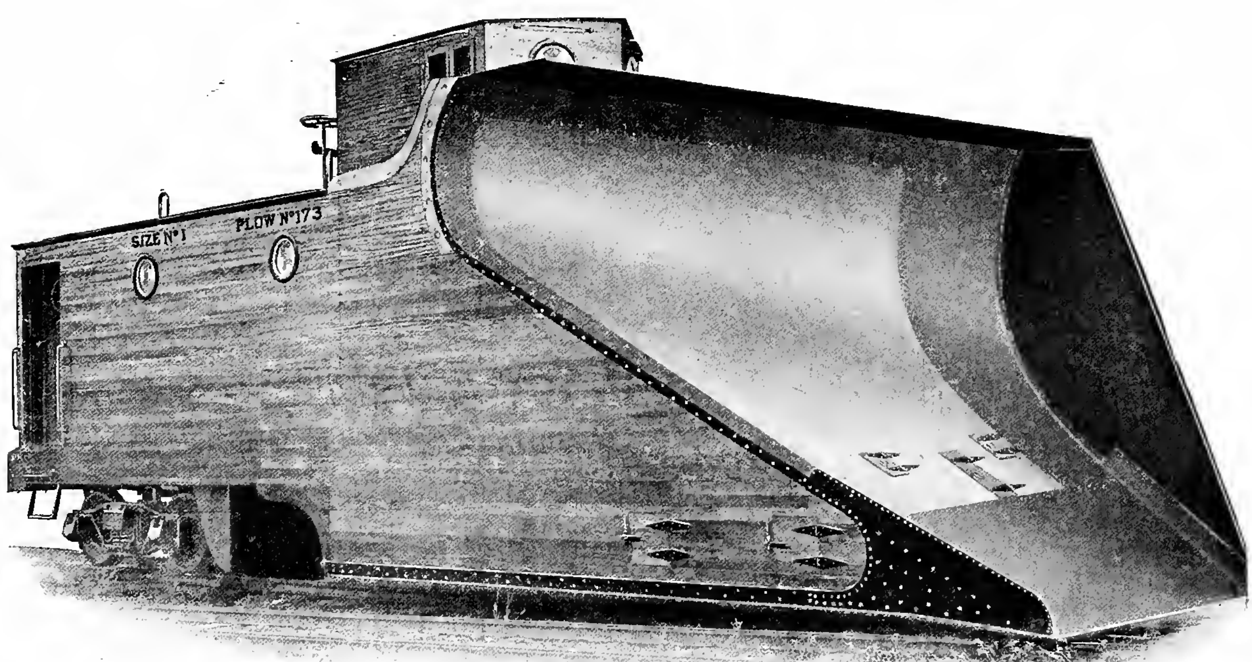


Fig. 228—Right Hand Double Track Snow Plow with Flanger. Builder, Russell Car & Snow Plow Company.

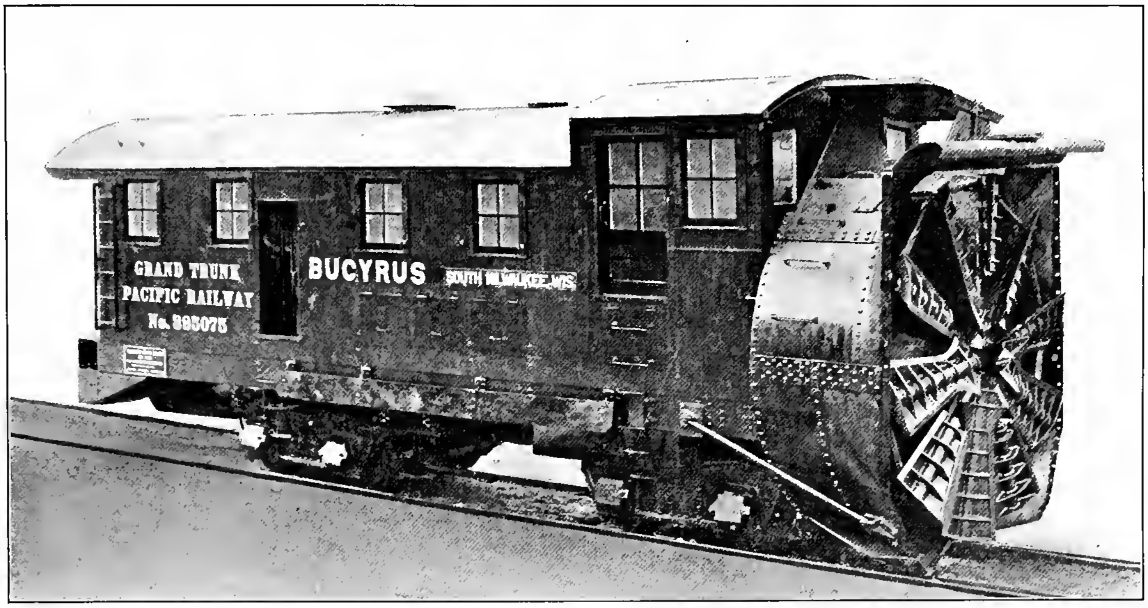


Fig. 229—Rotary Snow Plow. The Boiler is of the Locomotive Type. The Cutting Wheel is Driven by a Horizontal Steam Engine Having Two Cylinders, Each 18 in. x 26 in. Builder, The Bucyrus Company.

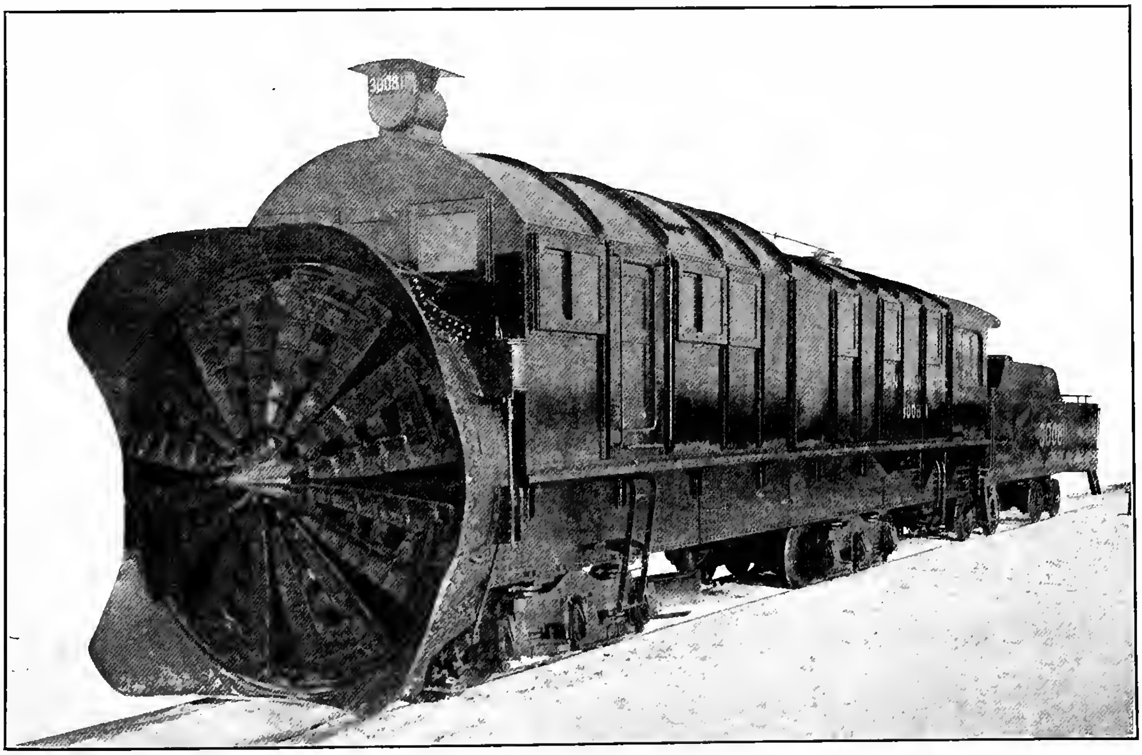


Fig. 230—Rotary Snow Plow in Use on the Canadian Pacific, Equipped with Specially Designed Six-Wheel Trucks. The Boiler is of the Locomotive Type, the Working Pressure Being 200 lbs. It has 317 2 in. Tubes and 44 sq. ft. of Grate Area. The Engine is Vertical, with Two 20 in. x 24 in. Cylinders. The Tender has a Capacity of 7,000 Imperial Gallons of Water and 10 Tons of Coal.

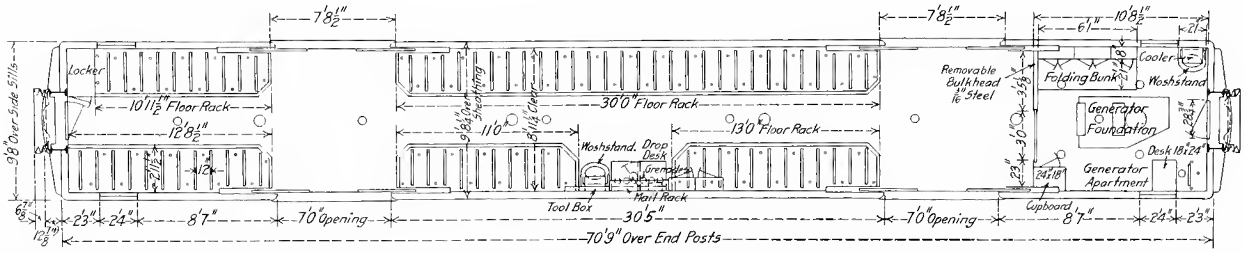


Fig. 231—Floor Plan of Baltimore & Ohio Steel Baggage Car Shown in Fig. 126.

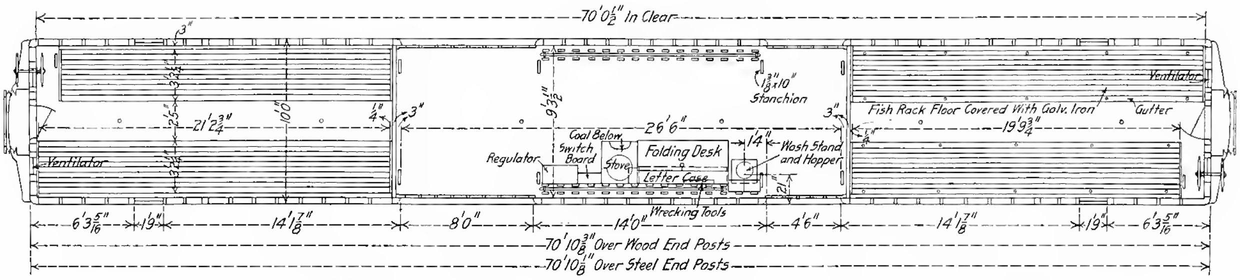


Fig. 232—Floor Plan of Missouri Pacific Baggage Car. Builder, American Car & Foundry Company.

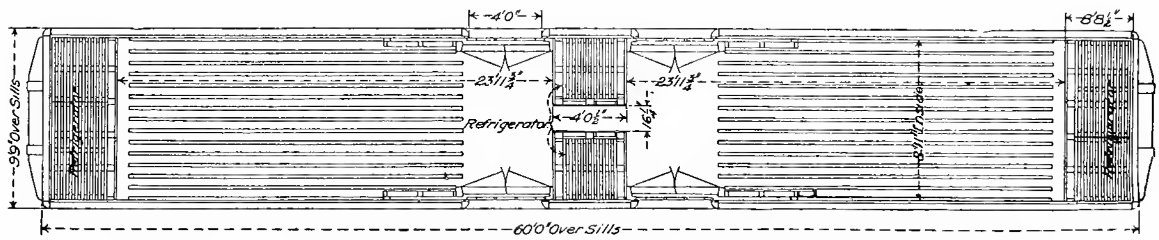


Fig. 233—Floor Plan of Great Northern Express Refrigerator Car Shown in Fig. 112.

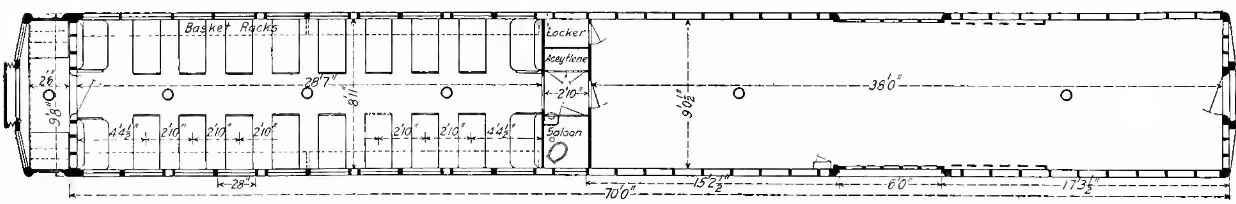


Fig. 234—Floor Plan of Chicago, Burlington & Quincy Combination Baggage and Passenger Car. Builder, American Car & Foundry Company.

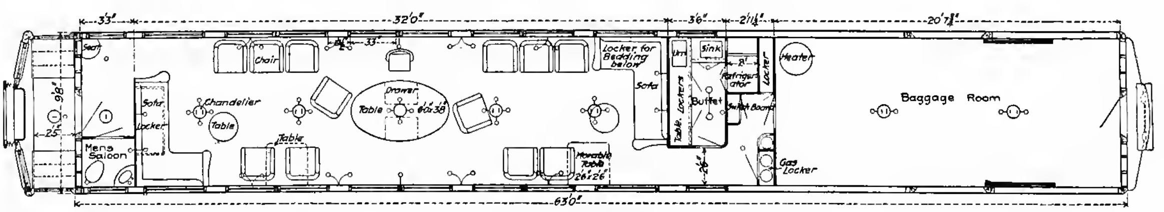


Fig. 235—Floor Plan of Chicago Great Western Combination Baggage and Buffet-Smoking Car. Builder, The Pullman Company.

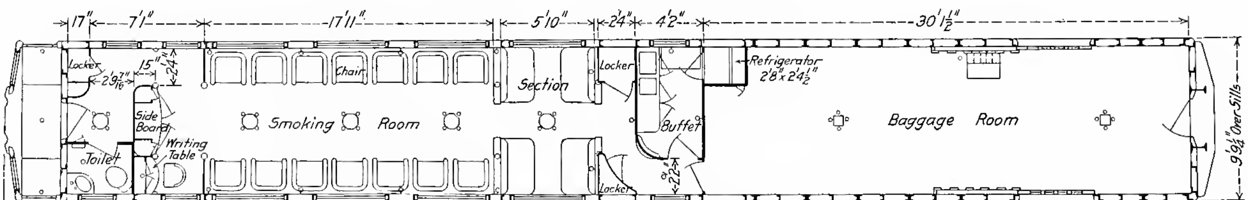


Fig. 236—Floor Plan of Western Pacific Baggage, Parlor and Library Car Shown in Fig. 170.

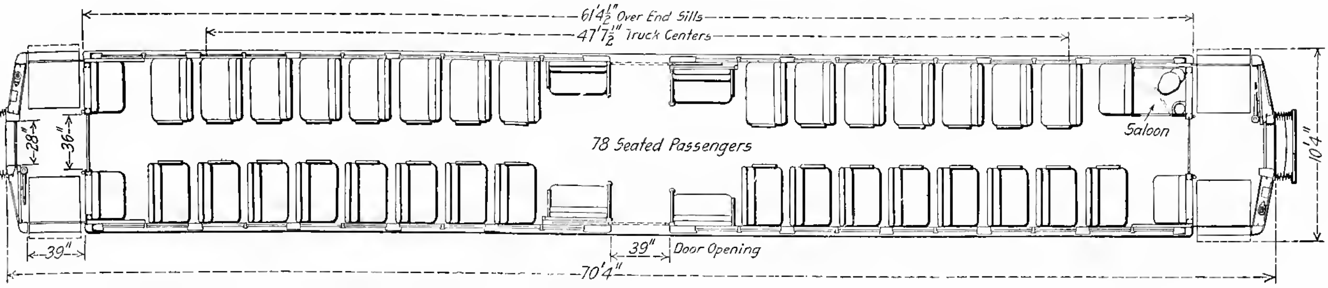


Fig. 237—Floor Plan of New York, Westchester & Boston Suburban Car Shown in Fig. 189.

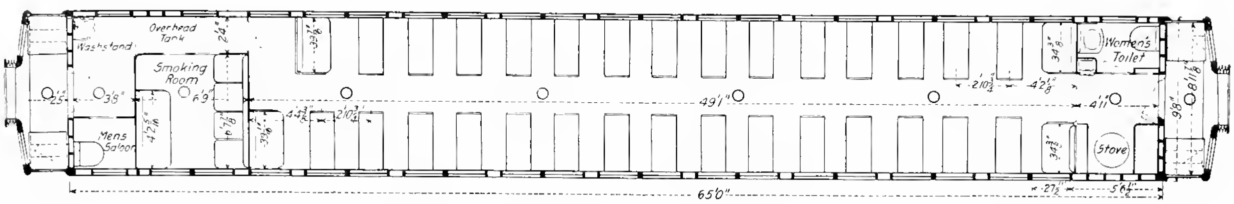


Fig. 238—Floor Plan of Mobile & Ohio Day Coach. Builder, American Car & Foundry Company.

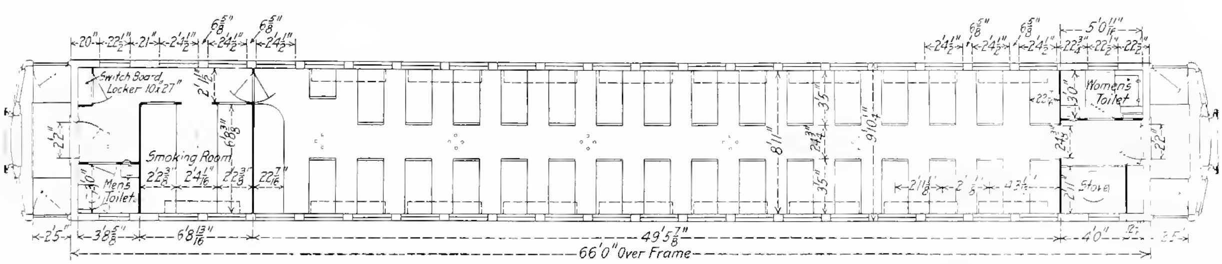


Fig. 239—Floor Plan of Southern Railway Day Coach Shown in Fig. 149.

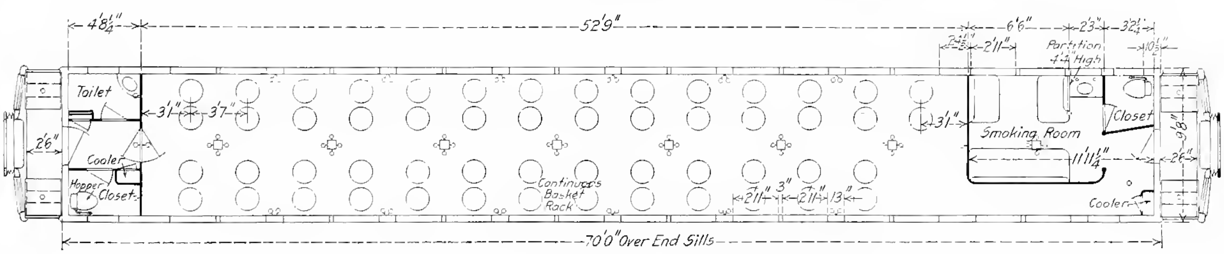


Fig. 240—Floor Plan of Chicago, Burlington & Quincy Chair Car Shown in Fig. 153.

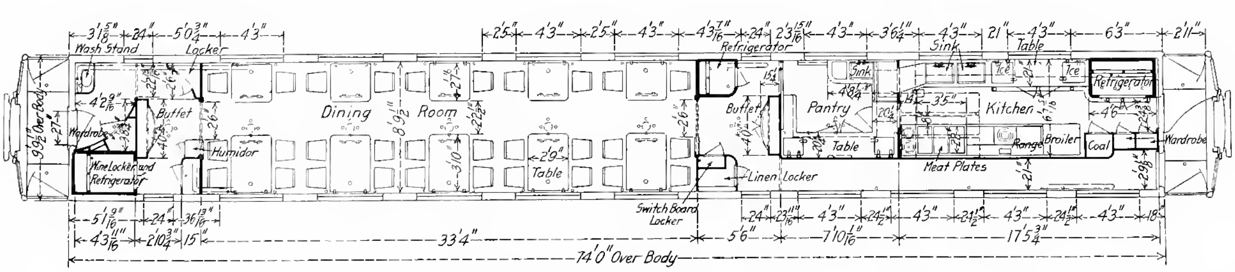


Fig. 241—Floor Plan of Philadelphia & Reading Dining Car Shown in Fig. 166.

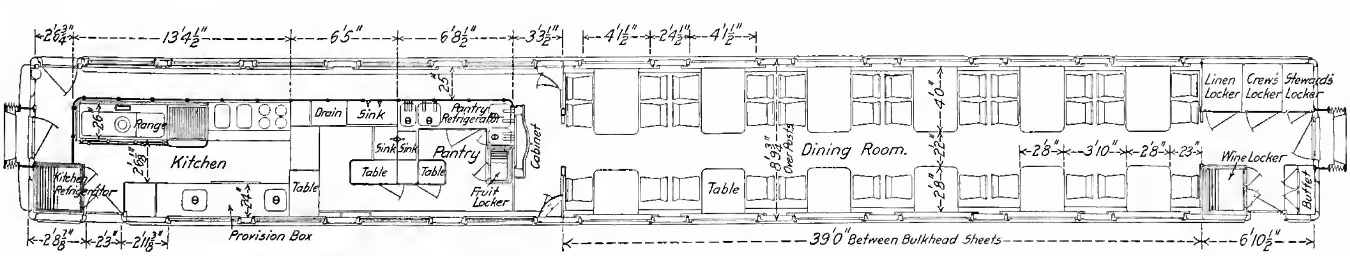


Fig. 242—Floor Plan of Pennsylvania Dining Car Without Vestibules.

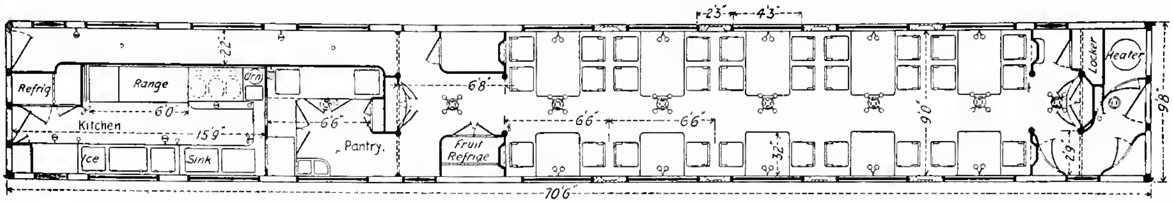


Fig. 243—Floor Plan of Pullman Dining Car.

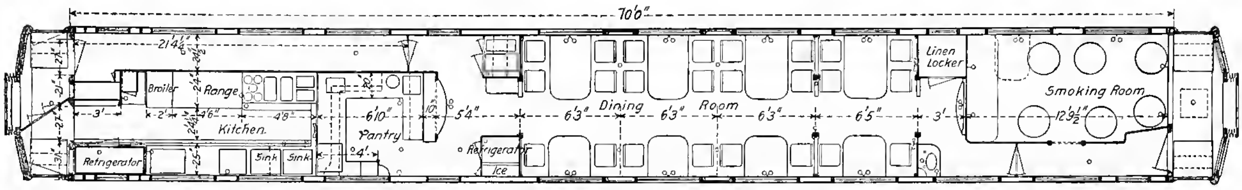


Fig. 244—Floor Plan of Wabash Dining Car. Builder, American Car & Foundry Company.

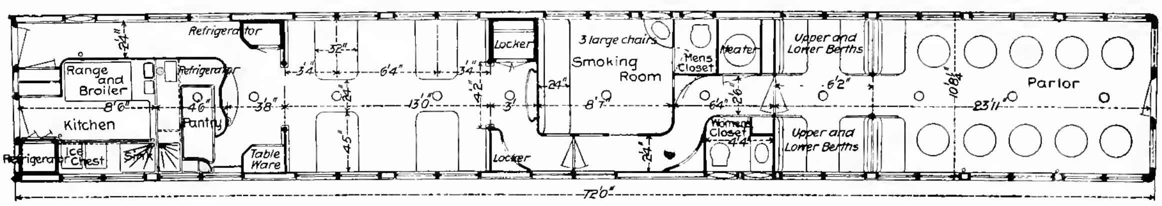


Fig. 245—Floor Plan of Chicago, Burlington & Quincy Parlor-Café Car. Builder, The Pullman Company.

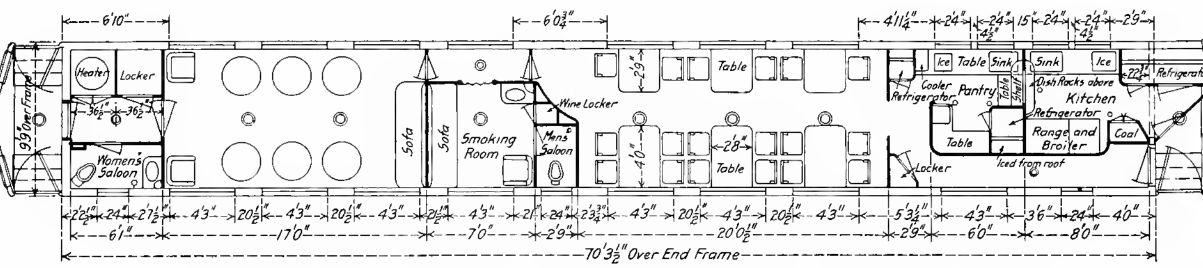


Fig. 246—Floor Plan of Ontario Government Parlor-Café Car Shown in Fig. 179.

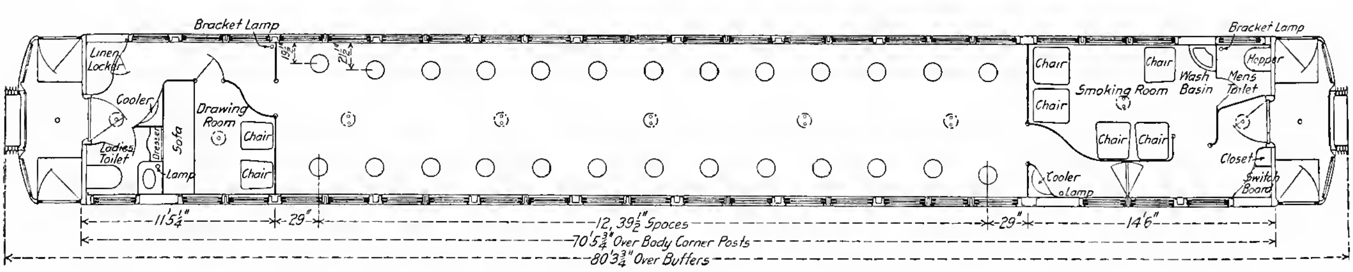


Fig. 247—Floor Plan of Long Island Steel Parlor Car. Builder, American Car & Foundry Company.

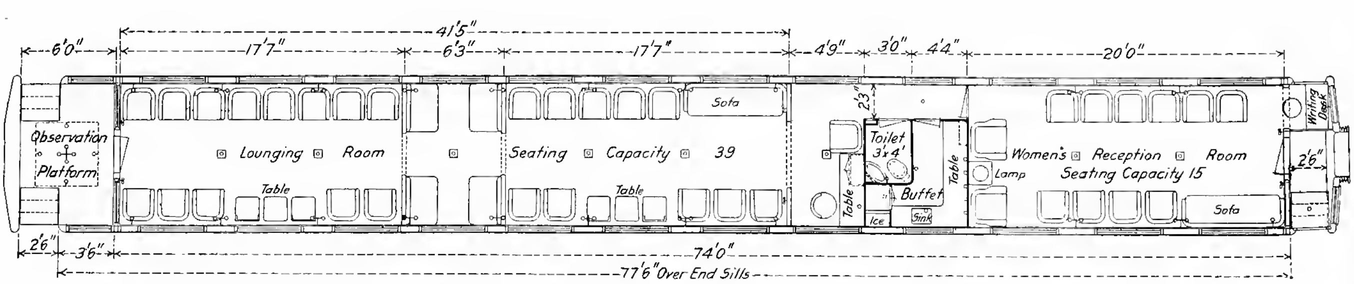


Fig. 248—Floor Plan of Chicago, Burlington & Quincy Parlor Car with Reception Room for Women.

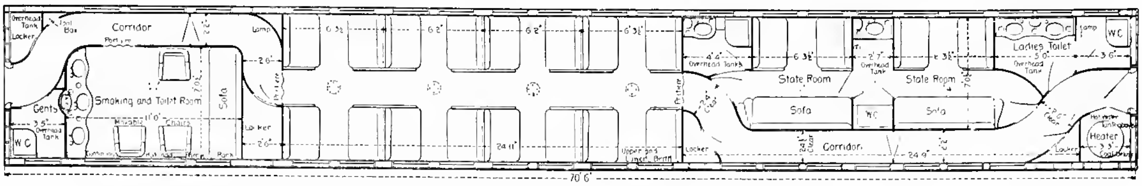


Fig. 249—Floor Plan of Canadian Pacific Sleeping Car.

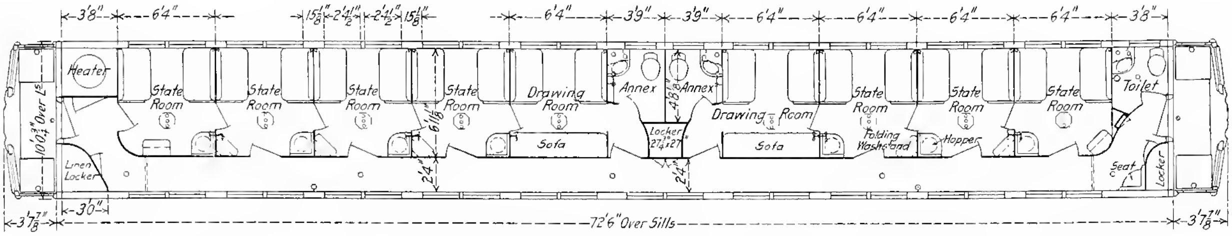


Fig. 250—Floor Plan of Chicago, Milwaukee & St. Paul Compartment Sleeping Car. Builder, The Barney & Smith Car Company.

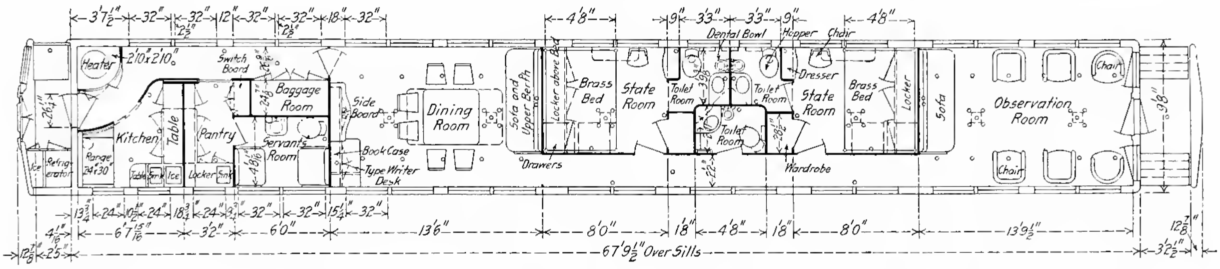


Fig. 251—Floor Plan of Western Maryland Business Car. Builder, The Barney & Smith Car Company.

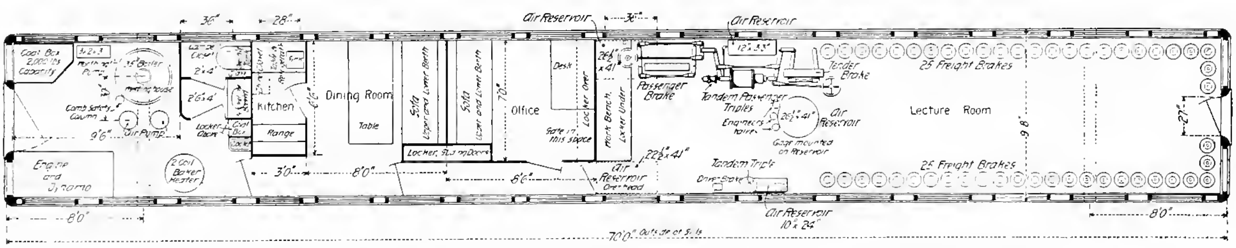


Fig. 252—Floor Plan of International Correspondence Schools Air Brake Instruction Car. Interior View is Shown in Fig. 214.

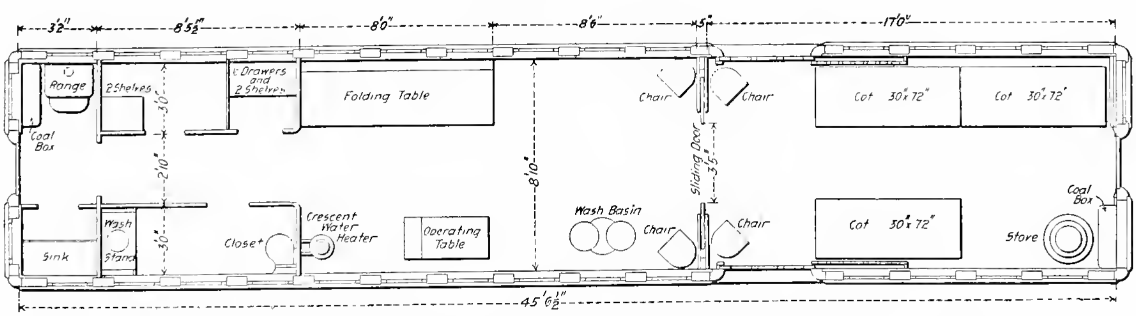


Fig. 253—Floor Plan of Lehigh Valley Hospital Car.

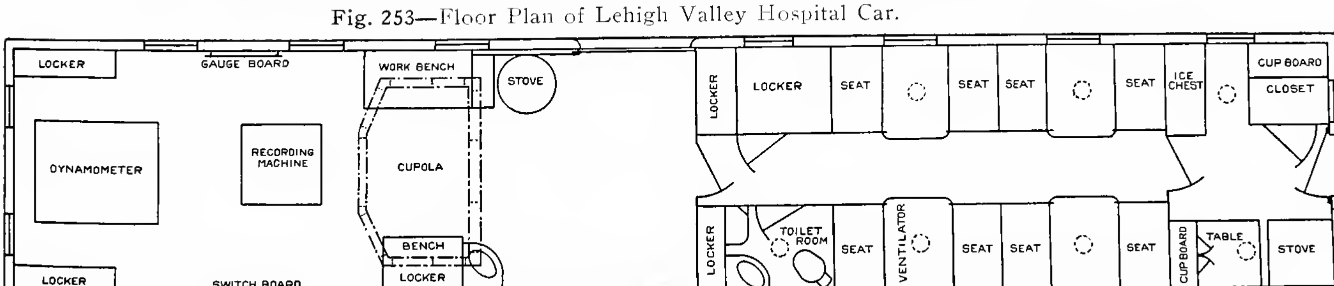


Fig. 254—Floor Plan of Atchison, Topeka & Santa Fe Dynamometer Car Shown in Fig. 217.

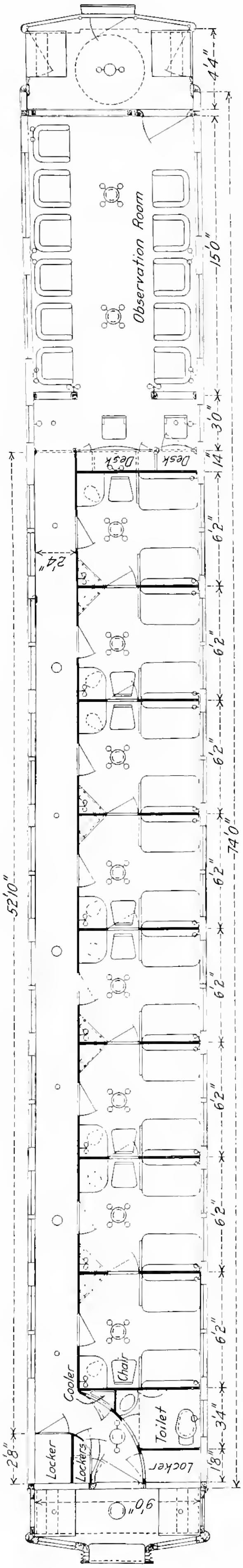


Fig. 255—Floor Plan of Chicago, Great Western Compartment Sleeper with Ladies' Observation Room. Builder, The Pullman Company.

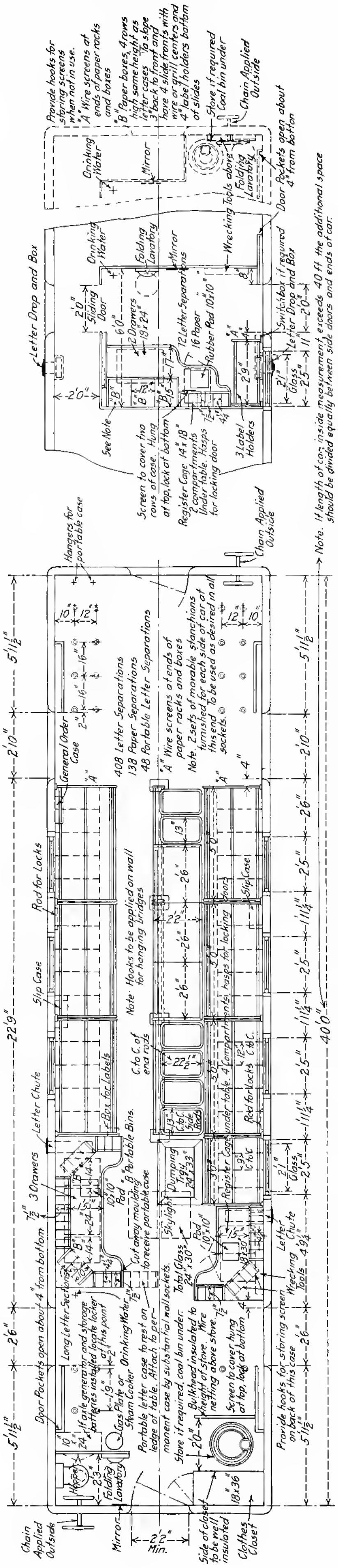


Fig. 256—Floor Plans Showing U. S. Government Requirements for 40 ft. Postal Car and 6 ft. Alley Apartment.

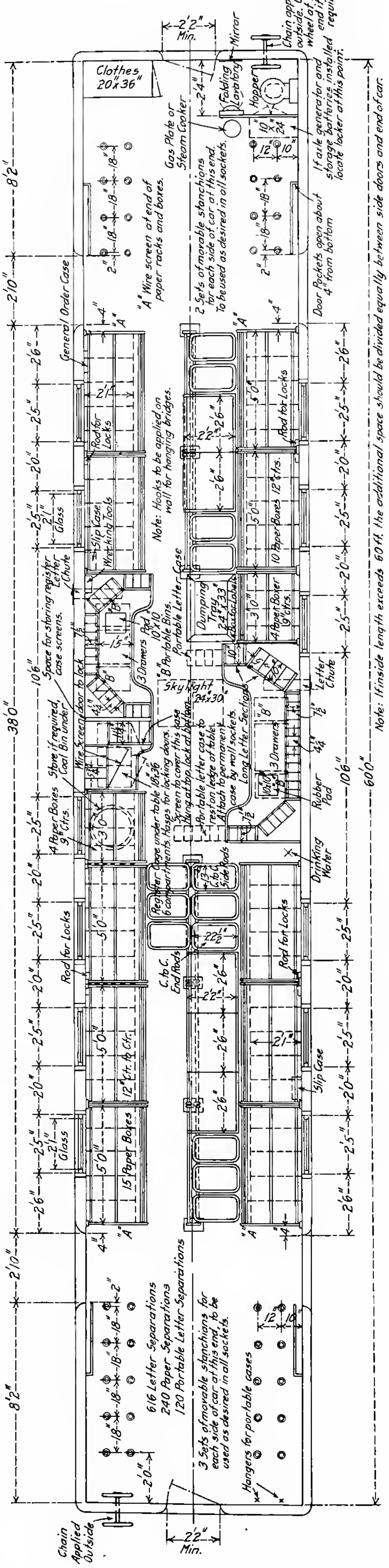


Fig. 257—Floor Plan Showing U. S. Government Requirements for 60 ft. Postal Car.

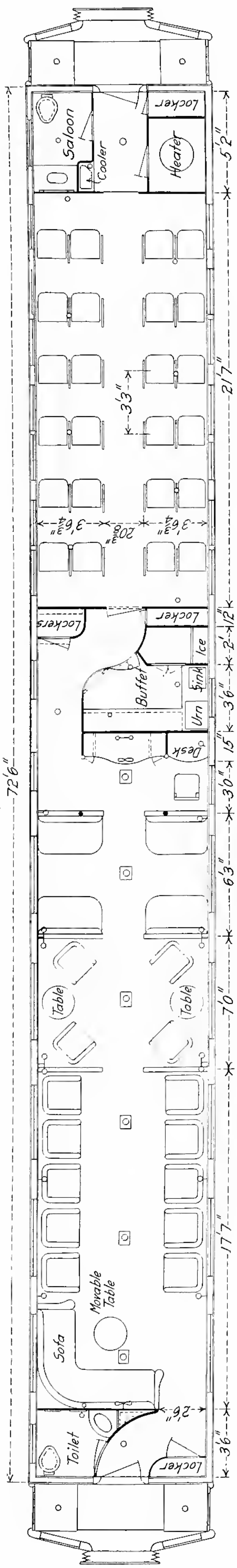


Fig. 258—Floor Plan of Chicago, Great Western Club Car for Men. Builder, The Pullman Company.

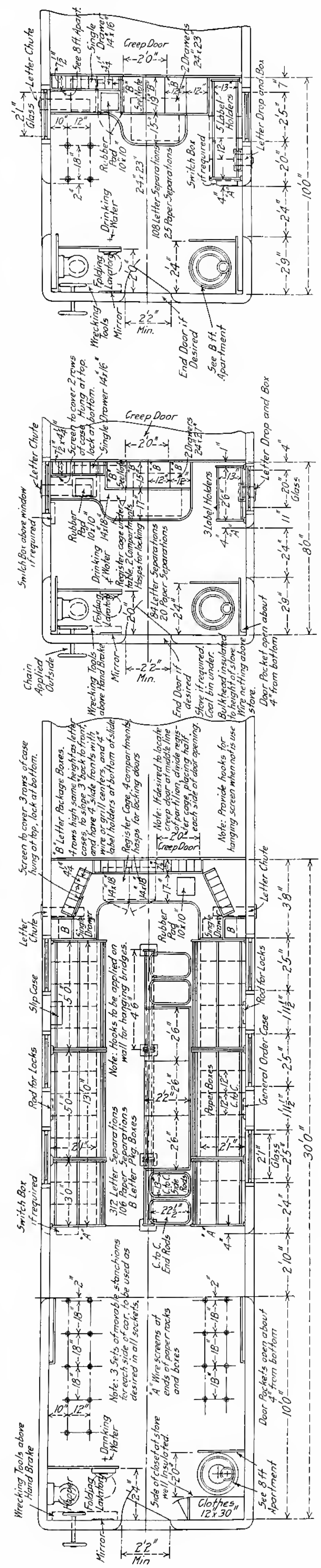


Fig. 259—Floor Plans Showing U. S. Government Requirements for 30 ft., 10 ft. and 8 ft. Mail Apartments.

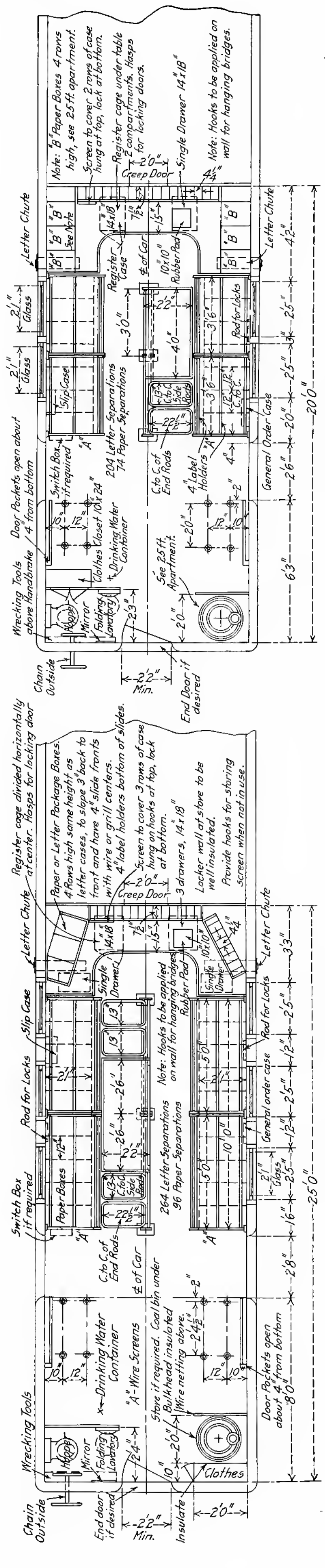


Fig. 260—Floor Plans Showing U. S. Government Requirements for 25 ft. and 20 ft. Mail Apartments.

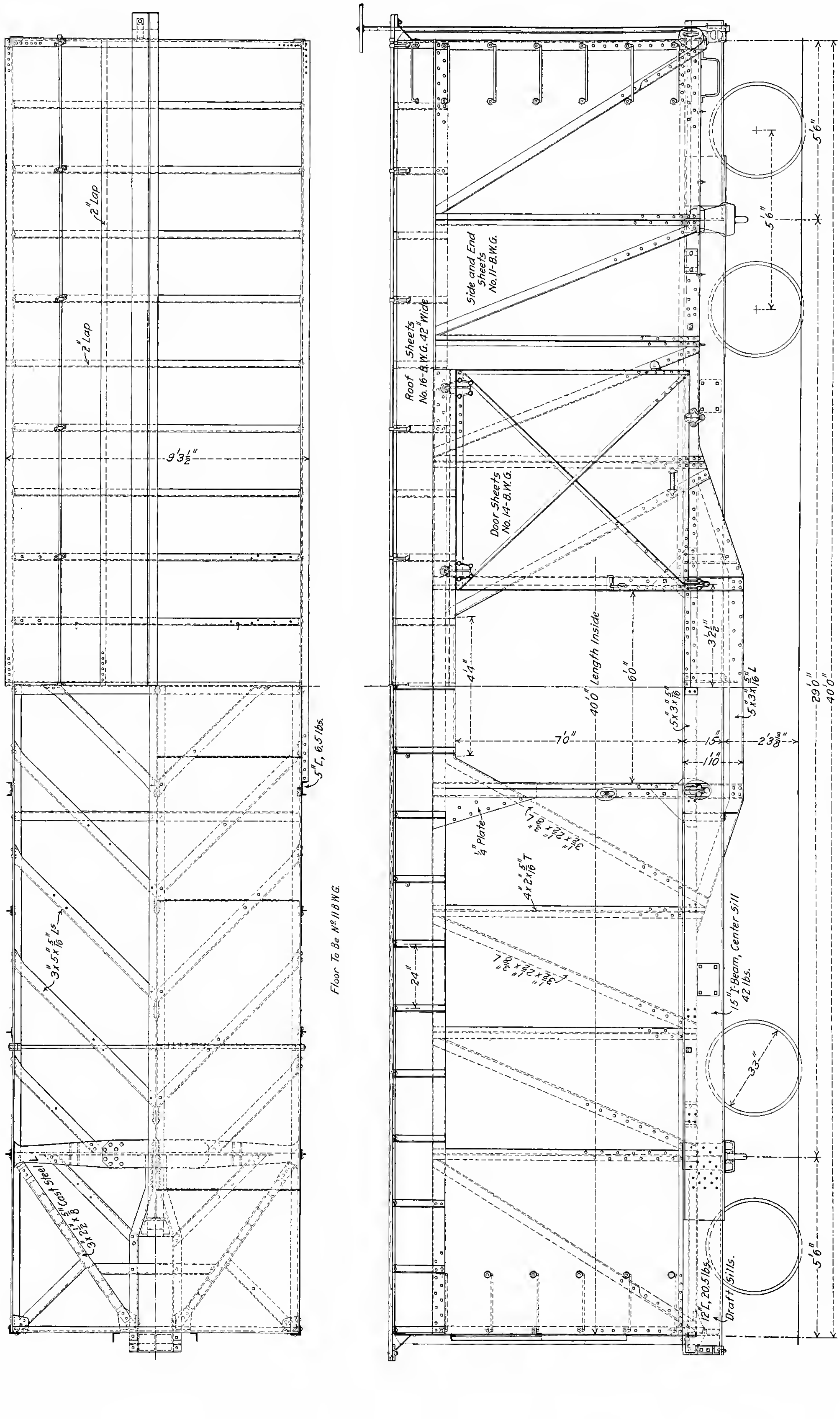


Fig. 261—Side Elevation and Plan of Union Pacific All-Steel 50-Ton Capacity Box Car Shown in Figs. 1 and 262.

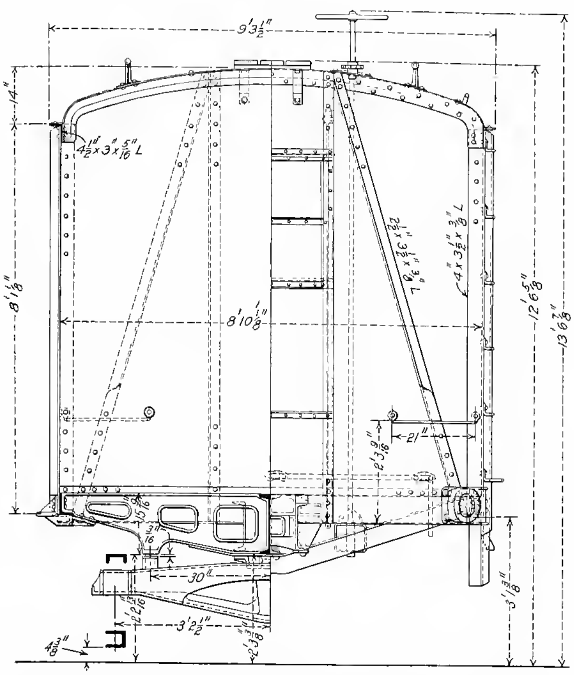


Fig. 262—End Elevation and Cross Section of Union Pacific All-Steel Box Car Shown in Figs. 1 and 261.

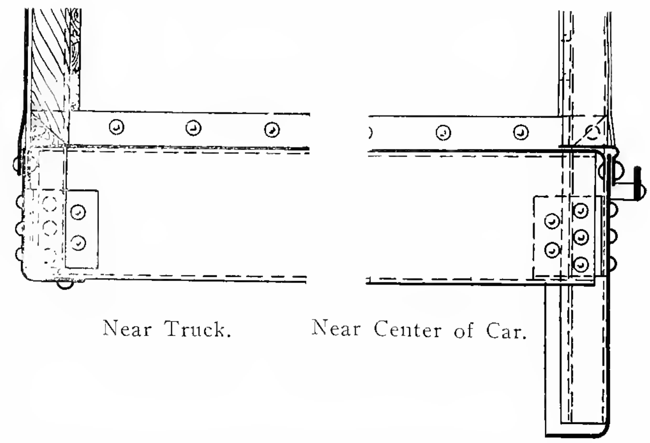


Fig. 263—Sections Through Side Sill of Summers All-Steel Box Car. See also Figs. 264-266.

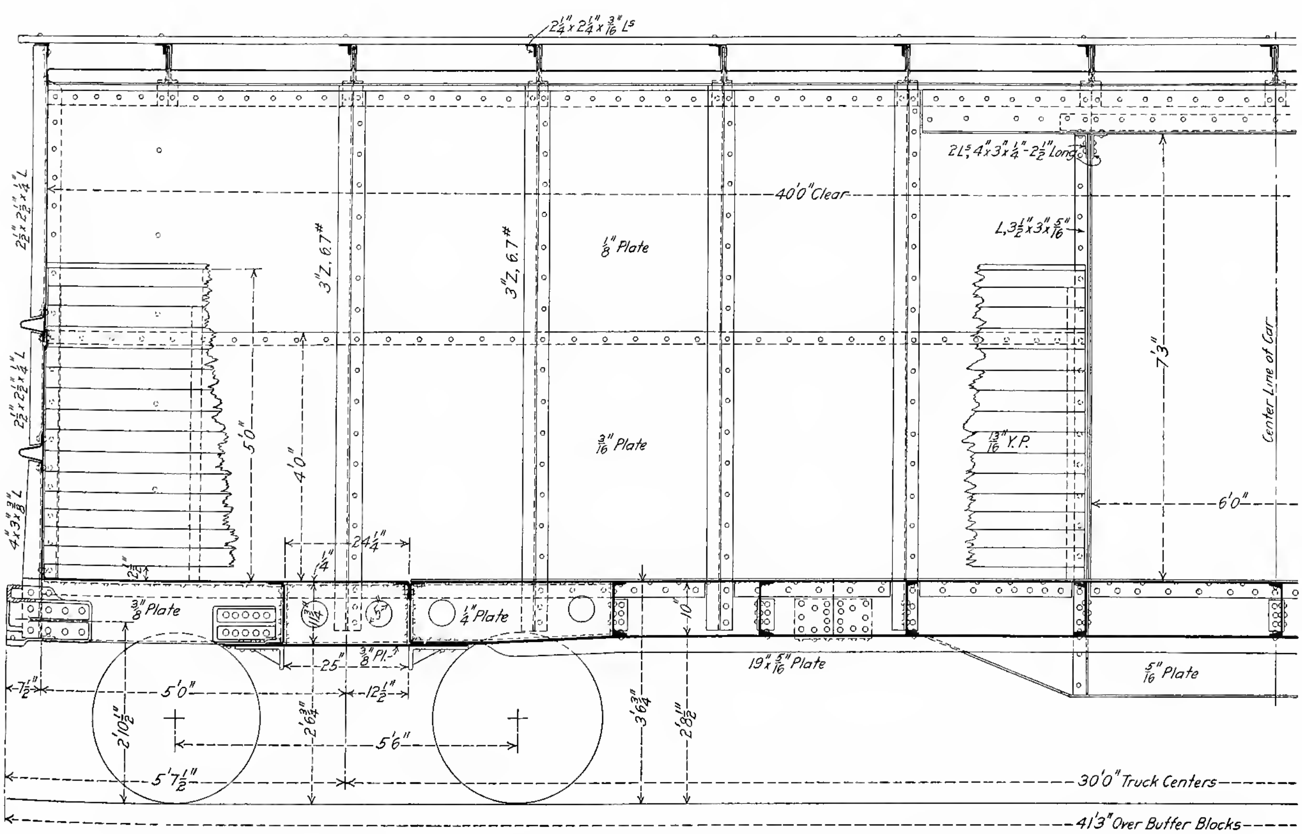


Fig. 264—Longitudinal Section of Summers All-Steel 50-Ton Capacity Box Car, Similar to the Car Shown in Fig. 3. See also Figs. 263, 265 and 266.

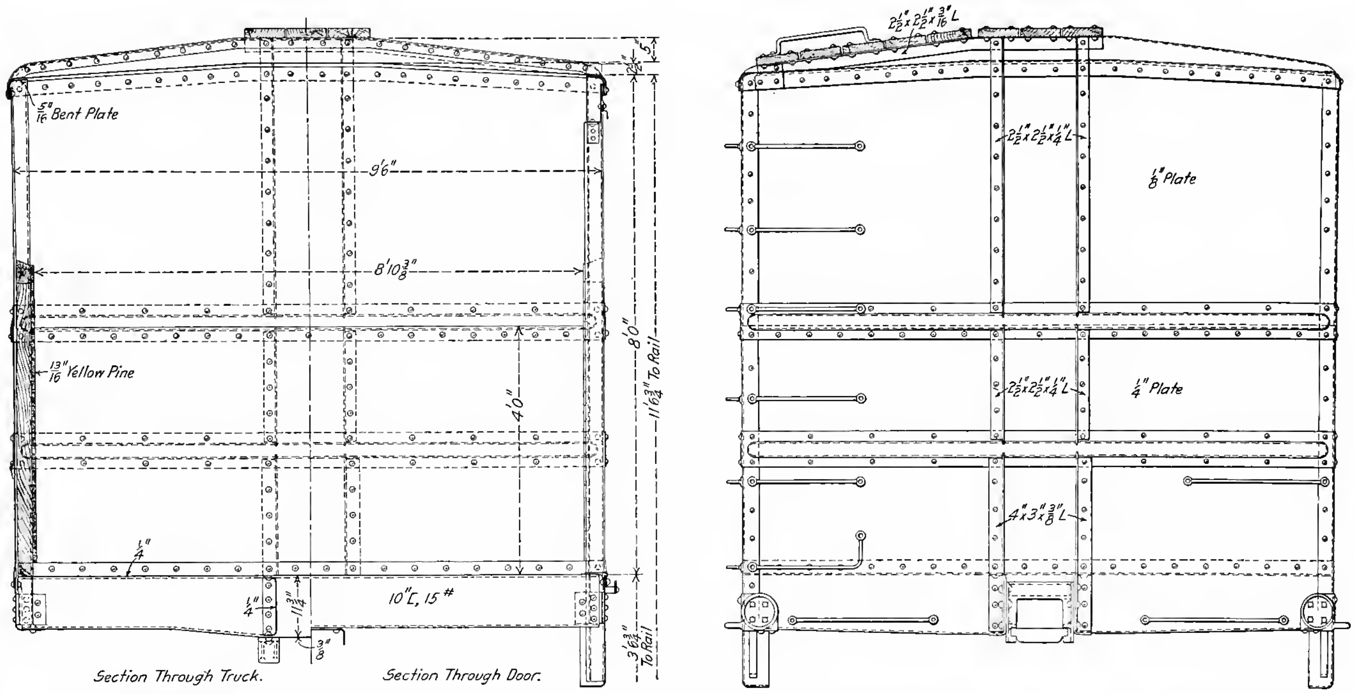


Fig. 265—Cross Sections and End Elevation of Summers All-Steel 50-Ton Capacity Box Car, Similar to the Car Shown in Fig. 3. See also Figs. 263, 264 and 266.

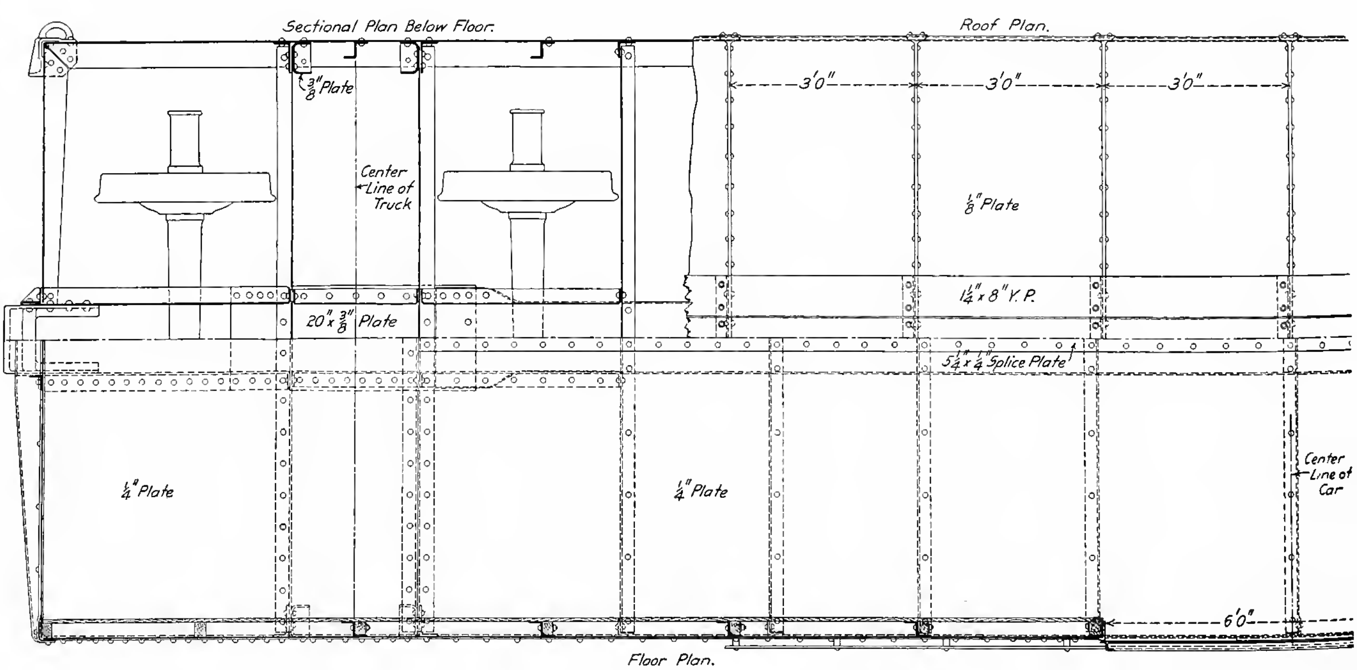


Fig. 266—Plan of Summers All-Steel 50-Ton Capacity Box Car, Similar to the Car Shown in Fig. 3. See also Figs. 263, 264 and 265.

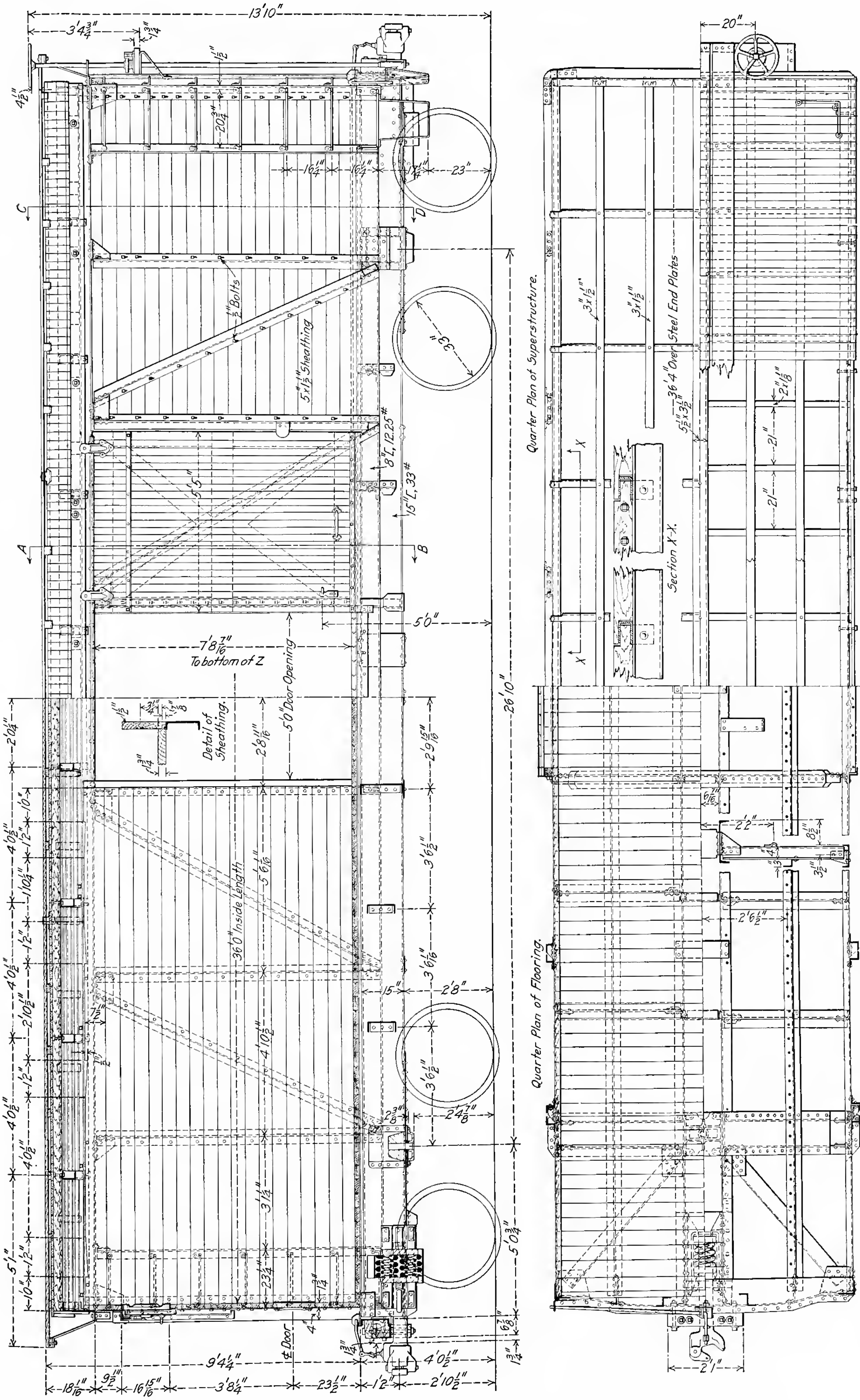


Fig. 267—Canadian Pacific Steel Frame 40-Ton Capacity Box Car Shown in Fig. 6. This Car is Built Under the Fowler Patents by the Canadian Car & Foundry Company. See also Fig. 268.

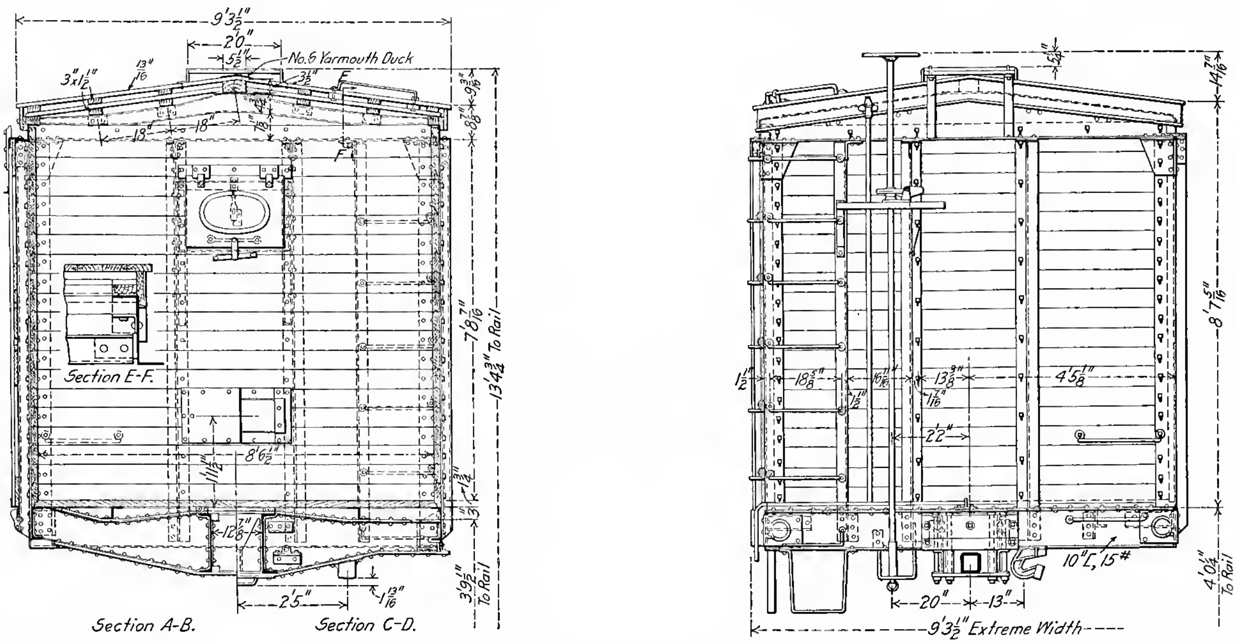


Fig. 268—Cross Sections and End Elevation of Canadian Pacific Steel Frame Box Car Shown in Figs. 6 and 267.

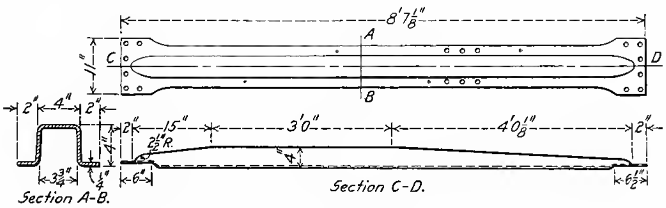


Fig. 269—Pressed Steel Side Post Used on Pennsylvania Steel Frame Box, Stock and Refrigerator Cars. See Figs. 270, 271, 361 and 363.

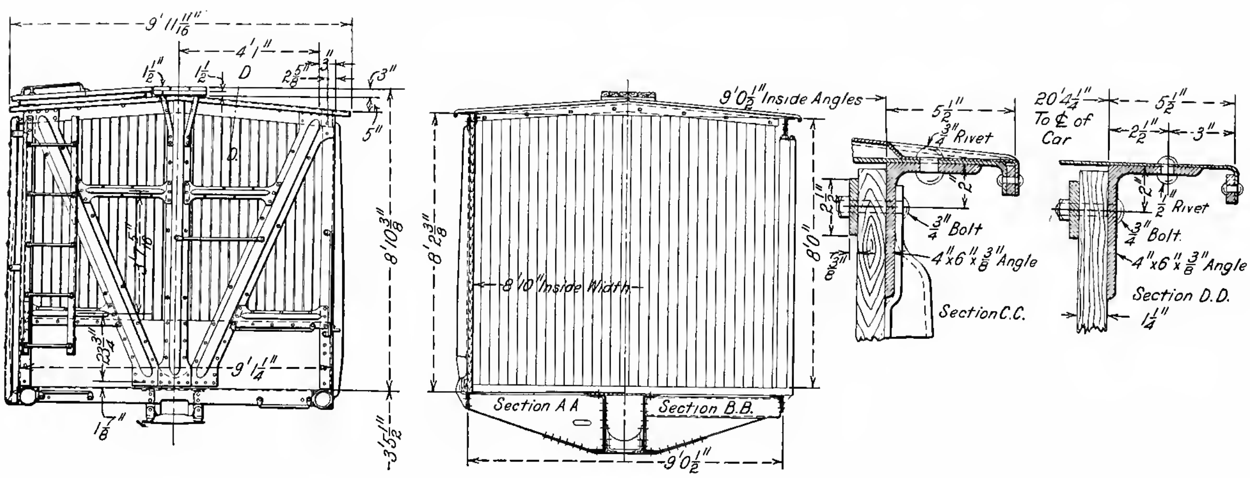


Fig. 270—End Elevation and Cross Sections of Pennsylvania Steel Frame 50-Ton Capacity Box Car. The Dotted Lines at Top of Section "CC" Show Opening in Steel Roof Extending Between Carlines for Ventilation. See also Figs. 269 and 271.

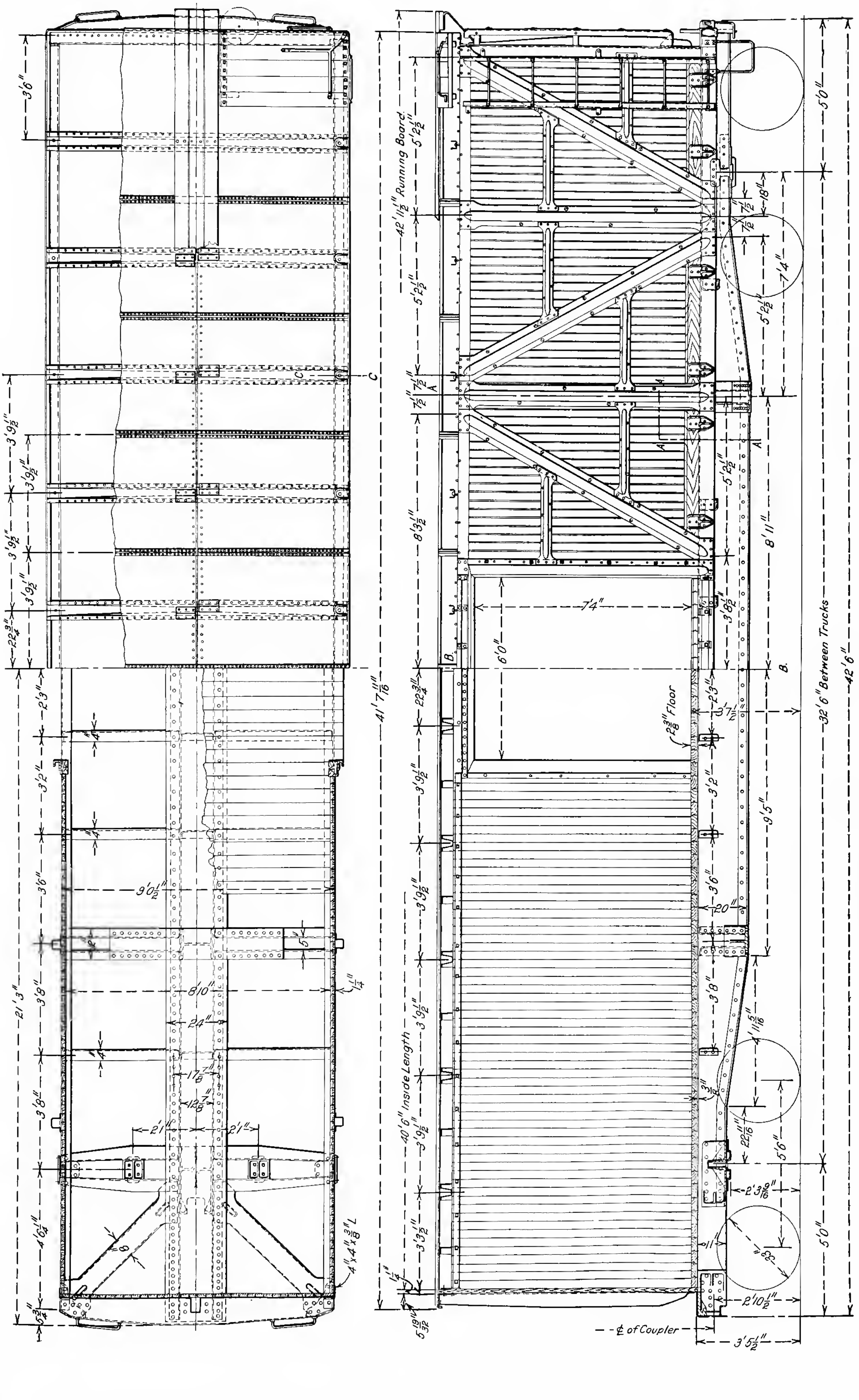


Fig. 271—Pennsylvania Steel Frame 50-Ton Capacity Box Car. See also Figs. 269 and 270.

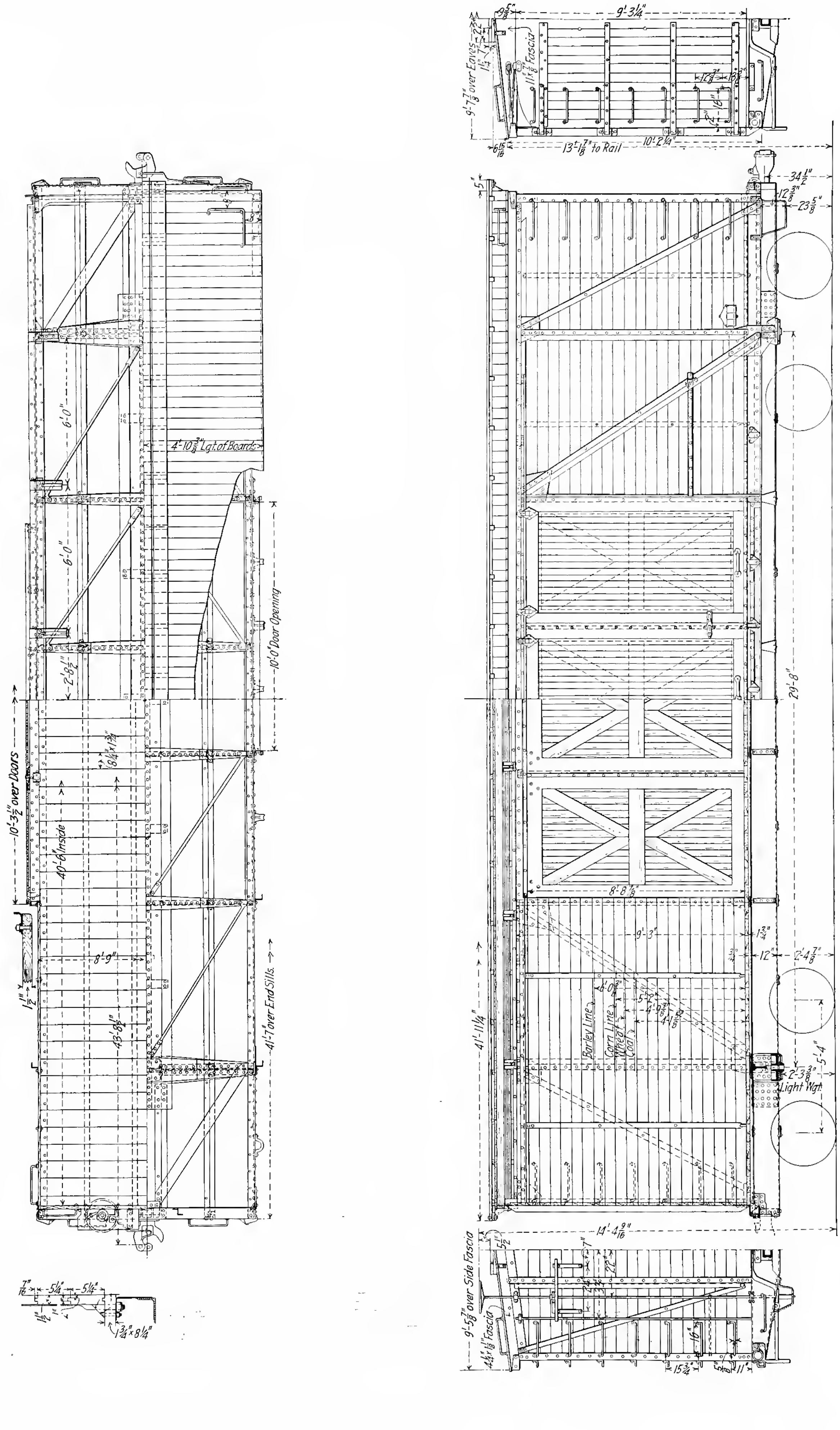


Fig. 272—Erie Steel Frame 40-Ton Capacity Automobile Car Shown in Fig. 12. Builder, American Car & Foundry Company.

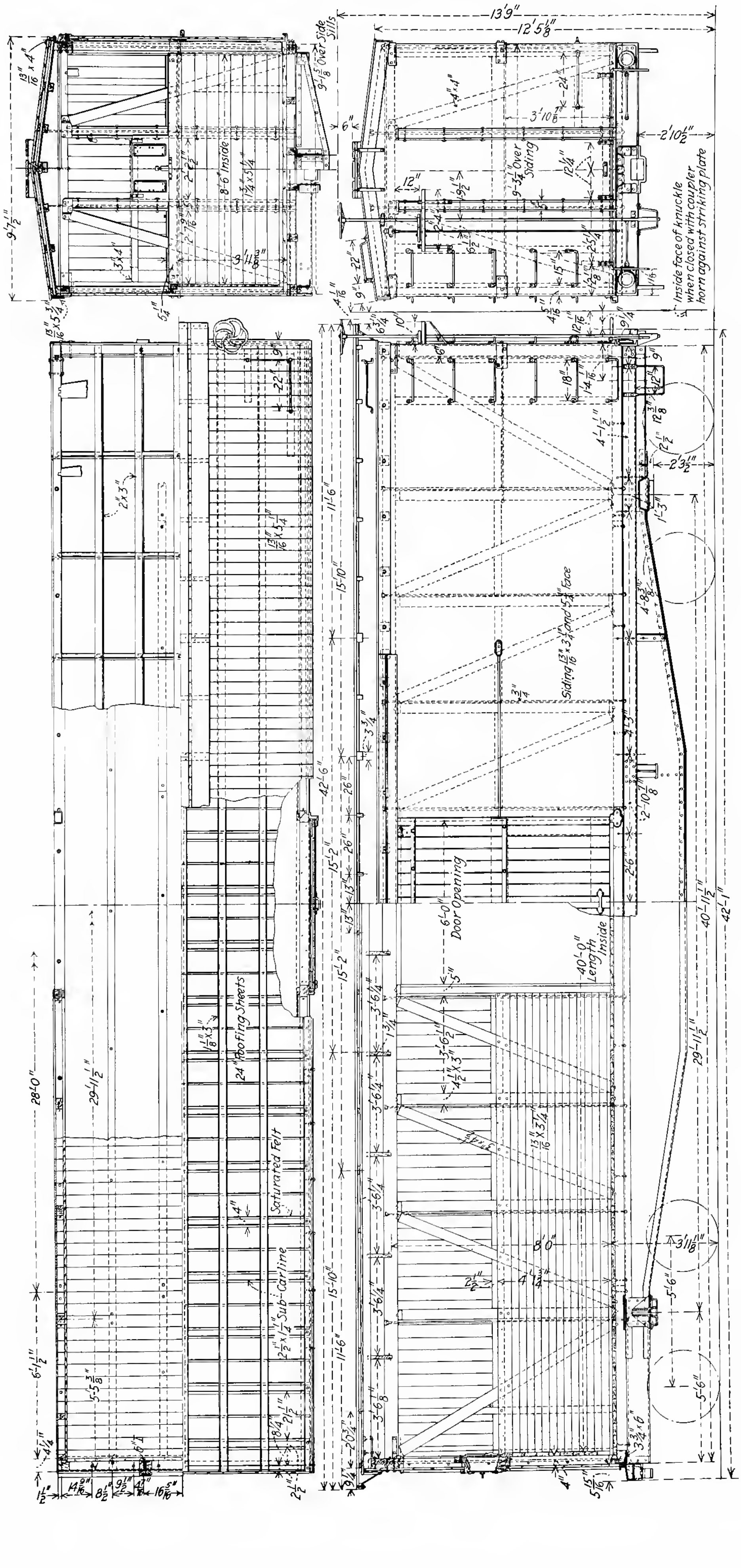


Fig. 273—Elevations, Plan and Sections of Ann Arbor Steel Underframe 40-Ton Capacity Box Car Shown in Fig. 7. Builder, Western Steel Car & Foundry Company.

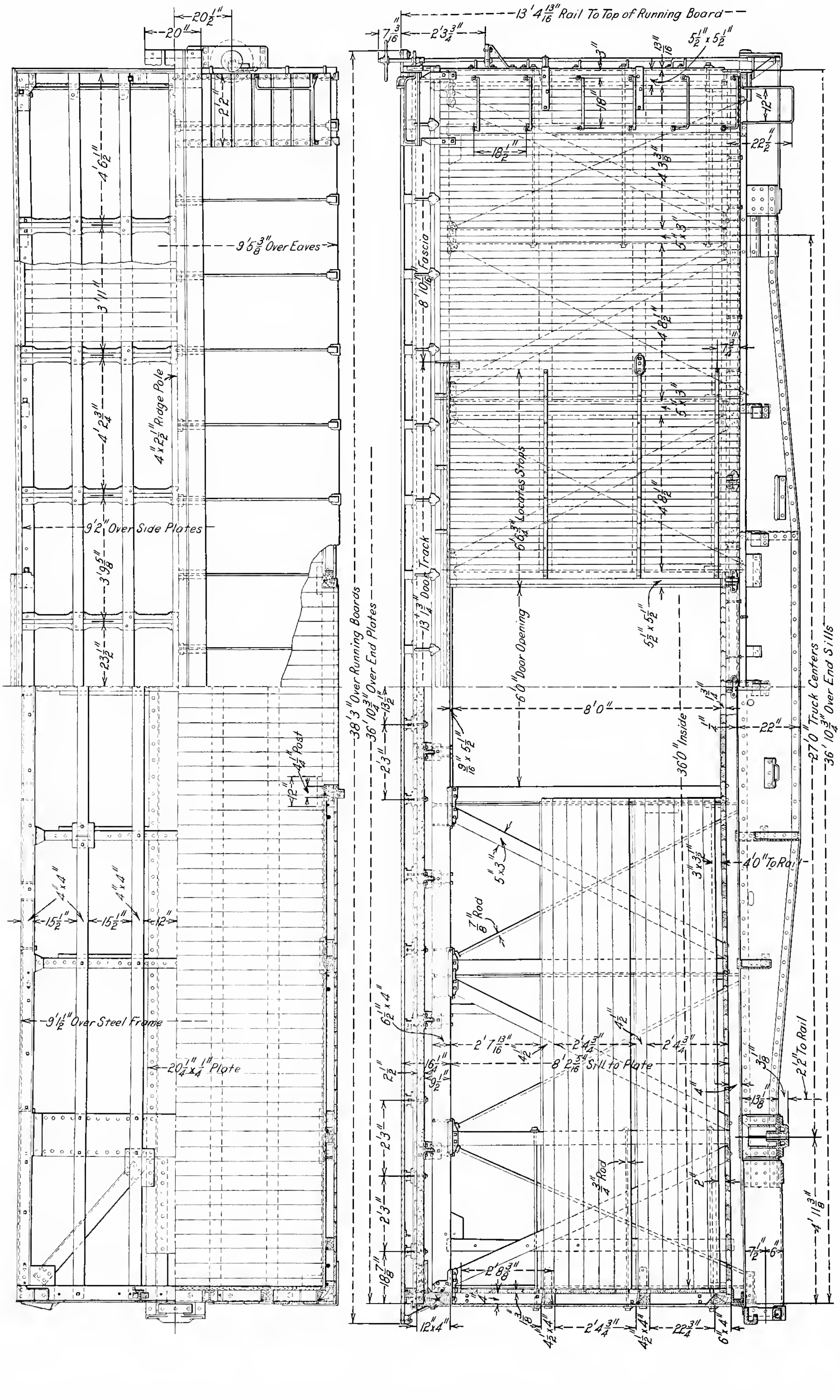


Fig. 274—New York Central & Hudson River Steel Underframe 40-Ton Capacity Box Car. See also Fig. 276.

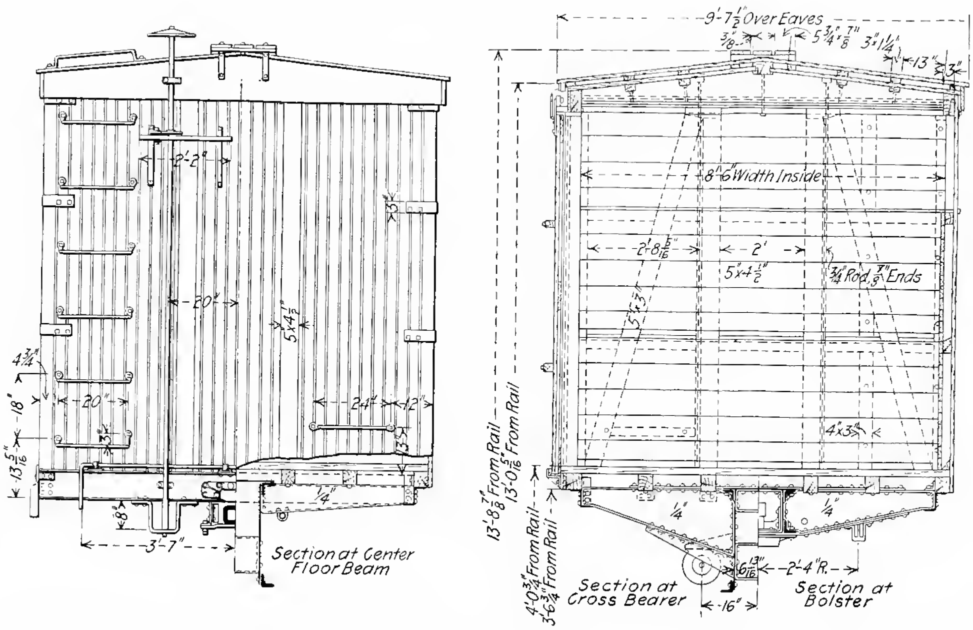


Fig. 275—End Elevation and Cross Sections of Chicago Great Western Steel Underframe Box Car Shown in Fig. 277.

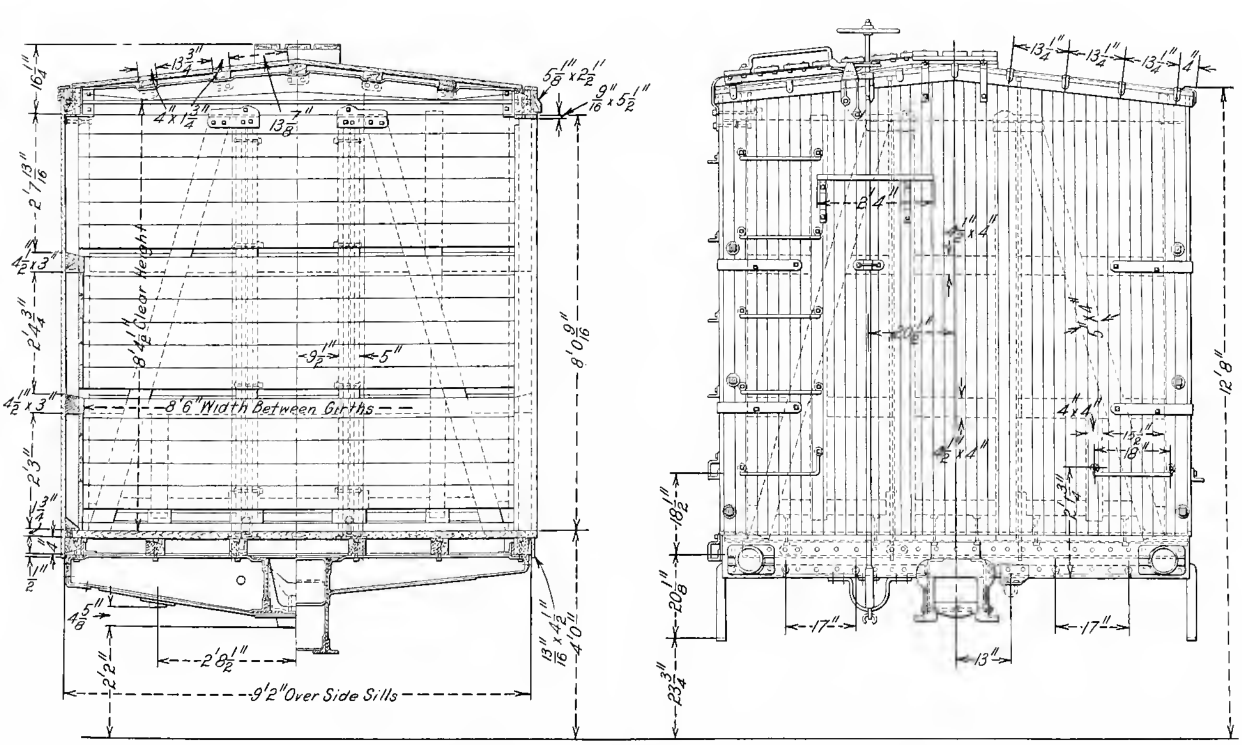


Fig. 276—Cross Sections and End Elevation of New York Central & Hudson River Steel Underframe Box Car Shown in Fig. 274.

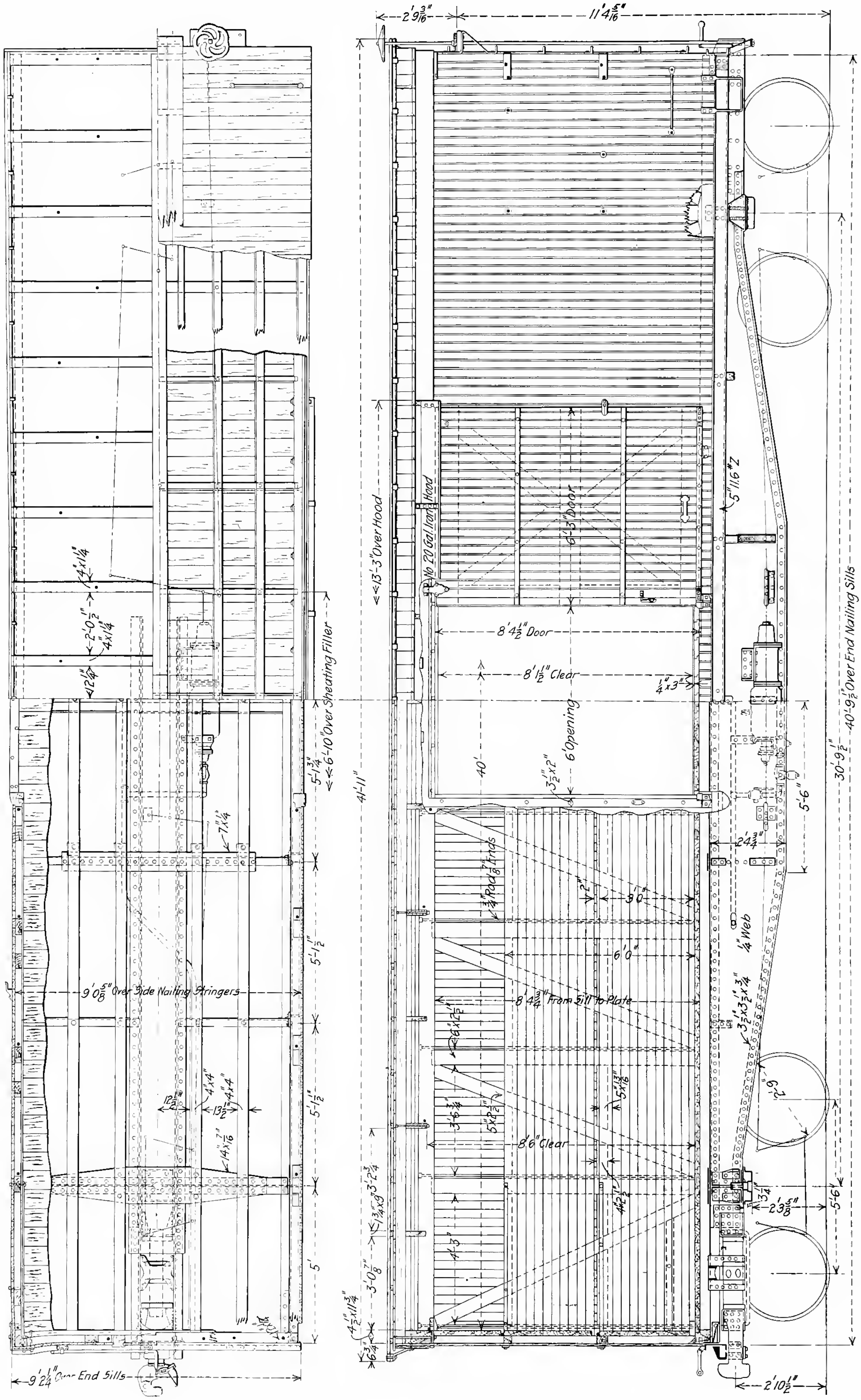


Fig. 277—Chicago Great Western Steel Underframe 50-Ton Capacity Box Car. Builder, American Car & Foundry Company. See also Fig. 275.

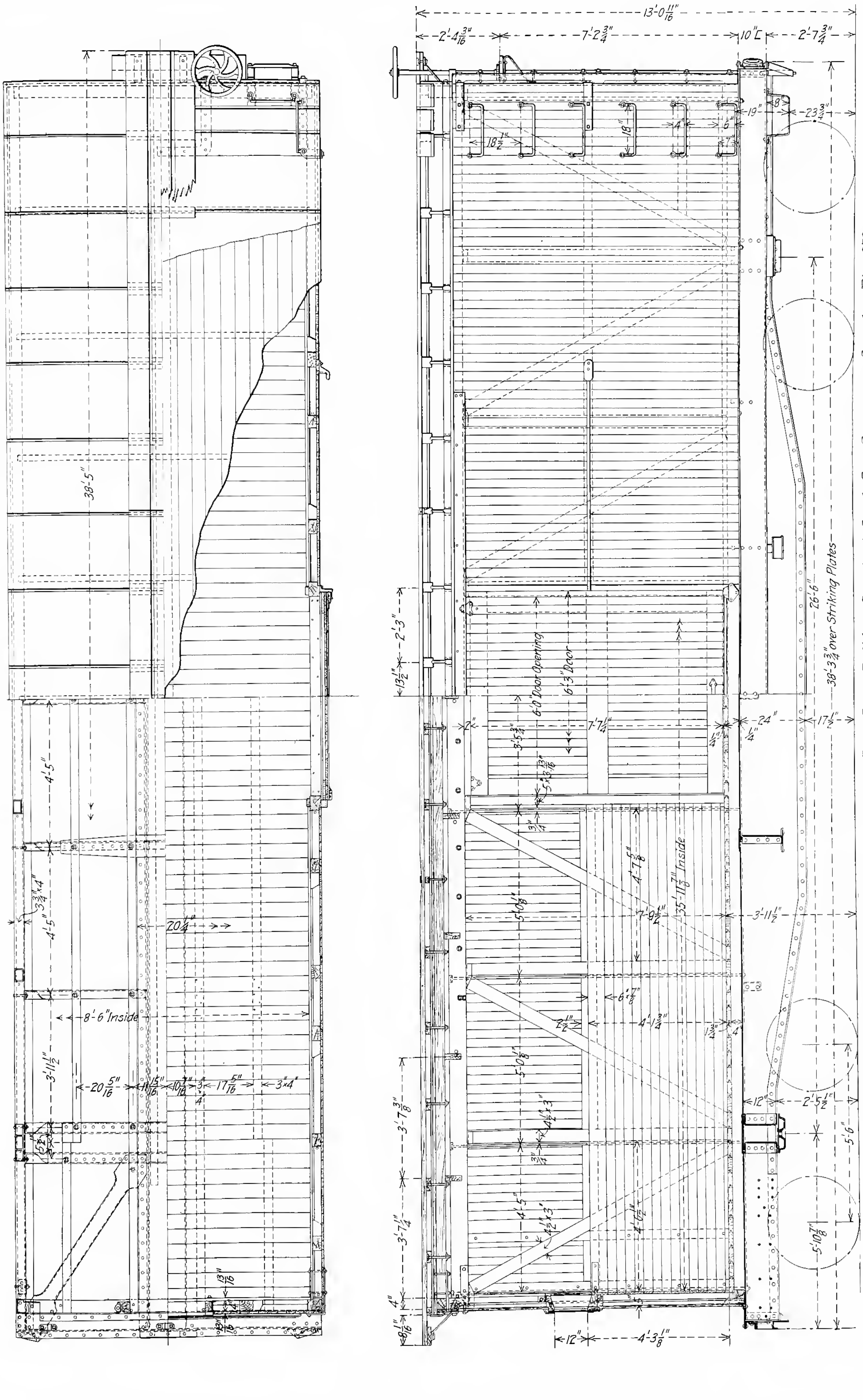


Fig. 278—Steel Underframe 40-Ton Capacity Box Car. Builder, Standard Steel Car Company. See also Fig. 279.

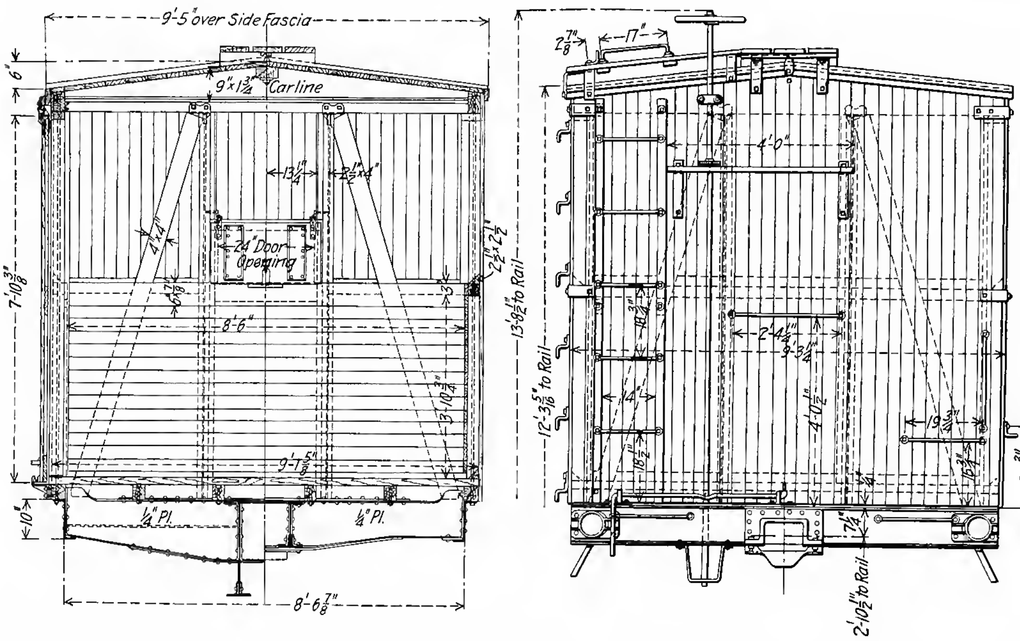


Fig. 279—Cross Sections and End Elevation of Steel Undertrame 40-Ton Capacity Box Car Shown in Fig. 278.

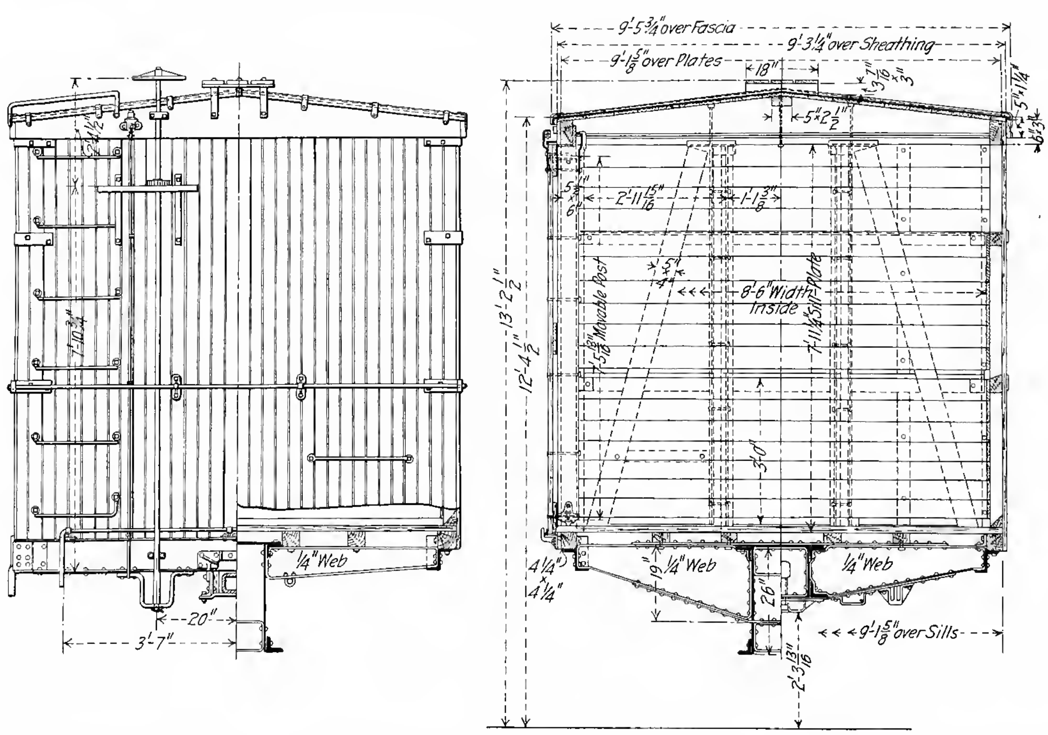


Fig. 280—End Elevation and Cross Sections of Cincinnati, Hamilton & Dayton Steel Underframe Automobile Car Shown in Figs. 9 and 281.

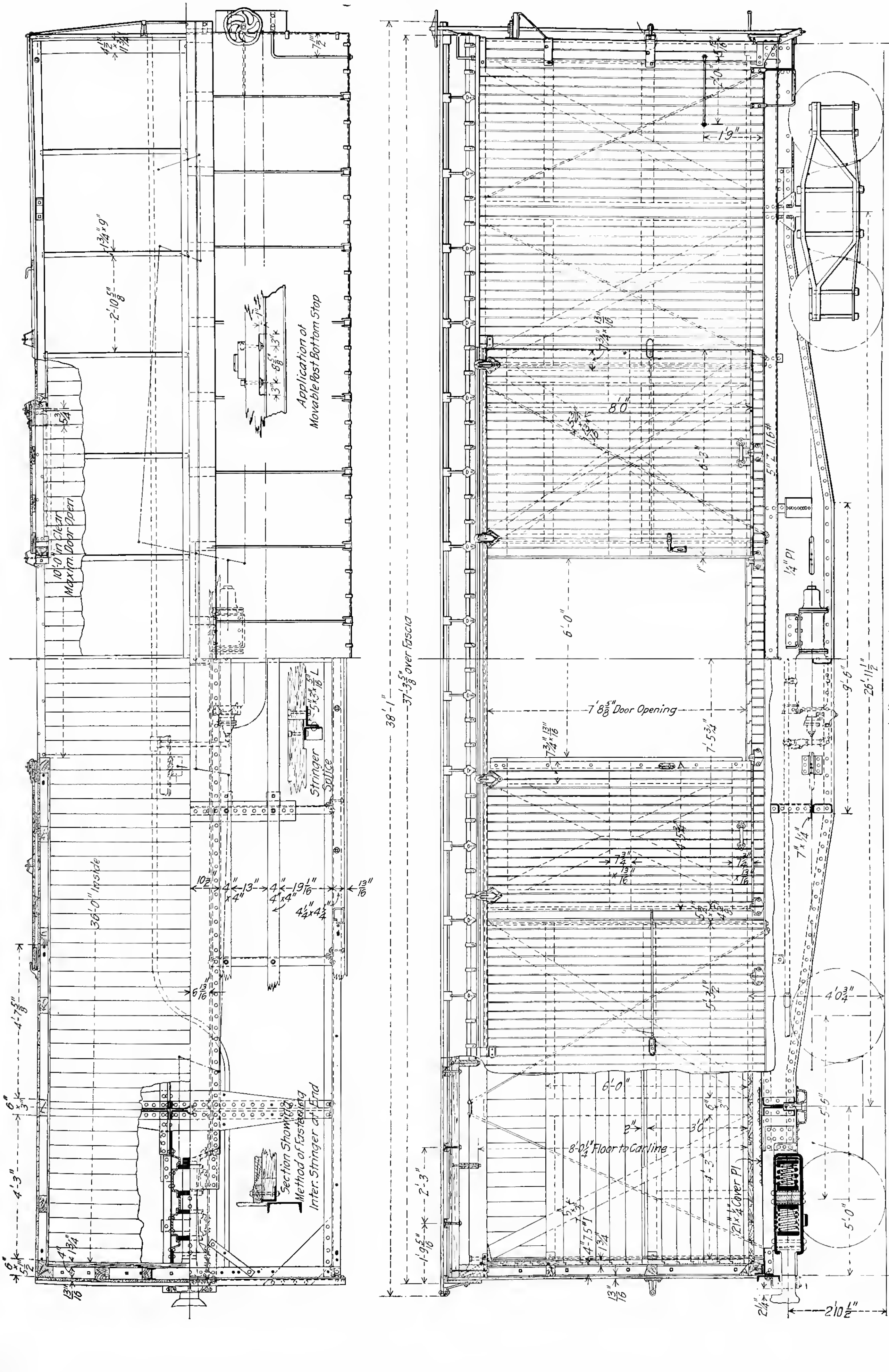


Fig. 281—Cincinnati, Hamilton & Dayton Steel Underframe 40-Ton Capacity Automobile Car Shown in Figs. 9 and 280. Builder, American Car & Foundry Company.

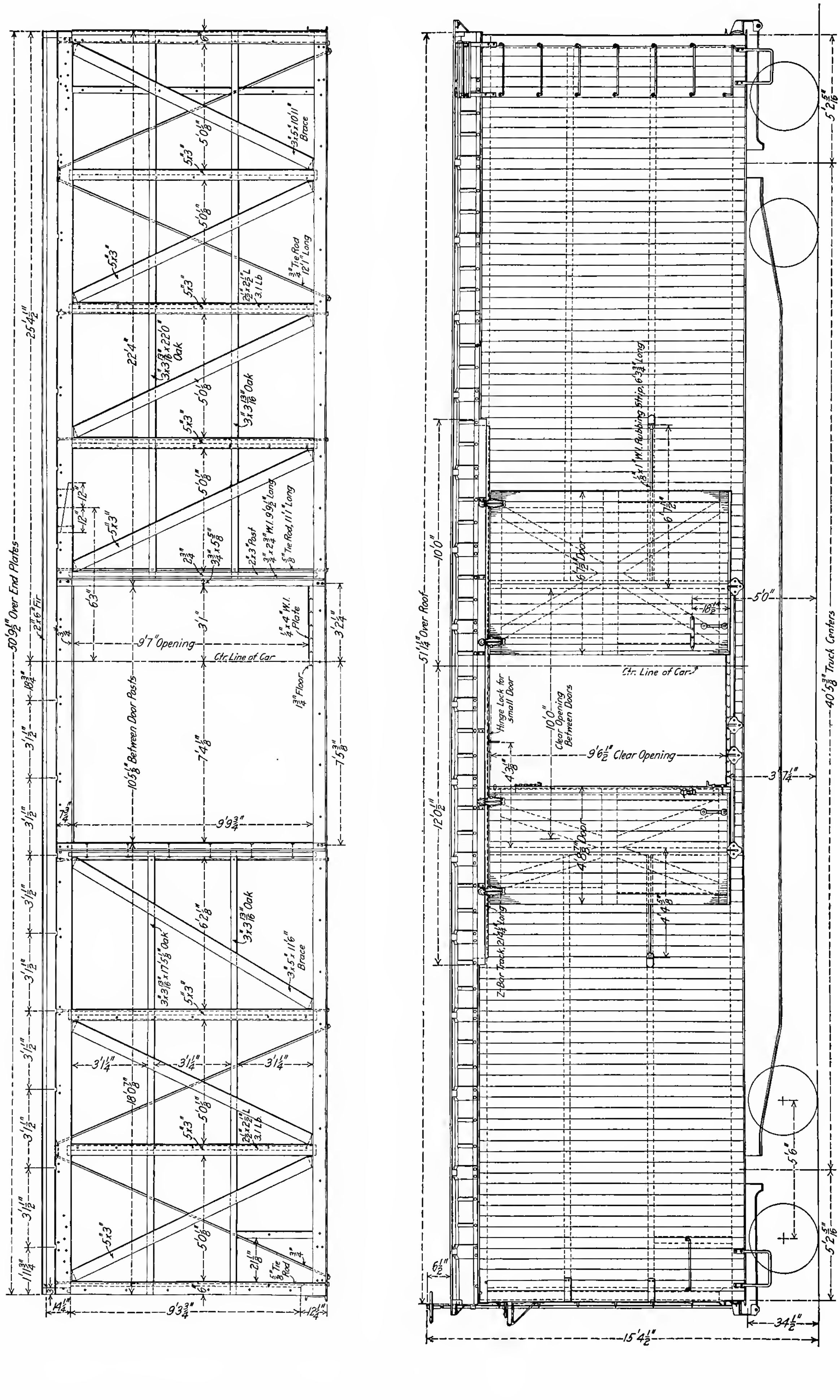


Fig. 282—Chicago, Milwaukee & St. Paul Steel Underframe 40-Ton Capacity Automobile Car. See also Figs. 283 and 284.

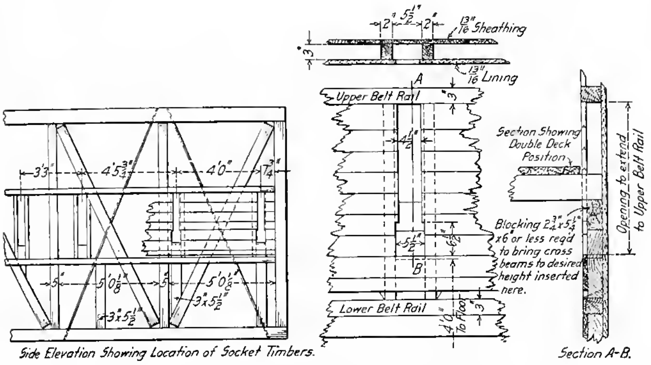


Fig. 283—Arrangement of Double-Deck Supports in Chicago, Milwaukee & St. Paul Automobile Car Shown in Figs. 282 and 284.

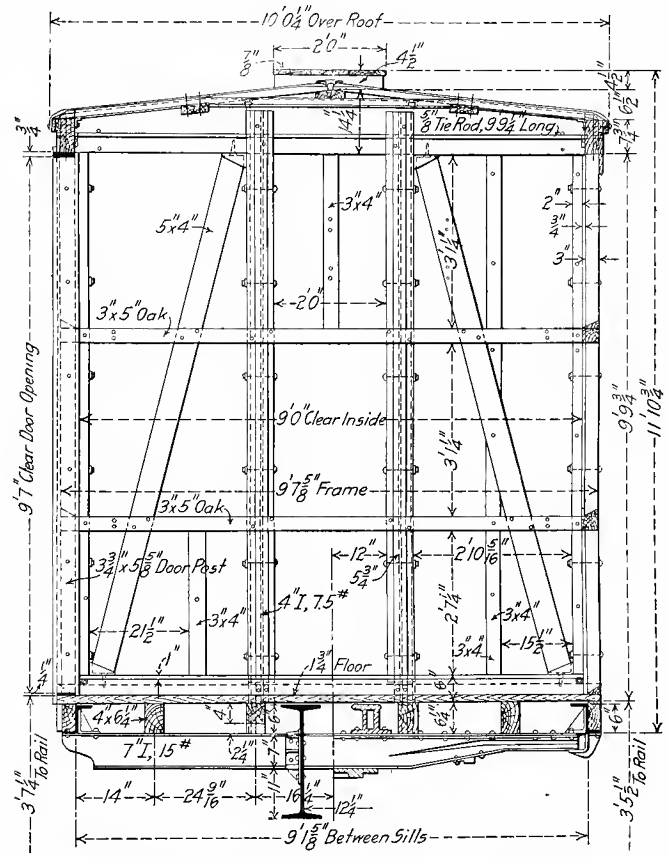


Fig. 284—Cross Sections of Chicago, Milwaukee & St. Paul Automobile Car Shown in Figs. 282 and 283.

Box Car Parts. See Figs. 285-288.

1 *Side Sill*
2 *End Sill*
3 *Inner Intermediate Sill*
3a *Outer Intermediate Sill*
4 *Center Sill*
12 *Body Bolster*
12a *Body Bolster Top Cover Plate*
12b *Body Bolster Bottom Cover Plate*
16 *Body Side Bearing*
17 *Body Center Plate*
18 *King Bolt or Center Pin*
19 *Truss Rod*
20 *Truss Rod Saddle*
21 *Queen Post*
22 *Needle Beam*
23 *Drawbar*
25 *Carry Iron*
26 *Draft Sill*
26a *Sub-sill*
27 *Floor*
30 *Sill Step*
32 *Buffer Block or Dead Wood*
33 *Side Brace*
34 *Brace Rod*
34b *Post Cap or Pocket*
35 *End Brace*
35a *End Post Pocket*
36 *Sill and Plate Tie Rod*
37 *Side Brace*
37a *Brace Rod*
38 *Brace Rod Washer*
42 *Side Post*
42a *Post Pocket*
42b *End Post*
43 *Corner Post*
44 *Door Post*
44a *Door Post Pocket*
45 *Corner Post Pocket*
46 *Side Plate*
47 *Side Plate Tie Rod*
48 *End Plate*
49 *Belt Rail*
50 *Belt Rail*
52 *Sheathing or Siding*
53 *Inside Lining*
55 *Upper Corner Plate*
56 *Intermediate Corner Plate*
57 *Lower Corner Plate*
59 *Ladder Round*
60 *Hand Hold*
61d *Side Door*
65 *Side Door Top Track or Guide*
66 *Side Door Bottom Guide*
81 *Carline*
83 *Purline*
84 *Ridge Pole*
86 *Roof*
86c *Inside Roof*
87 *Running Board*
89 *Running Board Bracket*
90 *End Fascia*
91 *Side Fascia*
93 *Hand Brake Wheel*
94 *Hand Brake Shaft*
95 *Horizontal Hand Brake Shaft*
96 *Hand Brake Shaft Bearing*
98 *Hand Brake Shaft Step or Bearing*
99 *Hand Brake Shaft Guide*
100 *Hand Brake Step*
101 *Hand Brake Step Bracket*
102 *Roof Hand Hold*
103 *Hand Brake Ratchet Wheel*
104 *Hand Brake Chain*
105 *Hand Brake Chain Sheave*
142 *Brake Head*
144 *Brake Hanger*
165 *Journal Box*
191 *Push Pole Pocket*
192 *Gusset Plate*
193 *Side Nailing Strip or Floor Stringer Bracket*
194 *Nailing Strip or Stringer*
194a *Side Nailing Strip*
195 *End Sill Diagonal Brace*
196 *Cross Tie, Floor Beam or Stringer Support*
210 *Uncoupling Rod*
222 *Inside Corner Plate*
A *Auxiliary Reservoir*
C *Brake Cylinder*
P *Train or Brake Pipe*
T *Triple Valve*

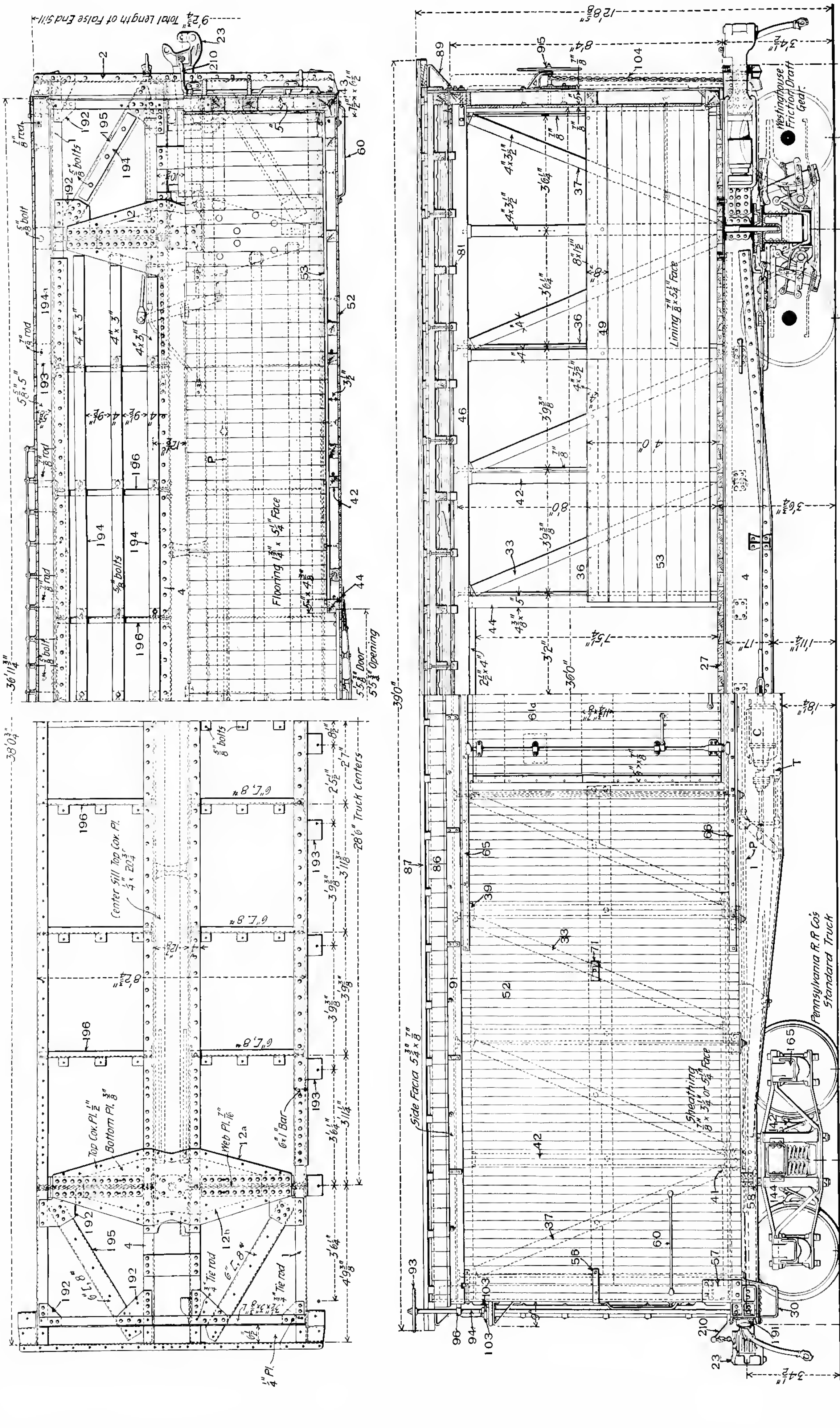


Fig. 285—Pennsylvania Railroad Steel Underframe 40-Ton Capacity Box Car. See Fig. 286.

See Page 289 for Names of Numbered Parts.

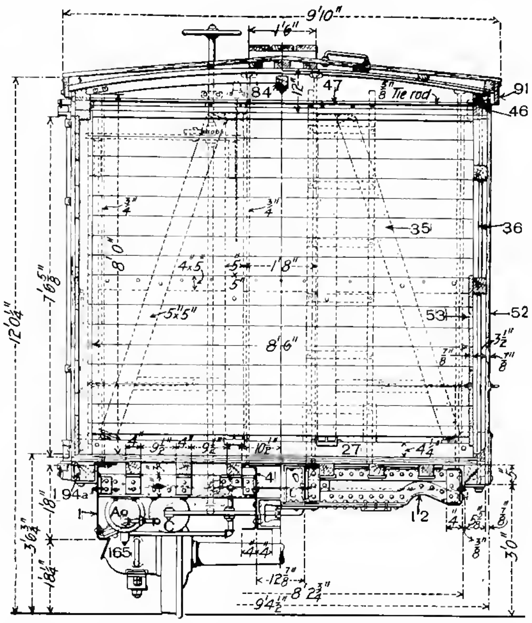


Fig. 286—Cross Sections of Pennsylvania Railroad Steel Underframe Box Car Shown in Fig. 285.

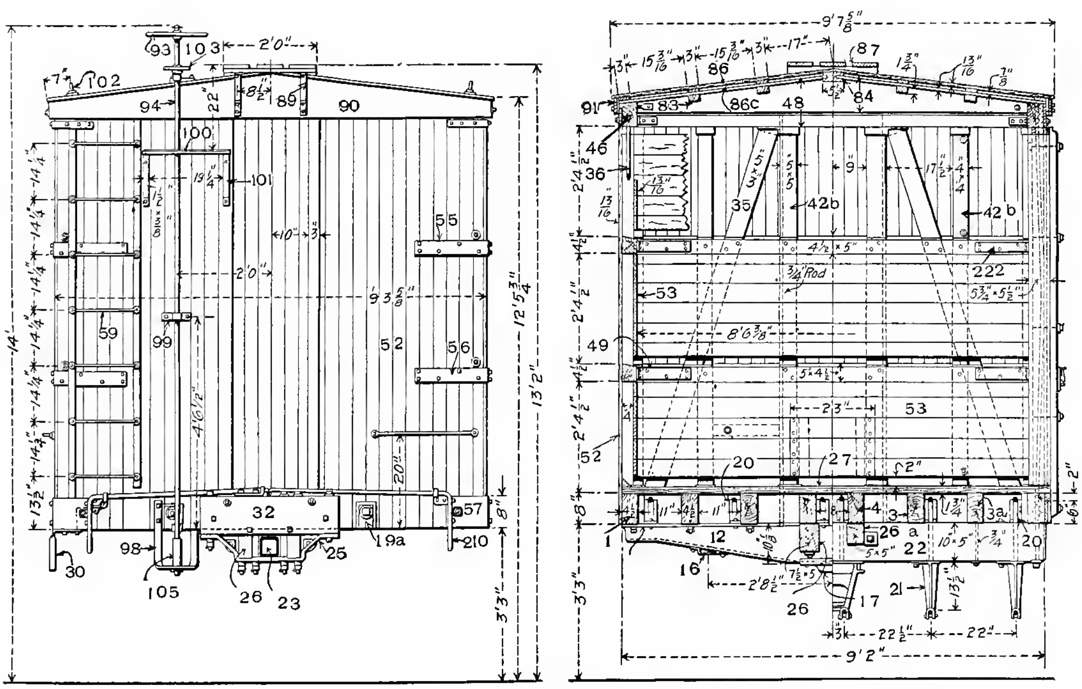


Fig. 287—End Elevation and Cross Sections of New York Central & Hudson River Wooden Box Car Shown in Fig. 288.

See Page 289 for Names of Numbered Parts.

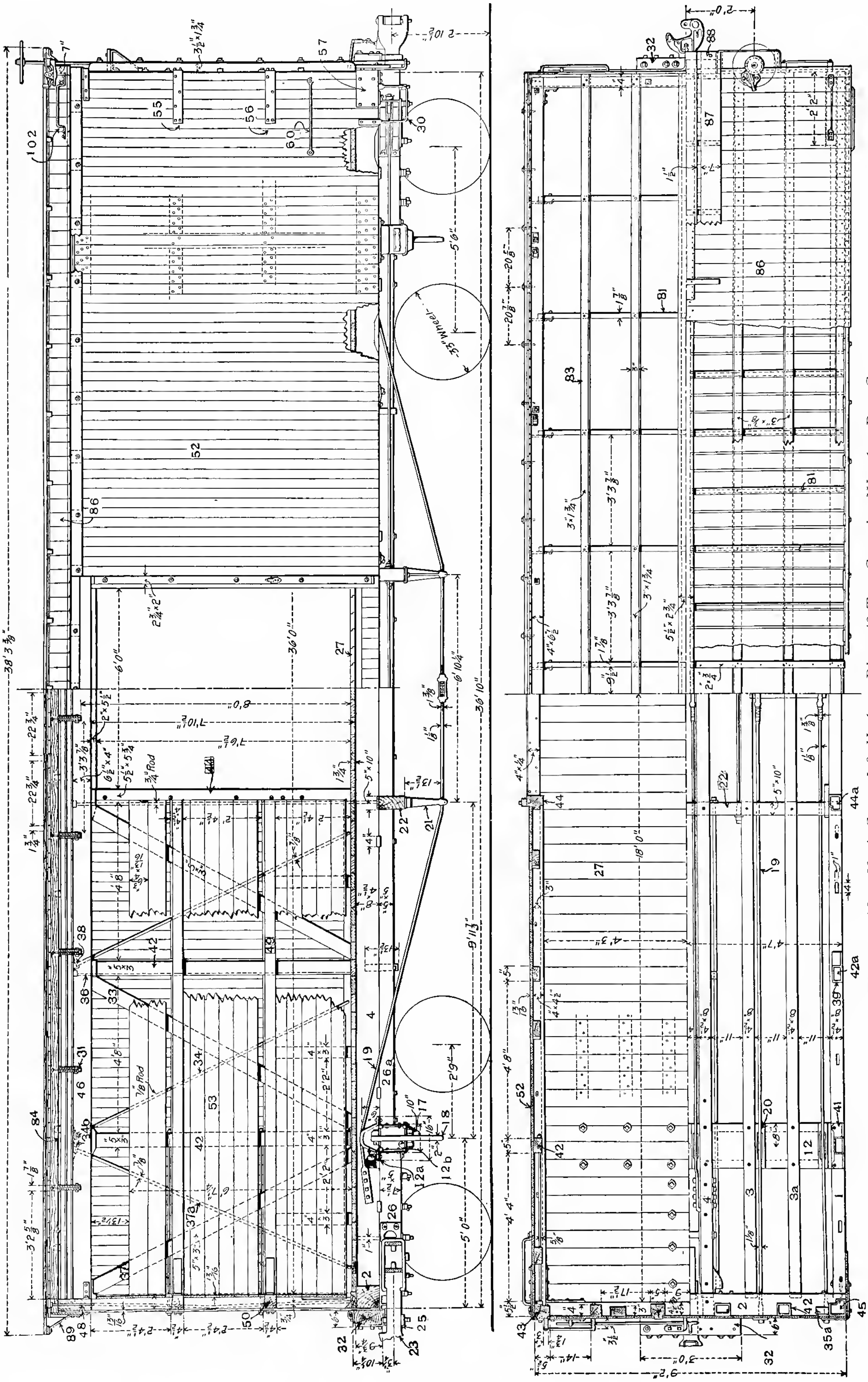


Fig. 288—New York Central & Hudson River 40-Ton Capacity Wooden Box Car.
See Page 289 for Names of Numbered Parts.

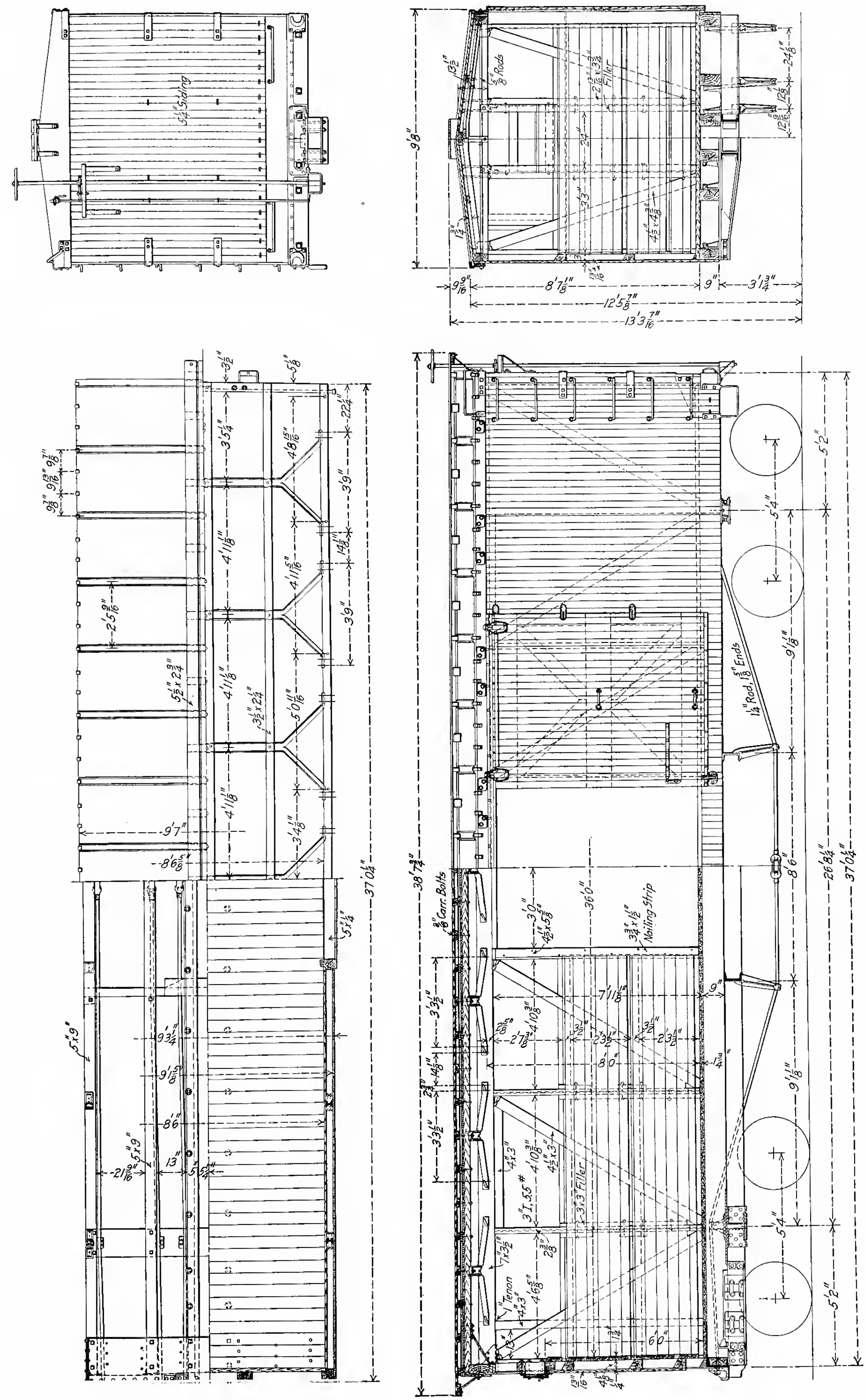


Fig. 289—Atchison, Topeka & Santa Fe 40-Ton Capacity Wooden Box Car

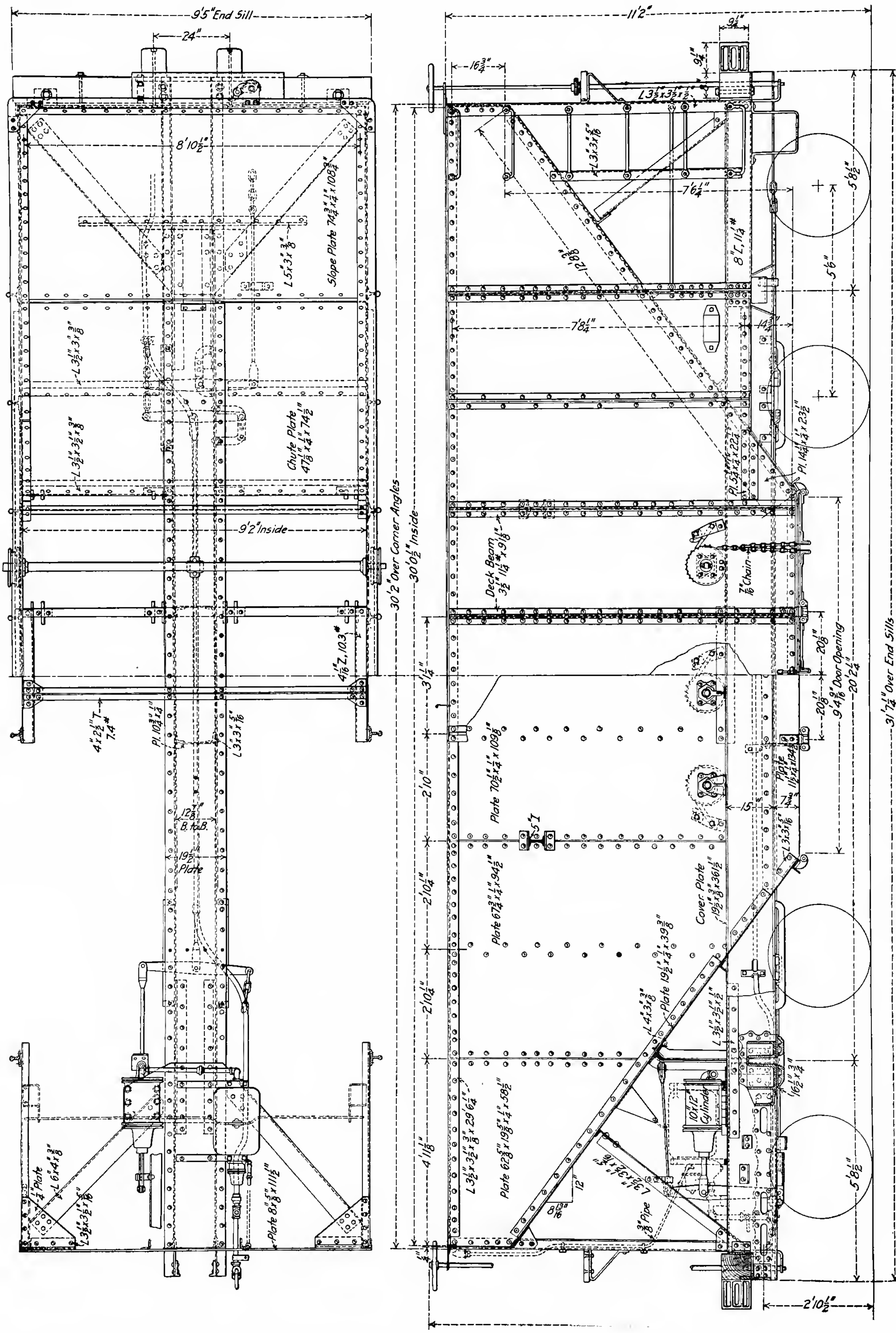


Fig. 290—Norfolk & Western All-Steel 57½-Ton Capacity Hopper Car Shown in Figs. 16, 291 and 292. Builder, The Barney & Smith Car Company.

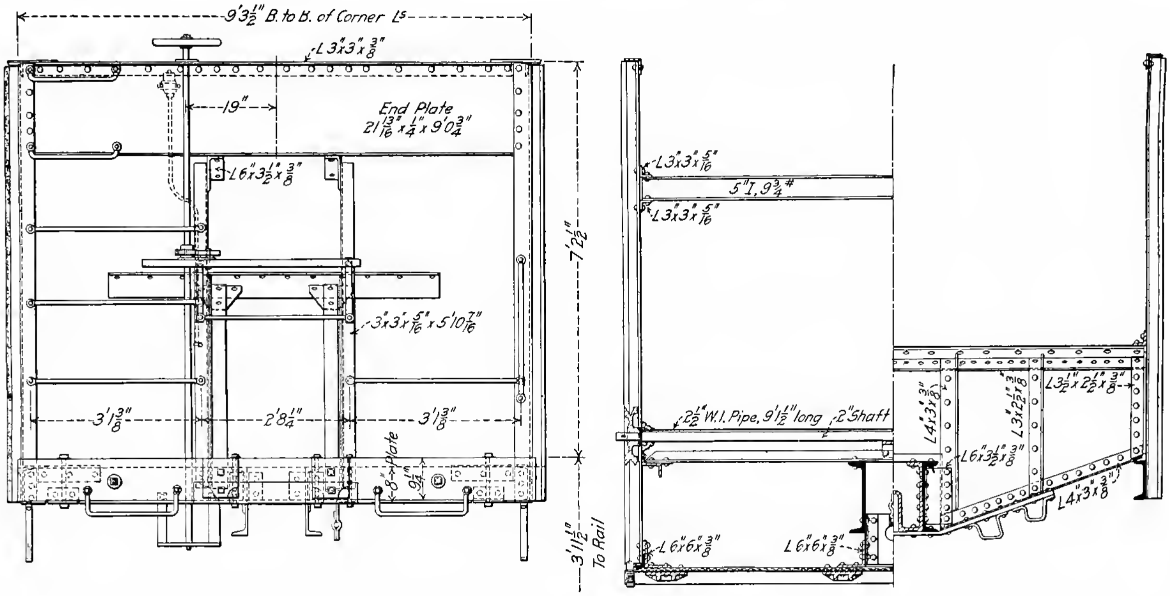


Fig. 291—End Elevation and Cross Sections of Norfolk & Western All-Steel Hopper Car Shown in Figs. 16, 290 and 292.

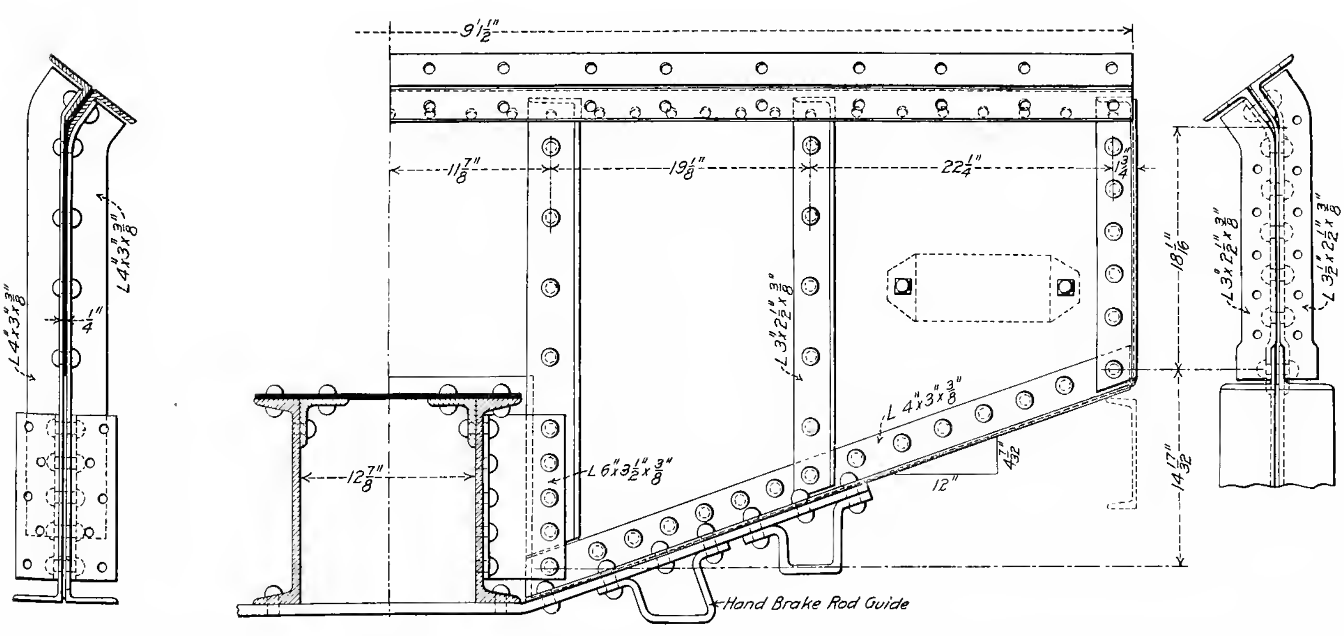


Fig. 292—Section Showing Construction of Body Bolster of Norfolk & Western All-Steel Hopper Car Shown in Figs. 16, 290 and 291.

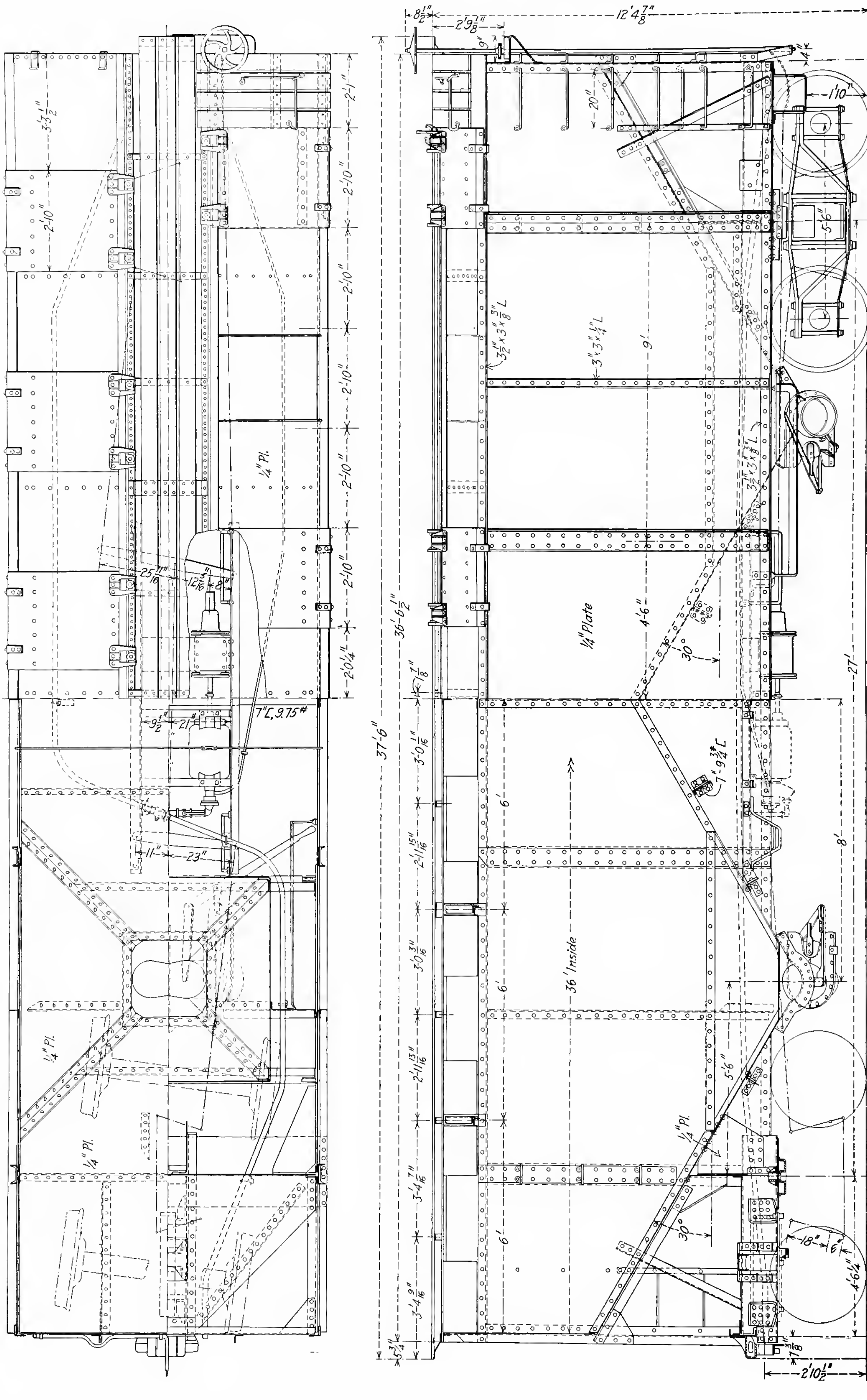


Fig. 293—All-Steel 50-Ton Capacity Covered Hopper Car Shown in Figs. 17 and 295. Builder, American Car and Foundry Company.

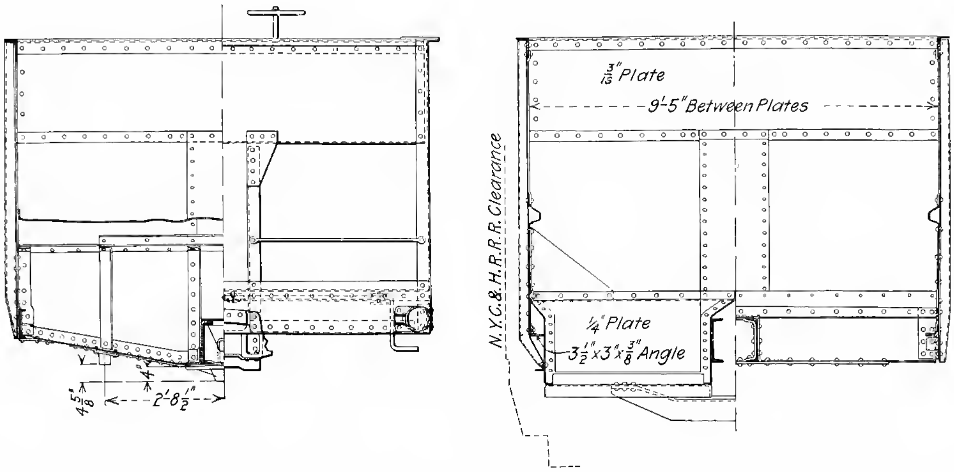


Fig. 294—Cross Sections and End Elevation of All-Steel 40-Ton Capacity Hopper Coke Car Shown in Figs. 28 and 296.

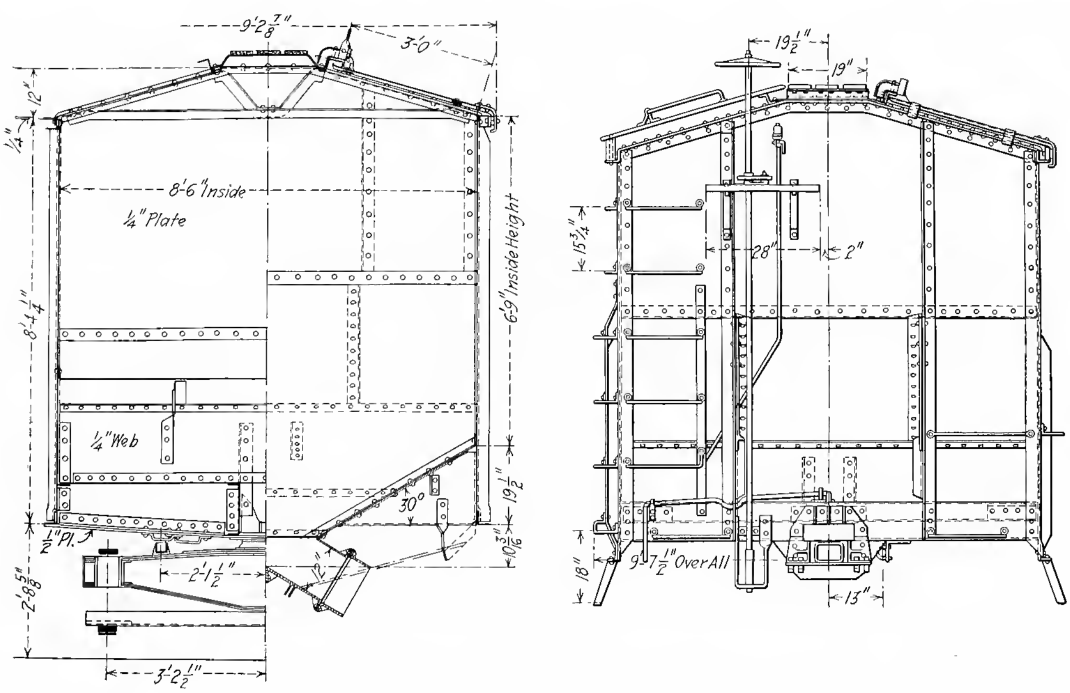


Fig. 295—Cross Sections and End Elevation of All-Steel Covered Hopper Car Shown in Figs. 17 and 293.

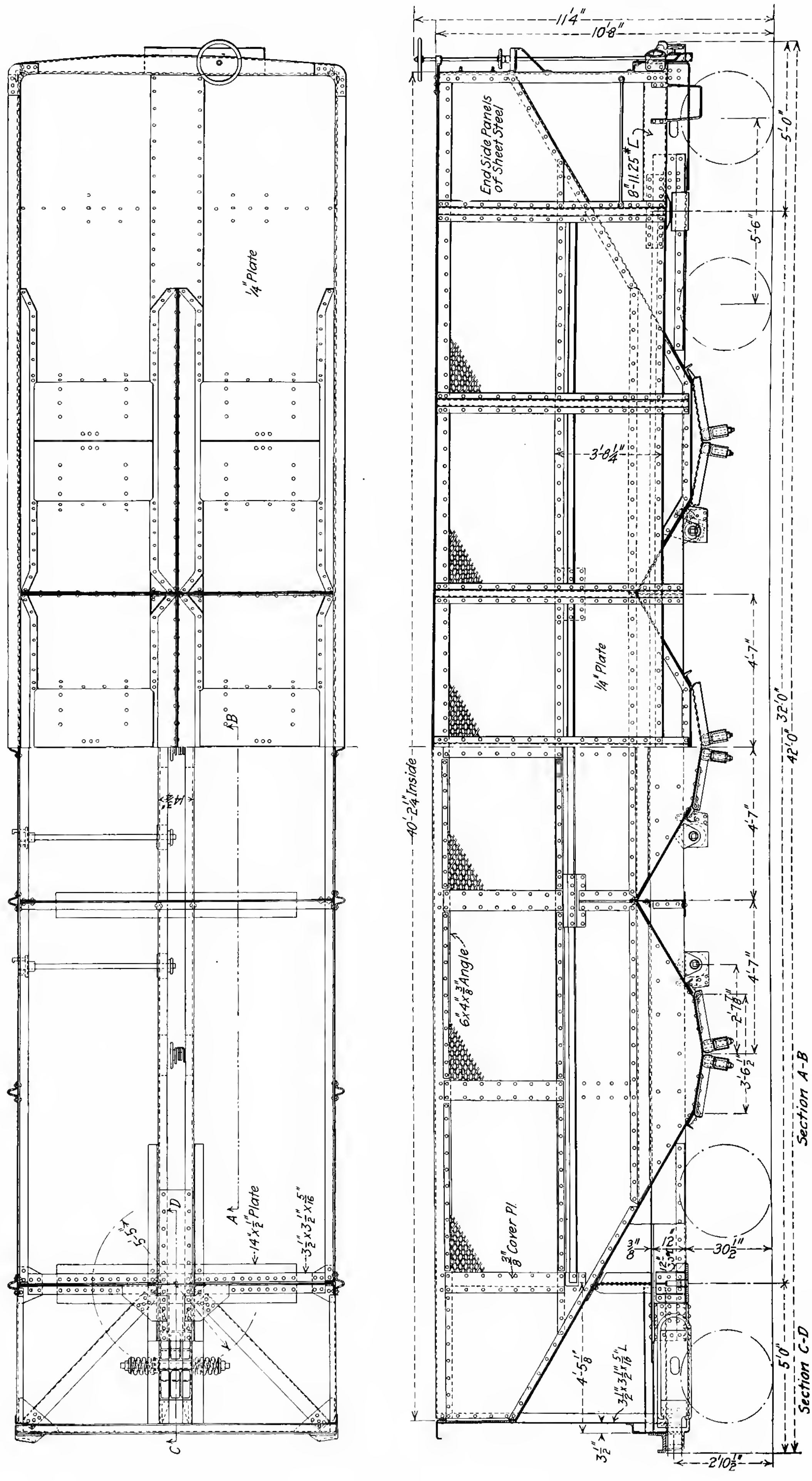


Fig. 296—Lake Shore & Michigan Southern All-Steel 40-Ton Capacity Hopper Coke Car Shown in Figs. 28 and 294. Builder, American Car & Foundry Company.

Hopper Car Parts. See Fig. 297.

1 *Draft Sill*
2 *Center Sill*
3 *Center Sill Top Cover Plate*
4 *End Sill*
5 *Draft Plate or Cheek Casting*
6 *Body Center Plates*
7 *Body Bolster*
8 *Cross Bearer*
9 *Diagonal or Corner Brace*
10 *Push Pole Pocket*
11 *Striking Plate*
12 *Uncoupling Lever*
13 *Coupler*
14 *Brake Mast*
15 *Hand Brake Wheel*
16 *Hopper Door*
17 *Door Operating Gear*
18 *Slope Floor Sheet*
19 *End Sheet*
20 *Side Sheets*
21 *Side Stake*
22 *Coupler Carrier*
23 *Corner Post Grab Iron*
24 *Side Sill Step*
25 *Brake Step*
26 *Brake Ratchet Wheel*
27 *Top Side Angle of Coke Rack*
28 *Wheel*
29 *Corner Post*
30 *Gusset; Cross Ridge to Side*
31 *Body Cross Tie*
32 *Intermediate Side Angles of Coke Rack*

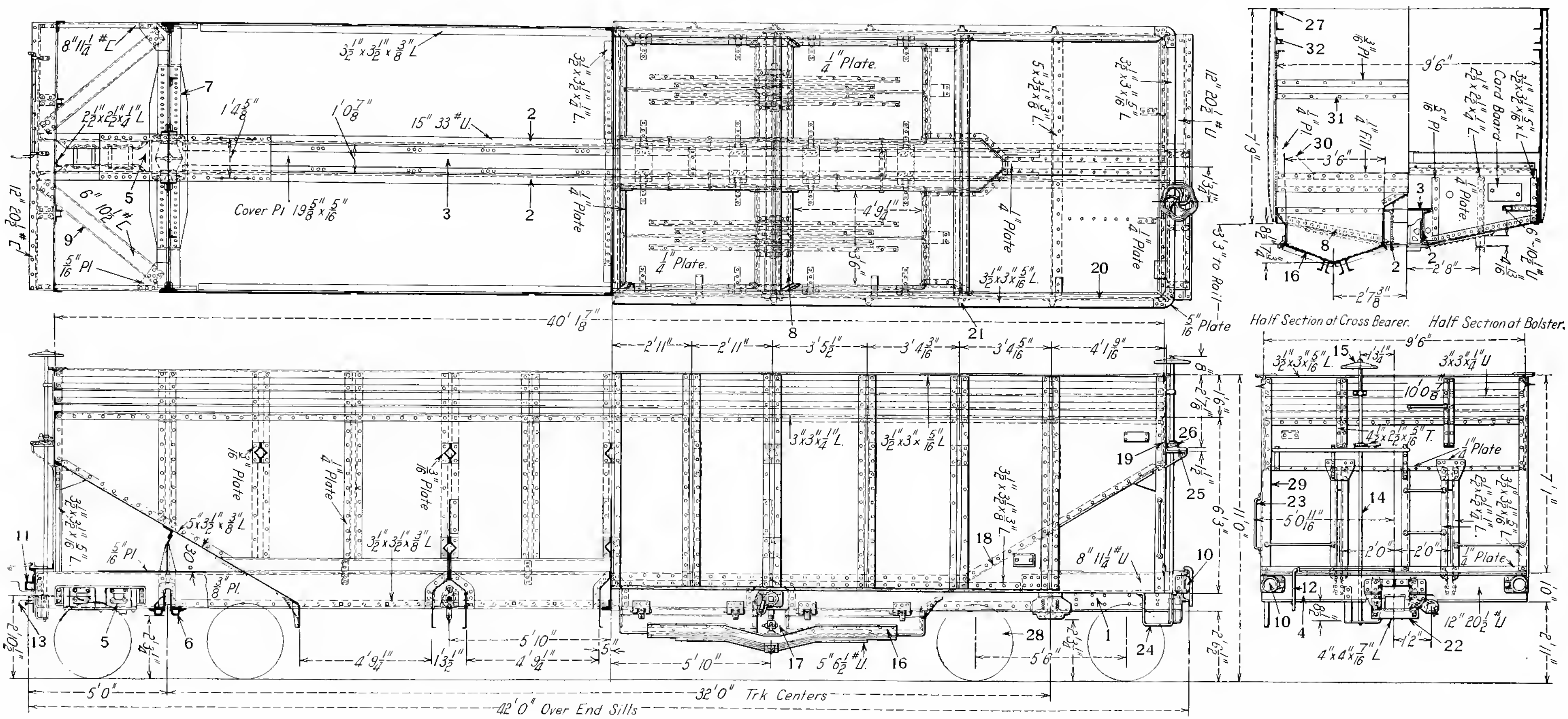


Fig. 297—Southern Railway All-Steel 50-Ton Capacity Hopper Coke Car Shown in Fig. 29. Builder, Cambria Steel Company.

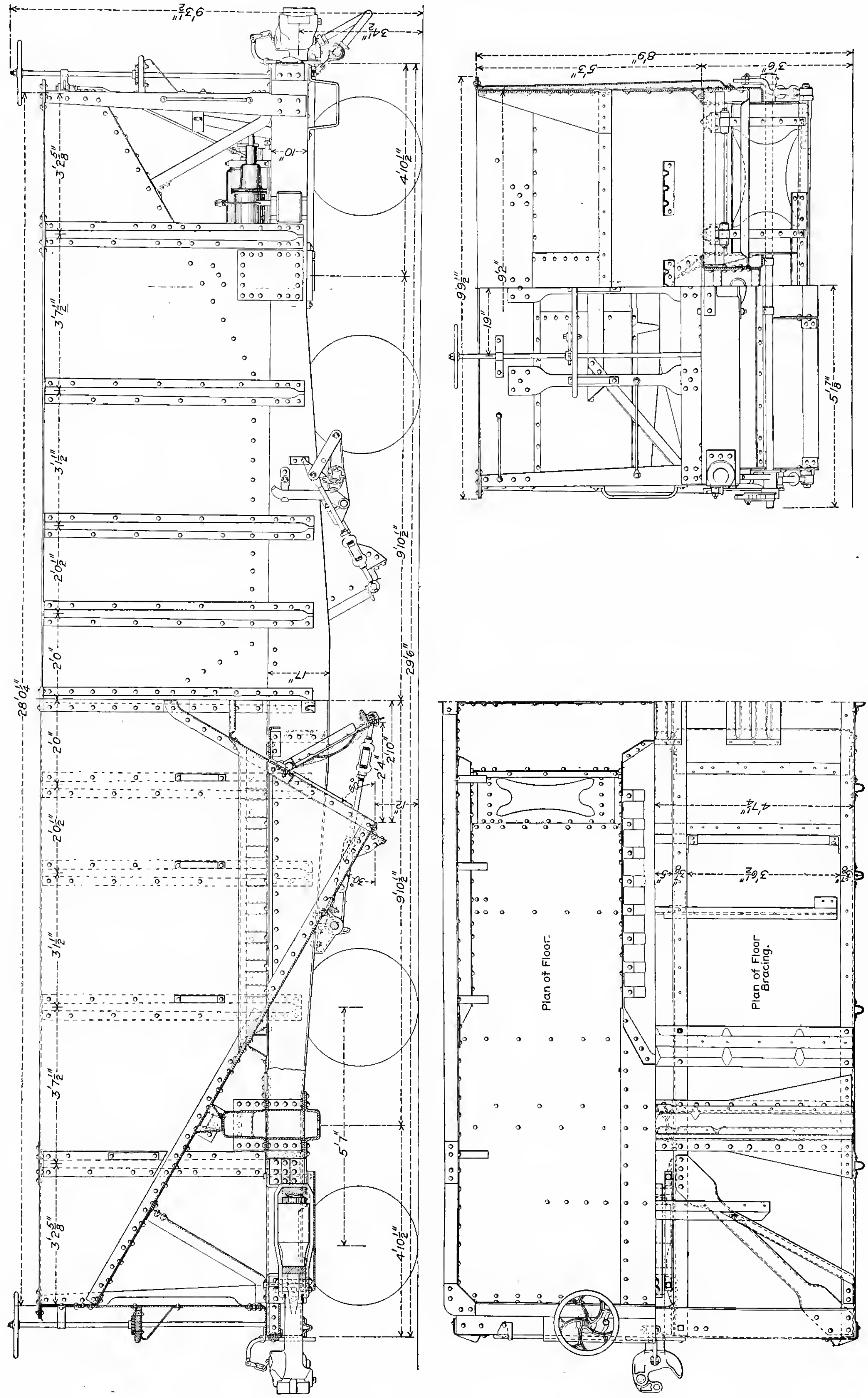


Fig. 298—Bessemer & Lake Erie All-Steel 50-Ton Capacity Hopper Car.

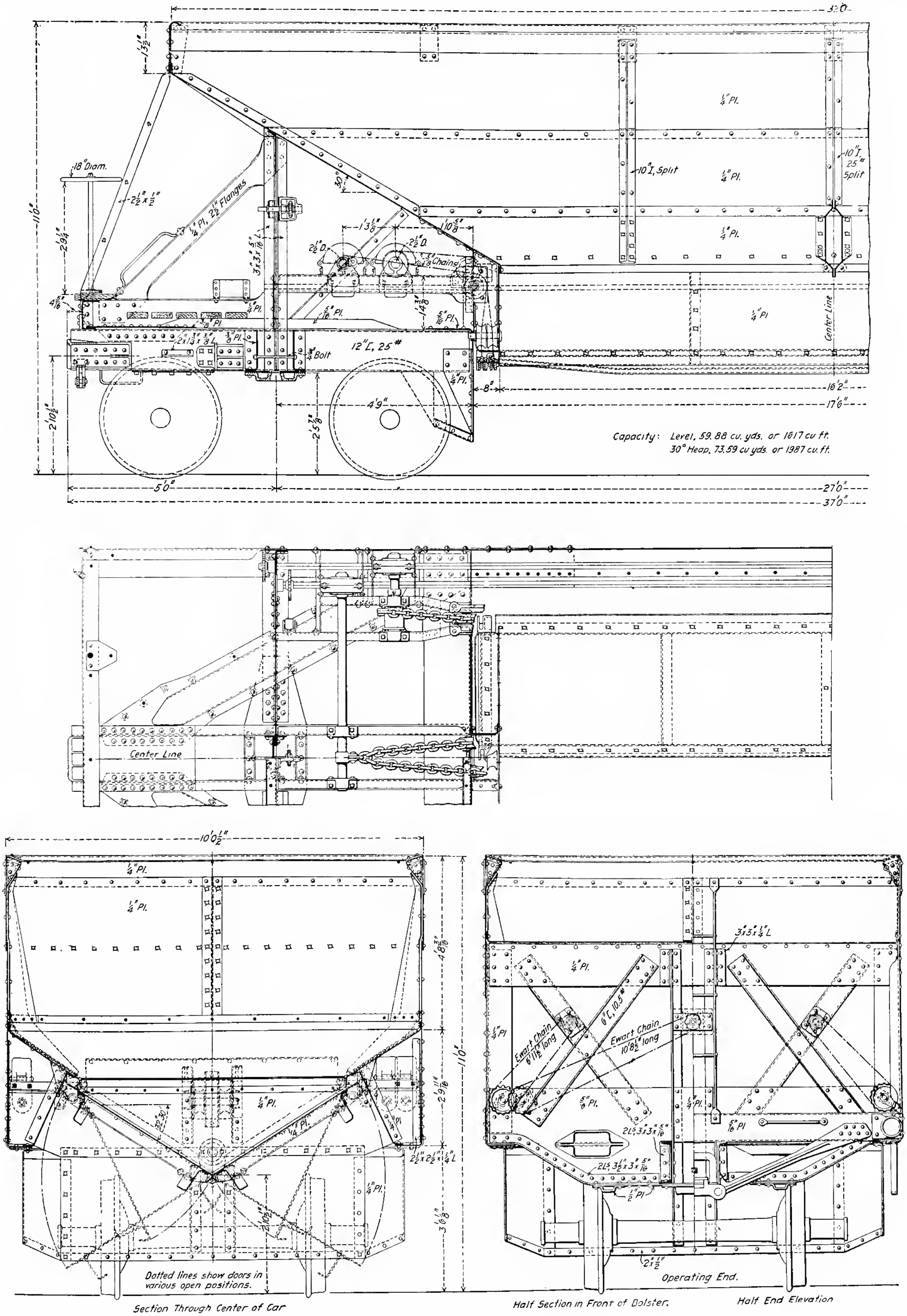


Fig. 299—Union Railroad All-Steel 50-Ton Capacity Hopper Car Shown in Fig. 22. Builder, Summers Steel Car Company.

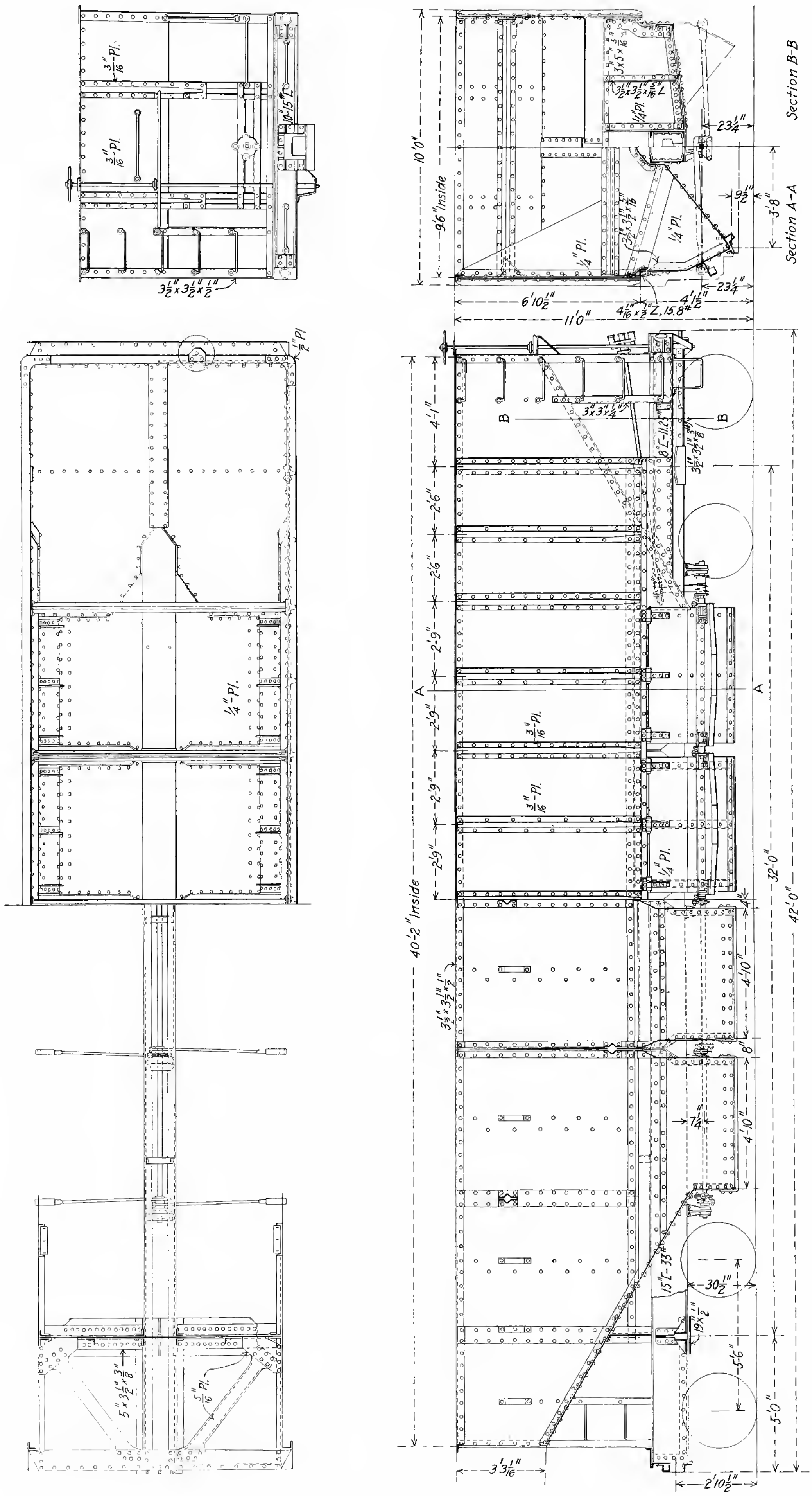


Fig. 300—Elevations, Plan and Sections of All-Steel 50-Ton Capacity Side Dump Hopper Car. Builder, Enterprise Railway Equipment Company.

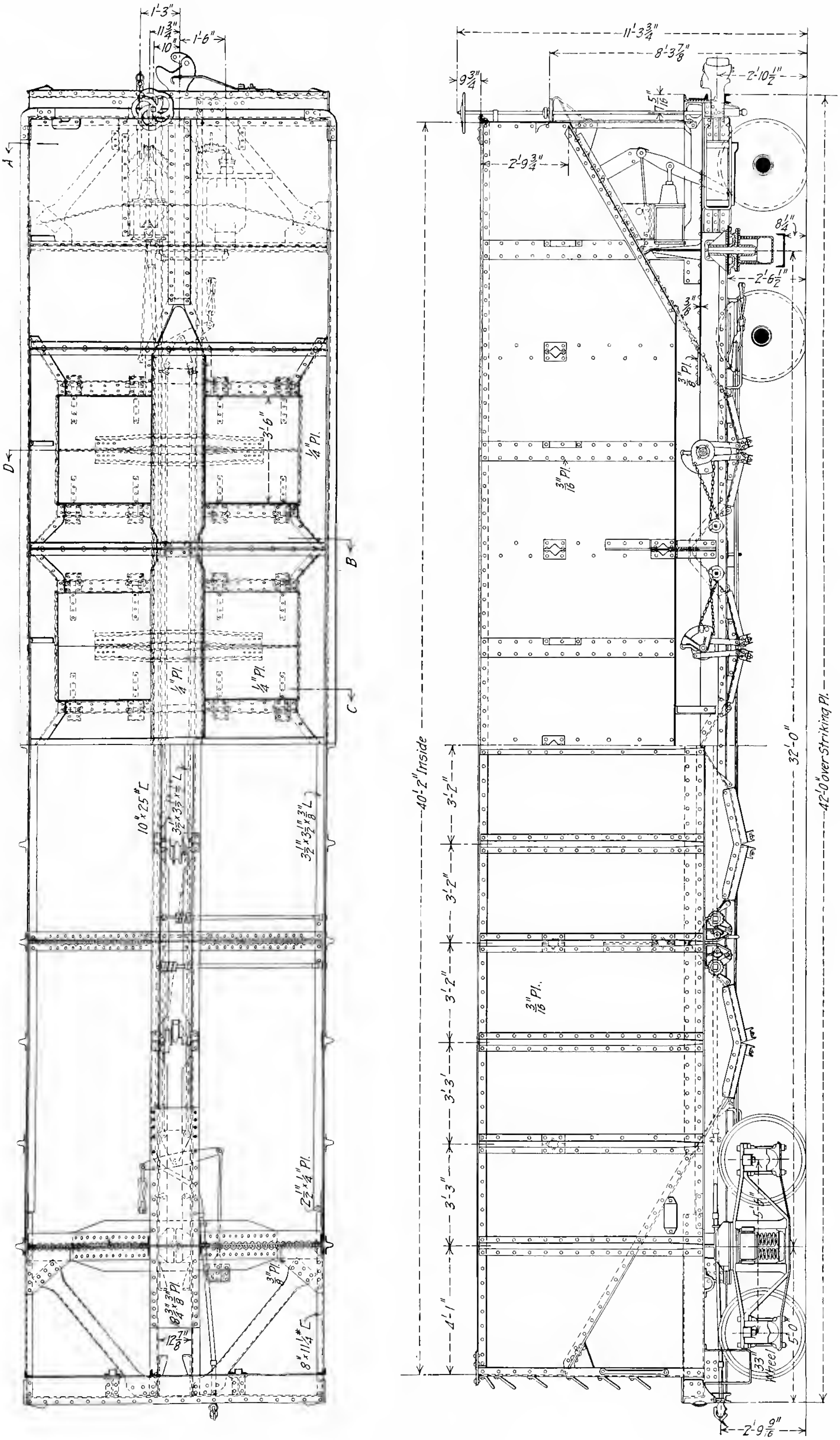


Fig. 301—Pennsylvania All-Steel 50-Ton Capacity Hopper Coke Car. Builder, Cambria Steel Company. See also Figs. 302 and 303.

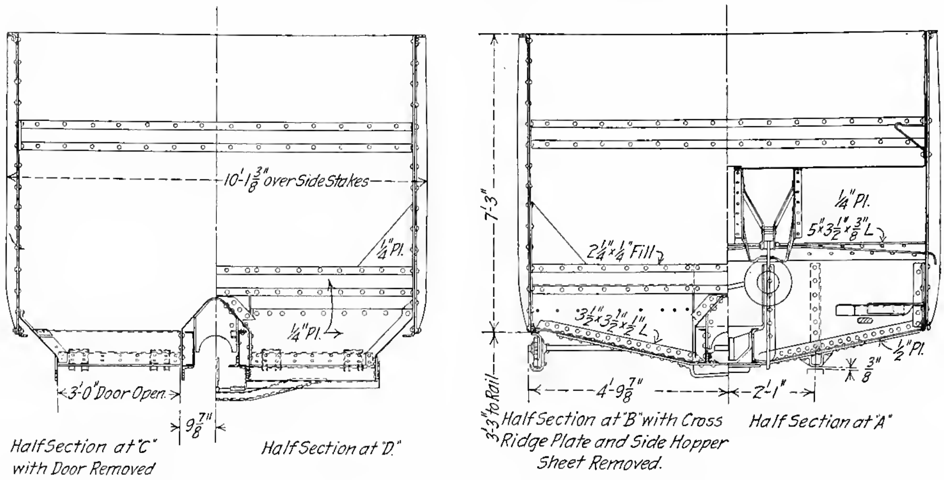


Fig. 302—Cross Sections of Pennsylvania All-Steel Hopper Car Shown in Figs. 301 and 303.

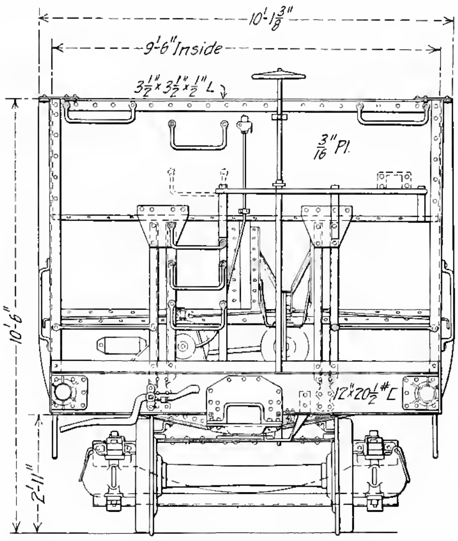


Fig. 303—End Elevation of Pennsylvania All-Steel Hopper Car Shown in Figs. 301 and 302.

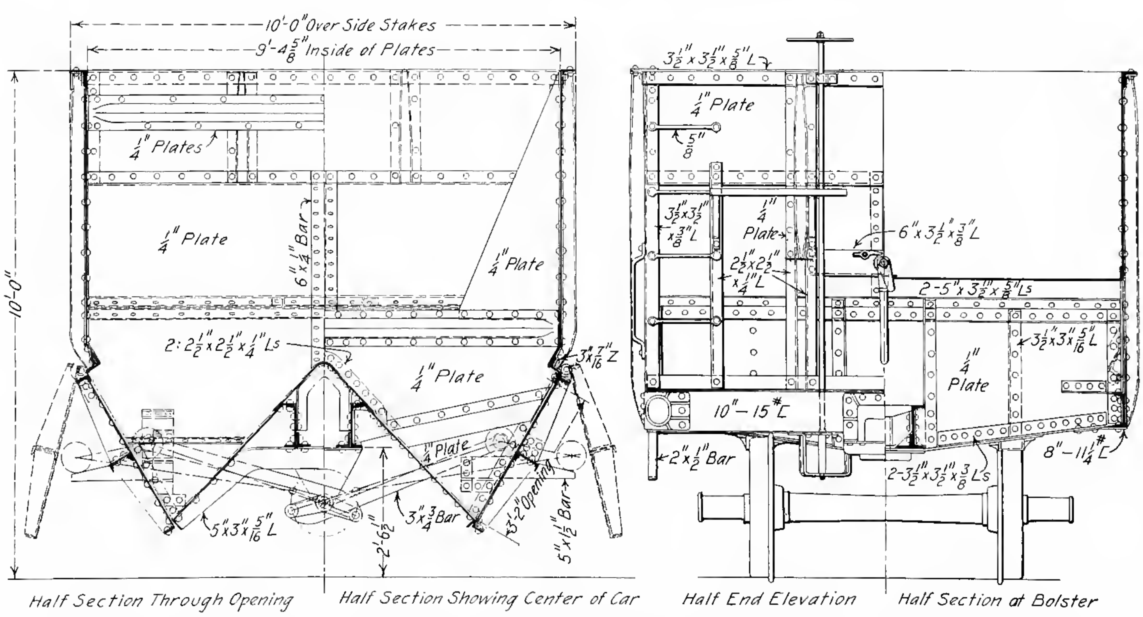


Fig. 304—Cross Sections and End Elevation of All-Steel Side Dump Coke Car Shown in Fig. 305.

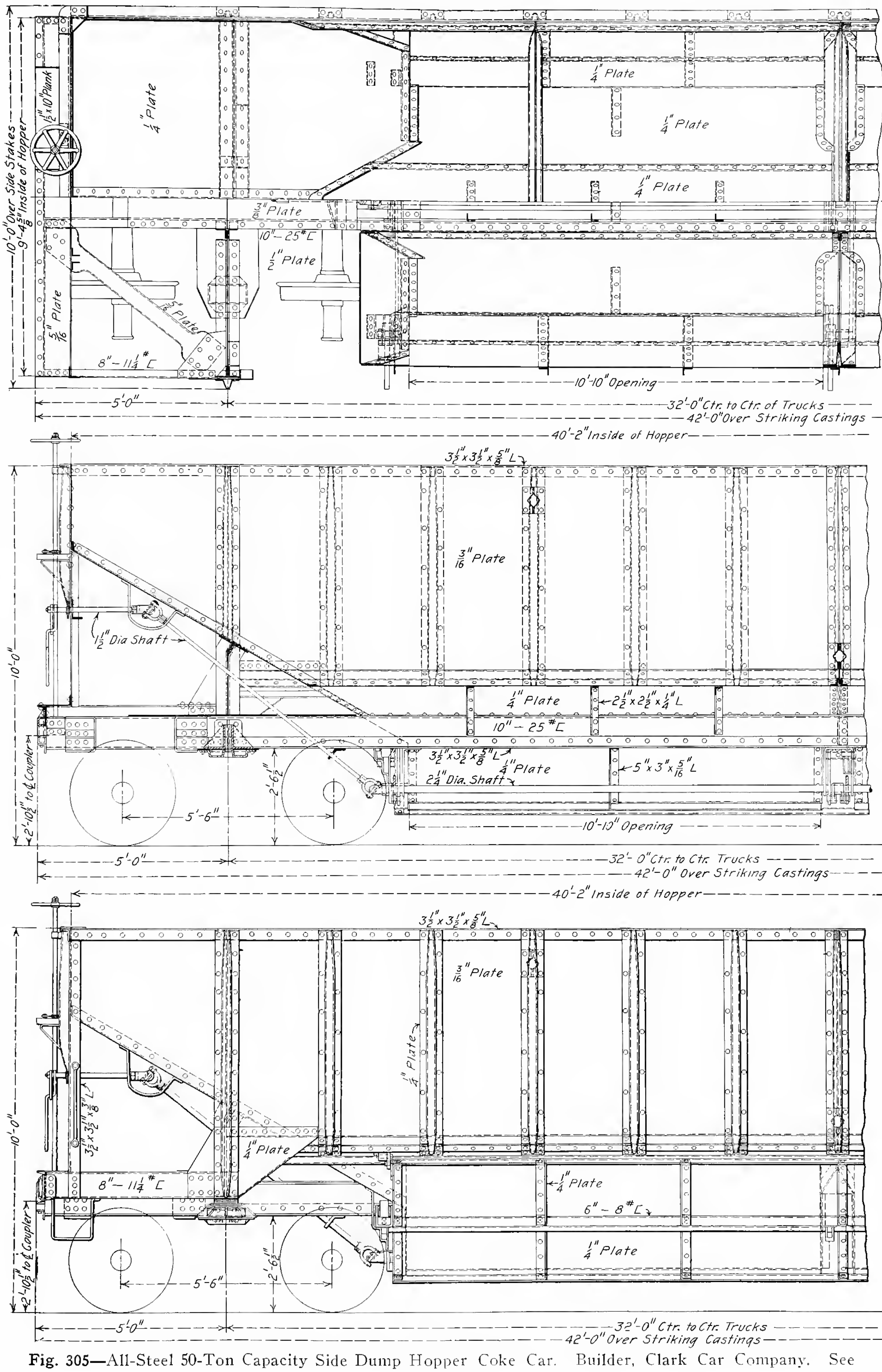


Fig. 305—All-Steel 50-Ton Capacity Side Dump Hopper Coke Car. Builder, Clark Car Company. See also Fig. 304.

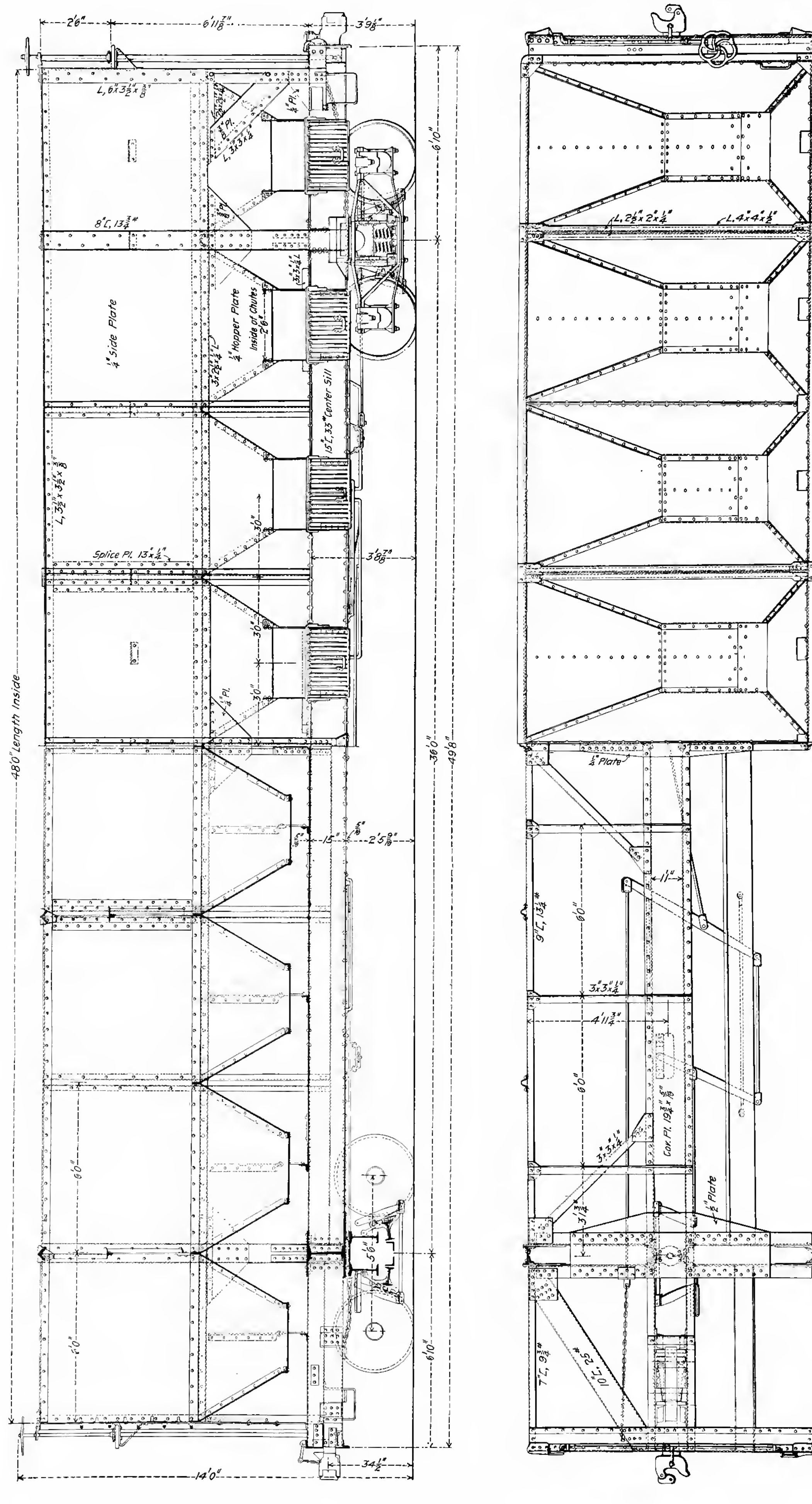


Fig. 306—All-Steel 50-Ton Capacity Side Dump Hopper Coke Car with Eight Hoppers. Builder, Cambria Steel Company. See also Fig. 307.

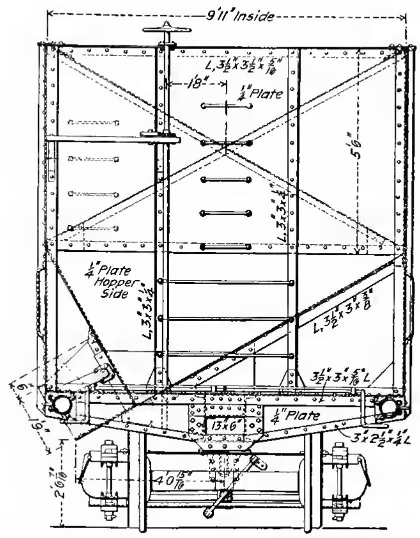


Fig. 307—End Elevation of All-Steel 50-Ton Capacity Side Dump Coke Car Shown in Fig. 305.

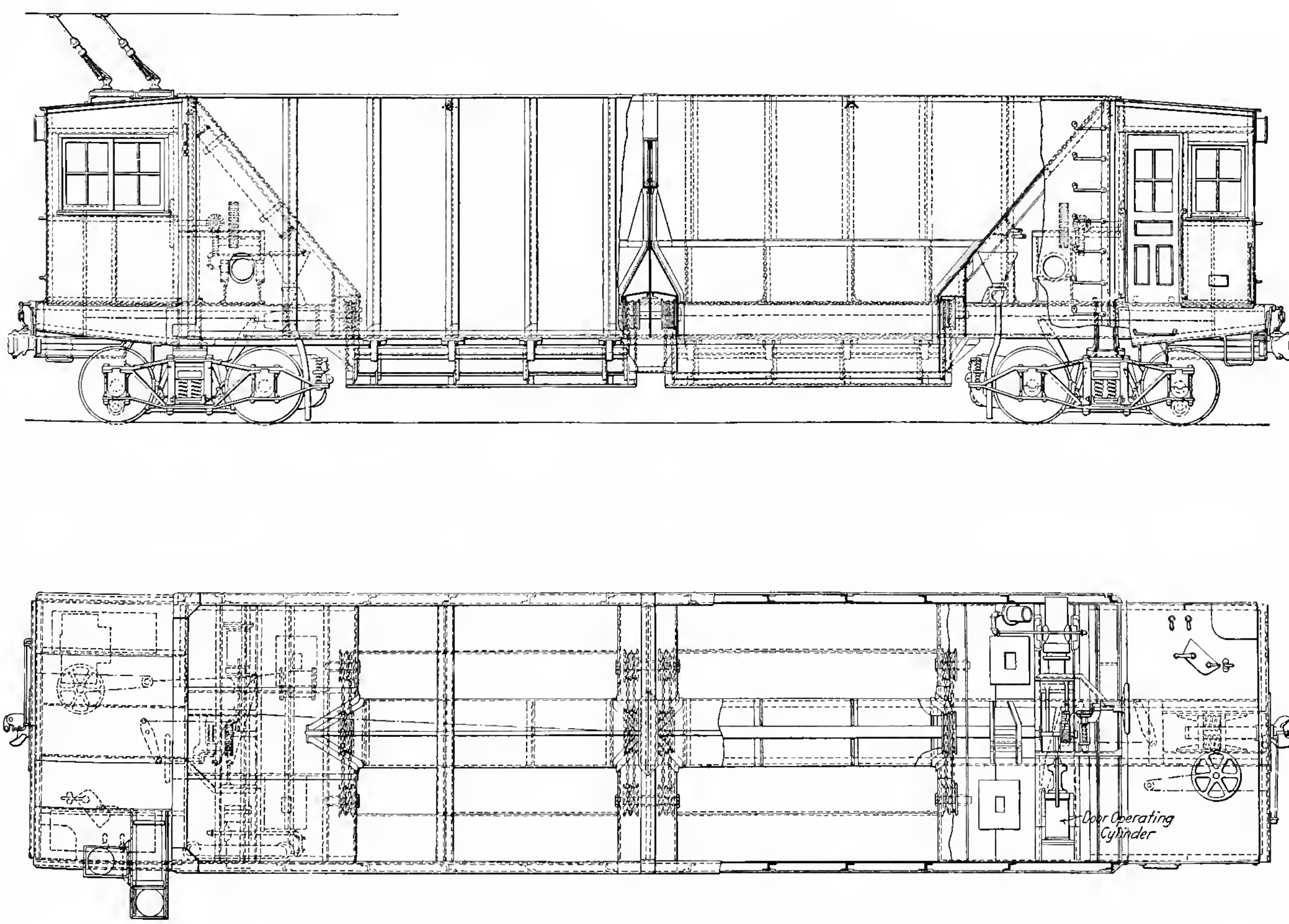


Fig. 308—All-Steel 60-Ton Capacity Electrically Operated Conveyor Hopper Car for Use on Virginian Railway Coal Wharf.

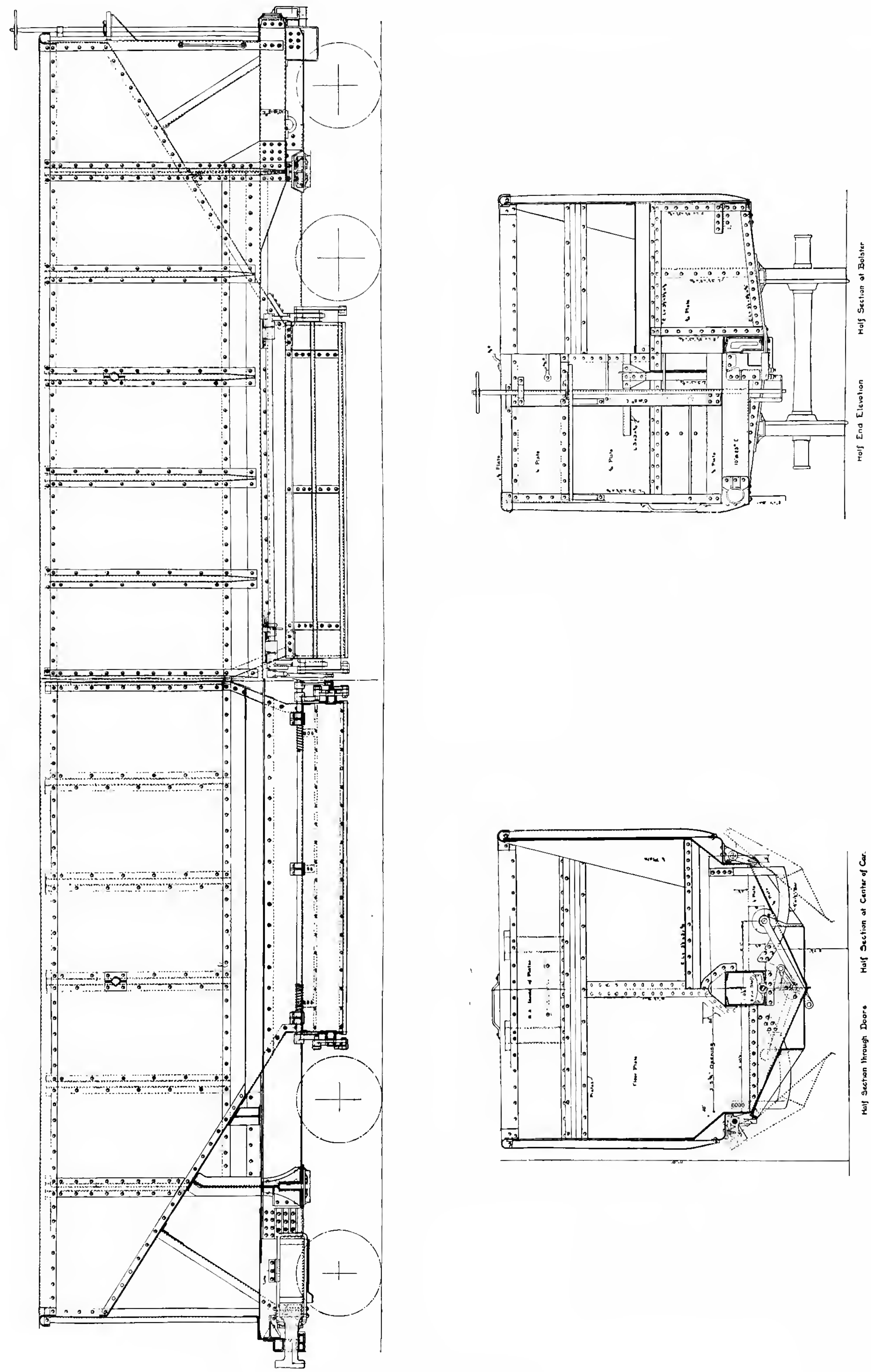


Fig. 309—All-Steel 50-Ton Capacity Center Dump Hopper Coke Car. Builder, Clark Car Company.

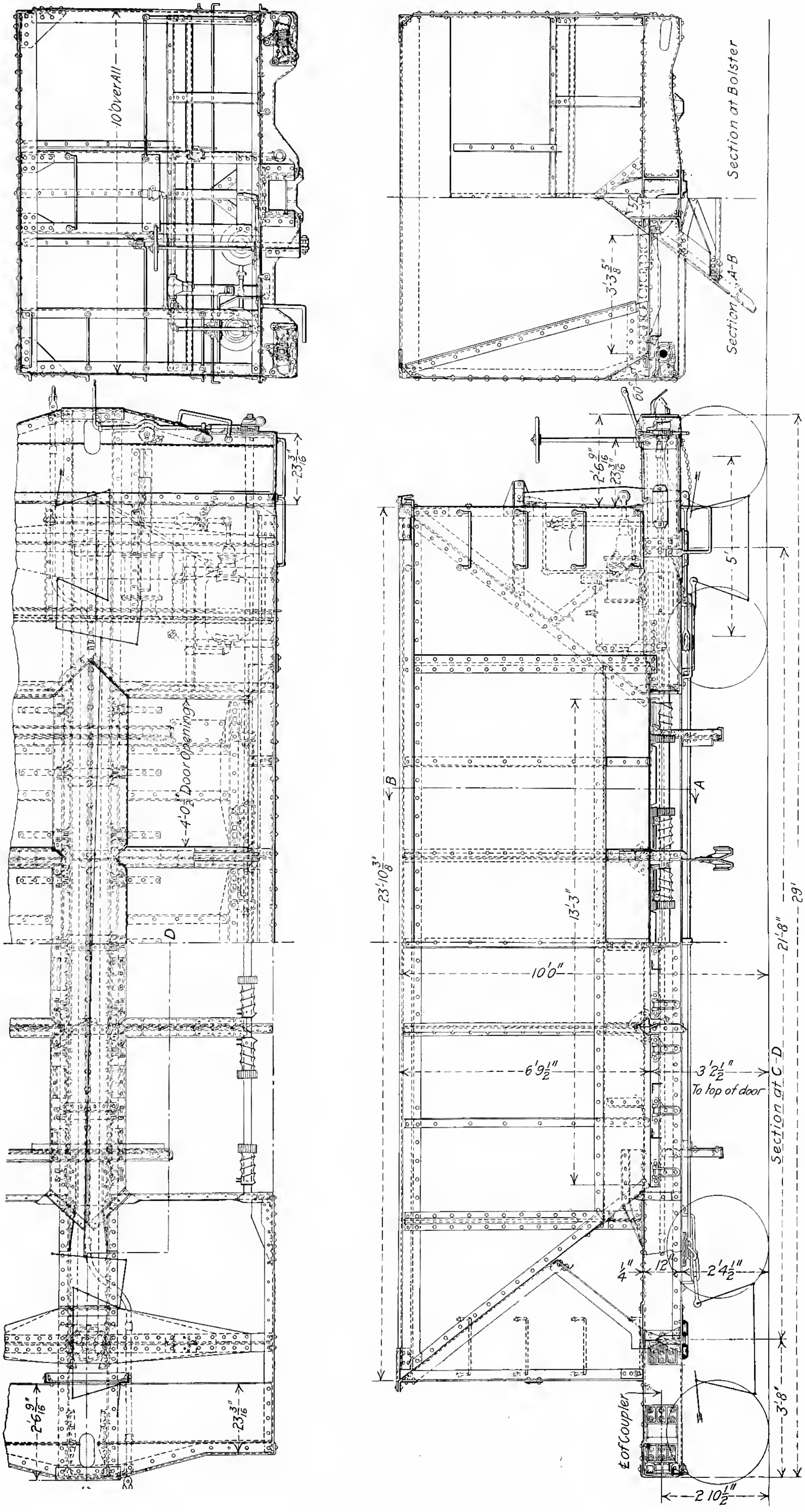


Fig. 310—Bingham & Garfield All-Steel 60-Ton Capacity Hopper Ore Car Shown in Fig. 31. Builder, Pressed Steel Car Company.

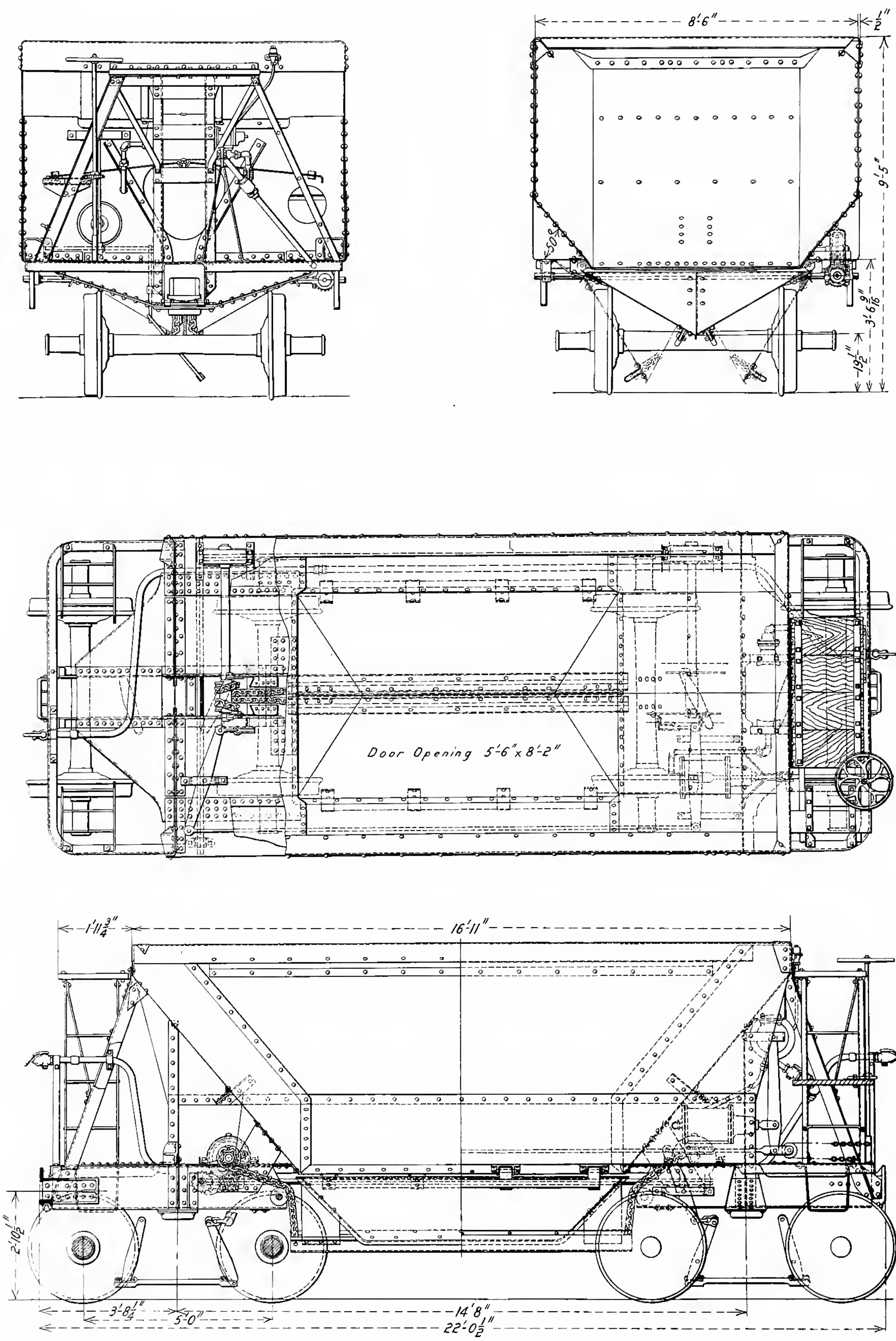


Fig. 311—Duluth & Iron Range All-Steel 50-Ton Capacity Hopper Ore Car Shown in Fig. 32. Builder, Summers Steel Car Company.

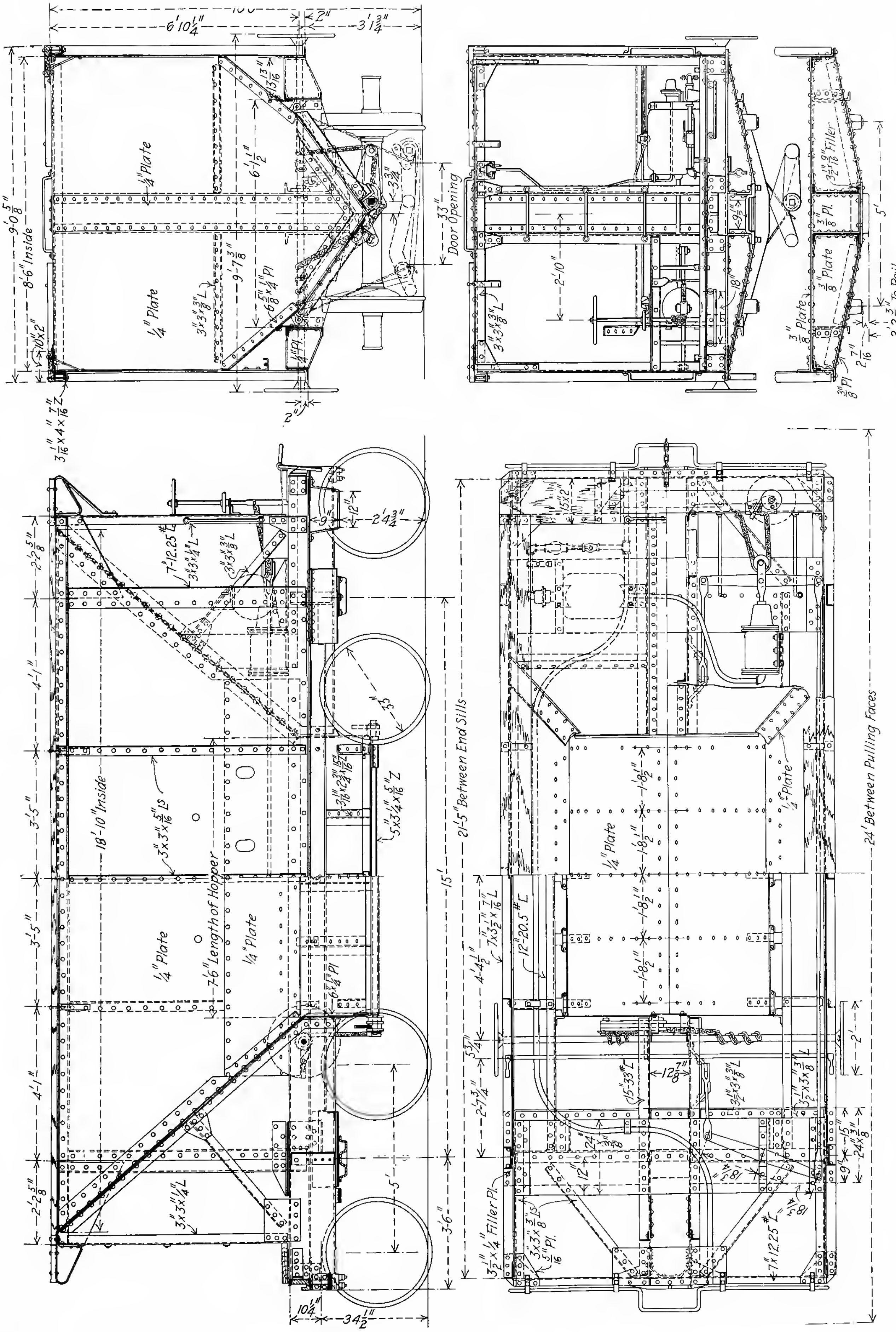


Fig. 312—Minneapolis, St. Paul & Sault Ste. Marie All-Steel 50-Ton Capacity Hopper Ore Car Shown in Fig. 34. Builder, National Dump Car Company.

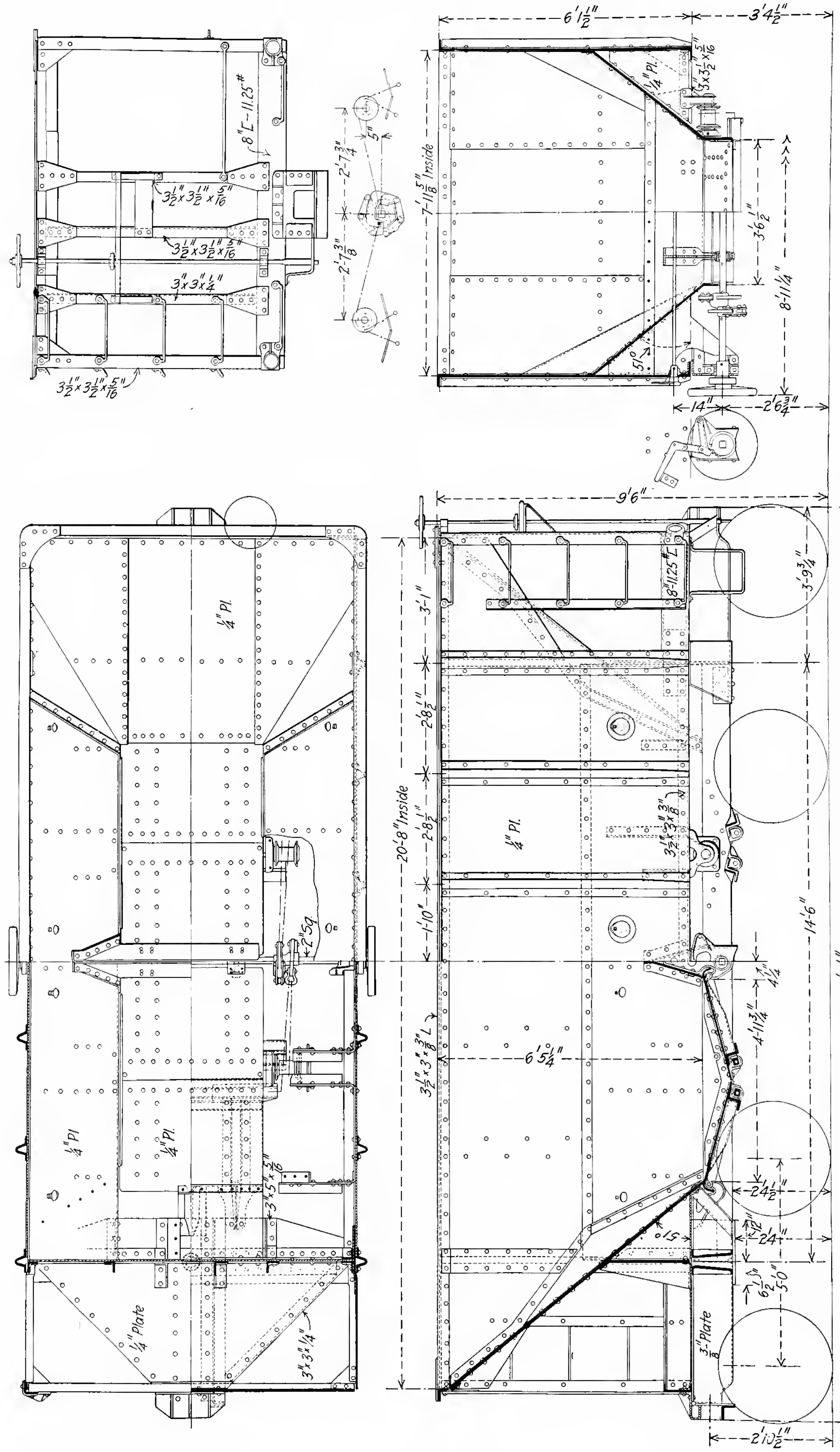


Fig. 313—All-Steel 60-Ton Capacity Hopper Ore Car. Builder, Enterprise Railway Equipment Company.

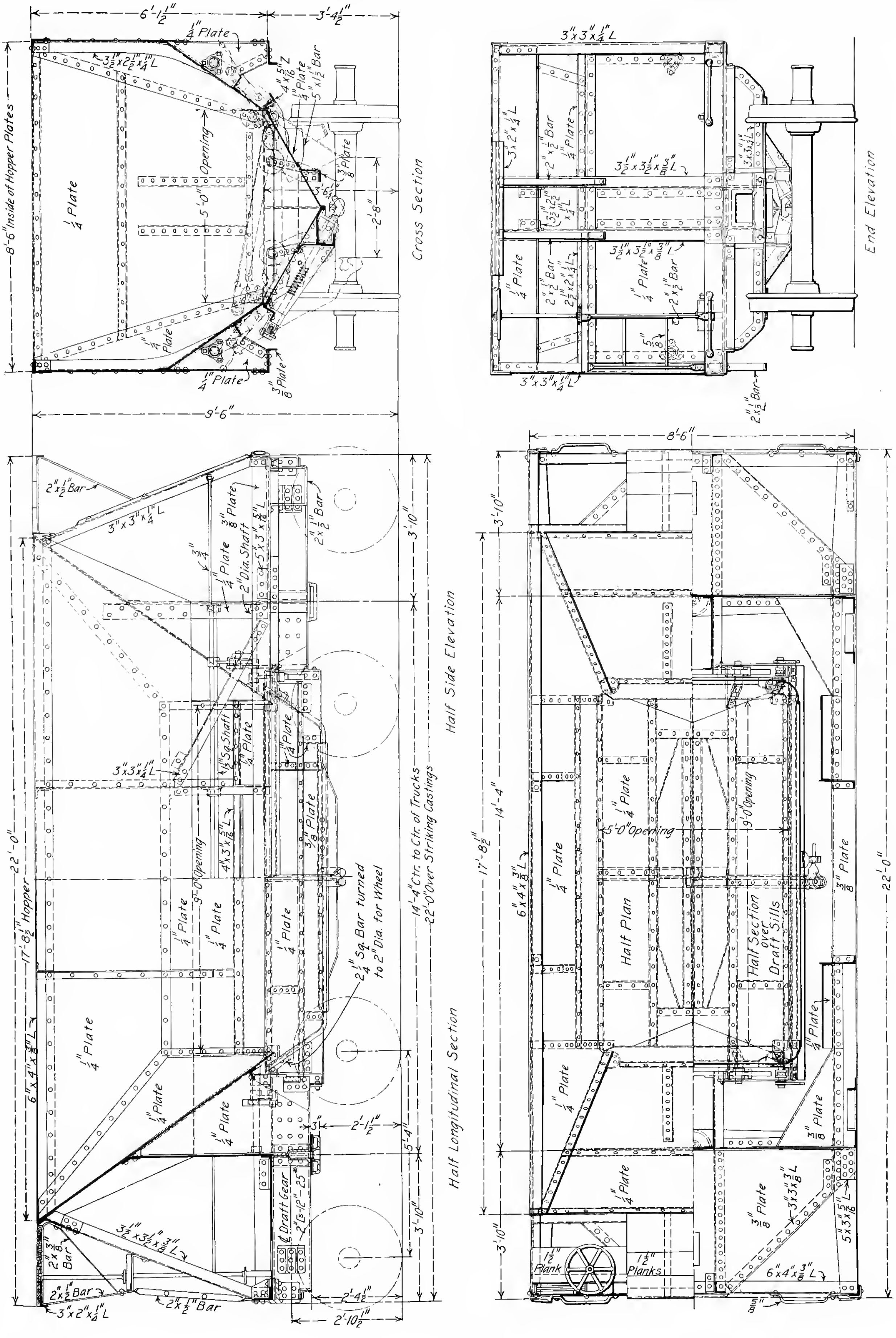


Fig. 314—All-Steel 50-Ton Capacity Hopper Ore Car. Builder, Clark Car Company.

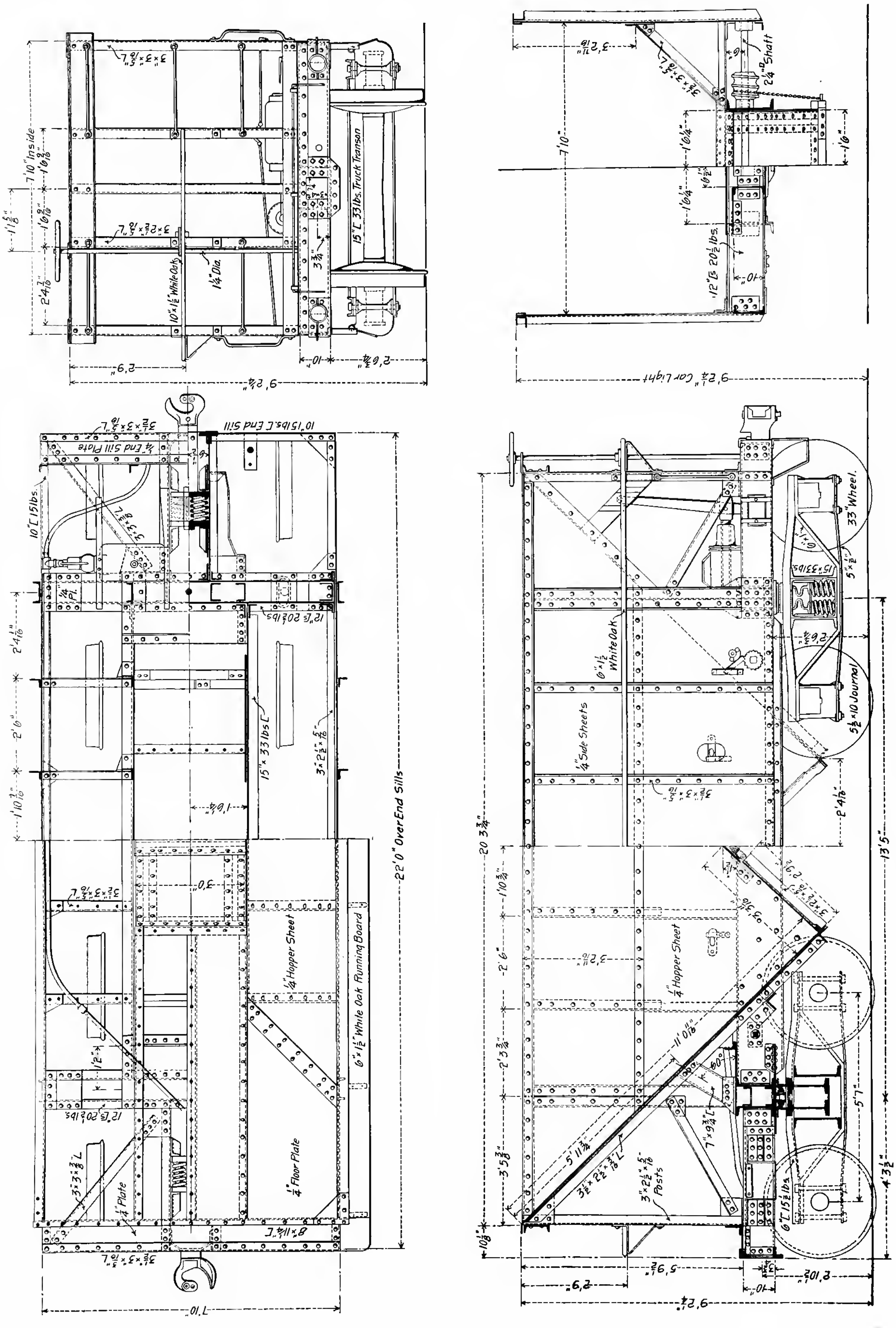


Fig. 315—Great Northern All-Steel 50-Ton Capacity Hopper Ore Car.

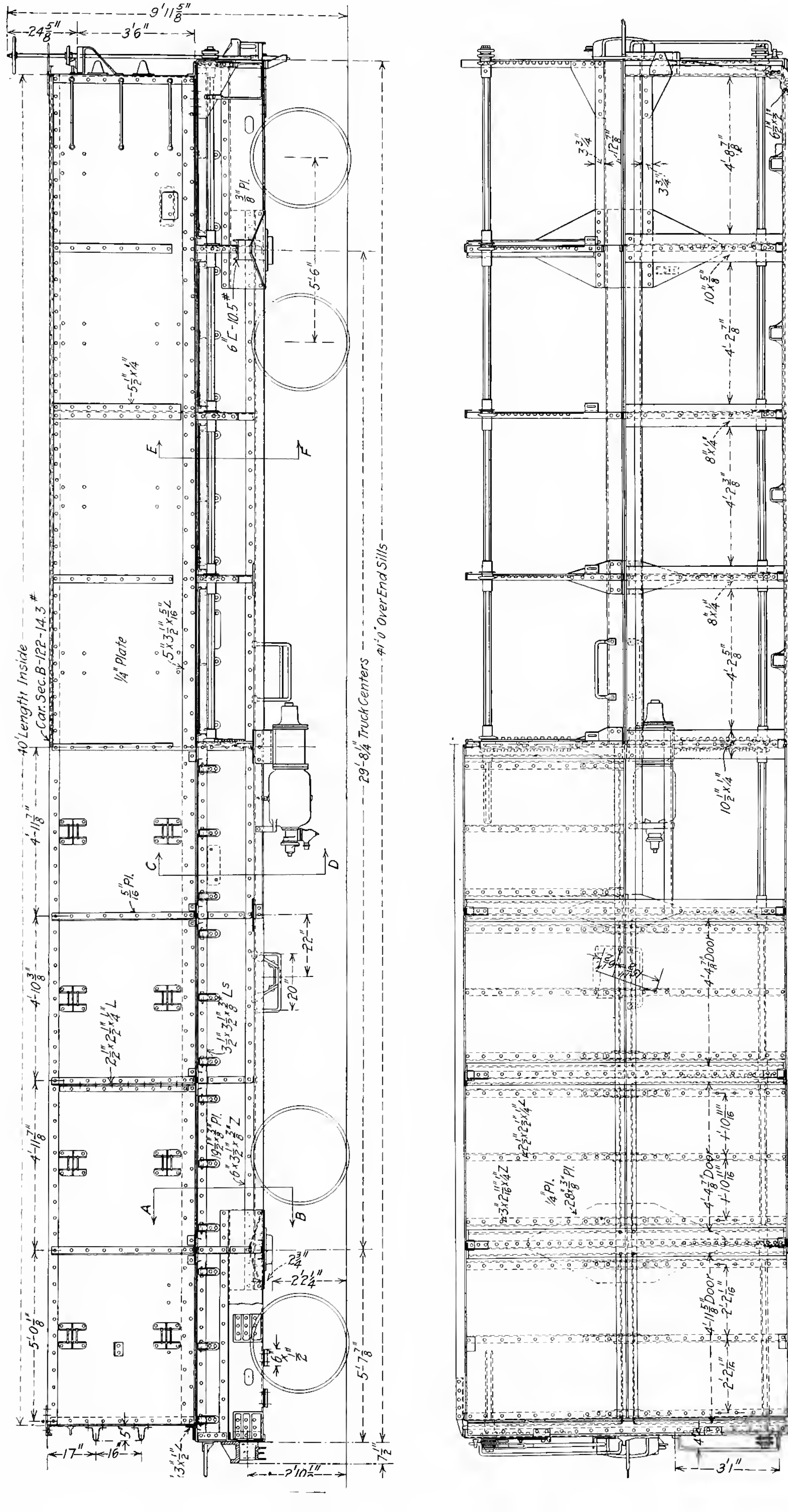


Fig. 316—Cleveland, Cincinnati, Chicago & St. Louis All-Steel 50-Ton Capacity Drop Bottom Gondola Car Shown in Figs. 41, 42 and 318. Builder, National Dump Car Company.

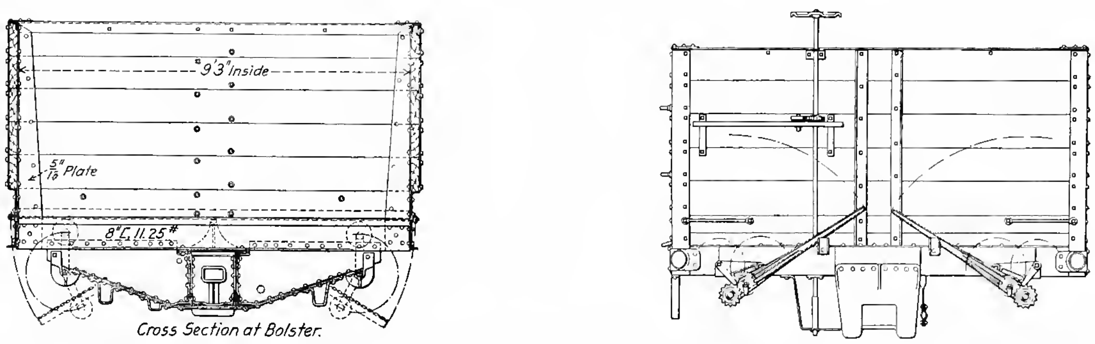


Fig. 317—Cross Section and End Elevation of Hocking Valley Steel Underframe 50-Ton Capacity Drop Bottom Gondola Car Shown in Figs. 45 and 319.

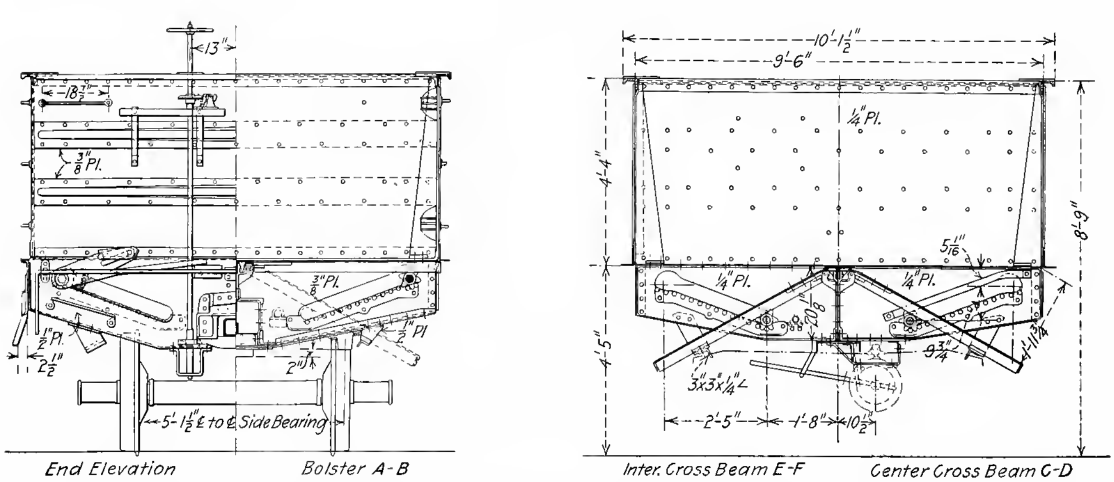


Fig. 318—End Elevation and Cross Sections of Cleveland, Cincinnati, Chicago & St. Louis All-Steel 50-Ton Capacity Drop Bottom Gondola Car Shown in Figs. 41, 42 and 316.

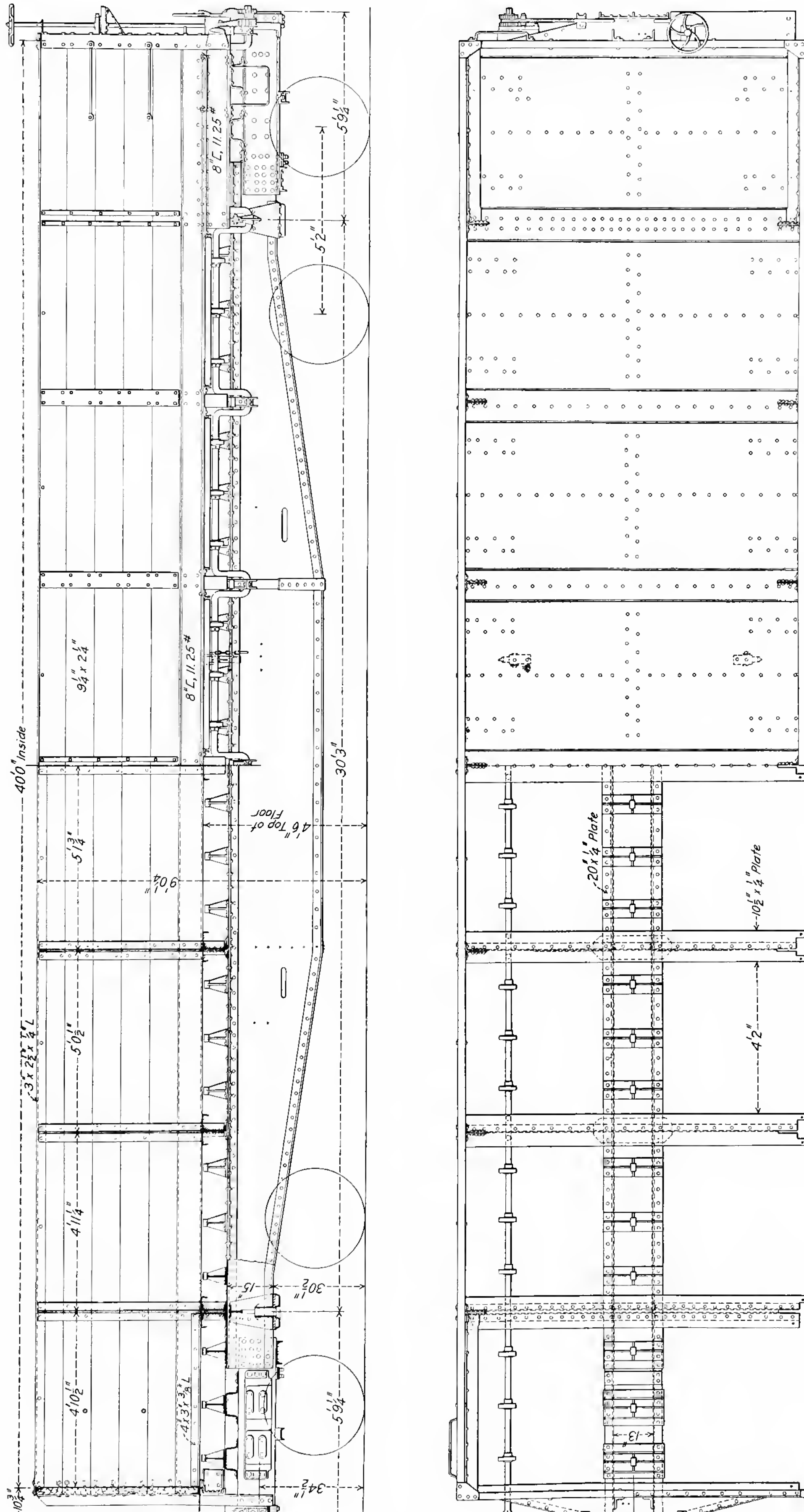


Fig. 319—Hocking Valley Steel Underframe 50-Ton Capacity Drop Bottom Gondola Car Shown in Figs. 45 and 317. Builder, Ralston Steel Car Company.

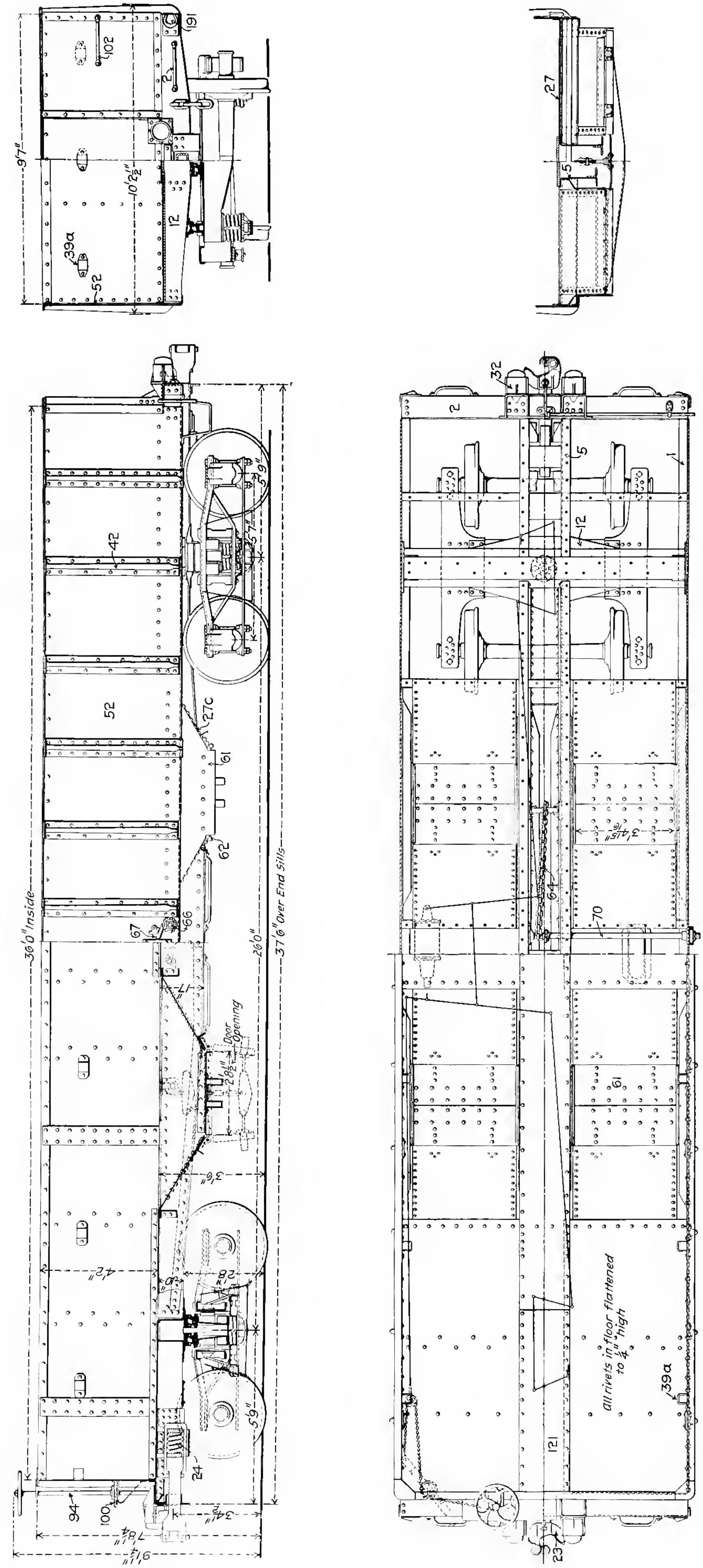


Fig. 320—Bessemer & Lake Erie All-Steel 50-Ton Capacity Hopper Bottom Gondola Car.

Gondola Car Parts

1	*Side Sill*	27	*Floor*	61	*Drop Door*
2	*End Sill*	27c	*Hopper Slope*	62	*Drop Door Hinge*
5	*Center Sill*	32	*Buffer Blocks*	64	*Drop Door Chain*
12	*Body Bolster*	39a	*Stake Pocket*	66	*Winding Shaft Ratchet Wheel*
23	*Drawbar*	42	*Side Stake*	67	*Winding Shaft Ratchet Pawl*
24	*Draft Gear*	52	*Side Sheet*	70	*Winding Shaft*
				94	*Brake Shaft*
				100	*Brake Step*
				102	*Hand Hold*
				121	*Center Sill Cover Plate*
				191	*Push Pole Pocket*

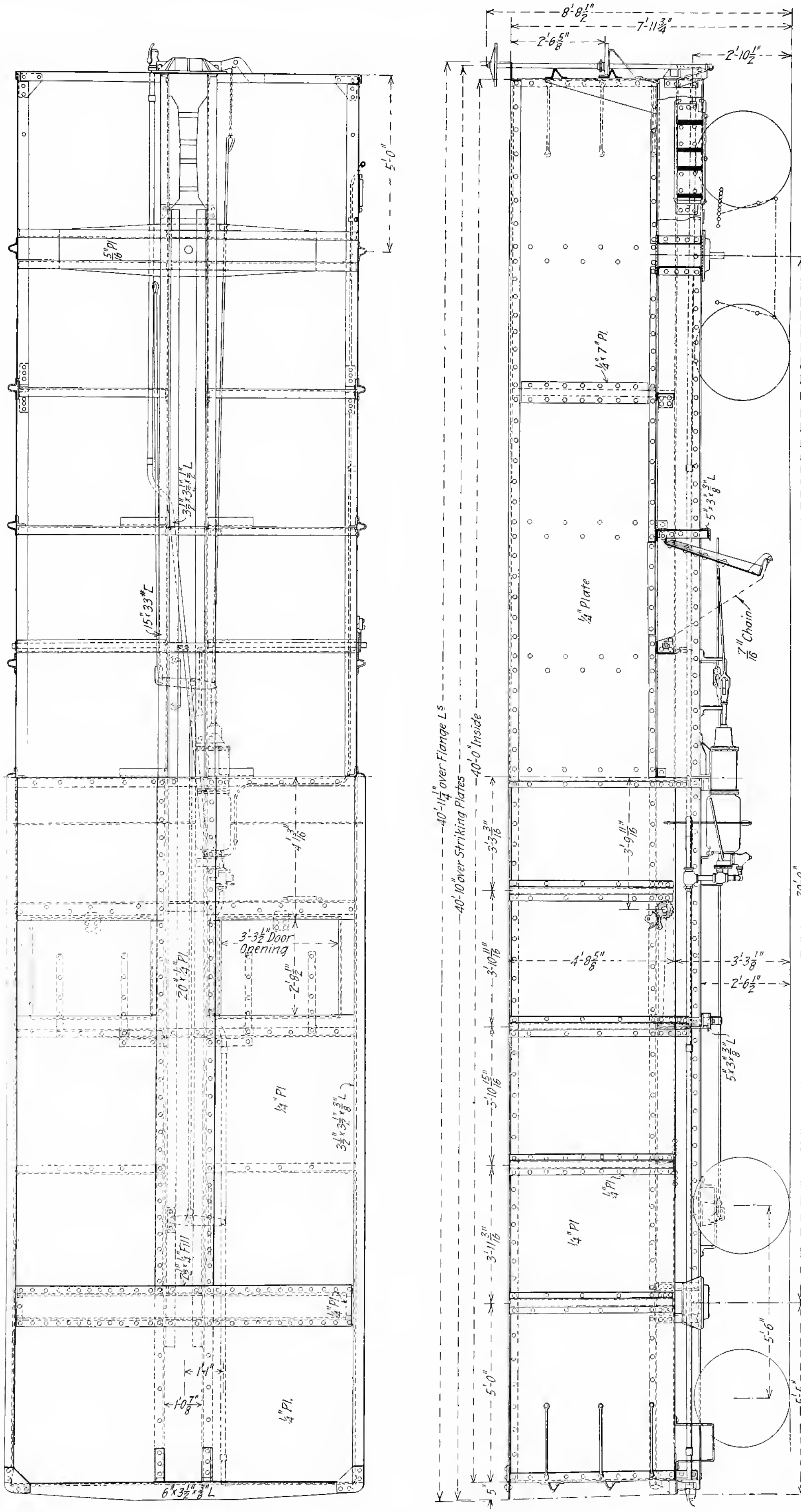


Fig. 321—Cincinnati, Hamilton & Dayton All-Steel 50-Ton Capacity Drop Bottom Gondola Car Shown in Figs. 50, 322 and 323. Builder, Cambria Steel Company.

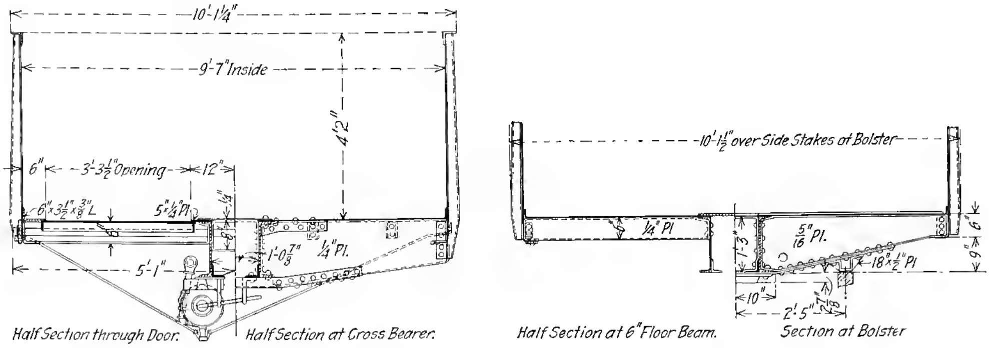


Fig. 322—Cross Sections of Cincinnati, Hamilton & Dayton All-Steel Drop Bottom Gondola Car Shown in Figs. 50, 321 and 323.

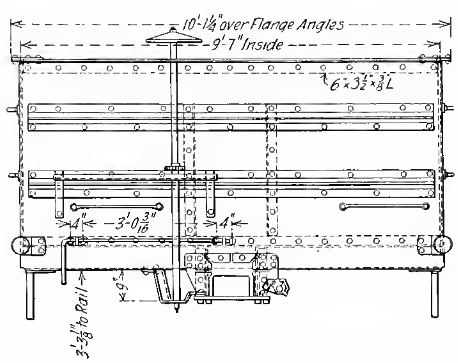


Fig. 323—End Elevation of Cincinnati, Hamilton & Dayton All-Steel Drop Bottom Gondola Car Shown in Figs. 50, 321 and 322.

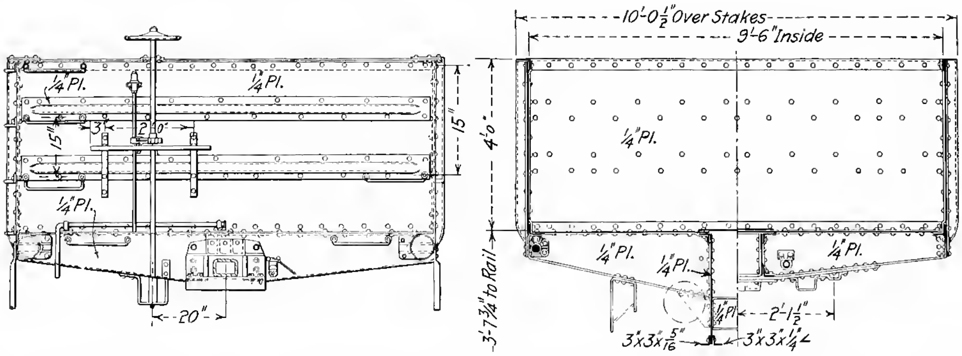


Fig. 324—End Elevation and Cross Sections of Akron, Canton & Youngstown All-Steel 50-Ton Capacity Drop Bottom Gondola Car Shown in Fig. 325.

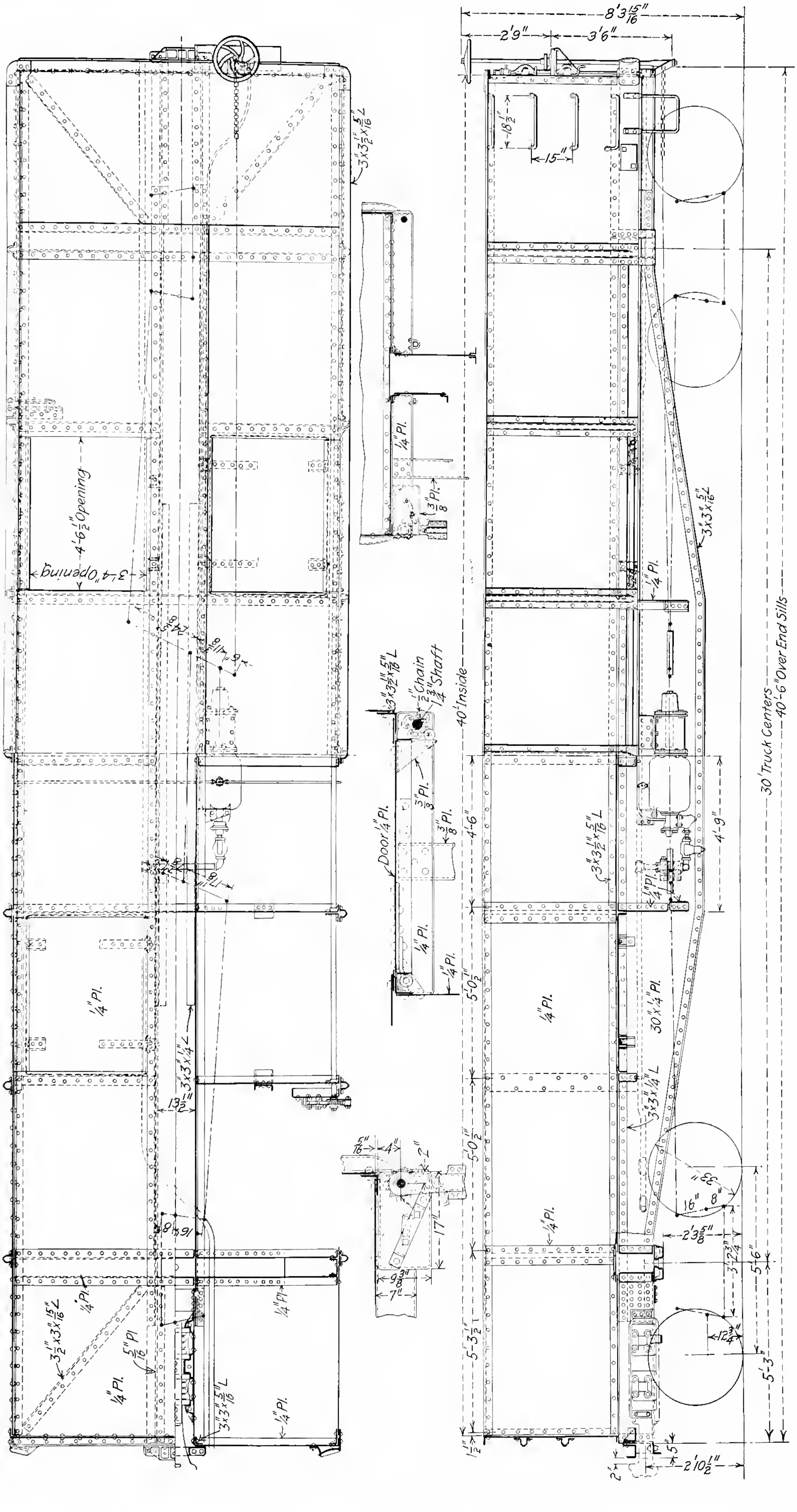


Fig. 325—Akron, Canton & Youngstown All-Steel 50-Ton Capacity Drop Bottom Gondola Car. See also Fig. 324. Builder, American Car & Foundry Company.

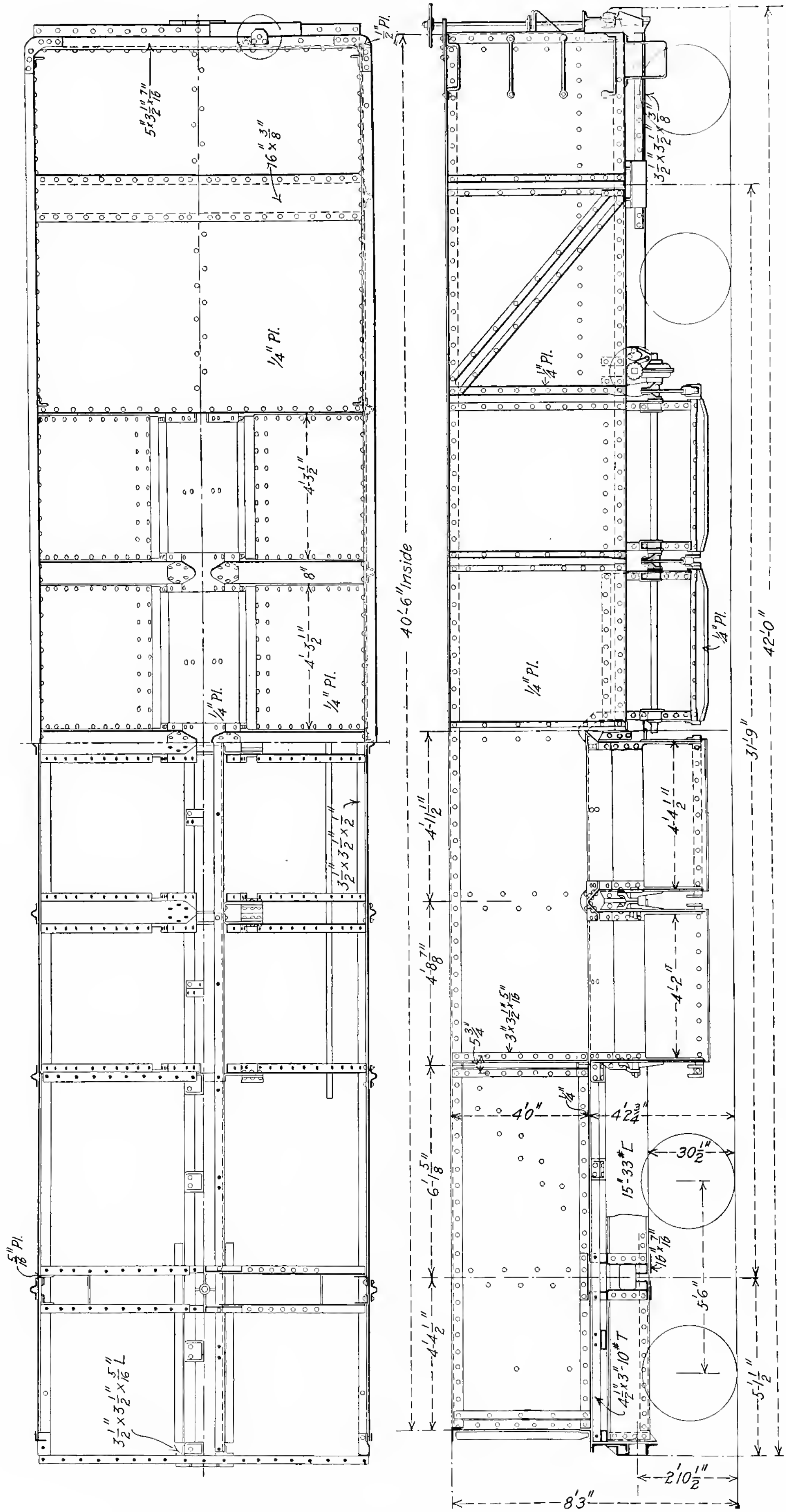


Fig. 326—All-Steel 50-Ton Capacity Center Dump Gondola Car. Builder, Enterprise Railway Equipment Company.

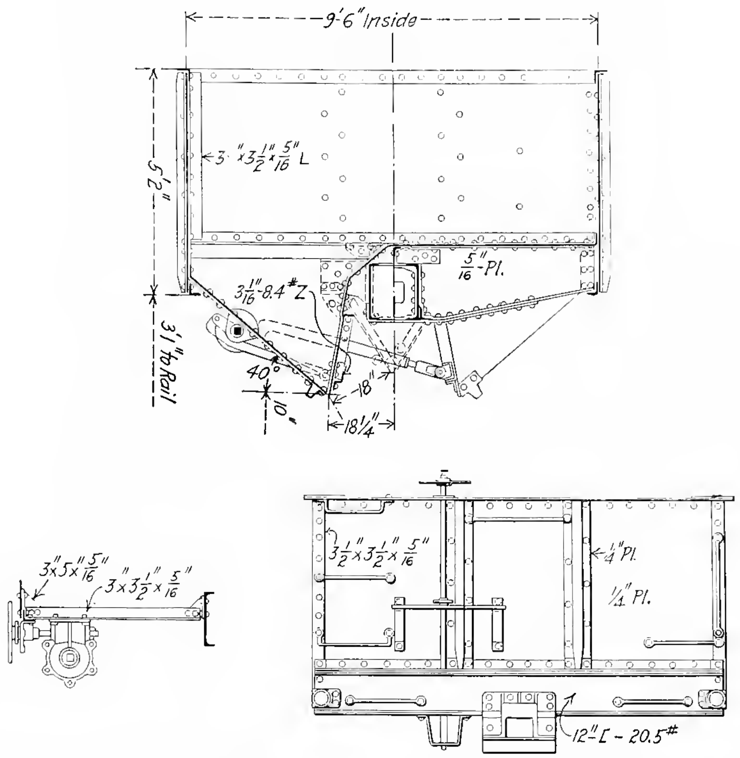


Fig. 327—Cross Sections and End Elevation of All-Steel 50-Ton Capacity Center Dump Gondola Car Shown in Fig. 326.

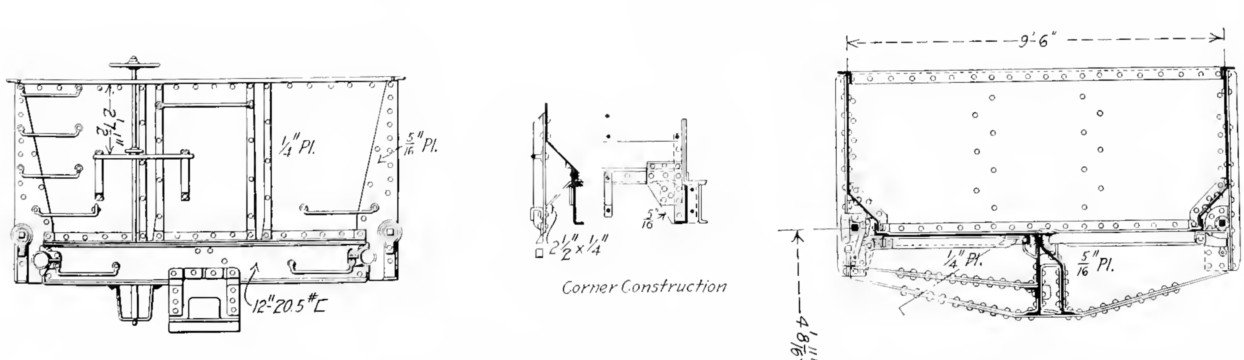


Fig. 328—End Elevation and Cross Sections of All-Steel 50-Ton Capacity Drop Bottom Side Dump Gondola Car Shown in Fig. 329.

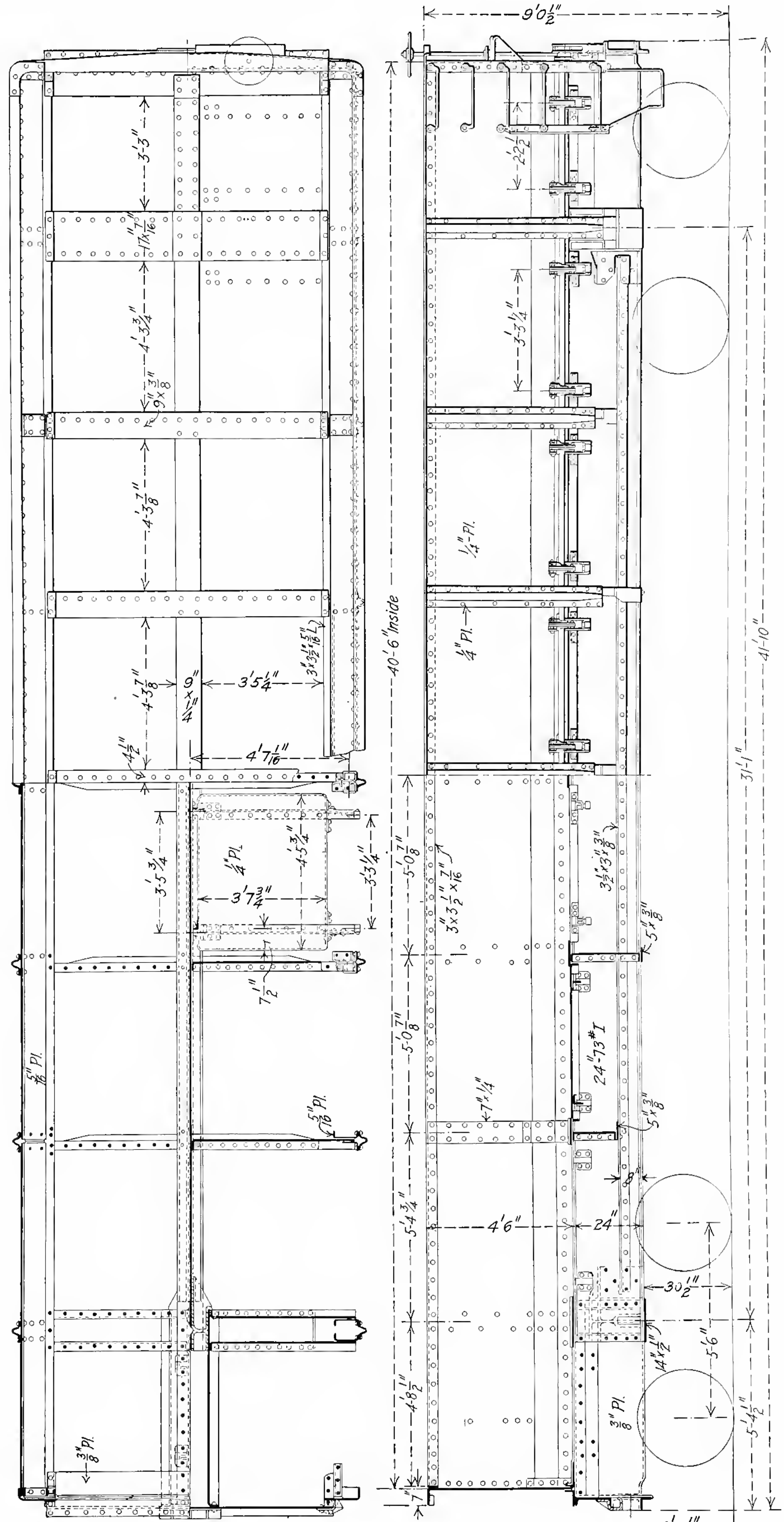


Fig. 329—All-Steel 50-Ton Capacity Drop Bottom Side Dump Gondola Car. See also Fig. 328. Builder, Enterprise Railway Equipment Company.

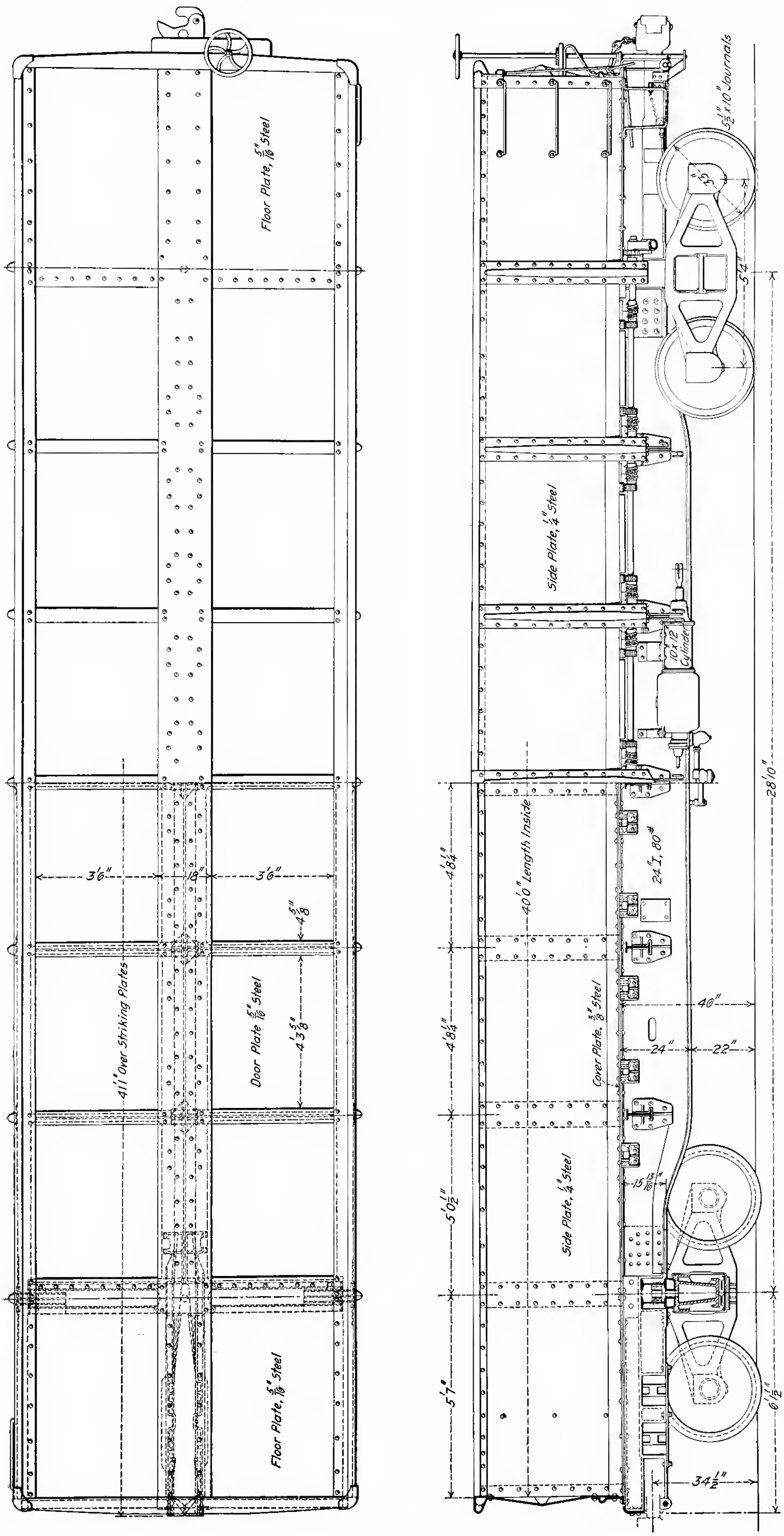


Fig. 330—Chicago, Burlington & Quincy All-Steel 50-Ton Capacity Drop Bottom Gondola Car. See also Fig. 331. Builder, Bettendorf Axle Company.

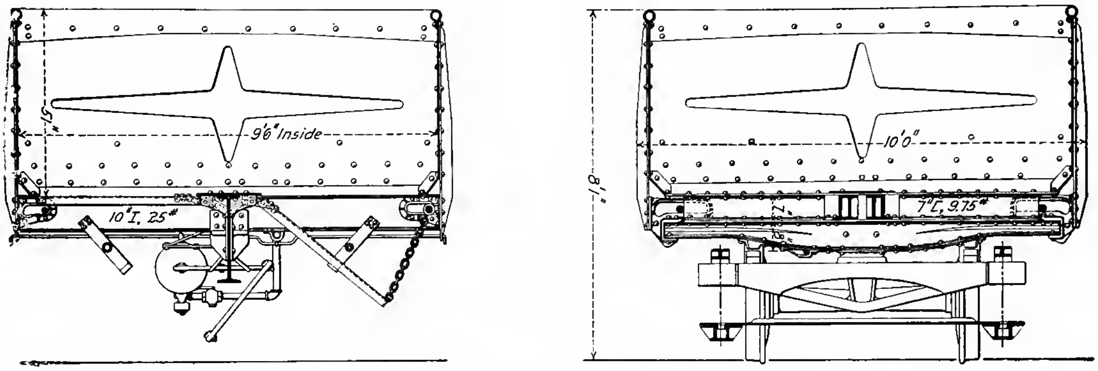


Fig. 331—Cross Sections of Chicago, Burlington & Quincy All-Steel Drop Bottom Gondola Car Shown in Fig. 330.

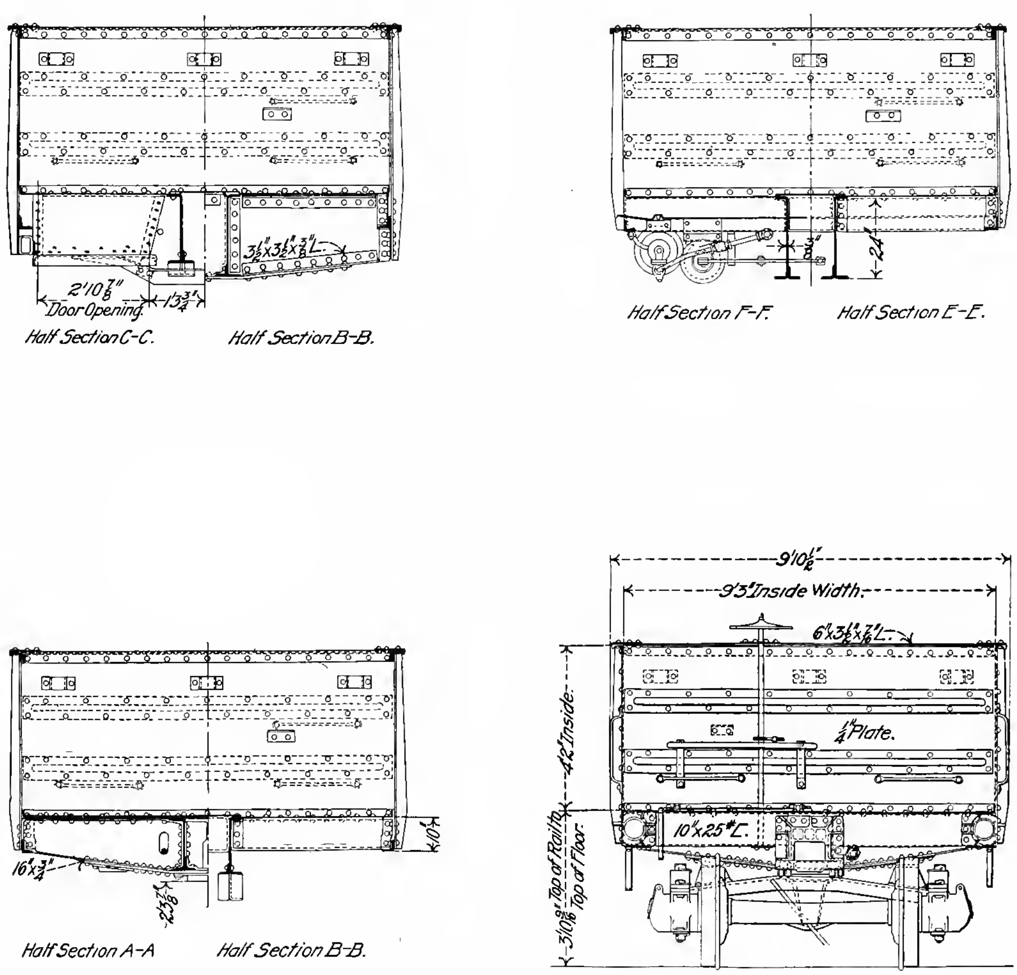


Fig. 332—End Elevation and Cross Sections of Baltimore & Ohio All-Steel 50-Ton Capacity Hopper Bottom Gondola Car Shown in Fig. 333.

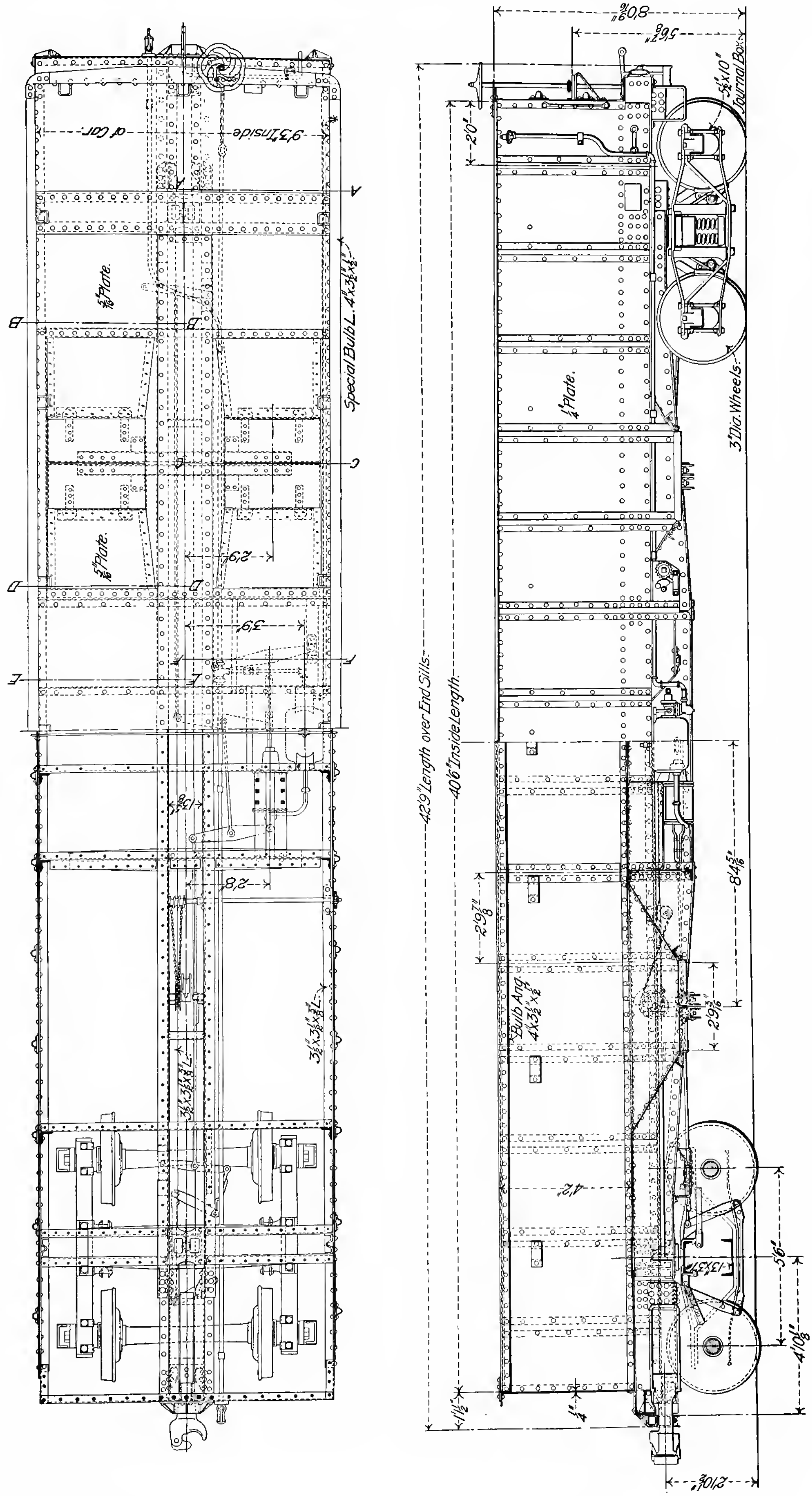


Fig. 333—Baltimore & Ohio All-Steel 50-Ton Capacity Hopper Bottom Gondola Car. See also Fig. 332.

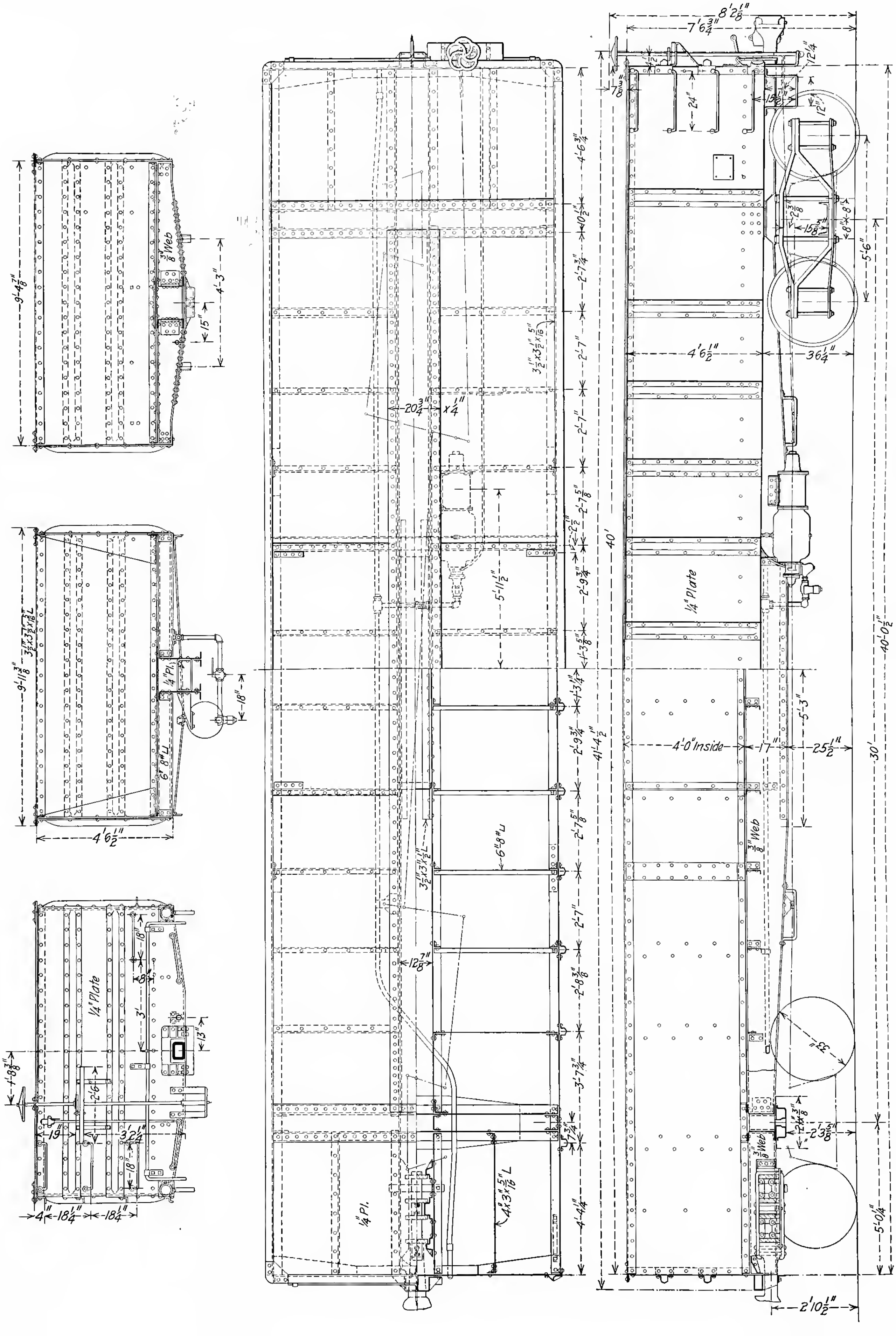


Fig. 334—Litchfield & Madison All-Steel 50-Ton Capacity Solid Bottom Gondola Car Shown in Fig. 53. Builder, American Car & Foundry Company.

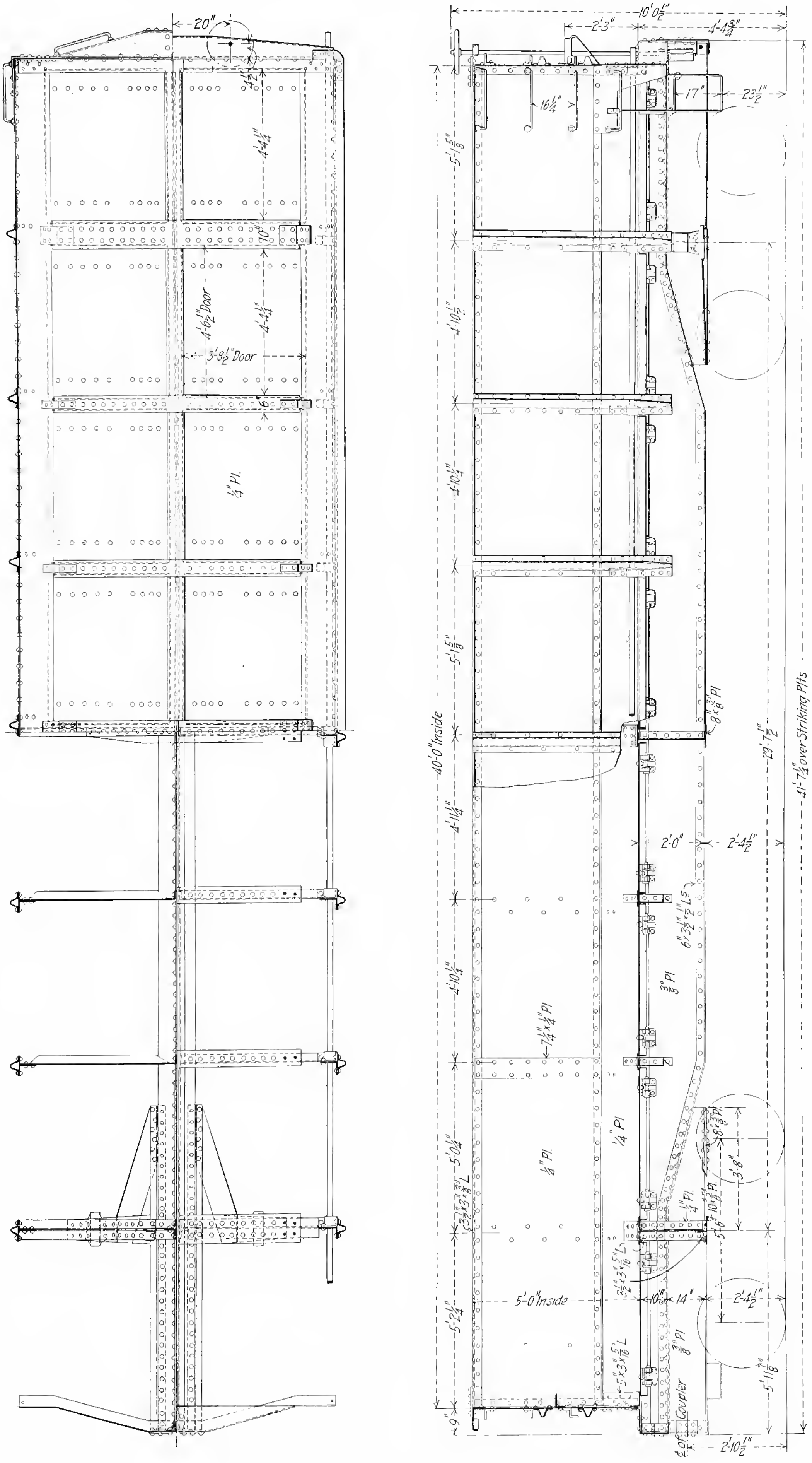


Fig. 335—All-Steel 50-Ton Capacity Drop Bottom Side Dump Gondola Car. See also Fig. 336. Builder, Standard Steel Car Company.

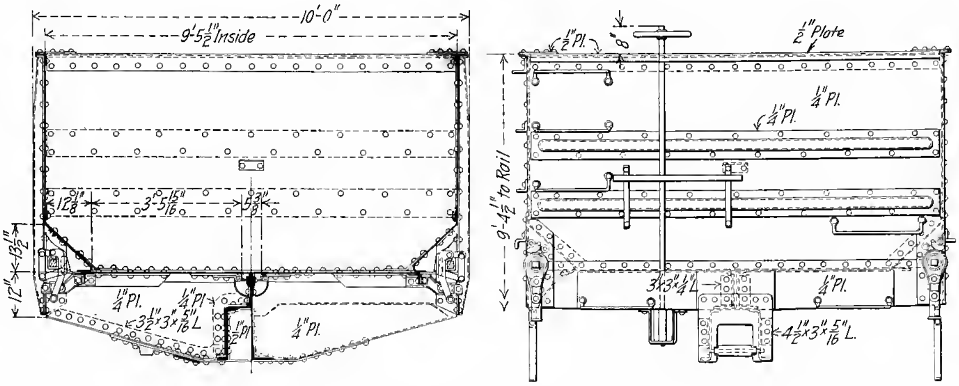


Fig. 336—Cross Sections and End Elevation of All-Steel Drop Bottom Gondola Car Shown in Fig. 335.

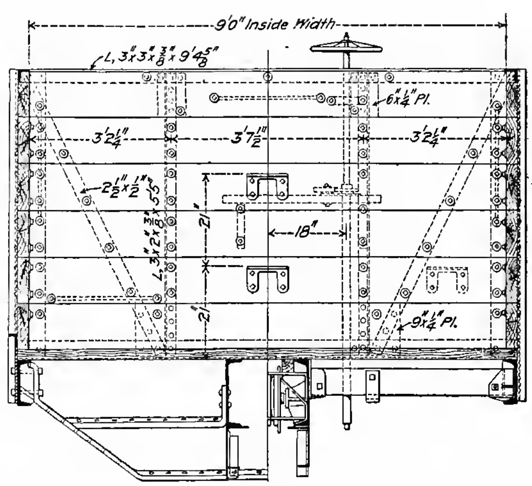
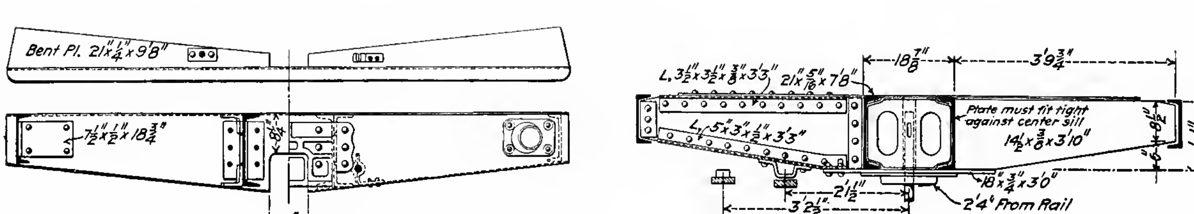


Fig. 337—Cross Sections of Berwind-White Coal Mining Company Steel Frame 40-Ton Capacity Hopper Bottom Gondola Car Shown in Figs. 338 and 339.



End Sill. Body Bolster

Fig. 338—Underframe Details of Berwind-White Coal Mining Company Steel Frame 40-Ton Capacity Hopper Bottom Gondola Car Shown in Figs. 337 and 339.

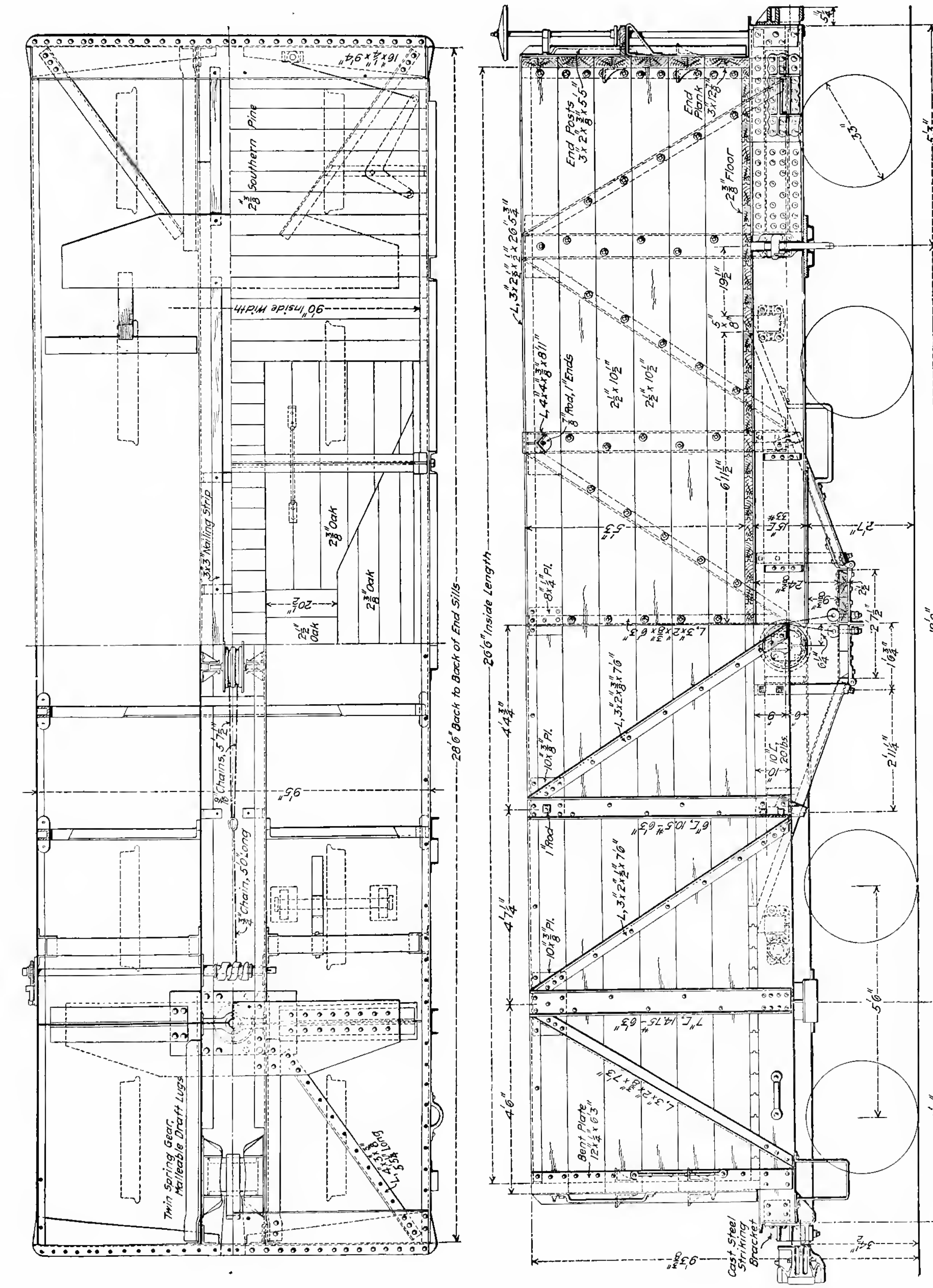


Fig. 339—Berwind-White Coal Mining Company Steel Frame 40-Ton Capacity Hopper Bottom Gondola Car Shown in Figs. 337 and 338.

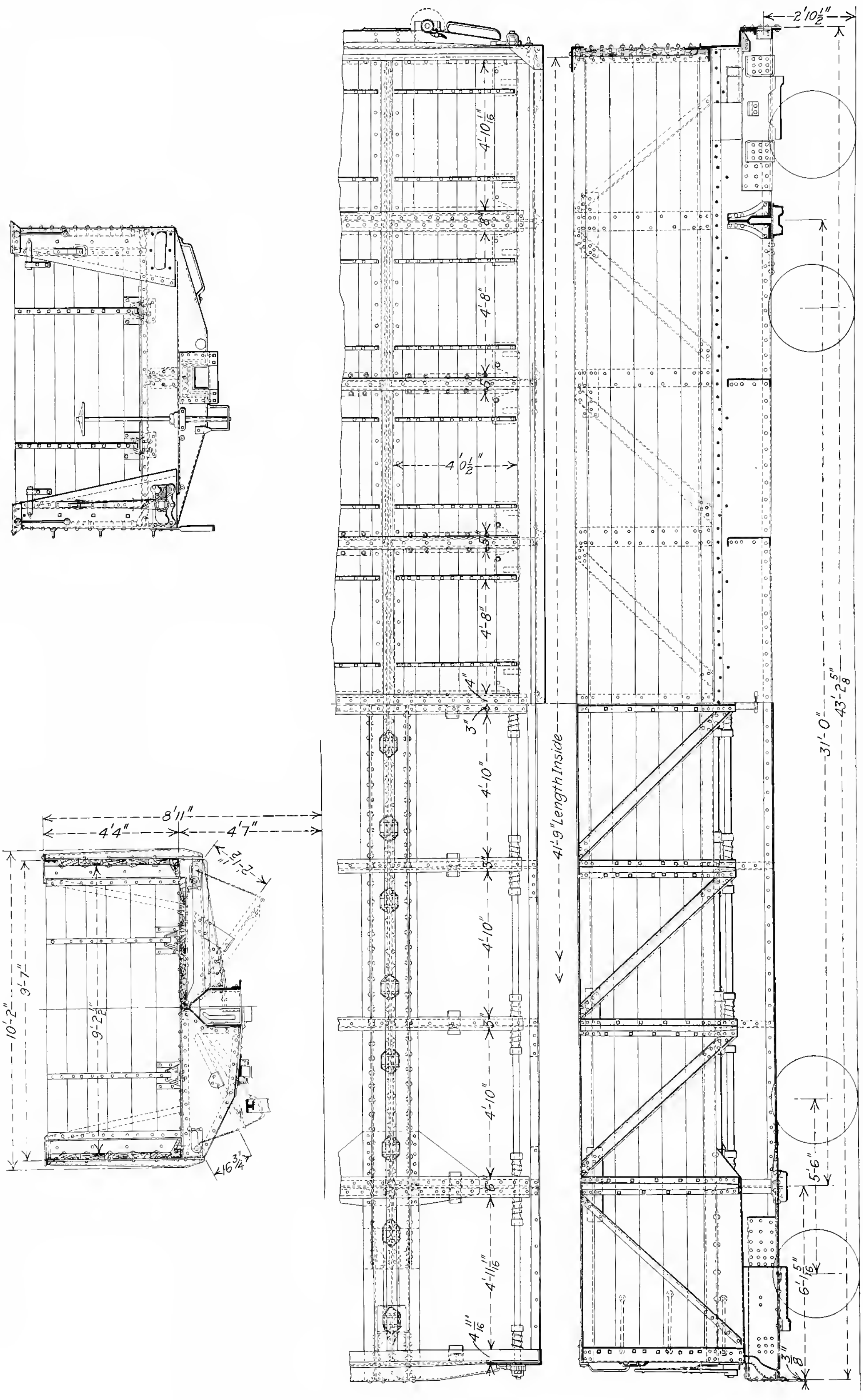


Fig. 340—Steel Frame 50-Ton Capacity Drop Bottom Side Dump Gondola Car. Builder, Western Steel Car & Foundry Company.

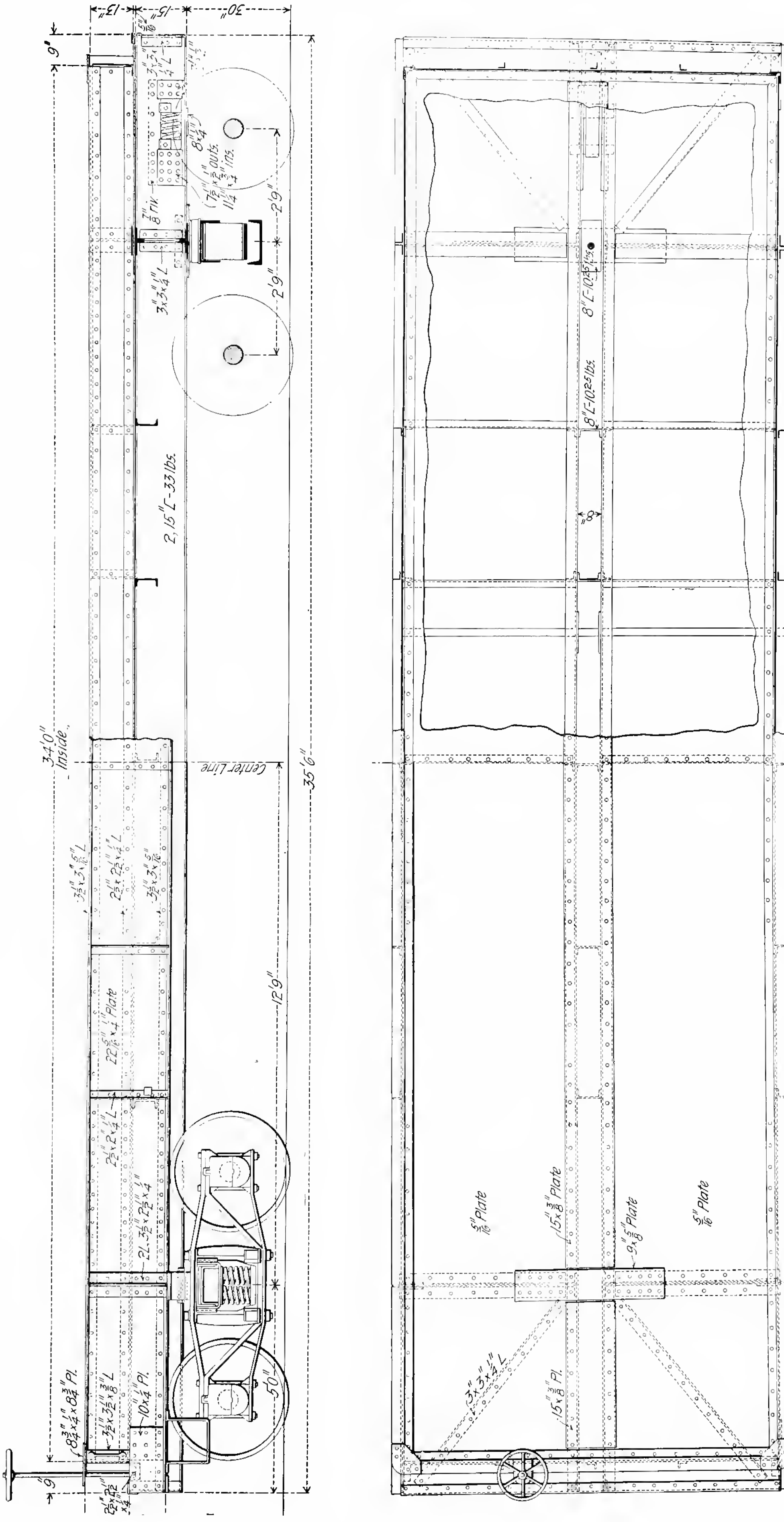


Fig. 341—All-Steel 50-Ton Capacity Solid Bottom Gondola Car with Low Sides.

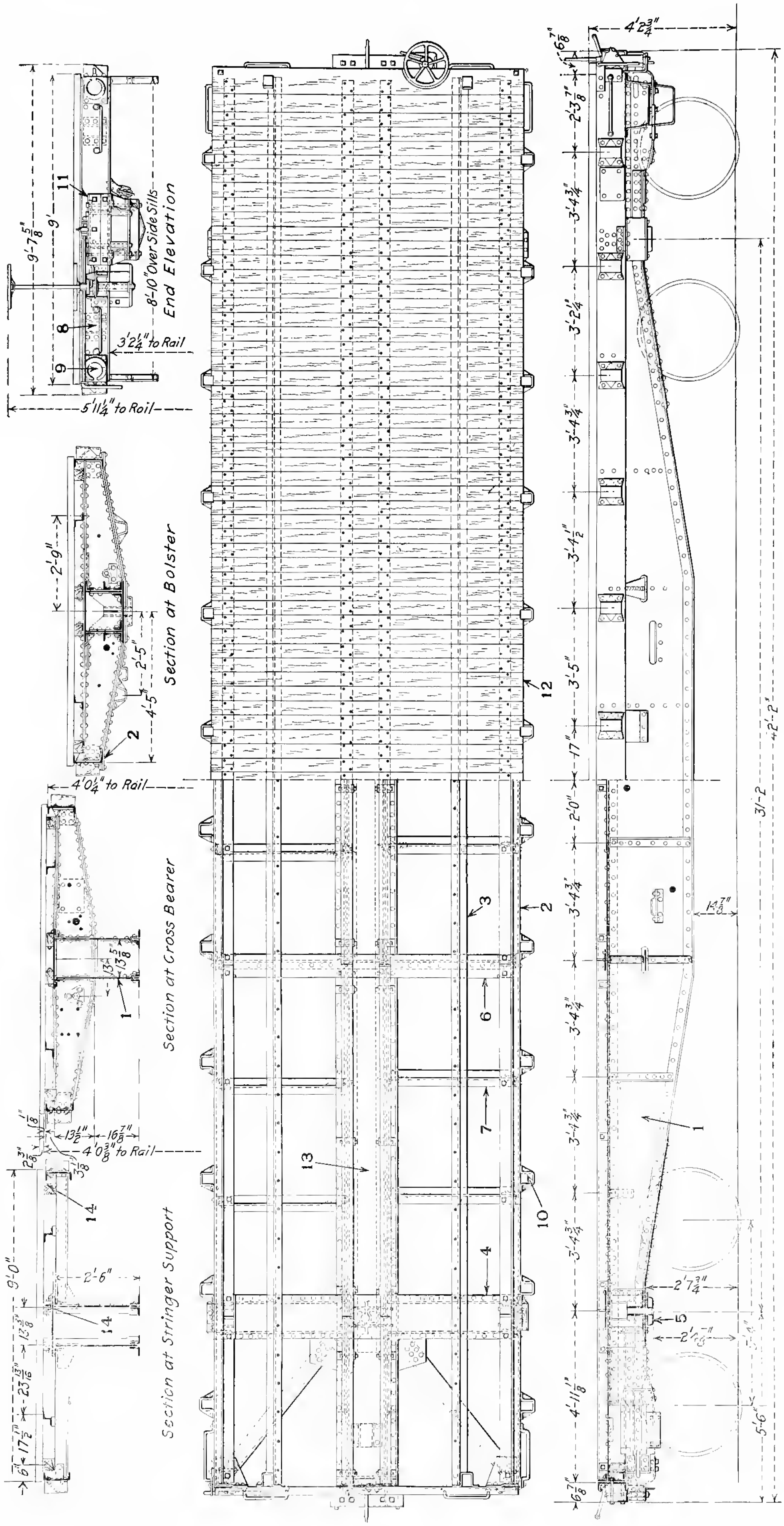


Fig. 342—Canadian Pacific Steel Frame 40-Ton Capacity Flat Car Shown in Fig. 68. Builder, Canadian Car & Foundry Company.

Flat Car Parts.

1 Center Sill
2 Side Sill
3 Floor Stringer
4 Body Bolster
5 Center Plate
6 Cross Bearer
7 Stringer Support or Floor Beam
8 End Sill
9 Push Pole Pocket
10 Side Stake Pocket
11 Dead Wood or Buffer Block
12 Floor
13 Center Sill Cover Plate
14 Floor Nailing Strip

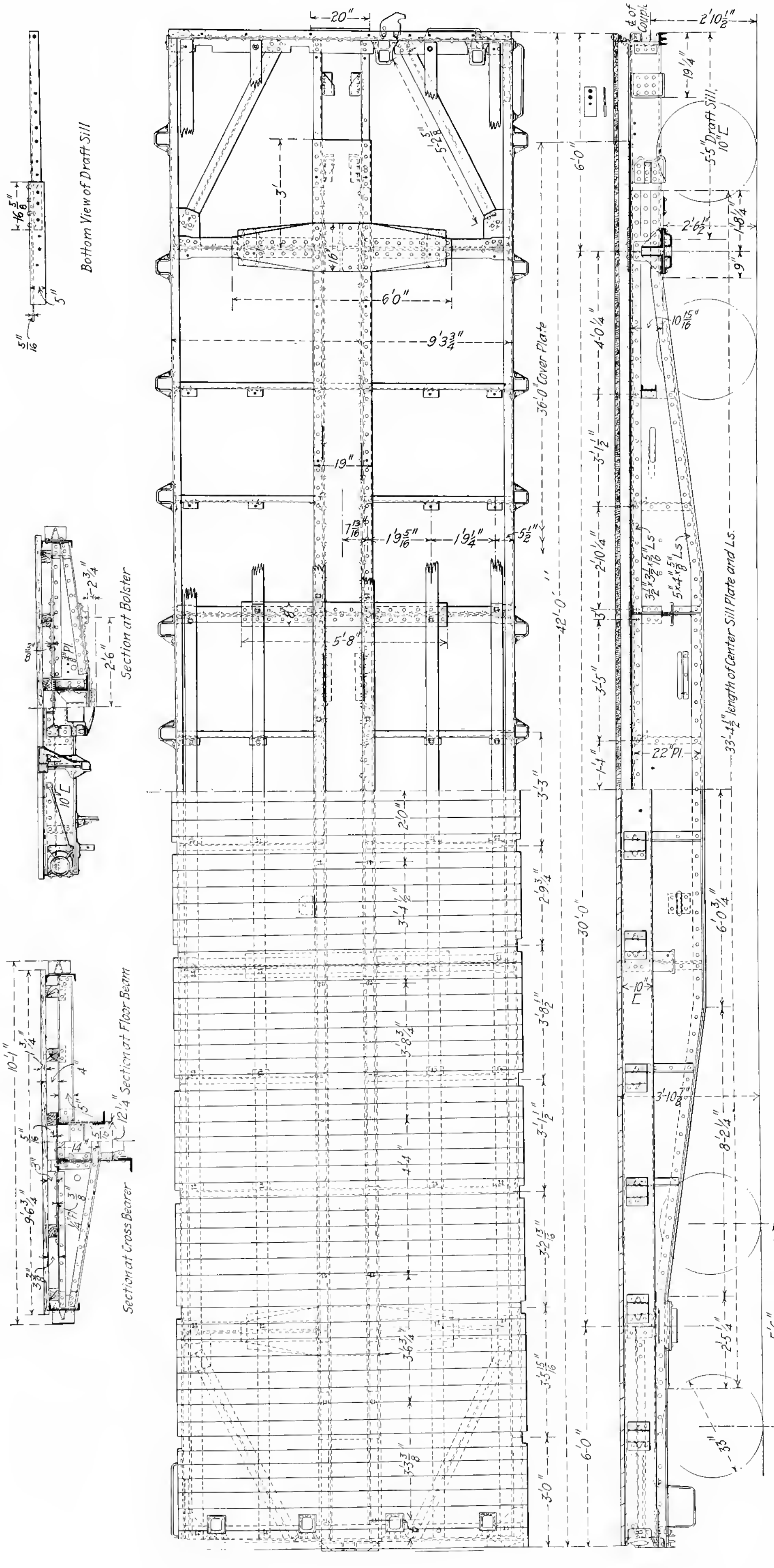


Fig. 343—Munising Railway Steel Frame 40-Ton Capacity Flat Car Shown in Fig. 75. Builder, Western Steel Car & Foundry Company.

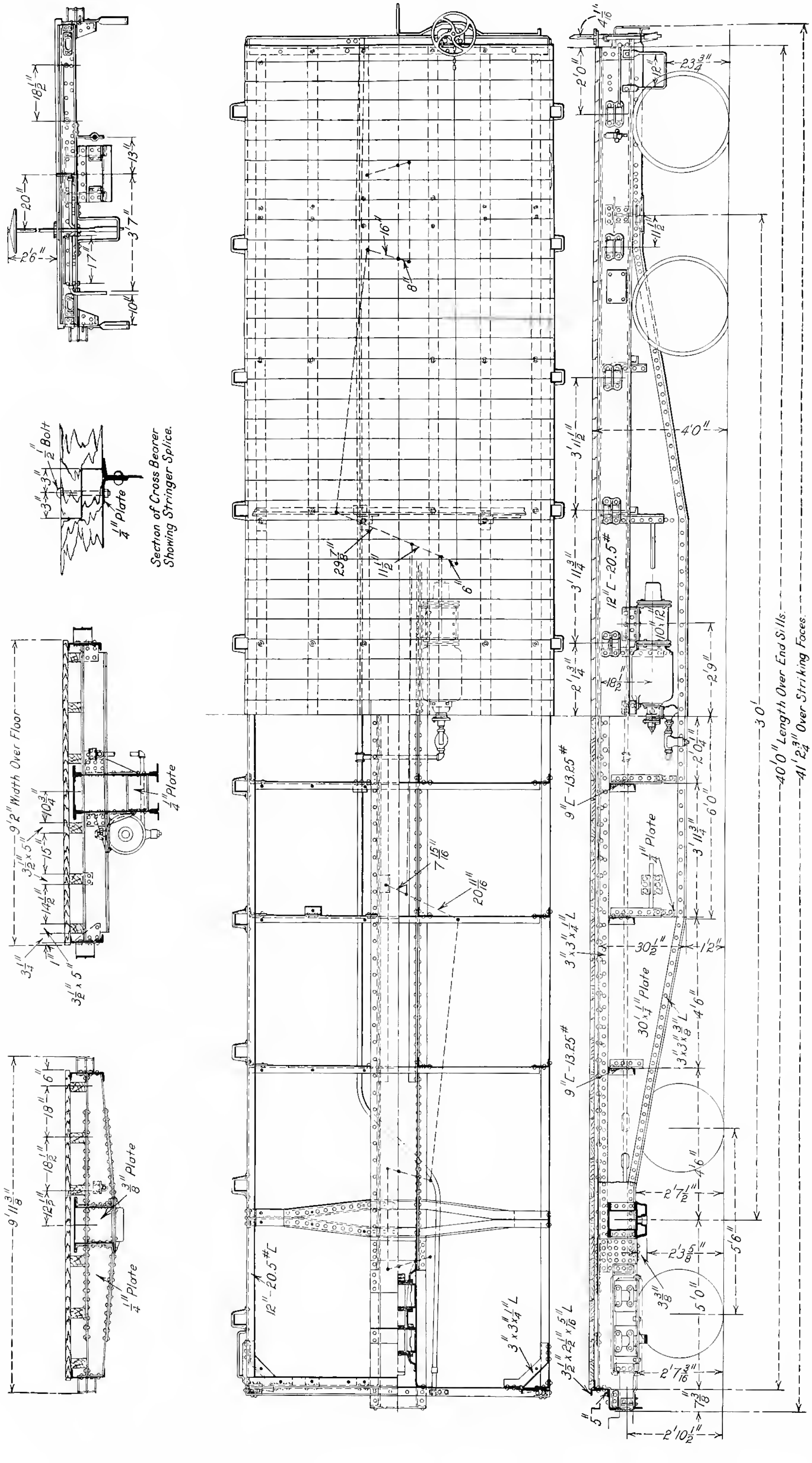


Fig. 344—Akron, Canton & Youngstown Steel Frame 50-Ton Capacity Flat Car. Builder, American Car & Foundry Company.

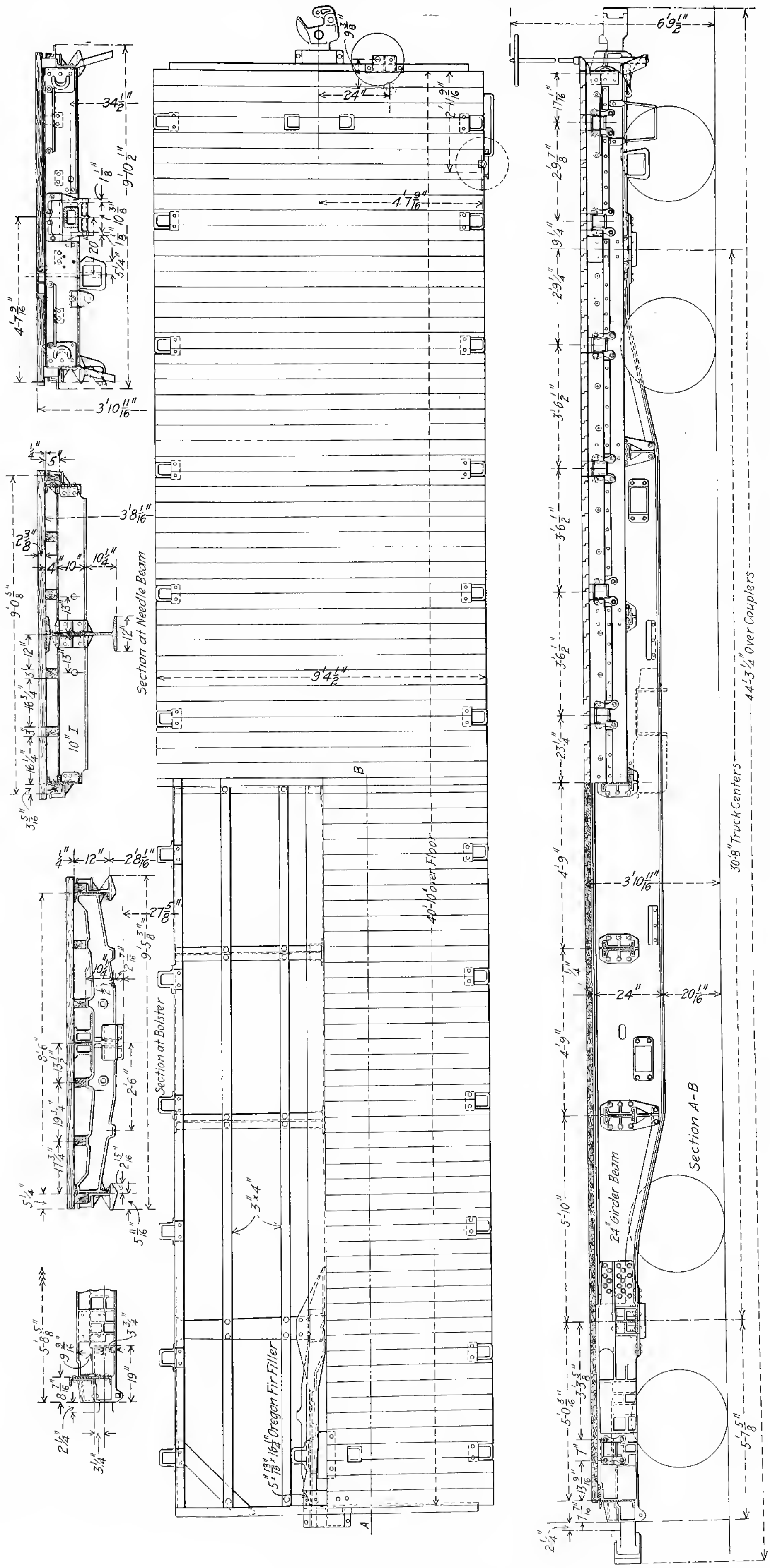


Fig. 345—Steel Frame 50-Ton Capacity Flat Car with Single I-Beam Center Sill. Builder, Bettendorf Axle Company.

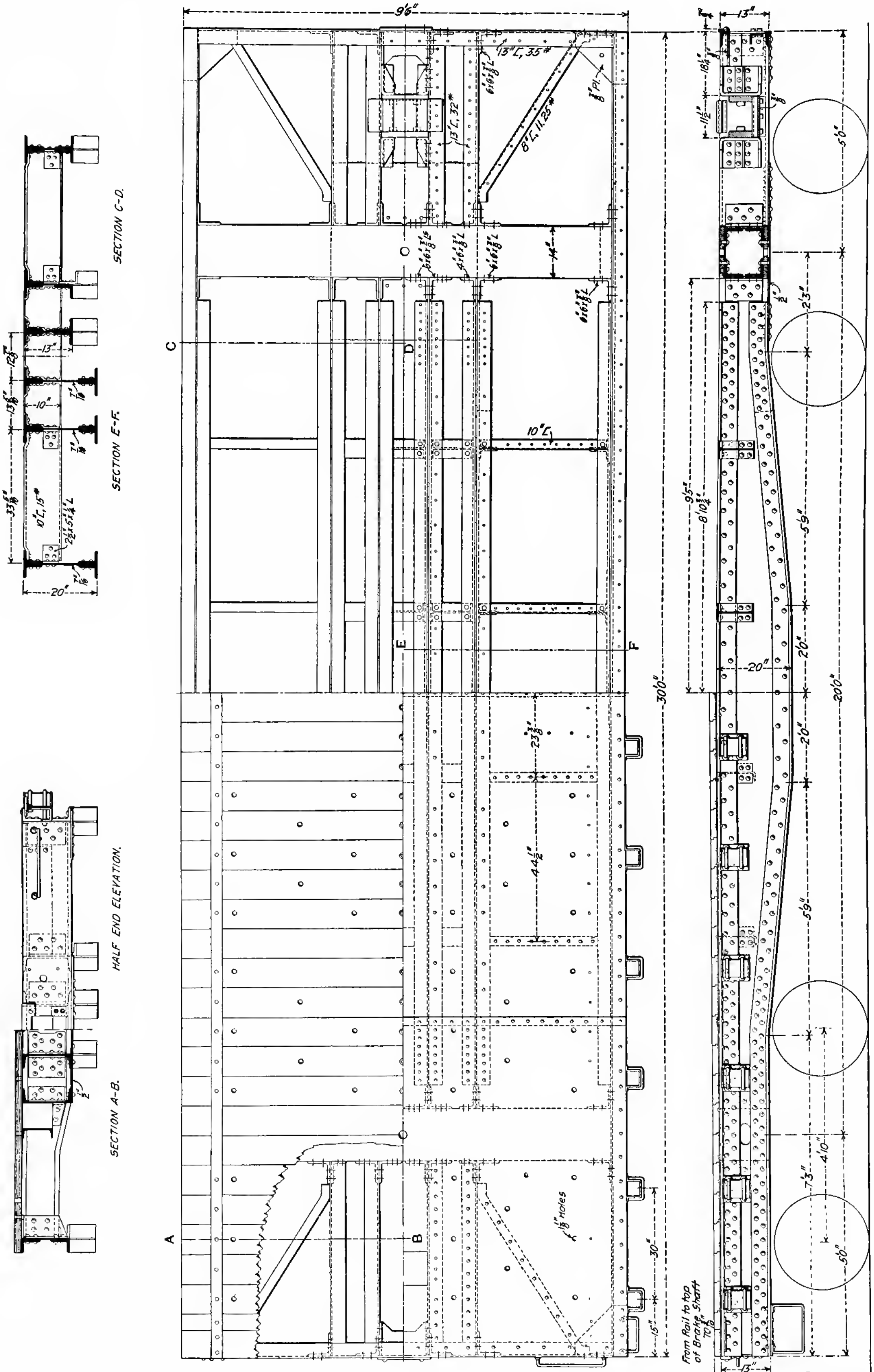


Fig. 346—Pittsburgh & Lake Erie Steel Frame 75-Ton Capacity Flat Car.

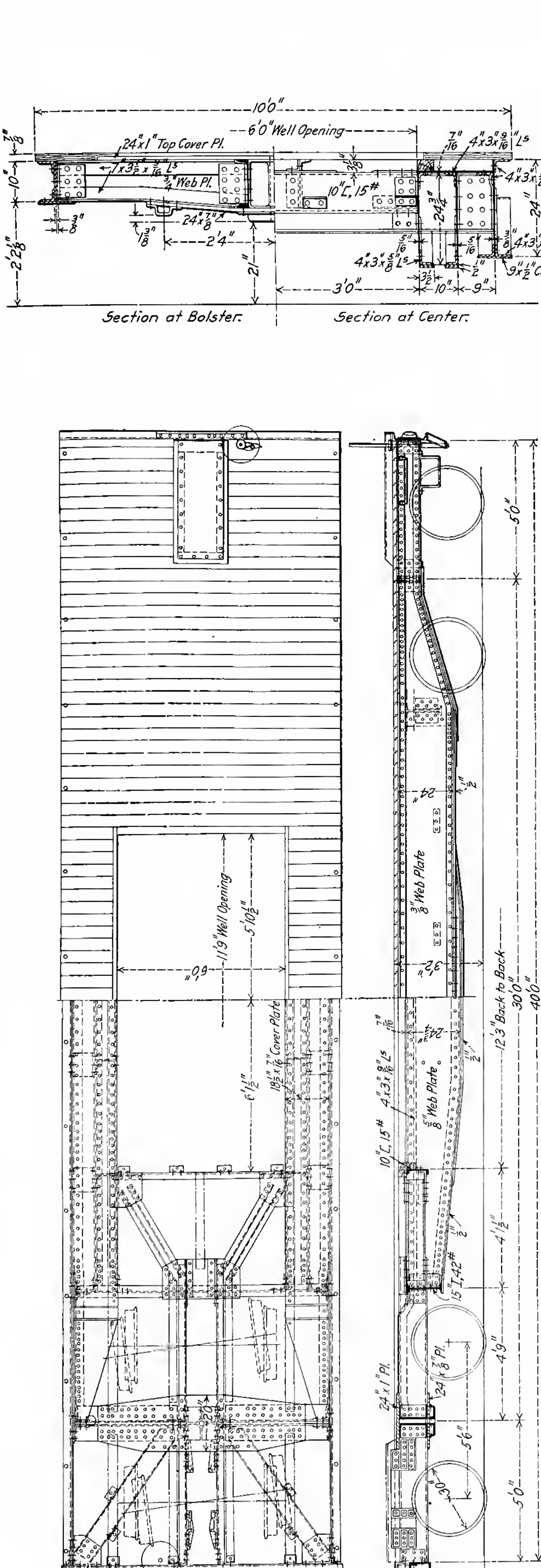


Fig. 347—Erie Railroad Steel Frame 75-Ton Capacity Well Car. Builder, American Car & Foundry Company.

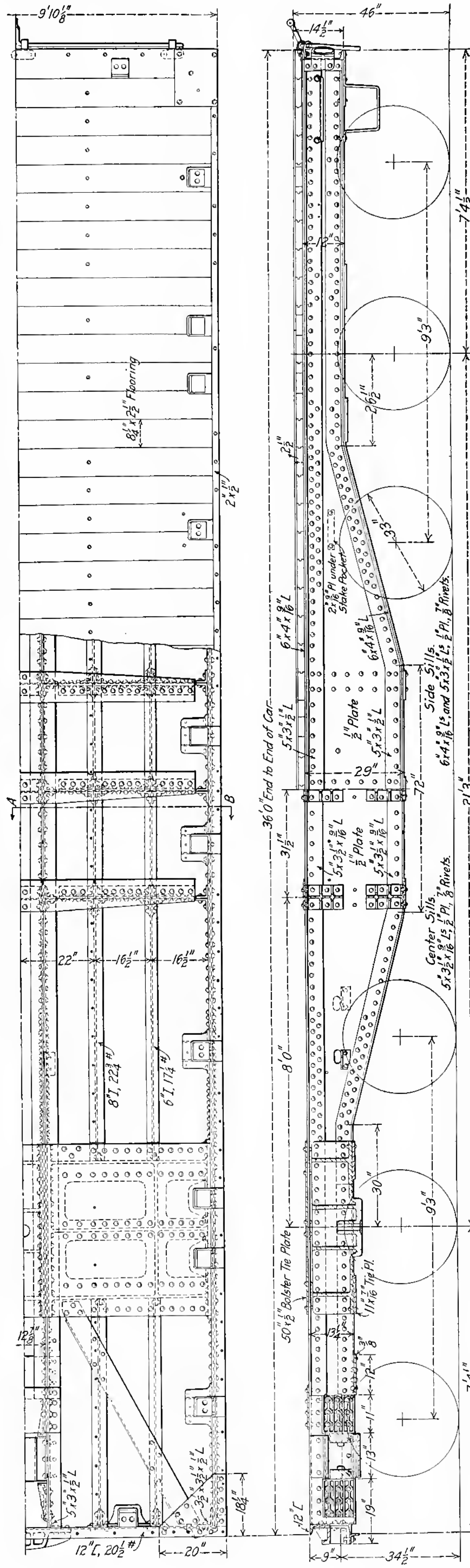


Fig. 348—Pittsburgh & Lake Erie Steel Frame 100-Ton Capacity Flat Car.

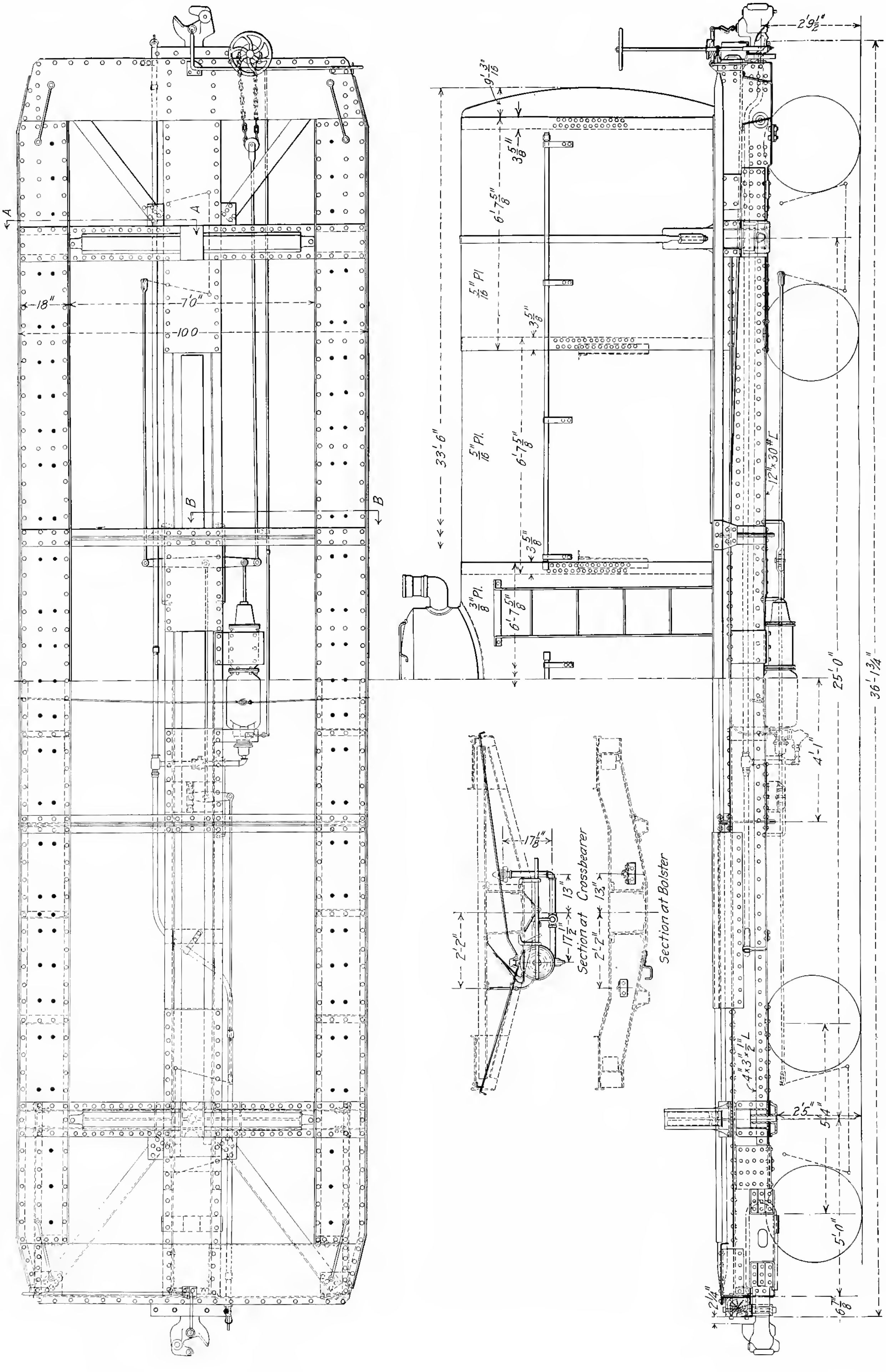


Fig. 349—Canadian Pacific Steel Frame Tank Car Shown in Figs. 82 and 350. Capacity, 8,000 Imperial Gallons. Builder, Canadian Car & Foundry Company.

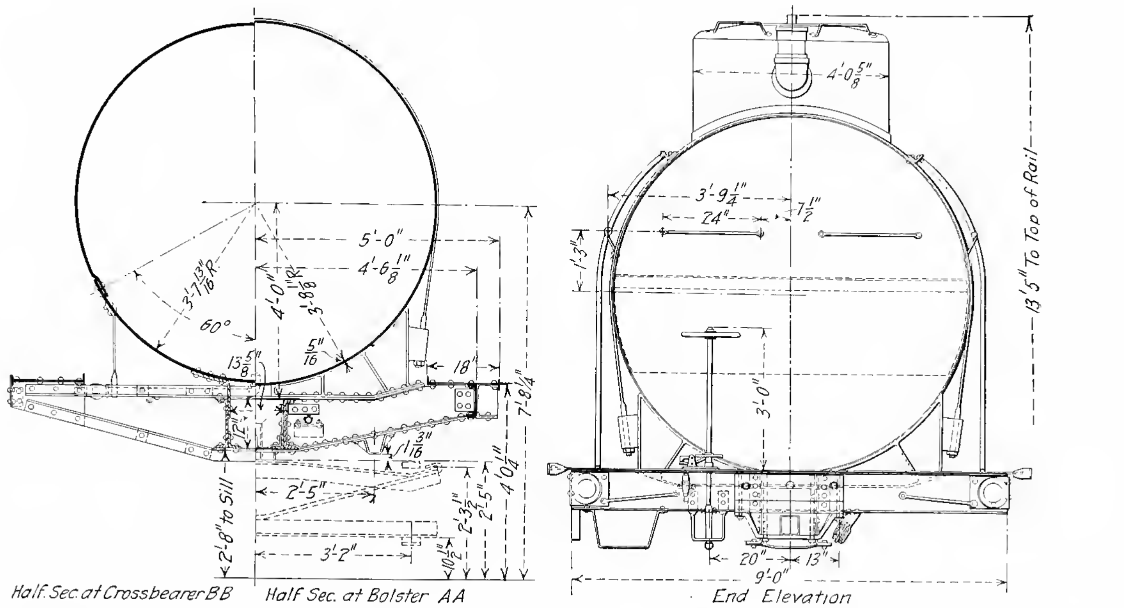


Fig. 350—Cross Section and End Elevation of Canadian Pacific Steel Frame Tank Car Shown in Figs. 82 and 349.

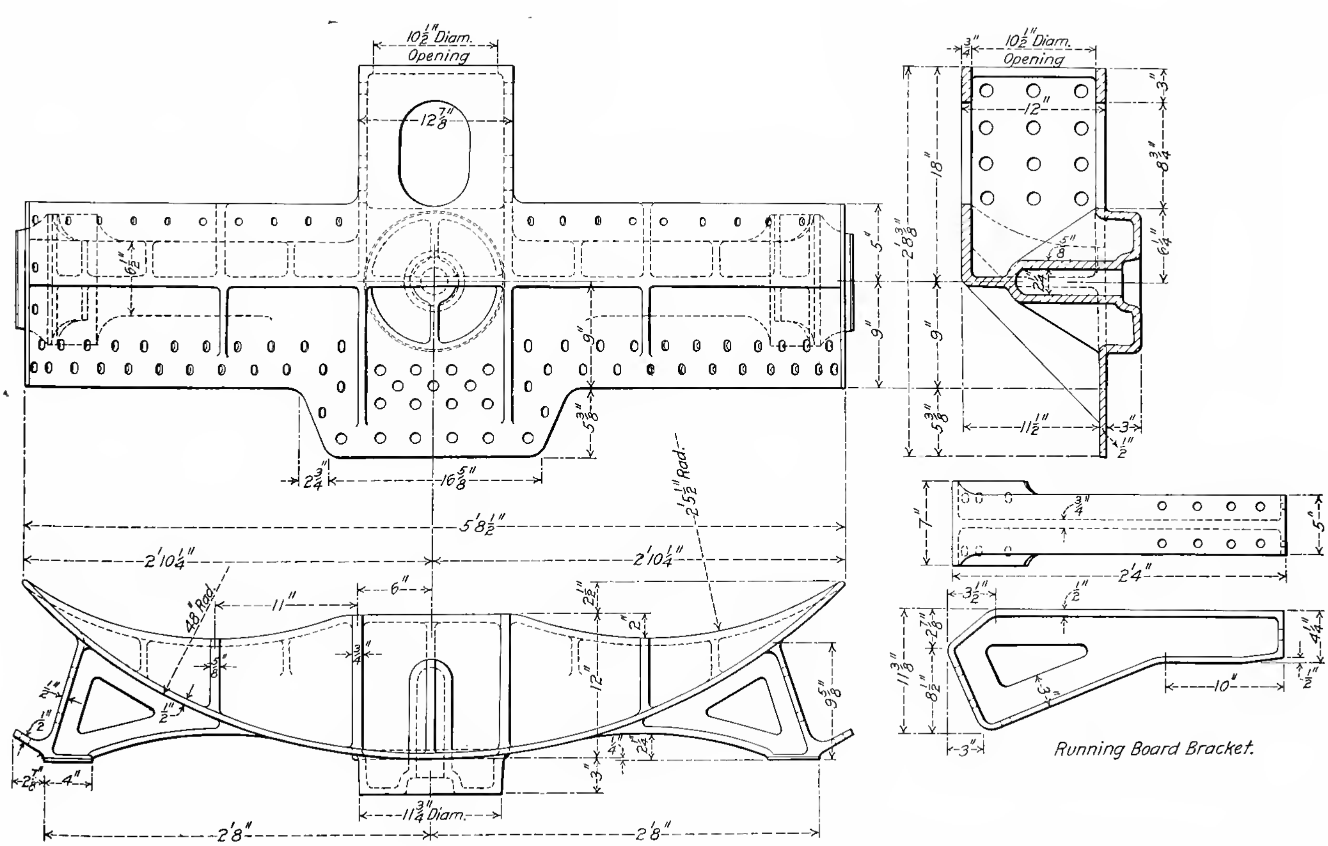


Fig. 351—Body Bolster of Chicago Steel Car Company Tank Car Shown in Fig. 352.

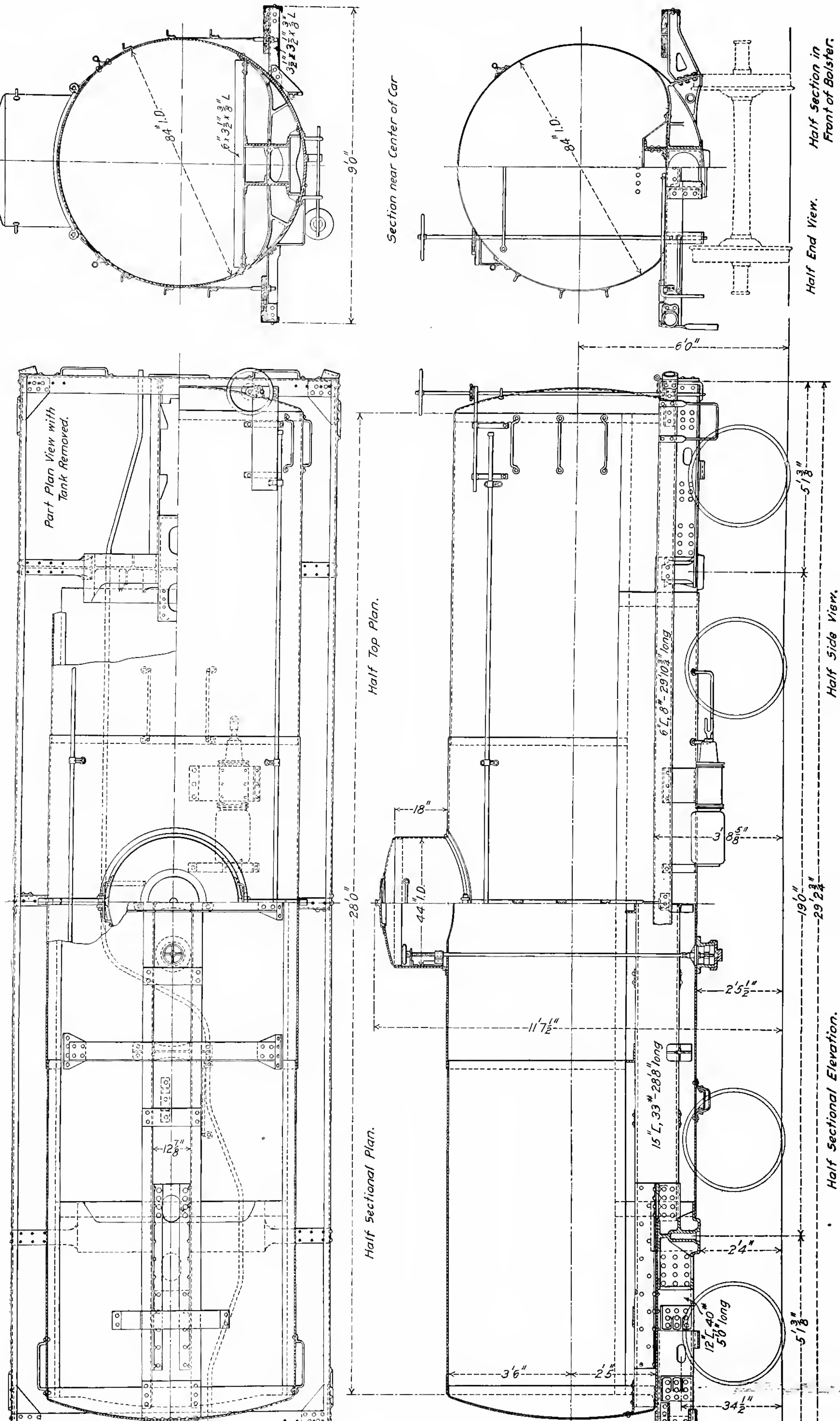


Fig. 352—Chicago Steel Car Co. Steel Frame Tank Car, Capacity, 8,000 U. S. Gallons. See also Fig. 351.

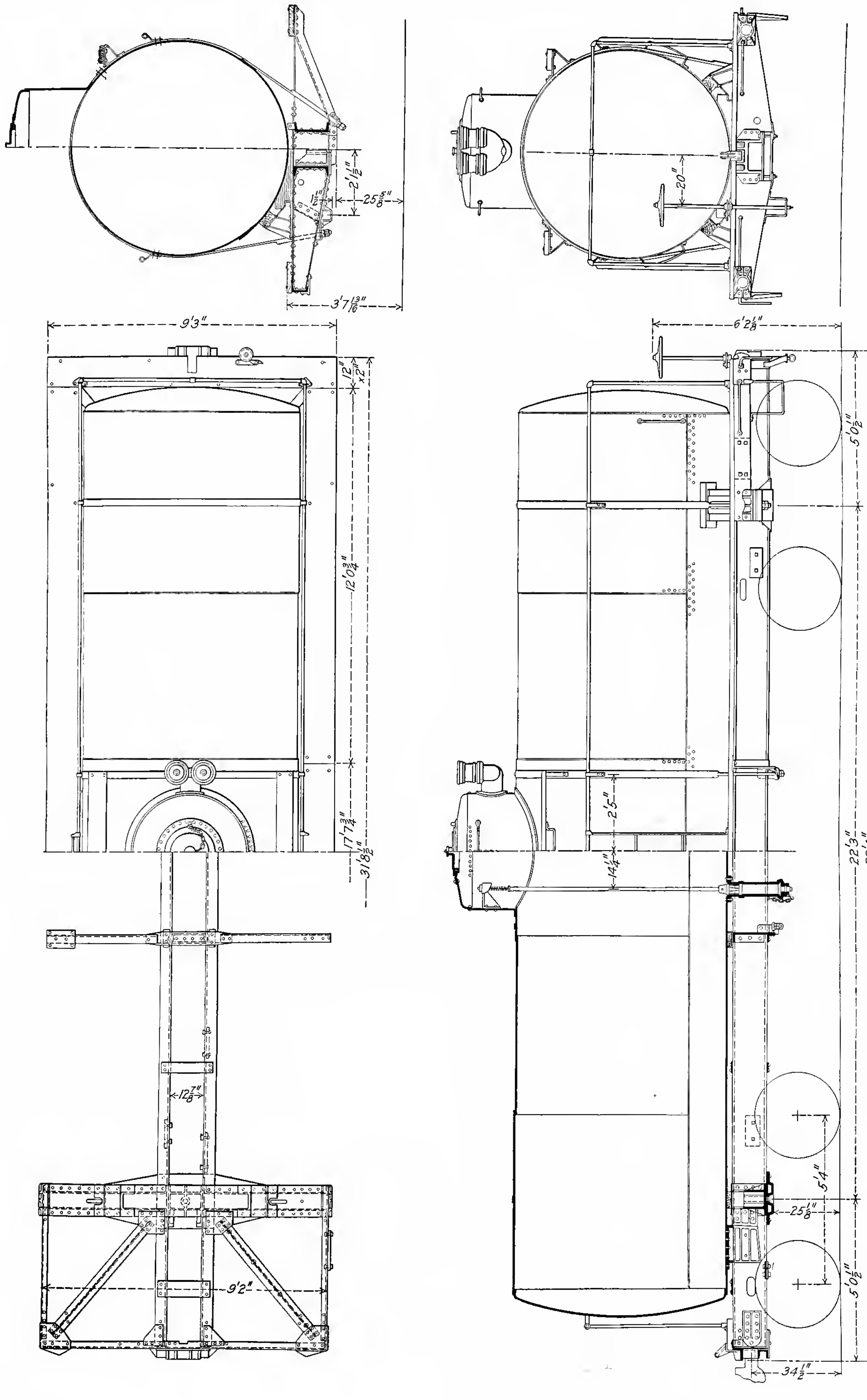


Fig. 353—American Car & Foundry Company Type 7 Tank Car, Capacity, 8,000 U. S. Gallons.

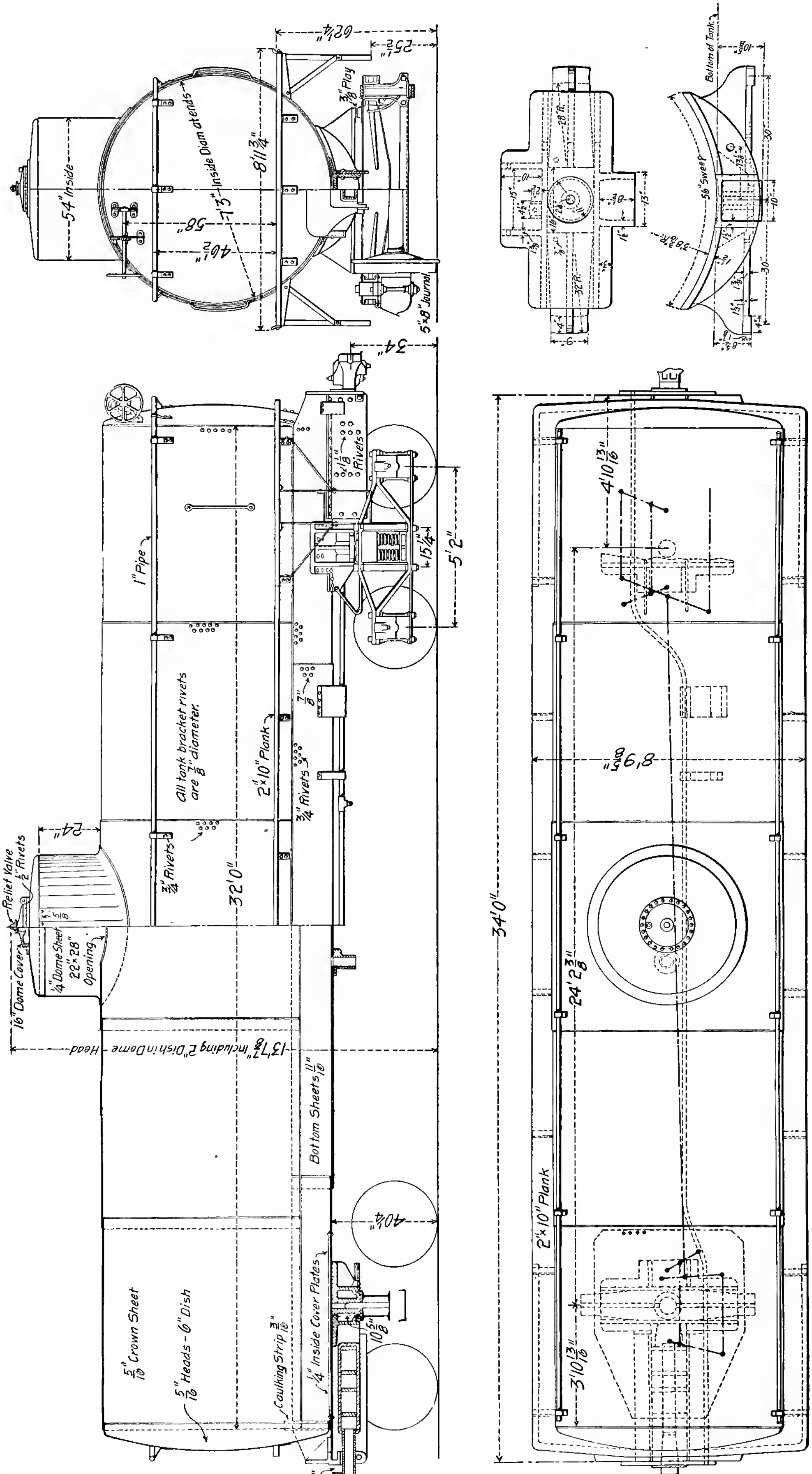


Fig. 354—Union Tank Line Steel Frame Tank Car Shown in Fig. 88. Built Under the Van Dyke Patents. Capacity, 10,000 U. S. Gallons.

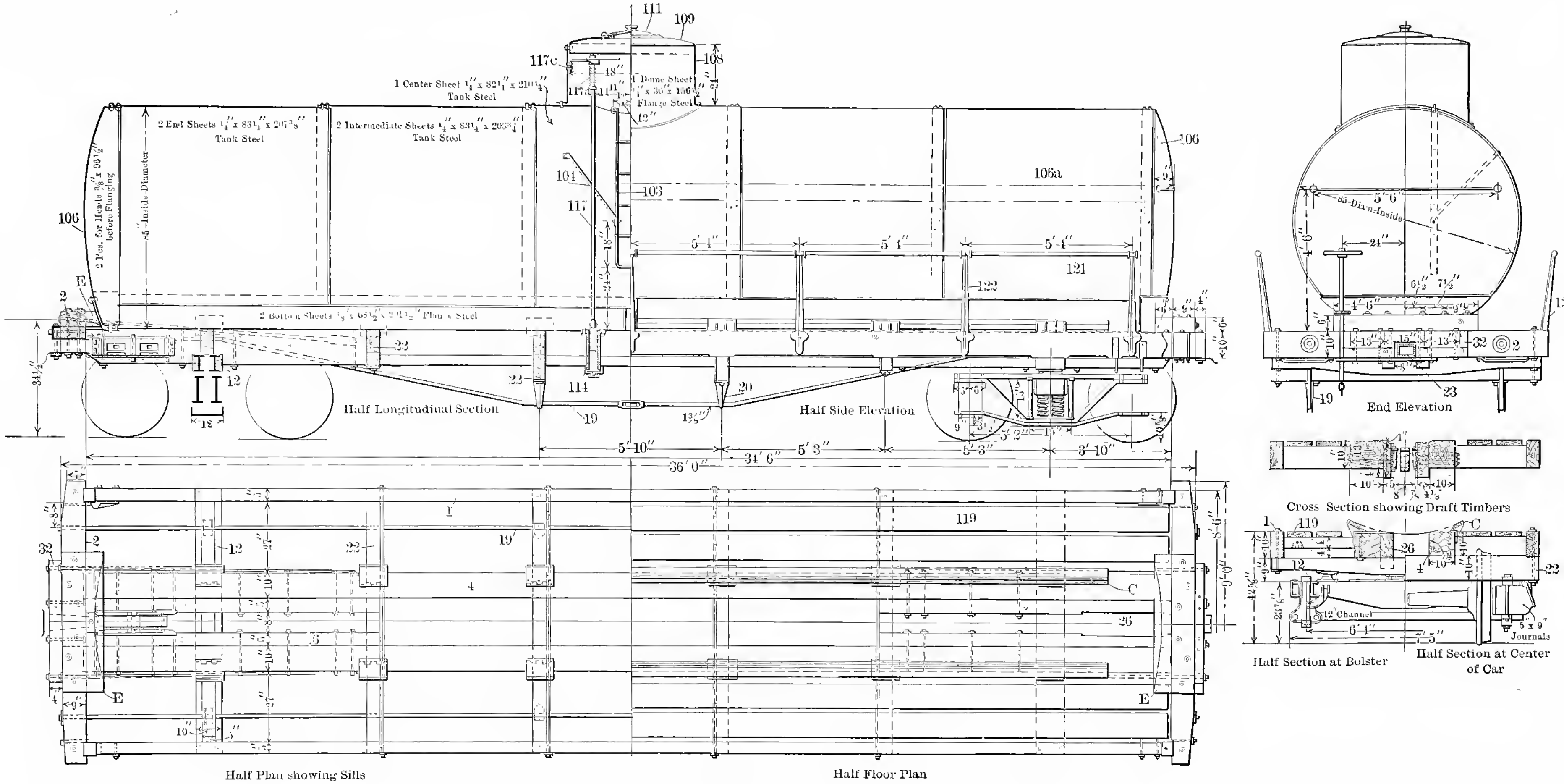


Fig. 355—Union Tank Line Wooden Frame Tank Car, Capacity, 10,000 U. S. Gallons.

Tank Car Parts.

1	*Side Sill*	22	*Cross Bearer*	106a	*Tank*	117c	*Tank Valve Rod Bracket*
2	*End Sill*	23	*Drawbar*	108	*Tank Dome*	119	*Running Board*
4	*Center Sill*	26	*Draft Timbers or Sills*	109	*Dome Head*	121	*Hand Rail*
12	*Body Bolster*	32	*Dead Wood or Buffer Block*	111	*Manhole Cover*	122	*Hand Rail Post*
19	*Body Truss Rod*	103	*Manhole Ladder*	114	*Tank Valve*	C	*Tank Saddle*
20	*Queen Post*	104	*Manhole Ladder Brace*	117	*Tank Valve Rod*	E	*Filler Block*
		106	*Tank Head*	117a	*Tank Valve Rod Screw*		

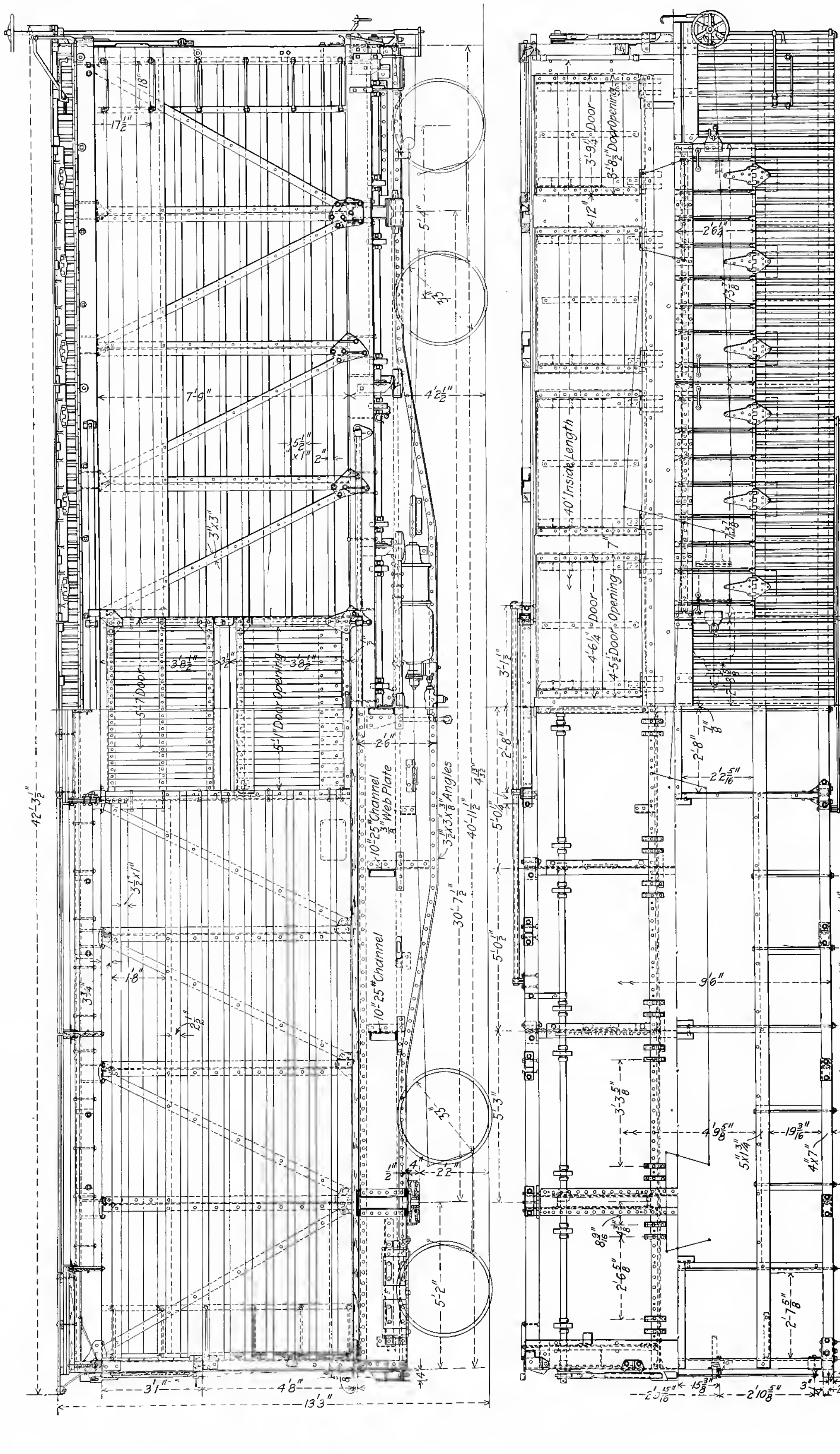


Fig. 356—Atchison, Topeka & Santa Fe Steel Frame 40-Ton Capacity Drop Bottom Stock and General Service Car Shown in Figs. 92 and 357. Builder, National Dump Car Company.

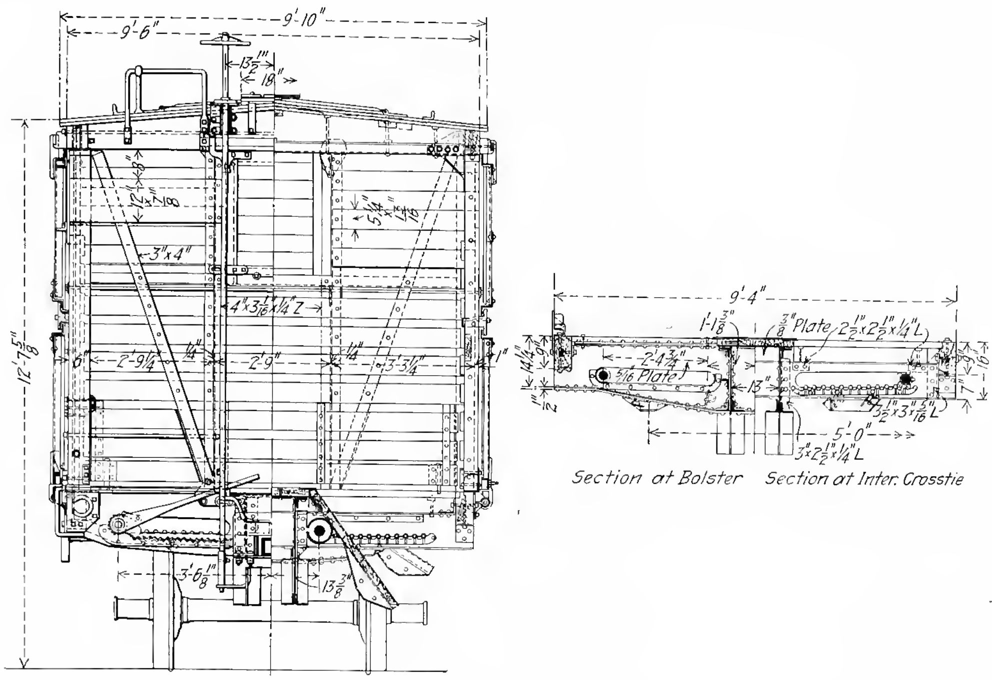


Fig. 357—End Elevation and Cross Sections of Steel Frame 40-Ton Capacity Drop Bottom Stock and General Service Car Shown in Figs. 92 and 356.

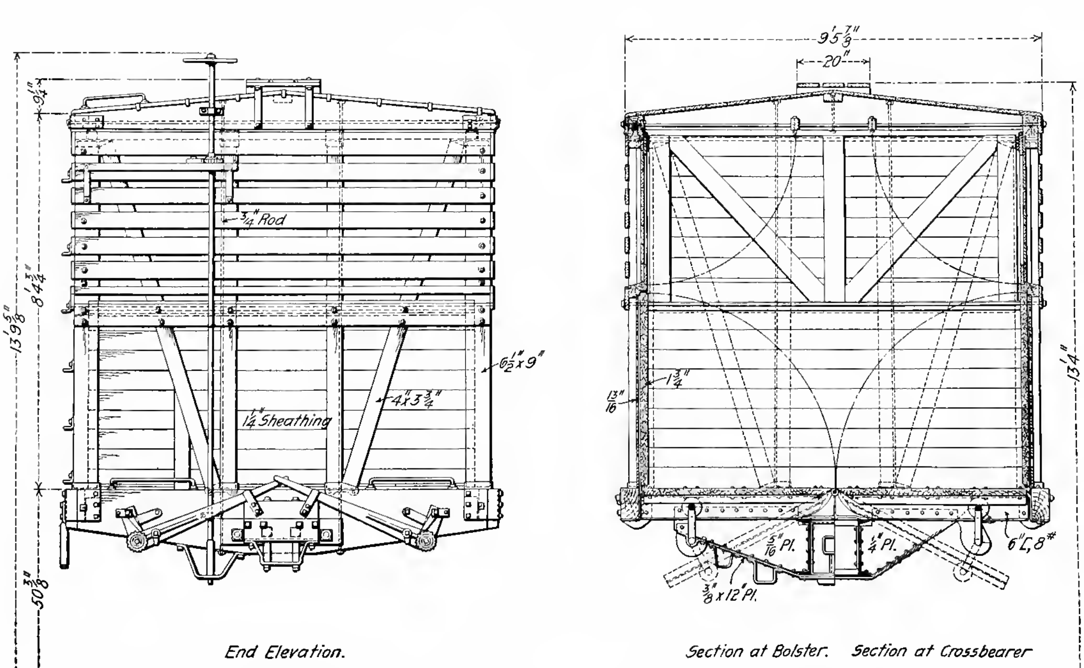


Fig. 358—End Elevation and Cross Sections of Ralston Steel Underframe 30-Ton Capacity Stock and General Service Car Shown in Figs. 93 and 359.

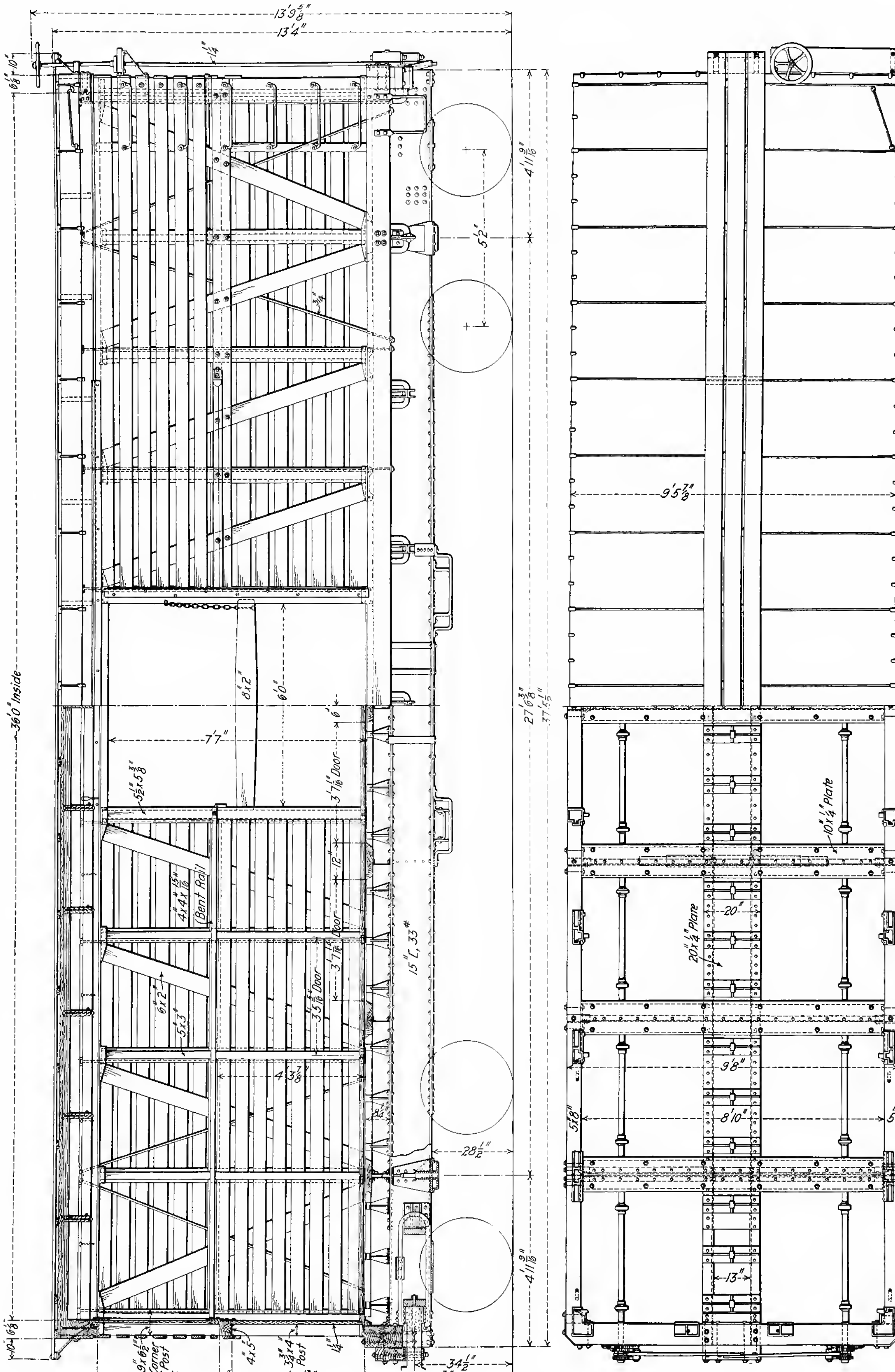


Fig. 359—Steel Underframe 30-Ton Capacity Drop Bottom Stock and General Service Car Shown in Figs. 93 and 358. Builder, Ralston Steel Car Company.

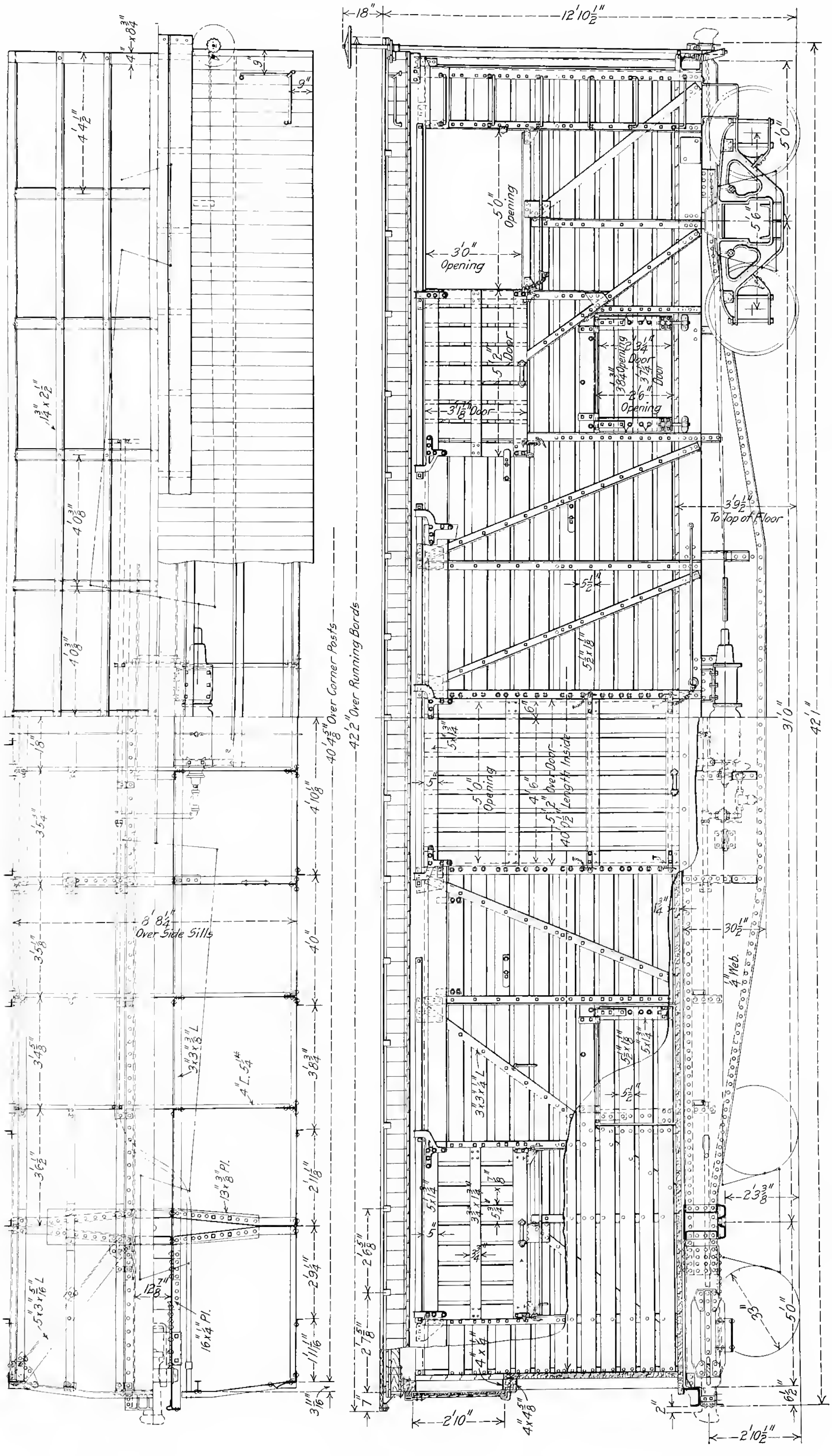


Fig. 360—Missouri Pacific Steel Frame 40-Ton Capacity Stock Car. Builder, American Car & Foundry Company. See also Fig. 362.

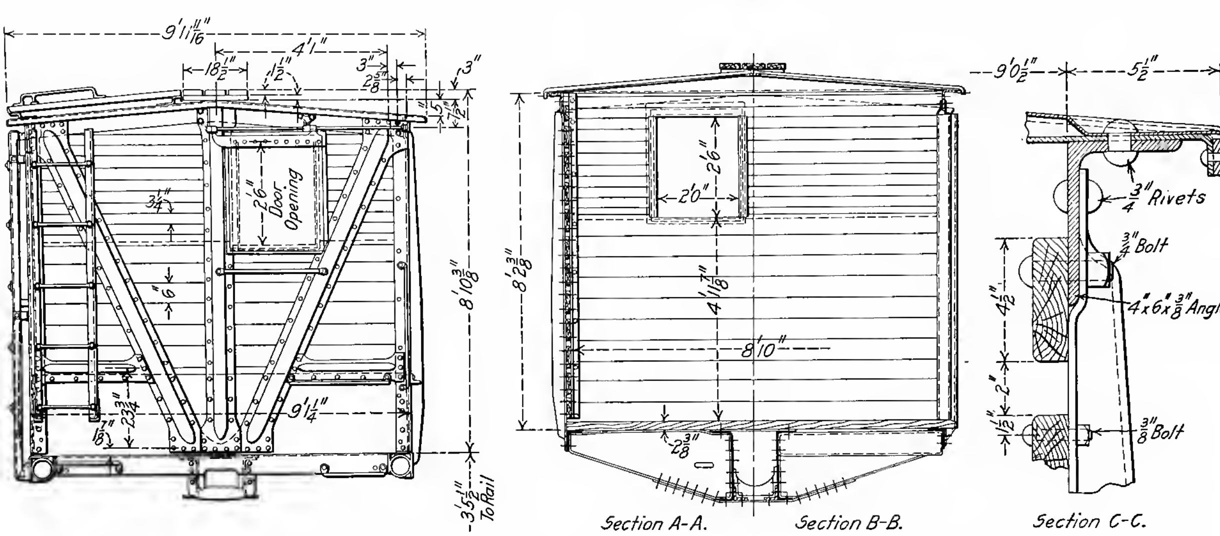


Fig. 361—End Elevation and Cross Sections of Pennsylvania Railroad Steel Frame Stock Car Shown in Fig. 363. The Frame and Roof of This Car are the Same as Those Used on the Box Car Shown in Figs. 269-271.

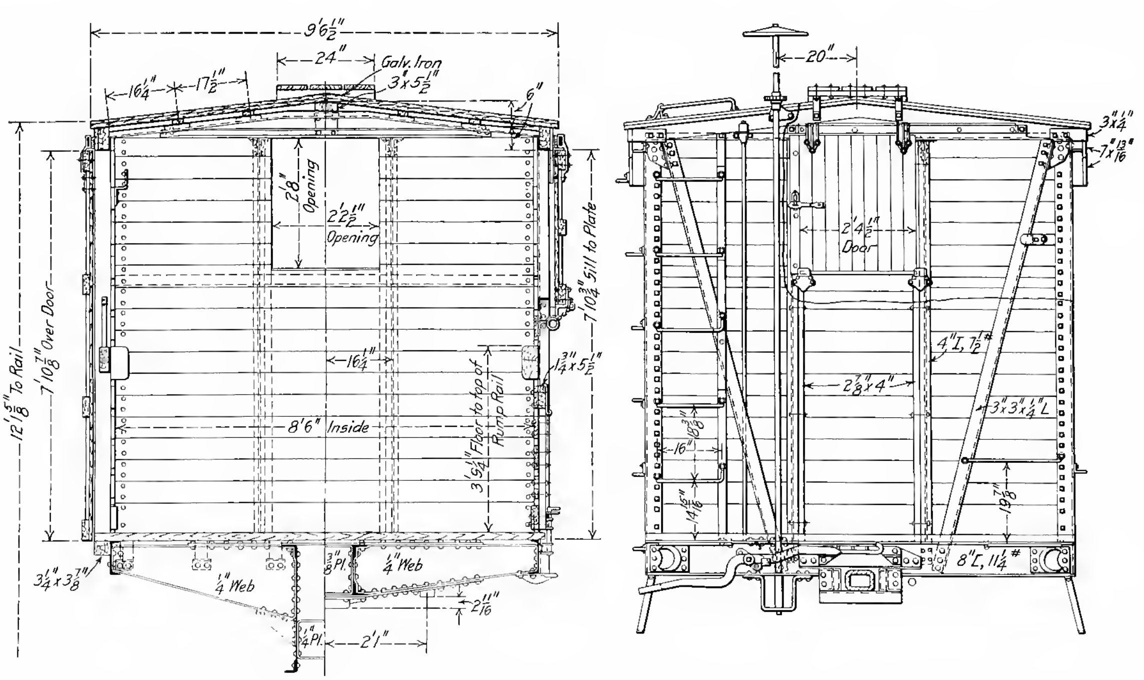


Fig. 362—Cross Sections and End Elevation of Missouri Pacific Steel Frame Stock Car Shown in Fig. 360.

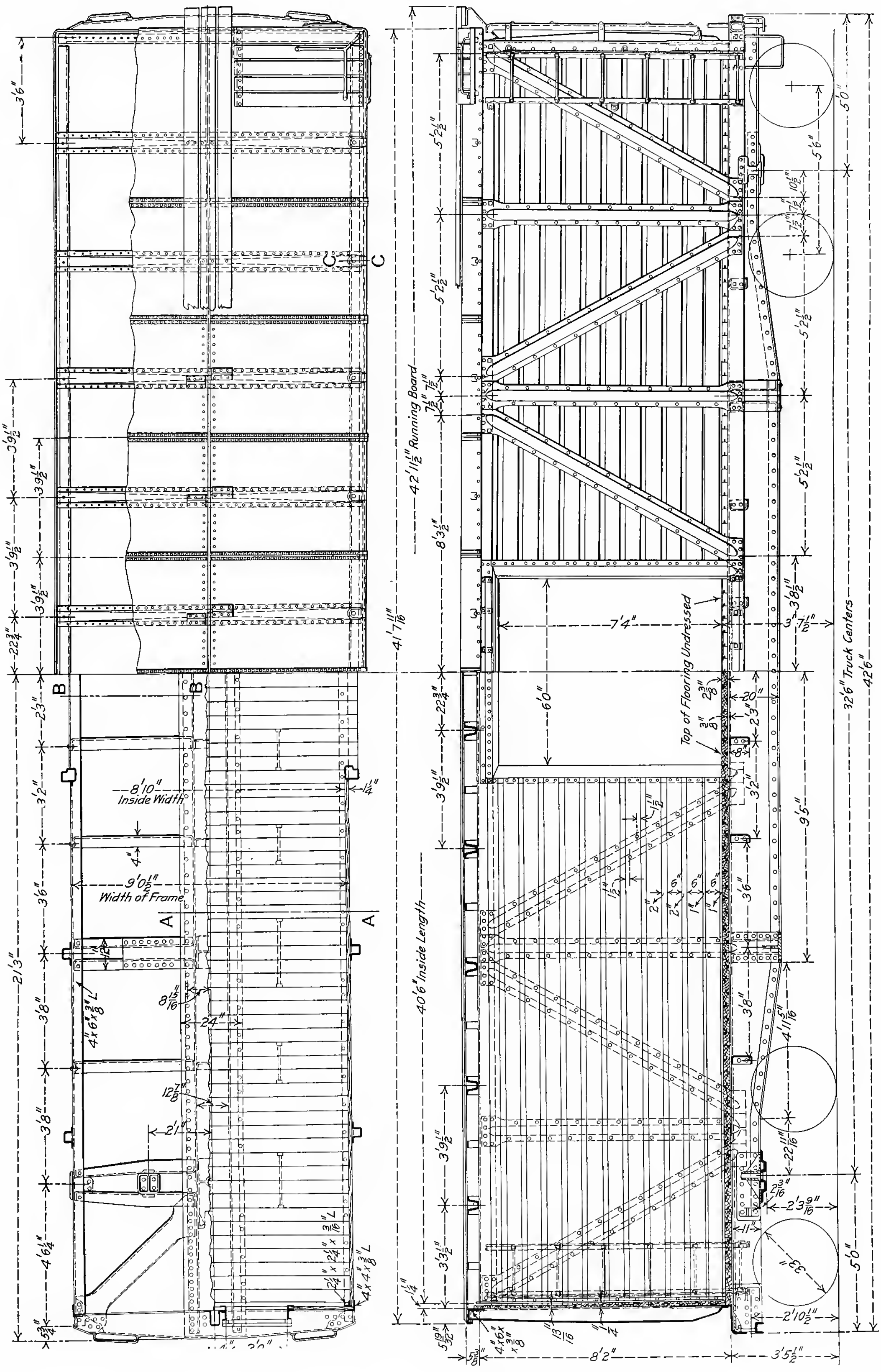


Fig. 363—Pennsylvania Railroad 50-Ton Capacity Steel Frame Stock Car. See also Fig. 361.

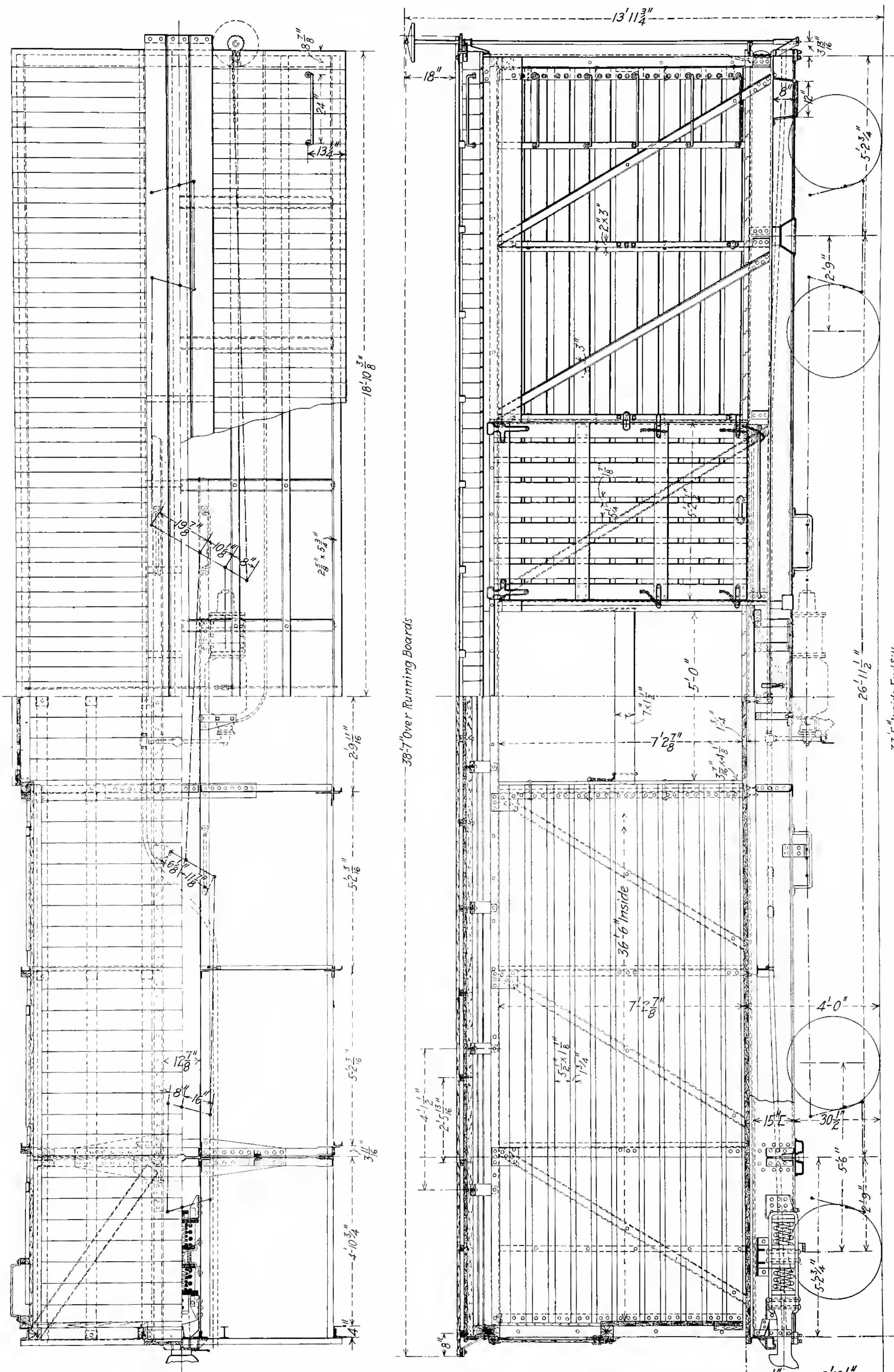


Fig. 364—Western Pacific Steel Frame 40-Ton Capacity Stock Car. Builder, American Car & Foundry Company. See also Fig. 365.

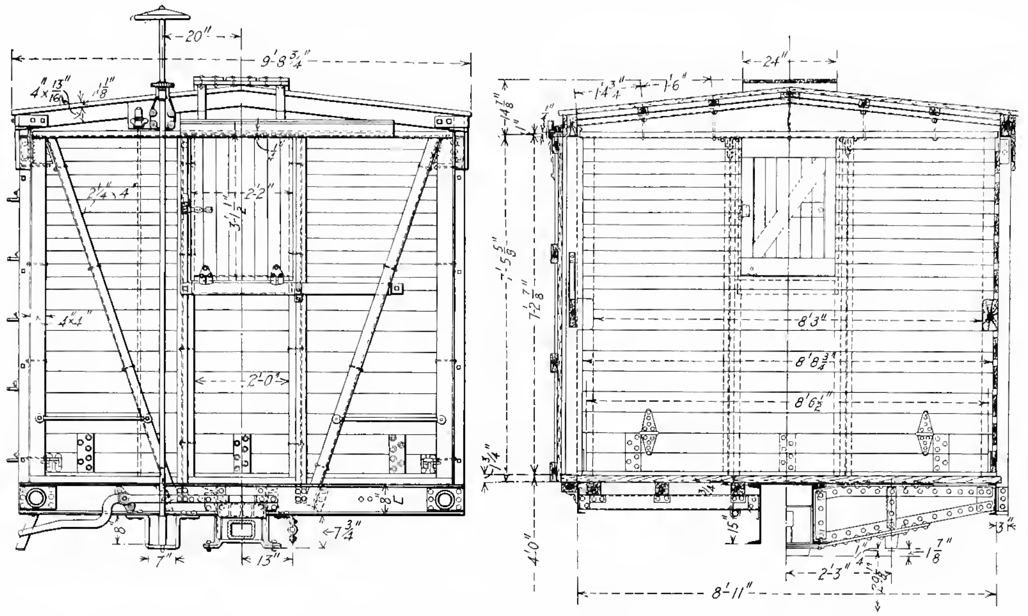


Fig. 365—End Elevation and Cross Section of Missouri Pacific Steel Frame Stock Car Shown in Fig. 364.

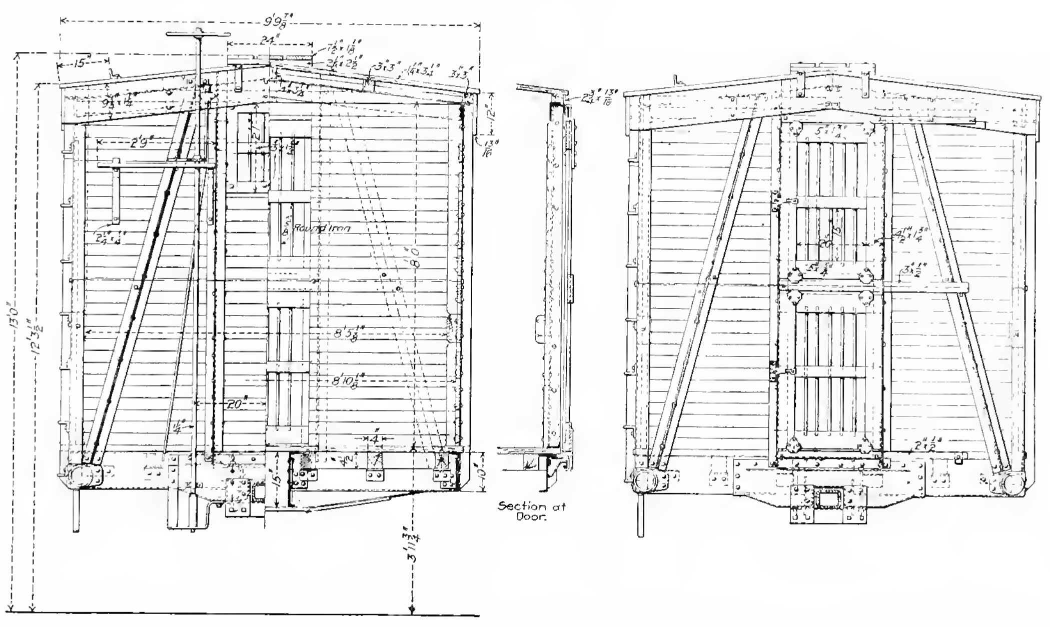


Fig. 366—End Elevation and Cross Sections of Oregon Short Line Steel Frame Stock Car Shown in Fig. 367.

Stock Car Parts. See Fig. 368.

1	*Side Sill*	27	*Side Sheathing*	48	*End Plate*
2	*End Sill*	28	*Upper Floor or Double Deck*	49	*Belt Rail*
3	*Intermediate Sill*	32	*Buffer Block or Dead Wood*	53	*Inside Lining*
4	*Center Sill*	33	*Side Brace*	81	*Carline*
12	*Body Bolster*	36	*Side Post*	83	*Purlin*
19	*Body Truss Rod*	37	*Side Brace*	87	*Running Board*
21	*Queen Post*	39	*Floor*	93	*Brake Wheel*
22	*Needlebeam*	42	*Door Stop*	94	*Brake Shaft*
26	*Draft Timber or Sill*	46	*Side Plate*	190	*Brake Guard Rail*

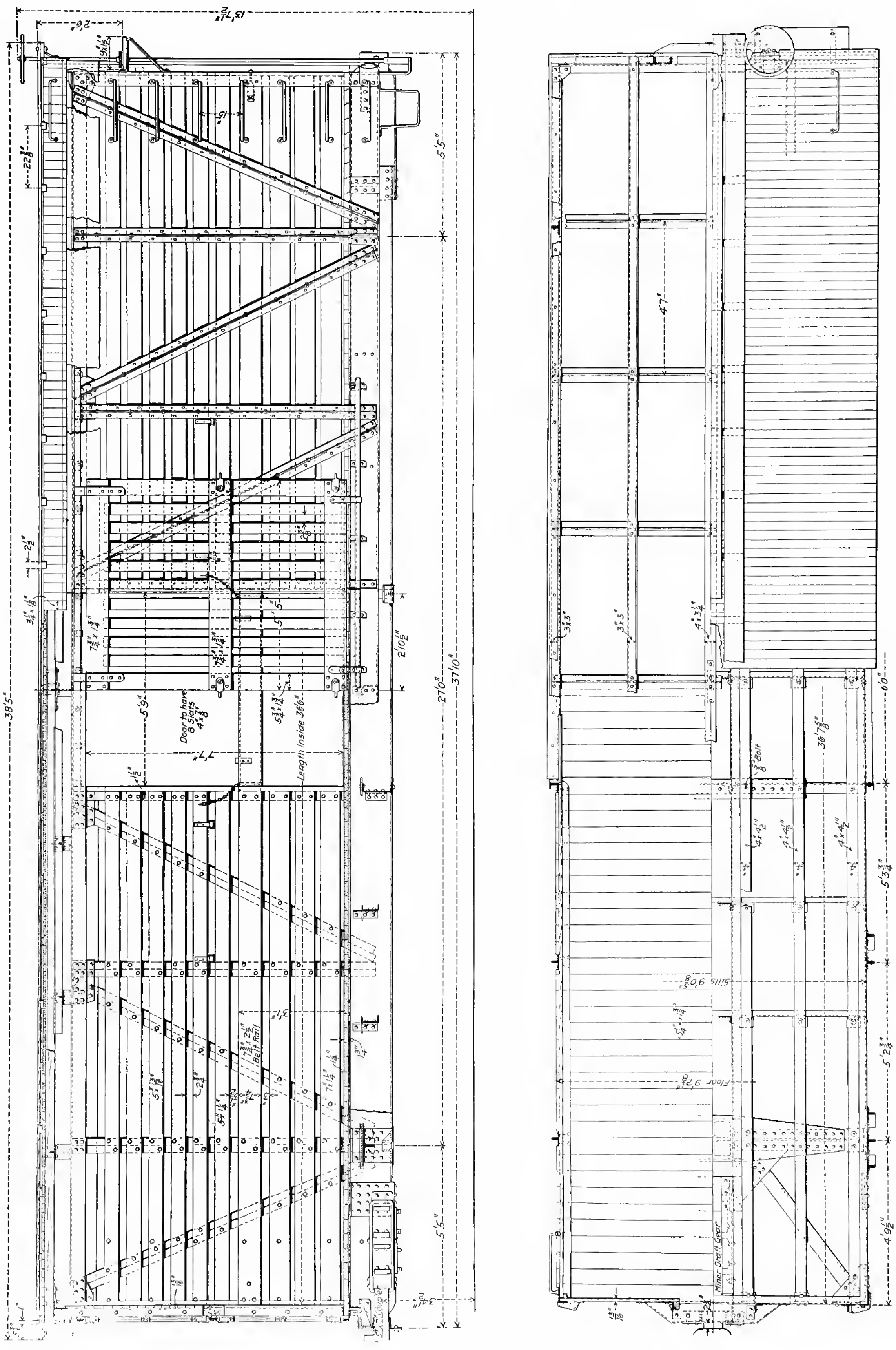


Fig. 367—Oregon Short Line Steel Frame 30-Ton Capacity Stock Car. See also Fig. 366.

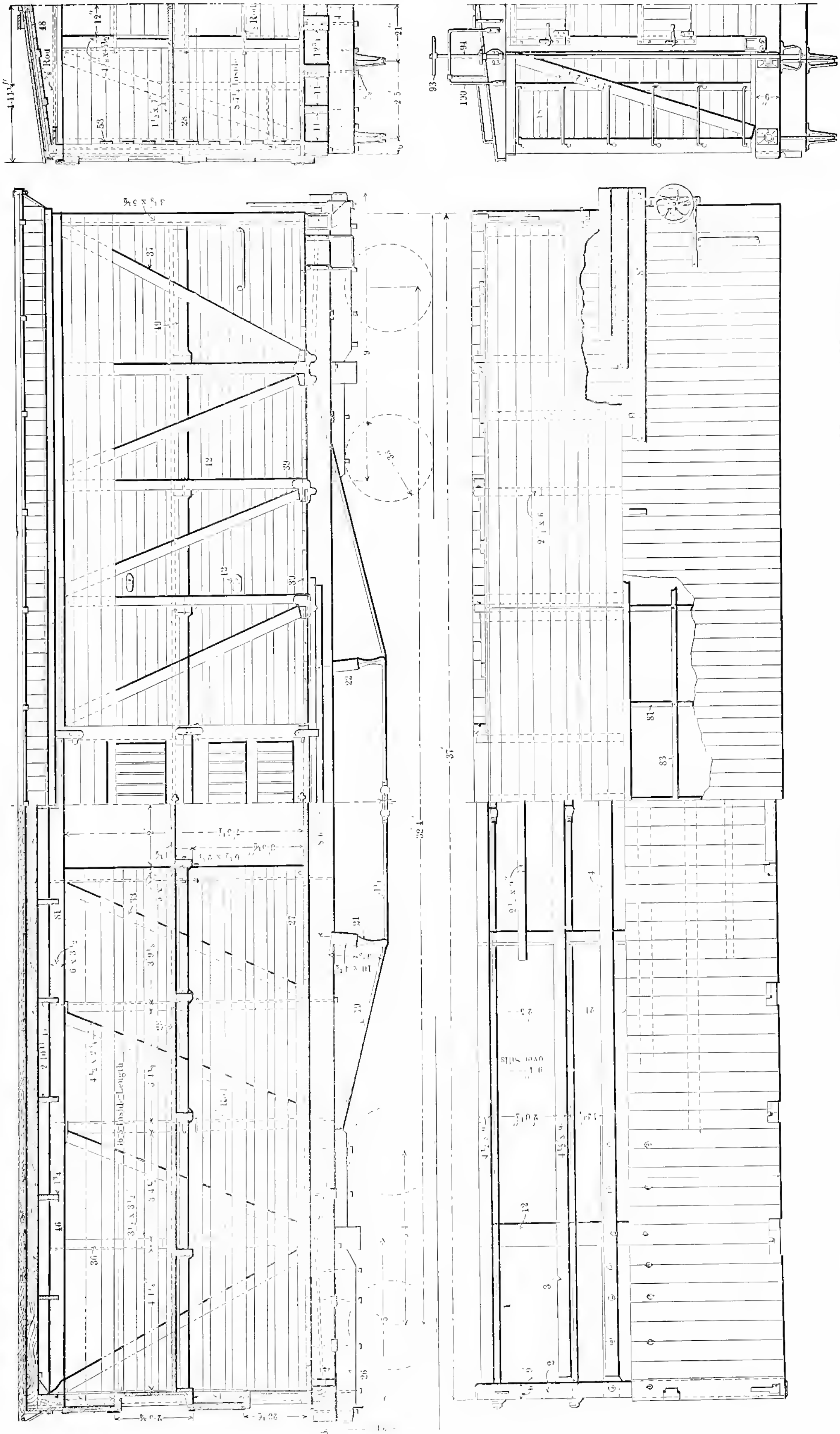


Fig. 368—Northern Pacific Wooden 25-Ton Capacity Double Deck Stock Car. See Page 353 for Names of Numbered Parts.

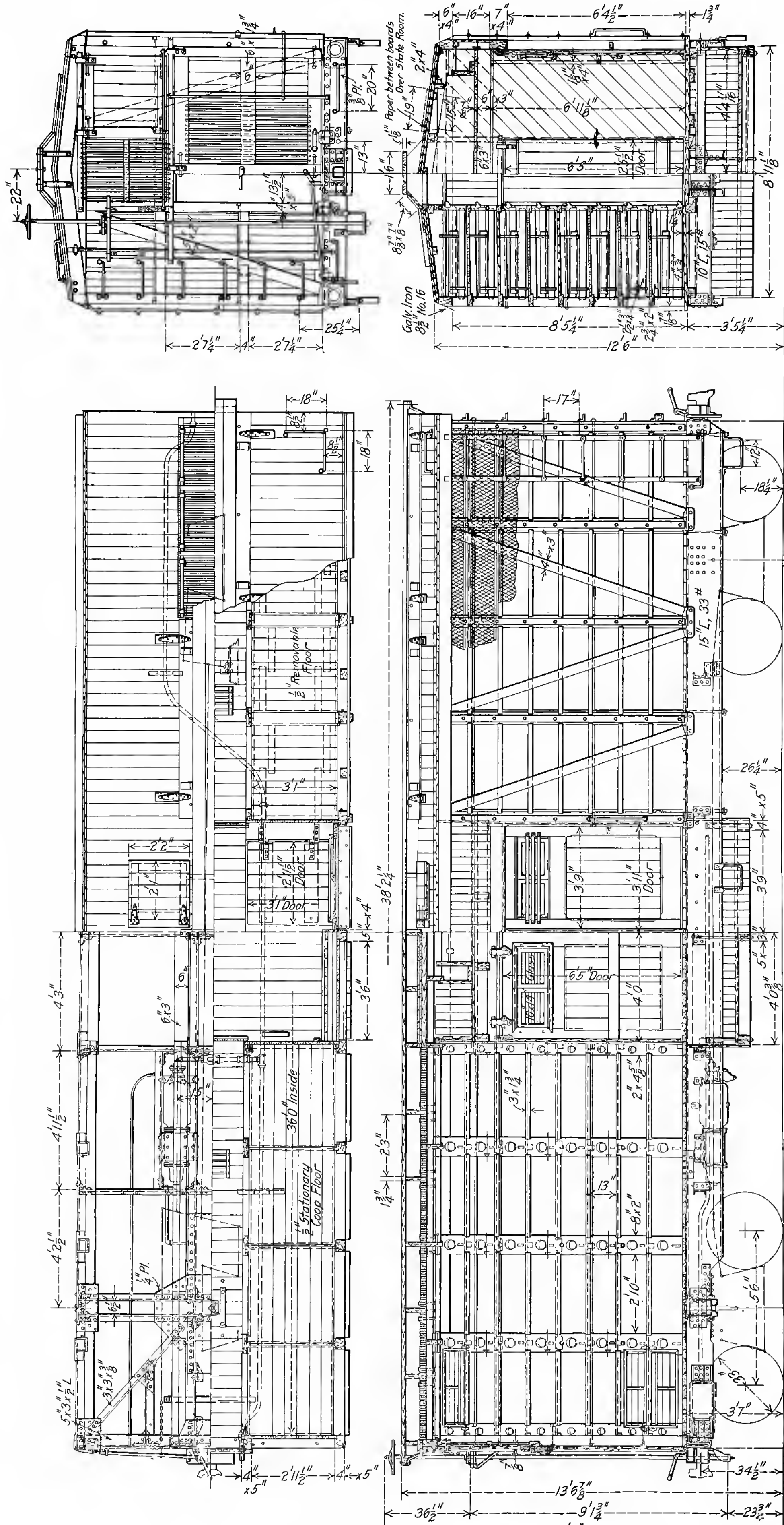


Fig. 369—Live Poultry Transportation Company 10-Ton Capacity Poultry Car Shown in Fig. 97. Builder, American Car & Foundry Company.

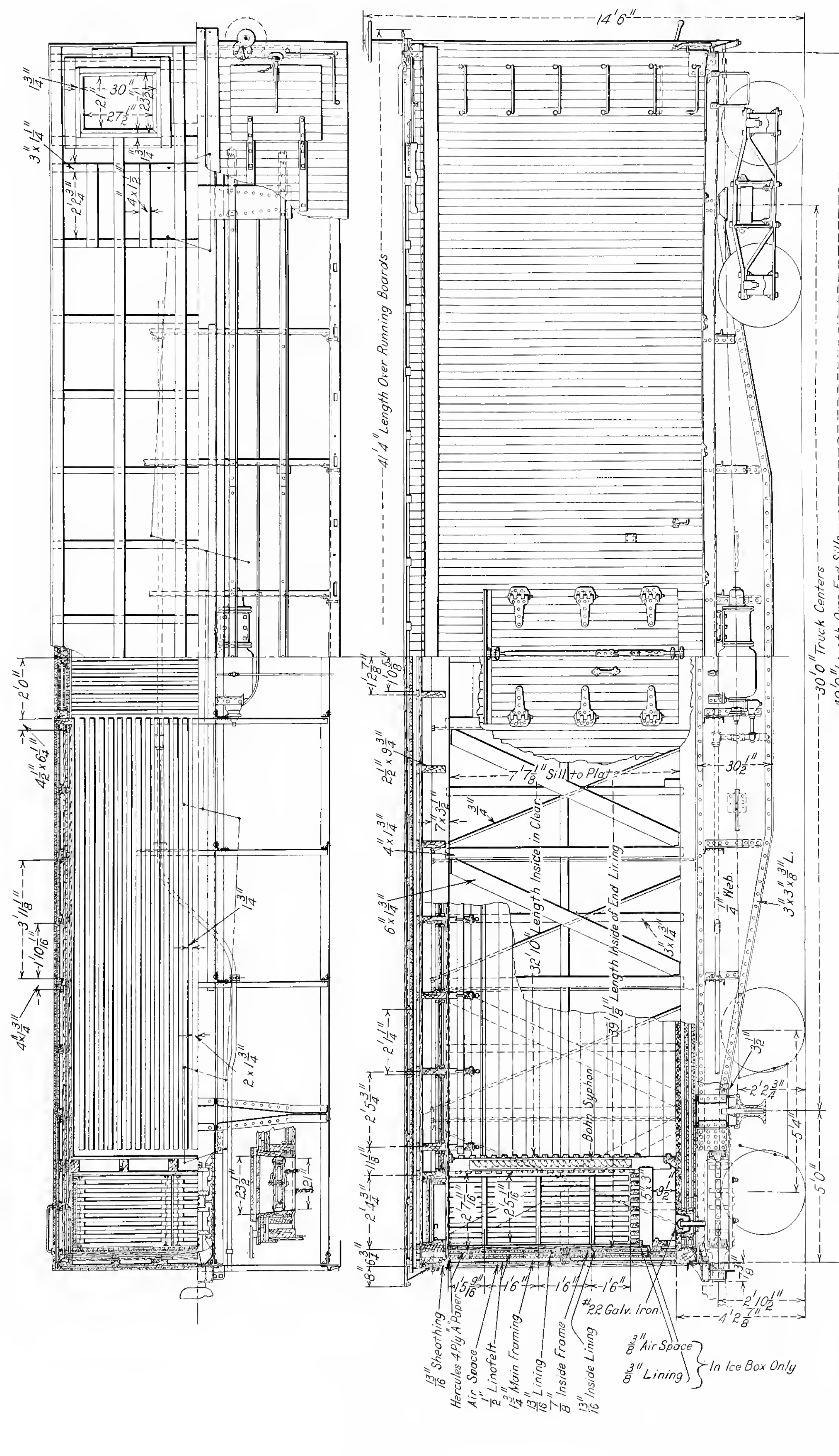


Fig. 370—American Refrigerator Transit Company Steel Underframe 30-Ton Capacity Refrigerator Car Shown in Figs. 107 and 372. Builder, American Car & Foundry Company.

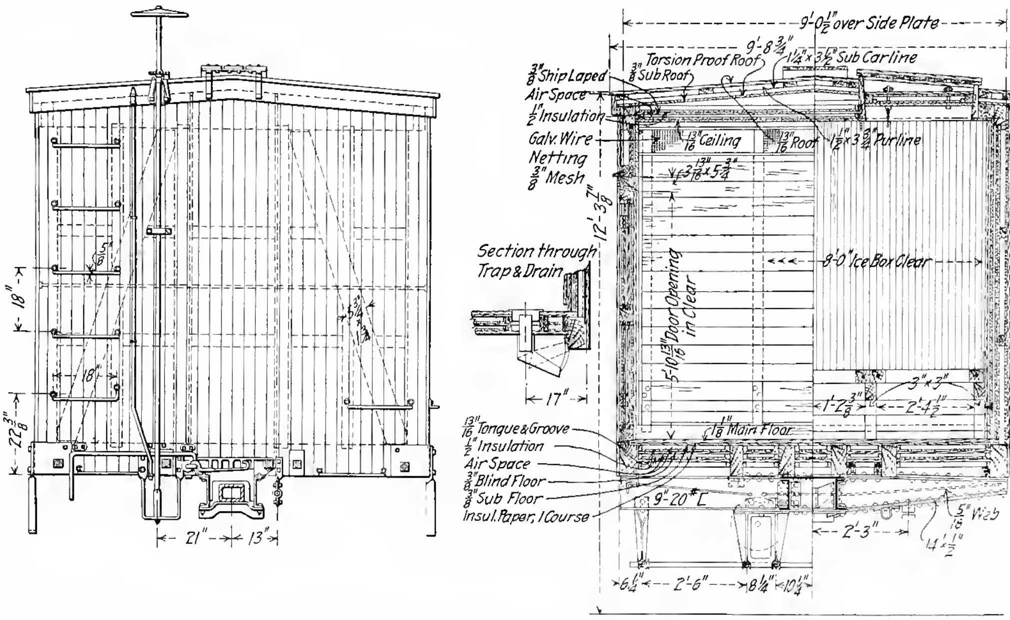


Fig. 371—End Elevation and Cross Sections of Frisco Refrigerator Line Wooden 30-Ton Capacity Refrigerator Car with Steel Center Sills Shown in Figs. 111 and 373.

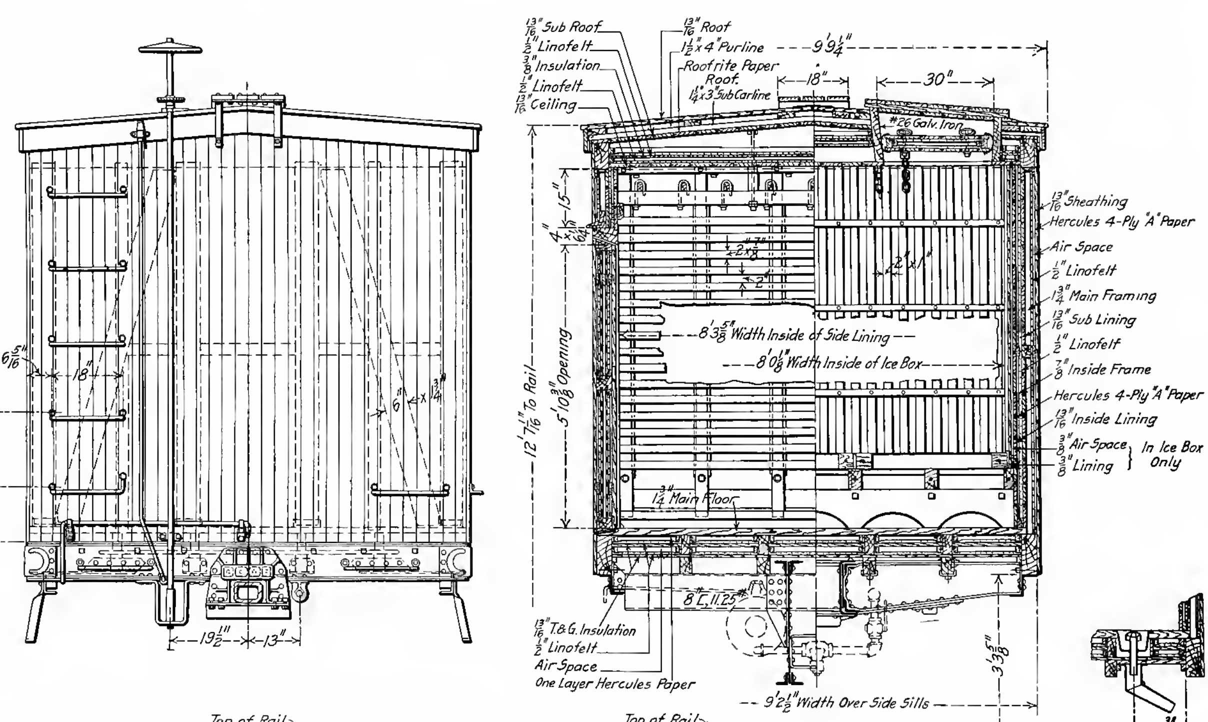


Fig. 372—End Elevation and Cross Sections of American Refrigerator Transit Company Steel Underframe Refrigerator Car Shown in Figs. 107 and 370.

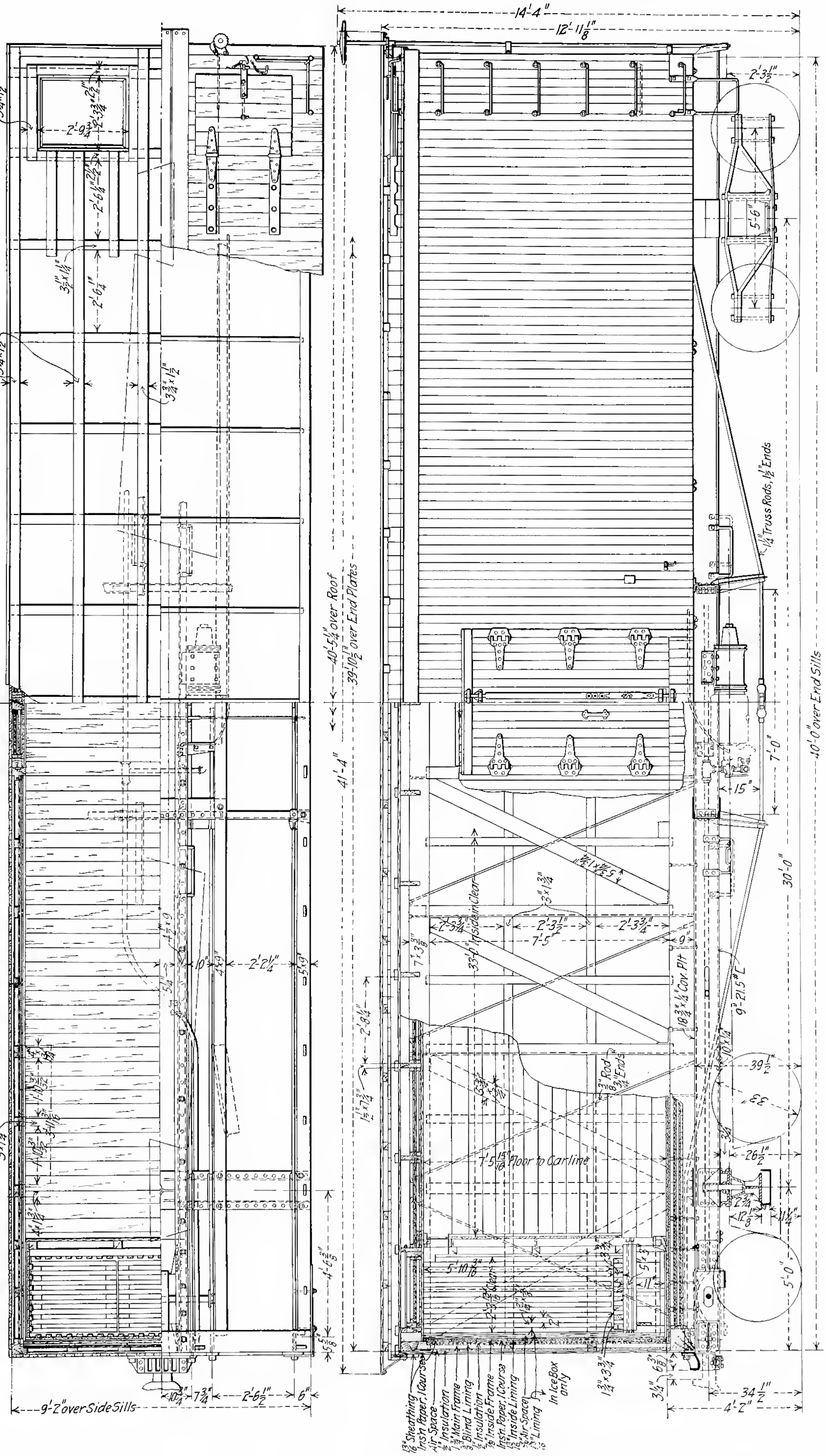


Fig. 373—Frisco Refrigerator Line Wooden 30-Ton Capacity Refrigerator Car with Steel Center Sills Shown in Figs. 111 and 371. Builder, American Car & Foundry Company.

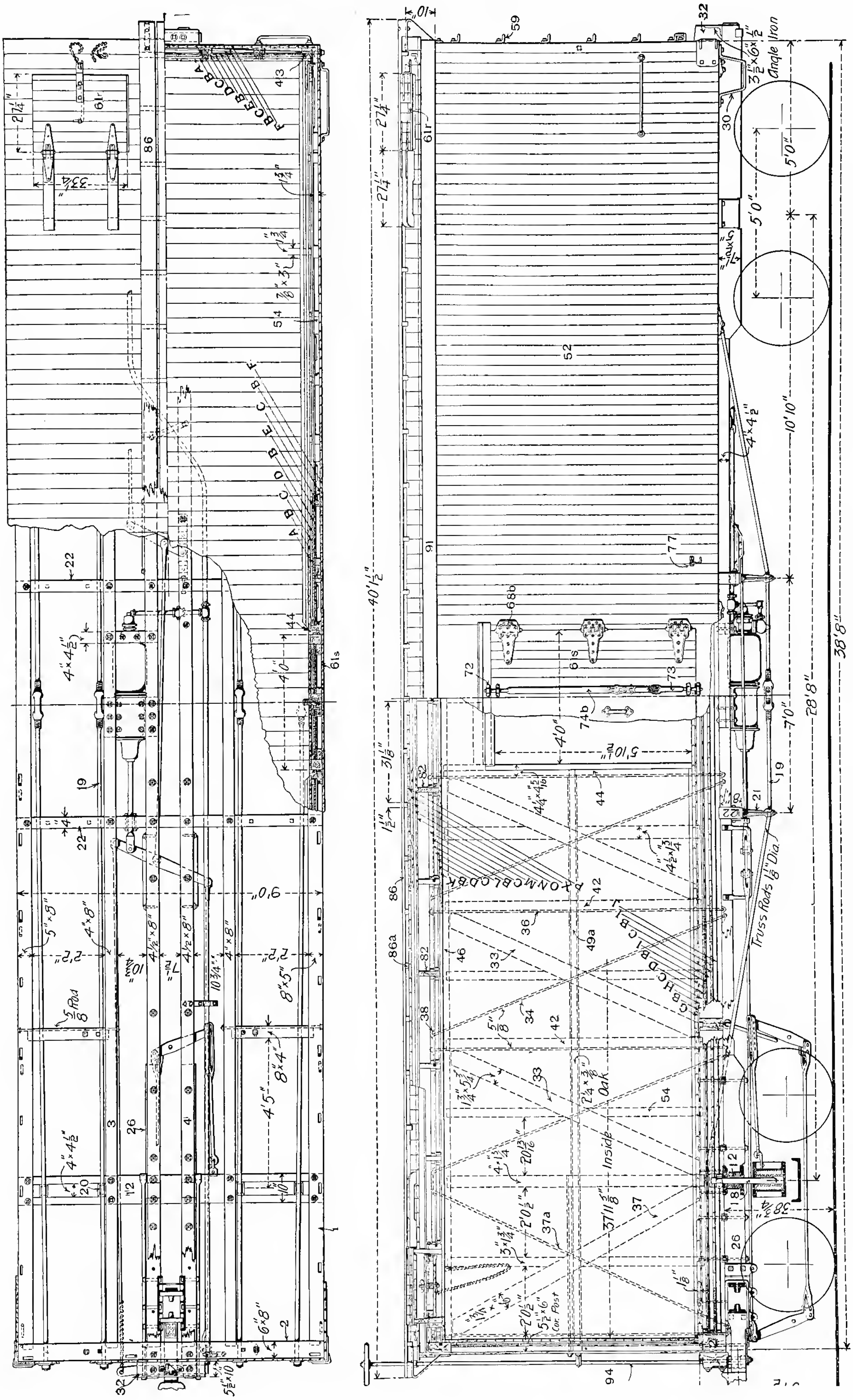


Fig. 374—Illinois Central Wooden 30-Ton Capacity Refrigerator Car. See also Fig. 375; also Page 361 for Names of Numbered Parts.

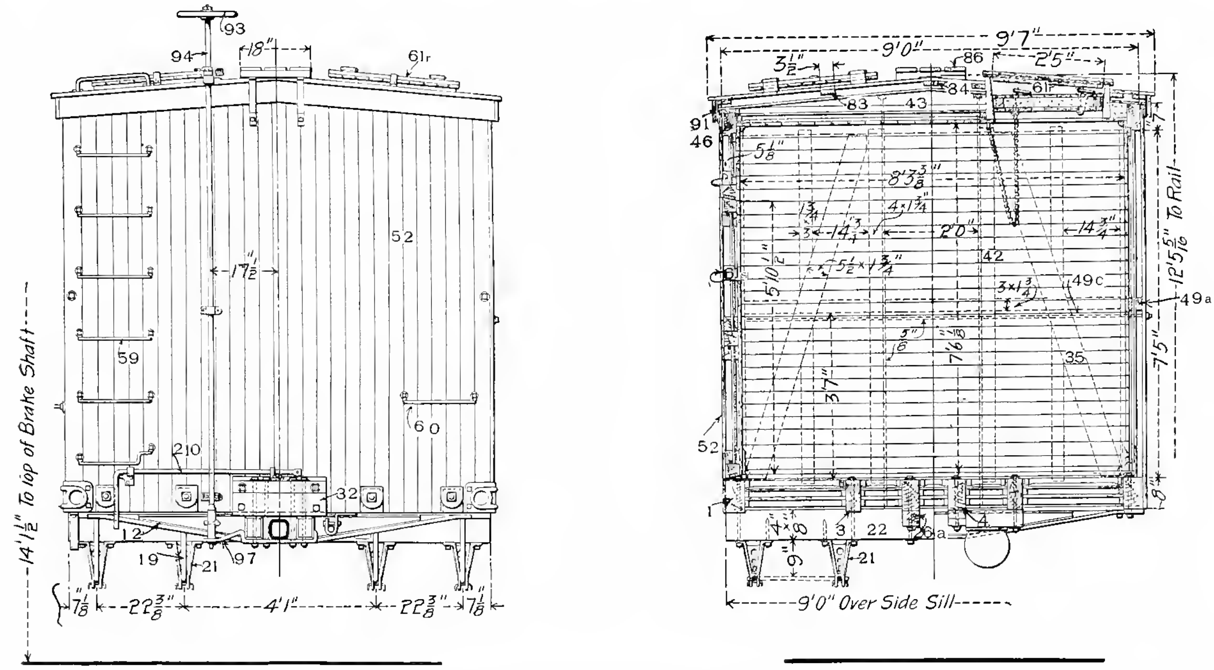


Fig. 375—End Elevation and Cross Sections of Illinois Central Wooden Refrigerator Car Shown in Fig. 374. Names of Numbered Parts are Given Below.

Refrigerator Car Parts. See Figs. 374 and 375.

1 *Side Sill*
2 *End Sill*
3 *Intermediate Sill*
4 *Center Sill*
12 *Body Bolster*
18 *King Bolt or Center Pin*
19 *Body Truss Rod*
20 *Body Truss Rod Saddle*
21 *Queen Post*
22 *Needlebeam*
26 *Draft Timber or Sill*
26*a* *Sub-sill*
30 *Sill Step*
32 *Buffer Block or Dead Wood*
33 *Side Brace*
34 *Brace Rod*
35 *End Brace*
37 *Side Brace*
37*a* *Brace Rod*
38 *Brace Rod Washer*
42 *Side Post*
43 *Corner Post*
44 *Door Post*
46 *Side Plate*
48 *End Plate*
49*a* *Belt Rail*
49*c* *Belt Rail*
52 *Sheathing. Same as* **F**
54 *Lining Stud*
59 *Ladder Round*
60 *Hand Hold or Grab Iron*
61*r* *Roof or Icing Door*
61*s* *Side Door*
68*b* *Door Hinge*
72 *Door Bolt Bracket*
73 *Door Hasp*
74*b* *Door Bolt or Bar*
77 *Door Hook*
82 *Carline*
83 *Purlin. Same as* **X**
84 *Ridge Pole*
86 *Running Board*
86*a* *Running Board Saddle*
91 *Fascia Board*
93 *Brake Wheel*
94 *Brake Shaft*
97 *Lower Brake Shaft Bearing*
210 *Uncoupling Rod*
A *Inside Lining*
B *Insulating Paper*
C *Air Space*
D *Insulation*
E *Blind Lining*
F *Outside Sheathing. Same as* **52**
G *Main Floor*
H *Sub-floor*
I *Blind Floor*
J *Nailing Strip*
K *Inside Ceiling*
L *Blind Ceiling*
M *Sub-roof*
N *Roofing Paper*
O *Sub-carline*
P *Main Roof*
X *Purlin. Same as* **83**

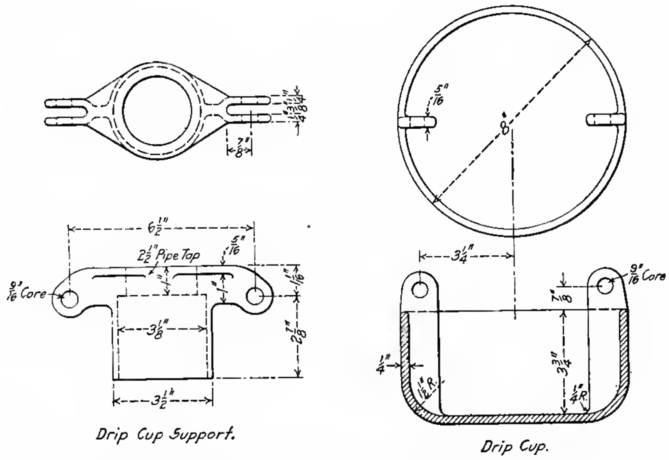


Fig. 376—Drip Cup and Support for Central of New Jersey Ice Car Shown in Figs. 377 and 379.

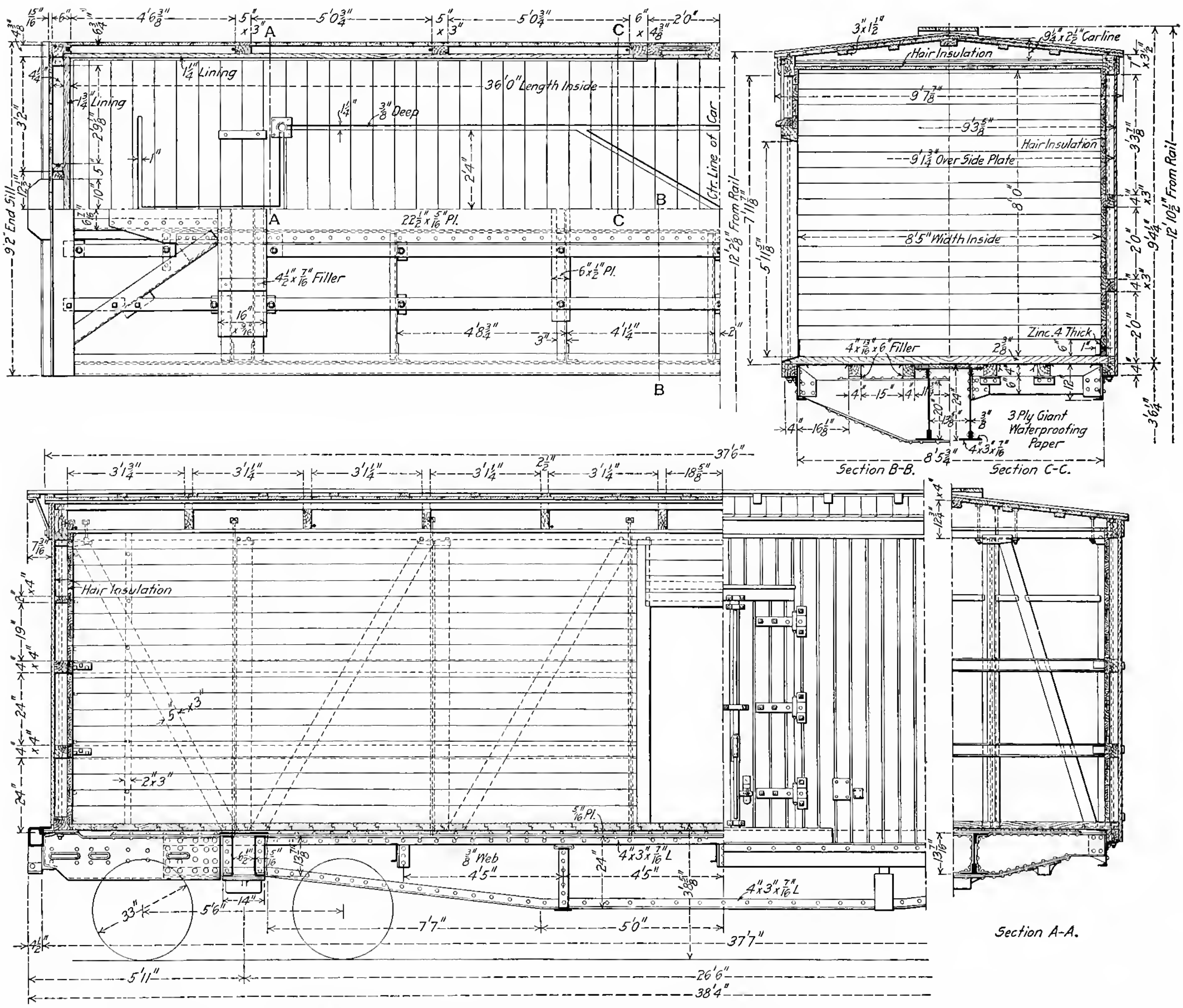


Fig. 377—Central of New Jersey Steel Underframe 40-Ton Capacity Car for Ice Transportation. See also Figs. 376 and 379.

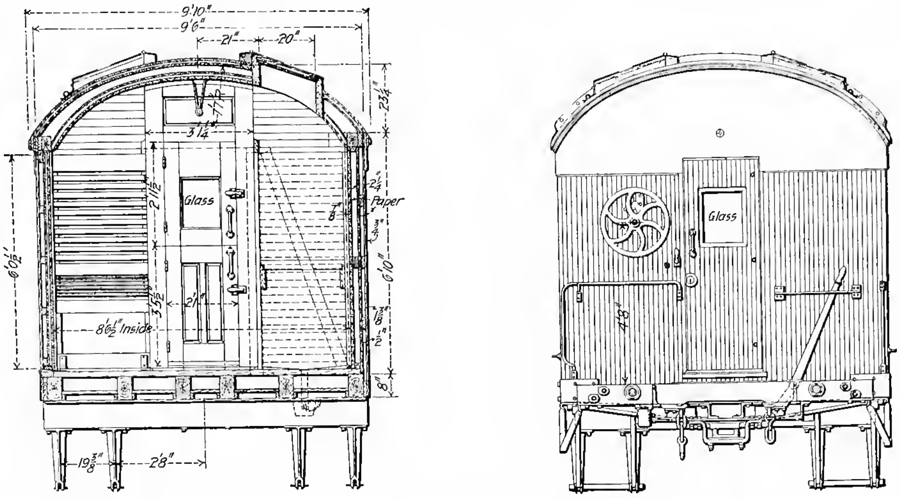


Fig. 378—Cross Sections and End Elevation of Lehigh Valley Wooden Car for Milk Transportation Shown in Fig. 381.

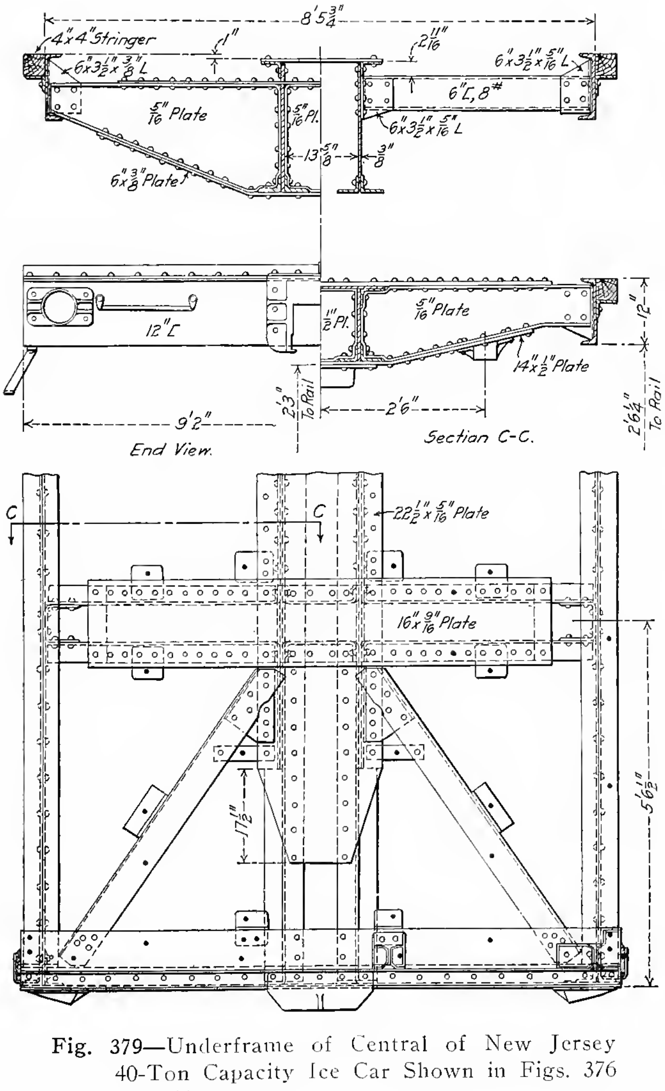


Fig. 379—Underframe of Central of New Jersey 40-Ton Capacity Ice Car Shown in Figs. 376 and 377.

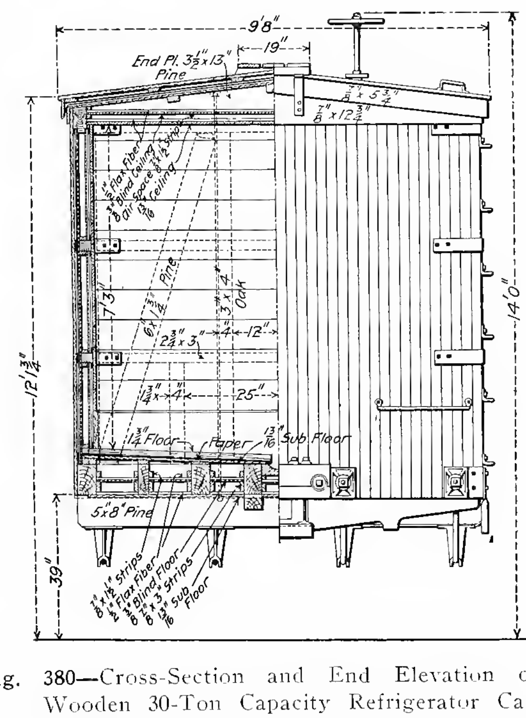


Fig. 380—Cross-Section and End Elevation of Wooden 30-Ton Capacity Refrigerator Car. Builder, Milwaukee Refrigerator Transit & Car Company.

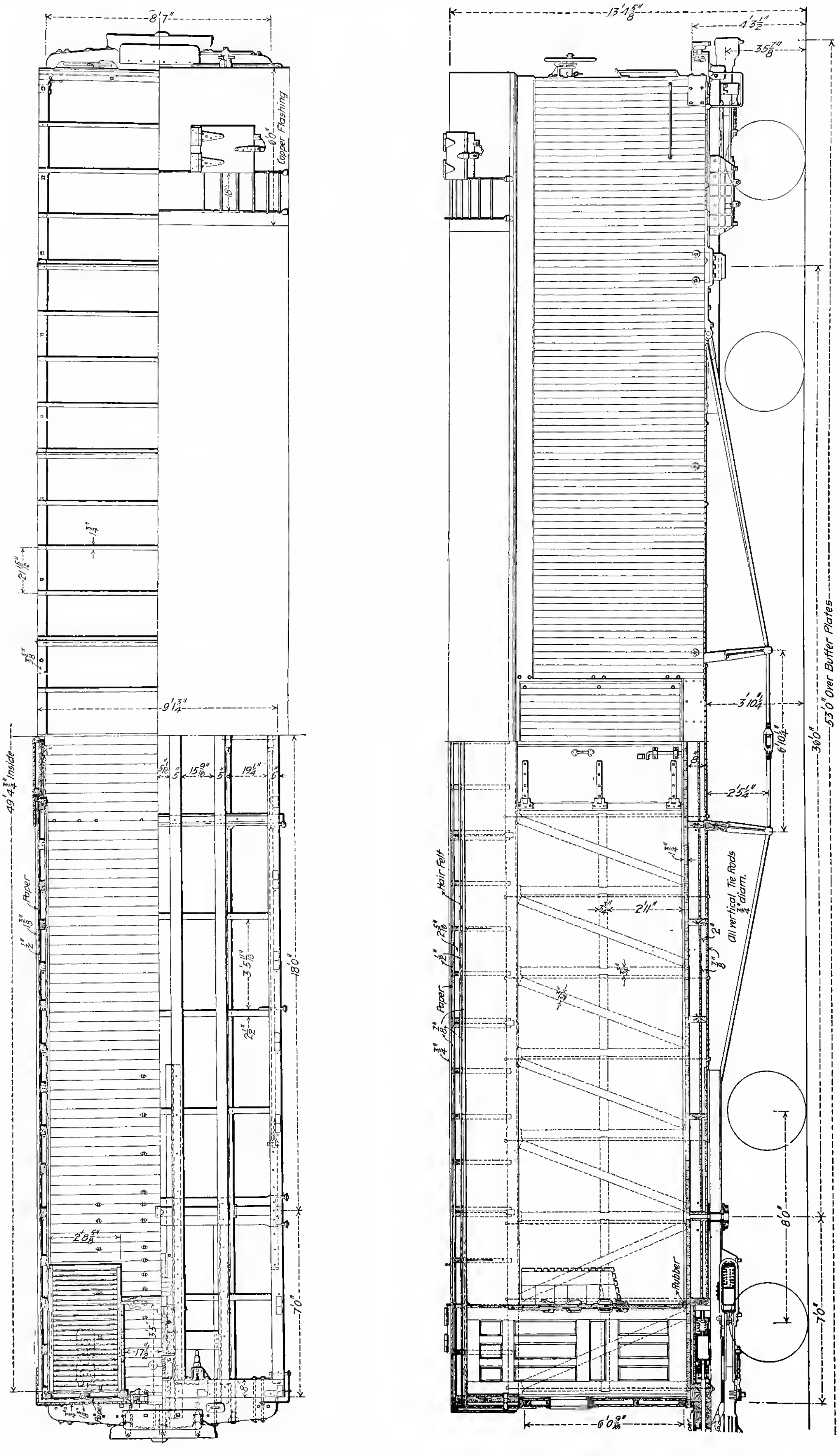


Fig. 381—Lehigh Valley Wooden Car for Milk Transportation. See also Fig. 378.

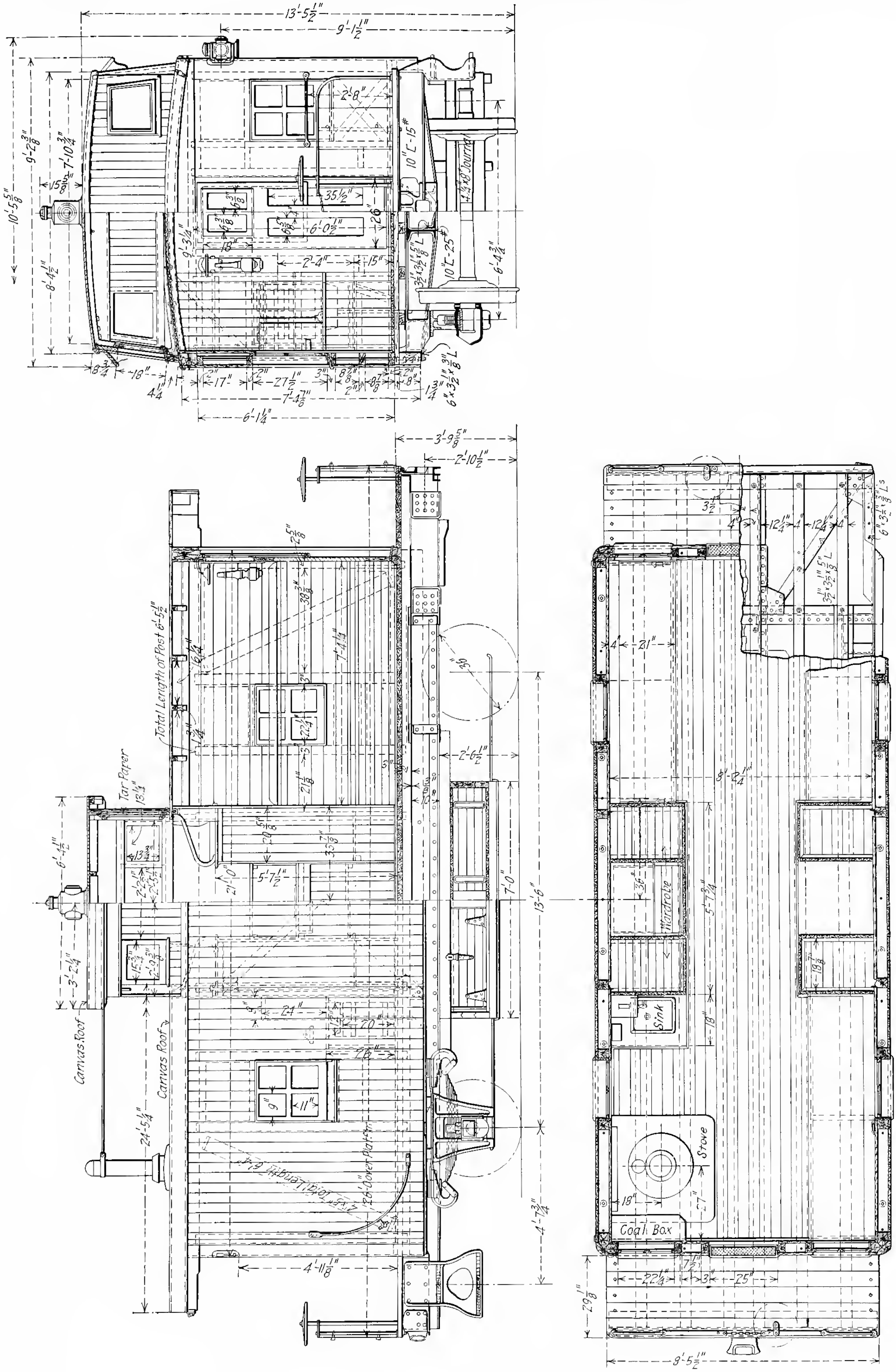


Fig. 382—Pennsylvania Railroad Steel Underframe 4-Wheel Caboose or Cabin Car Shown in Fig. 120.

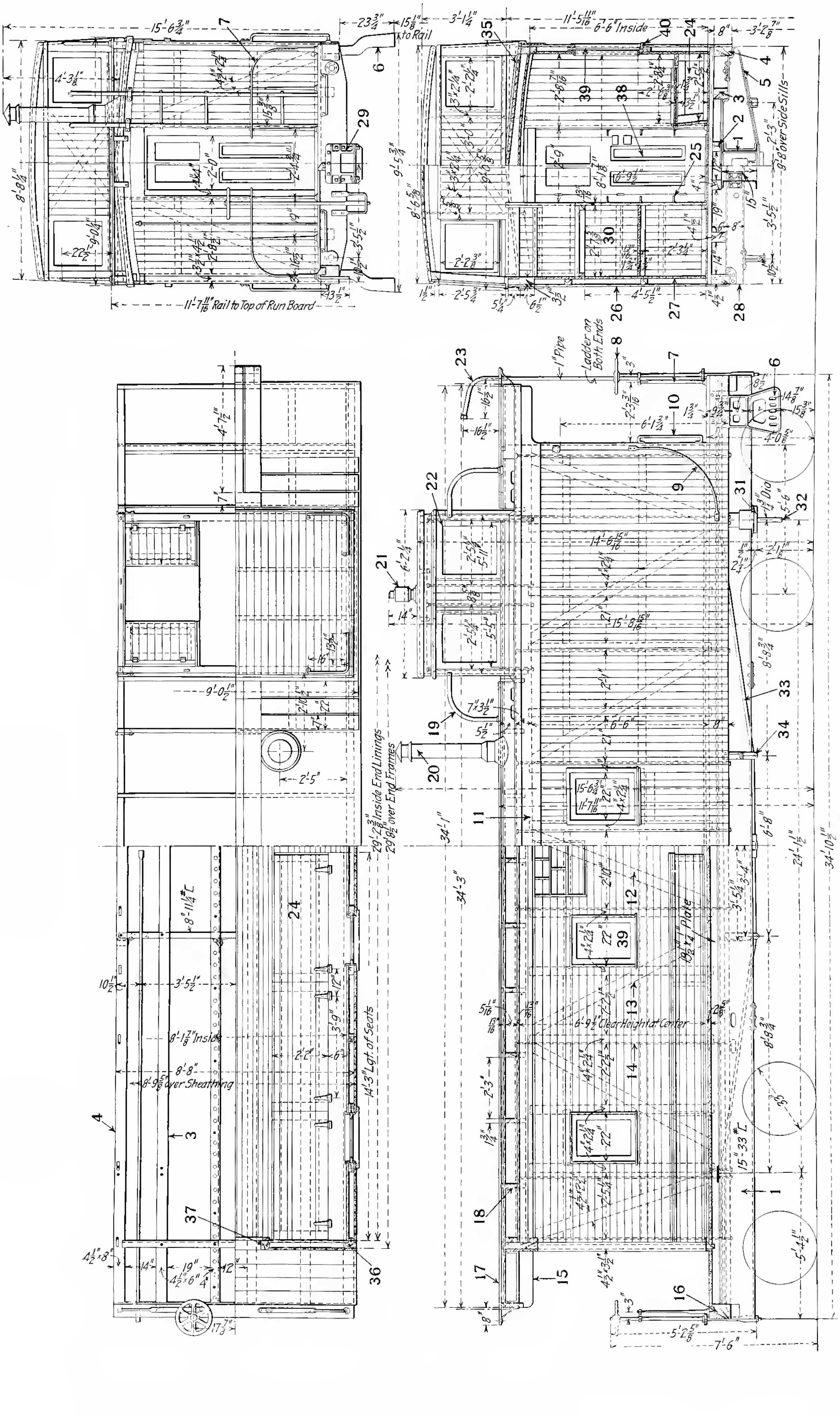


Fig. 383—Missouri Pacific Steel Underframe 8-Wheel Caboose Shown in Figs. 123-125. Builder, American Car & Foundry Company.

See Page 367 for Names of Numbered Parts.

See Page 367 for Names of Numbered Parts.

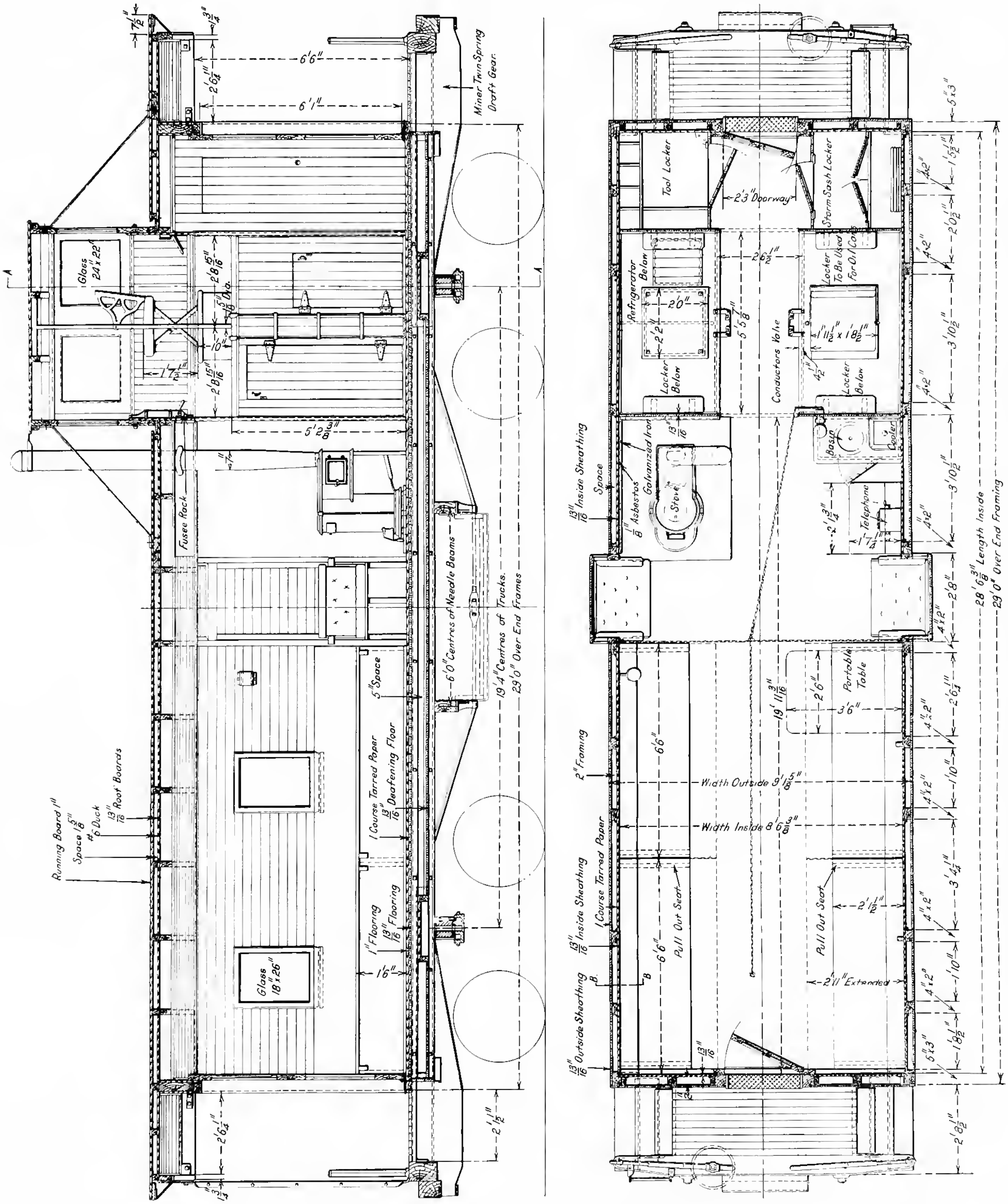


Fig. 384—Canadian Pacific 8-Wheel Caboose with Steel Center and Draft Sills. See also Fig. 385.

Parts of Caboose or Cabin Cars. See Fig. 383.

1 *Center Sill*
2 *Center Nailing Sill*
3 *Intermediate Sill*
4 *Side Sill*
5 *Body Bolster*
6 *Side Step*
7 *Platform Railing*
8 *Brake Wheel*
9 *Side Grab Iron*
10 *End Grab Iron*
11 *Side Fascia*
12 *Side Brace*
13 *Side Brace*
14 *Sill and Plate Tie Rod*
15 *Side Plate*
16 *Platform End Sill*
17 *Running Board*
18 *Carline*
19 *Cupola Hand Rail*
20 *Smoke Jack*
21 *Cupola Signal Lamp*
22 *Cupola*
23 *End Ladder*
24 *Bunk or Seat*
25 *Cupola Inside Step*
26 *Sheathing*
27 *Lining*
28 *Cross Tie or Needlebeam*
29 *Striking Casting*
30 *Cupboard*
31 *Center Plate*
32 *Center Pin*
33 *Truss Rod*
34 *Truss Rod Strut or Queen Post*
35 *Main Roof*
36 *Corner Post*
37 *End or Door Post*
38 *End Door*
39 *Side Window*
40 *Window Sill*

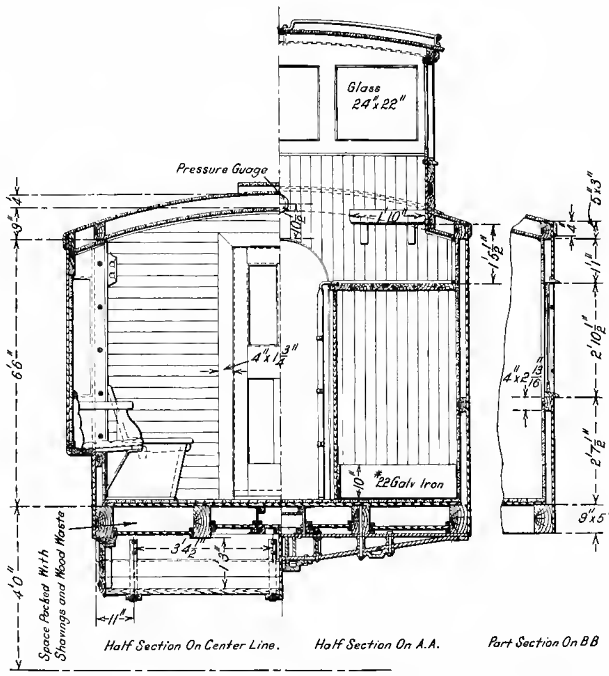


Fig. 385—Cross Sections of Canadian Pacific Caboose Shown in Fig. 384.

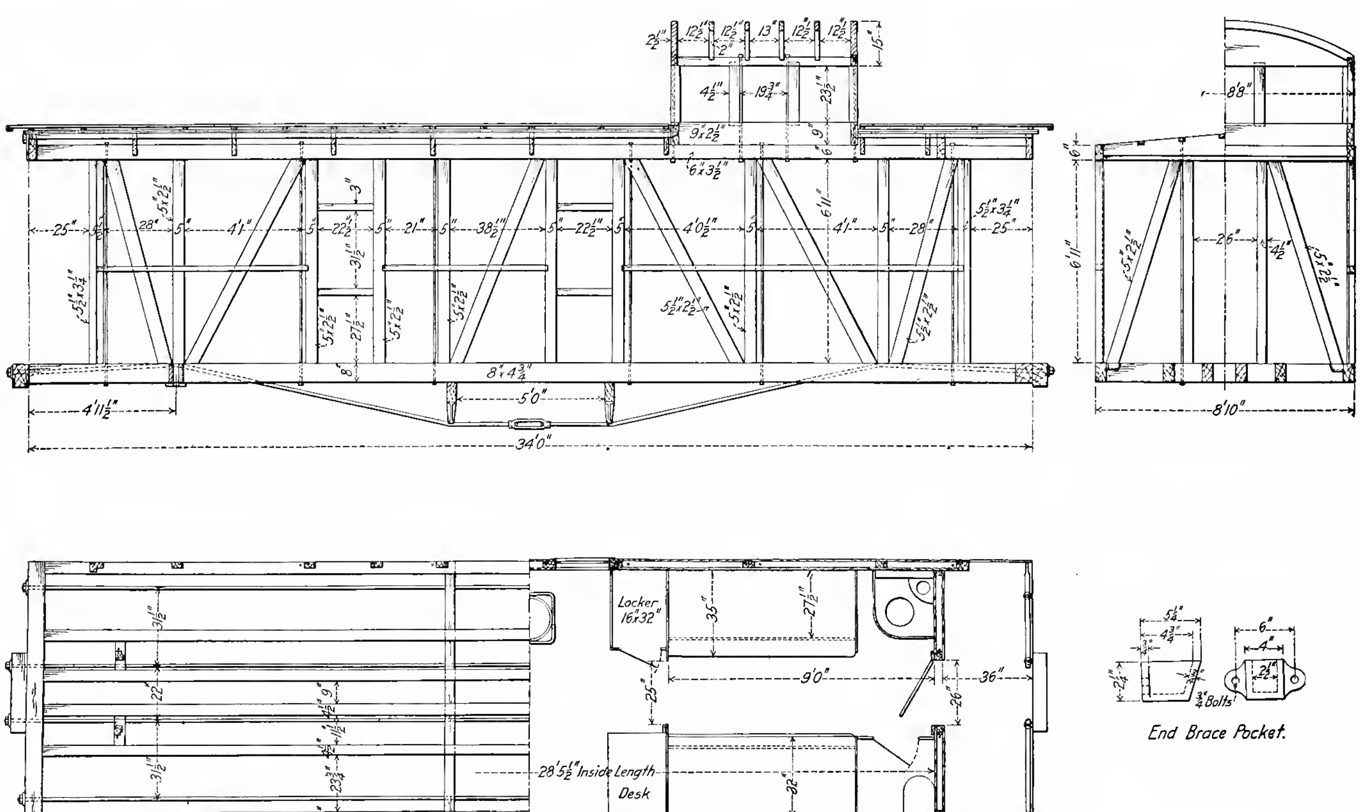


Fig. 386—Wabash Caboose Reconstructed from a Box Car.

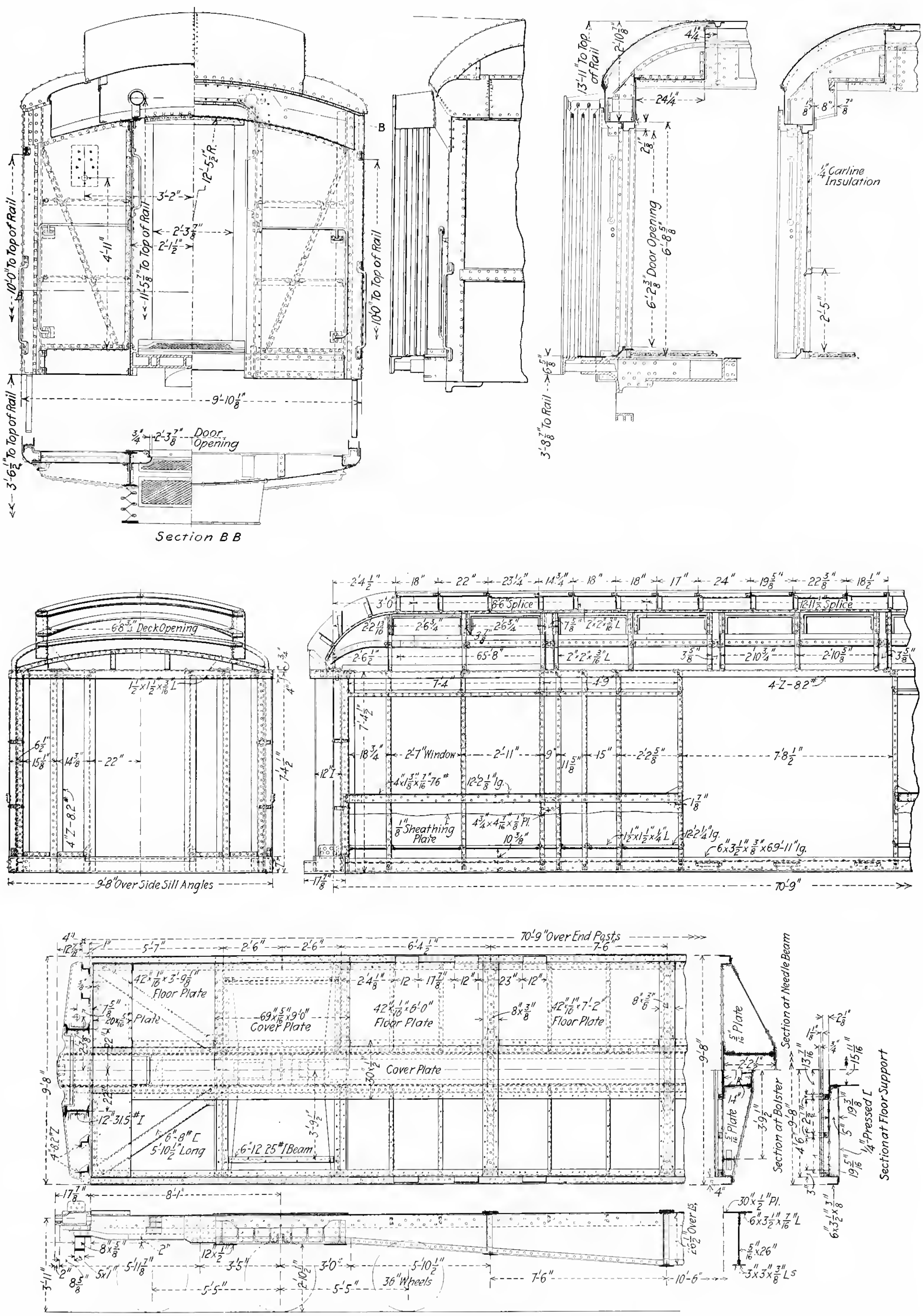


Fig. 387—Baltimore & Ohio Steel Baggage Car Shown in Figs. 126 and 127. Builder, The Barney & Smith Car Company.

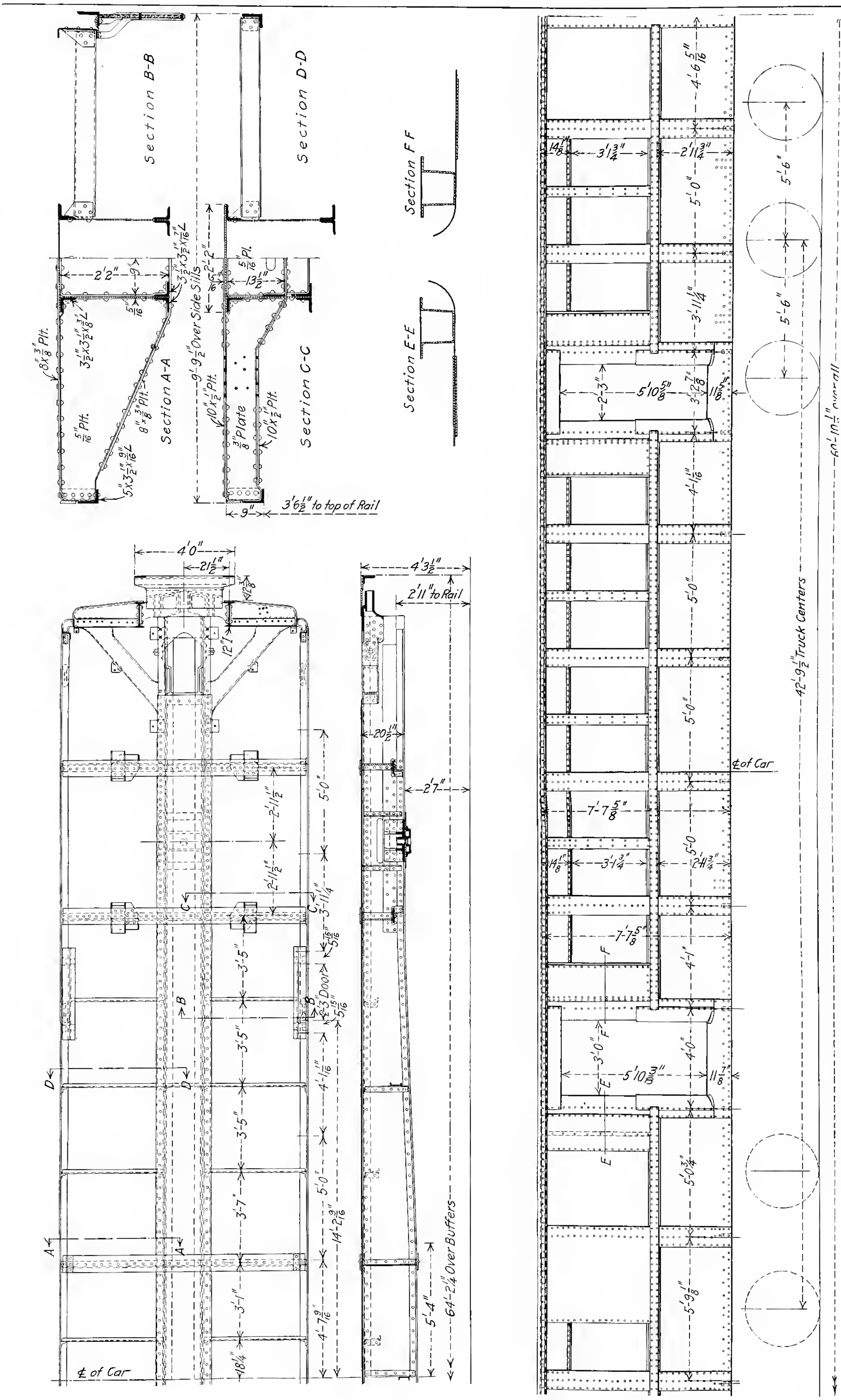


Fig. 388—Chesapeake & Ohio Steel Postal Car Shown in Figs. 137, 389 and 390. Builder, Pressed Steel Car Company.

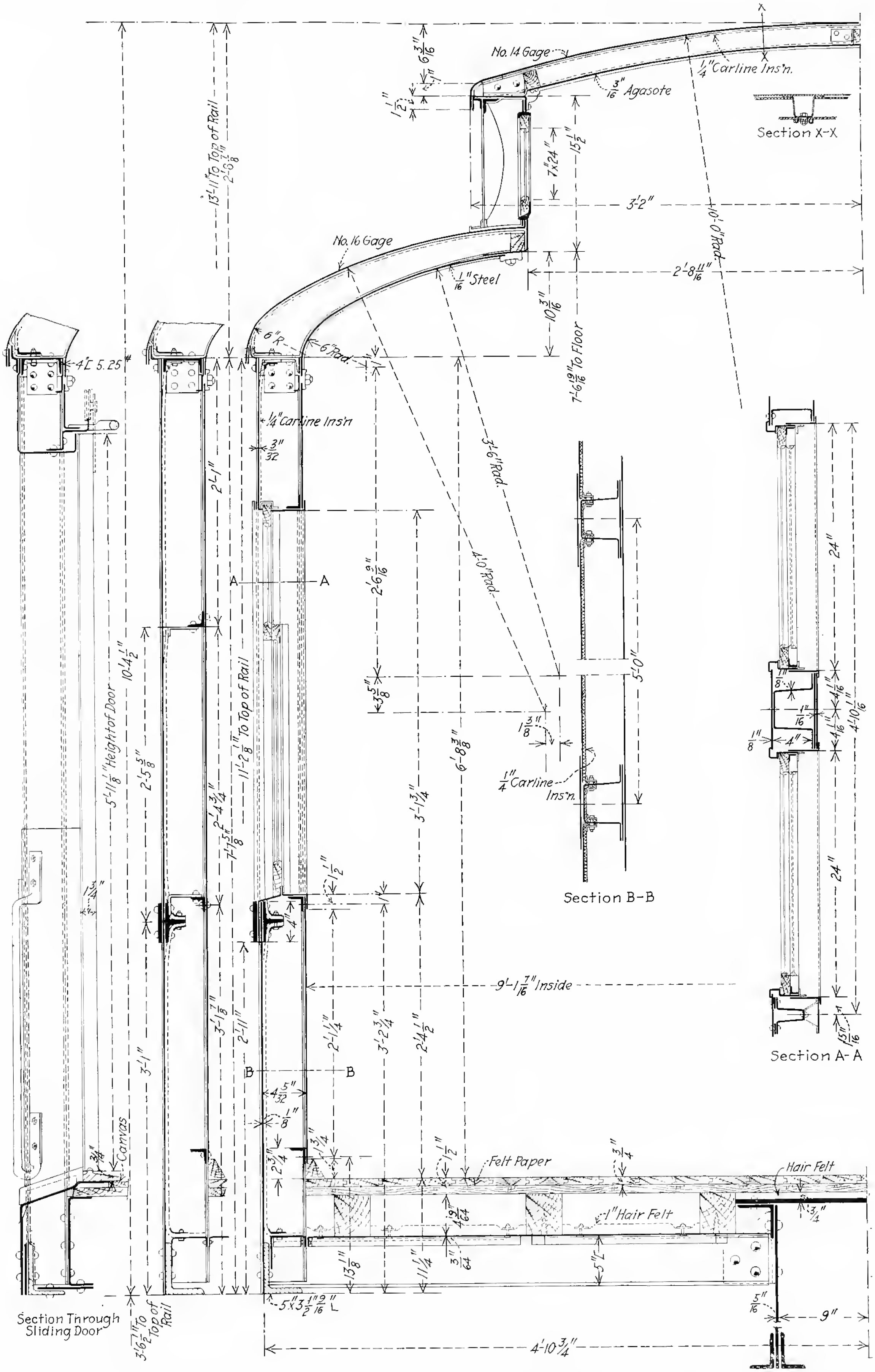


Fig. 389—Cross Sections of Chesapeake & Ohio Steel Postal Car Shown in Figs. 137, 388 and 390.

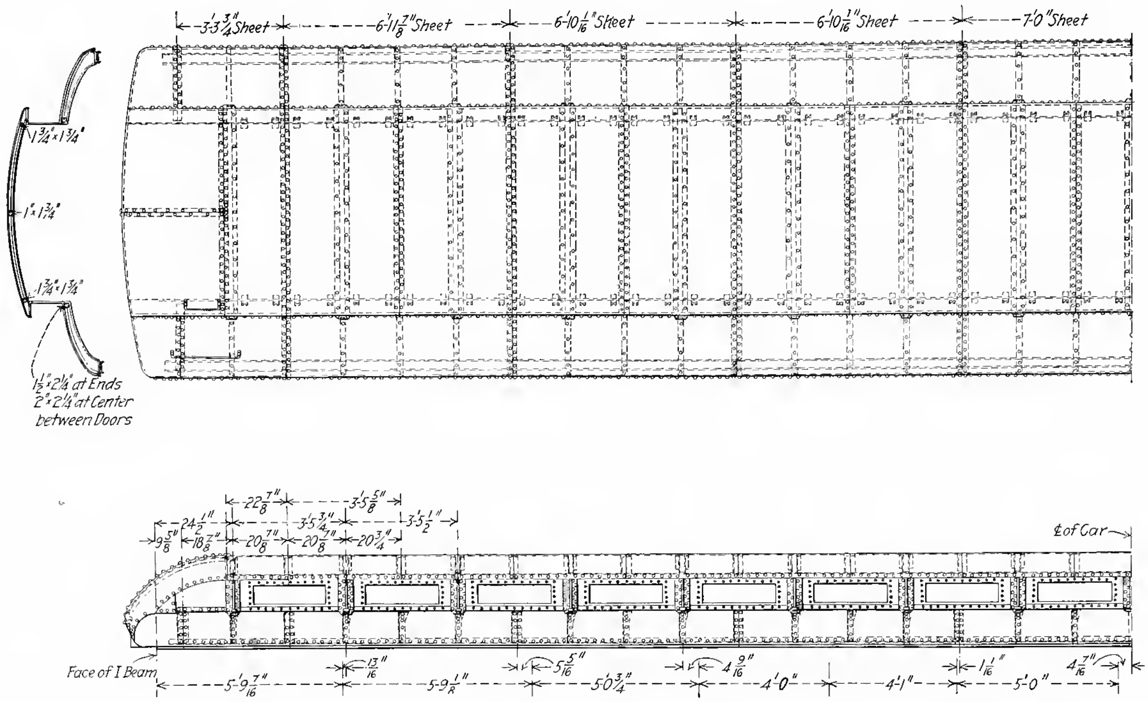


Fig. 390—Roof Construction of Chesapeake & Ohio Steel Postal Car Shown in Figs. 137, 388 and 389.

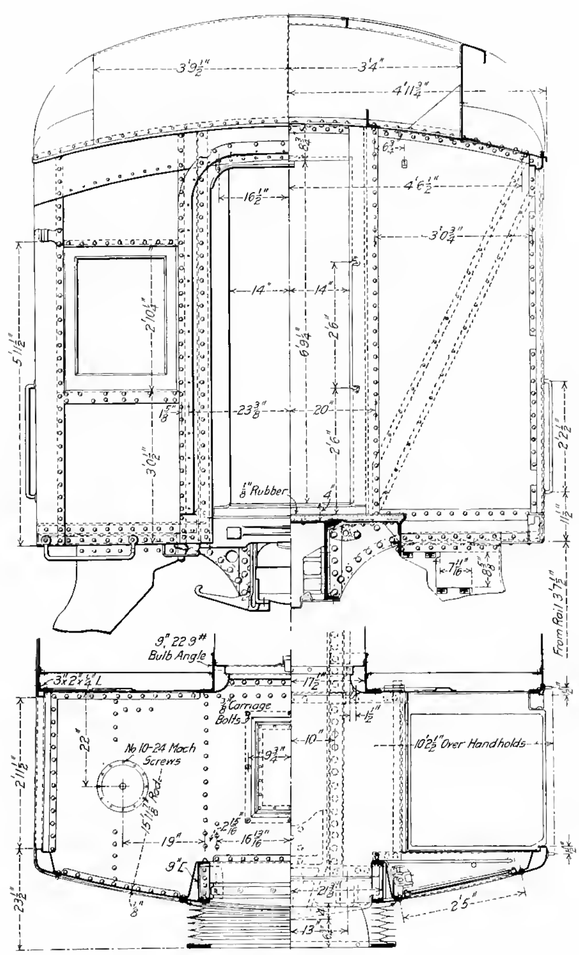


Fig. 391—End Construction Used on Pennsylvania Railroad Steel Passenger Train Cars, Classes P70 and PB70.

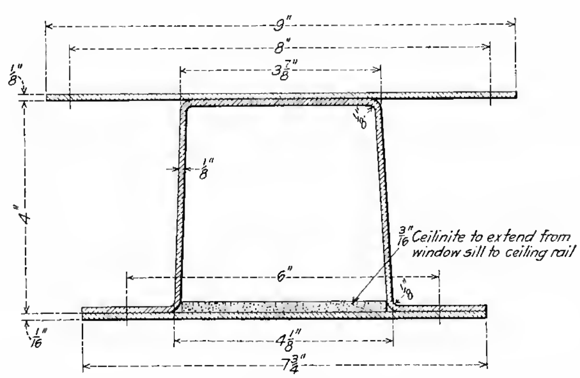


Fig. 392—Section Through Side Post of Pennsylvania Railroad Steel Passenger Train Cars, Classes P70 and MP58.

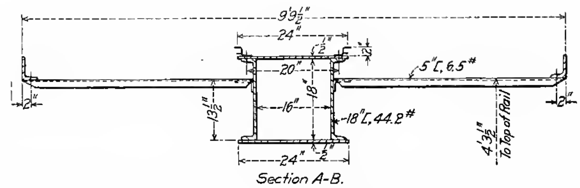


Fig. 393—Cross Section of Pennsylvania Railroad Steel Underframe for Passenger Train Cars Shown in Fig. 396.

See Note at Bottom of Page 373.

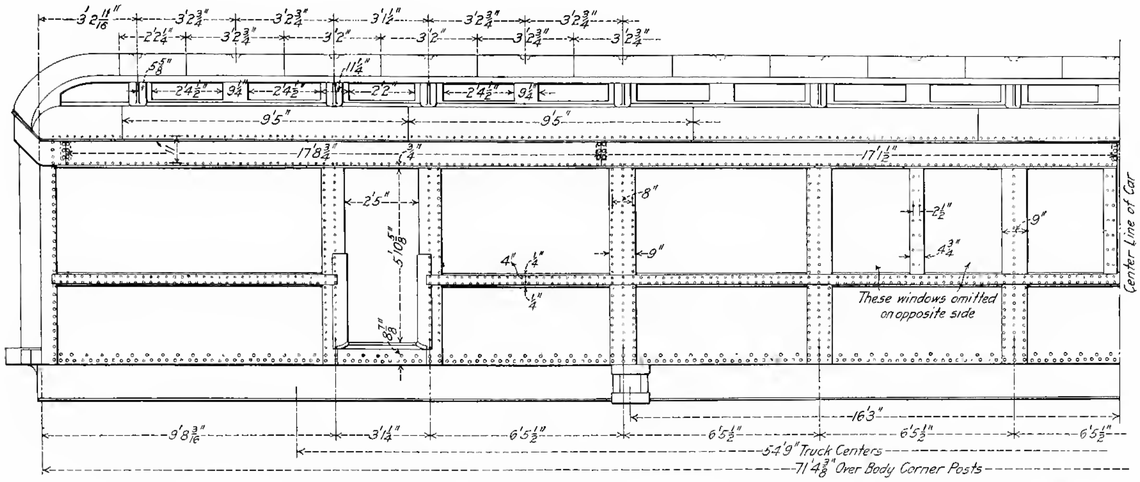


Fig. 394—Side Construction of Pennsylvania Railroad Steel Passenger Train Cars, Class M70.

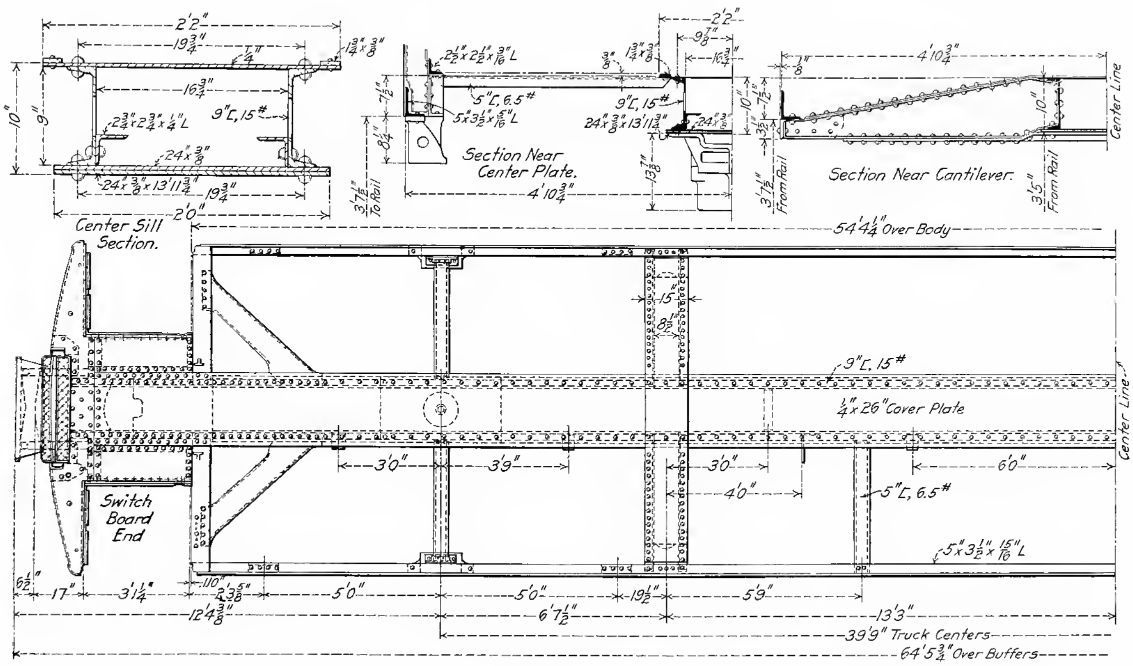


Fig. 395—Underframe of Pennsylvania Railroad Steel Passenger Train Cars, Classes MP54 and MPB54.

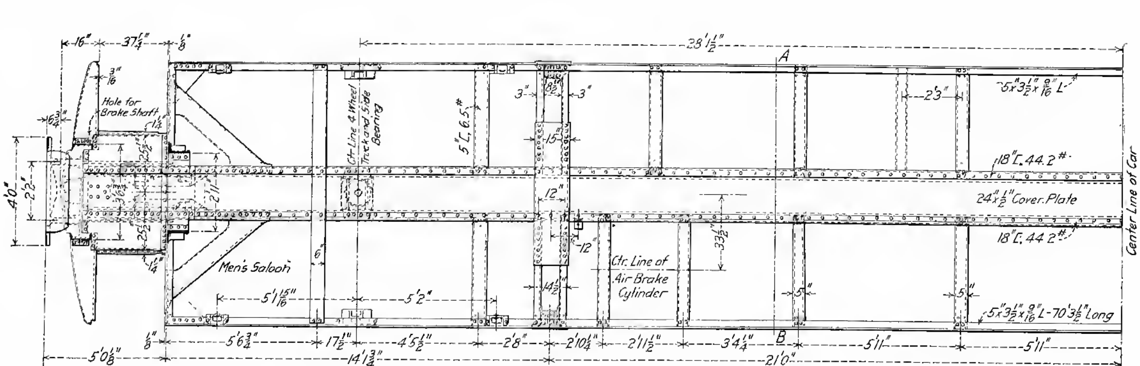


Fig. 396—Underframe of Pennsylvania Railroad Steel Passenger Train Cars, Class P70. See Fig. 393 for Cross Section.

Note:—Figs. 391-400 Cover General Design of All Pennsylvania Railroad Steel Passenger Train Cars. See also Fig. 142 for Day Coach and Fig. 158 for Dining Car.

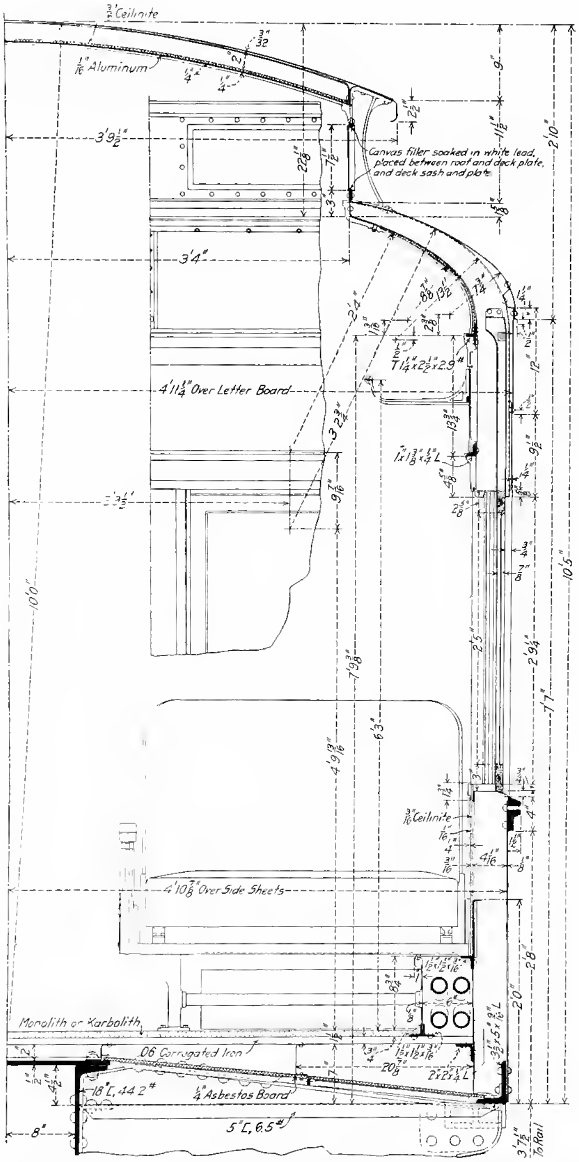


Fig. 397—Cross Section of Pennsylvania Railroad Steel Day Coach and Combination Cars, Classes P70 and PB70. Section Through Windows Shown in Fig. 400.

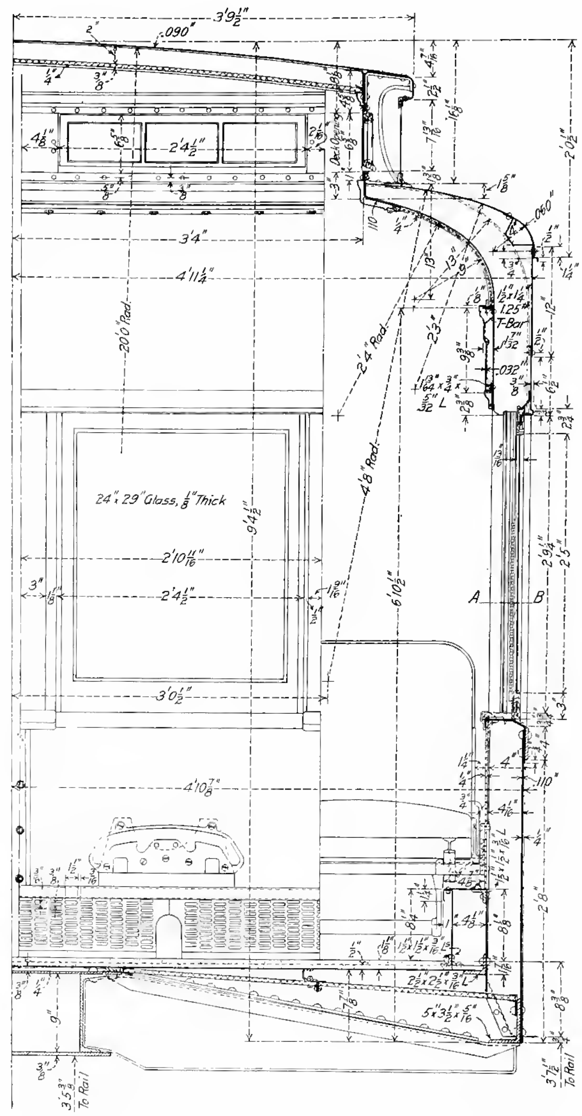


Fig. 398—Cross Section of Pennsylvania Railroad Steel Combination Cars, Classes MP54 and MPB54. See Fig. 399 for Section AB.

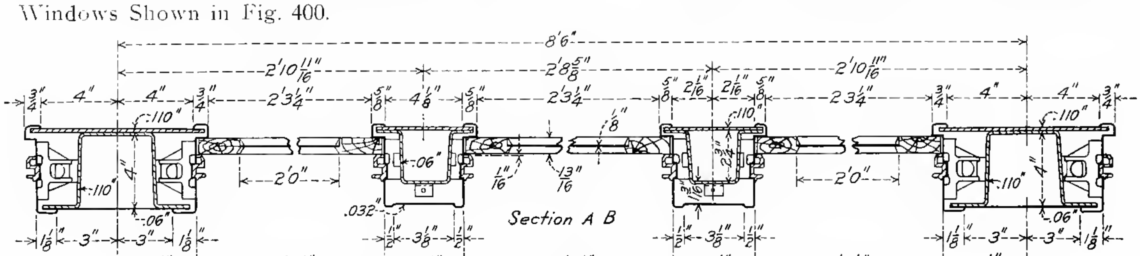


Fig. 399—Section Through Windows at AB in Fig. 398.

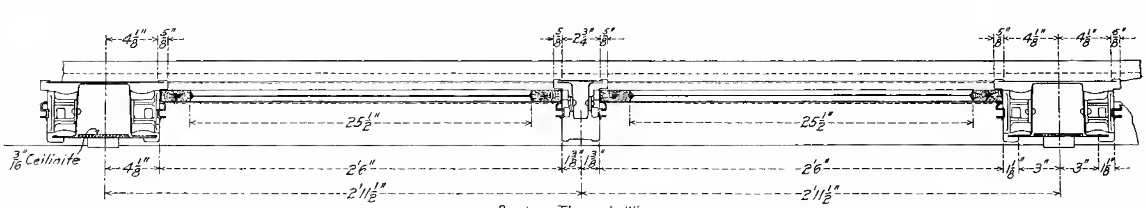


Fig. 400—Section Through Windows in Fig. 397.

See Note at Bottom of Page 373.

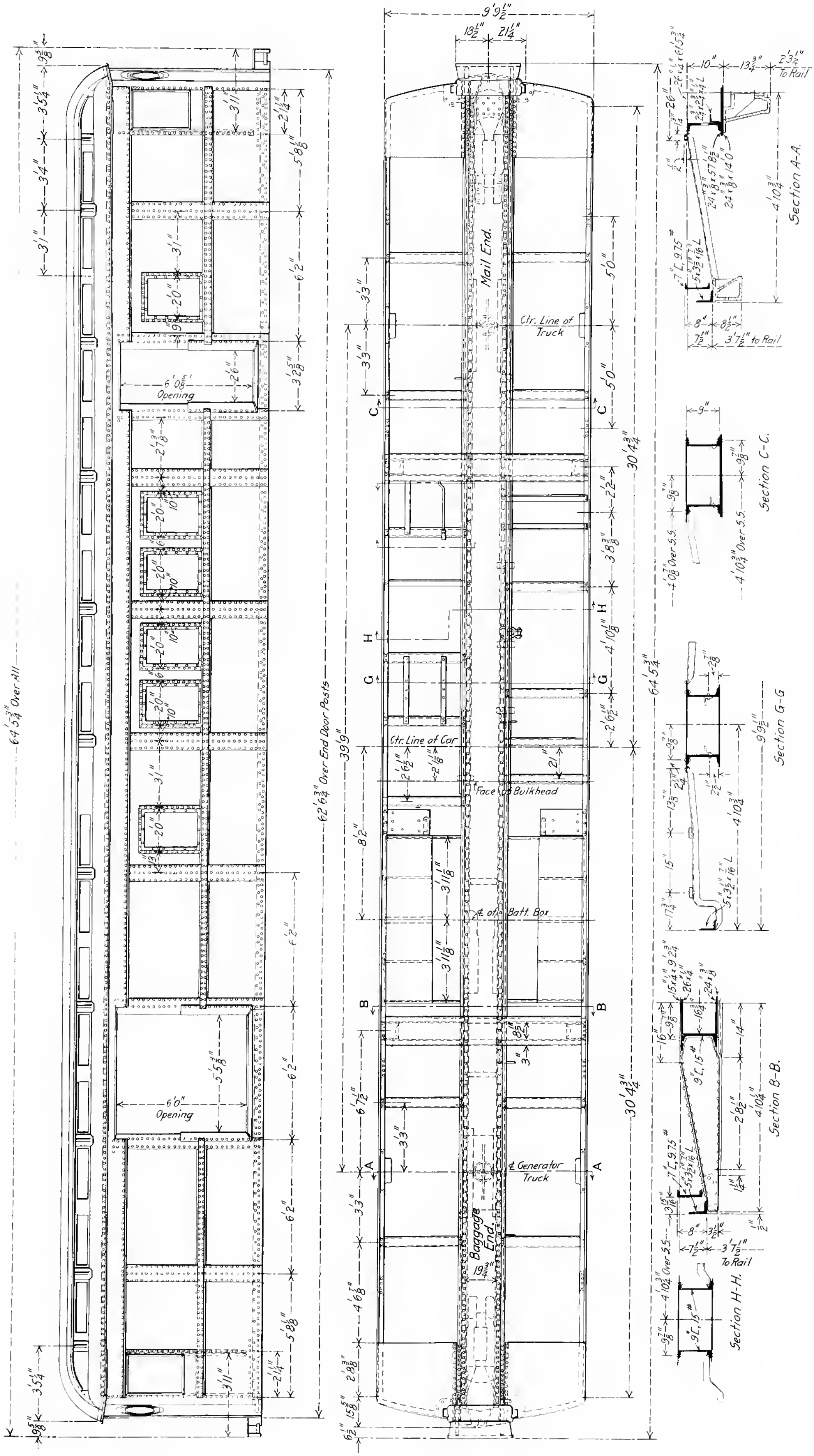


Fig. 401—Long Island Steel Postal and Express Car Shown in Fig. 141. Builder, American Car & Foundry Company.

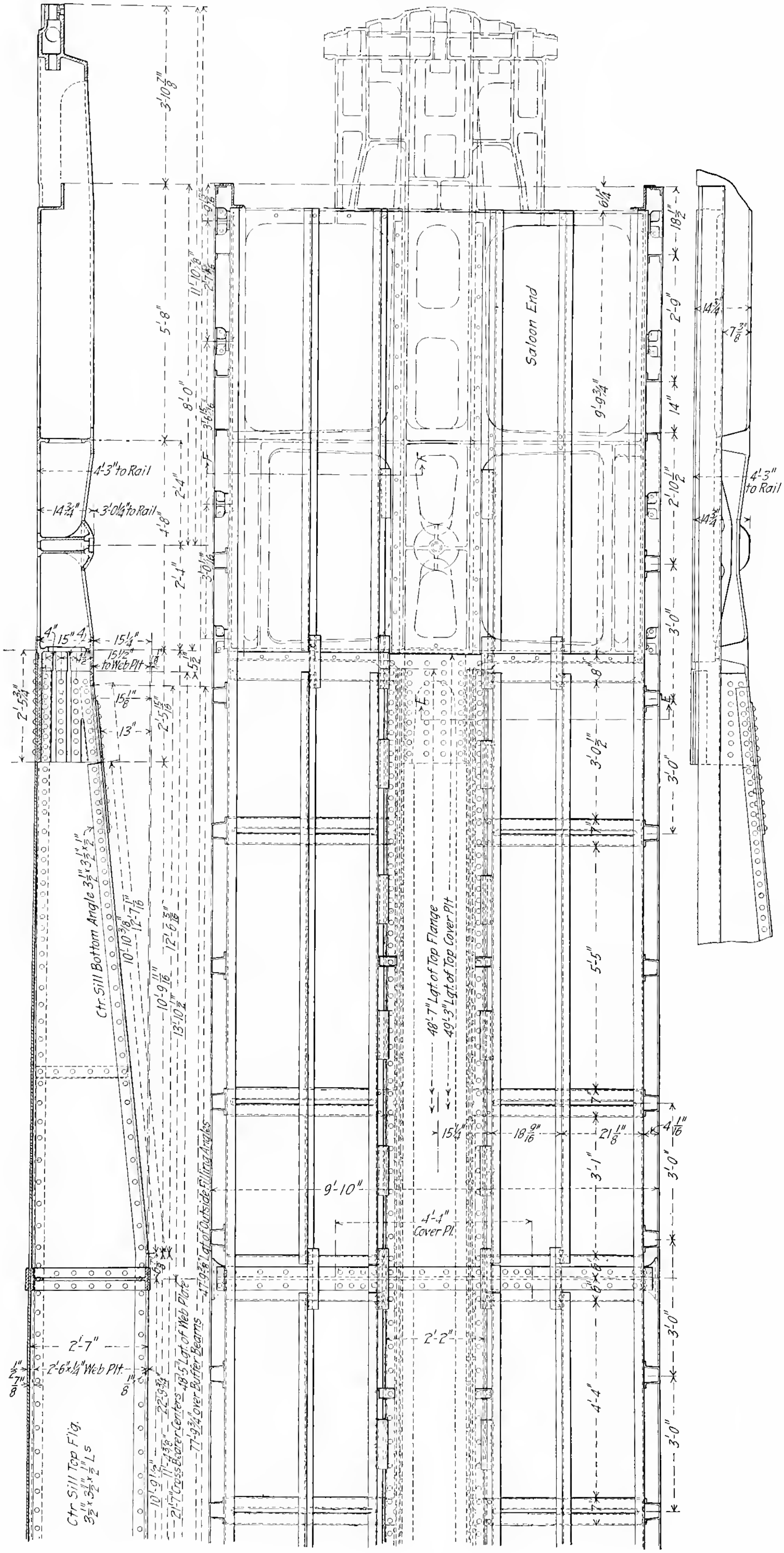


Fig. 402—Underframe of Lake Shore & Michigan Southern Steel Day Coach Shown in Figs. 145, 403, 404 and 405. Builder, American Car & Foundry Company.

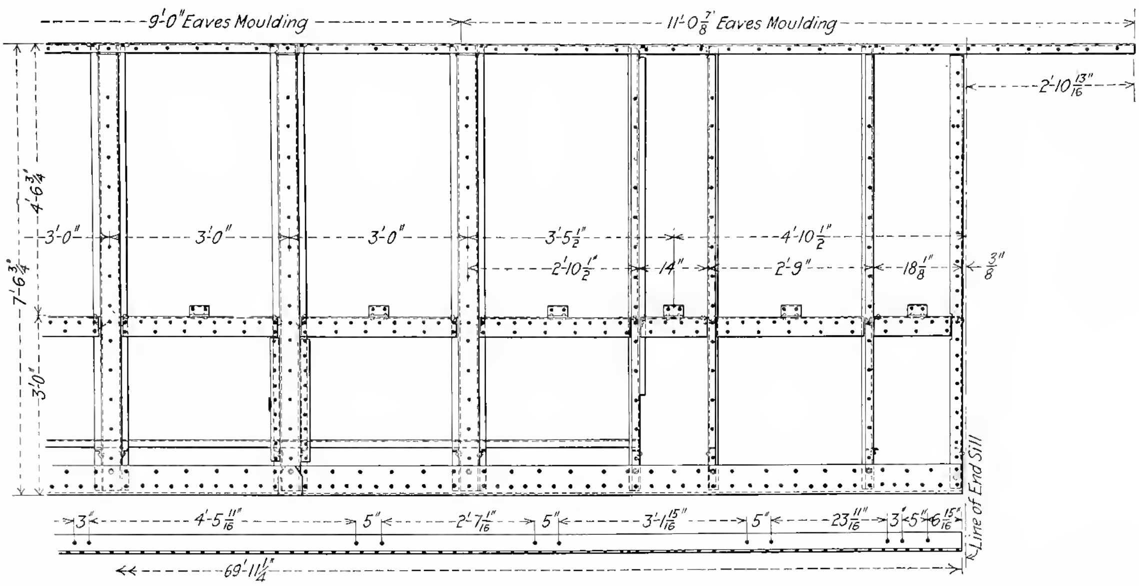


Fig. 403—Side Framing of Lake Shore & Michigan Southern Steel Day Coach Shown in Figs. 145, 402, 404 and 405.

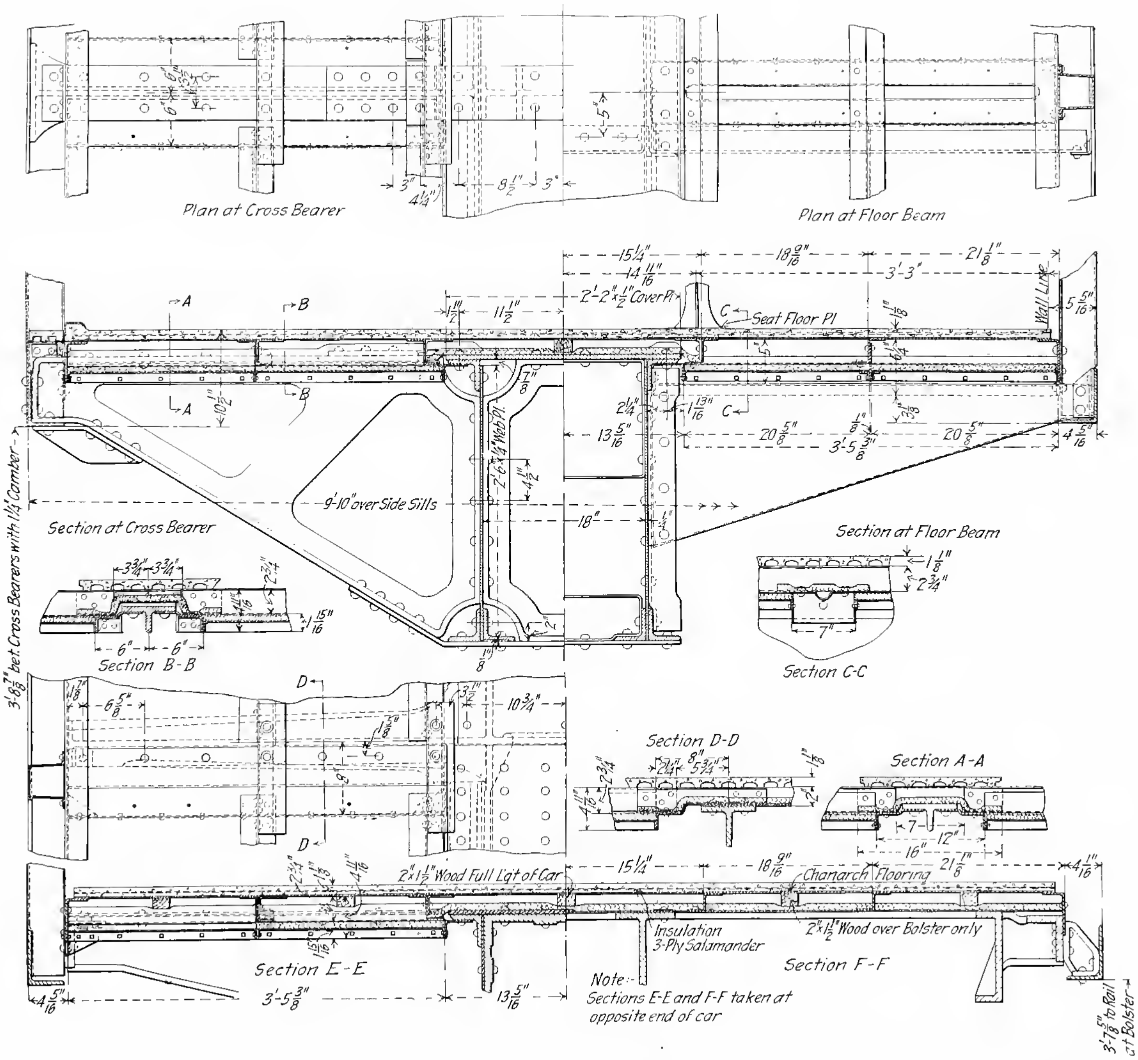


Fig. 404—Cross Sections of Underframe of Lake Shore & Michigan Southern Steel Day Coach Shown in Figs. 145, 402, 403 and 405. These Sections Refer to Fig. 402.

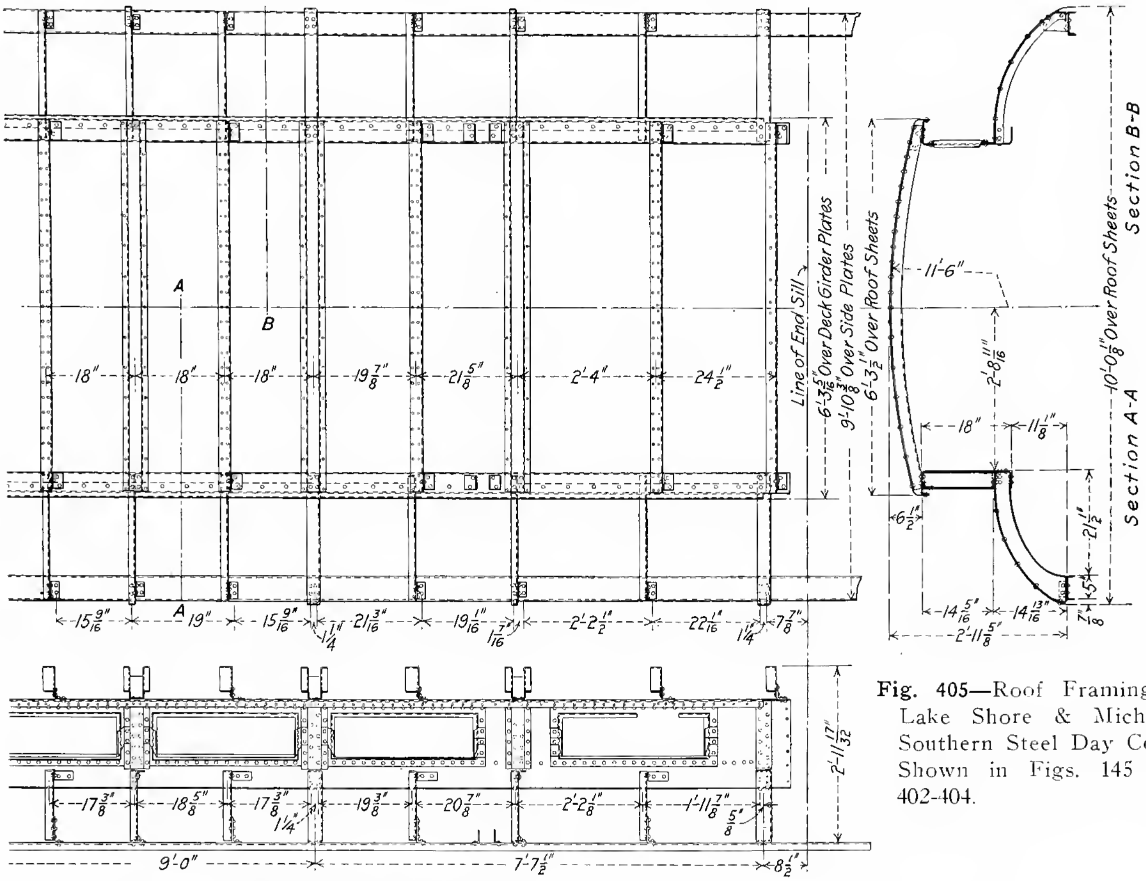


Fig. 405—Roof Framing of Lake Shore & Michigan Southern Steel Day Coach Shown in Figs. 145 and 402-404.

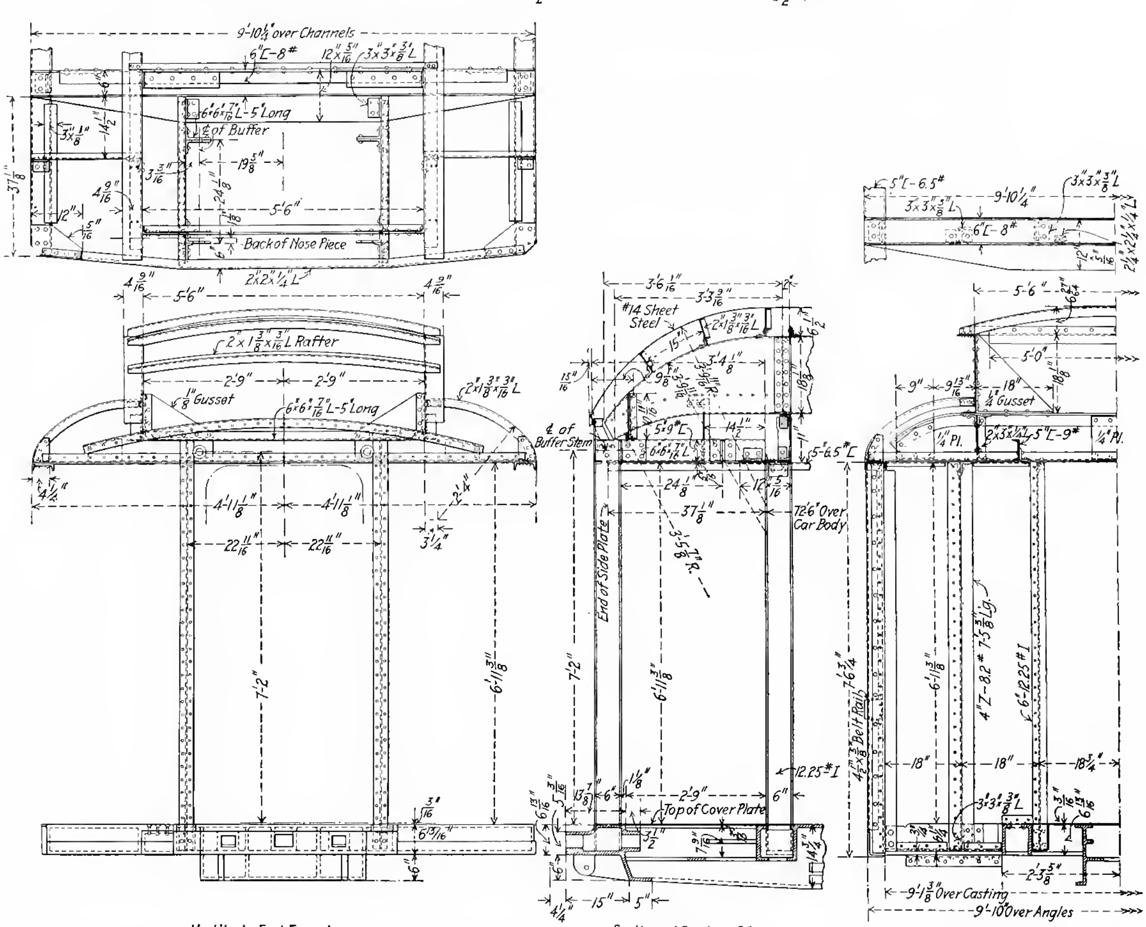


Fig. 406—End Construction of New York Central & Hudson River Steel Dining Car Shown in Figs. 162 and 407.

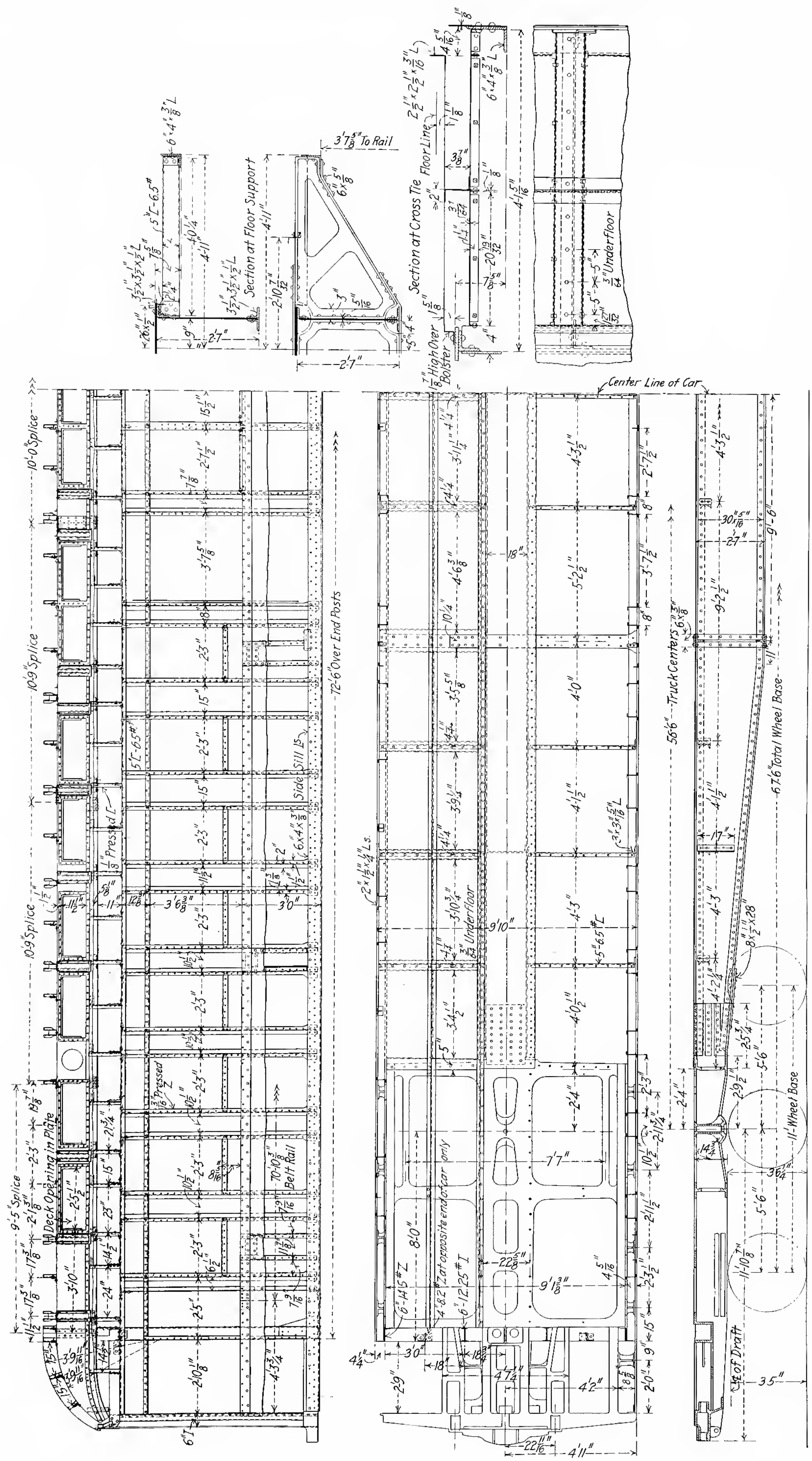


Fig. 407—New York Central & Hudson River Steel Dining Car Shown in Figs. 162 and 406. Builder, The Barney & Smith Car Company.

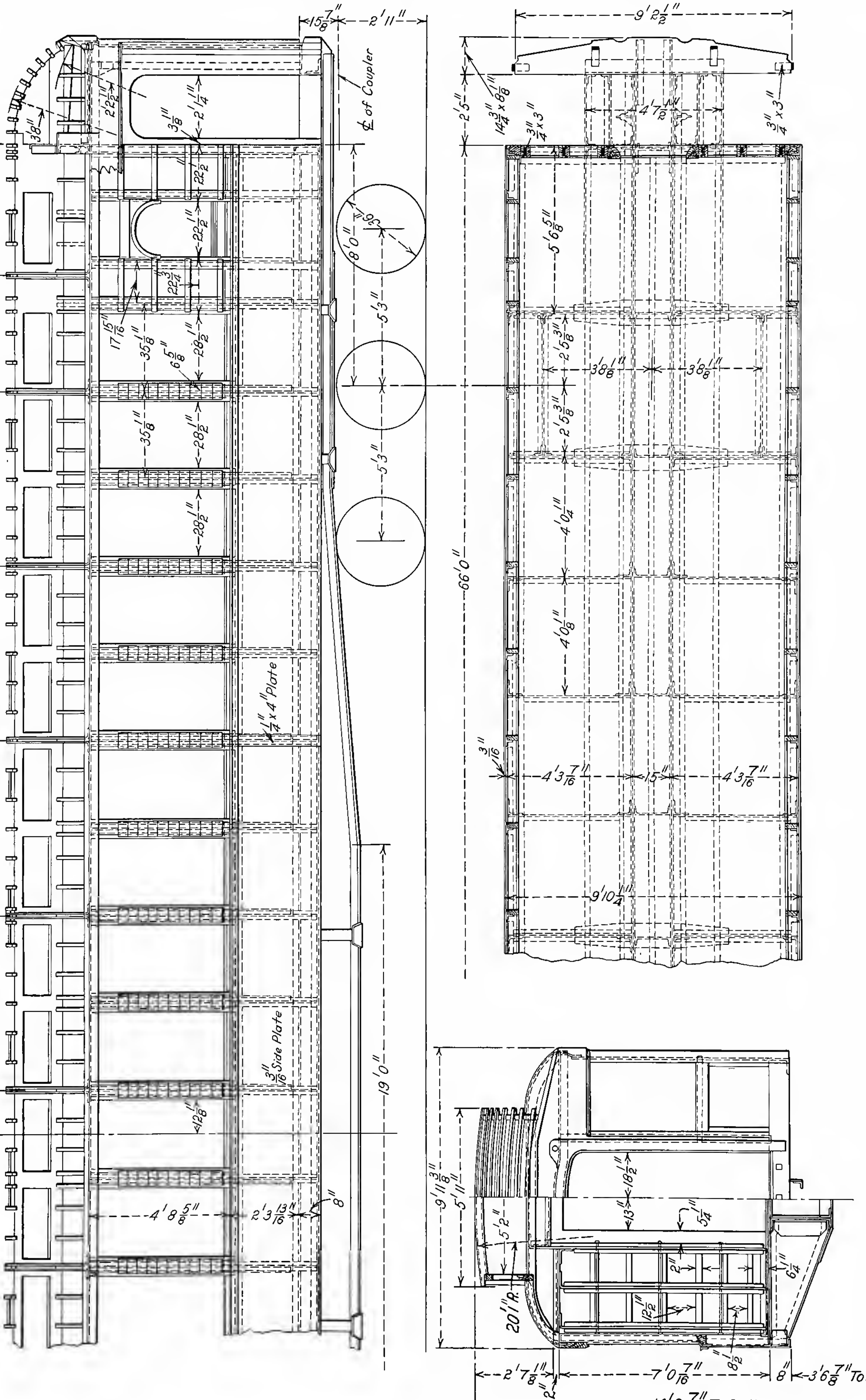


Fig. 408—Southern Railway Steel Frame Day Coach Shown in Fig. 149. Builder, The Harlan & Hollingsworth Corporation.

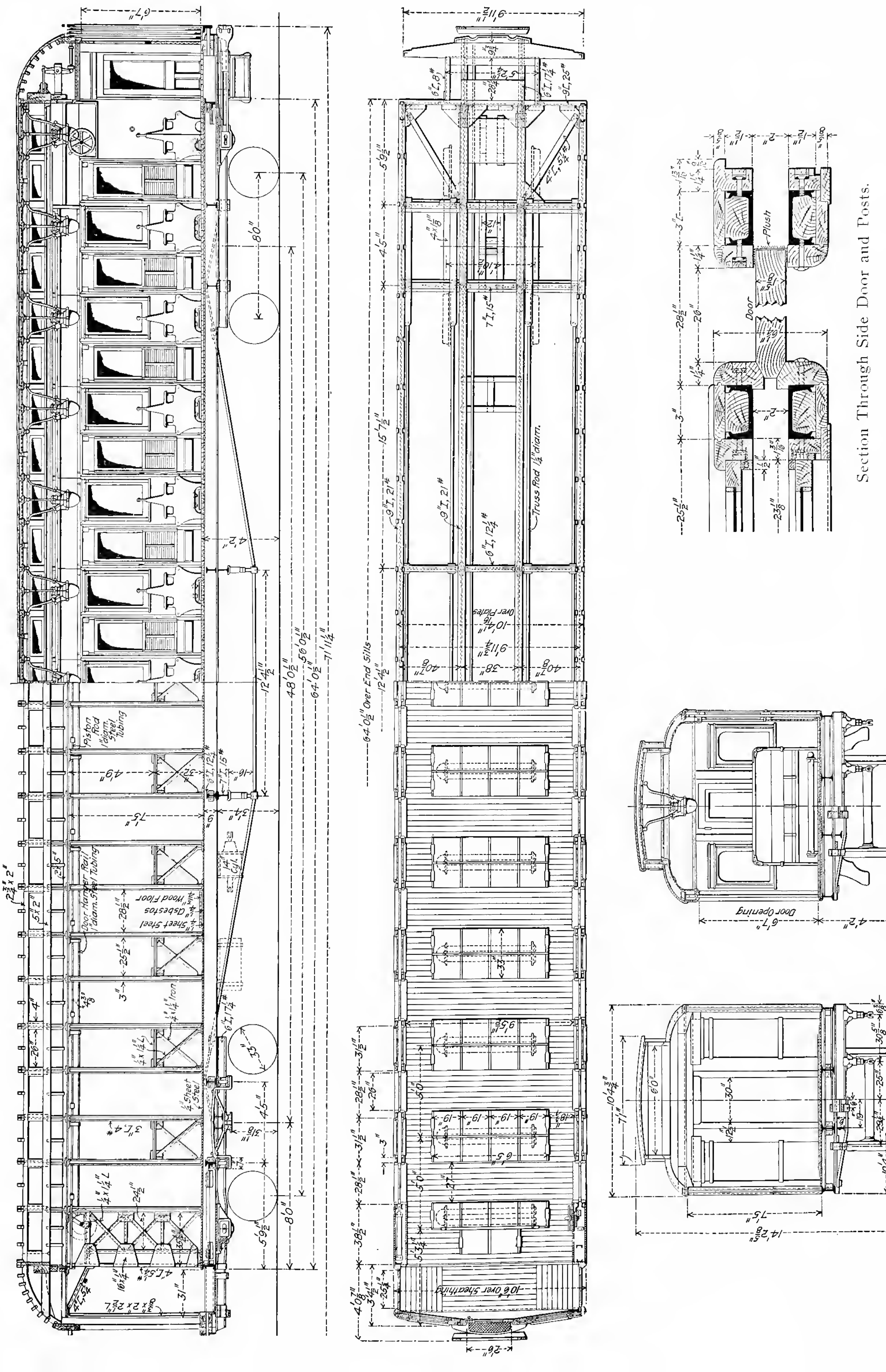


Fig. 409—Illinois Central Steel Underframe Suburban Coach Shown in Fig. 154.

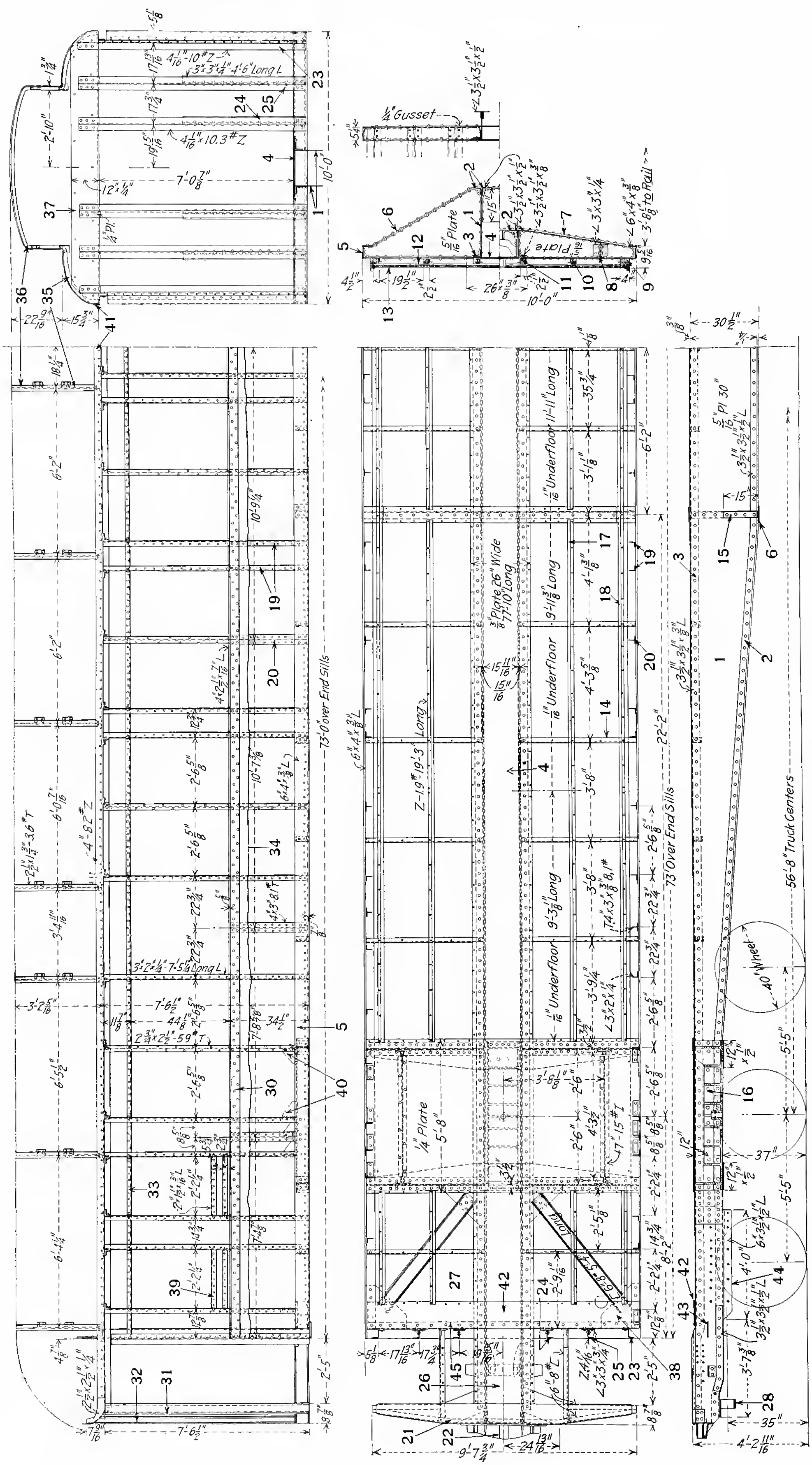


Fig. 410—Minneapolis, St. Paul & Sault Sainte Marie Steel Sleeping Car Shown in Figs. 180 and 182. Builder, The Barney & Smith Car Company.

See Page 383 for Names of Numbered Parts.

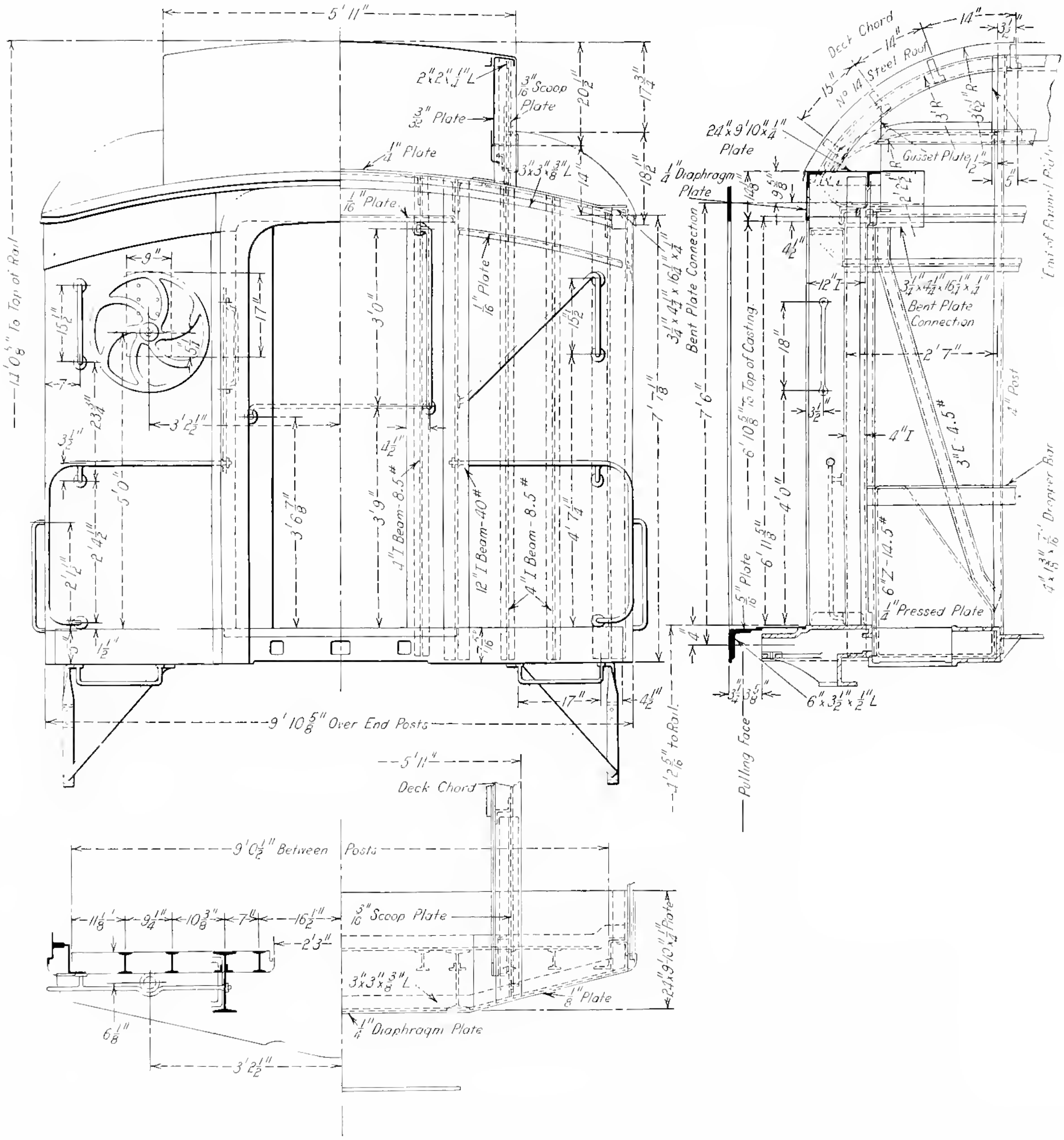


Fig. 411—Pullman Standard Dummy or Non-Vestibule End Framing for Steel Cars.

Parts of Steel Passenger Train Cars. See Fig. 410.

1 *Center Sill Web Plate*
2 *Center Sill Bottom Angle*
3 *Center Sill Top Angle*
4 *Center Sill Cover Plate*
5 *Side Sill Angle*
6 *Needle Beam Bottom Tie Plate*
7 *Body Bolster Tie Plate*
8 *Body Side Bearing*
9 *Floor Nailing Strip*
10 *Floor Nailing Strip*
11 *Floor Nailing Strip*
12 *Underfloor Course*
13 *Top Floor Course*
14 *Floor Support*
15 *Needle Beam Center Filler*
16 *Bolster Center Filler*
17 *Floor Nailing Strip Stiffener*
18 *Floor Nailing Strip Stiffener*
19 *Angle Side Post*
20 *Tee Side Post*
21 *Buffer Beam*
22 *Buffer Beam Extension*
23 *Corner Post*
24 *End Door Post*
25 *Intermediate End Post*
26 *Platform Cover Plate*
27 *Steel Underfloor Plate*
28 *Draw Bar Carry Iron*
30 *Side Girder Top Member or Belt Rail*
31 *Vestibule Corner Post*
32 *Vestibule Diaphragm Post*
33 *Window Header Angle*
34 *Side Sheathing Plate*
35 *Roof or Lower Deck Carline*
36 *Roof or Upper Deck Carline*
37 *Metal End Plate*
38 *Side and End Sill Corner Gusset*
39 *Window Sill Angle*
40 *Side Post Gusset*
41 *"Z" Bar Side Plate*
42 *End Sill Top Tie Plate*
43 *End Sill Bottom Tie Plate*
44 *Draft Lug Angle*
45 *End Sill Channel*

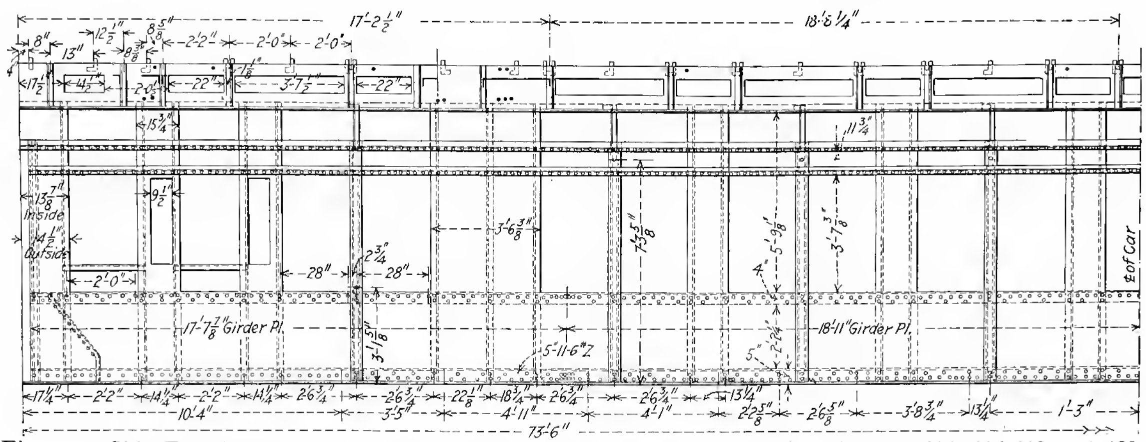


Fig. 412—Side Framing of Pullman Steel Sleeping Car Shown in Figs. 176, 181, 413, 414, 416-418 and 420.

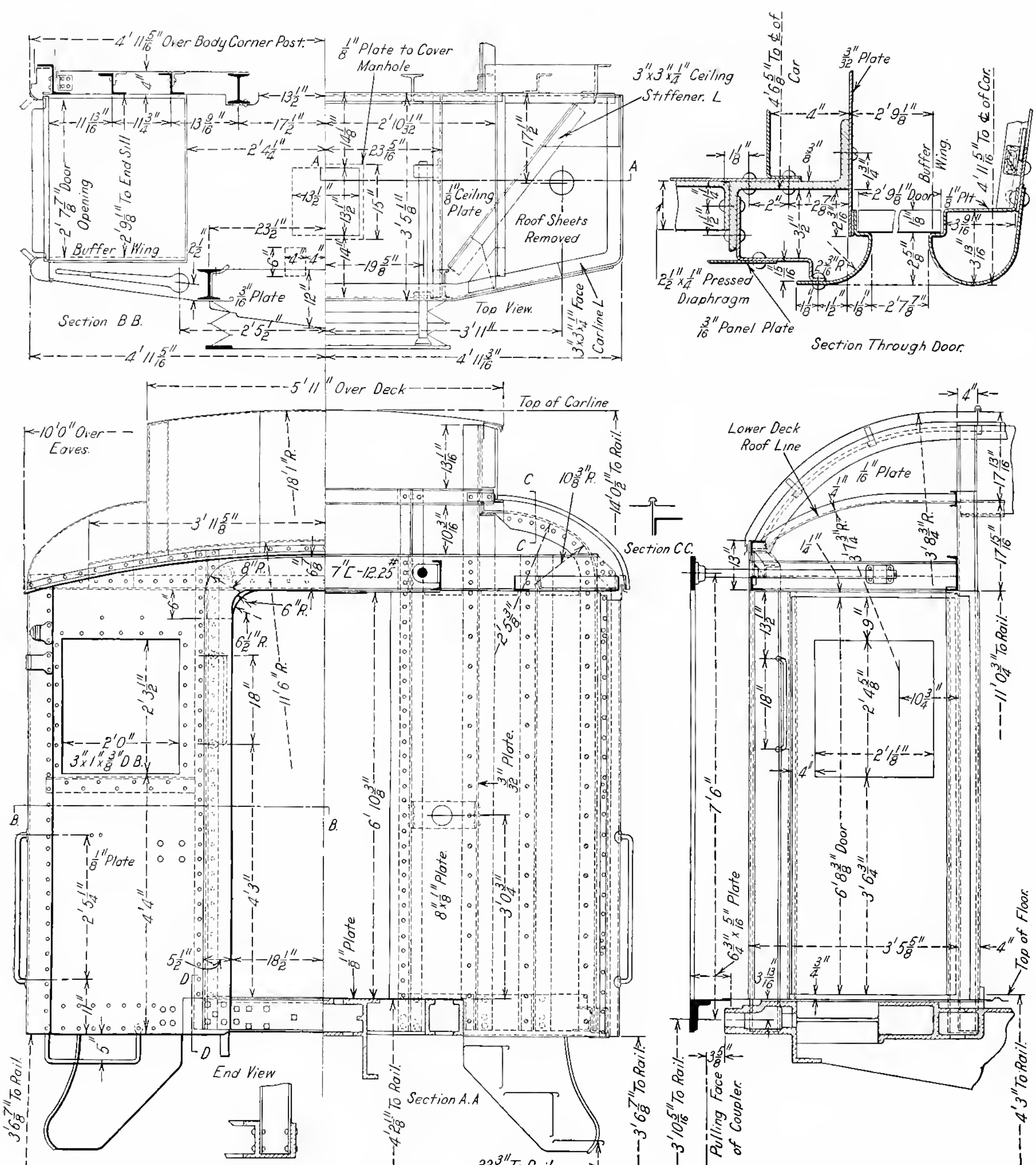


Fig. 413—Vestibule Construction of Pullman Steel Sleeping Car Shown in Figs. 176, 181, 412, 414, 416-418 and 420. Dummy End Framing is Shown in Fig. 411.

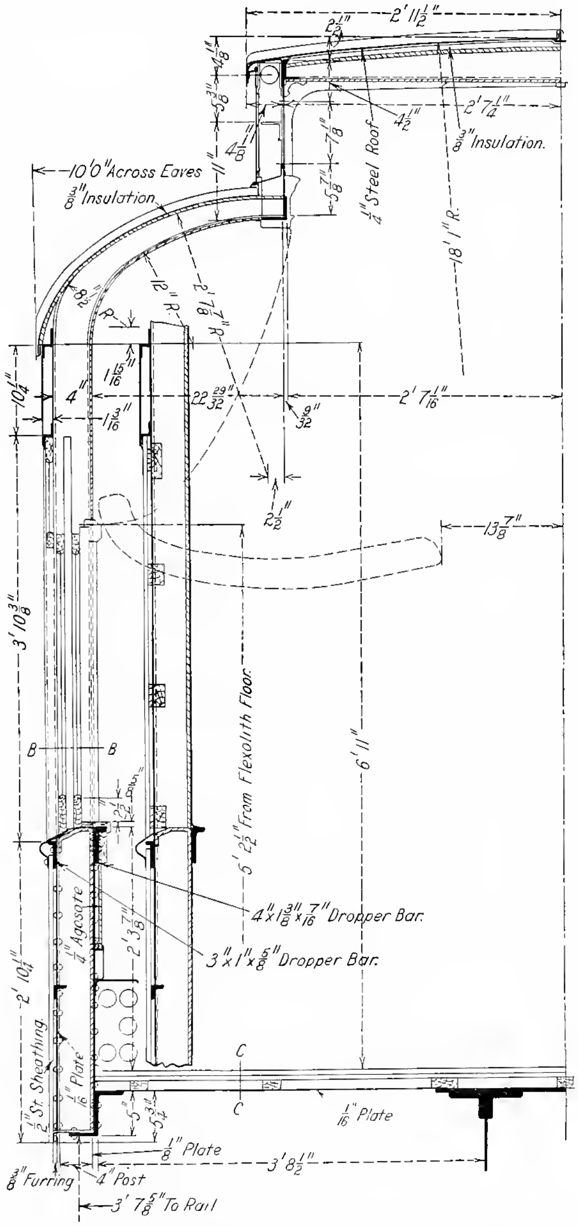


Fig. 414—Cross Sections of Pullman Steel Sleeping Car Shown in Figs. 176, 181, 412, 413, 416-418 and 420.

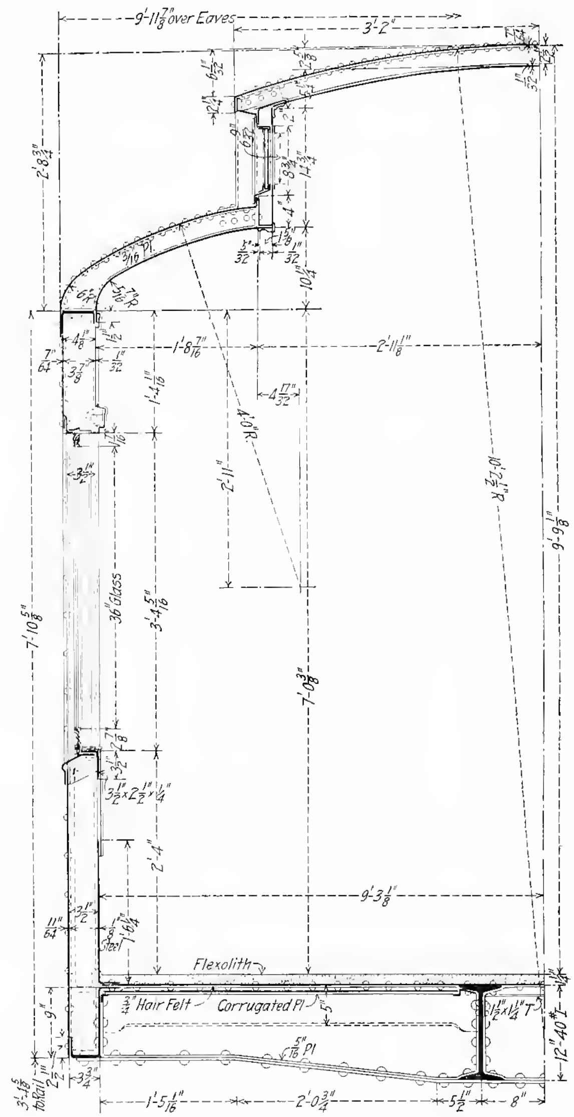


Fig. 415—Cross Section of 67-ft. Steel Day Coach. Builder, Standard Steel Car Company.

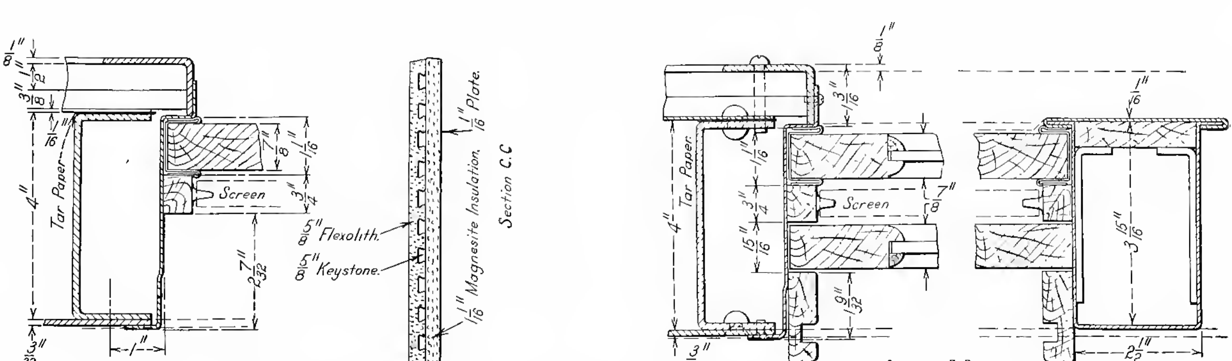


Fig. 416—Sections as Indicated by Reference Letters in Fig. 414.

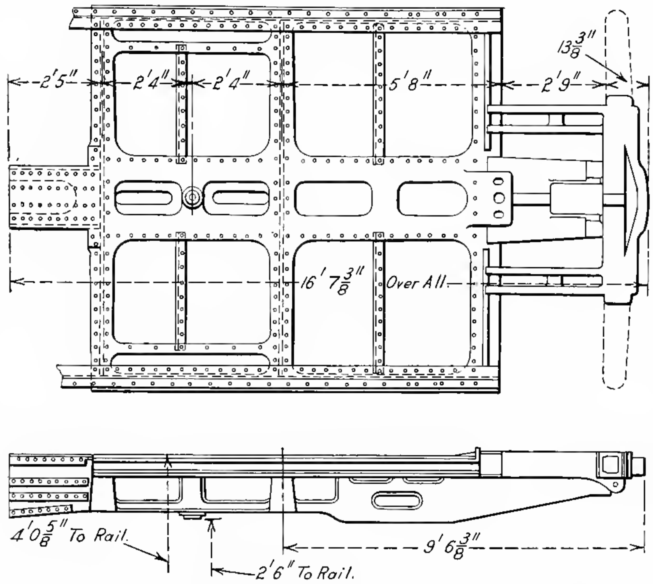


Fig. 417—Body Bolster and Platform of Pullman Steel Sleeping Car. See Fig. 420.

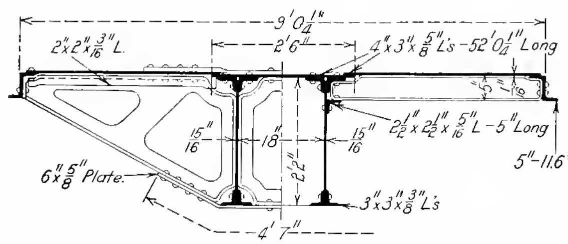


Fig. 418—Cross Sections of Underframe of Pullman Steel Sleeping Car. See Fig. 420.

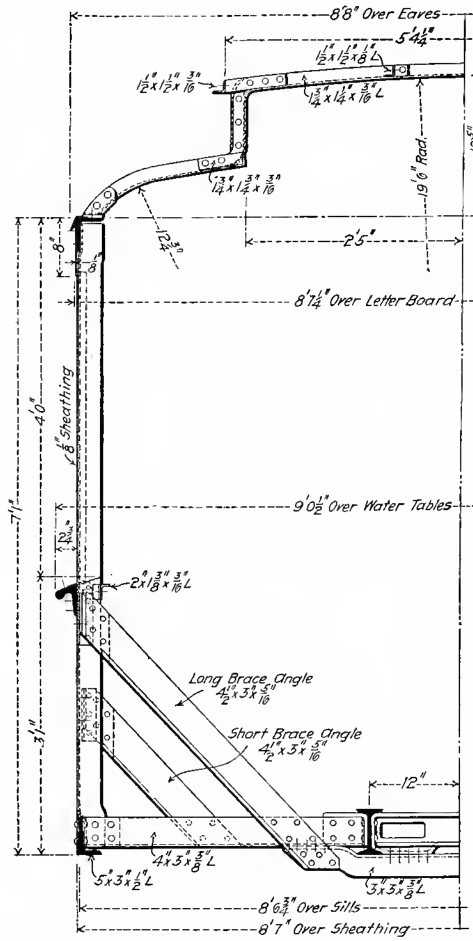


Fig. 419—Cross Section of Interborough Subway Motor Car Shown in Fig. 421.

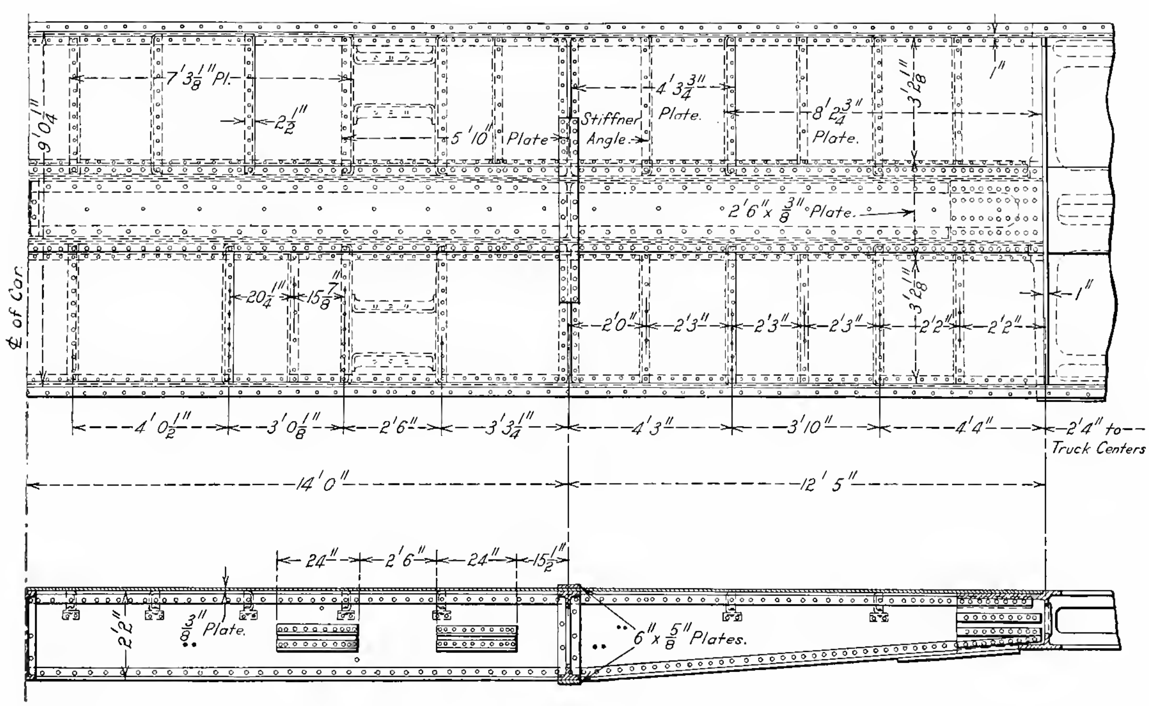


Fig. 420—Underframe of Pullman Steel Sleeping Car Shown in Figs. 176, 181, 412, 413, 414 and 416-418.

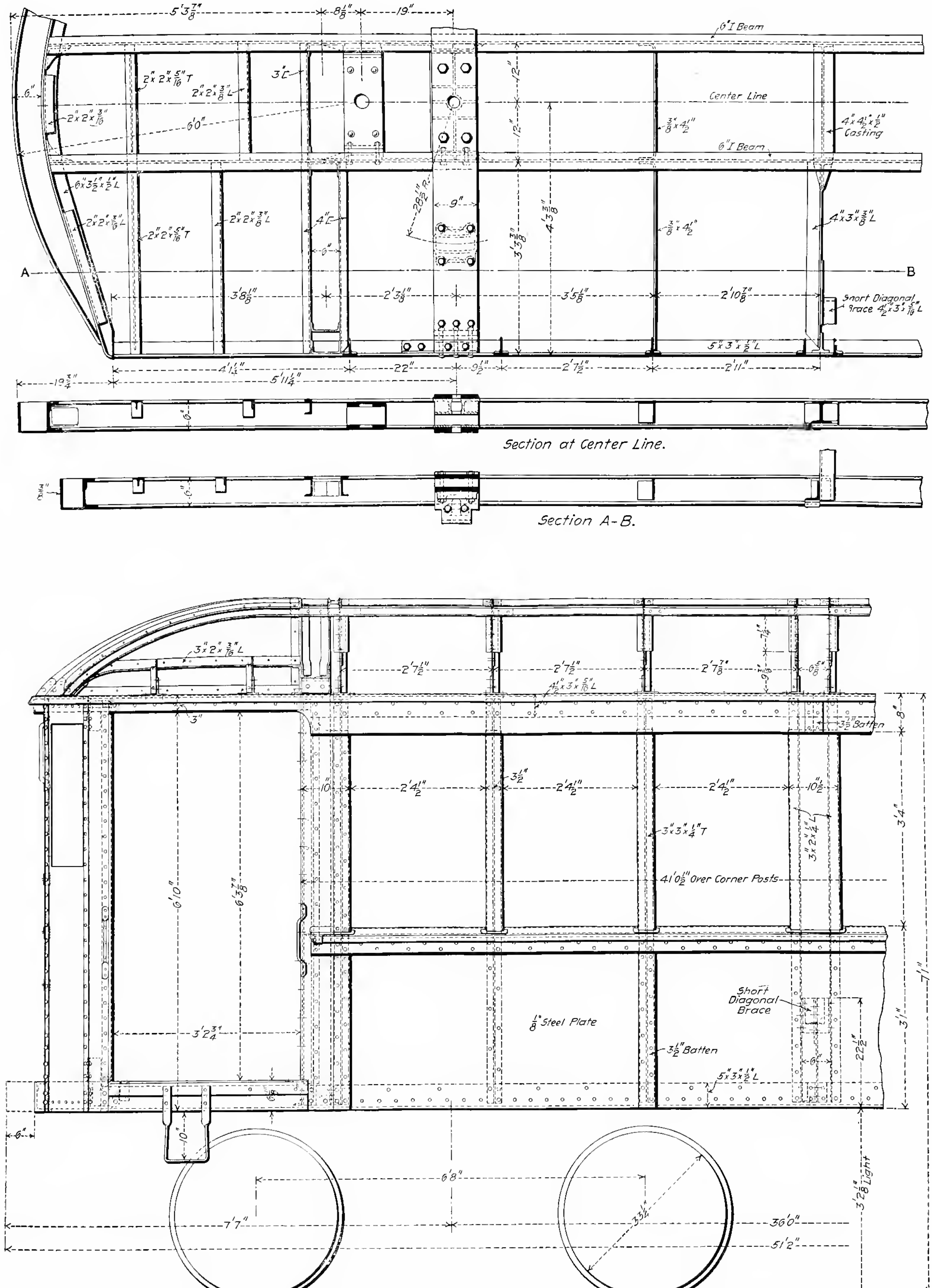


Fig. 421—Interborough Rapid Transit Subway Steel Motor Car, Built Under the Gibbs Patents. See also Fig. 419.

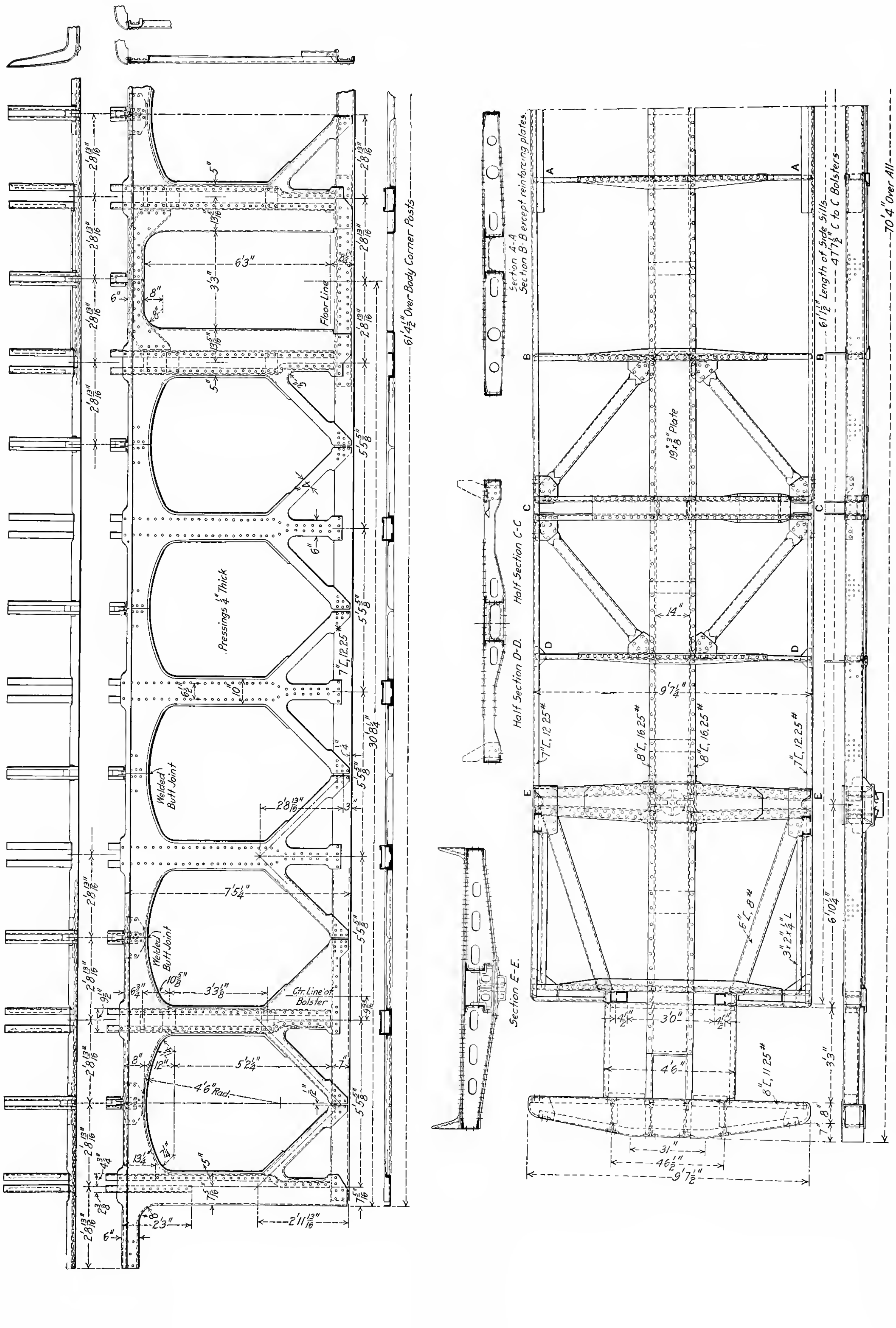


Fig. 422—New York, Westchester & Boston Steel Suburban Car Shown in Fig. 189, Designed by L. B. Stilwell, Consulting Electrical Engineer. Builder, Pressed Steel Car Company. The Pressed Steel Unit Sections for the Side Frames were Manufactured by Forsyth Brothers Company and are Shown in Fig. 476.

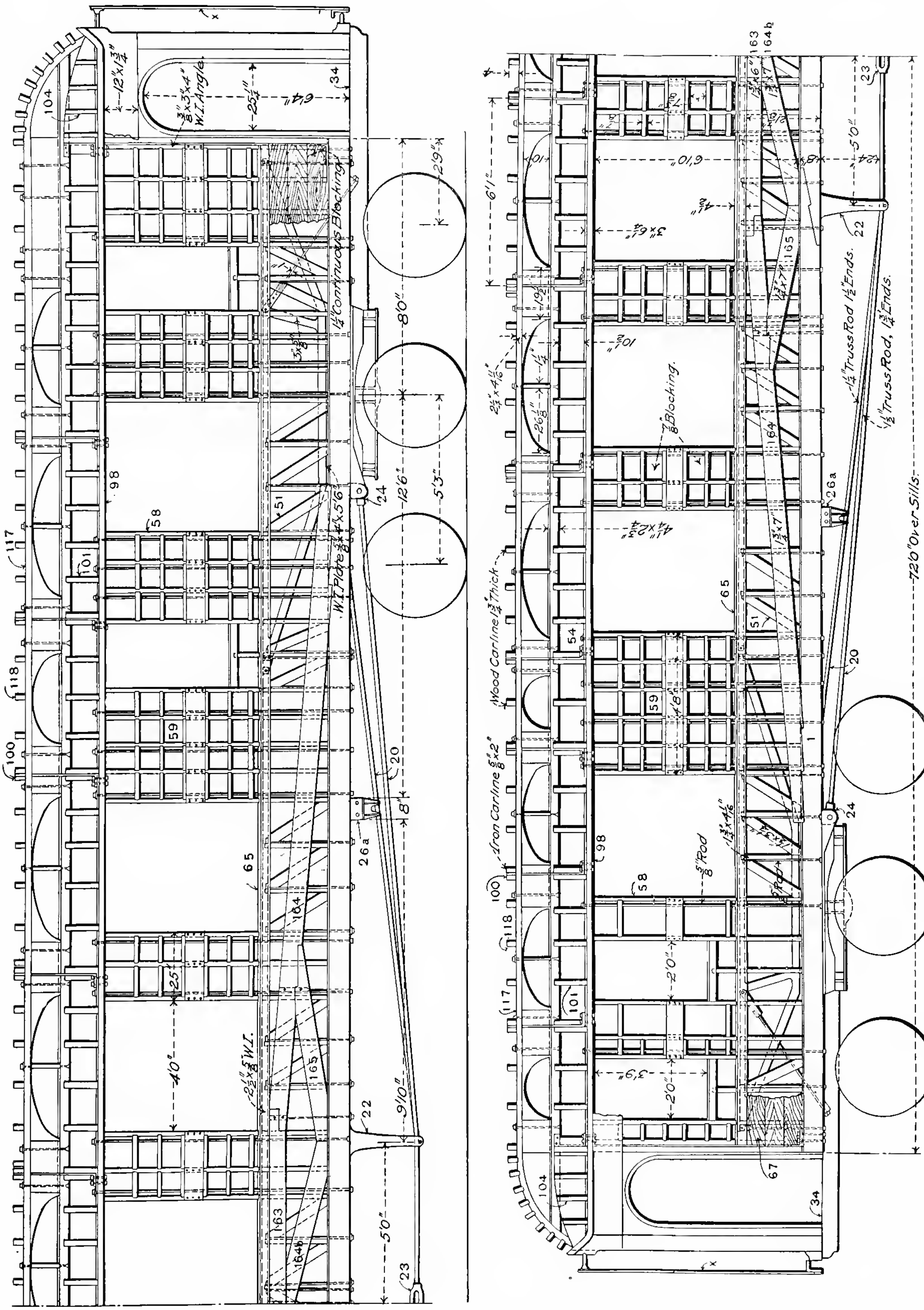


Fig. 423—Pullman Standard Framing for Wooden Sleeping Cars. See Page 390 for Names of Numbered Parts.

Parts of Wooden Passenger Train Cars, See Figs. 423-425.

3 *Intermediate Sill*
4 *Center Sill*
6 *Floor Nailing Strip*
20 *Body Truss Rod*
22 *Queen Post*
23 *Turnbuckle*
24 *Truss Rod Anchor*
26 and 26*a* *Cross Tie Timber or Needle Beam*
26*p* *Cross Tie Timber Truss Rod Bearing or Strut*
26*t* *Needle Beam Truss Rod*
27 *Floor*
34 *Platform Sill*
51 *Brace*
58 *Window Post*
59 *Side Furring*
59*b* *Furring Blocks*
59*e* *End Furring*
60 *Stud*
60*e* *End Stud*
61 *Corner Post*
62 *Door Post*
63 *Truss Plank*
65 *Belt Rail*
65*a* *Auxiliary Belt Rail*
66 *Sheathing Nailing Strip or Furring*
67 *Continuous Blocking*
81 *Belt Rail Cap*
90 *Window Lintel*
93 *Eaves Molding*
98 *Side Plate*
99 *Door Lintel*
100 *Compound Upper Deck Carline*
101 *Lower Deck Carline*
Upper 102 *Deck Roof*
Lower 102 *Main Roof*
108 *Platform Hood Bow*
111 *Deck Sill*
115 *Deck Post*
117 *Deck Plate*
118 *Upper Deck Carline*
137 *Window*
163 *Compression Beam*
164 *Compression Beam Brace*
164*b* *Auxiliary Compression Beam Brace*
165 *Counterbrace*
260 *End Plate*

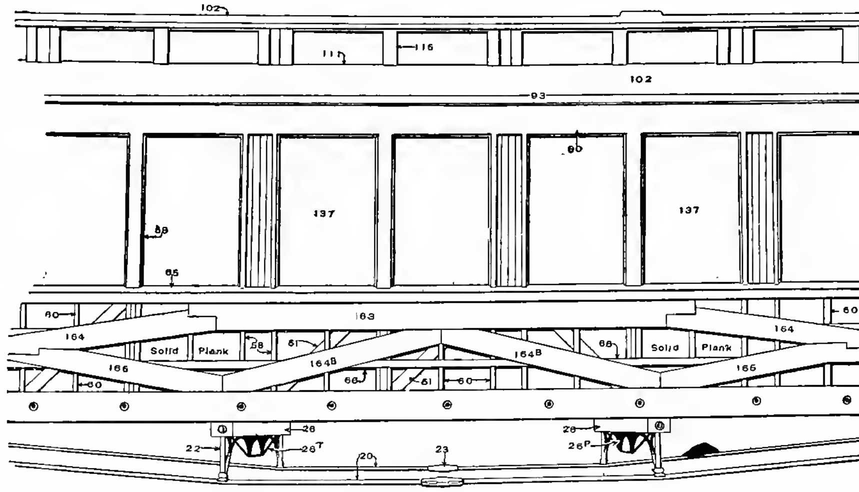
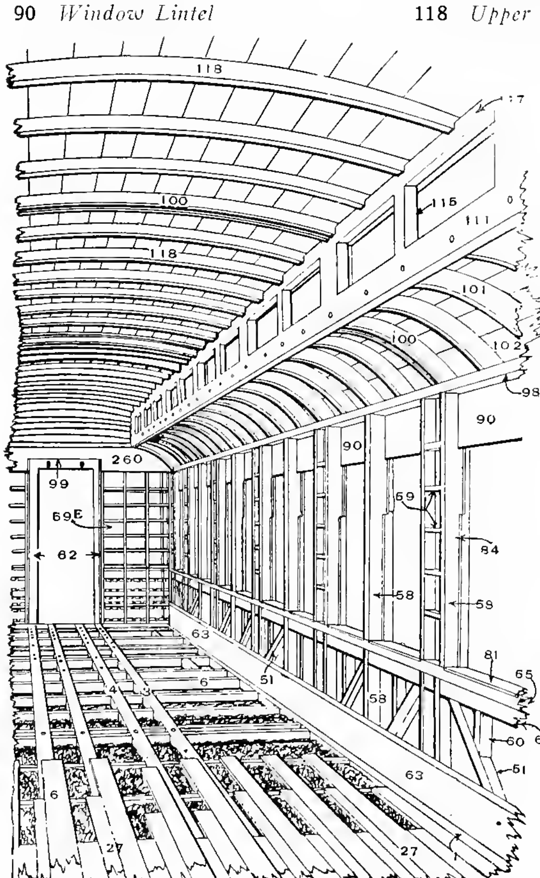


Fig. 424—Side Framing for Wooden Passenger Train Cars. See Names of Numbered Parts on This Page.



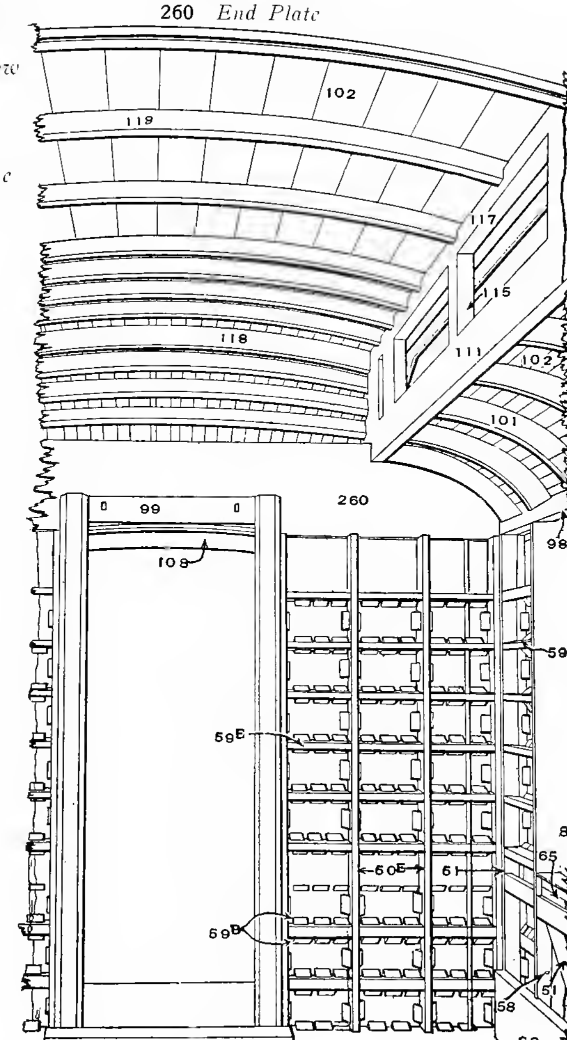


Fig. 425—Interior Views Showing Framing of Wooden Passenger Train Cars. See Names of Numbered Parts on This Page.

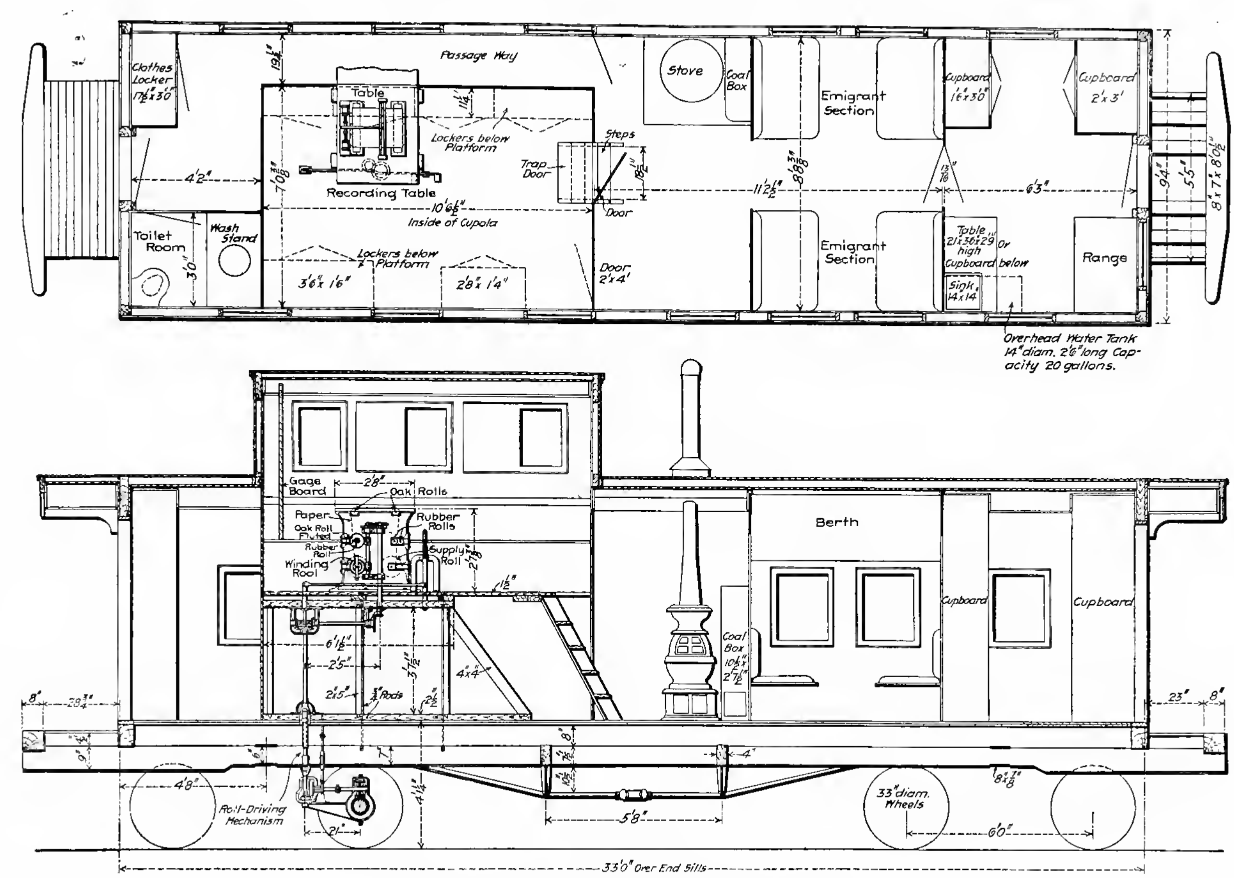


Fig. 426—Northern Pacific Dynamometer Car.

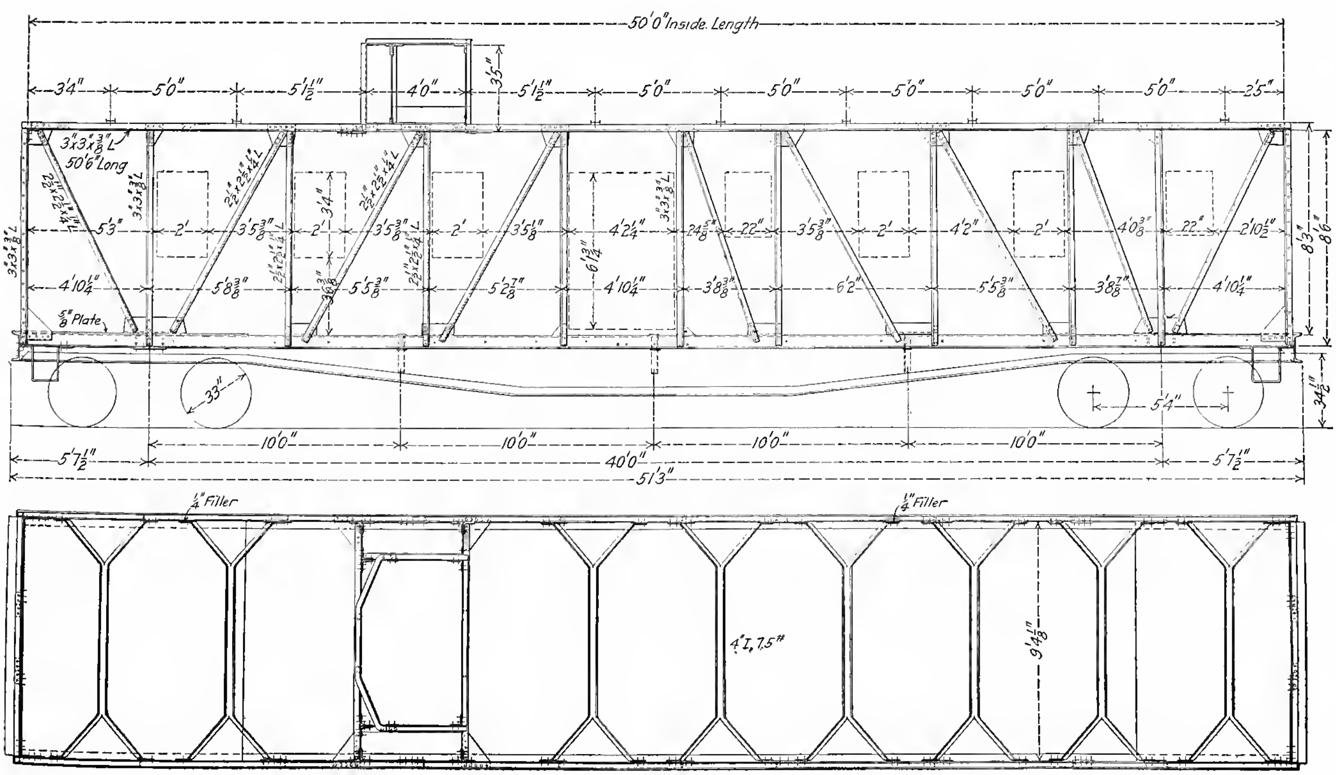
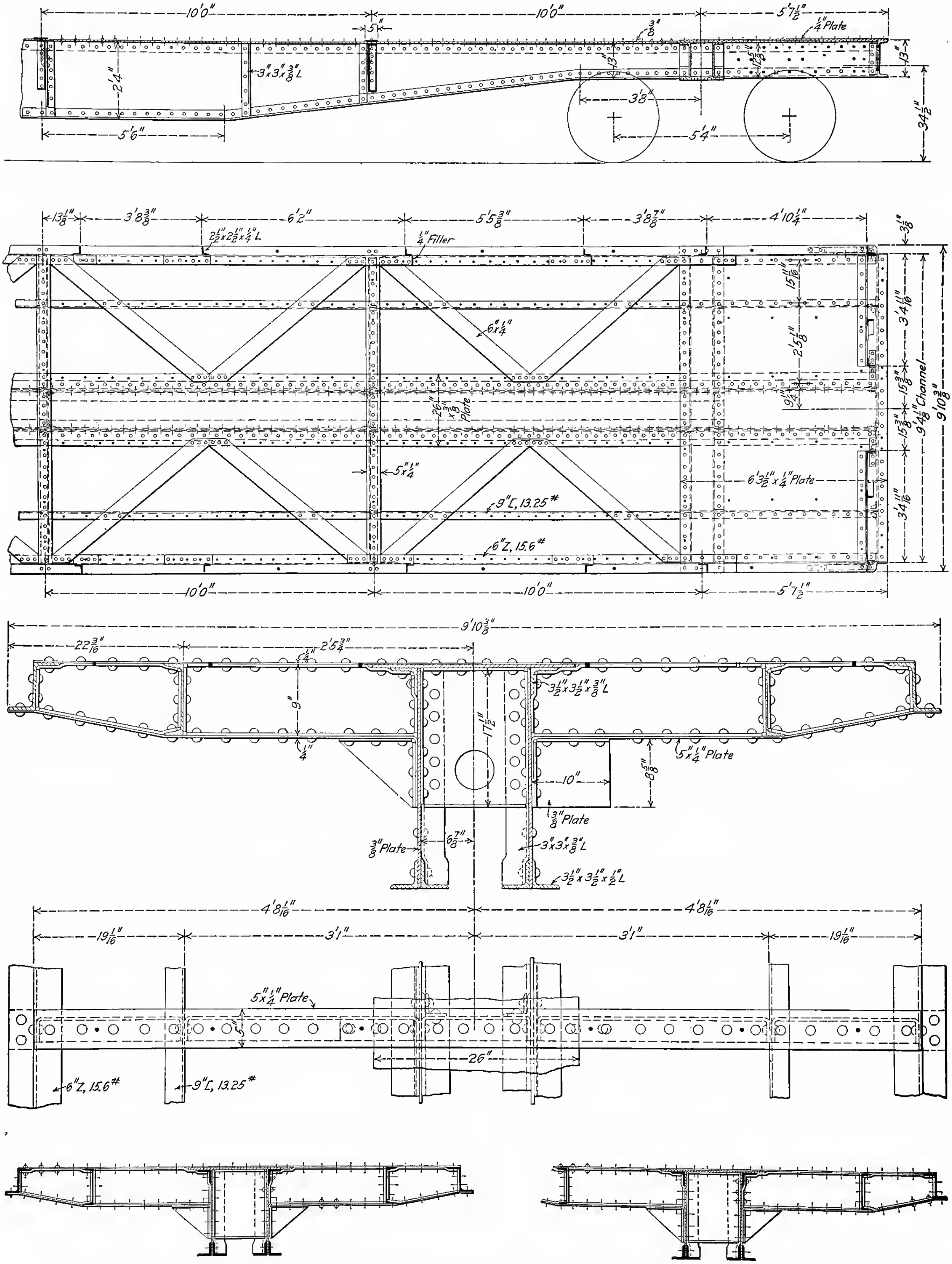


Fig. 427—Side and Roof Framing of Atchison, Topeka & Santa Fe Steel Frame Dynamometer Car Shown in Figs. 217 and 428-430.



Crosstie At Dynamometer End Looking Towards Center of Car. Crosstie Opposite Dynamometer End Looking Towards Center of Car.

Fig. 428—Underframe of Santa Fe Steel Frame Dynamometer Car Shown in Figs. 217, 427, 429 and 430.

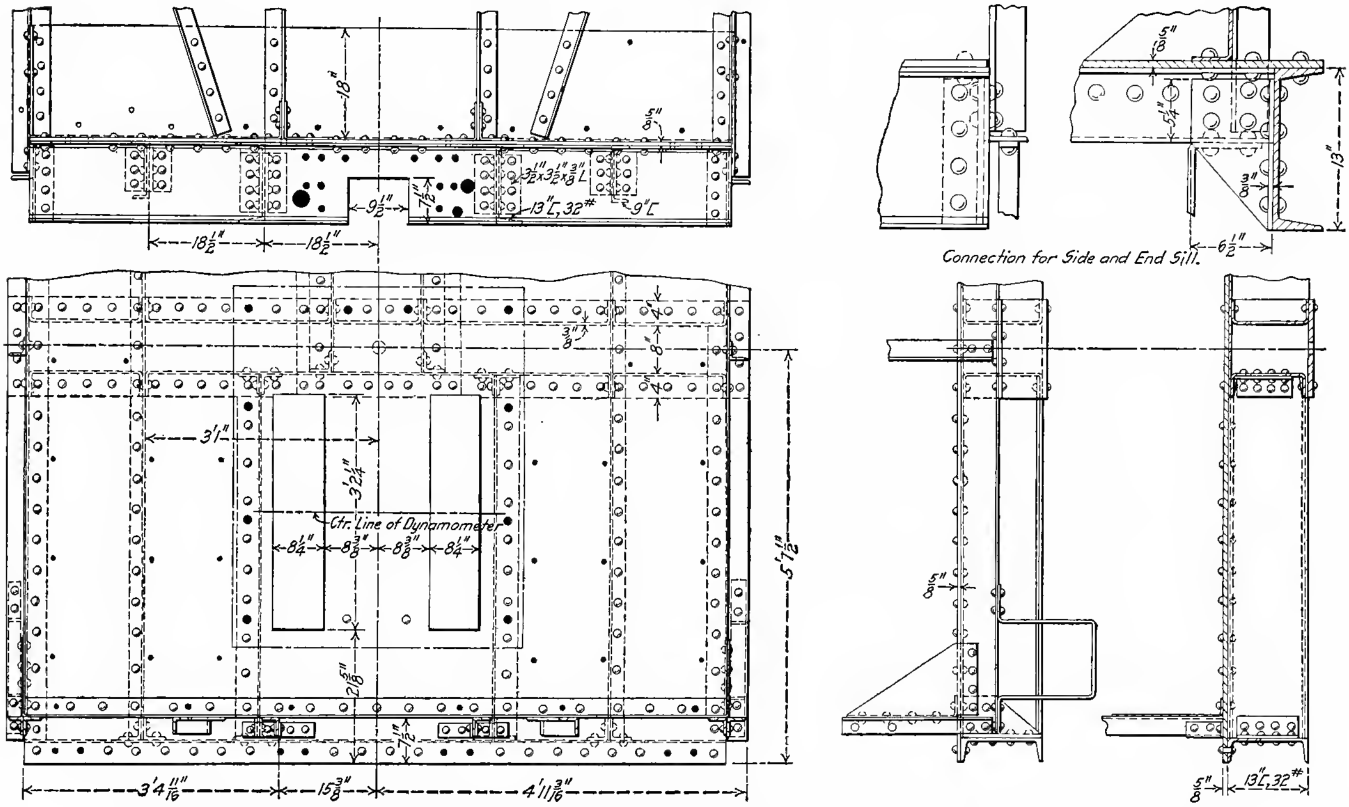


Fig. 429—Underframe at Dynamometer End of Santa Fe Dynamometer Car Shown in Figs. 217, 427, 428 and 430.

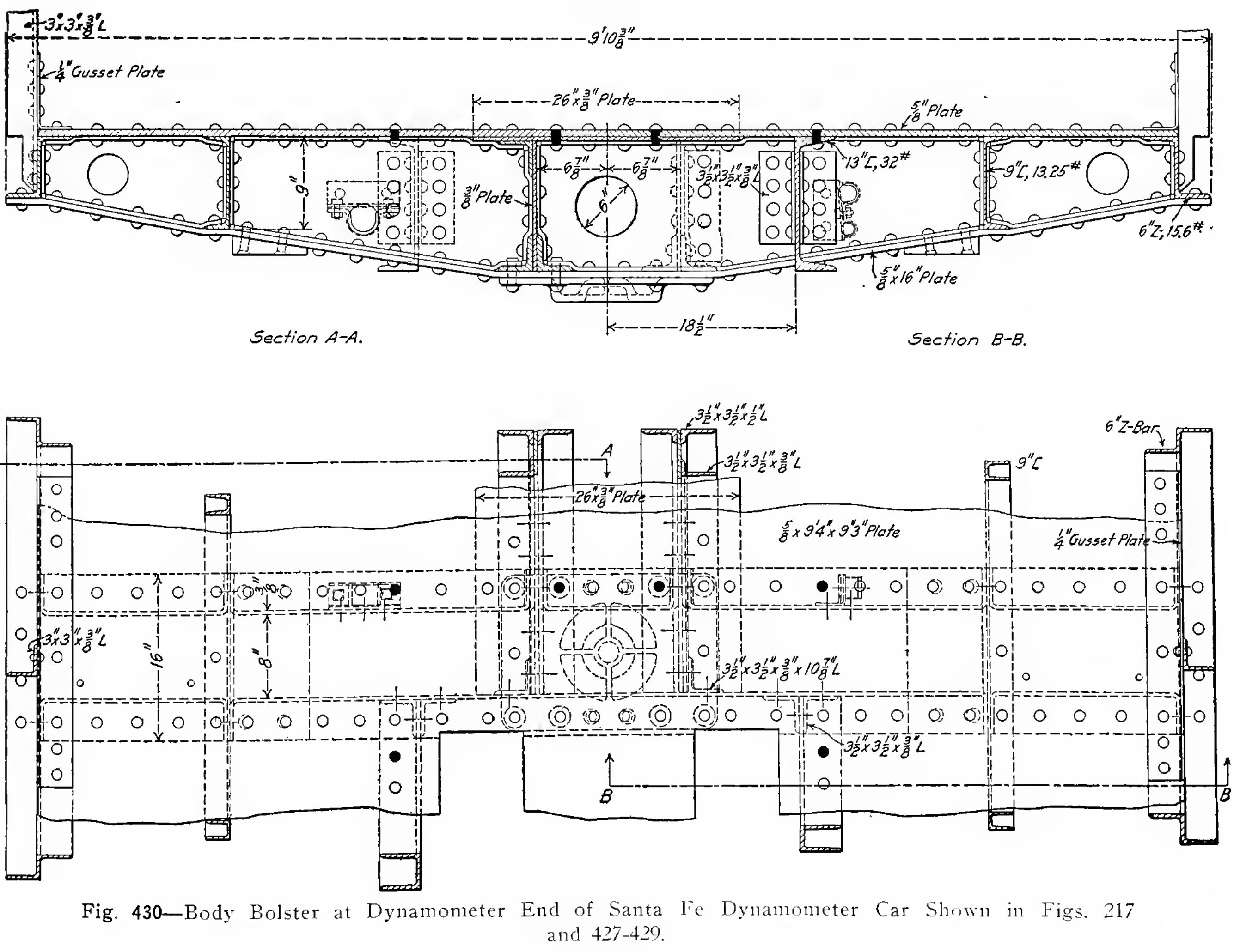


Fig. 430—Body Bolster at Dynamometer End of Santa Fe Dynamometer Car Shown in Figs. 217 and 427-429.

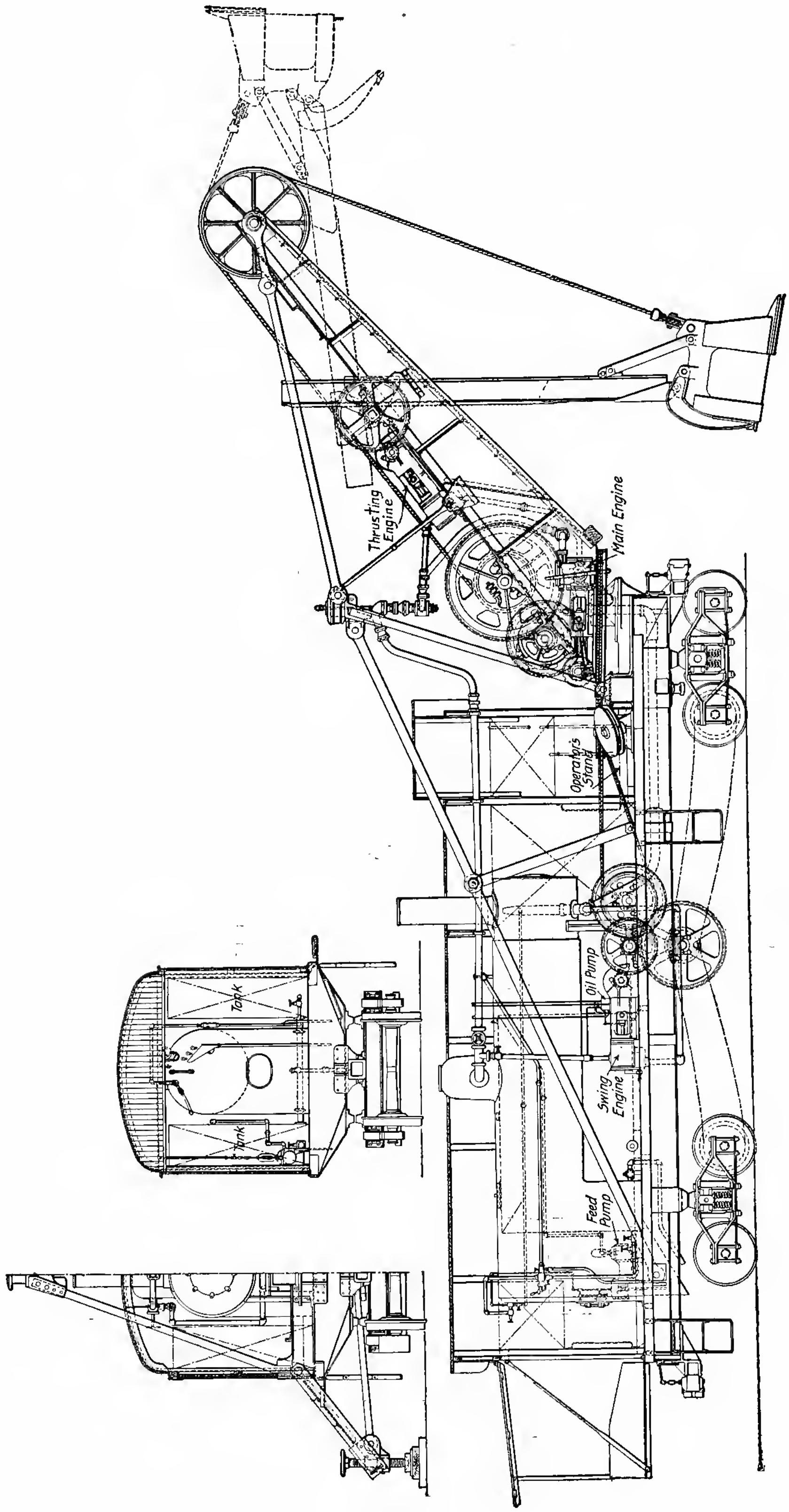


Fig. 431—Atlantic Steam Shovel Shown in Fig. 218. Builder, The Bucyrus Company.

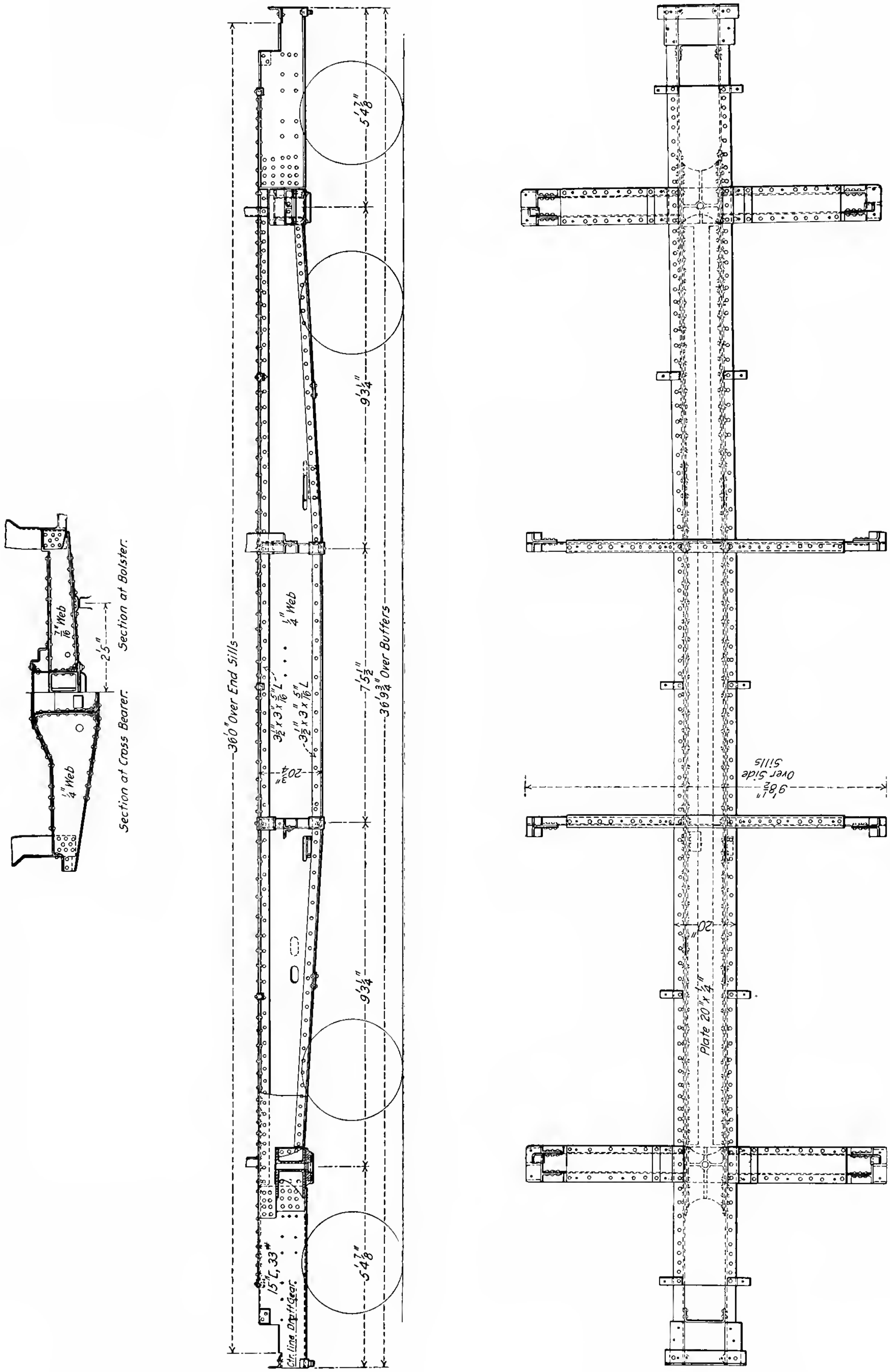


Fig. 432—Steel Underframe for 40-Ton Capacity Gondola Car. See also Fig. 445. Builder, Ralston Steel Car Company.

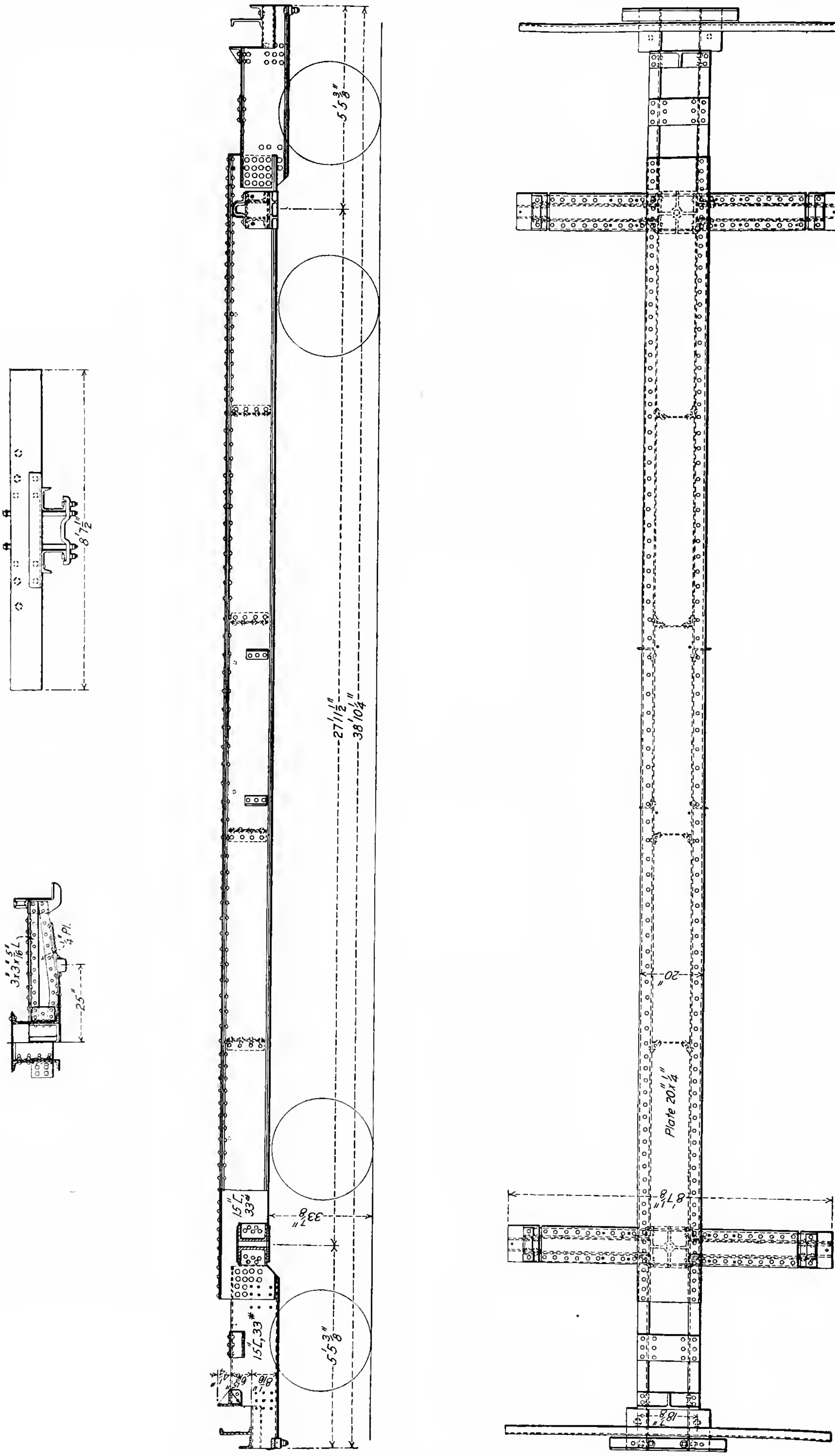


Fig. 433—Steel Underframe for 35-Ton Capacity Hopper Gondola Car. See also Fig. 443. Builder, Ralston Steel Car Company.

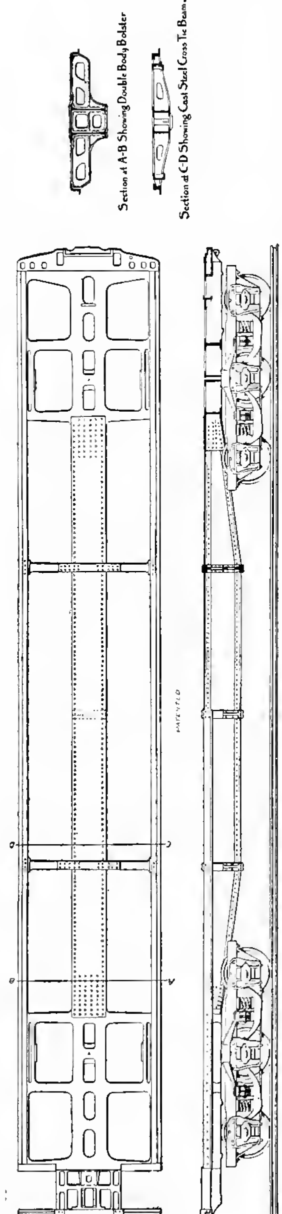


Fig. 434—Steel Underframe for Passenger Train Cars with One Vestibule and One Non-Vestibule End, Using Commonwealth Steel Company's Combined Cast Steel Platform and Double Body Bolsters.

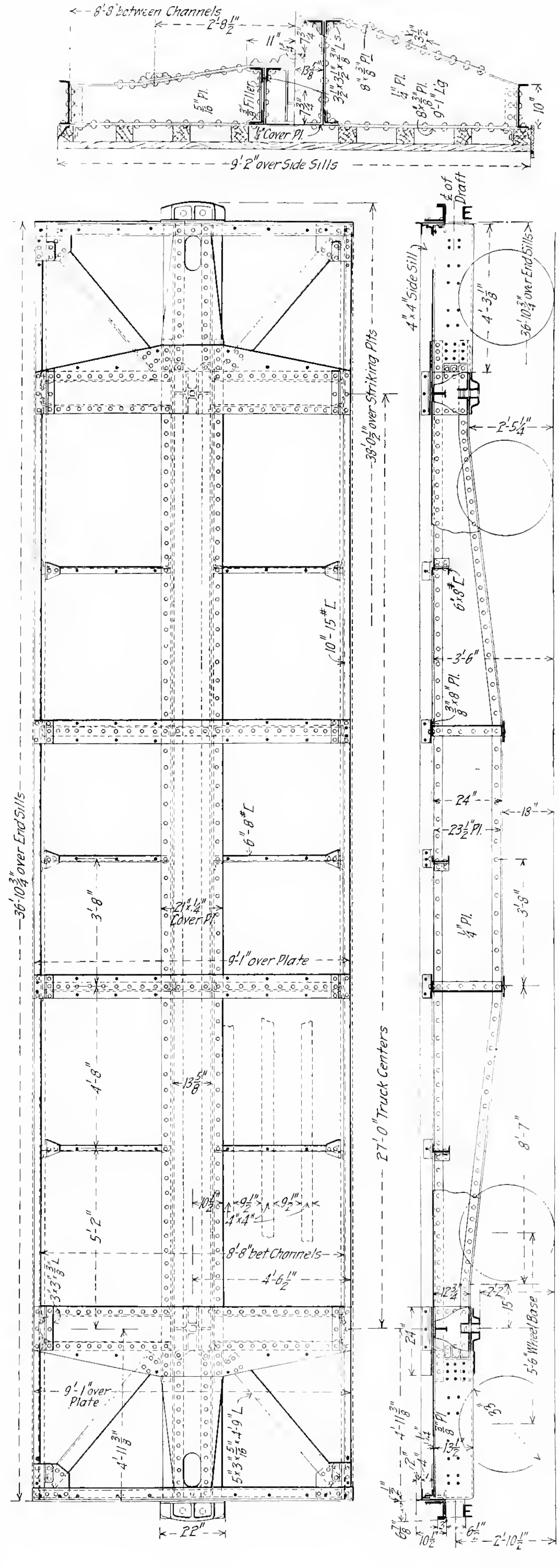


Fig. 435—Steel Underframe for Lake Shore & Michigan Southern Automobile Car Shown in Fig. 14. Builder, The Barney & Smith Car Company.

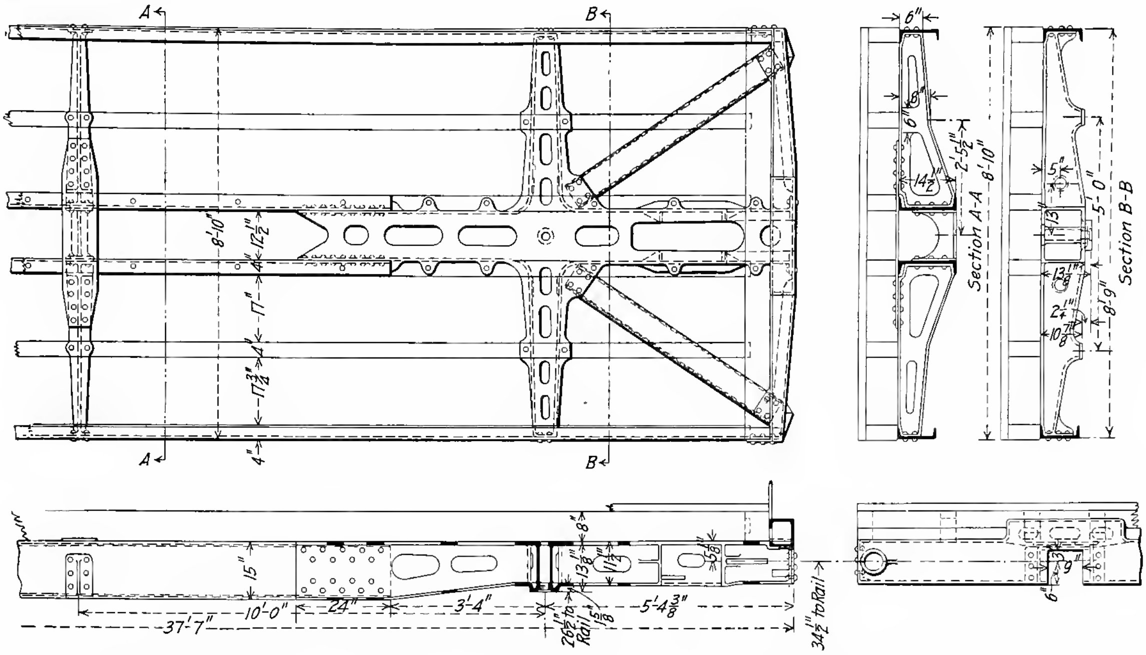


Fig. 436—Steel Underframe for 40-Ton Capacity Box Car. Builder, Pittsburgh Equipment Company.

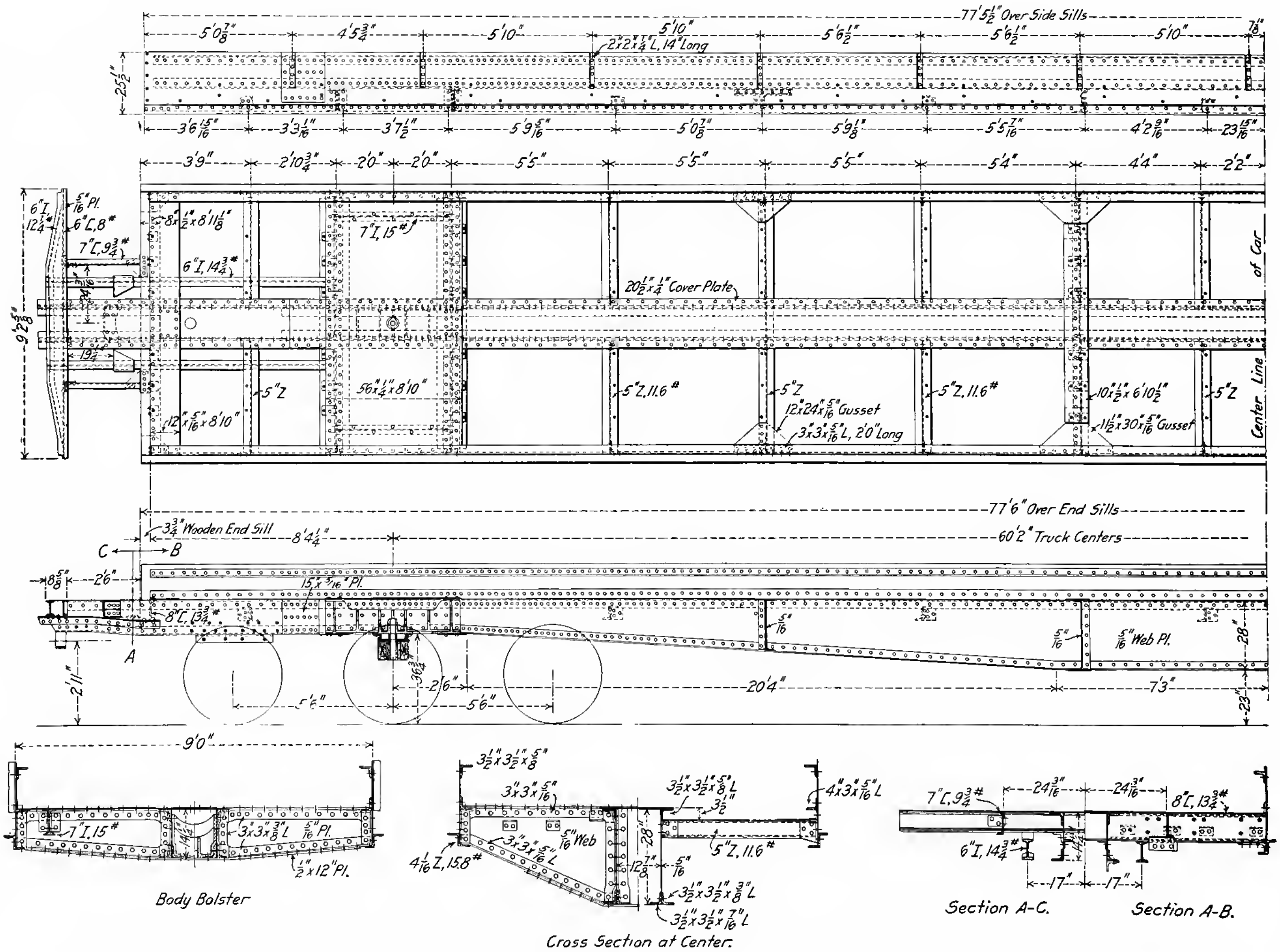


Fig. 437—Steel Underframe for Chicago, Burlington & Quincy Parlor Car. Builder, The Barney & Smith Car Company.

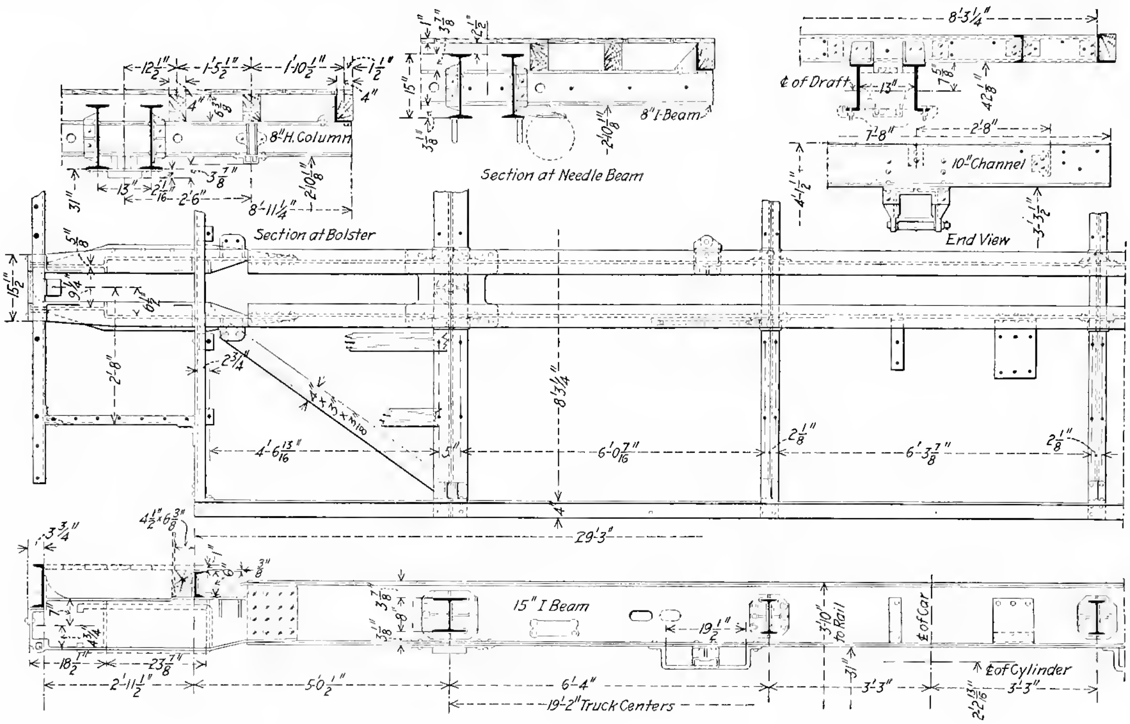


Fig. 438—Steel Underframe for Caboose. Builder, Bettendorf Axle Company.

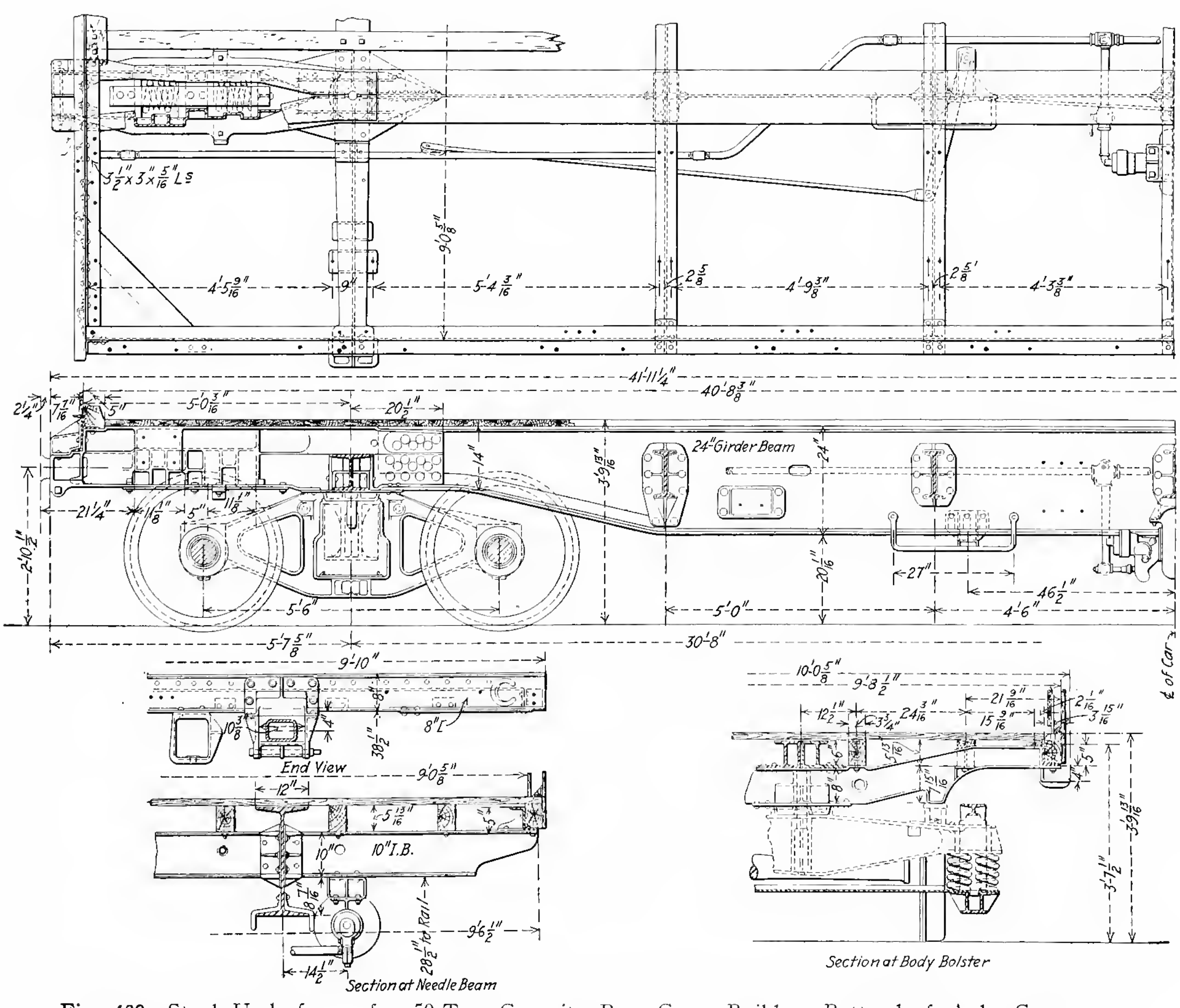


Fig. 439—Steel Underframe for 50-Ton Capacity Box Car. Builder, Bettendorf Axle Company.

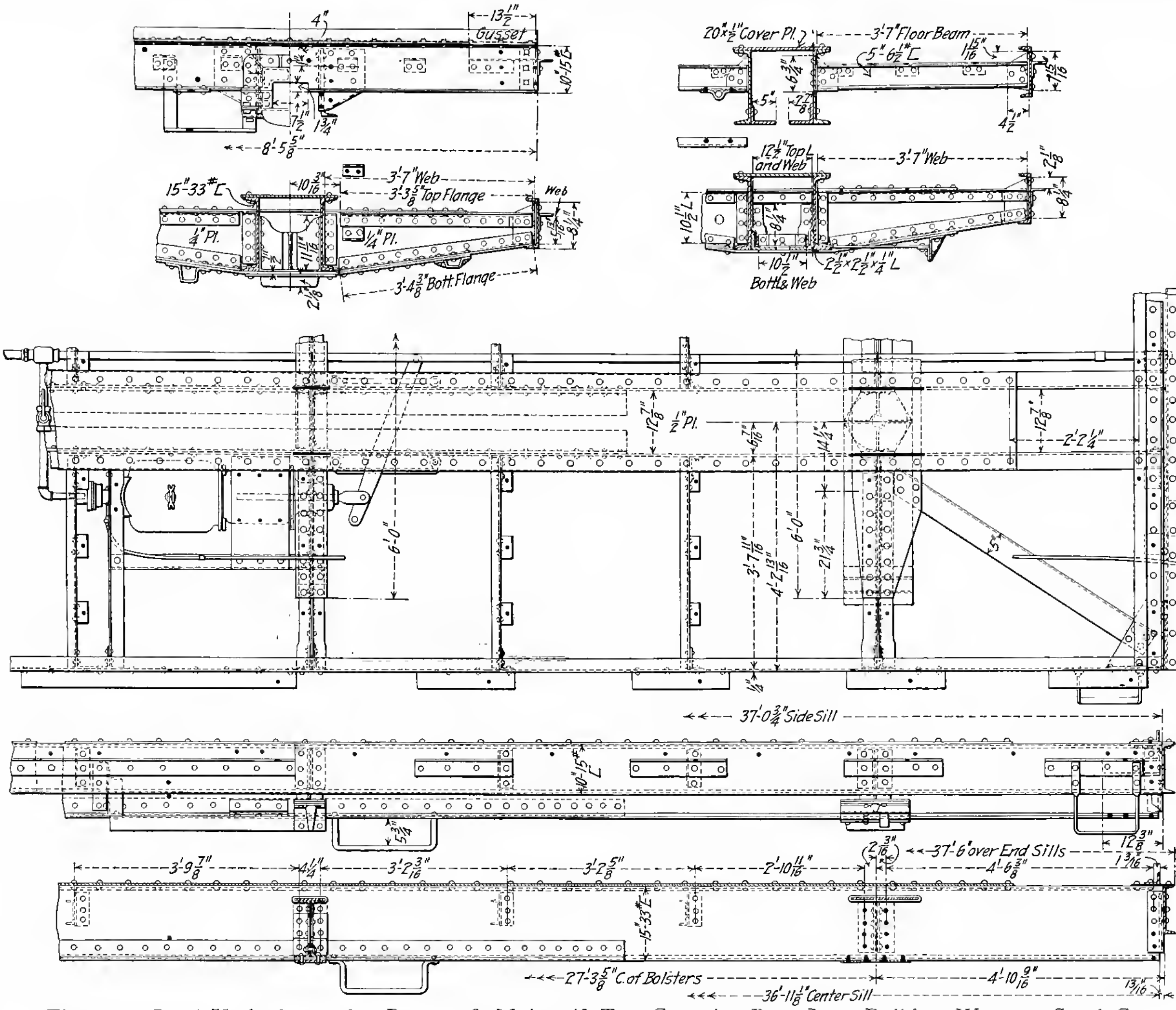


Fig. 440—Steel Underframe for Boston & Maine 40-Ton Capacity Box Car. Builder, Western Steel Car & Foundry Company.

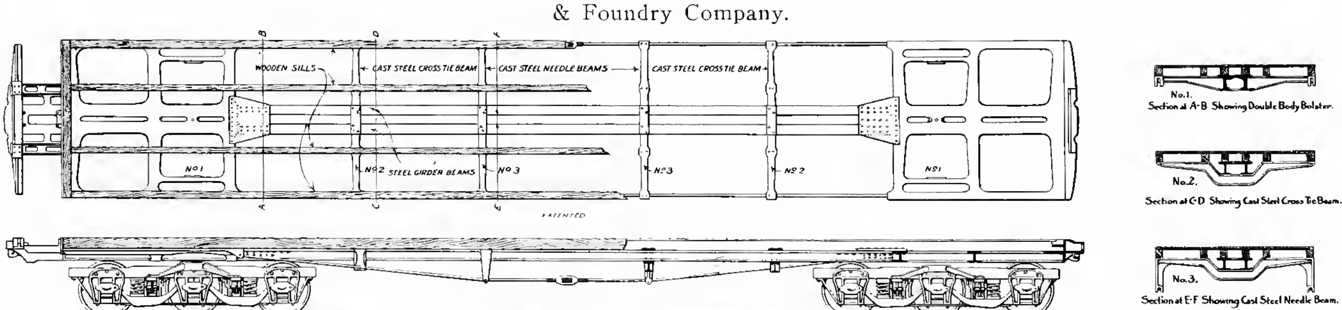


Fig. 441—Combined Wood and Steel Underframe for Passenger Train Cars with One Vestibule and One Non-Vestibule End, Using Commonwealth Steel Company's Cast Steel Combined Platform and Double Body Bolsters.

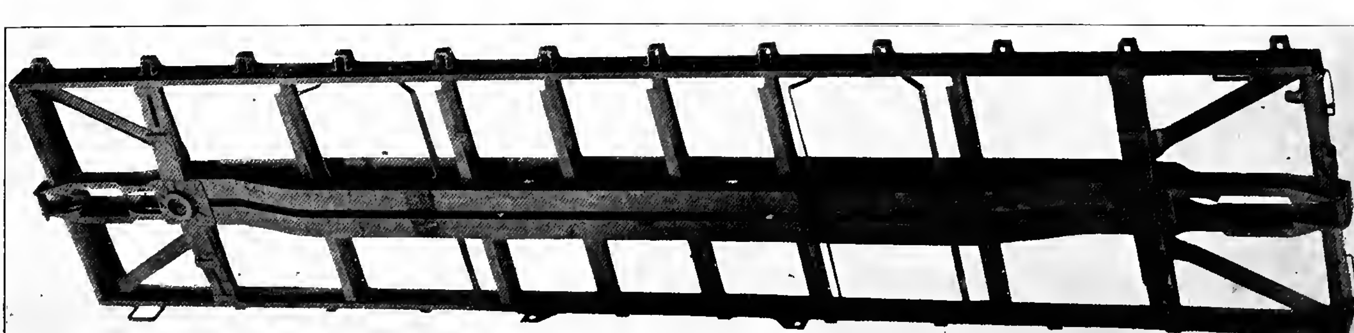


Fig. 442—Steel Underframe for 50-Ton Capacity Gondola Car. Builder, Bettendorf Axle Company.

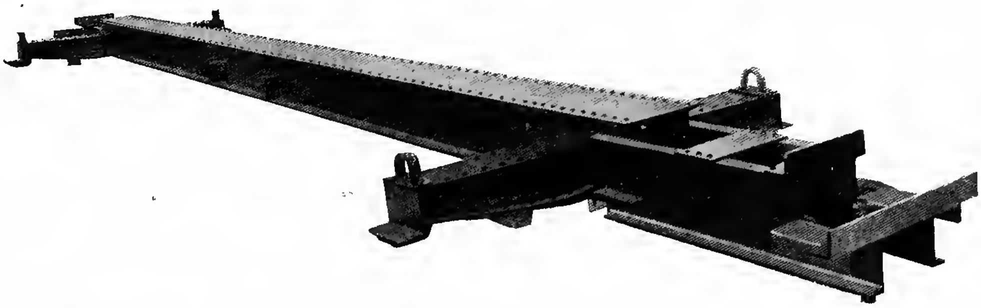


Fig. 443—Ralston Steel Underframe for 35-Ton Capacity Hopper Car. See also Fig. 433.

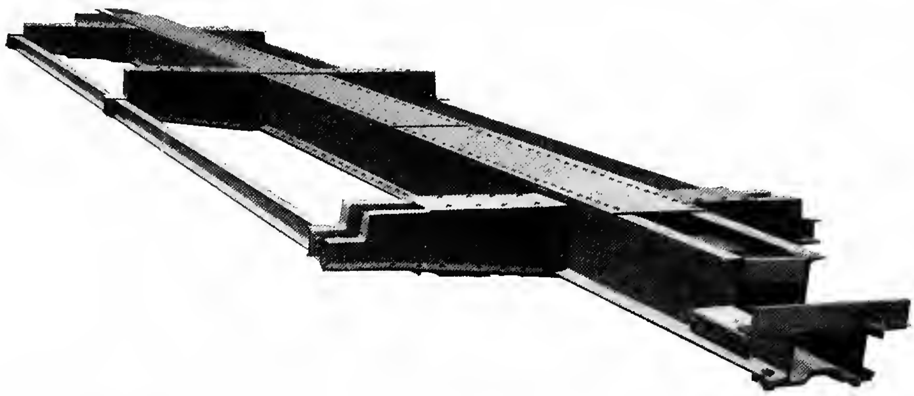


Fig. 444—Ralston Steel Underframe for 40-Ton Capacity Hopper Gondola Car.

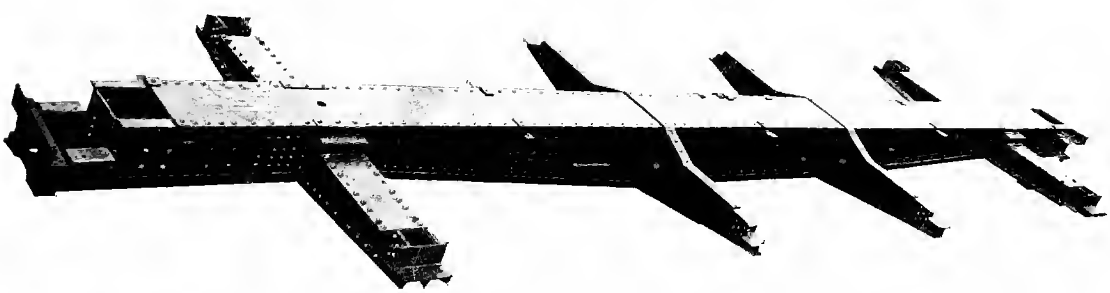


Fig. 445—Ralston Steel Underframe for 40-Ton Capacity Gondola Car. See also Fig. 432.

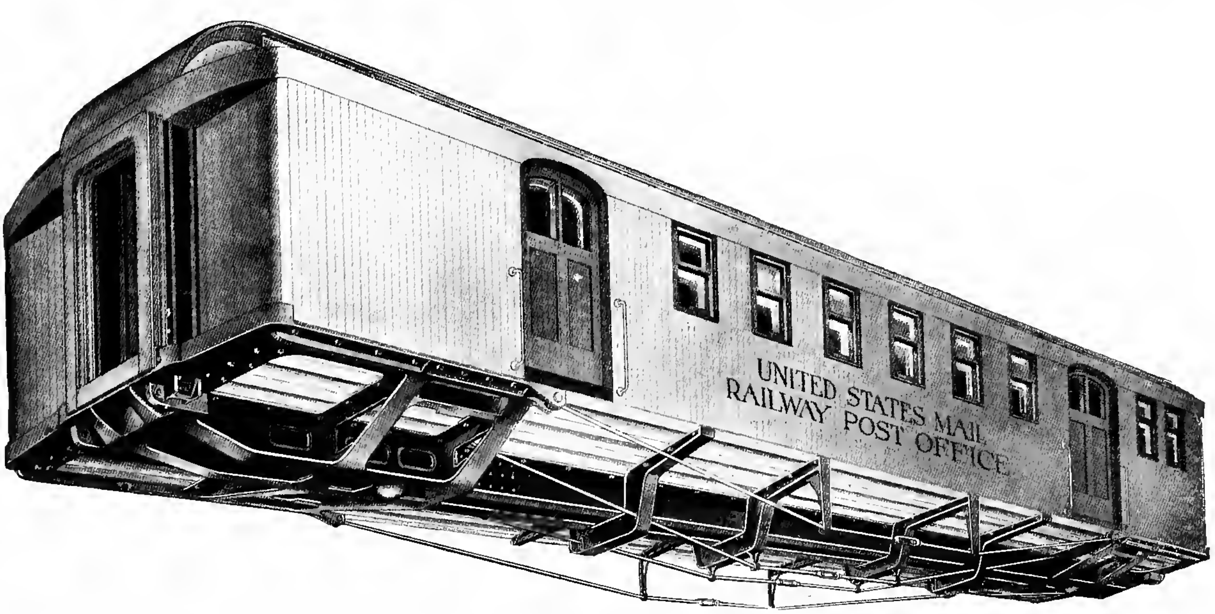


Fig. 446—Commonwealth Steel Company's Steel Underframe for Strengthening Old Postal Cars.

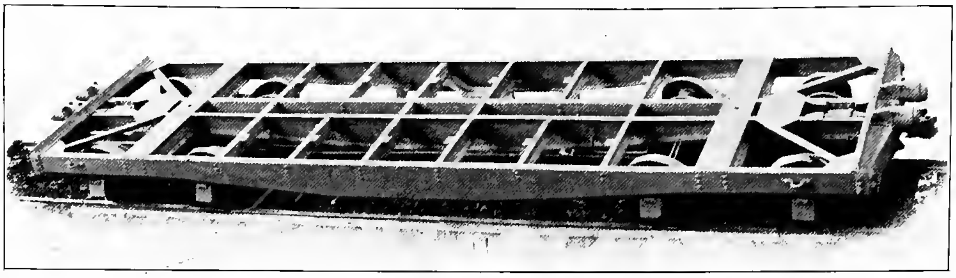


Fig. 447—Pressed Steel Underframe for 50-Ton Capacity Box Car. Builder, Pressed Steel Car Company.

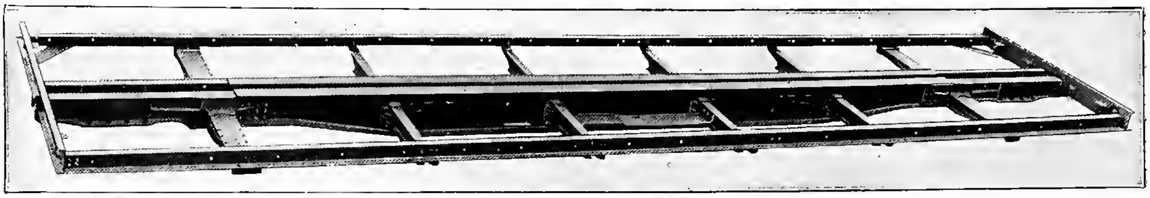


Fig. 448—Steel Underframe with Double Center Sill Equipped with Cast Steel Ends. Builder, Bettendorf Axle Company.

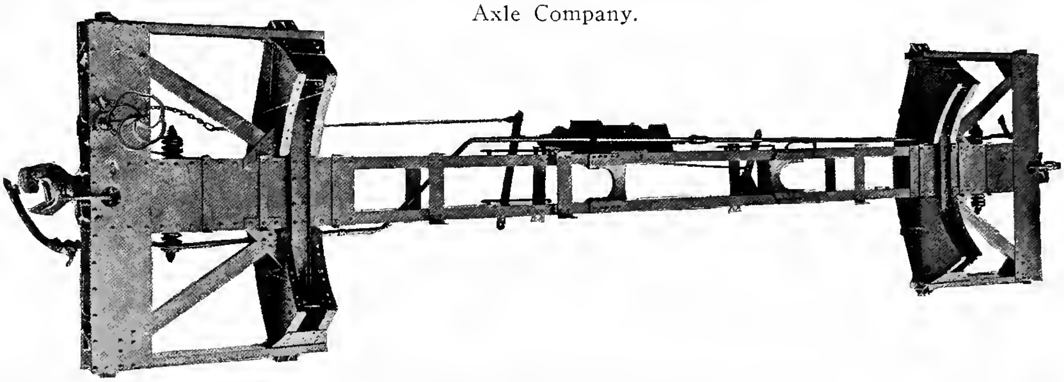


Fig. 449—Steel Underframe for Tank Car, Capacity 12,000 U. S. Gallons. Builder, American Car & Foundry Company.

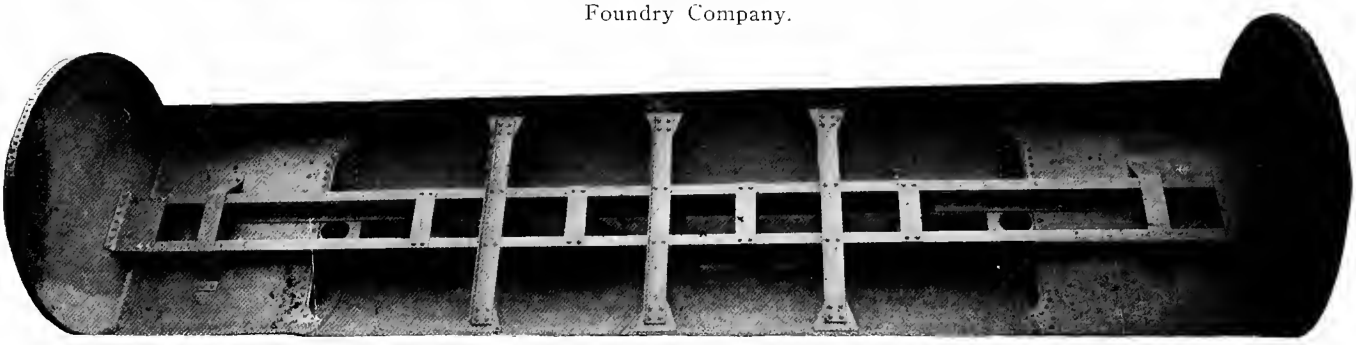


Fig. 450—Underframe for Chicago Steel Car Company's Tank Car, Capacity 8,000 U. S. Gallons.

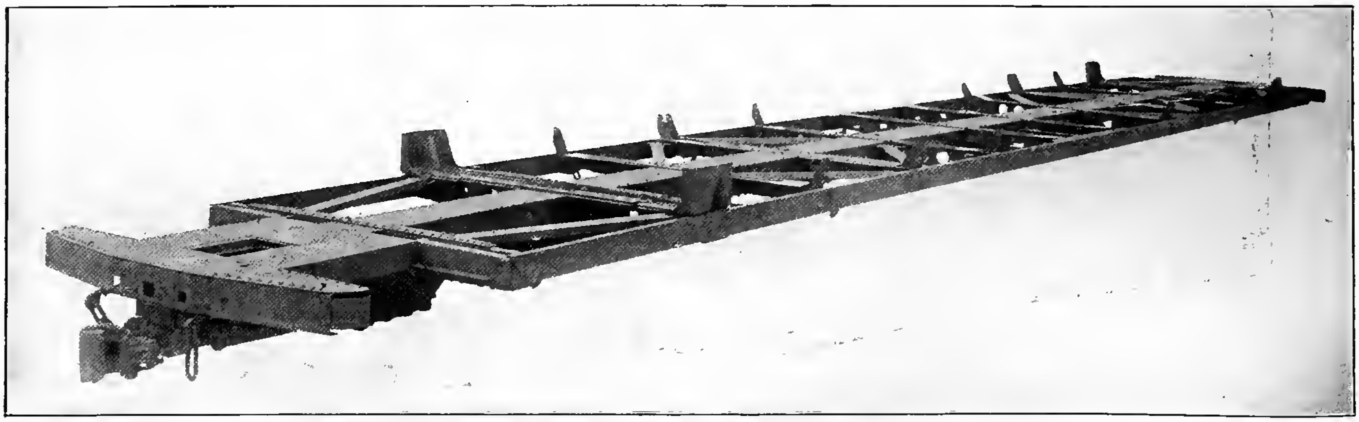


Fig. 451—Underframe for Steel Suburban Car Shown in Fig. 189.

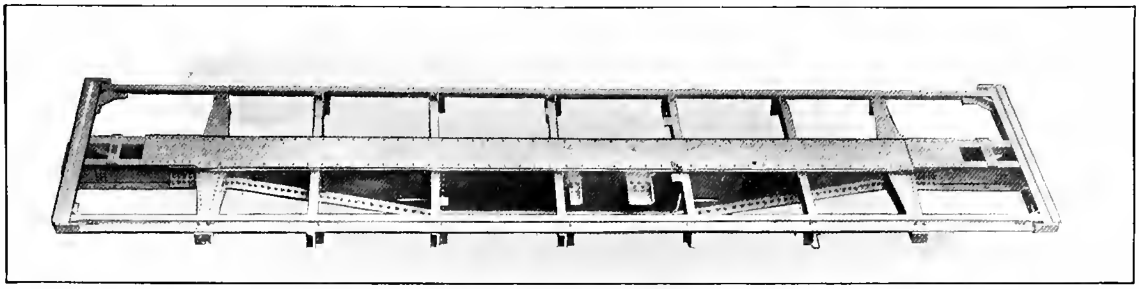


Fig. 452—American Car & Foundry Company Steel Underframe.

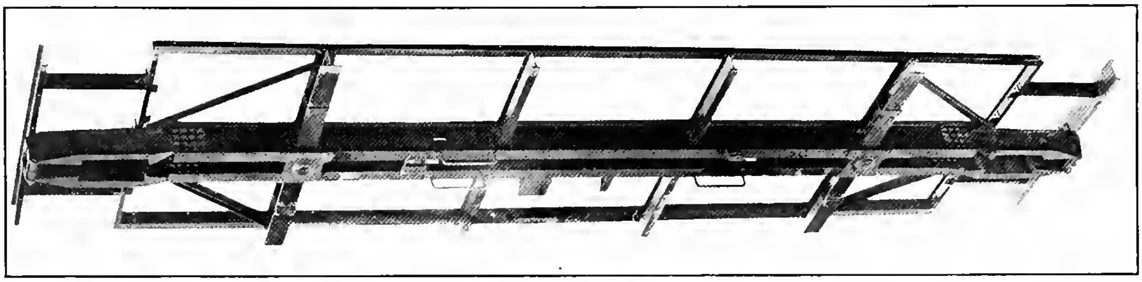


Fig. 453—Bottom View of Steel Underframe for Caboose. Builder, Bettendorf Axle Company.

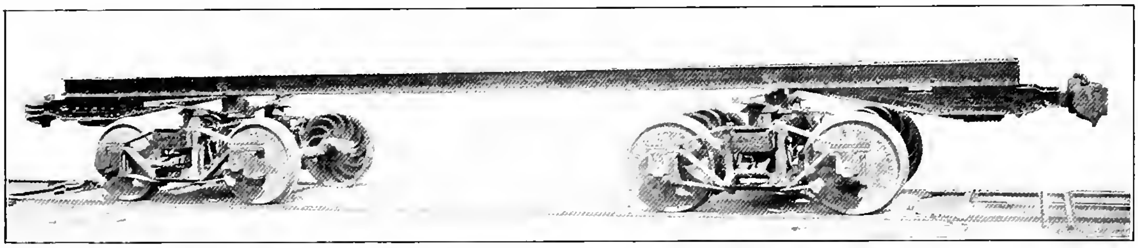


Fig. 454—Steel Center and Draft Sills for Canadian Pacific Caboose.

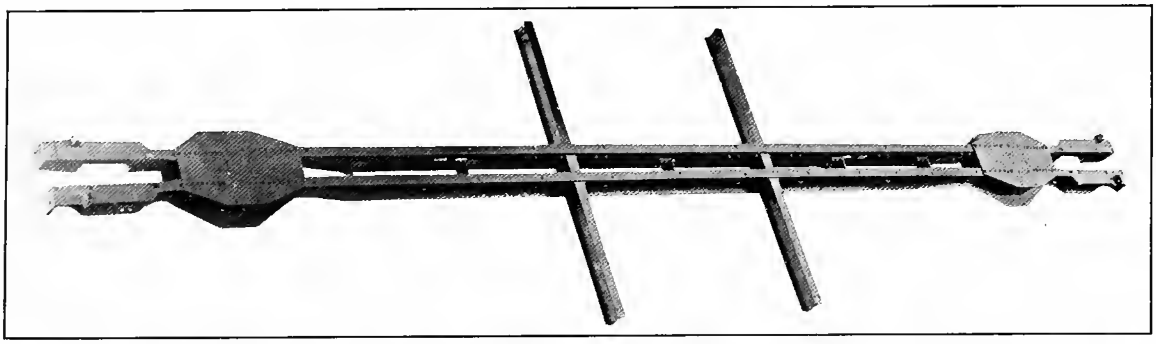


Fig. 455—Subsills for Strengthening Old Cars. Builder, Bettendorf Axle Company.

Fig. 456—Commonwealth Steel Company's Combined Steel and Wood Underframe for Passenger Train Cars, Using Cast Steel Combined Platform and Double Body Bolsters, Steel Cross Ties and Needle Beams.

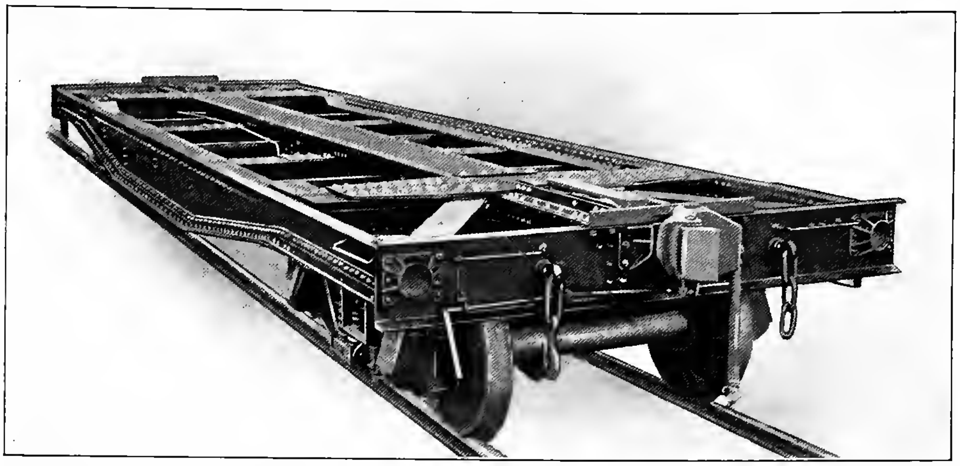


Fig. 457—Steel Frame for Erie Railroad 75-Ton Capacity Flat Car Shown in Fig. 71. Builder, American Car & Foundry Company.

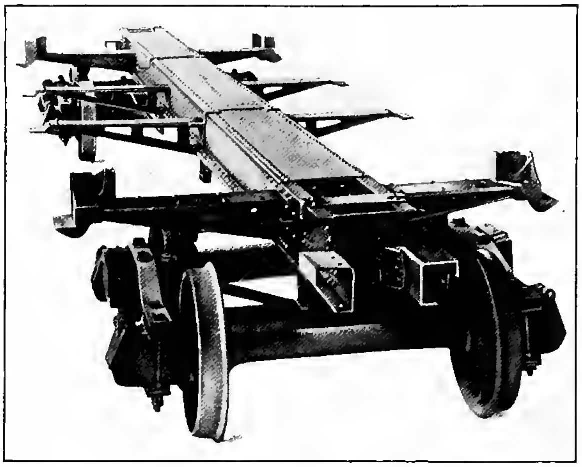


Fig. 458—Ralston Patent Steel Underframe for Freight Cars. Builder, Ralston Steel Car Company.

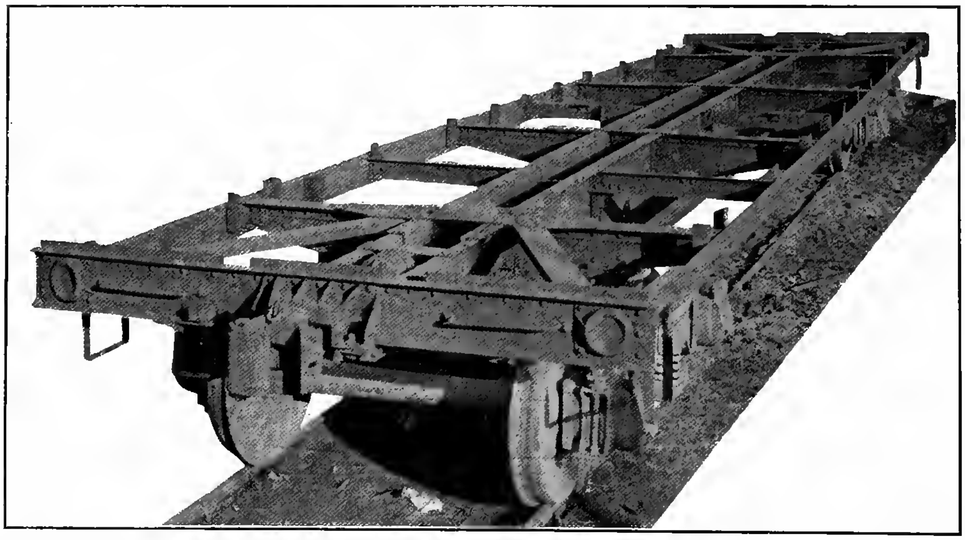


Fig. 459—Steel Underframe for Ann Arbor 40-Ton Capacity Box Car Shown in Fig. 7. Builder, Western Steel Car & Foundry Company.

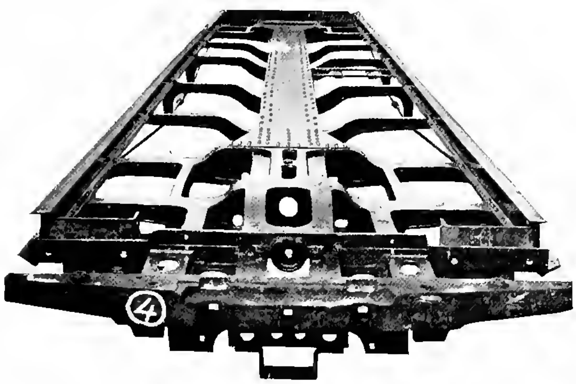


Fig. 460—Steel Underframe for Passenger Train Cars.

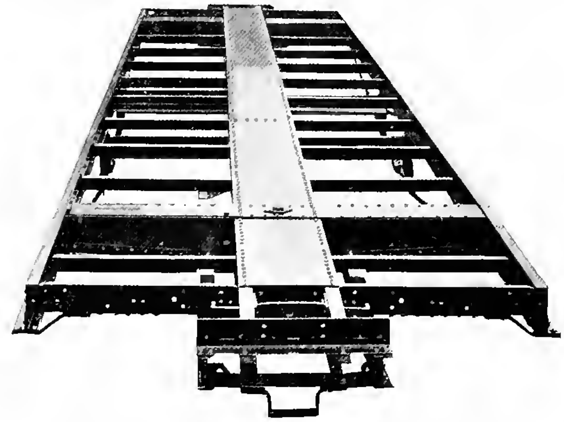


Fig. 461—Steel Underframe for Passenger Train Cars.

Builder, The Harlan & Hollingsworth Corporation.

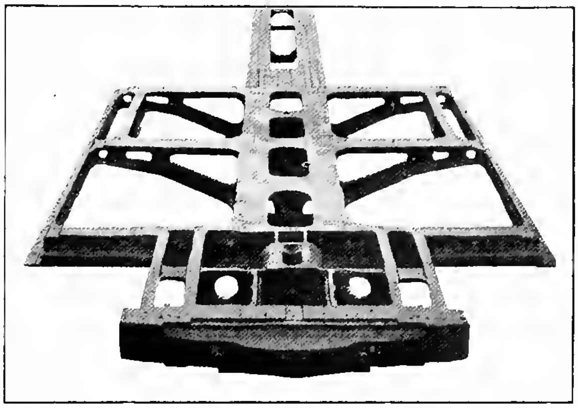


Fig. 462—Partially Completed Steel Underframe for Pullman Steel Sleeping Car Shown in Fig. 176.

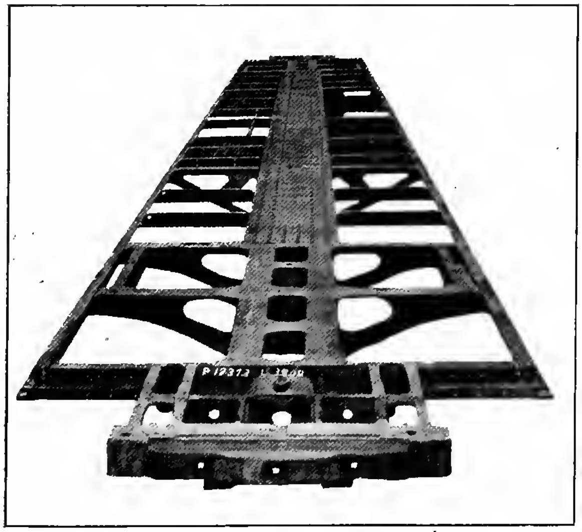


Fig. 463—Steel Underframe for Pullman Steel Sleeping Car Shown in Fig. 176.

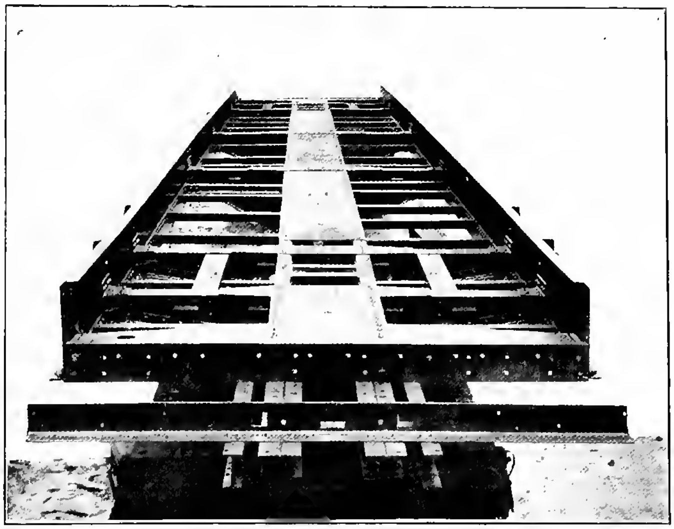


Fig. 464—Steel Underframe for Atlantic Coast Line Day Coach. Builder, Central Locomotive & Car Works.

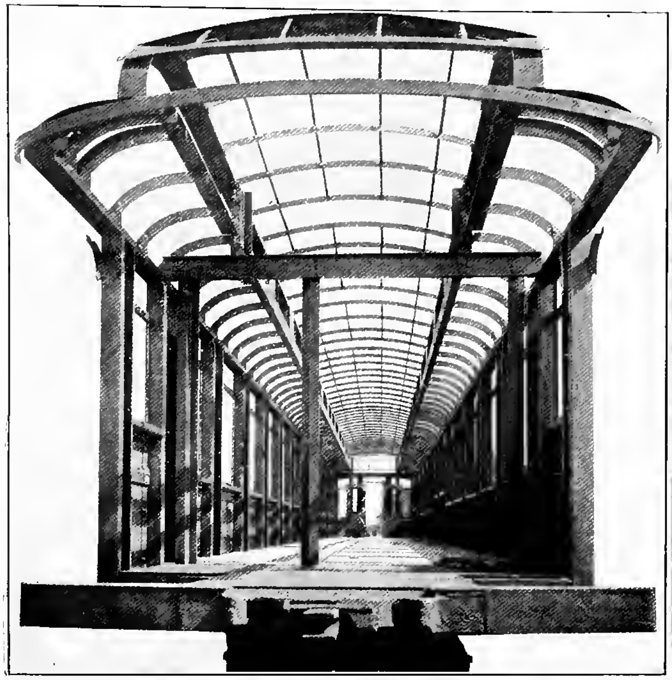


Fig. 465—Steel Frame for Observation Car. Builder, The Barney & Smith Car Company.

Fig. 466—Steel Frame for Pullman Sleeping Car Shown in Fig. 176.

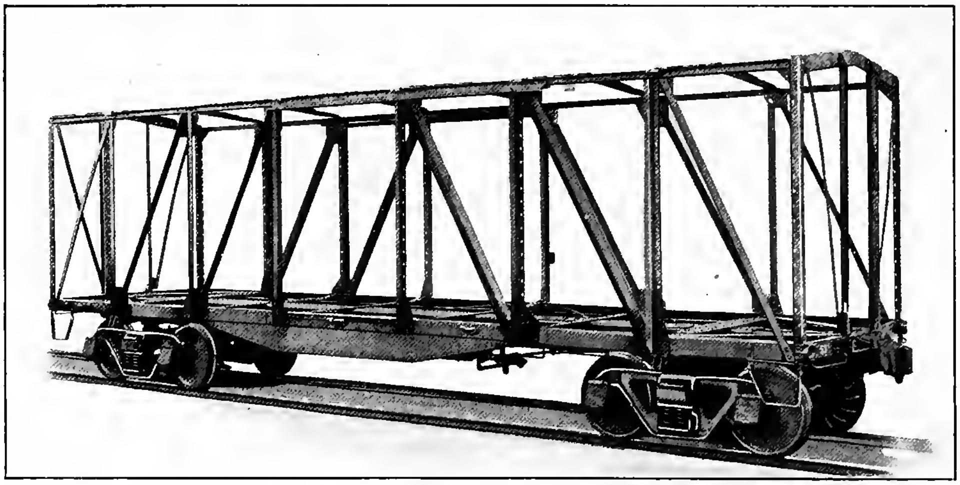


Fig. 467—Steel Frame for Erie Railroad Box Car Shown in Fig. 5.

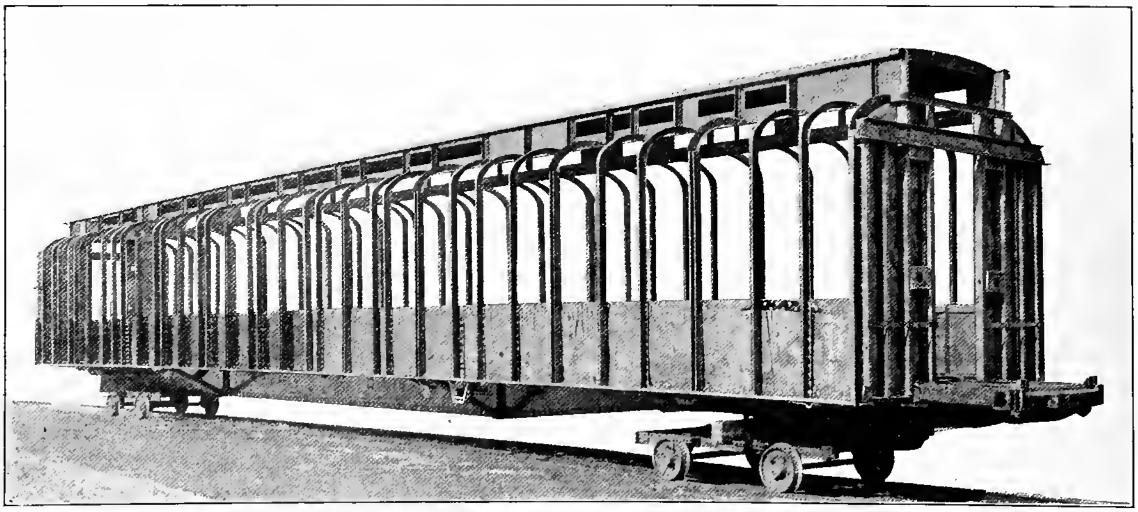
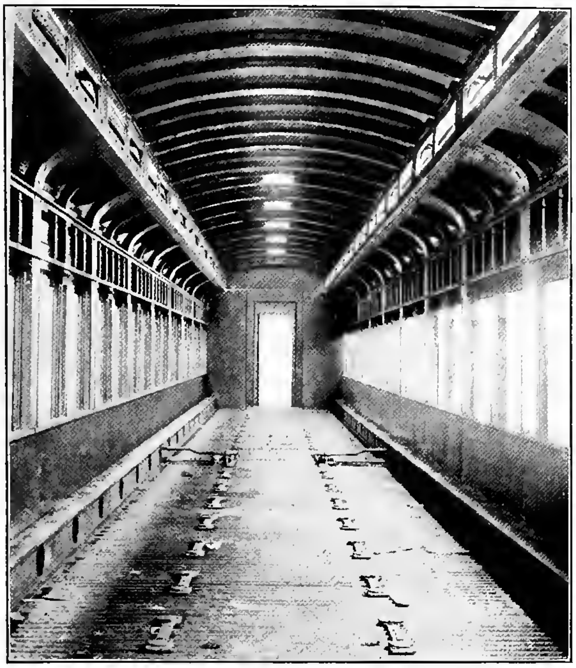
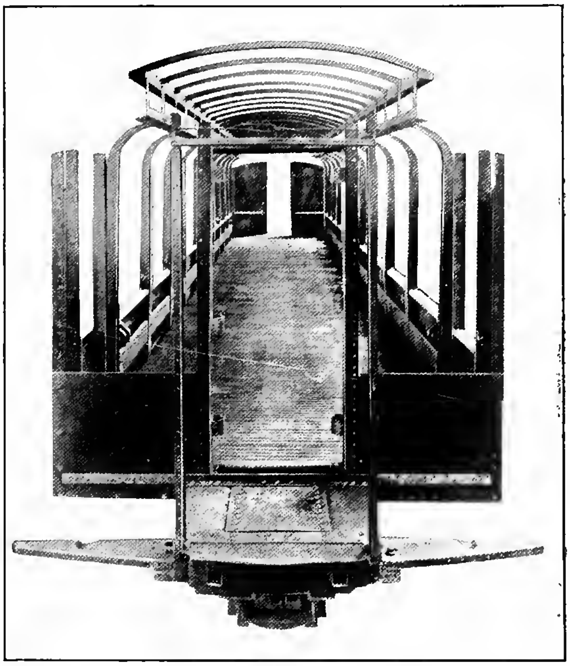


Fig. 468—Steel Frame for Pullman Sleeping Car Shown in Fig. 176.





Figs. 469 and 470—Steel Frame for Pennsylvania Railroad Day Coach Shown in Fig. 142.

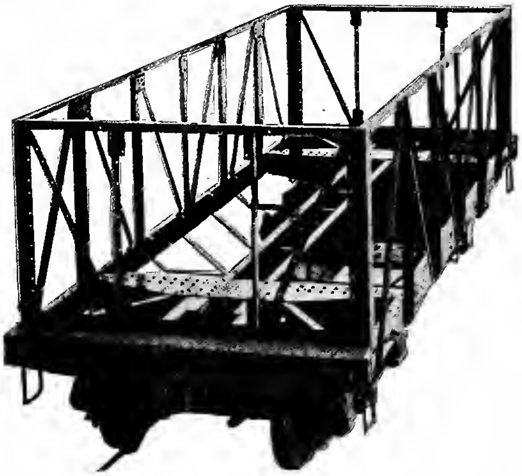
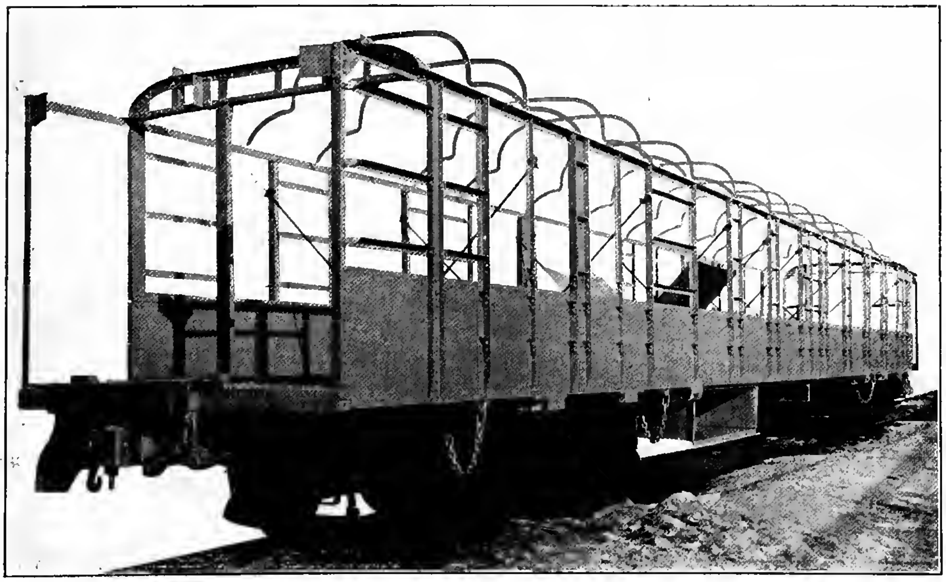


Fig. 471—Steel Frame for 40-Ton Capacity Gondola Car. Builder, Middletown Car Company.



...el Frame for Parlor Cafe Car Shown in Fig. 179.

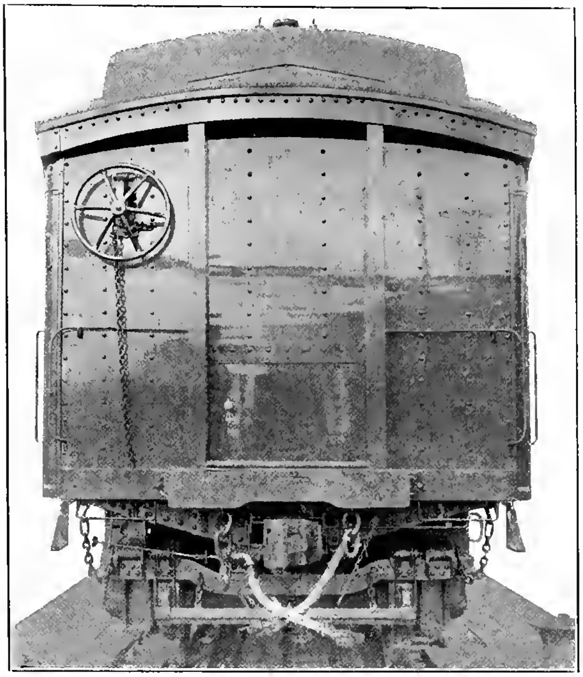


Fig. 473—End Construction of Steel Baggage Car. Builder, The Harlan & Hollingsworth Corporation.

Fig. 474—Van Dorn One Piece Steel End for Box Cars with End Door. W. T. Van Dorn Company.

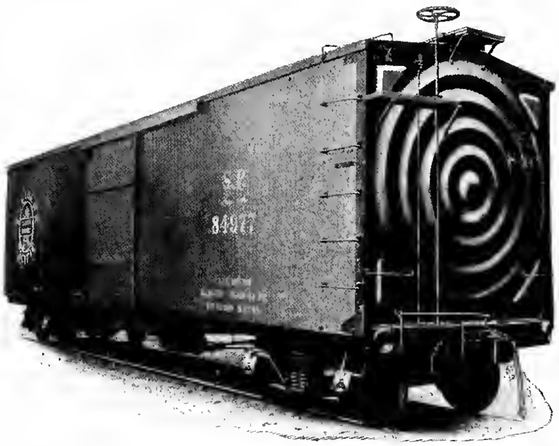


Fig. 475—Van Dorn One Piece Steel End for Box Cars. W. T. Van Dorn Company.

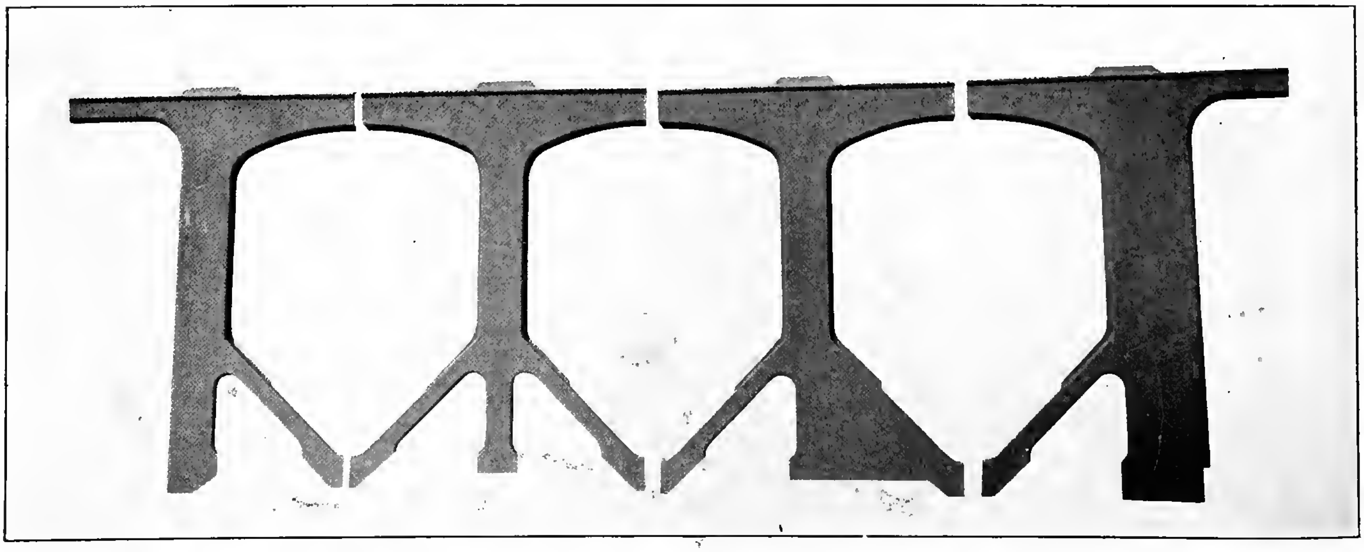


Fig. 476—Pressed Steel Unit Sections for Suburban Car Shown in Figs. 189 and 422. Forsyth Brothers Company.

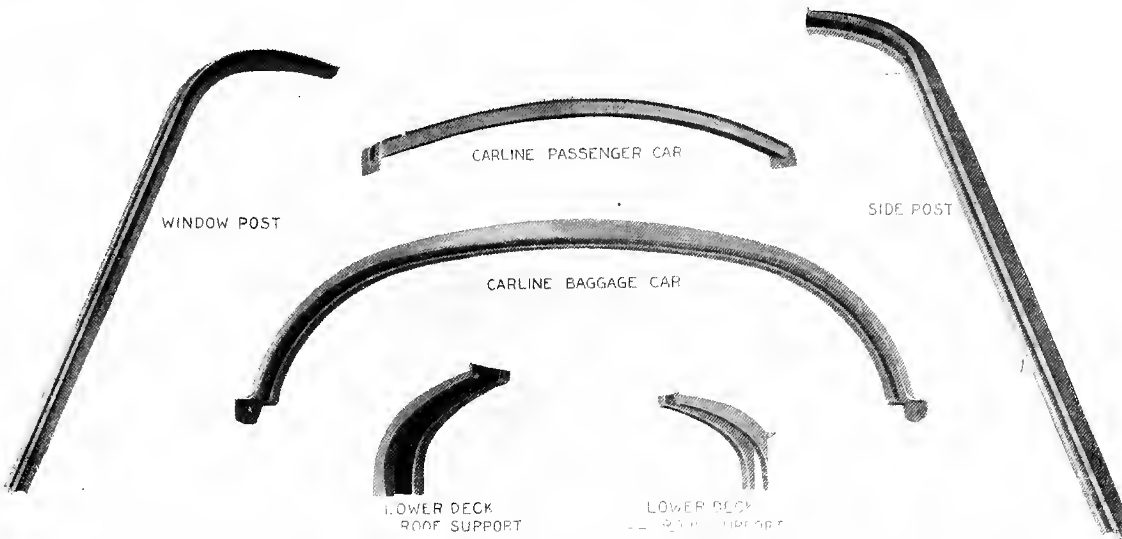


Fig. 477—Pressed Steel Shapes for Passenger Train Car Framing. Cleveland Car Specialty Company.

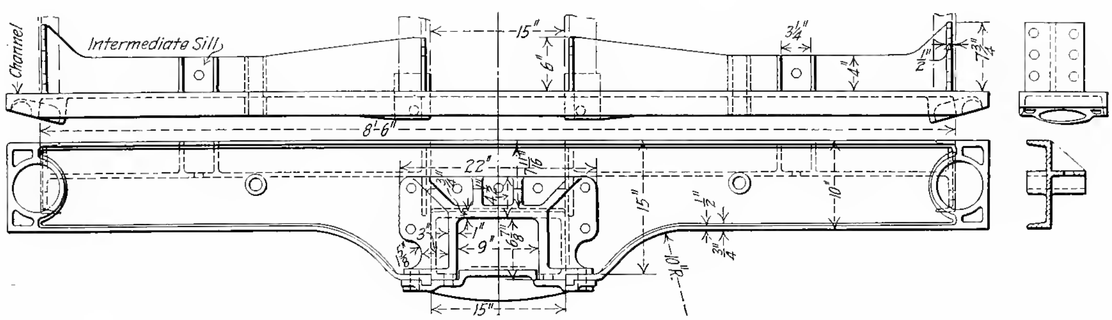


Fig. 478—Cast Steel End Sill for Freight Cars. Pittsburgh Equipment Company.

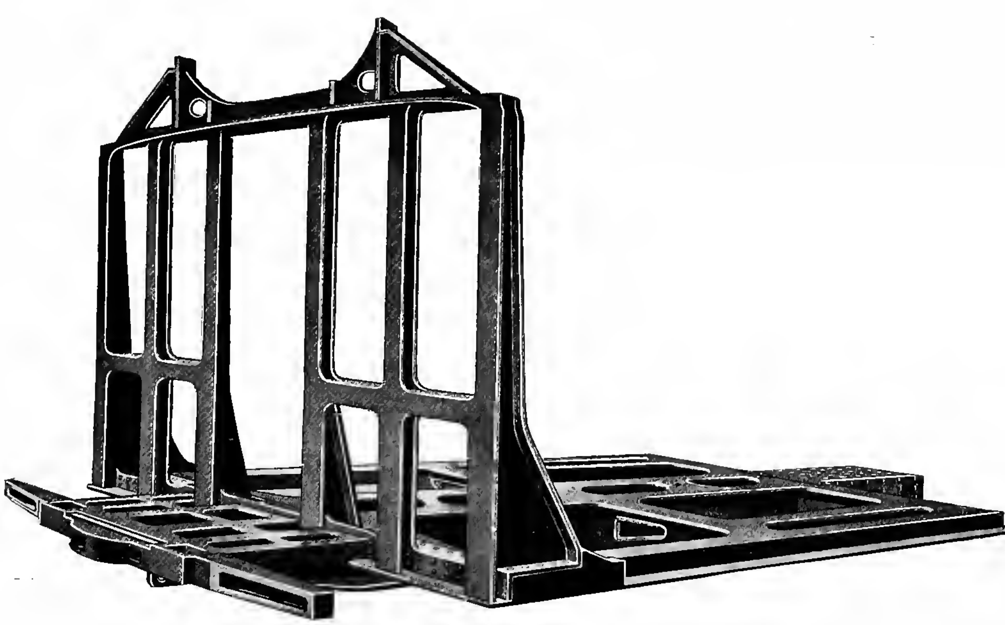


Fig. 479—Commonwealth Steel Company's Upright End Frame in One Piece, and Commonwealth Combined Platform and Double Body Bolster for Vestibuled Cars.

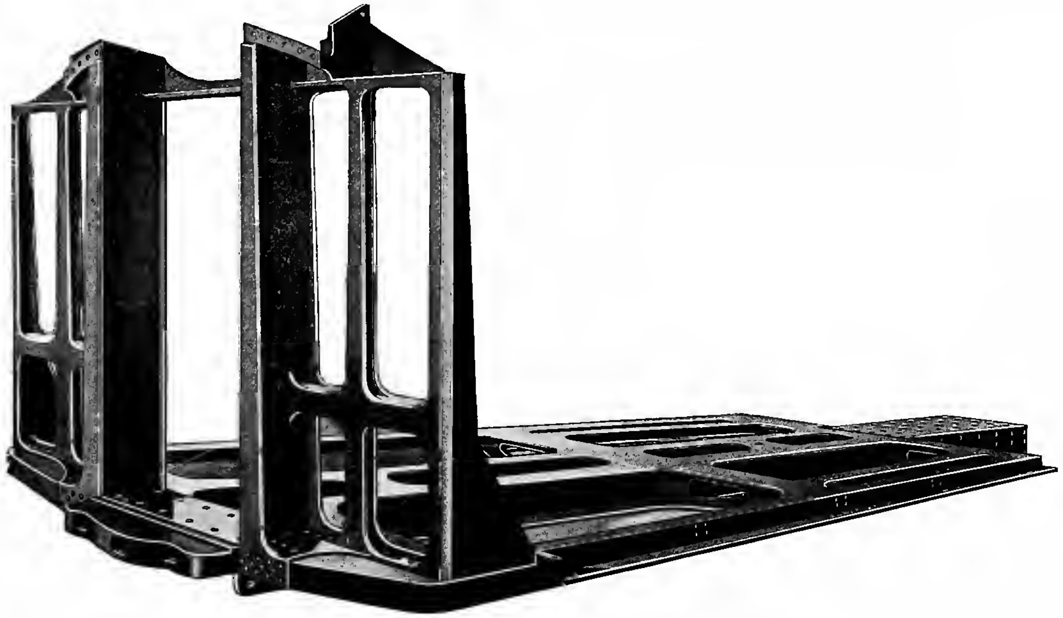


Fig. 480—Commonwealth Steel Company's Upright End Frame in One Piece, and Commonwealth Combined Platform and Double Body Bolster for Non-Vestibule Cars.

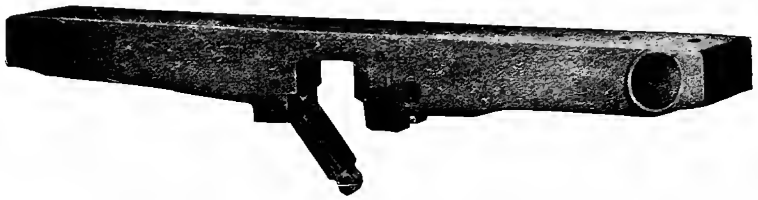


Fig. 481—Commonwealth Steel Company's Cast Steel End Sill for Freight Cars, with Flory Carry Iron.

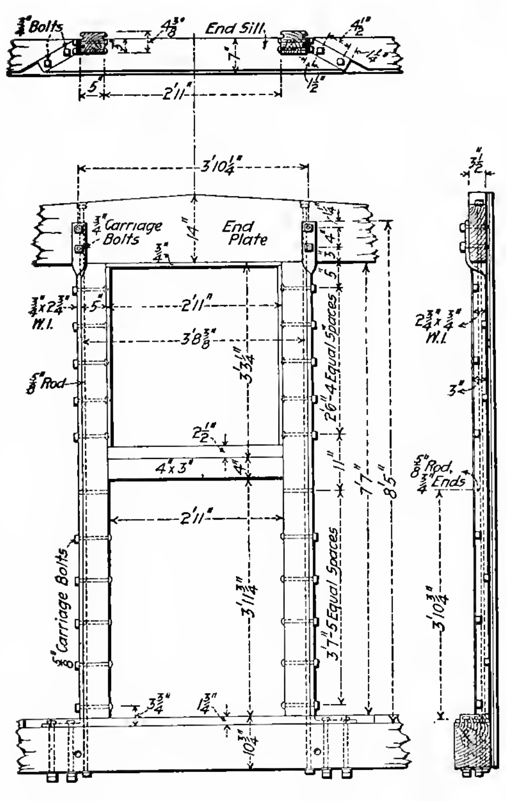


Fig. 482—End Construction for Chicago & Alton Box Cars.

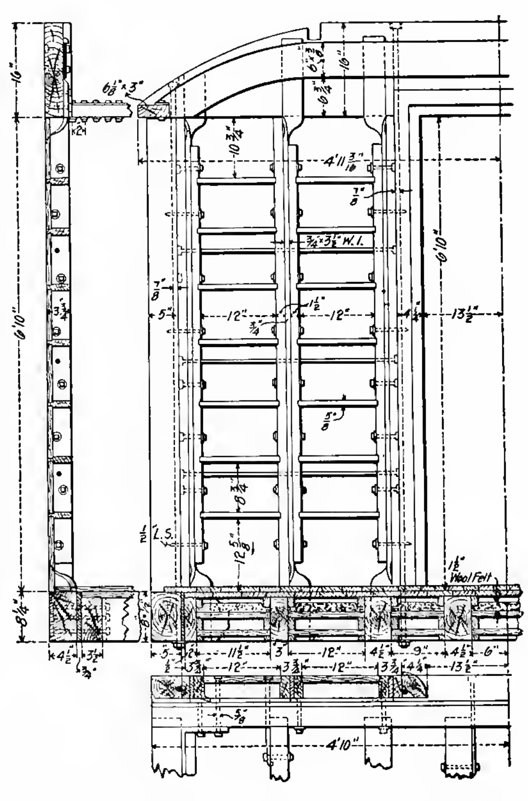


Fig. 482A—End Construction for Lake Shore & Michigan Southern Passenger Train Cars.

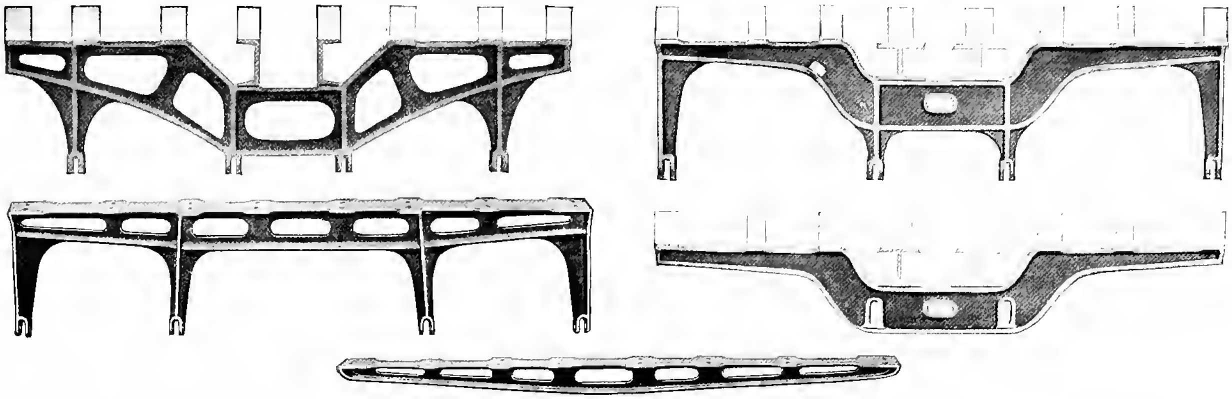


Fig. 483—Cast Steel Needle Beams. Commonwealth Steel Company.

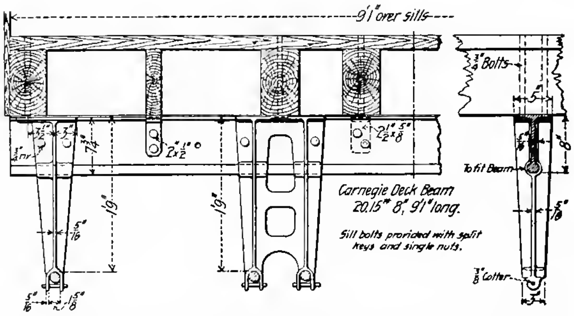


Fig. 484—Needle Beam and Queen Posts for Chicago, Burlington & Quincy 40-Ton Capacity Wooden Box Car.

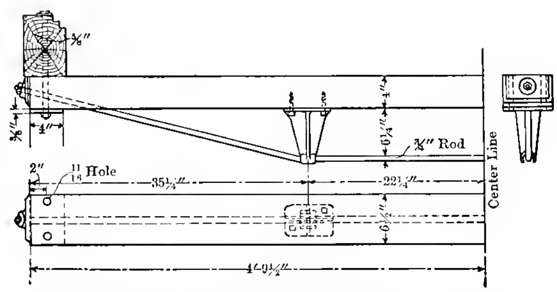


Fig. 485—Needle Beam Trussing for New York, New Haven & Hartford Wooden Day Coach.

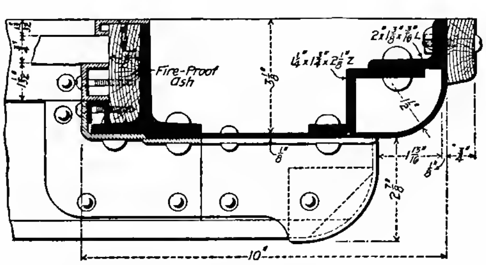


Fig. 486—End Door Post Construction for Interborough Subway Steel Motor Cars.

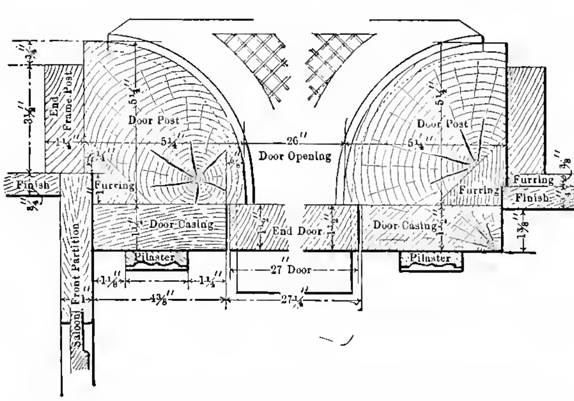


Fig. 487—Section Through Door Posts of New York, New Haven & Hartford Wooden Day Coach.

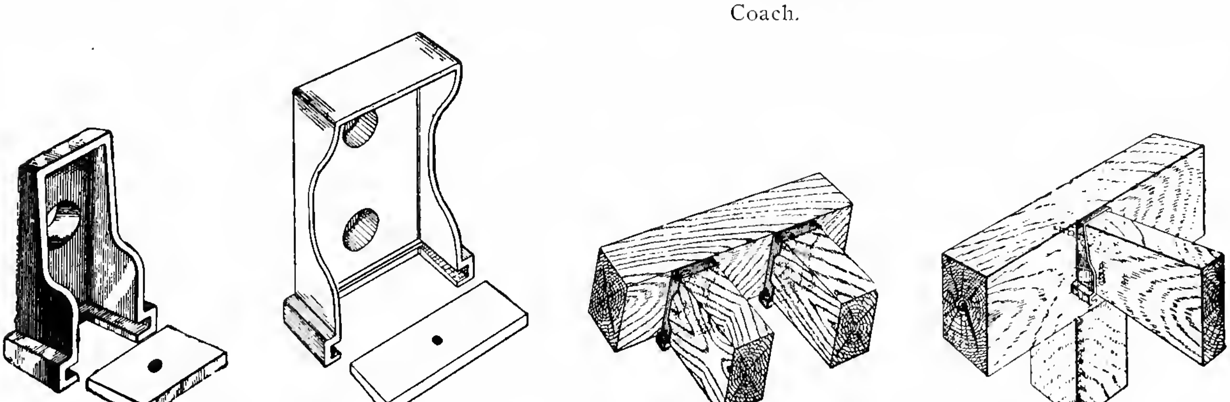


Fig. 488—Western Timber Pockets and Their Application. Western Railway Equipment Company.

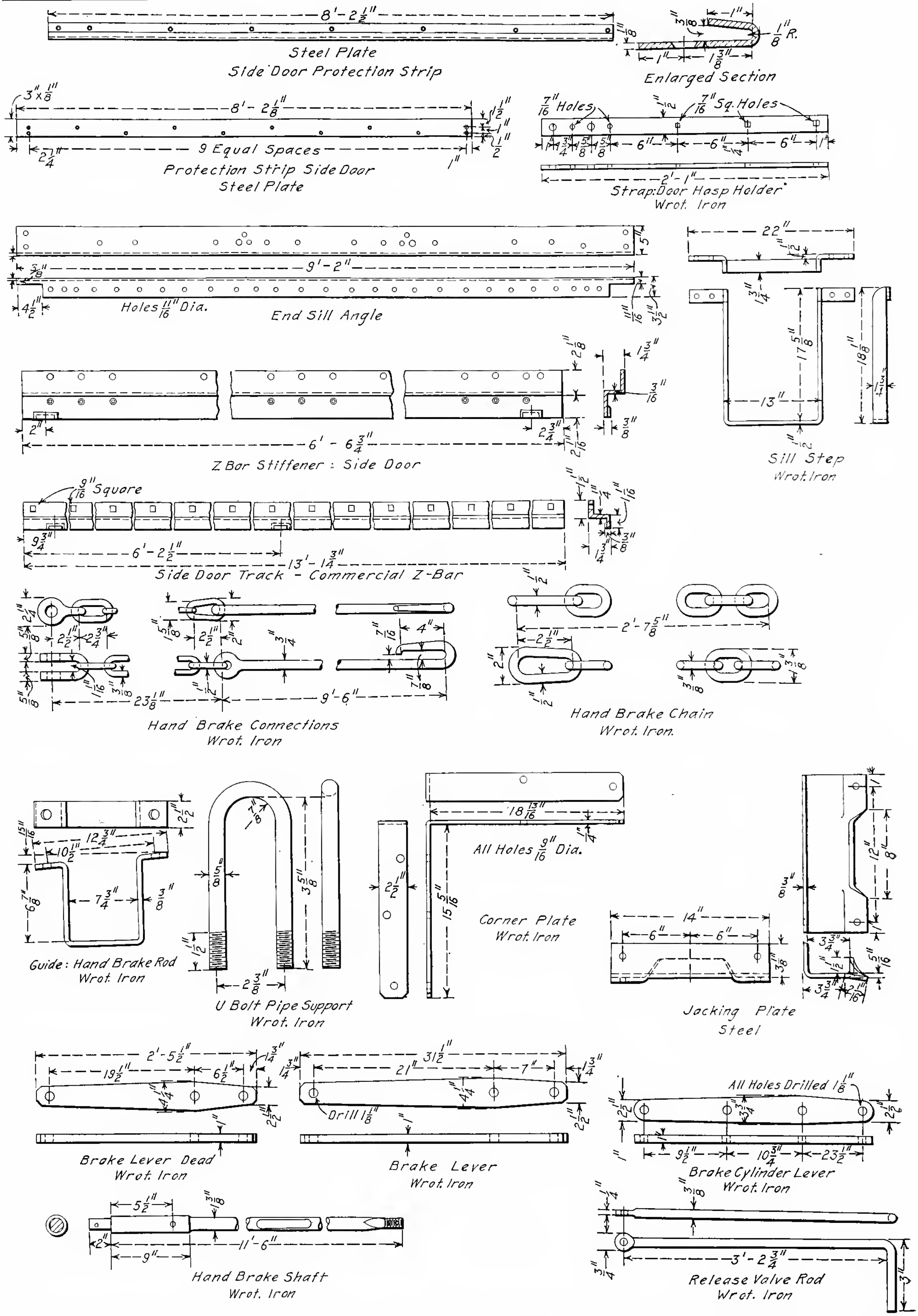


Fig. 489—Details Used on New York Central & Hudson River Box Car Shown in Figs. 274 and 276.

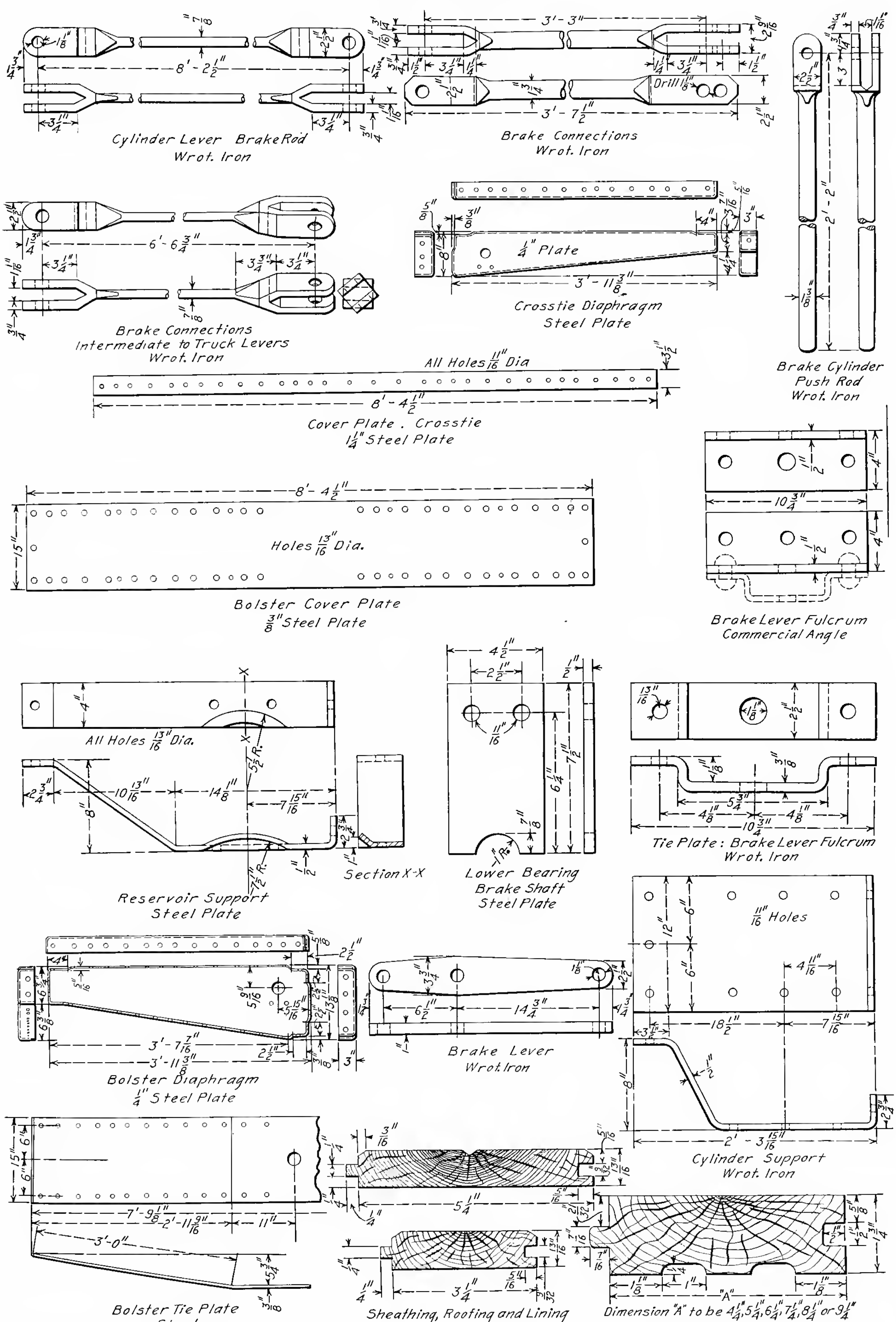


Fig. 490—Details Used on New York Central & Hudson River Box Car Shown in Figs. 274 and 276.

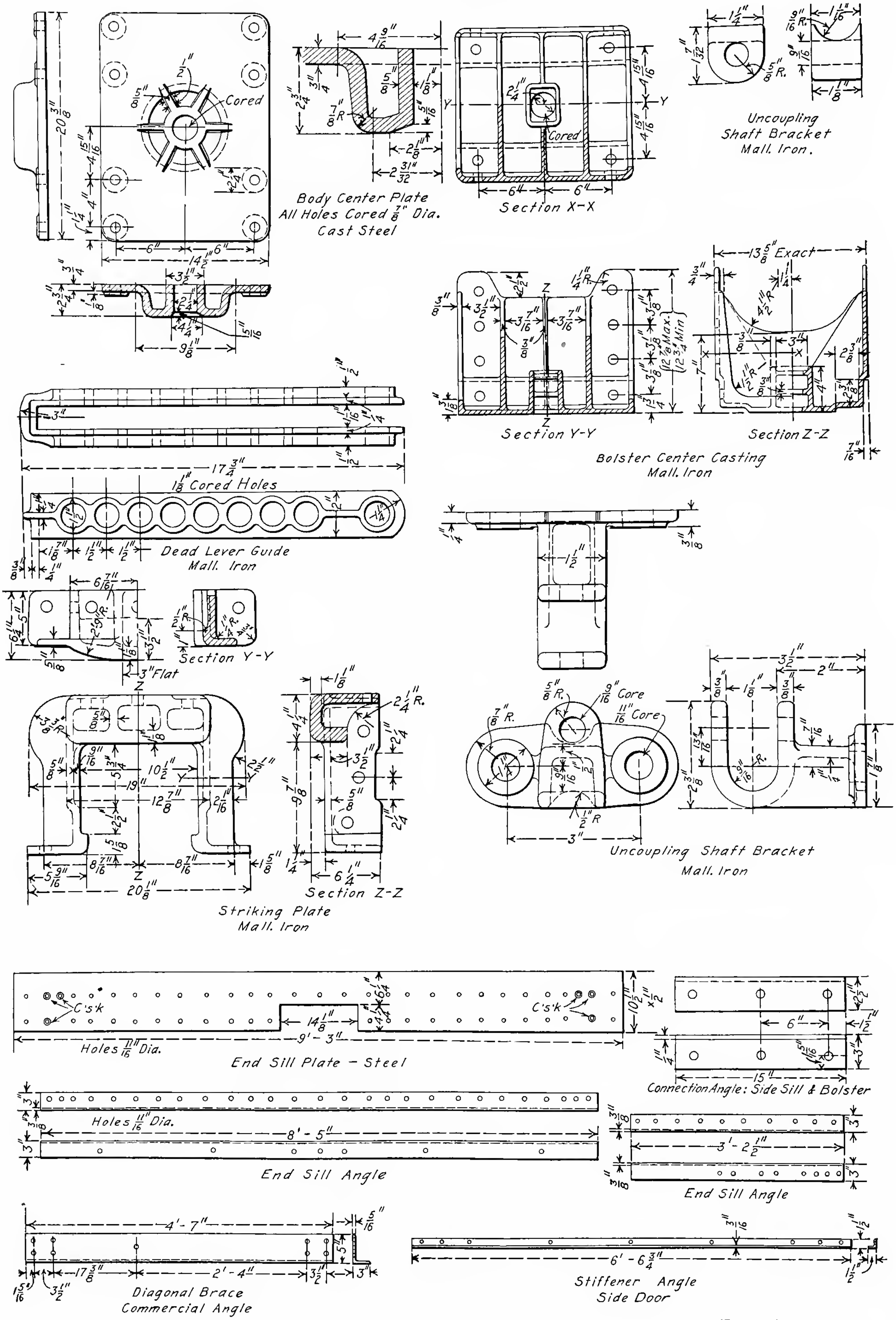


Fig. 491—Details Used on New York Central & Hudson River Box Car Shown in Figs. 274 and 276.

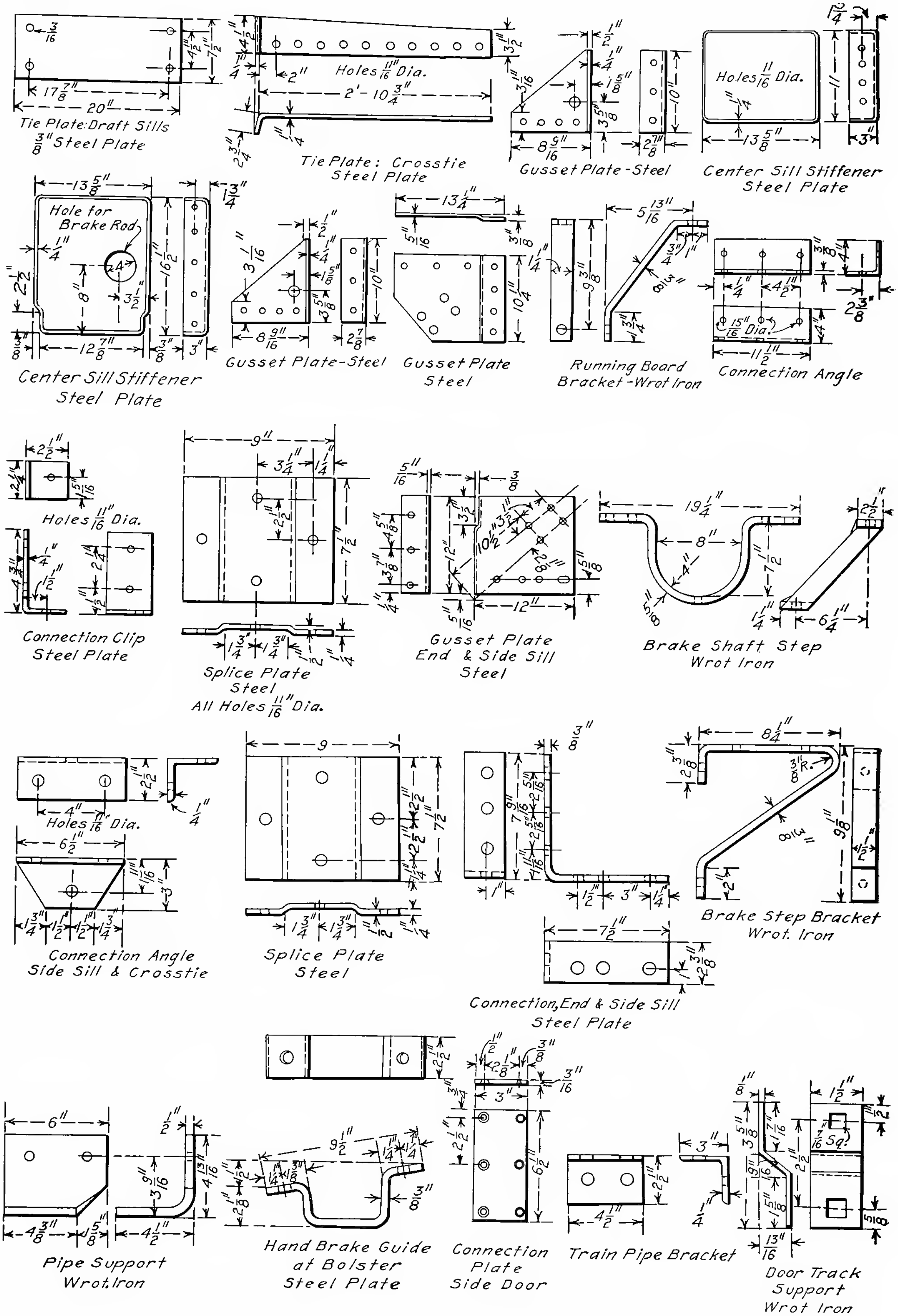


Fig. 492—Details Used on New York Central & Hudson River Box Car Shown in Figs. 274 and 276.

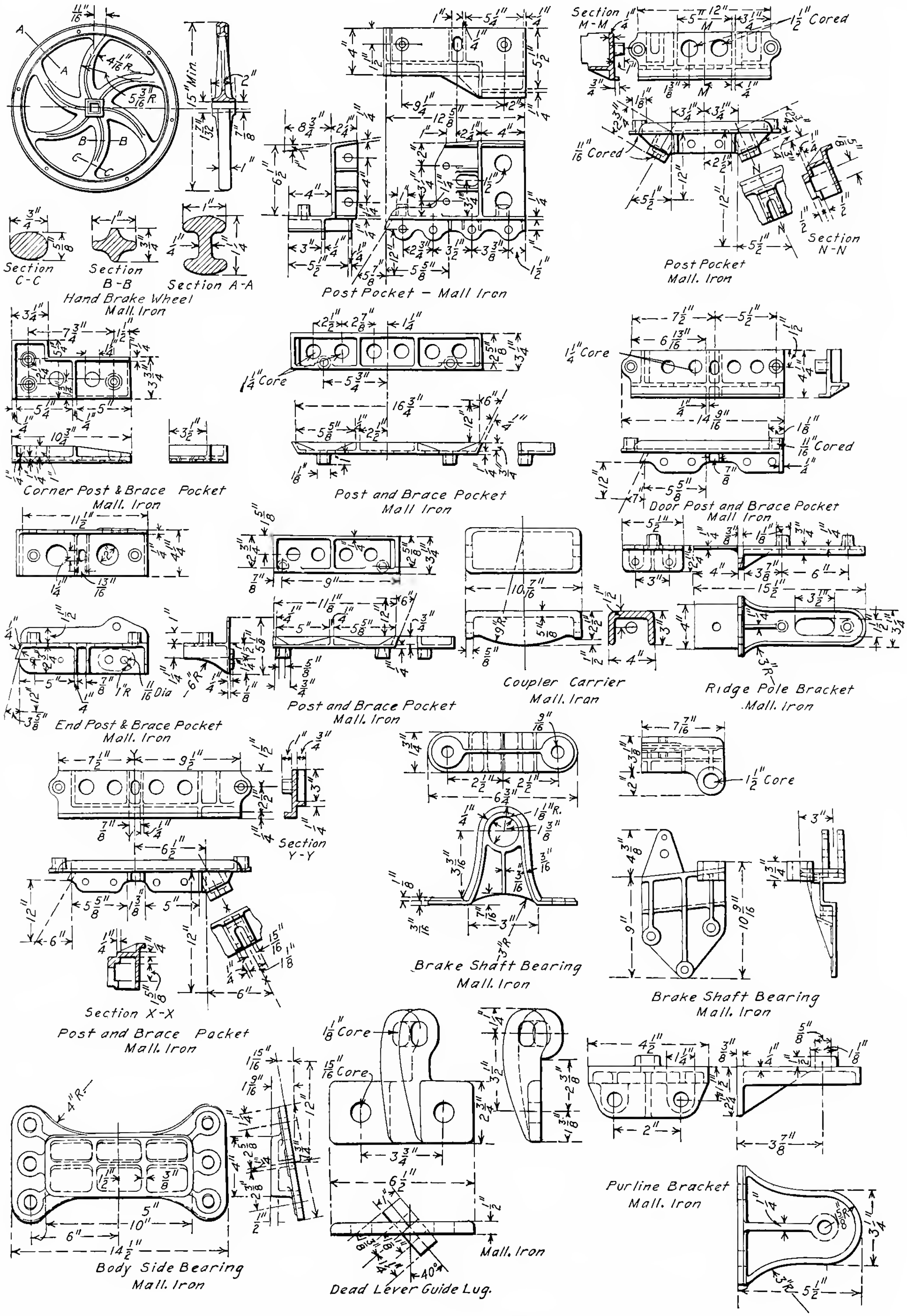


Fig. 493—Details Used on New York Central & Hudson River Box Car Shown in Figs. 274 and 276.

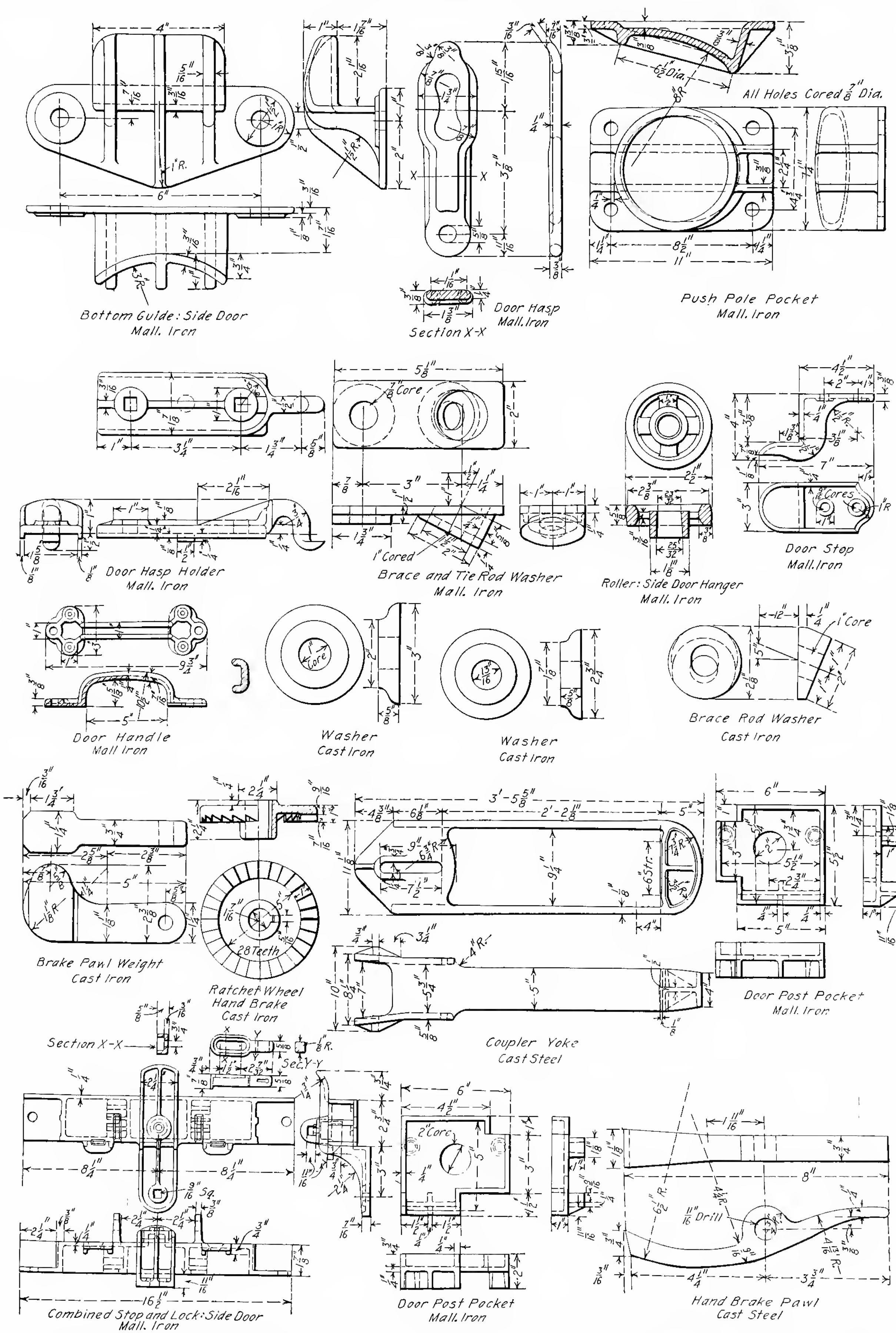


Fig. 494—Details Used on New York Central & Hudson River Box Car Shown in Figs. 274 and 276.

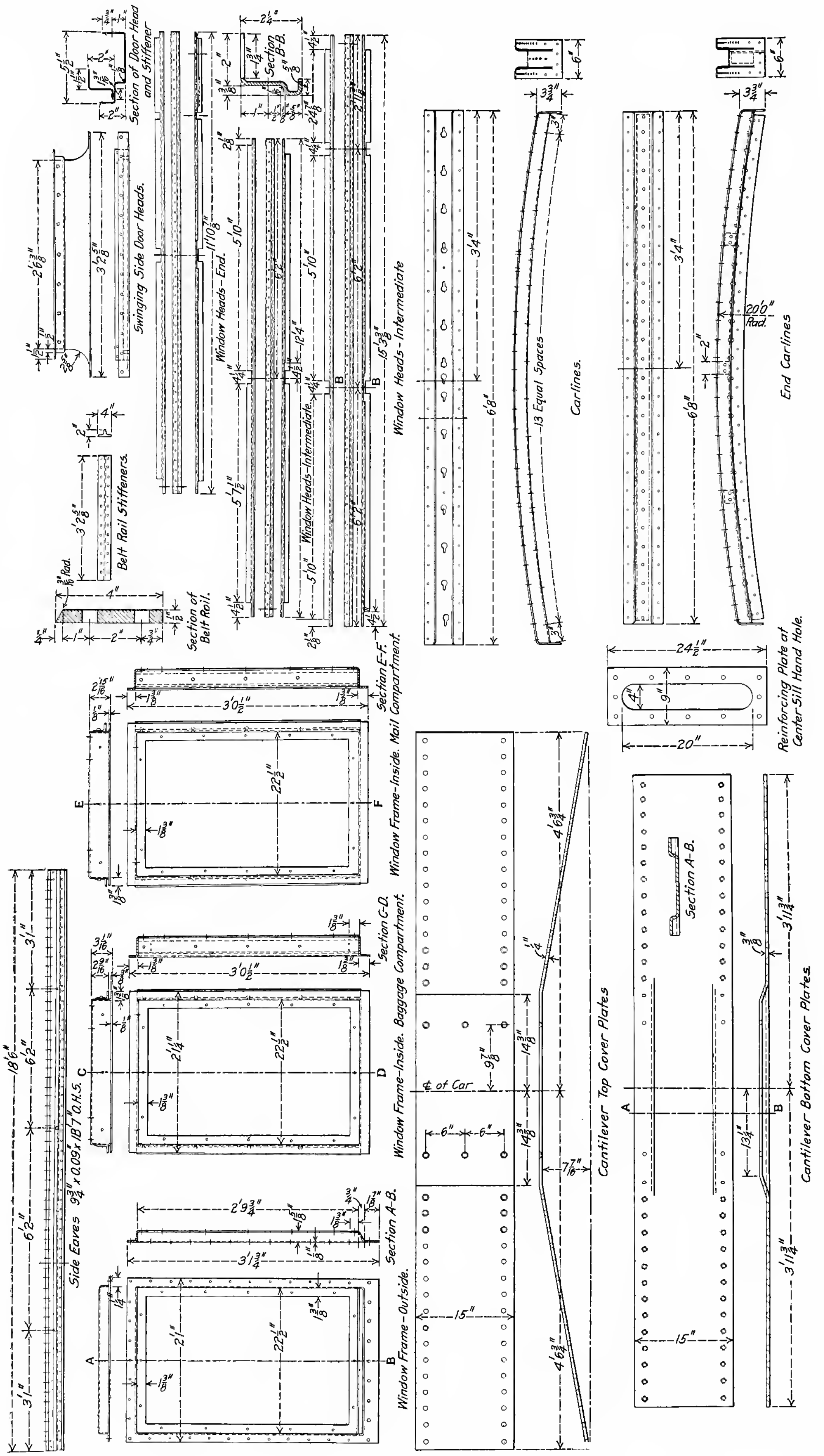


Fig. 495—Details Used on Long Island Steel Postal and Express Car Shown in Fig. 141.

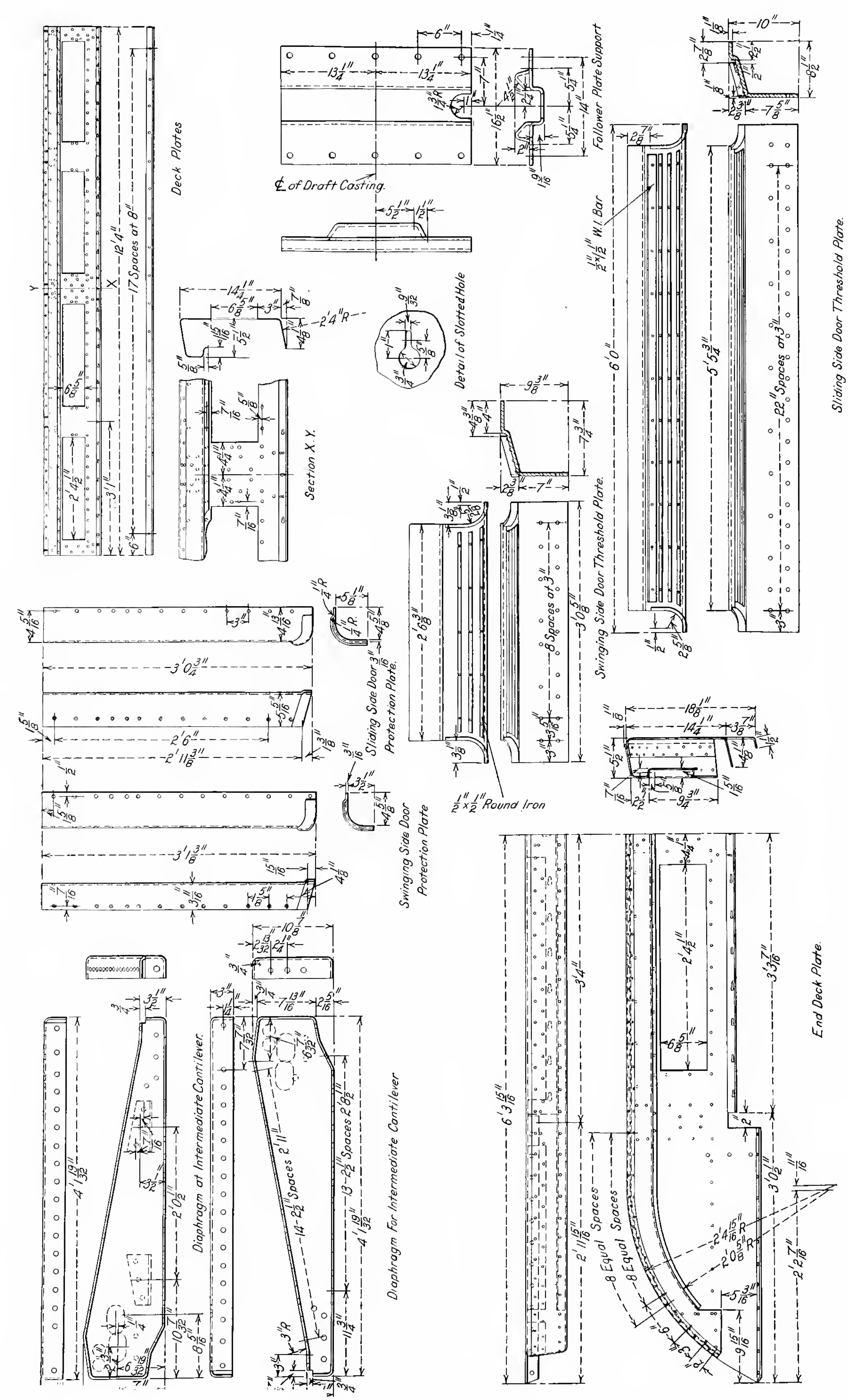


Fig. 496—Details Used on Long Island Steel Postal and Express Car Shown in Fig. 141.

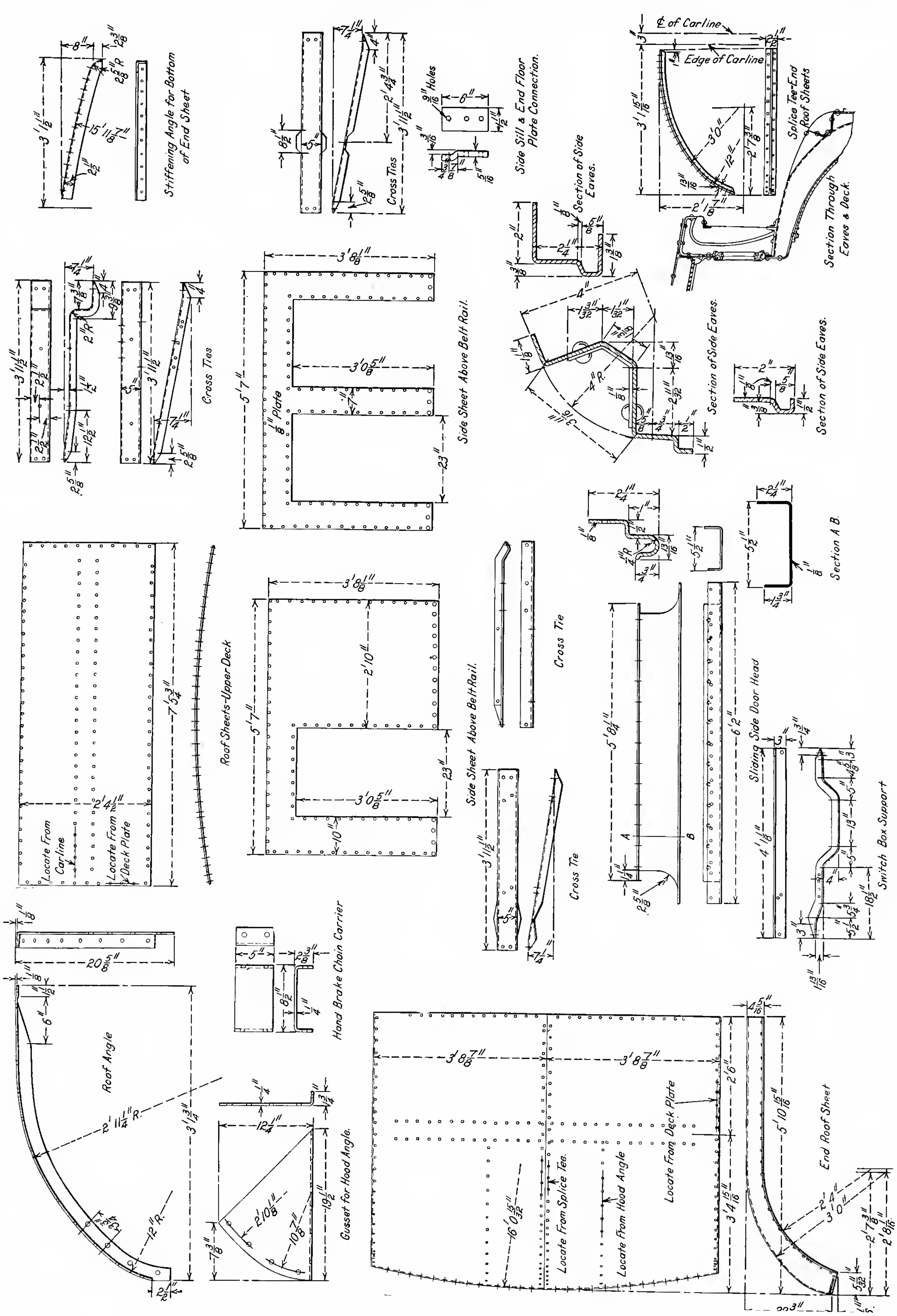


Fig. 497—Details Used on Long Island Steel Postal and Express Car Shown in Fig. 141.

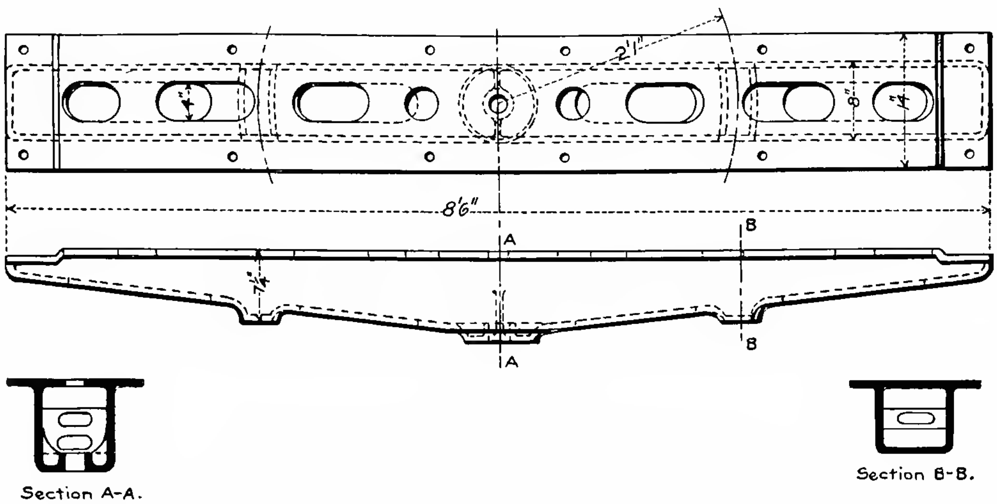


Fig. 498—Cast Steel Box-Section Body Bolster. American Steel Foundries.

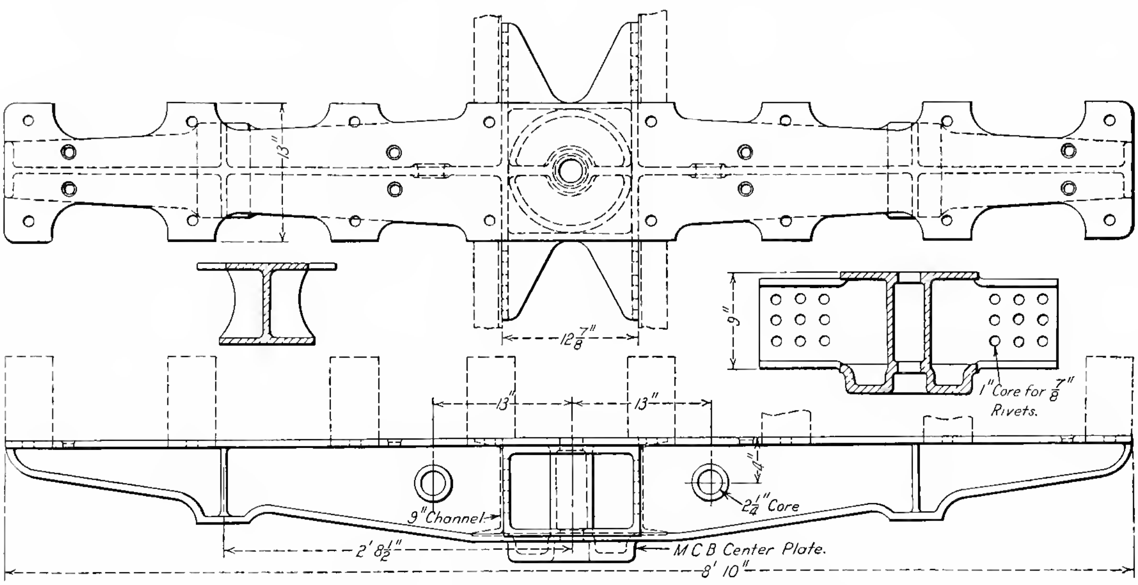


Fig. 499—Gould Cast Steel I-Beam Type Body Bolster. Gould Coupler Company.

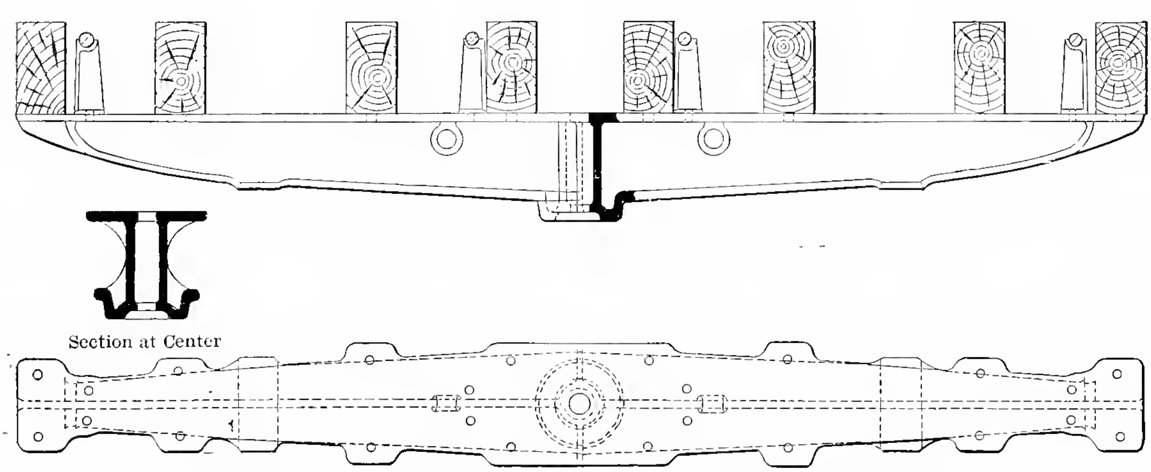


Fig. 500—Cast Steel I-Section Body Bolster. American Steel Foundries.

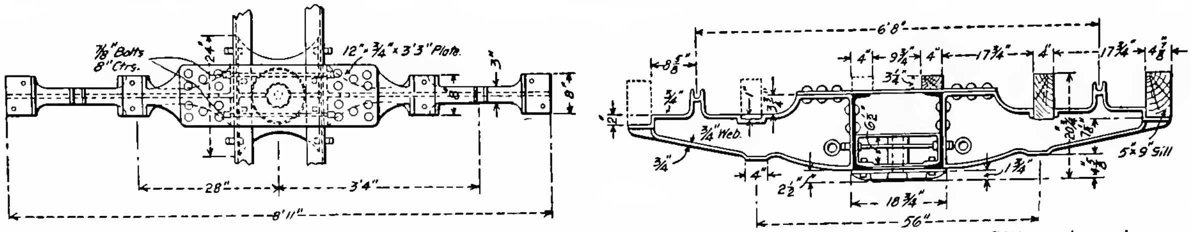


Fig. 501—Two Piece Cast Steel Body Bolster for Freight Cars with Channel Center Sills. American Steel Foundries.

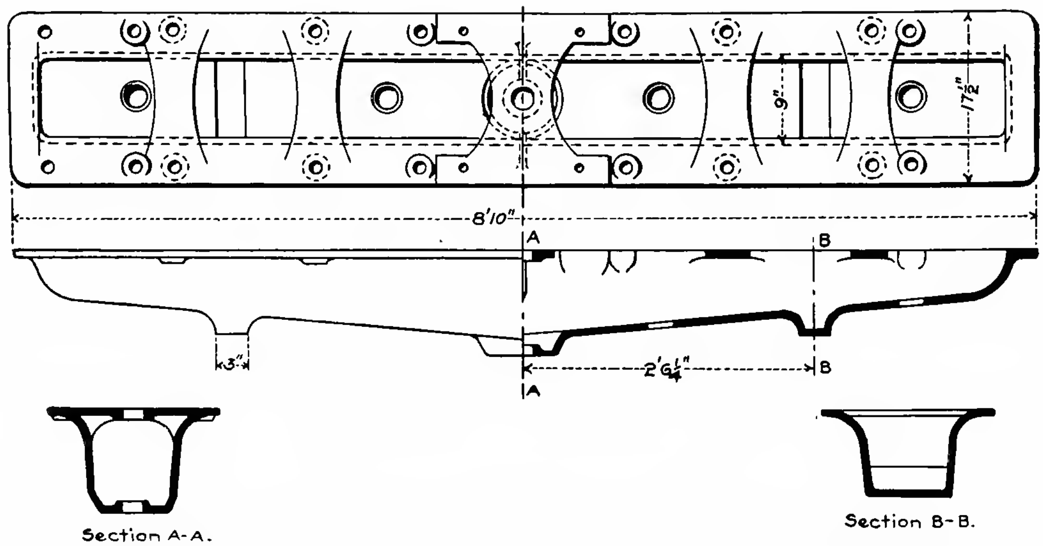


Fig. 502—Cast Steel Channel-Section Body Bolster. American Steel Foundries.

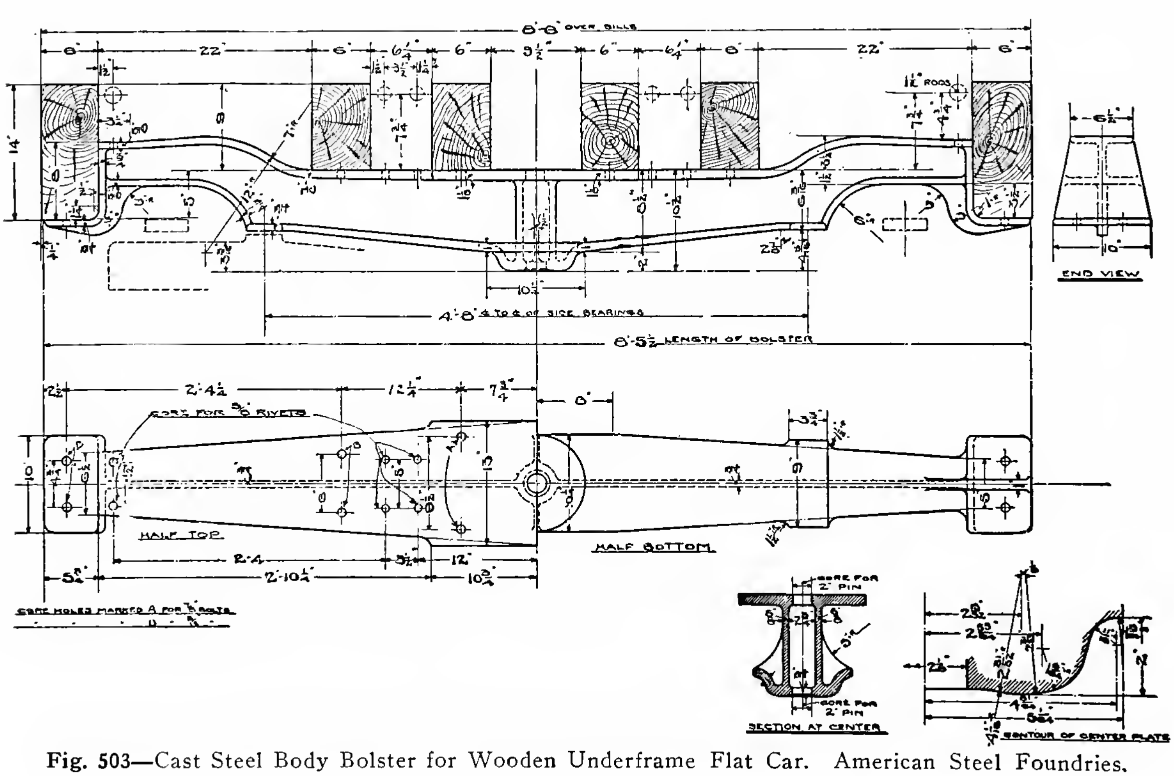


Fig. 503—Cast Steel Body Bolster for Wooden Underframe Flat Car. American Steel Foundries.

Body Bolster Parts, See Fig. 505.

1 *Top Plate*
2 *Bottom Plate*
4 *Thimble*
9 *Body Side Bearing*
10 *Truck Side Bearing*
11 *Body Center Plate*
12 *Truck Center Plate*
14 *Body Truss Rod Saddle*
15 *Body Truss Rod*
16 *Truck Bolster*
19 *Filling or Web Casting*

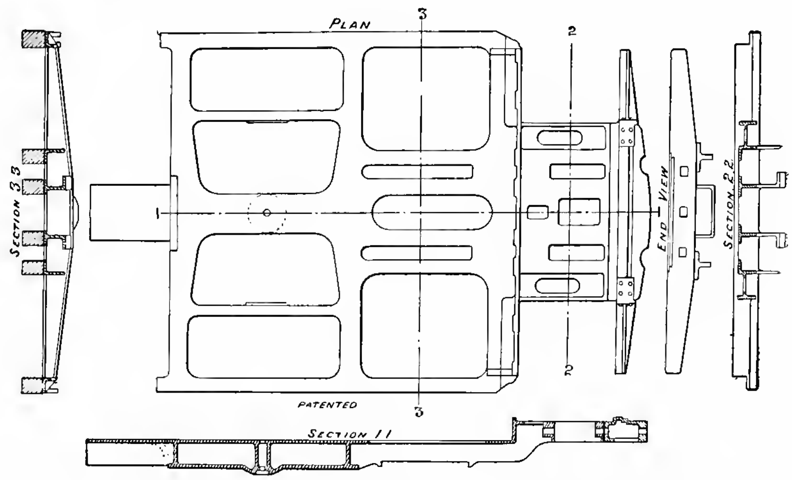


Fig. 504—Commonwealth Steel Company's Cast Steel Combined Platform and Double Body Bolster for Passenger Train Cars.

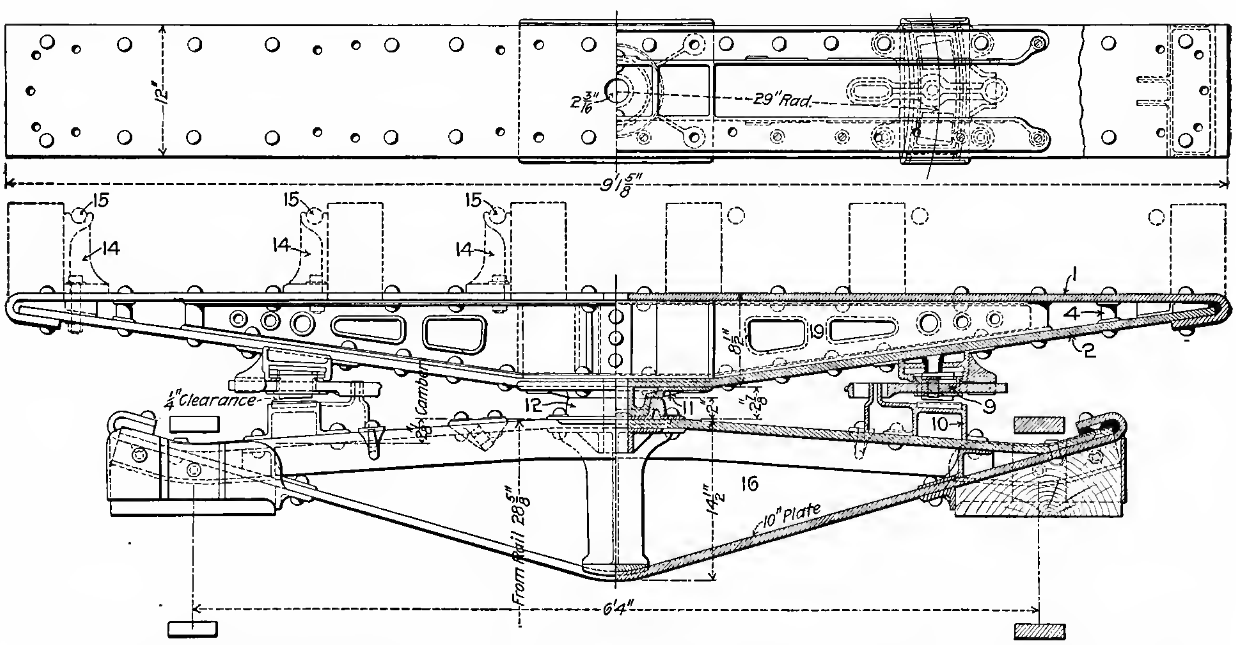


Fig. 505—"Simplex" Body and Truck Bolsters with Susemihl Roller Side Bearings. Simplex Railway Appliance Company.

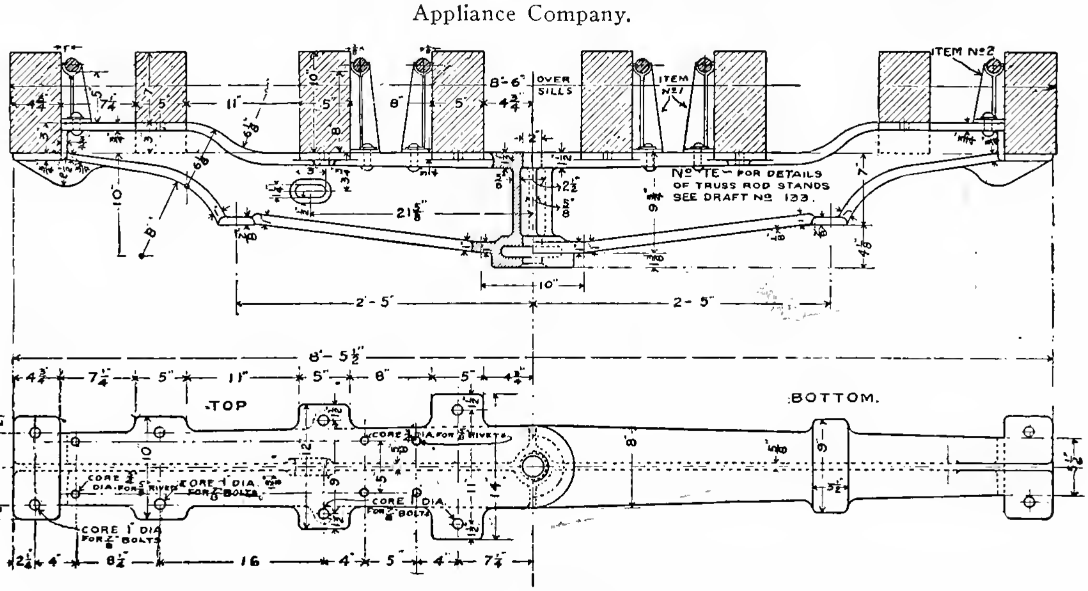


Fig. 506—Cast Steel Body Bolster for Wooden Gondola Car. American Steel Foundries.

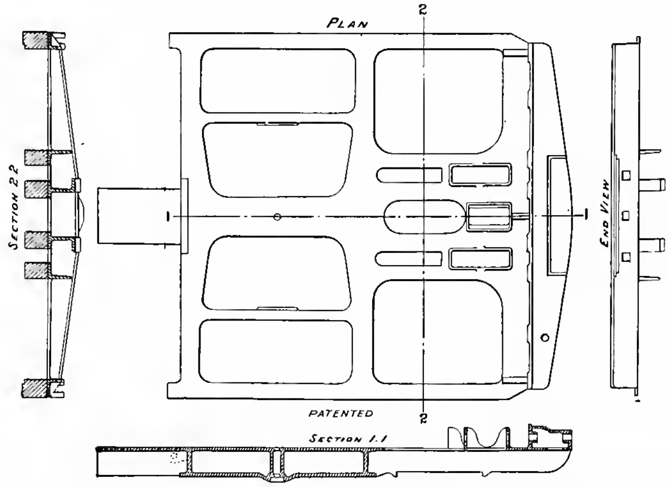


Fig. 507—Commonwealth Steel Company's Cast Steel Combined Platform and Double Body Bolster for Non-Vestibule Passenger Train Cars.

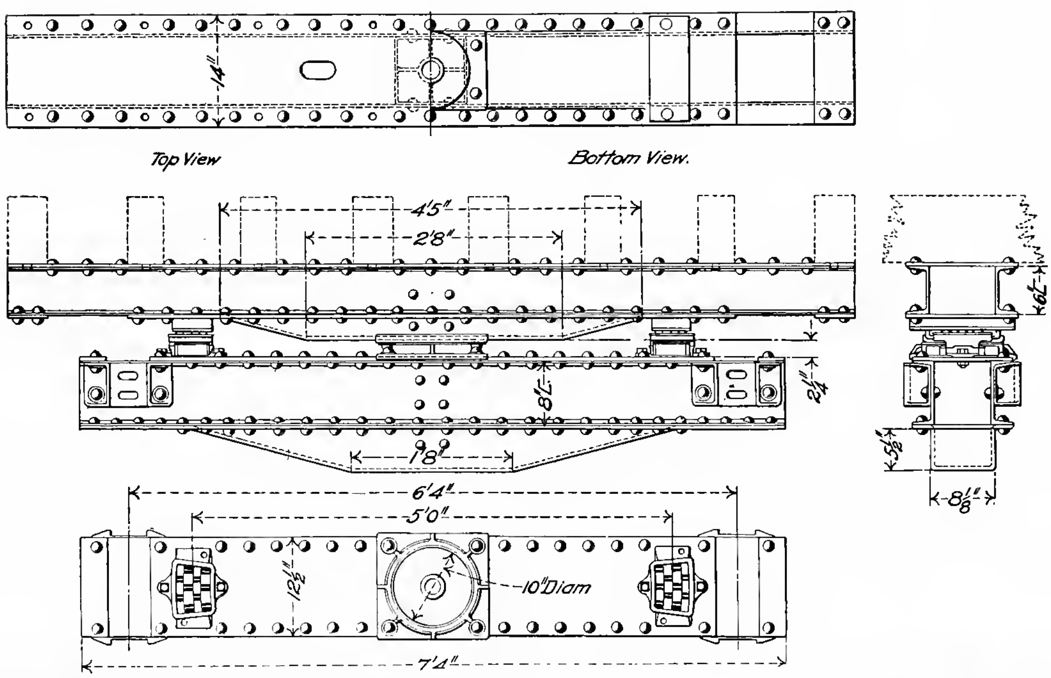


Fig. 508—Monitor Body and Truck Bolsters with Creco Side Bearings. Chicago Railway Equipment Company.

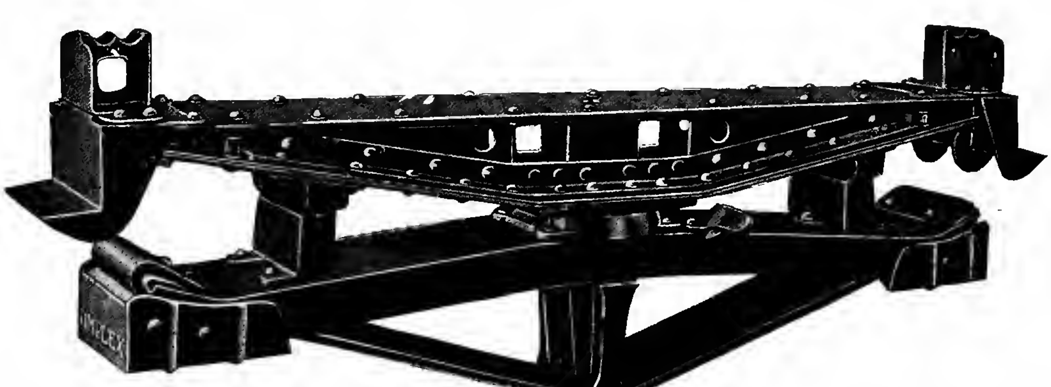


Fig. 509—Simplex Body and Truck Bolsters for Freight Cars with Long Draft Sills and Deep Side Sills. Simplex Railway Appliance Company.

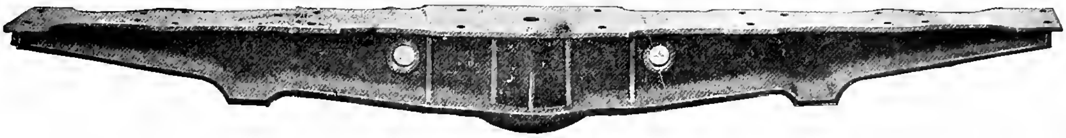


Fig. 510—Cast Steel I-Section Body Bolster. American Steel Foundries.

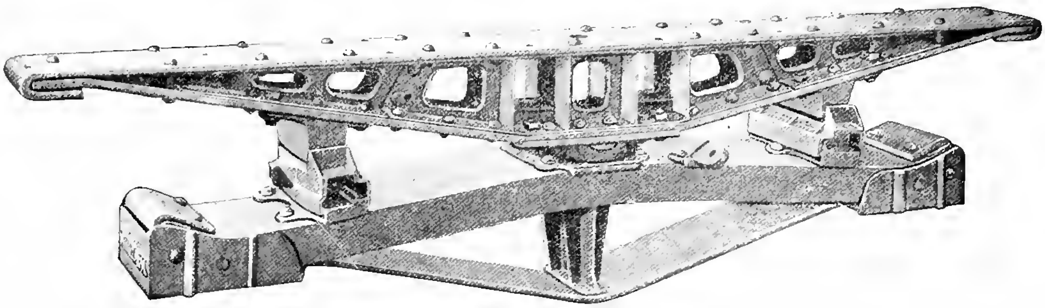


Fig. 511—Simplex Body Bolster with Cast Steel Web Filler, in Position on Simplex Truck Bolster with Susemihl Roller Side Bearings. Simplex Railway Appliance Company.

Fig. 512—Simplex Body Bolster with Plate Web Filler, in Position on Simplex Truck Bolster. Simplex Railway Appliance Company.

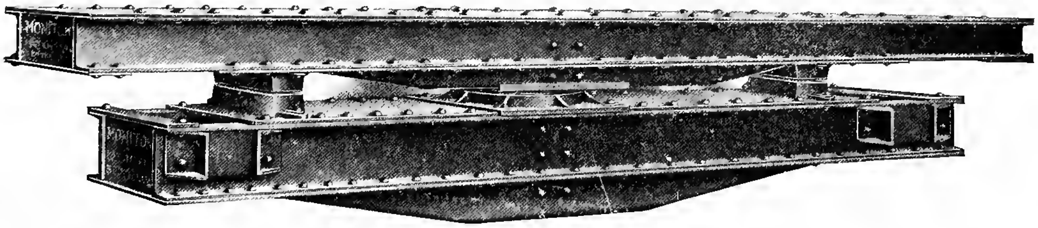


Fig. 513—Monitor Body Bolster in Position on Monitor Truck Bolster. Chicago Railway Equipment Company.

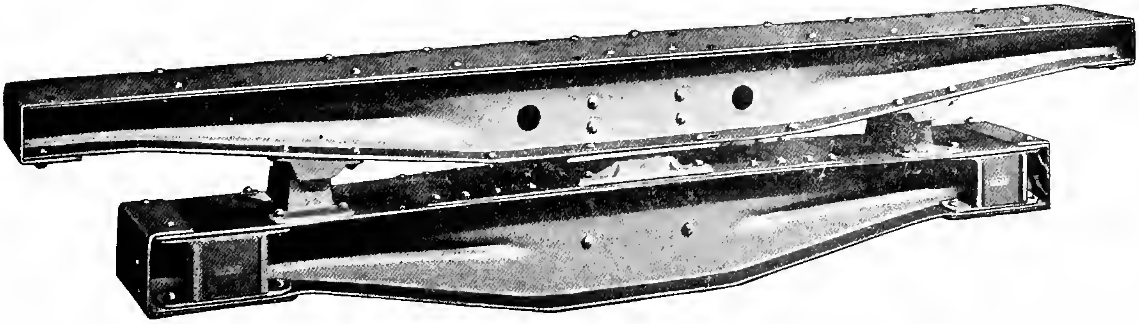


Fig. 514—Bettendorf Body Bolster in Position on Bettendorf Truck Bolster. Bettendorf Axle Company.

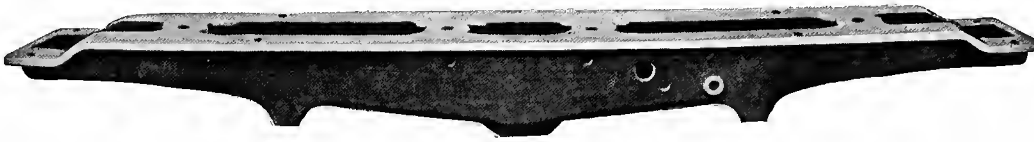


Fig. 515—Keystone Type Double Web Cast Steel Body Bolster. American Steel Foundries.

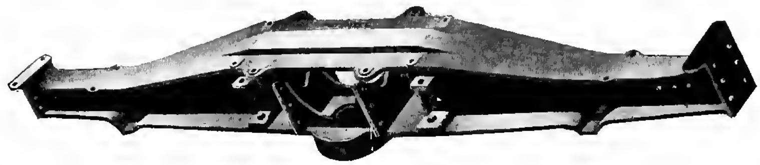


Fig. 516—Commonwealth Steel Company's Cast Steel Separable Body Bolster for Steel Freight Cars.

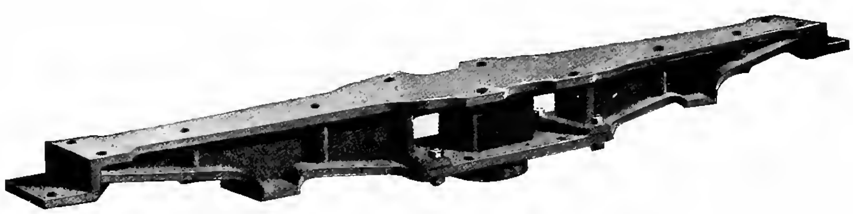


Fig. 517—Commonwealth Steel Company's Cast Steel Separable Body Bolster for Wooden Freight Cars.

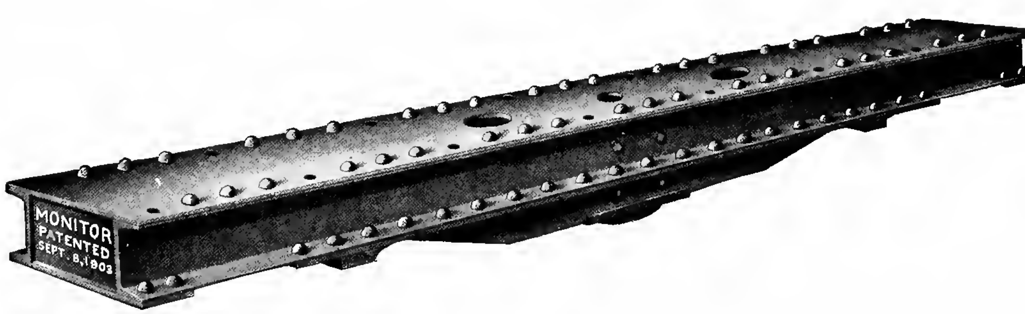


Fig. 518—Monitor Body Bolster. Chicago Railway Equipment Company.

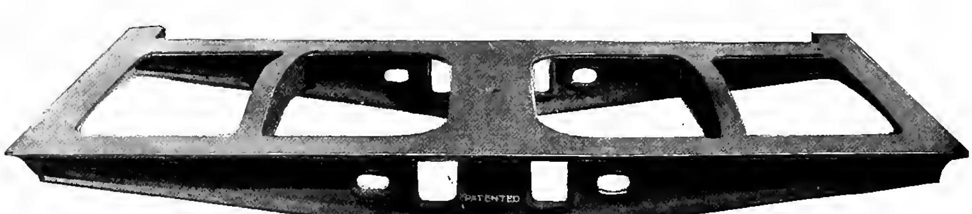


Fig. 519—One Piece Cast Steel Double Body Bolster for Passenger Train Cars. Commonwealth Steel Company.

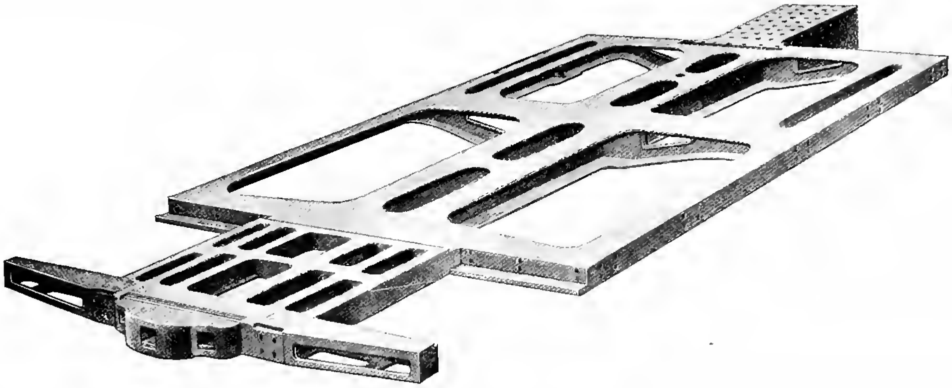


Fig. 520—Commonwealth Steel Company's Combined Cast Steel Platform and Double Body Bolster for Vestibuled Steel Cars.

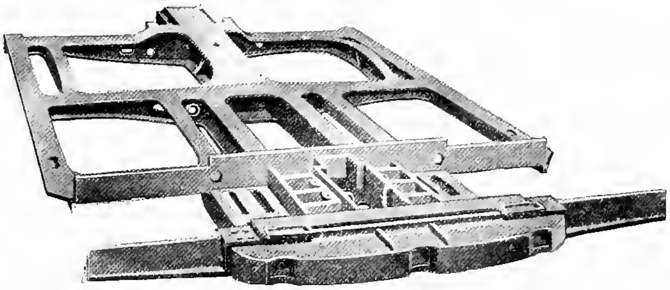


Fig. 521—Commonwealth Steel Company's Combined Cast Steel Platform and Double Body Bolster for Vestibuled Cars with Combined Wood and Steel Underframes.

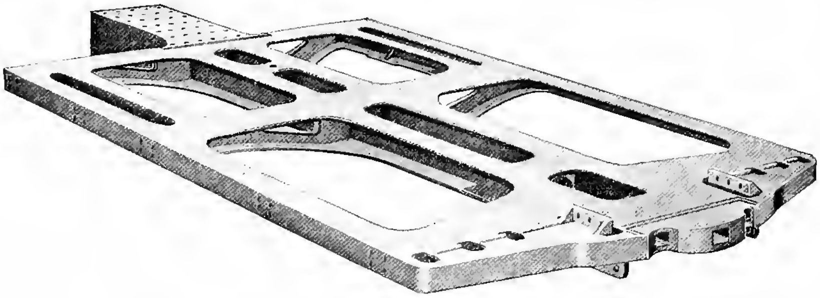


Fig. 522—Commonwealth Steel Company's Cast Steel Combined Platform and Double Body Bolster for Non-Vestibuled Steel Cars.

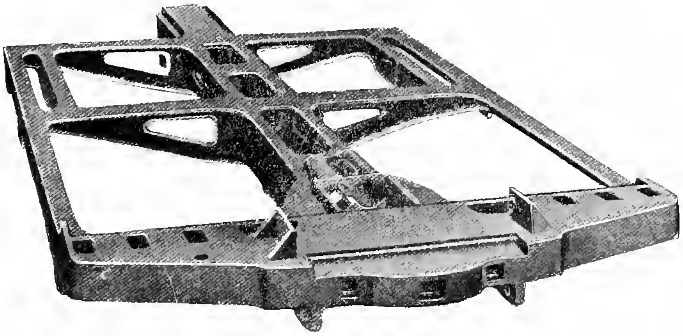


Fig. 523 Commonwealth Steel Company's Cast Steel Combined Platform and Double Body Bolster for Non-Vestibuled Cars with Combined Wood and Steel Underframe.

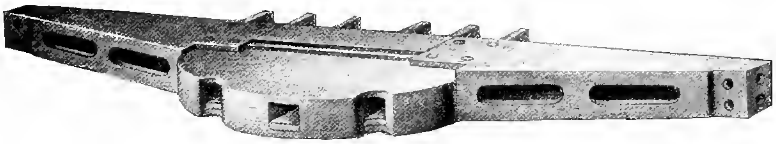


Fig. 524—Commonwealth Steel Company's Cast Steel Buffer Sill for Passenger Train Cars.

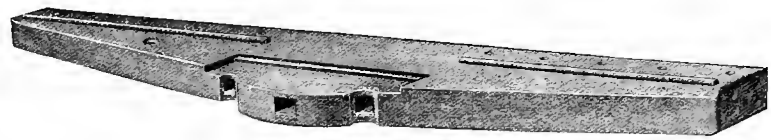


Fig. 525—Commonwealth Steel Company's Cast Steel Combined End and Buffer Sill.

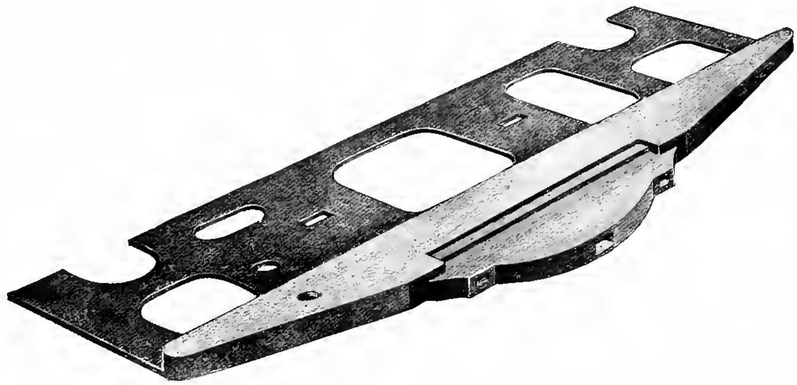
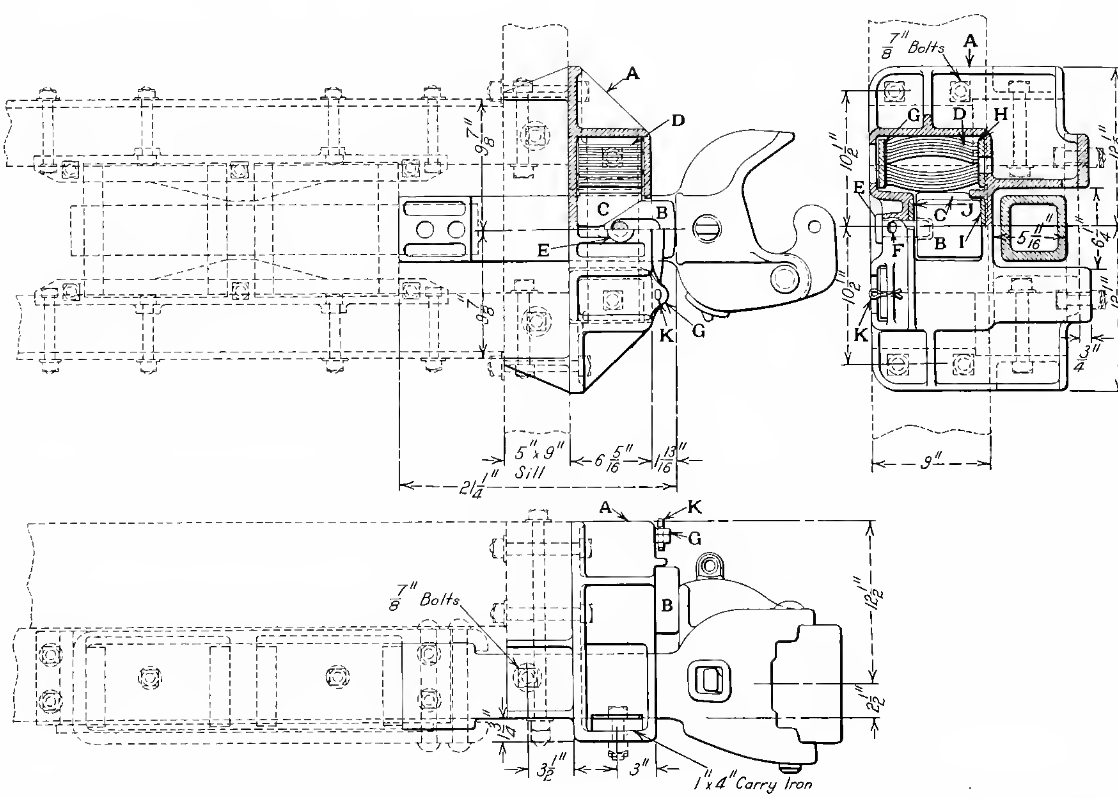


Fig. 526—Commonwealth Steel Company's One Piece Cast Steel Buffer Sill and Anti-Telescoping Plate for Non-Vestibuled Cars.



A	*Housing*	E	*Pin*	I	*Bottom Wear Plate*
B	*Wedge*	F	*Cotter Pin*	J	*Top Wear Plate*
C	*Wedge Plates*	G	*Cover Plates*	K	*Cotter Pins*
D	*Leaf Springs*	H	*Spring Wear Plates*		

Fig. 527—Gould Friction Striking Plate Buffer as Applied to Chicago, Milwaukee & St. Paul Box Cars. Gould Coupler Company.

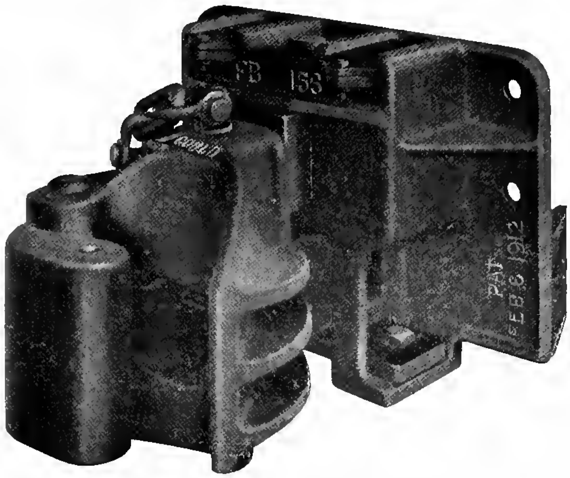


Fig. 528—Gould Friction Striking Plate Buffer for Freight Cars. See also Fig. 527. Gould Coupler Company.

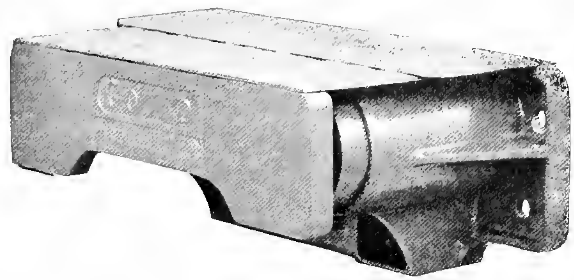


Fig. 529—Gould Spring Buffer for Non-Vestibuled Passenger Train Cars.

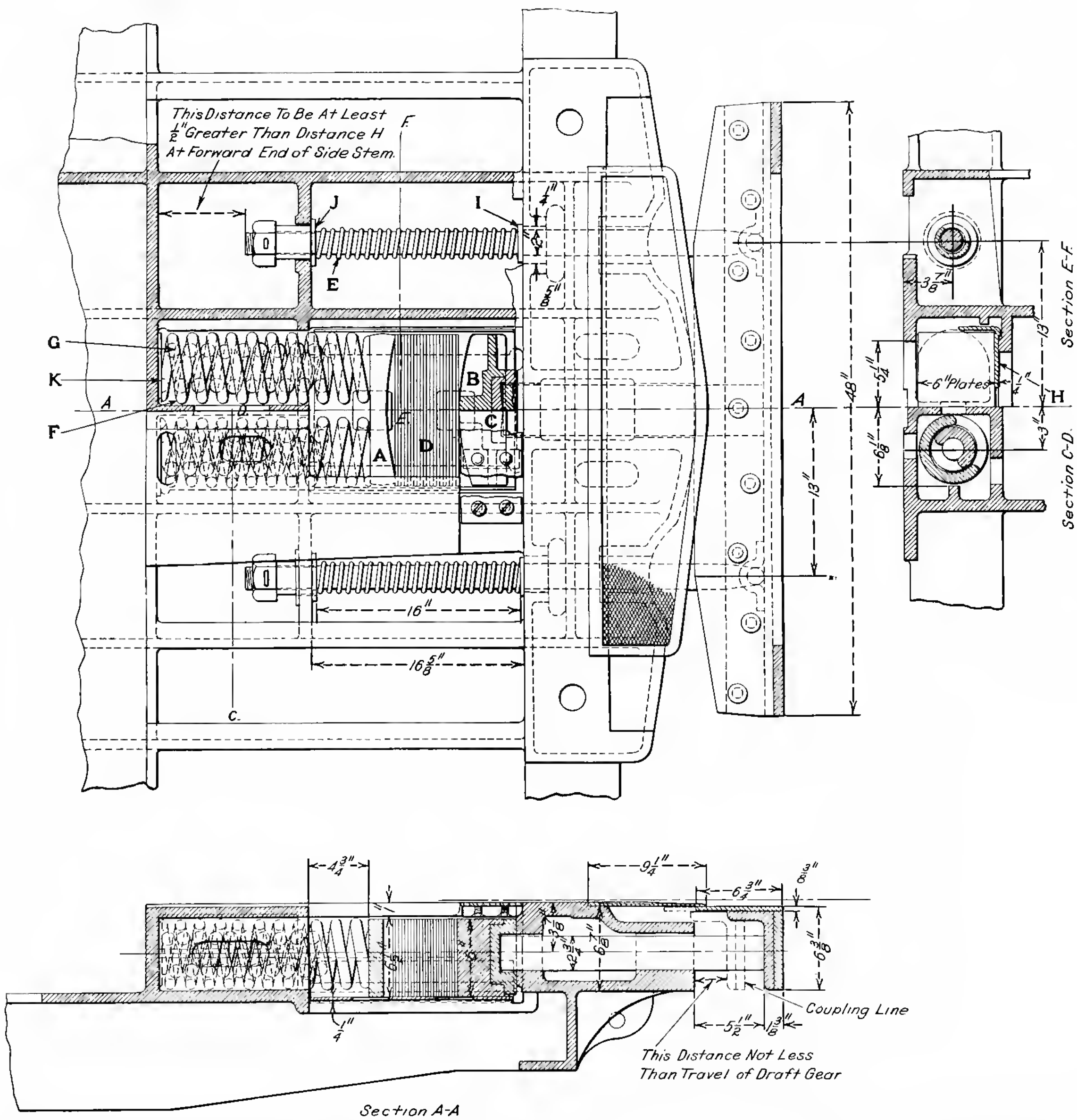


Fig. 530—Forsyth High Capacity Buffing Device Applied to Cast Steel Platform. Forsyth Brothers Company.

See Page 430 for Names of Lettered Parts.

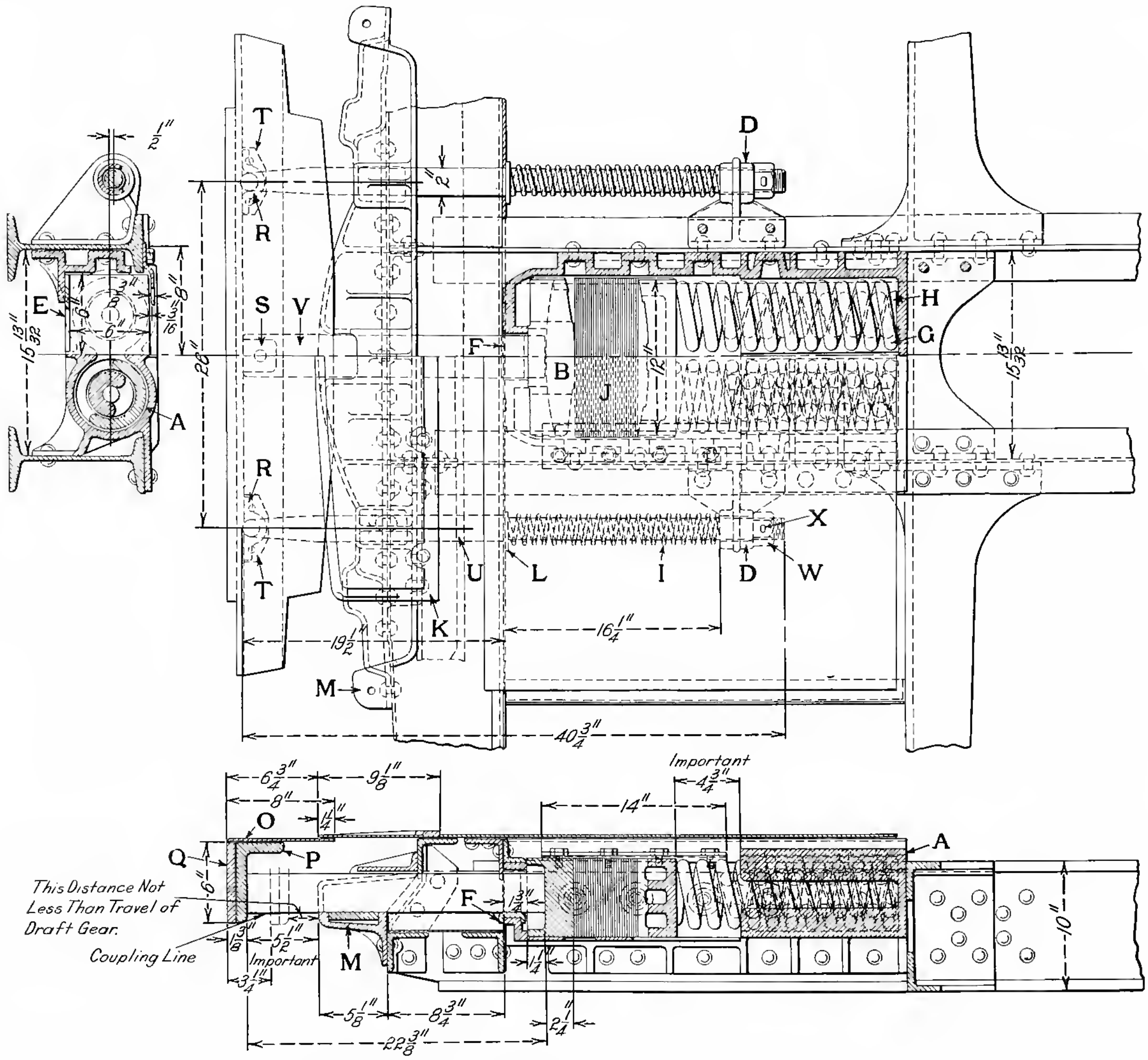


Fig. 531—Forsyth High Capacity Buffing Device Applied to Built Up Steel Platform. Forsyth Brothers Company.

Parts of Forsyth Buffing Device Shown in Fig. 531.

A *Housing Casting*
B *Convex Follower*
C *Concave Follower*
D *Side Stem Brackets*
E *Bottom Wear Plates*
F *Chafing Plates, Center Stem*
G *No. 50 Spring*
H *No. 51 Spring*
I *No. 53 Spring*
J *Spring Friction Plates*
K *Tread Plates*
L *Side Stem Spring Washer*
M *Buffer Face Casting with Inserts—Vestibule End Only*
N *Buffers*
O *Buffer Tread Plate*
P *Buffer Angle*
Q *Buffer Face Plate*
R *Hinge Plate*
S *Center Stem Chafing Block*
T *Side Stem Chafing Block*
U *Vestibule End Side Stems*
V *Vestibule End Center Stems*
W 1¾*-inch Hexagon Nut*
X ¼*-inch Cotter Pin*

Parts of Forsyth Buffing Device Shown in Fig. 530.

A *Concave Followers*
B *Convex Followers*
C *Interlock Followers*
D *2 Complete Sets of Friction Plates*
E *Side Stem Spring No. 53*
F *Outside Springs No. 50*
G *Inside Springs No. 51*
H *Bottom Wear Plates*
I *Side Stem Spring Washer*
J *Side Stem Spring Thimble*
K *Main Spring Washers*

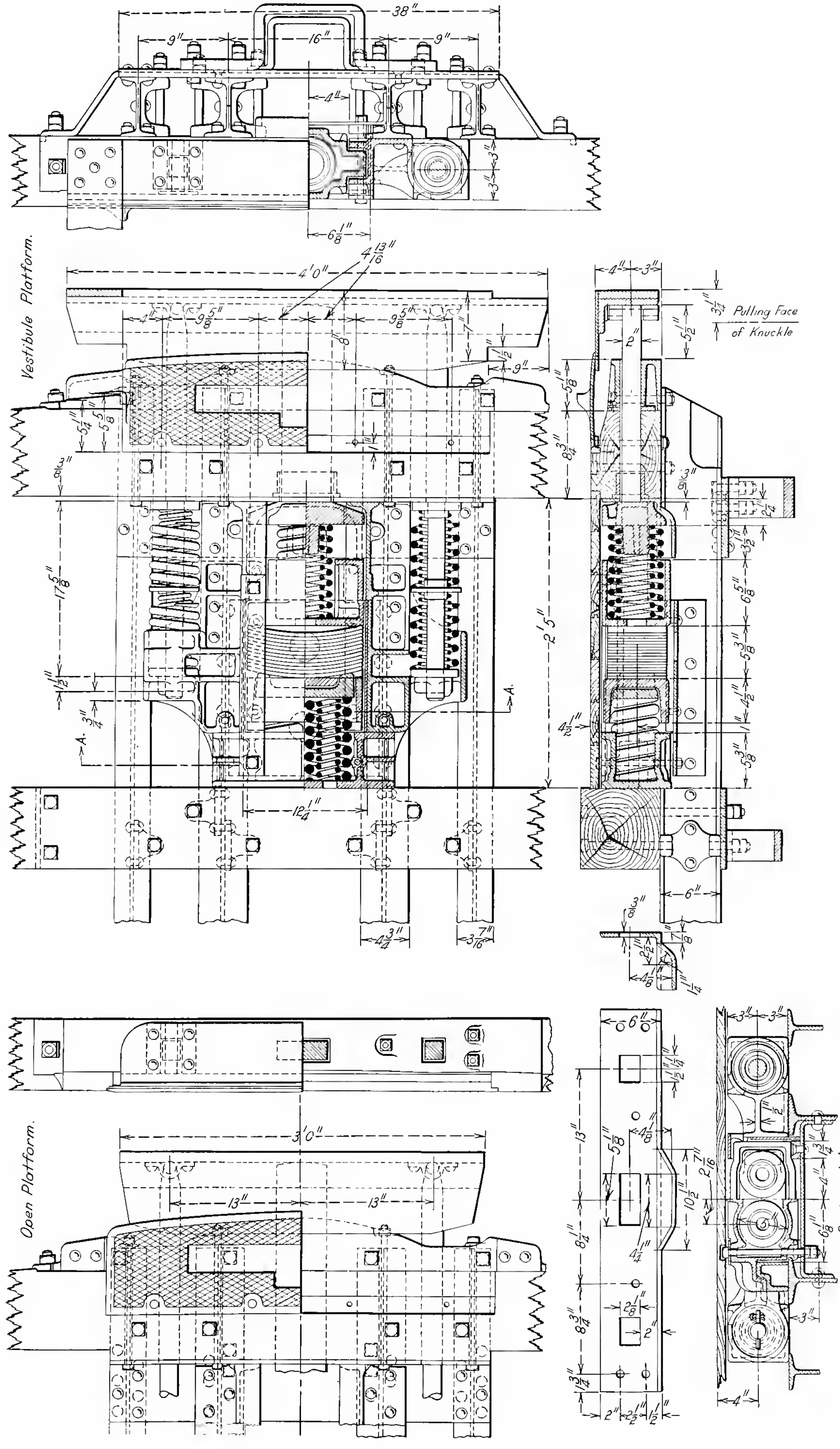
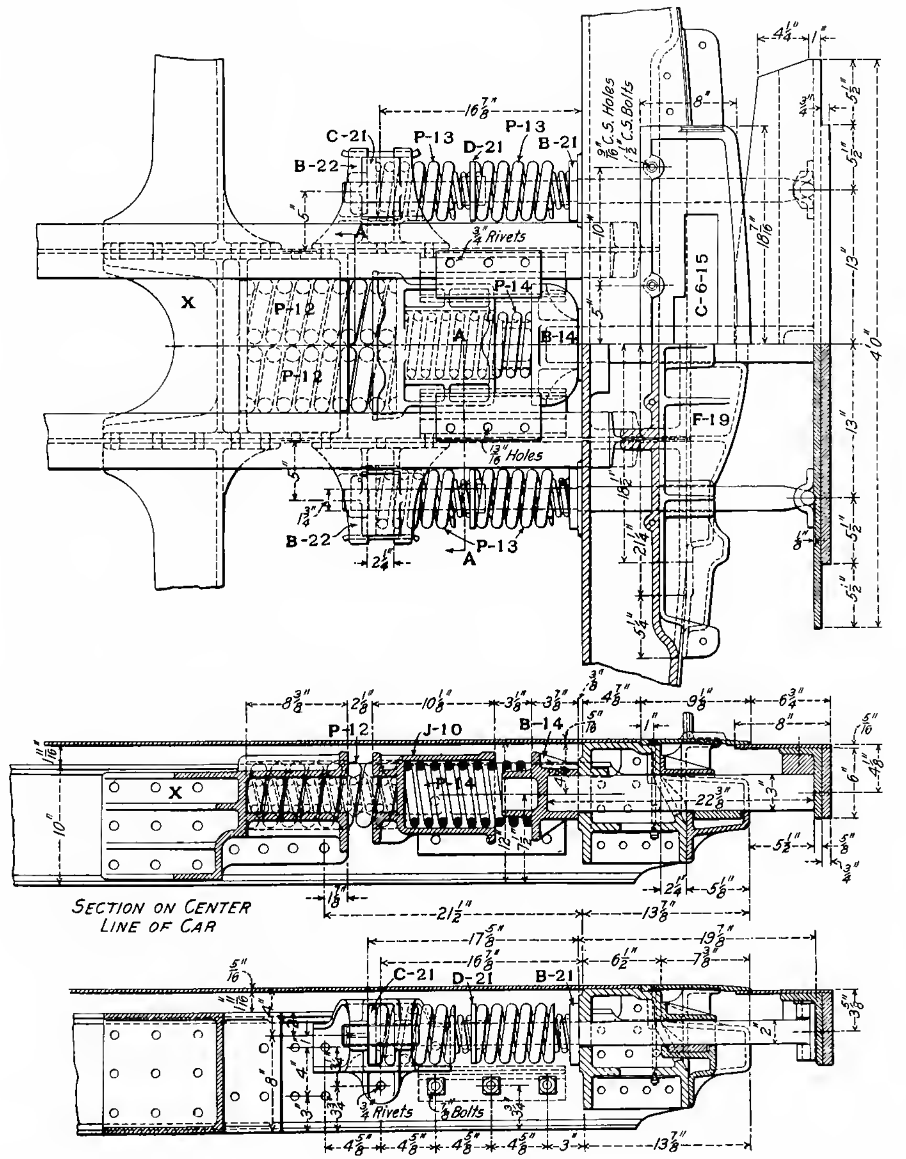
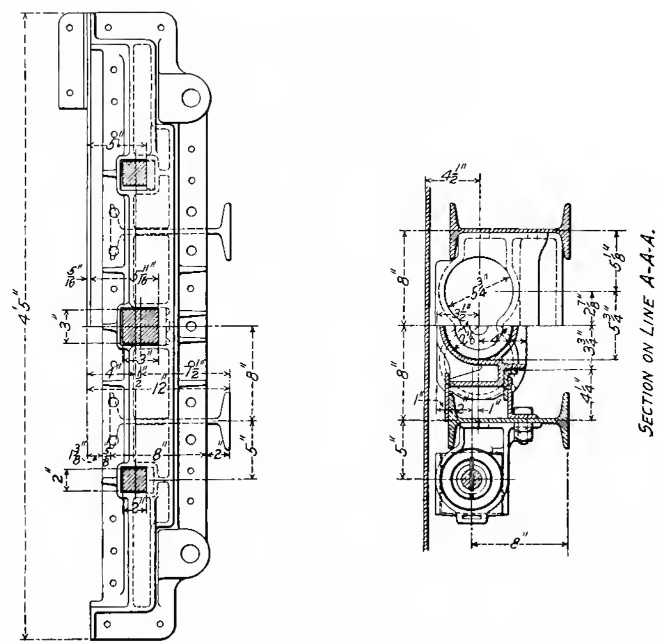


Fig. 532—Standard Steel Buffers Applied to Standard Steel Platforms. Standard Coupler Company.

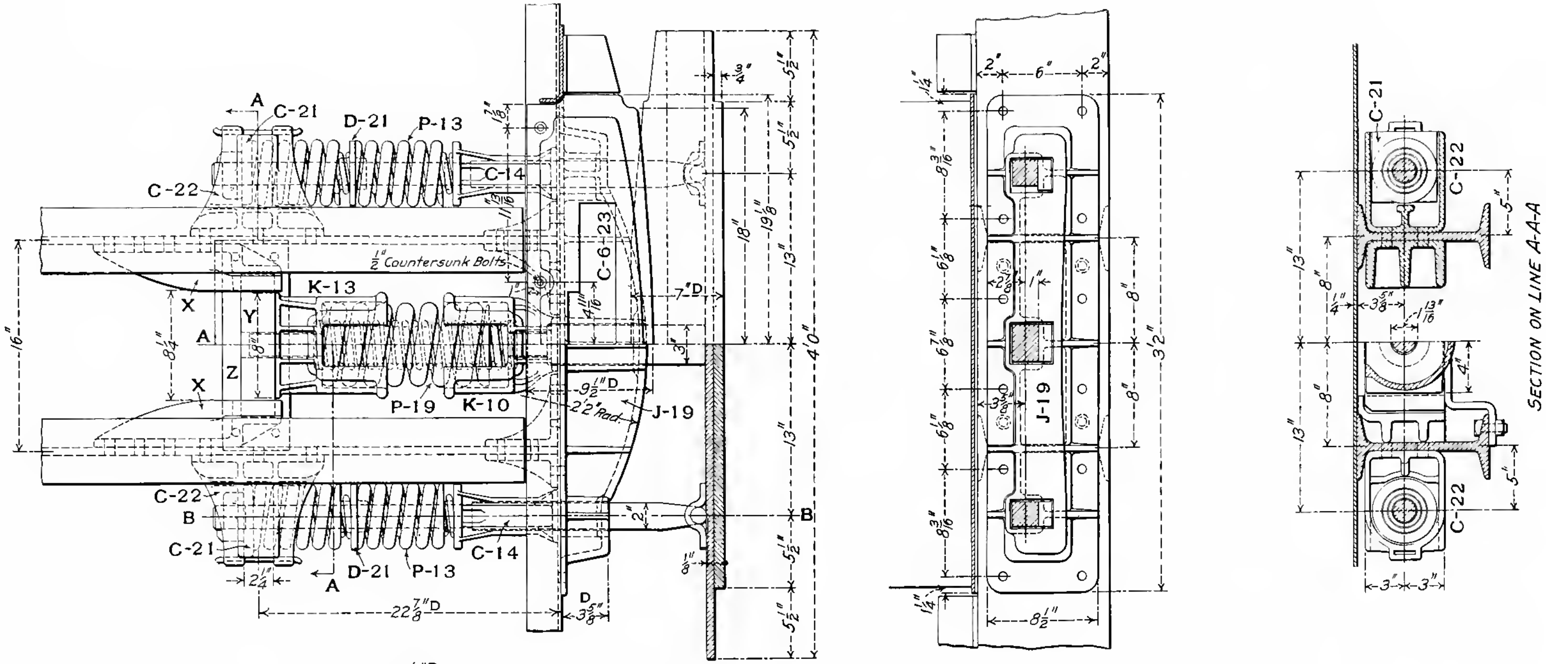




Parts of Standard Steel Platform Buffers, Type D-3, for Steel Cars.

2 *Buffer Beam Extensions, with Inserts*
2 *Name Plates*
2 *Buffer Spring Followers*
2 *Buffer Spring Casings*
4 *Side Stem Brackets, with Keys*
12 *Side Stem Washers*
2 *Buffer Center Stems*
2 *Buffer Face Angles*
2 *Buffer Face Plates*
2 *Buffer Tread Plates*
4 *Buffer Side Stems*
4 *Side Stem Keys and Cotters*
4 *Hinge Plates*
6 *Chafing Plates*
2 *Single Coil Buffer Springs, P-14*
4 *Double Coil Buffer Springs, P-12*
8 *Double Coil Buffer Springs, P-13*
Back Spring Cap, X, to Suit Car Construction.

Fig. 533—Standard Steel Platform Buffers for Steel Cars. Standard Coupler Company.



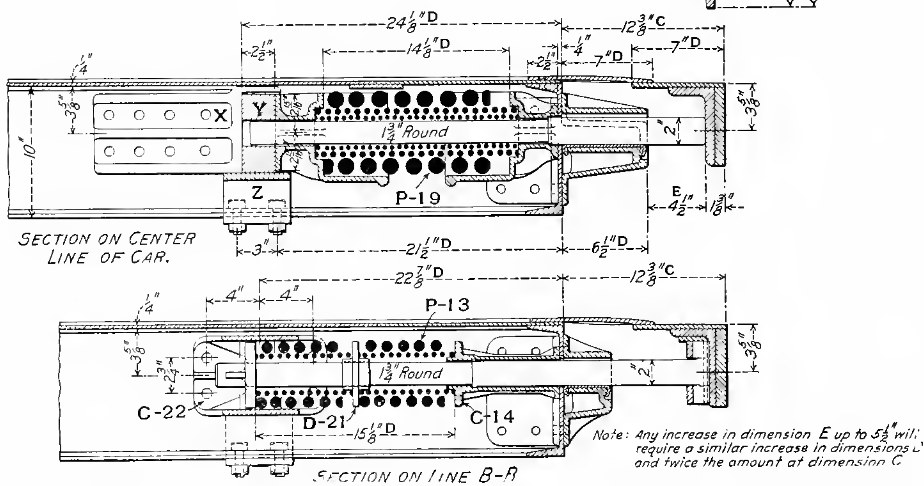


Fig. 534—Standard Steel Platform Buffers for Steel Cars. Standard Coupler Company.

Parts of Standard Steel Platform Buffers, Type E-3, for Steel Cars.

2 *Buffer Beam Extensions and Inserts*
2 *Name Plates*
2 *Front Spring Cups*
2 *Back Spring Cups*
4 *Side Stem Brackets, with Keys*
8 *Side Stem Washers*
4 *Side Stem Followers*
2 *Buffer Center Stems*
2 *Buffer Face Angles*
2 *Buffer Face Angle Plates*
2 *Buffer Tread Plates*
4 *Buffer Side Stems*
4 *Side Stem Keys and Cotters*
4 *Hinge Plates*
4 *Chafing Plates*
8 *Double Coil Buffer Springs, P-13*
2 *Triple Coil Buffer Springs, P-19*
Back Stops, X, Y, Z, to Suit Car Construction.

Parts of Standard Steel Buffers, Types F-216 and F-217. See Fig. 535.

Buffer Face Angles
Buffer Face Plates
Buffer Tread Plates
Buffer Stems (Side)
Buffer Stem Keys and Cotters
Buffer Stem Hinge Plates
Buffer Stems (Center)

Front Followers, D-14
Back Followers, A-18
Front Spring Cups, M-10
Back Spring Cups, M-13
Washers, F-21
Washers, H-21
Name Plates, C-6-27, *C*-6-28

Chafing Plates
Cover Plates
Angle (Chafing)
Buffer Springs D. C., P-23
Buffer Springs D. C., P-24
Buffer Springs D. C., P-25
Buffer Springs P-26

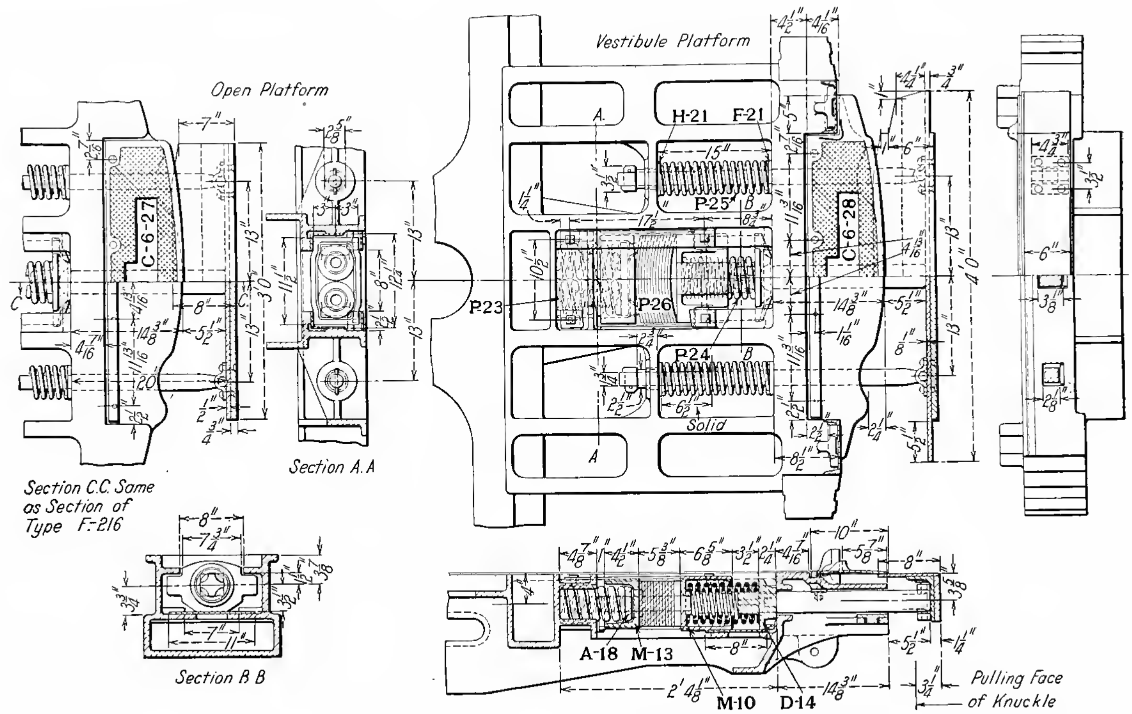


Fig. 535—Application of Standard Steel Buffers to Cast Steel Platforms. Standard Coupler Company.

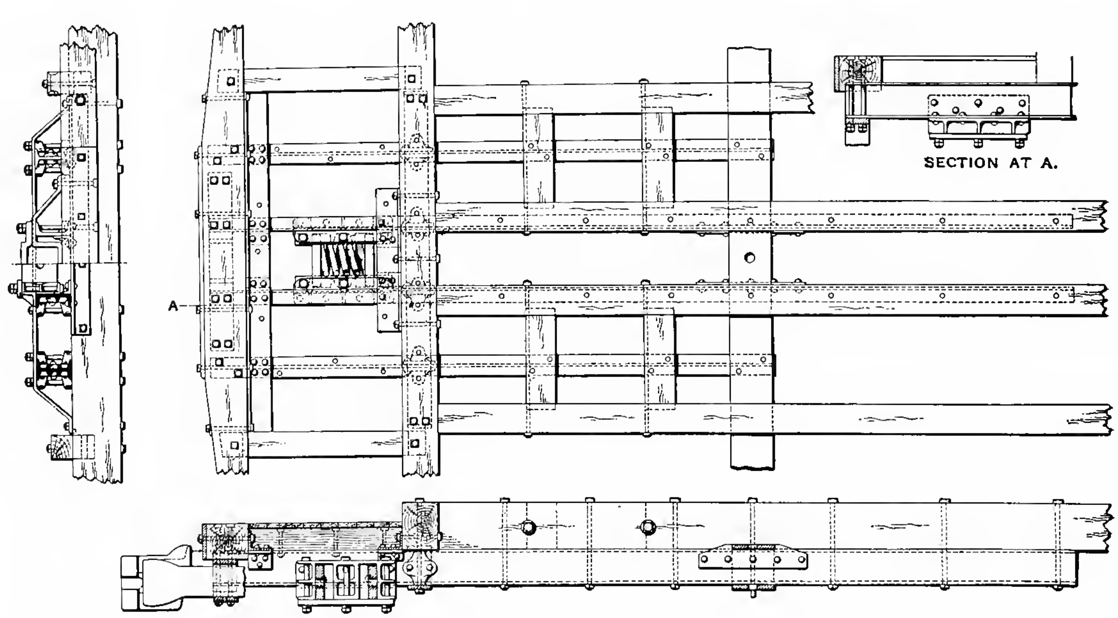


Fig. 536—Standard Steel Platform, Type C, for Caboose Cars. Standard Coupler Company.

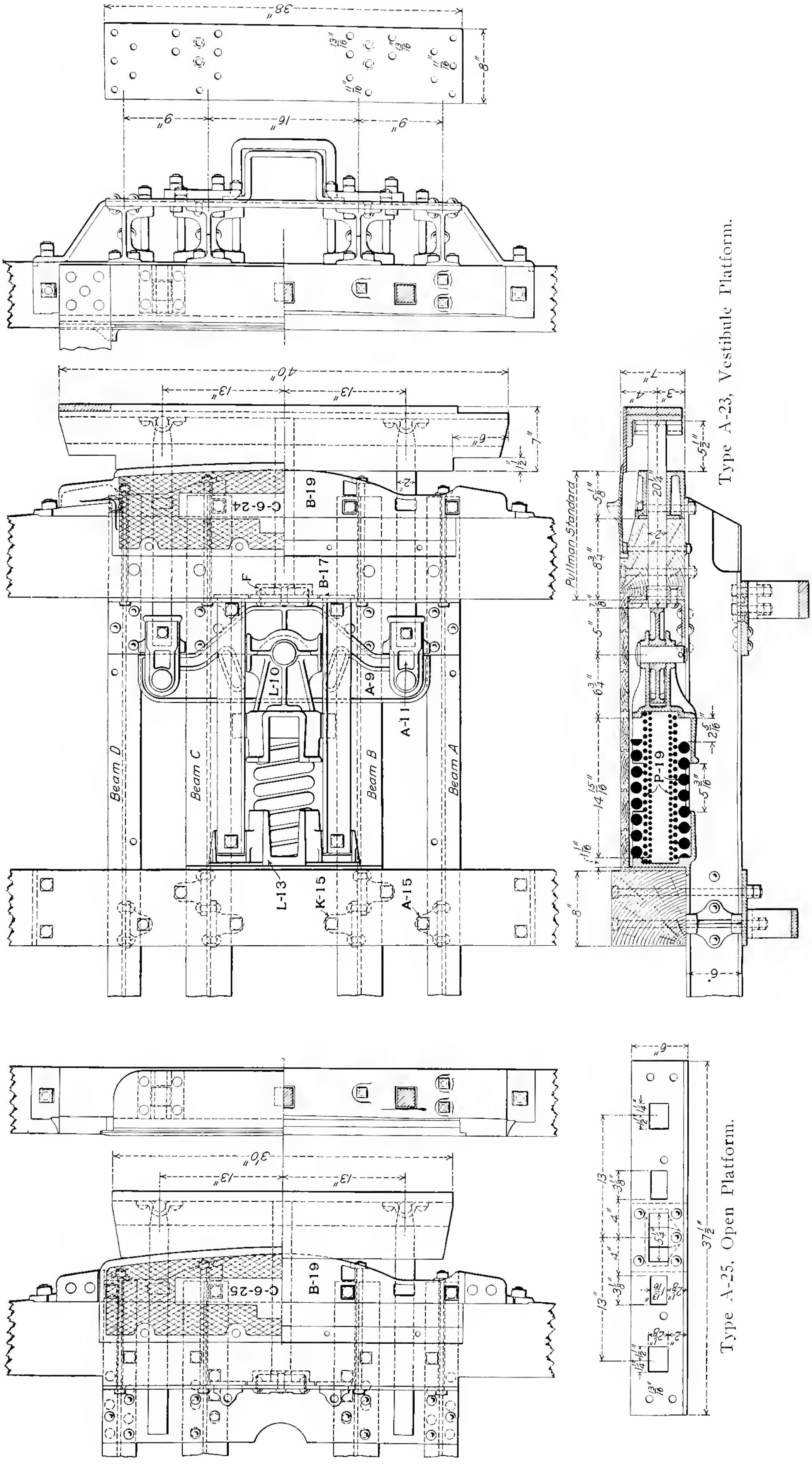


Fig. 537—Standard Steel Platforms for Vestibuled and Open End Cars. Standard Coupler Company

List of Parts on Page 437.

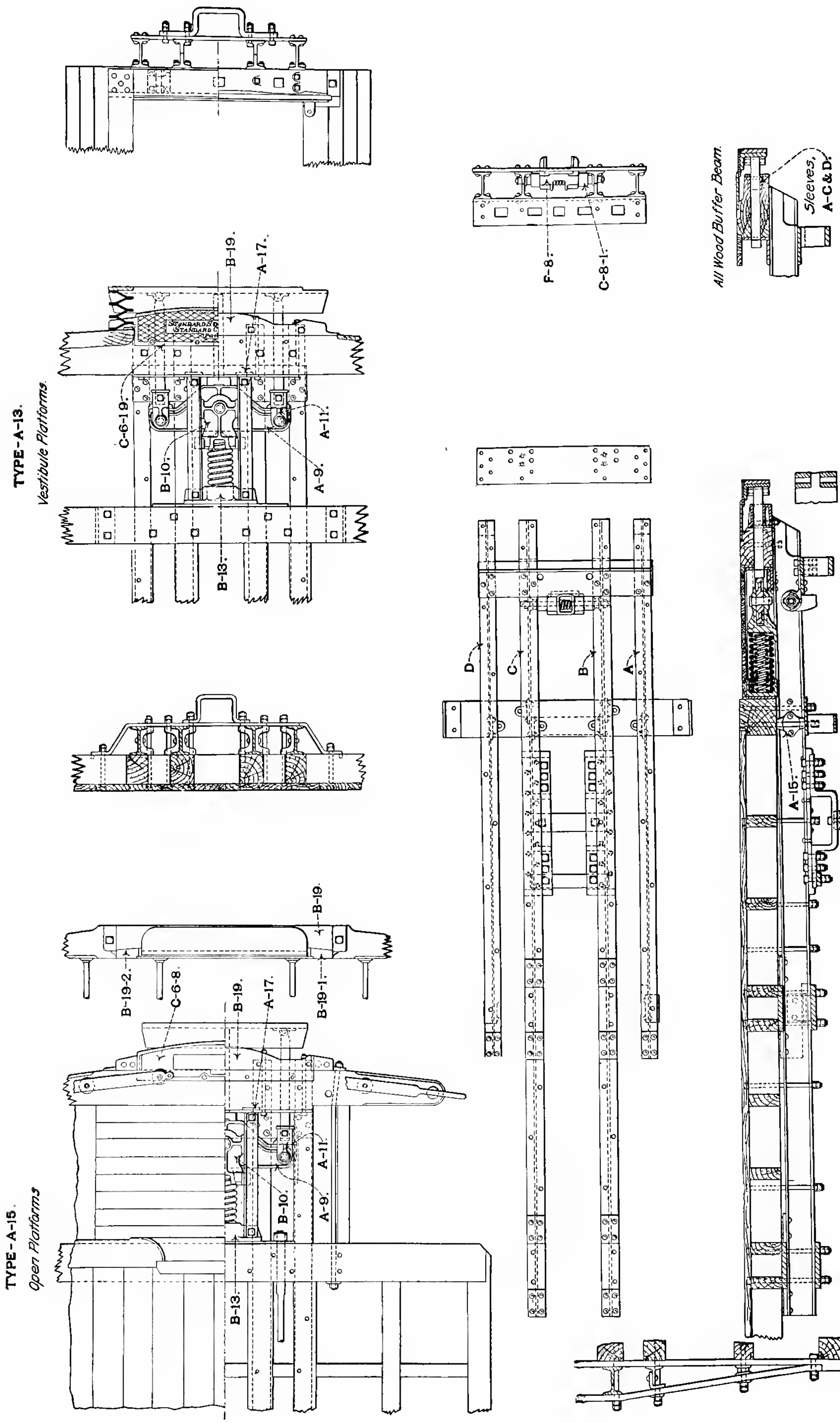


Fig. 538—Standard Steel Platforms for Vestibuled and Open End Platforms of Wooden Cars. Standard Coupler Company.

List of Parts on Page 437.

Parts of Standard Steel Platforms for Blind End Cars.

4 *I-Beams,* 17.25 *lbs. or* 23.90 *lbs. per ft., as required, machined to suit car framing*
2 *Buffer Face Angles, for Vestibule Blind Ends or Non-Vestibule Blind Ends*
2 *Buffer Face Plates, for Vestibule Blind Ends Only*
2 *Buffer Tread Plates*
4 *Buffer Stems, Side, Length to Suit*
2 *Buffer Stems, Center, Length to Suit*
4 *Buffer Stem Hinges*
12 *Buffer Stem Sleeves, 6 A, 2 each B, C and D (2 each A, C and D not used with buffer beam extensions.*
4 *Buffer Stem Washers, Front*
4 *Buffer Stem Washers, Back*
4 *Buffer Stem Keys*
2 *Buffer Springs for Center Stem*
2 *Spring Cups, Front*
2 *Spring Cups, Back*
4 *Buffer Springs for Side Stems*
4 *Hold-back Springs for Side Stems*
4 *End Sill Plates, Side*
2 *End Sill Plates, Center*
2 *Name Plates*
2 *Buffer Beam Extensions*
2 *Drawbar Guide Yokes, F-8*
4 *Drawbar Guide Sleeves, C-8-1*
2 *Drawbar Guide Springs*
2 *Drawbar Guide Rods*

NOTE.—Drawbar Guides F-8 are for central draft couplers only; lateral movement 2 in. either way.

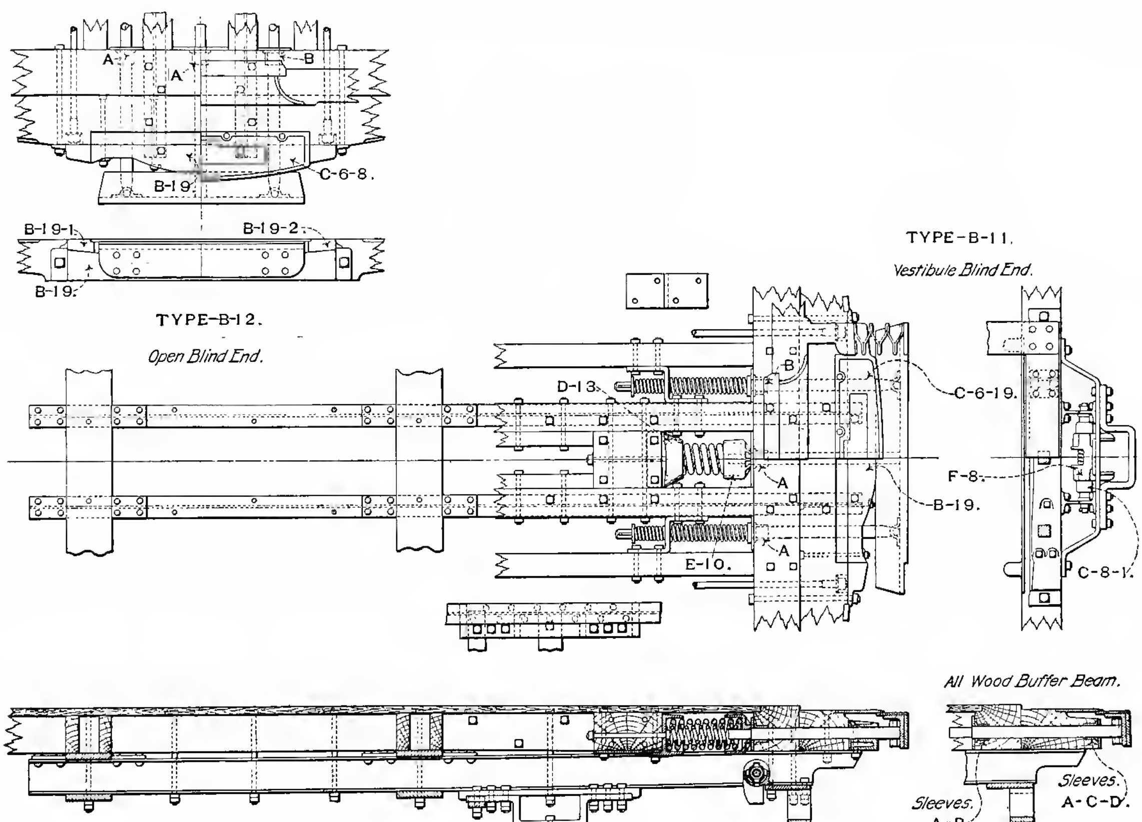


Fig. 539—Standard Steel Platform for Blind End Cars. Standard Coupler Company.

Parts of Standard Steel Platforms, Types A-23 and A-25, Page 435, and A-13 and A-15, Page 436.

2 *I-Beams, Each A and D,* 14.75 *lbs.,* 17.25 *lbs. or* 23.90 *lbs. per ft., as required, machined to suit car framing*
2 *I-Beams. Each B and C,* 17.25 *lbs., or* 23.90 *lbs. per ft., as required, machined to suit car*
12 *or* 16 *I-Beam Brackets, A-15 or K-15, riveted to beams*
2 *Buffer Beam Angles, 6 x 6 x 37½ in. to suit*
2 *Buffer Face Angles, for Open or Vestibule Platforms*
2 *Buffer Face Plates, for Vestibule Platforms Only*
2 *Buffer Tread Plates*
4 *Buffer Stems, Side, Length to Suit*
2 *Buffer Stems, Center, Length to Suit*
4 *Buffer Stem Hinges*
4 *Buffer Stem Clevises, A-11*
4 *Buffer Stem Clevis Bolts, ⅝ x 4 in.*
4 *Buffer Stem Clevis Pins, 1¼ x 4⅛ in.*
6 *Buffer Stem Sleeves, 2 Each, A, C and D, not required with buffer beam extensions*
2 *Buffer Springs, Double or Triple Coil, to Suit*
2 *Equalizers, A-9*
2 *Equalizer Pivot Pins, 1¾ x 4⅞ in.*
4 *Equalizer Guide Bars*
4 *Equalizer Guide Angles*
4 *Equalizer Guide Anchors, A-17 or B-17*
8 *Equalizer Guide Bolts, ¾ x 3¾ in.*
2 *Spring Cups, Front, B-10 or L-10*
2 *Spring Cups, Back, B-13 or L-13*
2 *Name Plates, as required*
2 *Buffer Beam Extensions, as required*
2 *Drawbar Guide Yokes, F-8*
2 *Drawbar Guide Sleeves, C-8-1*
2 *Drawbar Guide Springs*
2 *Drawbar Guide Rods*

NOTE.—Drawbar Guides F-8 are for central draft couplers only; lateral movement 2 in. either way.

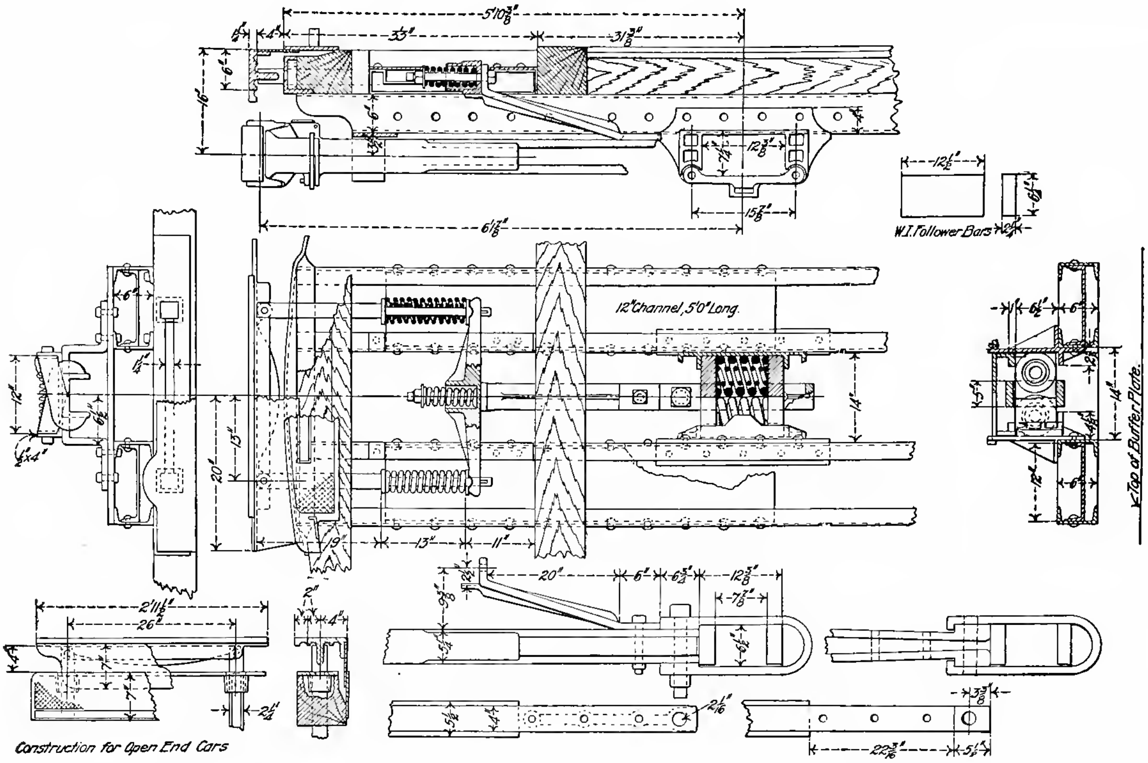


Fig. 540—National Steel Platform and Buffer with Hinson Twin Spring Draft Gear, for Vestibuled and Open End Cars. National Car Coupler Company.

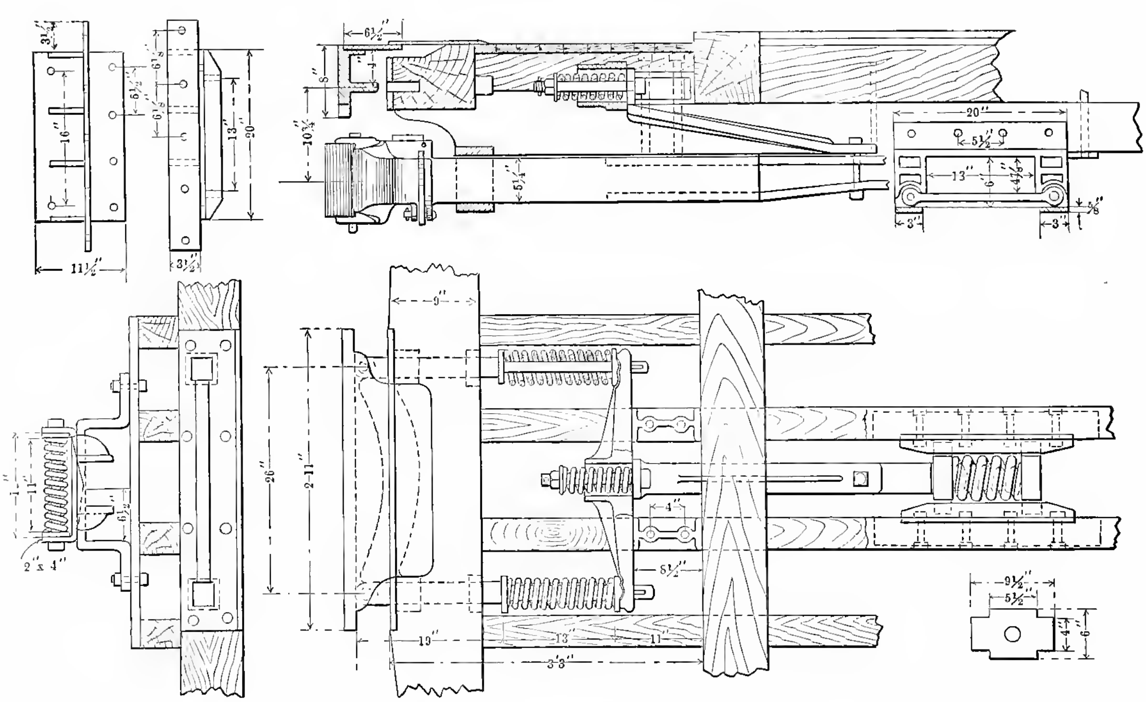


Fig. 541—National Continuous Platform Buffer and Equalizing Yoke with Hinson Single Spring Draft Gear. National Car Coupler Company.

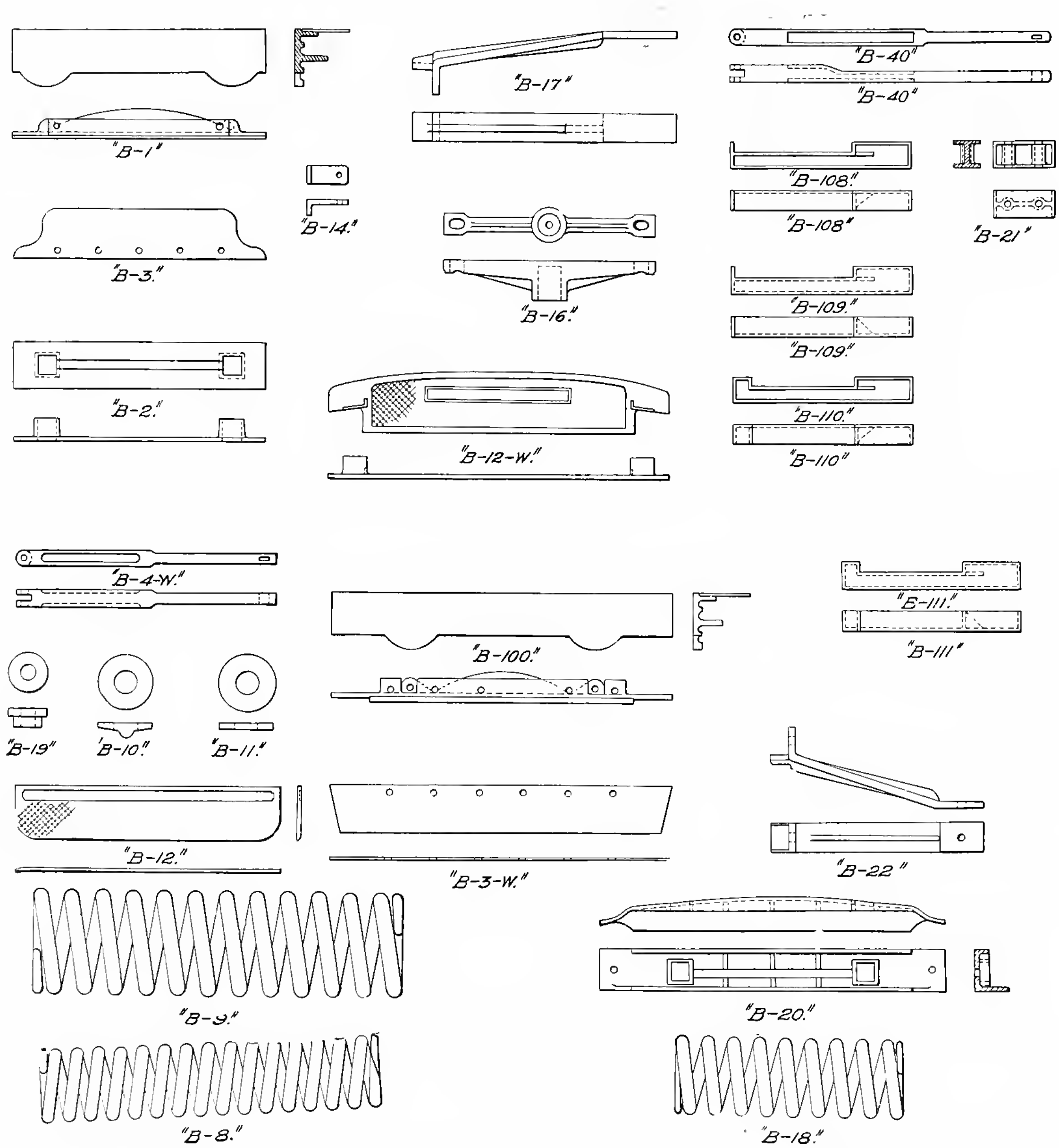


Fig. 542—Parts of National Steel Platform and Buffer. National Car Coupler Company.

B-1	*Buffer Plate*	B-16	*Buffer Yoke*
B-2	*Buffer Face Plate*	B-17	*Push Bar or Strut Beam*
B-3	*Sliding Foot Plate*	B-18	*Buffer Yoke Spring*
B-3-W	*Sliding Foot Plate*	B-19	*Buffer Yoke Spring Washer*
B-4-W	*Buffer Stem*	B-20	*Buffer Face Plate*
B-8	*Buffer Spring*	B-21	*Buffer Yoke Stop Block*
B-9	*Buffer Spring*	B-22	*Buffer Push Bar*
B-10	*Buffer Stem Washer*	B-40	*Buffer Stem*
B-11	*Buffer Stem Washer*	B-108	*Buffer Yoke Stop Block*
B-12	*Buffer Foot Plate*	B-109	*Buffer Yoke Stop Block*
B-12-W	*Buffer Foot Plate*	B-110	*Buffer Yoke Stop Block*
B-14	*Buffer Stem Key*	B-111	*Buffer Yoke Stop Block*

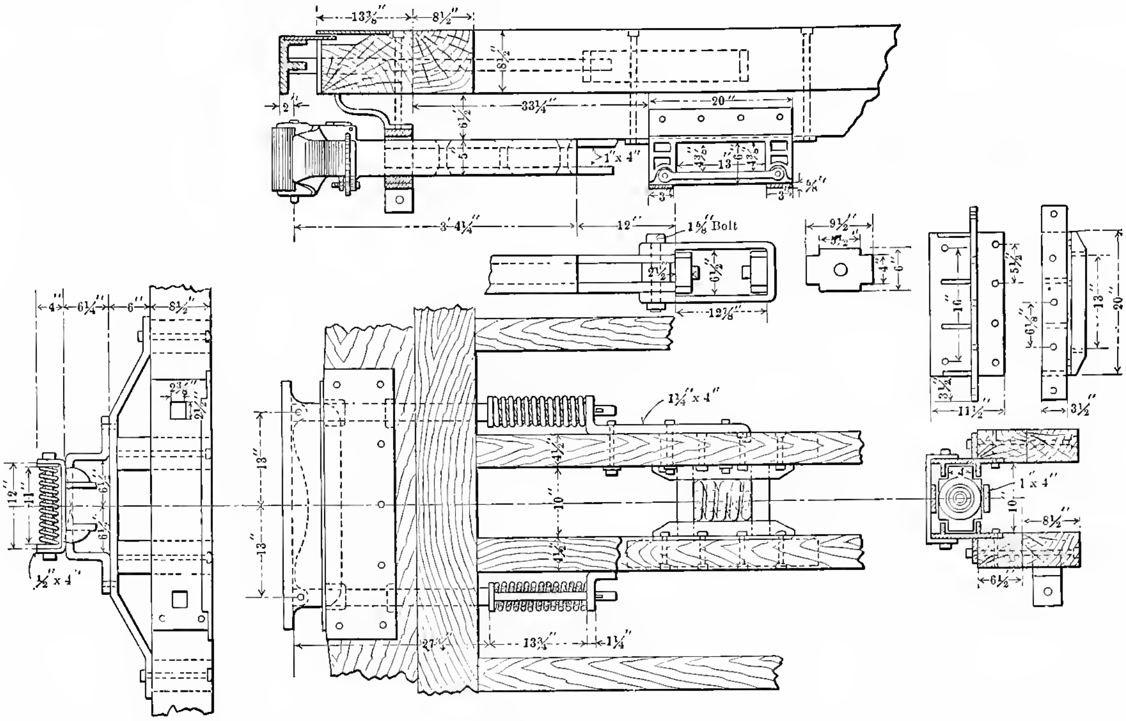


Fig. 543—National Platform and Buffer with Hinson Single Spring Draft Gear for Cars with Wooden Draft Sills. National Car Coupler Company.

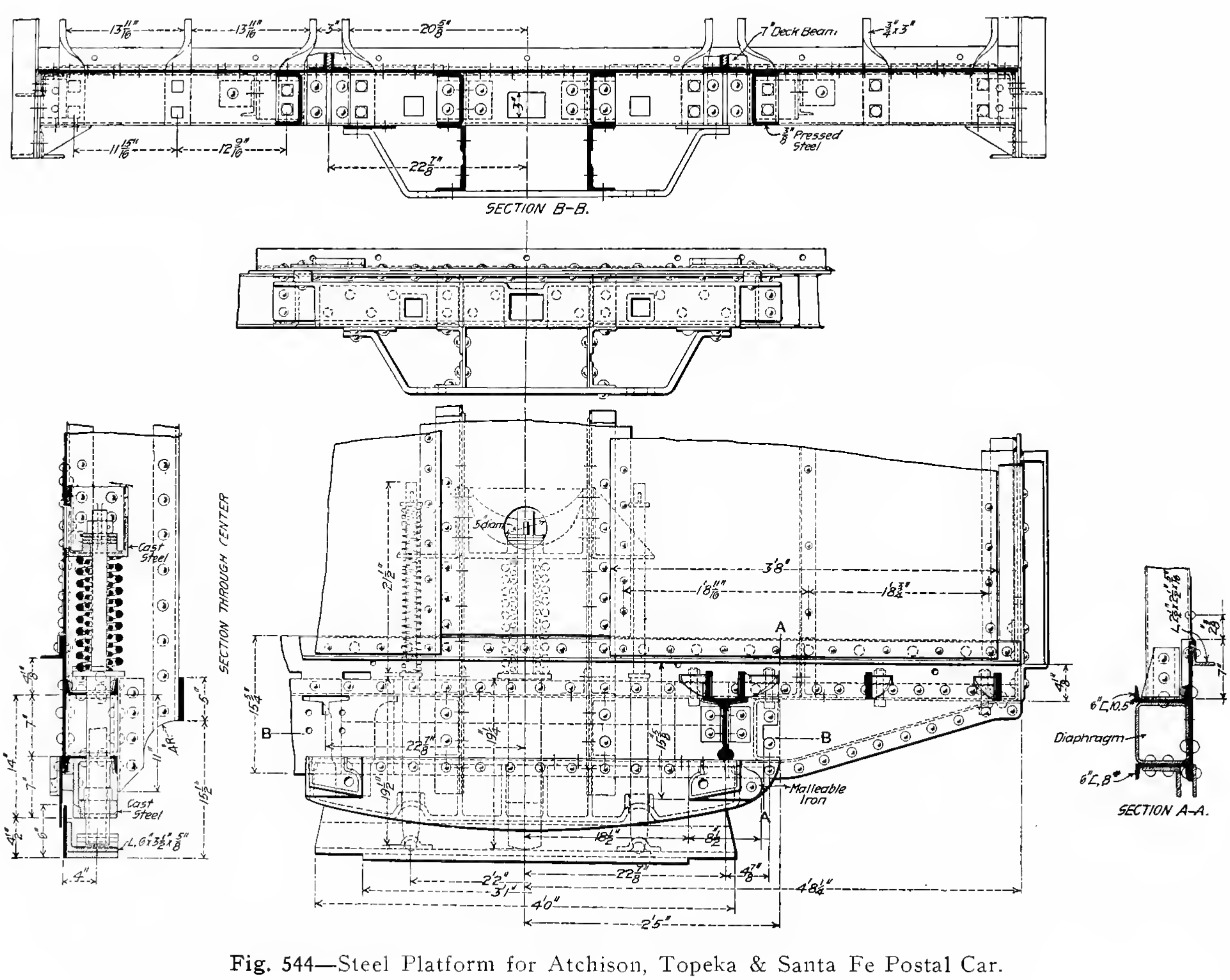


Fig. 544—Steel Platform for Atchison, Topeka & Santa Fe Postal Car.

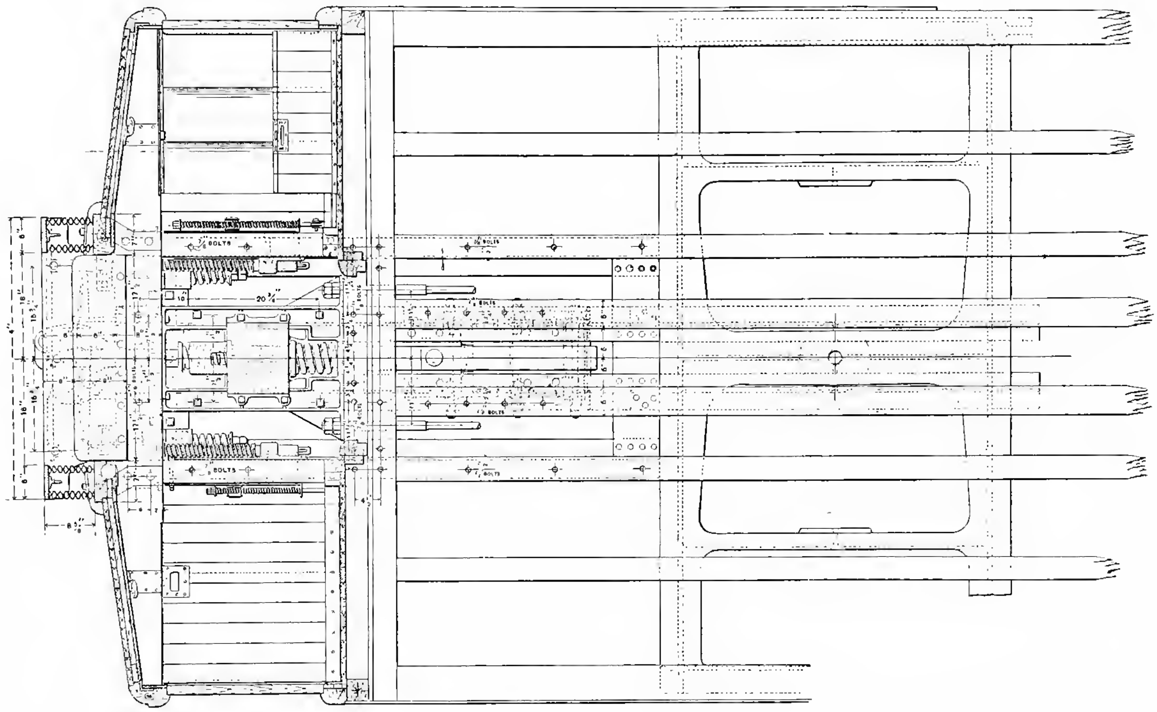


Fig. 545—Plan of Gould Wide Vestibule Steel Platform, with Friction Buffer and Draft Gear. Gould Coupler Company.

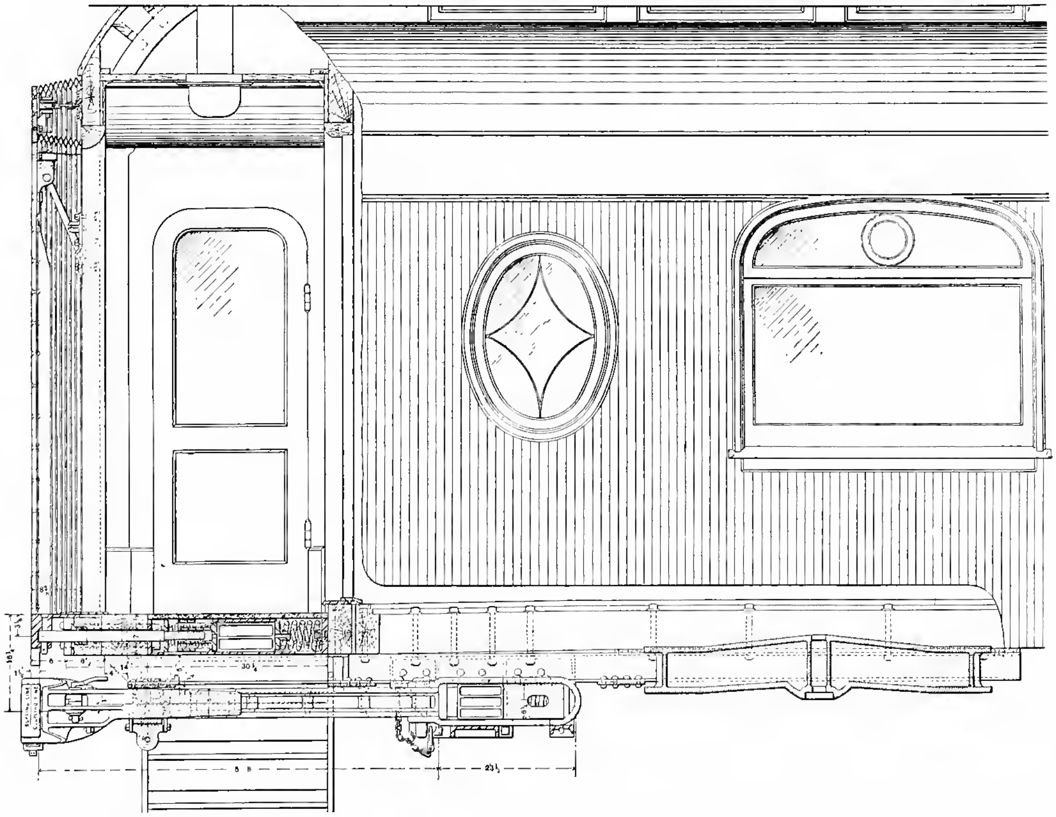
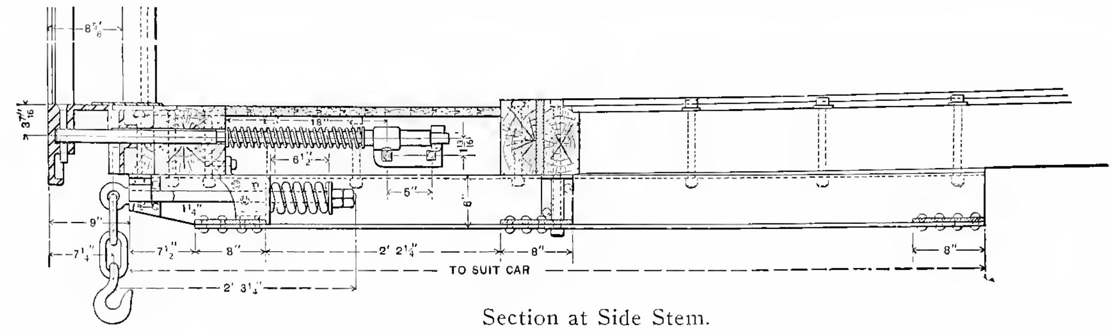
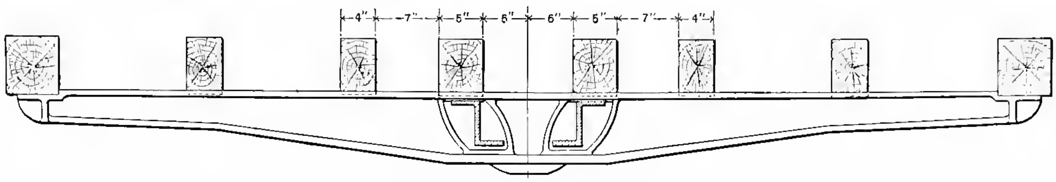


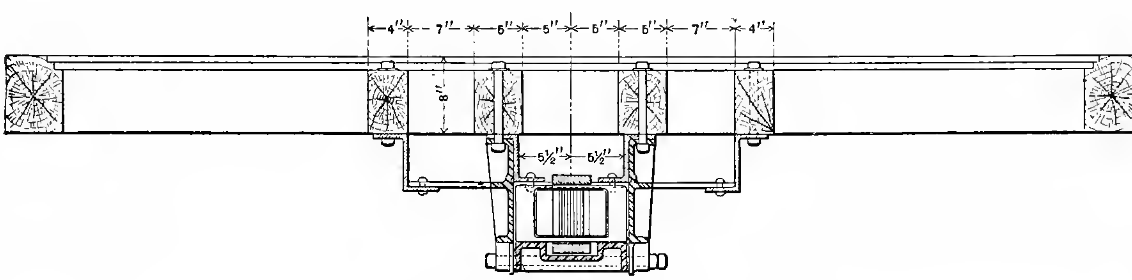
Fig. 546—Longitudinal Section Through Gould Wide Vestibule Steel Platform with Friction Buffer and Draft Gear. Gould Coupler Company.



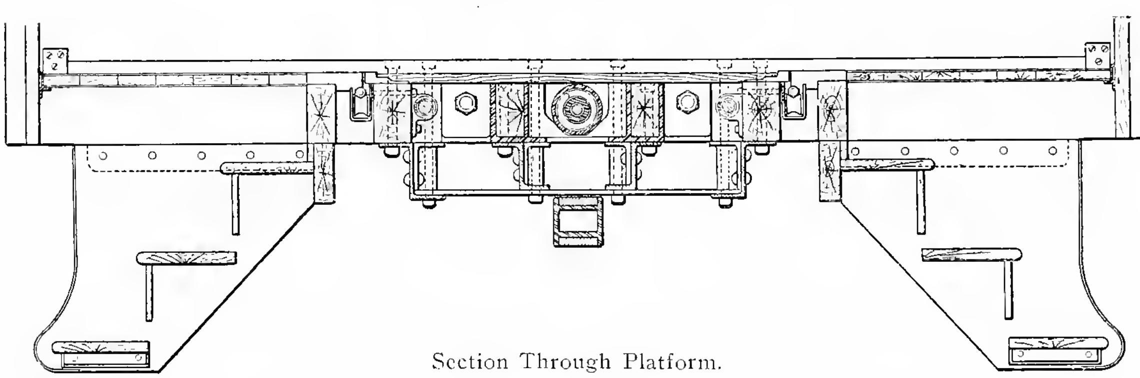
Section at Side Stem.



Section Through Bolster.



Section at Draft Gear.



Section Through Platform.

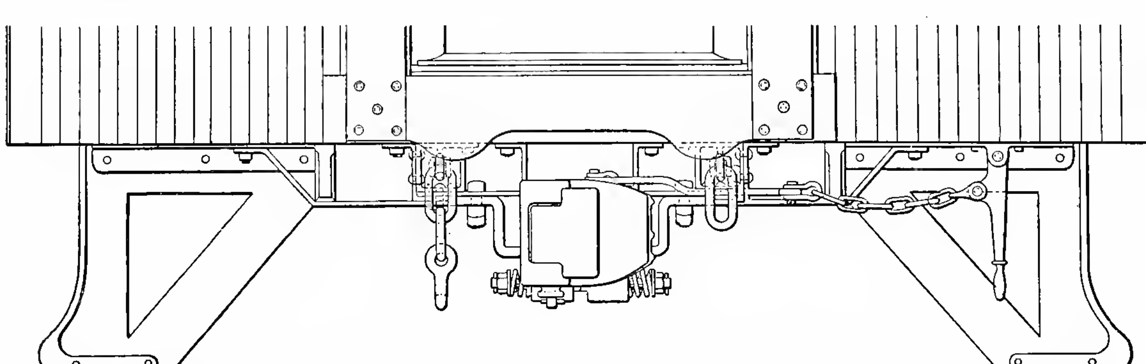


Fig. 547—End Elevation and Cross Sections of Gould Wide Vestibule Steel Platform with Friction Buffer and Draft Gear. Gould Coupler Company.

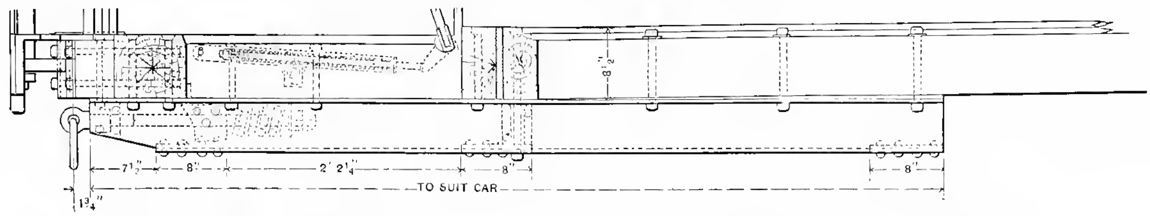


Fig. 548—Section Through Trap Door of Gould Wide Vestibule. See also Fig. 547.

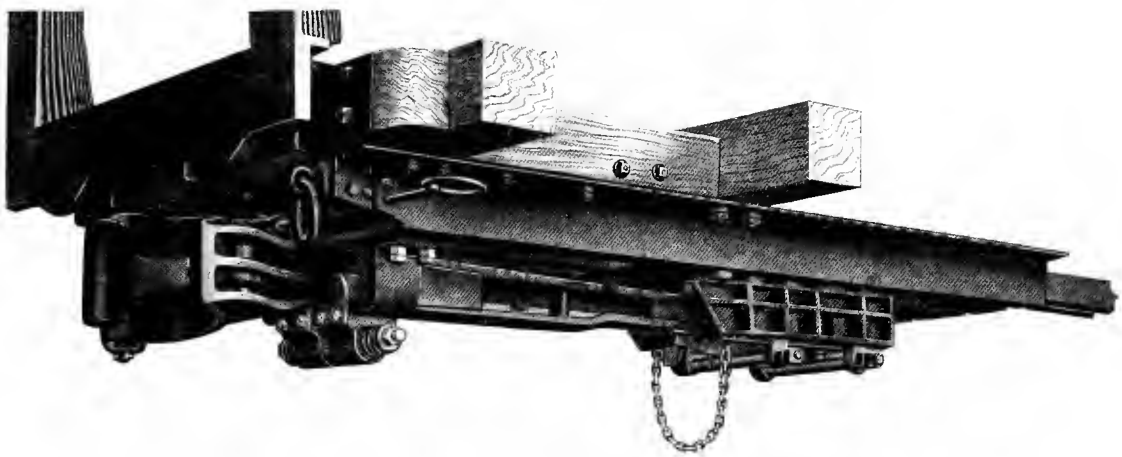


Fig. 549—Gould Steel Platform with Friction Buffer and Draft Gear.

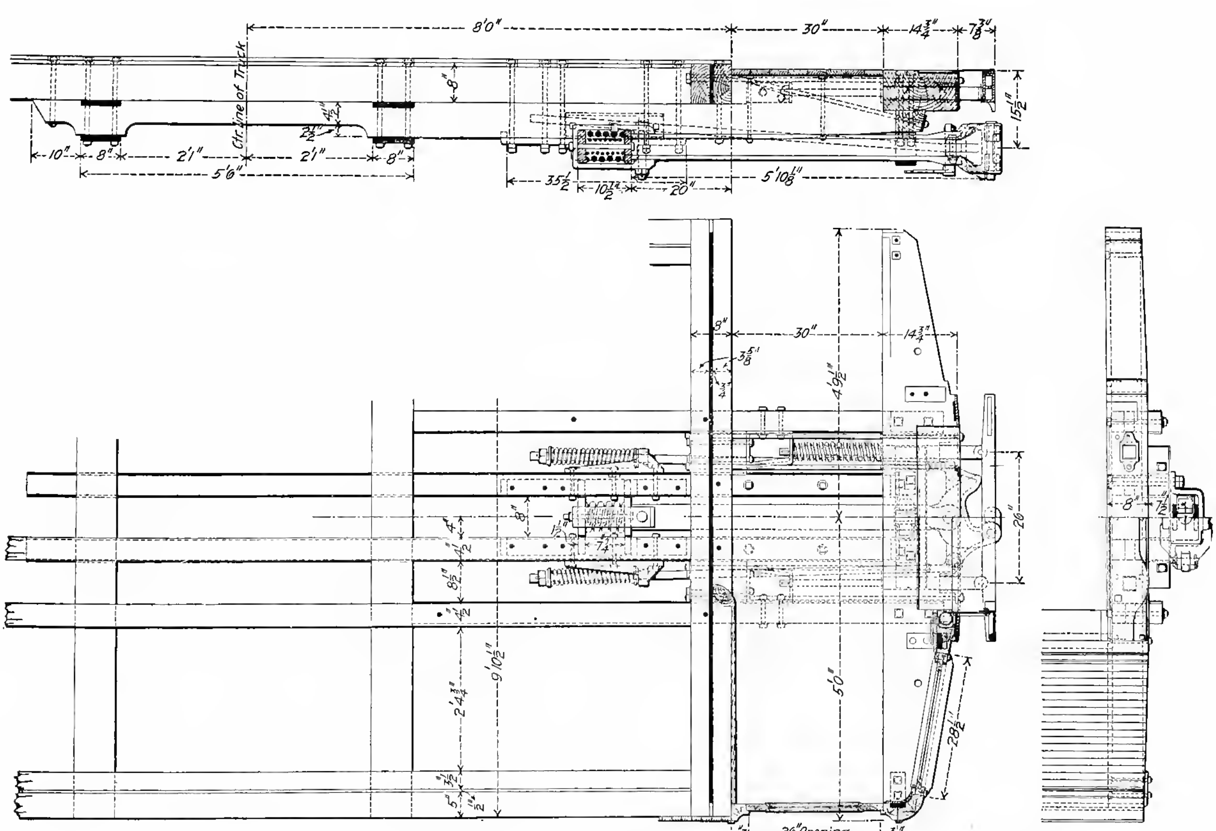


Fig. 550—Platform and Three-Stem Draft Gear for Cleveland, Cincinnati, Chicago & St. Louis Passenger Train Cars.

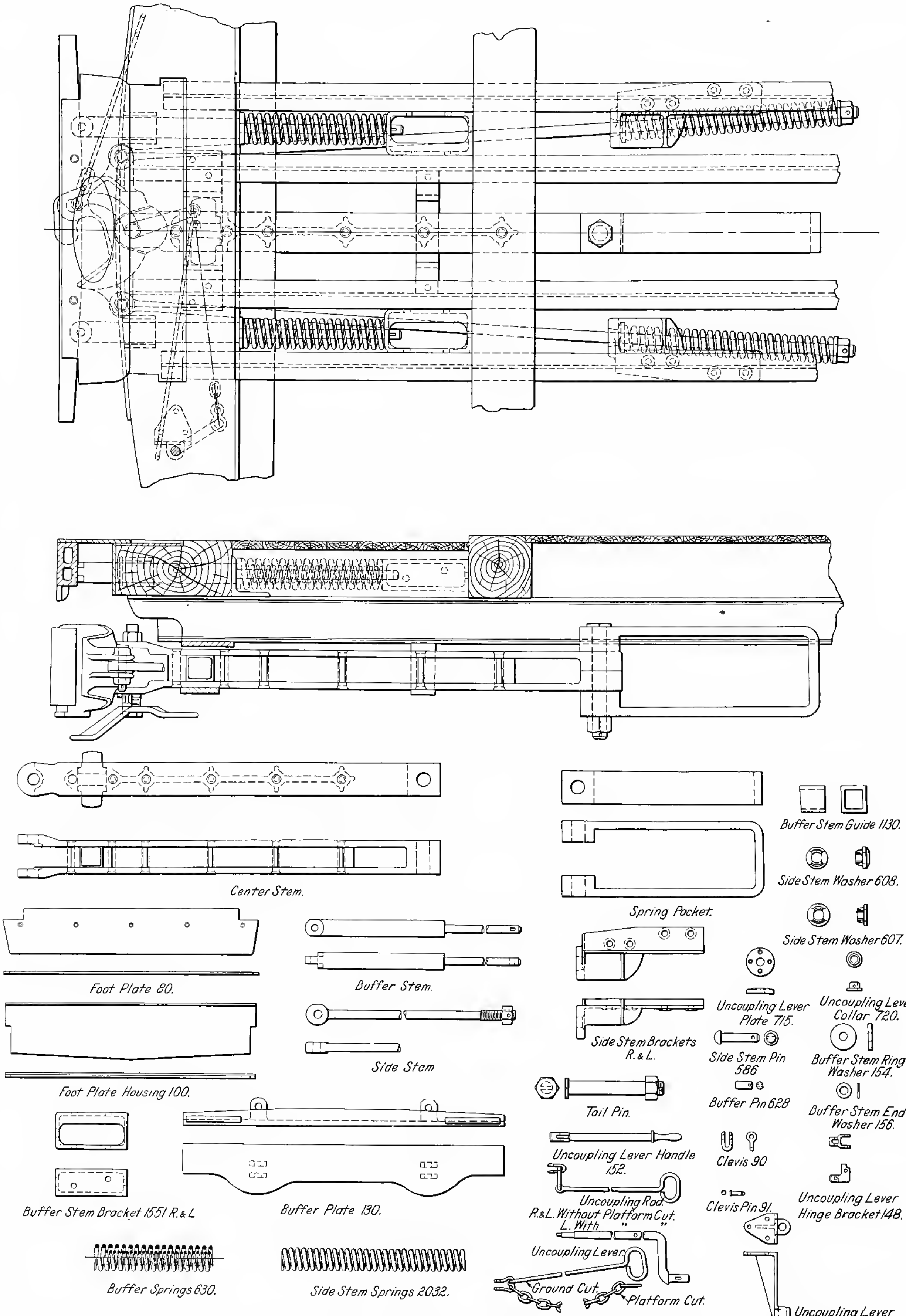


Fig. 551—Buhoup Three-Stem Equipment and Parts for Passenger Train Car Platforms. McConway & Torley Company.

Parts of Buhoup Wide Vestibule. See Figs. 552-555.

4	*Foot Plate*
6	*Spanner Bar, Lower*
8	*Curtain Plate, Front*
9	*Curtain Plate, Rear*
10	*Curtain Roller*
11	*Curtain*
12NP	*Post Plate, L and R*
20	*Curtain Bearing, Lower*
20A	*Curtain Bearing, Lower, Used with Standard Steel Platform*
21	*Curtain Bearing, Upper*
23	*Curtain Socket*
40	*Patent Plate*
44	*Curtain Spring, L and R*
45	*Curtain Roller Plug*
46	*Arch Plate and Buffer Spring*
49	*Arch Plate Band*
50	*Shield*
52	*Curtain Spring Plug, Large*
53	*Curtain Spring Plug, Small*
54	*Piston Stem*
79	*Buffer Plate for Standard Steel Platform*
80	*Foot Plate for Standard Steel Platform*
81	*Buffer Plate Spring*
91	*Arch Plate*
94	*Spanner Bar, Upper*
95	*Angle Connection, Top, R*
96	*Angle Connection, Top, L*
100	*Foot Plate Housing*
101	*Bulb Angle*
111	*Spanner Bar Bolt*
115	*Angle Connection, Bottom, R*
116	*Angle Connection, Bottom, L*
119	*Piston Stem Bracket*
120	*Piston Stem Guide*
123	*Accordion Hood Band*
124	*Accordion Hood*
125	*Hood Brace Bracket, Front, R*
126	*Hood Brace Bracket, Front, L*
127	*Hood Brace Bracket, Rear, R*
128	*Hood Brace Bracket, Rear, L*
129	*Hood Brace*
130	*Buffer Plate*
134	*Foot Plate Bolt*
154	*Piston Stem Spring*
155	*Piston Stem Washer*
156	*Piston Stem Ferrule*
628	*Buffer Plate Pin*

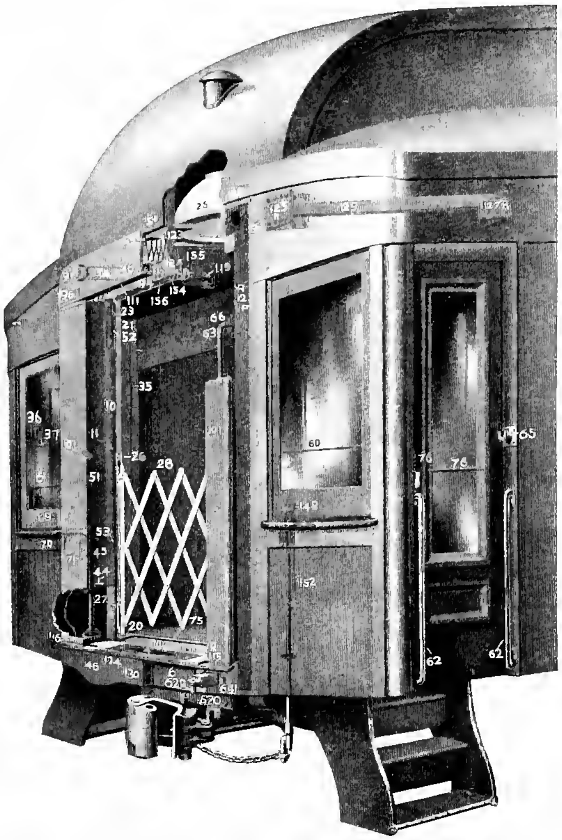


Fig. 552—Buhoup Wide Vestibule. McConway & Torley Company.

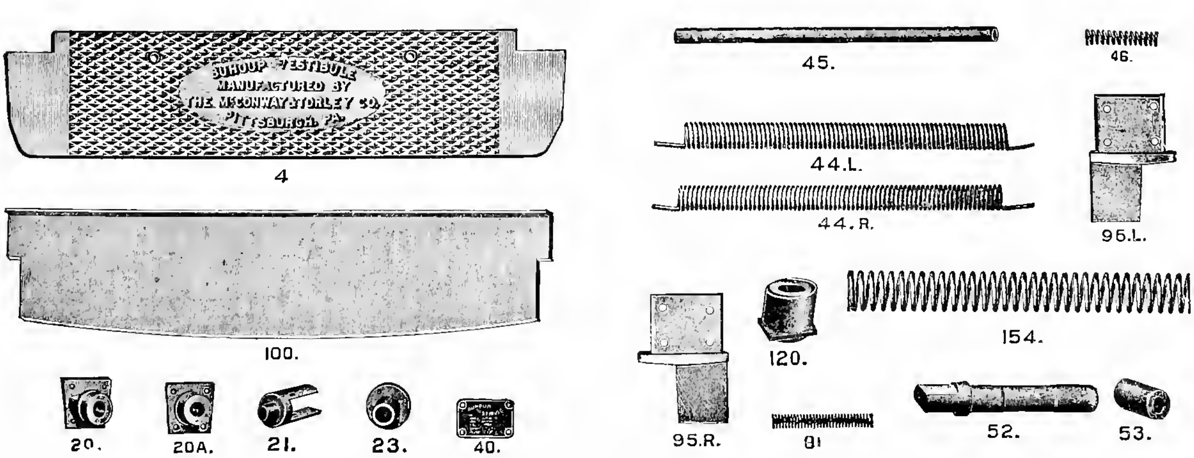


Fig. 553—Details of Buhoup Wide Vestibule. See also Figs. 552, 554 and 555 and Names of Parts on This Page.

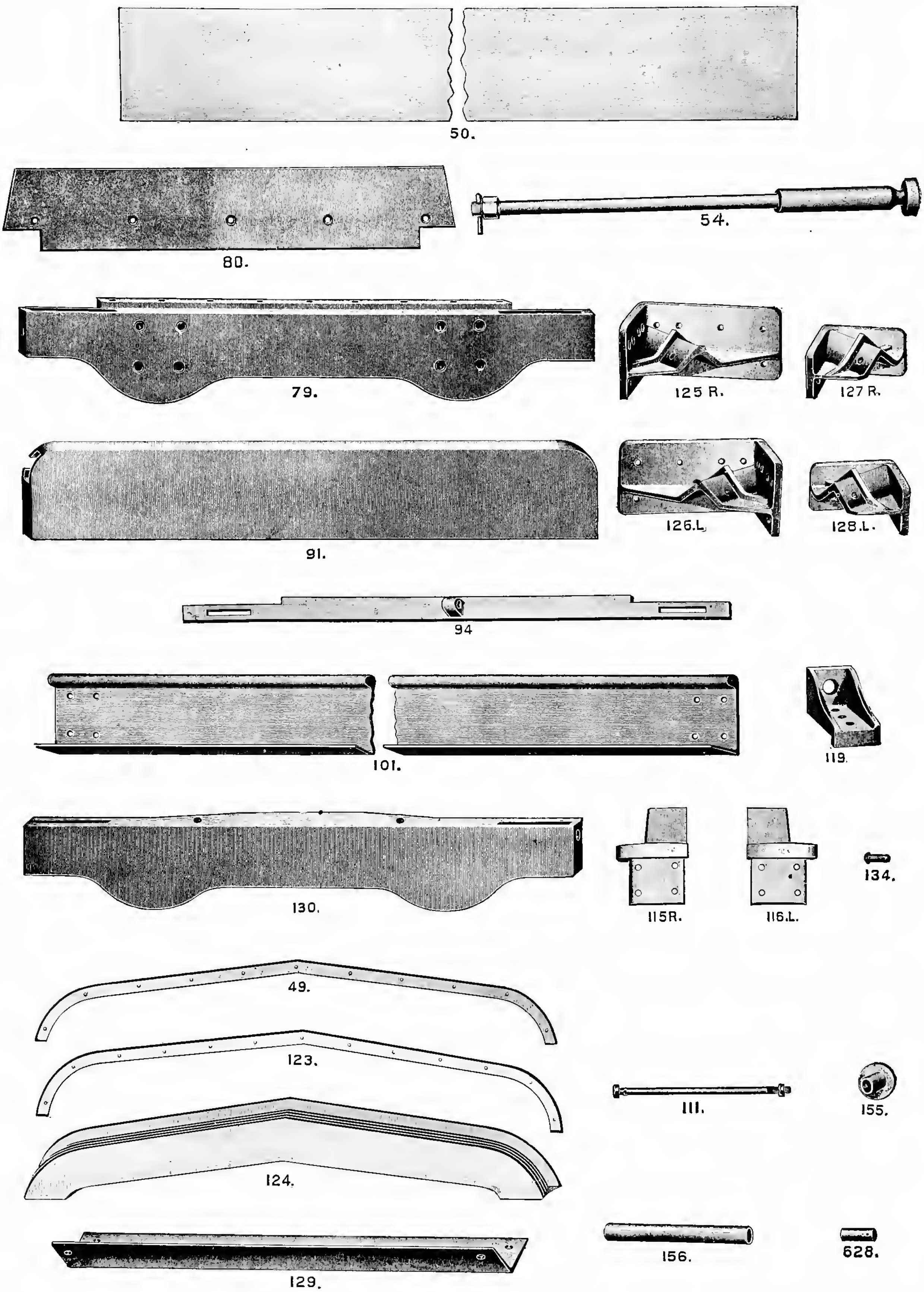


Fig. 554—Details of Buhoup Wide Vestibule. See also Figs. 552, 553 and 555 and Names of Parts on Page 445. McConway & Torley Company.

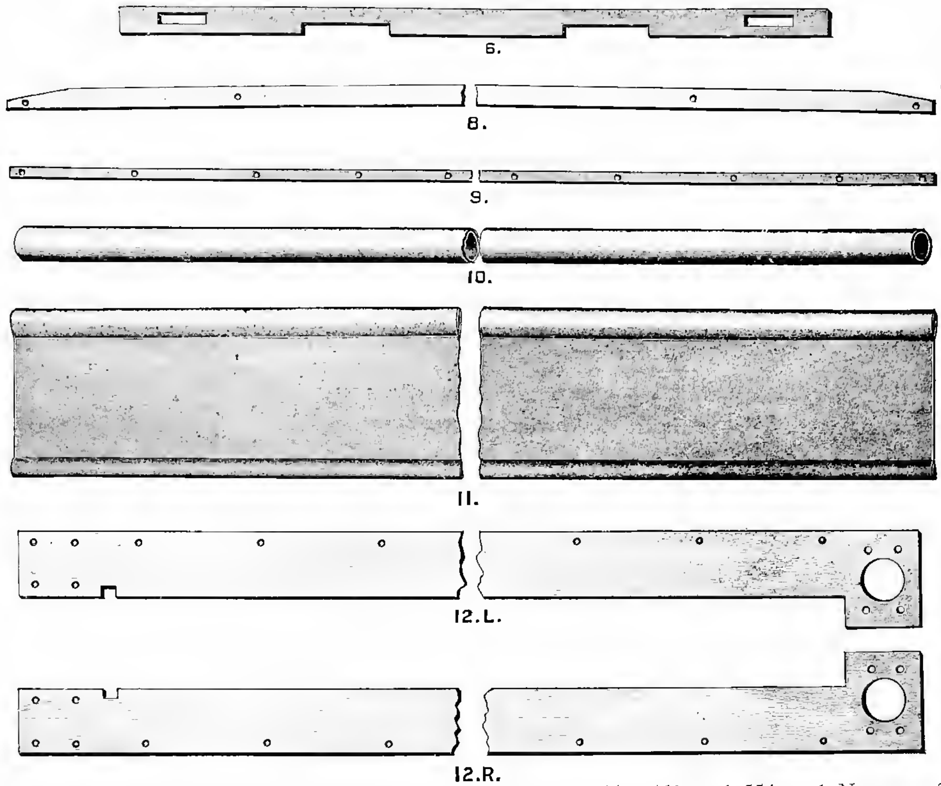


Fig. 555—Details of Buhoup Wide Vestibule. See also Figs. 552, 553 and 554 and Names of Parts on Page 445.

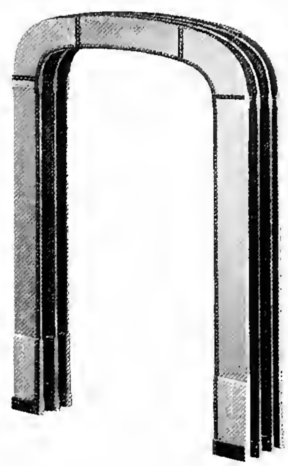


Fig. 557—Acme Vestibule Diaphragm. Acme Supply Company.

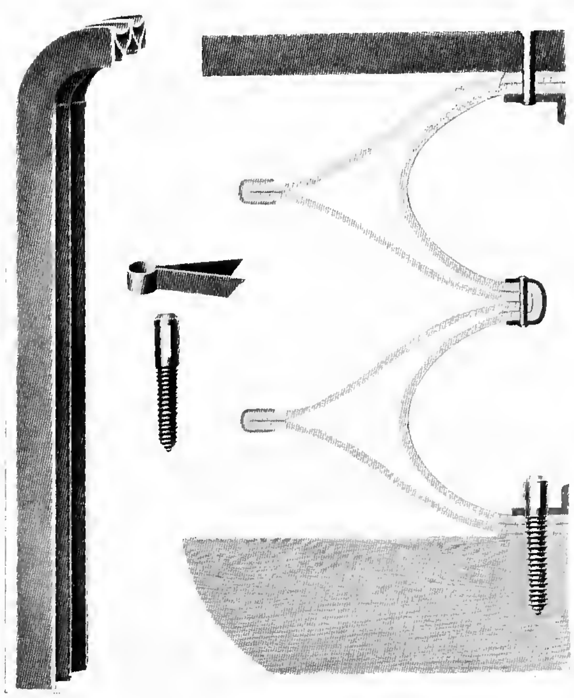


Fig. 556—Sectional View of Acme Improved Fireproof Vestibule Diaphragm and Attachment. Acme Supply Company.

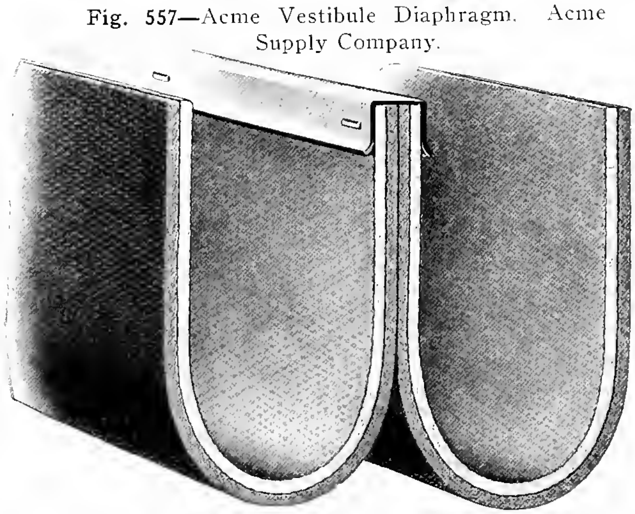


Fig. 558—Section Through Top of Acme Sectional Diaphragm. Acme Supply Company.

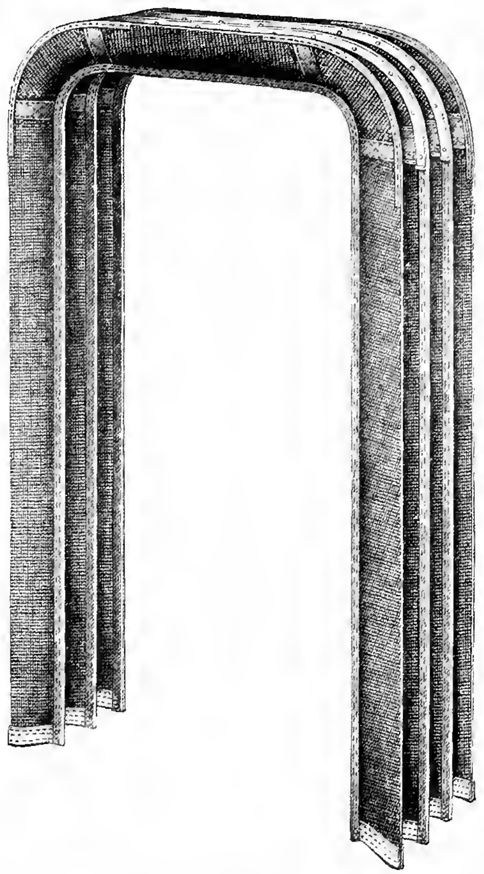
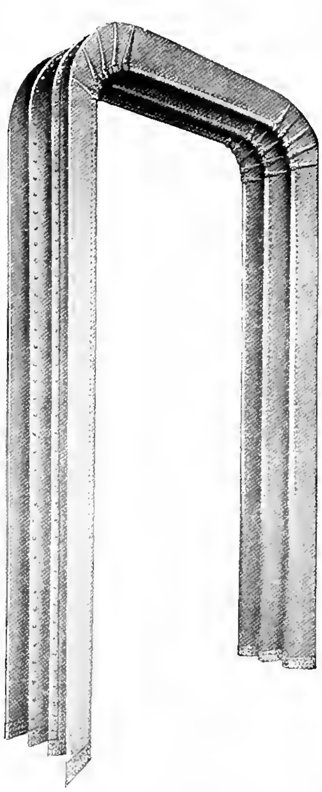
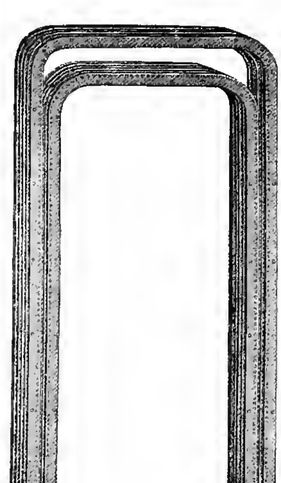


Fig. 559—CSCO Vestibule Diaphragm. Curtain Supply Company.

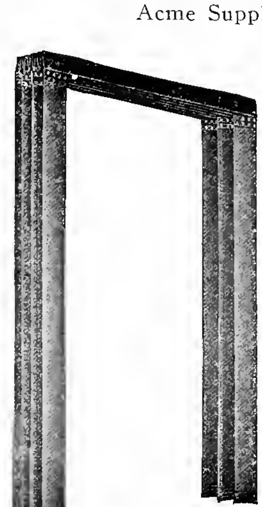
Fig. 560—Acme Sectional Vestibule Diaphragm. Acme Supply Company.



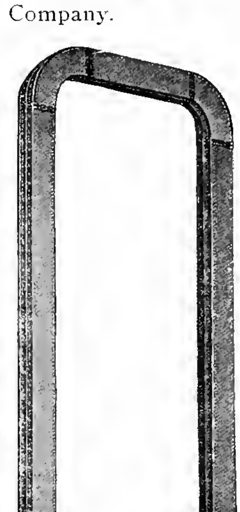
One-Piece; Corrugated Corners.



Gould.



American Car & Foundry.



Pullman.

Fig. 561—Ajax Vestibule Diaphragms. Railway Appliances Company.

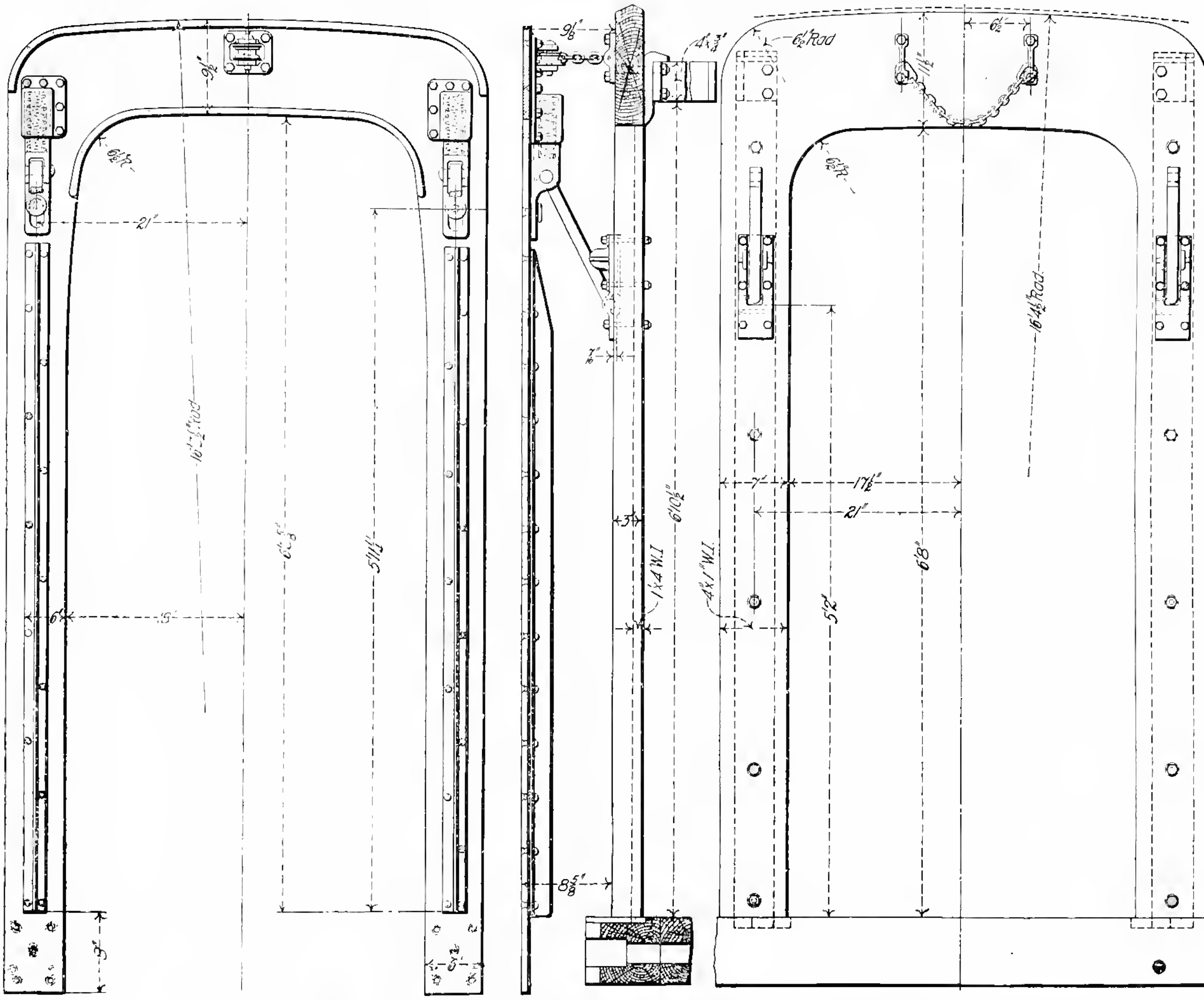


Fig. 562—Gould Vestibule Face Plate. Gould Coupler Company.

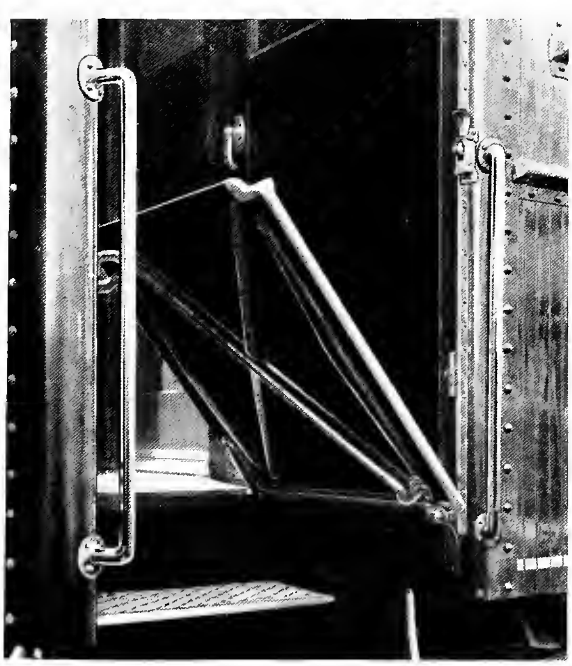


Fig. 563—National Steel Trap Door and Lifting Device with Door Raised to 45 Degrees. General Railway Supply Company.

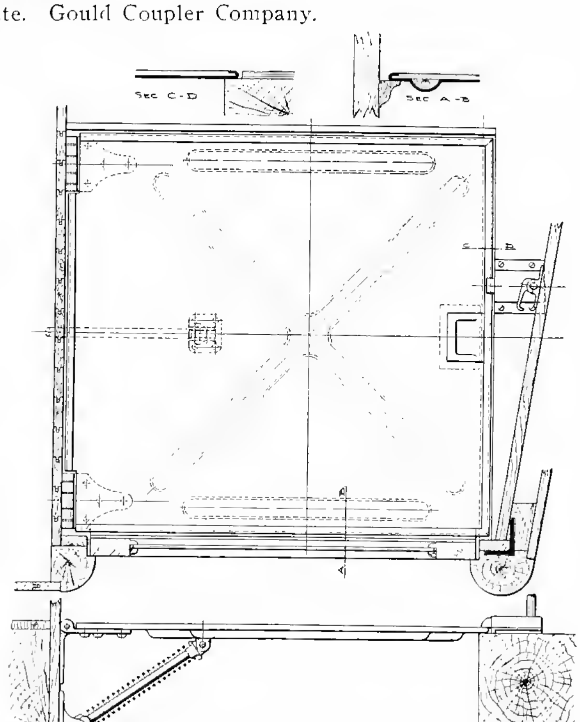


Fig. 564—National Steel Trap Door for Grade Level Platforms. General Railway Supply Company.

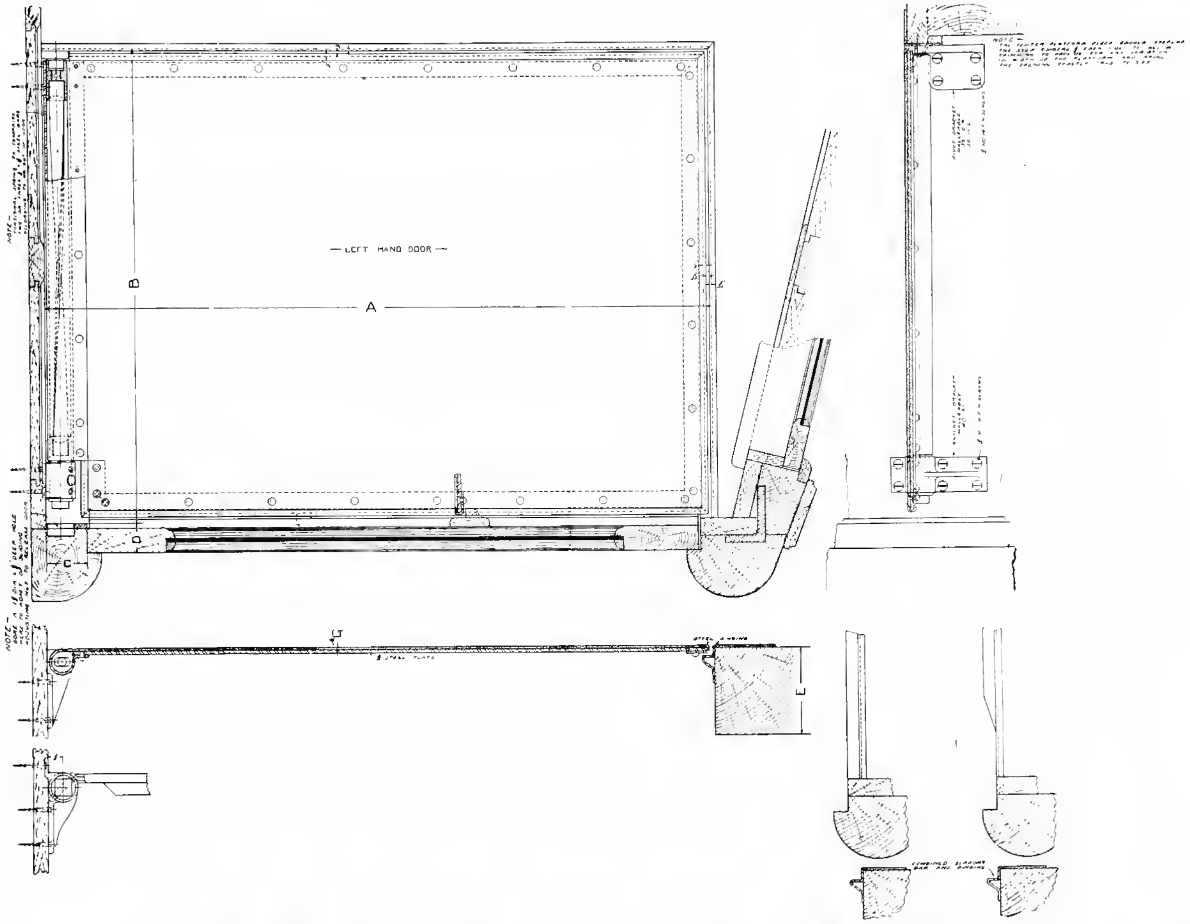


Fig. 565—Metal Trap Door for Grade Level Platforms. O. M. Edwards Company.

Note.—See "Locks" for Platform Trap Door Locks.

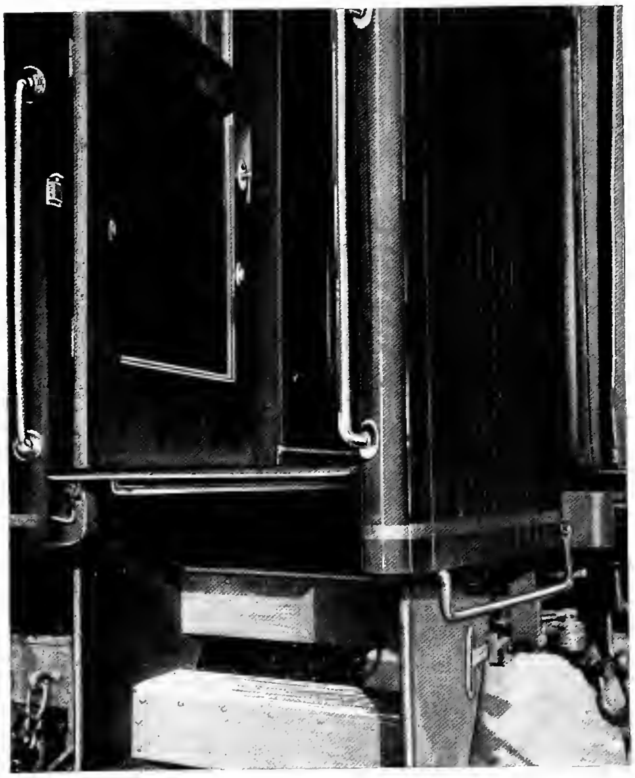


Fig. 566—Platform Trap Door Closed. O. M. Edwards Company.

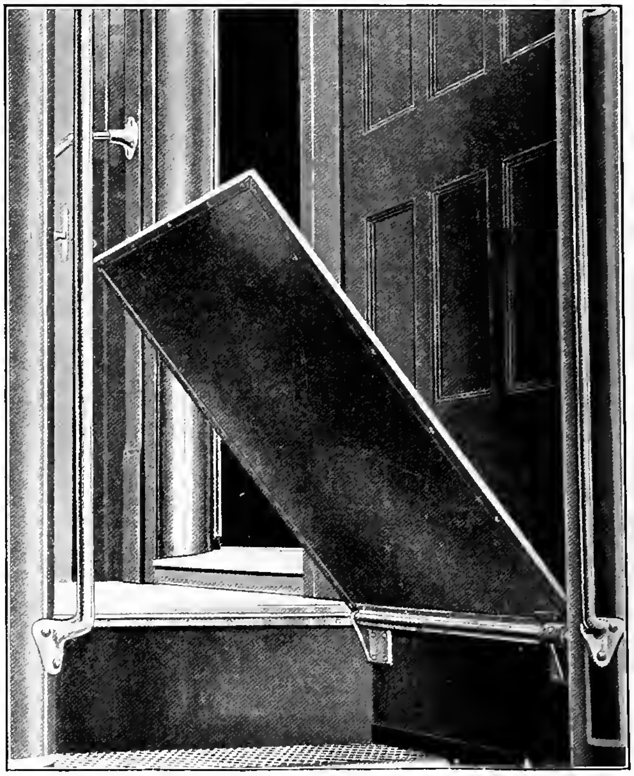


Fig. 567—Platform Trap Door Partly Open. O. M. Edwards Company.

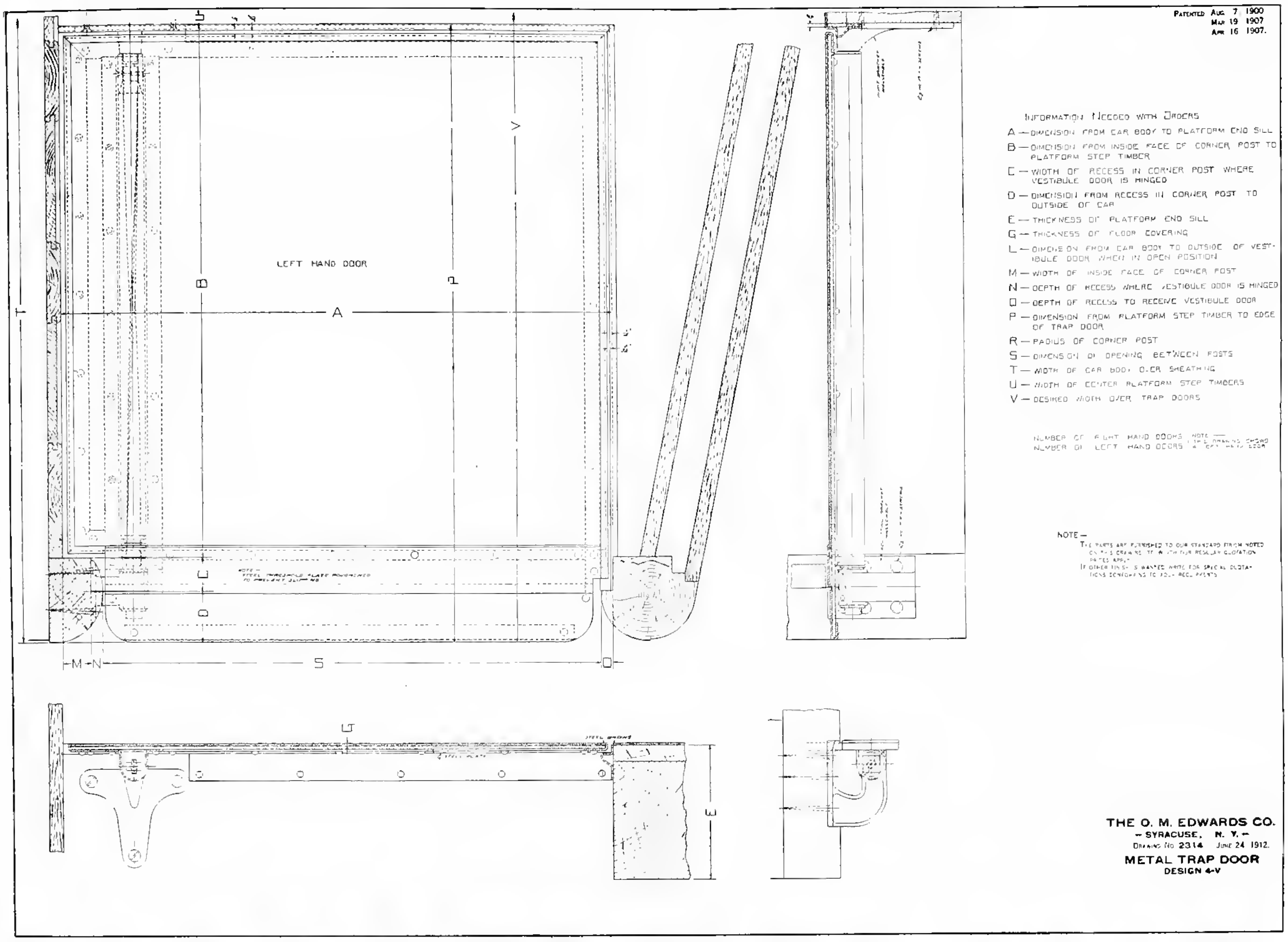


Fig. 568—Metal Trap Door for Elevated Platforms. O. M. Edwards Company.

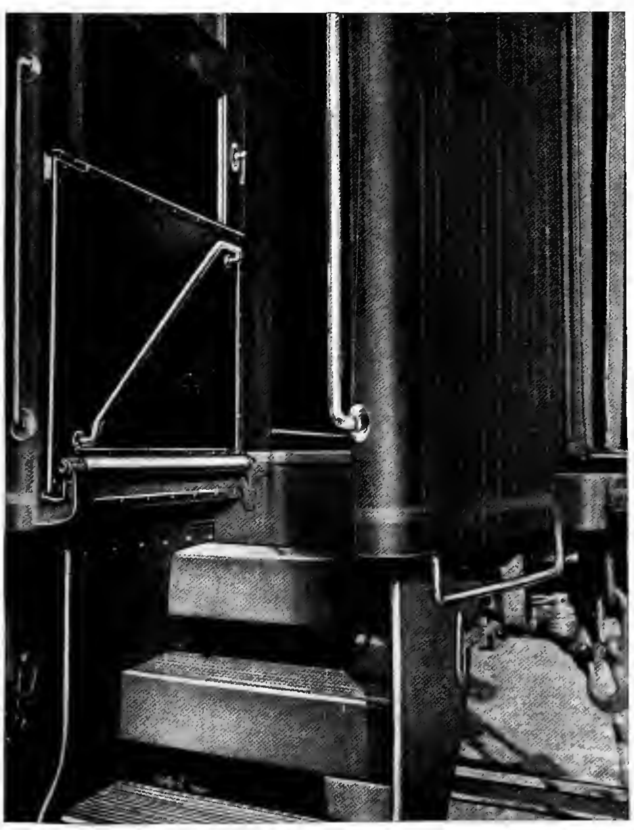


Fig. 569—Platform Trap Door Open. O. M.

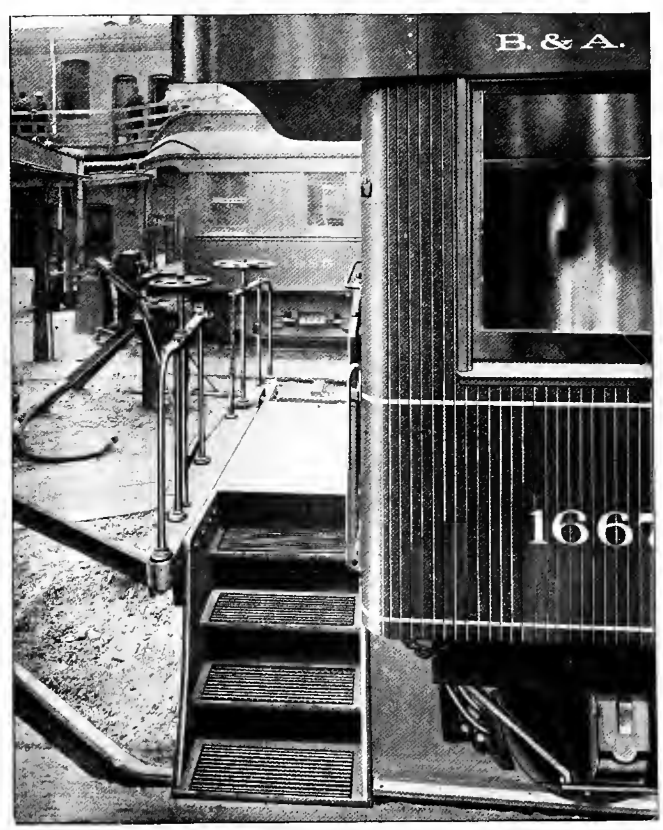


Fig. 570—Universal Safety Tread Applied to Car Steps. Universal Safety Tread Company. See also Fig. 573.

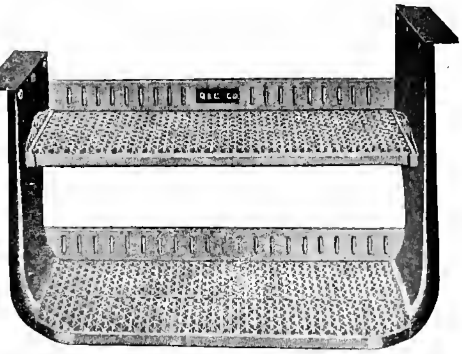


Fig. 571—Stanwood Self-Cleaning, Non-Slipping, Double Car Step. American Mason Safety Tread Company.

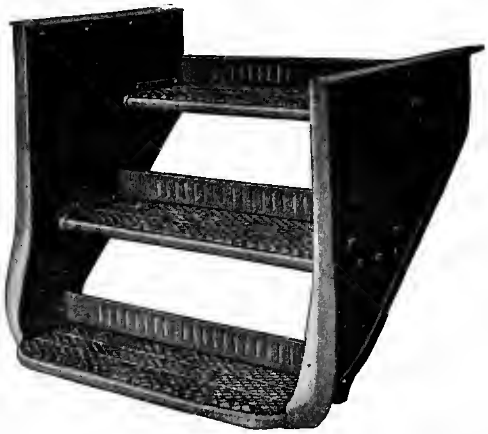


Fig. 572—Stanwood Self-Cleaning, Non-Slipping, Triple Car Step. American Mason Safety Tread Company.

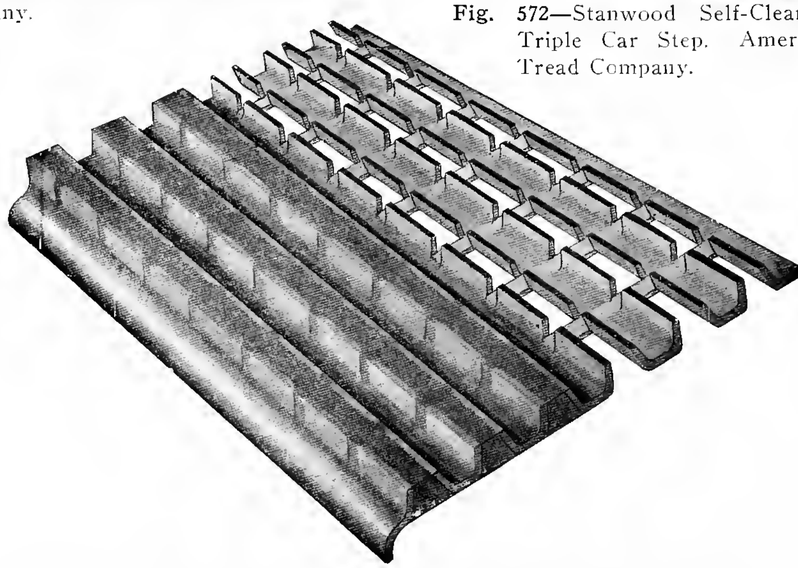
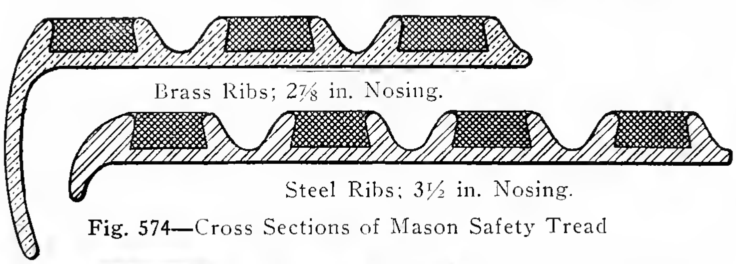


Fig. 573—Universal Safety Tread, Showing Steel Base Before and After Lead is Rolled In. Universal Safety Tread Company.



Brass Ribs; 2⅞ in. Nosing.

Steel Ribs; 3½ in. Nosing.

Fig. 574—Cross Sections of Mason Safety Tread

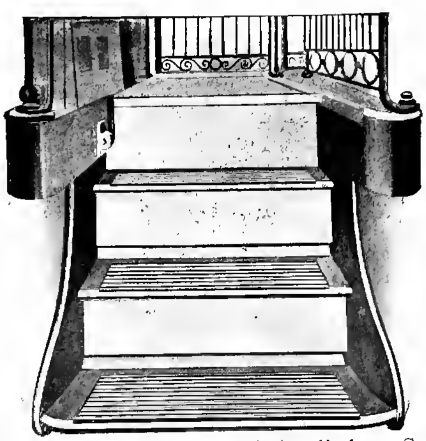


Fig. 575—Mason Safety Tread Applied to Steps of Pullman Car.

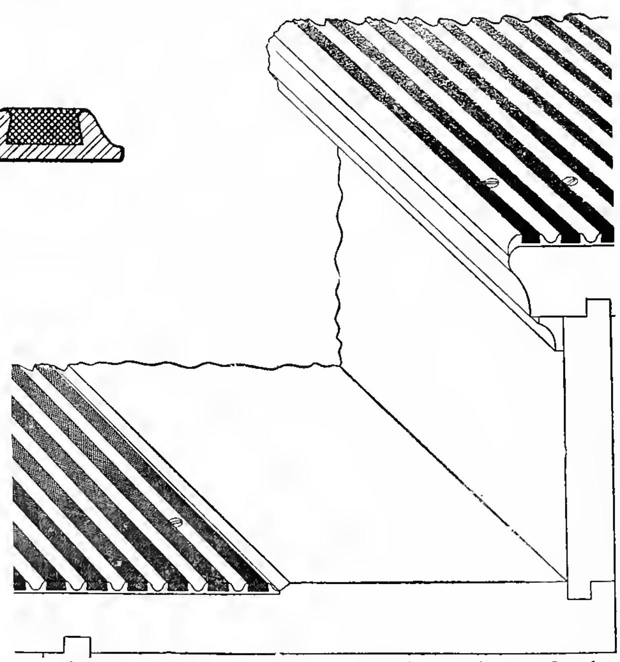


Fig. 576—Mason Safety Tread Applied to Wooden Car Steps. Upper Tread Carborundum Filled; Lower Tread Lead Filled.

American Mason Safety Tread Company.

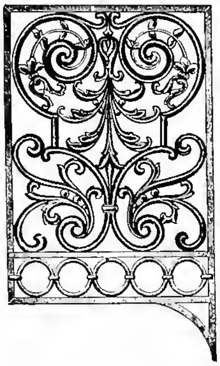


Fig. 577—Platform Gate Panel. Adams & Westlake Company.

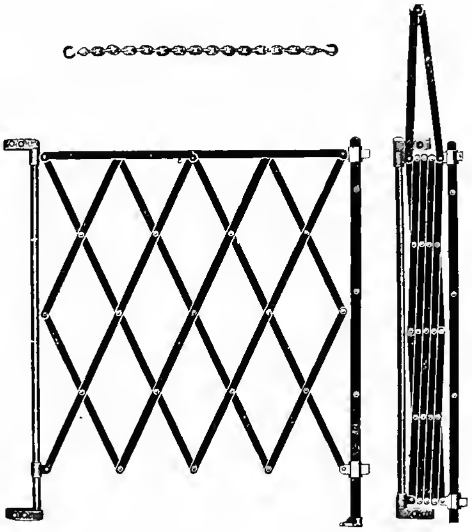


Fig. 578—Folding Platform Tail Gate. Adams & Westlake Company.

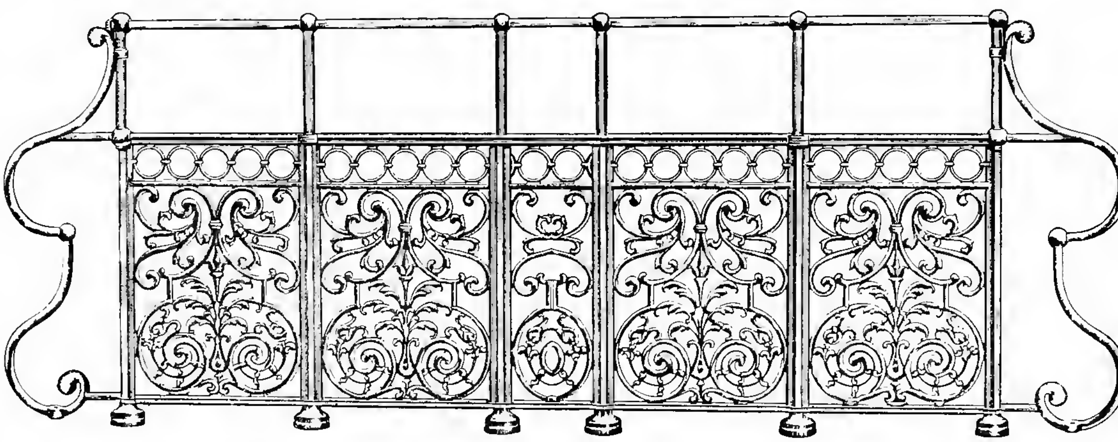


Fig. 579—Platform End Railing. Dayton Manufacturing Company.

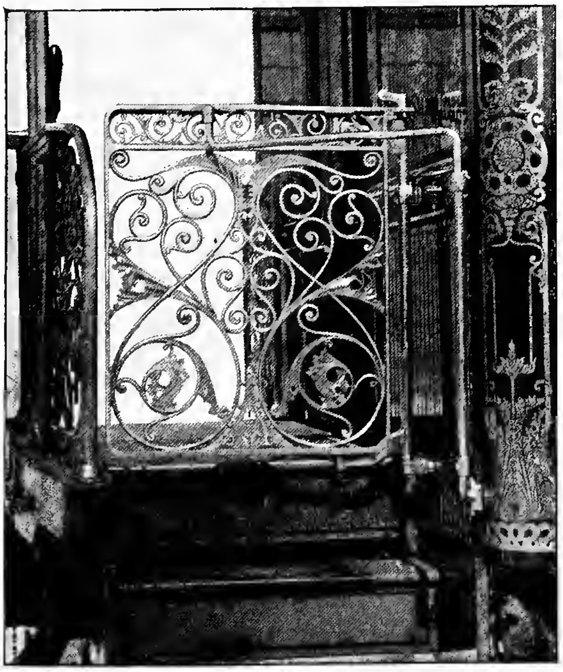


Fig. 580—Wood's Platform Gate. Adams & Westlake Company.

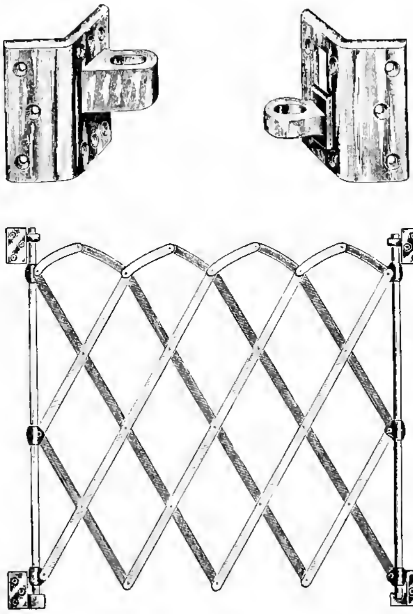


Fig. 581—Tail Gate and Fixtures. Dayton Manufacturing Company.

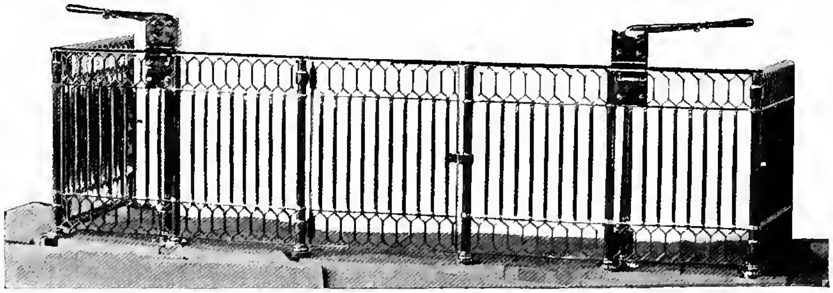


Fig. 582—Observation Platform Railing. Adams & Westlake Company.

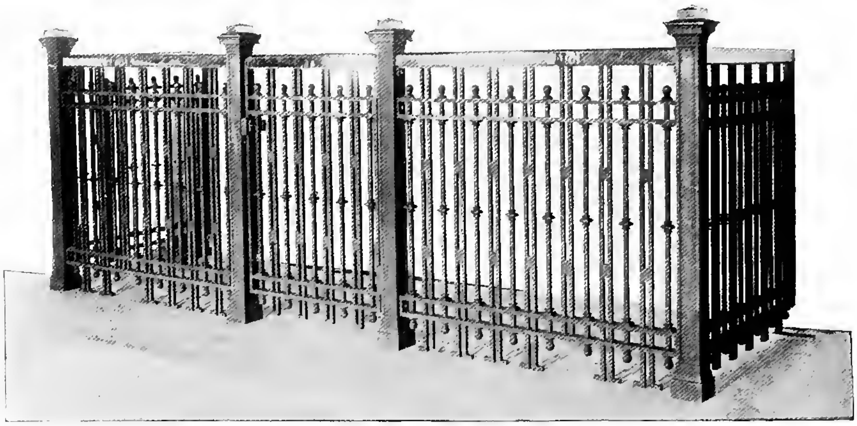


Fig. 583—Observation Platform Railing. Adams & Westlake Company.

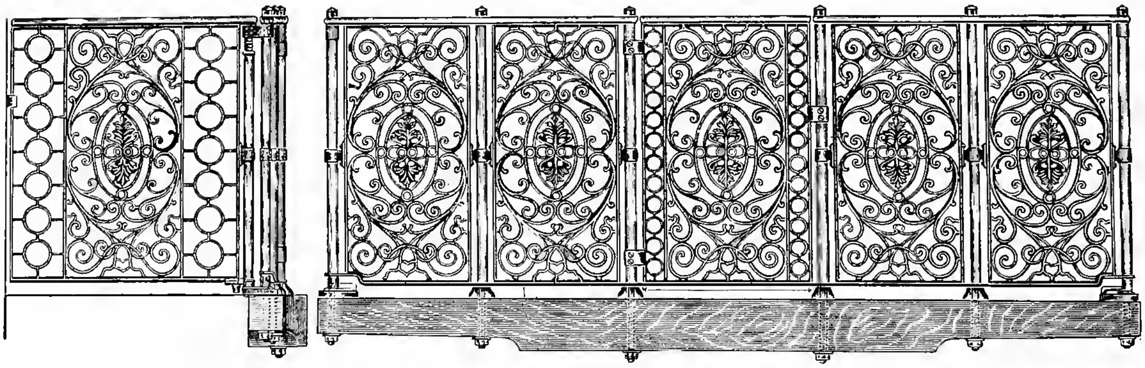


Fig. 584—Observation Platform Railing. Dayton Manufacturing Company.

Fig. 585—Acme Vestibule Curtain Handle. Acme Supply Company.

Fig. 586—Tuco Vestibule Curtain Handle. Acme Supply Company.

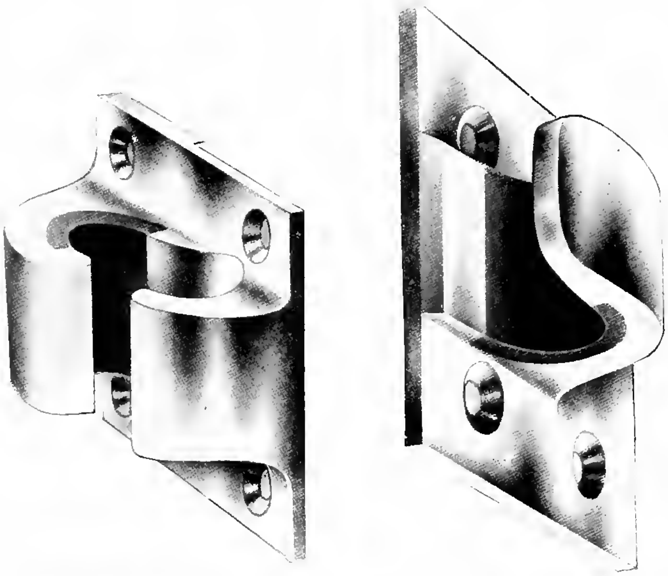


Fig. 587—Vestibule Curtain Hooks with Fibre Inserts. Acme Supply Company.

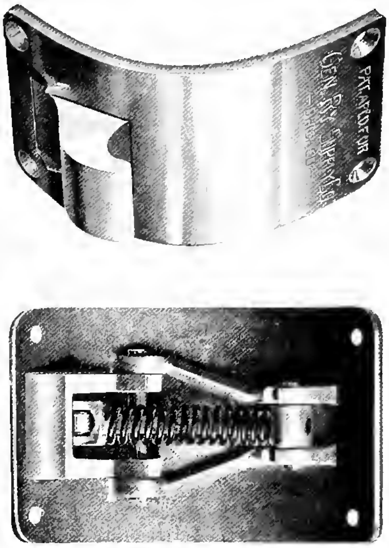


Fig. 588—National Vestibule Curtain Catches. General Railway Supply Company.

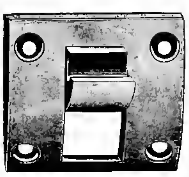


Fig. 589—Vestibule Curtain Catch. Adams & Westlake Company.

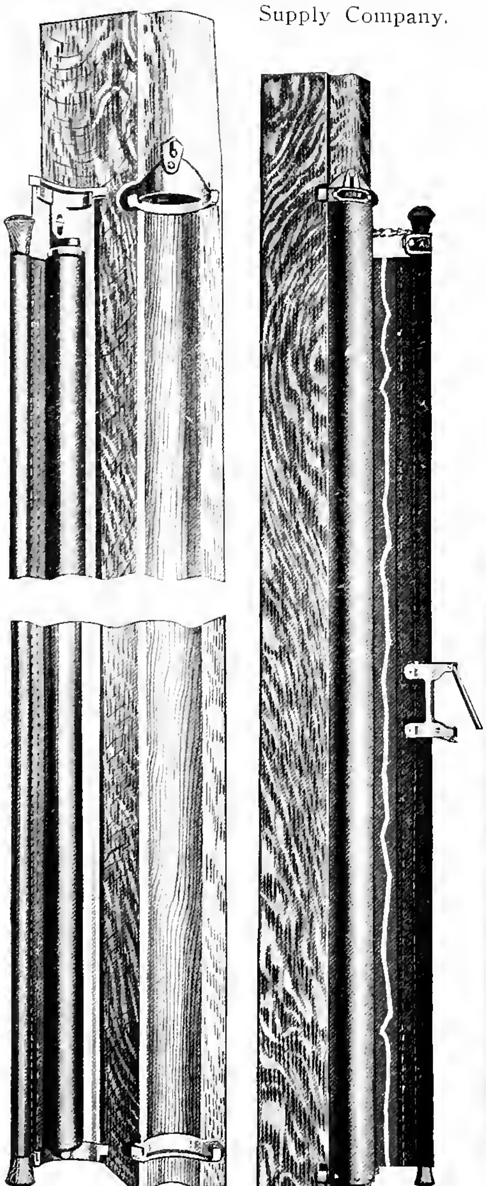


Fig. 590—Ajax Adjustable Vestibule Curtain Fixtures. Railway Appliances Company.

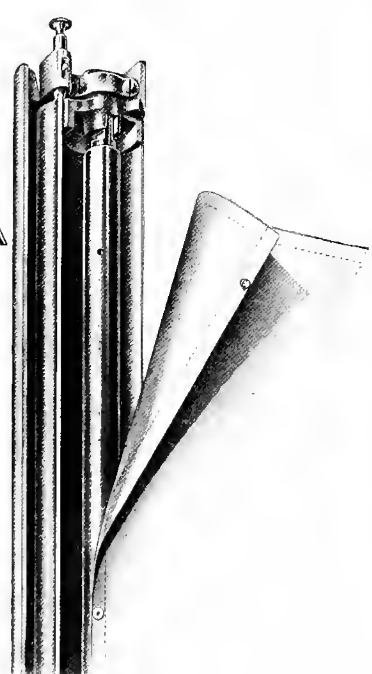


Fig. 591—Acme Vestibule Curtain Roller. Acme Supply Company.

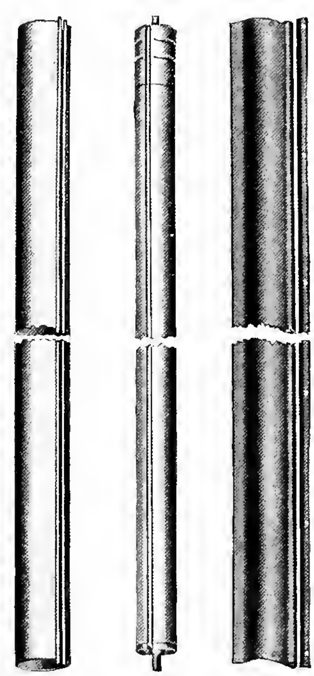
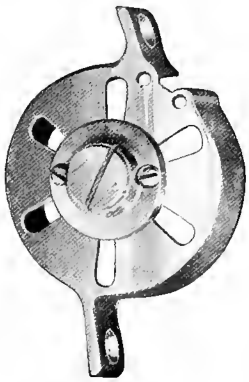
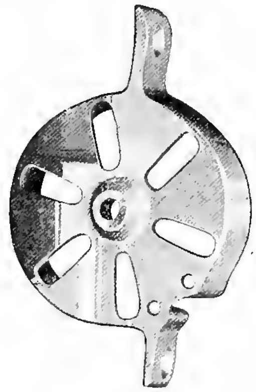


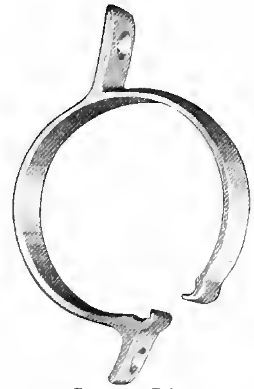
Fig. 592—Vestibule Curtain Fixtures. Curtain Supply Company.



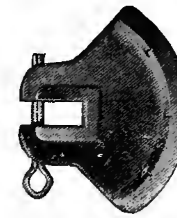
Top Bracket.



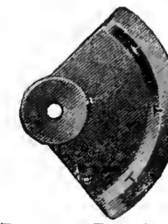
Bottom Bracket.



Center Ring.



Top Bracket.



Bottom Bracket.

Fig. 593—Vestibule Curtain Fixtures. Curtain Supply Company.

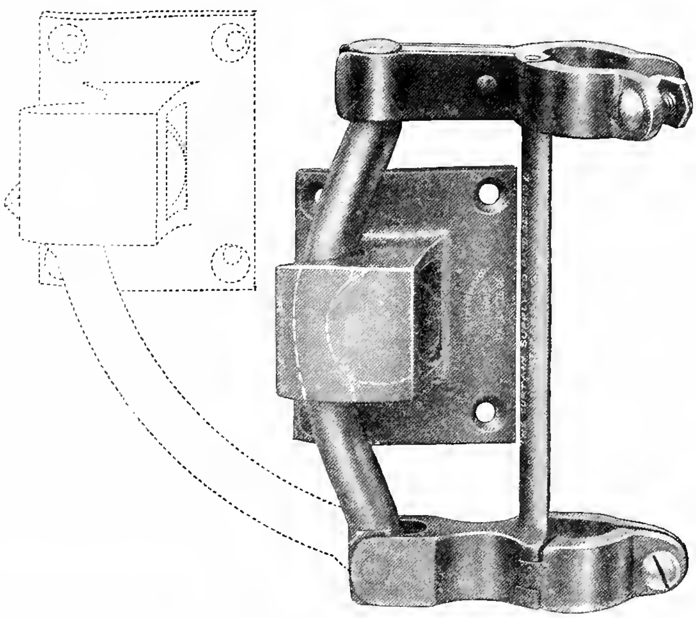


Fig. 594—Automatic Release Vestibule Curtain Handle. Curtain Supply Company.

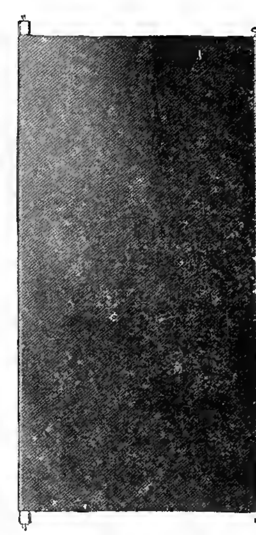
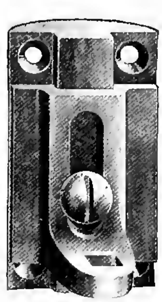
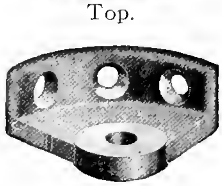


Fig. 595—Vestibule Passageway Curtain. Curtain Supply Company.



Top.



Bottom.

Fig. 596—Adjustable Vestibule Curtain Roller Brackets. Curtain Supply Company.

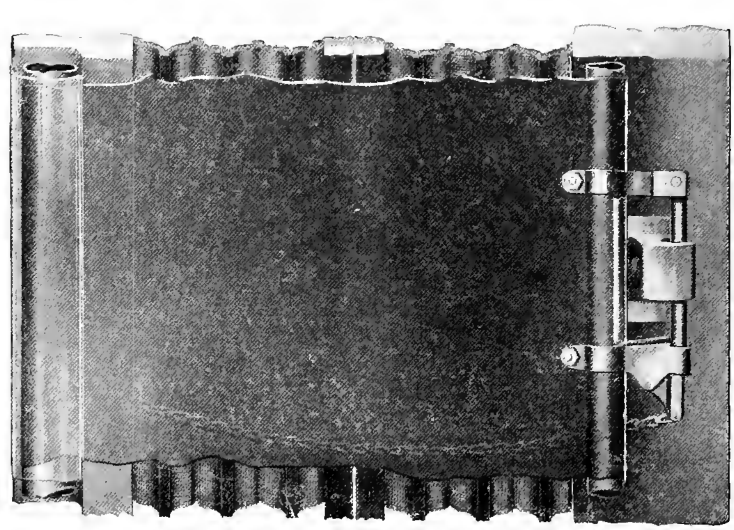


Fig. 597—Rex Release Handle When Cars Are Coupled. Curtain Supply Company.

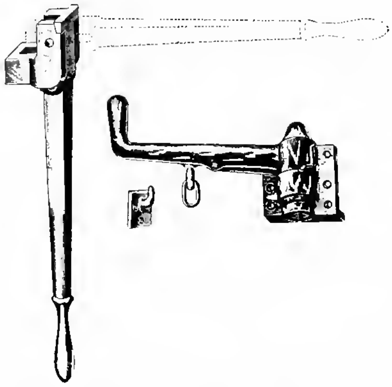


Fig. 598—Brake and Uncoupling Levers. Dayton Manufacturing Company.

Fig. 599—Brakeman's Vestibule Step. Adams & Westlake Company.

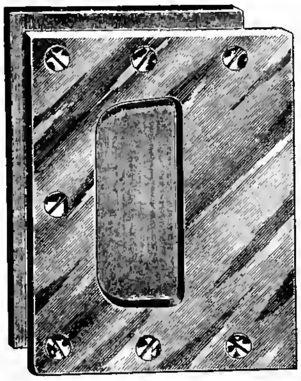


Fig. 600—Vestibule Trap Door Lift. Dayton Manufacturing Company.

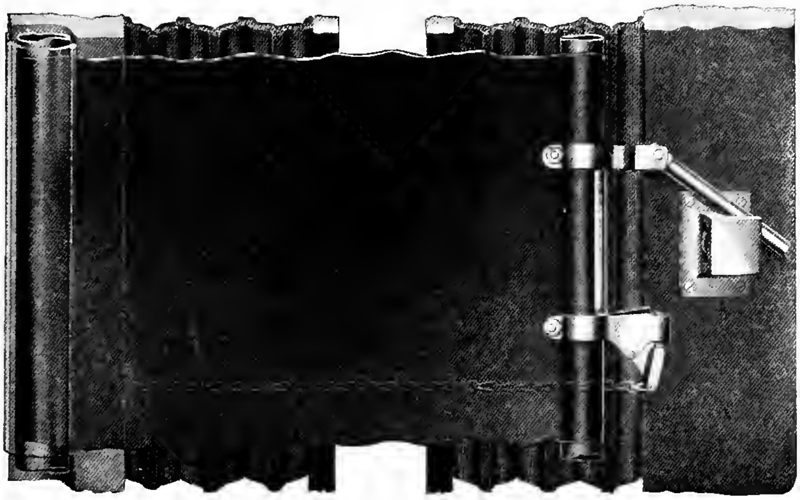


Fig. 601—Rex Release Handle when Cars Part. Curtain Supply Company.

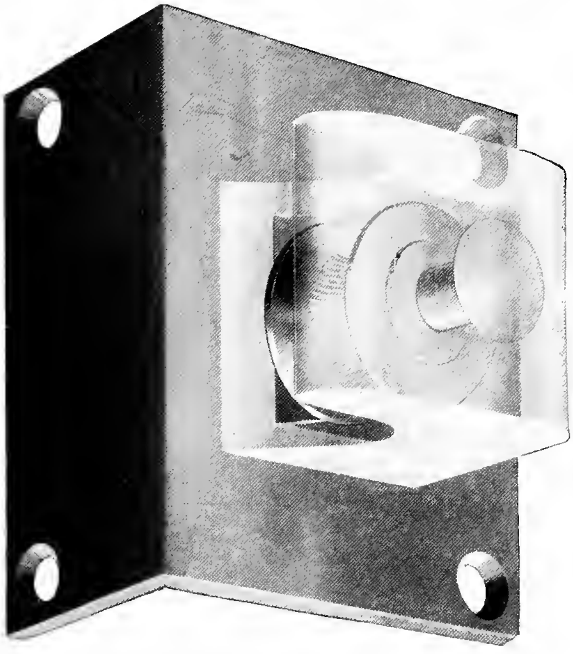


Fig. 602—Roller Bearing Vestibule Curtain Hook.

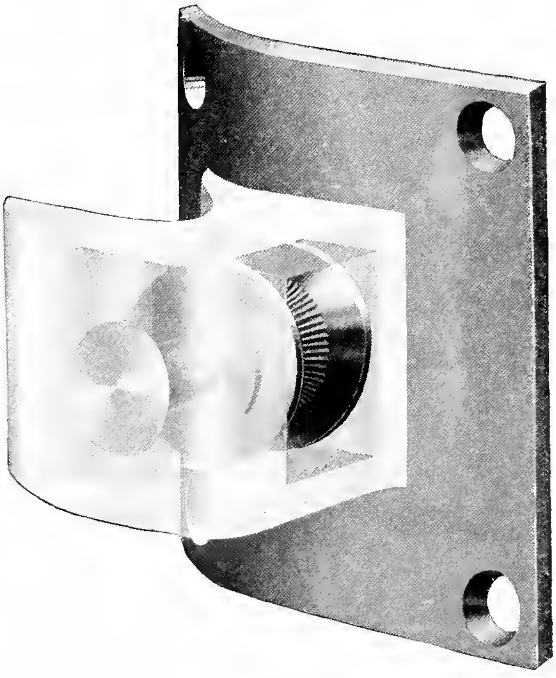


Fig. 603—Roller Bearing Vestibule Curtain Hook.

Curtain Supply Company.

Fig. 604 — Brake Rod Floor Plate.

Fig. 605 — Uncoupling Rod Guide.

Fig. 606 — Uncoupling Rod Foot.

Adams & Westlake Company.

Fig. 610—Feralun Safety Tread Applied to Car Steps. American Abrasive Metals Company.

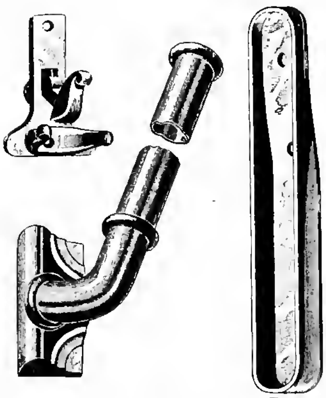


Fig. 607—Door Guard Drop Rod Catch and Pocket. Dayton Manufacturing Company.

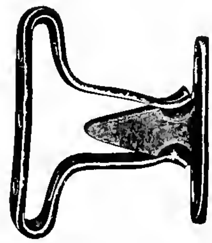


Fig. 608—Door Holder.

Fig. 609—Mat Hook. Adams & Westlake Company.

Fig. 611—Vestibule Guard Rail and Fittings. Jas. L. Howard & Company.

Fig. 617 — Trap Door Bumper. Dayton Manufacturing Company.

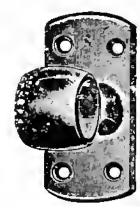


Fig. 618—Uncoupling Rod Guide. Adams & Westlake Company.

Fig. 612 — Vestibule Guard Rail and Fittings. Adams & Westlake Company.

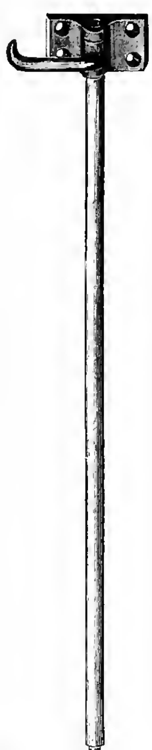


Fig. 613—Trap Door Latch Operating Rod. Dayton Manufacturing Company.

Fig. 614—Corner Post Grab Handle. Adams & Westlake Company.

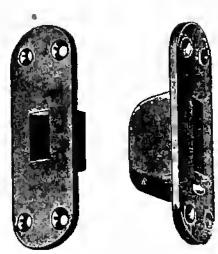


Fig. 615—Tail Gate Sockets. Adams & Westlake Company.

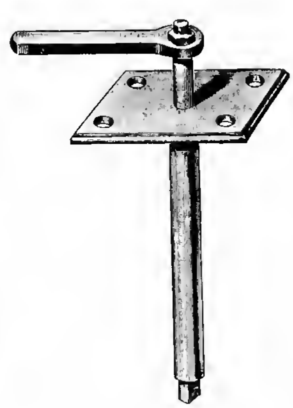


Fig. 616—Rod for Operating Trap Door Latch from Below Platform. Dayton Manufacturing Company.

Fig. 619—Corner Post Grab Handle. Adams & Westlake Company.

Fig. 620—Brakeman's Grab Handle. Adams & Westlake Company.

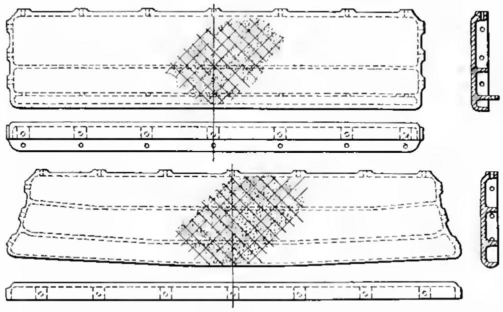


Fig. 621—Feralun Safety Treads for Pennsylvania Railroad Steel Cars. American Abrasive Metals Company.

Fig. 622—Vestibule Door Ornament. Adams & Westlake Company.

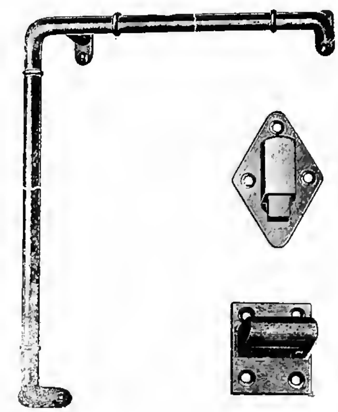


Fig. 623—Inside Hand Rail.

Fig. 624—Trap Door Holders.

Adams & Westlake Company.

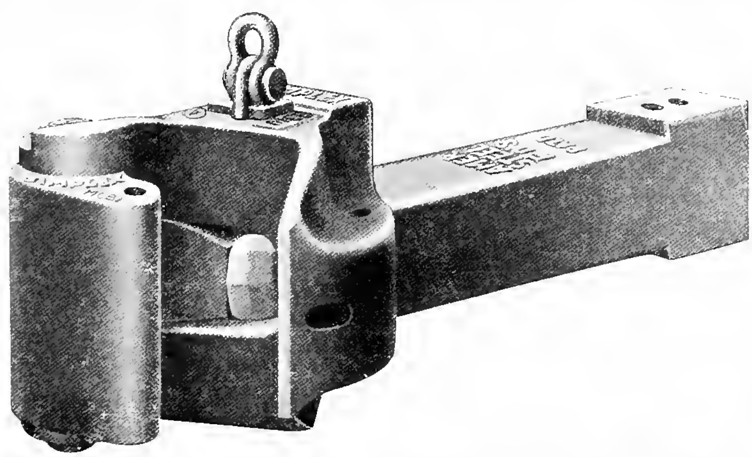


Fig. 625—Simplex Freight Coupler. Simplex Railway Appliance Company.

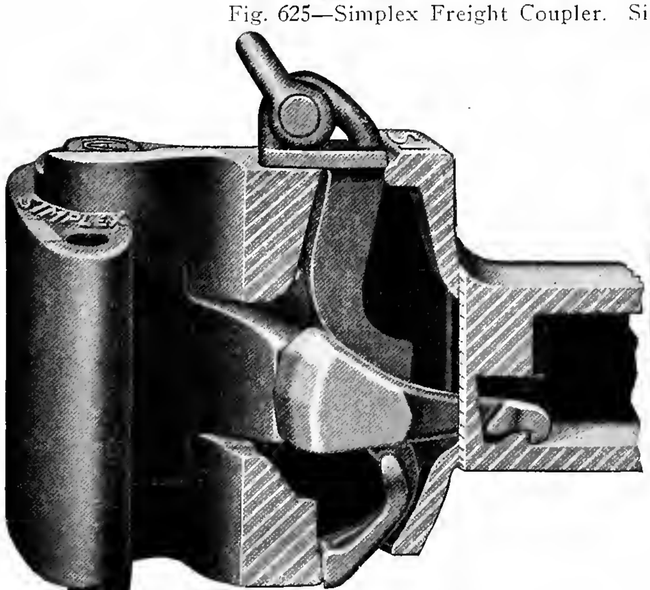


Fig. 626—Vertical Section Through Simplex Coupler When Closed.

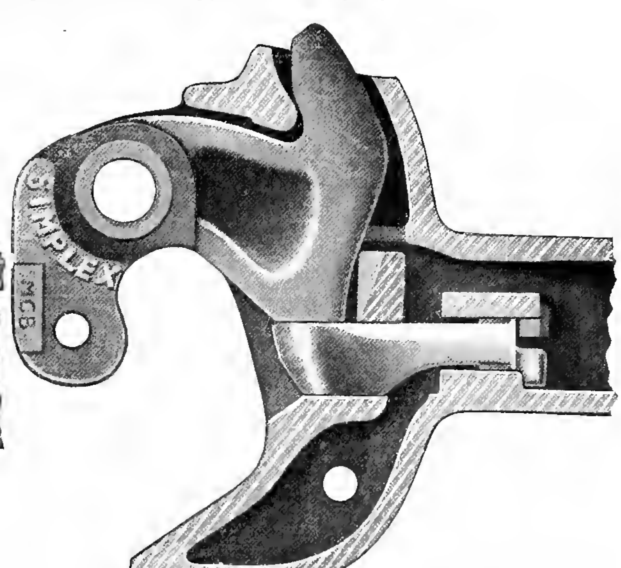


Fig. 627—Horizontal Section Through Simplex Coupler When Closed.

ex Railway Appliance Company.

Knuckle.

Lifter.

Lock.

Knuckle Pin.

Fig. 628—Parts of Simplex Freight Coupler Simplex Railway Appliance Company.

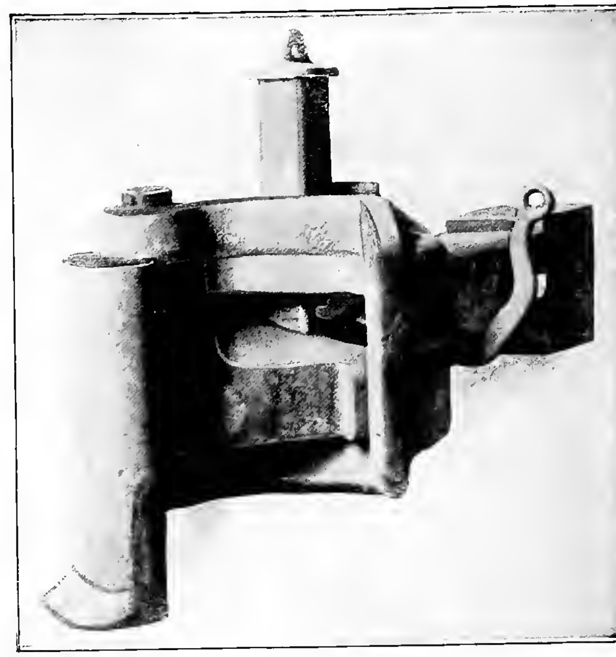


Fig. 629—Durbin Coupler with Knuckle Open. Scullin-Gallagher Iron & Steel Company.

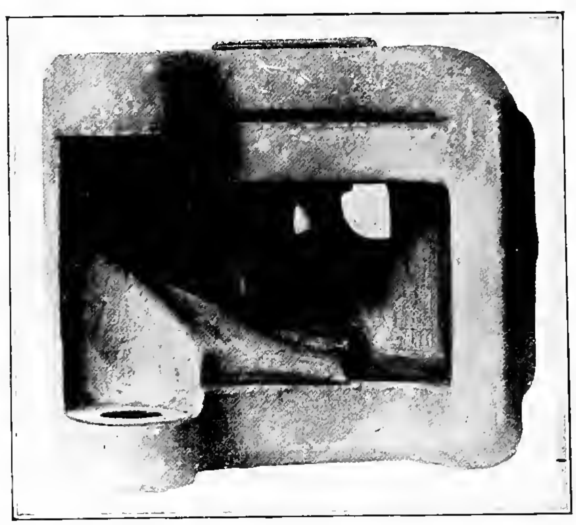


Fig. 630—Front View of Durbin Coupler, Showing Inclined Plane on Which Knuckle Tongue Rides.

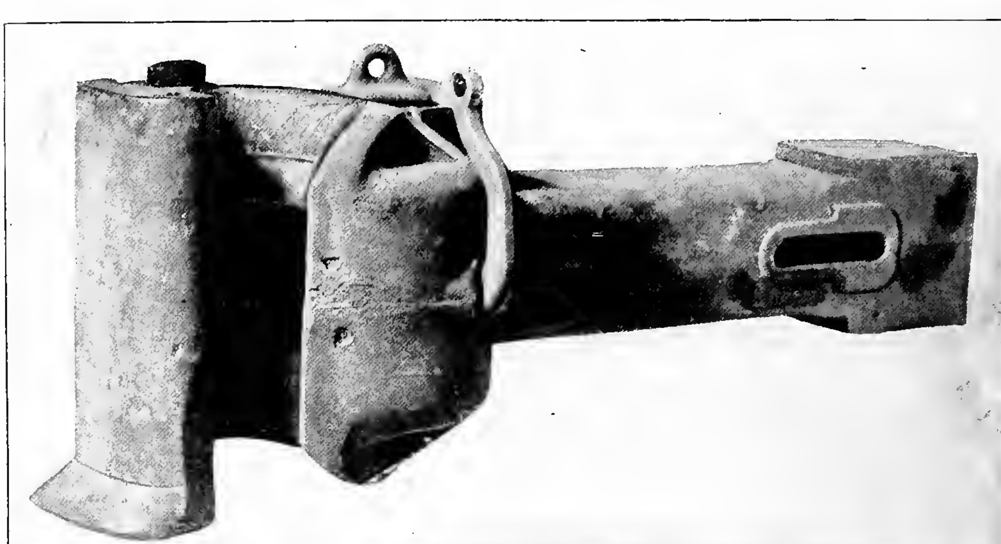


Fig. 631—Durbin Automatic Safety Coupler. Scullin-G

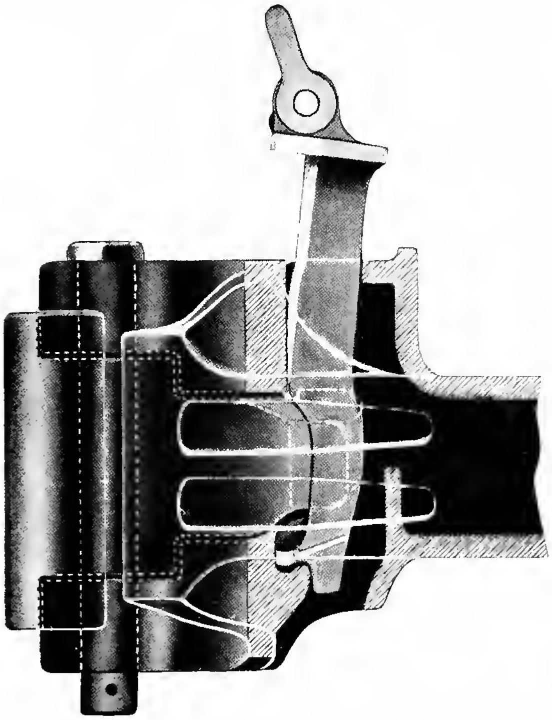


Fig. 632—R. E. Janney Coupler in Lock Set Position.

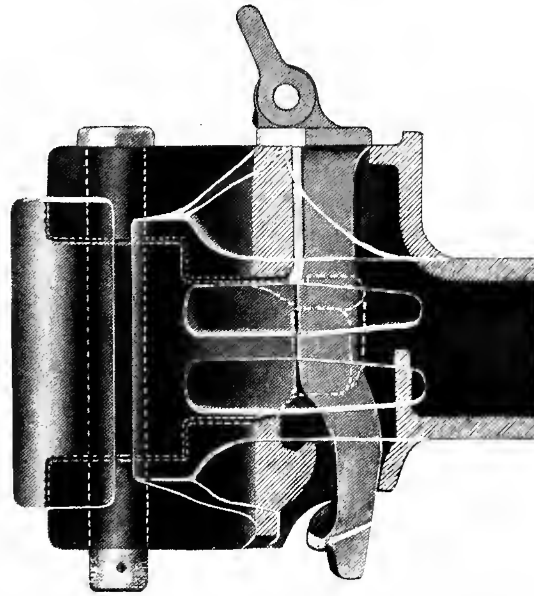


Fig. 633—R. E. Janney Coupler in Closed Position.

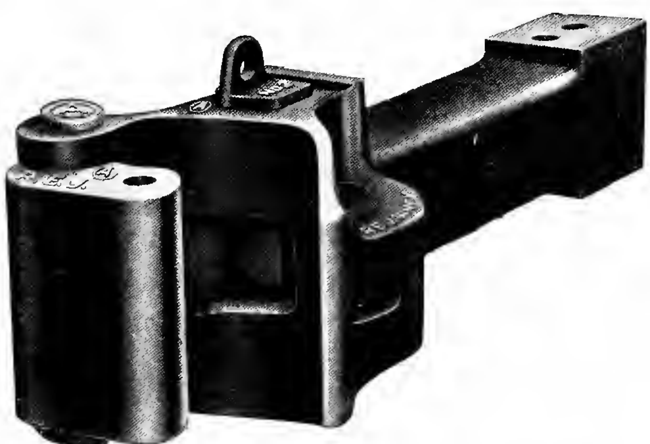


Fig. 634—R. E. Janney Coupler. American Steel Foundries.

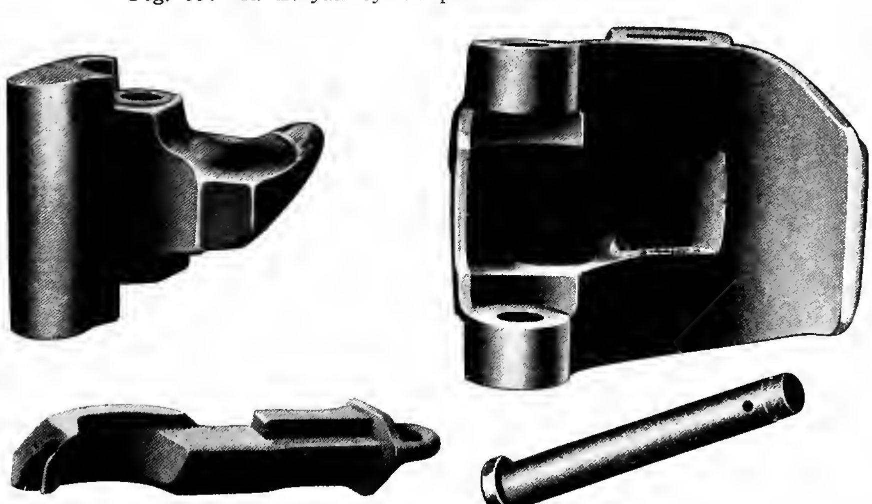


Fig. 635—Parts of R. E. Janney Coupler. American Steel Foundries.

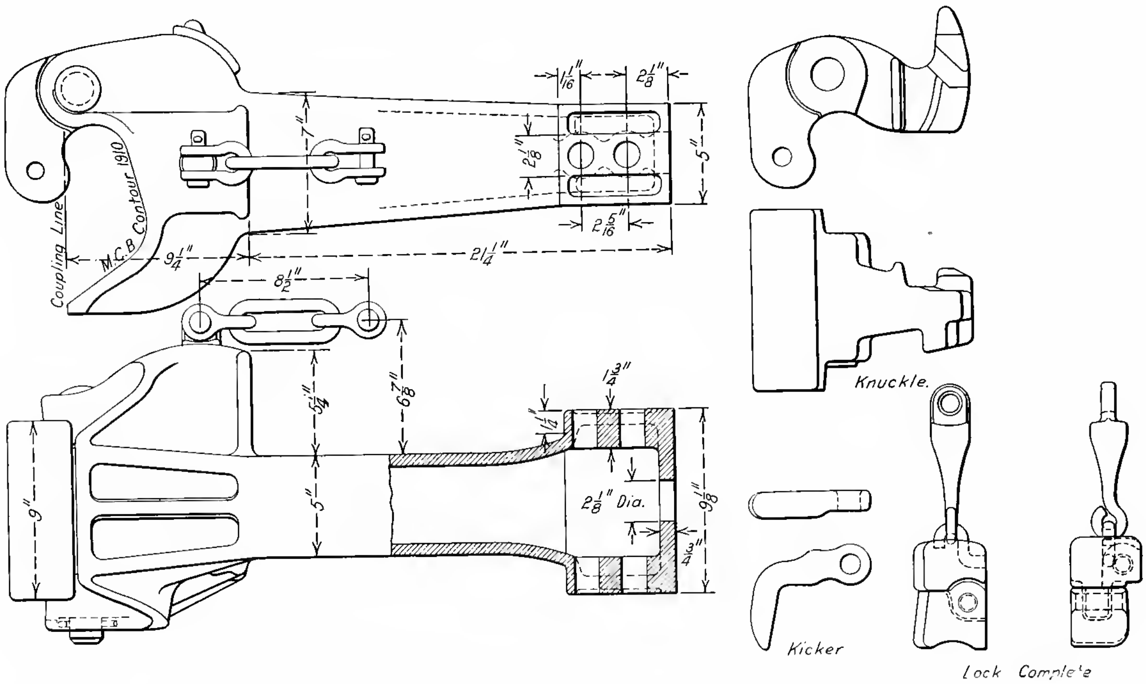


Fig. 636—Type Z Top Operated Freight Coupler. Gould Coupler Company.

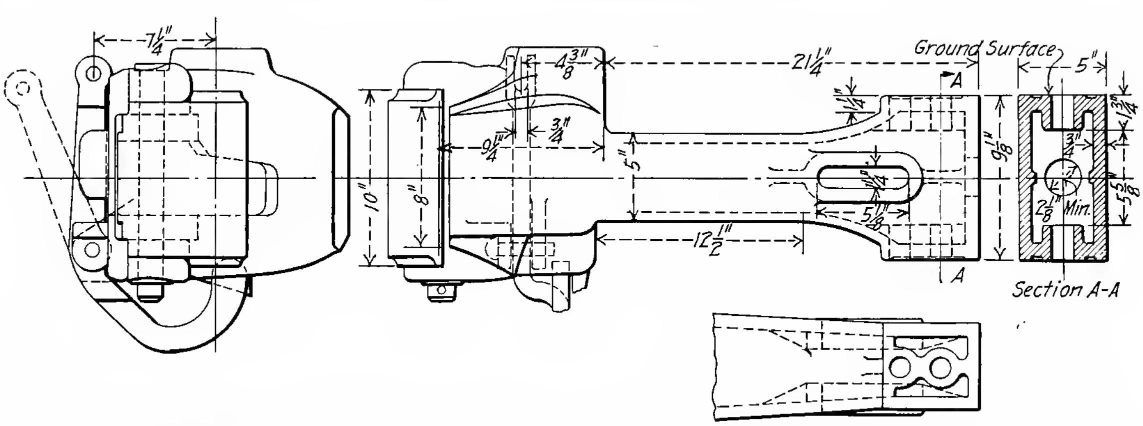


Fig. 637—Major Bottom Operated Freight Coupler. Buckeye Steel Castings Company.

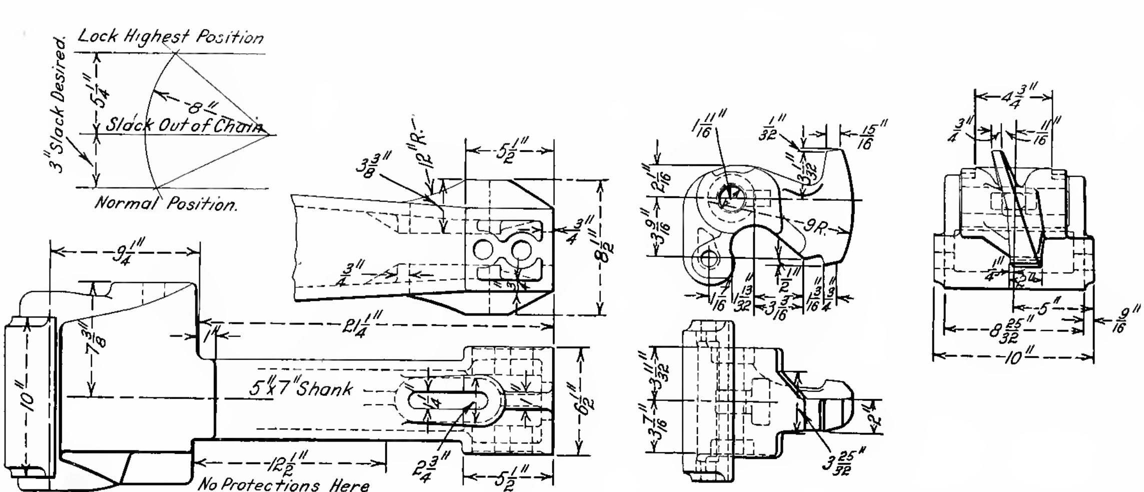


Fig. 638—Major Top Operated Freight Coupler and Knuckle. Buckeye Steel Castings Company.

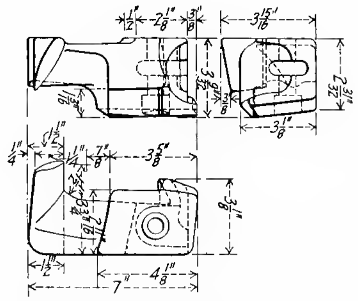


Fig. 639—Lock for Major Coupler. Buckeye Steel Castings Company.

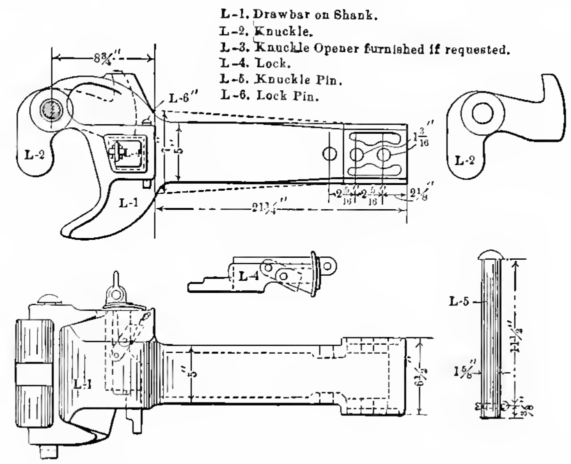


Fig. 640—National Freight Coupler and Parts. National Car Coupler Company.

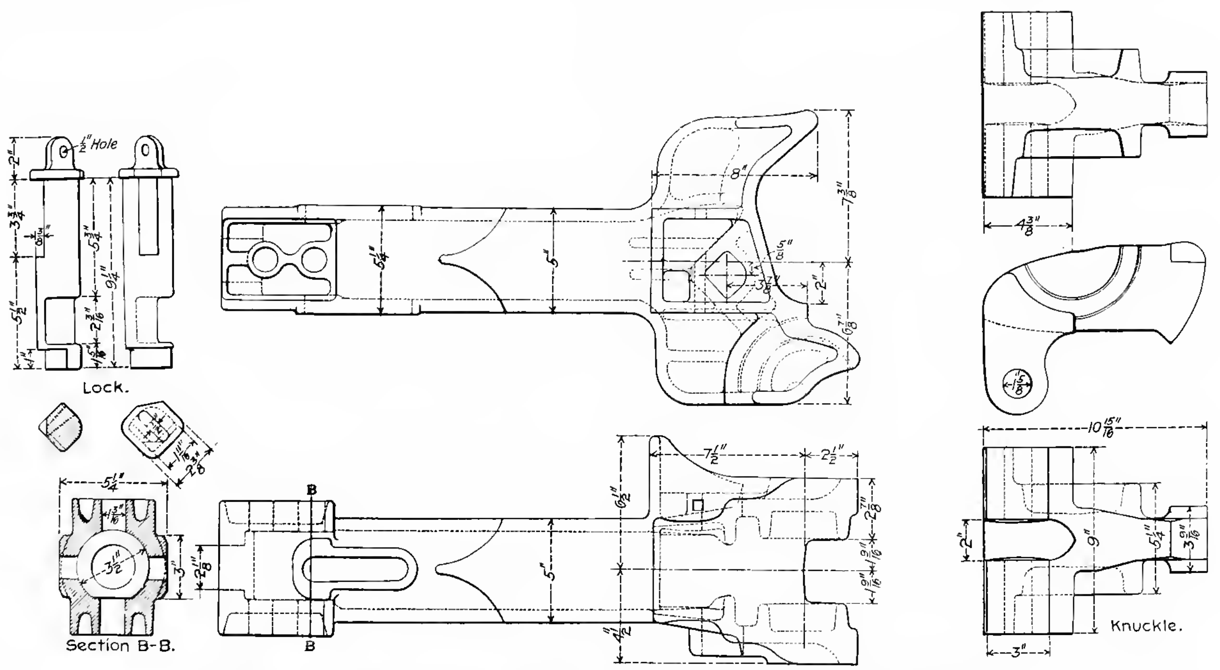


Fig. 641—Standard Freight Coupler and Parts. Standard Coupler Company.

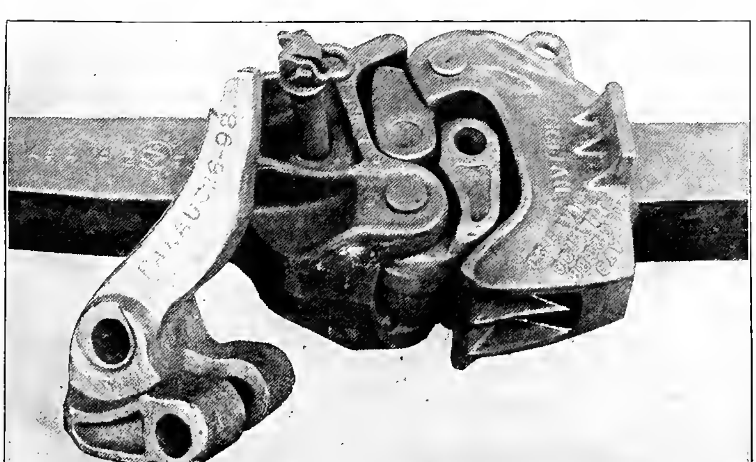


Fig. 642—Gilman-Brown Emergency Knuckle and Application. Railway Appliances Company.

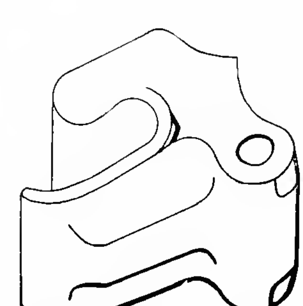
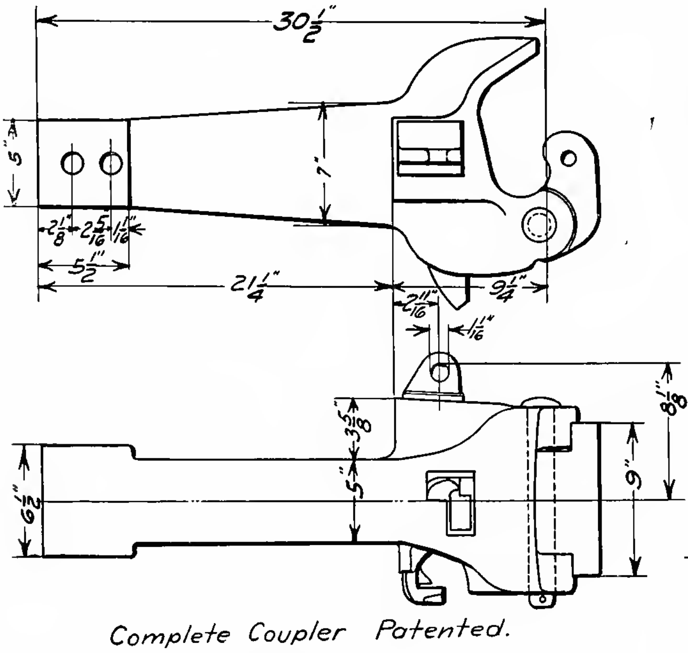
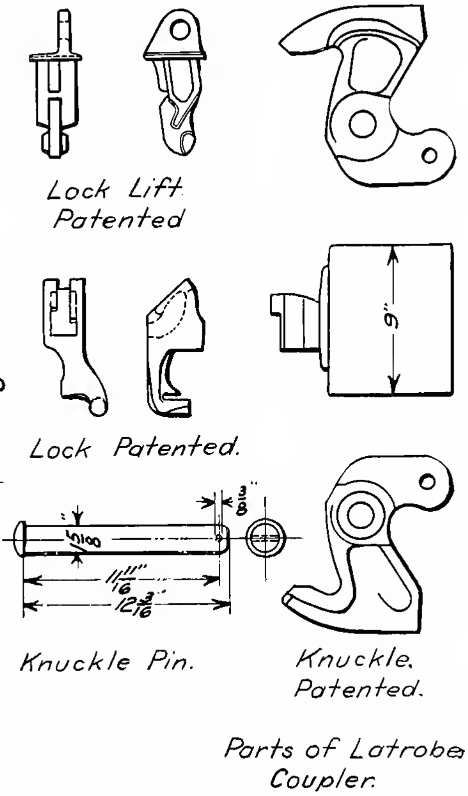
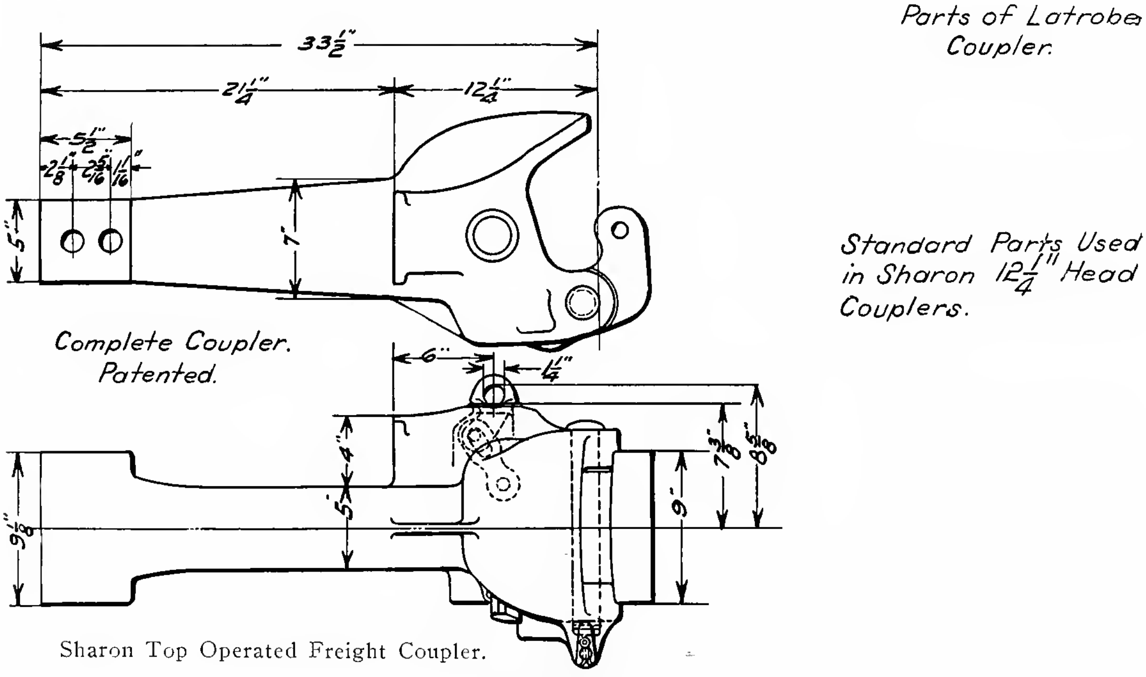


Fig. 643—Hinson Emergency Knuckle. National Car Coupler Company.

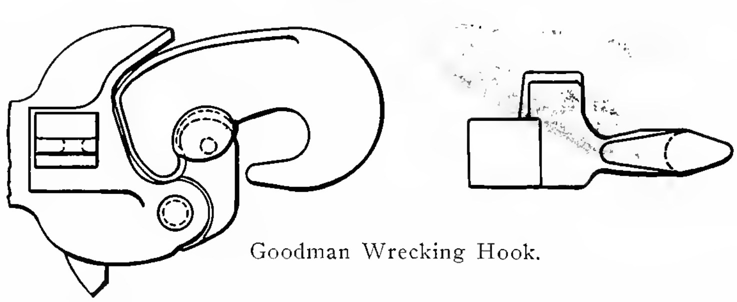


Latrobe Freight Coupler.



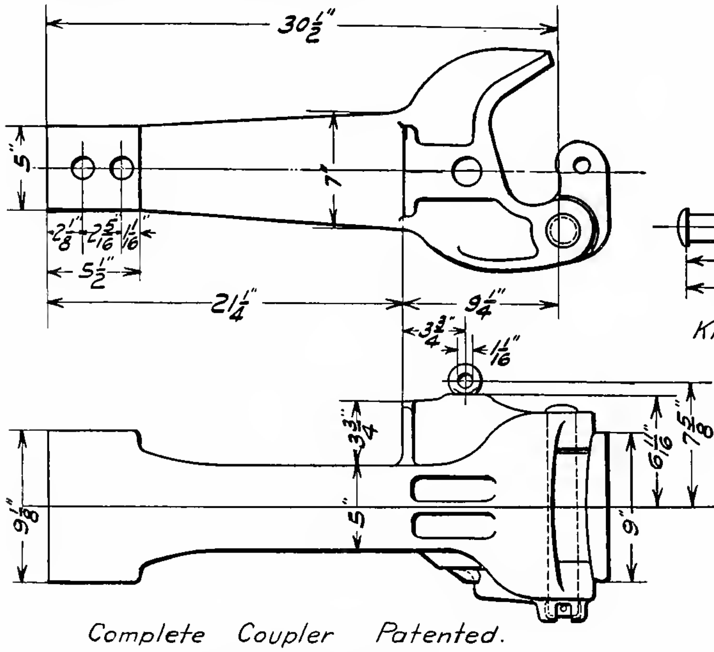


Sharon Top Operated Freight Coupler.

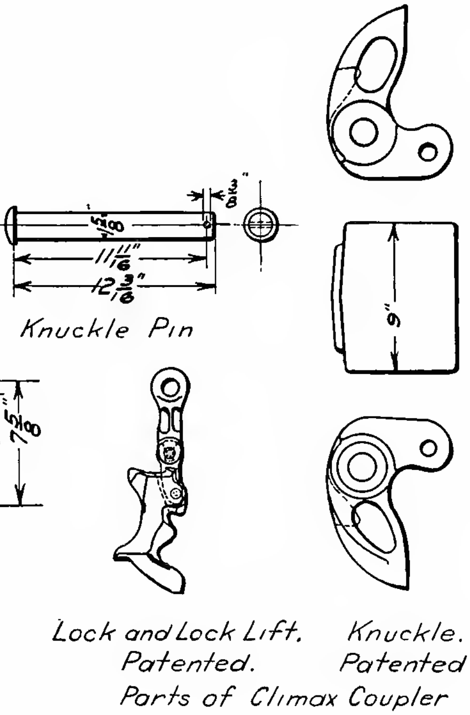


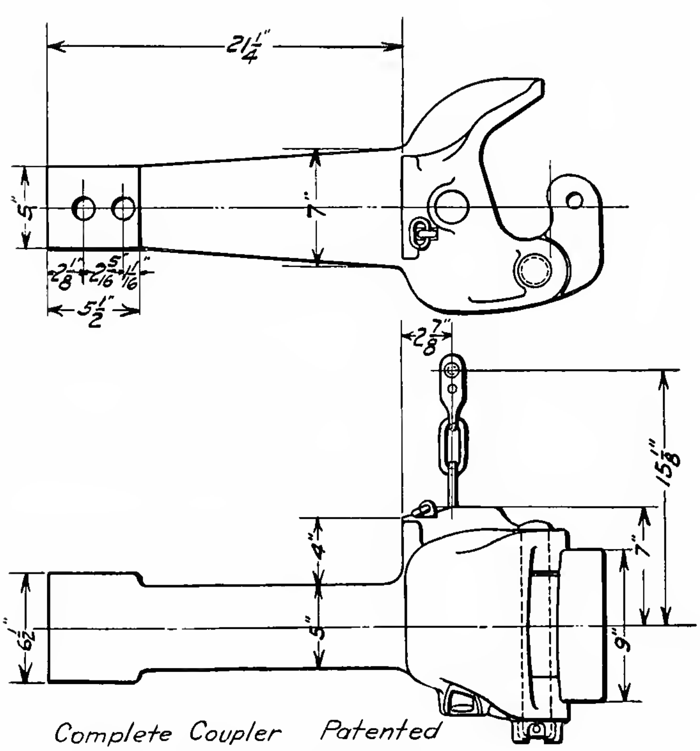
Goodman Wrecking Hook.

Fig. 644—Latrobe and Sharon 12¼-in. Head Freight Couplers and Goodman Wrecking Hook. National Malleable Castings Company.



Climax Freight Coupler.





Tower Top Operated Freight Coupler.

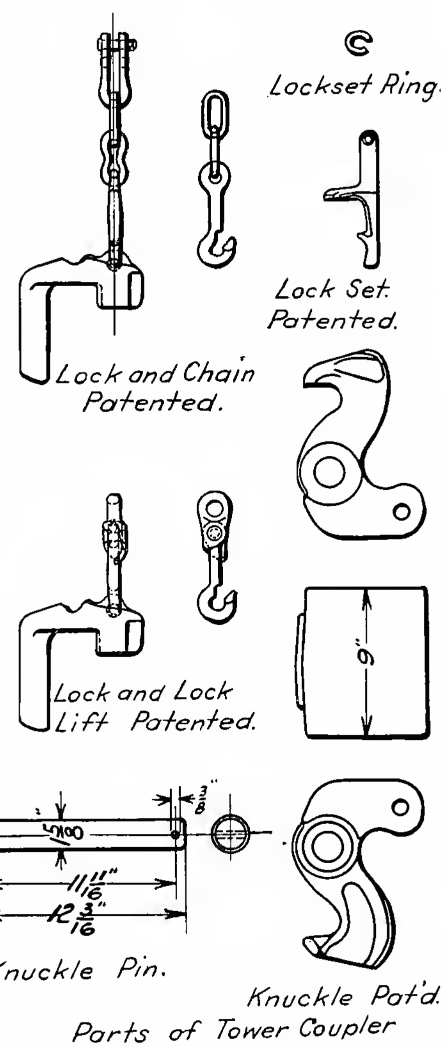


Fig. 645—Climax and Tower Top Operated Freight Couplers. National Malleable Castings Company.

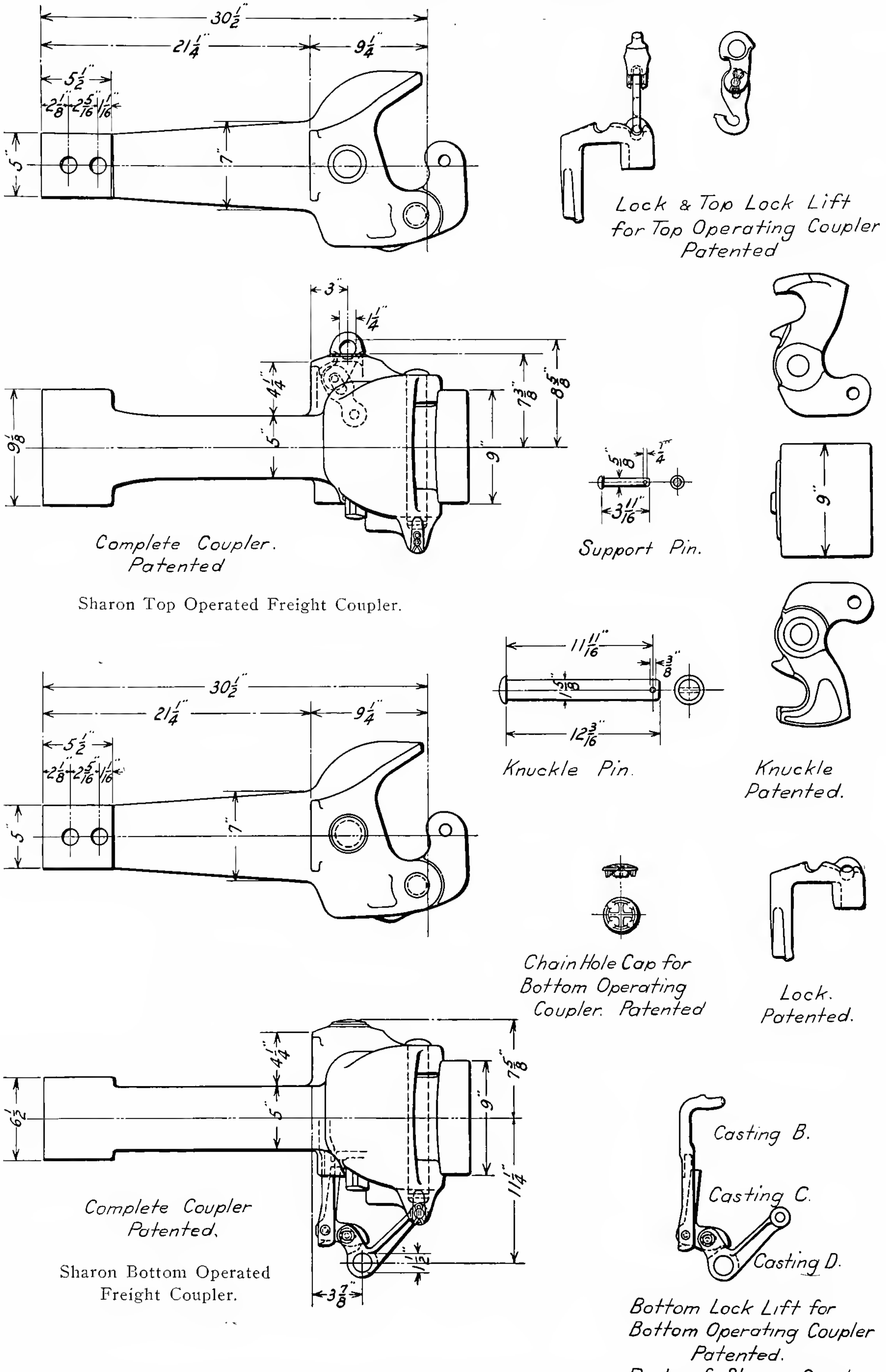
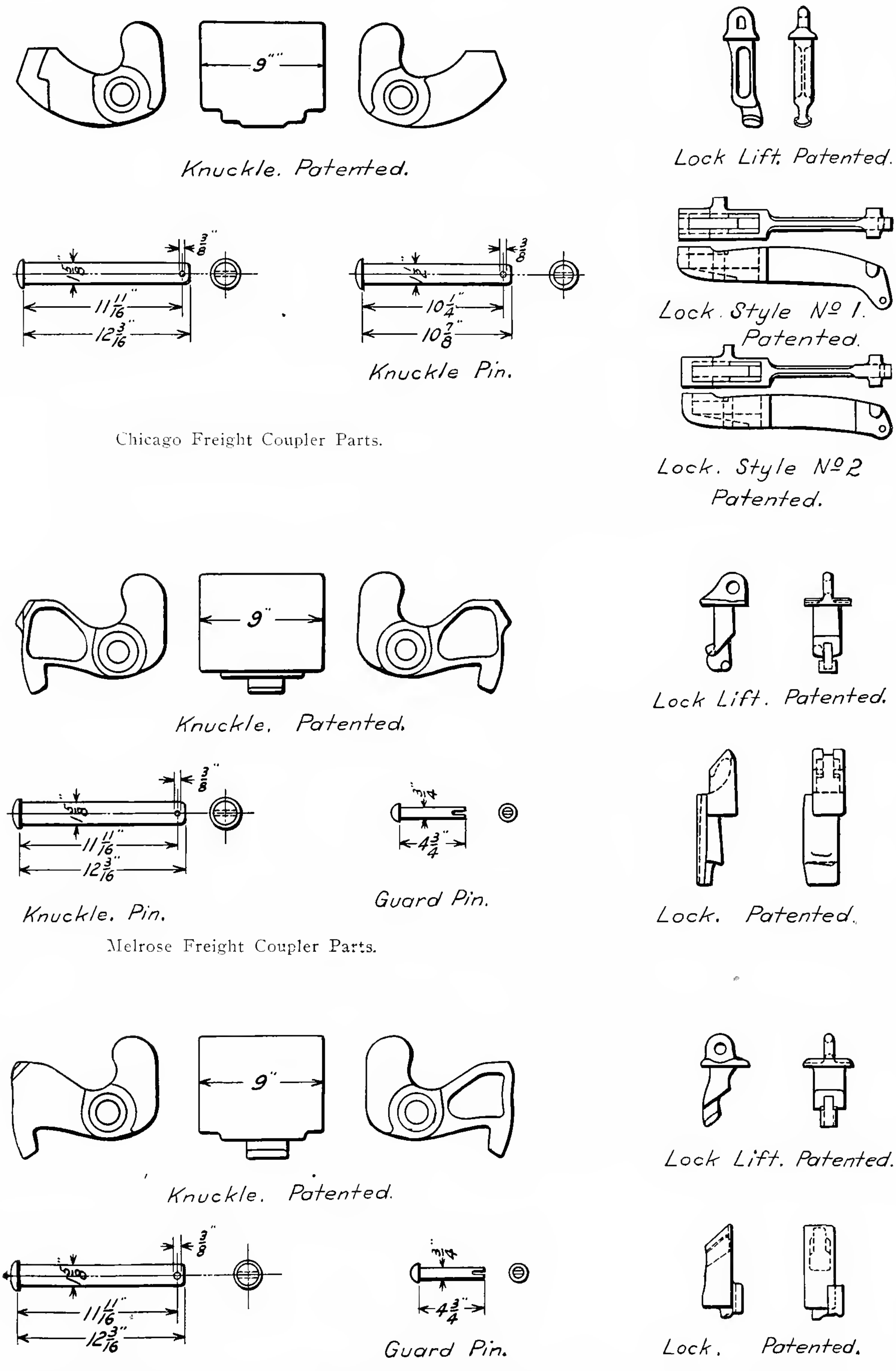


Fig. 646—Sharon Top and Bottom Operated Freight Couplers. National Malleable Castings Company.



Chicago Freight Coupler Parts.

Melrose Freight Coupler Parts.

Munton Freight Coupler Parts.

Fig. 647—Repair Parts for Chicago, Melrose and Munton Freight Couplers. National Malleable Castings Company.

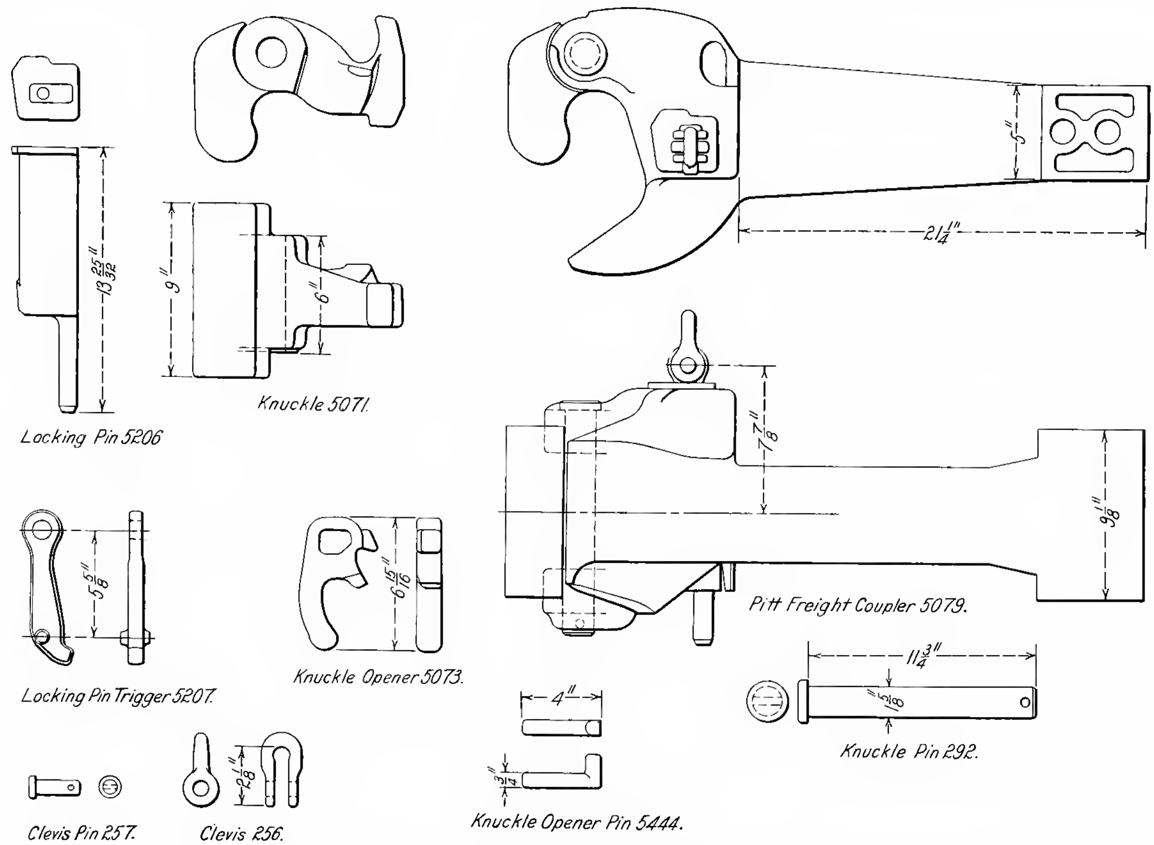


Fig. 648—Pitt Freight Coupler and Parts. McConway & Torley Company.

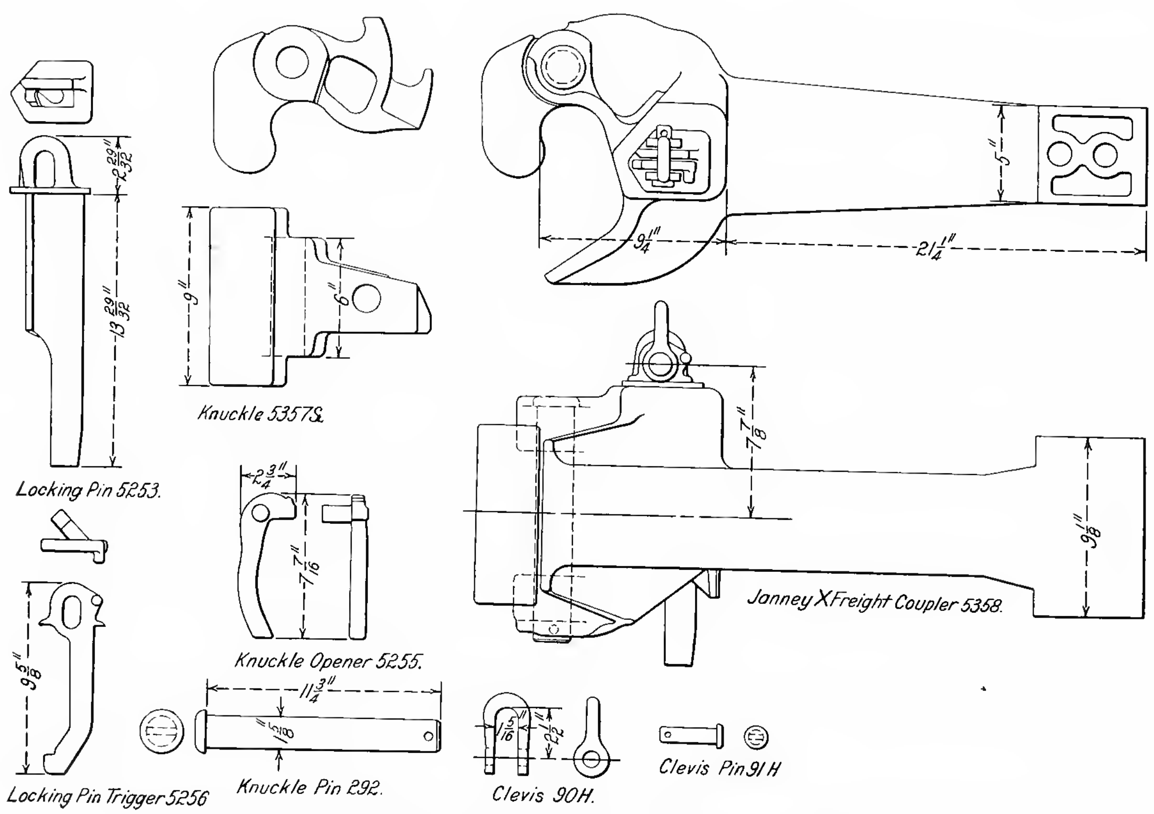


Fig. 649—Janney X Freight Coupler and Parts. McConway & Torley Company.

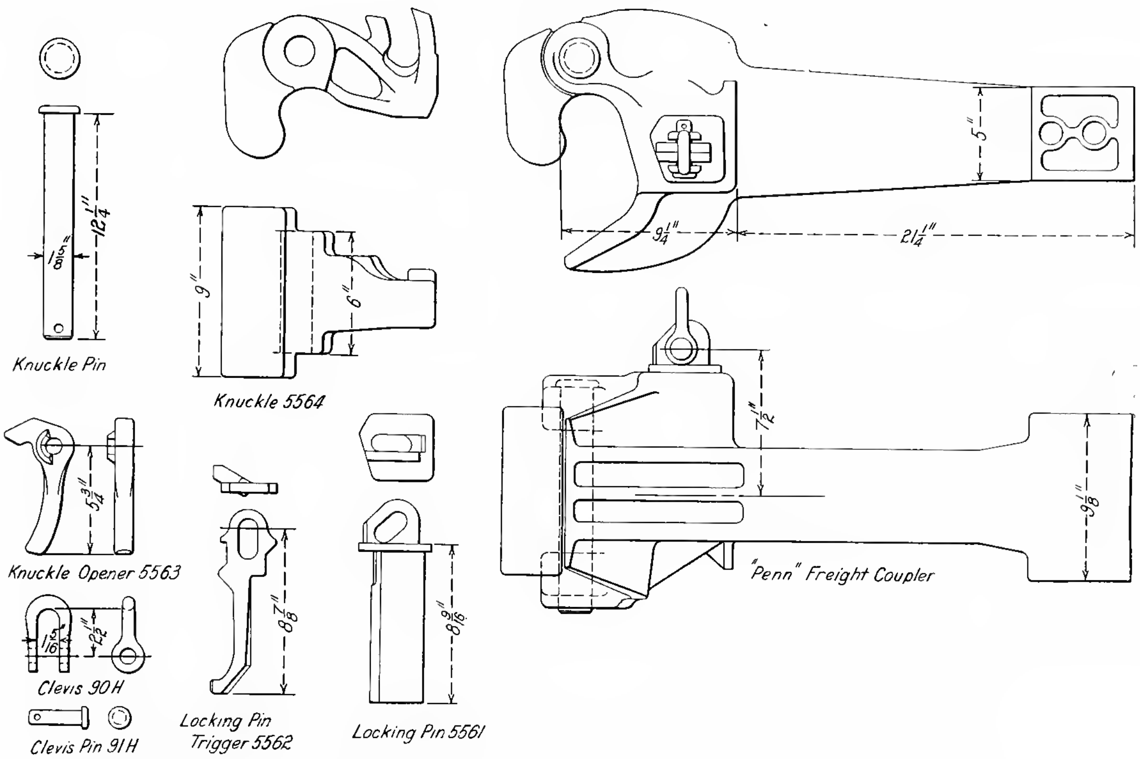


Fig. 650—Penn Freight Coupler and Parts. McConway & Torley Company.

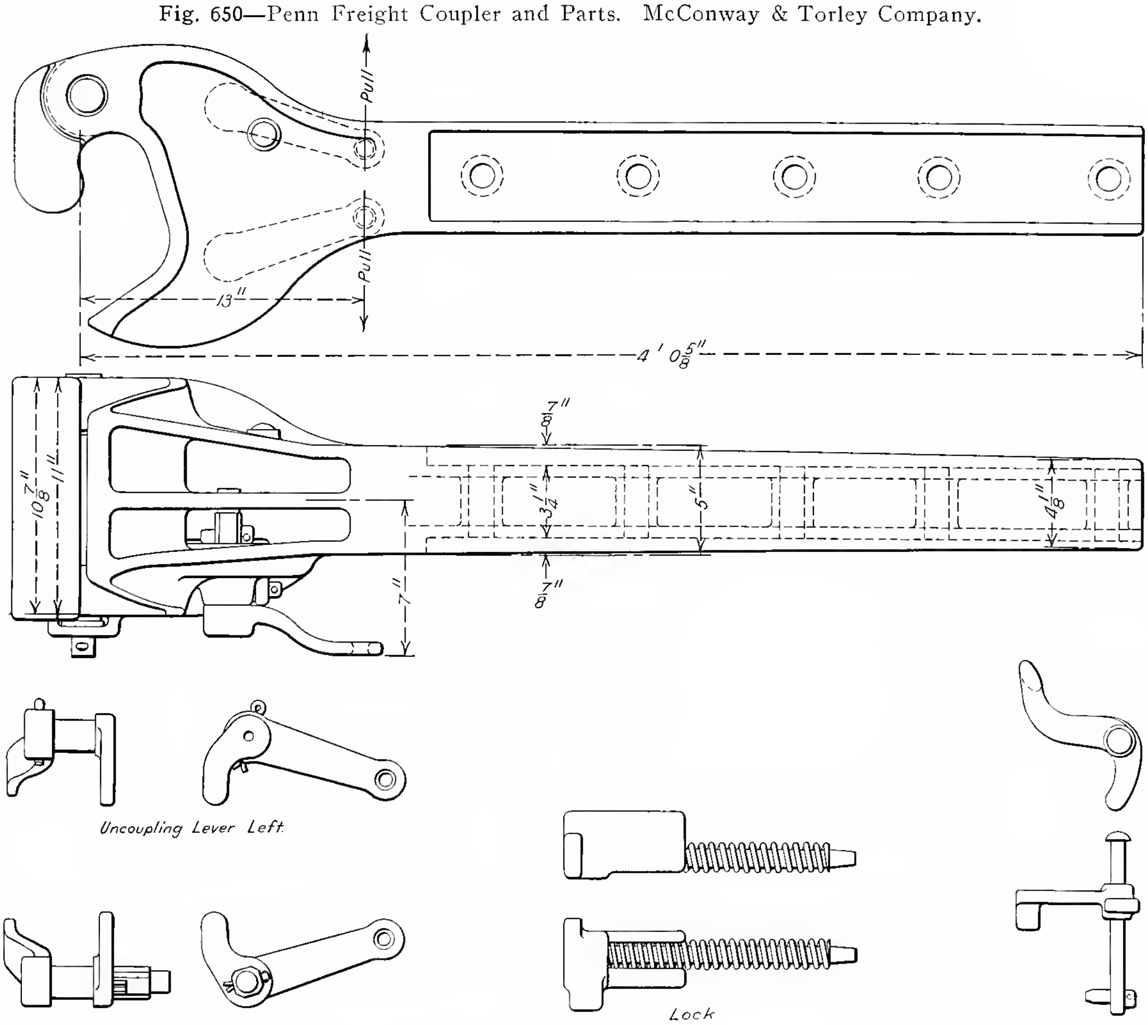


Fig. 651—Double Bottom Operated Passenger Coupler. Gould Coupler Company.

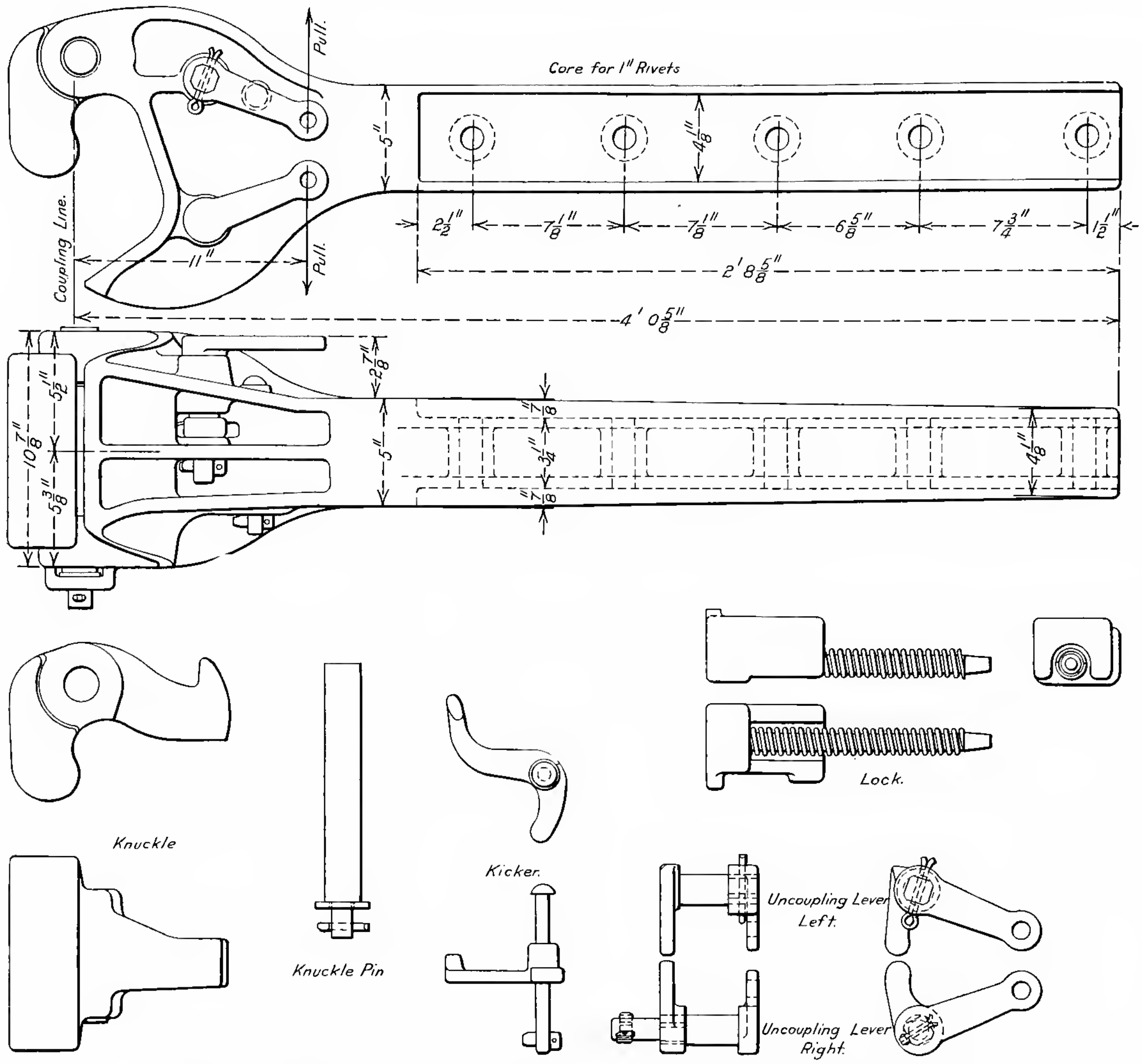


Fig. 652—Double Top Operated Passenger Coupler. Gould Coupler Company.

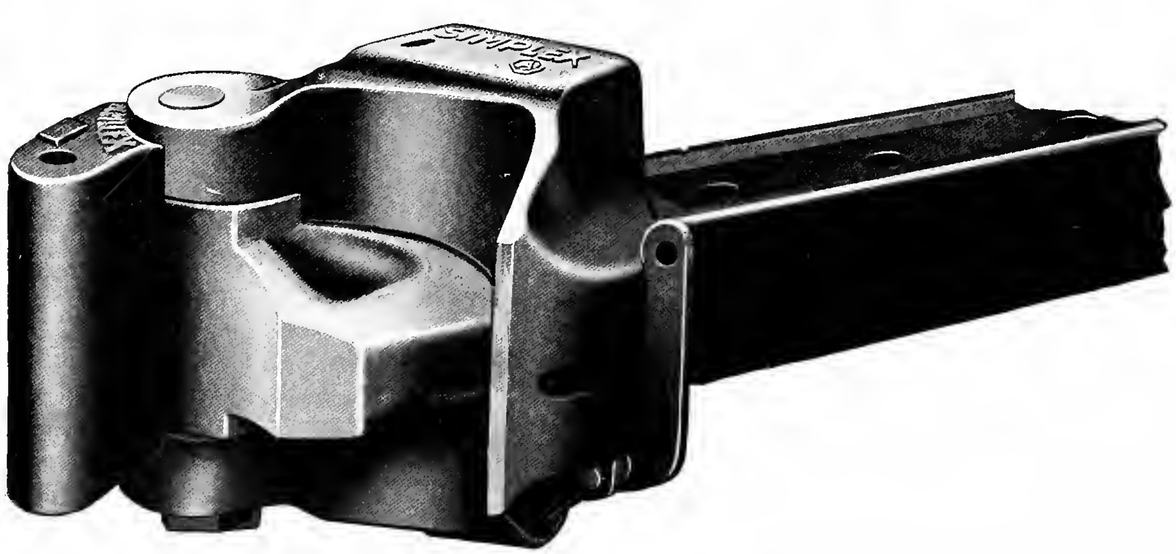


Fig. 653—Simplex Passenger Coupler. Simplex Railway Appliance Company.

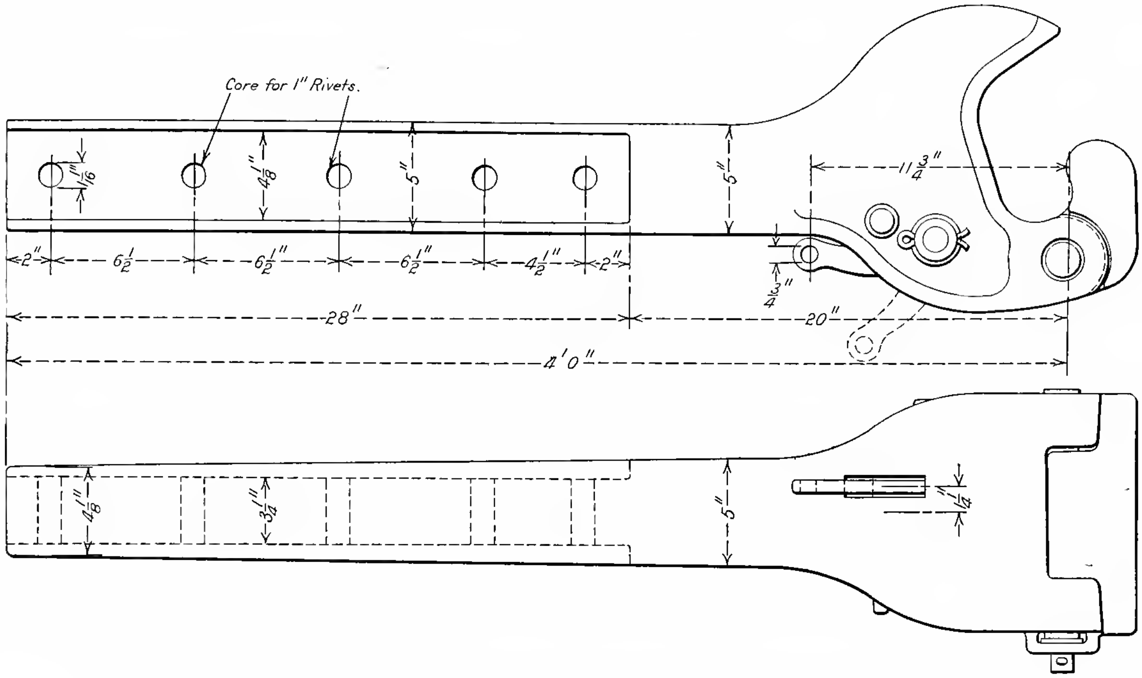


Fig. 654—Passenger Coupler with Single Side Operation. Gould Coupler Company.

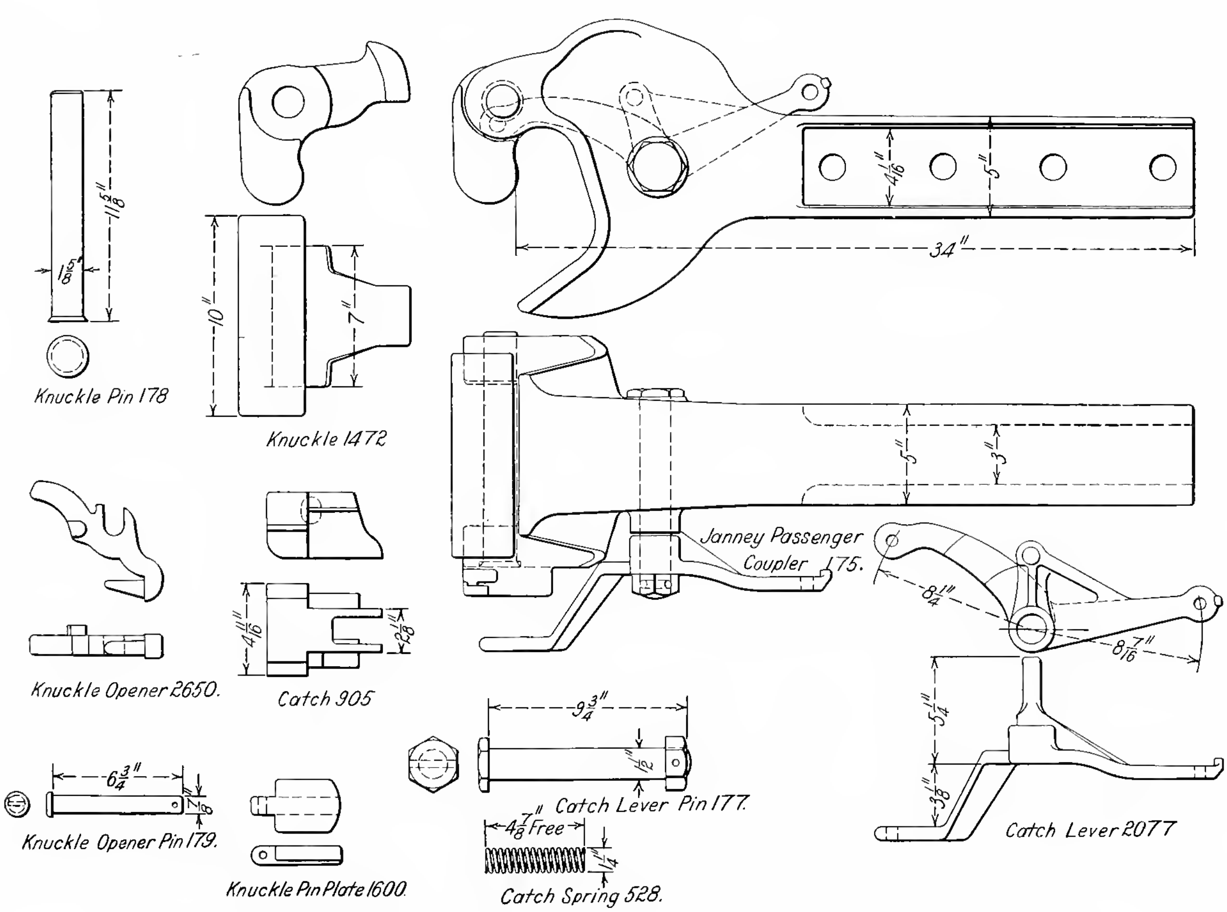


Fig. 655—Janney Passenger Coupler No. 175 and Parts. McConway & Torley Company.

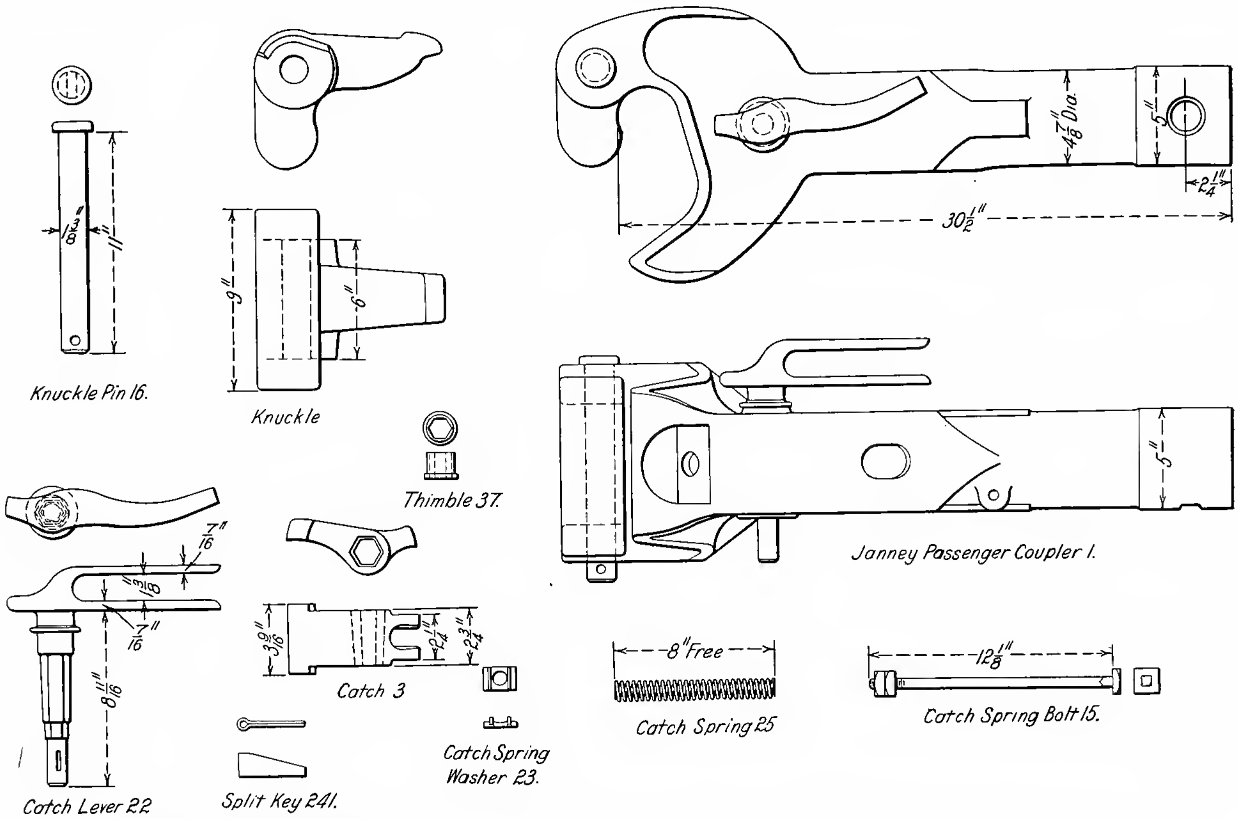


Fig. 656—Janney Passenger Coupler No. 1 and Parts. McConway & Torley Company.

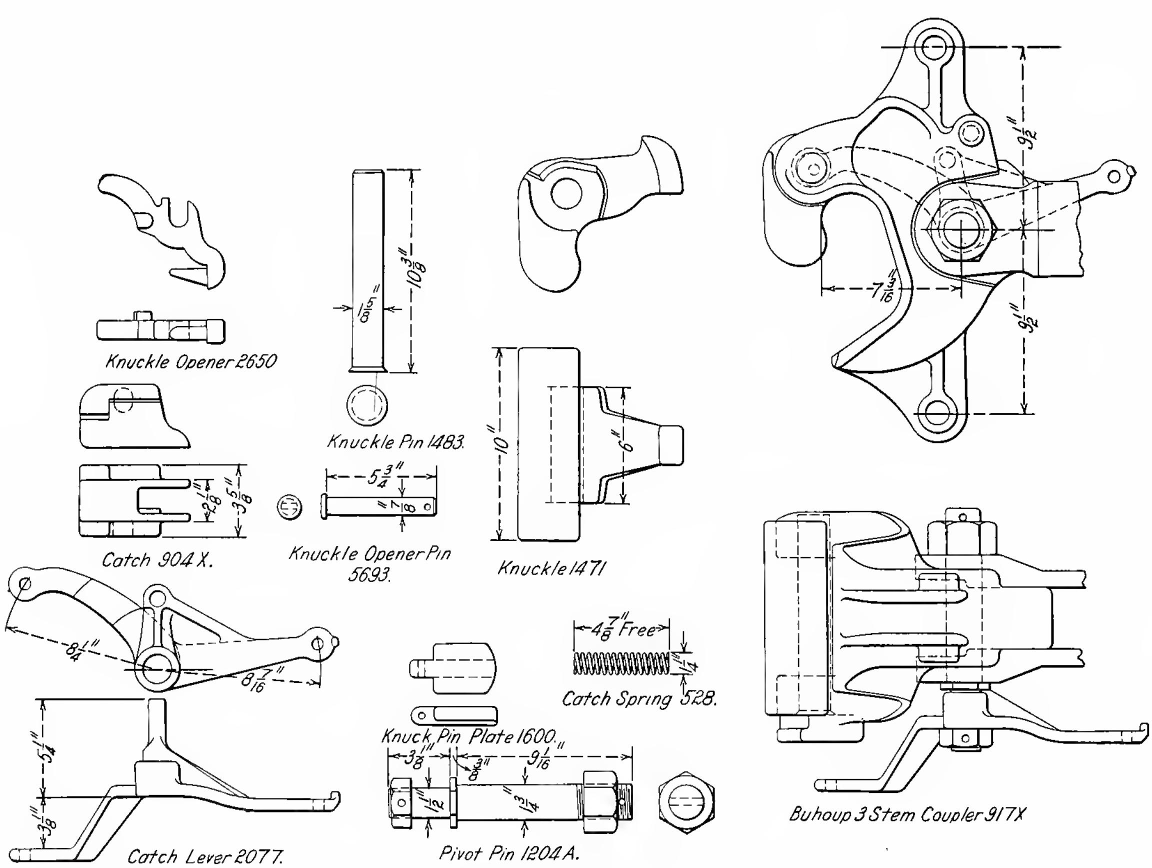
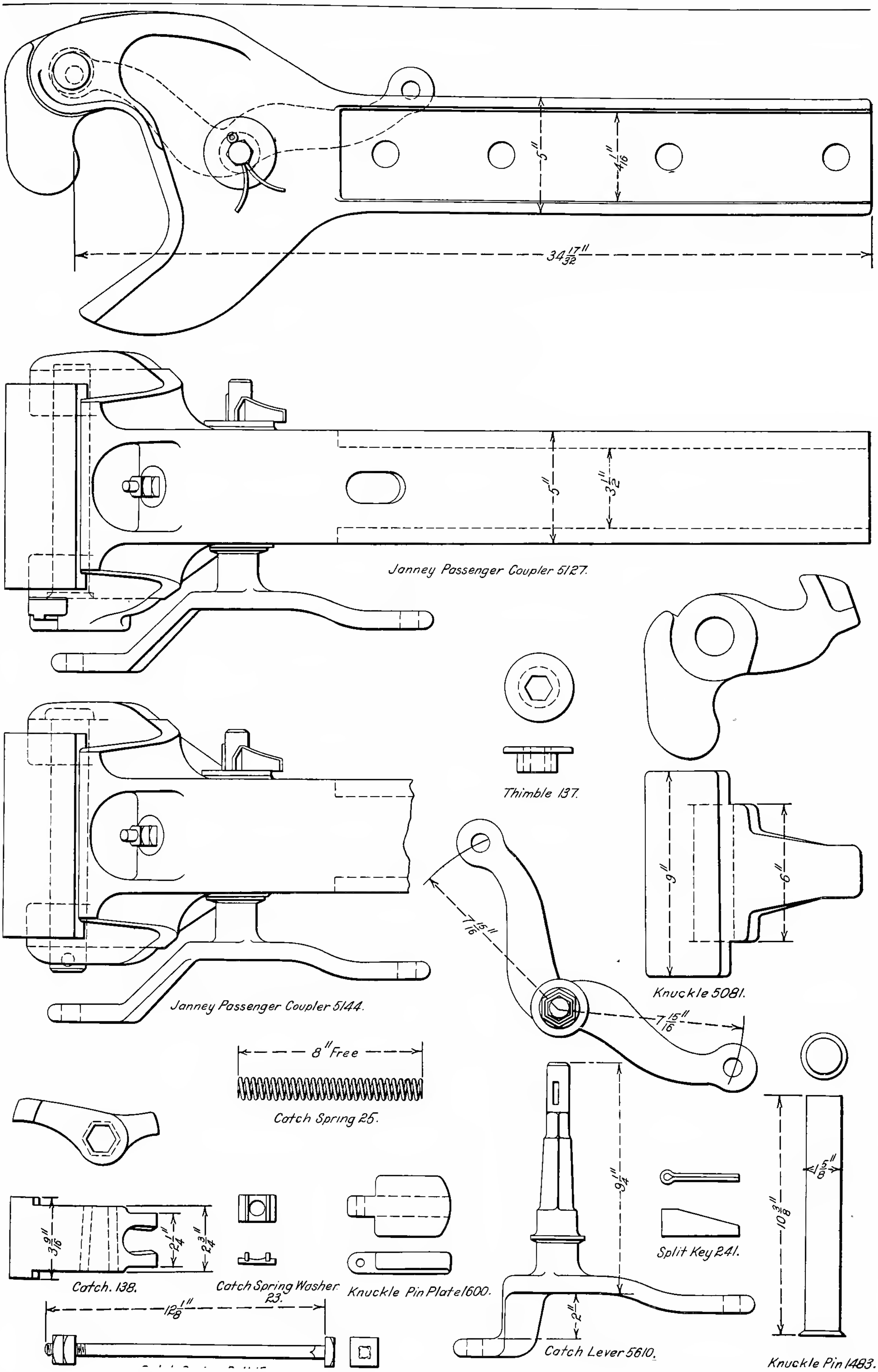


Fig. 657—Buhoup Three-Stem Passenger Coupler and Parts. McConway & Torley Company.



ger Couplers and Parts. McConway & Torley Company.

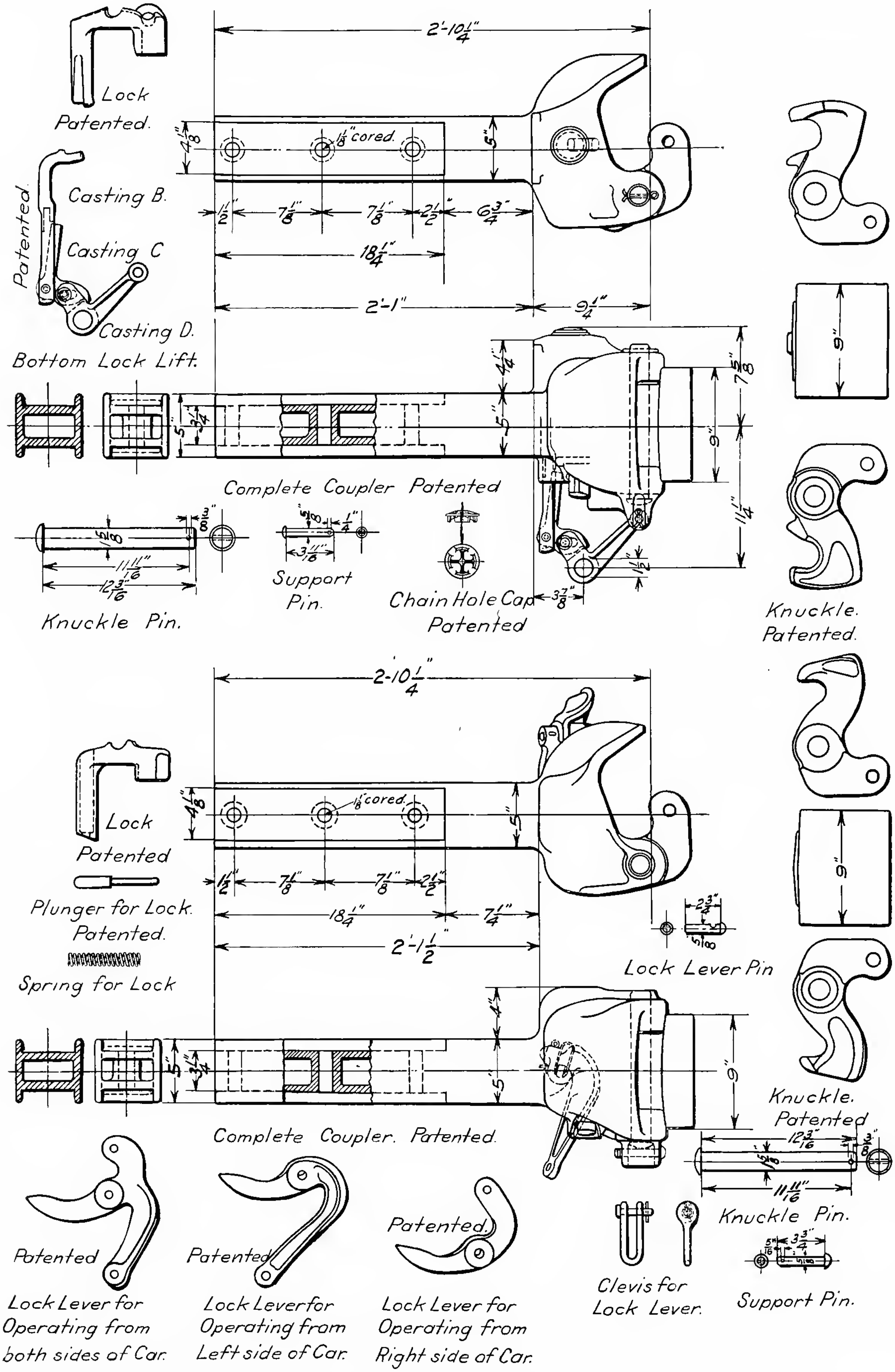


Fig. 659—Sharon and Tower Passenger Couplers and Parts. The Sharon is the Upper Coupler. National Malleable Castings Company.

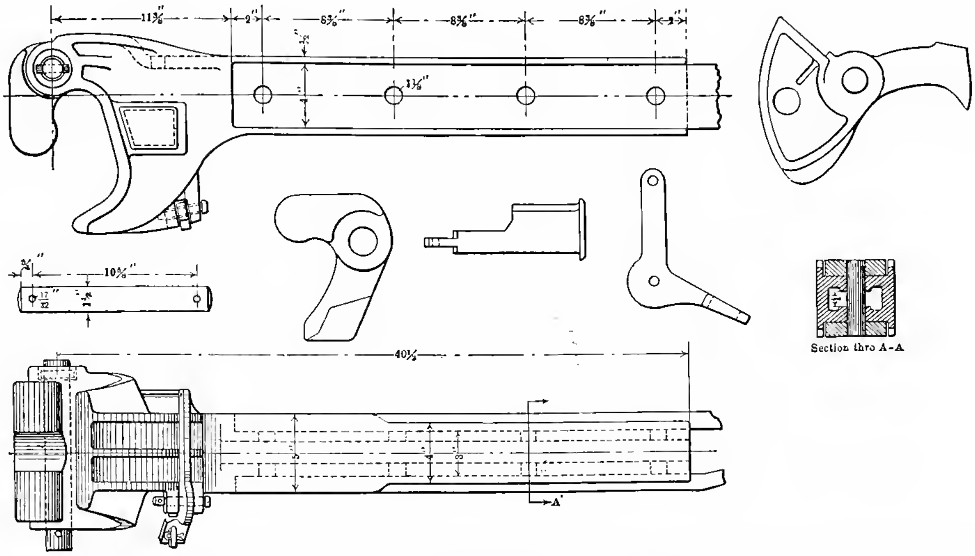


Fig. 660—National Passenger Coupler No. 5P, with M. C. B. or Miller Knuckle. National Car Coupler Company.

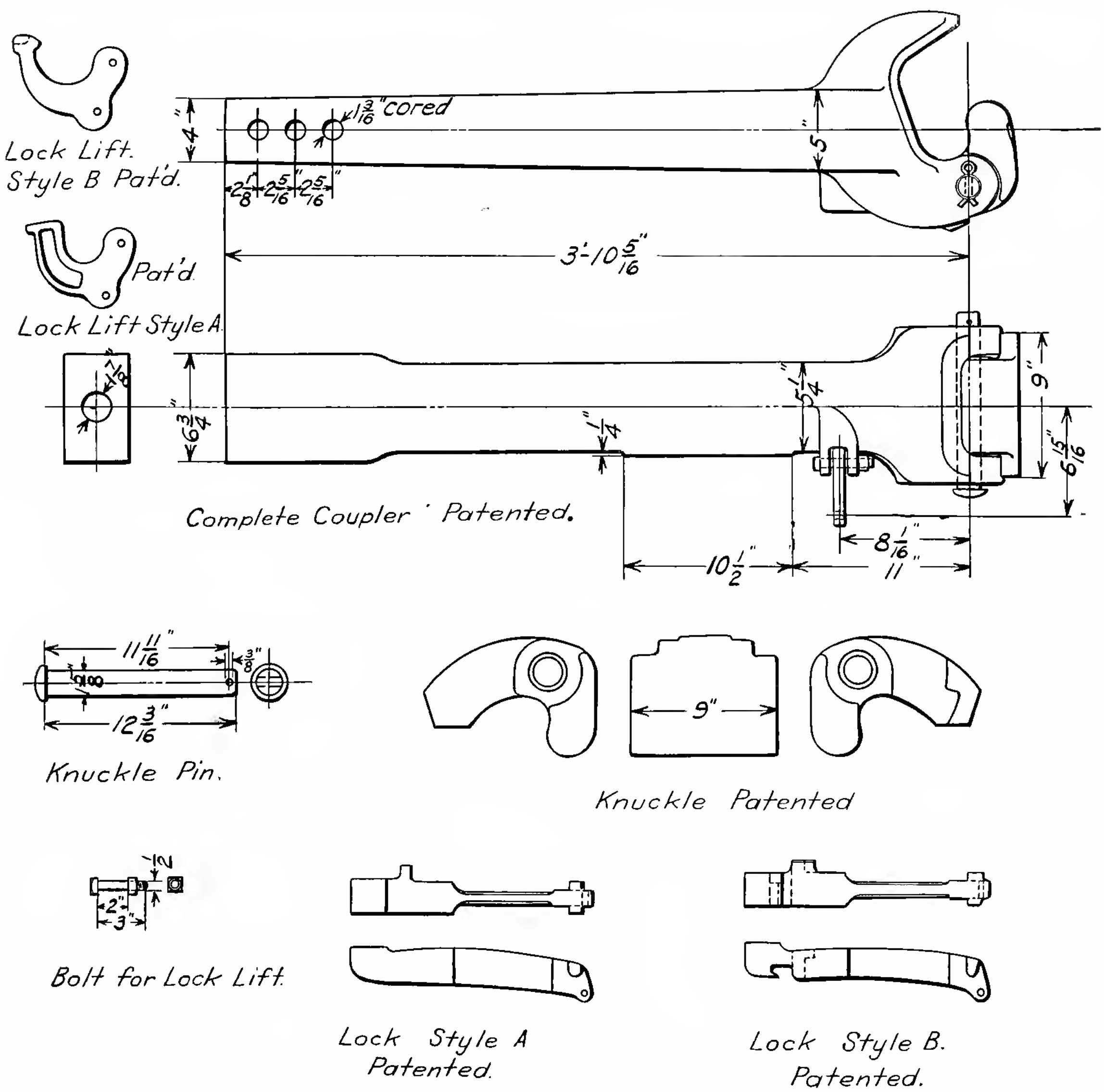


Fig. 661—Chicago Passenger Coupler and Parts. National Malleable Castings Company.

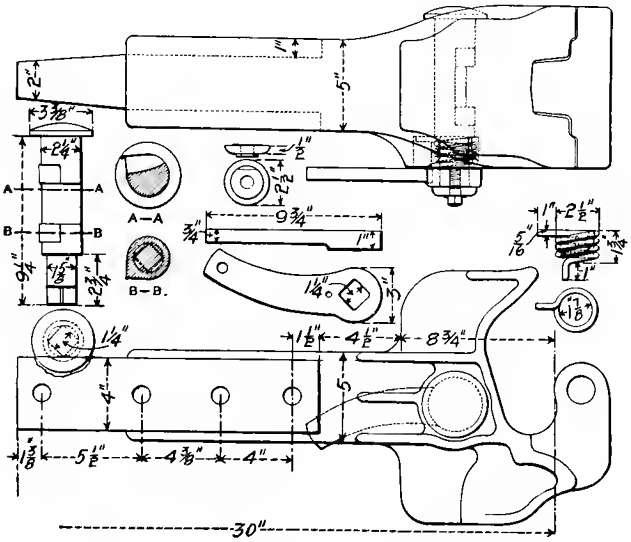


Fig. 662—Standard Passenger Coupler and Parts. Standard Coupler Company.

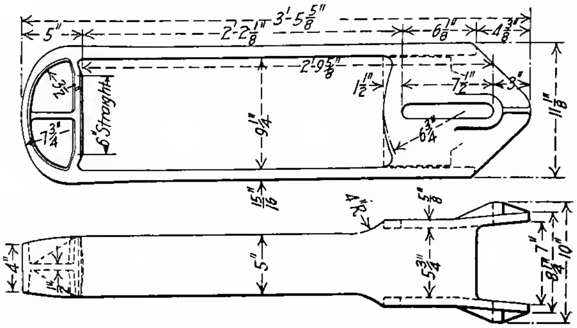


Fig. 663—Cast Steel Draft Yoke for Use with Friction Draft Gear. Buckeye Steel Castings Company.

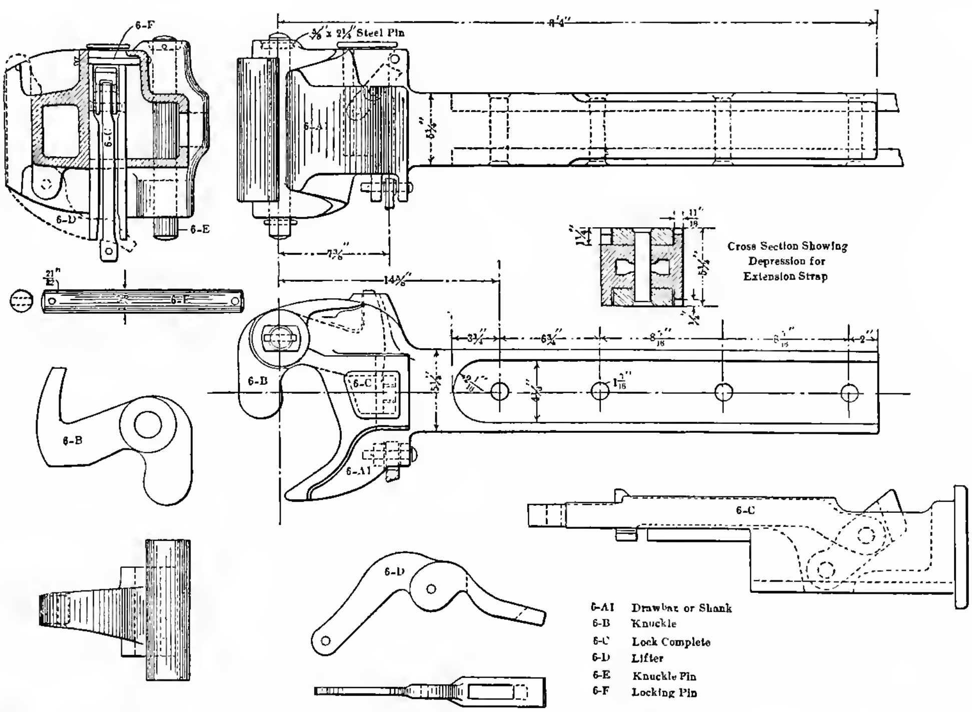


Fig. 664—National Passenger Coupler No. 6A1 and Parts. National Car Coupler Company.

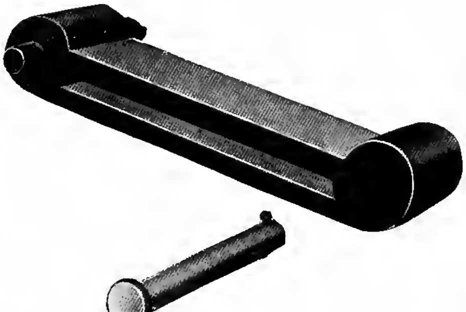


Fig. 665—Flory Cast Steel Reversible Carry Iron for Freight Couplers.

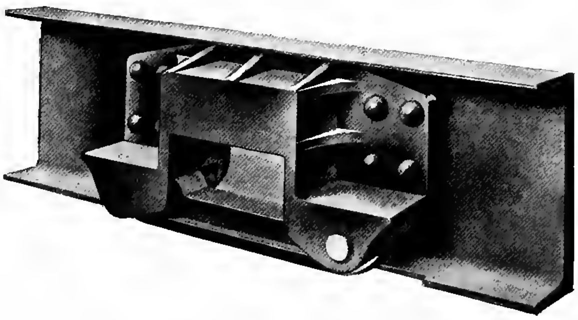


Fig. 666—Flory Cast Steel Reversible Carry Iron and Striking Plate for Steel Freight Cars.

Commonwealth Steel Company.

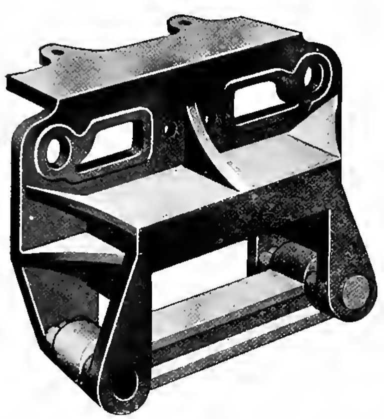


Fig. 667—Flory Cast Steel Reversible Carry Iron and Striking Plate for Wooden Freight Cars. Commonwealth Steel Company.

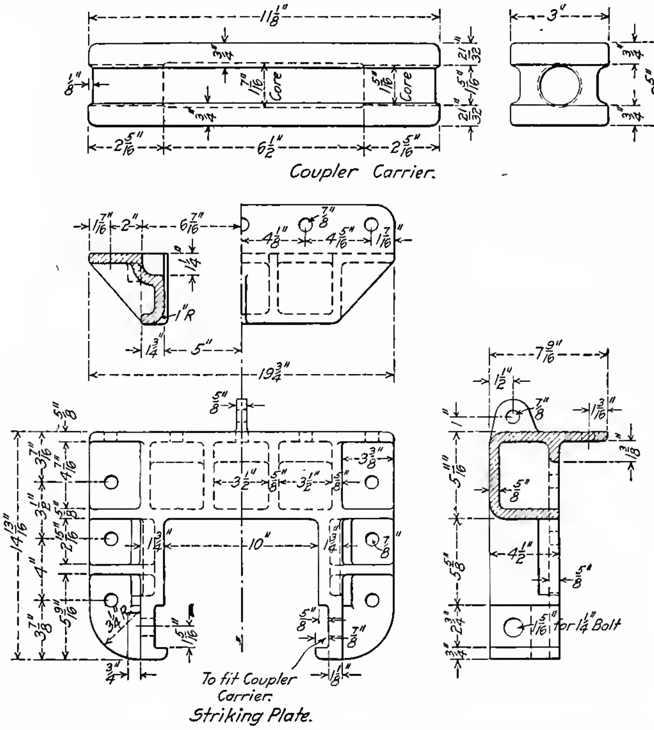


Fig. 668—Coupler Carry Iron and Striking Plate for Central of New Jersey Ice Car Shown in Figs. 376, 377 and 379.

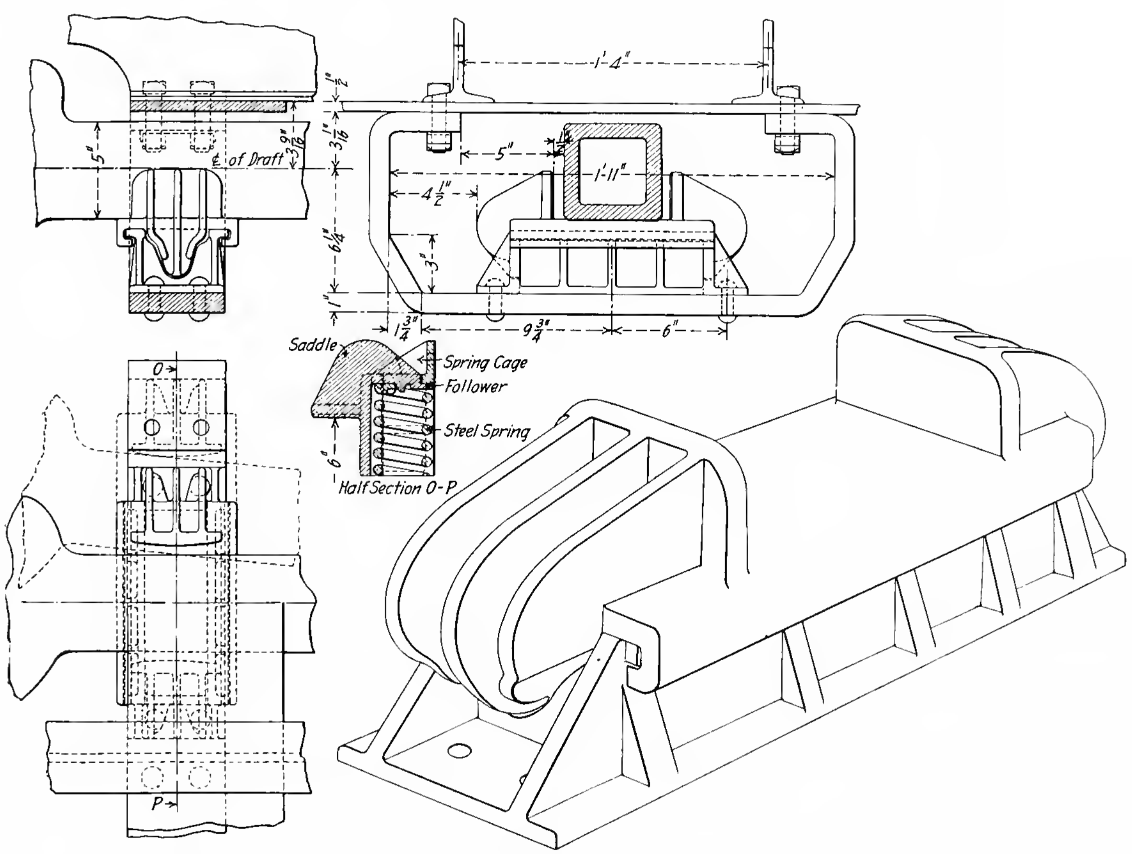
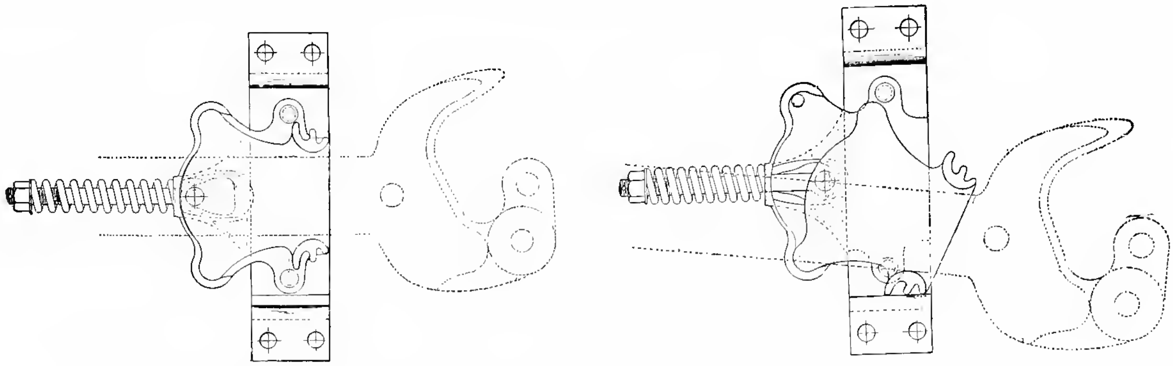


Fig. 669—Miner Coupler Centering Device for Passenger Train Cars. W. H. Miner.



On Straight Track. On Curve.

Fig. 670—Chaffee Drawbar Centering Device. Forsyth Brothers Company.

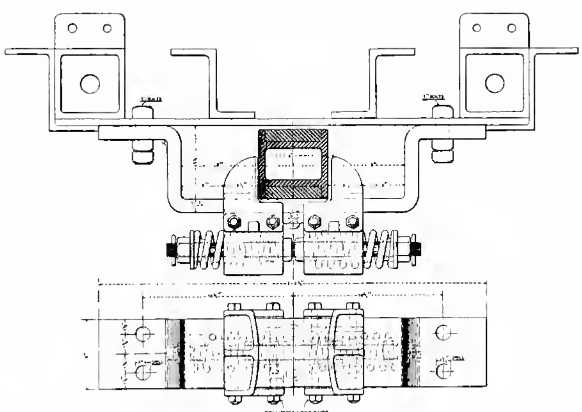


Fig. 671--Passenger Drawbar Centering Device.
Gould Coupler Company.

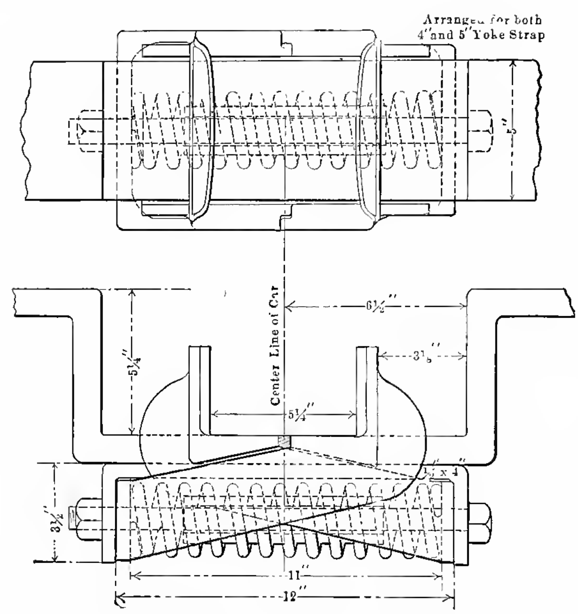


Fig. 672—National Drawbar Centering Yoke.
National Car Coupler Company.

Fig. 673—Steel Draft Sills Arranged for Fastening to Both Body Bolster and End Sill of Freight Cars.
Gould Coupler Company.

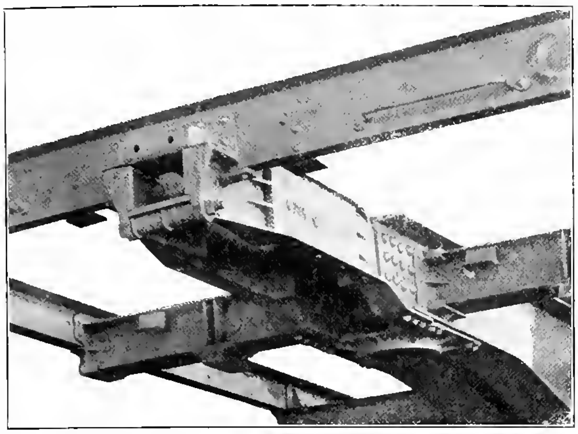


Fig. 674—Bettendorf Cast Steel Draft Sills with Pockets and Stops Cast Integral. Bettendorf Axle Company.

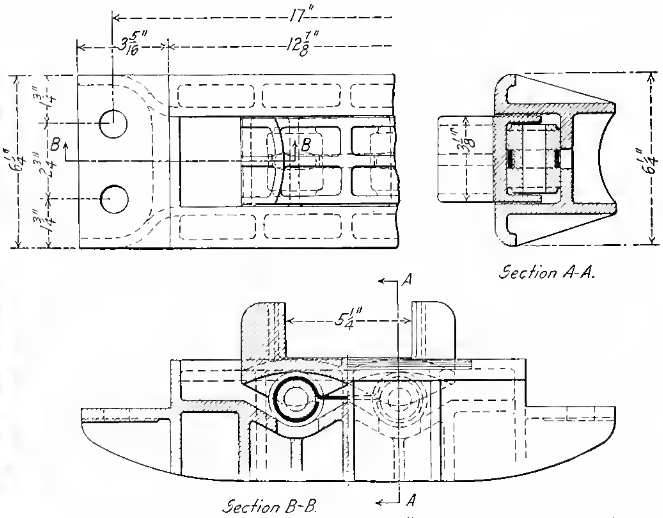


Fig. 675—Powers Gravity Centering Device for Freight Couplers.

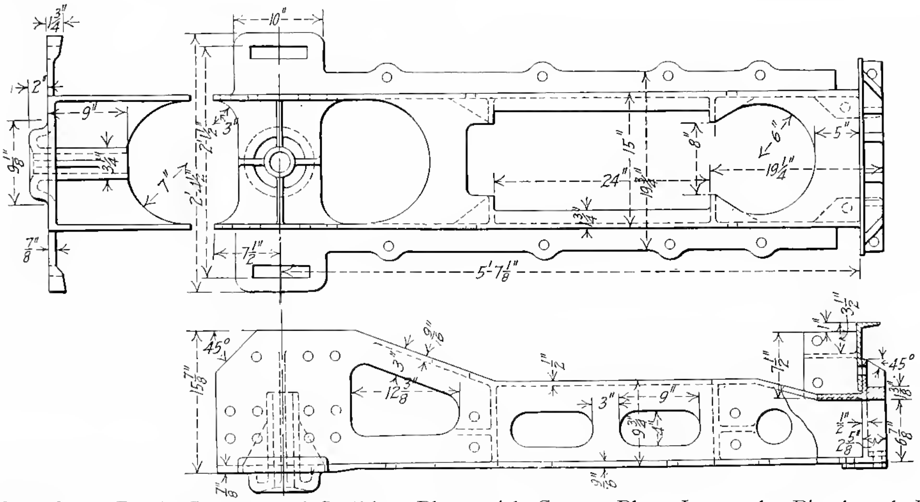


Fig. 676—Cast Steel Draft Carrier and Striking Plate with Center Plate Integral. Pittsburgh Equipment Company.

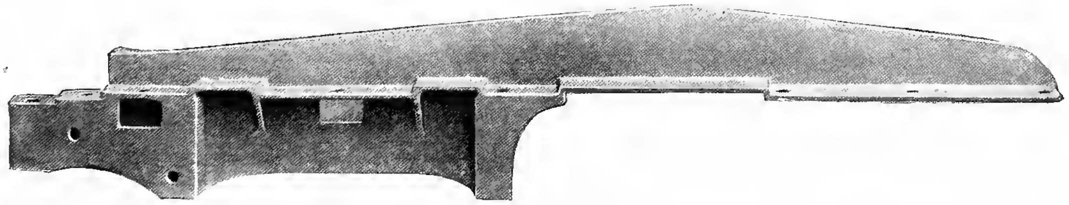


Fig. 677—Inside View of Economy Draft Arm Showing Draft Gear Lugs or Stops. American Steel Foundries.

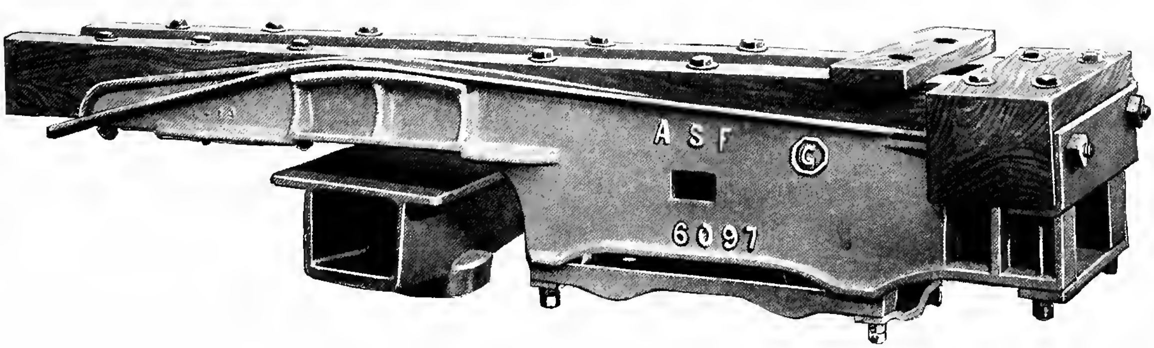


Fig. 678—Economy Draft Arms Applied to Center Sills. The Body Bolster is Dropped to Show the Recess. American Steel Foundries.

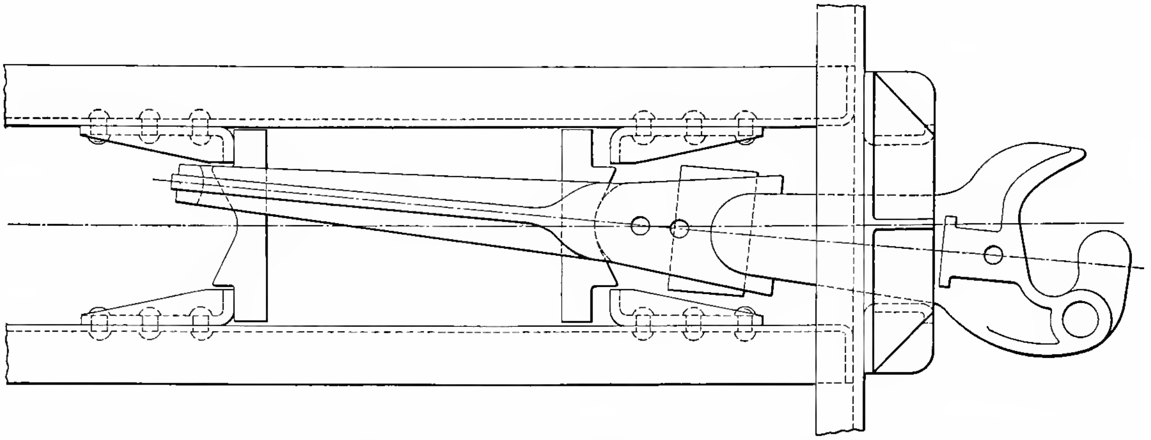


Fig. 679—Forsyth Radial Yoke Under Buffing Stress on Curves, Showing How Tapering of Yoke Permits Sufficient Clearance Between the Rear Follower Stops. Forsyth Brothers Company.

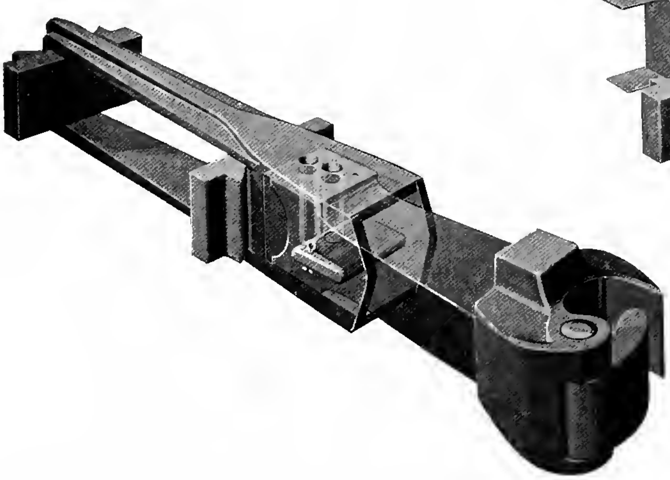


Fig. 680—Forsyth Radial Yoke and Followers with Center Key for Engaging Drawbar Butt; Applicable to Any Standard Gear or Drawbar.

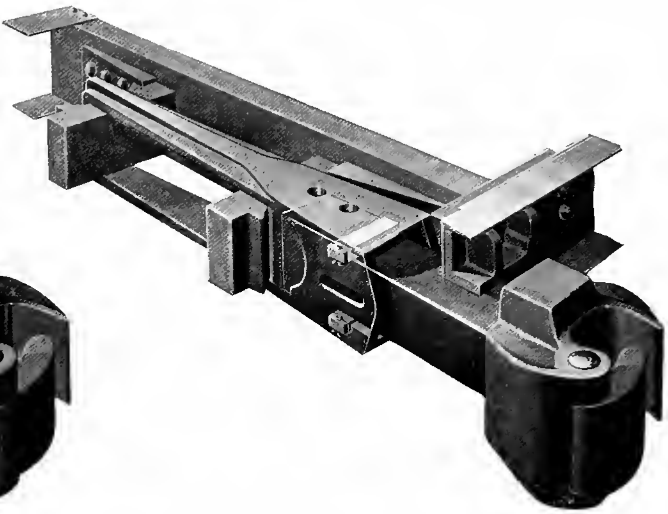


Fig. 681—Forsyth Radial Yoke and Followers with Top and Bottom Keys for Engaging Shoulders of Drawbar Butt; Applicable to Any Standard Gear or Drawbar.

Forsyth Brothers Company.

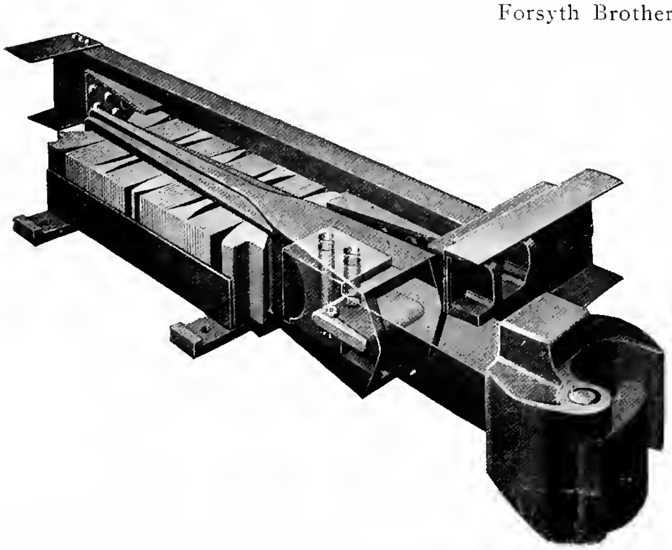


Fig. 682—Forsyth High Capacity Draft Gear with Containing Box and Radial Yoke, the Latter Applicable to Any Standard Gear and Drawbar. Forsyth Brothers Company.

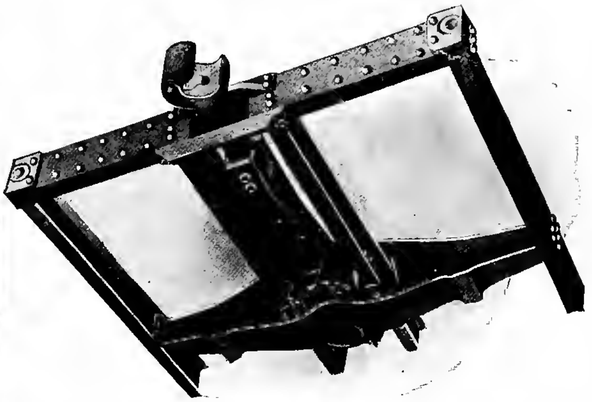


Fig. 683—Commonwealth Cast Steel Transom Draft Gear for Steel Cars. Commonwealth Steel Company.

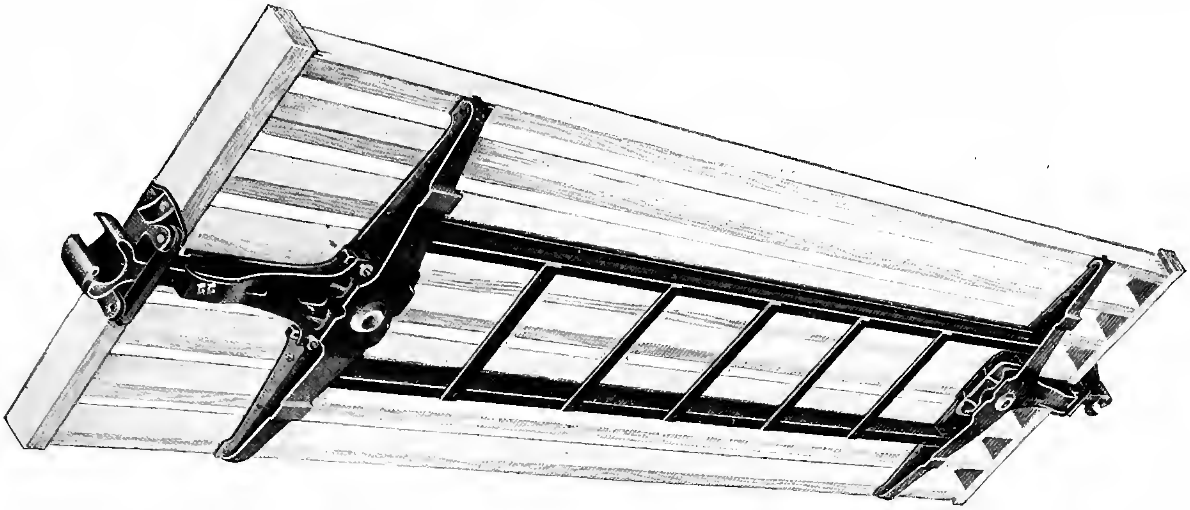


Fig. 684—Application of Cast Steel Transom Draft Gear with Reinforcements for Old Cars. Commonwealth Steel Company.

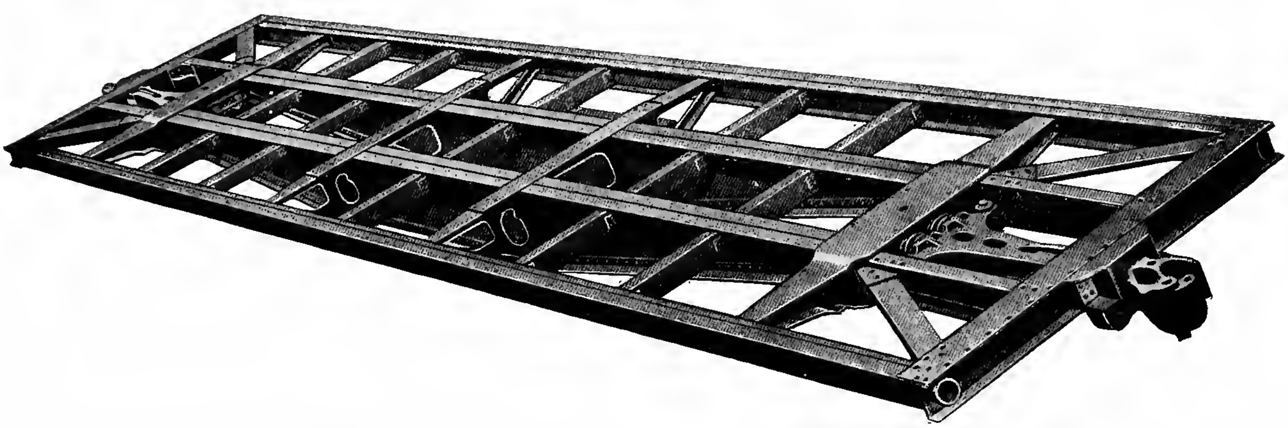


Fig. 685—Cast Steel Transom Draft Gear Applied to Steel Underframe. Commonwealth Steel Company.

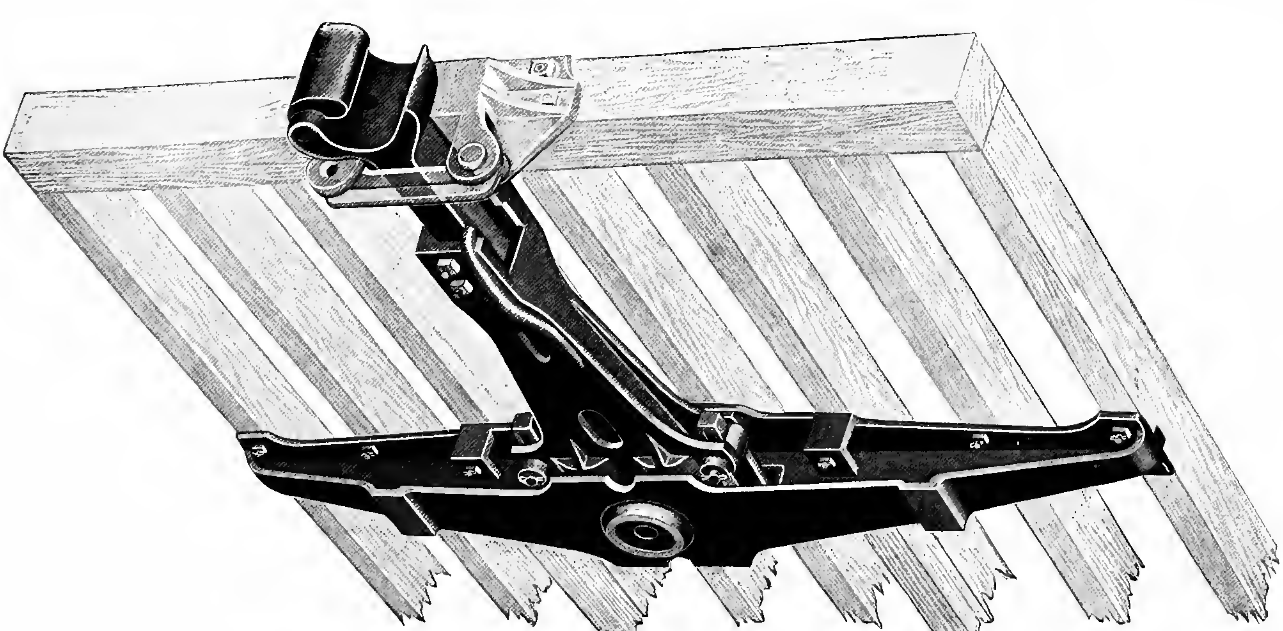


Fig. 686—Commonwealth Cast Steel Transom Draft Gear. Commonwealth Steel Company.

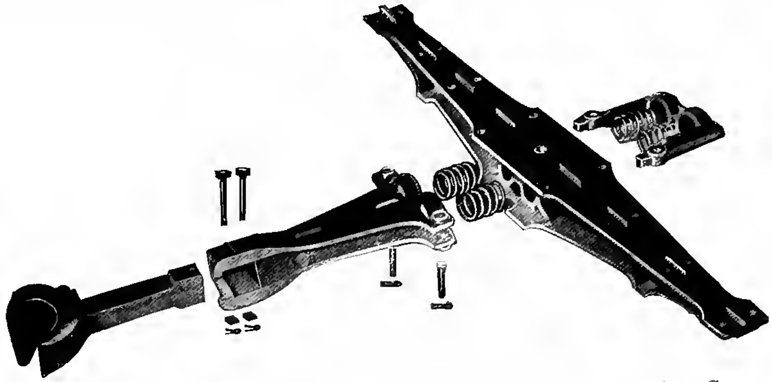


Fig. 687—Parts of Commonwealth Cast Steel Transom Draft Gear for Wooden Cars. Commonwealth Steel Company.

Fig. 688—Harvey Friction Draft Spring. Frost Railway Supply Company.

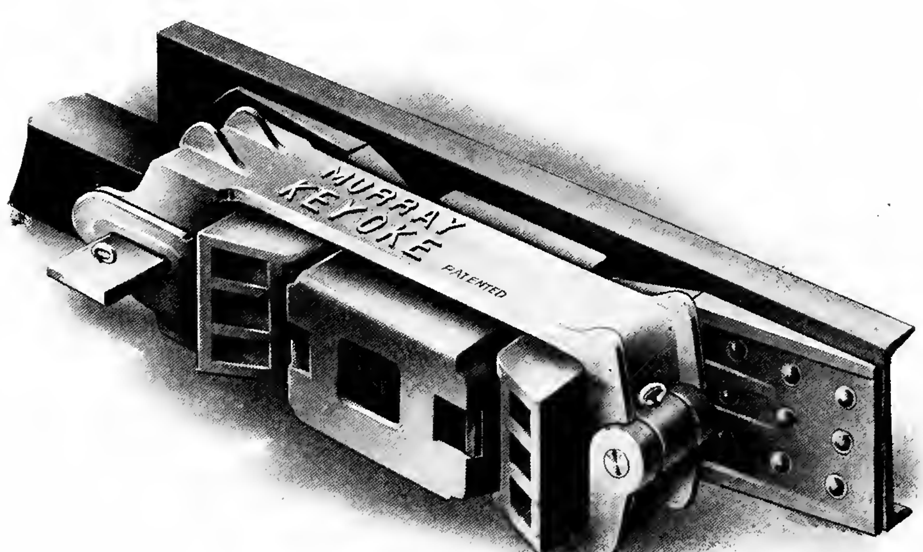


Fig. 689—Murray Cast Steel Keyoke Applied to Steel Center Sills in Connection with Friction Draft Gear. Keyoke Railway Equipment Company.

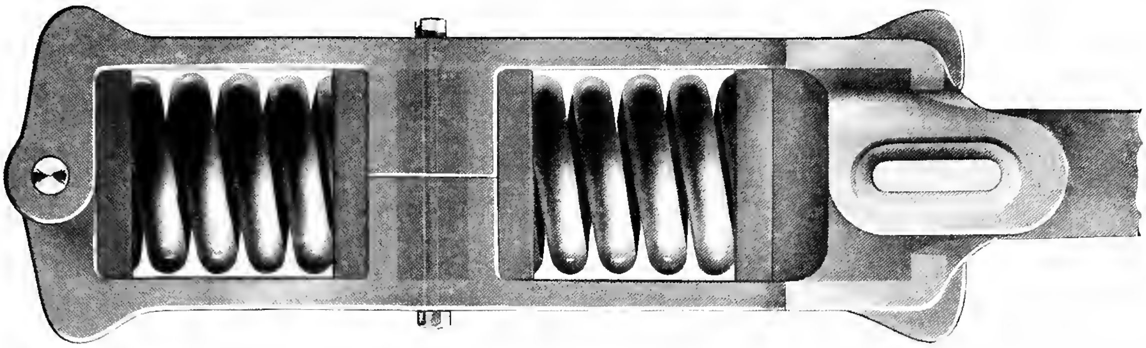


Fig. 690—Murray Keyoke for Use with Tandem Spring Draft Gear. Keyoke Railway Equipment Company.

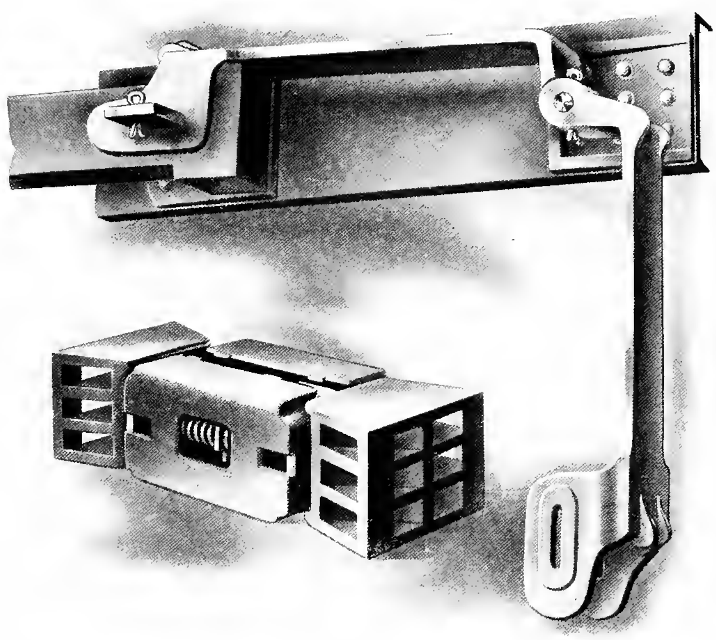


Fig. 691—Murray Keyoke with Lower Casting Dropped for Application of New Draft Gear. Keyoke Railway Equipment Company.

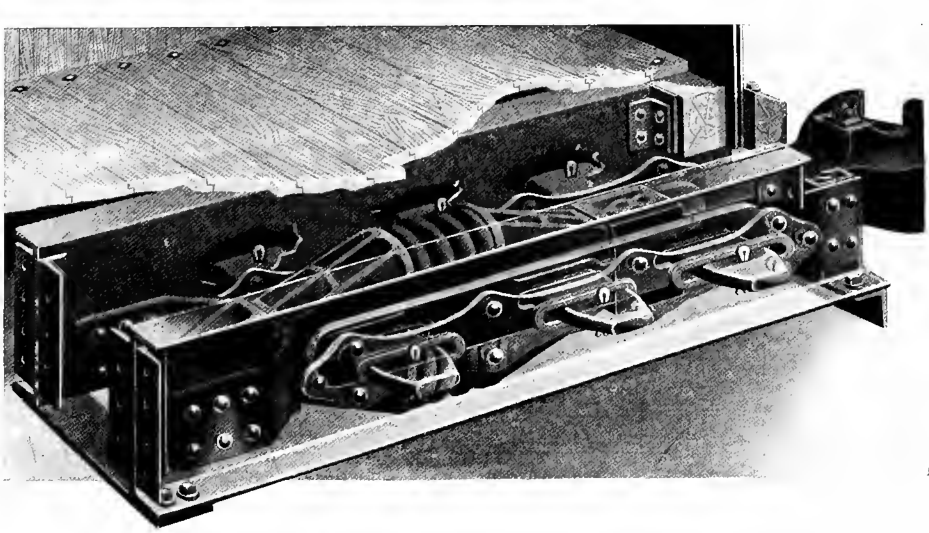


Fig. 692—Farlow Draft Rigging with M. C. B. 8 in. by 7⅞ in. Twin Springs. T. H. Symington Company.

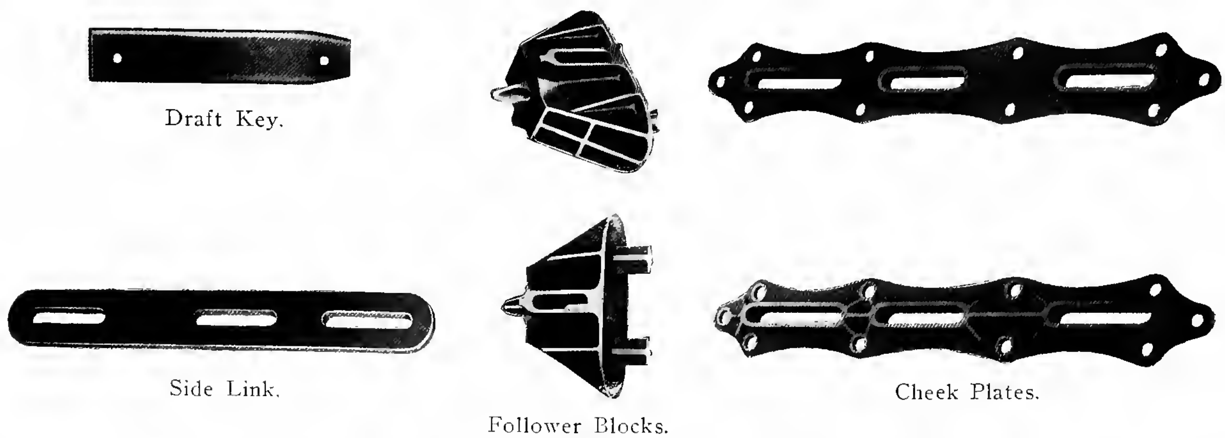


Fig. 693—Parts of Farlow Draft Rigging. T. H. Symington Company.

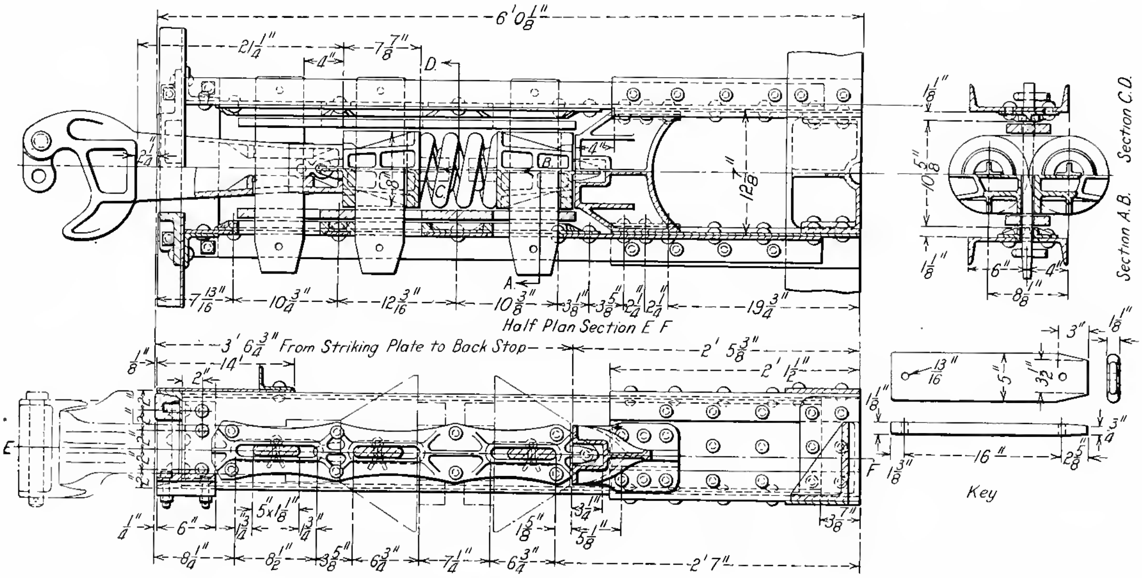


Fig. 694—Farlow Spring Draft Gear with M. C. B. Class G, 8 in. by 7⅞ in. Twin Springs. T. H. Symington Company.

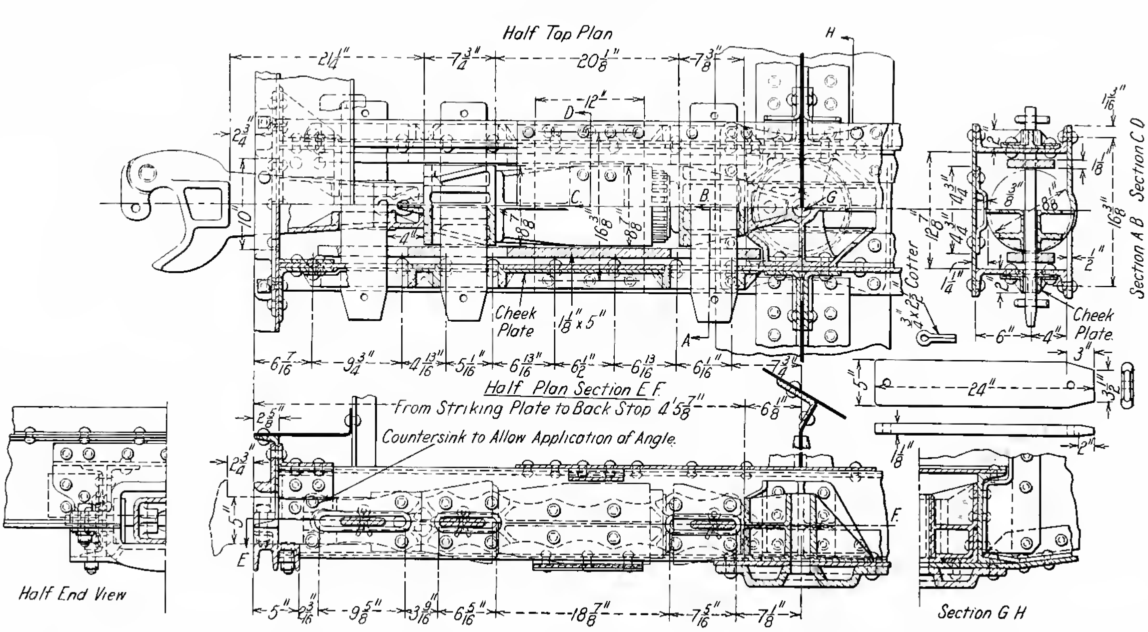
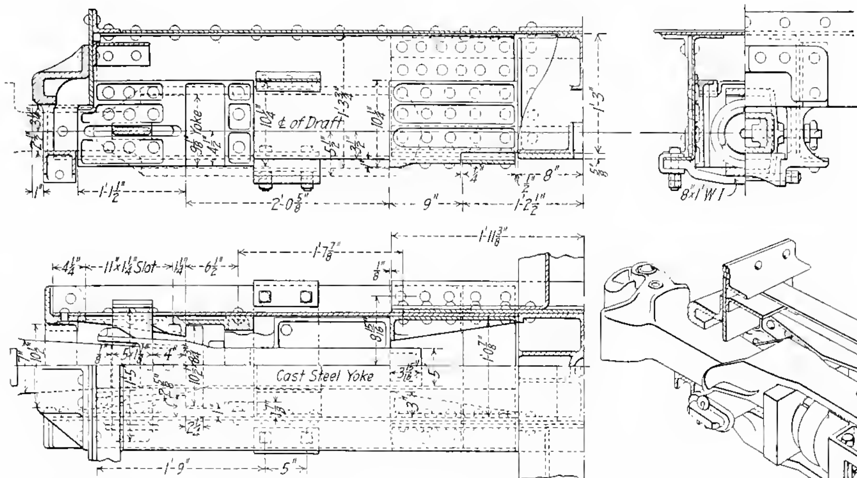


Fig. 695—Farlow Attachments with Westinghouse Friction Draft Gear. T. H. Symington Company.



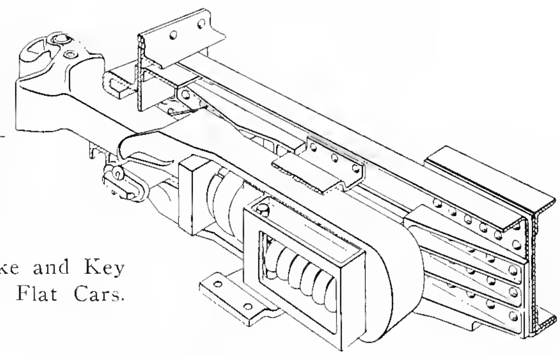


Fig. 696—Miner Friction Draft Gear with Cast Steel Yoke and Key Coupler Connections for New York Central Lines Flat Cars. W. H. Miner.

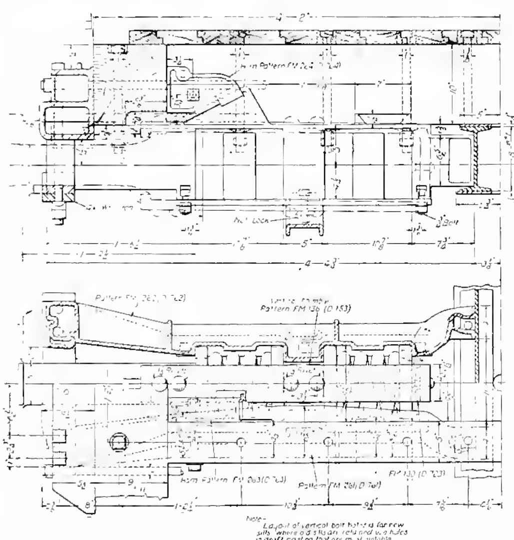
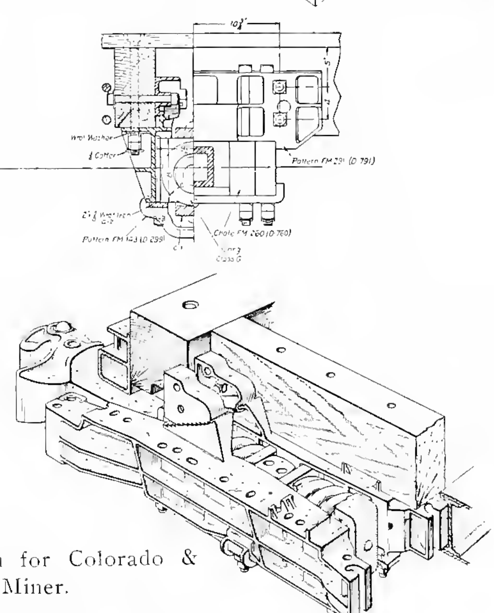



Fig. 697—Miner Tandem Draft Gear with Adjustable Horn for Colorado & Southern Wooden Sill Freight Cars. W. H. Miner.

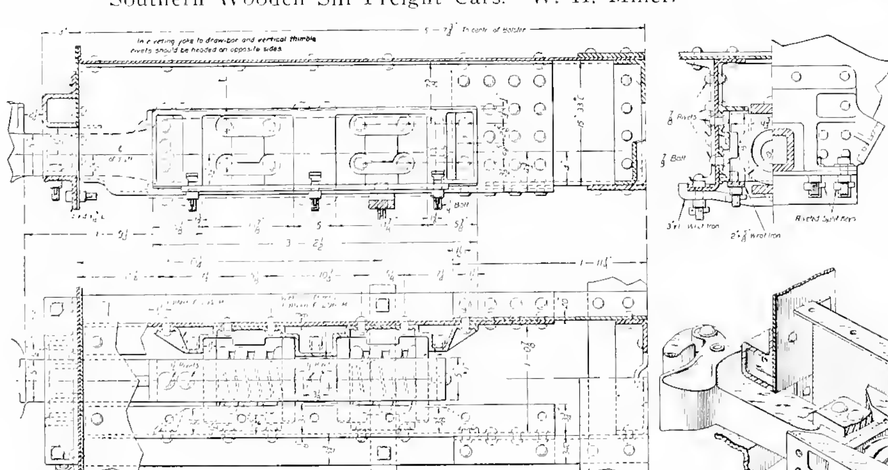
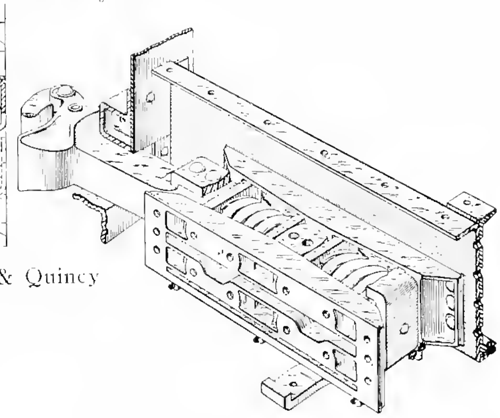



Fig. 698—Miner Tandem Draft Gear for Chicago, Burlington & Quincy Gondola Cars with Steel Center Sills. W. H. Miner.

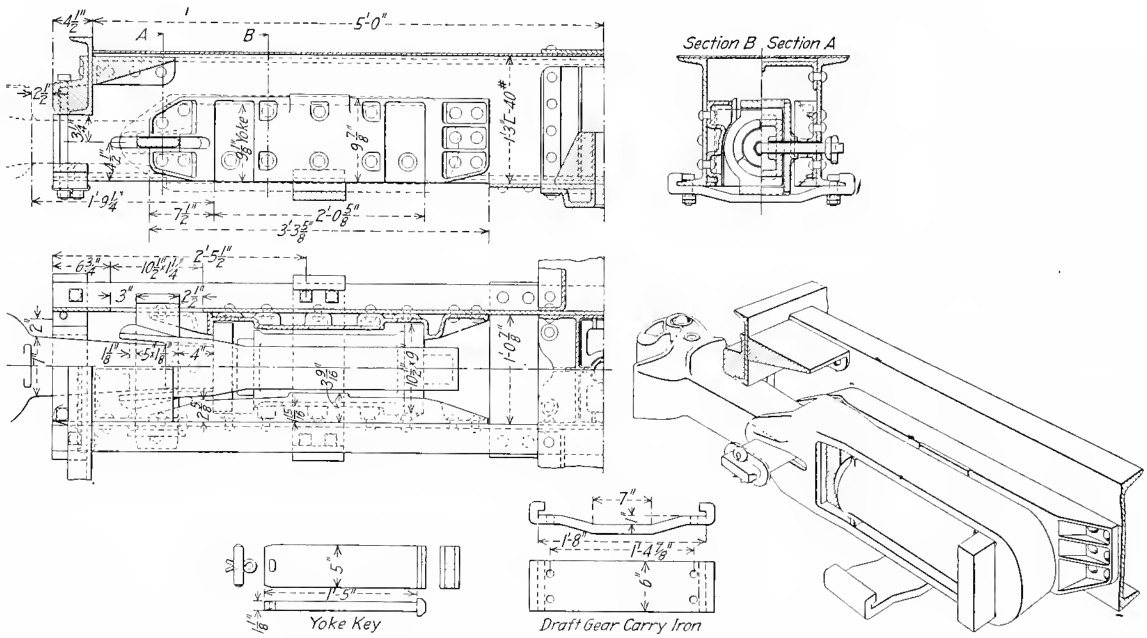


Fig. 699—Miner Friction Draft Gear with Cast Steel Yoke and Key Coupler Connection for Freight Cars.
W. H. Miner.

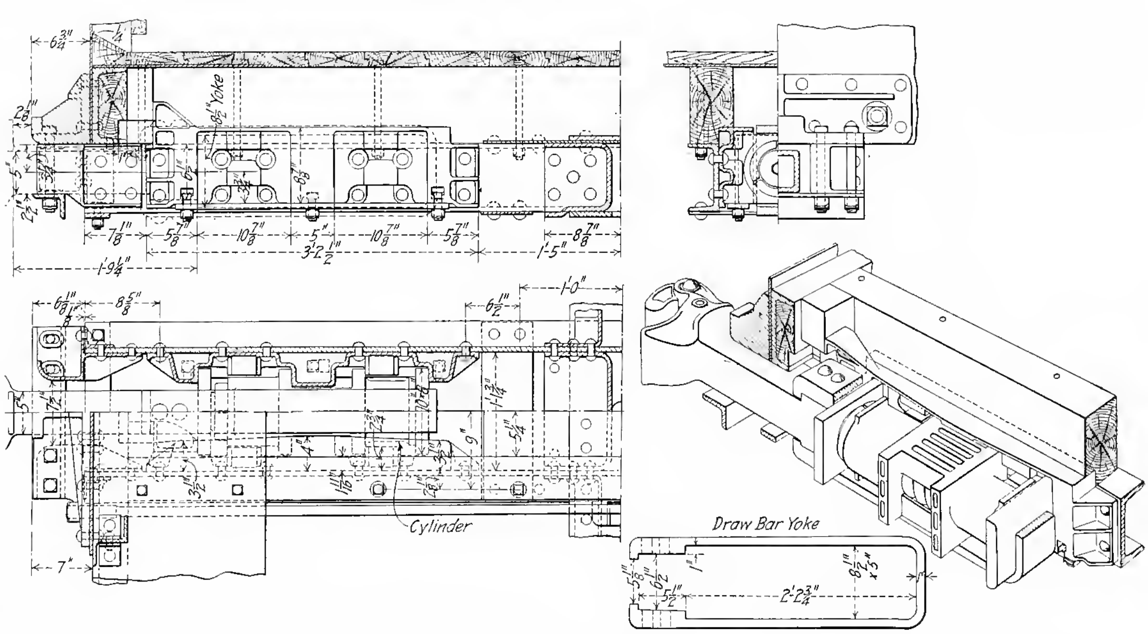


Fig. 700—Miner Tandem Friction Draft Gear for Atchison, Topeka and Santa Fe Box Cars.
W. H. Miner.

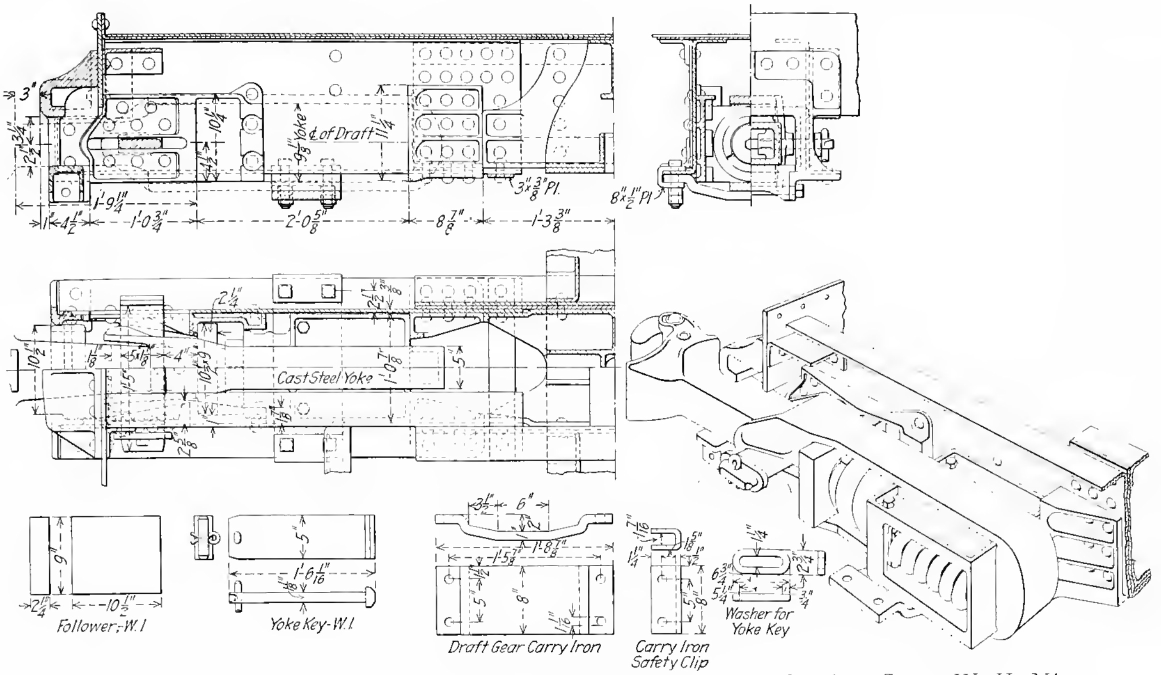


Fig. 702—Miner Friction Draft Gear for New York Central Lines Gondola Cars. W. H. Miner.

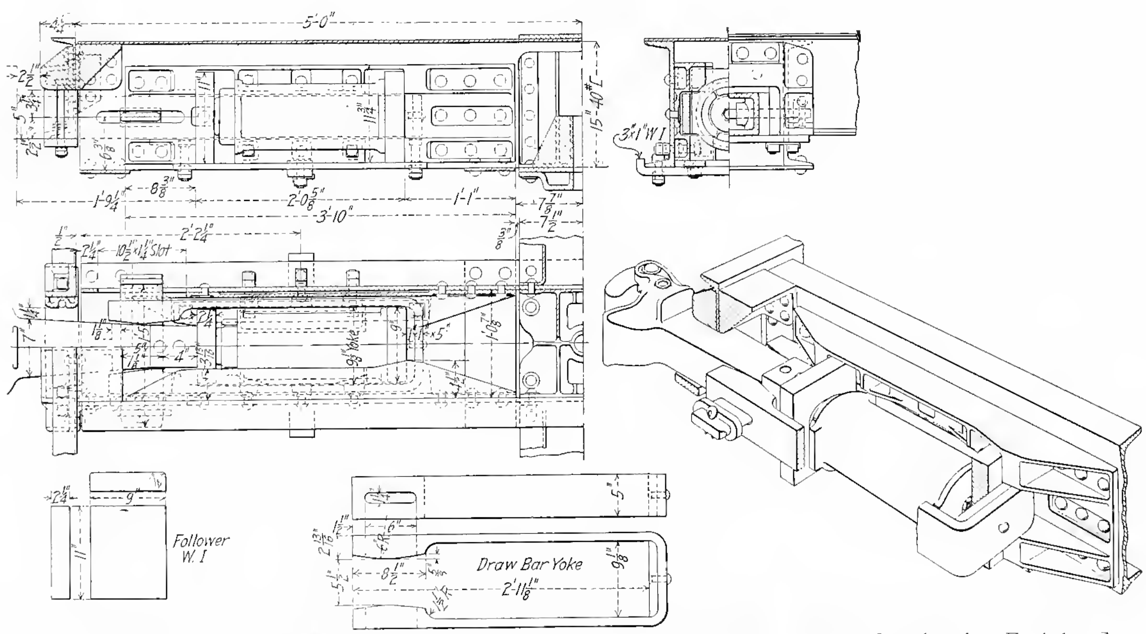


Fig. 703—Miner Friction Draft Gear with Key Connection Between Yoke and Coupler for Freight Cars. W. H. Miner.

Parts of Anderson Friction Draft Gear.

1 *Followers*
2 *Spring Caps*
3 *Lever*
4 *Springs*

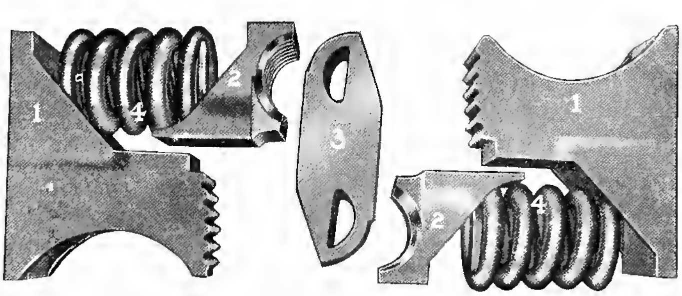
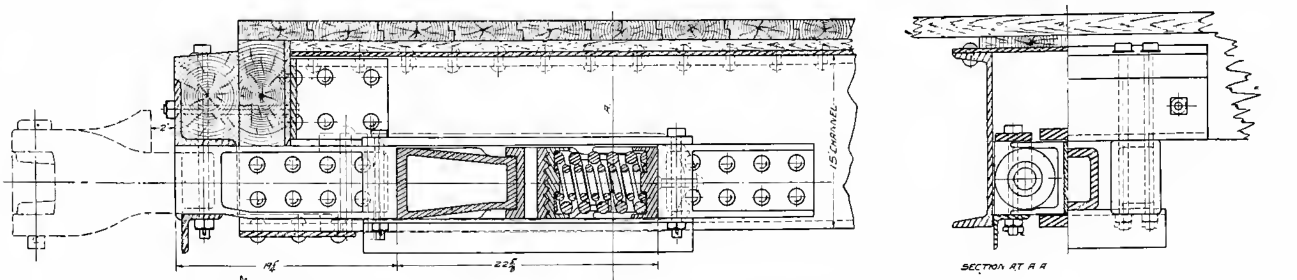


Fig. 704—Anderson Friction Draft Gear, Type A, Unassembled. Mid-Western Car Supply Company.



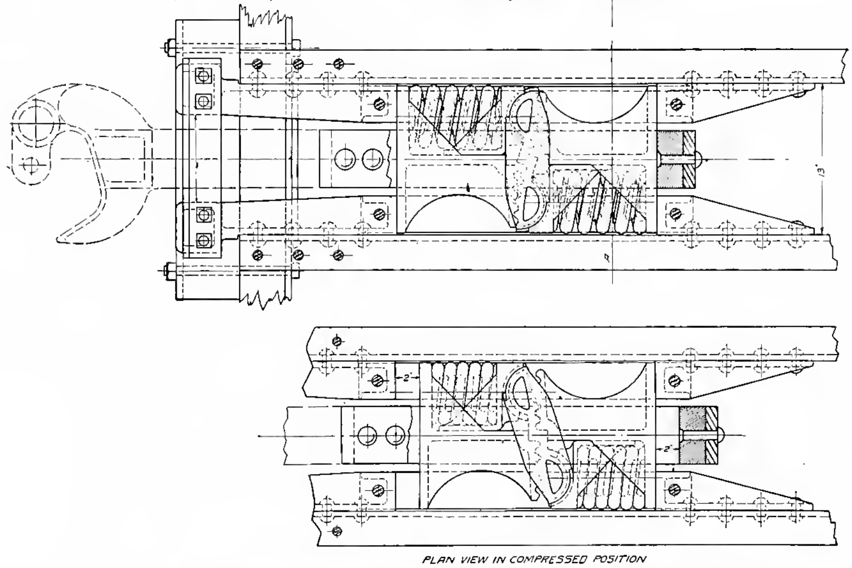


Fig. 705 — Anderson Friction Draft Gear, Type A, Applied to Freight Car. Mid-Western Car Supply Company.

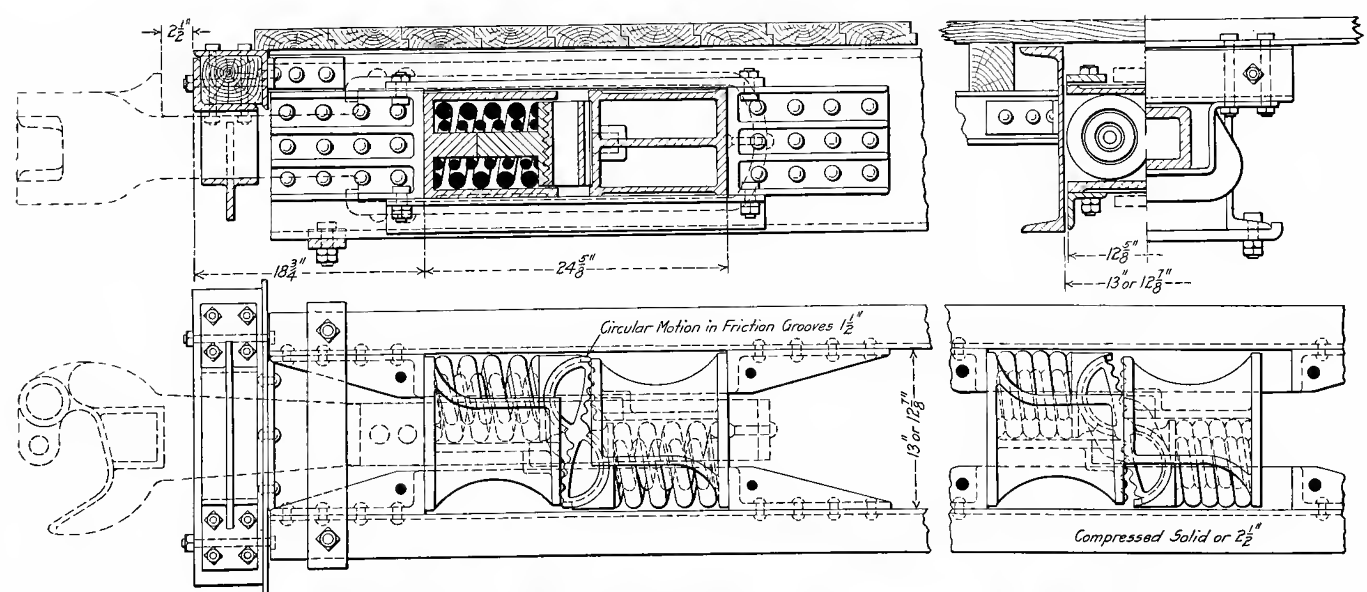


Fig. 706—Anderson Friction Draft Gear, Type B, Applied to Freight Car. Mid-Western Car Supply Company.

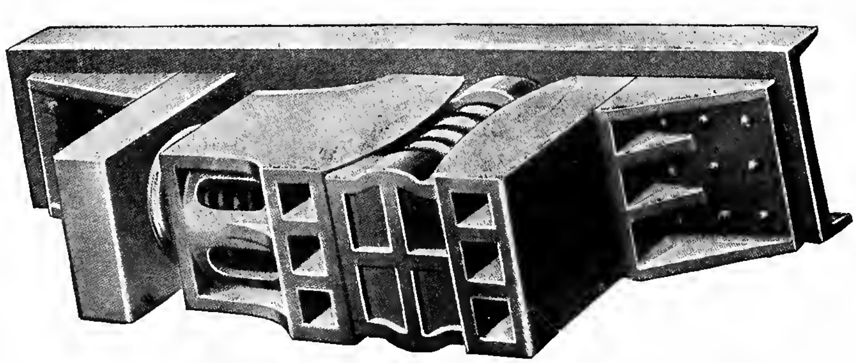


Fig. 707—Butler Friction Draft Gear No. 350 with One Draft Sill Removed. Butler Drawbar Attachment Company.

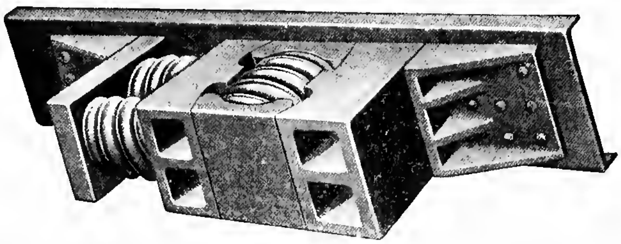


Fig. 708—Butler Friction Draft Gear No. 370 with One Draft Sill Removed.

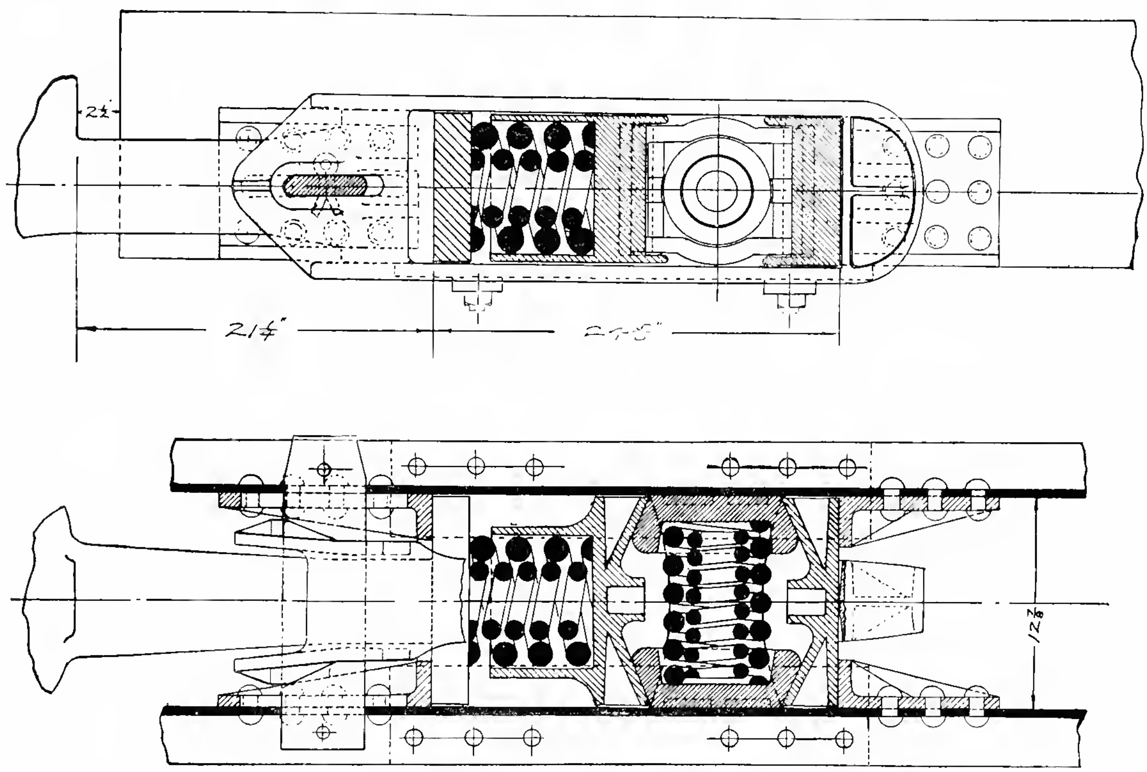


Fig. 709—Butler Friction Draft Gear No. 350 Applied to Freight Car.

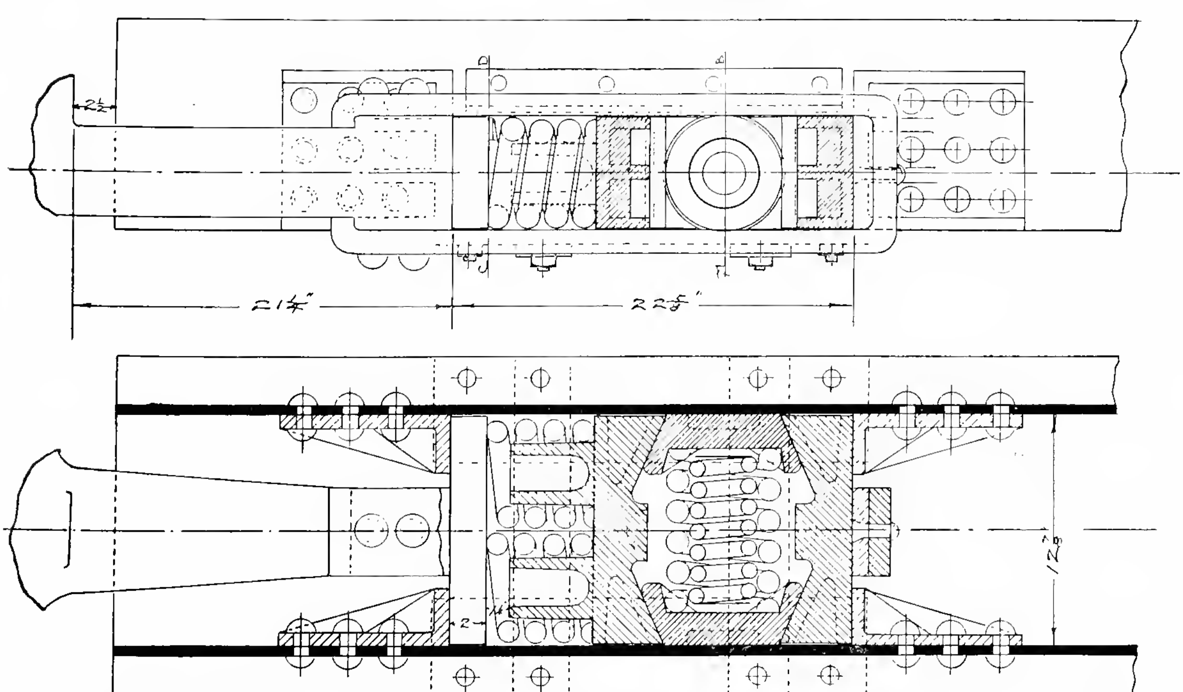


Fig. 710—Butler Friction Draft Gear No. 370 Applied to Freight Car. Butler Drawbar Attachment Company.

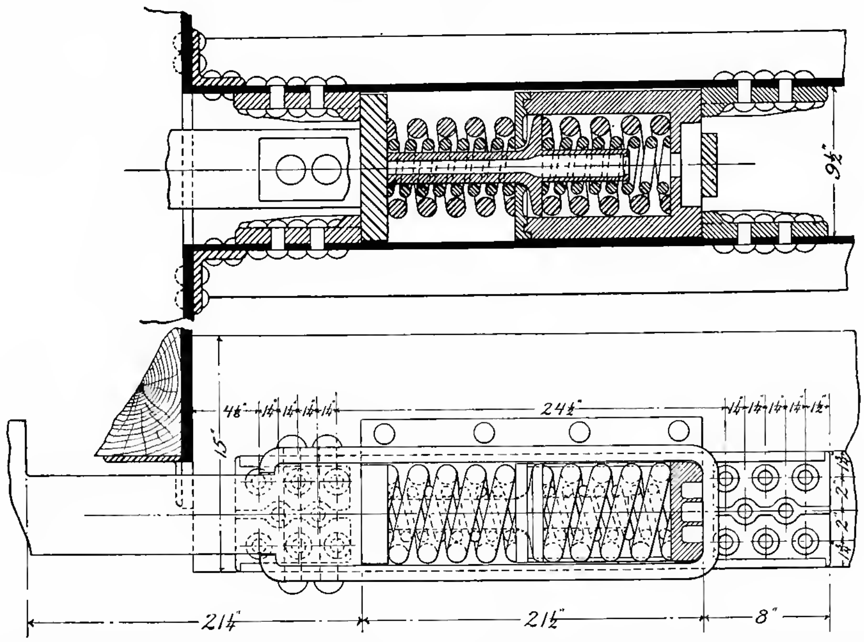


Fig. 711—Butler Special Tandem Spring Draft Gear. Butler Drawbar Attachment Company.

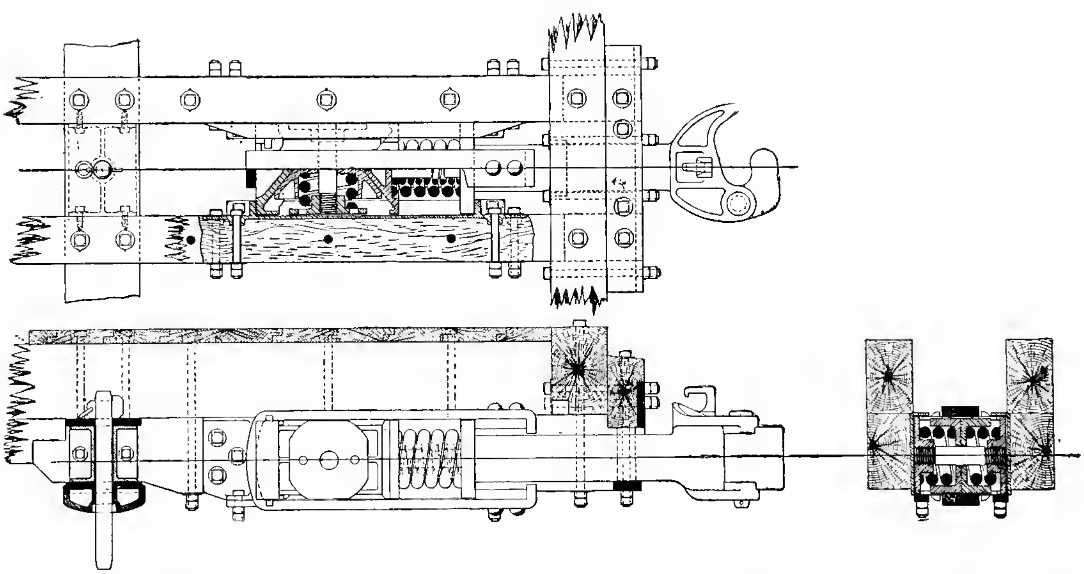


Fig. 712—Republic Friction Draft Gear for Freight Cars with Wooden Sills. Western Railway Equipment Company.

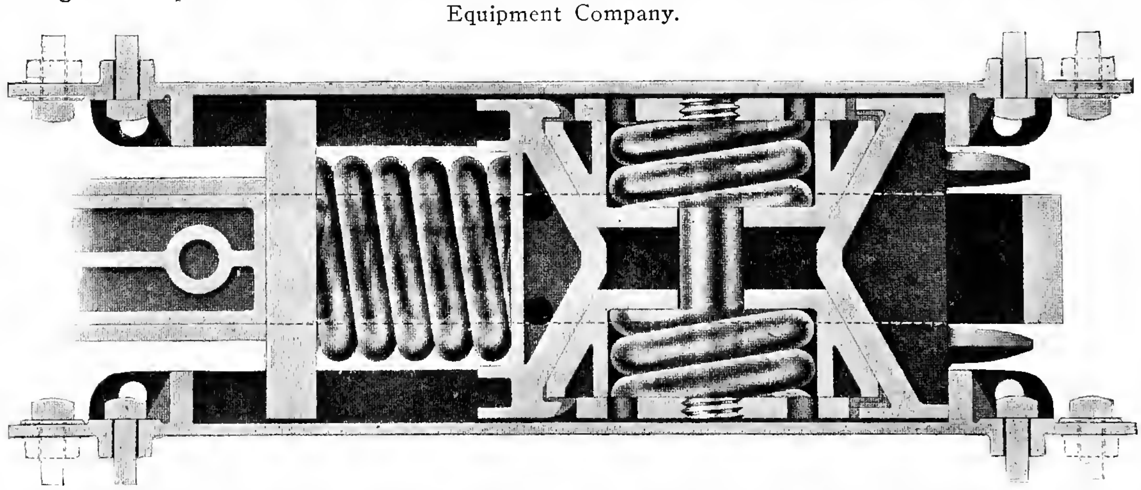


Fig. 713—Republic Friction Draft Gear Under Buffing Compression. Western Railway Equipment Company.

Parts of Republic Friction Draft Gear. See Fig. 714.

A *Front Friction Block*
B *Back Friction Block*
C *Side Friction Block*
D *Spring Cap*
E *Tension Bolt*
F *Front Follower*
G *Cross Spring*
H, L *M. C. B. Draft Springs*
I *Yoke*
K *Draft Lug or Check Plate*

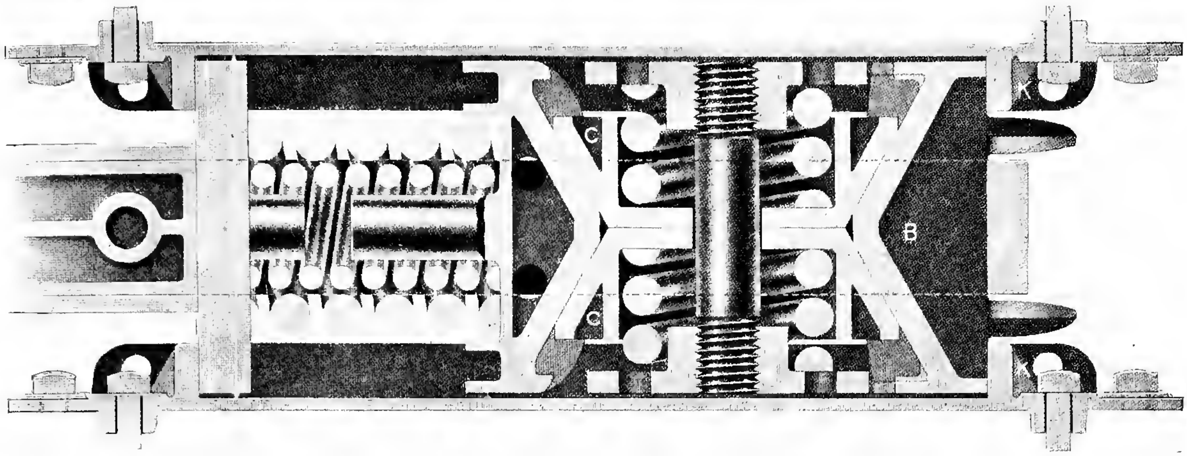


Fig. 714—Republic Friction Draft Gear, Type G, with Parts in Normal Position. Western Railway Equipment Company.

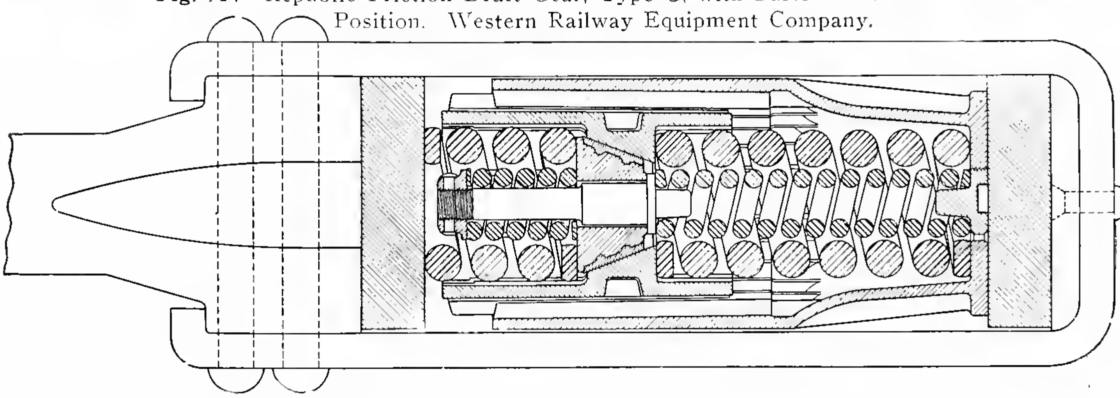


Fig. 715—Sectional View of Westinghouse Friction Draft Gear. Westinghouse Air Brake Company.

Parts of Westinghouse Friction Draft Gear. See Fig. 716.

5660 *Standard Friction Draft Gear, complete*
5661 *Draft Gear Cylinder Body*
5662 *Release Spring*
5663 *Preliminary Spring*
5664 *Auxiliary Release Spring*
5665 *Auxiliary Preliminary Spring*
5666 *Nut for Release Pin*
5667 *Release Pin*
5668 *Rivet for Securing Release Pin Nut*
5669 *Wedge*
5670 *Female Segment*
5671 *Male Segment*
5672 *Friction Strip*
5673 *Wedge and Release Pin with Auxiliary Preliminary Spring, complete*

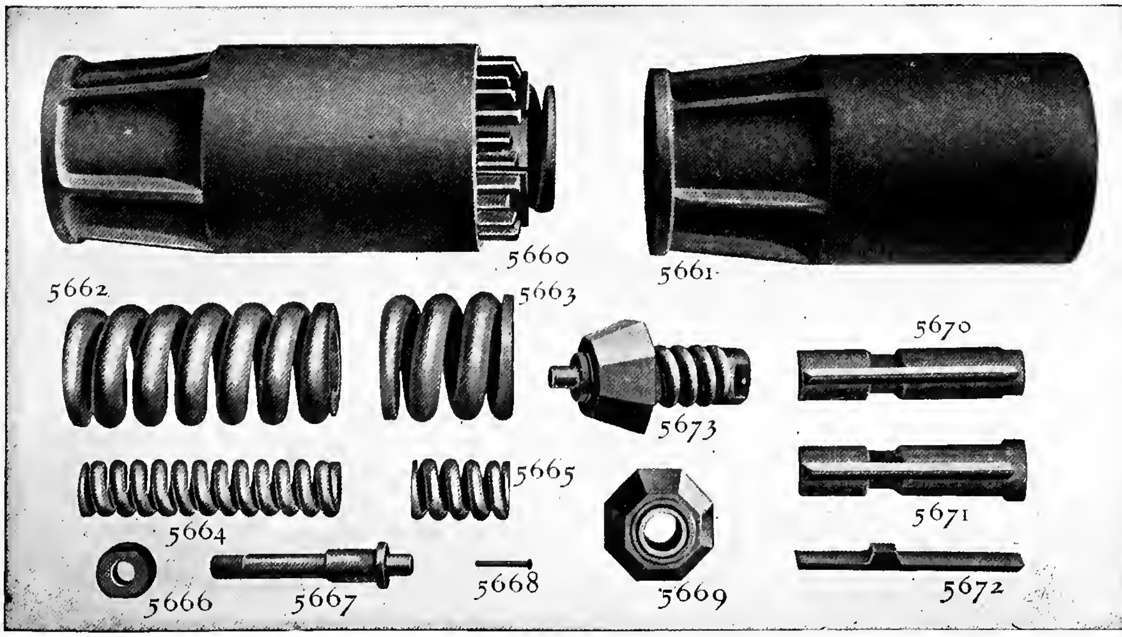


Fig. 716—Parts of Westinghouse Friction Draft Gear. Westinghouse Air Brake Company.

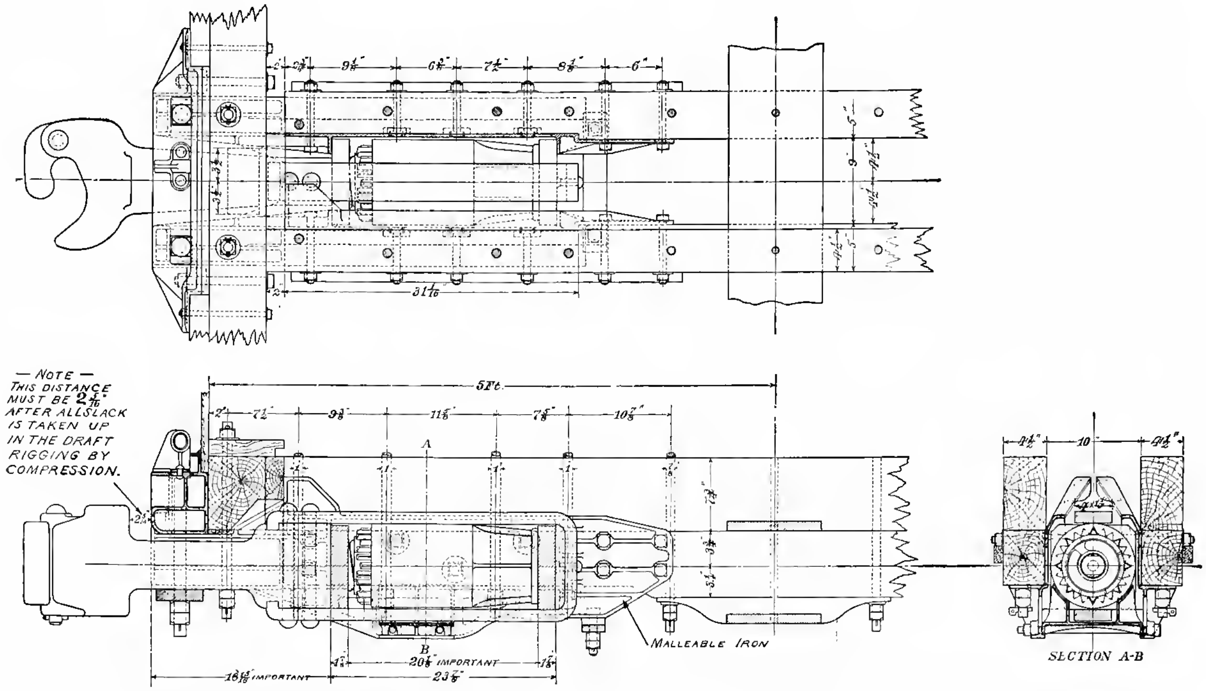


Fig. 717—Westinghouse Friction Draft Gear for Freight Cars with Wooden Center Sills and Malleable Iron Draft Sills. Westinghouse Air Brake Company.

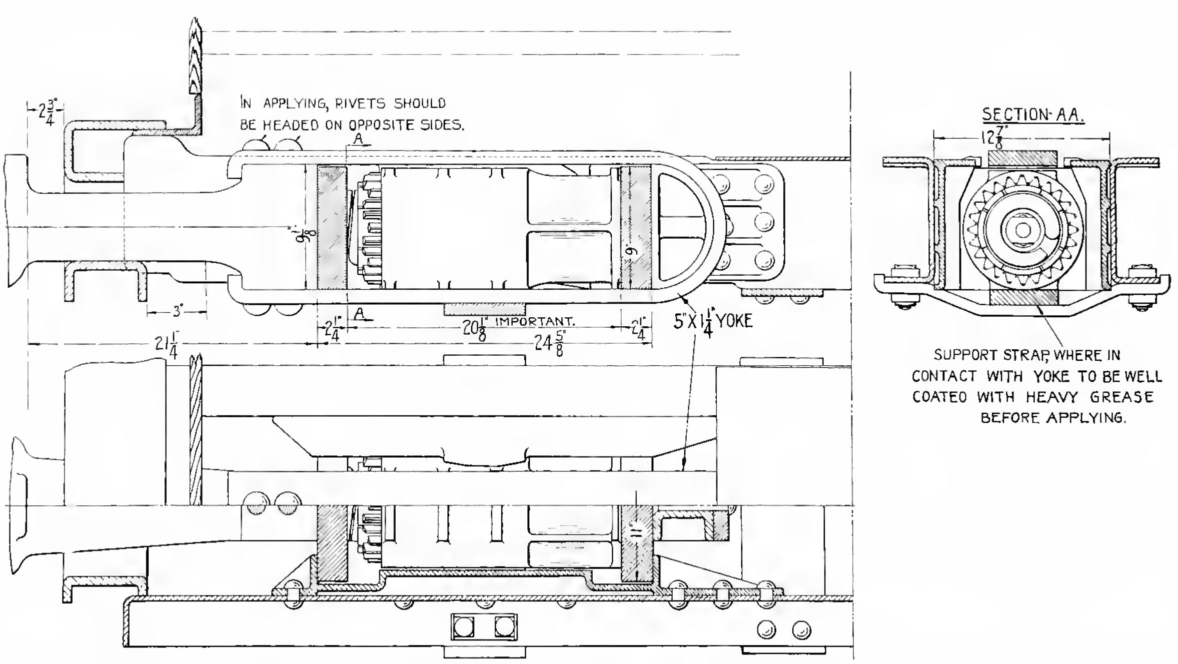


Fig. 718—Westinghouse Friction Draft Gear for Freight Cars, with Universal Attachments and Yoke. Westinghouse Air Brake Company.

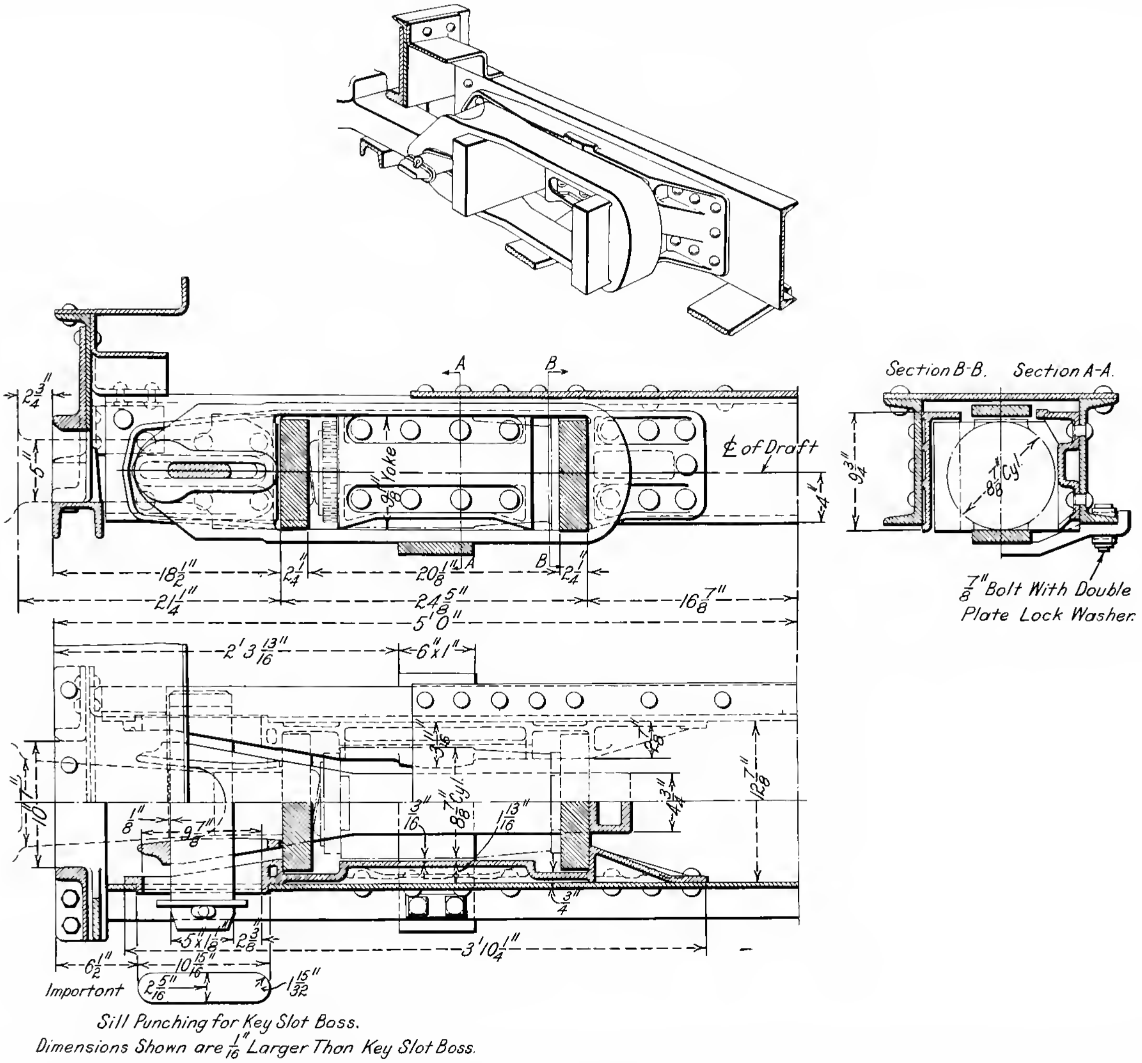


Fig. 719—Universal Attachments and Yoke for Westinghouse Friction Draft Gear. Universal Draft Gear Attachment Company.

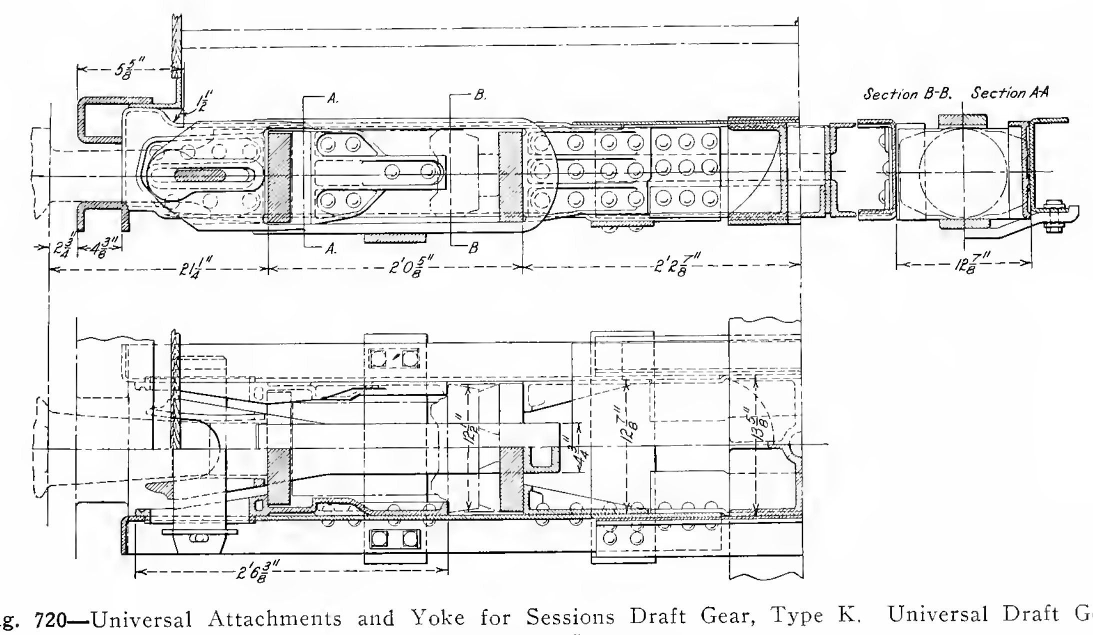


Fig. 720—Universal Attachments and Yoke for Sessions Draft Gear, Type K. Universal Draft Gear Attachment Company.

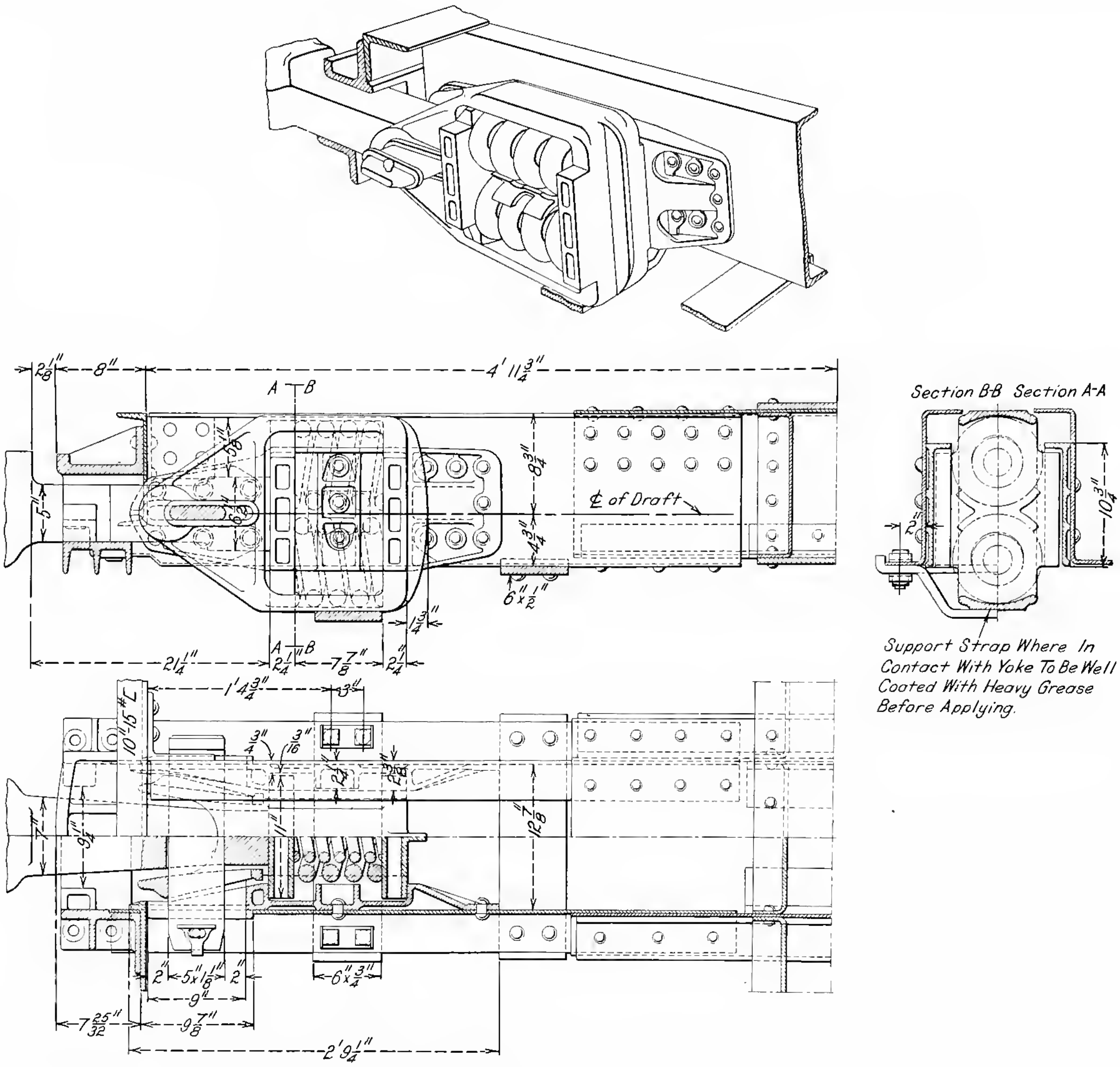


Fig. 722—Universal Attachments and Yoke for Twin Spring Draft Gear. Universal Draft Gear Attachment Company.

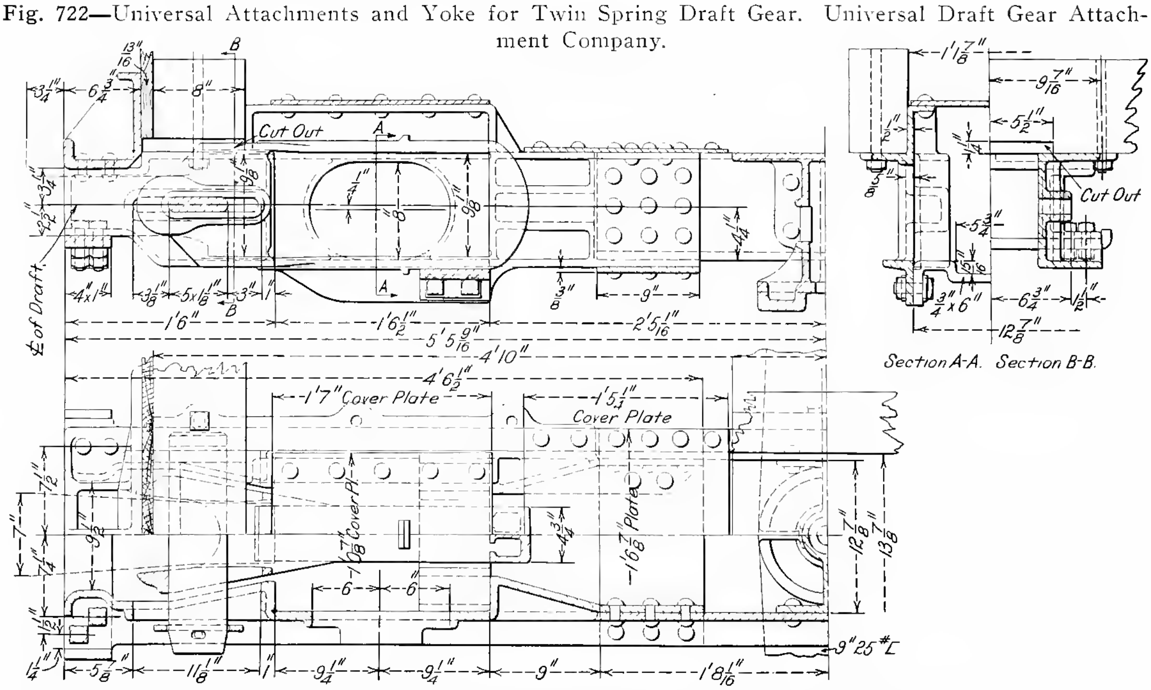


Fig. 723—Universal Attachments and Keyed Yoke with Cast Steel Draft Arms, for Cardwell Friction Draft Gear, Type G. Universal Draft Gear Attachment Company.

Parts of Sessions-Standard Friction Draft Gear. See Fig. 724.

A	*Spring Barrel*	F	*Check Plate, right*
B	*Friction Box*	G	*Check Plate, left*
C	*Side Friction Blocks*	H	*Draft Gear Carrier*
D	*Center Friction Blocks*	I	*Double Coil Draft Spring*
E	*Follower Plate*		

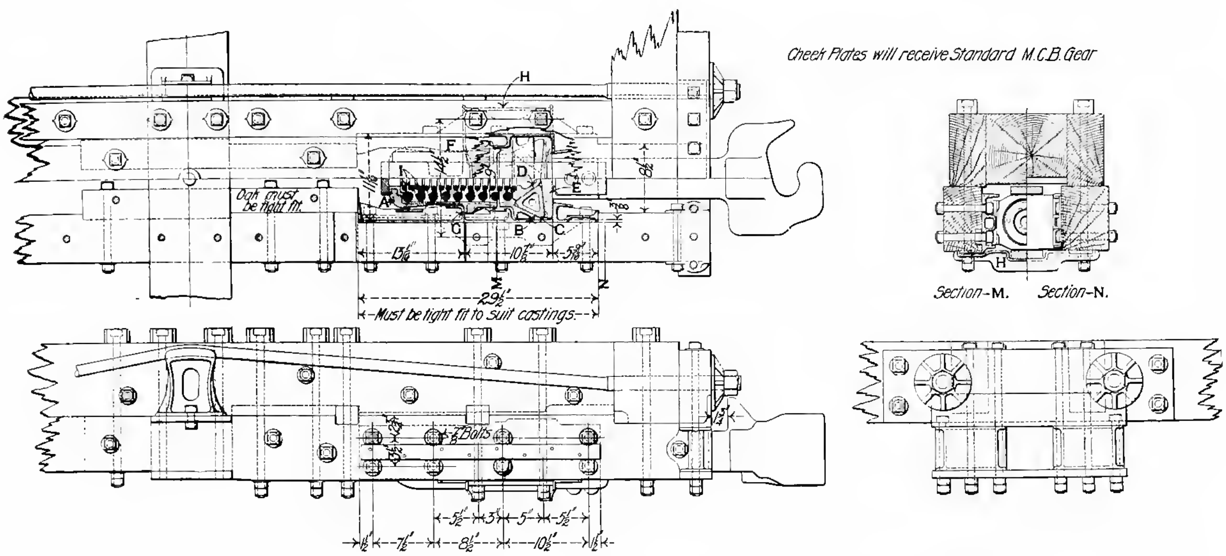


Fig. 724—Sessions-Standard Friction Draft Gear, Type E, for Freight Cars with Wooden Center Sills. Standard Coupler Company.

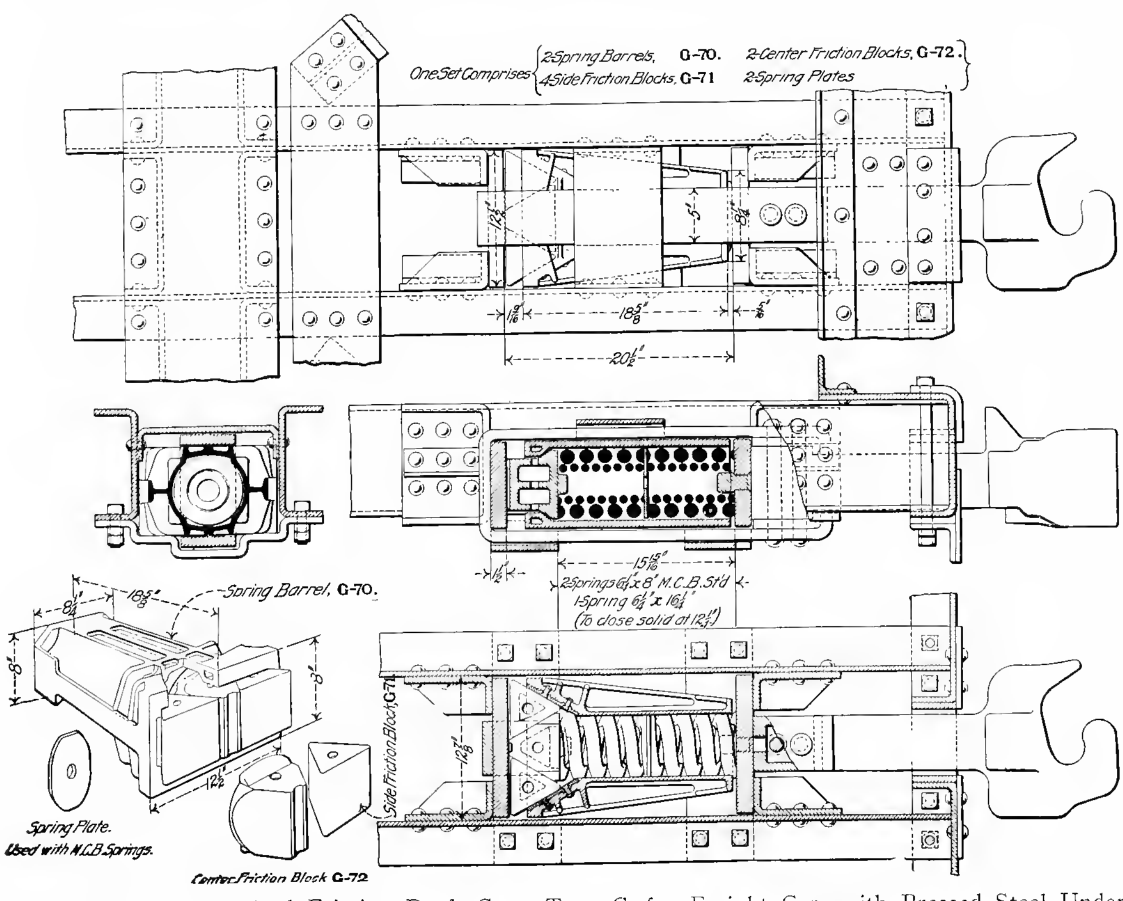


Fig. 725—Sessions-Standard Friction Draft Gear, Type C, for Freight Cars with Pressed Steel Underframes. Standard Coupler Company.

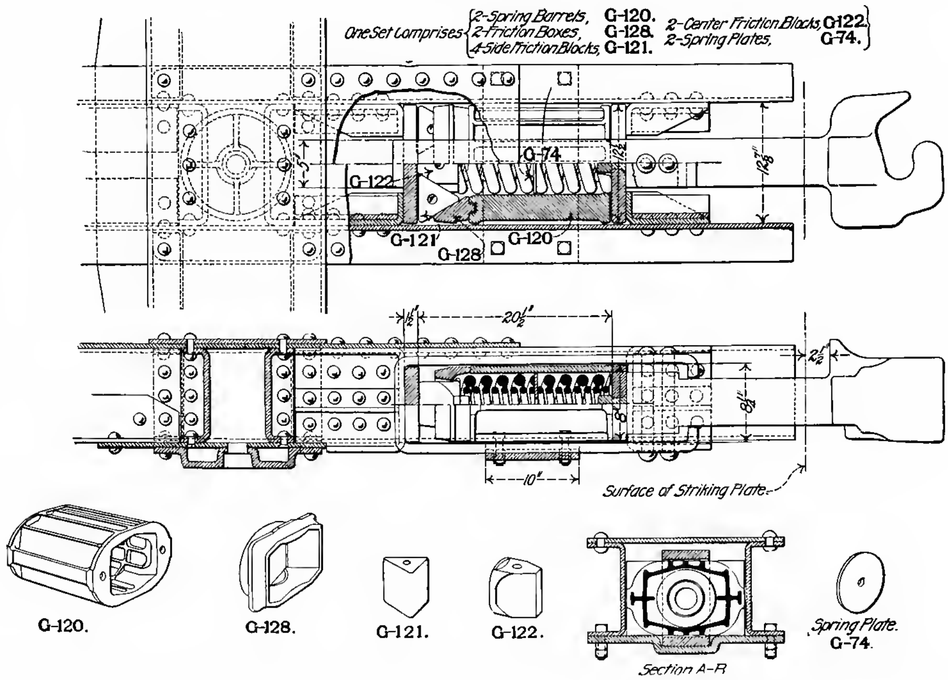


Fig. 726—Sessions-Standard Friction Draft Gear, Type H, for Freight Cars with Pressed Steel Underframes. Standard Coupler Company.

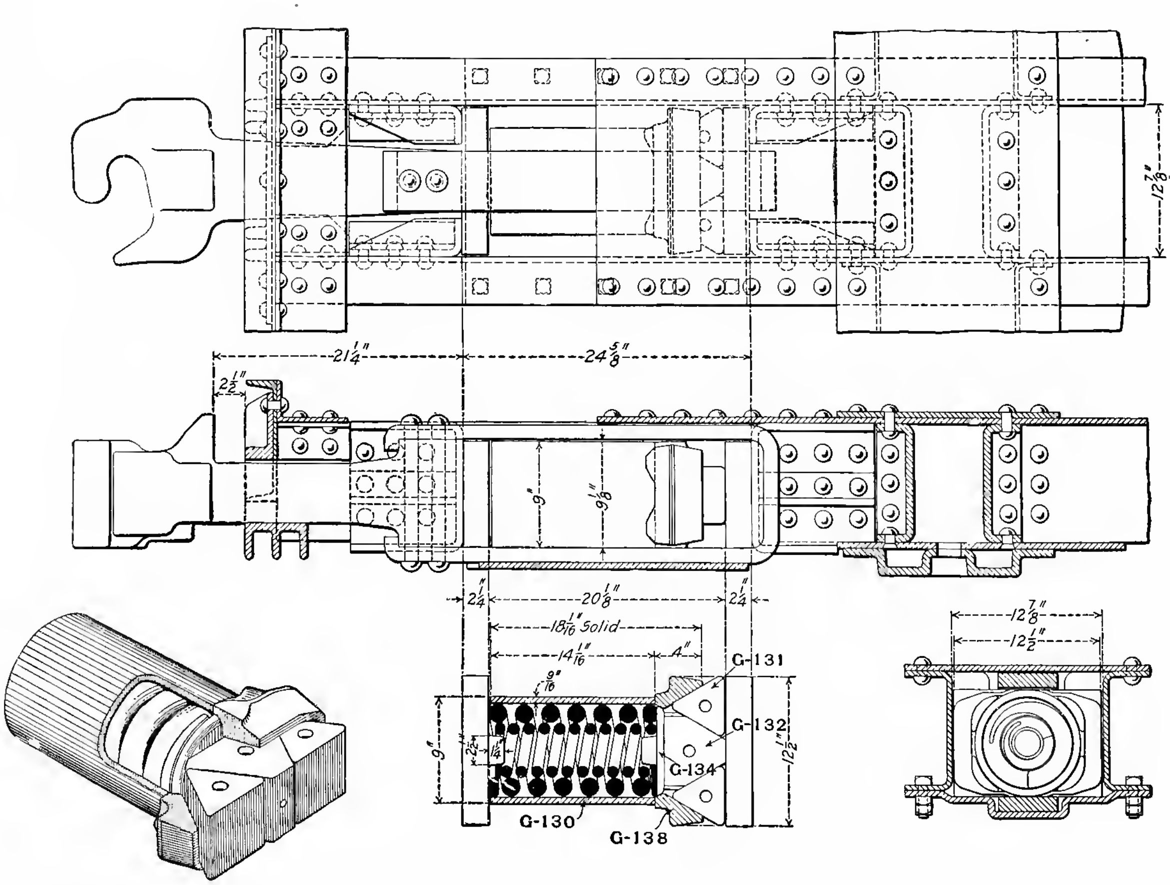


Fig. 727—Sessions-Standard Friction Draft Gear, Type K, for Freight Cars. Standard Coupler Company.

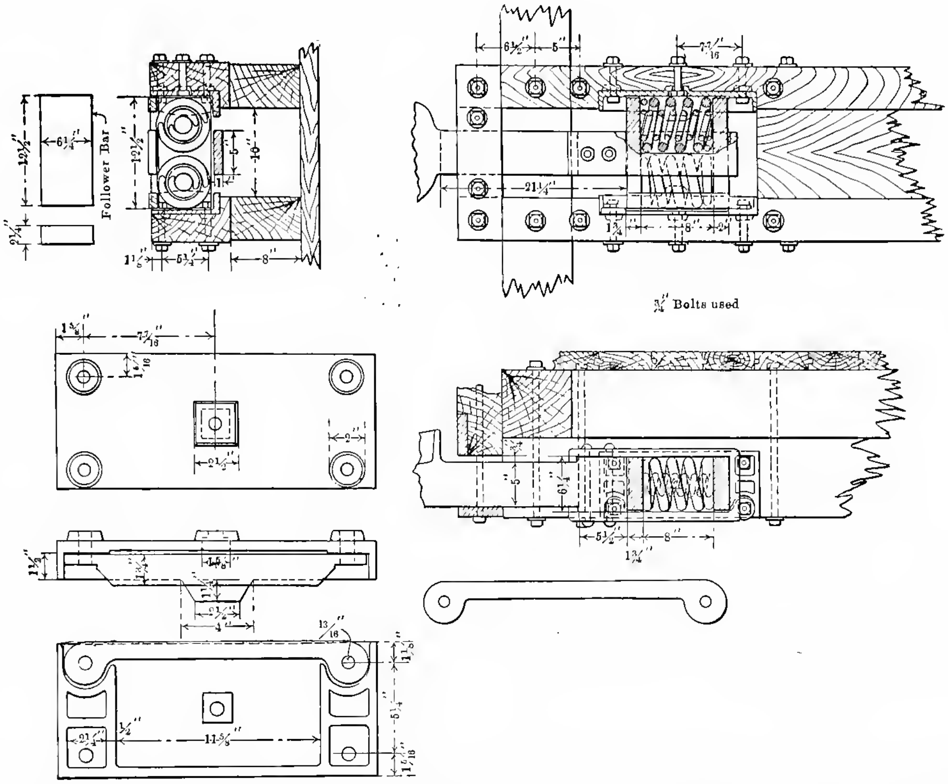


Fig. 728—Hinson Twin Spring Draft Gear for Freight Cars with Wooden Center Sills. National Car Coupler Company.

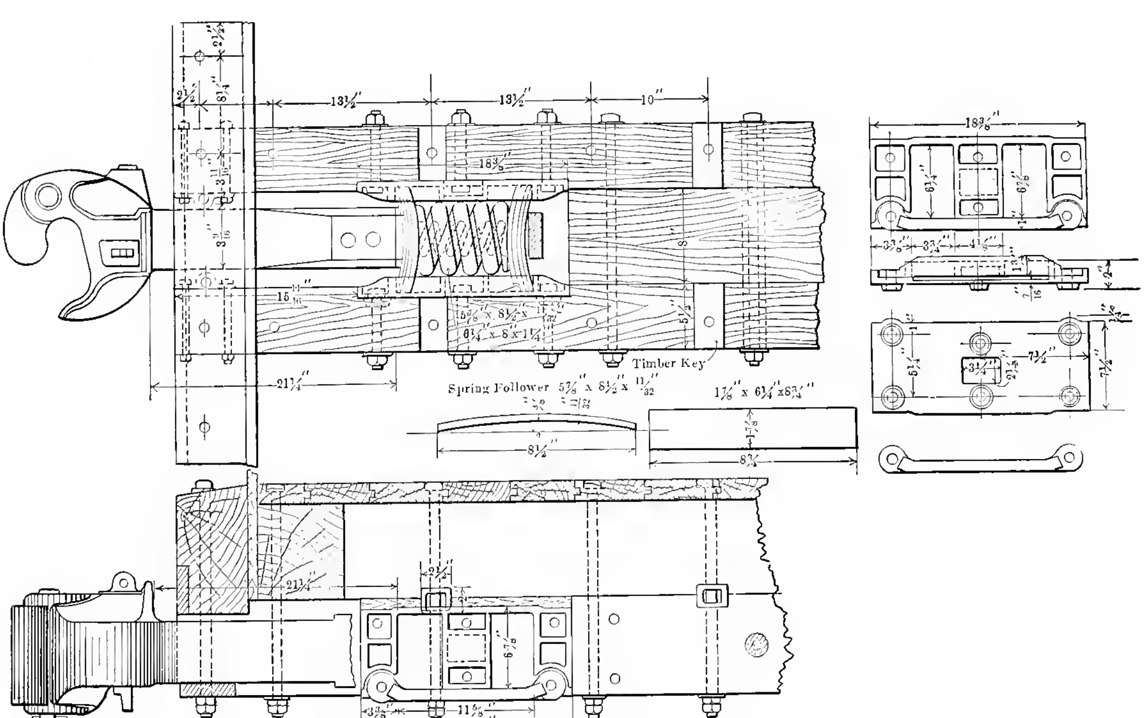


Fig. 729—Hinson Single Spring Draft Gear with Spring Follower Plates for Freight Cars with Wooden Center Sills. National Car Coupler Company.

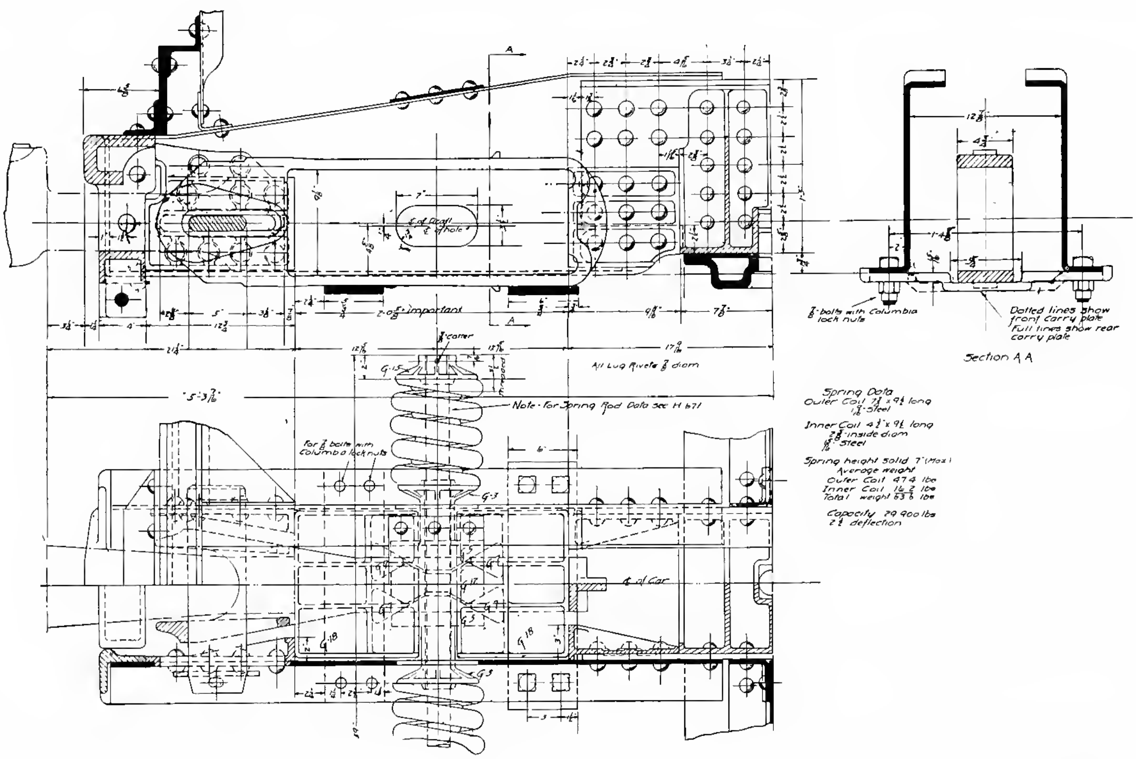


Fig. 730—Cardwell Friction Draft Gear, Type G, Class 18, for New York Central & Hudson River Hopper Cars. Union Draft Gear Company.

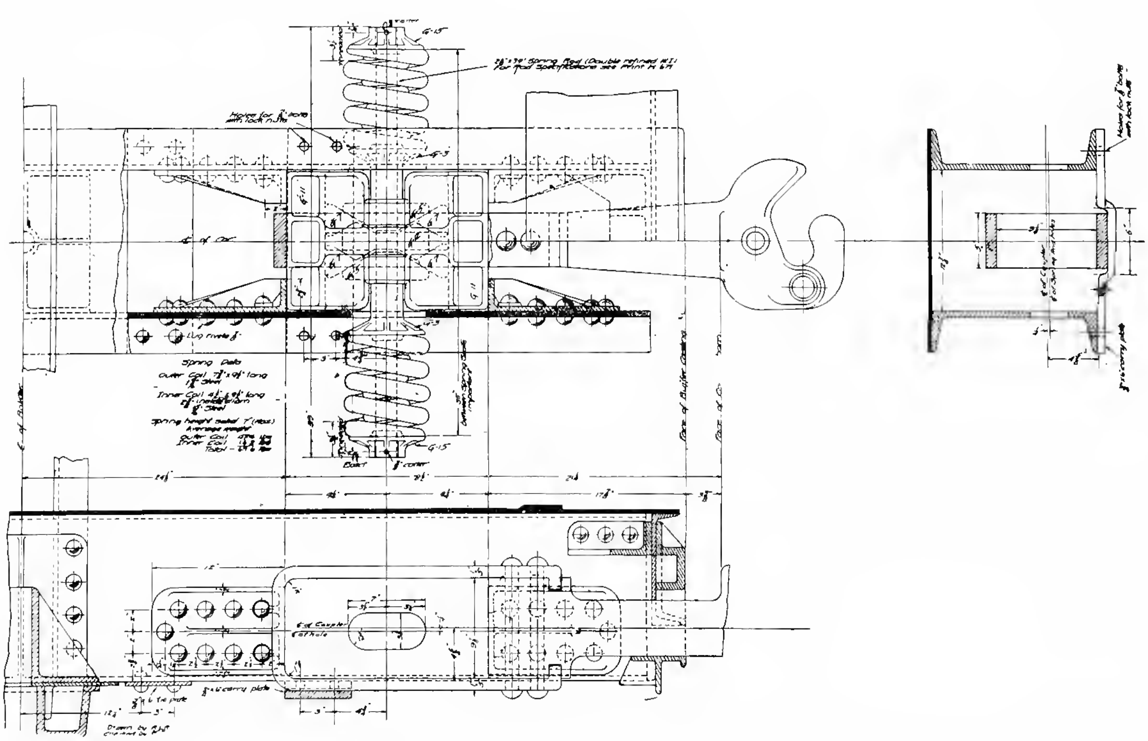


Fig. 731—Cardwell Friction Draft Gear, Type G, Class 11, for Tank Cars. Union Draft Gear Company.

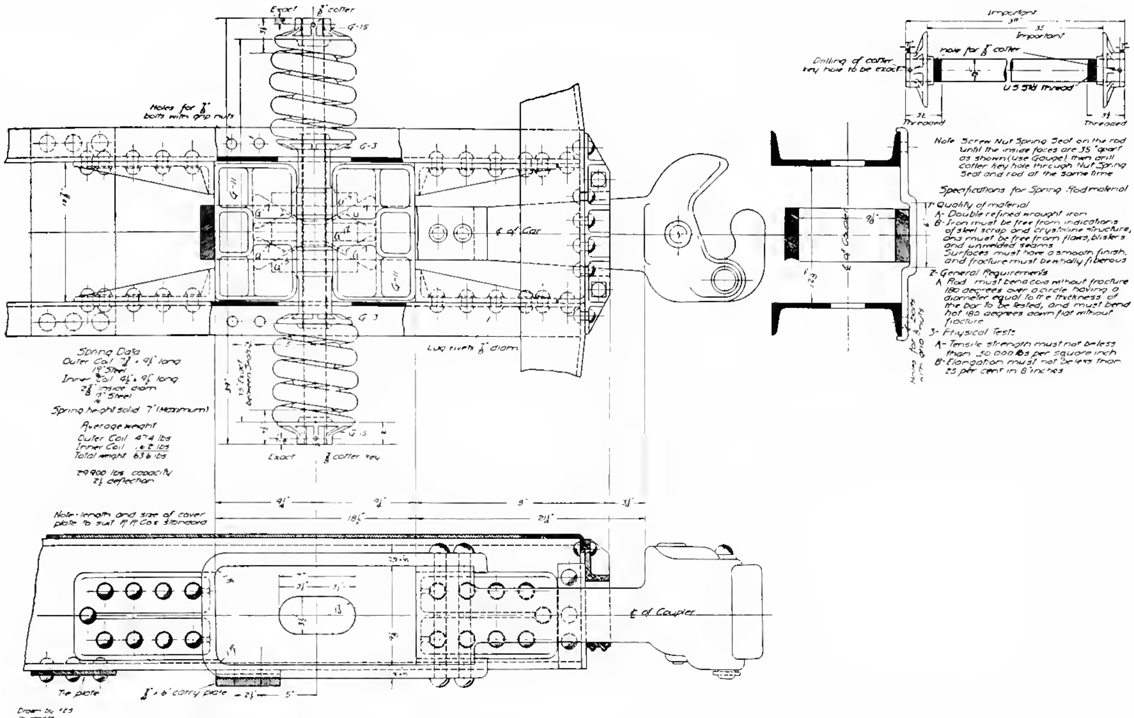


Fig. 732—General Design of Application of Cardwell Friction Draft Gear, Type G, Class 11. Union Draft Gear Company.

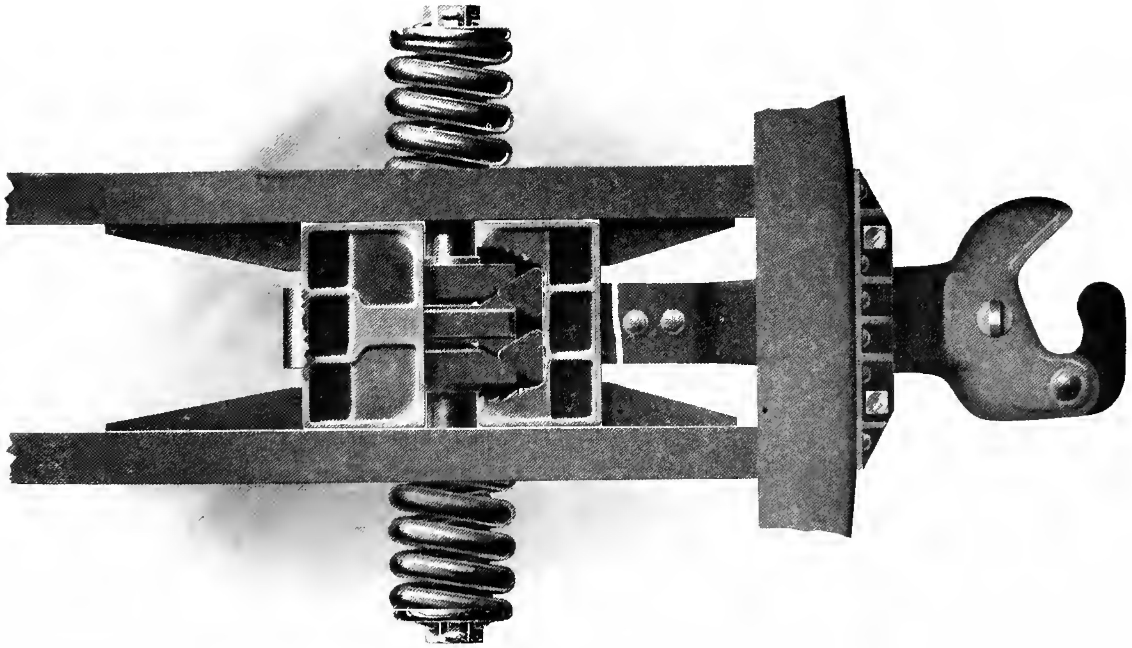


Fig. 733—General Design of Application of Cardwell Friction Draft Gear, Type G, Class 11. Union Draft Gear Company.

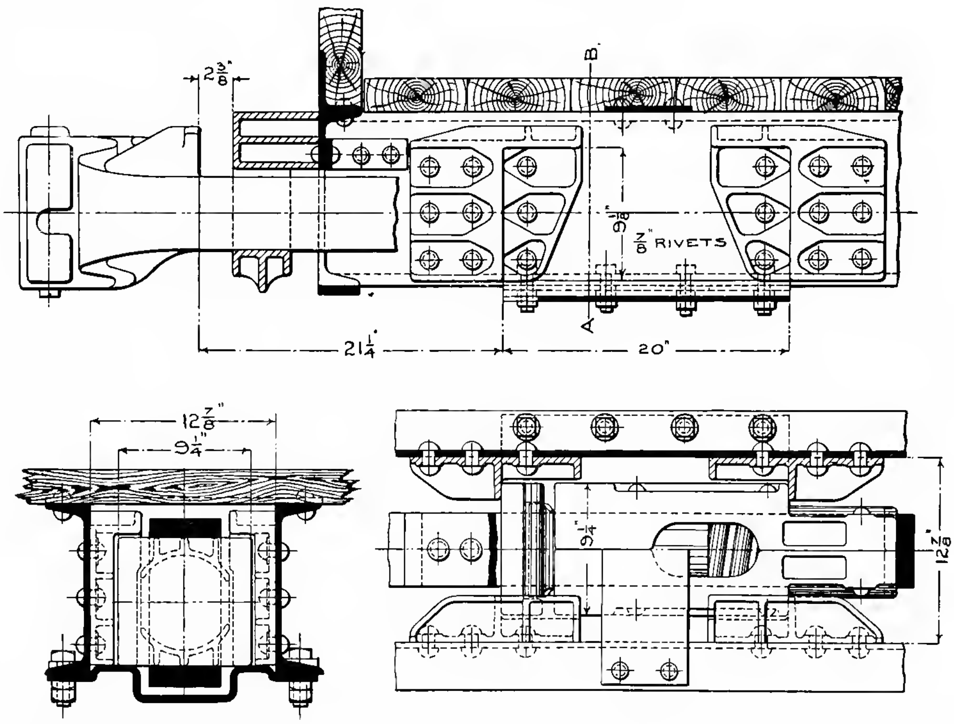


Fig. 734—McCord Draft Gear, Type D, for Steel Underframe Freight Cars. McCord & Company.

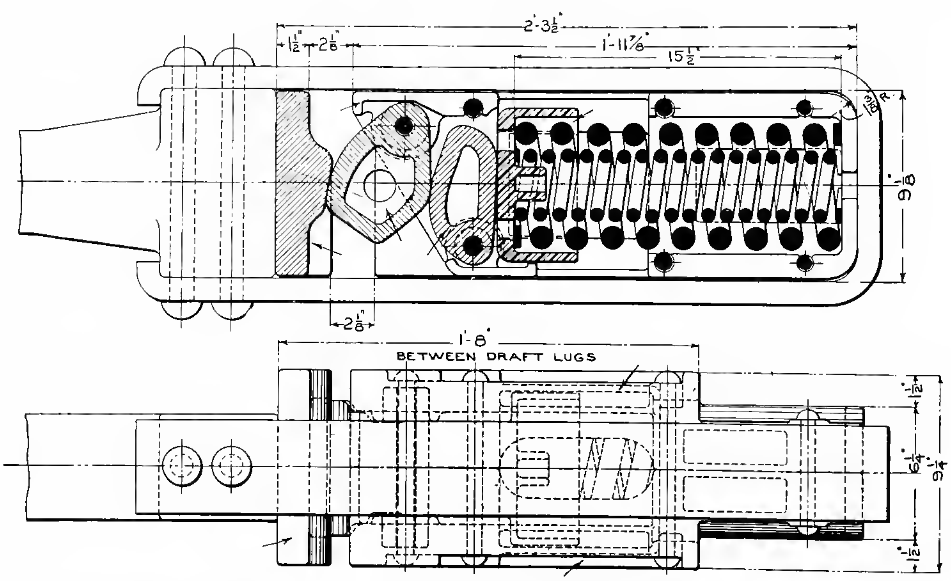


Fig. 735—General Arrangement of McCord Draft Gear, Type D. McCord & Company.

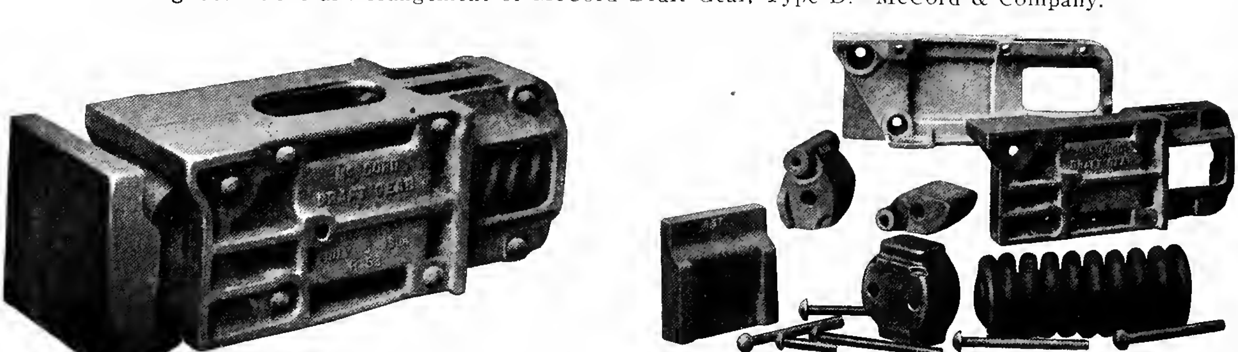


Fig. 736—McCord Draft Gear, Type D. McCord & Company.

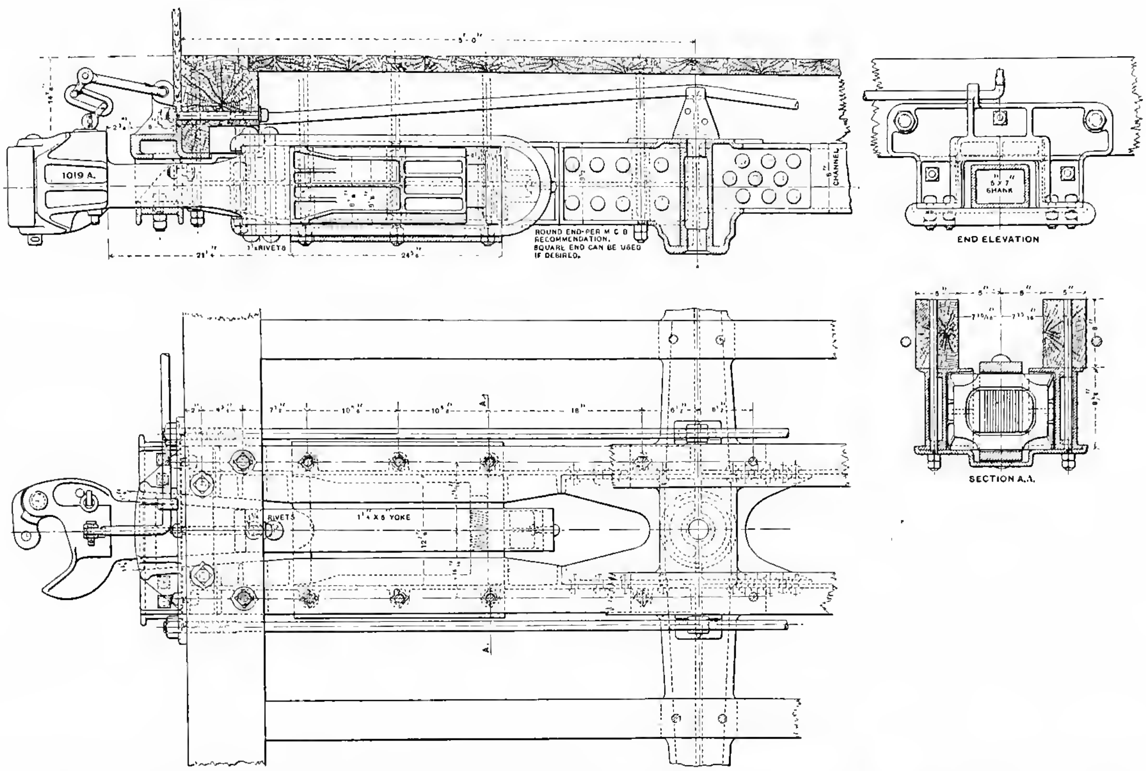


Fig. 737—Gould Friction Draft Gear Applied to Freight Car with Cast Steel Body Bolster. Gould Coupler Company.

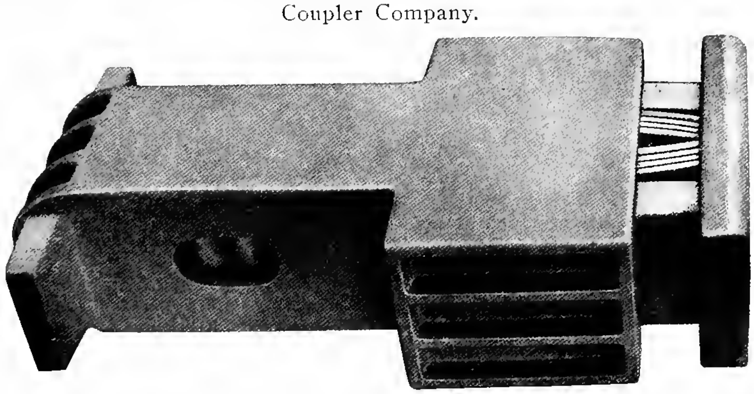


Fig. 738—Gould Friction Draft Gear for Passenger Train Cars. Gould Coupler Company.

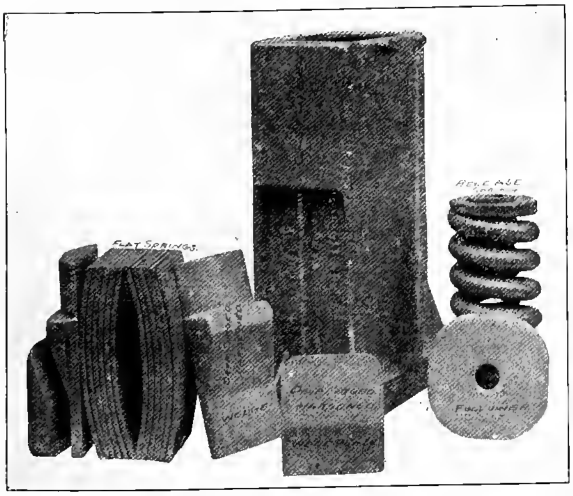


Fig. 739—Parts of Gould Friction Draft Gear for Freight Cars.

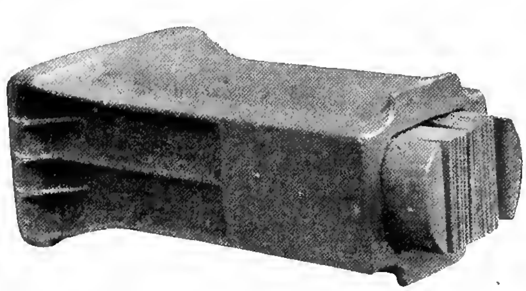


Fig. 740—Gould Friction Draft Gear for Freight Cars.

Gould Coupler Company.

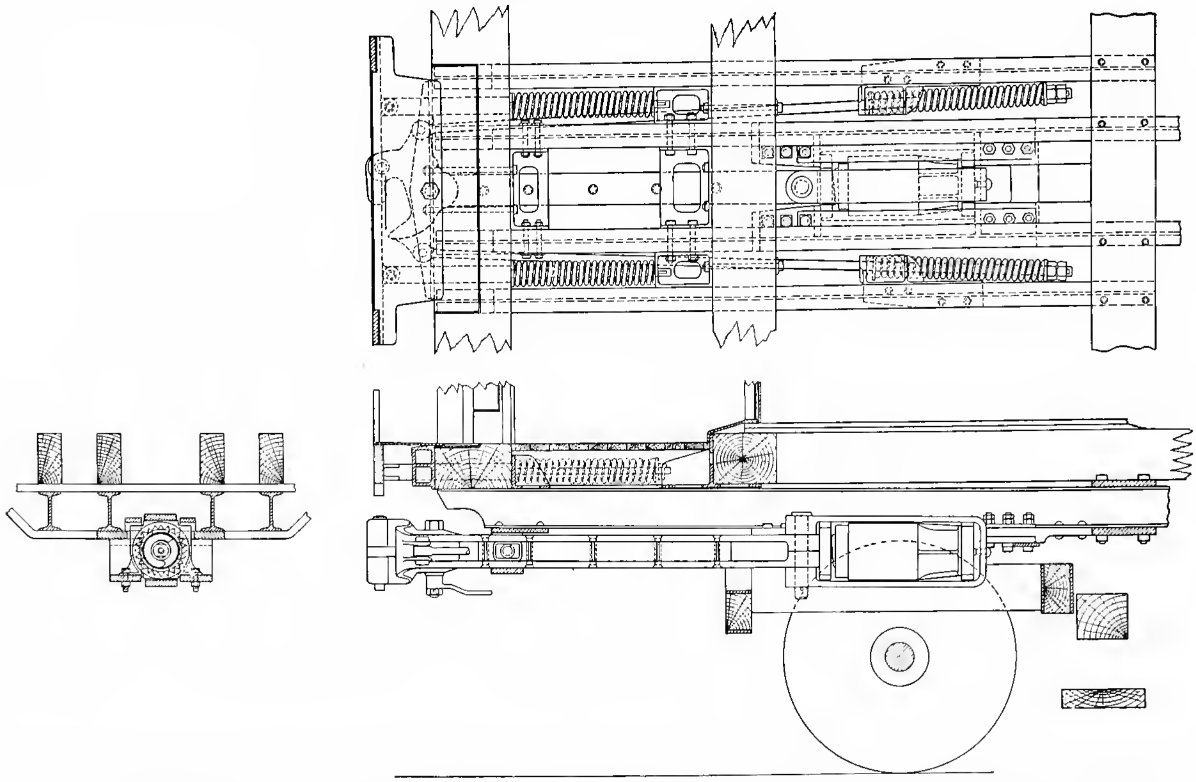


Fig. 741—Westinghouse Friction Draft Gear for Passenger Train Cars with Standard Steel Platforms and Three Stem Couplers. Westinghouse Air Brake Company.

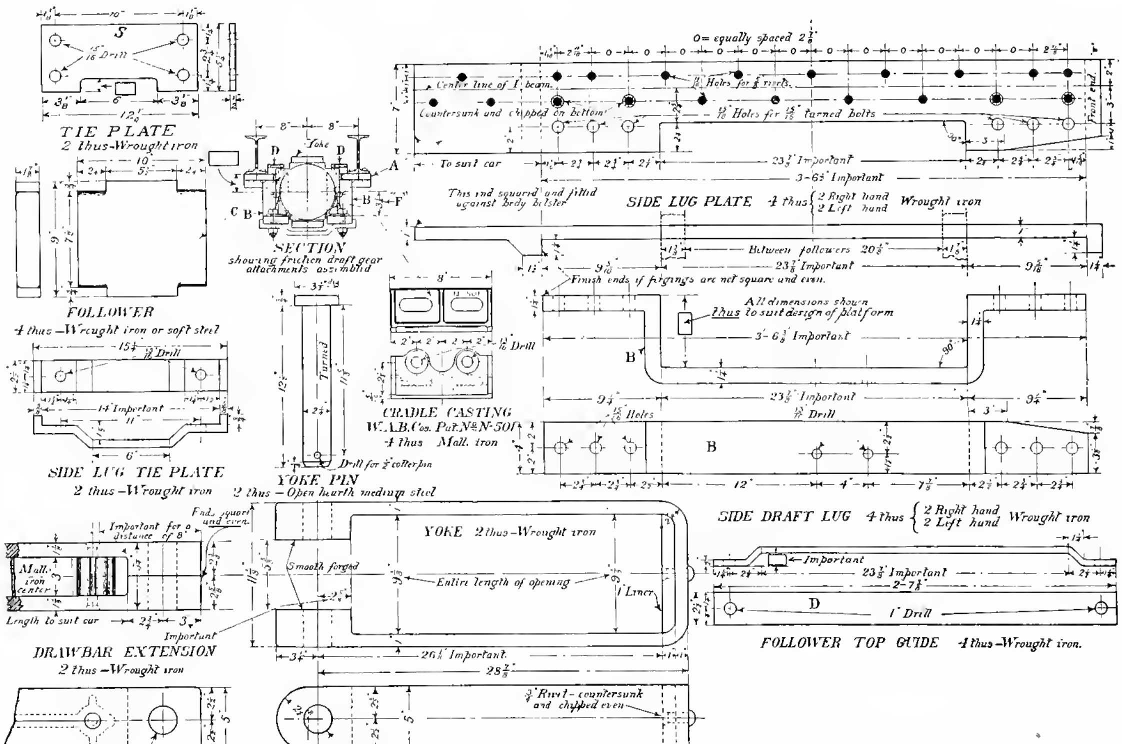


Fig. 742—Parts Used in Application of Westinghouse Friction Draft Gear to Passenger Train Cars with Standard Steel Platforms and Three Stem Couplers. Westinghouse Air Brake Company.

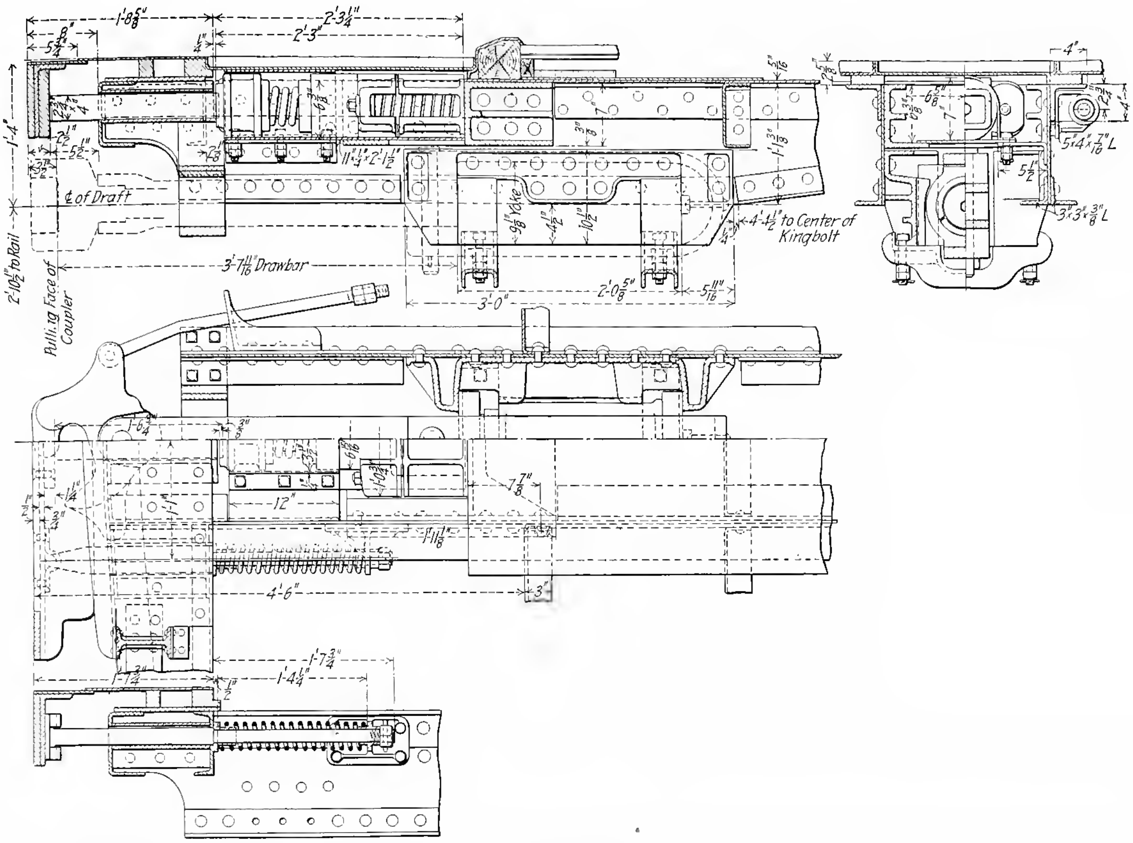


Fig. 743—Miner Friction Draft Gear and Friction Buffer for Lehigh Valley Passenger Train Cars. W. H. Miner.

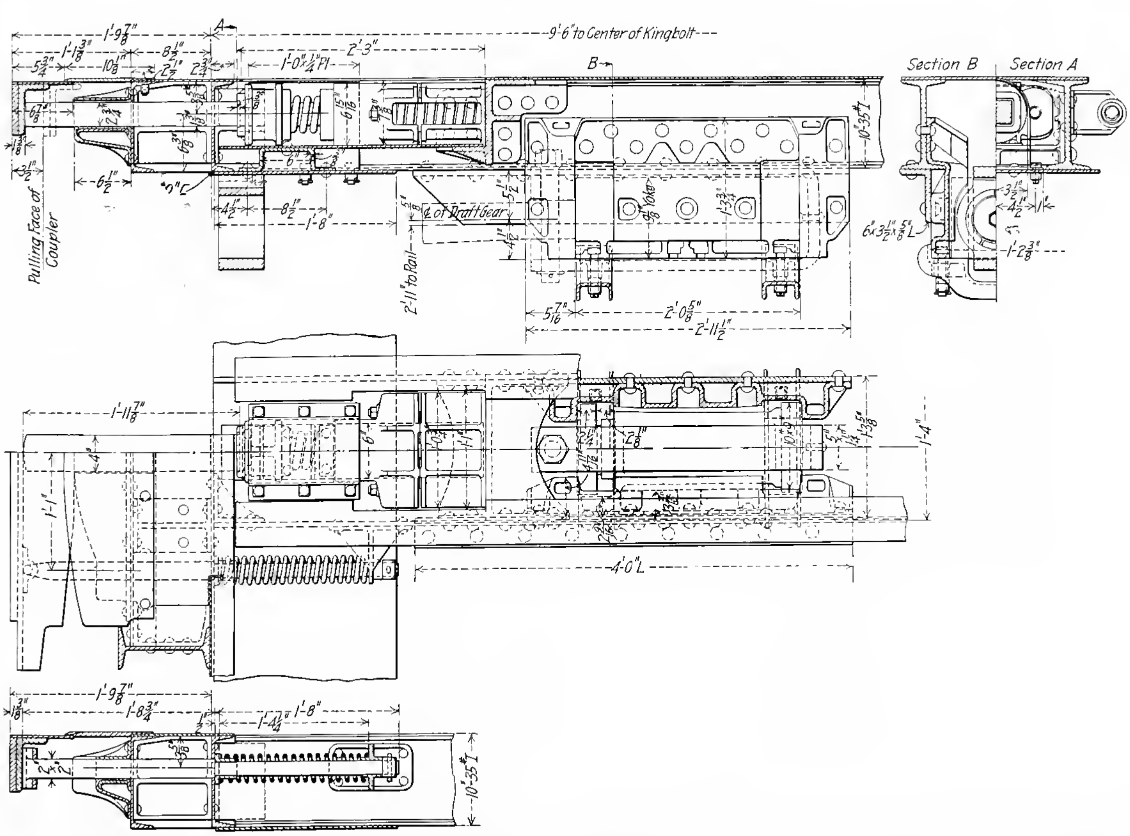


Fig. 744—Miner Friction Draft Gear and Friction Buffer for St. Louis & San Francisco Non-Vestibule Passenger Train Cars. W. H. Miner.

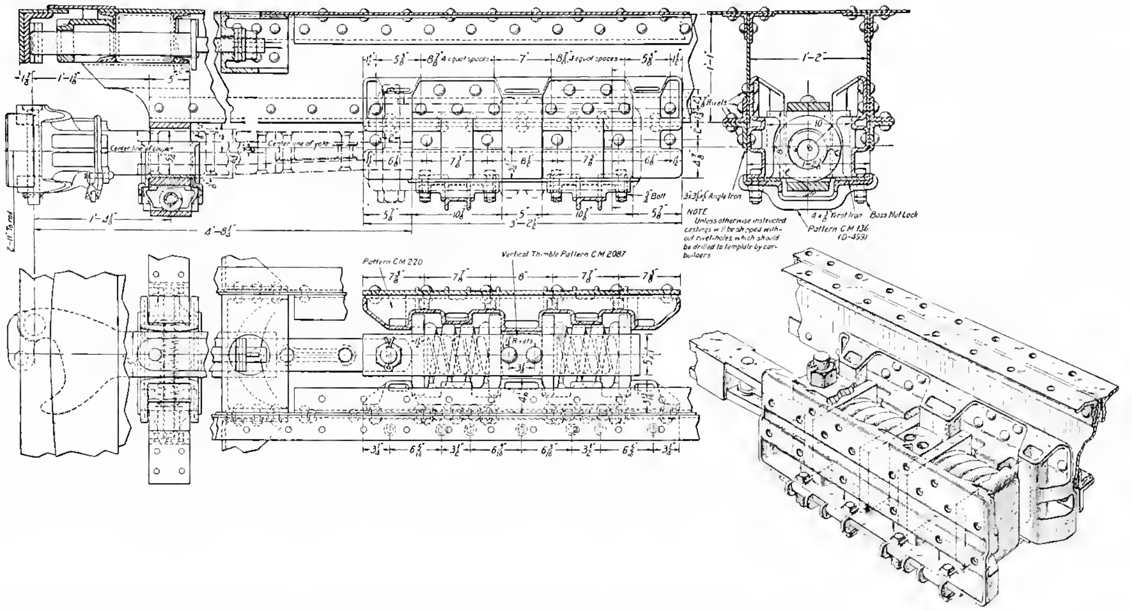


Fig. 745—Miner Tandem Draft Gear for Atchison, Topeka & Santa Fe Steel Underframe Passenger Train Cars. W. H. Miner.

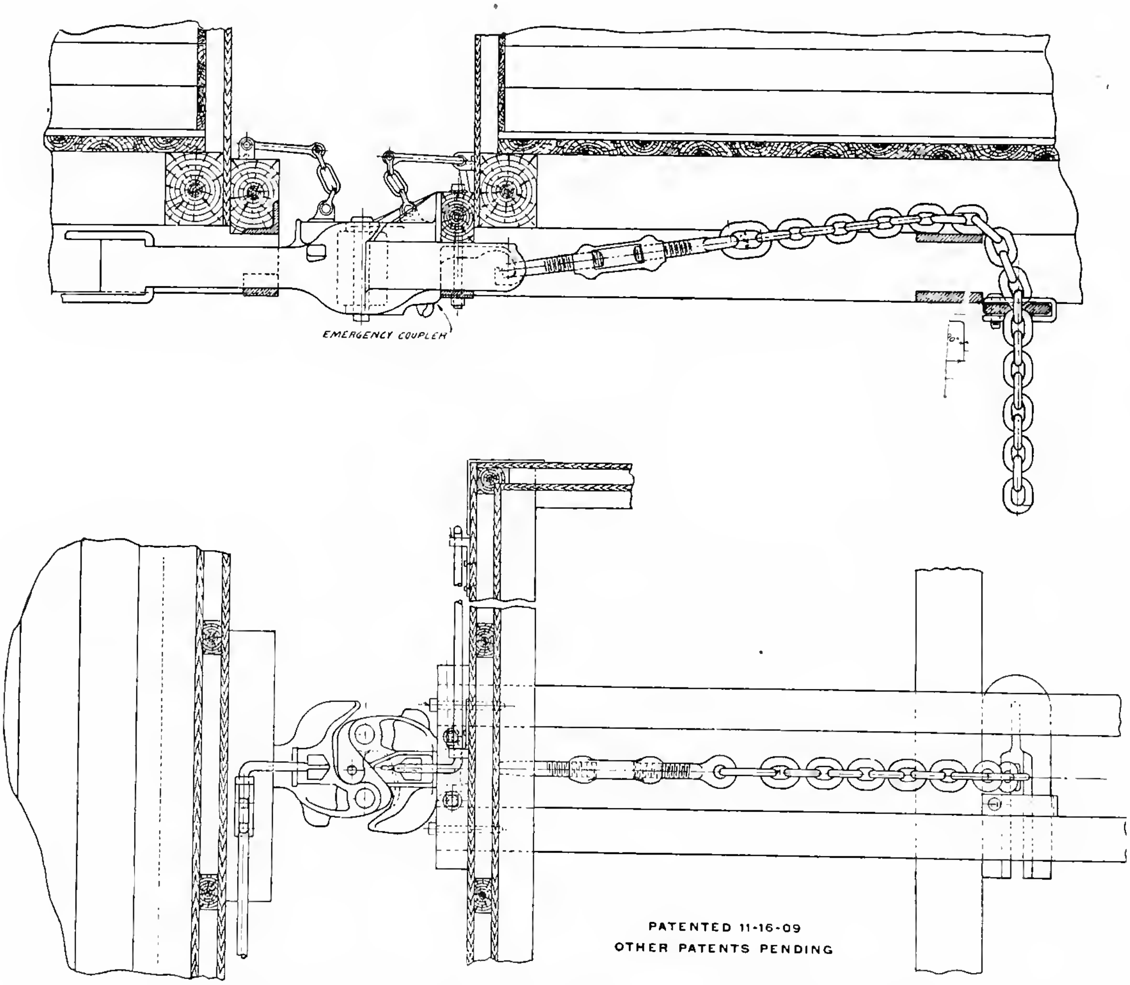
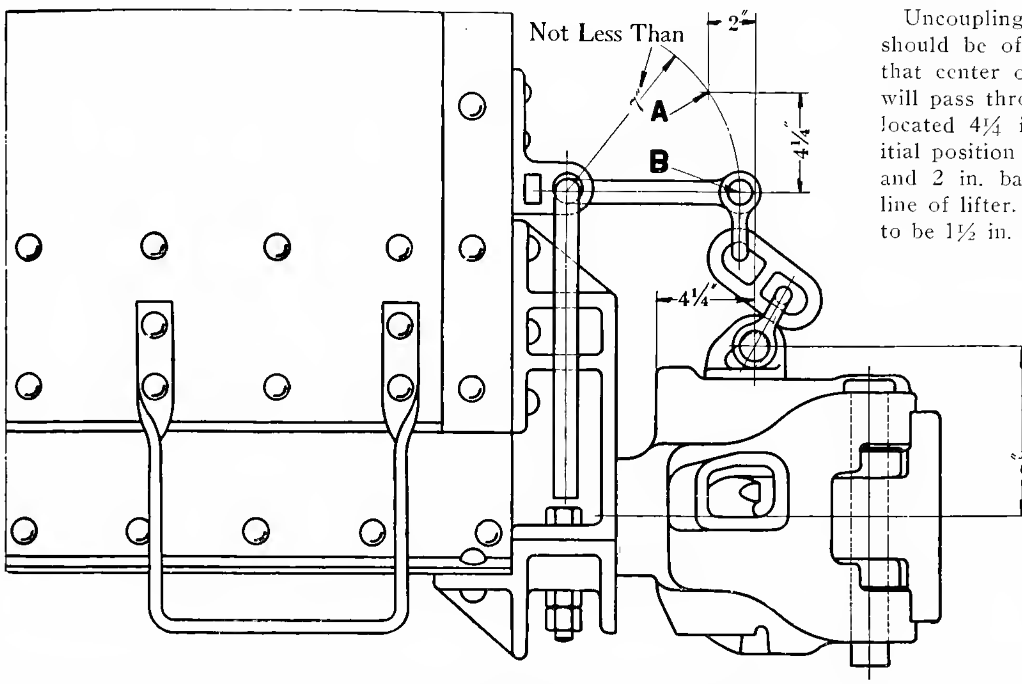


Fig. 746—Economy Emergency Coupling Device. Spencer Otis Company.



Uncoupling lever arm should be of such length that center of pin-hole **B** will pass through point **A** located 4¼ in. above initial position of lever arm and 2 in. back of center line of lifter. Chain slack to be 1½ in. to 2 in.

Fig. 747—Recommended Method for Application of Uncoupling Lever to Simplex Top Lift Freight Coupler. American Steel Foundries.

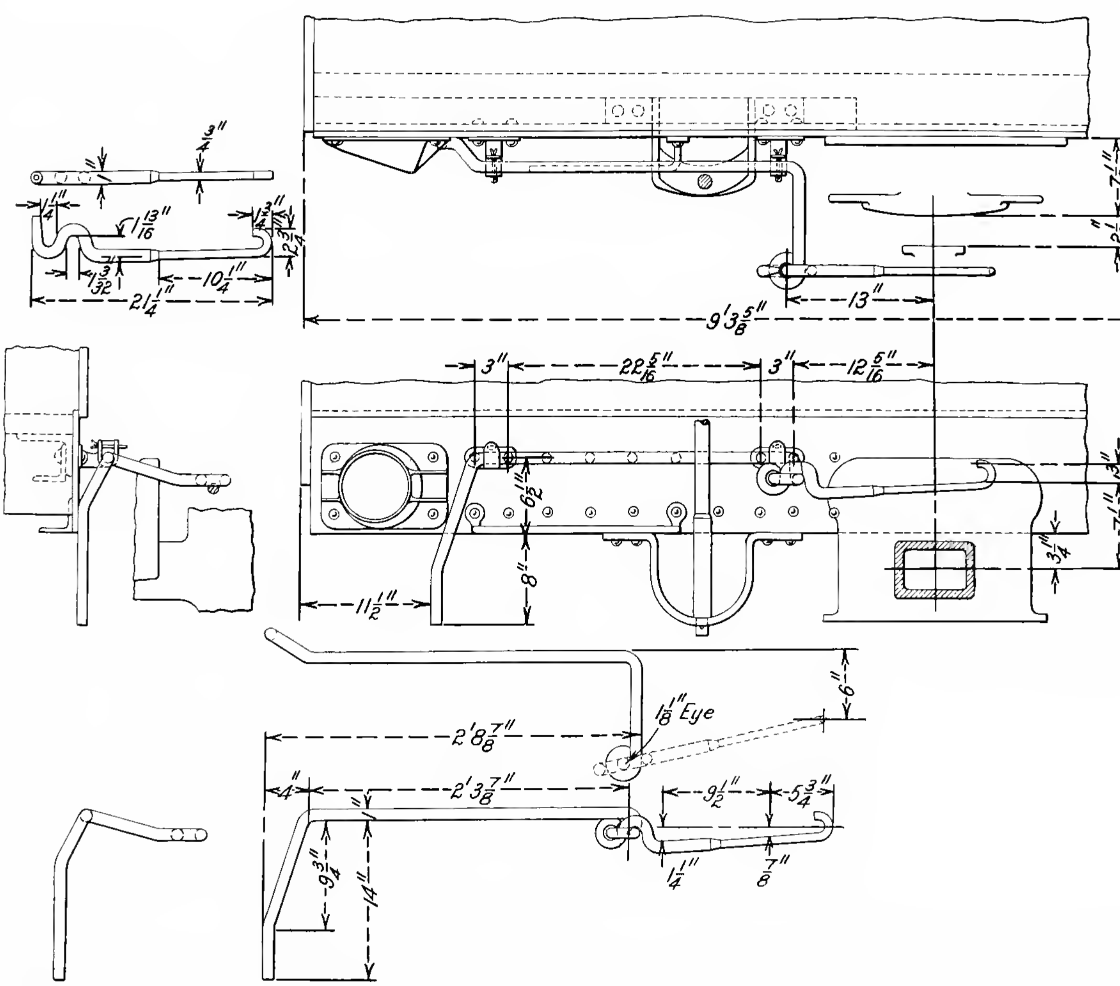


Fig. 748—Imperial Uncoupling Apparatus and Details, for New York Central & Hudson River Box Car Shown in Figs. 274 and 276.

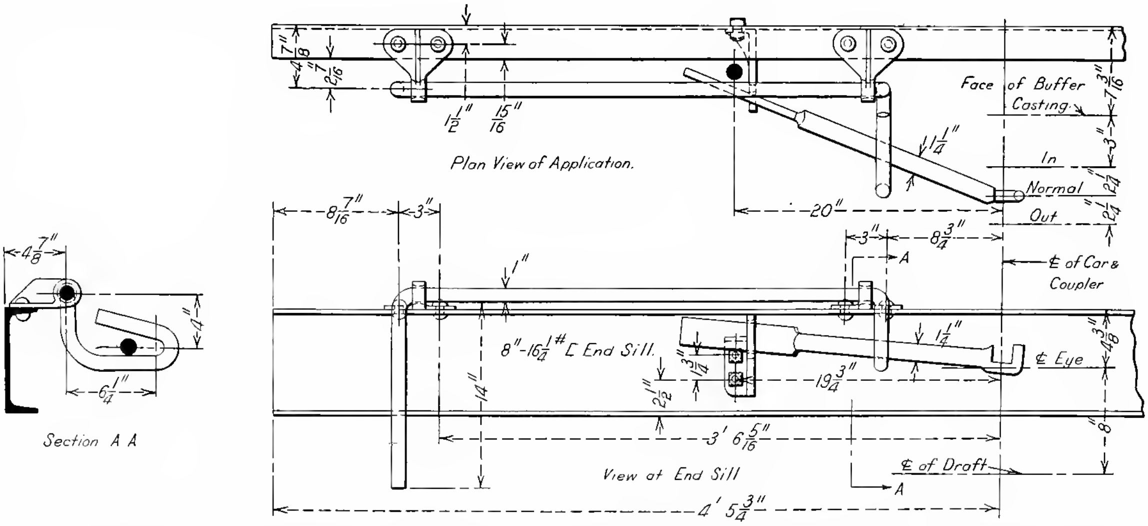


Fig. 749—Application of Duplex Uncoupling Apparatus to Box Car. National Railway Devices Company.

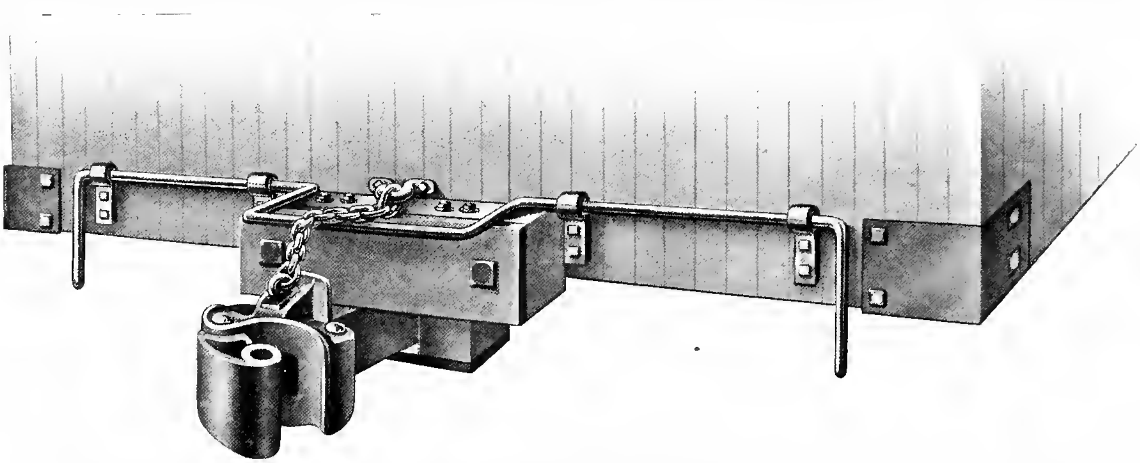


Fig. 750—Application of Acme Universal Uncoupling Apparatus to Box Car. Acme Railway Equipment Company.

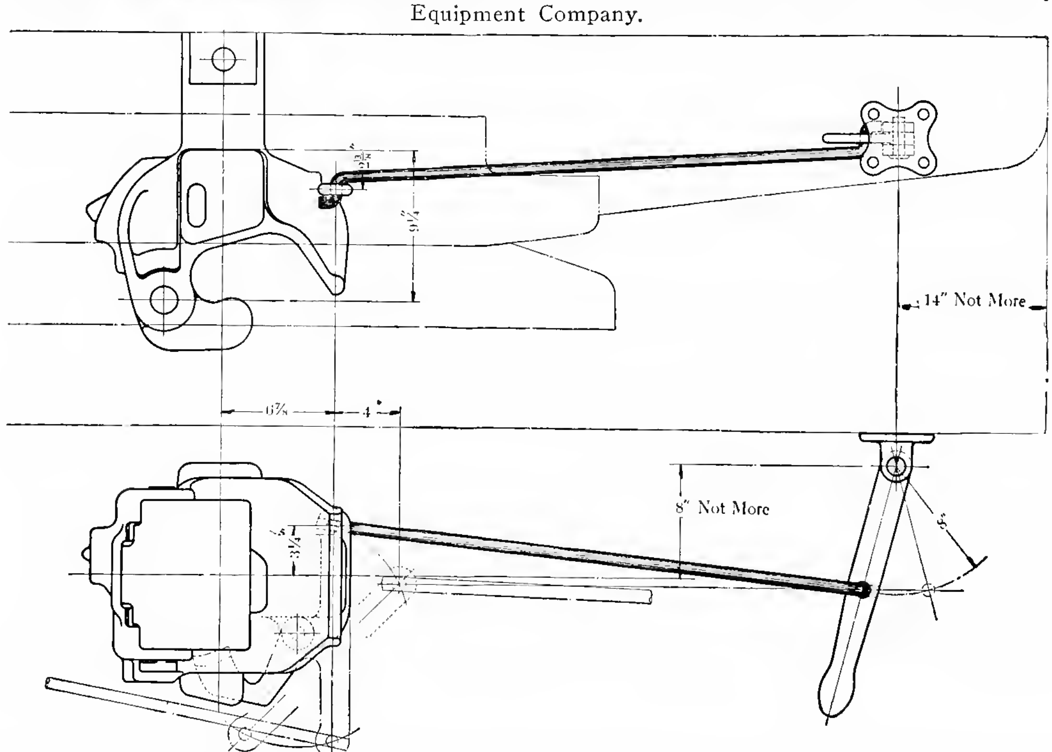


Fig. 751—Recommended Uncoupling Arrangement for Simplex Passenger Coupler. American Steel Foundries.

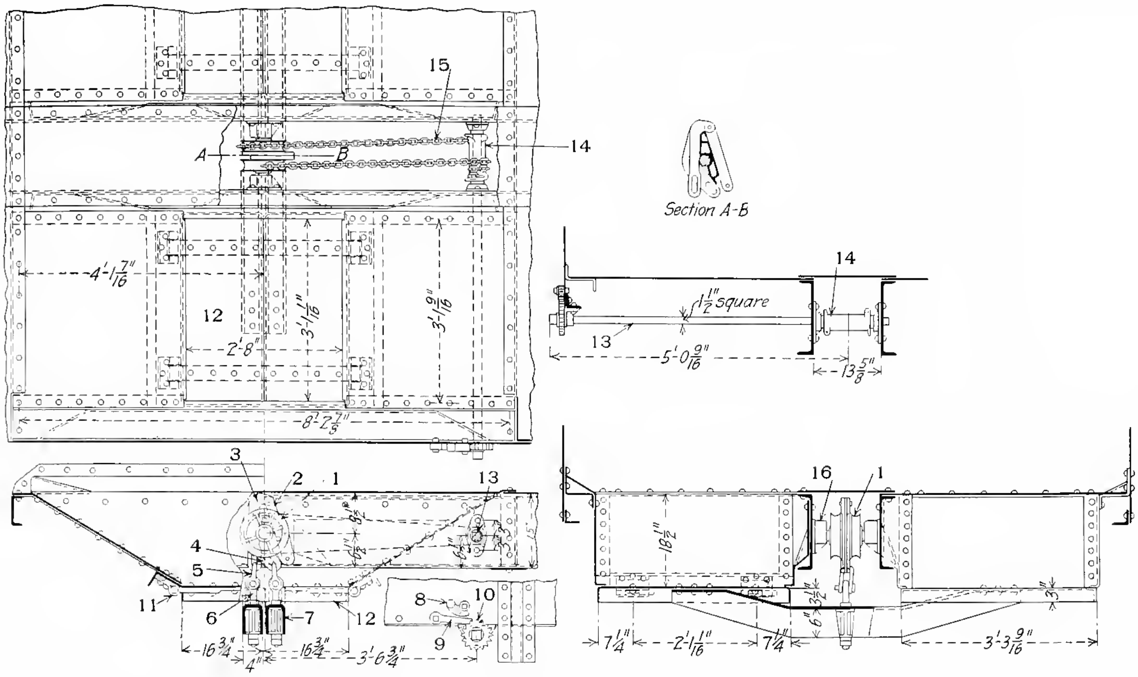
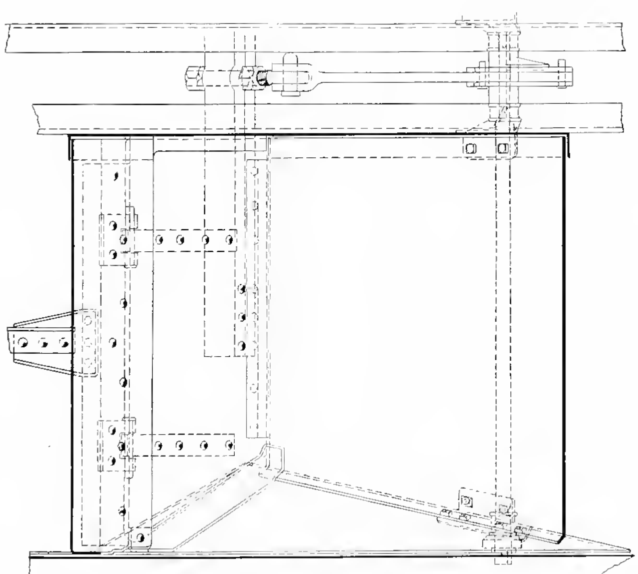
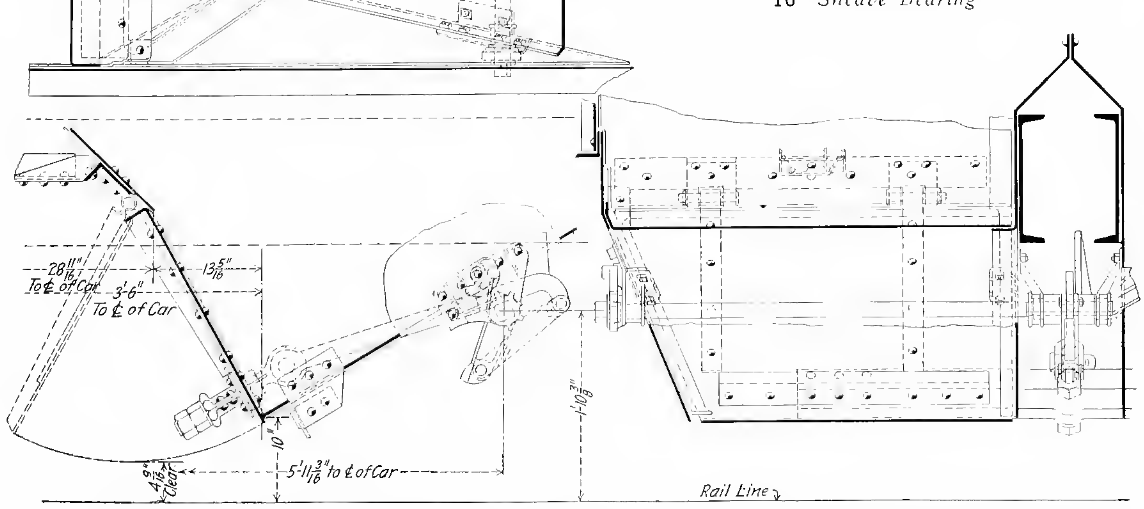


Fig. 752—Simonton Door Operating Apparatus for Twin-Hopper Gondola Car. Standard Steel Car Company.

Parts of Dumping Apparatus Shown in Fig. 752.

1 *Double Sheave with Arm*
2 *Link*
3 *Left Hanger*
4 *Right Hanger*
5 *Hanger Clevis*
6 *I-Bolt*
7 *Door Stiffener*
8 *Latch Dog*
9 *Latch*
10 *Latch Wheel and Bushing*
11 *Hinge and Hinge Butt*
12 *Door*
13 *Square Winding Shaft*
14 *Winding Shaft Drum*
15 *Chain for Operating Gear*
16 *Sheave Bearing*

Fig. 753—Simonton Door Operating Apparatus for Self-Clearing Hopper Car. Standard Steel Car Company.

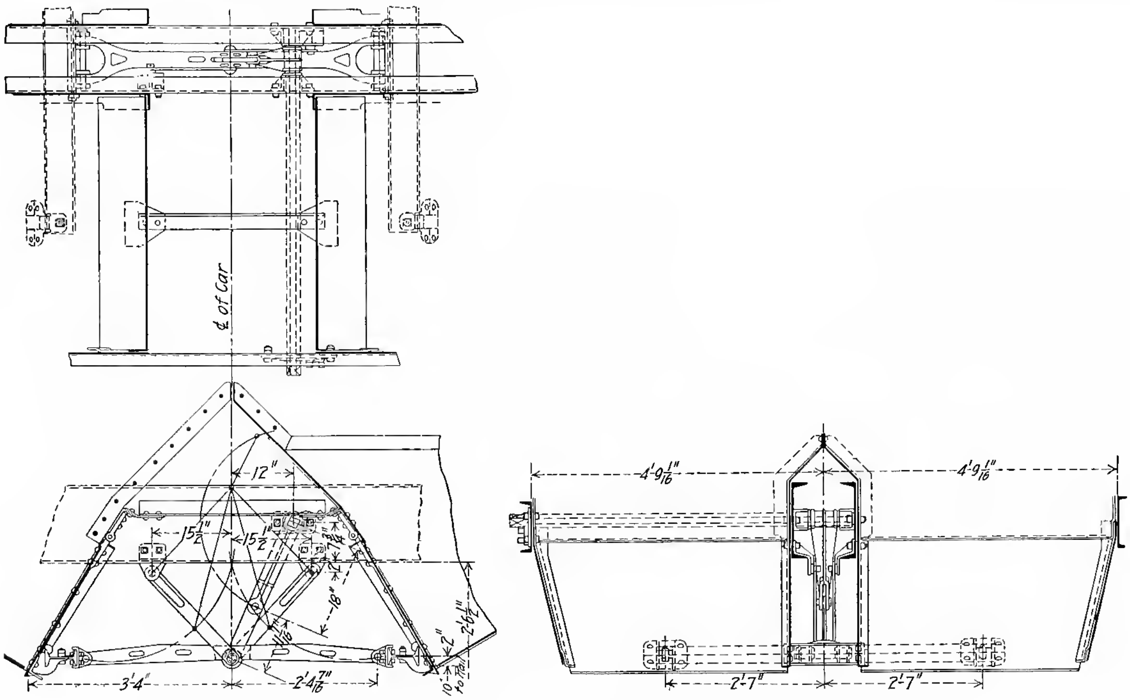


Fig. 754—Hopper Door Operating Apparatus. Standard Steel Car Company.

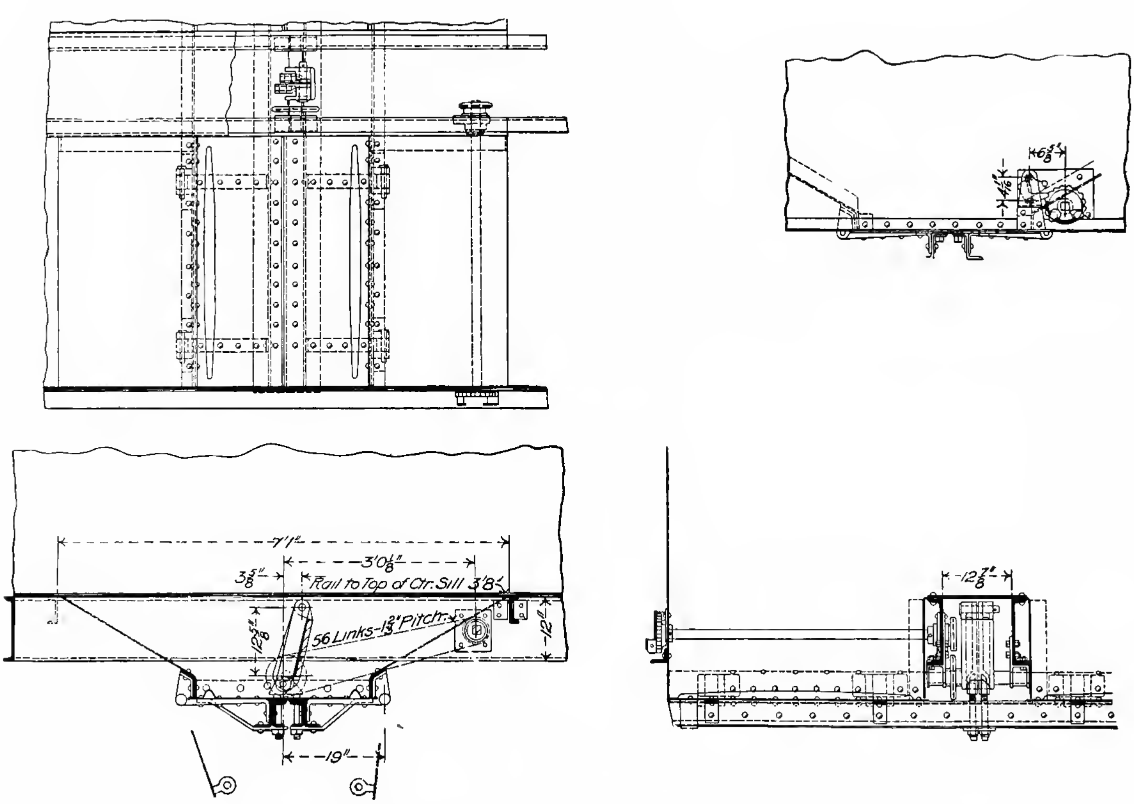


Fig. 755—Dunham Drop Door Apparatus for All-Steel Hopper Bottom Gondola Car. United States Metal & Manufacturing Company.

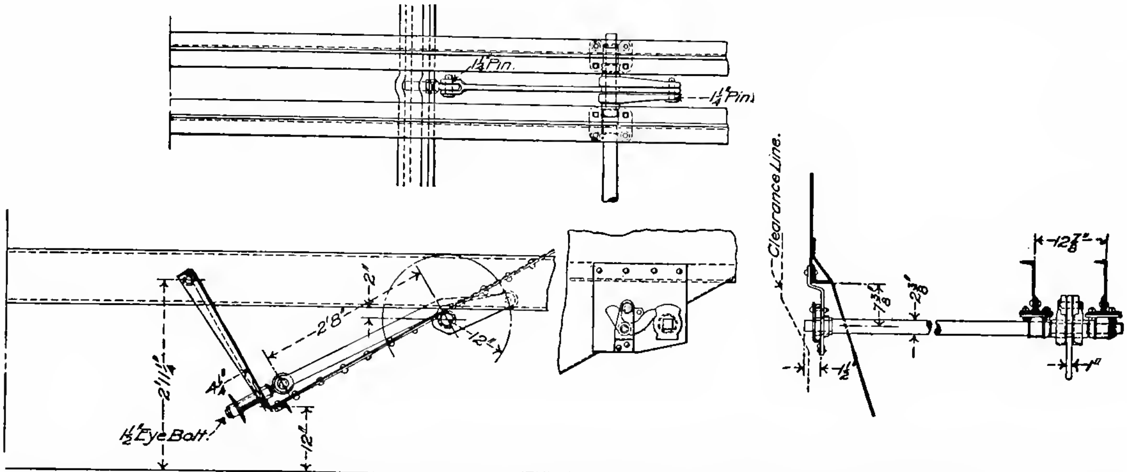


Fig. 756—Dunham Hopper Door Apparatus for Pennsylvania Railroad All-Steel Hopper Car. United States Metal & Manufacturing Company.

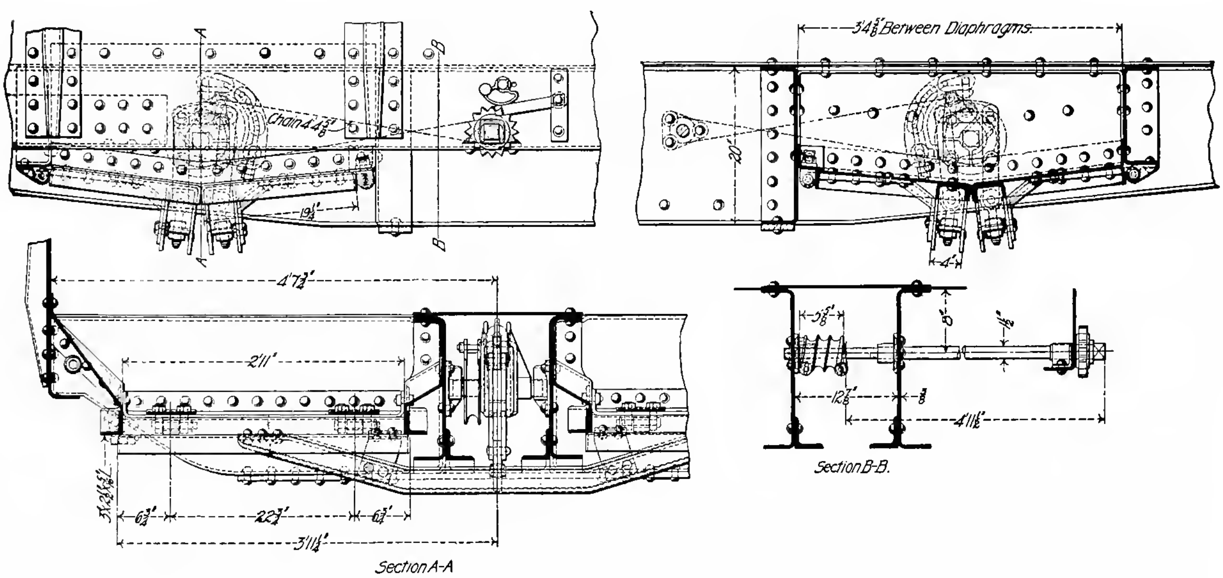


Fig. 757—Lind Drop Door Apparatus for All-Steel Hopper Bottom Gondola Car. Pressed Steel Car Company.

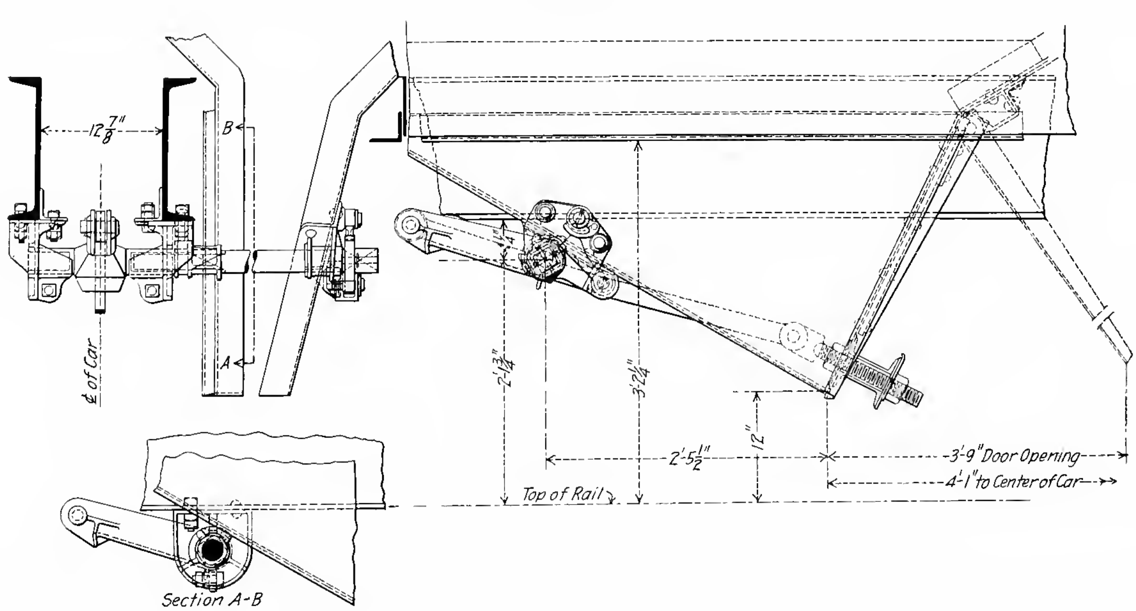


Fig. 758—Door Operating Apparatus with Lind Safety Clutch for All-Steel Hopper Car. Pressed Steel Car Company.

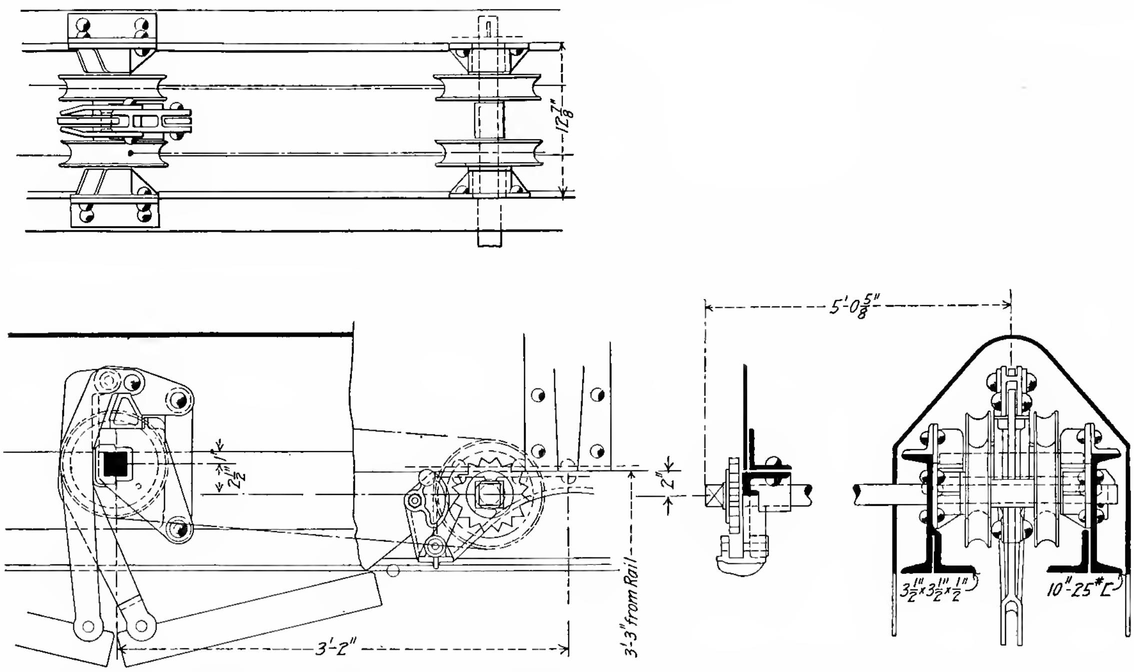


Fig. 759—Door Operating Apparatus for All-Steel Hopper Car with Transverse Doors. Enterprise Railway Equipment Company.

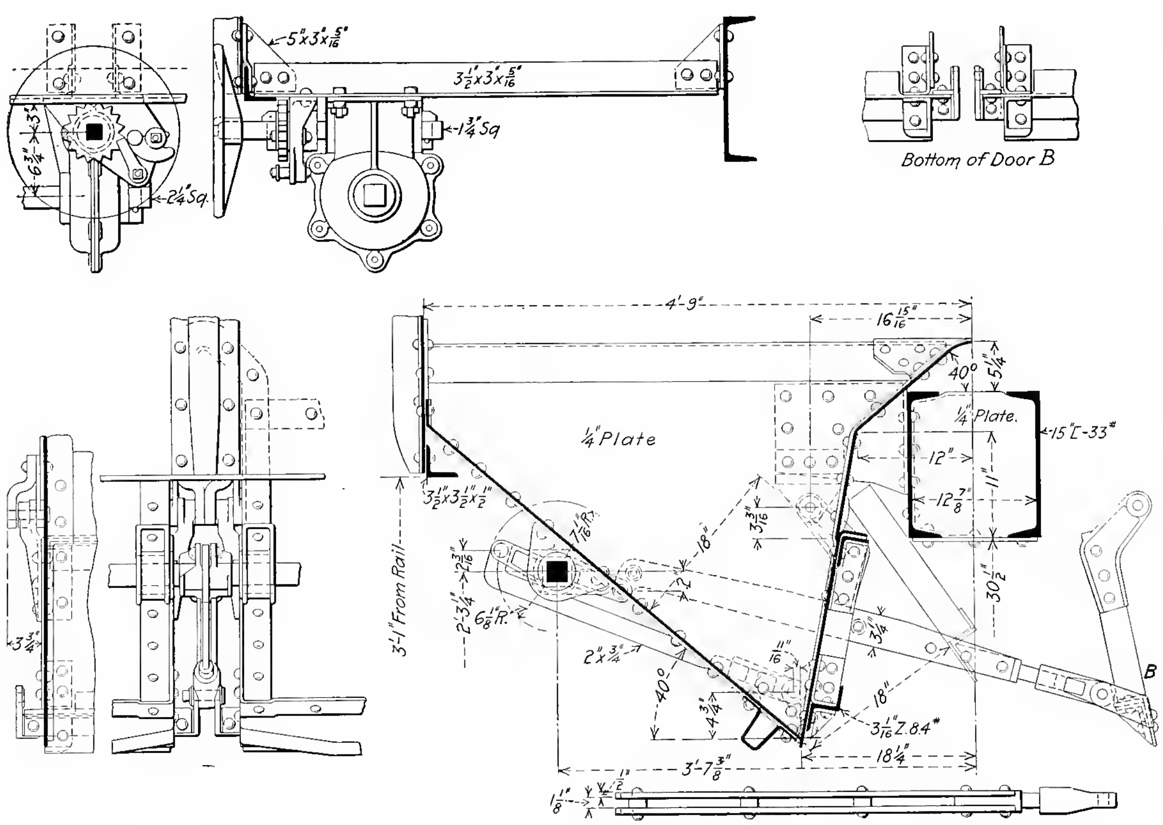


Fig. 760—Door Operating Apparatus for Center Dump Ballast Car. Enterprise Railway Equipment Company.

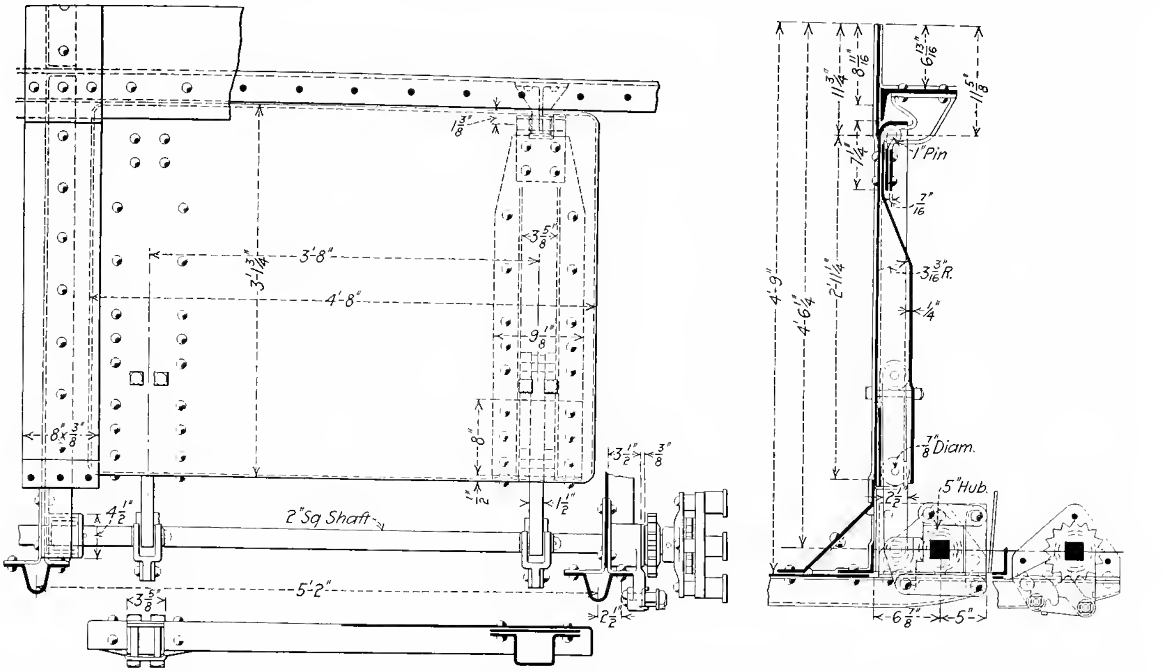


Fig. 761—Door Operating Apparatus for Side Dump Gondola Car. Enterprise Railway Equipment Company.

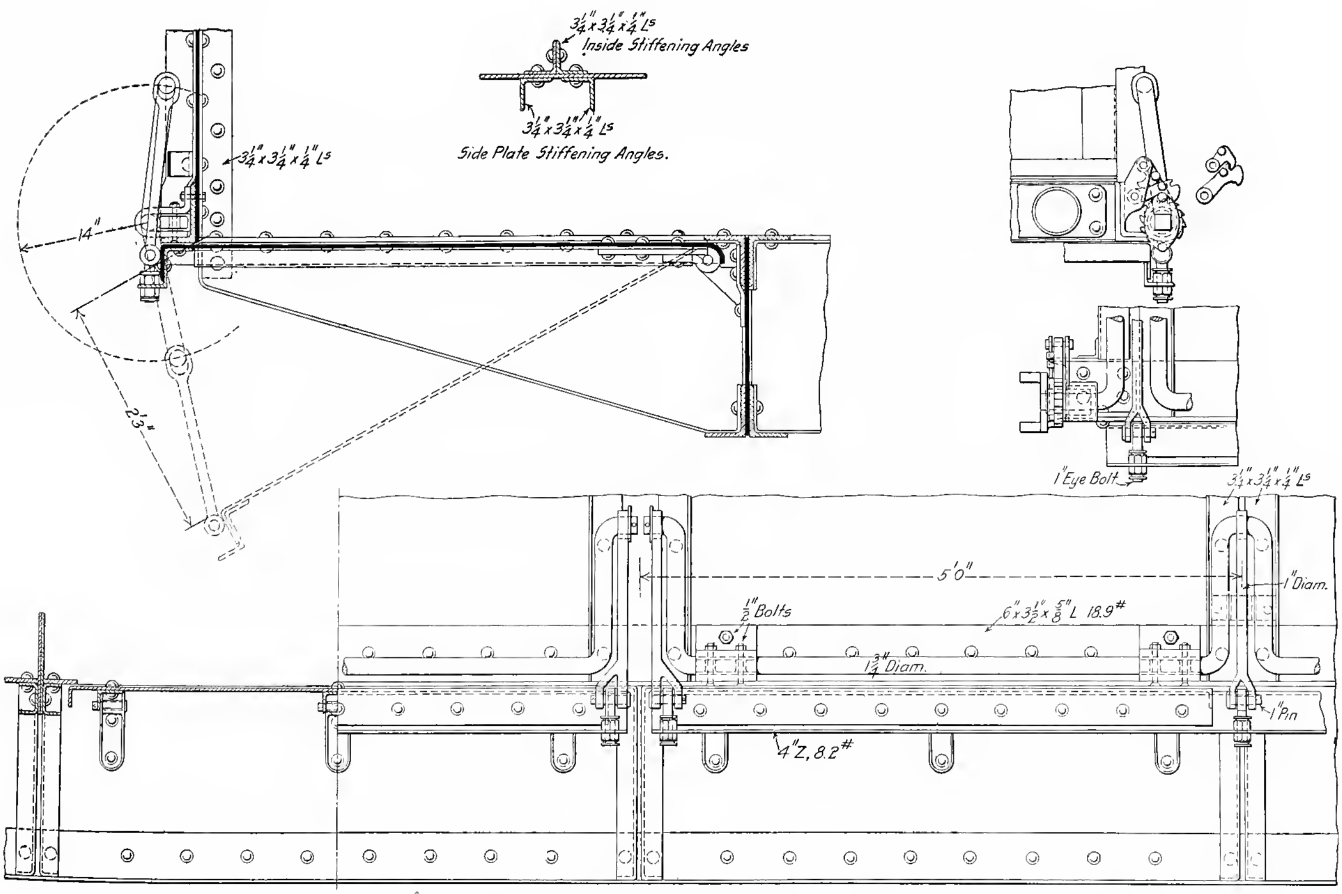


Fig. 762—Empire Drop Door Operating Apparatus for General Service Car. United States Metal & Manufacturing Company.

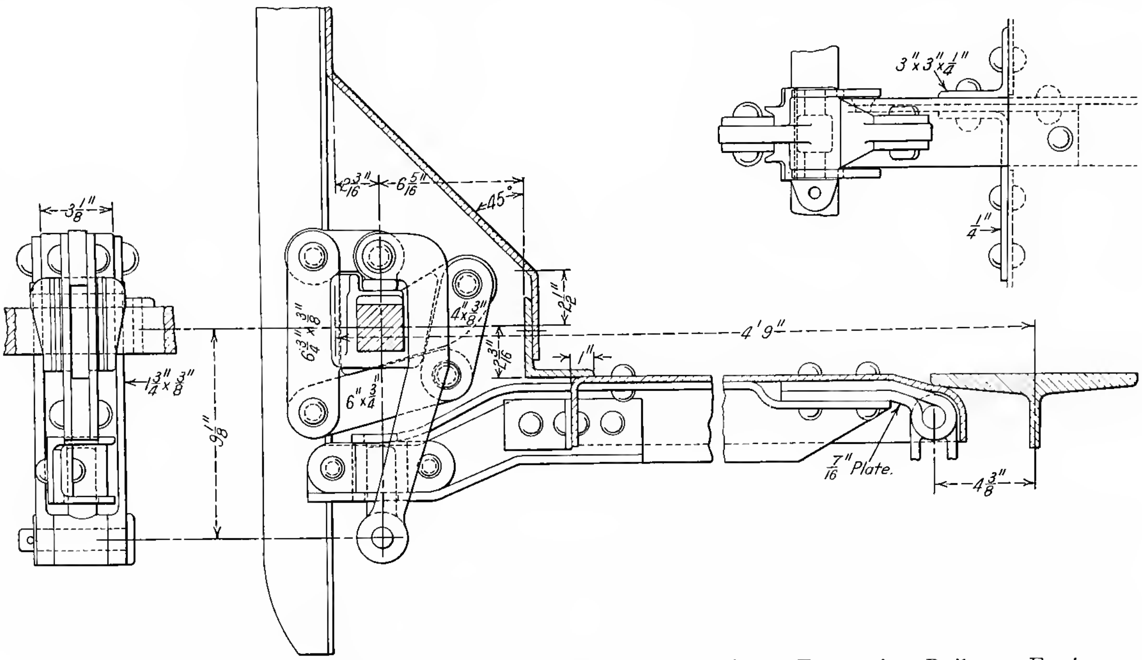


Fig. 763—Door Operating Apparatus for Side Dump Gondola Car. Enterprise Railway Equipment Company.

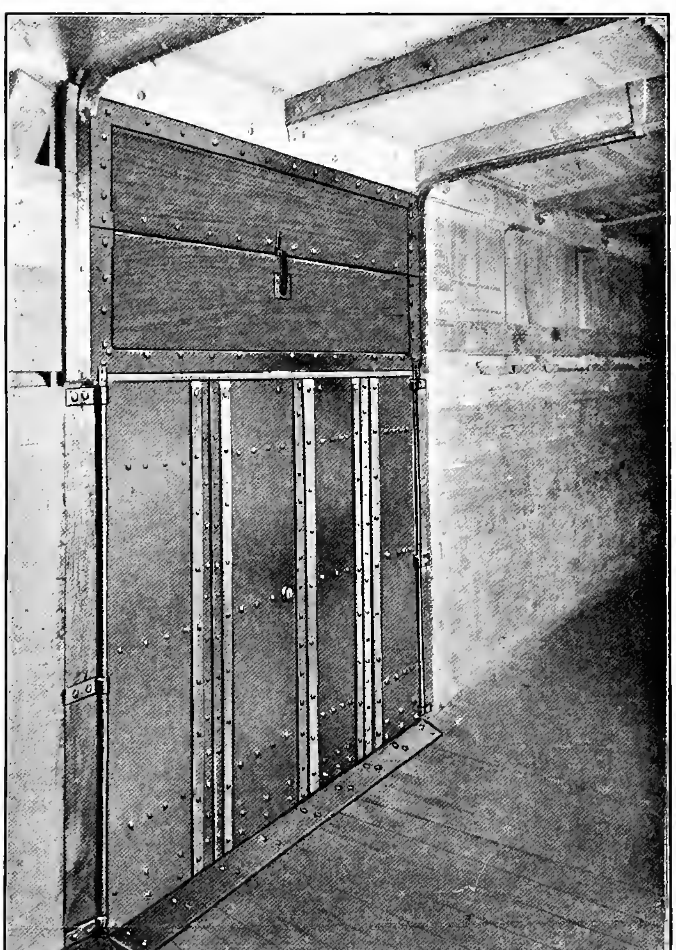


Fig. 764—Interior View.

Fig. 765—Exterior View.

Williams All-Service Car Door. Williams All-Service Car Door Company.

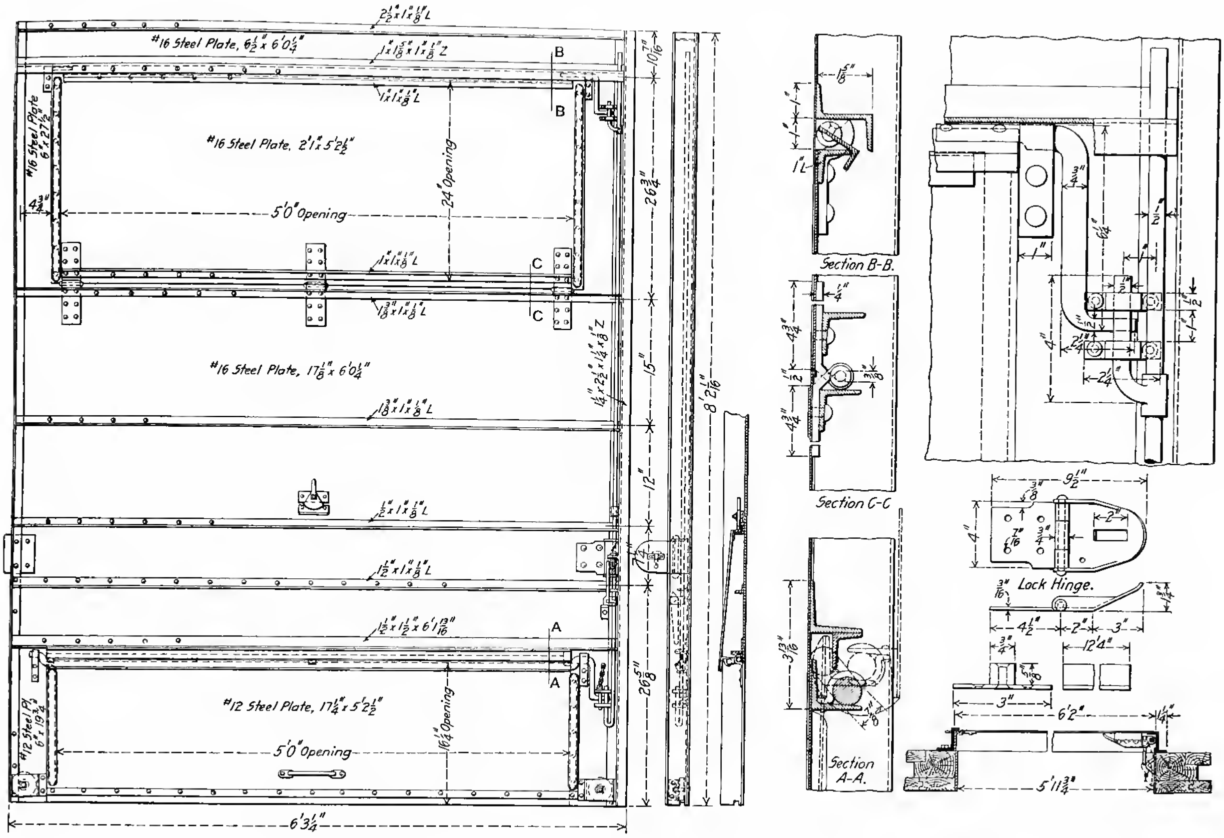


Fig. 766—Christy Steel Door for Box Cars. H. A. Christy & Company.

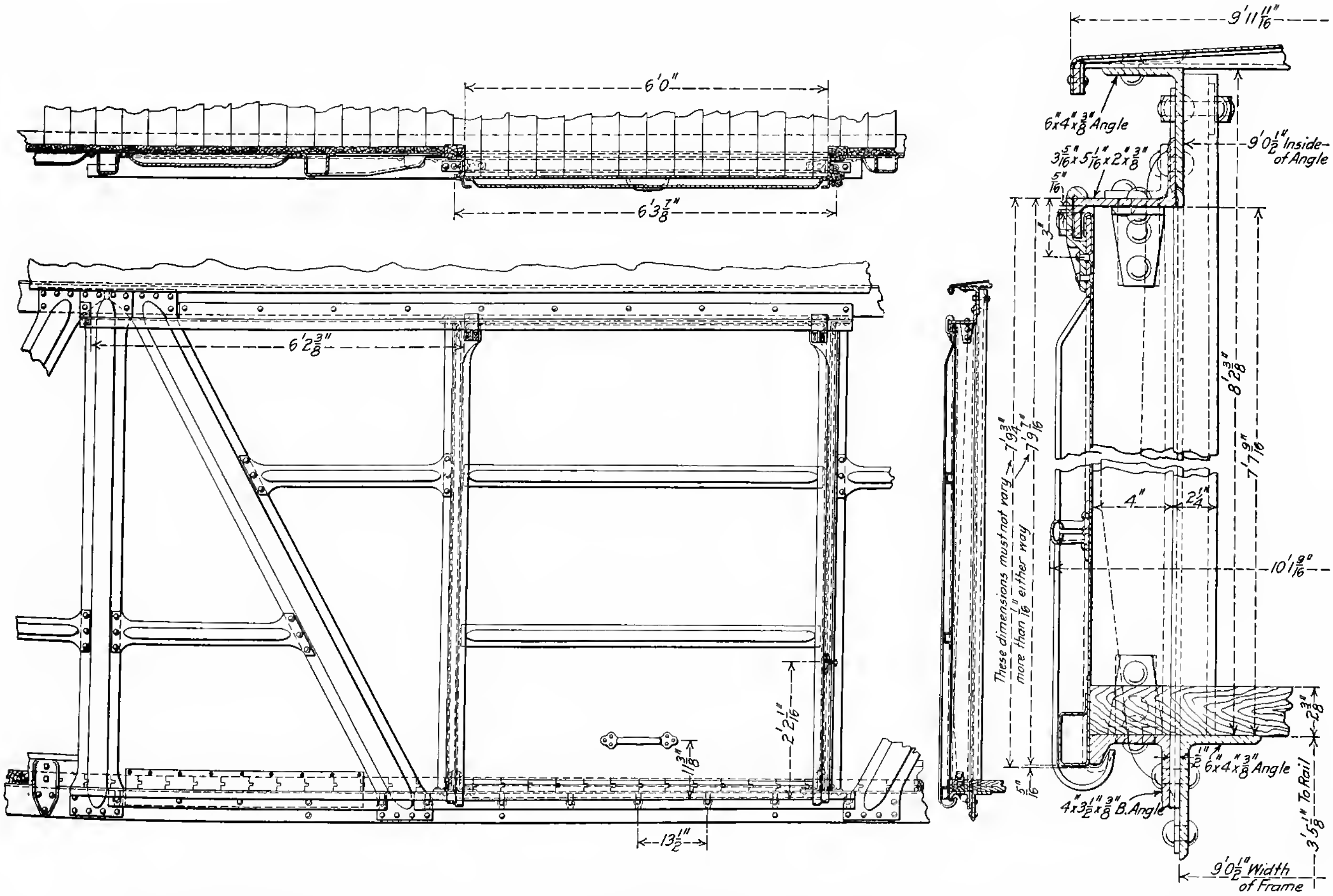


Fig. 767—All-Steel Door Used on the Pennsylvania Railroad Steel Frame Box Car Shown in Figs. 270 and 271.

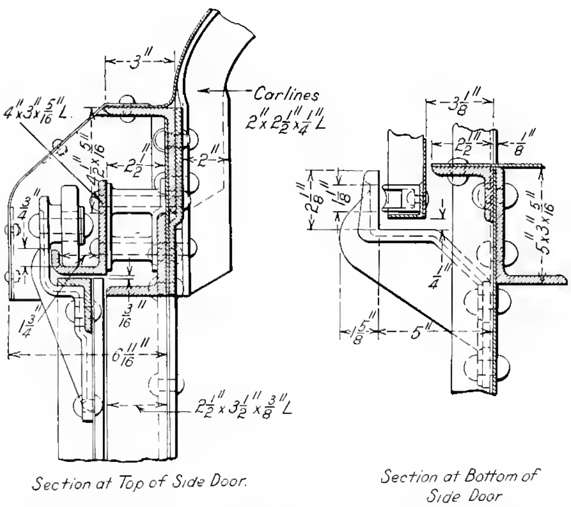


Fig. 768—Details of Side Door for Union Pacific All-Steel Box Car Shown in Figs. 1, 261 and 262.

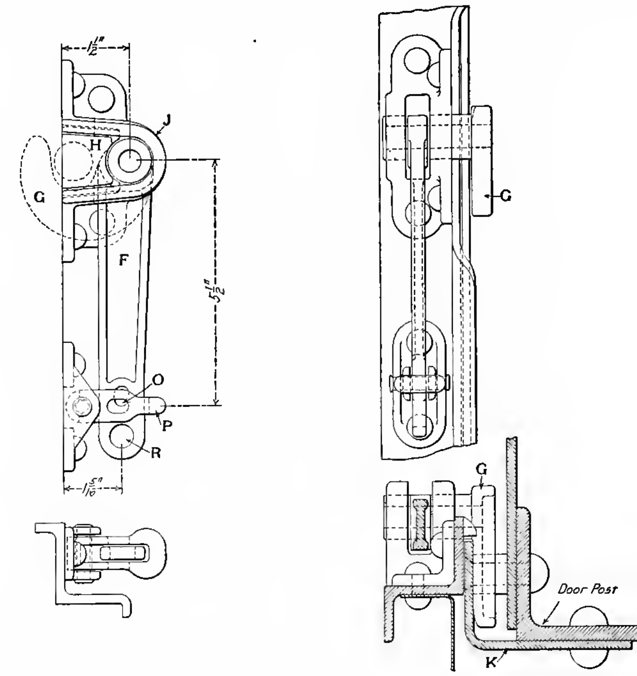


Fig. 769—Latch for Door of Summers All-Steel Box Car.

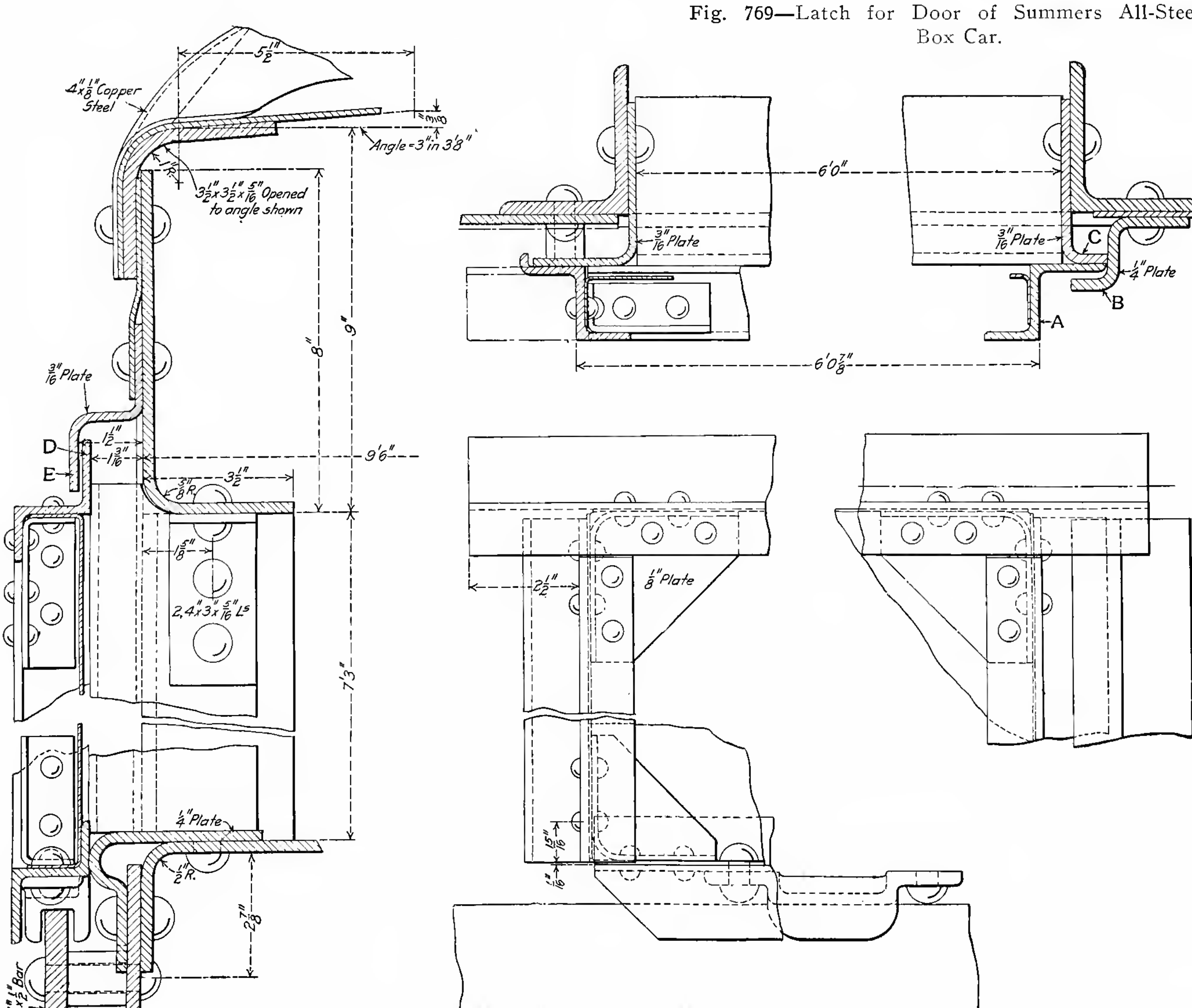


Fig. 770—Details of Door for All-Steel Box Car Shown in Figs. 263-266. Summers Steel Car Company

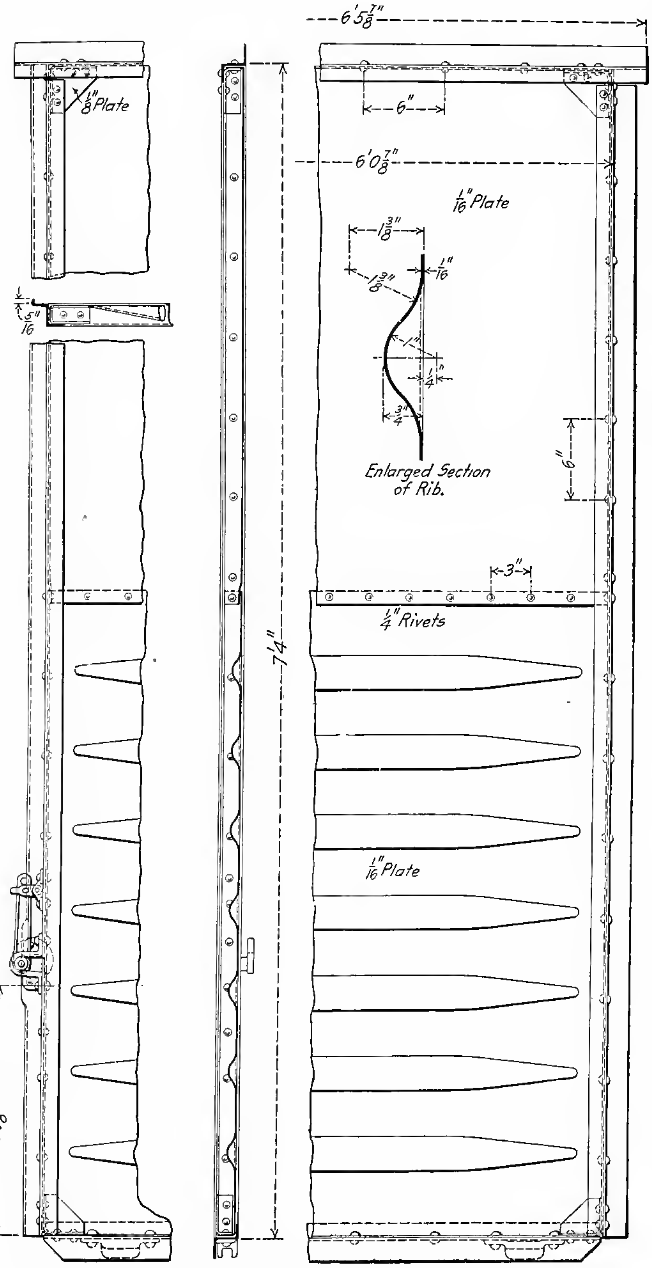


Fig. 771—Door for Summers All-Steel Box Car. See also Figs. 769 and 770.

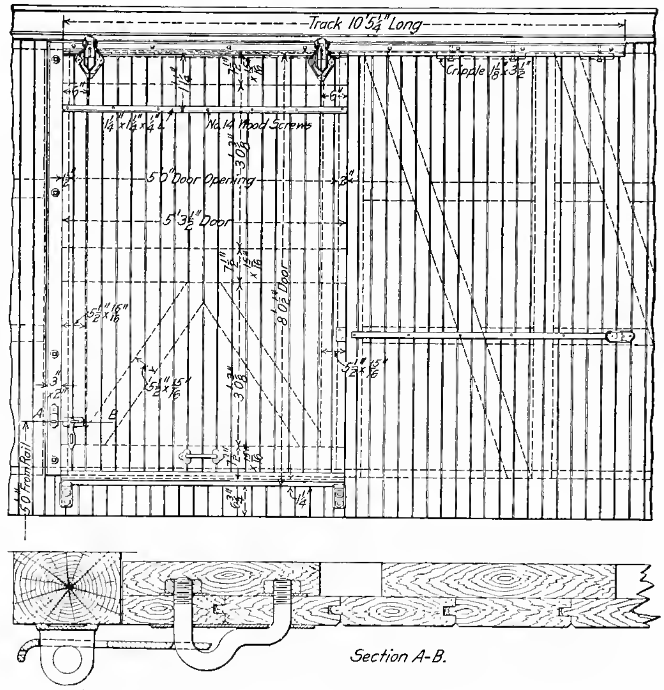


Fig. 772—Door for Canadian Pacific Steel-Frame Box Car Shown in Figs. 6, 267 and 268.

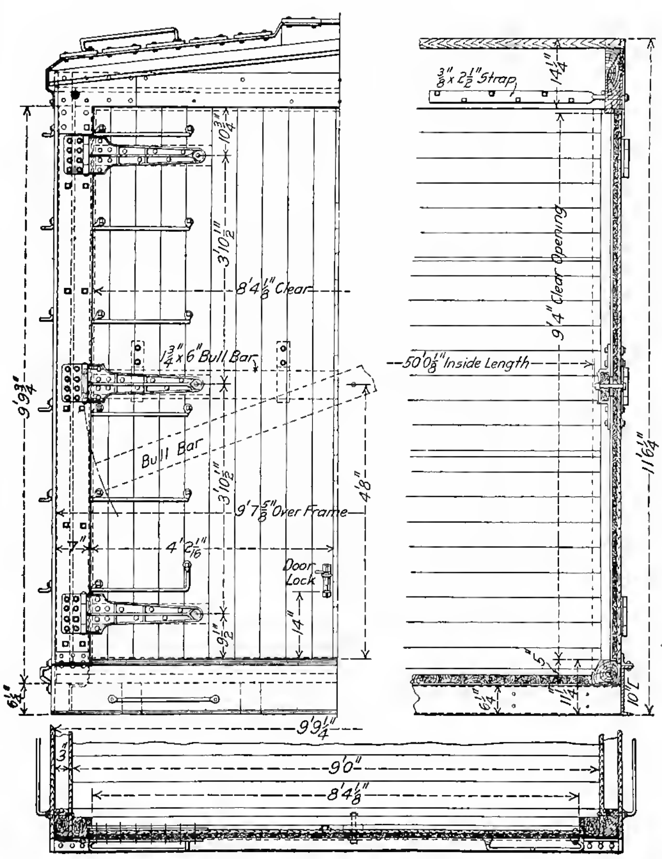


Fig. 773—End Door for Chicago, Milwaukee & St. Paul Automobile Box Car Shown in Figs. 282, 283 and 284.

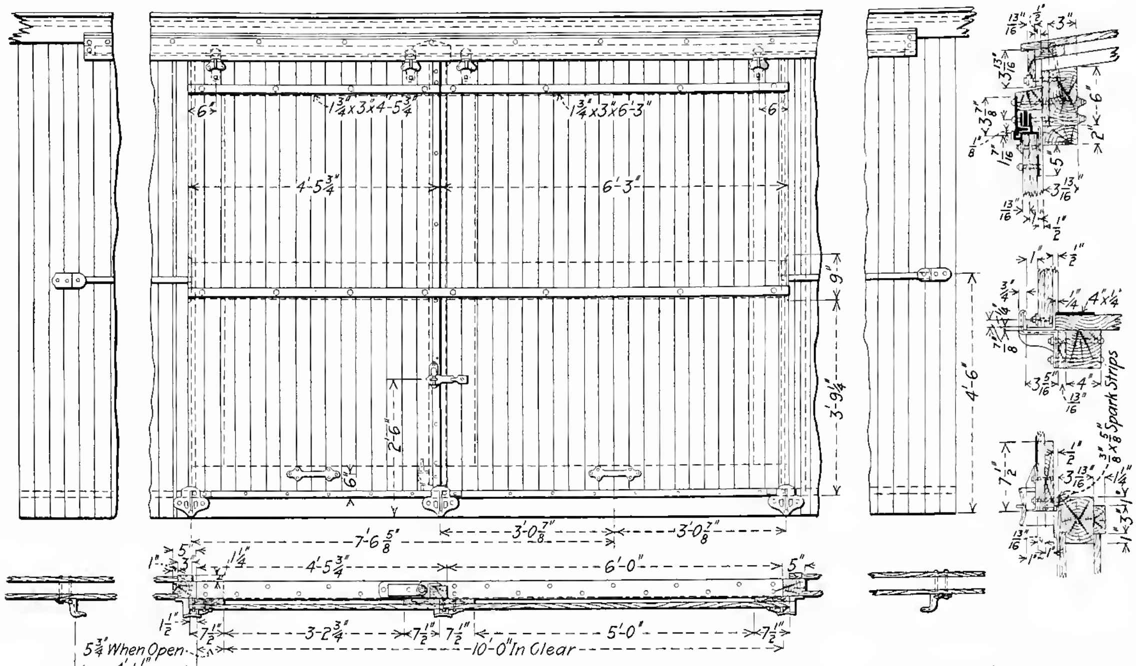
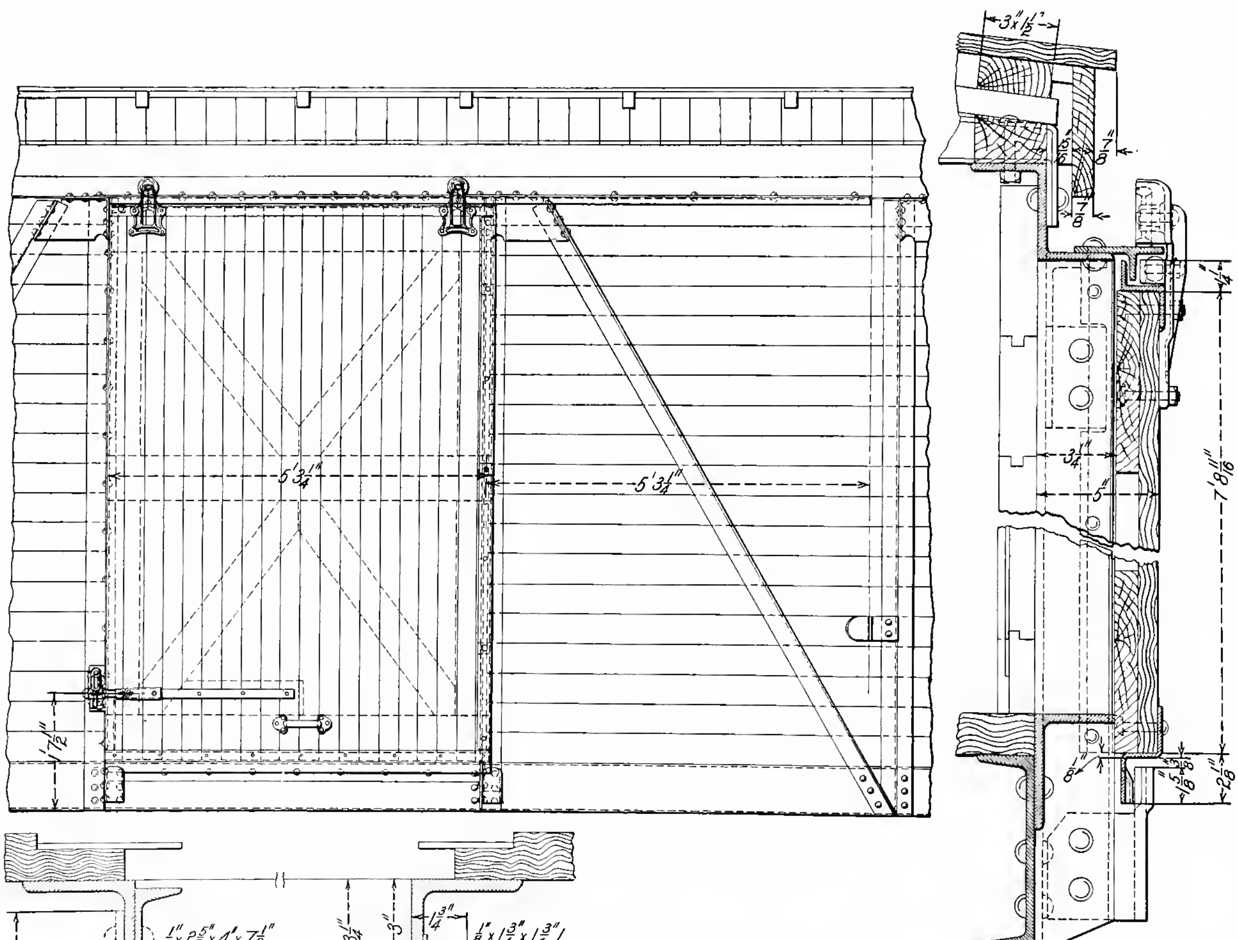


Fig. 774—Two-Piece Side Door for Automobile Box Car. Western Steel Car & Foundry Company.



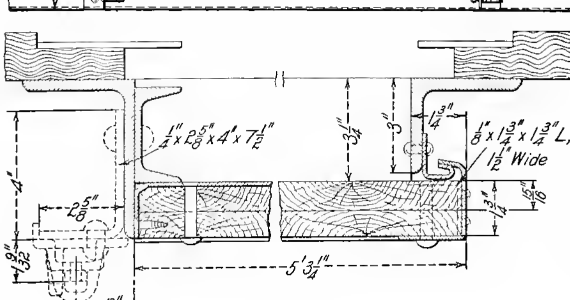


Fig. 775—Camel Door No. 30 for Steel Frame Box Cars. The Camel Company.

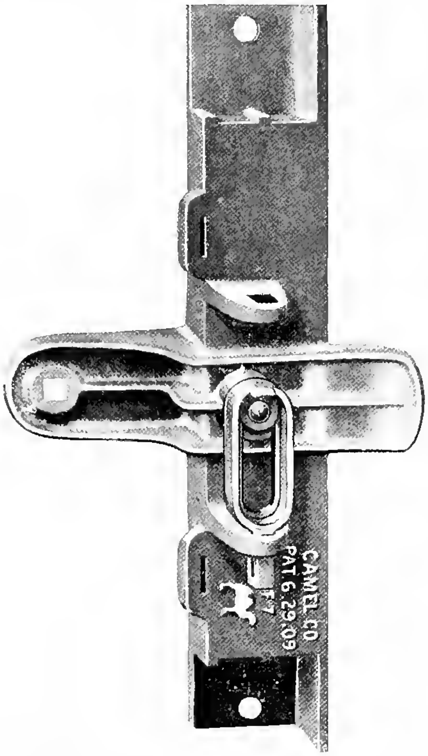


Fig. 776—Combination Door Stop and Lock. The Camel Company.

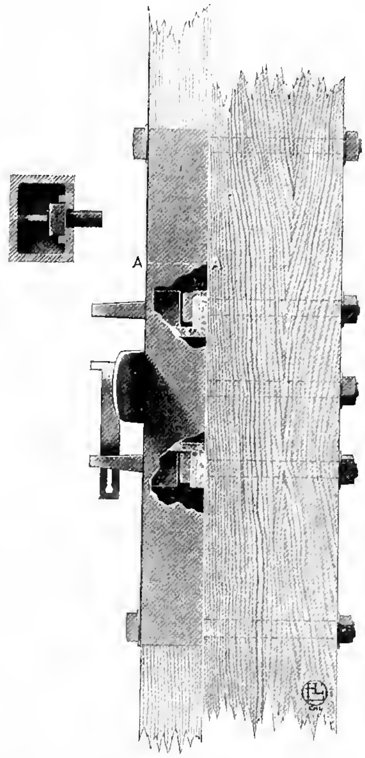


Fig. 777—Sectional View Showing Application of Combination Door Stop and Lock. The Camel Company.

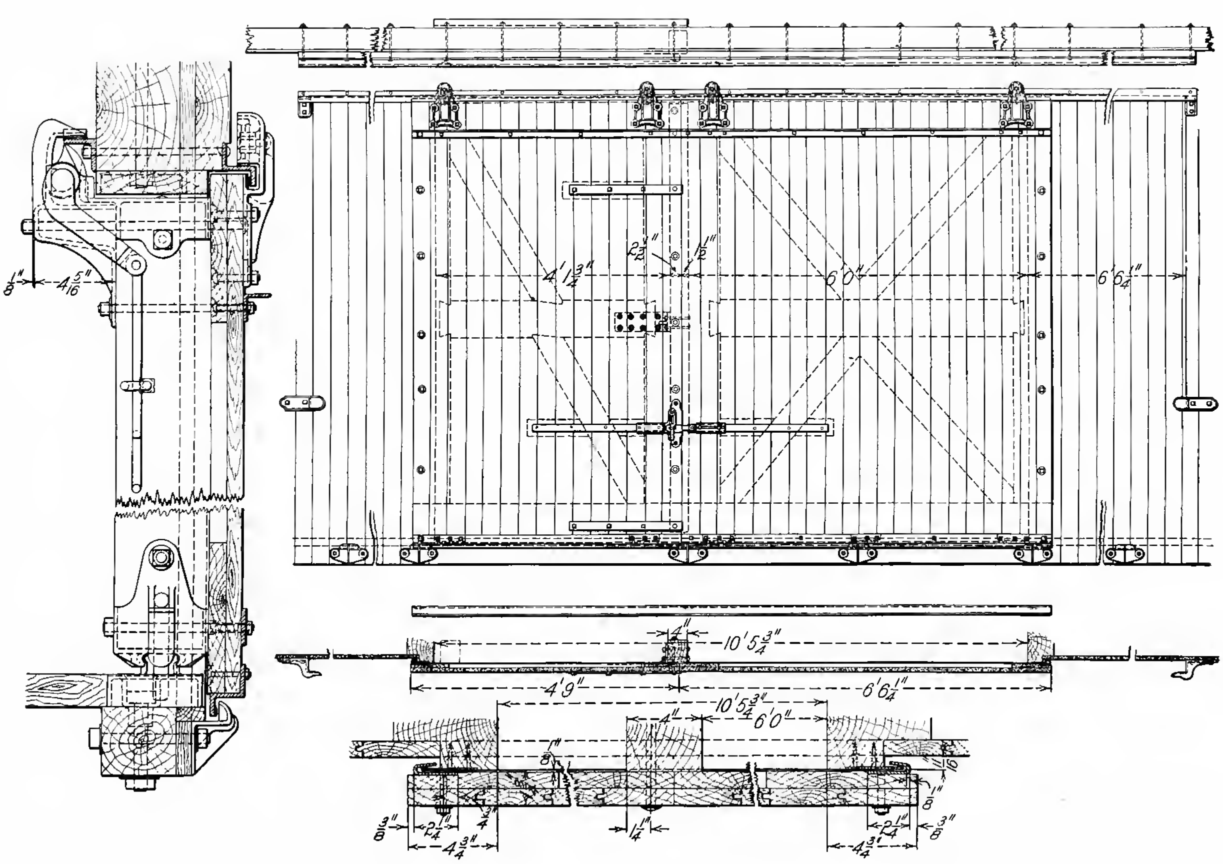


Fig. 778—Security Door with Movable Post for Automobile Box Cars. The Camel Company.

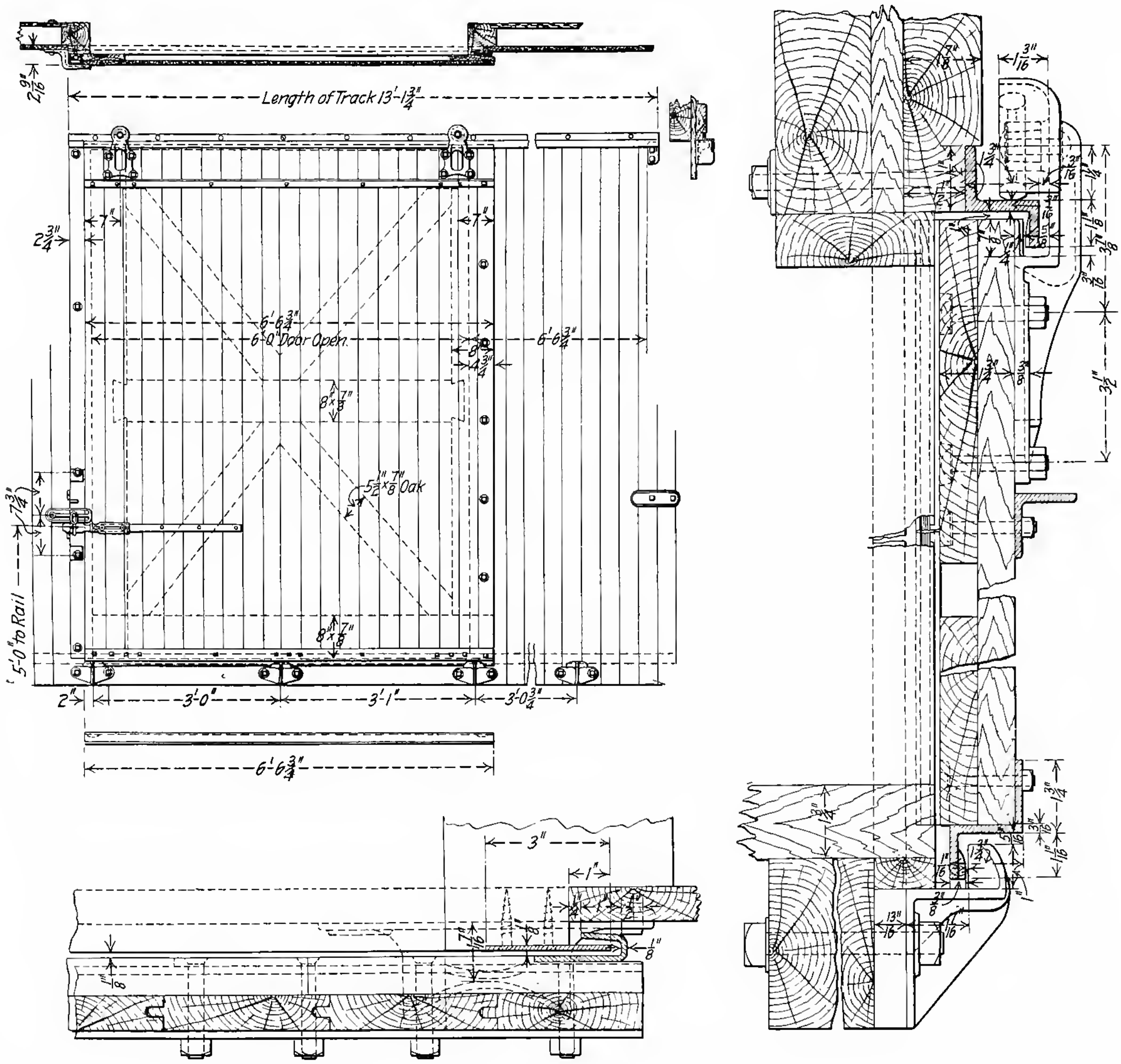


Fig. 779—Application of Security Car Door Fixtures. The Camel Company.

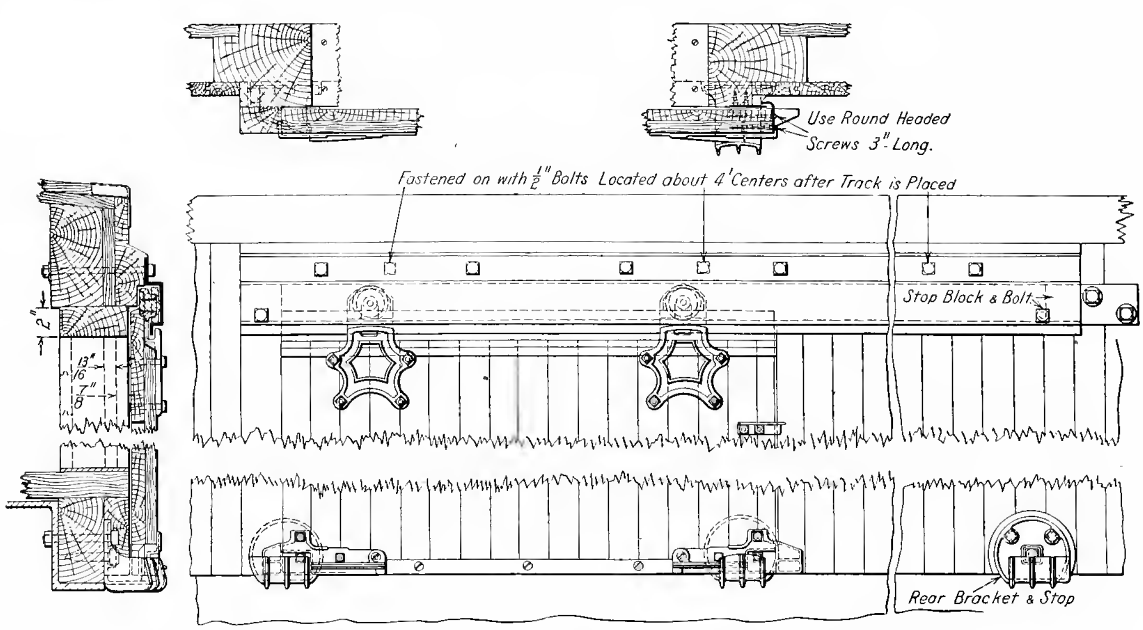


Fig. 780—Chicago Car Door and Fixtures. Chicago Car Door Company.

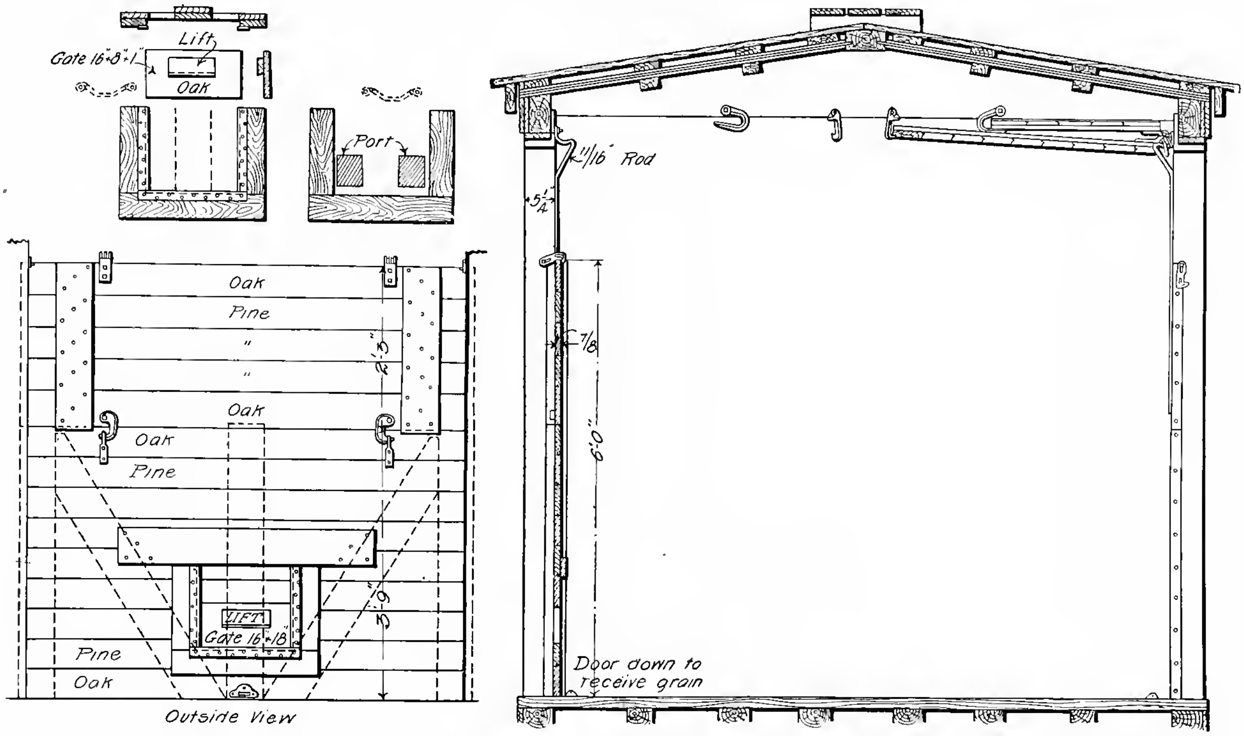


Fig. 781—Details and Application of Chicago Grain Door. Chicago Car Door Company.

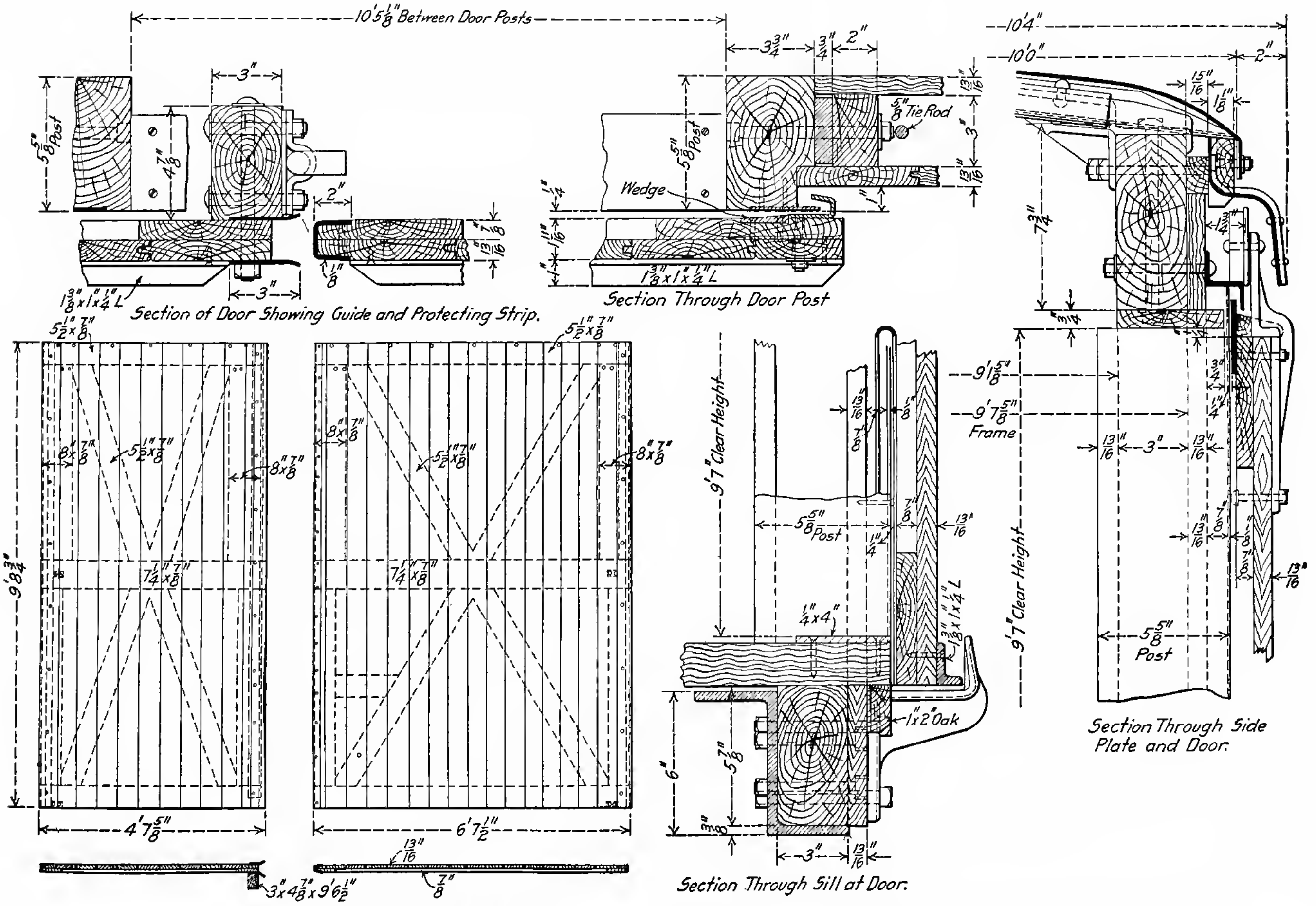


Fig. 782—Side Door for Chicago, Milwaukee & St. Paul Automobile Car Shown in Figs. 282, 283 and 284.

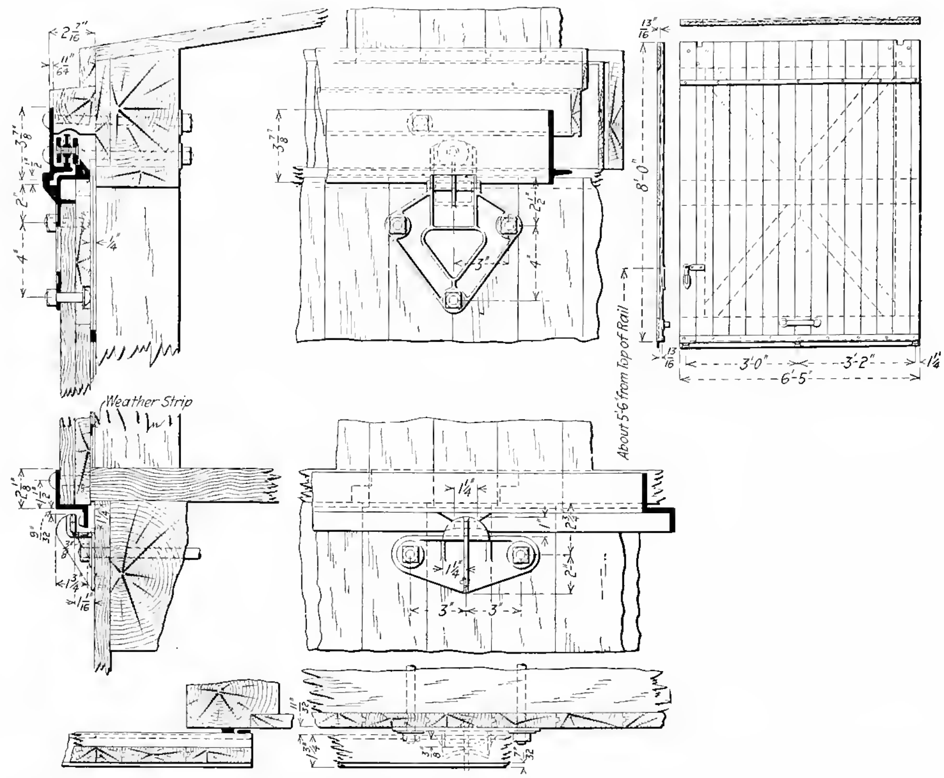


Fig. 783—Details of Application of Detroit Door. Hutchins Car Roofing Company.

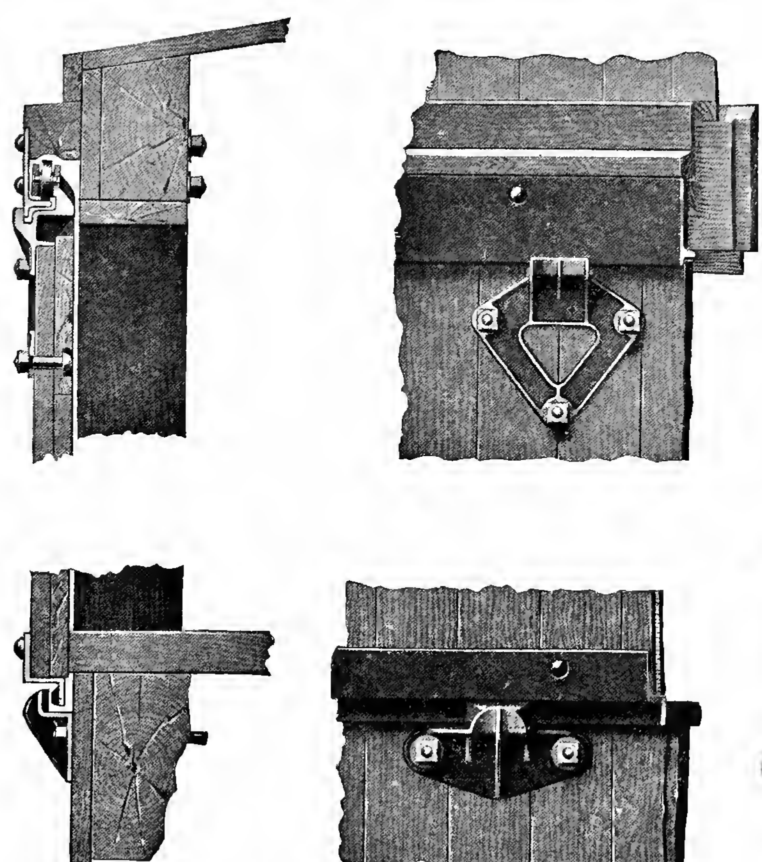


Fig. 784—Detroit Door Fixtures. Hutchins Car Roofing Company.

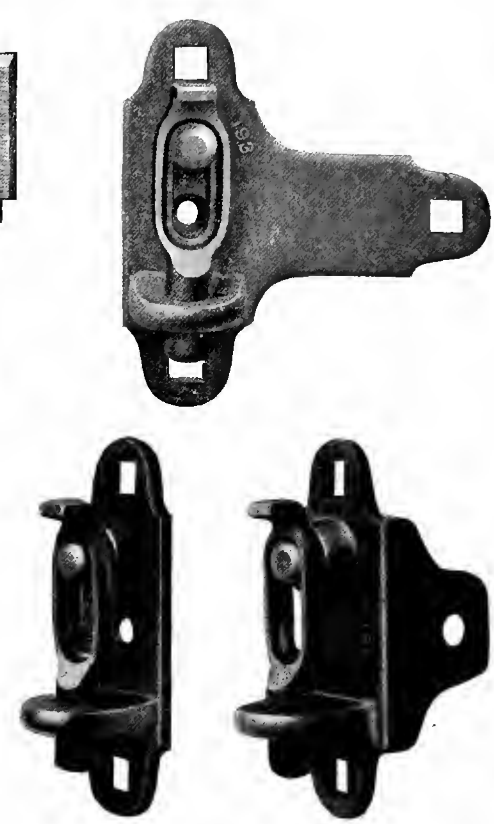


Fig. 785—Types of Locks for National Safety Car Door Fastener. See Fig. 788. National Malleable Castings Company.

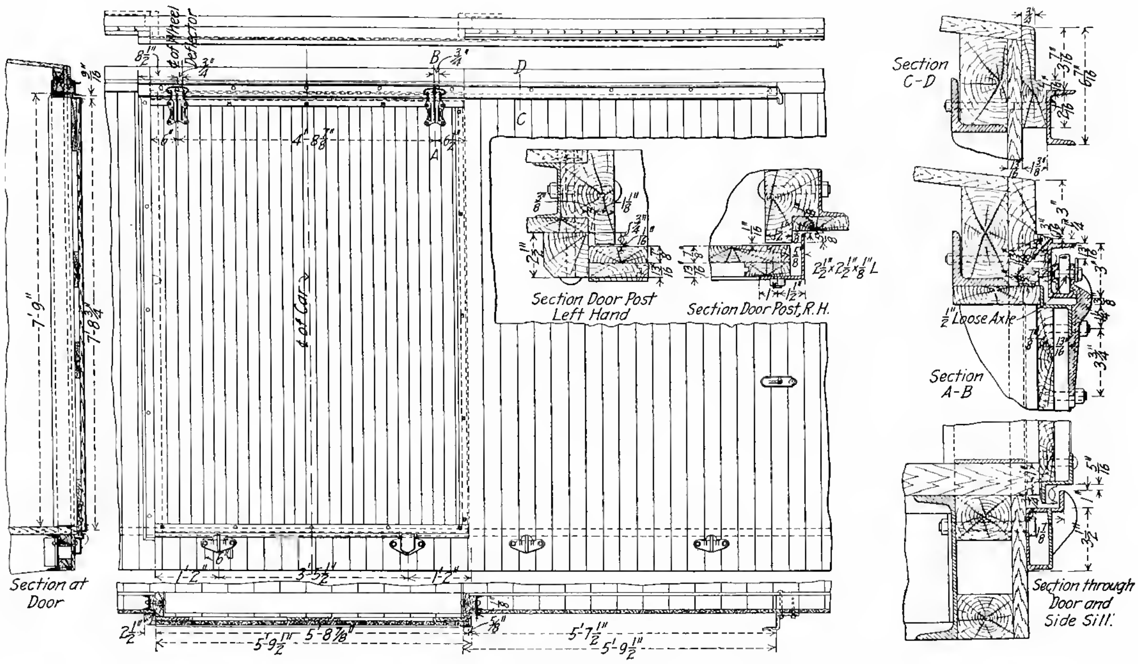


Fig. 786—Jones Peerless Door for Box Cars. Jones Car Door Company.

Fig. 787—Hasp for National Safety Car Door Fastener Shown in Fig. 788.

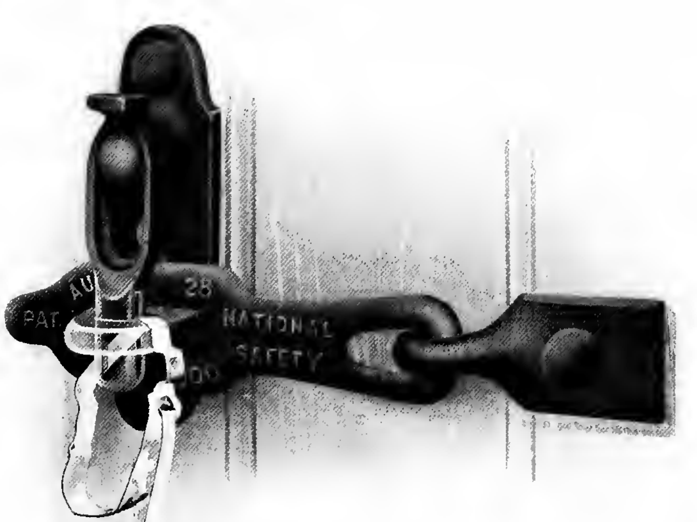


Fig. 788—National Safety Car Door Fastener (Patented). National Malleable Castings Company. See also Figs. 785, 787 and 789.

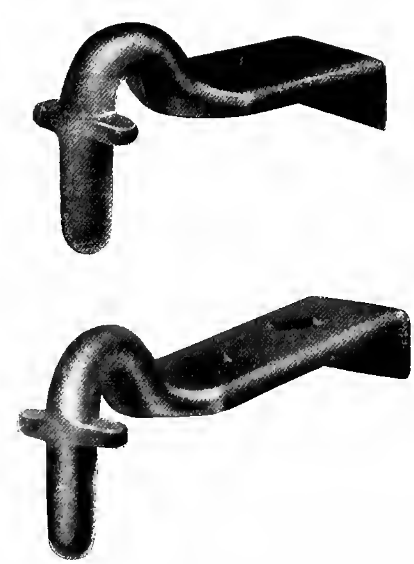


Fig. 789—Staples for National Safety Car Door Fastener Shown in Fig. 788.

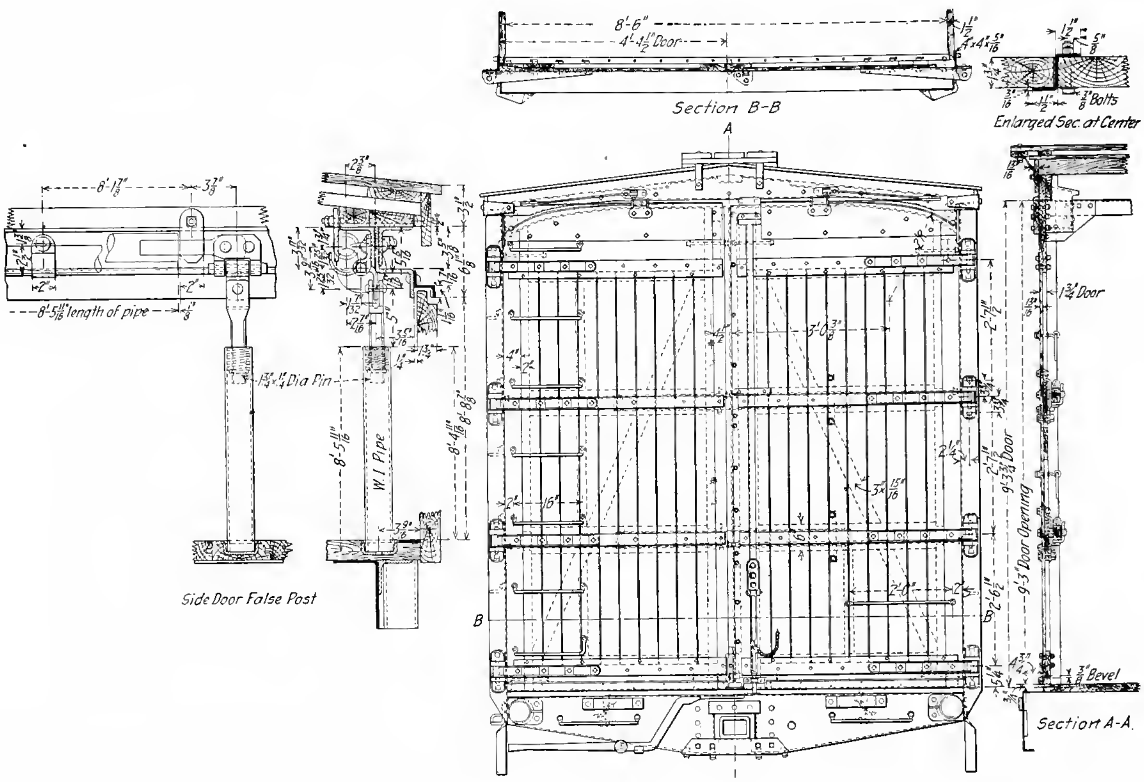


Fig. 790—End Door and False or Movable Post for Side Door of Erie Railroad Automobile Box Car Shown in Figs. 12 and 272. American Car & Foundry Company.

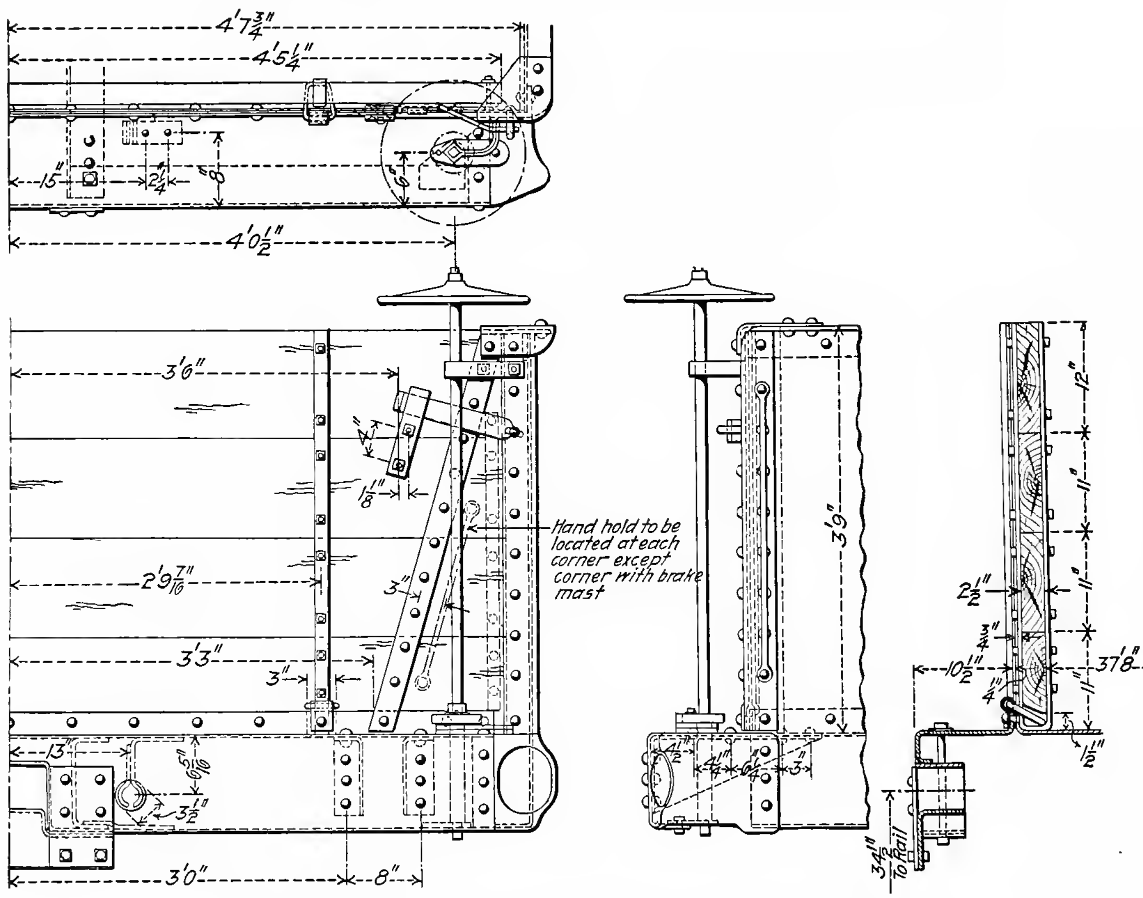
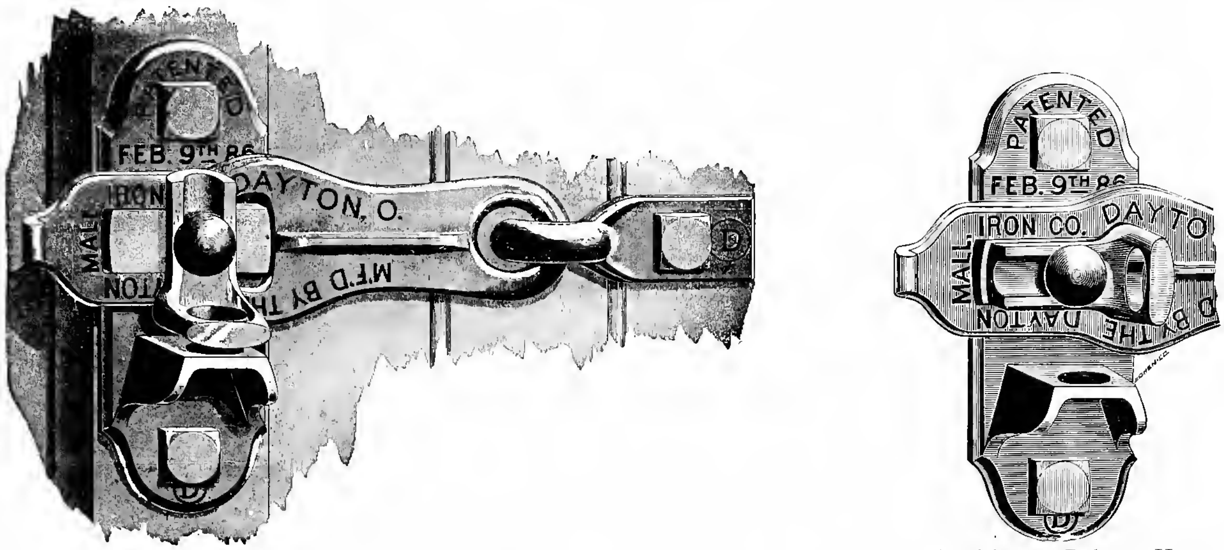


Fig. 791—Drop End Door for Pennsylvania Railroad Gondola Car.



Closed, Ready for Sealing. In Position to Release Hasp.

Fig. 792—Dayton Freight Car Door Lock. Dayton Malleable Iron Company.

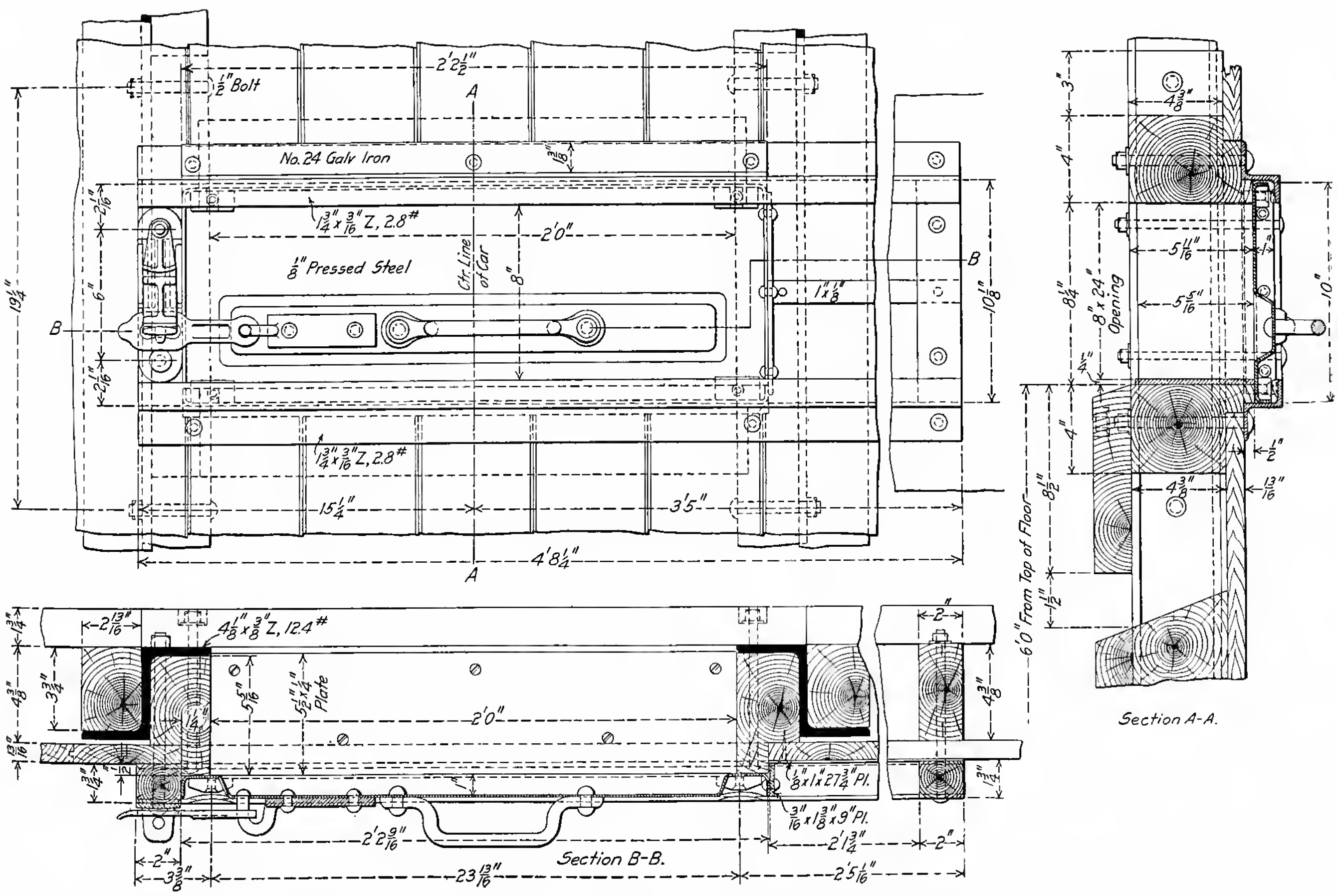


Fig. 793—End Door for Atchison, Topeka & Santa Fe Box Car Shown in Fig. 289.

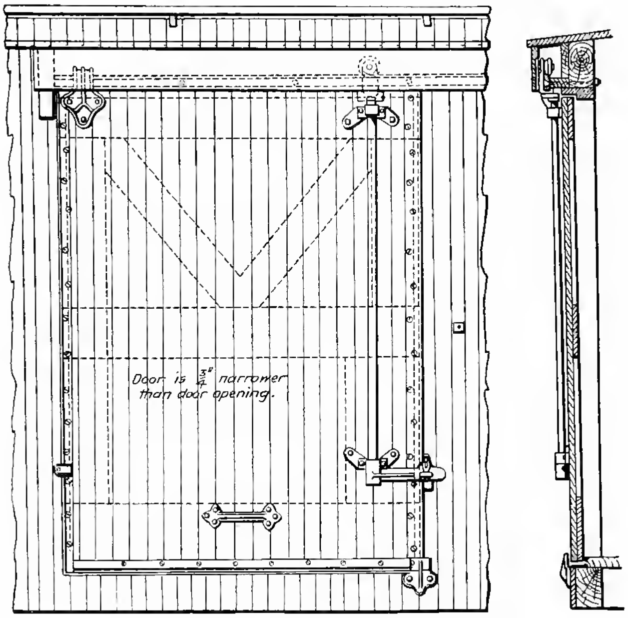


Fig. 794—St. Louis Flush Car Door.

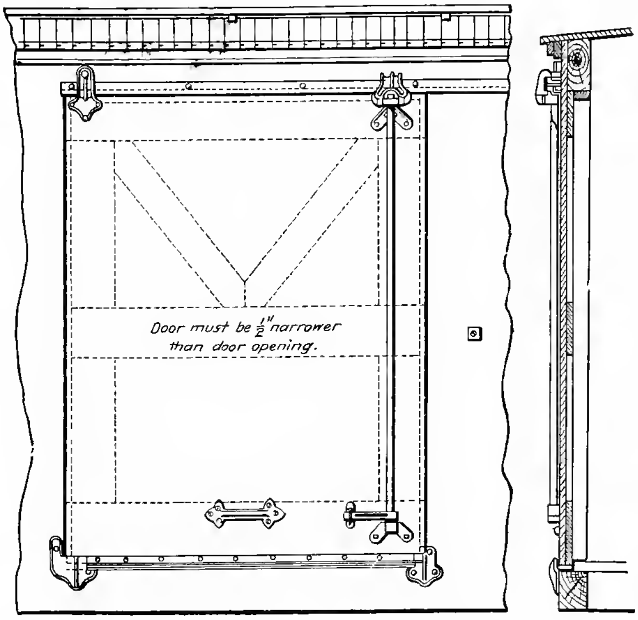


Fig. 795—Western Flush Car Door.

Western Railway Equipment Company.

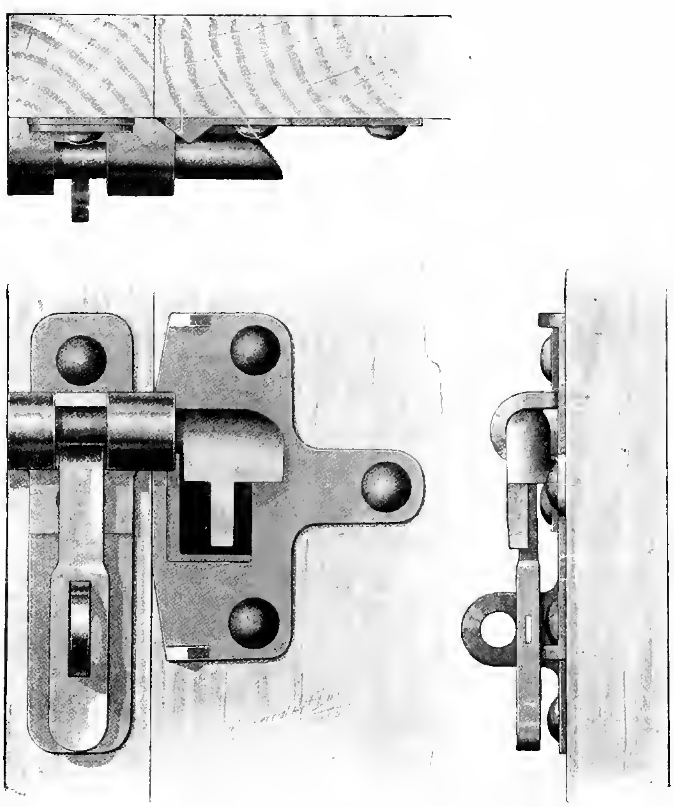


Fig. 796—Automatic Car Door Lock. Railway Utility Company.

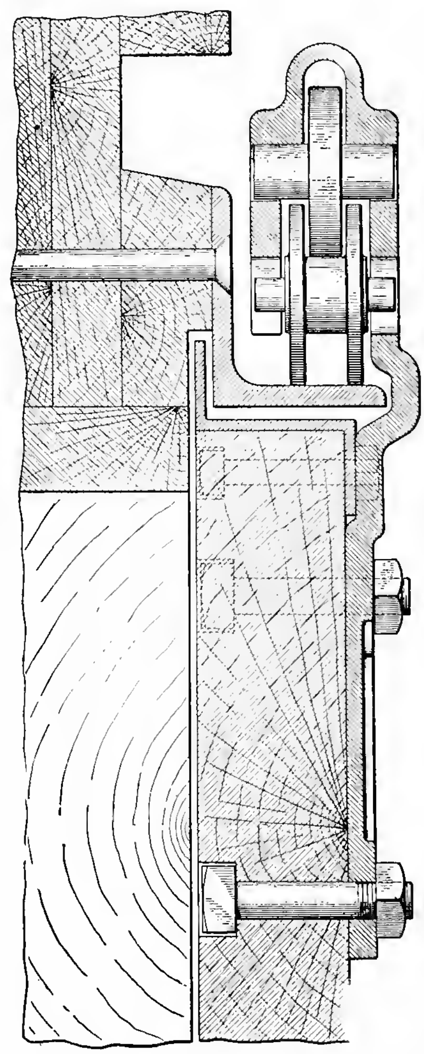


Fig. 797—Cross Section Through Utility Double Roller Car Door Hanger. Railway Utility Company.

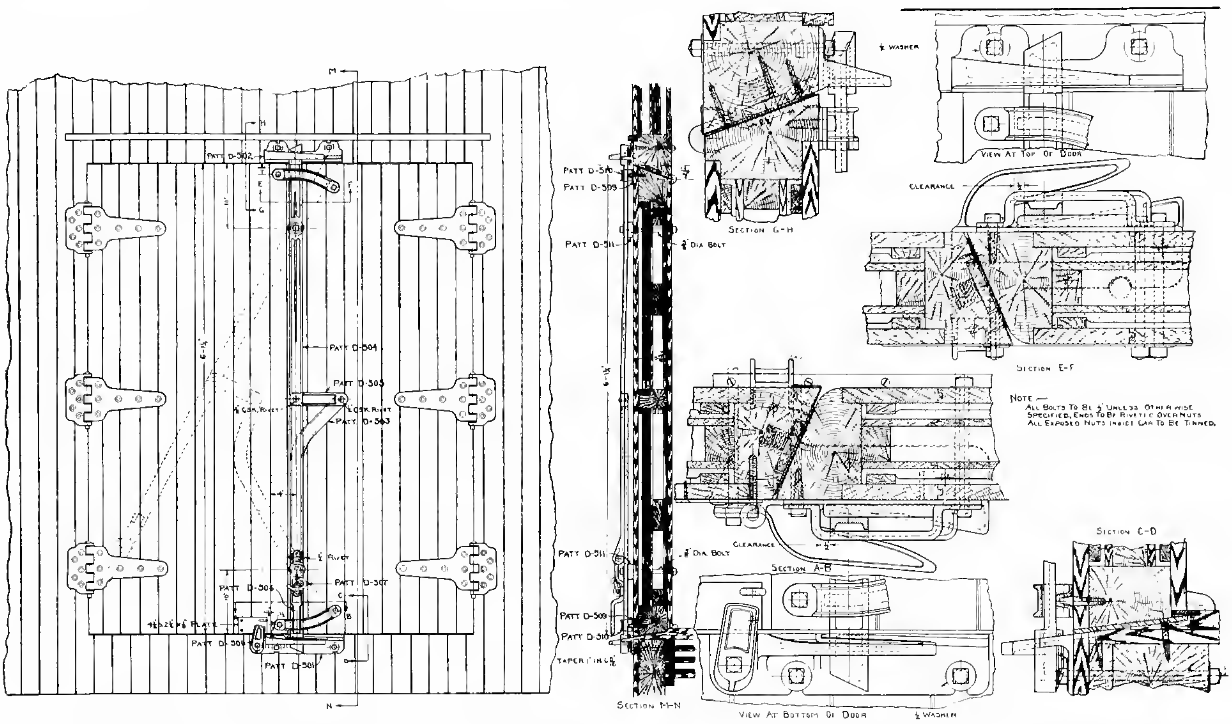


Fig. 798—Arrangement and Details of Garland Refrigerator Car Door Fastener. Burton W. Mudge & Company.

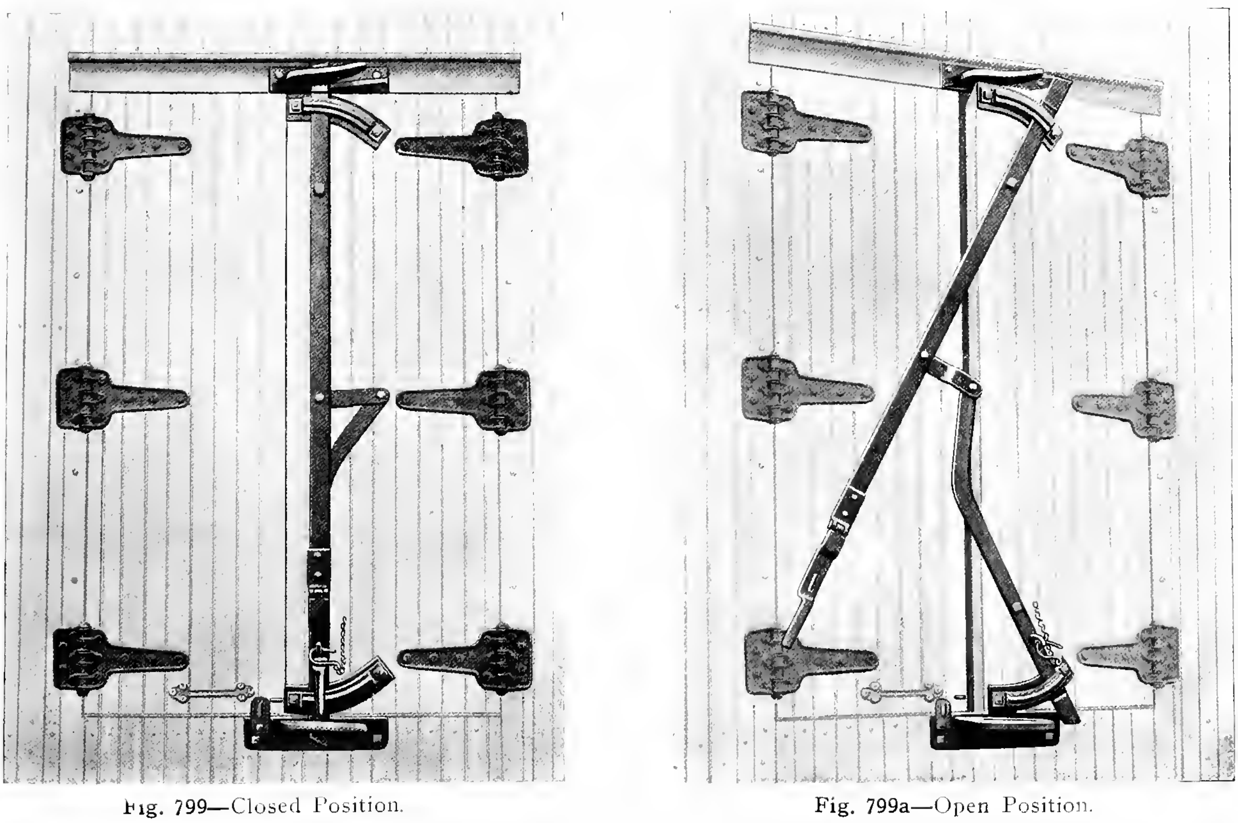


Fig. 799—Closed Position. **Fig. 799a**—Open Position.

Garland Refrigerator Car Door Fastener. Burton W. Mudge & Company.

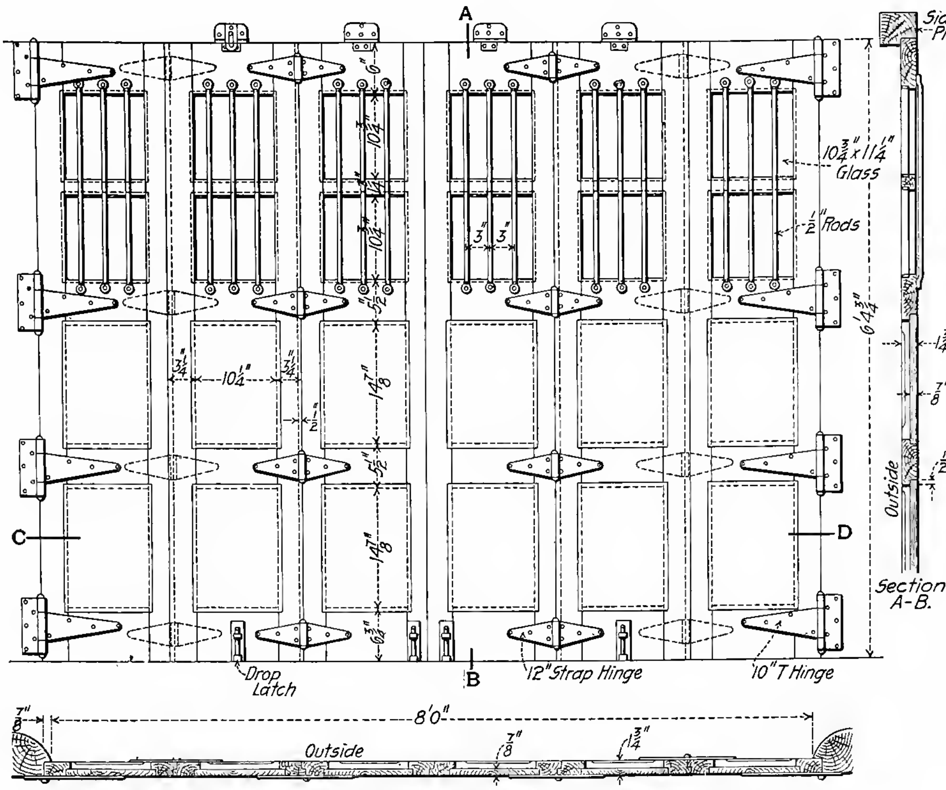


Fig. 800—Folding Side Door for Central of New Jersey Horse Car.

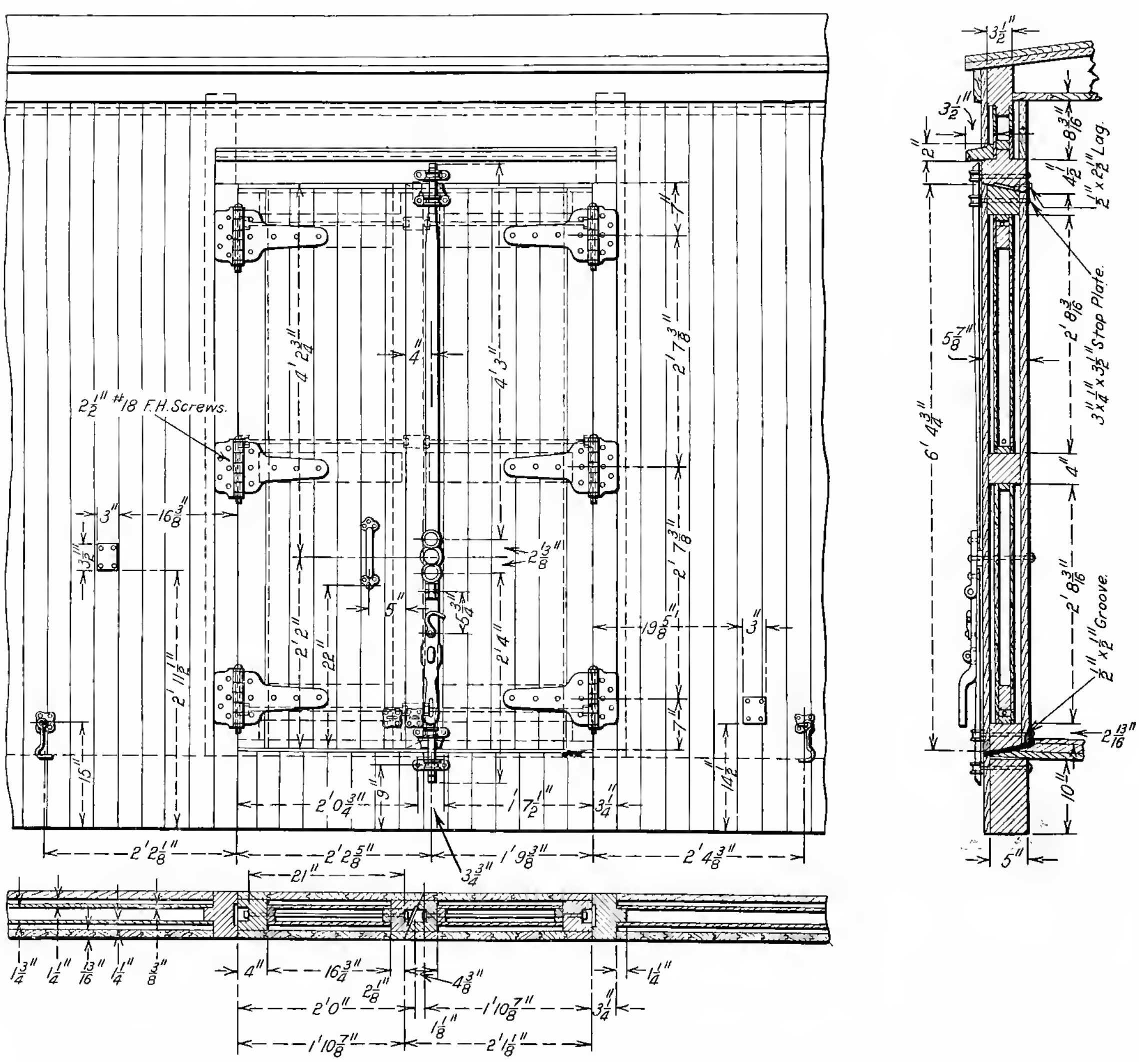


Fig. 801—Refrigerator Car Door. Milwaukee Refrigerator Transit & Car Company.

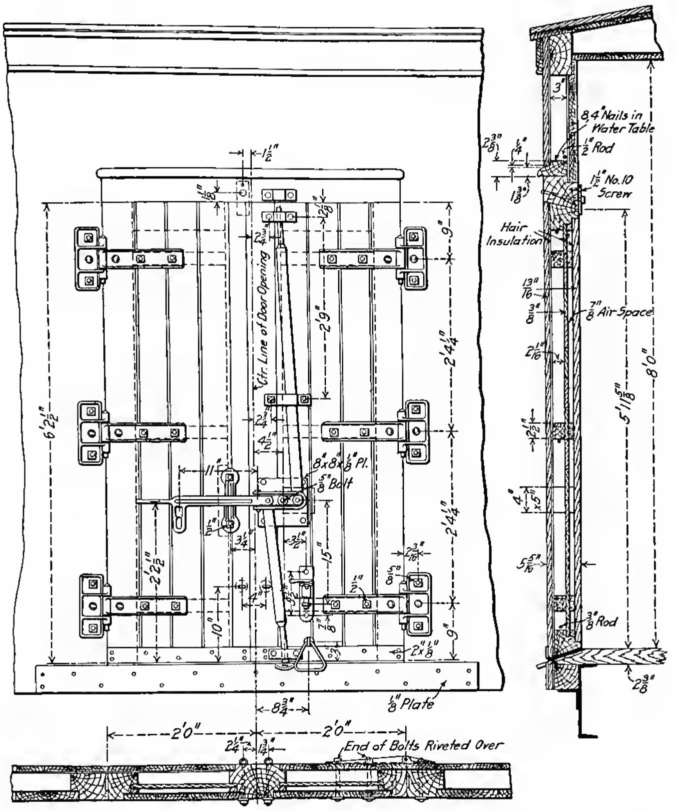


Fig. 802—Door for Central of New Jersey Ice Car Shown in Figs. 376, 377 and 379.

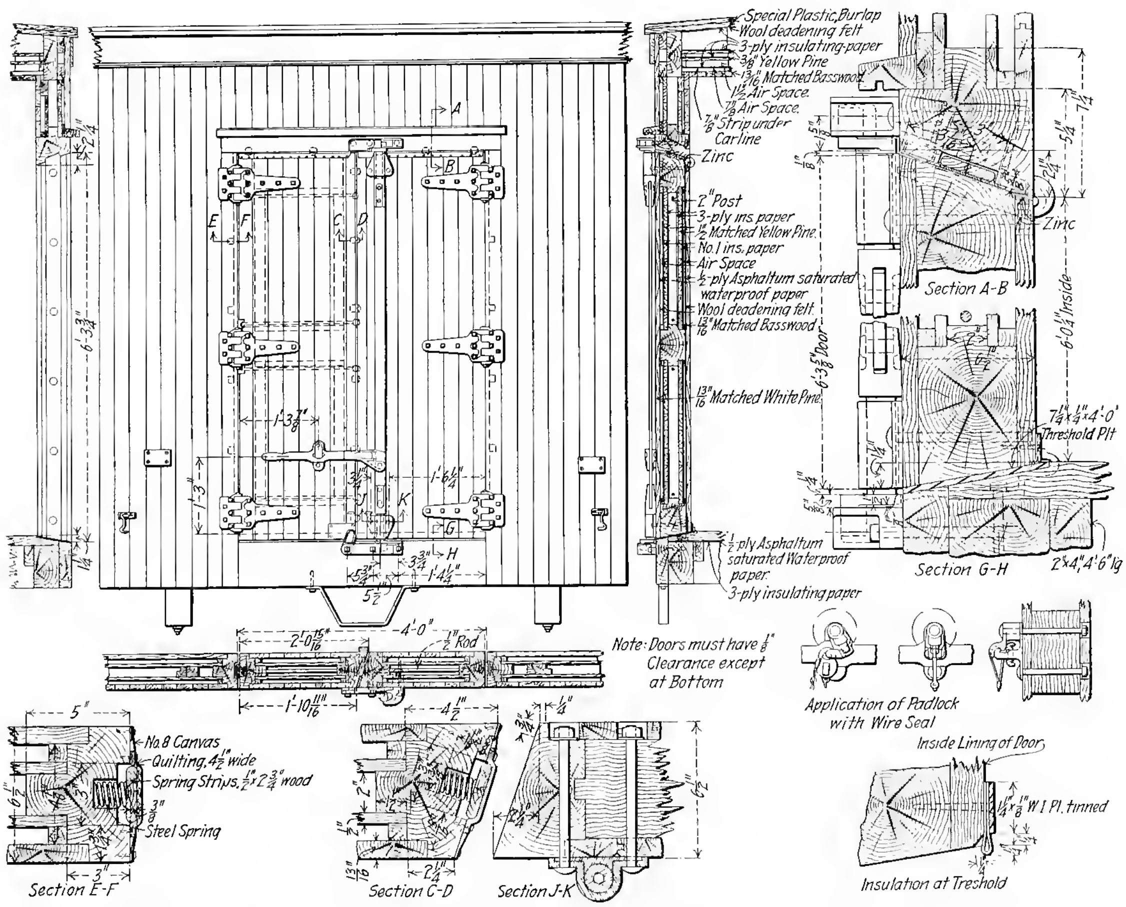


Fig. 803—Miner Refrigerator Car Door Fastener and La Flare Insulation for Baltimore & Ohio Refrigerator Cars. W. H. Miner.

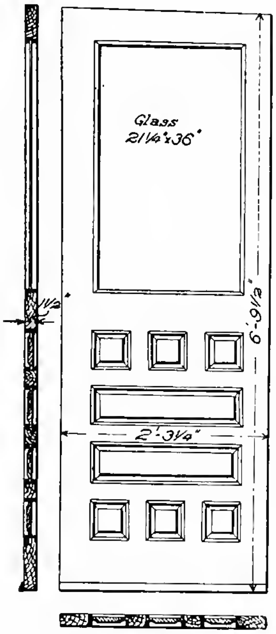


Fig. 804—Wooden End Door for Norfolk & Western Coaches.

Parts of Doors.
See Figs. 805 and 809.

1 *Door Post or Jamb*
2 *Door Mullion*
4 *Top Door Rail*
5 *Bottom Door Rail*
6 *Middle or Lock Door Rail*
7 *Parting Door Rail*
8 *Door Stile*
10 *Lower or Twin Door Panels*
11 *Middle Door Panel*
12 *Upper Door Sash*
13 *Lower Door Sash*
21 *Door Hanger*
22 *Door Hook*
23 *Door Guards*

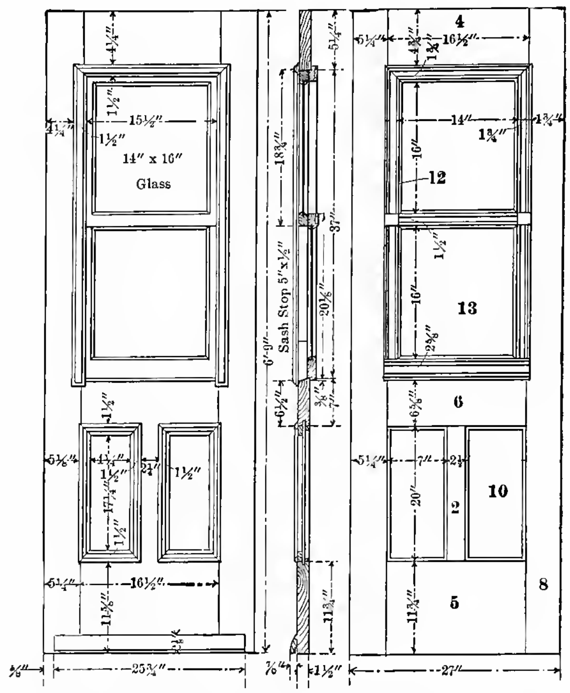


Fig. 805—Wooden End Door for New York, New Haven & Hartford Coaches.

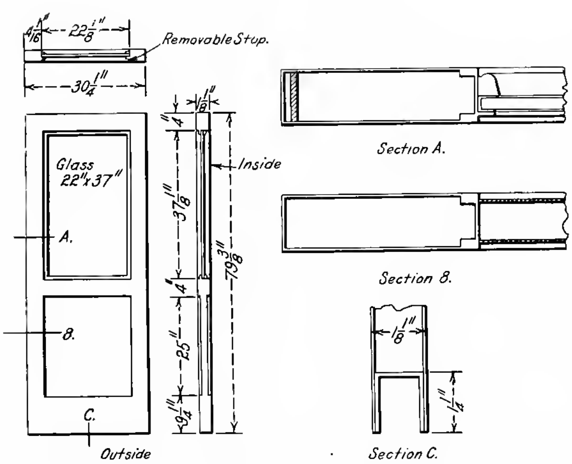


Fig. 806—Steel Vestibule Side Door and Details. Dahlstrom Metallic Door Company.

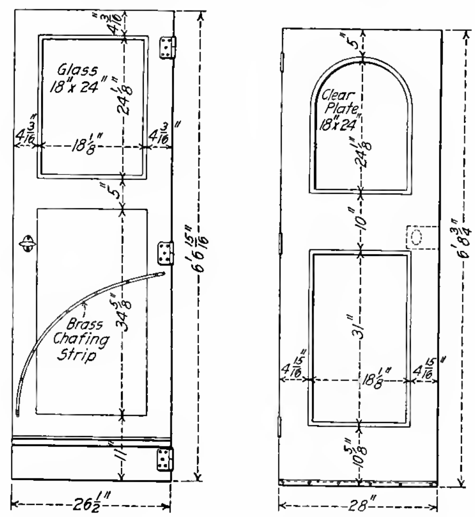


Fig. 807—Wooden Vestibule and End Doors for Pullman Cars.

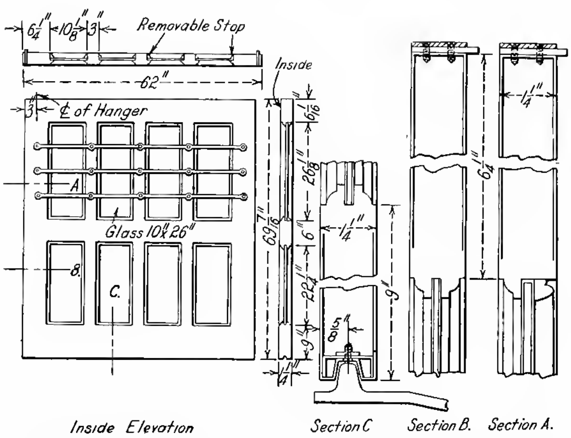


Fig. 808—Steel Side Door and Details for Baggage Car. Dahlstrom Metallic Door Company.

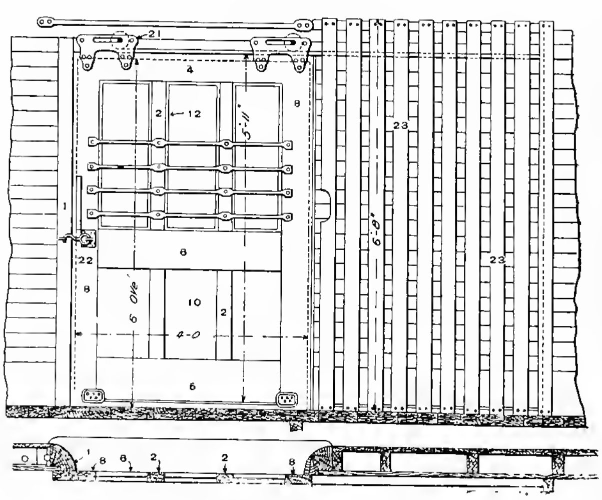
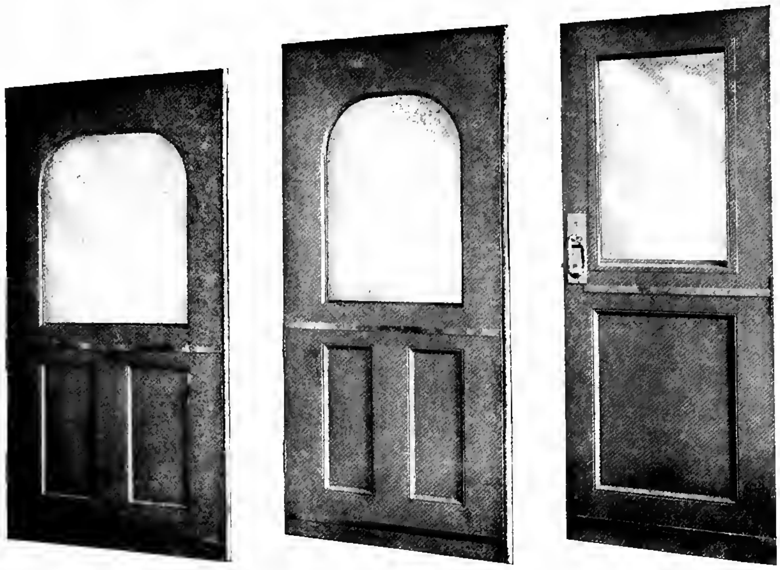


Fig. 809—Wooden Side Door for Norfolk & Western Baggage Cars.



Sliding Doors. End Door

Fig. 810—Steel Doors for Hudson & Manhattan Tunnel Cars. Hale & Kilburn Company.

Fig. 811—Steel End Door for Harriman Lines Steel Coaches.

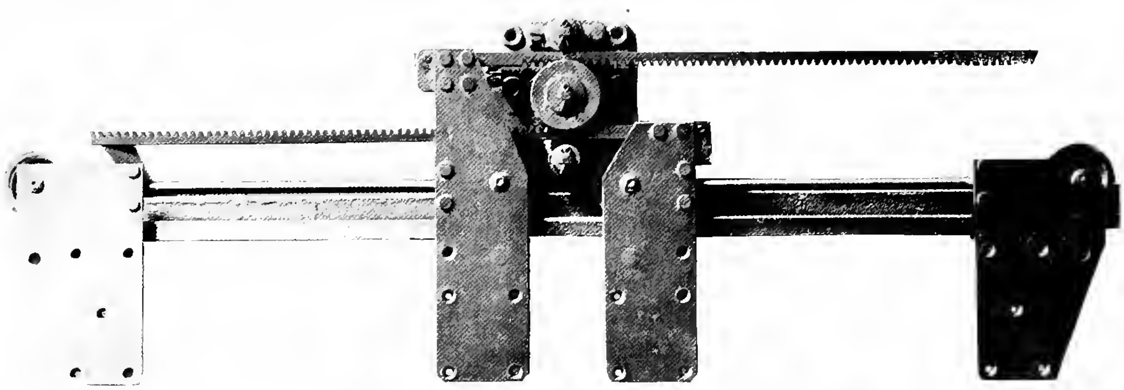


Fig. 812—Double Sliding Door Fixture. James L. Howard & Company.

Inside. Outside.

Fig. 813—Steel Vestibule, End and Saloon Doors for Pennsylvania Railroad Steel Coaches. Hale & Kilburn Company.

Sliding Door. Wide Door. Swing Door.

Fig. 814—Acme Pressed Steel Doors. Acme Supply Company.

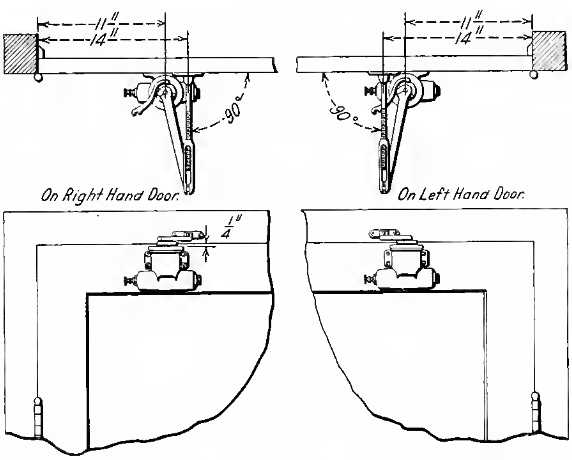


Fig. 815—Application of Russwin Door Check. Russell & Erwin Manufacturing Company.

Fig. 816—Russwin Door Check. Russell & Erwin Manufacturing Company.

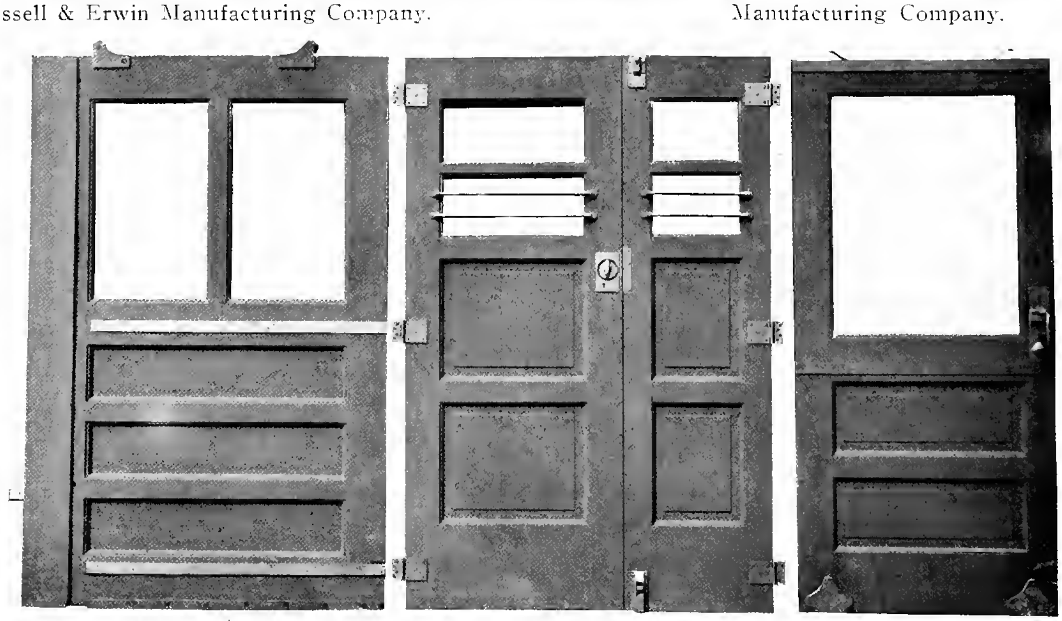


Fig. 817—Hollow Steel Doors for Steel Subway Cars. Grinden Art Metal Company.

Fig. 818—Hollow Steel Baggage Car Door. Grinden Art Metal Company.

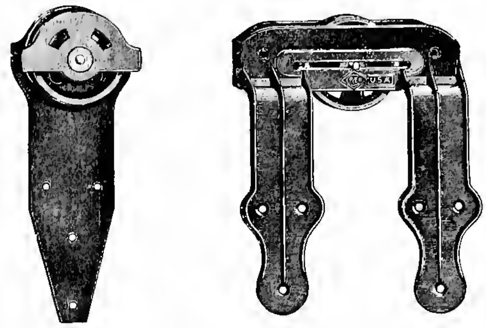


Fig. 819—Sliding Door Hangers. Russell & Erwin Manufacturing Company.

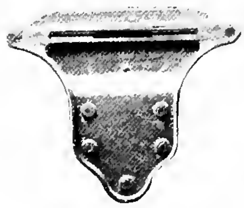


Fig. 820—Baggage Car Sliding Door Hanger. James L. Howard & Company.

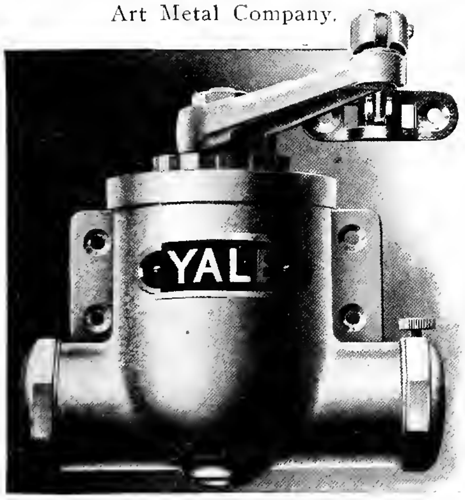


Fig. 821—Yale Door Check. Yale & Towne Manufacturing Company.

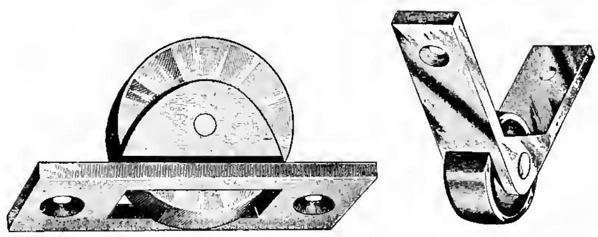


Fig. 822—Door Bottom and Corner Rollers. Dayton Manufacturing Company.

Fig. 823—For Baltimore & Ohio Baggage Cars.

Fig. 824—For Harriman Lines Coaches.

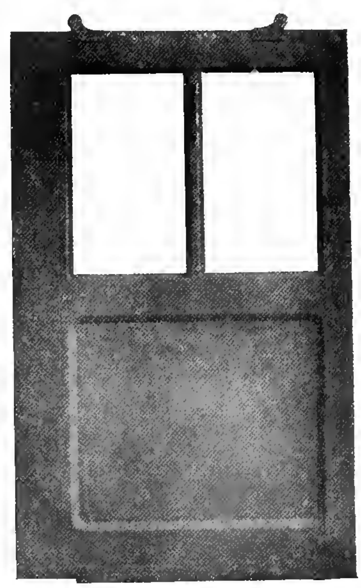


Fig. 825—For Interborough Subway Cars.

One Piece Metal Doors. Forsyth Brothers Company.

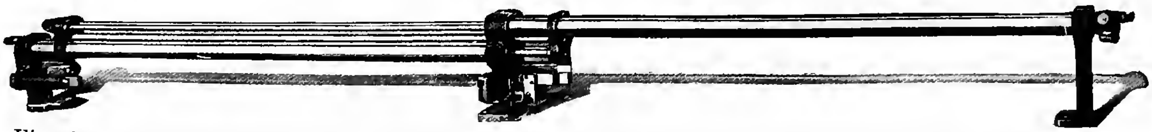


Fig. 826—Pneumatic Operating Apparatus for Sliding Doors. Consolidated Car Heating Company.

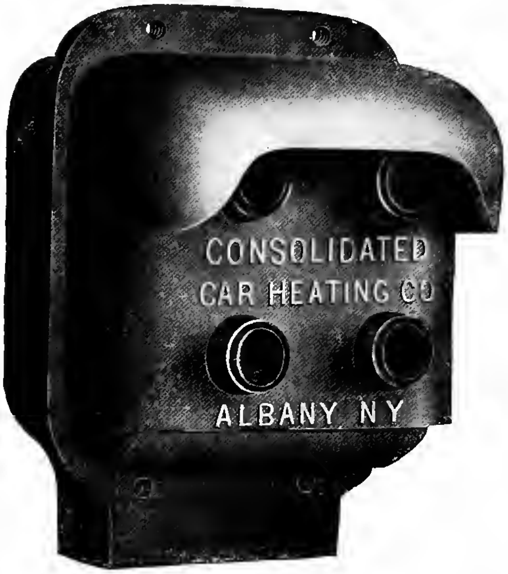


Fig. 827—Four Button Push Switch for Remote Control of Magnetic Air Valves for Pneumatic Door Operators. Consolidated Car Heating Company.

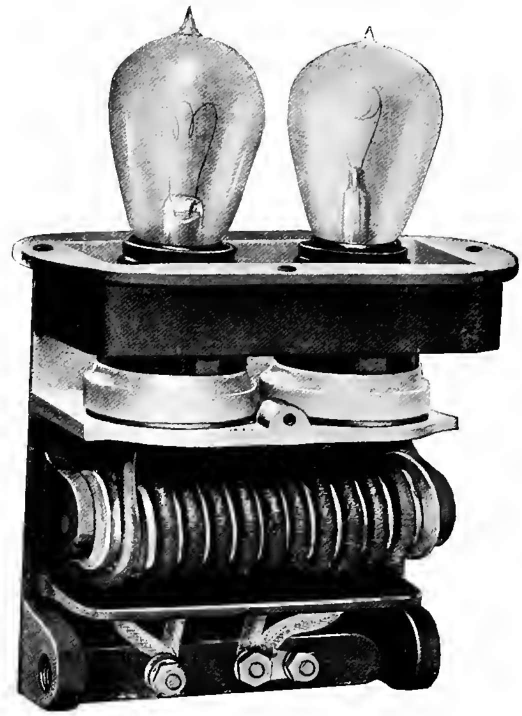


Fig. 828—Signal Light Box with Cover Removed for Motorman's Automatic Starting Signal, Indicating All Doors of Train Closed. Consolidated Car Heating Company.

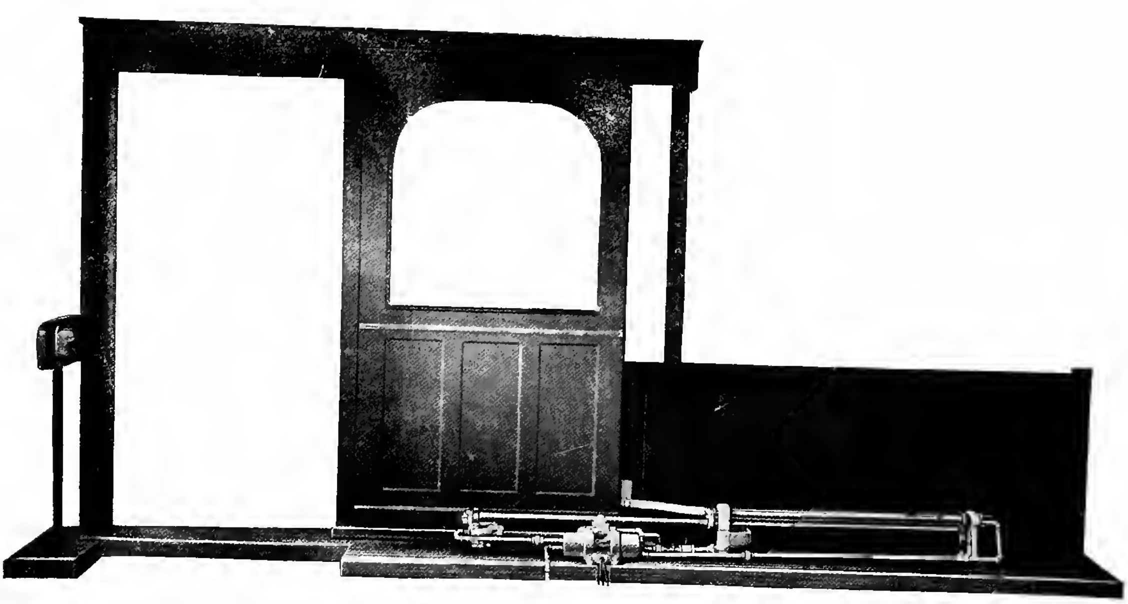


Fig. 829—Pneumatic Door Operator and Magnetic Valve, Showing Application to Car Door. Consolidated Car Heating Company.

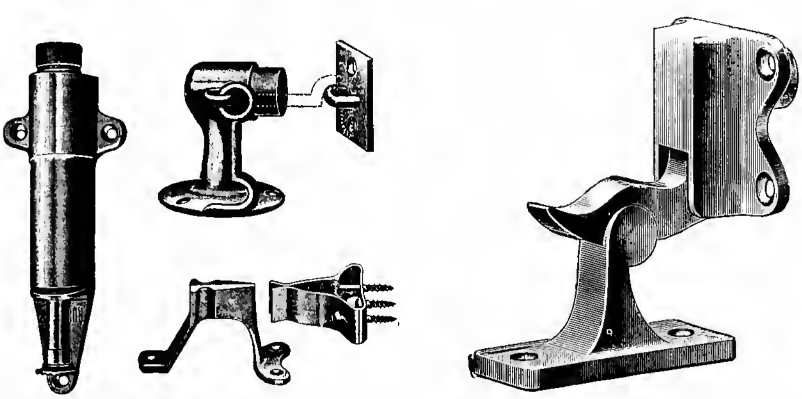


Fig. 830—Door Stops and Holders. Russell & Erwin Manufacturing Company.

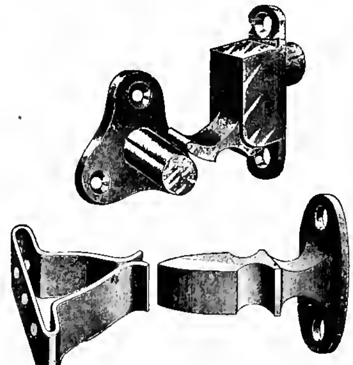
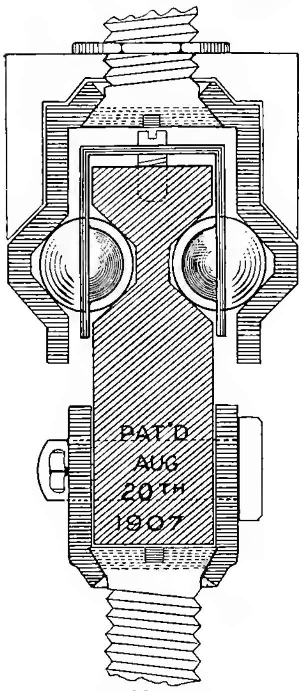


Fig. 831—Door Holders. Adams & Westlake Company.



FULL SIZE

Fig. 832—Cross Section of Diamond Tubular Ball Bearing Door Hanger.

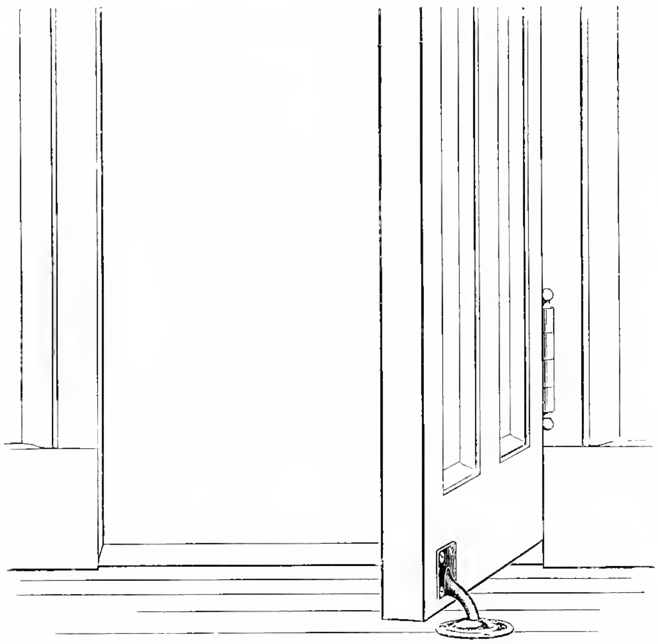


Fig. 833—Sherburne Patented Car Door Holder. Sherburne & Company.

Fig. 834 — Door Spring. Russell & Erwin Manufacturing Company.

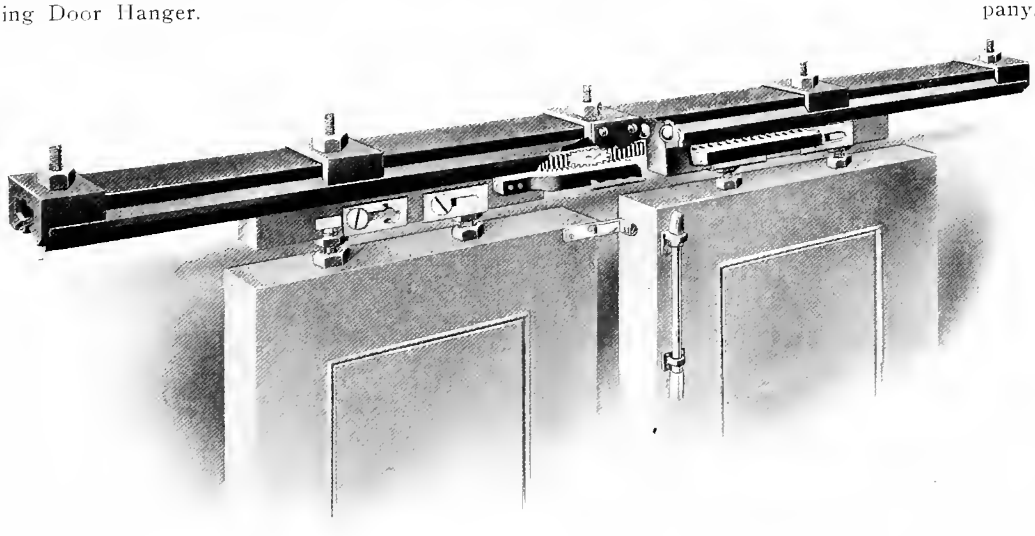


Fig. 835—Diamond Tubular Ball Bearing Sliding Door Hangers for Brooklyn Rapid Transit Center Entrance Cars. Diamond Door Hanger Company.

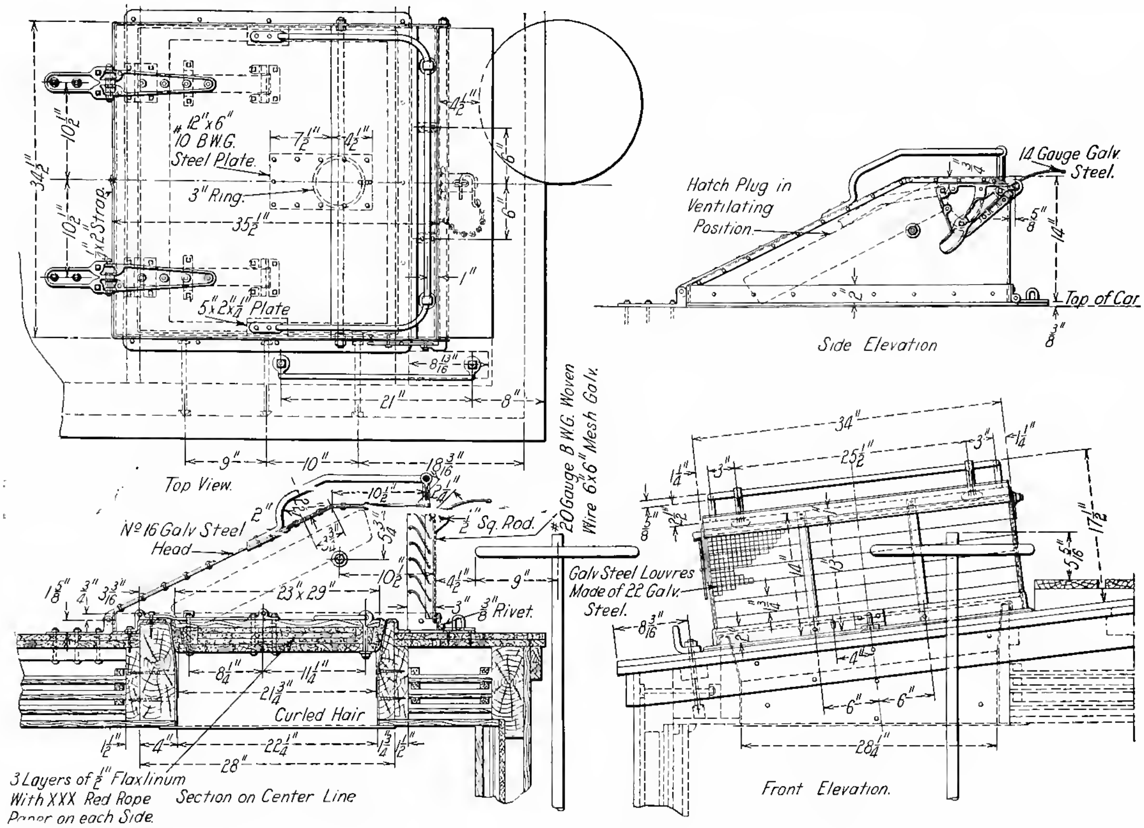


Fig. 836—Bohn Standard Ventilator and Plug for Refrigerator Cars. White Enamel Refrigerator Company.

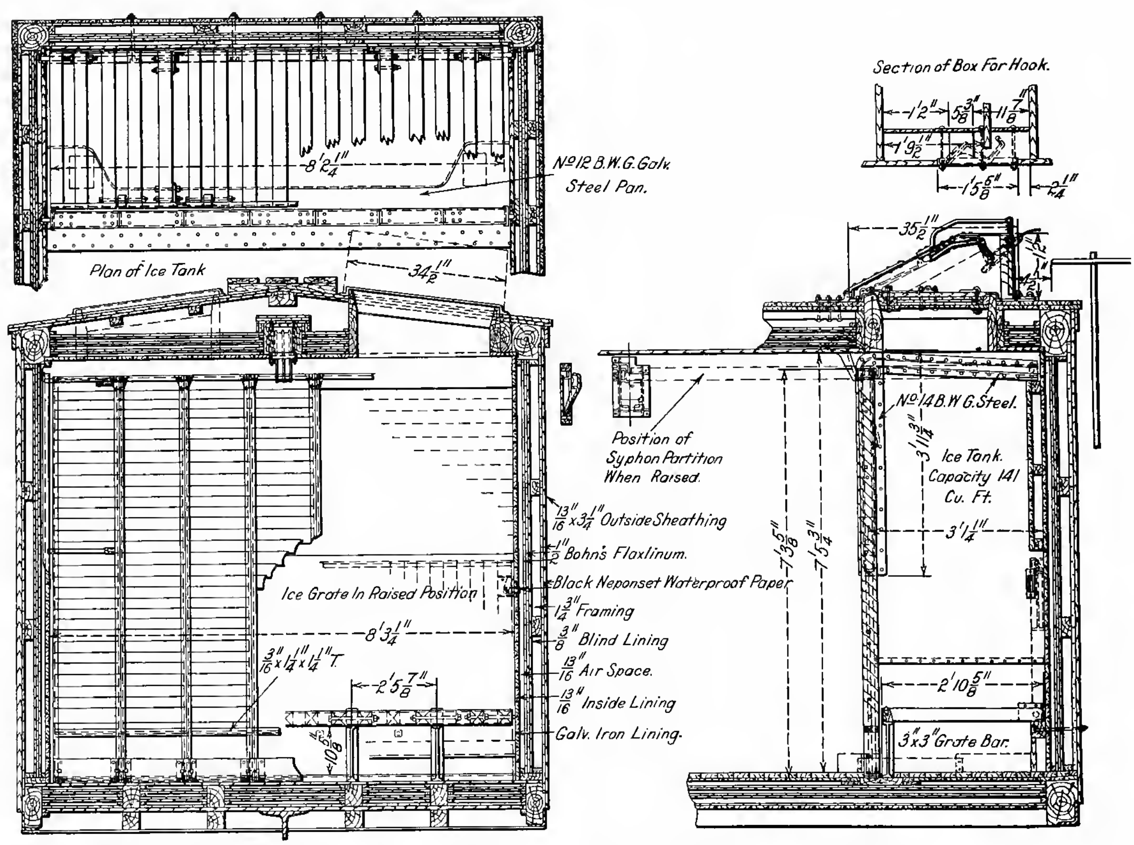


Fig. 837—Insulation and All-Steel Removable Bulkhead for Refrigerator Cars, Bohn System. White Enamel Refrigerator Company.

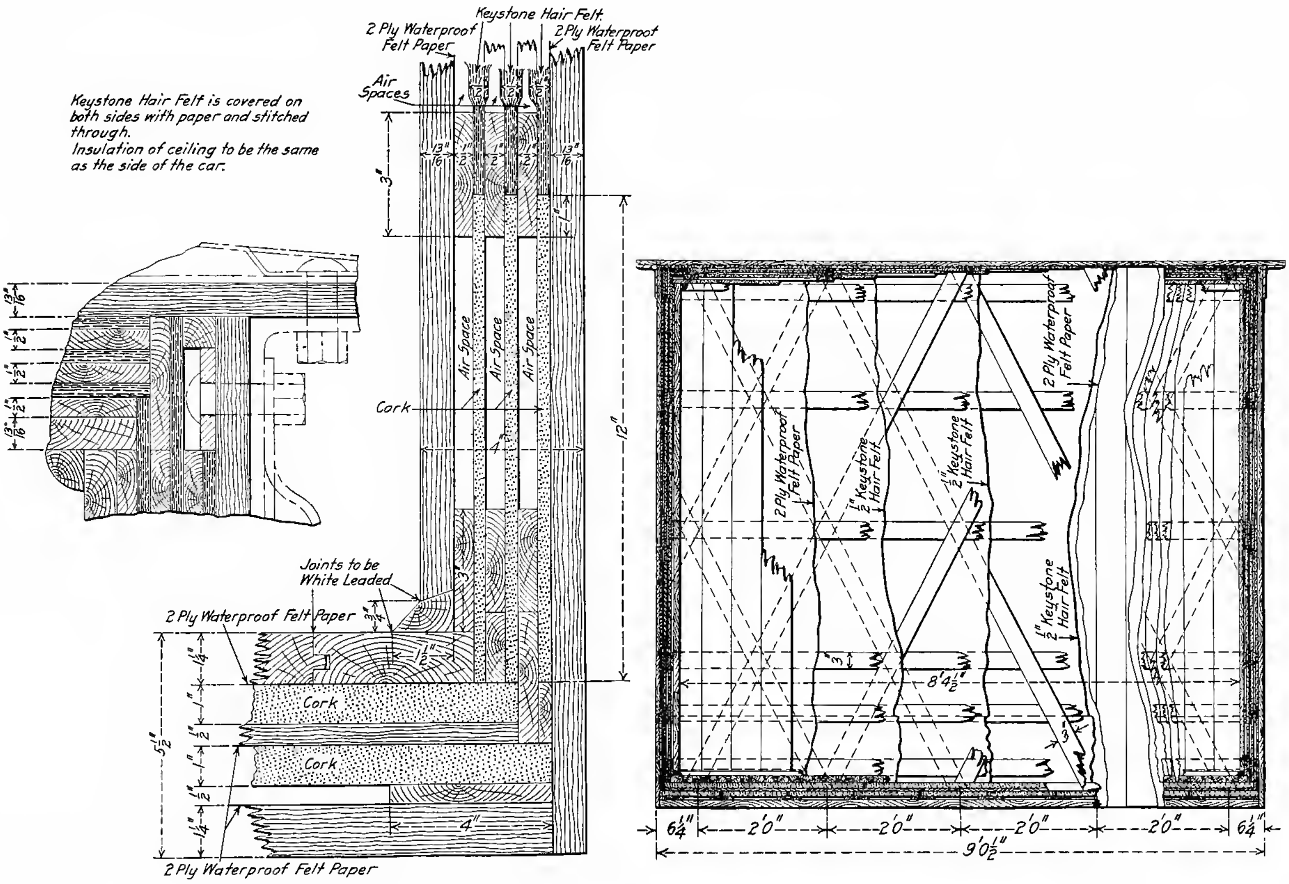


Fig. 838—Insulation Details for Pennsylvania Railroad Steel Frame Refrigerator Cars.

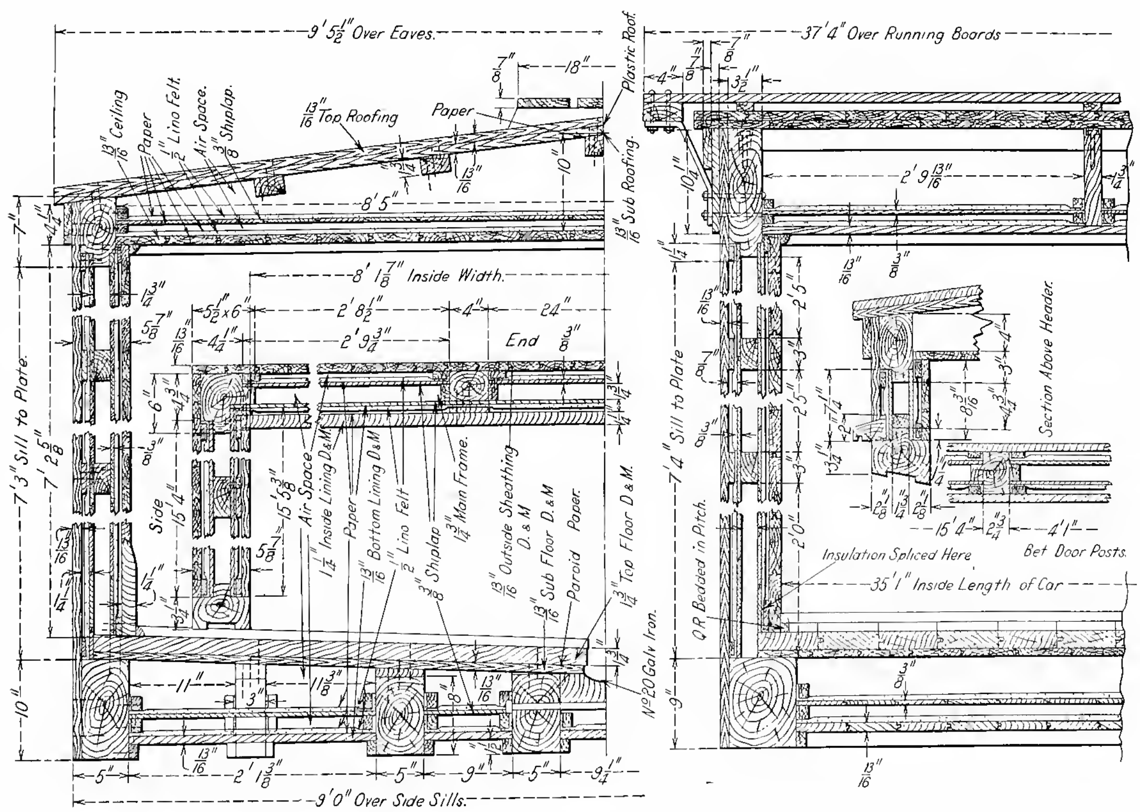


Fig. 839—Refrigerator Car Insulation Details. Milwaukee Refrigerator Transit & Car Company.

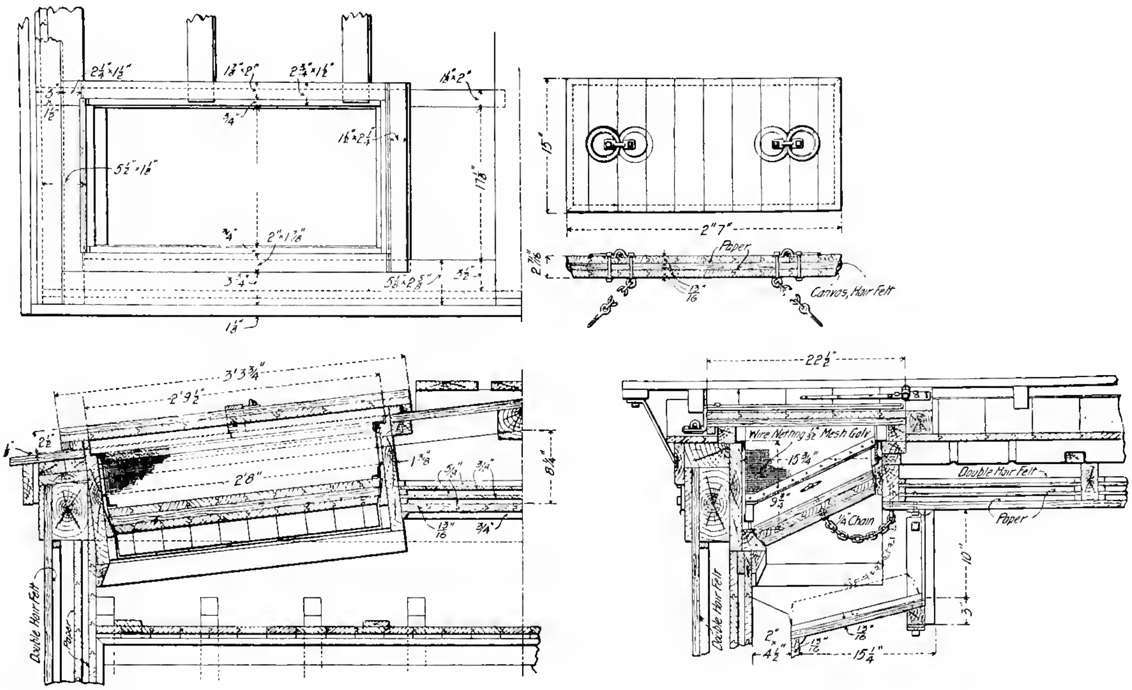


Fig. 840—Details of Ventilators for New York Central & Hudson River Produce Car.

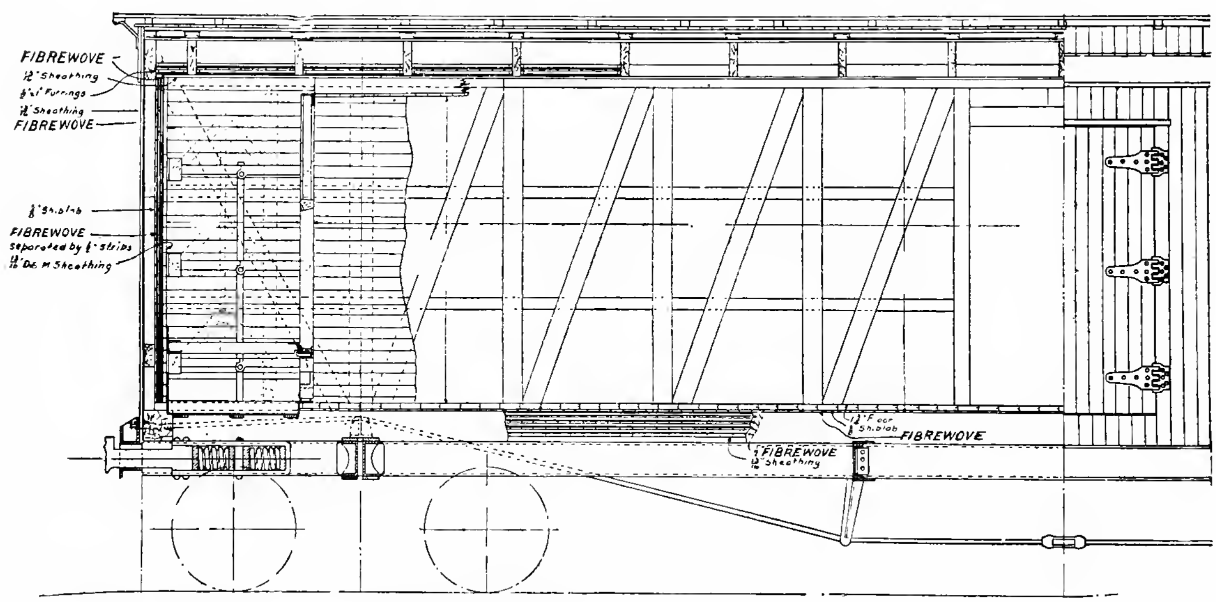


Fig. 841—Application of Fibrewove Insulating Paper to Refrigerator Car. Philip Carey Company.

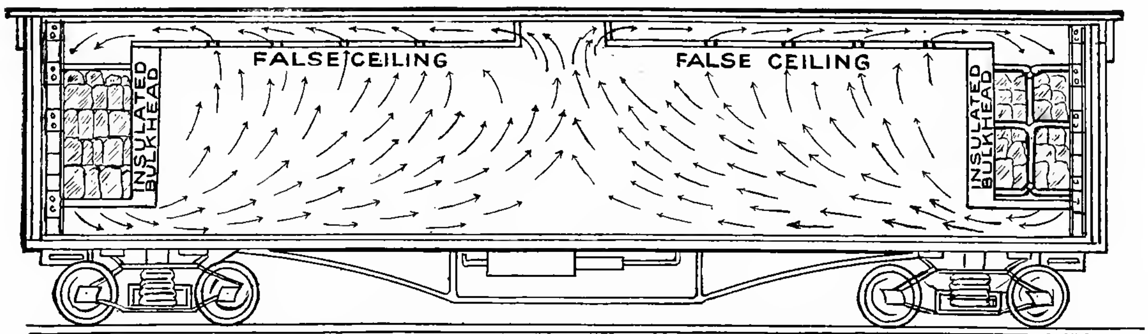
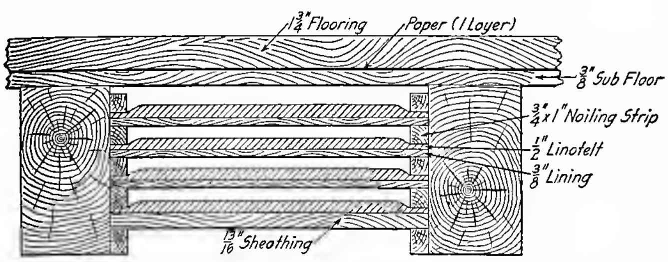
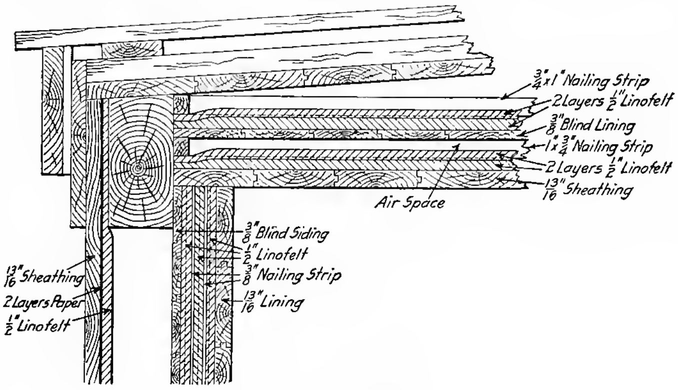


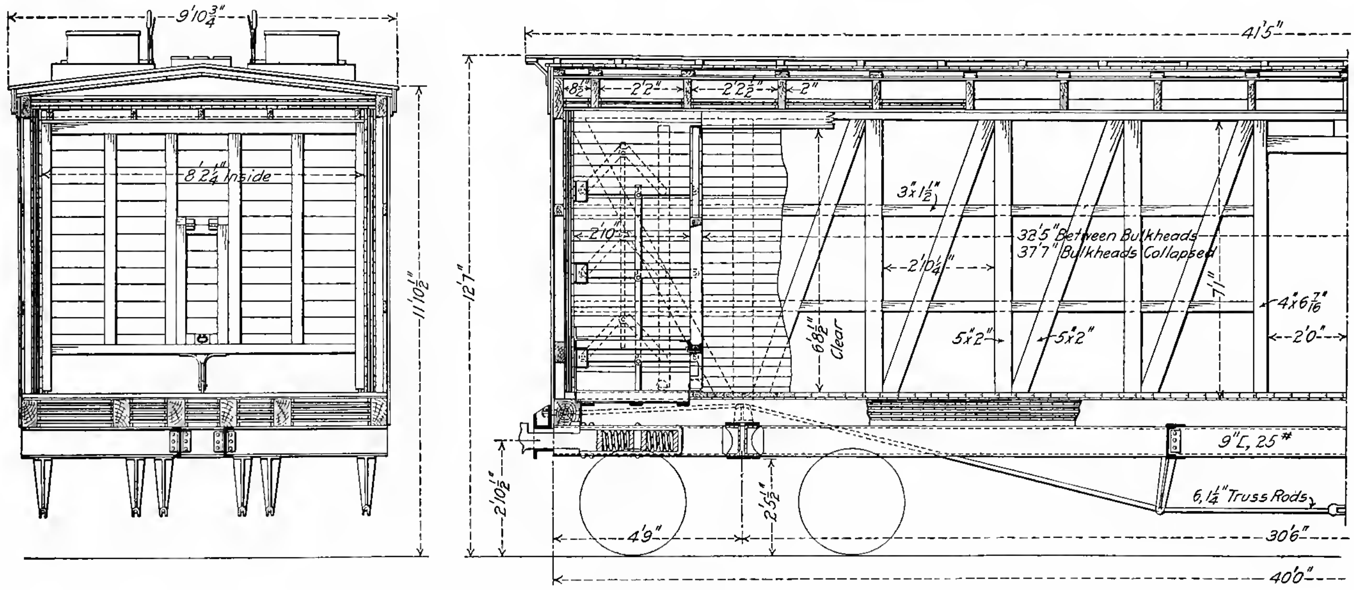
Fig. 842—Diagram of Refrigerator Car, Union Fibre Company's System, Showing Air Circulation.



Floor.

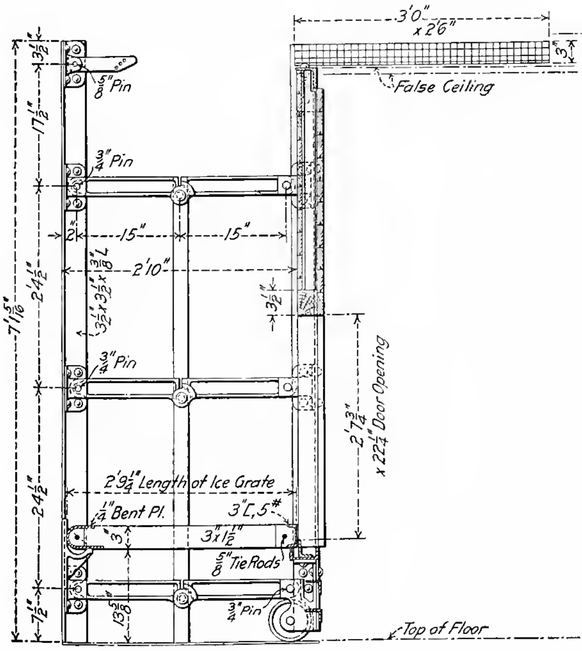


Roof.

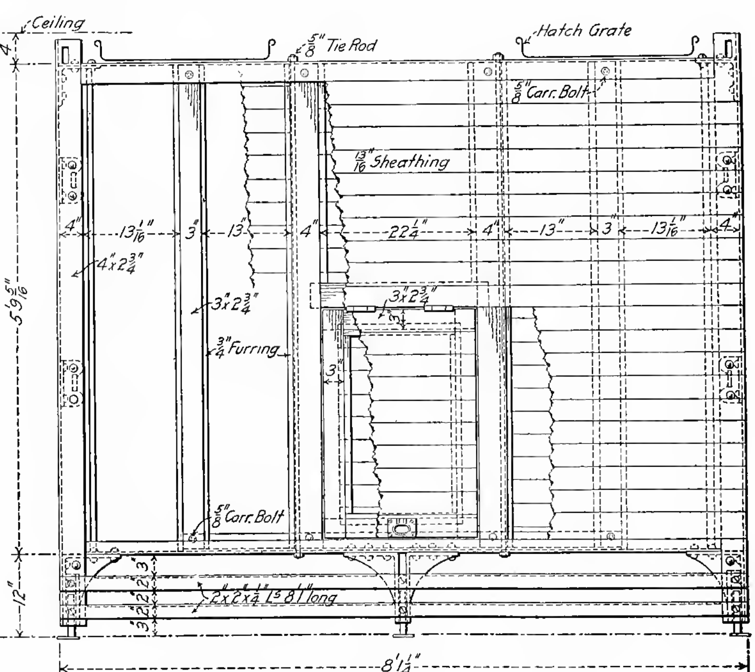


Car Body.

Fig. 843—Refrigerator Car Insulation. Union Fibre Company.



Cross Section.



Elevation Showing Framing. Front Elevation.

Fig. 844—Collapsible Ice Bunker for Refrigerator Car. Union Fibre Company.

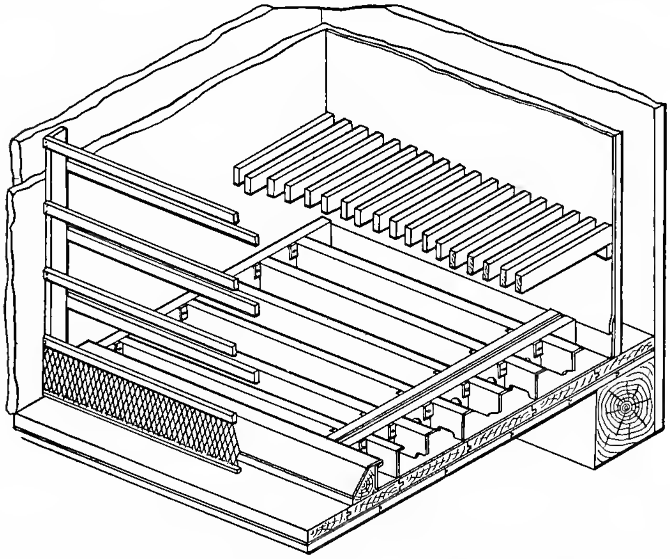


Fig. 845—Non-Splash Drip Pan for Collapsible Ice Bunker. Union Fibre Company.

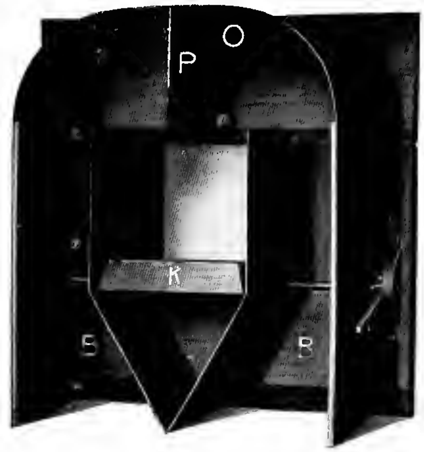


Fig. 846—Leeds Ventilator for Refrigerator Cars, with Top Removed. **B, B** are Air Passages; Plate **P** Prevents Air from Circulating Around Ventilator; **O** Shows Position of Drainage Hole. Plug **K** is Shown Open for Admission of Air to Ice Tank or Bunker.

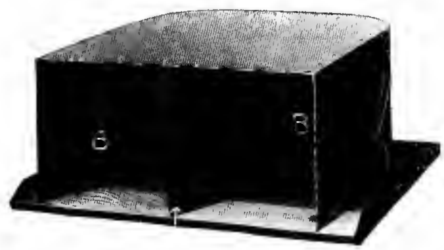
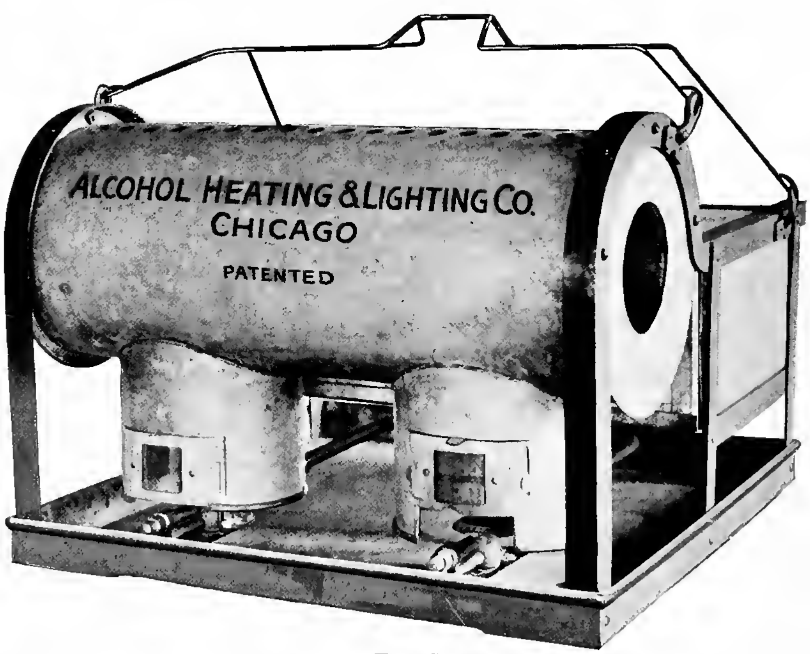


Fig. 847—Leeds Ventilator for Refrigerator Cars. Arrow Indicates Deflector Which Carries Air into Passages, **B, B.** Union Fibre Company.

Single Burner Type.



Two Burner Type.

Fig. 848—Alcohol Portable Stoves for Heating Refrigerator Cars for Transportation of Perishable Products in Cold Weather. Alcohol Heating & Lighting Company.

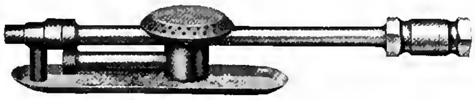


Fig. 849—Alcohol Burner for Alcohol Heating & Lighting Company's Heaters.

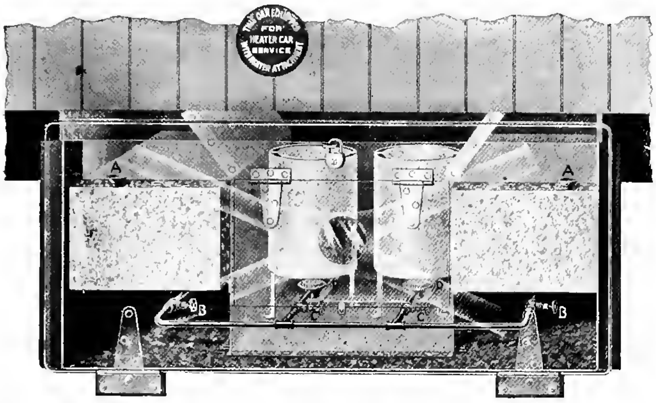


Fig. 850—Heater Box as Applied to Refrigerator Car, Showing Location of Heater Drums and Alcohol Supply Tanks.

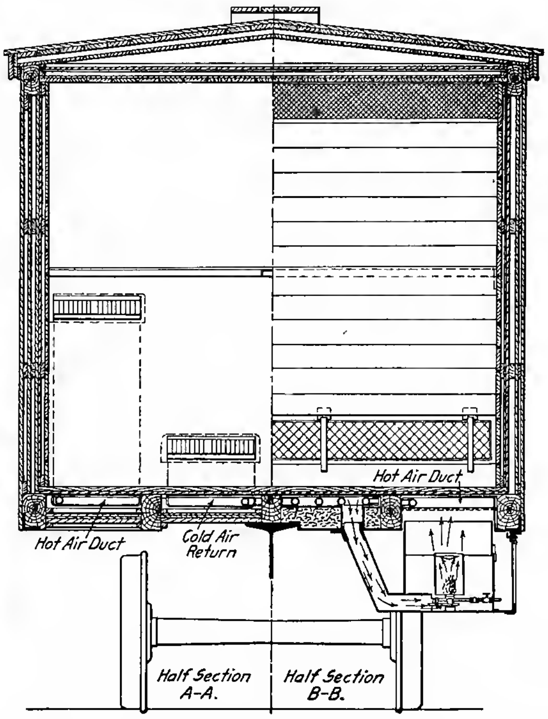


Fig. 851—Cross Sections of Refrigerator Car Shown in Fig. 852, Showing Application of Heater.

Alcohol Heating & Lighting Company.

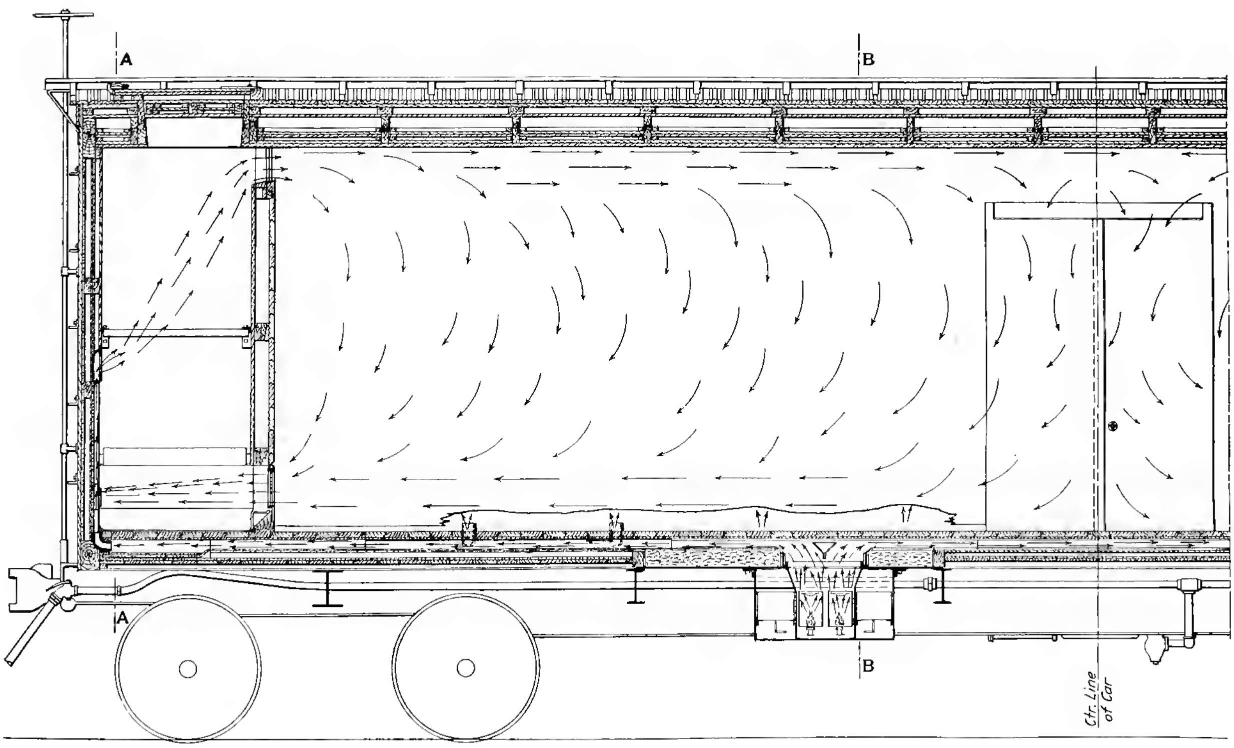


Fig. 852—Section Through Refrigerator Car Equipped with the Alcohol Heating & Lighting Company's Heating System, Showing Location of Heater and Passages, and Flow of Air Currents. See also Fig. 118.

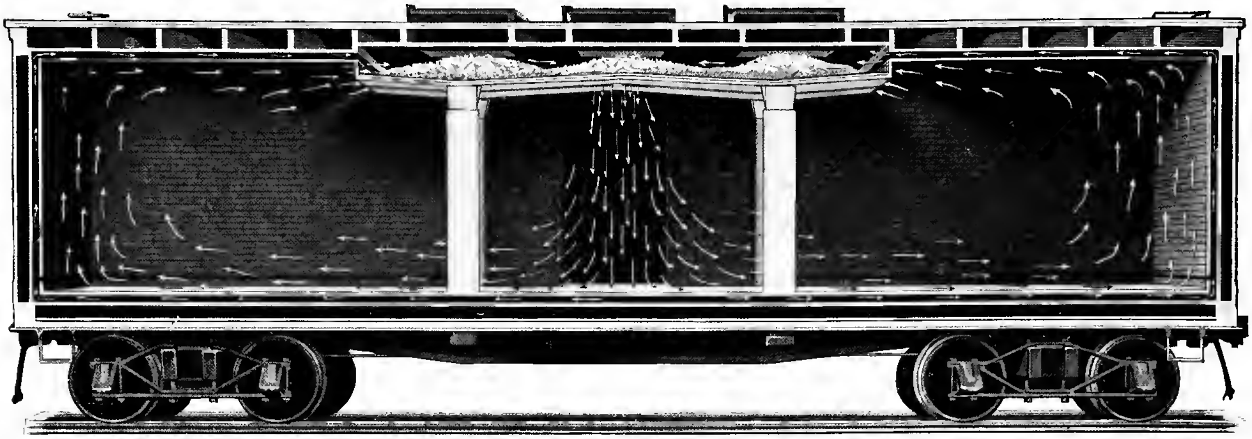


Fig. 853—Air Circulation in Moore Patent Car when Arranged for Refrigeration.

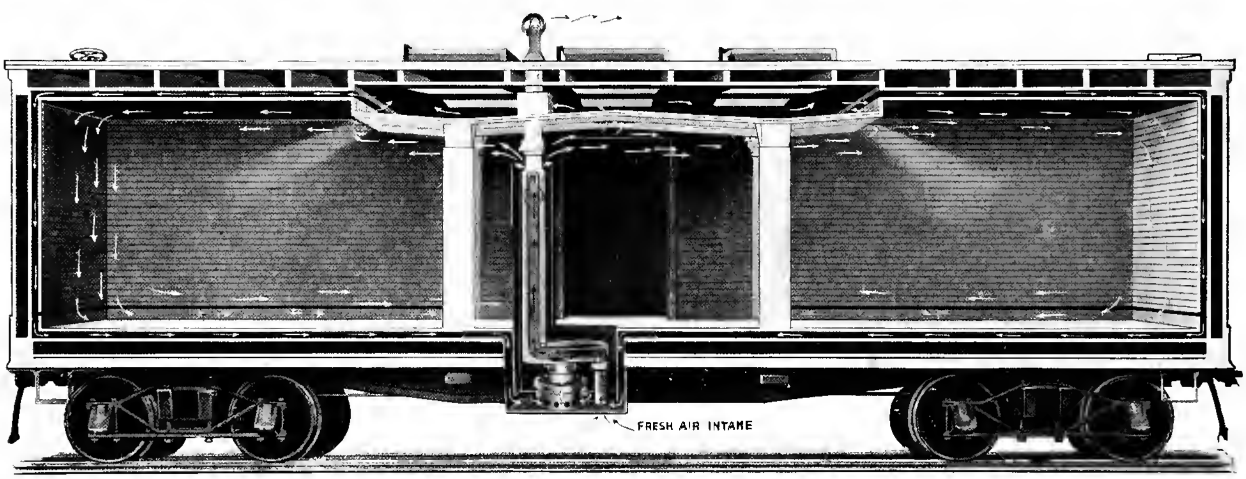


Fig. 854—Air Circulation in Moore Patent Car when Arranged for Heating.

Fig. 855—Air Circulation in Moore Patent Car when Arranged for Ventilation. Moore Patent Car Company. See also Figs. 109 and 114.

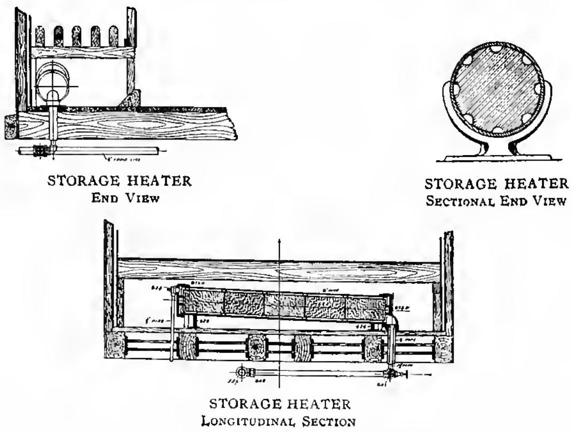


Fig. 856—Gold's Improved Storage Heater for Use in Refrigerator Cars During Cold Weather. Gold Car Heating & Lighting Company.

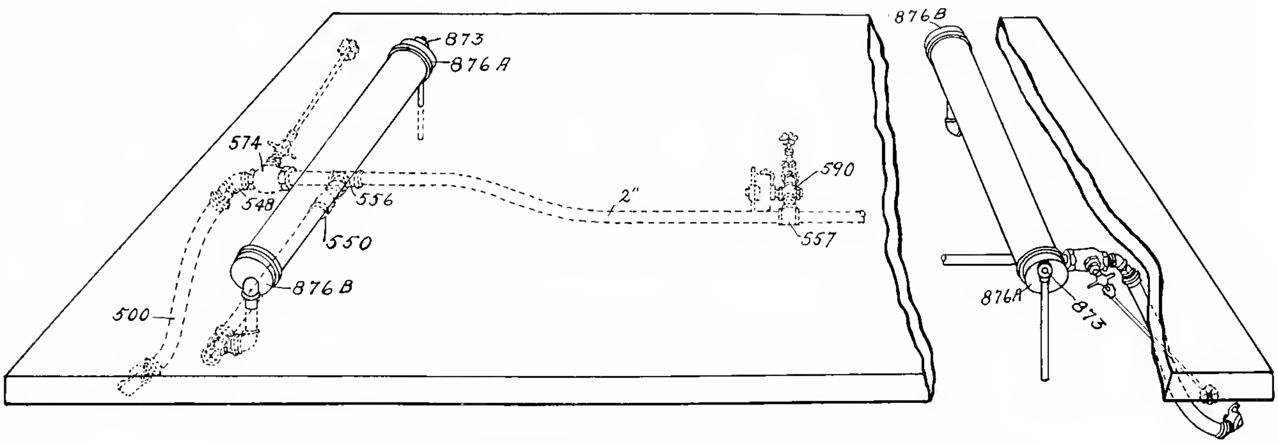


Fig. 857—Piping Arrangement for Gold's Improved Storage Heaters.

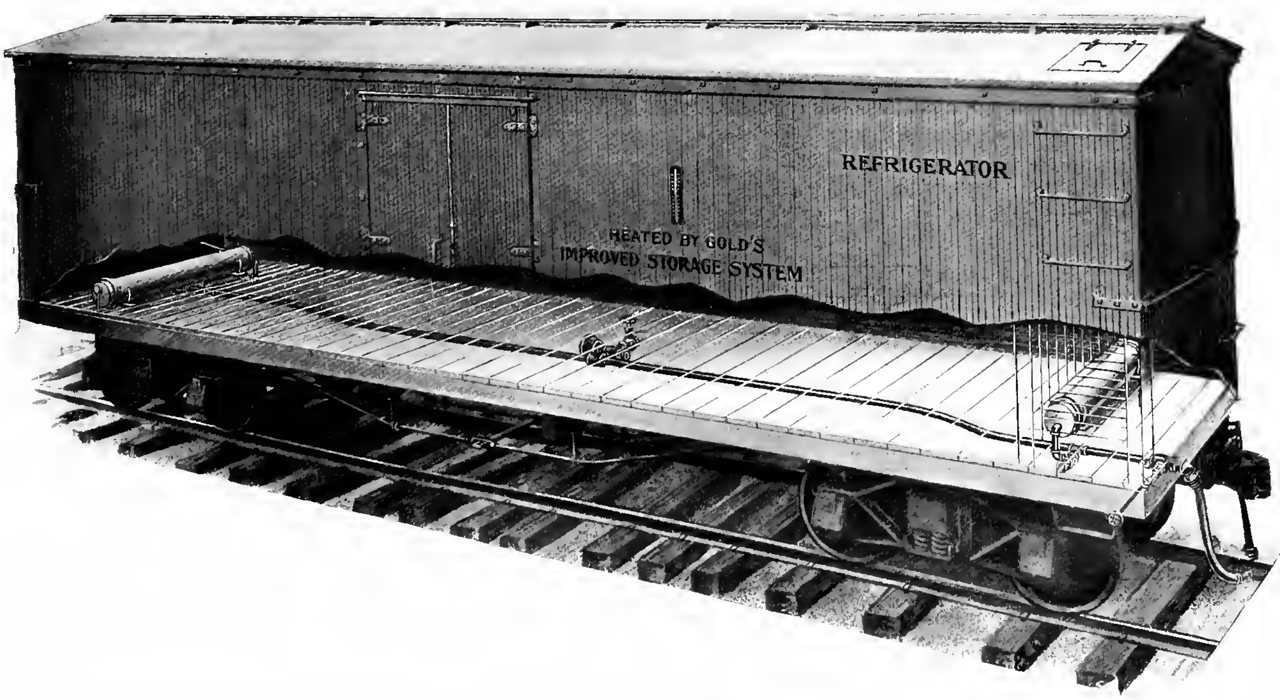


Fig. 858—Gold's Improved Storage Heaters as Applied to a Refrigerator Car. Gold Car Heating & Lighting Company.

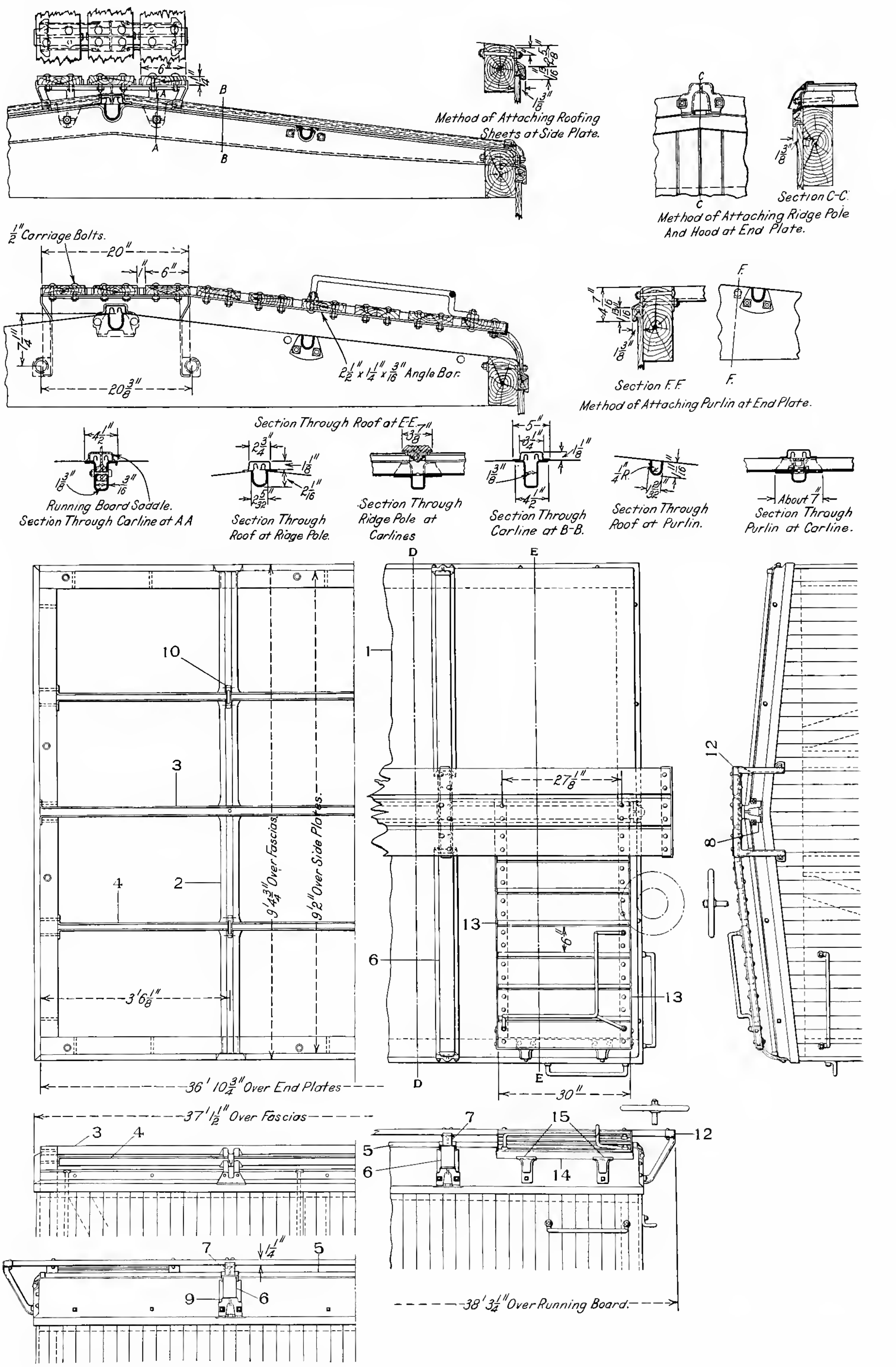


Fig. 859—General Arrangement and Details of Franklin Flexible Metallic Roof for Box Cars. Franklin Railway Supply Company.

See Page 543 for Names of Numbered Parts.

Parts of Franklin Roof. See Fig. 859.

1 *Roofing Sheets*
2 *Carlines*
3 *Ridge Pole*
4 *Purlins*
5 *Ridge Caps*
6 *Carline Caps*
7 *Running Board Saddles*
8 *Ridge Pole Hoods*
9 *Carline Hoods*
10 *Purlin-Carline Keys*
12 *Running Board Brackets*
13 *Running Board Side Extension Supports*
14 *Running Board End Extension Supports*
15 *Running Board Extension Brackets*

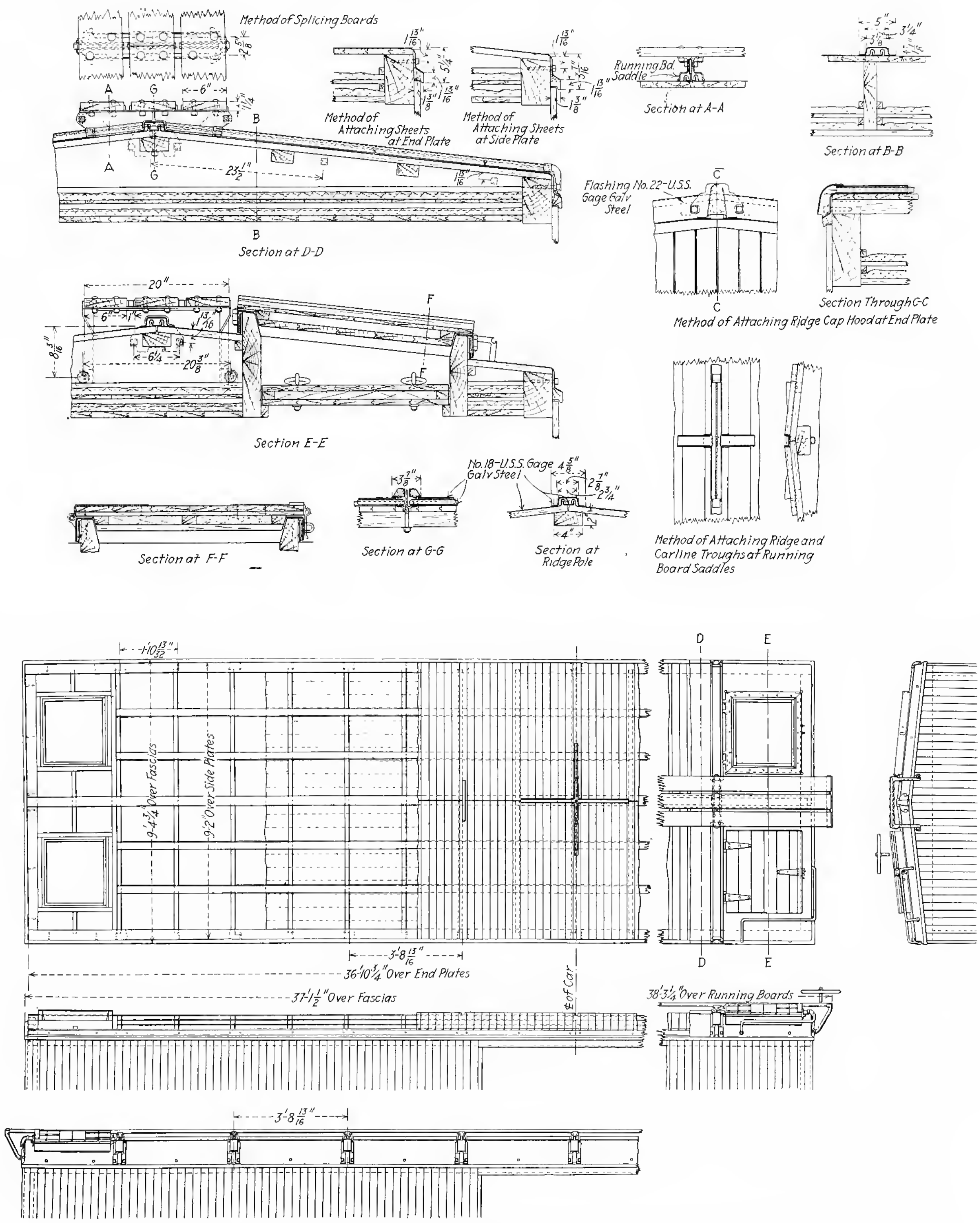


Fig. 860—General Arrangement and Details of Outside Type of Franklin Flexible Metallic Roof for Refrigerator Cars. Franklin Railway Supply Company.

Fig. 861—Western Steel Carline. Western Railway Equipment Company.

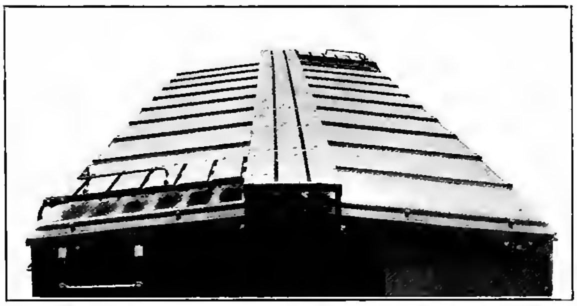


Fig. 862—Franklin Flexible Metallic Roof Applied to Box Car. Franklin Railway Supply Company.

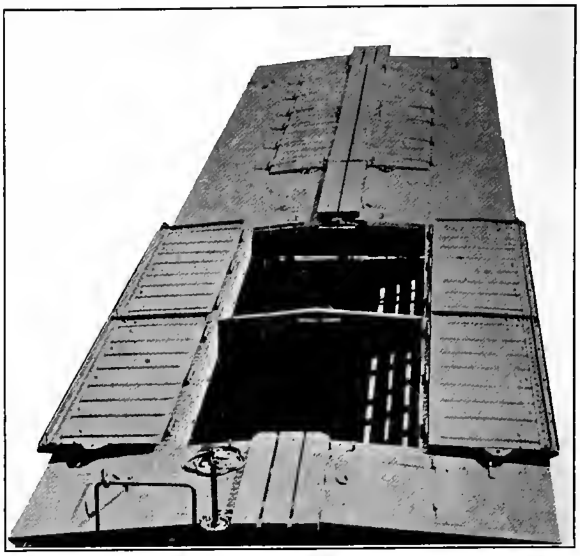


Fig. 863—Roof of General Service Car Shown in Fig. 92. National Dump Car Company.

Fig. 864—Interior View of Box Car Equipped with Franklin Flexible Metallic Roof. Franklin Railway Supply Company.

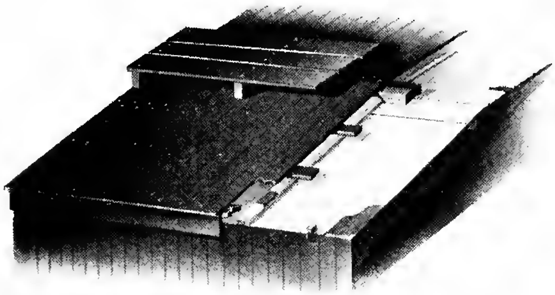


Fig. 865—Hutchins Air Space Sectional Plastic Car Roof.

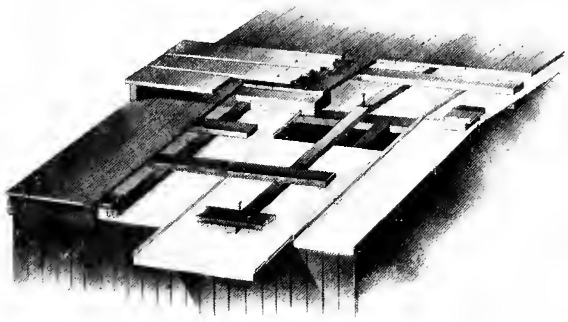


Fig. 866—Hutchins All-Metal Inside Roof.

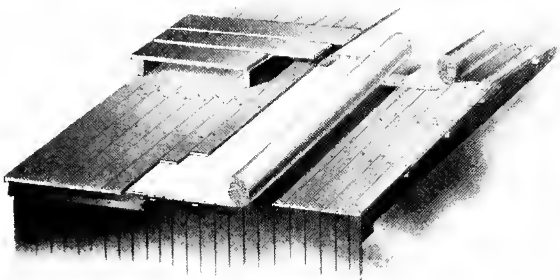


Fig. 867—Hutchins Plastic Car Roof.

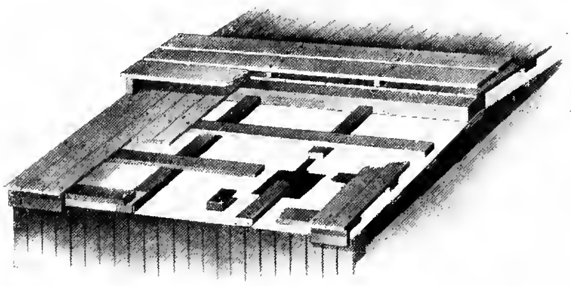


Fig. 868—Hutchins Sectional Metal Inside Roof.

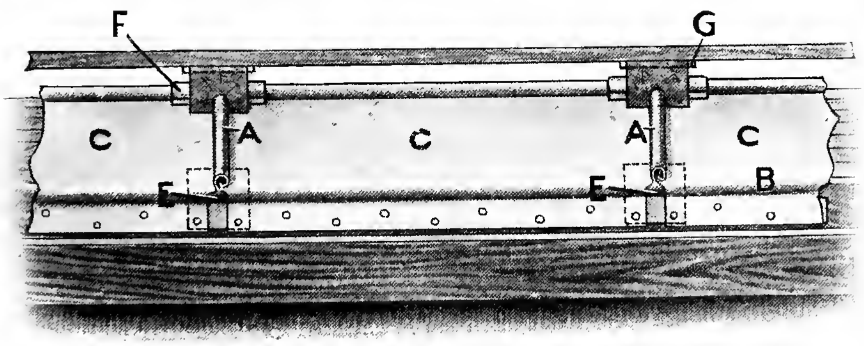


Fig. 869—Hutchins Type D Outside Metal Roof.

Parts of Hutchins Type D Roof.

A *Lock Roll Joint*
B *Torsion Eave Bead*
C *Galvanized Roofing Sheets*
E *Galvanized Joint Eave Filler Piece*
F *Galvanized Center Hood*
G *Galvanized Saddle Cover*

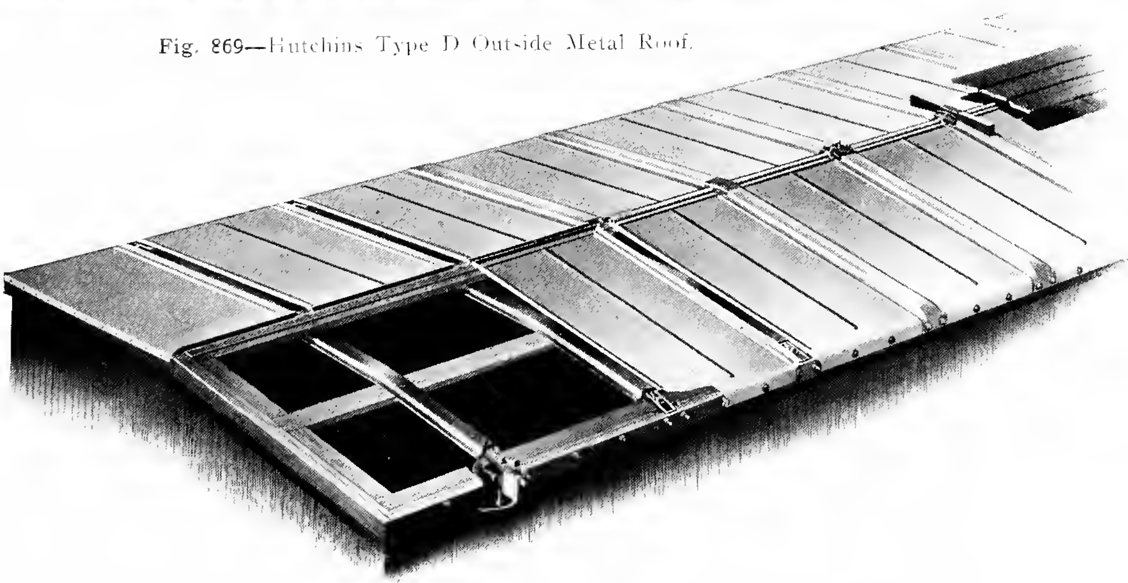


Fig. 870—Hutchins Improved All-Steel Steel Carline Roof.

Hutchins Car Roofing Company.

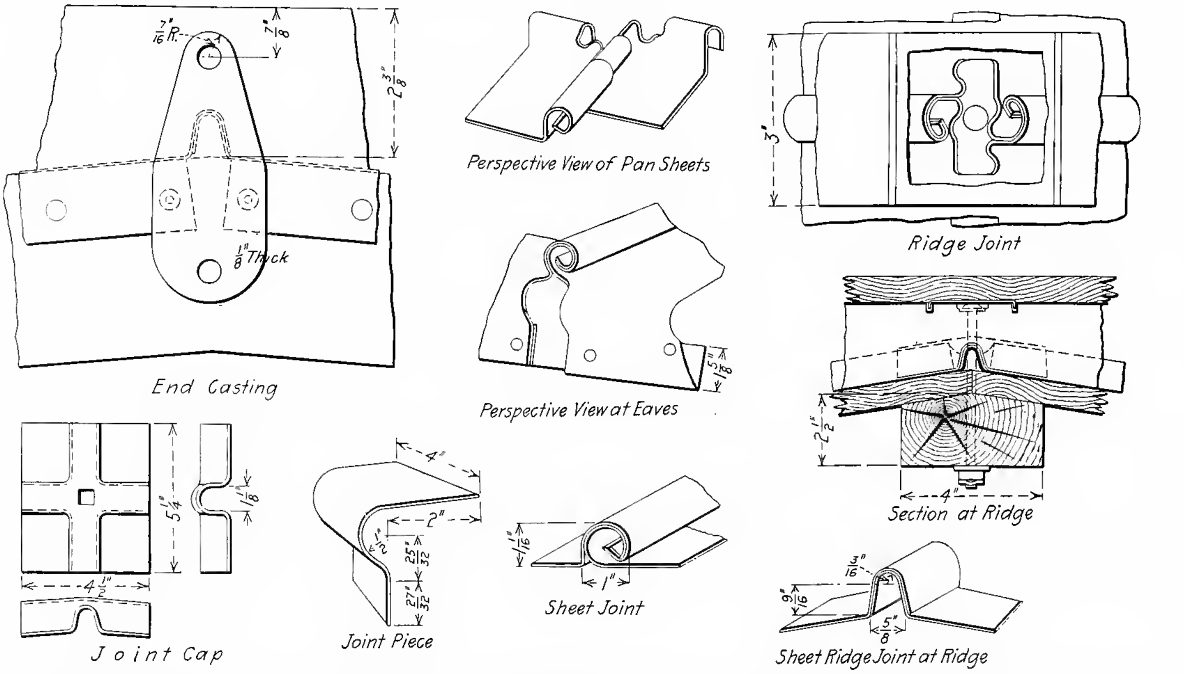


Fig. 871—Details of Hutchins Type D Outside Metal Roof. See also Fig. 869. Hutchins Car Roofing Company.

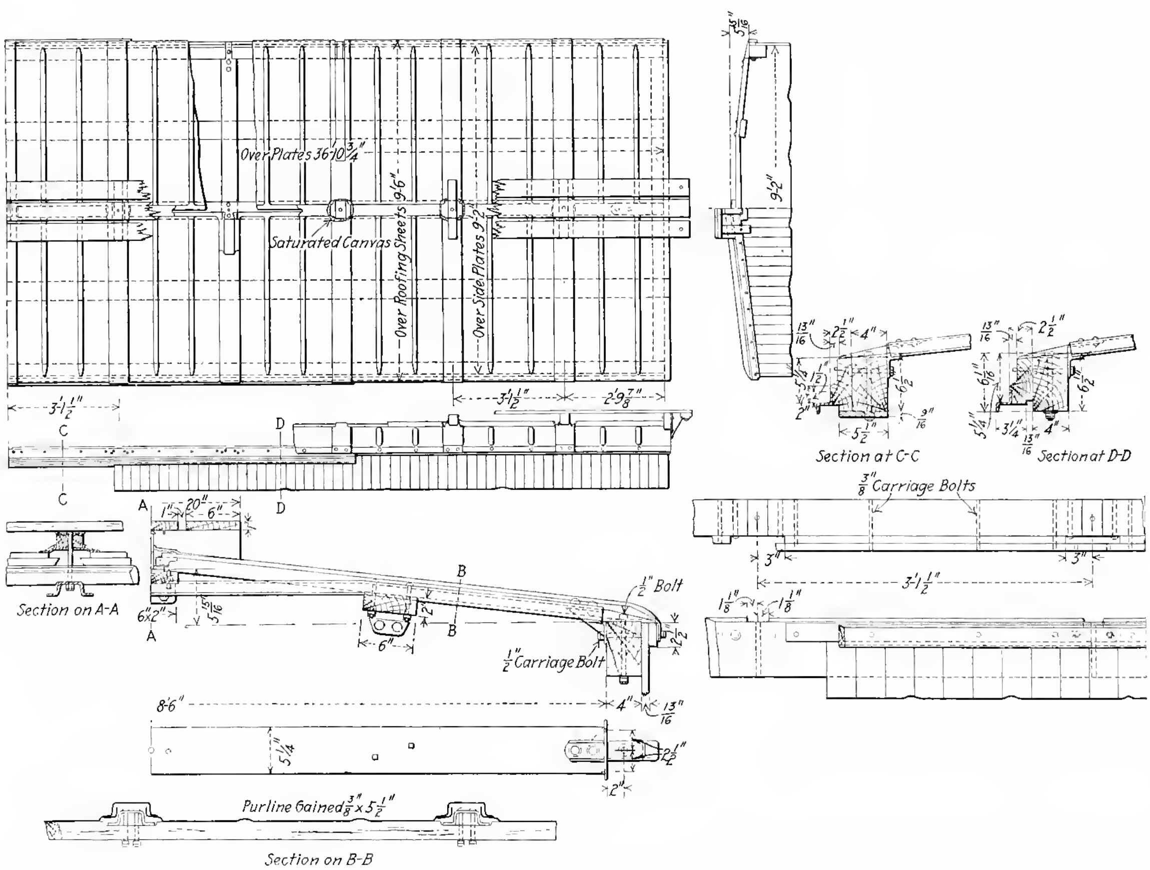


Fig. 872—Details of Hutchins All-Steel Steel Carline Roof. See also Fig. 870. Hutchins Car Roofing Company.

NOTE.—In Figs. 269-271 are shown general drawings of a Pennsylvania Railroad box car equipped with an all-steel roof. This roof is attached to the superstructure in such a manner as to leave an opening for ventilation between the carlines.

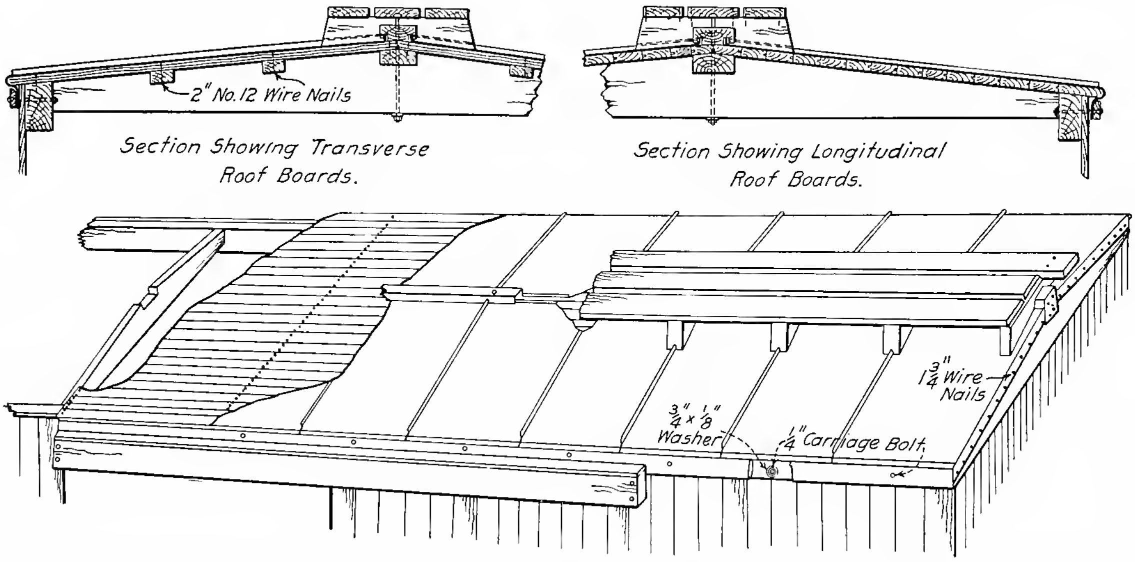


Fig. 873—Application of No. 4 Outside Iron Roof. Chicago-Cleveland Car Roofing Company.

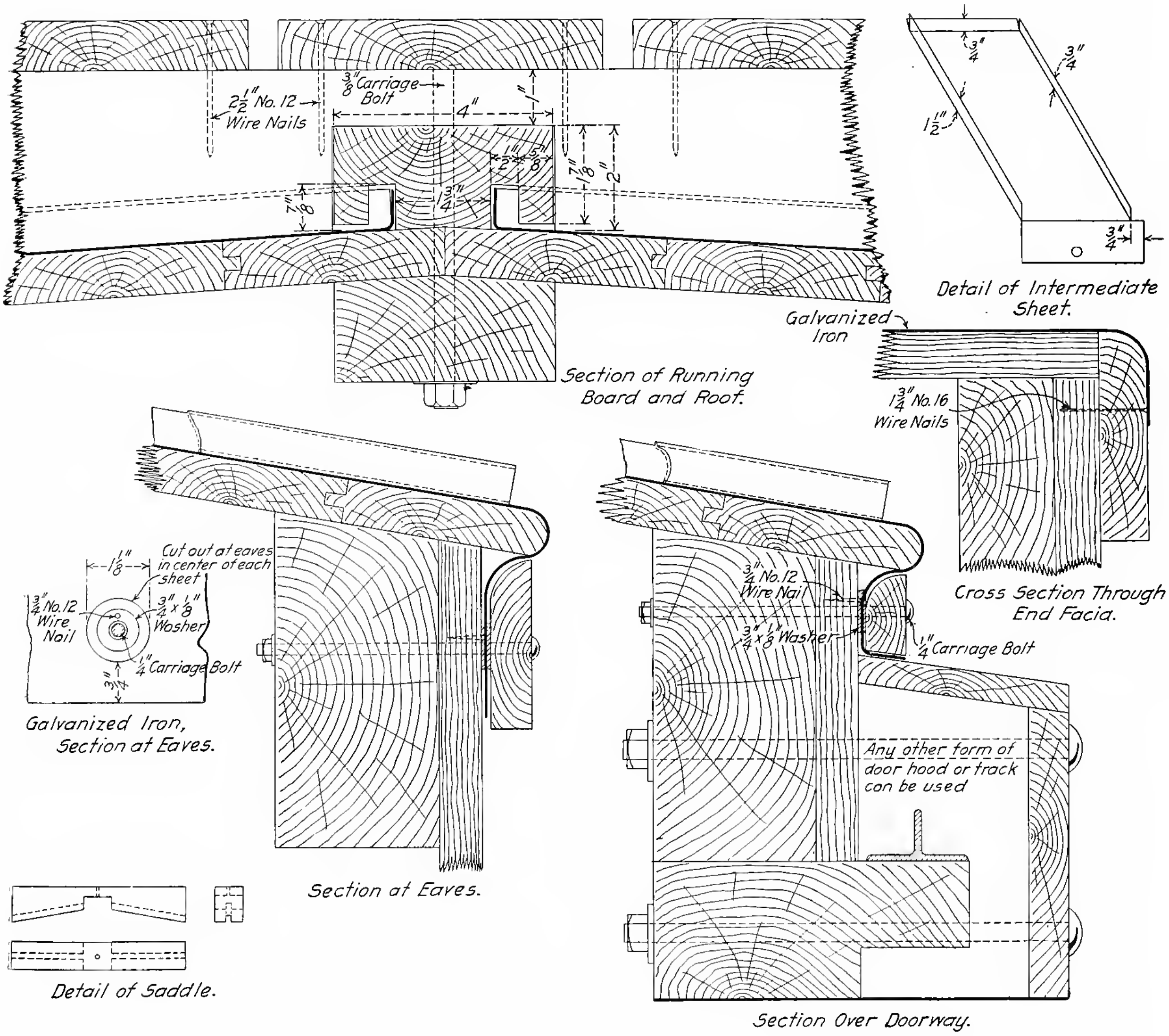


Fig. 874—Details of No. 4 Outside Iron Roof. Chicago-Cleveland Car Roofing Company.

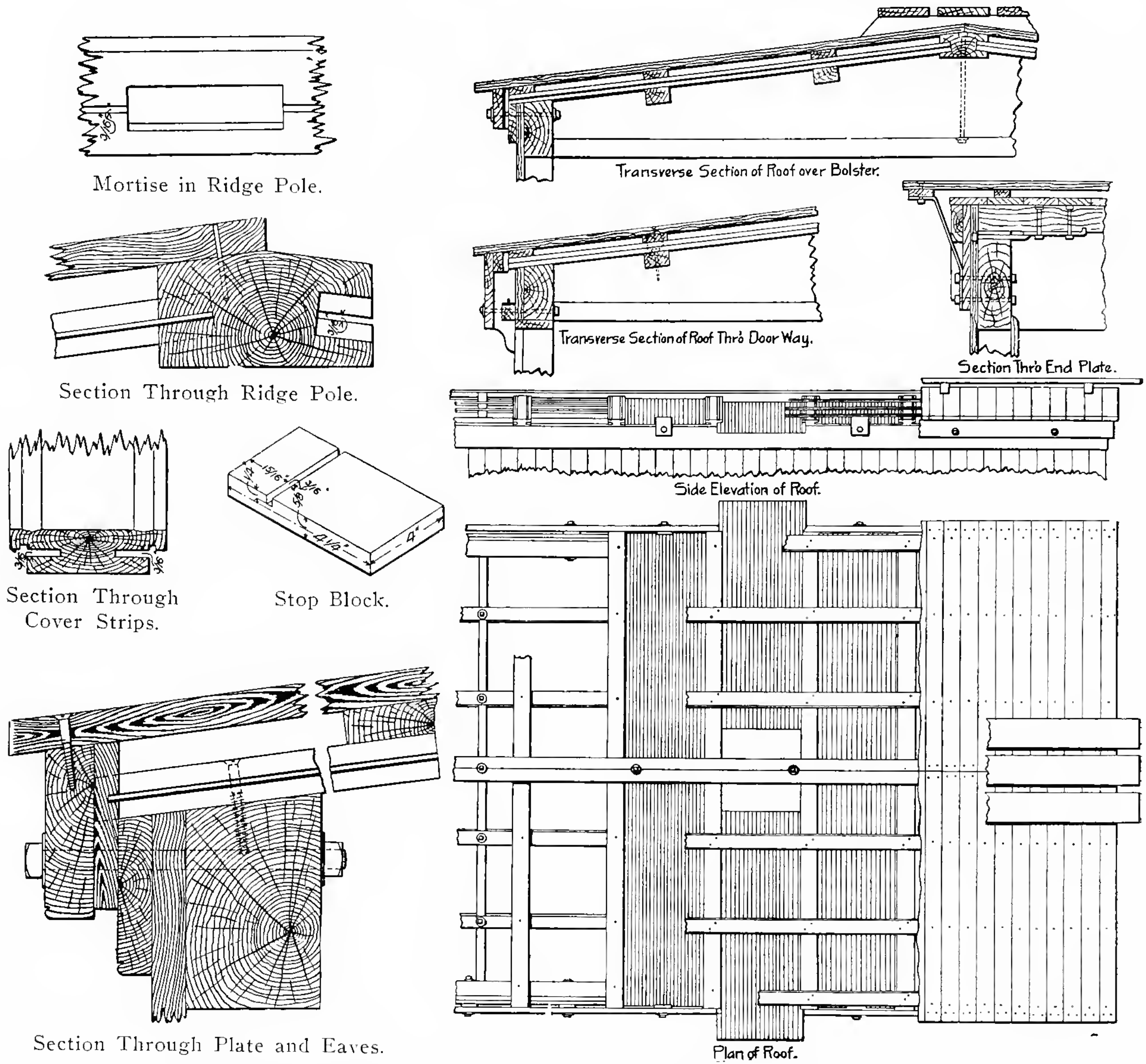


Fig. 875—Improved Chicago Car Roof. Chicago-Cleveland Car Roofing Company.

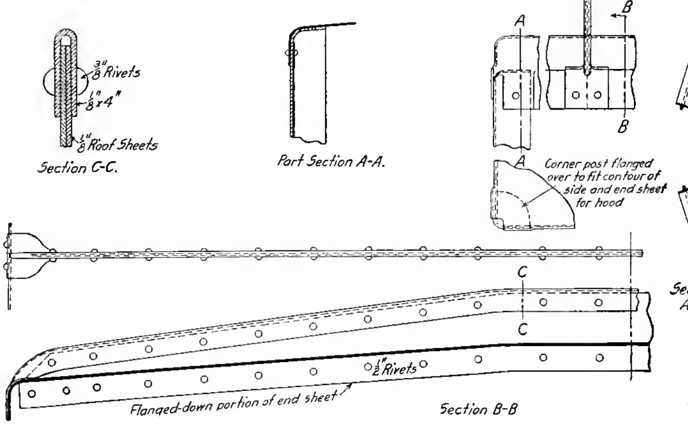


Fig. 876—Details of Steel Roof for Summers All-Steel Box Car Shown in Figs. 263-266.

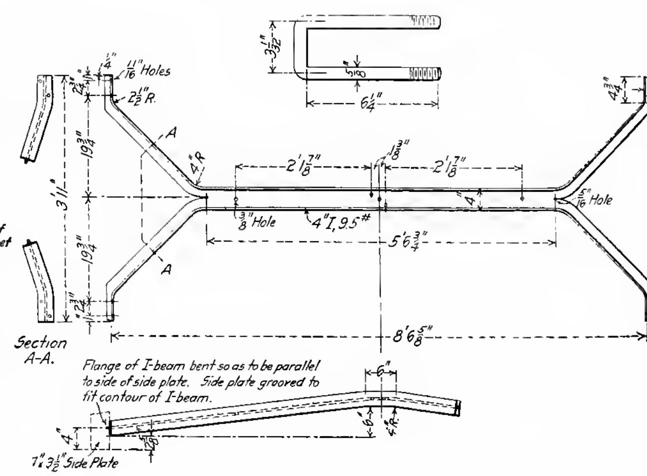


Fig. 877—I-Beam Carline. The Camel Company. This Carline is Shown Applied to Box Car in Fig. 289.

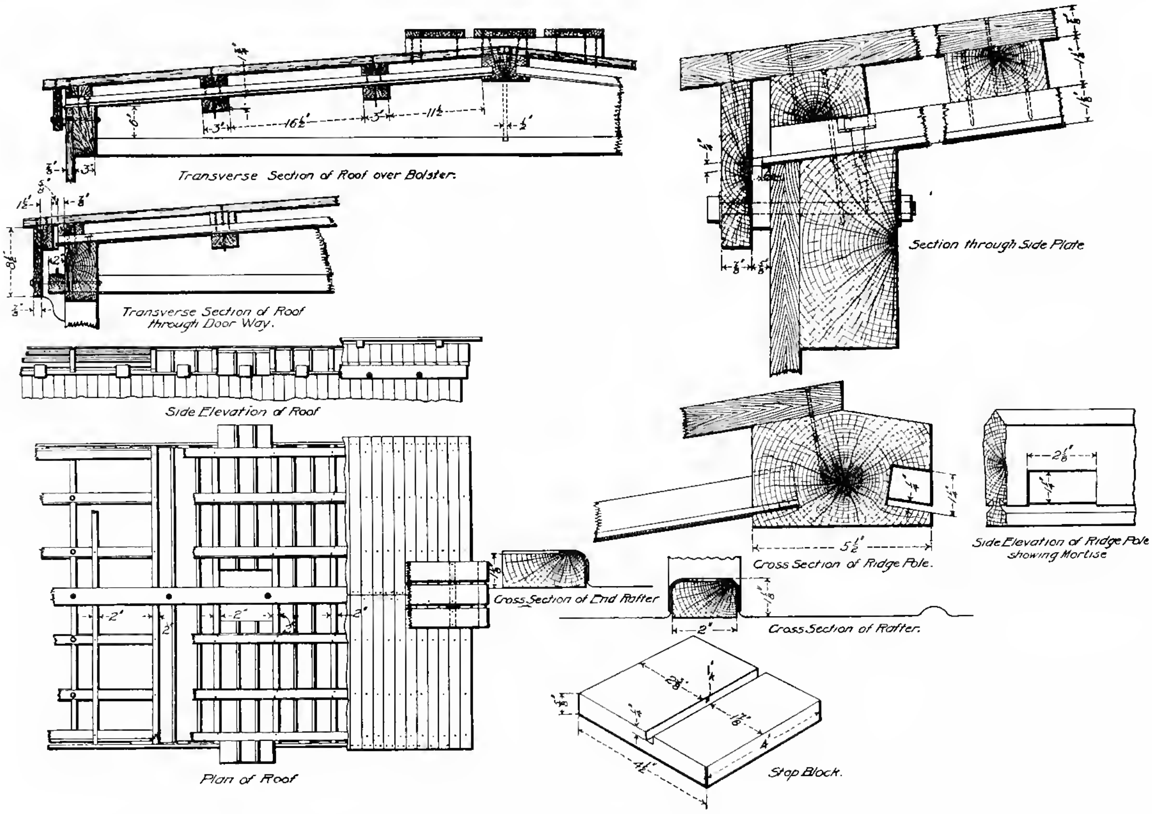


Fig. 878—Chicago Improved Winslow Roof. Chicago-Cleveland Car Roofing Company.

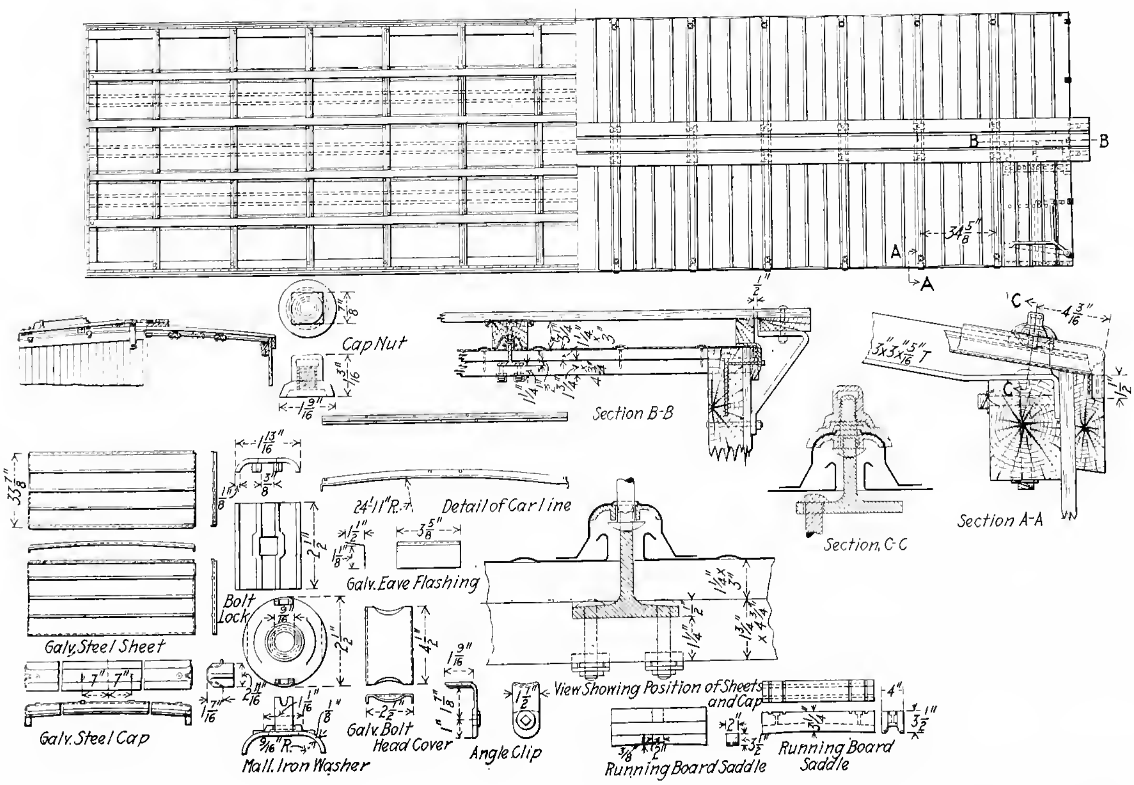


Fig. 879—New Murphy All-Steel Radial Car Roof and Details. Standard Railway Equipment Company.

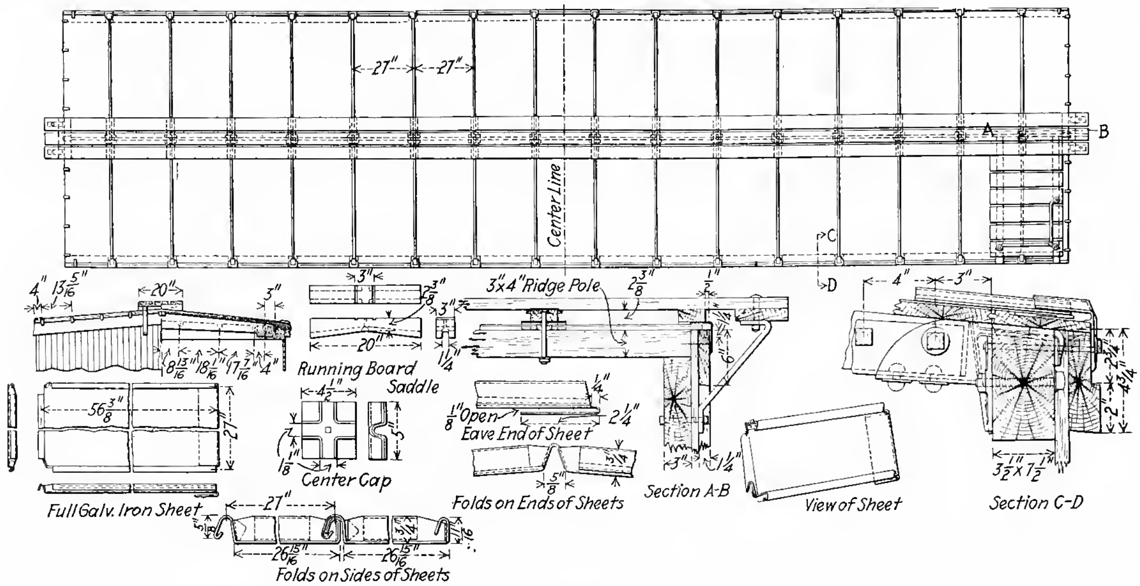


Fig. 880—New Murphy Car Roof, Type XLA and Details, for Louisville & Nashville Box Cars. Standard Railway Equipment Company.

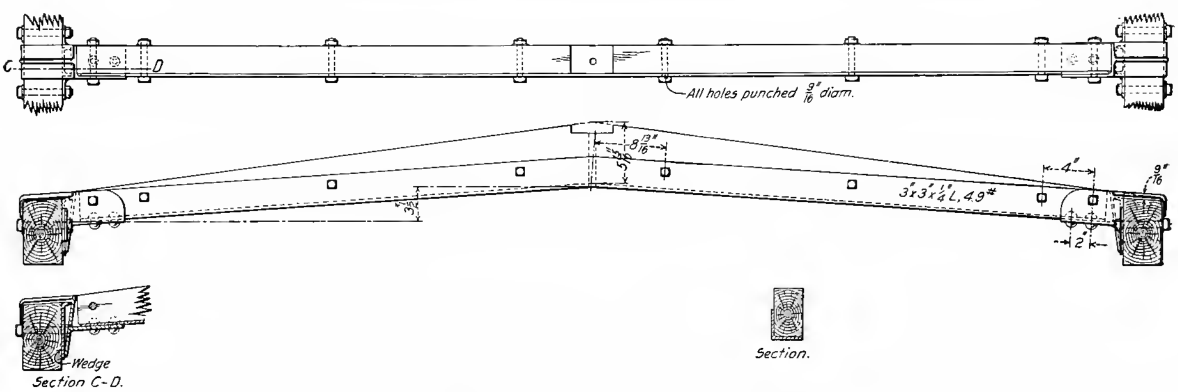


Fig. 881—Steel Angle Roof Carline. Standard Railway Equipment Company.

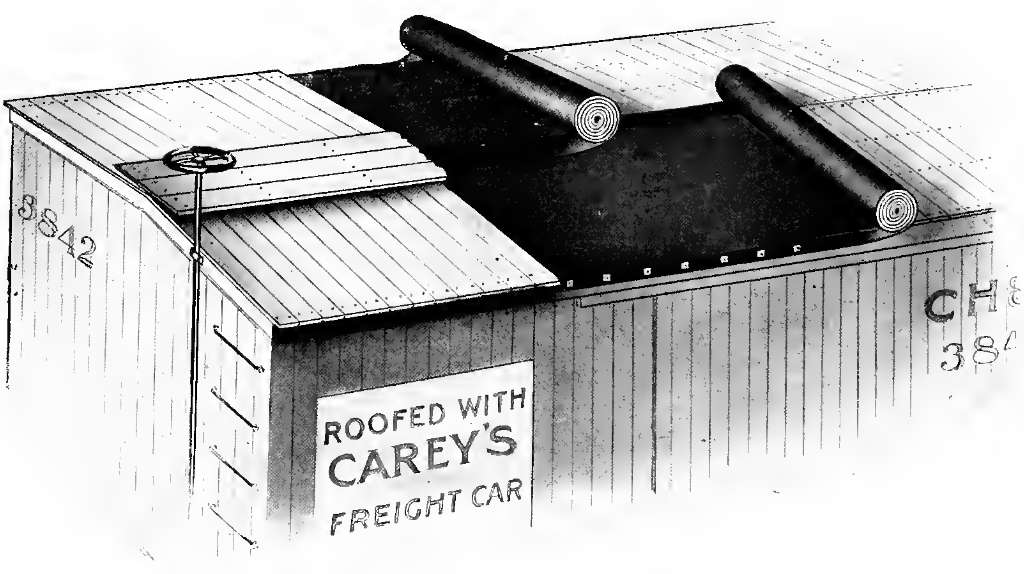


Fig. 882—Application of Carey's Three-Ply Burlap Center Freight Car Roofing. Philip Carey Company.

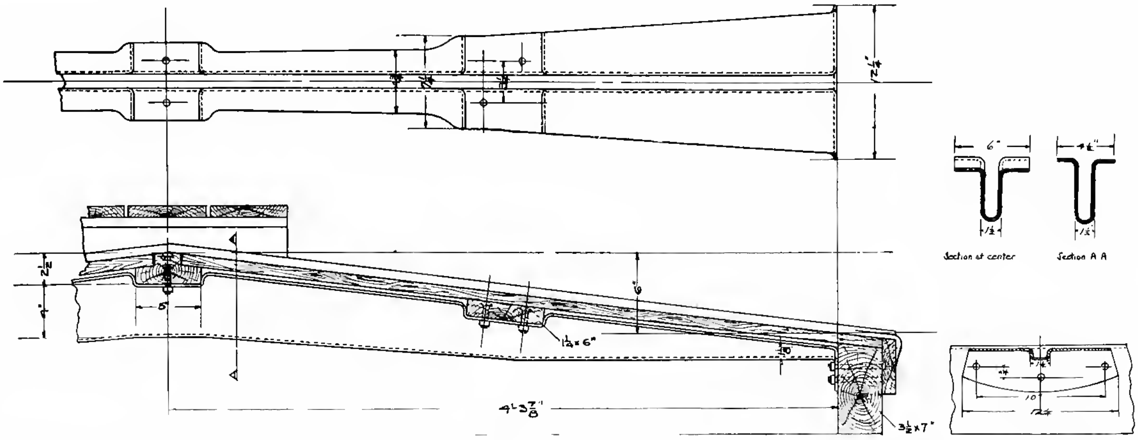


Fig. 883—Cleveland Type B Pressed Steel Carline with Wide Ends. Cleveland Car Specialty Company.

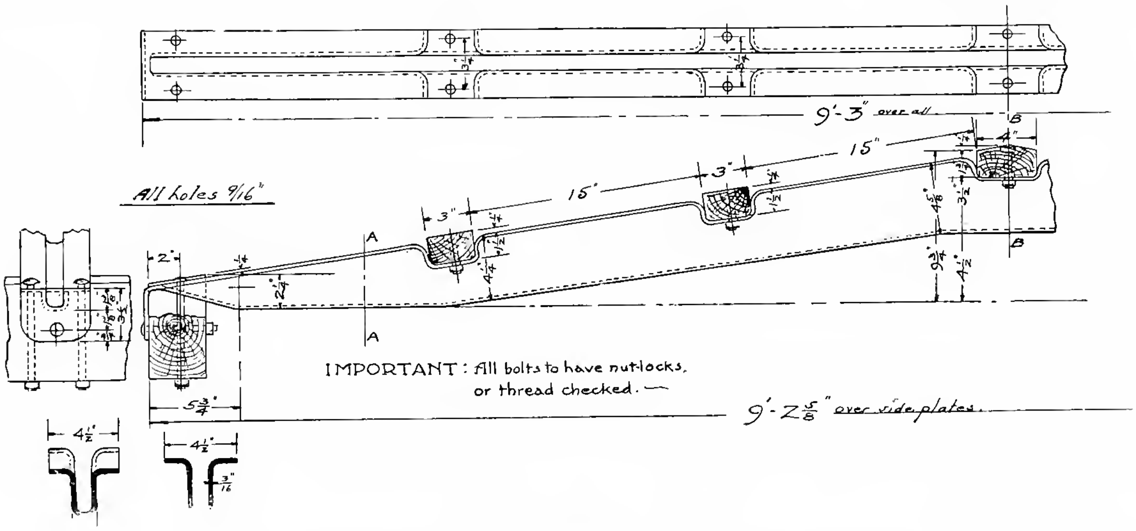


Fig. 884—Cleveland Type B Pressed Steel Carline, Heavy Pattern with Diminishing Ends. Cleveland Car Specialty Company.

Fig. 885—Cleveland Pressed Steel Roof Carline. Cleveland Car Specialty Company.

Fig. 886—Cleveland Pressed Steel Channel Carline for Outside Roofs. Cleveland Car Specialty Company.

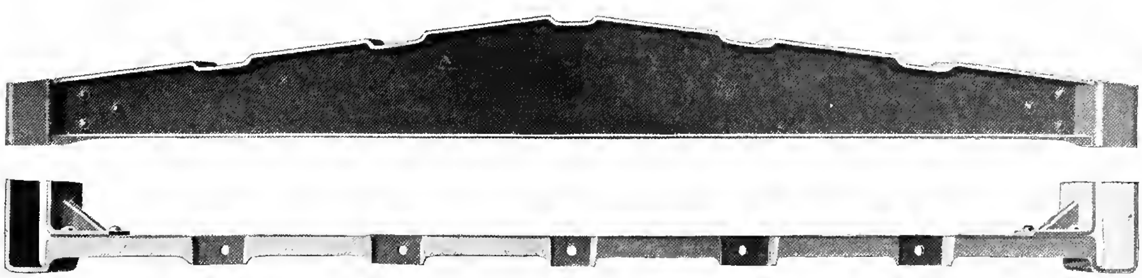


Fig. 887—Pressed Steel End Plate. Cleveland Car Specialty Company.

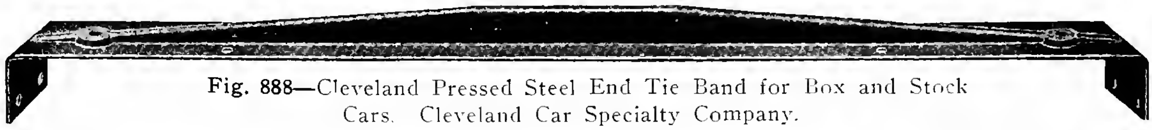


Fig. 888—Cleveland Pressed Steel End Tie Band for Box and Stock Cars. Cleveland Car Specialty Company.

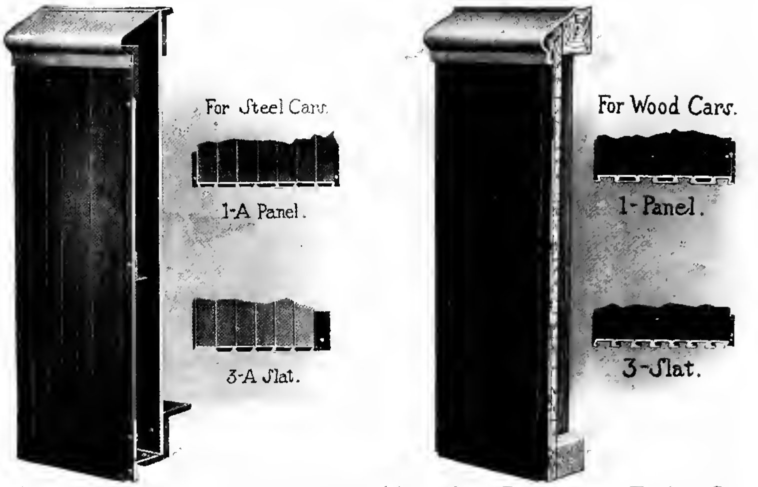


Fig. 889—Metallic (Steel) Sheathing for Passenger Train Cars. General Railway Supply Company.

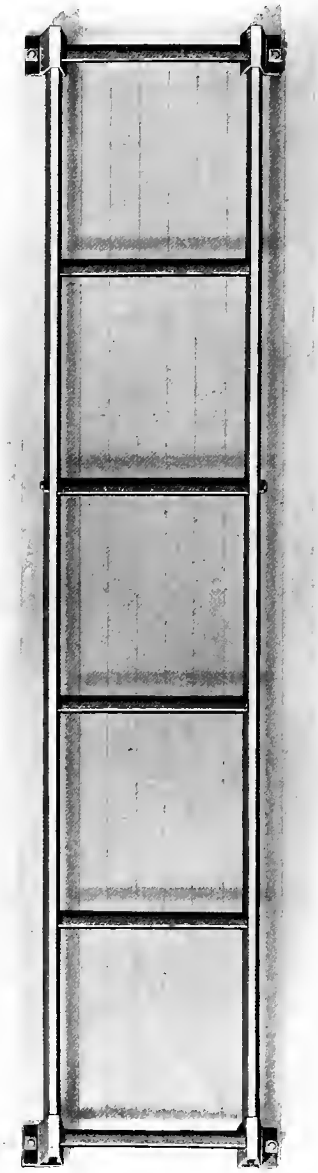


Fig. 891—Acme All-Steel Freight Car Ladder. Acme Supply Company.

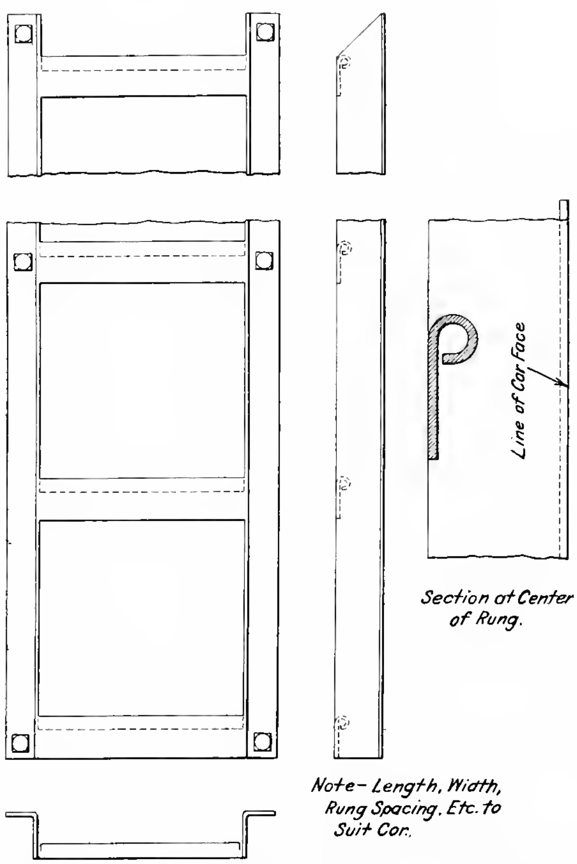


Fig. 890—Interstate One Piece Steel Freight Car Ladder. Interstate Railway Engineering Company.

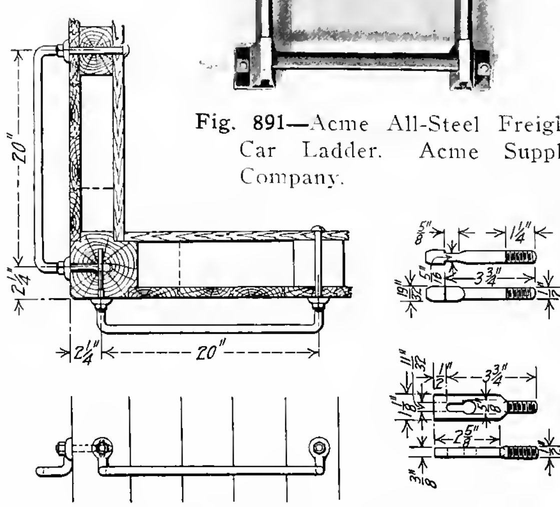


Fig. 892—Security Interlocking Ladder Bolt. Adreon Manufacturing Company.

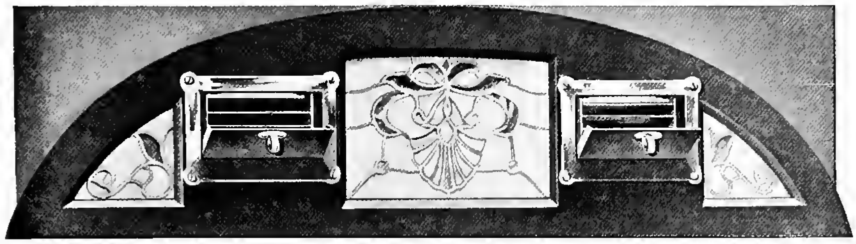


Fig. 893—Automatic Ventilator from Inside of Car Showing Diffusion Boxes and Controlling Shutters.

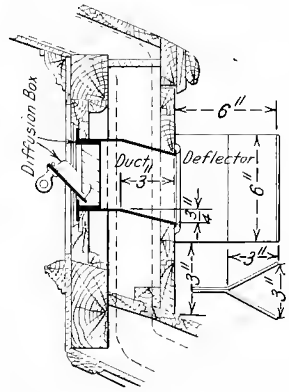


Fig. 895—Sectional View Showing Application of Automatic Ventilator. Automatic Ventilator Company.

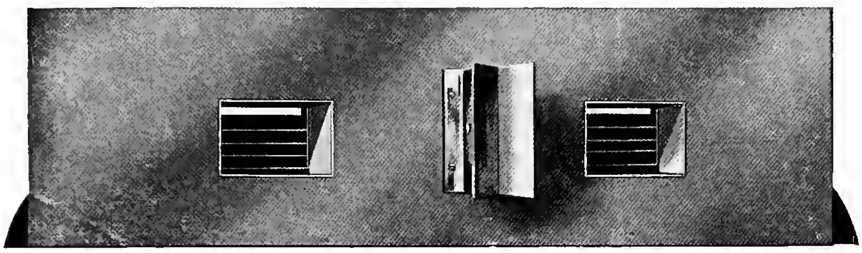
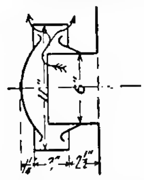
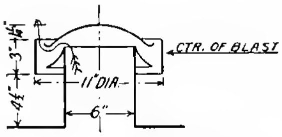


Fig. 894—Automatic Ventilator from Outside of Car Showing Deflector and Openings to Diffusion Boxes. Automatic Ventilator Company.



The Globe Horizontal.



The Globe Erect.

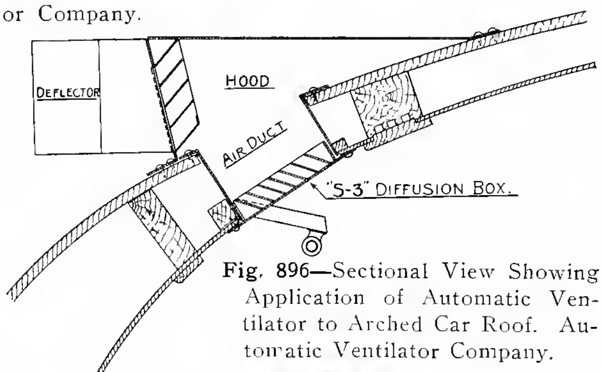


Fig. 896—Sectional View Showing Application of Automatic Ventilator to Arched Car Roof. Automatic Ventilator Company.

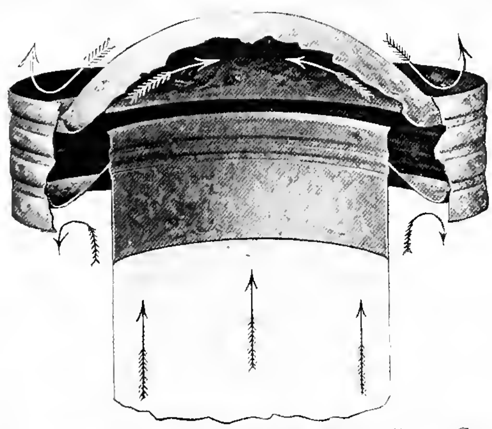


Fig. 897—The Globe Ventilator. Globe Ventilator Company.

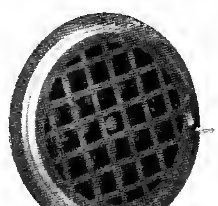


Fig. 898—Register for Ventilator Pipe. James L. Howard & Company.

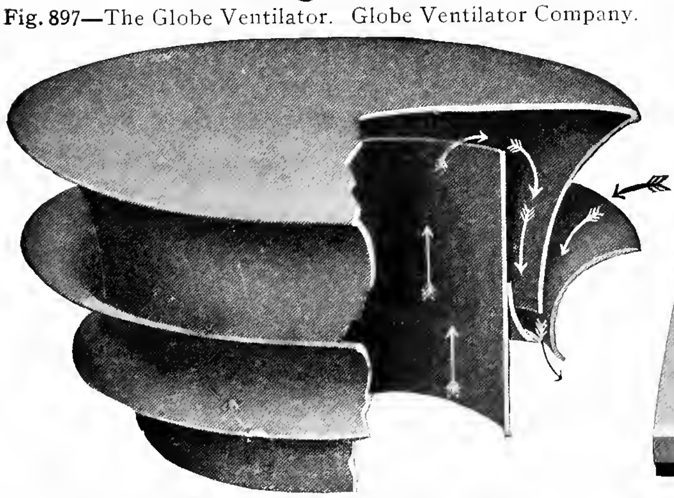


Fig. 899—Utility Ventilator. Railway Utility Company.

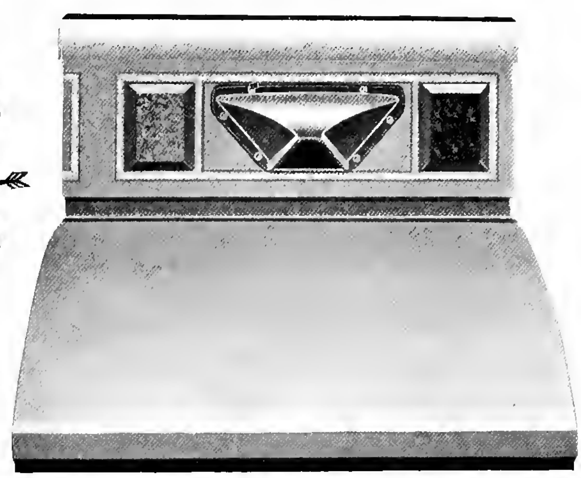


Fig. 900—Ward's Improved Ventilator. Ward Equipment Company.

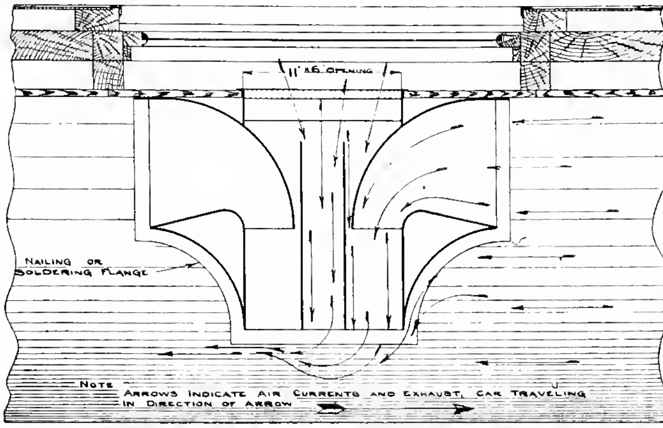


Fig. 901—Diagram of Air Currents in Garland Ventilator.

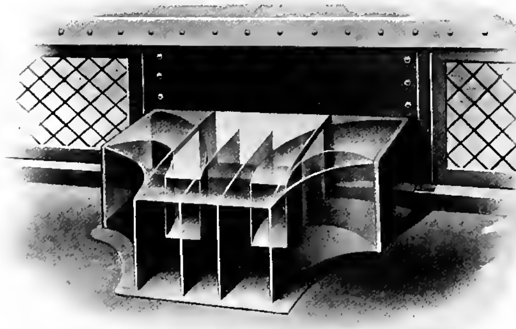


Fig. 902—View Showing Construction of Garland Ventilator.

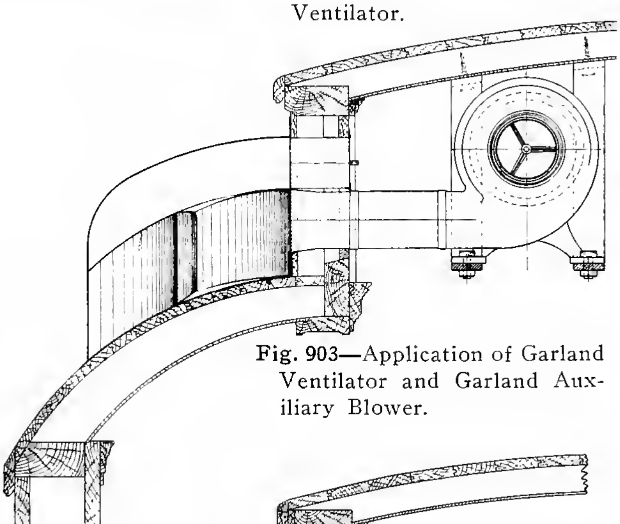


Fig. 903—Application of Garland Ventilator and Garland Auxiliary Blower.

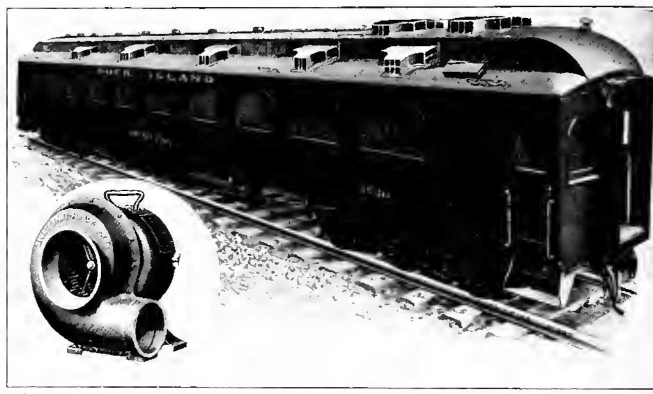


Fig. 904—Dining Car Equipped with Garland Ventilating System and Garland Type of Sturtevant Blower.

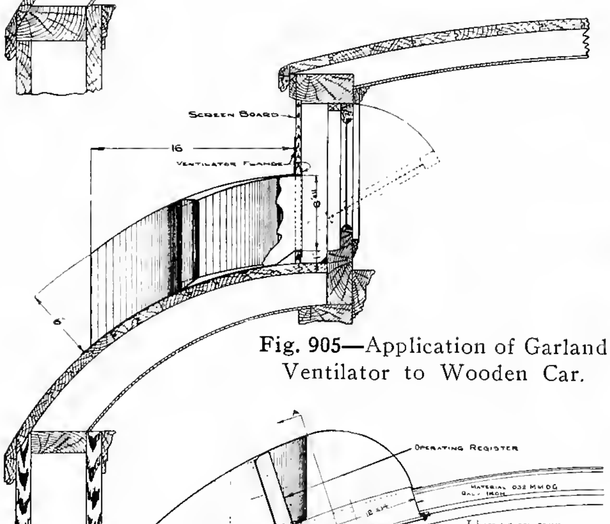


Fig. 905—Application of Garland Ventilator to Wooden Car.

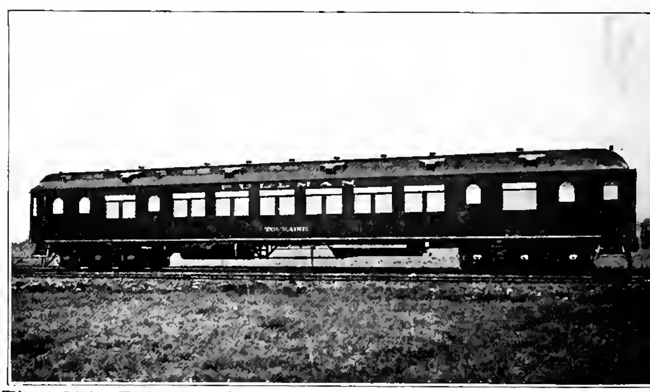


Fig. 906—Pullman Sleeping Car Equipped with Garland Ventilators.

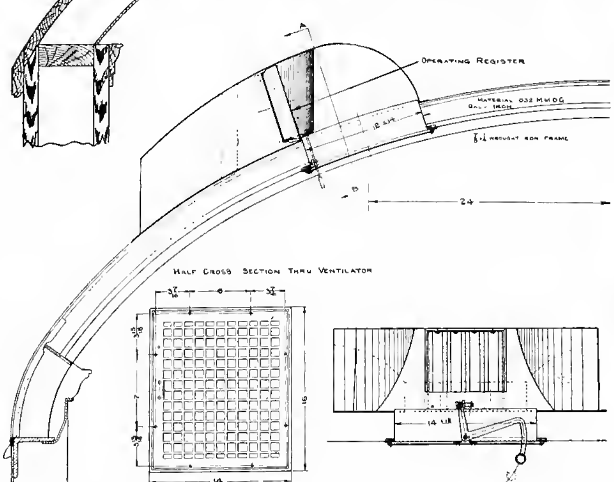


Fig. 907—Application of Garland Ventilator to Arched Roof of Harriman Lines Steel Cars.

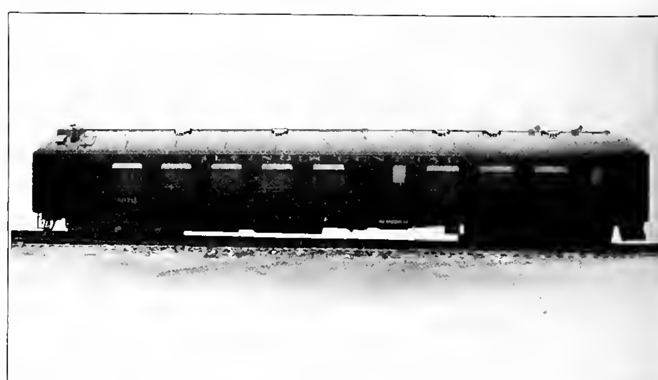


Fig. 908—Illinois Central Arched Roof Dining Car Equipped with Garland Ventilators.

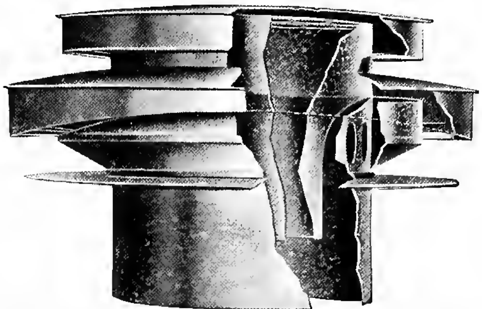


Fig. 909—Combined Ventilator and Lamp Jack.
Scully-Jones & Company.

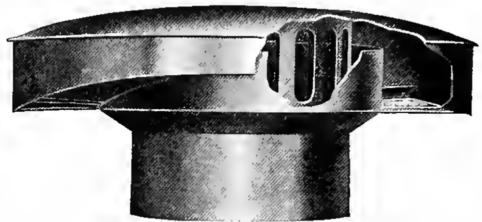


Fig. 910—Direct Type Ventilator.

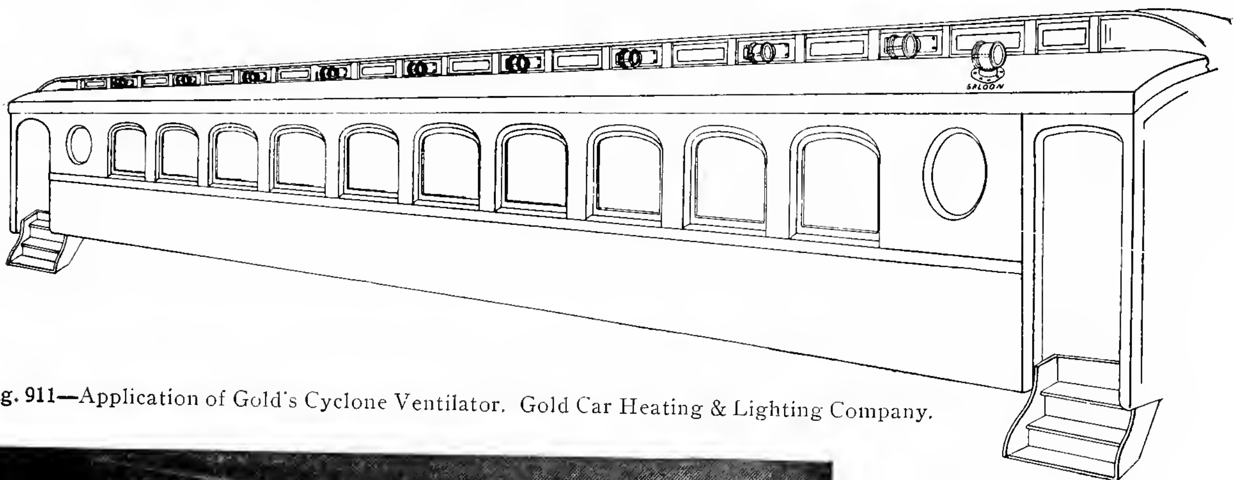


Fig. 911—Application of Gold's Cyclone Ventilator. Gold Car Heating & Lighting Company.

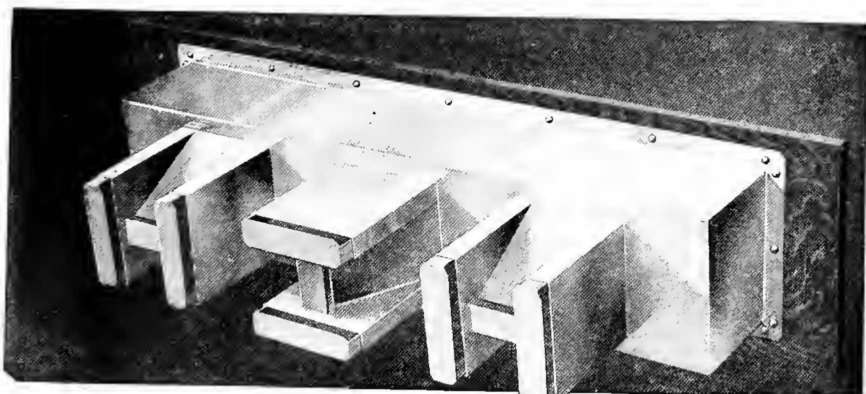


Fig. 912—Gilmore Non-Intake Ventilator from Outside of Car.

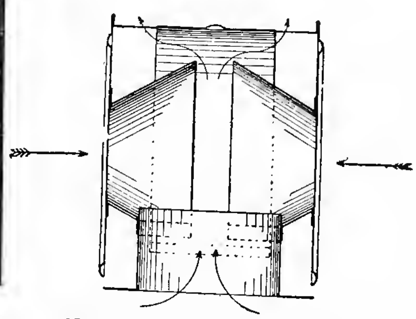


Fig. 914—Sectional View of Gold's Cyclone Ventilator.

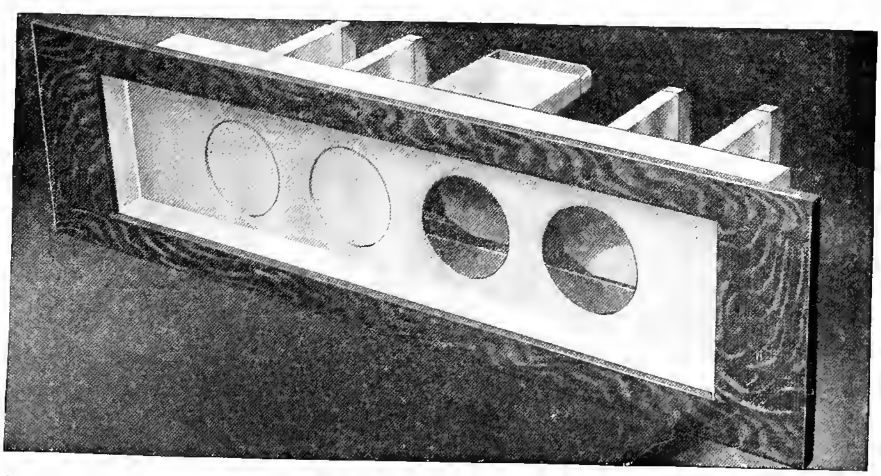


Fig. 913—Gilmore Non-Intake Ventilator from Inside of Car, Showing Vibrators. Kernchen Company.

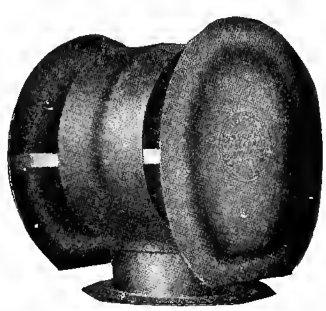


Fig. 915 — Gold's Cyclone Ventilator. Gold Car Heating & Lighting Company.

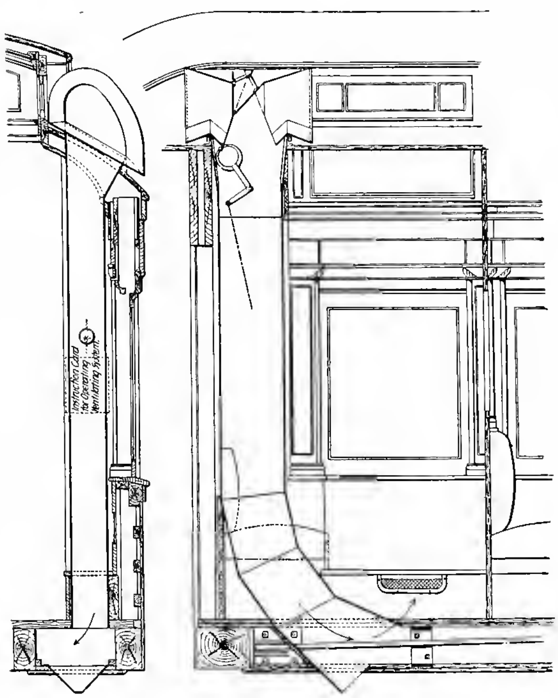


Fig. 916—Pennsylvania Railroad Ventilating Apparatus for Passenger Train Cars.

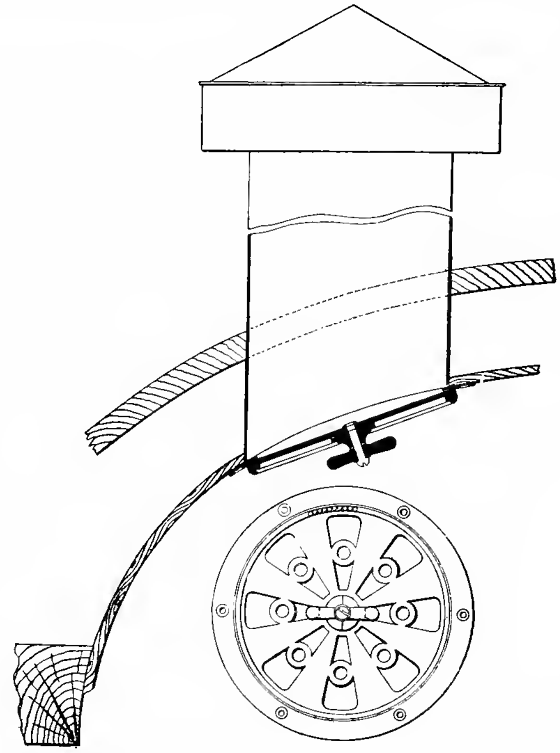


Fig. 917—Ventilator for Saloons of Passenger Train Cars.

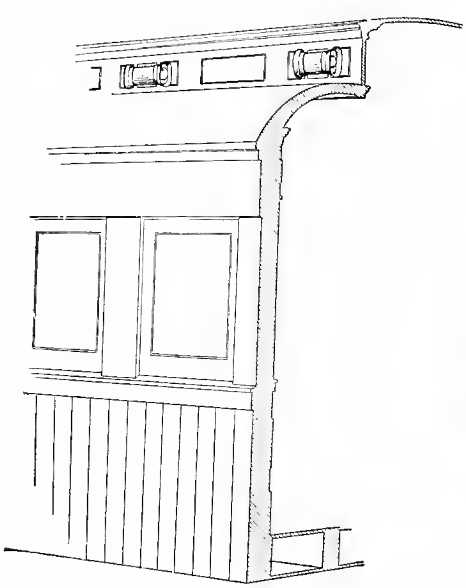


Fig. 918—Application of Andrews Automatic Ventilator. Safety Car Heating & Lighting Company.

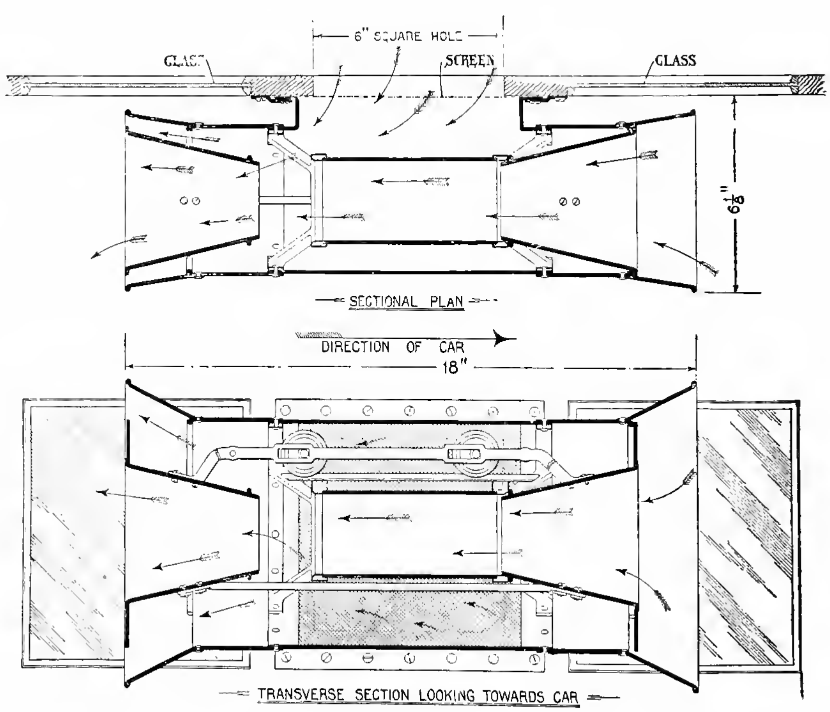


Fig. 919—Sections Through Andrews Automatic Ventilator. **Safety** Car Heating & Lighting Company.

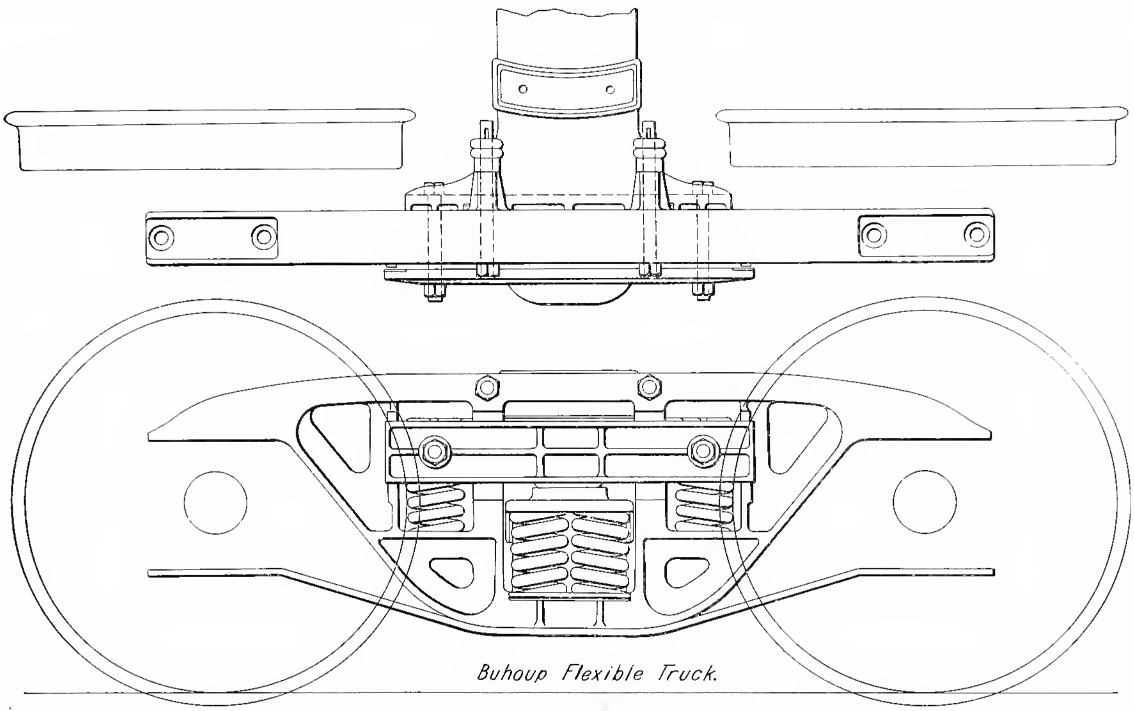


Fig. 920—Buhoup Flexible Truck. McConway & Torley Company.

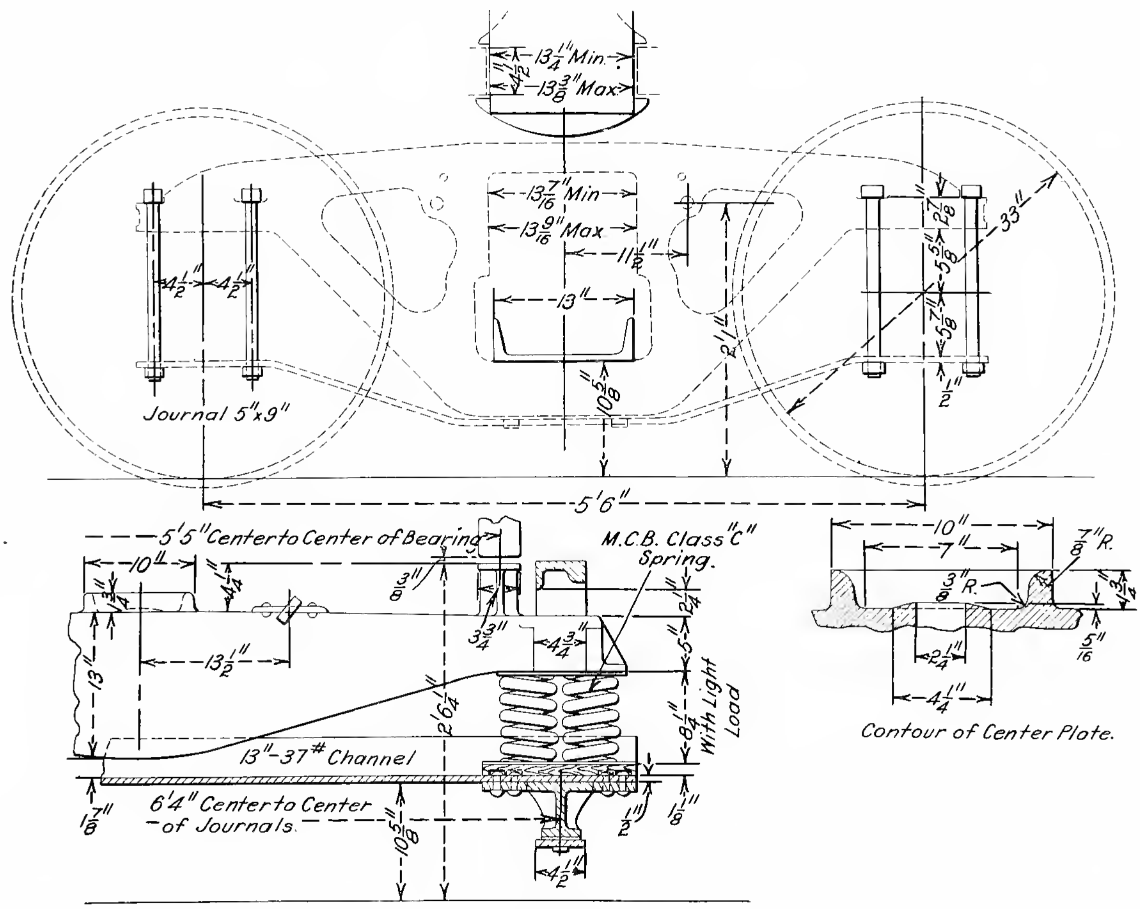


Fig. 921—Truck for New York Central & Hudson River 40-Ton Capacity Box Car Shown in Figs. 274 and 276.

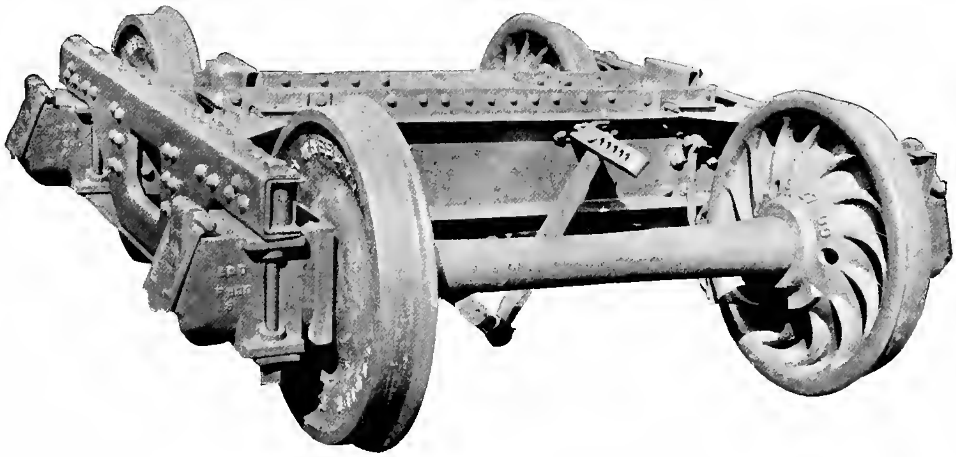


Fig. 922—Buckeye Pressed Steel Truck. Pressed Steel Car Company.

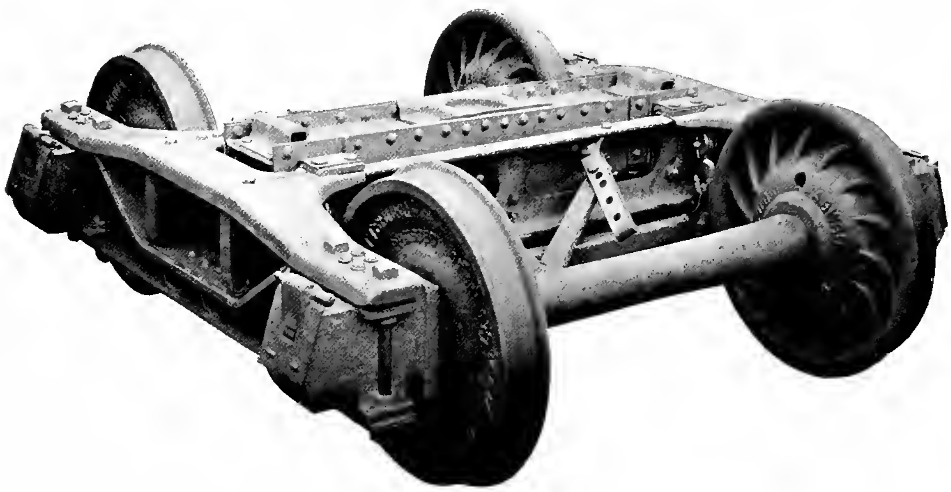


Fig. 923—Pressed Steel Diamond Arch Bar Truck. Pressed Steel Car Company.

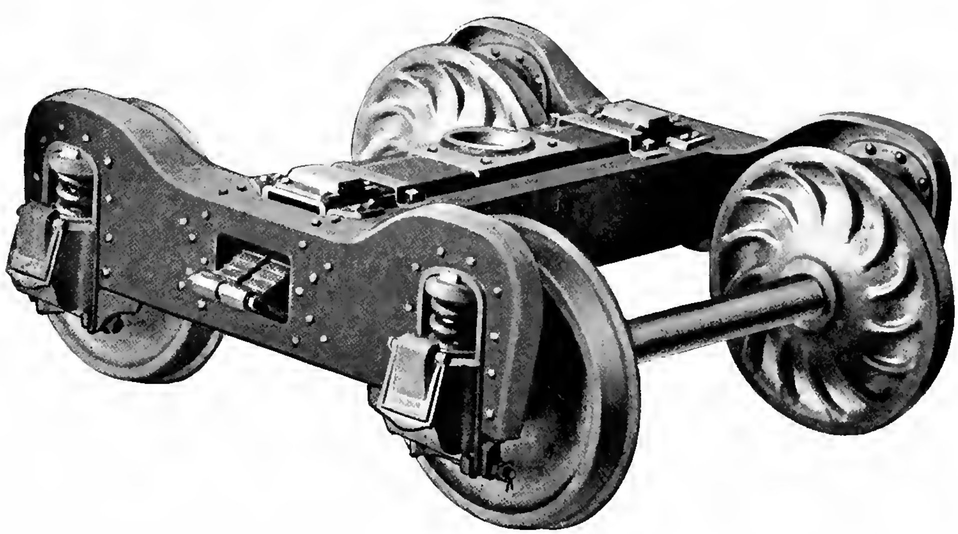


Fig. 924—Fox Pressed Steel Truck. Pressed Steel Car Company.

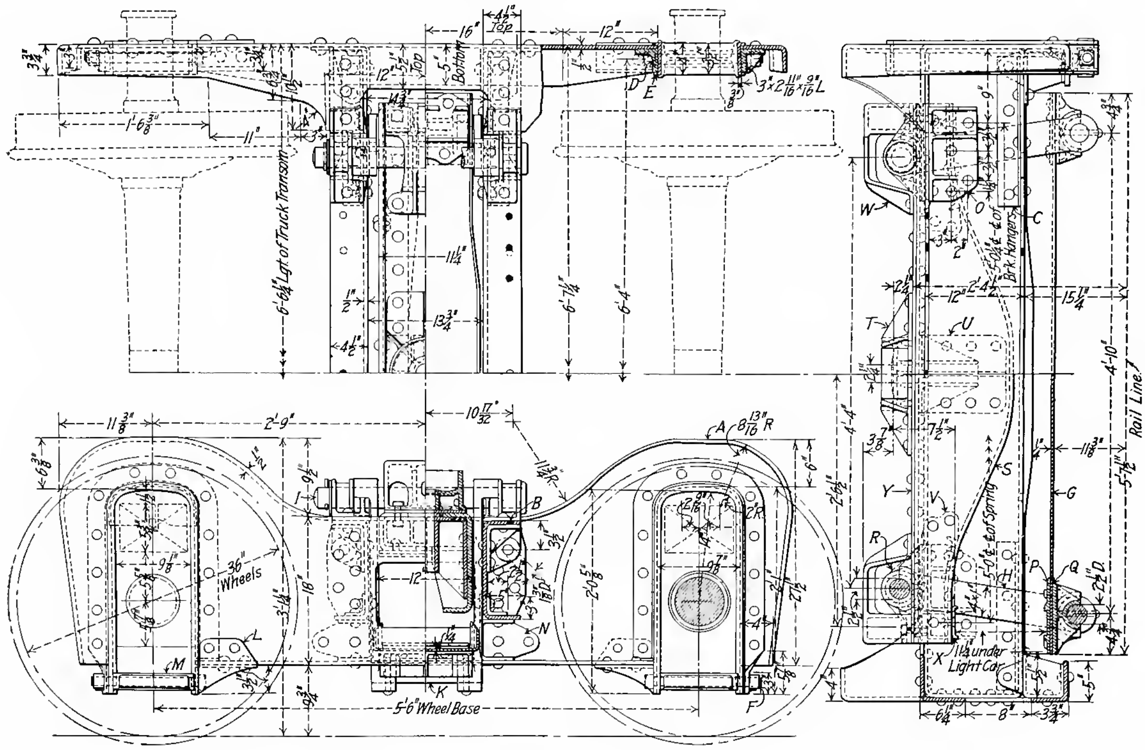


Fig. 925—Fox Truck with Swing Motion Bolster for 40-Ton Capacity Car. Pressed Steel Car Company.

Parts of Fox Truck. See Fig. 925.

A	*Side*	N	*Side and Transom Connection*
B	*Transom*	O	*Brake Beam End Hanger Bracket*
C	*Transom Reinforcing Angle*	P	*Spring Seat*
D	*Pedestal Angle*	Q	*Combined Spring Plank Seat and Hanger Arm Bearing*
E	*Pedestal Wearing Piece*	R	*Spring Plank Hanger Bearing*
F	*Pedestal Bolt*	S	*Bolster Channel*
G	*Spring Plank*	T	*Center Plate*
H	*Spring Plank Hanger*	U	*Center Plate Support*
I	*Spring Plank Hanger Pin*	V	*Reinforcing End Casting*
K	*Lower Spring Plank Hanger Pin*	W	*Side Bearing*
L	*Pedestal Bracket*	X	*Spring Cap*
M	*Pedestal Spreader*	Y	*Top Tie Plate*

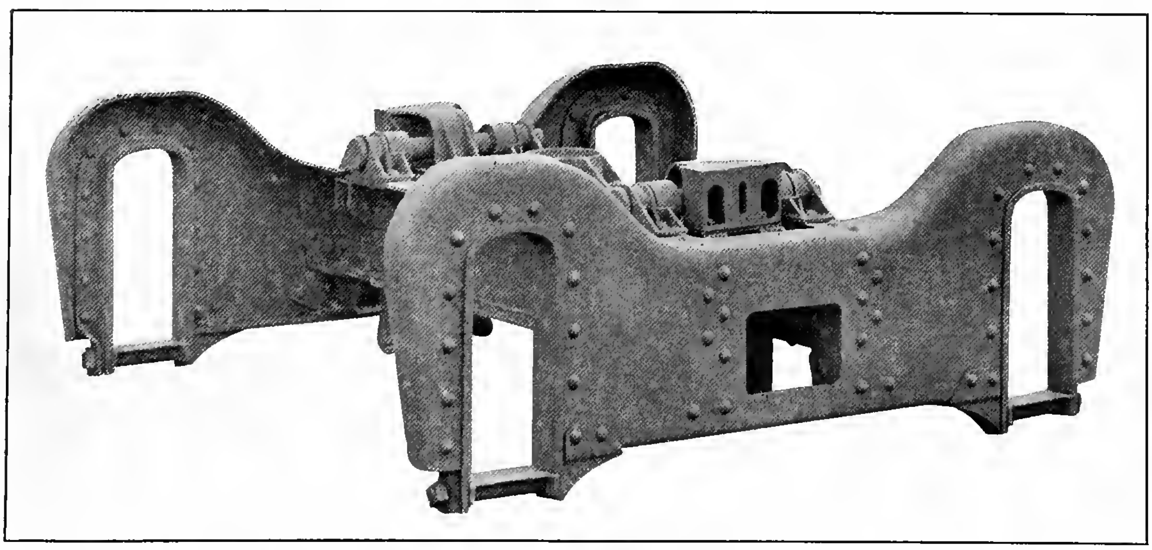


Fig. 926—Fox Swing Motion Bolster Truck with Wheels and Fittings Removed. Pressed Steel Car Company.

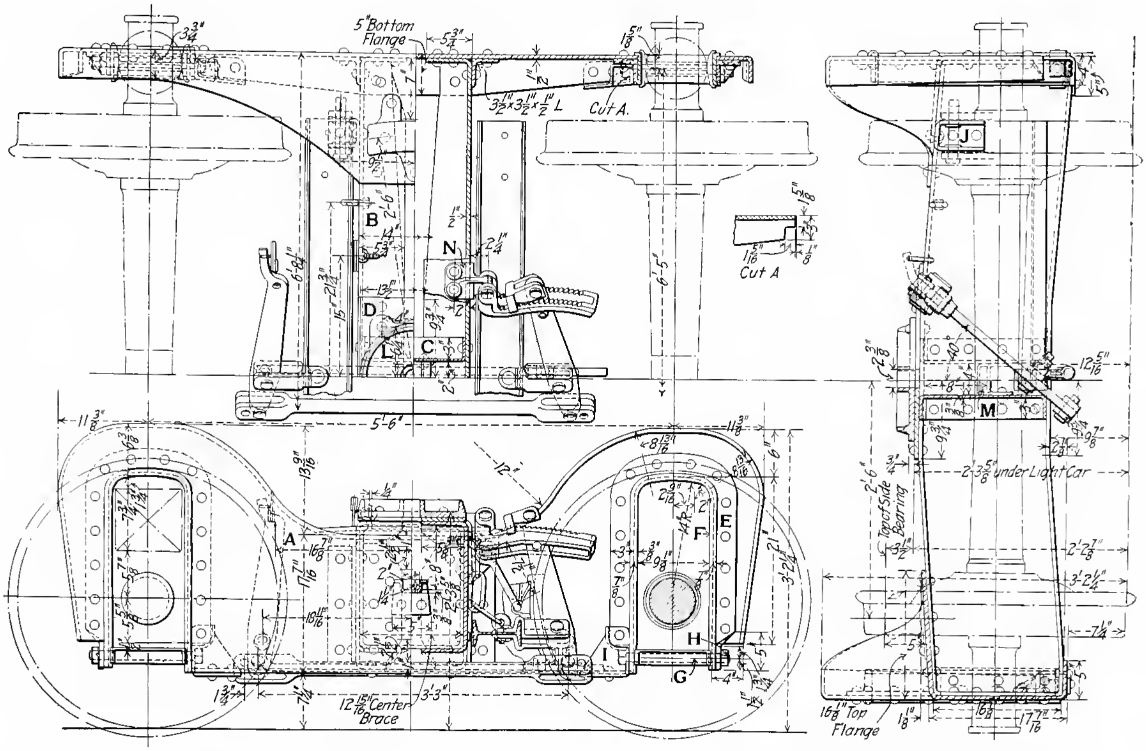
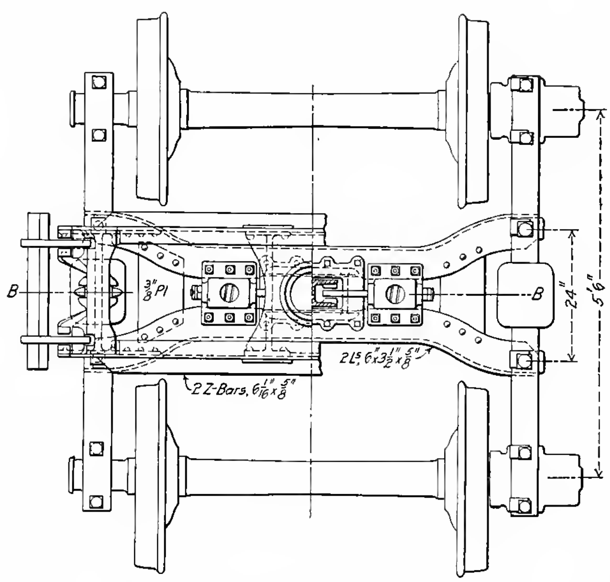
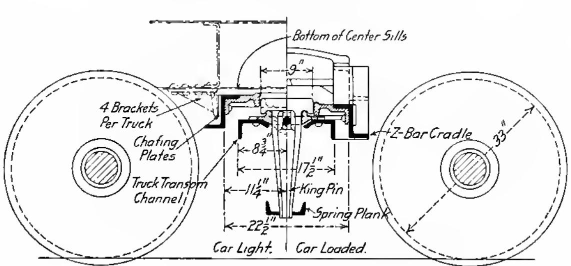


Fig. 927—Fox Truck for 50-Ton Capacity Car. Pressed Steel Car Company.

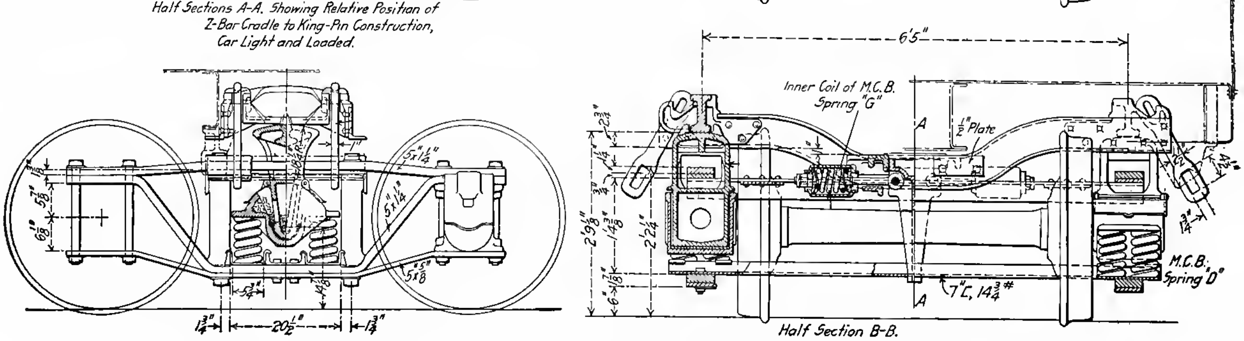
Parts of Fox Truck. See Fig. 927.

- A *Side*
- B *Transom*
- C *Center Stiffener*
- D *Base Plate*
- E *Pedestal Angle*
- F *Pedestal Wearing Piece*
- G *Pedestal Separator*
- H *Pedestal Bolt*
- I *Pedestal Bracket*
- J *Brake Hanger Bracket*
- L *Center Plate*
- M *King Pin Support*
- N *Dead Lever Guide Anchor*





Half Sections A-A. Showing Relative Position of Z-Bar Cradle to King-Pin Construction, Car Light and Loaded.



Half Section B-B.

Fig. 928—Summers Balanced Side Bearing Truck. Summers Steel Car Company.

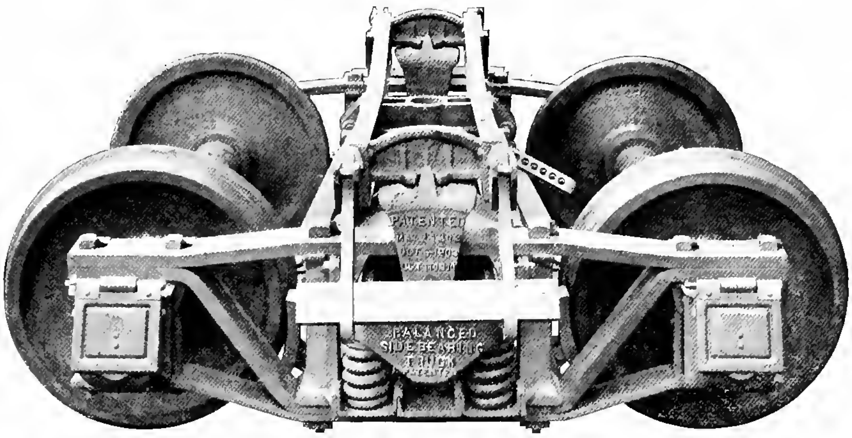


Fig. 929—Summers Balanced Side Bearing Truck. Summers Steel Car Company.

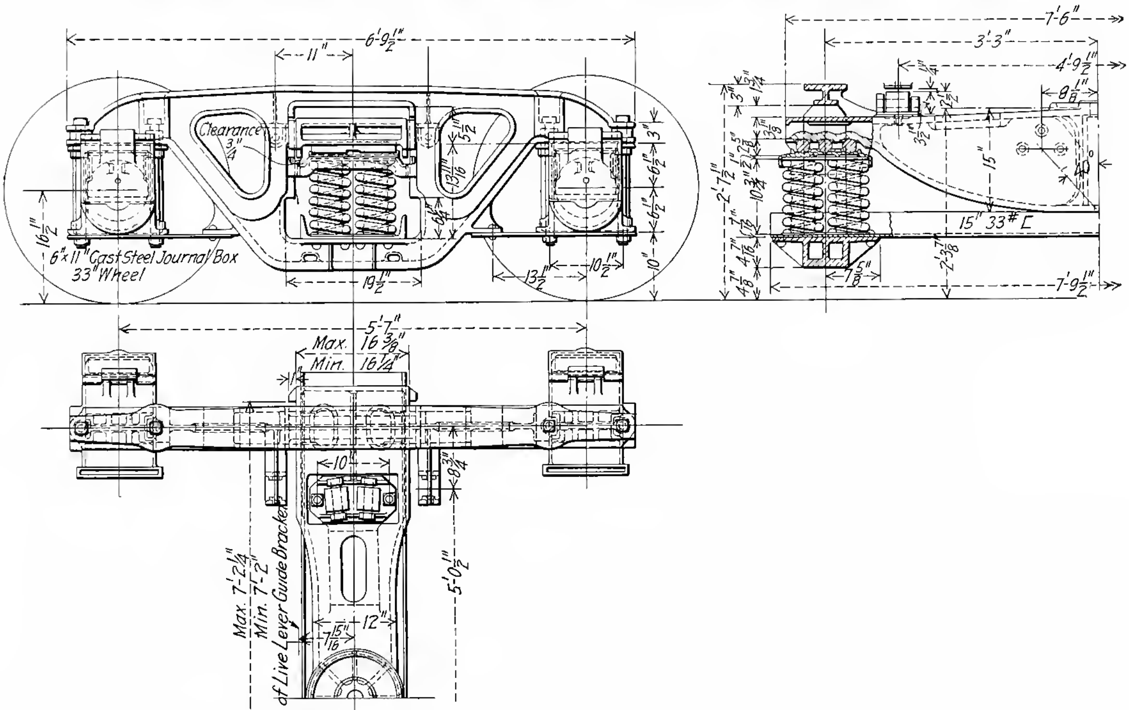


Fig. 930—Truck for Baltimore & Ohio 70-Ton Capacity Car. Buckeye Steel Castings Company.

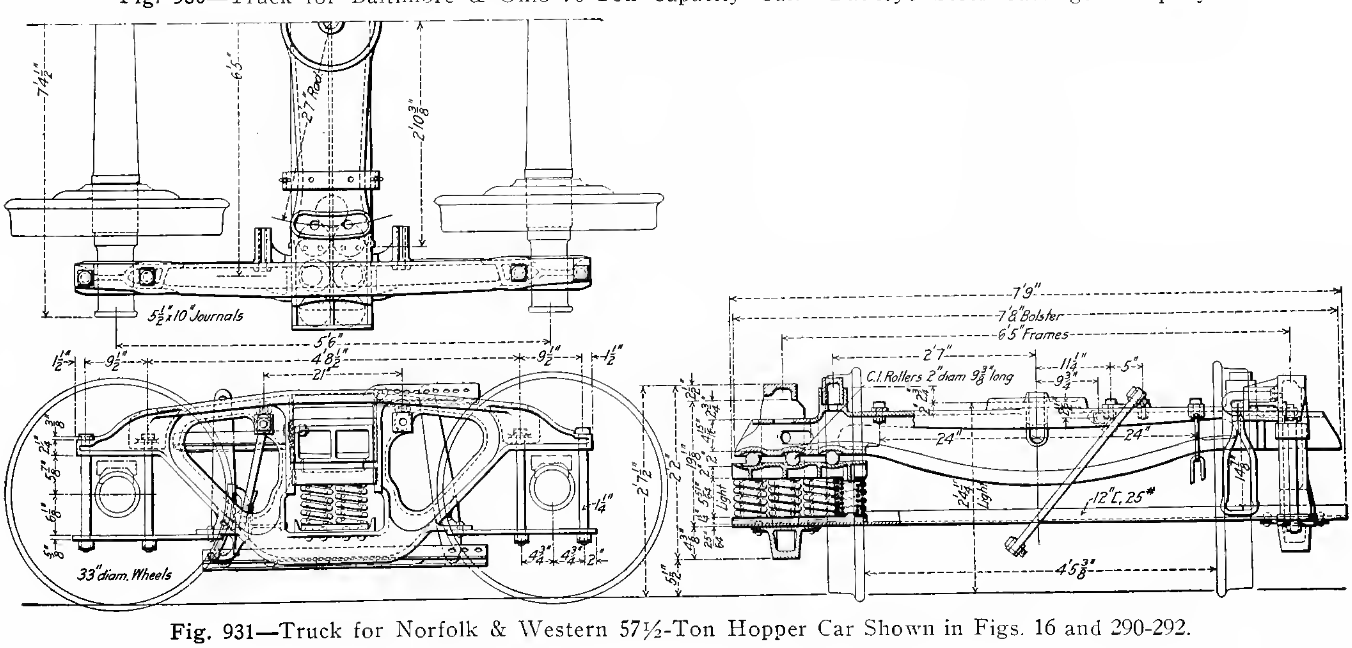


Fig. 931—Truck for Norfolk & Western 57½-Ton Hopper Car Shown in Figs. 16 and 290-292.

Fig. 932—Barber Side Bearing Truck. Standard Car Truck Company.

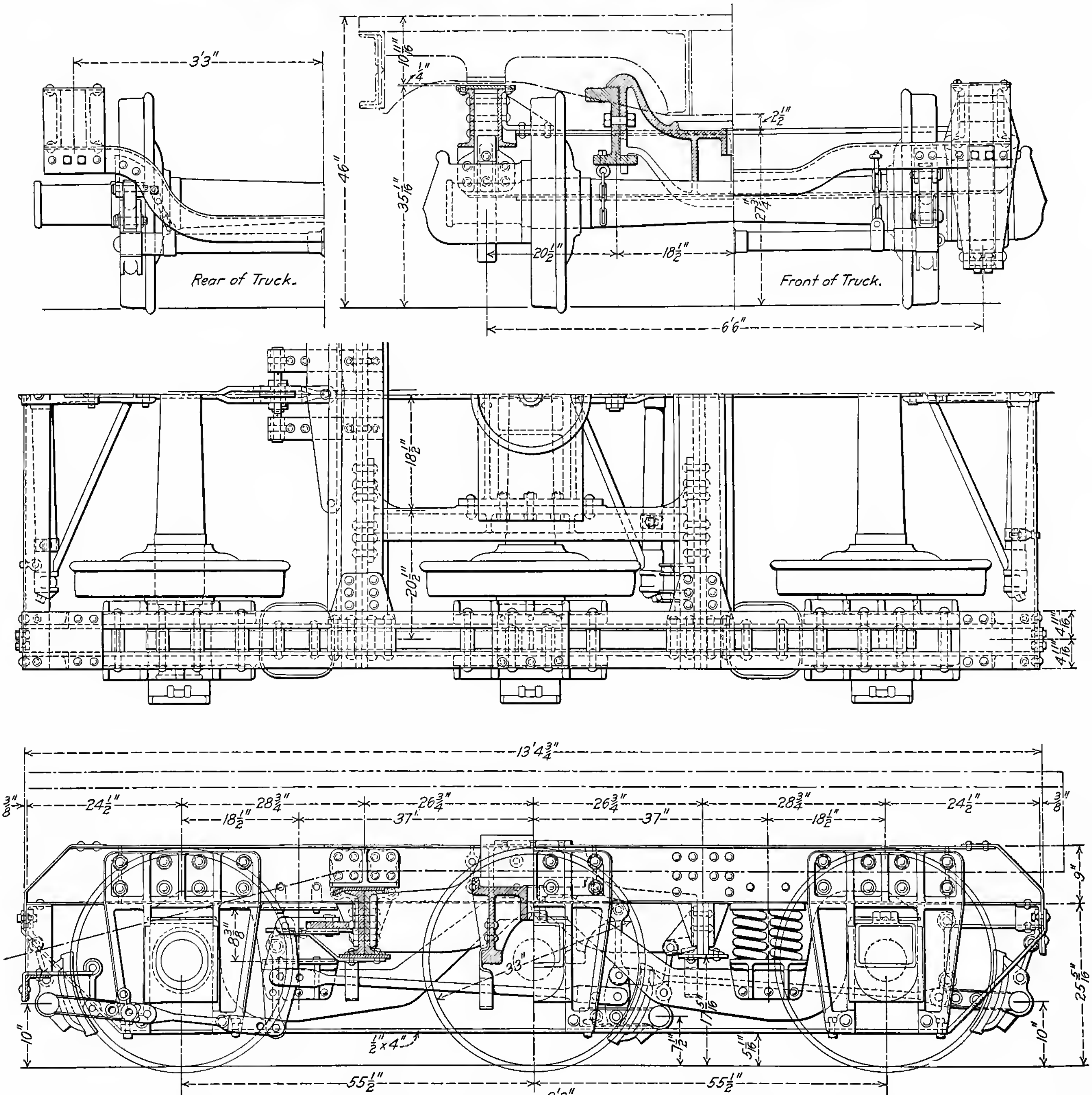


Fig. 933—Six-Wheel Truck for Pittsburgh & Lake Erie 100-Ton Capacity Flat Car Shown in Fig. 348.

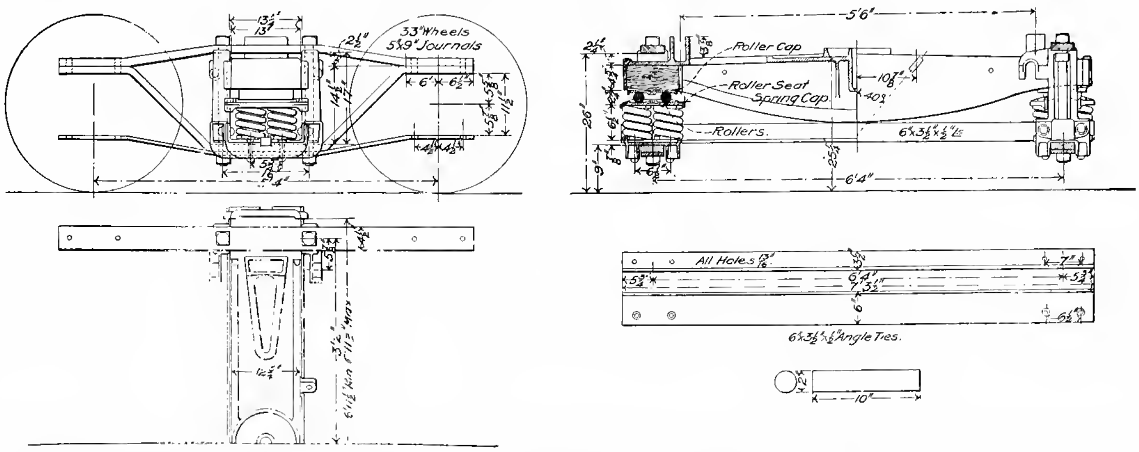


Fig. 934—Barber Type Diamond Arch Bar Truck for 40-Ton Capacity Car. Standard Car Truck Company.

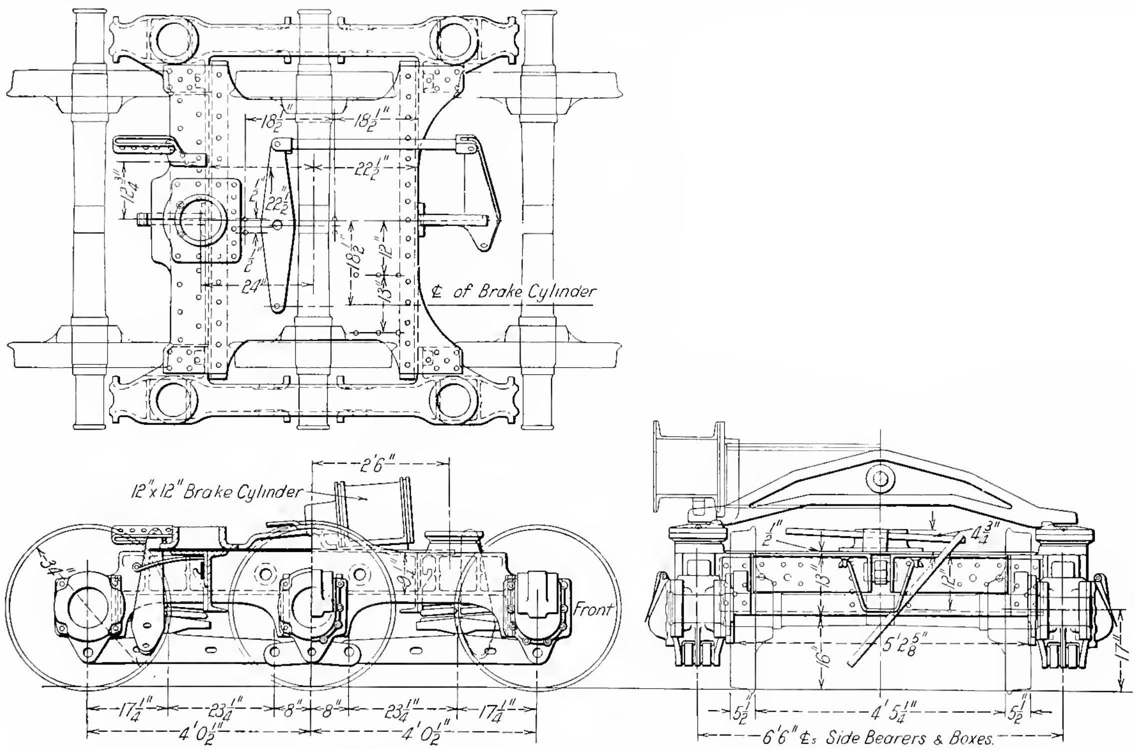


Fig. 935—Six-Wheel Rear Truck for Canadian Pacific Rotary Snow Plow Shown in Fig. 230.

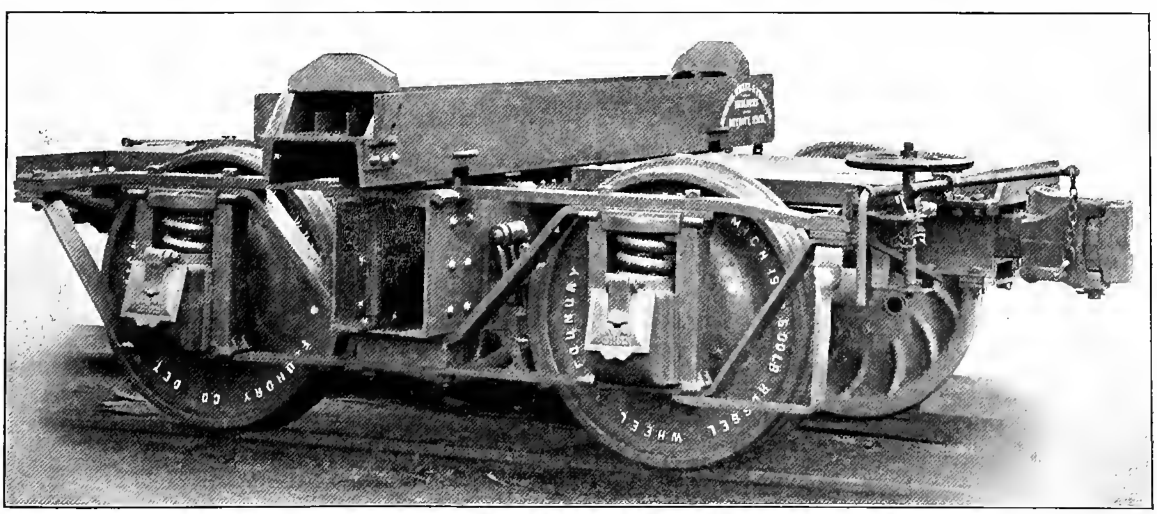


Fig. 936—All-Metal Pacific Pattern Logging Truck for 40 or 50-Ton Loads. Russel Wheel & Foundry Company.

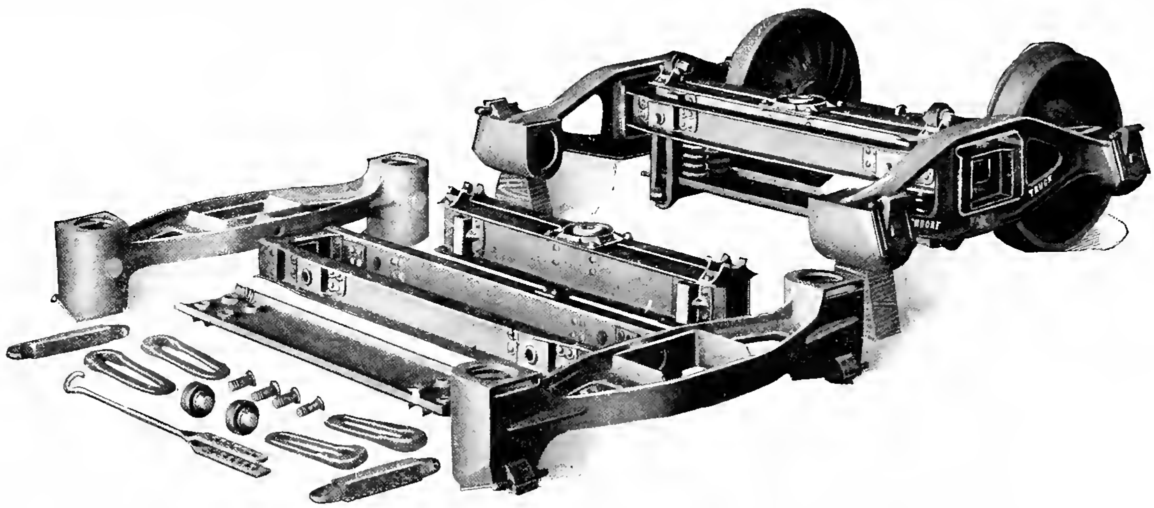


Fig. 937—Parts of Bettendorf Swing Motion Truck. Bettendorf Axle Company.

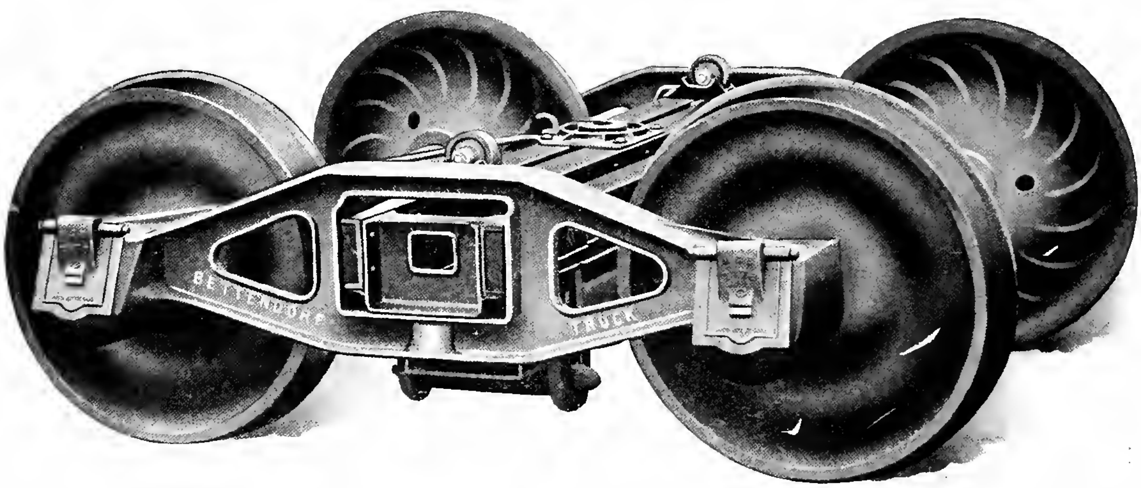


Fig. 938—Bettendorf Swing Motion Truck for 30-Ton Capacity Car. Bettendorf Axle Company.

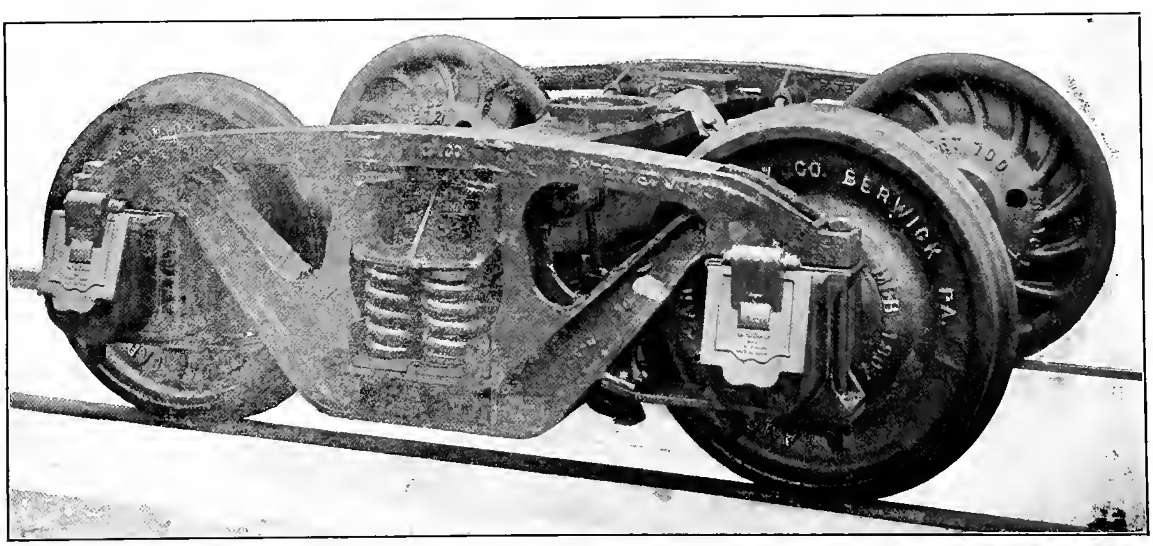


Fig. 939—Freight Car Truck with Cast Steel Bolster and Side Frames. Scullin-Gallagher Iron & Steel Company.

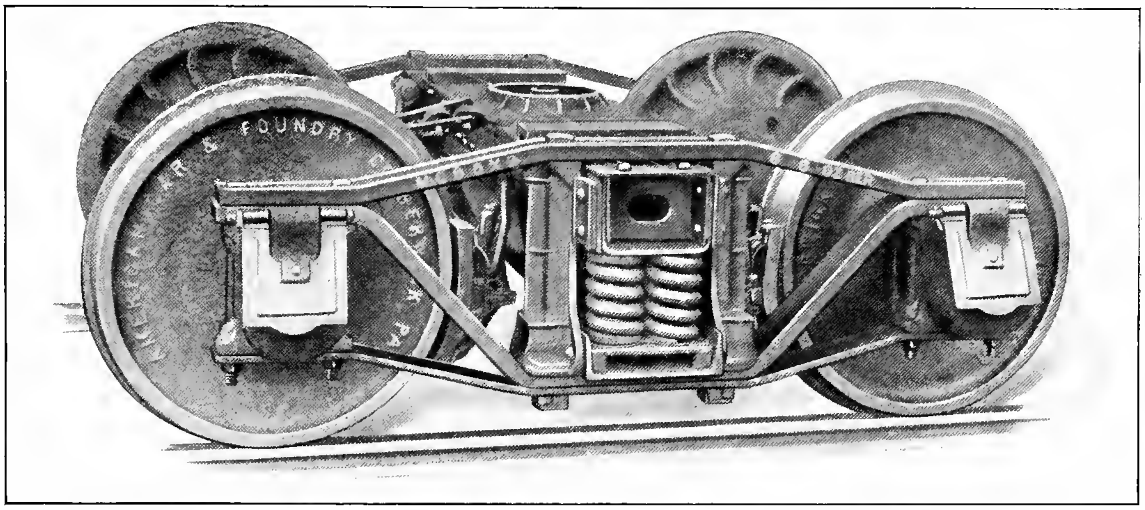


Fig. 940—Diamond Arch Bar Truck for 30, 40 or 50-Ton Capacity Cars. American Car & Foundry Company.

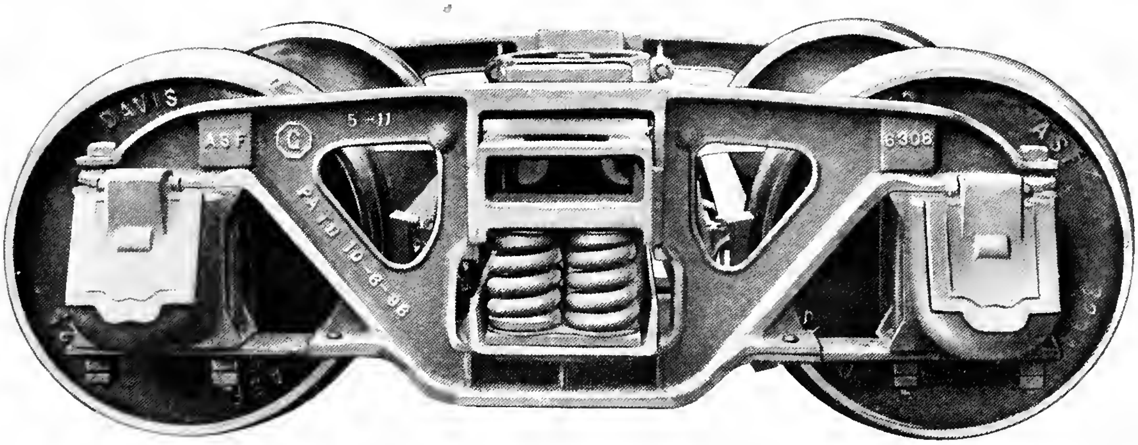


Fig. 941—American Steel Foundries Standard Freight Car Truck.

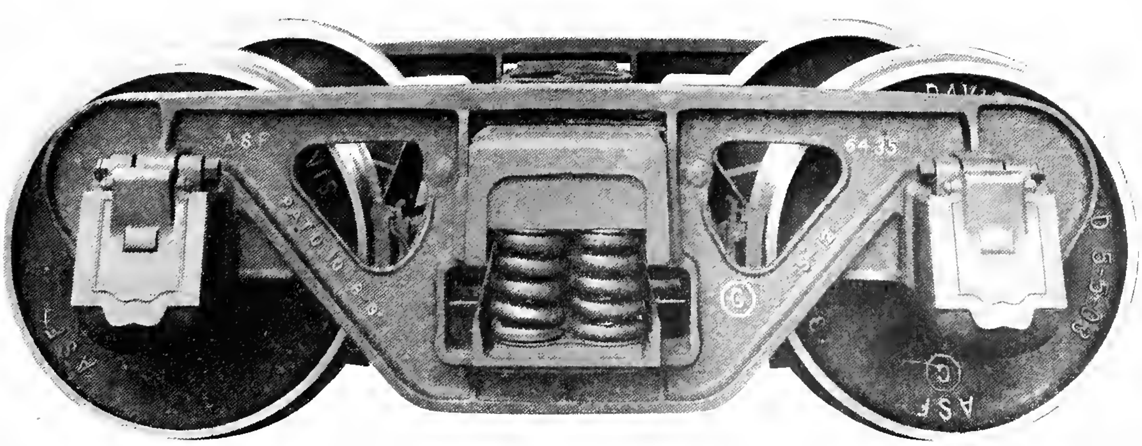


Fig. 942—Freight Car Truck with Cast Steel Side Frames and Integral Pedestal Jaws. American Steel Foundries.

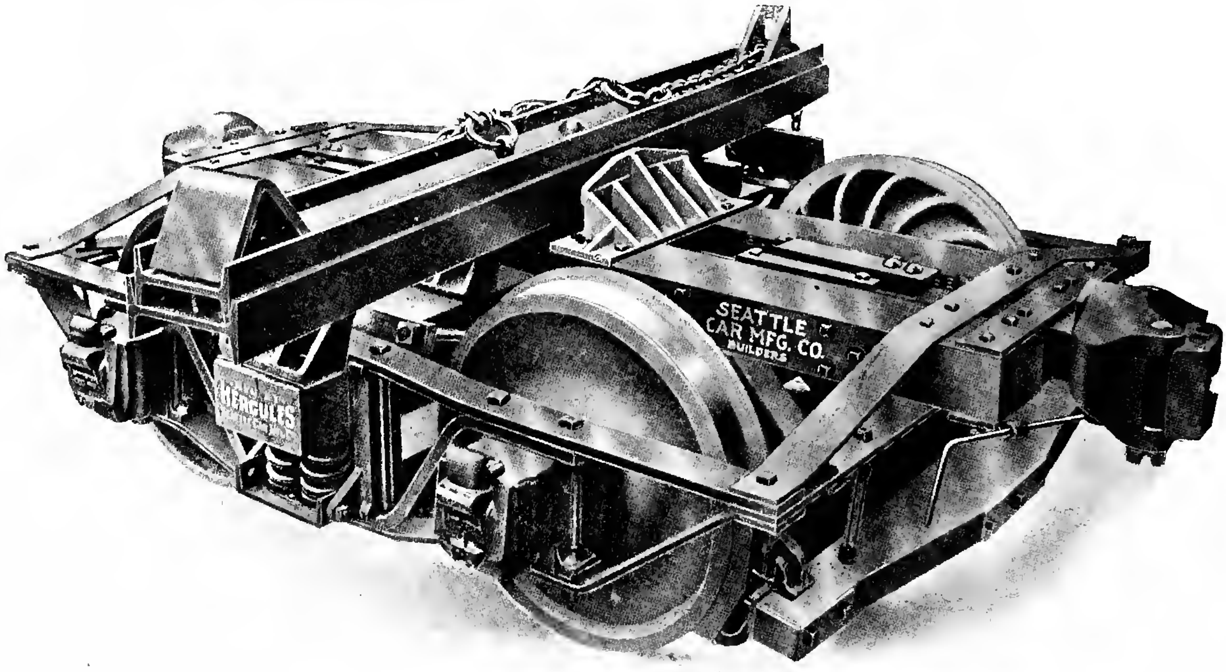


Fig. 943—All-Steel Logging Truck for 50-Ton Loads. Seattle Car & Foundry Company.

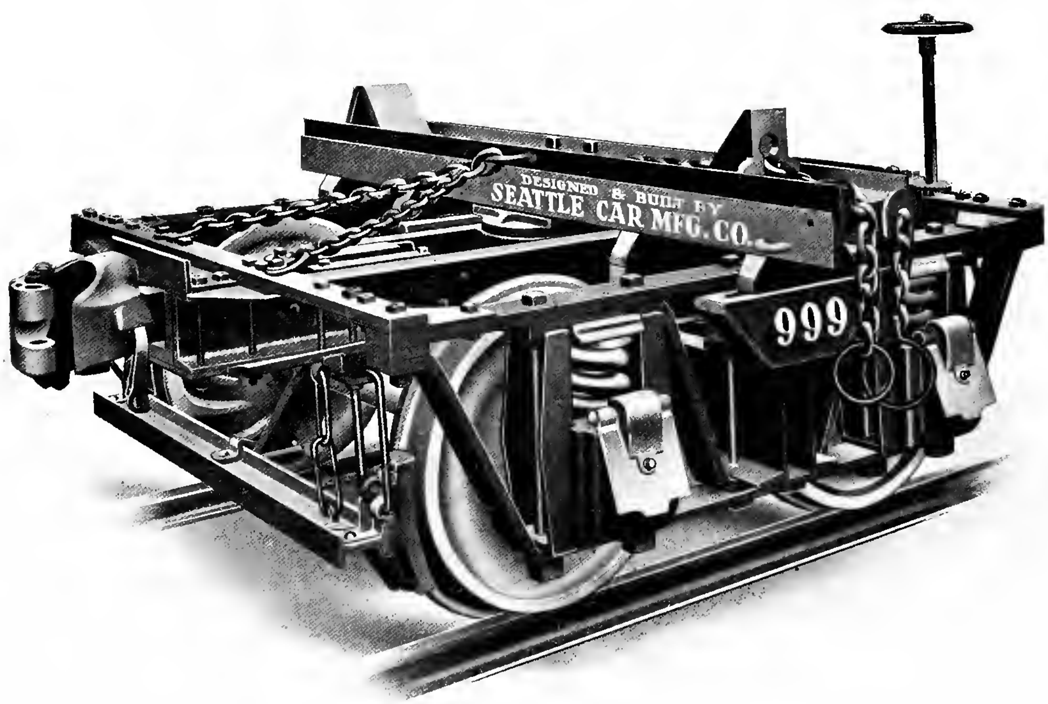


Fig. 944—Hercules Logging Truck with Knight Patent Chock Block. Seattle Car & Foundry Company.

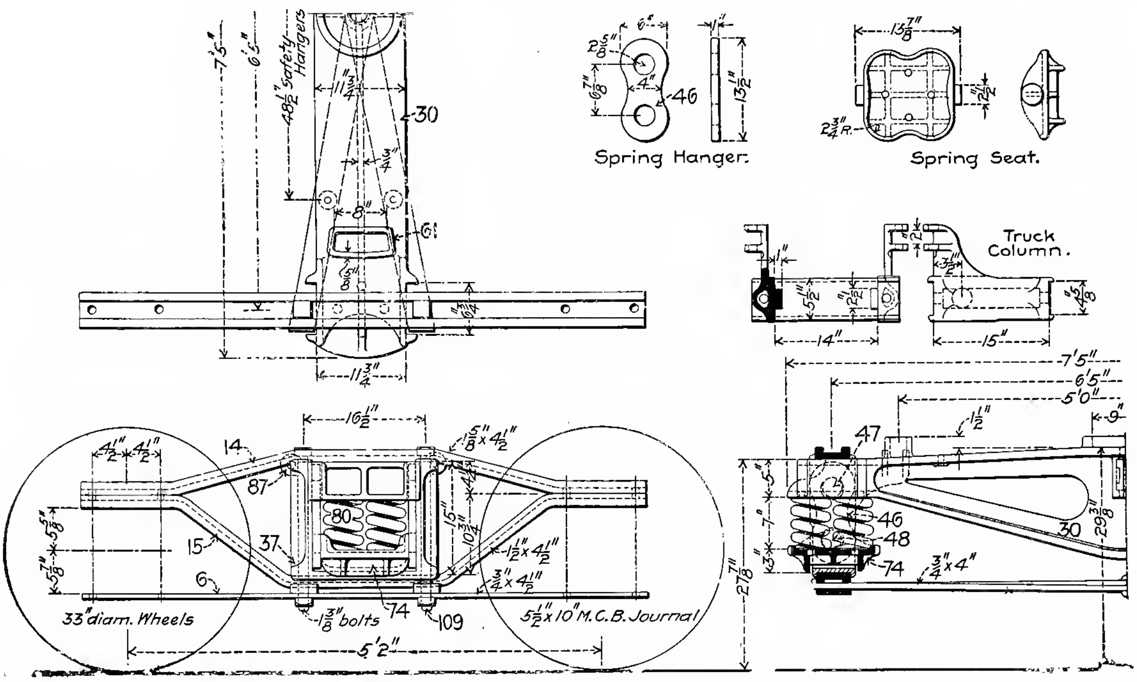


Fig. 945—Swing Motion Diamond Arch Bar Truck for 50-Ton Capacity Cars.

Parts of Trucks. See Figs. 945, 947 and 966.

1 *Wheel*
2 *Axle*
3 *Journal Box*
4 *Journal Box Lid*
5 *Pedestal*
6 *Pedestal Tie Bar*
7 *Pedestal Stay Rod*
10 *Wheel Piece*
11 *Outside Wheel Piece Plate*
12 *Inside Wheel Piece Plate*
14 *Top Arch Bar*
15 *Bottom Arch Bar*
17 *Truck Frame End Piece*
20 *Transom*
20a *Extra Transom*
21 *Middle Transom (for Six-Wheel Truck)*
22 *Outside Transom (for Six-Wheel Truck)*
23 *Transom Tie Rod*
23a *Extra Transom Tie Rod*
24 *Transom Truss Rod*
25 *Transom Truss Block*
26 *Transom Tie Rod Washer*
27 *Friction Block*
30 *Truck Bolster*
37 *Bolster Guide Bars or Truck Columns*
43 *Spring Plank*
44 *Spring Plank Bearing*
45 *Spring Plank Safety Hanger*
46 *Swing or Spring Hanger*
47 *Upper Swing or Spring Hanger Pin*
48 *Lower Swing or Spring Hanger Pin or Spring Plank Pin*
49 *Swing Hanger Pin Bearing*
51 *End Axle Guard*
55 *Axle Safety Hanger*
59 *Transom and End Piece Tie Rod*
60 *Center Axle Guard*
61 *Truck Side Bearing*
62 *Side Bearing Arch*
63 *Truck Center Plate*
64 *Center Plate Block*
66 *Center Bearing Top Arch Bar*
67 *Center Bearing Bottom Arch Bar*
68 *Safety Chain*
69 *Safety Chain Hook*
70 *Safety Chain Eye Bolt*
71 *Equalizing Bar*
72 *Equalizing Bar Spring Cap*
73 *Equalizing Bar Spring Seat*
74 *Bolster Spring Seat*
75 *Bolster Spring Cap*
76 *Spring Block*
79 *Equalizing Bar Spring*
80 *Bolster Spring*
83 *Brake Head*
84 *Brake Beam*
86 *Brake Hanger*
87 *Brake Hanger Carrier*
88 *Brake Beam Safety Chain*
89 *Brake Safety Chain Eye Bolt*
90 *Brake Beam Safety Hanger*
91 *Release Spring*
92 *Brake Lever*
93 *Brake Lever Fulcrum*
95 *Dead Lever Guide*
97 *Bottom Brake Rod*
98 *Brake Shoe*
109 *Column Bolt*
130 *End Piece Corner Plate*
131 *Transom Corner Plate*

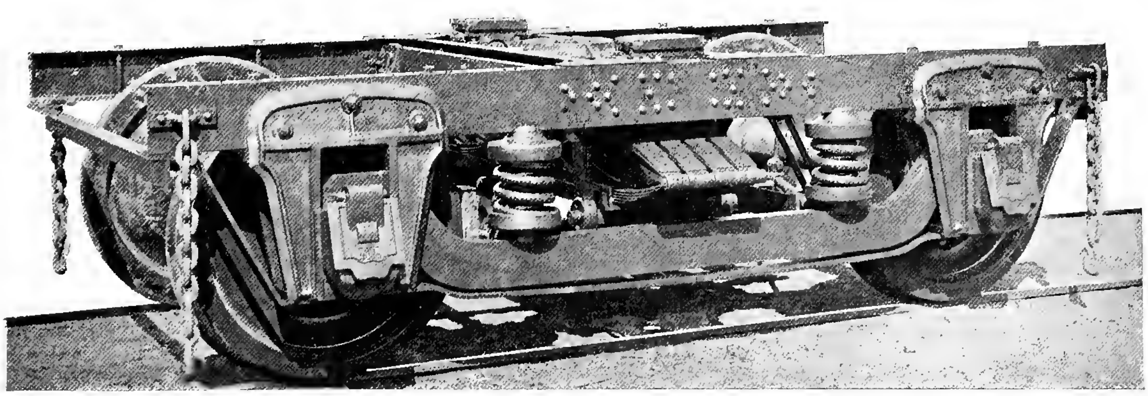


Fig. 946—Four-Wheel Steel Truck for Passenger Train Cars. The Harlan & Hollingsworth Corporation.

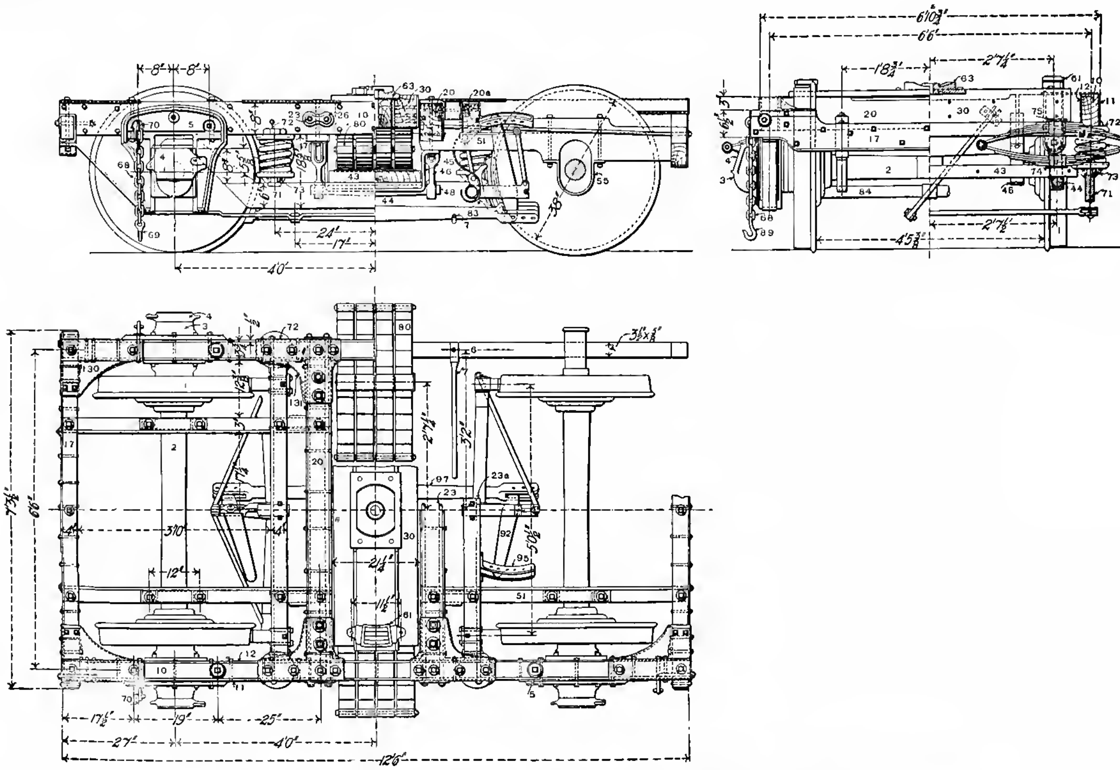


Fig. 947—Pullman Standard Four-Wheel Passenger Truck No. 104.
See Figs. 974 and 975 for Details and Page 567 for Names of Numbered Parts.

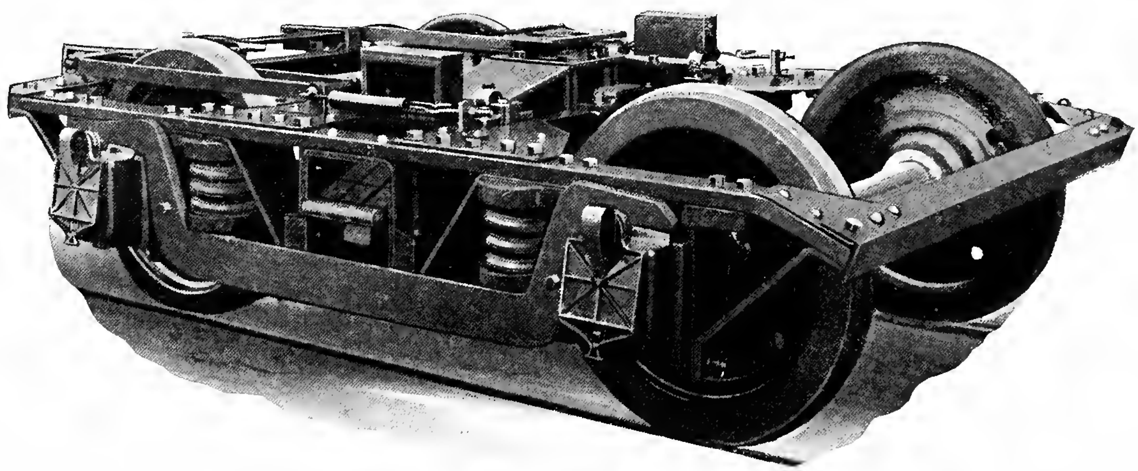


Fig. 948—Truck for Heavy Interurban Motor Cars. McGuire-Cummings Manufacturing Company.

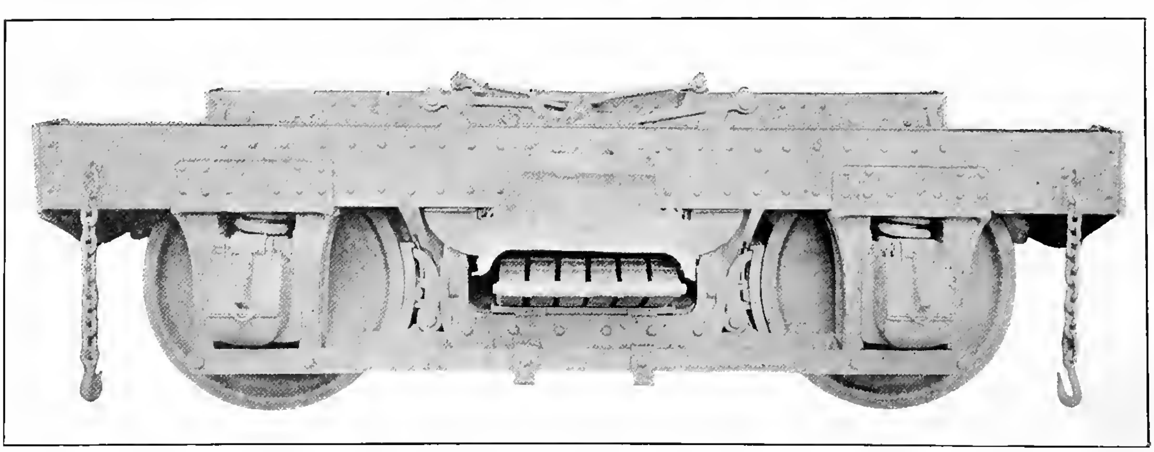


Fig. 949—Four-Wheel Truck for Pennsylvania Railroad Steel Cars.

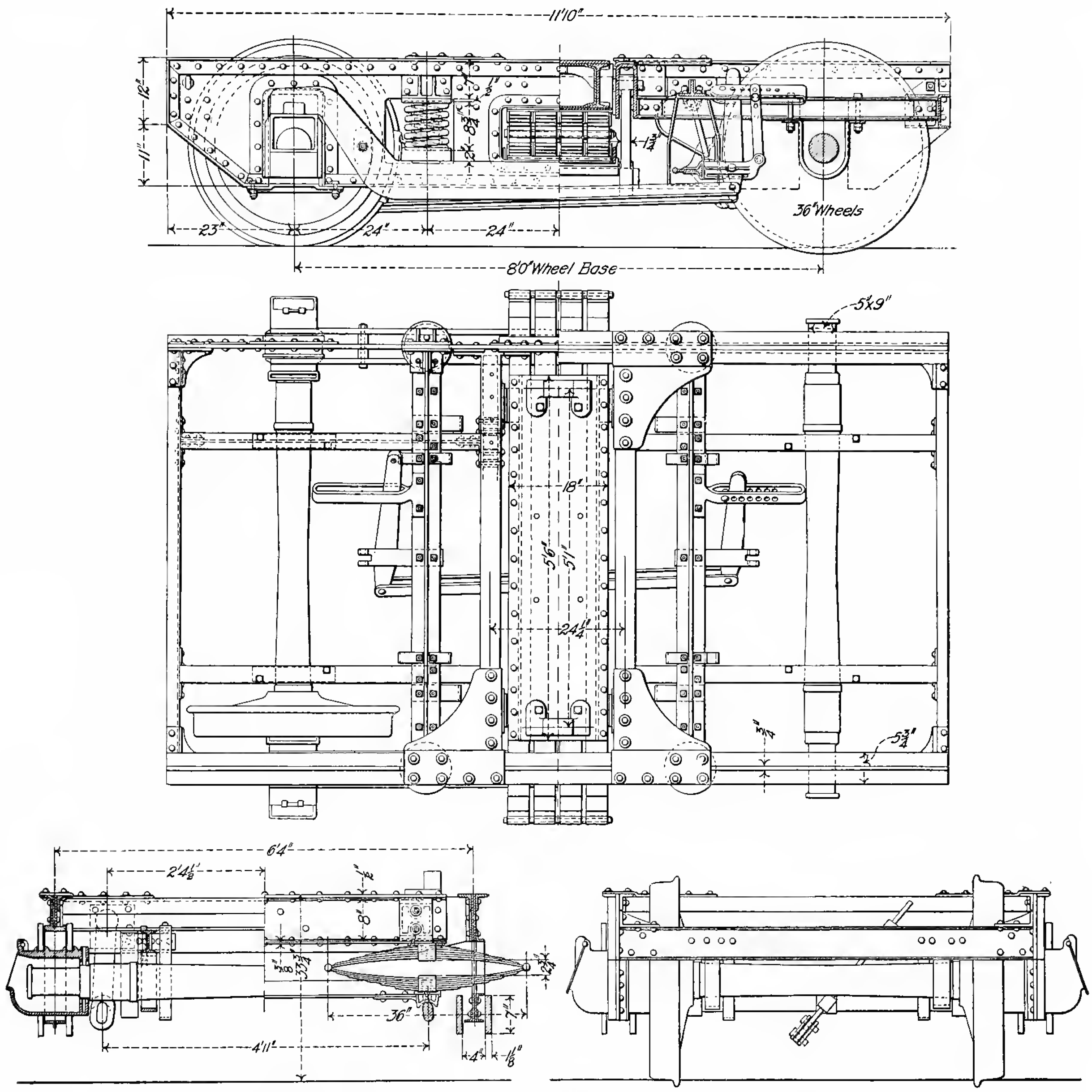


Fig. 950—General Arrangement of Four-Wheel Steel Truck Shown in Fig. 951.

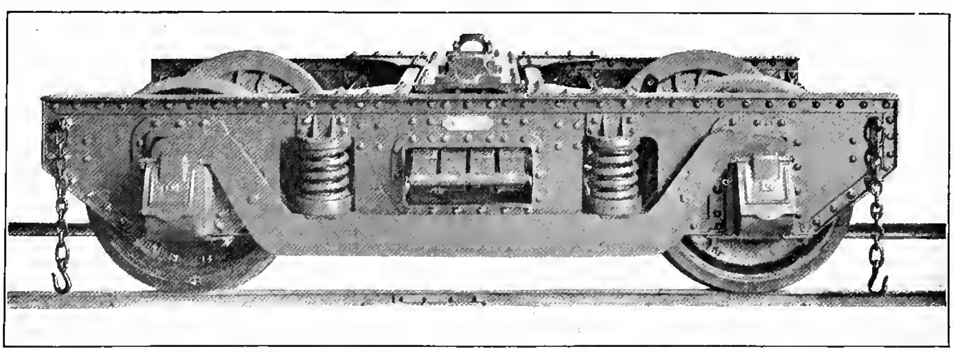


Fig. 951—Four-Wheel Steel Truck. The Barney & Smith Car Company.

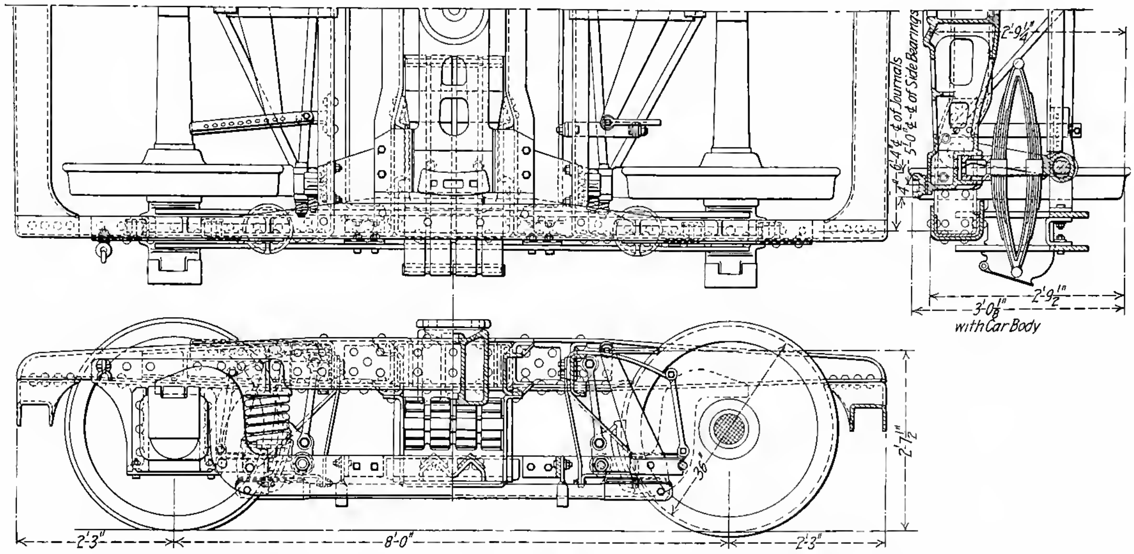


Fig. 952—Four-Wheel Truck for Electric Motor Car. Standard Motor Truck Company.

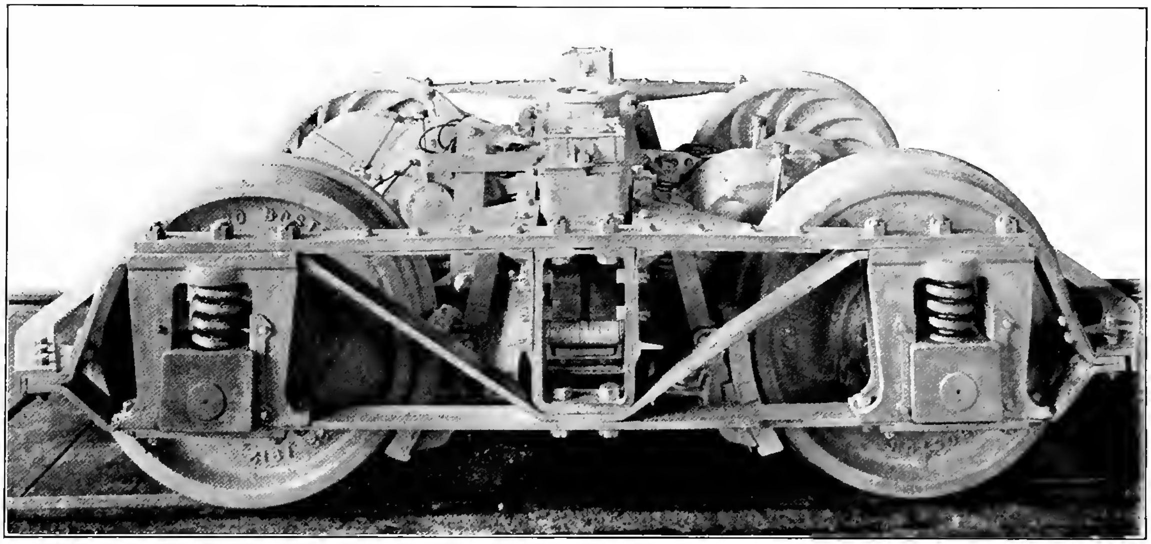


Fig. 953—Four-Wheel Motor Truck with Wheels Rotating on Axles, for Chesapeake & Ohio Car Shown in Fig. 195. Federal Storage Battery Car Company.

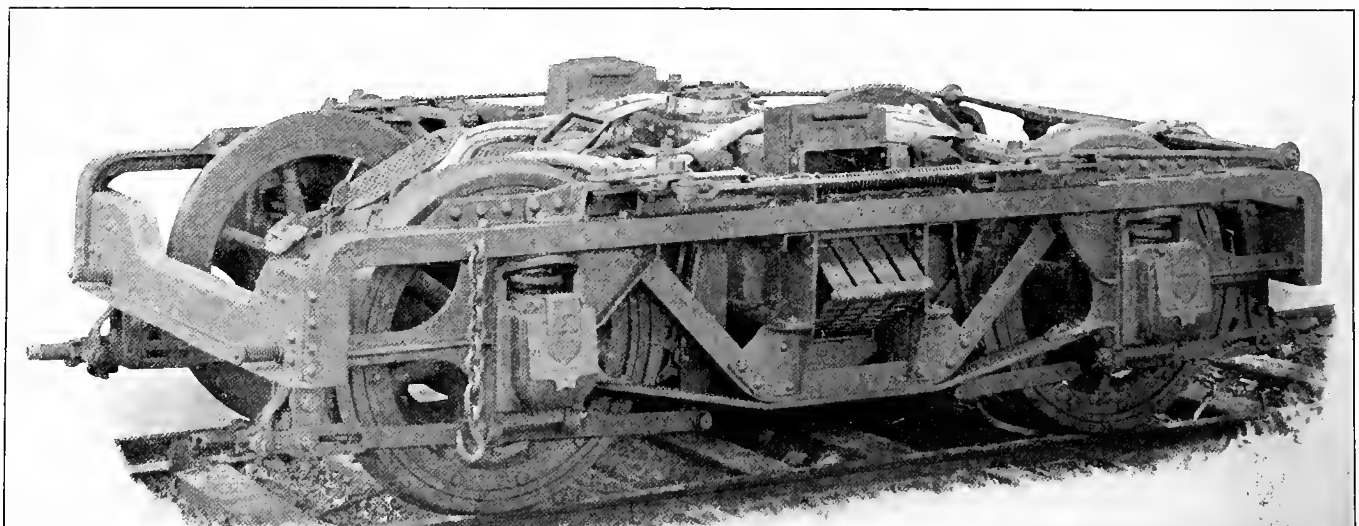


Fig. 954—Four-Wheel Motor Truck with Clasp Brake Arrangement for New York, Westchester & Boston Car Shown in Fig. 189.

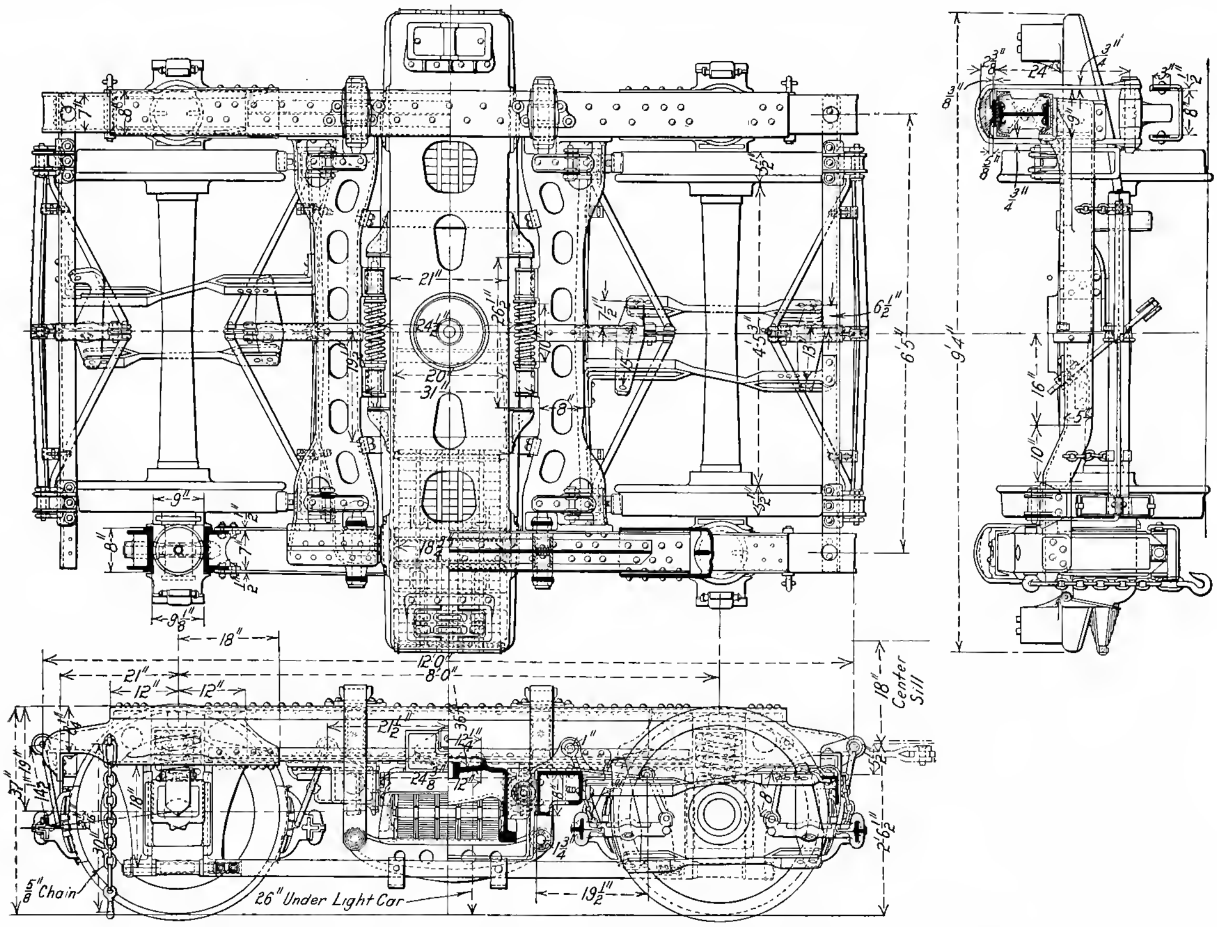


Fig. 955—General Arrangement of Four-Wheel Steel Truck Shown in Fig. 956.

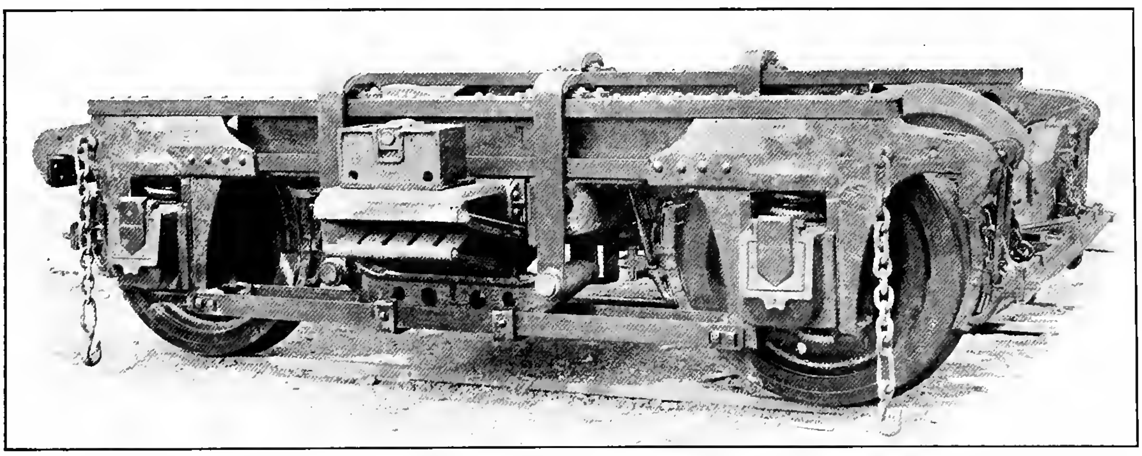
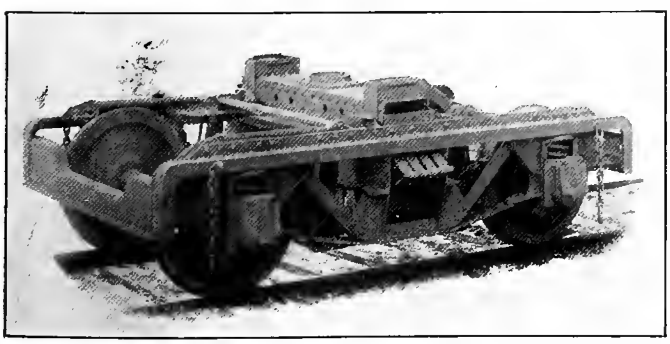


Fig. 956—Philadelphia & Reading Four-Wheel Steel Truck with Clasp Brake Arrangement. The Harlan & Hollingsworth Corporation.



New York, Fig. 189.

Fig. 958—Commonwealth Steel Company's Four-Wheel Cast Steel Truck.

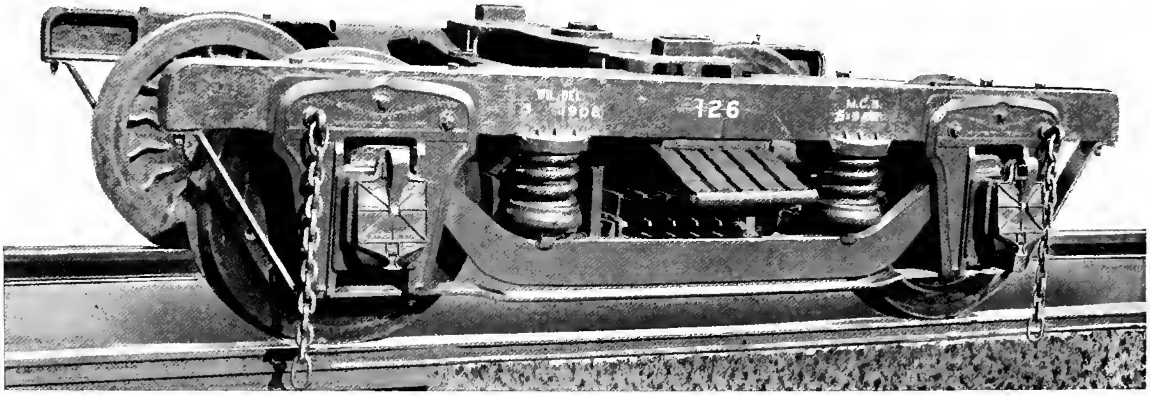


Fig. 959—Four-Wheel Steel Truck. The Harlan & Hollingsworth Corporation.

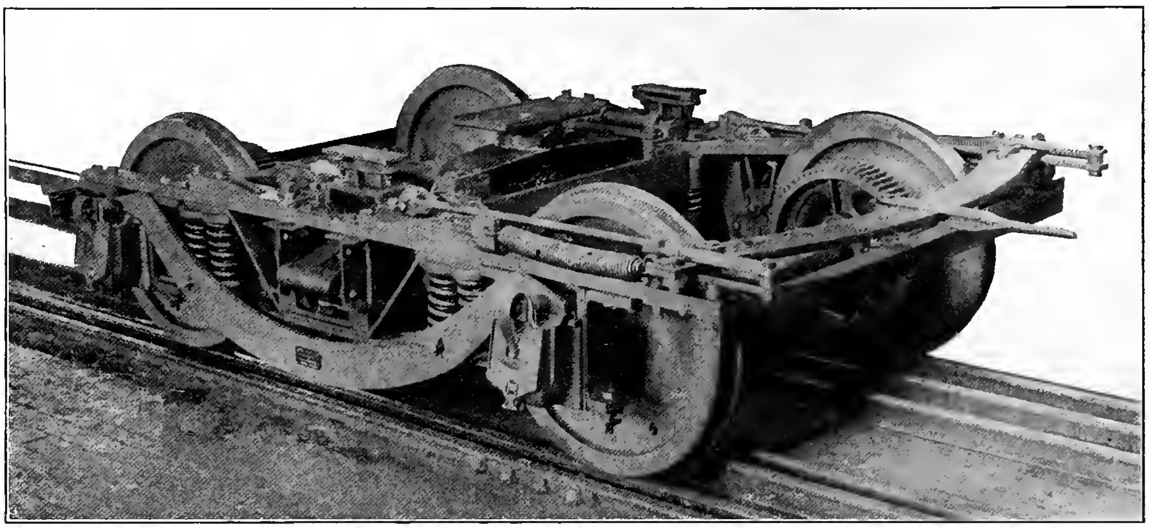


Fig. 960—Four-Wheel Electric Motor Truck. Baldwin Locomotive Works.

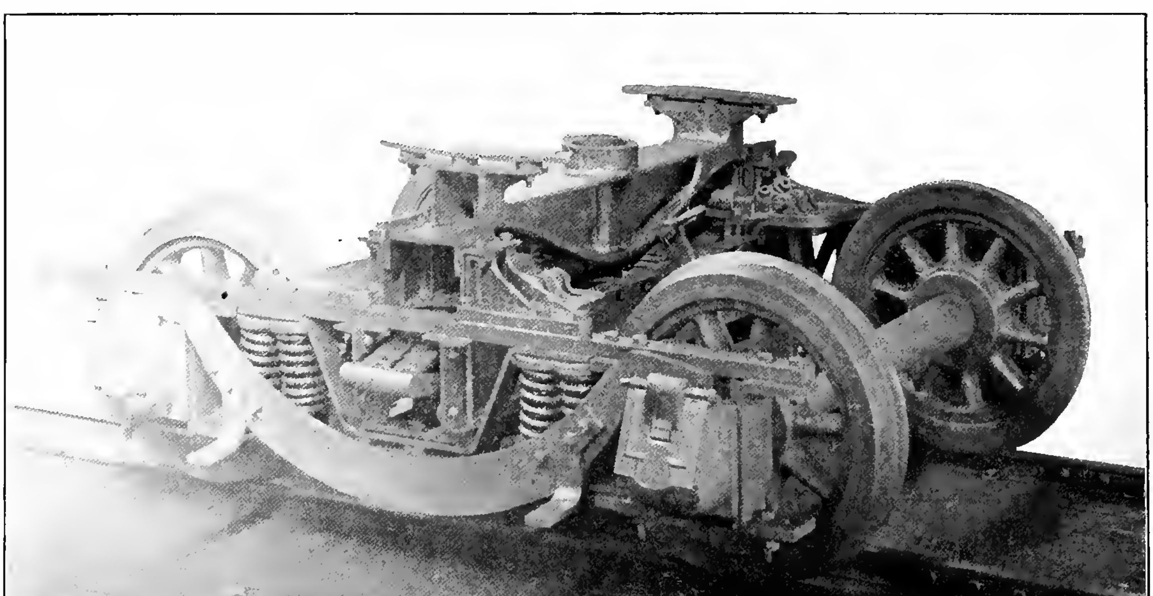


Fig. 961—Four-Wheel Trailer Truck for Electric Motor Cars. Baldwin Locomotive Works.

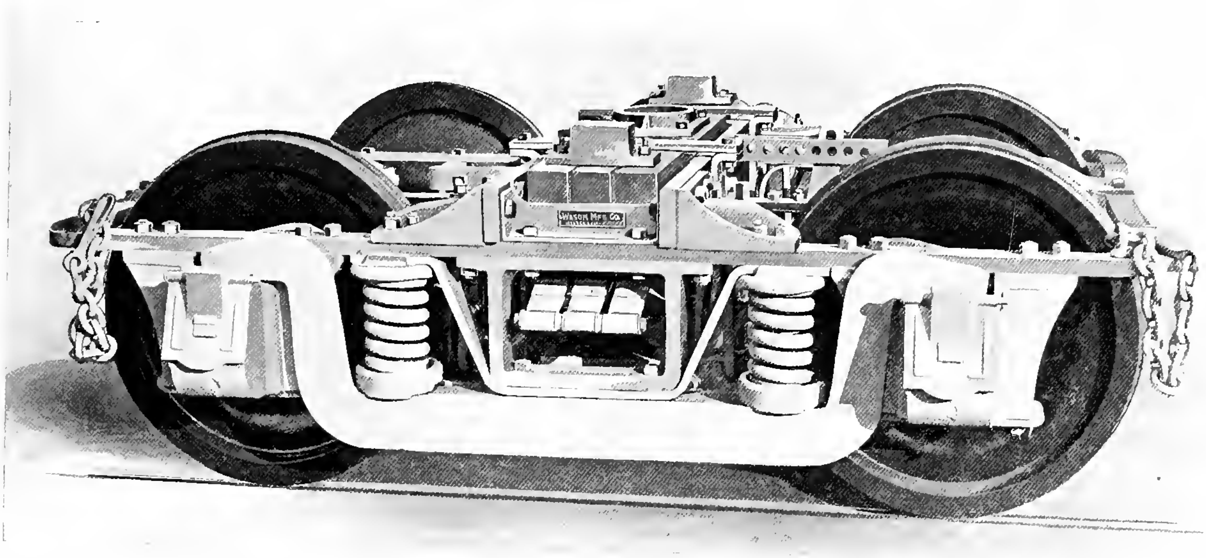


Fig. 962—Four-Wheel Truck with Low Frame. Wason Manufacturing Company.

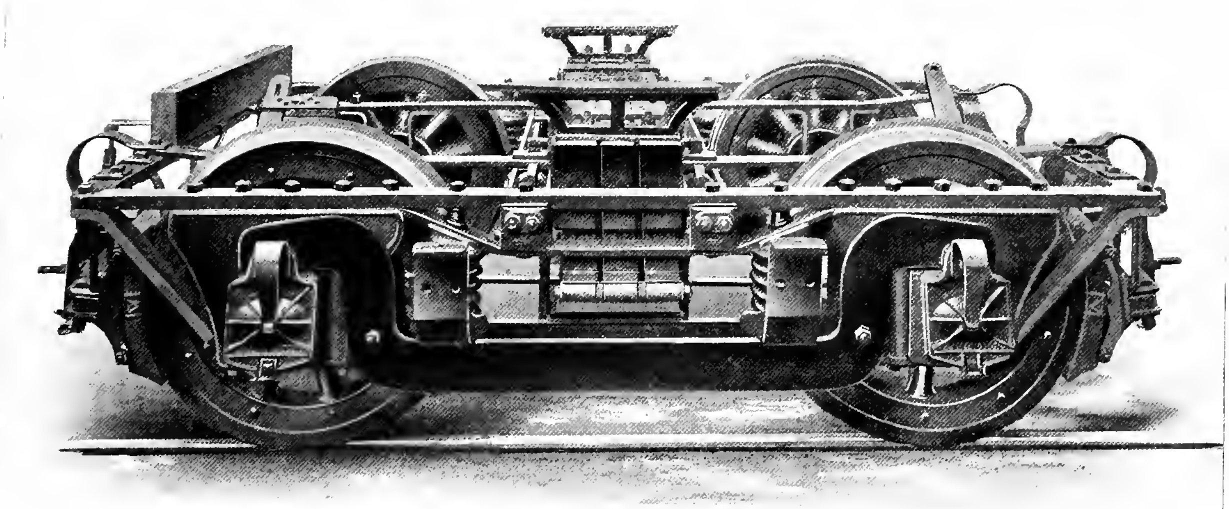


Fig. 963—Four-Wheel Truck for High Speed Electric Motor Cars. Wason Manufacturing Company.

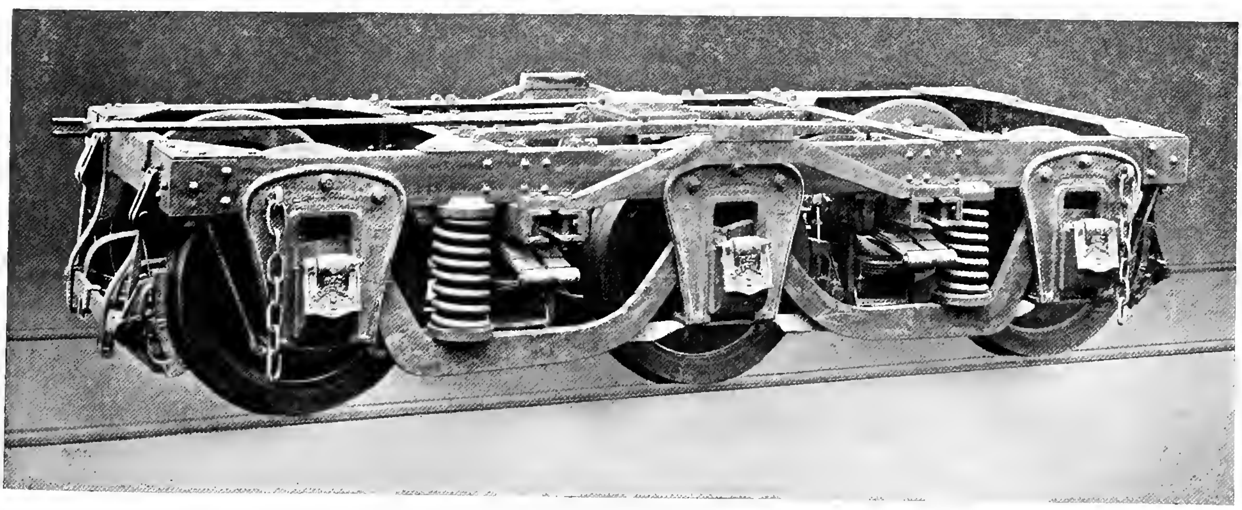


Fig. 964—Six-Wheel Steel Truck. Wason Manufacturing Company.

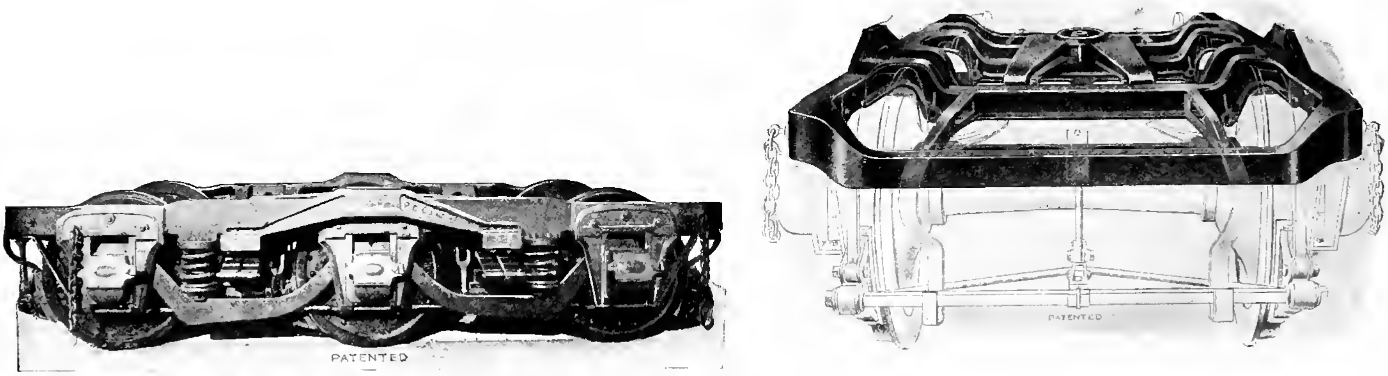


Fig. 965—Commonwealth Steel Company's Six-Wheel Cast Steel Truck.

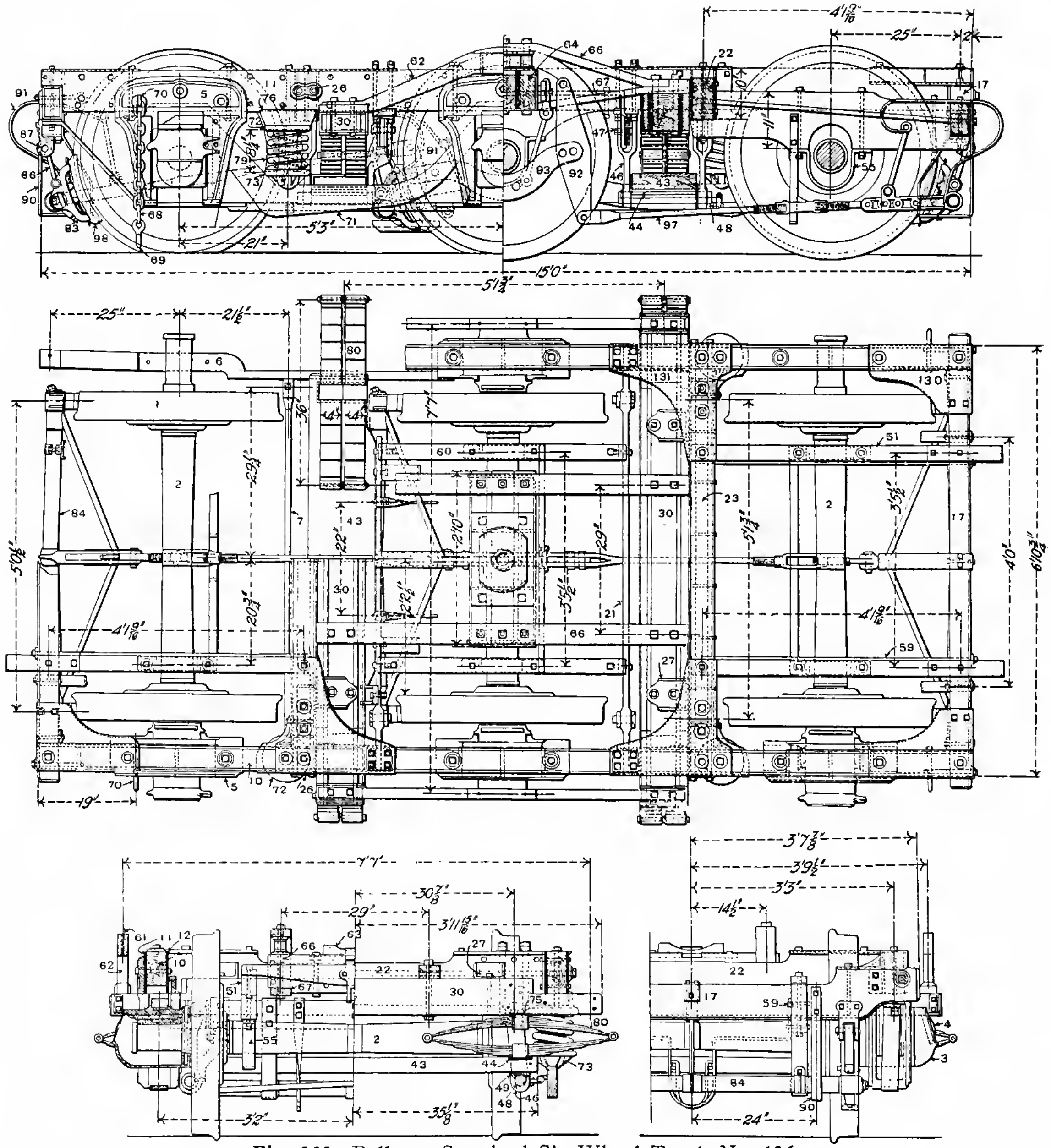


Fig. 966—Pullman Standard Six-Wheel Truck No. 106.

See Figs. 976-978 for Details and Page 567 for Names of Numbered Parts.

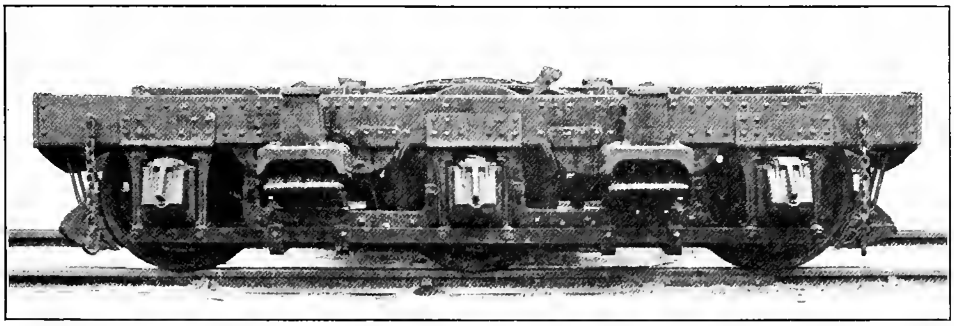


Fig. 967—Six-Wheel Truck for Pennsylvania Railroad Steel Cars.

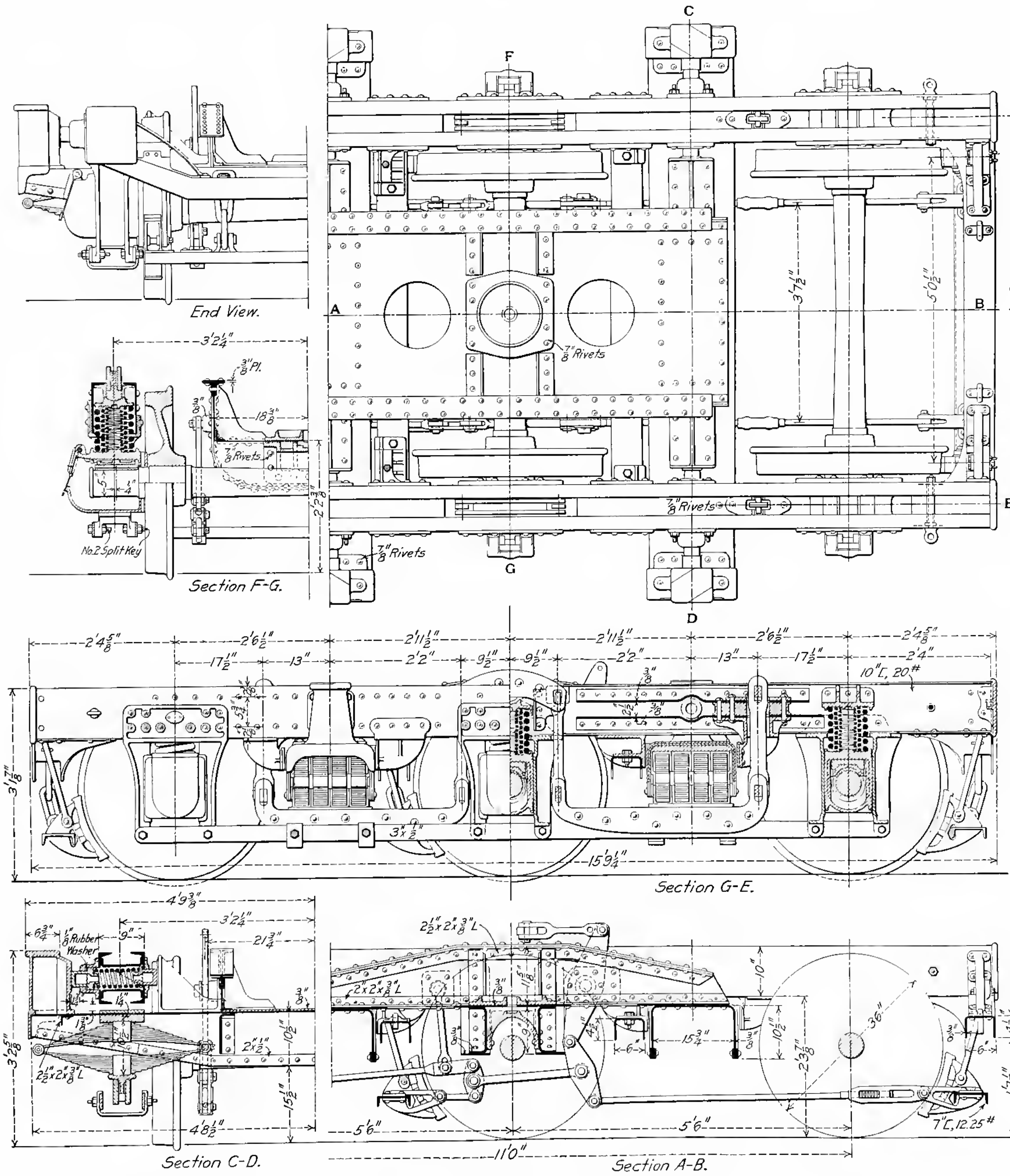


Fig. 968—General Arrangement of Pennsylvania Railroad Six-Wheel Steel Truck Shown in Fig. 967.

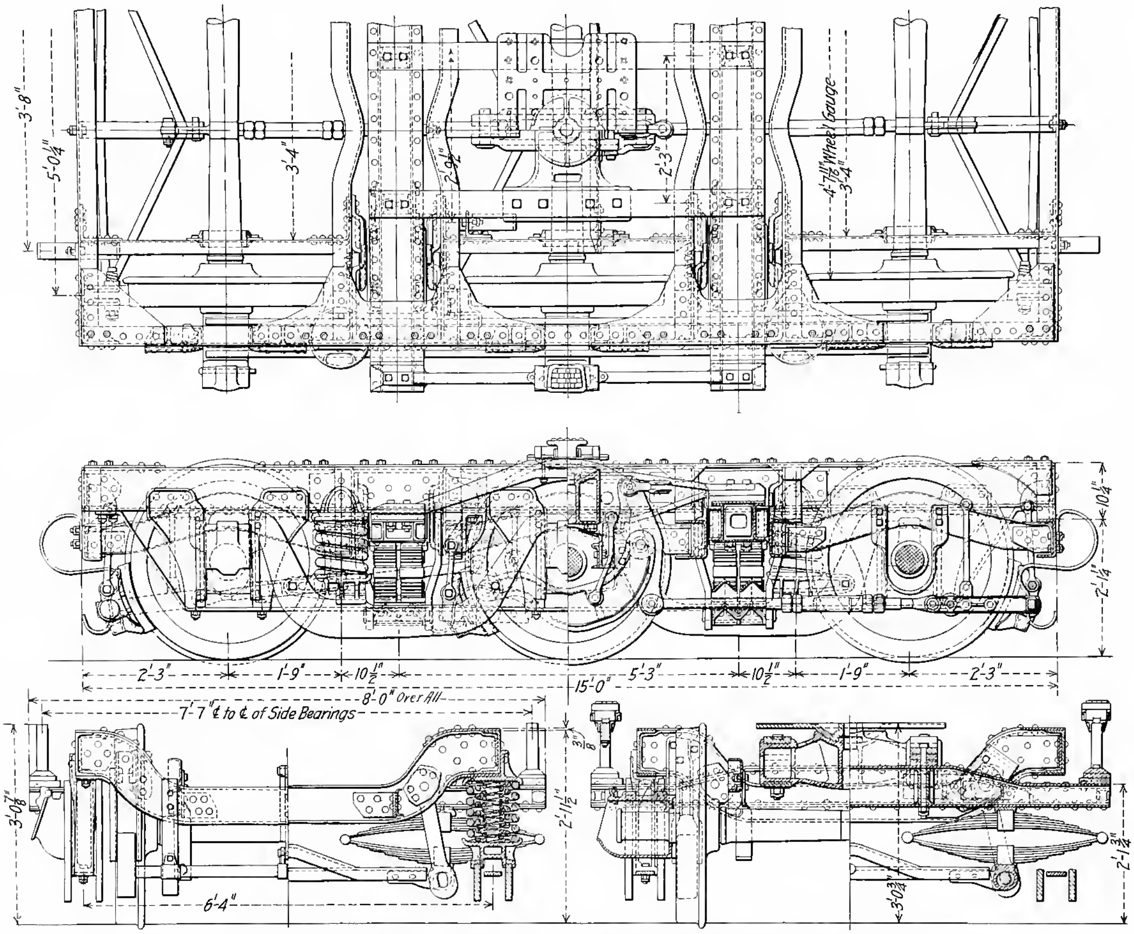


Fig. 969—Six-Wheel Steel Truck. Standard Steel Car Company.

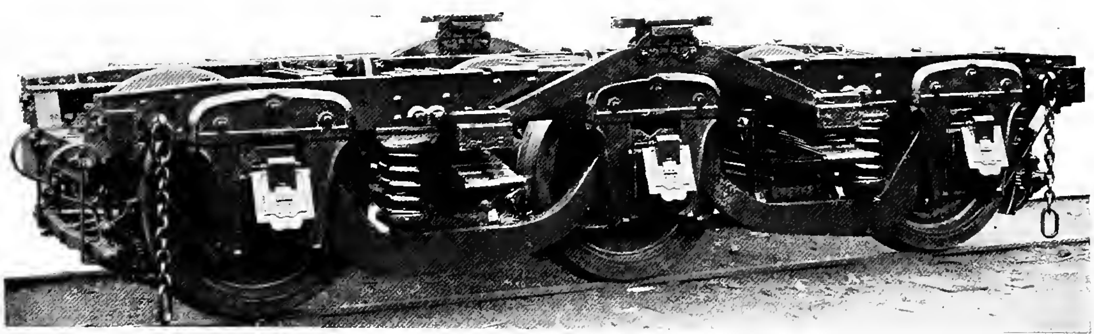


Fig. 970—Six-Wheel Truck. The Harlan & Hollingsworth Corporation.

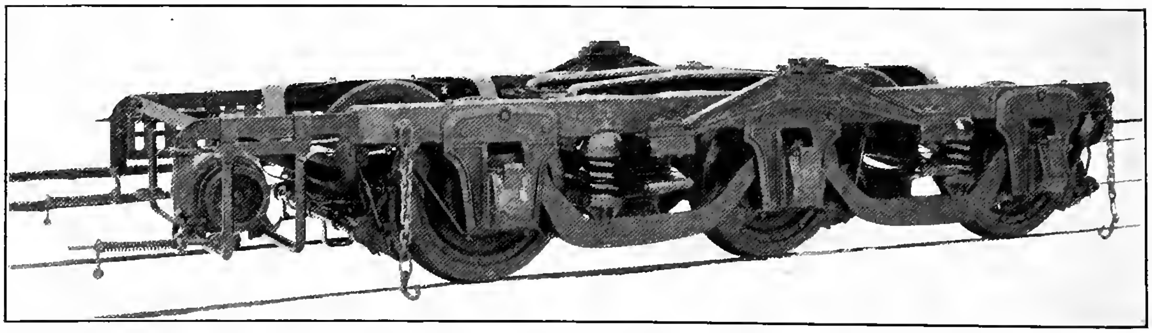


Fig. 971—Six-Wheel Truck with Commonwealth Cast Steel Frame. The Harlan & Hollingsworth Corporation.

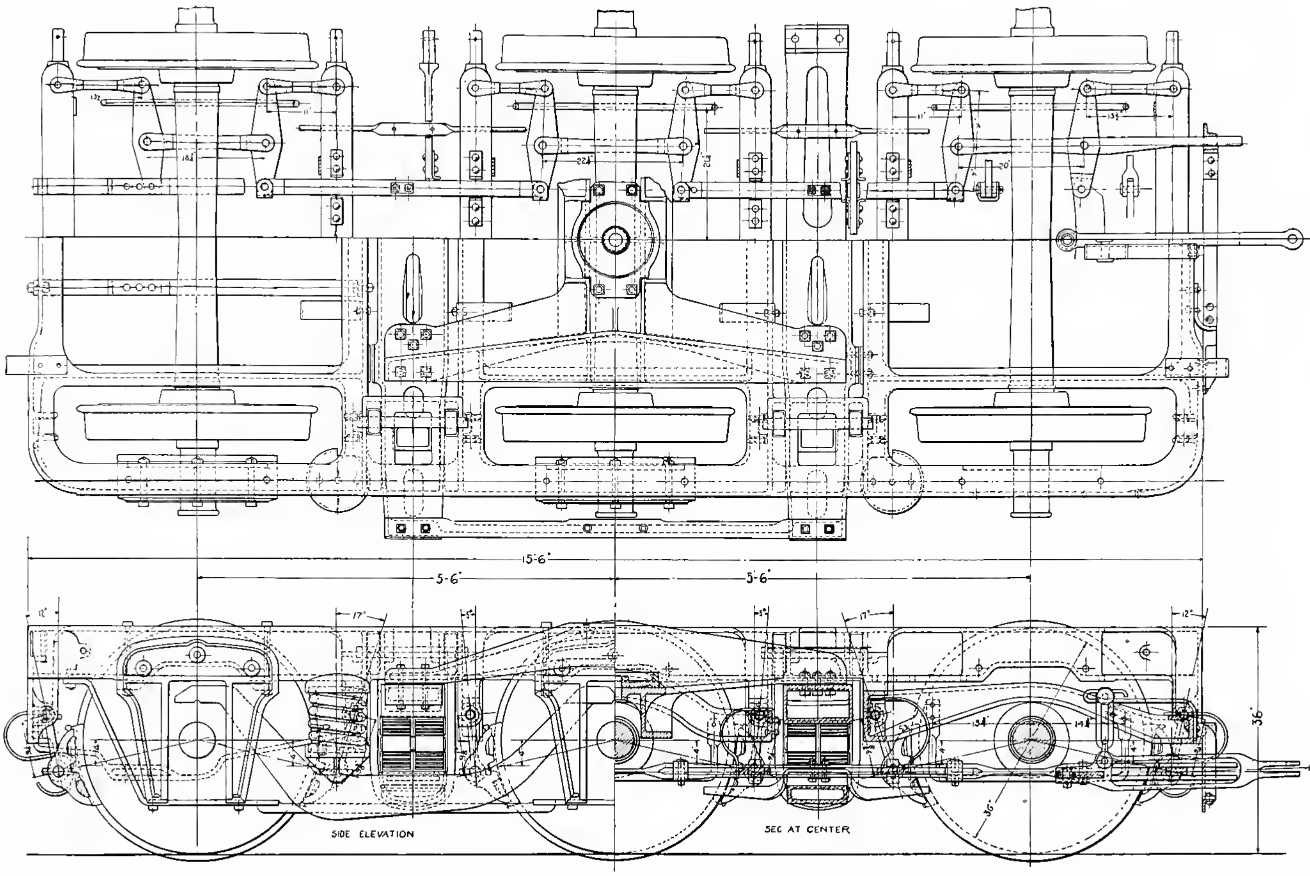


Fig. 972—Philadelphia & Reading Six-Wheel Truck with Clasp Brake Arrangement.

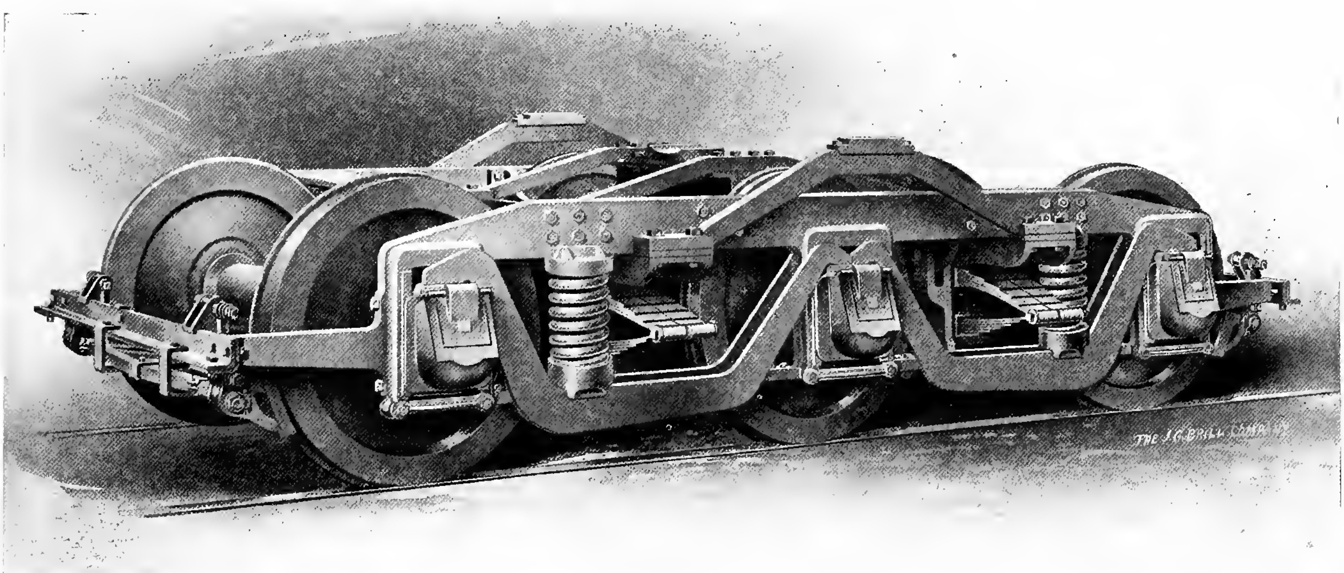


Fig. 973—Six-Wheel Truck with Side Frame and Pedestals Forged in One Piece. J. G. Brill Company.

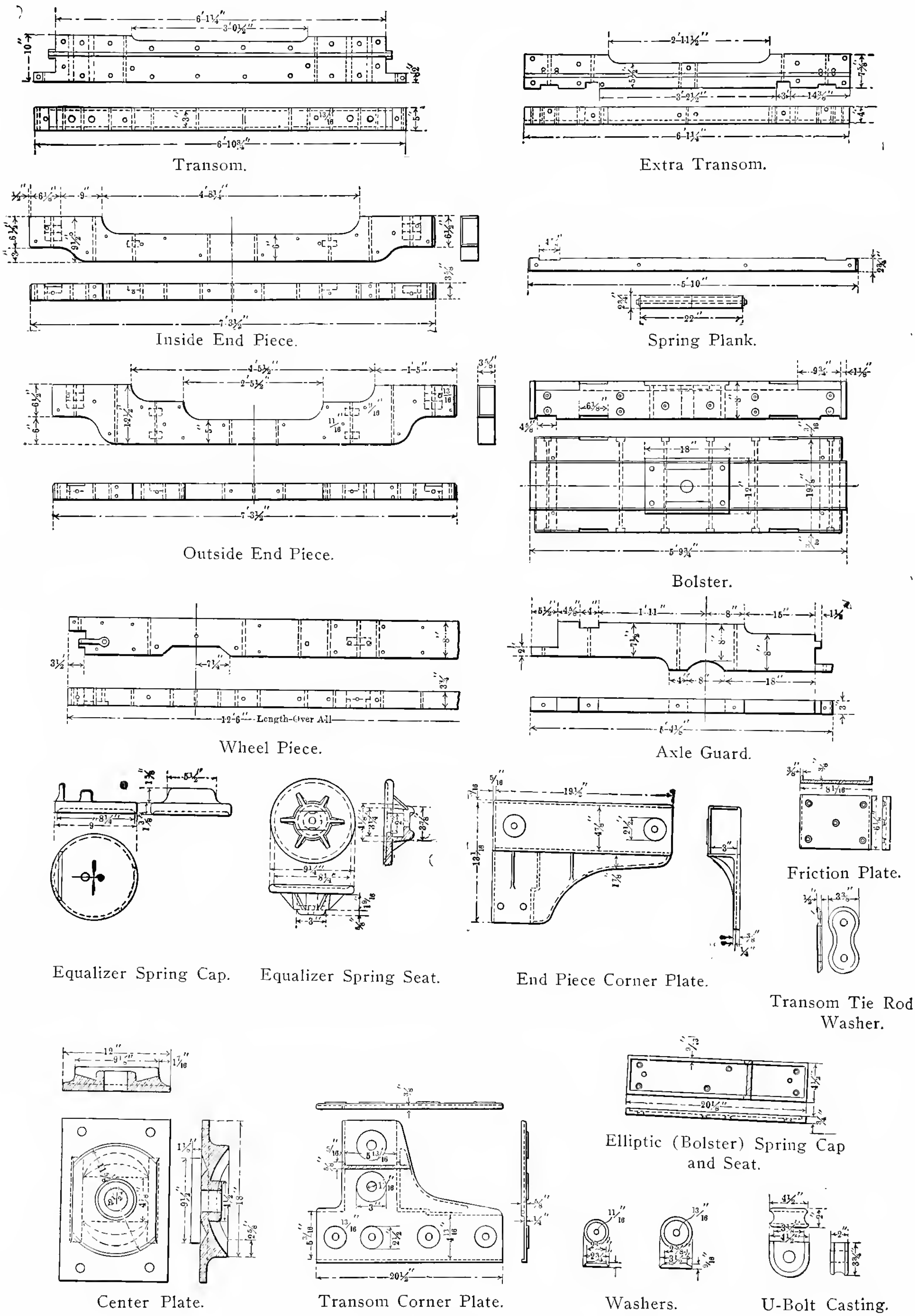


Fig. 974—Wooden and Cast Iron Details of Pullman Standard Four-Wheel Truck No. 104 Shown in Fig. 947.

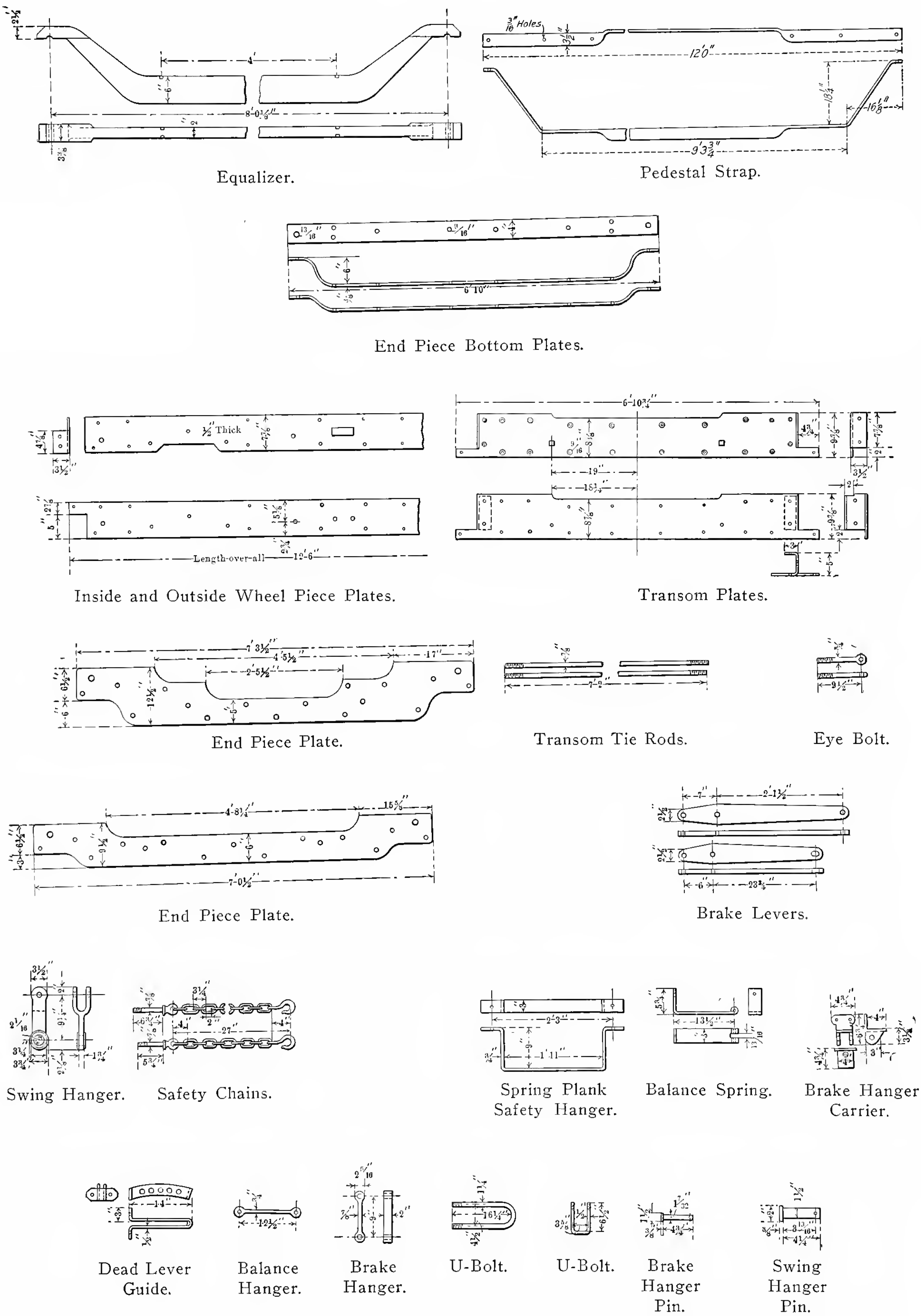
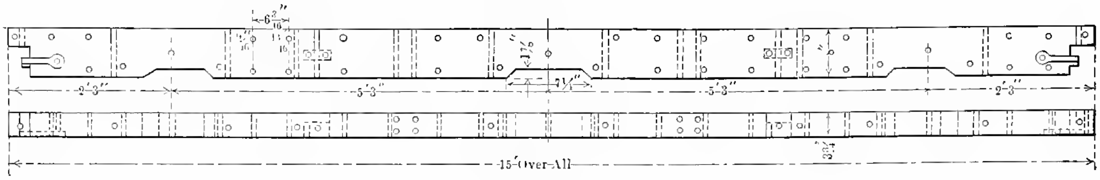
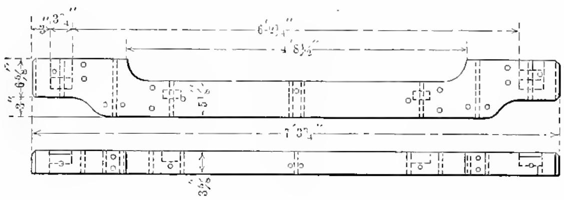


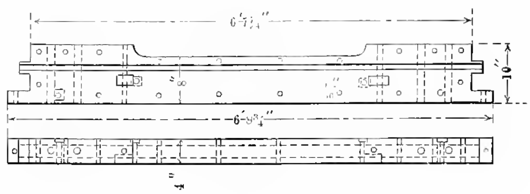
Fig. 975—Wrought Iron Details of Pullman Standard Four-Wheel Truck No. 104 Shown in Fig. 947.



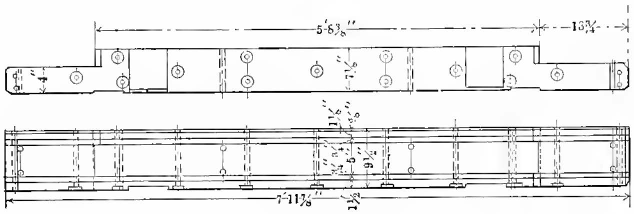
Wheel Piece.



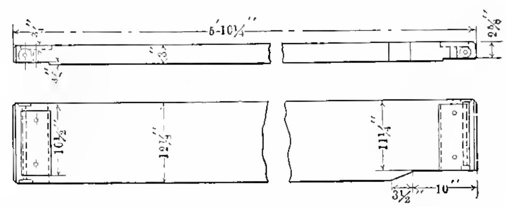
End Piece.



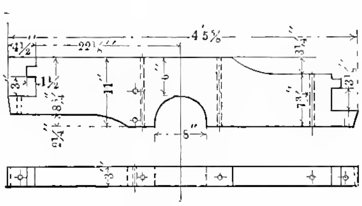
Transom.



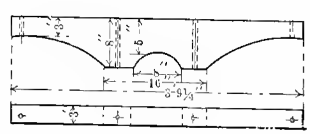
Bolster.



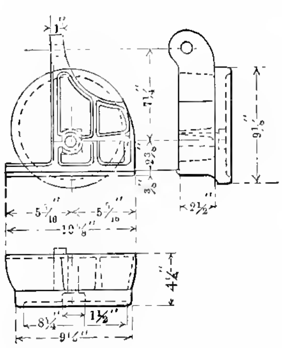
Spring Plank.



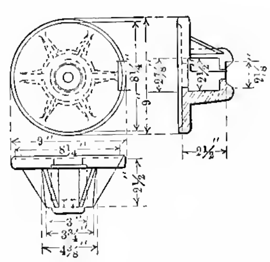
End Axle Guard.



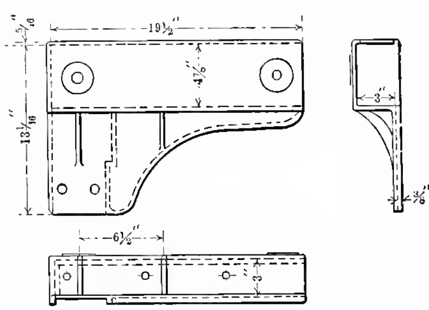
Center Axle Guard.



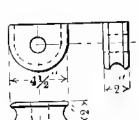
Equalizer Spring Cap.



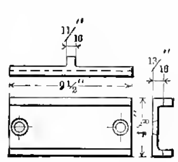
Equalizer Spring Seat.



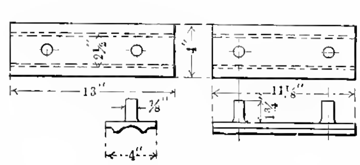
End Piece Corner Plate.



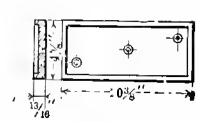
Swing Hanger Carrier.



Elliptic (Bolster) Spring Cap.

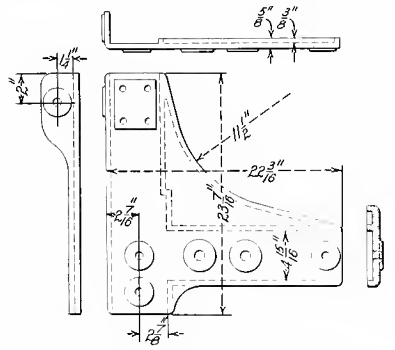


Swing Hanger Axle Plates or Bearings.

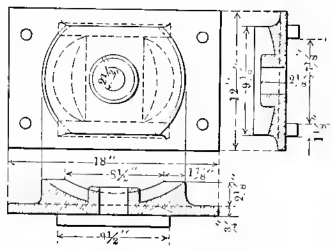


Elliptic (Bolster) Spring Seat.

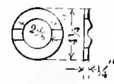
Fig. 976—Wooden and Cast Iron Details of Pullman Standard Six-Wheel Truck No. 106 Shown in Fig. 966.



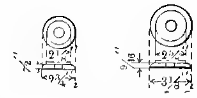
Transom Corner Plate.



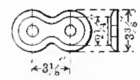
Center Plate.



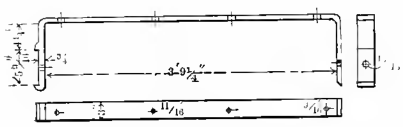
Swing Hanger Axle Washer.



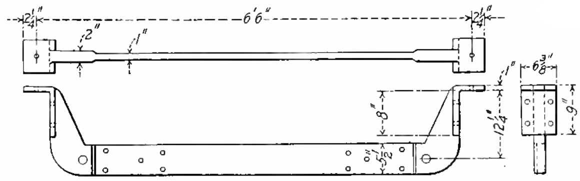
Washers.



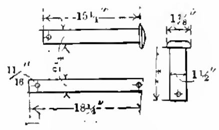
Transom Tie Rod Washer.



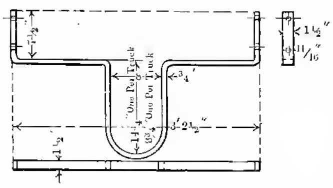
Axle Guard Truss.



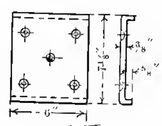
Middle Transom.



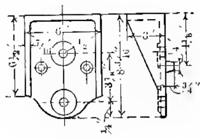
Swing Hanger Axles and Pin.



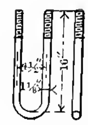
Safety Guards for Brake Connection Rods.



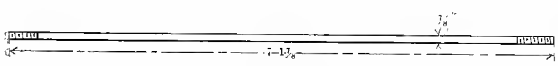
Bolster Chafing Plate.



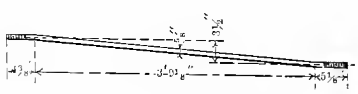
Friction Block.



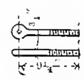
U-Bolt.



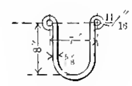
Transom Tie Rod.



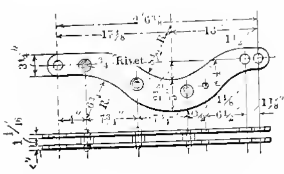
Transom and End Piece Tie Rod.



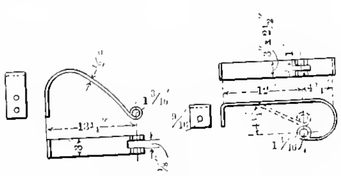
Eye Bolt.



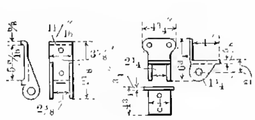
Safety Guard or Hanger.



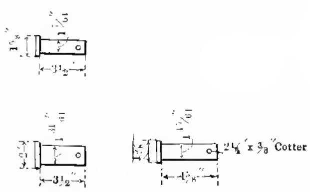
Brake Lever Fulcrum.



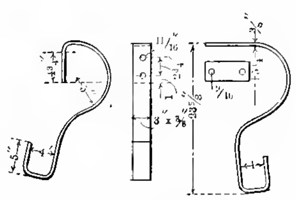
Balance Springs.



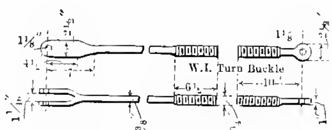
Brake Hanger Carriers.



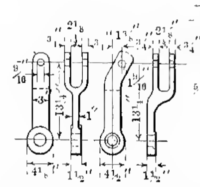
Brake Connection Pins.



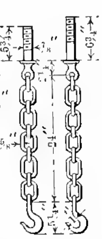
Release Springs.



Brake Connection Rods.

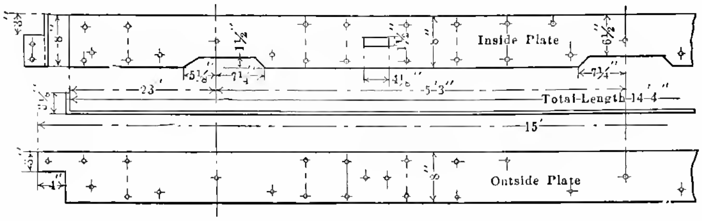


Swing Hangers.

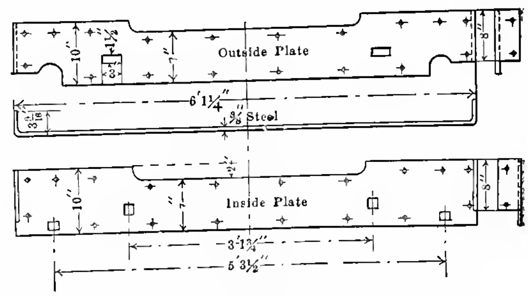


Safety Chains.

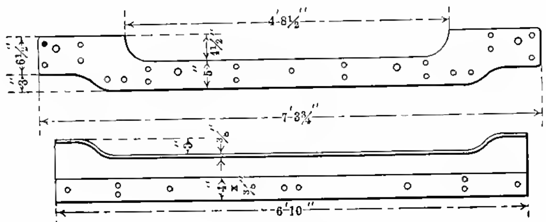
Fig. 977—Cast and Wrought Iron Details of Pullman Standard Six-Wheel Truck No. 106 Shown in Fig. 966.



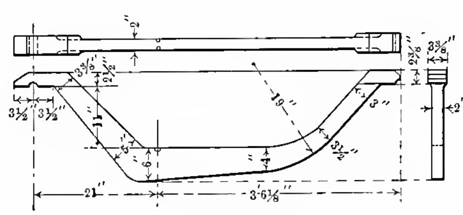
Wheel Piece Plates.



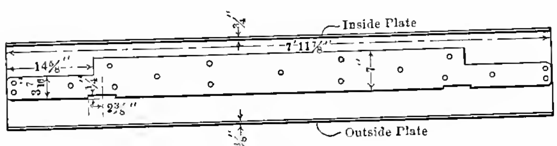
Transom Plates.



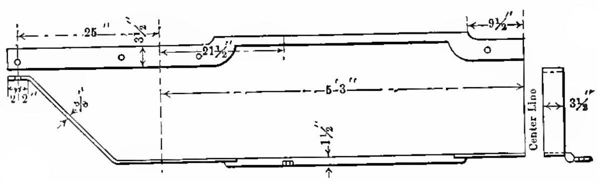
End Piece Plates.



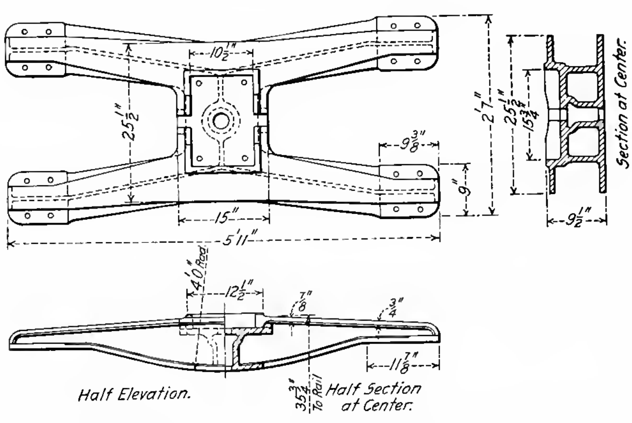
Equalizer.



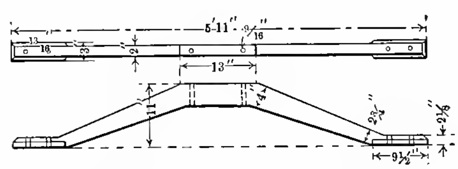
Bolster Plates.



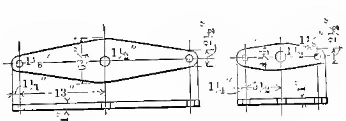
Pedestal Strap.

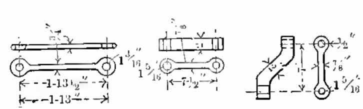


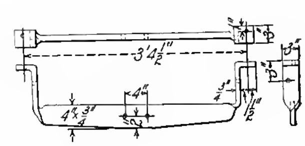
Commonwealth Cast Steel Truck Center Bolster.



Side Bearing Arch or Bridge.

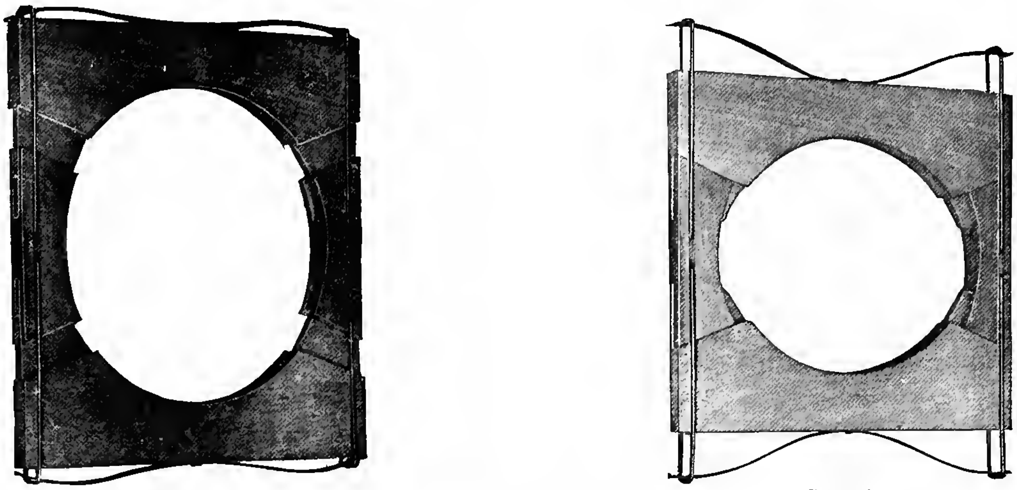

Brake Levers.


Brake Beam Hangers.



Fulcrum Hanger Bar.

Fig. 978—Wrought Iron and Cast Steel Details of Pullman Standard Six-Wheel Truck No. 106 Shown in Fig. 966.



Extended. Closed.

Fig. 979—Security Dust Guard. Western Railway Equipment Company.

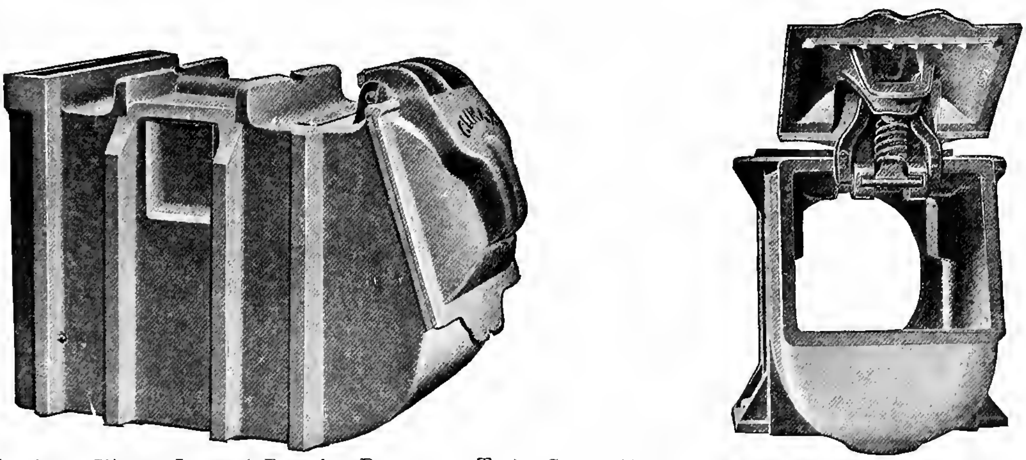


Fig. 980—Climax Journal Box for Passenger Train Cars. National Malleable Castings Company.

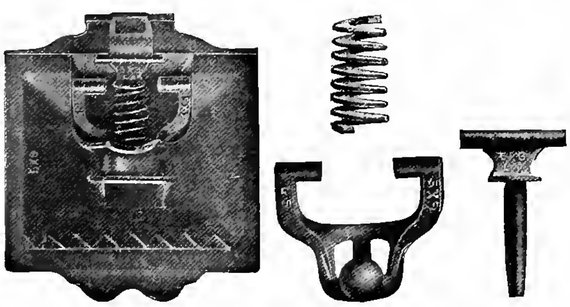


Fig. 981—Climax Journal Box Lid and Details.

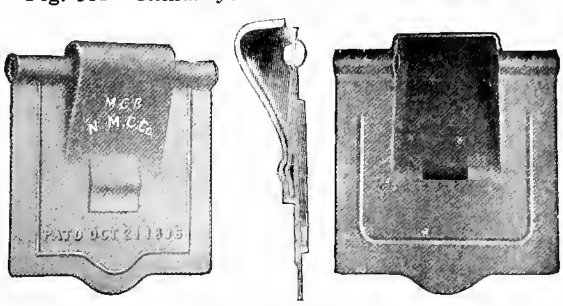


Fig. 982—M. C. B. Standard Malleable Iron Lid for 3¾ in. by 7 in., 4¼ in. by 8 in., 5 in. by 9 in. and 5½ in. by 10 in. size Journal Boxes.

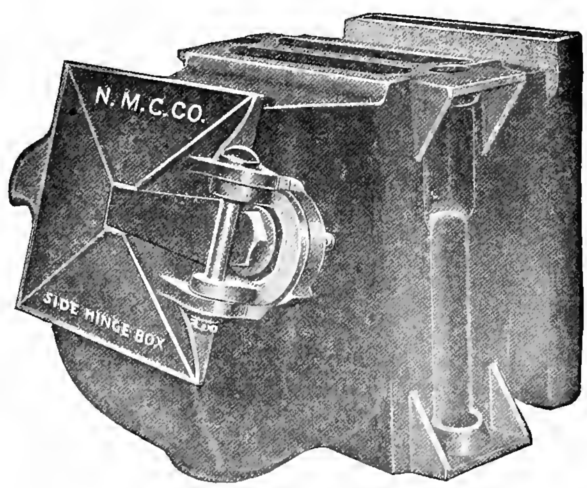


Fig. 983—Side Hinge Journal Box for Arch Bar Trucks with 4¼ in. by 8 in., 5 in. by 9 in. and 5½ in. by 10 in. Journals.

National Malleable Castings Company.

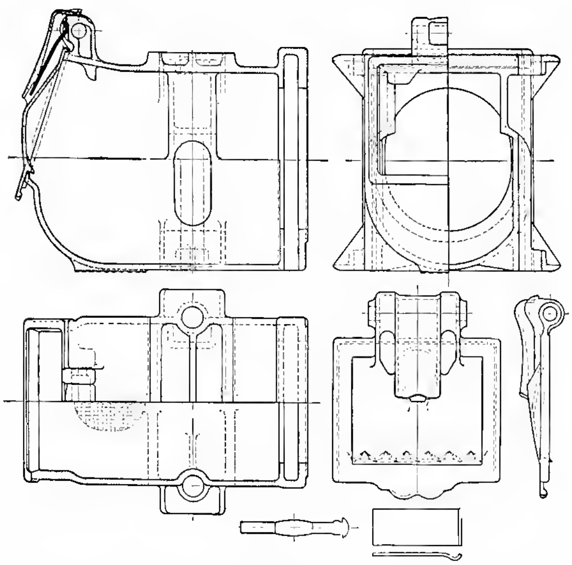


Fig. 984—National Journal Box for Arch Bar Trucks with 4¼ in. by 8 in., 5 in. by 9 in., 5½ in. by 10 in. and 6 in. by 11 in. Journals.

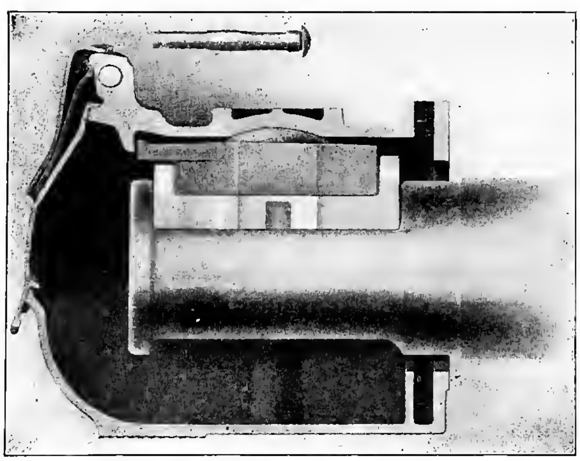


Fig. 987—National Equalizing Journal Box Wedge in Position in Box.

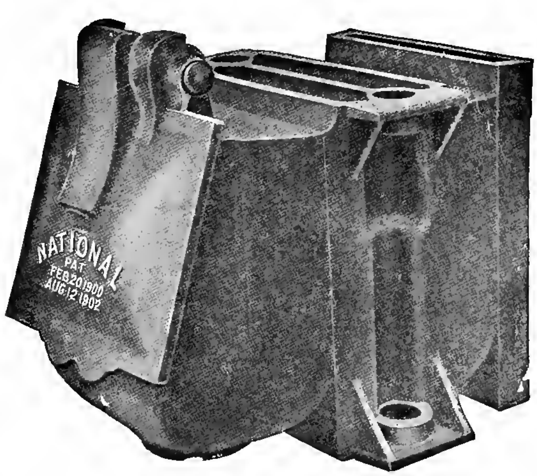


Fig. 989—National Journal Box.

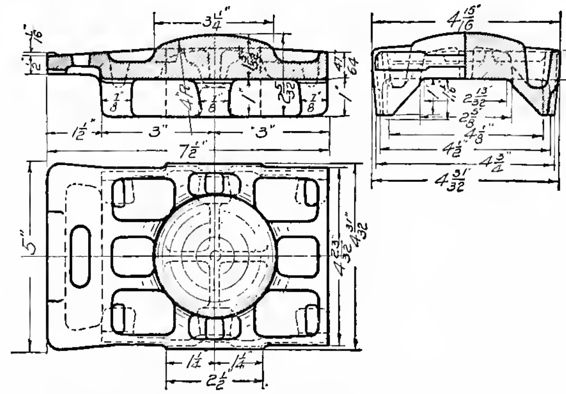


Fig. 985—National Equalizing Journal Box Wedge for 4¼ in. by 8 in. Journal.

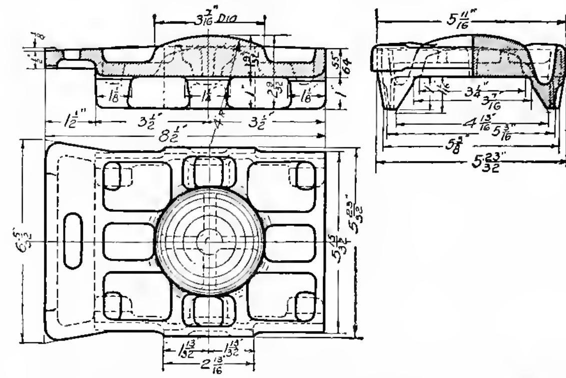


Fig. 986—National Equalizing Journal Box Wedge for 5 in. by 9 in. Journal.

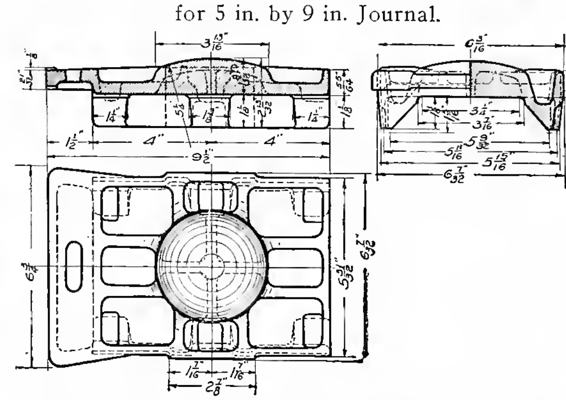


Fig. 988—National Equalizing Journal Box Wedge for 5½ in. by 10 in. Journal.

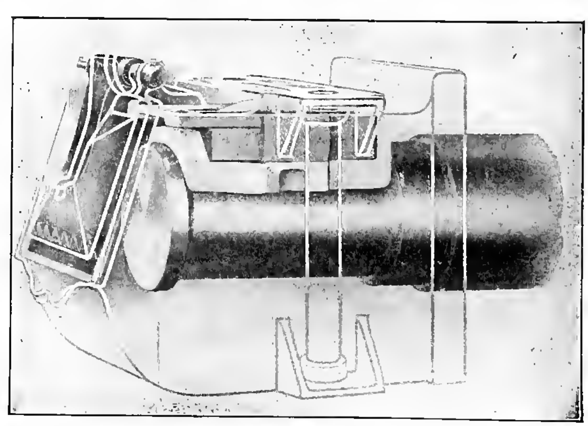


Fig. 990—National Journal Box and Equalizing Wedge.

National Malleable Castings Company.

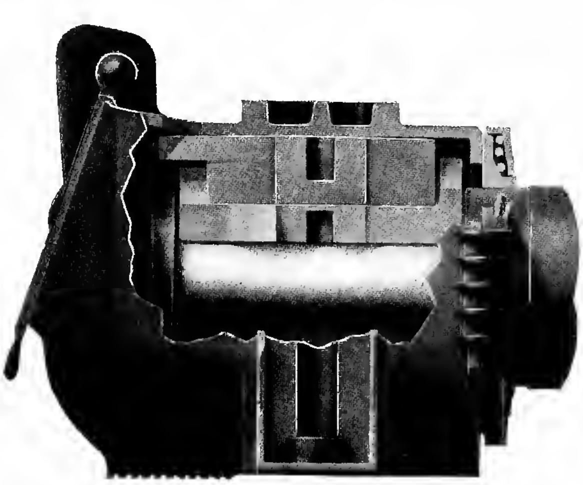


Fig. 991—McCord Journal Box with Outside Dust Guard.

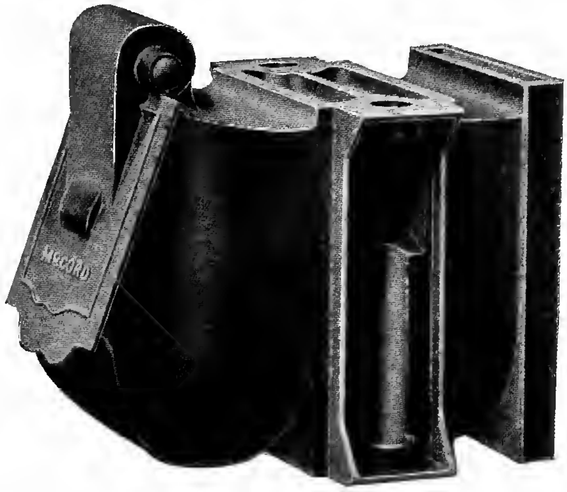


Fig. 992—McCord Journal Box for Arch Bar Trucks.

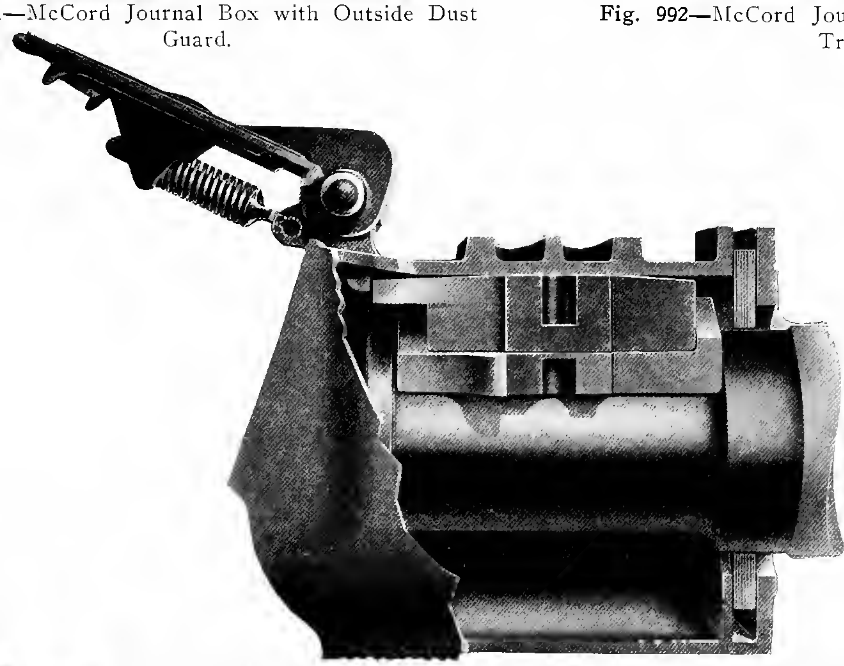


Fig. 993—McCord Journal Box for Arch Bar Trucks, in Open Position.

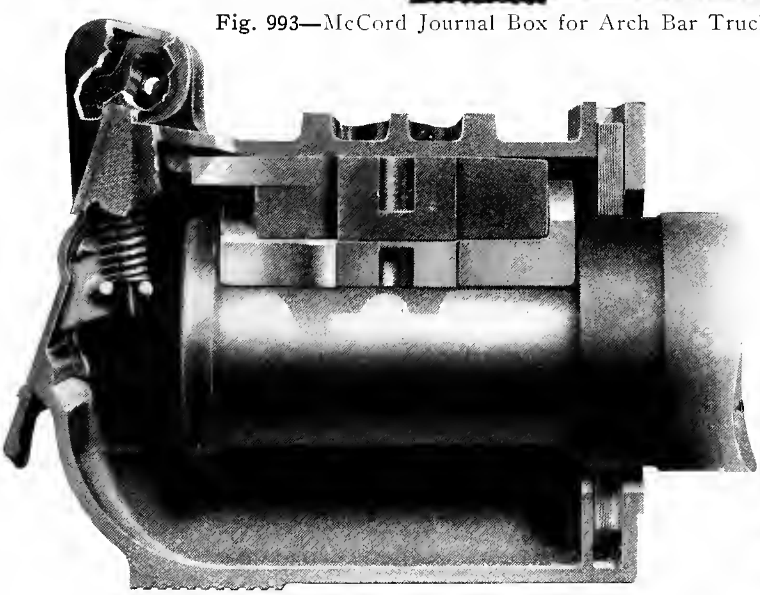


Fig. 994—McCord Journal Box for Arch Bar Trucks, in Closed Position.

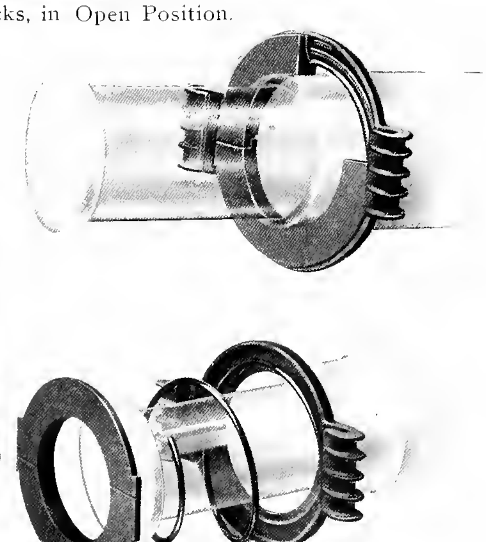
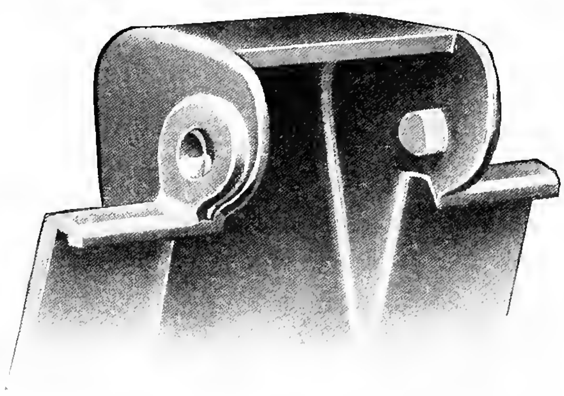
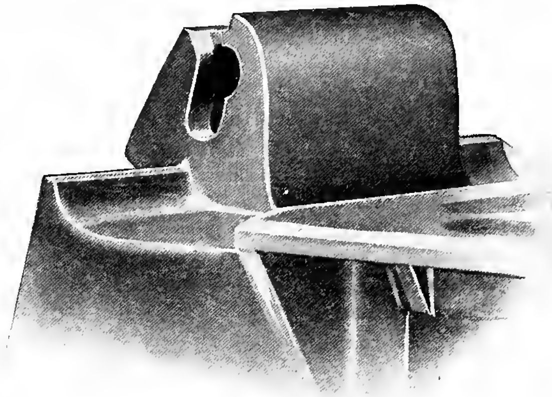
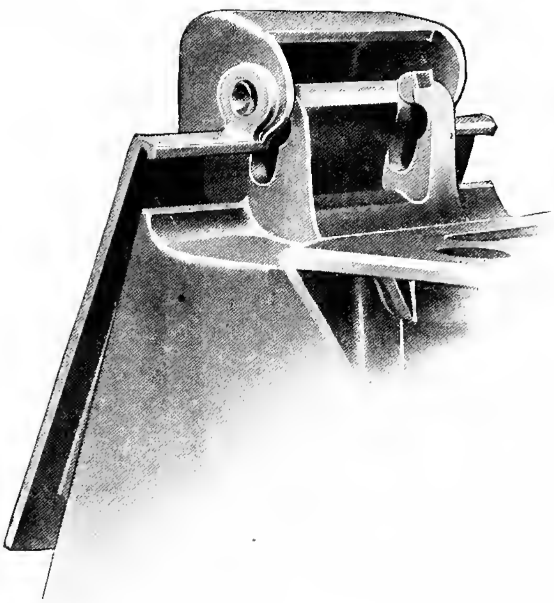


Fig. 995—McCord Outside Dust Guard.

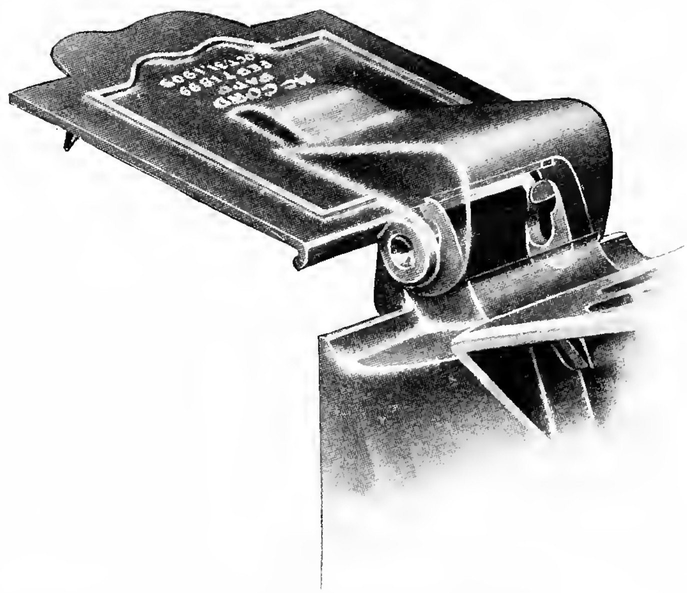




Hinge on Lid.



Hinge on Box.



Ready to Apply.

Open Position After Application.

Fig. 996—McCord Pinless Journal Box Lid.

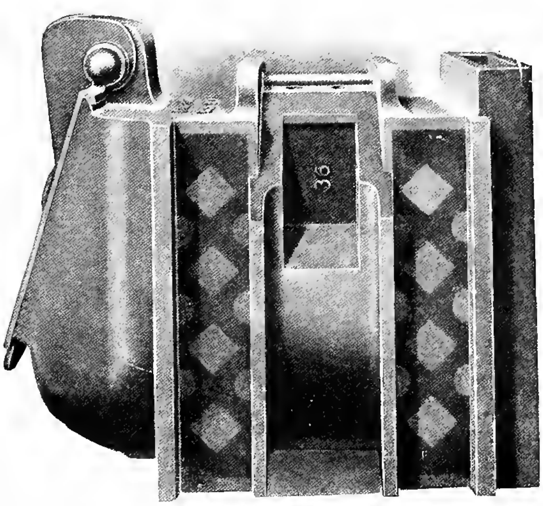


Fig. 997—McCord Malleable Iron Pedestal Truck Journal Box with Continuous Steel Inserts for Protection of Pedestal Channels.

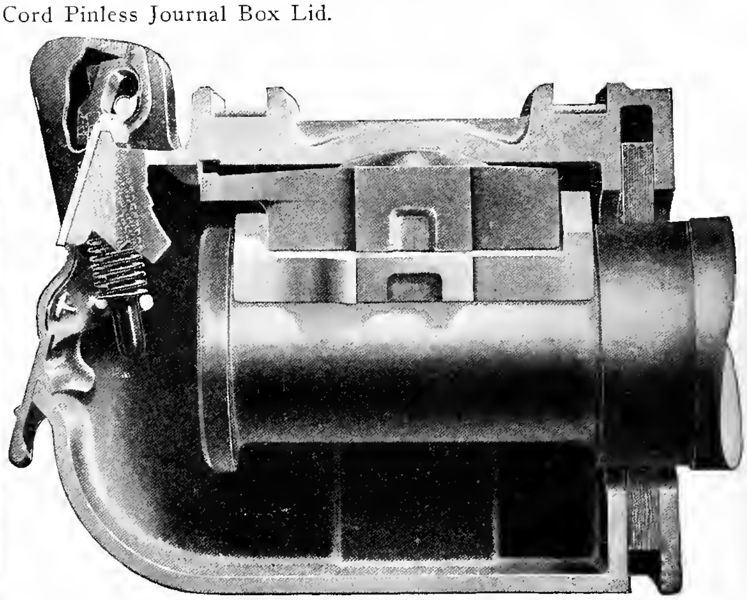


Fig. 998—McCord Journal Box with National Equalizing Wedge.

McCord & Company.

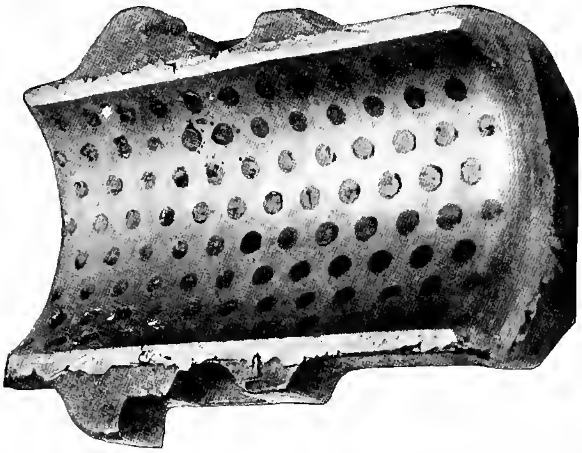


Fig. 999—Randall Graphite Sheet Lubricant Applied to Journal Bearing. Strong, Carlisle & Hammond Company.

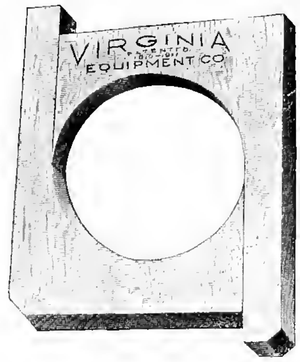


Fig. 1000—Virginia Journal Box Dust Guard. Virginia Equipment Company.

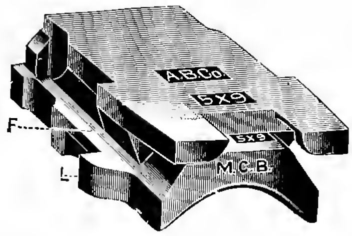


Fig. 1001—A. B. C. Wedge Fitted to M. C. B. Journal Bearing.

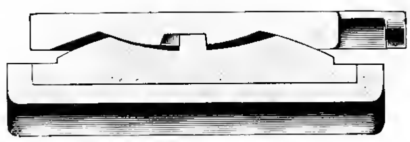


Fig. 1002—Section Through A. B. C. Journal Bearing and Wedge. A. B. C. Bearing Corporation.

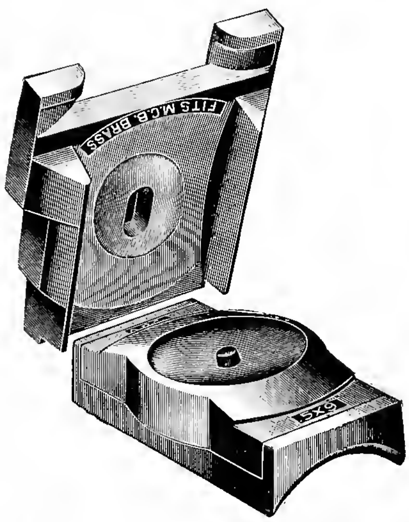


Fig. 1003—A. B. C. Journal Bearing and Wedge. A. B. C. Bearing Corporation.

Fig. 1004—Gould Journal Box with M. C. B. Lid. This Box also Takes Gould Inset Lid.

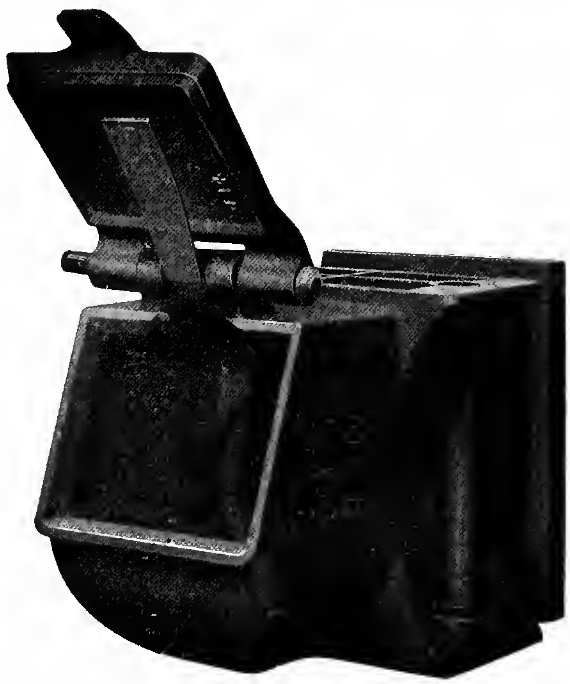


Fig. 1005—Gould Malleable Iron Journal Box with Inset Lid. This Box also Takes M. C. B. Lid.

Gould Coupler Company.

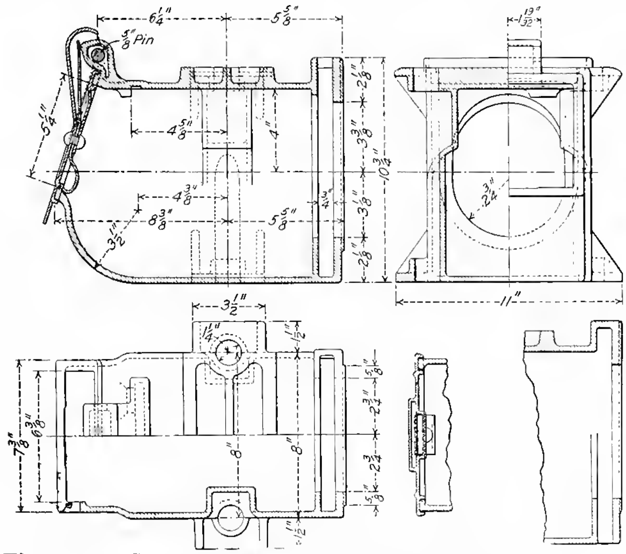


Fig. 1006—Standard M. C. B. Journal Box with Creco Lid, for 4¼ in. by 8 in. Journals.

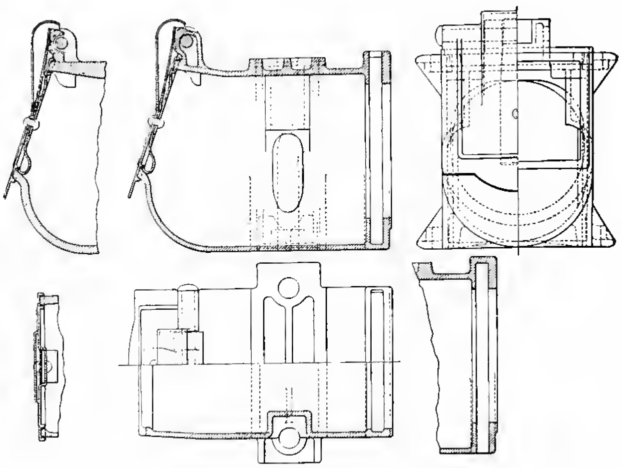


Fig. 1007—Standard M. C. B. Journal Box with Creco Lid, for 5 in. by 9 in. and 5½ in. by 10 in. Journals.

Chicago Railway Equipment Company.

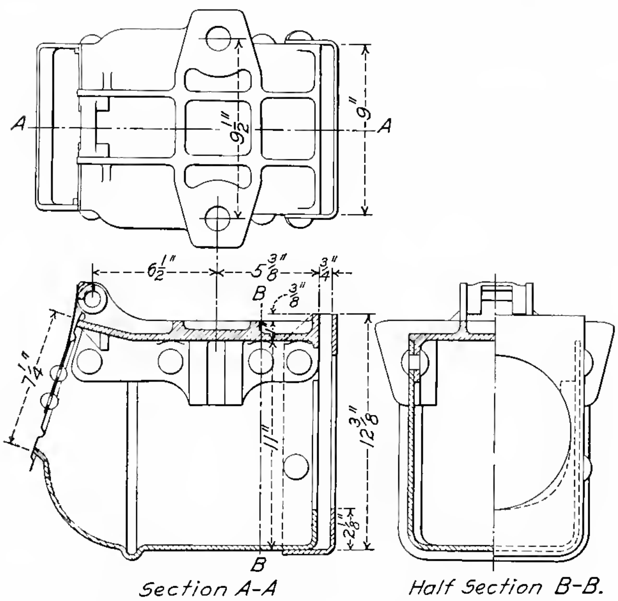


Fig. 1008—Kensington Steel Journal Box with Outside Lid Spring.

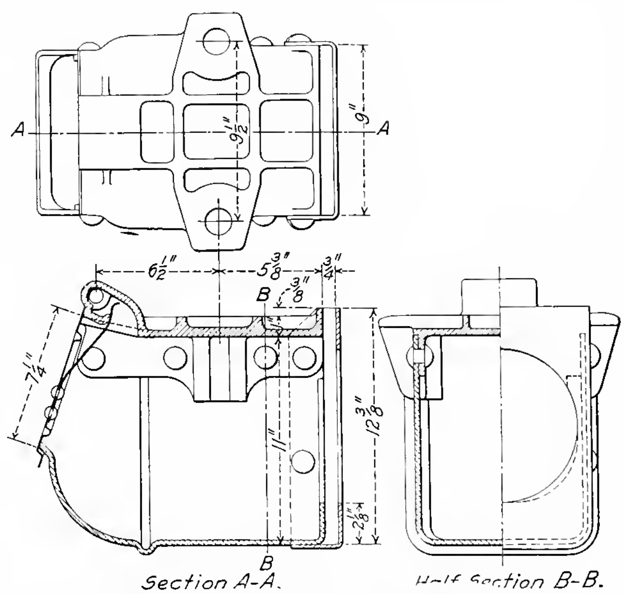


Fig. 1009—Kensington Steel Journal Box with Inside Lid Spring.

Union Spring & Manufacturing Company.

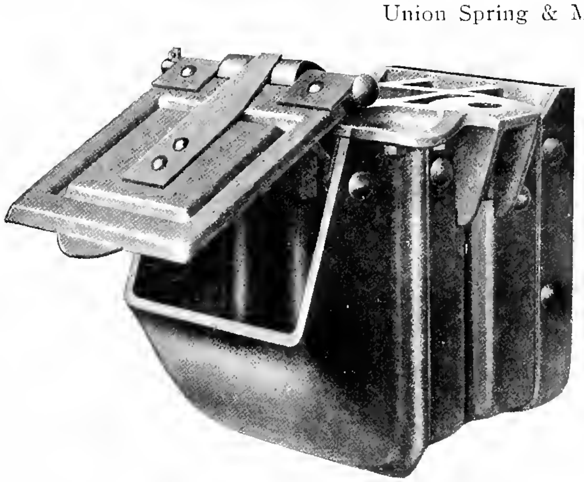


Fig. 1010—Kensington Steel Journal Box with Outside Lid Spring.

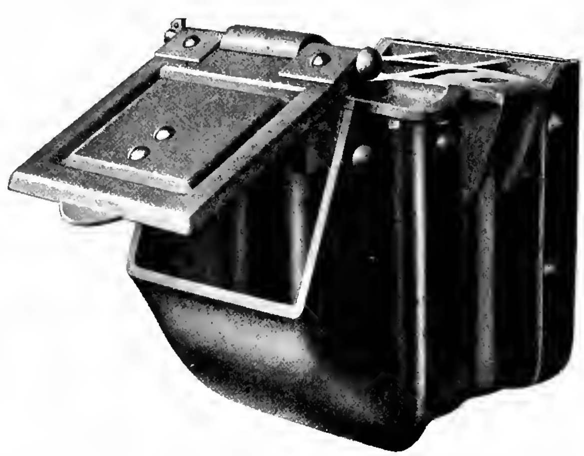
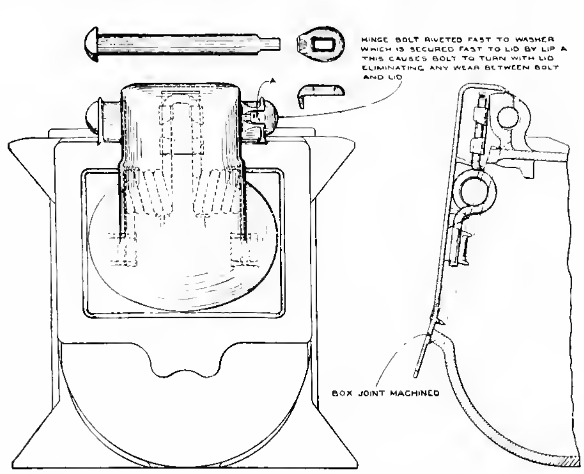


Fig. 1011—Kensington Steel Journal Box with Inside Lid Spring.

Union Spring & Manufacturing Company.



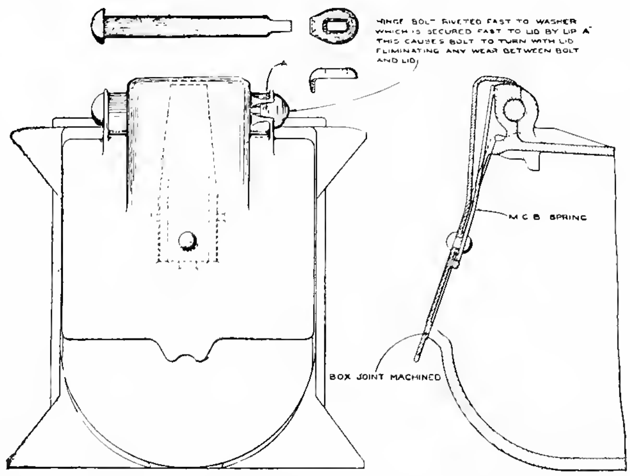


Fig. 1012—Symington M. C. B. Freight Car Journal Box with Torsion Spring Lid.

Fig. 1013—Symington M. C. B. Freight Car Journal Box with Flat Spring Lid.

T. H. Symington Company.

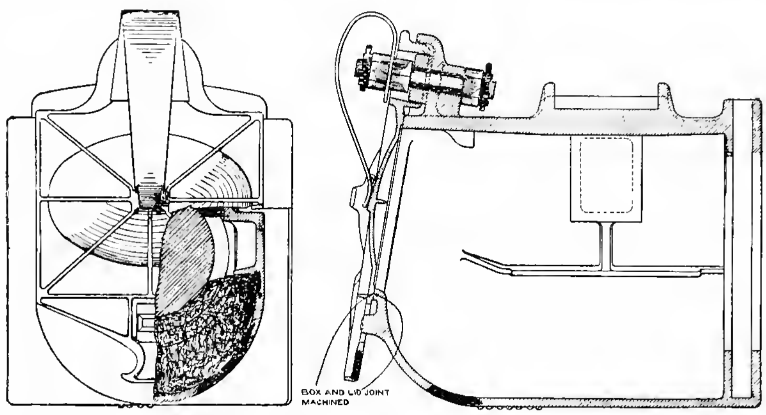
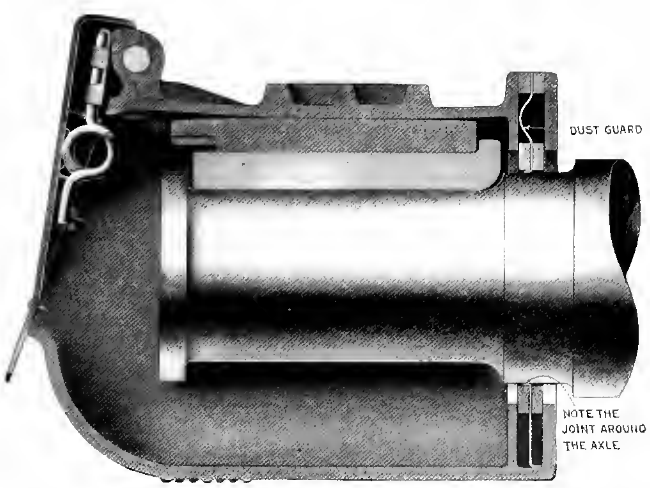


Fig. 1014—Symington Passenger Train Car Journal Box with Pivot Lid and Central Spring Pressure.

T. H. Symington Company.



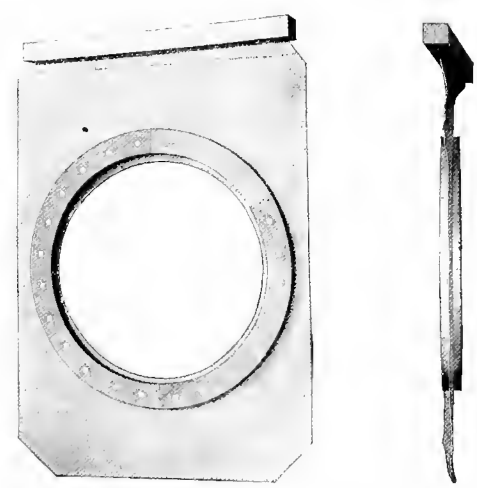


Fig. 1015—Symington Journal Box Equipped with Symington Flexible Dust Guard.

Fig. 1016—Symington Flexible Journal Box Dust Guard.

T. H. Symington Company.

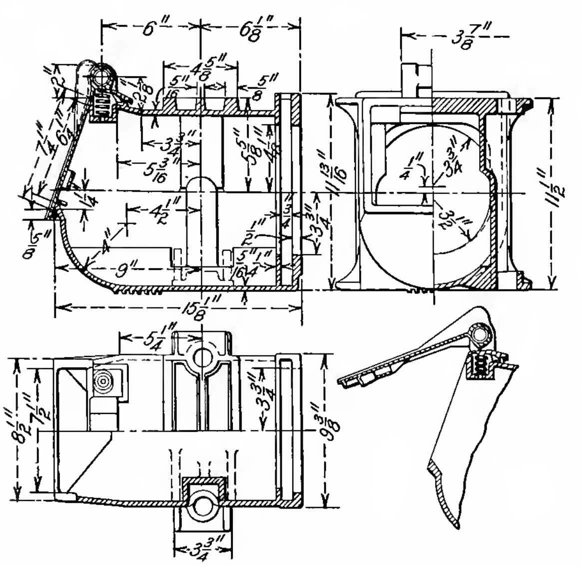


Fig. 1017—Buffalo Journal Box for 5 in. by 9 in. Journals. The Pratt & Letchworth Company.

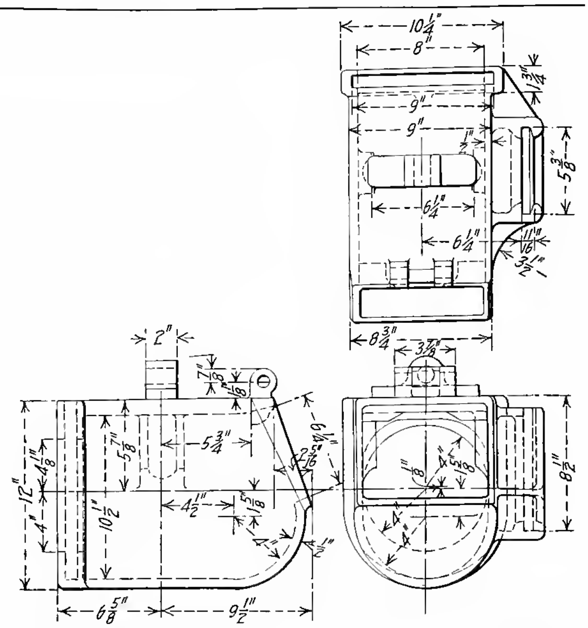


Fig. 1018—Journal Box for 5½ in. by 10 in. Journals and Cast Steel Side Frames. Pittsburgh Equipment Company.

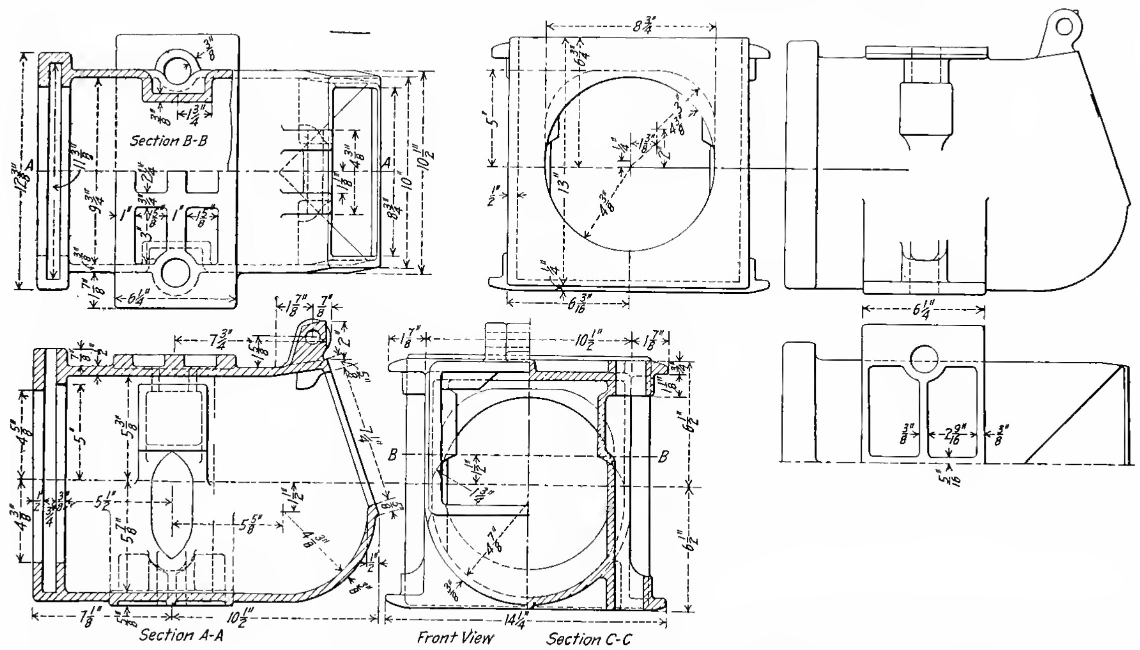


Fig. 1019—Cast Steel Journal Box for 6 in. by 11 in. Journals of Baltimore & Ohio 70-Ton Capacity Freight Car. Buckeye Steel Castings Company.

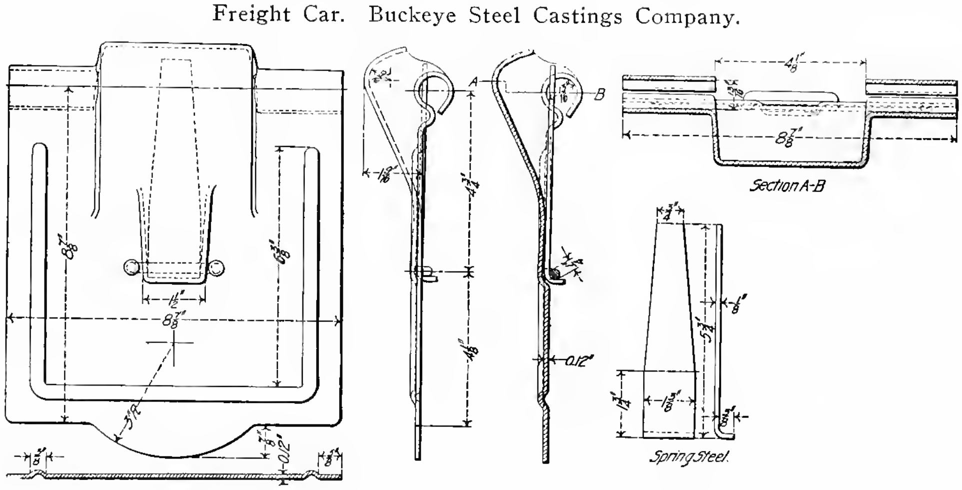


Fig. 1020—Davis Pressed Steel Journal Box Lid and Spring. Davis Solid Truss Brake Beam Company.

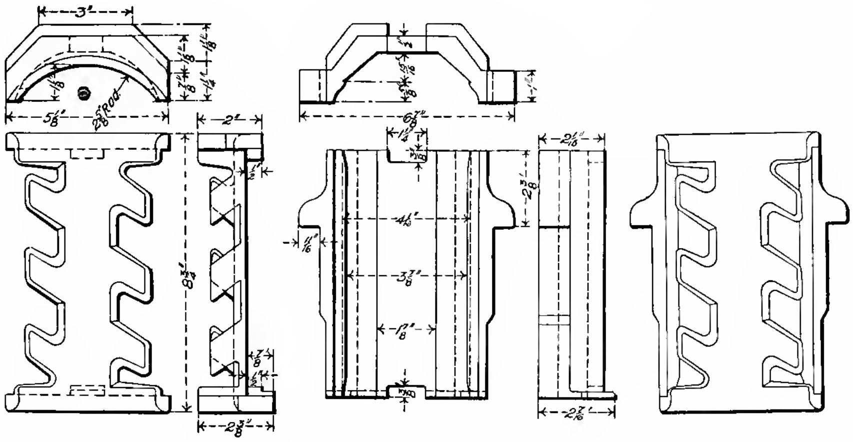


Fig. 1021—Spiral Journal Bearing for 5 in. by 9 in. Journals. St. Louis Car Company.

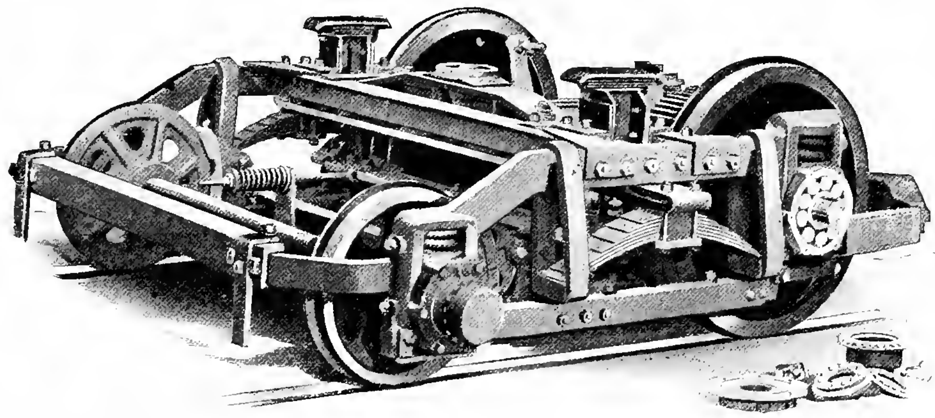


Fig. 1022—Rollway Journal Bearings Applied to Electric Motor Truck. Railway Roller Bearing Company.

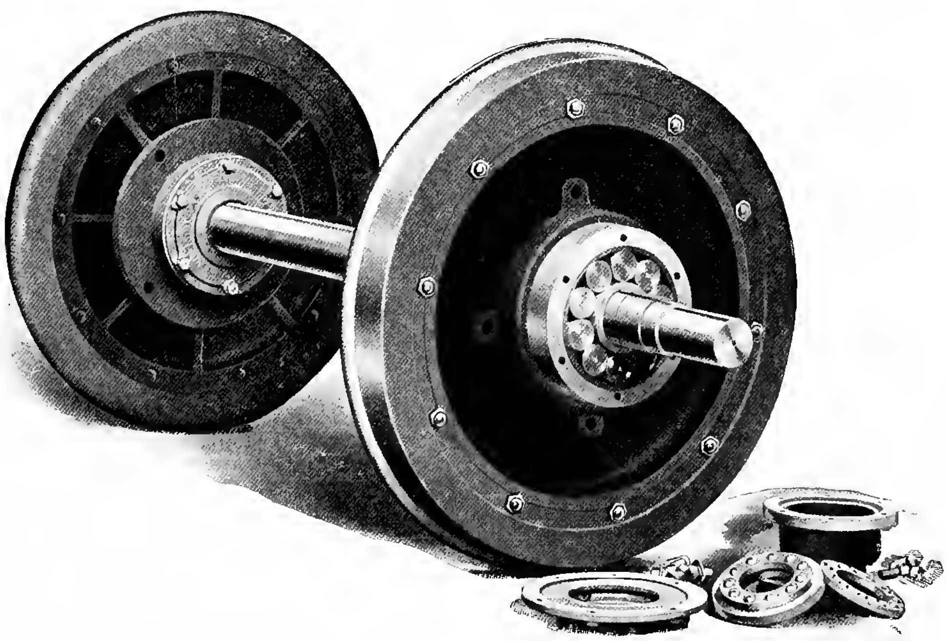


Fig. 1023—Wheels Mounted on Non-Rotating Axle with Detachable Rollway Hubs and Roller Bearings. Railway Roller Bearing Company.

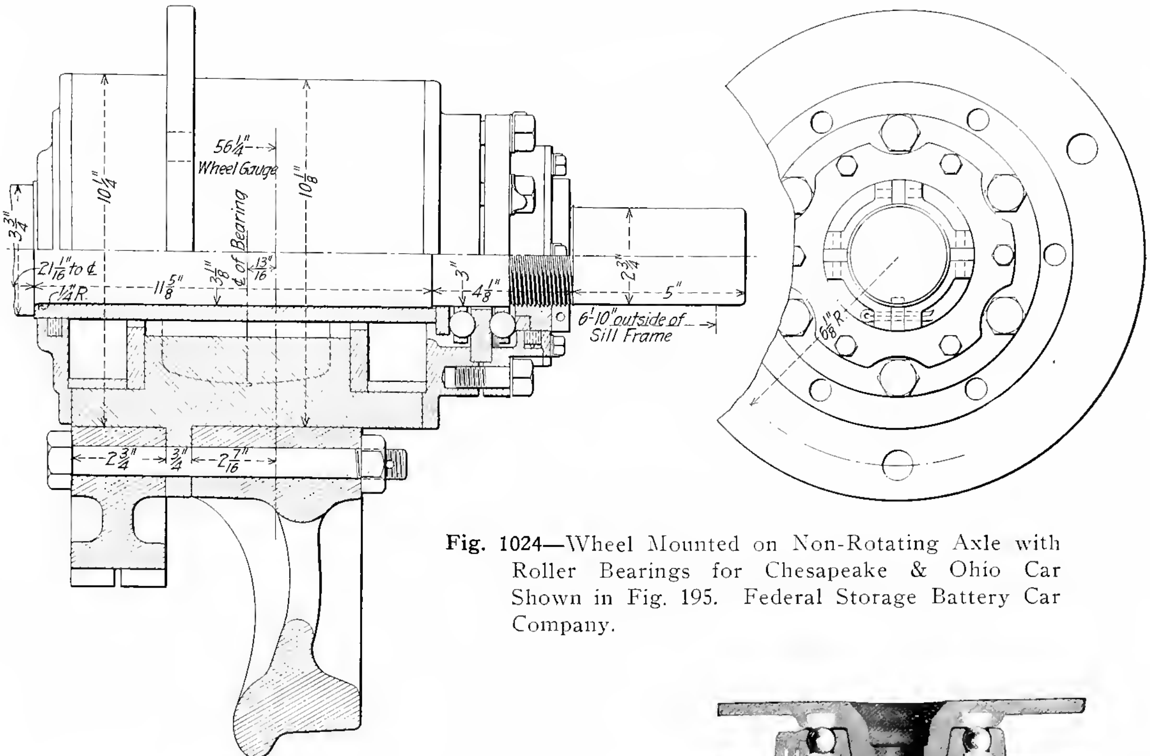


Fig. 1024—Wheel Mounted on Non-Rotating Axle with Roller Bearings for Chesapeake & Ohio Car Shown in Fig. 195. Federal Storage Battery Car Company.

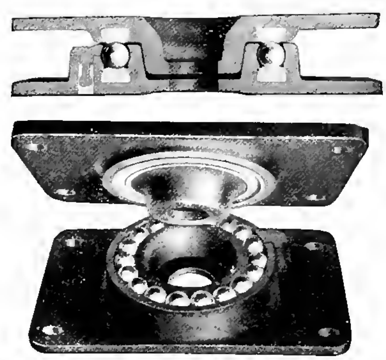


Fig. 1026—Baltimore Ball Center Bearing. T. H. Symington Company.

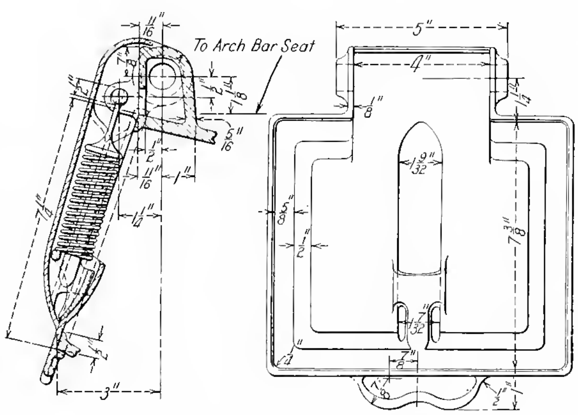


Fig. 1025—Franklin Journal Box Lid for 5 in. by 9 in. and 5½ in. by 10 in. Journals. Kirby Equipment Company.

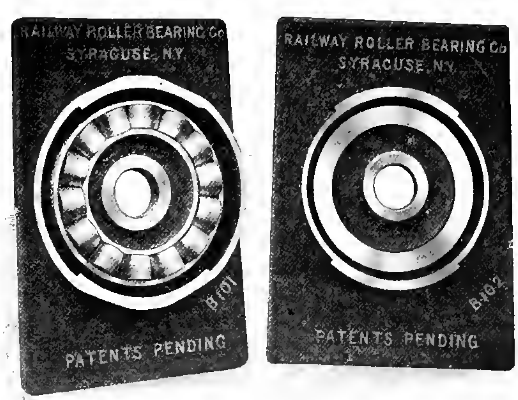


Fig. 1027—Rollway Center Plate with Cone Disc Rollers. Railway Roller Bearing Company.

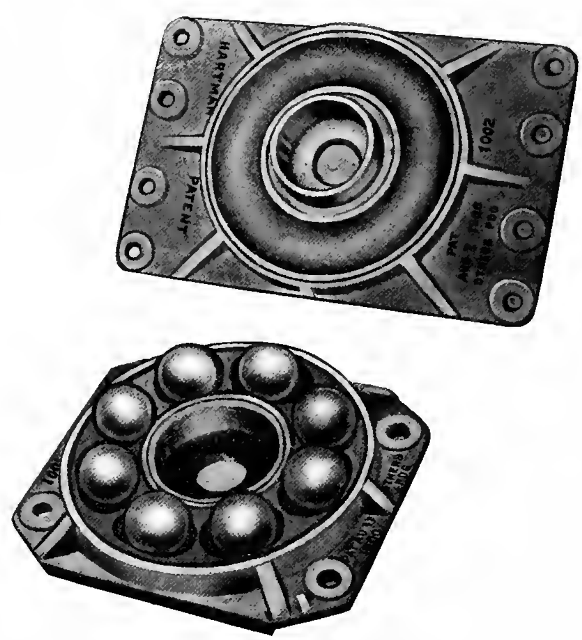


Fig. 1028—Hartman Ball Bearing Center Plate. Joliet Railway Supply Company.

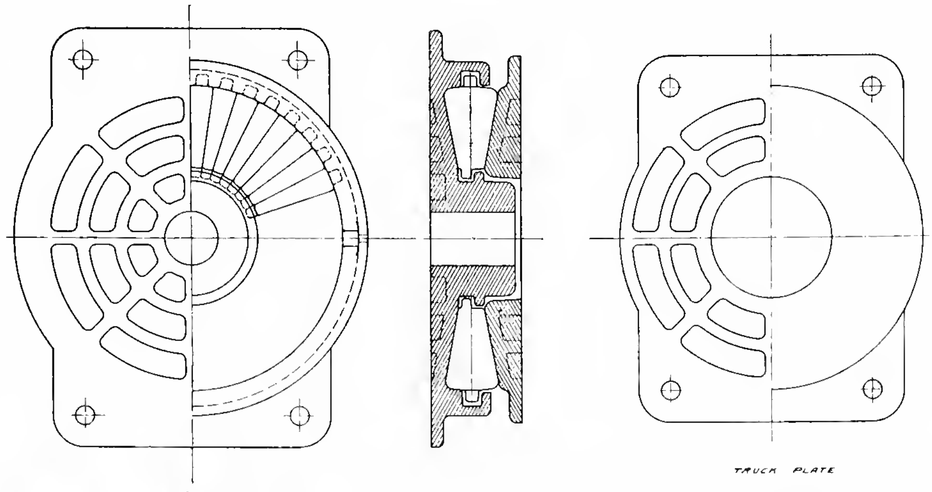


Fig. 1029—General Arrangement of 12 in. Roller Center Plate. Edwin S. Woods & Company.

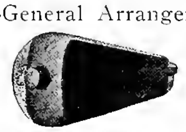


Fig. 1030—Woods Center Plate Roller Showing Development from a Cone.

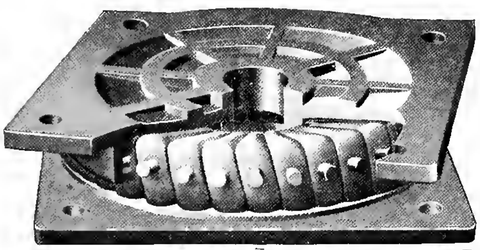


Fig. 1031—Roller Center Plate. Diameter of Roller Circle, 12 in; Number of Rollers, 40; Diameter, 2¼ in.; Length, 3¼ in. Edwin S. Woods & Company.

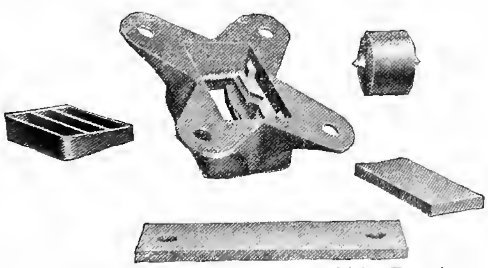


Fig. 1032—Parts of Single Roller Side Bearing for Freight Cars. Edwin S. Woods & Company.

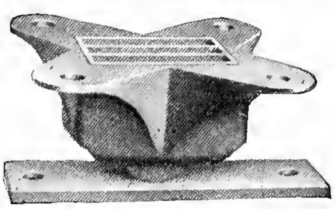


Fig. 1034—Single Roller Side Bearing for Freight Cars. Edwin S. Woods & Company.

Fig. 1036—Double Roller Side Bearing. Edwin S. Woods & Company.

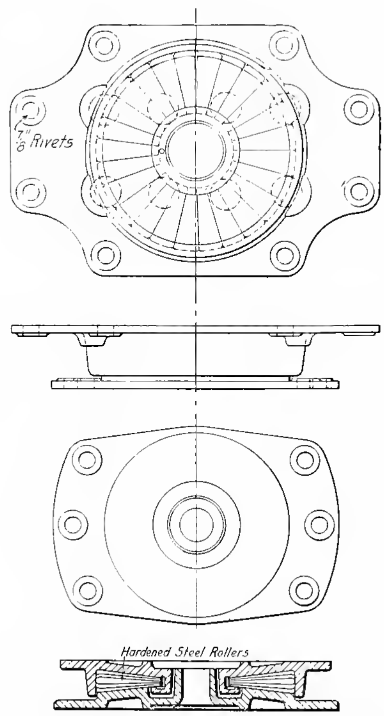


Fig. 1033—Barber Roller Bearing Center Plate. Standard Car Truck Company.

Fig. 1035—Passenger Train Car Side Bearing. Edwin S. Woods & Company.

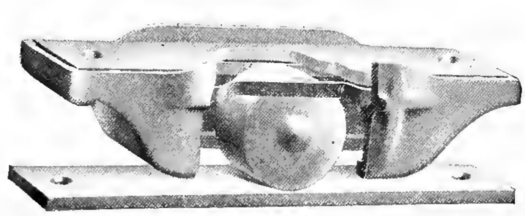


Fig. 1037—Passenger Train Car Side Bearing Showing Roller and Springs. Edwin S. Woods & Company.

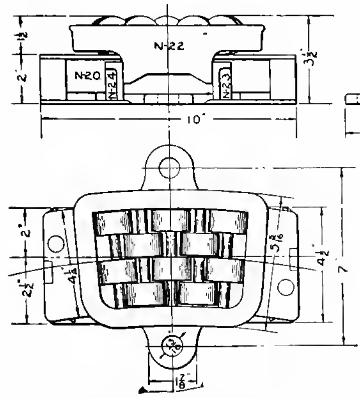


Fig. 1038—Creco Roller Side Bearing for Freight Cars.

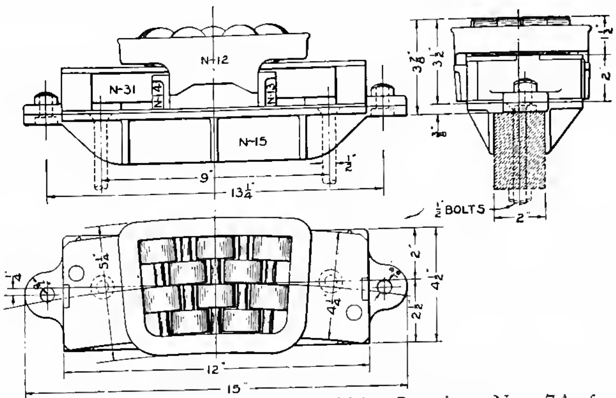


Fig. 1039—Creco Roller Side Bearing No. 7A for Six-Wheel Passenger Train Car Trucks.

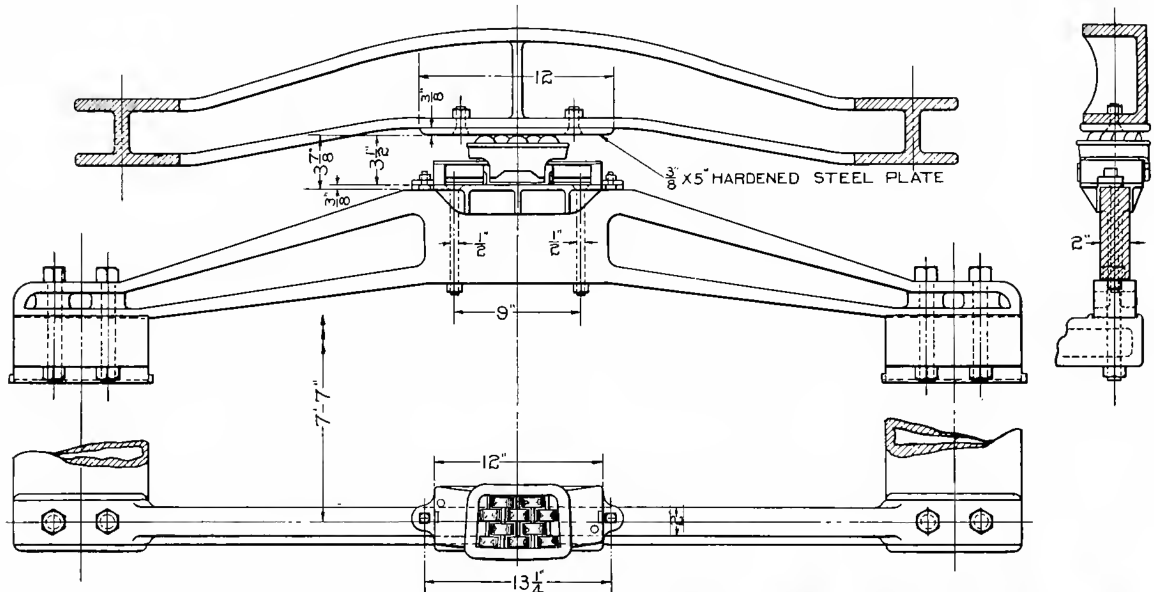


Fig. 1040—Creco Roller Side Bearing Applied to Bearing Bridge of Six-Wheel Truck.

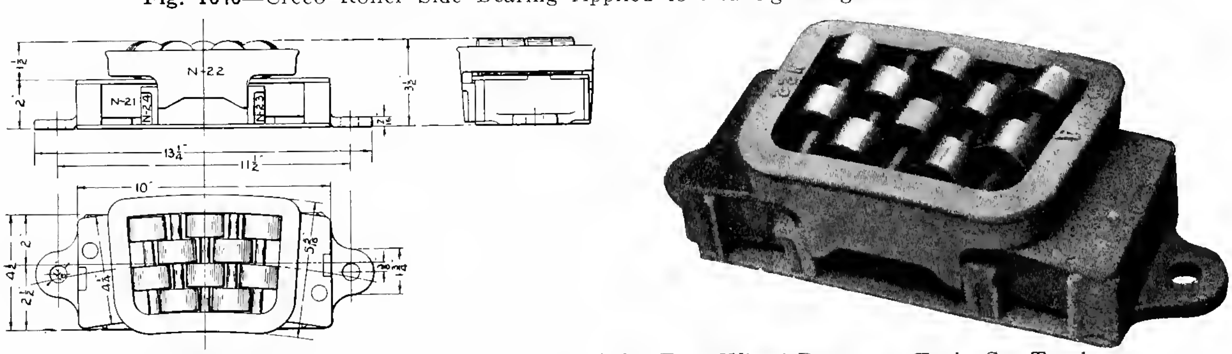


Fig. 1041—Creco Roller Side Bearing No. 4A for Four-Wheel Passenger Train Car Trucks.

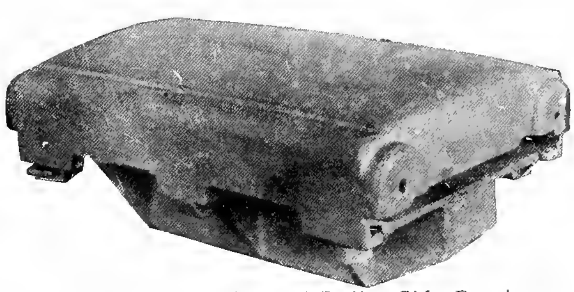


Fig. 1042—Creco Covered Roller Side Bearing.

Fig. 1043—Creco Covered Roller Side Bearing Applied to Bearing Bridge of Six-Wheel Truck.

Chicago Railway Equipment Company.

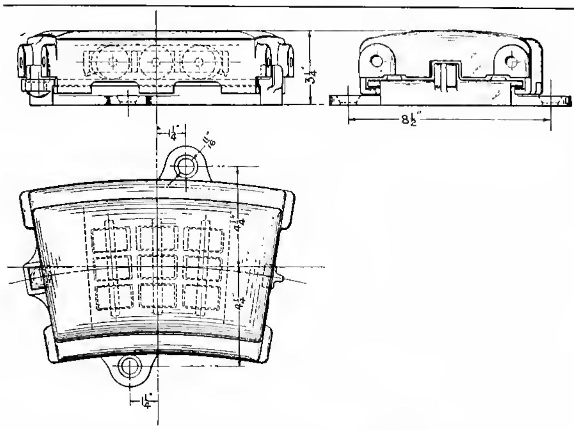


Fig. 1044—Creco Covered Roller Side Bearing for Freight Car Trucks.

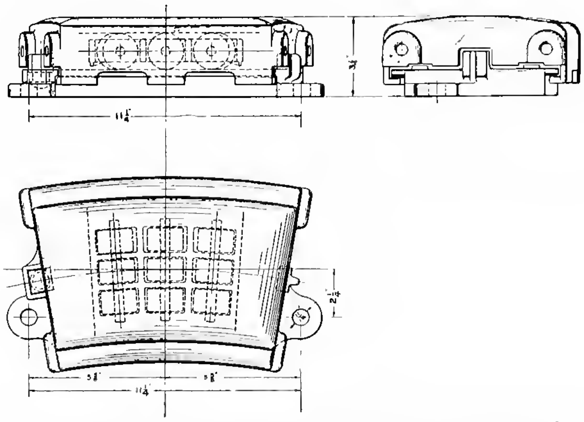


Fig. 1045—Creco Covered Roller Side Bearing for Four-Wheel Passenger Train Car Trucks.

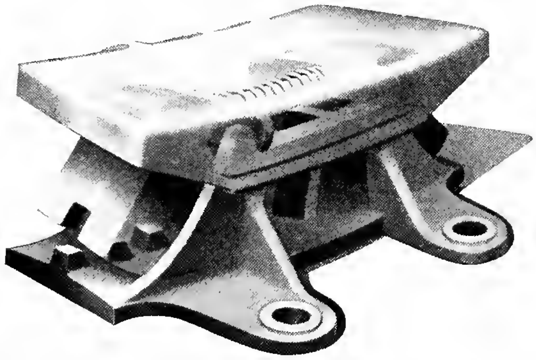


Fig. 1046—Gravity Side Bearing. W. H. Miner.

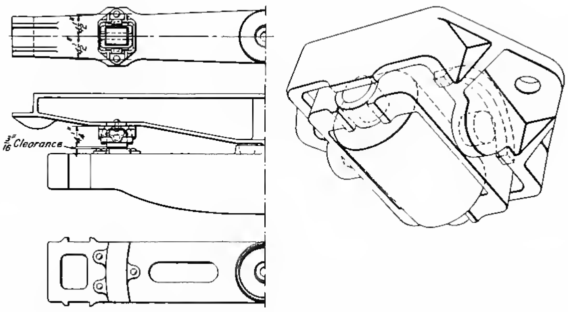


Fig. 1047—Miner Roller Side Bearing for Freight Car Trucks. W. H. Miner.

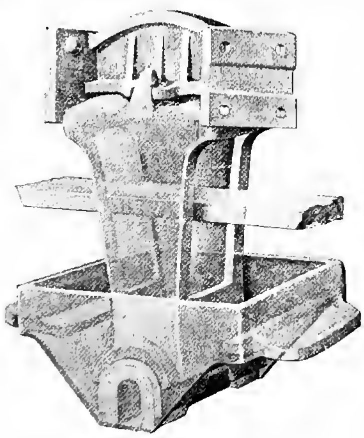


Fig. 1048—Rocker Side Bearing for Summers Balanced Side Bearing Truck. Summers Steel Car Company.

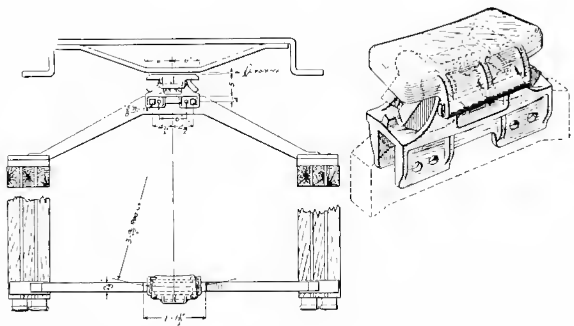


Fig. 1049—Gravity Side Bearing Applied to Bearing Bridge of Six-Wheel Passenger Train Car Truck. W. H. Miner.

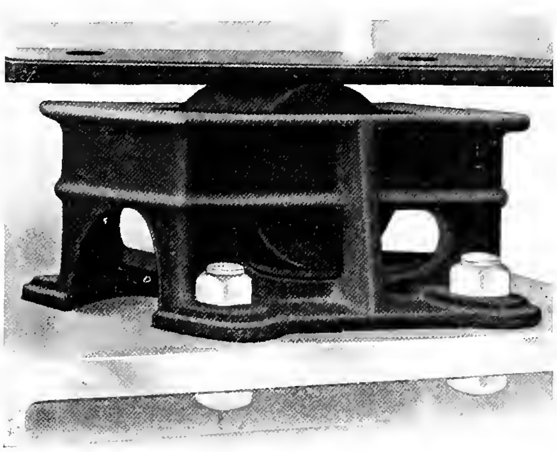


Fig. 1050—Stucki Side Bearing for Freight Cars.

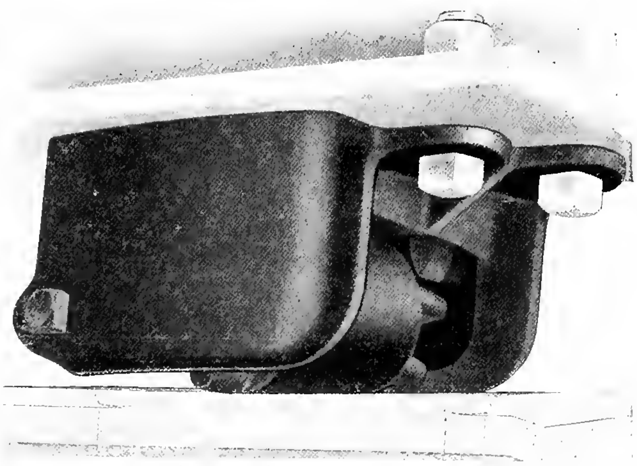


Fig. 1051—Stucki Side Bearing for Passenger Train Cars.

A. Stucki Company.

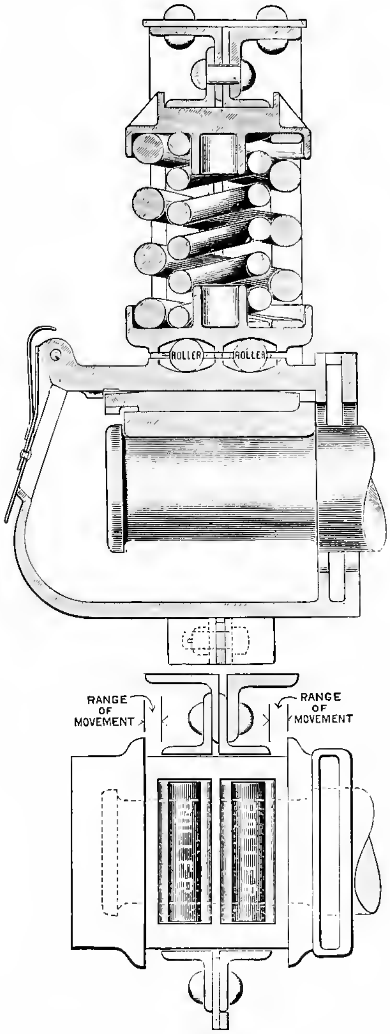


Fig. 1052—Lateral Motion Device for Pedestal Trucks. Standard Car Truck Company.

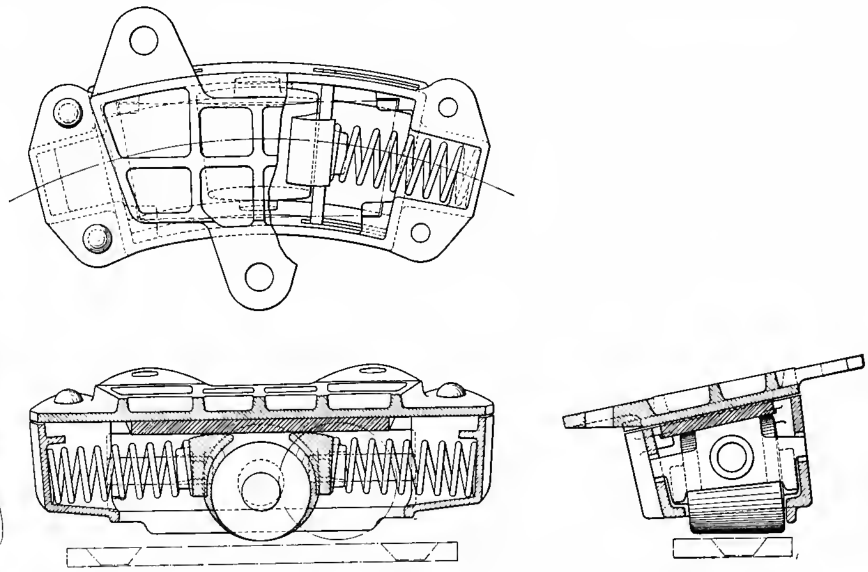


Fig. 1053—Baltimore Side Bearing. T. H. Symington Company.

Fig. 1054—Susemihl Side Bearing for Freight Car Trucks. American Steel Foundries.

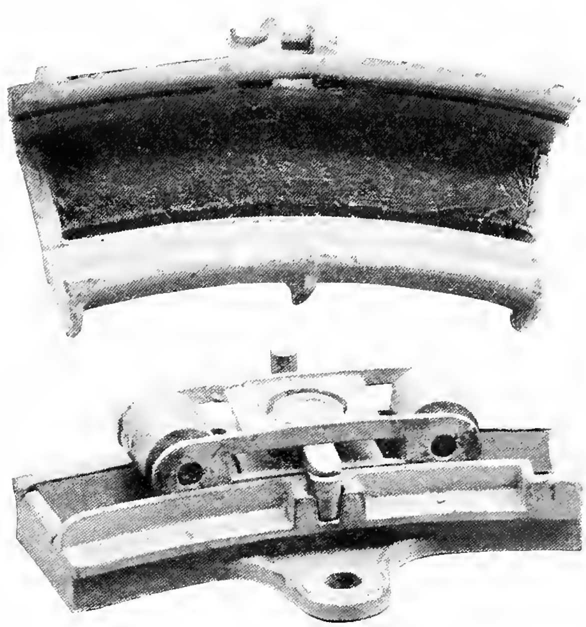


Fig. 1055—Susemihl Side Bearing with Top Removed.

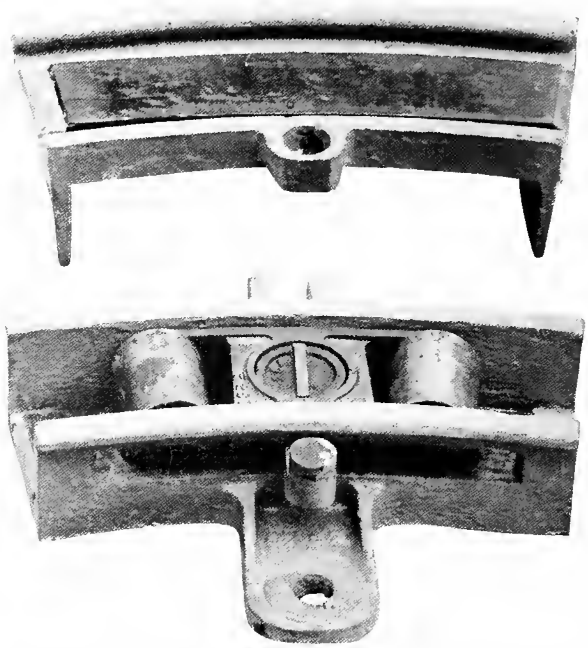


Fig. 1056—Susemihl Side Bearing for Freight Car Trucks, with Top Removed.

American Steel Foundries.

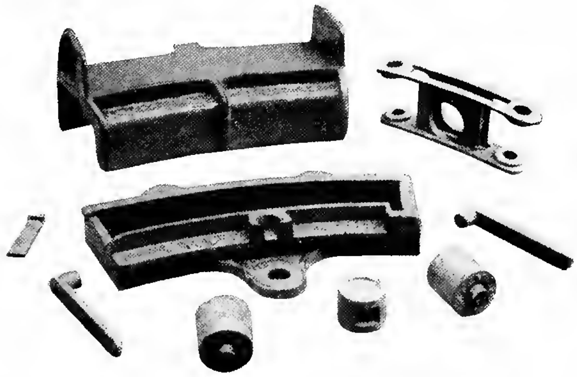


Fig. 1057—Parts of Susemihl Side Bearing.

Fig. 1058—Susemihl Side Bearing for Four-Wheel Passenger Train Car Trucks.

Fig. 1059—Susemihl Side Bearing for Six-Wheel Passenger Train Car Trucks.
American Steel Foundries.

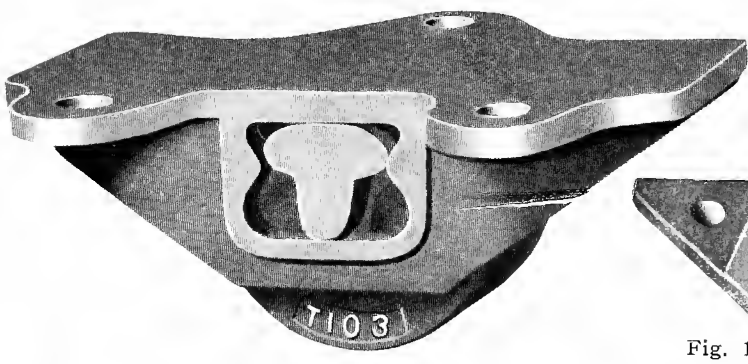


Fig. 1060—Cardwell Rocker Side Bearing.

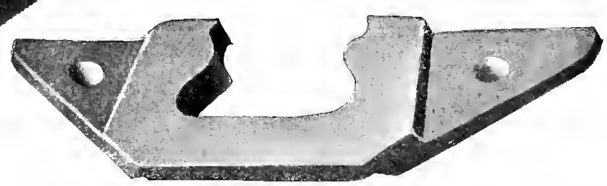


Fig. 1061—Side Plate of Carrier for Cardwell Rocker Side Bearing.

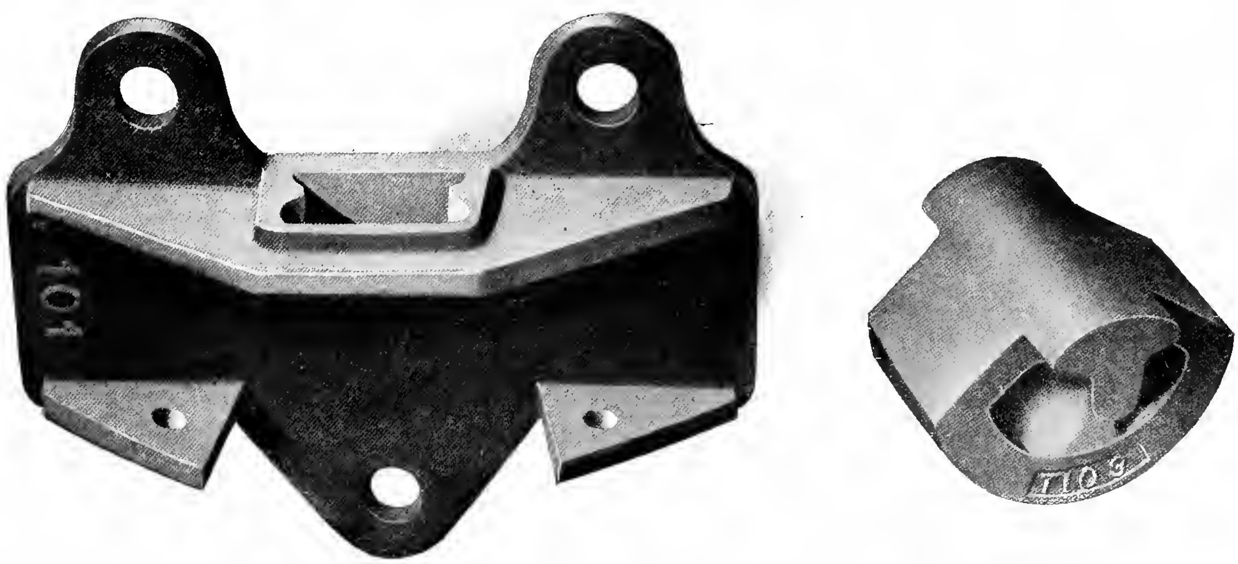


Fig. 1062—Rocker Carrier and Rocker for Cardwell Rocker Side Bearing.
Cardwell Manufacturing Company.

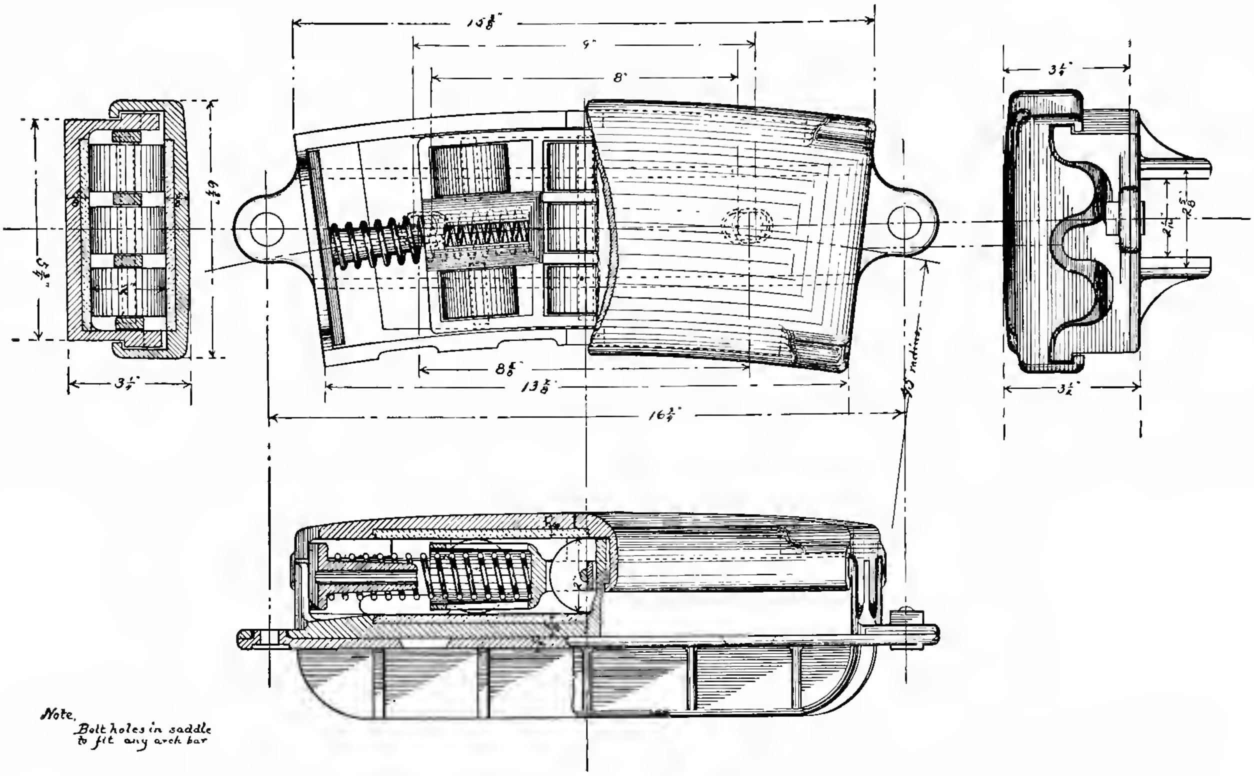


Fig. 1063—Perry Side Bearing for Passenger Train Cars. Joliet Railway Supply Company.

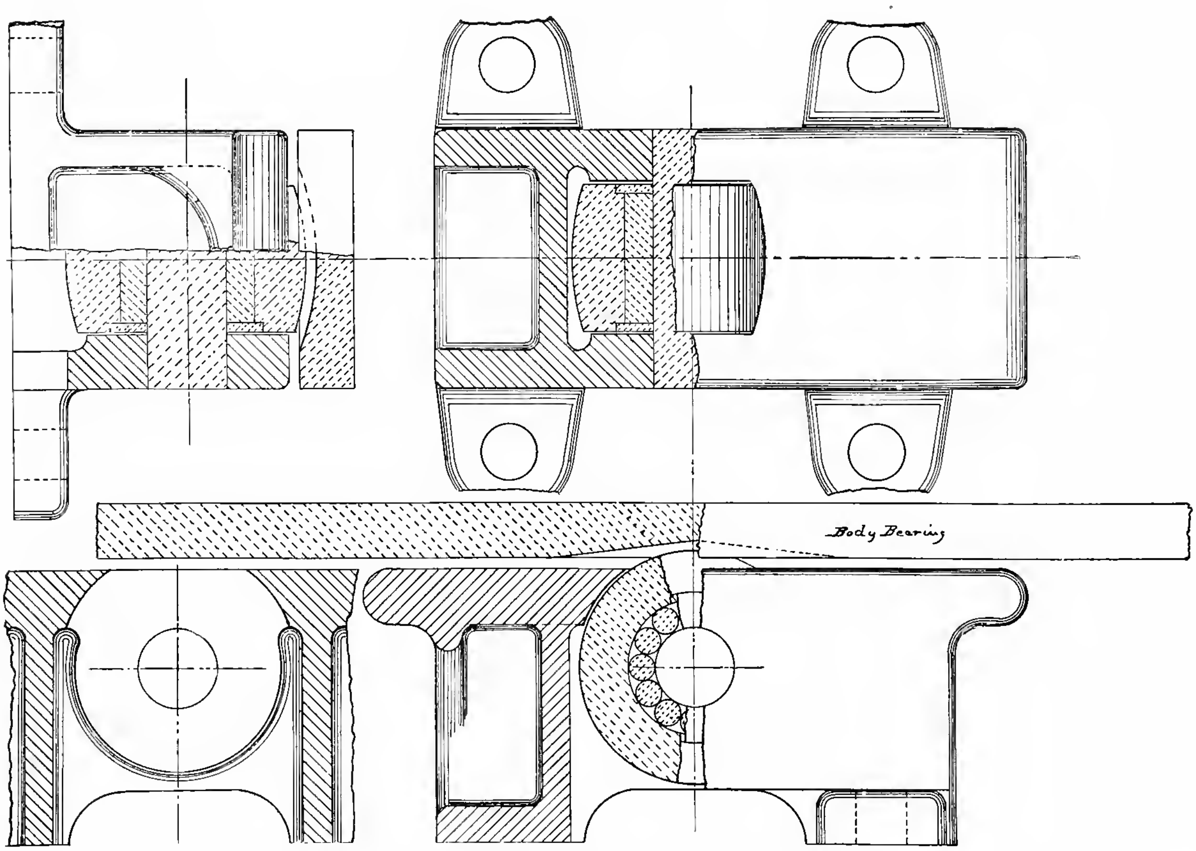


Fig. 1064—Perry Pocket Side Bearing. Joliet Railway Supply Company.

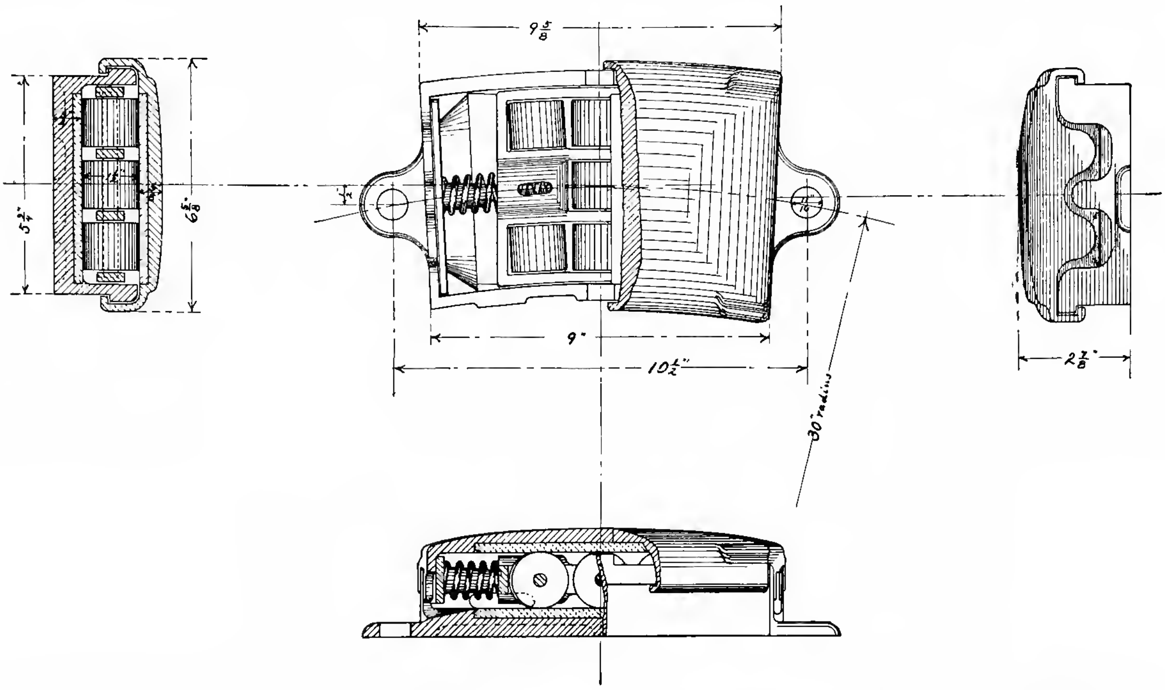


Fig. 1065—Perry Side Bearing for 50-Ton Capacity Freight Cars. Joliet Railway Supply Company.

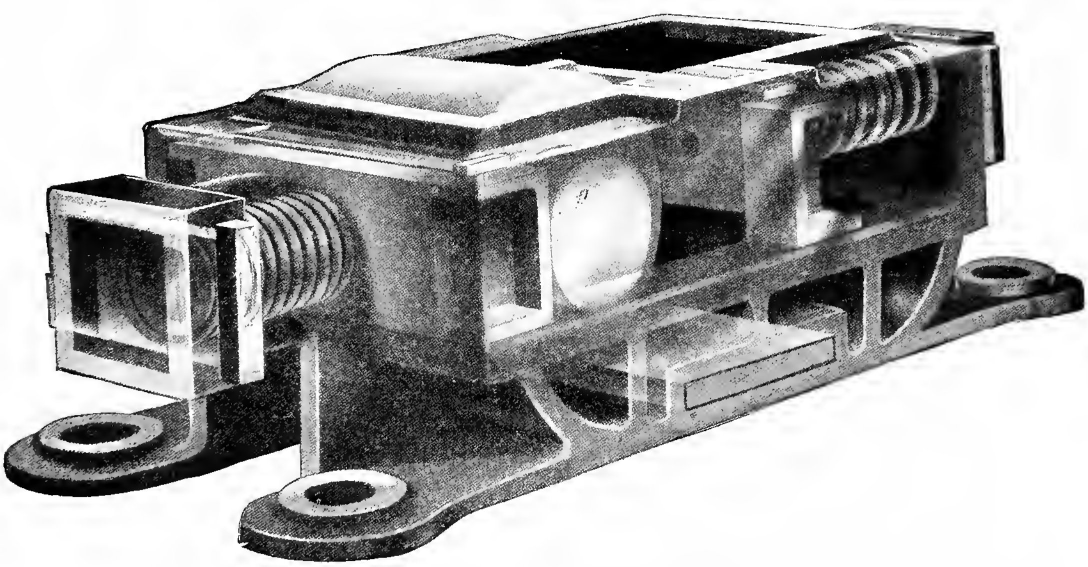


Fig. 1066—Joliet Single Roller Side Bearing. Joliet Railway Supply Company.

Fig. 1067—Cast Steel Truck and Body Bolsters for Freight Cars. American Steel Foundries.

NOTE.—For Other Views of Body and Truck Bolsters Combined See Body Bolsters.

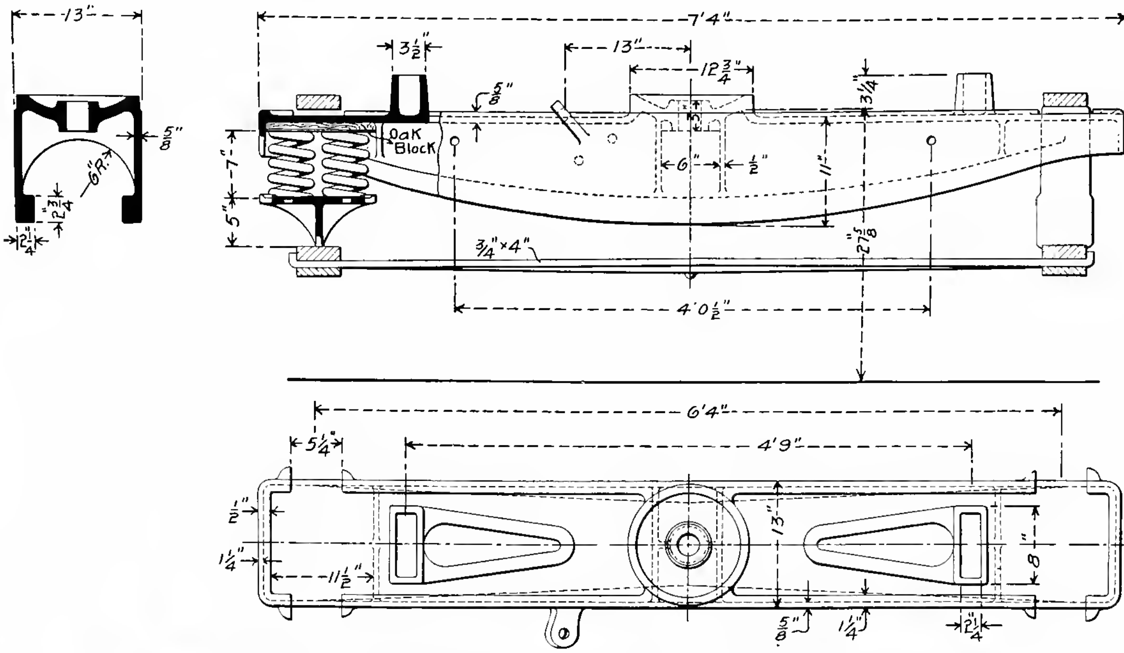


Fig. 1068—Cast Steel Truck Bolster for Freight Cars. American Steel Foundries.

Fig. 1069—T-Shape Cast Steel Truck Bolster for Freight Cars. American Steel Foundries.

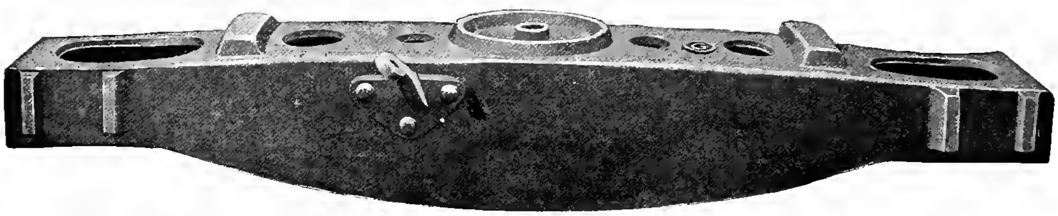


Fig. 1070—Box Shape Cast Steel Truck Bolster for Freight Cars. American Steel Foundries.

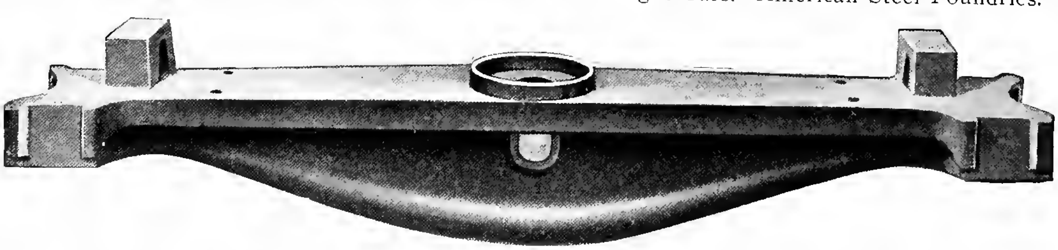


Fig. 1071—T-Shape Cast Steel Truck Bolster for 30 to 50-Ton Capacity Freight Cars. American Steel Foundries.

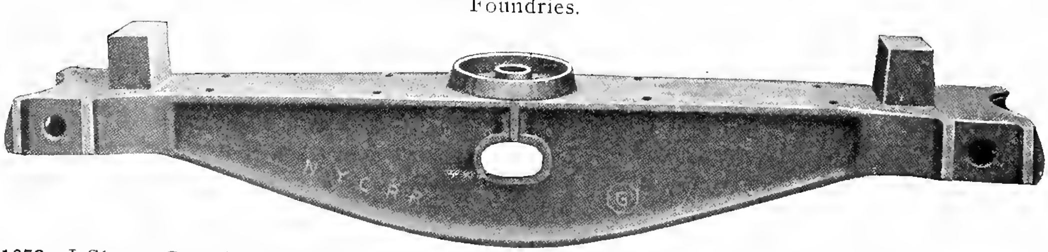


Fig. 1072—I-Shape Cast Steel Truck Bolster for 30 and 40-Ton Capacity Freight Cars. American Steel Foundries.

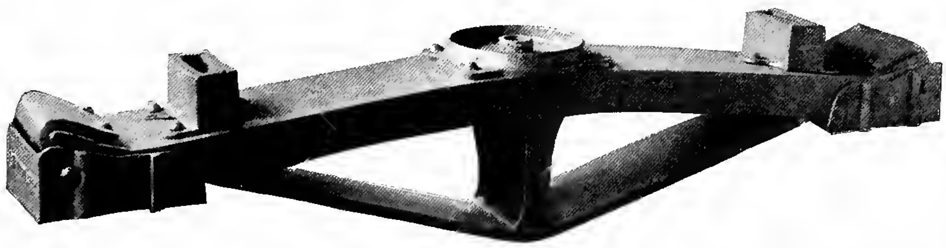


Fig. 1073—Simplex Truck Bolster for 40-Ton Capacity Freight Cars. Simplex Railway Appliance Company.

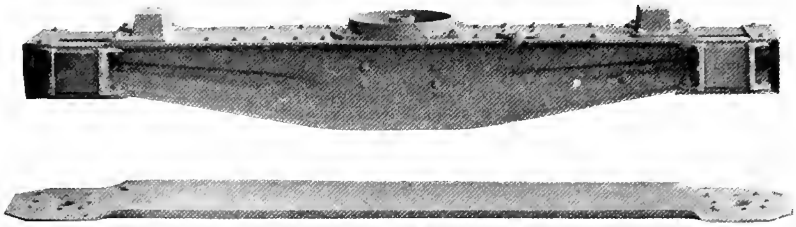


Fig. 1074—Bettendorf Truck Bolster and Spring Plank for Freight Cars. Bettendorf Axle Company.

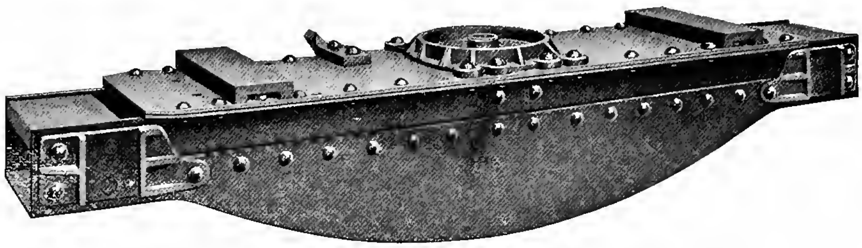


Fig. 1075—Empire Truck Bolster for Freight Cars. U. S. Metal & Manufacturing Company.

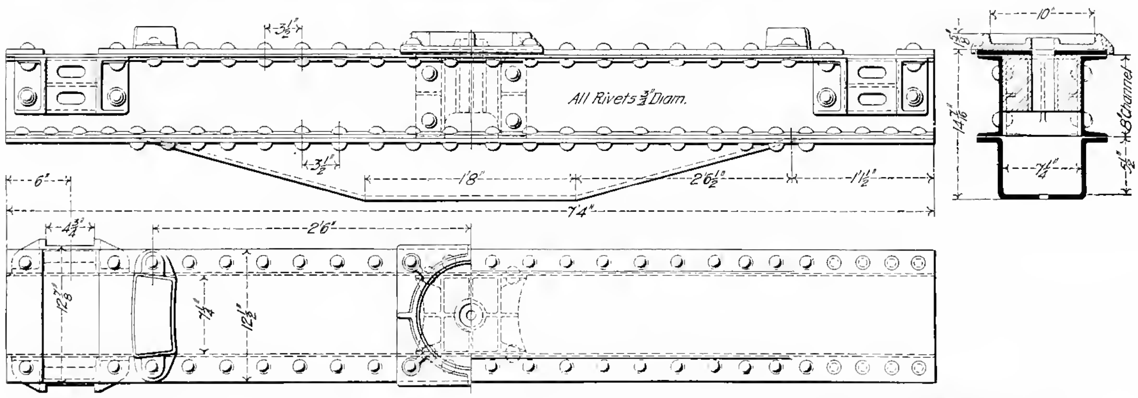


Fig. 1076—Monitor Truck Bolster for 40-Ton Capacity Freight Cars. Chicago Railway Equipment Company.

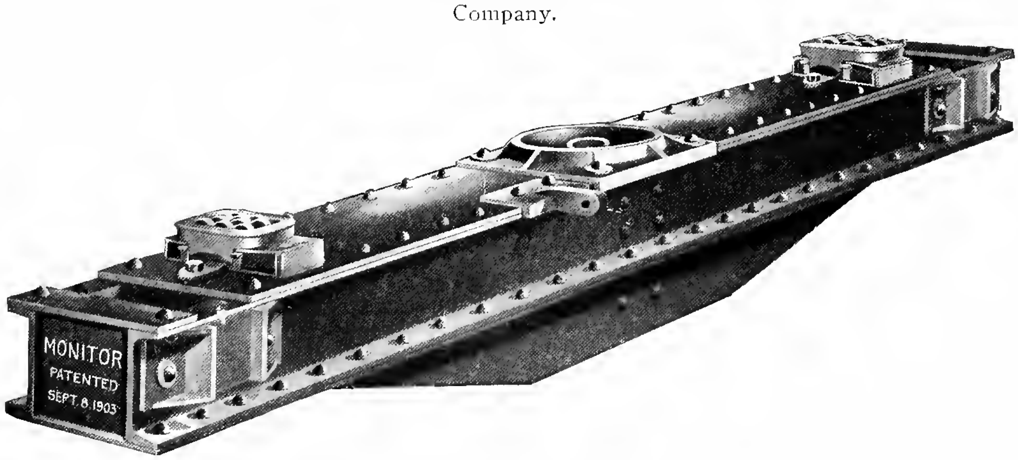


Fig. 1077—Monitor Truck Bolster with Creco Roller Side Bearings for Freight Cars. Chicago Railway Equipment Company.

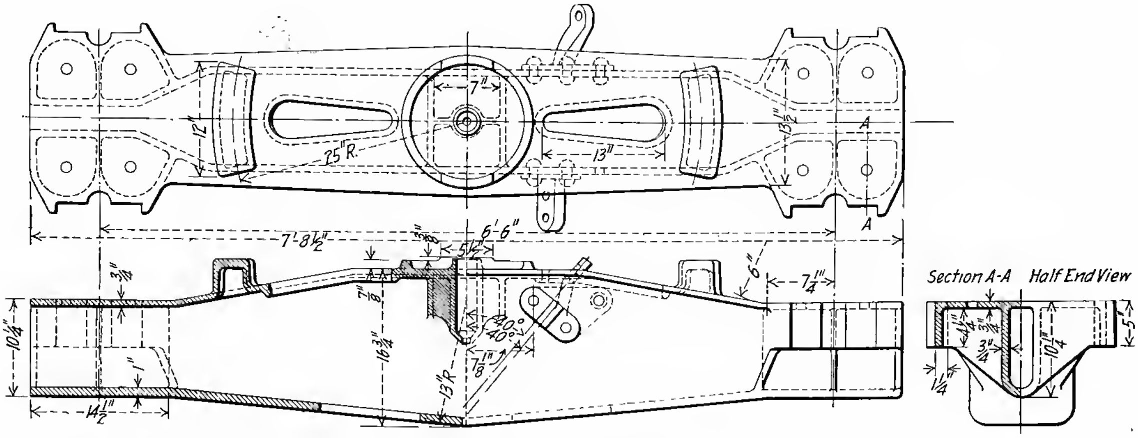


Fig. 1078—Cast Steel Truck Bolster for Pennsylvania Railroad 70-Ton Capacity Freight Cars. Pittsburgh Equipment Company.

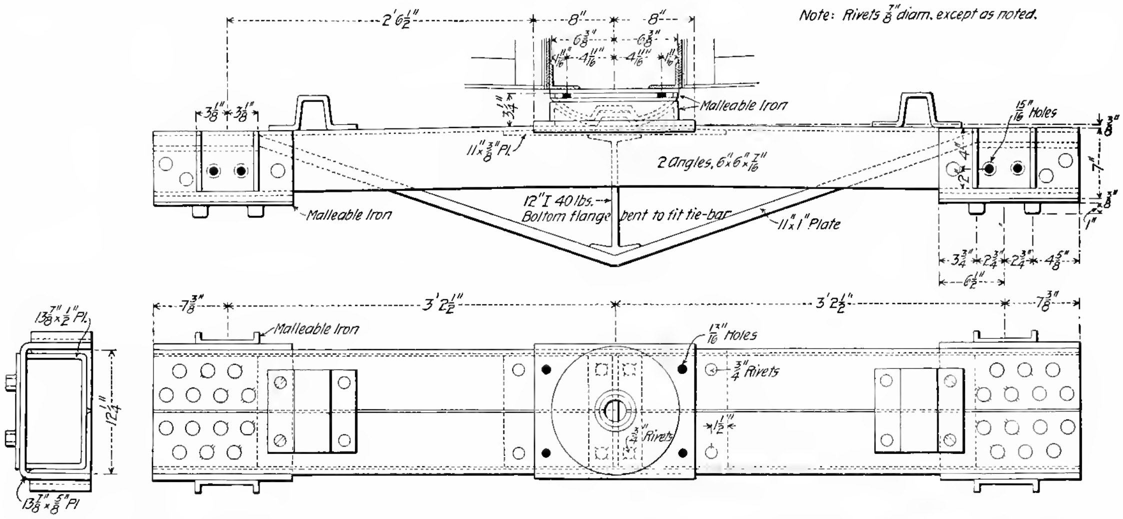


Fig. 1079—Bolster for Diamond Arch Bar Trucks for 50-Ton Capacity Freight Cars. Cambria Steel Company.

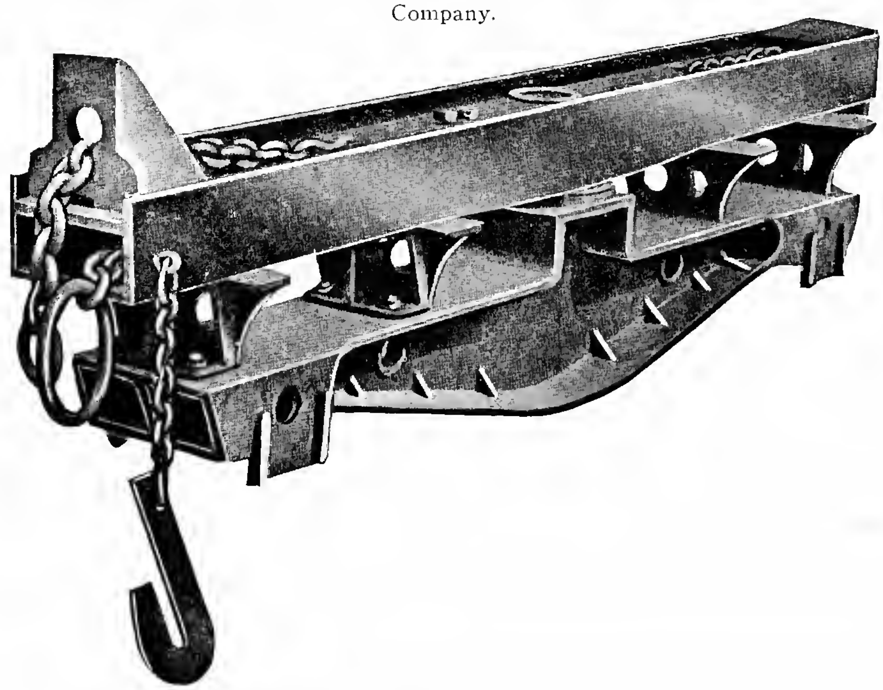


Fig. 1080—Cast Steel Bolster and Bunk for 40-Ton Capacity Logging Truck. Seattle Car & Foundry Company.

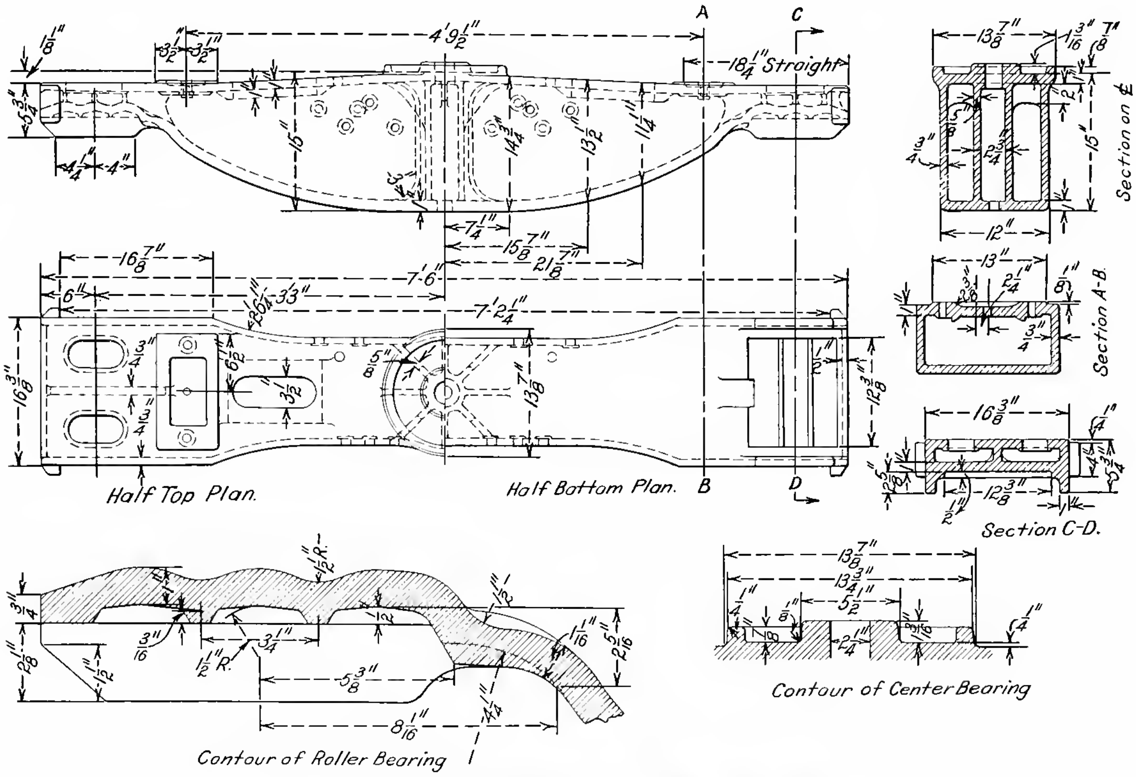


Fig. 1081—Cast Steel Truck Bolster for Baltimore & Ohio 70-Ton Capacity Freight Cars. Buckeye Steel Castings Company.

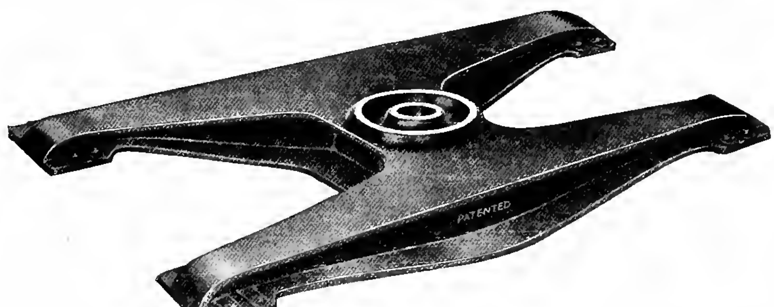


Fig. 1082—Commonwealth Cast Steel Bolster for Six-Wheel Passenger Train Car Truck. Commonwealth Steel Company.

Fig. 1083—Gould Improved Z-Type Cast Steel Truck Bolster for Freight Cars. Gould Coupler Company.

Fig. 1084—Compo Truck Bolster for Freight Cars. Pressed Steel Car Company.

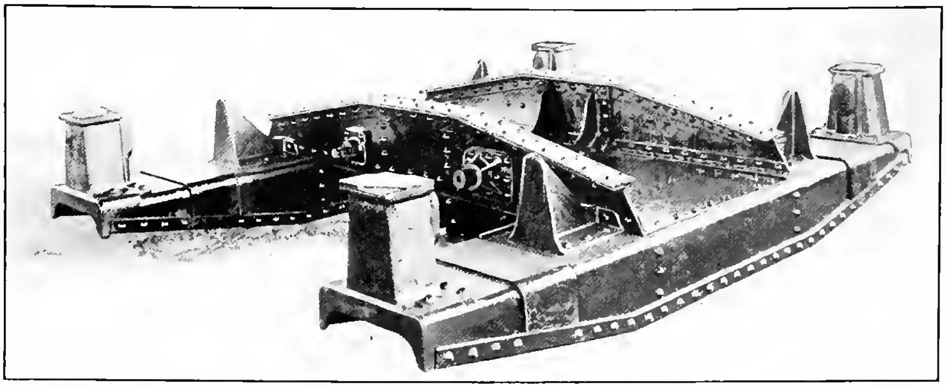


Fig. 1085—Bolster for Pennsylvania Railroad All-Steel Passenger Train Car Truck.

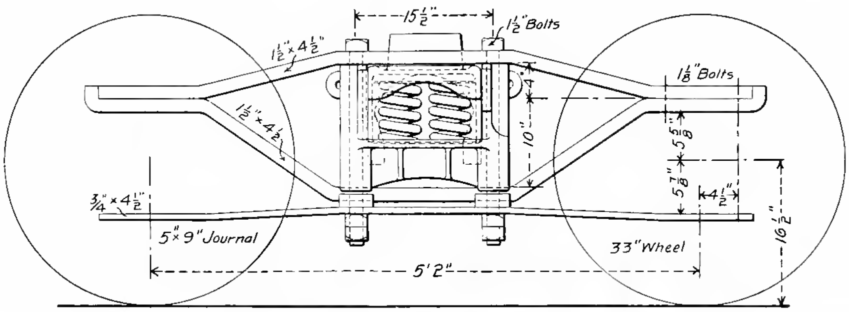


Fig. 1086—Arch Bar Truck Side Frames. American Steel Foundries.

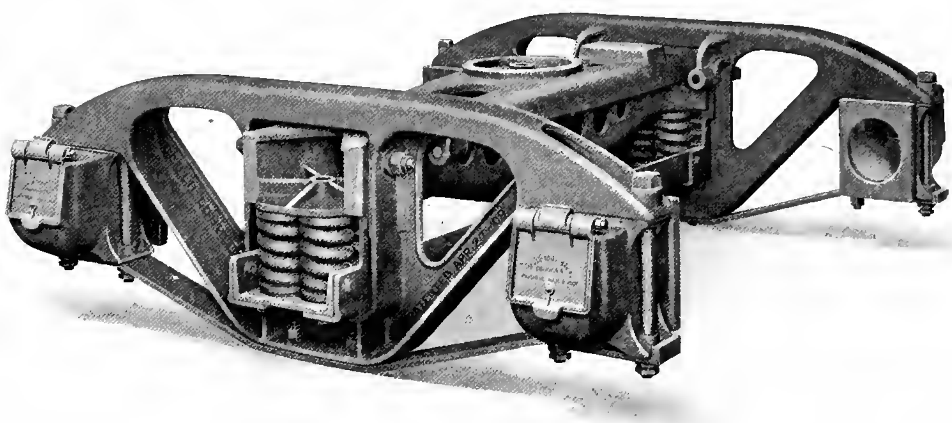


Fig. 1087—Cast Steel Truck Side Frames, Assembled. Gould Coupler Company.

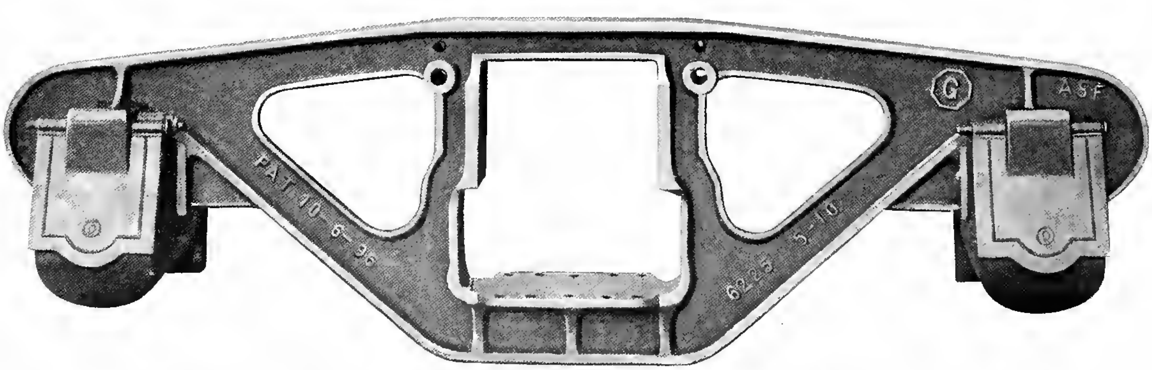


Fig. 1088—Andrews Cast Steel Freight Car Truck Side Frame for Use without Tie Bars. American Steel Foundries.

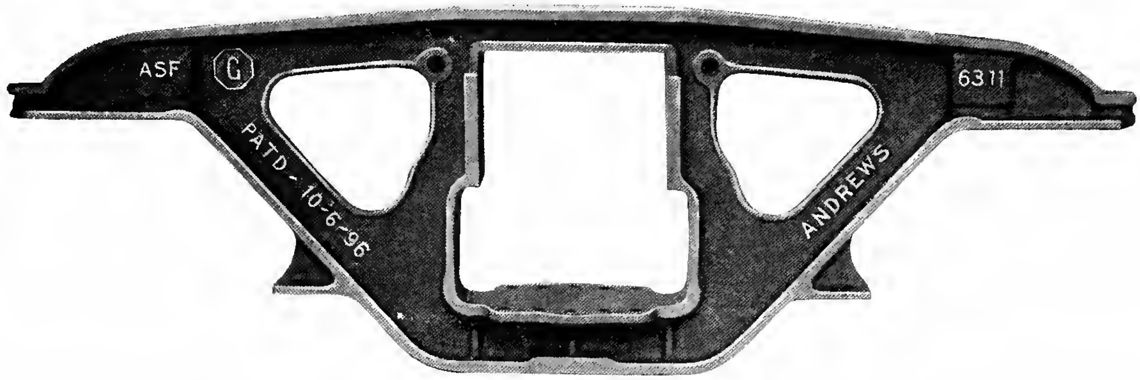


Fig. 1089—Andrews Cast Steel Freight Car Truck Side Frame for Use with Short Tie Bars. American Steel Foundries.

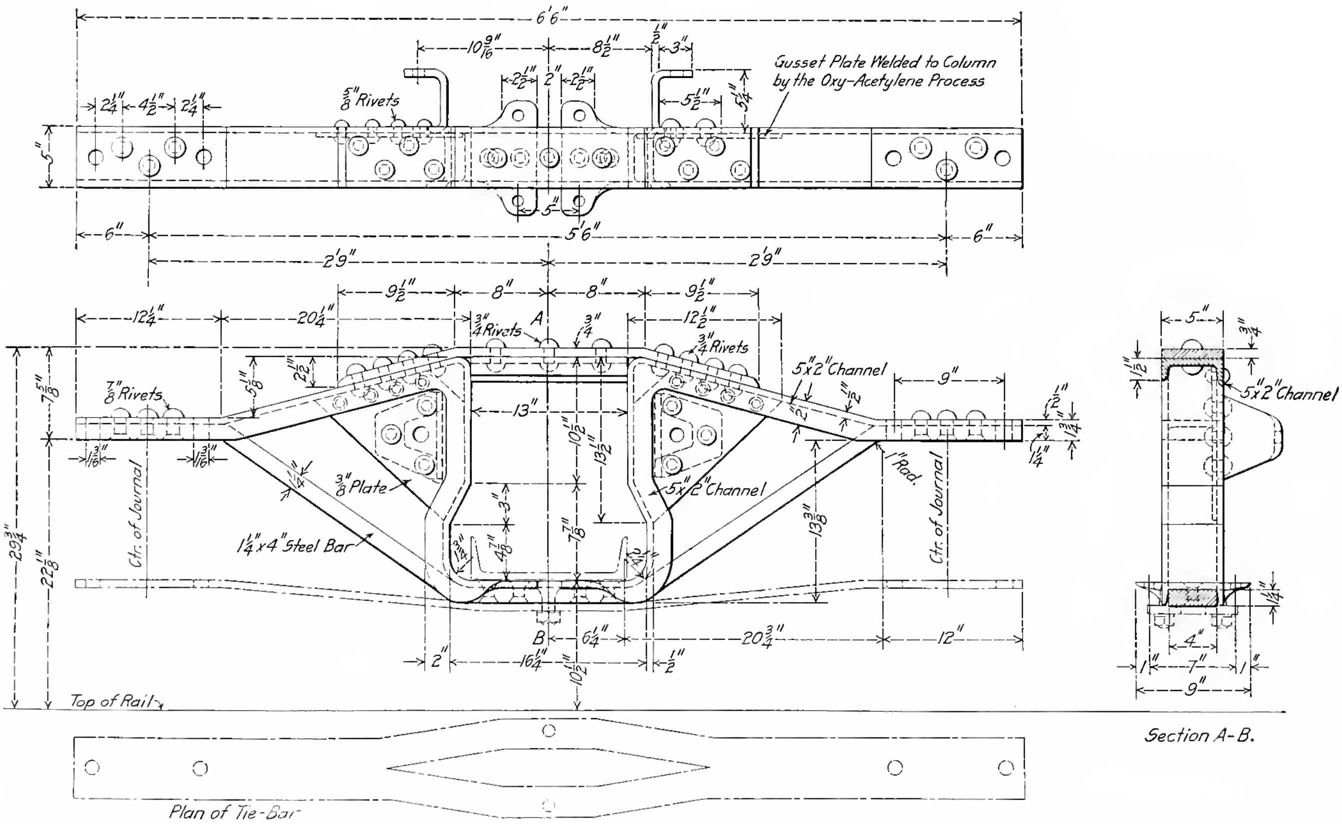
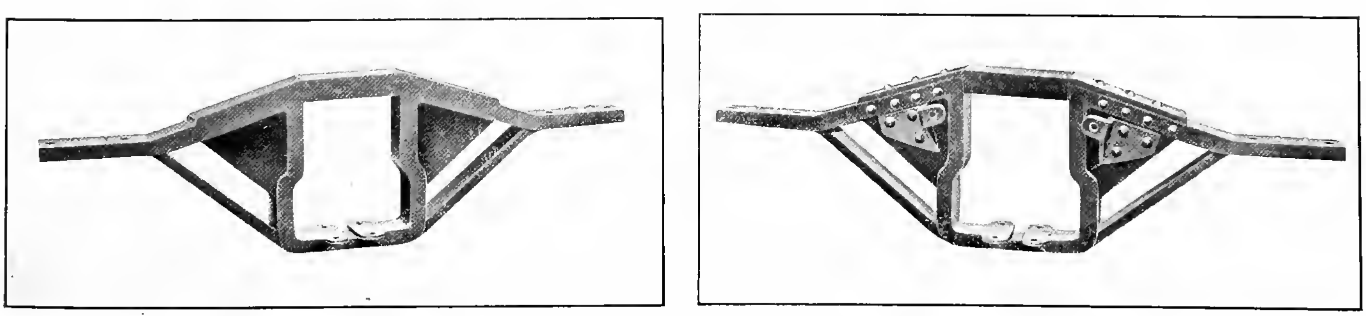
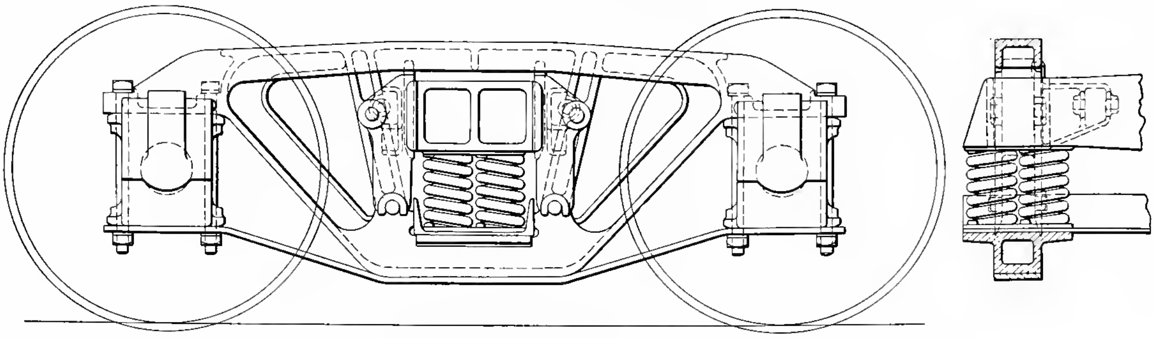


Fig. 1090—Freight Car Truck Side Frame Built of Rolled Steel Members Riveted Together. Murphy Equipment Company.

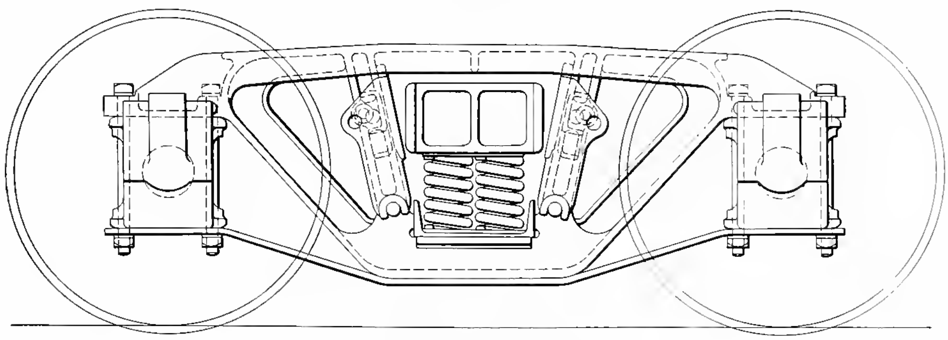


Welded. Riveted.

Fig. 1091—Rolled Steel Side Frames for Freight Car Trucks. Murphy Equipment Company.



Shows Side Frame With Bolster Guides In Position.



Shows Side Frame With Bolster Guides Out of Position, to Permit Removing of Bolster

Fig. 1092—Buhoup Cast Steel Freight Car Truck Side Frame with Movable Bolster Guides. McConway & Torley Company.

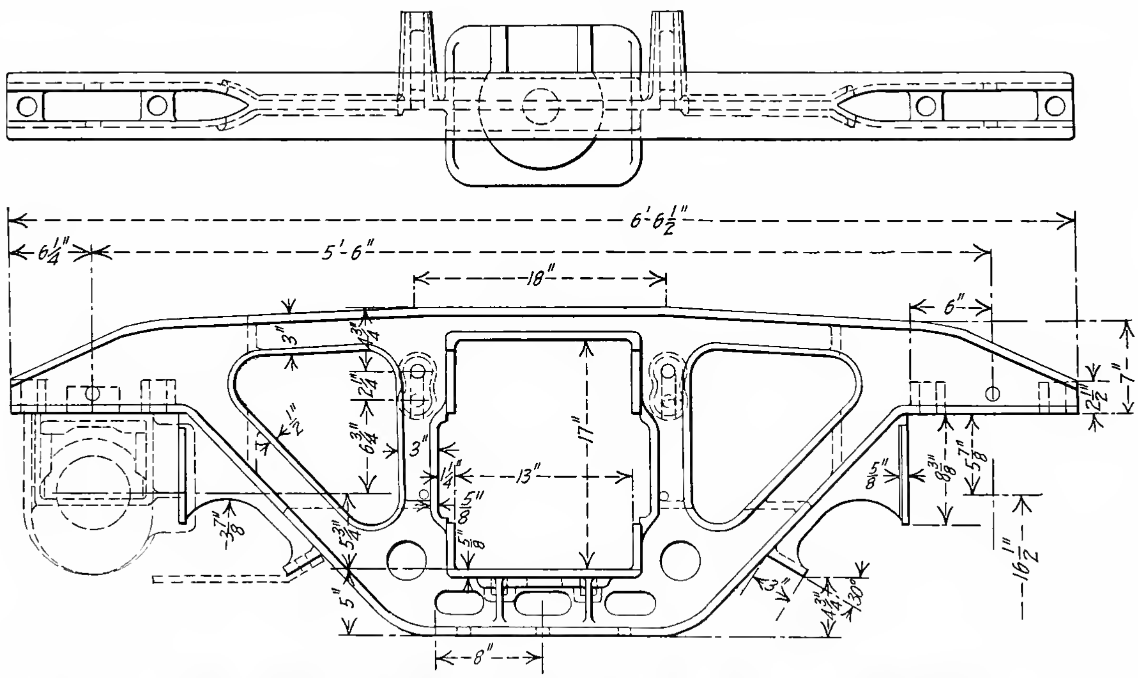


Fig. 1093—Cast Steel Truck Side Frame for 50-Ton Capacity Freight Cars. Pittsburgh Equipment Company.

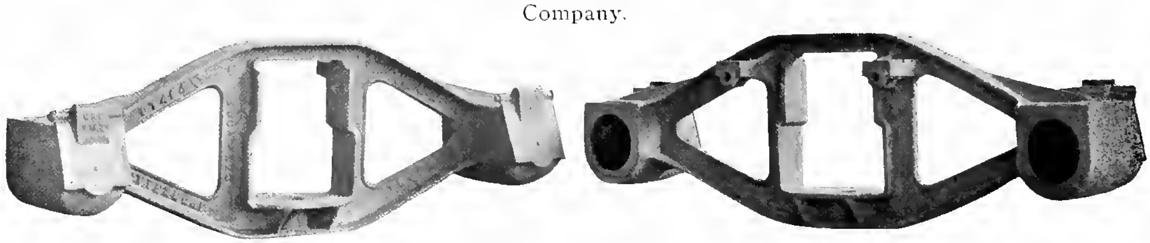


Fig. 1094—Bettendorf Cast Steel Side Frame for Freight Car Trucks. Bettendorf Axle Company.

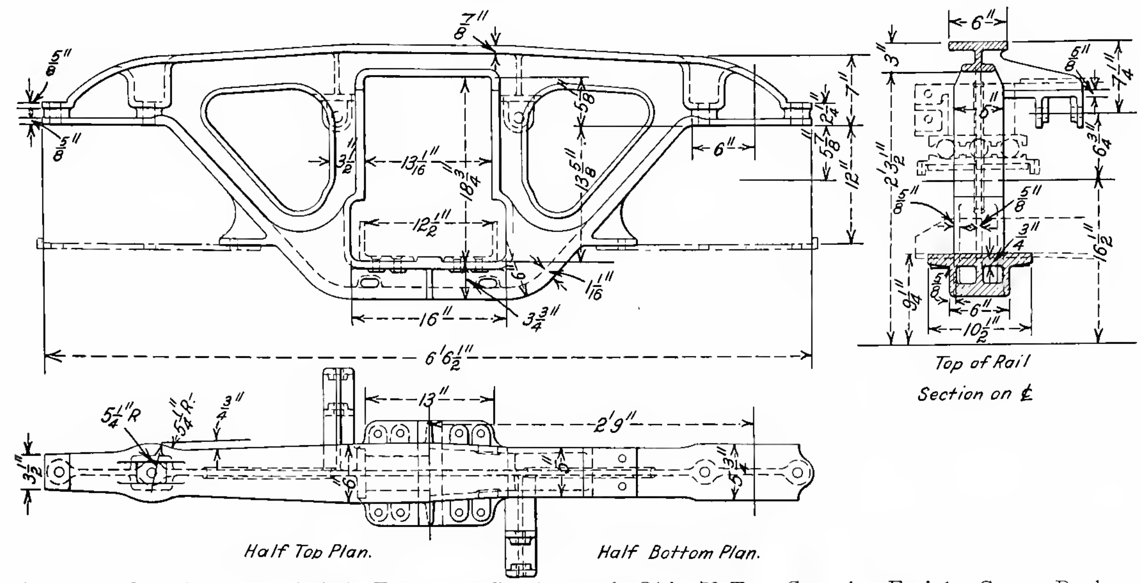


Fig. 1095—Cast Steel Truck Side Frame for Baltimore & Ohio 70-Ton Capacity Freight Cars. Buckeye Steel Castings Company.

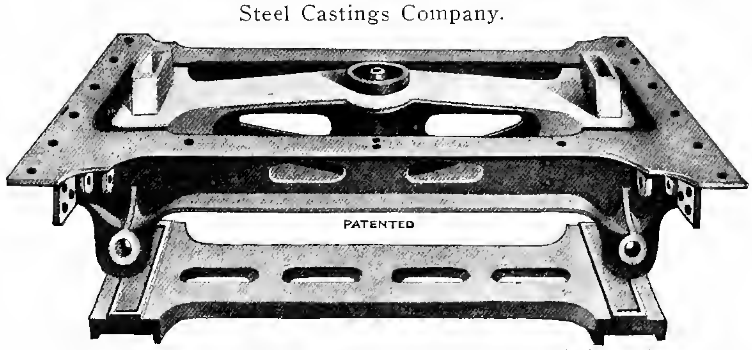


Fig. 1096—Commonwealth Cast Steel Center Frame for Four and Six-Wheel Passenger Train Car Trucks. Commonwealth Steel Company.

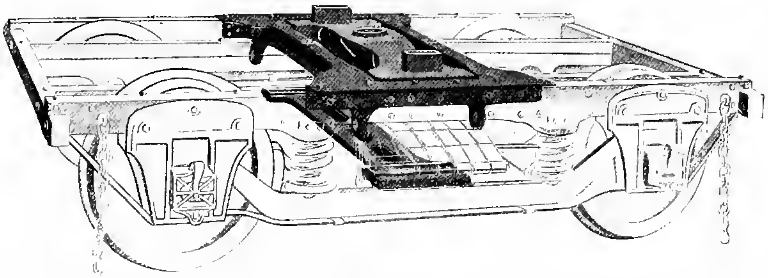


Fig. 1097—Commonwealth Cast Steel Center Frame Applied to Four-Wheel Truck.

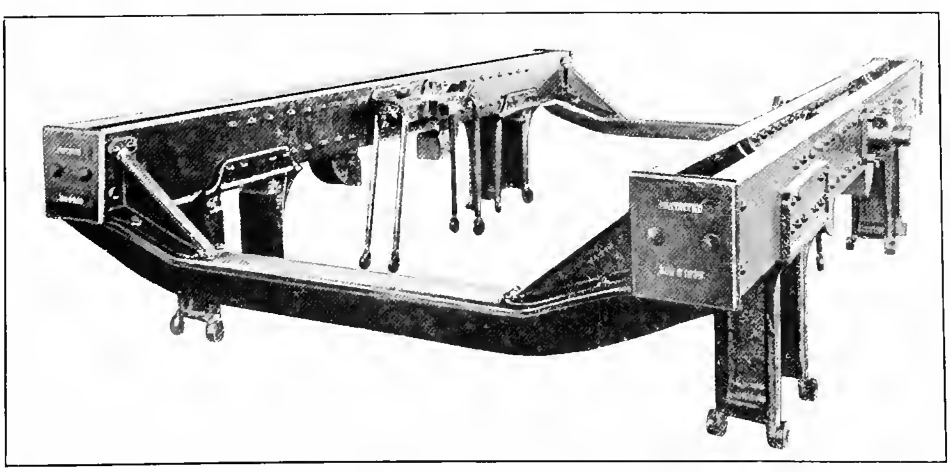


Fig. 1098—Frame for Pennsylvania Railroad A1 1-Steel Four-Wheel Passenger Train Car Truck.

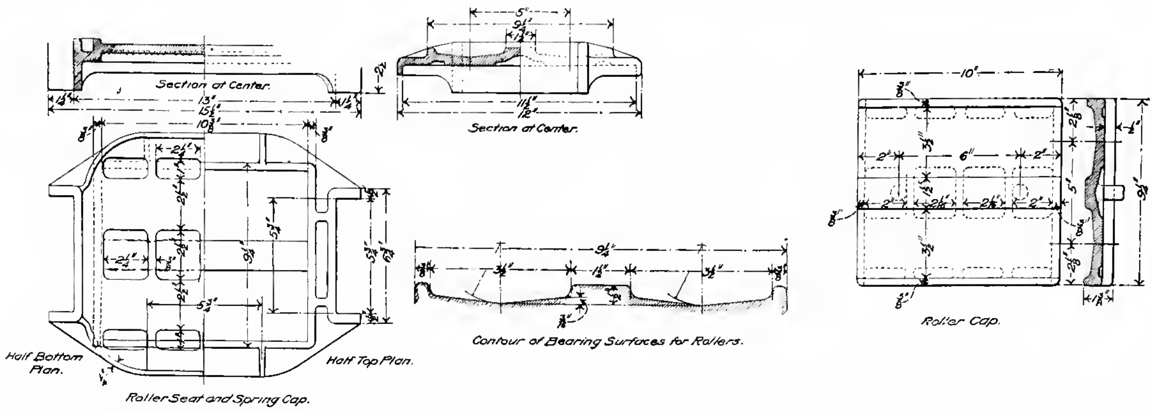


Fig. 1099—Details of Spring Caps and Seats for Barber Truck with Top Rollers. Standard Car Truck Company.

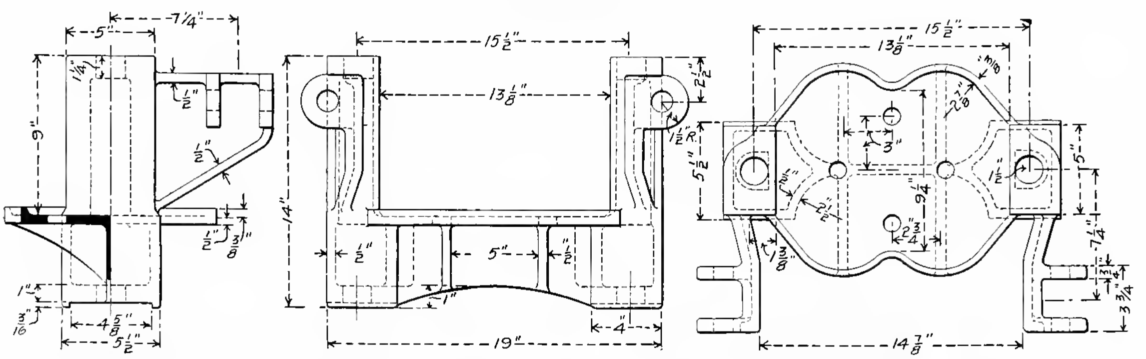


Fig. 1100—Cast Steel Combined Truck Column or Bolster Guide, Brake Hanger and Spring Seat. American Steel Foundries.

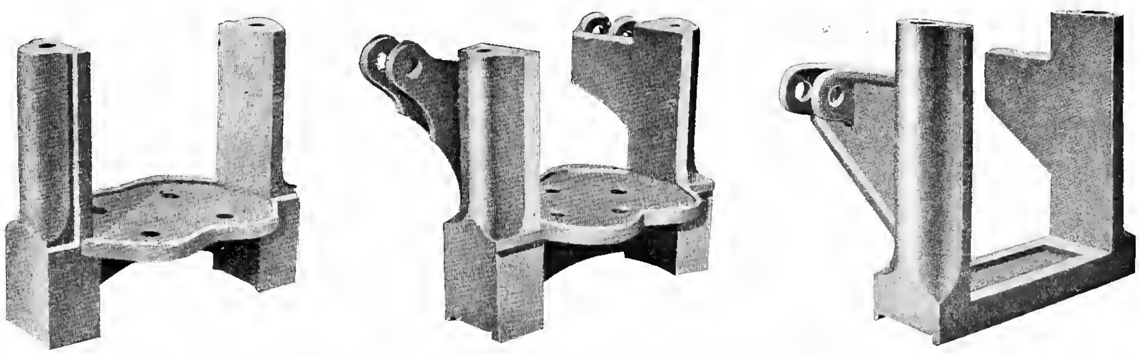


Fig. 1101—Cast Steel Combined Column or Bolster Guides and Spring Seats for Arch Bar Trucks. American Steel Foundries.

Fig. 1102—Single Coil Controller Spring.

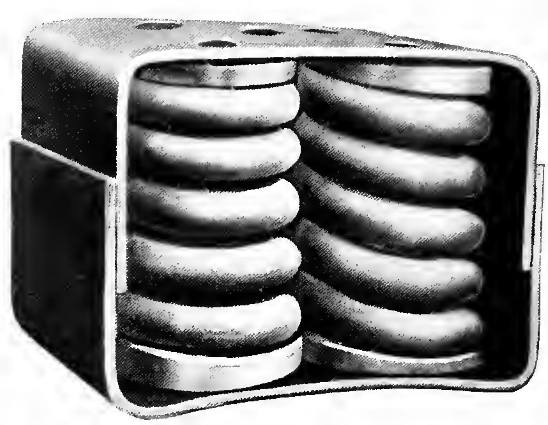


Fig. 1103—Double Coil Controller Spring.

Simplex Railway Appliance Company.

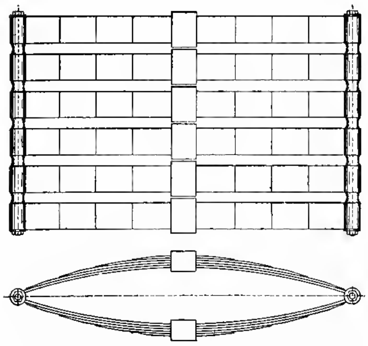


Fig. 1104—Sextuple Elliptic Spring.

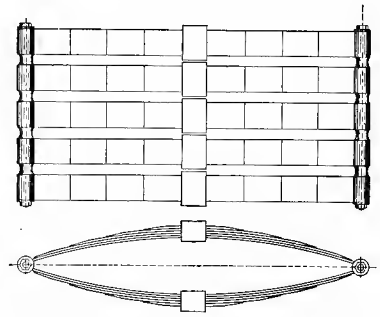


Fig. 1105—Quintuple Elliptic Spring.

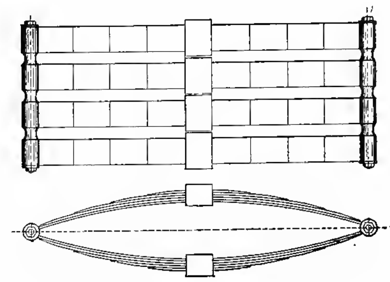


Fig. 1106—Quadruple Elliptic Spring.

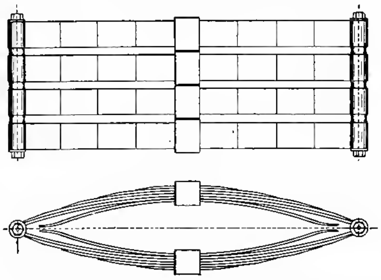


Fig. 1107—Graduated Quadruple Elliptic Spring.

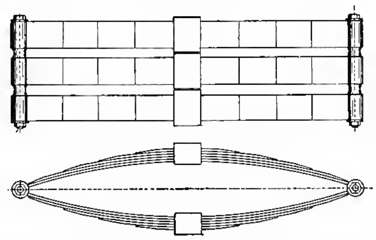


Fig. 1108—Triple Elliptic Spring.

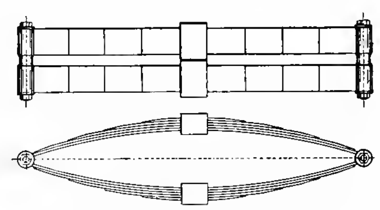


Fig. 1109—Double Elliptic Spring.

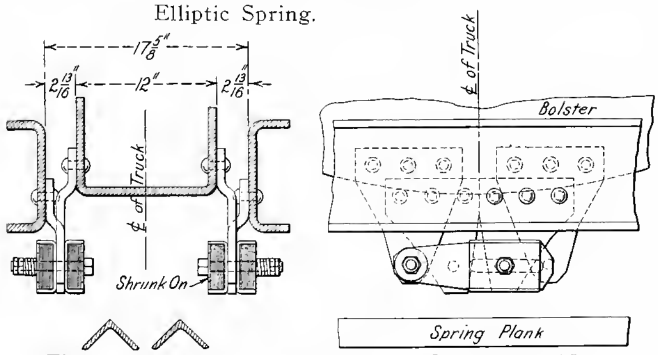


Fig. 1110—Spring Dampener for New York, New Haven & Hartford Electric Motor Truck.

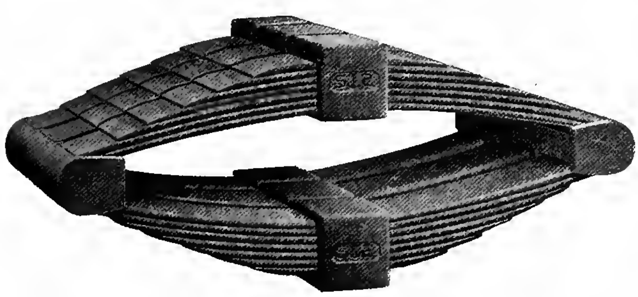


Fig. 1111—Triple Elliptic Bolster Spring. Baldwin Locomotive Works.

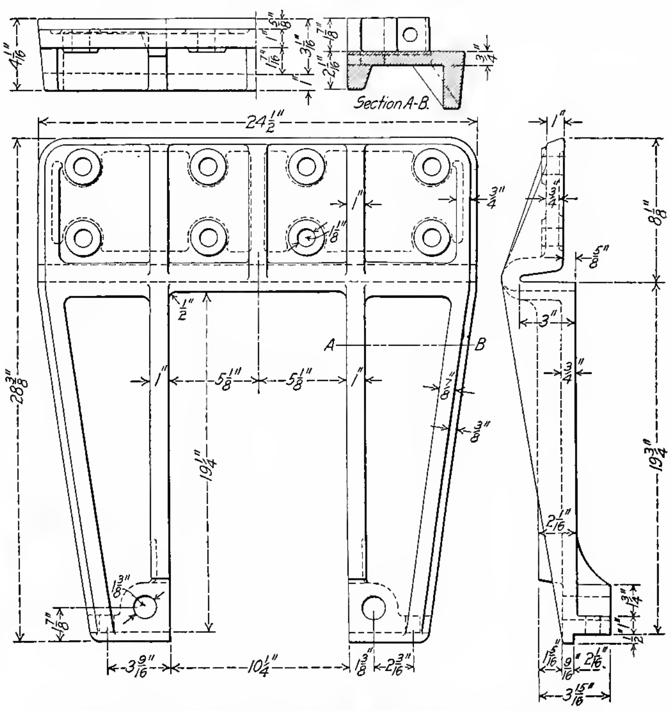


Fig. 1112—Pedestal of Six-Wheel Truck for Pittsburgh & Lake Erie 100-Ton Capacity Flat Car.

Fig. 1113—McCord Spring Dampener. McCord & Company.

Fig. 1114—Four-Coil Bolster Spring.

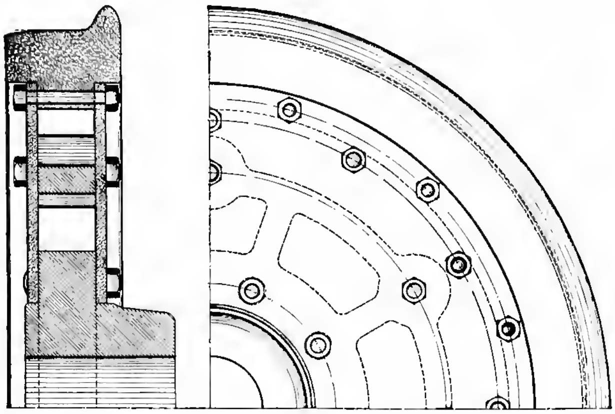


Fig. 1115—Paige Plate Coach Wheel. Cast Iron Spider with Steel Plates Secured by Bolts.

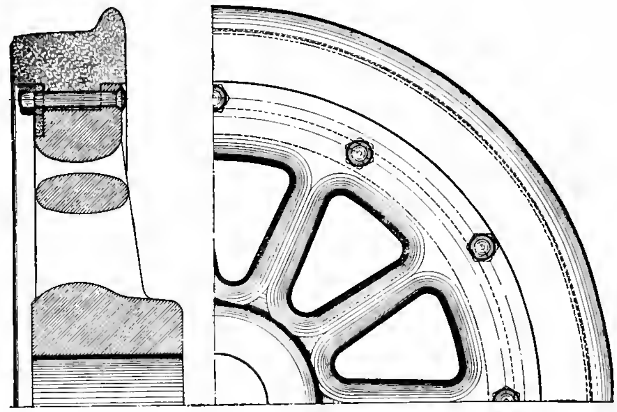


Fig. 1116—Paige Spoke Coach Wheel. Cast Iron Spoke Center with Tire Secured by Shrinkage, Retaining Rings and Bolts.

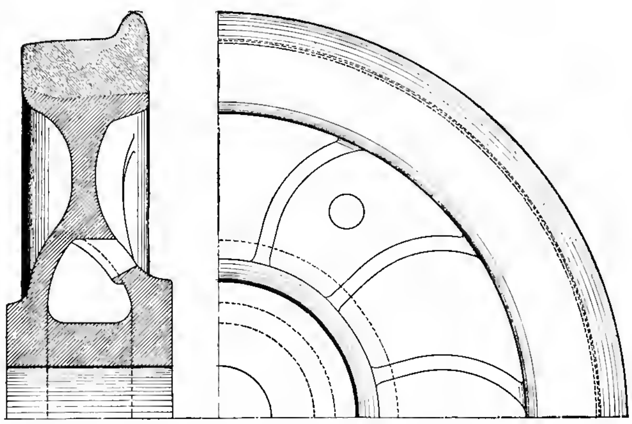


Fig. 1117—Fused Coach Wheel. Cast Iron Plate Center with Tire Secured by Welding.

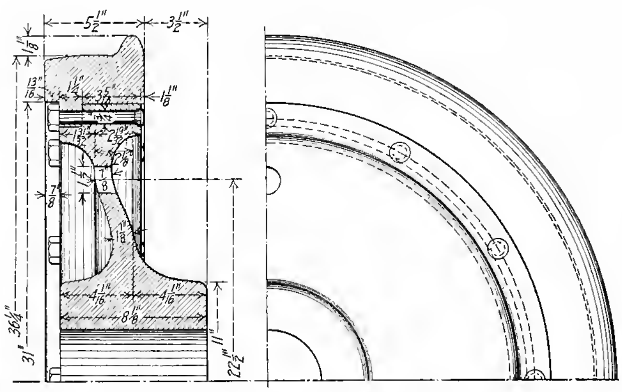


Fig. 1118—Bolted Type Coach Wheel with Cast Steel Plate Center.

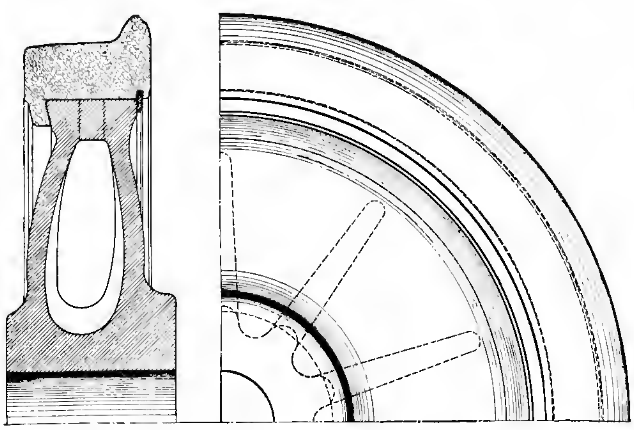


Fig. 1119—National No. 2 Coach Wheel. Cast Iron Double Plate Center, Having Internal Ribs, with Tire Secured by Shrinkage and Gibson Retaining Ring.

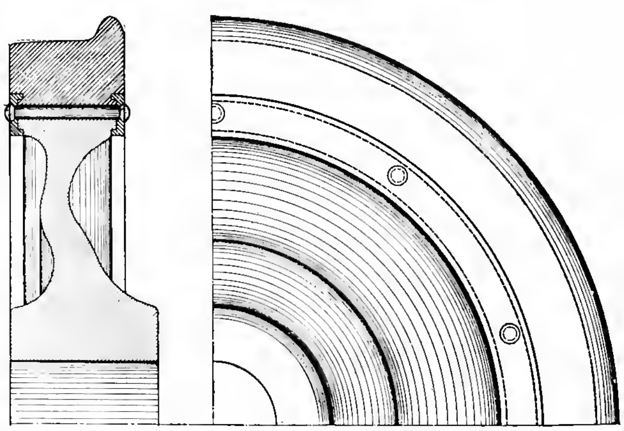


Fig. 1120—National No. 6 Coach Wheel. Wrought Iron Disc Center with Tire Secured by Shrinkage and Double Lip Retaining Rings.

Railway Steel-Spring Company.

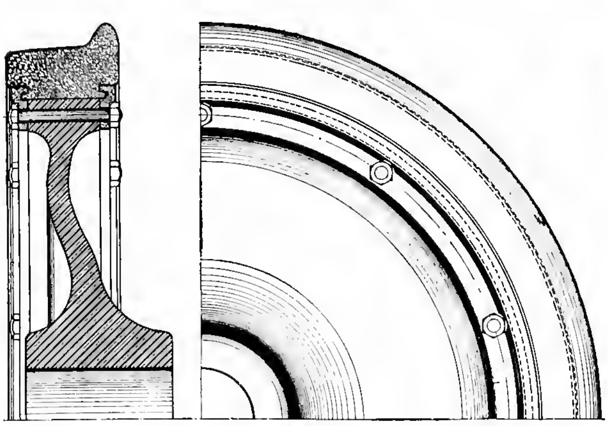


Fig. 1121—National No. 6 Coach Wheel. Wrought Iron Disc Center with Tire Secured by Shrinkage and Mansell Retaining Rings.

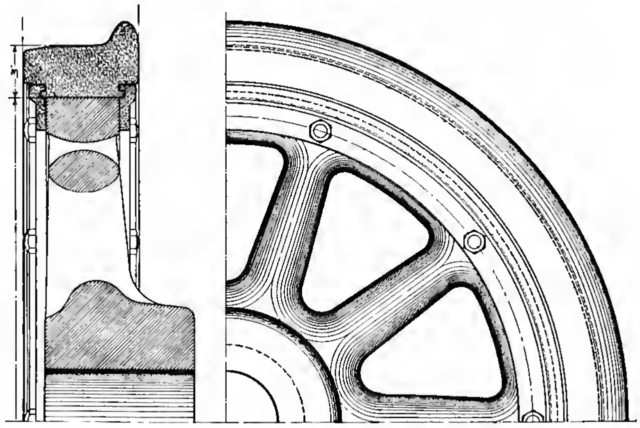


Fig. 1122—National No. 3 Coach Wheel. Cast Iron Spoke Center with Tire Secured by Shrinkage and Mansell Retaining Rings.

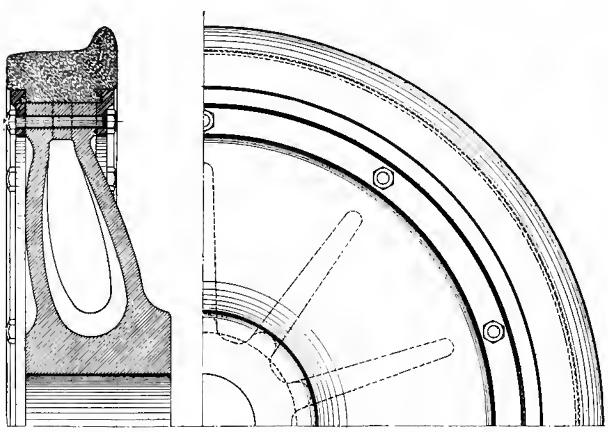


Fig. 1123—National No. 4 Coach Wheel. Cast Iron Double Plate Center, Having Internal Ribs, with Tire Secured by Shrinkage and Mansell Retaining Rings.

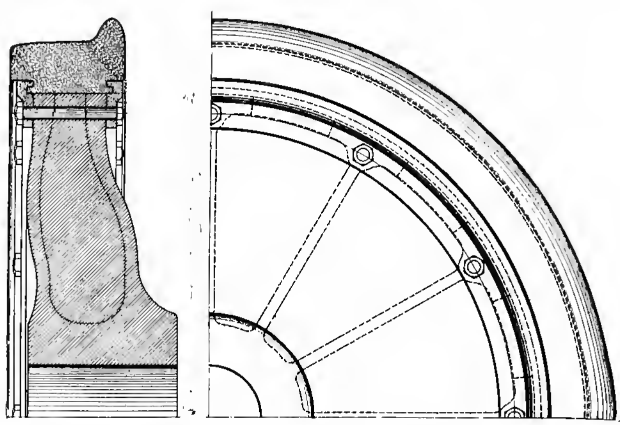


Fig. 1124—Allen No. 9 Coach Wheel. Cast Iron Double Plate Center with Tire Secured by Shrinkage and Mansell Retaining Rings.

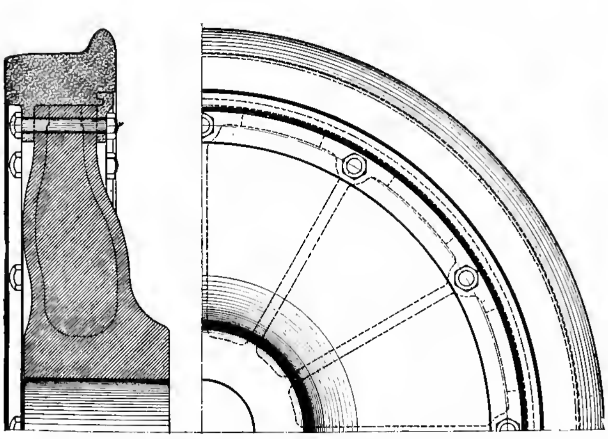


Fig. 1125—Allen No. 11 Coach Wheel. Cast Iron Double Plate Center, Having Internal Spokes, with Tire Secured by Shrinkage, Bolts and Mansell Retaining Rings.

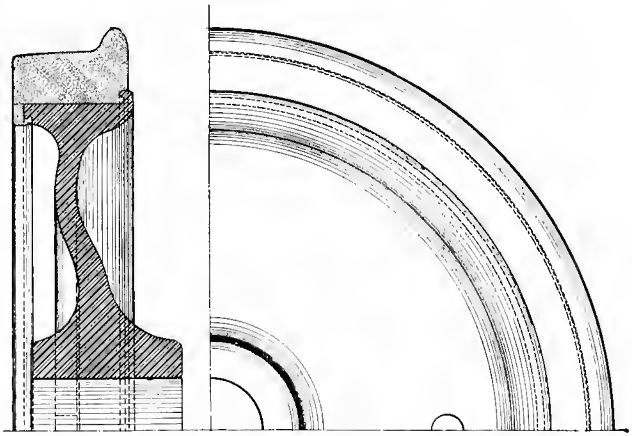


Fig. 1126—Boies No. 2 Coach Wheel. Wrought Iron Disc Center with Tire Secured by Shrinkage and Integral Lock.

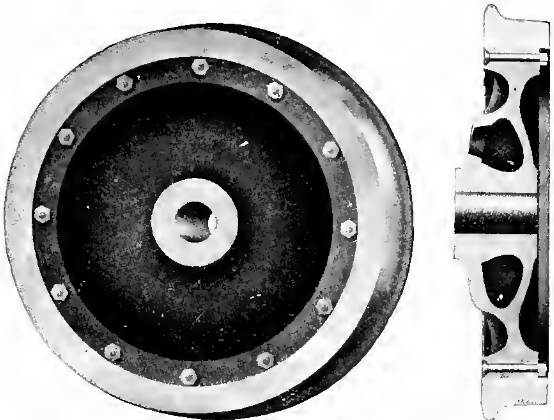


Fig. 1127—Cast Iron Plate Center with Tire Held by Shrinkage and Bolts.

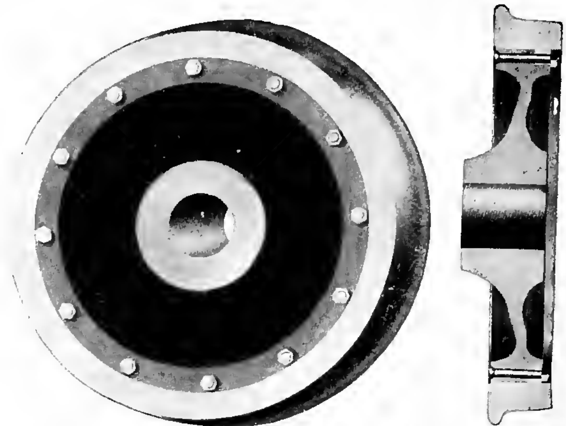


Fig. 1128—Cast Steel Plate Center with Tire Held by Shrinkage and Bolts.

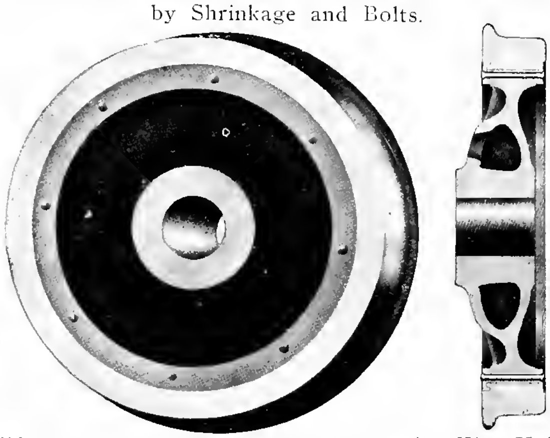


Fig. 1129—Cast Iron Plate Center with Tire Held by Shrinkage, Double Lip Retaining Rings and Rivets.

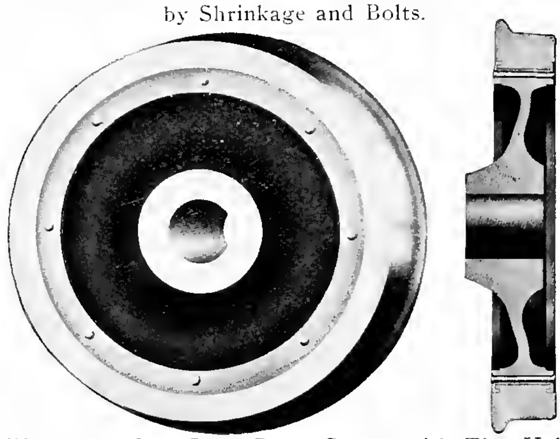


Fig. 1130—Cast Steel Plate Center with Tire Held by Shrinkage, Double Lip Retaining Rings and Rivets.

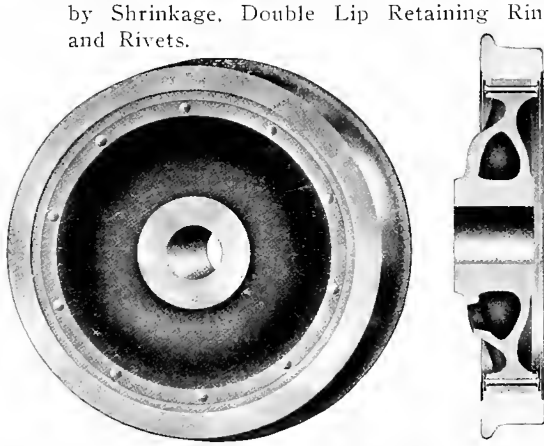


Fig. 1131—Cast Iron Plate Center with Tire Held by Shrinkage, Mansell Retaining Rings and Rivets.

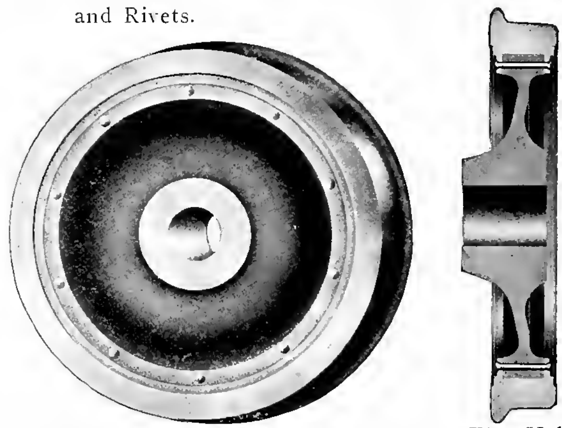


Fig. 1132—Cast Steel Plate Center with Tire Held by Shrinkage, Mansell Retaining Rings and Rivets.

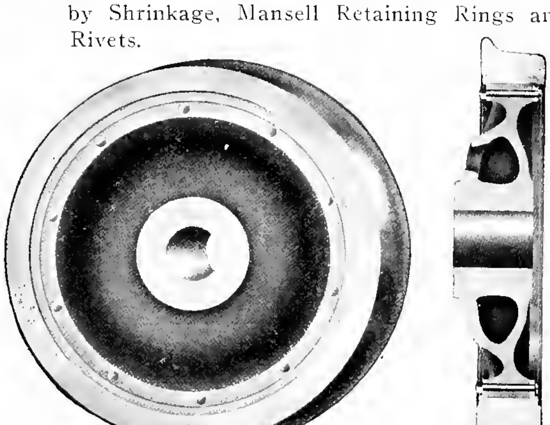


Fig. 1133—Cast Iron Plate Center with Tire Held by Shrinkage, Mansell Retaining Rings and Bolts.

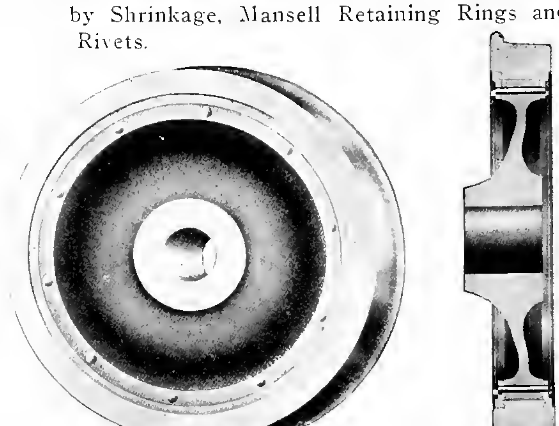


Fig. 1134—Cast Steel Plate Center with Tire Held by Shrinkage, Mansell Retaining Rings and Bolts.

Standard Steel Works Company.

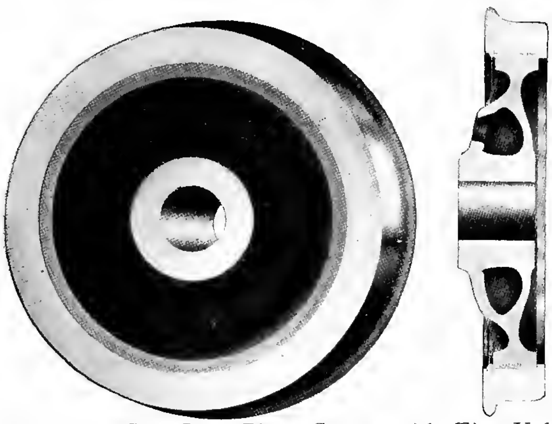


Fig. 1135—Cast Iron Plate Center with Tire Held by Shrinkage and Gibson Retaining Ring.

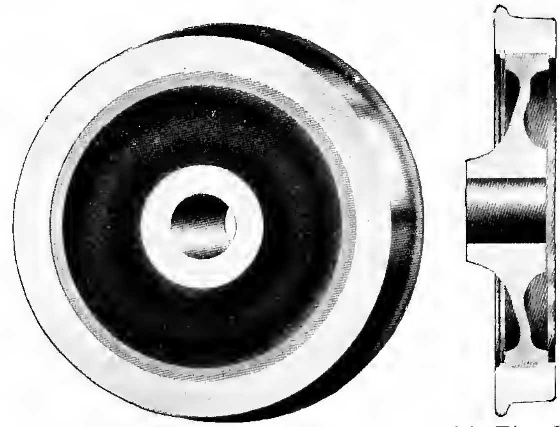


Fig. 1136—Cast Steel Plate Center with Tire Held by Shrinkage and Gibson Retaining Ring.

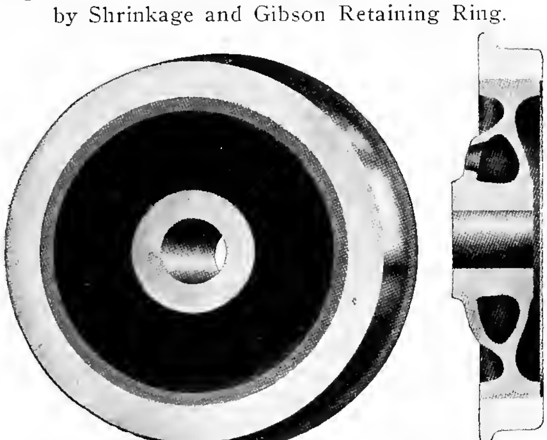


Fig. 1137—Cast Iron Plate Center with Tire Held by Shrinkage and Shoulder.

Fig. 1138—Cast Steel Plate Center with Tire Held by Shrinkage and Shoulder.

Standard Steel Works Company.

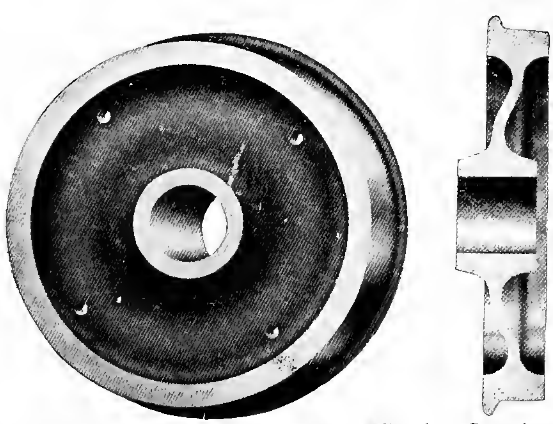


Fig. 1139—Solid Rolled Steel Wheel. Standard Steel Works Company.

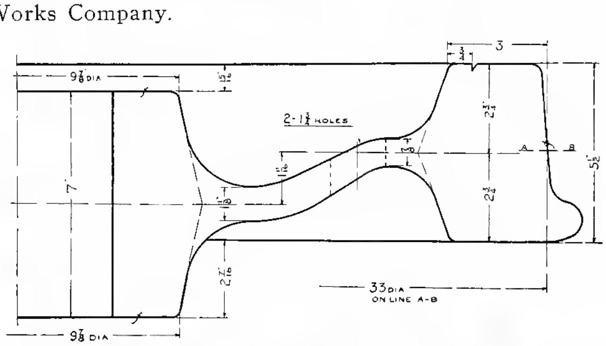


Fig. 1140—Rolled Steel Wheel, Diameter 33 in. Midvale Steel Company.

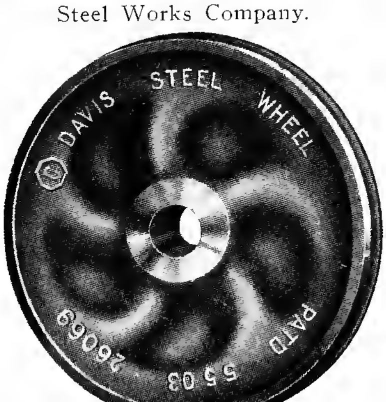


Fig. 1141—Davis Cast Steel Wheel. Weight of 33 in., 600 lbs.; 36 in., 675 lbs. American Steel

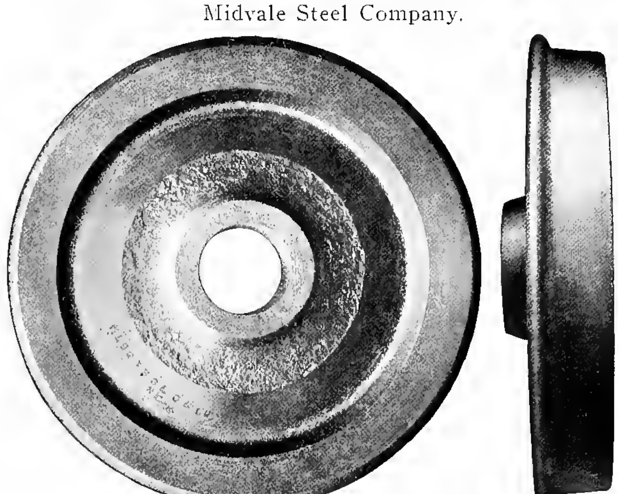


Fig. 1142—Solid Forged and Rolled Steel Freight Car Wheel. Carnegie Steel Company.

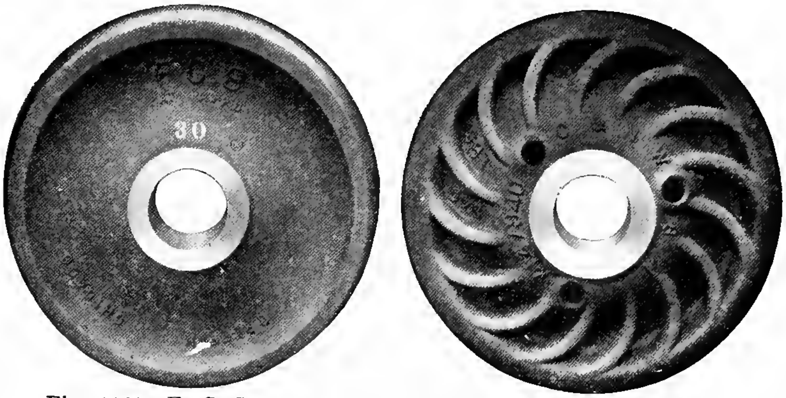


Fig. 1143—F. C. S. Wheel for Freight and Passenger Service.

Fig. 1144—F. C. S. Wheel for Street and Interurban Service.

Griffin Wheel Company.

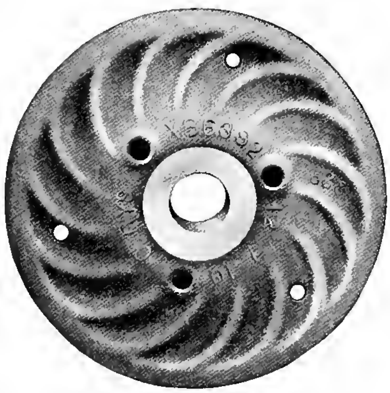


Fig. 1145—F. C. S. Wheel for Street and Interurban Service. Griffin Wheel Company.

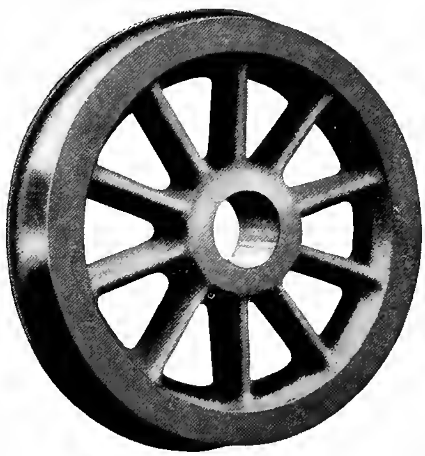


Fig. 1146—Steel Spoke Wheel. Lobdell Car Wheel Company.

Fig. 1147—Schoen Steel Wheel. Carnegie Steel Company.

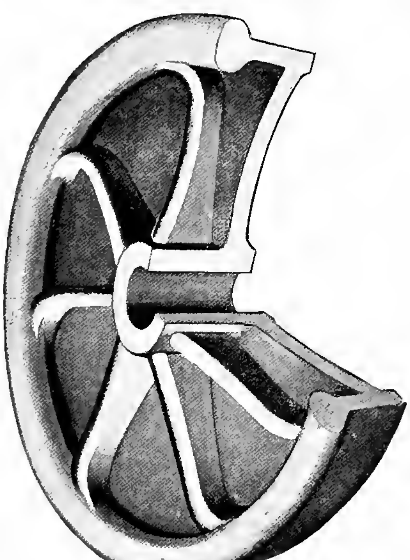


Fig. 1148—Single Plate Chilled Cast Iron Wheel.

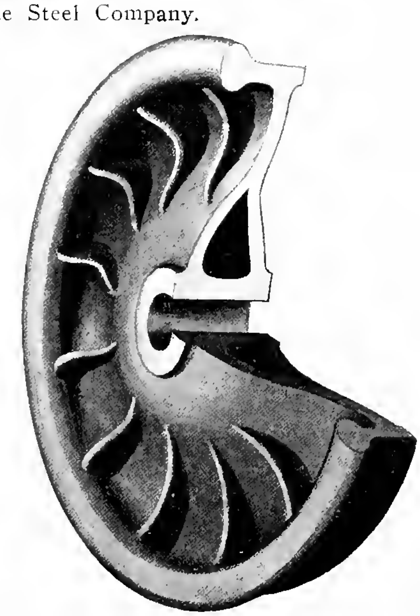


Fig. 1149—Double Plate Chilled Cast Iron Wheel.

Lobdell Car Wheel Company.

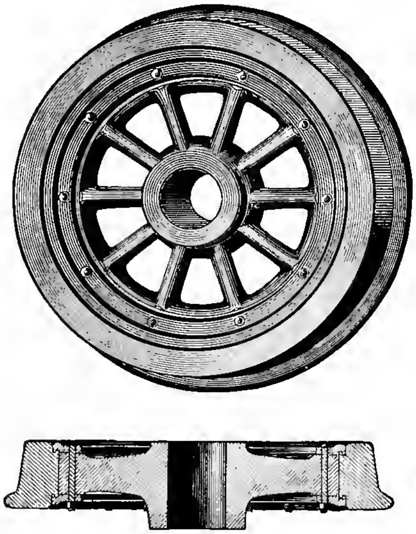


Fig. 1150—No. 3 Krupp Wheel. Cast Iron Spoke Center with Tire Secured by Wrought Iron Retaining Rings.

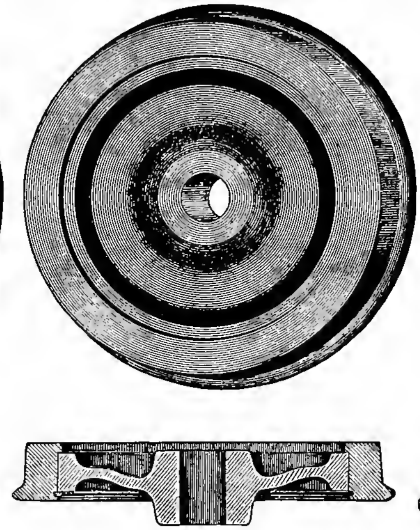


Fig. 1151—No. 14 Krupp Wheel. Forged Steel Disc Center with Tire Secured by Bute Fastening.

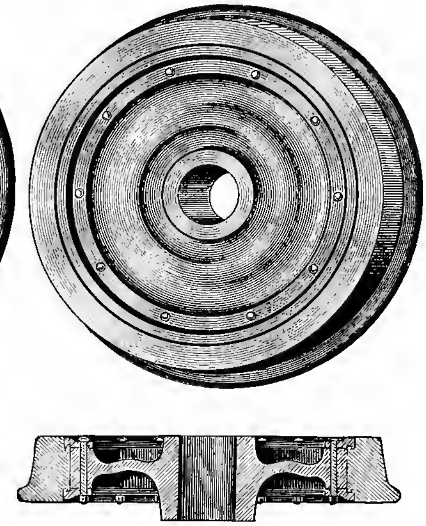


Fig. 1152—No. 1 Krupp Wheel. Forged Steel Disc Center with Tire Secured by Wrought Iron Retaining Rings.

Thomas Prosser & Son.

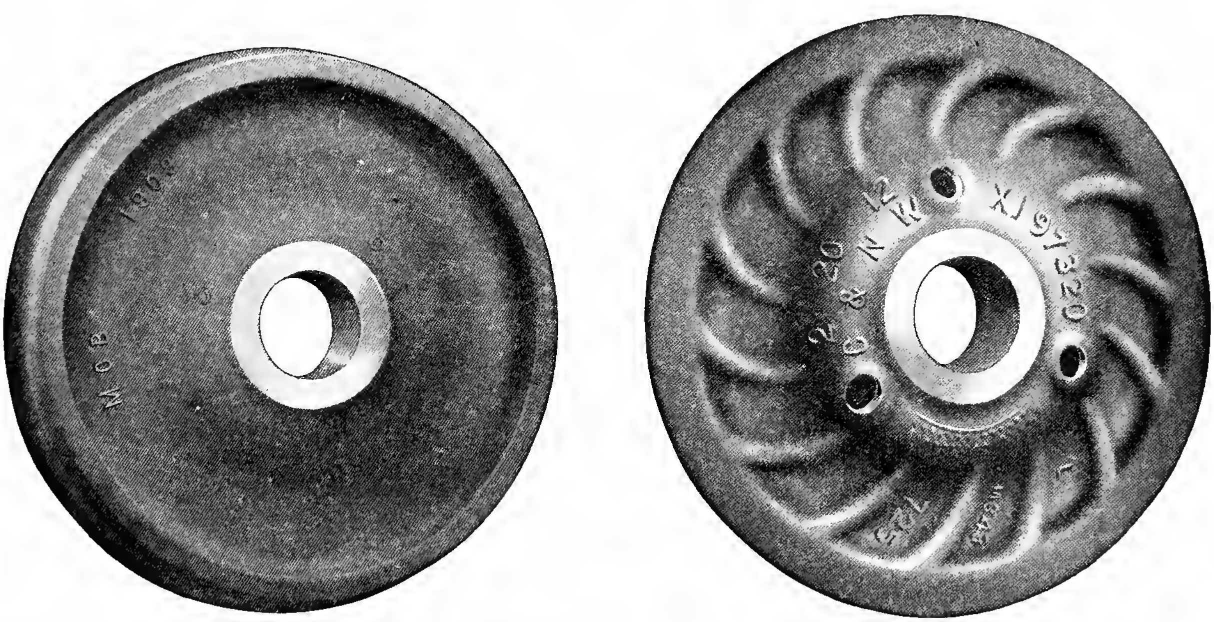


Fig. 1153—M. C. B. Standard Cast Iron Wheel for 50-Ton Capacity Freight Cars. Weight, 725 lbs. Association of Manufacturers of Chilled Car Wheels.

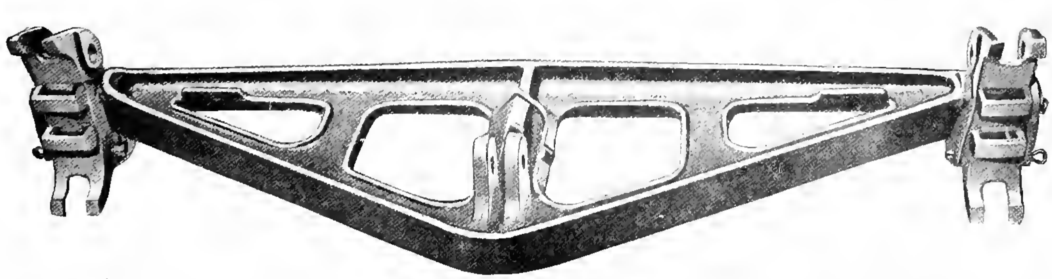


Fig. 1154—Vulcan Brake Beam for High Speed Four-Wheel Trucks. Simplex Railway Appliance Company.

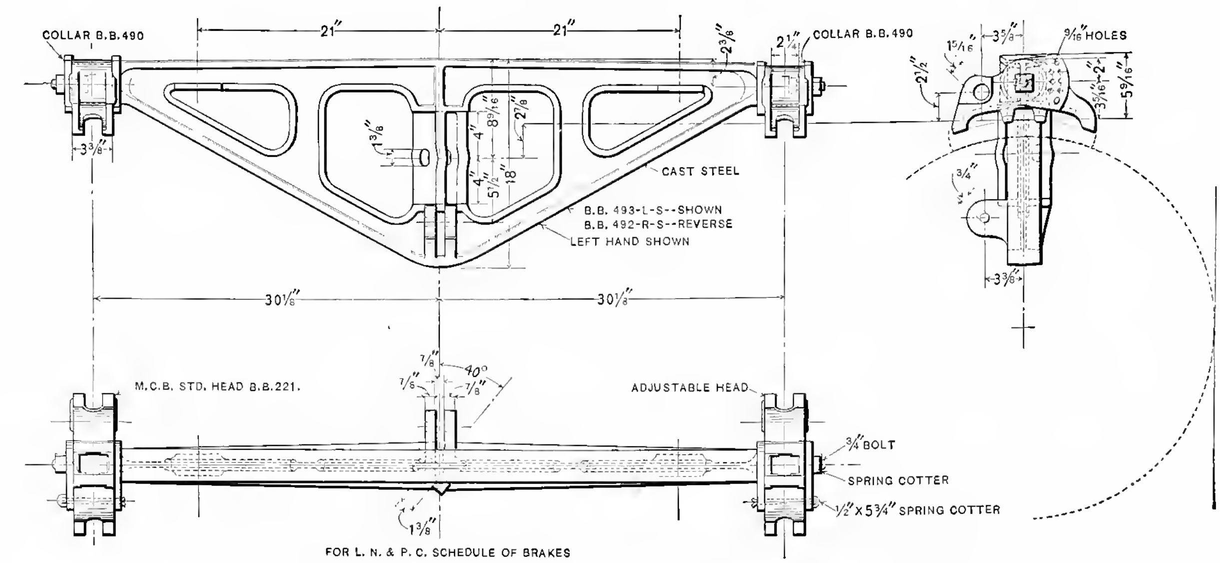


Fig. 1155—Vulcan Brake Beam. Simplex Railway Appliance Company.

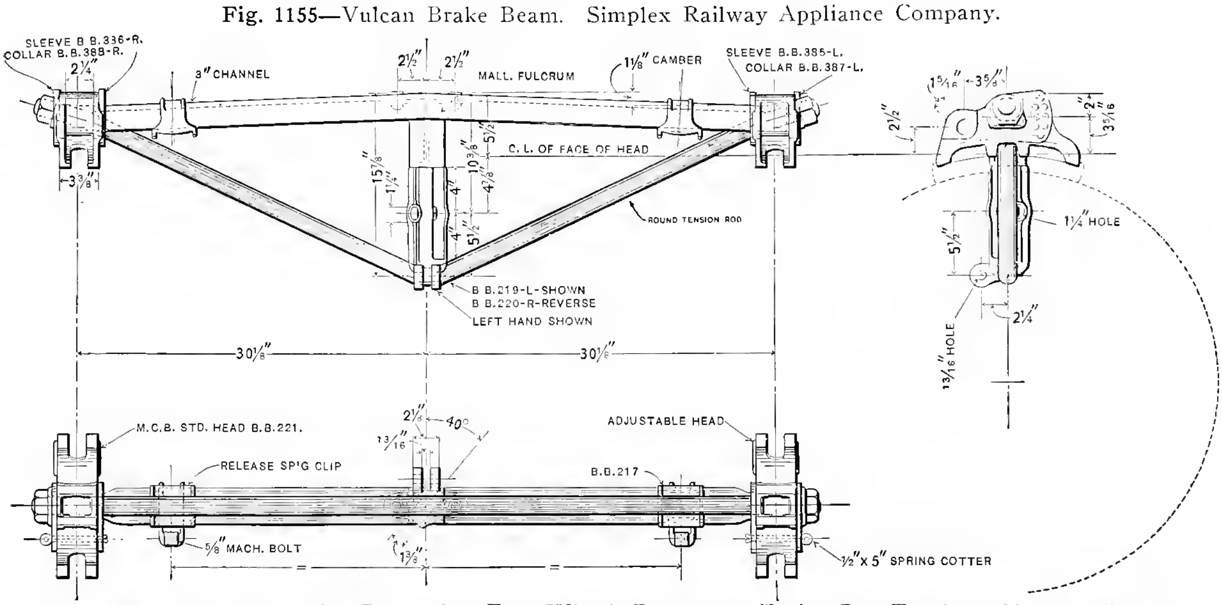


Fig. 1156—Hercules Brake Beam for Four-Wheel Passenger Train Car Trucks. Simplex Railway Appliance Company.

Fig. 1157—Acme Brake Beam for Short Wheel Base Freight Car Trucks. Simplex Railway Appliance Company.

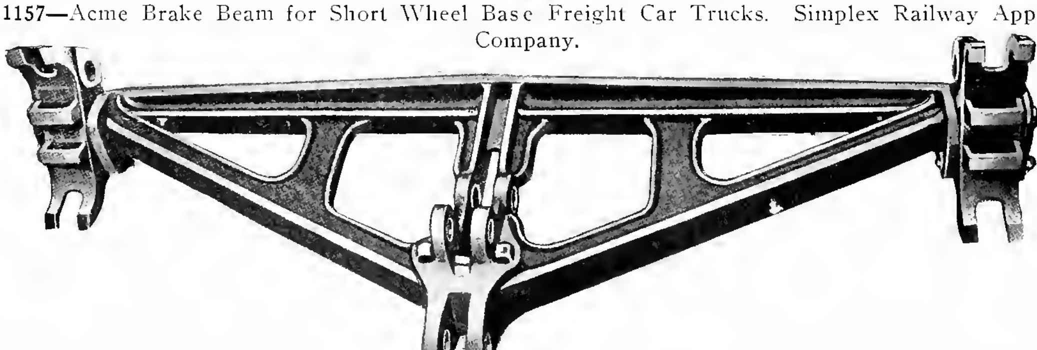


Fig. 1158—Vulcan Cast Steel Brake Beam for High Speed Six-Wheel Trucks. Simplex Railway Appliance Company.

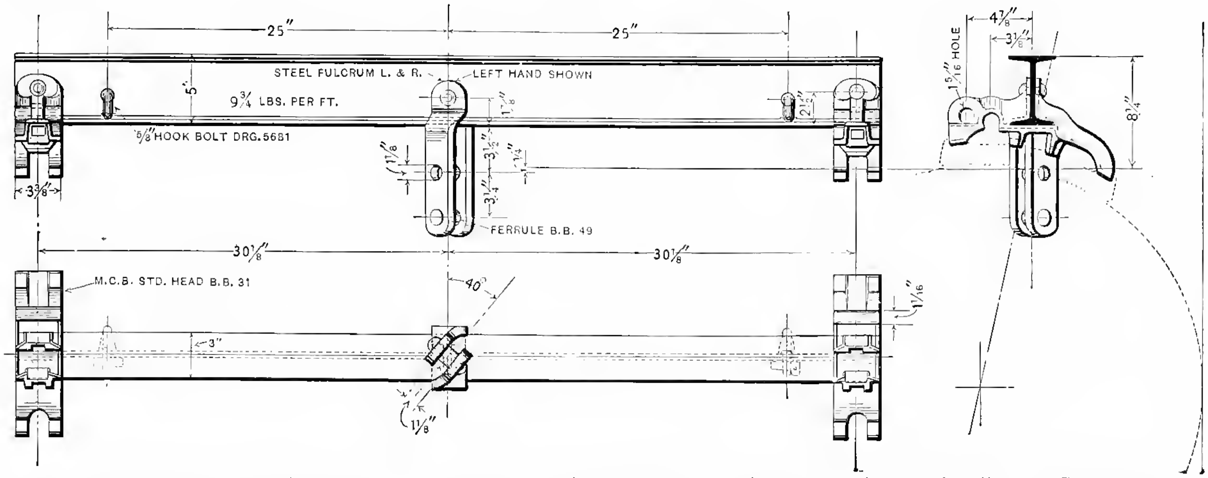


Fig. 1159—Acme Brake Beam for Light Freight Service. Simplex Railway Appliance Company.

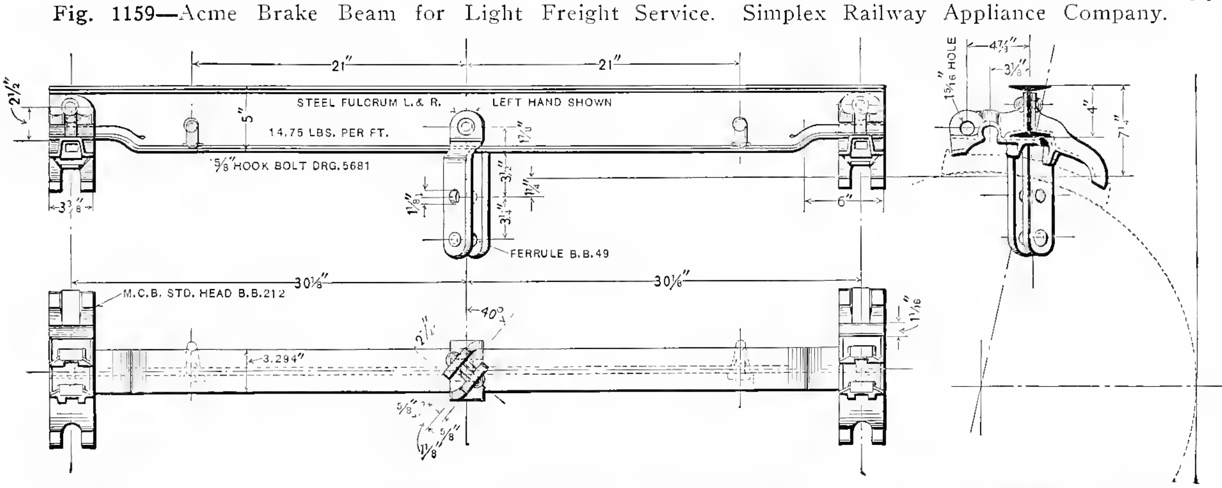


Fig. 1160—Acme Brake Beam for Short Wheel Base Freight Car Trucks. Simplex Railway Appliance Company.

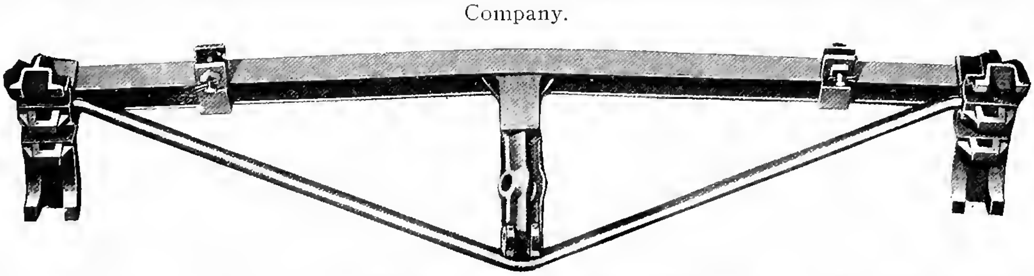


Fig. 1161—Ajax Brake Beam for Heavy Freight Service. Simplex Railway Appliance Company.

Fig. 1162—Hercules Brake Beam for Passenger Train Car Trucks. Simplex Railway Appliance Company.

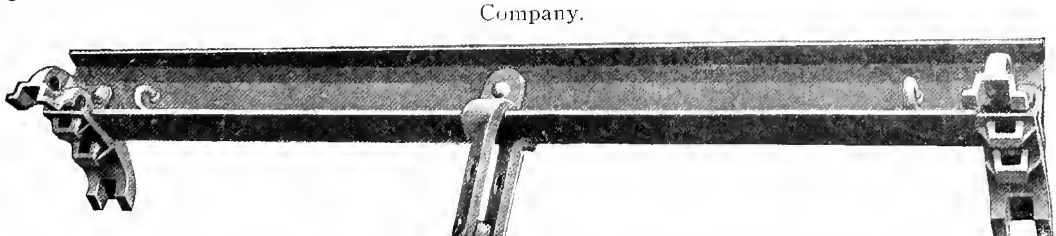


Fig. 1163—Acme Brake Beam for Freight Car Trucks. Simplex Railway Appliance Company.

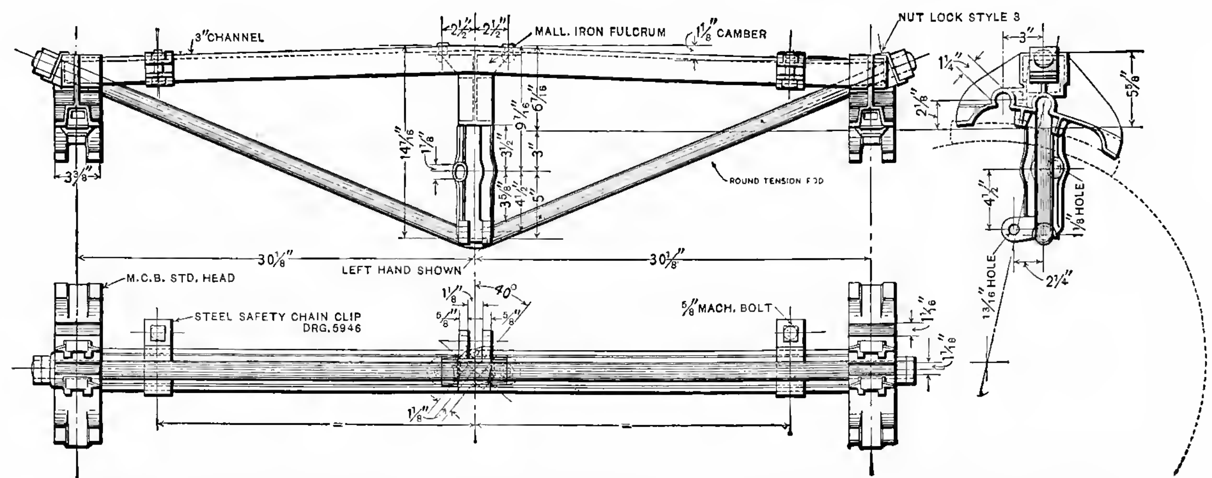


Fig. 1164—Ajax Brake Beam for Heavy Freight Service. Simplex Railway Appliance Company.

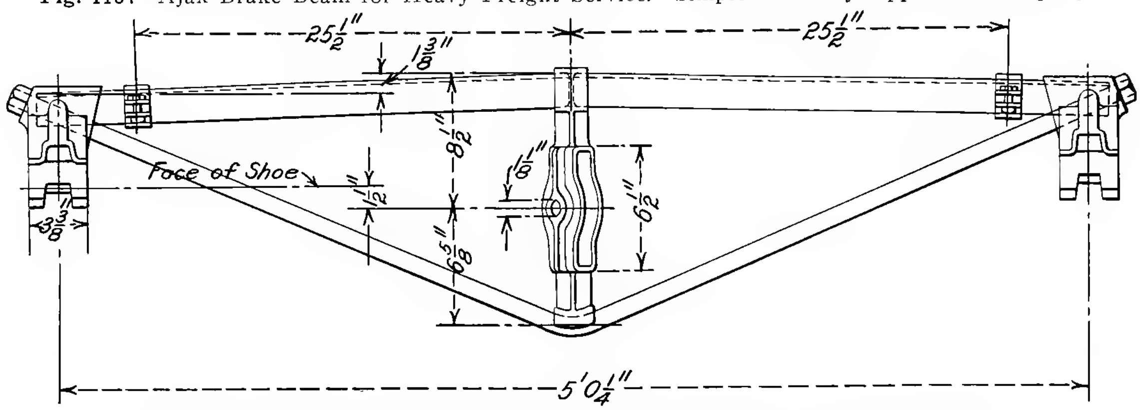


Fig. 1165—Buffalo Truss Brake Beam No. 1. Buffalo Brake Beam Company.

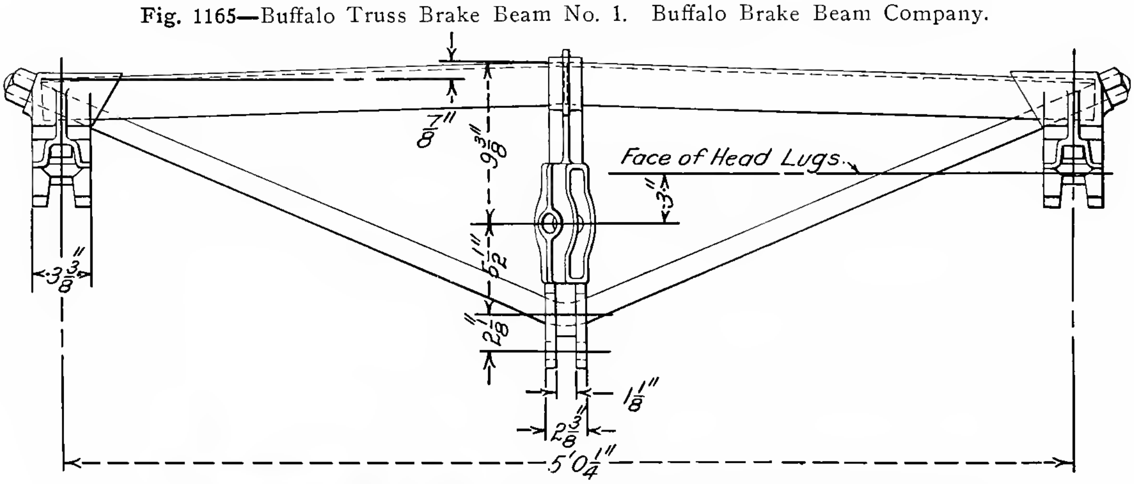


Fig. 1166—Buffalo Truss Brake Beam No. 3. Buffalo Brake Beam Company.

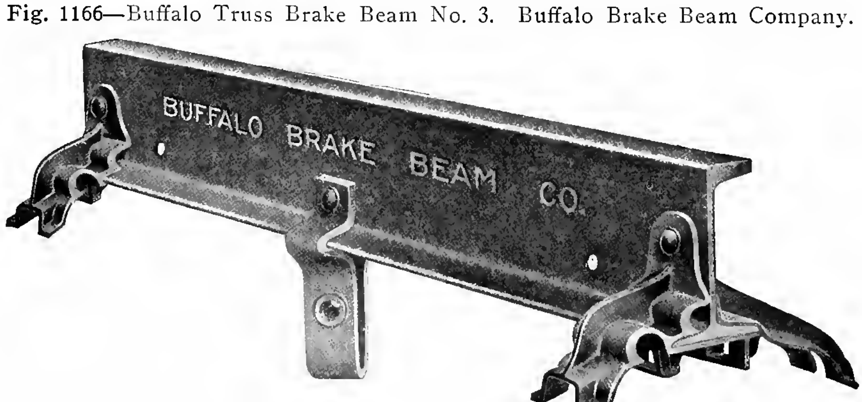


Fig. 1167—Vanderbilt Special Brake Beam for Heavy Freight and Passenger Service. Buffalo Brake Beam Company.

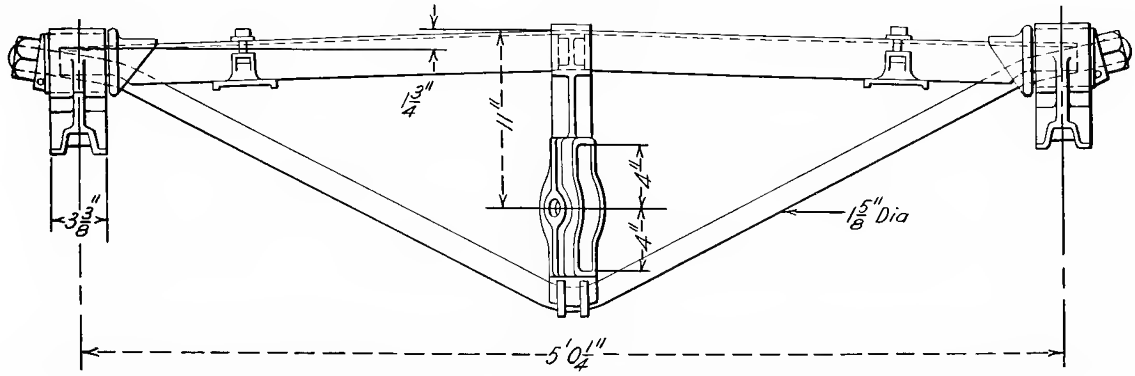


Fig. 1168—Buffalo Passenger Truss Brake Beam No. 5, with Adjustable Heads. Buffalo Brake Beam Company.

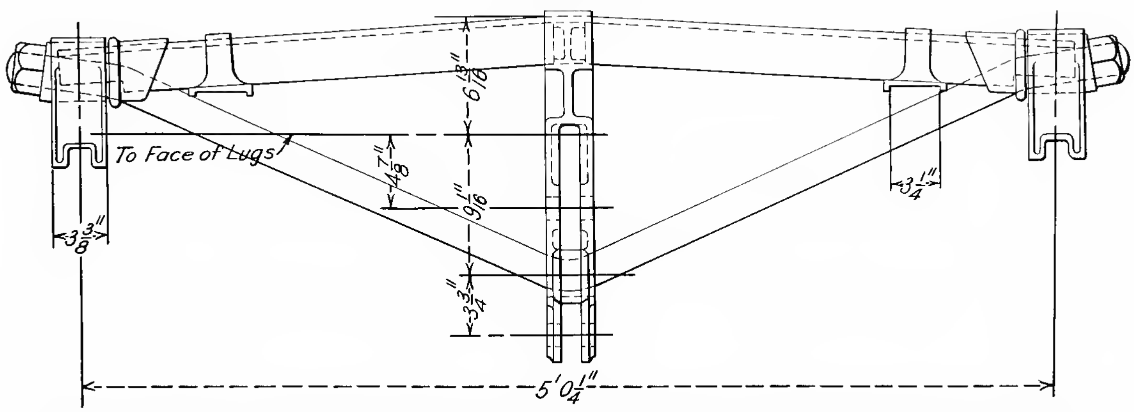


Fig. 1169—Buffalo Passenger Brake Beam for PC Equipment. Buffalo Brake Beam Company.

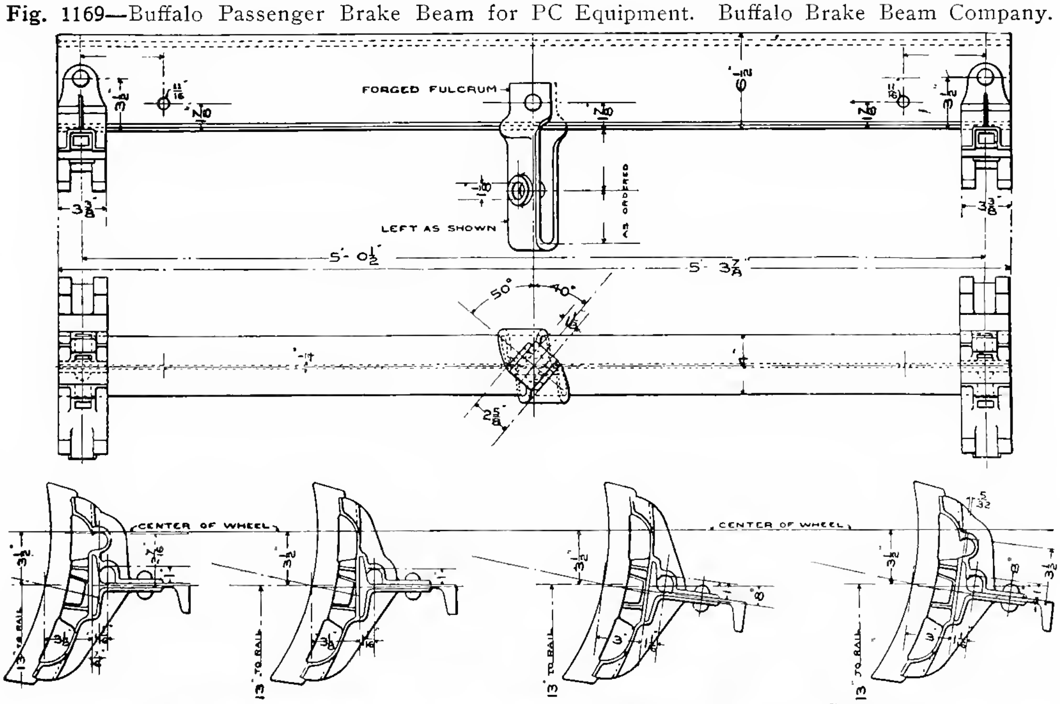


Fig. 1170—Buffalo Special Brake Beam. Buffalo Brake Beam Company.

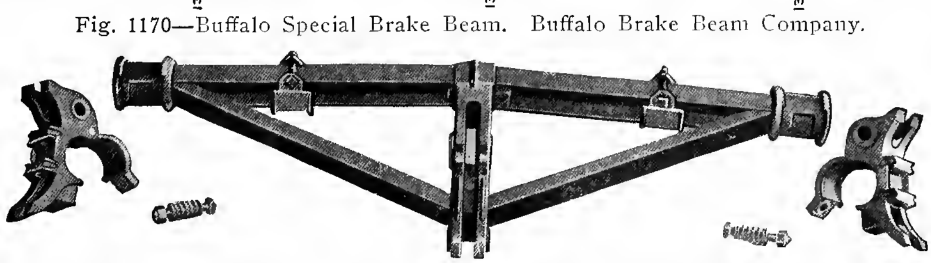


Fig. 1171—Huntoon Passenger Brake Beam, Showing Automatic Adjustable Heads. Joliet Railway Supply Company.

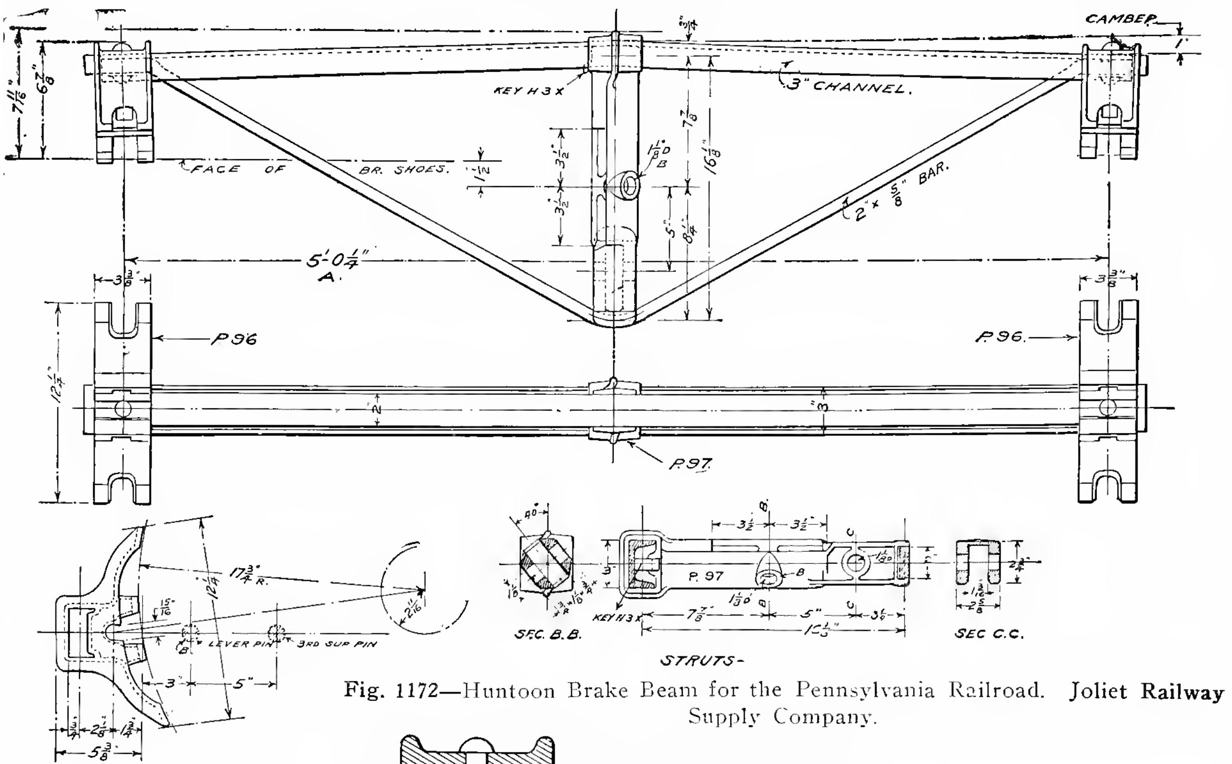


Fig. 1172—Huntoon Brake Beam for the Pennsylvania Railroad. **Joliet Railway** Supply Company.

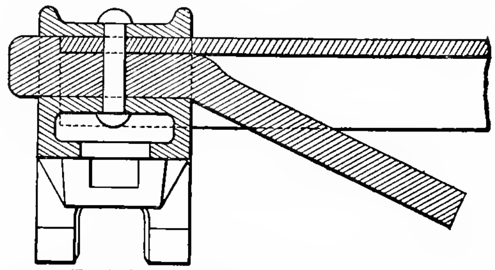


Fig. 1173—End Construction of Huntoon Brake Beam.

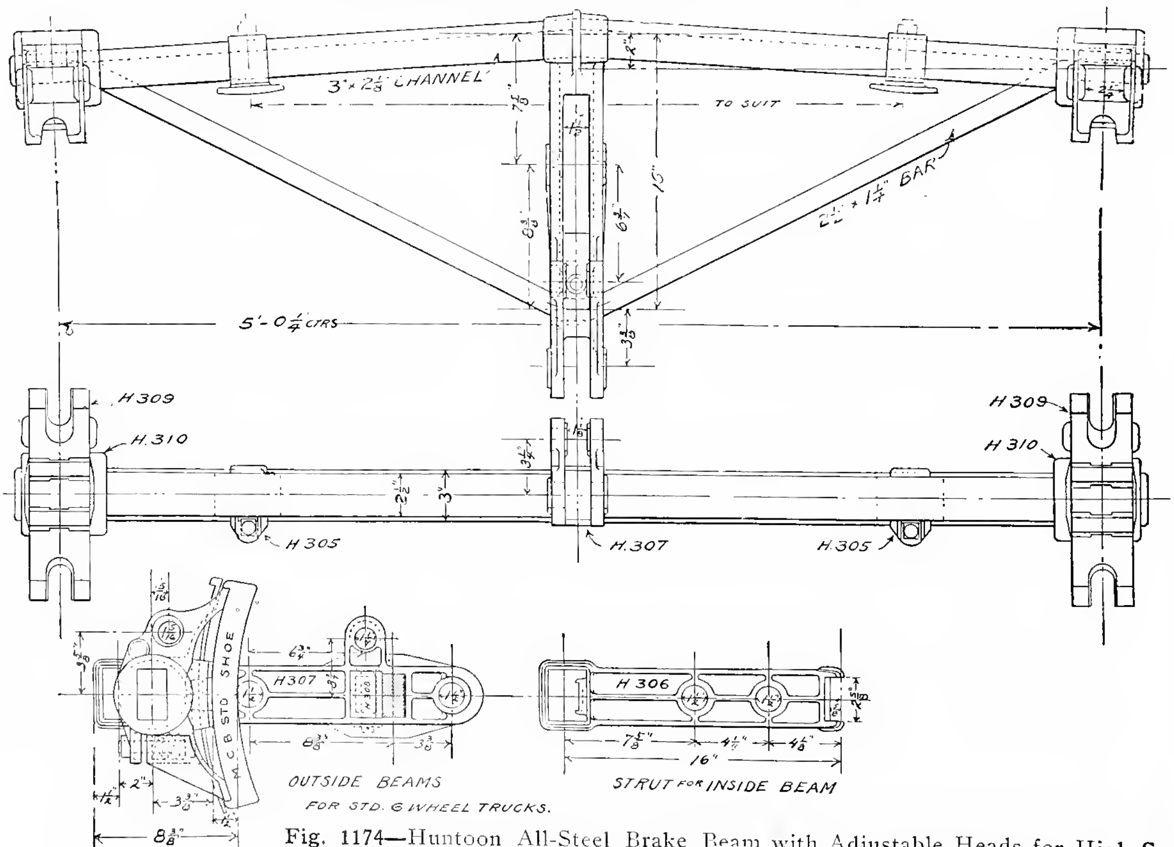


Fig. 1174—Huntoon All-Steel Brake Beam with Adjustable Heads for High Speed Service. Joliet Ra

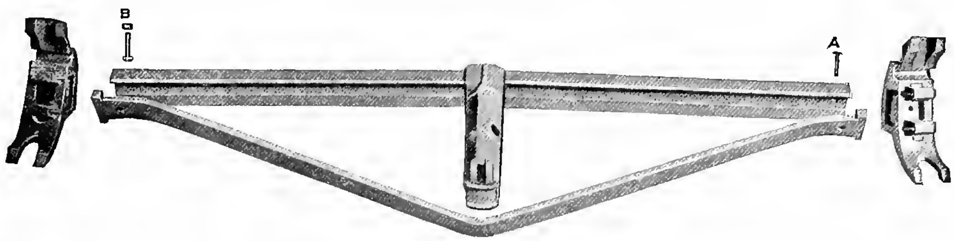


Fig. 1175—Huntoon Brake Beam with Heads Detached. Joliet Railway Supply Company.

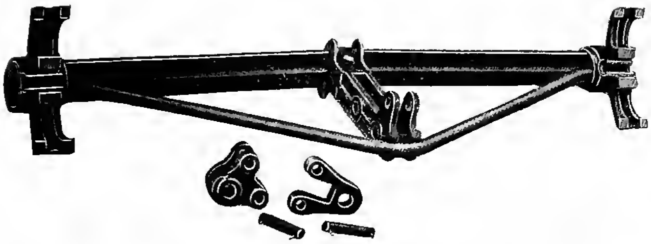


Fig. 1176—Davis Solid Truss High Speed Brake Beam No. 4 with F Adjustable Head Loop Hanger. Davis Solid Truss Brake Beam Company.

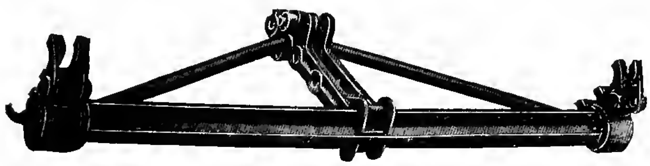


Fig. 1177—Davis Solid Truss High Speed Brake Beam No. 4 with D Adjustable Head, Single Link Hanger.

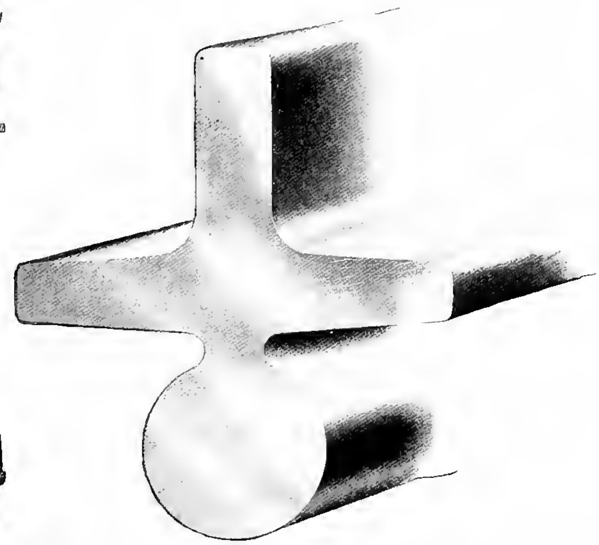


Fig. 1178—Detail of Davis Brake Beam Section.

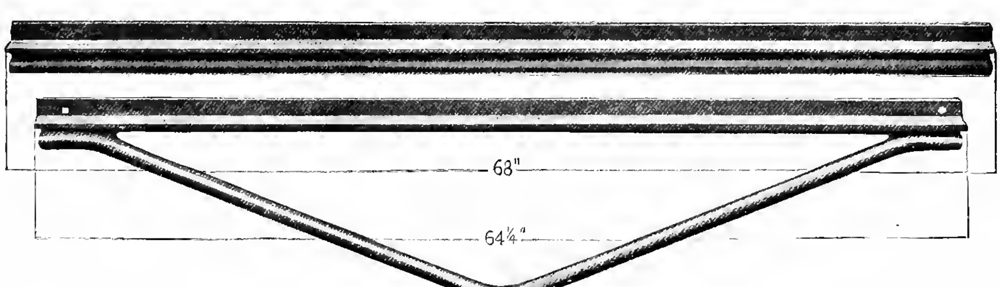


Fig. 1179—Method of Manufacture of Davis Solid Truss Brake Beam.

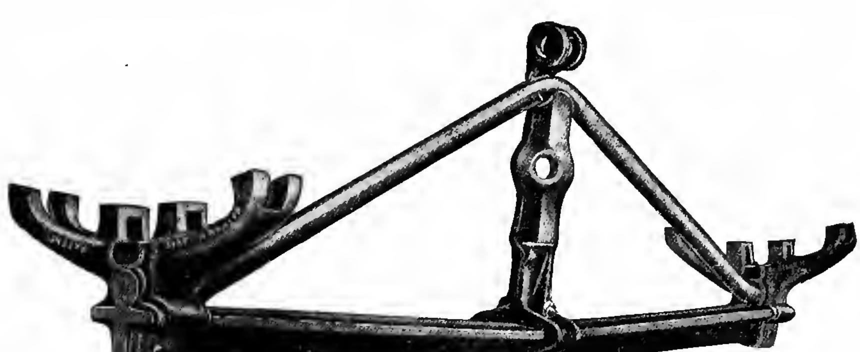


Fig. 1180—Davis Solid Truss Brake Beam No. 3, for 50-Ton Capacity Freight Cars. Davis Solid Truss Brake Beam Company.

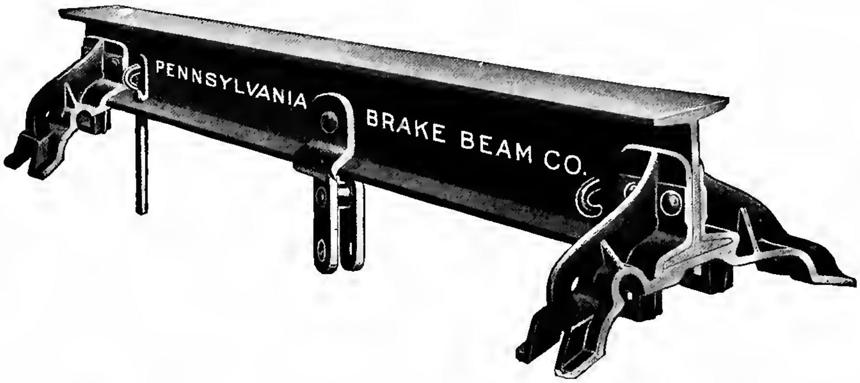


Fig. 1181—Standard I-Beam Brake Beam with Drop Forged Fulcrum

Fig. 1182—Standard Deck Beam Brake Beam with Malleable Iron Fulcrum.

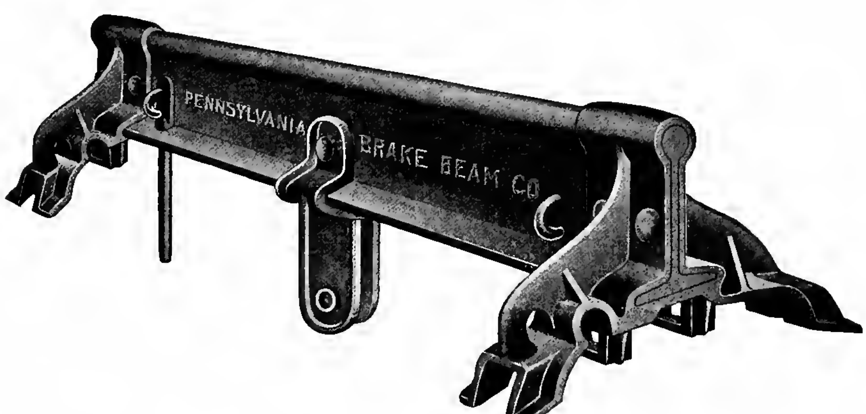


Fig. 1183—Standard Deck Beam Brake Beam with Drop Forged Fulcrum.

Fig. 1184—Special Combination Deck and I-Beam Section Brake Beam with Drop Forged **Fulcrum.**
Pennsylvania Brake Beam Company.

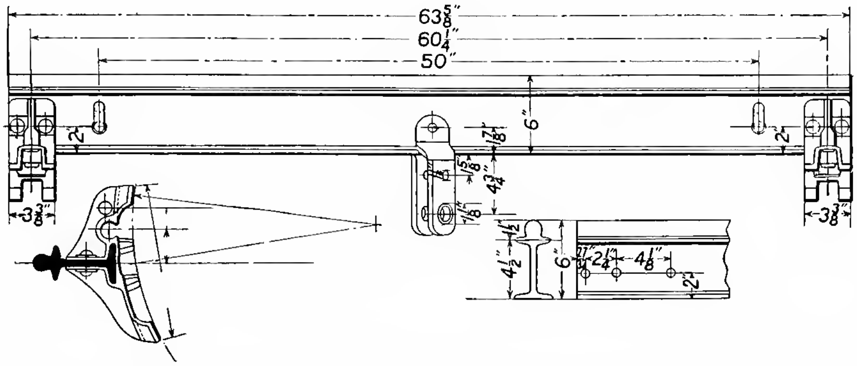


Fig. 1185—Special Combination Deck and I-Beam Section Brake Beam for Heavy Freight Service. Pennsylvania Brake Beam Company.

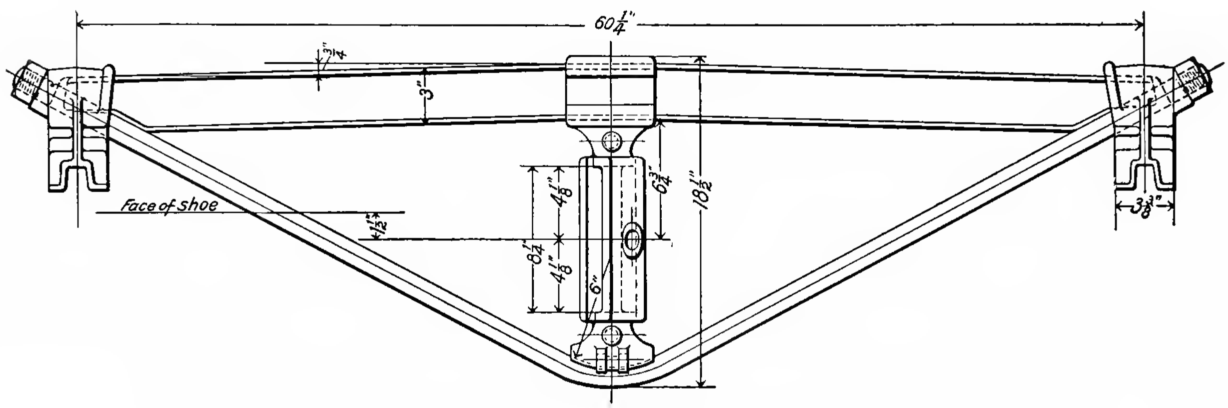


Fig. 1186—Trussed Brake Beam. Pennsylvania Brake Beam Company.

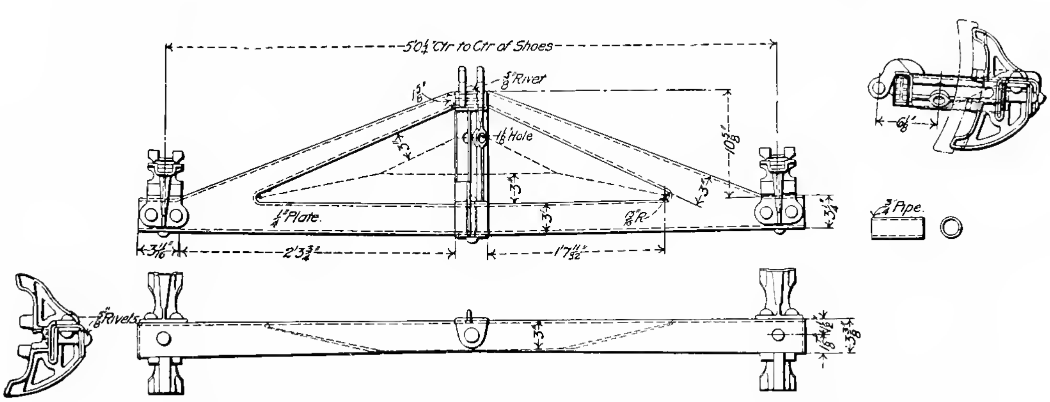


Fig. 1187—Pressed Steel Brake Beam. Pressed Steel Car Company.

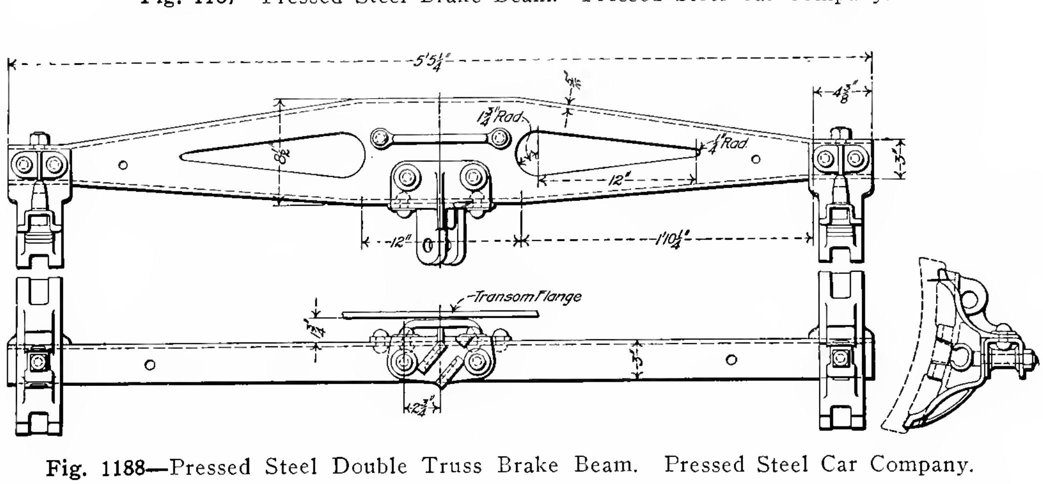


Fig. 1188—Pressed Steel Double Truss Brake Beam. Pressed Steel Car Company.

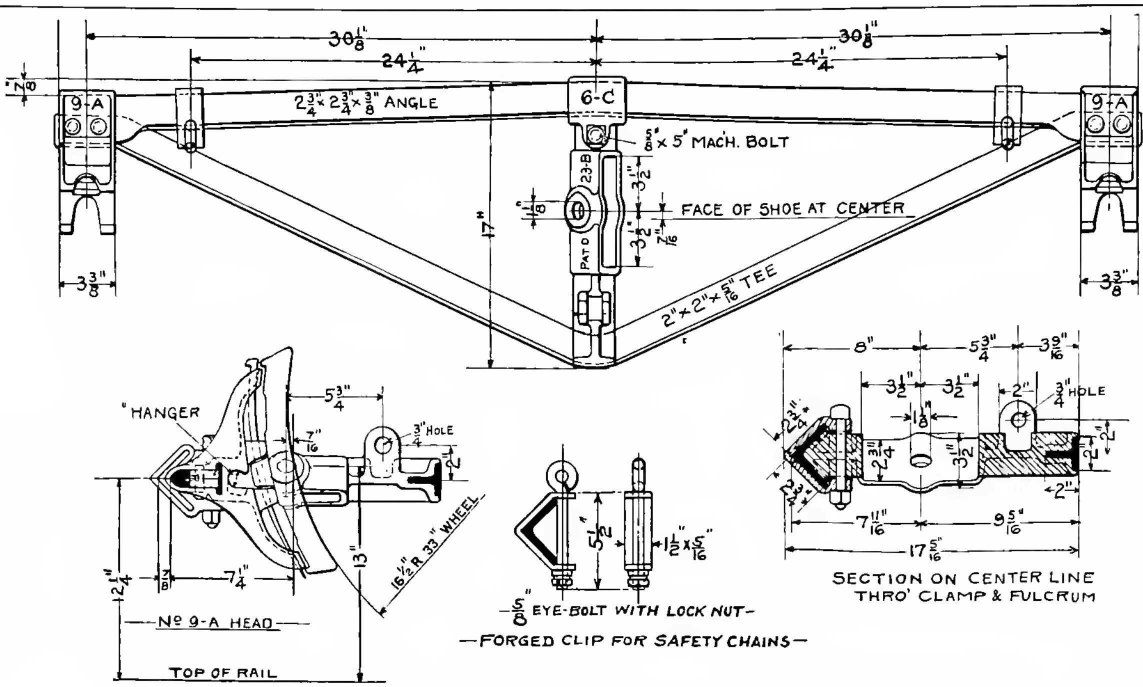


Fig. 1189—Waycott Freight Brake Beam. Damascus Brake Beam Company.

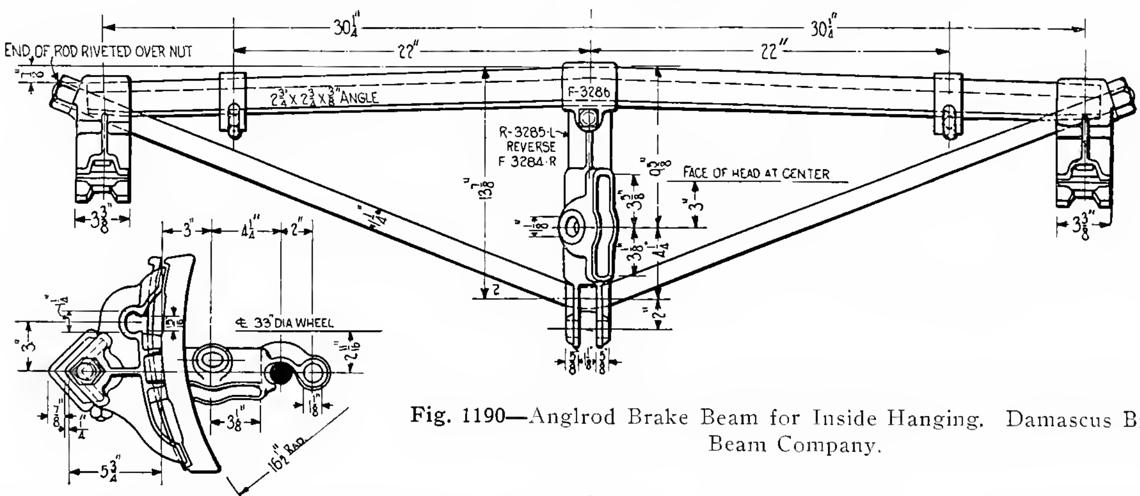


Fig. 1190—Anglrod Brake Beam for Inside Hanging. Damascus Brake Beam Company.

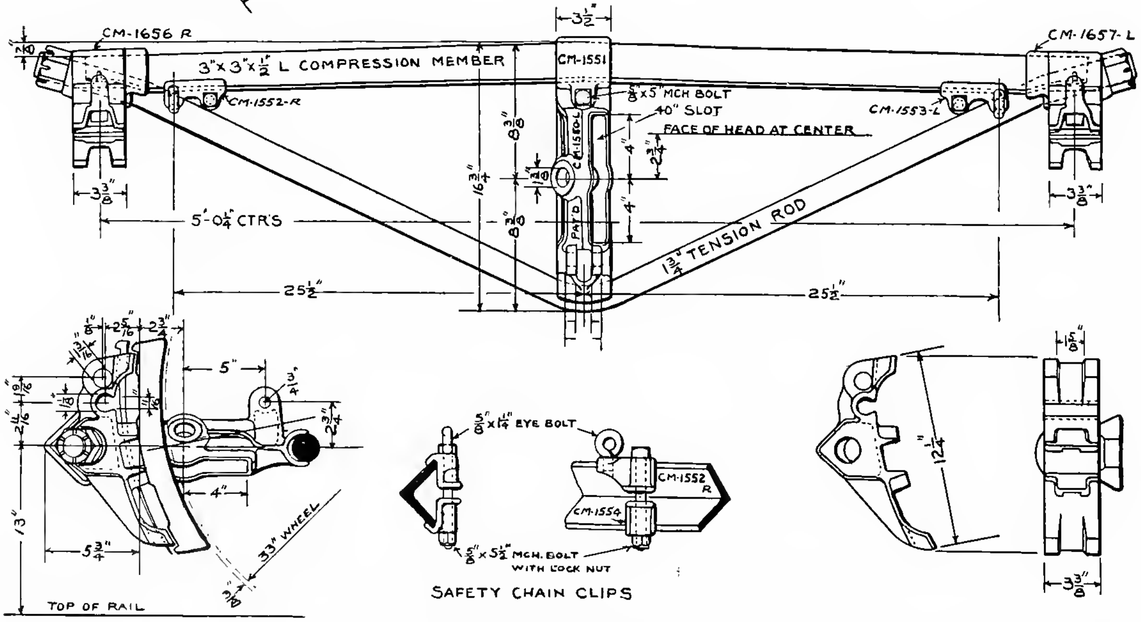


Fig. 1191—Waycott Brake Beam with Rigid Heads for High Speed Four-Wheel Trucks. Damascus Brake Beam Company.

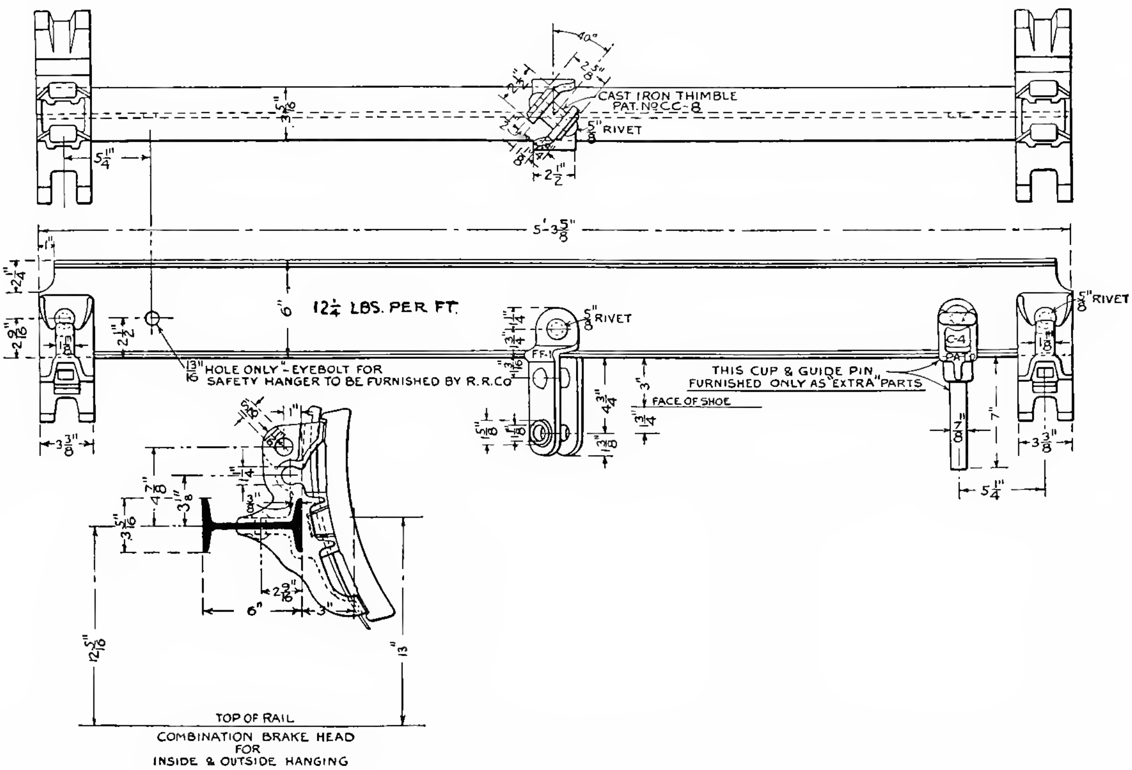


Fig. 1192—Damascus Brake Beam for Inside or Outside Hanging. Damascus Brake Beam Company.

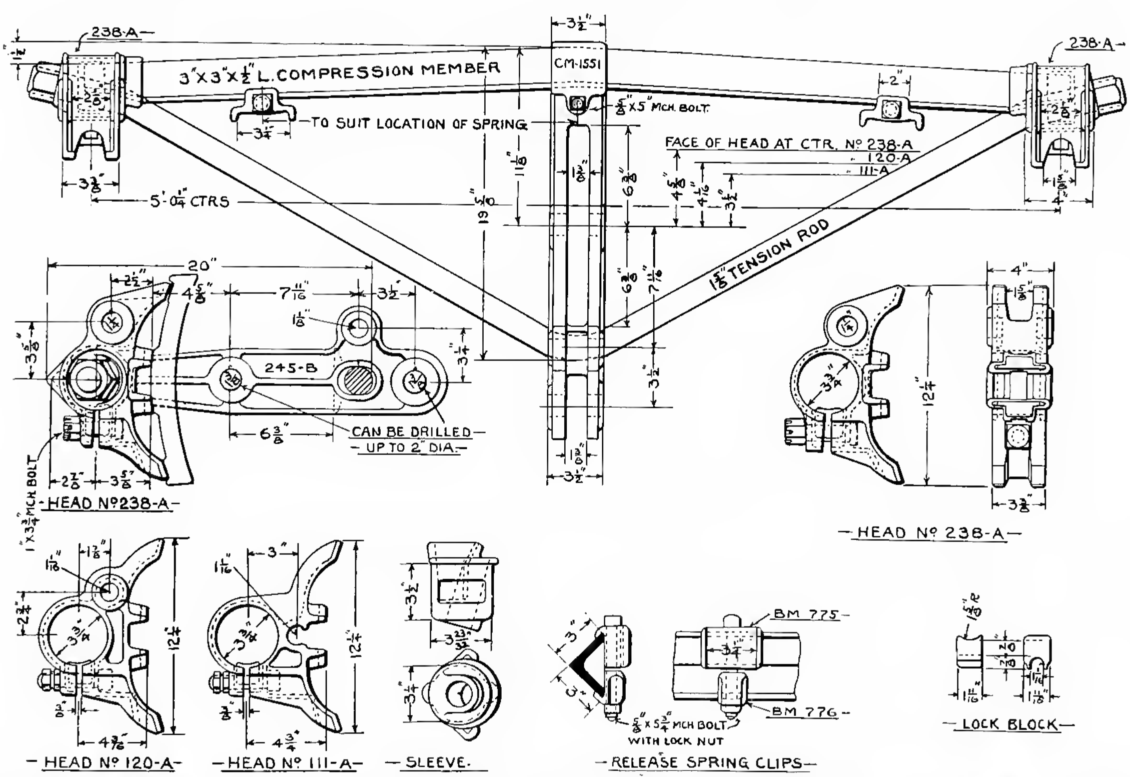


Fig. 1193—Waycott Special Brake Beam with Adjustable Heads for High Speed Six-Wheel Trucks. Damascus Brake Beam Company.

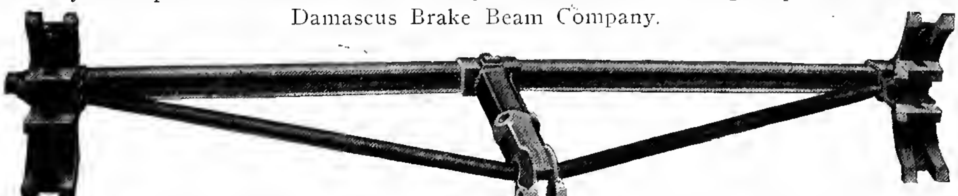


Fig. 1194—Creco Standard Freight Brake Beam. Chicago Railway Equipment Company.

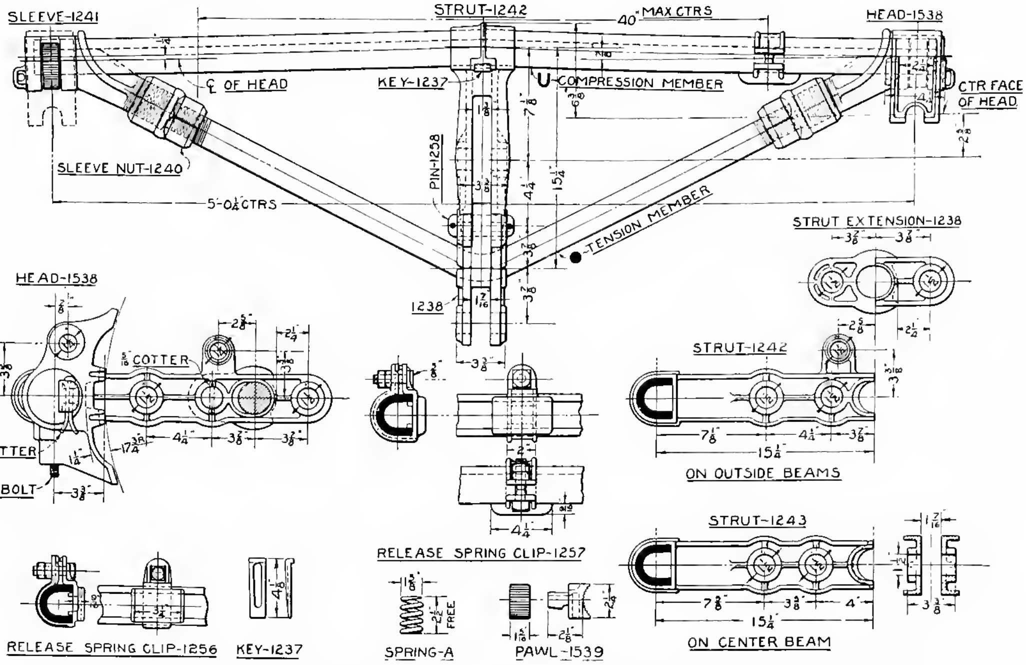


Fig. 1195—P C Creco Triple Brake Beam for Heavy Service with Six-Wheel Trucks.

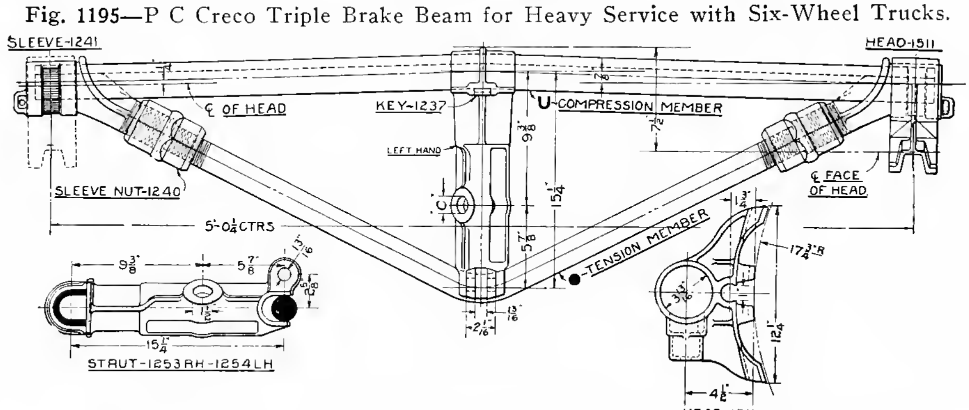


Fig. 1196—P C Creco Brake Beam for Heavy Service with Four-Wheel Trucks.

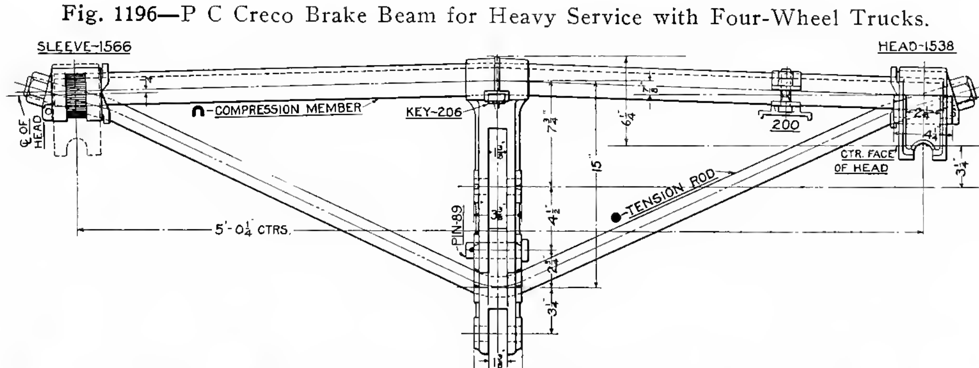


Fig. 1197—Creco Triple Brake Beam for High Speed Six-Wheel Trucks.

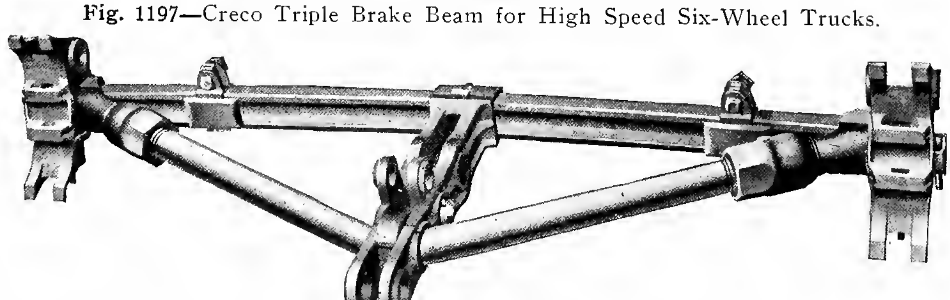


Fig. 1198—P C Creco Triple Brake Beam.
Chicago Railway Equipment Company.

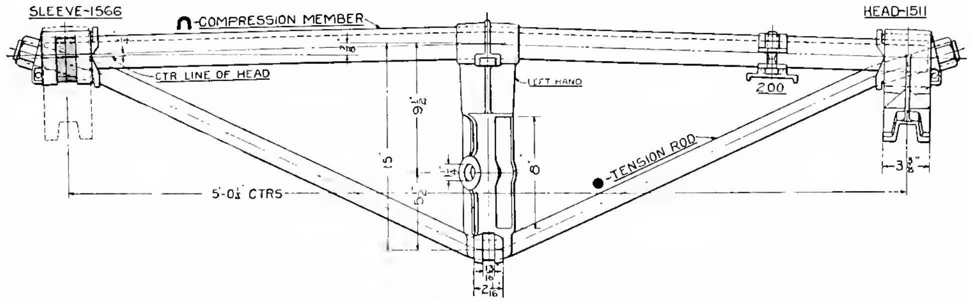


Fig. 1199—Creco Double Brake Beam for Four-Wheel Passenger Trucks.

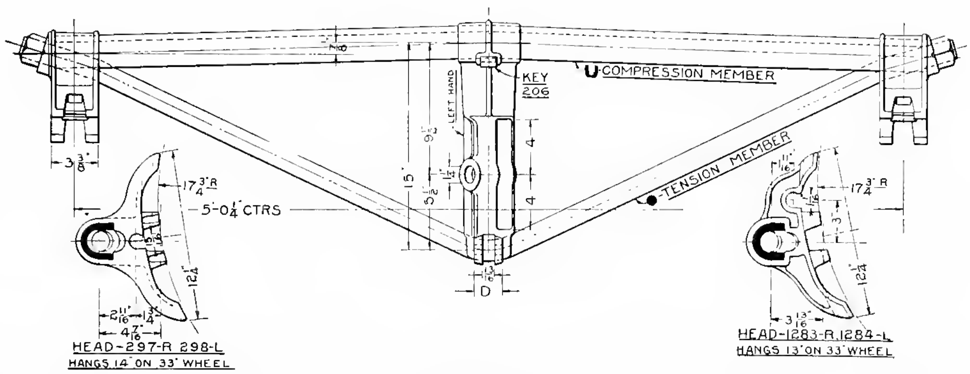
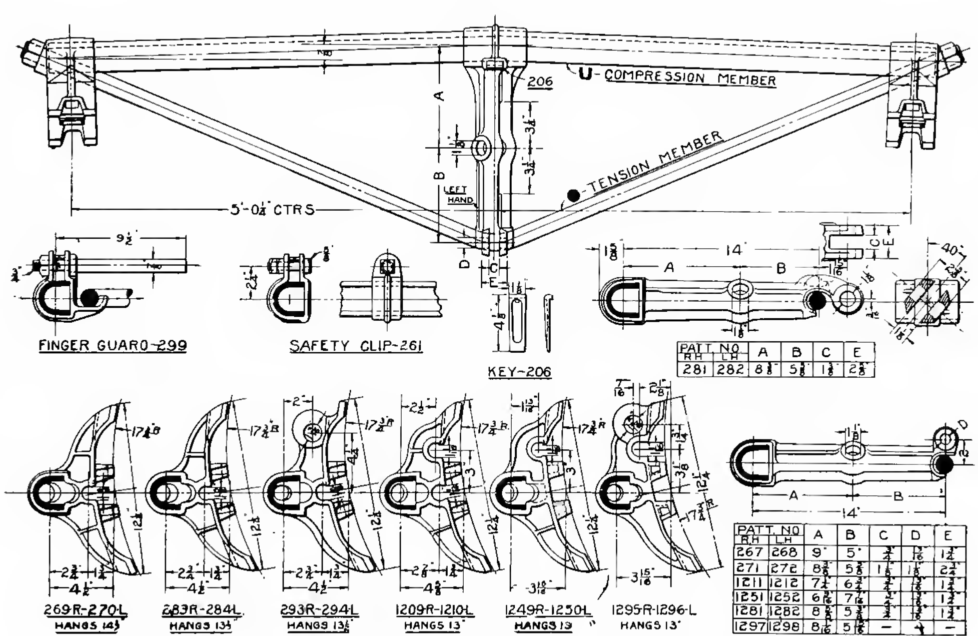


Fig. 1200—E L Creco Brake Beam for Use with Westinghouse Empty and Load Brake for Heavy Freight Service.



PATT. NO. R.H.	PATT. NO. L.H.	A	B	C	E
281	282	8⅜"	5⅜"	1⅜"	2⅜"

PATT. NO. R.H.	PATT. NO. L.H.	A	B	C	D	E
267	268	9"	5"	¾"	3/16"	1¼"
271	272	8⅝"	5⅜"	1⅛"	1⅛"	2¼"
1211	1212	7¼"	6¾"	¾"	13/16"	1¼"
1251	1252	6 9/16"	7 7/16"	¾"	13/16"	1¼"
1281	1282	8⅝"	5⅜"	¾"	13/16"	1¼"
1297	1298	8 1/16"	5 15/16"	—	¼"	—

Fig. 1201—Creco Brake Beam for Heavy Freight Service.

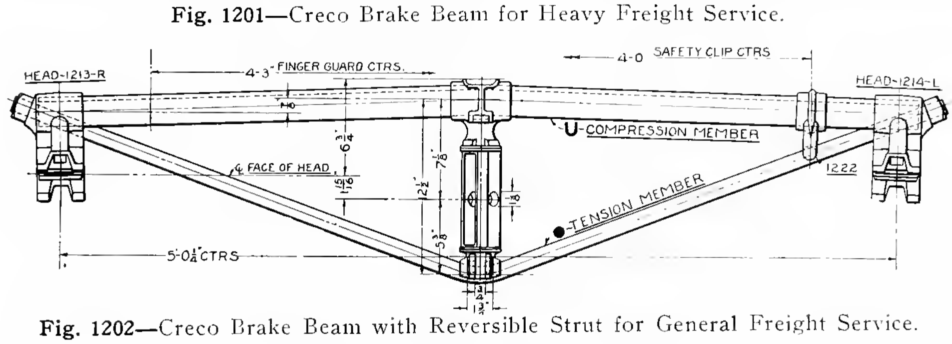
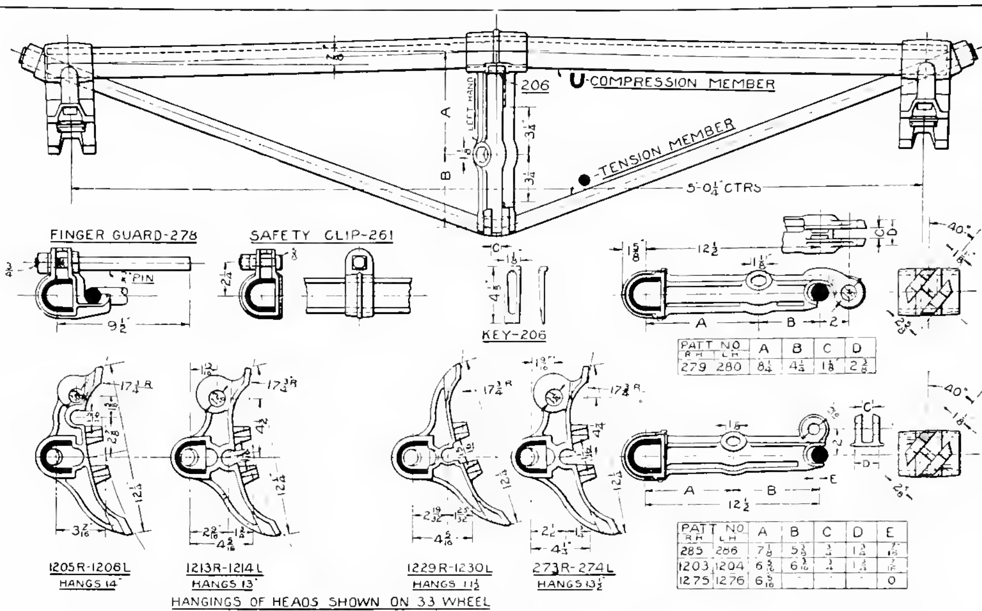


Fig. 1202—Creco Brake Beam with Reversible Strut for General Freight Service.

Chicago Railway Equipment Company.



PATT NO R H	PATT NO L H	A	B	C	D
279	280	8¼	4¼	1⅛	2⅜

PATT NO R H	PATT NO L H	A	B	C	D	E
285	286	7⅛	5⅜	¾	1¾	7/16
1203	1204	6 5/16	6 3/16	¾	1¾	7/16
1275	1276	6 5/16	-	-	-	0

Fig. 1203—Creco Freight Brake Beam for M. C. B. No. 1 and No. 2 Capacities.

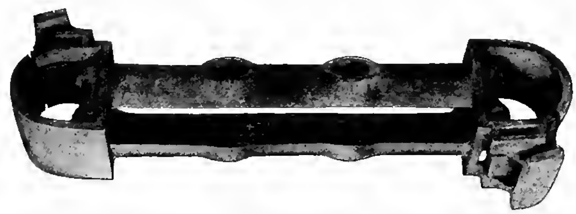


Fig. 1204—Creco Duplex Strut for Brake Beams.

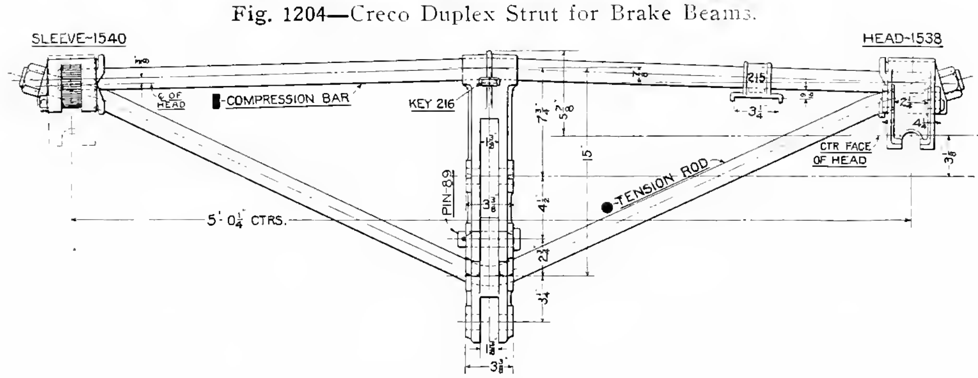


Fig. 1205—Diamond Special Triple Brake Beam for High Speed Six-Wheel Trucks.

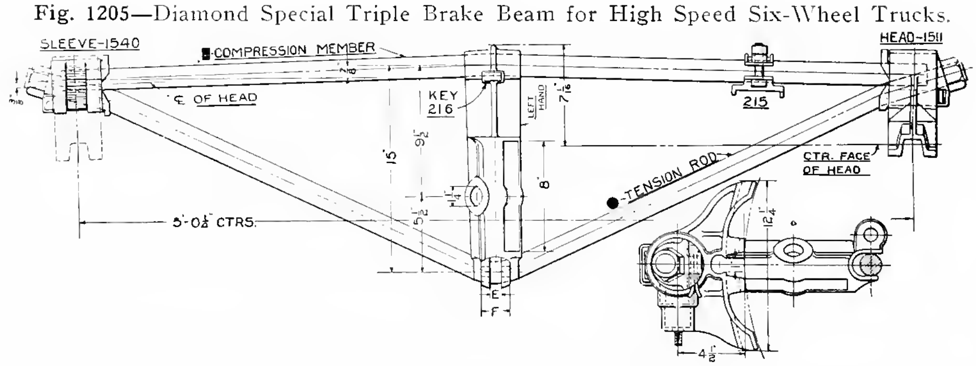


Fig. 1206—Diamond Special Double Brake Beam for High Speed Four-Wheel Trucks.

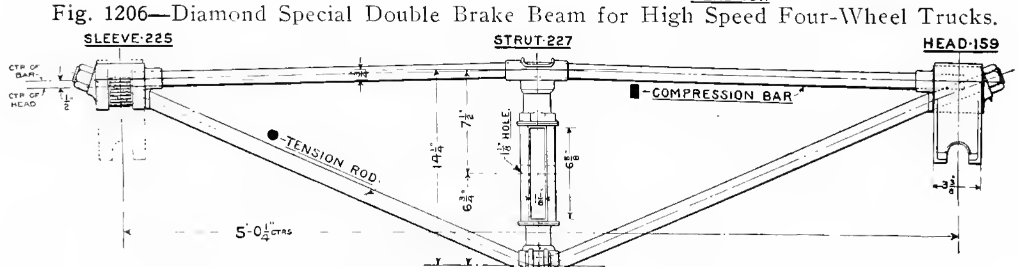


Fig. 1207—Diamond Adjustable Brake Beam for Heavy Freight Service.
Chicago Railway Equipment Company.

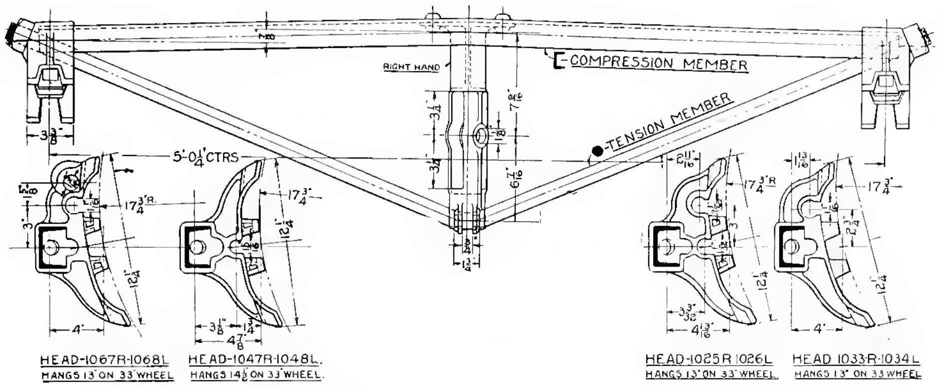


Fig. 1208—Drexel Freight Brake Beam for M. C. B. No. 2 Capacity.

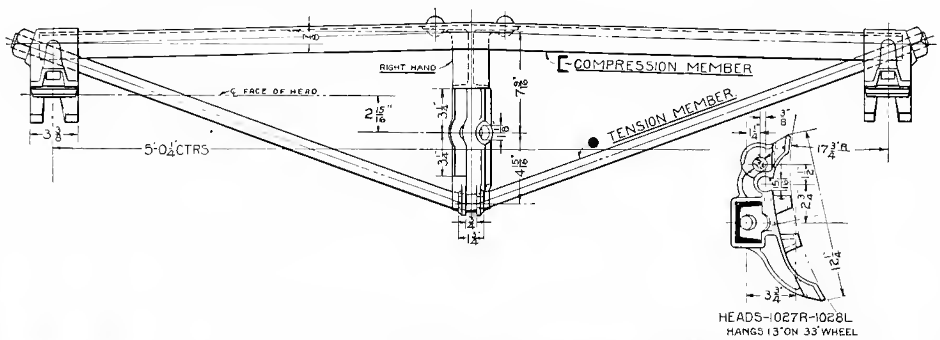


Fig. 1209—Drexel Freight Brake Beam with Riveted Strut for M. C. B. No. 1 Capacity.

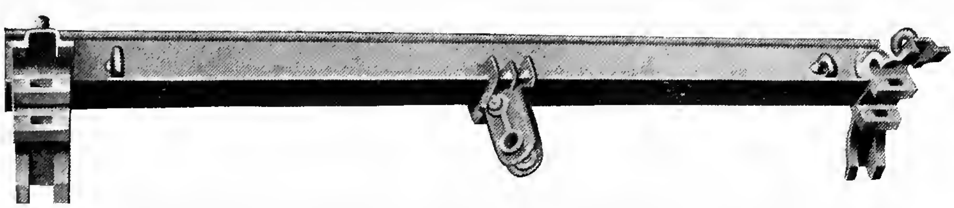


Fig. 1210—Drexel Brake Beam for Heavy Freight Service.

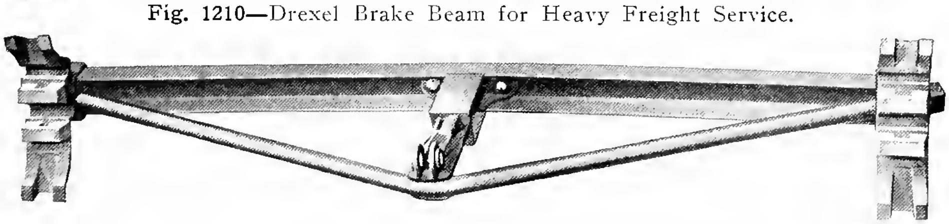


Fig. 1211—Sterlingworth Freight Brake Beam.

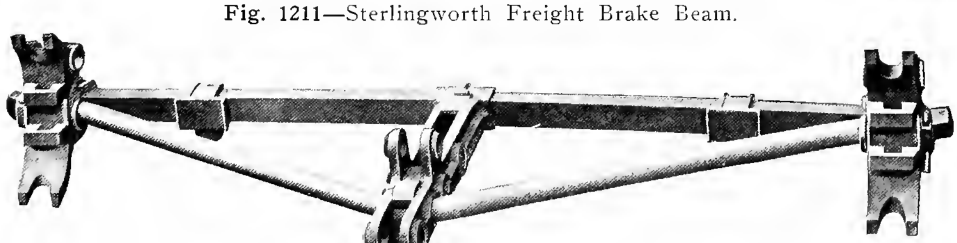


Fig. 1212—Diamond Special Brake Beam for High Speed Six-Wheel Trucks.

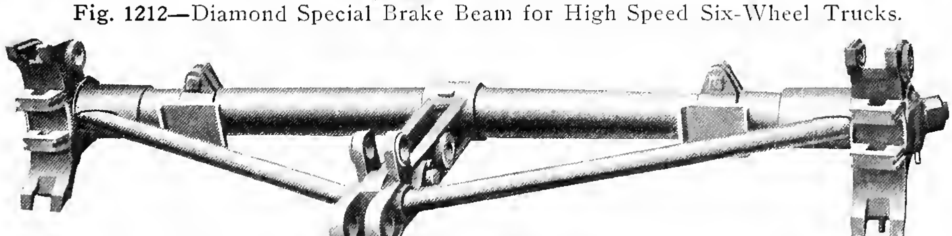


Fig. 1213—National Hollow Brake Beam for Six-Wheel Trucks.

Chicago Railway Equipment Company.

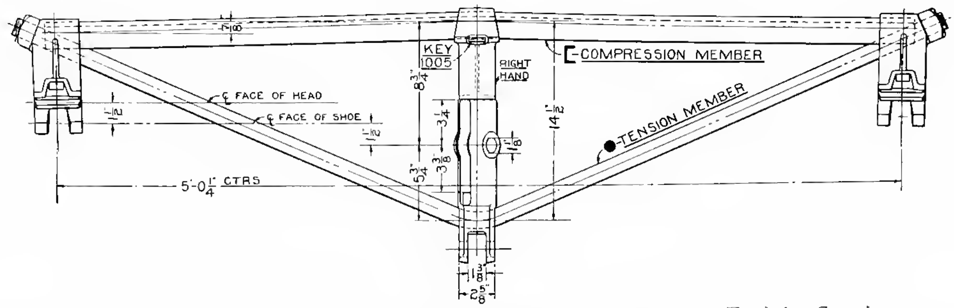


Fig. 1214—Drexel Brake Beam with Keyed Strut for Special Freight Service.

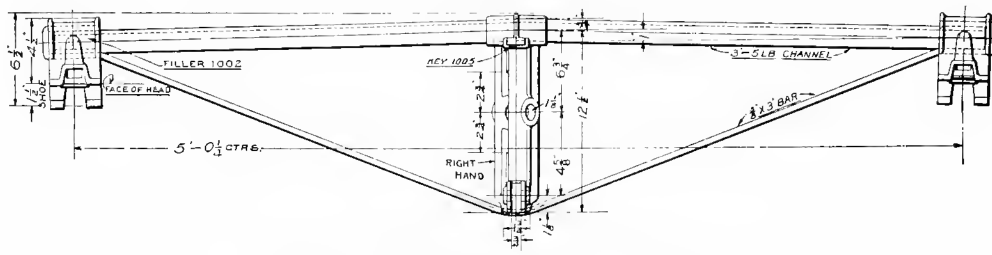


Fig. 1215—Reliance Freight Brake Beam.

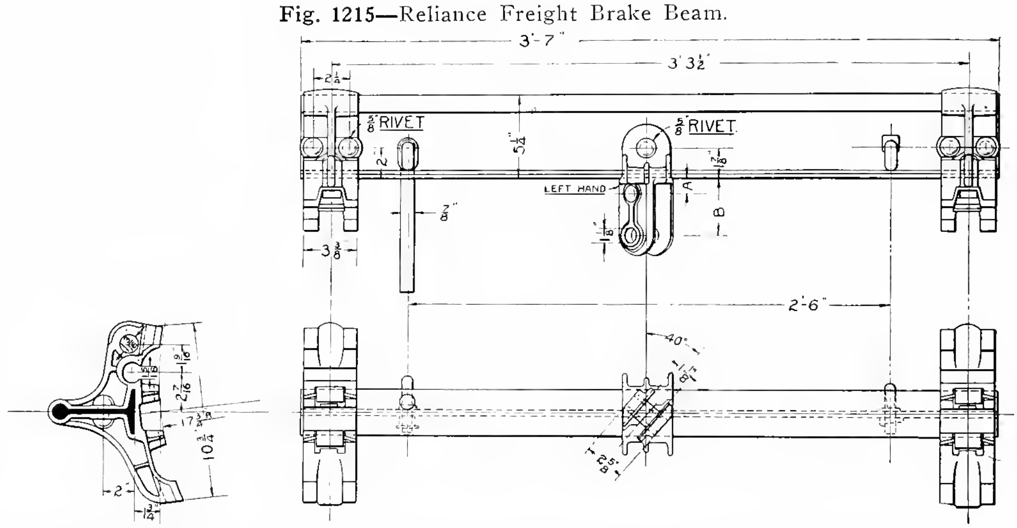


Fig. 1216—Sterlingworth Brake Beam for Narrow Gage Cars.

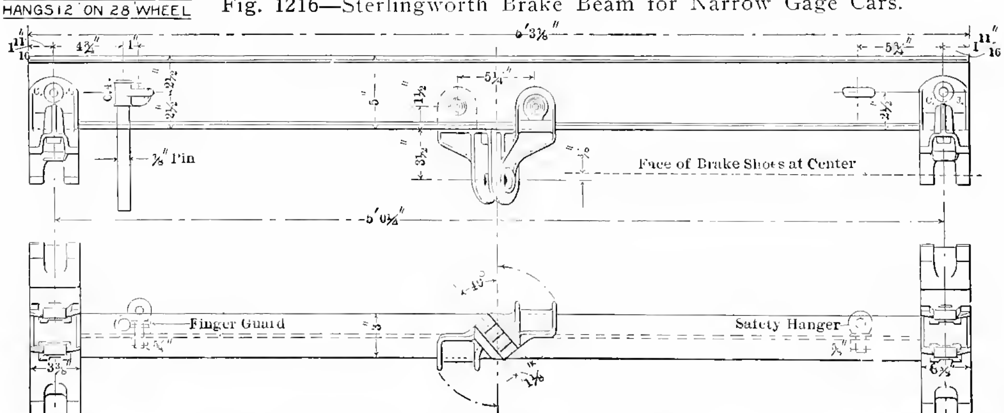


Fig. 1217—Ninety-Six Freight Brake Beam.

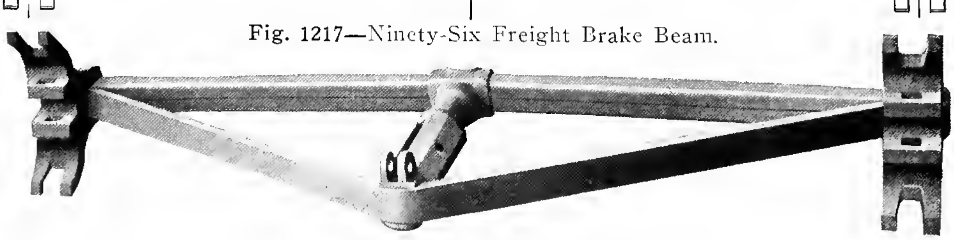


Fig. 1218—Kewanee Brake Beam.
Chicago Railway Equipment Company.

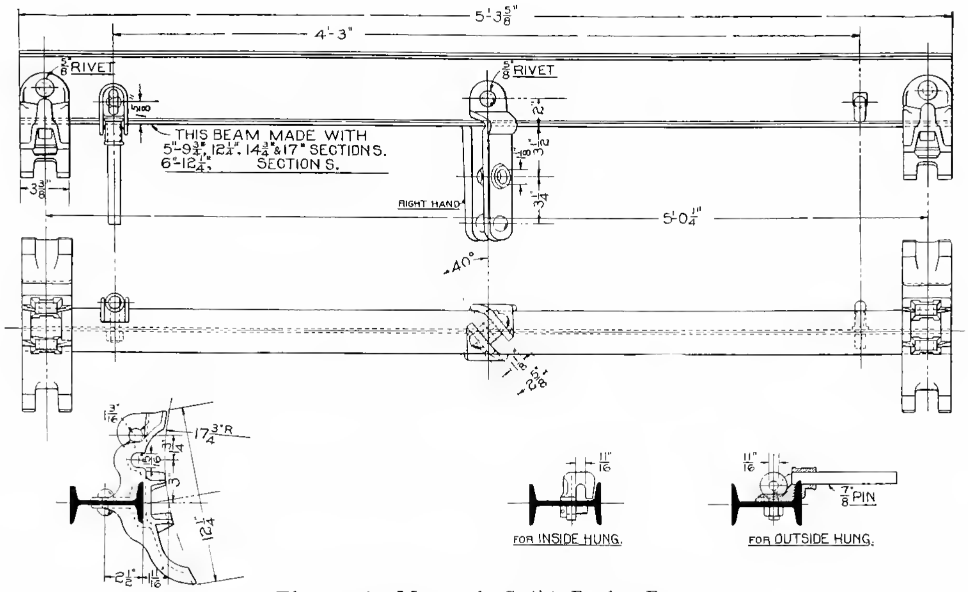


Fig. 1219—Monarch Solid Brake Beam.

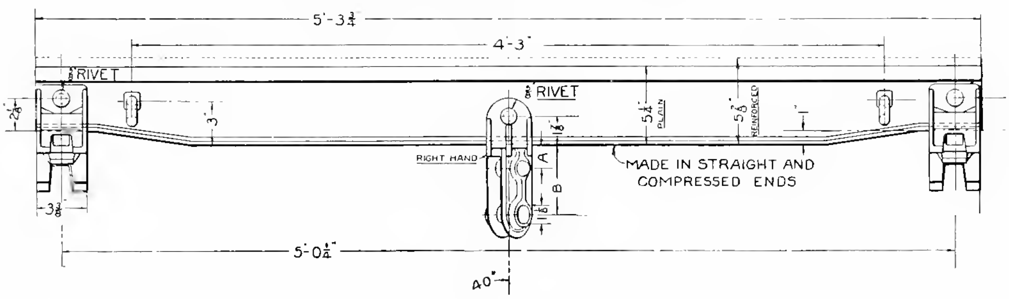


Fig. 1220—Sterlingworth Compressed End Freight Brake Beam.

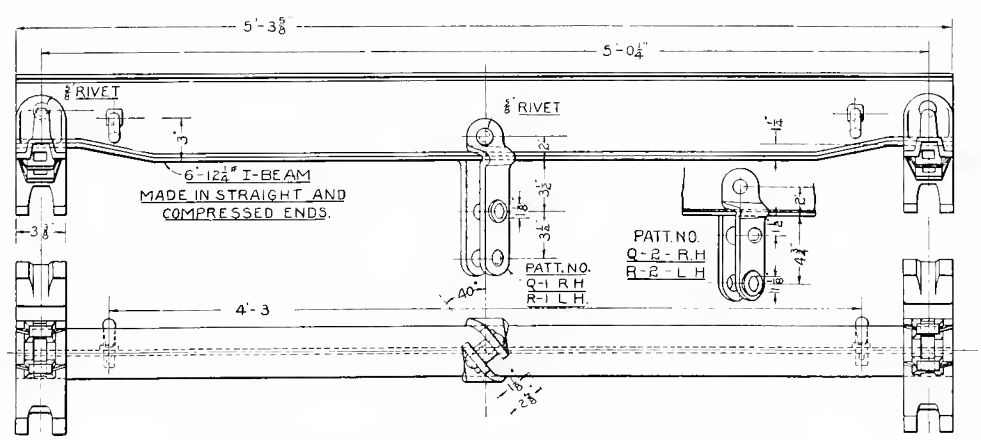


Fig. 1221—Monarch Solid Compressed End Brake Beam.

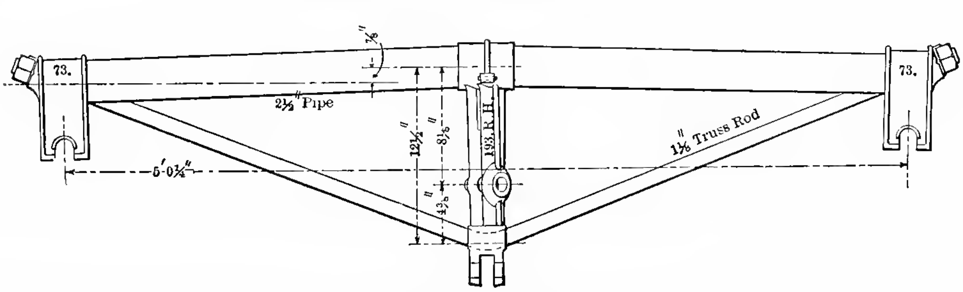


Fig. 1222—National Hollow 2½ in. Brake Beam with Rigid Heads for Heavy Freight Service.

Chicago Railway Equipment Company.

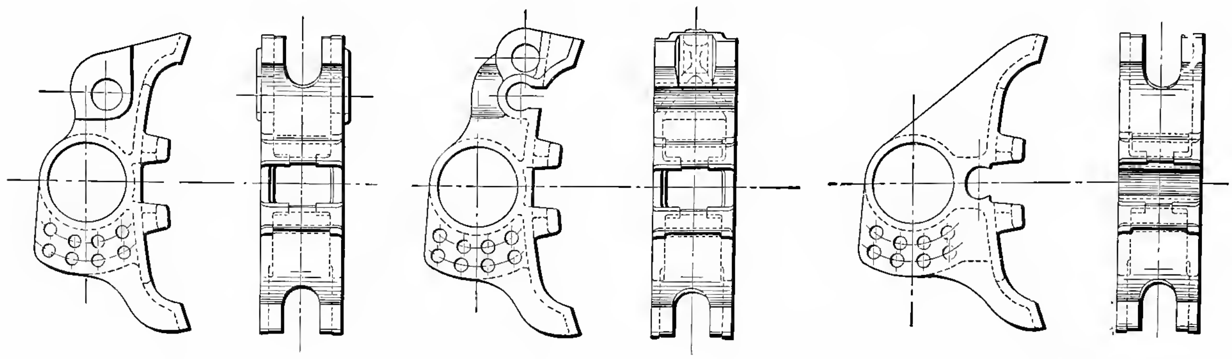


Fig. 1223—Adjustable Brake Heads for Vulcan and Hercules Brake Beams. Simplex Railway Appliance Company.

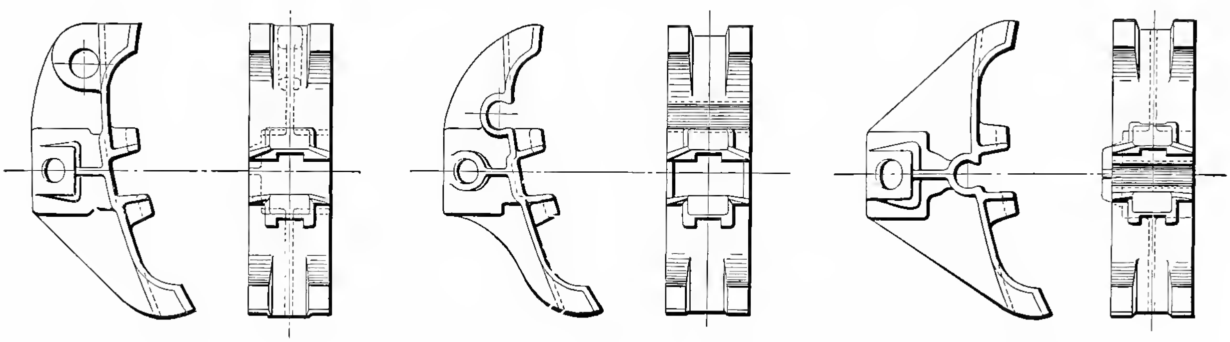


Fig. 1224—Brake Heads for Ajax Brake Beams. Simplex Railway Appliance Company.

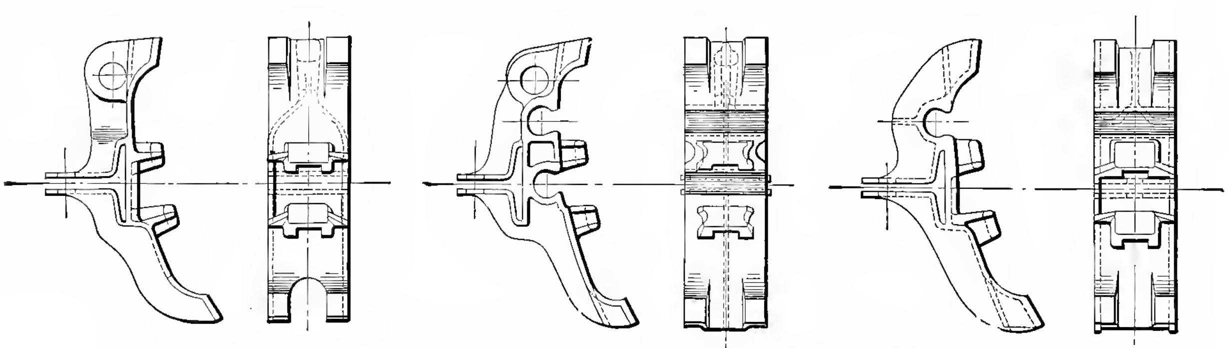


Fig. 1225—Brake Heads for Acme Brake Beams. Simplex Railway Appliance Company.

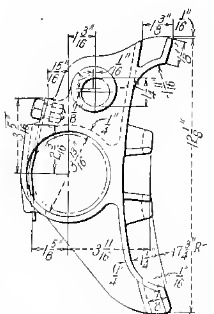


Fig. 1226—Adjustable Brake Head. Buffalo Brake Beam Company.

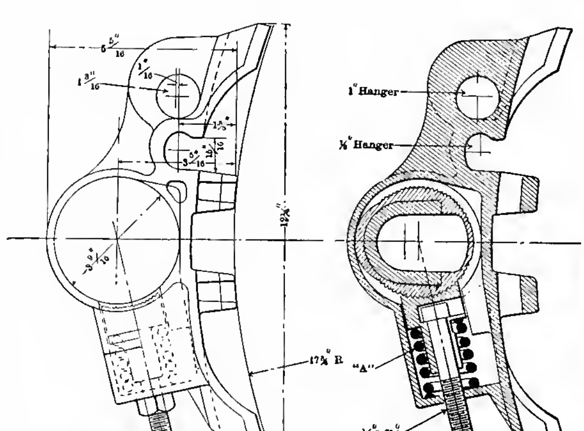


Fig. 1227—Self-Adjusting Head and Sleeve for Creco Freight Brake Beam. Chicago Railway Equipment Company.

Fig. 1228—Sliding Chair for Creco Third Point Support. Chicago Railway Equipment Company.

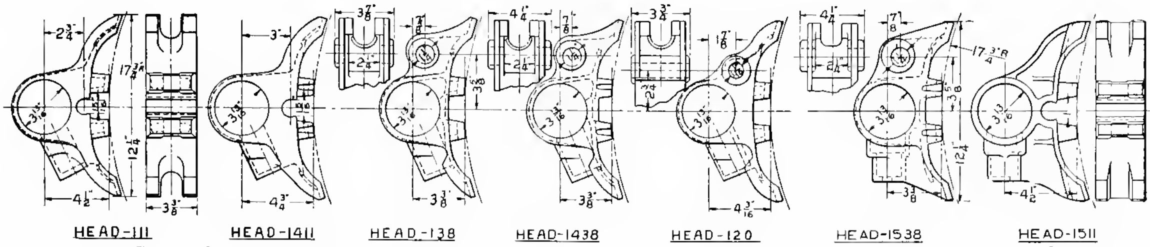


Fig. 1229—Creco Standard Automatic Adjustable Brake Heads. Chicago Railway Equipment Company.

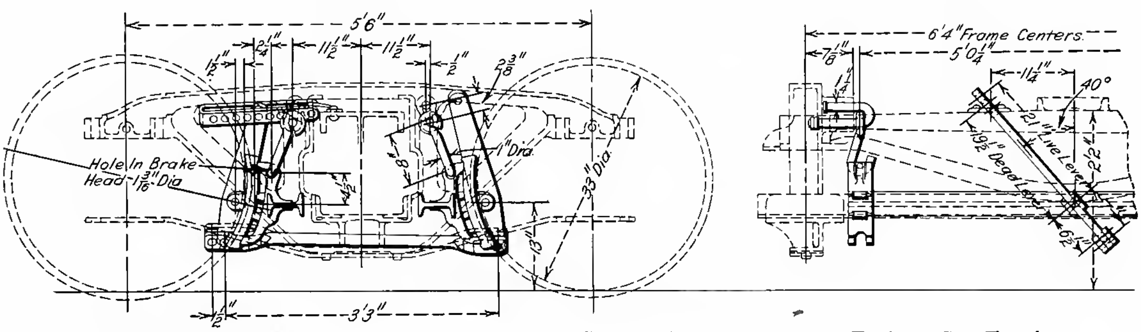


Fig. 1230—Brake Arrangement for New York Central & Hudson River Freight Car Truck.

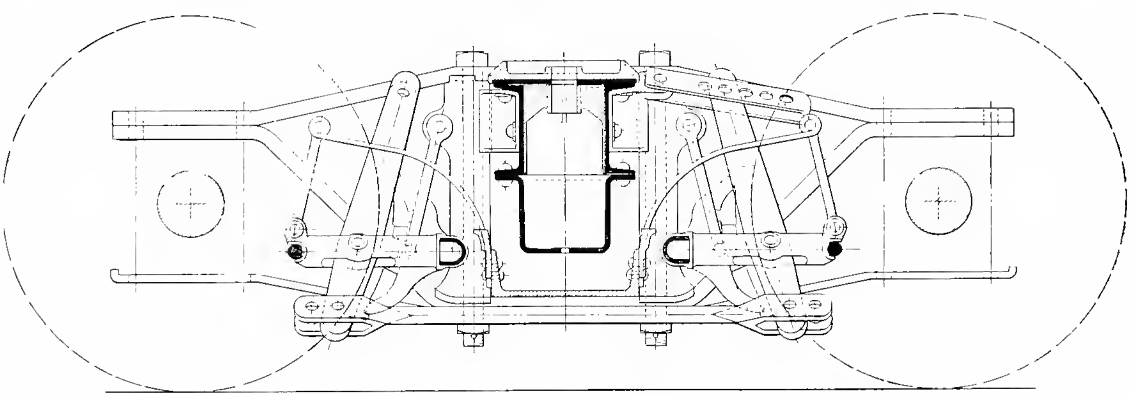


Fig. 1231—Inside Hung Creco Brake Beams Applied to Rigid Diamond Freight Car Truck. Chicago Railway Equipment Company.

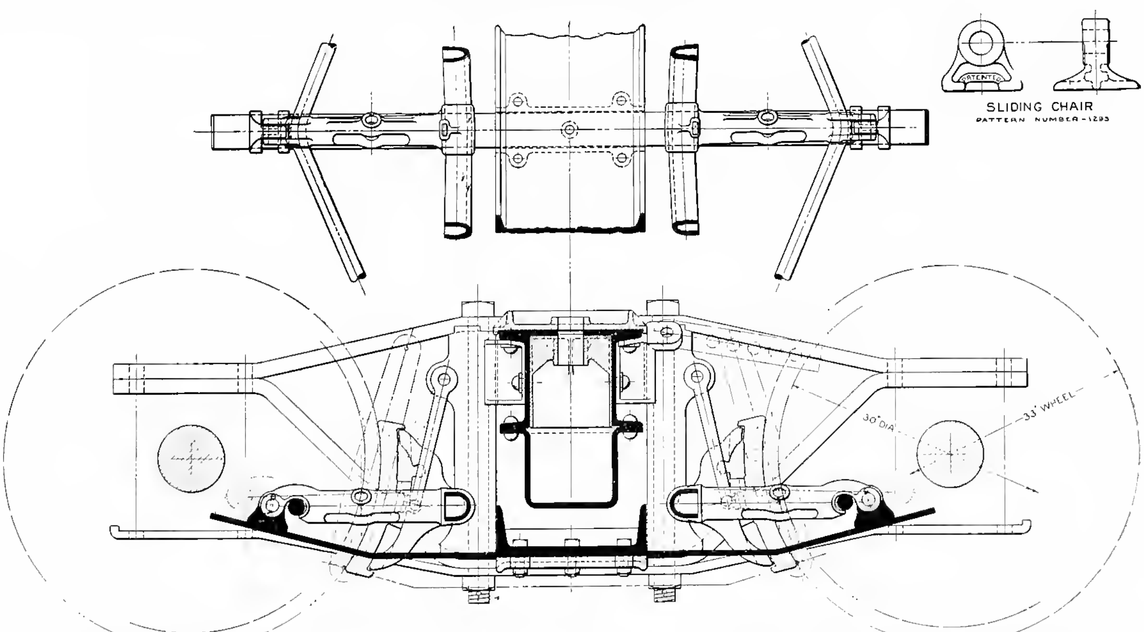


Fig. 1232—Creco Sliding Third Point Support and Safety Device Applied to Rigid Diamond Freight Car Truck. Chicago Railway Equipment Company.

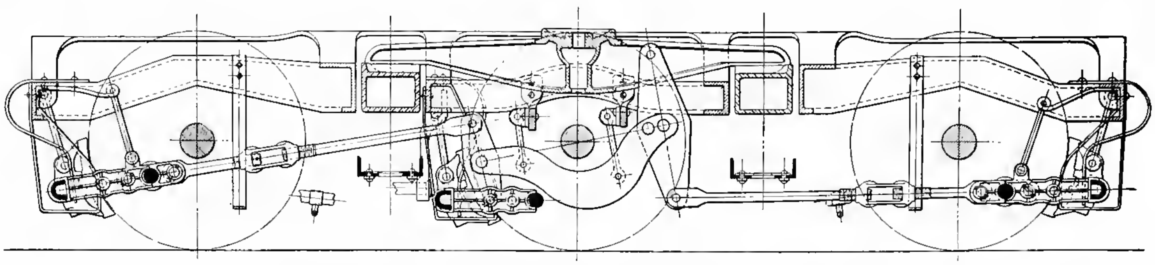


Fig. 1233—Harriman Lines Arrangement of Brake Rigging for Triple Brakes on Six-Wheel Passenger Train Car Trucks. Chicago Railway Equipment Company.

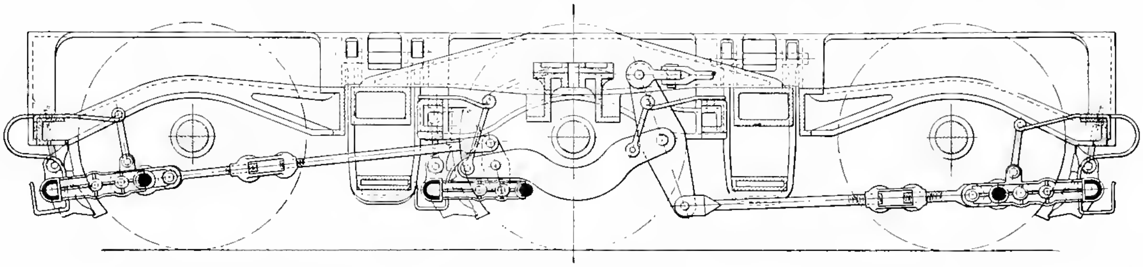


Fig. 1234—Pullman Standard Arrangement of Brake Rigging for All-Steel Six-Wheel Passenger Train Car Trucks. Chicago Railway Equipment Company.

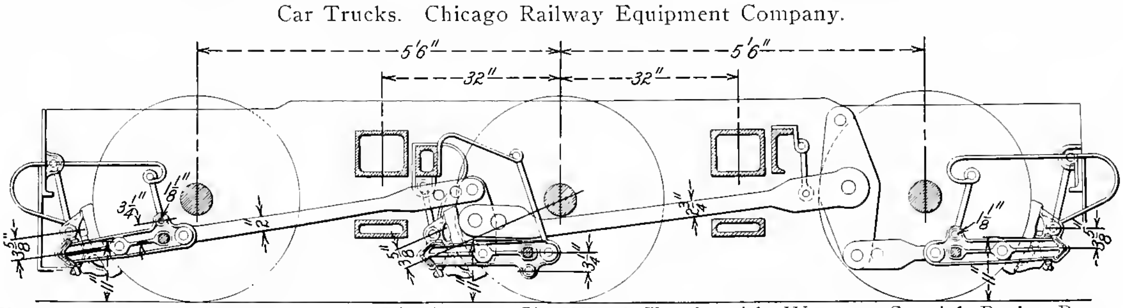


Fig. 1235—Arrangement of Brake Rigging on Six-Wheel Truck with Waycott Special Brake Beams. Damascus Brake Beam Company.

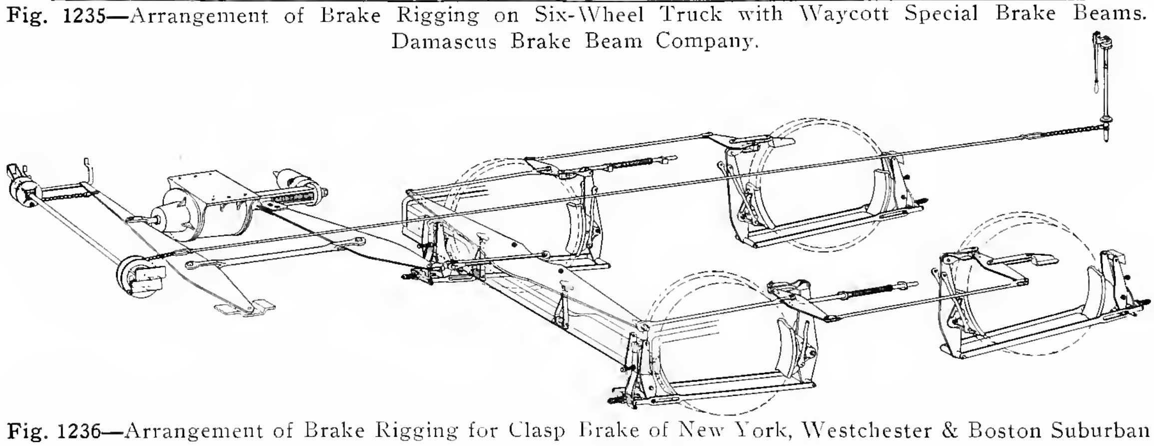
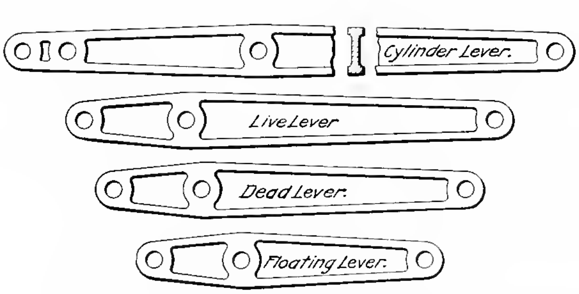


Fig. 1236—Arrangement of Brake Rigging for Clasp Brake of New York, Westchester & Boston Suburban Car Shown in Fig. 189.



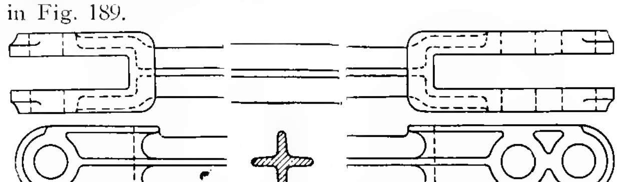


Fig. 1238—Malleable Iron Brake Lever Strut.

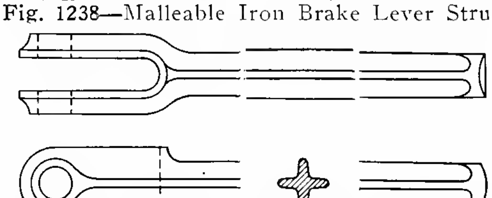


Fig. 1237—Malleable Iron Brake Levers.

Fig. 1239—Malleable Iron Brake Cylinder Push Rod.

National Malleable Castings Company.

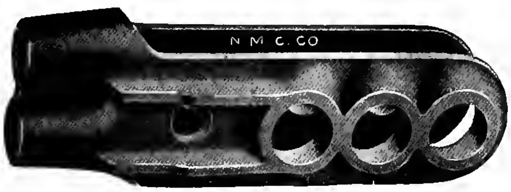


Fig. 1240—Three-Hole Malleable Iron Brake Jaw. (Patented.)

Fig. 1241—One-Hole Malleable Iron Brake Jaw. (Patented.)

Fig. 1242—National Safety Brake Lever. (Patented.)

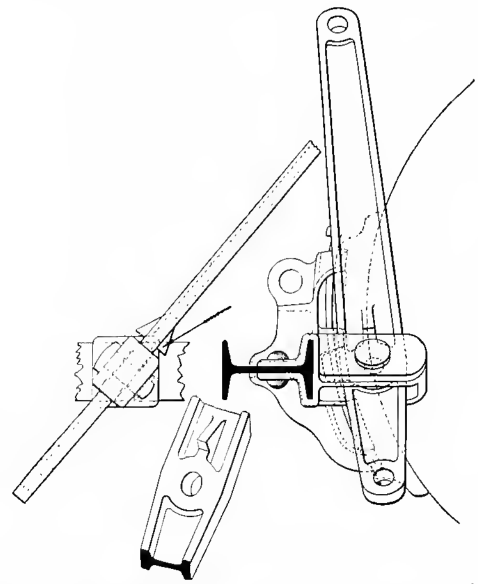


Fig. 1243—National Safety Brake Lever and Application. (Patented.)

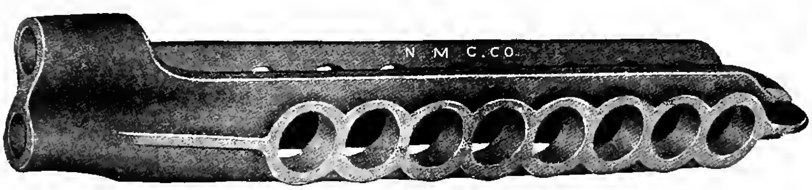


Fig. 1244—Malleable Iron Dead Lever Guide. (Patented.)

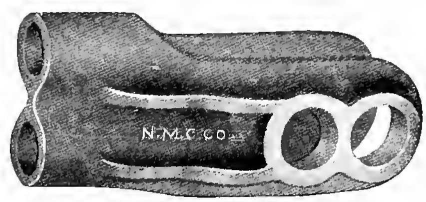


Fig. 1245—Two-Hole Malleable Iron Brake Jaw. (Patented.)

National Malleable Castings Company.

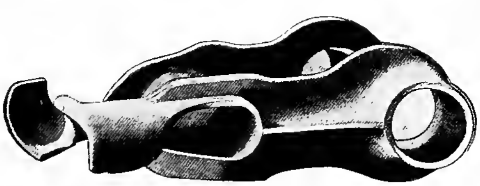


Fig. 1246—Western One-Hole Brake Jaw.

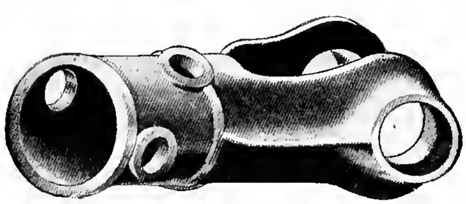


Fig. 1247—One-Hole Malleable Iron Brake Jaw.

Fig. 1248—Western Three-Hole Brake Jaw.

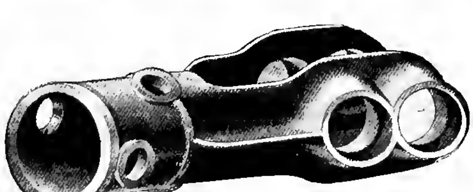


Fig. 1249—Two-Hole Malleable Iron Brake Jaw.

Fig. 1250—Western Dead Lever Guide.

Fig. 1251—Western Bottom Connecting Rod with Center of Extra Heavy Pipe.

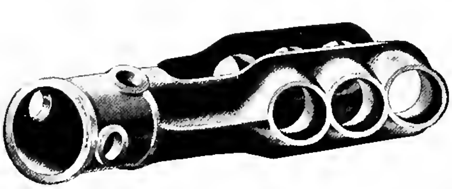


Fig. 1252—Three-Hole Malleable Iron Brake Jaw.

Western Railway Equipment Company.

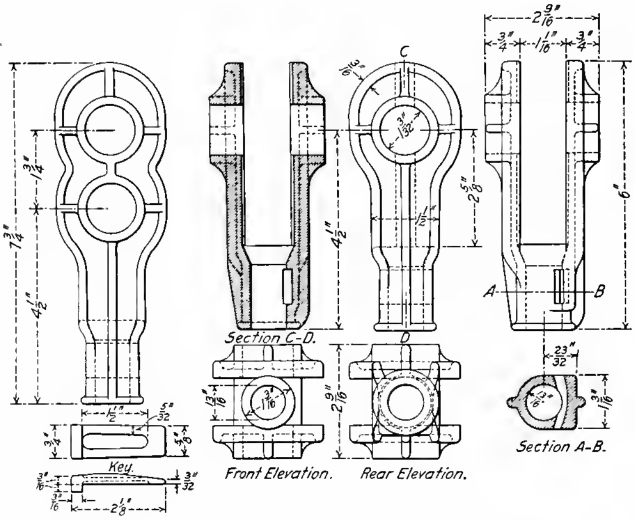


Fig. 1253—Creco Brake Jaw. Chicago Railway Equipment Company.

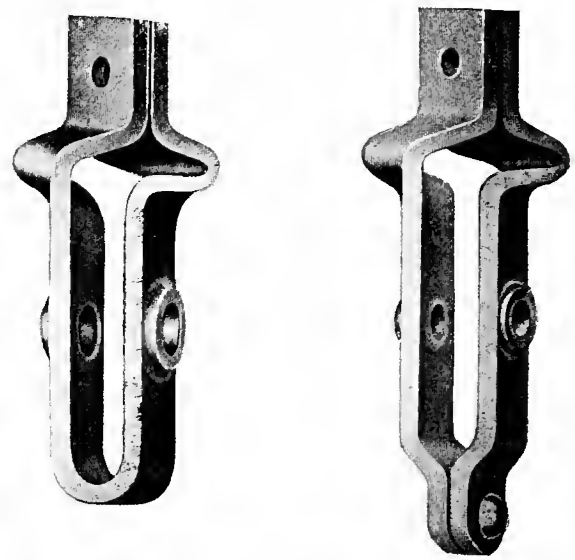


Fig. 1255—One and Two-Piece Forged Brake Beam Fulcrums. Buffalo Brake Beam Company.

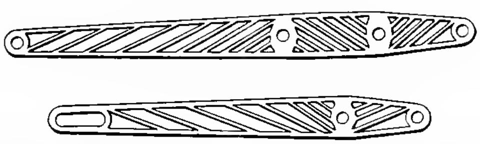


Fig. 1254—Malleable Iron Brake Levers. Dayton Malleable Iron Company.

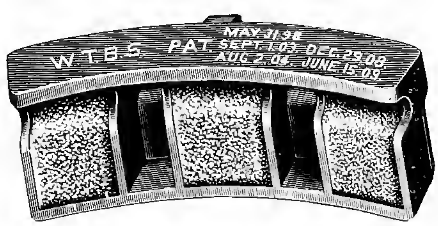


Fig. 1256—Wheel Truing Brake Shoe. Wheel Truing Brake Shoe Company.

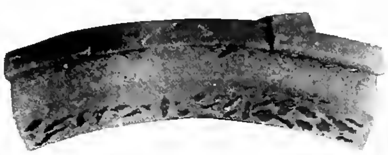


Fig. 1257—Wheel Truing Brake Shoe. American Abrasive Metals Company.

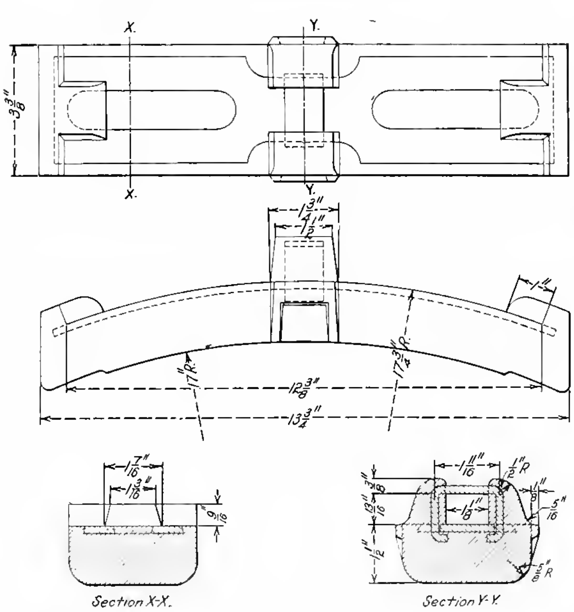


Fig. 1258—New York Central & Hudson River Freight Brake Shoe.

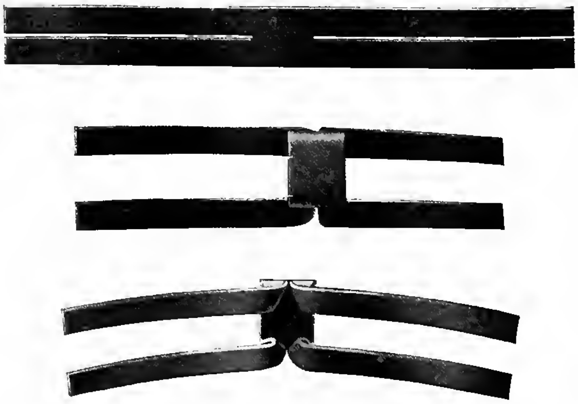
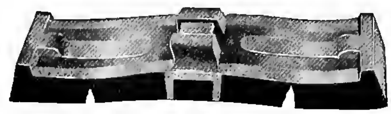
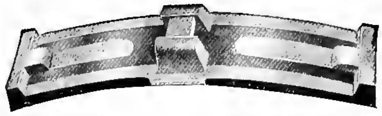


Fig. 1259—Davis Solid Steel Brake Shoe Back. Davis Solid Truss Brake Beam Company.


Showing Reinforcing Steel Back and Lug.


Broken Brake Shoe Held by Steel Back.


Brake Shoe Worn to Steel Back.


Plain Type.

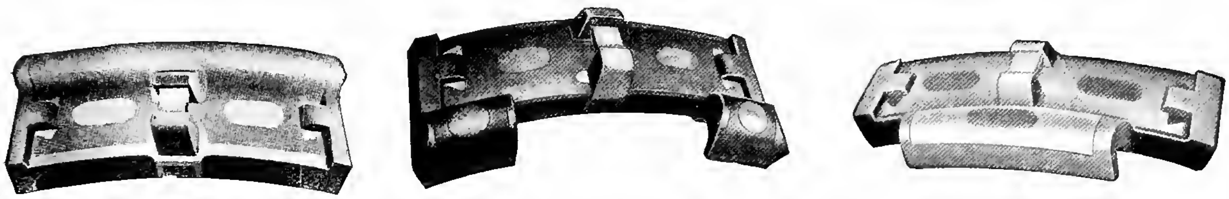

Special Chilled Type.


Congdon Type.

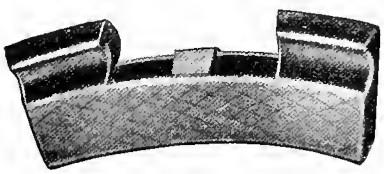

Streeter Type.

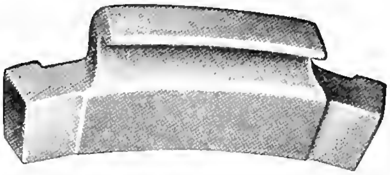

Diamond S Type.

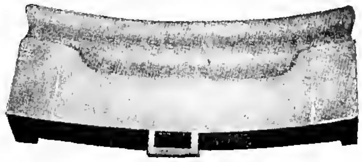
Fig. 1260—Special Reinforced Unflanged Brake Shoes. American Brake Shoe & Foundry Company.


Reinforcing Steel Back and Steel Lug for Full, Open and Center Flange Brake Shoes.


Diamond S Type with Full Flange.


Diamond S Type with Open Flange.


Special Chilled Type with Center Flange.


Special Chilled Type.

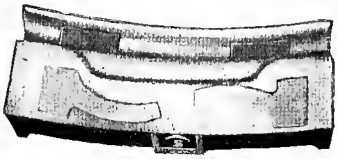

Streeter Type.

Fig. 1261—Special Reinforced Flanged Brake Shoes. American Brake Shoe & Foundry Company.

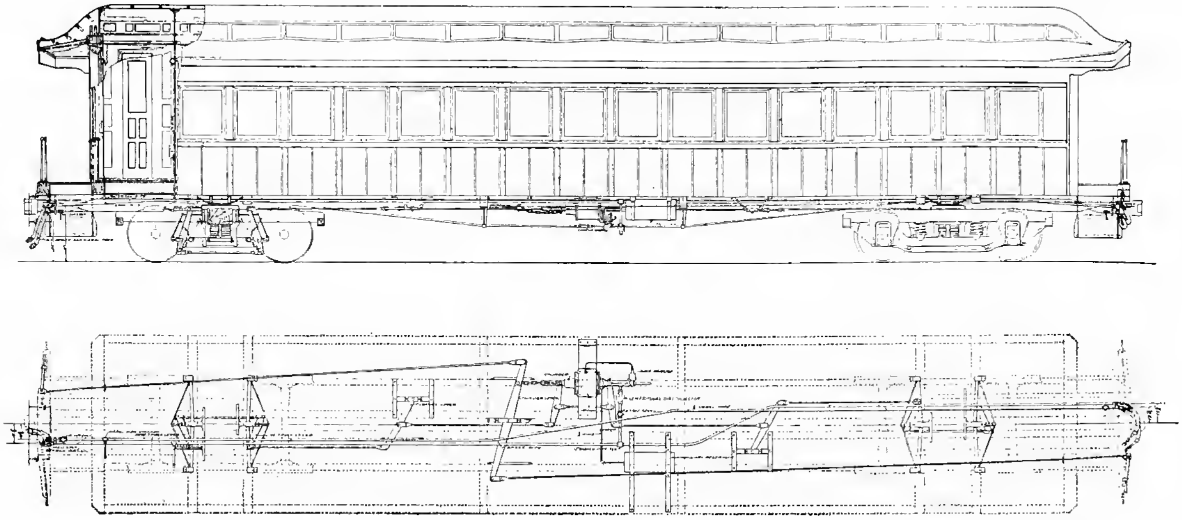


Fig. 1262—Westinghouse Air Brake and Train Air Signal Apparatus Applied to a Passenger Train Car.

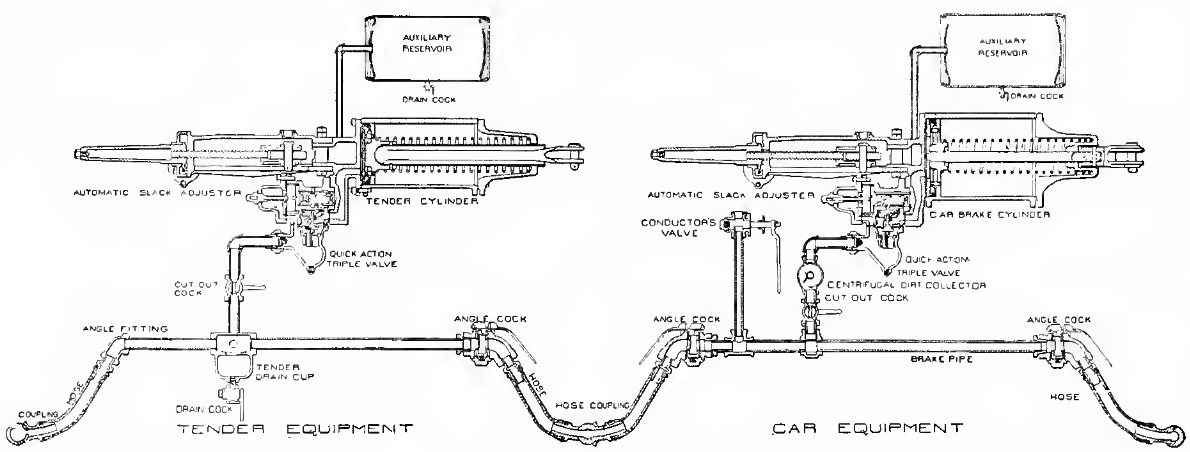


Fig. 1263—Diagram of Westinghouse Old Standard Quick Action Air Brake Apparatus for Passenger Train Cars.

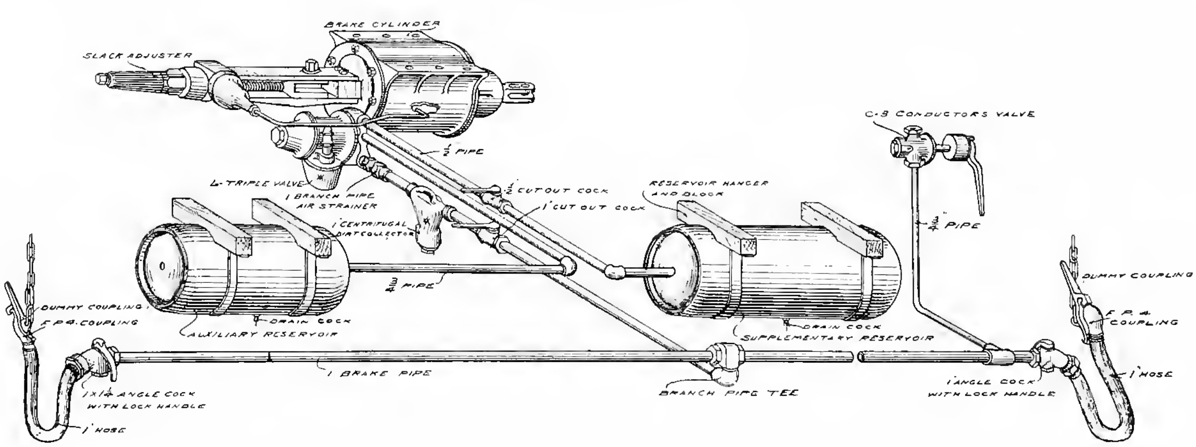


Fig. 1264—L N Passenger Brake Equipment.

Westinghouse Air Brake Company.

NOTE.—The Westinghouse Air Brake Equipment Shown in Figs. 1262-1312 is for Use on Trains Where Steam is the Motive Power. The Equipment Shown in Figs. 1313-1345 is for Use on Electrically Propelled Trains.

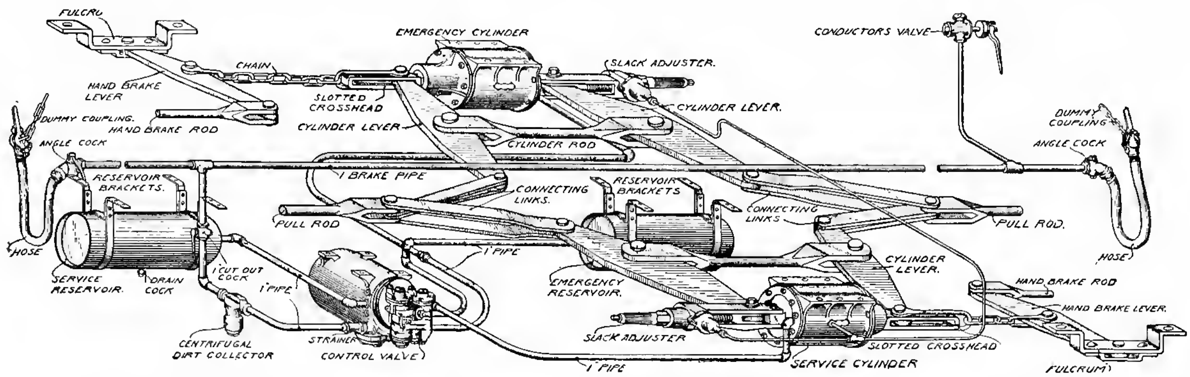


Fig. 1265—P C Passenger Brake Equipment with Cylinders Pointing in Opposite Directions.

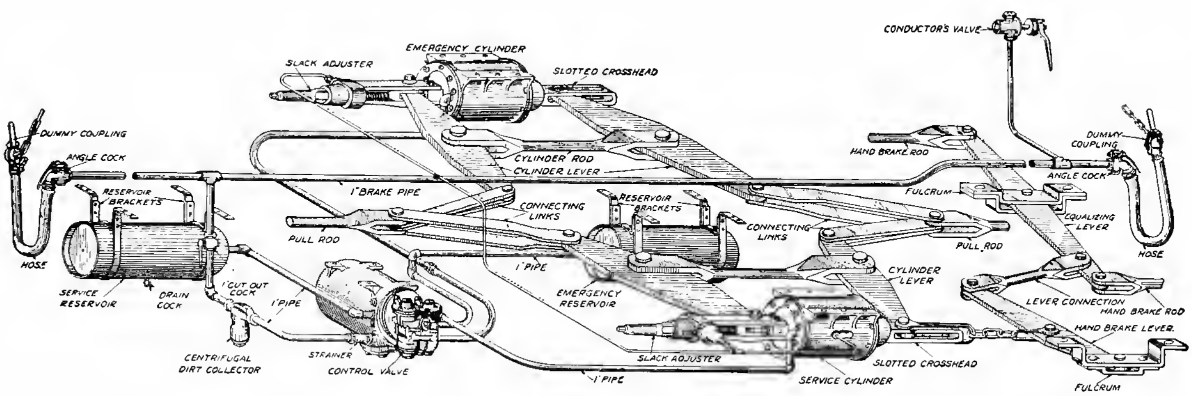


Fig. 1266—P C Passenger Brake Equipment with Cylinders Pointing in the Same Direction.

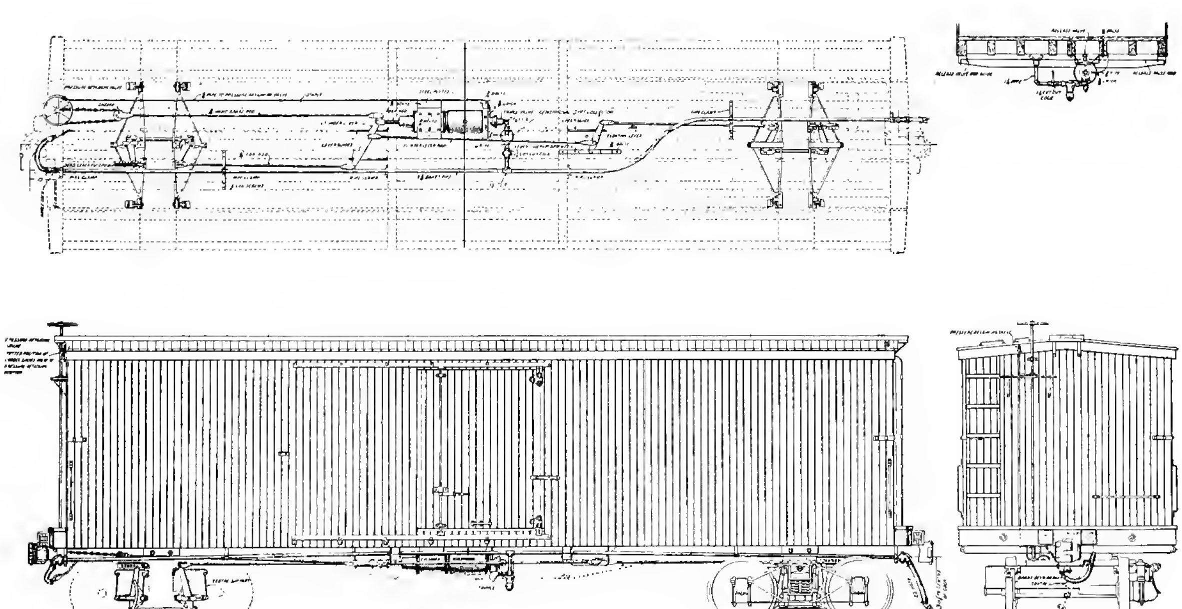


Fig. 1267—Westinghouse Air Brake Applied to a Freight Car.

Westinghouse Air Brake Company.

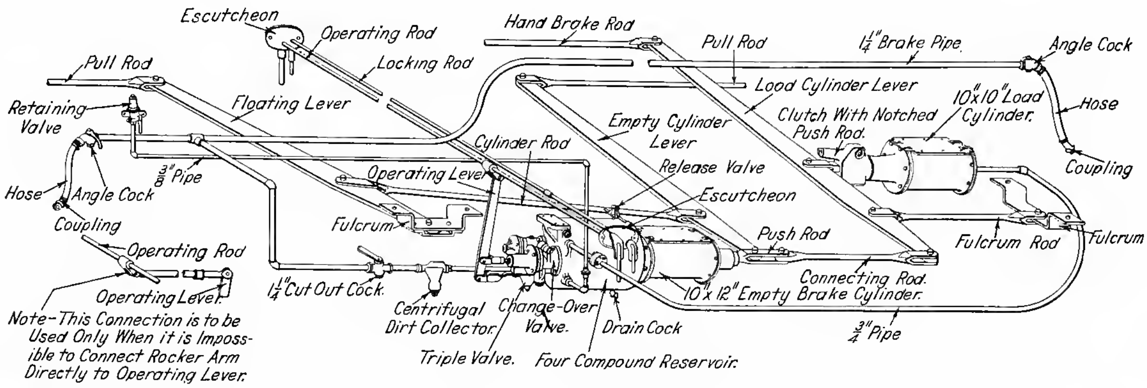


Fig. 1268—Empty and Load Freight Brake Equipment.

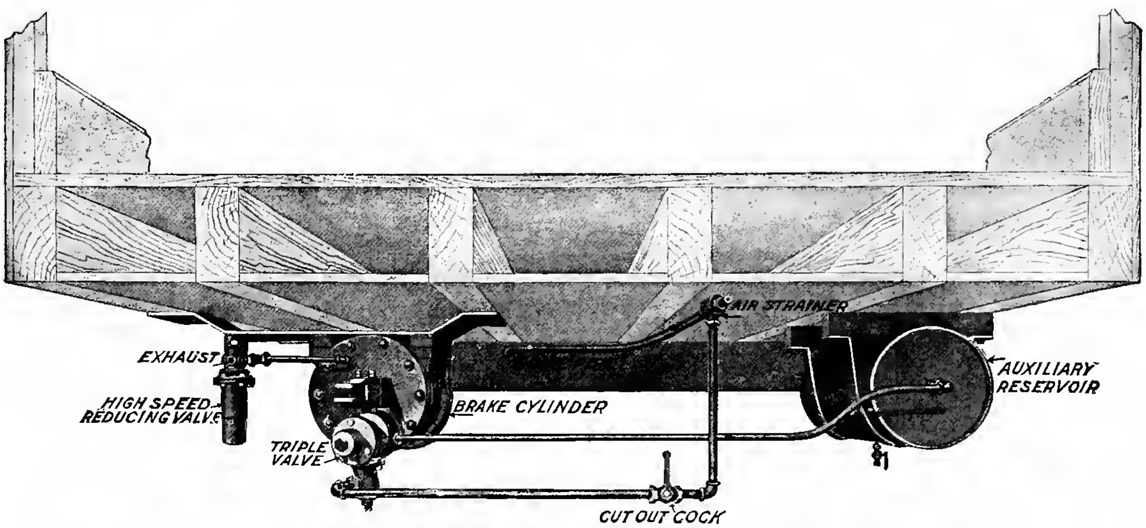


Fig. 1269—Arrangement of High Speed Brake Under Passenger Train Car.

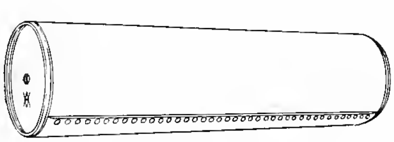


Fig. 1270—Main Reservoir.

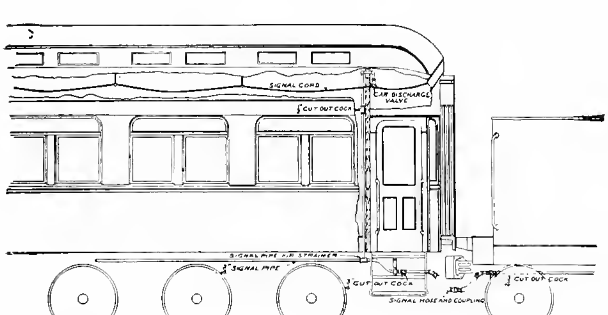


Fig. 1271—Arrangement of Train Air Signal on Passenger Train Car.

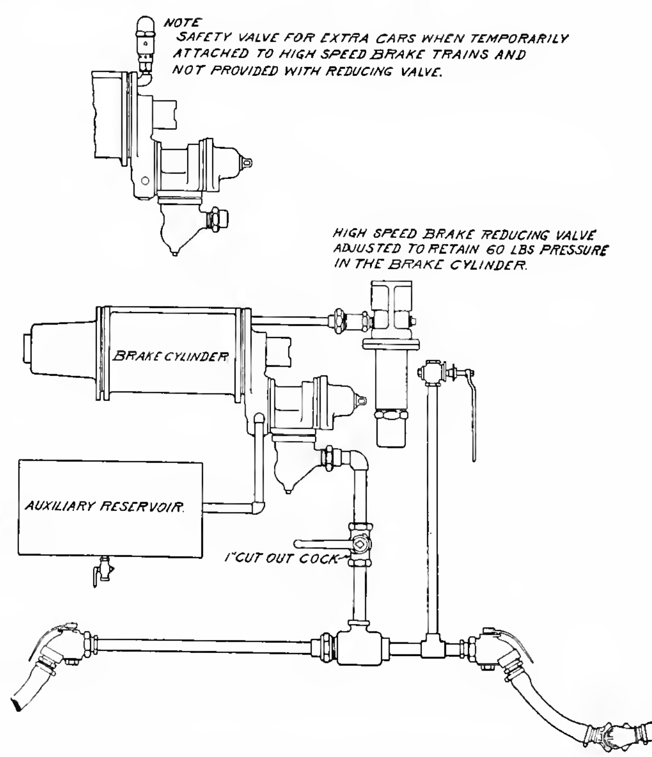


Fig. 1272—Diagram of Apparatus for High Speed Brake on Passenger Train Car.

Westinghouse Air Brake Company.

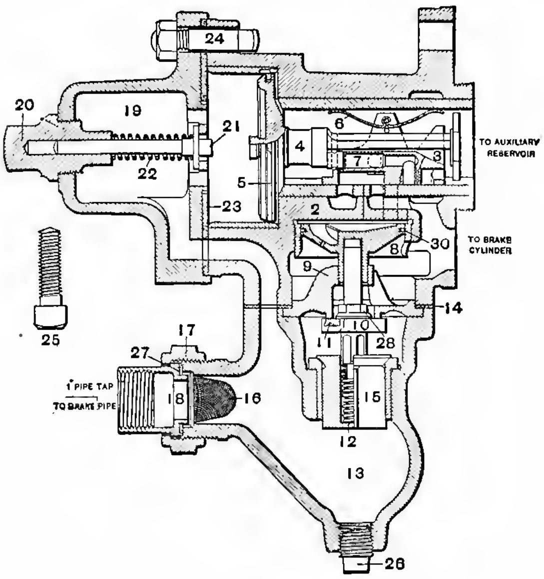


Fig. 1273—Quick Action Triple Valve, Type P-2.

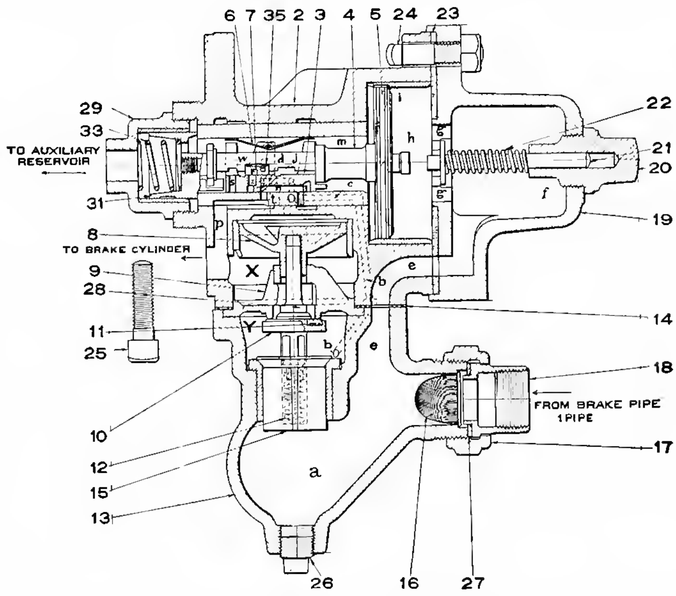


Fig. 1274—Standard Quick Action, Quick Service, Uniform Release, Uniform Recharge Freight Triple Valve, Type K-1.

Parts of Type P-2 Triple Valve, Fig. 1273.

2 *Body*
3 *Slide Valve*
4 *Main Piston*
5 *Main Piston Ring*
6 *Slide Valve Spring*
7 *Graduating Valve*
8 *Emergency Piston*
9 *Emergency Valve Seat*
10 *Emergency Valve*
11 *Rubber Seat*
12 *Check Valve Spring*
13 *Check Valve Case, Complete*
14 *Check Valve Case Gasket*
15 *Check Valve*
16 *Strainer*
17 *1 in. Union Nut*
18 *1 in. Union Swivel*
19 *Cylinder Cap*
20 *Graduating Stem Nut*
21 *Graduating Stem*
22 *Graduating Spring*
23 *Cylinder Cap Gasket*
24 *Cylinder Cap Bolt and Nut*
25 *Cap Screw*
27 *1 in. Union Gasket*
28 *Emergency Valve Nut*
30 *Emergency Piston Ring*

Parts of Type K-1 Triple Valve, Fig. 1274.

2 *Body, Complete*
3 *Slide Valve*
4 *Main Piston*
5 *Main Piston Ring*
6 *Slide Valve Spring*
7 *Graduating Valve*
8 *Emergency Piston*
9 *Emergency Valve Seat*
10 *Emergency Valve*
11 *Rubber Seat*
12 *Check Valve Spring*
13 *Check Valve Case, Complete*
14 *Check Valve Case Gasket*
15 *Check Valve*
16 *Strainer*
17 *1 in. Union Nut*
18 *1 in. Union Swivel*
19 *Cylinder Cap*
20 *Graduating Stem Nut*
21 *Graduating Stem*
22 *Graduating Spring*
23 *Cylinder Cap Gasket*
24 *Cylinder Cap Bolt and Nut*
25 *Cap Screw*
27 *1 in. Union Gasket*
28 *Emergency Valve Nut*
29 *Retarding Device Body*
31 *Retarding Stem*
33 *Retarding Spring*
35 *Graduating Valve Spring*

Parts of Type L Triple Valve, Fig. 1275.

2 *Body*
3 *Slide Valve*
4 *Main Piston*
5 *Main Piston Ring*
6 *Slide Valve Spring*
7 *Graduating Valve*
8 *Emergency Piston*
9 *Emergency Valve Seat*
10 *Emergency Valve*
11 *Rubber Seat for Emergency Valve*
12 *Check Valve Spring*
13 *Check Valve Case, Complete*
14 *Check Valve Case Gasket*
15 *Check Valve*
16 *Emergency Valve Nut*
17 *Graduating Valve Spring*
18 *Cylinder Cap*
19 *Graduating Spring Nut*
20 *Graduating Sleeve*
21 *Graduating Spring*
22 *Cylinder Cap Gasket*
23 *Cylinder Cap Bolt and Nut*
24 *Check Valve Case Bolt and Nut*
25 *By-Pass Piston*
26 *By-Pass Piston Ring*
27 *By-Pass Valve*
29 *By-Pass Valve Spring*
30 *By-Pass Valve Cap*
31 *By-Pass Piston Cap*
32 *Strainer*
33 *E-7 Safety Valve*
34 *End Cap*

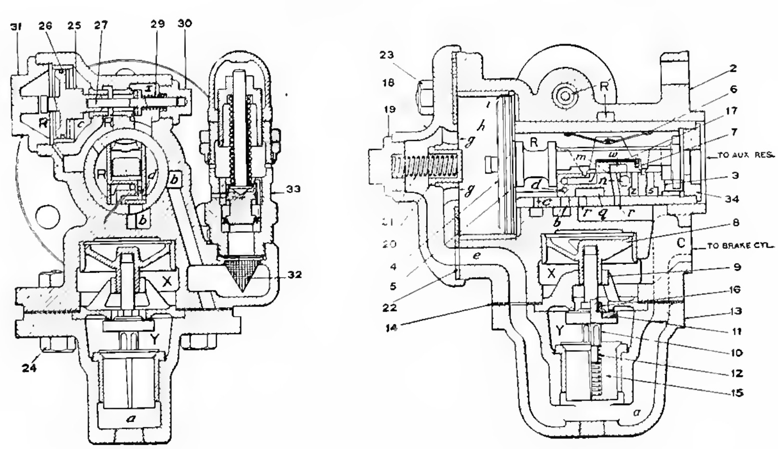
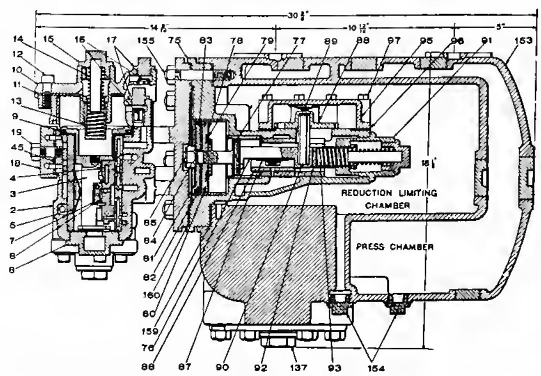


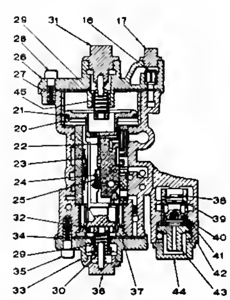
Fig. 1275—Passenger Triple Valve, Type L.

Parts of No. 3-E Control Valve, Fig. 1276.

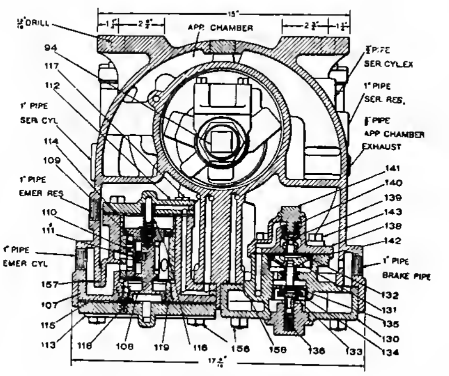
2 *Equalizing Body, Complete*
3 *Release Piston*
4 *Release Slide Valve*
5 *Release Slide Valve Spring*
6 *Release Graduating Valve*
7 *Release Graduating Valve Spring*
8 *Release Piston Cap Nut for Equalizing Portion*
9 *Release Piston Ring*
10 *Release Cylinder Cap*
11 *Release Cylinder Cap Gasket*
12 *Cap Screw*
13 *Release Piston Graduating Sleeve*
14 *Release Piston Graduating Spring*
15 *Release Piston Graduating Nut*
16 *Check Valve*
17 *Check Valve Cap Nut*
18 *Release Regulating Cap*
19 *Stud and Nut for Release Regulating Cap*
20 *Equalizing Piston*
21 *Equalizing Piston Ring (Large)*
22 *Equalizing Slide Valve*
23 *Equalizing Slide Valve Spring*
24 *Equalizing Graduating Valve*
25 *Equalizing Graduating Valve Spring*
26 *Large Equalizing Cylinder Cap*
27 *Large Equalizing Cylinder Cap Gasket*
28 *Cap Screw*
29 *Equalizing Piston Stop Sleeve*
30 *Lower Equalizing Piston Stop Spring*
31 *Equalizing Graduating Nut*
32 *Equalizing Piston Ring (Small)*
33 *Small Equalizing Cylinder Cap*
34 *Gasket for Small Equalizing Cylinder Cap*
35 *Cap Screw*
36 *Cap Nut for Small Equalizing Cylinder Cap*
37 *Small Equalizing Piston Bush*
38 *Service Reservoir Charging Valve*
39 1 *in. Charging Valve Piston Ring*
40 1¼ *in. Charging Valve Piston Ring*
41 *Charging Valve Seat*
42 *Charging Valve Washer*
43 *Internal Charging Valve Nut*
44 *External Charging Valve Nut*
45 *Gasket for Release Regulating Cap*
46 *Upper Equalizing Piston Stop Spring*
75 *Application Body*
76 *Piston Stem*
77 *Piston Ring (Small)*
78 *Piston Head*
79 *Piston Seal*



Release Portion. **Application Portion.**



Equalizing Portion.



Emergency and Quick Action Portions.

Fig. 1276—No. 3-E Control Valve.

80 *Piston Ring (Large)*
81 *Piston Follower*
82 *Piston Packing Leather*
83 *Piston Packing Leather Expander*
84 *Piston Nut*
85 *Piston Cotter*
86 *Exhaust Valve*
87 *Exhaust Valve Spring*
88 *Application Valve*
89 *Application Valve Spring*
90 *Application Piston Bolt*
91 *Spring Box*
92 *Piston Spring Sleeve*
93 *Piston Spring*
94 *Graduating Nut*
95 *Application Valve Cover*
96 *Application Valve Cover Gasket*
97 *Cap Screw for Application Valve Cover*
107 *Emergency Body*
108 *Piston*
109 *Piston Ring*
110 *Slide Valve*
111 *Slide Valve Spring*
112 *Small Cylinder Cap*
113 *Large Cylinder Cap*
114 *Small Cylinder Cap Gasket*
115 *Large Cylinder Cap Gasket*
116 *Piston Spring*
117 *Cap Screw*
118 *Oval Fillister Head Cap Screw*
119 *Emergency Piston Bush*
130 *Quick Action Body*
131 *Piston*
132 *Piston Ring*
133 *Quick Action Valve*
134 *Quick Action Valve Seat*
135 *Quick Action Valve Nut*
136 *Quick Action Valve Spring*
137 *Quick Action Valve Cap Nut*
138 *Quick Action Valve Cover*
139 *Quick Action Closing Valve*
140 *Quick Action Closing Valve Spring*
141 *Cover Cap Nut*
142 *Cover Gasket*
143 *Cap Screw for Cover*
153 *Reservoir*
154 *Cap Nut*
155 *Stud with Hexagon Nut*
156 *Stud with Hexagon Nut*
157 *Emergency Cylinder Gasket*
158 *Quick Action Cylinder Gasket*
159 *Large Reservoir Gasket*
160 *Equalizing Cylinder Gasket*

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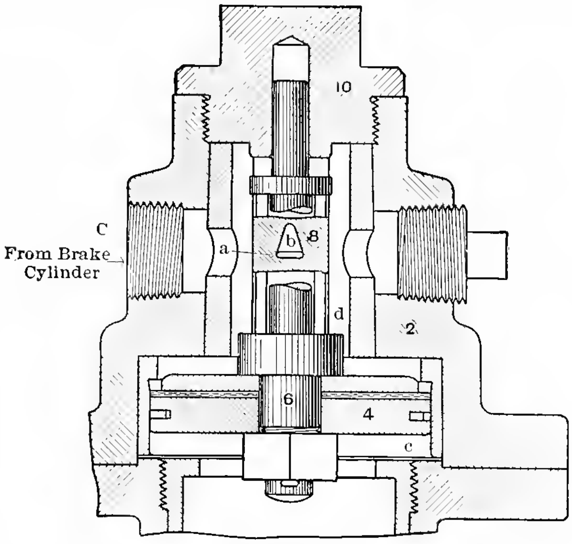
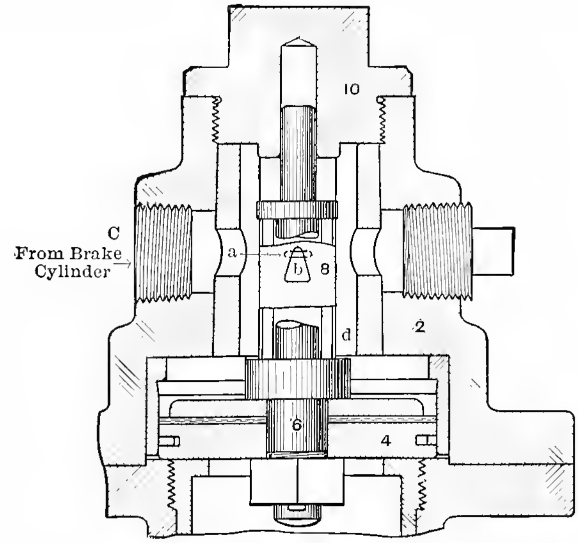


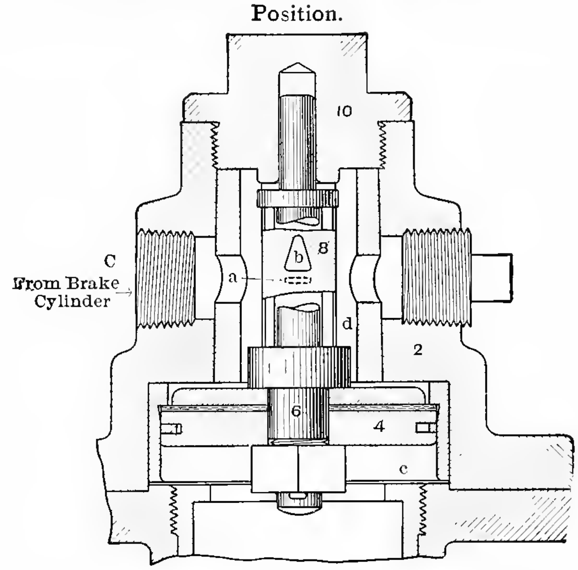
Service
Pressure Exceeding 60 Lbs.
in Brake Cylinder

Fig. 1277—High Speed Reducing Valve, Service Position.



Emergency

Fig. 1278—High Speed Reducing Valve, Emergency **Position.**



Release

Fig. 1280—High Speed Reducing Valve, Release Position.

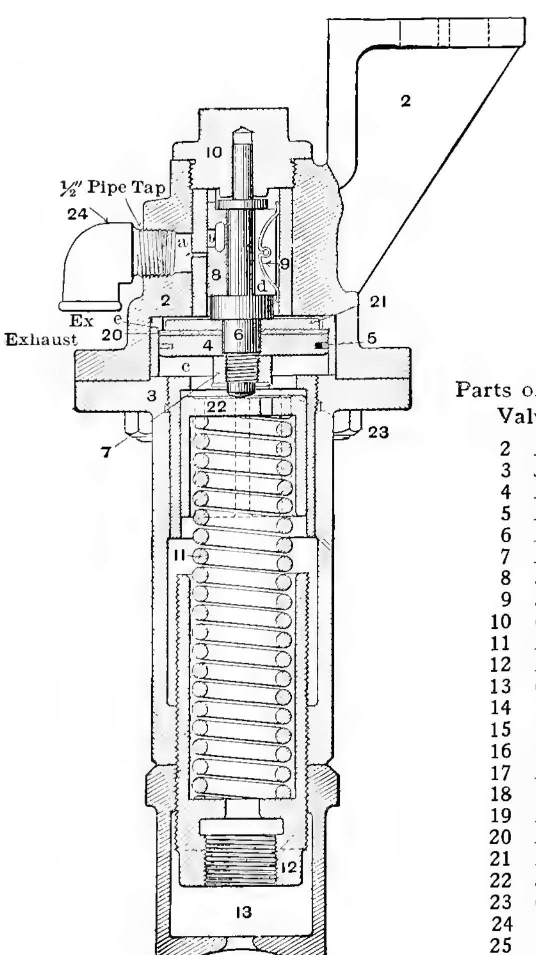


Fig. 1279—Vertical Section Through High Speed Reducing Valve.

Parts of High Speed Reducing Valve, Figs. 1277-1281.

2 *Body*
3 *Spring Box*
4 *Piston*
5 *Piston Ring*
6 *Piston Stem*
7 *Piston Stem Nut*
8 *Slide Valve*
9 *Slide Valve Spring*
10 *Cap Nut*
11 *Regulating Spring*
12 *Regulating Nut*
13 *Check Nut*
14 *Union Stud*
15 *Union Swivel*
16 *Union Nut*
17 *Air Strainer*
18 *Union Gasket*
19 *Bolt and Nut*
20 *Piston Seat*
21 *Piston Disc*
22 *Spring Abutment*
23 *Cotter*
24 *½ in. Street Elbow*
25 *¾ in. Pipe Plug*

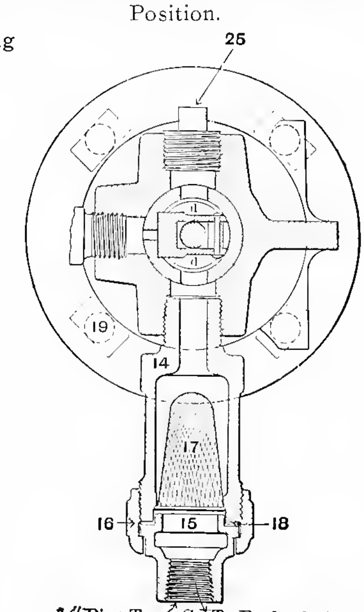


Fig. 1281—Horizontal Section Through High Speed Reducing Valve.

Westinghouse Air Brake Company.

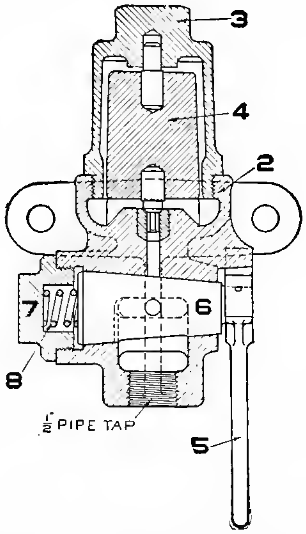
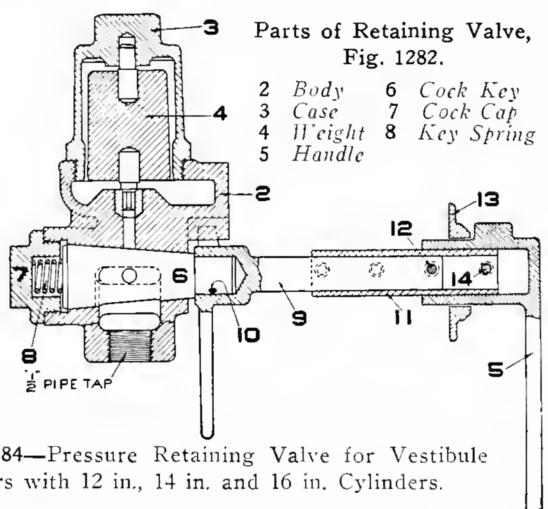


Fig. 1282—Pressure Retaining Valve for 12 in., 14 in. and 16 in. Brake Cylinders.



Parts of Retaining Valve, Fig. 1282.

2 *Body*
3 *Case*
4 *Weight*
5 *Handle*
6 *Cock Key*
7 *Cock Cap*
8 *Key Spring*

Fig. 1284—Pressure Retaining Valve for Vestibule Cars with 12 in., 14 in. and 16 in. Cylinders.

Parts of Retaining Valve, Fig. 1284.

2 *Body*
3 *Case*
4 *Weight*
5 *Handle*
6 *Cock Key*
7 *Cock Cap*
8 *Key Spring*
9 *Extension Socket*
10 *Extension Socket Cotter*
11 *Extension Socket Sleeve*
12 *Extension Socket Sleeve Pin*
13 *Handle Plate*
14 *Handle Pin*

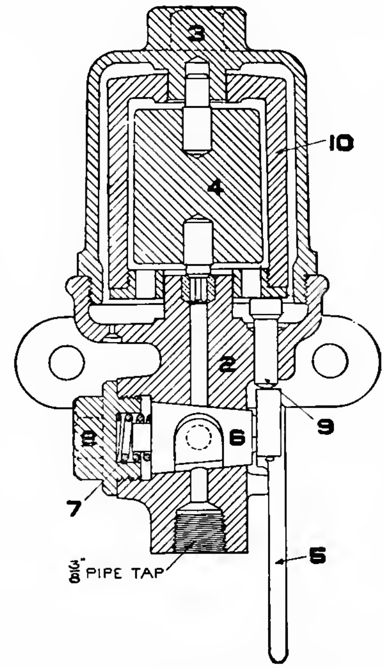


Fig. 1283—High and Low Pressure Retaining Valve.

Parts of Retaining Valve, Fig. 1283.

2 *Body*
3 *Case*
4 *Inside Weight*
5 *Handle*
6 *Cock Key*
7 *Cock Cap*
8 *Key Spring*
9 *Weight Lifting Rod*
10 *Outside Weight*

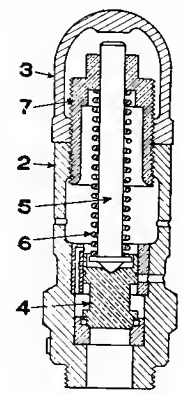


Fig. 1285 — Type E-6 Safety Valve.

Parts of Type E-6 Safety Valve, Fig. 1285.

2 *Body*
3 *Cap Nut*
4 *Valve*
5 *Valve Stem*
6 *Spring (50 lbs. to 90 lbs.)*
7 *Regulating Nut*

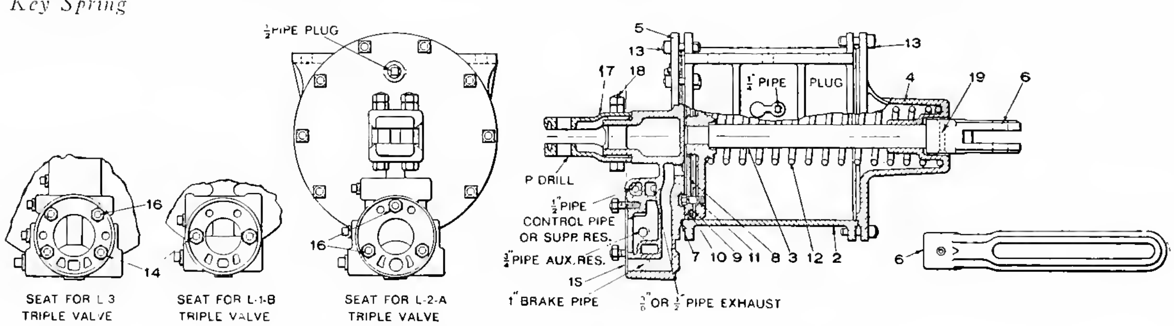


Fig. 1286—Type N Passenger Brake Cylinder.

Parts of Type N Brake Cylinder, Fig. 1286.

2 *Cylinder Body*
3 *Piston and Rod*
4 *Non-Pressure Head*
5 *Pressure Head*
6 *Crosshead*
7 *Cylinder Gasket*
8 *Follower*
9 *Packing Leather*
10 *Packing Expander*
11 *Follower Stud and Nut*
12 *Release Spring*
13 *Cylinder Head Bolt and Nut*
14 *Triple Valve Bolt and Nut*
15 *Triple Valve Gasket*
16 *Triple Valve Stud and Nut*
17 *Lever Bracket*
18 *Lever Bracket Bolt and Nuts*
19 *Crosshead Rivet*

Westinghouse Air Brake Company.

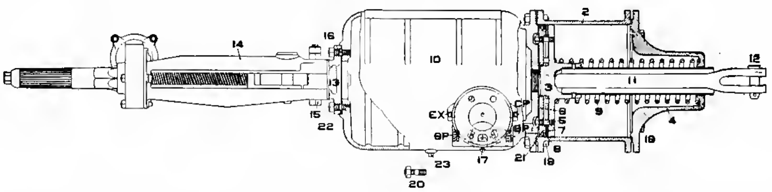


Fig. 1287—Brake Cylinder, 12 in. by 8 in., with Slack Adjuster.

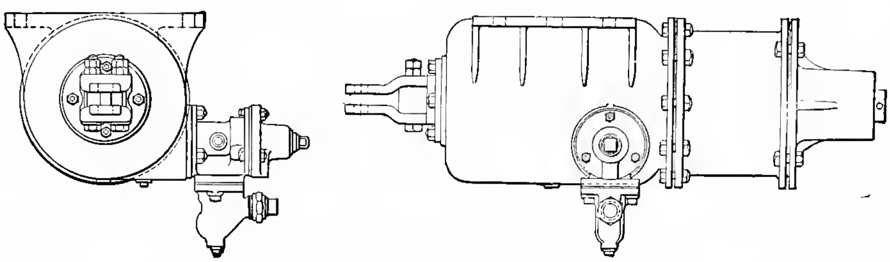


Fig. 1288—Brake Cylinder, 12 in. by 8 in., and Auxiliary Reservoir Combined, with Standard Triple Valve.

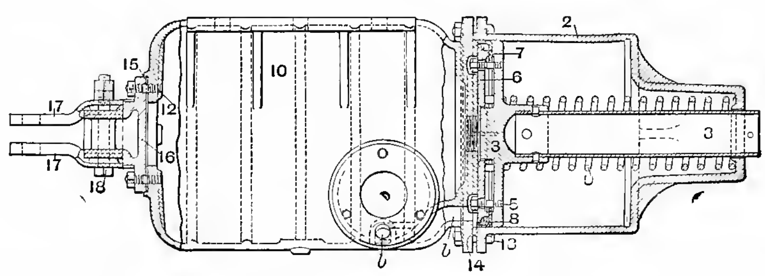


Fig. 1289—Section Through 12 in. by 8 in. Brake Cylinder and Auxiliary Reservoir Combined.

Parts of Brake Cylinder, Fig. 1289.

2 *Cylinder Body*
3 *Piston and Rod*
5 *Follower Stud and Nut*
6 *Follower*
7 *Packing Leather*
8 *Packing Expander*
9 *Release Spring*
10 *Reservoir*
12 *Reservoir Stud and Nut*
13 *Reservoir Cylinder Bolt and Nut*
14 *Cylinder Gasket*
15 *End Cover Gasket*
16 *Reservoir End Cover*
17 *Detachable Bracket*
18 *Detachable Bracket, Bolt and Nut*

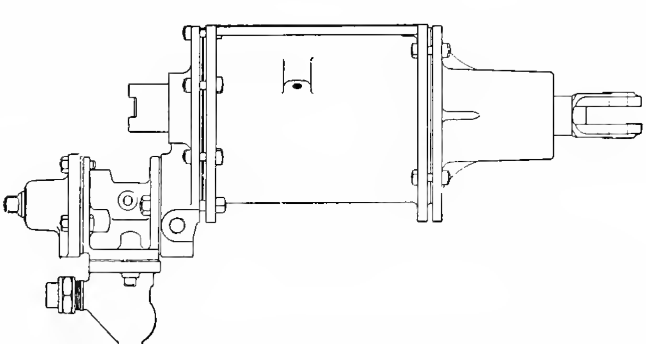


Fig. 1290—Passenger Brake Cylinder, 10 in.

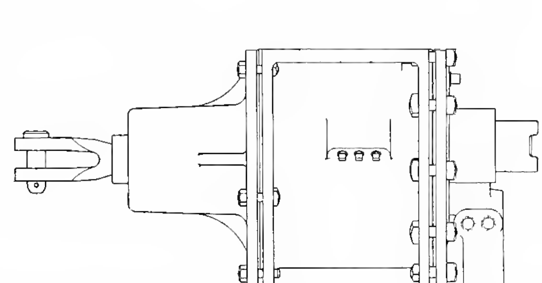


Fig. 1291—Passenger Brake Cylinder, 12 in. by 8 in.

Westinghouse Air Brake Company.

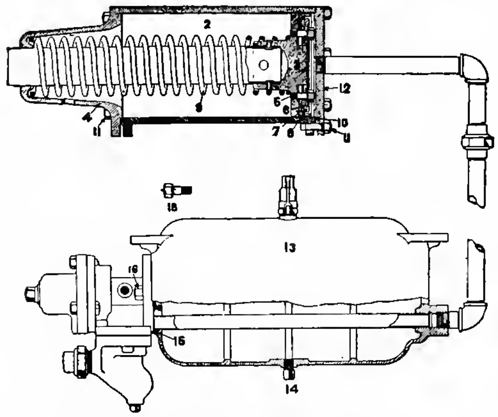


Fig. 1292—Freight Brake Cylinder with Detached Auxiliary Reservoir and Triple Valve.

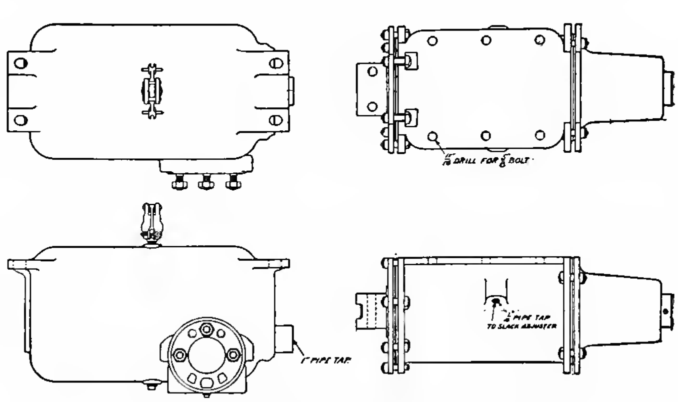


Fig. 1293—Freight Brake Cylinder, 8 in. by 12 in., with Detached Auxiliary Reservoir.

Parts of Brake Cylinder, Fig. 1292.

2 *Cylinder Body*
3 *Piston and Rod*
4 *Non-Pressure Head*
5 *Follower-Stud and Nut*
6 *Follower*
7 *Packing Leather*
8 *Packing Expander*
9 *Release Spring*
10 *Cylinder Gasket*
11 *Cylinder-Head Bolt and Nut*
12 *Pressure Head*
13 *Type D Reservoir*
14 *Drain Plug*
15 *Triple Valve Gasket*
16 *Reservoir-Stud and Nut*

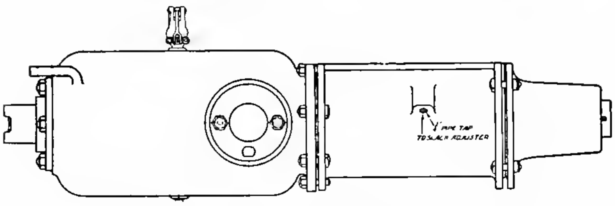


Fig. 1294—Freight Brake Cylinder, 8 in. by 12 in., and Auxiliary Reservoir Combined.

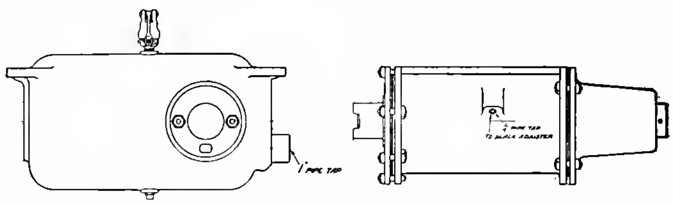


Fig. 1295—Freight Brake Cylinder, 8 in. by 12 in., with Auxiliary Reservoir Detached.

Parts of Load Brake Cylinder, Fig. 1297.

2 *Cylinder Body*
3 *Piston and Rod*
4 *Non-Pressure Head*
5 *Follower-Stud and Nut*
6 *Follower*
7 *Packing Leather*
8 *Packing Expander*
9 *Release Spring*
10 *Cylinder Gasket*
11 *Cylinder-Head Bolt and Nut*
18 *Pressure Head*
25 *Push Rod*
26 *Push Rod Pin*
27 *Push Rod Pin Cotter*
28 *Latch Box*
29 *Stud and Nut*
30 *Lotch Box Cover*
31 *Latch Box Cap Nut*
32 *Latch*
33 *Latch Pin*
34 *Latch Pin Cotter*
35 *Release Pin*
36 *Spring Guide*
37 *Latch Spring*
40 *3/4 in. by 1/2 in. Reducing Bush*

Parts of Brake Cylinder, Fig. 1298.

2 *Cylinder Body*
3 *Piston and Rod*
4 *Non-Pressure Head*
5 *Follower-Stud and Nut*
6 *Follower*
7 *Packing Leather*
8 *Packing Expander*
9 *Release Spring*
10 *Cylinder Gasket*
11 *Cylinder-Head Bolt and Nut*
12 *Reservoir Stud and Nut*
13 *Reservoir*
15 *Triple Valve Gasket*
17 *Reservoir Cylinder Bolt and Nut*

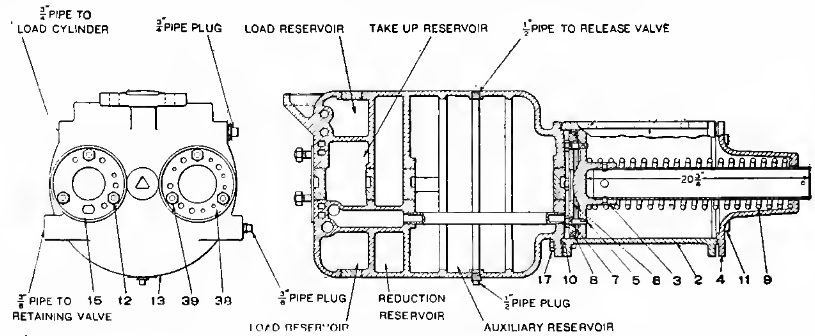


Fig. 1296—Empty Brake Cylinder, 10 in. by 12 in., and Four-Compartment Reservoir Combined.

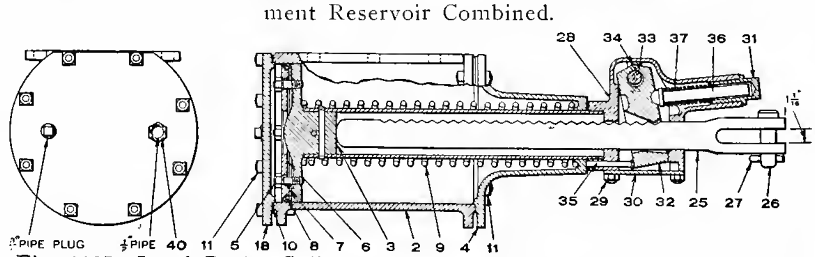


Fig. 1297—Load Brake Cylinder, 10 in. by 12 in., with Notched Push Rod and Enclosed Locking Mechanism, for Empty and Load Freight Brake Equipment.

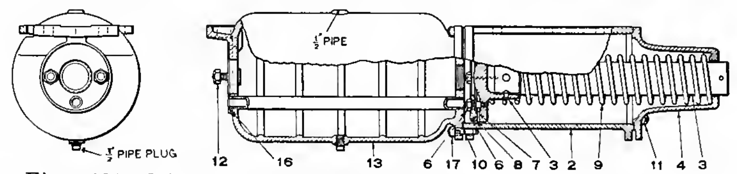


Fig. 1298—8 in. by 12 in. Freight Brake Cylinder and Auxiliary Reservoir Combined.

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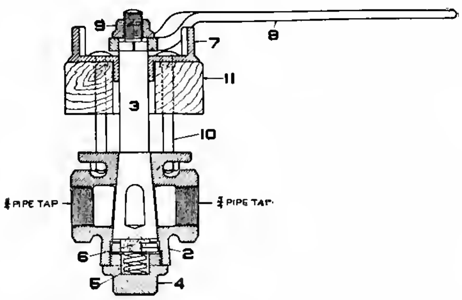

Fig. 1299—Type C-3 Conductor's Valve.

Parts of Conductor's Valve, Fig. 1299.

2 *Body*
3 *Key*
4 *Cap*
5 *Key Spring*
6 *Key Stop*
7 *Key Escutcheon*
8 *Handle*
9 *Key Nut*
10 *Bolt and Nut*
11 *Filler Block*

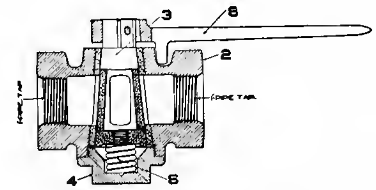

Fig. 1300—One Inch Cut-Out Cock.

Parts of Cut-Out Cock, Fig. 1300.

2 *Body*
3 *Key*
4 *Cap*
5 *Spring*
6 *Handle*

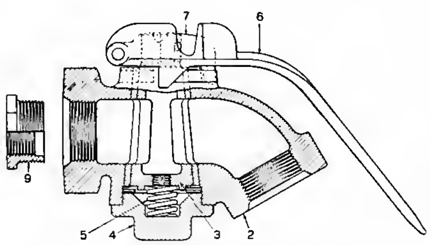

Fig. 1301—Self-Locking Angle Cock.

Parts of Angle Cock, Fig. 1301.

2 *Body*
3 *Key*
4 *Cap*
5 *Spring*
6 *Handle*
7 *Handle Socket*
9 *1¼ in. by 1 in. Bushing*

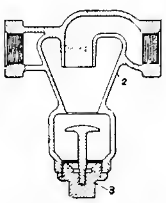

Fig. 1302—Centrifugal Dirt Collector.

Parts of Centrifugal Dirt Collector, Fig. 1302.

2 *Body*
3 *Deflector and Special Plug*

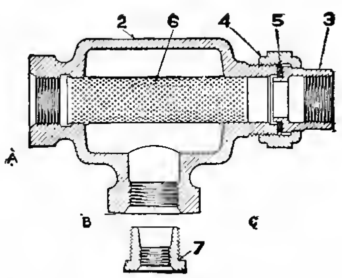

Fig. 1303—One Inch Brake Pipe Air Strainer.

Parts of Strainer, Fig. 1303.

2 *Strainer Body*
3 *1 in. Union Swivel*
4 *1 in. Union Nut*
5 *1 in. Union Gasket*
6 *Strainer*
7 *Bushing*

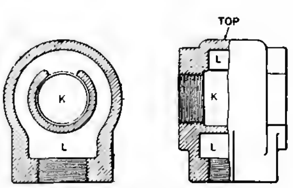

Fig. 1304—Branch Pipe Tee.

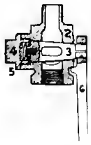

Fig. 1305 — Reservoir Drain Cock, ½ in.

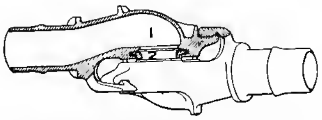

Fig. 1306—Freight Hose Coupling.

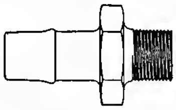

Fig. 1307—Threaded Hose Nipple.

Parts of Drain Cock, Fig. 1305.

2 *Body*
3 *Key*
4 *Cap*
5 *Spring*
6 *Handle*

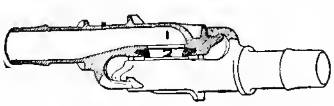

Fig. 1308—Passenger Hose Coupling.

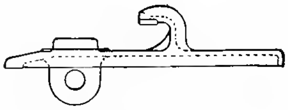

Fig. 1309—Dummy Hose Coupling.

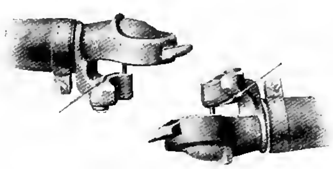

Fig. 1310—Hose Protecting Coupling.

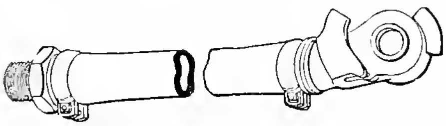

Fig. 1311—Brake Hose and Coupling

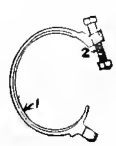

Fig. 1312—Hose Clamp.

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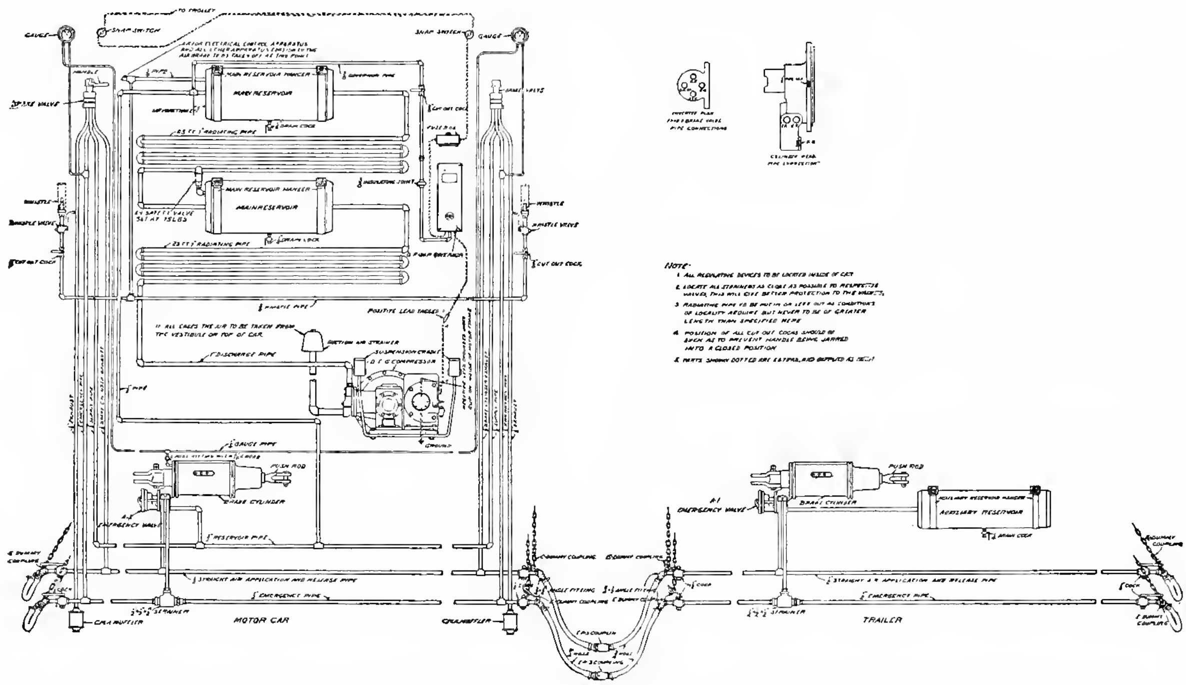

Fig. 1313—Diagram of Westinghouse Air Brake Equipment, Schedule SME. Straight Air Brake with an Automatic Emergency Feature for Single Car Service. Under Some Conditions it May be Used for Two-Car Trains, Consisting of Motor Car and Trailer, Where the Motor Car Operates Singly Most of the Time.

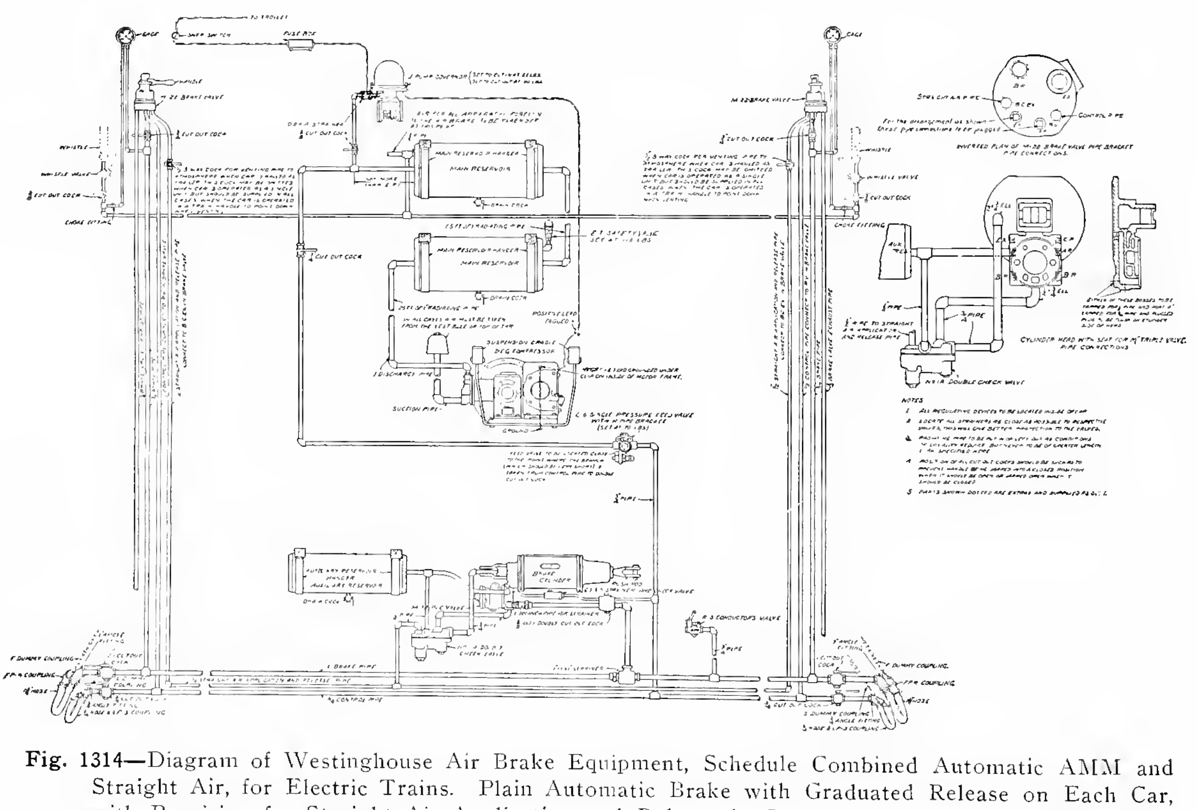

Fig. 1314—Diagram of Westinghouse Air Brake Equipment, Schedule Combined Automatic AMM and Straight Air, for Electric Trains. Plain Automatic Brake with Graduated Release on Each Car, with Provision for Straight Air Application and Release in Single Car Service. The Length of Train Should Not Exceed Five Cars.

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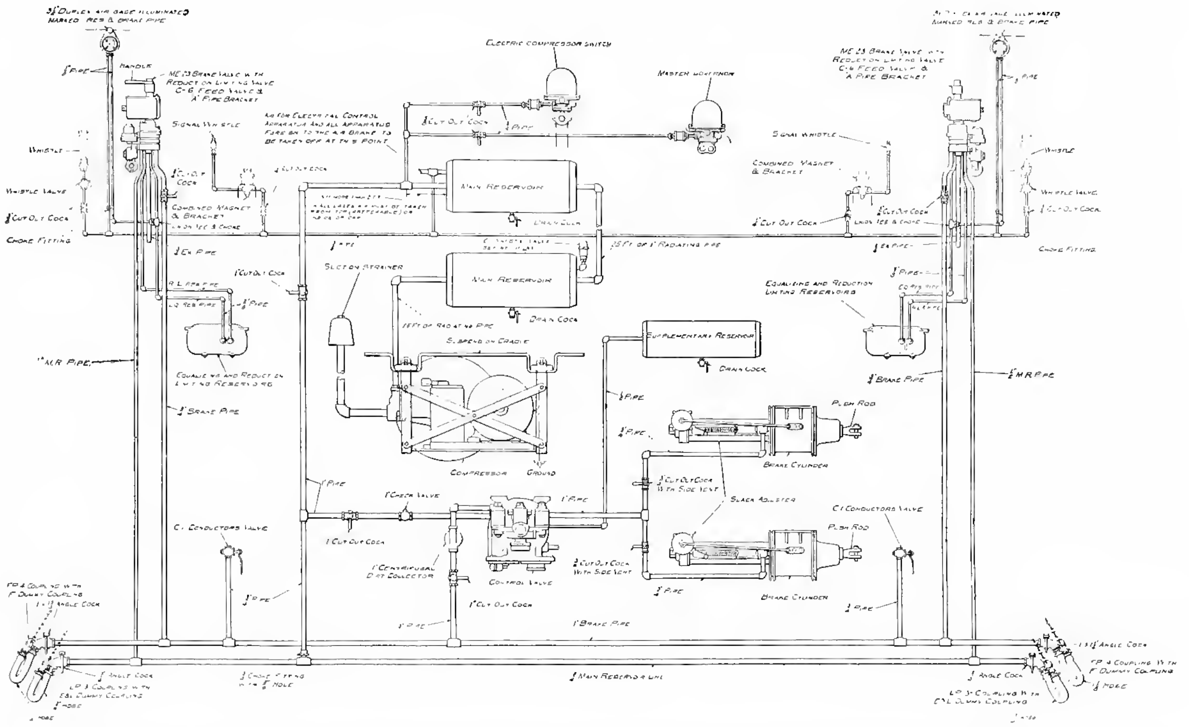

Fig. 1315—Diagram of Westinghouse Air Brake Equipment, Schedule AMCE, for Electric Trains. Consists of a Combination of a Pneumatic Service and Emergency Brake with an Electric Control of Both Service and Emergency Operations of the Brakes. For Trains of Any Length.

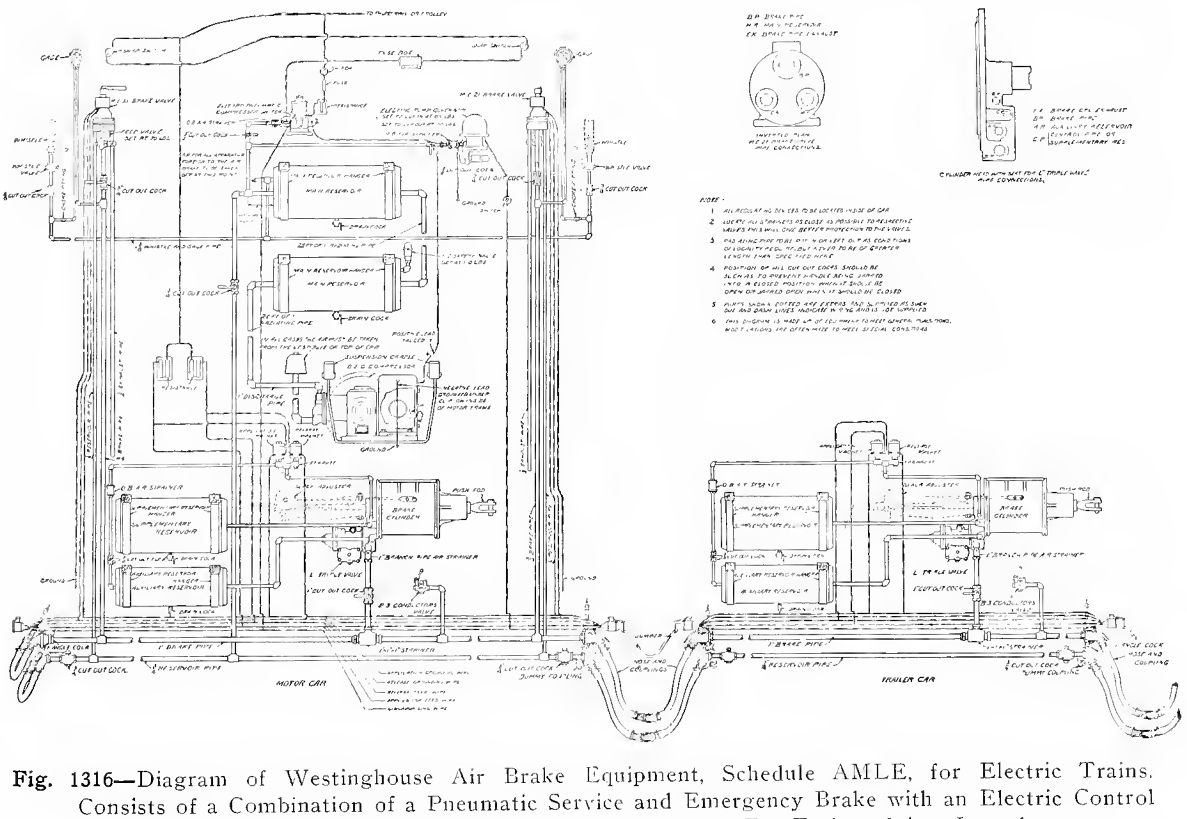

Fig. 1316—Diagram of Westinghouse Air Brake Equipment, Schedule AMLE, for Electric Trains. Consists of a Combination of a Pneumatic Service and Emergency Brake with an Electric Control of Both Service and Emergency Operations of the Brakes. For Trains of Any Length.

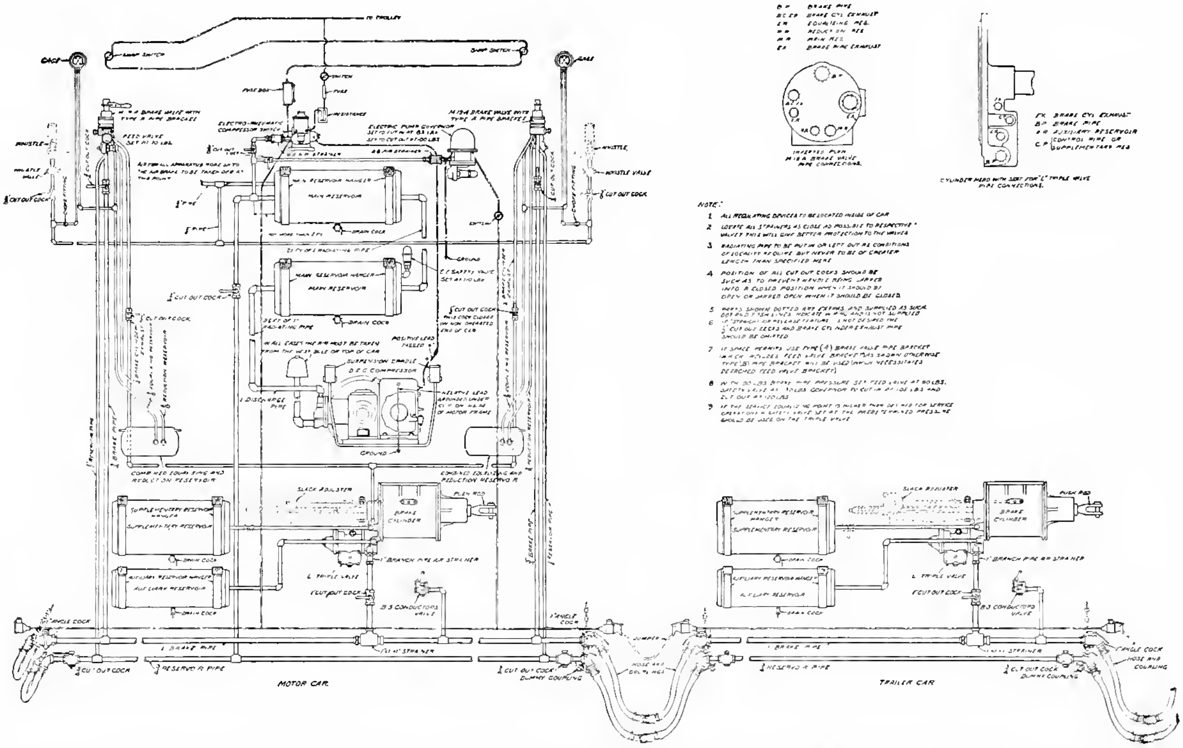

Fig. 1317—Diagram of Westinghouse Air Brake Equipment, Schedule AML, for Electric Trains. Quick Action, Automatic Brake with Graduated Release, Quick Service and Quick Recharge Features on Every Car with the Addition of Straight Air Release on Head Car; Also Reduction Limiting Features. For Trains of Any Length.

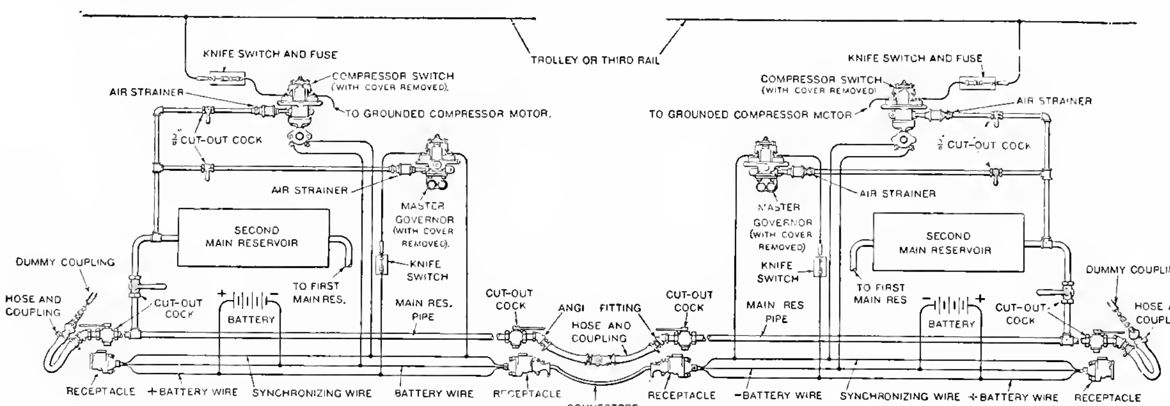

Fig. 1318—Wiring Diagram of Westinghouse Governor Synchronizing System; Battery Circuit.

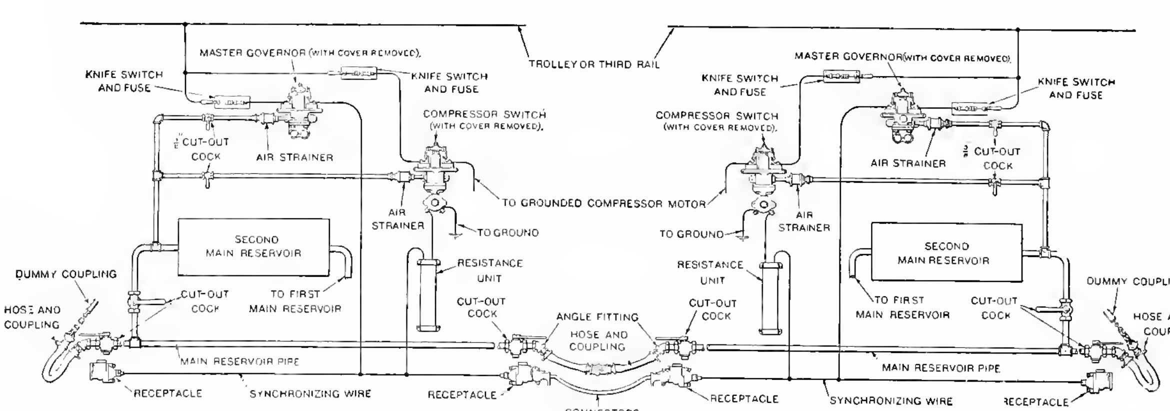

Fig. 1319—Wiring Diagram of Westinghouse Governor Synchronizing System; Trolley Circuit.

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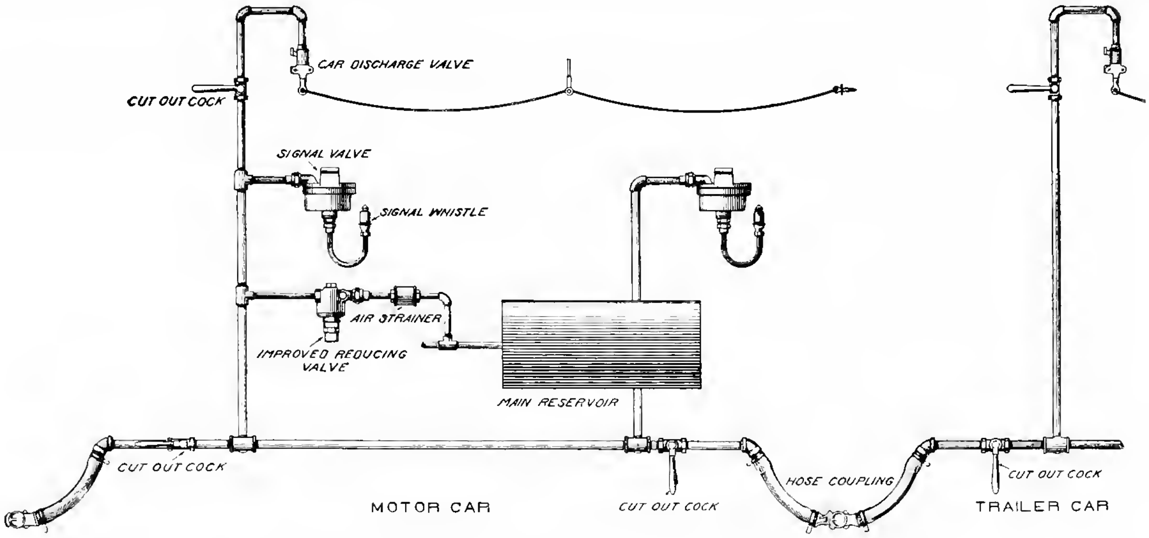

Fig. 1320—Diagram of Train Air Signal for Electric Car Trains.

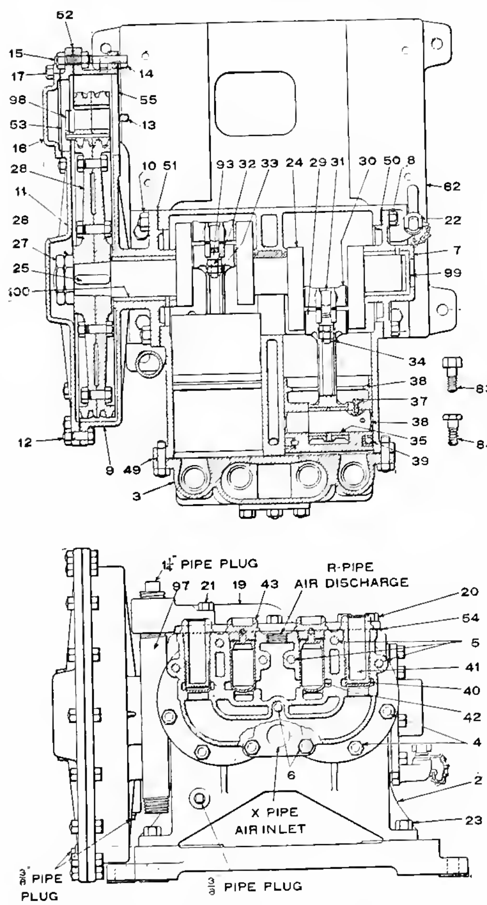

Fig. 1321—Compressor Portion of Motor Driven Air Compressor for Electric Cars.

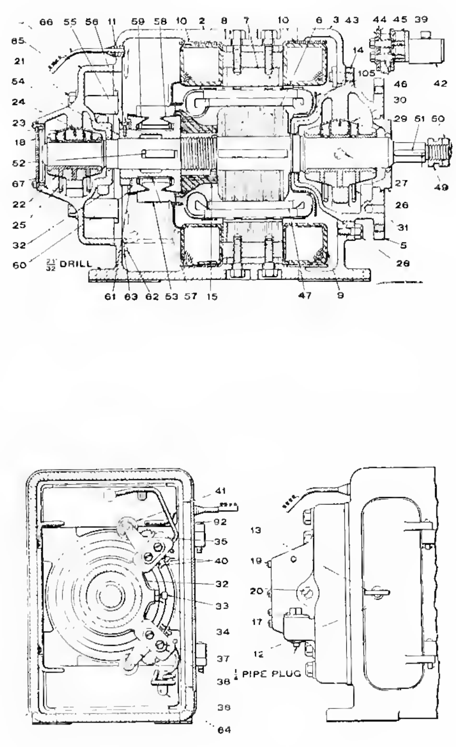

Fig. 1322—Motor Portion of Motor Driven Air Compressor for Electric Cars.

Parts of Compressor, Fig. 1321.

2 *Cylinder and Crank Case*
3 *Cylinder Cover*
4, 5 *and* 6 *Cylinder Cover Bolt and Nut*
7 *Front Crank Case Cover*
8 *Front Crank Case Cover Cap Screw*
9 *Gear Case*
10 *Gear Case Stud and Nut*
11 *Gear Case Cover*
12 *Gear Case Cover Bolt and Nut*
13 *Long Cap Screw for Gear Case and Motor*
14 *Short Cap Screw for Gear Case and Motor*

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Parts of Compressor, Fig. 1321. (Continued.)

15 *Bolt for Gear Case and Motor*
16 *Gear Case Cover Cap*
17 *Cap Screw for Gear Case Cover Cap*
19 *Crank Case Top Cover*
20 *Short Cap Screw for Crank Case Top Cover*
21 *Long Cap Screw for Crank Case Top Cover*
22 *Crank Case Oil Fitting*
23 *Cap Screw for Securing Compressor to Bed Plate*
24 *Crank Shaft*
25 *Crank Shaft Key*
26 *Crank Shaft Nut*
27 *Crank Shaft Jam Nut*
28 *Gear*
29 *Connecting Rod*
30 *Connecting Rod Cap*
31 *Connecting Rod Eye Bolt*
32 *Nut for Eye Bolt*
33 *Jam Nut for Eye Bolt*
34 *Cotter for Eye Bolt*
35 *Connecting Rod Bush*
36 *Wrist Pin with Dowel*
37 *Wrist Pin Set Screw*
38 *Piston*
39 *Piston Ring*
40 *Inlet Valve*
41 *Inlet Valve Chamber Cap*
42 *Discharge Valve*
43 *Discharge Valve Chamber Cap*
49 *Cylinder Cover Gasket*
50 *Front Crank Case Cover Gasket*
51 *Gear Case and Crank Case Gasket*
52 *Gear Case Cover Gasket*
53 *Gear Case Cover Cap Gasket*
54 *Cronk Case Top Cover Gasket*
55 *Motor Gasket*
82 *Bed Plate*
83 *and* 84 *Cap Screw for Securing Motor to Bed Plate*
93 *Washer for Eye Bolt*
97 *1¼ in. by 9½ in. Pipe for Vent of Crank Case Cover*
98 *Pinion*
99 *Shaft Bearing Bush (Front End)*
100 *Shaft Bearing Bush (Rear End)*

Parts of Motor, Fig. 1322.

2 *Field Yoke*
3 *End Bell*
4 *Front Bearing Housing*
5 *Rear Bearing Housing*
6 *Armature*
7 *Field Pole*
8 *Cop Screw for Pole Piece*
9 *Field Coil*
10 *Field Coil Washer*
11 *Insulating Bush for Leads*
12 *Commutator Door*
13 *Commutator Door Latch*
14 *Stud and Nut for Securing End Bell*
15 *Armature Coil Support*
17 *Oil Fitting Elbow Cap Nut*
18 *Front Bearing Housing Dust Plate*
19 *Screw for Dust Plate*
20 *Front Bearing Housing Headless Screw*
21 *Cap Screw for Front Bearing Housing*
22 *Front Bearing*
23 *Cleat for Front Bearing*
24 *Cleat Screw*
25 *Front Bearing Oil Ring*
26 *Nut for Rear Bearing Housing*
27 *Rear Bearing Housing Headless Screw*
28 *Cap Screw for Rear Bearing Housing*
29 *Rear Bearing*
30 *Cleat for Rear Bearing*
31 *Rear Bearing Oil Ring*
32 *Rocker Arm*
33 *Rocker Arm Set Screw*
34 *Set Screw Jam Nut*
35 *Upper Carbon Holder*
36 *Lower Carbon Holder*
37 *Carbon Holder Cap Screw*
38 *Washer for Carbon Holder Screw*
39 *Double Nut for Carbon Holder*
40 *Screw for Carbon Holder Lead*
41 *Carbon Holder Spring*
42 *Carbon*
43 *Insulating Washer, Fibre*
44 *Insulating Washer, Fullerboard*
45 *Insulating Washer, Mica*
46 *Insulating Tube for Rocker Arm*
47 *Armature Coil*
49 *Nut for Removing Pinion*
50 *Motor Shaft Jam Nut*
51 *Key for Pinion*
52 *Key for Commutator*
53 *Commutator*
54 *Commutator Bushing*
55 *Commutator Nut*
56 *Set Screw for Commutator Nut*
57 *Insulating Bush for Commutators*
58 *Inner Insulating V Ring*
59 *Outer Insulating V Ring*
60 *Taper Ring for Commutator*
61 *Washer for Commutator Nut*
62 *Screw for Cleat*
63 *Nut Lock for Cleat*
64 *Cleat for Holding Lead*
65 *Connector for Lead*
66 *Carbon Holder Lead*
67 *Dust Plate Gasket*
92 *Hinge Pin for Commutator Door*
105 *Oil Deflector*

Parts of Type ME-23 Brake Valve, Fig. 1324.

2 *Rotary Valve Seat*
3 *Body*
4 *Type B Pipe Bracket*
5 *Rotary Valve*
6 *Rotary Valve Key*
7 *Rotary Valve Spring*
8 *Key Washer*
9 *Oil Screw*
10 *Malleable Iron Handle*
18 *Fillister Head Screw*
19 *Upper Gasket*
20 *Lower Gasket*
21 *Square Head Bolt and Nut*
22 *Oil Plug*
23 *Holding Stud*
24 *Holding Nut*
33 *Cover*
34 *Thumb Nut*
35 *Eye Bolt*
50 *Bottom Case*
51 *Equalizing Piston and Valve*
52 *Piston Ring*
53 *Equalizing Piston Valve*
54 *Cap Nut*
55 *Piston Washer*
56 *Equalizing Piston Spring*
57 *Middle Gasket*
58 *Tee for Gage and Equalizing Reservoir Pipes*
59 *Union Nut*
60 *Union Swivel*
88 *Blanking Flange Gasket*
90 *Blanking Flange Cap Screw*
91 *Blanking Flange*
92 *Pawl*
93 *Pawl Spring*
94 *Cap Nut*
95 *Quadrant*
96 *Feather Key*
105 *Cottered Rivet Pin*

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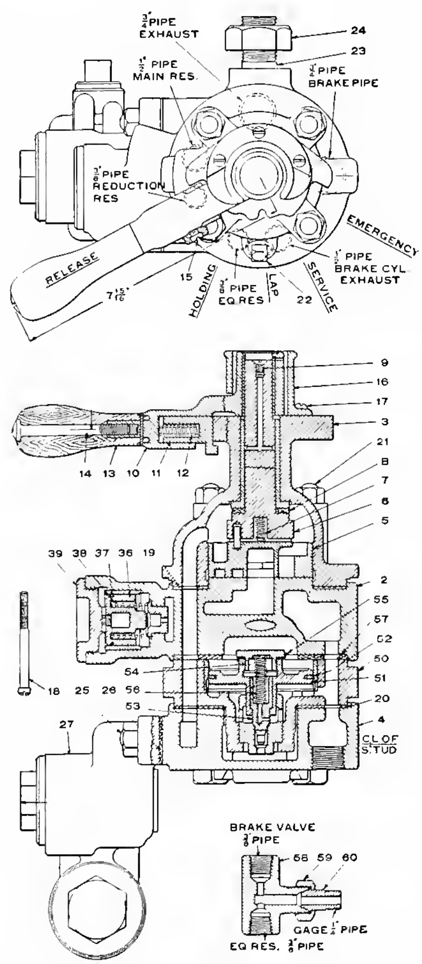

Fig. 1323—Motorman's Automatic Brake Valve, Type M-19-C.

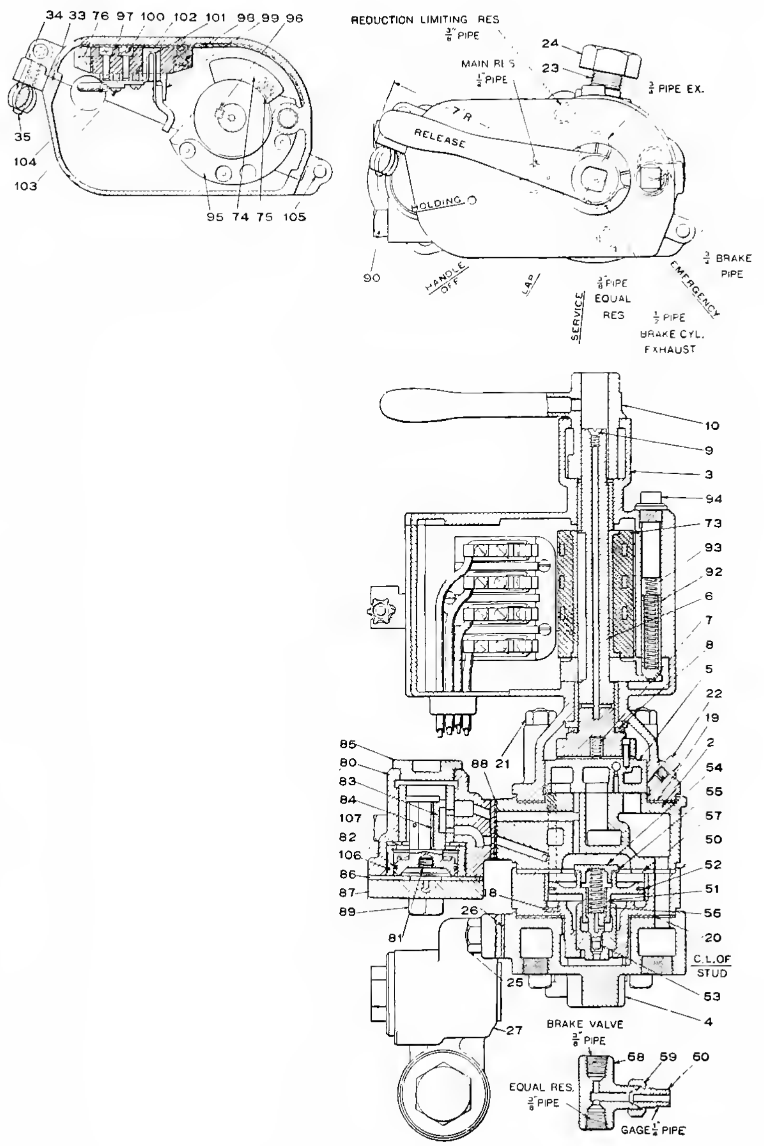

Fig. 1324—Motorman's Electro-Pneumatic Brake Valve, Type ME-23.

Parts of Type M-19-C Brake Valve, Fig. 1323.

2 *Valve Seat*
3 *Body*
4 *Type A Pipe and Feed Valve Bracket*
5 *Rotary Valve*
6 *Rotary Valve Key*
7 *Rotary Valve Spring*
8 *Key Washer*
9 *Oil Screw*
10 *Handle*
11 *Latch*
12 *Latch Spring*
13 *Handle Grip*
14 *Grip Screw*
15 *Latch Screw*
16 *Handle Guard*
17 *Handle Guard Screw*
18 *Fillister Head Screw*
19 *Upper Gasket*
20 *Lower Gasket*
21 *Bolt and Nut*
22 *Oil Plug*
23 *Holding Stud*
24 *Holding Nut*
25 *Feed Valve Stud and Nut*
26 *Feed Valve Gasket*
27 *C-6 Feed Valve*
36 *Automatic Valve*
37 *Automatic Valve Packing Ring*
38 *Automatic Valve Spring*
39 *Flush Nut*
50 *Bottom Case*
51 *Equalizing Piston and Valve*
52 *Piston Ring*
53 *Equalizing Piston Valve*
54 *Cap Nut*
55 *Piston Washer*
56 *Equalizing Piston Spring*
57 *Intermediate Gaskets*
58 *Tee for Gage and Equalizing Reservoir Pipes*
59 *Union Nut*
60 *Union Swivel*

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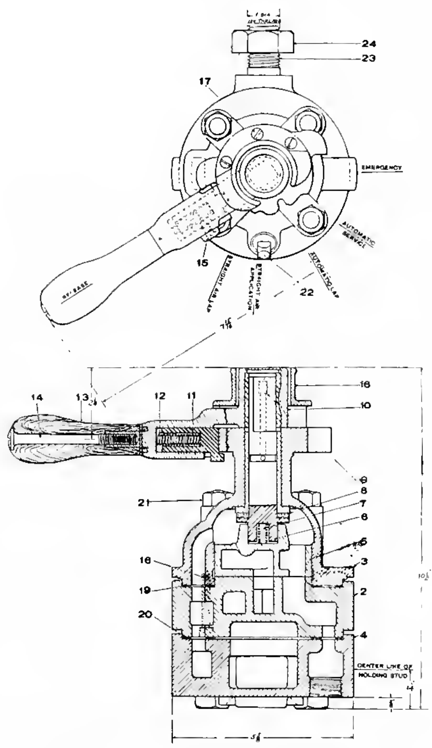


Fig. 1325—Motorman's Automatic Brake Valve, Type M-22.

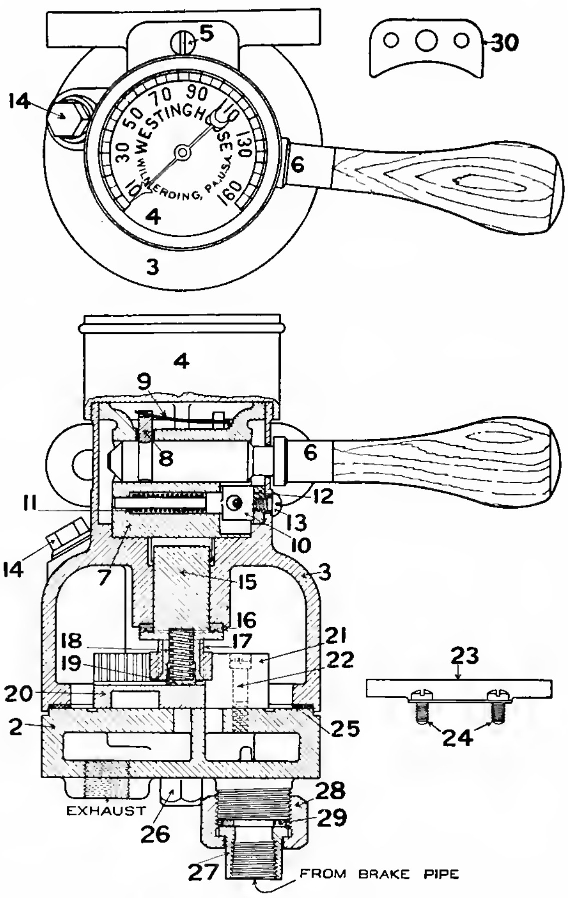


Fig. 1326—Motorman's Straight Air Brake Valve, Type SQ.

Parts of Type M-22 Brake Valve, Fig. 1325.

2 *Volve Seat*
3 *Body*
4 *Type B Pipe Bracket*
5 *Rotary Volve*
6 *Rotary Valve Key*
7 *Rotary Valve Spring*
8 *Key Washer*
9 *Oil Screw*
10 *Handle*
11 *Latch*
12 *Latch Spring*
13 *Handle Grip*
14 *Grip Screw*
15 *Latch Screw*
16 *Handle Guard*
17 *Handle Guard Screw*
18 *Fillister Head Screw*
19 *Upper Gasket*
20 *Lower Gasket*
21 *Bolt and Nut*
22 *Oil Plug*
23 *Holding Stud*
24 *Holding Nut*

Parts of Type SQ Brake Valve, Fig. 1326.

2 *Valve Seat*
3 *Body*
4 *Air Gage, Single Pointer*
5 *Gage Screw*
6 *Handle*
7 *Handle Socket*
8 *Handle Latch*
9 *Handle Latch Spring*
10 *Socket Latch*
11 *Socket Latch Spring*
12 *Index Plate*
13 *Index Plate Screw*
14 *Oil Plug*
15 *Slide Valve Spindle*
16 *Slide Valve Washer*
17 *Pinion*
18 *Slide Valve Spring*
19 *Slide Valve Wearing Plate*
20 *Slide Valve*
21 *Rear Guide*
22 *Rear Guide Screw*
23 *Front Guide*
24 *Front Guide Screw*
25 *Valve Seat Gasket*
26 *Cap Screw*
27 *Union Swivel*
28 *Union Nut*
29 *Union Gasket*

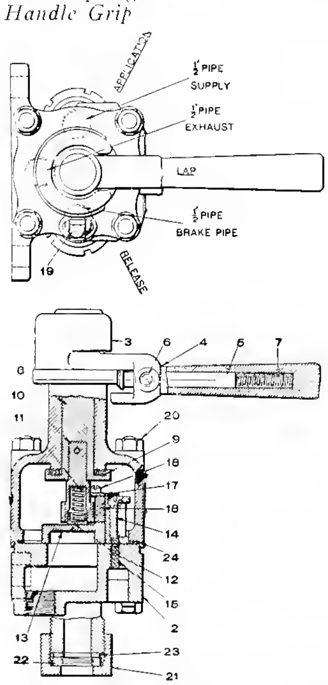


Fig. 1327—Motorman's Straight Air Brake Valve, Type SY.

Parts of Type SY Brake Valve, Fig. 1327.

2 *Valve Seat*
3 *Body*
4 *Handle*
5 *Handle Latch*
6 *Handle Latch Screw*
7 *Handle Latch Spring*
8 *Shaft*
9 *Washer for Shaft*
10 *Pinion*
11 *Slide Valve Spring*
12 *Slide Valve Spring Tip*
13 *Slide Valve and Rack*
14 *Valve and Rack Guide with Dowels*
15 *Fillister Head Screw*
16 *Rack with Dowel*
17 *Rack Plate*
18 *Fillister Head Screw*
19 *Oil Plug*
20 *Bolt and Nut*
21 *Union Nut*
22 *Union Swivel Ring*
23 *Union Gasket*
24 *Gasket*

Parts of Type SX-2 Brake Valve, Fig. 1328.

2 *Rotary Valve Seat*
3 *Body*
4 *Pipe Bracket*
5 *Rotary Valve*
6 *Rotary Valve Key*
7 *Rotary Valve Key Spring*
8 *Rotary Valve Key Washer*
9 *Oil Screw*
10 *Handle*
11 *Latch*
12 *Latch Spring*
13 *Handle Grip*
14 *Handle Grip Screw*
15 *Handle Latch Screw*
16 *Handle Guard*
17 *Round Head Machine Screw*
18 *Fillister Head Screw*
19 *Upper Gasket*
20 *Lower Gasket*
21 *3/8 in. by 5 in. Hexagon Head Bolt and Nut*
22 *Oil Plug*

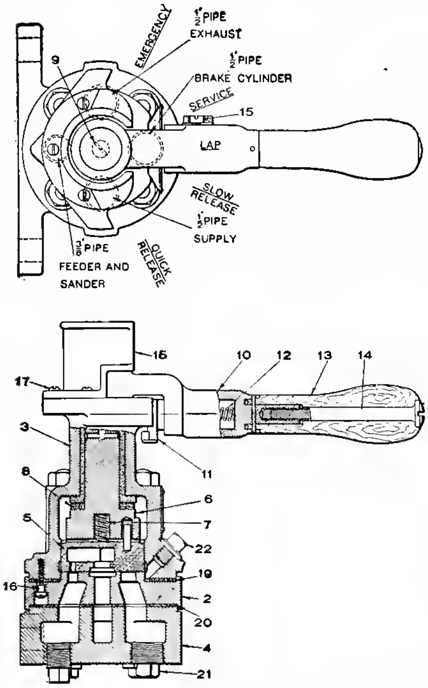


Fig. 1328—Motorman's Straight Air Brake Valve, Type SX-2.

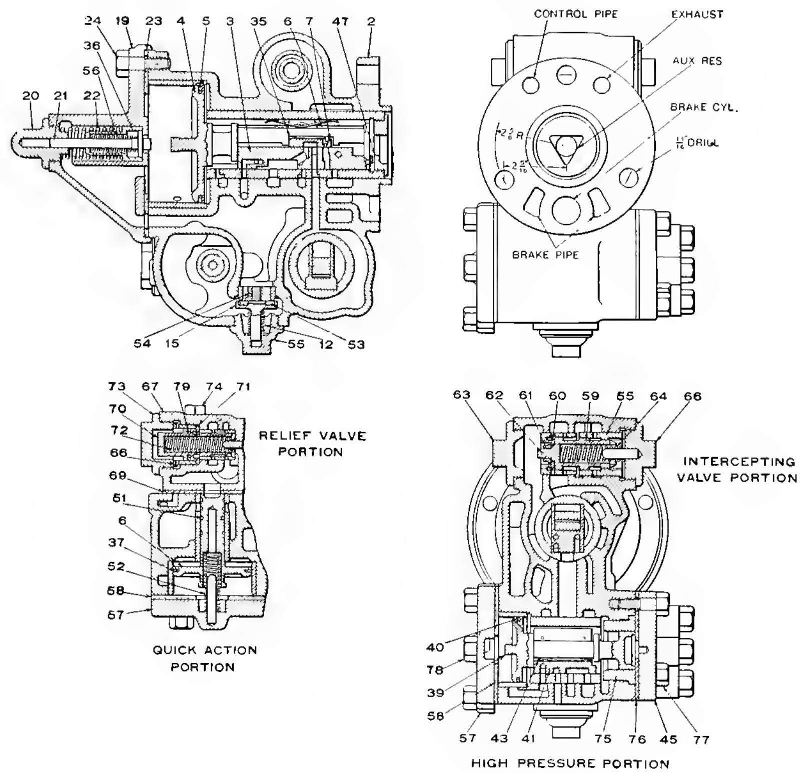


Fig. 1329—Type L-2-G Triple Valve.

Parts of Type L-2-G Triple Valve, Fig. 1329.

2 *Body*
3 *Main Slide Valve*
4 *Main Piston*
5 *Main Piston Ring*
6 *Main Slide Valve Spring*
7 *Graduating Valve*
8 *Emergency Piston*
12 *Check Valve Spring*
15 *Check Valve*
19 *Main Cylinder Cap*
20 *Graduating Spring Nut*
21 *Graduating Stem*
22 *Graduating Spring (Large)*
23 *Main Cylinder Cap Gasket*
24 *Cap Screw*
35 *Graduating Valve Spring*
37 *Emergency Piston Ring (Large)*
38 *Graduating Sleeve*
39 *By-Pass Piston*
40 *By-Pass Piston Ring*
41 *By-Pass Slide Valve*
43 *By-Pass Slide Valve Spring*
45 *By-Pass Cover (Small)*
47 *End Cap*
51 *Emergency Piston Ring (Small)*
52 *Emergency Piston Spring*
53 *Check Valve Seat*
54 *Check Valve Nut*
55 *Check Valve Cap Nut*
56 *Graduating Spring (Small)*
57 *Emergency Piston Cover*
58 *Emergency Piston Cover Gasket*
59 *Transfer Piston Valve*
60 *Transfer Piston Valve Seat*
61 *Transfer Piston Valve Nut*
62 *Steel Cotter*
63 *Transfer Piston Valve Cap Nut*
64 *Transfer Piston Valve Spring*
65 *Transfer Piston Valve Bush (Small)*
66 *Transfer Piston Valve Cap Nut and Spring Guide*
67 *Relief Valve Body*
68 *Relief Valve Bush*
69 *Relief Valve Gasket*
70 *Piston Relief Valve*
71 *Piston Relief Valve Seat*
72 *Piston Relief Valve Spring*
73 *Piston Relief Valve Cap Nut*
74 *Cap Screw*
75 *By-Pass Piston Bush (Small)*
76 *By-Pass Piston Cover Gasket (Small)*
77 *and* 78 *Cap Screw*

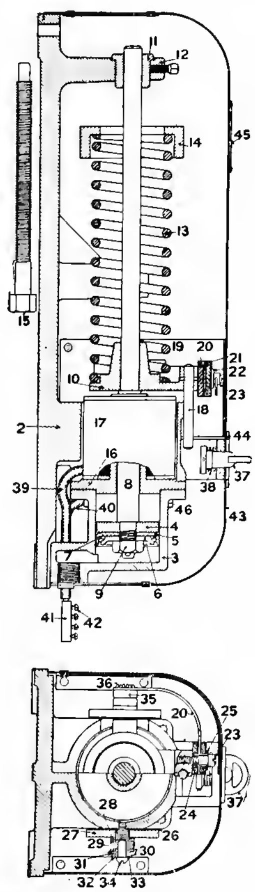


Fig. 1330—Electric Compressor Governor, Type G-1-A.

Westinghouse Air Brake Company.

Parts of Compressor Governor, Fig. 1330.

2 *Base*
3 *Cylinder*
4 *Piston*
5 *Piston Packing*
6 *Piston Follower*
7 *Packing Leather Expander*
8 *Piston Rod*
9 *Piston Nut*
10 *Armature*
11 *Piston Rod Guide*
12 *Set Screw*
13 *Regulating Spring*
14 *Spring Yoke*
15 *Adjusting Bolt*
16 *Magnet Core*
17 *Magnet Coil*
18 *Pin for Armature*
19 *Circuit Closer Insulator*
20 *Circuit Closer*
21 *Circuit Closer Insulator*
22 *Washer*
23 *Fillister Head Screw with Drilled Head*
24 *Insulating Bush*
25 *Lock for Screw*
26 *Shield Cushion*
27 *Arc Shield*
28 *Insulation for Fixed Contact*
29 *Fixed Contact*
30 *Controller Clip*
31 *Contact Screw Insulator*
32 *Insulating Washer*
33 *Bushing*
34 *Contact Screw*
35 *Tip for Circuit Closer*
36 *Button Head Screw*
37 *Latch*
38 *Spring for Latch*
39 *Lead*
40 *Washer*
41 *Connector for Lead*
42 *Round Head Screw*
43 *Cover*
44 *Latch Plate*
45 *Insulating Bush*
46 *Fillister Head Screw*

Parts of Type M-2-A Triple Valve, Fig. 1331.

2 *Body*
3 *Slide Valve*
4 *Main Piston*
5 *Main Piston Ring*
6 *Slide Valve Spring*
7 *Graduating Valve*
8 *Graduating Valve Spring*
9 *Check Valve*
10 *Rubber Seat for Check Valve*
11 *Check Valve Spring*
12 *Check Valve Cap*
13 *By-Pass Piston*
14 *By-Pass Piston Ring*
15 *By-Pass Piston Cap*
16 *By-Pass Valve*
17 *Rubber Seat for By-Pass Valve*
18 *By-Pass Valve Cap*
19 *By-Pass Valve Spring*
20 *Cylinder Cap*
21 *Graduating Spring Nut*
22 *Graduating Spring*
23 *Graduating Sleeve*
24 *Bolt and Nut*
25 *Cylinder Cap Gasket*
26 *End Cap*

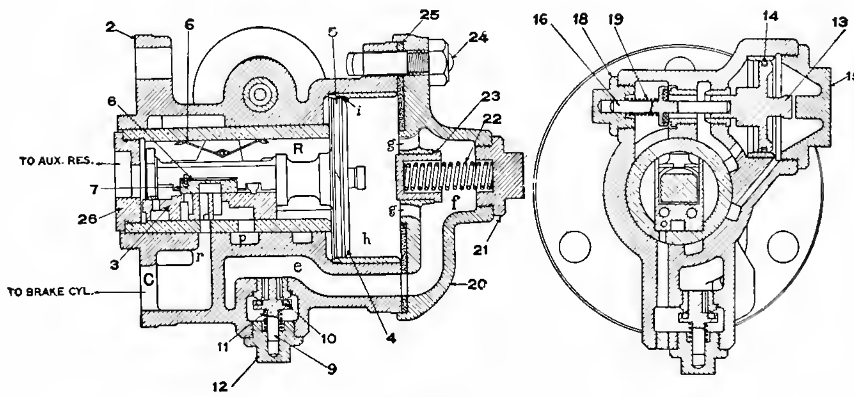


Fig. 1331—Type M-2-A Triple Valve.

Parts of Type S-6 Compressor Governor, Fig. 1332.

2 *Frame*
3 *Guide Pin*
4 *Finger Board Insulation*
5 *Finger*
6 *Adjusting Screw Jam Nut*
7 *Finger Adjusting Screw*
8 *Finger Base*
9 *Screw for Securing Finger to Finger Base*
10 *Finger Clamp*
11 *Finger Board Screw*
12 *Switch Cover*
13 *Eye Bolt Thumb Nut*
14 *Cover Eye Bolt*
15 *Eye Bolt Rivet*
16 *Switch Piston and Rod*
17 *Piston Spring*
18 *Piston Spring Seat*
19 *Piston Seal*
20 *Switch Piston Ring*
36 *Piston Rod Cotter*
37 *Piston Rod Nut*
38 *Piston Rod Brass Washer*
39 *and* 40 *Piston Rod Fibre Washers*
41 *Square Fibre Brush*
42 *Contact Screw*
43 *Switch Spider*
44 *Switch Spider Contact*
45 *Piston Rod Fibre Washer*
46 *Piston Rod Brass Washer*
47 *Lead Screw*
48 *Finger Board*
50 *Porcelain Bush for Leads*
107 *Tee Head Bolt and Nut*
301 *Gasket*
302 *Valve Case*
303 *Cut-in Valve Cap*
304 *Cut-out Valve*
305 *Cut-in Valve*
306 *Cut-in Valve Spring*
307 *Extension Piece*
310 *Cut-out Valve Spring*
311 *Cut-in Regulating Nut*
312 *Jam Nut*
314 *Cut-out Regulating Nut*
315 *Spring Stem*
317 *Cut-out Valve Cap*
318 *Cut-in Valve Seat Retainer*
319 *Cut-in Valve Leather Washer*
320 *Cut-in Valve Washer*

Parts of Type A-1 Compressor Switch, Fig. 1333.

2 *Frame*
3 *Guide Pin*
4 *Finger Board Insulation*
5 *Finger*
6 *Adjusting Screw Jam Nut*
7 *Finger Adjusting Screw*
8 *Finger Base*
9 *Screw for Securing Finger to Finger Base*
10 *Finger Clamp*
11 *Finger Board Screw*
12 *Switch Cover*
13 *Eye Bolt Thumb Nut*
14 *Cover Eye Bolt*
15 *Eye Bolt Rivet*
16 *Switch Piston and Rod*
17 *Piston Spring for Pressure Above* 40 *lbs.*
18 *Piston Spring Seat*
19 *Piston Seal*
20 *Switch Piston Ring*
21 *Piston Washer*
23 *Piston Washer Screw*
36 *Piston Rod Cotter*
37 *Piston Rod Nut*
38 *Piston Rod Brass Washer*
39 *and* 40 *Piston Rod Fibre Washer*
41 *Square Fibre Bush*
42 *Contact Screw*
43 *Switch Spider*
44 *Switch Spider Contact*
45 *Piston Rod Fibre Washer*
46 *Piston Rod Brass Washer*
47 *Lead Screw*
48 *Finger Board*
50 *Porcelain Bush for Leads*
52 *Frame Gasket*
107 *Tee Head Bolt with Nut for Securing Switch to Pneumatic Portion*
501 *Body*
502 *Cover*
503 *Cap*
504 *Armature*
505 *Armature Stem*
506 *Magnet Core*
507 *Core Pole*
508 *Magnet Coil*
510 *Button Head Cap Screw*

Westinghouse Air Brake Company.

Parts of Type A-1 Compressor Switch, Fig. 1333. (Continued.)

511	*Insulator*	515	*Supply Valve*
512	*Brass Washer*	516	*Supply Valve Spring*
513	*Contact Screw*	517	*Supply Valve Seat*
514	*Exhaust Valve*	518	*Cap Nut*

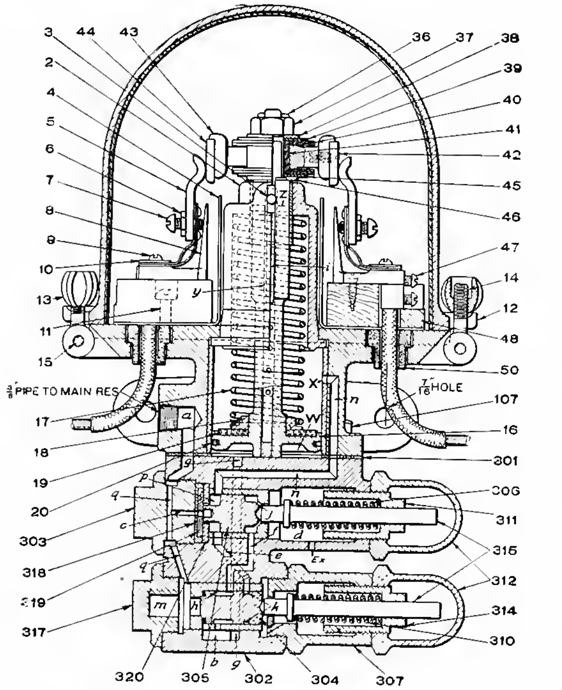
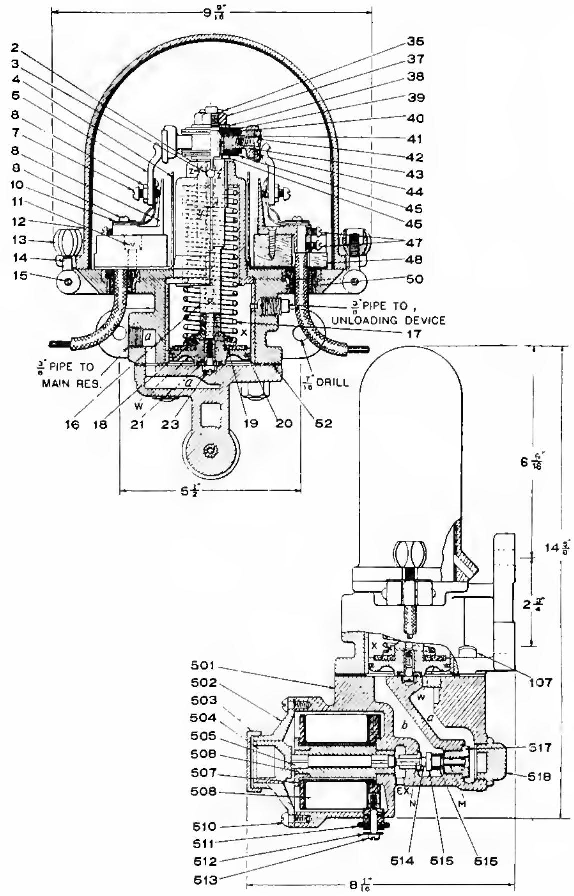


Fig. 1332—Electric Compressor Governor, Type S-6.



Weight, 35 lbs.

Fig. 1333—Electro-Pneumatic Compressor Switch, Type A-1.

Parts of Compressor Governor, Type J, Fig. 1335.

2 *Frame*
3 *Guide Pin*
4 *Finger Board Insulation*
5 *Finger*
6 *Adjusting Screw Jam Nut*
7 *Finger Adjusting Screw*
8 *Finger Base*
9 *Screw for Securing Finger to Finger Base*
10 *Finger Clamp*
11 *Finger Board Screw*
12 *Switch Cover*
13 *Eye Bolt Thumb Nut*
14 *Cover Eye Bolt*
15 *Eye Bolt Rivet*
16 *Switch Piston and Rod*
17 *Piston Spring*
18 *Piston Spring Seat*
19 *Piston Seat*
20 *Switch Piston Ring*
21 *Piston Washer*
23 *Piston Washer Screw*
24 *Large Ring for Double Piston*
25 *Double Piston with Rings*
26 *Regulating Valve Cap*
27 *Regulating Valve Spring*
28 *Regulating Valve for Cutting Out*
36 *Piston Rod Cotter*
37 *Piston Rod Nut*
38 *Piston Rod Brass Washer*
39 *and* 40 *Piston Rod Fibre Washer*
41 *Square Fibre Bush*
42 *Contact Screw*
43 *Switch Spider*
44 *Switch Spider Contact*
45 *Piston Rod Fibre Washer*
46 *Piston Rod Brass Washer*
47 *Lead Screw*
48 *Finger Board*
50 *Porcelain Bush for Leads*
52 *Frame Gasket*
53 *Valve Case*
54 *Cylinder Head and Diaphragm Cover*
55 *Cylinder Gasket*
56 *Small Ring for Double Piston*
57 *Piston Bush*
58 *Diaphragm Cap Nut*
59 *Diaphragm Ring*
60 *Diaphragm*
61 *Diaphragm Spindle*
62 *Regulating Spring*
63 *Regulating Nut*
64 *Regulating Check Nut*
65 *Regulating Valve for Cutting In*
66 *Regulating Valve Spring*
67 *Diaphragm Spindle*
68 *Regulating Nut*
69 *Regulating Check Nut*
70 *Regulating Spring*
71 *Diaphragm*
72 *Diaphragm Ring*
73 *Diaphragm Cap Nut*
74 *Cylinder Gasket*
75 *Cylinder Head and Diaphragm Cover*
76 *Slide Valve*
77 *Slide Valve Spring*
78 *Pipe Plug*
80 *Short Cap Screw for Cylinder Head*
81 *Long Cap Screw for Cylinder Head*
107 *Tee-Head Bolt with Nut for Securing Switch to Controlling Mechanism*

Westinghouse Air Brake Company.

Parts of Type E-6 Safety Valve, Fig. 1334.

2 *Body*
3 *Cap Nut*
4 *Valve*
5 *Valve Stem*
6 *Spring (50 lbs. to 90 lbs.)*
7 *Regulating Nut*

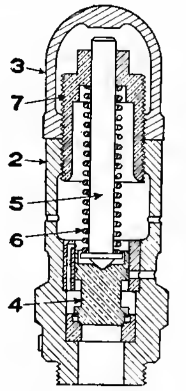


Fig. 1334 — Type E-6 Safety Valve.

Parts of Application and Release Magnets, Fig. 1336.

501 *Pipe Bracket*
502 *Magnet Bracket Body*
503 *Cap Nut and Valve Stop*
504 *Cylinder Supply Valve*
505 *Seat for Cylinder Supply Valve*
506 *Cap Nut with Choke*
507 *Magnet Bracket Gasket*
508 *Spring (15 lbs. Differential)*
509 *Pipe Bracket Gasket*
510 *Tee-Head Bolt and Nut*

Parts Common to Application and Release Magnets.

511 *Magnet Cap*
512 *Top Cover*
513 *Leather Gasket*
514 *Cotter*
515 *Plunger*
516 *Special Washer*
517 *Terminal Insulator*
518 *Terminal*
519 *Brass Washer*
520 *Nut*
521 *and* 522 *Rubber Gasket*
523 *Lead Washer*
524 *Magnet Valve Spring*
525 *Magnet Valve Cap*

Application Magnet.

526 *Magnet Core*
527 *Back Strap*
528 *Magnet Coil*
529 *Armature Stem*
530 *Magnet Valve*
531 *Cover*

Release Magnet.

540 *Magnet Core*
541 *Back Strap*
542 *Magnet Coil*
543 *Armature Stem*
544 *Magnet Valve*
545 *Spring Guide*

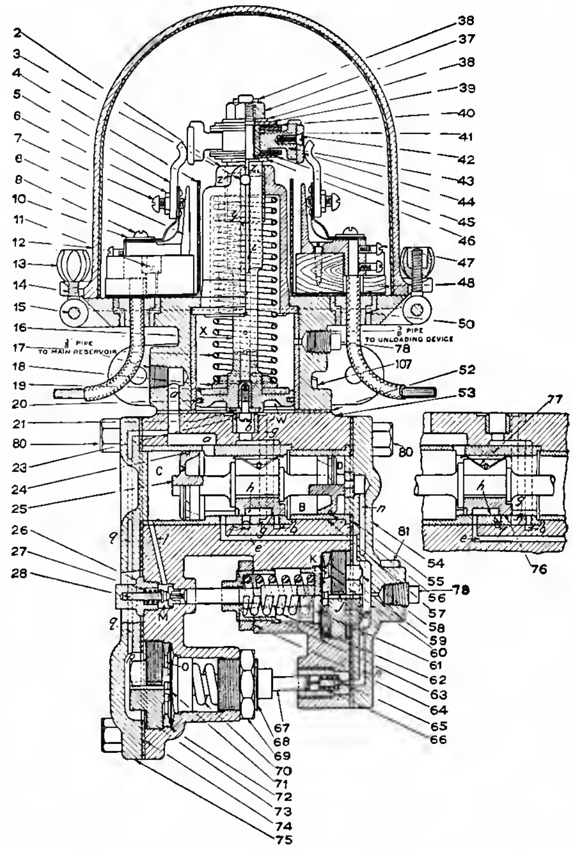


Fig. 1335—Type J Electric Compressor Governor.

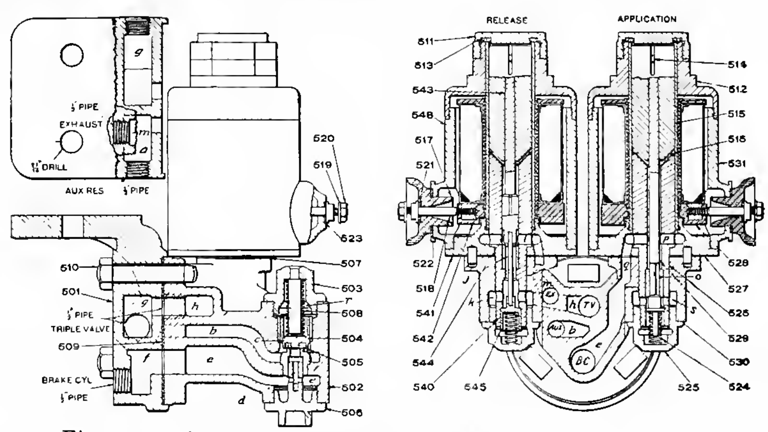


Fig. 1336—Application and Release Magnets for Interborough Rapid Transit Company.

Parts of Type R Brake Cylinder, Fig. 1337.

2 *Cylinder Body*
3 *Piston and Rod*
4 *Non-Pressure Head*
5 *Pressure Head*
6 *Follower*
7 *Packing Leather*
8 *Packing Expander*
9 *Release Spring*
10 *Follower-Stud and Nut*
11 *Pressure-Head Bolt and Nut*
12 *Non-Pressure-Head Bolt and Nut*
13 *Cylinder Gasket*
14 *Push Rod with Pin and Cotter*
15 *Push Rod Pin with Cotter*
16 *Detachable Lever Bracket*
17 *Lever Bracket Bolt and Nuts*
18 *¼ in. Pipe Plug*
19 *Exhaust Pipe Plug*
20 *½ in. Pipe Plug*
21 *¾ in. Pipe Plug*
22 *1 in. Pipe Plug*
23 *Triple Valve Gasket*
24 *Triple Valve Stud and Nut*
25 *Triple Valve Bolt and Nut*

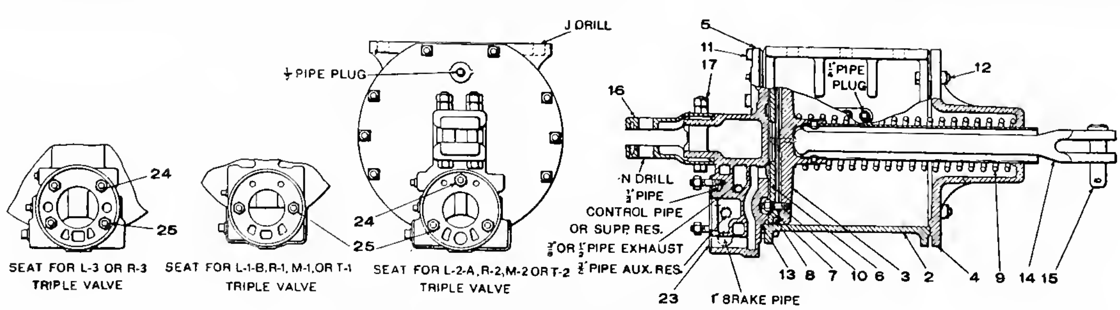
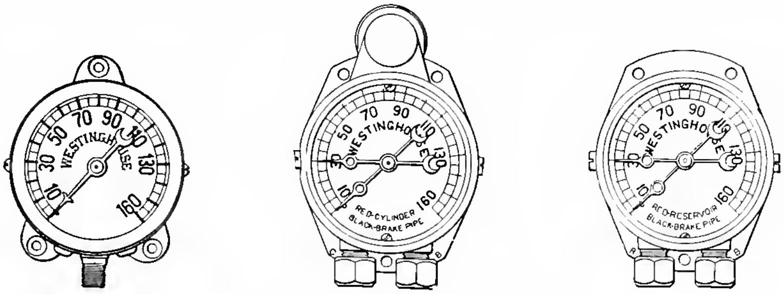


Fig. 1337—Traction Brake Cylinder, Type R.

Westinghouse Air Brake Company.



Single Pointer. Duplex, Illuminated. Duplex.

Fig. 1338—Air Gages.

Parts of Cut-Out Cock, Fig. 1339.

2 *Body*
3 *Key*
4 *Cap*
5 *Spring*
6 *Handle*

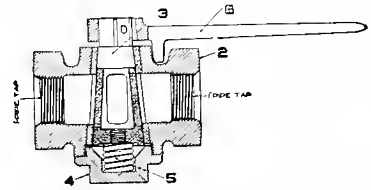


Fig. 1339—One Inch Cut-Out Cock.

Parts of Type B-3 Conductor's Valve, Fig. 1340.

2 *Body*
3 *Vent Valve*
4 *Rubber Seat*
5 *Valve Nut*
6 *Valve Spring*
7 *Cap*
8 *Valve Lever*
9 *Operating Lever*
10 *Rivet*
11 *Cotter*

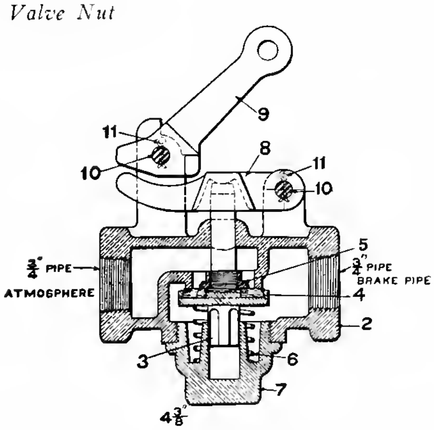


Fig. 1340—Type B-3 Conductor's Valve.

Parts of Angle Cock, Fig. 1341.

2 *Body*
3 *Key*
4 *Cap*
5 *Spring*
6 *Handle*
7 *Handle Socket*
9 *1¼ in. by 1 in. Bushing*

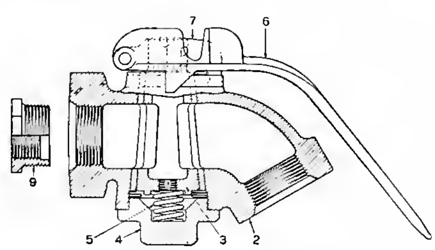


Fig. 1341—Self Locking Angle Cock.

Fig. 1342—Threaded Hose Nipple.

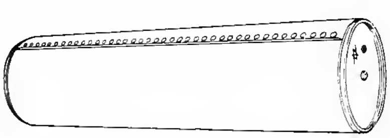


Fig. 1343—Main Reservoir.

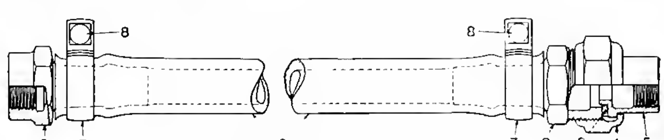


Fig. 1344—Hose and Coupling.

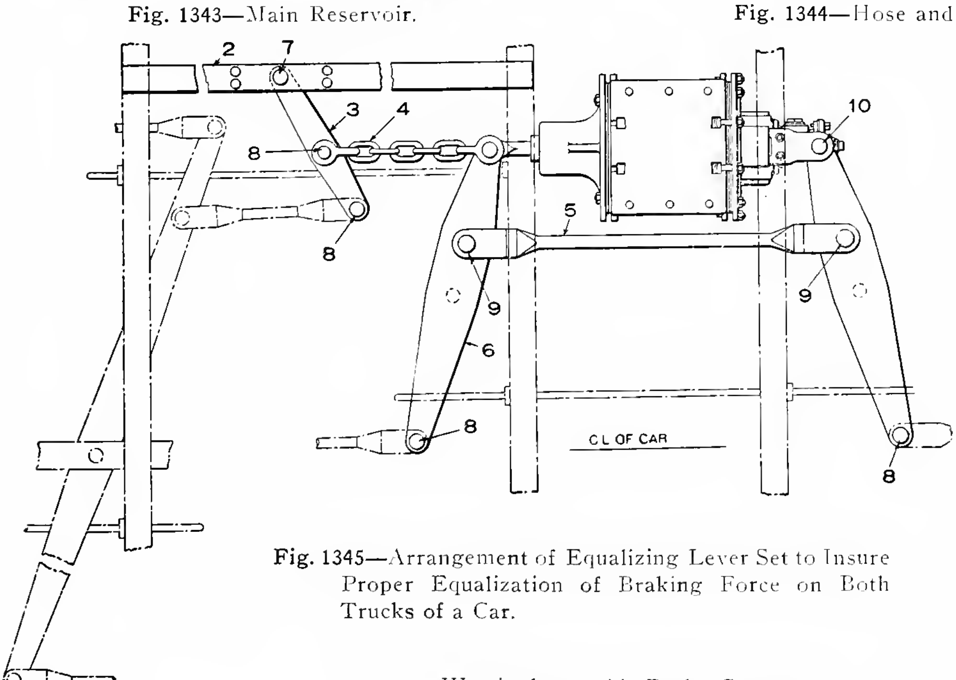


Fig. 1345—Arrangement of Equalizing Lever Set to Insure Proper Equalization of Braking Force on Both Trucks of a Car.

Parts of Hose and Coupling, Fig. 1344.

2 *1¼ in. by 22 in. Hose*
3 *Union Hose Nipple*
4 *Union Nut*
5 *Union Swivel*
6 *Union Gasket*
7 *Hose Clamp*
8 *Hose Clamp Bolt and Nut*
9 *Tapped Hose Nipple*

Parts of Equalizing Lever Set, Fig. 1345.

2 *Multiplying Lever Fulcrum Bracket*
3 *Multiplying Lever*
4 *Connecting Chain*
5 *Cylinder Lever Rod*
6 *Cylinder Lever*
7 *Pin for Fulcrum Bracket*
8, 9 *and* 10 *Pins*

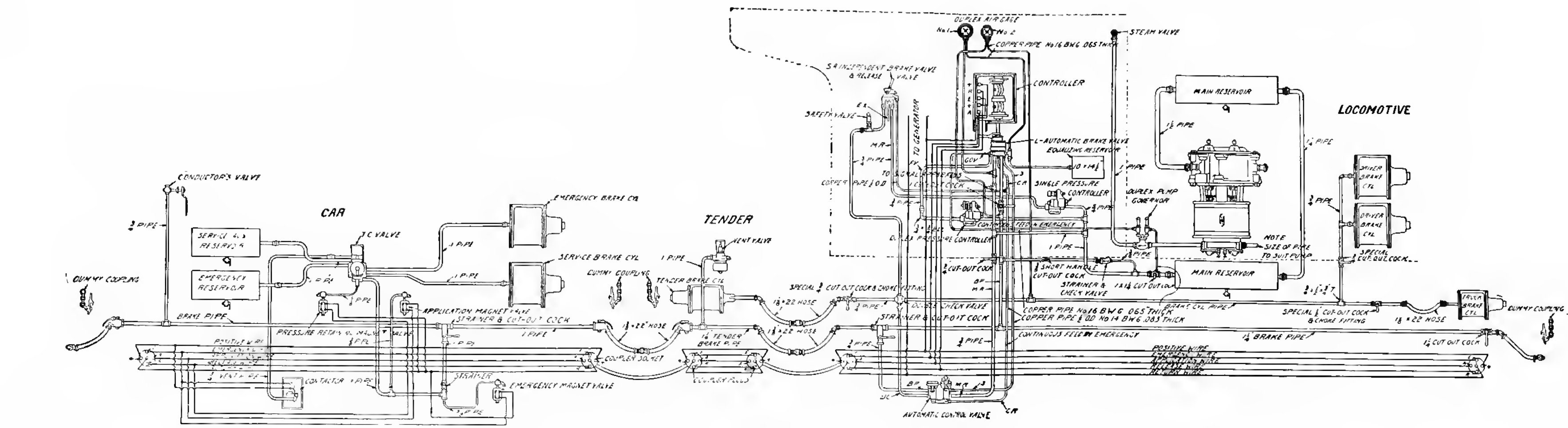


Fig. 1346—Piping Diagram of New York Electro-Pneumatic Brake for Use on Steam-Propelled Trains.

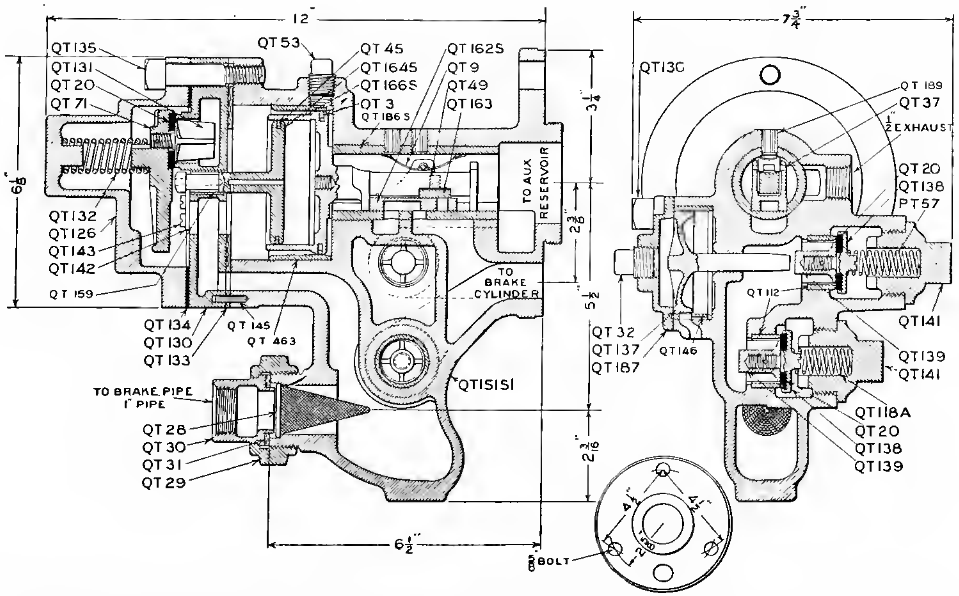


Fig. 1347—Quick Action Triple Valve, Styles S1A and S1B, for 12 in., 14 in. and 16 in. Passenger Brake Cylinders.

New York Air Brake Company.

Parts of Triple Valve, Fig. 1347.

QT 3	*Main Piston Spring*	QT 133	*Main Cylinder Gasket*
QT 9	*Exhaust Valve Spring*	QT 134	*Front Cap Gasket*
QT 20	*Rubber Valve Seat*	QT 135	*Front Cap Bolt*
QT 28	*Strainer*	QT 136	*Side Cap Bolt*
QT 29	*Union Nut*	QT 137	*Quick Action Valve Piston*
QT 30	*Union Swivel*	QT 138	*Check Valve*
QT 31	*Union Gasket*	QT 139	*Check Valve Guide*
QT 32	*Pipe Plug*	QT 141	*Check Valve Cap*
QT 37	*Exhaust Valve Pin*	QT 142	*Piston Stop*
QT 45	*Vent Valve Pistan Ring*	QT 143	*Piston Stap Screw*
QT 49	*Graduating Valve Spring*	QT 151SI	*Triple Valve Bady*
QT 53	*Pipe Plug*	QT 161S	*Exhaust Valve*
QT 69	*Triple Valve Gasket*	QT 163	*Graduating Valve*
QT 71	*Vent Valve*	QT 164S	*Vent Valve Pistan*
QT 118A	*Check Valve Spring*	QT 166S	*Main Pistan*
QT 126	*Frant Cap*	QT 187	*Side Cap*
QT 130	*Vent Valve Seat*	PT 57	*Quick Action Valve Spring*
QT 131	*Vent Valve Guide*	QT 63S	*Bushing*
QT 132	*Vent Valve Spring*	QT 186S	*Bushing*

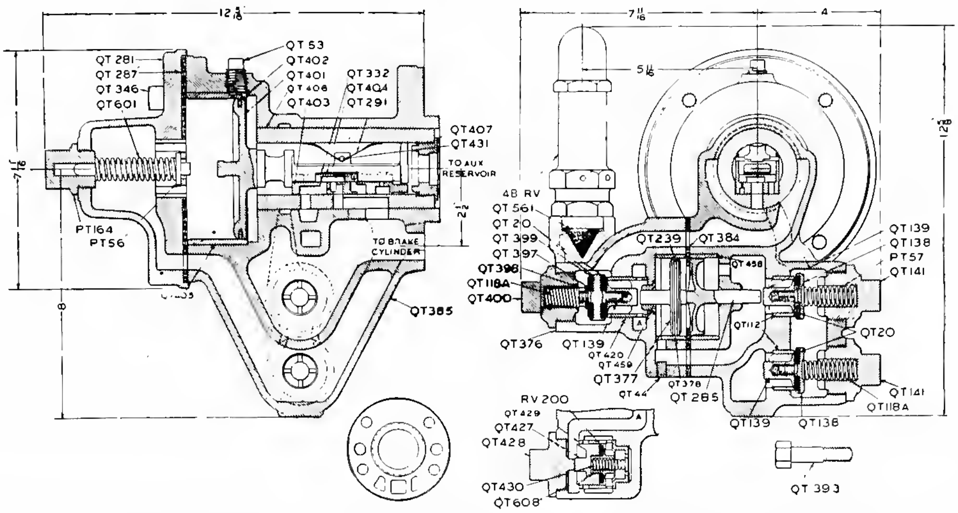


Fig. 1348—Quick Action Pipeless Triple Valve, J6, Style A with High Emergency Pressure Cap and Safety Valve. Used with 16 and 18 in. Passenger Brake Cylinders.

Parts of Triple Valve, Fig. 1348.

QT 20	*Rubber Seat*	QT 332	*Graduating Valve Spring*	QT 404	*Graduating Valve*
QT 53	*3/8 in. Pipe Plug*	QT 346	*Front Cap Bolt*	QT 407	*Exhaust Valve Stop*
QT 118A	*Check Valve Spring*	QT 376	*Emergency Cap Body*	QT 427	*Lower Valve*
QT 138	*Check Valve*	QT 377	*Emergency Piston*	QT 428	*Lower Valve Cap*
QT 139	*Check Valve Guide*	QT 384	*Emergency Cap Gasket*	QT 430	*Lower Valve Spring*
QT 141	*Check Valve Cap*	QT 385	*Body*	QT 431	*Exhaust Valve Pin*
QT 239	*Emergency Valve Piston Packing Ring*	QT 393	*1/2 in. by 2 in. Tap Bolt*	QT 561	*Strainer*
		QT 397	*Washer*	QT 601	*Graduating Spring*
QT 262	*Triple Valve Gasket*	QT 398	*Nut*	QT 608	*Lower Valve Guide*
QT 281	*Front Cap*	QT 399	*Check Valve*	PT 56	*Graduating Stem*
QT 285	*Quick Action Valve Piston*	QT 400	*Cap Nut*	PT 57	*Check Valve Spring*
		QT 401	*Main Piston*	PT 164	*Graduating Stem Nut*
QT 287	*Front Cap Gasket*	QT 402	*Piston Packing Ring*	RV 200	*Lower Valve Seat*
QT 291	*Exhaust Valve Spring*	QT 403	*Exhaust Valve*	48 RV	*Safety Valve Complete*

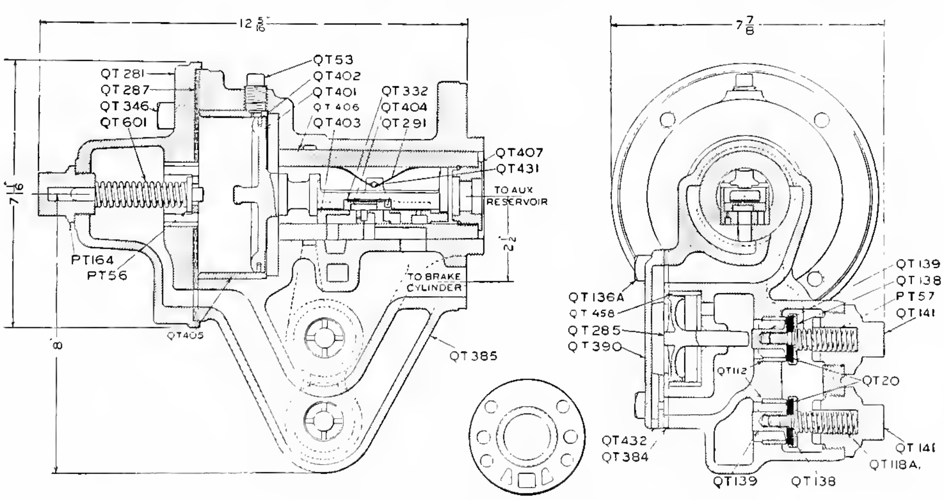


Fig. 1349—Quick Action Pipeless Triple Valve J6, Style B, for 16 and 18 in. Passenger Brake Cylinders.

Parts of Triple Valve, Fig. 1349.

QT 20	*Rubber Seat*	QT 285	*Quick Action Valve Piston*	QT 402	*Piston Packing Ring*
QT 53	*3/8 in. Pipe Plug*	QT 287	*Front Cap Gasket*	QT 403	*Exhaust Valve*
QT 118A	*Check Valve Spring*	QT 291	*Exhaust Valve Spring*	QT 404	*Graduating Valve*
QT 136A	*Side Cap Bolt*	QT 332	*Graduating Valve Spring*	QT 407	*Exhaust Valve Stop*
QT 138	*Check Valve*	QT 346	*Front Cap Bolt*	QT 431	*Exhaust Valve Pin*
QT 139	*Check Valve Guide*	QT 384	*Emergency Cap Gasket*	QT 601	*Graduating Spring*
QT 141	*Check Valve Cap*	QT 385	*Body*	PT 56	*Graduating Stem*
QT 262	*Triple Valve Gasket*	QT 390	*Side Cap*	PT 57	*Check Valve Spring*
QT 281	*Front Cap*	QT 401	*Main Piston*	PT 164	*Graduating Stem Nut*

New York Air Brake Company.

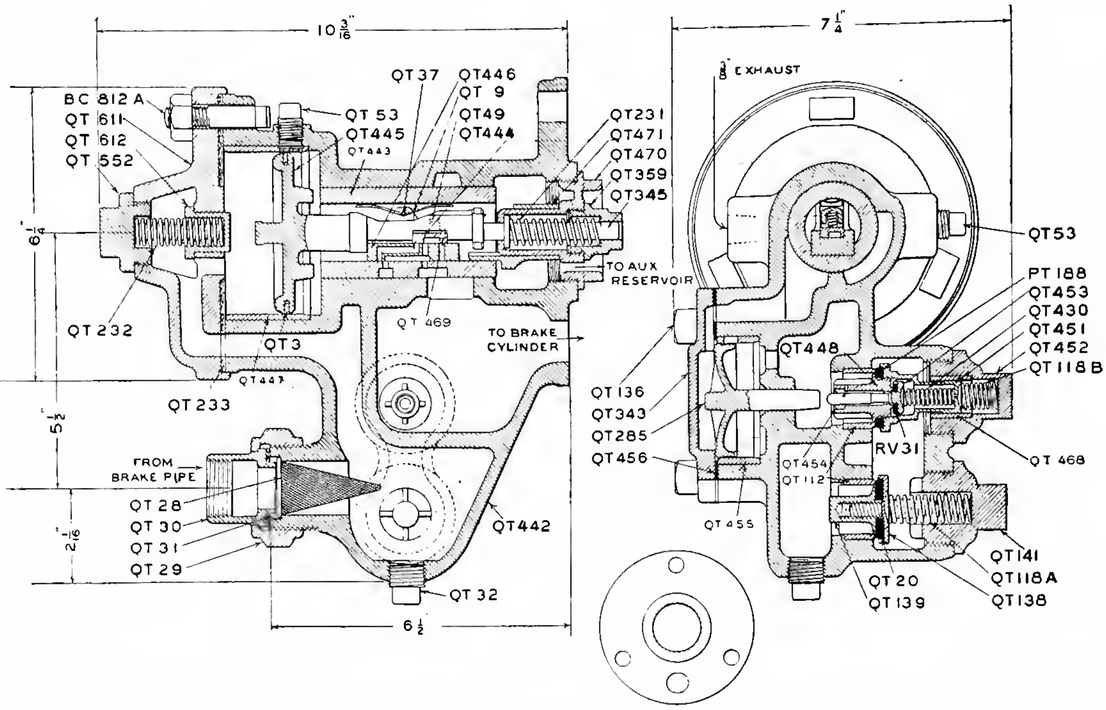


Fig. 1350—Quick Action Triple Valve, Style K6 with Quick Service, Uniform Release and Uniform Recharge, for 10 in. Freight Brake Cylinders.

Parts of Triple Valve, Fig. 1350.

QT 3	*Main Piston Ring*
QT 9	*Slide Valve Spring*
QT 20	*Check Valve Seat*
QT 28	*Strainer*
QT 29	*1 in. Union Nut*
QT 30	*1 in. Union Swivel*
QT 31	*1 in. Union Gasket*
QT 32	*½ in. Pipe Plug*
QT 37	*Slide Valve Pin*
QT 49	*Graduating Valve Spring*
QT 53	*⅜ in. Pipe Plug*
QT 118A	*Brake Pipe Check Valve Spring*
QT 118B	*Emergency Valve Spring*
QT 136	*Side Cap Bolts*
QT 138	*Check Valve*
QT 139	*Check Valve Guide*
QT 141	*Check Valve Cap*
QT 231	*Retard Spring*
QT 232	*Graduating Spring*
QT 233	*Front Cap Gasket*
QT 285	*Emergency Piston*
QT 343	*Side Cap*
QT 345	*Retard Stem*
QT 359	*Piston Stop Spring Abutment*
QT 430	*Quick Service Valve Spring*
QT 442	*Body*
QT 444	*Graduating Valve*
QT 445	*Main Piston*
QT 446	*Slide Valve*
QT 448	*Emergency Valve Guide*
QT 451C	*Emergency Valve*
QT 452	*Emergency Side Cap Nut*
QT 453	*Quick Service Valve*
QT 454	*Quick Service Valve Guide*
QT 456	*Side Cap Gasket*
QT 468	*Emergency Cap Nut Bushing*
QT 470	*Piston Stop Spring Box*
QT 471	*Piston Stop Abutment*
QT 552	*Front Cap Nut*
QT 611	*Front Cap*
QT 612	*Graduating Spring Guide*
PT 188	*Emergency Valve Seat*
BC 812A	*Tee Head Bolt*
RV 31	*Quick Service Valve Seat*

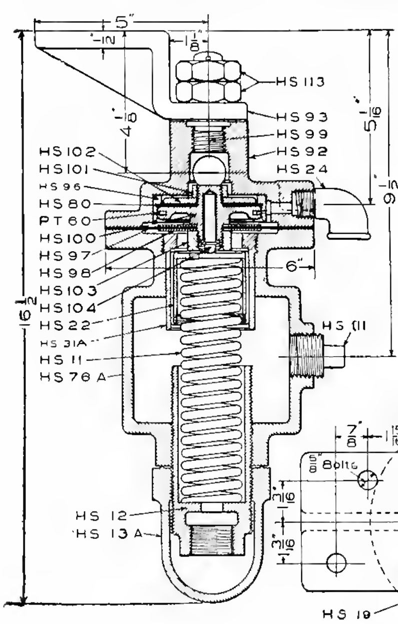
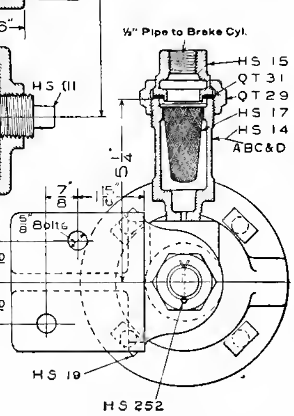



Fig. 1351—Compensating Valve, Style B1.

Parts of Compensating Valve, Fig. 1351.

HS 11	*Regulating Spring*
HS 12	*Regulating Nut*
HS 13A	*Check Nut*
HS 14A	*Union Stud*
HS 15	*Union Swivel*
HS 17	*Union Strainer*
HS 19	*Tee Head Bolt*
HS 22	*Spring Abutment*
HS 24	*Street Elbow*
HS 76A	*Spring Box*
HS 80	*Leather Washer*
HS 92	*Body*
HS 93	*Bracket*
HS 97	*Diaphragm*
HS 98	*Diaphragm Washer*
HS 99	*Bracket Stud*
HS 100	*Piston*
HS 101	*Top Piston Nut*
HS 102	*Piston Disc*
HS 103	*Bottom Piston Nut*
HS 104	*Rider Pin*
HS 111	*Plug*
HS 113	*Holding Nut*
HS 252	*Cotter*
PT 60	*Packing Ring*
QT 29	*Union Nut*
QT 31	*Union Gasket*
HS 31A	*Spring Box Bush*
HS 96	*Piston Bush*

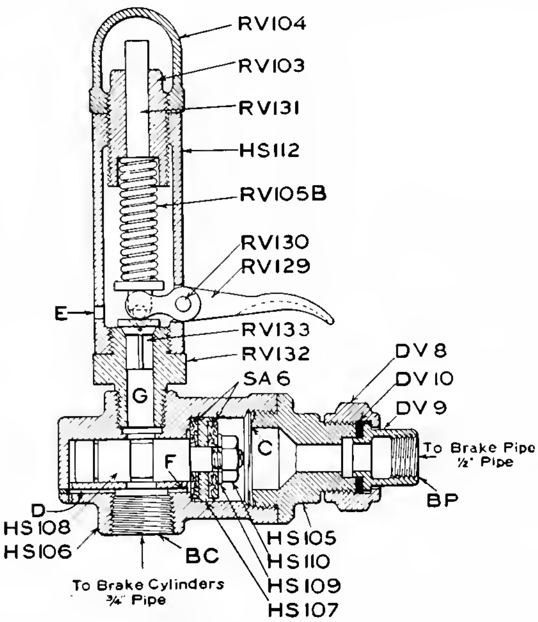


Fig. 1352—High Speed Controller.

Parts of High Speed Controller, Fig. 1352.

RV 103	*Regulating Nut*
RV 104	*Cap Nut*
RV 105B	*Regulating Spring*
RV 129	*Lever Handle*
RV 130	*Lever Handle Pin with Cotter*
RV 131	*Valve Stem*
RV 132	*Valve Seat*
RV 133	*Valve*
HS 105	*Cap*
HS 106	*Base*
HS 107	*Piston*
HS 108	*Piston Valve*
HS 109	*Washer*
HS 110	*Nut*
HS 112	*Body*
SA 6	*Leather Seat*
DV 8	*Union Nut*
DV 9	*Union Swivel*
DV 10	*Union Gasket*

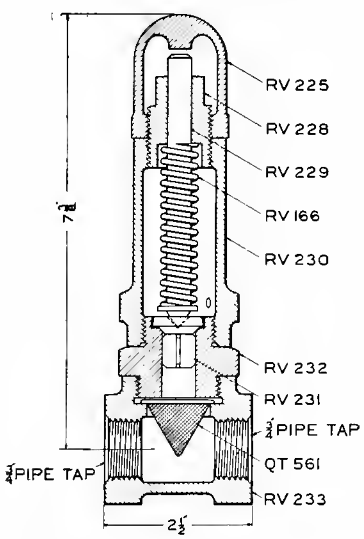


Fig. 1353—Safety Valve with Special Tee.

Parts of Safety Valves, Figs. 1353 and 1354.

RV 166	*Spring*
RV 225	*Cap Nut*
RV 228	*Regulating Nut*
RV 229	*Valve Stem*
RV 230	*Body*
RV 231	*Valve*
RV 232	*Valve Seat*
RV 233	*Special Tee*
QT 561	*Strainer*

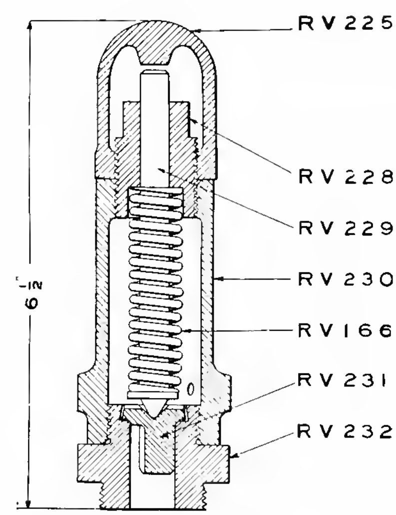


Fig. 1354—Safety Valve.

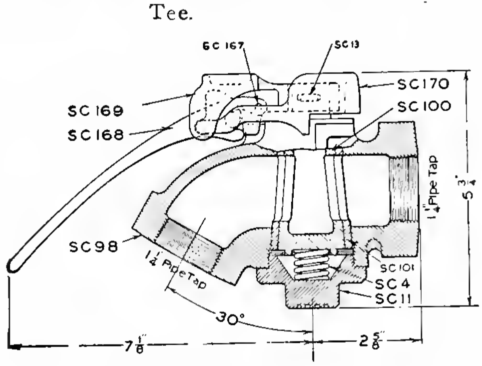


Fig. 1355—Angle Cock with Self-Locking Handle.

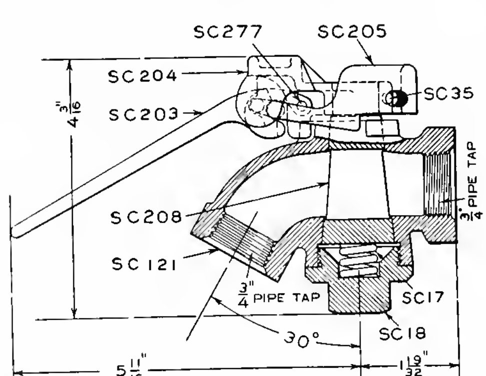


Fig. 1356—Angle Cock with Self-Locking Handle.

Parts of Angle Cock, Fig. 1355.

SC 4	*Spring*	SC 167	*Handle Pin*
SC 11	*Cap*	SC 168	*Handle*
SC 13	*Bracket Pin*	SC 169	*Bracket*
SC 98	*Body*	SC 170	*Latch*
SC 100	*Plug*		

Parts of Angle Cock, Fig. 1356.

SC 17	*Spring*	SC 204	*Bracket*
SC 18	*Cap*	SC 205	*Latch*
SC 35	*Bracket Pin*	SC 208	*Plug*
SC 121	*Body*	SC 277	*Handle Pin*
SC 203	*Handle*		

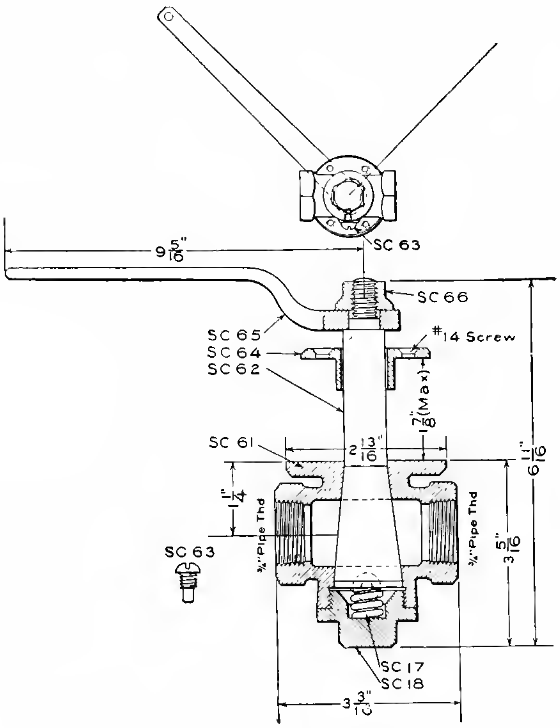


Fig. 1357—Conductor's Valve, Style B.

Parts of Conductor's Valve, Fig. 1357.

SC 17	*Spring*	SC 63	*Stop*
SC 18	*Cap*	SC 64	*Plate*
SC 61	*Body*	SC 65	*Handle*
SC 62	*Plug*	SC 66	*Nut*

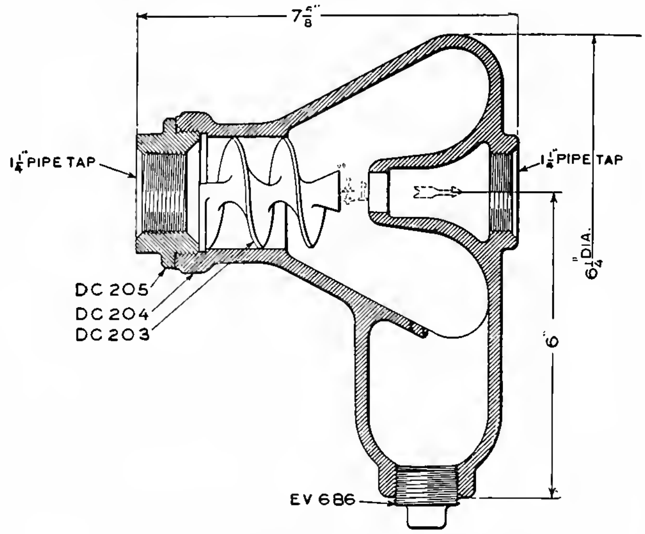


Fig. 1358—Rotary Branch Pipe Strainer.

Parts of Rotary Strainer, Fig. 1358.

DC 203	*Rotator*	DC 205	*Cap*
DC 204	*Body*	EV 686	1 *in. Pipe Plug*

Parts of Cut-Out Cock, Fig. 1359.

DC 7	1¼ *in. Union Swivel*	DC 135	*Body*
DC 8	1¼ *in. Union Nut*	SC 4	*Spring*
DC 9	1¼ *in. Union Gasket*	SC 11	*Cap*
DC 35	*Strainer*	SC 12	*Handle*
DC 36	*Spider*	SC 13	*Handle Pin*
DC 78	1¼ *in. by* ¾ *in. Reducer*	SC 34	1¼ *in. by* 1 *in. Reducer*
		SC 100	*Plug*

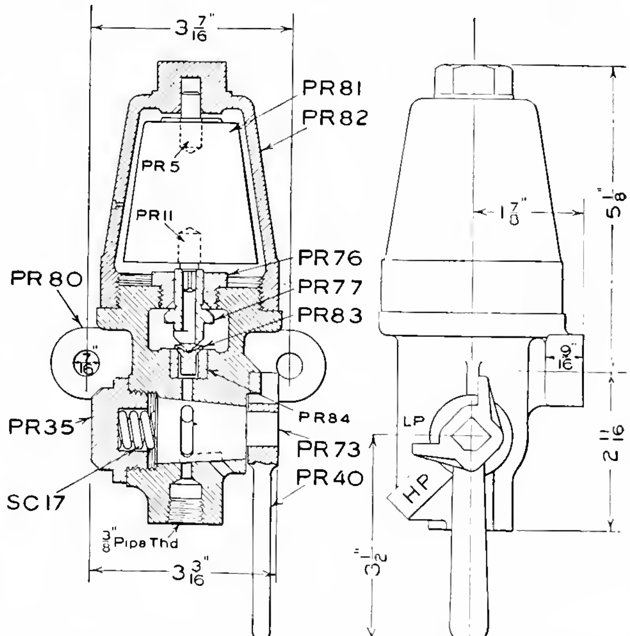


Fig. 1360—Double-Pressure Retaining Valve, Style FD30.

Parts of Retaining Valve, Fig. 1360.

SC 17	*Spring*	PR 77	*Upper Valve*
PR 35	*Cap*	PR 81	*Weight*
PR 40	*Handle*	PR 82	*Case*
PR 73	*Plug*	PR 83	*Lower Valve*
PR 76	*Seat*	PR 97	*Handle Pin*

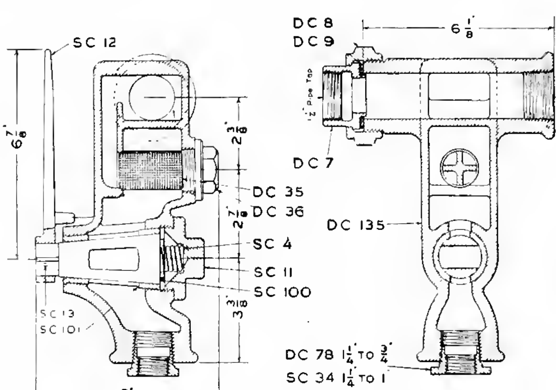


Fig. 1359—Combined Strainer and Cut-Out Cock.

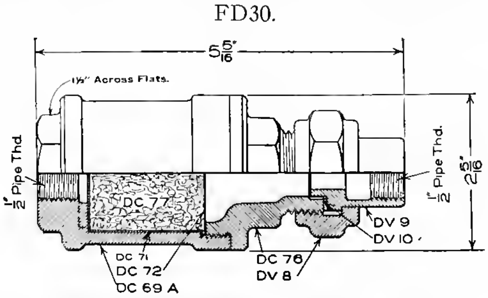


Fig. 1361—Reducing Valve Strainer.

Parts of Strainer, Fig. 1361.

DC 69A	*Body*	DV 8	½ *in. Union Nut*
DC 72	*Strainer*	DV 9	½ *in. Union Swivel*
DC 76	*Cap*	DV 10	½ *in. Union Gasket*
DC 77	*Curled Hair* (½ *oz.*)		

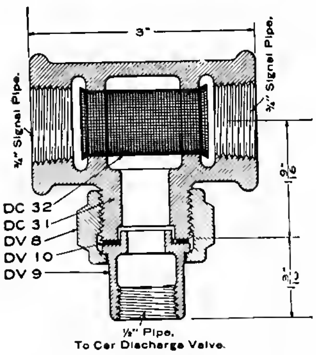


Fig. 1362—Signal Pipe Strainer.

Parts of Strainer, Fig. 1362.

DC 31 *Body*
DC 32 *Strainer*
DV 8 *½ in. Union Nut*
DV 9 *½ in. Union Swivel*
DV 10 *½ in. Union Gasket*

Parts of Strainer, Fig. 1363.

QT 28 *Strainer*
QT 29 *Union Nut*
QT 30 *Union Swivel*
QT 31 *Union Gasket*
QT 316 *Body*

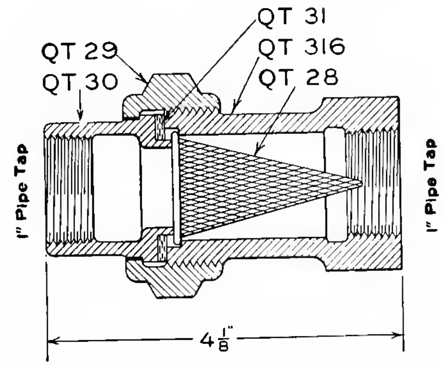


Fig. 1363—Branch Pipe Strainer.

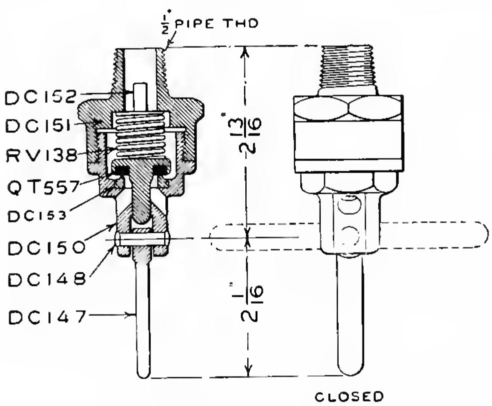


Fig. 1364—Drip Valve.

Parts of Drip Valve, Fig. 1364.

DC 147 *Handle*
DC 148 *Handle Pin*
DC 150 *Cylinder*
DC 151 *Stud*
DC 152 *Valve*
RV 138 *Spring*
QT 557 *Rubber Valve Seat*

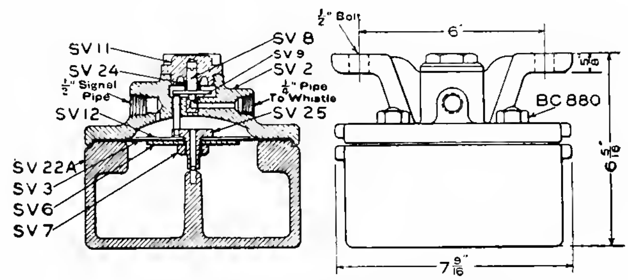


Fig. 1365—Signal Valve, Style BA.

Parts of Signal Valve, Fig. 1365.

SV 2 *Upper Case*
SV 3 *Diaphragm*
SV 6 *Lower Diaphragm Plate*
SV 7 *Nut*
SV 8 *Valve*
SV 11 *Cap*
SV 12 *Upper Diaphragm Washer*
SV 22A *Lower Case*
SV 24 *Spring*
SV 25 *Diaphragm Stem*
BC 880 *Stud and Nut*

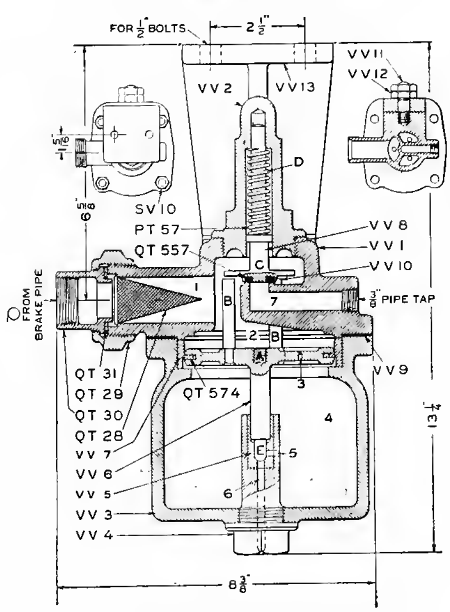


Fig. 1366—Vent Valve, Style A.

Parts of Vent Valve, Fig. 1366.

VV 1 *Upper Case*
VV 2 *Upper Case Cap Nut*
VV 3 *Lower Case*
VV 4 *Post*
VV 6 *Piston*
VV 8 *Valve*
VV 9 *Lower Case Gasket*
VV 10 *Lifting Pins*
VV 12 *Holding Nut*
VV 13 *Bracket*
PT 57 *Valve Spring*
QT 28 *Strainer*
QT 29 *Union Nut*
QT 30 *Union Swivel*
QT 31 *Union Gasket*
QT 574 *Valve Seat*
QT 557 *Piston Ring*
SV 10 *Tee Head Bolt and Nut*

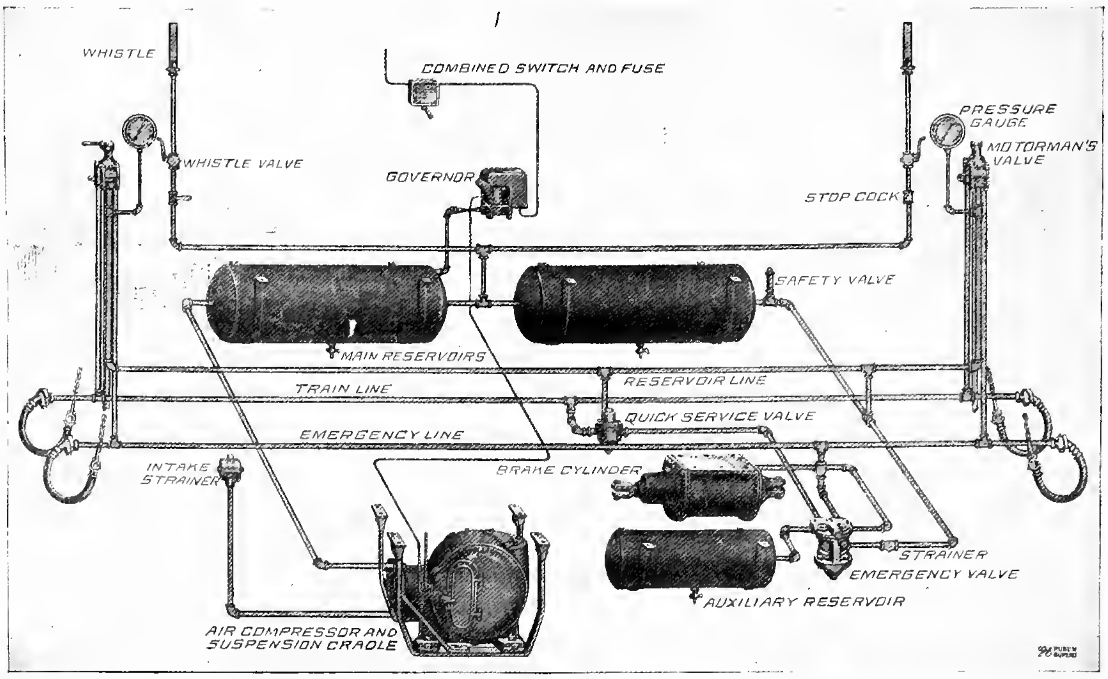


Fig. 1367—Diagram of Piping and Electrical Connections for General Electric Emergency-Straight Air Brake Equipment for Electric Cars.

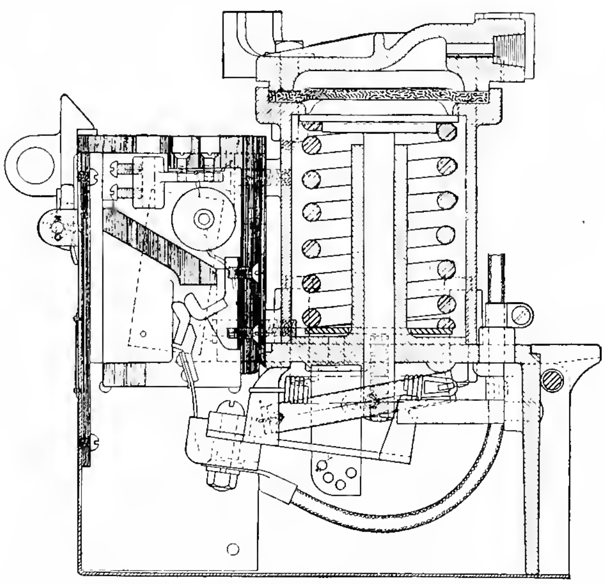


Fig. 1368—Section Through Air Compressor Governor.

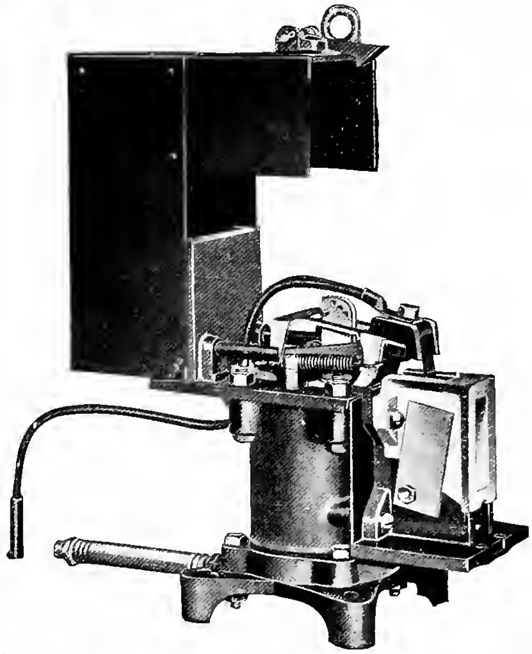


Fig. 1369—Air Compressor Governor. (Not the Same Type as Shown in Fig. 1368.)

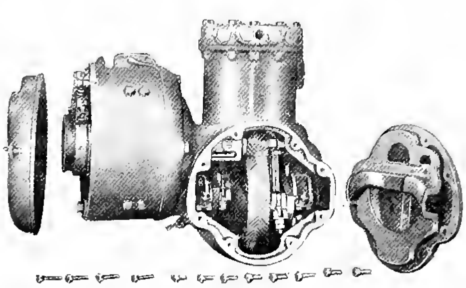


Fig. 1370—Type CP27 Air Compressor with Covers Removed.

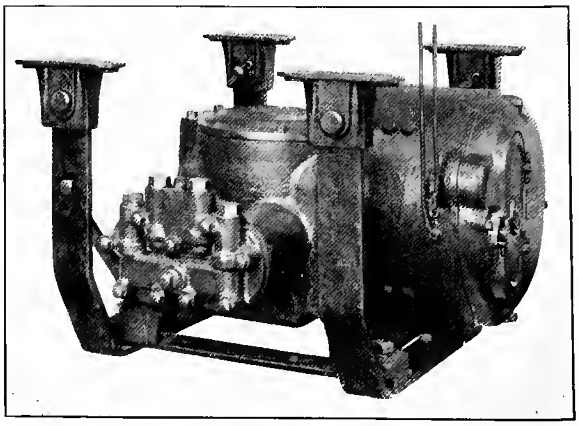


Fig. 1371—Type CP27 Air Compressor and

General Electric Company.

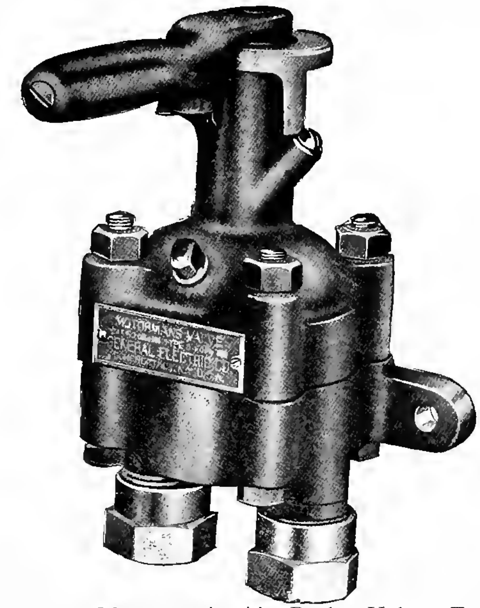


Fig. 1372—Motorman's Air Brake Valve, Type S, Form F4.

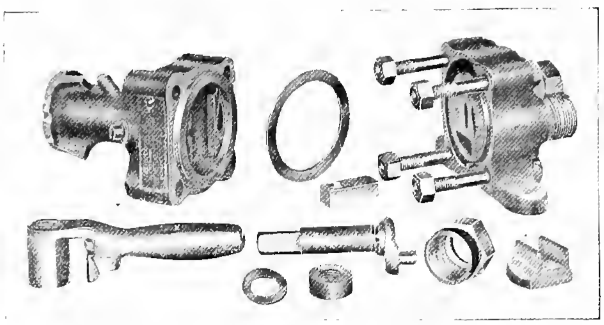


Fig. 1373—Parts of Motorman's Brake Valve Shown in Fig. 1372.

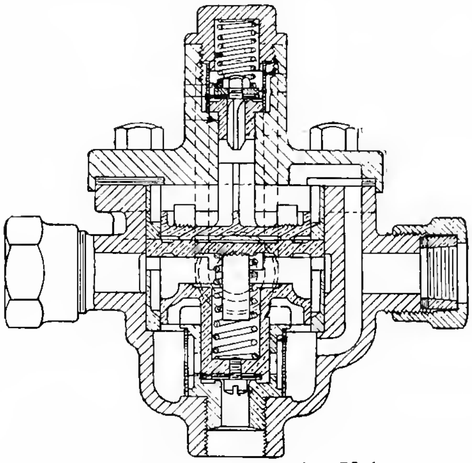


Fig. 1374—Quick Service Valve.

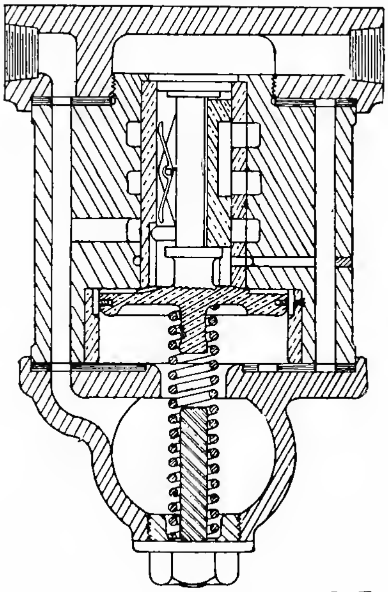


Fig. 1375—Emergency Valve, Type E, Form H-1.

Parts of Triple Valve, Fig. 1376.

QT 290	*Bush*	QT 287	*Front Cap Gasket*
QT 391	*Piston Stem*	QT 346	*Front Cap Bolt*
QT 112	*Check Valve Seat*	QT 231	*Graduating Stem Spring*
QT 139	*Check Valve Guide*	QT 288	*Bush*
QT 138	*Check Valve*	QT 267	*Piston Ring*
QT 118A	*Check Valve Spring*	QT 327	*Main Piston*
QT 141	*Check Valve Cap*	QT 330	*Exhaust Valve Bush*
QT 20	*Rubber Seat*	QT 328	*Exhaust Valve*
PT 56	*Graduating Stem*	QT 332	*Graduating Valve Spring*
PT 58	*Graduating Stem Cap Nut*	QT 329	*Graduating Valve*
		QT 291	*Exhaust Valve Spring*
QT 281	*Front Cap*	QT 371	*Body*

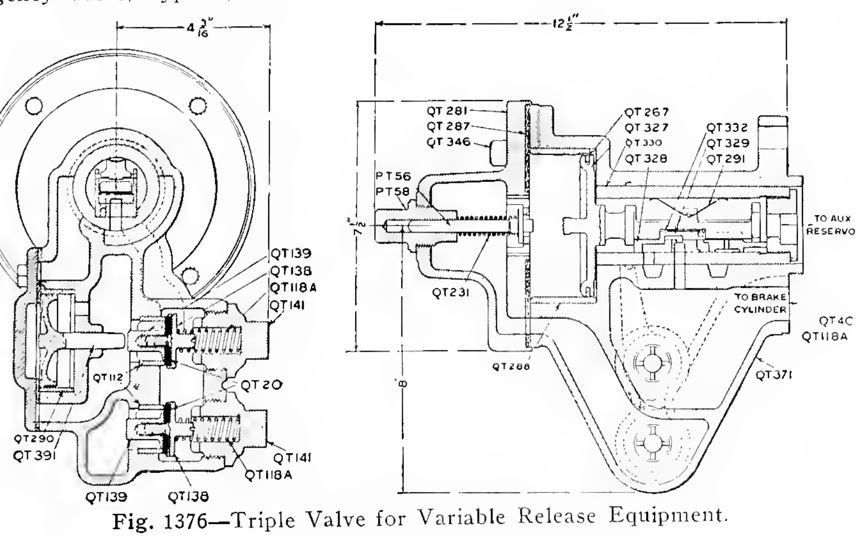


Fig. 1376—Triple Valve for Variable Release Equipment.

General Electric Company.

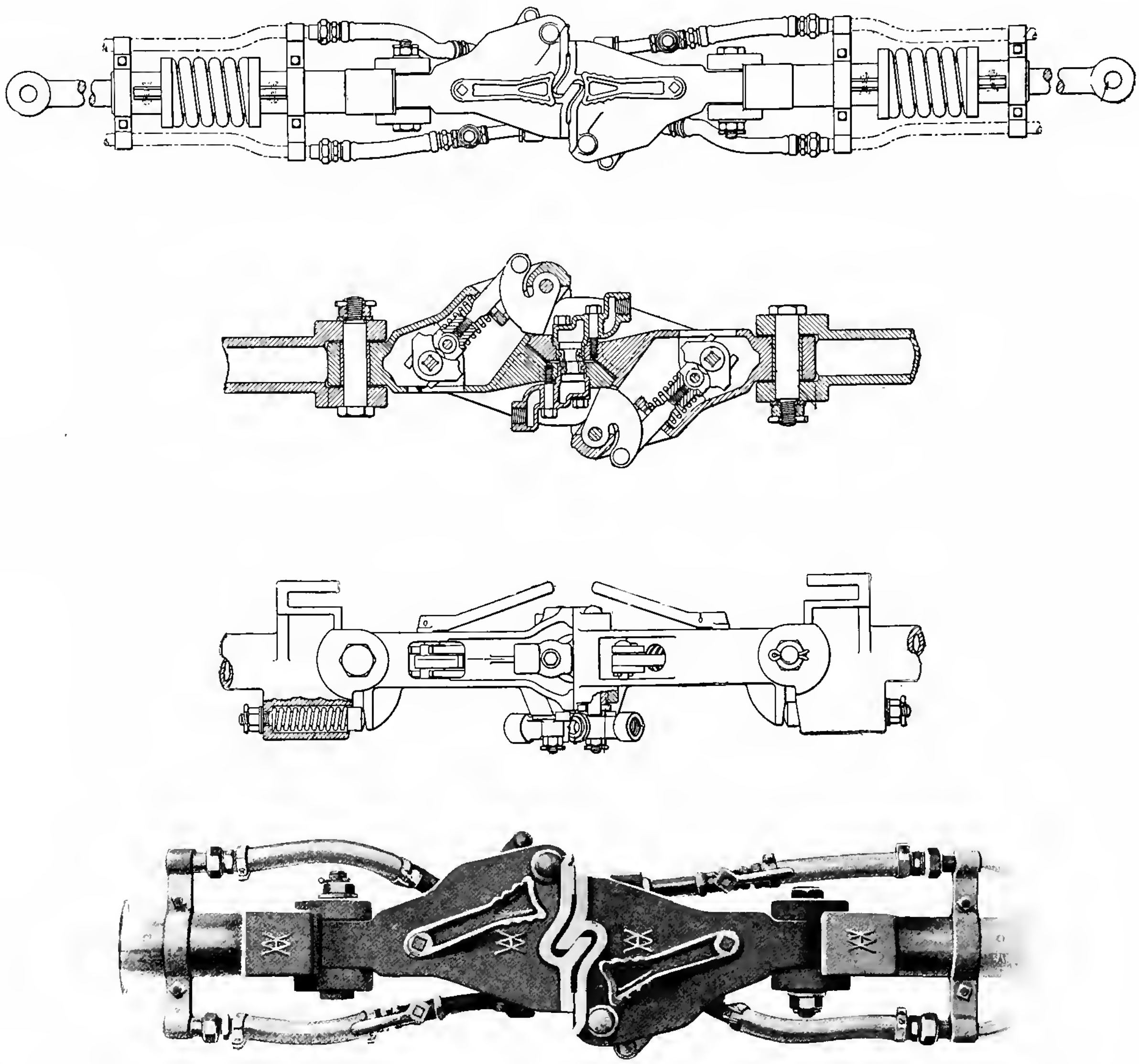


Fig. 1377—Westinghouse Automatic Car and Air Coupler. Westinghouse Air Brake Company.

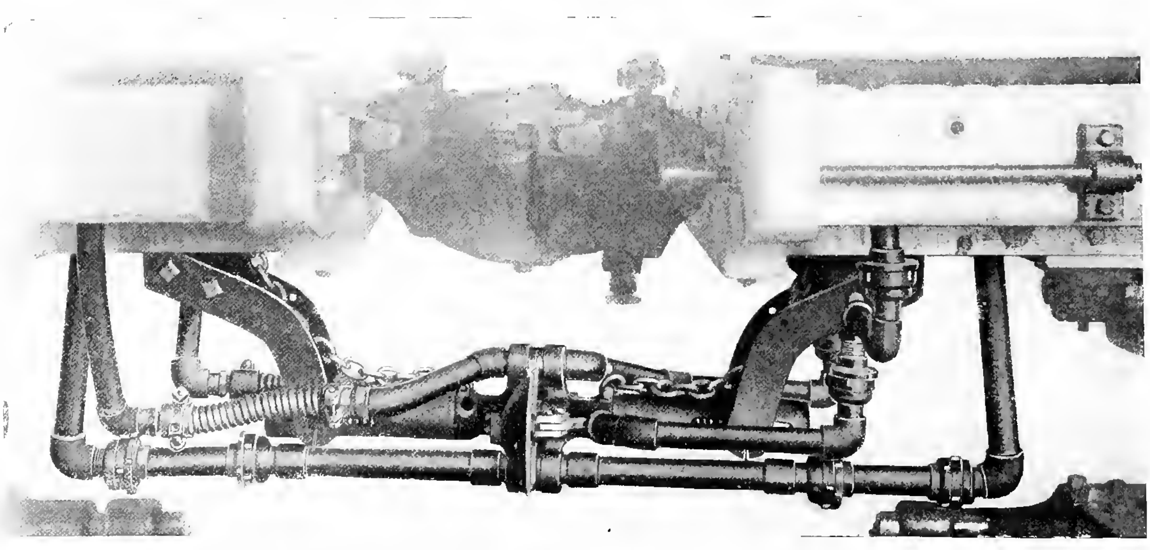


Fig. 1378—Automatic Connector for Air Brake, Signal and Steam Heat Pipes. Kelly-Arnold Manufacturing Company.

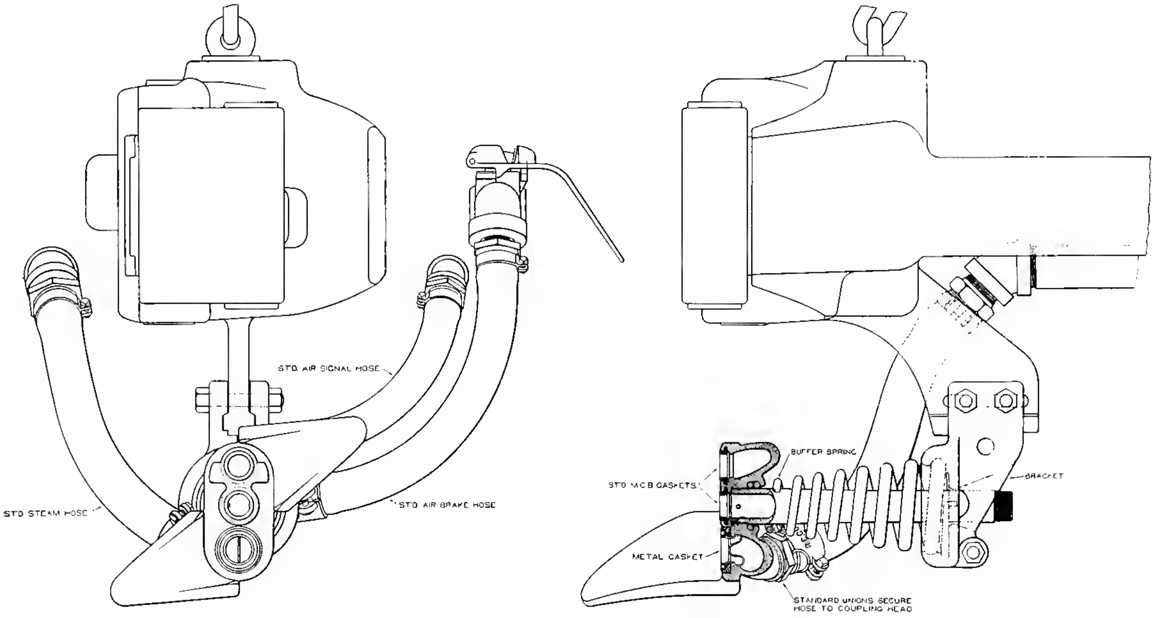


Fig. 1379—Robinson Automatic Coupler for Air Brake, Signal and Steam Heat Pipes. Robinson Coupler Company.

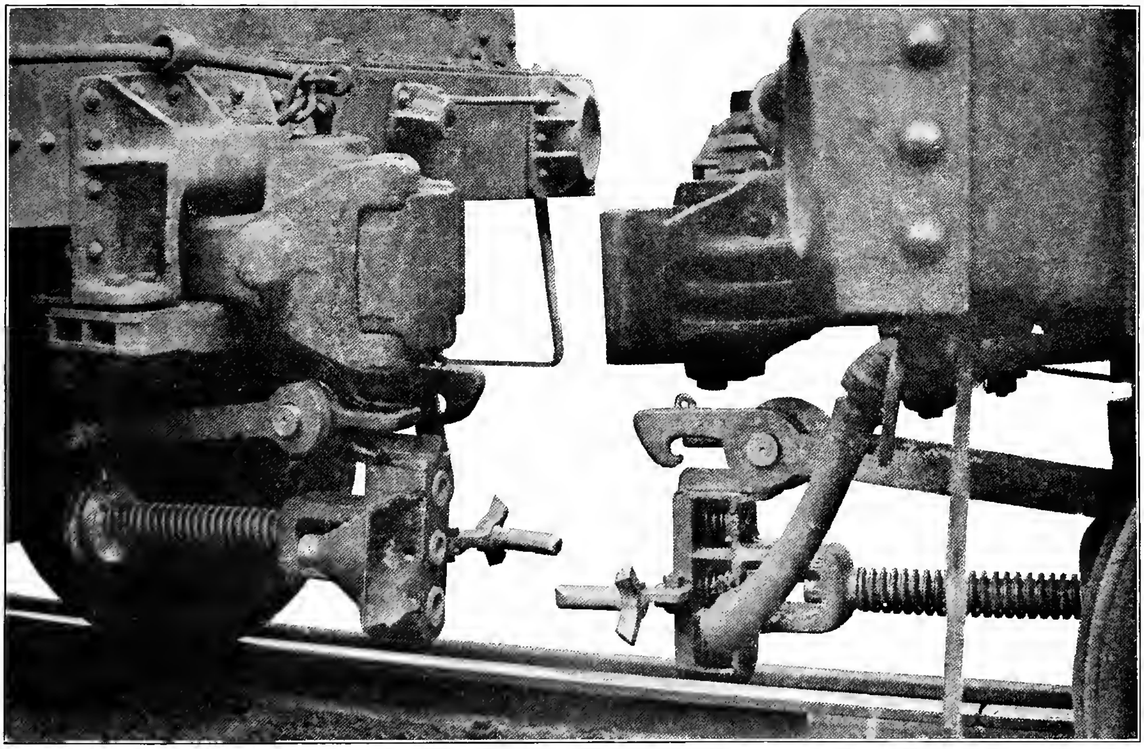


Fig. 1380—Barnett Automatic Connector for Air Brake, Signal and Steam Heat Pipes, with Automatic Safety Coupling Hook. Barnett Equipment Company.

Parts of New York Freight Connector, Fig. 1382.

4 HC 7	*1¼ in. Swivel Elbow*
16 HC	*1⅜ in. Coupling*
25 SC	*1¼ in. Three-Way Reversing Cock*
HC 78	*Gasket*
HC 760	*Head*
HC 766	*1¼ in. by 5 in. Nipple*
HC 7125	*Bolt*
HC 7127	*Spring Seat*
HC 7128	*Spring*
HC 7131	*Fingers*
HC 7132	*Center Pipe*
HC 7134	*Side Plate*

Parts of New York Passenger Connector, Fig. 1381.

3 HC 7	*Automatic Drip Valve*
HC 71	*Head*
HC 78	*Packing Ring*
HC 7125	*Bolt*
HC 7126	*1¼ in. Elbow*
HC 7127	*Spring Seat*
HC 7128	*Spring*
HC 7129	*Steam Heat Retainer*
HC 7130	*Steam Heat Seat*
HC 7131	*Fingers*
HC 7132	*Center Pipe*
HC 7134	*Side Plate*
HC 759	*Bush*

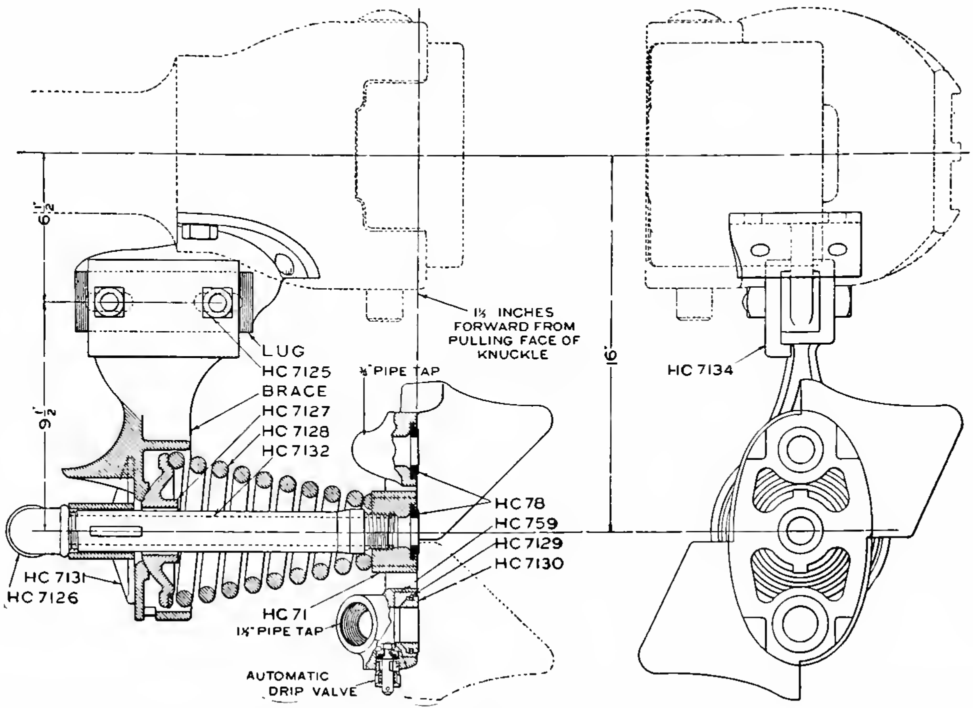


Fig. 1381—Passenger Connector for Air Brake, Signal and Steam Heat Pipes. New York Air Brake Company.

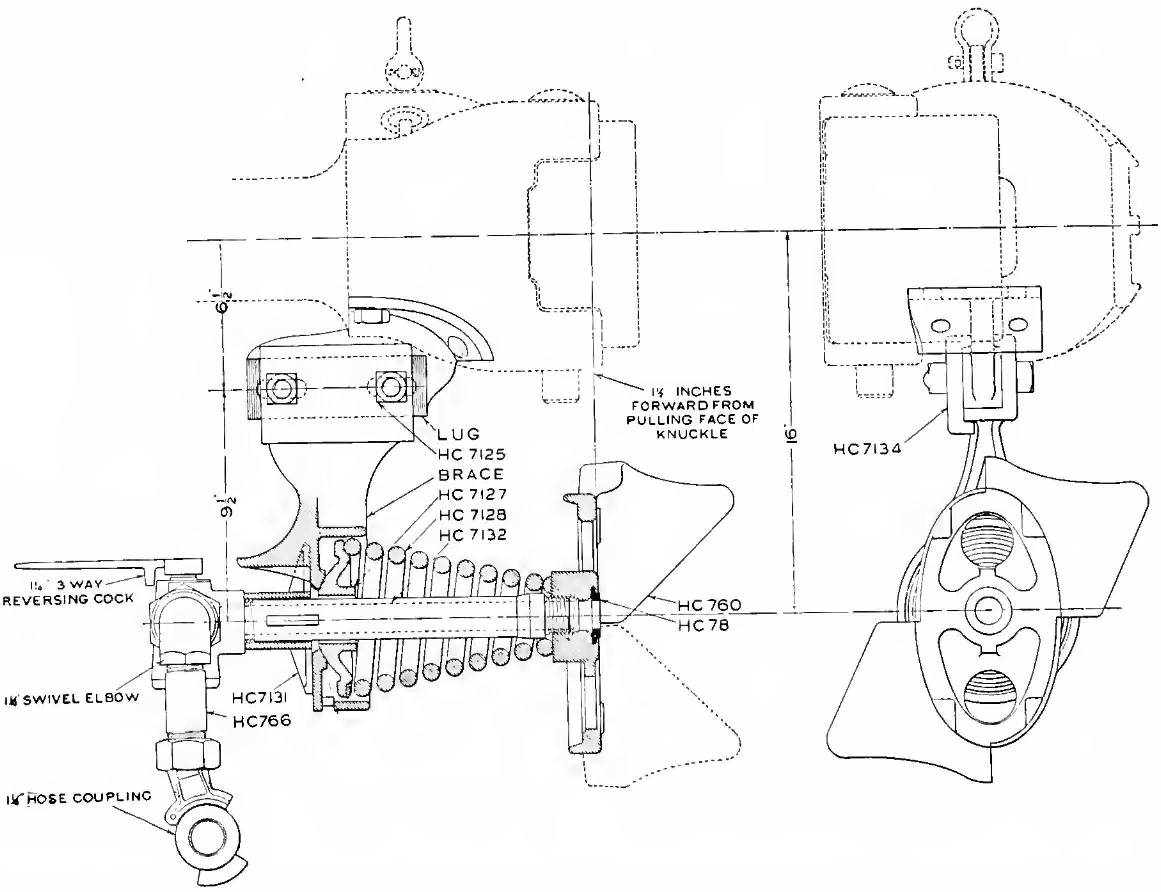
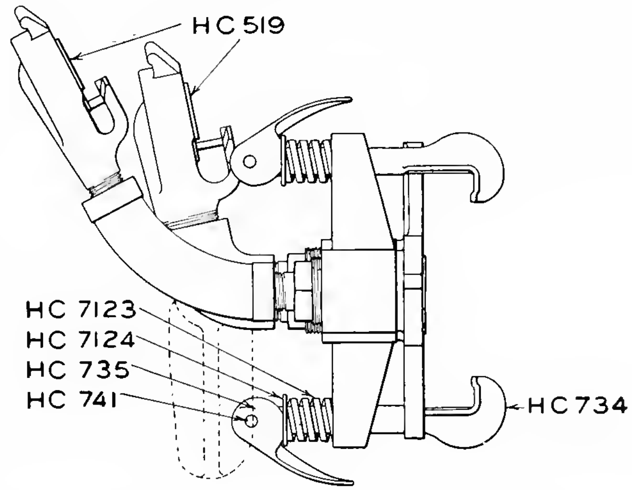


Fig. 1382—Freight Connector for Air Brake, Signal and Steam Heat Pipes. New York Air Brake Company.

Parts of Emergency Head, Fig. 1383.

HC 78	*Packing Ring*
HC 519	*Packing Ring*
HC 710	*Steam Heat Gasket*
HC 725	*1¼ in. Packing Nut*
HC 726	*1¼ in. Swivel*
HC 729	*¾ in. Packing Nut*
HC 730	*¾ in. Swivel*
HC 734	*Hook*
HC 735	*Cam*
HC 737	*1⅜ in. Coupling*
HC 738	*Signal Coupling*
HC 739	*1¼ in. Elbow*
HC 740	*¾ in. Bend*
HC 741	*Cam Pin*
HC 7122	*1¼ in. Street Elbow*
HC 7123	*Cam Spring*
HC 7124	*Cam Bearing*
HC 7133	*Head*



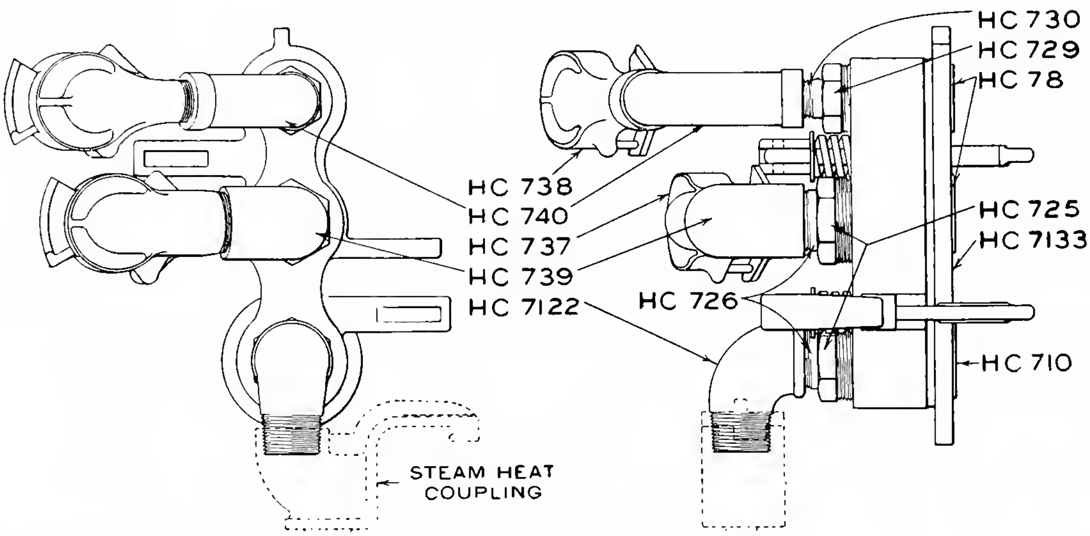


Fig. 1383—Emergency Head Back-Up Connection. New York Air Brake Company.

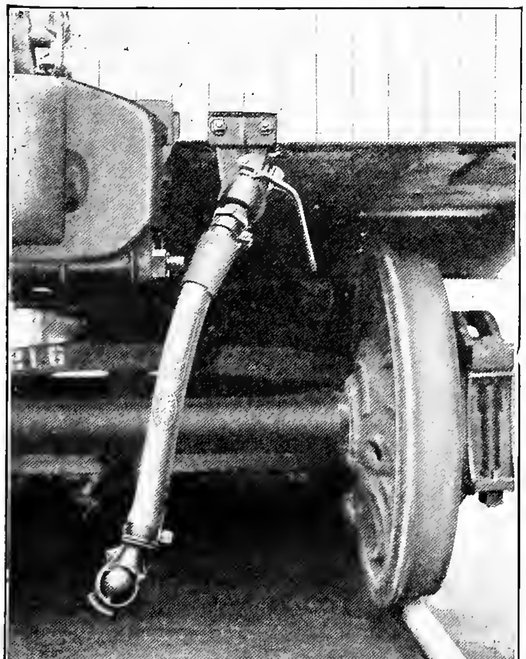


Fig. 1384—Monogram Pipe Bracket and Nipple End Hose Protector. Guilford S. Wood.

Parts of Figs. 1385 and 1386.

A *Whistle*
B *Whistle Push Button*
C *Train Pipe Exhaust*

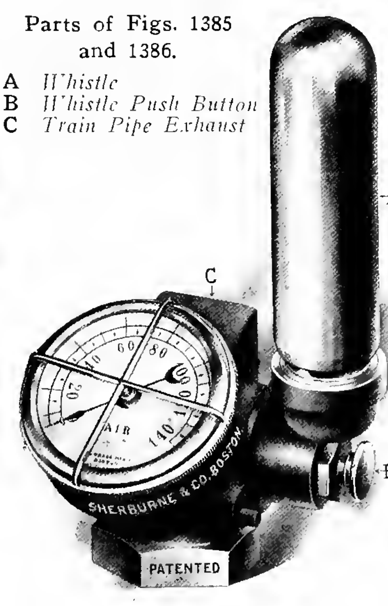


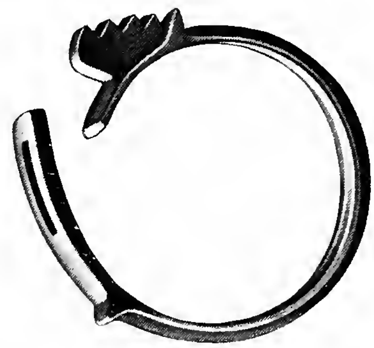
Fig. 1385—Brakeman's Back-up Air Brake and Signal Cock, with Gage. (See also Page 678.)

Fig. 1386—Brakeman's Back-Up Air Brake Cock.

Sherburne & Company.

Fig. 1387—Universal Hose Protector. McCord & Company.

Two Piece.



One Piece.

Fig. 1388—Hose Clamps. Camel Company.

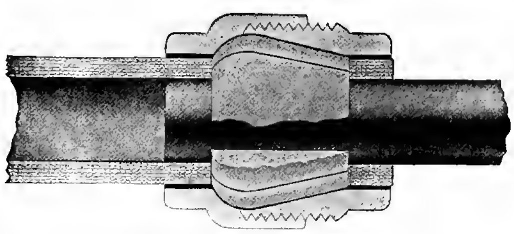


Fig. 1389—Strong Hose Clamp. Strong, Carlisle & Hammond Company.

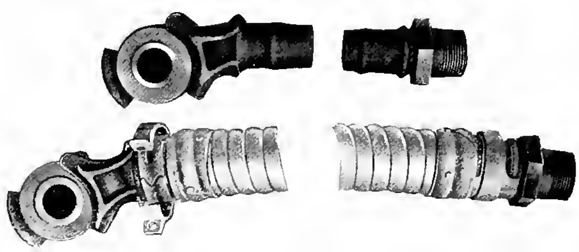


Fig. 1390—Sprague Flexible Steel Armored Hose and Nipples. Sprague Electric Works.

Fig. 1391 — Thompson Hose Clamp. Storrs Mica Company.

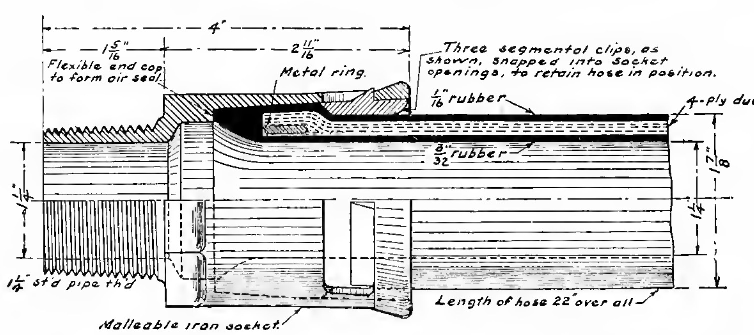
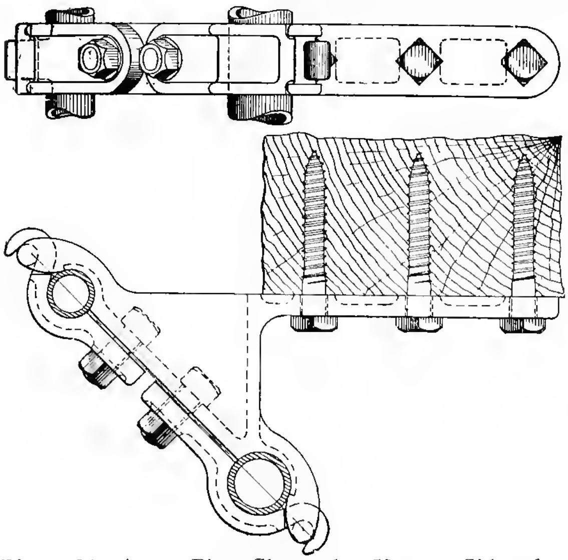


Fig. 1392—N B Hose Connection. G. M. Newhall Engineering Company.

Fig. 1393—Western Angle Cock Holders. Railway Devices Company.



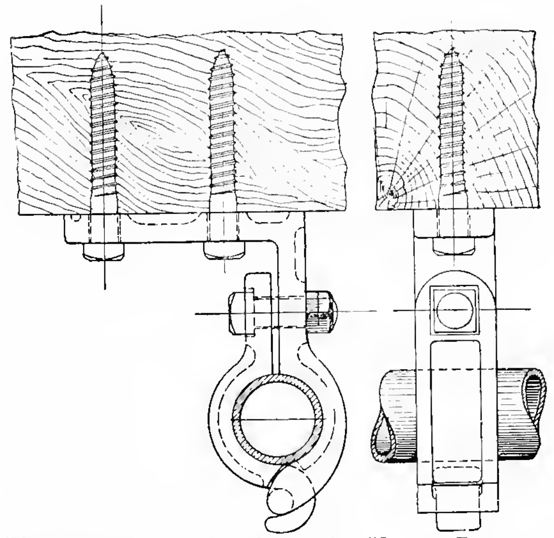


Fig. 1394—Acme Pipe Clamp for Use on Side of a Longitudinal Sill. Western Railway Equipment Company.

Fig. 1395—Acme Pipe Clamp for Use on Bottom of End Sill.

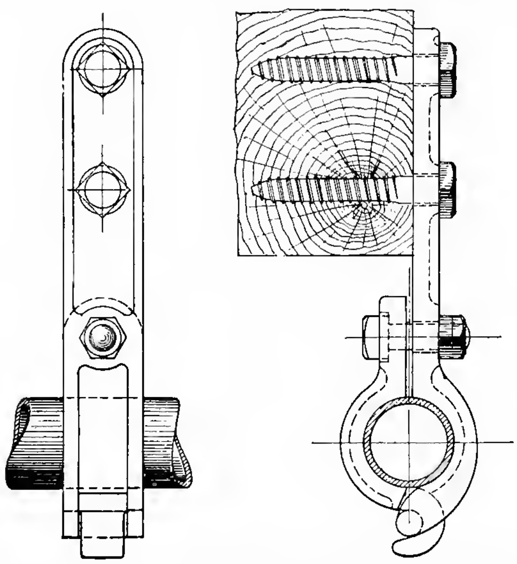


Fig. 1396—Acme Pipe Clamp for Side of Longitudinal Sill. Western Railway Equipment Company.

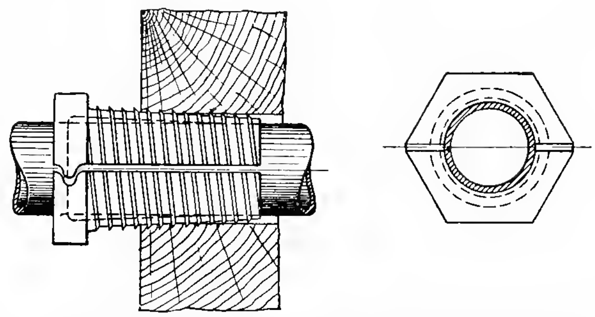


Fig. 1397—Acme Pipe Clamp for Use in Needle Beam. Western Railway Equipment Company.

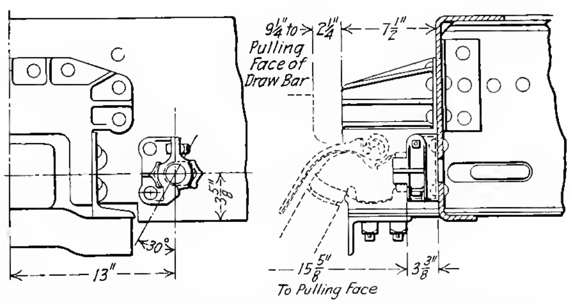


Fig. 1399—Security Angle Cock Bracket Applied to Dump Car. Adreon Manufacturing Company.

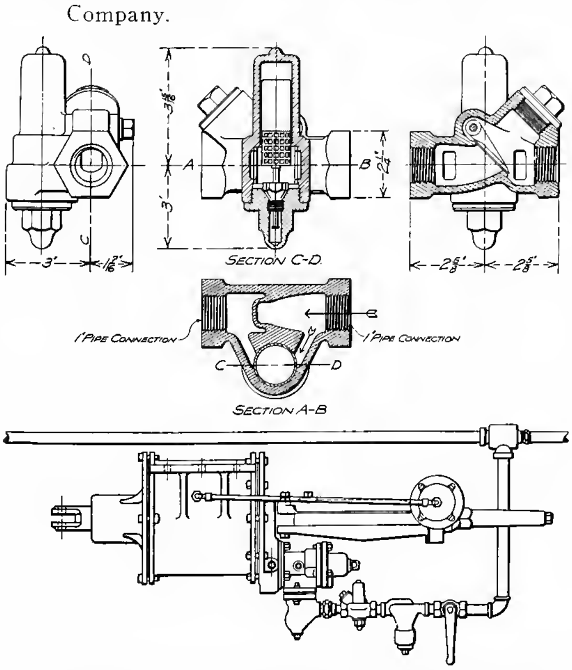


Fig. 1398—Emery Lubricator and Application to
neumatic

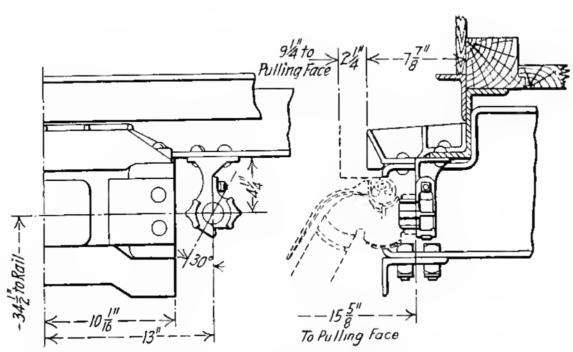


Fig. 1400—Security Angle Cock Holder Applied to Box Car. Adreon Manufacturing Company.

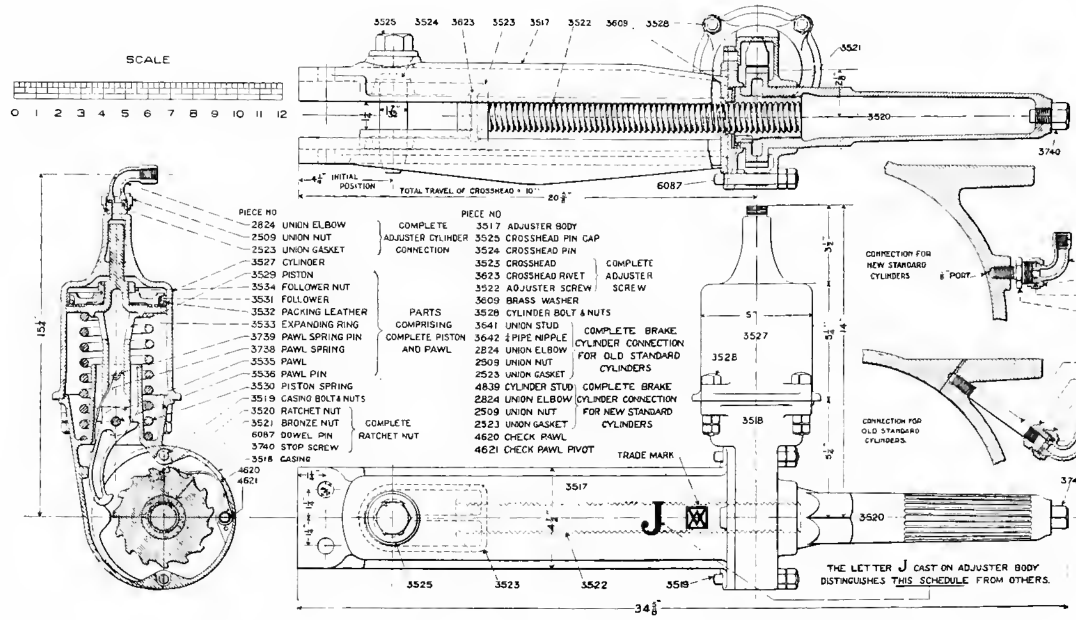


Fig. 1401—American Automatic Slack Adjuster. American Brake Company.

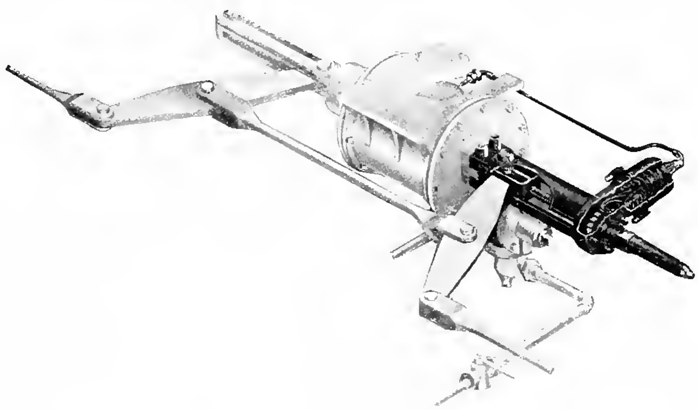


Fig. 1402—American Automatic Slack Adjuster Applied to Brake Cylinder. American Brake Company.

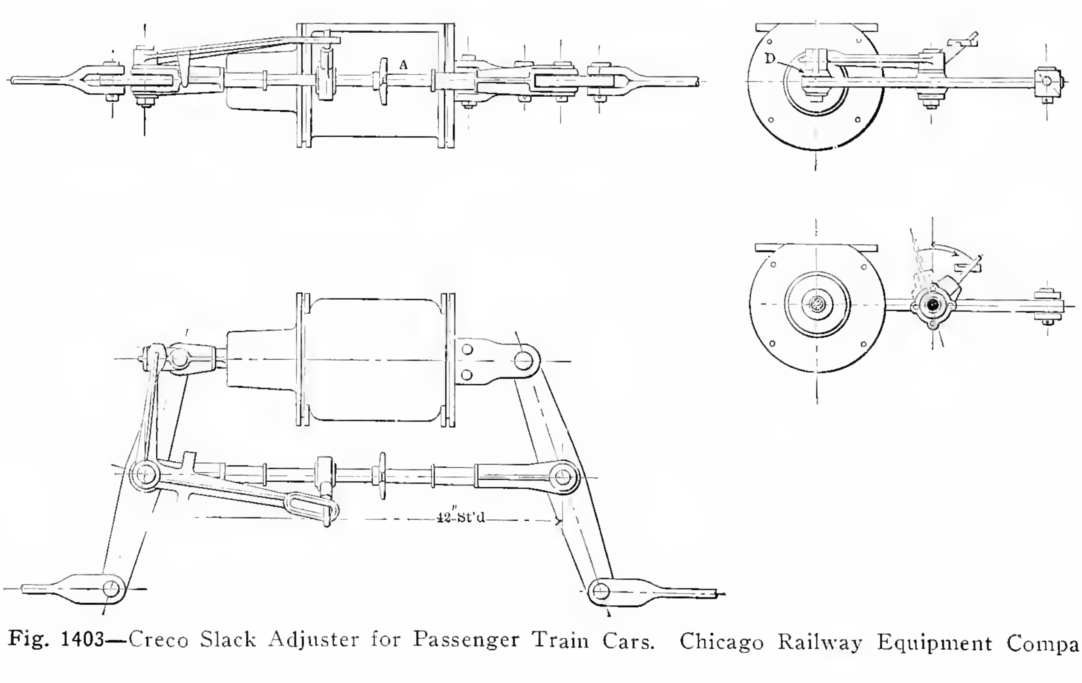


Fig. 1403—Creco Slack Adjuster for Passenger Train Cars. Chicago Railway Equipment Company.

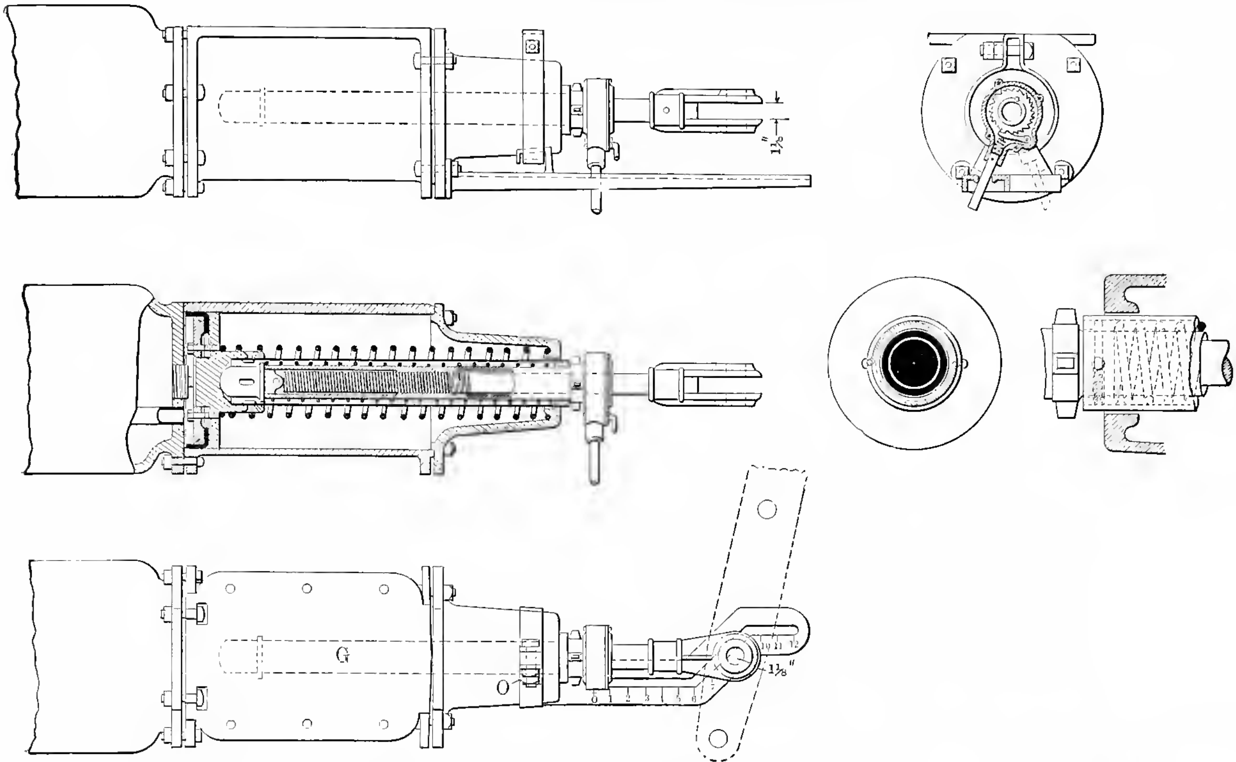


Fig. 1404—Creco Combined Slack Adjuster and Brake Release for Freight Cars. Chicago Railway Equipment Company.

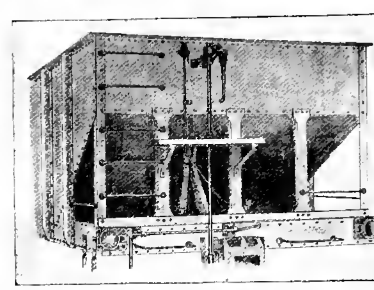


Fig. 1406—Ratchet Brake Applied to Hopper Car. Ratchet Brake Company.

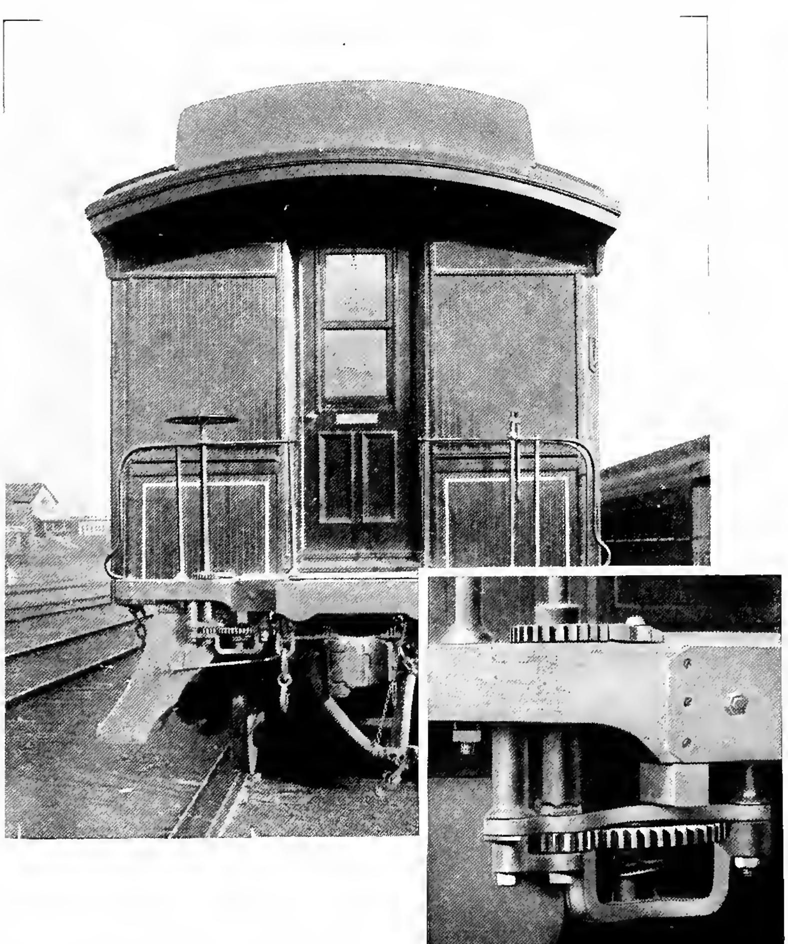


Fig. 1405—National Geared Hand Brake. National Brake Company.

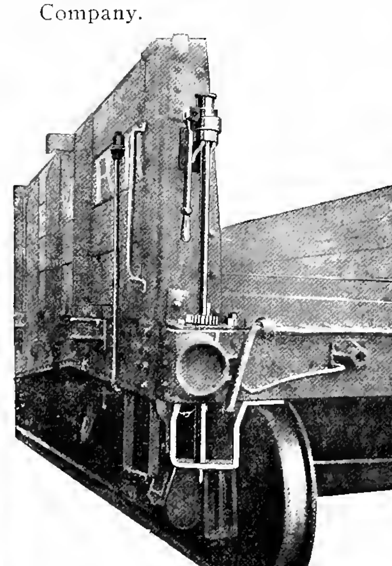


Fig. 1407—Ratchet Brake Applied to Drop End Gondola Car with Brake Cylinder at Side of Car. Ratchet Brake Company.

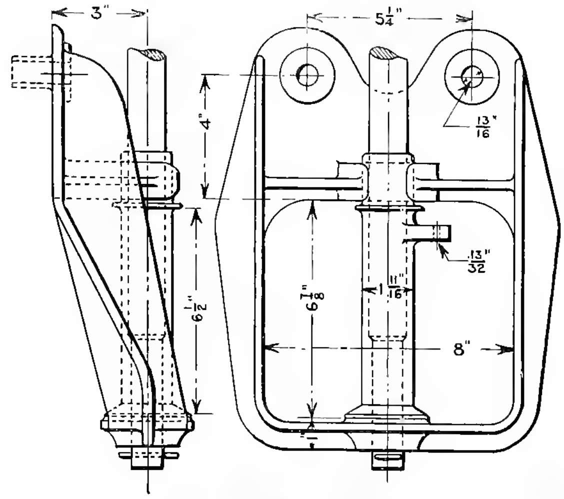
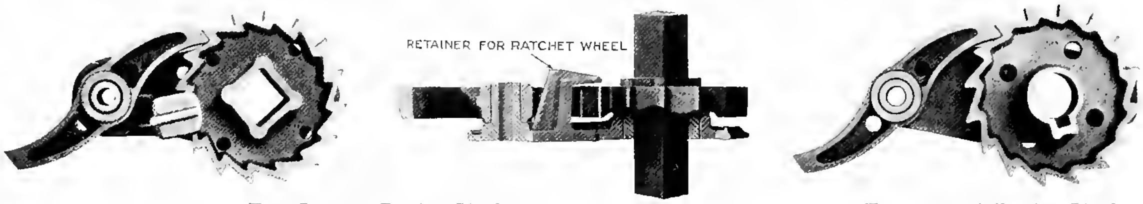


Fig. 1408—Malleable Iron Steps and Sleeves for Square or Round Brake Shafts.



For Square Brake Shaft. For Round Brake Shaft.

Fig. 1409—Carmer Ratchet Wheel, Pawl and Plate. (Patented.)

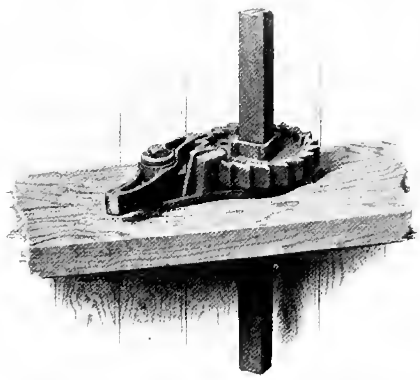


Fig. 1410—Carmer Ratchet Wheel, Pawl and Plate Applied to Square Brake Shaft.

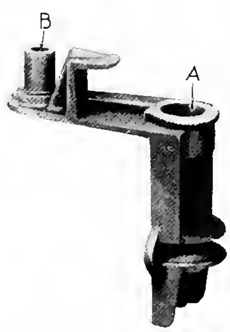


Fig. 1411—Malleable Iron Roof Bracket for Round Brake Shaft.

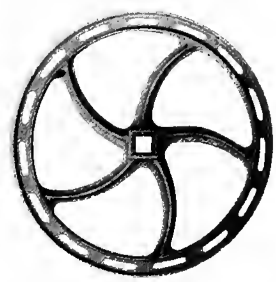


Fig. 1412—Malleable Iron Brake Wheel; Five Spokes; Diameter, 15 or 16 ins. (Patented.)

Fig. 1413—Malleable Iron Bushing and Collar for Square Brake Shaft.

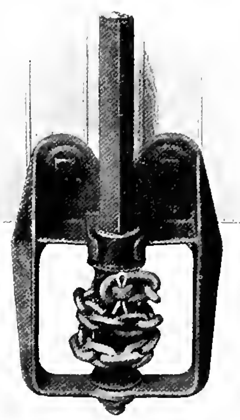


Fig. 1414—Malleable Iron Step and Sleeve for Square Brake Shaft.

Fig. 1415—Malleable Iron Sleeve for Square Brake Shaft.

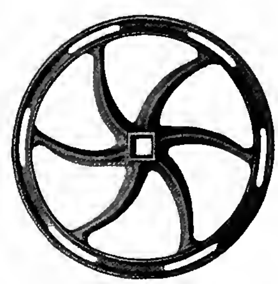


Fig. 1416—Malleable Iron Brake Wheel; Six Spokes; Diameter, 15, 16 or 18 ins.

National Malleable Castings Company.

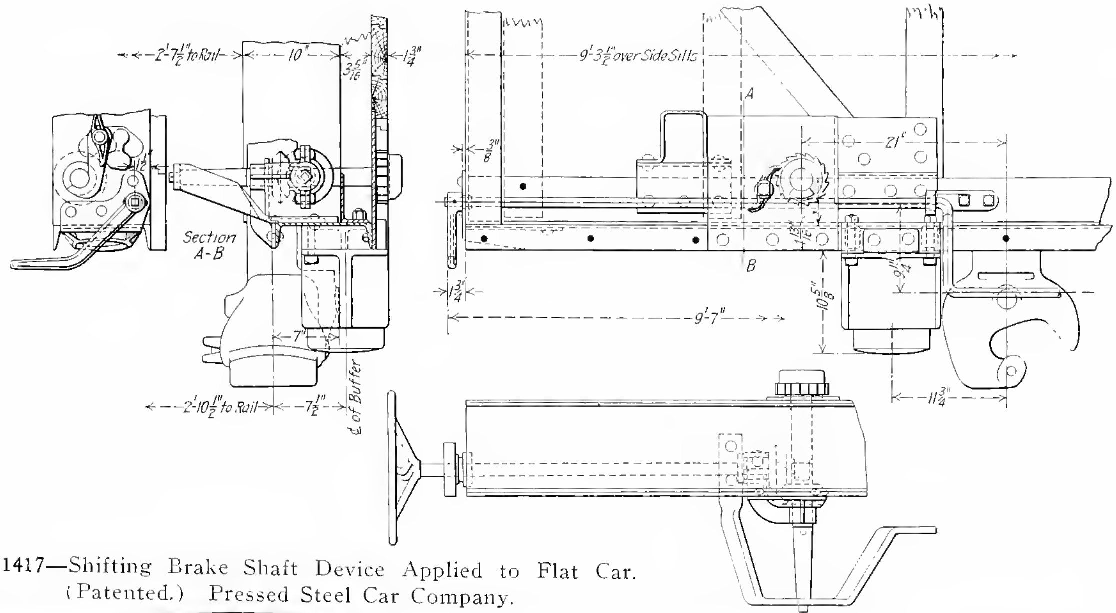


Fig. 1417—Shifting Brake Shaft Device Applied to Flat Car. (Patented.) Pressed Steel Car Company.

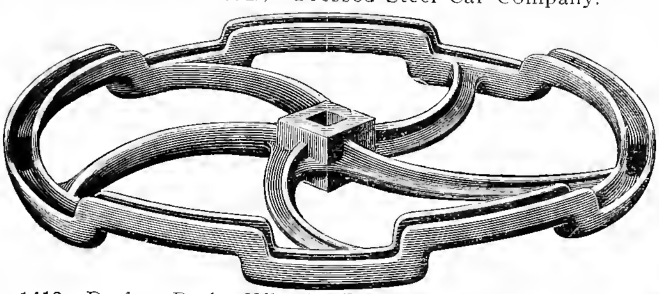


Fig. 1418—Perfect Brake Wheel. Dayton Malleable Iron Company.

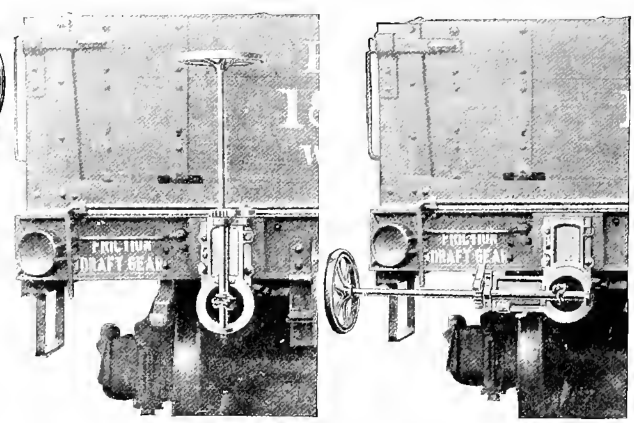


Fig. 1419—Feasible Drop Brake Staff. U. S. Metal & Manufacturing Company.

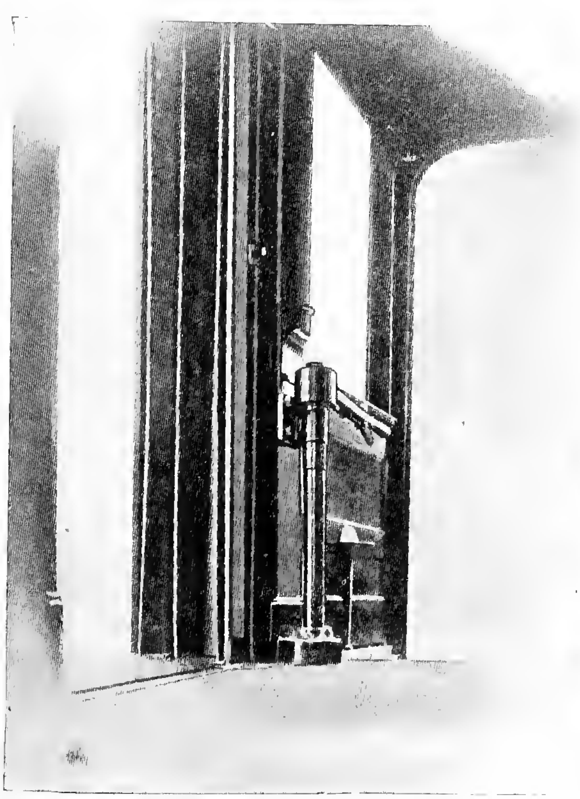


Fig. 1420—Lindstrom Brake Applied to Wide Vestibule Car.

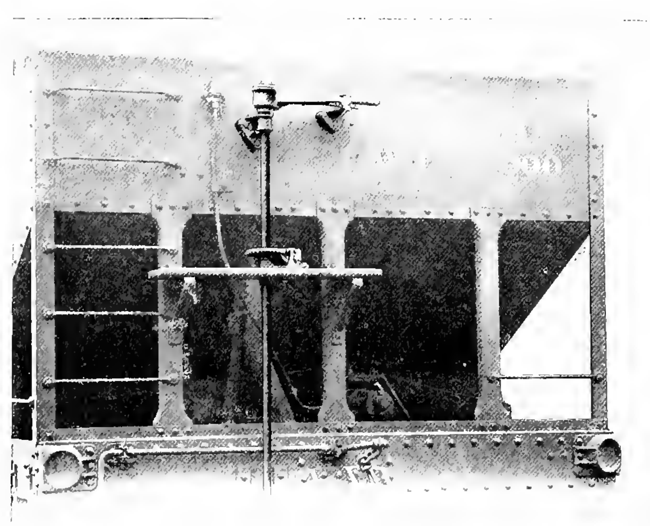


Fig. 1421—Lindstrom Brake Applied to Hopper Car.

Lindstrom Brake Company.

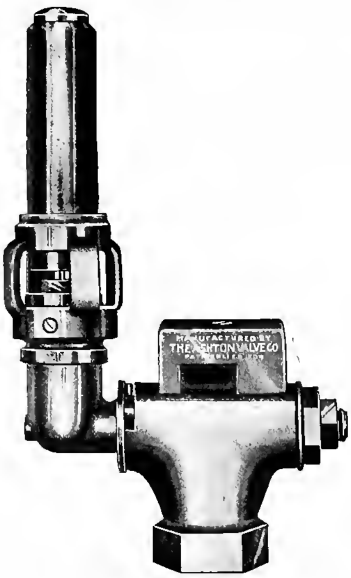


Fig. 1422—Back-Up Air Brake Cock. (See also Page 671.)

Fig. 1422A—Air Gage for Caboose.

Ashton Valve Company.

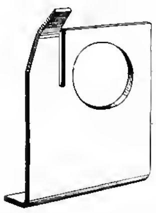


Fig. 1423—Bartley Flange Nut Fastener.

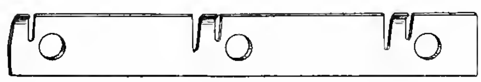


Fig. 1424—Bartley Multiple Nut Fastener.

American Nut and Bolt Fastener Company.

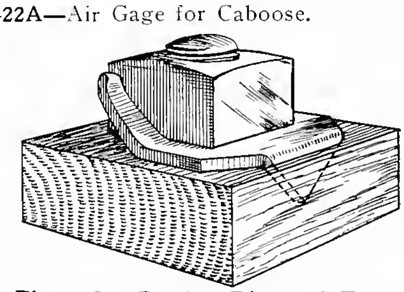


Fig. 1425—Bartley Diamond Tang Fastener for Application to Wood.

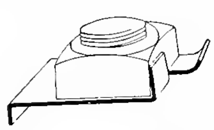


Fig. 1426—Jones Arch Bar Nut Lock.

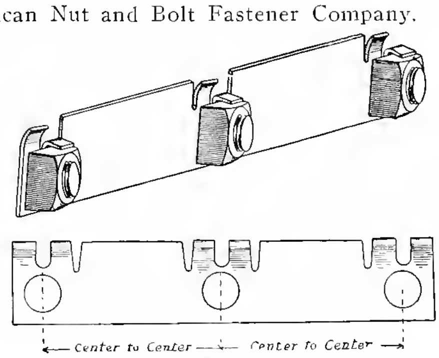


Fig. 1427—Jones Multiple Nut Lock.

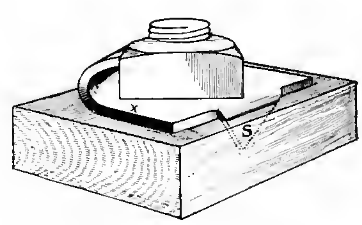
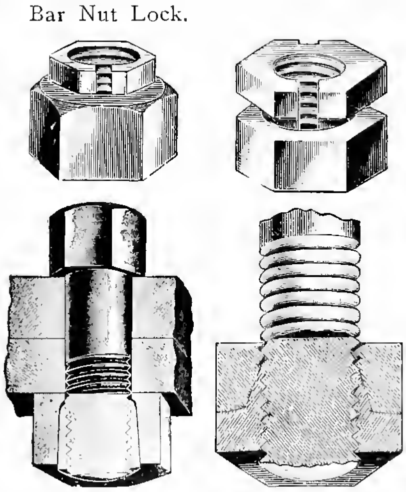


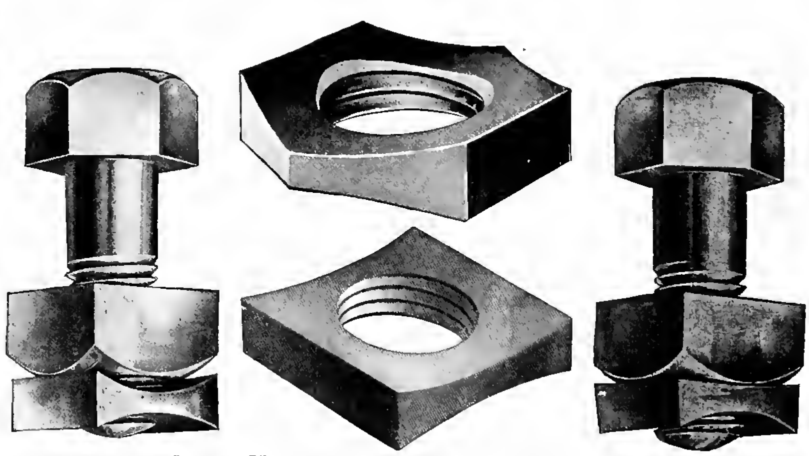
Fig. 1428—Jones Nut Lock for Application to Wood.

Jones Positive Nut Lock Company.



Original. Improved.

Fig. 1429—Columbia Lock Nuts and Application. Columbia Nut & Bolt Company, Incorporated.



Applied but Not Locked. Hexagon and Square Nuts. Locked.

Fig. 1430—Boss Nuts and Application. Boss Nut Company.

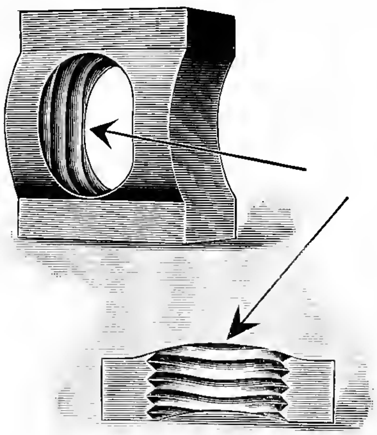


Fig. 1431—Grip Nut with Curve in Thread-Pitch Exaggerated to Show Locking Method.

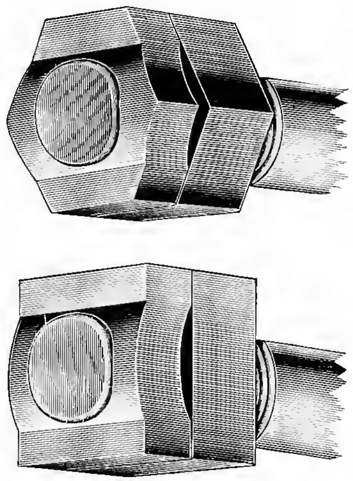
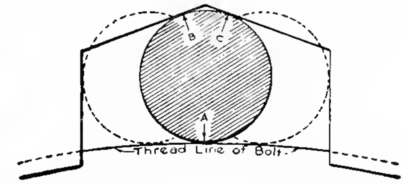
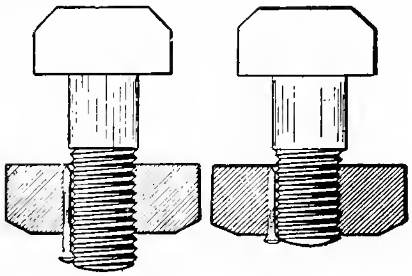


Fig. 1432—Hexagon and Square Grip Nuts Applied.

Grip Nut Company.



Enlarged View of Groove and Pin.



Locking Pin Locked in Place to Overcome Effects of Vibration.

Ordinary Application.

Fig. 1433—Taylor Lock Nut. Taylor Lock Nut Company.

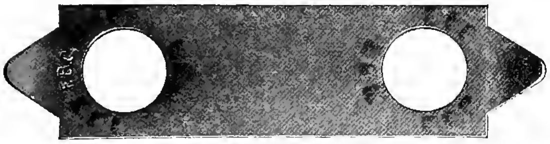


Fig. 1434—F. B. C. Lock for Striking Plate Bolts.

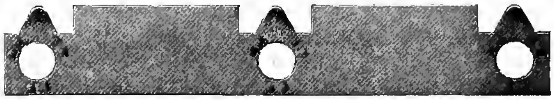


Fig. 1435—F. B. C. Continuous Lock.

Fig. 1436—F. B. C. Arch Bar Nut Lock.

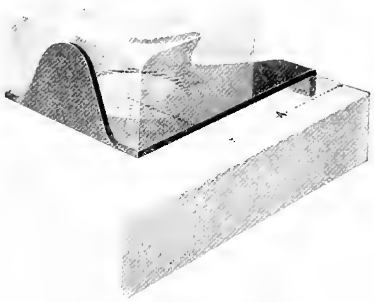


Fig. 1437—F. B. C. Arch Bar Nut Lock Applied.

Keystone Nut Lock Manufacturing Company.

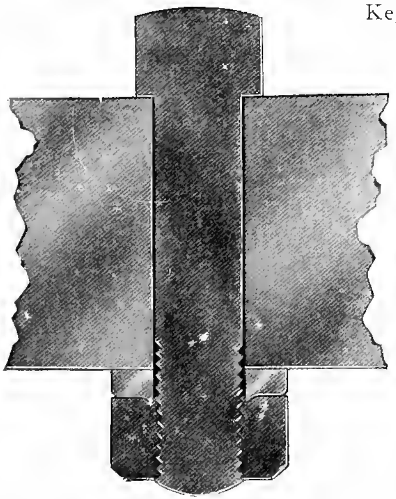


Fig. 1438—National Lock Washer Applied to Metal.

Fig. 1439—National Lock Washer.

National Lock Washer Company.

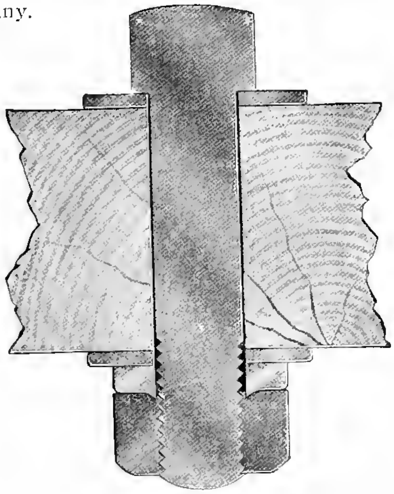


Fig. 1440—National Lock Washer Applied to Wood, with Flat Washer Beneath.

Fig. 1441—Turnbuckle. Cleveland City Forge &

Fig. 1442—Hillman Lock Turnbuckle. U. S. Metal & Manufacturing Company.

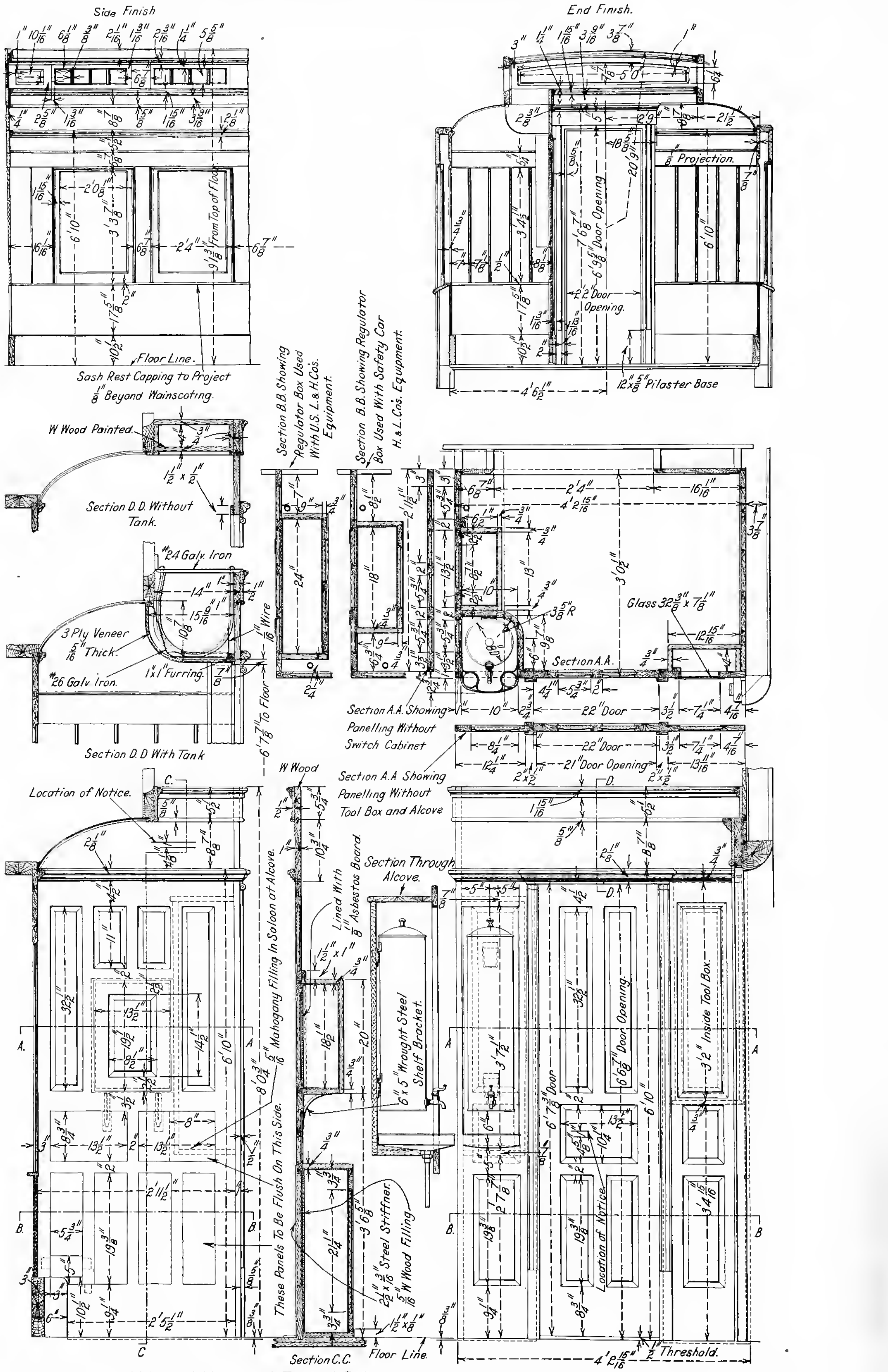


Fig. 1443—Finish on Side and End, and End of Saloon of New York, New Haven & Hartford Day Coach.

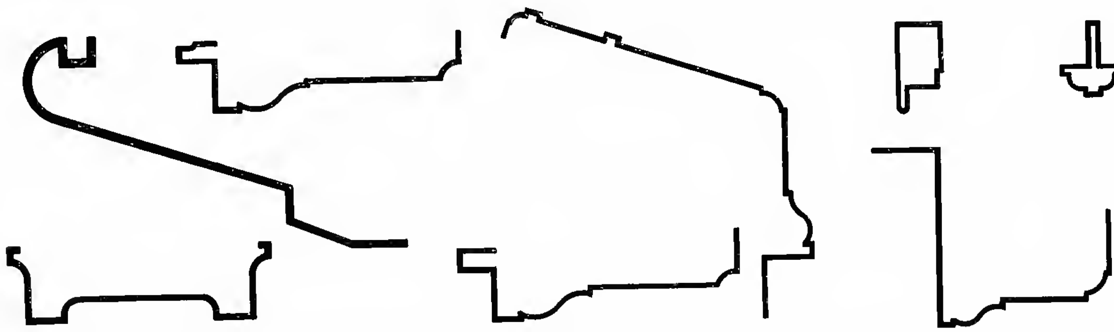


Fig. 1444—Sections of Moldings for Metal Interior Finish. Grinden Art Metal Company.

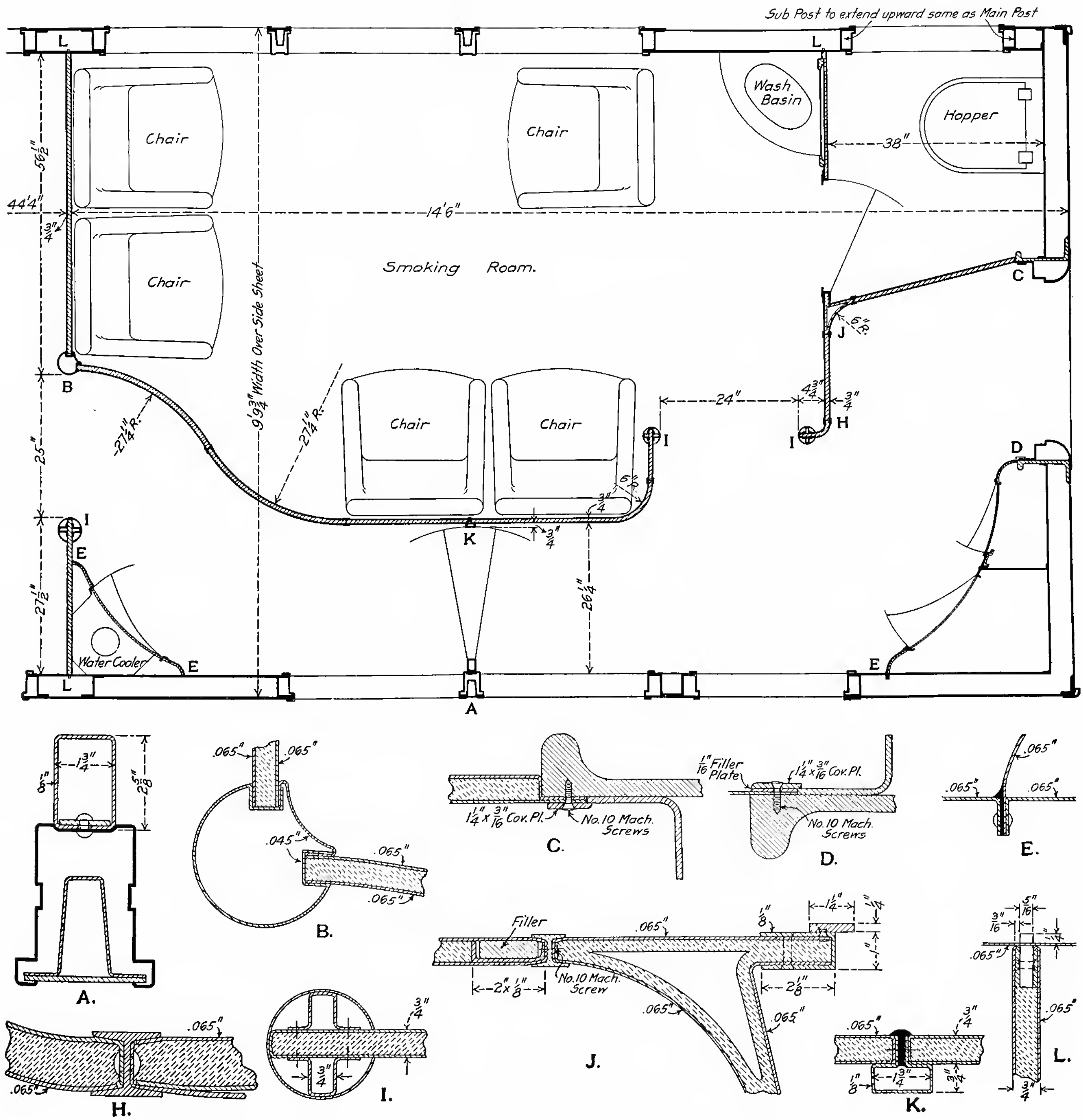


Fig. 1445—Steel Finish and Details at Smoking Room End of Long Island Parlor Car.

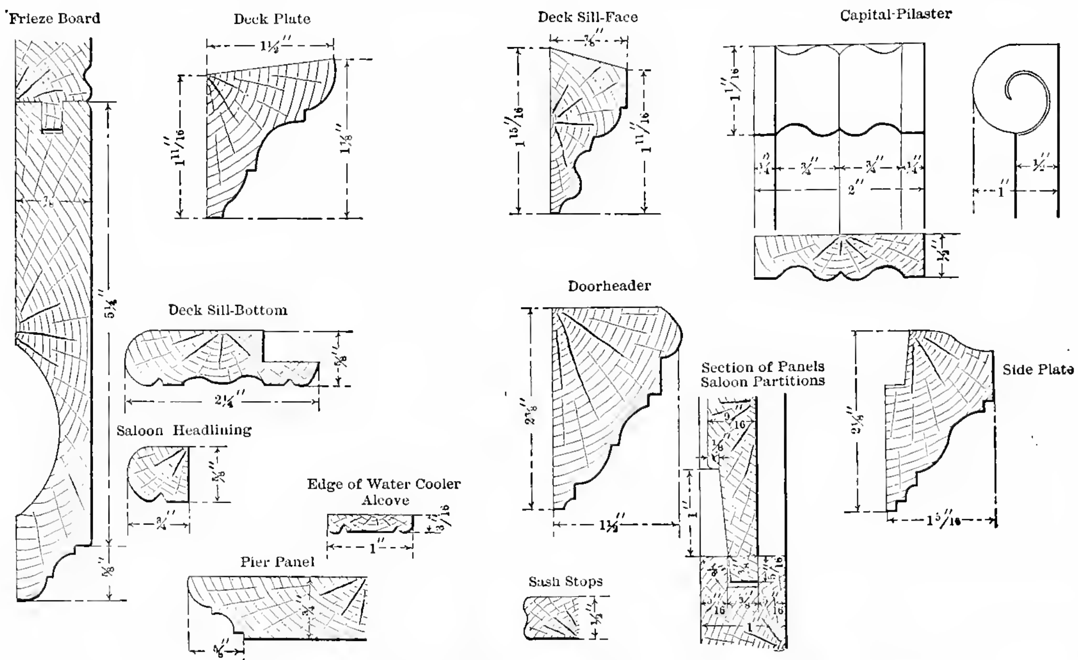


Fig. 1446—Molding Sections for Wooden Interior Finish.

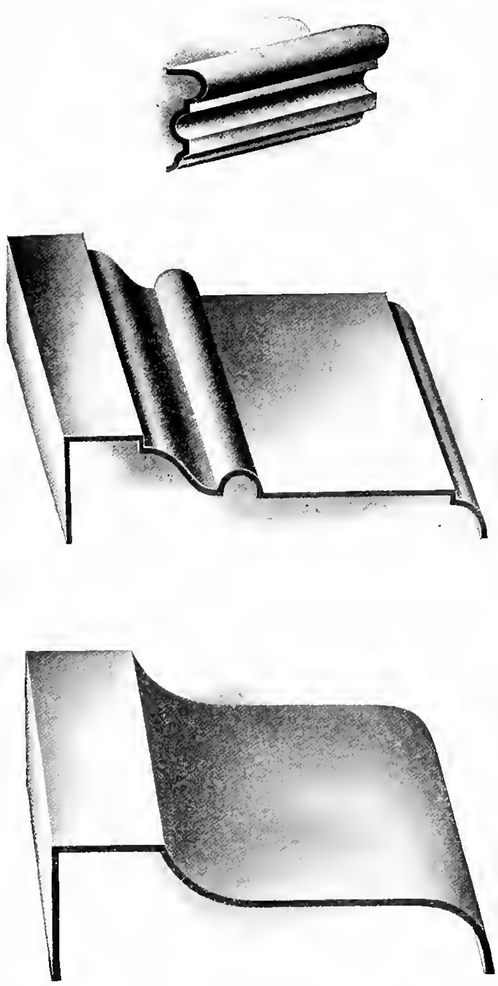


Fig. 1447—Drawn Steel Molding Sections. Acme Supply Company.

Fig. 1448—Steel Finish in Long Island Parlor Car.

Parts of Interior Finish, Fig. 1450.

1 *Truss Plank*
3 *Wainscot Rail*
4 *Wainscot Panel*
5 *Window Sill*
6 *Window Glass*
7 *Window Casing, or Sash Stop*
8 *Pilaster*
9 *Pilaster Cap*
10 *Pilaster Base*
11 *Window Stile*
12 *Window Sash Rail*
13 *Shade*
14 *Bottom Bar of Shade*
15 *Shade Thumb Latch*
17 *Continuous Basket Rack*
18 *Basket Rack Bracket*
19 *Window Shade Stop*
20 *Window Casing or Cap Molding*
21 *Window Sash Lift*
22 *Window Sash Lock*
25 *Pilaster Cap Bracket*
26 *Window Cove Molding*
27 *Floor*
36 *Cornice*
37 *Cornice Sub-Fascia Board, or Paneling*

NOTE.—Finish of Deck or Clere Story, Not shown in Fig. 1450, is Known as Headlining.

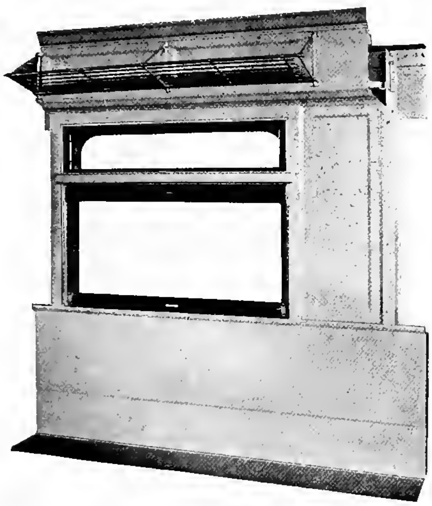


Fig. 1449—Steel Side and Window Finish. Hale & Kilburn Company.

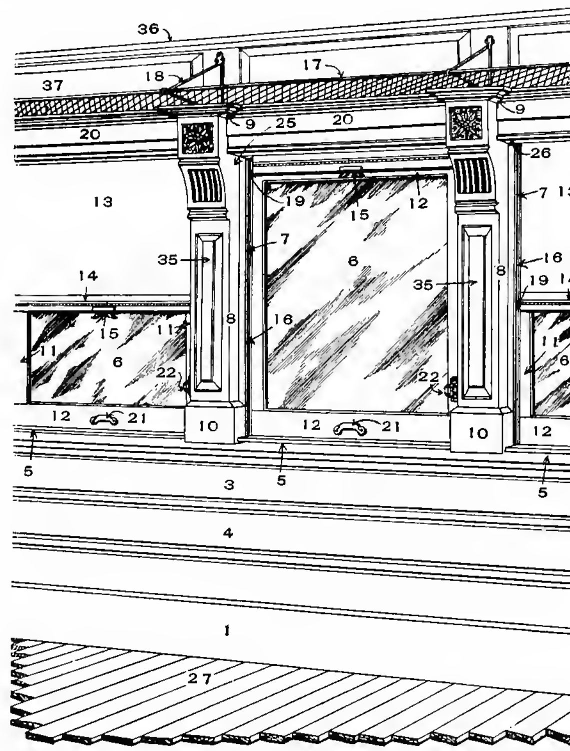


Fig. 1450—Wooden Finish for Day Coach.

Fig. 1451—Steel Bulkhead and Saloon for Harriman Lines Arched Roof Coach. Hale & Kilburn Company.

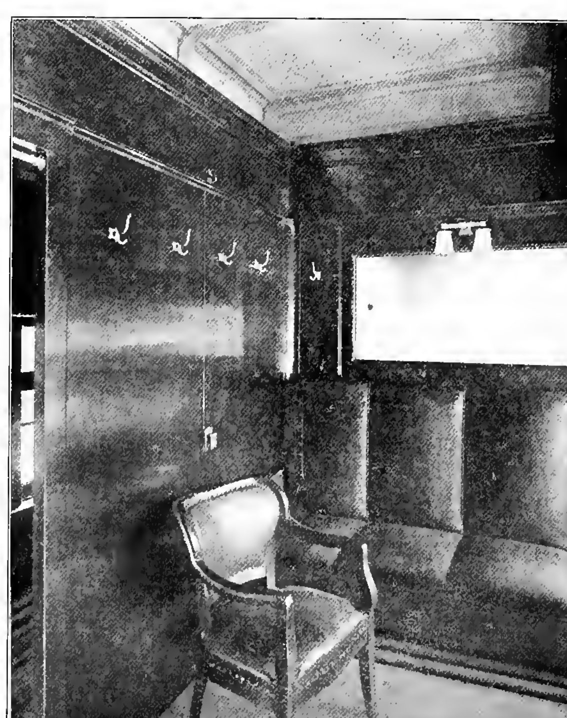


Fig. 1452—Steel Finish in Smoking Room of Pullman Sleeping Car. Dahlstrom Metallic Door Company.

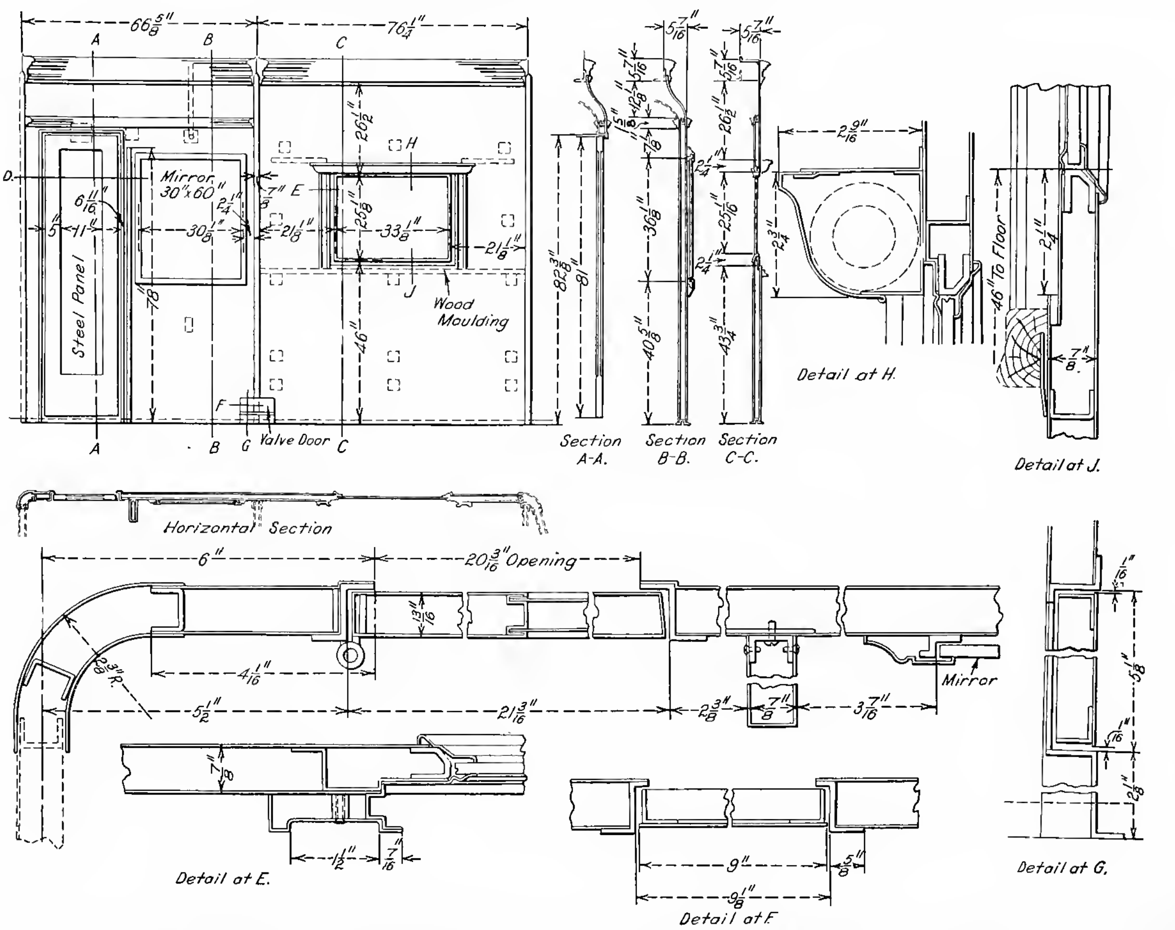


Fig. 1453—Steel Lavatory Partition and Details. Dahlstrom Metallic Door Company.

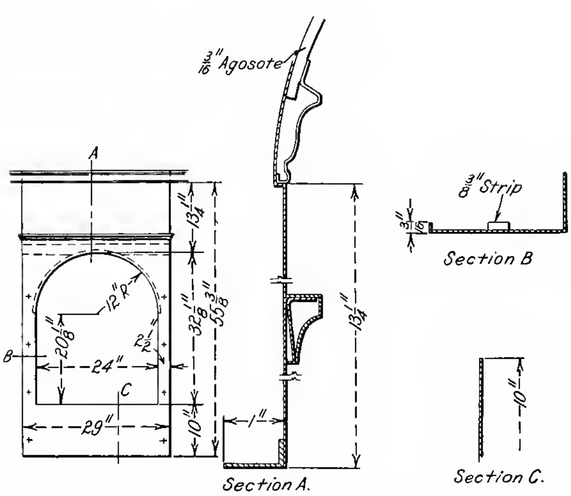


Fig. 1454—Steel Finish at Saloon Window. Dahlstrom Metallic Door Company.

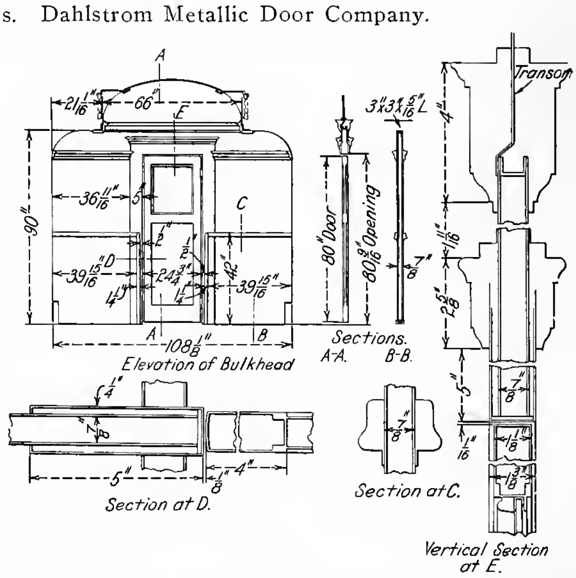


Fig. 1455—Steel Bulkhead and Details. Dahlstrom Metallic Door Company.

Parts of Sleeping Car Sections, Figs. 1458 and 1459.

1 *Lower Berth*
2 *Upper Berth*
4 *Upper Berth Top Rail*
5 *Upper Berth Lower Rail*
6 *Upper Berth Front Panel*
7 *Deck Sill Facing*
8 *Berth Partition*
9 *Head Board*
10 *Inside Window Panel*
11 *Pilaster*
13 *Seat End*
14 *Seat Head End*
15 *Curtain Rod Folding Bracket*
16 *Berth Curtain Rod*
17 *Berth Curtain*
19 *Pillow Box*
20 *Upper Berth End*
21 *Bunk Panel*
22 *Lower Deck Headlining*
23 *Berth Spring and Frame*
24 *Berth Chain Pulley*
25 *Berth Chain*
26 *Berth Safety Rope*
27 *Portoble Table*
28 *Folding Table Leg*
29 *Seat Cushicn. (The cushion pulls out, the back takes the place of the cushion, and together they form the lower berth.)*
30 *Seat Back*

Parts of Sleeping Car Sections, Figs. 1458 and 1459. (Continued.)

31 *Seat Arm Rest*
32 *Head Rest and Head Board Pocket. (The upholstered head rest lifts up about its hinged top and forms a pocket for day wearing apparel.)*
33 *Inner Seat Head End*
34 *Pillow*
35 *Bedding*
41 *Vaulted Deck Window*
43 *Window Sash Lift*
44 *Window Sash Lock*
45 *Table Hook*
47 *Upper Berth Lock*
48 *Berth Latch*
50 *Window Shade*
51 *Window Shade Thumb Latch*
52 *Hammock*
53 *Seat Back Paneling*
54 *Head Board Bolt and Lock*
55 *Hat Hook*

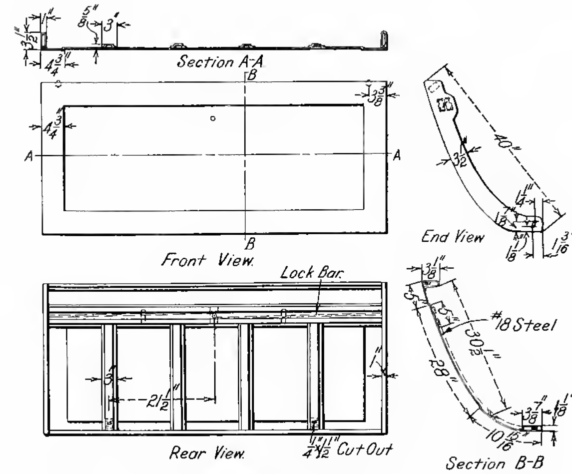


Fig. 1456—Steel Upper Berth. Dahlstrom Metallic Door Company.

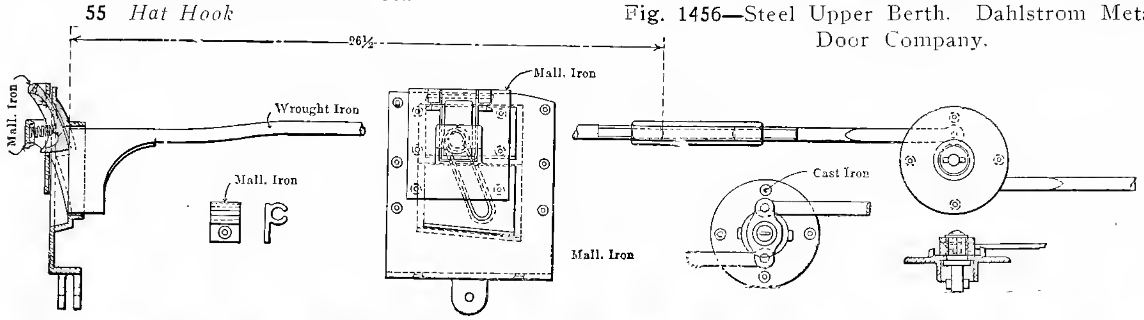


Fig. 1457—Pullman Berth Latch Mechanism.

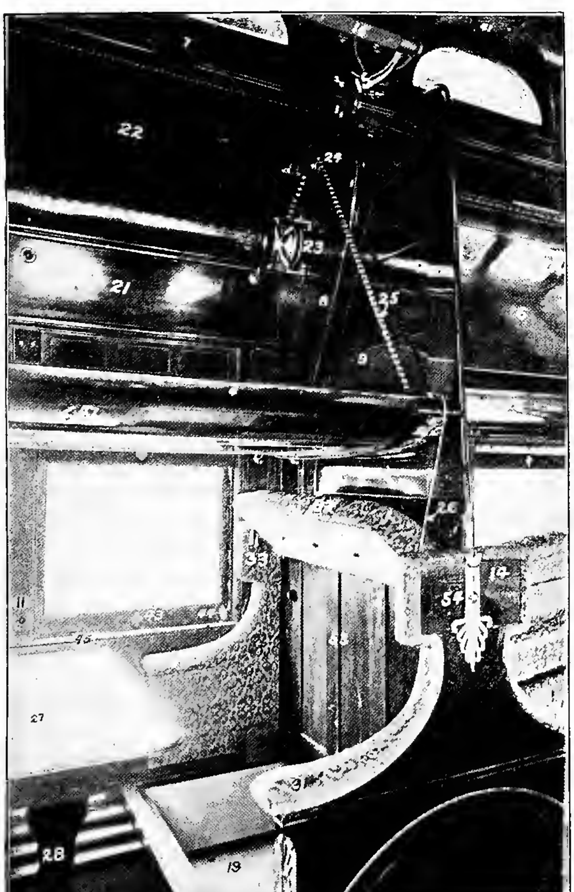


Fig. 1458—Sleeping Car Section with Upper Berth Down and Cushions Removed from Seat.

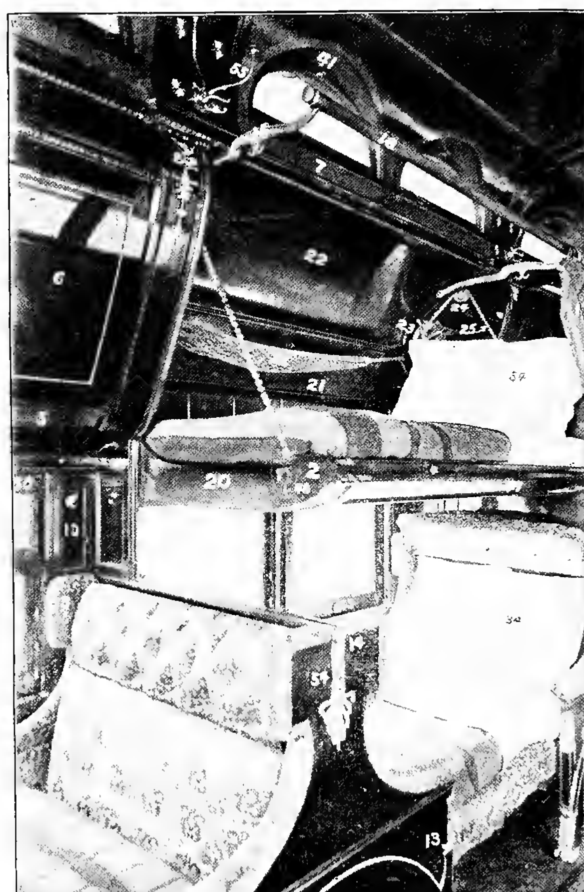


Fig. 1459—Sleeping Car Section with Upper and Lower Berths Made Up.

See Page 684 for Names of Numbered Parts.

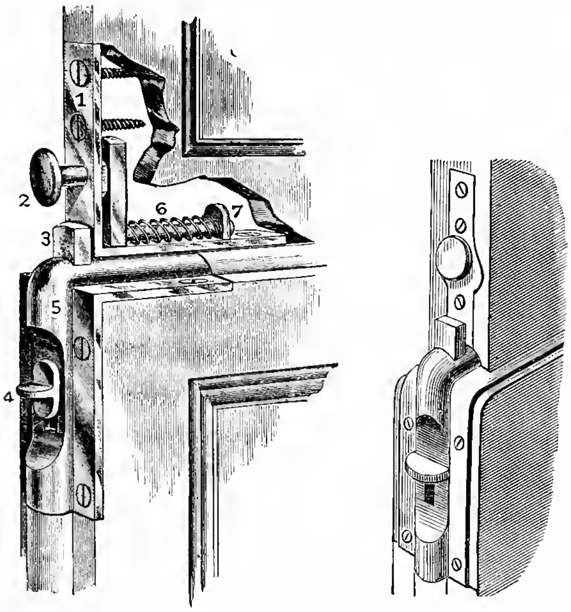
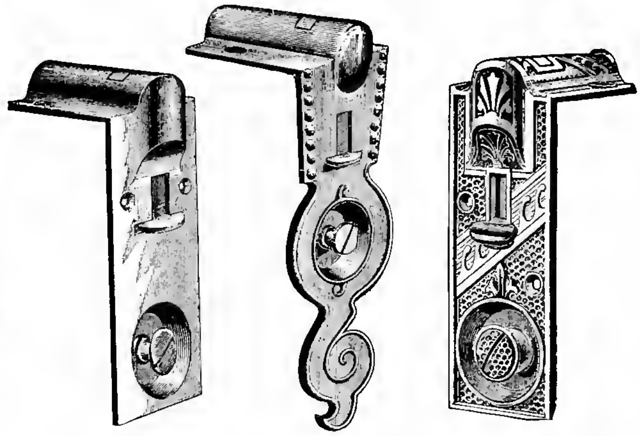


Fig. 1460—Head Board Bolt and Application Details. Dayton Manufacturing Company.



For Bevel Rail Head. D. M. Co.

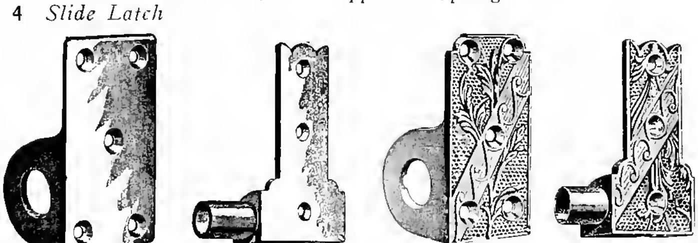
For Flat Rail Board. A. & W. Co.

For Flat Rail Bushings. D. M. Co.

Fig. 1461—Head Board Bushings.

Parts of Fig. 1460.

1 *Upper Face Plate*
2 *Knob Latch*
3 *Lower or Fixed Bolt*
4 *Slide Latch*
5 *Lower Face Plate*
6 *Bolt Spring*
7 *Upper or Spring Bolt*



A. & W. Co. D. M. Co. A. & W. Co. D. M. Co.

Fig. 1462—Berth Hinges.

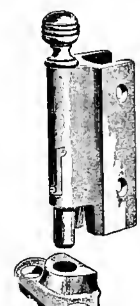


Fig. 1463—Head Board Fastener. Adams & Westlake Company.

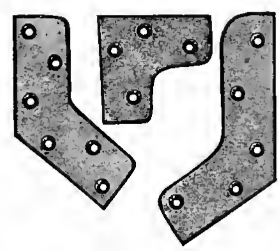


Fig. 1464—Head Board Plates. Adams & Westlake Company.

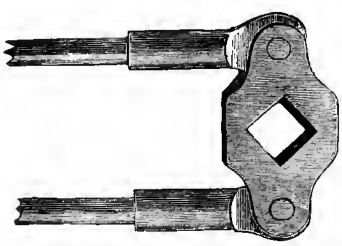


Fig. 1465—Berth Lock Rods. Dayton Manufacturing Company.

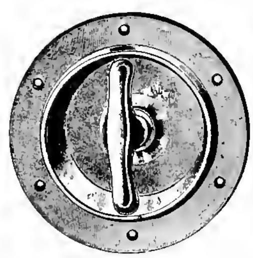


Fig. 1466—Berth Lock Handle. Adams & Westlake Company.

Fig. 1467—Berth Curtain Hook. D. M. Co.

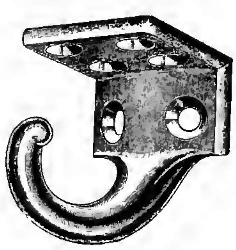


Fig. 1468—Berth Safety Rope Hook. A. & W. Co.

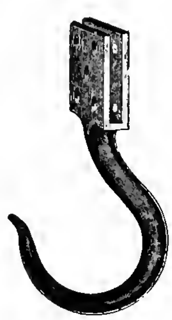


Fig. 1469—Berth Curtain Hook.

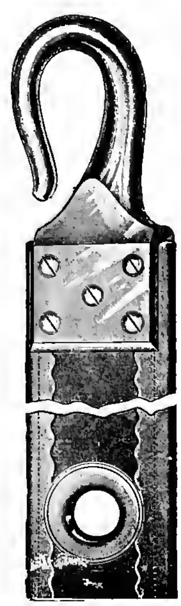


Fig. 1470—Upper Berth Safety Strap and Hook. J. L. Howard & Co.

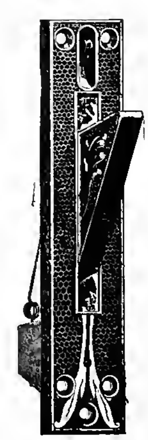
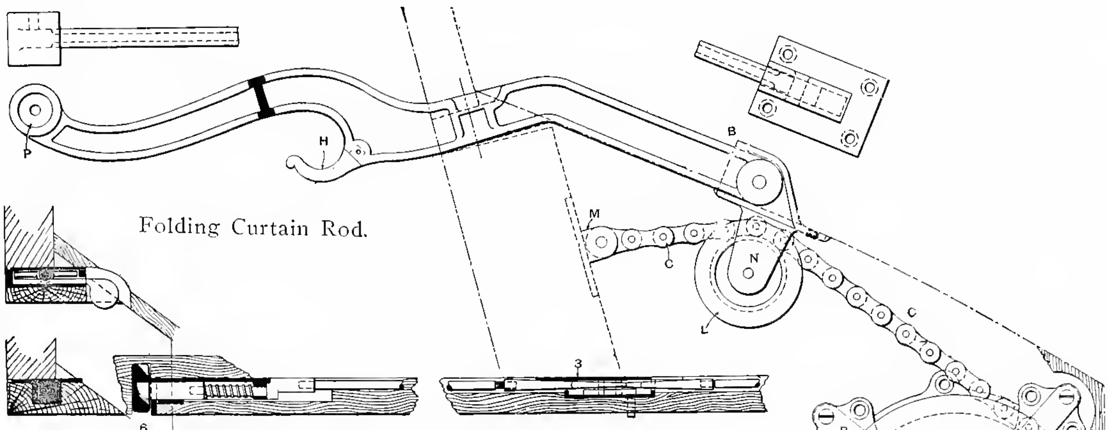
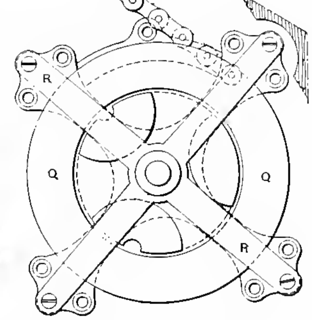


Fig. 1471—Upper Berth Catch. A. & W. Co.



Section Through Latch.

Fig. 1472—Upper Berth Details.



Berth Spring, Chain and Pulley.

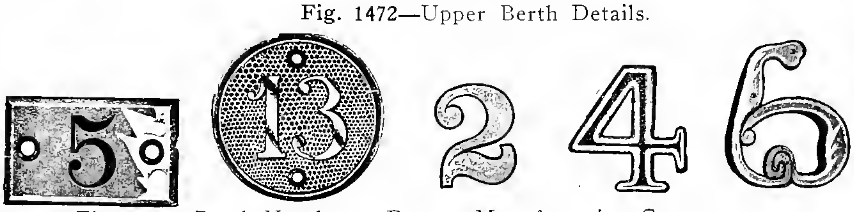
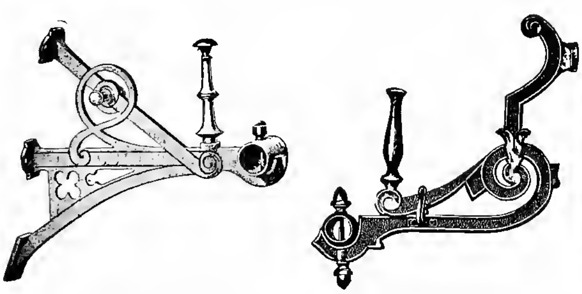


Fig. 1473—Berth Numbers. Dayton Manufacturing Company.



Jas. L. Howard & Co. Adams & Westlake Co.

Fig. 1474—Berth Curtain Rod Brackets.

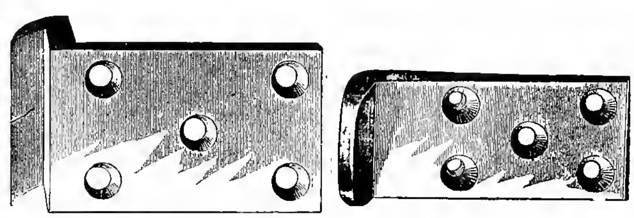


Fig. 1475—Table Hooks. Dayton Manufacturing Company.

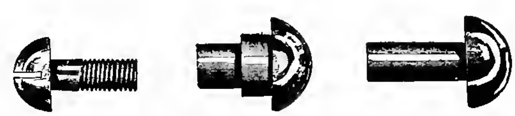


Fig. 1476—Seat Arm Rivets. Dayton Manufacturing Company.

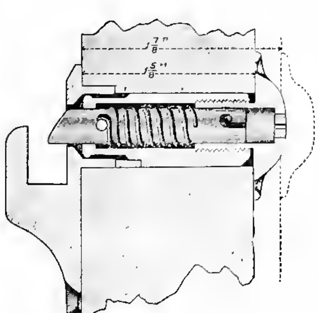


Fig. 1477—Kirby's Seat Lock for Wood Seat Ends. Dayton Manufacturing Company.

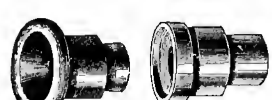


Fig. 1478—Seat Arm Thimbles. Adams & Westlake Company.

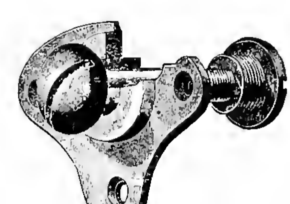


Fig. 1479—Seat Arm Pivot Bolt. Dayton Manufacturing Company.

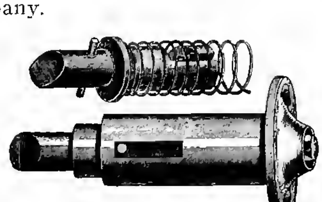


Fig. 1480—Seat Back Arm Lock, Bolt and Spring. Adams & Westlake Company.

Adams & Westlake Company. Dayton Manufacturing Company.

Fig. 1481—Seat Back Arm Locks with Escutcheons.

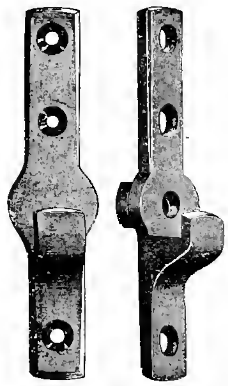
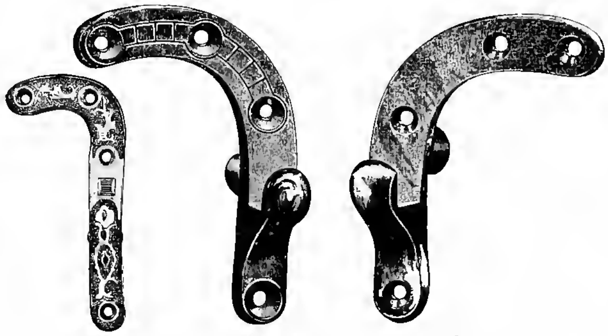


Fig. 1482—Straight Seat Arm Stops. Adams & Westlake Company.



A. & W. Co. Dayton Manufacturing Co.

Fig. 1483—Curved Seat Arm Stops.

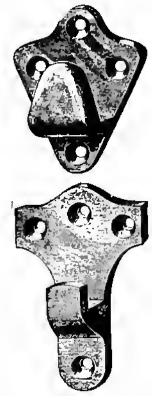


Fig. 1484—Seat Arm Stops. D. M. Co.

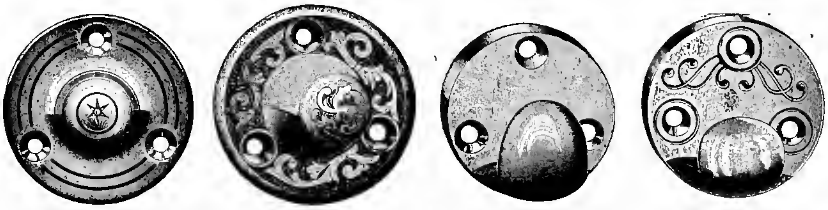


Fig. 1485—Round Seat Arm Stops Which May be Fitted with Locks. Adams & Westlake Company.

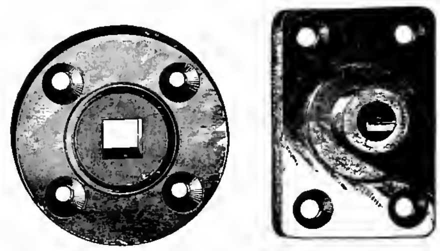


Fig. 1486—Seat Arm Pivots. Dayton Manufacturing Company.

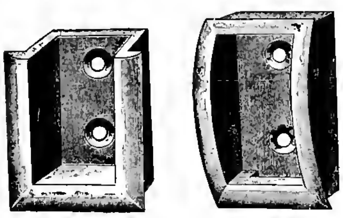


Fig. 1487—Seat Rail Sockets. A. & W. Co.

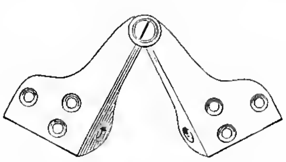


Fig. 1488—Seat Hinge. D. M. Co.

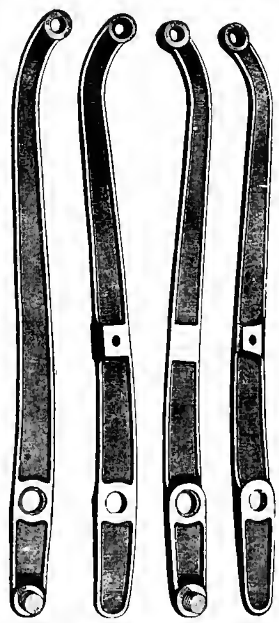


Fig. 1489—Seat Back Arms for Forney Seats.

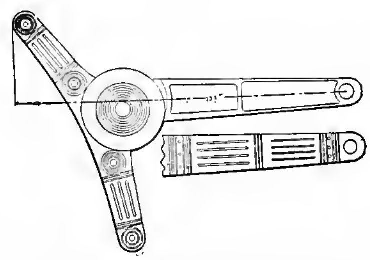


Fig. 1490—Pivoted Seat Back Arm. Dayton Manufacturing Company.

Fig. 1491—Curved Seat Arm Stop with Lock.

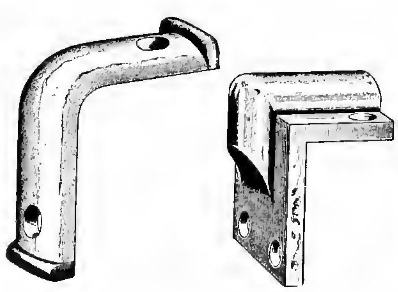


Fig. 1492—Seat Back Corners. A. & W. Co.

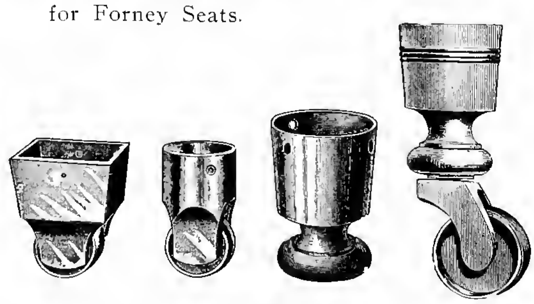


Fig. 1493—Chair and Sofa Casters. Adams & Westlake Co.

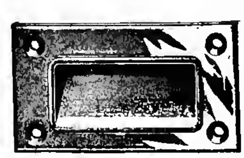


Fig. 1494—Seat Pull. A. & W. Co.

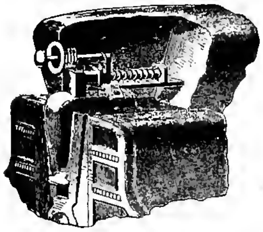


Fig. 1495—Sofa Arm Rest Bolt in Position.

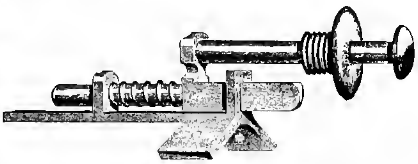


Fig. 1496—Sofa Arm Rest Bolt.

Dayton Manufacturing Company.

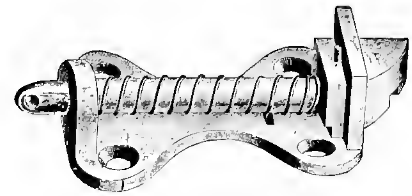


Fig. 1497—Sofa Bolt. Adams & Westlake Company.

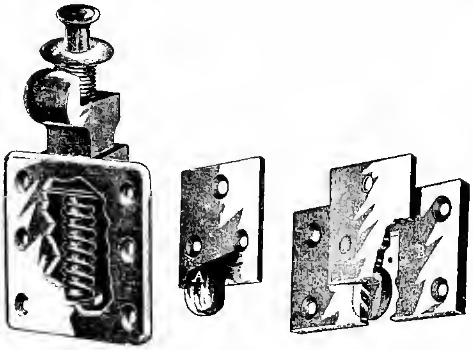


Fig. 1498—Sofa Arm Rest Fixtures. Dayton Manufacturing Company.

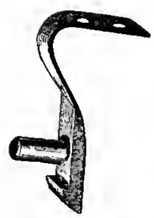


Fig. 1499—Spring Catch.

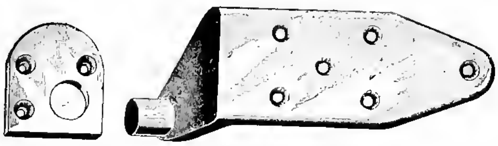
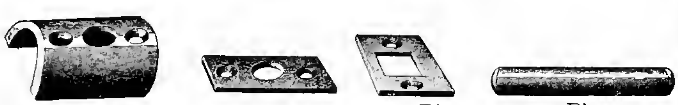


Fig. 1500—Sofa Back Pivot, Hinge and Bushing. Dayton Manufacturing Company.



Pin Bushing. Pin Plate. Catch Plate. Pin.

Fig. 1501—Sofa Arm Rest Fixtures. Dayton Manufacturing Company.

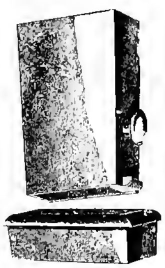


Fig. 1502—Sofa Rail End and Socket. Adams & Westlake Company.

Fig. 1503—Sofa Back Leg Socket and Pocket. Dayton Manufacturing Company.

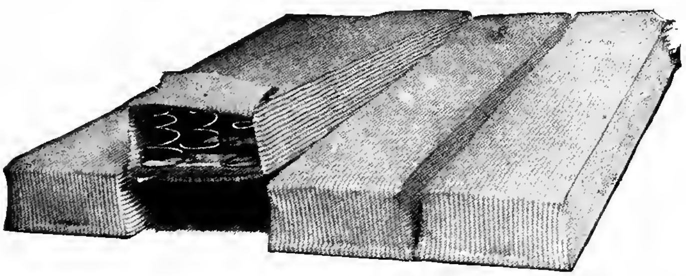


Fig. 1504—Spring Bed Sections for Private and Sleeping Cars. Hale and Kilburn Company.

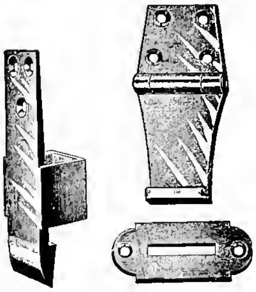


Fig. 1505—Table Leg Hook; Table Holder and Plate. Adams & Westlake Company.

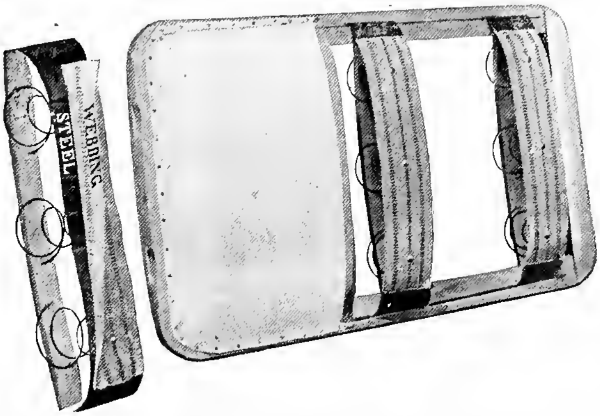


Fig. 1506—Improved Combination Spring Back, with One Section Detached.

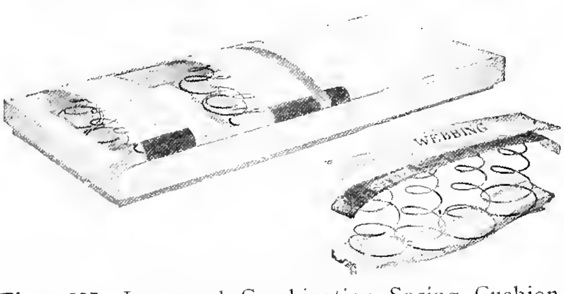


Fig. 1507—Improved Combination Spring Cushion, with One Section Detached.

Hale & Kilburn Company.

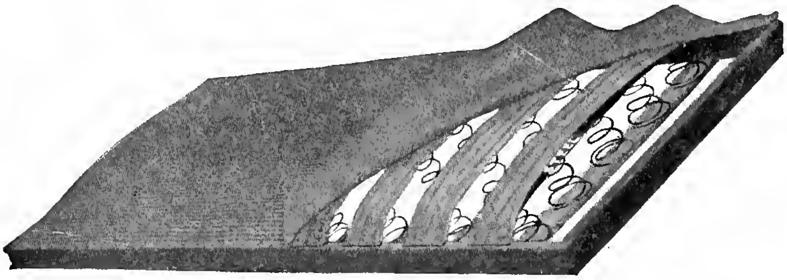


Fig. 1508—Sleeping Car Upper Berth Spring.

Fig. 1510—Walkover Seat No. 97 with Frieze Plush Upholstery.

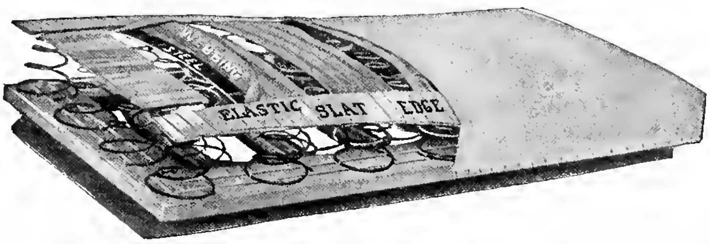


Fig. 1509—Spring Seat, Showing the Use of Slat and Webbing and the Elastic Slat Edge.

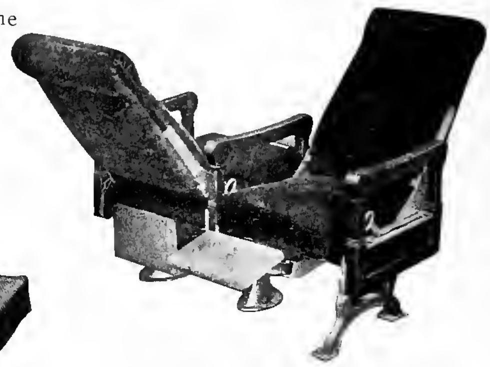


Fig. 1512—Double Reclining Chair No. 65 with Plush Upholstery.

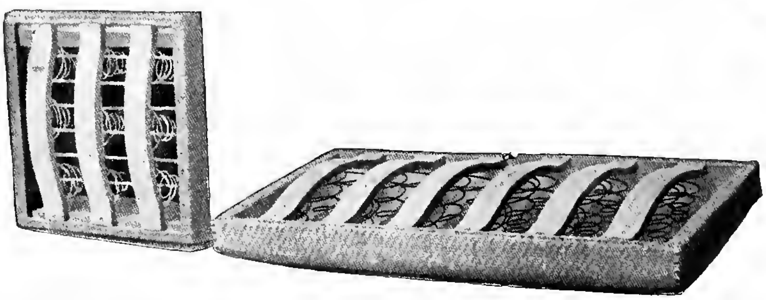


Fig. 1511—Reverse Side of Single and Double Rattan Spring Seats, Showing Construction.

Fig. 1513—Walkover Seat No. 197 with Plain High Back and Frieze Plush Upholstery.

Fig. 1514—Walkover Seat No. 197 with Extra High Headroll Back and Plain Plush Upholstery.

Fig. 1515—Walkover Seat No. 93 with Rattan Upholstery.

Fig. 1516—Steel Walkover Seat with Plush Upholstery, for New York Central & Hudson River Steel Coaches.

Fig. 1517—Steel Walkover Seat with Rattan Upholstery, for New York Central & Hudson River Suburban Cars.

Fig. 1518—Steel Walkover Seat with Plush Upholstery, for Harriman Lines Steel Coaches.

Fig. 1519—Steel Walkover Seat with Frieze Plush Upholstery, for Pennsylvania Railroad Steel Coaches.

Fig. 1520—Reversible Seat for New York, New Haven & Hartford Vestibuled Coaches.

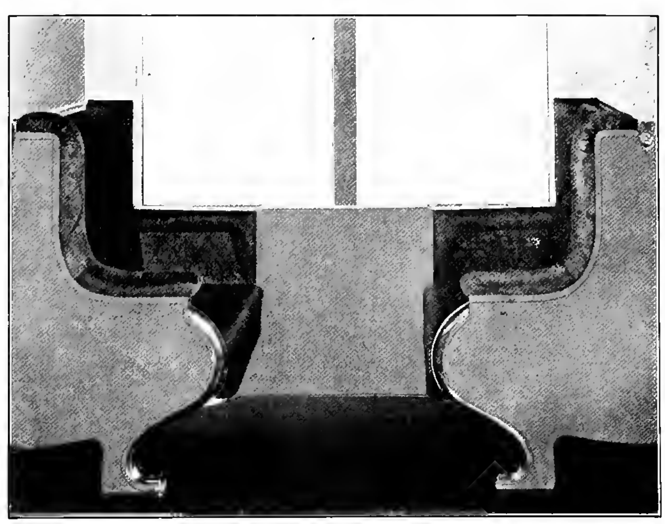


Fig. 1521—Steel Seats and Lower Berth with Plush Upholstery, for Sleeping Car.

Hale & Kilburn Company.

Fig. 1522—Reclining Parlor Car Chair No. 42.

Fig. 1523—Revolving Parlor Car Chair No. 30.

Fig. 1524—Revolving Parlor Car Chair No. 32.

Hale & Kilburn Company.

Fig. 1525—Revolving Parlor Car Chair No. 41.

Fig. 1526—Revolving Parlor Car Chair No. 38.

Hale & Kilburn Company.

Fig. 1527—Pressed Steel Walkover Seat. Walker & Bennett Manufacturing Company.

Fig. 1528—Pressed Steel Walkover Seat.

Fig. 1529—Walkover Seat with Reversible Foot Rest and Steel Arm Rest.

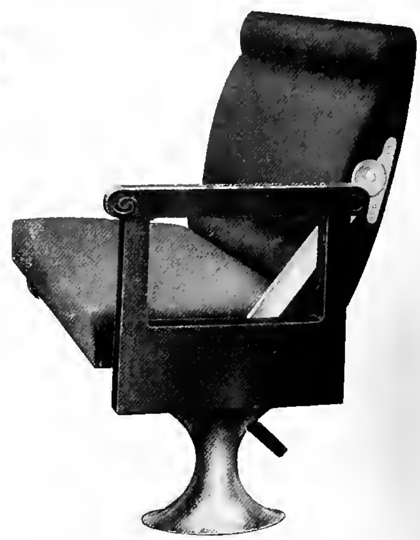


Fig. 1530—Pressed Steel Reversible Seat.

Walker & Bennett Manufacturing Company.

Fig. 1531—Universal Wheeler Reversing Seat with Stationary Foot Rest and Rattan Upholstery.

Fig. 1532—Universal Wheeler Reversing Seat with High Headroll Back and Leather Upholstery.

Fig. 1533—Universal Wakefield Reversing Seat with Turnover Reversing Action and Single Automatic Foot Rest.

Fig. 1534—Universal Wheeler Reversing Seat with Detachable Back and Frieze Plush Upholstery.

Fig. 1535—Upholstered Reed Chair with Swivel Base Support, for Parlor and Observation Cars.

Fig. 1536—Wheeler Seat with Automatic Tilting Foot Rest and Leather Upholstery.

Fig. 1537—Wheeler Seat with Cricket Leg.

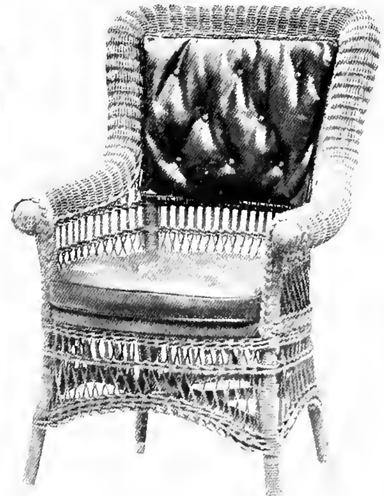


Fig. 1538—Upholstered Reed Chair for Parlor and Observation Cars.

Fig. 1539—Universal Wakefield Reversing Seat with Turnover Reversing Action and Rattan Upholstery.

Heywood Brothers & Wakefield Company.

Fig. 1540—Richards Panel Back Dining Car Chair, without Arms.

Fig. 1541—Richards Panel Back Double Seat.

Fig. 1542—Richards Panel Back Dining Car Chair, with Arms.

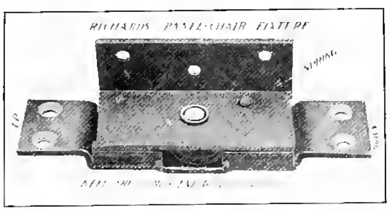


Fig. 1543—Richards Panel Chair Steel Pivot Fixture.

Fig. 1544—Richards Panel Back Fiber-Rush Chair.

Fig. 1545—Richards Panel Back Parlor Car Chair; Pullman Standard.

Fig. 1546—Richards Panel Back Revolving Chair Seat, with or without Reclining Back.

Richards Chair Panel Company.

Fig. 1547—Standard Coach Seat with Plush Upholstery.

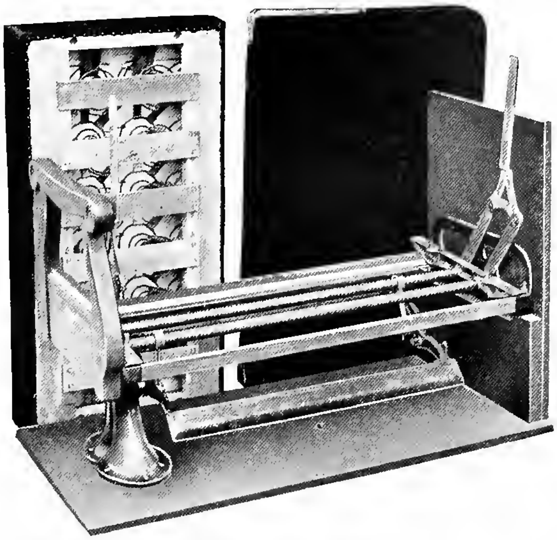


Fig. 1548—Mechanism of Standard Coach Seat.

The Barney & Smith Car Company.

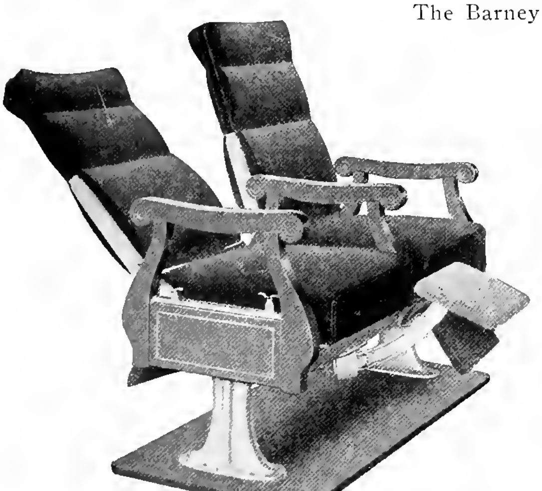


Fig. 1549—Double Reclining Chair Seat.

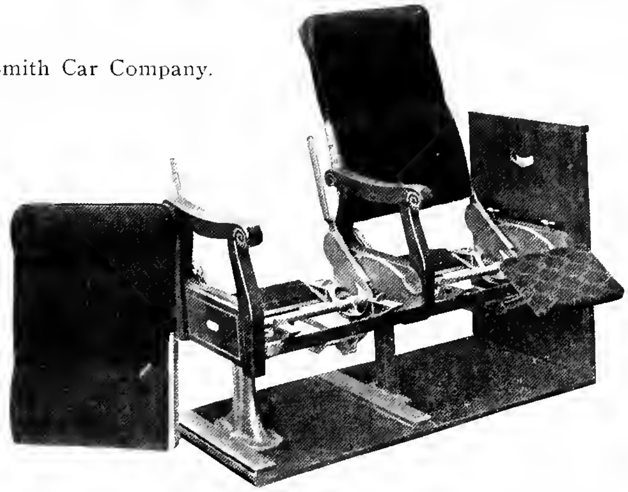


Fig. 1550—Mechanism of Double Reclining Chair Seat Shown in Fig. 1549. The Barney & Smith Car Company.

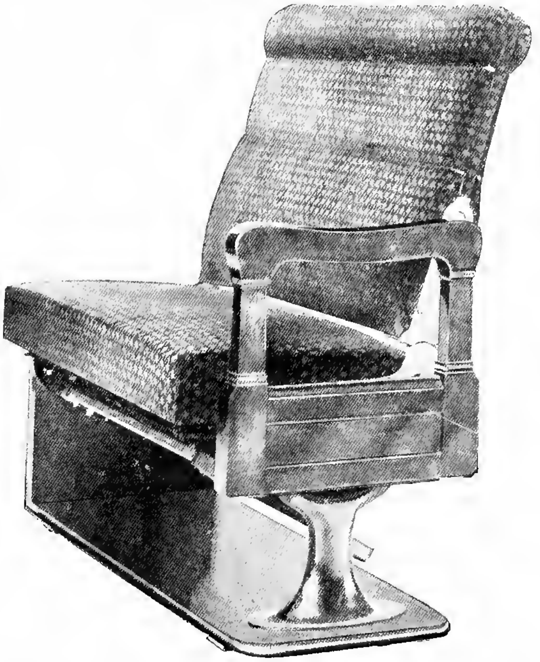


Fig. 1551—Coach Seat with Foot Rest Arranged to Allow Room for Suit Case.

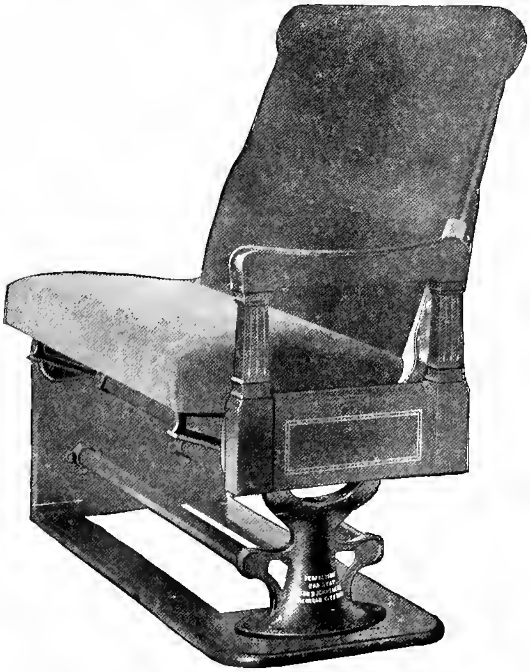


Fig. 1552—Coach Seat with Stationary Foot Rest.

The Ford & Johnson Company.

Fig. 1553—Reversible Seat No. 71 with Rattan Upholstery, for Narrow Gage Cars.

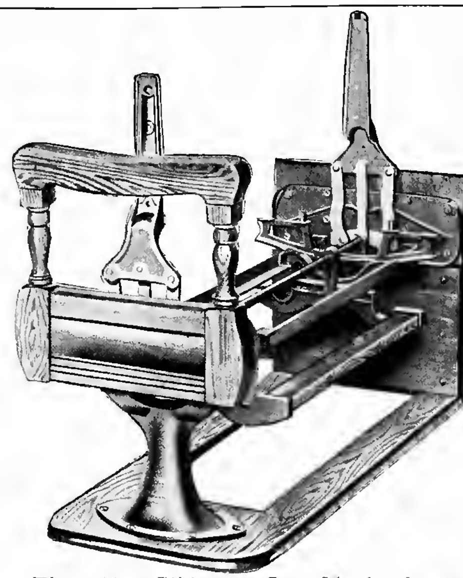


Fig. 1554—Glideover Seat Mechanism.

Fig. 1555—Coach Seat with Double Striker Arms and Grab Handle.

Fig. 1556—Parlor Car Chair with Revolving Pedestal.

The Ford & Johnson Company.

Fig. 1557—Reed Chair for Parlor and Observation Cars. The Ford & Johnson Company.

Fig. 1558—Parlor Car Chair No. 1091. Scarritt-Comstock Furniture Company.

Fig. 1559—Medium Back Coach Seat No. 33.

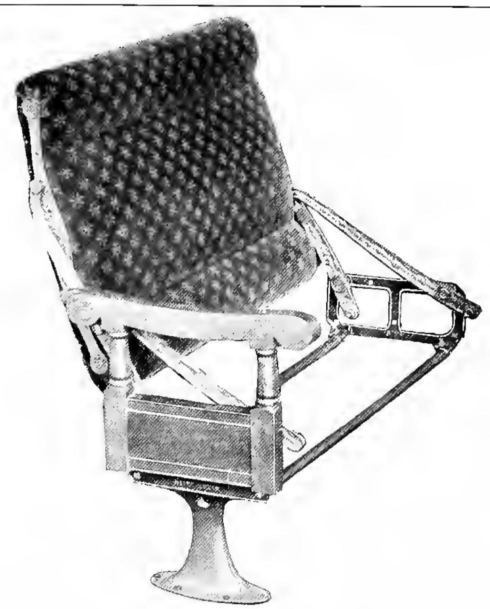


Fig. 1560—High Back Coach Seat No. 32X, Showing Construction of Frames.

Fig. 1561—Parlor Car Chair No. 114.

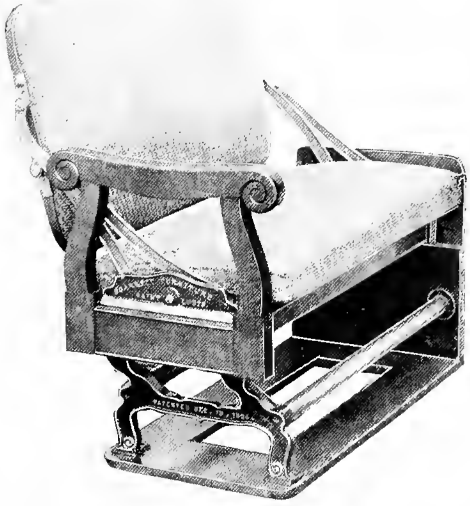


Fig. 1562—Medium Back Coach Seat No. 17.

Fig. 1563—Parlor Car Chair No. 113.

Fig. 1564—Parlor Car Chair No. 115.

ritt-Comstock Furniture Company.

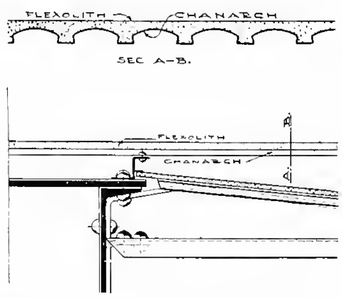


Fig. 1565—Flexolith Composition Flooring Laid Over Chanarch Metal Flooring. General Railway Supply Company.

Fig. 1566—Arch Flooring. Acme Supply Company.

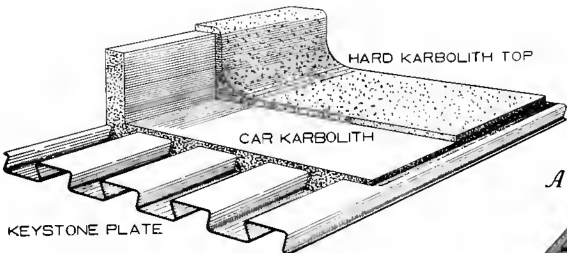
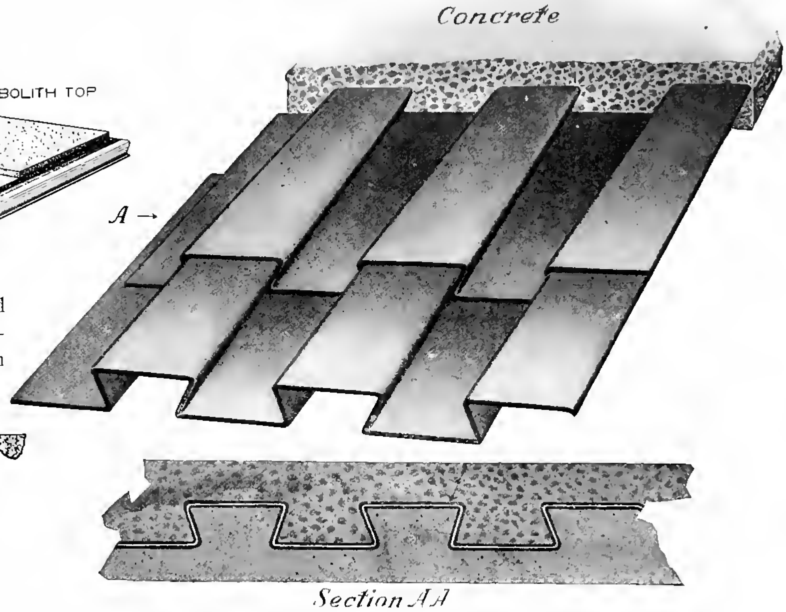


Fig. 1567—Karbolith Flooring as Applied to Pennsylvania Railroad Steel Passenger Train Cars. American Mason Safety Tread Company.



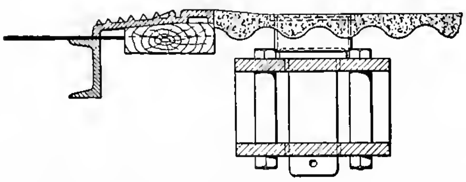


Fig. 1568—Fireproof Flooring for Interborough Subway Cars.

Fig. 1569—Ferroinclave Floor Covering. Brown Hoisting Machinery Company.

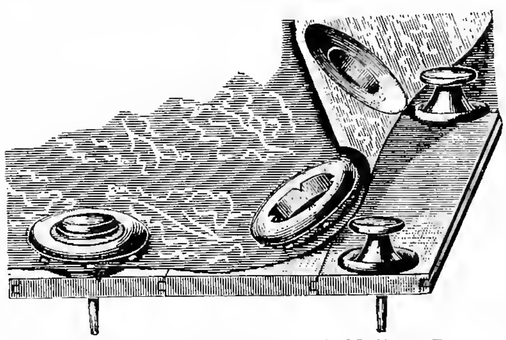


Fig. 1570—Carpet Eyelets and Nails. Dayton Manufacturing Company.

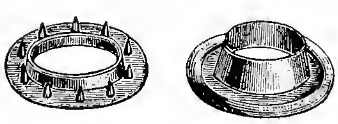


Fig. 1571—Upper and Lower Gromets for Carpet Eyelets. Adams & Westlake Company.

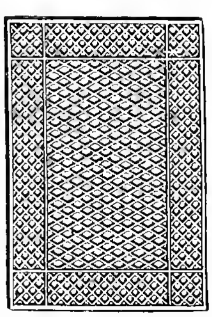


Fig. 1572 — Perforated Rubber Floor Mat.

Fig. 1573—Application of Ferroinclave Floor Covering to Floor of Steel Car. Brown Hoisting Machinery Company.

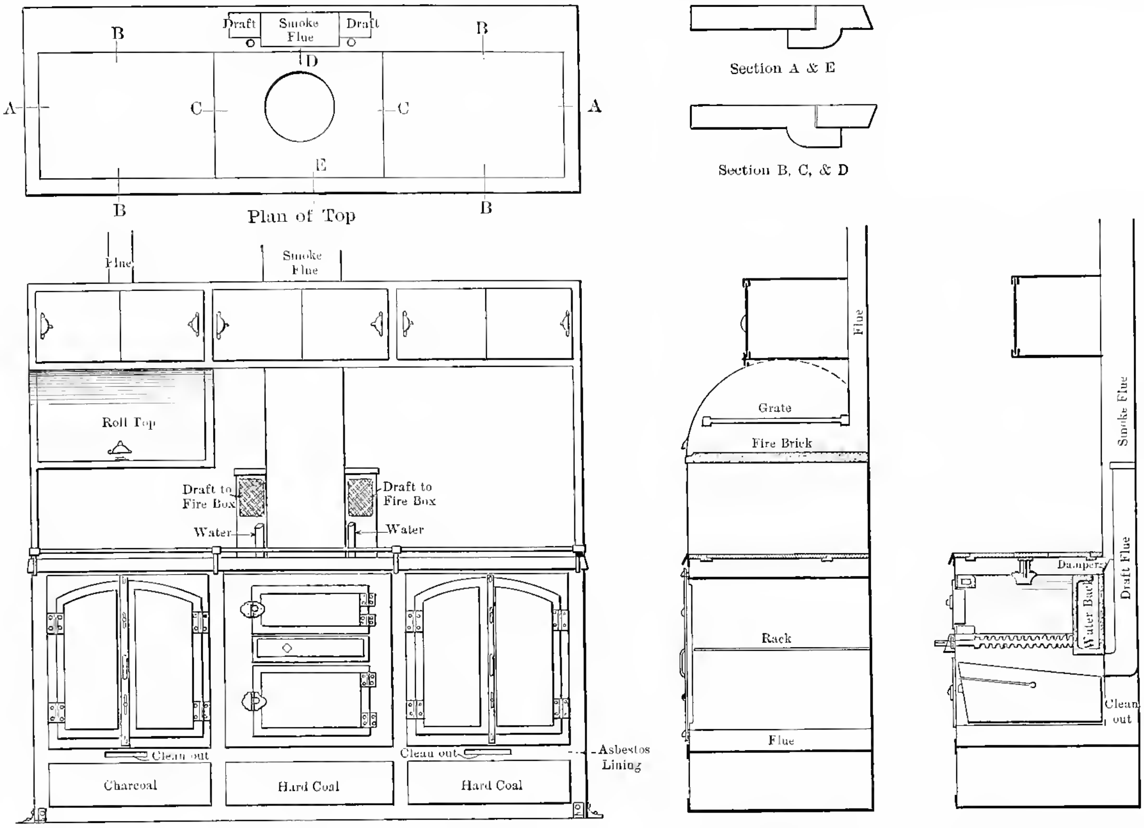


Fig. 1574—Stearns Safety Range for Dining Cars. Stearns Steel Range Company.

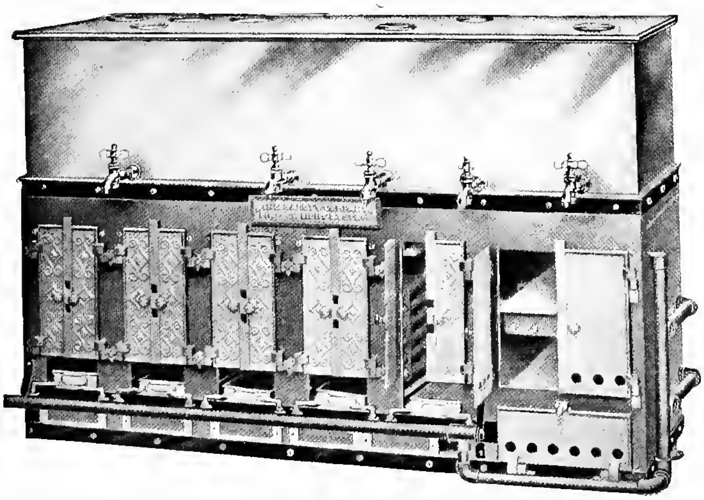


Fig. 1575—Gas Broiler and Oven No. 1507.

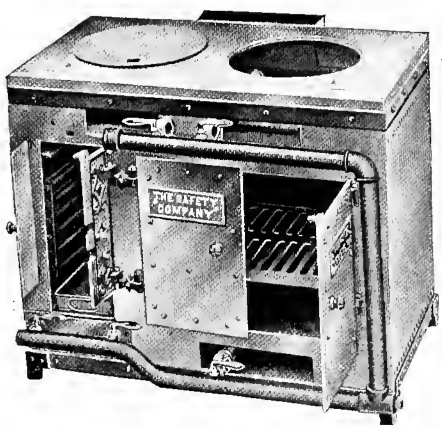


Fig. 1576—Gas Broiler and Oven No. 1501a.

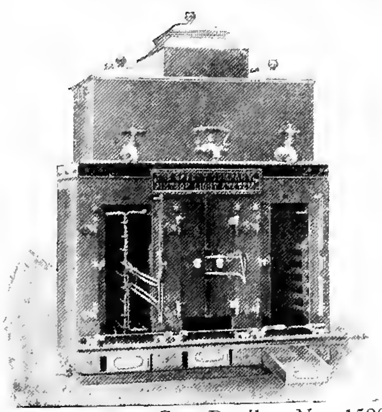


Fig. 1579—Gas Broiler No. 1500.

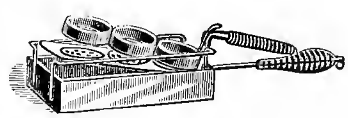


Fig. 1577—Egg Poacher No. 1504.

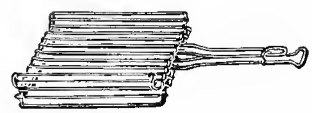


Fig. 1578—Broiling Iron No. 1502.

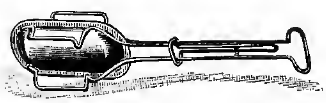


Fig. 1580—Hash Browner No. 1504.

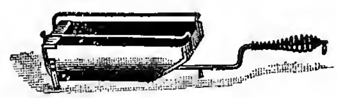
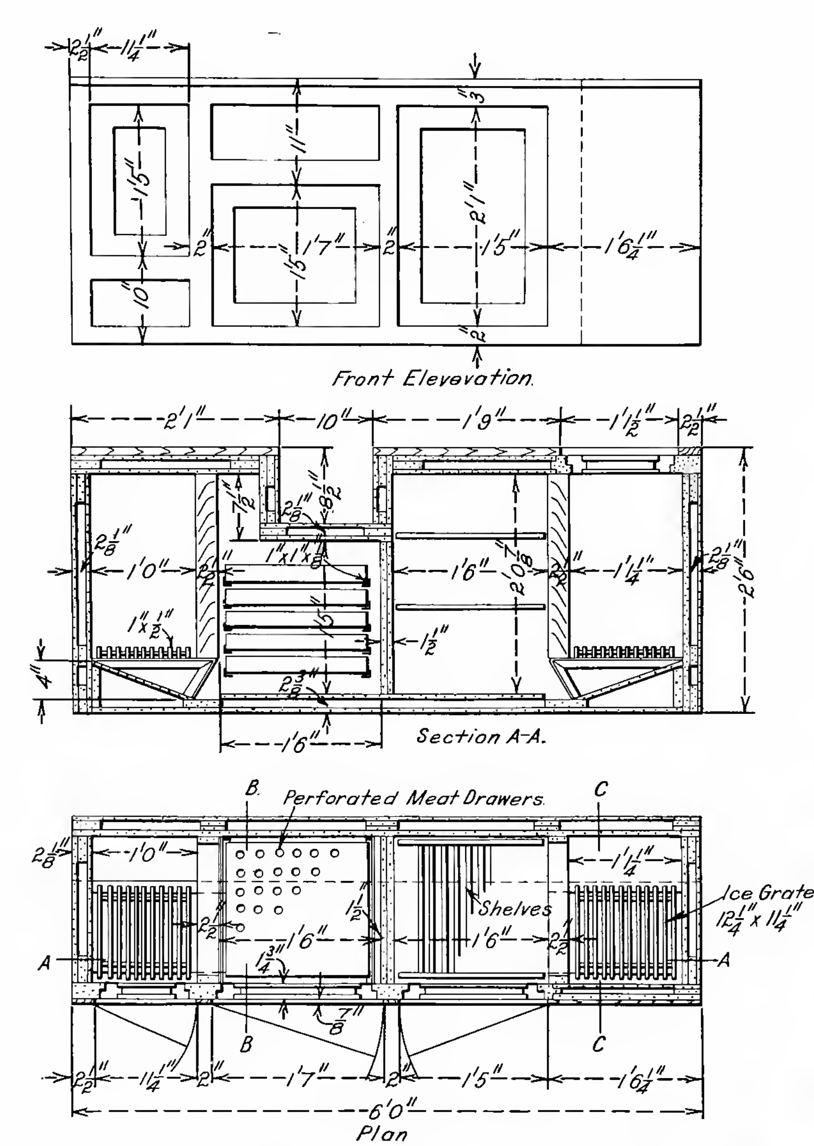


Fig. 1581—Frying Pan No. 1503.

Utensils. The Safety Car Heating & Lighting Company.



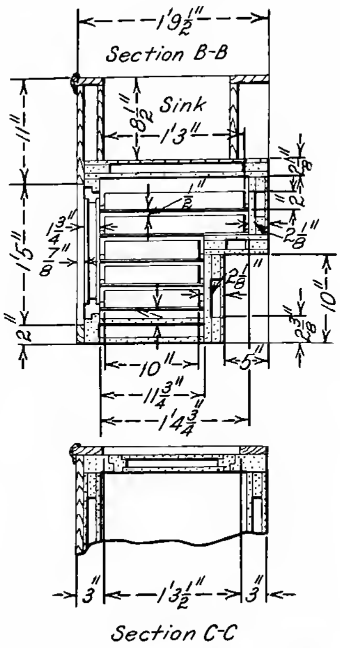


Fig. 1582—Buffet Refrigerator. White Enamel Refrigerator Company.

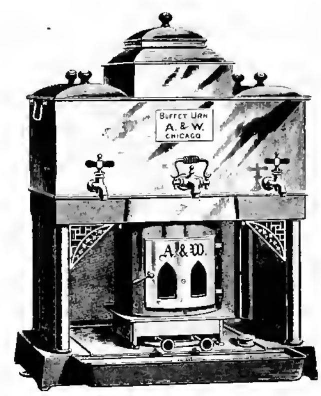


Fig. 1583—Buffet Stove and Urn. Adams & Westlake Company.

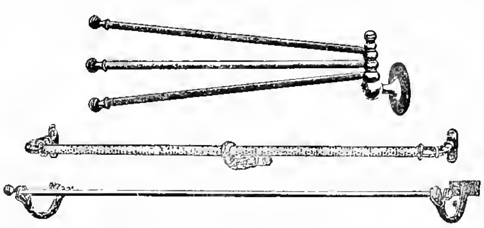


Fig. 1584—Towel Rods. Dayton Manufacturing Company.

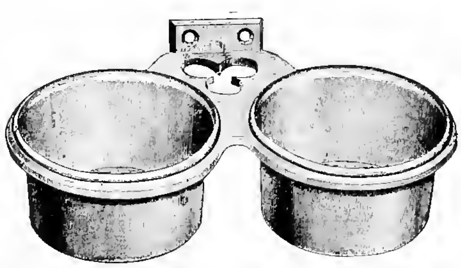


Fig. 1585—Double Tumbler Holder. Dayton Manufacturing Company.

Fig. 1586—Tumbler Holder. Adams & Westlake Company.

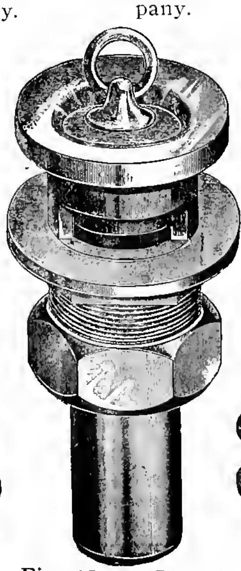


Fig. 1587 — Basin Bushing and Plug for Overflow Bowl.

Fig. 1588—Sink Bushing and Plug.

Fig. 1589 — Basin Bushing and Plug.

Adams & Westlake Company.

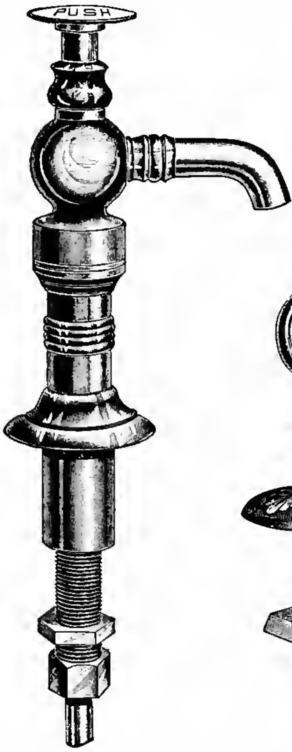


Fig. 1590 — Compression Faucet. Fig. 1591—Chain Post or Stay.
Adams & Westlake Company.

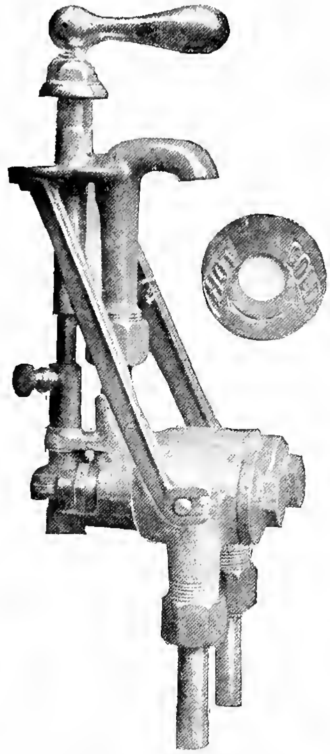


Fig. 1592—Combination Hot and Cold Water Faucet. A. & W. Co.

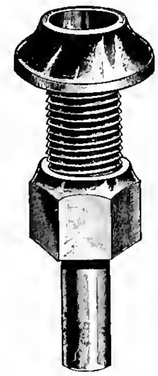


Fig. 1593 — Tail Coupling for Alcove Faucet. Fig. 1594 — Tumbler Holder and Drip.
Adams & Westlake Company.

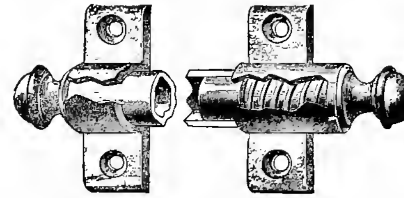


Fig. 1597—Towel Rod Bracket. Dayton Manufacturing Company.

Fig. 1595—Filler Cover. Jas. L. Howard & Company.

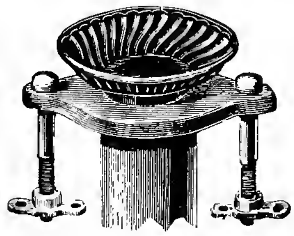


Fig. 1596—Soap Dish. A. & W. Co.

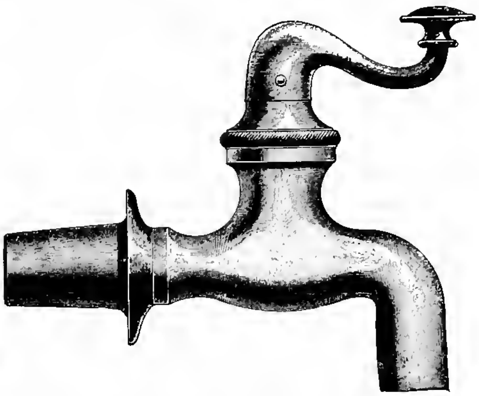


Fig. 1601—Telegraph Faucet. Dayton Manufacturing Company.

Fig. 1598—Soap Dish. Adams & Westlake Company.

Fig. 1599—Spud and Coupling. D. M. Co.

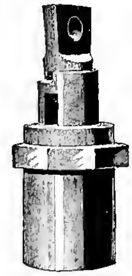
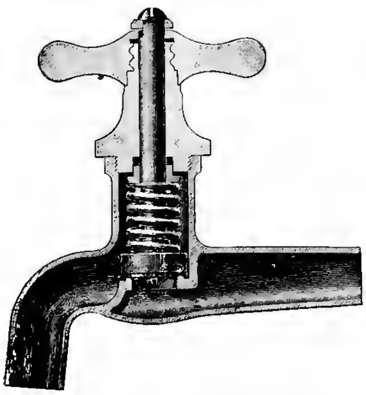


Fig. 1600—Tank Waste Cock. A. & W. Co.



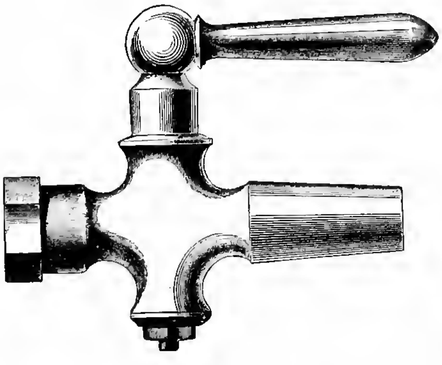


Fig. 1602—Zane's Self-Closing Bibb Cock. Fig. 1603—Stop Cock.
Dayton Manufacturing Company.

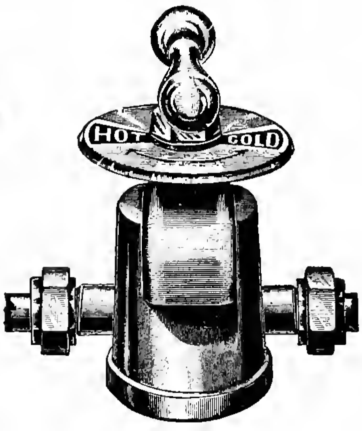


Fig. 1604—Combination Hot and Cold Water Faucets. A. & W. Co.

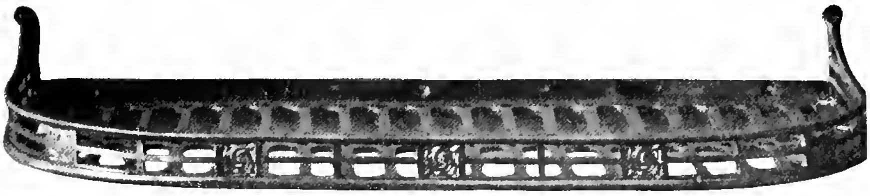


Fig. 1605—Toilet Rack. Adams & Westlake Company.

Fig. 1606—Dental Lavatory. Dayton Manufacturing Company.

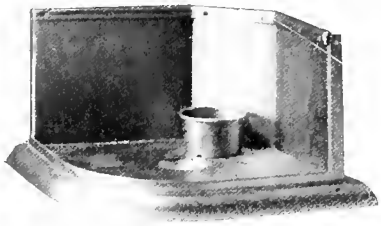


Fig. 1607—White Metal Drip Tray. Jas. L. Howard & Company.

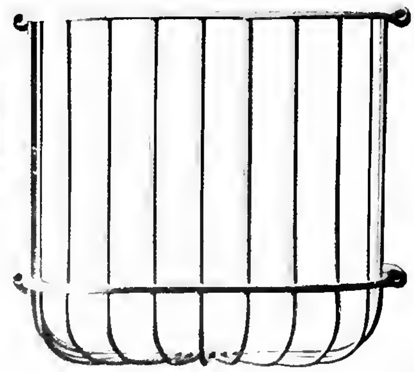


Fig. 1608—Rack for Soiled Towels. Jas. L. Howard & Company.

Fig. 1609—Comb and Brush Rack. Adams & Westlake Company.

Fig. 1610—Corner Toilet Rack. Adams & Westlake Company.

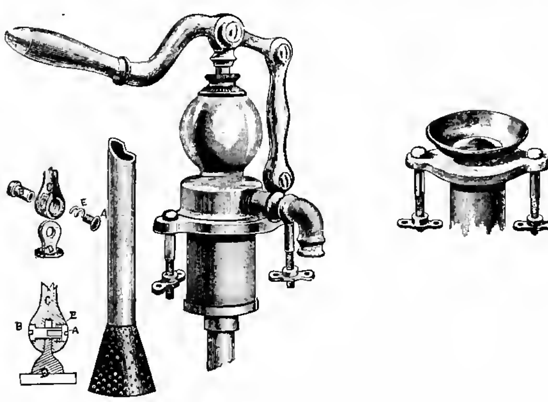


Fig. 1611—Washroom Pump and Soap Holder. Dayton Manufacturing Company.

Parts of Washroom Pump, Fig. 1612.

A *Pump Body with Spout and Cylinder*
B *Nut for Attaching Body to Base*
C *Base*
D *Screws for Attaching Base to Slab*
E *Nuts for Attaching Base to Slab*
F *Lever*
G *Rosewood Handle*
H *Handle Nut*
I *Rocker Arm*
J *Rocker Arm Pivot Screw, Upper*
K *Rocker Arm Pivot Screw, Lower*
L *Piston Rod*
M *Piston Rod Pivot Screw*
N *Piston Rod Shock Absorber (Leather)*
O *Piston Rod Stuffing Box Nut*
P *Piston Rod Stuffing Box Collar*
Q *Piston and Valve*
R *Piston Packing (Leather)*
S *Plunger*
T *Cylinder Head with Valve*
U *Cylinder Head Washer (Leather)*
V *Suction Pipe, with Coupling Nut and Strainer*

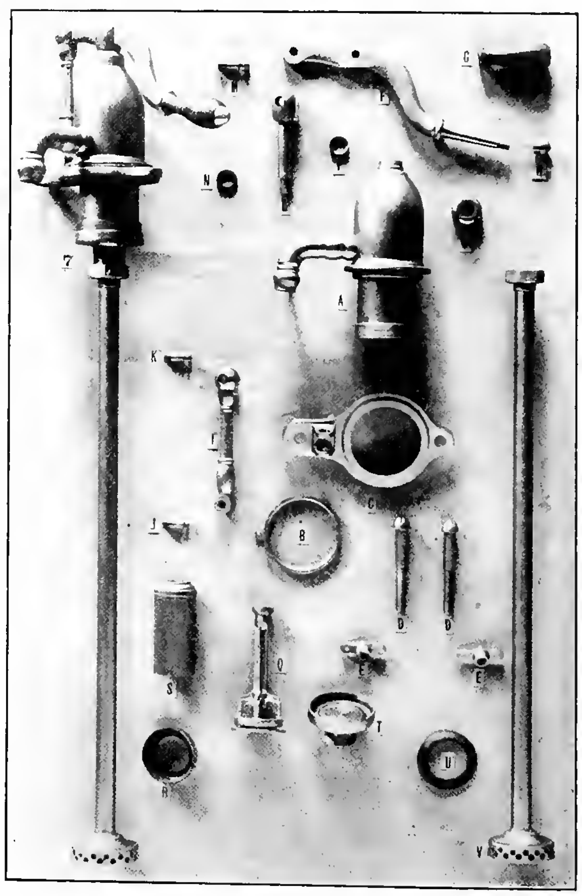


Fig. 1612—Washroom Pump and Fittings. Jas. L. Howard & Company.

Fig. 1613—Water Alcove. Jas. L. Howard & Company.

Closed. Open.

Fig. 1614—Metal Folding Lavatory. Dayton Manufacturing Company.

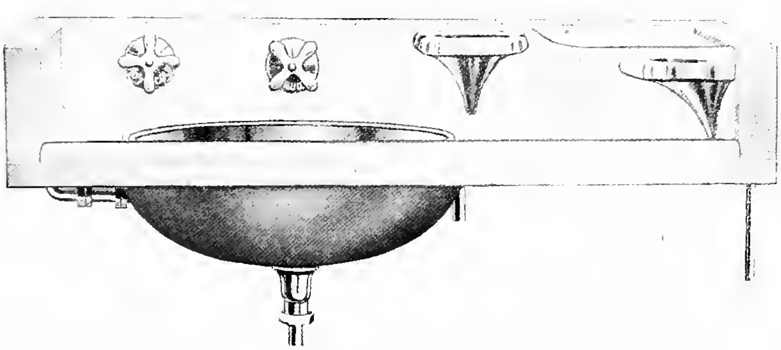


Fig. 1615—White Metal Lavatory. Dayton Manufacturing Company.

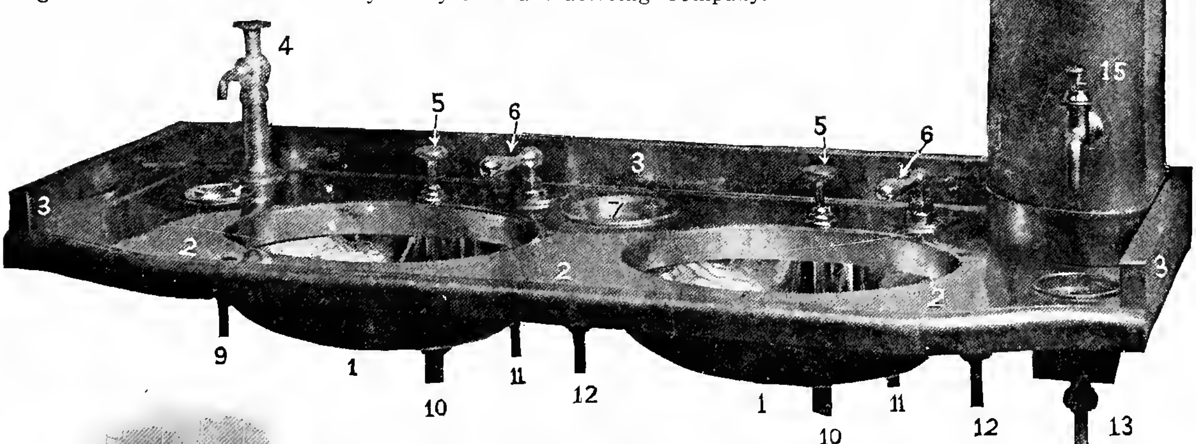


Fig. 1616—White Metal Lavatory and Water Cooler. Adams & Westlake Company.

Fig. 1617—Universo Liquid Soap Fixture. The Watrous Company.

Parts of Lavatory, Fig. 1616.

1 *Bowl or Basin*
2 *Slab*
3 *Riser*
4 *Compression Faucet*
5 *Basin Valve*
6 *Combination Hot and Cold Water Faucets*
7 *Soap Dish*
9 *Supply Pipe to Compression Faucet*
10 *Wash Basin Drain*
11 *Supply Pipe, Hot Water*
12 *Supply Pipe, Cold Water*
13 *Tumbler Holder Drain*
14 *Water Cooler*
15 *Water Cooler Faucet*

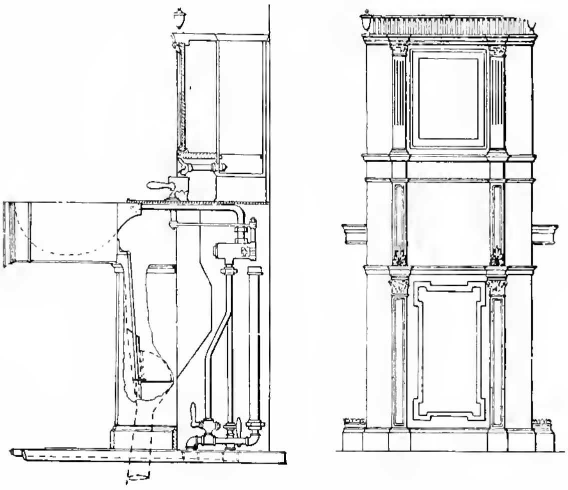


Fig. 1618—Folding Lavatory for Staterooms. Adams & Westlake Company.

Fig. 1619—Folding Corner Lavatory. Dayton Manufacturing Company.

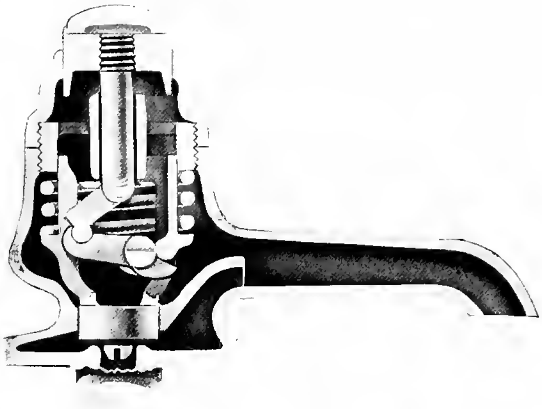


Fig. 1620—Section Through Push Button Faucet. The Watrous Company.

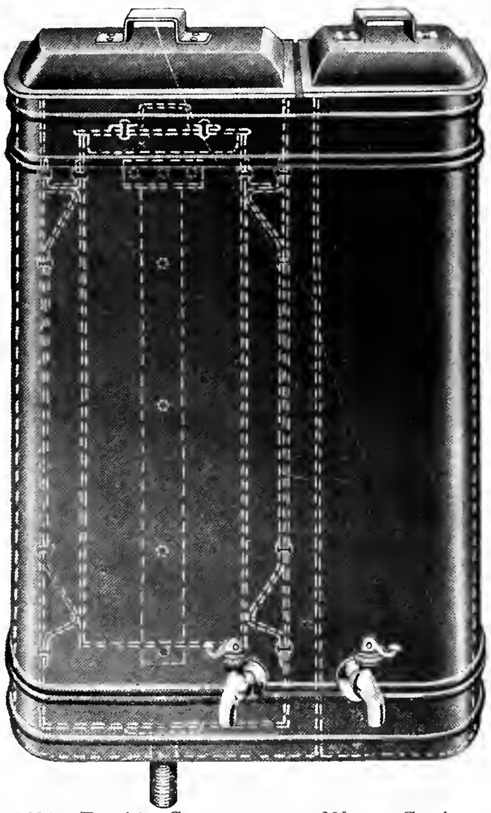


Fig. 1621—Double Compartment Water Cooler with Removable Ice Container.

Fig. 1622—Double Compartment Water Tank and Lavatory.

Dayton Manufacturing Company.

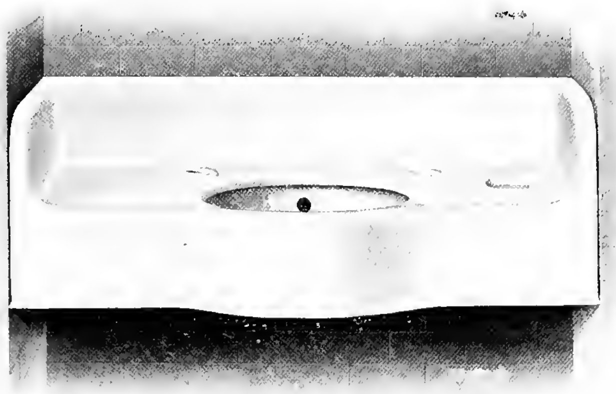


Fig. 1623—Enameled Iron Lavatory. Dayton Manufacturing Company.

Fig. 1624—Enameled Iron Lavatory for Postal and Baggage Cars. Dayton Manufacturing Company.

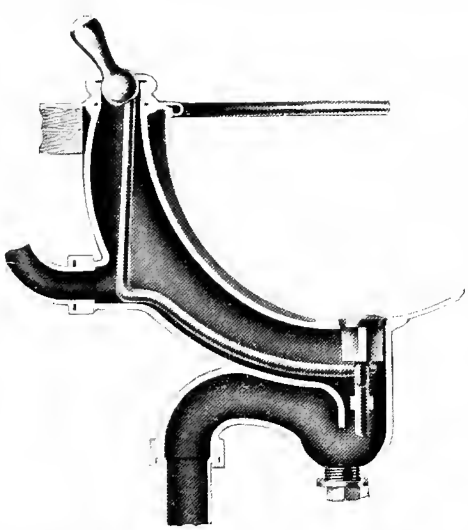


Fig. 1625—Section Through White Metal Lavatory Showing Tilting Lever Waste and Trap.

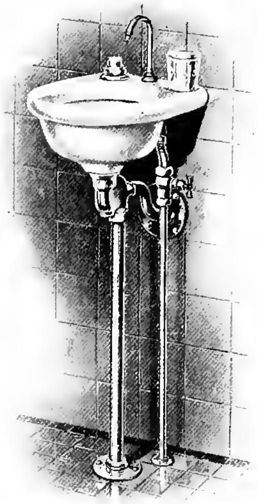


Fig. 1626—Vitreous Ware Dental Lavatory.

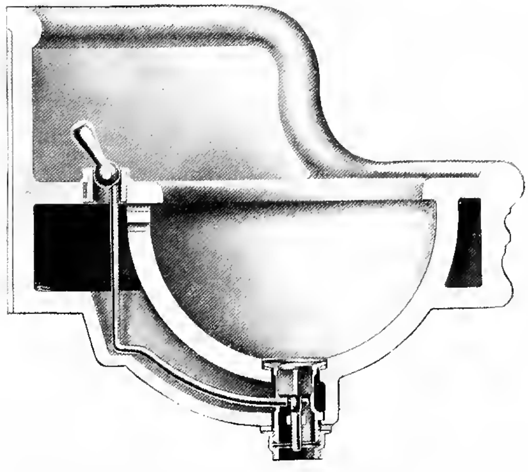


Fig. 1627—Section Through Vitreous Ware Lavatory Showing Waste Attachment.

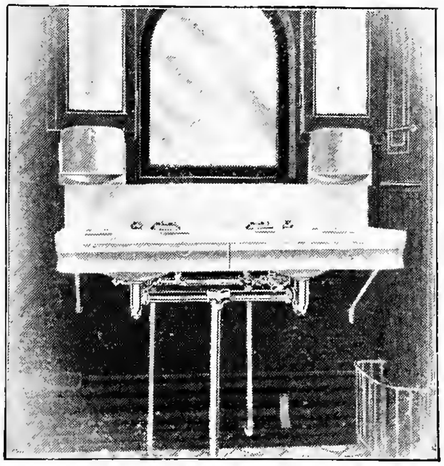


Fig. 1628—Double White Metal Lavatory.

The Watrous Company.

Fig. 1629—White Metal Corner Lavatory.

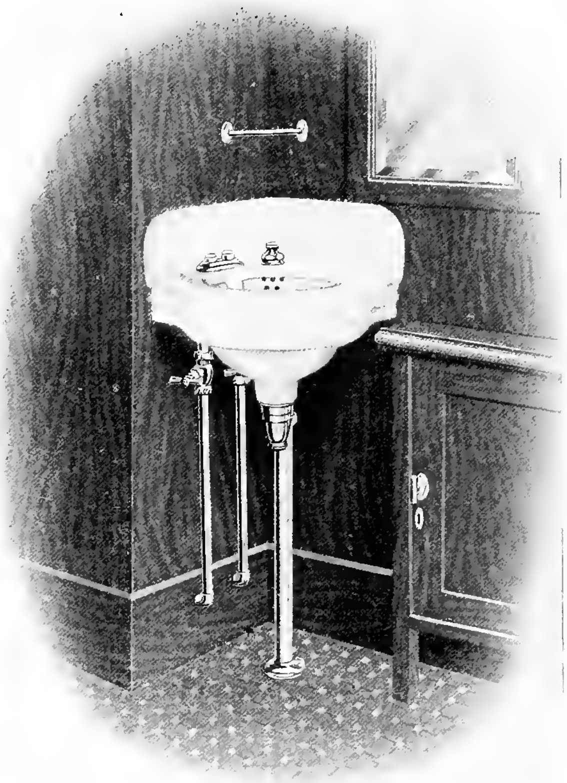


Fig. 1630—Vitreous Ware Corner Lavatory.

Fig. 1631—Vitreous Ware Lavatory.

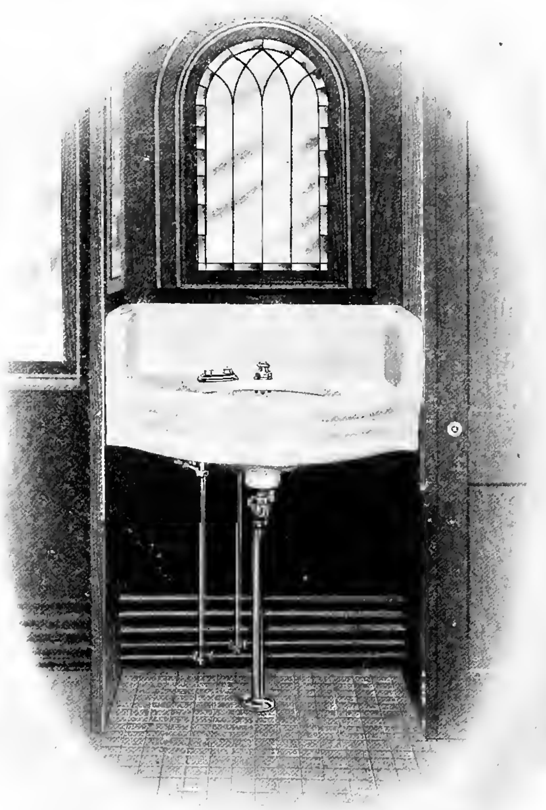


Fig. 1632—Vitreous Ware Recess Lavatory.

The Watrous Company.

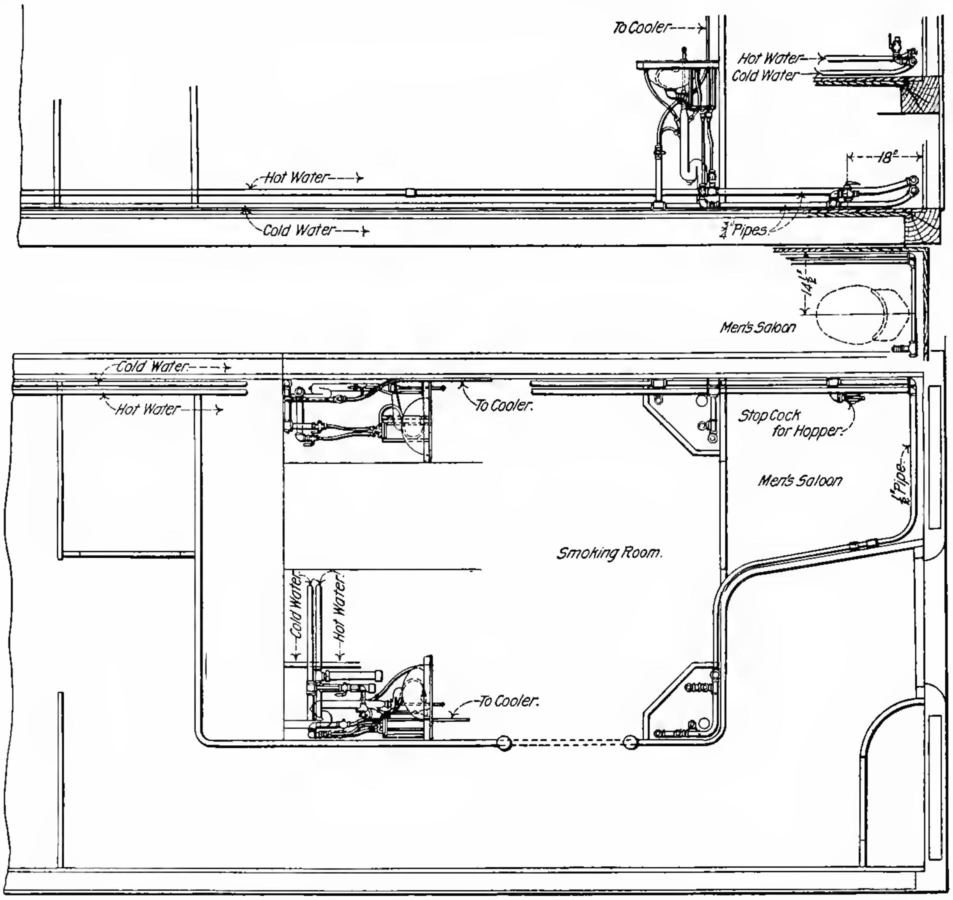
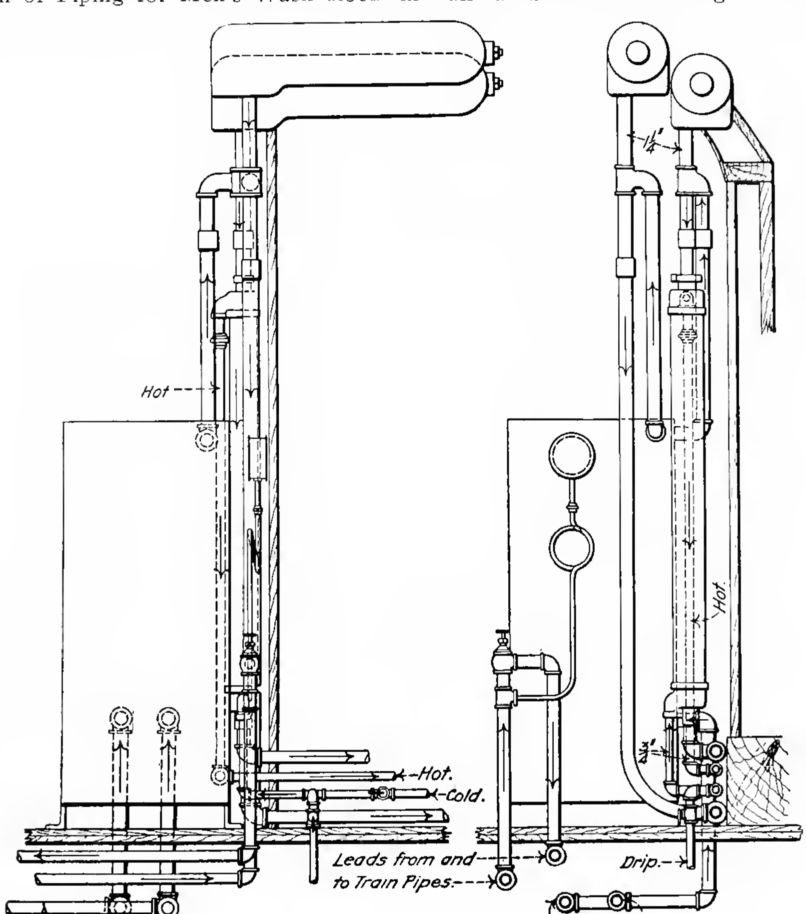


Fig. 1633—Plan of Piping for Men's Wash Room in Pullman Standard Drawing Room Sleeping Car.



ions to Baker Heater in Pullman Standard Drawing Room Sleeping Car.

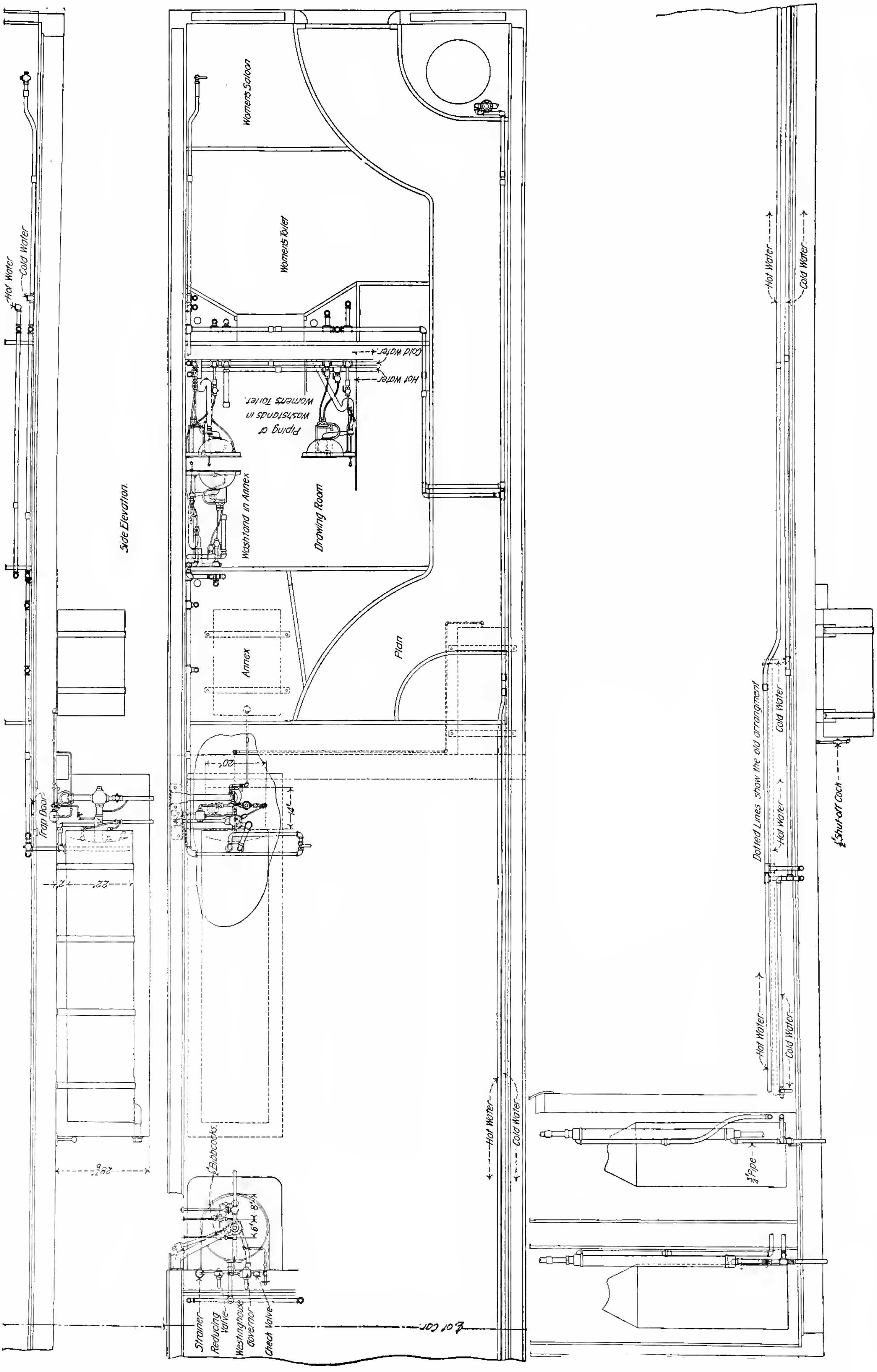


Fig. 1635—Piping and Connections for Hot and Cold Water Supply for Pullman Standard Drawing Room Sleeping Car.

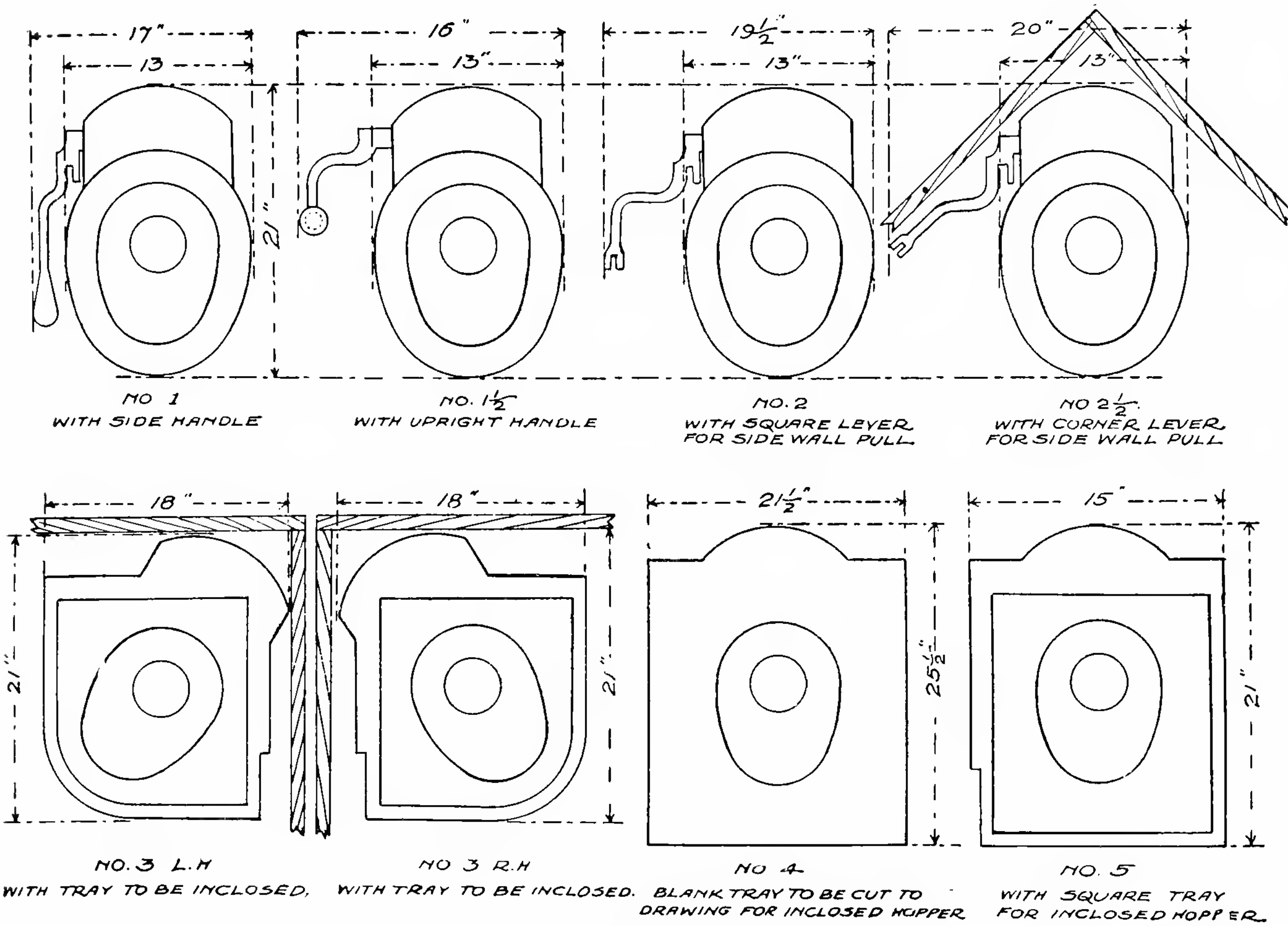


Fig. 1636—Types and Dimensions of Duner Car Closets.

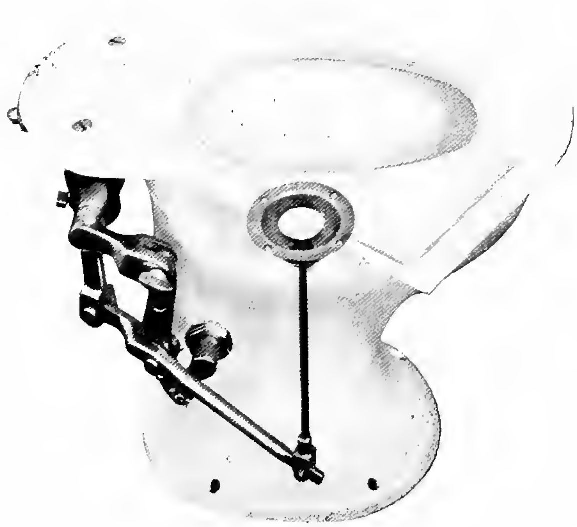


Fig. 1637—Duner Enameled Iron Corner Closet No. 3 with Tray to be Inclosed.

Fig. 1638—Duner Combined Flush and Dry Closet with Side Handle.

Duner Company.

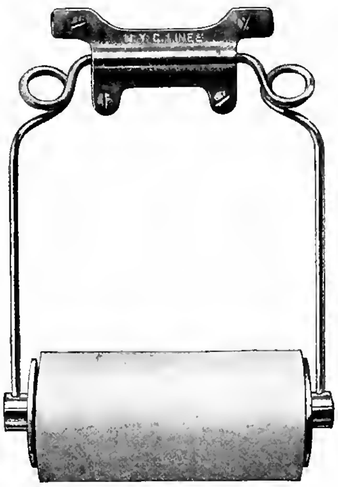


Fig. 1639—Toilet Paper Holder. Dressel Railway Lamp Works.

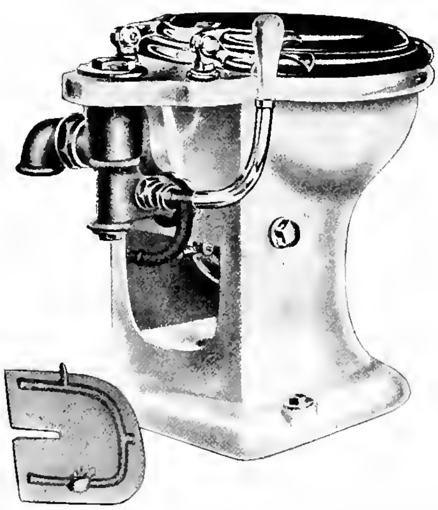


Fig. 1640—Americo Car Closet. The Watrous Company.

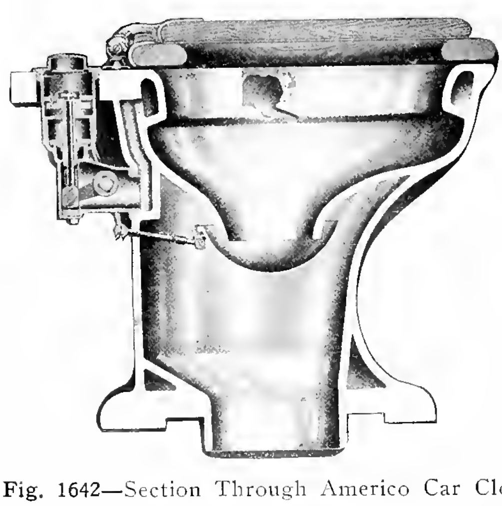


Fig. 1642—Section Through Americo Car Closet.

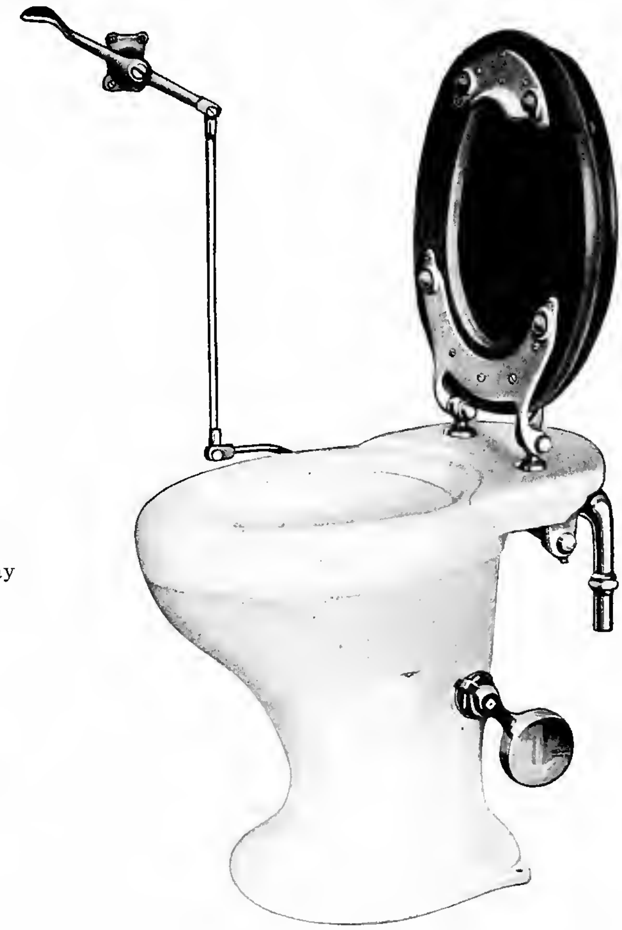


Fig. 1641—Duner Closet with Side Wall Pull. Duner Company.

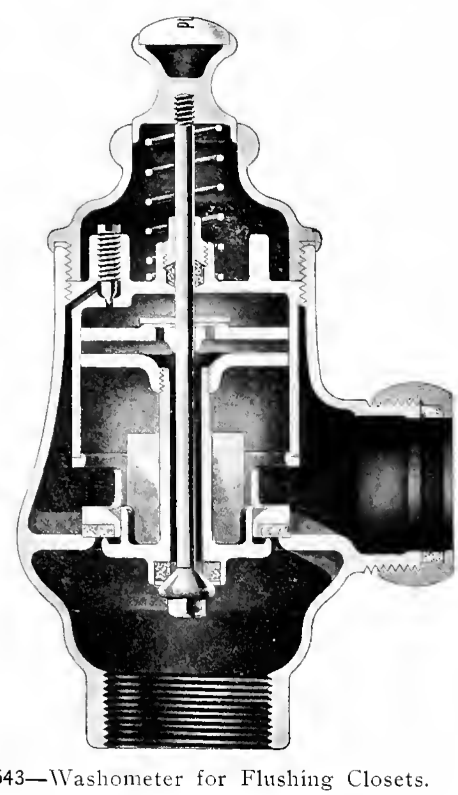


Fig. 1643—Washometer for Flushing Closets.

The Watrous Company.

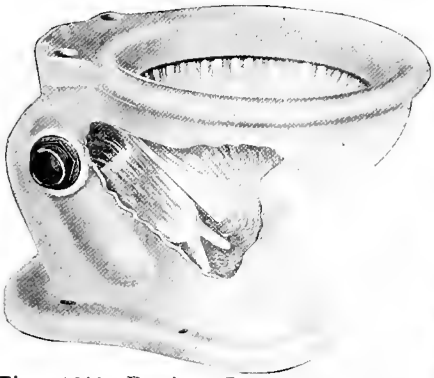


Fig. 1644—Duojet Closet, Showing Arrangement of Jets. The Watrous Company.

Fig. 1645—Americo Closet with Operating Lever on Side Wall. The Watrous Company.

Fig. 1646—Enameled Iron Hopper with Seat Raising Attachment. Jas. L. Howard & Company.

Fig. 1647—No. 32 Hopper. Adams & Westlake Company.

Apron and Lid Partly Raised. Apron and Lid Raised.

Fig. 1648—Protection Dry Closet. Adams & Westlake Company.

Fig. 1649—Floor Chutes for Car Closets. Dayton Manufacturing Company.

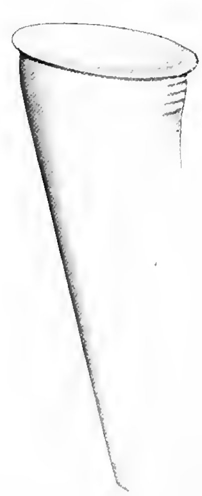


Fig. 1650—Duner Adjustable Enameled Iron Hopper Tube. Duner Company.

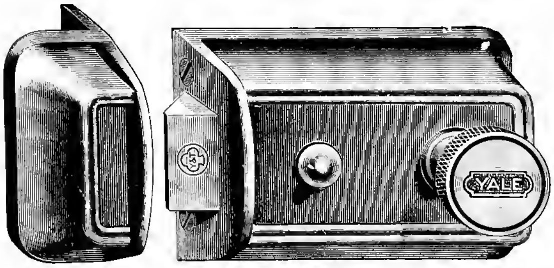
Fig. 1651—Eckert Car Water Closet.

Fig. 1652—Pennsylvania Dry Closet.

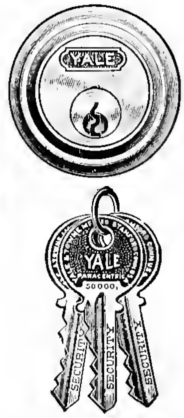
Fig. 1653—Miami Dry Closet.

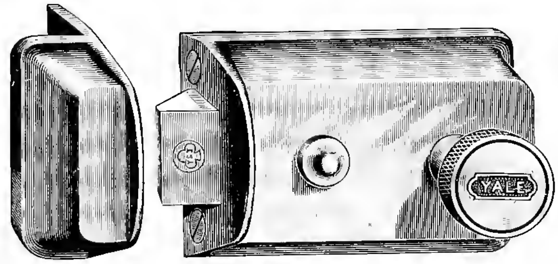
Fig. 1654—Rex No. 22 Dry Closet.

Dayton Manufacturing Company.



No. 42 Series.





No. 5042 Latch.

Fig. 1655—Rim Night Latches, Cylinder and Keys.

Fig. 1656—Padlocks and Keys.

Fig. 1657—Cabinet Lock, Keys and Master Key.

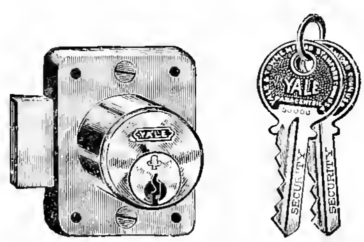


Fig. 1658—Cabinet Lock and Keys.

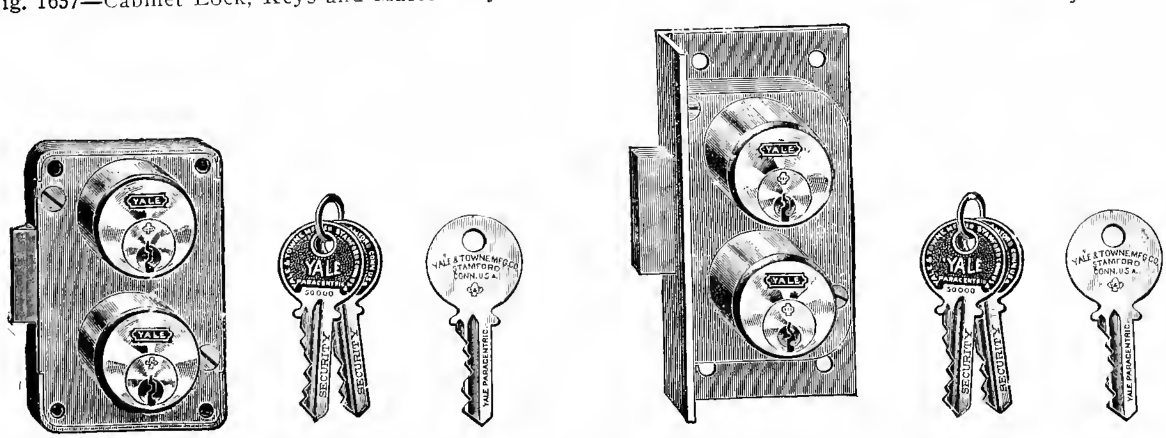


Fig. 1659—Cabinet Locks, Keys and Master Keys.

Yale & Towne Manufacturing Company.

Fig. 1660—Square Door Bolt and Keeper.

Fig. 1661—Flush Door Bolt.

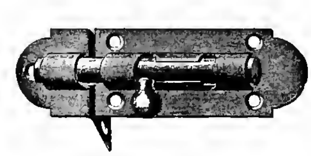


Fig. 1662—Barrel Door Bolt with Bent Staple Plate.

Adams & Westlake Company.

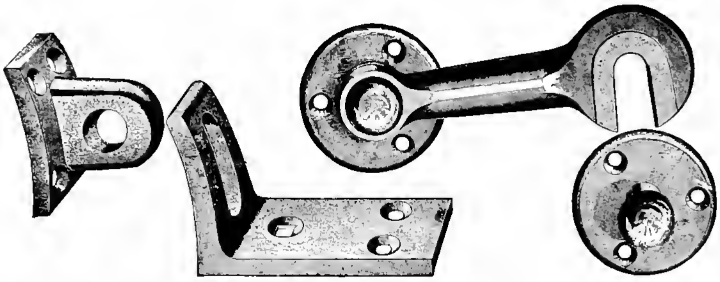


Fig. 1663—Sliding Door Hasp and Staple for Mail Car.

Fig. 1664—Sliding Door Hook and Button for Baggage Car.

Adams & Westlake Company.

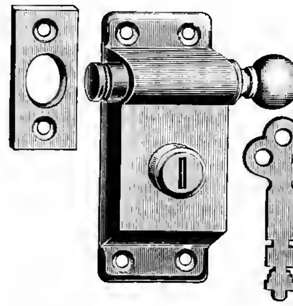


Fig. 1665—Rim Sash Lock. Russell & Erwin Manufacturing Company.

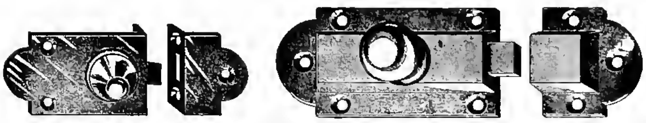


Fig. 1666—Cupboard Catches and Bolts. Adams & Westlake Company.

Fig. 1667—Refrigerator Catches. Russell & Erwin Manufacturing Company.

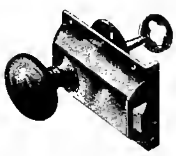


Fig. 1668 — Baggage Car Door Latch.

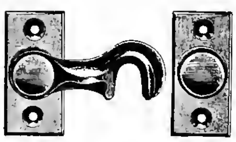


Fig. 1669—Cabin Door Hook and Button.

Adams & Westlake Company.

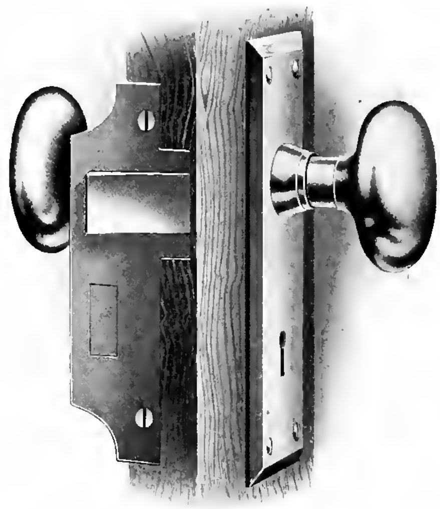


Fig. 1670—Rim Knob Lock. Russell & Erwin Manufacturing Company.

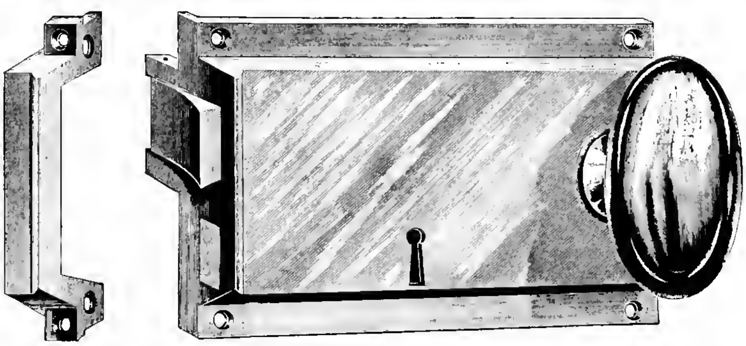


Fig. 1671—End Door Lock. Dayton Manufacturing Company.

Fig. 1672 — Sliding Door Lock. (Patented.)

Fig. 1673—Door Top and Bottom Latch

Jas. L. Howard & Company.

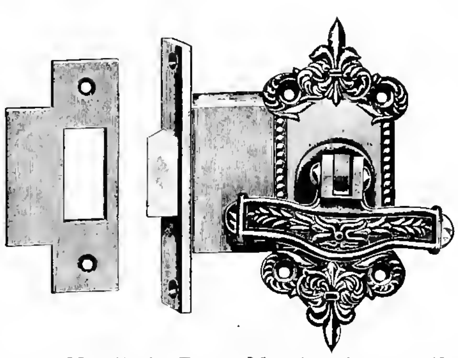


Fig. 1674—Vestibule Door Mortise Latch. Dayton Manufacturing Company.

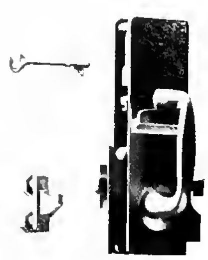


Fig. 1675—Sliding Door Lock (Patented) Which Latches Door Either Open or Closed. Jas. L. Howard & Company.

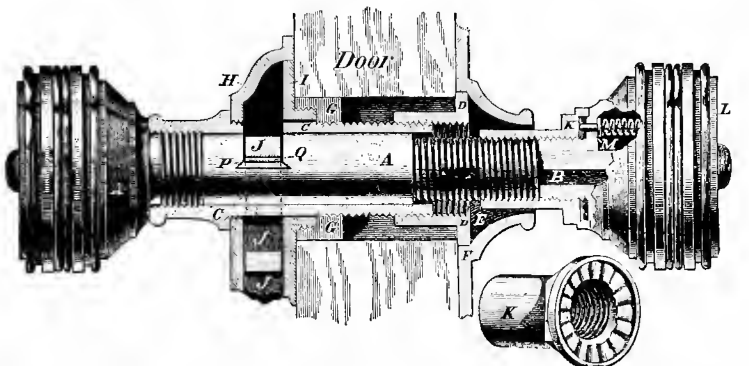


Fig. 1676—Kirby's Car Door Lock. Dayton Manufacturing Company.

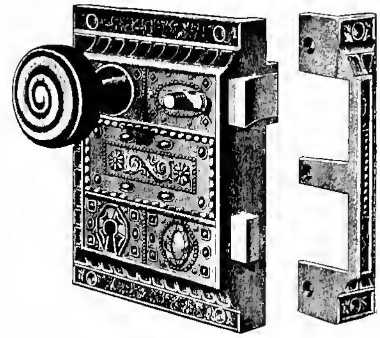


Fig. 1677—Combined End Door Lock and Night Latch. Dayton Manufacturing Company.

Parts of Car Door Lock, Fig. 1676.

A	*Inside Door Knob*	E *and* F	*Door Latch Rose*	K	*Coupling Sleeve*
A'	*Shank*	G	*Lock Nut*	L	*Outside Knob*
B	*Spindle*	H	*Inside Shell*	M	*Ratchet Bolt*
C	*Sleeve*	I	*Back Plate*	P	*Shank Facing*
D	*Outside Sleeve Collar*	J	*Latch Pull*	Q	*Latch Bolt Facing*

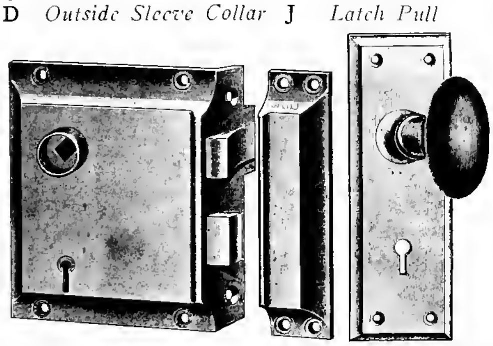


Fig. 1678—Rim Knob Lock, Keeper and Escutcheon.

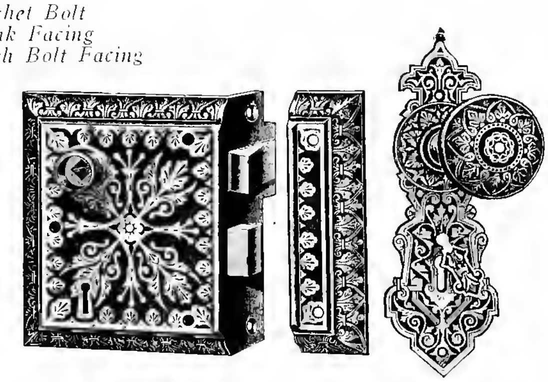


Fig. 1679—Rim Knob Lock, Keeper and Escutcheon.

Russell & Erwin Manufacturing Company.

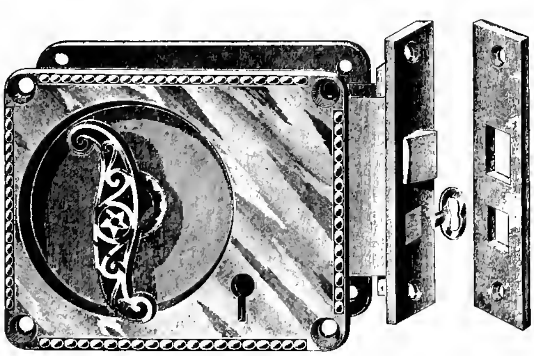


Fig. 1680—Double Flush Handle Saloon Door Mortise Lock. Dayton Manufacturing Company.

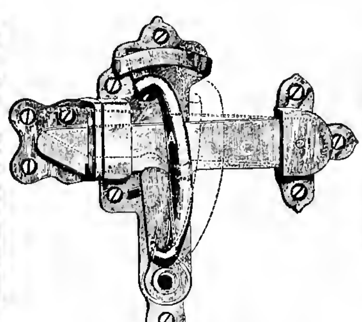


Fig. 1681—Sliding Door Latch. Dayton Manufacturing Company.

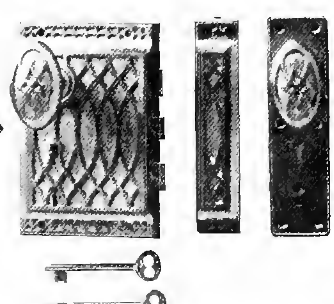


Fig. 1682 — Two-Bolt Lock and Details. Jas. L. Howard & Company.

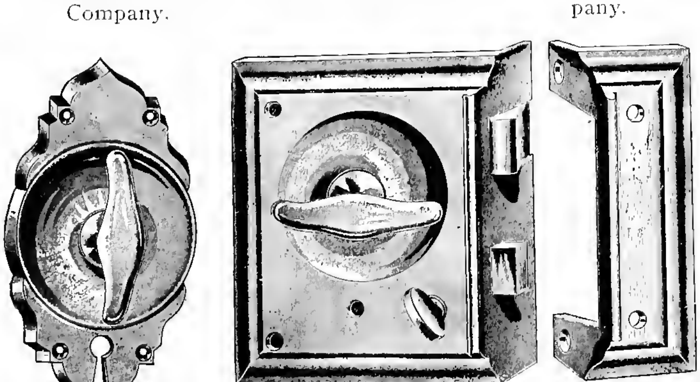


Fig. 1683—Double Flush Handle Saloon Door Lock and Keeper.

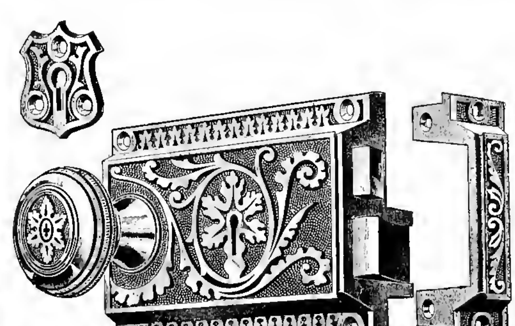


Fig. 1684—End Door Lock, Keeper and Escutcheon.

Adams & Westlake Company.

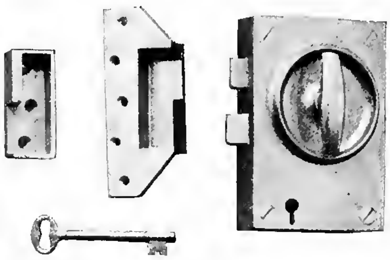


Fig. 1685—Motorman's Cab Door Lock No. 48. Jas. L. Howard & Company.

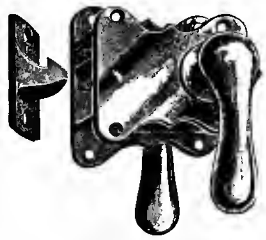


Fig. 1686—Sliding Door Latch.

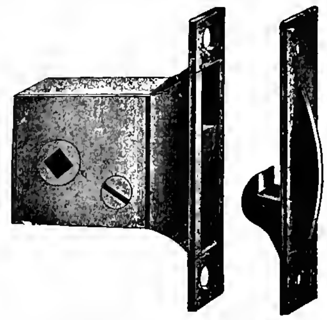


Fig. 1687—Sliding Door Mortise Latch.

Dayton Manufacturing Company.

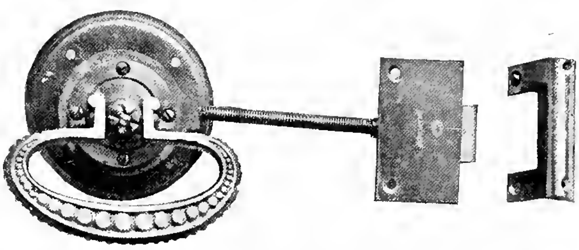


Fig. 1688—Vestibule Door Latch and Keeper.

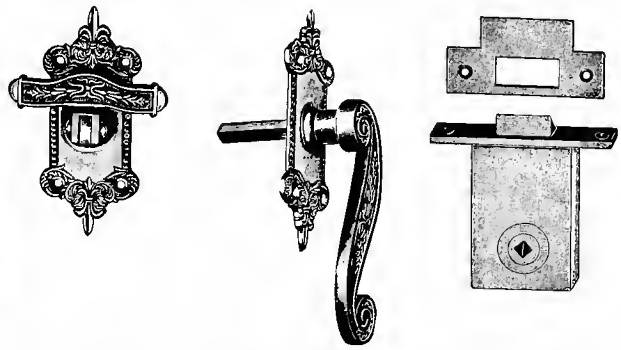


Fig. 1689—Platform Vestibule Door Latch, Handles and Keeper.

Adams & Westlake Company.

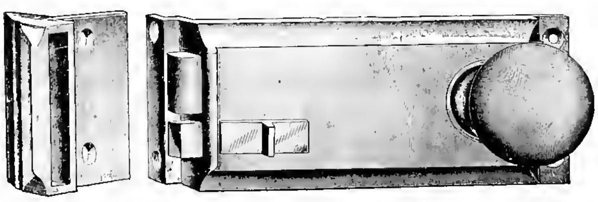


Fig. 1690—Extra Long Saloon Door Lock and Keeper. Adams & Westlake Company.

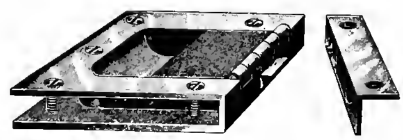


Fig. 1691—Vestibule Trap Door Latch and Pull. Dayton Manufacturing Company.

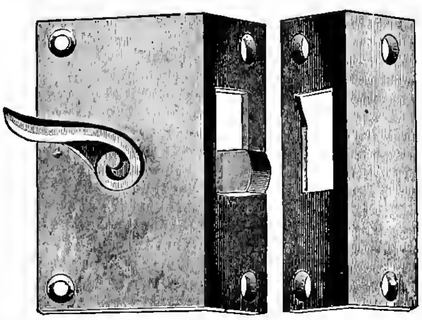


Fig. 1692—Vestibule Door Bolt. Adams & Westlake Company.

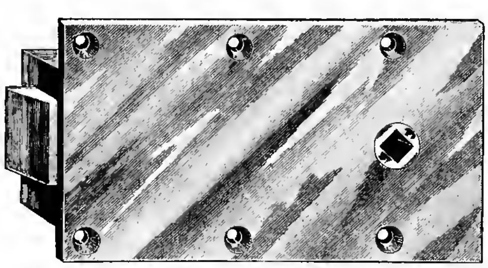


Fig. 1693—Vestibule Trap Door Latch. Dayton Manufacturing Company.

Fig. 1694—Vestibule Door Mortise Latch. Dayton Manufacturing Company.

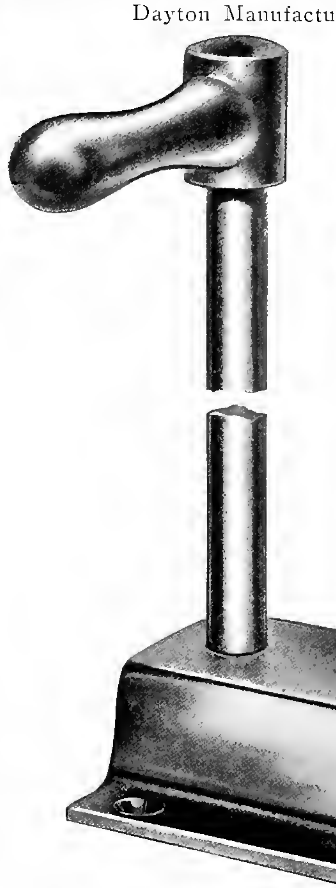


Fig. 1695—Trap Door Lock. Design K. O. M.

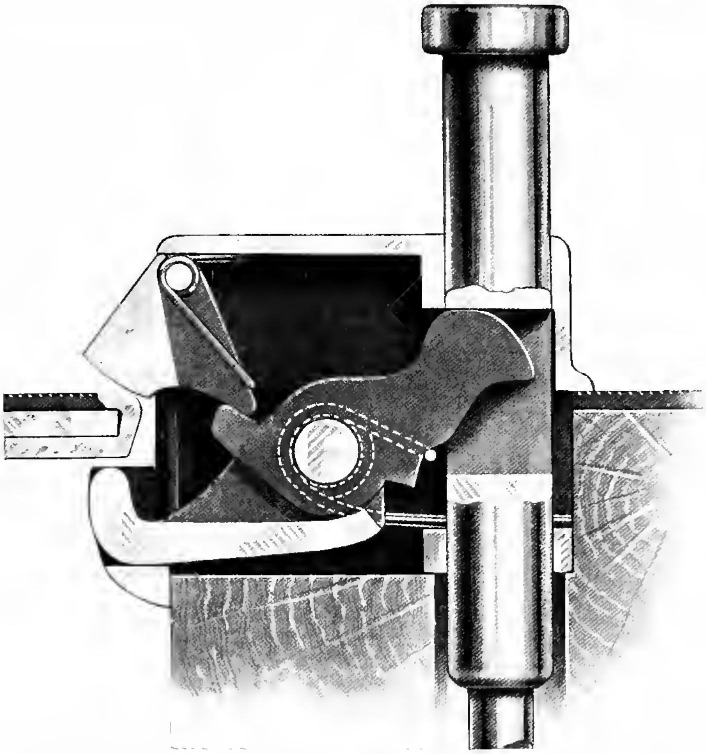


Fig. 1696—Trap Door Lock, Design H, Showing Door Locked Down.

Fig. 1697—Trap Door Lock, Design H.

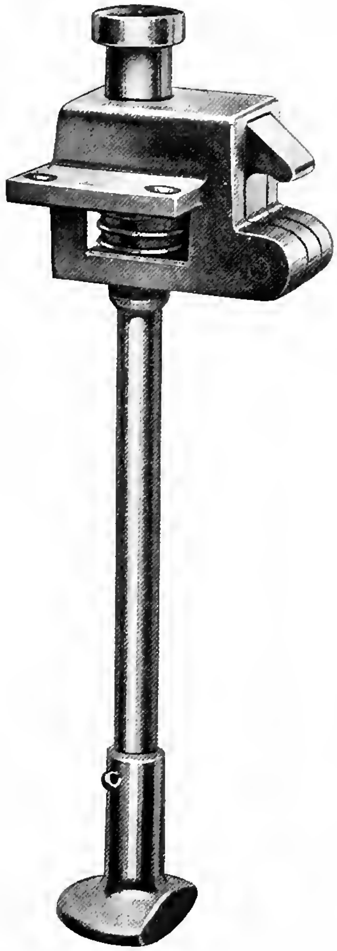


Fig. 1698—Trap Door Lock, Design B.

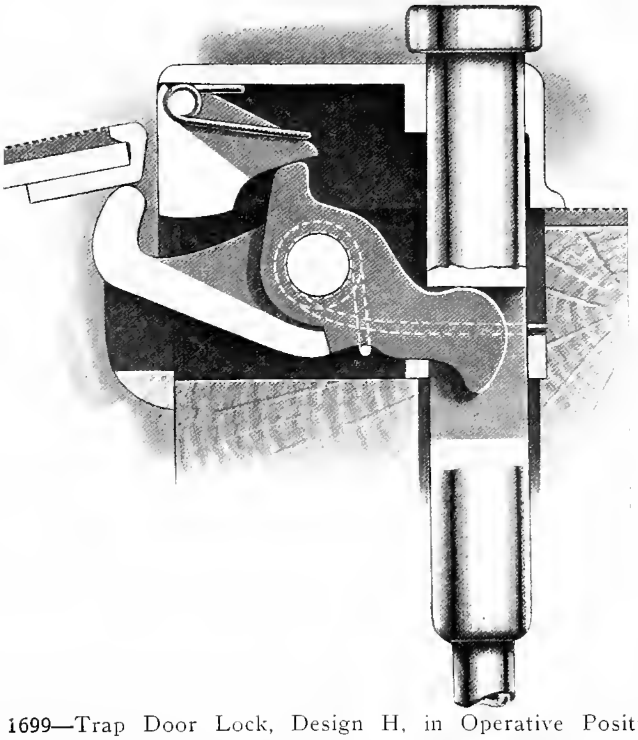


Fig. 1699—Trap Door Lock, Design H, in Operative Position. Latch is Withdrawn and Starting Device Forcing Door Open.

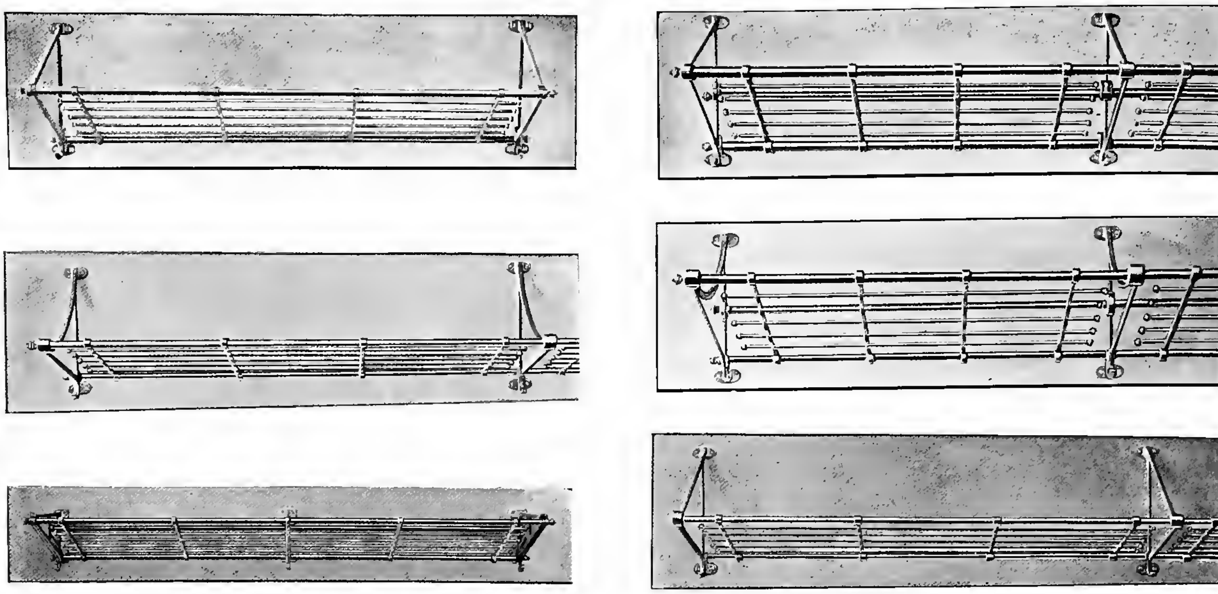


Fig. 1700—Removable Bottom Basket Racks. Adams & Westlake Company.

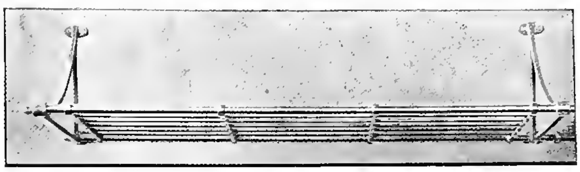


Fig. 1701—Removable Bottom Basket Rack. Adams & Westlake Company.

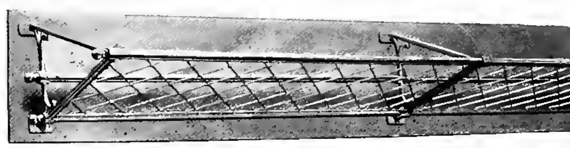


Fig. 1702—Continuous, Removable Bottom Baggage Rack No. 55. Jas. L. Howard & Company.

Fig. 1703—Continuous Baggage Rack No. 61. Jas. L. Howard & Company.

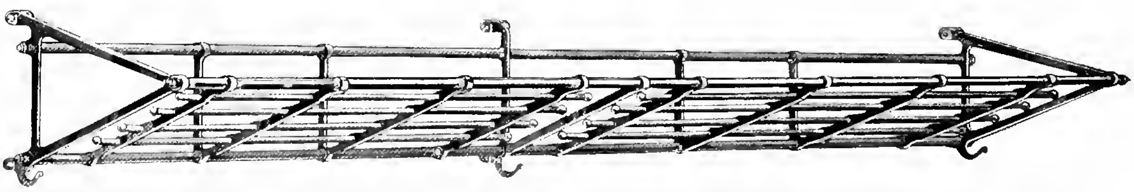


Fig. 1704—Rod Basket Rack with Fixed Bottom and Back Rod. Length, 62 in.; Width, 12¾ in. Dayton Manufacturing Company.

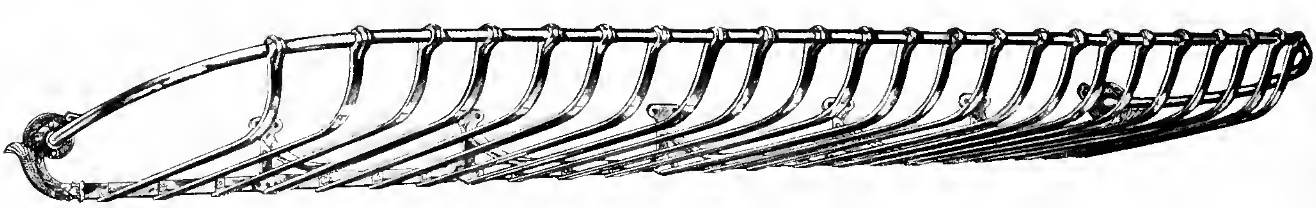


Fig. 1705—Basket Rack No. 184 for Flat Surface. Dayton Manufacturing Company.

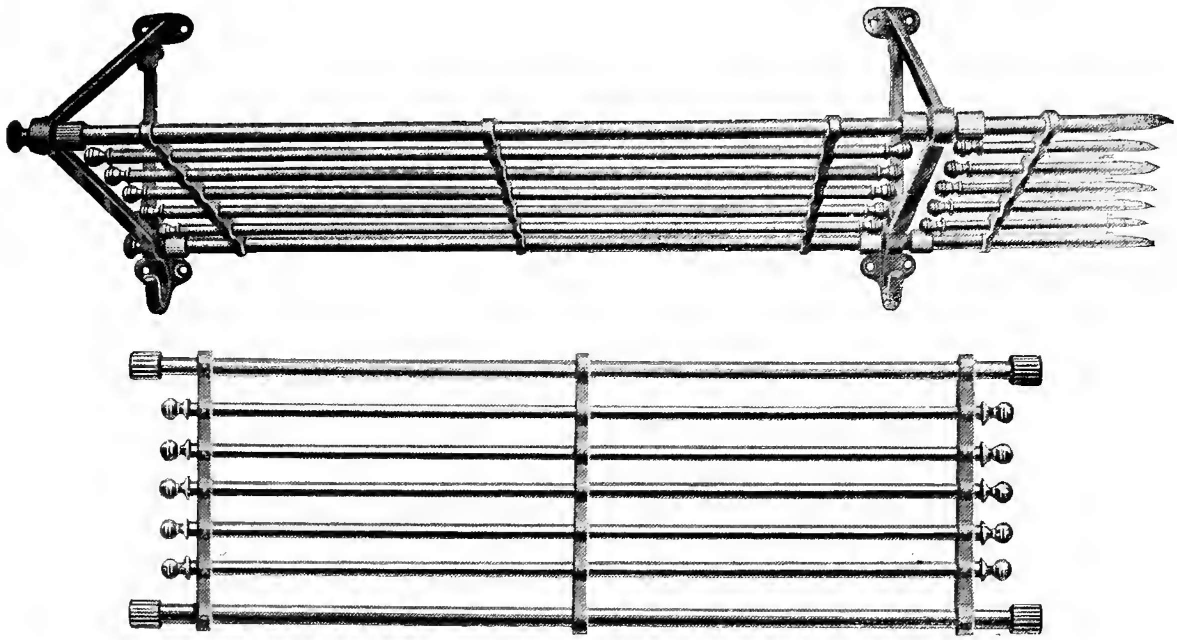


Fig. 1706—Rex Rod Basket Rack and Removable Bottom.

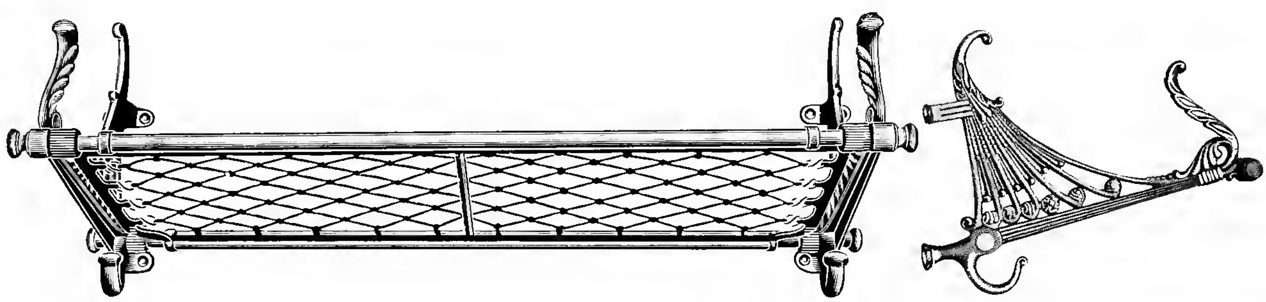


Fig. 1707—Rex Wire Cord Basket Rack with Removable Bottom. Length of Section, 36 in.; Width, 12½ in.

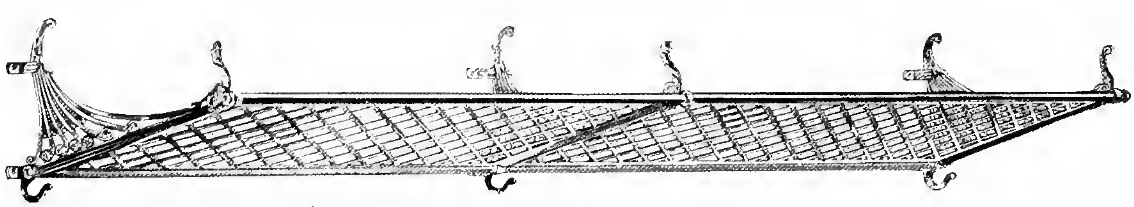


Fig. 1708—Cast Basket Rack with Fixed Bottom.

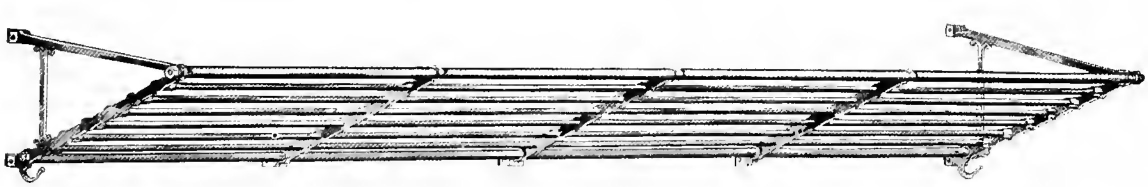


Fig. 1709—Rod Basket Rack. Length, 48½ in.; Width, 12½ in.

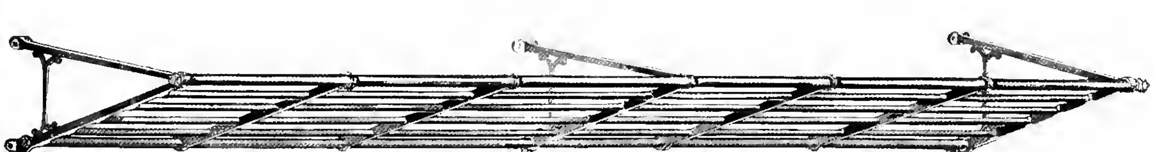


Fig. 1710—Rod Basket Rack. Length, 48 in.; Width, 11 in.

Dayton Manufacturing Company.

TABLE OF CAPACITY

Size of Mail Apartment	Capacity of Tank
40-50-60 Feet Apartment	40 Gallons or Over
30 " "	25 " " "
15-20-25 " "	20 " " "
8-10-12 " "	15 " " "

NOTE: Where dry hoppers are used above capacity may be reduced 50%

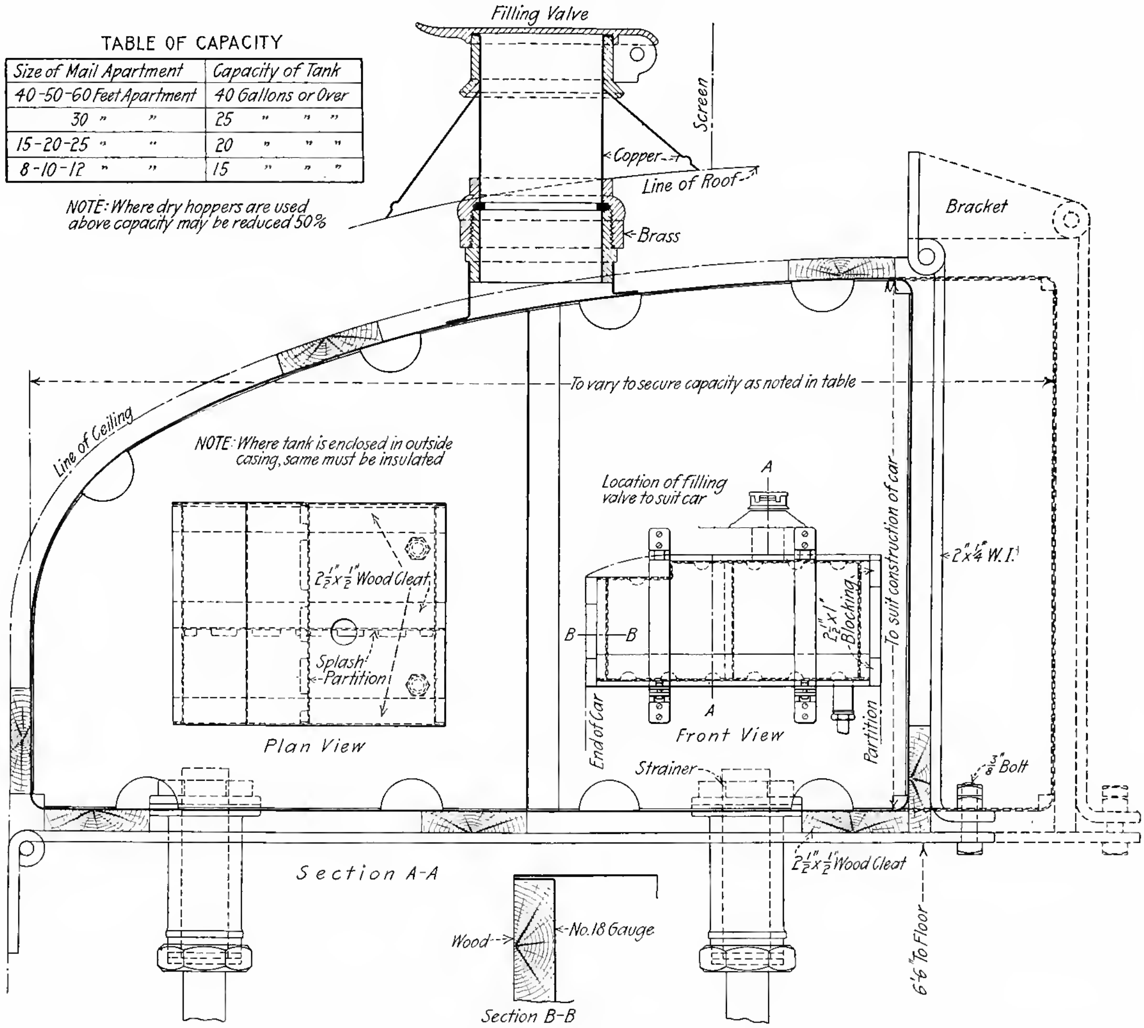


Fig. 1711—Typical Construction of Overhead Water Tank.

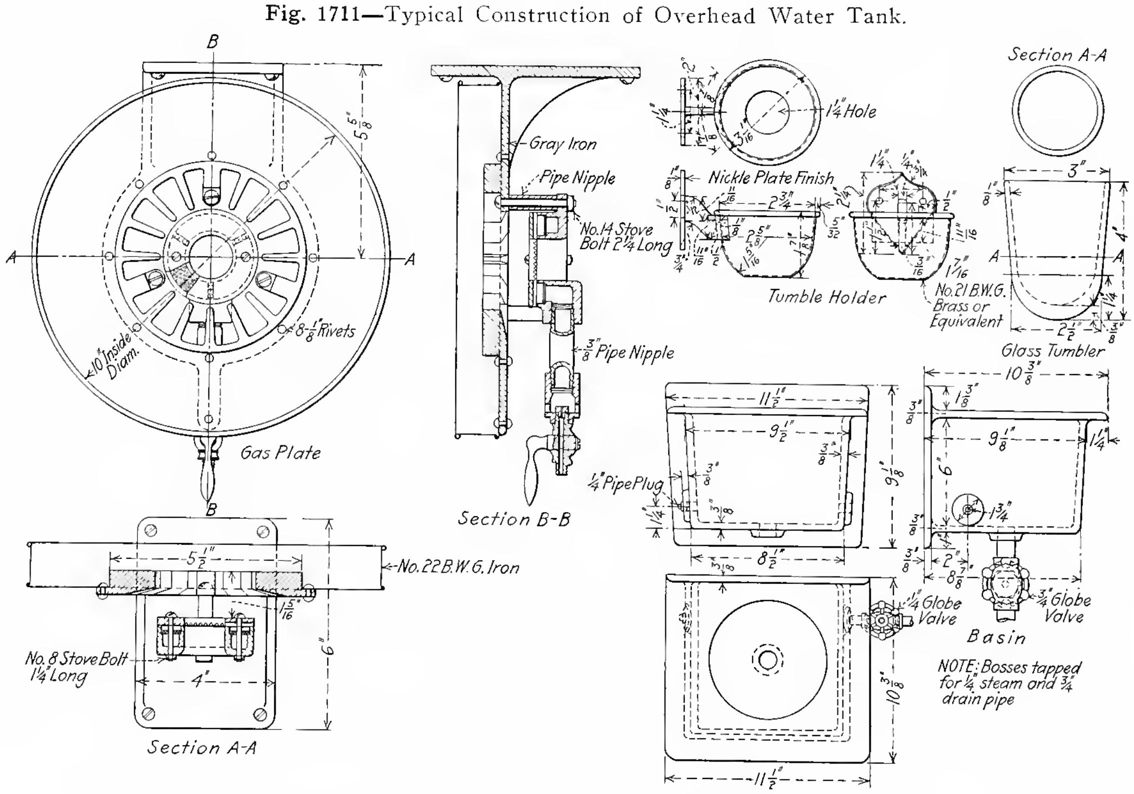


Fig. 1712—Postal Car Fittings.
United States Government Specifications for Postal Cars.

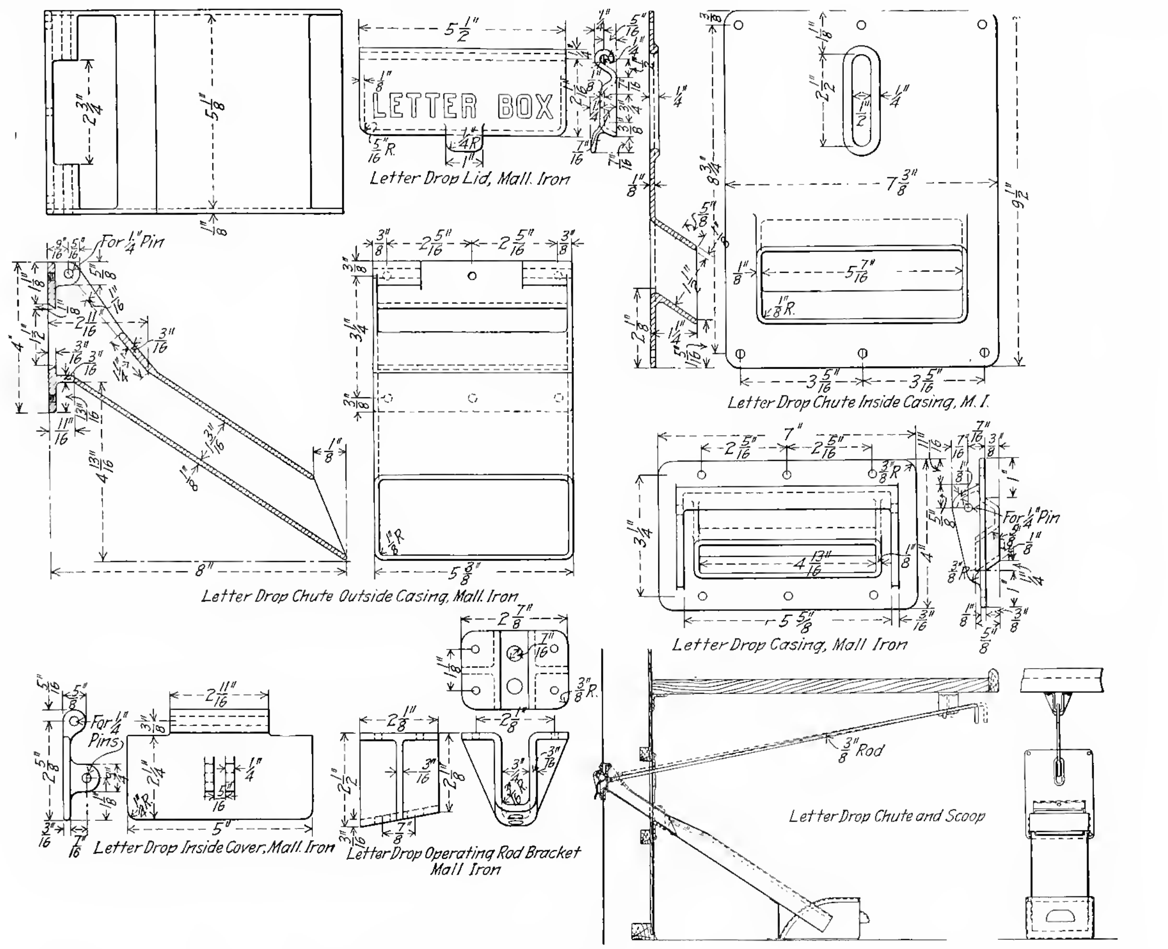


Fig. 1713—Letter Drop and Chute.

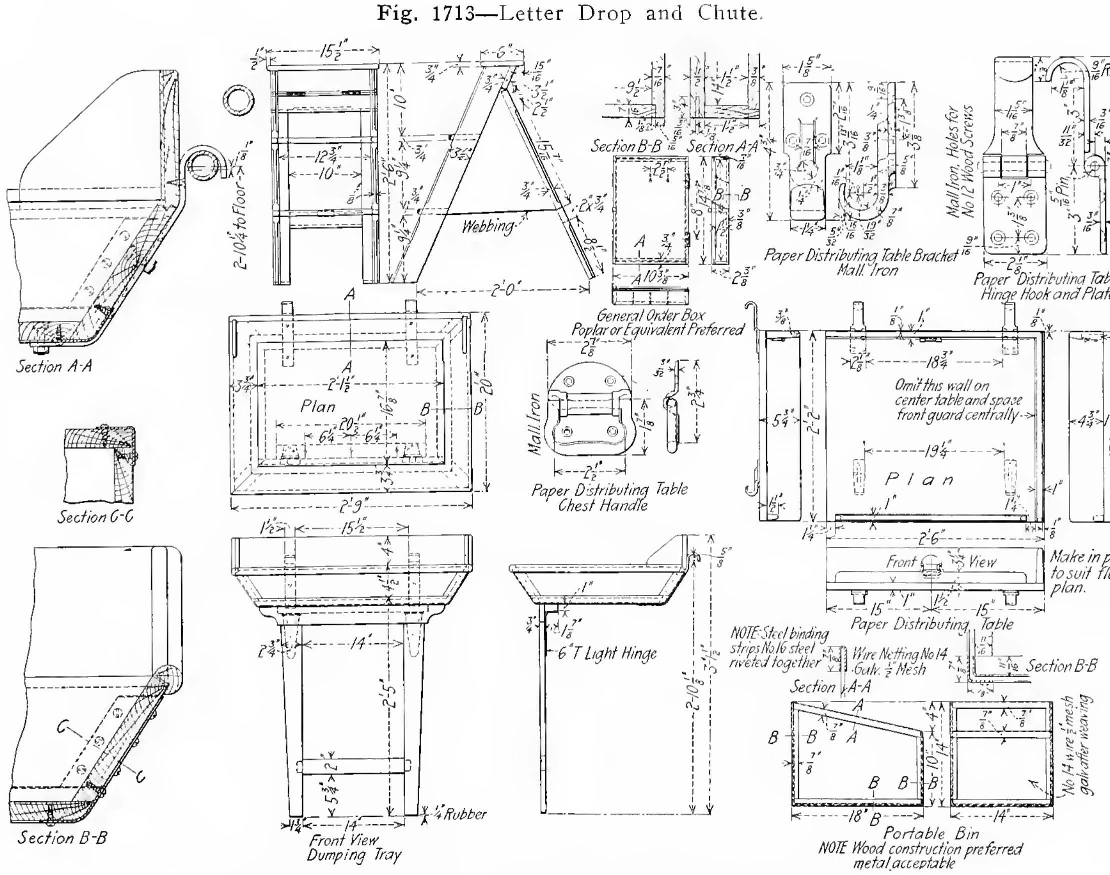


Fig. 1714—Dumping Tray, Distributing Table and Step Ladder.
United States Government Specifications for Postal Cars.

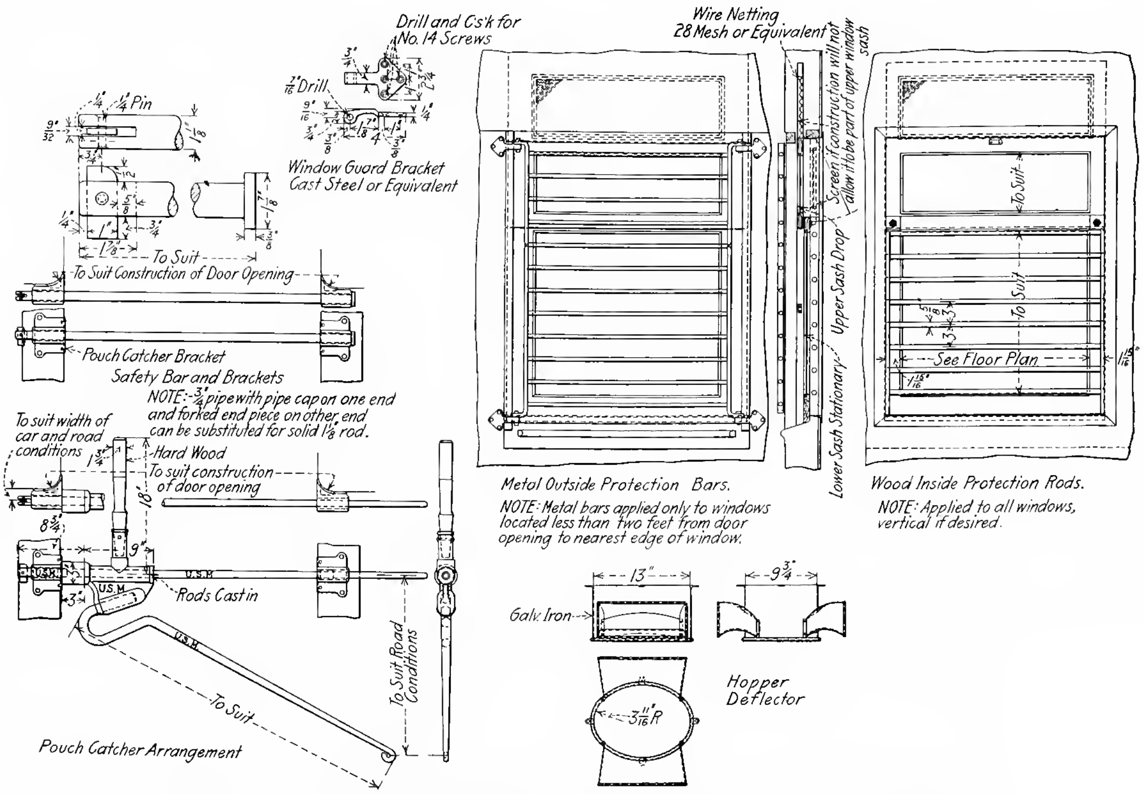


Fig. 1715—Pouch Catcher, Window Protection Bars and Hopper Deflector.

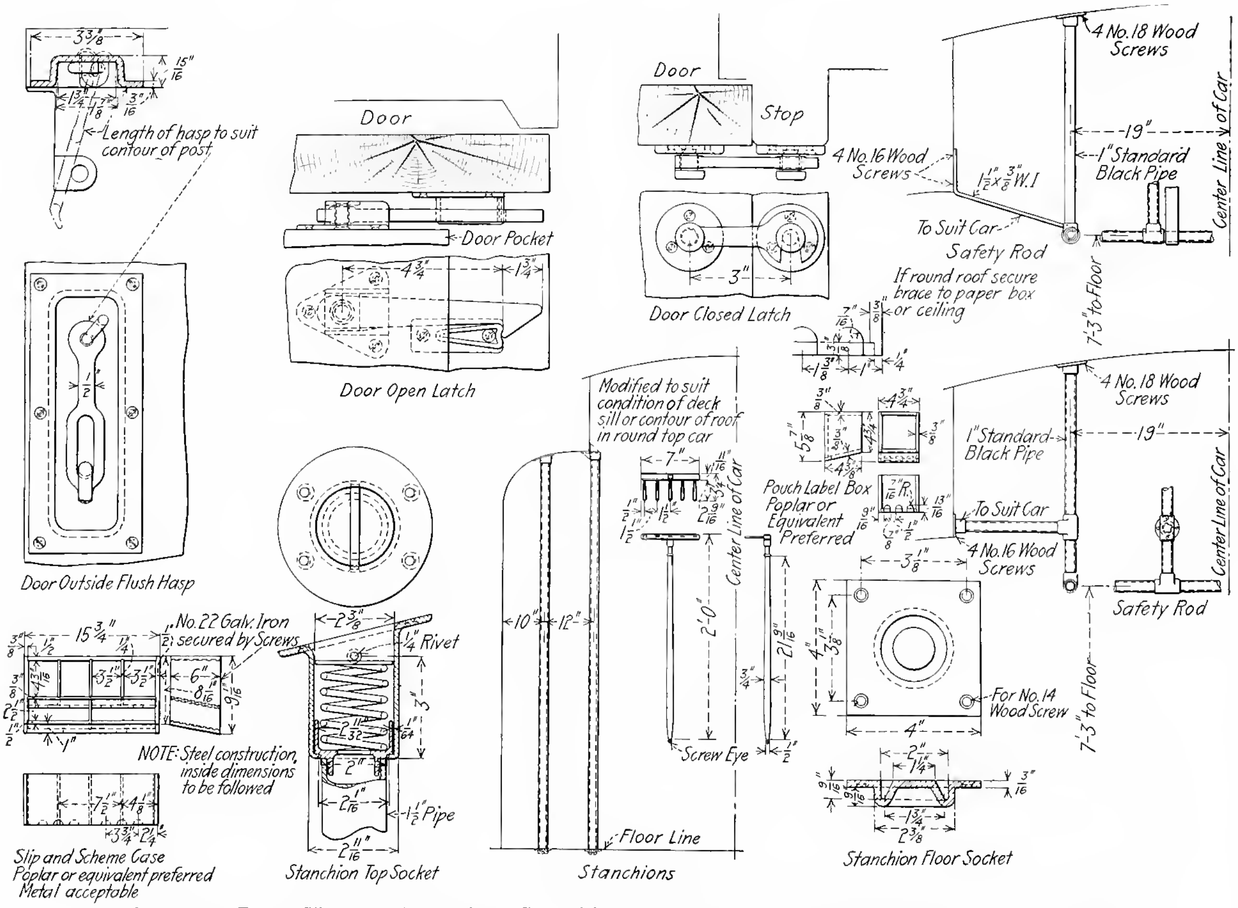


Fig. 1716—Door Hasp and Latches, Stanchions, Rake, Safety Rod, Slip Case and Label Box.

United States Government Specifications for Postal Cars.

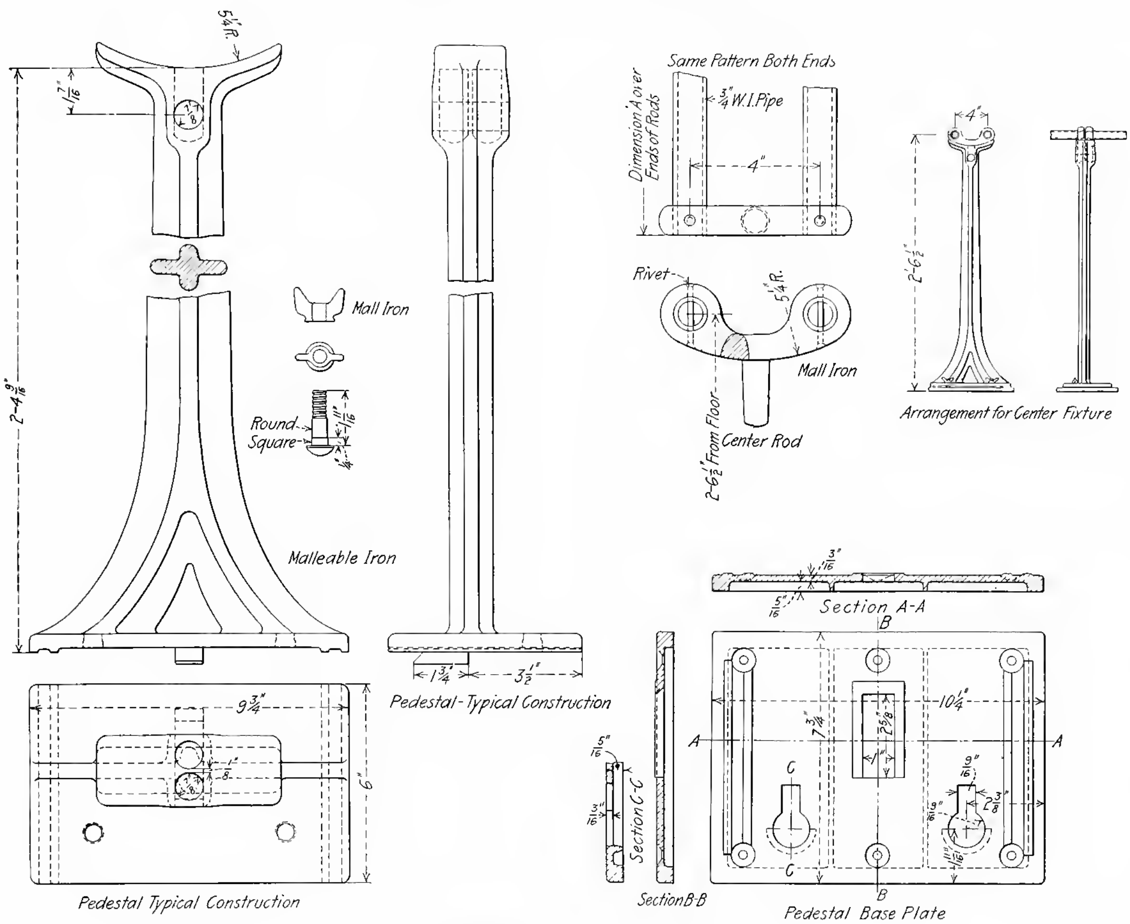


Fig. 1717—Pedestal, Center Rod and Details.

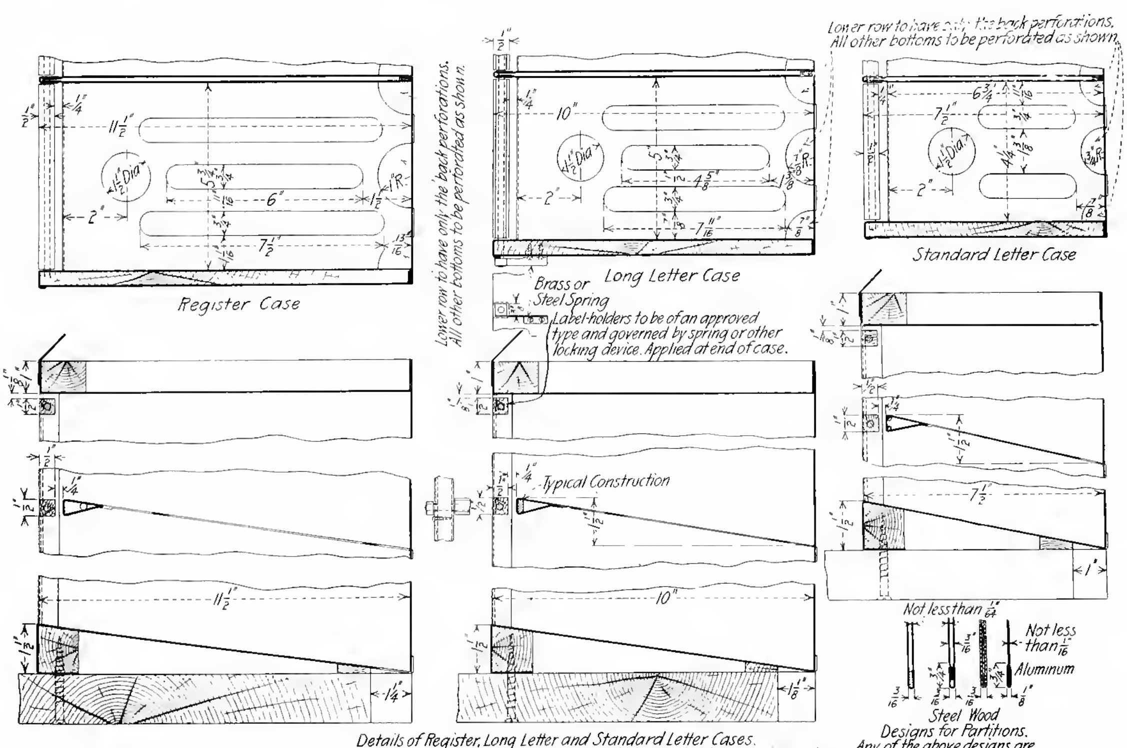


Fig. 1718—Register and Letter Cases.

United States Government Specifications for Postal Cars.

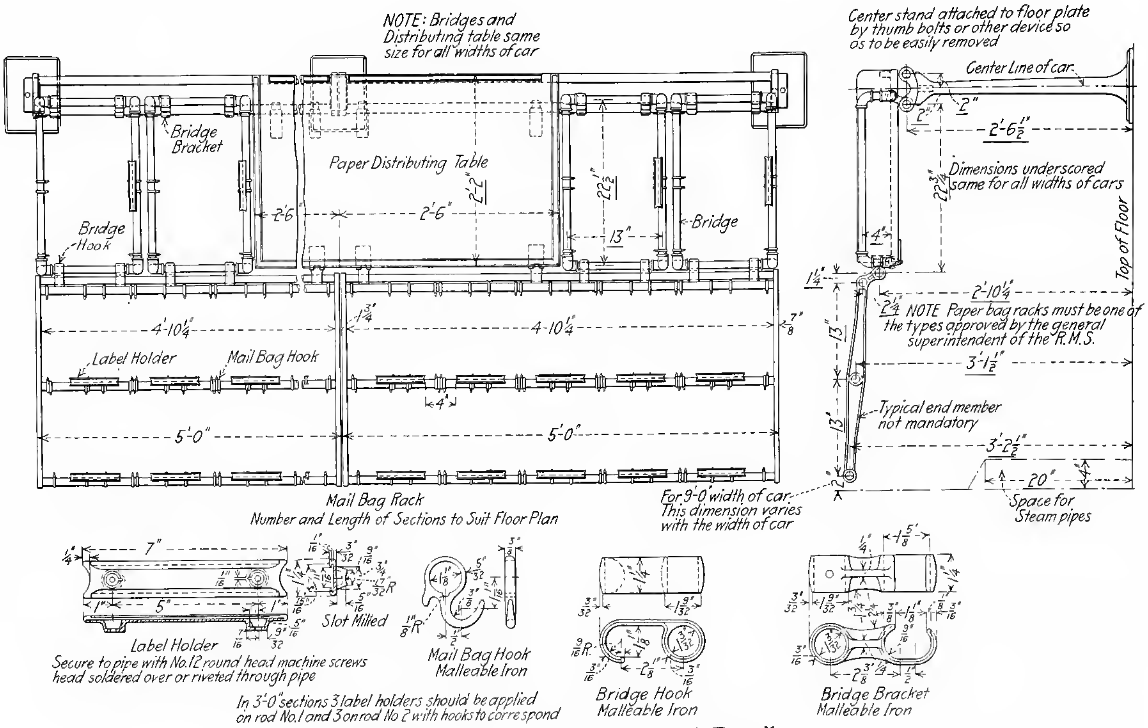


Fig. 1719—Mail Bag Rack and Details.

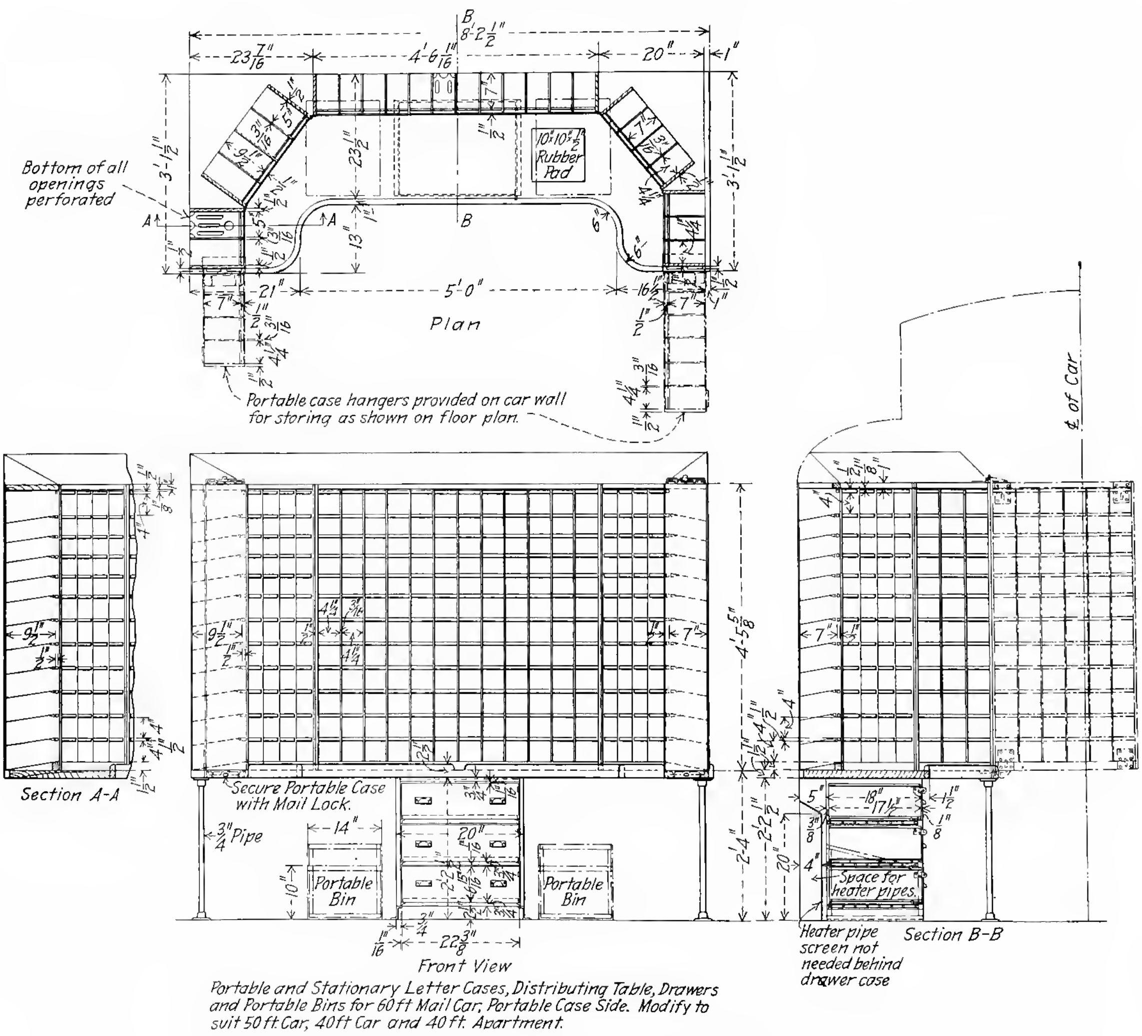


Fig. 1720—Letter Cases and Bins for Portable Case Side of 60 ft. Car.
United States Government Specifications for Postal Cars.

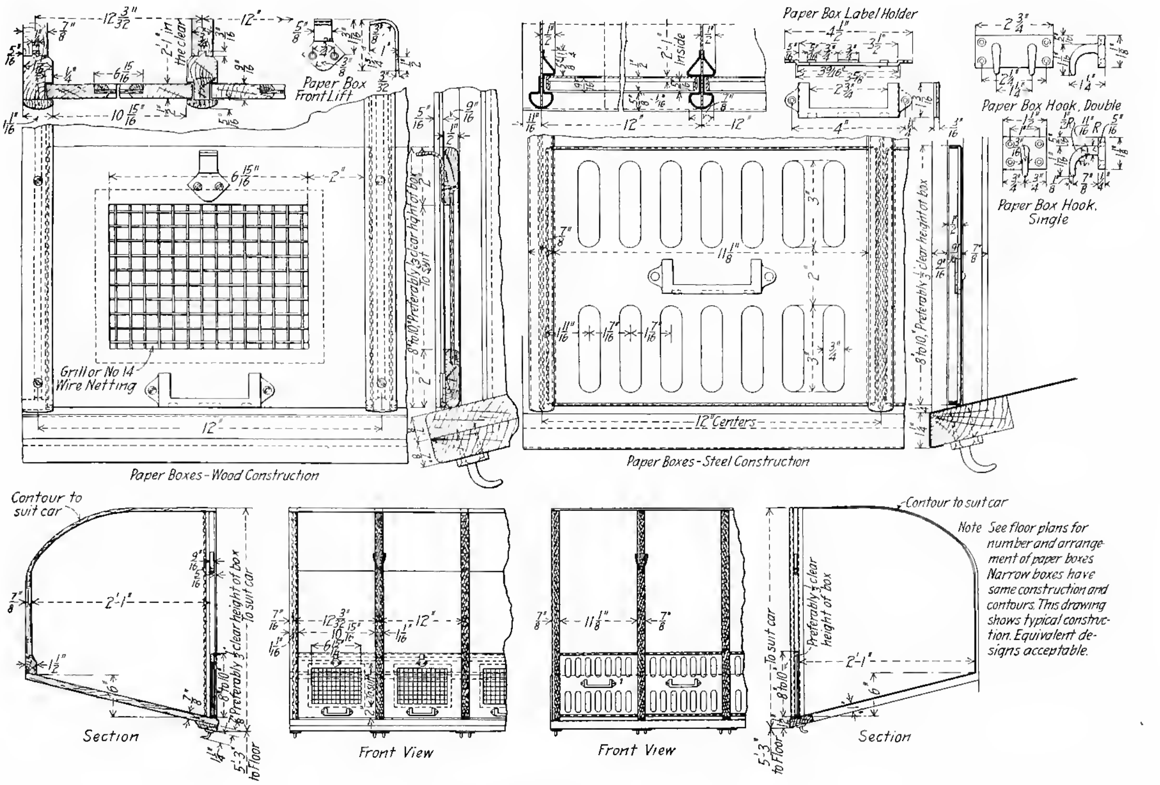


Fig. 1721—Construction of Paper Boxes.

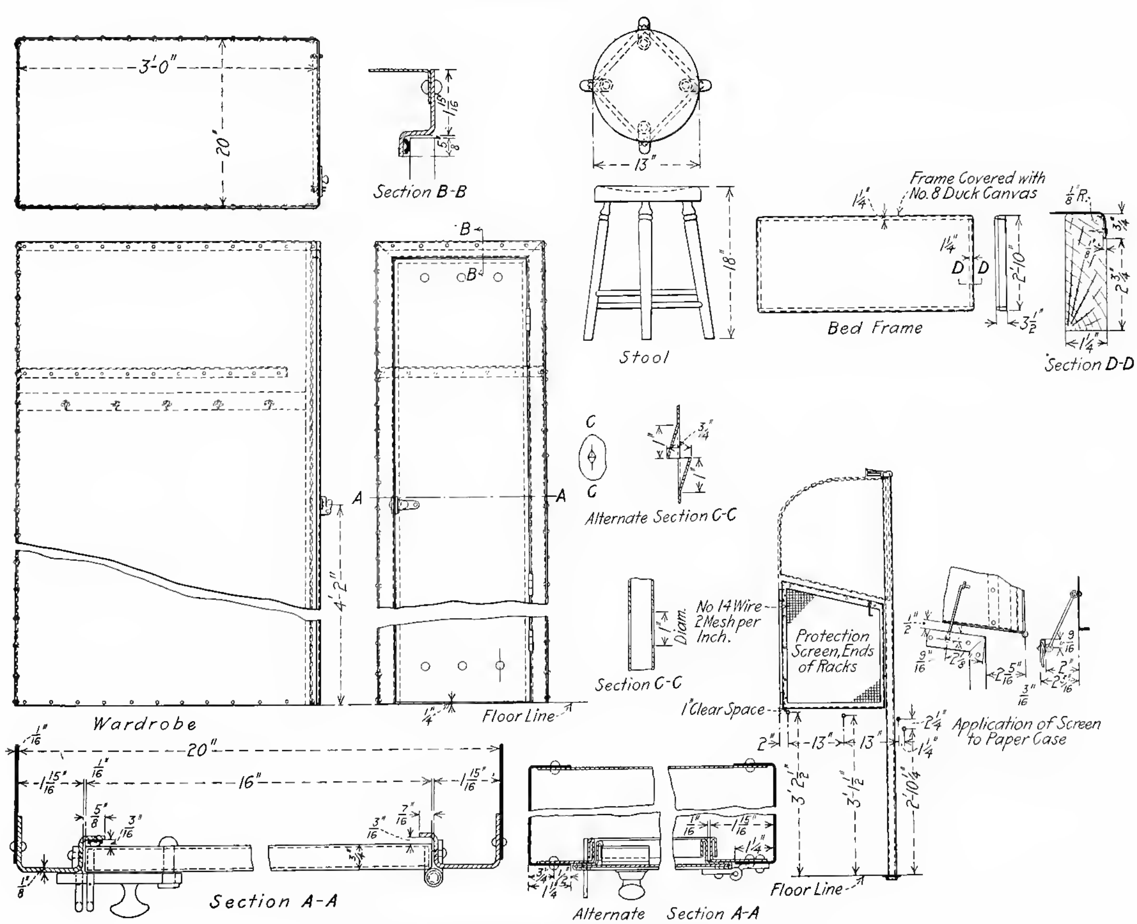


Fig. 1722—Wardrobe and Miscellaneous Details.

United States Government Specifications for Postal Cars.

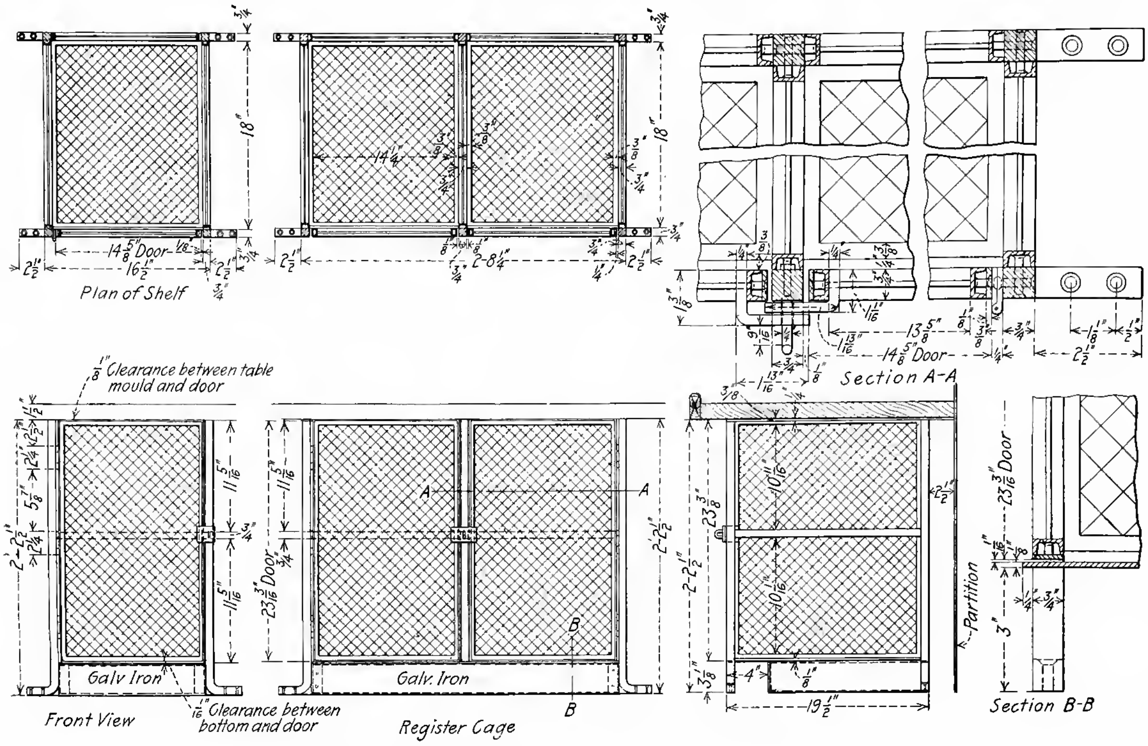


Fig. 1723—Construction Details of Register Cage.

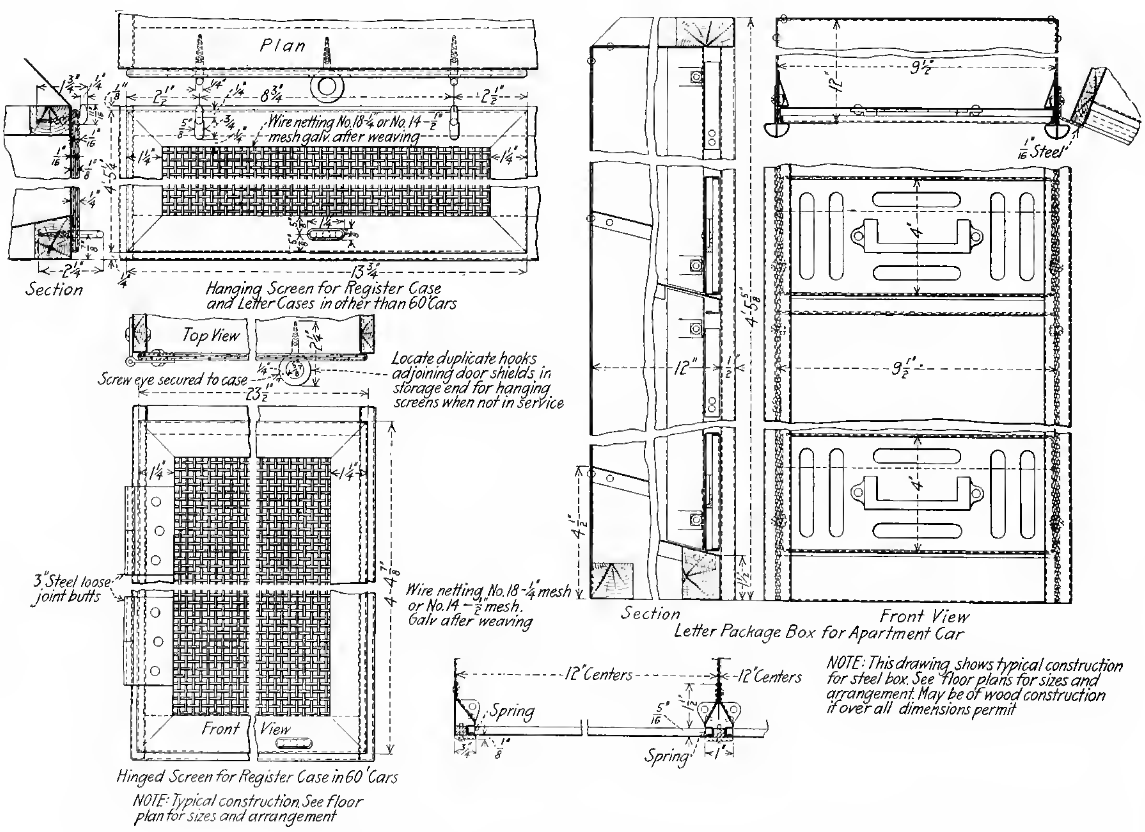


Fig. 1724—Screens for Register Case, and Letter Package Box.

United States Government Specifications for Postal Cars.

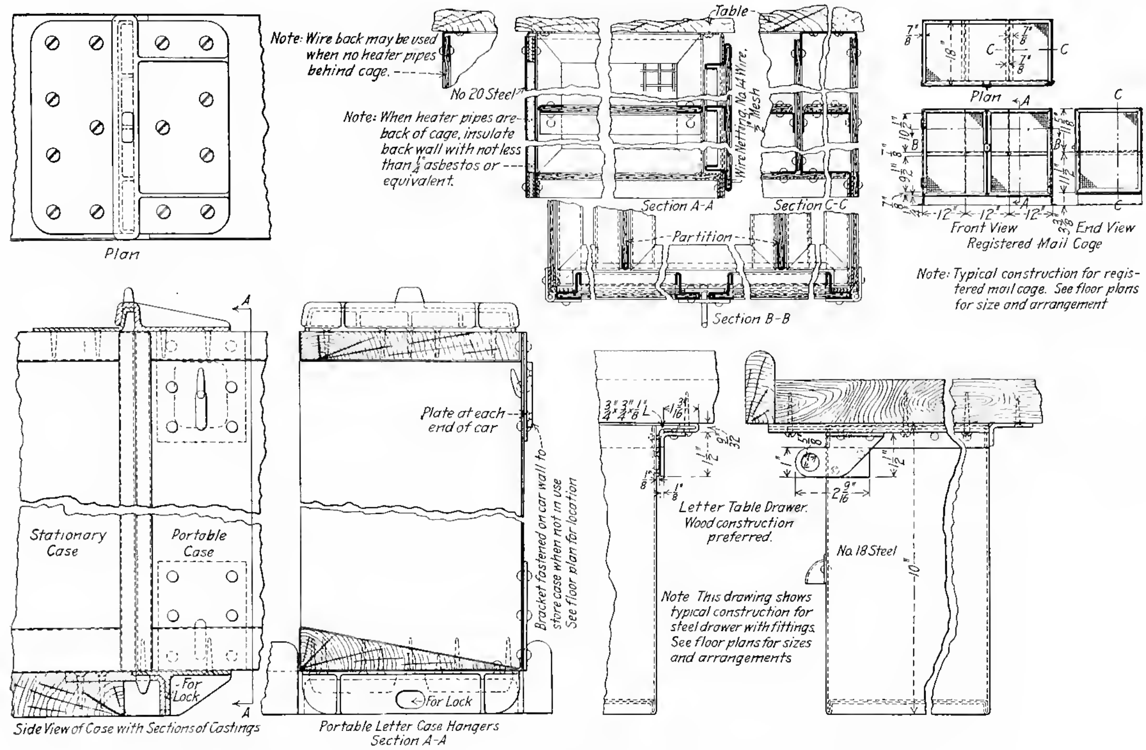


Fig. 1725—Letter Cases, Letter Table Drawer and Registered Mail Cage.

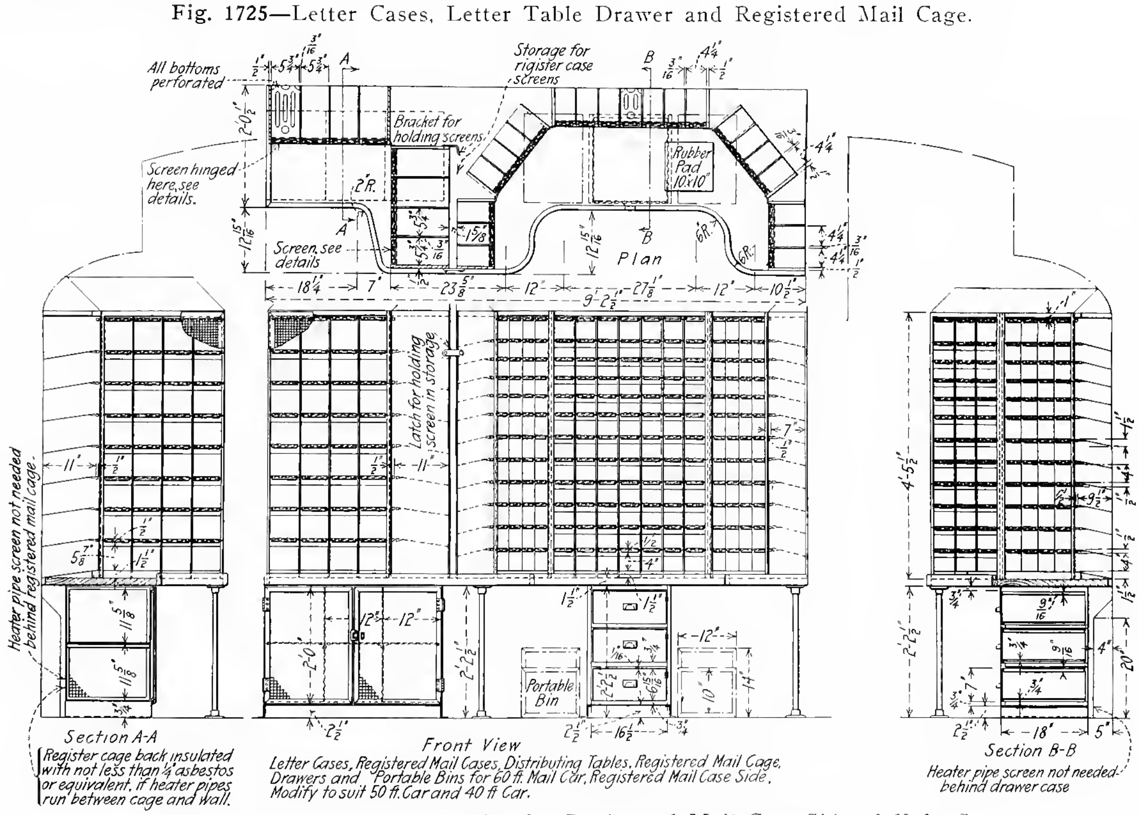


Fig. 1726—Letter Cases and Bins for Registered Mail Case Side of 60 ft. Car.

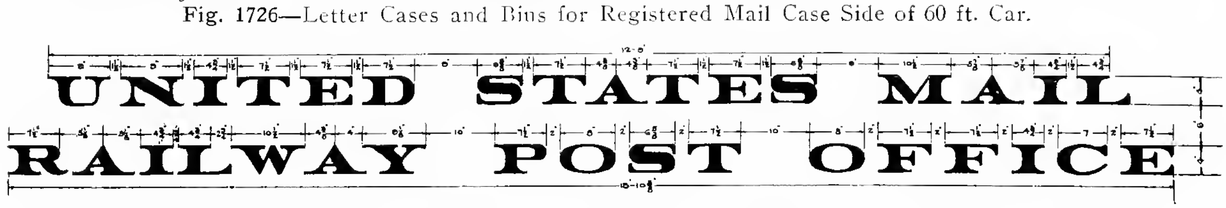


Fig. 1727—Outside Lettering. The Words Are Required as Shown. The Design of Letters is to Harmonize with the Other Lettering on the Car.

United States Government Specifications for Postal Cars.

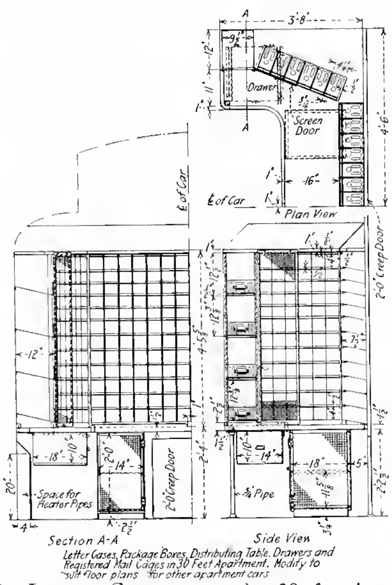


Fig. 1728—Letter Cases, etc., in 30 ft. Apartment. U. S. Gov't Specifications for Postal Cars.

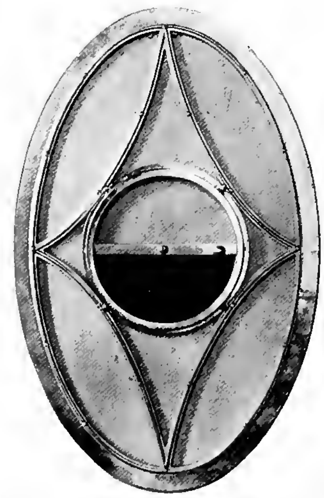


Fig. 1729—Art Glass Oval Sash, with Ventilator, for Saloons. Adams & Westlake Company.

Fig. 1730—Art Glass Deck Light. Adams & Westlake Company.

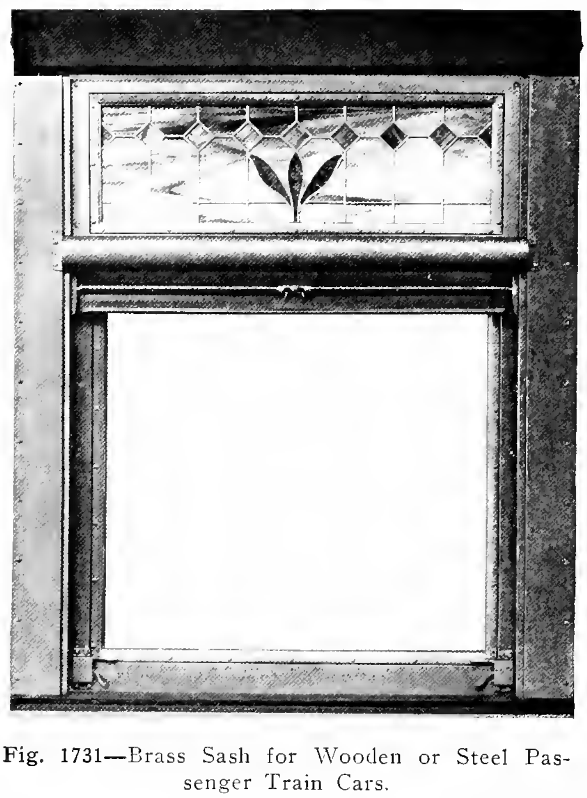
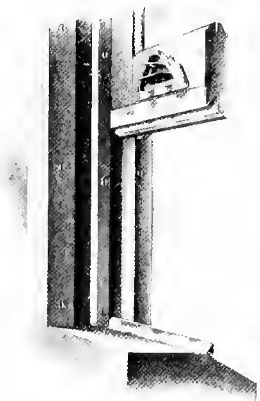


Fig. 1731—Brass Sash for Wooden or Steel Passenger Train Cars.

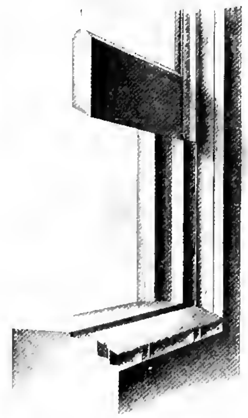
Fig. 1732—Beadless Type of Brass Sash with Narrow Rail.

Forsyth Brothers Company.

Bottom Strip as Applied to Old Car.



Strip as Applied to Double Sash.



Outside Strip as Attached to Corner Stop; and Dust Deflector.

Fig. 1733—Acme Weatherproof Window. Acme Supply Company.

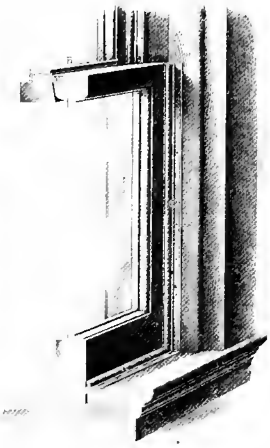


Fig. 1734—Window Equipped with Asco Weatherstrip. Acme Supply Company.

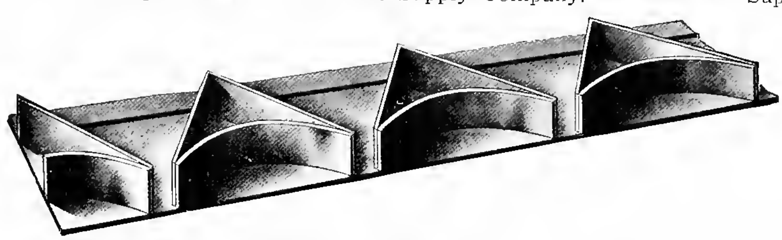
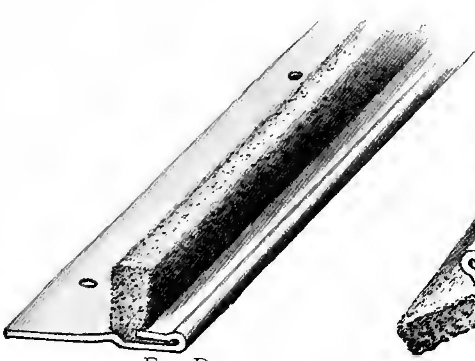
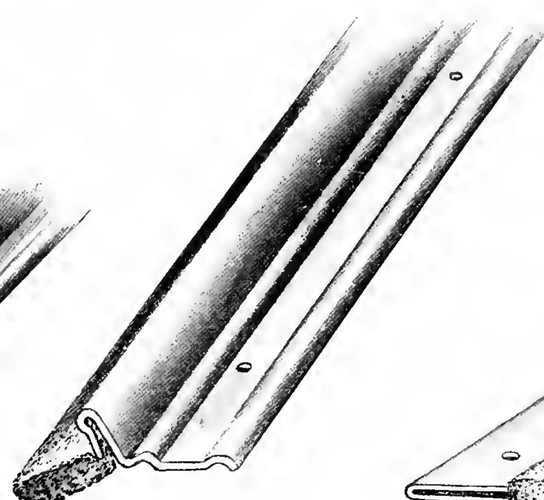


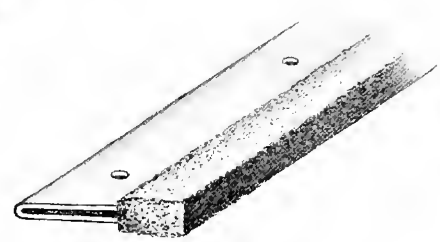
Fig. 1735—Dust and Cinder Deflector. Acme Supply Company.



For Doors.



For Windows.



For Doors.

Fig. 1736—Asco Weather Strips. Acme Supply Company.

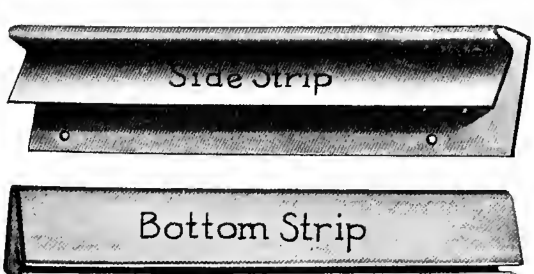
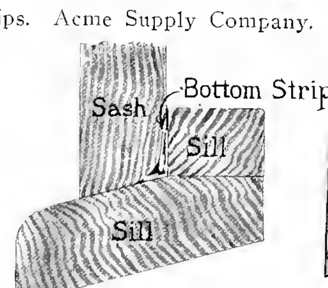


Fig. 1737—Detroit Metal Weather Strips.



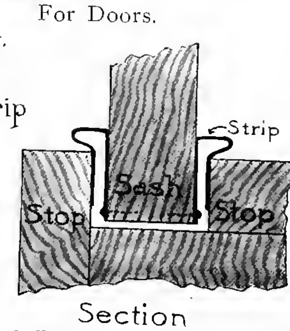


Fig. 1738—Application of Detroit Metal Weather Strips.

Frost Railway Supply Company.

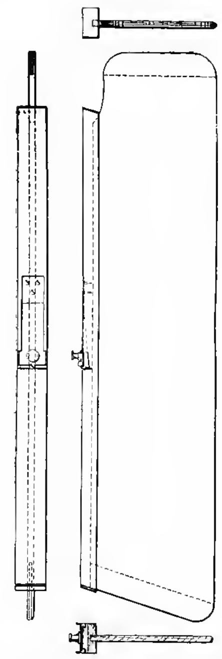


Fig. 1739—Window Dust Guard or Deflector.

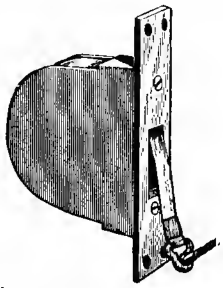


Fig. 1740—Caldwell Window Sash Balance.

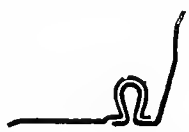


Fig. 1741—Section Through Monarch Metal Weather Strip.

Fig. 1742—Monarch Metal Weather Strip. Monarch Metal Weather Strip Company.

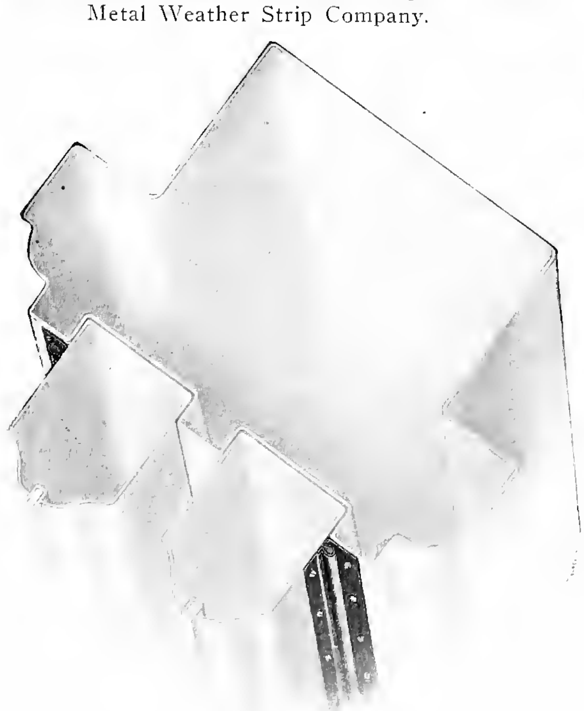
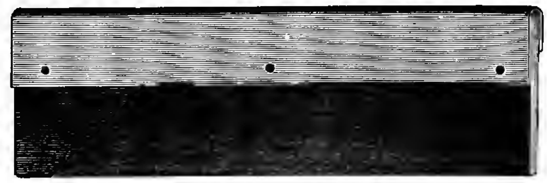
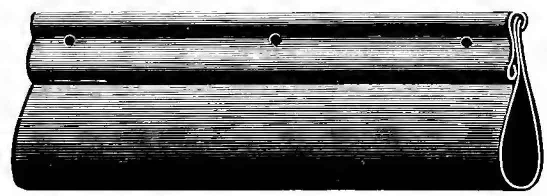


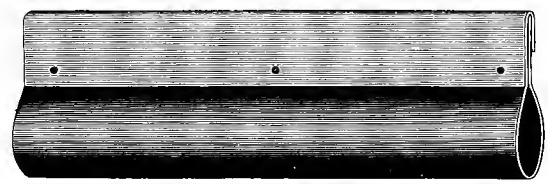
Fig. 1744—Section Through Double Hung, Hollow Metal Sash, Showing Application of Monarch Metal Weather Strips. Monarch Metal Weather Strip Company.



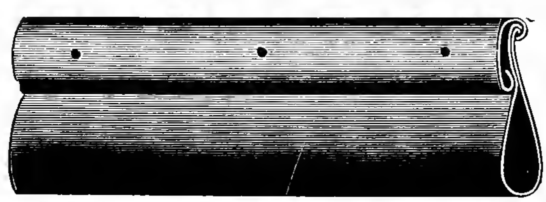
Single Rubber.



Creased.



Flat Back.



Oval Back.

Fig. 1743—Metallic Rubber Weather Strips. D. M. Bosley Company.

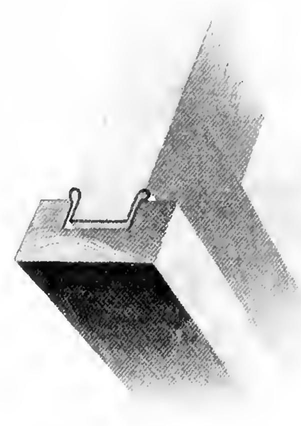
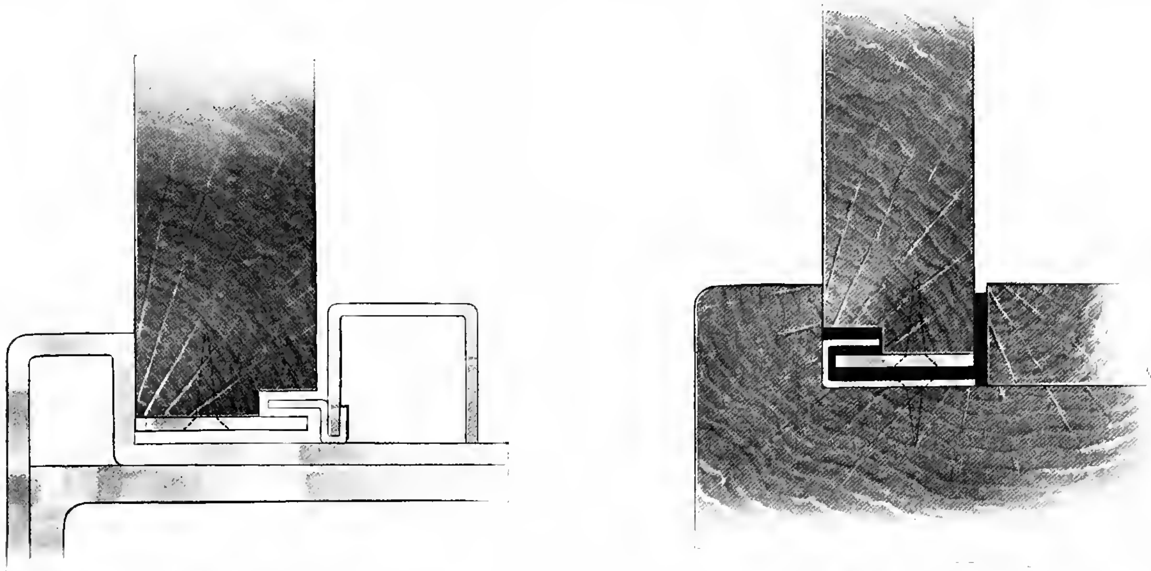


Fig. 1745—Brown Metallic Window Strip. Metal Plated Car & Lumber Company.



For Steel Construction. For Wood Construction.

Fig. 1746—Side Weather Stripping.

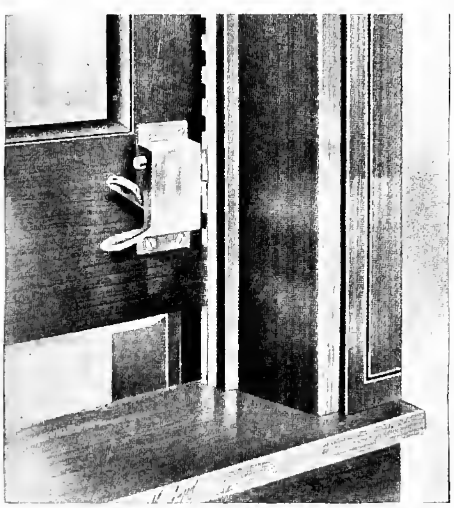


Fig. 1747—Edwards Wedge Lock and Bevel Stop Bar as Used Without Roller Sash Balance.

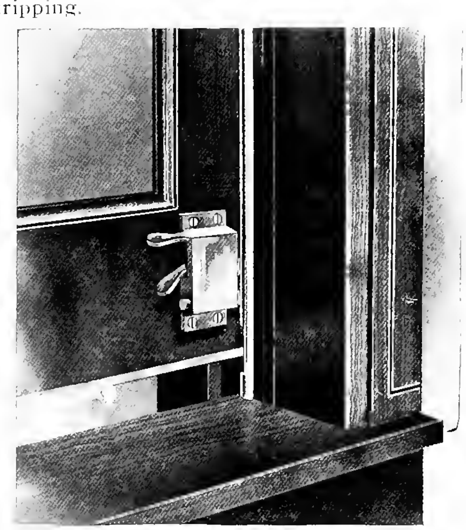


Fig. 1748—Edwards Wedge Lock and Bevel Stop Bar as Used with Spring Roller Sash Balance.

Fig. 1749—Edwards 13-O Sash Lock with Phantom View of Stop Bar as Used Without Roller Sash Balance.

Fig. 1750—Edwards 13-O Sash Lock with Phantom View of Keeper Plate as Used with Roller Sash Balance.

O. M. Edwards Company.

Fig. 1751—Edwards All-Metal Sash Balance. O. M. Edwards Company.

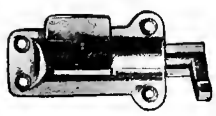


Fig. 1752—Sash Lock No. 22-28 and Stop Bar. O. M. Edwards Company.

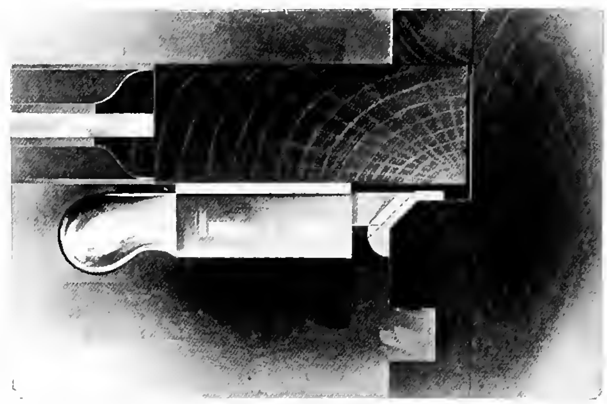


Fig. 1753—Top View Showing No. 7 Wedge Lock and Stop Bar Mounted on Sash. O. M. Edwards Company.

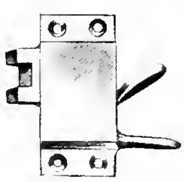


Fig. 1754—Sash Lock No. 50-1 and Stop Bar. O. M. Edwards Company.

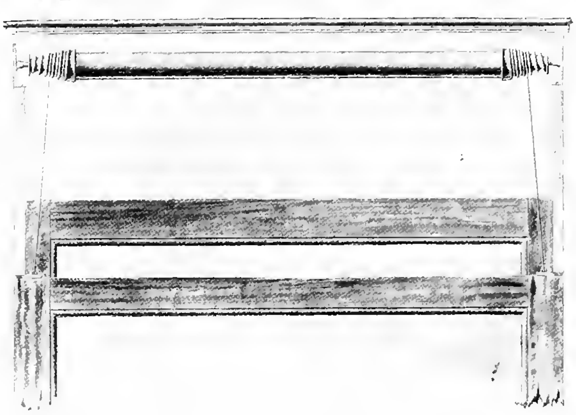


Fig. 1755—Perfection Sash Balance. General Railway Supply Company.

Fig. 1756—Top and Bottom Weather Stripping. O. M. Edwards Company.

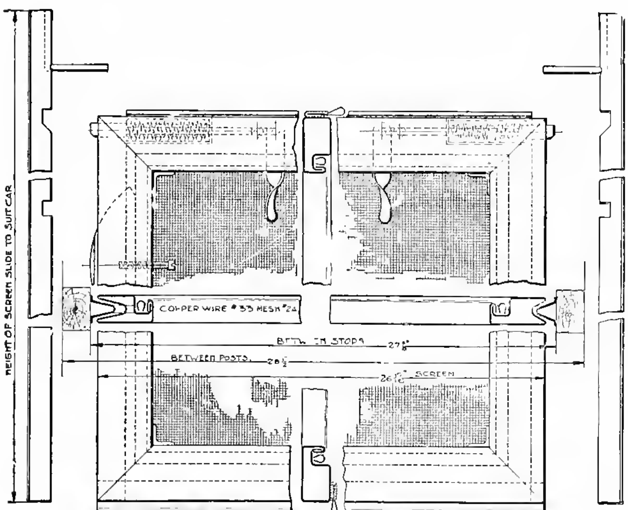


Fig. 1757—Imperial Car Window Screen. General Railway Supply Company.

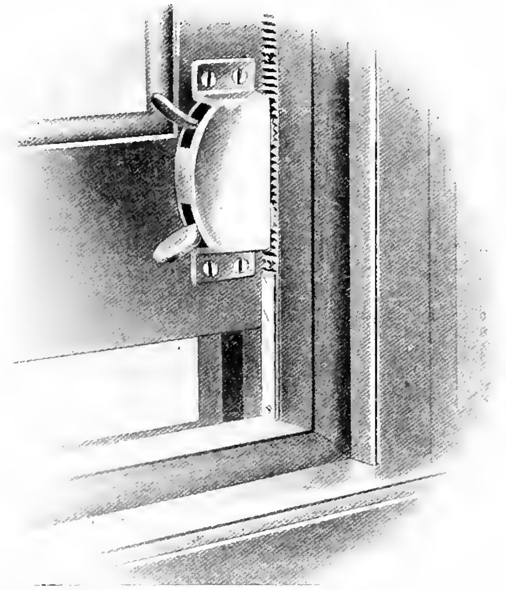


Fig. 1758—National Sash Lock and Rack. National Lock Washer Company.

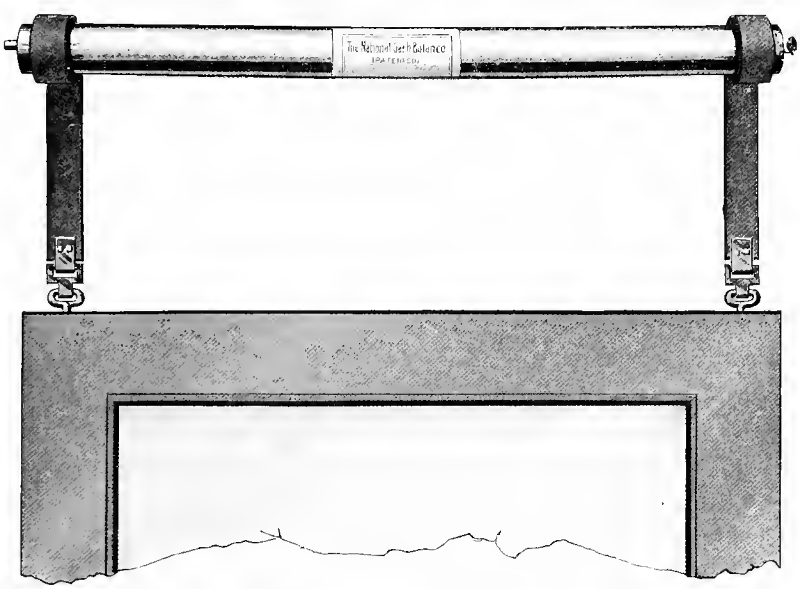


Fig. 1759—National Sash Balance with Belt Attachment.

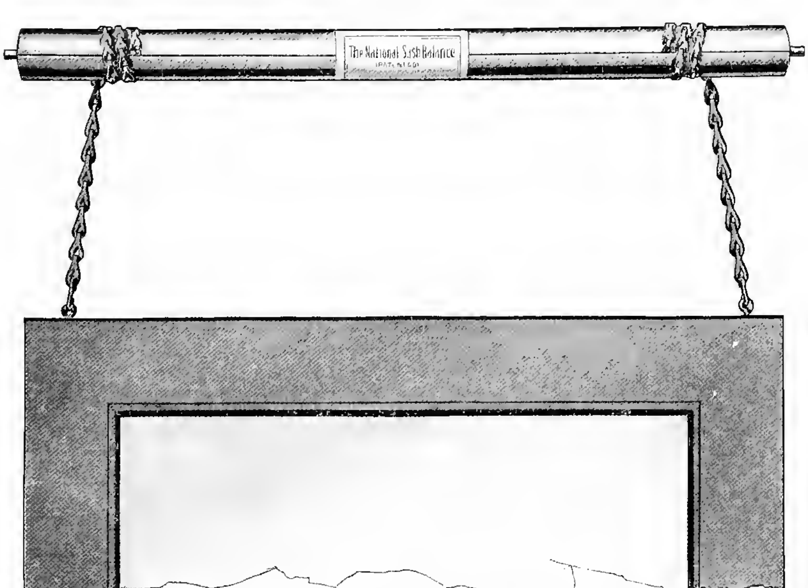
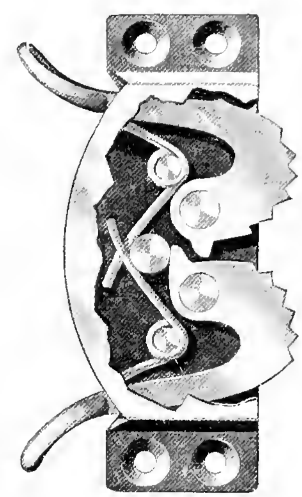
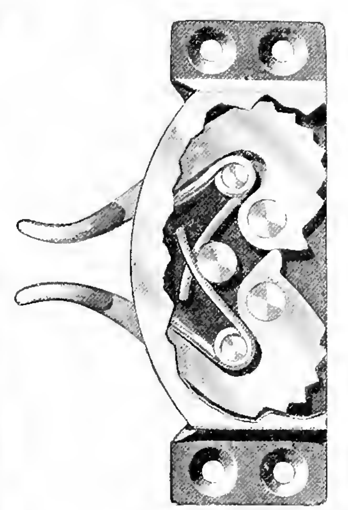


Fig. 1760—National Sash Balance with Chain Attachment. National Lock Washer Company.



Levers Extended.



Levers Compressed.

Fig. 1761—National Sash Lock.

Fig. 1762—Universal Metal Roller Sash Balance with Positive Chain-Adjusting Connections.

Fig. 1763—Section Through Windows Equipped with Universal No. 70 Extension Sash Lock.

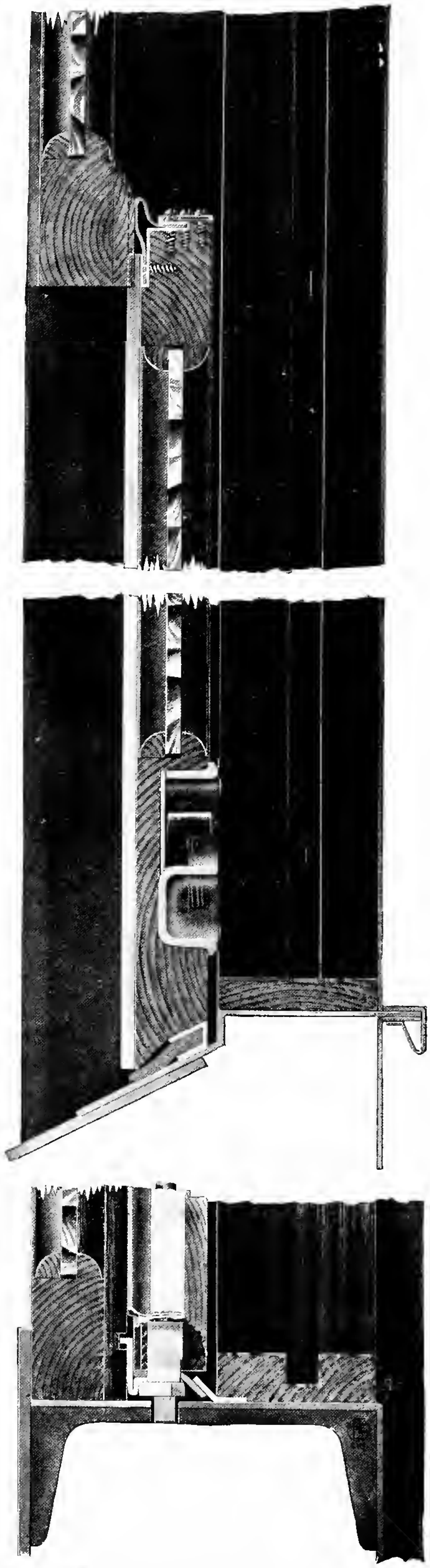


Fig. 1764—Windows Fitted with Universal Weather Stripping and No. 80 Sash Lock.

McCord Manufacturing Company.

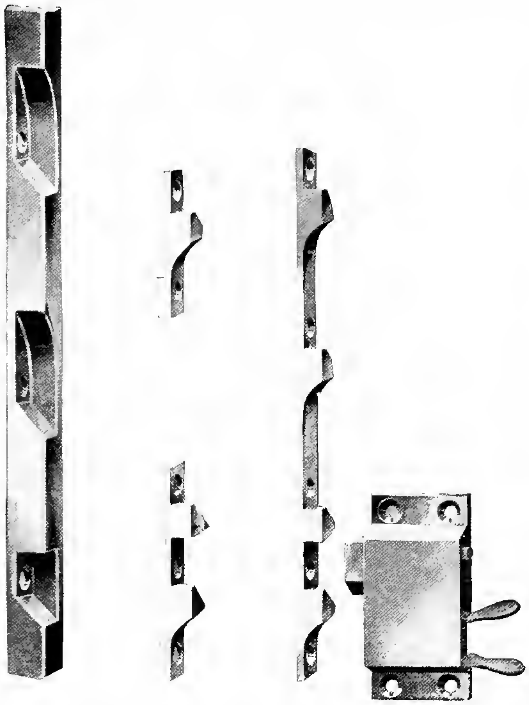


Fig. 1765—Universal Stamped Bronze Flush Continuous Gravity Wedging Sash Rack and Cast Bronze Individual Sash Stops for No. 10 Lock.

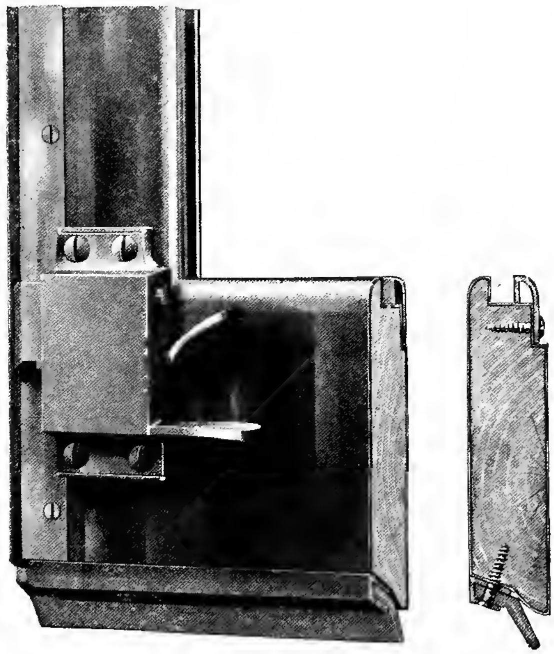


Fig. 1766—Universal Sash Bead and Sash Lock as Applied with Wood Screws to Universal Copper Insulated Sash.

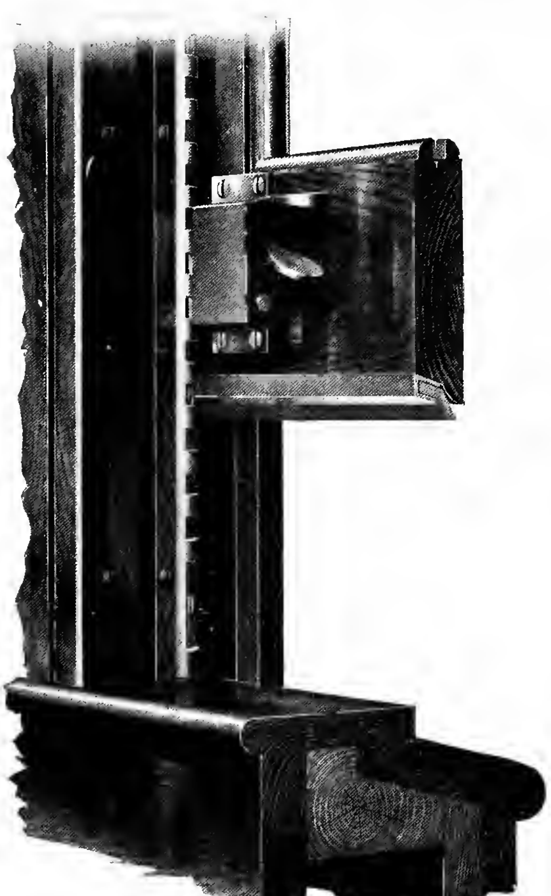


Fig. 1767—Universal No. 20 Wedging Sash Lock and Rack, and Bottom Weather Strip Applied to Wooden Sash.

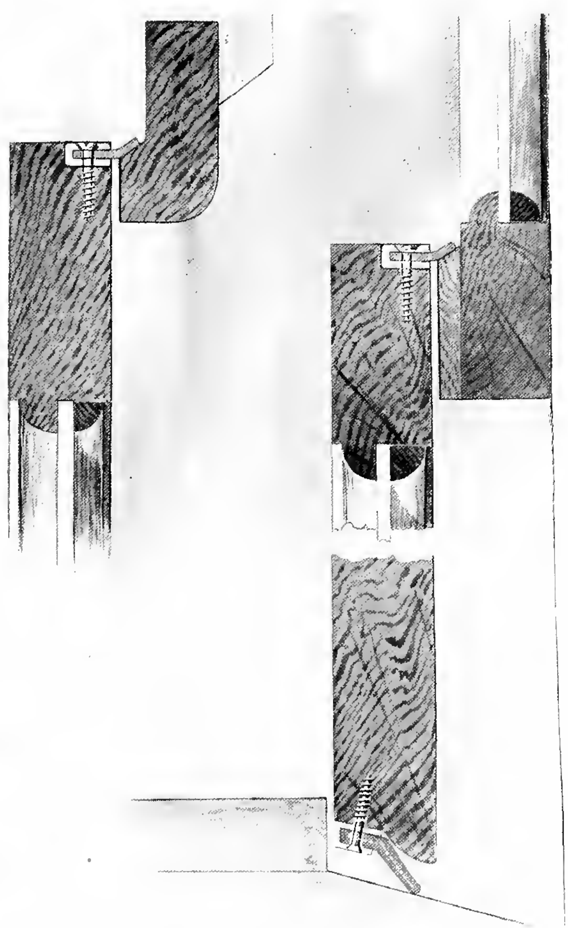
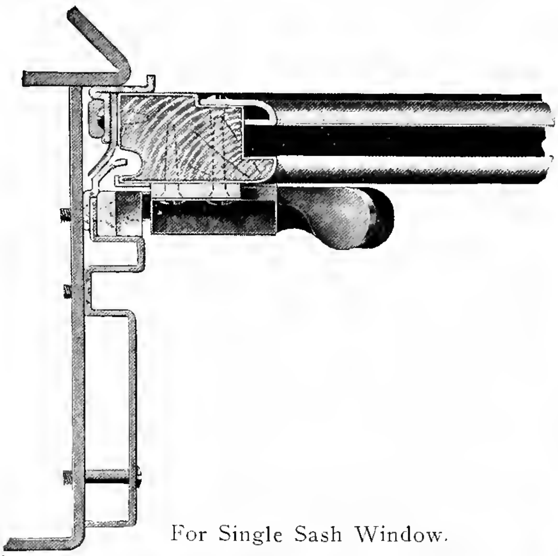
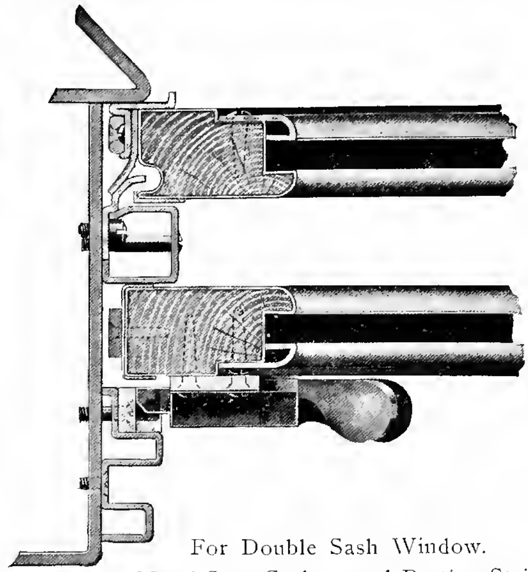


Fig. 1768—Universal Top and Bottom Channel-Holding Weather Strips.

McCord Manufacturing Company.



For Single Sash Window.



For Double Sash Window.

Fig. 1769—Insulated Copper Adjustable Sash, with Weather Strips, Metal Stop Casings and Parting Strips.

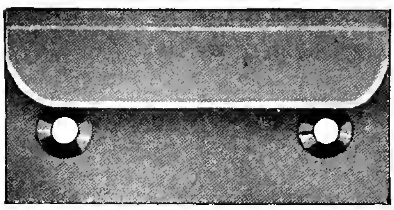


Fig. 1770—Universal No. 5 Extended Sash Lift.

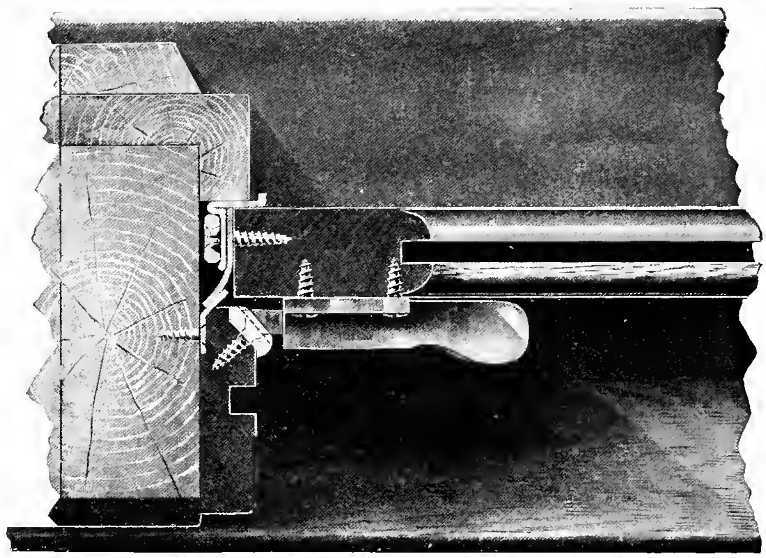


Fig. 1771—Universal Side Weather Stripping and No. 20 Wedging Sash Lock and Rack Applied to Wooden Sash.

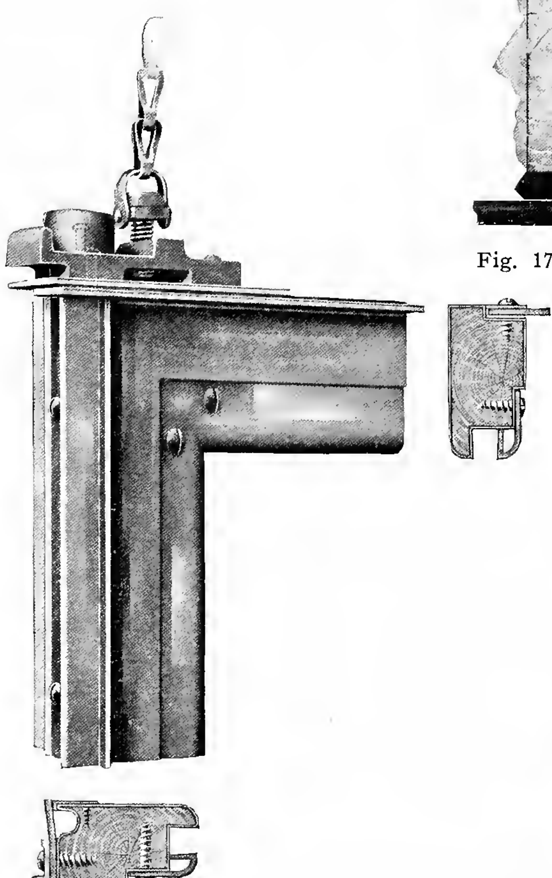


Fig. 1772—Universal Adjustable Chain Connection as Applied for Adjustment of Universal Metal Sash.

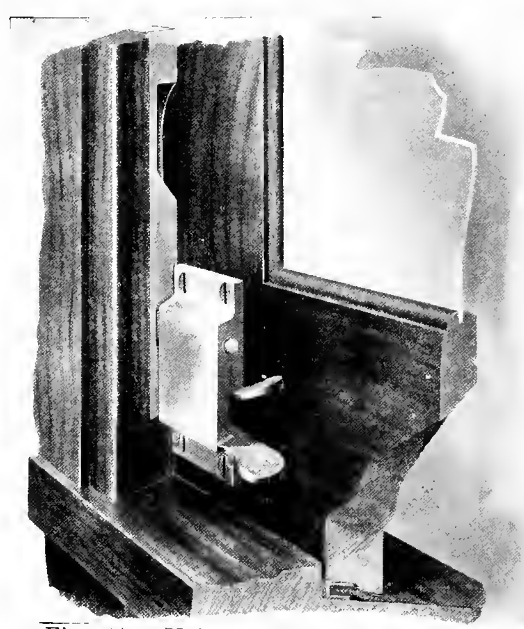


Fig. 1773—Universal Bronze Continuous Flush Sash Stop Rack with No. 10 Gravity Sash Lock.

McCord Manufacturing Company.

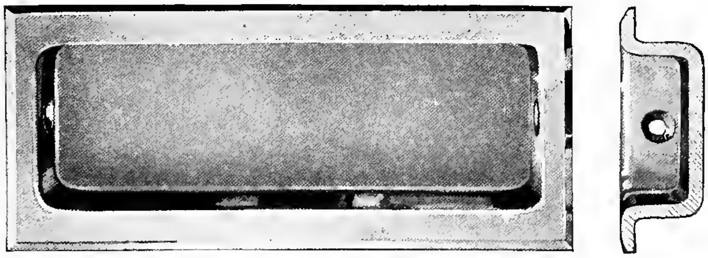
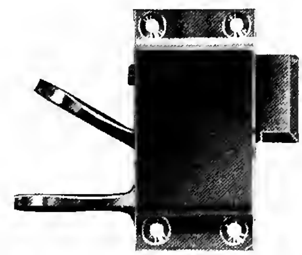


Fig. 1774—Universal No. 15 Flush Sash Lift. McCord Manufacturing Company.



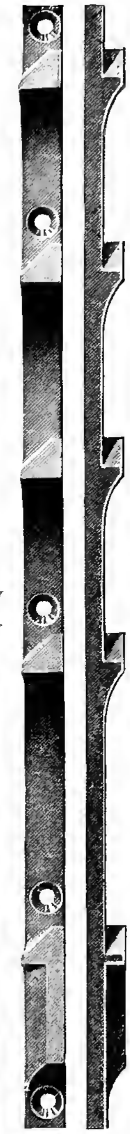


Fig. 1775—Universal No. 10 Gravity Wedging Sash Lock and Rack. McCord Manufacturing Company.

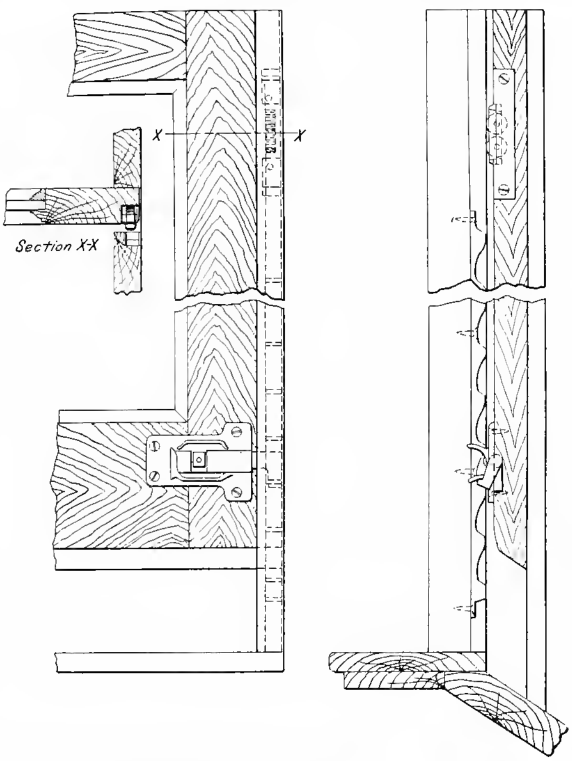


Fig. 1776—No. 177 Lock Applied to Sash. Dayton Manufacturing Company.

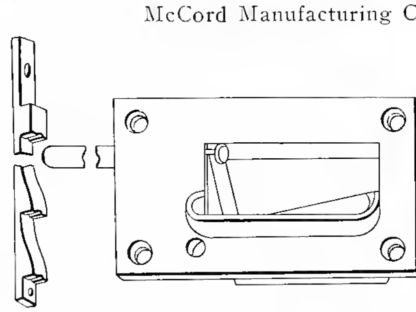


Fig. 1777—Hagel Combined Sash Lock and Lift. Dayton Manufacturing Company.

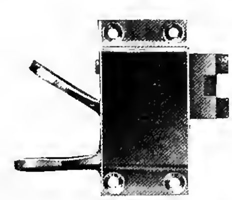
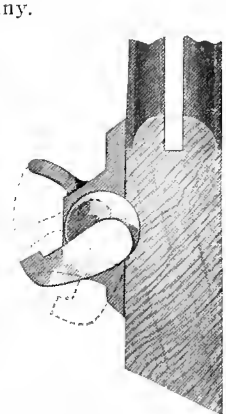


Fig. 1778—Universal No. 20 Sash Lock and Rack. McCord Manufacturing Company.



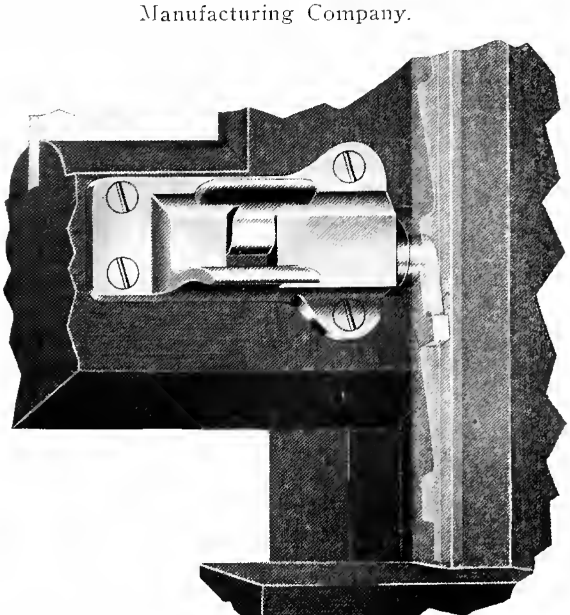
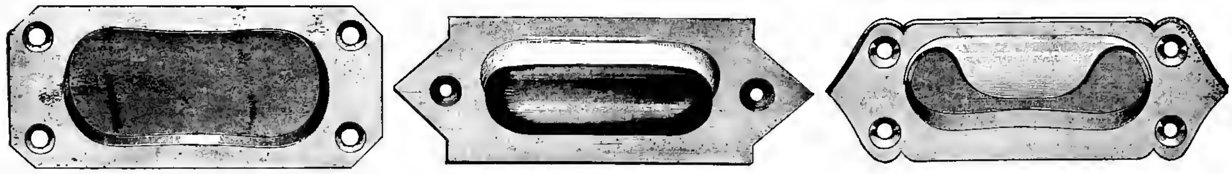


Fig. 1779—Ardee No. 199 Lock Applied to Sash. Dayton Manufacturing Company.



Adams & Westlake Company. Jas. L. Howard & Company. Adams & Westlake Company.

Fig. 1780—Mortise Sash Lifts.

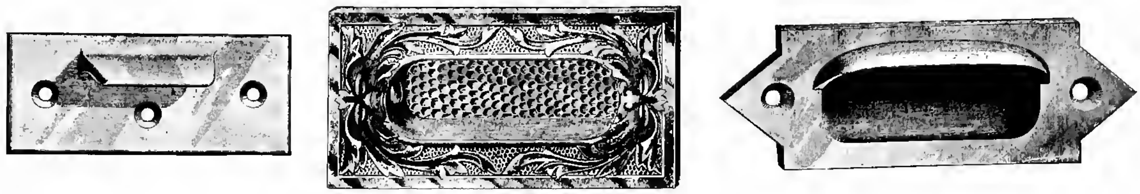


Fig. 1781—Sash Lifts. Dayton Manufacturing Company.

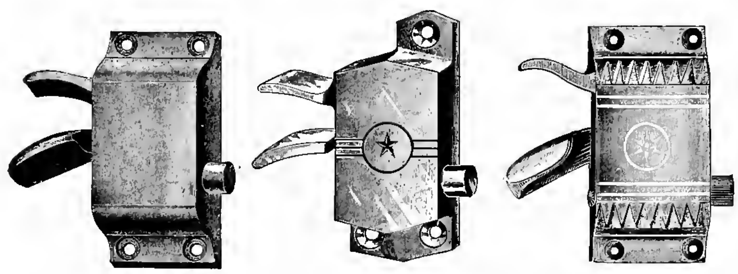


Fig. 1782—Window Sash Locks. Jas. L. Howard & Company.

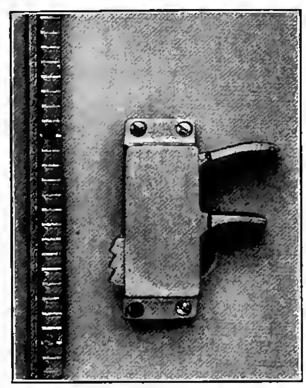


Fig. 1783—No. 83 Ratchet Sash Lock and Stop. Jas. L. Howard & Company.

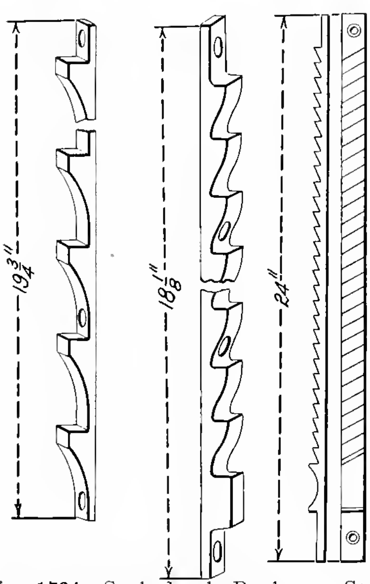


Fig. 1784—Sash Lock Racks or Stop Bars. Dayton Manufacturing Company.

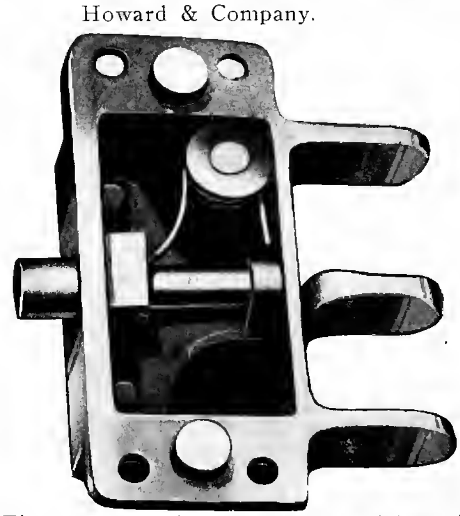
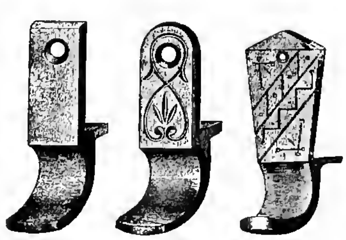


Fig. 1787—No. 763 Sash Lock. Adams & Westlake Company.



A.&W.Co. A.&W.Co. D. M. Co.

Fig. 1785—Window Blind Pulls.

Fig. 1786—Sash Lock Racks. A. & W. Co.

Fig. 1788—Sash Locks. Adams & Westlake Company.

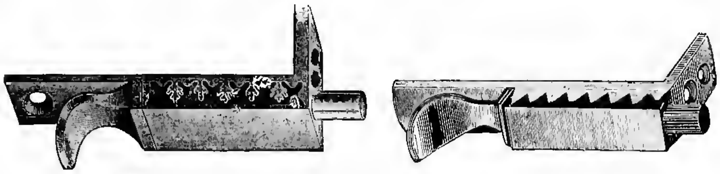


Fig. 1789—Window Blind Bolts.
Adams & Westlake Company.

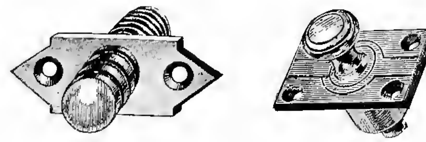
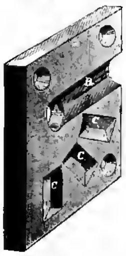
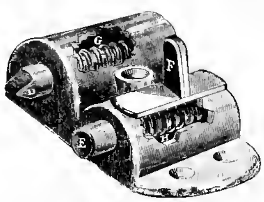


Fig. 1790—End Door Sash Bolts.



Ratchet Plate.



Pivot and Ratchet Bolt.

Fig. 1791—Monitor Deck Sash Pivot and Ratchet Catch. Dayton Manufacturing Company.

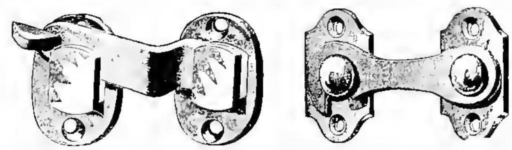


Fig. 1792—Sash Bars. Dayton Manufacturing Company.

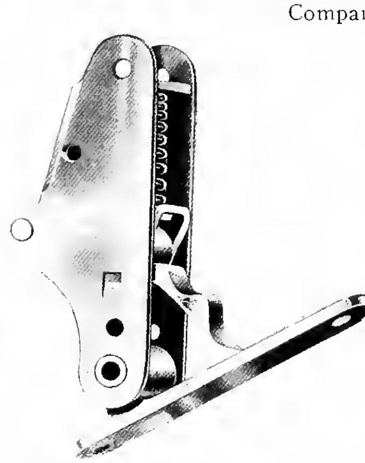


Fig. 1794—Eclipse Deck Sash Ratchet. General Railway Supply Company.

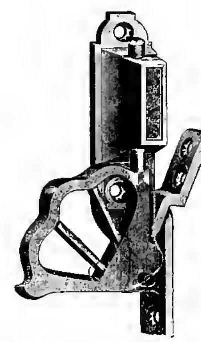


Fig. 1795—Hart's Combined Deck Sash Ratchet, Pivot and Stop. Dayton Manufacturing Company.

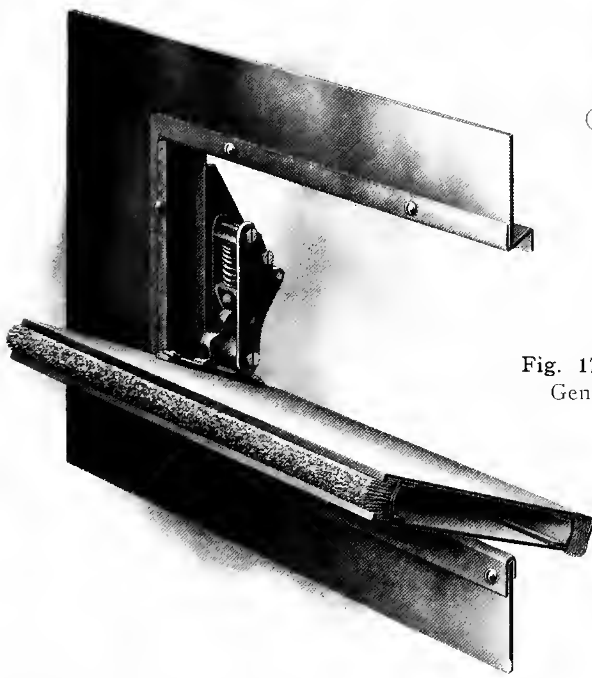


Fig. 1793—Acme Deck Sash and Fixture. Acme Supply Company.

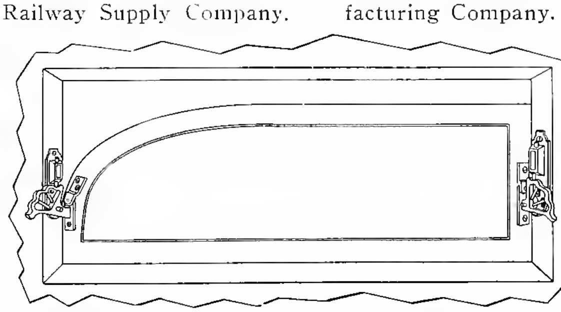
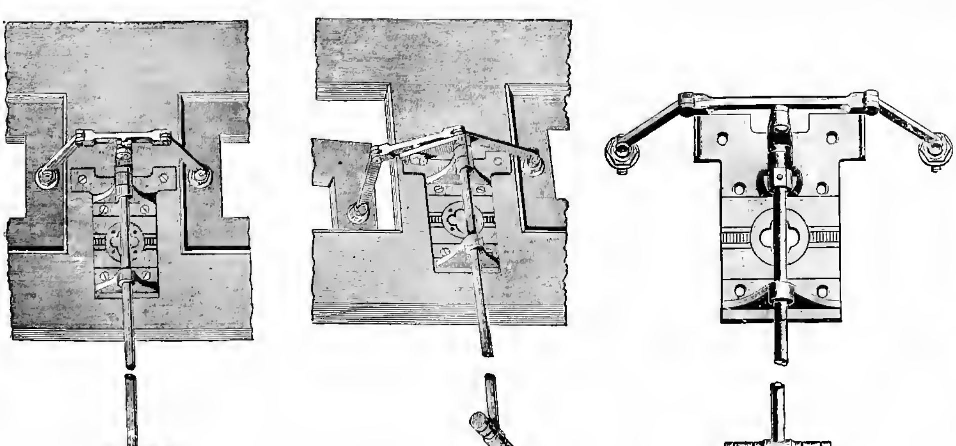


Fig. 1796—Hart's Deck Sash Ratchet Applied to Deck Sash. Dayton Manufacturing Company.



Windows Closed. One Window Open. Opener Complete.
Fig. 1797—Mansfield Deck Sash Opener. Adams & Westlake Company.

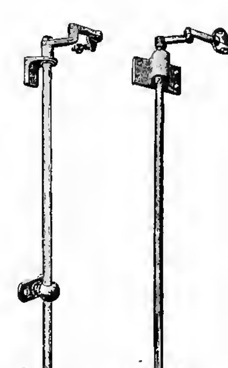


Fig. 1798—Deck Sash and Transom Openers. Dayton Manufacturing Company.

Fig. 1799—Deck Sash Openers. Adams & Westlake Company.

Fig. 1800—Deck Sash Pulls. Adams & Westlake Company.

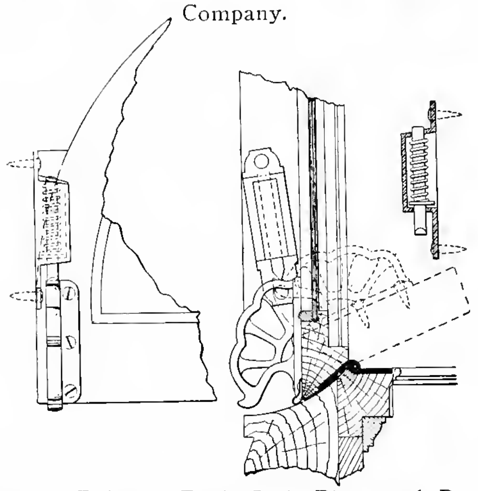
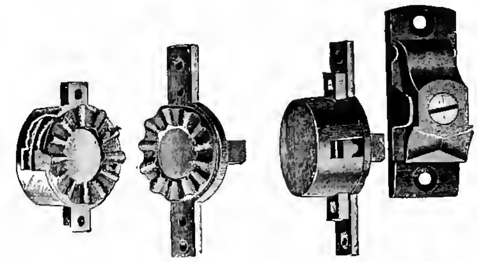


Fig. 1801—Pullman Deck Sash Pivot and Ratchet Catch.



Lower Ratchet Plate and Spring. Upper Ratchet Plate. Ratchet Pivot. Clamp.

Fig. 1802—Morgan Automatic Deck Sash Pivot and Clamp. Adams & Westlake Company.

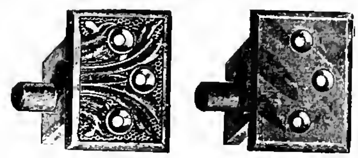


Fig. 1803—Deck Sash Pivots. Dayton Manufacturing Company.

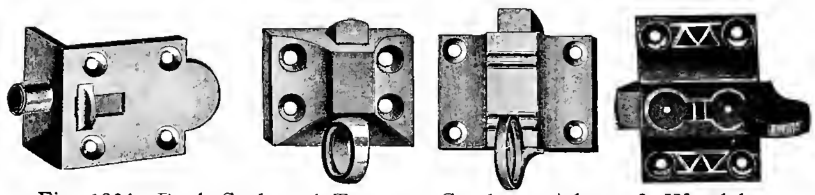


Fig. 1804—Deck Sash and Transom Catches. Adams & Westlake Company.

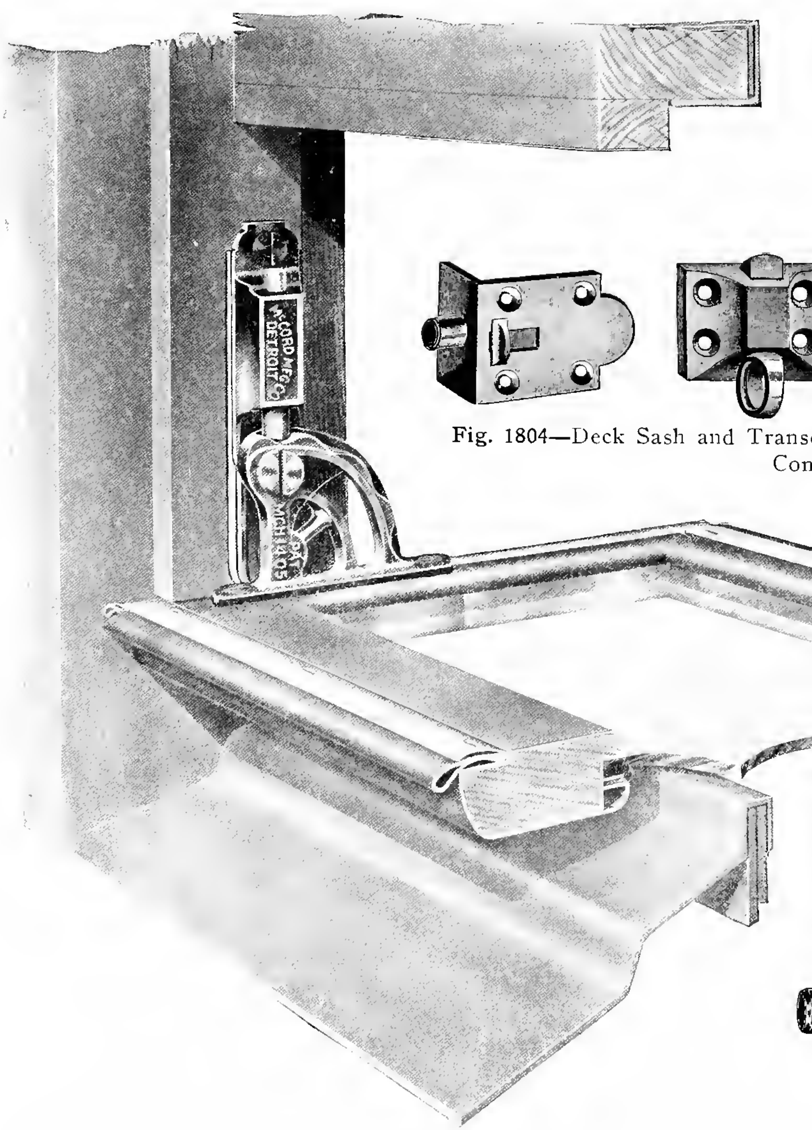
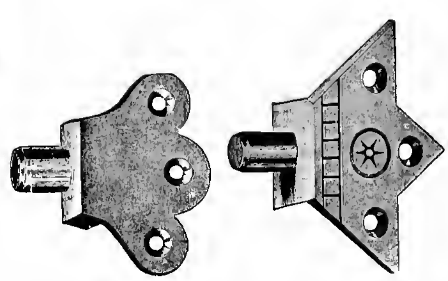


Fig. 1805—Universal Malleable Deck Sash Ratchet. McCord Manufacturing Company.



A. & W. Co. Jas. L. Howard & Co.

Fig. 1806—Deck Sash Pivots.

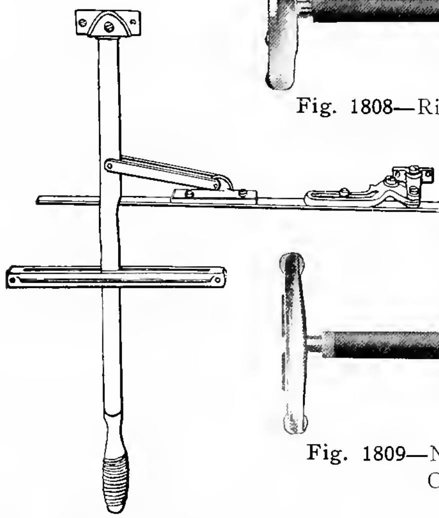


Fig. 1807—Continuous Deck Sash Opener.

Fig. 1808—Ring Curtain Fixture No. 88. Curtain Supply Company.

Fig. 1809—No. 86 Forsyth Roller Tip Fixture. Curtain Supply Company.

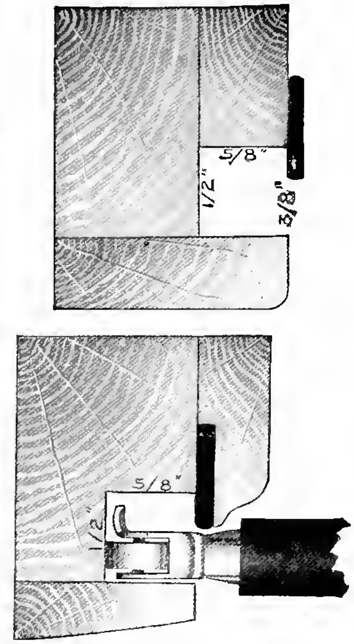


Fig. 1810—Styles of Grooved Construction for Use with Ring Curtain Fixture. Curtain Supply Company.

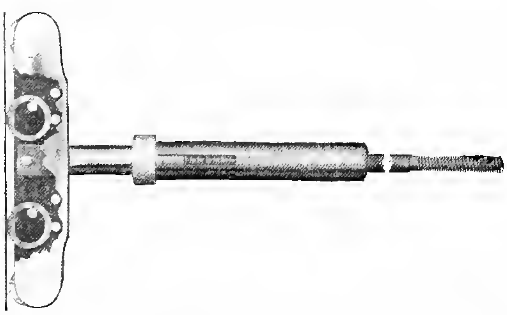


Fig. 1811—Ring Fixture Mechanism with Tip in Holding Position.

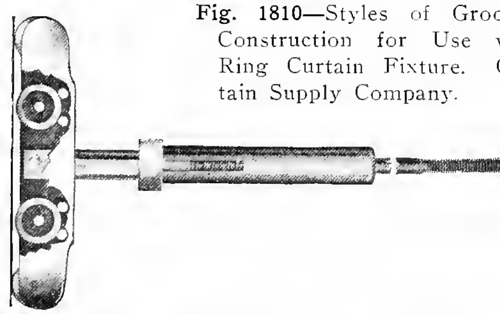


Fig. 1812—Ring Fixture Mechanism with Tip in Non-Holding Position.

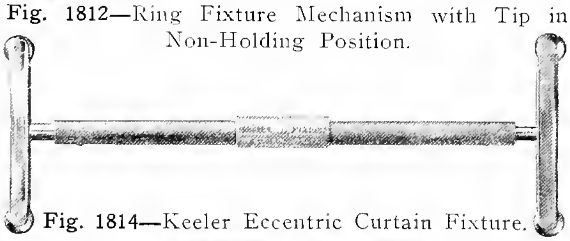


Fig. 1814—Keeler Eccentric Curtain Fixture.

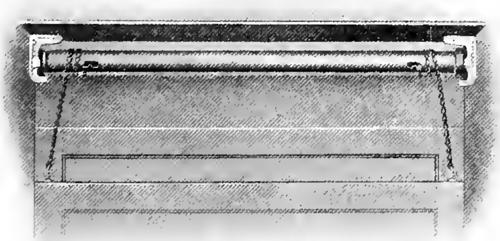


Fig. 1813—Rex Sash Balance.

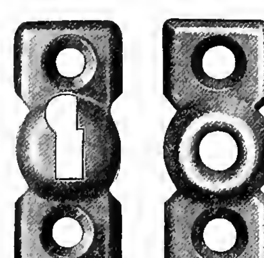


Fig. 1815—Roller Brackets No. 63.

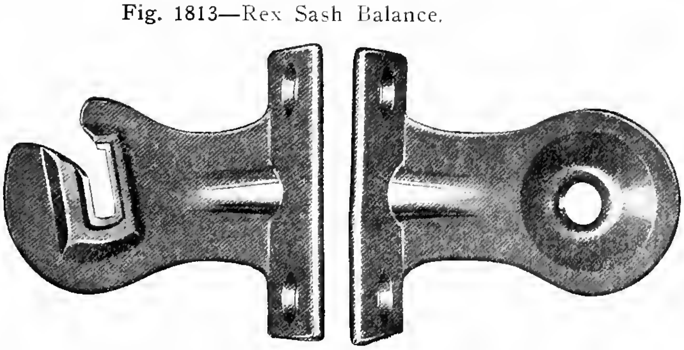


Fig. 1816—Roller Brackets No. 67.

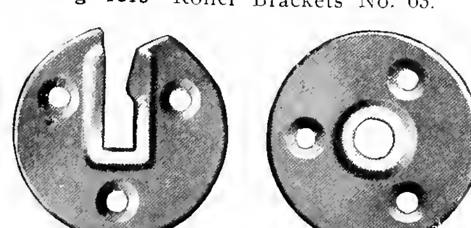


Fig. 1817—Roller Brackets No. 60.

Curtain Supply Company.

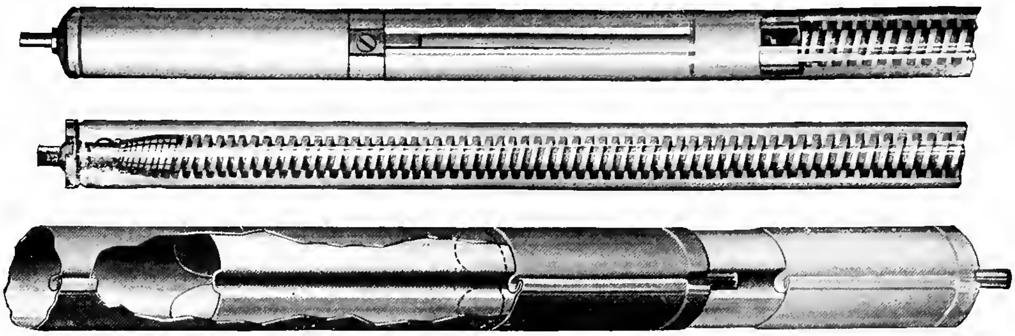
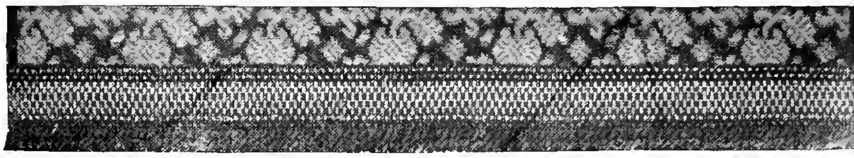
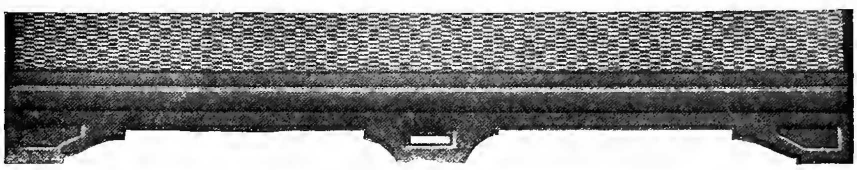


Fig. 1818—Rex All-Metal Roller Showing Internal Construction and External Plug.



Fringe.

Leather.



Leather.

Fig. 1819—Types of Flap Curtains.

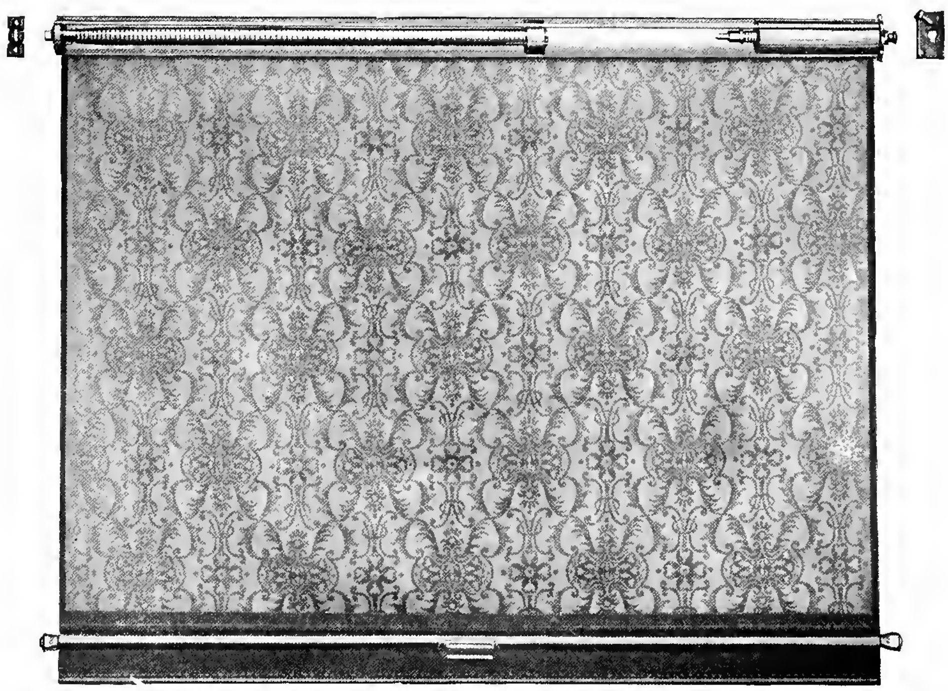


Fig. 1820—Curtain Equipped with Rex All-Metal Roller.

Curtain Supply Company.

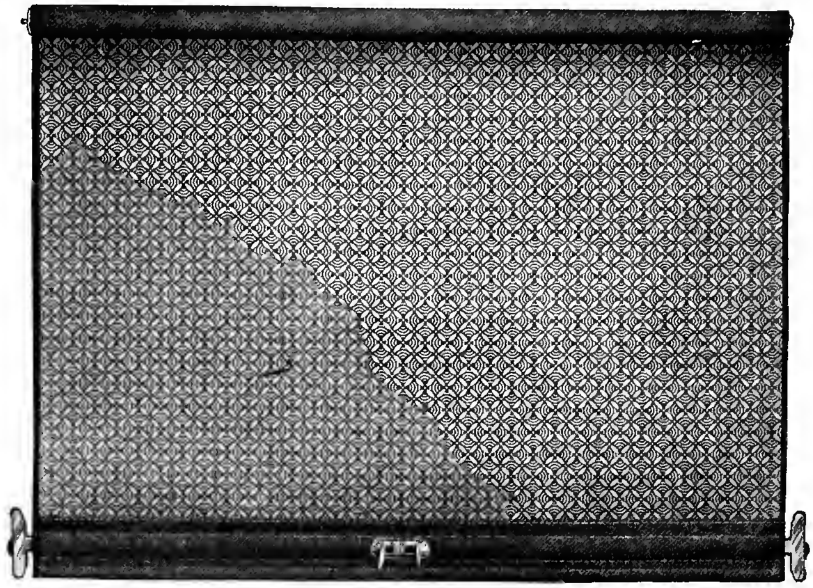


Fig. 1821—Curtain Equipped with National Cam Curtain Fixture. National Lock Washer Company.

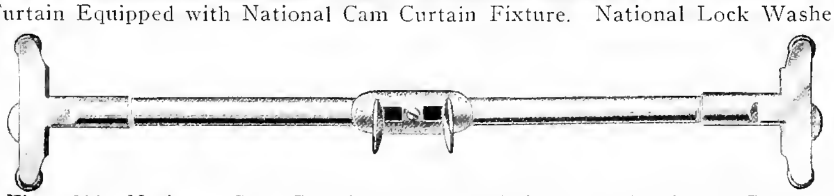


Fig. 1822—National Cam Curtain Fixture. National Lock Washer Company.

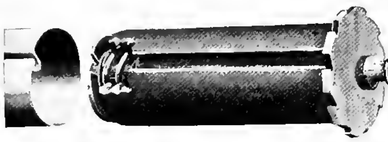


Fig. 1823—Friction Plug for Tuco Friction Curtain Roller. Acme Supply Company.

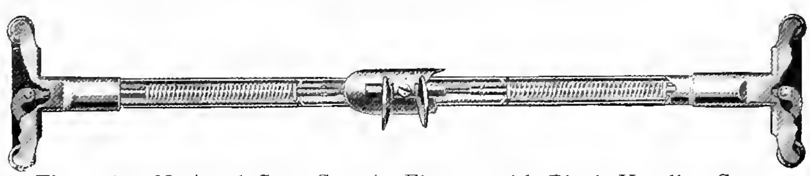


Fig. 1824—National Cam Curtain Fixture with Pinch Handles Compressed. National Lock Washer Company.

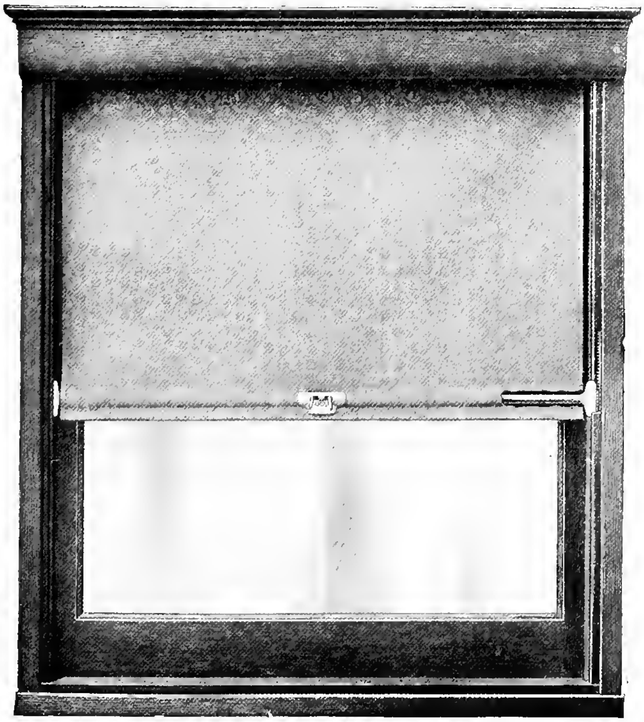


Fig. 1825—Tuco Rack Curtain Fixture.

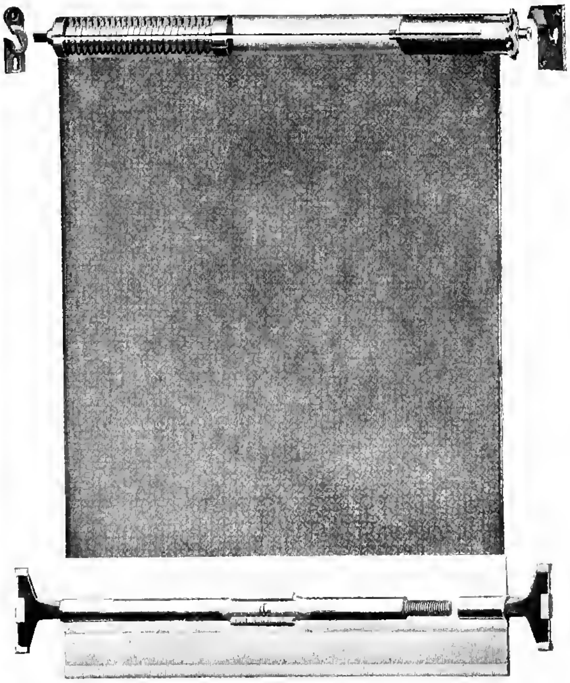


Fig. 1826—Tuco Friction Curtain Roller and Fixtures.

Acme Supply Company.

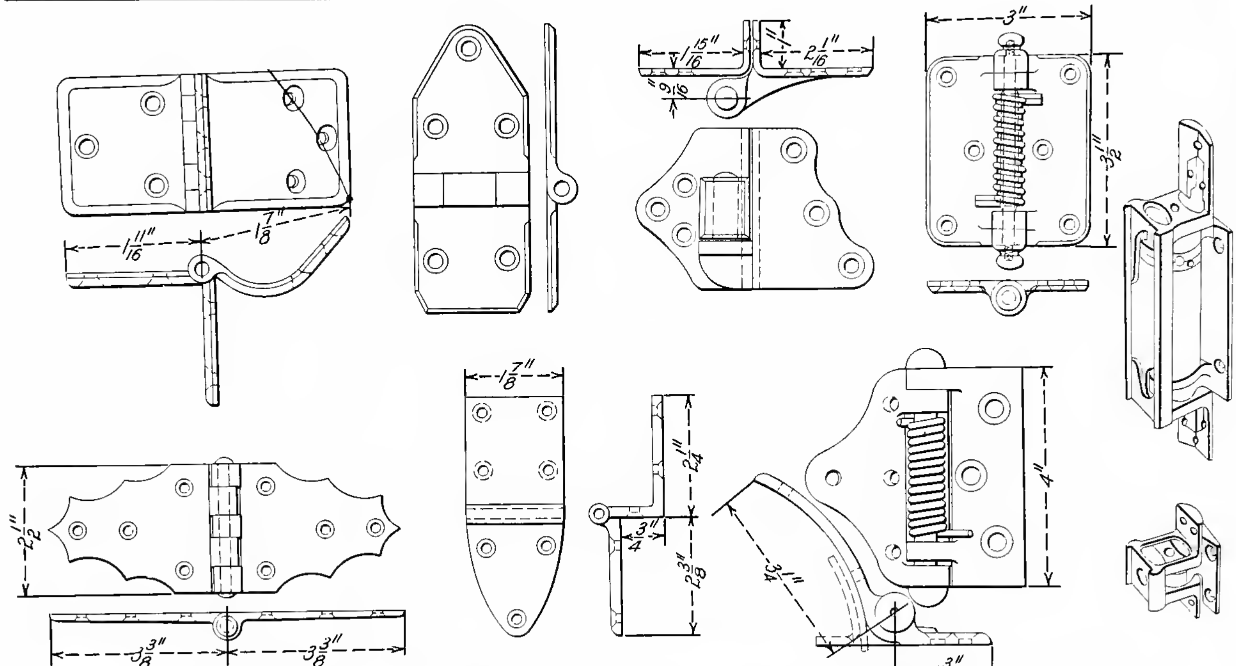
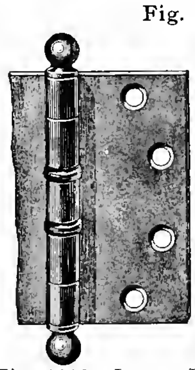
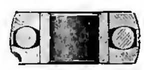
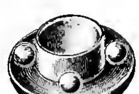


Fig. 1827—Miscellaneous Plain and Spring Hinges. Dayton Manufacturing Company.

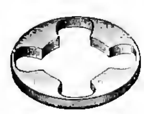




Washer Complete.



Washer Base.



Ball Guide.

Fig. 1828—Loose Pin Butt Hinge with Ball Bearing Washer.

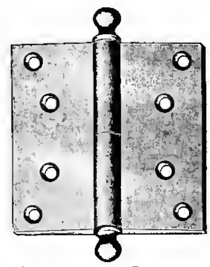


Fig. 1829—Loose Joint Butt Hinge. R. & E. Mfg. Co.

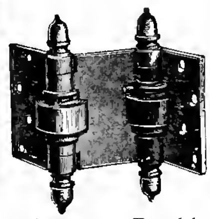


Fig. 1830—Double Acting Spring Hinge. A. & W. Co.

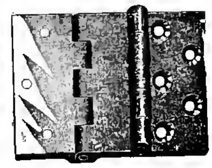
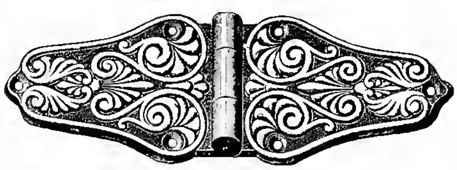
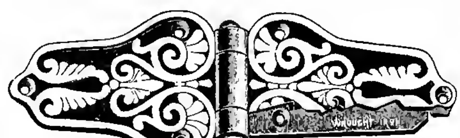


Fig. 1831—Table Hinge. A. & W. Co.



Adams & Westlake Company.



Dayton Manufacturing Company.

Fig. 1832—Brass Covered Vestibule Door Hinges.

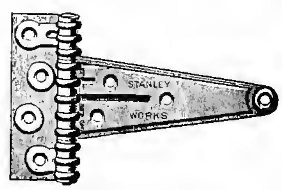


Fig. 1833—T Hinge.

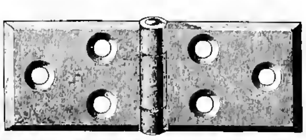


Fig. 1834—Riveted Joint Butt Hinge.

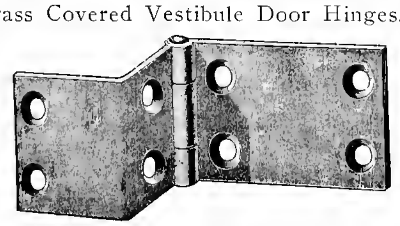


Fig. 1835—Offset Riveted Joint Butt Hinge.

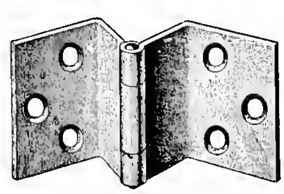


Fig. 1836—Pocket Hinge.

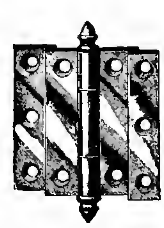


Fig. 1837—Rabbeted Door Hinge. A. & W. Co.

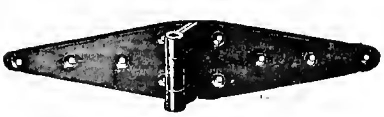


Fig. 1838—Distributing Table Hinge for Postal Cars. D. M. Co.

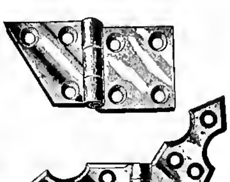


Fig. 1839—Lamp House Hinges. D. M. Co.

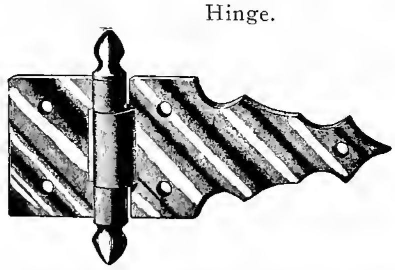


Fig. 1840—Refrigerator Door Hinge. D. M. Co.

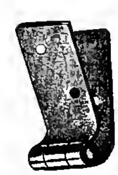
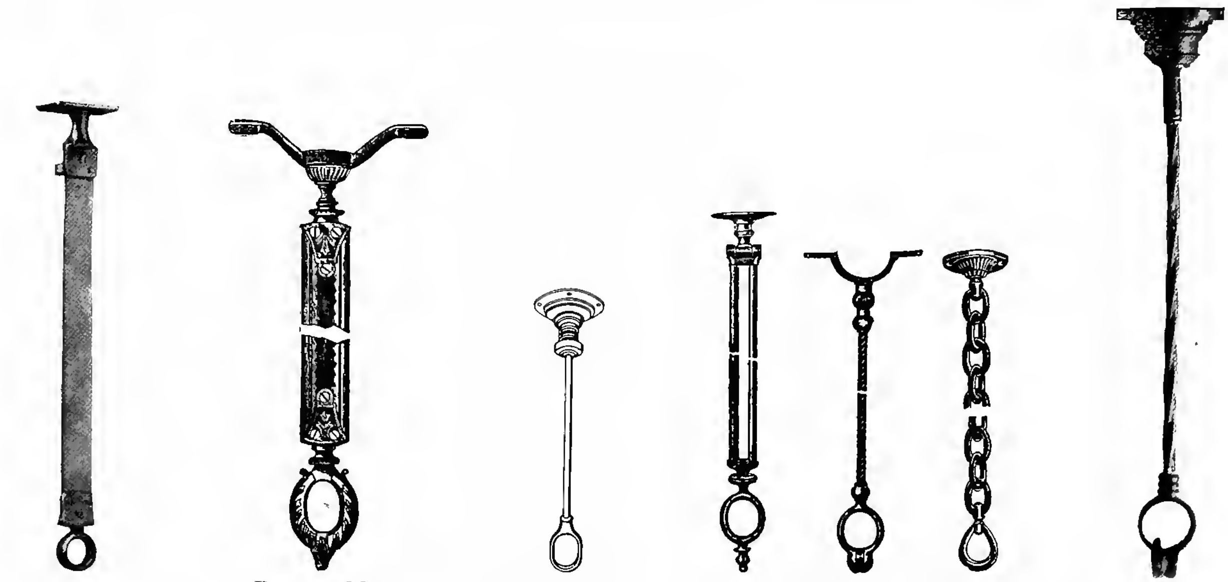


Fig. 1841—Lamp House Hinge. D. M. Co.



Jas. L. Howard & Company.

Dayton Manufacturing Company.

Adams & Westlake Company.

Fig. 1842—Signal Cord Hangers.

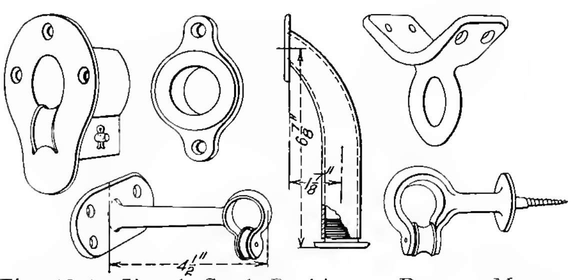
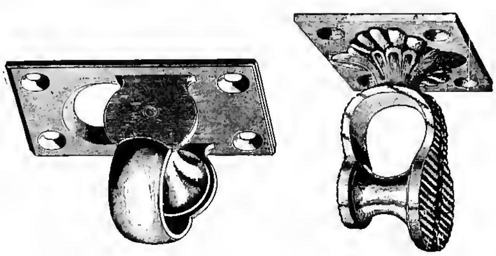


Fig. 1843—Signal Cord Bushings. Dayton Manufacturing Company.



A. & W. Co. D. M. Co.

Fig. 1844—Angle Signal Cord Guides.

Fig. 1845—Overhead Guide. D. M. Co.

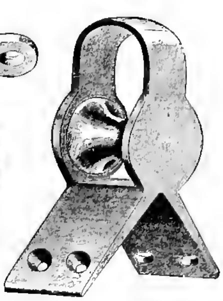


Fig. 1846—Corner Guide. A. & W. Co.

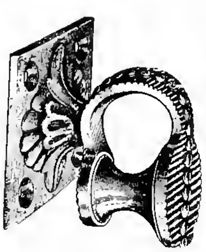


Fig. 1847—Side Pulley Guide. A. & W. Co.

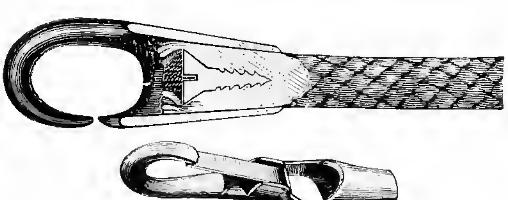


Fig. 1848—Signal Cord Couplings. Samson Cordage Works.

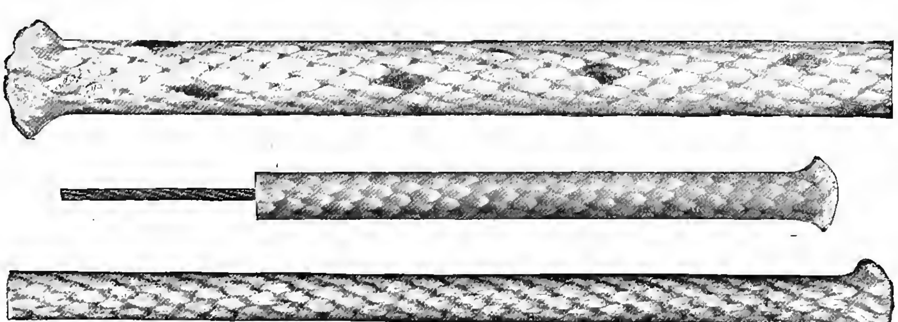


Fig. 1849—Signal Cords. Samson Cordage Works.

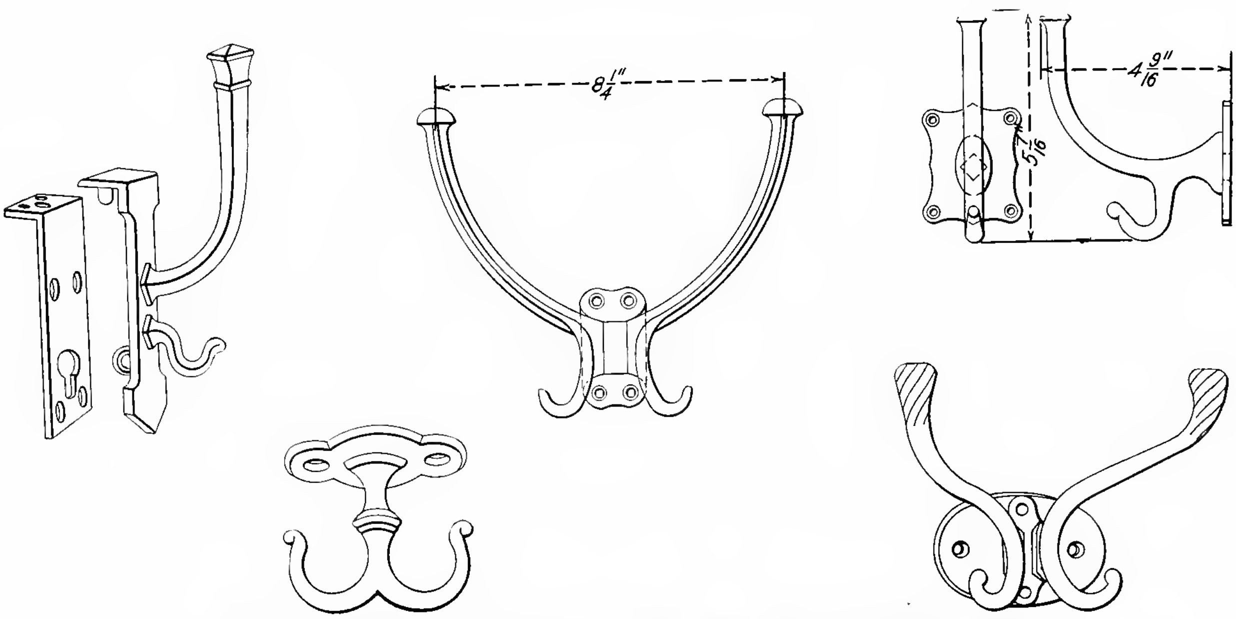
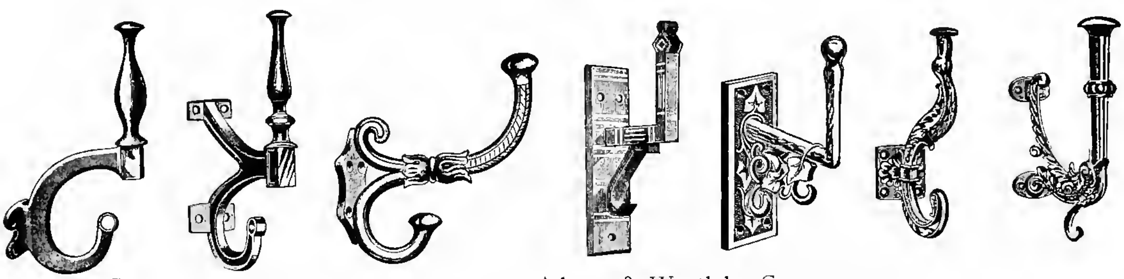


Fig. 1850—Miscellaneous Coat and Hat Hooks. Dayton Manufacturing Company.



D. M. Co. Adams & Westlake Company.

Fig. 1851—Miscellaneous Coat and Hat Hooks.

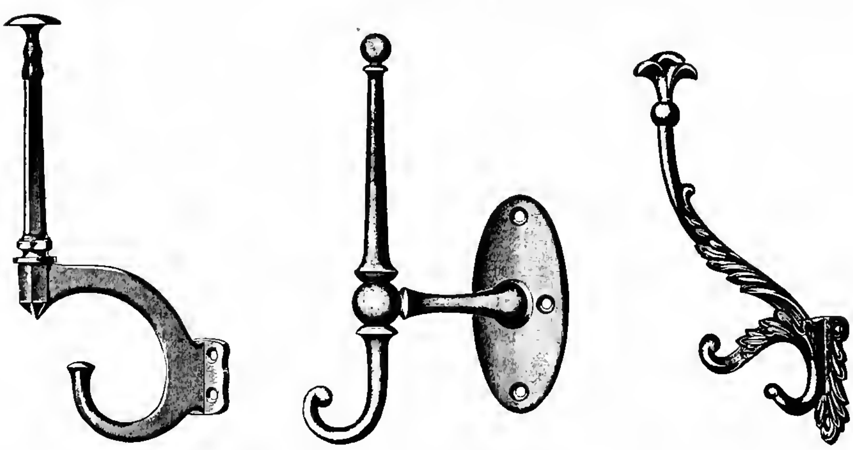


Fig. 1852—Coat and Hat Hooks. Russell & Erwin Manufacturing Company.

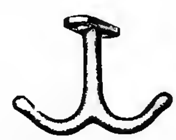


Fig. 1853—Ceiling Hook. R. & E. Mfg. Co.

Fig. 1854—Wardrobe Hook. R. & E. Mfg. Co.

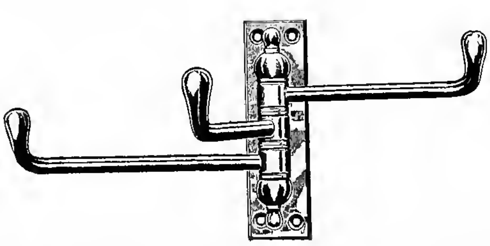


Fig. 1855—Folding Coat Hook. Adams & Westlake Company.

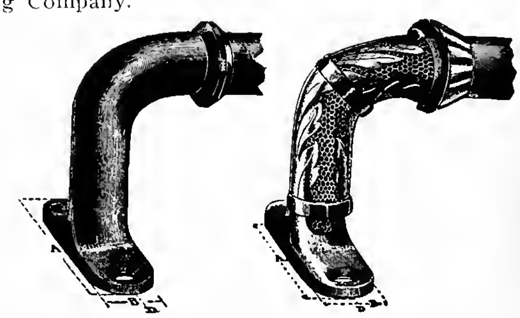


Fig. 1856—Window Rod Brackets. Adams & Westlake Company.

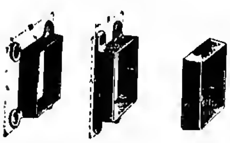


Fig. 1857—Curtain Rod Bushings.

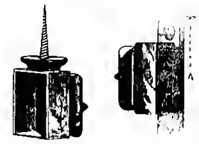


Fig. 1858—Curtain Rod Brackets.

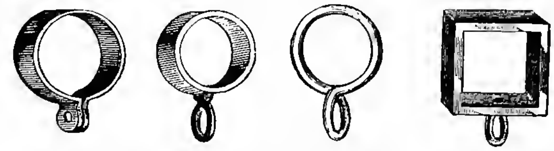


Fig. 1859—Curtain Rings.

Dayton Manufacturing Company.

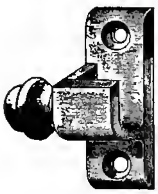


Fig. 1860—Towel Rod Bracket.

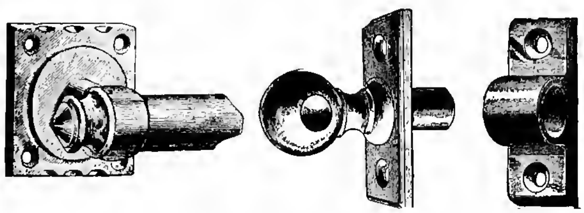


Fig. 1861—Curtain Rod Brackets.

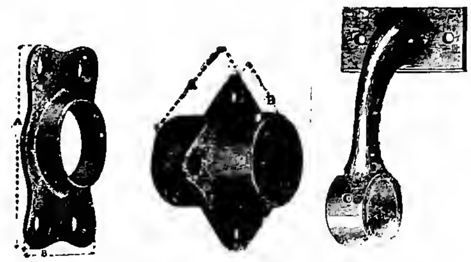
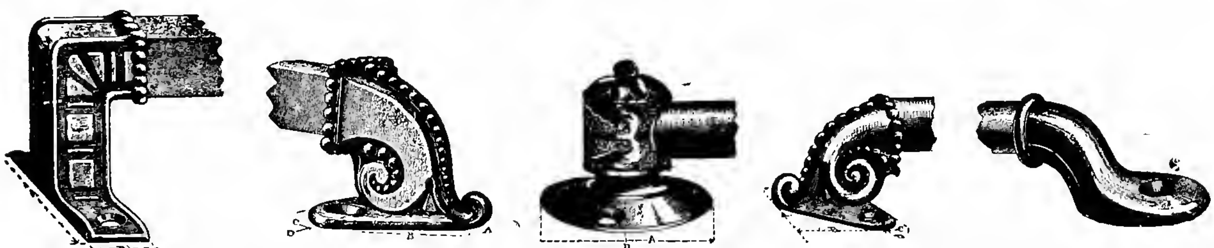


Fig. 1862—Curtain Rod Bushings.

Dayton Manufacturing Company.



Adams & Westlake Company. D. M. Co. Adams & Westlake Company.

Fig. 1863—Window Rod Brackets.

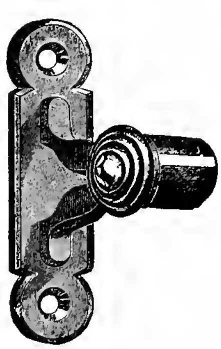


Fig. 1864—Window Rod Bracket. A. & W. Co.

A. & W. Co. D. M. Co.
Fig. 1865—Door Handles.

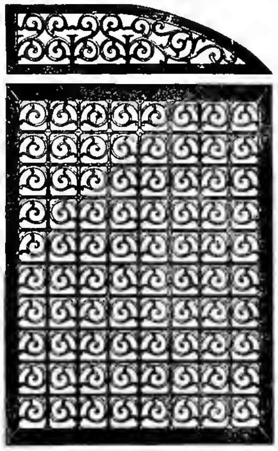


Fig. 1866—Cast Grilles. A. & W. Co.

Fig. 1867—Window Guard Rod Bracket. A. & W. Co.

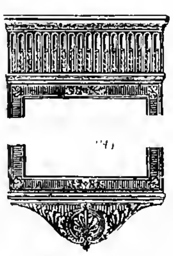
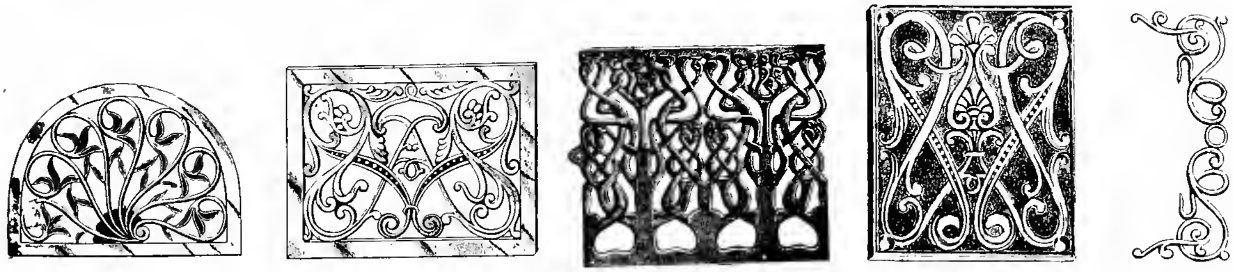
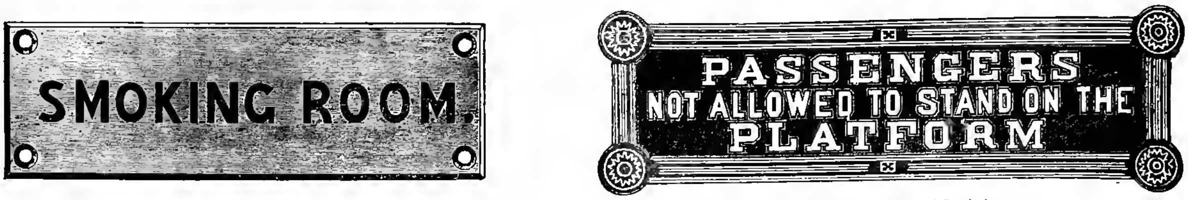


Fig. 1868—Mirror Frame. D. M. Co.



Grilles for Vestibule Doors. To Cover Heater Pipes. For Vestibule and King Pin Plate. For Door.

Fig. 1869—Ornamental Cast Work. Dayton Manufacturing Company.



Size, 2 by 6½ ins. Size, 3⅞ by 11⅝ ins.

Fig. 1870—Notice Plates. Adams & Westlake Company.

Size, 2⅜ by 11 ins. Size, 2⅜ by 8⅝ ins. Size, 2⅜ by 9 ins.

Fig. 1871—Notice Plates. Dayton Manufacturing Company.

Fig. 1872 — Veneered Wood Panel.

Fig. 1873—Spittoon. Dayton Manufacturing Company.

Fig. 1874—Cast Spittoon.

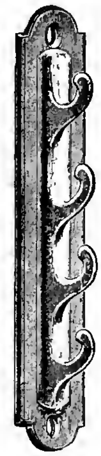


Fig. 1875—Pen Rack. D. M. Co.

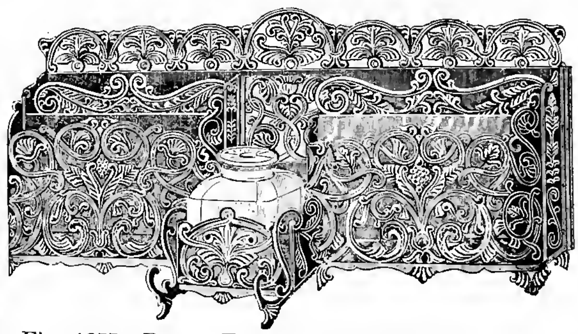


Fig. 1877—Paper, Envelope and Ink Rack. Dayton Manufacturing Company.

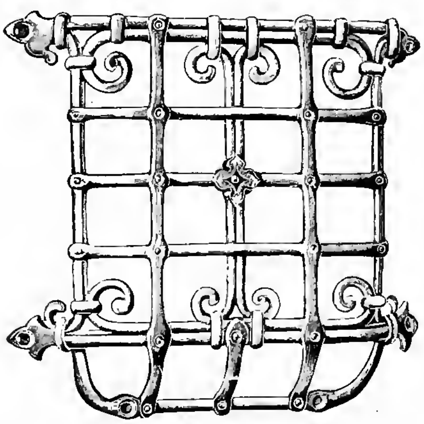


Fig. 1876—Telegraph Blank Rack. Adams & Westlake Company.

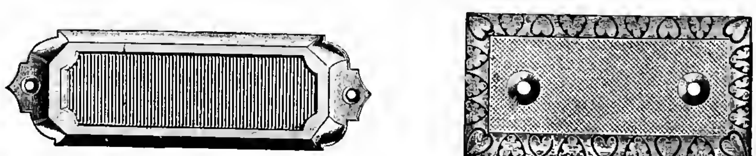


Fig. 1878—Match Strikers. Adams & Westlake Company.

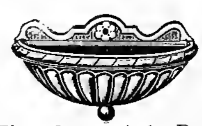


Fig. 1881—Ash Receiver. A. & W. Co.

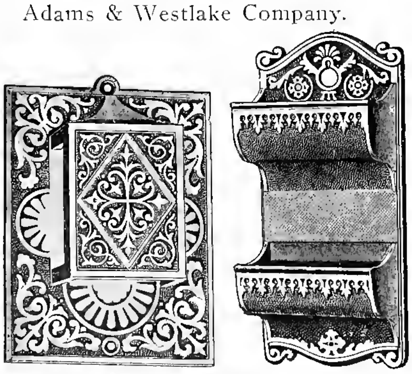


Fig. 1879—Match Box Holder and Match Safe. Adams & Westlake Company.

Fig. 1880—Cigar and Ash Receiver.

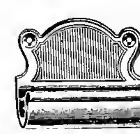


Fig. 1882 — Match Striker and Cigar Holder. A. & W. Co.

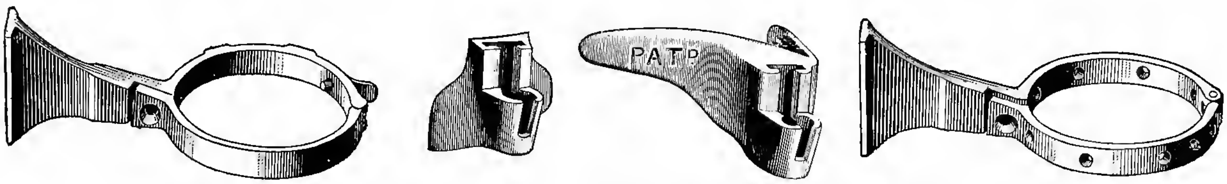


Fig. 1883—Marker or Tail Lamp Brackets. Armspear Manufacturing Company.

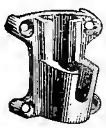


Fig. 1884—Combination Lamp and Flag Socket. Armspear Manufacturing Company.

Fig. 1885—Adjustable Marker Arm. Peter Gray & Sons.

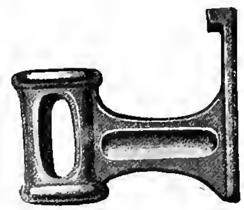
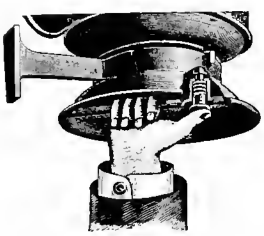
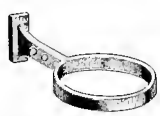


Fig. 1886—Flag Holder. Dressel Railway Lamp Works.

Fig. 1887—Mica Lantern Globe. Storrs Mica Company.

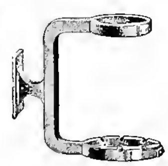


Lamp Bracket, Adjustable.

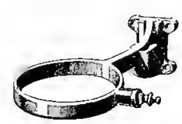


Parted Lamp. Bracket.

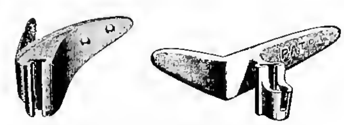
Solid Lamp Bracket.



Top Support Bracket.



Set Screw Bracket.



Corner Sockets.

Fig. 1888—Lamp and Flag Holders. Adams & Westlake Company.

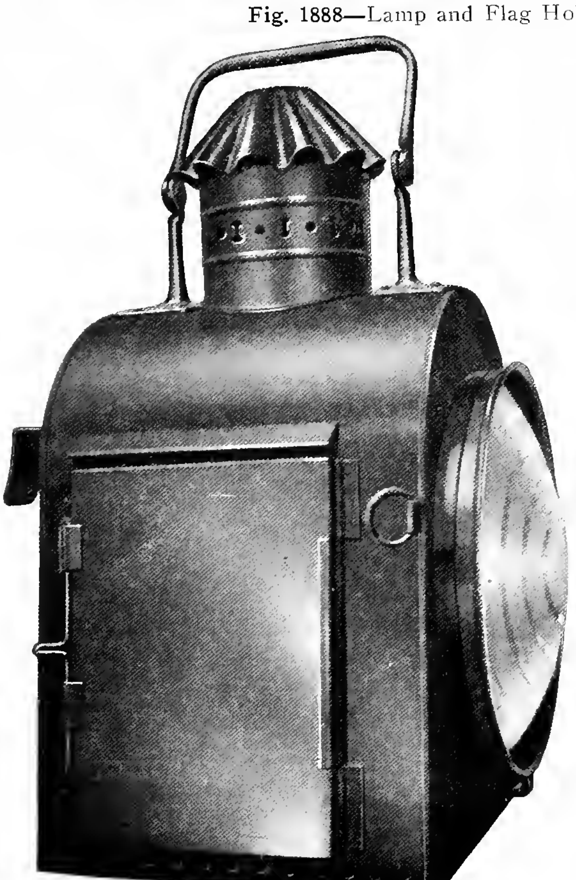


Fig. 1889—Platform Tail Lamp with Upper Draft Ventilator and 8 in. Lens.

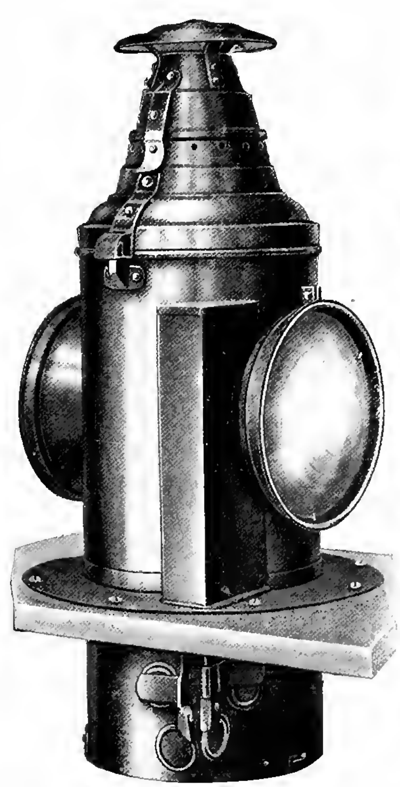


Fig. 1890—Automatic Deck Caboose Lamp with Externally Controlled Color Changes.

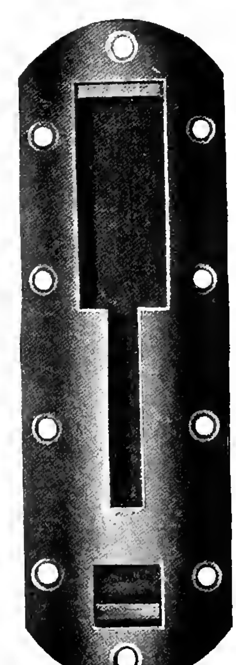


Fig. 1891—Flag and Lamp Socket.

Dressel Railway Lamp Works.

Fig. 1892—Dressel Low Burner with Flame Spreader.

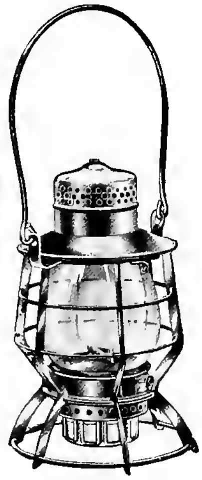


Fig. 1893—Dressel Steel Guard Lantern with Lard Oil Burner and Detachable Base.

Fig. 1894—Combination Tail and Route Signal Lamp.

Fig. 1895—Tail Lamp with Detachable Base.

Dressel Railway Lamp Works.

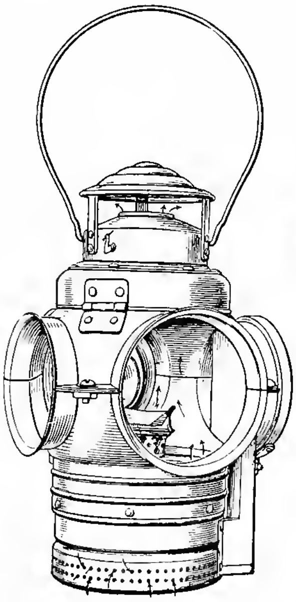


Fig. 1896—Armspear Bottom Draft Method for Marker Lamps.

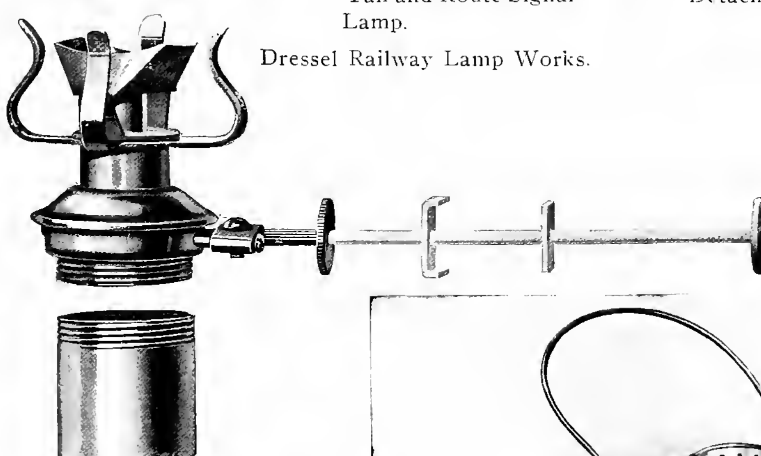


Fig. 1897—Armspear Flat Flame Field Long Time Burner.

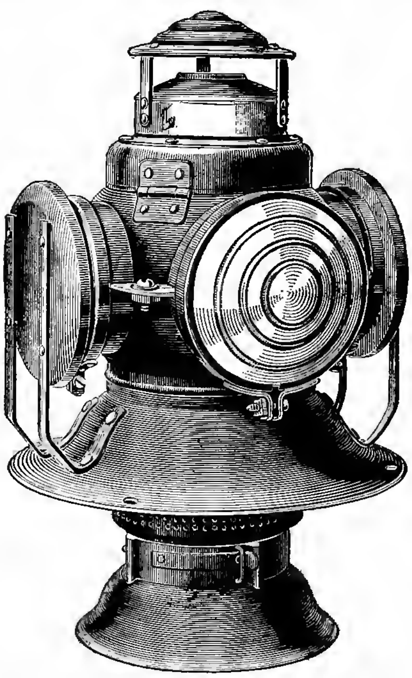


Fig. 1898—Armspear Caboose Deck Lamp.

Fig. 1899—Armspear Outside Adjustment Lantern.

Armspear Manufacturing Company.

Fig. 1900—Armspear Platform Tail Lamp. Armspear Manufacturing Company.

Fig. 1901—Straight Body Steel Marker Lamp. Armspear Manufacturing Company.

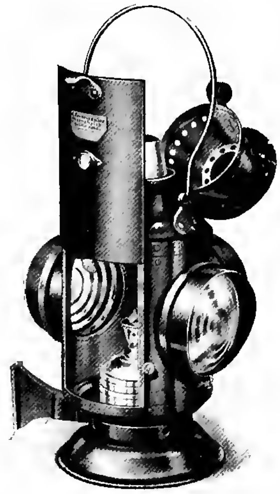


Fig. 1902—Three Lens Marker Lamp. Peter Gray & Sons.

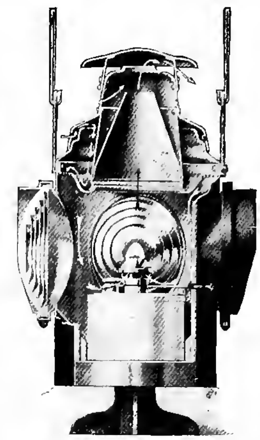


Fig. 1903—Section Through Round Body Lamp Showing Top Draught Method. Peter Gray & Sons.

Fig. 1904—Platform Tail Lamp.

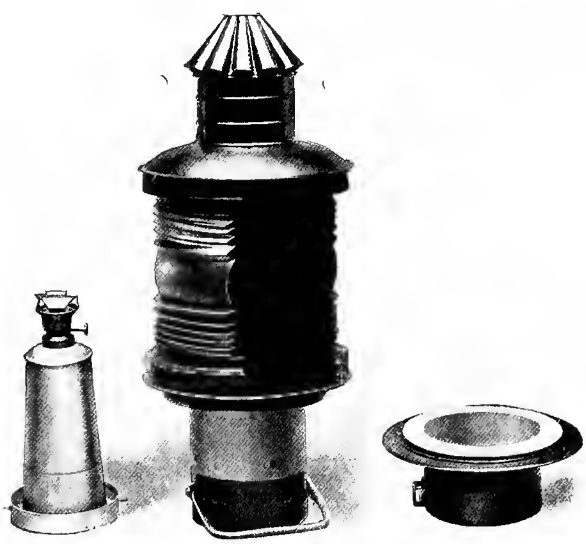


Fig. 1905—Cupola Marker Lamp.

Fig. 1906—Caboose Deck Lamp.

Fig. 1907—Chimneyless Burner.

Peter Gray & Sons.

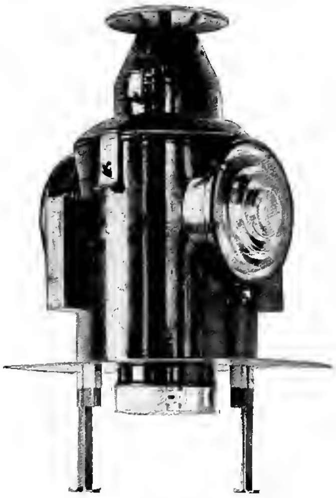


Fig. 1908—Caboose Cupola Lamp.

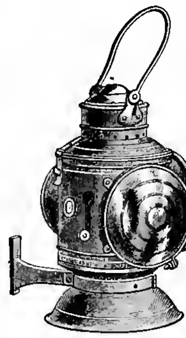


Fig. 1909—Caboose Tail Lamp.

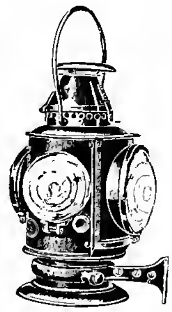


Fig. 1910—Tornado Coach Tail Lamp.

Adams & Westlake Company.

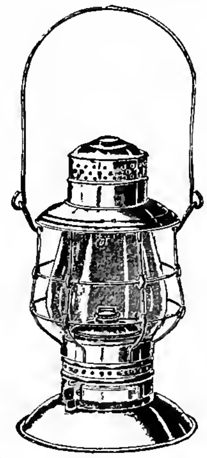


Fig. 1911—Double Wire Guard Lantern.

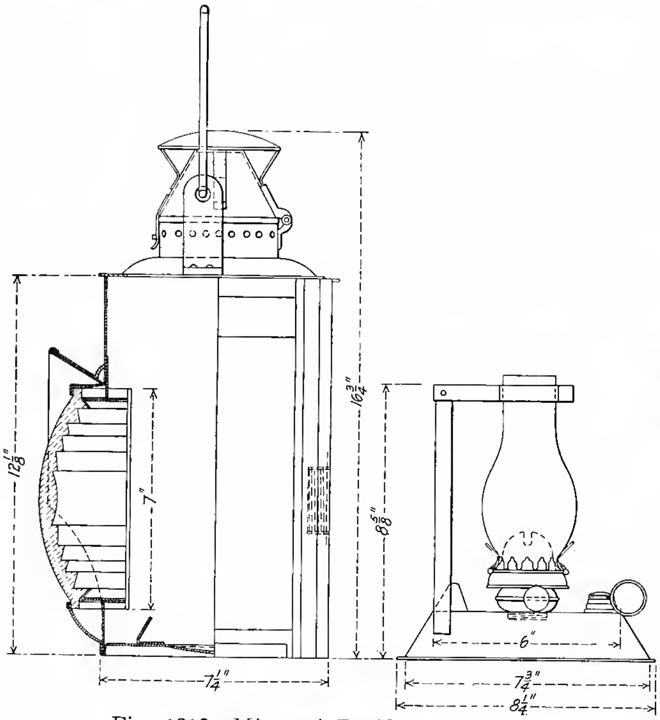


Fig. 1912—Missouri Pacific Tail Lamp.

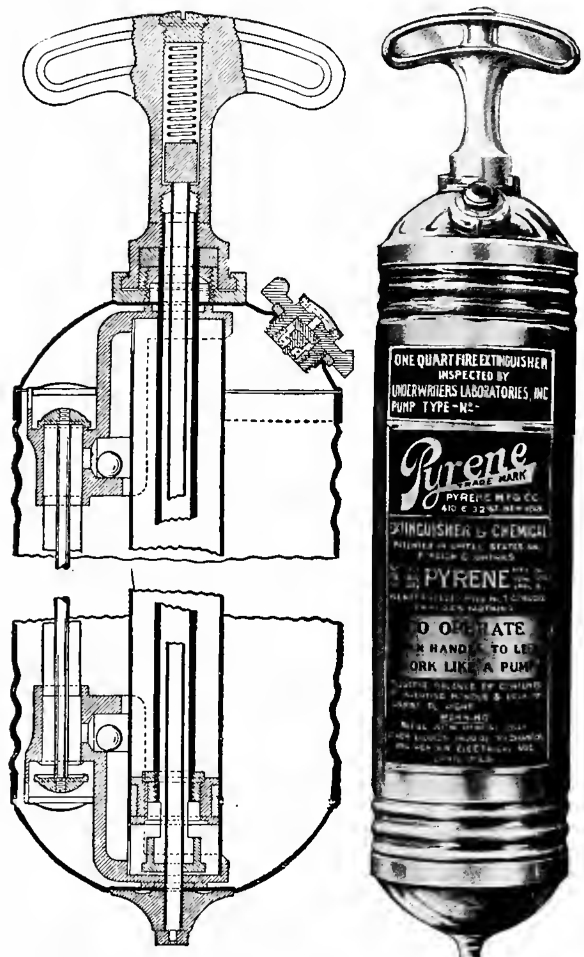


Fig. 1914—Pyrene Fire Extinguisher. Pyrene Manufacturing Company.

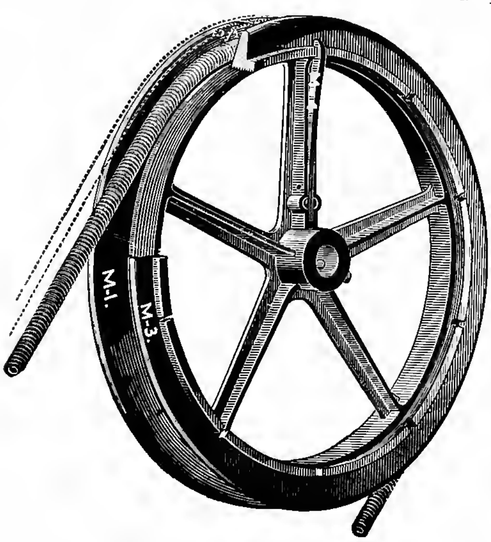


Fig. 1913—Pulley for Boyer Speed Recorder. Chicago Pneumatic Tool Company.

Fig. 1915—Carrying Case for Fusees and Torpedoes. Peter Gray & Sons.

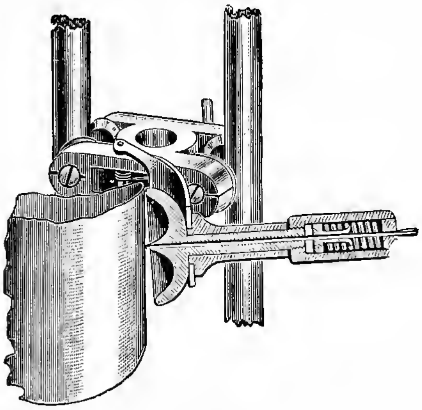


Fig. 1916—Pencil Holder for Boyer Speed Recorder. Chicago Pneumatic Tool Company.

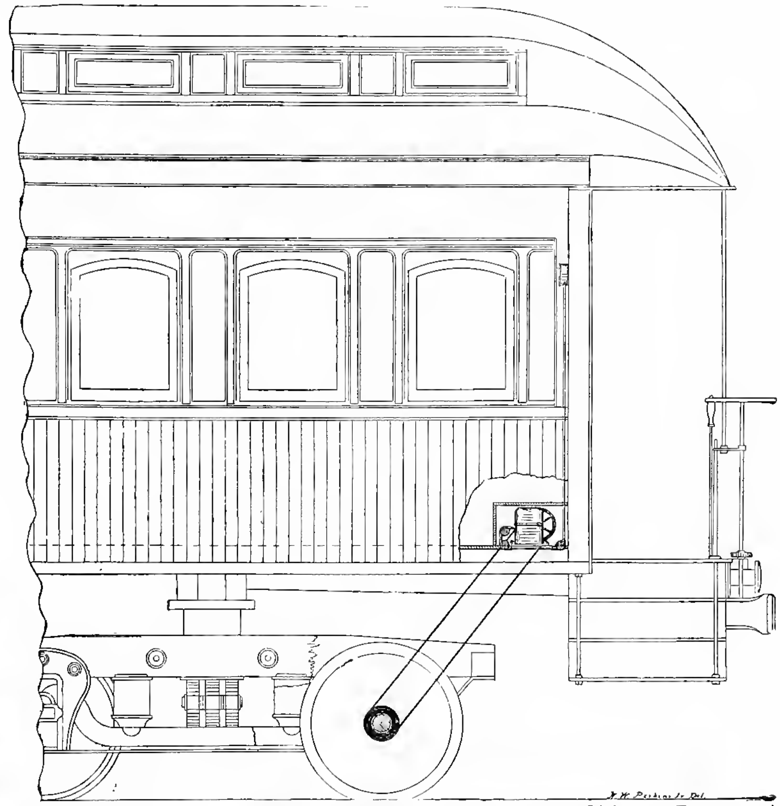


Fig. 1918—Boyer Speed Recorder Applied to Car. Chicago Pneumatic Tool Company.

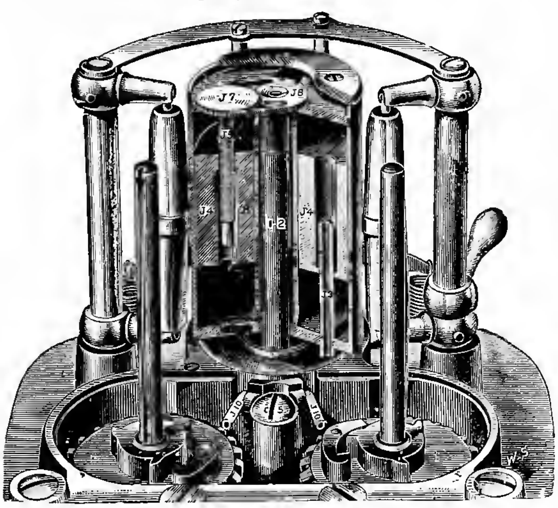


Fig. 1917—Paper Drum of Boyer Speed Recorder. Chicago Pneumatic Tool Company.

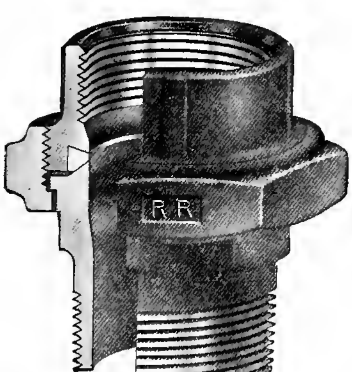


Fig. 1919—Crane Union with Outside and Inside Thread. The Crane Company.

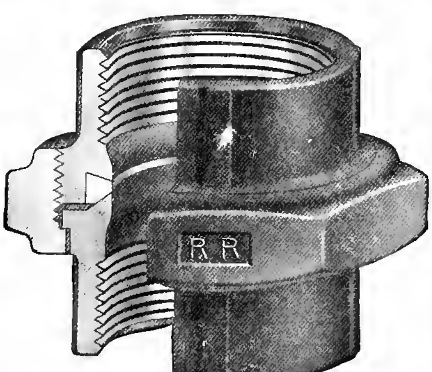


Fig. 1920—Crane Union with Inside Thread. The Crane Company.

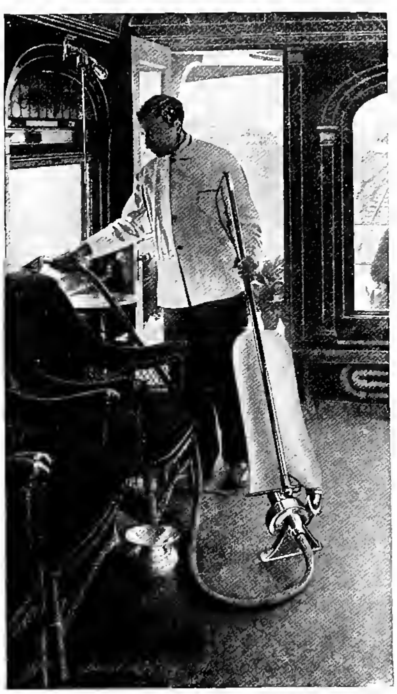


Fig. 1921—Electric Vacuum Car Cleaner. Railway Utility Company.

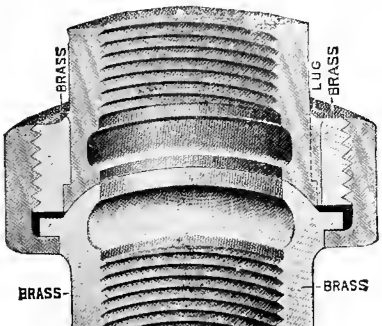


Fig. 1922—Nokoros Union.

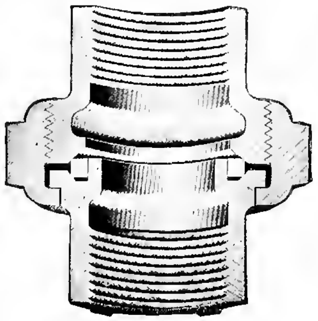


Fig. 1923—Compression Disc Union.
Company.

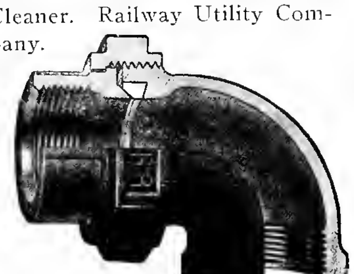


Fig. 1924—Crane Union Elbow. The Crane Company.

Fig. 1925—Metal Hose. American Metal Hose Company.

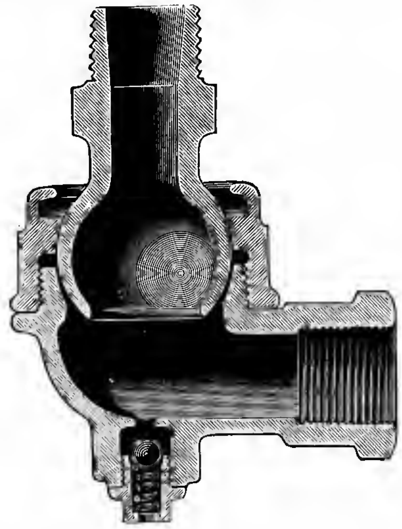


Fig. 1926—Flexible Metallic Joint. Moran Flexible Steam Joint Company.

Fig. 1927—Interlocking Metal Hose. Pennsylvania Flexible Metallic Tubing Company.

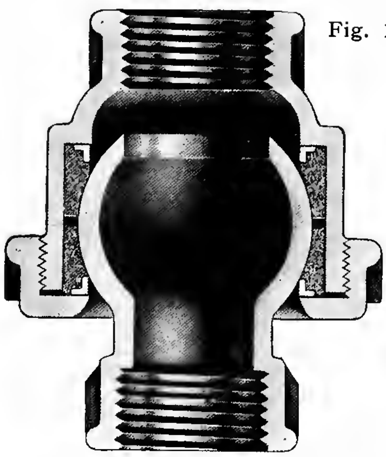


Fig. 1928—Flexible Joint. Barco Brass & Joint Company.

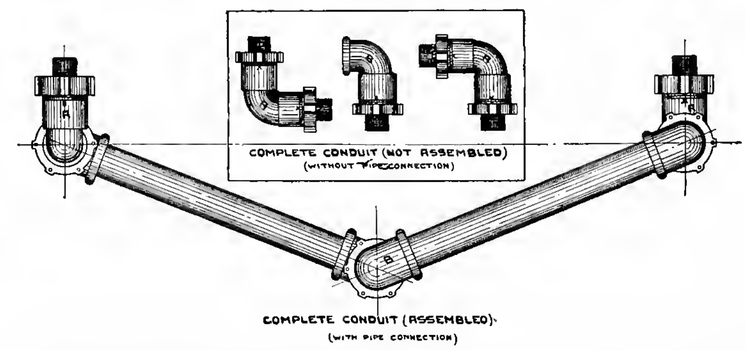


Fig. 1929—McLaughlin Flexible Metallic Joint. Franklin Railway Supply Company.

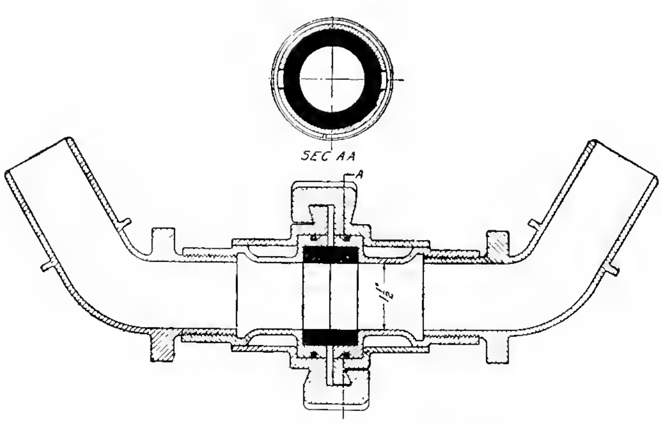


Fig. 1930—Steam Coupler. Railway Utility Company.

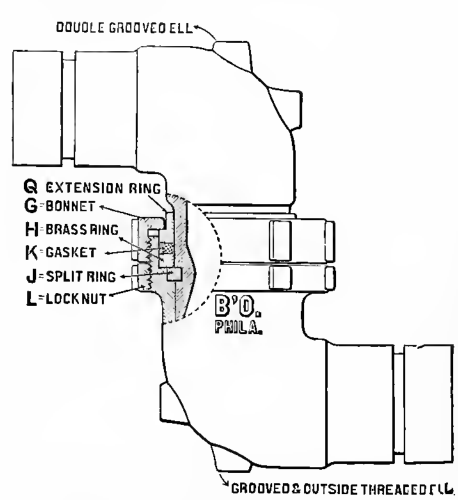


Fig. 1931—Swing Joint. L. J. Bordo Company.

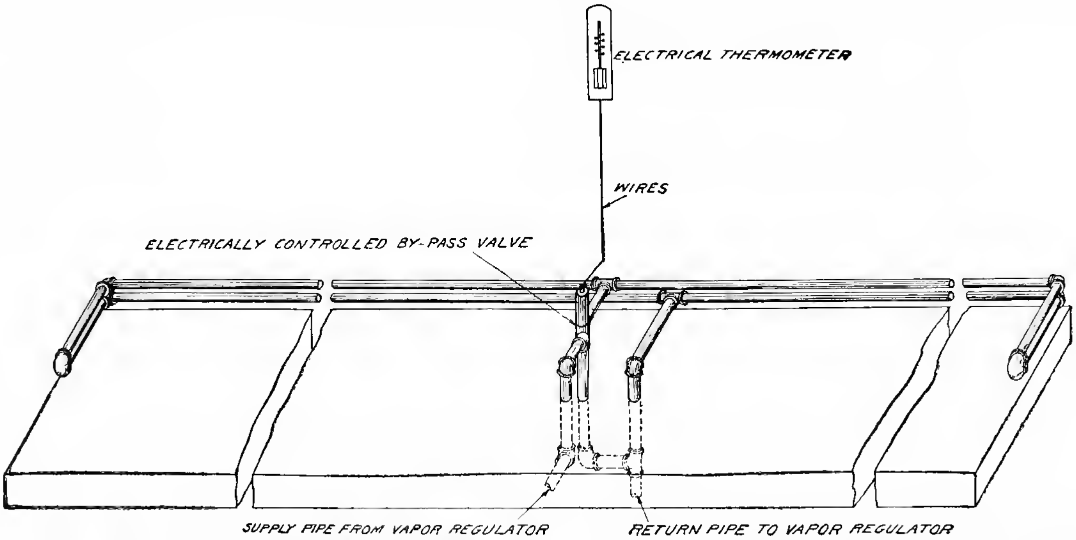


Fig. 1932—Diagram Showing Railway Utility Company's Direct Electrically Controlled By-Pass Valve for Temperature Regulation of Passenger Cars.

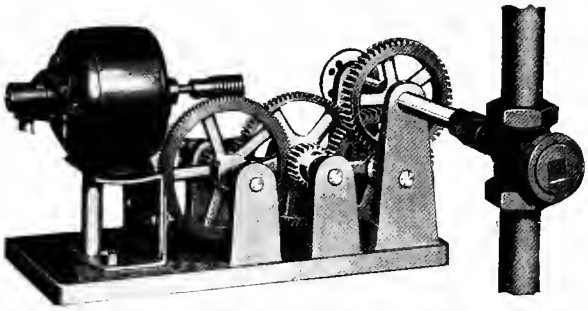


Fig. 1933—Electric Motor and Mechanism Controlling Steam Inlet Valve for Temperature Regulation of Passenger Cars. Railway Utility Company.

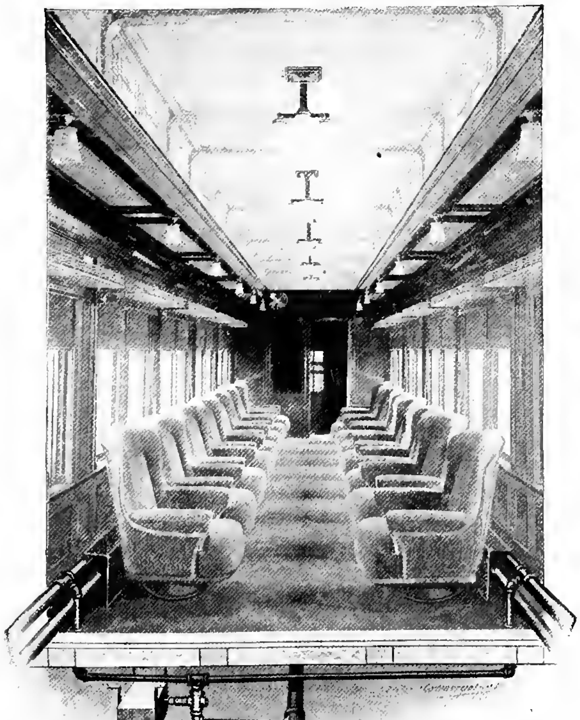


Fig. 1934—Temperature Regulating Apparatus Applied to Parlor Car. Railway Utility Company.

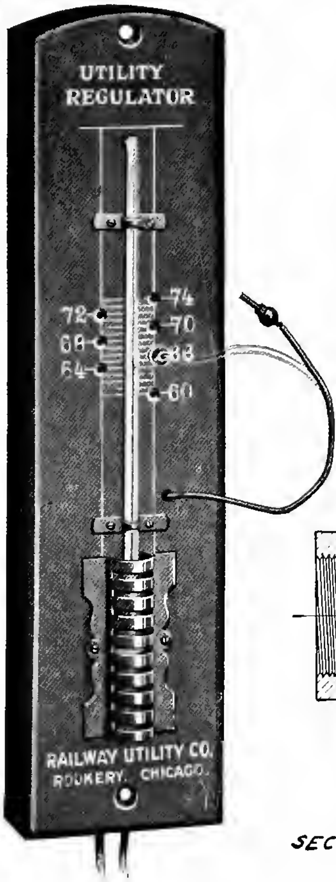


Fig. 1935—Electric Thermostat for Automatic Control of Motor Shown in Fig. 1933.

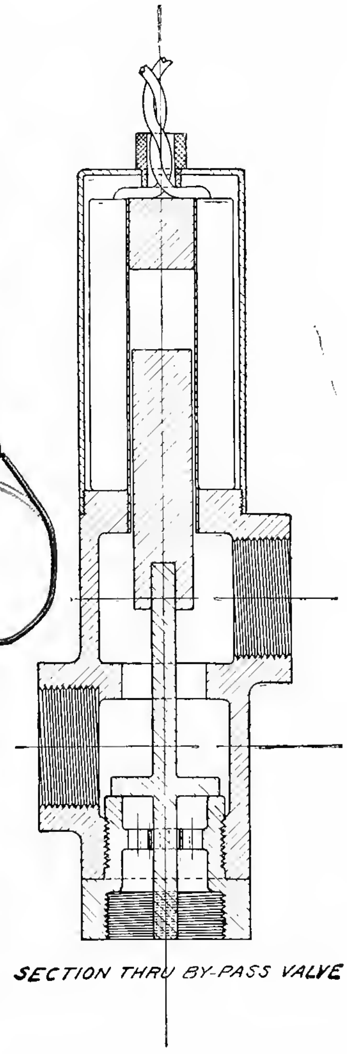


Fig. 1936—Section Through By-Pass Valve Controlled Direct from Thermostat by Solenoid. Railway Utility Company.

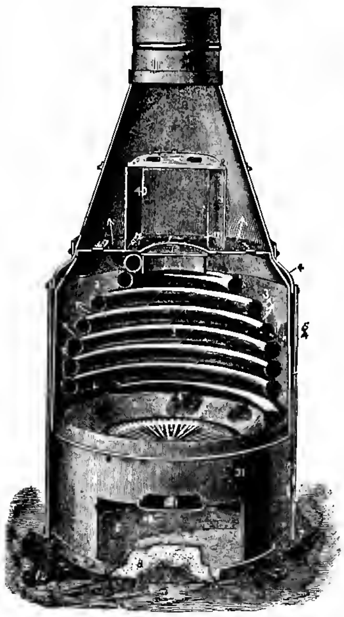


Fig. 1937—Fire-Proof Heater. W. C. Baker Car Heater Company.

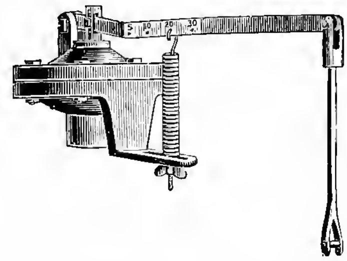


Fig. 1938—Automatic Fire Regulator and Pressure Indicator Combined for Baker's Fire-Proof Heater.

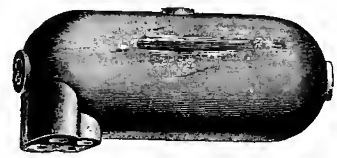
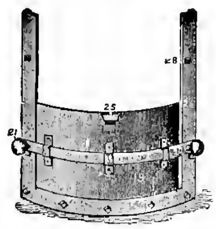
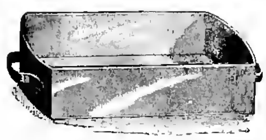


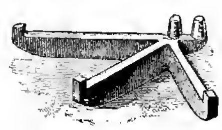
Fig. 1939—Circulating Drum for Baker's Improved Two-Coil Fire-Proof Heater.



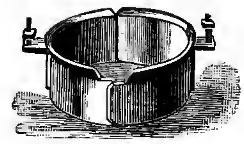
Ash Pit Door Frame.



Removable Ash Pan.



Fire Grate Support.



Coal Feed Chute.

Fig. 1940—Parts for Baker's Fire-Proof Heater.

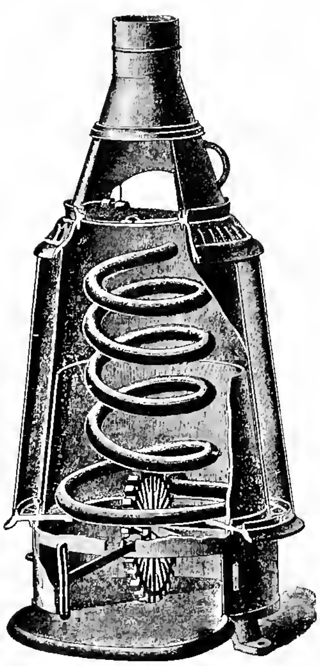


Fig. 1941—Perfected Heater.

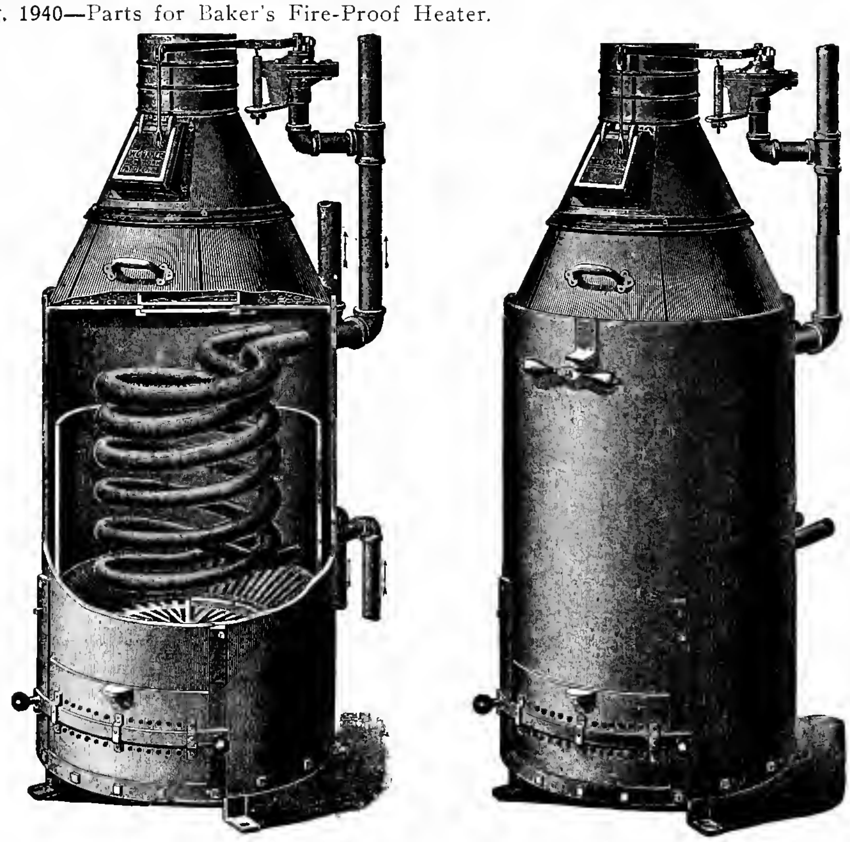


Fig. 1942—Improved Two-Coil Fire-Proof Heater.
W. C. Baker Car Heater Company.

Fig. 1943—Mighty Midget Heater.

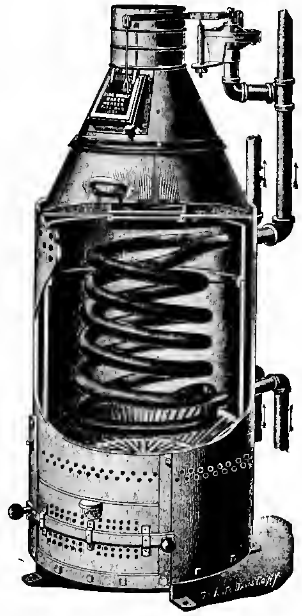


Fig. 1944—Double-Coil Fire-Proof Heater with Solid Steel Shell.

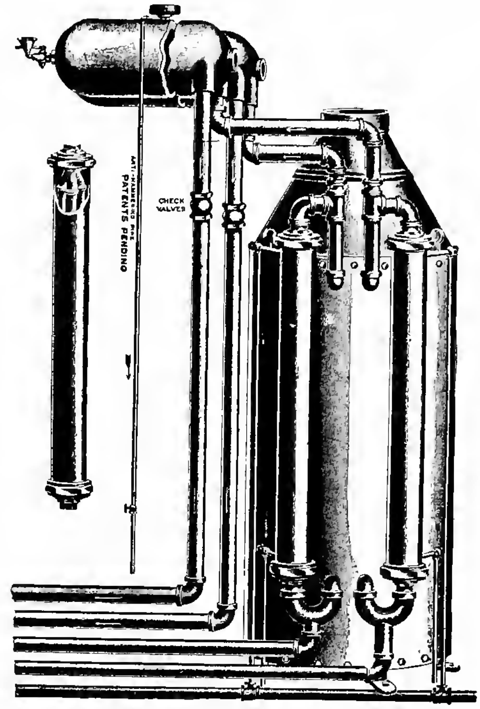


Fig. 1945—Baker Heater with Steam Attachment.

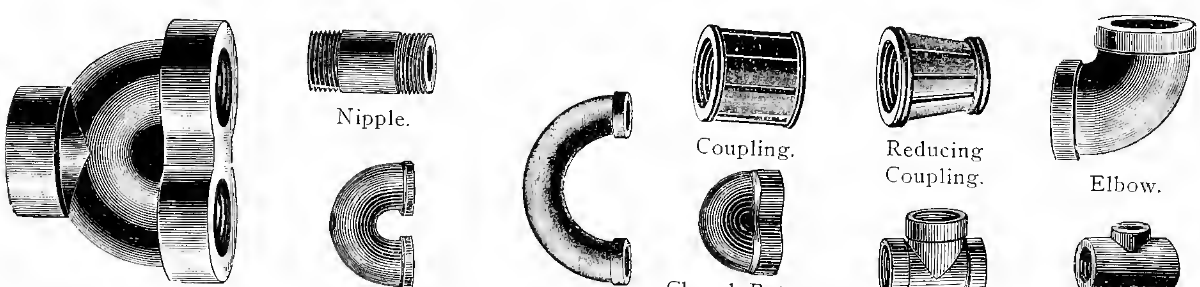


Fig. 1946—Fittings and Special Parts for Baker's Heating Apparatus.

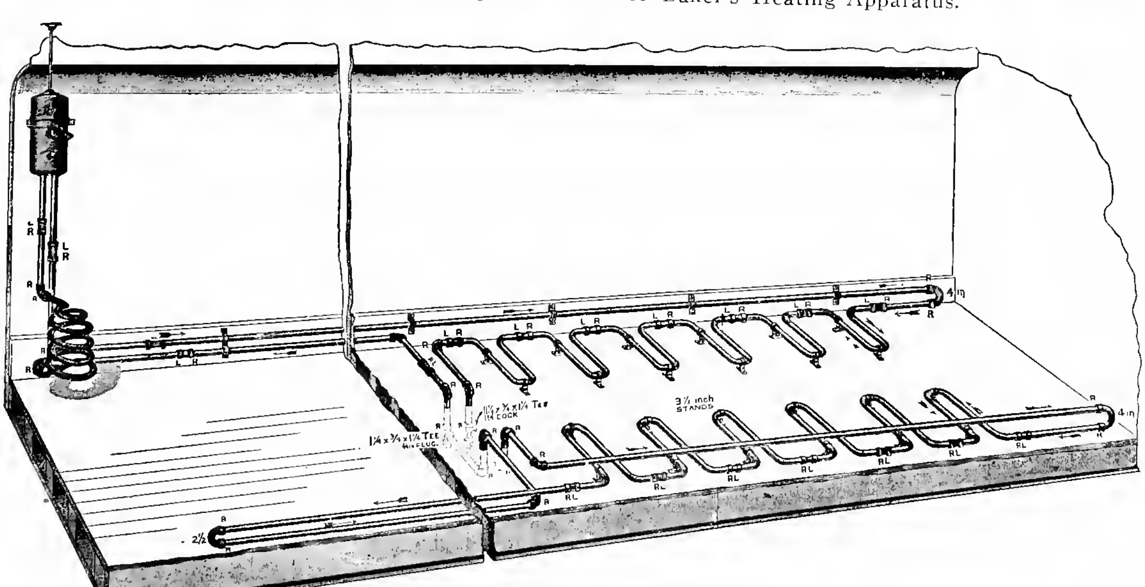


Fig. 1947—Arrangement of Piping for Passenger Cars Heated with the Baker Heater.

W. C. Baker Car Heater Company.

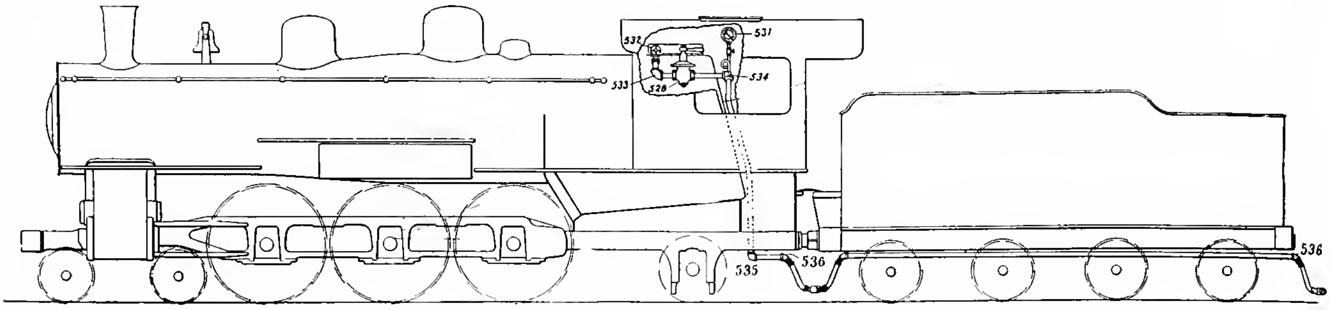


Fig. 1948—Arrangement of Gold's Heating Apparatus on Locomotive and Tender.

Parts of Locomotive and Tender Equipment, Fig. 1948.

532 *Starting Valve*
528 *Gold Improved Pressure Regulator*
531 *Steam Gauge*
533 *1½ in. Elbow*
534 *2 in. by ¼ in. by 2 in. Tee*
535 *2 in. Elbow*
536 *2 in. by 1½ in. 65 degree Elbows*
552 *2 in. R. & L. Coupling*

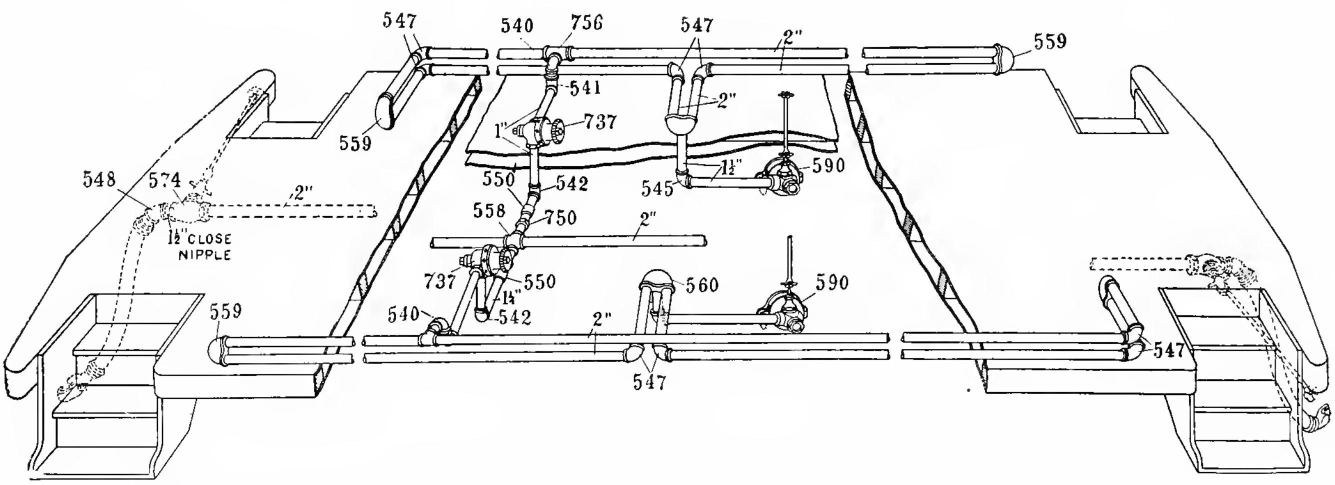


Fig. 1949—Arrangement of Gold's Direct Steam Heating System with Temperature Regulators.

Parts of Heating Apparatus, Fig. 1949.

540 *1 in. Elbows*
541 *1 in. R & L Elbows*
542 *1¼ by 1 in. Elbows*
545 *1½ in. Elbows*
547 *2 in. R & L Elbows*
548 *1½ in. 65 degree Elbows*
550 *1¼ in. R & L Couplings*
552 *2 in. R & L Couplings*
558 *2 by 2 by 1¼ by 1¼ in. Cross*
559 *2 in. R & L Return Bends*
560 *2 in. Return Bends, 1½ in. Side Outlet*
564 *Plates*
565 *Shields*
574 *Gold End Train Pipe Valves*
590 *Gold Improved Tee Traps*
737 *Gold Temperature Regulators*
750 *Strainer Nipples*
756 *2 by 2 by 1 in. Tees*

Parts of Heating Apparatus, Fig. 1950.

320 *Vapor Valves*
325 *Vapor Reservoirs*
540 *1 in. Elbows*
541 *1 in. R & L Elbows*
542 *1¼ by 1 in. Elbows*
545 *1½ in. Elbows*
547 *2 in. R & L Elbows*
548 *1½ in. 65 degree Elbows*
550 *1¼ in. R & L Couplings*
552 *2 in. R & L Couplings*
558 *2 by 2 by 1¼ by 1¼ in. Cross*
559 *2 in. R & L Return Bends*
560 *2 in. Return Bends, 1½ in. Side Outlet*
564 *Hook Plates*
565 *Pipe Shields*
566 *1 in. Supply Valves*
574 *Gold End Train Pipe Valves*
590 *Automatic Tee Traps*
750 *Strainer Nipples*
756 *2 by 2 by 1 in. Tees*

Gold Car Heating & Lighting Company.

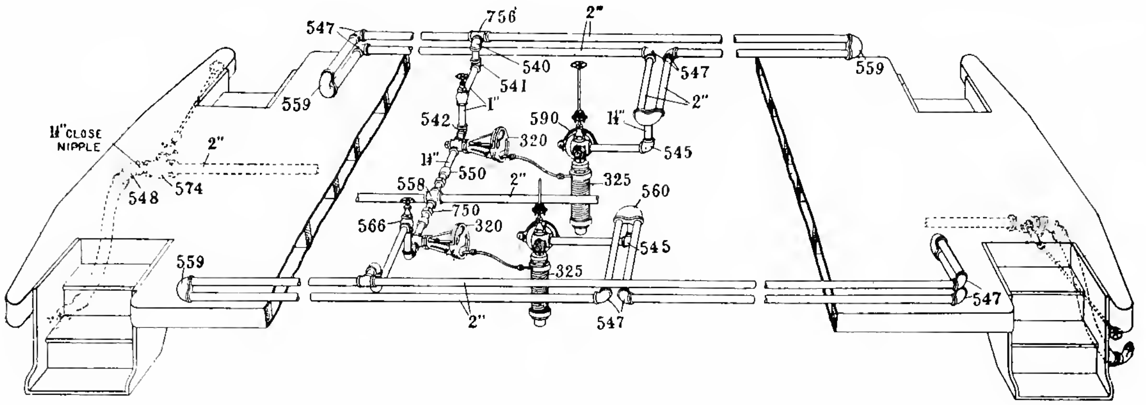


Fig. 1950—Arrangement of Gold's Combination Pressure and Vapor System for Heating Passenger Cars.

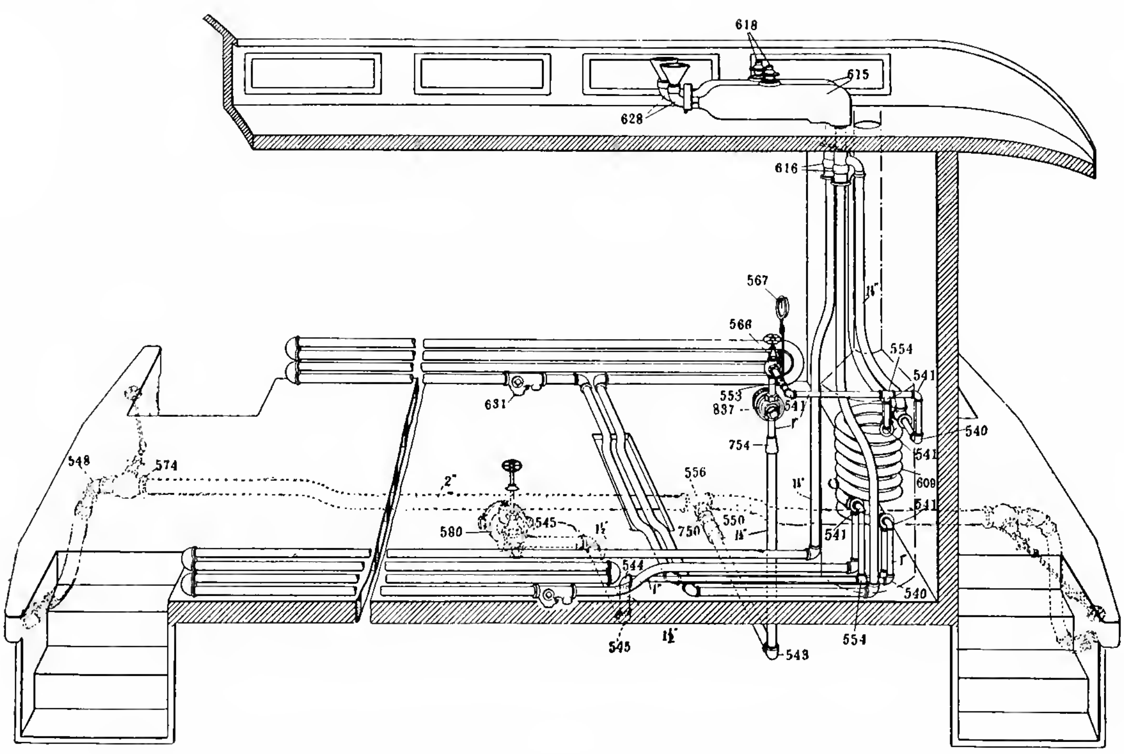


Fig. 1951—Arrangement of Gold's Improved System of Hot Water Circulation.

Parts of Heating Apparatus, Fig. 1951.

540 1 *in. Elbows*
541 1 *in. R & L Elbows*
543 1¼ *in. R & L Elbows*
544 1½ *by* 1 *in. Elbows*
545 1½ *in. Elbows*
548 1½ *in.* 65 *degree Elbows*
549 1 *in. R & L Couplings*
550 1¼ *in. R & L Coupling*
552 2 *in. R & L Couplings*
553 1 *by* 1 *by* ¼ *in. Tee*
556 2 *by* 2 *by* 1¼ *in. Tee*
566 1 *in. Supply Valve*
567 120 *lb. Steam Gauge*
574 *Gold End Train Pipe Valves*
590 *Tee Trap*
609 *Large Heater Coil*
616 *Sealed Jets*
618 *Ideal Safety Valves*
631 *Filling Devices*
750 *Strainer Nipple*
754 1¼ *by* 1 *in. Reducer*
837 *Gold Temperature Regulator*

Gold Car Heating & Lighting Company.

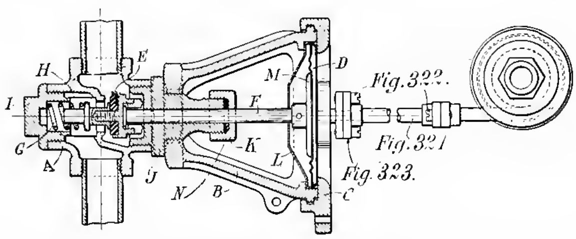


Fig. 1952—Reservoir Type Automatic Vapor Regulating Valve.

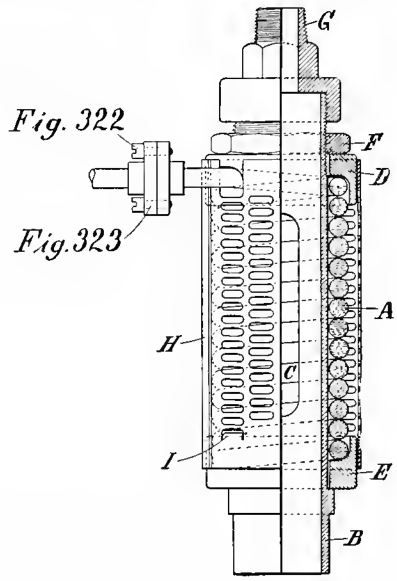


Fig. 1953—Vapor Reservoir.

Parts of Regulating Valve, Fig. 1952.

A	*Body*	J	*Bonnet*
B	*Diaphragm Case*	K	*Packing Nut*
C	*Diaphragm Case Cover*	L	*Diaphragm Shield*
D	*Diaphragm*	M	*Diaphragm Plate*
E	*Valve*		*Fig. 321.—¼ in. Copper Pipe with Flanges*
F	*Valve Stem*		*Fig. 322.—Flange Screws*
G	*Spring*		*Fig. 323.—Pipe Flange*
H	*Strainer*		
I	*Bottom Plug*		

Parts of Reservoir, Fig. 1953.

A	*Copper Coil*	F	*Lock Nut*
B	*Slotted Pipe*	G	*2 in. by 1 in. Connector*
D	*Top Cap*	H	*Coil Shield*
E	*Bottom Cap*		*See also Fig. 1952*

Parts of Regulating Valve, Fig. 1954.

A	*Body*	N	*Diaphragm*
B	*Door*	O	*Cam*
C	*Valve Body*	P	*Link*
D	*Bottom Plug*	Q	*Valve Stem Screw*
E	*Screen*	R	*Diaphragm Plate*
F	*Disc Nut*	S	*Adjusting Screw Plate*
G	*Disc Holder*	T	*Rivets*
H	*Valve Seat Nut*	U	*Hinge Pin*
I	*Bonnet*	V	*Disc*
J	*Packing Nut*	W	*Body Bolt Nuts*
K	*Valve Stem*	X	*Body Bolts*
L	*Lock Nut*	Y	*Cotters*
M	*Adjusting Screw*	Z	*Spring*

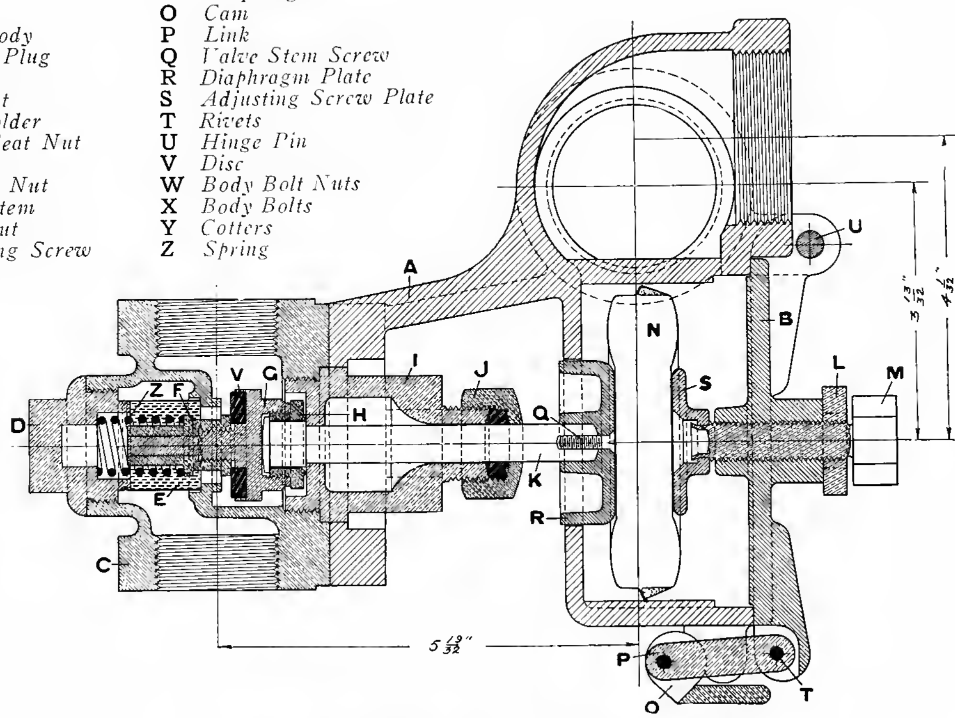


Fig. 1954—Excelsior Vapor Regulating Valve.

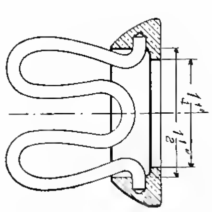


Fig. 1955—Coupler Gasket.

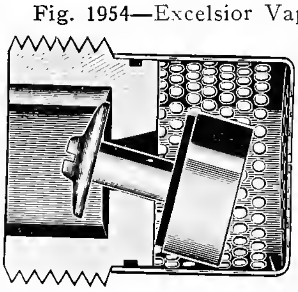


Fig. 1956—Improved Gravity Relief Trap.

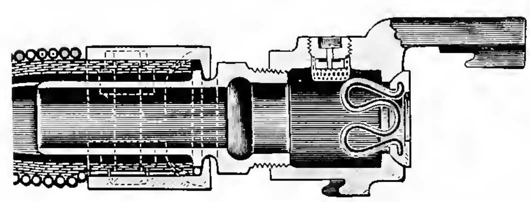


Fig. 1957—Improved Gravity Relief Trap and Gasket Applied to Coupler.

Gold Car Heating & Lighting Company.

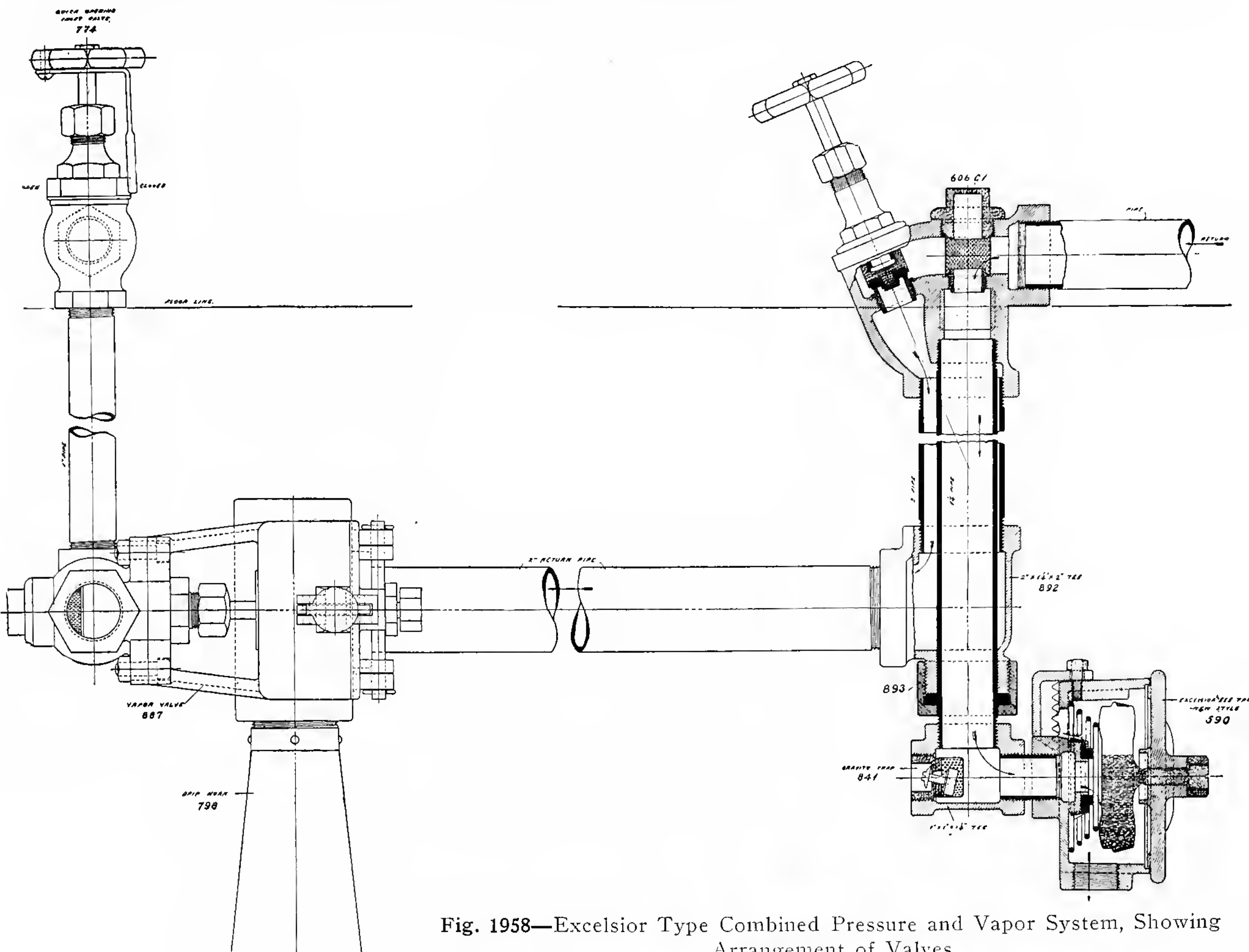


Fig. 1958—Excelsior Type Combined Pressure and Vapor System, Showing Arrangement of Valves.

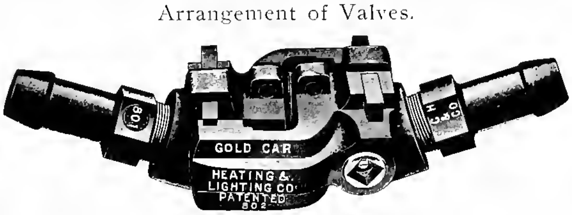


Fig. 1959—Hose Couplers, Showing Method of Locking.

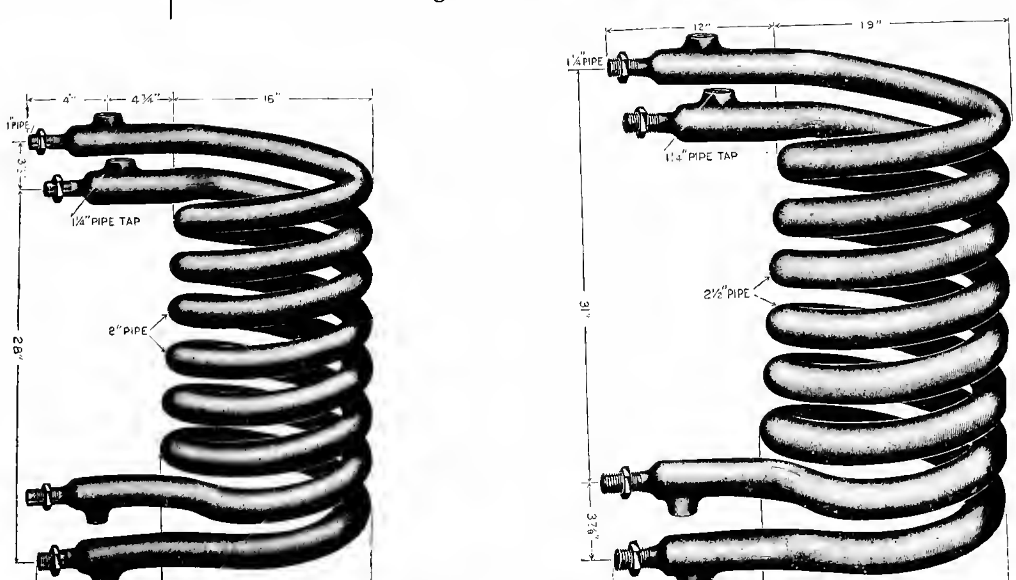
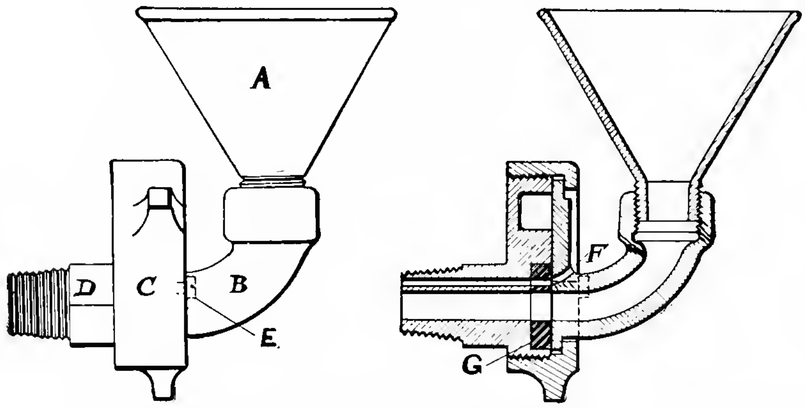
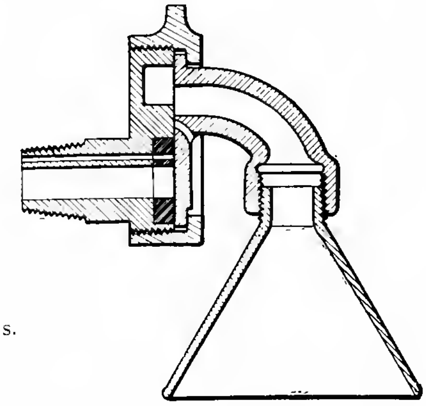


Fig. 1960—Improved Double Duplex Coils with Welded Ends, for Hot Water Circulation. Gold Car Heating & Lighting Company.



Open.

Fig. 1961—Filling Cock for Hot Water Circulating Apparatus.



Closed.

Parts of Filling Cock, Fig. 1961.

A *Funnel*
B *Elbow*
C *Lock Nut*
D *Body*
E *Set Screw*
F *Vent*
G *Seat*

Parts of Safety Valve, Fig. 1962.

A *Composition Ball*
B *Cap*
C *Body*
D *Cup*
E *Set Screws*
F *Spring*
G *Inlet from Drum*
H *Valve Seat*

Parts of Temperature Regulator, Fig. 1964.

A *Body*
B *Dome*
C *Top Spring*
D *Regulating Screw*
E *Set Screw*
G *Wheel*
H *Indicator Spring*
I *Washer*
J *Top Flange*
K *Bottom Flange*
L *Auxiliary Valve Spindle*
M *Main Valve Spindle*
N *Bottom Spring*
P *Bottom Plug*
T *Spanner Nut*
U *Diaphragm*
V *Strainer*
W *Lock Nut*

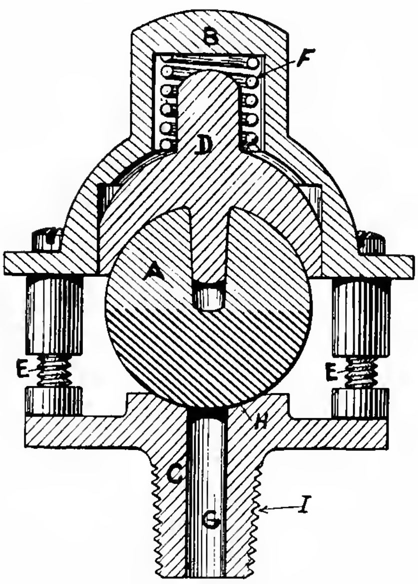


Fig. 1962—Ideal Safety Valve.

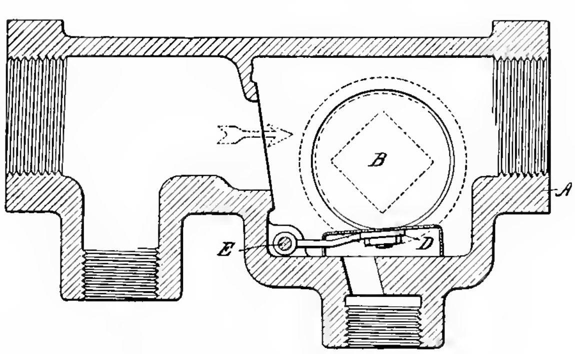


Fig. 1963—Filling Device No. 631.

Parts of Filling Device, Fig. 1963.

A *Body*
B *Body Cap*
D *Clapper Arm*
E *Hinge Pin*

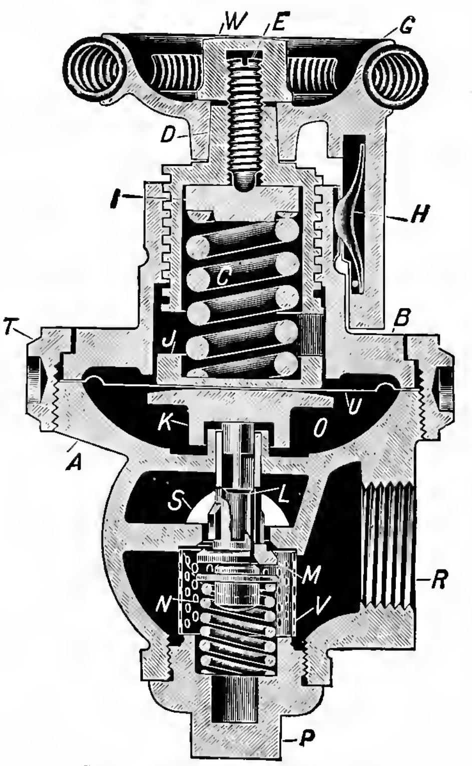


Fig. 1964—Stop Valve Temperature Regulator.

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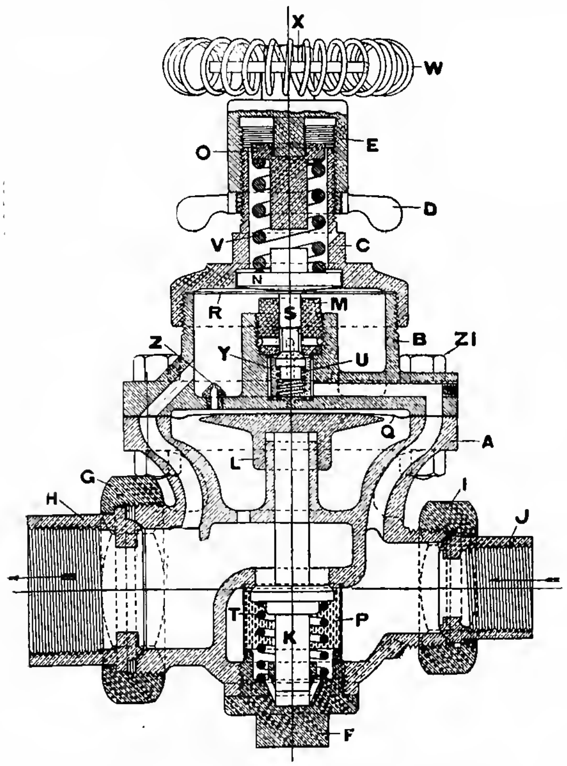

Fig. 1965—Ideal Pressure Regulator.

Parts of Pressure Regulator, Fig. 1965.

- **A** *Body*
- **B** *Dome*
- **C** *Spring Case*
- **D** *Lock Nut*
- **E** *Adjusting Screw*
- **F** *Bottom Plug*
- **G** *Outlet Union Nut*
- **H** *Outlet Union Nipple*
- **I** *Inlet Union Nut*
- **J** *Inlet Union Nipple*
- **K** *Main Valve*
- **L** *Lower Diaphragm Plate*
- **M** *Controlling Valve Plug*
- **N** *Top Diaphragm Plate*
- **O** *Top Spindle*
- **P** *Bottom Strainer*
- **Q** *Main Diaphragm*
- **R** *Controlling Diaphragm*
- **S** *Controlling Valve*
- **T** *Bottom Spring*
- **U** *Controlling Valve Spring*
- **V** *Regulating Spring*
- **W** *Hand Wheel*
- **X** *Hand Wheel Nut*
- **Y** *Top Strainer*
- **Z** *Vent Plug*
- **Z1** *Bolts and Nuts*

Fig. 1966—Nipple for 1⅝ in. Inside Diameter Hose.

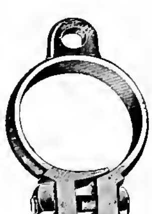

Fig. 1967—Hose Band.

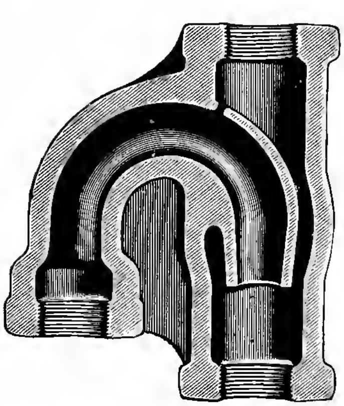

Fig. 1968—Accelerator.

Parts of Trap, Fig. 1969.

- **A** *Automatic Valve*
- **A_1** *Disc for Automatic Valve*
- **B** *Blow-off Valve*
- **B_1** *Disc for Blow-off Valve*
- **C** *Cast Iron Trap Head*
- **D** *Strainer for Valve A*
- **E** *Valve Stem*
- **F** *Expansive Diaphragm*
- **G** *Set Screw for Adjusting Trap*
- **H** *Outlet Ports of Trap, Four*
- **I** *Cam Lock for Cover M*
- **J** *Diaphragm Casing Ventilating Holes*
- **K** *Blow-off Discharge Shield*
- **L** *Cast Iron Casing*
- **M** *Hinged Cover for Trap Casing*
- **N** *Hooks to Prevent Diaphragm Shifting*
- **O** *Bottom Plate*
- **O_1** *Top Plate*
- **P** *Outside Tube*
- **Q** *Inside Tube*
- **R** *Blow-off Discharge Passage*
- **S** *Automatic Valve Discharge Passage*
- **T** *Automatic Valve Guides*
- **U** *Automatic Valve Stem Guides*
- **V** *Spring Catch*
- **W** *Brass Valve Seats*
- **X** *Lock Nut*
- **Y** *Slot for Spring Catch*
- **Z** *Bonnet of Blow-off Valve*

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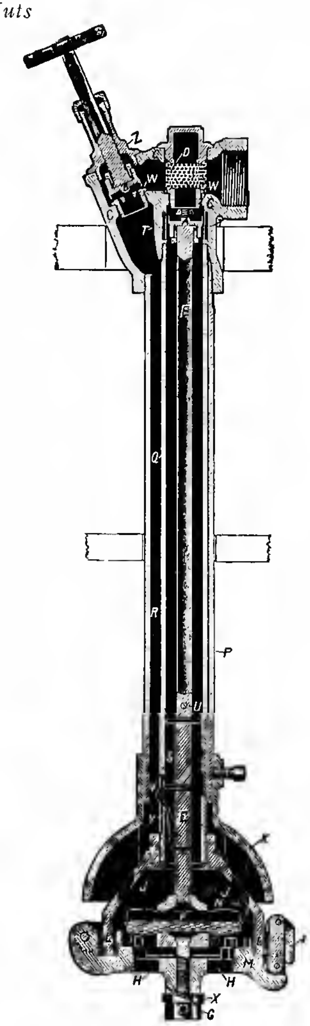
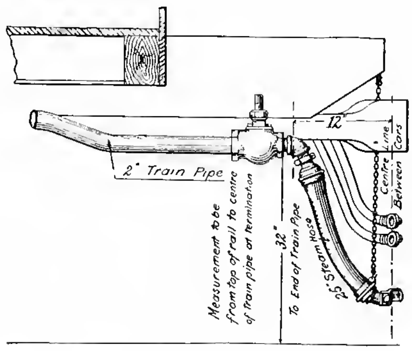


Fig. 1969—Improved Vertical Trap No. 607.



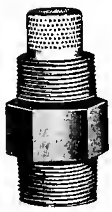


Fig. 1970—Strainer Nipple for 1¼ in. Train Line.

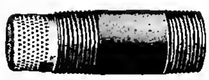


Fig. 1971 — Strainer Nipple for 1 in. Train Line.

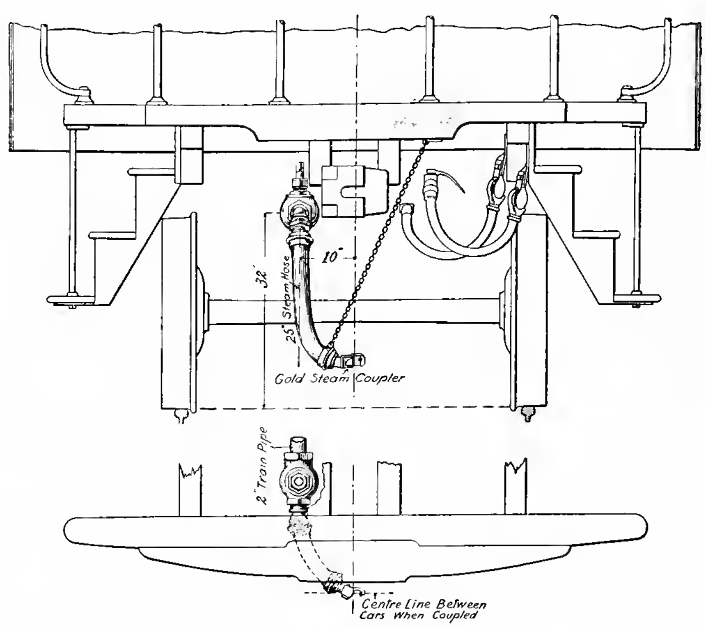
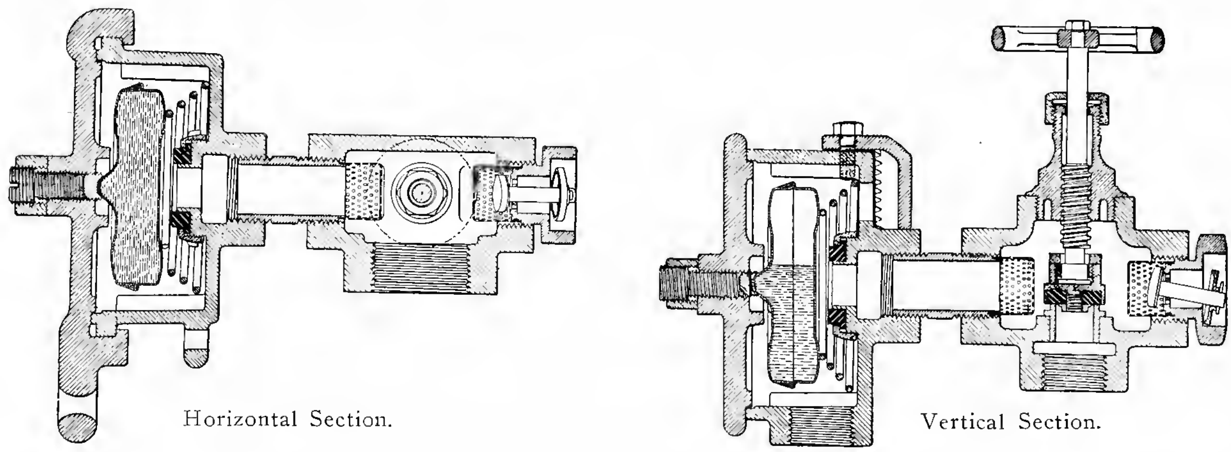


Fig. 1972—Location of Universal Straight Port Steam Coupler on Car.



Horizontal Section. Vertical Section.

Fig. 1973—Improved Automatic Tee Trap No. 590.

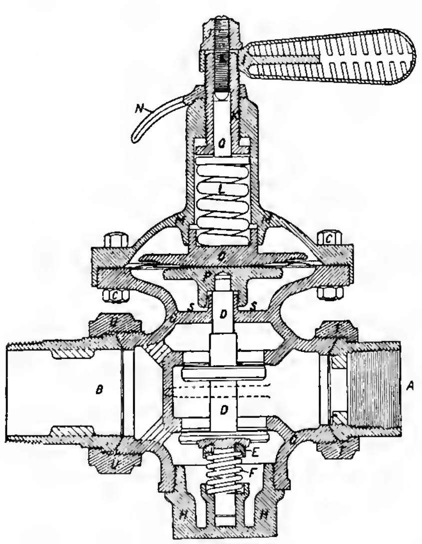


Fig. 1974—Improved Balance Valve Pressure Regulator No. 529.

Parts of Pressure Regulator, Fig. 1974.

A *1½ in. Inlet Union Nipple*
B *2 in. Outlet Union Nipple*
C *Bolts and Nuts for Dome and Body*
D *Balance Spindle*
E *Oscillating Washer*
F *Bottom Spring*
G *Body*
H *Bottom Plug*
I *Handle*
J *Top Nut*
K *Hollow Screw*
L *Top Spring*
M *Dome*
N *Lock Nut*
O *Top Flange*
P *Bottom Flange*
Q *Top Spindle*
R *Set Screw*
T *1½ in. Inlet Union Nut*
U *2 in. Outlet Union Nut*

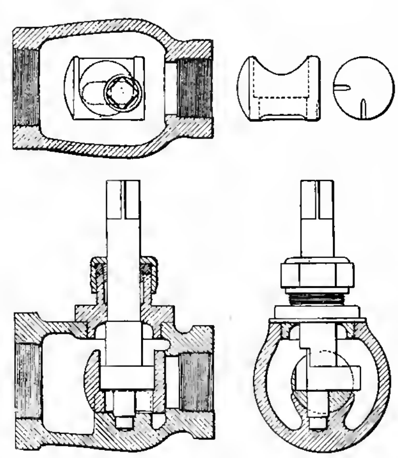


Fig. 1975—Improved End Train Pipe Valve.

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Fig. 1976—Electric Heater Knife Switch.

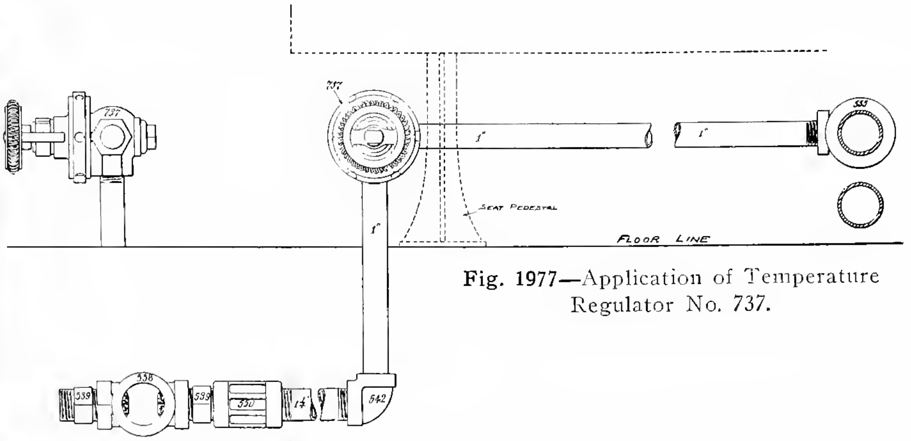


Fig. 1977—Application of Temperature Regulator No. 737.

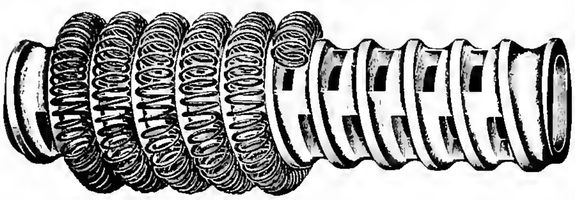


Fig. 1978—Ventilated Porcelain Core for Electric Heater.

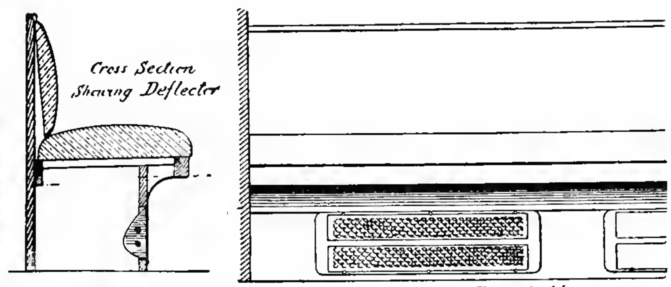


Fig. 1979—Arrangement of Electric Panel Heaters and Deflectors in Car.

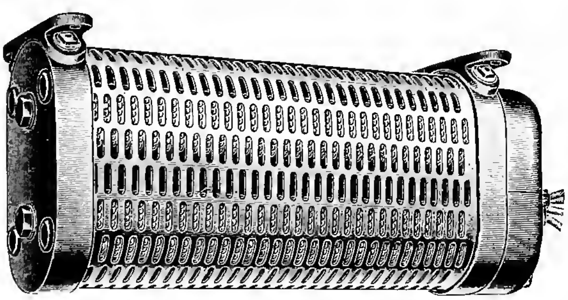


Fig. 1980—Two Coil Cross Seat Electric Heater with Junction Box.

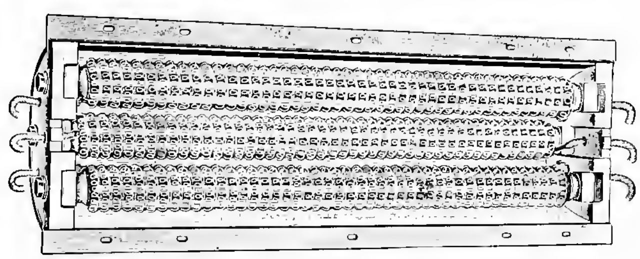
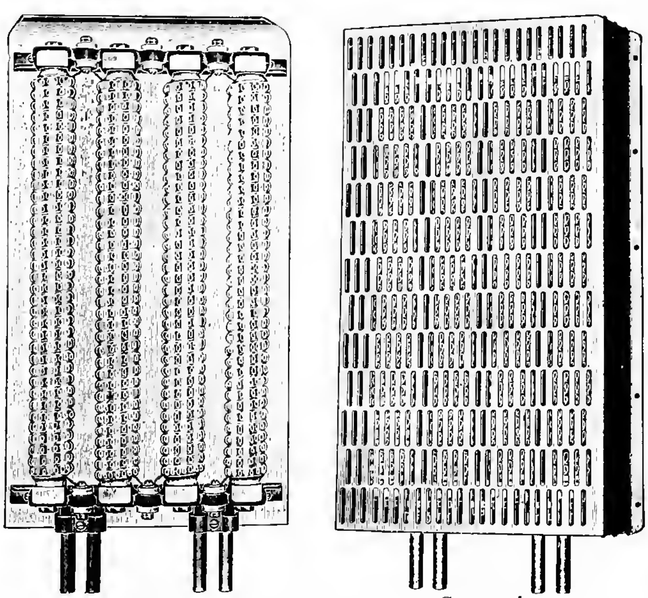


Fig. 1981—Three Coil Panel Electric Heater.

Fig. 1982—Resistance Coil and Support Used in Improved Electric Heaters.



Interior. Covered.

Fig. 1983—Four-Coil Electric Vestibule Heater.

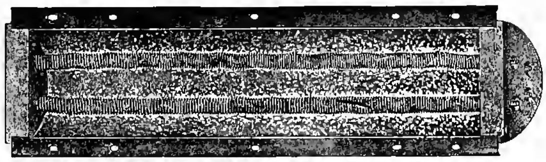
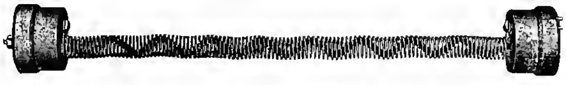


Fig. 1984—Interior View of Improved Electric Panel Type Heater, Three Degrees.



Interior.

Front View.

Fig. 1985—Improved Standard Electric Heater, One Degree.

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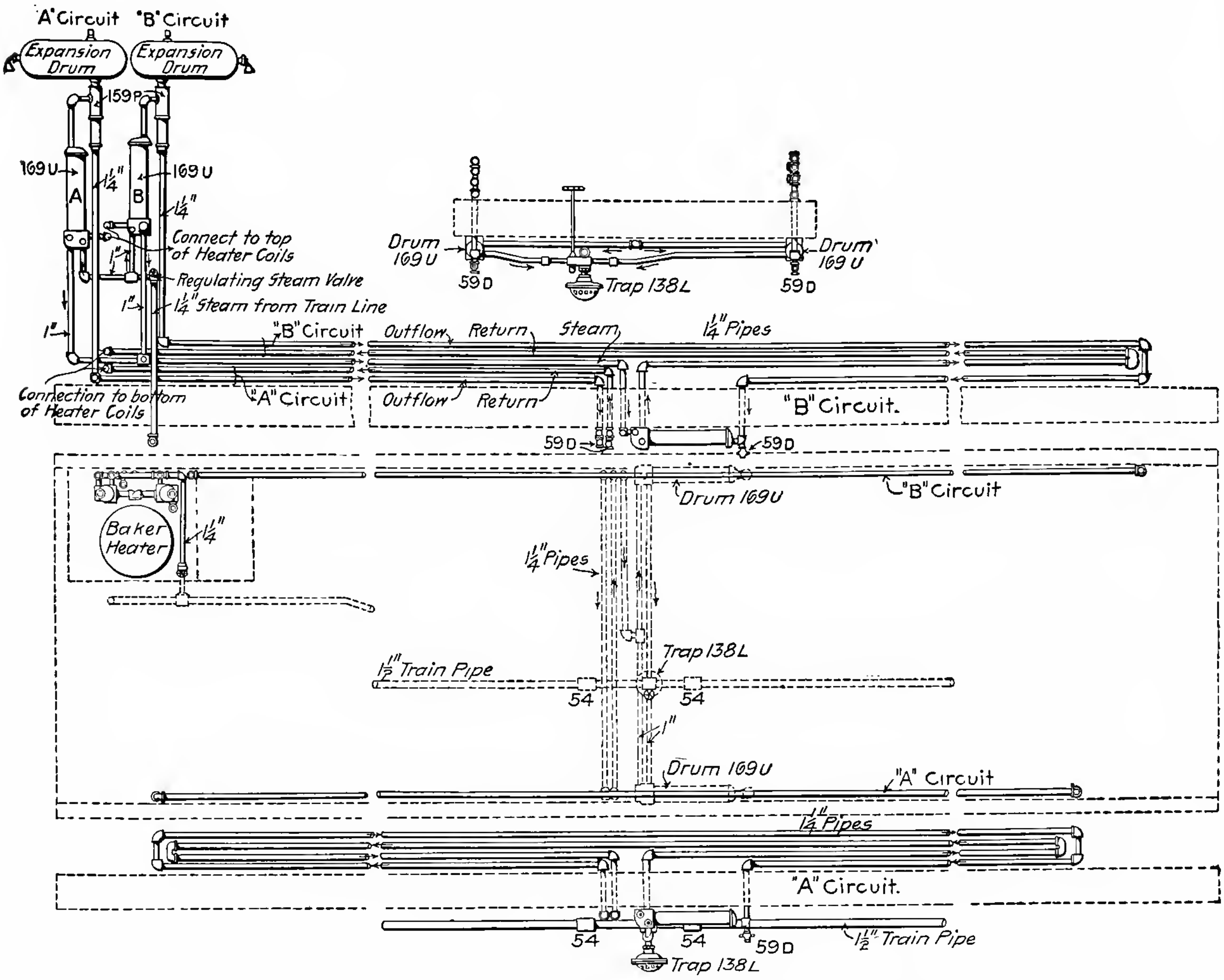

Fig. 1986—Piping Showing Application of Consolidated Steam Drum No. 169U to Double Circuit.

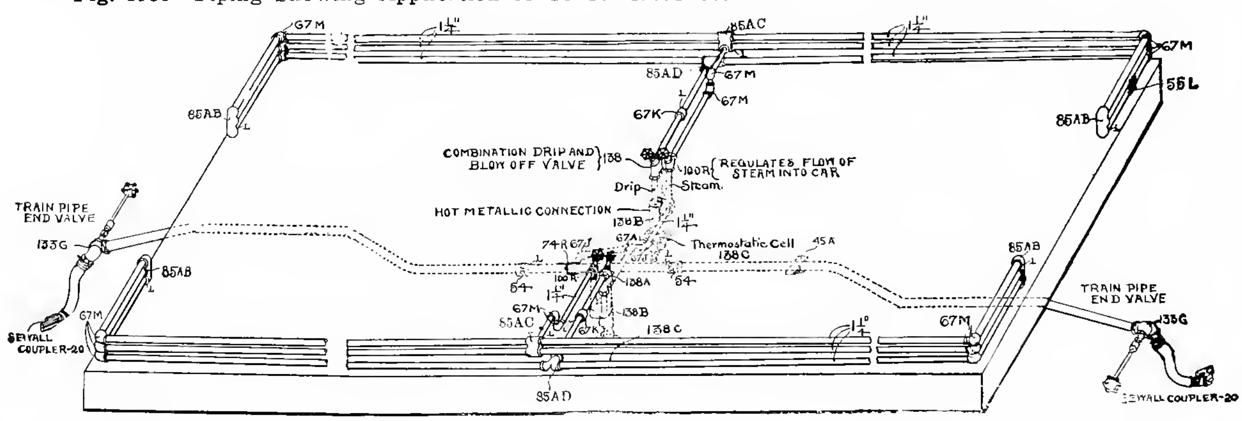

Fig. 1987—Piping for Direct Steam System C, Showing 3-Pipe System with Two Traps No. 138L.

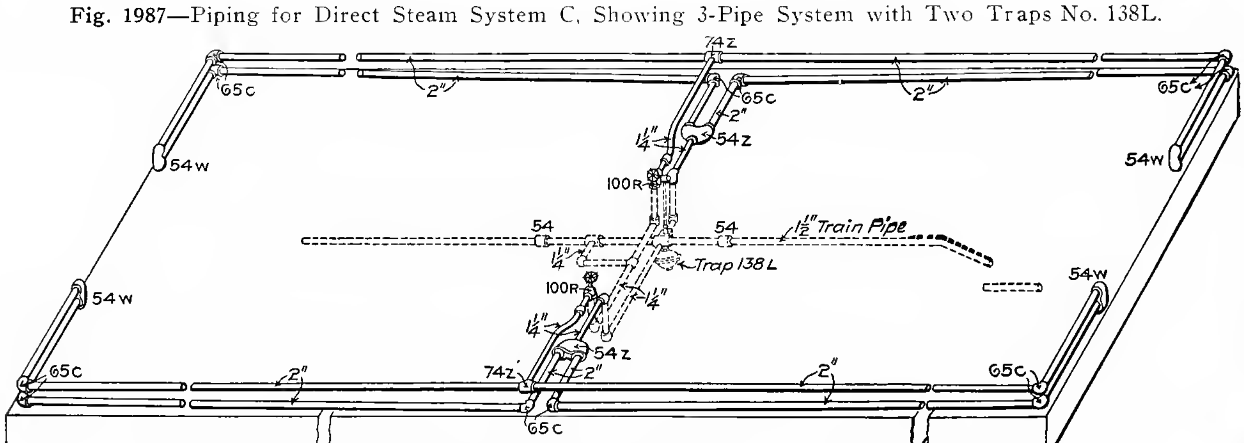

Fig. 1988—Piping for Direct Steam System B, with One Thermostatic Trap No. 138L.

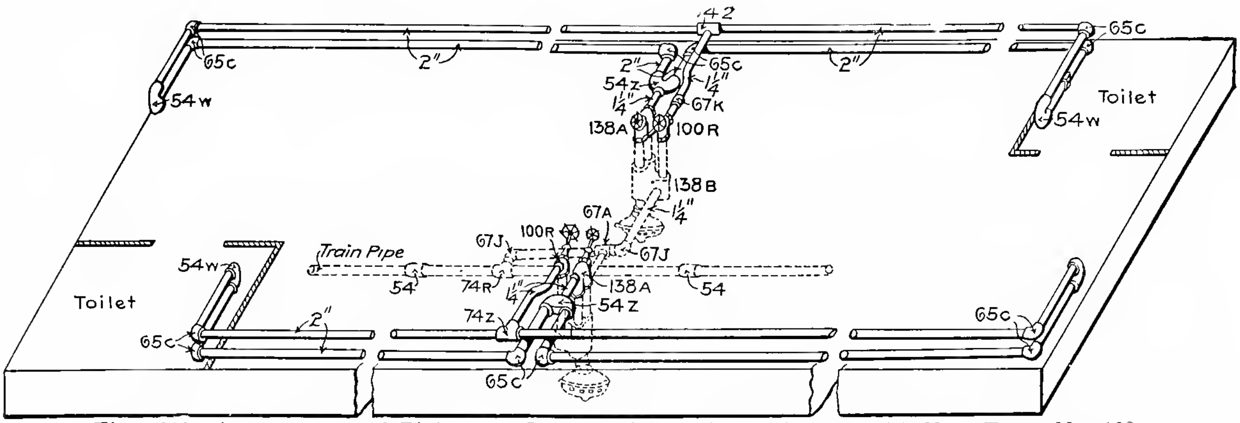

Fig. 1989—Arrangement of Piping for Standard Direct Steam System with Two Traps No. 138.

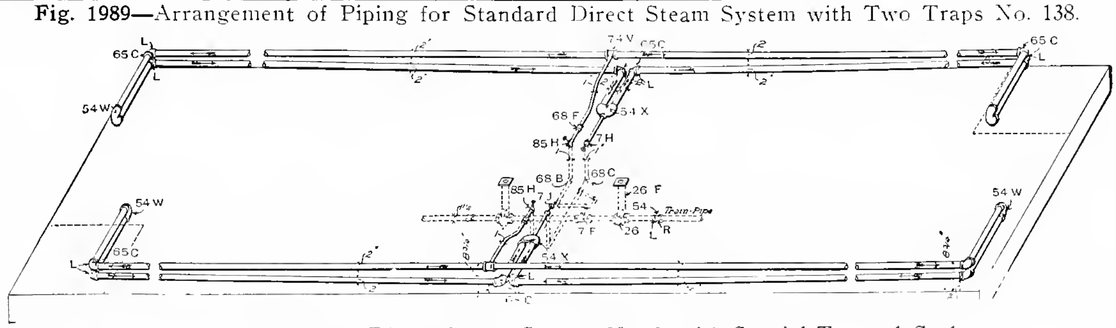

Fig. 1990—Arrangement of Piping for Direct Steam System No. 2, with Special Tee and Cock.

Parts of Heating Apparatus, Figs. 1986-1990.

- **7F** *Tee with Drip Connection*
- **7H** *Angle Trap Valve*
- **7J** *Eccentric Tee*
- **20** *Sewall Coupler*
- **26** *Asbestos Packed Cock*
- **26F** *Round Spindle*
- **26G** *Floor Plate for 26 F*
- **45A** *1½ in. Pipe Clamp*
- **54** *Coupling, R. & L.*
- **54W** *Return Bend*
- **54X** *Return Bend*
- **54Z** *Return Bend with Eccentric Outlet*
- **55L** *Expansion Bracket*
- **68C** *R. & L. Elbow*
- **67A** *Tee*
- **67J** *R. & L. Elbow*
- **67K** *R. & L. Couplings*
- **67M** *Elbow*
- **68B** *Elbow*
- **68C** *R. & L. Elbow.*
- **68F** *R. & L. Coupling*
- **74R** *Tee*
- **74V** *Tee*
- **74Z** *Tee*
- **85AB** *Three-Pipe Manifold*
- **85AC** *Center Tee*
- **85AD** *Return Tee*
- **85H** *Graduating Steam Angle Valve*
- **100R** *Graduating Steam Valve*
- **133G** *End Train Pipe Valve*
- **138** *Steam Trap*
- **138A** *Steam Trap*
- **138B** *Steam Trap*
- **138C** *Steam Trap*
- **138L** *Steam Trap*

Fig. 1991—Graduating Steam Valve No. 85H.

Fig. 1992—End Train Pipe Valve No. 200.

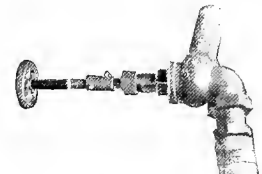

Fig. 1993—End Train Pipe Valve No. 133G.

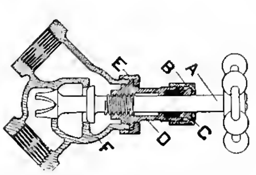

Fig. 1994 — Graduating Steam Valve No. 85H.

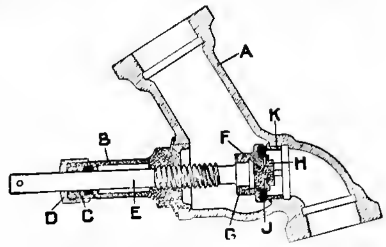

Fig. 1995—End Train Pipe Valve No. 200.

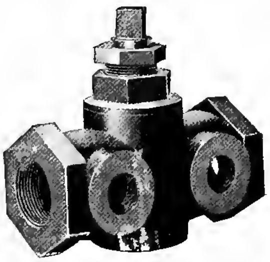

Fig. 1996—Filler Cock No. 121.

Parts of Valve, Fig. 1995.

- **A** *Body Casting* 200*A*
- **B** *Bonnet* 195*B*
- **C** *Gland* 133*GC*
- **D** *Gland Nut* 133*GD*
- **E** *Stem* 133*GE*
- **F** *Swivel Head* 133*GG*
- **G** *Swivel Head Nut* 133*GH*
- **H** *Gasket Nut* 133*GJ*
- **J** *Gasket* 133*GK*
- **K** *Brass Seat* 195*D*

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Fig. 1997—Current Director No. 59R.

Fig. 1998—Safety Valve No. 59C.

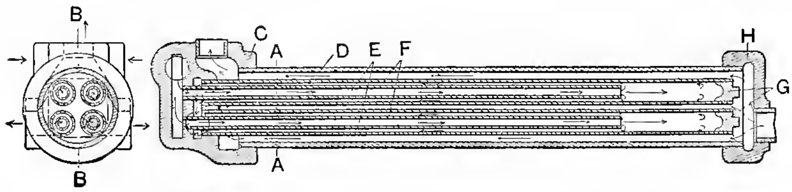


Fig. 1999—Section Through Steam Drum No. 169U.

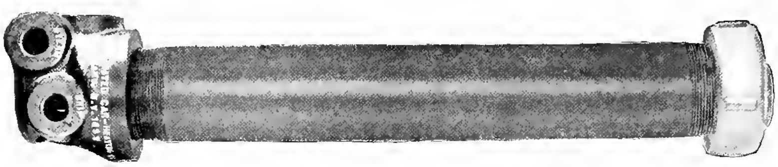


Fig. 2000—Steam Drum No. 169U.

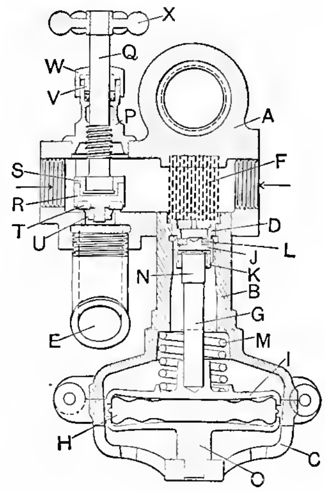


Fig. 2001—Section Through Steam Trap No. 138R.

Parts of Steam Drum, Fig. 1999.

C	*Head Casting*	*169V*	F	*1 in. Brass Pipe*	*169P*
D	*3½ in. Iron Pipe*	*169N*	G	*Plug for F*	*169L*
E	*1½ in. Brass Pipe*	*169R*	H	*Cap Casting*	*169K*

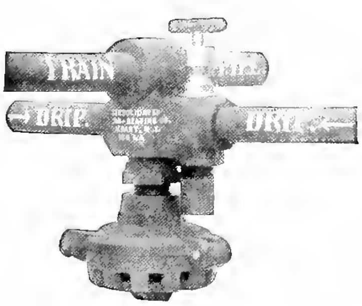


Fig. 2002—Steam Trap No. 138L.

Parts of Steam Trap, Fig. 2001.

A	*Body Casting*	*138RA*	L	*Swivel Head Gasket*	*138CL*
B	*Upper Basket Casting*	*138RB*	M	*Spring*	*138CM*
C	*Lower Basket Casting*	*138CU*	N	*Cap for Valve Stem*	*138CR*
D	*Brass Seat for Thermostatic Valve*	*138RC*	O	*Lower Spider Plate*	*138CW*
E	*Curved Nipple for Blow-off*	*138RD*	P	*Bonnet*	*100B*
F	*Strainer*	*138LC*	Q	*Valve Stem*	*100C*
G	*Stem or Rod*	*138LD*	R	*Swivel Head*	*100D*
H	*Diaphragm*	*138CA*	S	*Swivel Head Nut*	*100E*
I	*Upper Spider Plate*	*138CE*	T	*Gasket*	*100G*
J	*Swivel Head*	*138CJ*	U	*Nut for T*	*100H*
K	*Swivel Heat Nut*	*138CK*	V	*Gland*	*100J*
			W	*Gland Nut*	*100K*
			X	*Hand Wheel*	*7R*

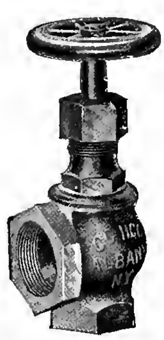


Fig. 2003—Steam Inlet Valve No. 100L.

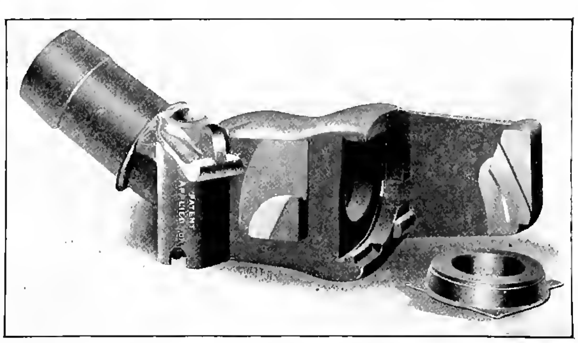


Fig. 2004—Consolidated Steam Coupler No. 33.

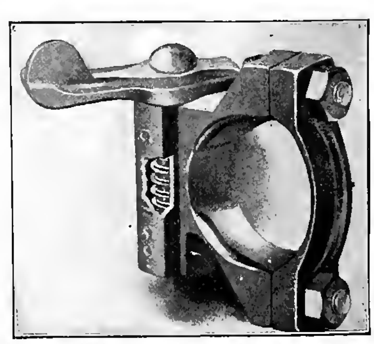


Fig. 2005—Clamp Lock for Steam Couplers No. 9S.

Consolidated Car Heating Company.

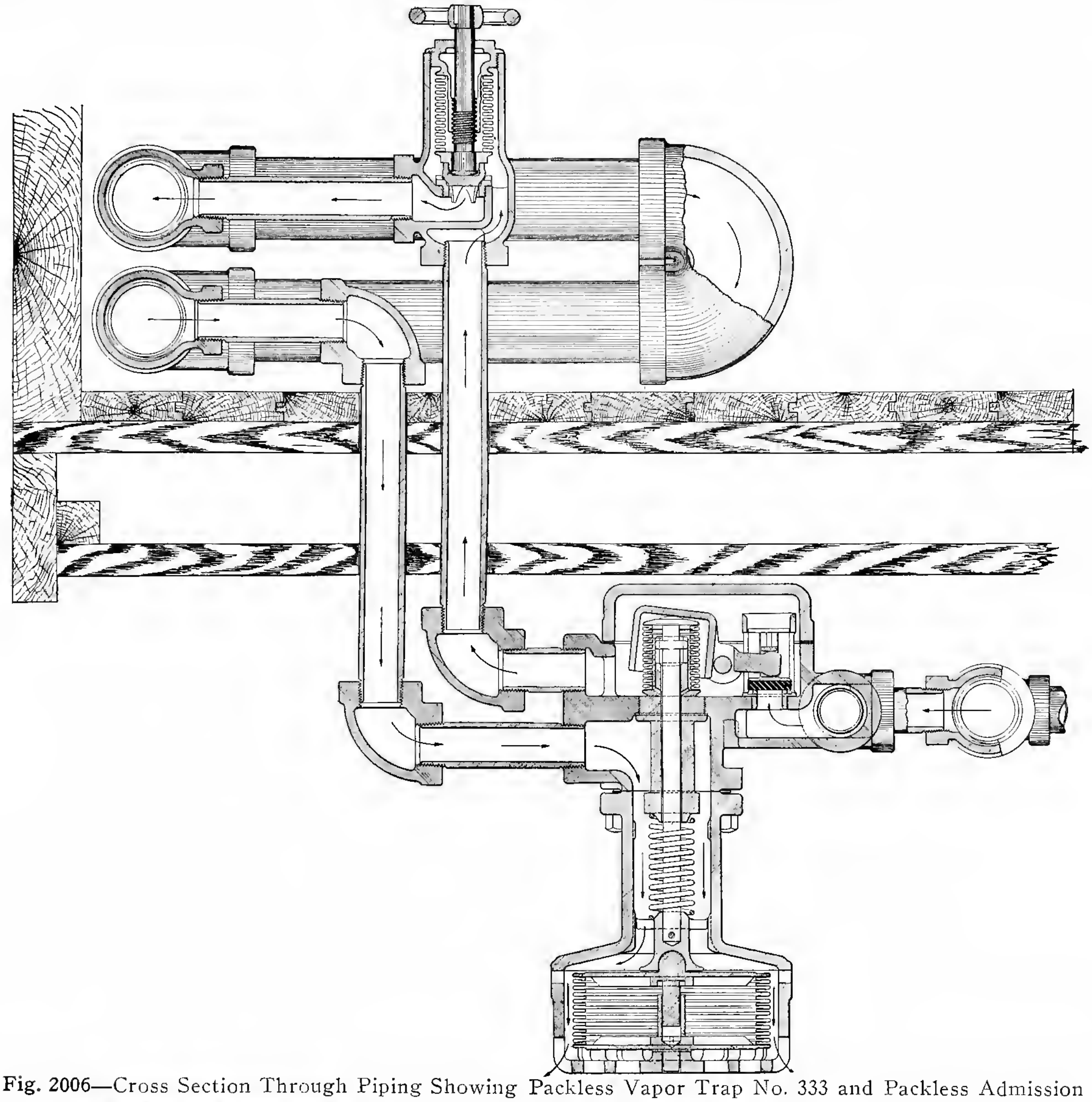


Fig. 2006—Cross Section Through Piping Showing Packless Vapor Trap No. 333 and Packless Admission Valve No. 533.

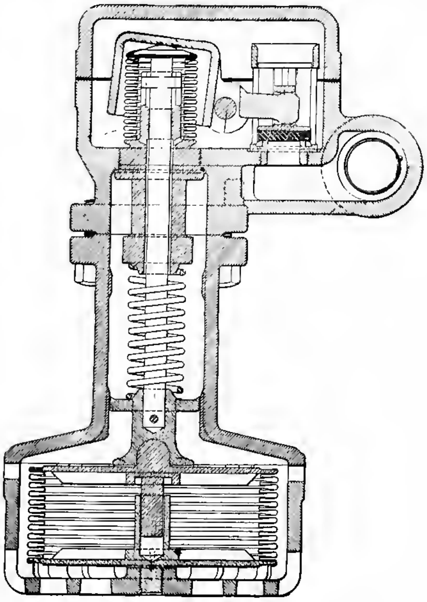


Fig. 2007—Packless Vapor Trap with Sylphon Diaphragm.

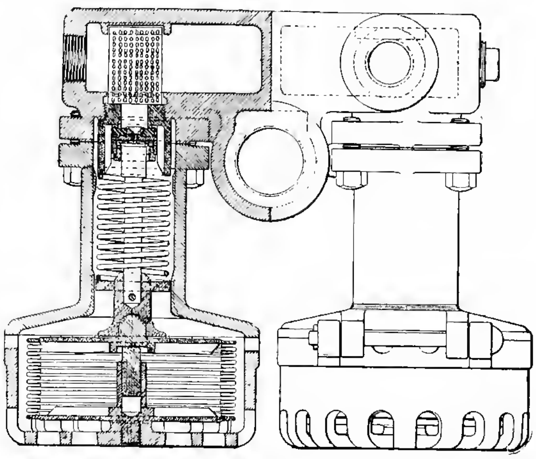


Fig. 2008—Twin Pressure Trap with Sylphon Diaphragm.

Consolidated Car Heating Company.

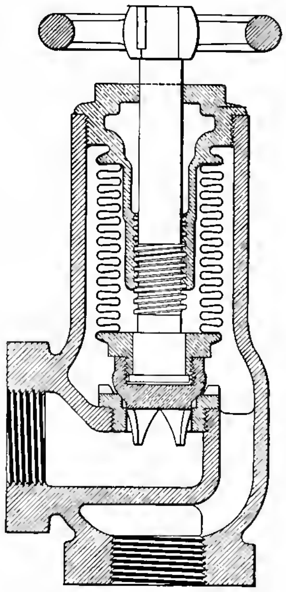


Fig. 2009—Single Packless Admission Valve No. 633.

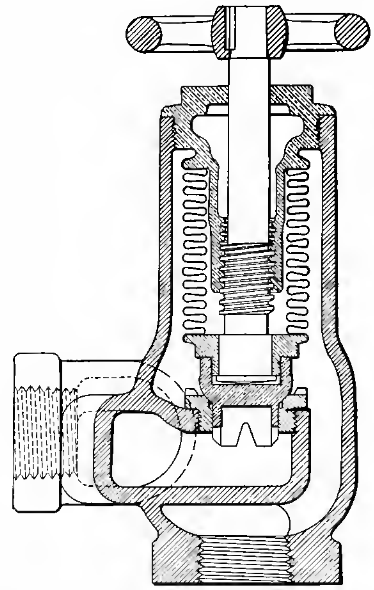


Fig. 2010—Twin Packless Admission Valve No. 633T.

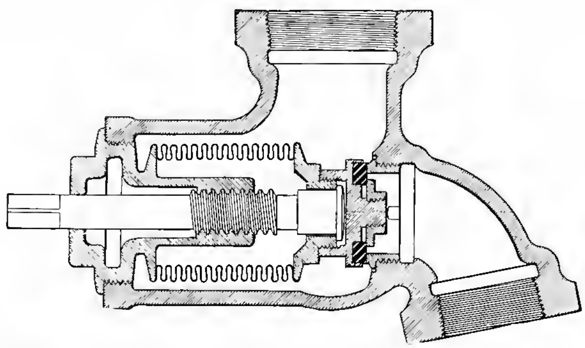


Fig. 2011—Packless Train Line End Valve No. 433.

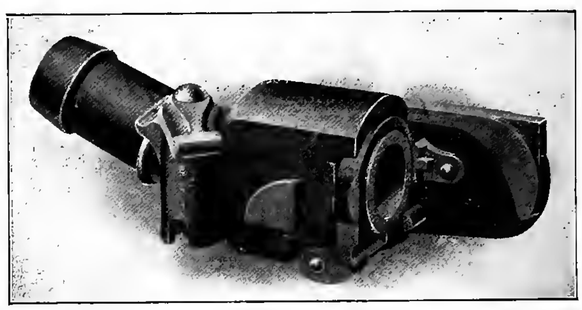


Fig. 2012—Consolidated Steam Coupler No. 9C.

Fig. 2013—No. 33TD Steam Coupler with Two-Piece Hose Clamp.

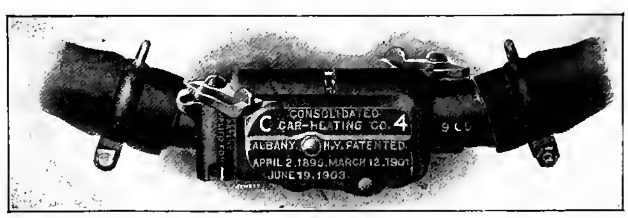


Fig. 2014—Pair of Consolidated Steam Couplers (No. 9C), Locked.

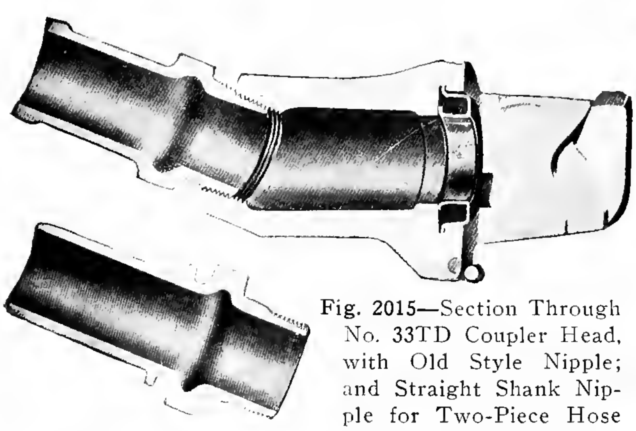


Fig. 2015—Section Through No. 33TD Coupler Head, with Old Style Nipple; and Straight Shank Nipple for Two-Piece Hose Clamp.

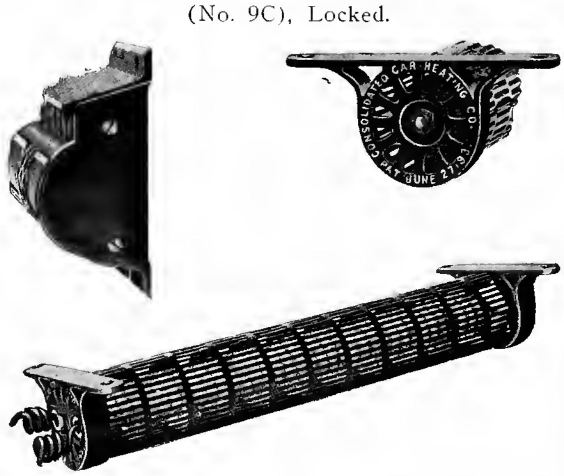


Fig. 2016—Single Coil Electric Heater, Drop Pattern No. 192, for Cross Seats.

Consolidated Car Heating Company.

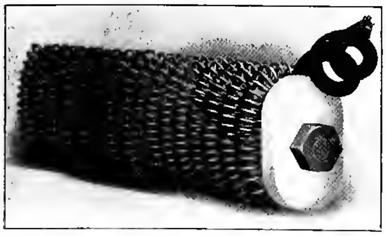


Fig. 2017—Resistance Coil for Electric Heater.

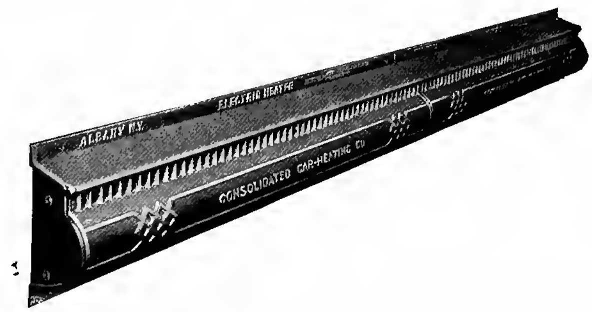


Fig. 2018—Continuous Panel, Single Coil, Electric Heater No. 93T.

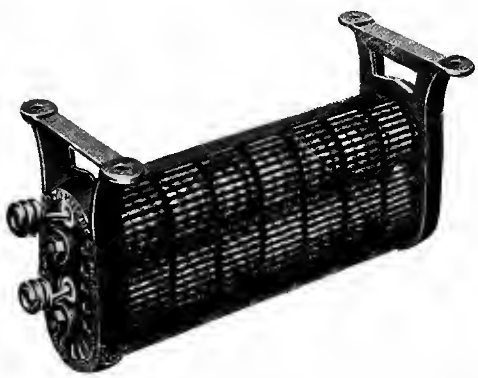
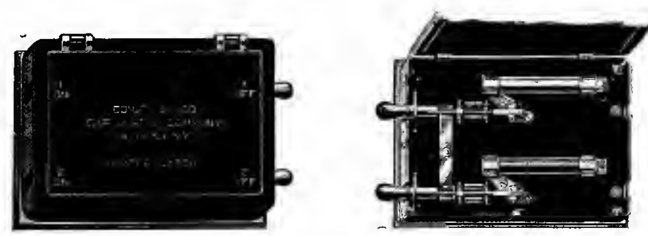


Fig. 2019—Double Coil Electric Heater, Drop Pattern, No. 192H.



Closed. Open.

Fig. 2020—Heater Switch No. 204.

Consolidated Car Heating Company.

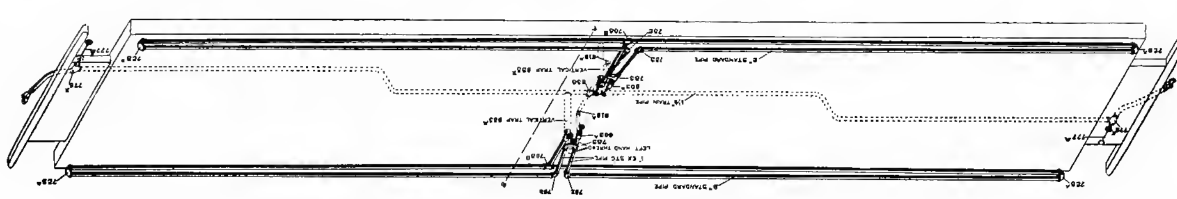


Fig. 2021—Arrangement of Piping and Connections for Direct Steam Heating System (L-811).

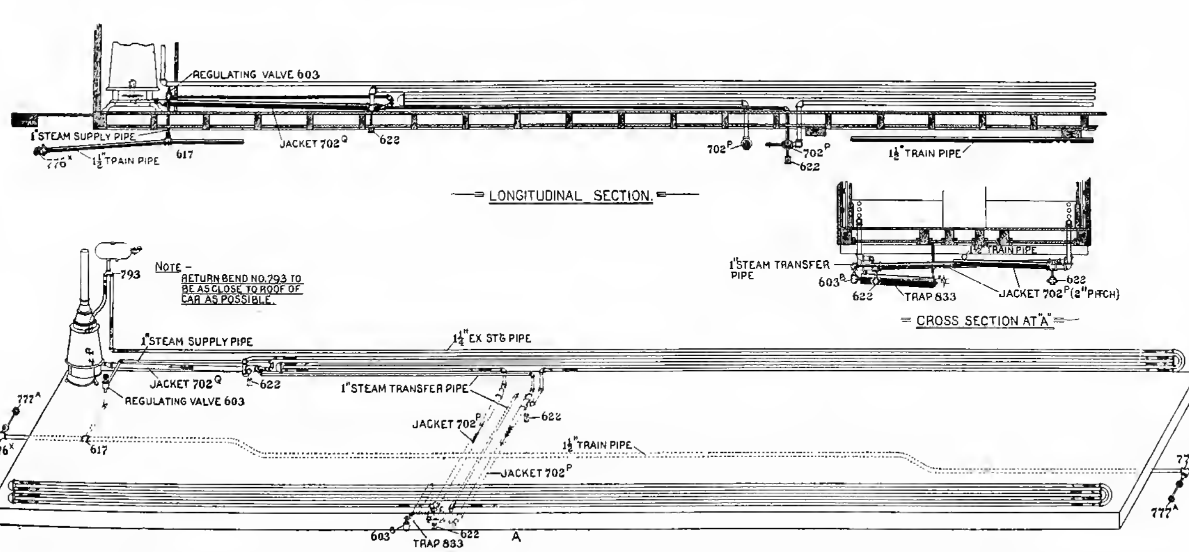


Fig. 2022—Arrangement of Heater and Connections for Standard System of Steam Heating by Single Water Circulation (L-850). Water is Heated at Three Points by the Jackets Shown in Fig. 2033.

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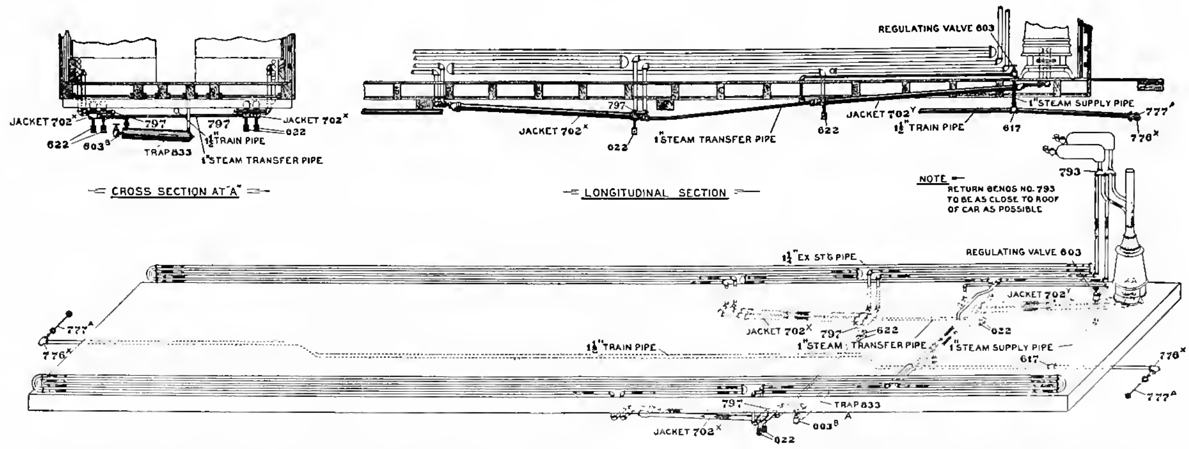

Fig. 2023—Arrangement of Heater and Connections for Standard System of Steam Heating by Double Water Circulation (L-845a). Water is Heated at Six Points by the Jackets Shown in Fig. 2032.

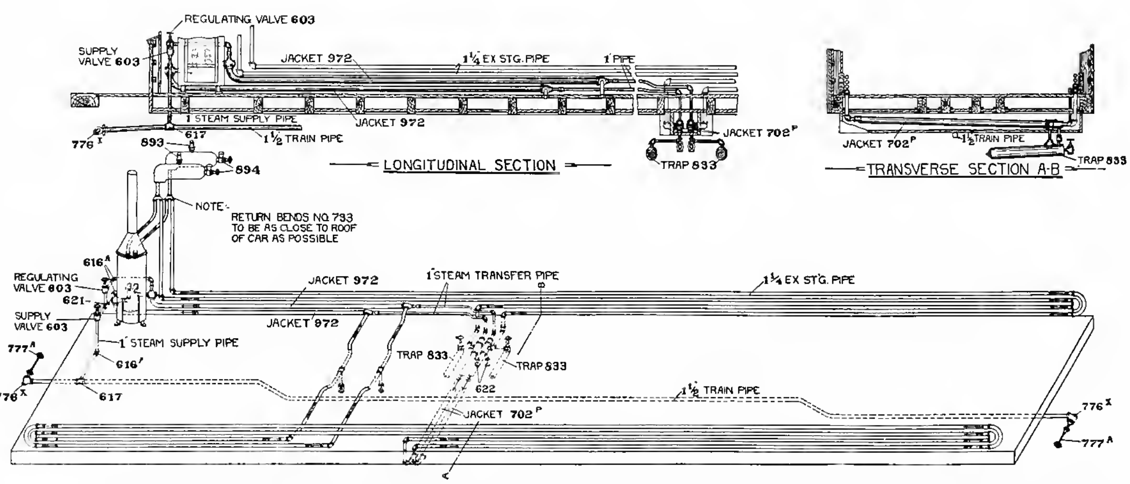

Fig. 2024—Arrangement of Heater and Connections for Standard System of Steam Heating by Double Water Circulation (L-1476). Water is Heated at Four Points by the Jackets Shown in Figs. 2033 and 2034.

Parts for Standard Heating Systems, Fig. 2022-2024.

603 1 *in. Angle Valve*
603b 1 *in. Drain Valve*
611 1¼ *in. Extra Heavy Car Elbow*
611a 1¼ *in. Extra Heavy Car Elbow R. & L.*
612a 1¼ *in. by* ¾ *in. Extra Heavy Tee*
622 ¾ *in. Extra Heavy Cock*
629 ¾ *in. Extra Heavy Nipple*
639 *Directions for Management (Framed)*
642 1 *in. Plug*
680 *Covering for* 1 *in. Pipe*
681 *Covering for* 1 *in. Elbow*
682 *Covering for* 1 *in. Tee*
690 1¼ *in. Plug*
702p *Single Jacket*
702q *Single Jacket*
702x *Double Jacket*
702y *Double Jacket*
756 *Covering for* 1¼ *in. Elbow*
793 1¼ *in. Extra Heavy Return Bend, with* 1¼ *in. Back Outlet*
797 1¼ *in. Extra Heavy Return Bend*
802p *Covering for Jacket, No.* 702*p*
802x *Covering for Jacket, No.* 702*x*
802y *Covering for Jacket, No.* 702*y*
833 *Automatic Trap Complete*
960 *Directions for Management, L-1476 System (Framed)*
972 *Bent Jackets*
617 1½ *in. by* 1 *in. Tee*
677 *Covering for* 1½ *in. Pipe*
679 *Covering for* 1½ *in. Tee*
776x *Train Pipe Valve*
777a *Extension Handle*
618 1½ *in. R. & L. Coupling*
628 1½ *in. Standard Pipe*

(OTHER THAN TRAIN PIPE)

616 1 *in. Elbow*
616a 1 *in. Elbow, R. & L.*
621 1 *in. Tee*
625 1 *in. Standard Pipe*
626 1¼ *in. Extra Strong Pipe*
631 1 *in. R. & L. Coupling*
699 1 *in. Street Elbow*

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Parts for Direct Steam Heating System, Fig. 2021.

179 *2 in. by 3/8 in. Lag Screw*
603a *1 in. Angle Valve*
603c *1 in. Cross Valve*
617 *1½ in. by 1 in. Tee*
638 *1½ in. by 1 in. Cross*
680 *Covering for 1 in. Pipe*
681 *Covering for 1 in. Elbow*
686 *2 in. Cross-over*
687 *2 in. by 1 in. Eccentric Reducer*
708b *2 in. Tee*
723a *2 in. Return Bend*
723b *2 in., R. & L. Return Bend*
726 *2 in., R. & L. Elbow*
743 *2 in. by 1 in. Elbow*
748 *2 in. by 1 in. Reducer*
749 *Pipe Strap*
752 *2 in. by 1 in. Elbow (Eccentric Left)*
753 *2 in. by 1 in. Elbow (Eccentric Right)*
783 *1 in. Open Return Bend with 1 in. Back Outlet*
836 *2 in. Special Return Bend*
933x *Automatic Trap*
677 *Covering for 1½ in. Pipe*
679 *Covering for 1½ in. Tee*
683 *Covering for 1½ in. Cross*
776x *Train Pipe Valve*
777a *Extension Handle*
618 *1½ in. R. & L. Coupling*
628 *1½ in. Standard Pipe*
616 *1 in. Elbow*
616a *1 in., R. & L. Elbow*
625 *1 in. Standard Pipe*
631 *1 in. R. & L. Coupling*
183 *1 in. Extra Strong Pipe*
685 *2 in. Standard Pipe*
732 *2 in., R. & L. Coupling*

Parts for Thermo-Jet Heating System, Fig. 2025.

776X *Train Pipe Valves*
777A *Extension Handles for 776X*
896 *2 in. by 1 in. Strainer Cross*
975X *Automatic Traps, with Blow-Off Valve*
6079 *Floor Plates for Steam Supply Pipe*
6266 *2 in. Anchor Couplings*
6290 *Indicators*
6400 *Injectors*
782 *1½ in. Elbows, R. & L.*
616 *1 in. Elbows*
616A *1 in. Elbows, right and left*
625 *1 in. Standard Pipe*
628 *1½ in. Standard Pipe*
631 *1 in. Couplings, right and left*
677 *Covering for 1½ in. Pipe*
680 *Covering for 1 in. Pipe*
681 *Covering for 1 in. Elbows*
685 *2 in. Standard Pipe*
726 *2 in. Elbows, right and left*
732 *2 in. Couplings, right and left*
757 *Covering for 2 in. Pipe*
800 *Covering for 2 by 1 in. Cross*
836 *2 in. Close Return Bends*

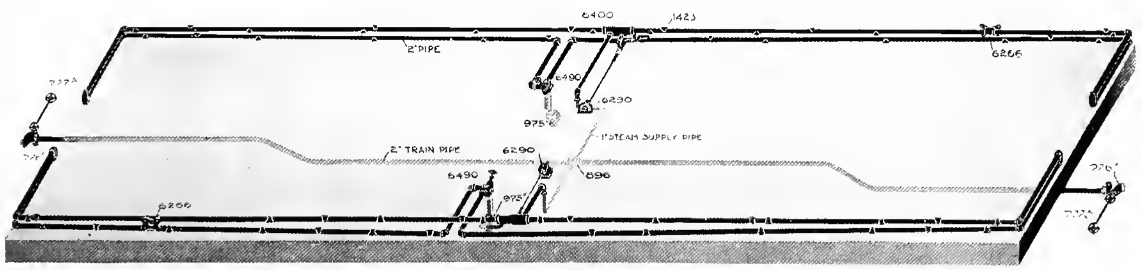

Fig. 2025—Thermo-Jet Heating System for Passenger Cars.

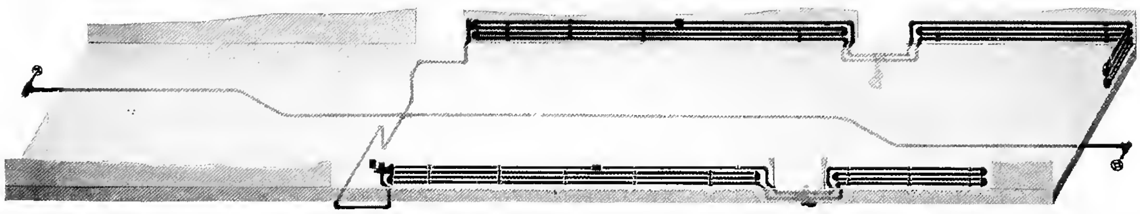

Fig. 2026—Thermo-Jet Heating System for Postal Cars.

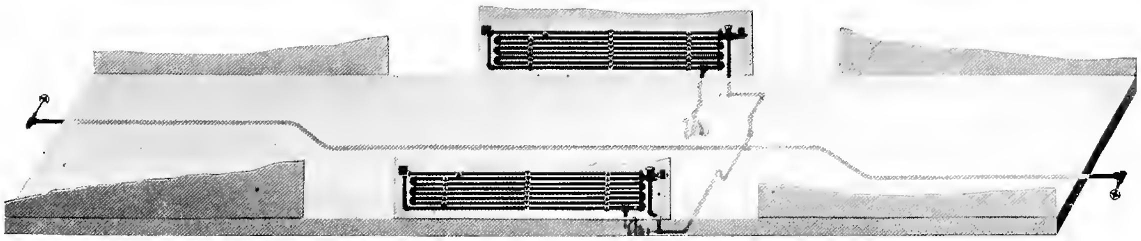

Fig. 2027—Thermo-Jet Heating System for Baggage Cars.

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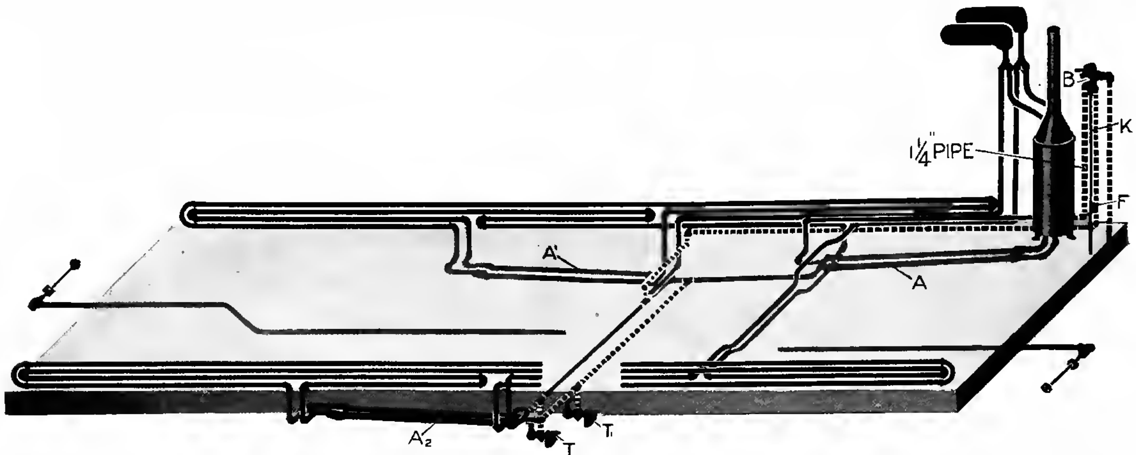

Fig. 2028—Thermo-Jet Heating System for Regulating the Temperature of Cars Heated by Hot Water.

Parts of Injector, Fig. 2029.

6010 *Plug*
6127 *Bonnet*
6128 *Gland*
6129 *Gland Nut*
6310 *Valve Stem*
6343 *Valve*
6365 *Valve Lever*
6537 *Valve Seat*
6538 *Nozzle*
6539 *Spring*
6542 *Spring Case*
6545 *Injector Casting*

Parts of Indicator, Fig. 2029.

6016 *Washer*
6309 *Anchor Fitting*
6311 *Operating Lever*
6312 *Reducer*
6313 *Adjusting Rod*
6315 *Lock Nut*
6316 *Indicator Plate*
6317 *Indicator Handle*
6318 *Indicator Lock*
6319 *Spring for Lock*
6321 *Pointer*
6357 *Screw*
6541 *Anchor Rod*
6543 *Coupling Piece*
6544 *Pin*

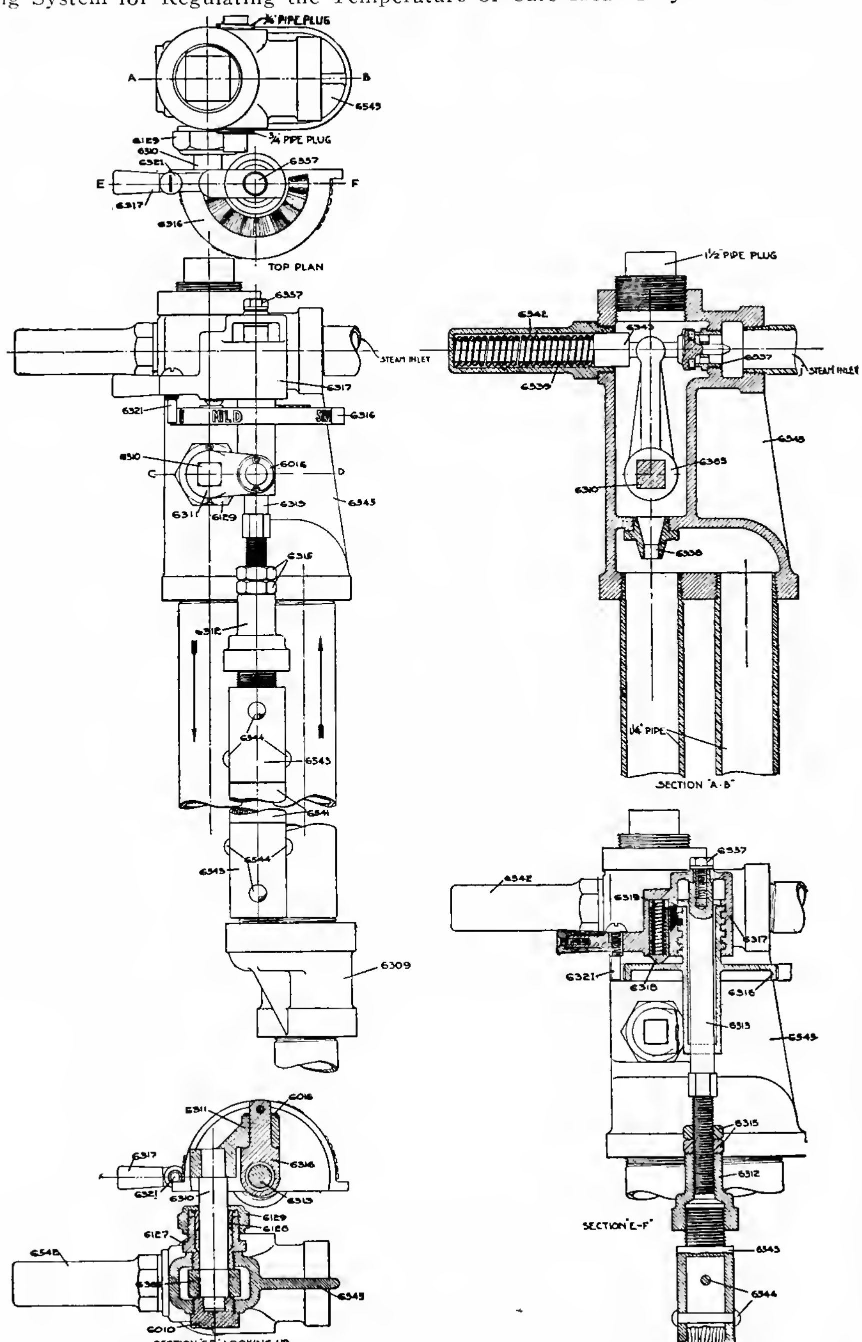

Fig. 2029—Indicator No. 6340 and Injector No. 6330 for Regulating Hot Water Circulating Systems.
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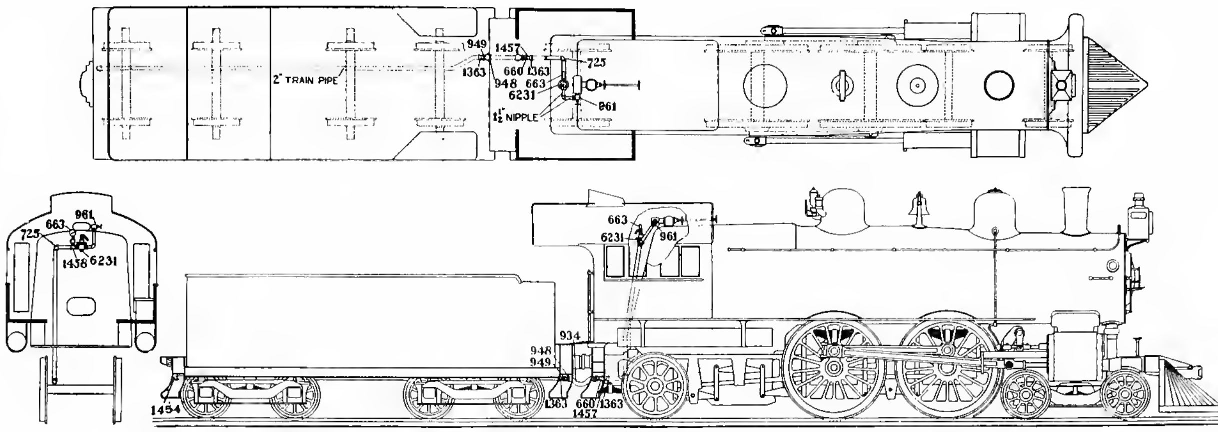

Fig. 2030—Steam Heat Equipment for Locomotive and Tender.

Parts for Locomotive Equipment (L-8a), Fig. 2030.

660	*1½ in. Ground Joint Union*
663	*Steam Gage*
757	*Covering for 2 in. Pipe*
934	*1⅝ in. Steam Hose, 24 in. Long*
948	*Half Clamps*
949	*Nipples, 1⅝ in. Hose, 1½ in. Pipe Thread*
953	*½ by 2¼ in. Bolts*
961	*1½ in. Extra Heavy Angle Valve*
1350	*1½ by 2 in. Reducing Valve*
1363	*2 by 1½ in. Reducers*
1384	*Covering for 2 in. Elbow*
1454	*2 in. 45 degree Elbow*
1457	*1½ in. Extra Heavy Nipples, 3 in. Long*
1458	*2 by 2 by ¼ in. Tee*
615	*1½ in. Elbow*
628A	*1½ in. Extra Heavy Pipe*
685	*2 in. Standard Pipe*
725	*2 in. Elbows*
732	*2 in. Couplings, R. & L.*

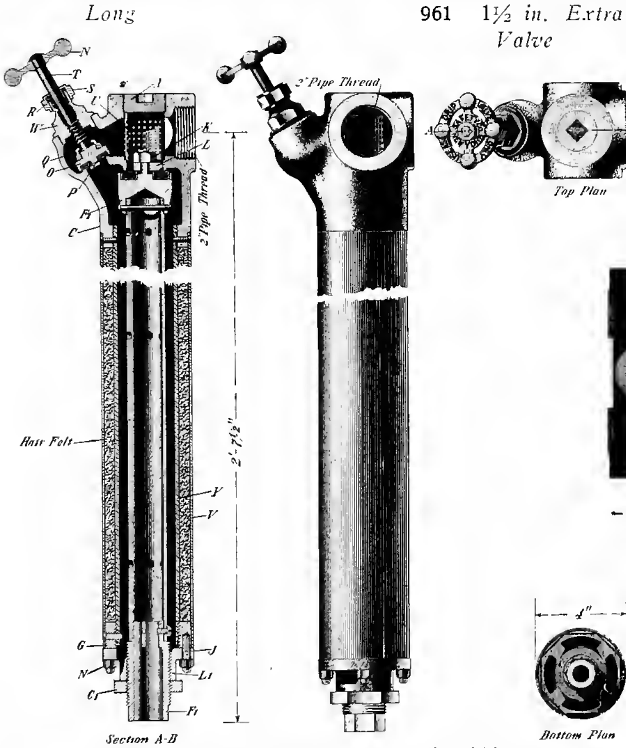

Fig. 2031—Vertical Steam Trap No. 933.

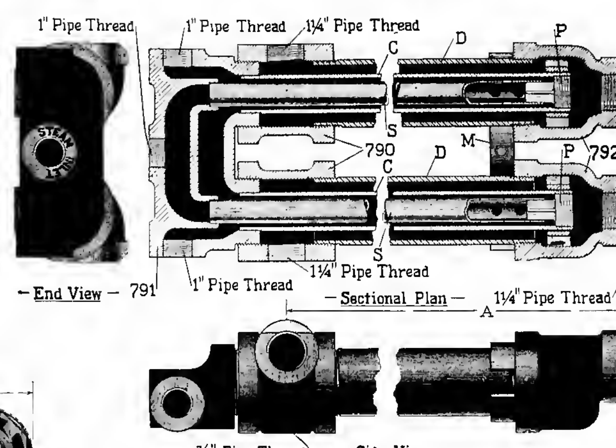

Fig. 2032—Double Jackets Nos. 702x and 702y.

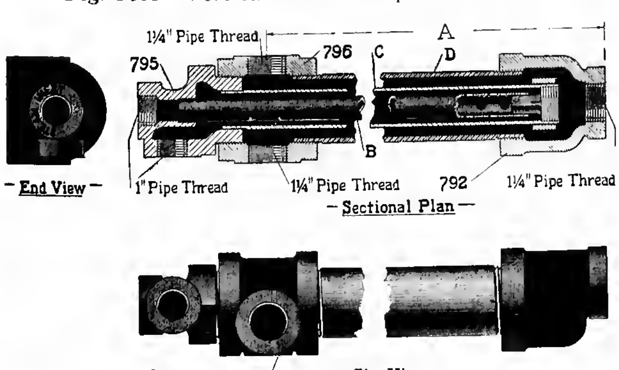

Fig. 2033—Single Jackets Nos. 702p and 702q.

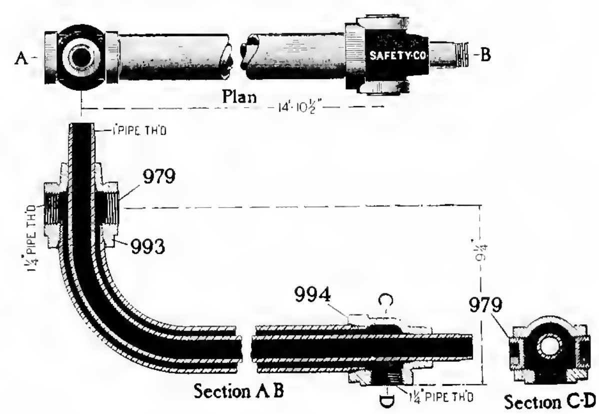

Fig. 2034—Jacket No. 972.

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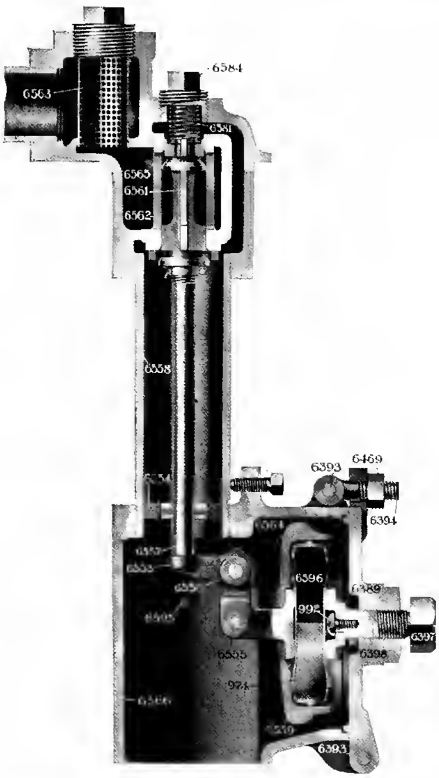


Fig. 2035—Steam Trap No. 6530.

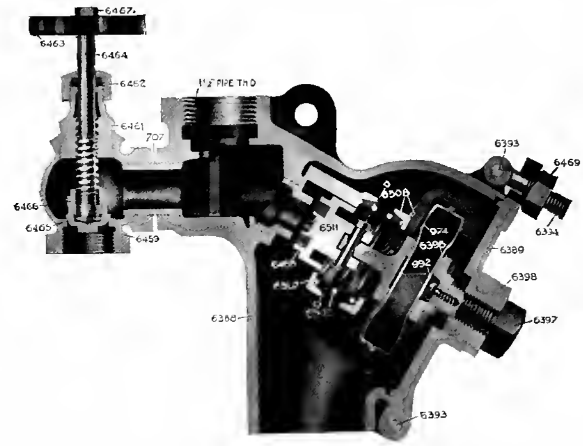


Fig. 2036—Steam Trap No. 975X and Blow-off Valve.

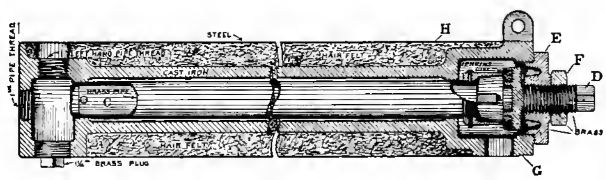
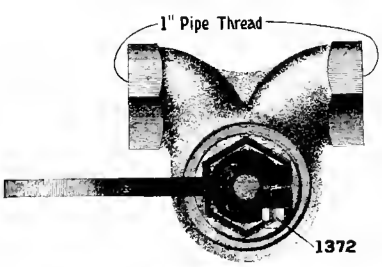


Fig. 2037—Steam Trap No. 833.

Parts of Steam Trap, Fig. 2036.

707	*1 in. Extra Heavy Close Nipple*	6507	*Valve Seat*
974	*Thermostat*	6508	*Thermostat Frame*
992	*Screw*	6509	*Spring*
6388	*Trap Body*	6511	*Valve Case*
6389	*Cover*	6459	*Blow-Off Valve, Valve Body*
6393	*Pin for Cover and Bolt*	6461	*Bonnet*
6394	*Bolt for Cover*	6462	*Packing Nut*
6396	*Thermostat Seat*	6463	*Hand Wheel*
6397	*Adjusting Stem*	6464	*Valve Stem*
6398	*Locknut*	6465	*Valve*
6399	*Valve Pin*	6466	*Valve Carrier*
6468	*Valve Disc*	6467	*Hand Wheel Nut*
6469	*Nut for Bolt*		



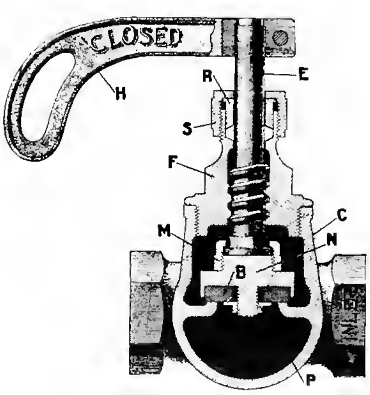


Fig. 2038—1 in. Globe Valve

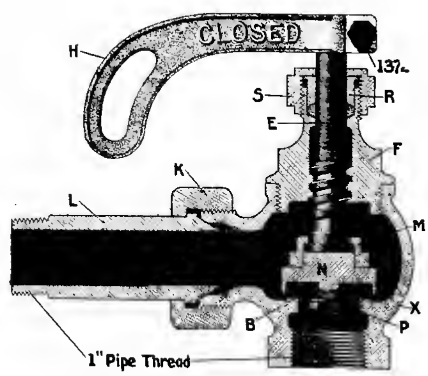


Fig. 2039—1 in. Angle Valve No. 980.

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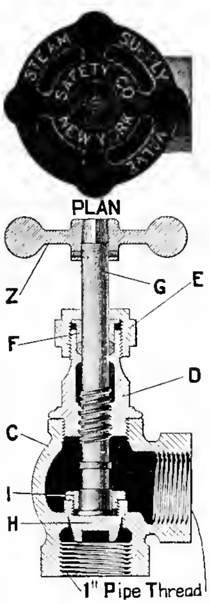

Fig. 2040—1 in. Inlet Valve No 603.

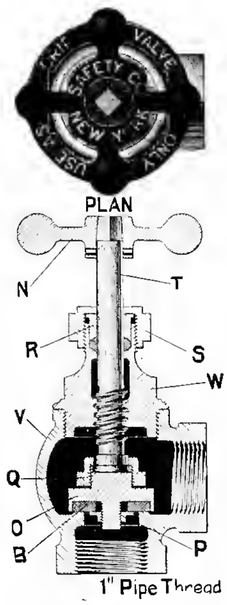

Fig. 2041—1 in. Drain Valve No. 603b.

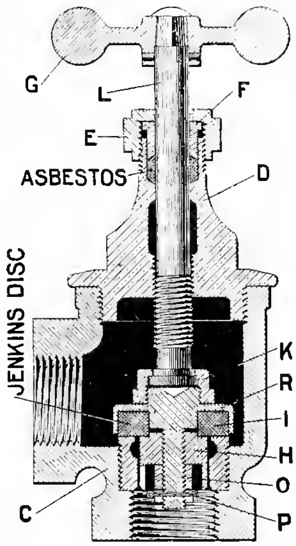

Fig. 2042—1 in. Graduating Valve No. 603a.

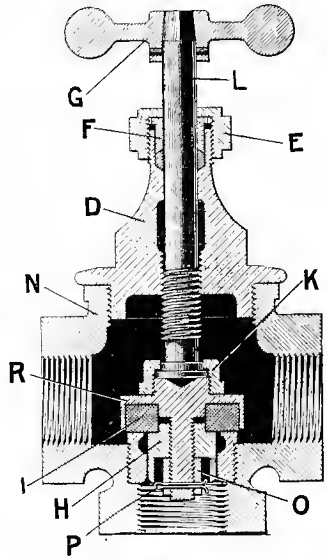

Fig. 2043—1 in. Cross Graduating Valve No. 603c.

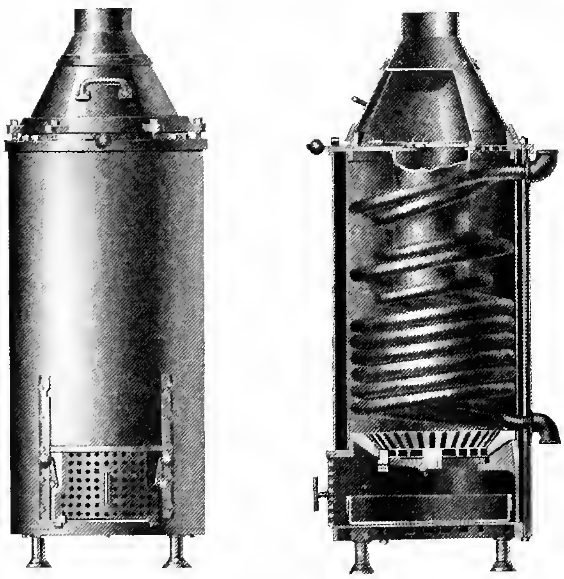

Fig. 2044—Car Heater.

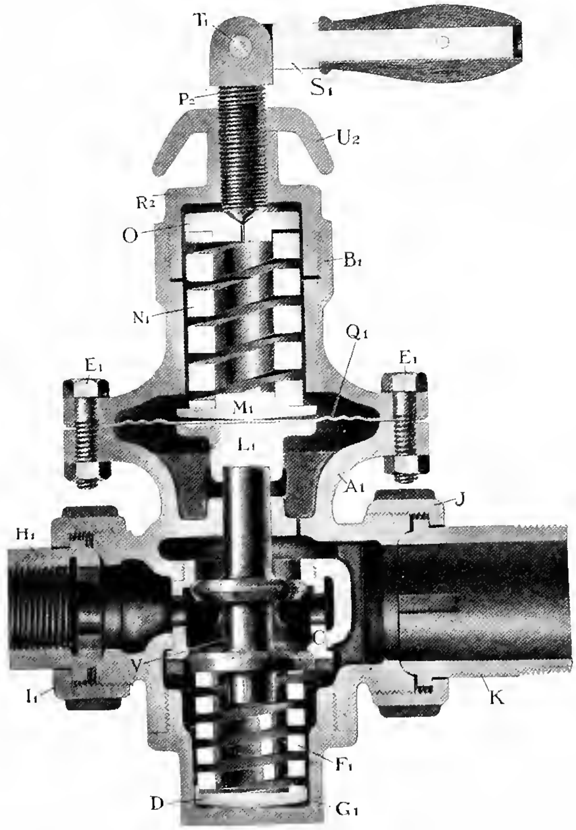

Fig. 2045—Locomotive Reducing Valve No. 6231.

Parts of Locomotive Reducing Valve, Fig. 2045.

- A1 *Regulator Body*
- B1 *Regulator Bonnet*
- C *Valve Seat Bushing*
- D *Guide for Bottom Spring*
- E1 *3/8 in. Bolt for Regulator Bonnet*
- F1 *Bottom Spring*
- G1 *Bottom Plug*
- H1 *1 in. Inlet Union Nipple*
- I1 *Inlet Union Nut*
- J *Outlet Union Nut*
- K *2 in. Outlet Union Nipple*
- L1 *Bottom Diaphragm Flange*
- M1 *Top Diaphragm Flange*
- N1 *Top Spring*
- O *Guide for Top Spring*
- P2 *Adjusting Stem*
- Q1 *Diophragm*
- R2 *Adjusting Stem Bonnet*
- S1 *Handle*
- T1 *3/8 in. Bolt for Handle*
- U2 *Locknut*
- V *Valve*

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Parts of Steam Trap, Fig. 2035.

974 *Diaphragm*
992 *Screw*
6389 *Cover*
6393 *Pin for Cover and Bolt*
6394 *Bolt for Cover*
6396 *Diaphragm Seat*
6397 *Adjusting Stem*
6398 *Locknut*
6469 *Nut for Cover*
6470 *Blow-Off Valve Complete—Not shown in cut*
6553 *Bell Crank Lever*
6554 *Valve Stem Guide*
6555 *Lever Pin*
6556 *Bearing Pin*
6557 *Valve Stem*
6558 *2 in. Pipe Nipple*
6559 *Diaphragm Frame*
6561 *Double Seat Valve*
6562 *Valve Seat*
6563 *Screen*
6564 *Set Screw*
6565 *Valve Body*
6566 *Trap Body*
6581 *Valve Spring*
6584 *Plug*
6595 *Supporting Pin*

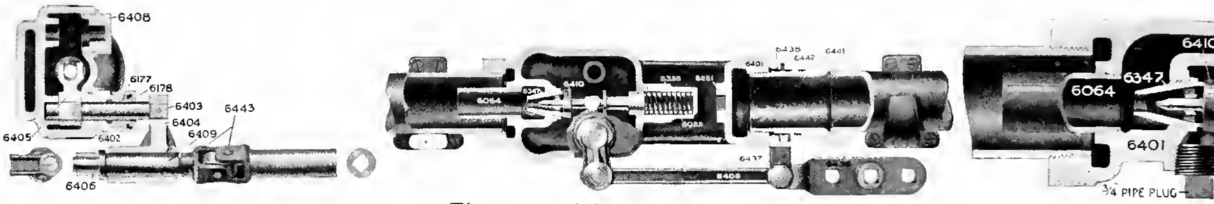

Fig. 2046—Injector No. 6400.

Parts of Injector, Fig. 2046.

6025 *Spring*
6064 *Injector Nipple*
6177 *Gland*
6178 *Gland Nut*
6221 *Countersunk Plug*
6347 *Nozzle*
6356 *Valve Guide*
6401 *Injector Casting*
6402 *Bonnet*
6403 *Valve Stem*
6404 *Operating Lever*
6405 *Valve Lever*
6406 *Link*
6408 *Hexagon Plug*
6409 *Eccentric Stem*
6410 *Valve*
6436 *Back Plate (for Wooden Cars)*
6437 *Cap Screw for Link*
6438 *Guide Collar*
6439 *Back Plate (for Steel Cars)*
6441 *Guide Nipple*
6442 *Guide Spring*
6443 *Universal Joint*

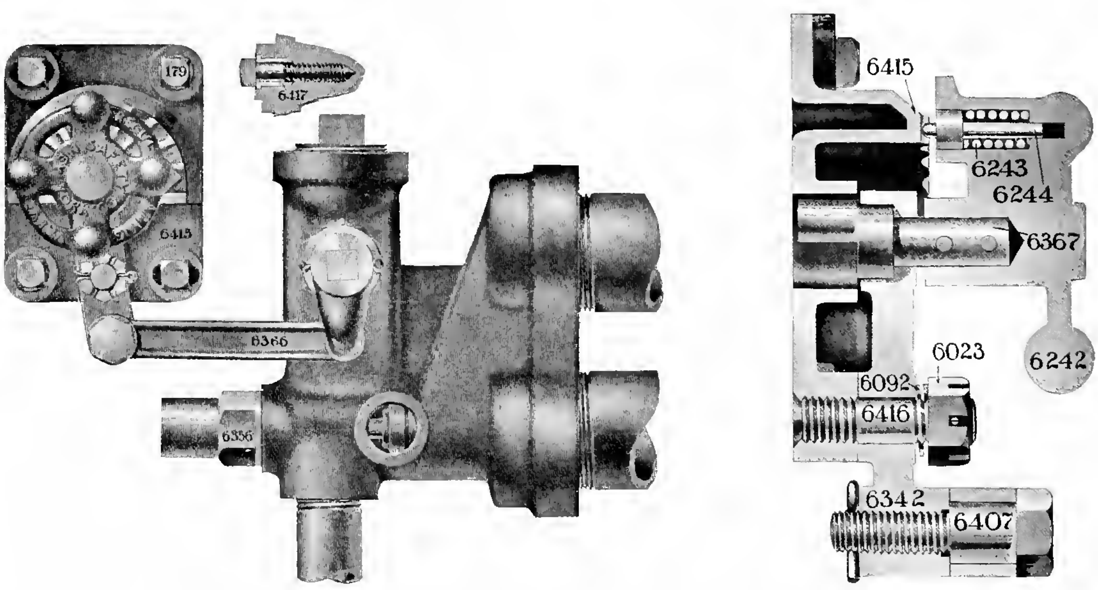

Fig. 2047—Baggage Car Injector No. 6450 and Indicator No. 6440.

Parts of Indicator, Figs. 2047 and 2048.

6023 *Hexagon Nut*
6092 *Spring Washer*
6242 *Indicator Handle*
6243 *Spring for Lock*
6244 *Lock for Operating Handle*
6342 *Indicator Lever*
6367 *Indicator Stem*
6366 *Link*
6407 *Cap Screw*
6415 *Indicator Plate*
6416 *Stud Bolt*
6417 *Steel Bushing—2 Required*
6425 *Washer*

Parts of Injector, Figs. 2047 and 2048.

6010 *Plug*
6025 *Spring for Valve*
6064 *Injector Nipple*
6127 *Bonnet*
6128 *Gland*
6129 *Gland Nut*
6229 *Injector Casting with 1½ in. Plug*
6249 *Operating Lever*
6343 *Valve*
6347 *Nozzle*
6356 *Guide for Valve*
6365 *Valve Lever*
6368 *Valve Stem*

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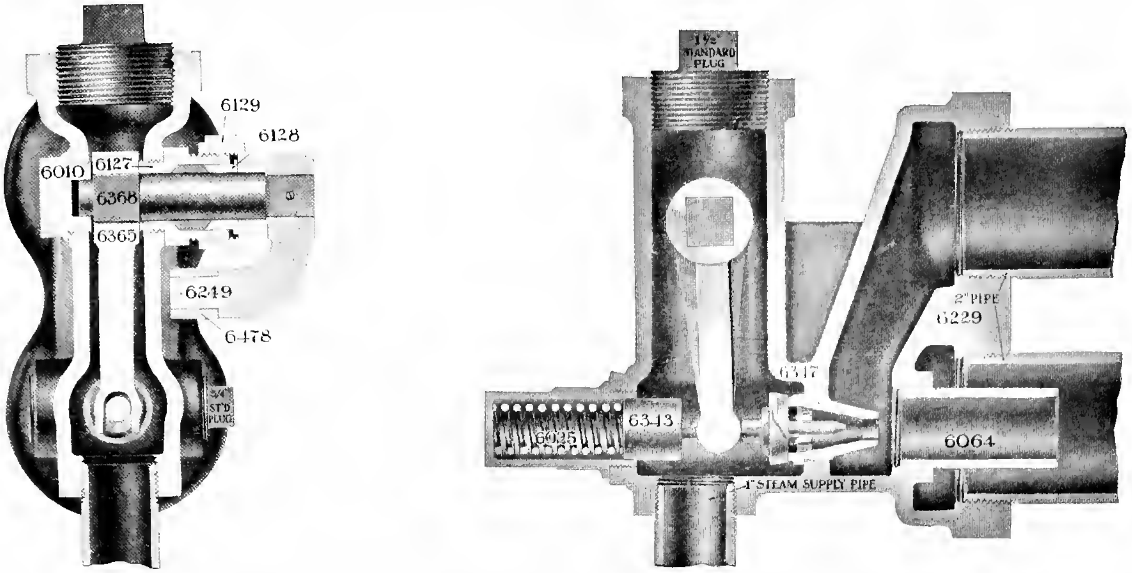
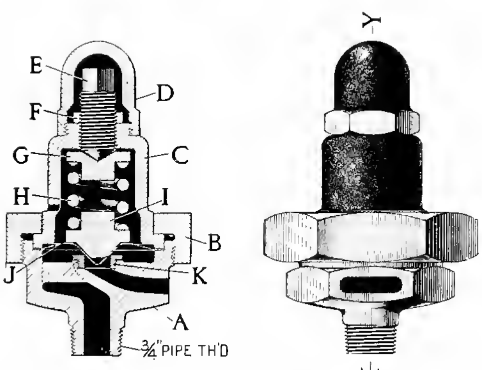
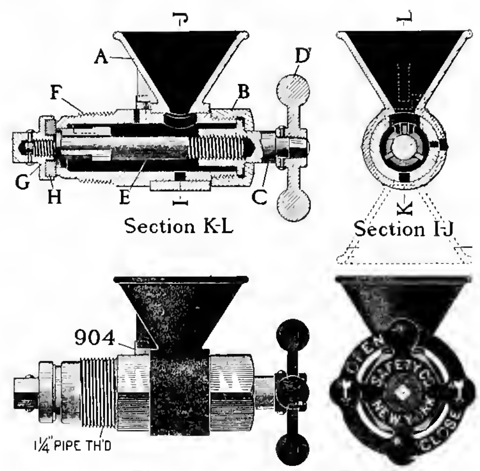


Fig. 2048—Baggage Car Injector and Indicator. See also Fig. 2047.



Section X-Y Elevation

Fig. 2049—Safety Valve.



Elevation End Elevation

Fig. 2050—Combination Valve.

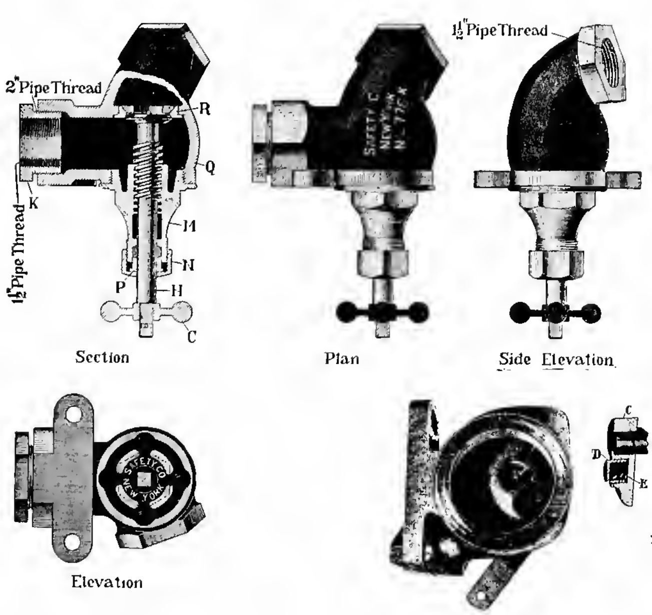


Fig. 2052—Extension Handle No. 777a for End Train Pipe Valve.

Fig. 2051—1½ in. End Train Pipe Valve No. 776x.

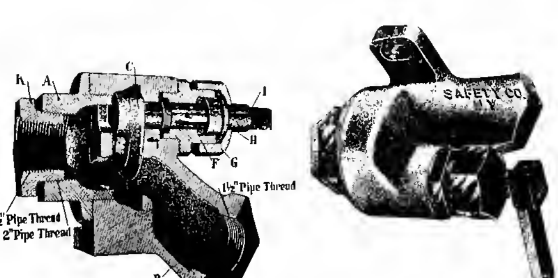


Fig. 2053—Train Pipe Valve No. 1376.

Safety Car Heating & Lighting Company.

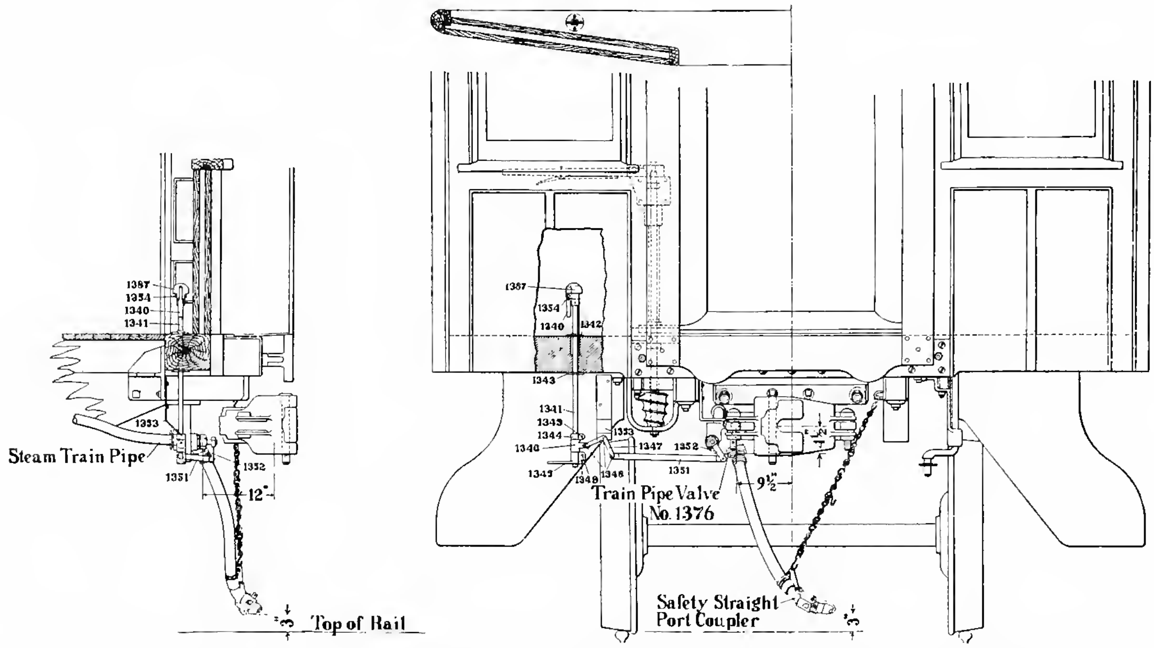


Fig. 2054—Standard Position for Train Pipe Valve No. 776x, with Extension Handle No. 777a.

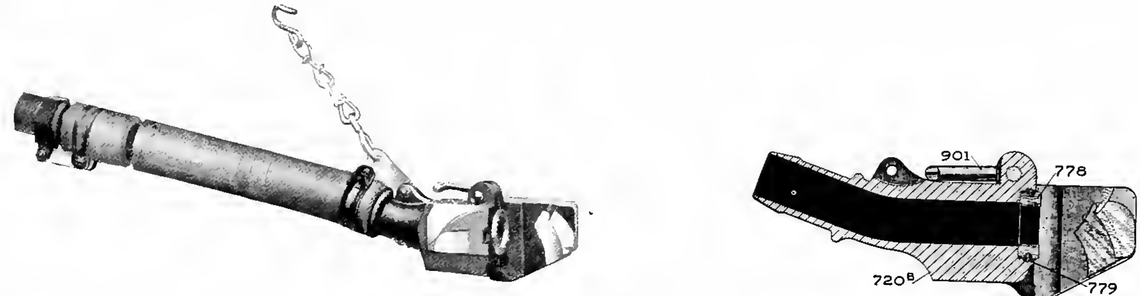


Fig. 2055—Steam Coupler No. 720B.

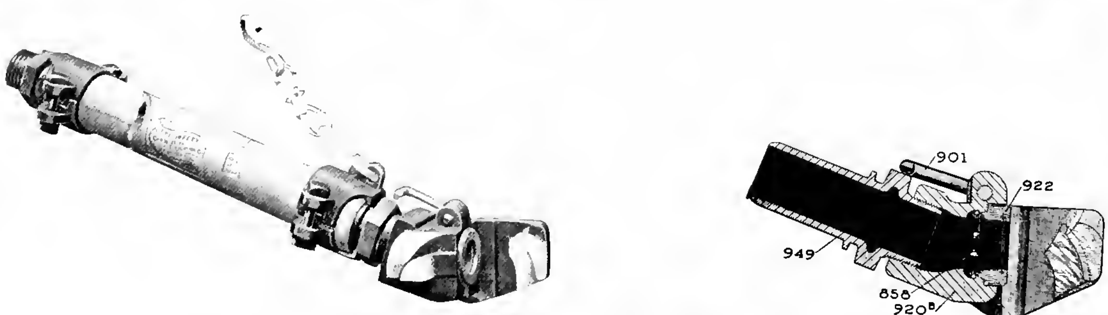


Fig. 2056—Steam Coupler No. 920B.

Fig. 2057—Gasket and Retaining Ring for Couplers.

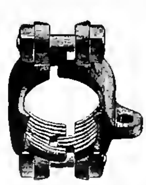


Fig. 2058—Clamp for Steam Coupler.

Fig. 2059—Gasket No. 778 and Retaining Ring No. 779.

Safety Car Heating & Lighting Company.

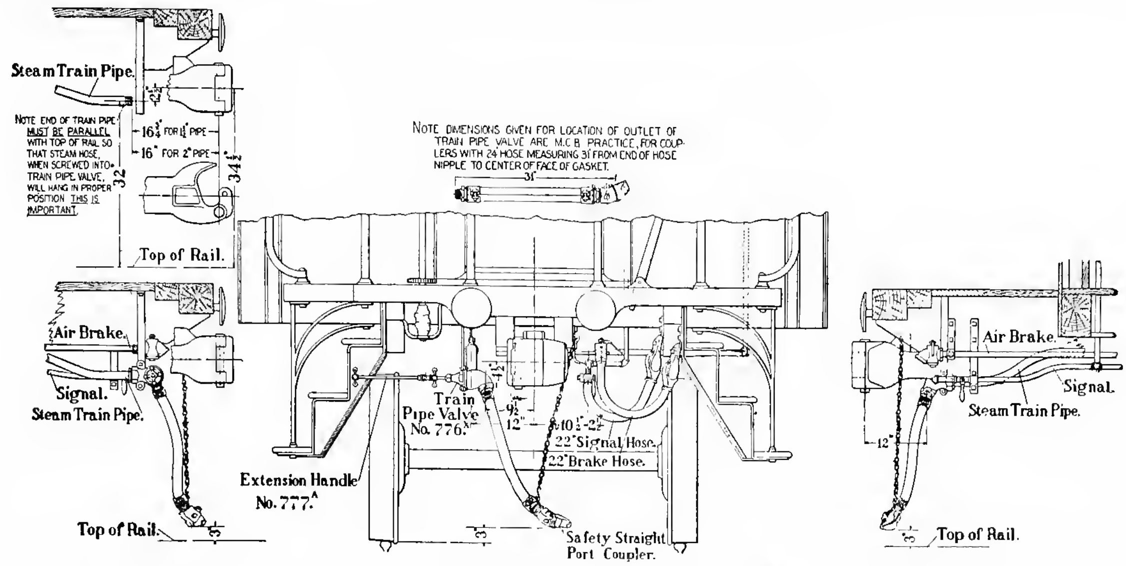


Fig. 2060—Standard Position for Train Pipe Valve No. 1376, Showing Arrangement of Operating Mechanism No. 1377.

Parts for Platform Operating Mechanism, Fig. 2060.

1340 *Platform Handle*
1341 *Vertical Rod*
1342 *Floor Plate*
1343 *Bottom Plate*
1344 *Set Collar*
1345 *Bottom Handle*
1346 *Collar Link*
1347 *Bell Crank*
1348 *Pins for Bell Crank*
1349 *3/8 by 1 1/4 in. Bolts*
1351 *Connecting Rod*
1352 *Valve Stem Lever*
1353 *Bracket for Bell Crank*
1354 *3/8 by 1 7/8 in. Bolt*
1387 *Top Casting for Platform Handle*

Safety Car Heating & Lighting Company.

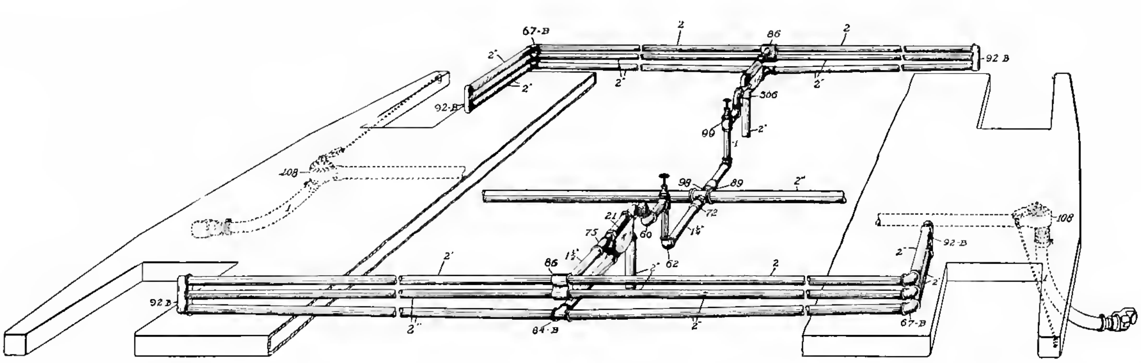


Fig. 2061—Ideal Heating System for Wooden Coaches, Using Three 2 in. Pipes.

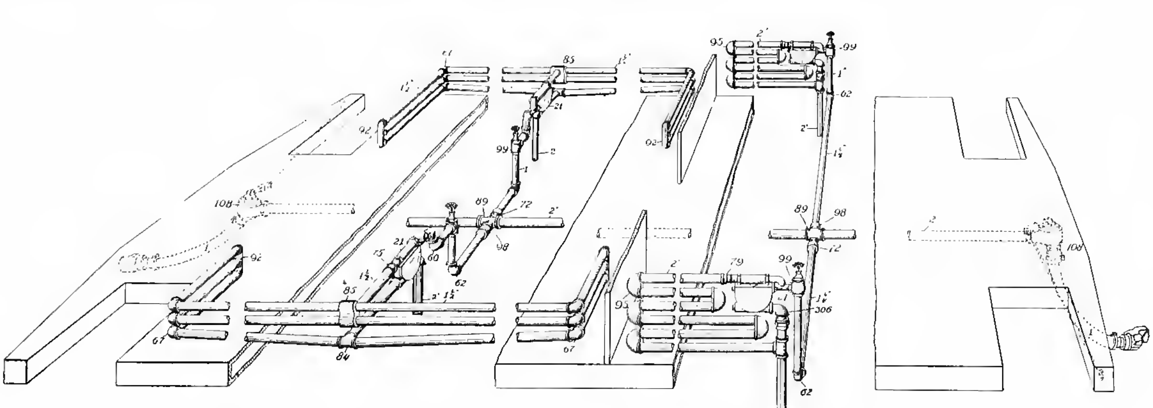


Fig. 2062—Ideal Heating System for Combination Passenger and Baggage Car.

Ward Equipment Company.

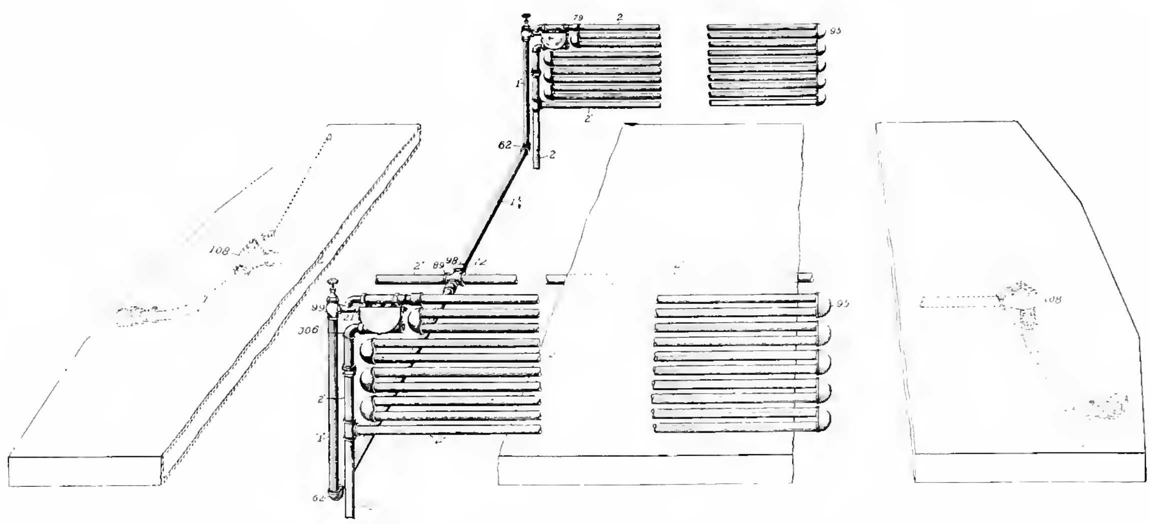


Fig. 2063—Ideal Heating System for Baggage Cars.

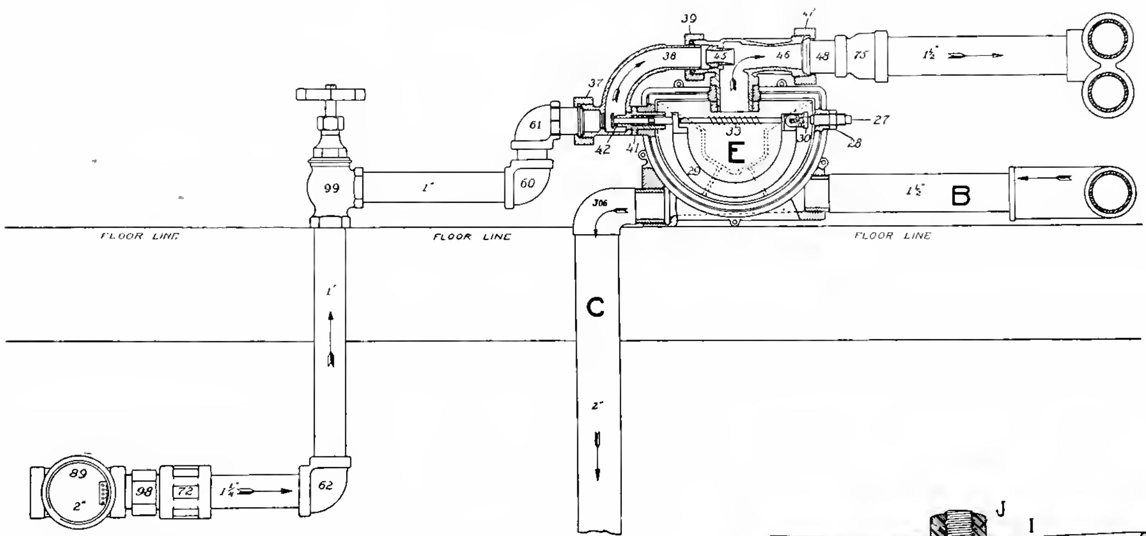


Fig. 2064—Unotherm and Piping Connections as Arranged Under Seat at Center of Coach.

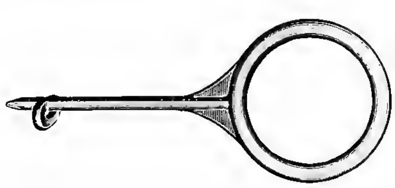


Fig. 2065—Steam Hose Gasket Remover.

Parts of Reducing Valve, Fig. 2066.

- **A** *1½ in. Inlet Union Nipple*
- **B** *2 in. Outlet Union Nipple*
- **C** *Bolts and Nuts for Dome and Body*
- **D** *Balance Spindle*
- **E** *Oscillating Washer*
- **F** *Bottom Spring*
- **G** *Body of Regulator*
- **H** *Bottom Plug*
- **I** *Handle*
- **J** *Top Nut*
- **K** *Hollow Screw*
- **L** *Top Spring*
- **M** *Dome of Regulator*
- **N** *Lock Nut*
- **O** *Top Flange*
- **P** *Bottom Flange*
- **Q** *Top Spindle*
- **T** *1½ in. Inlet Union Nut*
- **U** *2 in. Outlet Union Nut*

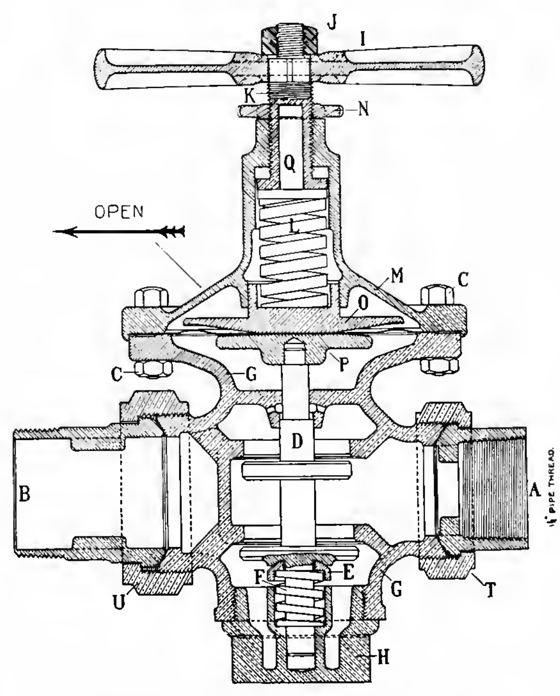


Fig. 2066—Improved Reducing Valve.

Ward Equipment Company.

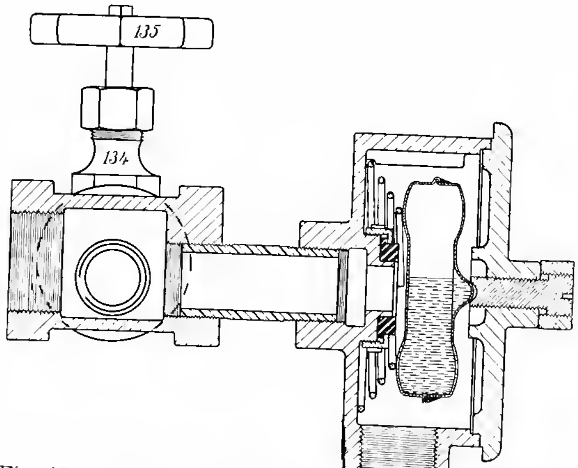


Fig. 2067—Section Through Automatic Steam Trap.

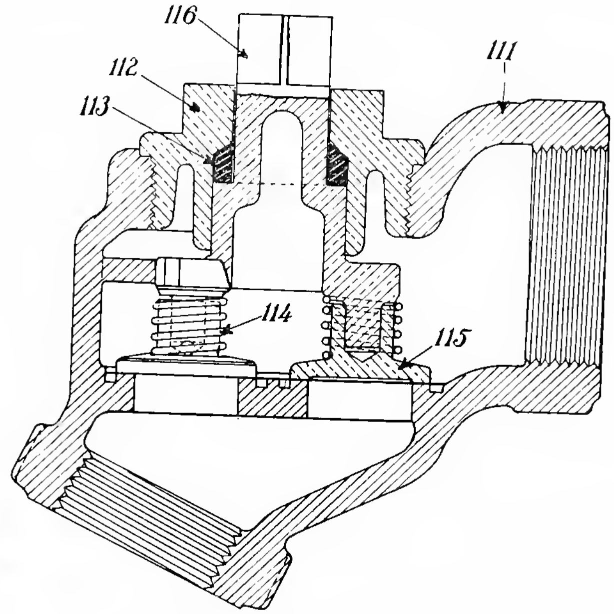


Fig. 2068—End Train Line Valve.

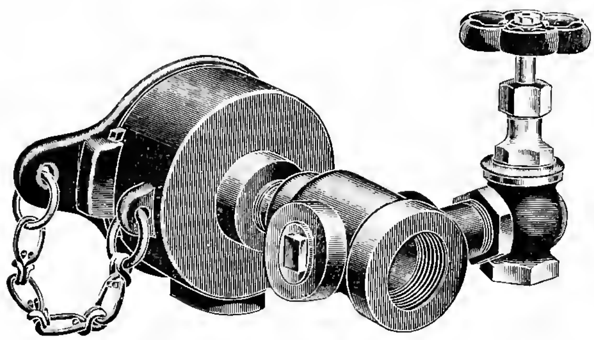


Fig. 2069—Automatic Steam Trap.

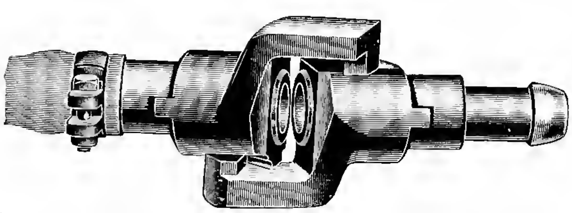


Fig. 2070—Top View of Improved Steam Coupler, Showing Locking Method.

Fig. 2071—Steam Couplers Locked.

Ward Equipment Company.

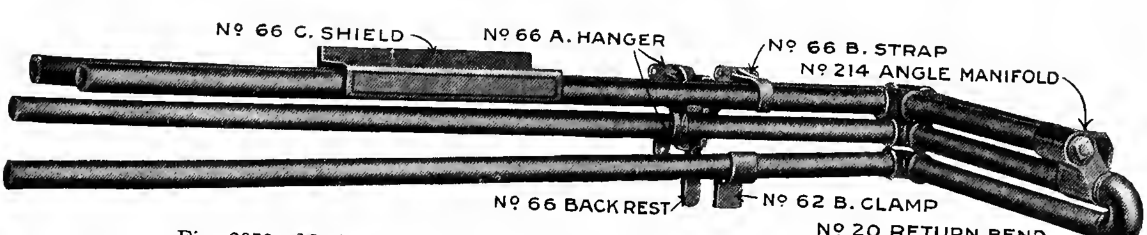


Fig. 2072—Method of Connecting at Corners for Four-Pipe 1¼ in. Coils.

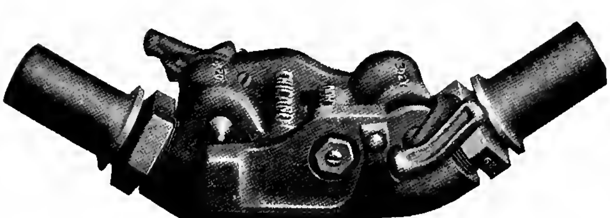


Fig. 2073—Couplers, Locked.

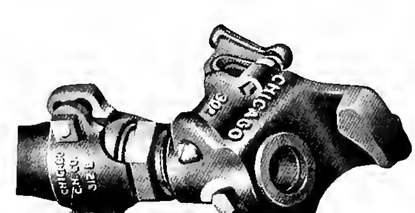


Fig. 2074—Hose Coupler No. 302.

Chicago Car Heating Company.

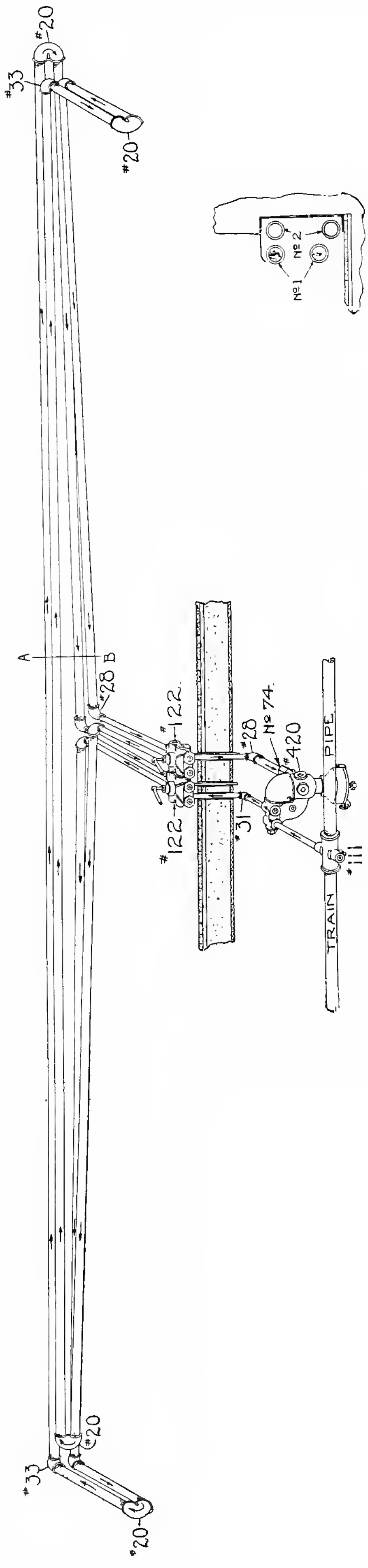


Fig. 2075—Arrangement of Piping in Passenger Car.

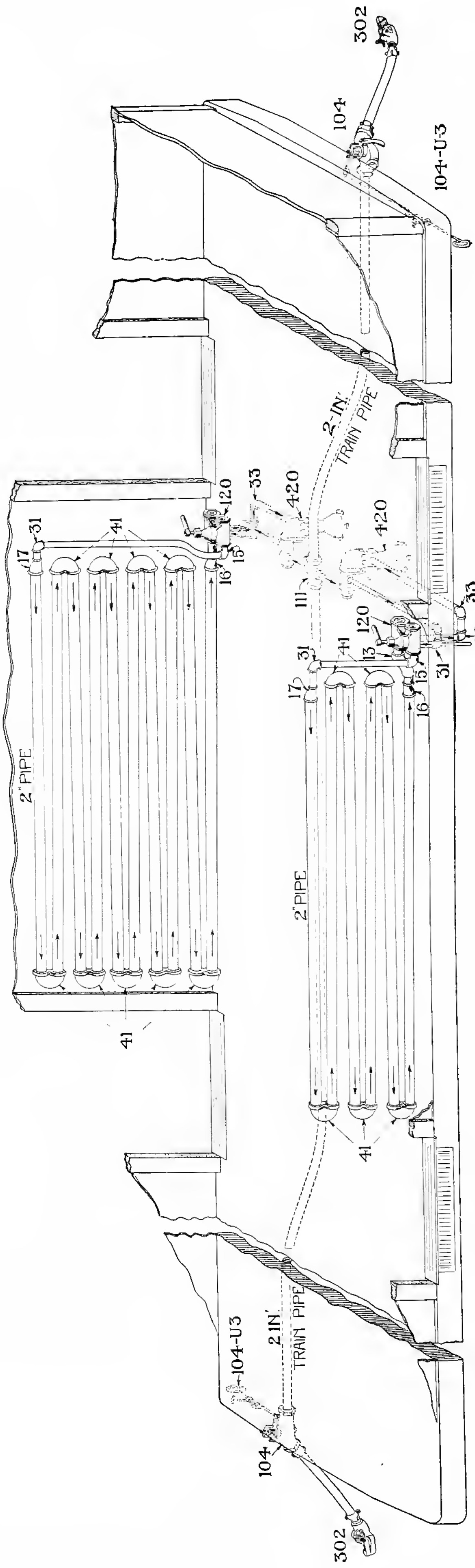


Fig. 2076—Arrangement of Piping in Baggage Car.

Chicago Car Heating Company.

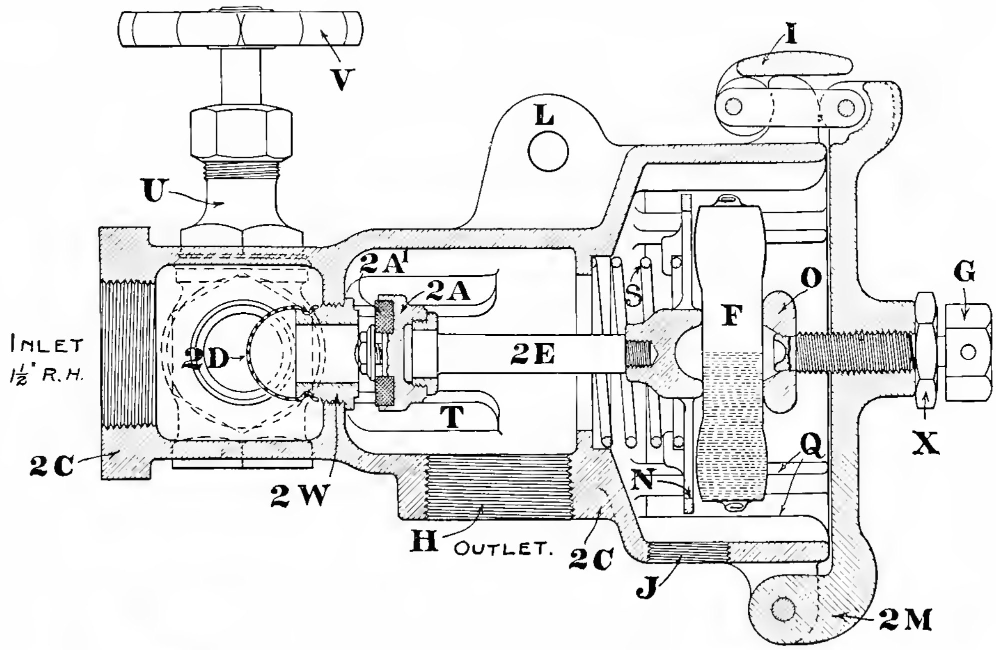


Fig. 2077—Horizontal Steam Trap.

Fig. 2078—Two-Piece Hose Clamp.

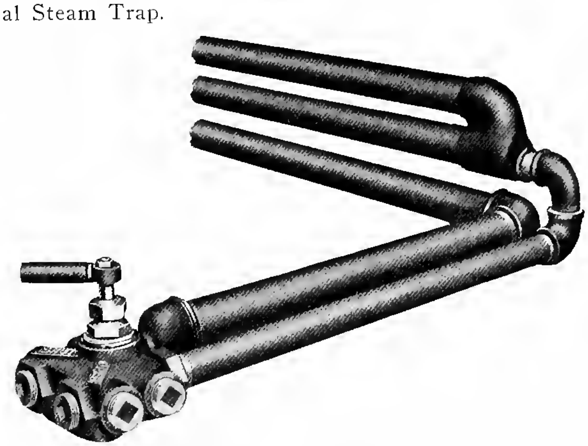


Fig. 2079—Method of Connecting Radiator Pipes to Cut-Out Valve.

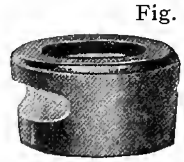


Fig. 2080—Hose Coupler Gasket.

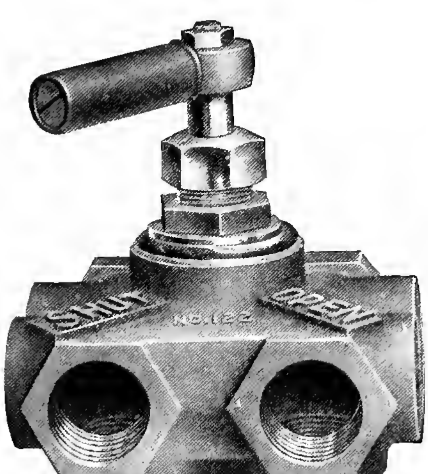


Fig. 2081—Vapor Cut-Out Valve.

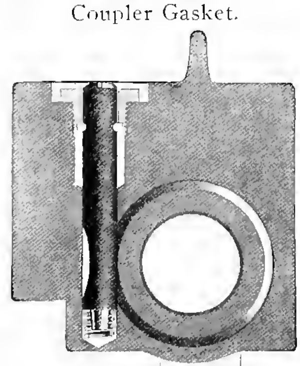


Fig. 2082—Cross Section Showing Hose Coupler Gasket Locked in Place by Retaining Bolt.

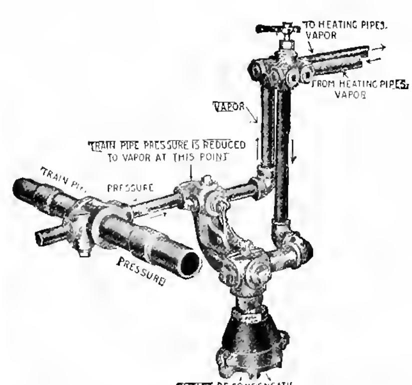


Fig. 2083—Arrangement of Piping and Valves in Connection with Vapor Regulator.

Chicago Car Heating Company.

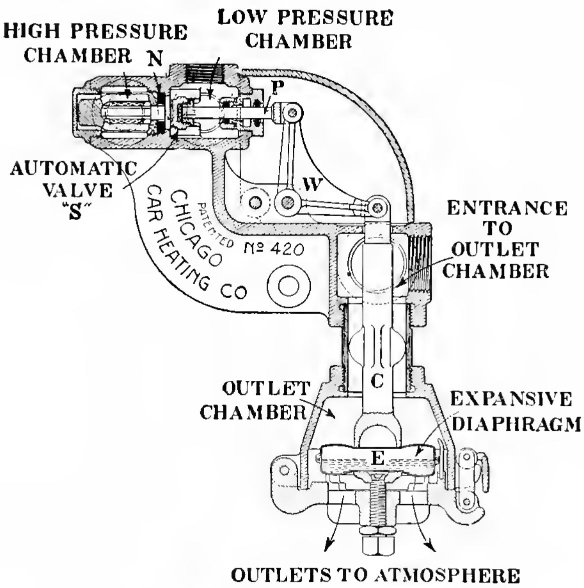


Fig. 2084—Vapor Regulator.

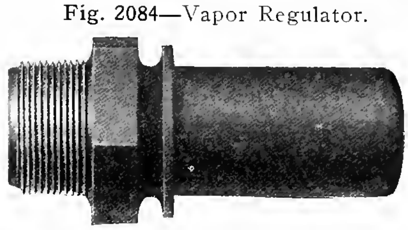
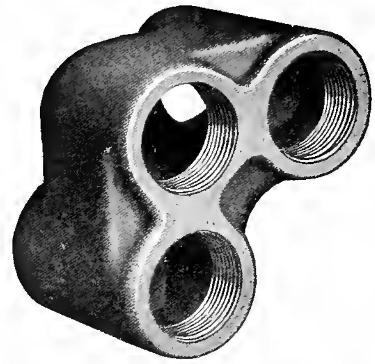


Fig. 2085—Straight Shank Hose Nipple.



Front.

Back.

Fig. 2086—Angle Manifold, 1¼ in.

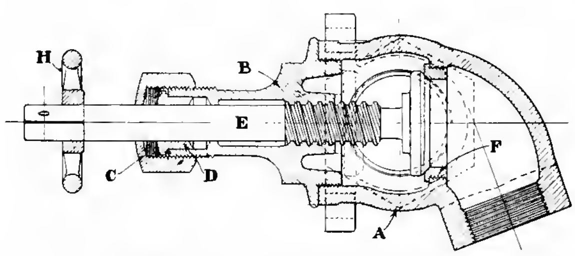


Fig. 2087—Section Through No. 48 End Train Pipe Valve.

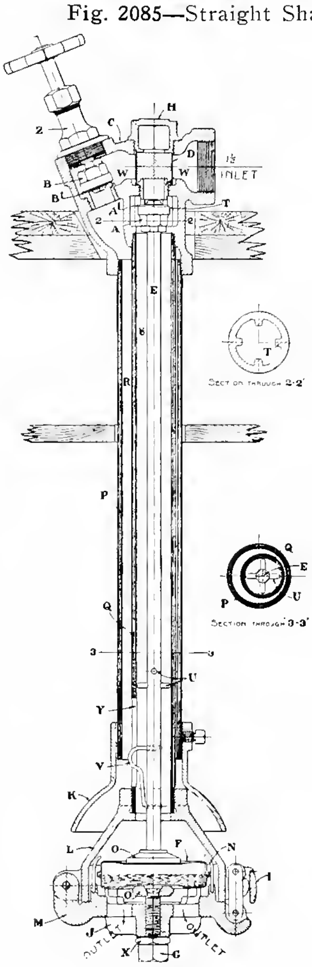


Fig. 2088—Vertical Steam Trap.

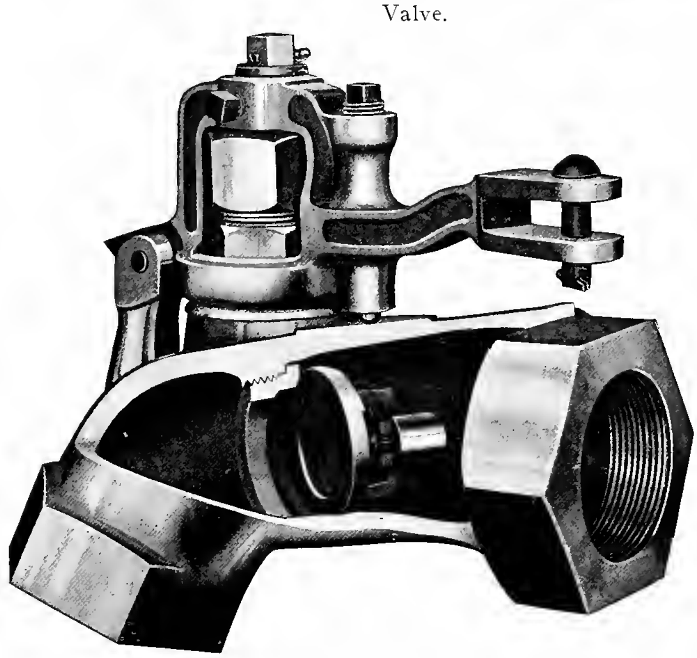


Fig. 2089—End Train Pipe Valve.

Chicago Car Heating Company.

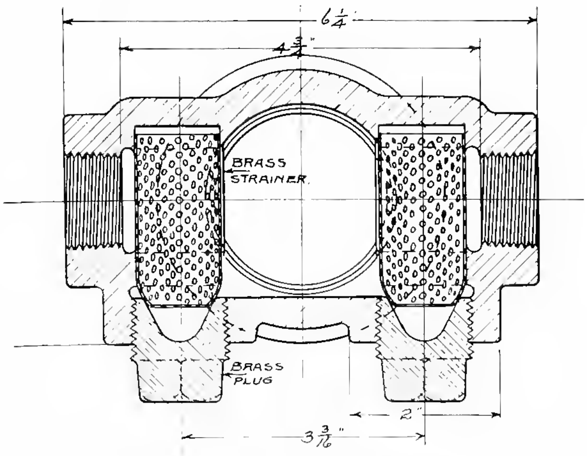


Fig. 2090—Cross Pipe Fitting with Strainers.

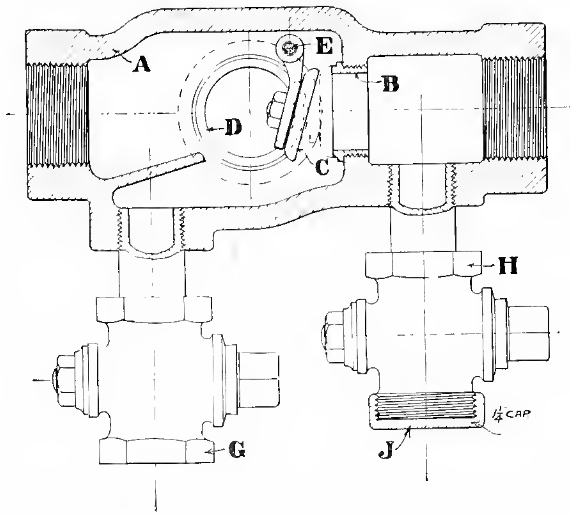


Fig. 2091—Section Through Hot Water Filling Device.

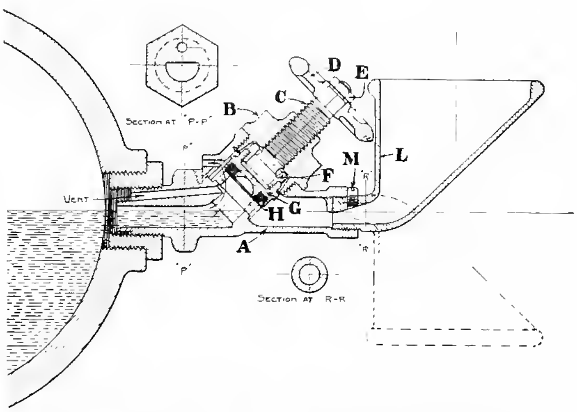


Fig. 2092—Combination Valve for Expansion Drum of Hot Water Circulating Apparatus.

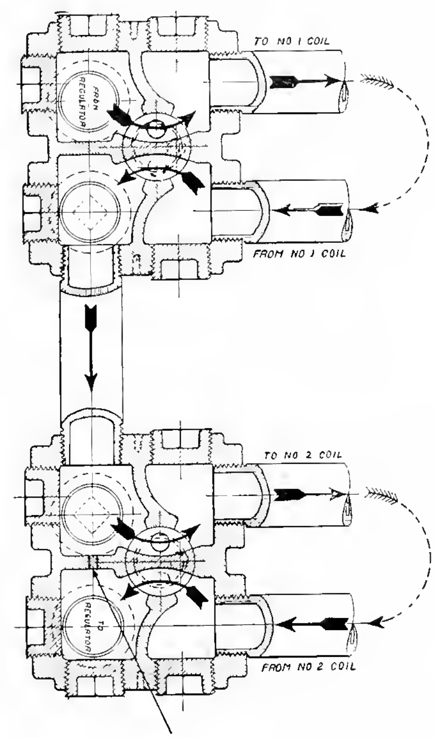


Fig. 2093—Section Through Vapor Cut-Out Valves.

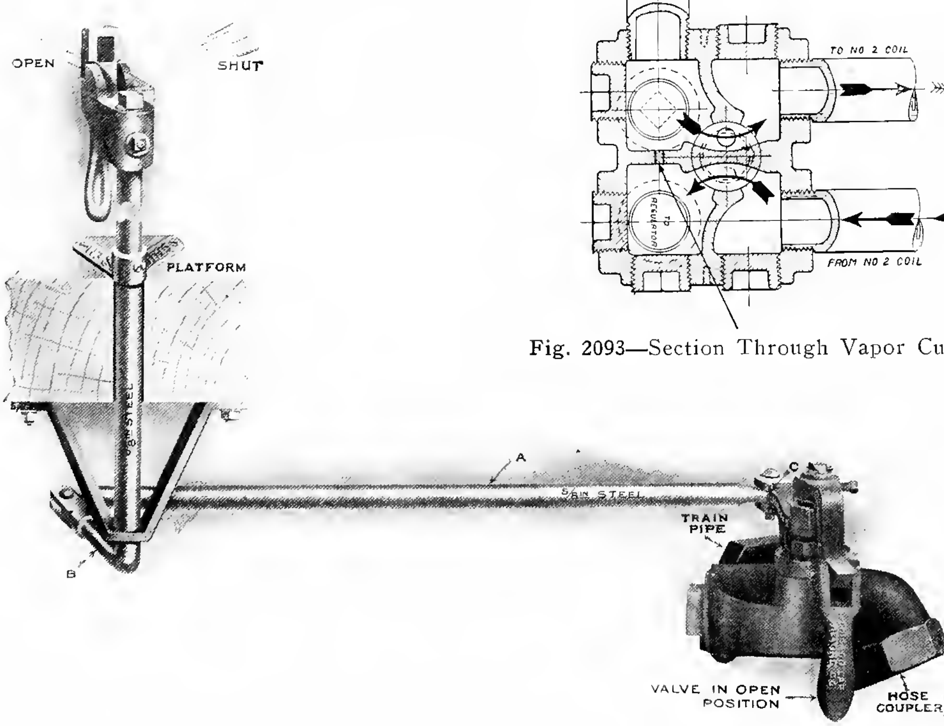


Fig. 2094—Method of Operation of End Train Pipe Valve from Platform.

Chicago Car Heating Company.

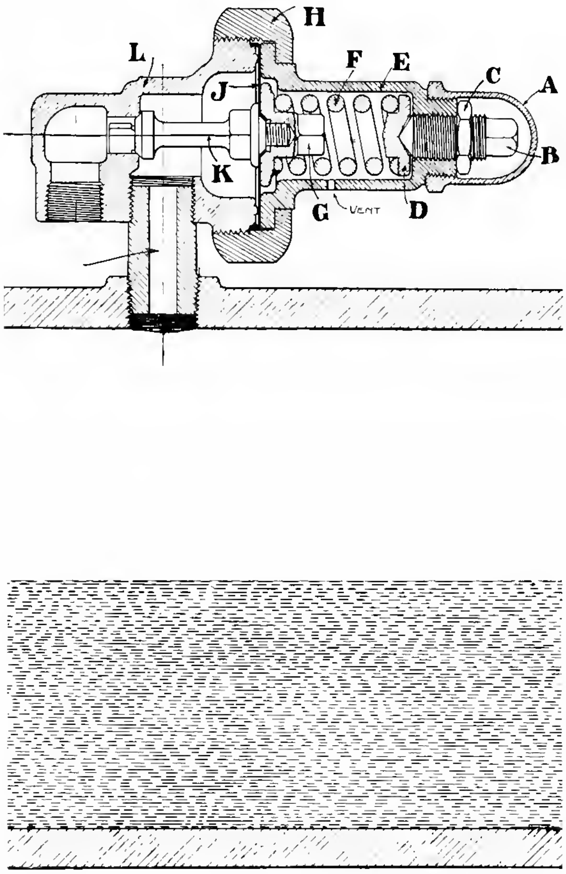


Fig. 2095—Salt Water Safety Valve Applied to Expansion Drum.

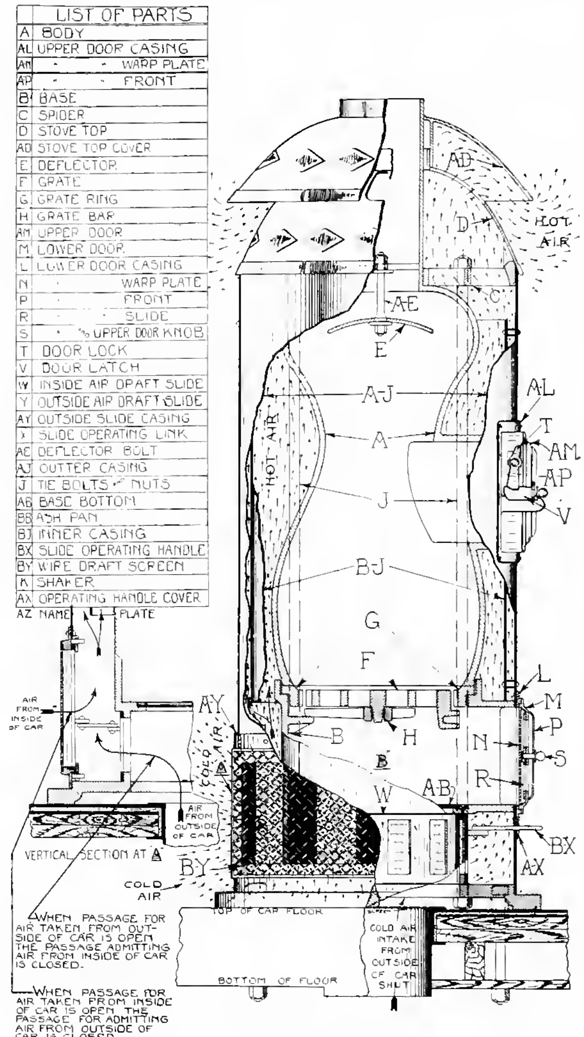


Fig. 2096—Emergency Heating Stove.

Chicago Car Heating Company.

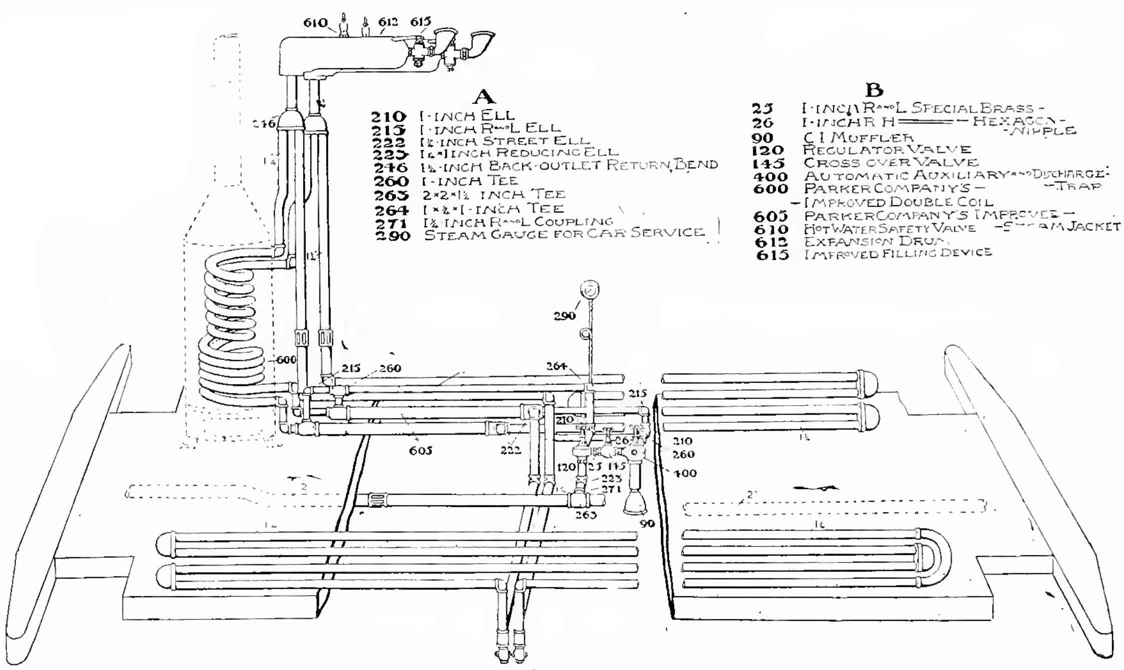
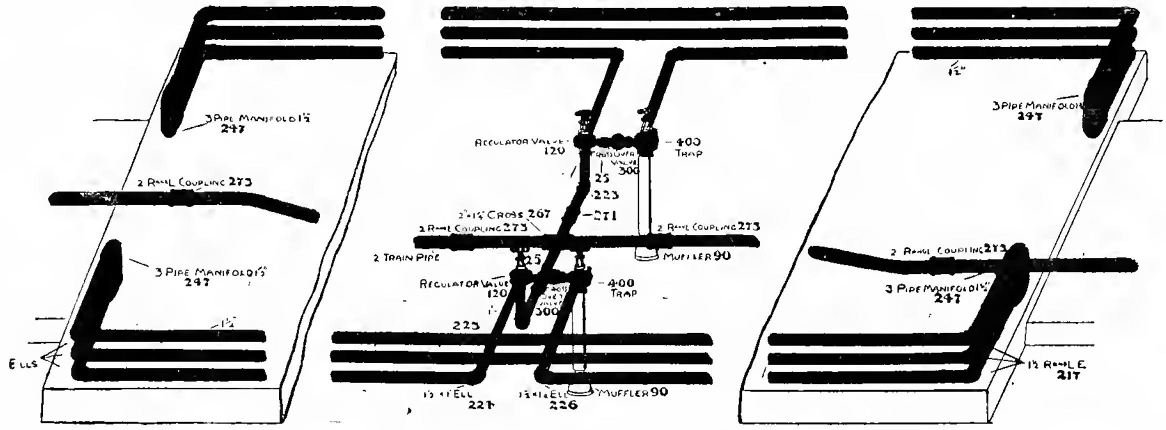
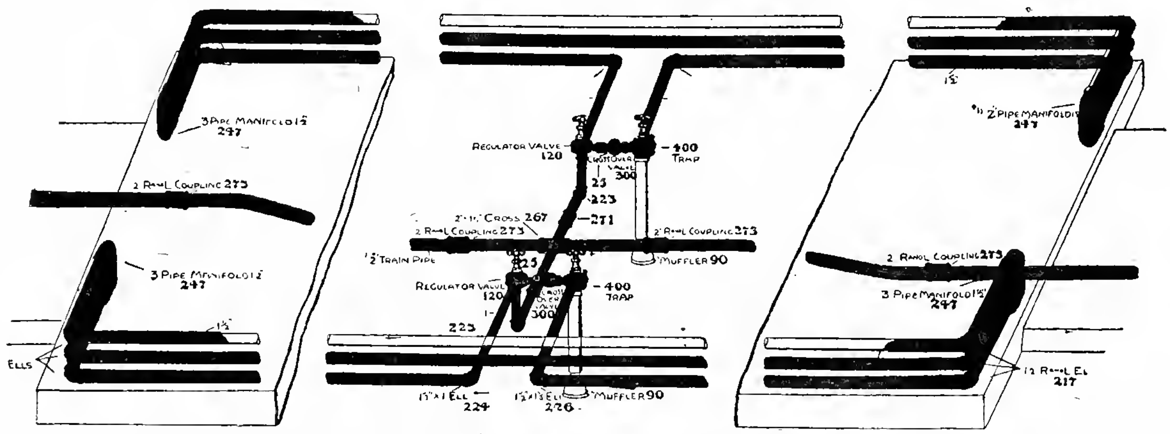


Fig. 2097—Anti-Freezing System of Hot Water Circulation with Improved Steam Jackets and Double Coil.

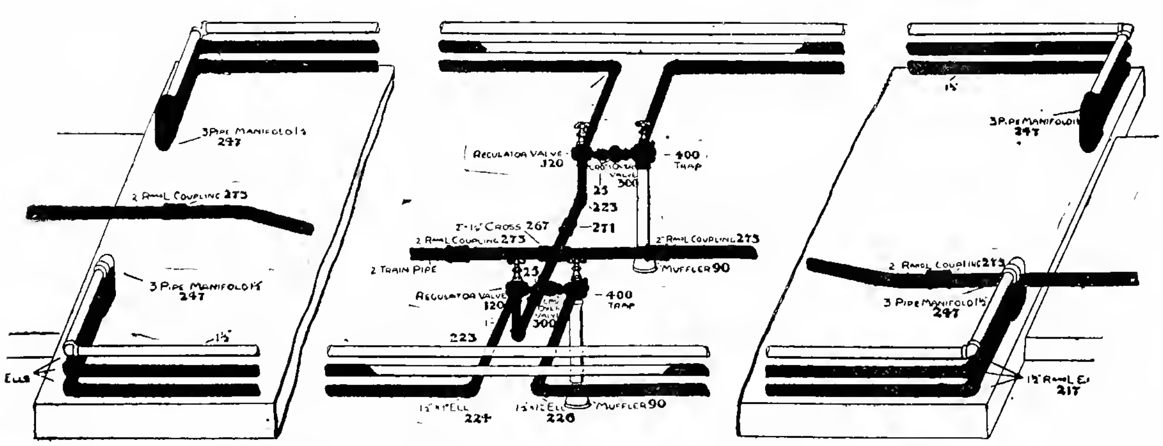
Parker Car Heating Company, Limited.



Regulator Valves in third or full open position, heating 100 per cent. of the radiating surface.



Regulator Valves in second or ½ open position, heating 75 per cent of the total radiating surface.



Regulator Valves in first or ¼ open position, heating 50 per cent. of the total heating surface.

Fig. 2098—Chart Showing Travel of Steam in Radiating Pipes in Parker Heating System.

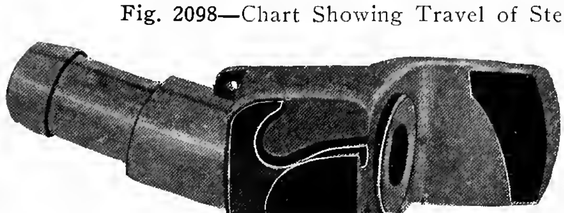


Fig. 2099—Straight Port Steam Hose Coupler. Fig. 2100—Wedge-Shaped Hose Coupler Gasket.

Parker Car Heating Company, Limited.

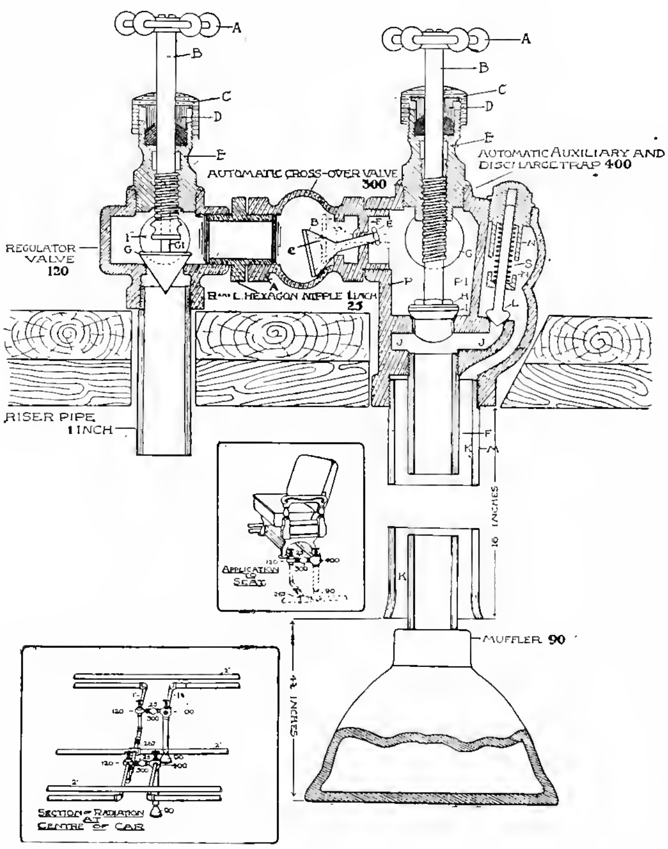
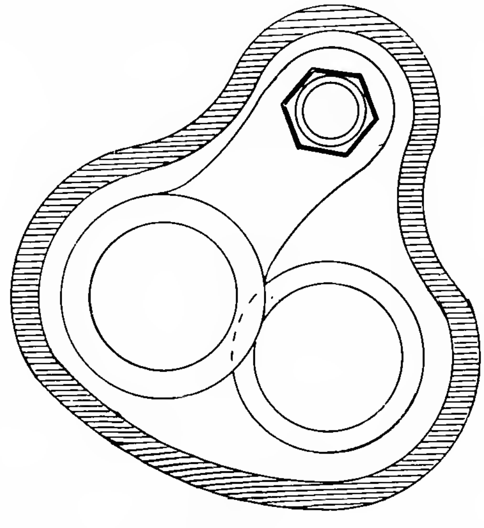


Fig. 2101—E. T. O. Coach Equipment. Parker Car Heating Company, Limited.



Section AA.

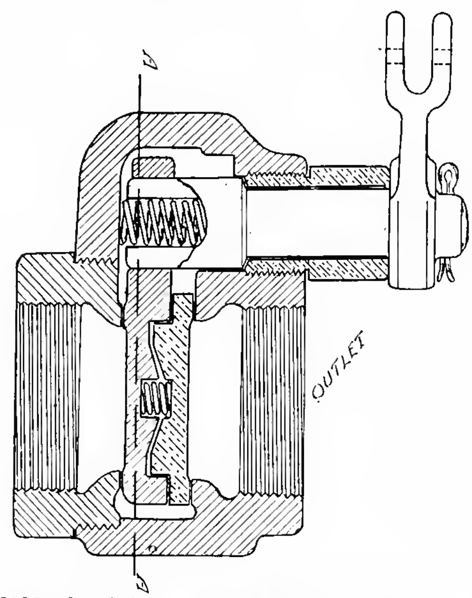


Fig. 2102—Straight Port Trainline Valve. Parker Car Heating Company, Limited.

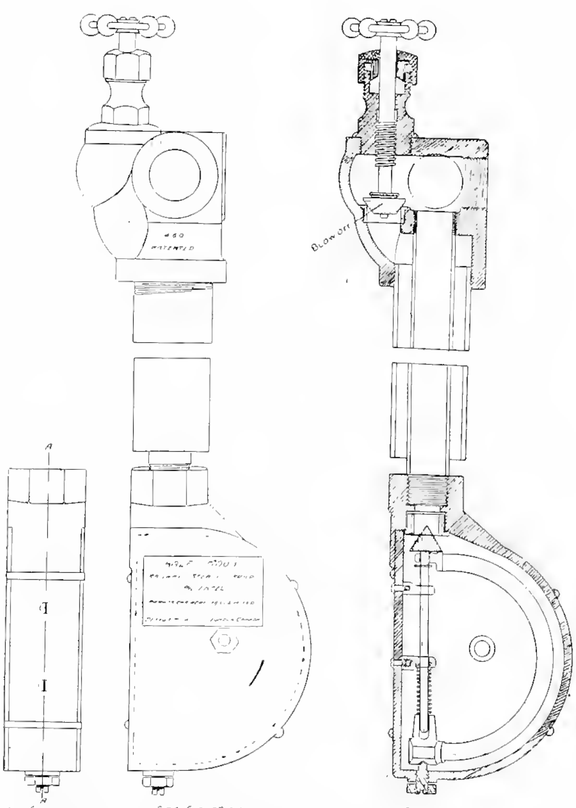


Fig. 2103—Half Moon Steam Trap. Parker Car Heating Company, Limited.

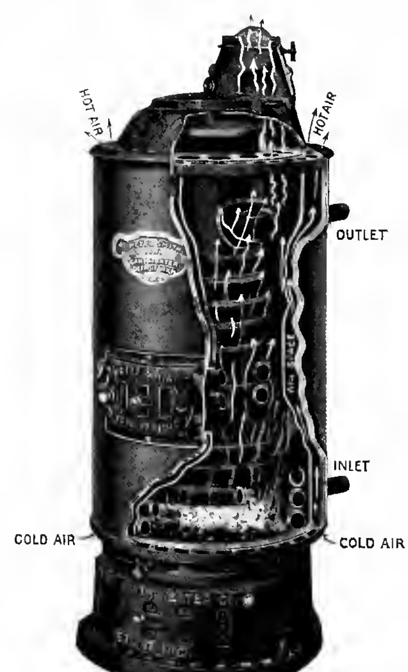


Fig. 2104—Magazine Coil Heater. Peter Smith

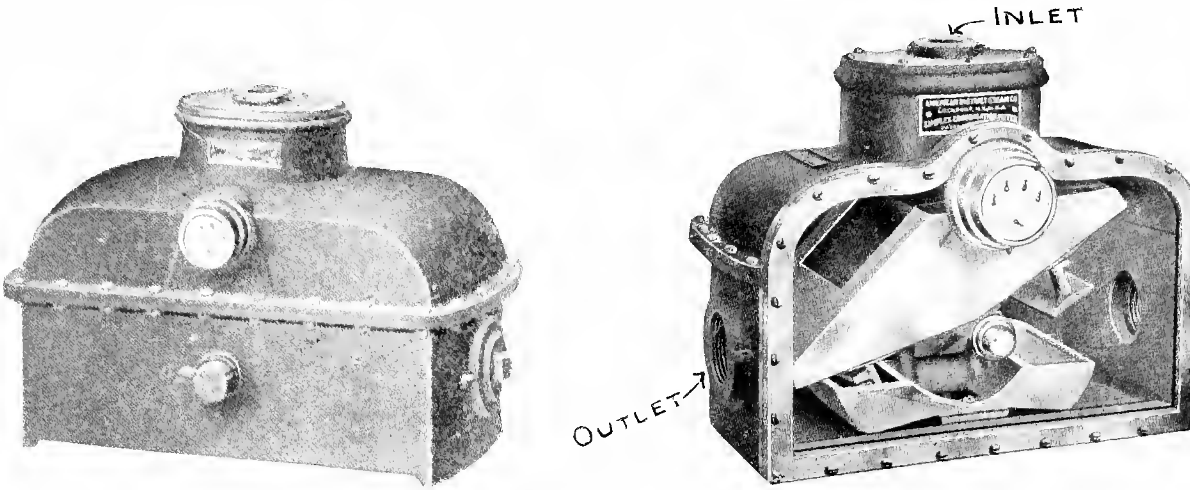


Fig. 2105—Condensation Meter for Measuring Steam Consumption of Car Heating Systems.

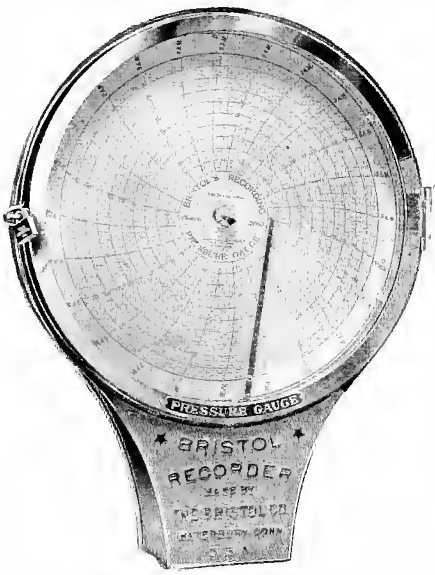


Fig. 2106—Steam Gage for Recording Trainline Pressure.

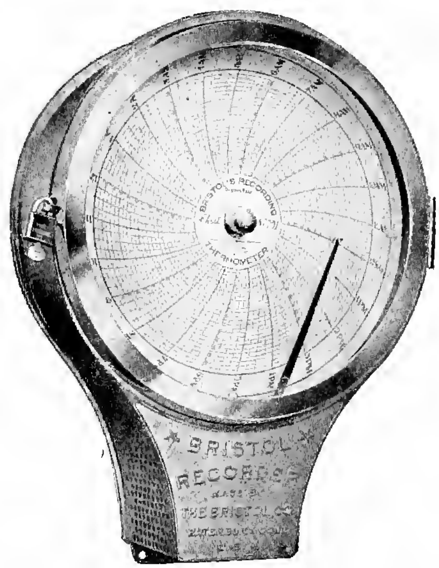
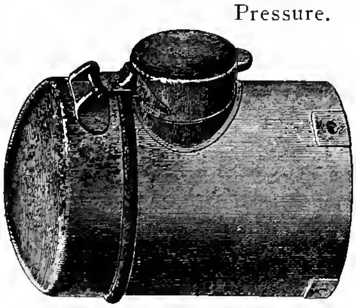
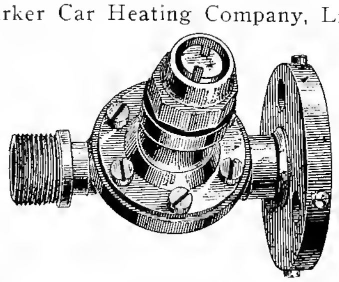


Fig. 2107—Thermometer for Recording Temperature of Car.

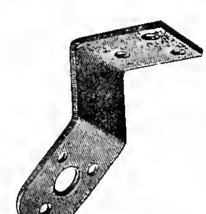
Parker Car Heating Company, Limited.



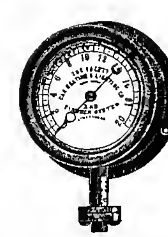
Filling Valve Cover. (F, Fig. 2109.)



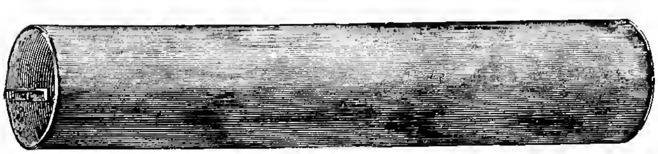
No. 65, Filling Valve for Cars. (Section Shown in Fig. 2115.)



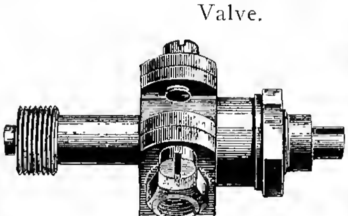
No. 118a, Bracket for Filling Valve.



Gage. (G, Fig. 2109.)



Holder (A, Fig. 2109.)



No. 53b, Holder Valve. (Section Shown in Fig. 2116.)

No. 214a, Gage for Car.

Fig. 2108—Details Used in Pintsch System of Gas Lighting. Safety Car Heating & Lighting Company.

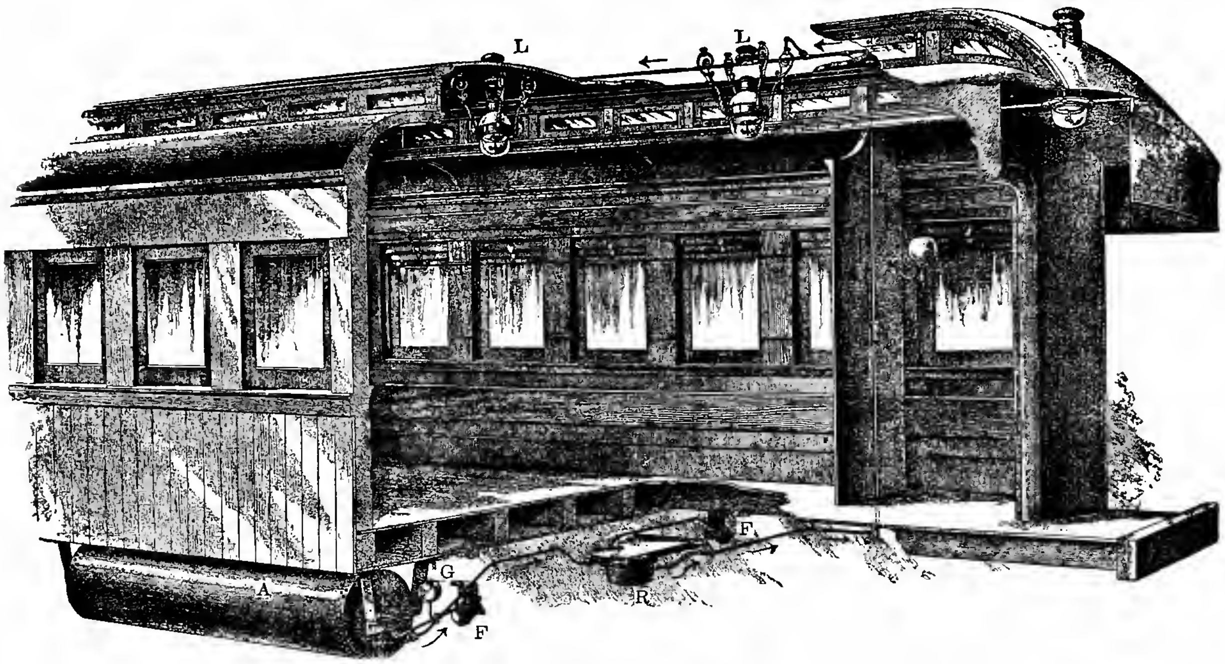
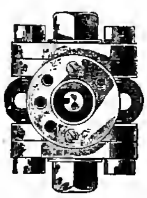
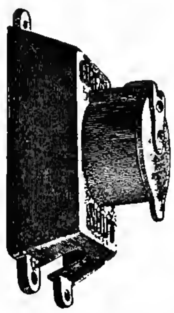


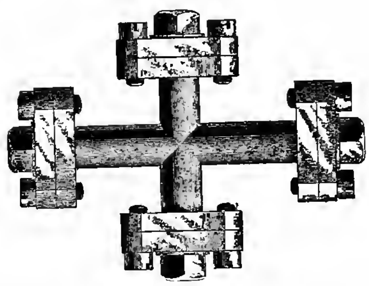
Fig. 2109—Method of Application of Pintsch System of Gas Lighting to Passenger Cars.



Main Cock; ¼, ⅜ and ½ in.



Cover for Main Cocks.

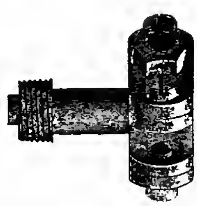


No. 55a, Flanged Cross, ¼ in.

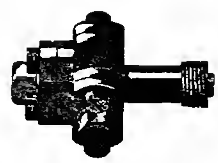
Nos. 54-55, Flanged Tees, ¼ in.

No. 9 Connection. Piece, ¼ in.

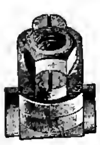
Regulator (R, Fig. 2109.)
No. 244 2 in. Water Pressure.
No. 254 2 lb. Pressure.
No. 1844 6 in. Water Pressure.
No. 1954 1 lb. Pressure.



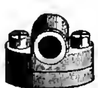
No. 49, Flange Tee for Regulator, ¼ in.



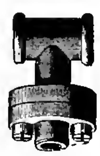
Flange Cross.



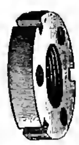
Nos. 12-13, Tee Flange Unions; ¼ by ⅛ in. ¼ by ¼ in.



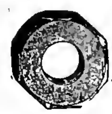
No. 17a, Angle Flange, ⅛ in.



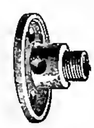
Nos. 16a, b and c, Tee Flanges.



Nos. 3 and 3a, Flange for Nos. 49, 53b, 53a and 120.



Nos. 27-56, Lock Nuts; ⅜ in.; ½ in.



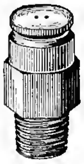
No. 167, Bracket Back; ⅛ in.

Nipple to Support Lamp; ⅜ in.

Regulator Strap.

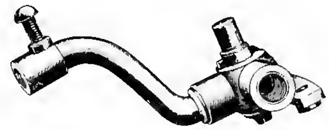
Pipe Strap.

Fig. 2110—Details Used in Pintsch System of Gas Lighting.
Safety Car Heating & Lighting Company.



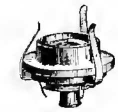
No. 222a, Burner.

Keys for Lamps and Valves.

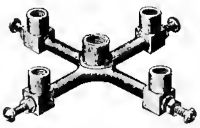


Burner Cock for Lamp.

Burner for Argand Lamp, No. 86a.



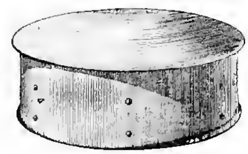
Burner for Argand Lamp, No. 87a.



Four-Flame Cluster.

Cluster for Vestibule Lamp.

Two-Flame Cluster.



Ventilator.

Cover for Main Cocks.

Fig. 2111—Details Used in Pintsch System of Gas Lighting.

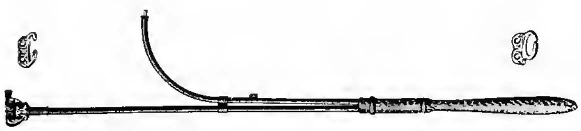


Fig. 2112—Torch and Key.

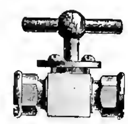


Fig. 2113—Main Cock for Postal Cars.

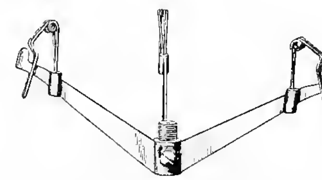


Fig. 2114—No. 80c Shade Holder for No. 236.

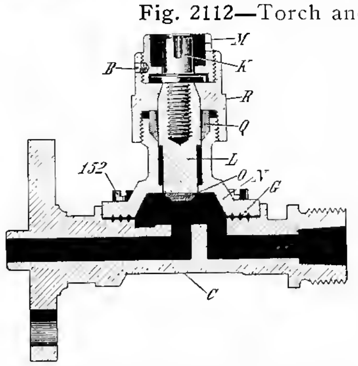


Fig. 2115—Section Through Filling Valve No. 65, Fig. 2108.

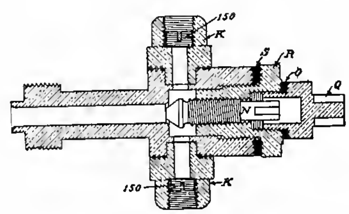


Fig. 2116—Section Through Holder Valve No. 53b, Fig. 2108.

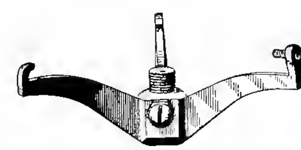


Fig. 2117—Shade Holder No. 80b for Lamp No. 102.

Parts of Fig. 2115.

B	*Set Screw*
C	*Valve Body*
G	*Gasket for Bonnet*
K	*Valve Stem*
L	*Valve Carrier*
M	*Valve Stem Nut*
N	*Bonnet*
O	*Disc*
Q	*Packing*
R	*Packing Nut*
152	*Screw for Bonnet*

Parts of Fig. 2116.

K	*Flanges*	R	*Gland*
N	*Valve*	S	*Gasket for Gland*
O	*Gasket for Cap*	150	*Flange Screws*
Q	*Cap*		

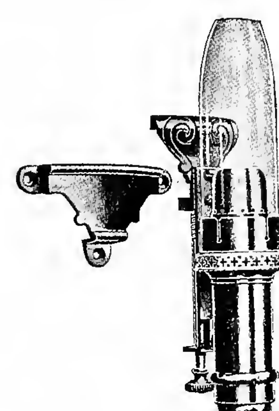


Fig. 2121 — Candle Bracket Lamp No. 232.

Fig. 2118 — Combination Gas and Electric Bracket Lamp No. 373a.

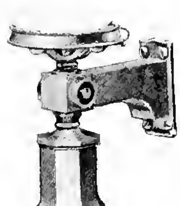


Fig. 2119 — Combination Gas and Electric Bracket Lamp No. 1910a.

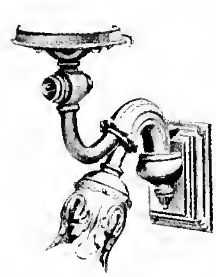


Fig. 2120 — Combination Gas and Electric Bracket Lamp No. 1920a.

Fig. 2122—Bracket Lamp No. 373.

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Fig. 2123—Drop Bracket Lamp No. 377.

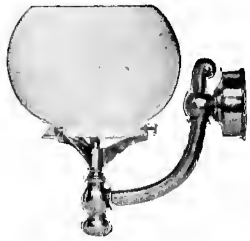

Fig. 2124—Drop Bracket Lamp No. 86.

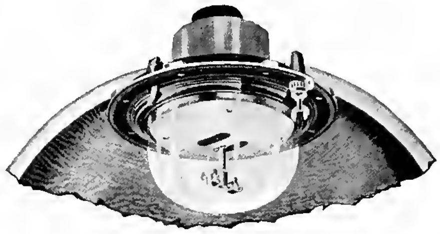

Fig. 2125—Two and Four-Flame Vestibule Lamp.

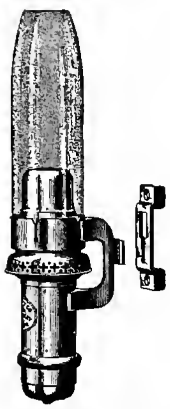

Fig. 2126—Removable Candle Bracket Lamp No. 282.

Fig. 2127—Combination Gas and Electric Deck Lamp.

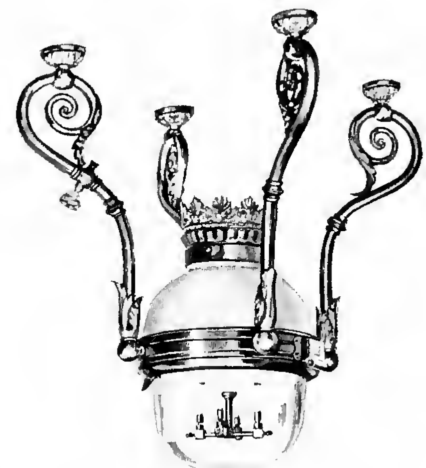

Fig. 2128—Lamp No. 191.

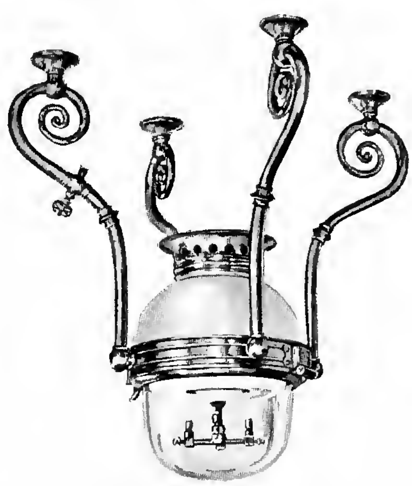

Fig. 2129—Lamp No. 196.

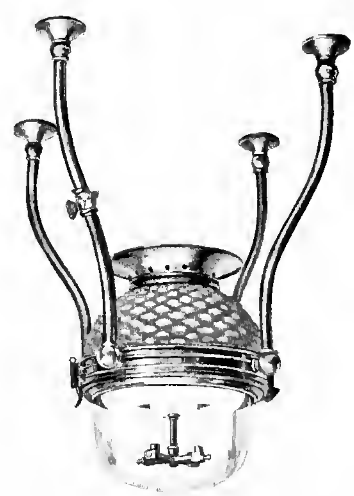

Fig. 2130—Lamp No. 211.

Parts of Gas Lamps, Figs. 2131-2141.

8a *1/8 in. Flange Union*
17a *1/8 in. Angle Flange*
23 *Iron Washer for 3/8 in. Pipe*
24 *Rubber Washer for 3/8 in. Pipe*
26 *3/8 in. Nipple, 6 in. Long*
26b *3/8 in. Nipple, 5 in. Long*
26c *3/8 in. Nipple, 3½ in. Long*
27 *3/8 in. Locknut*
28 *3/8 in. by 1/8 in. Ell*
29 *3/8 in. Cap*
79 *1/8 in. Extra Strong Pipe*
100 *Glass Bowl*
100a *9 in. Pressed Glass Bowl*
101 *Opalescent Dome*
102 *4 in. Opal Globe*
104 *Opal Dome*
107 *Ring Reflector*
109 *Mica Chimney*
110 *Ring Reflector*
111a *Cup Reflector (Porcelain)*
113 *Reflector*
142 *Check Screws for Cluster*
142a *Screw for Bracket*
151 *Screw for Hinge Cover and Spring Catch*
154 *Screw for Center Casting*
155 *Screw for Hinge and Spider*

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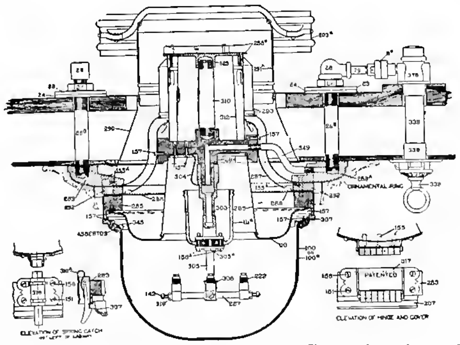

Fig. 2131—Section Through Combination Deck Lamp Nos. 431 and 218.

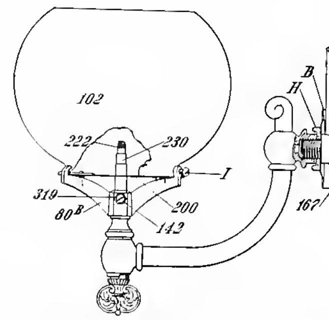

Fig. 2132—Section Through Bracket Lamp No. 86a.

Parts of Gas Lamps. (Continued.)

155a *Screw for Spacing Block and Bracket*
156 *Screw for Hinge Cover and Spring Catch*
156a *Screw for Cluster Stem*
157 *Screw or Reflector*
158 *Screw for Inner Ring or Crown*
167 *Bracket Back*
189 *Screw for Thumb-piece*
200 *4 in. Wind Guard*
203a *Ventilator*
203b *Ventilator*
204 *4⅝ in. Ventilator*
204a *Ventilator*
222a *Burner Tips, Hexagon Base*
226 *Two-flame Cluster*
226a *Two-flame Cluster*
227 *Four-flame Cluster*
230 *Pintsch Pillar*
283 *Cast Iron Body Ring*
284 *Cast Iron Spider*
285 *Enameled Chimney*
286 *Lower Diaphragm*
287 *Upper Diaphragm*
288a *Deflecting Plate and Chimney*
289 *Bracket*
289a *Bracket for Gas-way Connection*
290 *Lower Thimble*
290a *Lower Thimble*
291 *Roof Thimble*
291a *Roof Thimble*
292 *Spacing Block*
293 *Shield*
299 *Asbestos Wick*
301 *Cast Iron Ring*
302 *Spider*
303 *Extension Pillar*
304 *Lock*
305 *Cluster Stem*
305a *Cluster Stem Flange*
305b *Cluster Stem Flange*
305c *Cluster Stem Flange*
306 *Locknut for Cluster Stem*
307 *Bezel or Ring for Bowl*
309 *Gas-way Tube*
310 *Post*
311 *Top Piece for Flues*
312 *Flues*
313 *Chimney*
314 *Ring for Fastening Crown*
315 *Diaphragm*
316 *Spring Catch, Complete*
316a *Spring for Spring Catch*
317 *Hinge Cover*
319 *Locknuts for Check Screws*
320 *Body Casting*
321 *Flues*
322 *Top Piece for Flues*
323a *Diaphragm*
324 *Ventilating Chimney*
325 *Center Post for Flues*
326 *Cock, Complete*
327 *Gas-way*
338 *Cock and Sleeve*
339 *Thumb-piece and Socket for Cock*
345 *Spun Globe Holder Ring*
346 *Deflecting Plate*
348 *6½ in. Ventilator*
349 *Gas-way Tube*
403 *Spring for Catch*
404 *Catch*
417 *Screw*
420 *Screw for Fuse Block Bracket*
439 *Washer for Cock*
439a *Washer for Cock*
444 *Plug and Pin for Cock*
445 *Cap for Cock*
446 *Set Screw for Cap*
447 *Spring for Cock*
472 *Body Casting*
473 *Flues*
474 *Chimney*
492 *10 in. Opal Dome*
493 *10 in. Etched Bowl*
493a *10 in. Clear Glass Bowl*
494 *Bezel*
495 *Spun Globe Holder*
496 *Frame for Dome*
497 *Ring Casting*
498 *Diaphragm*
525 *Top Ring for Flues*
537a *Cup Reflector*
538 *Extension Pillar*
539 *Locknut for Deflecting Plate*
540 *Deflecting Plate*
542 *Top Piece for Flues*
545 *Cover for Flues*
546 *Flue Post*
547 *Screw for Ceiling Plate*
573 *Lower Thimble*
574 *Roof Thimble*
575 *Four-flame Cluster*
575a *Two-flame Cluster*
577 *Cylindrical Reflector*
580 *Body Casting*
583 *Flues*
584 *Body Casting*
586 *Extension Chimney*
589 *Screw for Spun Globe Holder Ring*
590 *Spun Globe Holder Ring*
592 *Flues*
596 *9 in. Clear Glass Bowl*
596a *9 in. Clear Glass Bowl, Etched Figure*
597 *9 in. Etched Bowl*
598 *Screw for Globe Holder*
1617 *Screws for Ring Reflector*
1625 *Ring Reflector*
1637 *Conical Shield*
1646 *6 in. Opal Dome*
1647 *6 in. Etched Bowl*
1648 *Ring Reflector*
1649 *Cup Reflector*
1658 *Cluster Stem*
1659 *Spun Globe Holder Ring*
1660 *Body Casting*
1661 *Frame for Dome*
1662 *Bezel or Globe Ring*
1663 *Extension Pillar*
1664 *Long Bracket*
1665 *Short Bracket*
1667 *Mica Chimney*
1668 *Opal Dome*
1670 *Frame for Dome*
1672 *Cover for Catch*
1673 *Catch*
1674 *Spring for Catch*
1675 *Frame for Dome*
1685 *Bezel*
1686 *Dome Ring Holder*
1687 *Screw for Dome Ring Holder*
1688 *Frame for Dome*
1689 *Ventilator*
1690 *Screw for Catch*
1705 *Lower Thimble*
1708 *Screw for Ornamental Parts*
1708a *Screw for Ornamental Body*
1738 *Screw for Thumb-piece*
1739 *Thumb-piece and Socket for Cock*
1757 *Wood Screw for Ornamental Ring*
1851 *Wood Screw for Ornamental Ring*
1853 *Key for Switch*
1854 *Bracket for Wires*
1855 *Clamp for Wires*
1857 *Bracket for Switch*
1858 *Key for Switch*
1862 *Wood Screws for Ceiling Ring*
1873 *Porcelain Insulator Clamp*
1877 *Washer for No. 1873*
1878 *Washer for No. 1855*

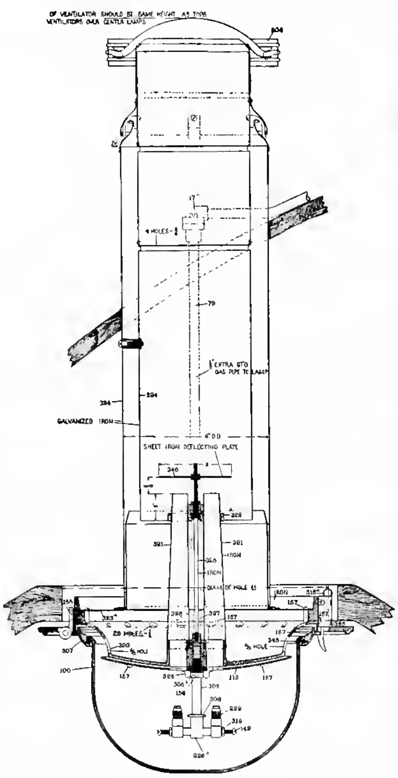

Fig. 2133—Section Through Vestibule Lamp No. 194.

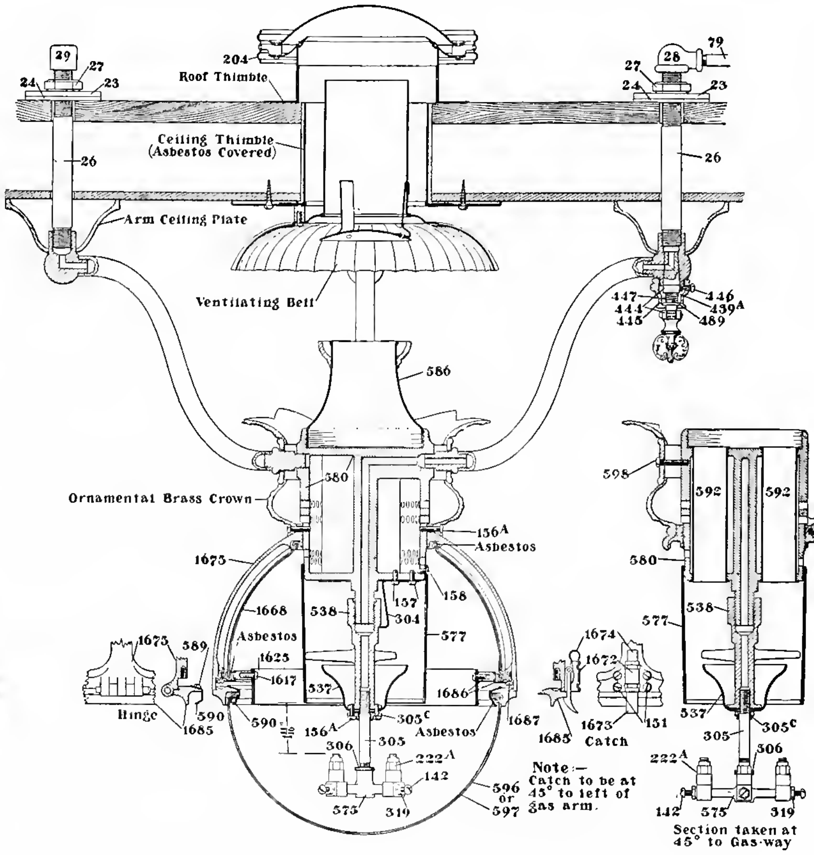

Fig. 2134—Section Through Lamp No. 427.

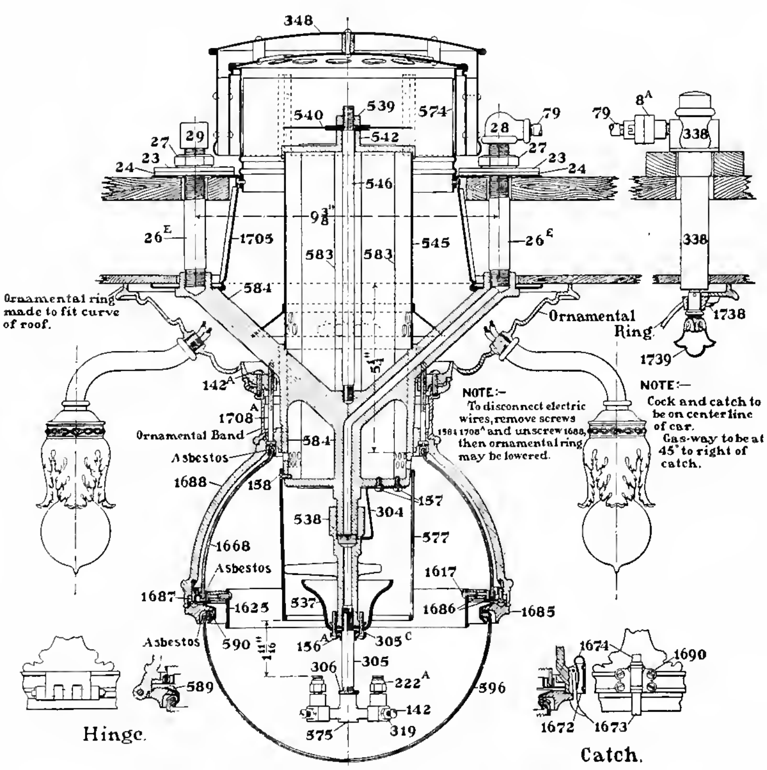

Fig. 2135—Section Through Combination Deck Lamp No. 1680a.

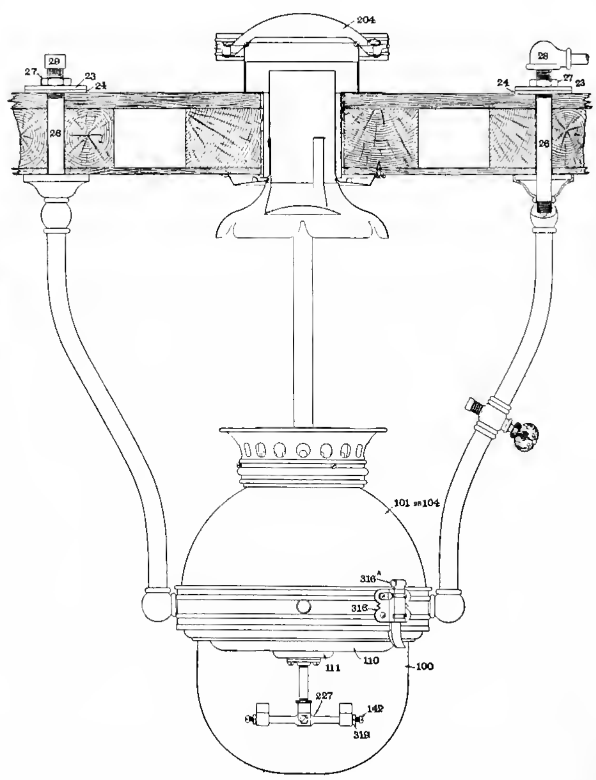

Fig. 2136—Method of Hanging Four-Arm Lamp.

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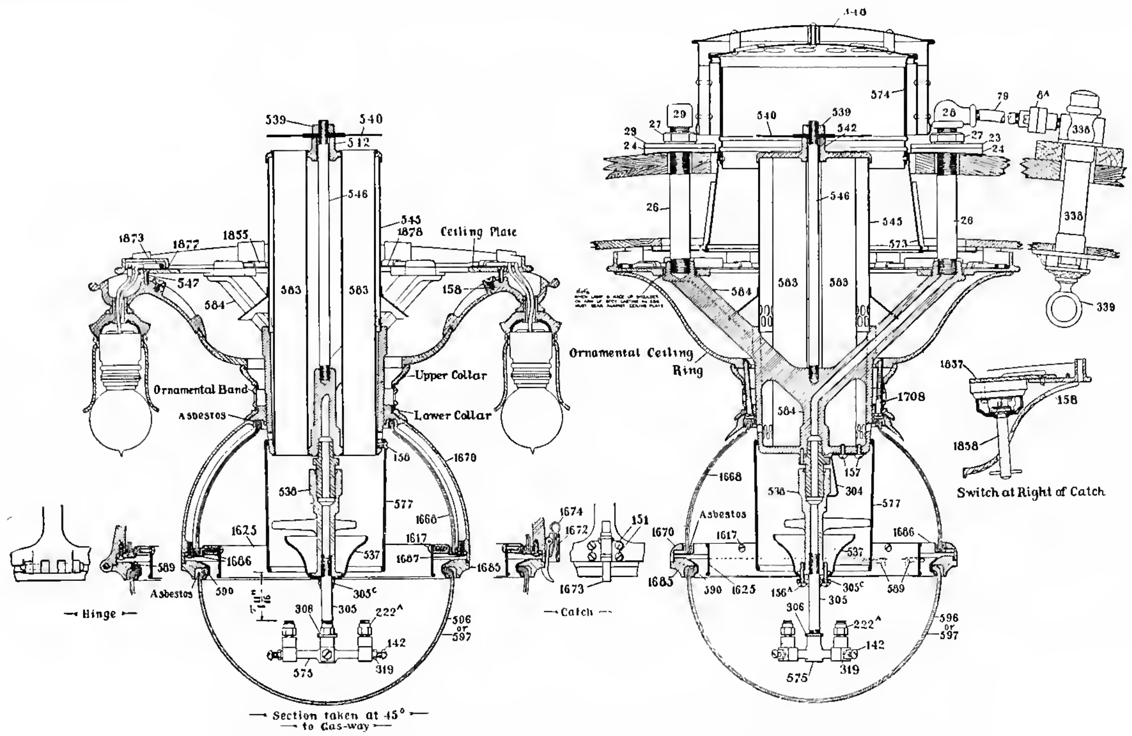

Fig. 2137—Section Through Combination Deck Lamp No. 440a.

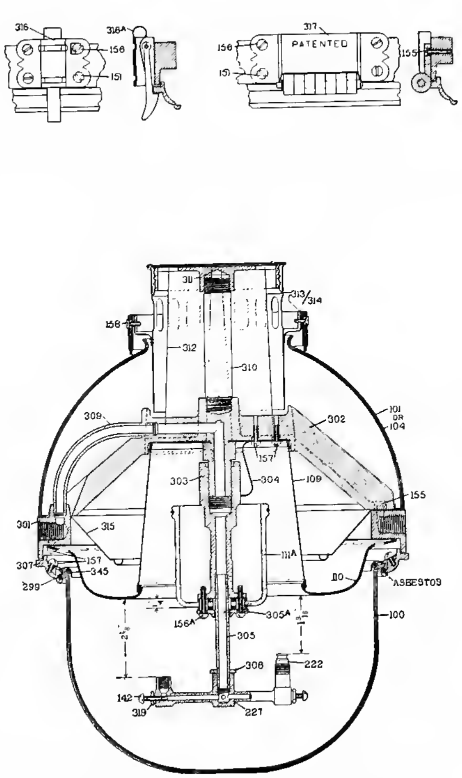

Fig. 2138—Section Through Standard Lamp Body.

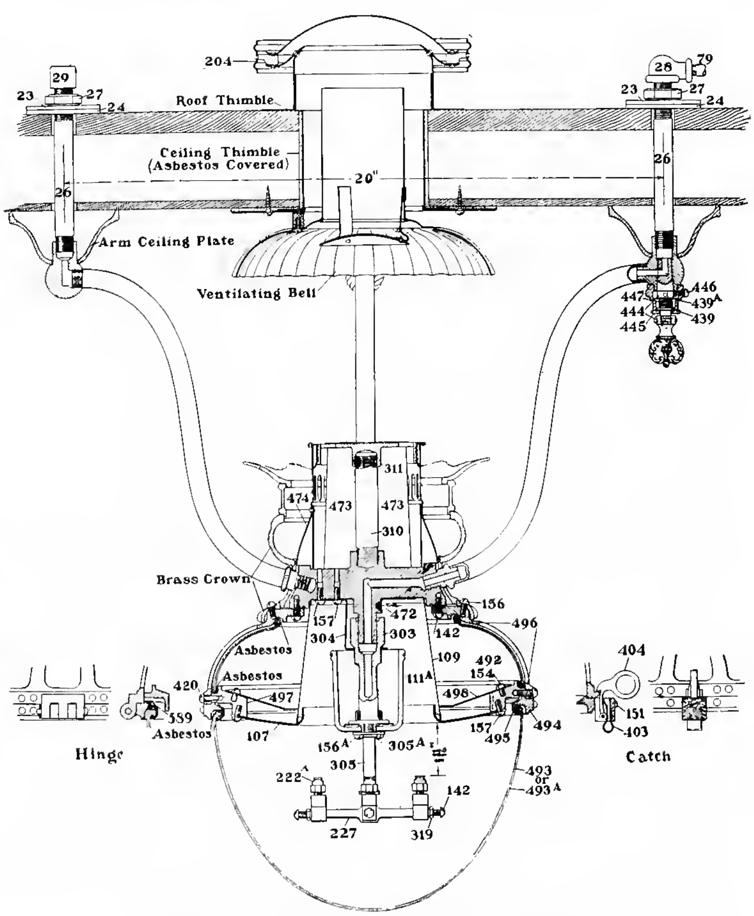

Fig. 2139—Section Through Lamp No. 438.

Safety Car Heating & Lighting Company.

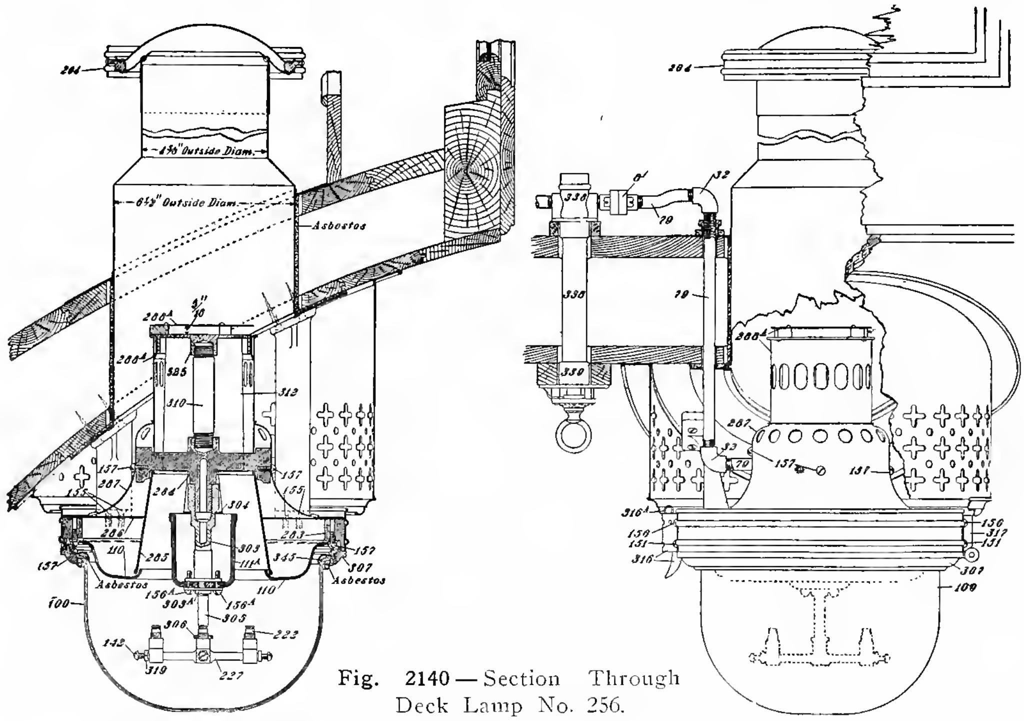

Fig. 2140 — Section Through Deck Lamp No. 256.

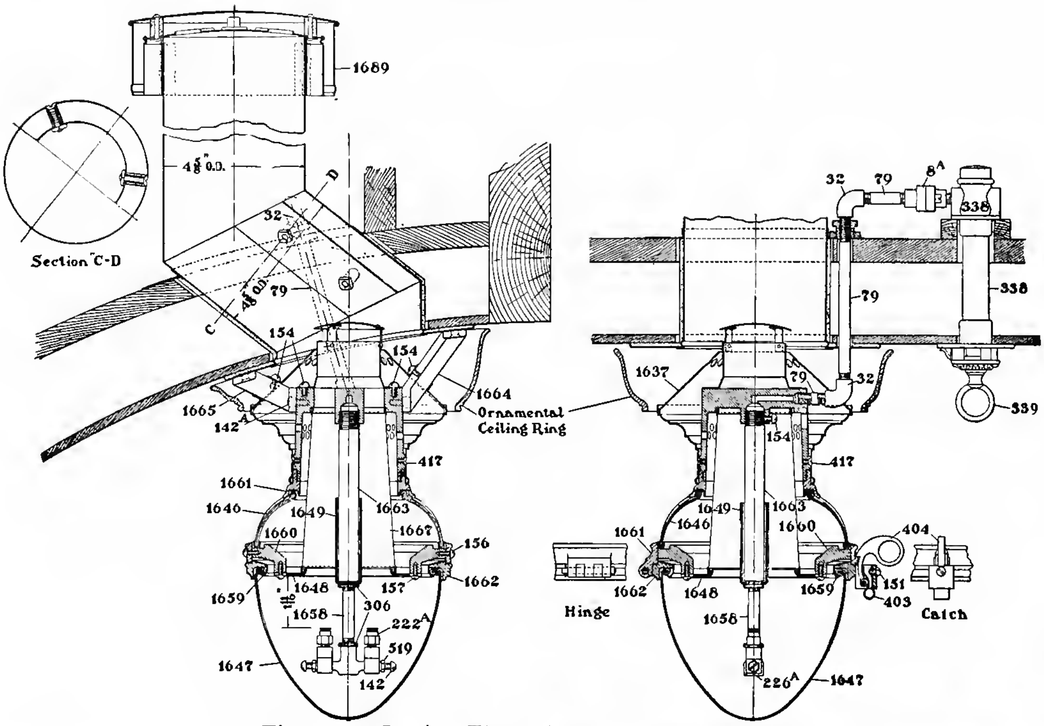

Fig. 2141—Section Through Deck Lamp No. 442.

Fig. 2142—Deck Mantle Lamp No. 2532.

Fig. 2143—Bracket Mantle Lamp No. 2515.

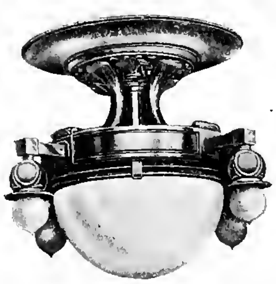

Fig. 2144—Combination Deck Mantle Lamp No. 2511a.

Fig. 2145—Deck Mantle Lamp No. 2511.

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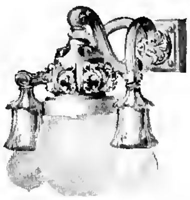

Fig. 2146—Combination Bracket Mantle Lamp No. 2556a.

Fig. 2147—Bracket Mantle Lamp No. 2556.

Fig. 2148—Bracket Mantle Lamp No. 2534.

Fig. 2149—Wall Mantle Lamp No. 2513.

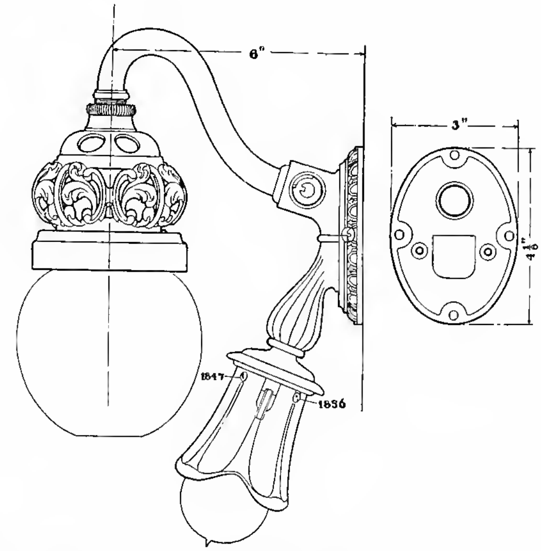

Fig. 2150—Combination Bracket Mantle Lamp No. 2550a.

Fig. 2151—Mantle Lamp No. 3599.

Fig. 2152—Mantle Lamp No. 3572.

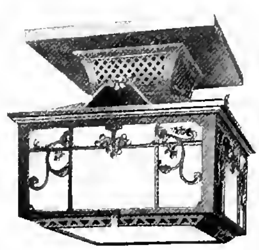

Fig. 2153—Mantle Lamp No. 3577A.

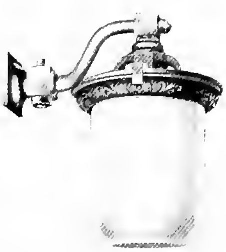

Fig. 2154—Bracket Mantle Lamp No. 2563.

Fig. 2155—Mantle Lamp No. 3583B.

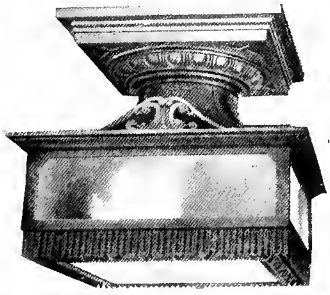

Fig. 2156—Mantle Lamp No. 3581A.

Fig. 2157—Mantle Lamp No. 3534.

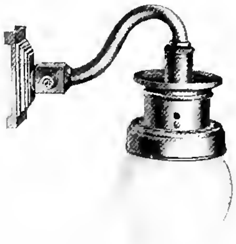

Fig. 2158—Bracket Mantle Lamp No. 2587.

Fig. 2159—Mantle Lamp No. 3542A.

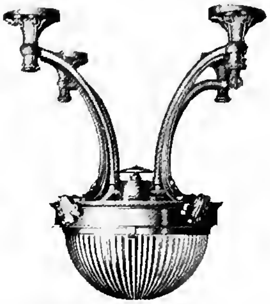

Fig. 2160—Mantle Lamp No. 3598A.

Fig. 2161—Mantle Lamp No. 3540.

Fig. 2162—Mantle Lamp No. 3566A.

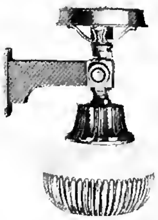

Fig. 2163—Combination Bracket Mantle Lamp No. 8500A.

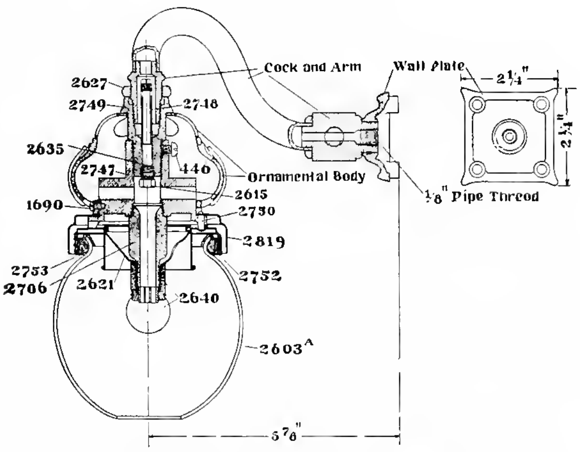

Fig. 2164—Section Through Bracket Mantle Lamp No. 2536.

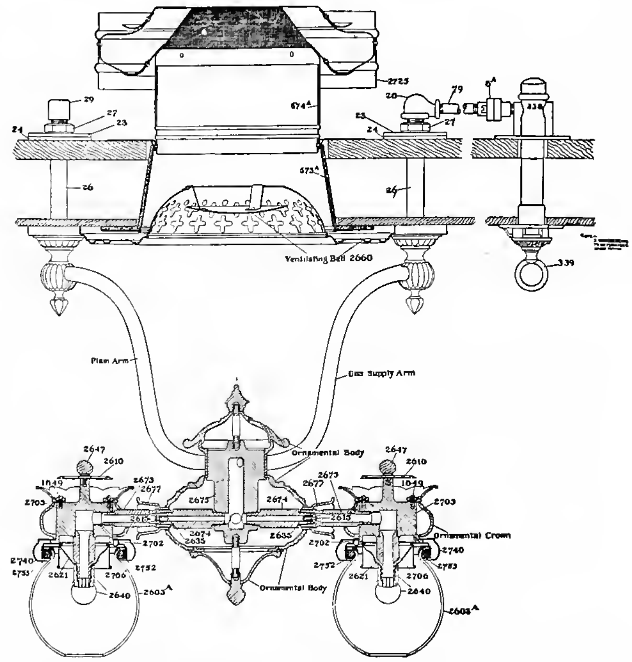

Fig. 2165—Section Through Mantle Lamp No. 2505.

Parts of Mantle Lamps, Figs. 2164-2173.

- 8a *⅛ in. Flange Union*
- 23 *Iron Washer*
- 24 *Rubber Washer*
- 26 *⅜ in. Nipple, 6 in. Long*
- 26d *⅜ in. Nipple, 4 in. Long*
- 26c *⅜ in. Nipple, 3½ in. Long*
- 26f *⅜ in. Nipple, 6½ in. Long*
- 27 *⅜ in. Locknut*
- 28 *⅜ in. by ⅛ in. Ell*
- 29 *⅜ in. Cap*
- 30 *⅜ in. Tee*
- 31 *⅜ in. Plug*
- 79 *⅛ in. Extra Strong Pipe*
- 100 *Glass Bowl*
- 142a *Screw for Ornamental Ring*
- 151 *Screw for Deflecting Plate*
- 154 *Screw for Deflecting Plate*
- 155 *Screw for Hinge*
- 155a *Screw for Body Casting*
- 156 *Screw for Catch Cover*
- 157 *Screws for Reflector, Catch, etc.*
- 157a *Screw for Porcelain Clamp*
- 158 *Screw for Ceiling Plate*
- 204a *Ventilator*
- 307 *Bezel*
- 316a *Spring for Catch*
- 326 *Cock, Complete*
- 338 *Cock and Sleeve*
- 339 *Thumb-piece for Cock*
- 345 *Spun Globe Holder Ring*
- 413 *Screw for Husk*
- 417 *Screw for Bezel*
- 421 *Screw for Ornamental Cage*
- 439 *Washer for Lamp Cock (Thick)*
- 439A *Washer for Lamp Cock (Thin)*
- 446 *Set Screw for Extension Pillar*
- 447 *Spring for Lamp*
- 573 *Lower Thimble*
- 574 *Roof Thimble*
- 574A *Roof Thimble*
- 589 *Screw for Spun Globe Holder*
- 1527 *Screw for Top and Side pieces of Bezel*
- 1672 *Cover for Catch*
- 1690 *Screw for Ornamental Body*
- 1816 *⅜ in. Close Nipple*

(Continued on next page.)

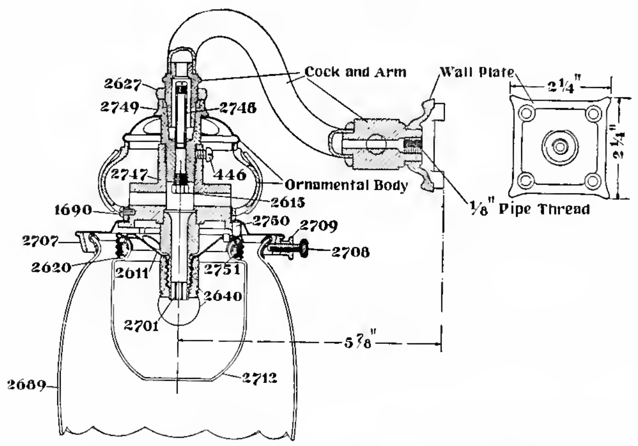

Fig. 2166—Section Through Bracket Mantle Lamp No. 2515.

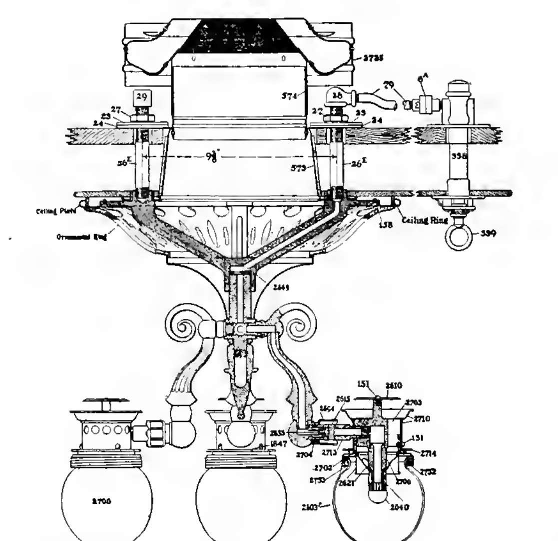

Fig. 2167—Section Through Mantle Lamp No. 2501.

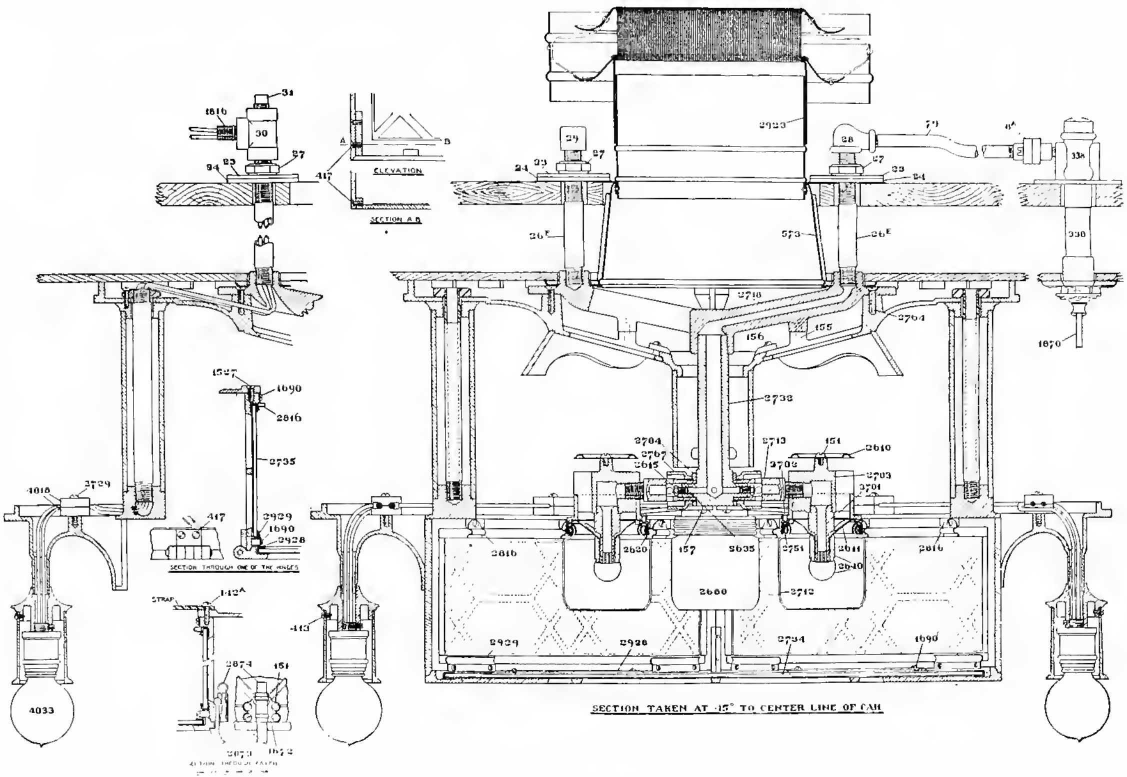

Fig. 2168—Section Through Mantle Lamp No. 2523a.

Parts of Mantle Lamps.

(Continued from Page 800.)

1847	*Screw for Spring Lock*
1849	*Screw for Ornamental Ring*
1853	*Key for Switch*
1862	*Wood Screw for Ornamental Ring*
1870	*Thumb-piece for Cock*
1873	*Porcelain Insulator Clamp*
2601	*11 in. Spherical Bowl, Clear Glass*
2603A	*Opal Bowl*
2605	*Body Ring*
2606	*Ceiling Ring*
2608	*Reflector*
2610	*Deflecting Plate*
2611	*Mantle and Globe Holder*
2615	*Gas Tip*
2619	*Cover for Catch*
2620	*Globe Ring*
2621	*Mantle and Globe Holder*
2627	*Locknut*
2634	*Ventilating Chimney*
2635	*Screen for Gas Tip*
2640	*Mantle*
2647	*Pinnacle for Deflector*
2658	*Catch Cover*
2659	*Catch*
2667	*⅜ in. by ⅛ in. Angle Flange*
2669	*Spider Casting*
2673	*Air Mixer*
2674	*Gas Tube*
2675	*Center Casting*
2677	*Air Shield*
2678	*Vulcabeston Washer*
2679	*Extension Piece*
2680	*Incandescent Gas Bulb, Complete*
2694	*Air Shield*
2695	*Bezel*
2697	*Spun Globe Holder*
2698	*11 in. Etched Glass Bowl*
2700	*Incandescent Bulb and Globe, Complete*
2701	*Burner Nozzle*
2702	*Spring Lock*
2703	*Lamp Body*
2704	*Washer*
2705	*Air Mixer*
2706	*Burner Nozzle*
2707	*Shade Holder*
2708	*Thumb Screw*
2709	*Thumb-Screw Locknut*
2710	*Spun Crown*
2711	*Thimble and Flange*
2712	*Clear Glass Bowl*
2713	*Air Mixer*
2714	*Shield*
2717	*Bezel*
2718	*Body Casting*
2719	*Catch*
2720	*Brace for Catch*
2721	*Body Ring*
2722	*Cluster Stem*
2724	*Cluster Stem Strap*
2725	*Ventilator*
2726	*Porcelain Clamp*
2727	*Vulcabeston Washer*
2728	*Screw for Ornamental Arm*
2729	*Screw for Porcelain Clamp*
2730	*Roof Thimble*
2732	*Cluster Stem*
2734	*Bottom Glass*
2735	*Side Glass*
2737	*Catch*
2738	*Spring for Catch*
2740	*Spun Ring*
2742	*Clamps for Bottom and Side Glass*
2743	*Clamps for Side Glass*
2747	*Lamp Body*
2748	*Gas Strainer*
2749	*Extension Pillar*
2749A	*Extension Pillar*
2750	*Spring Lock*
2751	*Inner Globe Ring*
2752	*Outer Globe Ring*
2753	*Inner Globe Ring*
2754	*Spring Pin*
2764	*Screw for Ornamental Ring*
2767	*Air Shield*
2782	*Body Ring*
2783	*Center Casting*
2816	*Clamp for Glass*
2823	*Shield*
2873	*Catch*
2883	*Cluster Stem*
2886	*Gas-way Bracket*
2887	*Thumb-piece and Plug for Cock*
2890	*Electric Switch*
2893	*Bracket for Catch*
2904	*Brace for Lamp Bodies*
2905	*Ceiling Thimble*
2908	*Ceiling Thimble*
2911	*Ventilating Bell*
2917	*Bracket for Switch*
2918	*Ceiling Thimble*
2922	*Collar for Electric Nipple*
2923	*Roof Thimble*
2928	*Bezel Clamp for Glass*
2929	*Side Clamp for Glass*
2953	*Bonnet for Cock*
2954	*Thumb-piece and Plug for Cock*
3162	*Wood Screw*
3170	*Body Casting*
4018	*Wire Cleat*
4033	*Electric Bulb*

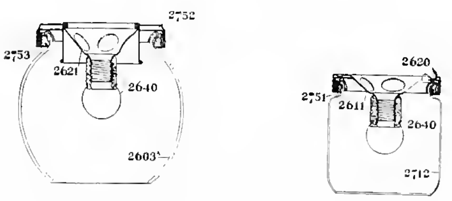

Fig. 2169—Sections Through Mantle Lamp Bulbs.

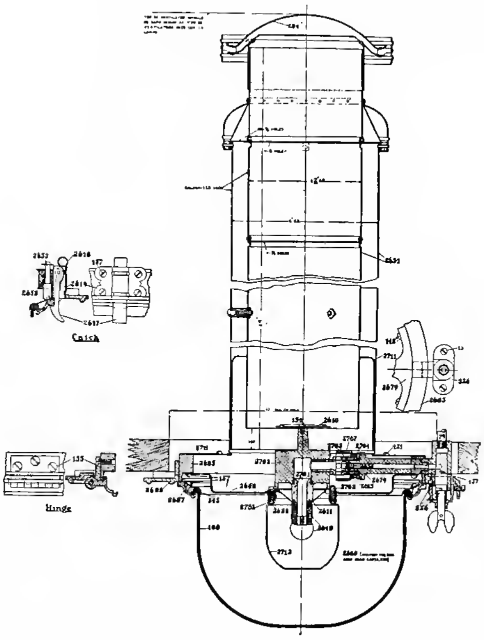

Fig. 2170—Section Through Vestibule Mantle Lamp No. 2594.

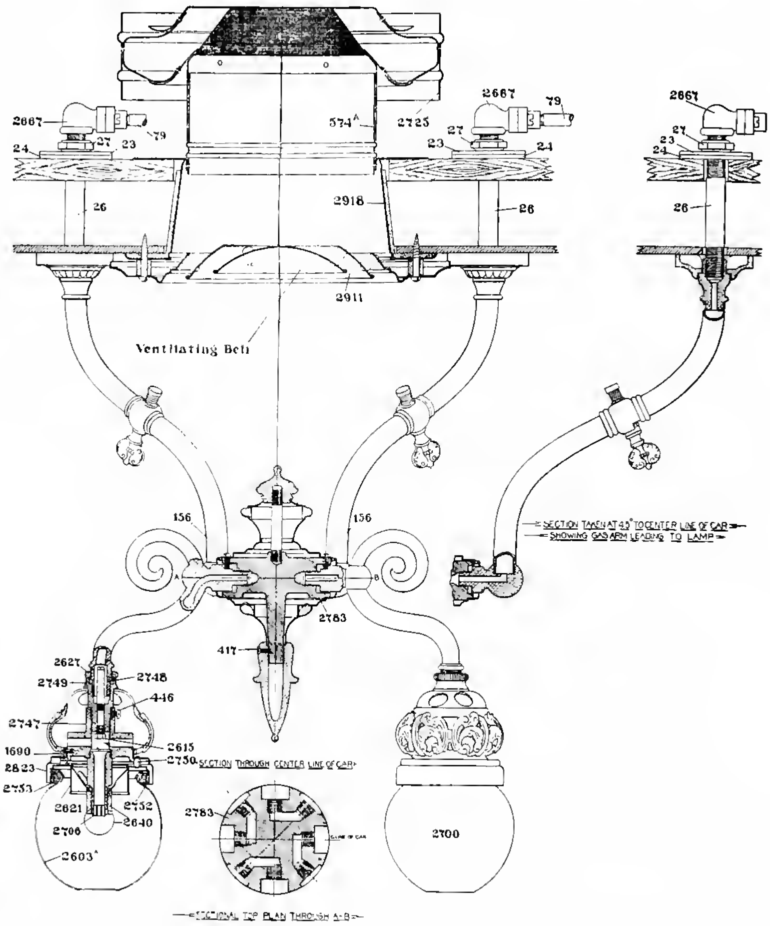

Fig. 2171—Section Through Mantle Lamp No. 2524.

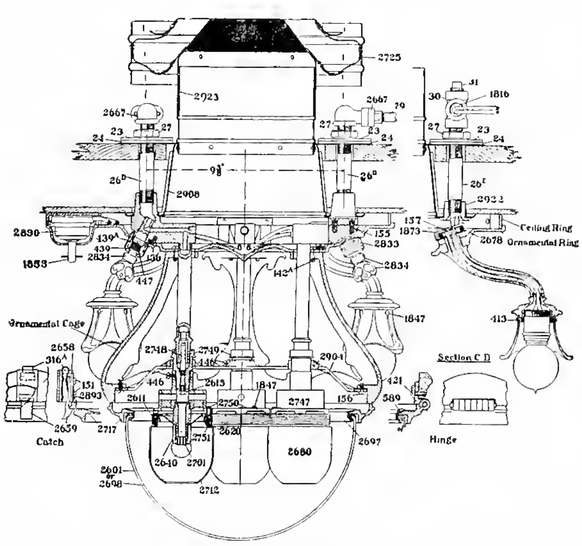

Fig. 2172—Section Through Mantle Lamp No. 2503a.

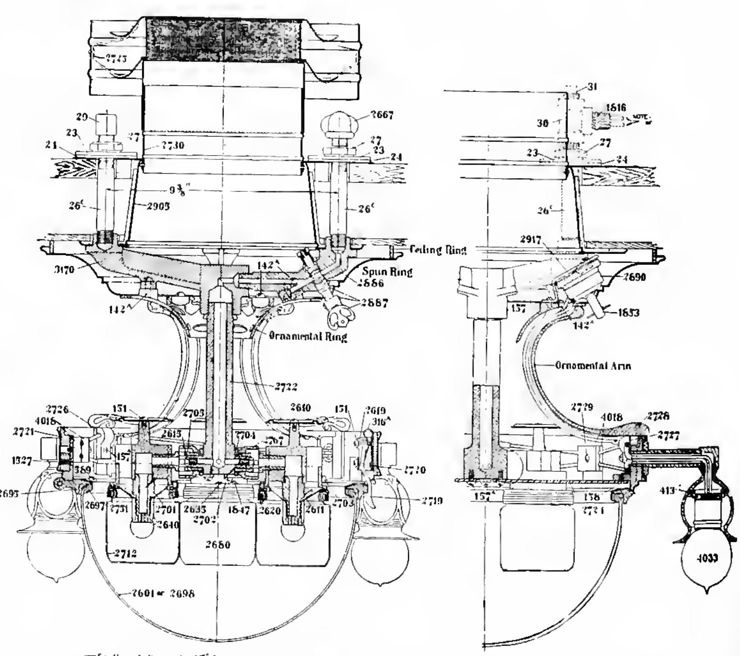

Fig. 2173—Section Through Mantle Lamp No. 2511a.

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Parts of Mantle Lamps, Figs. 2174-2183.

8A ⅛ in. Flange Union
23 Iron Washer
24 Rubber Washer
26 ⅜ in. Nipple, 6 in. Long
26B ⅜ in. Nipple, 5 in. Long
26E ⅜ in. Nipple, 4¾ in. Long
26F ⅜ in. Nipple, 6½ in. Long
26I ⅜ in. Nipple, 6¼ in. Long
27 ⅜ in. Locknut
28 ⅜ in. x ⅛ in. Ell
29 ⅜ in Cap
30 ⅜ in. Tee
31 ⅜ in. Plug
79 ⅛ in. Extra Strong Pipe
102 4 in. Opal Bowl
142A Screw for Gas Cock Body
151 Screw for Catch, etc.
156 Screw for Bracket
157 Screw for Body Casting
157A Screw for Ceiling Ring
158 Screw for Switch Bracket
167 Wall Plate
200 Wind Guard
204 4⅝ in. Ventilator
222A Burner Tip
230 Pintsch Pillar
307 Bezel
316A Spring for Catch
319 Locknut
324 Ventilating Chimney
326 Cock Complete
338 Cock and Sleeve
339 Thumb-piece and Socket for Cock
345 Spun Globe Holder
413 Screw for Husk
420 Screw for Crown
421 Screw for Thimble
439 Thick Washer for Cock
439A Thin Washer for Cock
444 Thumb-piece and Plug for Cock
445 Bonnet for Cock
446 Set Screw for Bonnet
447 Spring for Cock
518 Screw for Spider Casting
547 Screw for Hinge
589 Screw for Globe Holder
598 Screw for Lock
1527 Screw for Gas Cock Body
1672 Cover for Catch
1673 Catch
1674 Spring for Catch
1683 Gas Cock Body
1684 Thumb-piece and Plug for Cock
1733 Spun Globe Holder
1741 2¼ in. Opal Shade
1782 Screw for Shade Holder
1783 Locknut for No. 1782
1816 ⅜ in. Close Nipple
1847 Screw for Husk
1853 Key for Switch
1855 Clamp for Wires
1856 Screw for Electric Socket
1857 Bracket for Switch
1858 Key for Switch
1865 Set Screw
1873 Porcelain Insulator
1877 Vulcabeston Washer
1878 Vulcabeston Washer
1949 Ceiling Thimble
1950 Roof Thimble
2175 High Pressure Base Check
2213 Check Screw
2214 Screw for Orifice
2601 11 in. Clear Glass Bowl
2606 Ceiling Ring
2615 Gas Tip
2619 Cover for Catch
2640 Small Mantle
2656 Screw for Bracket
2667 ⅜ in. x ⅛ in. Angle Flange
2695 Bezel
2697 Spun Globe Holder
2698 11 in. Electro Etched Bowl
2711 Thimble and Flange
2719 Catch
2720 Brace for Catch
2721 Body Ring with Electrics
2726 Porcelain Clamp
2727 Vulcabeston Washer
2728 Screw for Ornamental Arm
2729 Screw for Insulator
2748 Gas Strainer
2763 Screw for Shade Holder Ring
2854 Ceiling Thimble
2855 Roof Thimble
2886 Gas-way Bracket
2887 Thumb-piece and Plug for Cock
2890 Electric Switch
2917 Bracket for Switch
2922 Collar for Electric Nipple
2936 Globe Holder
3044 Large Mantle
3046 Gas Tip
3049 Burner Nozzle
3050 Bezel
3051 Spider Casting
3052 Body Casting
3053 Top Flue
3054 Bottom Flue
3055 8½ in. Frosted Bowl
3057 Crown
3063 Ventilating Bell
3070 Ventilating Bell
3081 Ornamental Crown and Apron
3084 Bracket
3085 Center Casting
3087 Bottom Flue
3091 Top Flue
3106 Gas Strainer
3107 9 in. Clear Glass Bowl
3116 9½ in. Opal Bowl
3125 Ornamental Crown and Apron
3126 Brackets
3128 Bushing
3129 Crown
3130 Flue
3131 Ornamental Collar
3132 Ornamental Apron
3134 Bracket
3135 Spider Casting
3136 Gas-way
3137 Extension Pillar
3139 Spacing Piece
3140 Center Casting
3143 Screw for Gas-way
3147 Burner Nozzle
3148 Ventilating Bell
3149 Short Arms
3163 Short Arm
3165 Spider Casting
3168 Extension Pillar
3170 Spider Costing
3174 Center Casting
3218 Ornamental Crown and Apron
3219 Bracket
3220 Flue
3237 Body Casting
3241 Ornamental Collar
3243 Ceiling Thimble
3261 9½ in. Frosted Bowl
3264 8½ in. Opal Bowl
3266 Body Ring
3267 Extension Piece
3268 Flue
3270 Extension Pillar
3271 Flue
3272 Lock
3273 Ornamental Crown and Apron
3274 Roof Thimble
3303 Gas Strainer
3313 Reflector
3319 Ceiling Thimble
3321 Bracket for Reflector
3373 Apron
3375 Body Casting
3406 Extension Flue
3411 Air Tube
3412 Ring Reflector
4018 Porcelain Wire Cleat
4033 Electric Bulb
4144 Screw for Ornamental Ceiling Ring

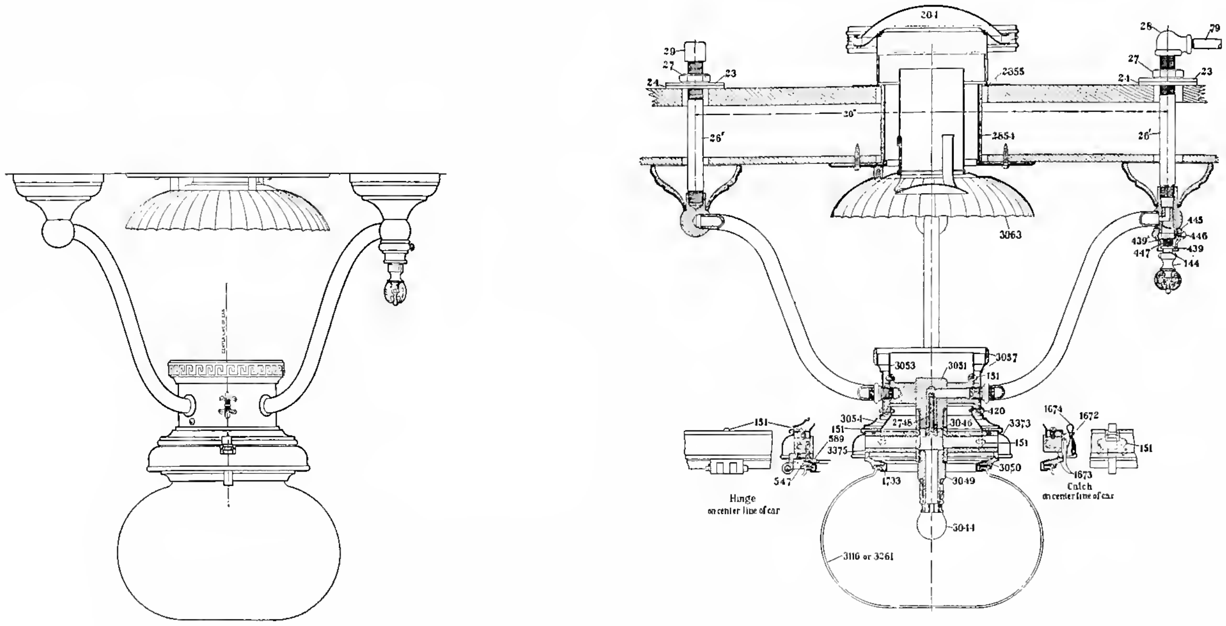

Fig. 2174—Mantle Lamp No. 3500.

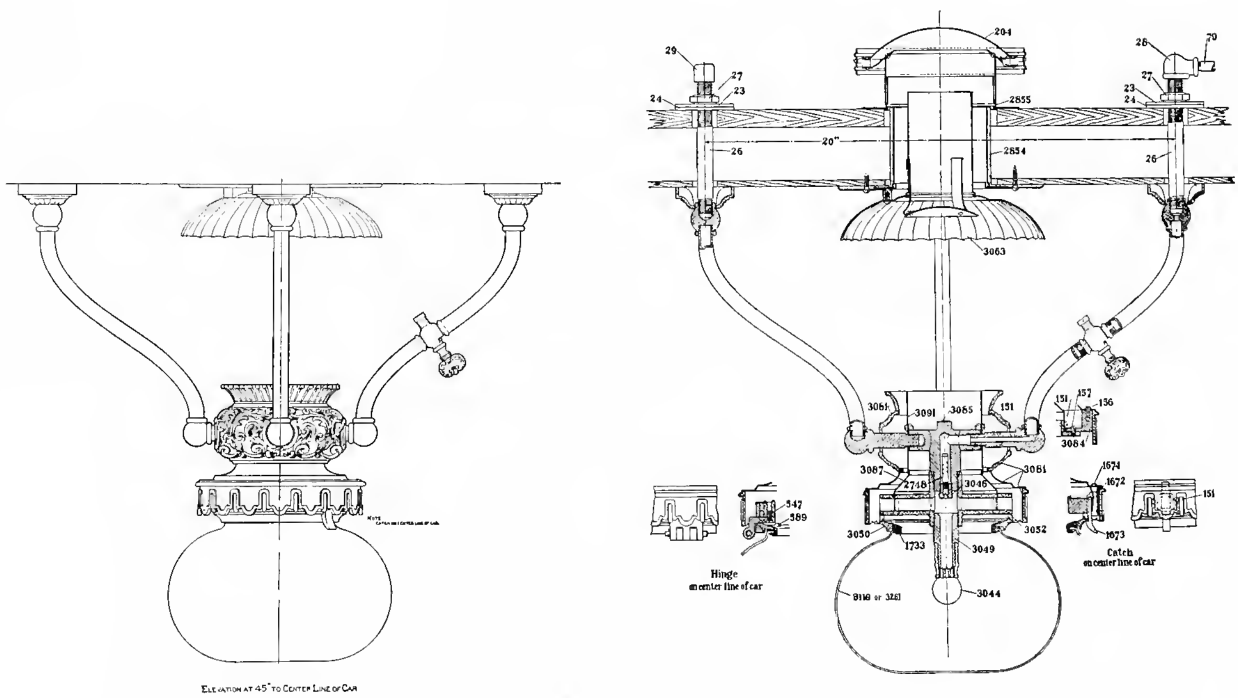

Fig. 2175—Mantle Lamp No. 3508.

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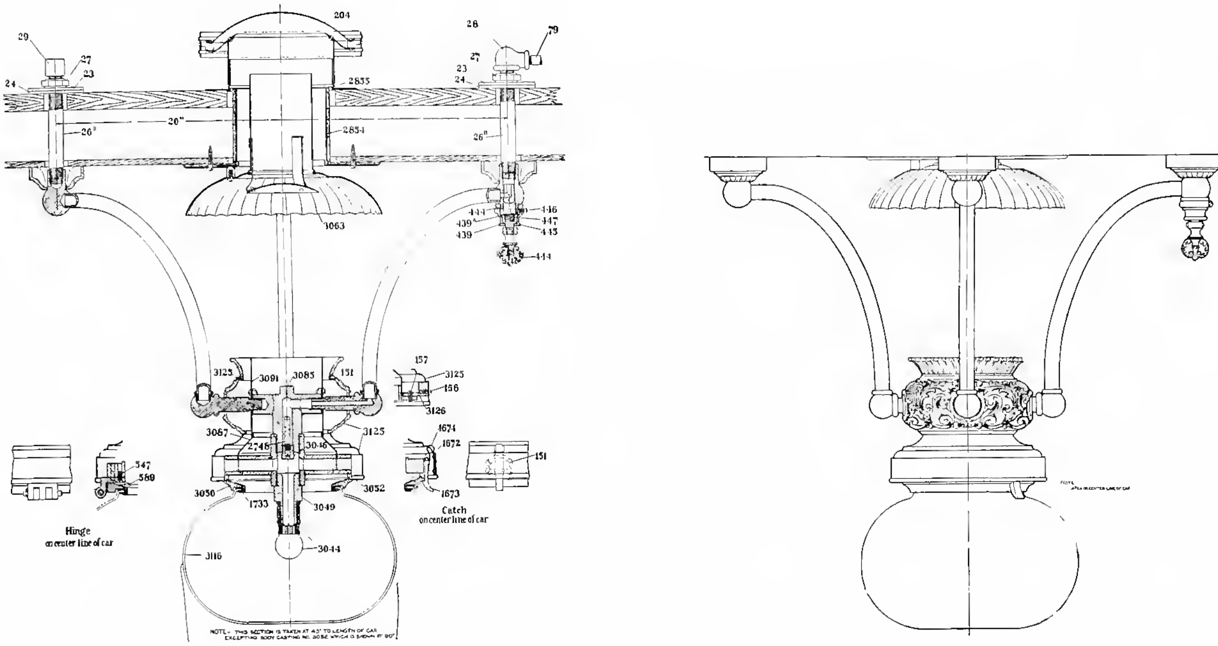

Fig. 2176—Mantle Lamp No. 3509.

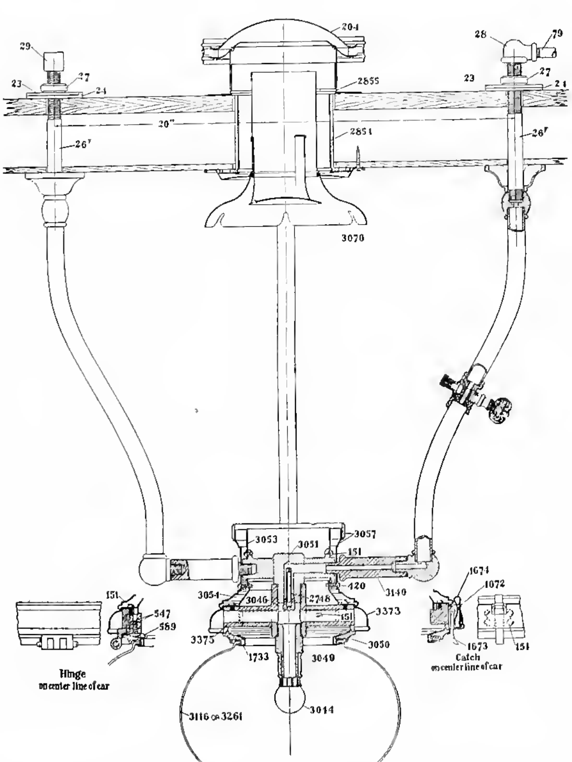

Fig. 2177—Section Through Mantle Lamp No. 3511.

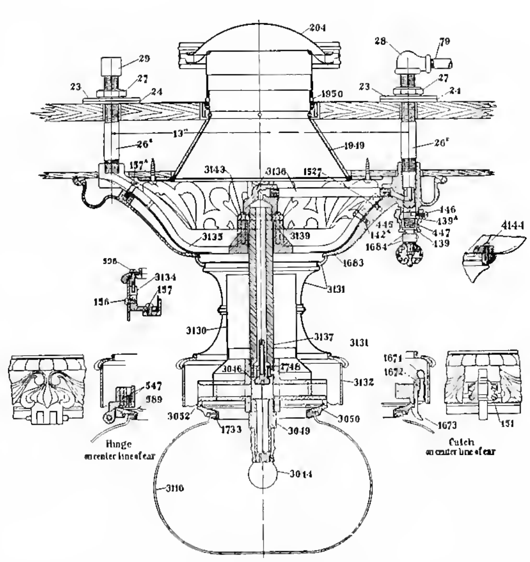

Fig. 2178—Section Through Mantle Lamp No. 3512.

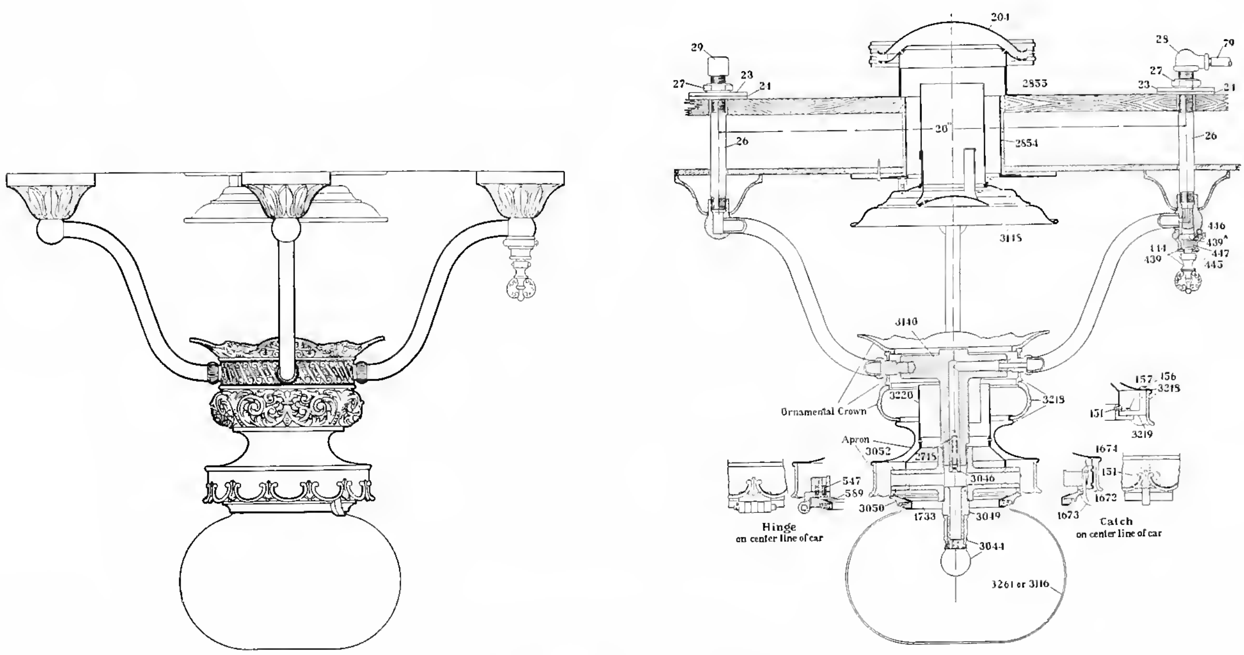

Fig. 2179—Mantle Lamp No. 3514.

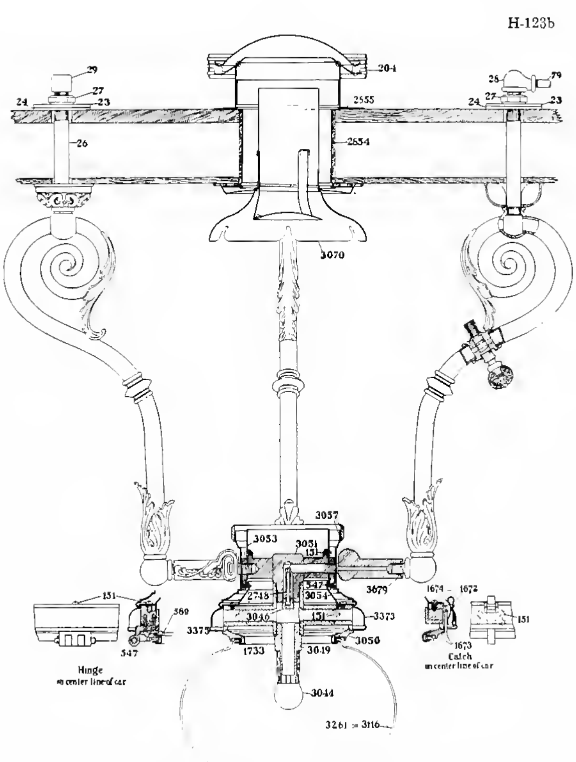

Fig. 2180—Section Through Mantle Lamp No. 3518.

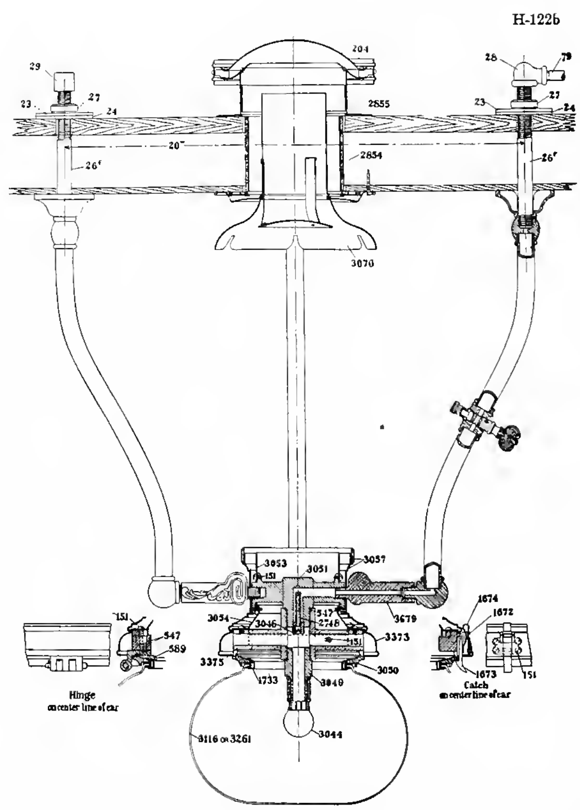

Fig. 2181—Section Through Mantle Lamp No. 3519.

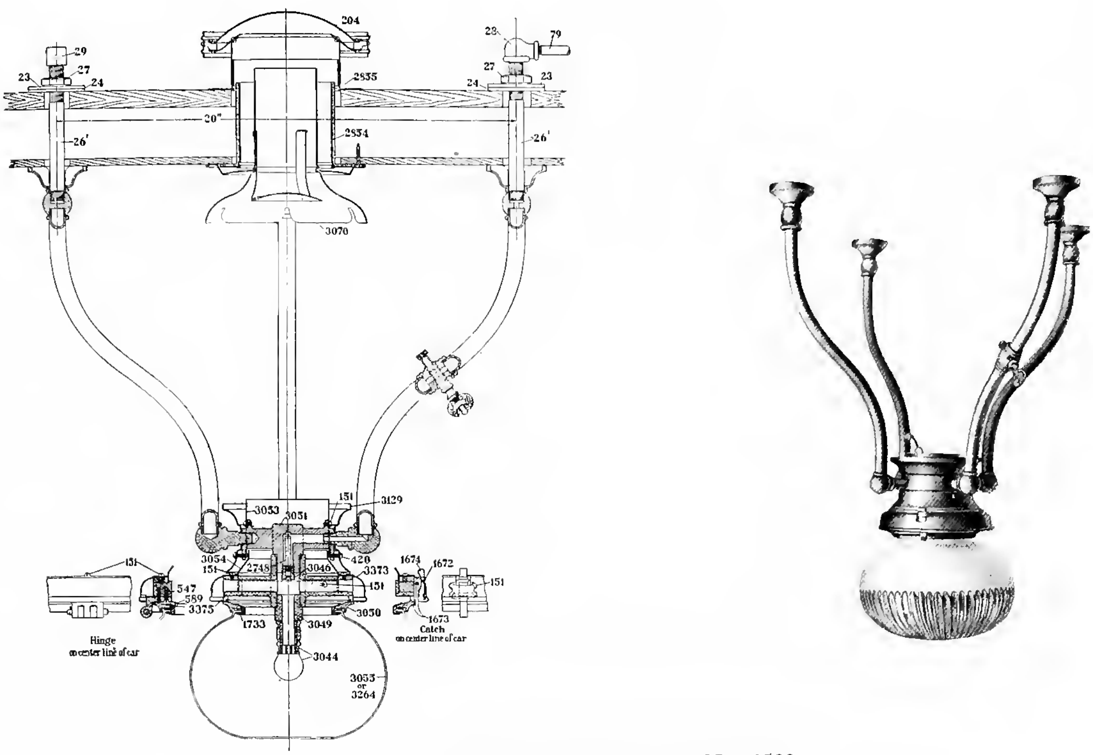

Fig. 2182—Mantle Lamp No. 3520.

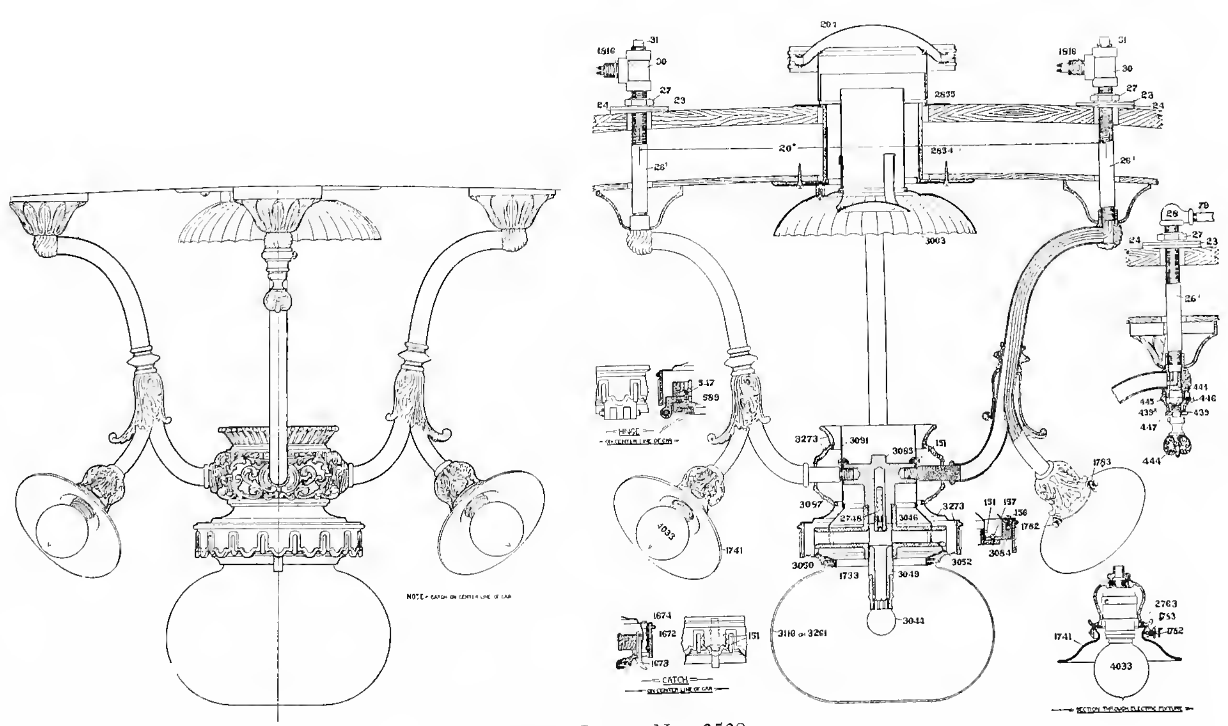

Fig. 2183—Lamp No. 3538a.

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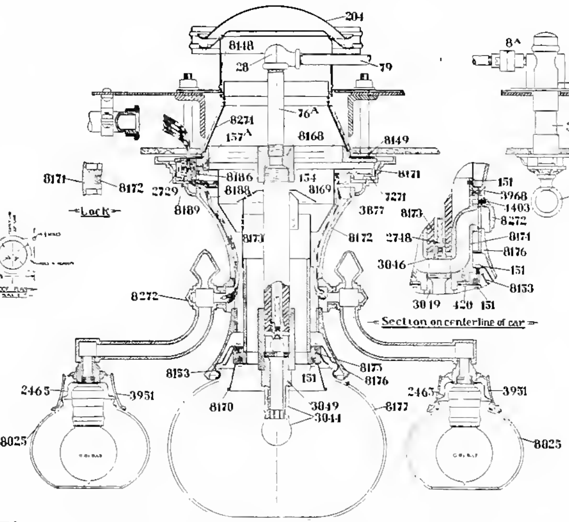

Fig. 2184—Section Through Combination Mantle and Electric Lamp No. 3583B.

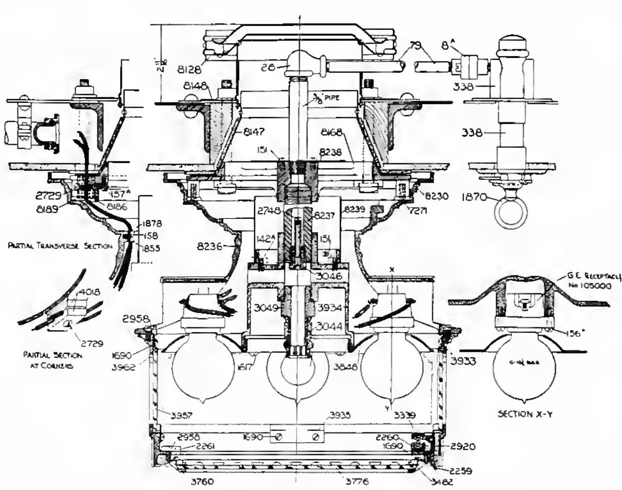

Fig. 2185—Section Through Combination Deck Mantle Lamp No. 3581A.

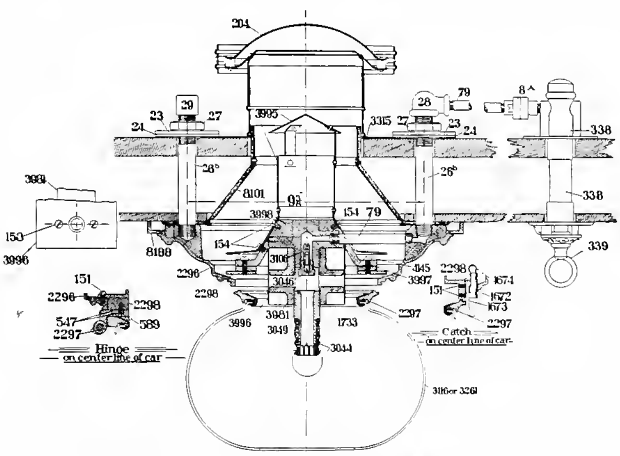

Fig. 2186—Section Through Deck Mantle Lamp No. 3599.

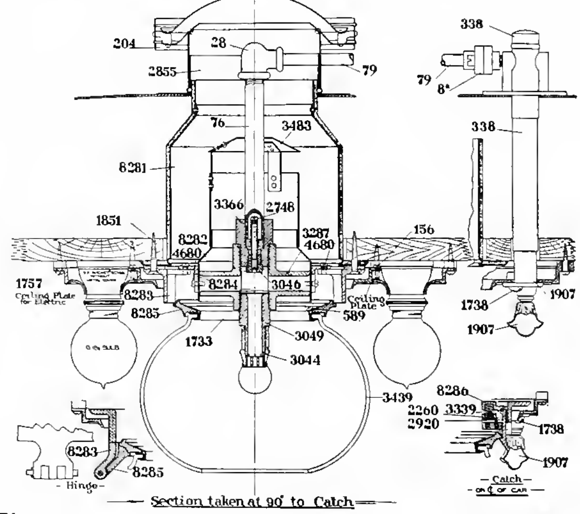

Fig. 2187—Section Through Mantle Lamp No. 8504B.

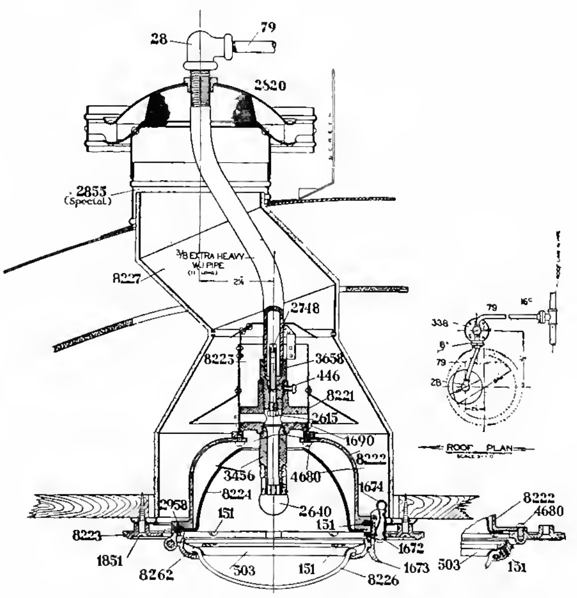

Fig. 2188—Section Through Deck Mantle Lamp No. 8502.

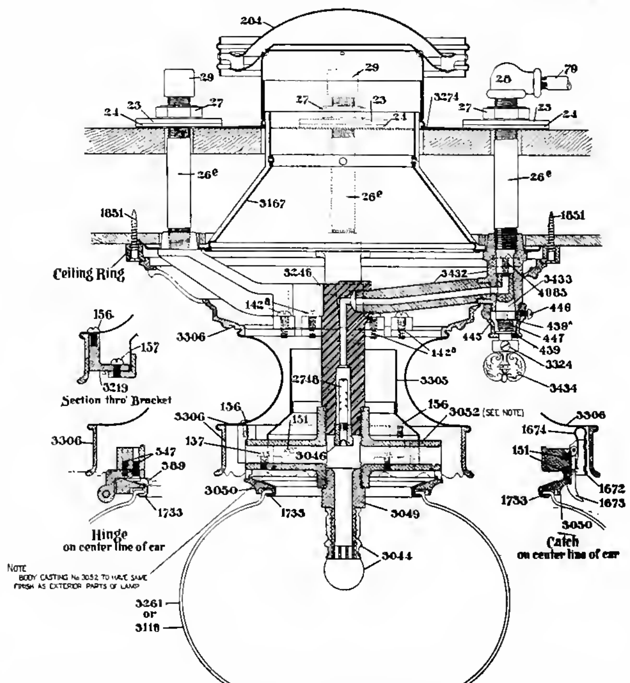

Fig. 2189—Section Through Mantle Lamp No. 3534.

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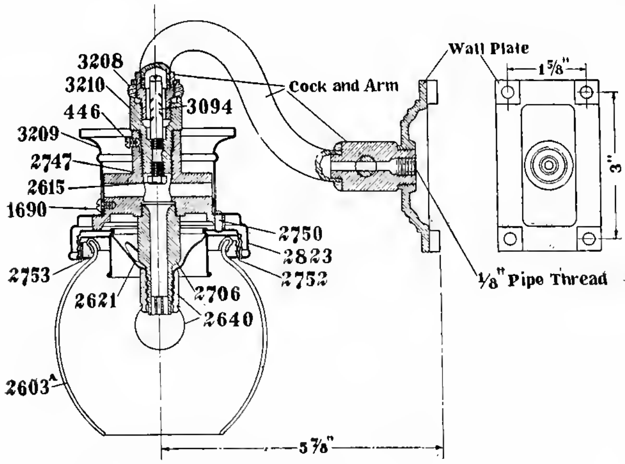


Fig. 2190—Section Through Bracket Mantle Lamp No. 2587.

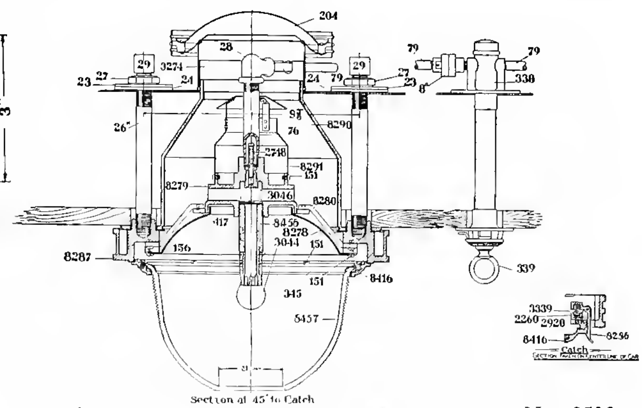


Fig. 2191—Section Through Mantle Lamp No. 8503.

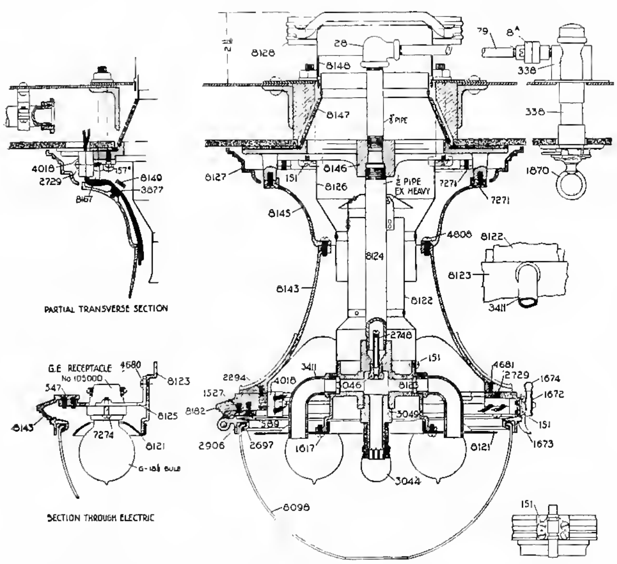


Fig. 2192—Section Through Combination Mantle Lamp No. 3566A.

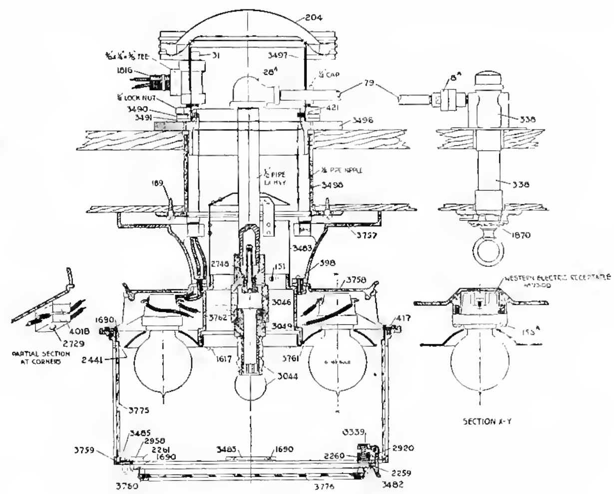


Fig. 2193—Section Through Deck Mantle Lamp No. 3577A.

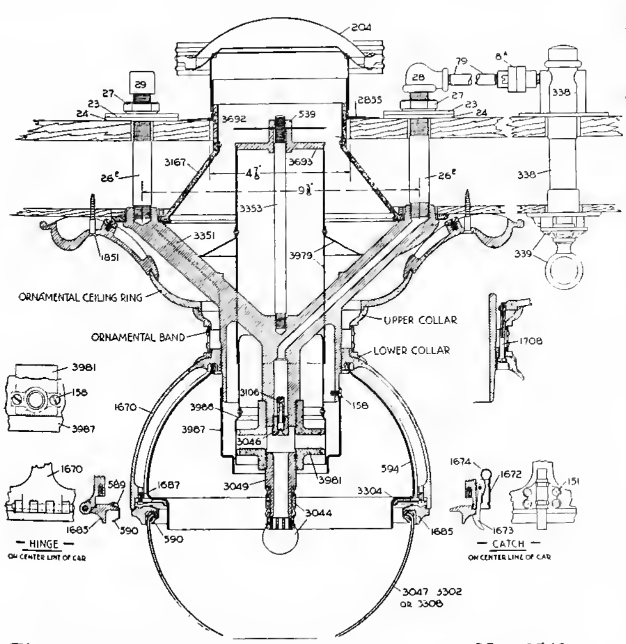


Fig. 2194—Section Through Mantle Lamp No. 3540.

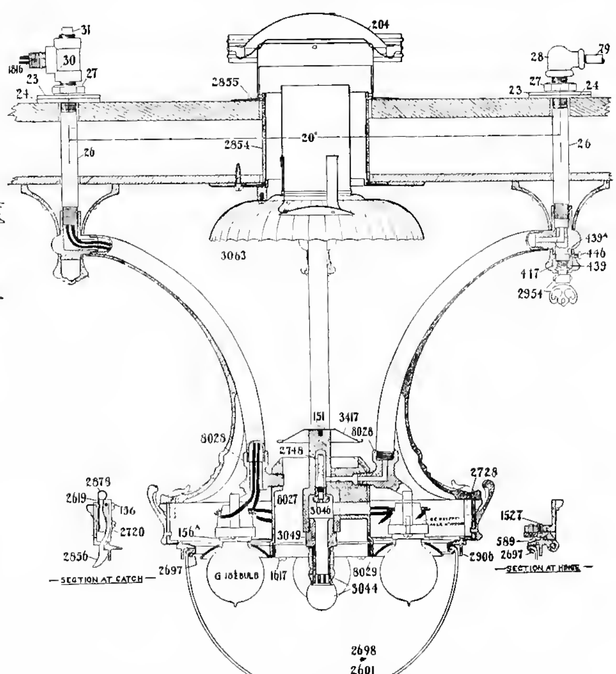


Fig. 2195—Section Through Combination Mantle Lamp No. 3598A.

Safety Car Heating & Lighting Company.

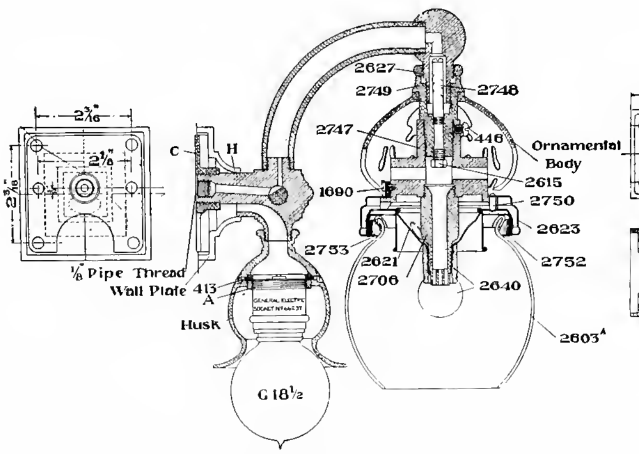


Fig. 2196—Section Through Bracket Mantle Lamp No. 2599A.

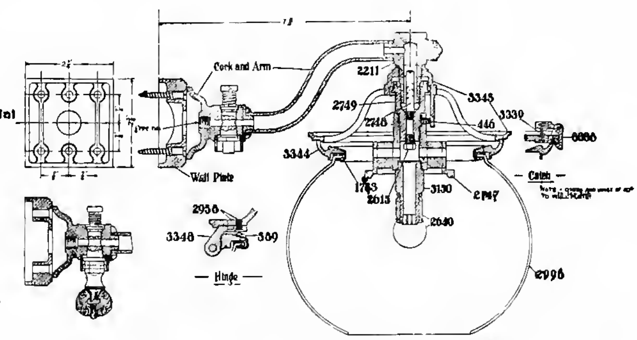


Fig. 2197—Section Through Bracket Mantle Lamp No. 2593.

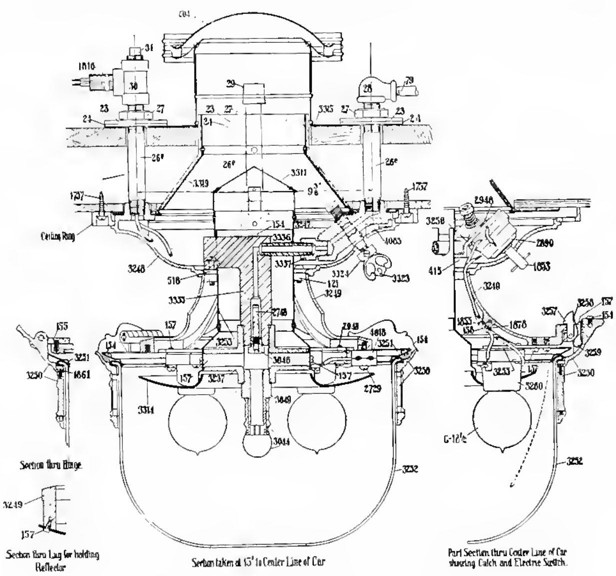


Fig. 2198—Section Through Combination Deck Mantle Lamp No. 3542A.

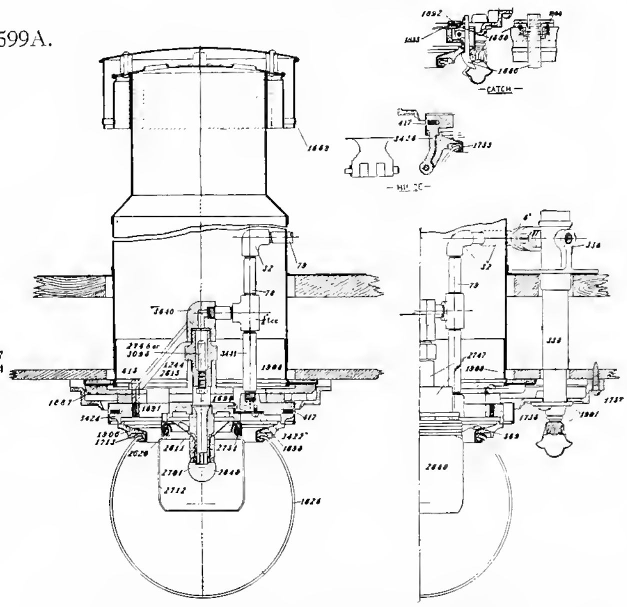


Fig. 2199—Section Through Deck Mantle Lamp No. 2597.

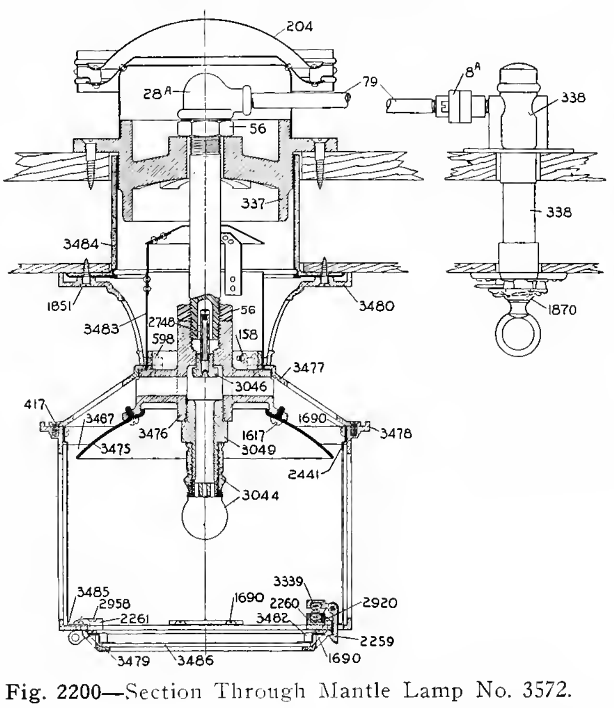


Fig. 2200—Section Through Mantle Lamp No. 3572.

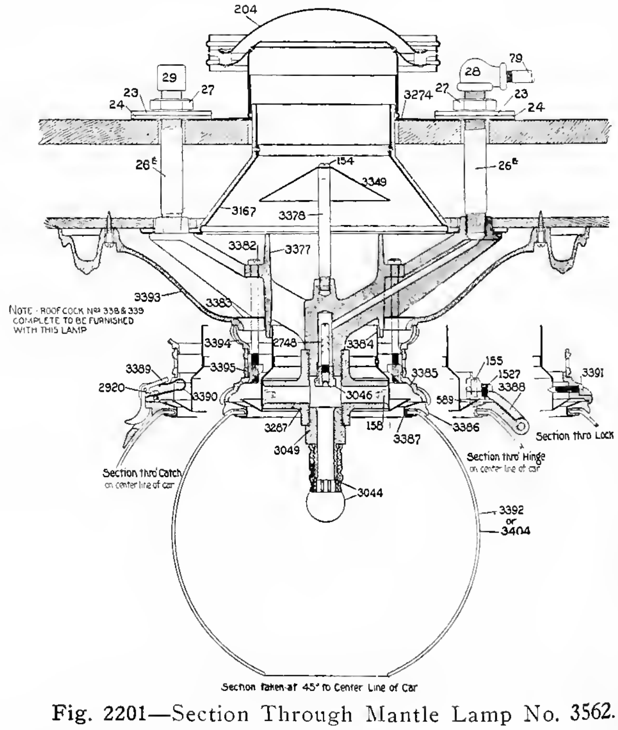


Fig. 2201—Section Through Mantle Lamp No. 3562.

Safety Car Heating & Lighting Company.

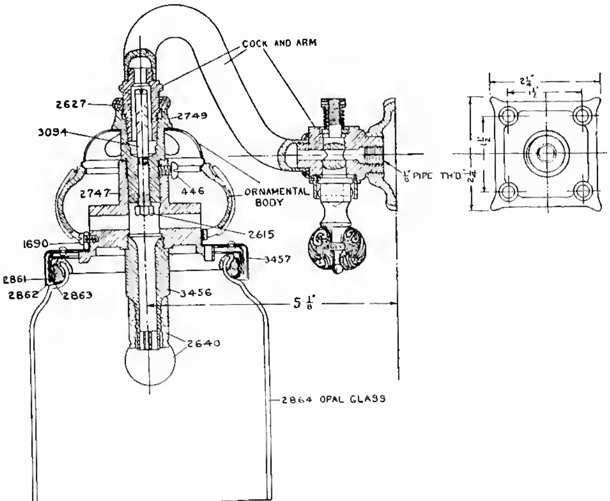


Fig. 2202—Section Through Bracket Mantle Lamp No. 2506.

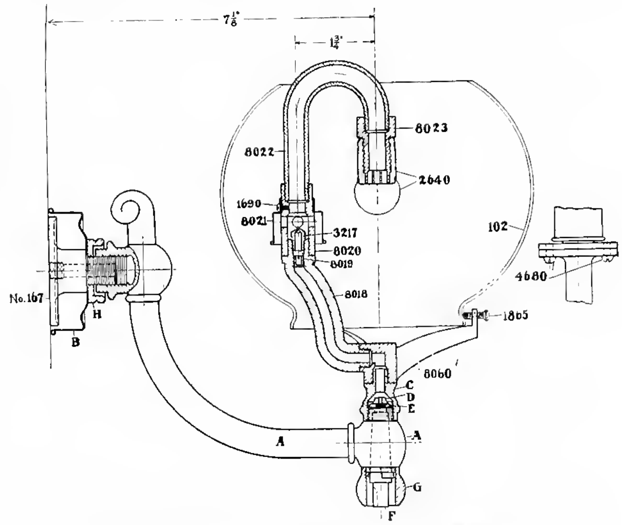


Fig. 2203—Section Through Bracket Mantle Lamp No. 8586.

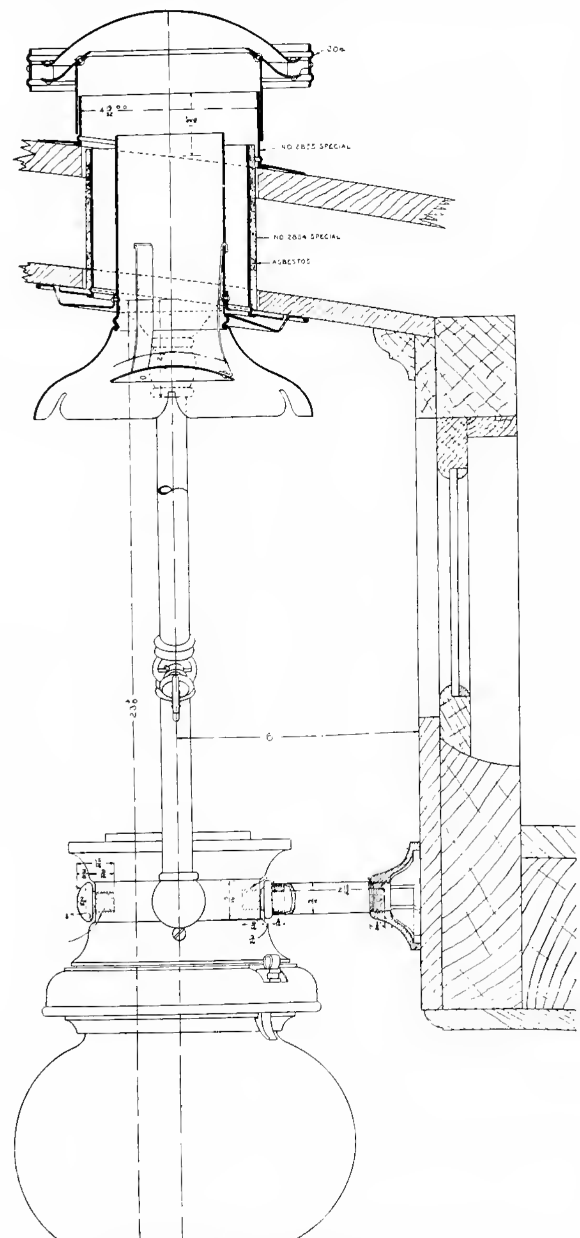


Fig. 2204—Mail Car Mantle Lamp No. 3520.

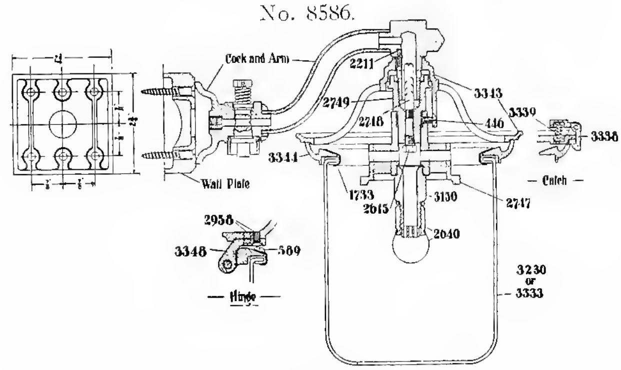


Fig. 2205—Section Through Bracket Mantle Lamp No. 2563.

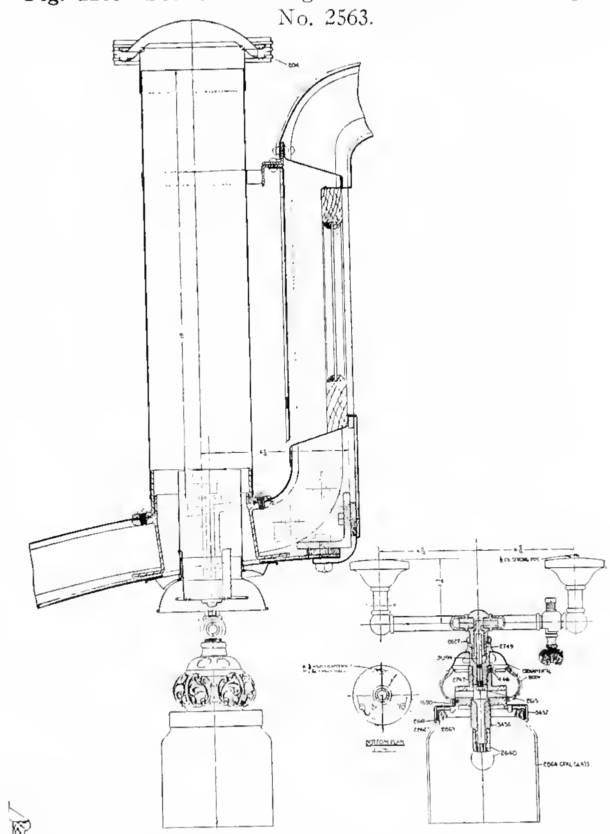


Fig. 2206—Mail Car Mantle Lamp No. 8501.

Safety Car Heating & Lighting Company.

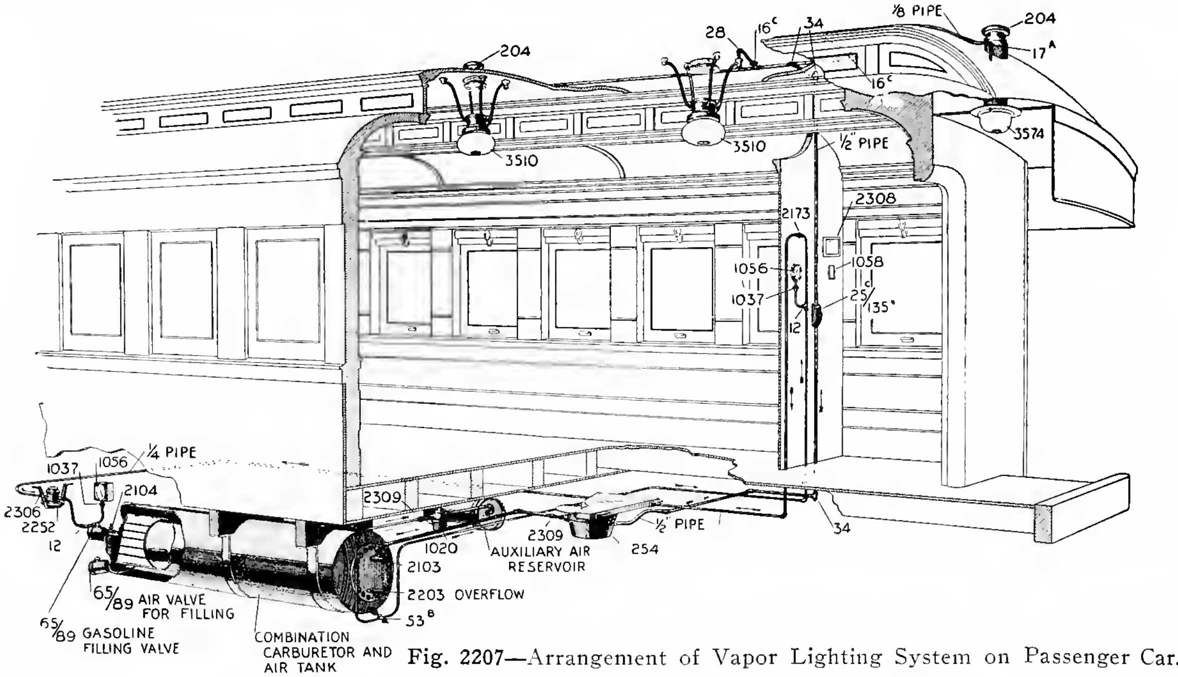


Fig. 2207—Arrangement of Vapor Lighting System on Passenger Car.

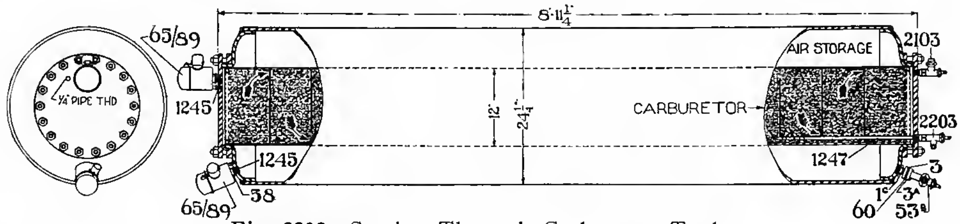


Fig. 2208—Section Through Carburetor Tank.

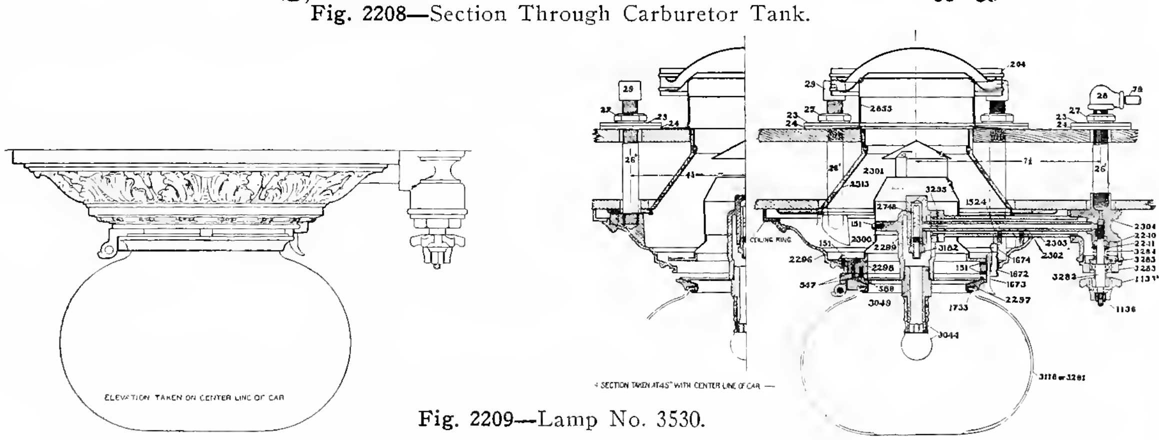


Fig. 2209—Lamp No. 3530.

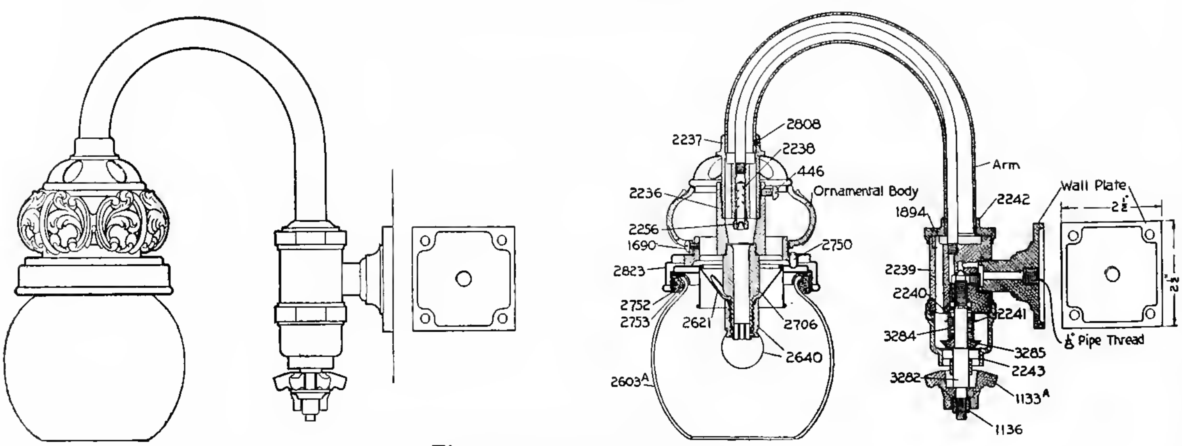


Fig. 2210—Lamp No. 2598.
Safety Car Heating & Lighting Company.

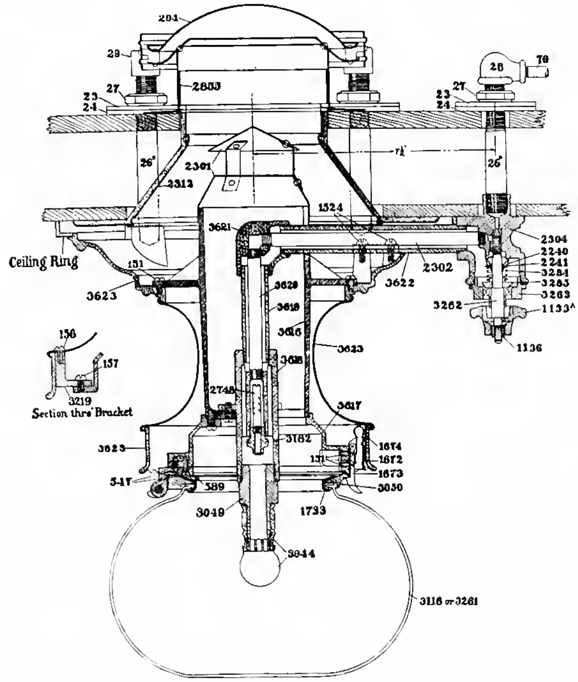


Fig. 2211—Section Through Lamp No. 3546.

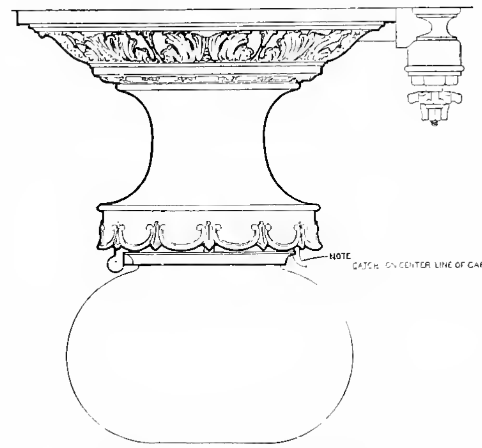


Fig. 2212—Lamp No. 3546.

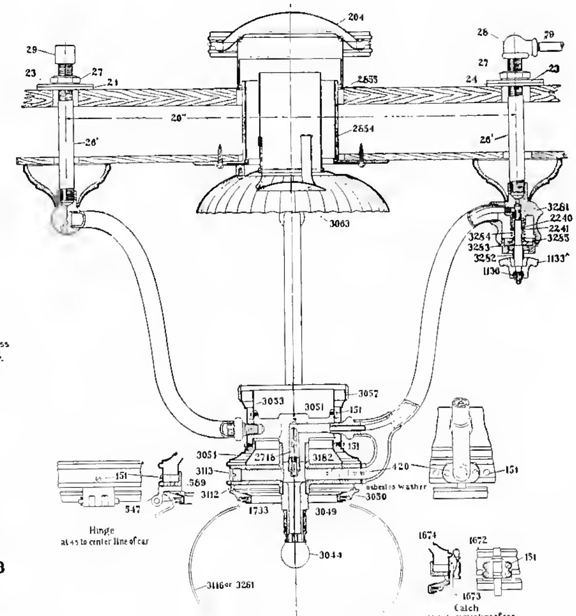


Fig. 2214—Section Through Lamp No. 3510.

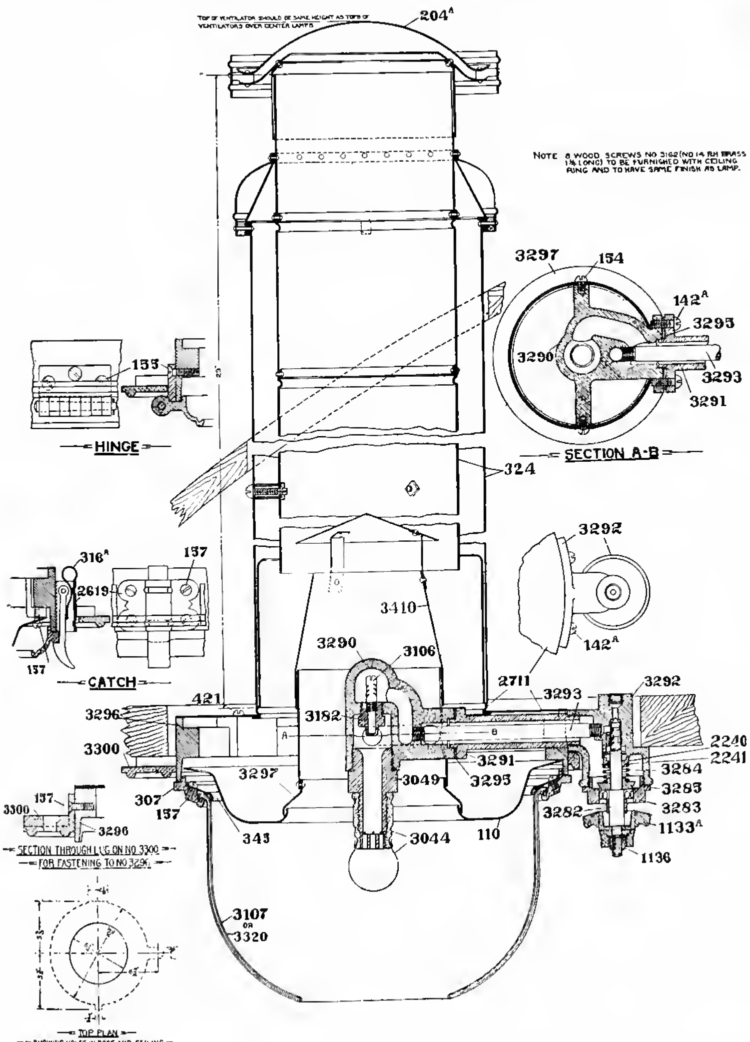


Fig. 2213—Section Through Vestibule Lamp No. 3574.

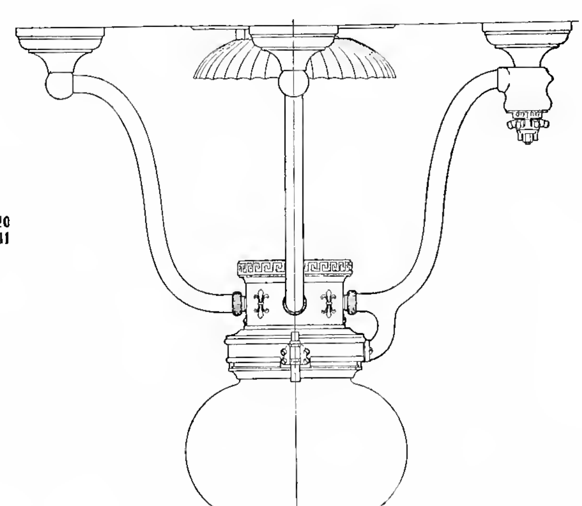


Fig. 2215—Lamp No. 3510.

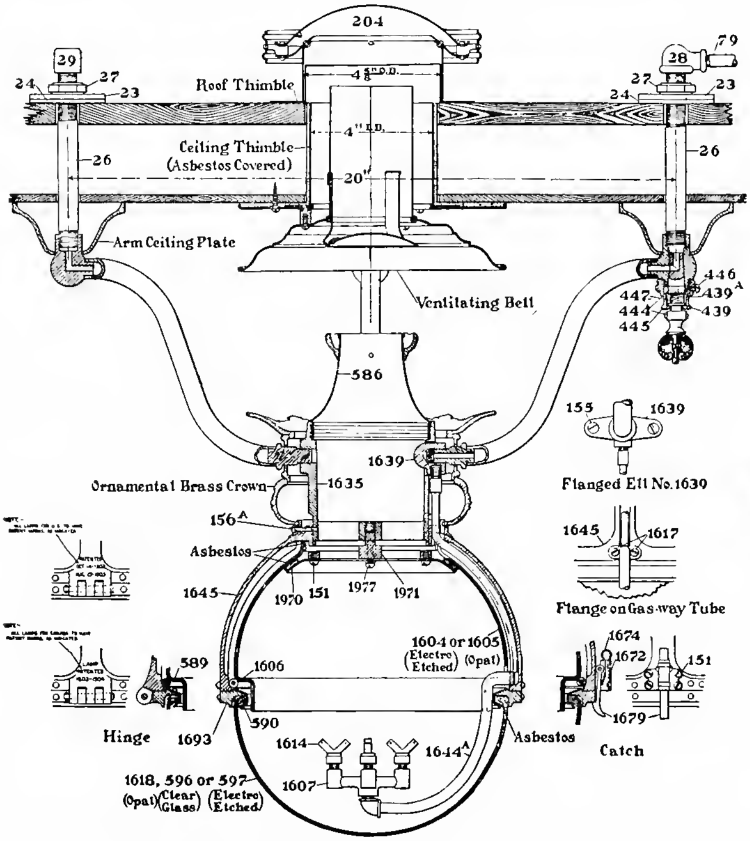


Fig. 2216—Section Through Acetylene Lamp No. 1627.

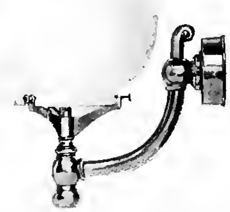


Fig. 2217—Acetylene Lamp No. 86a.

Fig. 2218—Acetylene Lamp No. 2096.

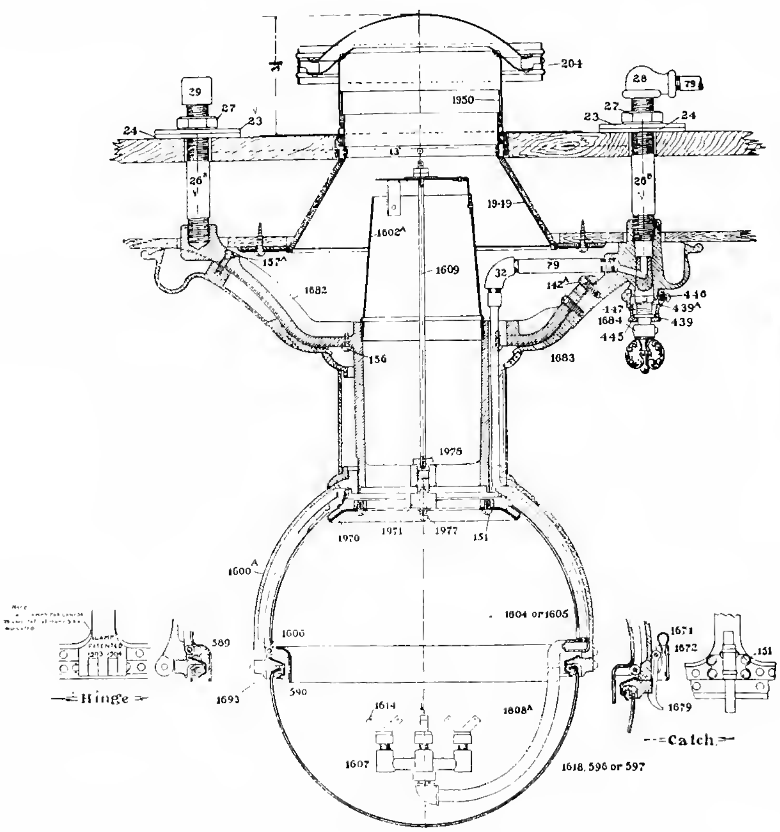


Fig. 2219—Section Through Acetylene Lamp No. 1681.

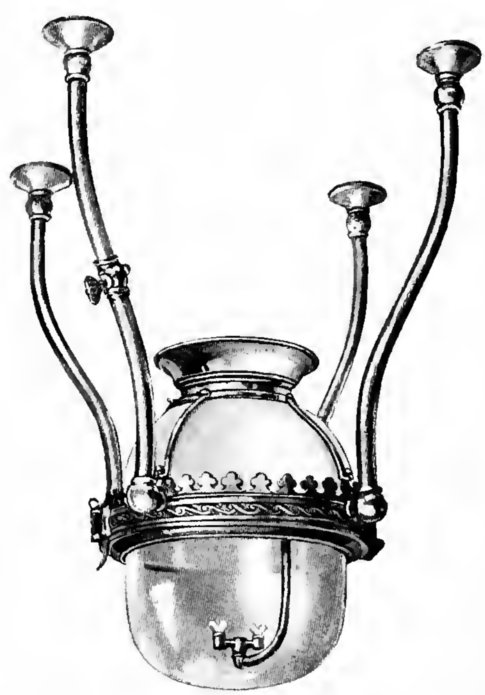


Fig. 2220—Acetylene Lamp No. 2012.

Safety Car Heating & Lighting Company.

Parts of Acetylene Lamps, Figs. 2216-2226.

17a	*Angle Flange*	154	*Screw for Flue*
23	*Iron Washer*	155	*Screw for Hinge*
24	*Rubber Washer*	156	*Screw for Ceiling Ring*
26	*3/8 in. Nipple, 6 in. Long*	156a	*Screw for Flange*
26b	*3/8 in. Nipple, 5 in. Long*	157	*Screw for Reflector*
26f	*3/8 in. Nipple, 6½ in. Long*	157a	*Screw for Ceiling Ring*
27	*3/8 in. Locknut*	204	*4 5/8 in. Ventilator*
28	*3/8 in. by 1/8 in. Ell*	204a	*Ventilator*
29	*3/8 in. Cap*	307	*Bezel for Bowl, with Hinge*
32	*1/8 in. Ell*	316	*Spring Catch, Complete*
79	*1/8 in. Extra Strong Pipe*	316a	*Spring for Catch*
100	*Glass Bowl*	323a	*Diaphragm*
140	*Screw for Bezel*	324	*Ventilating Chimney*
142a	*Screw for Gas Cock Body*	326	*Cock, Complete*
144	*Screw for Spring Lock*	345	*Spun Globe Holder Ring*
151	*Screw for Catch and Reflector*		

(Continued on next page.)

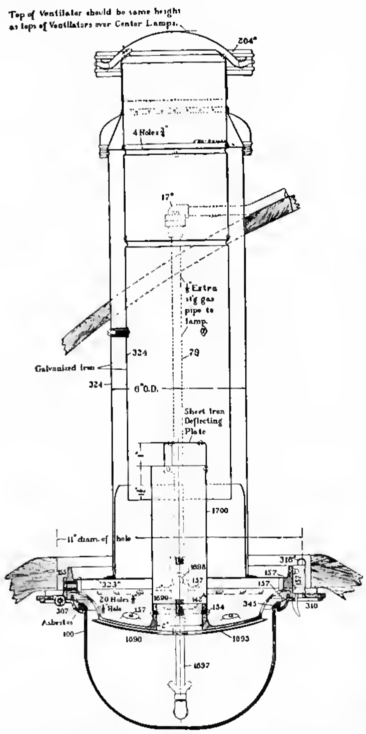
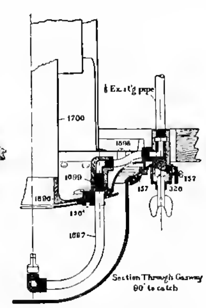



Fig. 2221—Section Through Acetylene Vestibule Lamp No. 1694.

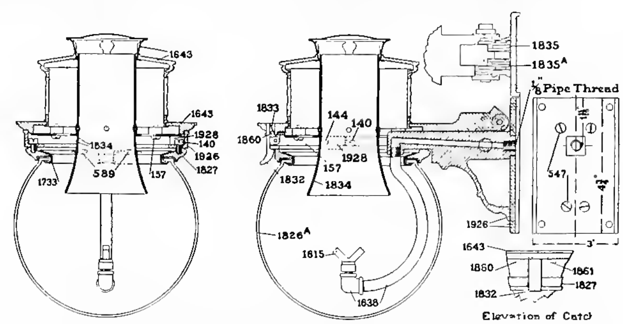


Fig. 2222—Sections Through Acetylene Wall Lamp No. 1641.

Fig. 2223—Wall Lamp No. 1641.

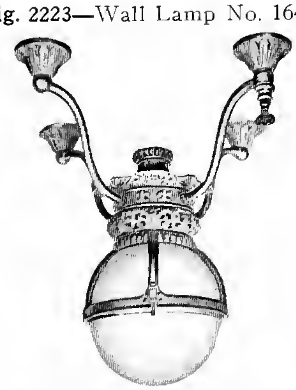


Fig. 2224—Lamp No. 1627.

Fig. 2225—Deck Lamp No. 1681.

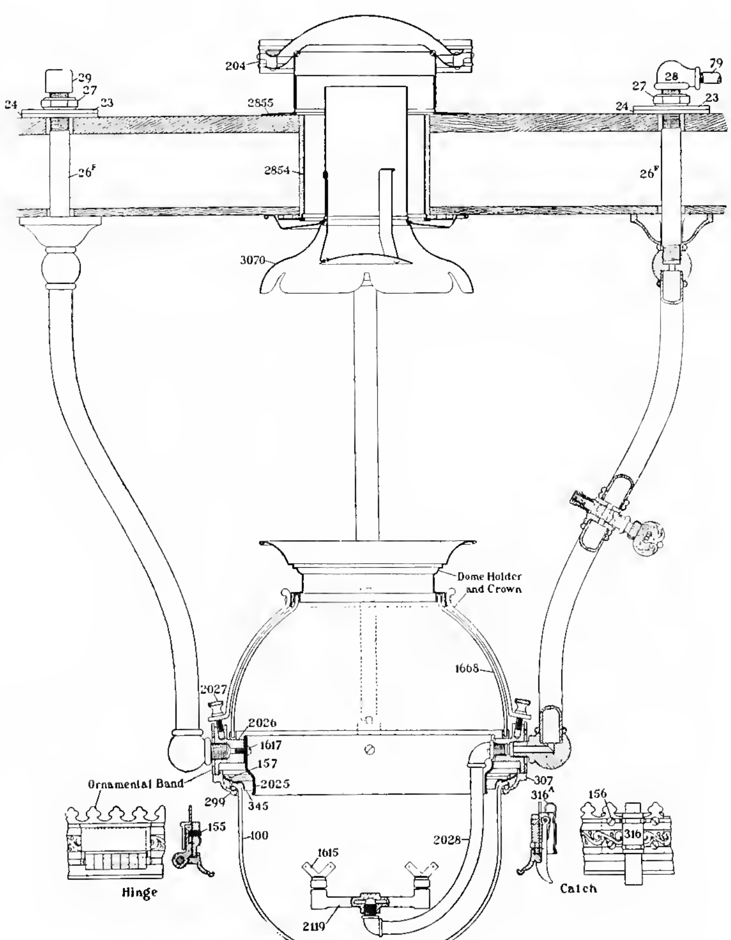


Fig. 2226—Section Through Acetylene Lamp No. 2012.

Safety Car Heating & Lighting Company.

Parts of Acetylene Lamps, Figs. 2216-2226.. (Continued.)

439 *Thick Washer for Cock*
439a *Thin Washer for Cock*
444 *Plug and Thumb-piece for Cock*
445 *Bonnet for Cock*
446 *Screw for Cock*
447 *Spring for Cock*
547 *Screw for Wall Plate*
586 *Extension Chimney*
589 *Screw for Spun Globe Holder*
590 *Spun Globe Holder*
596 *9 in. Clear Glass Bowl*
597 *9 in. Etched Glass Bowl*
1600a *Frame for Dome*
1602a *Flue*
1604 *9 in. Etched Dome*
1605 *9 in. Opal Dome*
1606 *Dome Ring*
1607 *Four-flame Cluster*
1608a *Gas-way Tub*
1609 *Post for Flues*
1613 *3/8 ft. Von Schwartz Burner*
1614 *1/2 ft. Von Schwartz Burner*
1615 *3/4 ft. Von Schwartz Burner*
1617 *Screw for Gas-way Tube Flange*
1618 *9 in. Opal Bowl*
1635 *Body Casting*
1638 *Gas-way Tube*
1639 *Flanged Ell*
1643 *Crown*
1644a *Gas-way Tube*
1645 *Frame for Dome*
1668 *Opal Dome*
1672 *Cover for Catch*
1674 *Spring for Catch*
1679 *Catch*
1682 *Body Casting*
1683 *Gas Cock Body*
1684 *Thumb-piece and Plug for Cock*
1693 *Bezel*
1695 *Reflector*
1696 *Body Casting*
1697 *Gas-way Tube*
1697a *Two-flame Cluster*
1698 *Brass Nipple*
1699 *Flanged Ell*
1700 *Flue*
1733 *Spun Globe Holder*
1826 *6½ in. Opal Bowl*
1826a *6½ in. Clear Glass Bowl*
1827 *Bezel*
1832 *Catch*
1833 *Spring for Catch*
1834 *Reflector*
1835 *Spring for Hinge, Left*
1835a *Spring for Hinge, Right*
1860 *Flange for Catch*
1861 *Screw for Flange*
1926 *Body with Gas Cock*
1928 *Spring Lock for Bezel*
1949 *Lower Thimble*
1950 *Roof Thimble*
1970 *Reflector*
1971 *Casting for Reflector*
1977 *Set Screw*
1978 *Bushing for Flue Post*
2025 *Reflector*
2026 *Body Ring*
2027 *Thumb Screw*
2028 *Gas-way Tube*
2119 *Two-flame Cluster*
2854 *Ceiling Thimble*
2855 *Roof Thimble*
3070 *Ventilating Bell*

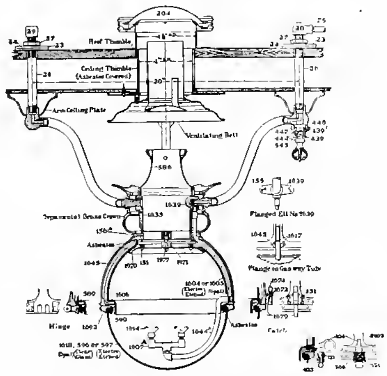


Fig. 2227 — Section Through Acetylene Lamp No. 1627.

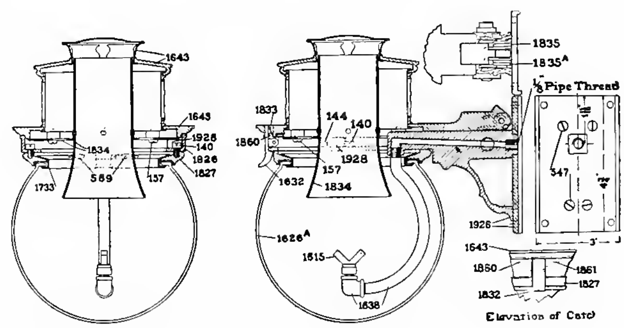


Fig. 2228—Sections Through Acetylene Lamp No. 1641.

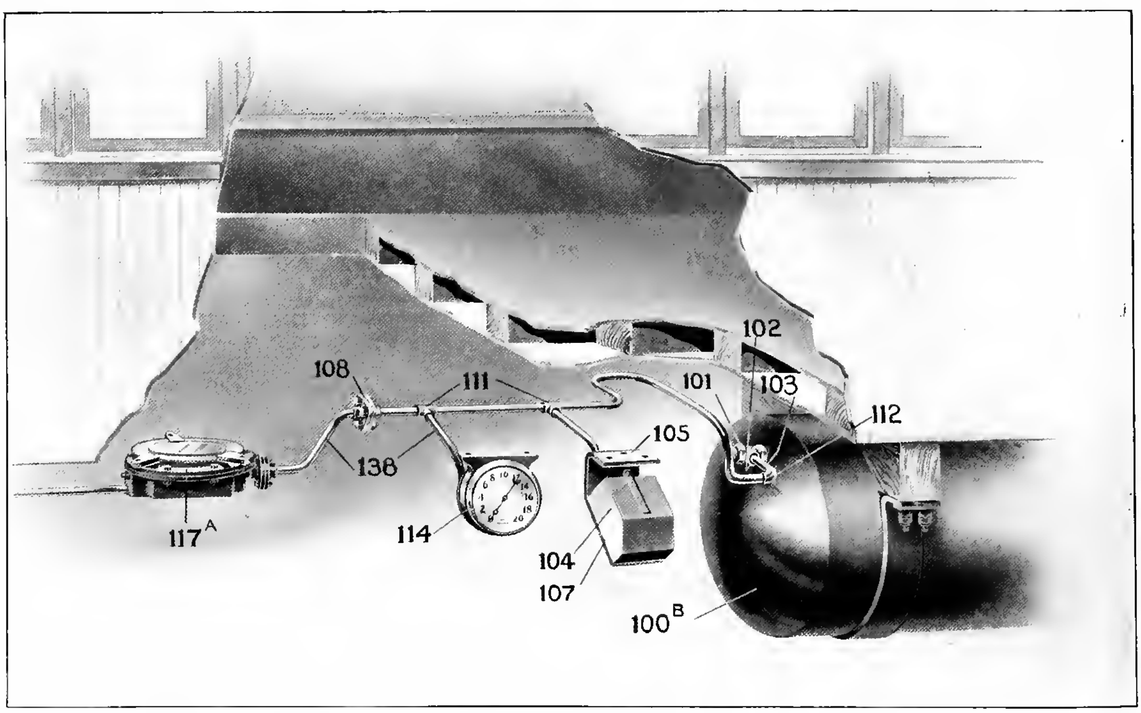


Fig. 2229—Arrangement of Acetylene Gas Lighting Apparatus on Passenger Car.
Commercial Acetylene Railway Light & Signal Company.

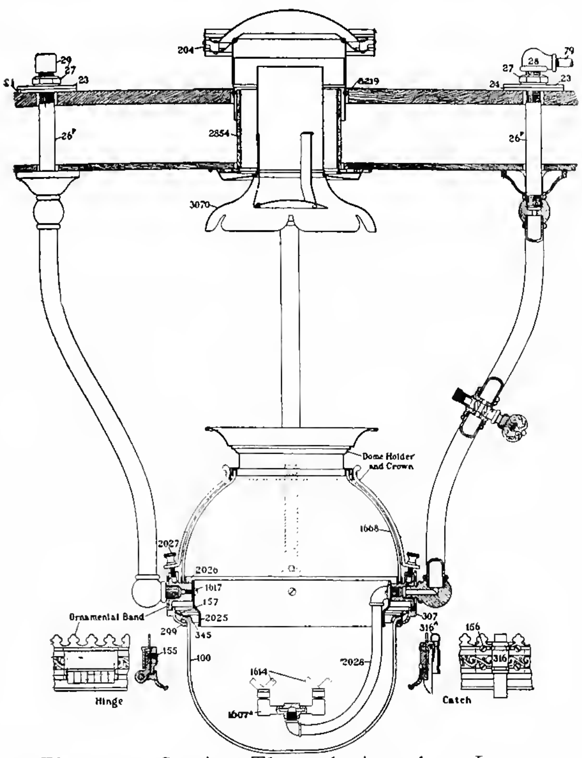


Fig. 2230—Section Through Acetylene Lamp No. 2012.

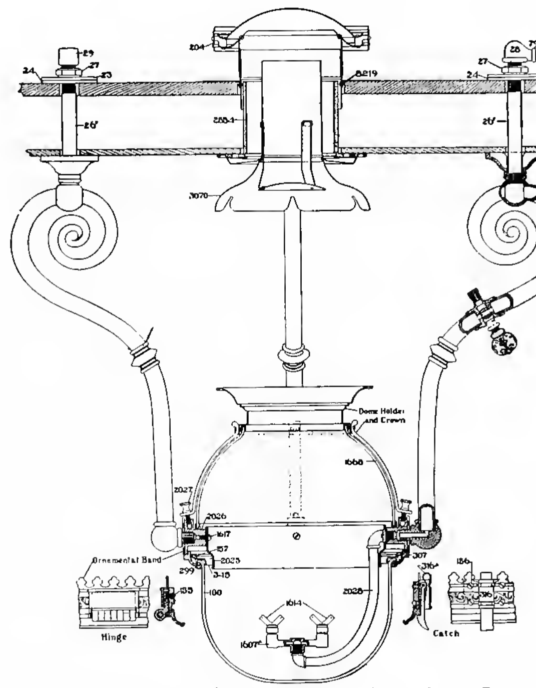


Fig. 2231—Section Through Acetylene Lamp No. 2096.

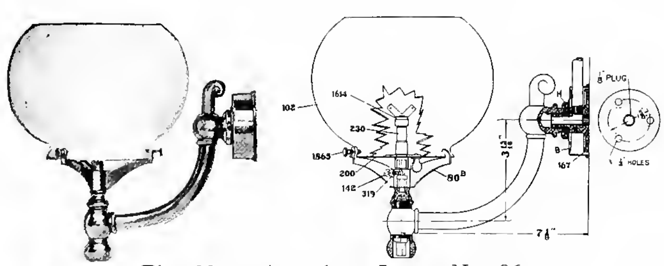


Fig. 2232—Acetylene Lamp No. 86.

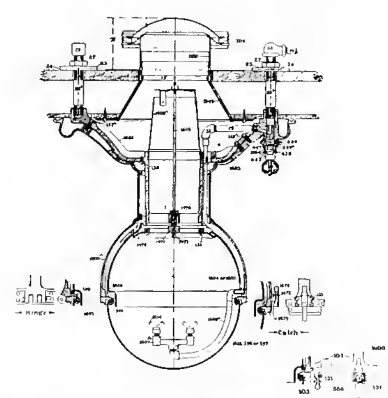


Fig. 2233—Section Through Acetylene Lamp No. 1681.

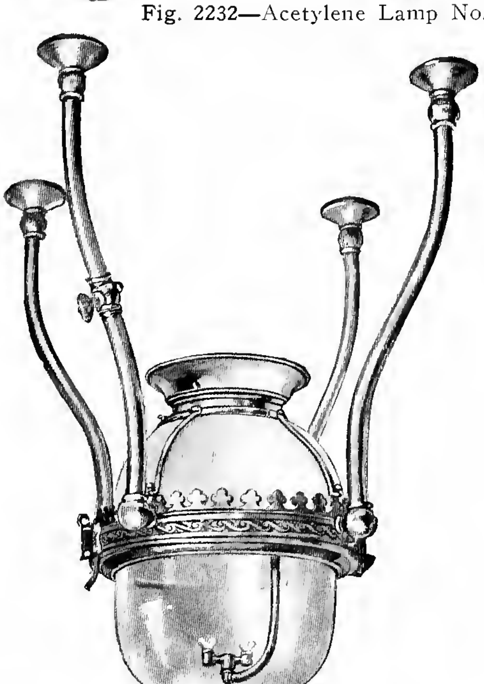


Fig. 2234—Lamp No. 2012.

Fig. 2235—Lamp No. 2096.

Commercial Acetylene Railway Light & Signal Company.

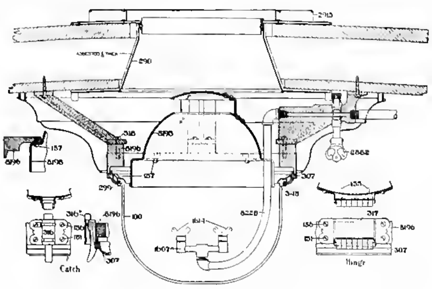


Fig. 2236—Section Through Lamp No. 2054.

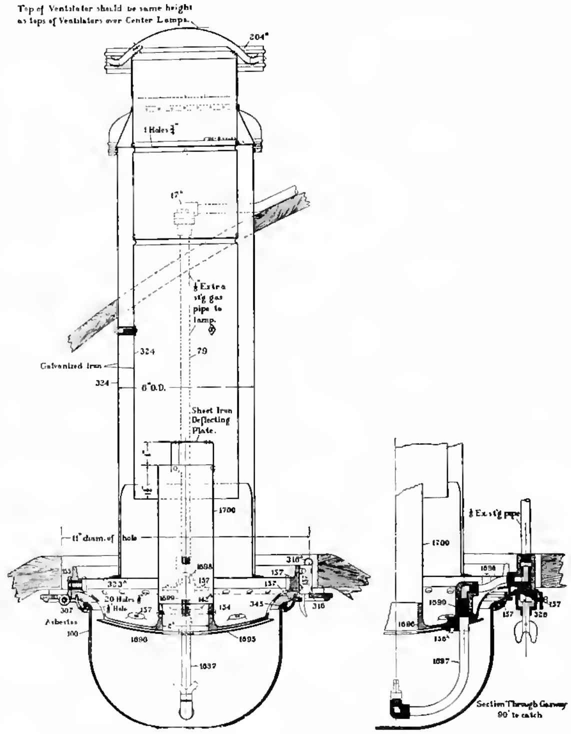


Fig. 2238—Section Through Lamp No. 1694.

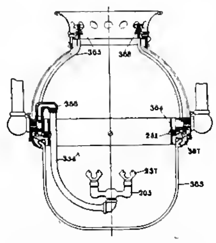
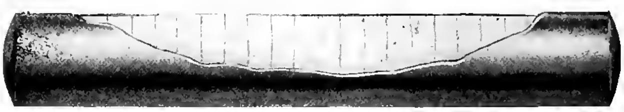
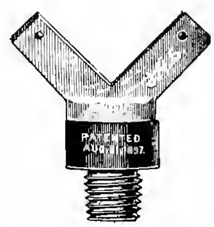


Fig. 2237—Pintsch Gas Lamp Converted for Use of Acetylene Gas.

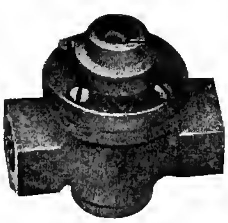


Brazed Cylinder, Cut Open to Show Packing.



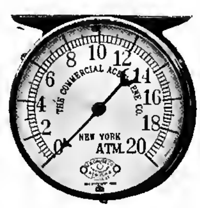
No. 242 ¾ ft. V. S. Burner, Male Thread.

Burner Pillar.

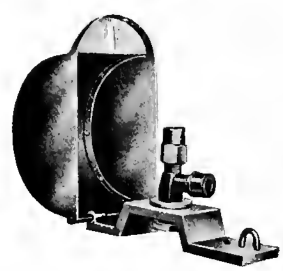


Main Cock.

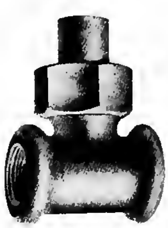
Main Cock Key.



Gage for Car.

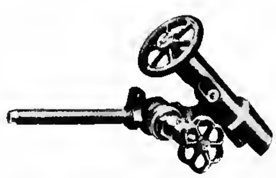


Pipe Line Valve.



Brass Union Tee, ⅜ in. by ⅛ in.

Stud Valve.



Charging Hose Connection No. 144.

Filling Valve.

No. 108 ¼ in. Flange Union. H. P.

Regulating Valve.

Blow-Off for Safety Device.

Fig. 2239—Parts Used in Acetylene Gas Lighting System.

Commercial Acetylene Railway Light & Signal Company.

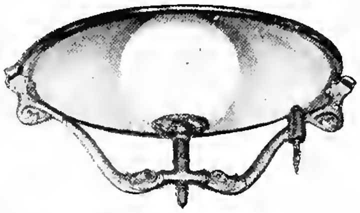


Fig. 2240—Vestibule Lamp No. 709.

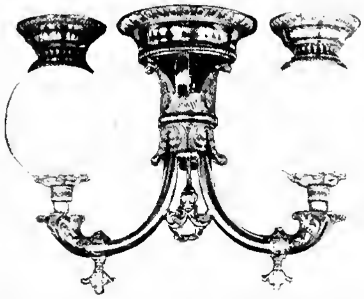


Fig. 2241—Two-Light Chandelier No. 720.

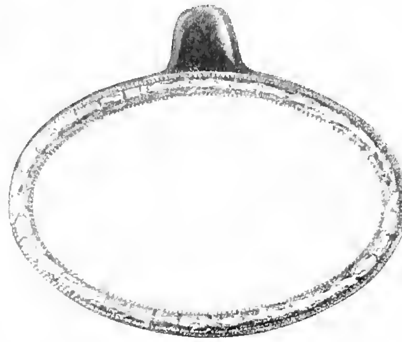


Fig. 2242—One-Light Oval Corridor Lamp.

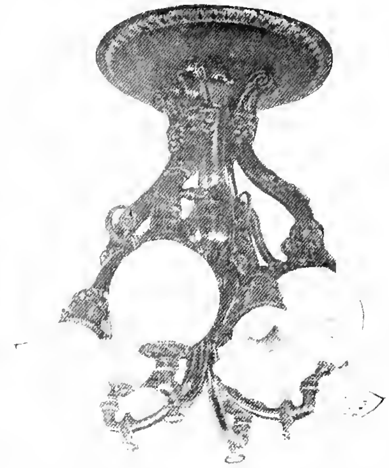


Fig. 2243—Four-Light Combination Gas and Electric Chandelier No. 747.

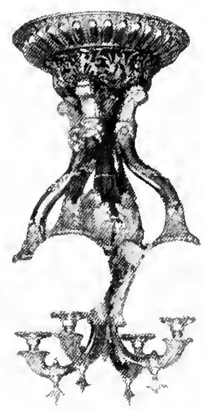


Fig. 2245—Four-Light Chandelier No. 754.

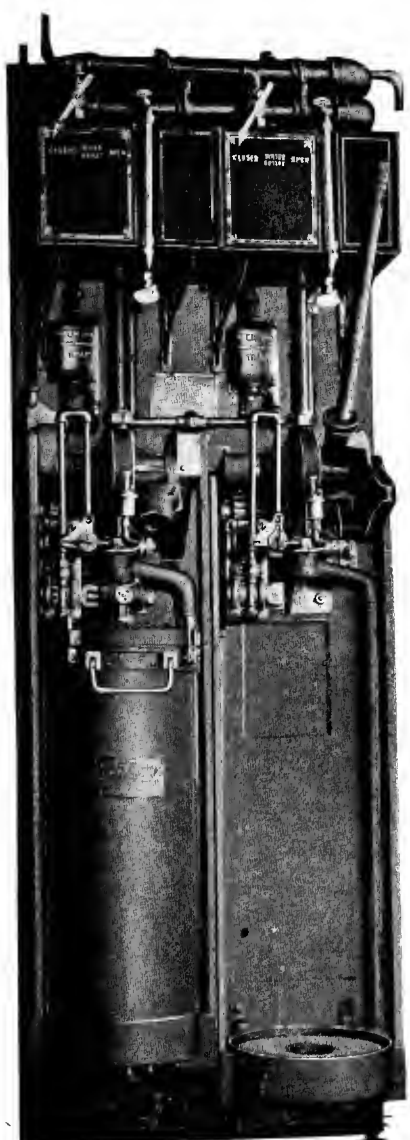



Fig. 2244—Generating Apparatus and Removable Cartridge.

Fig. 2246—View Showing Location of Generator in Closet at End of Car.

Adams & Westlake Company.

Fig. 2247 — Combination Gas and Electric Side Bracket Lamp No. 723.

Fig. 2248—Oval Panel Lamp No. 732.

Fig. 2249—Panel Lamp No. 766, for Passage Way.

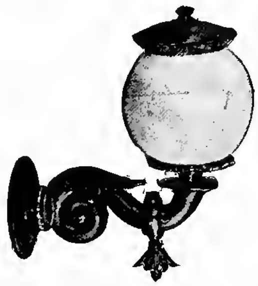


Fig. 2250—Side Bracket Lamp No. 738.

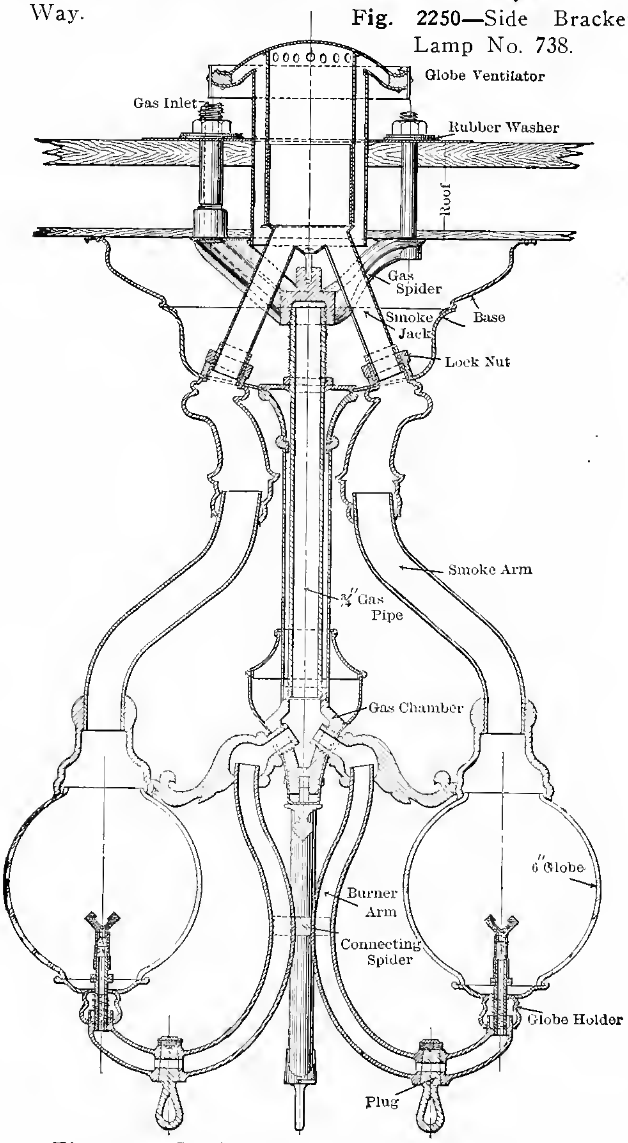


Fig. 2251—Section Through Lamp Body.

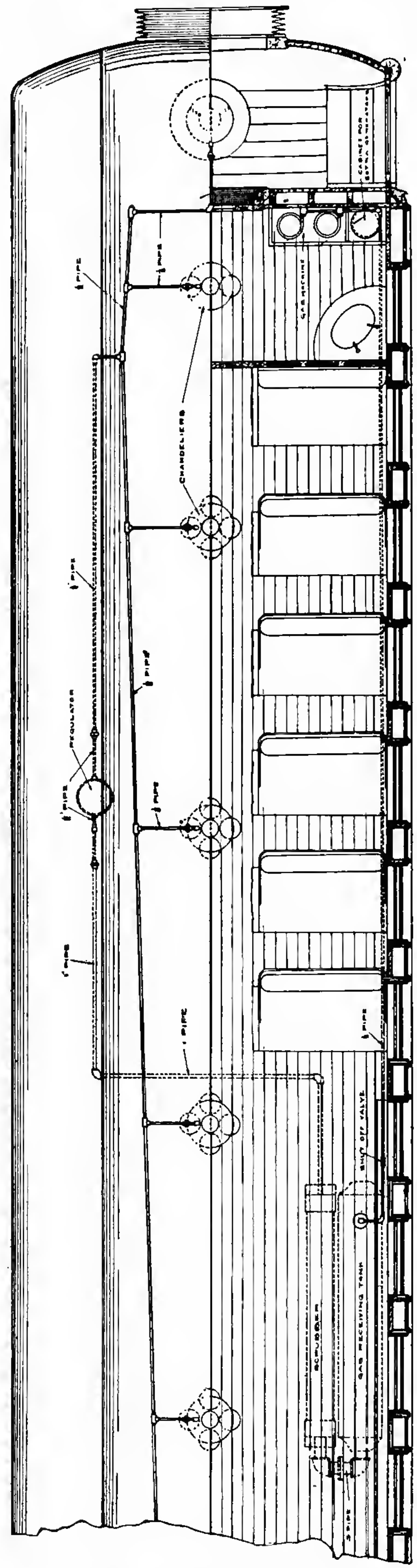


Fig. 2252—Arrangement of Piping on Passenger Car.

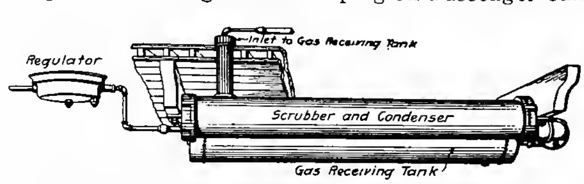


Fig. 2253—Arrangement of Fixtures Under Car.

Adams & Westlake Company.

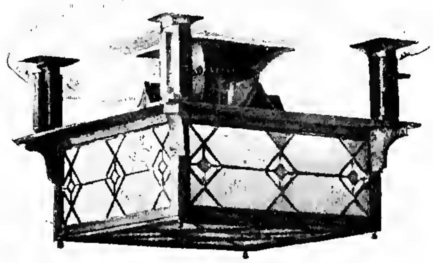


Fig. 2255—Four-Light Chandelier No. 792.

Fig. 2254—One-Light Side Deck Lamp with Curved Foot for Empire Deck.

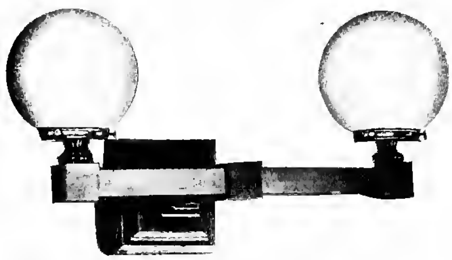


Fig. 2256—Two-Light Electric Bracket No. 7190a.

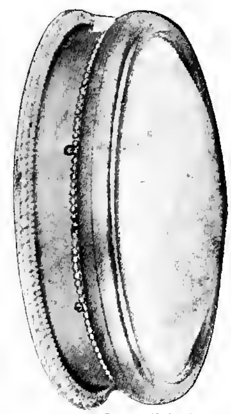


Fig. 2257—One-Light Oval Panel Lamp.

Fig. 2258—Four-Light Chandelier No. 772.

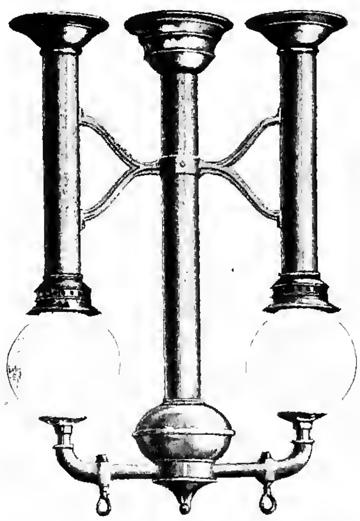


Fig. 2259—Two-Light Chandelier No. 764.

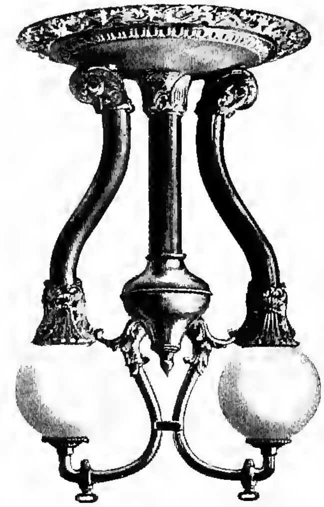


Fig. 2260—Two-Light Chandelier No. 770.

Fig. 2261 — One-Light Vestibule Chandelier No. 798, for Flat Deck.

Fig. 2262—One-Light Chandelier No. 784.

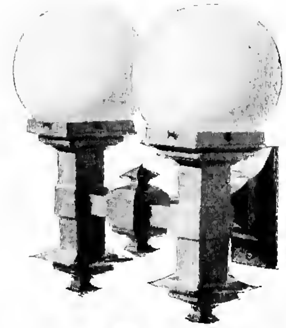


Fig. 2263—Two-Light Electric Bracket No. 7290.

Adams & Westlake Company.

Fig. 2264—Two-Light Chandelier No. 202.

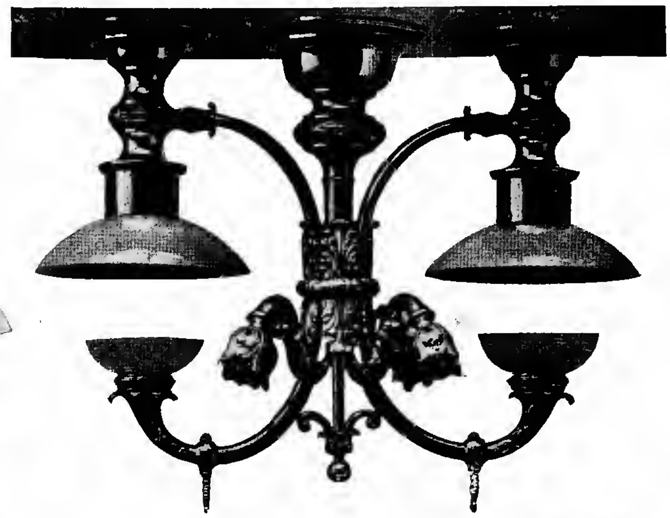


Fig. 2265—Two-Light Chandelier No. 302.

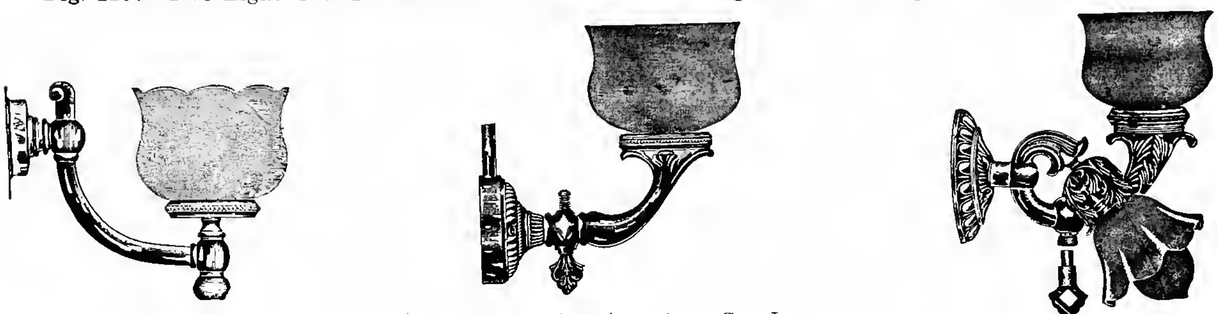


Fig. 2266—Bracket Acetylene Gas Lamps.

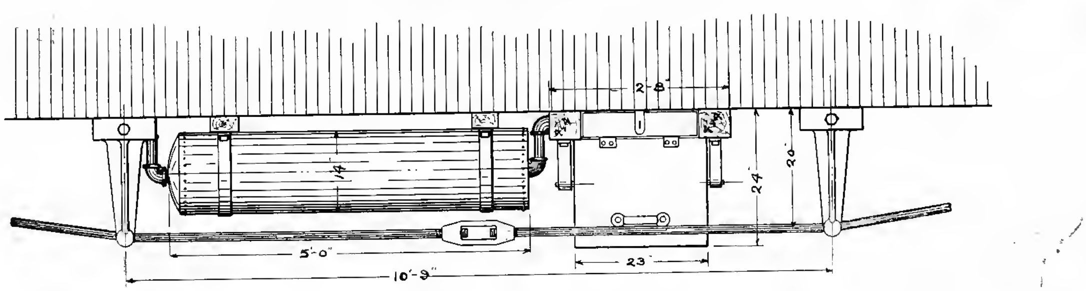


Fig. 2267—Application of Generator and Gas Tank Under Car; Avery System of Acetylene Gas Lighting.

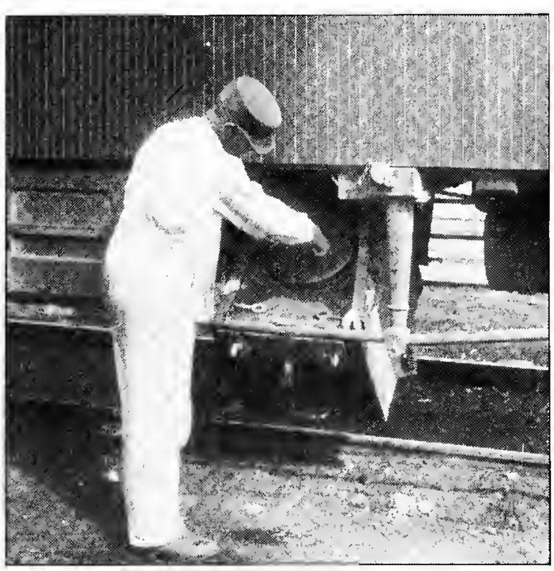


Fig. 2268—Generator Box Lowered for Recharging.

Fig. 2269—Generator Box Closed in Running Position.

Dayton Manufacturing Company.

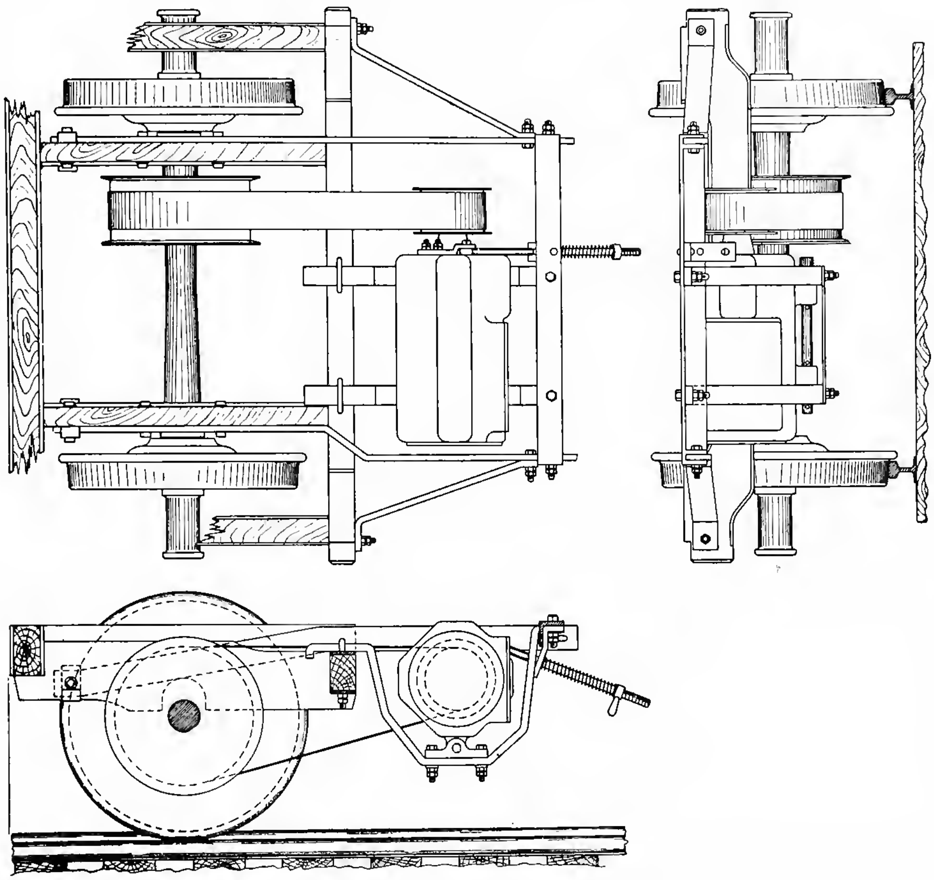


Fig. 2270—Application of Generator to Truck in Ner oold System of Electric Lighting.

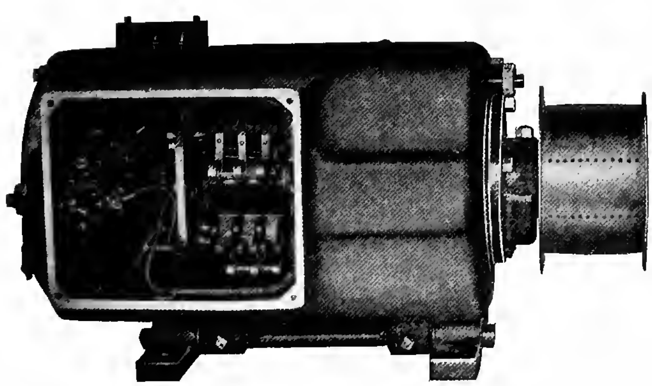


Fig. 2271—Generator with Casing Removed, Showing Brushes.

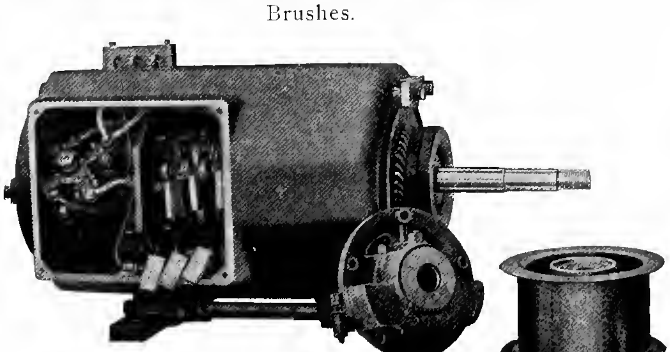


Fig. 2272—Generator with Casing and Pulley Removed and Brushes Taken Down.

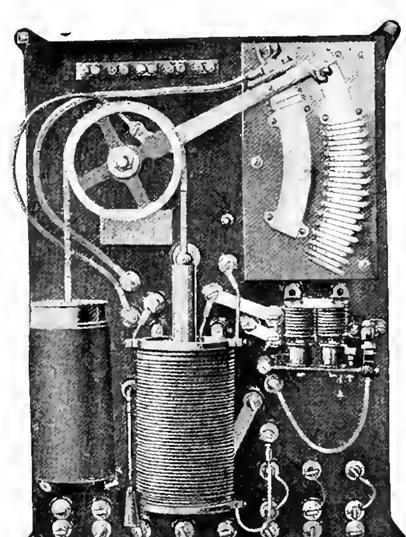


Fig. 2273—Automatic Regulator.

Adams & Westlake Company.

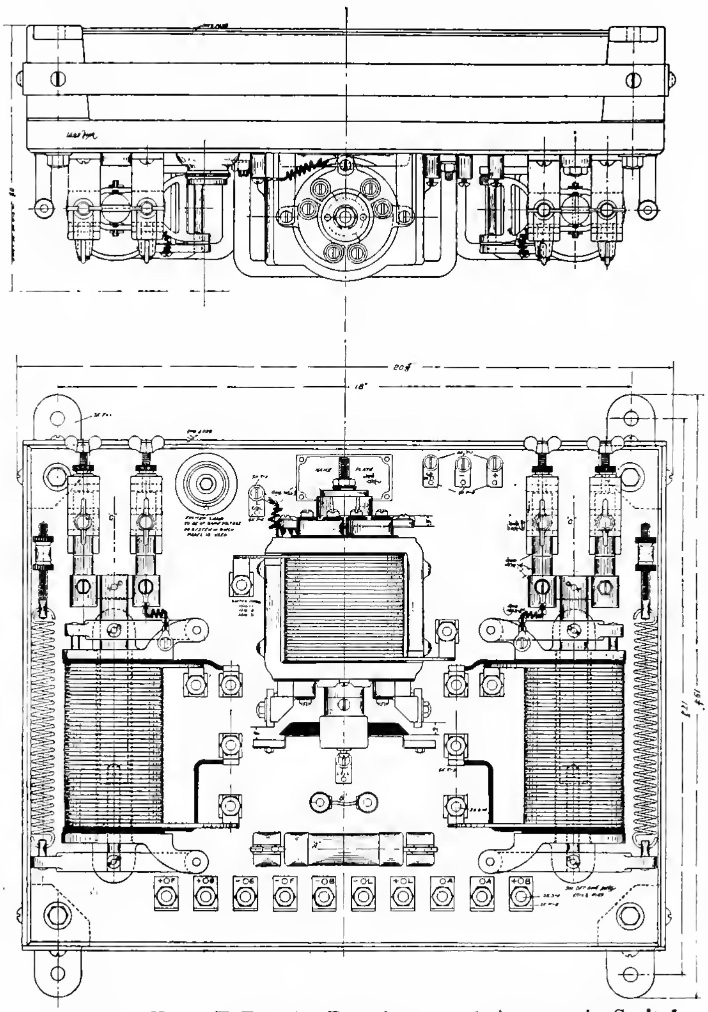


Fig. 2274—Type F Panel. Regulator and Automatic Switch.

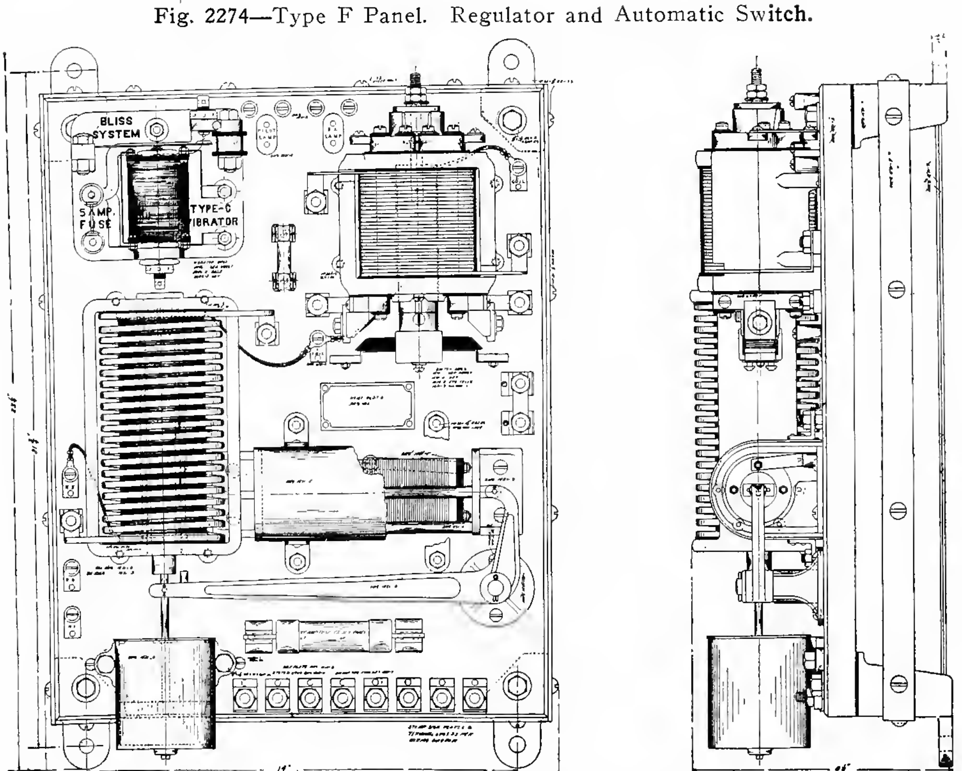


Fig. 2275—Type C-2 Panel. Regulator and Automatic Switch.
United States Light & Heating Company.

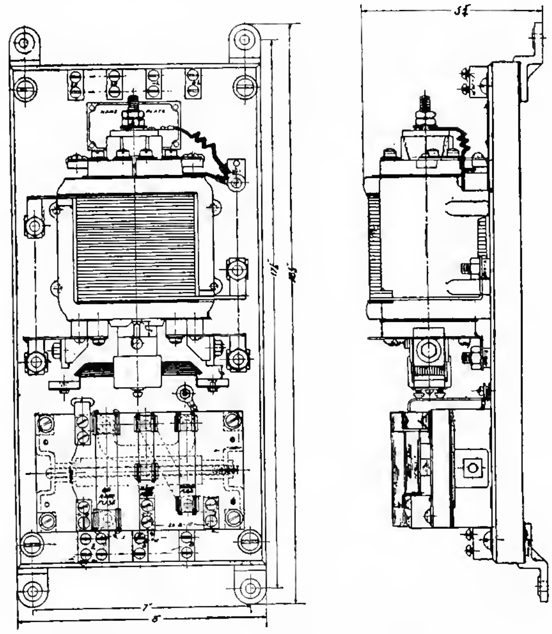


Fig. 2276—Type A-2 Panel. Automatic Switch; Bucker System.

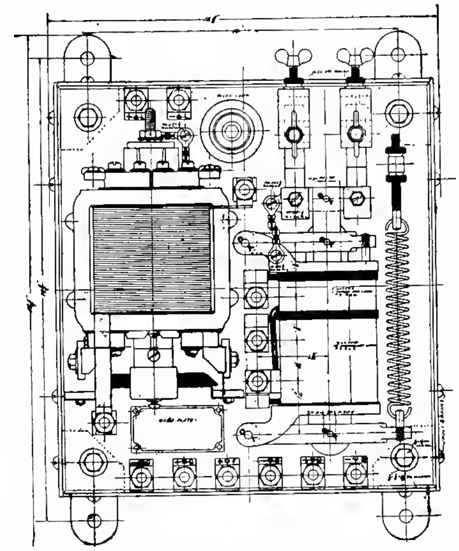
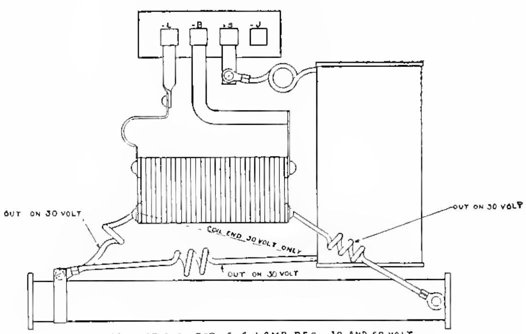


Fig. 2277—Type E-2 Panel. Regulator and Automatic Switch; Export Type.



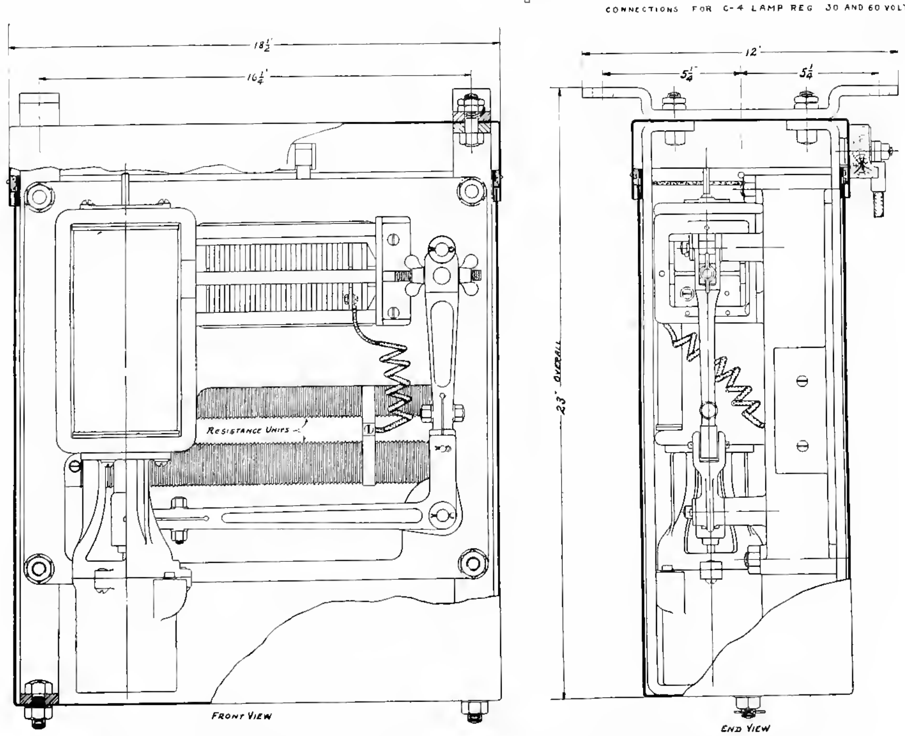


Fig. 2278—Lamp Regulators, Types C-3 and C-4, for Mounting Outside.

United States Light & Heating Company.

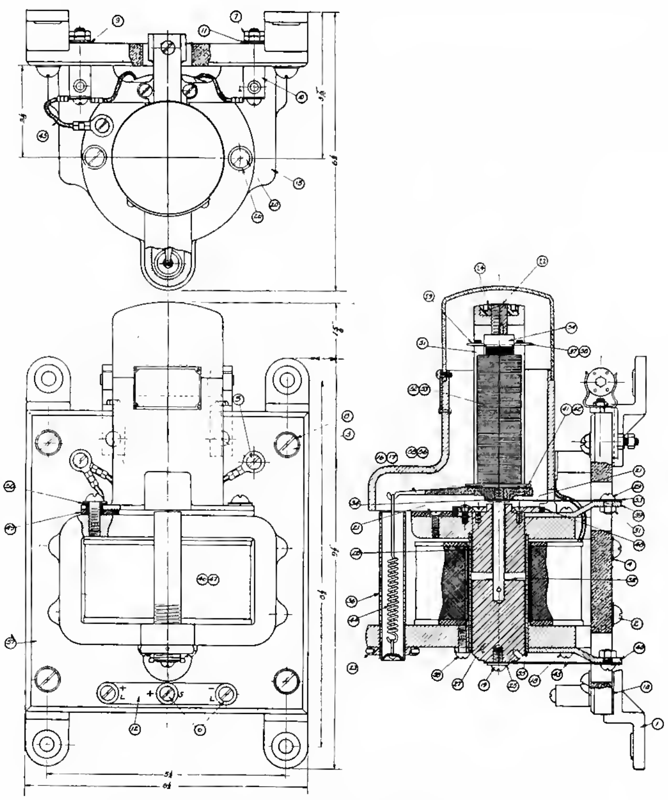


Fig. 2279—Type K Lamp Regulator Relay.

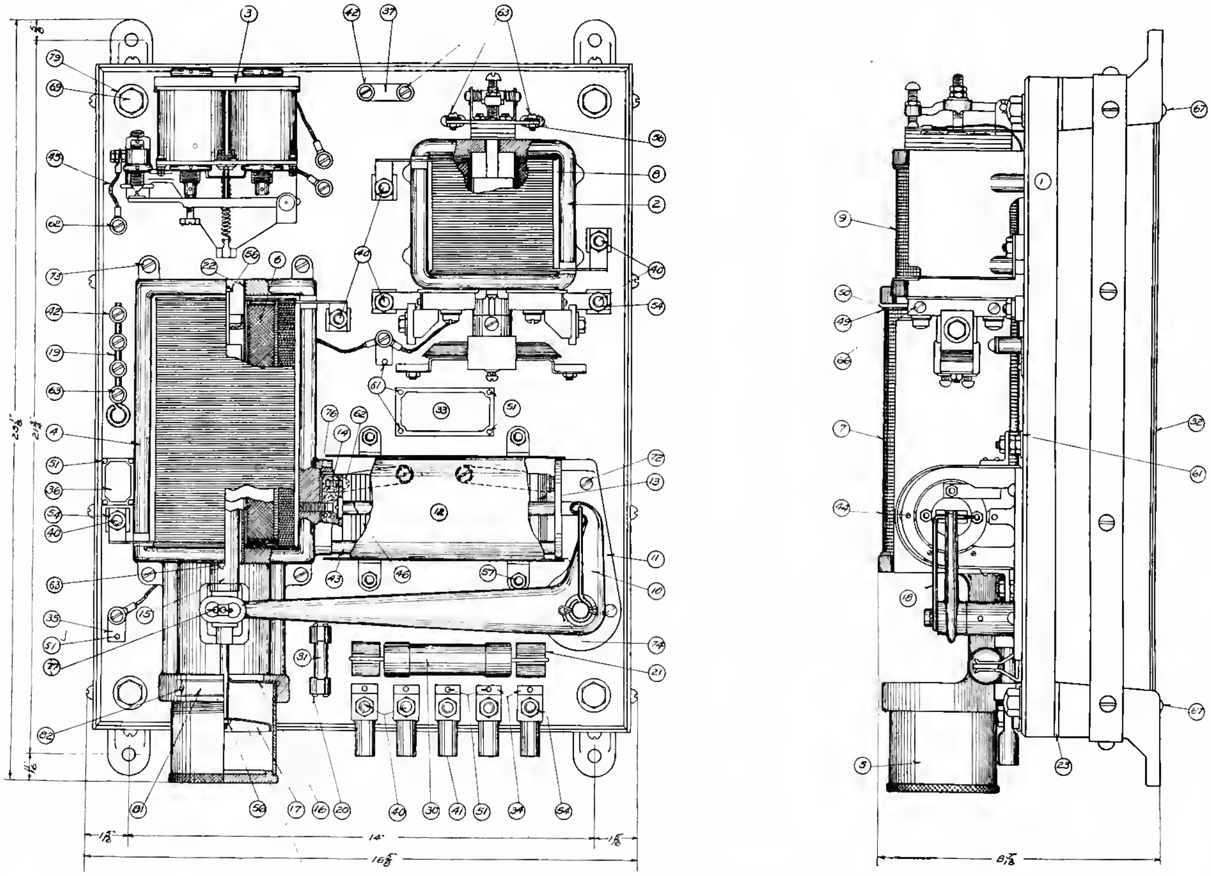


Fig. 2280—Type C-7 Panel.

United States Light & Heating Company.

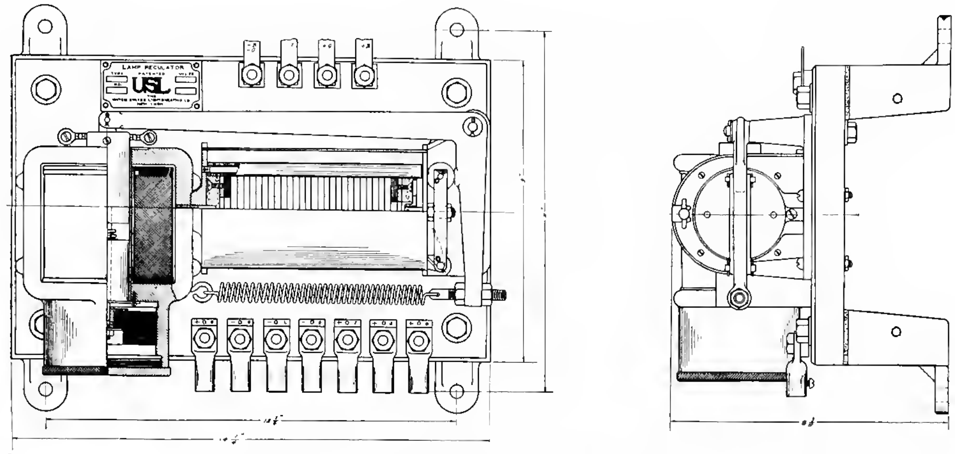


Fig. 2281—Type B-1 Lamp Regulator, for Mounting Inside Locker.

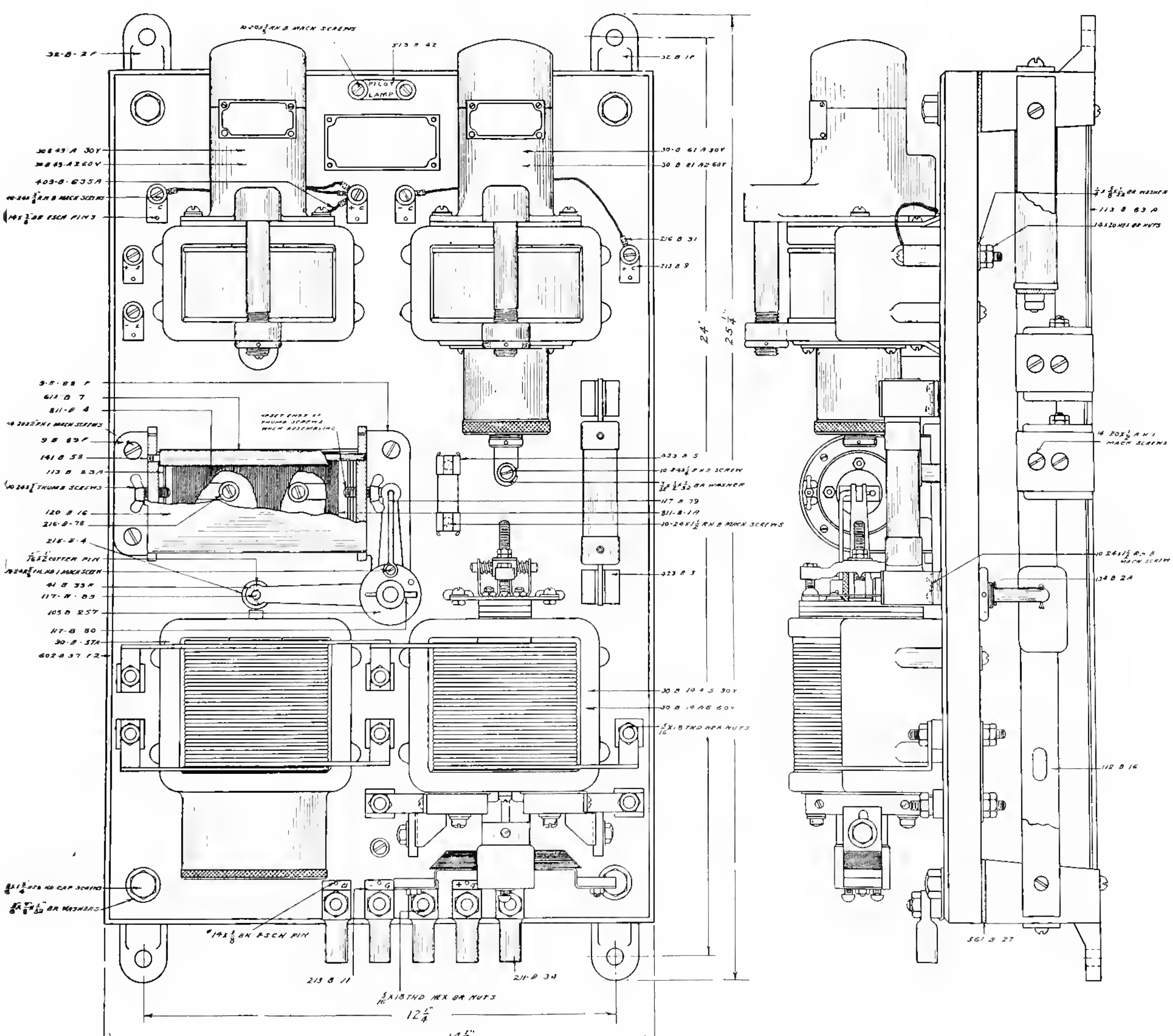


Fig. 2282—Type S-1 Panel.

United States Light & Heating Company.

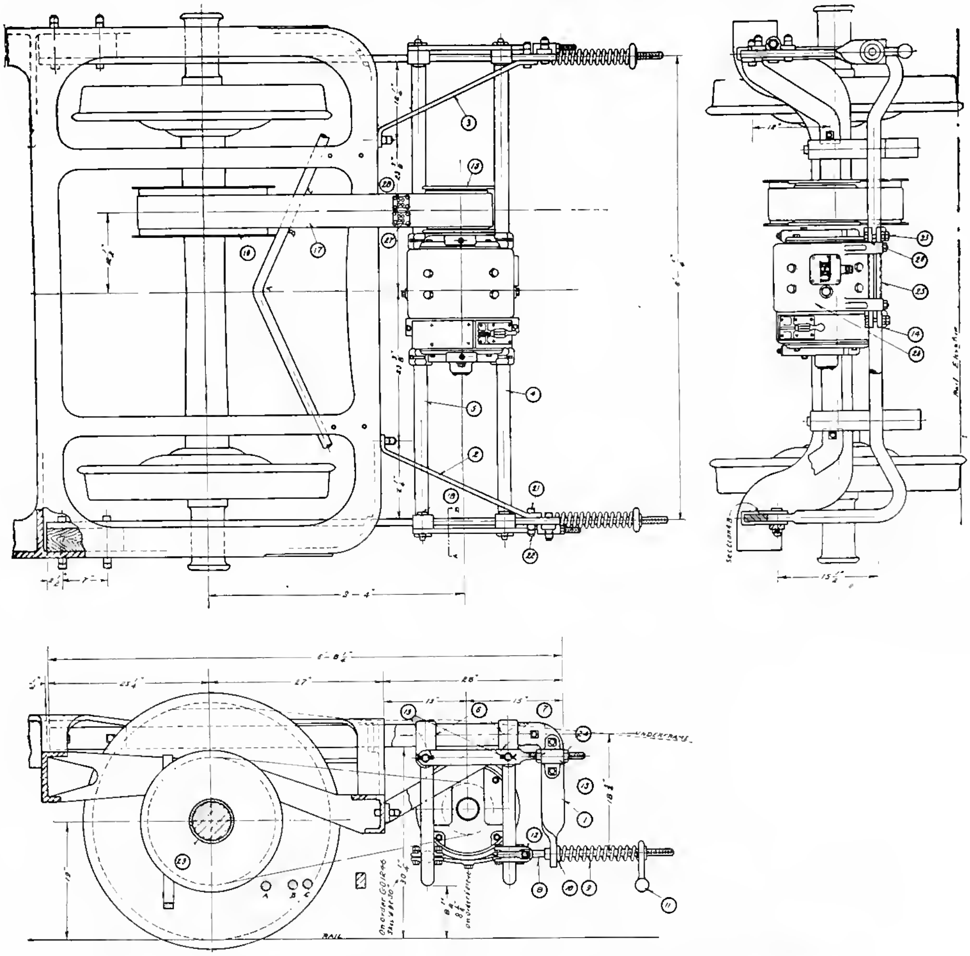


Fig. 2283—U. S. L. Generator on Suspension and Truck.

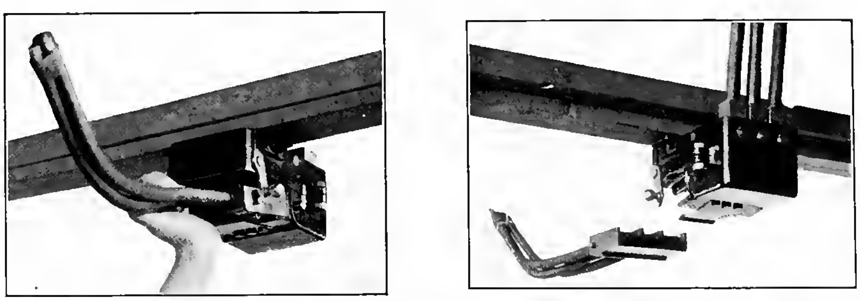


Fig. 2284—Vestibule Type of Train Line Coupler for Overhead Use. Couples by Hand, Uncouples Automatically.

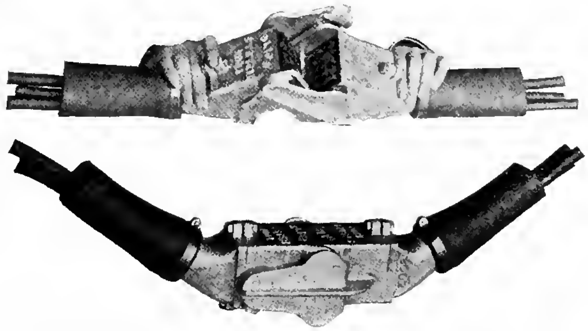
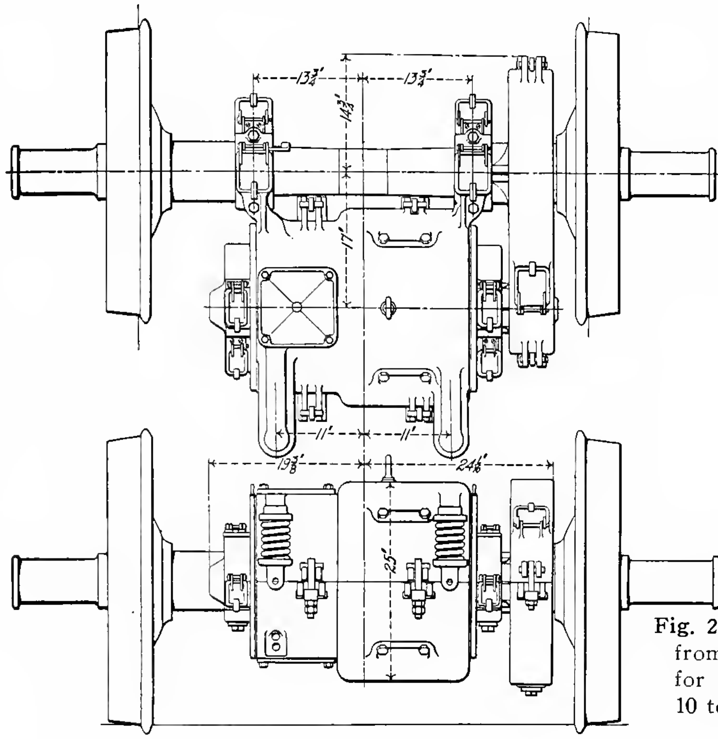


Fig. 2285—Steam Type of Train Line Coupler for Use Below Car Floor. Couples by Hand, and Uncouples Automatically. Capacity, 300 Amperes.

Fig. 2286—U. S. L. Generator, Type O-3.

United States Light & Heating Company.



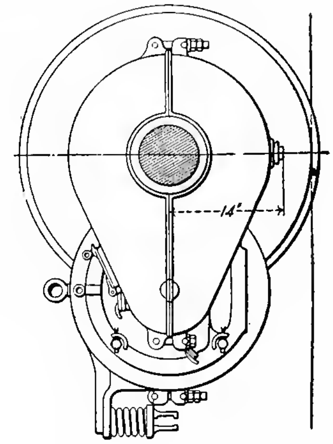


Fig. 2287—Tender Generator, Gear **Driven** from Axle; Capacity, 25 K. W. **Adapted** for Lighting and Charging **Batteries on** 10 to 12 Cars.

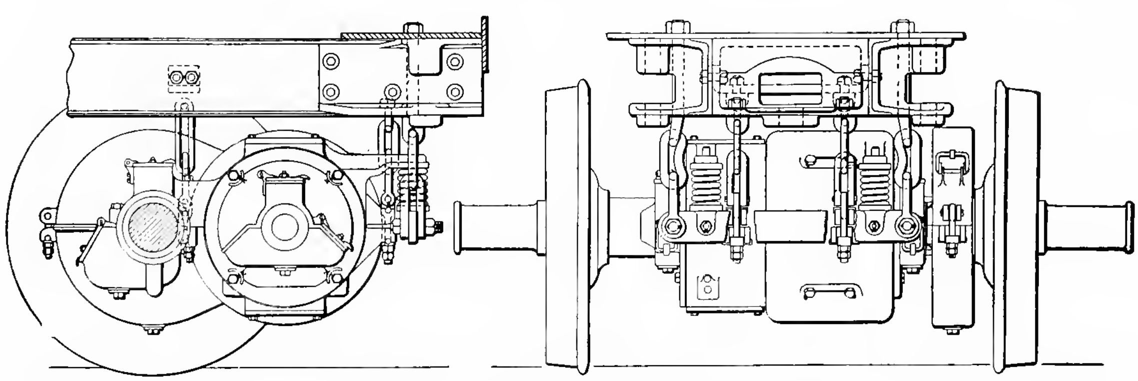


Fig. 2288—Application of Gear-Driven Tender Generator to Pennsylvania Railroad Tender, **Showing** Method of Suspension.

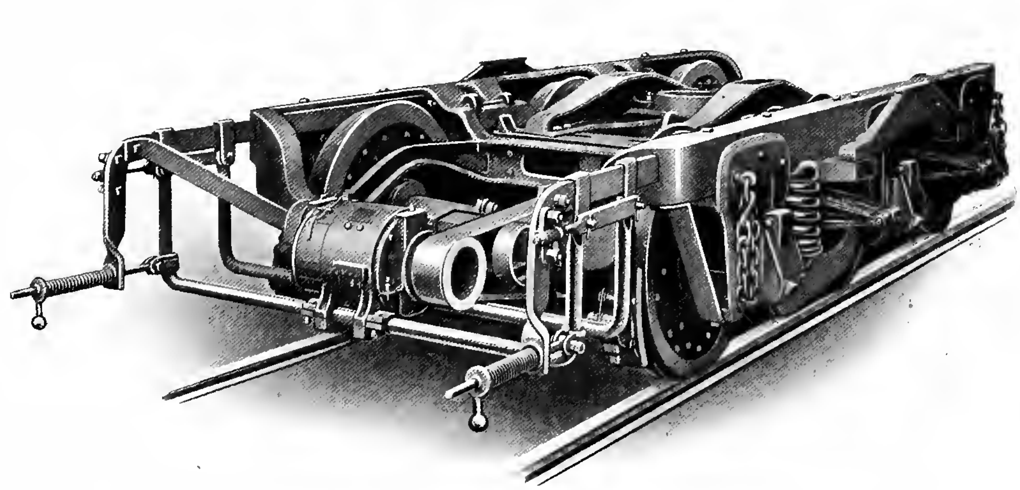


Fig. 2289—Six-Wheel Truck Equipped with Type M Generator.

United States Light & Heating Company.

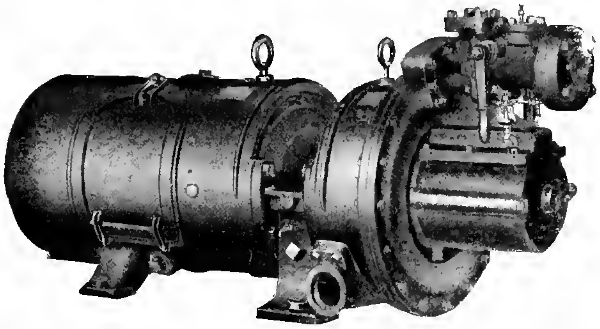


Fig. 2290—Type CC, 2 Pole, 20-25 K. W., Curtis Steam Turbine for Train Lighting; Speed, 4,500 R. P. M. Located on and Takes Steam Supply from Locomotive.

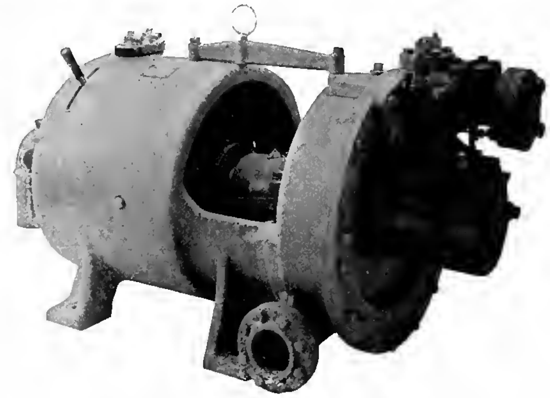


Fig. 2291—Baggage Car Type of Curtis Steam Turbine Generator Set, for Train Lighting.

General Electric Company.

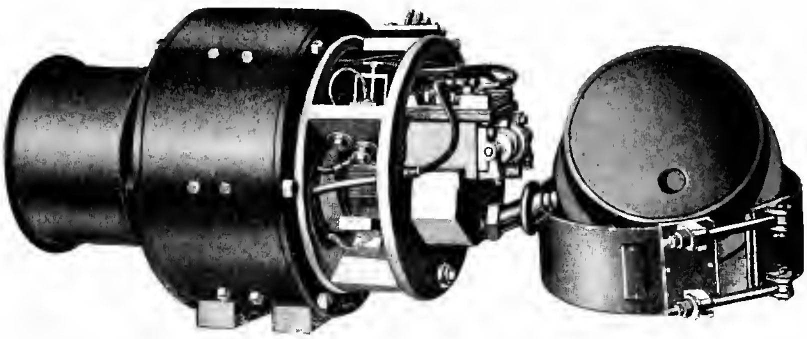


Fig. 2292—Consolidated Type F, 2 K. W. Dynamo, for Baggage Cars and Coaches.

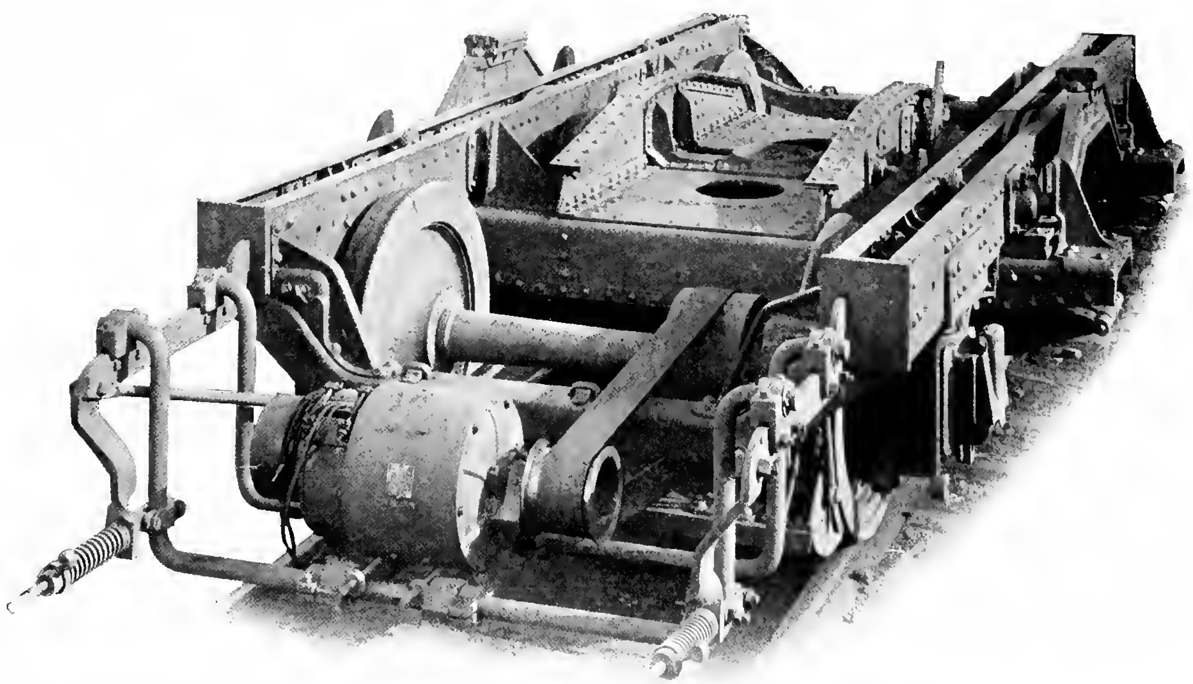


Fig. 2293—Generator Applied to Six-Wheel Truck; Consolidated Type D Axle Light System for Dining, Sleeping and Private Cars.

Consolidated Railway Electric Lighting & Equipment Company.

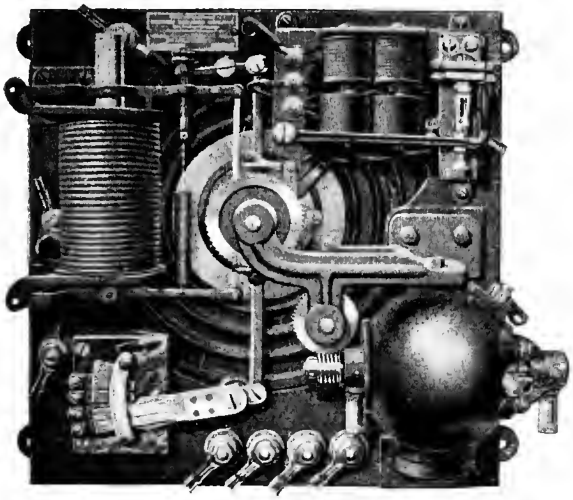


Fig. 2294—Regulator for Type A Equipment.

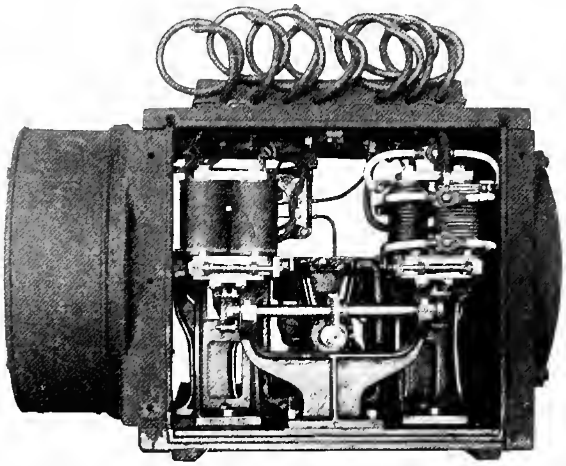


Fig. 2295—Kennedy Regulator, Type D, with Cover Removed.

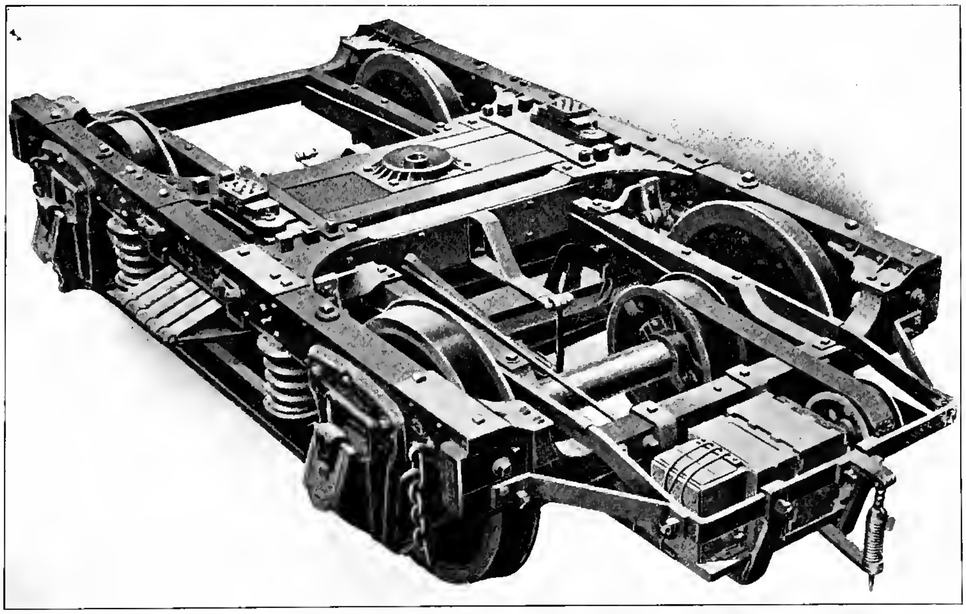


Fig. 2296—Generator Applied to Four-Wheel Truck; Consolidated Type A Axle Light System for Day Coaches and Chair Cars.

Consolidated Railway Electric Lighting & Equipment Company.

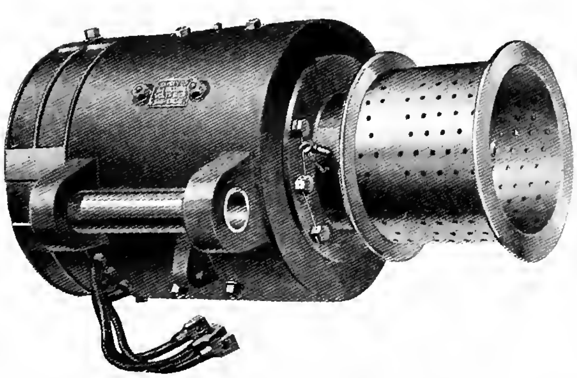


Fig. 2297—Dynamo with Ball Bearings.

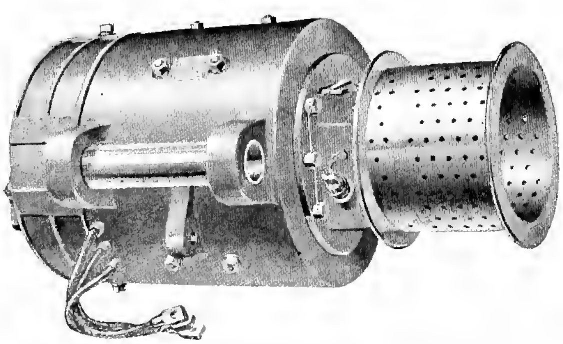


Fig. 2298—Dynamo with Waste Packed Heads.

Safety Car Heating & Lighting Company.

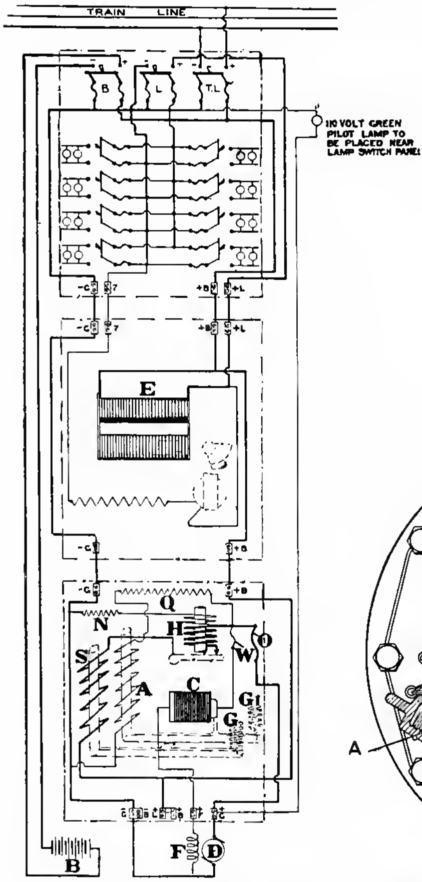


Fig. 2299—Type F Wiring Diagram.

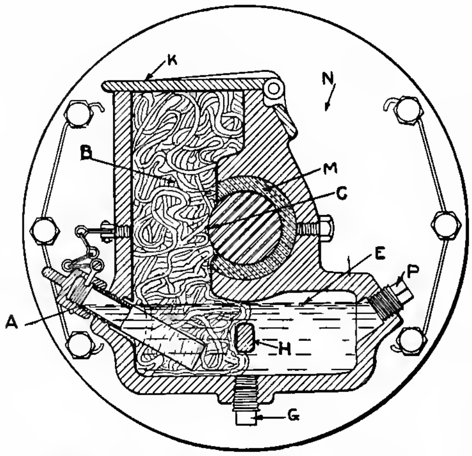


Fig. 2300—Section Through Waste Packed Head for Dynamo.

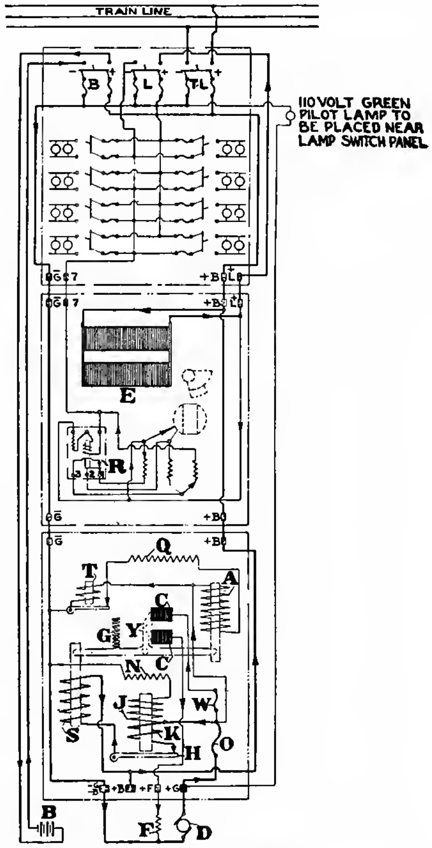


Fig. 2301—Type D Wiring Diagram.

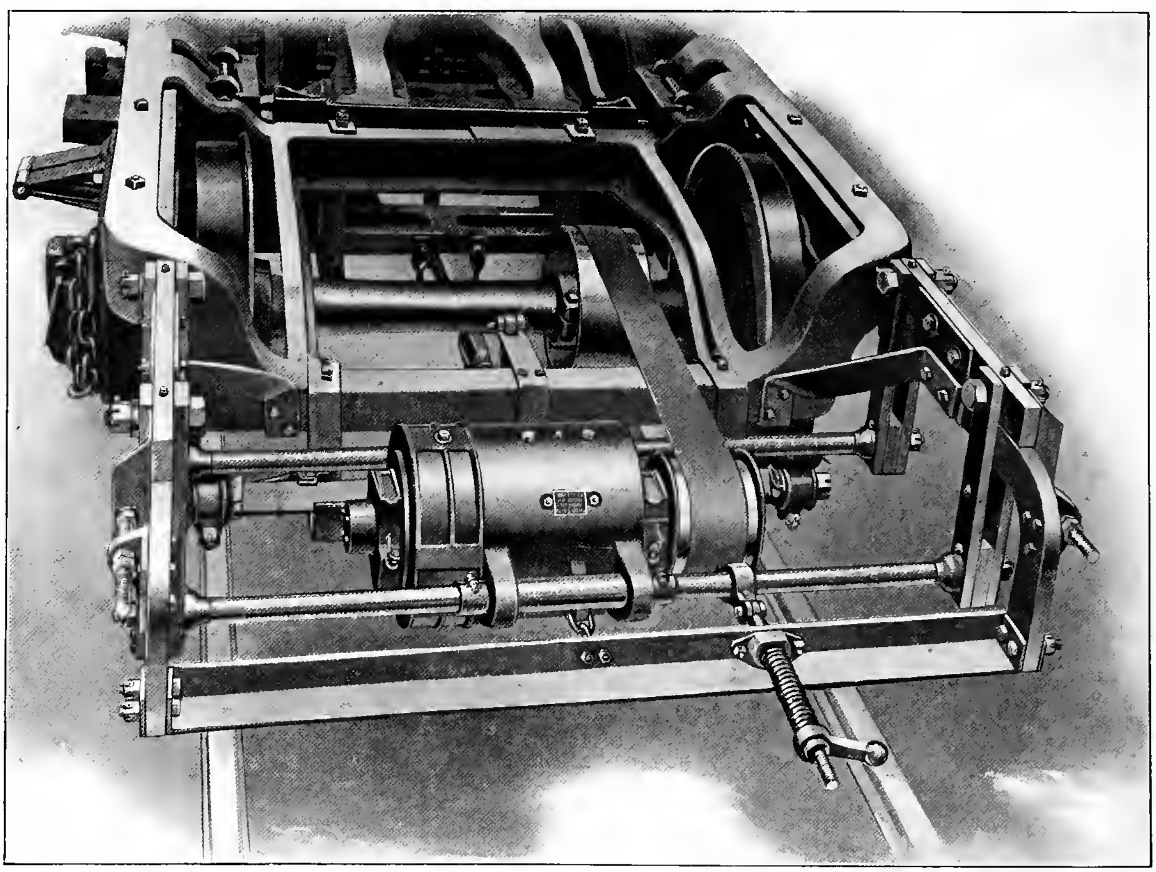


Fig. 2302—Dynamo Suspended on Six-Wheel Truck.
Safety Car Heating & Lighting Company.

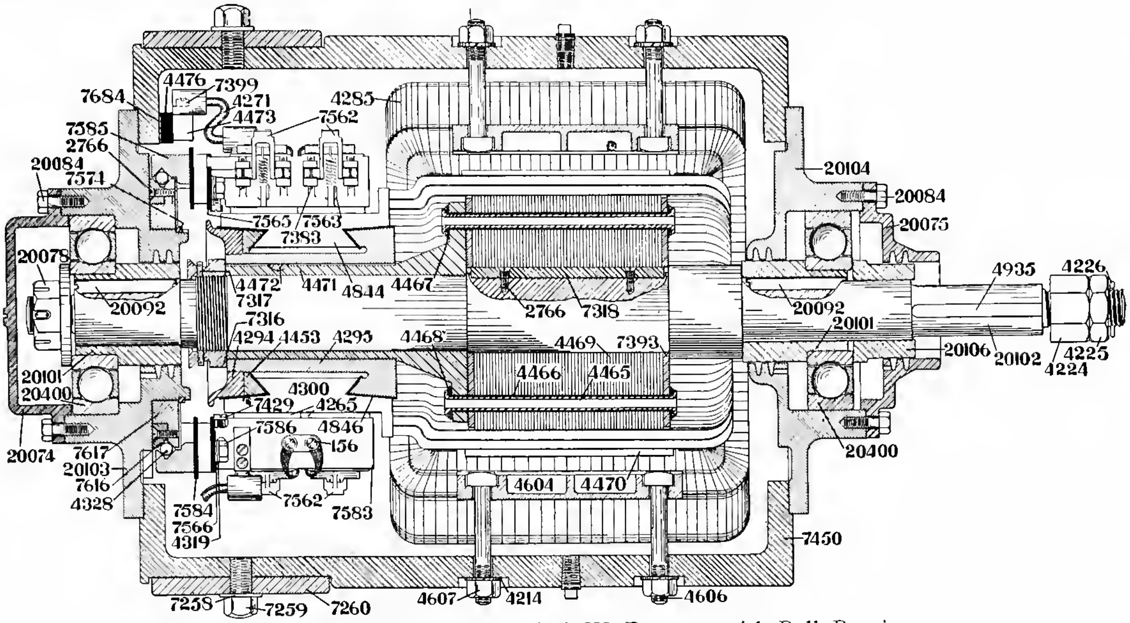


Fig. 2303—Section Through 2.6 K. W. Dynamo with Ball Bearings.

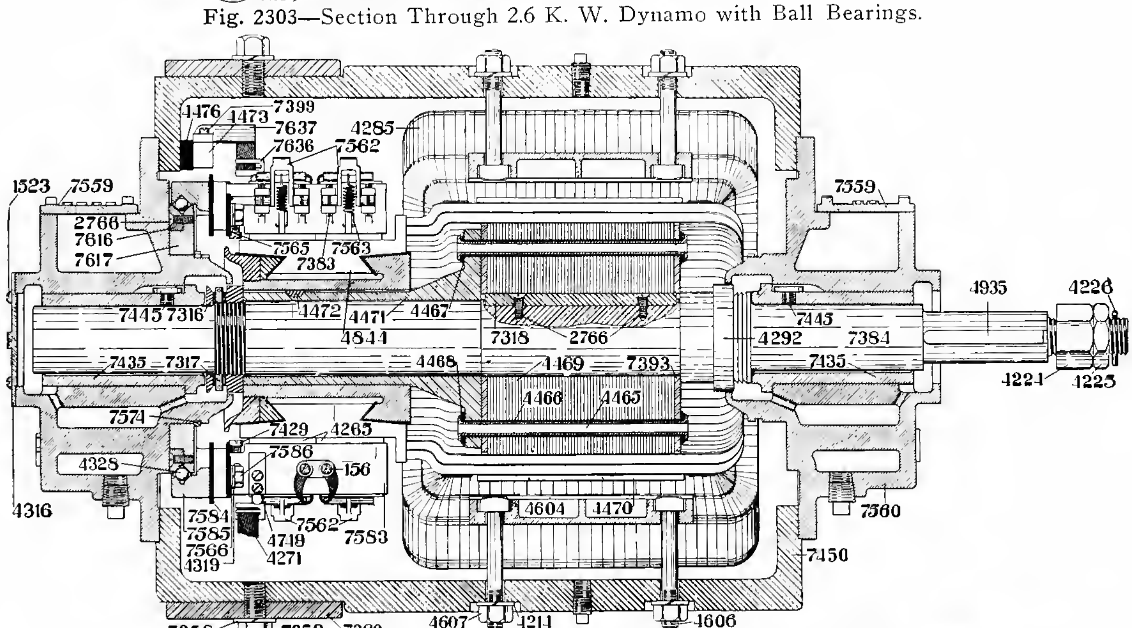


Fig. 2304—Section Through 2.6 K. W. Dynamo with Waste Packed Heads.

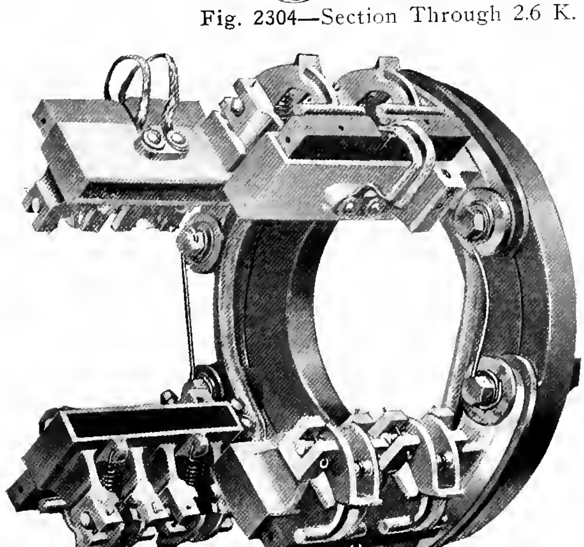


Fig. 2305—Brush Rigging No. 7625.

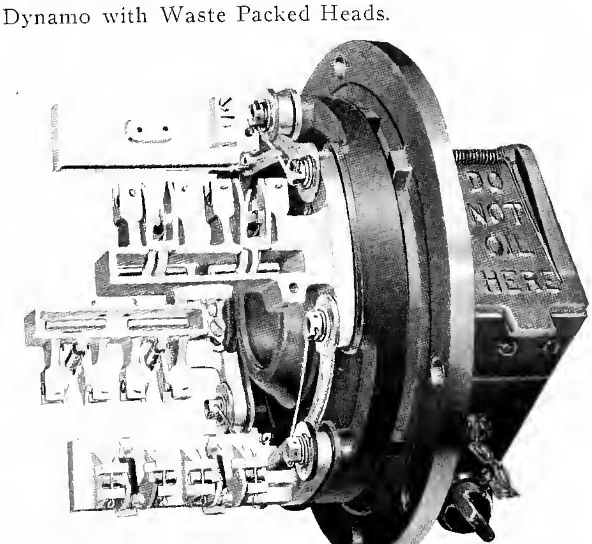


Fig. 2306—Waste Packed Head with Brush Rigging.

Car Heating & Lighting Company.

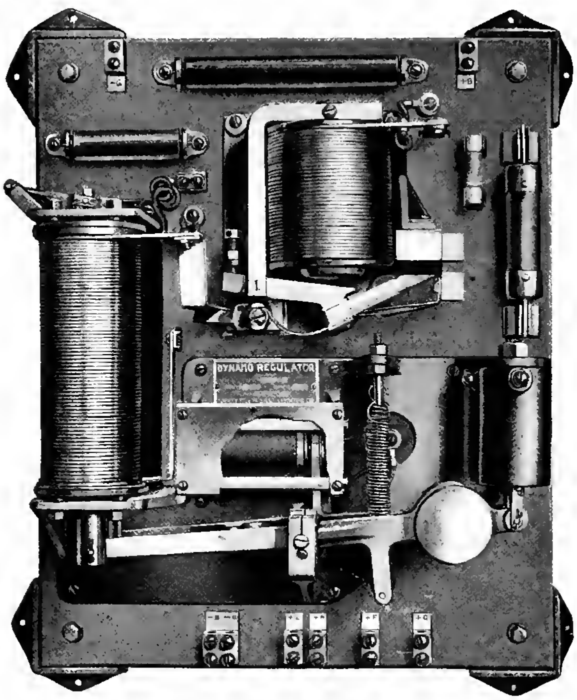


Fig. 2307—Type F Dynamo Regulator.

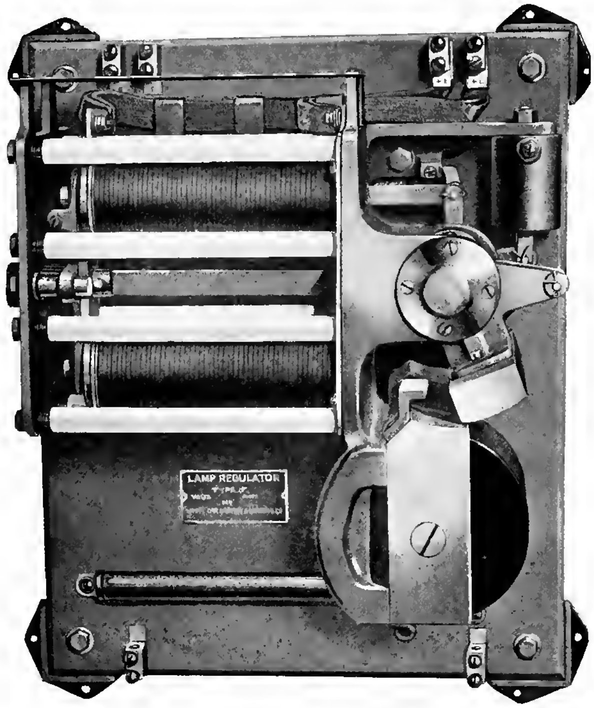


Fig. 2308—Type F Lamp Regulator.

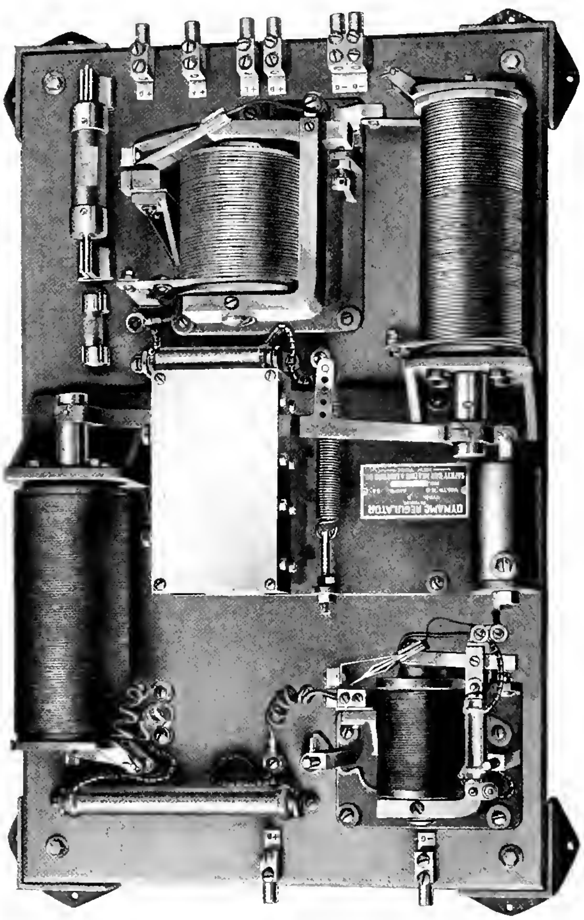


Fig. 2309—Type D Dynamo Regulator.

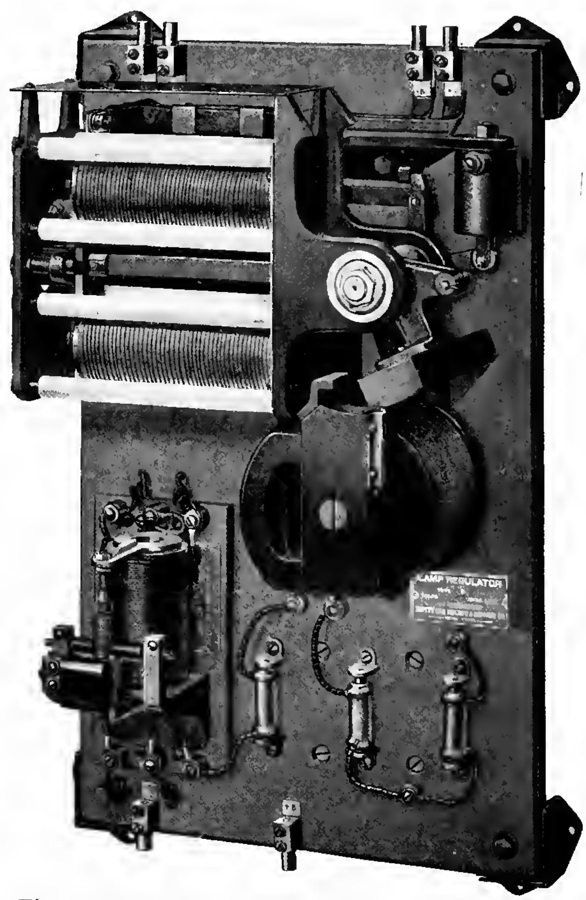


Fig. 2310—Type D Lamp Regulator, with Relay.

Safety Car Heating & Lighting Company.

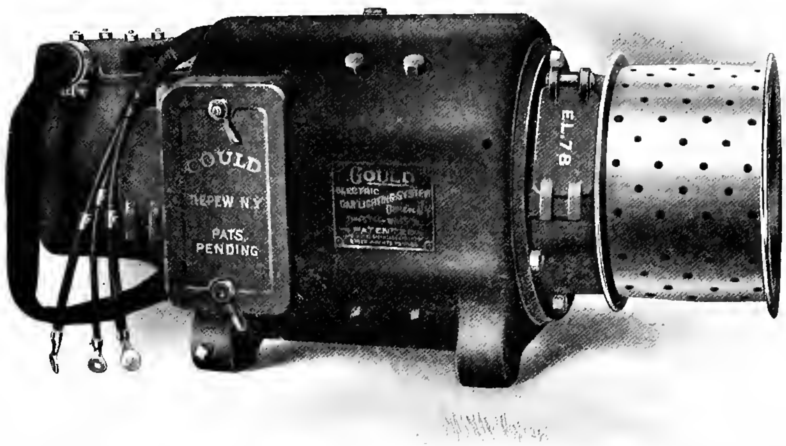


Fig. 2311—Car Lighting Generator of 30 and 60 Volt, 2, 3 and 4 K. W. Capacities.

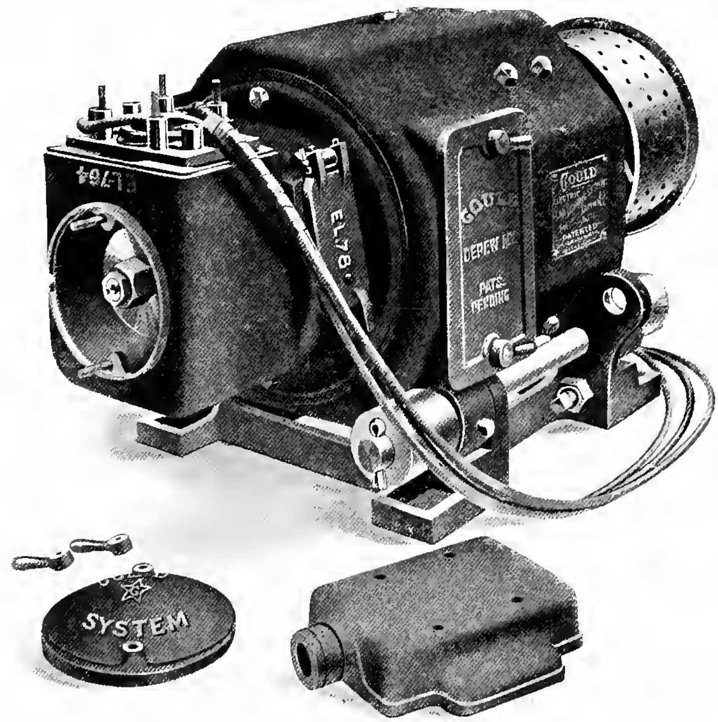
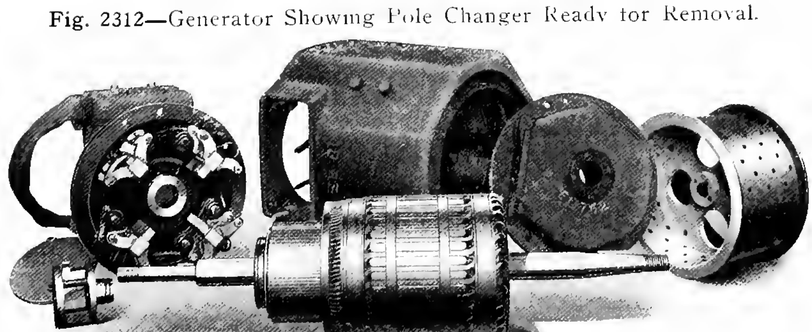


Fig. 2312—Generator Showing Pole Changer Ready for Removal.



Commutator End Housing.
End Cap.
Trip Holder.

Magnet Frame.
Armature with Shaft.

Pulley End Housing.
Generator Pulley.

Fig. 2313—Main Parts of Generator; Gould Simplex System of Car Lighting.
Gould Coupler Company.

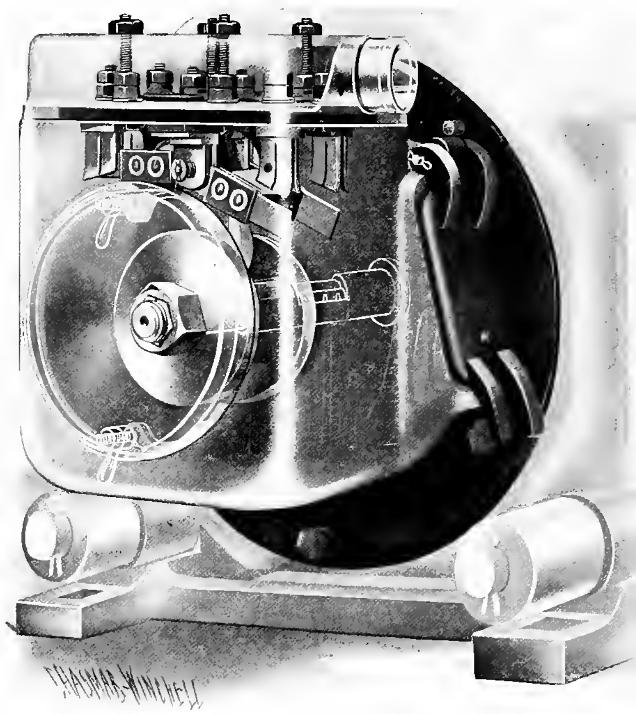
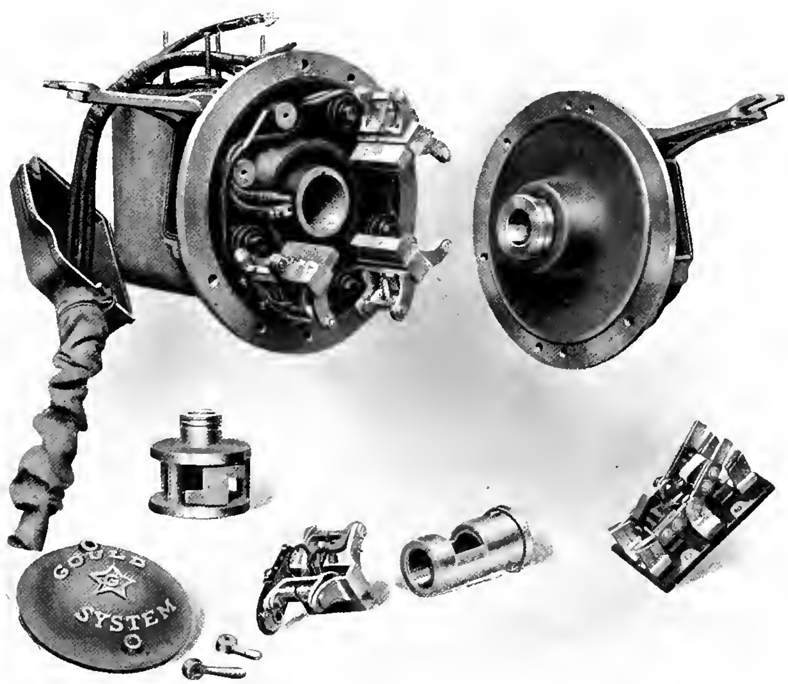


Fig. 2314—Mechanical Pole Changer.



Commutator End Housing.
End Cap.
Lever Nuts.
Trip Holder.
Bearing.
Brush Holder.
Pulley End Housing
Pole Changer Switch.

Fig. 2315—Parts of Pole Changer End of Generator.

Gould Coupler Company.

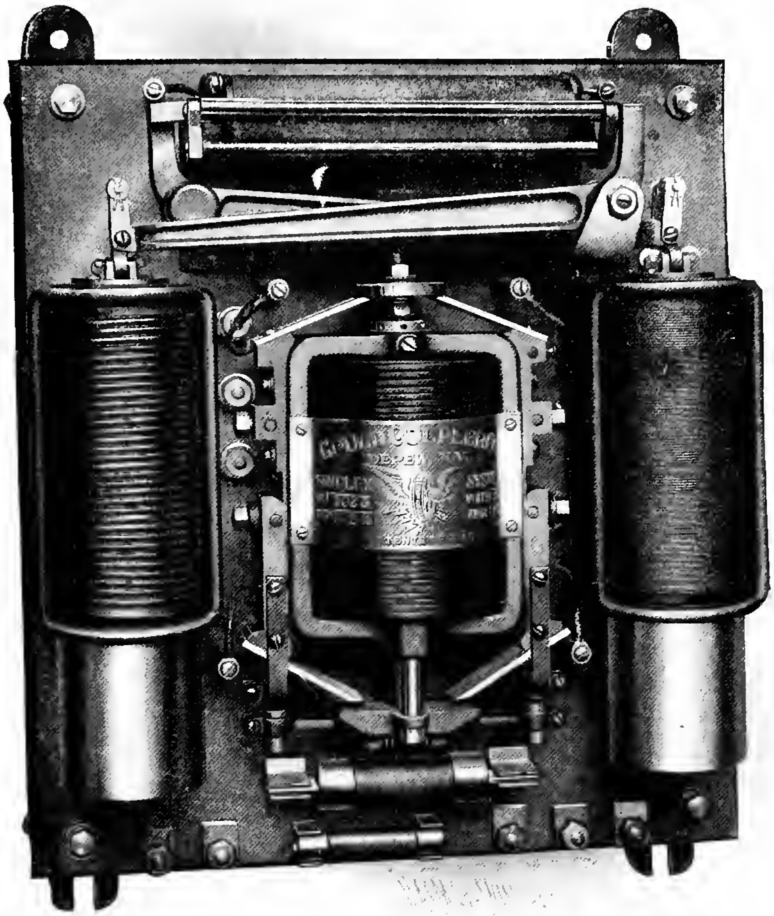


Fig. 2316—Generator Regulator, Type B.

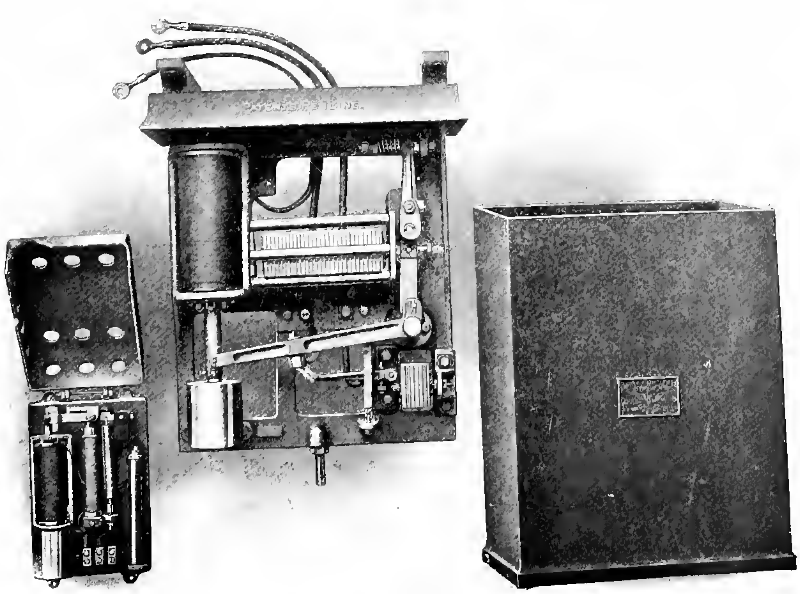


Fig. 2317—Multiplier, Type A, and Lamp Regulator, Type B.

Gould Coupler Company.

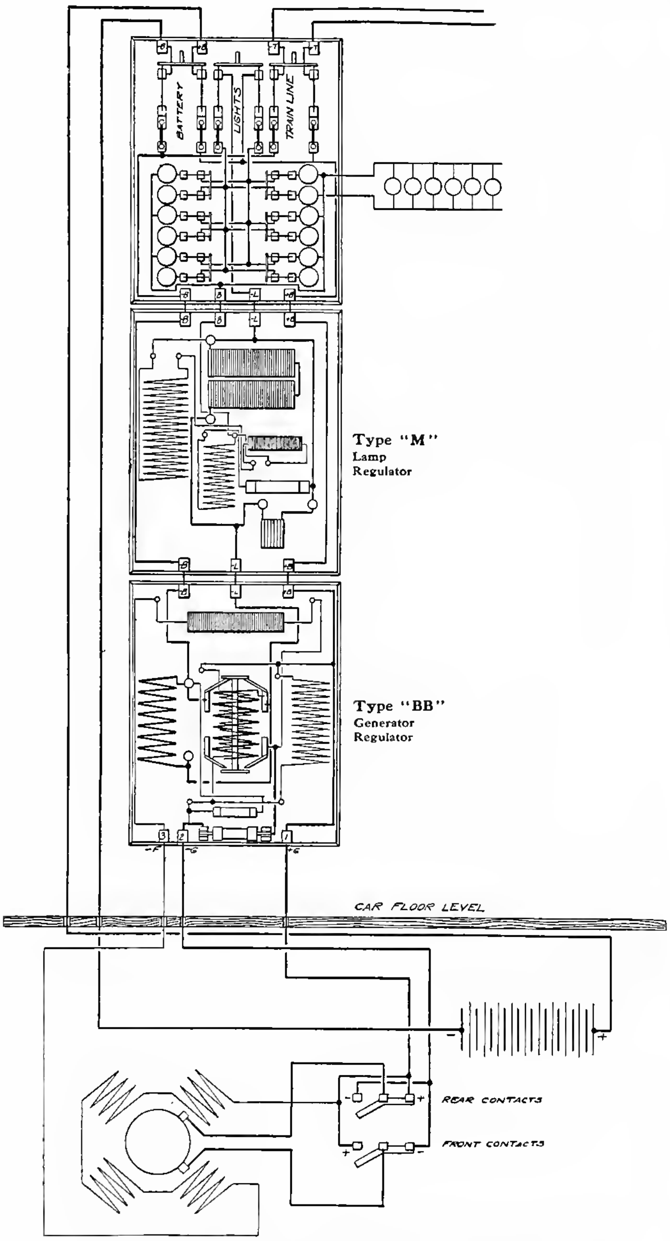


Fig. 2318—Wiring Diagram Showing Regulators.

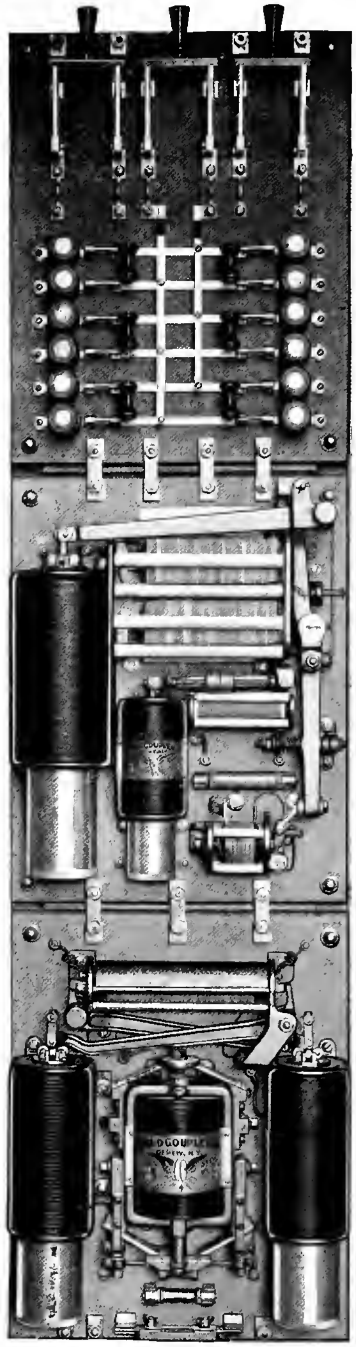


Fig. 2319—Regulator Panels Arranged for Mounting in Locker, Showing Type M Lamp Regulator and Type BB Generator Regulator.

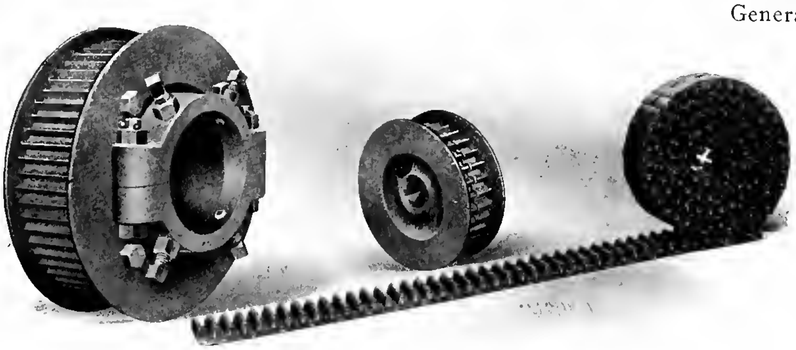


Fig. 2320—Axle and Generator Sprockets and Chain.
Gould Coupler Company.

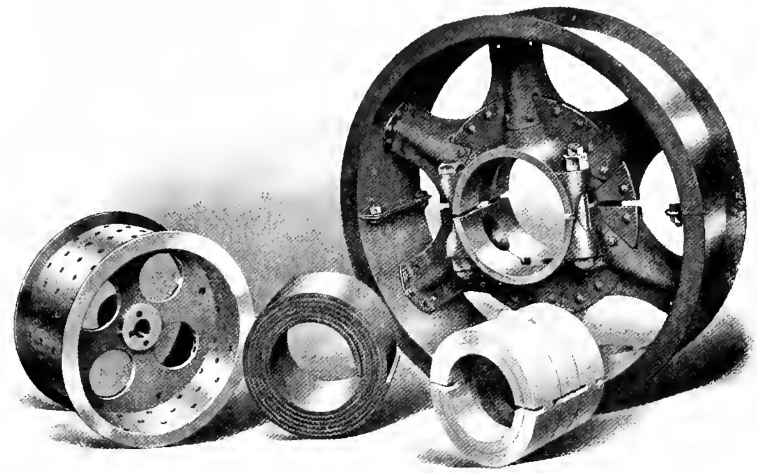


Fig. 2321—Generator Pulley, Belt, Axle Pulley and Bushing.

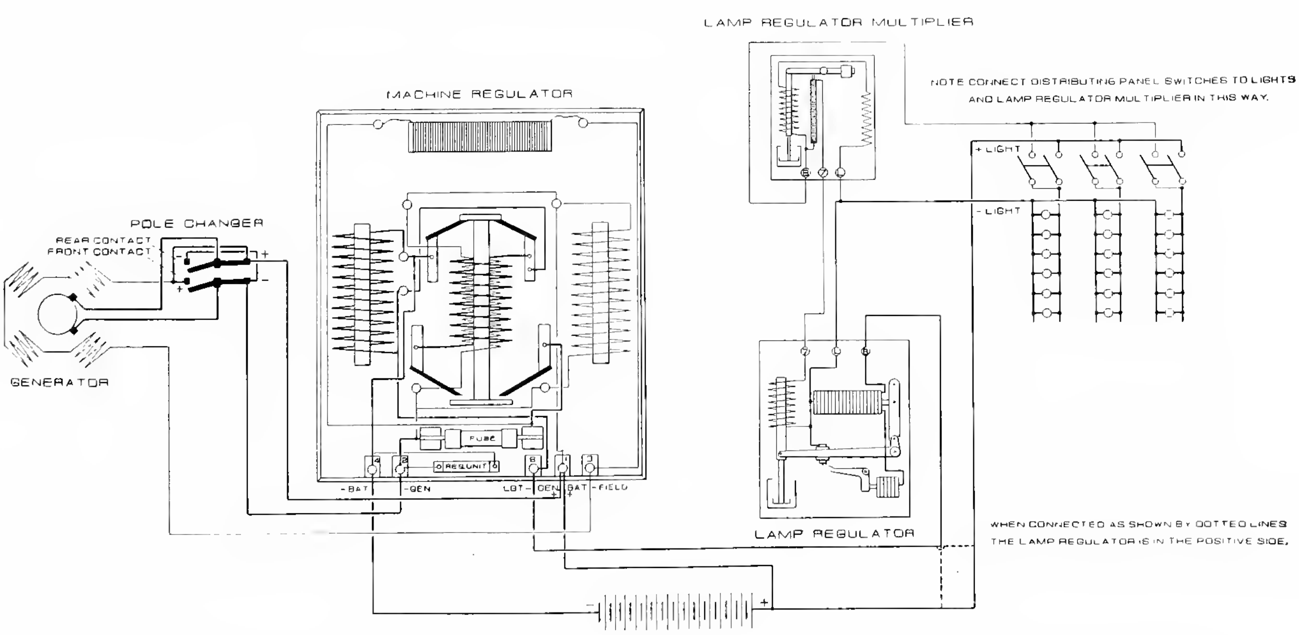


Fig. 2322—Wiring Diagram Showing Type B Generator Regulator; Type B Lamp Regulator; and Type A Multiplier.

Gould Coupler Company.

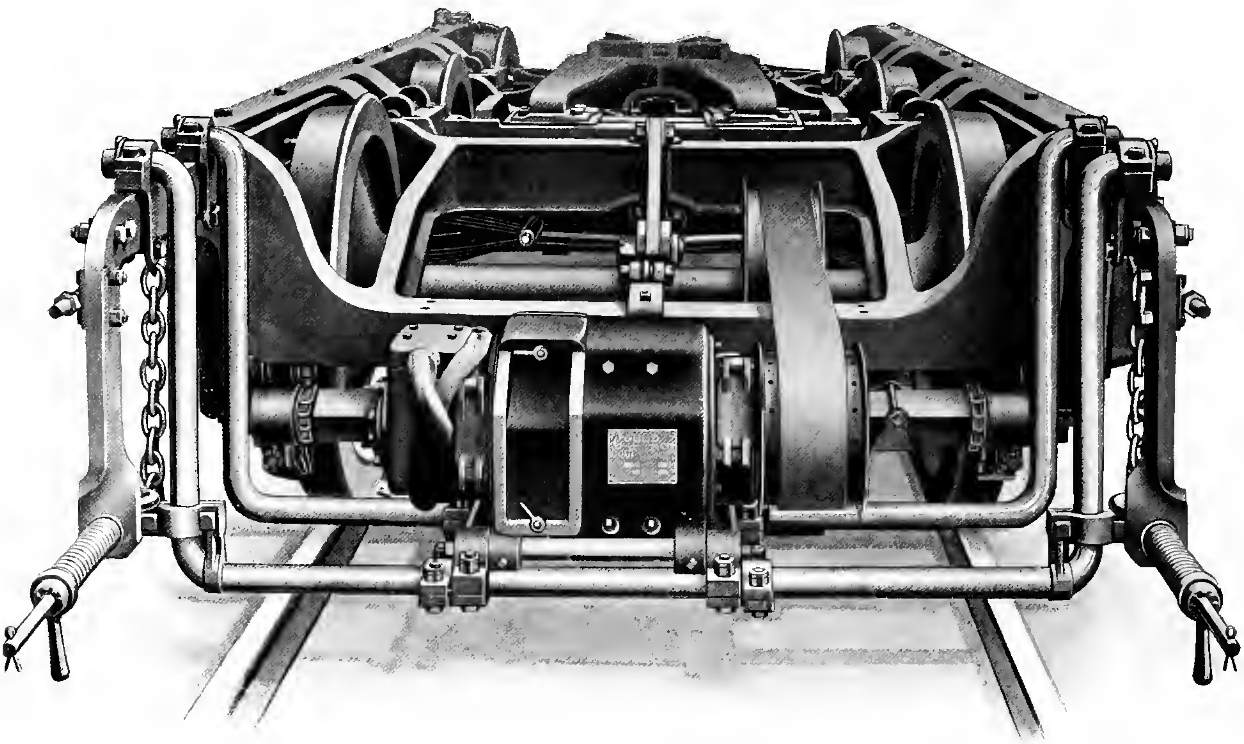


Fig. 2323—Generator Mounted on Link Suspension.

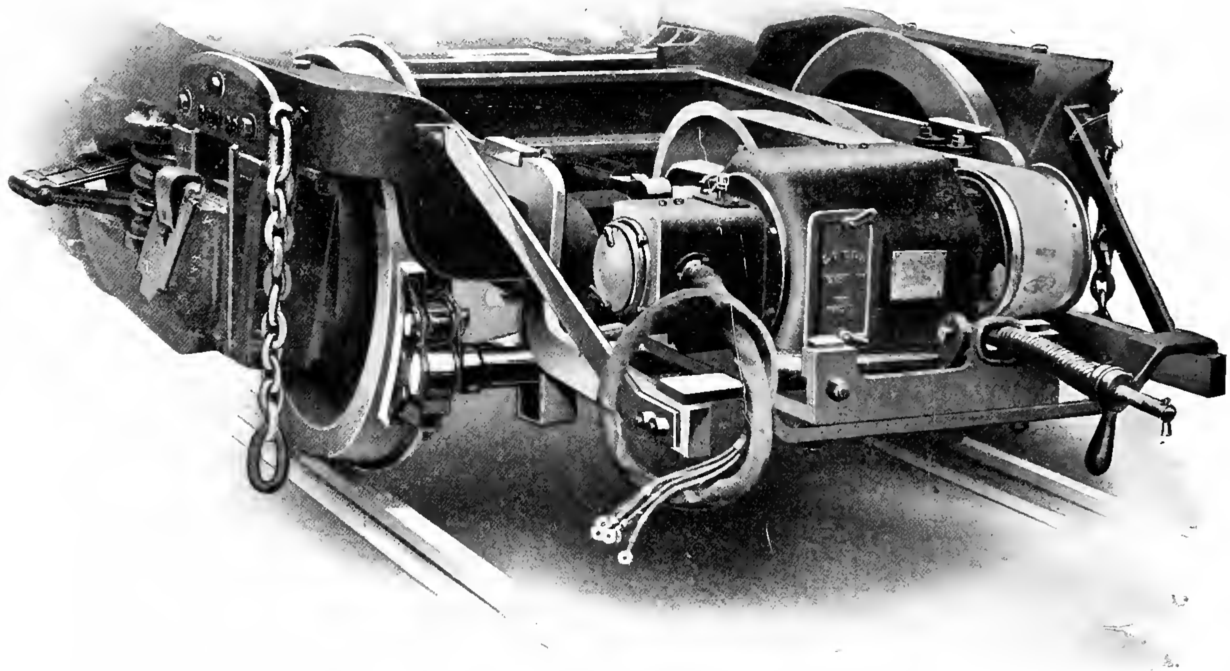
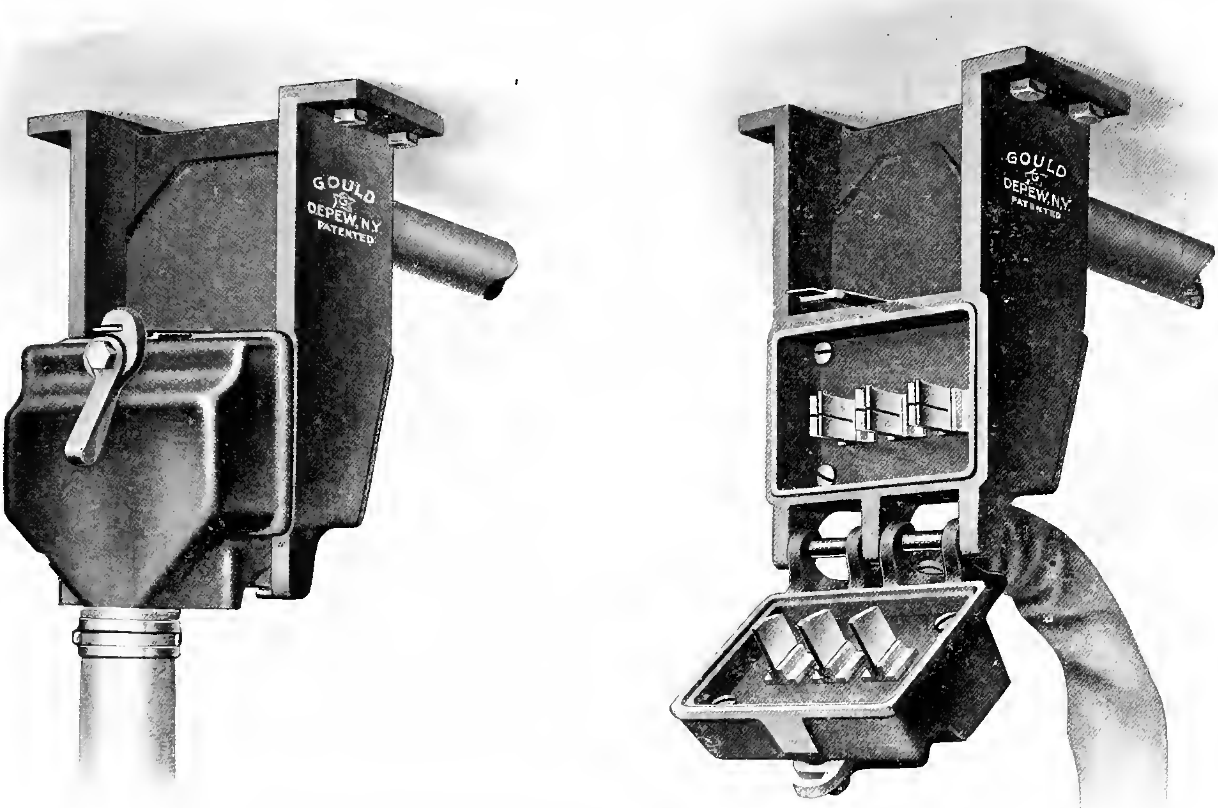


Fig. 2324—Generator Mounted on Drop Type Suspension.

Gould Coupler Company.



Closed. Open.

Fig. 2325—Generator Cable Connection Box. Gould Coupler Company.

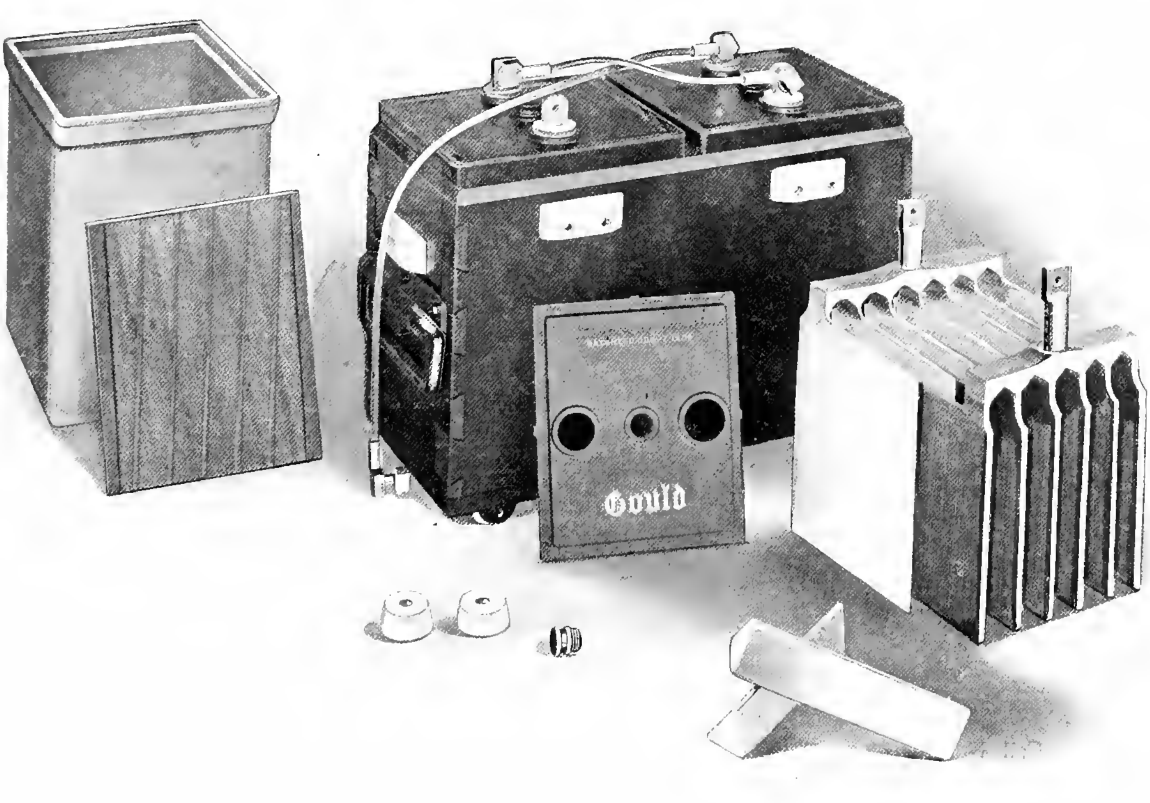


Fig. 2326—Double Compartment Cell and Parts. Gould Storage Battery Company.

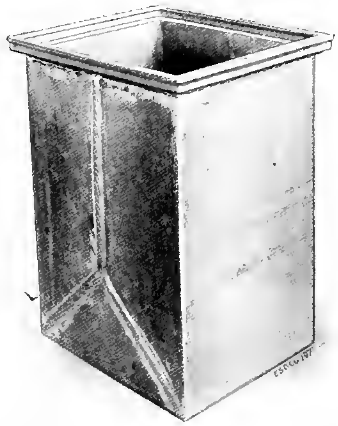


Fig. 2327—Lead Lining for Type EP-13 Storage Battery.

Fig. 2328—Tudor Positive Group for Type EC-13 Storage Battery.

Fig. 2329—Rubber Jar for Type EP-13 Storage Battery.

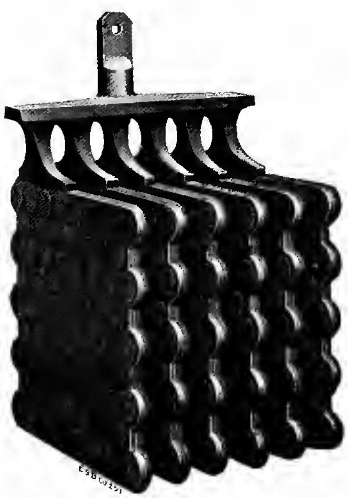


Fig. 2330—Manchester Positive Group for Type ECS-13 Storage Battery.

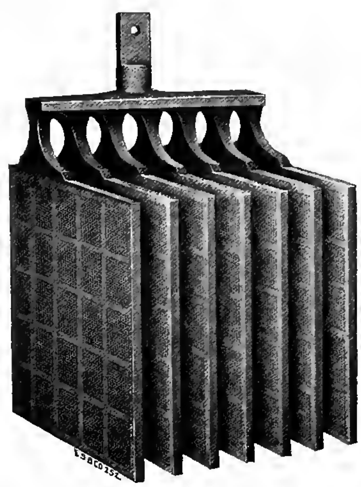


Fig. 2331—Box Negative Group for Type ECS-13 Storage Battery.

Fig. 2332—Rolled Negative Group for Type ECS-13 Storage Battery.

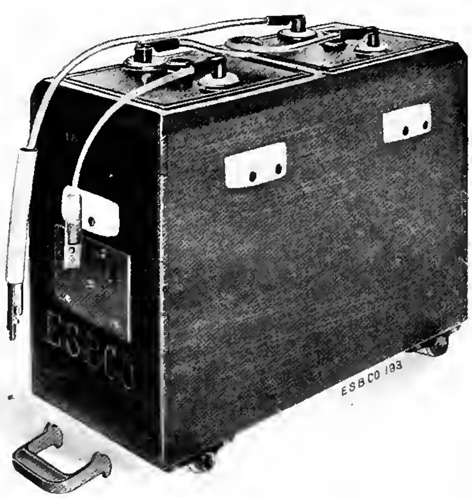


Fig. 2333—Two-Cell Unit of Type EP-13 Storage Battery in Lead Lined Tank with Special Connectors.

Fig. 2334—Two-Cell Unit of Type EP-11 Storage Battery in Rubber Jars, with Wood Crate.

Electric Storage Battery Company.

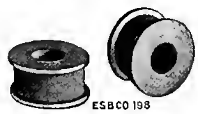


Fig. 2335—Sponge Rubber Terminal Bushings for Type EP Storage Battery Cover, Positive and Negative.

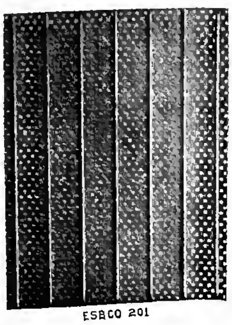


Fig. 2336—Ribbed and Perforated Rubber Separator for Type EP Storage Battery. (Ribbed on Both Sides.)

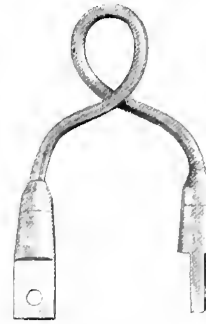


Fig. 2337—Cable Connector No. 7290.

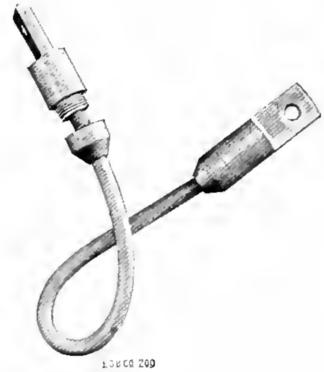


Fig. 2338—Cable Connector No. 7292.


Fig. 2339—Bolt Connector No. 7080.


Fig. 2340—Lead Protector Cap No. 7090.


Fig. 2341—Hard Rubber Cover for Type EP Storage Battery Cell, Showing Hard Rubber Vent Plug.

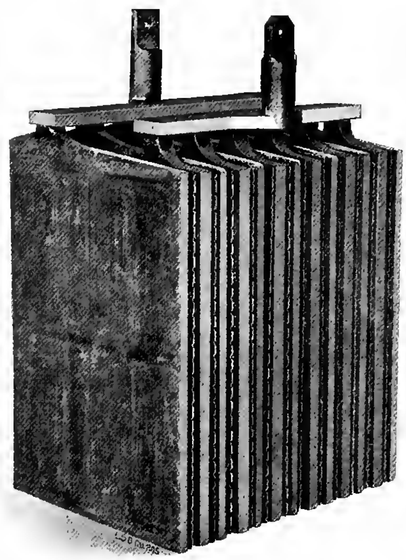


Fig. 2342—Tudor Accumulator Element for Type EP-13 Storage Battery.


Fig. 2343—Soft Lip Rubber Cover for Storage Battery Cell, Showing Knob and Soft Rubber Vent Plug.

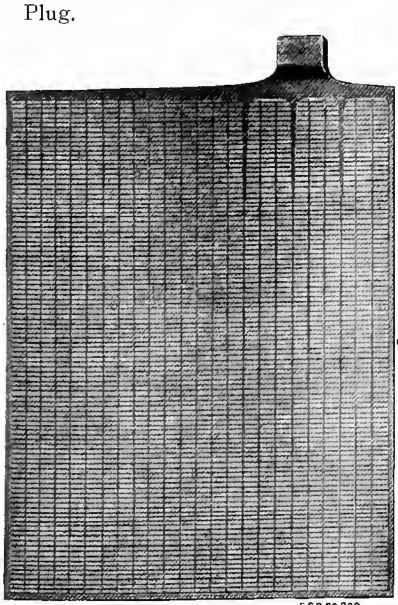


Fig. 2344—Shelf Negative Plate for Type EP Storage Battery.

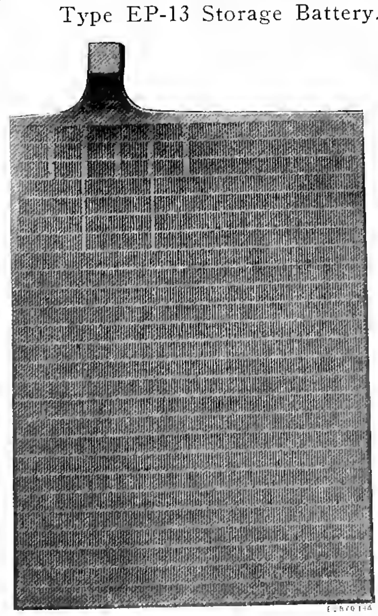


Fig. 2345—Tudor Positive Plate for Type EP Storage Battery.

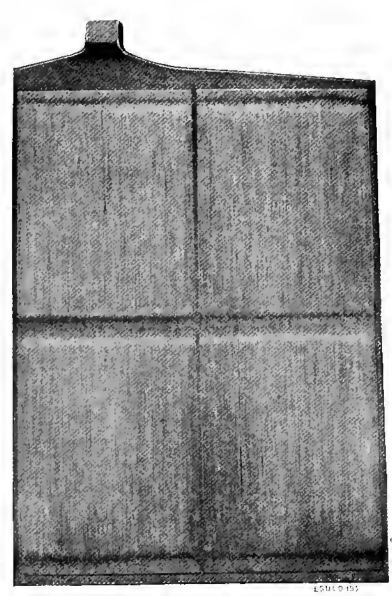


Fig. 2346—Rolled Negative Plate for Type EP Storage Battery.

[illegible]ic Storage Battery Company.

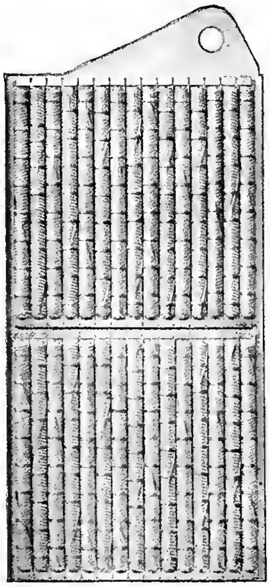


Fig. 2347—Positive Electrode.

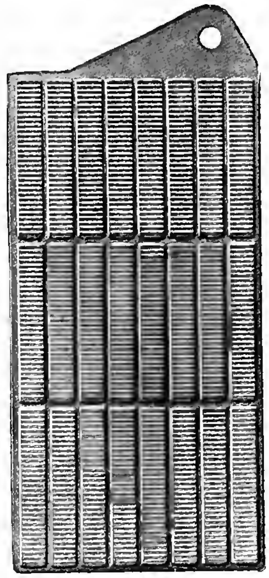


Fig. 2348—Negative Electrode.

Fig. 2349 — Positive Electrode Tube.

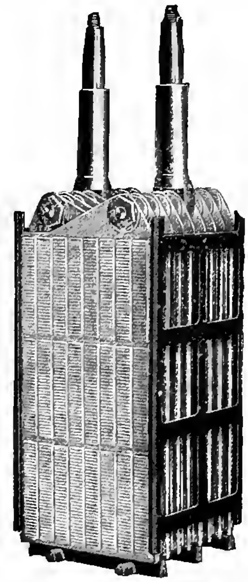


Fig. 2350—Type A-8H Battery Assembled, But Entirely Removed from Container.

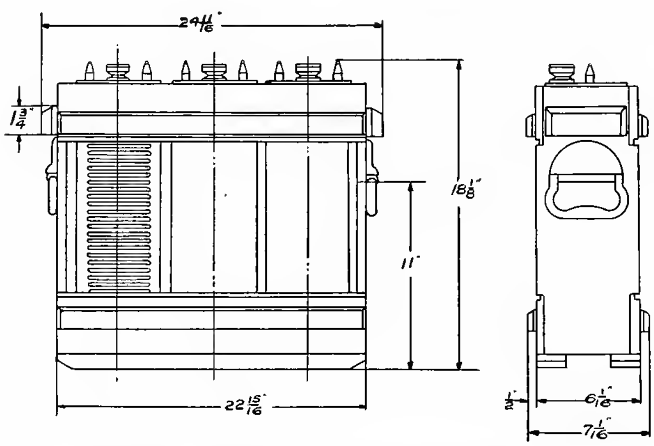


Fig. 2351—Battery of Three Cells Type A-8H.

A-4H	A-6H	A-8H	A-10H	A-12H
150	225	300	375	450

Ampere Hour Capacities.

Fig. 2352—Types of Edison Storage Batteries.

Edison Storage Battery Company.

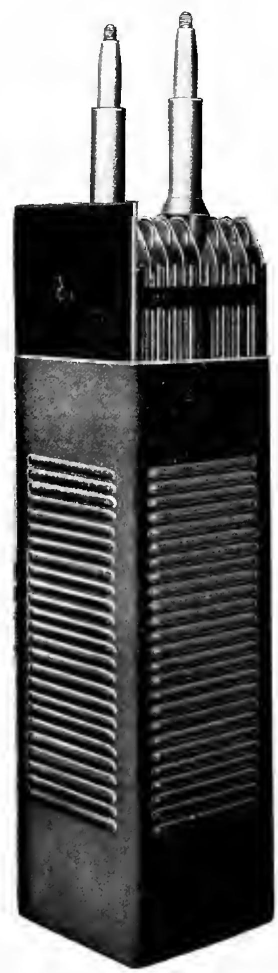


Fig. 2353—Contents of Container Partly Lifted Showing End and Side Insulation.

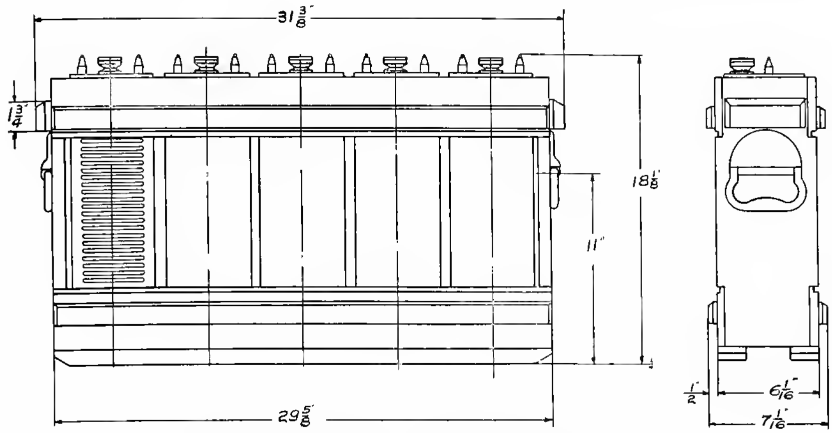


Fig. 2354—Battery of Five Cells, Type A-8H.

Fig. 2355—Jumper.

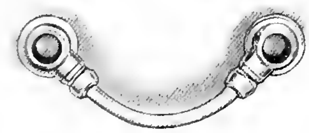


Fig. 2356—Connector.

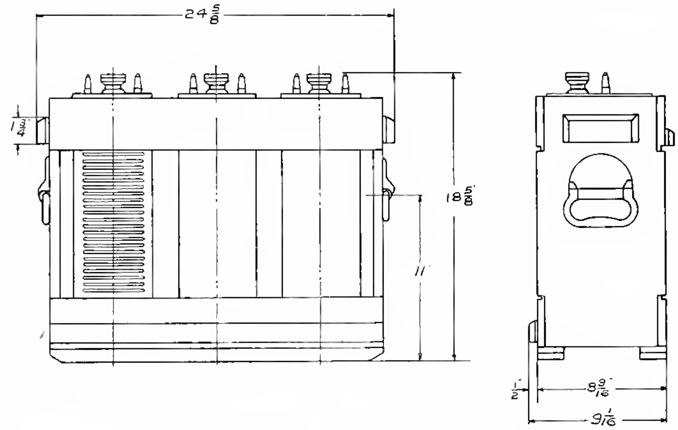


Fig. 2357—Battery of Three Cells, Type A-12H.

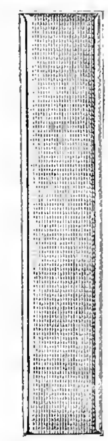


Fig. 2358—Pocket for Negative Electrode.

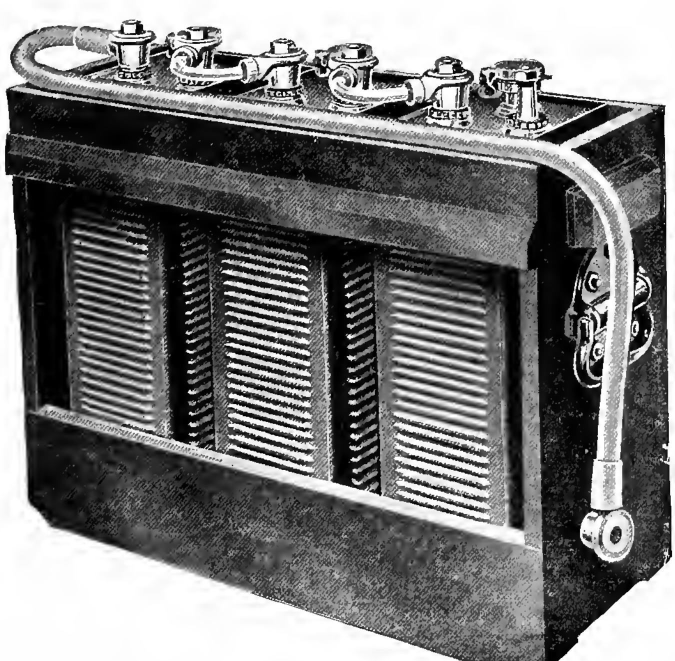


Fig. 2359—Battery of Three Cells, Type A-8H in Tray.

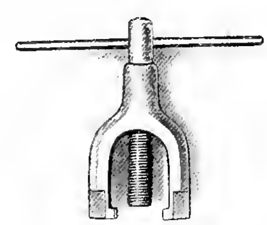


Fig. 2360—Jack.

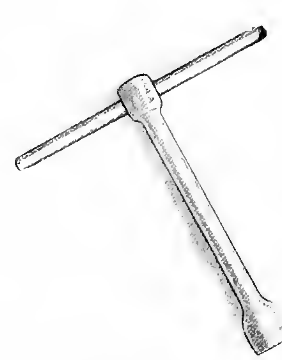


Fig. 2361—Wrench.

Edison Storage Battery Company.

Fig. 2362—Complete Set of 25 Cells, Type A-8H.

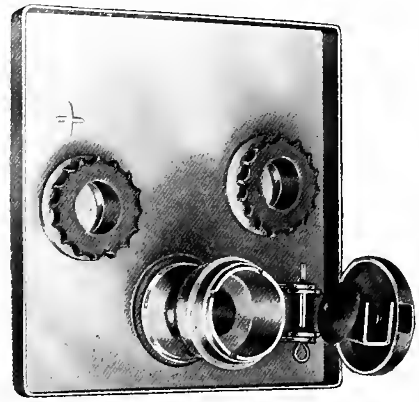


Fig. 2363—Type A-8H Cell Cover Showing Filling Aperture and Check Valve.

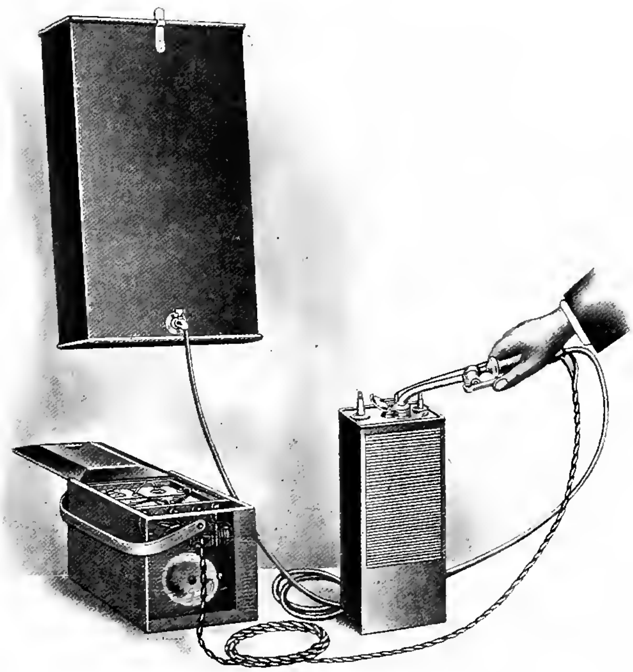


Fig. 2364—Electric Cell Filler.

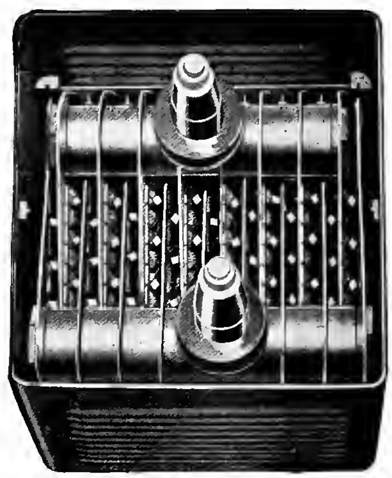


Fig. 2365—Complete Cell with Cover Removed to Show Method of Insulating.

Edison Storage Battery Company.

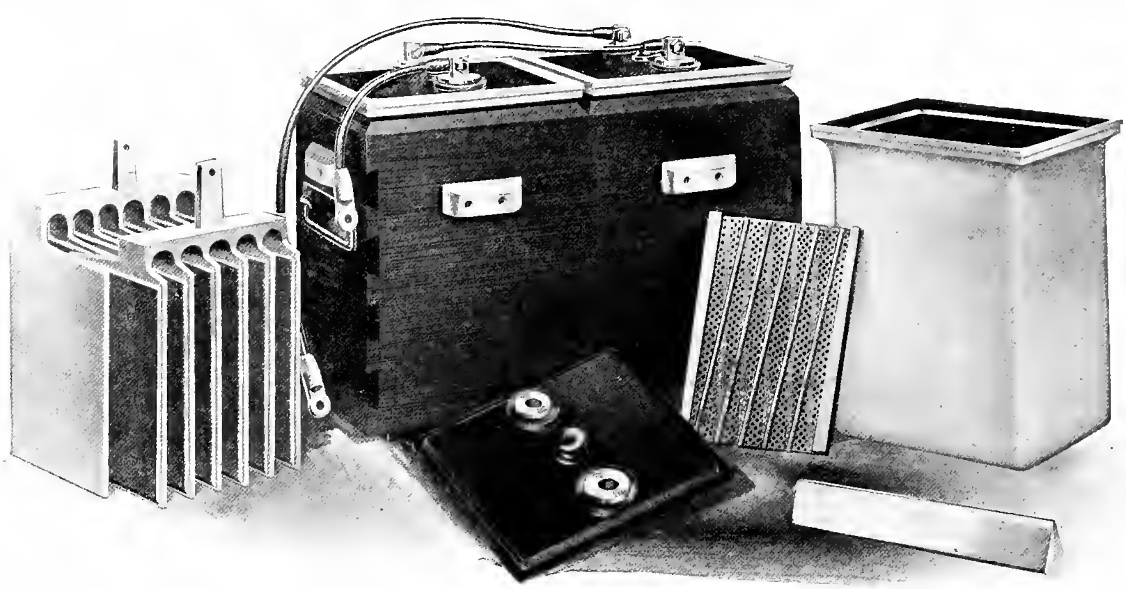


Fig. 2366—Willard Type P.T.L.-13 Train-Lighting Storage Battery and Parts, with Style A Connectors.

Willard Storage Battery Company.

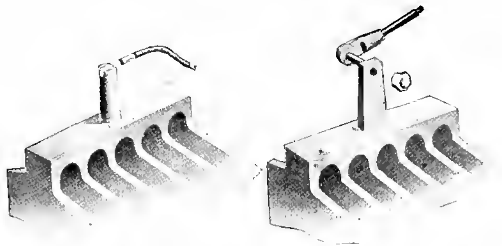


Fig. 2367—Types of Terminals for Use with Willard Train-Lighting Batteries.

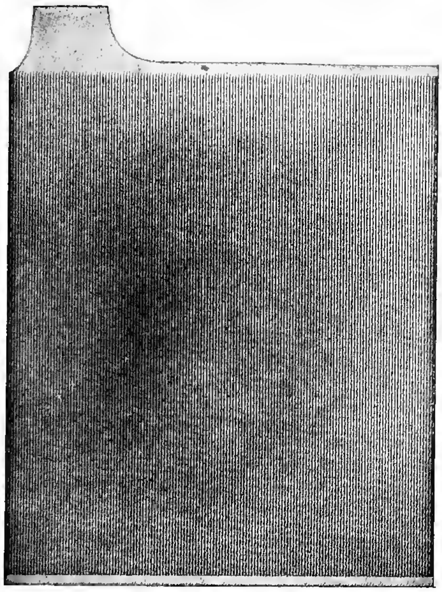


Fig. 2368—Plate for Willard Train-Lighting Battery. Willard Storage Battery Company.

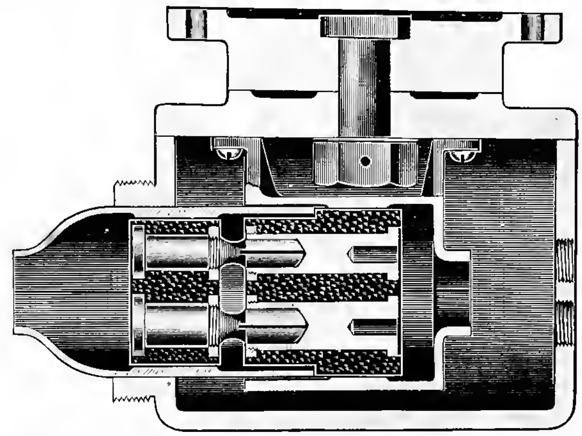


Fig. 2369—Section Through Car Receptacle for Charging Storage Batteries. Ward Equipment Company.

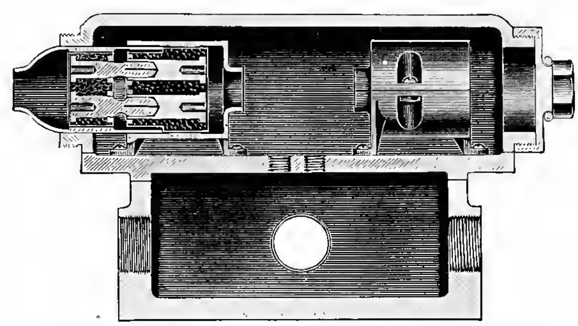


Fig. 2370—Section Through Electric Charging Plug for Storage Batteries. Ward Equipment Company.

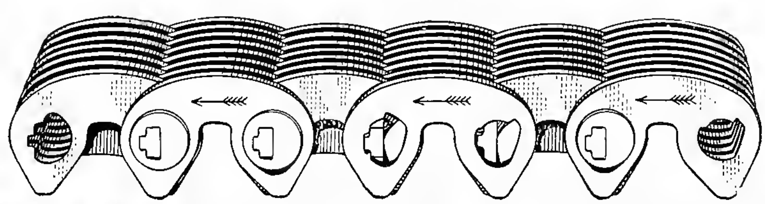


Fig. 2371—Morse Silent Chain for Driving Axle Light Generators. Morse Chain Company.

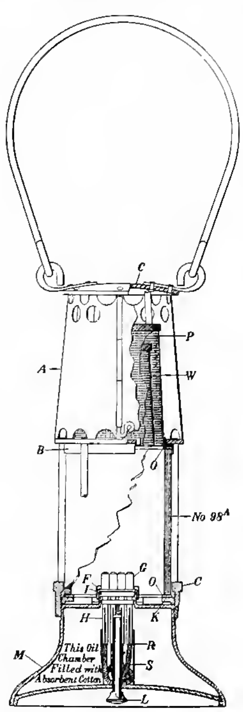


Fig. 2372—Car Filler's Lantern No. 209, for Use When Filling Pintsch Gas Tanks.

Fig. 2373—Mica Chimney No. 109.

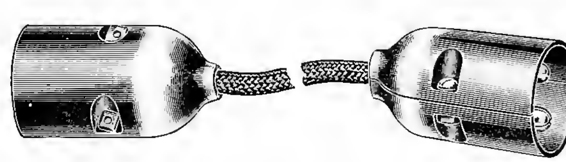


Fig. 2374—Connector for Charging Storage Batteries. Ward Equipment Company.

Fig. 2375—Gas Lamp Mantle No. 2640 and Protector.

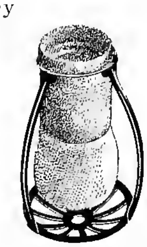
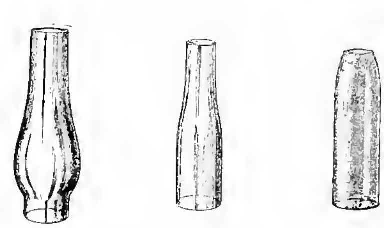


Fig. 2376—Gas Lamp Mantle No. 3044 and Protector.



No. 237. No. 237a. No. 234.

Fig. 2377—Types of Gas Lamp Chimneys.

Safety Car Heating & Lighting Company.

Fig. 2378—Enameled Chimney.

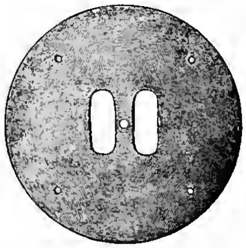


Fig. 2379—Two-Flame Reflector.

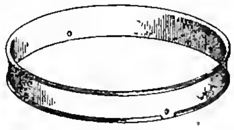


Fig. 2380—Ring Reflector No. 1625.

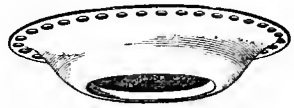


Fig. 2381—Ring Reflector No. 110.

Fig. 2382—Reflector No. 410.

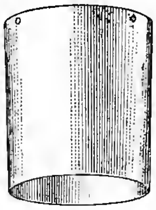


Fig. 2383—Reflector No. 577.

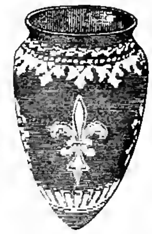


Fig. 2384—Etched Shade.

Fig. 2385—Cup Reflector.

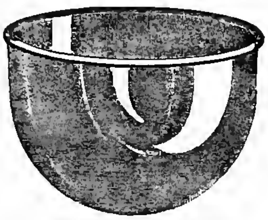


Fig. 2386—Clear Glass Bowl.

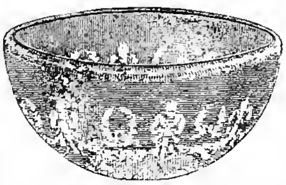


Fig. 2387—Clear Glass Bowl with Etched Figure.

Fig. 2388—Opal Dome.

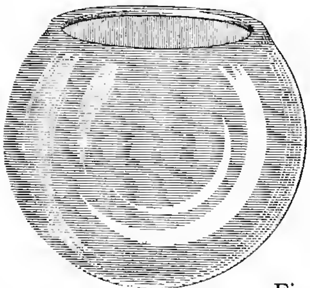


Fig. 2389—Opal Bowl.

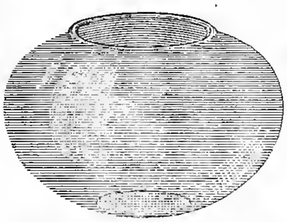


Fig. 2390—Opal Bowl, 7½ in.

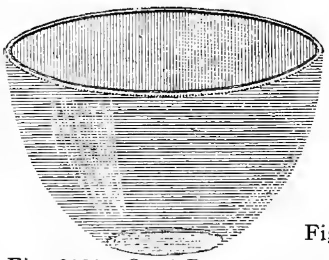


Fig. 2391—Opal Bowl, 6 in.

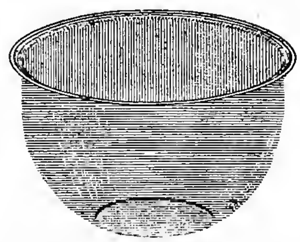


Fig. 2392—Frosted Bowl, 9 in.

Fig. 2393—Glass for Lamp No. 205a.

Fig. 2394—Etched Glass Bowl, 11 in.

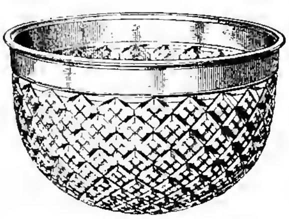


Fig. 2395—Pressed Glass Bowl, 9 in.

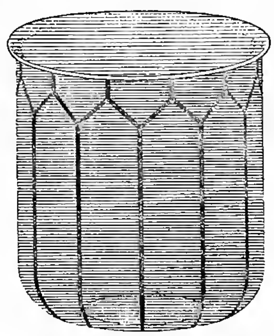


Fig. 2396—Straw Opal Bowl, 8¼ in.

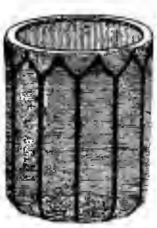


Fig. 2397—Straw Opal Bowl, 4⅝ in.

Fig. 2398—Etched Bowl.

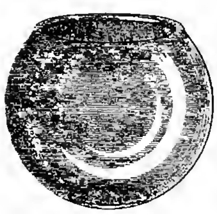


Fig. 2399—Opal Bowl, 6 in.

Fig. 2400—Ribbed Dome, 7 in.

Fig. 2401—Etched Bowl, 6 in.

Fig. 2402—Opal Shade, 2¼ in.

Fig. 2403—Pressed Shade, 2¼ in.

Fig. 2404—Etched Shade, 2¼ in.

Fig. 2405—Etched Shade, 3 in.

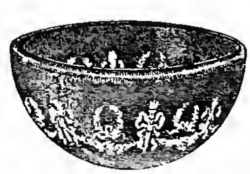


Fig. 2406—Clear Glass Bowl with Etched Figure, 9 in.

Safety Car Heating & Lighting Company.

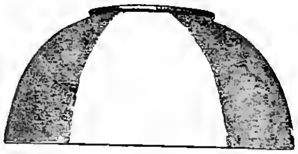


Fig. 2407—Opal Dome, 10 in.


Fig. 2408—Etched Globe, 4 in.

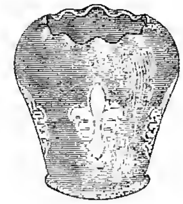


Fig. 2409—Etched Globe, 3¼ in.


Fig. 2410—Bowl, 11½ in.

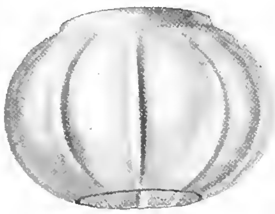


Fig. 2411—Bowl No. 8017.

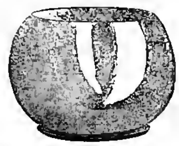


Fig. 2412 — Opal Globe, 4 in.


Fig. 2413 — Shade No. 3847.


Fig. 2414—Etched Shade, 2¼ in.


Fig. 2415—Etched Shade, 2¼ in.

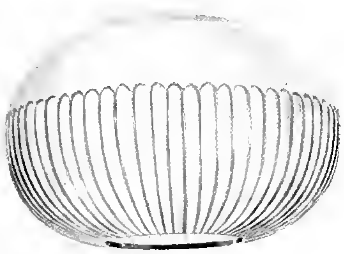


Fig. 2416—Corona Bowl No. 3425.


Fig. 2417—Opal Envelope No. 8671 and Prismatic Reflector No. 8672.

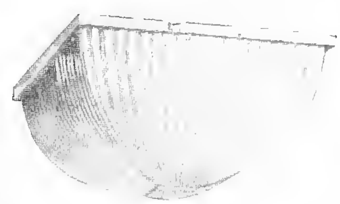


Fig. 2418—Bowl No. 8159.


Fig. 2419—Bowl No. 8025.


Fig. 2420—Opal Envelope No. 8687 and Prismatic Reflector No. 8693.


Fig. 2421—Shade No. 9011.


Fig. 2422—Shade.


Fig. 2423—Bowl No. 8098.


Fig. 2424—Electro-Etched Shade, 4 in.


Fig. 2425—Shade No. 3990.


Fig. 2426—Shade No. 3912.


Fig. 2427—Shade No. 2346.


Fig. 2428—Shade No. 8261.


Fig. 2429—Reflector No. 3913.


Fig. 2430 — Shade No. 3767.


Fig. 2431 — Shade No. 3738.

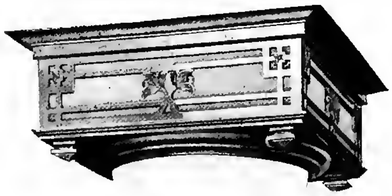


Fig. 2432—Lamp No. 3938.


Fig. 2433—Lamp No. 2326.


Fig. 2434—Lamp No. 8662.

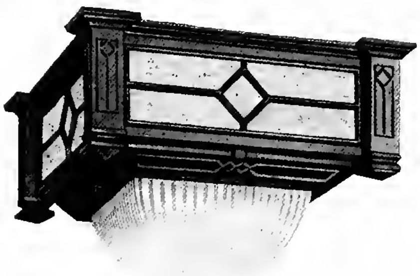


Fig. 2435—Lamp No. 2254.


Fig. 2436—Lamp No. 2372.


Fig. 2437—Lamp No. 3889.

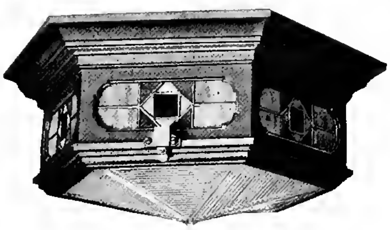


Fig. 2438—Lamp No. 8780.


Fig. 2439—Lamp No. 8350.


Fig. 2440—Lamp No. 2283.

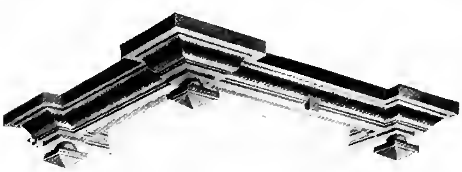


Fig. 2441—Lamp No. 2255.


Fig. 2442—Lamp No. 8304.


Fig. 2443—Lamp No. 3880.


Fig. 2444—Lamp No. 8105.

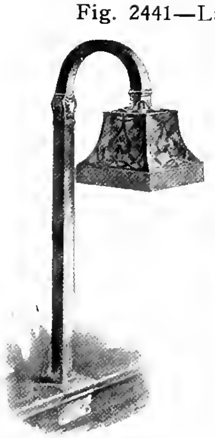


Fig. 2445—Chandelier No. 3688.


Fig. 2446—Lamp No. 2378.


Fig. 2447—Lamp No. 2160.

Safety Car Heating & Lighting Company.


Fig. 2448—Pendant No. 1749.


Fig. 2449—Pendant No. 1921.


Fig. 2450—Bracket Lamp No. 1785.


Fig. 2451—Corner Berth Lamp.


Fig. 2452—Berth Lamp No. 2485.


Fig. 2453—Berth Lamp No. 3862.


Fig. 2454—Lamp No. 8661.


Fig. 2455—Lamp No. 8094.

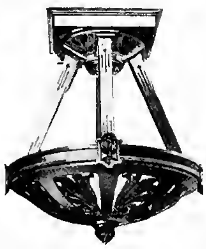


Fig. 2456—Indirect Lighting Fixture No. 8700.


Fig. 2457—Indirect Lighting Fixture No. 8216.


Fig. 2458—Lamp No. 3875.


Fig. 2459—Lamp No. 3785.


Fig. 2460—Lamp No. 3960.


Fig. 2461—Bracket Lamp No. 2305.


Fig. 2462—Bracket Lamp No. 8249.

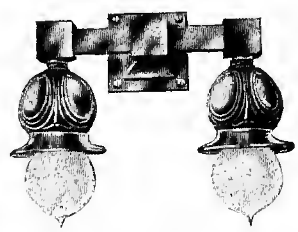


Fig. 2463—Two-Light Bracket.

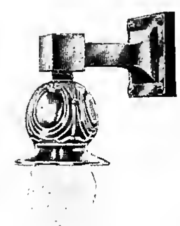


Fig. 2464—One-Light Bracket.


Fig. 2465—Pendant.


Fig. 2466
Platform Lamp.


Fig. 2467
Electric Lamp.

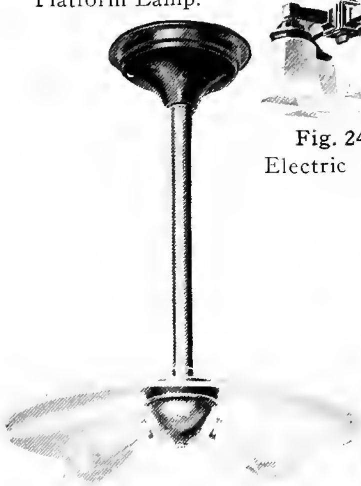


Fig. 2468—Lamp No. 2454.

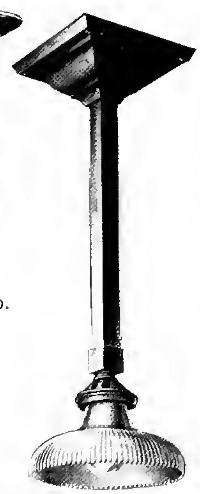


Fig. 2469—Lamp No. 2310.


Fig. 2470—Pendant No. 2482.


Fig. 2471—Pendant No. 8139.

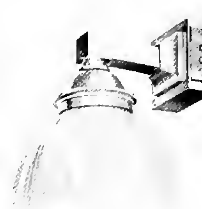


Fig. 2472—Bracket Lamp No. 8183.


Fig. 2473—Bracket Lamp No. 2318.


Fig. 2474—Pendant No. 2412.


Fig. 2475—Pendant No. 2145.


Fig. 2476—Swinging Bracket Lamp No. 8181.

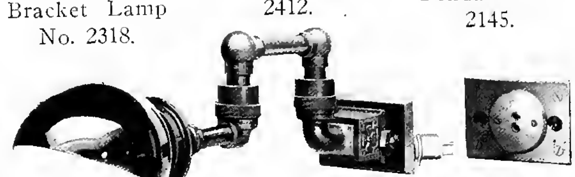


Fig. 2477—Removable Swinging Bracket Lamp No. 8380.


Fig. 2478—Pendant No. 8185.


Fig. 2479—Vestibule Lamp No. 8406.


Fig. 2480—Pendant No. 3846.


Fig. 2481—Bracket Lamp No. 8373.


Fig. 2482—Bracket Lamp No. 8663.

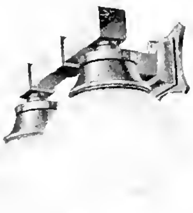


Fig. 2483—Bracket Lamp No. 8138.


Fig. 2484—Bracket Lamp No. 8184.


Fig. 2485—Bracket Lamp No. 3845.


Fig. 2486—Bracket Lamp No. 2386.


Fig. 2487—Pendant No. 2136.

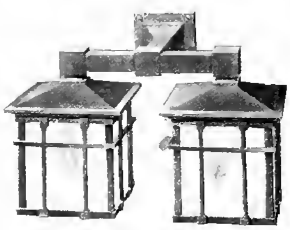


Fig. 2488—Bracket Lamp No. 8080.

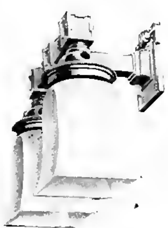


Fig. 2489—Bracket Lamp.


Fig. 2490—Bracket Lamp.


Fig. 2491—Platform Lamp.

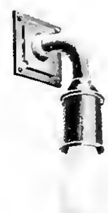


Fig. 2492—Bracket Lamp.


Fig. 2493—Mail Car Lamp.


Fig. 2494—Electric Lamp for Conduit.


Fig. 2495—Mail Car Lamp No. 8801.

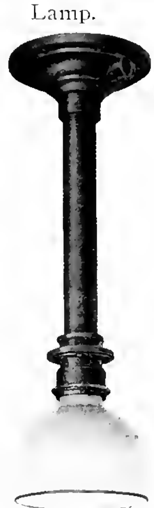


Fig. 2496—Mail Car Lamp.

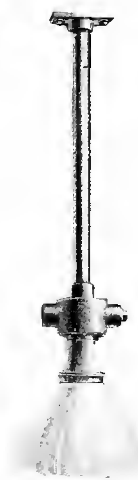


Fig. 2497—Mail Car Lamp.


Fig. 2498—Adjustable Table Lamp.


Fig. 2499—Candelabra No. 2125.


Fig. 2500—Lamp No. 8645.

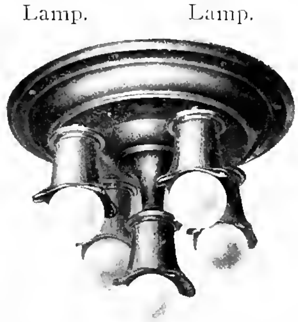
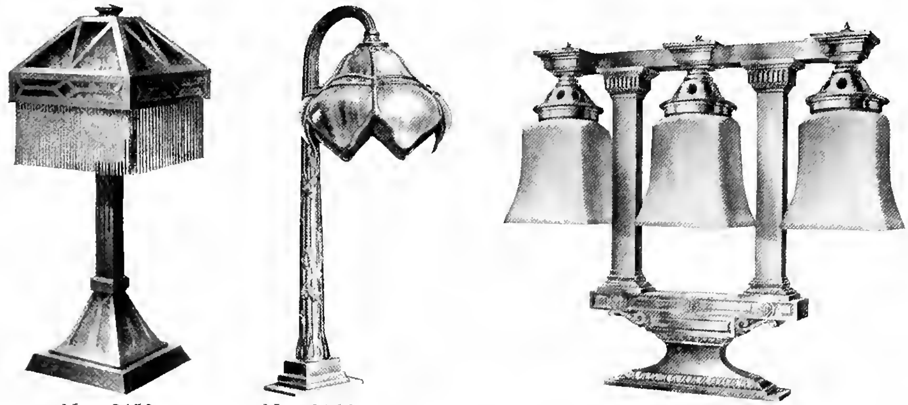


Fig. 2501—Five-Light Deck Lamp.

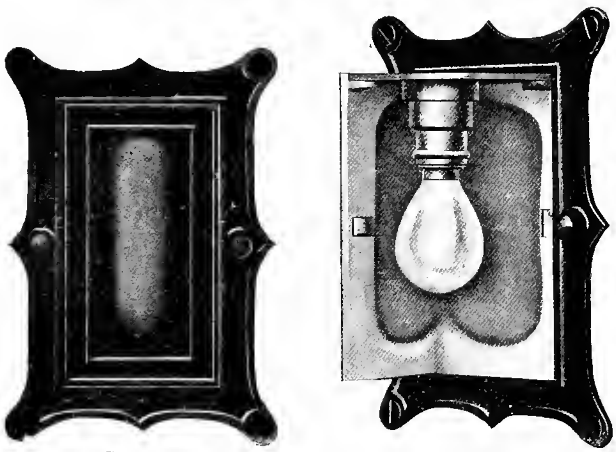

Fig. 2502—Four-Light Deck Lamp.

Safety Car Heating & Lighting Company.



No. 2453. No. 2166. No. 3665.

Fig. 2503—Candelabra. Safety Car Heating & Lighting Company.



Closed. Open.

Fig. 2504—Berth Lamp.

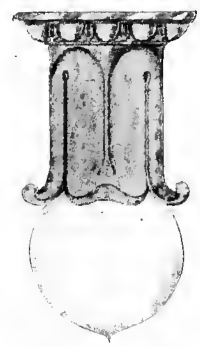


Fig. 2505—Pendant No. 7620.

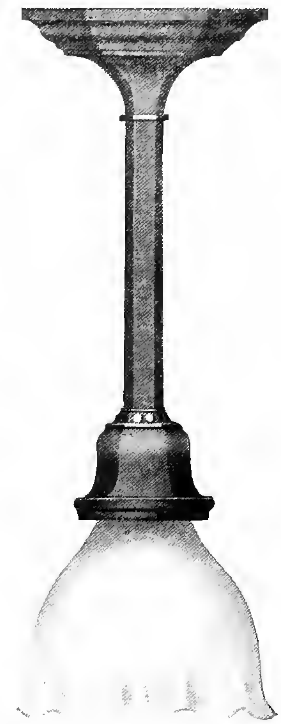
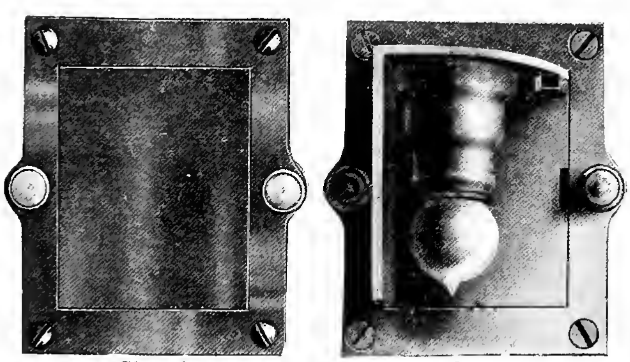


Fig. 2506—One-Light Chandelier.



Closed. Open.

Fig. 2507—Berth Lamp No. 10540.

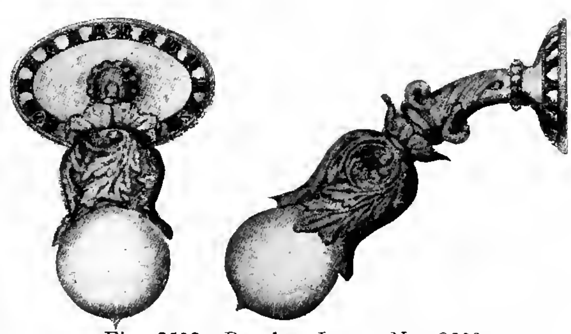


Fig. 2508—Bracket Lamp No. 9230.

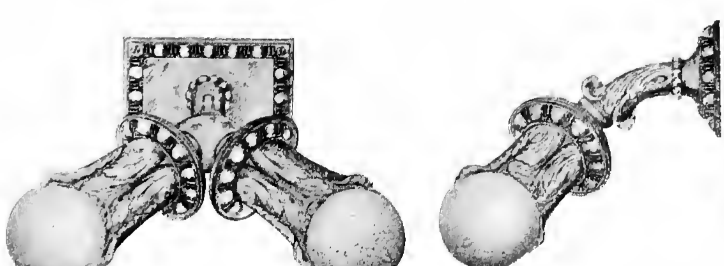


Fig. 2509—Bracket Lamp No. 7260.

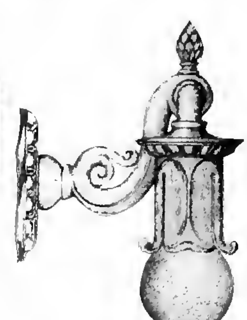


Fig. 2510—Bracket Lamp.

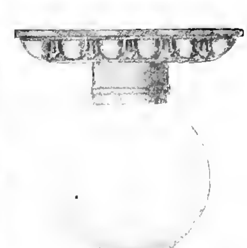


Fig. 2511—Pendant No. 7760.

Adams & Westlake Company.

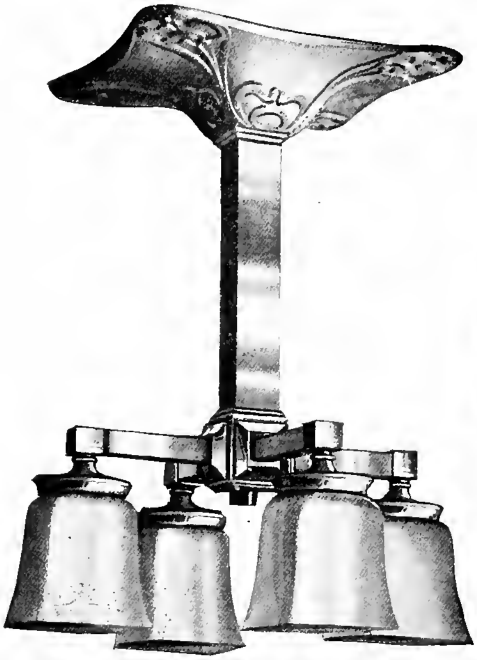


Fig. 2512—Four-Light Chandelier.

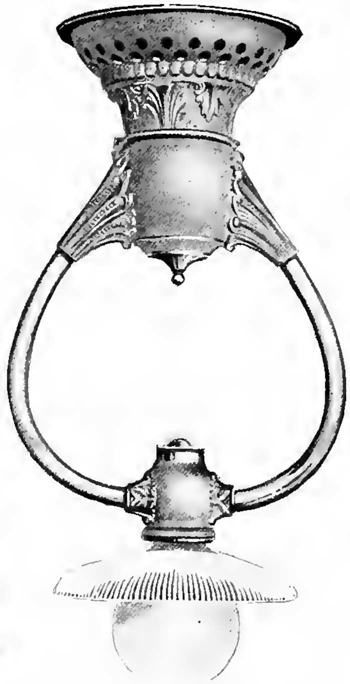


Fig. 2513—One Light Center Fixture

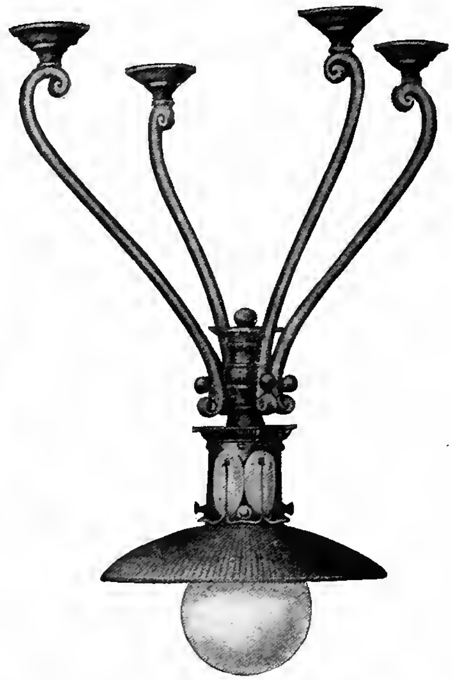


Fig. 2514—One Light Center Fixture.

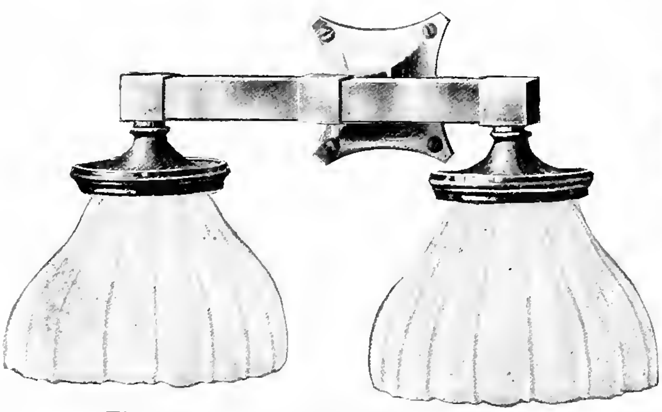
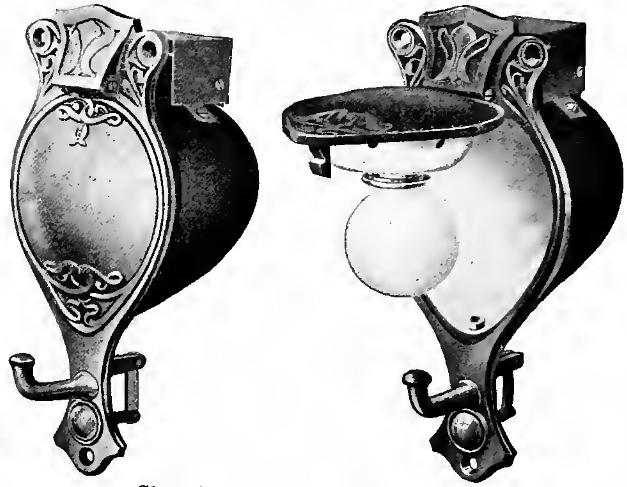


Fig. 2515—Two-Light Bracket Lamp.



Closed. Open.

Fig. 2516—Berth Lamp No. 9600.

Fig. 2517—One-Light Pendant.

Fig. 2518—One-Light Pendant.

Adams & Westlake Company.

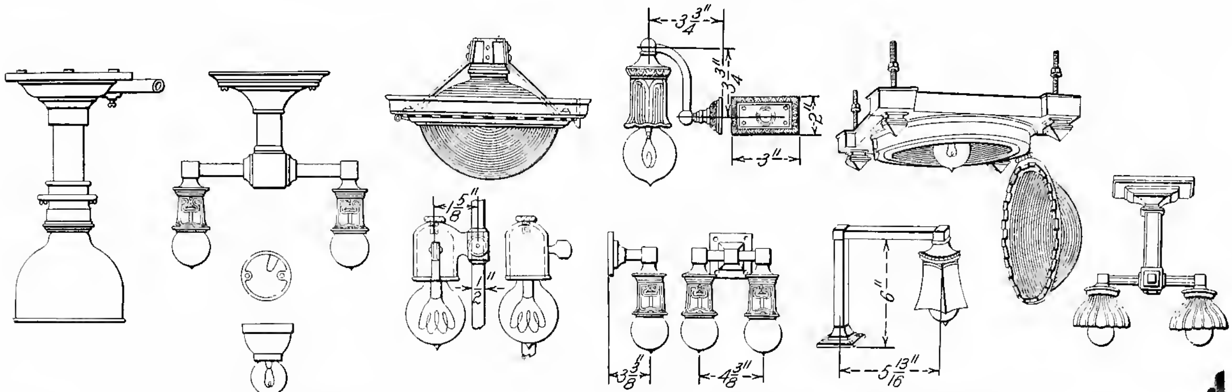


Fig. 2519—Miscellaneous Electric Lamps. Dayton Manufacturing Company.

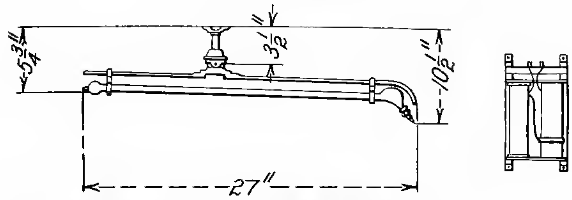


Fig. 2520—Mercury Vapor Mail Car Lamp. Cooper Hewitt Electric Company.

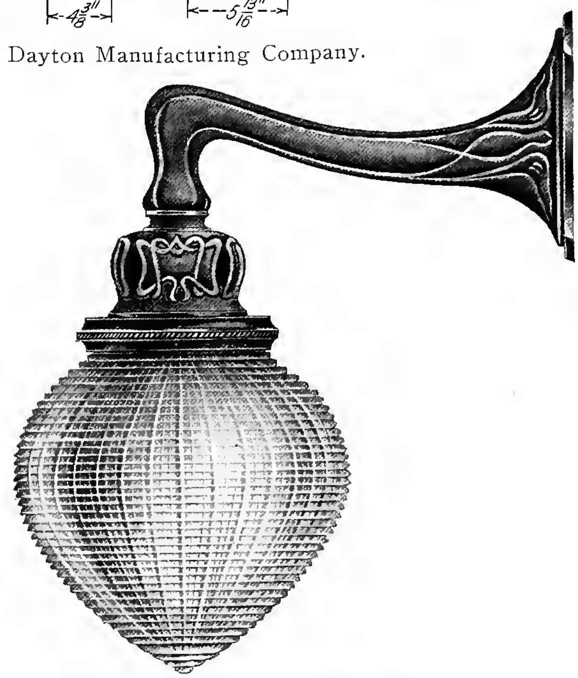


Fig. 2522—Bracket Lamp.

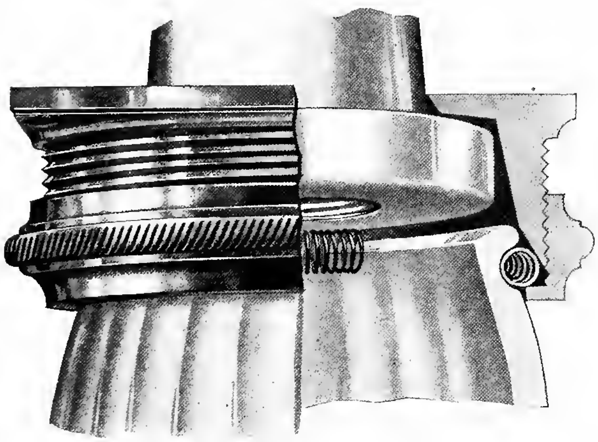


Fig. 2521—Flex Shade Holder.

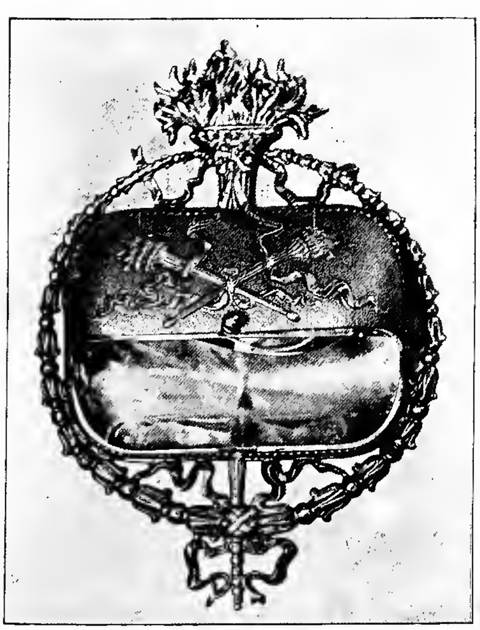


Fig. 2523—Gibbs Berth Lamp.

Fig. 2524—Ceiling Cluster.

Dayton Manufacturing Company.

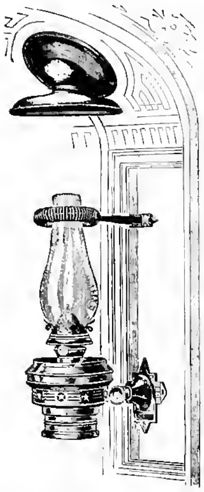


Fig. 2525—Side Wall Lamp.

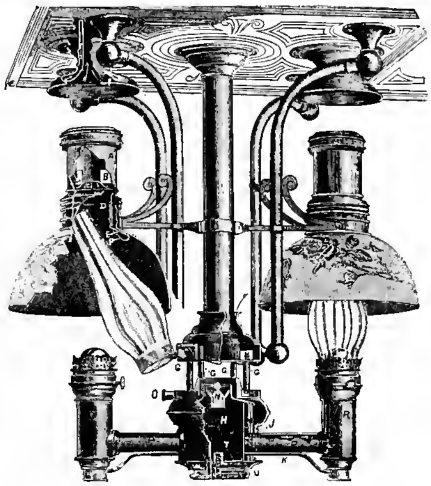


Fig. 2526—Center Lamps.

Fig. 2527—Center Lamps.

Dayton Manufacturing Company.

Fig. 2528—Center Lamp. Adams & Westlake Company.

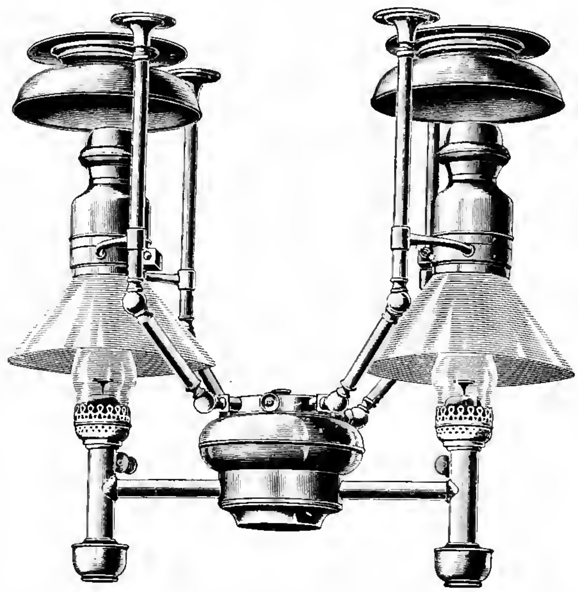


Fig. 2529—Center Lamps with Victoria Burners for Use with Heavy Oil. Sherburne & Company.

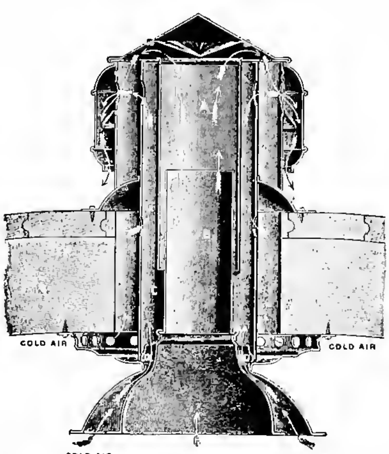


Fig. 2530—Improved Combination Smoke Bell and Ventilator.

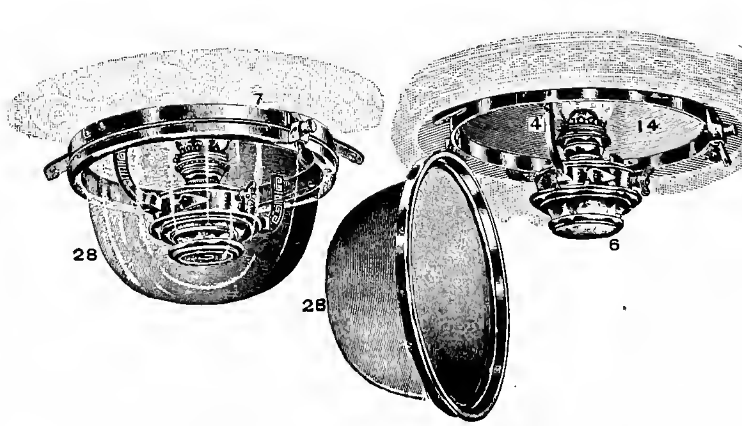


Fig. 2531—Vestibule Dome or Platform Lamp.

Adams & Westlake Company.

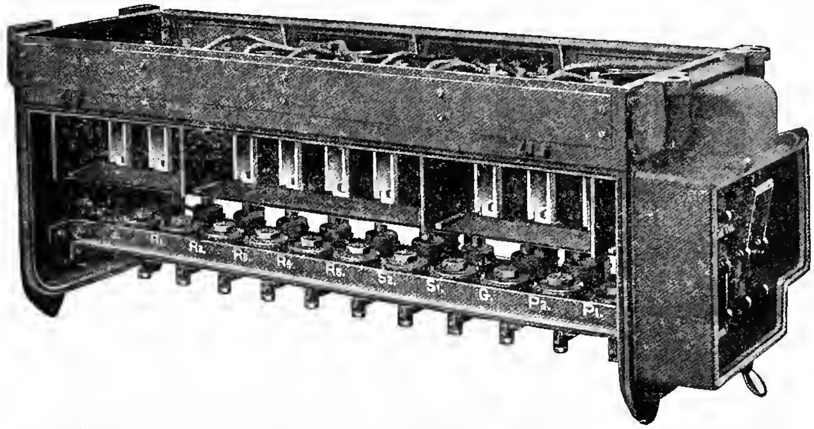


Fig. 2532—Switch Group for 1,500 Volt, Direct Current Control.

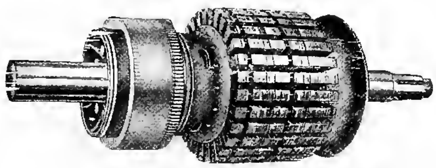


Fig. 2533—Bolted Commutator and Shaft.

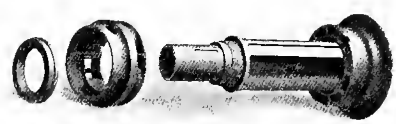


Fig. 2534—Armature Spider.

Fig. 2535—Double Equipment of No. 308 Commutating Pole Motors, with Forced Ventilation, and Type Y-E Double Blower Set, for the Long Island.

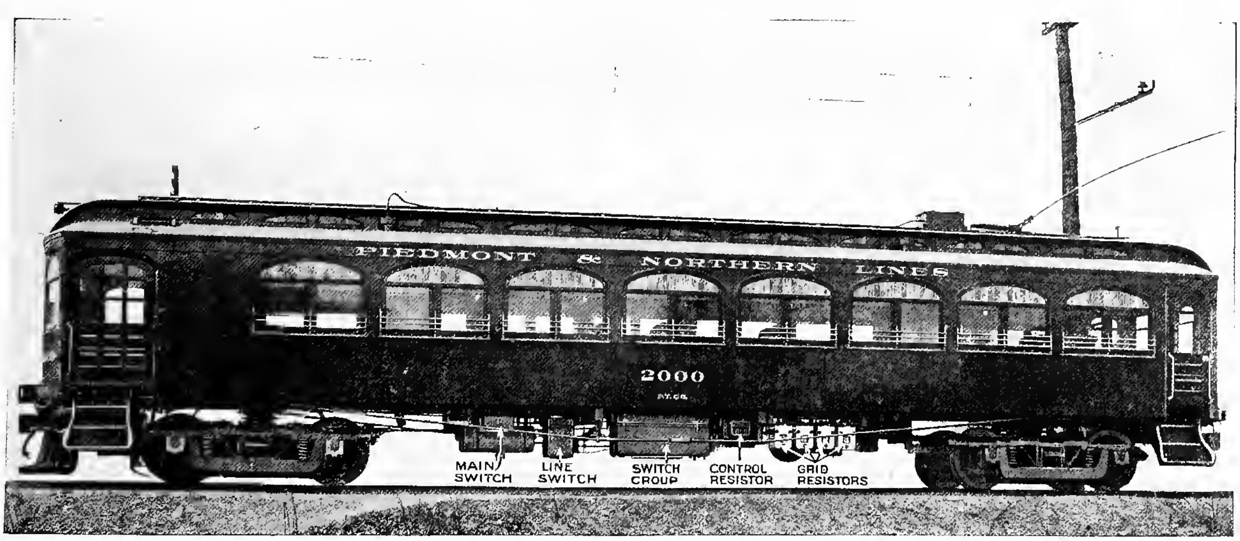


Fig. 2536—Motor Car Equipped with 1,500 Volt, Direct Current Apparatus.

Westinghouse Electric & Manufacturing Company.

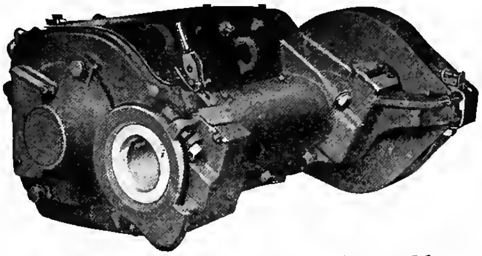


Fig. 2537—Commutating Pole Railway Motor.

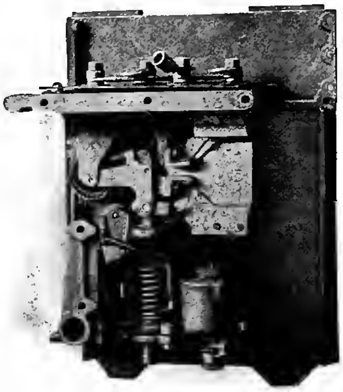


Fig. 2538—Type 264 Line Switch Without Cover.

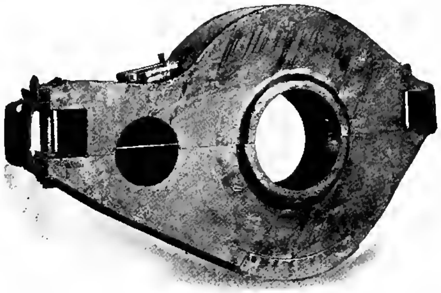


Fig. 2539—Gear Case for Railway Motors.

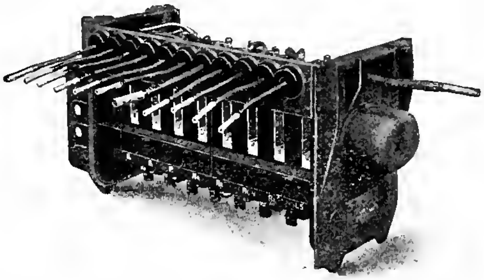


Fig. 2540—HL Control Unit Switch Group, Showing Overload Trip and Eight-Unit Switches.

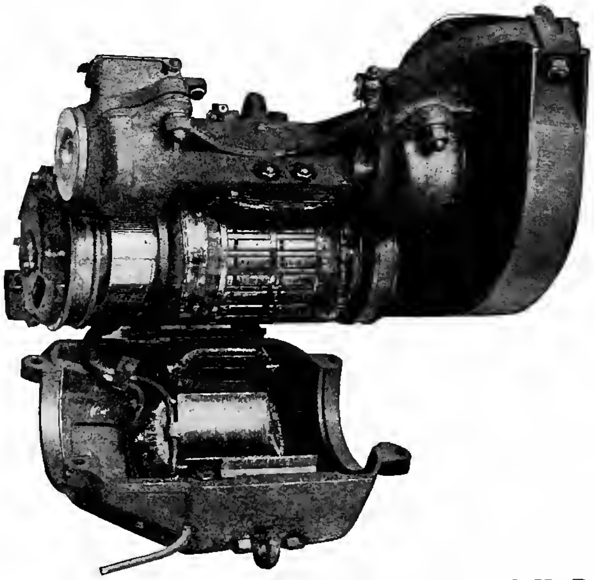


Fig. 2541—No. 323-A, 38 H. P., 600 Volt, Commutating Pole Motor in Open Position, Showing the Armature in the Upper Field Frame.

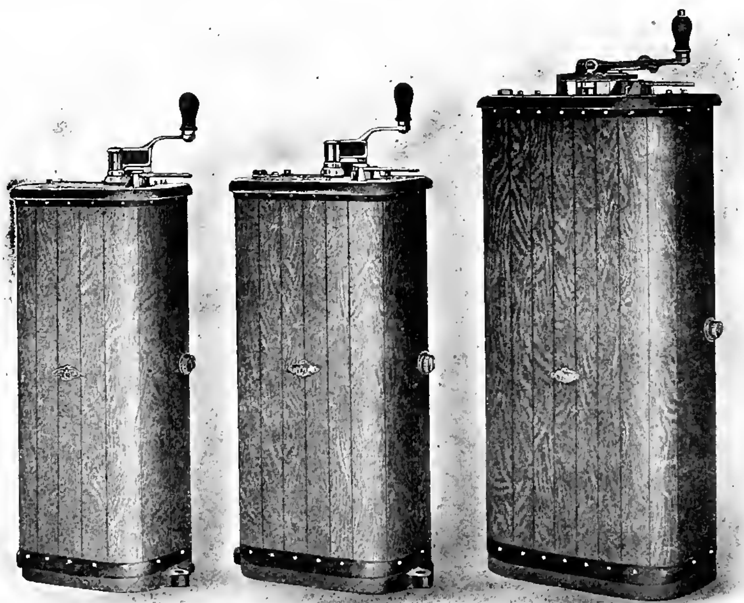


Fig. 2542—Type K Controllers for Railway Service.

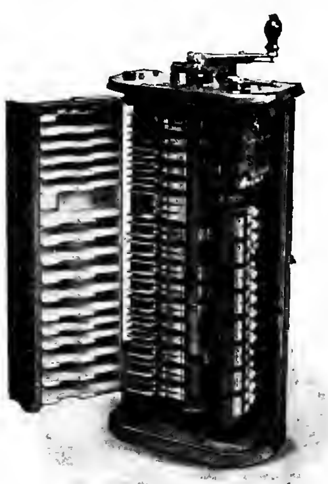


Fig. 2543—Interior of Type K-34-D Railway Controller.

Westinghouse Electric & Manufacturing Company.

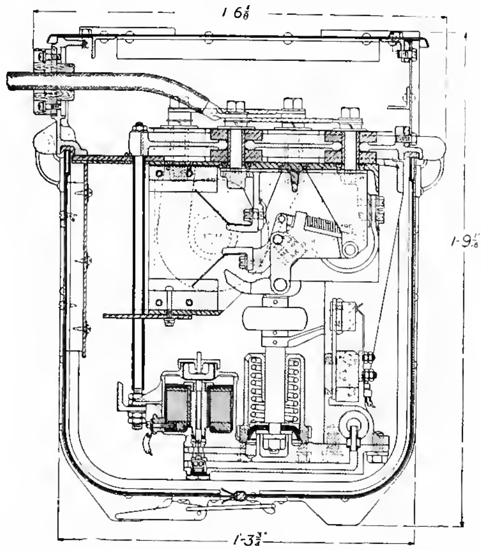


Fig. 2544—Section Through Unit Switch Group.

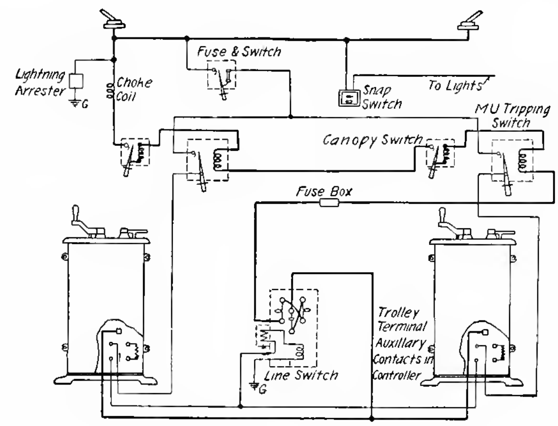


Fig. 2545—Wiring Diagram for Auxiliary Contactor Equipment.

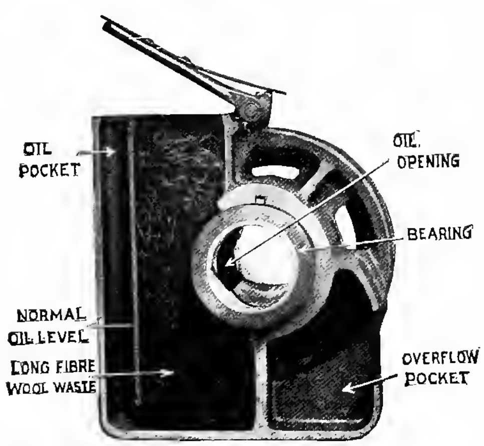


Fig. 2546—Motor Bearing.

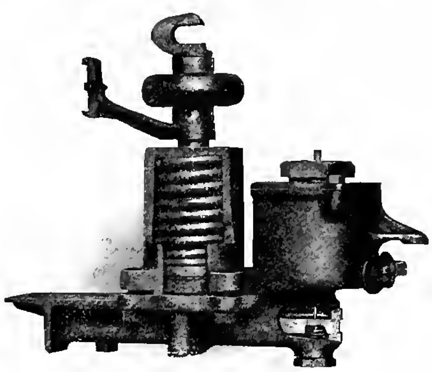


Fig. 2547—Unit Switch Magnet and Cylinders Cut to Show Working Parts of the Air Cylinder of Unit Switches.

Fig. 2548—No. 321, 750-1,500 Volt Direct Current Commutating Pole Railway Motor.

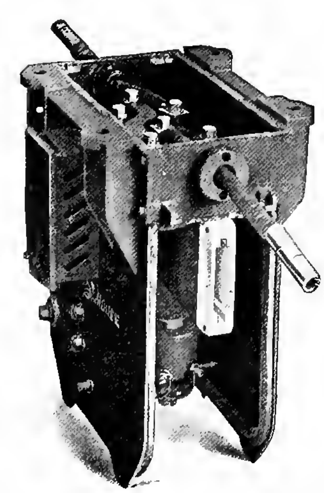


Fig. 2549—Single Jaw Line Switch of the Unit Switch Type for Use with Auxiliary Contactor Equipments.

Westinghouse Electric & Manufacturing Company.

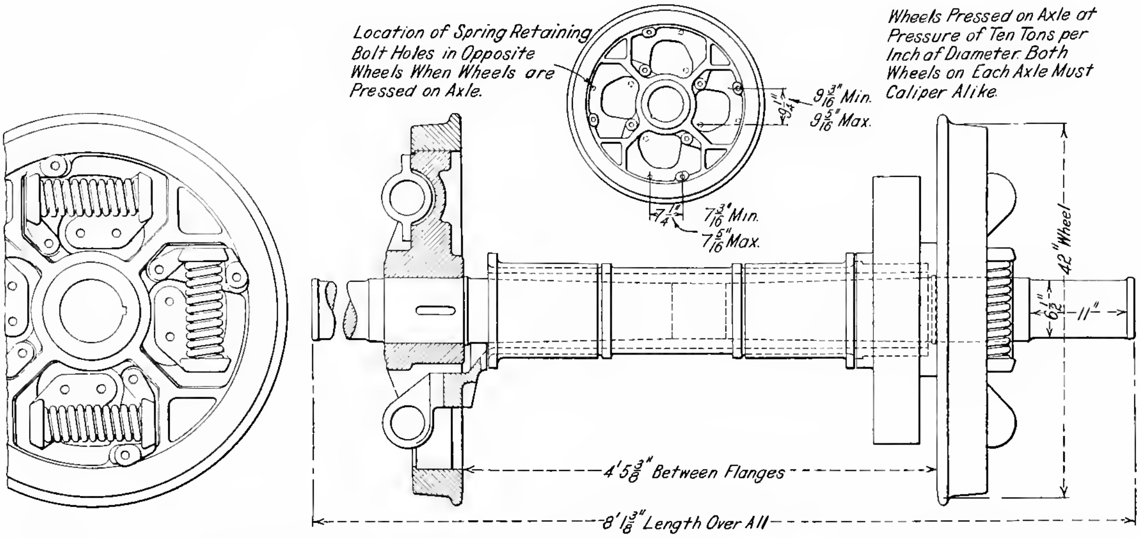
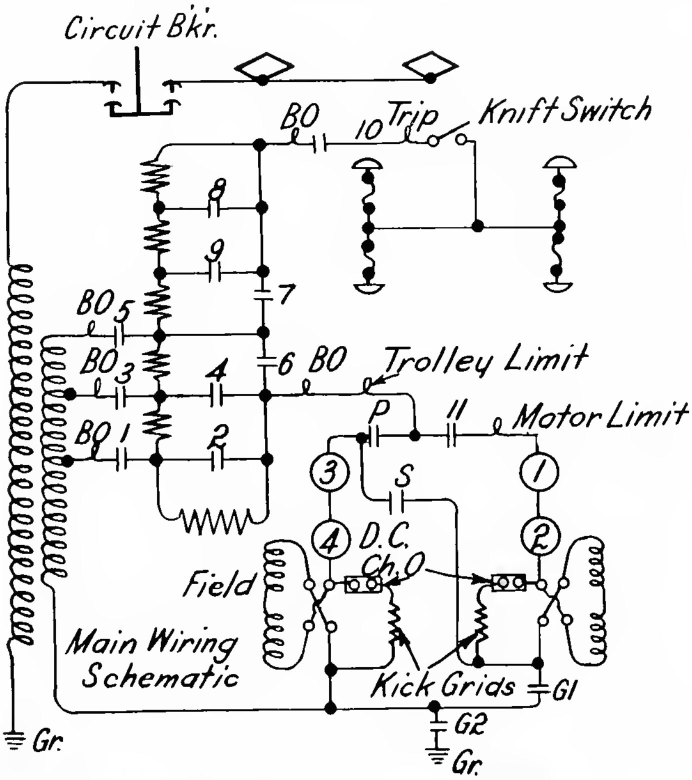


Fig. 2550—Quill and Spring Driving Arrangement for New York, New Haven & Hartford Motor Shown in Fig. 2561.



Sequence of Switches.
A.C. Operation.

Step	1	2	3	4	5	6	7	8	9	10	11	P	S	G1	G2
1	o										o	o		o	
2	o	o									o	o		o	
3		o	o								o	o		o	
4		o	o	o							o	o		o	
5		o		o	o						o	o		o	
6		o		o	o	o					o	o		o	

D.C. Operation

Step	1	2	3	4	5	6	7	8	9	10	11	P	S	G1	G2
1										o	o		o		o
2								o		o	o		o		o
3								o	o	o	o		o		o
4		o						o	o	o	o		o		o
5		o		o				o	o	o	o		o		o
6		o		o		o		o	o	o	o		o		o
7		o		o		o	o	o	o	o	o		o		o
Tran										o	o		o	o	o
8										o	o	o		o	o
9								o		o	o	o		o	o
10								o	o	o	o	o		o	o
11		o						o	o	o	o	o		o	o
12		o		o				o	o	o	o	o		o	o
13		o		o		o		o	o	o	o	o		o	o
14		o		o		o	o	o	o	o	o	o		o	o

Fig. 2551—Wiring Diagram for New York, New Haven & Hartford Alternating Current Motor Cars.

Fig. 2552—Direct Current Car Circuit Breaker.

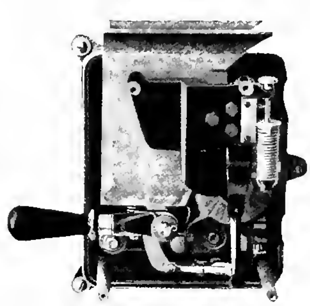


Fig. 2553—Open View of Circuit Breaker for Car Service.

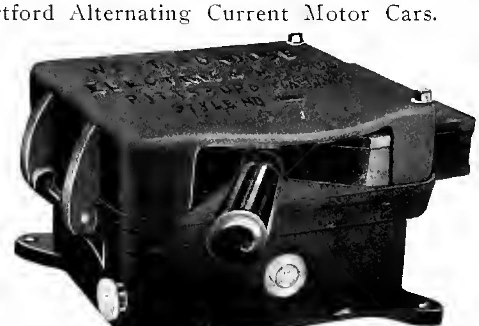
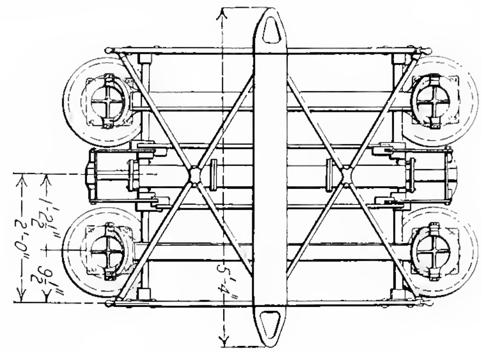


Fig. 2554—Westinghouse Car Type Circuit Breaker.

Westinghouse Electric & Manufacturing Company.

Fig. 2555—Westinghouse M. P. Lightning Arrester for Railway Service.



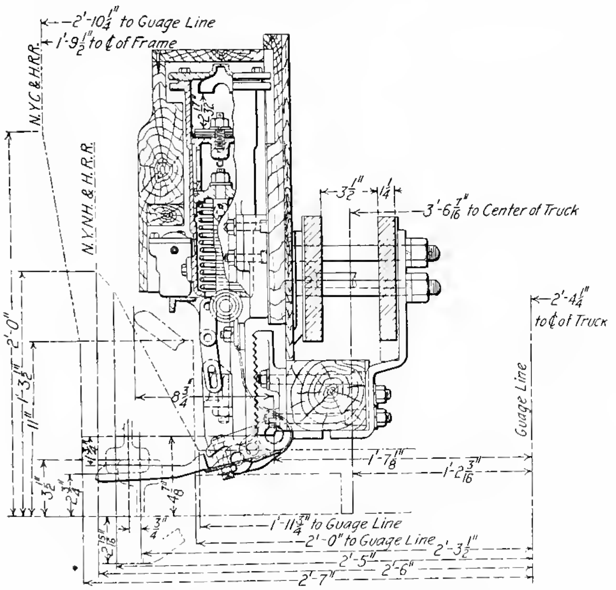


Fig. 2556—New York, New Haven & Hartford Third Rail Current Collecting Shoe.

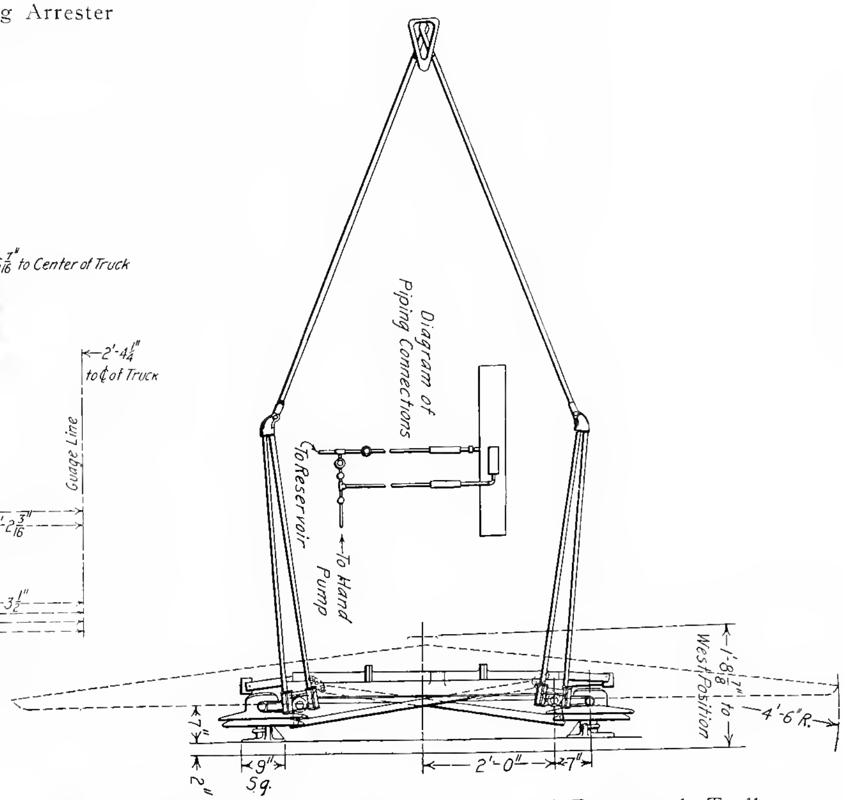


Fig. 2557—New York, New Haven & Hartford Pantagraph Trolley.

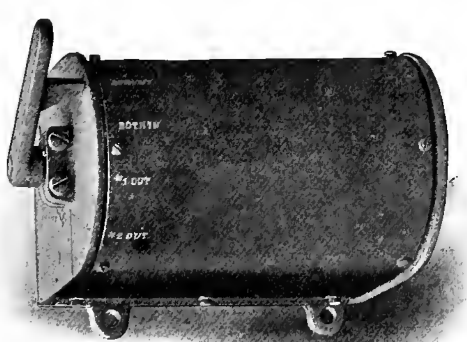


Fig. 2558—Motor Control Cut-Out for Two 200 H. P. Direct Current Motors.

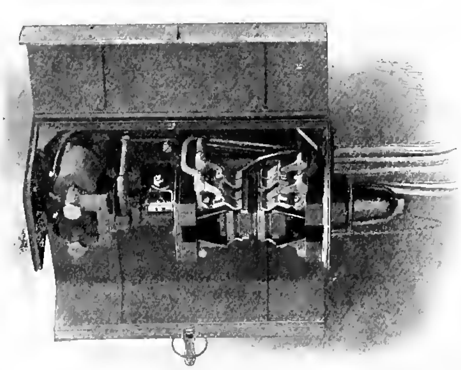
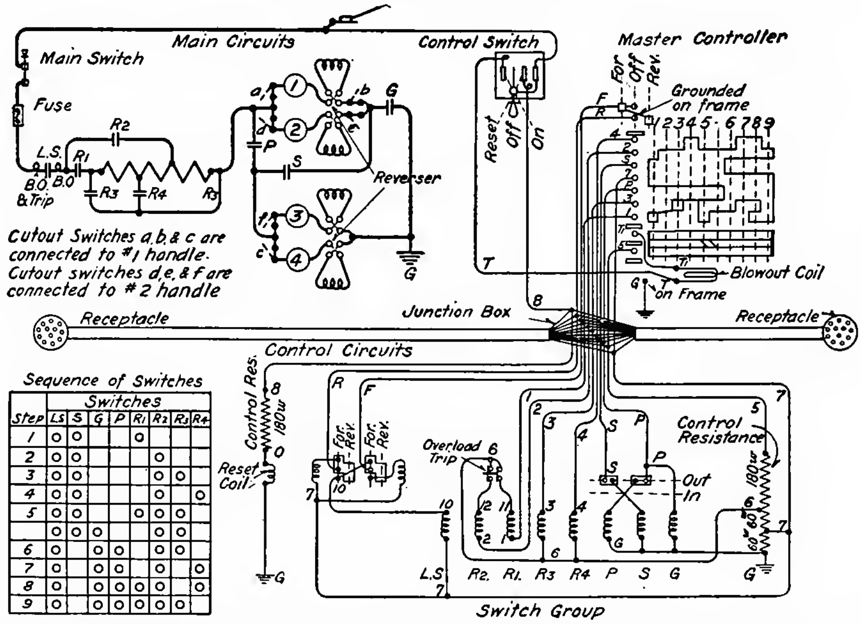


Fig. 2559—Type No. 176-C Reverse Switch for Two 200 H. P. Direct Current Motors.

Westinghouse Unit Switch System of Multiple Control.

Westinghouse Electric & Manufacturing Company.



Sequence of Switches

Step	LS	S	G	P	R1	R2	R3	R4
1	o	o			o			
2	o	o				o		
3	o	o				o	o	
4	o	o				o		o
5	o	o			o	o	o	
	o	o	o			o	o	
6	o		o	o		o	o	
7	o		o	o		o		o
8	o		o	o	o	o		o
9	o		o	o	o	o	o	

Fig. 2560—Wiring Diagram for Type HL Unit Switch Control for Quadruple Equipment of 75 H. P. Railway Motors. Westinghouse Electric & Manufacturing Company.

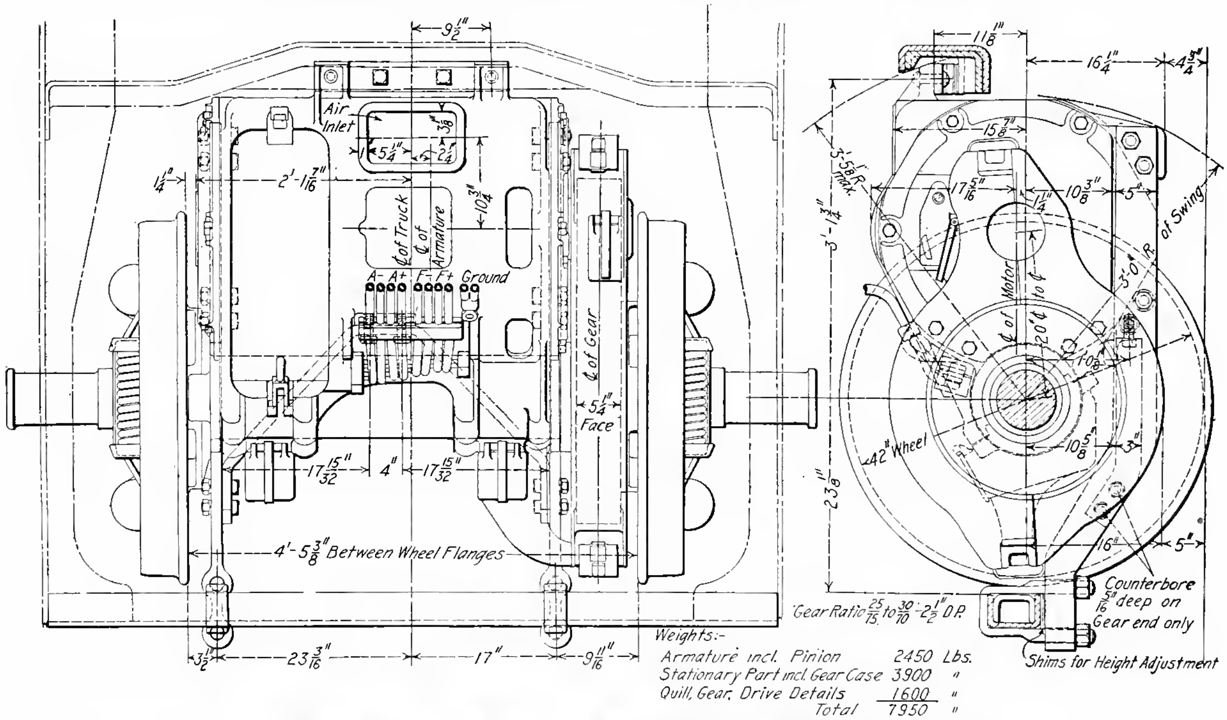


Fig. 2561—Motor Used on the New York, New Haven & Hartford.

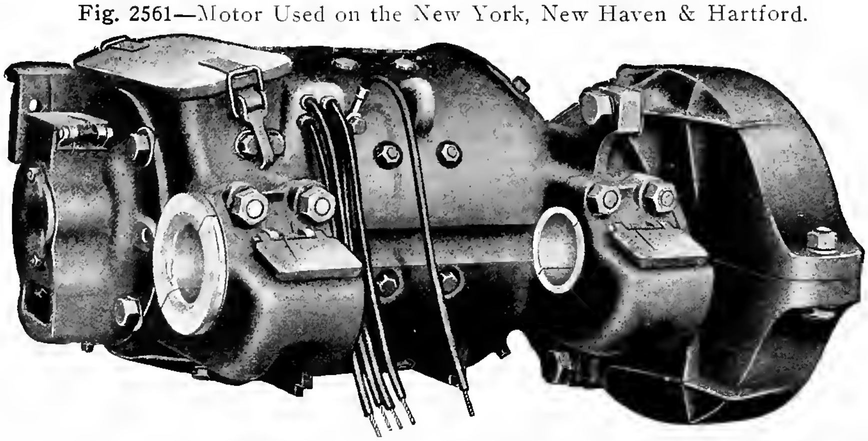


Fig. 2562—G. E.-216A, 50 H. P., 600 Volt Railway Motor. Weight, 2,875 lbs. General Electric Company.

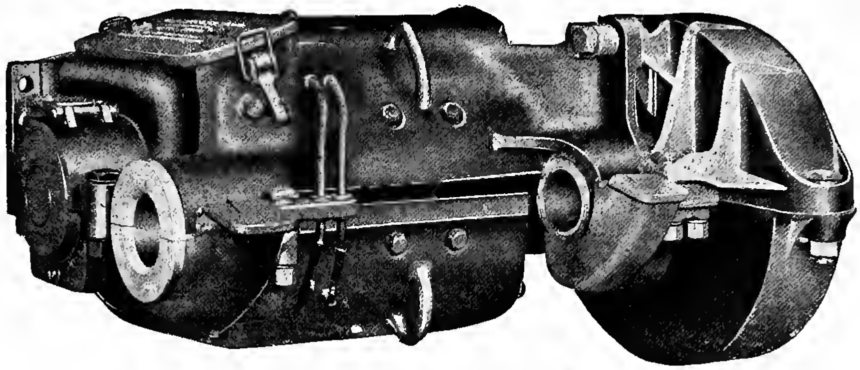


Fig. 2563—G. E. 219 Railway Motor.

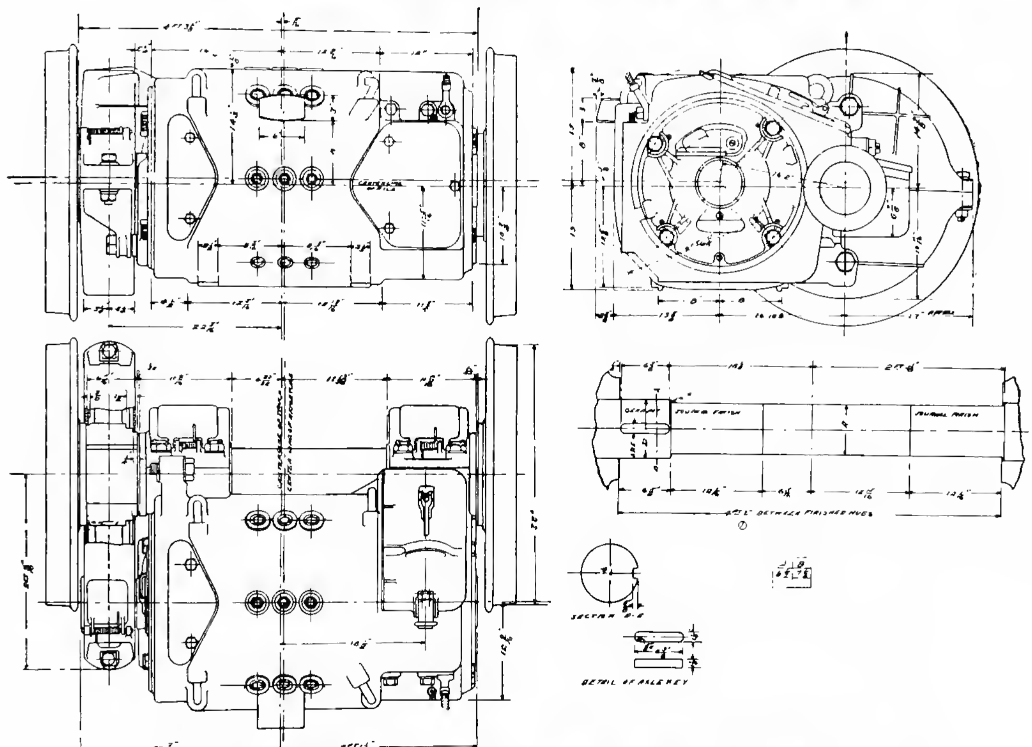


Fig. 2564—General Arrangement of G. E. 207 Railway Motor.

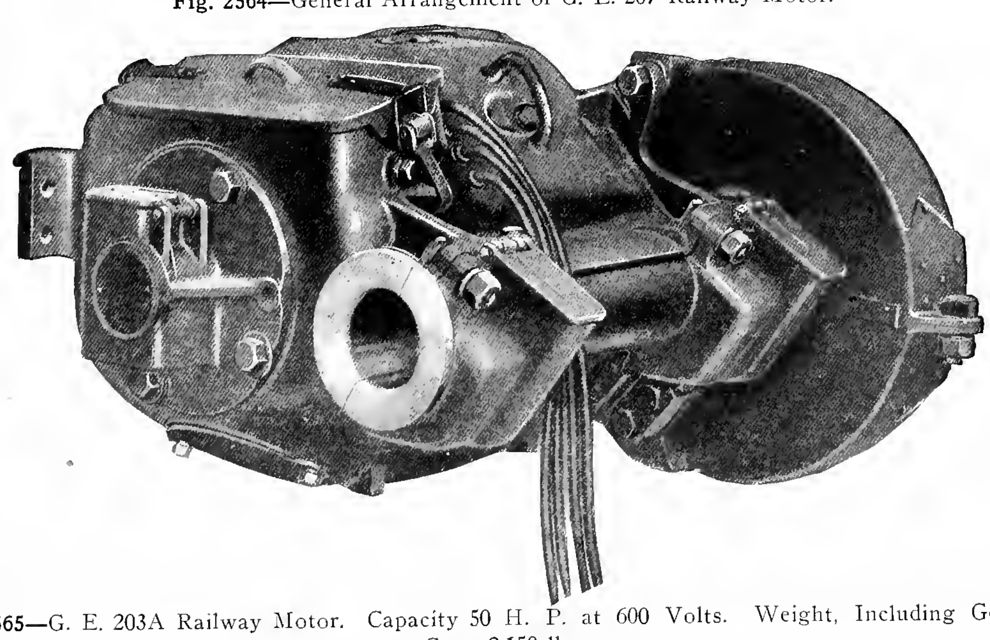
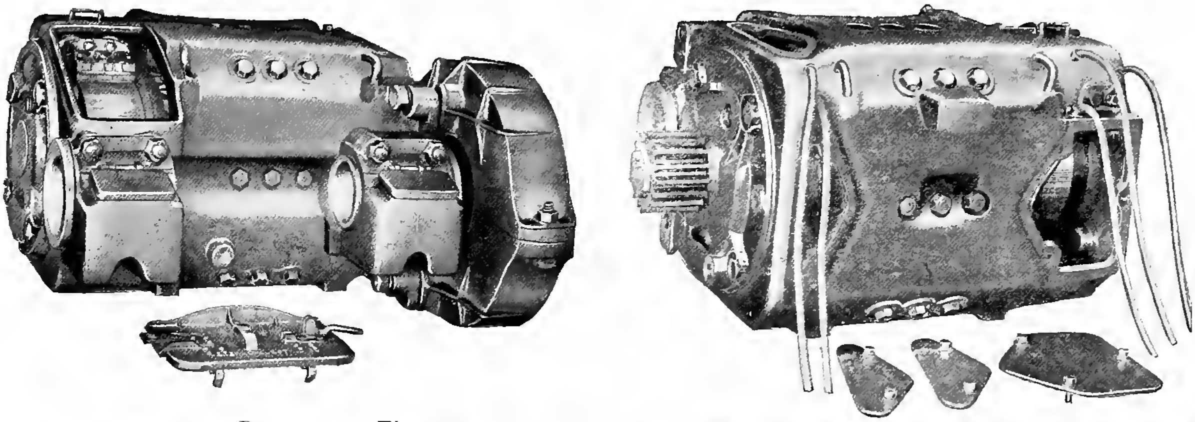


Fig. 2565—G. E. 203A Railway Motor. Capacity 50 H. P. at 600 Volts. Weight, Including Gear and Case, 2,150 lbs.

General Electric Company.



Rear. **Fig. 2566**—G. E. 207 Railway Motor. Front.

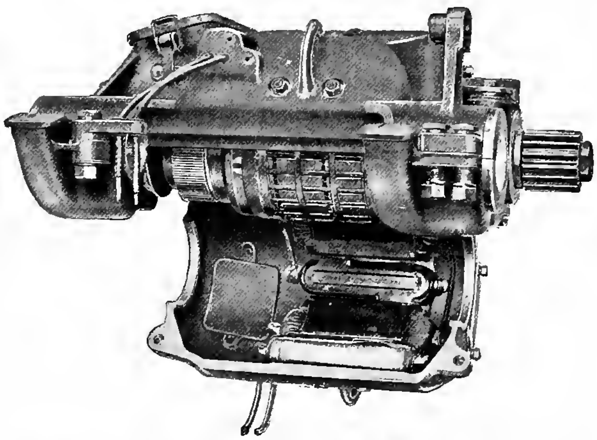


Fig. 2567—G. E. 219 Railway Motor with Lower Frame Dropped and Armature Ready for Removal.

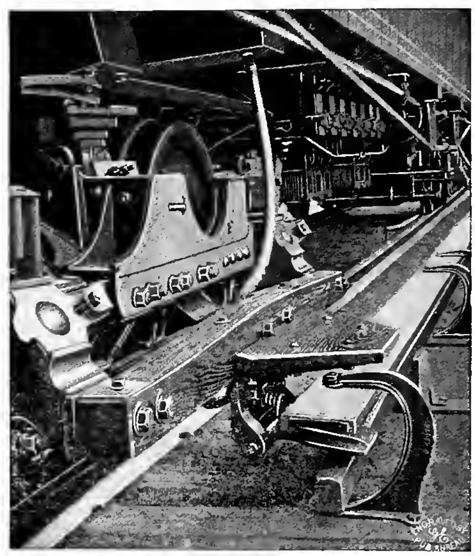


Fig. 2568—Third Rail Current Collecting Shoe Mounted on Truck.

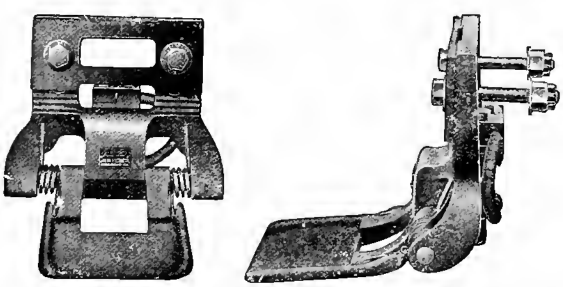


Fig. 2569—Spring Type Current Collector for Over-Running Third Rail.

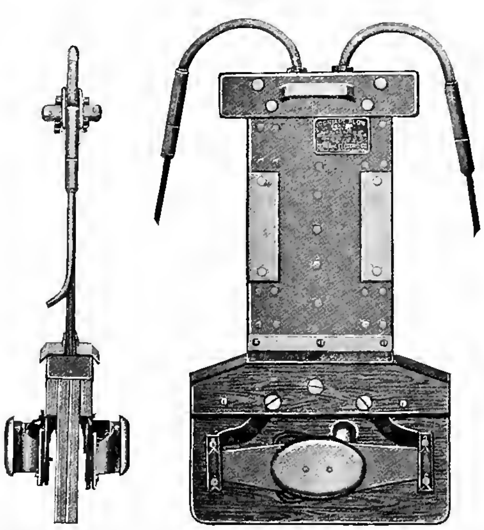


Fig. 2570—Open Conduit Plow or Current Collector.

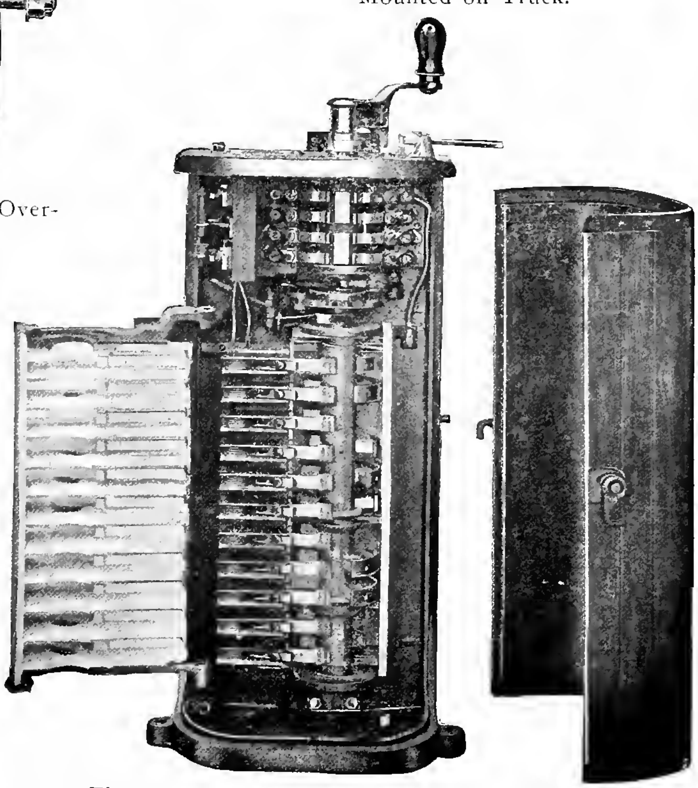


Fig. 2571—Series-Parallel Controller K-36.

General Electric Company.

Fig. 2572—Three-Way Snap Switch for Lighting Circuit.

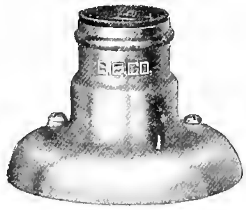


Fig. 2573—Keyless Lamp Socket and Base.

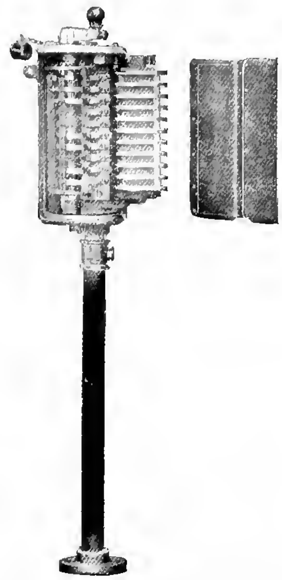


Fig. 2575—Master Controller for Automatic Control.

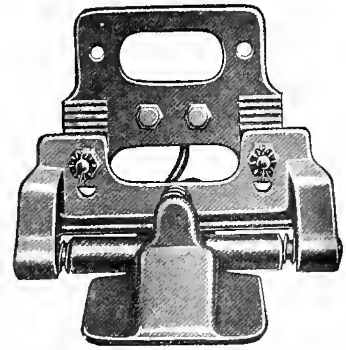


Fig. 2576—Spring Type Current Collector for Over-Running Third Rail.

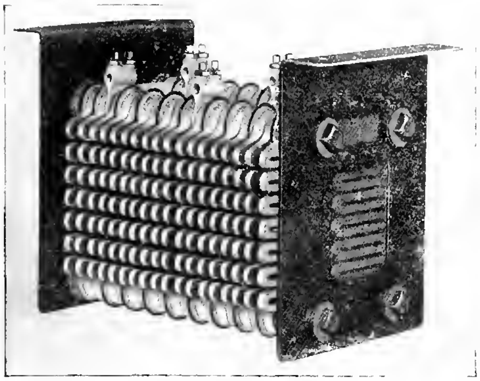


Fig. 2574—Type R. G. Rheostat for Railway Service.

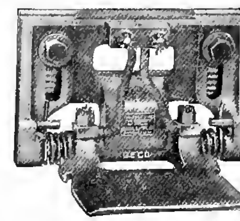


Fig. 2577—Spring Type Current Collector for Under-Running Third Rail.

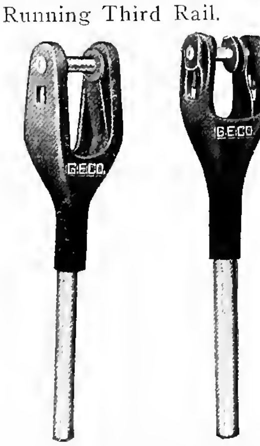


Fig. 2578—Trolley Harps for High and Low Speed Service.

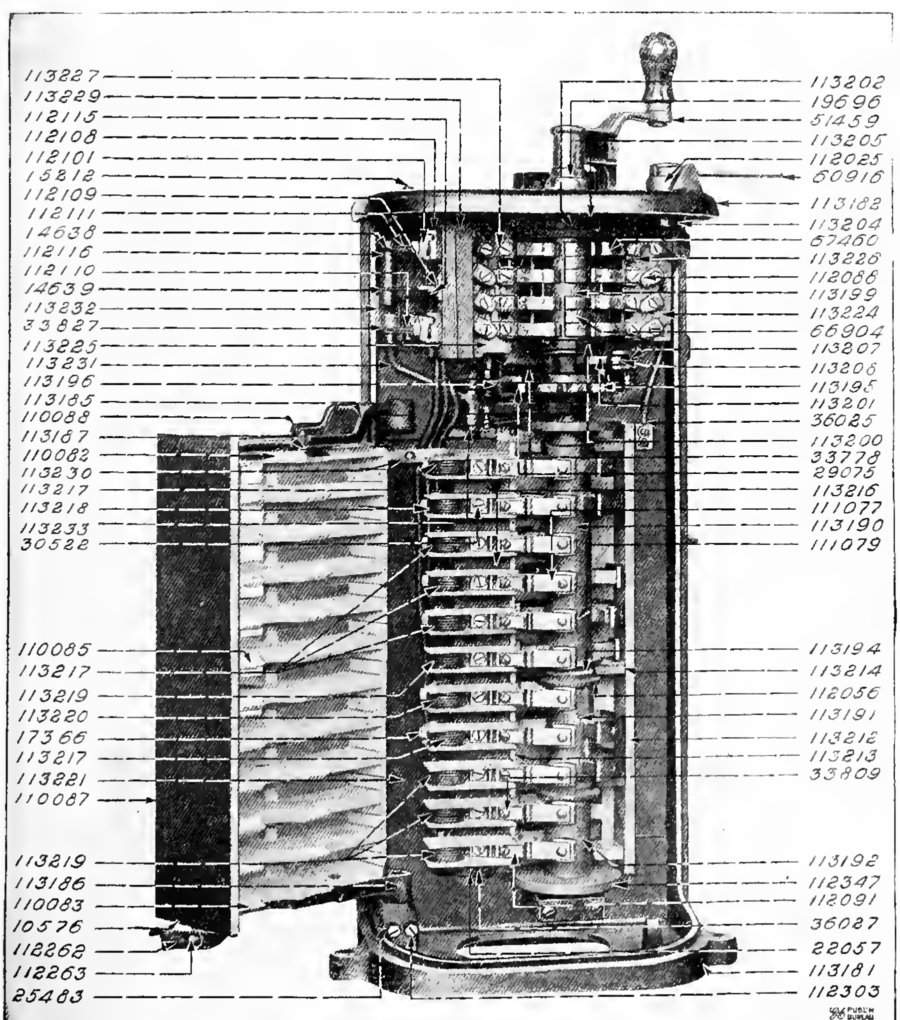


Fig. 2579—Type K-36-B Controller.
General Electric Company.

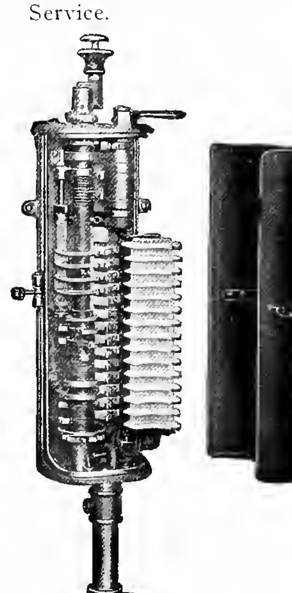


Fig. 2580—Master Controller.

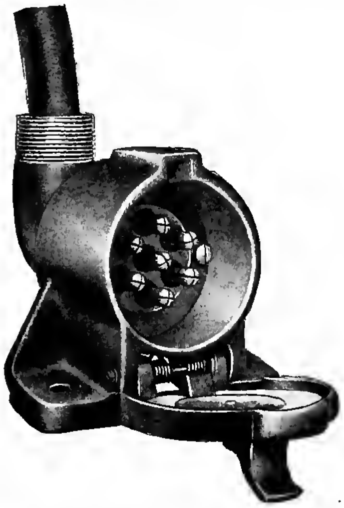


Fig. 2581—Control Coupler Socket.

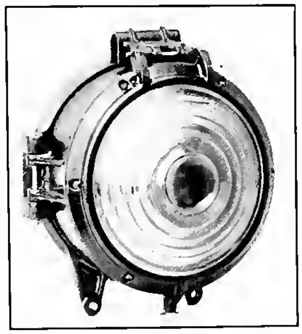


Fig. 2583—Form 10, 2 Ampere, 550 Volt, Direct Current, Luminous Arc Headlight.

Fig. 2584—Lamp Socket.

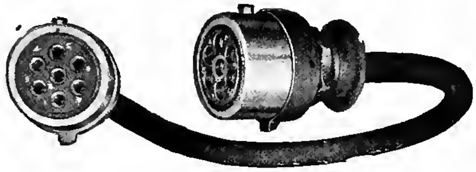


Fig. 2582—Control Coupler Jumper.

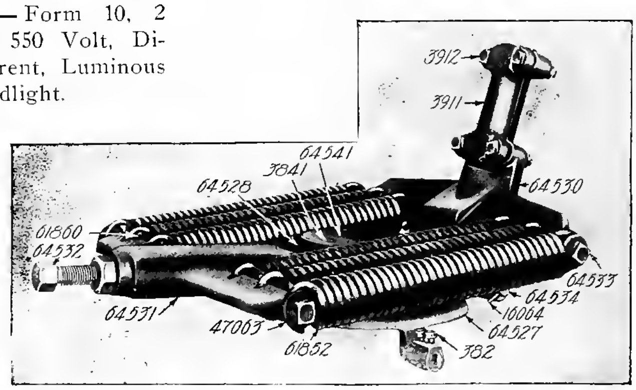
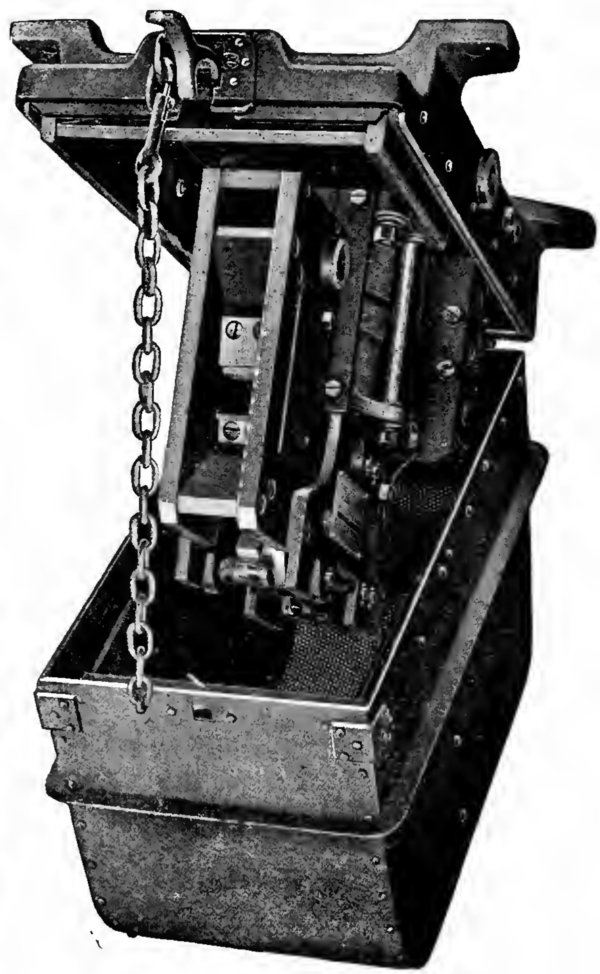
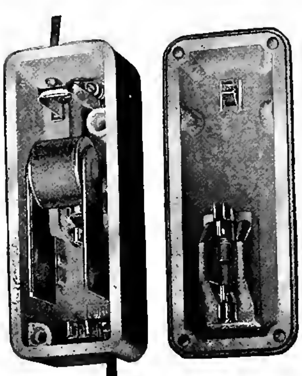


Fig. 2585—Ball Bearing Trolley Base.

Fig. 2586—Circuit Breaker.

Fig. 2587 — Three Ampere, 600 Volt, Single Pole, Combined Indicating Switch and Enclosed Fuse Cutout.





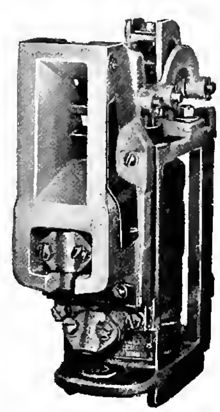
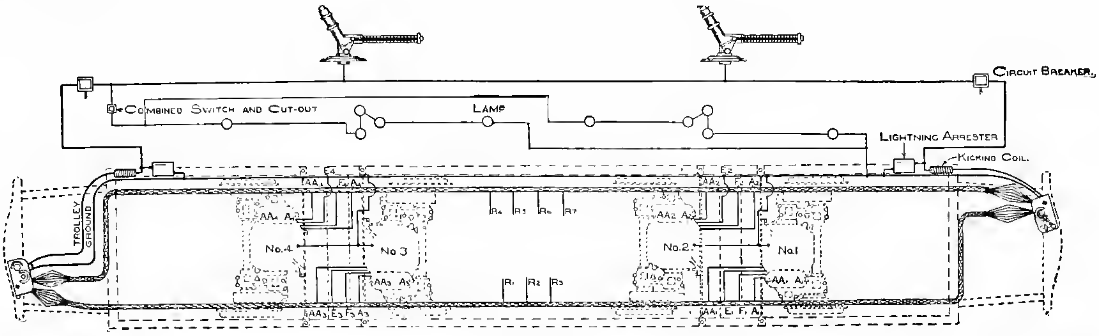


Fig. 2588—Type M, Form D Lightning Arrester.

Fig. 2589—Contactor.

Fig. 2590—Automatic Circuit Breaker.

General Electric Company.



E1 and E3 Taps are connected to same wire in Cable.

Fig. 2591—Car Wiring for Two Series-Parallel Controllers and Four Motors.

Fig. 2592—1,200 Volt Lamp Receptacle.

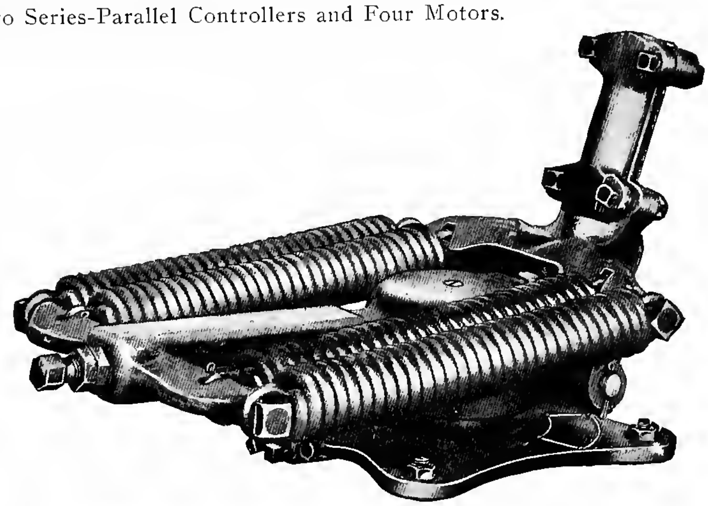


Fig. 2593—Roller Bearing Trolley Base.

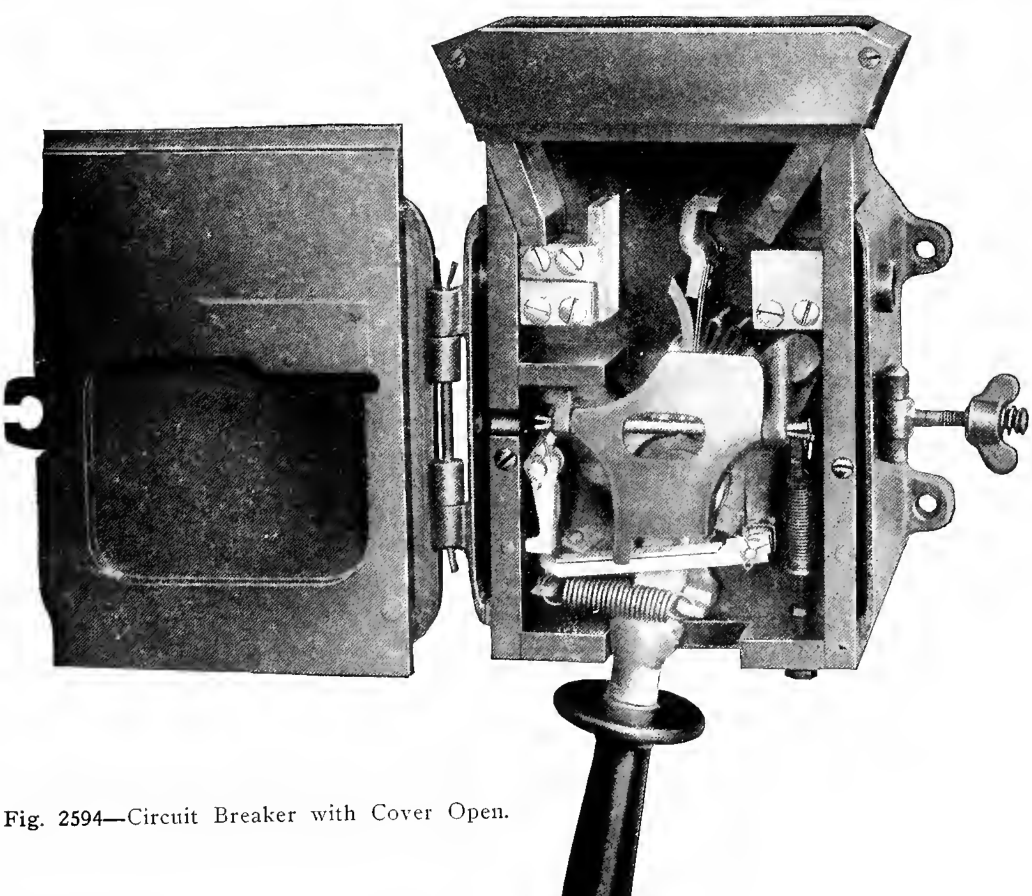


Fig. 2594—Circuit Breaker with Cover Open.

General Electric Company.

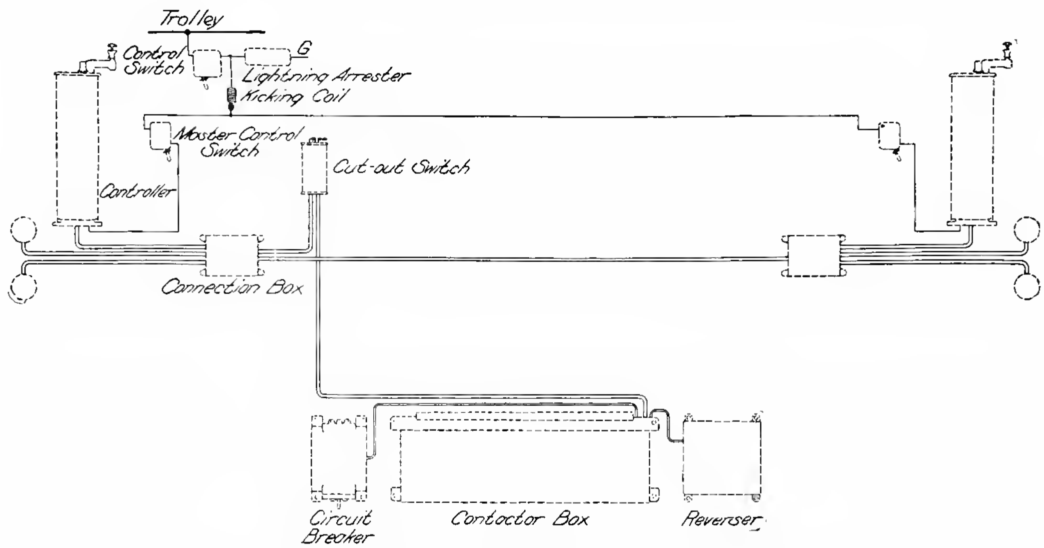


Fig. 2595—Control Wiring for Sprague-General Electric Type M Control.

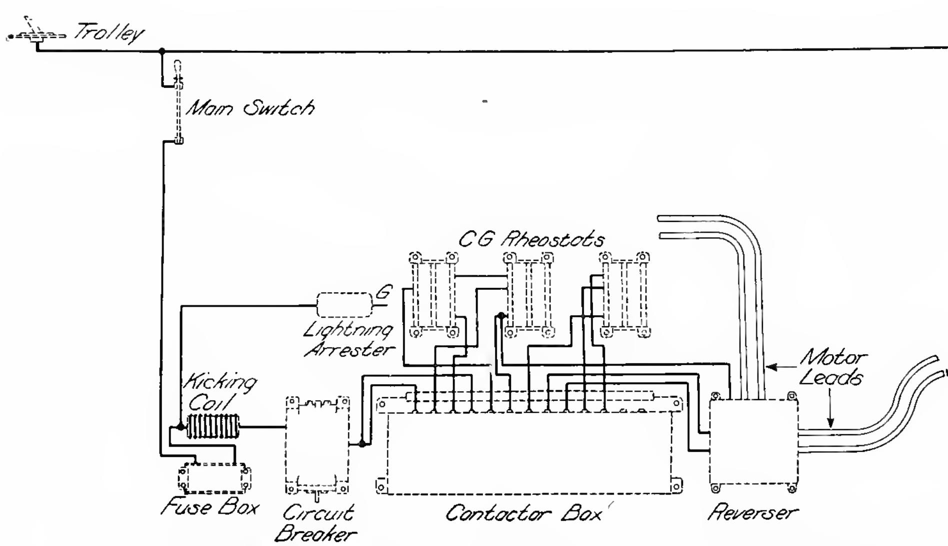


Fig. 2596—Motor Wiring for Sprague-General Electric Type M Control.

General Electric Company.

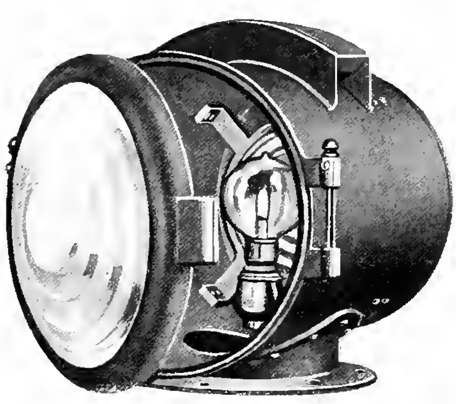


Fig. 2597—Electric Incandescent Hood Headlight. Dayton Manufacturing Company.

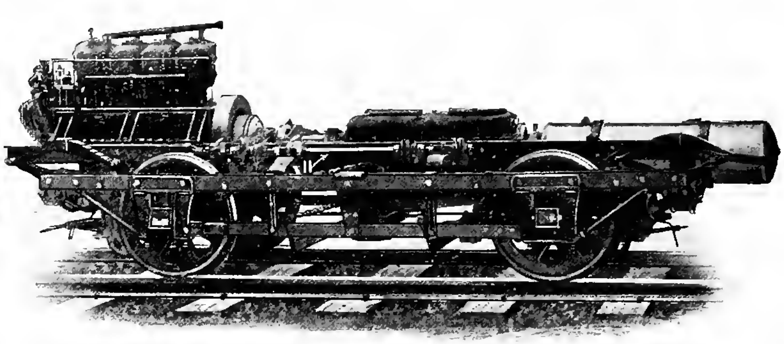


Fig. 2598—Arrangement of Engine and Transmission on Fairbanks-Morse Gasolene Motor Cars.

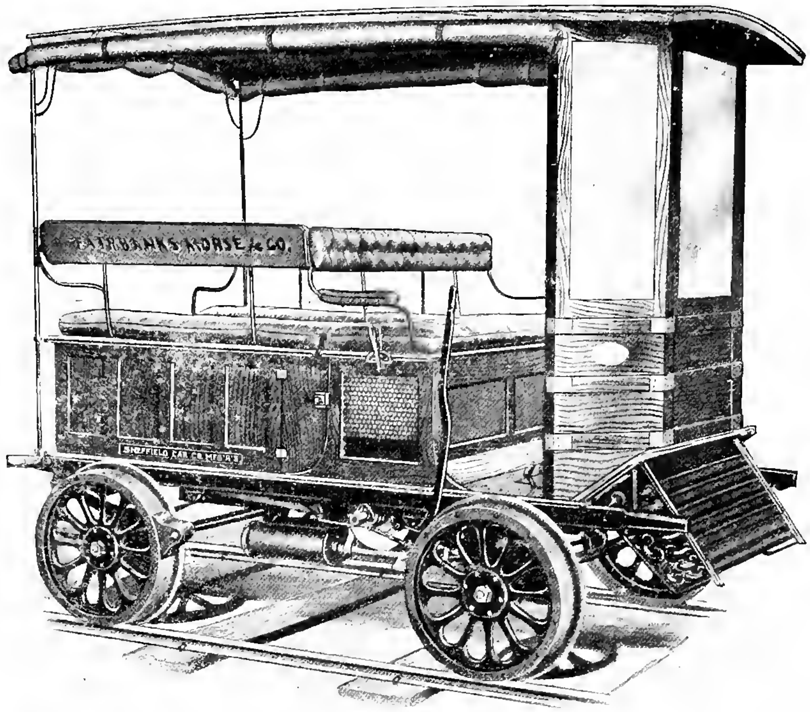


Fig. 2599—Section Gasolene Motor Car No. 14.

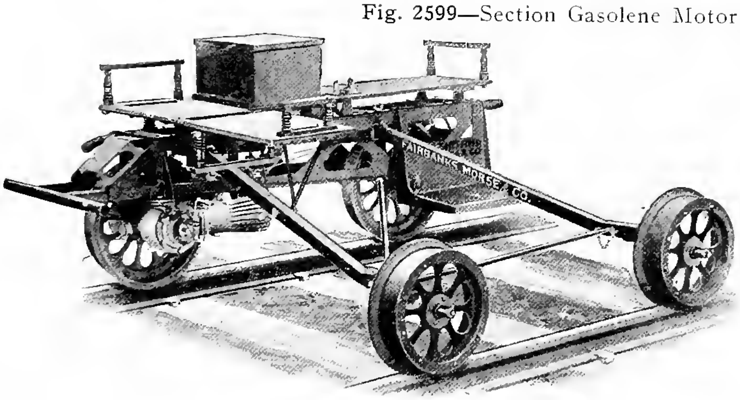


Fig. 2600—All-Steel Gasolene Motor Car No. 28.

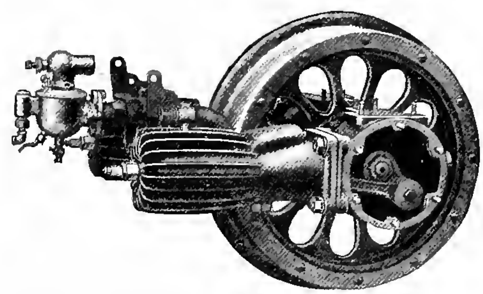


Fig. 2601—Engine for Motor Car No. 28 Showing Timer.

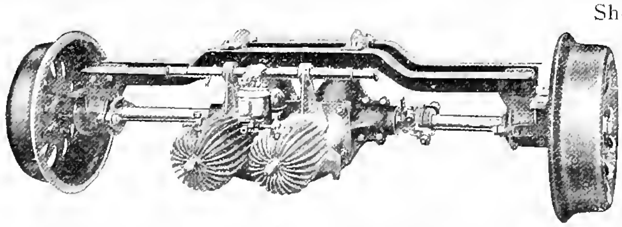


Fig. 2602—Removable Power Plant of Motor Car No. 32.

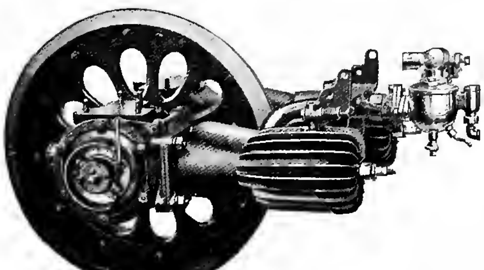


Fig. 2603—Engine for Motor Car No. 28.

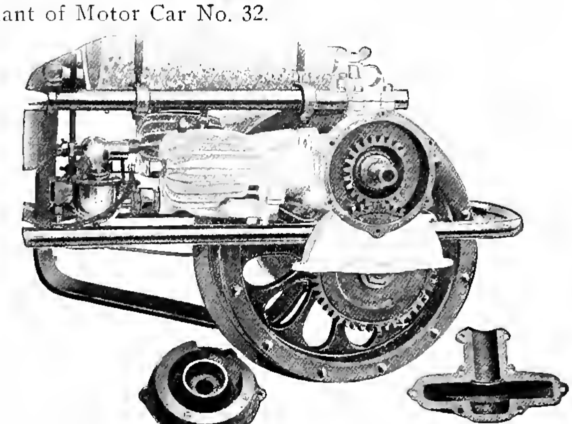


Fig. 2604—Engine and Gear for Motor Car No. 30.

Fairbanks, Morse & Company.

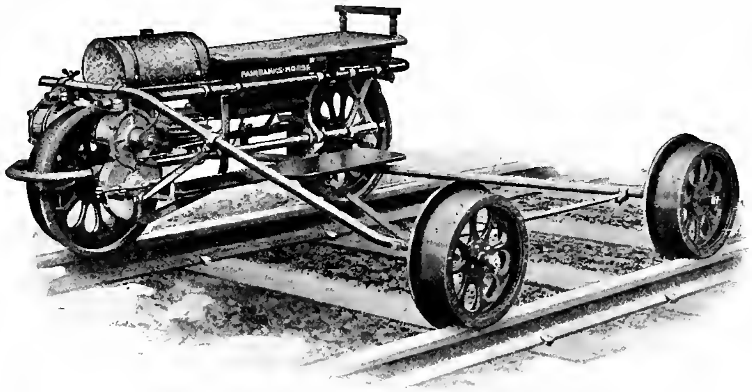


Fig. 2605—All-Steel Gasolene Motor Car No. 30.

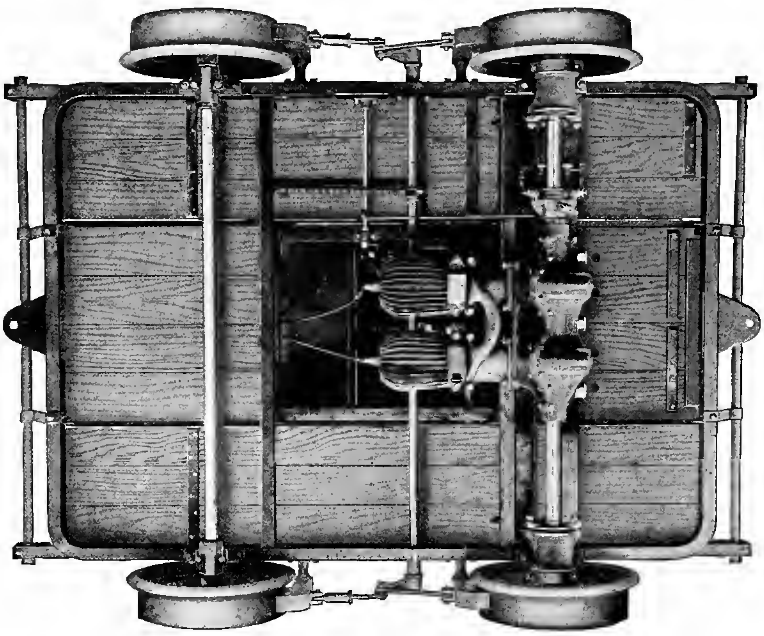


Fig. 2606—Bottom View of Motor Car No. 32.

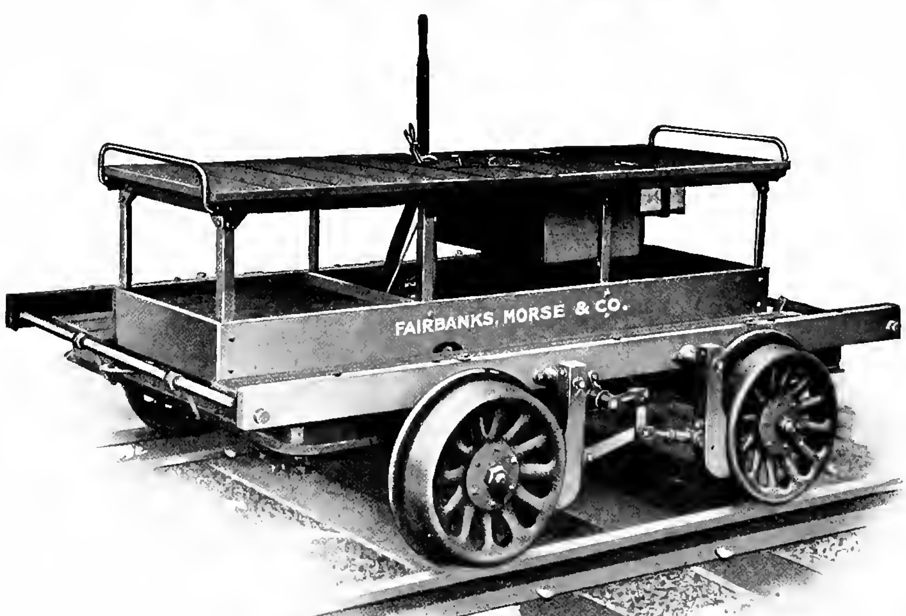


Fig. 2607—Gasolene Section Motor Car No. 32.
Fairbanks, Morse & Company.

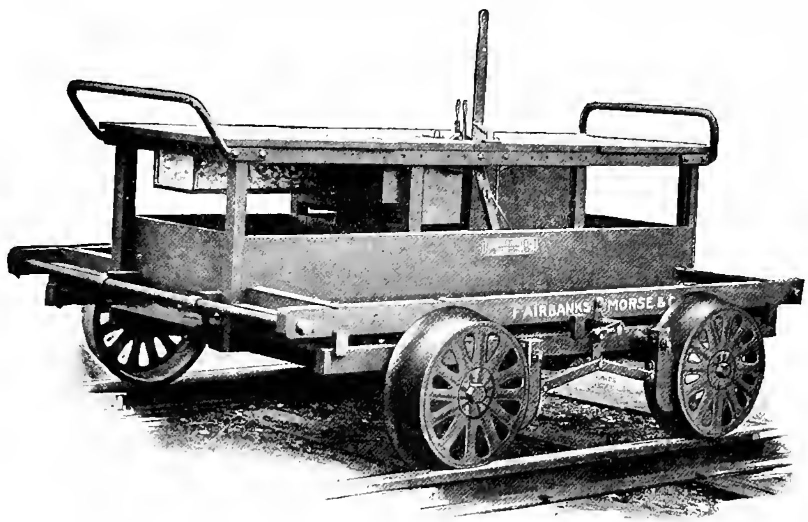


Fig. 2608—Gasolene Section Motor Car No. 26.

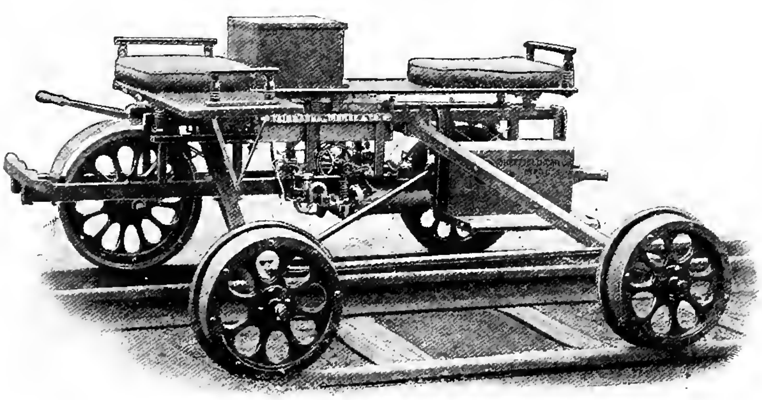


Fig. 2609—Inspection Gasolene Motor Car No. 2J.

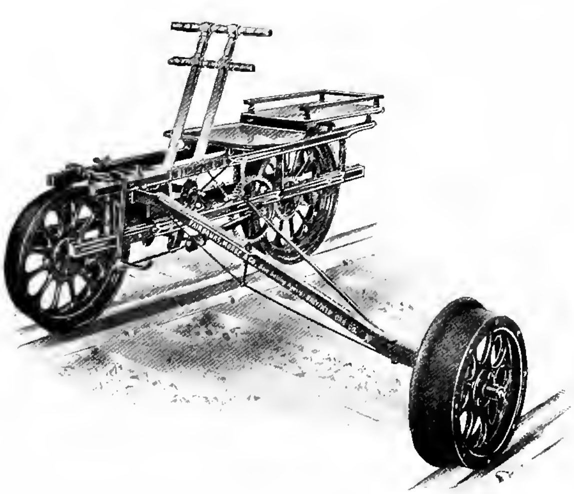


Fig. 2610—Ball Bearing Velocipede Car.

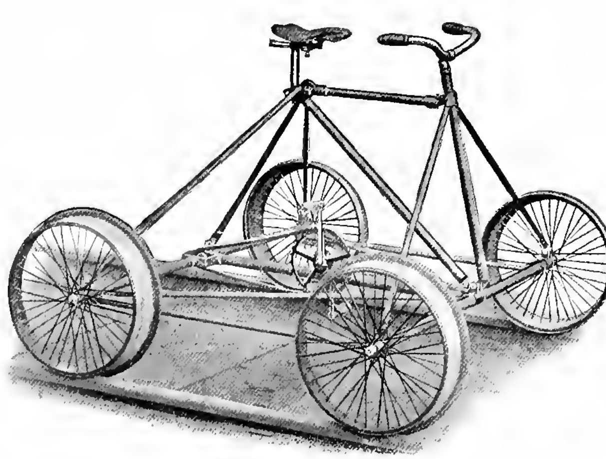


Fig. 2611—Velocipede Car No. 19.

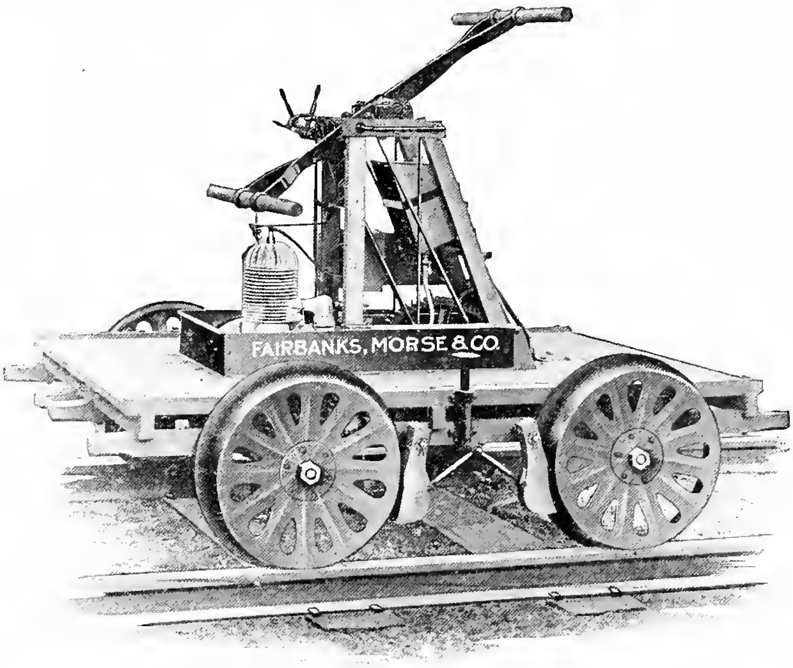


Fig. 2612—Hand Car with Auxiliary Gasolene Motor.

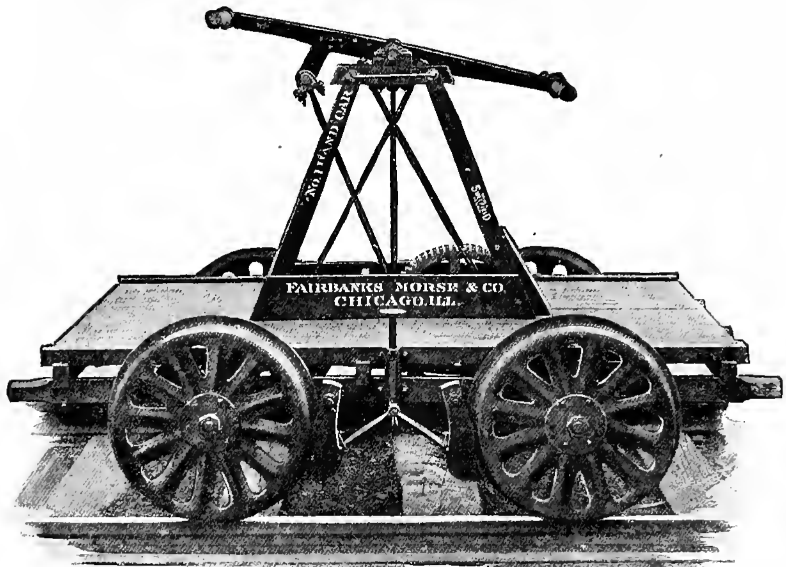


Fig. 2613—Standard Section Hand Car No. 1; Weight, 540 lbs.
Fairbanks, Morse & Company.

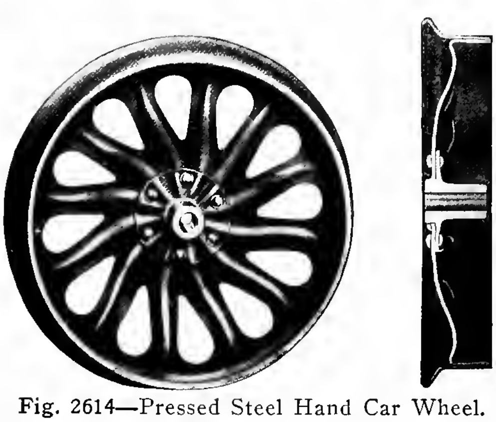


Fig. 2614—Pressed Steel Hand Car Wheel.

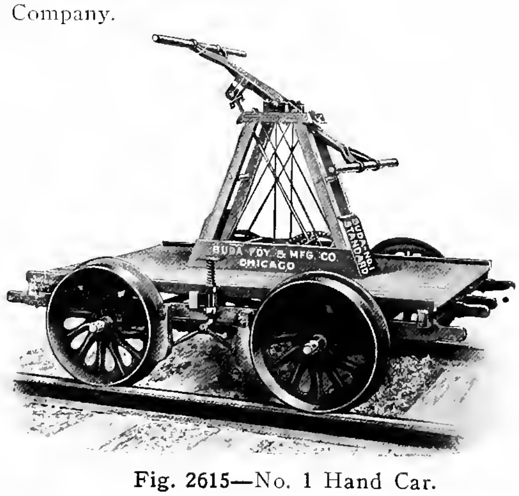


Fig. 2615—No. 1 Hand Car.

The Buda Company.

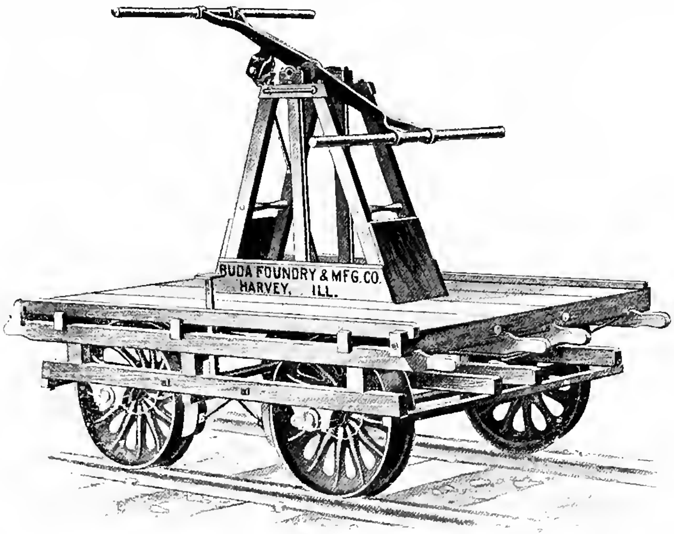
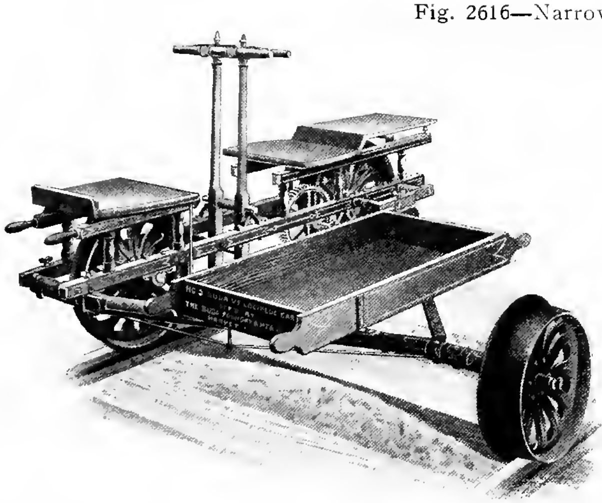


Fig. 2616—Narrow Gage Hand Car.



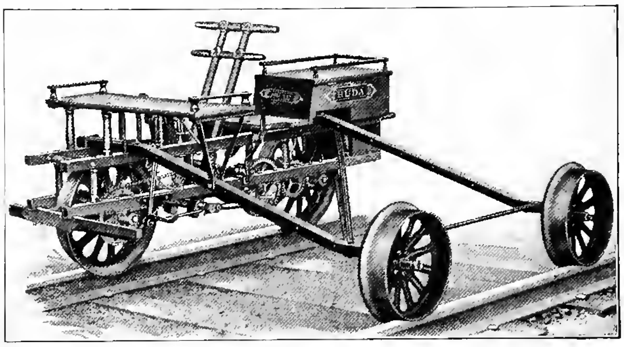


Fig. 2618—Motor Velocipede Car No. 12.

Fig. 2617—Velocipede Car No. 3.

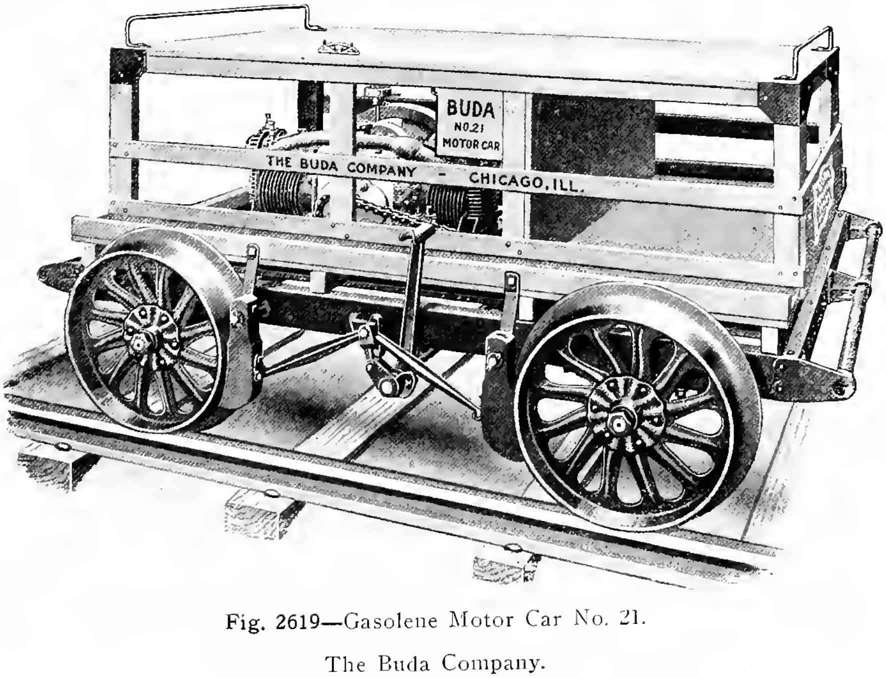


Fig. 2619—Gasolene Motor Car No. 21.

The Buda Company.

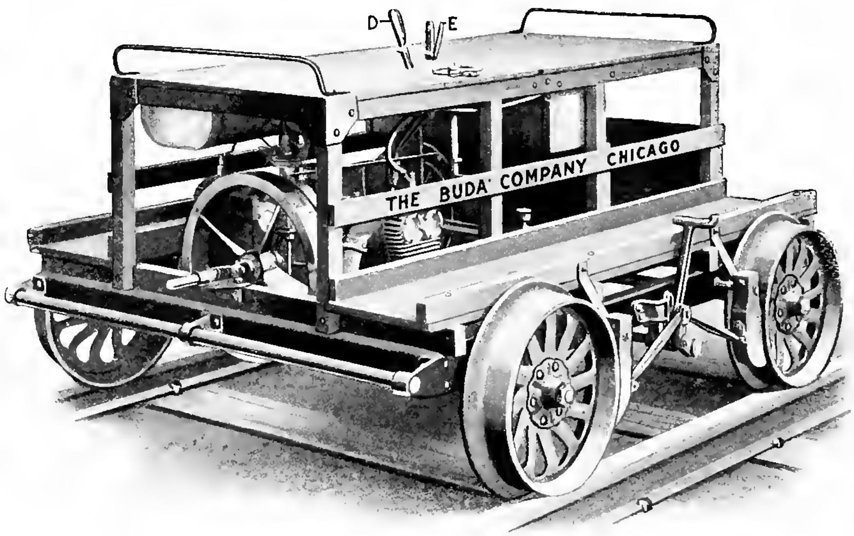


Fig. 2620—Section Motor Car No. 19. The Buda Company.

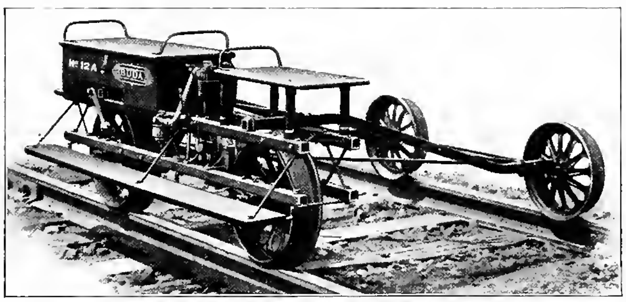


Fig. 2621—Motor Velocipede Car No. 12A. The Buda Company.

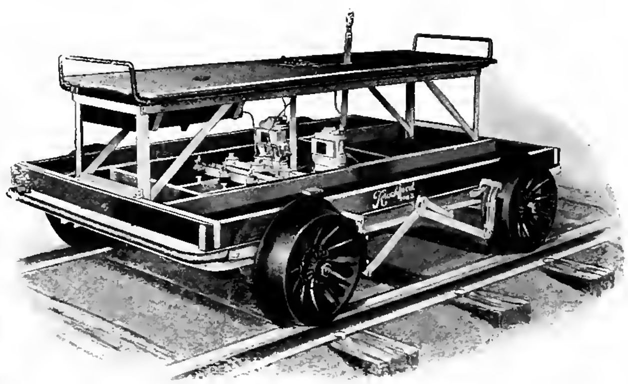


Fig. 2622—Rockford Motor Car. Chicago Pneumatic Tool Company.

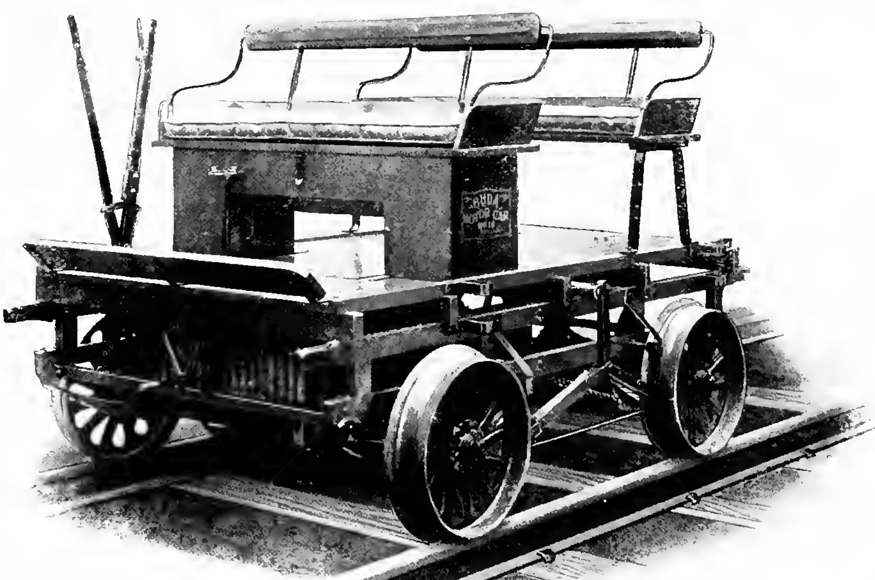


Fig. 2623—Motor Inspection Car No. 16. The Buda Company.

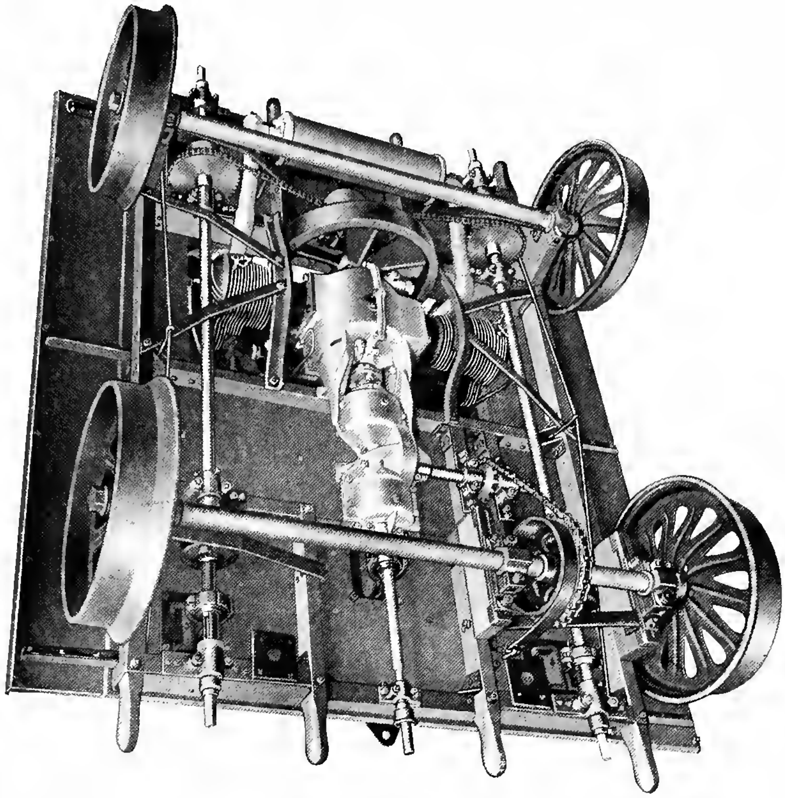


Fig. 2624—Bottom View of Au-tra-kar, Showing Side Shaft for Supplying Power for Outside Purposes. Railway Specialty Company.

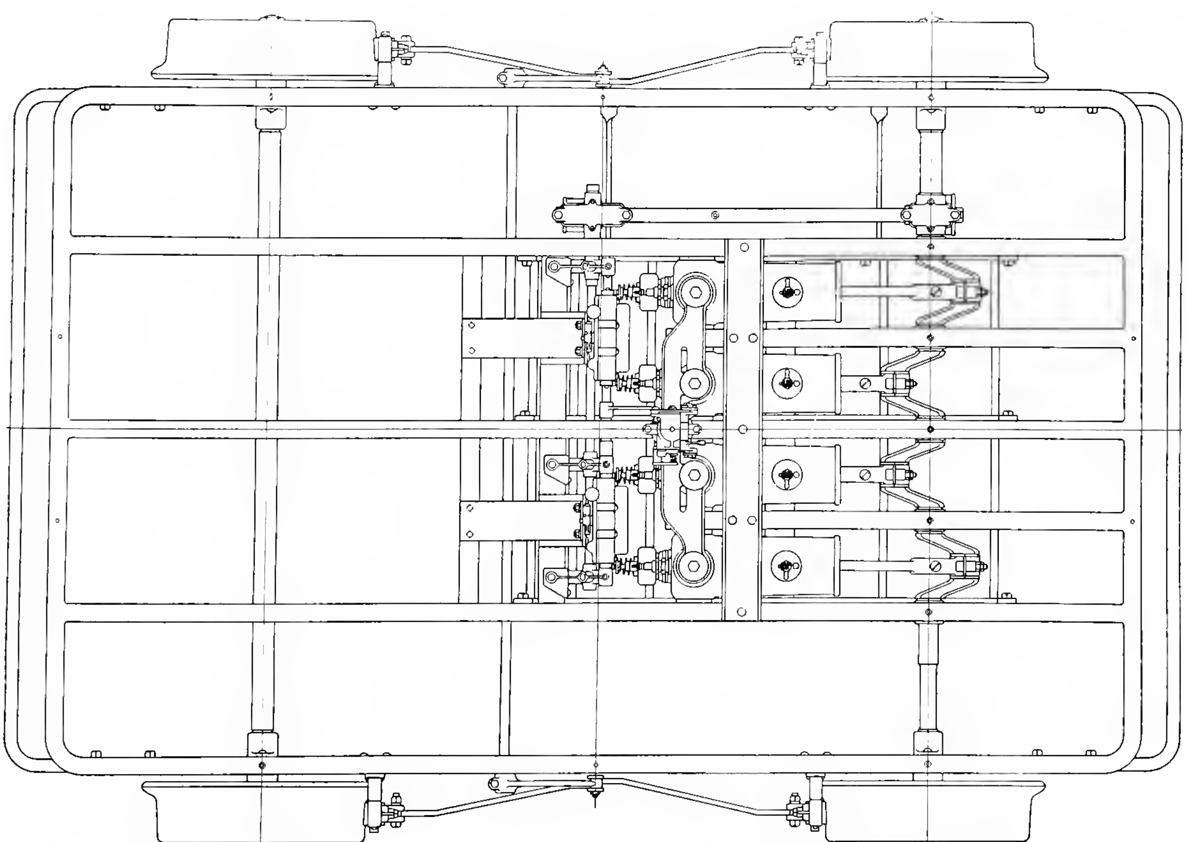
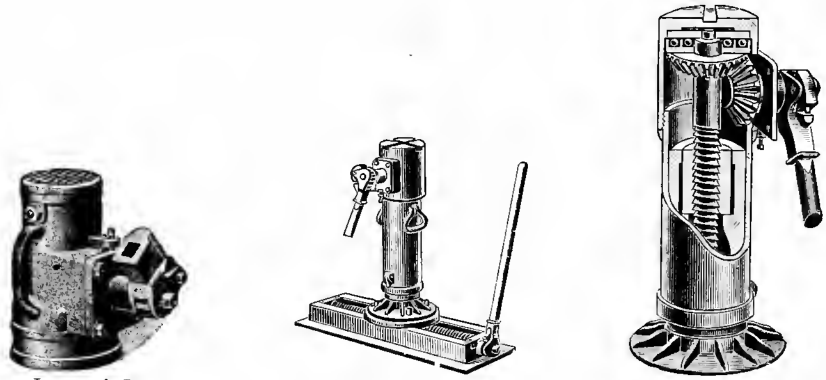


Fig. 2625—Frame and Driving Mechanism of Rockford Motor Car No. 5 Chicago Pneumatic Tool Company.

Fig. 2626—Hydraulic Journal Box Jack. Watson-Stillman Company.



Journal Jack. Capacity, 25 Tons.

Traversing Jack.

Ratchet Screw Jack.

Fig. 2627—Types of Norton Ball Bearing Jacks. A. O. Norton, Incorporated.

Fig. 2628 — Hydraulic Wrecking Jack. Watson-Stillman Company.

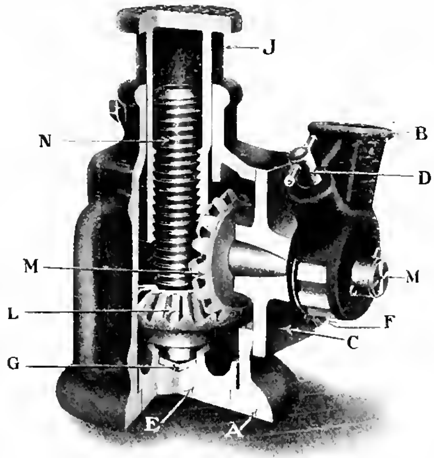


Fig. 2629—Ball Bearing Journal Jack. Duff Manufacturing Company.

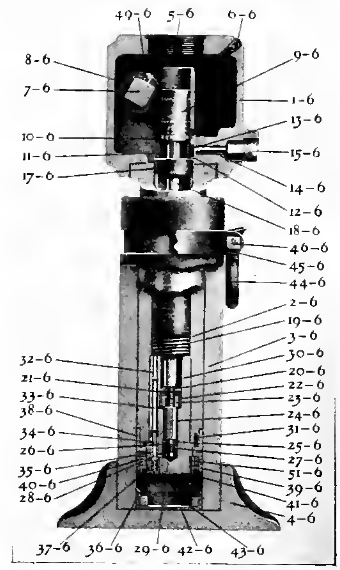


Fig. 2630—Universal Railroad Hydraulic Jack. Richard Dudgeon.

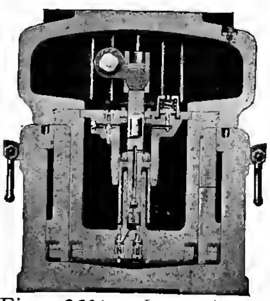


Fig. 2631 — Low Type Telescope Hydraulic Jack. Duff Manufacturing Company.

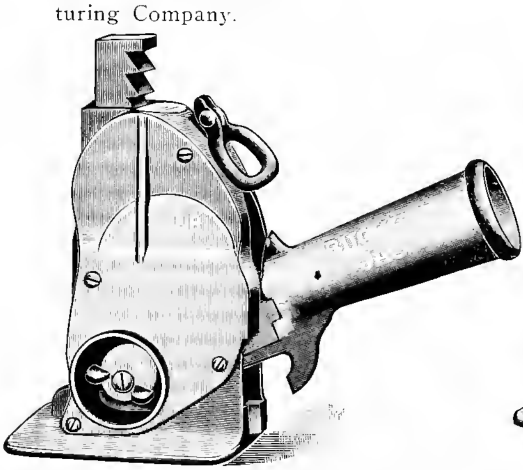


Fig. 2632—Buckeye Automatic Lowering Jack for Journal Box Work; Capacity, 10 Tons.

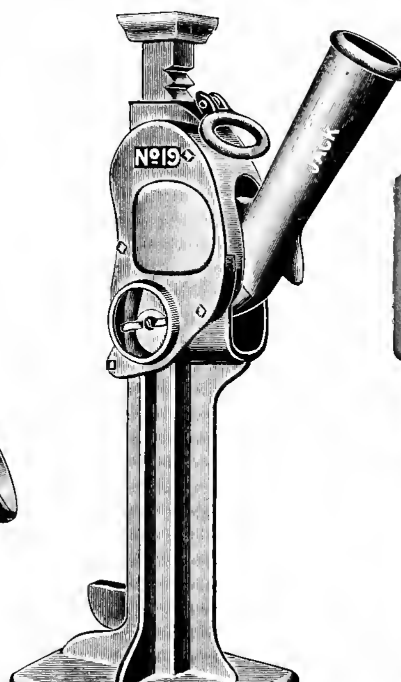


Fig. 2633 — Buckeye Automatic Lowering Jack for General Car Work.

Buckeye Jack Company.

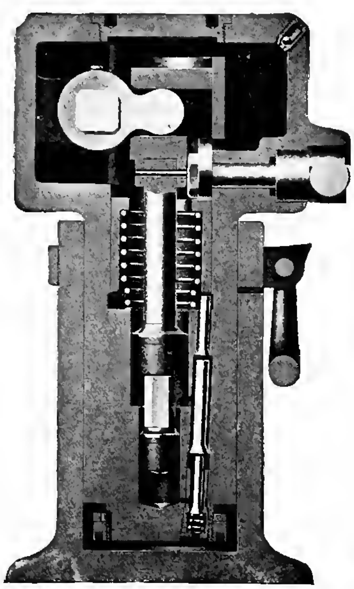


Fig. 2634—Hydraulic Plain Type Car Inspector's Double Pump Jack. Richard Dudgeon.

Fig. 2635—Cone Bearing Postop Journal Jack.

Fig. 2636—Cone Bearing Postop Journal Jack for Car Inspectors.

Fig. 2637—Ball Bearing Journal Jack with Wheel Holding Device.

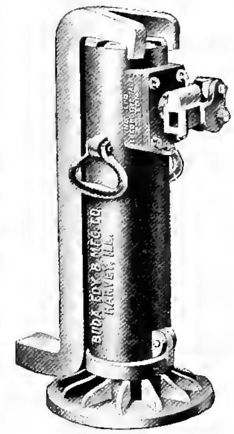


Fig. 2638—Jack No. 110, Equipped with Foot Lift.

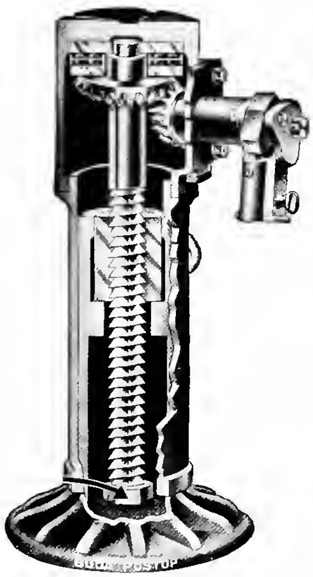


Fig. 2639—Buda Postop Ball Bearing Jack.

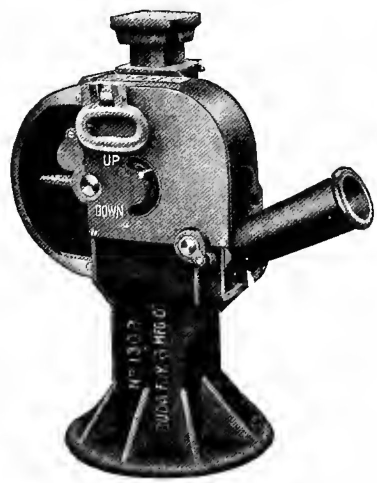


Fig. 2640—Single Acting, Automatic Lowering, Geared Ratchet Jack; Capacity, 40 Tons.

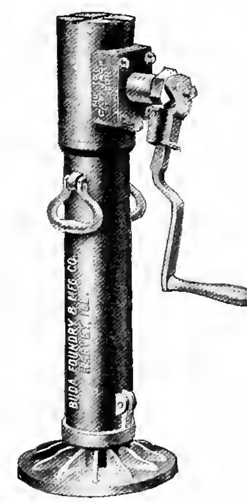


Fig. 2641—Car Jack No. 101.

The Buda Company.

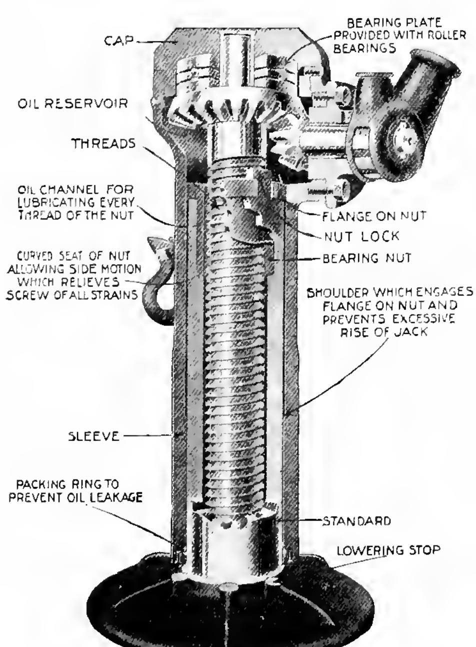


Fig. 2642—Geared Screw Jack. The Joyce-Cridland Company.

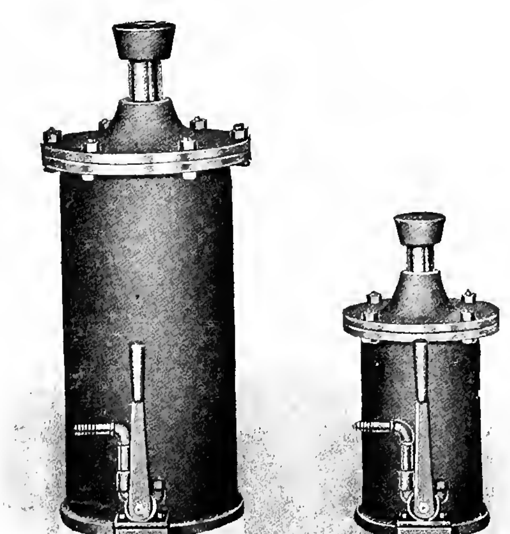


Fig. 2643—Compressed Air Jacks. Chicago Pneumatic Tool Company.

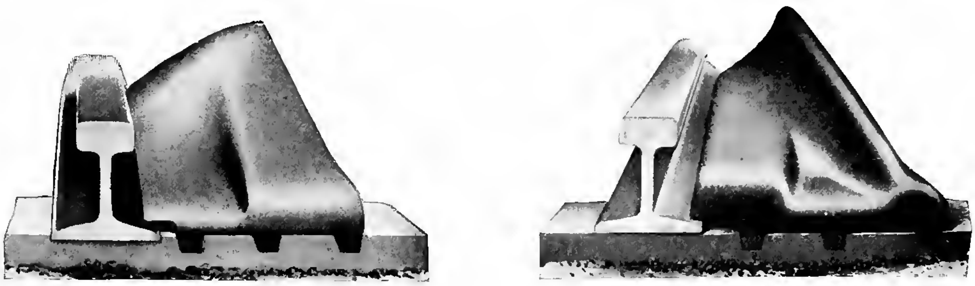


Fig. 2644—Inside and Outside Car Replacers. The Buda Company.

Fig. 2645—Alexander Car Replacers. Alexander Car Replacer Company.

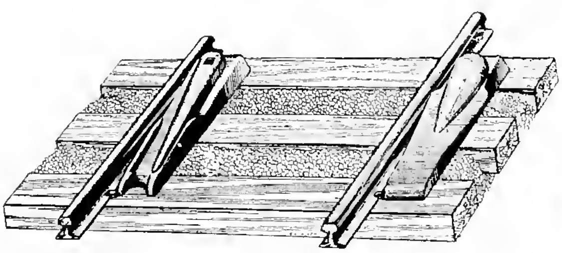


Fig. 2646—Snow Car Replacers. Handy Railway Equipment Company.

Fig. 2647—Aldon Car Replacer. The Aldon Company.

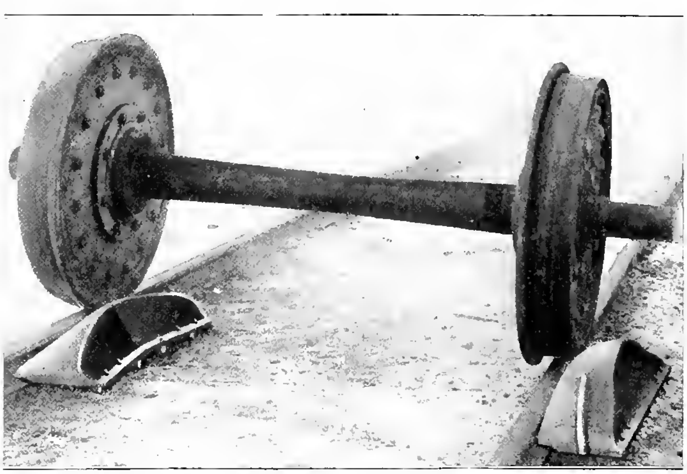


Fig. 2648—Fewings Wrecking Frogs.

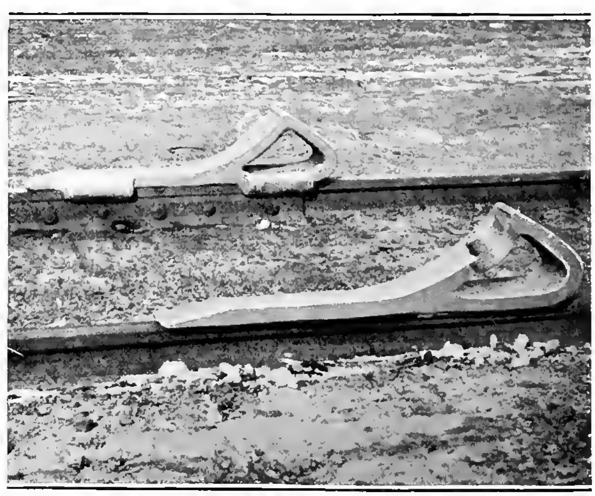


Fig. 2649—R. A. Skid Shoe for Sliding Damaged Wheels.

Railway Appliances Company.

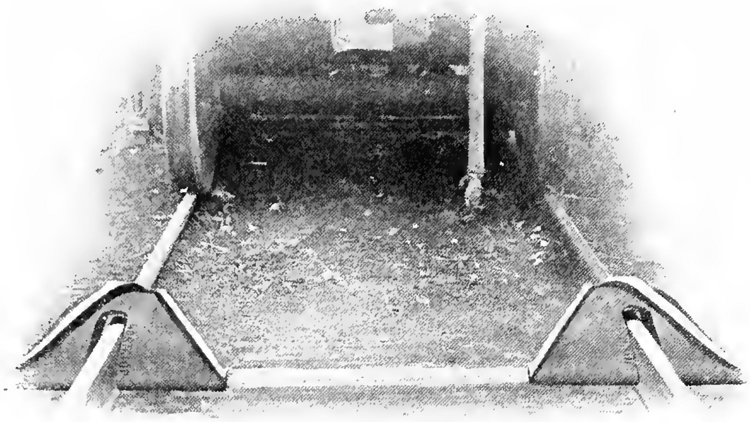


Fig. 2650—Johnson Wrecking Frog. Johnson Wrecking Frog Company.

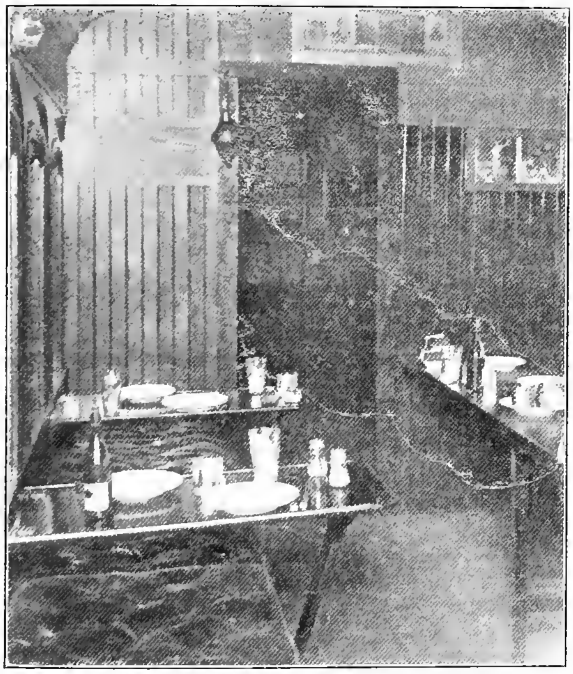


Fig. 2651—Interior of Dining Car of New York Central & Hudson River Wreck Train.

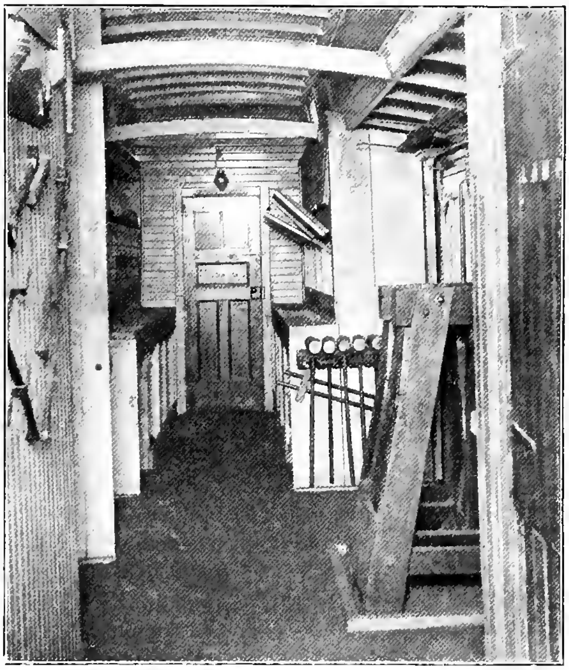


Fig. 2652—Interior of Tool Car of New York Central & Hudson River Wreck Train.

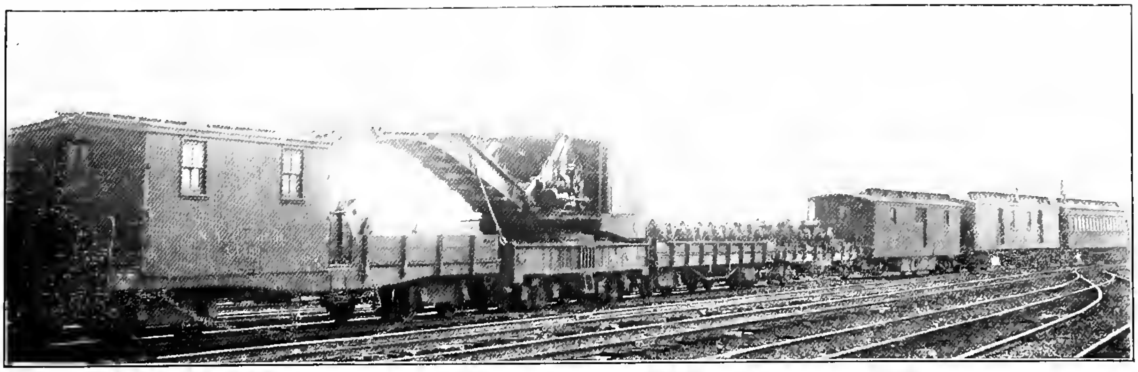


Fig. 2653—Arrangement of Cars in New York Central & Hudson River Wreck Train. From Left to Right—Crane Tender, Crane, Truck Cars, Tool Cars, Sleeping and Dining Cars.

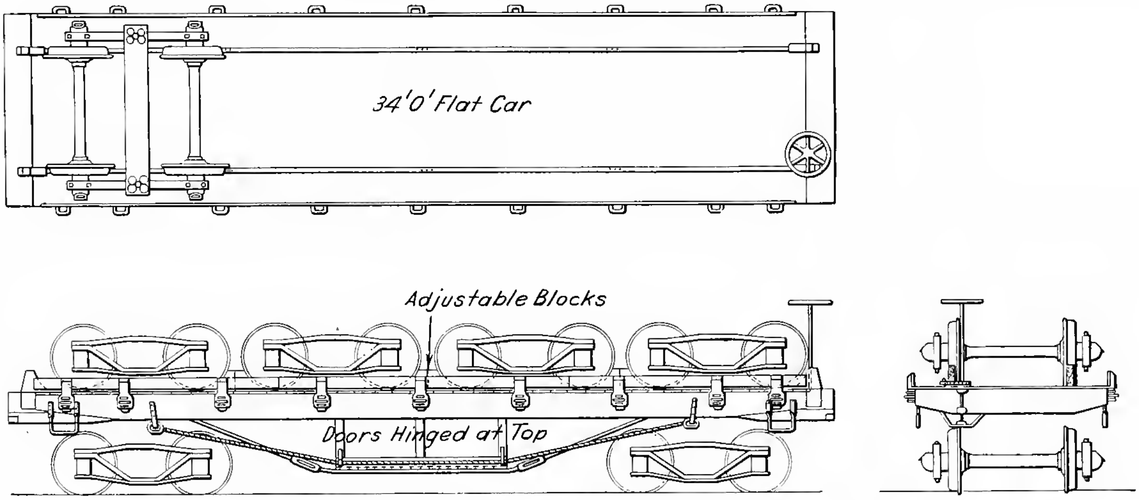


Fig. 2654—New York, New Haven & Hartford Truck Car.

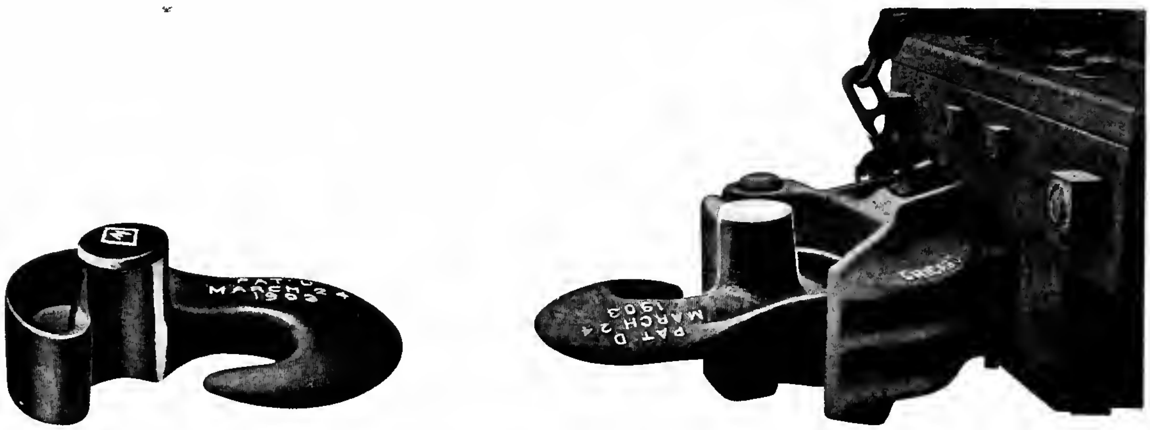


Fig. 2655—Goodman Wrecking Hook for Hauling Cars with Chain or Cable. National Malleable Castings Company.

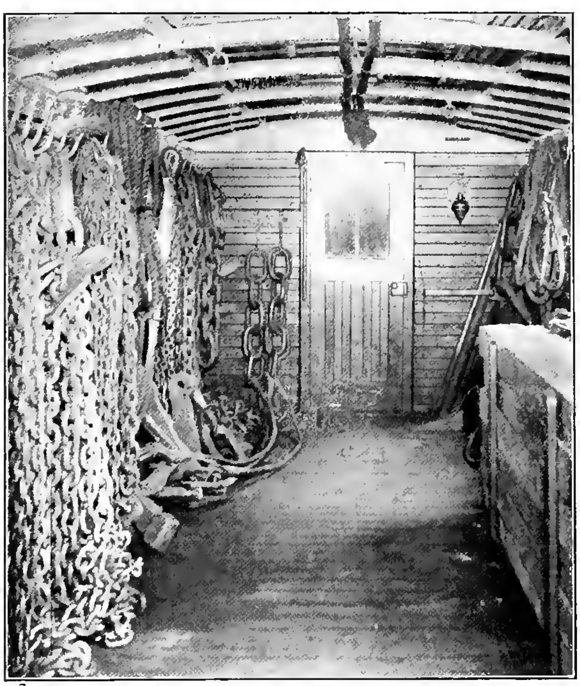


Fig. 2656—Interior of New York Central & Hudson River Tool Car.

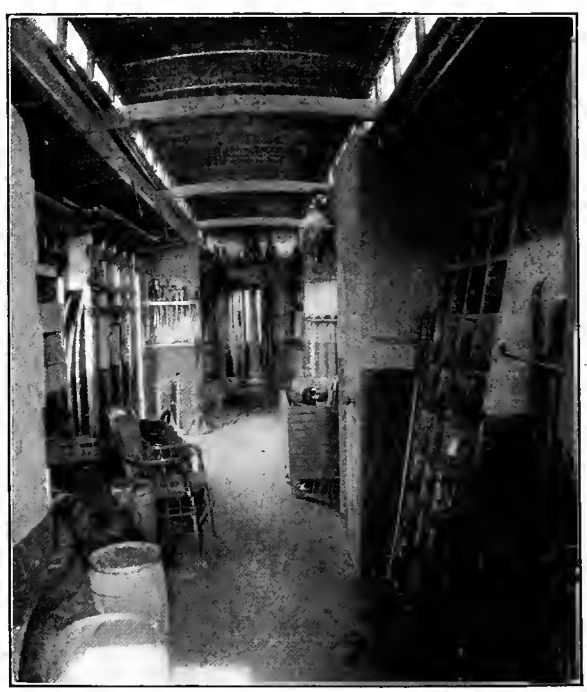


Fig. 2657—Interior of Erie Railroad Tool Car.

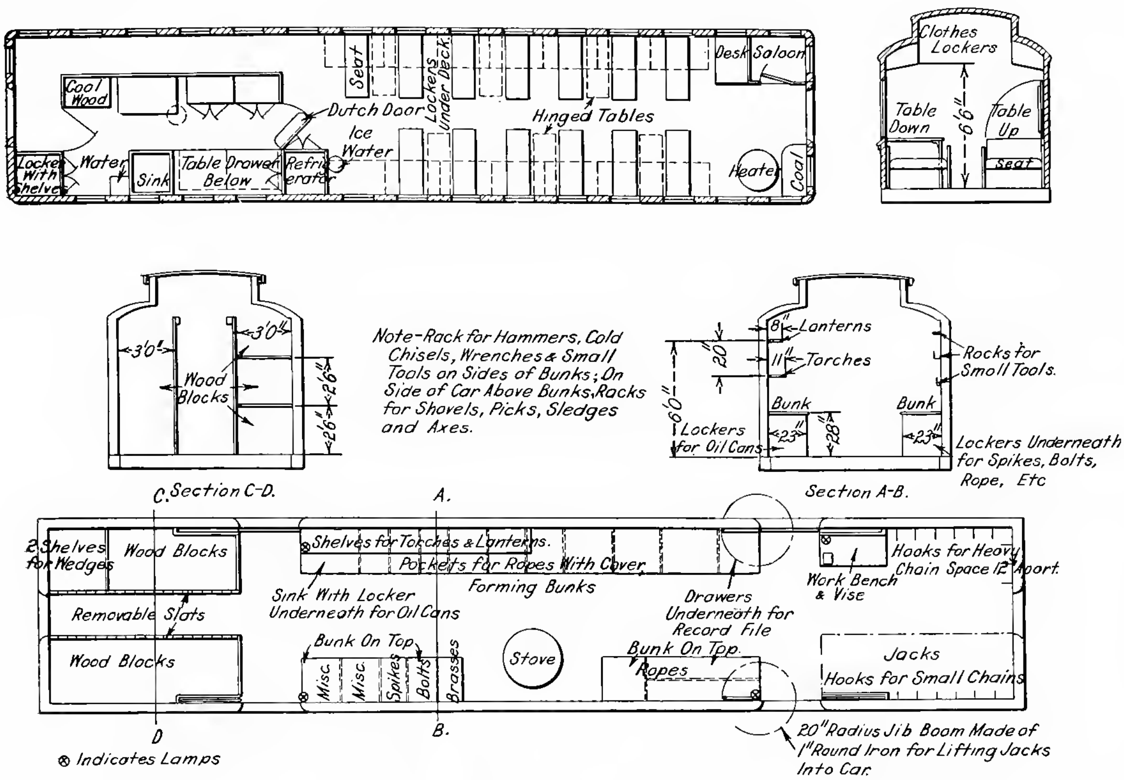


Fig. 2658—New York, New Haven & Hartford Dining, Tool and Sleeping Cars.

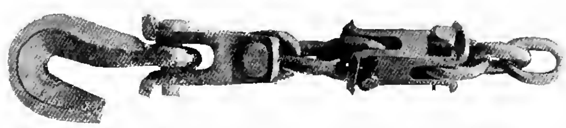


Fig. 2659—Buckley Wreck Chain Repair Link, Used on the Illinois Central for Temporary Repairs to Broken Chains.

Fig. 2660—Interior of Erie Railroad Dining and Sleeping Car.

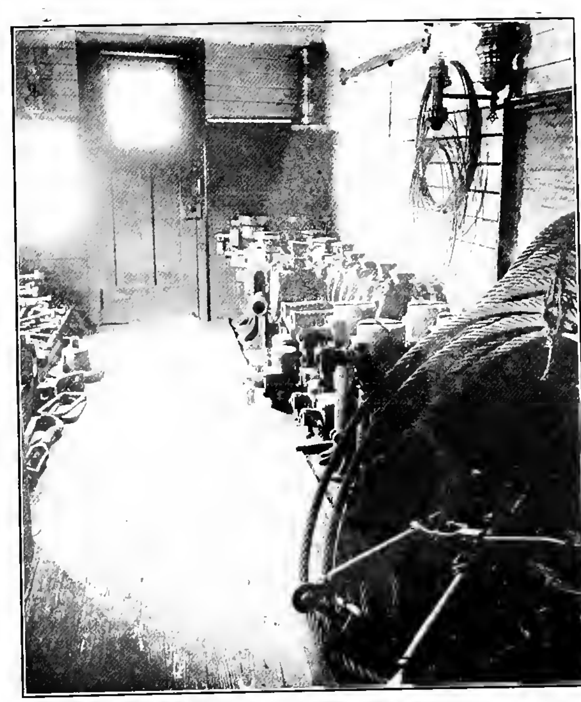


Fig. 2661—Interior of Baltimore & Ohio Tool Car.

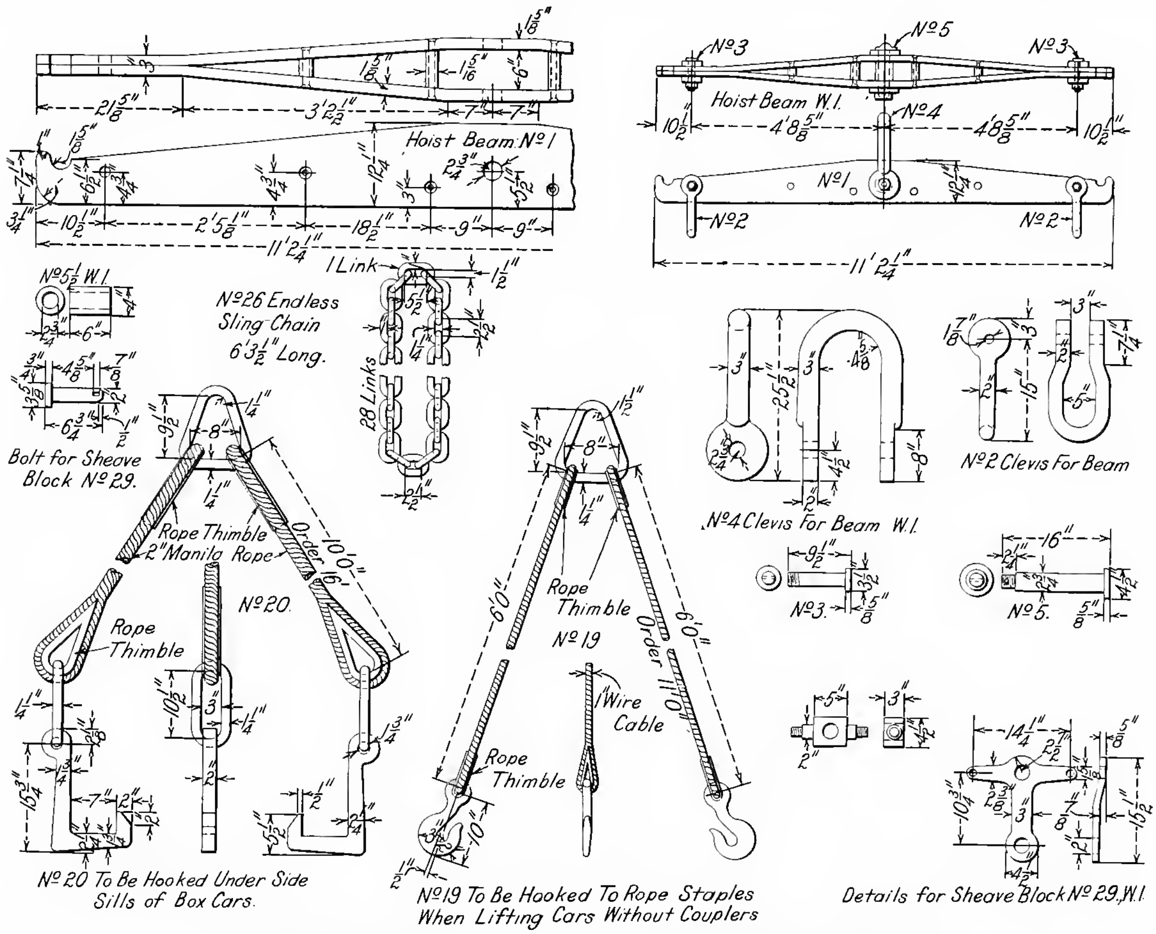


Fig. 2662—Chicago, Burlington & Quincy Wreck Train Tools.

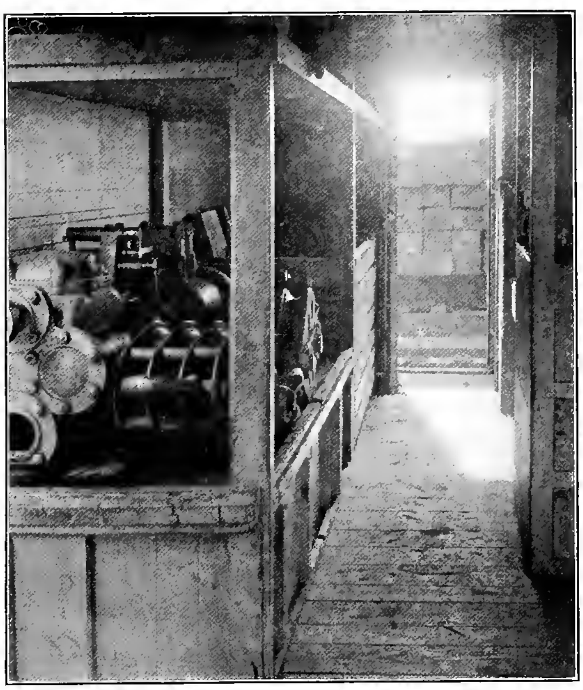


Fig. 2663—Interior of Southern Pacific Tool Car. The Pump is Used for Transferring Oil from Wrecked Tank Cars.

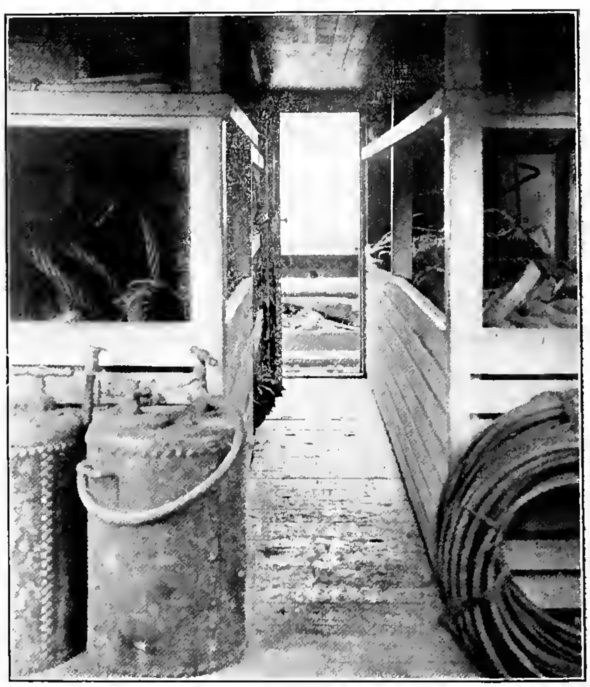


Fig. 2664—Interior of Southern Pacific Tool Car, Showing Portable Lights and Bins for Cable Storage.

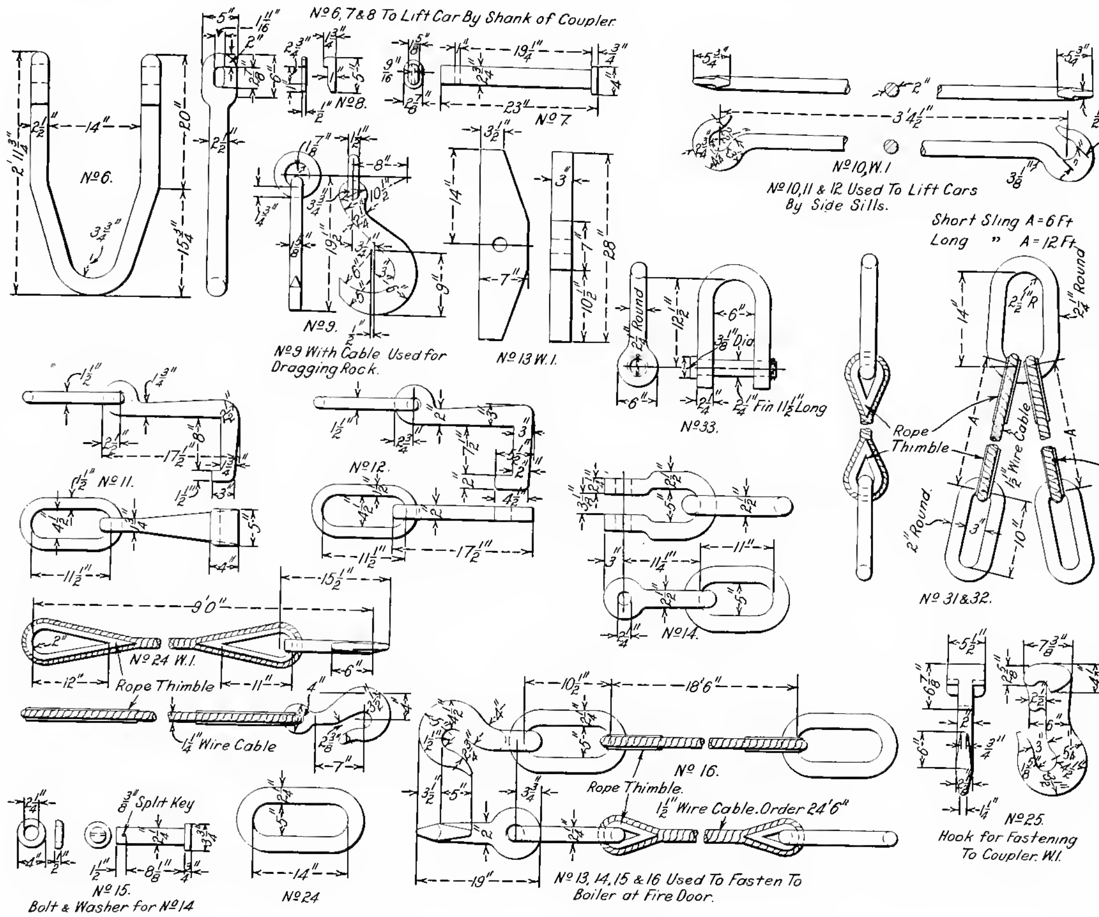


Fig. 2665—Chicago, Burlington & Quincy Wreck Train Tools.

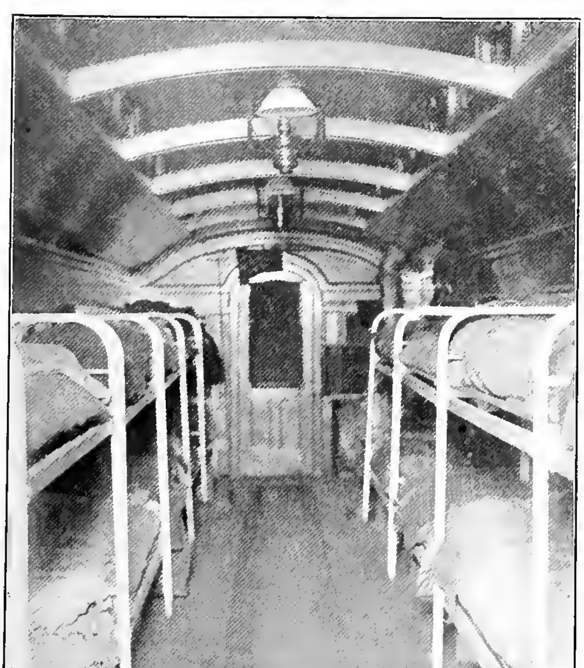


Fig. 2666—Interior of Chicago, Burlington & Quincy Sleeping Car.

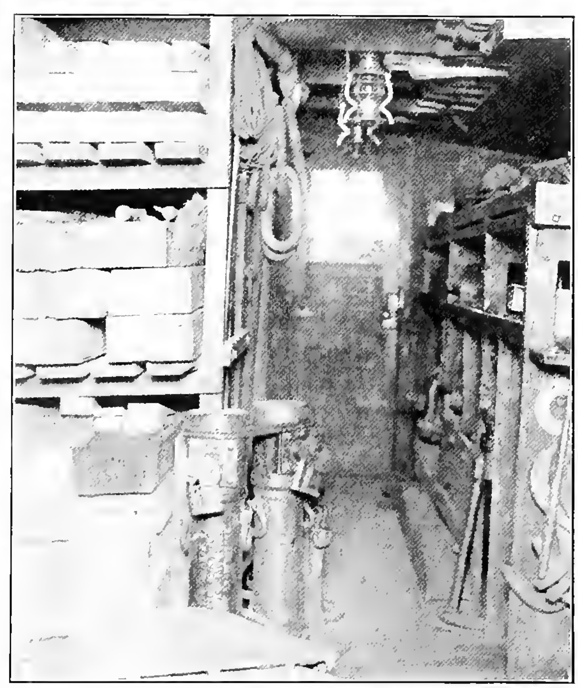


Fig. 2667—Interior of Chicago, Burlington & Quincy Tool Car, Showing Arrangement of Blocking.

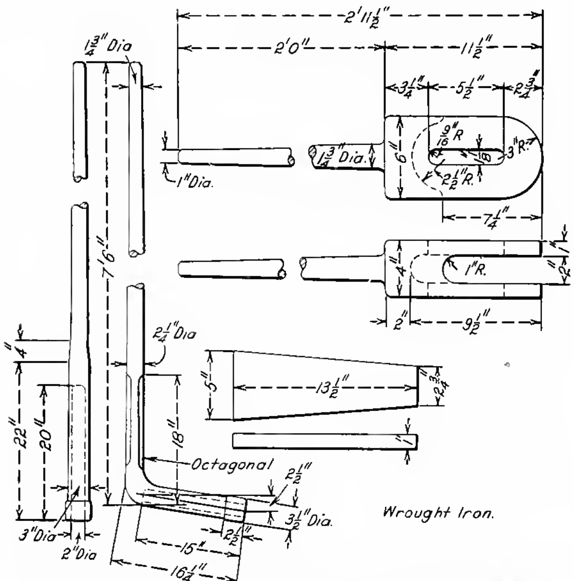
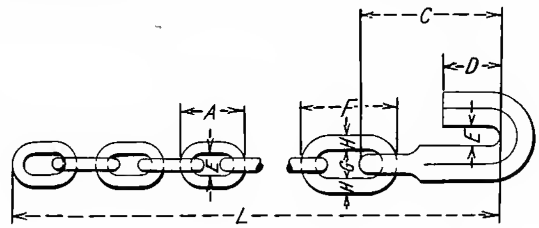
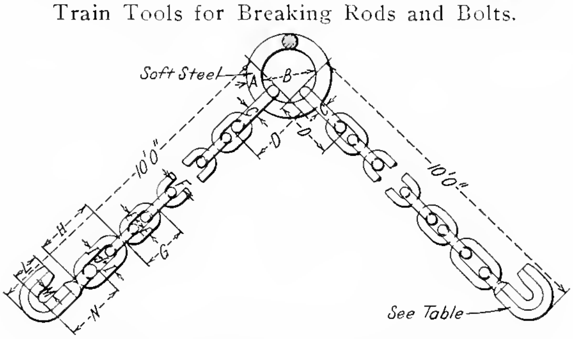


Fig. 2668—Chicago, Burlington & Quincy Wreck Train Tools for Breaking Rods and Bolts.

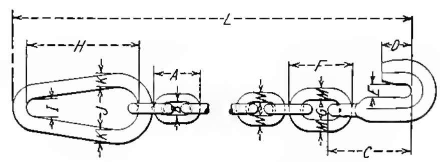


H	No. In Service	Iron Size	Iron Length L	A	B	C	D	E	F	G	Hook Size
		Sling Chains Table of Dimensions									
5/8"	8	1/2"	7'0"	2 3/4	7/8"	6"	2 1/2"	5/8"	4"	1 1/4"	1" □ Iron
3/4"	15	5/8"	7'0"	3 1/2"	1"	6"	2 1/4"	3/4"	4 1/2"	1 1/4"	1 1/4" □ Iron
7/8"	8	3/4"	7'0"	4"	1"	7 1/2"	3"	7/8"	6"	1 3/4"	1 1/2" □ Iron
1"	4	7/8"	7'0"	4"	1 1/4"	8"	3 1/2"	1"	6"	1 3/4"	1 3/4" □ Iron
1 1/4"	4	1 1/8"	10'0"	5"	1 3/8"	8 1/2"	3 1/2"	1 1/8"	6 1/2"	2"	2" □ Iron
1 3/8"	4	1 1/4"	10'0"	5 1/2"	1 1/2"	9"	4"	1 1/4"	7"	2"	2 1/4" □ Iron

Fig. 2669—Dimensions of Southern Railway Wreck Chains.



Ring	Hook	A	B	C	D	E	F	G	H	I	J	K	L	M	N
O.S.D. 13"	2 1/2" □	2 1/2"	8"	1 1/2"	9 1/2"	1 1/4"	1 1/2"	6 1/4"	9"	1 1/2"	2"	1 5/8"	5"	1 3/8"	11"
" " " 15 1/2"	2 5/8" □	2 3/4"	10"	1 3/4"	10 1/4"	1 1/2"	2"	7 3/4"	10"	1 3/4"	2 1/4"	1 7/8"	5"	1 5/8"	11"
" " " 16"	2 3/4" □	3"	10"	2"	11"	1 5/8"	2 1/4"	8 1/2"	10 1/2"	2"	2 1/2"	2 1/4"	5 1/2"	1 3/4"	11 1/2"



No. of Chains In Service	Kind of Chains		A	B	C	D	E	F	G	H	I	J	K	L	Size M	Size N	Hook Size
	Wrecking Chains																
10	Common		4 1/2"	1 1/4"	8"	3 1/2"	1 1/8"	6"	2"	10 1/2"	2"	4"	1 1/4"	16'-0"	1"	7/8"	1 3/4" □ Iron
4		Special	5 1/2"	1 1/2"	10"	4 1/2"	1 1/4"	8"	2 1/4"	11"	2 1/4"	4"	1 3/8"	22'-0"	1 1/8"	1"	2" □ Iron
6		"	5 3/4"	1 1/2"	10"	5"	1 1/4"	8 1/4"	2 1/4"	11"	2 1/4"	4"	1/2"	22'-0"	1 1/4"	1 1/8"	2 1/8" □ Iron
8		"	6"	1 3/4"	10 1/2"	5"	1 3/8"	8 1/2"	2 1/4"	11"	3"	4 1/2"	1 3/4"	24'-0"	1 3/8"	1 1/4"	2 1/4" □ Iron
		"	7"	2"	11 1/2"	6"	1 3/4"	9"	2 1/2"	12"	3 1/4"	5 1/2"	2"	20'-0"	1 5/8"	1 1/2"	2 3/4" □ Iron

Fig. 2670—Dimensions of Southern Railway Wreck Chains.

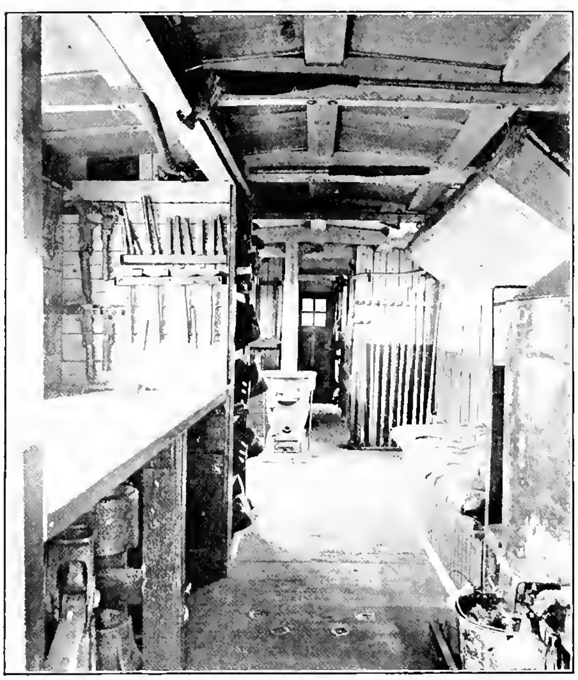


Fig. 2671—Interior of Lake Shore & Michigan Southern Tool Car.

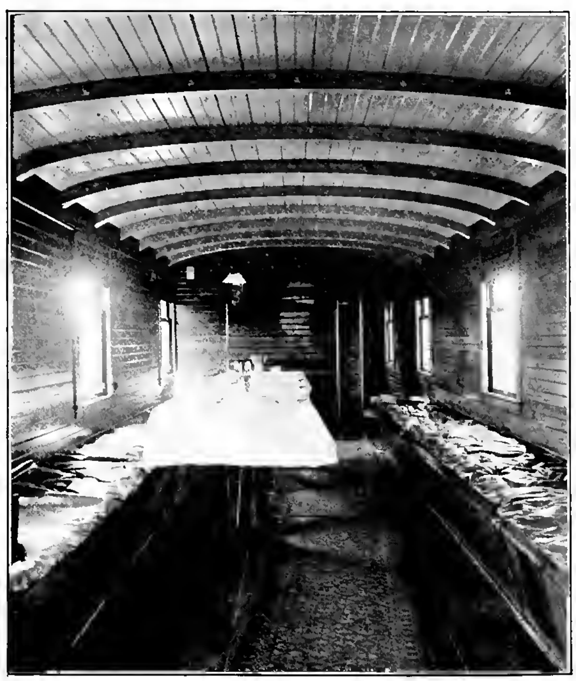


Fig. 2672—Interior of Lake Shore & Michigan Southern Dining and Sleeping Car.

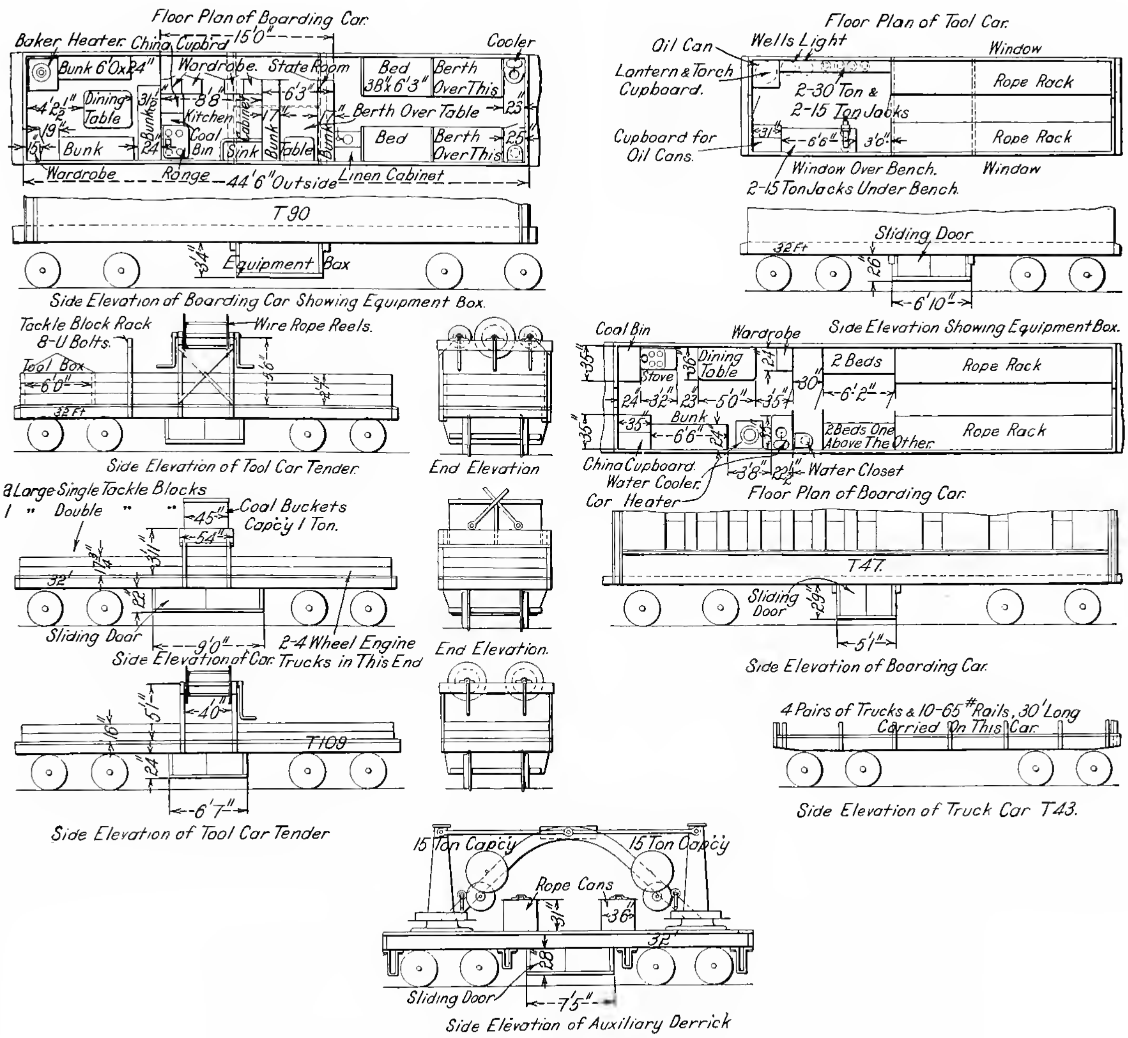


Fig. 2673—Southern Railway Wreck Train Cars.

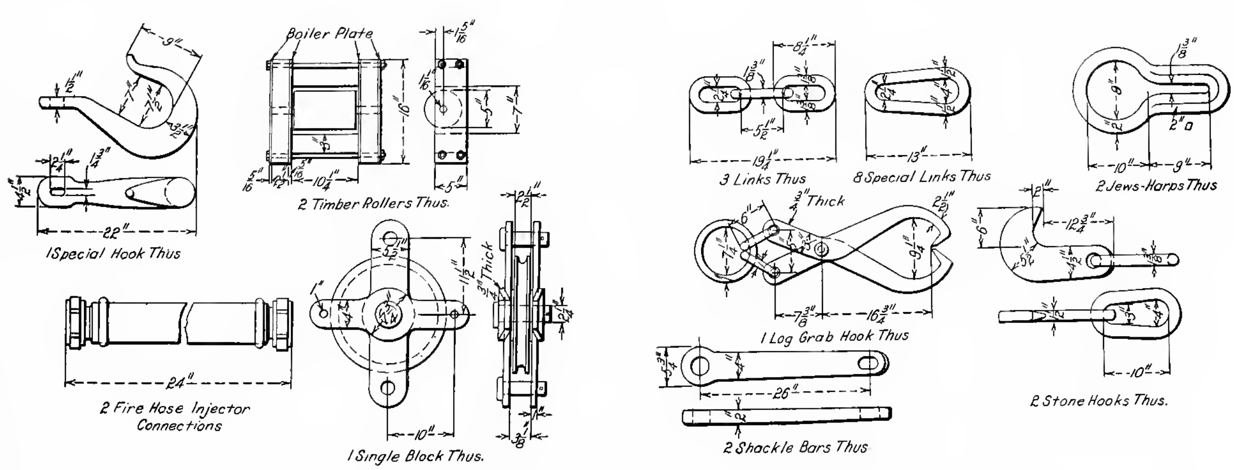


Fig. 2674—Southern Railway Wreck Train Tools.

Cars and Tools Used in Baltimore & Ohio Wreck Trains.

Office and Dining Car.

2 Childs Fire Extinguishers
4 Axes
3 Hand Saws
1 Sealing Iron and Supply of Seals
2 Each, Red, White and Green Flags
2 Markers
2 Red and 4 White Lanterns
15 Fusees
24 Torpedoes
1 Carpenter's Ratchet Brace
6 Assorted Ratchet Bits
4 Augers
1 Screw Driver
2 18 in. Pipe Wrenches
1 24 in. Pipe Wrench
2 Soft Hammers
1 Hatchet
1 Foot Adz
3 Pair Lineman's Tapping Clamps
1 Pair Lineman's Pliers
1 Pair Lineman's Pole Climbers
1 Pair Lineman's Comealongs
6 Cold Chisels
6 Hammers
4 14 in. Flat Files
2 14 in. Round Files
1 Limit Gauge
2 Emergency Cases
1 Pipe Cutter
1 Set, Stock, Dies and Taps
2 Wood Chisels
Repair Parts for Steam Crane

Material in Kitchen and Rope Car.

3 Childs Fire Extinguishers
8 Fire Buckets
1,000 ft. 3½ in. Manila Rope
500 ft. 2 in. Manila Rope
2 12 in. Pennants
2 10 in. Pennants
2 3 in. Block and Falls
2 1½ in. Wire Slings
2 1½ in. Wire Rope Lifts
1 300 ft. 1⅛ in. Wire Rope Boom Hoist
1 300 ft. 1⅛ in. Wire Rope Main Hoist
2 150 ft. 1⅛ in. Wire Rope Auxiliary Hoists
4 35-Ton Jacks
2 60-Ton Jacks
2 25-Ton Norton Jacks
2 15-Ton Norton Jacks
4 35-Ton Barrett Jacks
2 25-Ton Barrett Jacks
4 15-Ton Pearson Jacks
2 Canvas Covers
1 Vise
16 Sockets for Wire Rope
20 lbs. Babbitt Metal
1 Cross Cut Saw
1 Track Gauge
1 Axle Gauge
6 Air Hose
3 Signal Hose
1 Air Hose, 50 ft. Long
2 Syphon Hose
2 10 ft. Slings
12 Wire Rope Clamps

Material in Tool Car.

2 Buckeye Lights
24 1 Gal. Torches
5 3 Gal. Oil Cans, Filled
2 Burgess Rail Clamps
4 Double Blocks
4 Snatch Blocks
14 Grain Baskets
1 Telegraph Office Table and Stationery
1 Forge
10 Pairs Car Replacers
2 9 in. Screw Jacks
6 Iron Jack Levers
6 Wooden Jack Levers
6 Sledge Hammers
6 Chisel Bars
12 Drift Pins
2 Sets Iron Wrenches, ¼ in. to 4 in.
3 3 in. Link Chains
6 1 in. Link Chains
3 Wheel Clamps, E. J. Napier. (Patented)
3 Emergency Knuckles
1 Childs Fire Extinguisher
100 Assorted Nuts
100 Assorted Blocks and Wedges
6 Spiking Hammers
6 Claw Bars
2 Stretchers
12 Rail Cutters
8 Lining Bars
12 Tamping Picks
12 Squeeze Joint Shovels
12 Scoop Shovels
6 Track Wrenches
2 Track Gauges
2 Coils Telegraph Wire
150 Grain Bags
4 Wire Cables 1⅛ in. by 125 ft.
20 lbs. Cotton Waste
20 lbs. Wool Waste, Saturated
4 Fire Hooks
1 Ratchet and Grab
1 34 in. Tire Expander
1 36 in. Tire Expander
1 42 in. Tire Expander
1 50 in. Tire Expander
1 52 in. Tire Expander
1 60 in. Tire Expander
1 64 in. Tire Expander

Material in Rail and Tie Car.

10 80 lb. Rails
2 Switch Points
7 100 lb. Rails
50 Cross Ties
5 Kegs Track Spikes
2 Kegs Track Bolts
12 Sets Angle Iron Bars
12 Car Chains
50 ft. 1 in. Chain
4 Switch Ropes
1 Fire Box Toggle
2 Pulling Toggles
1 1½ in. Wire Lifting Rope
1 2 in. Wire Lifting Rope
4 Journal Boxes
4 Caboose Pedestals
4 Caboose Springs
20 Assorted Knuckles
3 Iron Slabs
3 Push Poles
1 Goose Neck Coupler
1 Gasoline Tank

Material in Truck Car.

2 Steel Trucks
1 Wooden Truck
1 Hoisting Beam
75 ft. 1¼ in. Chain
100 ft. ⅜ in. Chain
2 1½ in. Wire Slings
2 2 in. Wire Slings
6 Lifting Hooks
2 Turning Hooks
4 Truck Chains
25 Wooden Wedges
1 1,000 gal. Capacity Water Tank

1 Steam Wreck Crane.

Cars and Tools Used in New York Central & Hudson River Wreck Trains.

1	120 Tons Capacity Steam Self Propelling Wreck Crane
1	Steel Boom Car
2	Steel Truck Cars
1	Blocking Car
1	Tool Car
1	Dining Car
4	Wood Axes
2	2 in. Chains, 25 ft. Long
2	1¾ in. Chains, 15 ft. Long
2	1½ in. Chains, 15 ft. Long
3	1¼ in. Chains, 10 ft. Long with Hook in One end to Catch End Sill
3	1¼ in. Chains, 11 ft. Long, Used as Reach Chains.
25	⅞ in. Chains, 16 ft. Long
10	⅞ in. Chains, 15 ft. Long
5	⅞ in. Chains, 10 ft. Long
2	1 in. Chains, 10 ft. Long, Link in Center
2	1 in. Chains, 8 ft. Long, with Hook on Each End.
1	1 in. Chain, 25 ft. Long
1	1 in. Chain, 20 ft. Long
2	1 in. Chains, 10 ft. Long
1	1 in. Chain, 15 ft. Long
2	1½ in. Chains, 25 ft. Long
1	Bumper Chain, 1 in., 8 ft. Long
1	Grab Links for 1 in. Chain
2	Grab Links for 1¼ in. Chain
2	Grab Links for 1½ in. Chain
2	Grab Links for 1¾ in. Chain
2	Grab Links for 2 in. Chain
1	Hand Saw
2	Cross Cut Saws
4	16 in. Wrenche
2	24 in. Wrenches
2	No. 3 Alligator Wrenches
2	No. 4 Alligator Wrenches
1	24 in. Pipe Wrench
1	Pipe Cutter
6	Track Wrenches
2	½ in. Wrenches
3	¾ in. Wrenches
4	1 in. Wrenches
6	No. 4 Scoops
4	Dirt Shovels
4	Picks
5	Rail Tongues
2	Track Gauges
1	Wheel Gauge
1	Coupler Gauge
5	Water Pails
1	Water Cooler
12	Bushel Baskets
4	Kerosene Hand Torches
4	Pike Poles, 20 ft. Long
2	10 ft. Ladders
2	20 ft. Ladders
4	Pairs of Car Replacers
7	Iron Wedges
3	Emergency Knuckles.
3	Gould Knuckles.
3	Chicago Knuckles
3	Janney Knuckles
2	Hand Pumps
1	Hand Pump for Fighting Fire.
3	Fire Extinguishers
3	Stretchers
2	Wells Lights
1	Milburn Light, No. 3-W, 5,000 Candle Power.
3	Hand Hammers
6	7 lb. Sledges
3	8 lb. Sledges
2	Car Hammers
7	Track Bars
2	Pinch Bars
5	1 in. Cutting Bars
6	1 in. Cold Chisels
4	1 in. Hand Punches
4	1½ in. Hand Punches
4	Track Chisels
3	Track Spike Mauls
8	Air Hose
11	Key Center Pins
11	2 in. Head Center Pins
12	Knuckle Pins
2	Car Horses
2	Wheel Slides
1	Balance Beam with Cables and Hooks for Handling Pullman Cars and Coaches
100	Wooden Wedges
50	2 in. Planks, 24 in. Long
50	3 in. Planks, 24 in. Long
50	1 in. Planks, 24 in. Long
50	Pieces of Timber, 6 in. by 12 in., to 24 in. Long
50	Pieces of Timber, 6 in. by 12 in., to 36 in. Long
25	Pieces of Timber, 6 in. by 12 in., to 8 ft. Long
1	Set of Blocks for 1 in. Rope; and 200 ft. of Rope
1	Set of Blocks for ¾ in. Rope; and 150 ft. of Rope
1	Set of Blocks for 1½ in. Rope; and 1,000 ft. of Rope
500	ft. of 1 in. Rope
3	3 in. Drag Ropes, 80 ft. Long
2	1 in. Wire Drag Ropes, 25 ft. Long
1	1 in. Wire Drag Rope, 20 ft. Long
2	Engine Hooks and Chains
1	1 in. Hand Line, 70 ft. Long
2	1 in. Hand Lines, 50 ft. Long
5	1½ in. Slings, 7 ft. Long
2	Hand Lanterns, White
2	Hand Lanterns, Red
2	Hand Lanterns, Blue
2	Dietz Hand Lanterns
3	5 gallon Oil Cans
3	3 gallon Oil Cans
1	Pair of Timber Hooks
3	Draw Bars
2	Hydraulic Jacks, 30 tons Capacity
2	Hydraulic Jacks, 25 tons Capacity
3	Hydraulic Jacks, 20 tons Capacity
2	Hydraulic Jacks, 10 tons Capacity
2	Ballbearing Norton Jacks, 30 tons Capacity
2	24 in. Screw Jacks
2	36 in. Screw Jacks
2	Tarpaulins, 20 by 30 ft., Canvas
1	Set of Telegraph Instruments
1	Telephone
12	Brasses, 4¼ in. by 8 in.
8	Brasses, 5 in. by 9 in.
5	Brasses, 5½ in. by 10 in.
10	Pairs of Rubber Boots
10	Pairs of Rubber Gloves
1	Cannon to Blow Out Engine Pins, etc.
30	60,000 lbs. Capacity Wrecking Trucks
15	80,000 lbs. Capacity Wrecking Trucks
10	100,000 lbs. Capacity Wrecking Trucks
1	Engine Truck
1	Tank Truck
1	Burgess Rail Anchor
1	Burgess Emergency Knuckle
2	Rail Clamps
12	T Rails for Main Line
1	Keg of Spikes
2	Switch Points
1	Keg of Track Bolts
2	Switch Stands

Cars and Tools Used in Northern Pacific Wreck Trains.

Tools in Tool Car.

2 40-Ton Hydraulic Jacks with Levers
2 30-Ton Norton Jacks with Levers
2 Foot Lifts for Hydraulic Jacks
4 12 in. Pony Jacks
600 ft. in. Rope
600 ft. 2 in Rope
300 ft. 1½ in. Rope
300 ft. 1¼ in. Rope
300 ft. 1 in. Rope
2 Pieces 1¼ in. Rope, 100 ft. Long
1 Piece 3 in. Rope, 300 ft. Long, for Rolling Line
1 Complete Set of Splicing Tools
2 2½ in. Rope Slings, 50 ft. Long
2 Wire Cables, 1½ in. diameter, 60 ft. Long, with Heavy Links at Each End
1 3-Sheave Tackle Block for 3 in. Rope
1 2-Sheave Tackle Block for 3 in. Rope with Becket
1 3-Sheave Tackle Block for 2 in. Rope
1 2-Sheave Tackle Block for 2 in. Rope with Becket
2 2-Sheave Tackle Blocks for 1¼ in. Rope, One with Becket
2 2-Sheave Tackle Blocks for 1 in. Rope, One with Becket
2 3½ in. Iron Snatch Blocks
2 2½ in. Iron Snatch Blocks
2 1½ in. Iron Snatch Blocks
1 1¼ in. Iron Snatch Block
1 1 in. Iron Snatch Blocks
2 1¼ in. Chains, 25 ft. Long, with Ring in Center and Grabs at Both Ends
2 ¾ in. Chains, 30 ft. Long, with Ring in Center and Grabs at Both Ends
1 ⅝ in. Chain, with Ring in Center and 4 Ends with Hooks
6 ½ in. Chains, 4 to 6 ft. Long, Ring at One End, Hooks at Other End
6 1¼ in. Switch Chains, 16 ft. Long
20 ⅞ in. Switch Chains, 16 ft. Long
2 Coupling bars
12 Coupling Links
24 Knuckle Pins, Assorted Sizes
4 Clevises, 1½ in., with 3½ in. Jaws
2 Links, with Thimbles for Rope
6 S Hooks, 2 in. to 3 in. in diameter
2 Wells-Buckeye Lights No. 5
2 Extra Burners for Wells-Buckeye Lights
1 Tent for Field Telegraph Service
1 Complete Telegrapher's Outfit
1 Portable Telephone, Complete with All Attachments
3 5 gallon Cans of Headlight Oil.
2 3 gallon Cans of Car Oil
3 Buckets of Prepared Packing for Journal Boxes
3 Packing Irons
3 Packing Hooks
2 Small Squirt Cans
1 Small Funnel
1 5 gallon Can of Wood Alcohol for Hydraulic Jacks
12 Hand Torches
4 White Lanterns
4 Red Lanterns
6 White Globes, Extra
4 Red Globes, Extra
2 Blue Globes, Extra
6 1¼ in. Air Brake Hose

2 Dummy Hose
2 Signal Hose
6 Pairs Rubber Boots
6 Cant Hooks
2 Cutting Bars, 4 ft. Long
3 Axes
4 Axe Handles
1 Hand Axe
2 Carpenter's Foot Adzes
1 5 ft. Cross Cut Saw
2 30 in. Hand Saws
12 Scoop Shovels
6 No. 2 Track Shovels
2 Long Handled Shovels
4 Picks
4 Extra Pick Handles
4 Spike Mauls
2 Spike Maul Handles
4 Lining Bars
2 Claw Bars
1 Track Level
2 12 lb. Sledges
1 16 lb. Sledge
1 8 lb Sledge
2 3 lb. Hammers
2 2 lb. Hammers
6 Cold Chisels
4 Track Chisels
1 18 in Stilson Wrench
2 18 in. Monkey Wrenches
2 15 in. Comb Wrenches
4 12 in. Monkey Wrenches
15 Assorted Open End Wrenches
1 5 Wheel Pipe Cutter
Assortment of Brasses and Wedges for Cars
2 Center Pin Drifts
2 Cranes at Side Door for Handling Jacks
2 Hand Barrows for Carrying Jacks
2 Fire Extinguishers
2 Fire Axes
200 Grain Sacks
2 Pairs Aldon Car Replacers for 90 lb. Rails
3 Pairs Aldon Car Replacers for Lighter Rails
2 Pairs Alexander Car Replacers for Lighter Rails
2 Iron Wedges, 8 in. Wide, 2 ft. 9 in. long, 5 in thick
1 Track Gauge
4 Track Wrenches
12 Iron Buckets and 12 Iron Baskets for Handling Grain
1 Car Wheel Gauge
1 Box with Assortment of Nails
5 Pipe Rollers, 3 in. by 2 ft. Long
1 Carpenter's Brace
1 ¾ in. Car Bit
1 ⅞ in Car Bit
1 1 in Car Bit
1 2 in. Auger
2 Heavy Iron Dollies
1 Tool Chest for Small Tools
4 Drifts, for ¾ in., ⅞ in., 1 in. and 1¼ in. Bolts
4 Gilman Emergency Knuckles
25 lbs. Nuts and Bolts, Assorted Sizes
200 lbs. Assorted Bolts
2 Tarpaulins, 20 ft. by 40 ft., for Protecting Freight
1 First Aid Medicine Case

Material on Truck Car.

2 80,000 lbs. Capacity Steel Car Trucks
2 60,000 lbs. Capacity Steel Car Trucks
150 Pieces Blocking
25 Oak Wedges
6 30 ft. Cables

2 1½ in. Cable Slings, with Heavy Links at Each End
4 1½ in. Chains, 20 ft. to 30 ft. Long, Rings Each End
4 Kegs Track Spikes in Cellar
30 Pairs Angle Bars
4 Kegs Track Bolts

Material on Tie and Rail Car.

75 Ties
8 85 lb. Rails
8 72 lb. Rails
12 66 lb. Rails

Material in Bunk Car.

10 Bunks
10 Mattresses
Complete Set of Cooking Utensils
1 Steel Kitchen Range
1 Ice Box
1 Stretcher, Complete with Blankets, Pillows, etc.
Complete Set of Porcelain Dishes

1 100 Tons Capacity Steam Wreck Crane.

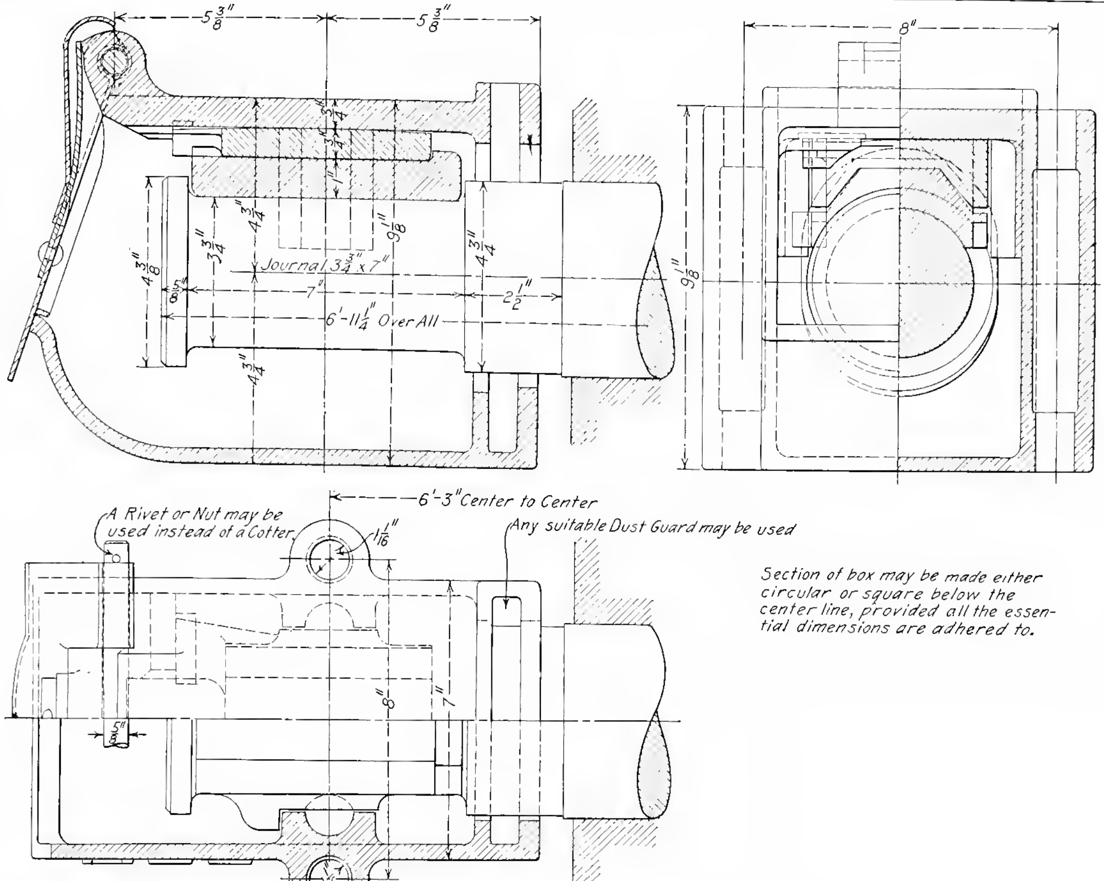
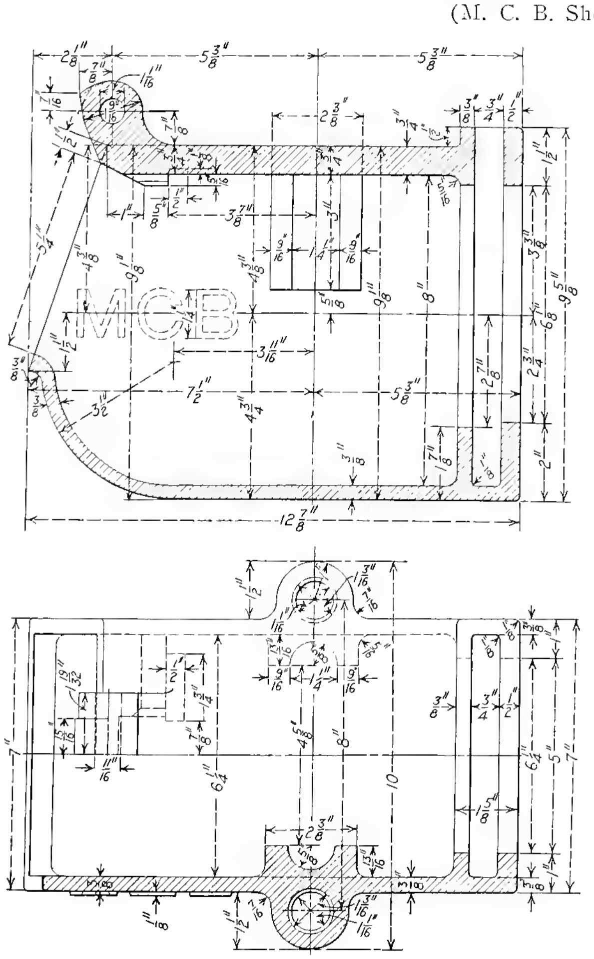
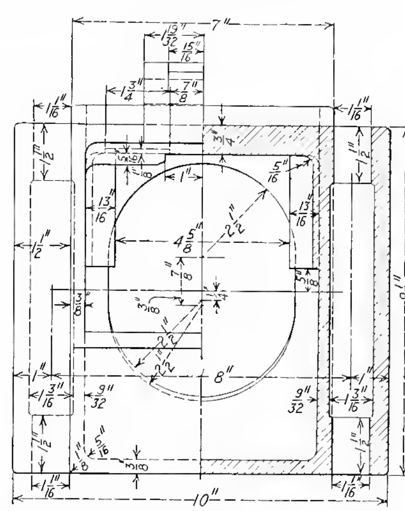


Fig. 2675—M. C. B. Standard Box and Contained Parts for 3¾ in. by 7 in. Freight Car Journal. (M. C. B. Sheet 1.)





Section of box may be made either circular or square below the center line, provided all the essential dimensions are adhered to.

When journal box is made of malleable iron, reduction in thickness of metal and coring to lighten weight is permissible, provided all the essential dimensions which affect interchangeability and the proper fitting of contained parts, are adhered to.

Width of box over all where lid fits should be $7\frac{3}{8}$ inches, in accordance with ballot of 1891, instead of 7 inches, as shown here.

See Plate III B.-Proceedings 1891.

Note:-
If the method of moulding does not permit of placing the letters M.C.B. on the side of the journal box, they may be placed on the top, between the hinge lug and the arch bar seat.

3¾ in. by 7 in. Freight Car Journal. (M. C. B. Sheet 2.)

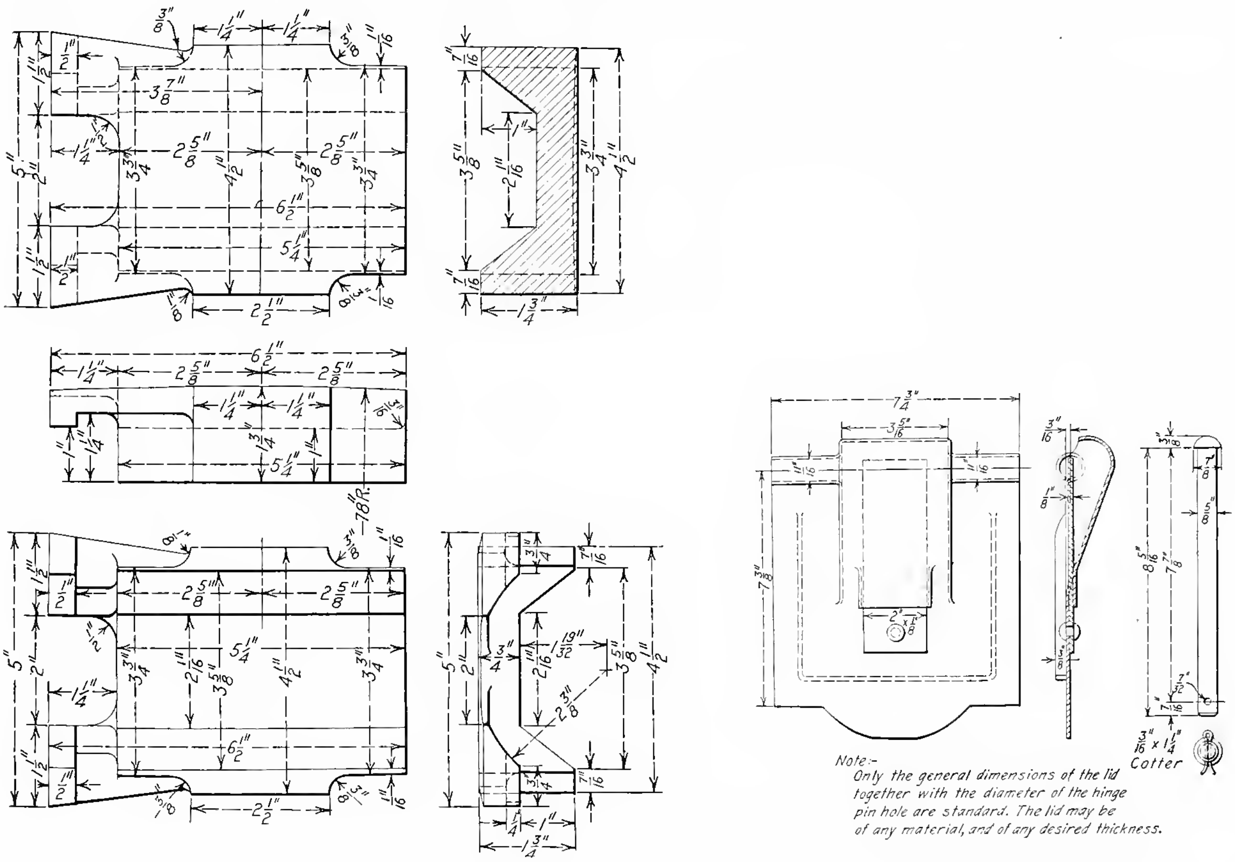


Fig. 2677—M. C. B. Standard Wedge and Journal Box Lid for 3¾ in. by 7 in. Journal. (M. C. B. Sheet 3.)

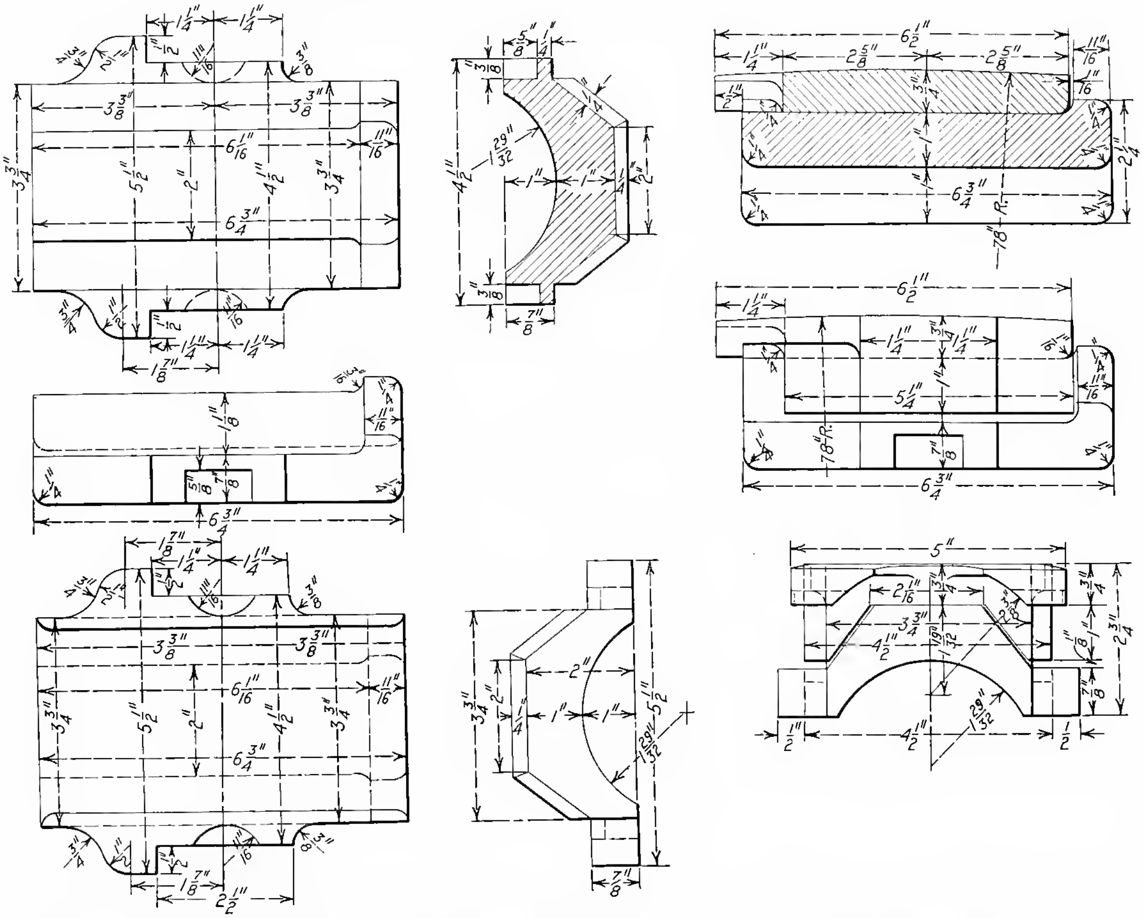


Fig. 2678—M. C. B. Standard Bearing and Wedge for 3¾ in. by 7 in. Journal. (M. C. B. Sheet 3.)

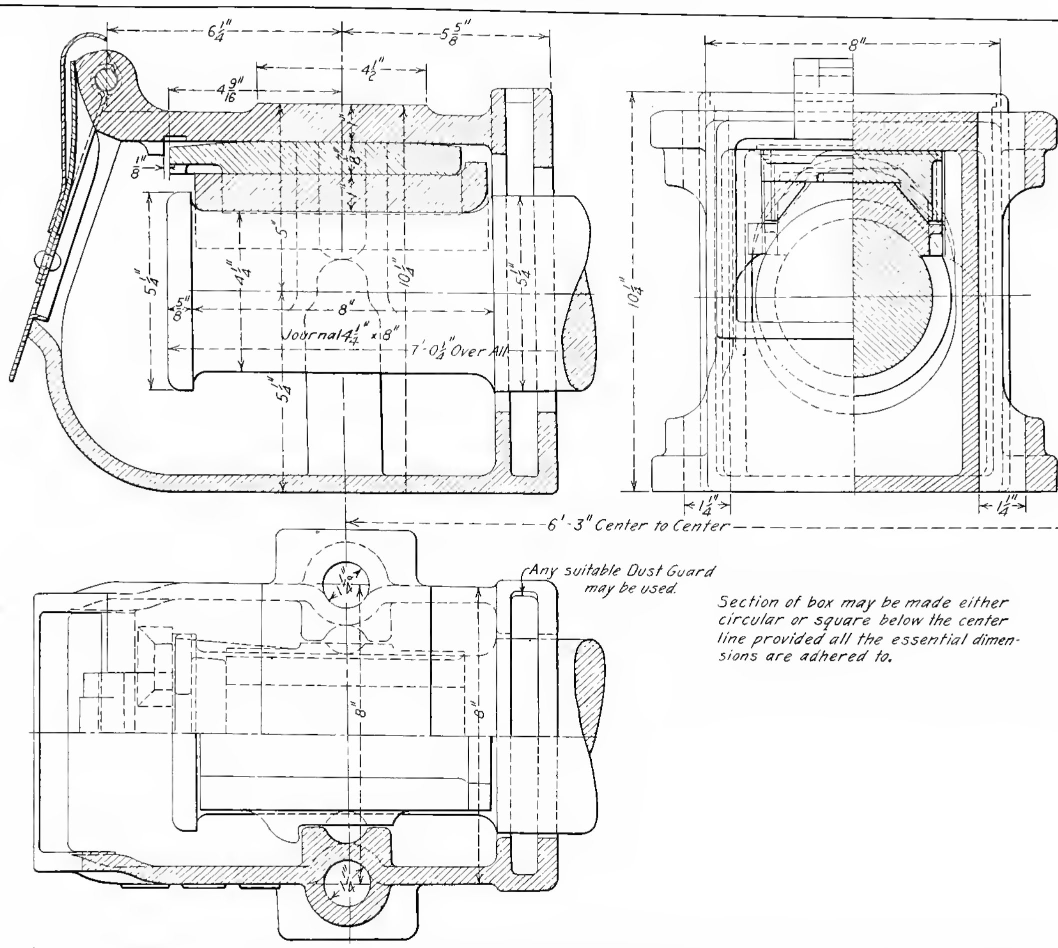
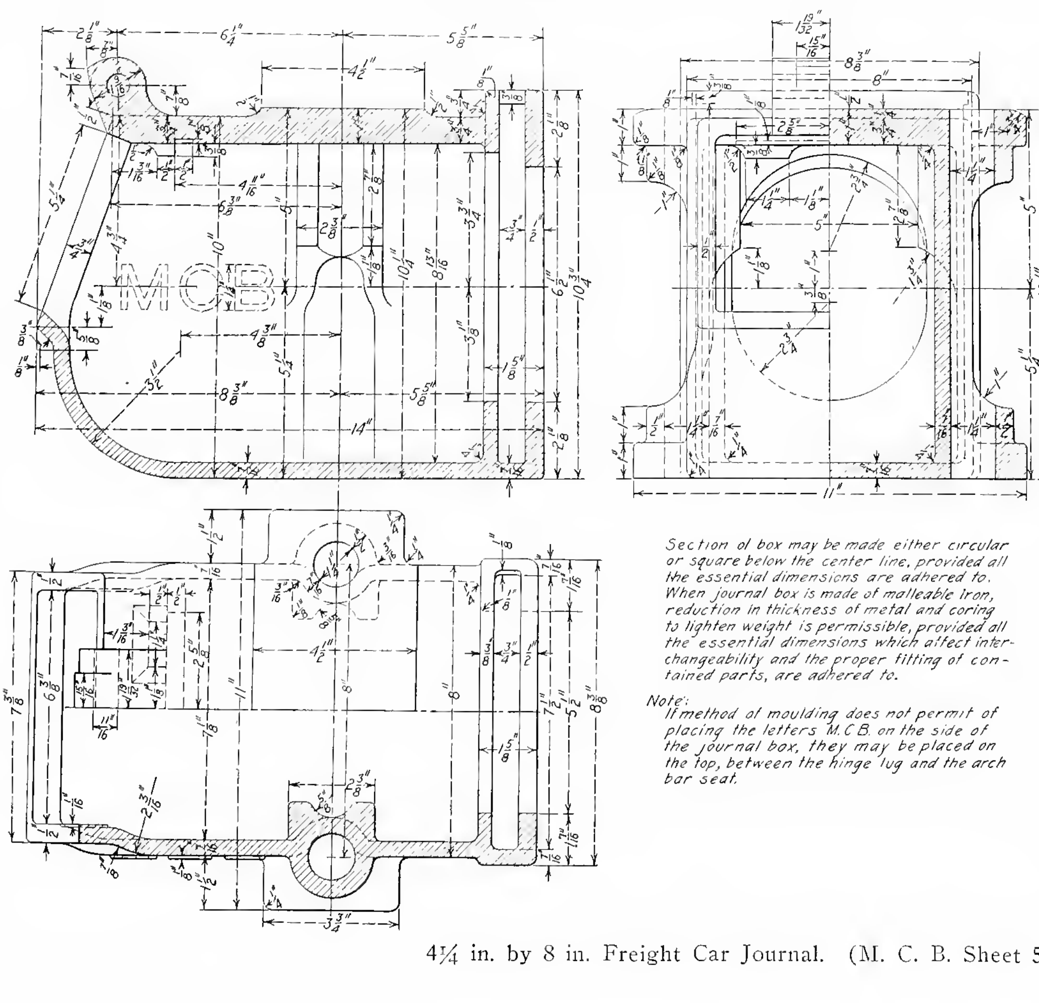


Fig. 2679—M. C. B. Standard Box and Contained Parts for 4¼ in. by 8 in. Freight Car Journal. (M. C. B. Sheet 4.)



4¼ in. by 8 in. Freight Car Journal. (M. C. B. Sheet 5.)

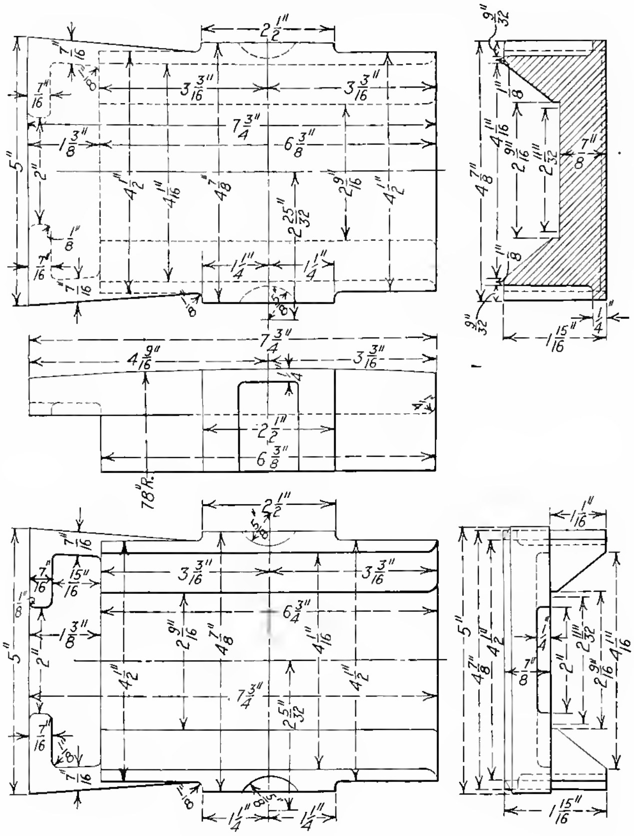


Fig. 2681—M. C. B. Standard Wedge for 4¼ in. by 8 in. Journal. (M. C. B. Sheet 6.)

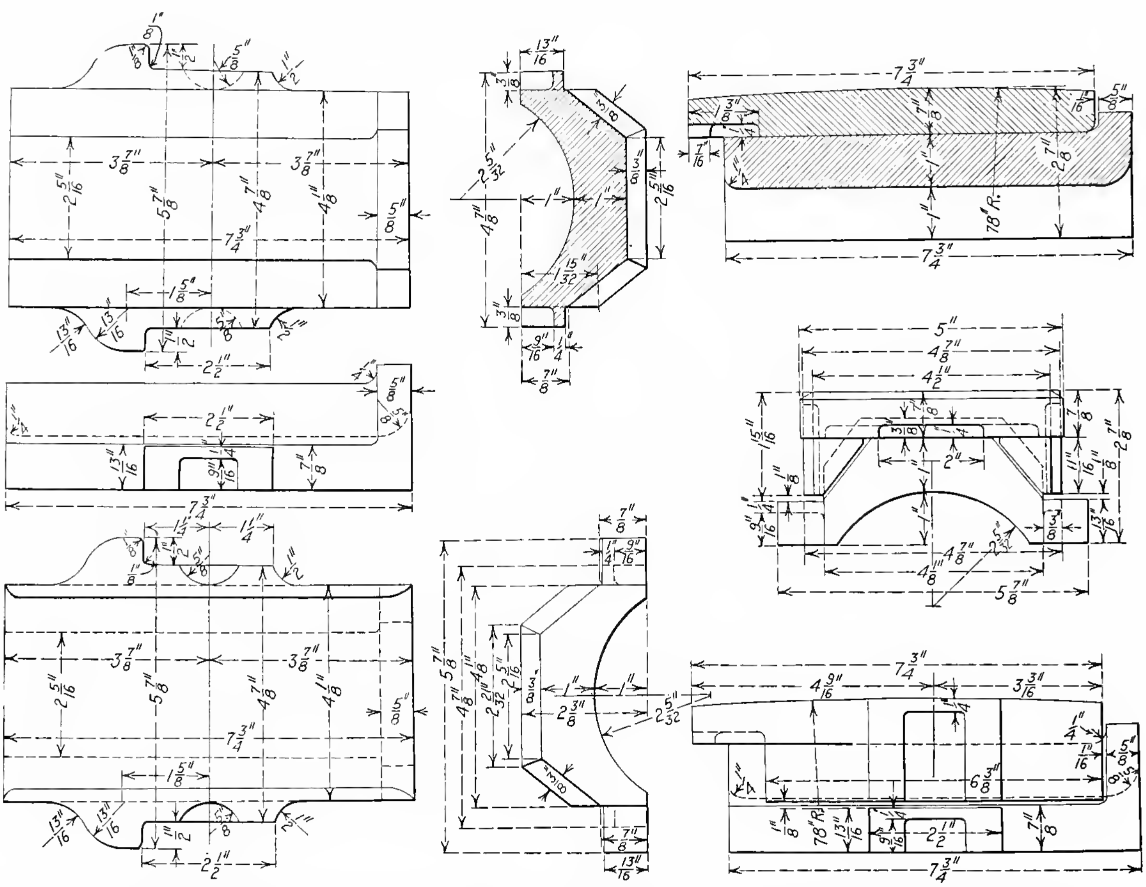


Fig. 2682—M. C. B. Standard Bearing and Wedge for 4¼ in. by 8 in. Journal. (M. C. B. Sheet 6.) The Journal Box Lid for This Size Journal is the Same as That Shown in Fig. 2677.

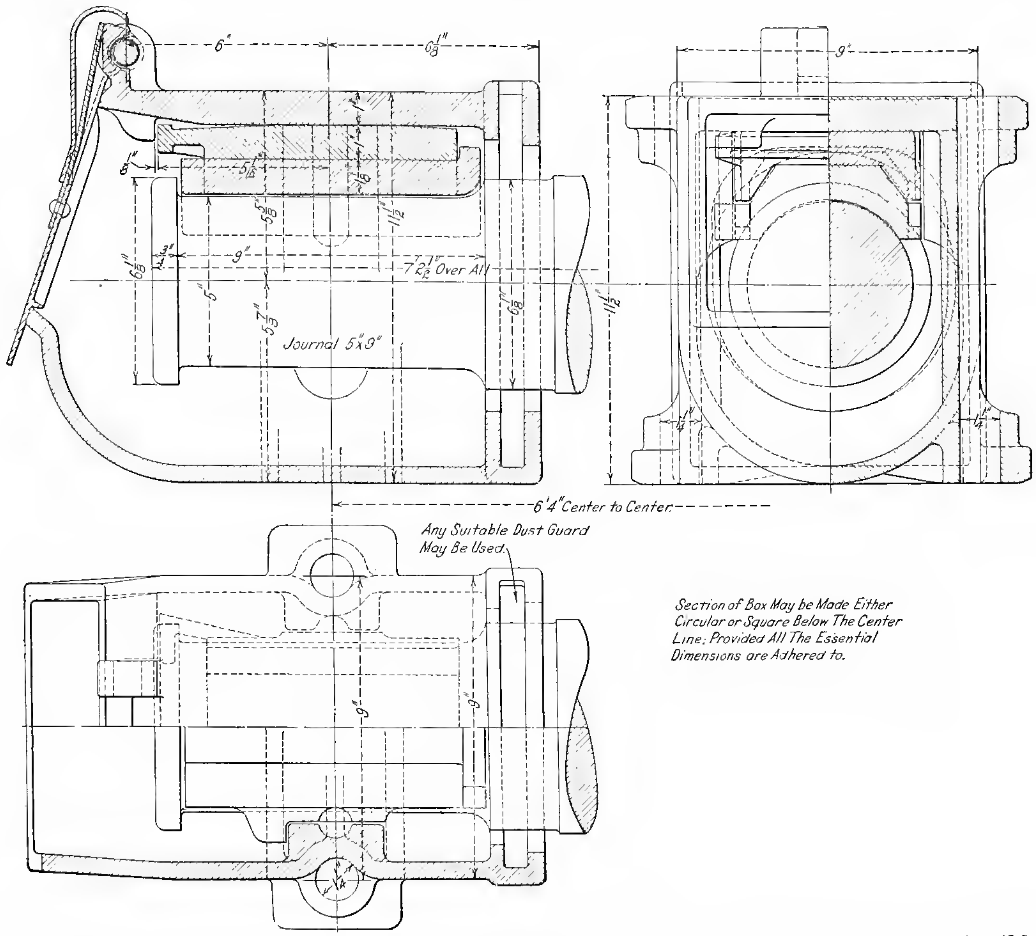
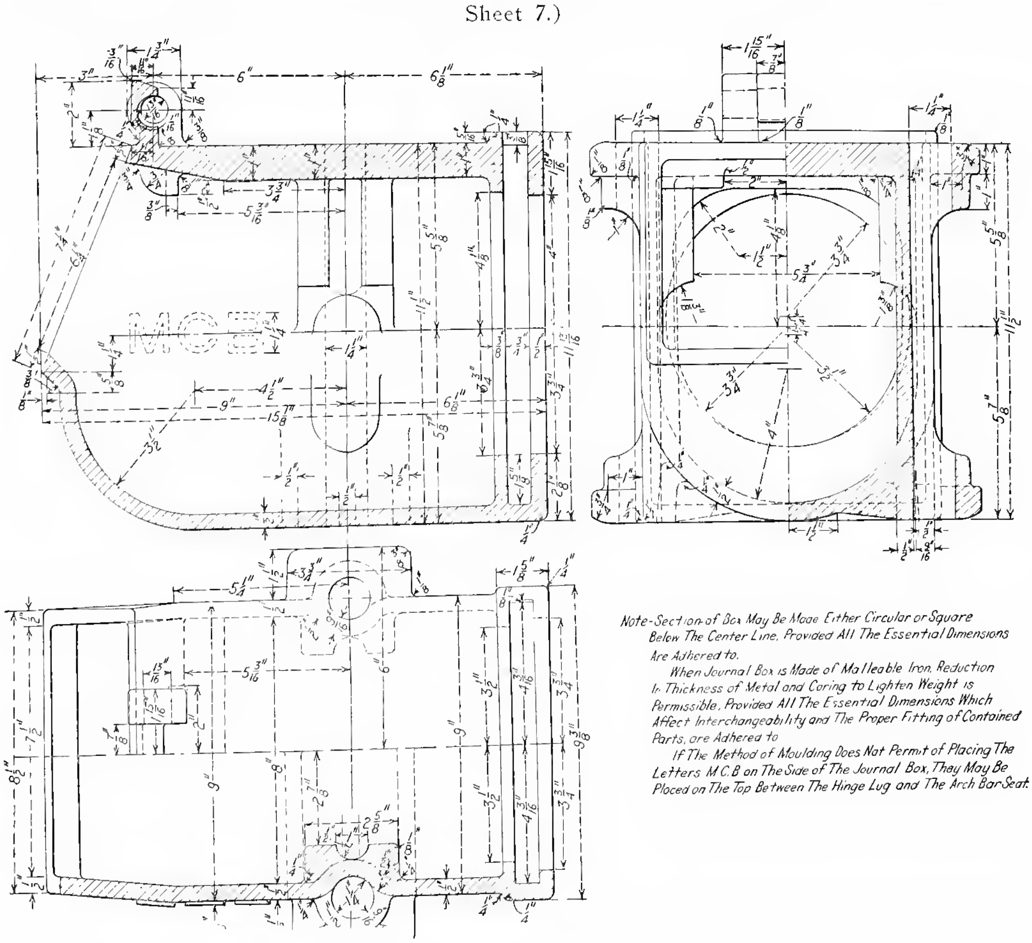


Fig. 2683—M. C. B. Standard Box and Contained Parts for 5 in. by 9 in. Freight Car Journal. (M. C. B. Sheet 7.)



x for 5 in. by 9 in. Freight Car Journal. (M. C. B. Sheet 8.)

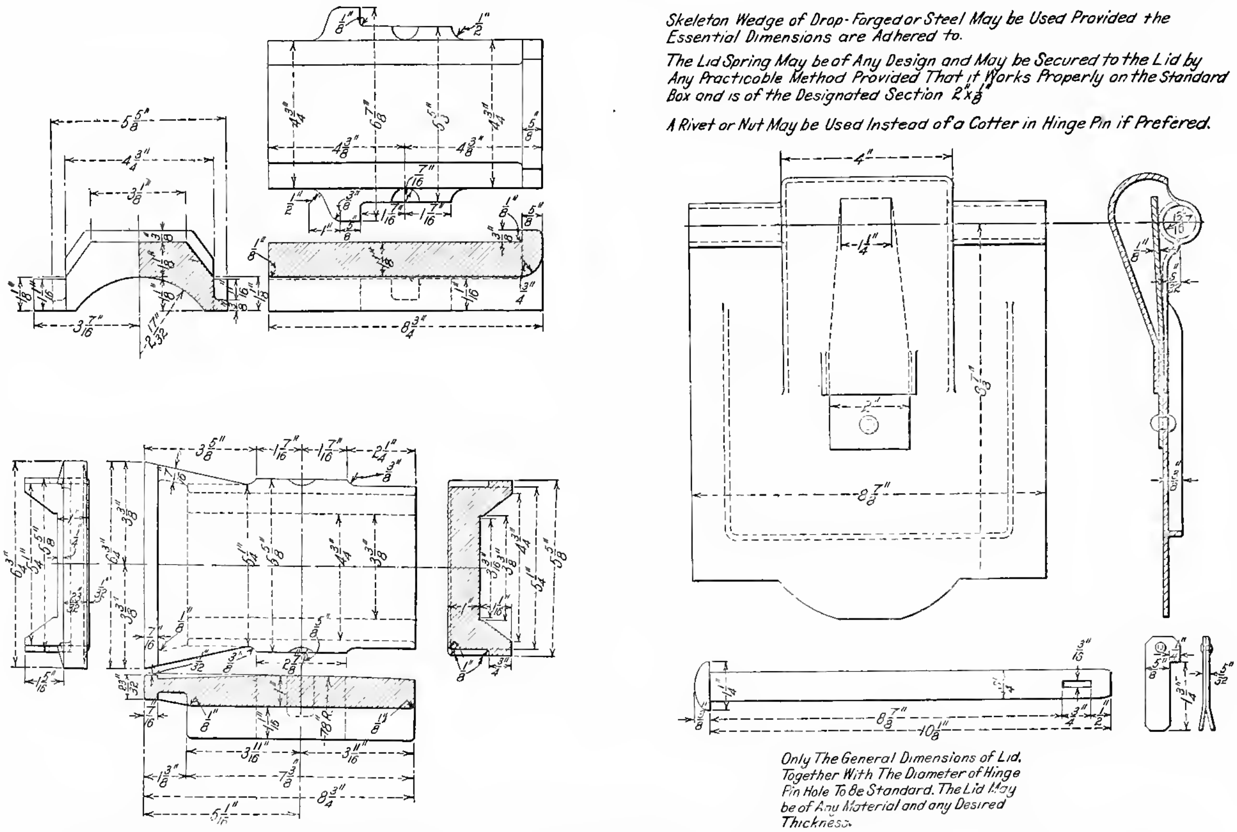


Fig. 2685—M. C. B. Standard Bearing, Wedge and Journal Box Lid for 5 in. by 9 in. Journal. (M. C. B. Sheet 9.)

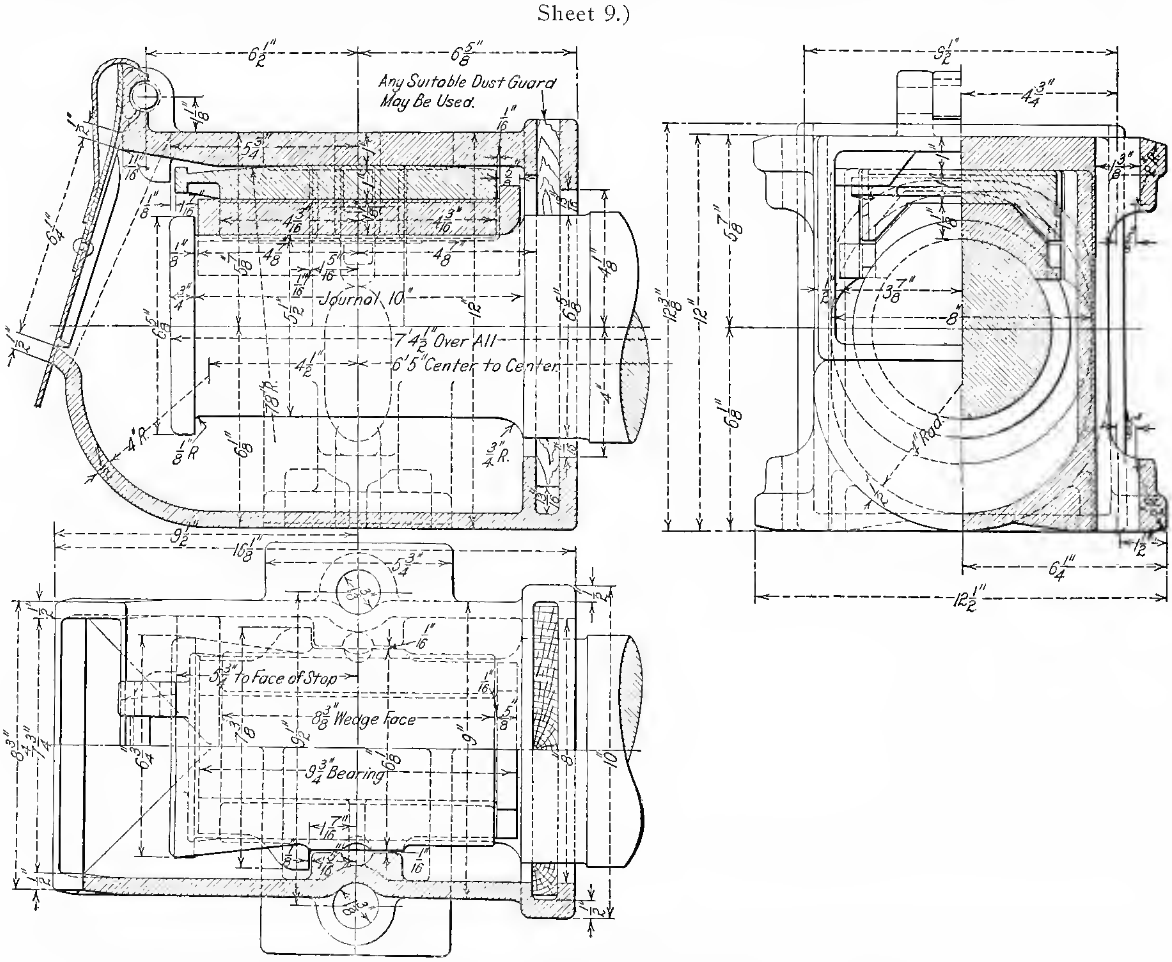


Fig. 2686—M. C. B. Standard Box and Contained Parts for 5½ in. by 10 in. Freight Car Journal. (M. C. B. Sheet 10.)

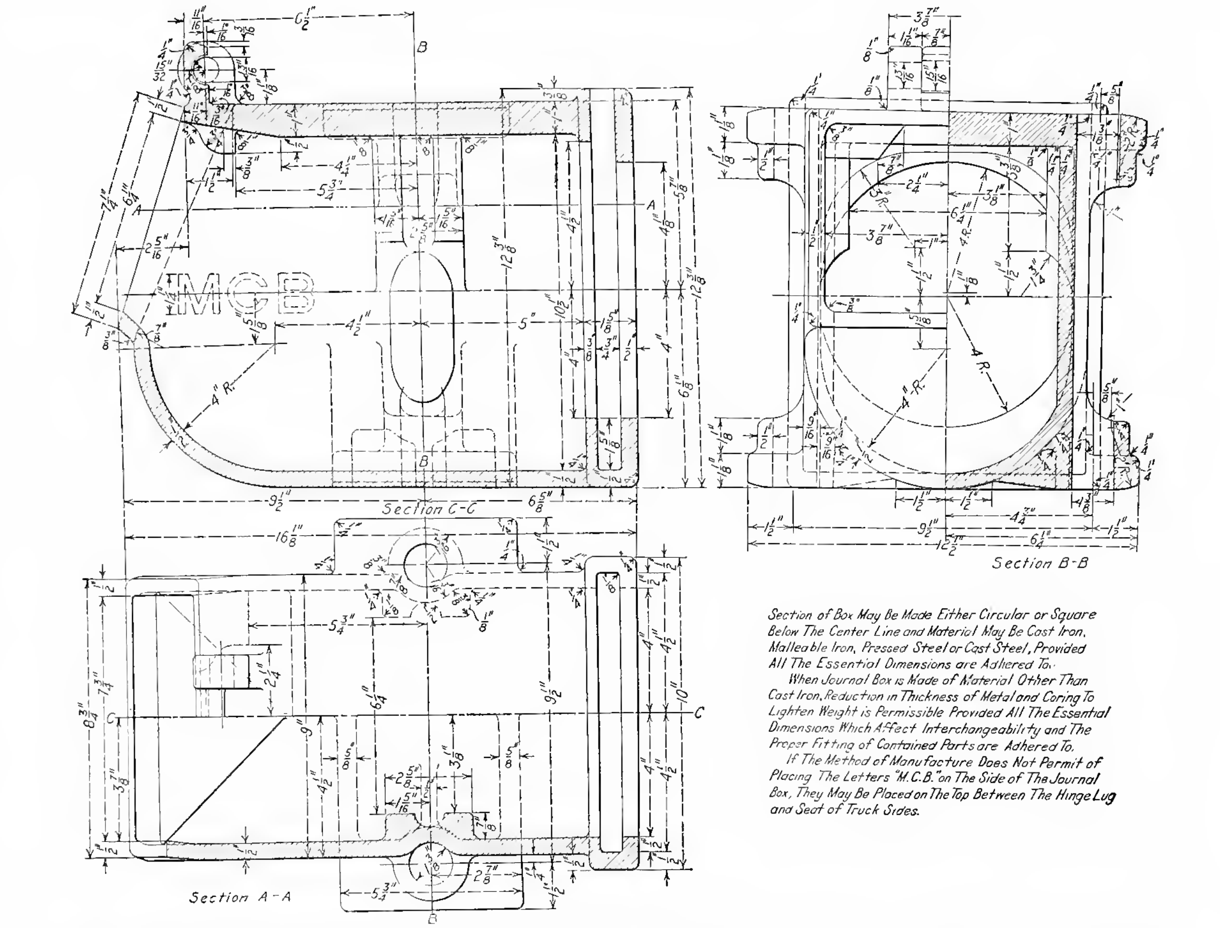


Fig. 2687—M. C. B. Standard Box for 5½ in. by 10 in. Freight Car Journal. (M. C. B. Sheet 11.)

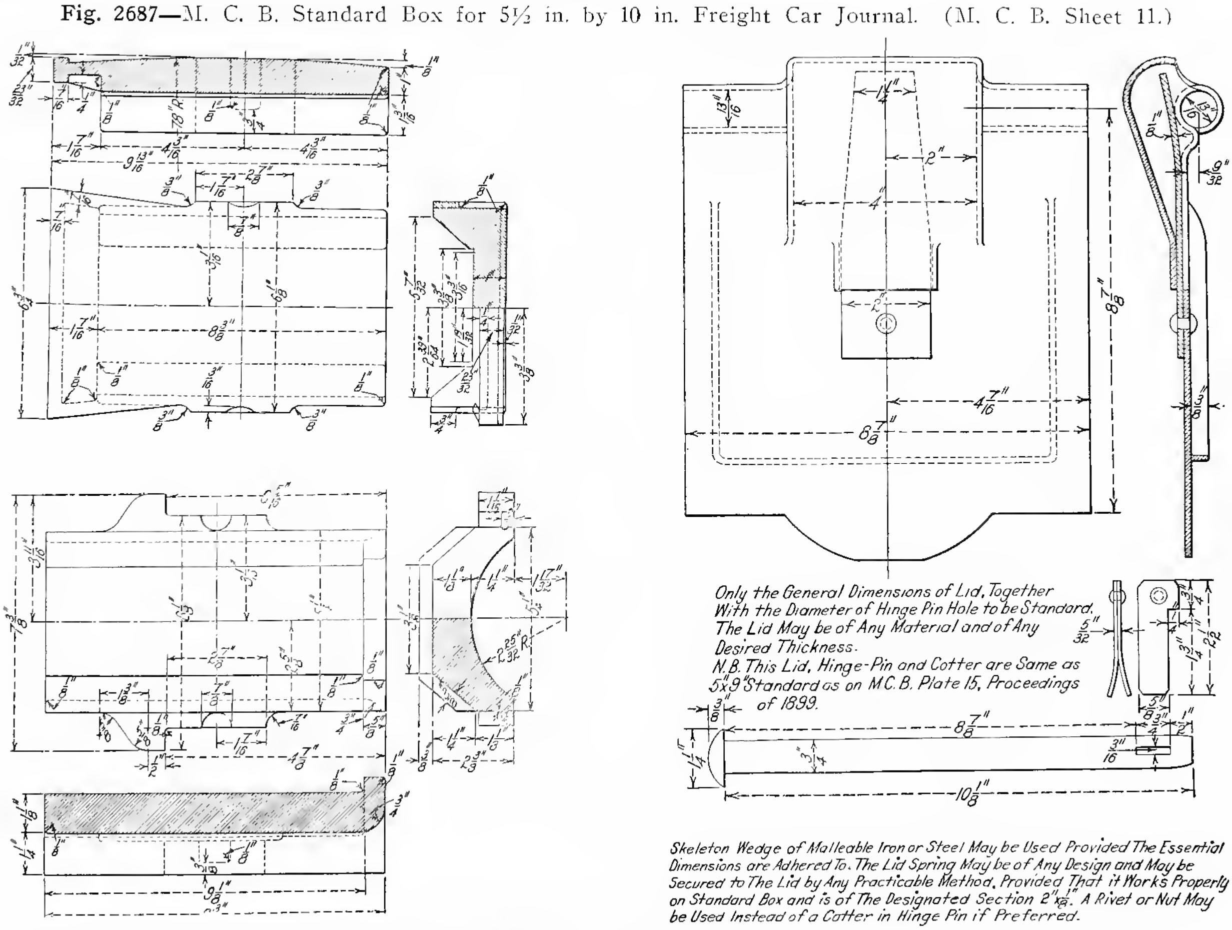


Fig. 2688—M. C. B. Standard Bearing, Wedge and Journal Box Lid for 5½ in. by 10 in. Journal. (M. C. B. Sheet 12.)

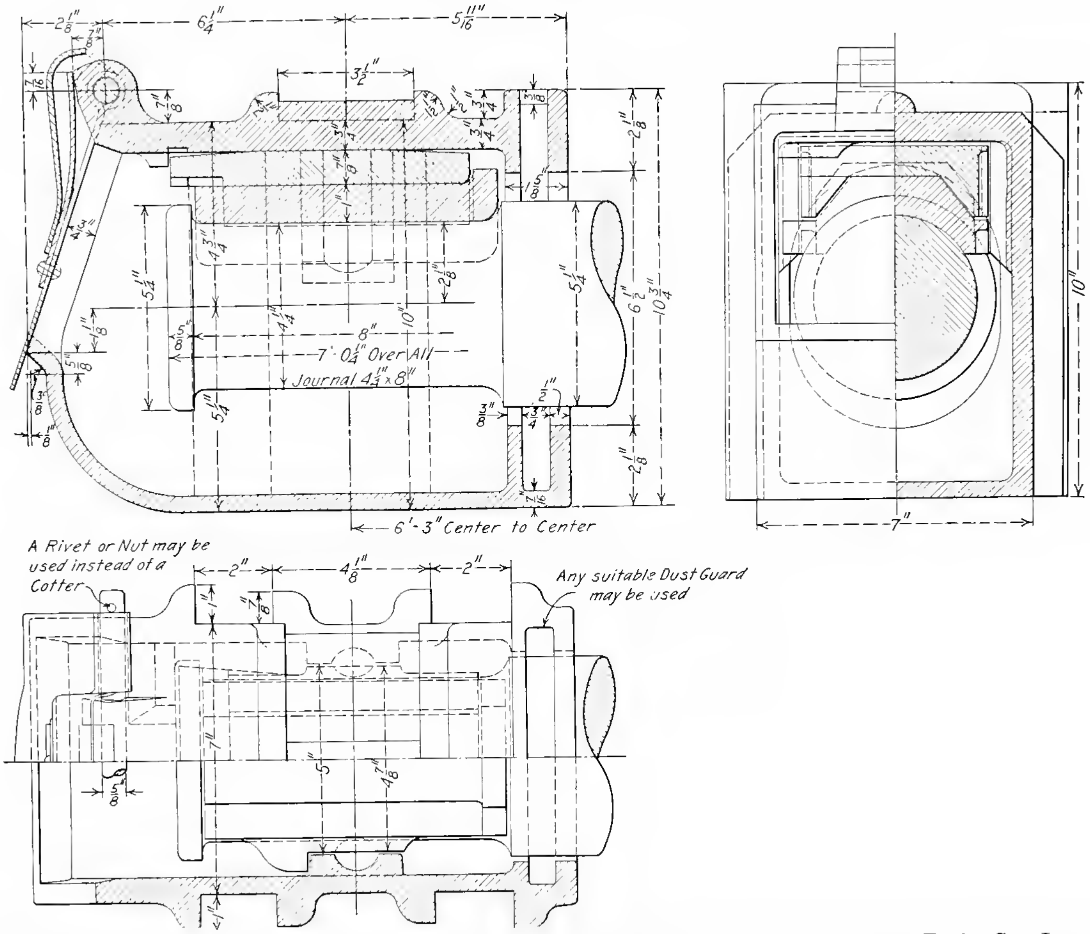


Fig. 2689—M. C. B. Standard Box and Contained Parts for 4¼ in. by 8 in. Passenger Train Car Journal. (M. C. B. Sheet 13.)

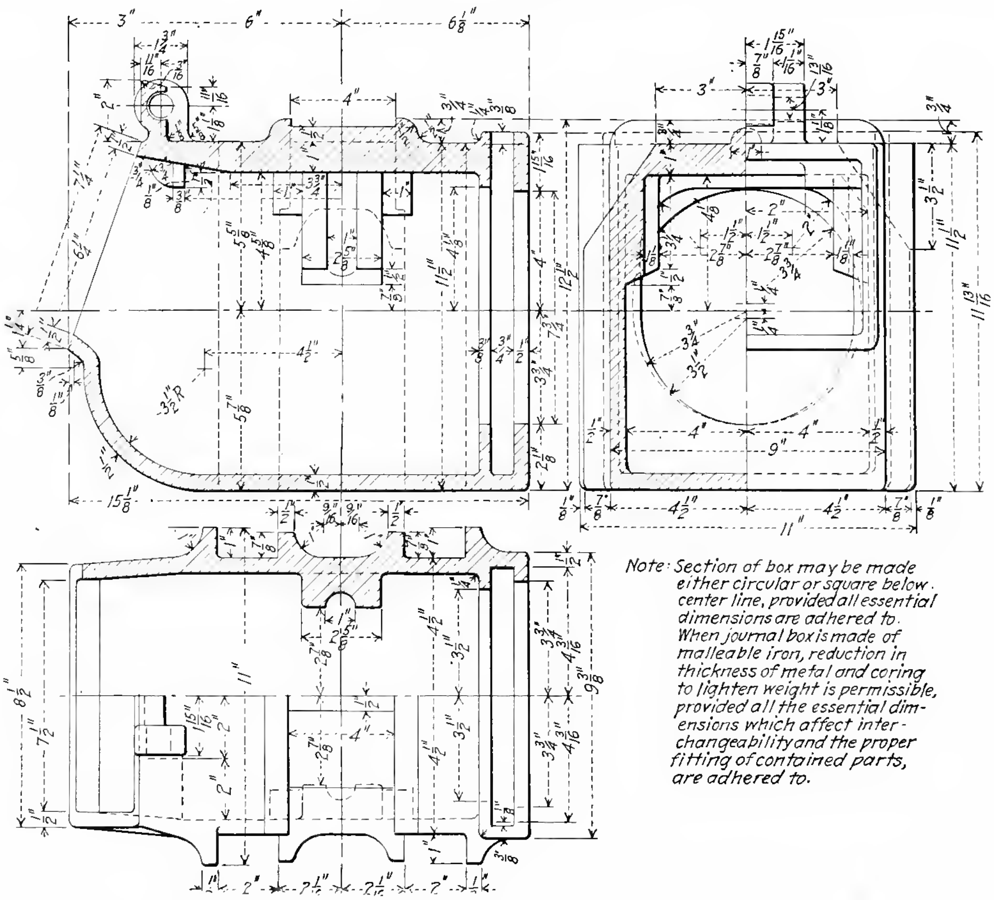


Fig. 2690—M. C. B. Standard Box for 5 in. by 9 in. Passenger Train Car Journal. (M. C. B. Sheet 8A.)

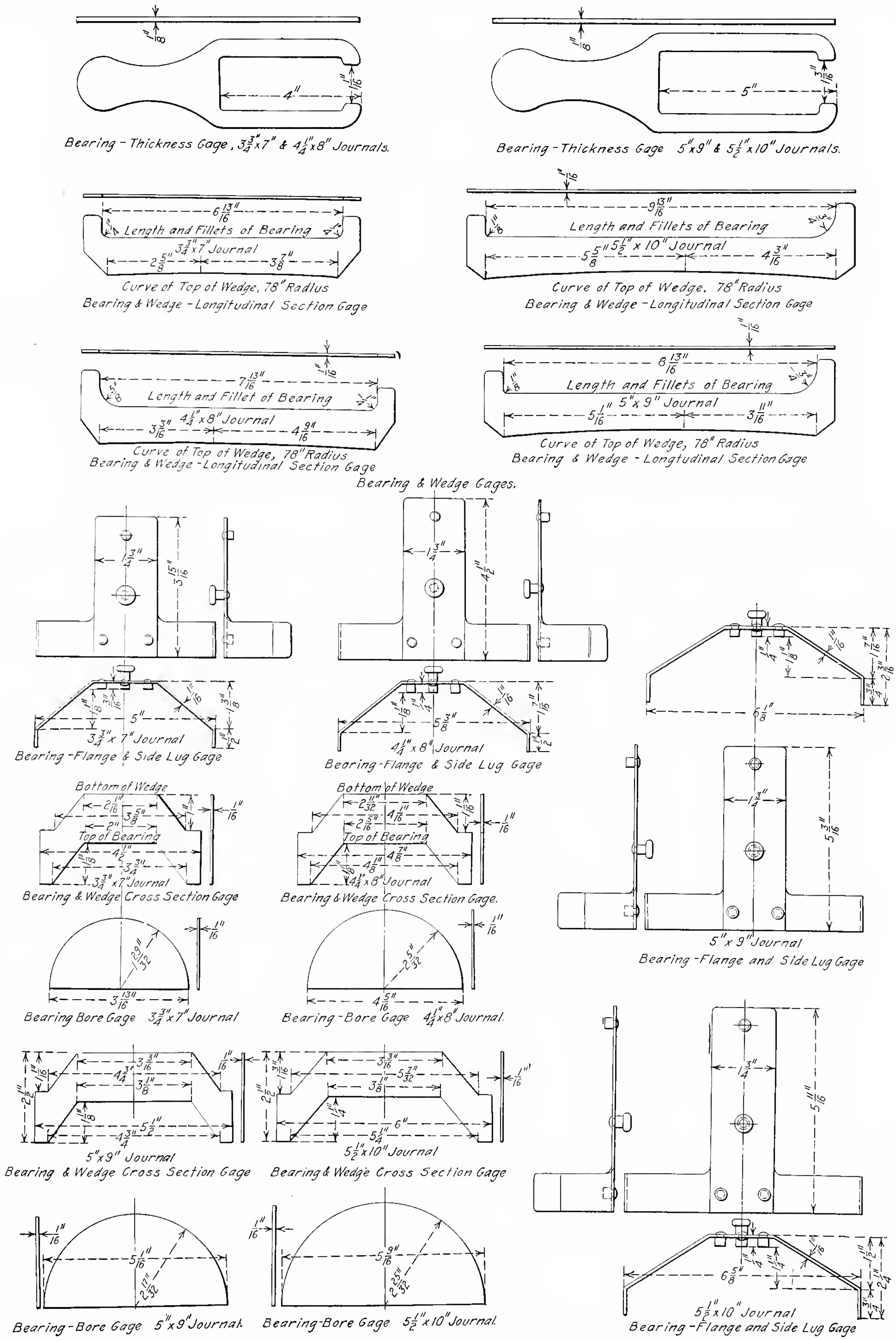


Fig. 2691—Journal Bearing and Wedge Gages. (M. C. B. Sheet 14.)

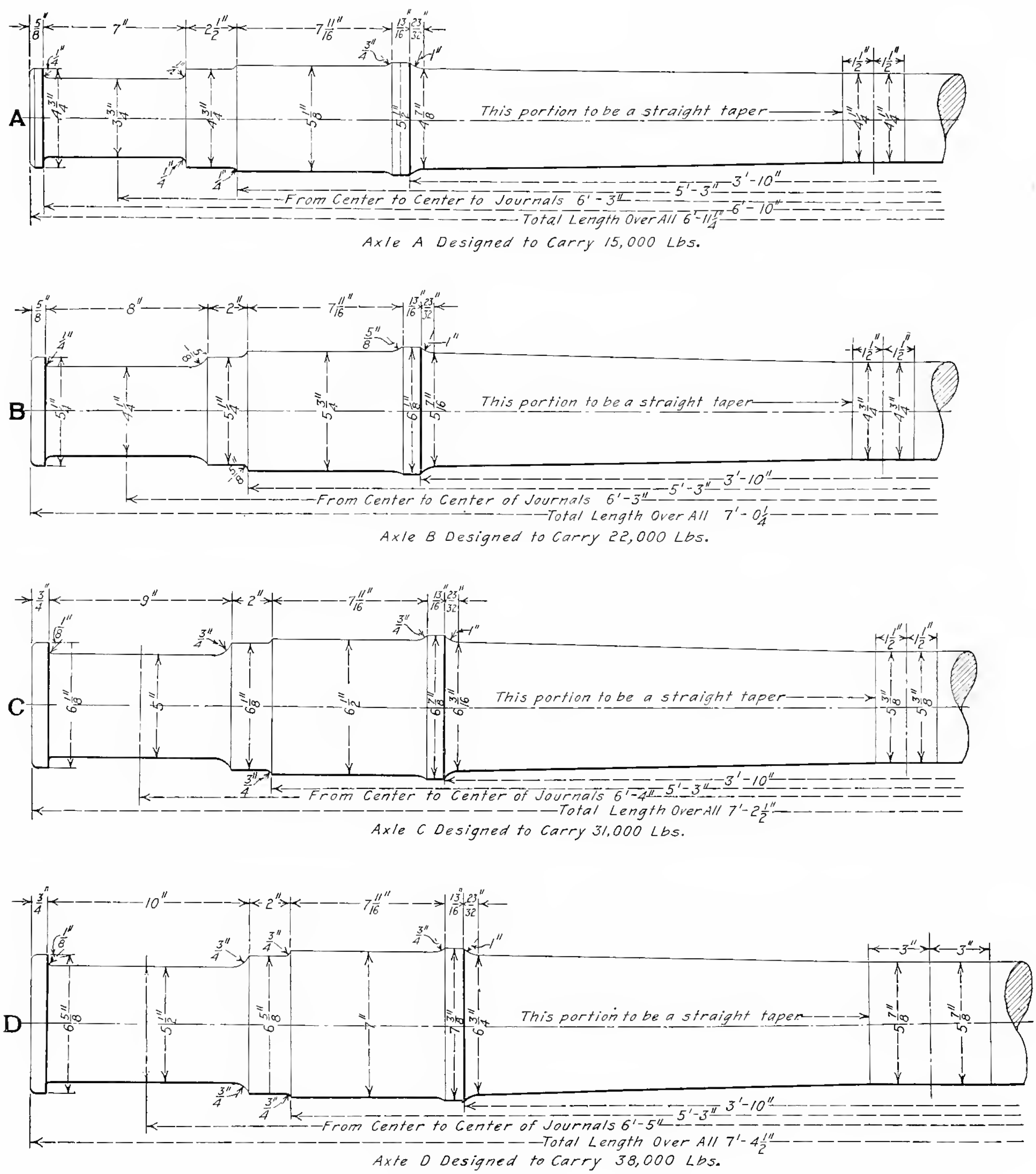


Fig. 2693—M. C. B. Standard Axles. (M. C. B. Sheet 15.)

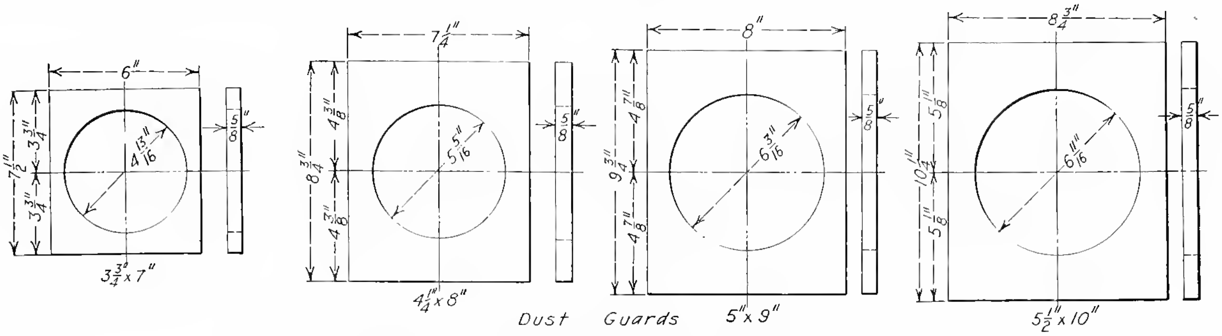


Fig. 2694—M. C. B. Standard Dust Guards. (M. C. B. Sheet 15.)

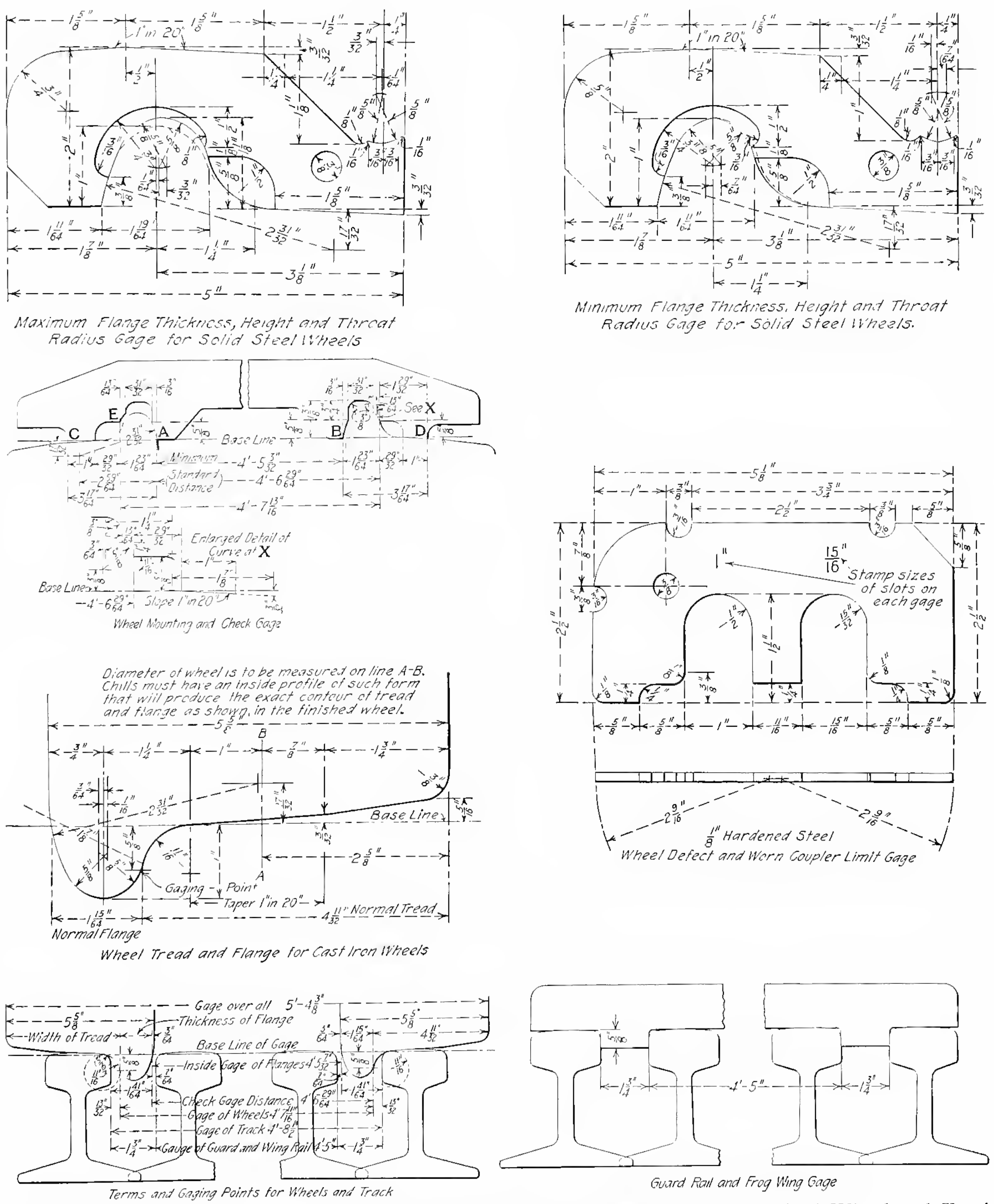


Fig. 2695—M. C. B. Standard Tread and Flange for Cast Iron Wheels; and Standard Wheel and Track Gages. (M. C. B. Sheet 16.)

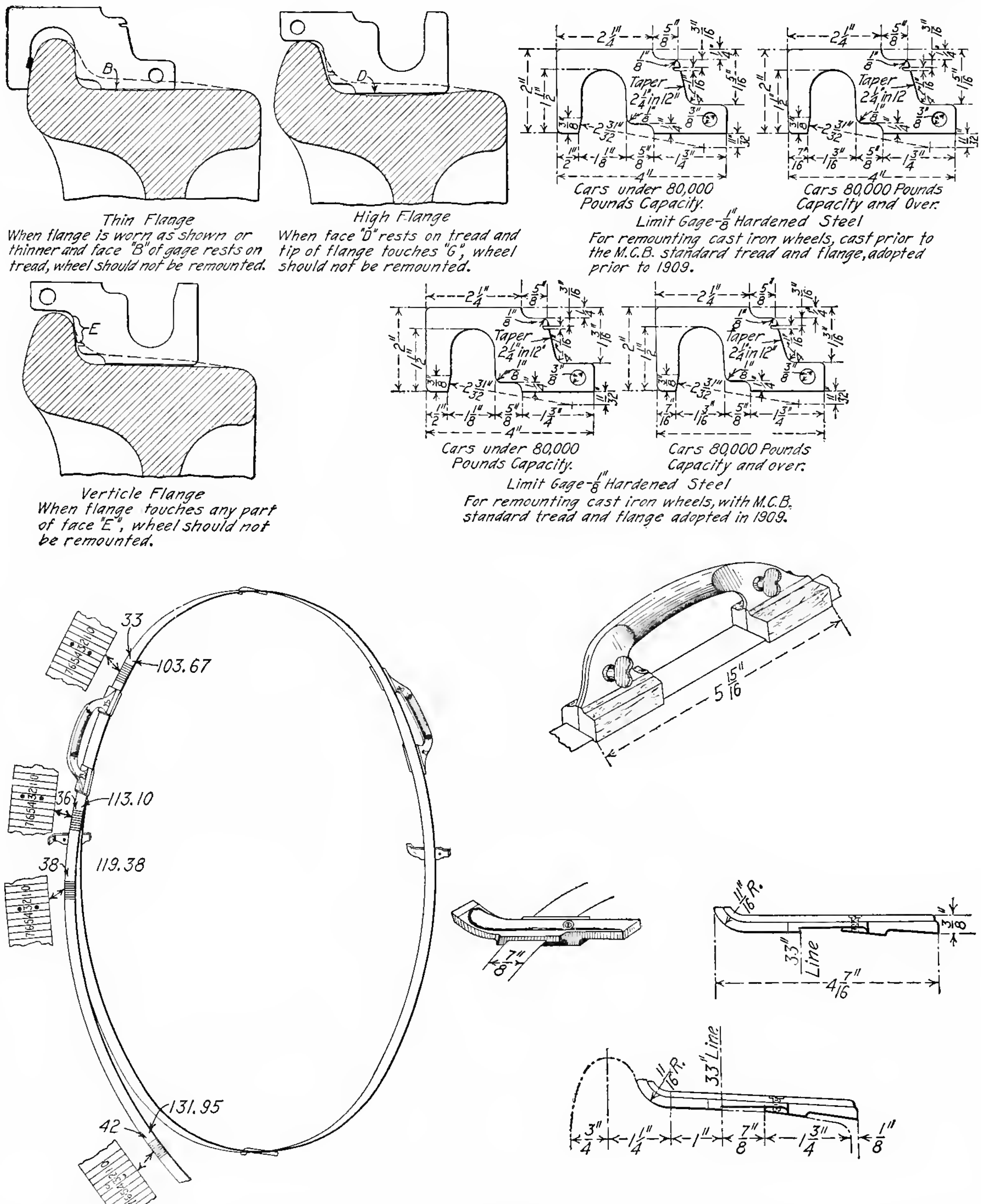


Fig. 2696—M. C. B. Standard Wheel Circumference Measure and Limit Gage for Remounting Cast Iron Wheels. (M. C. B. Sheet 16A.)

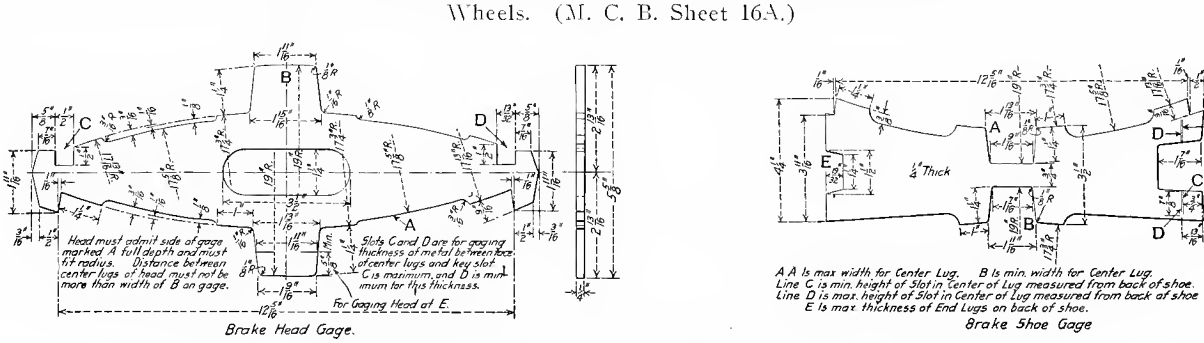


Fig. 2697—M. C. B. Standard Brake Head and Shoe Gages. (M. C. B. Sheet 17.)

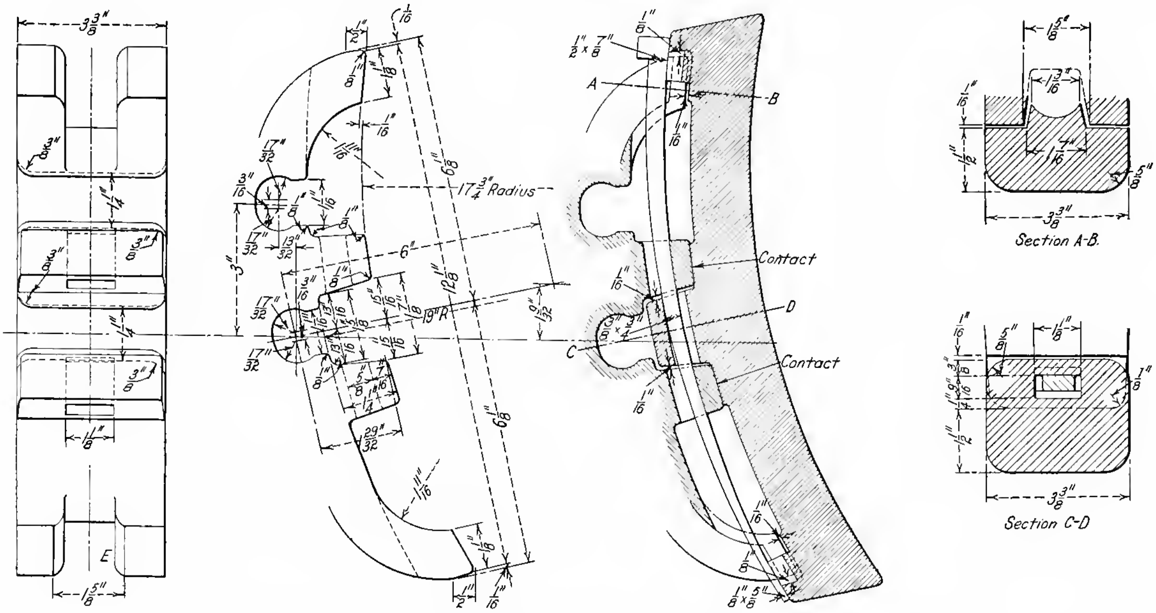


Fig. 2698—M. C. B. Standard Brake Head. (M. C. B. Sheet 17.)

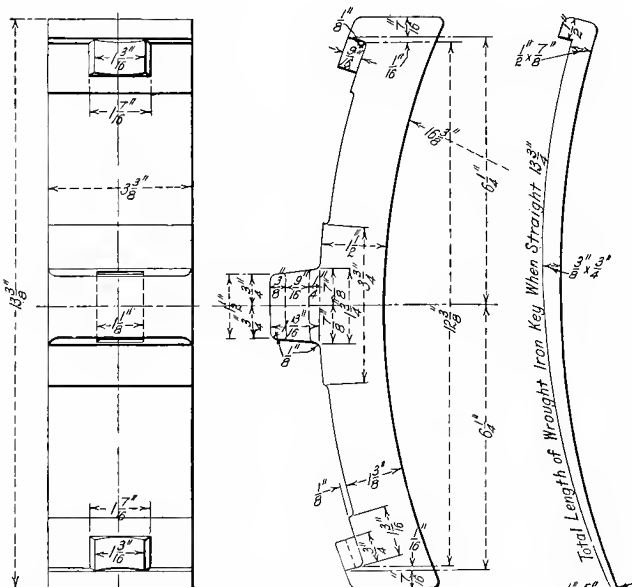


Fig. 2699—M. C. B. Standard Brake Shoe and Key. (M. C. B. Sheet 17.)

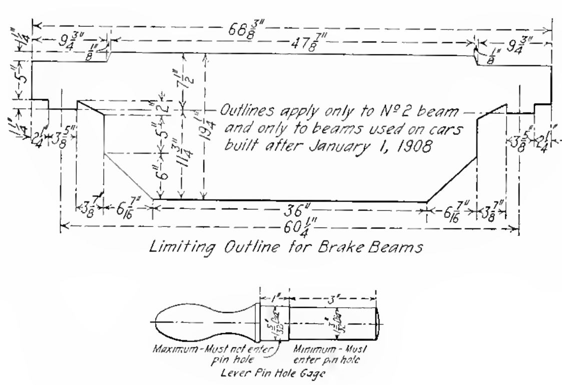


Fig. 2700—M. C. B. Standard Limiting Outline for Brake Beams and Standard Brake Lever Pin Hole Gage. (M. C. B. Sheet 17A.)

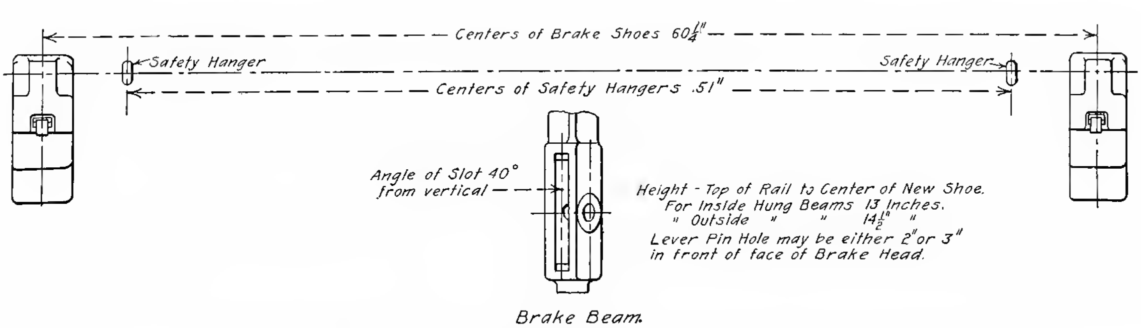
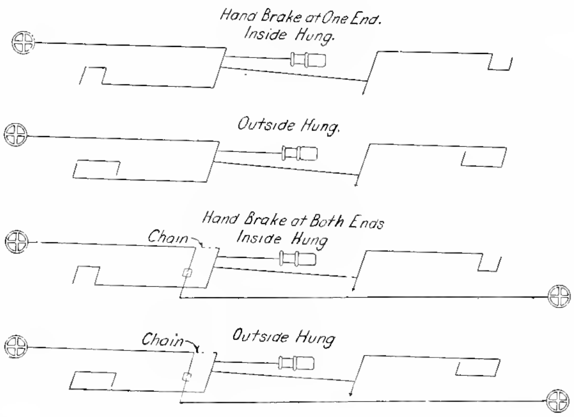


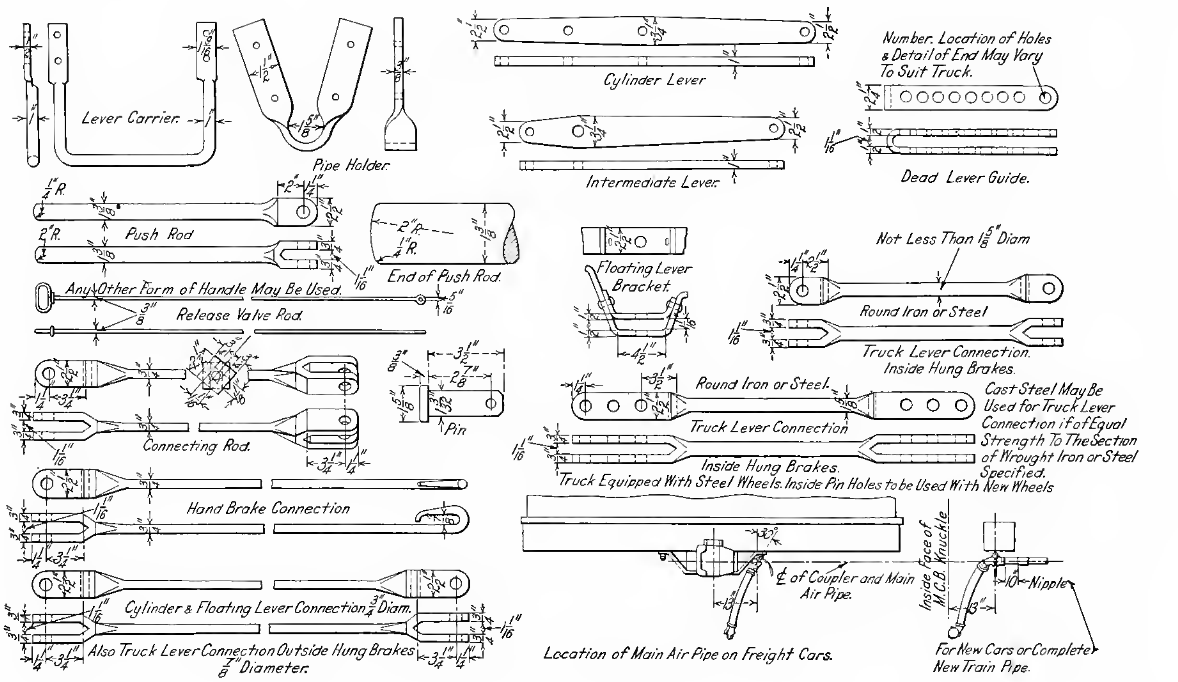
Fig. 2701—M. C. B. Standard Brake Beam. (M. C. B. Sheet 17A.)



For Brake Cylinders Larger Than 8" or for Brake Cylinder Pressures Above 50 Lbs. Per Square Inch, The Size of Brake Rods and Brake Levers Shown Should Be Increased So That The Fibre Stress Shall Not Exceed 15,000 Lbs. Per Square Inch for Rods and 23,000 Lbs. Per Square Inch for Levers.

The Form of Jaws May Be Varied Provided The Essential Dimensions Are Adhered To. Jaws May Be Made With Two (or more) Holes if Desired. All Rods Must Be At Least 3/4" Diam. and Truck Lever Connection For Outside Hung Brakes 7/8" Diam.

All Holes For Brake Pins Not Less Than 1 3/32" Diam. Nor More Than 1 1/8" Diam. Brake Beams Must Not Be Hung From Any Portion of Body of Cars On Cars Built After Sept. 1st 1909.



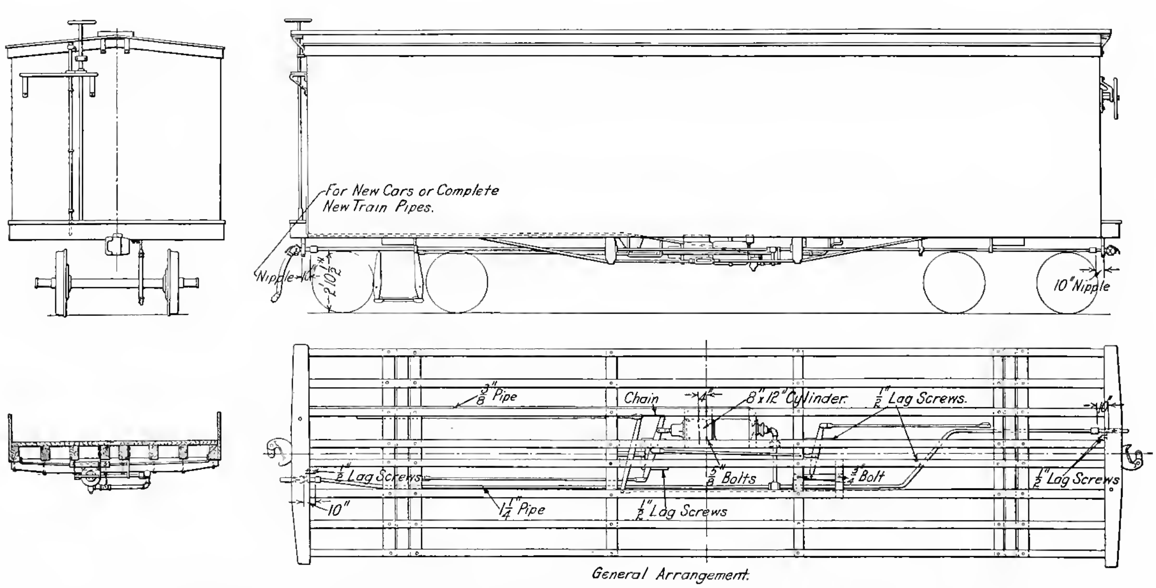


Fig. 2702—M. C. B. Standards for Air Brakes on Freight Cars. (M. C. B. Sheet 18.)

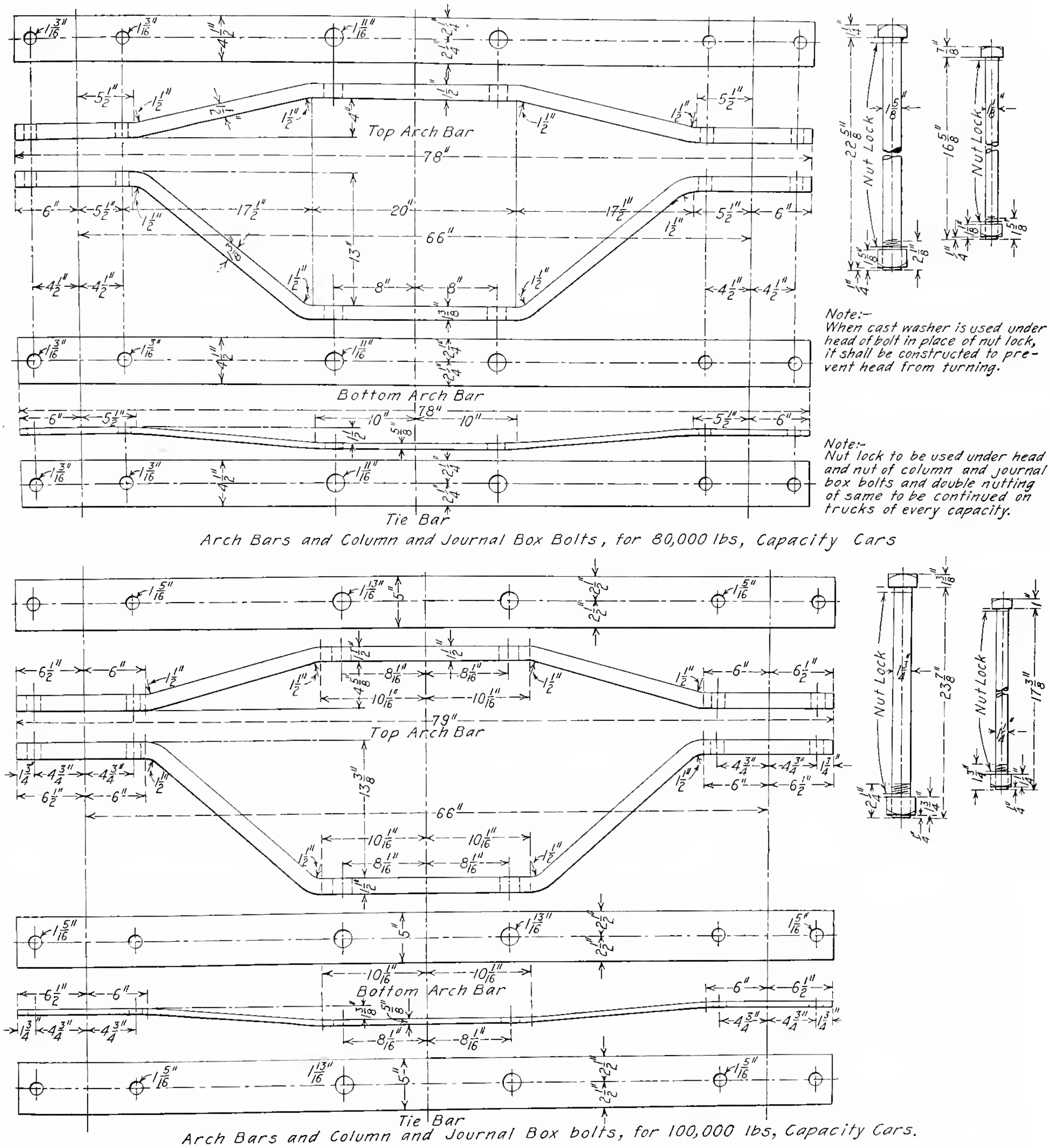


Fig. 2703—M. C. B. Standard Arch Bars and Column and Journal Box Bolts. (M. C. B. Sheet 20.)

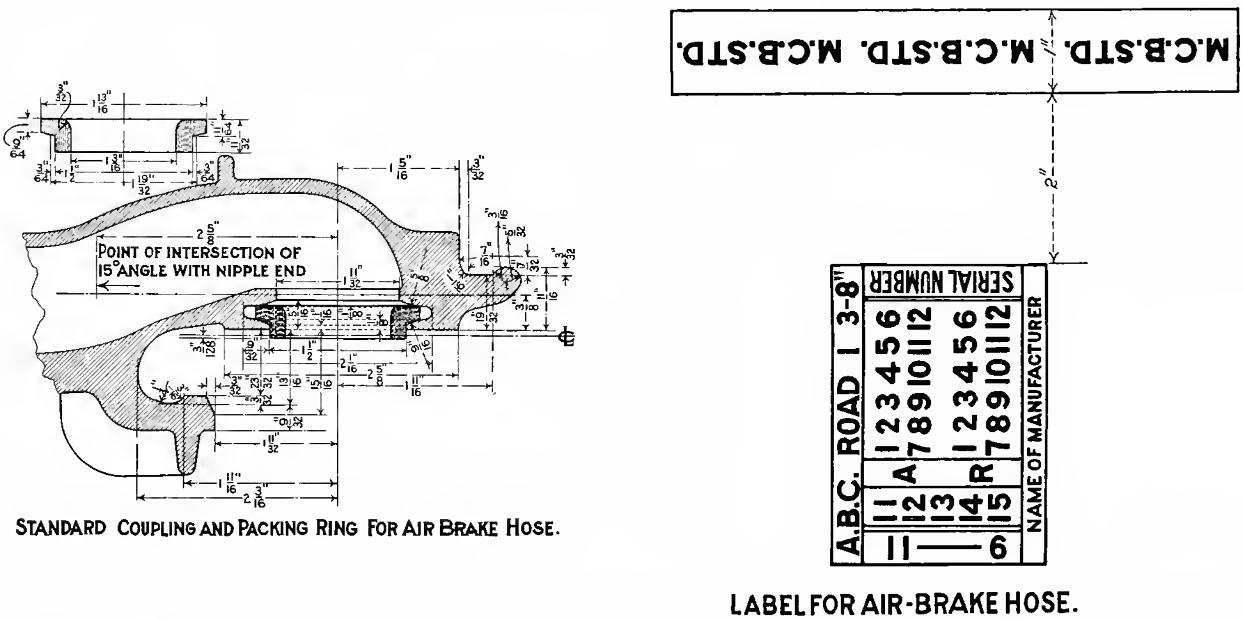


Fig. 2704—M. C. B. Standard Coupling, Packing Ring and Label for Air Brake Hose. (M. C. B. Sheet 18A.)

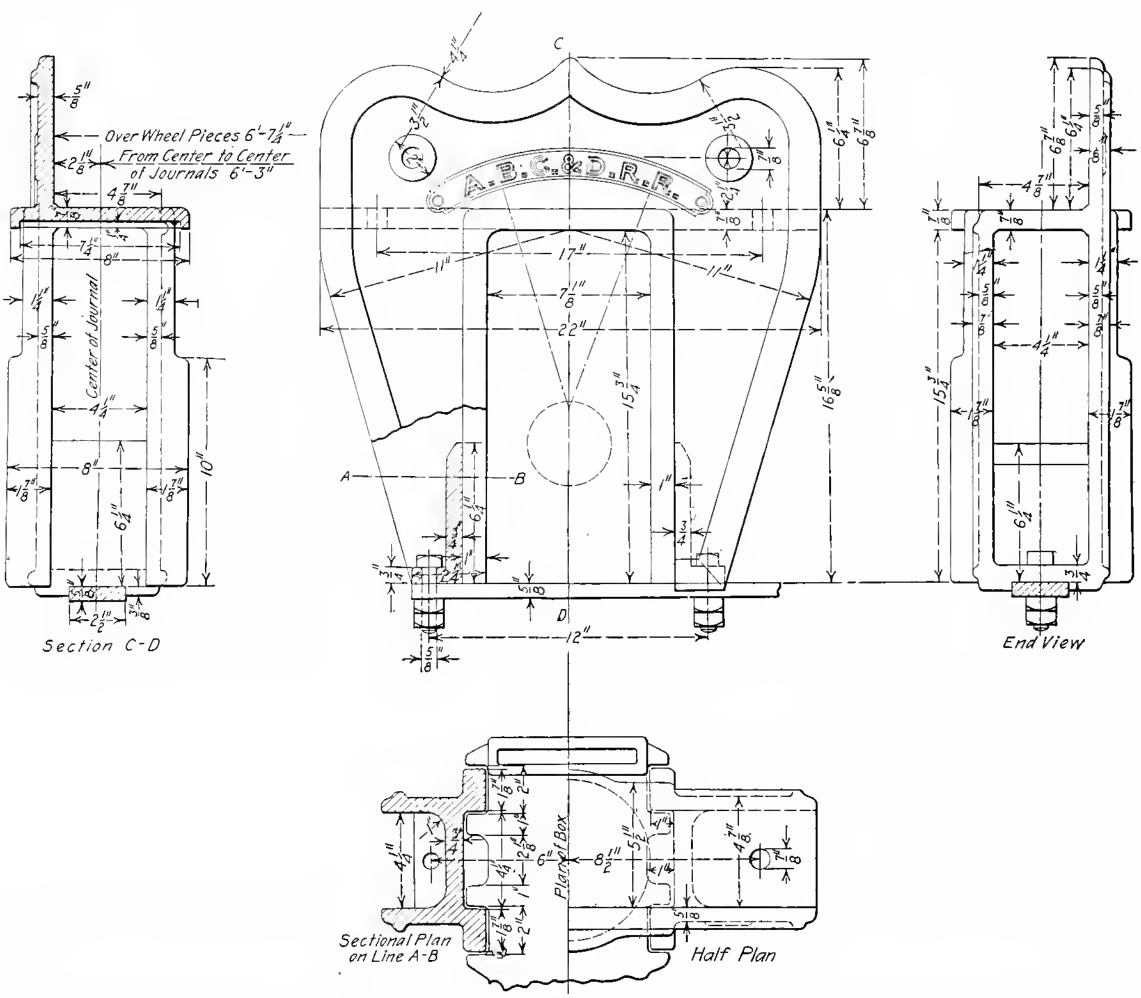


Fig. 2705—M. C. B. Standard Pedestal for 3¾ in. by 7 in. Journal. (M. C. B. Sheet 21.)

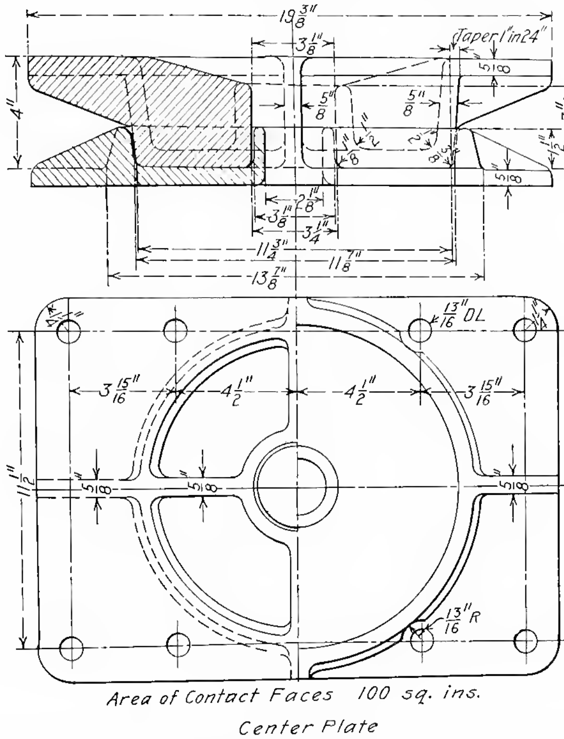


Fig. 2706—M. C. B. Standard Center Plate. (M. C. B. Sheet 20.)

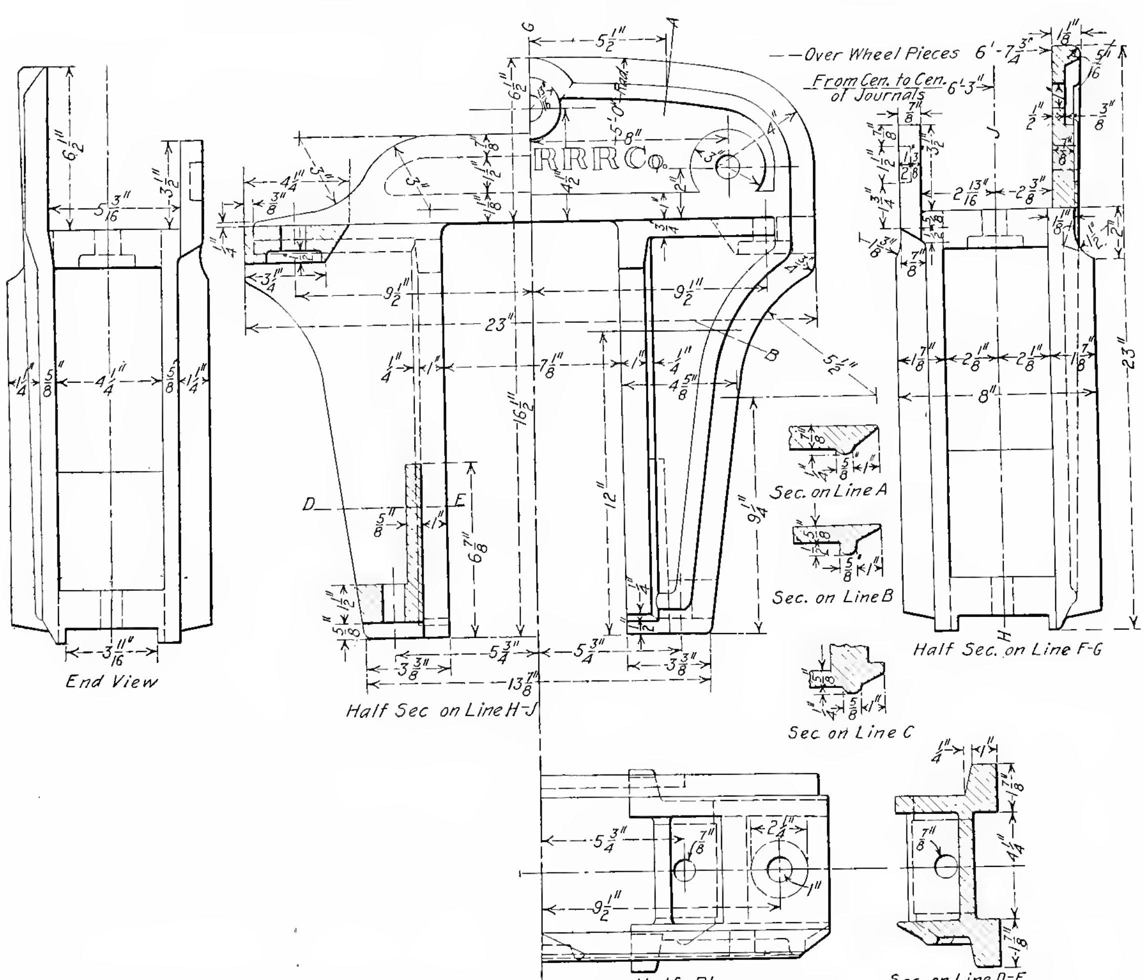


Fig. 2707—M. C. B. Standard Pedestal for 4¼ in. by 8 in. Journal. (M. C. B. Sheet 22.)

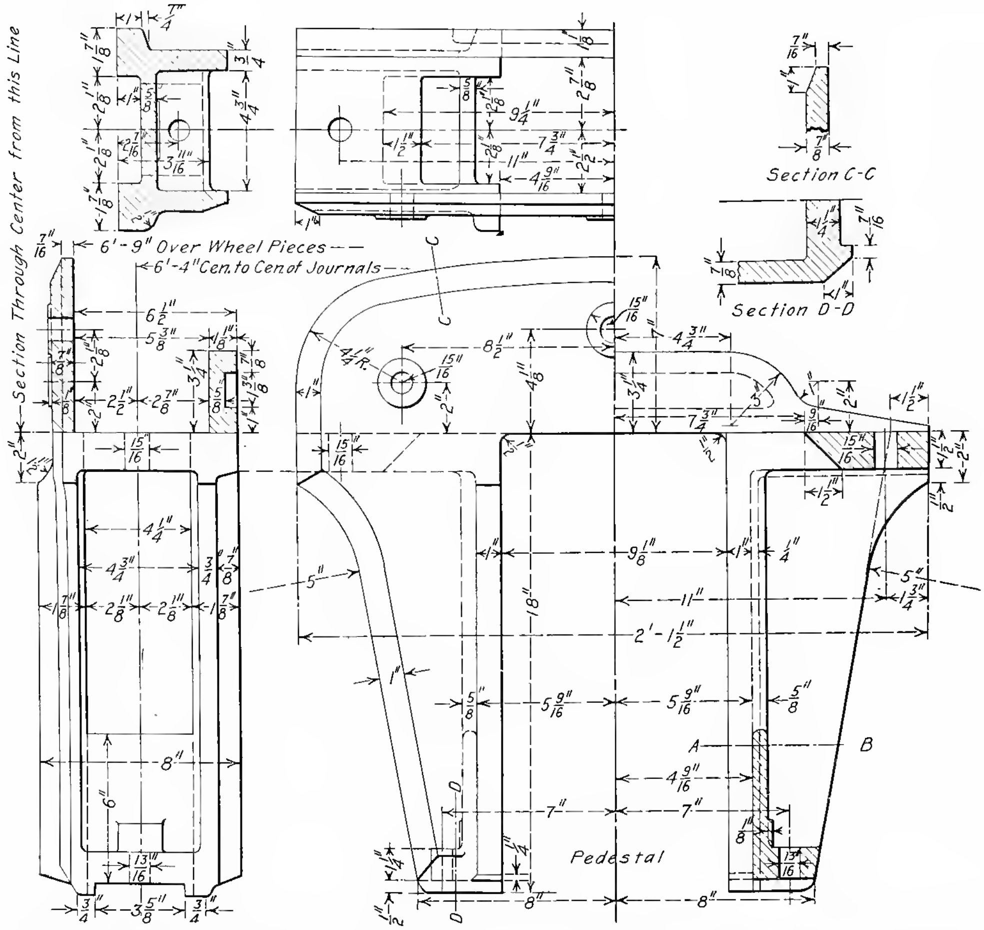


Fig. 2708—M. C. B. Standard Pedestal for 5 in. by 9 in. Journal. (M. C. B. Sheet 22.)

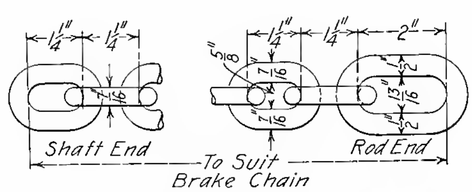


Fig. 2709—M. C. B. Standard Brake Chain. (M. C. B. Sheet 23A.)

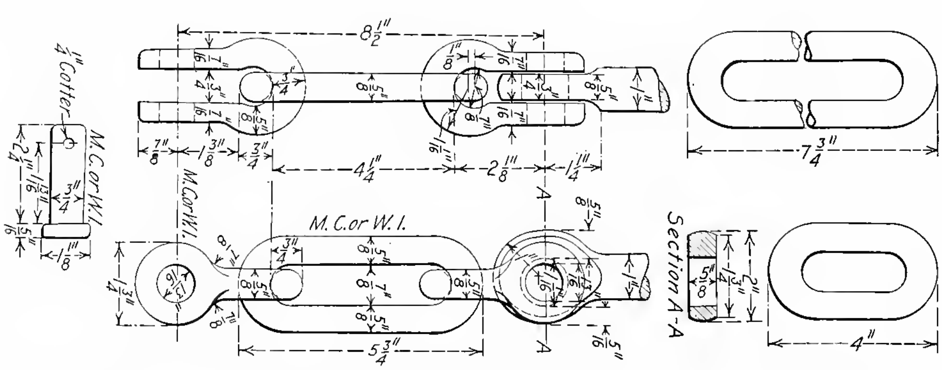


Fig. 2710—M. C. B. Standard Uncoupling Attachments. (M. C. B. Sheet 23A.)

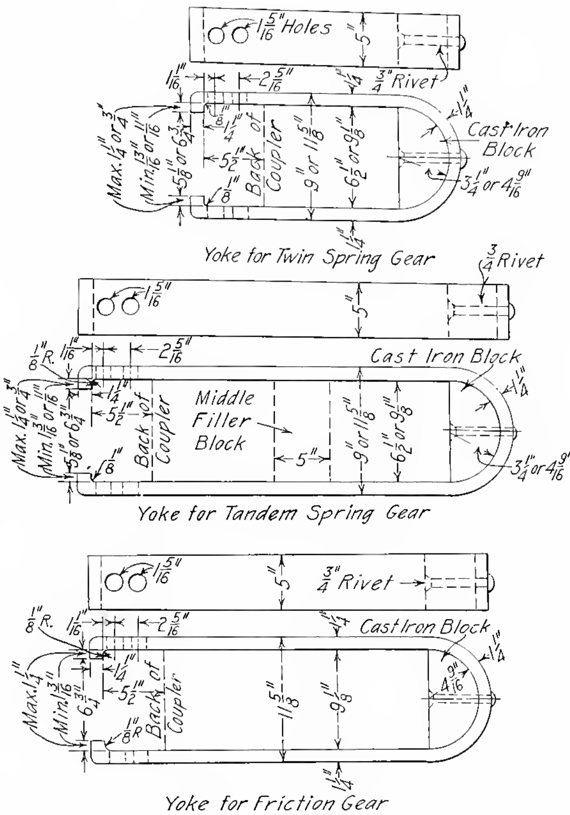


Fig. 2711—M. C. B. Standard Automatic Coupler Yokes. (M. C. B. Sheet 23A.)

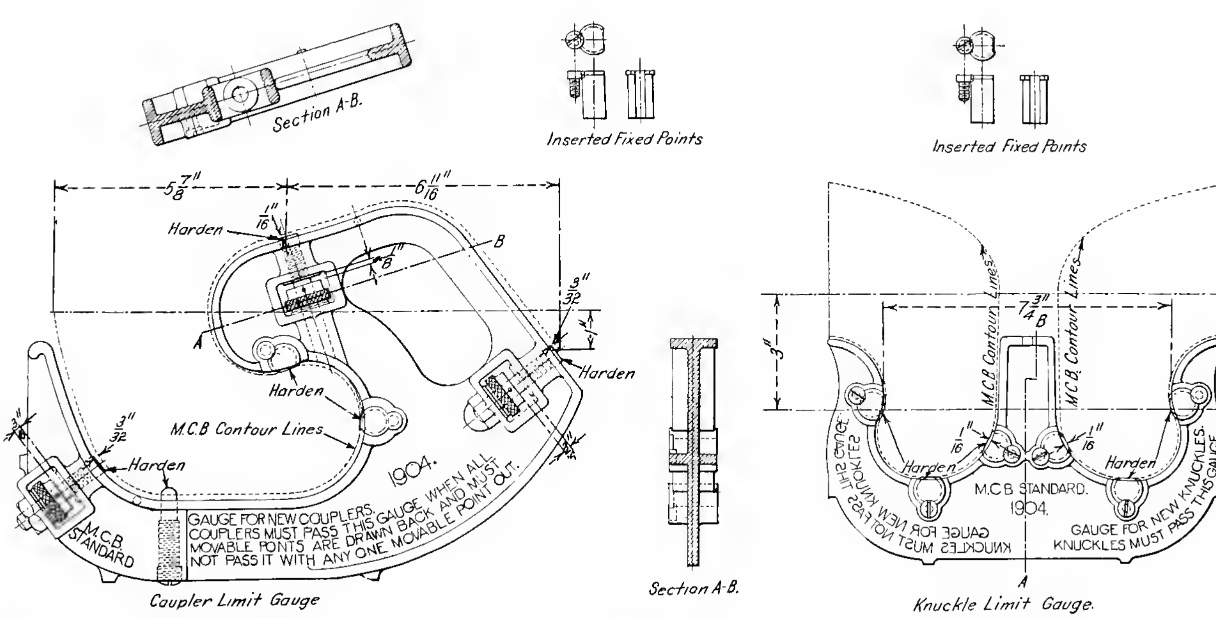


Fig. 2712—M. C. B. Standard Coupler and Knuckle Limit Gages. (M. C. B. Sheet 24.)

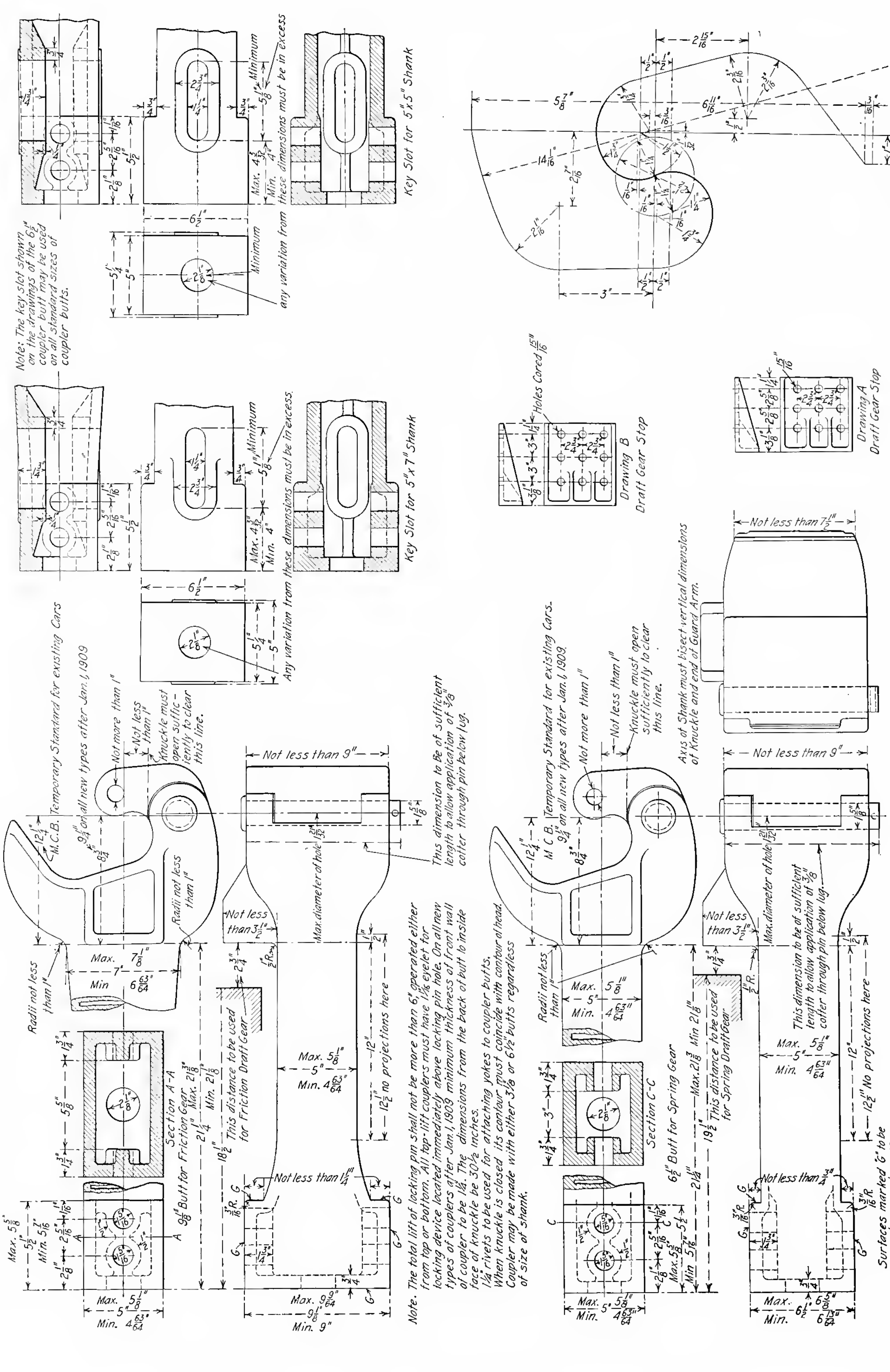


Fig. 2713—M. C. B. Standard Automatic Coupler, Contour Line, Draft Gear Stops and Key Slots for 5 in. by 5 in. and 5 in. by 7 in. Coupler Shanks. (M. C. B. Sheet 23.)

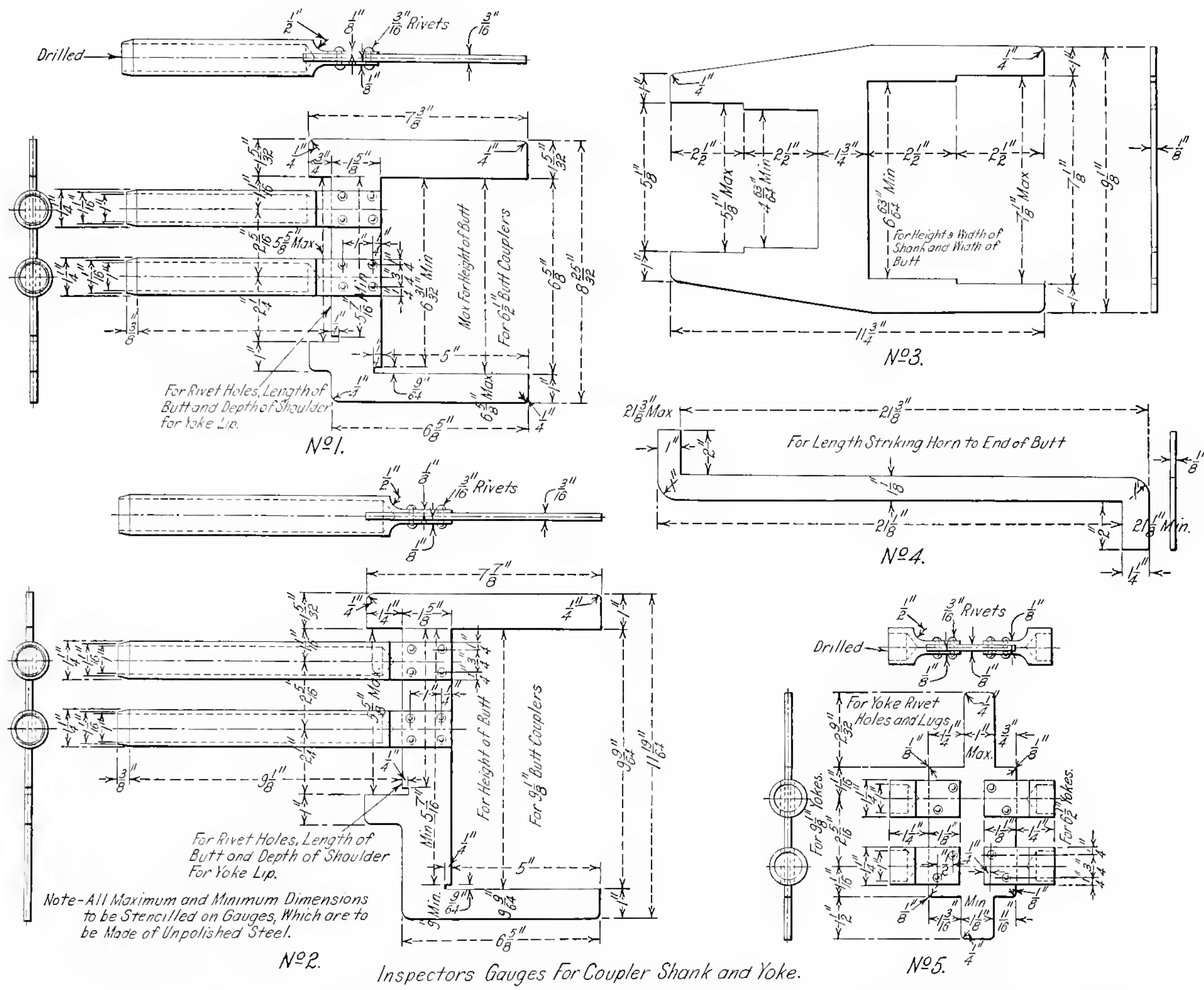


Fig. 2714—M. C. B. Standard Inspector's Gages for Coupler Shank and Yoke. (M. C. B. Sheet 24.)

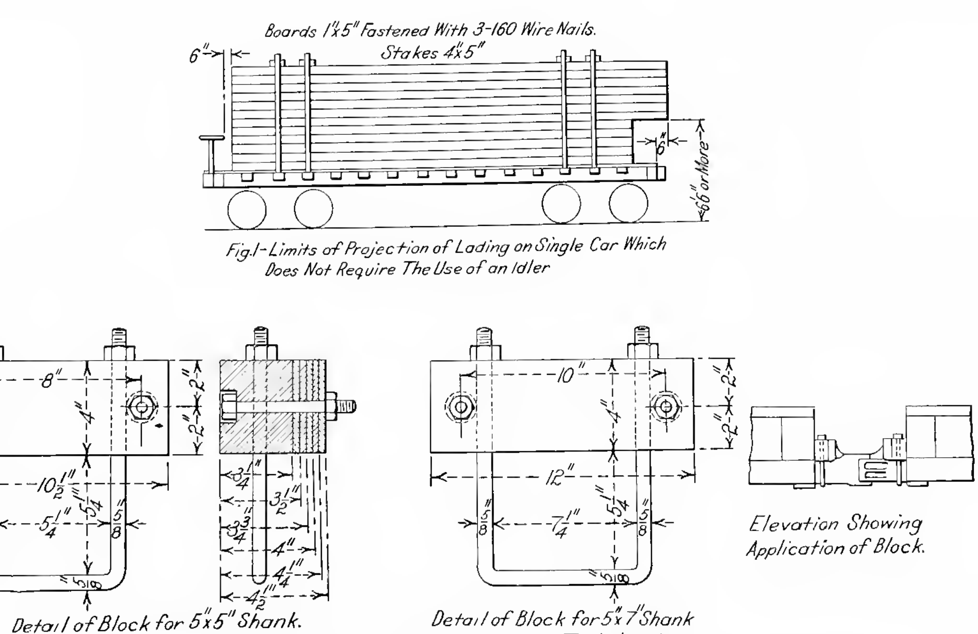


Fig. 2715—M. C. B. Standards for Loading Materials. (M. C. B. Sheet 25.)

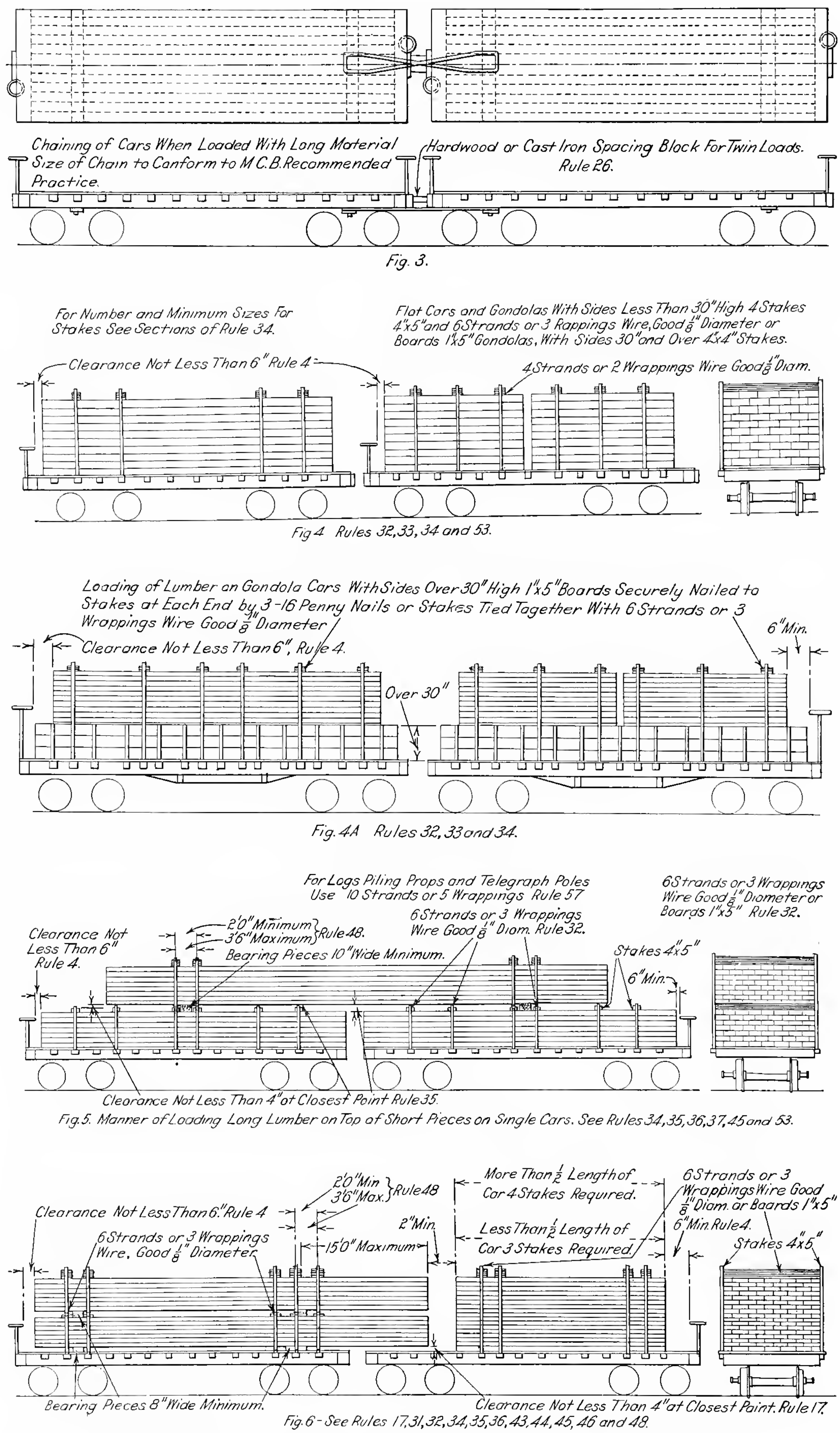


Fig. 2716—M. C. B. Standards for Loading Materials. (M. C. B. Sheet 25.)

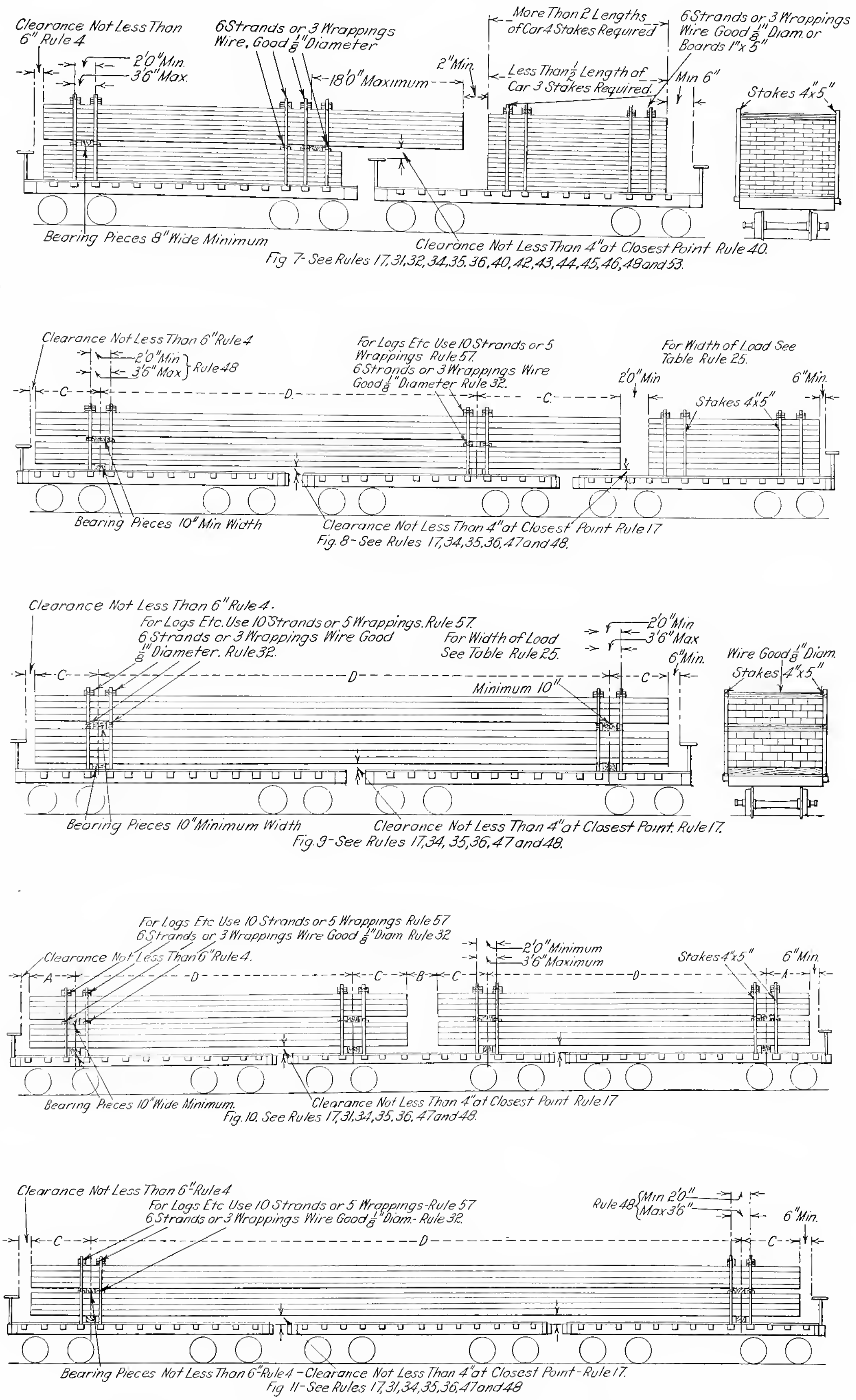


Fig. 2717—M. C. B. Standards for Loading Materials. (M. C. B. Sheet 25.)

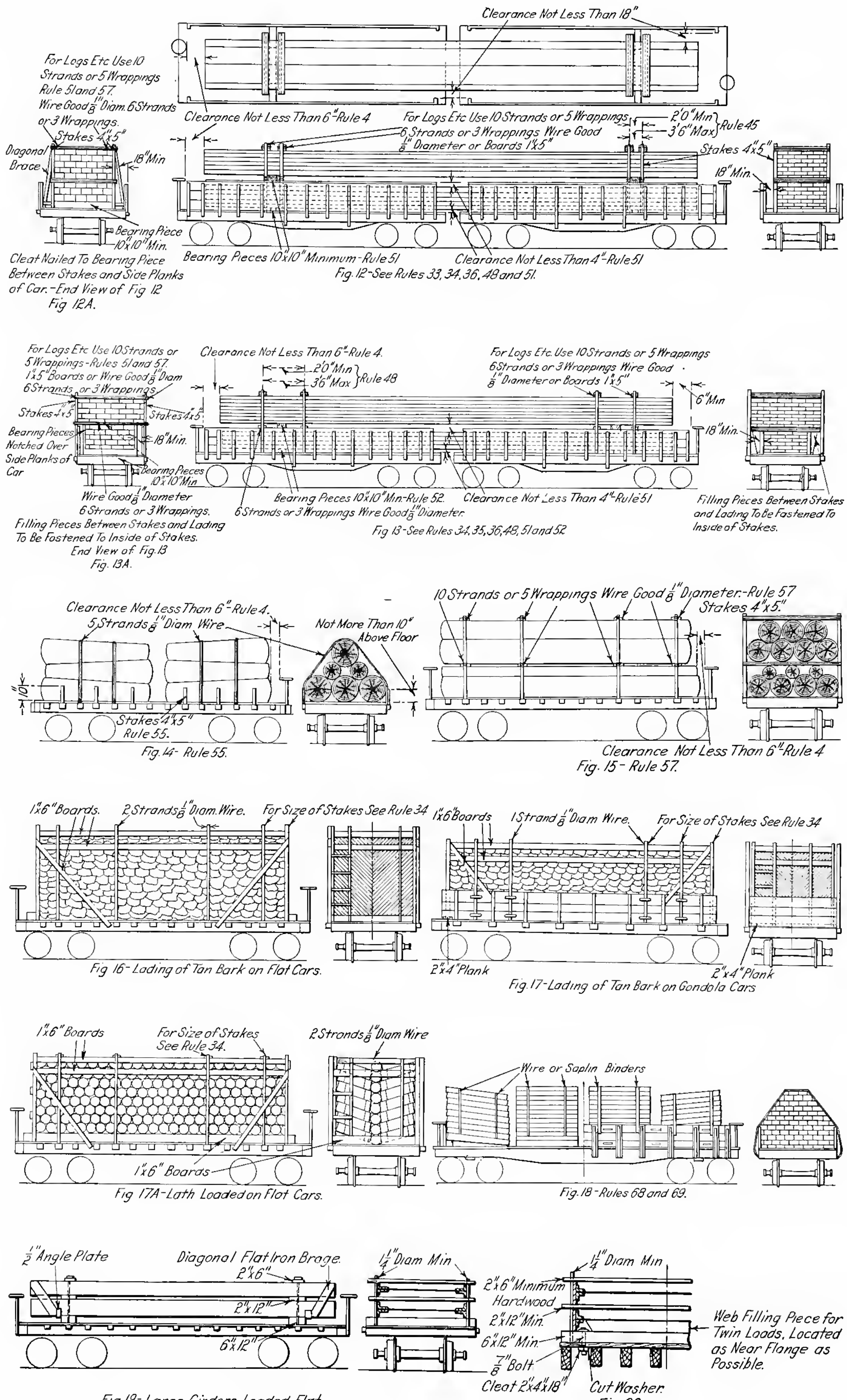


Fig. 2718—M. C. B. Standards for Loading Materials. (M. C. B. Sheets 25 and 25A.)

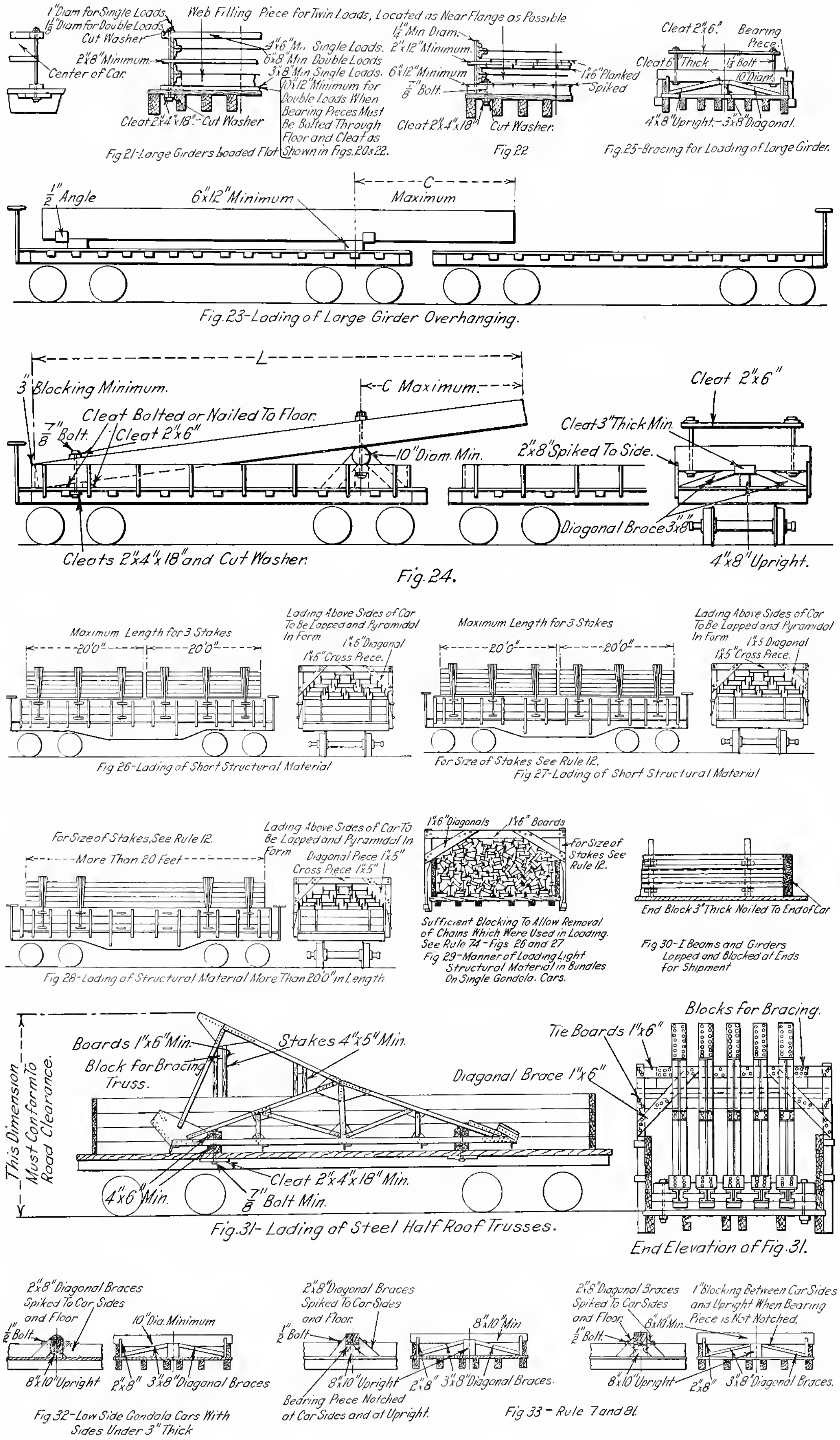


Fig. 2719—M. C. B. Standards for Loading Materials. (M. C. B. Sheet 25A.)

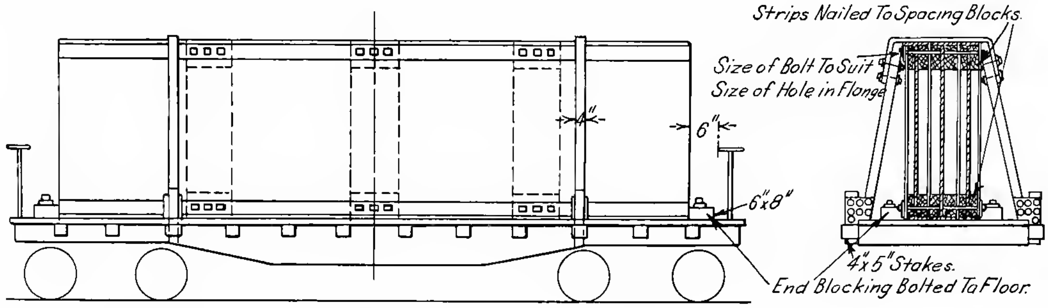


Fig. 31A-Rule 75A.-Manner of Loading Deep Girders on Flat Cars.

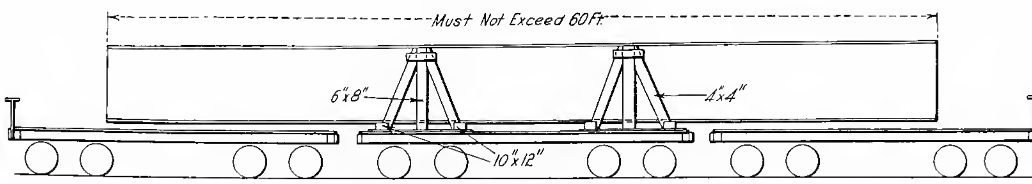


Fig 34

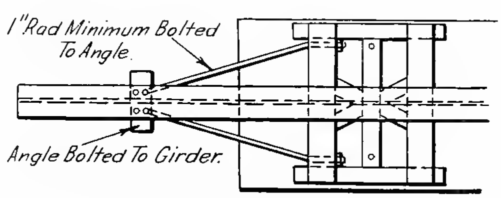


Fig. 35-Rules 72, 85, 86, 87 and Fig. 34.

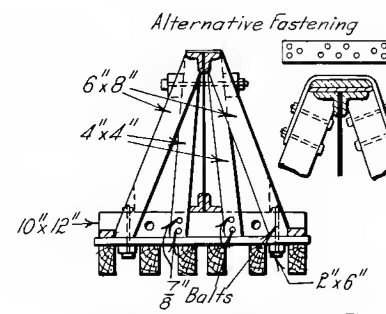


Fig. 36-Rules 72, 85, 86, 87 and Fig. 34.

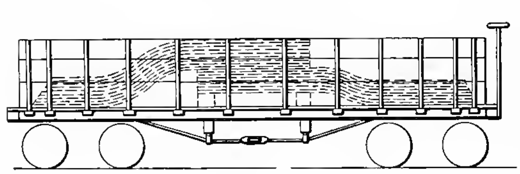
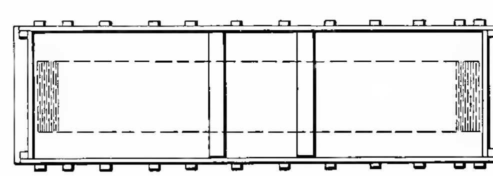


Fig 37



Plan View of Fig. 37
Fig. 38.

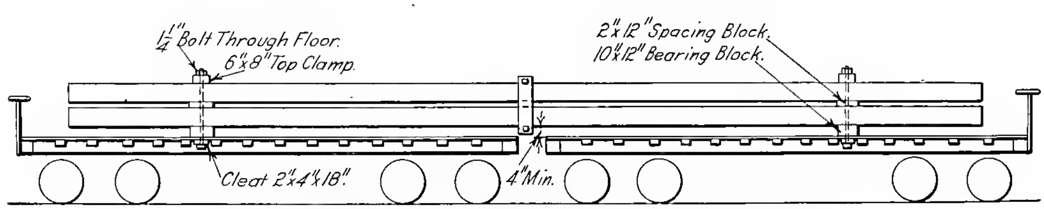


Fig. 39-Lading of Long Material on Flat or Drop End Gondola Cars

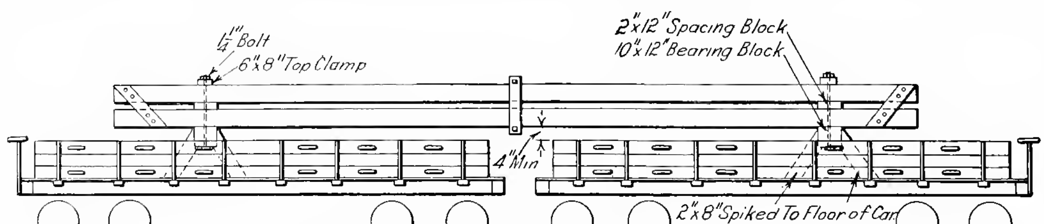


Fig. 40-Lading of Long Material on Gondola Cars.

Fig. 2720—M. C. B. Standards for Loading Materials. (M. C. B. Sheet 25A.)

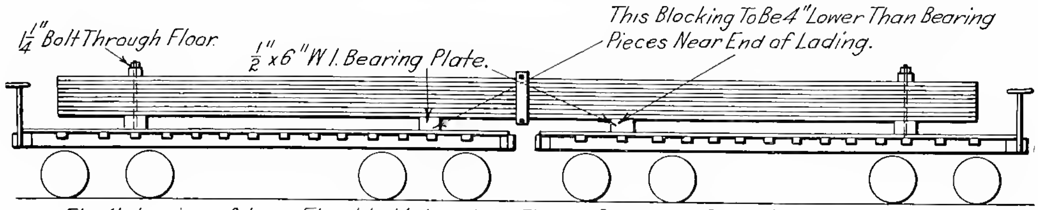


Fig 41-Lading of Long Flexible Material on Flat or Drop End Gondola Cars.

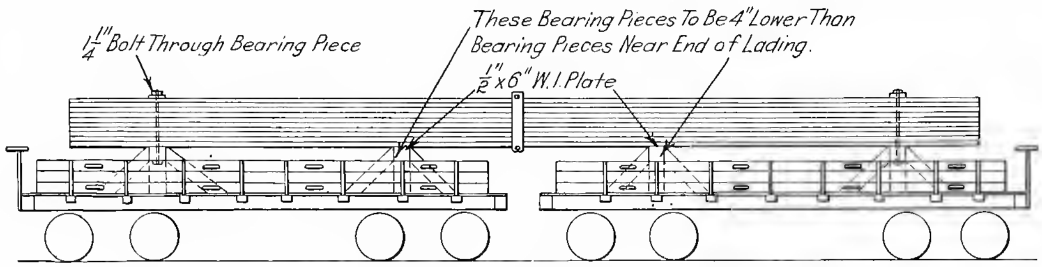


Fig. 42- Lading of Long Material on Gondola Cars Not Having Drop Ends.

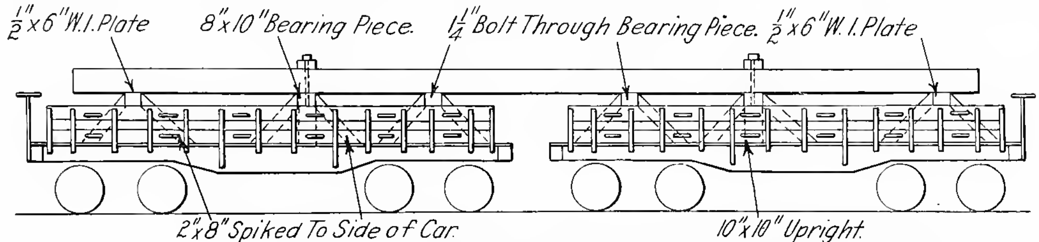


Fig. 43-Lading of Long Material on Gondola Cars Not Having Drop Ends.

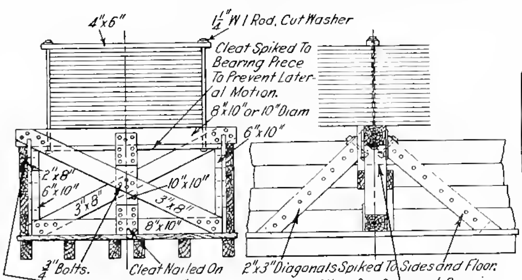


Fig 44-Twin Shipments on Gondola Cars Not Equipped With Drop End and Having Sides Less Than Three Inches Thick.

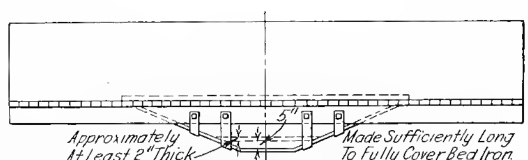


Fig-45D-Diagram of Hopper Bottom Car, Showing The Application of False Bottom for The Loading of Pig Iron Billets, Small Castings Etc

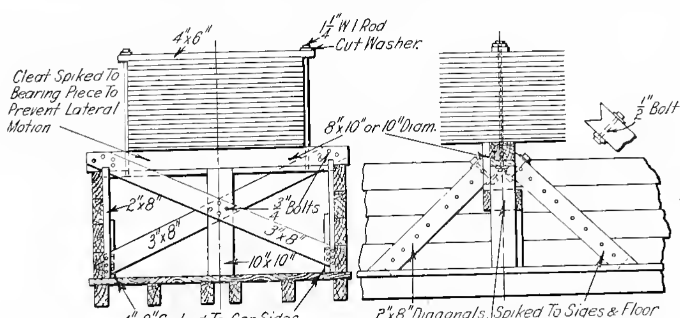


Fig 45-Rules 7 and 92-Twin Shipments on Gondola Cars Not Equipped With Drop Ends and Having Sides Three or More Inches Thick

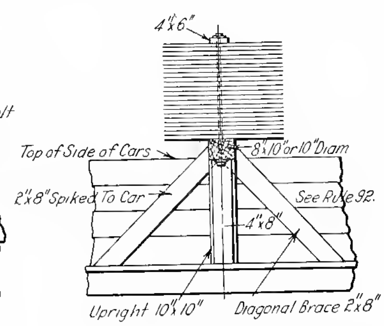


Fig 45C-Twin Shipments on Gondola Cars Not Equipped With Drop Ends

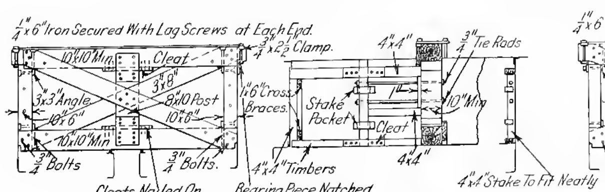


Fig. 45A-Manner of Blocking and Bracing Bearing Piece on Steel Gondola Cars With Inside Stake Pocket.

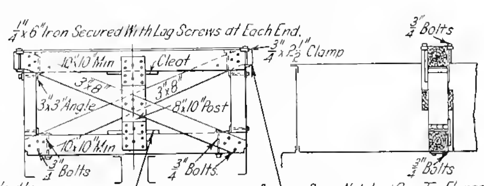
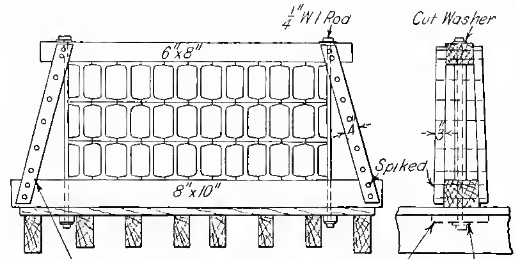
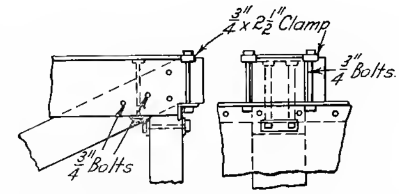


Fig 45B-Manner of Blocking and Bracing Bearing Piece on Steel Gondola Cars Without Inside Stake Pockets.

Fig. 2721. M. C. B. Standards for Loading Materials. (M. C. B. Sheet 25A.)



Manner of Blocking Round Bearing Pieces:- 2"x4"x18" Cleat. Cut Washer
Fig. 46 - Structural Material Loaded On Flat Cars:- Rule 100.



Manner of Blocking Bearing Piece on Steel Gondola Cars.

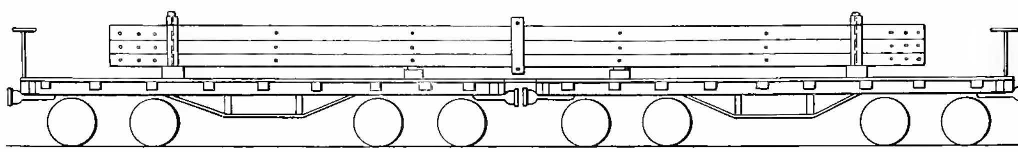


Fig. 47.

Plan View of Fig 47

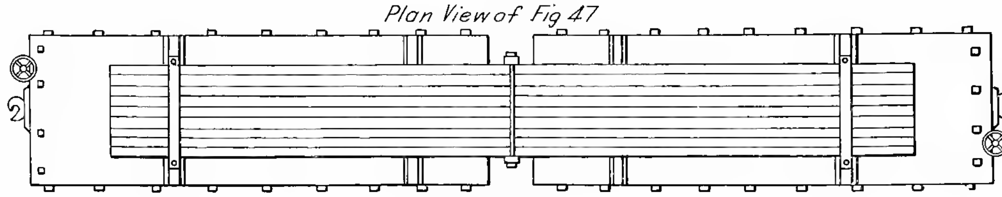


Fig. 48.

Built Up Side Ties Can Be Used and Nailed if Substantially Made

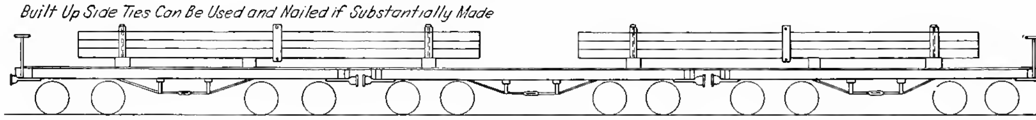


Fig 49.

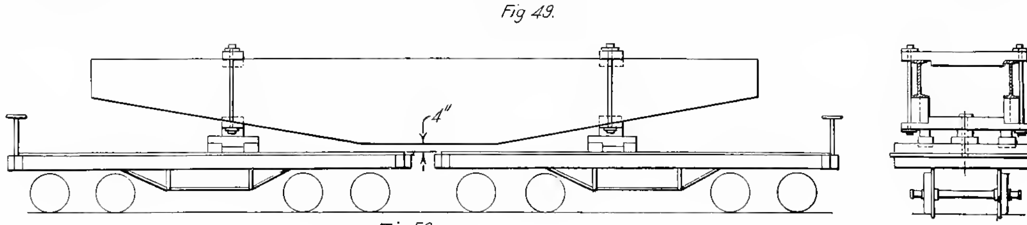


Fig. 50.

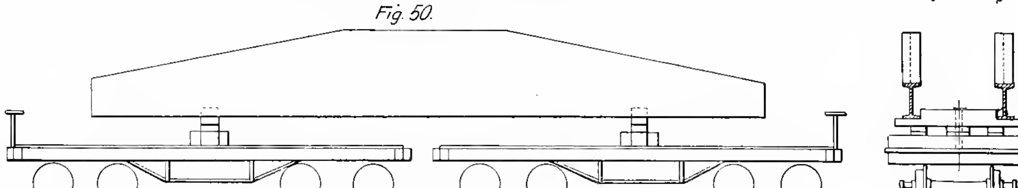


Fig 51 - Loading of Turntables, On Open Cars.

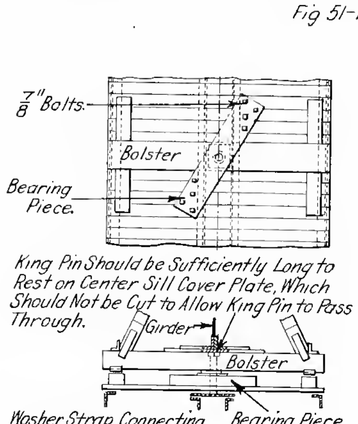
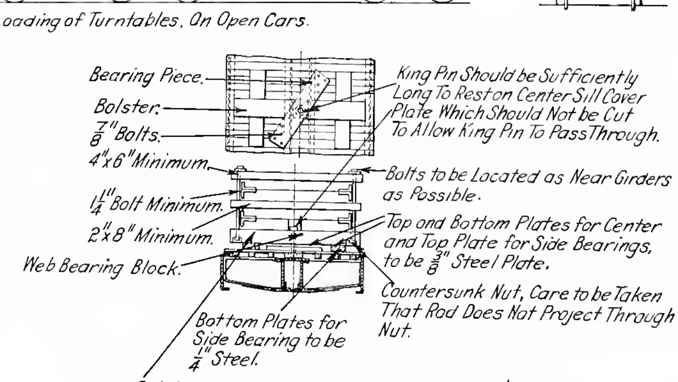


Fig. 52 - Vertical Lading of Long Girders.
Location of Bearing Piece for Bolster for Twin Loads.
Cars Equipped With Steel Underframing.
See Rules 88, 99, 103, 104, 106 and 111.



Bolsters Should in no Case be More Than 9'6" Long.
For Girders Weighing 30,000 lbs. or Less, Bolster to be 8" Deep x 10" Wide.
For Girders Weighing 30,000 lbs to 72,000 lbs. " " " 10" Deep x 14" Wide.
For Girders Weighing 72,000 lbs or More " " " 12" Deep x 16" Wide.

Fig. 53 - Horizontal Loading of Long Girders on Pivoted Bolsters.
Cars Equipped With Steel Underframes
See Rules 98 and 106.

Fig. 2722—M. C. B. Standards for Loading Materials. (M. C. B. Sheets 25A and 25B.)

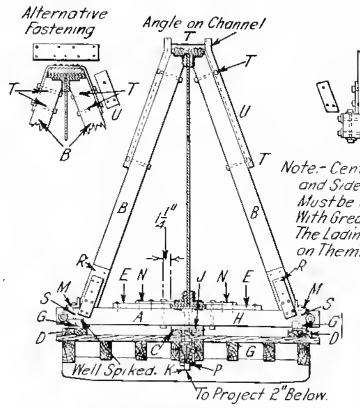


Fig. 54- See Rules 103 and 104 and Figs 55-55A -For Dimensions See Table Rule 104.

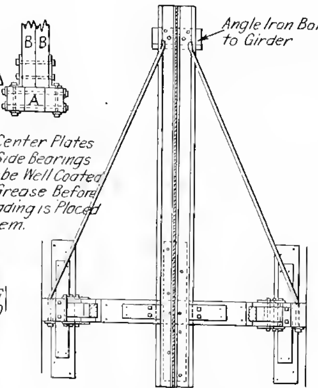


Fig. 55- Plan View of Fig 54-See Rules 103 and 104.

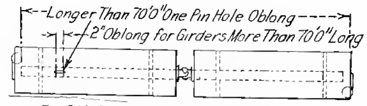


Fig. 54A-See Rule 104B, Letter F and Figures 54, 55 and 55A

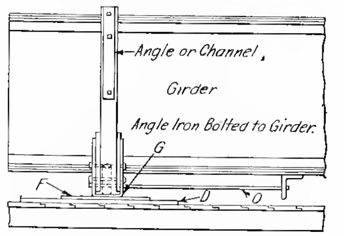


Fig. 55A-Side View of Fig. 55-See Rules 103 and 104 and Figs. 54-55.

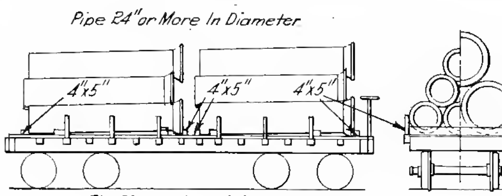


Fig. 56- Lading of Pipe on Flat Cars.

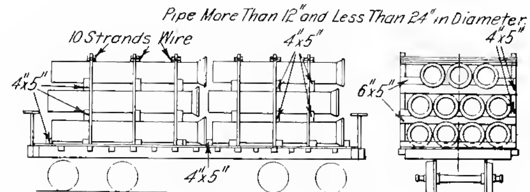


Fig 57-Lading of Cast Iron Pipe On Flat Cars.

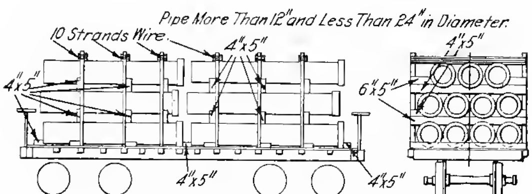
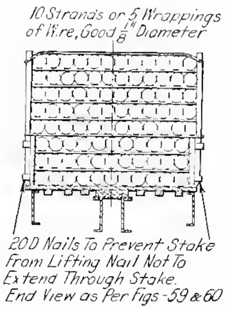


Fig. 58-Lading of Wrought Iron Pipe on Flat Cars



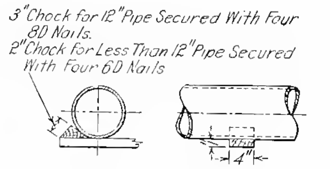
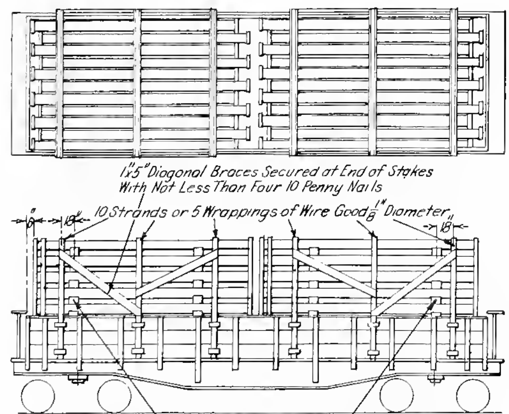
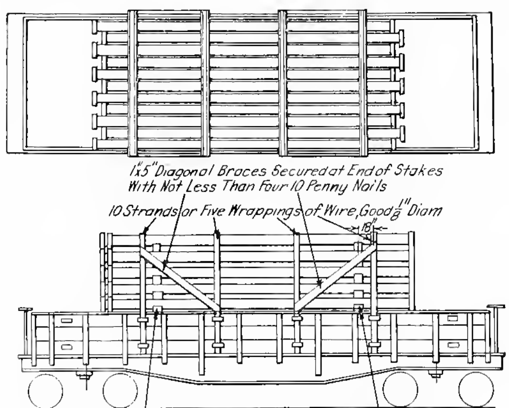


Fig 61 Enlarged View Showing Chock at Each Side of Pipe on Each Bearing Piers.



Bearing-Pieces Spaced Not More Than Six Feet Apart, Must be Placed Between Consecutive Courses of Pipe. These Bearing-Pieces Must Be Not Less Than Four (4) Inches Wide and at Least One (1) Inch Thick for Wrought Iron Pipe and Two (2) Inches Thick for Cast Iron Pipe - See Rule 112.
Fig 60-Loading Two Lengths of all Pipe or Tubing 12" or Less In Diam. In Gondola Cars



Bearing-Pieces Spaced Not More Than Six Feet Apart Must be Placed Between Consecutive Courses of Pipe These Bearing-Pieces Must Be Not Less Than Four (4) Inches Wide and at Least One (1) Inch Thick For Wrought Iron Pipe and Two (2) Inches Thick for Cast Iron Pipe.-See Rule 112.
Fig 59-Loading One Length of all Pipe or Tubing 12" or Less In Diam In Gondola Cars

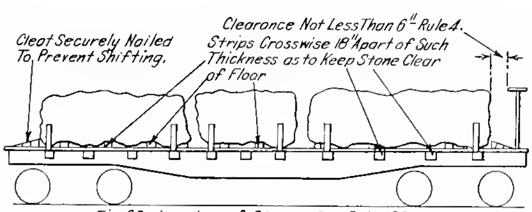


Fig 62- Loading of Stone - See Rule 120.

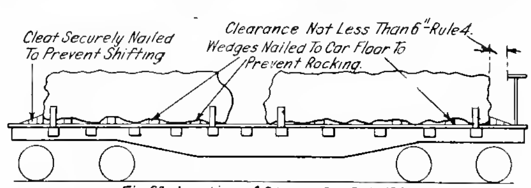


Fig. 63- Loading of Stone - See Rule 120.

Fig. 2723—M. C. B. Standards for Loading Materials. (M. C. B. Sheet 25B.)

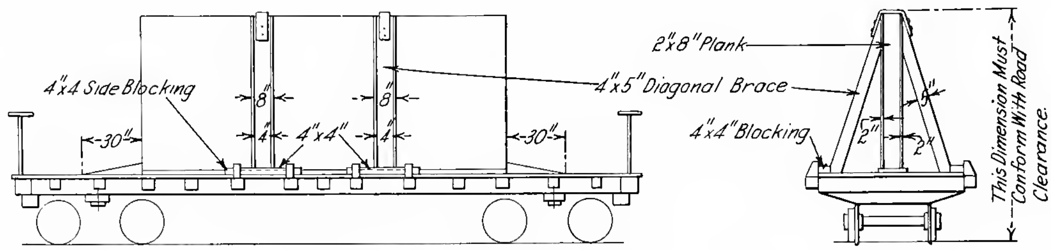


Fig. 64-Lading of Plate Glass on Flat Cars.

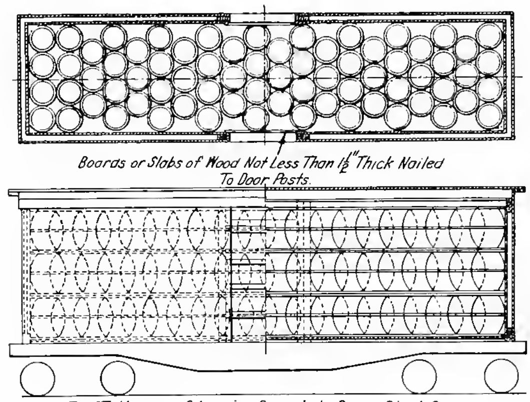


Fig 67-Manner of Loading Barrels In Box or Stock Cars.

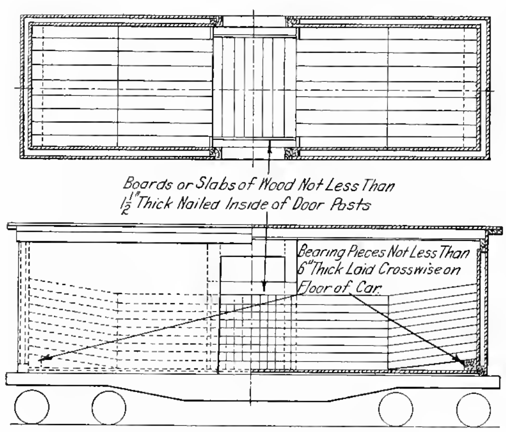


Fig 68-Manner of Loading Ties, Fence Posts, Wooden Billets, Barrel Staves and Similar Short Wood In Closed Cars.

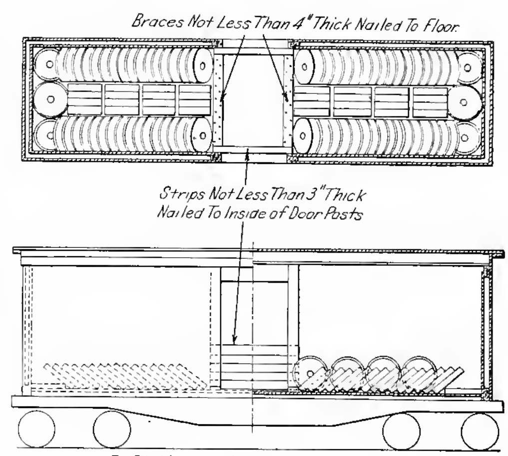


Fig. 70-Manner of Loading Wheels In Closed Cars.

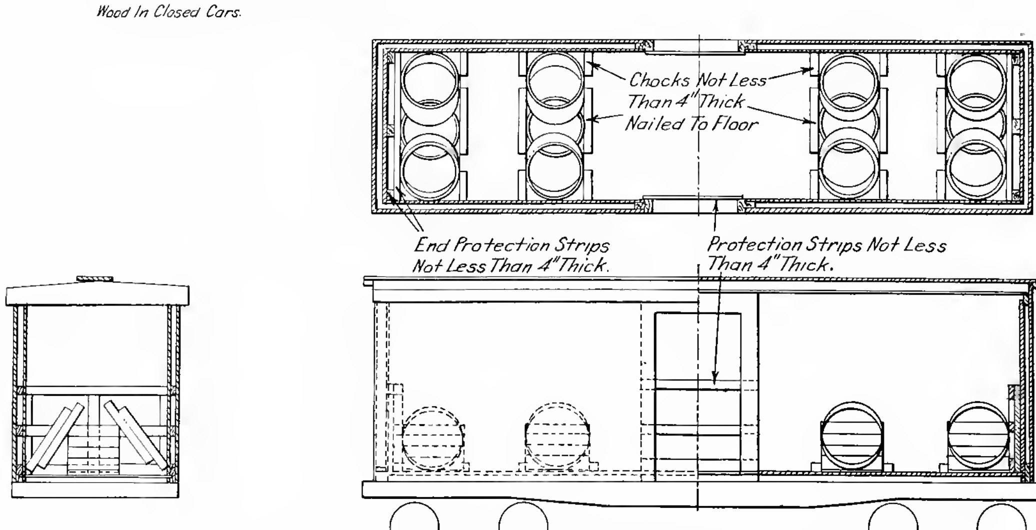


Fig 69- Manner of Loading Tires In Box or Stock Cars.

Fig. 2724—M. C. B. Standards for Loading Materials. (M. C. B. Sheet 25B.)

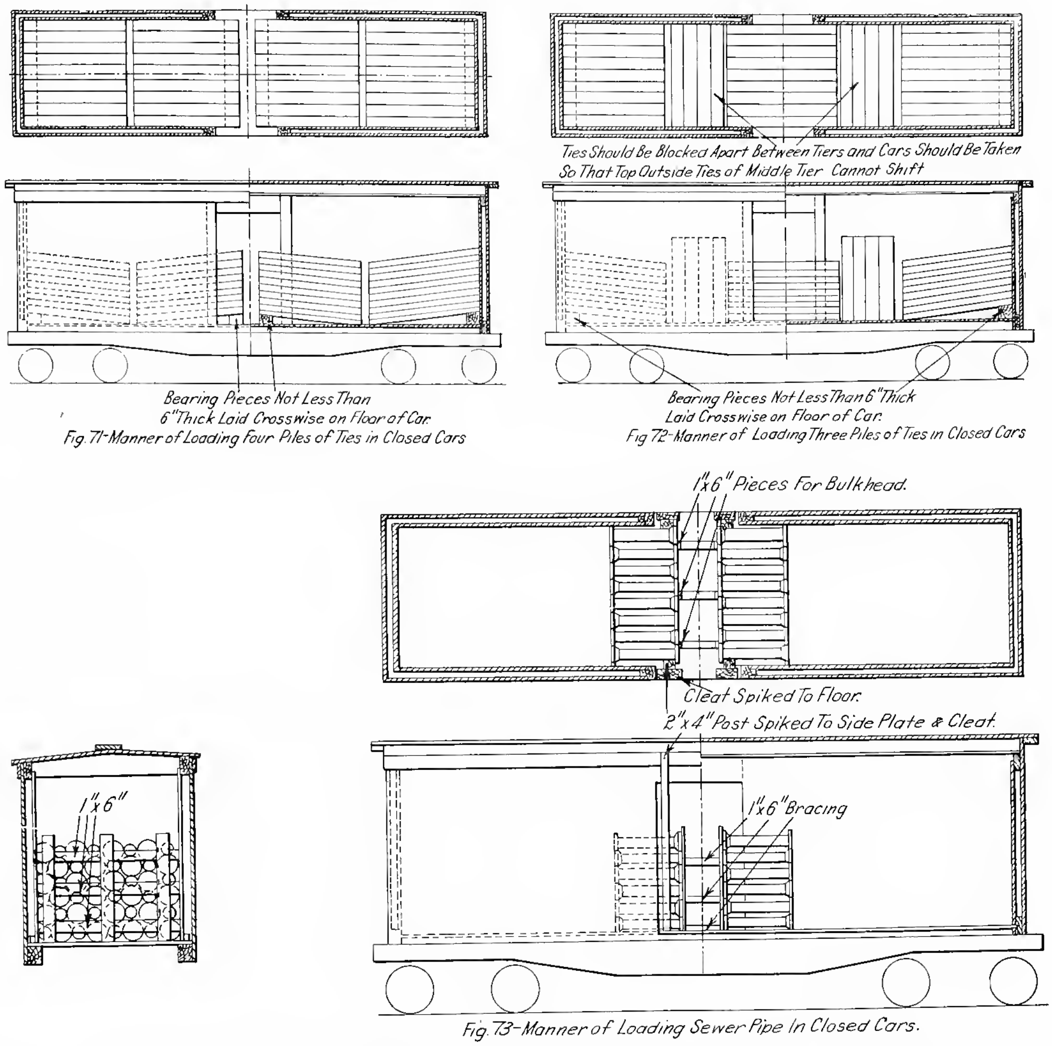


Fig. 2725—M. C. B. Standards for Loading Materials. (M. C. B. Sheet 25B.)

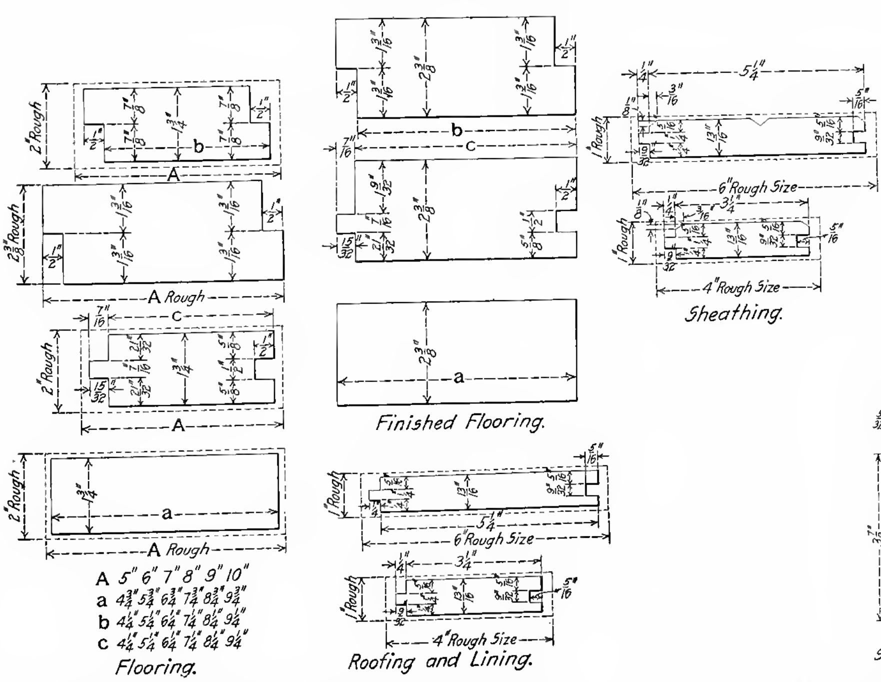


Fig. 2726—M. C. B. Standard Flooring, Sheathing, Roofing and Lining. (M. C. B. Sheet 26.)

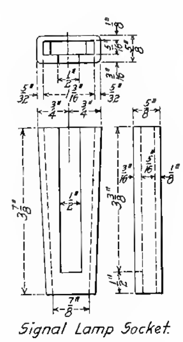


Fig. 2727—M. C. B. Standard Signal Lamp Socket. (M. C. B. Sheet 26.)

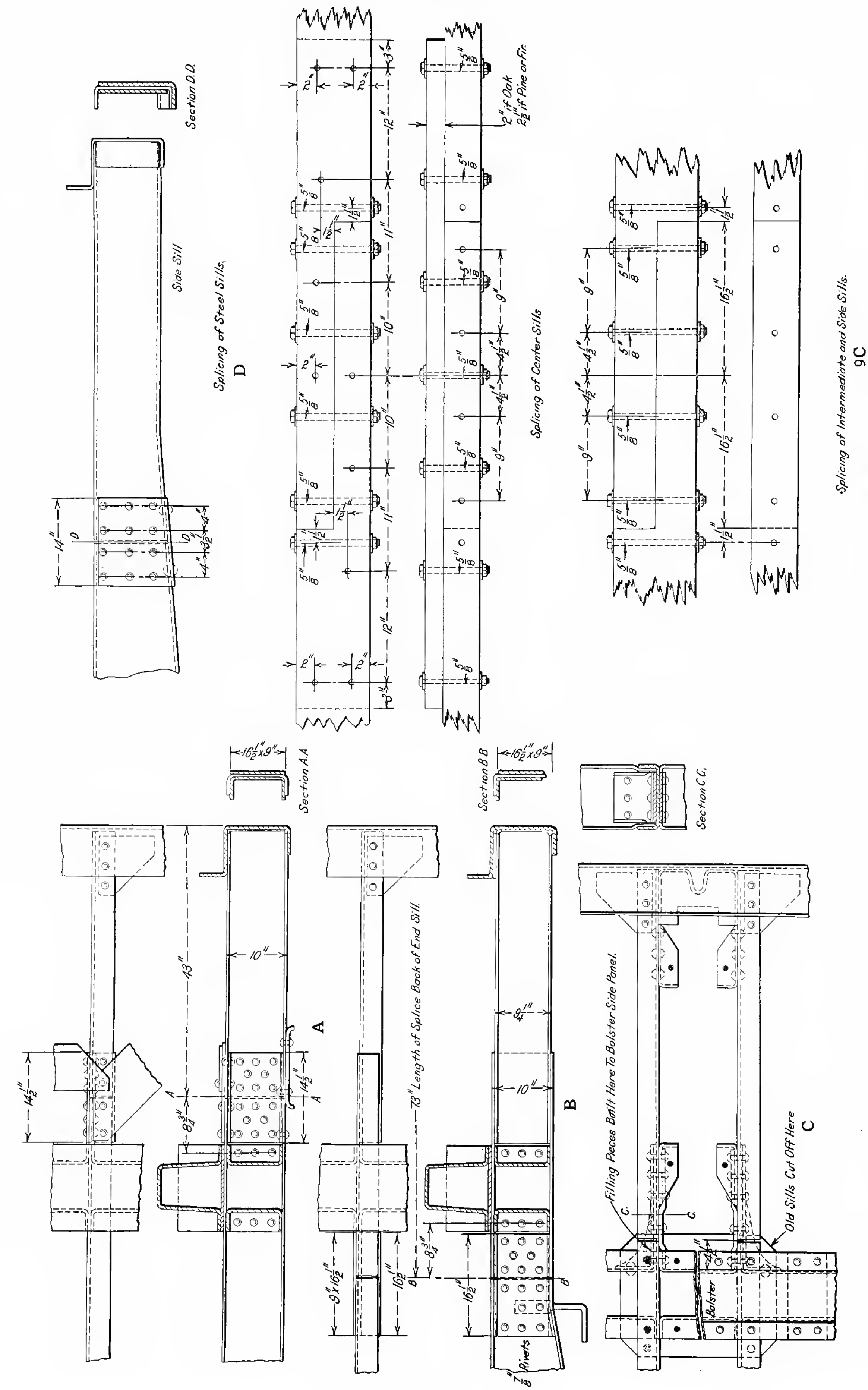


Fig. 2728—M. C. B. Standard Splicing for Steel and Wooden Sills. (M. C. B. Sheet 28.)

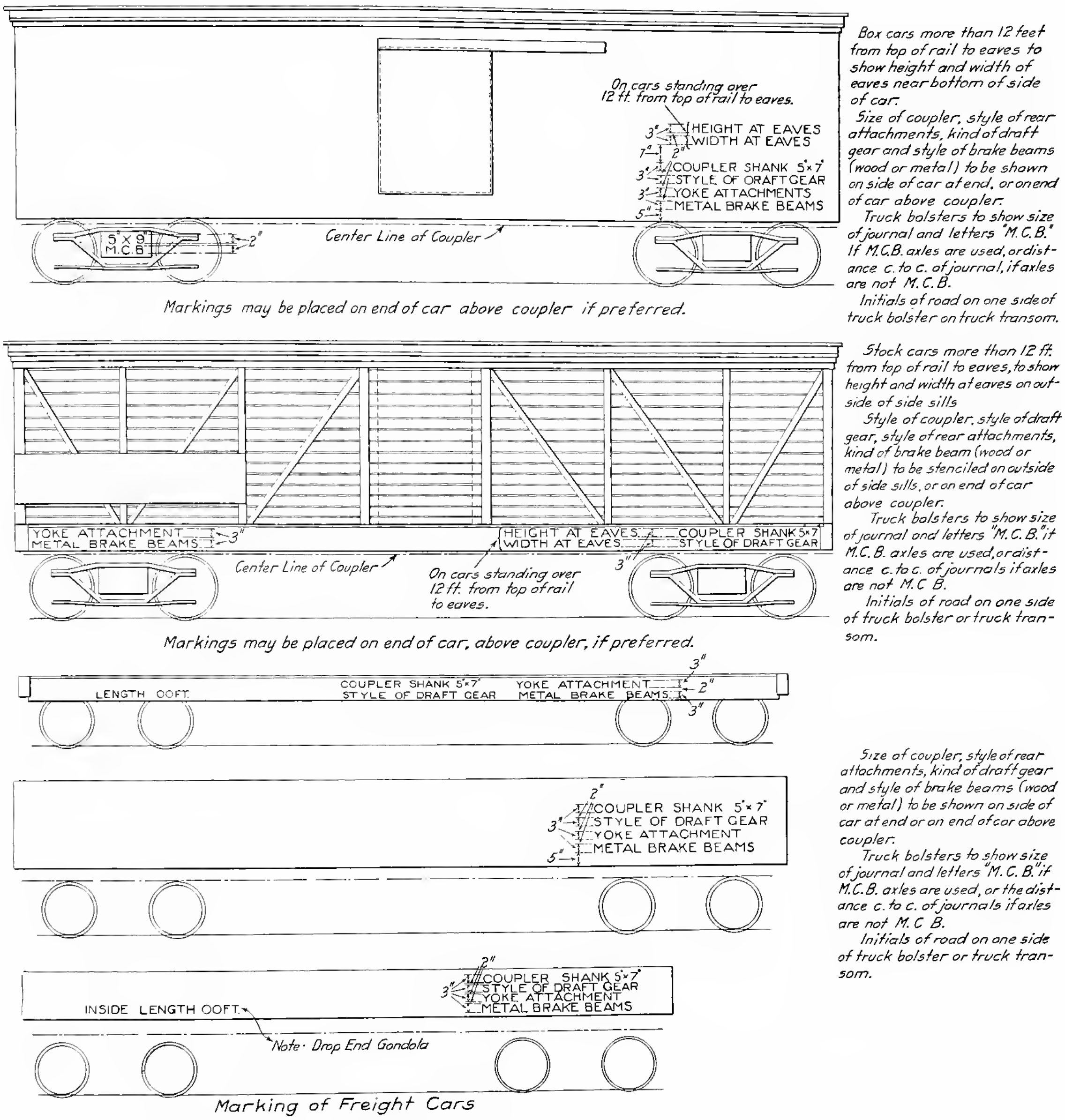
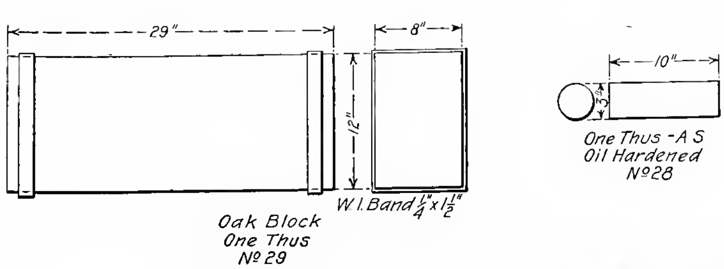


Fig. 2729—M. C. B. Standard Marking for Freight Cars. (M. C. B. Sheet 26.)



List of Bolts for Jerk Test

No. of Bolt	No Used	Diam.	Length	Remarks
28	1	$1\frac{1}{2}''$	$22\frac{1}{4}''$	Sq Hd $2\frac{7}{16}$ Across Flats
29	2	$\frac{7}{8}''$	$3\frac{1}{8}''$	
30	4	$\frac{7}{8}''$	$3''$	Turn Tapered
31	2	$\frac{15}{16}$	$9\frac{1}{2}''$	
32	2	$\frac{7}{8}''$	$3\frac{1}{2}''$	Tap Bolts

Fig. 2730—Details for Standard Jerk Test for M. C. B. Couplers. (M. C. B. Sheet 29A.)
See Figs. 2730-2733.

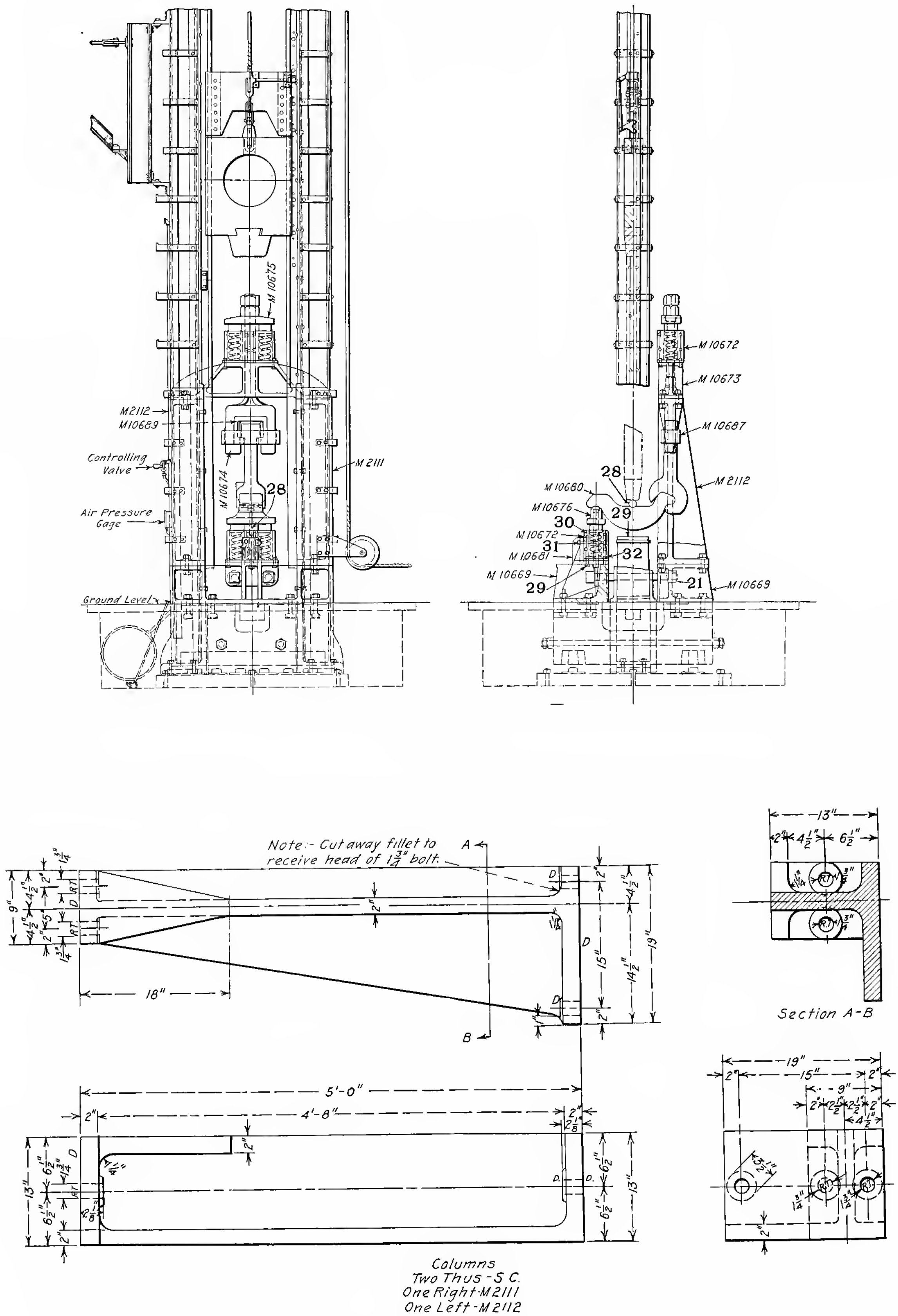


Fig. 2731—Details for Standard Jerk Test for M. C. B. Couplers. (M. C. B. Sheet 29A.)

See Figs. 2730-2733.

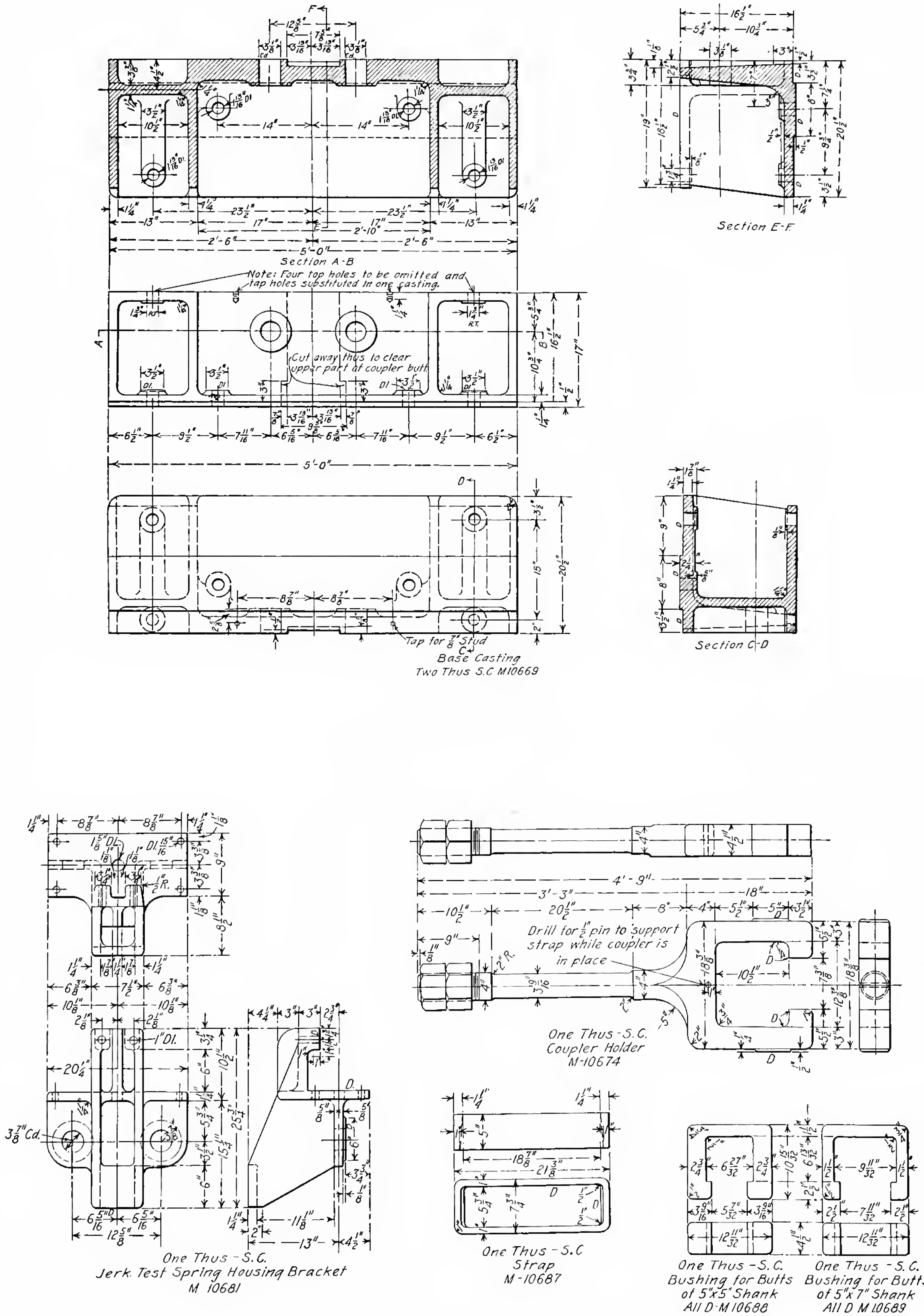


Fig. 2732—Details for Standard Jerk Test for M. C. B. Couplers. (M. C. B. Sheets 29A and 29B.)
See Figs. 2730-2733.

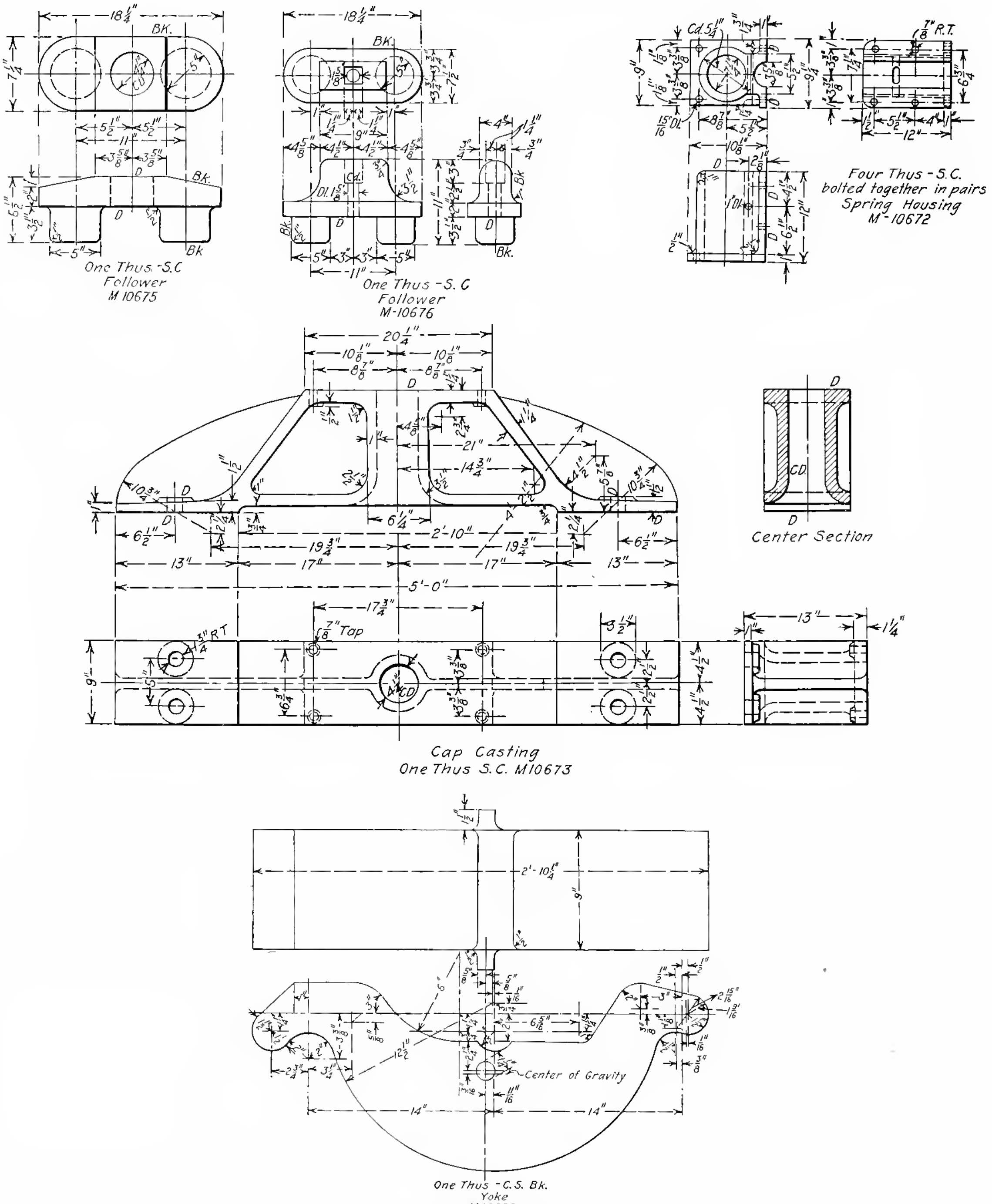


Fig. 2733—Details for Standard Jerk Test for M. C. B. Couplers. (M. C. B. Sheets 29A and 29B.) See Figs. 2730-2733.

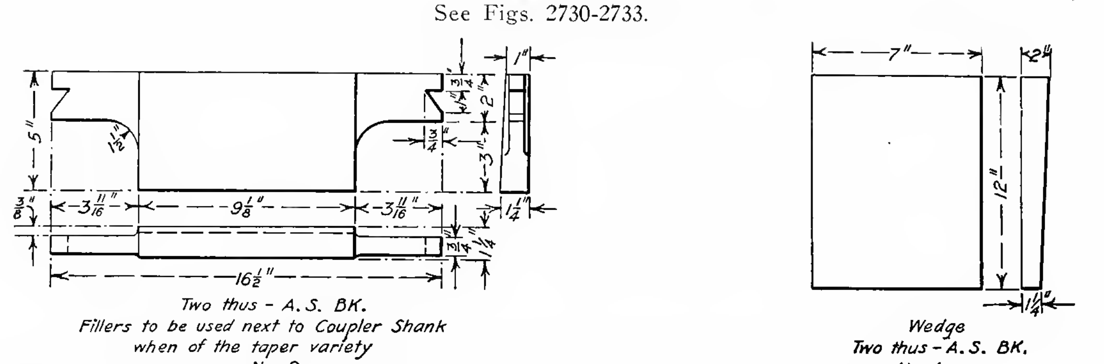
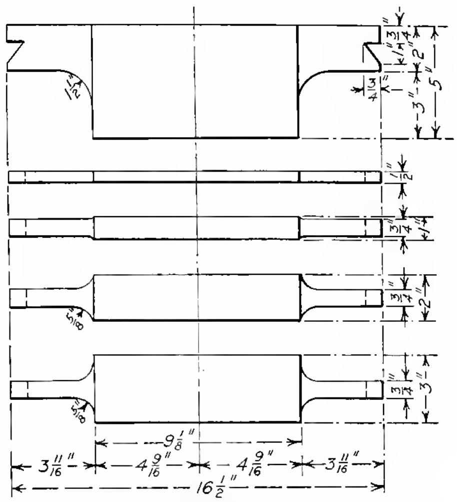
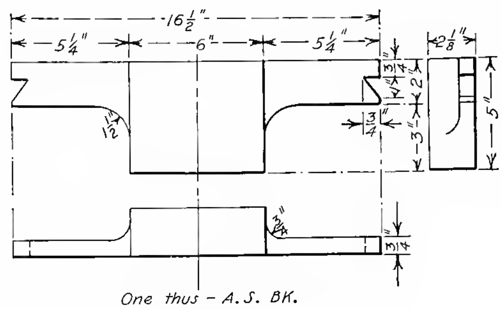


Fig. 2734—Details for Standard Striking Test for M. C. B. Couplers. (M. C. B. Sheet 29B.) See also Fig. 2735.





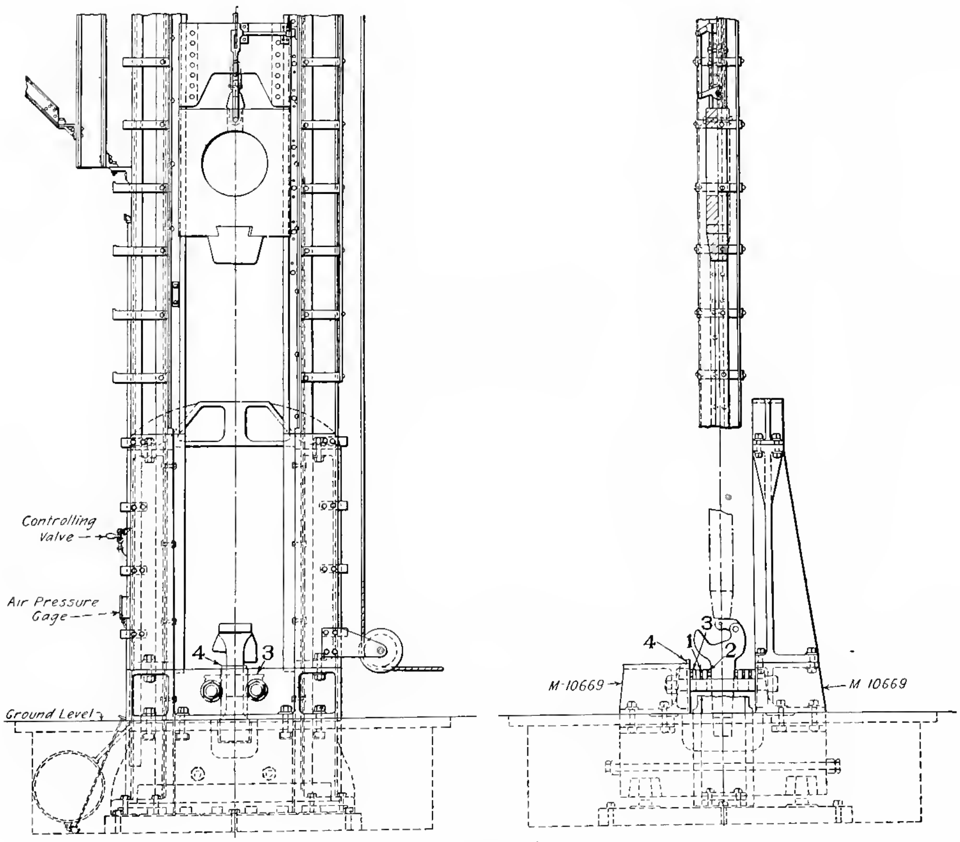
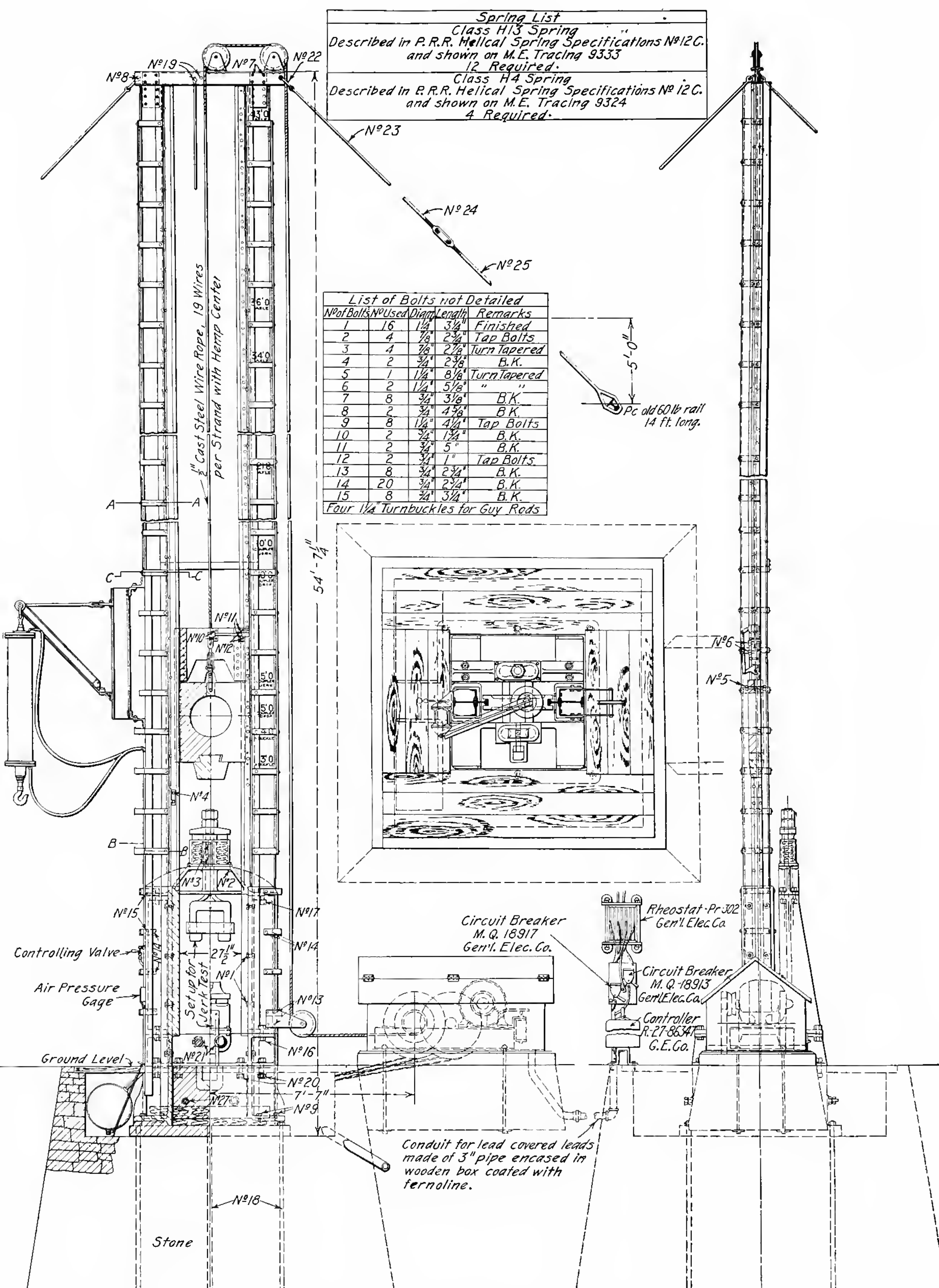


Fig. 2735—Details for Standard Striking Test for M. C. B. Couplers. (M. C. B. Sheet 29B.) See also Fig. 2734.



Spring List
Class H13 Spring Described in P. R. R. Helical Spring Specifications Nº 12 C. and shown on M. E. Tracing 9333 12 Required.
Class H4 Spring Described in P. R. R. Helical Spring Specifications Nº 12 C. and shown on M. E. Tracing 9324 4 Required.

List of Bolts not Detailed

Nº of Bolts	Nº Used	Diam.	Length	Remarks
1	16	$1\frac{1}{4}$"	$3\frac{1}{4}$"	Finished
2	4	$\frac{7}{8}$"	$2\frac{3}{4}$"	Tap Bolts
3	4	$\frac{7}{8}$"	$2\frac{7}{8}$"	Turn Tapered
4	2	$\frac{3}{4}$"	$2\frac{3}{8}$"	B.K.
5	1	$1\frac{1}{4}$"	$8\frac{1}{8}$"	Turn Tapered
6	2	$1\frac{1}{4}$"	$5\frac{1}{8}$"	" "
7	8	$\frac{3}{4}$"	$3\frac{1}{8}$"	B.K.
8	2	$\frac{3}{4}$"	$4\frac{5}{8}$"	B.K.
9	8	$1\frac{1}{4}$"	$4\frac{1}{4}$"	Tap Bolts
10	2	$\frac{3}{4}$"	$1\frac{3}{4}$"	B.K.
11	2	$\frac{3}{4}$"	5"	B.K.
12	2	$\frac{3}{4}$"	1"	Tap Bolts
13	8	$\frac{3}{4}$"	$2\frac{3}{4}$"	B.K.
14	20	$\frac{3}{4}$"	$2\frac{3}{4}$"	B.K.
15	8	$\frac{3}{4}$"	$3\frac{1}{4}$"	B.K.
Four $1\frac{1}{4}$" Turnbuckles for Guy Rods				

Fig. 2736—General Arrangement for M. C. B. Standard Drop Test Machine for M. C. B. Couplers and Axles. (M. C. B. Sheet 29.)

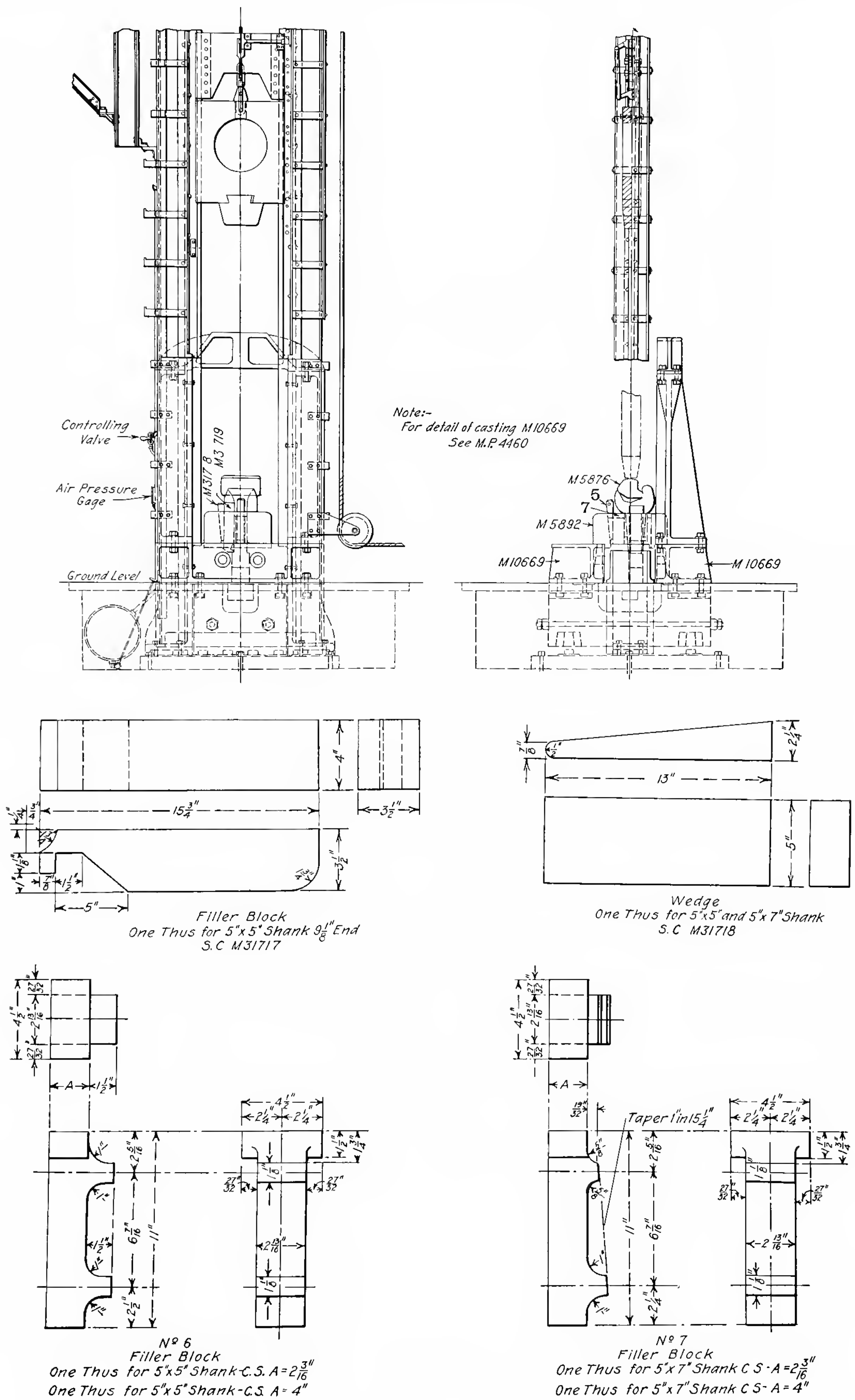


Fig. 2737—Details for Standard Face Test for M. C. B. Couplers. (M. C. B. Sheet 29C.) See also Fig. 2738.

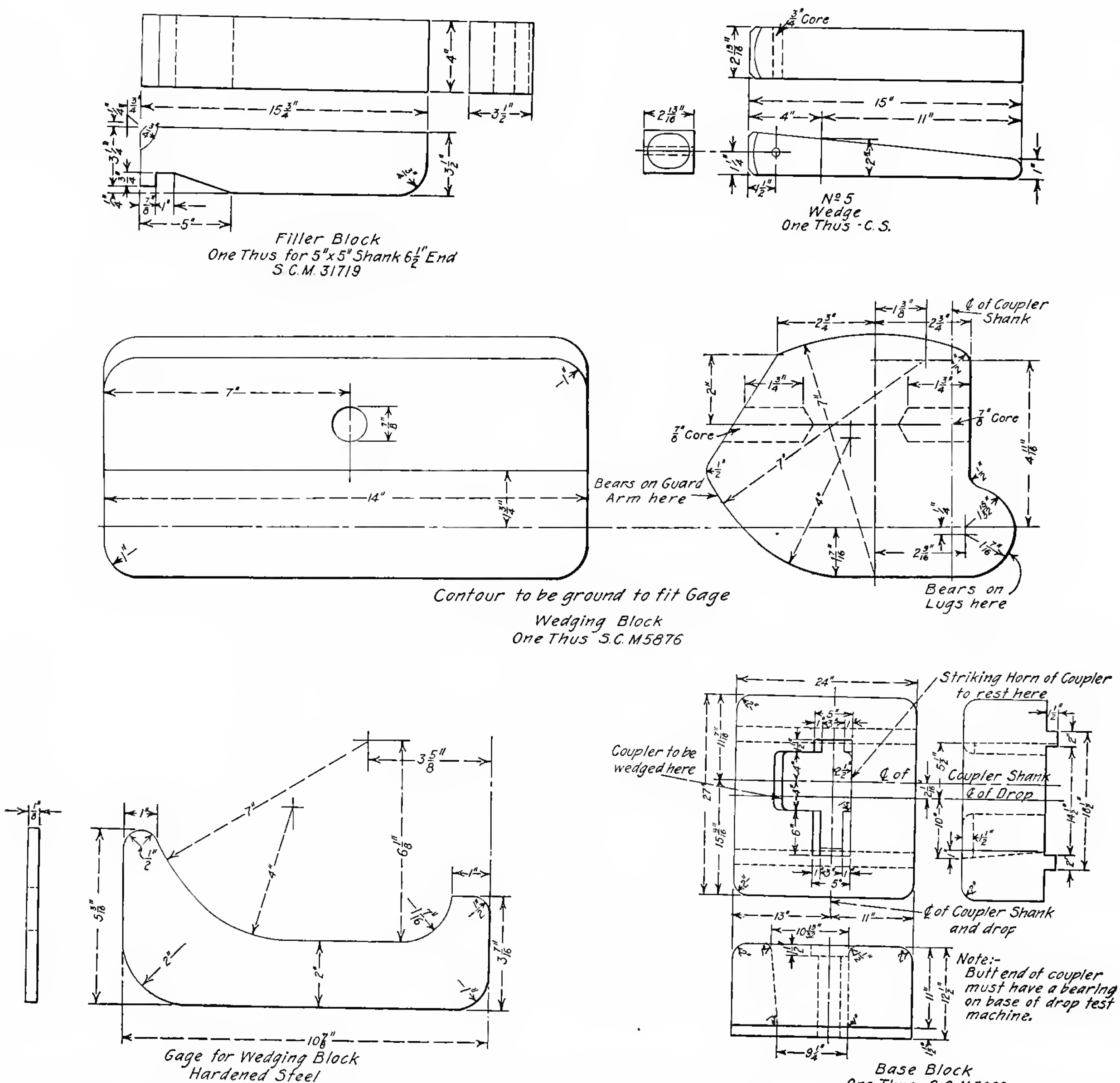


Fig. 2738—Details for Standard Face Test for M. C. B. Couplers. (M. C. B. Sheet 29C.) See also Fig. 2737.

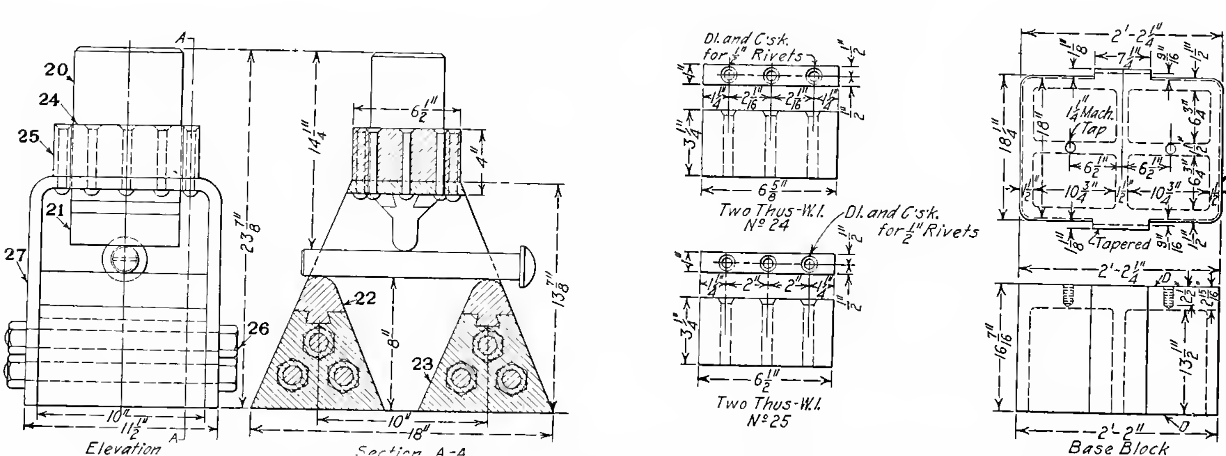


Fig. 2739—Details for Standard M. C. B. Knuckle Pin Test. (M. C. B. Sheet 29D.) See also Figs. 2740, 2741.

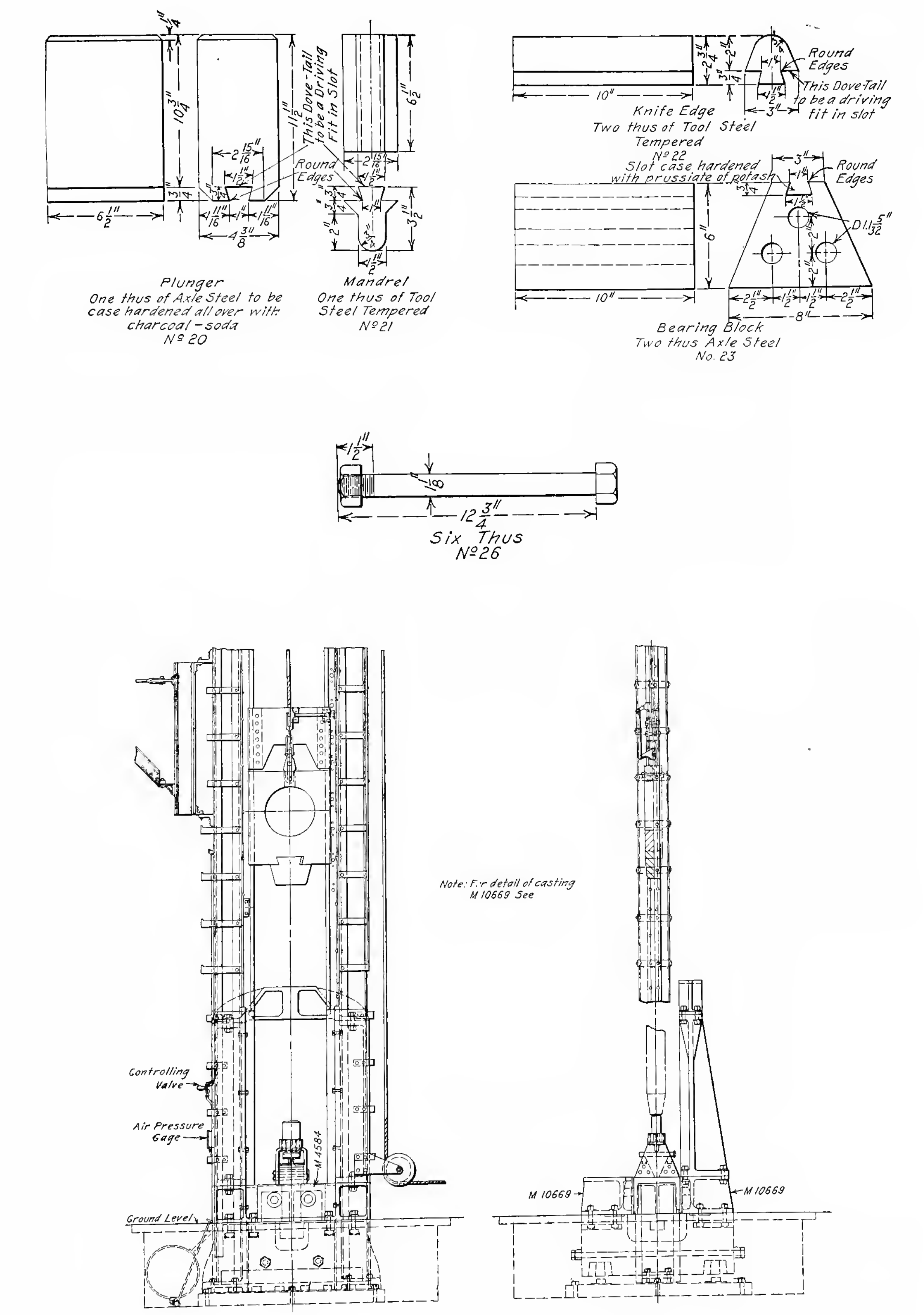


Fig. 2740—Details for Standard M. C. B. Knuckle Pin Test. (M. C. B. Sheet 29D.) See also Figs. 2739, 2741.

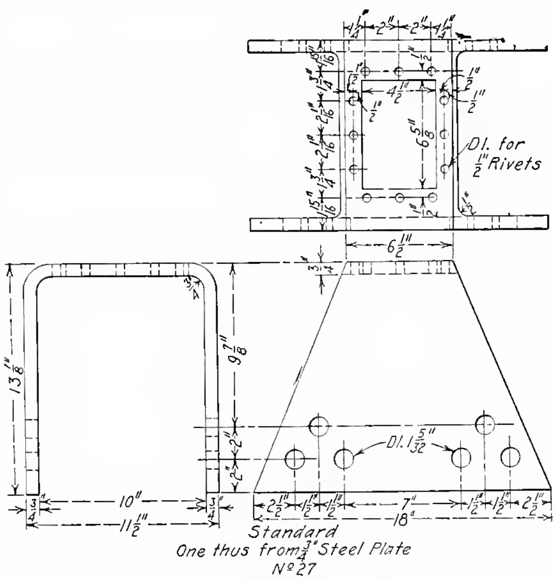


Fig. 2741—Details for Standard M. C. B. Knuckle Pin Test. (M. C. B. Sheet 29D.) See also Figs. 2739, 2740.

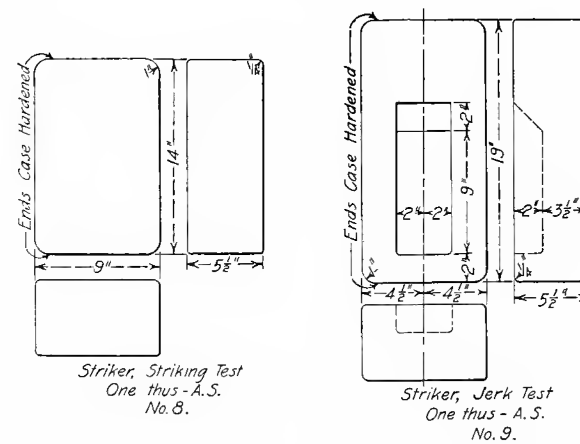


Fig. 2742—Details for M. C. B. Standard Separate Knuckle Test. (M. C. B. Sheet 29E). See also Figs. 2743, 2744.

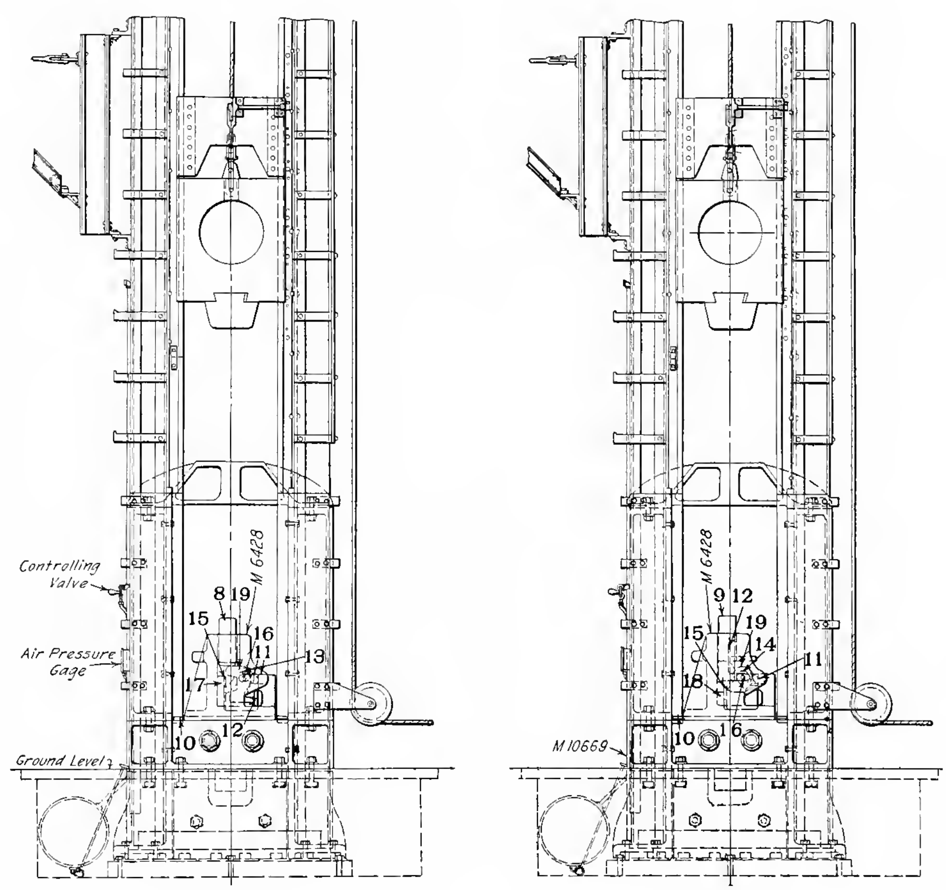


Fig. 2743—Details for M. C. B. Standard Separate Knuckle Test. (M. C. B. Sheet 29E). See also Figs. 2742, 2744.

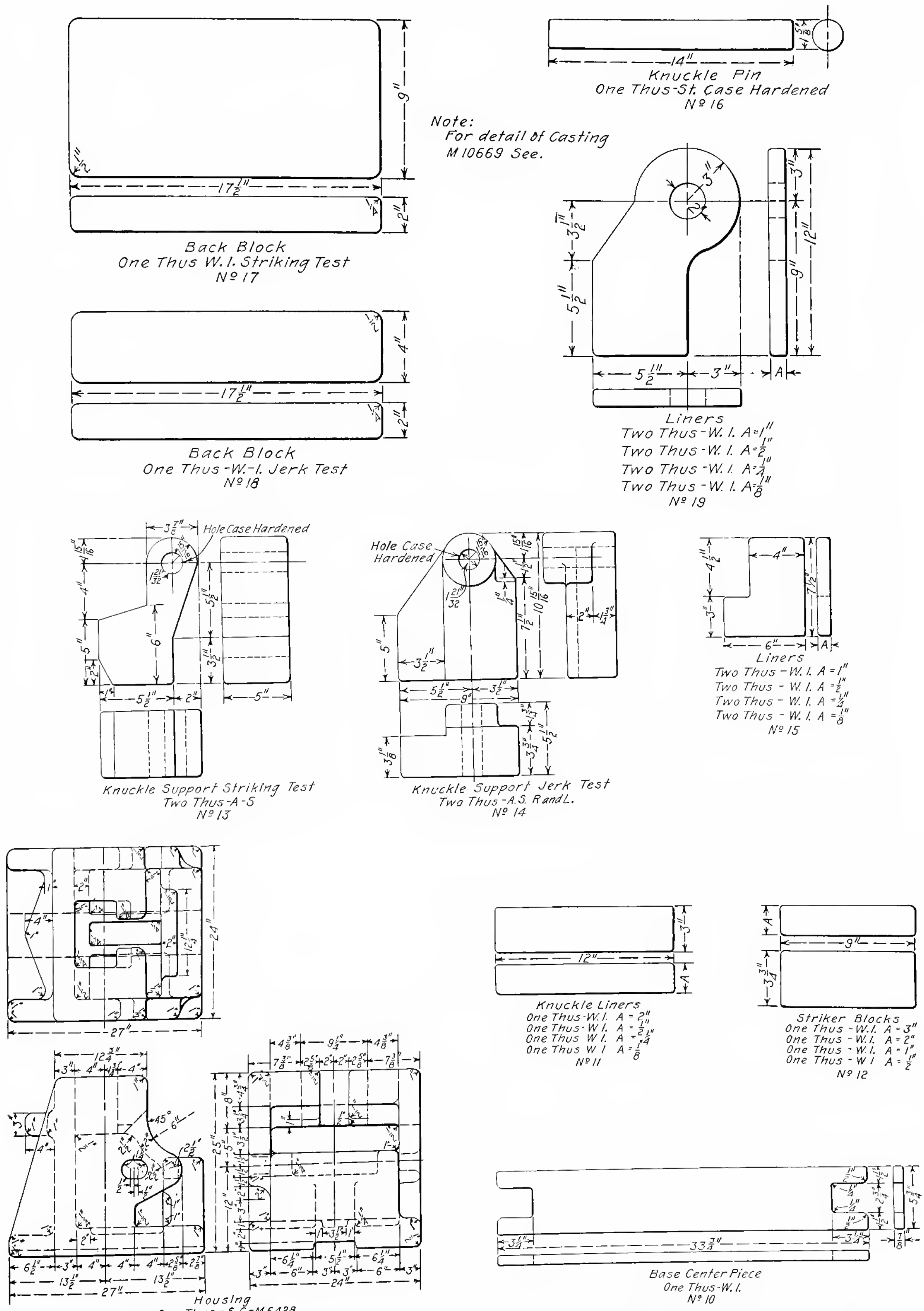


Fig. 2744—Details for M. C. B. Standard Separate Knuckle Test. (M. C. B. Sheet 29E). See also Figs. 2742, 2743.

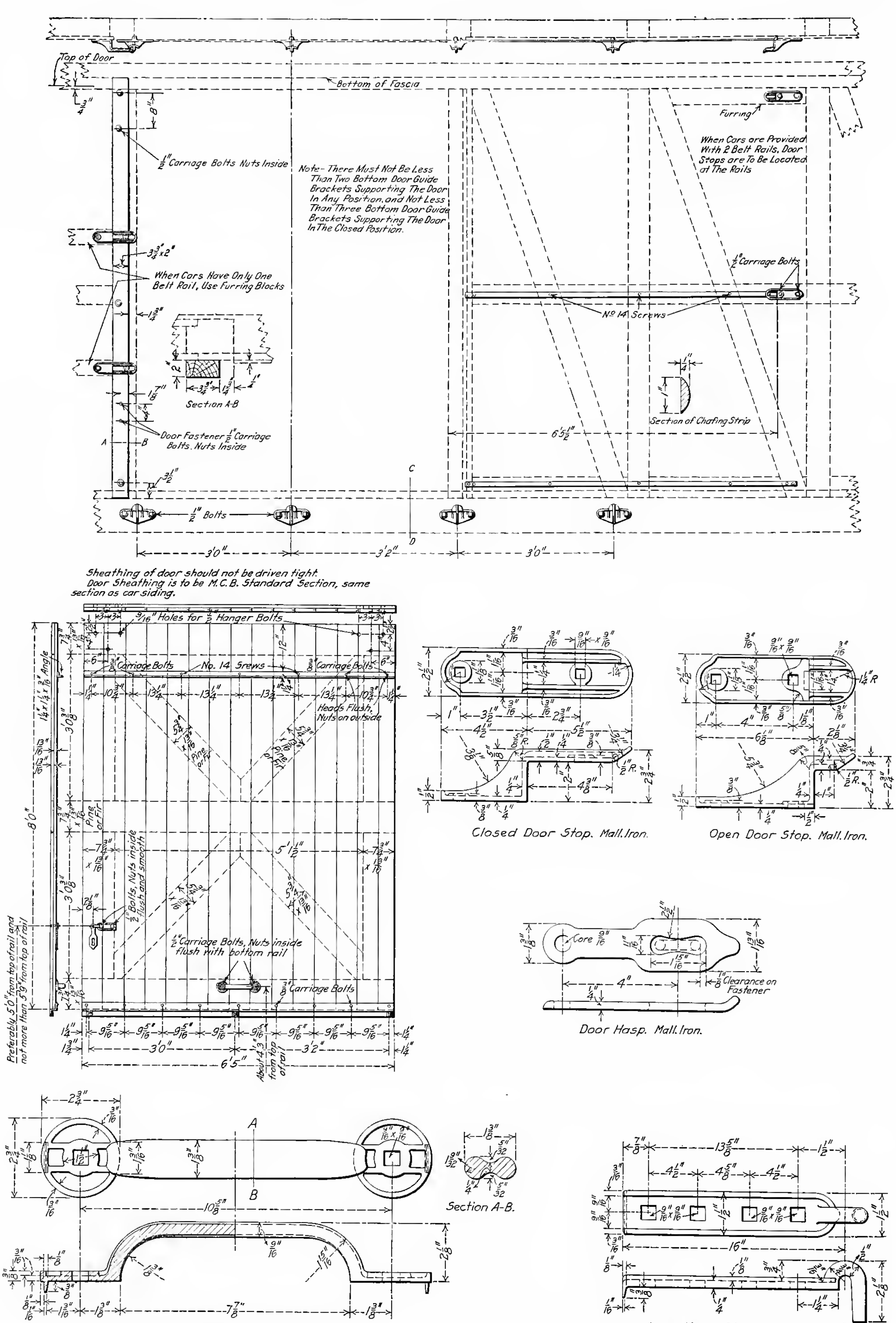


Fig. 2745—M. C. B. Standard Outside Hung Box Car Side Door and Details. (M. C. B. Sheet 30.) See also Fig. 2746.

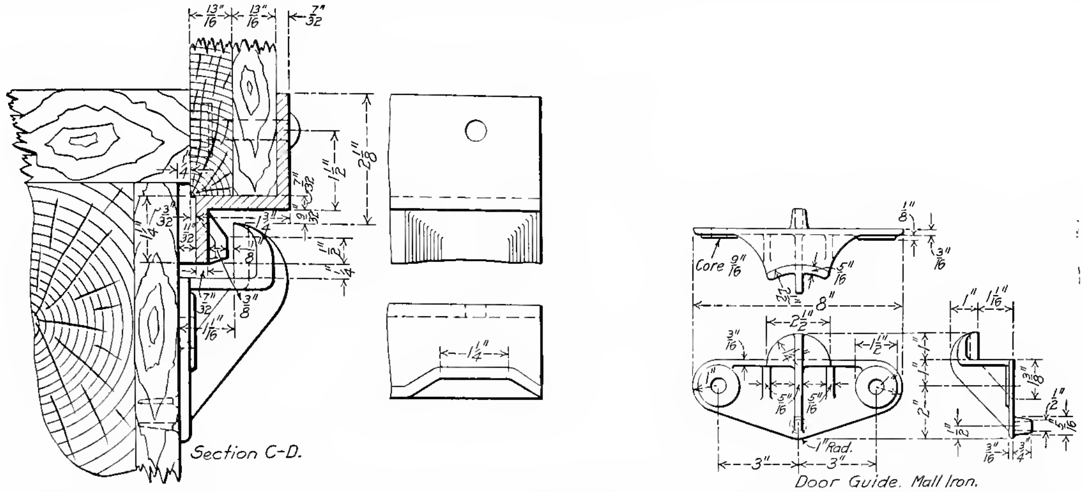


Fig. 2746—Details for M. C. B. Standard Outside Hung Box Car Side Door. (M. C. B. Sheet 30.) See also Fig. 2745.

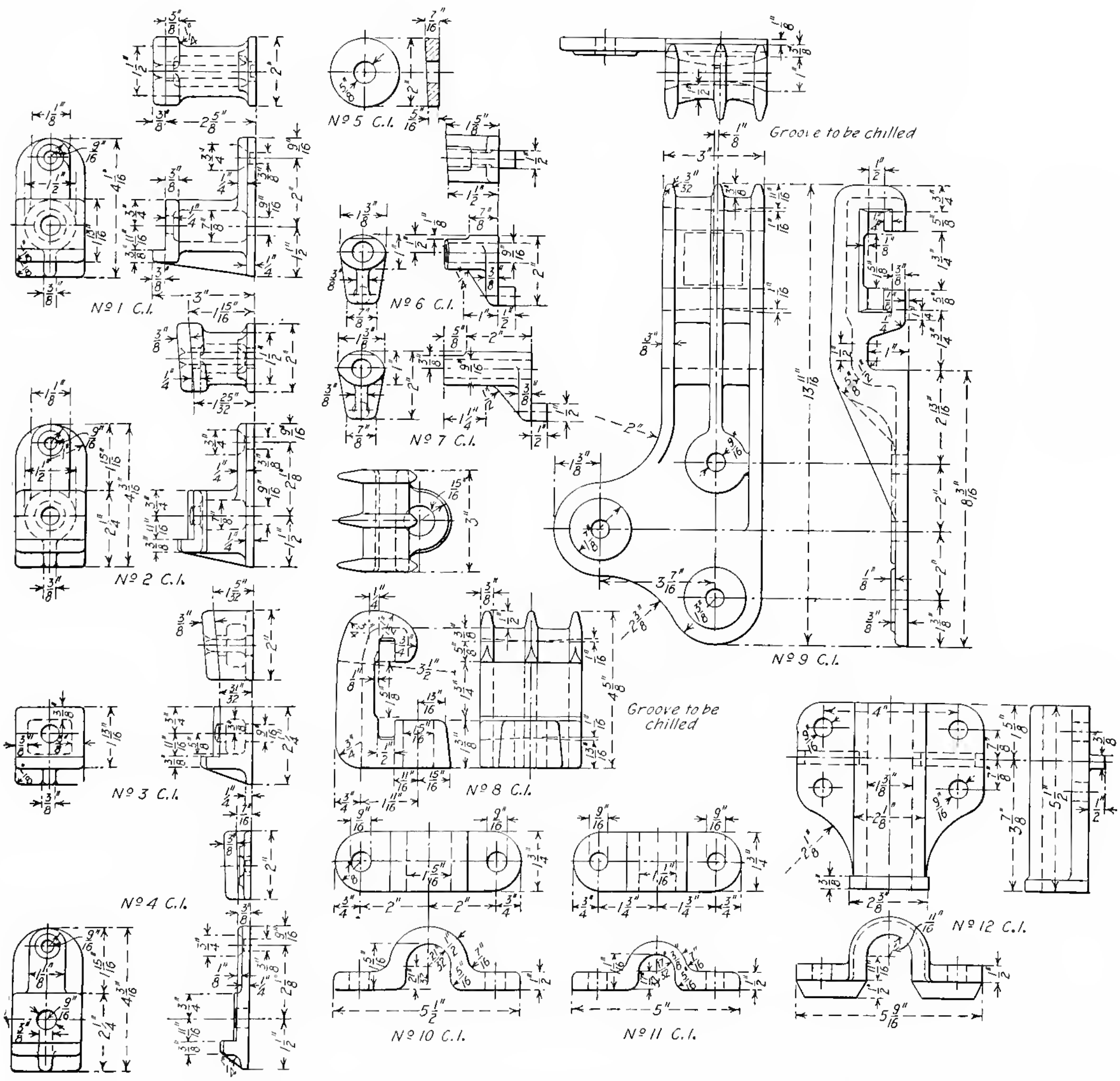


Fig. 2747—Details for M. C. B. Standard Flush Side Door for Box Cars. (M. C. B. Sheet 30A.) See also Figs. 2748, 2749.

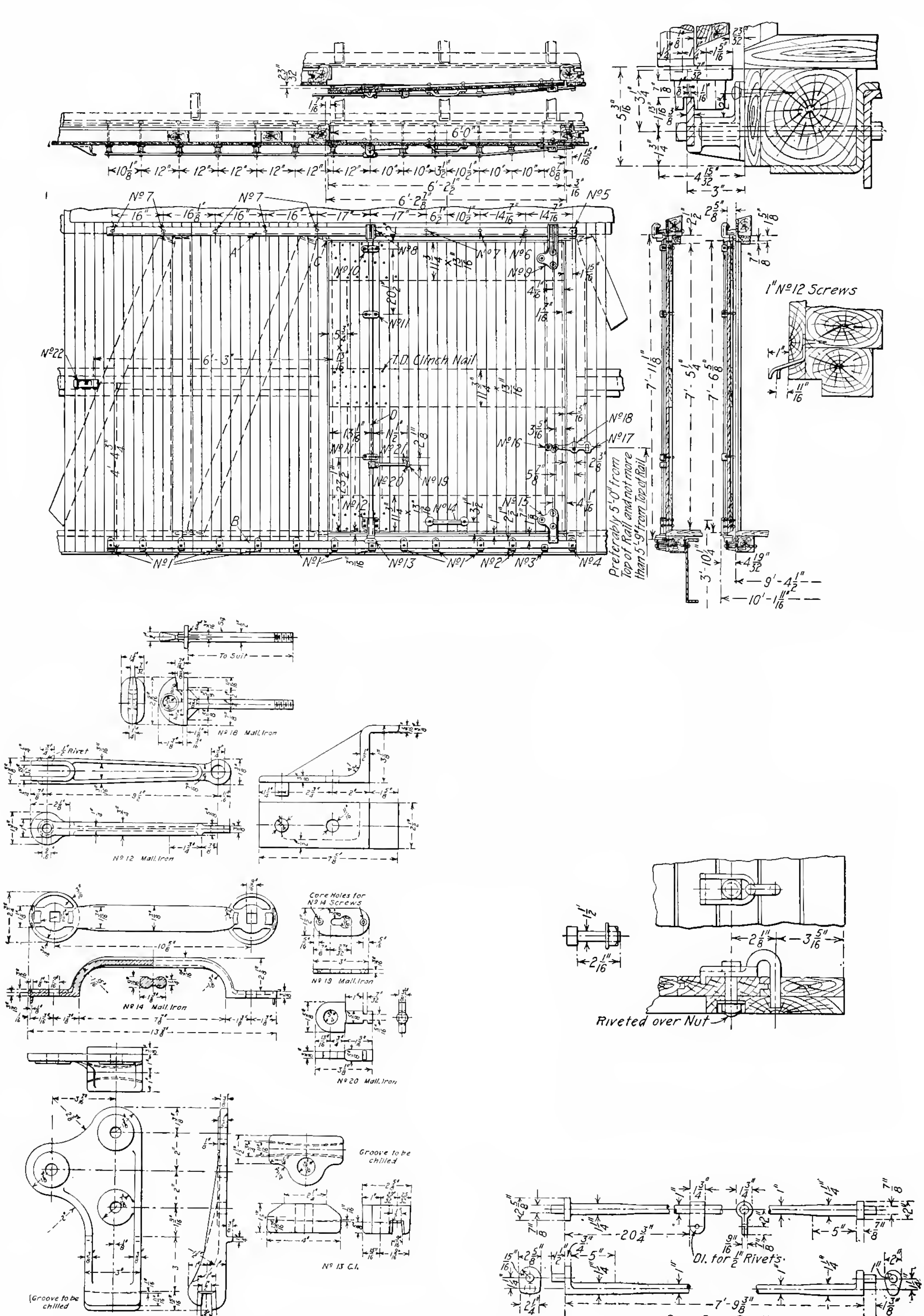


Fig. 2748—M. C. B. Standard Flush Side Door and Details for Box Cars. (M. C. B. Sheet 30A.) See also Figs. 2747, 2749.

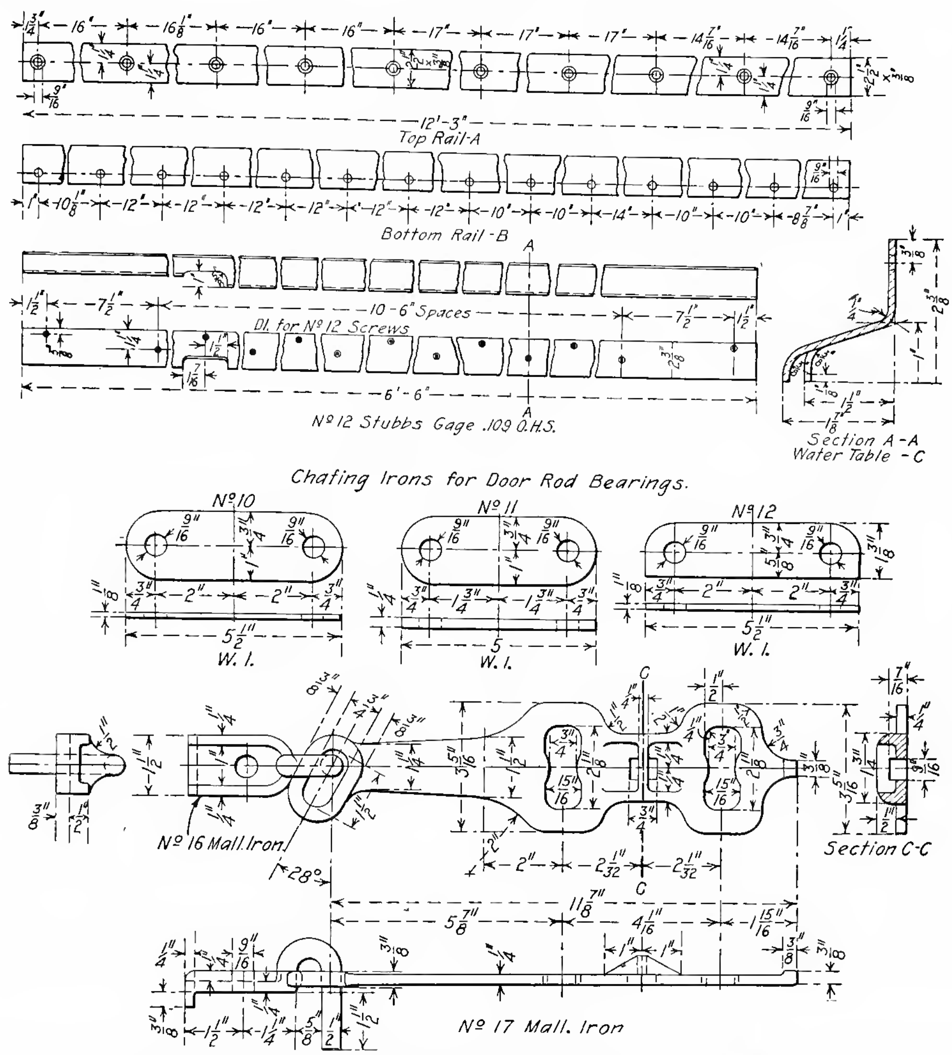


Fig. 2749—Details for M. C. B. Standard Flush Side Door for Box Cars. (M. C. B. Sheet 30A.) See also Figs. 2747, 2748.

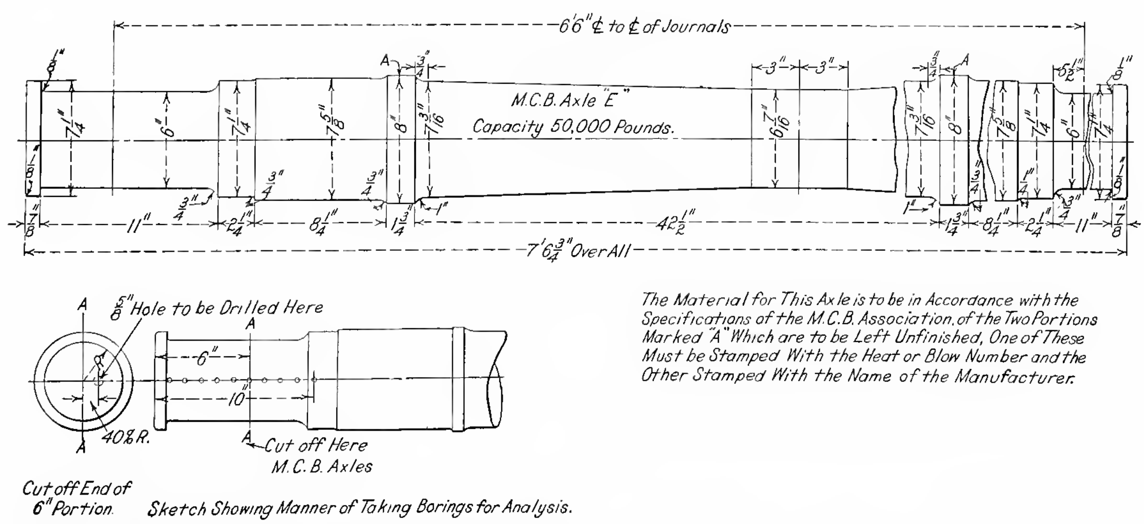


Fig. 2750—M. C. B. Recommended Practice for Freight Car Axle to Carry a Load of 50,000 lbs.; and Manner of Taking Borings for Analysis of Axles. (M. C. B. Sheet B.)

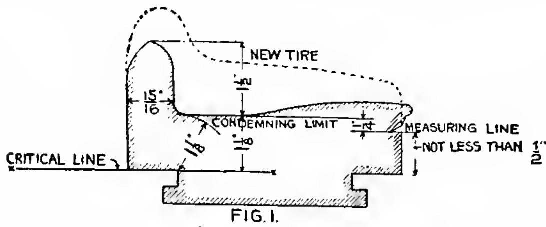


FIG. I.
STEEL TIRE
RETAINING RING FASTENING

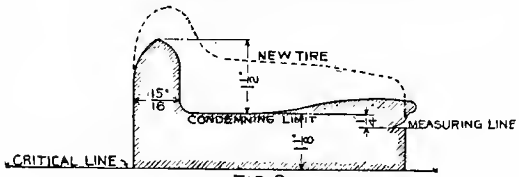


FIG. 2.
STEEL TIRE.
SHRINKAGE FASTENING ONLY.

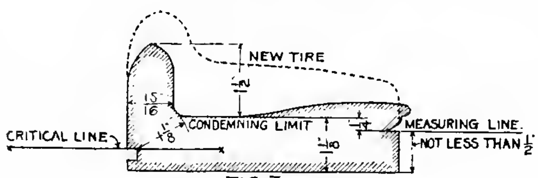


FIG. 3.
STEEL TIRE.
RETAINING RING FASTENING

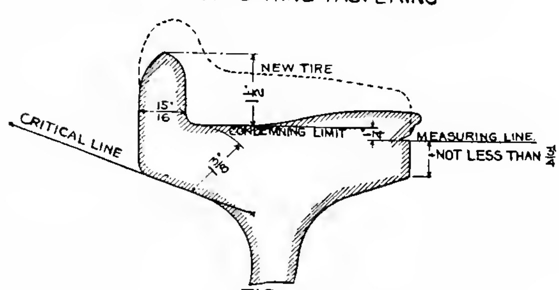
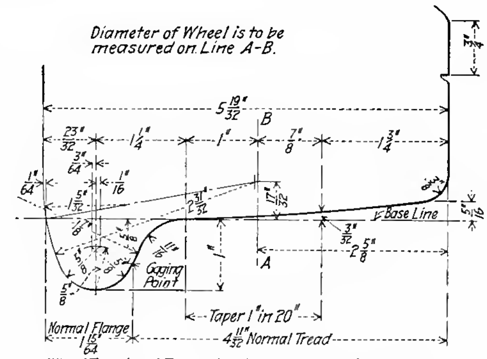
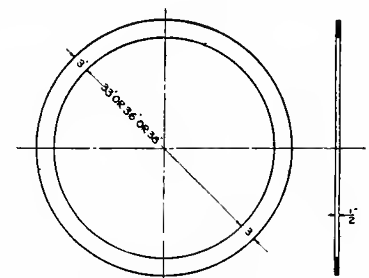


FIG. 4.
STEEL WHEEL.

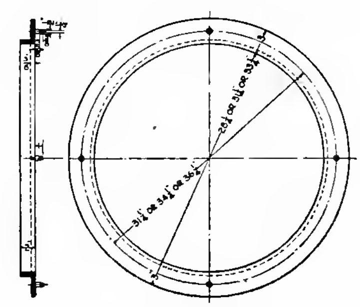
MINIMUM THICKNESS FOR STEEL TIRES.



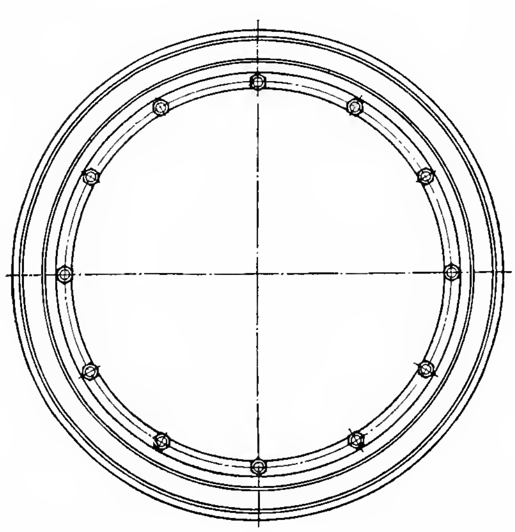
Wheel Tread and Flange for Steel and Steel Tired Wheels.

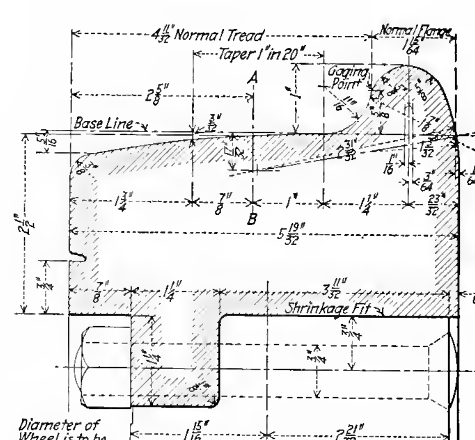


ROTUNDITY GAUGE
FOR 33" OR 36" OR 38" SOLID STEEL WHEELS



PLANE GAUGE
FOR SOLID STEEL WHEELS





Proposed Tire Fastening for Steel Tired Wheels

Fig. 2751—M. C. B. Recommended Practice for Minimum Thickness of Steel Tires, Wheel Tread and Flange for Steel Wheels, Rotundity and Plane Gages and Tire Fastening for Steel Tired Wheels. (M. C. B. Sheet C.)

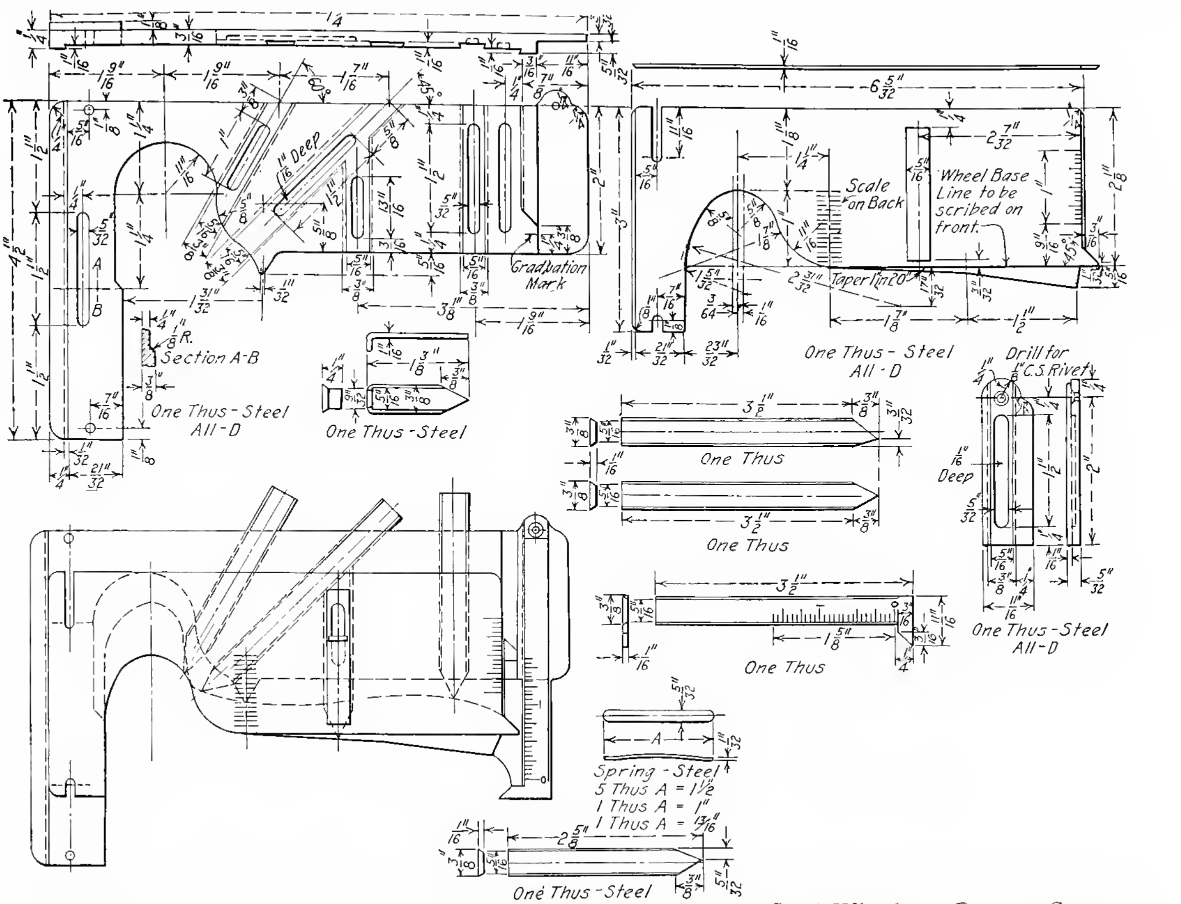


Fig. 2752—M. C. B. Recommended Practice for Gage for Measuring Steel Wheels to Restore Contour. (M. C. B. Sheet C1.)

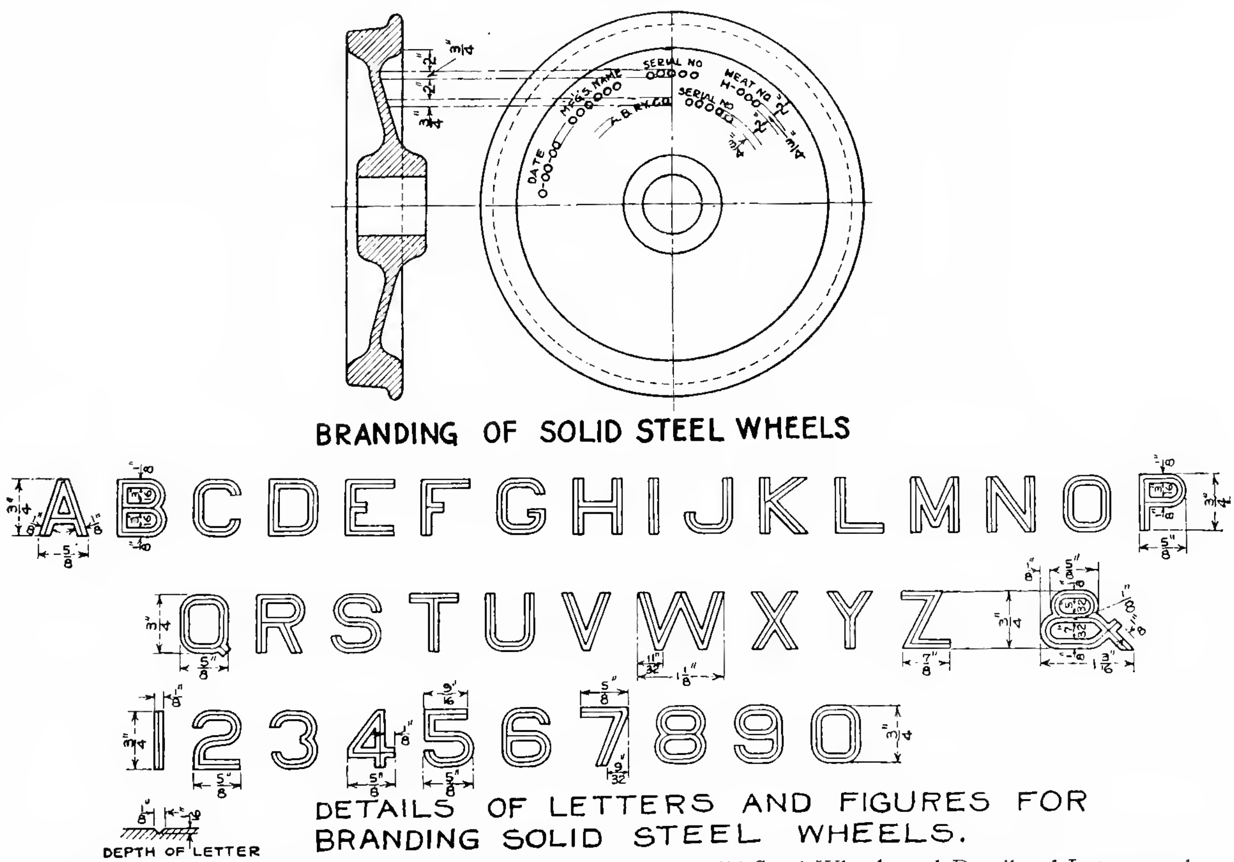


Fig. 2753—M. C. B. Recommended Practice for Branding Solid Steel Wheels and Details of Letters and Figures. (M. C. B. Sheet C2.)

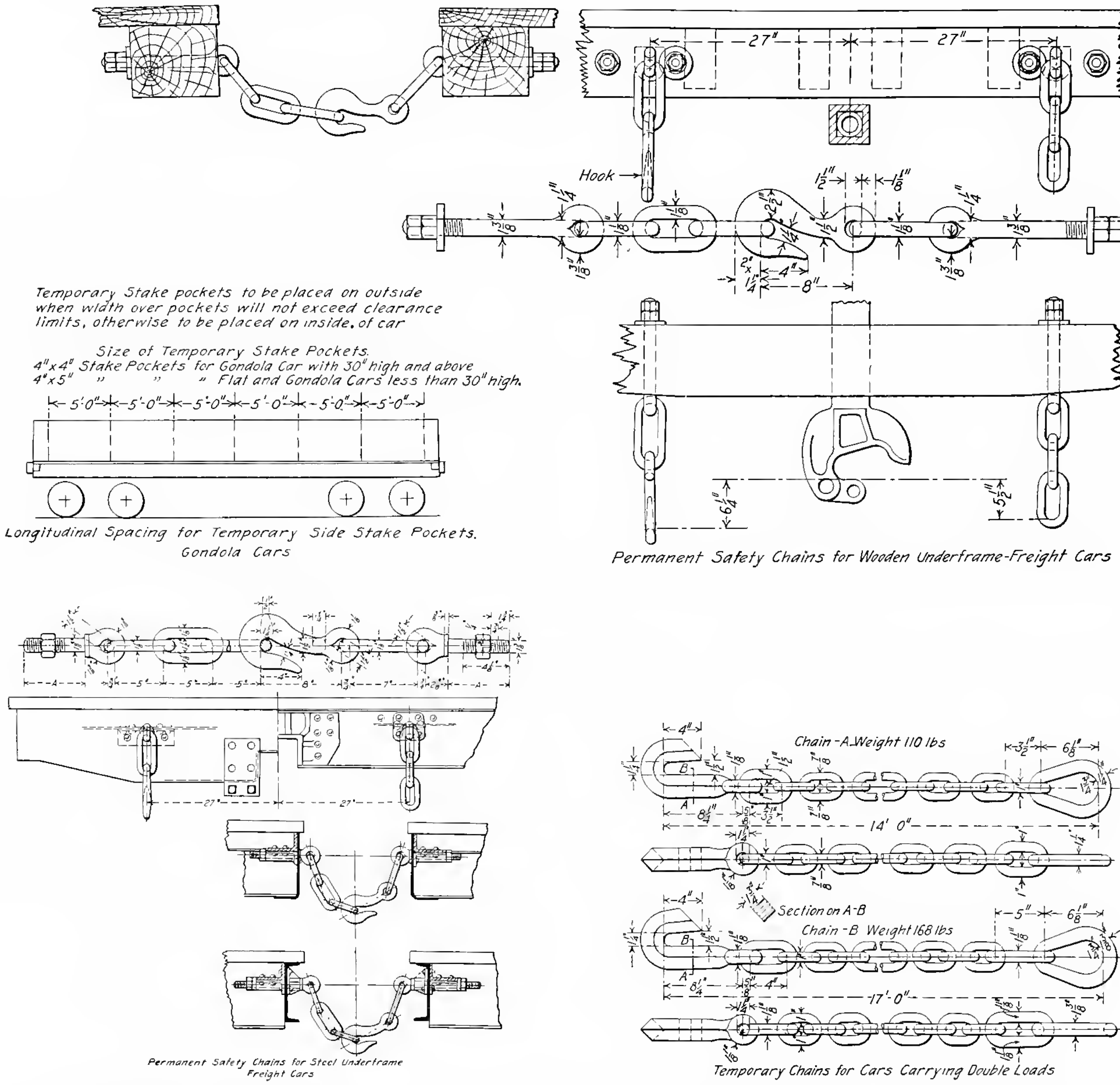


Fig. 2754—M. C. B. Recommended Practice for Safety Chains and Stake Pockets. (M. C. B. Sheet E.)

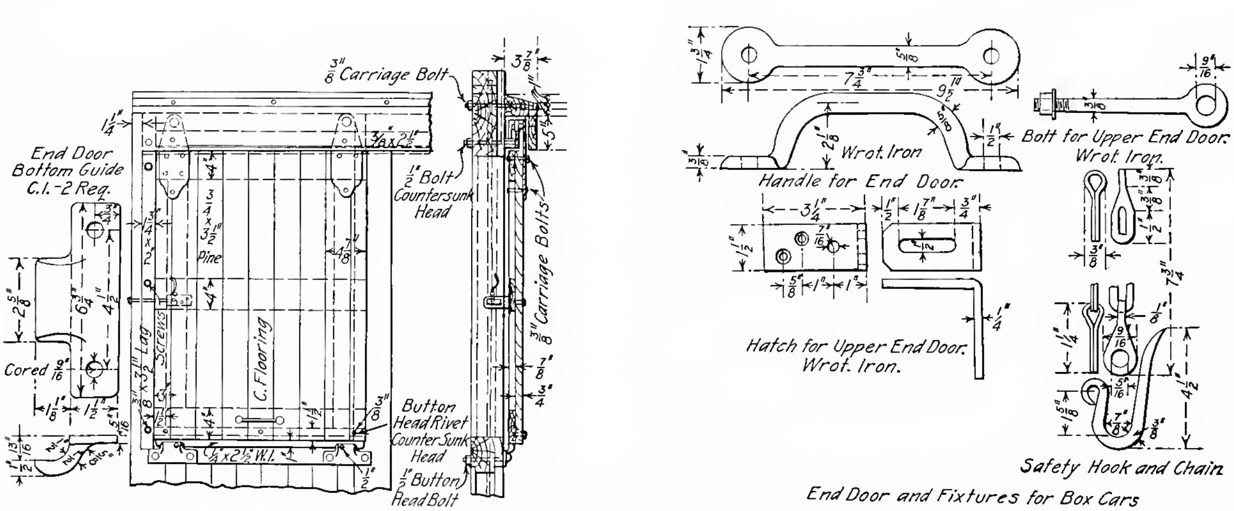


Fig. 2755—M. C. B. Recommended Practice for Box Car End Door and Fixtures. (M. C. B. Sheet F.)

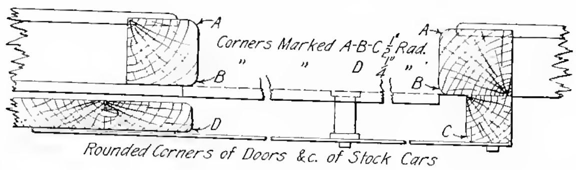


Fig. 2756—M. C. B. Recommended Practice for Rounded Corners of Doors, etc., of Stock Cars. (M. C. B. Sheet F.)

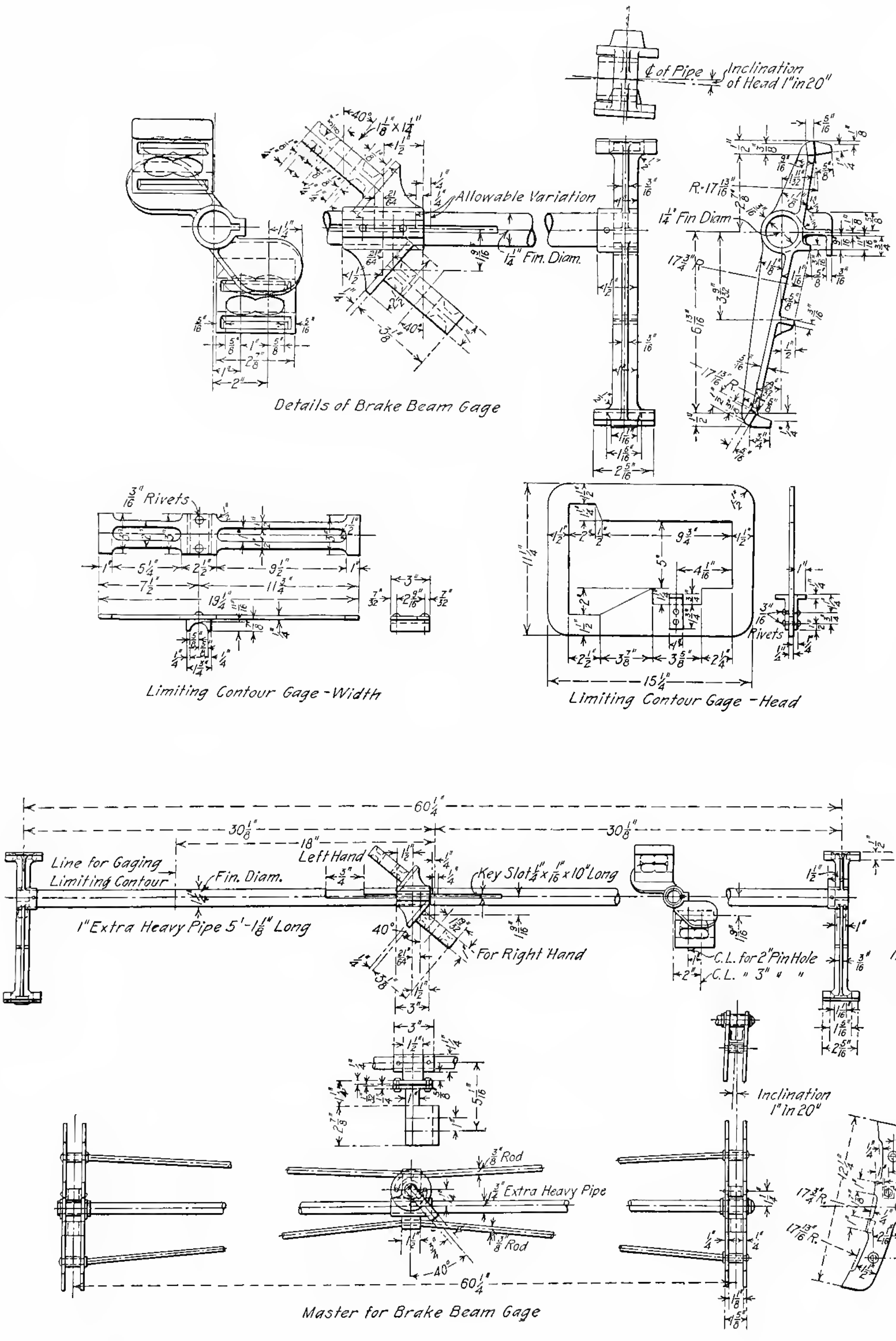
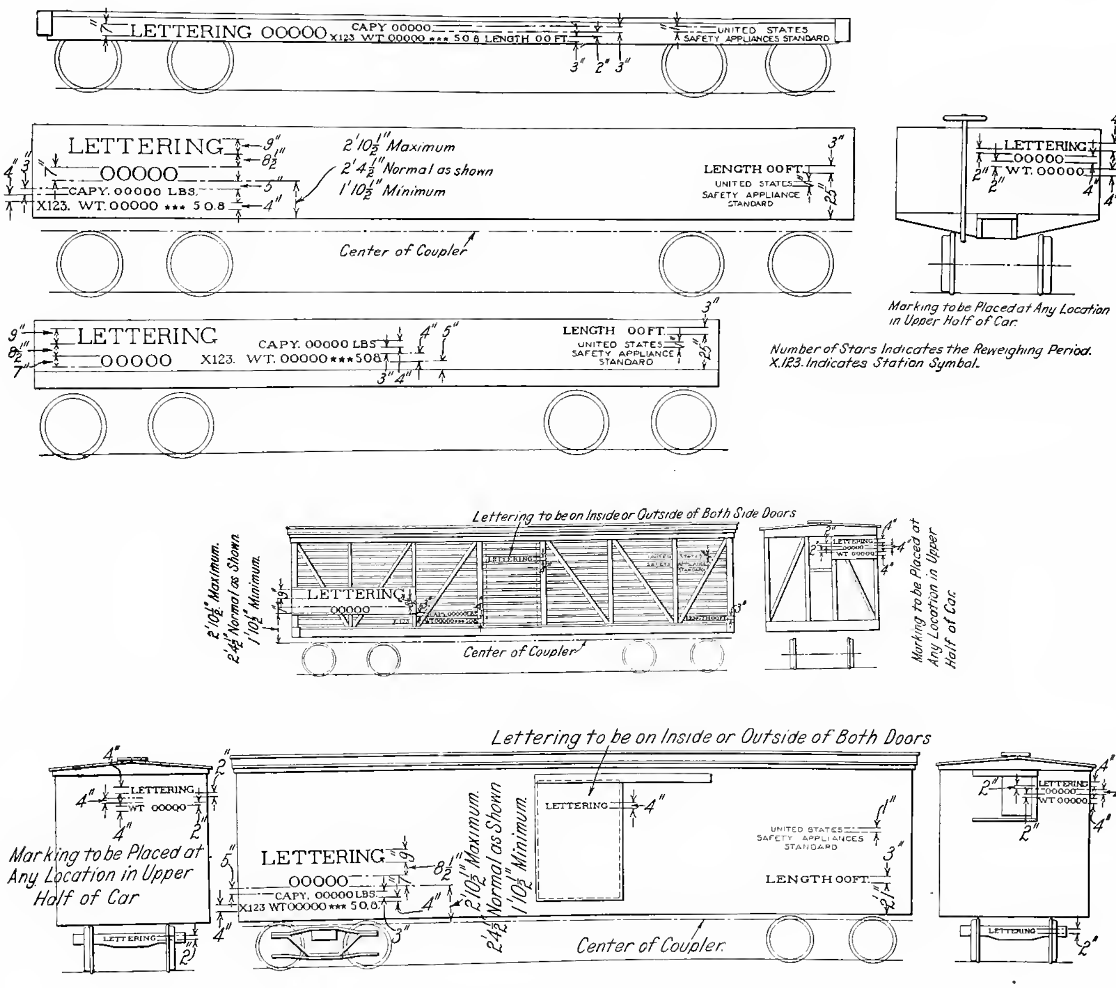


Fig. 2757—M. C. B. Recommended Practice for Brake Beam Gages and Details. (M. C. B. Sheet F.)

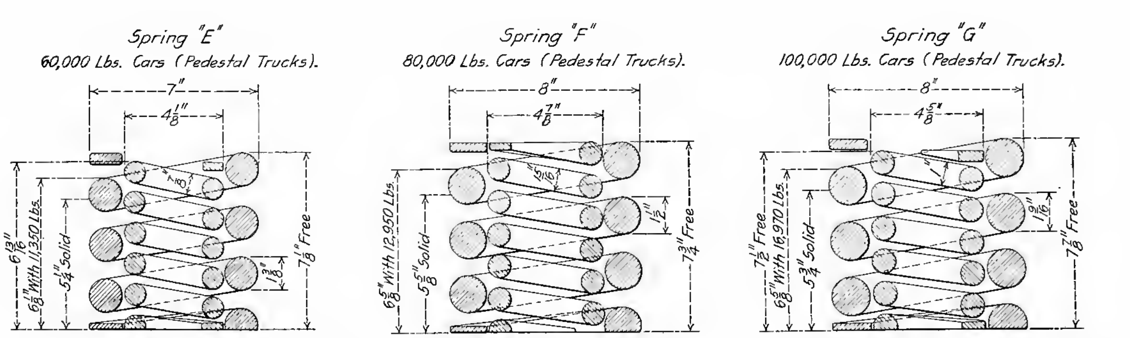


Lettering [Initials or Name] Over Truck, Preferably on Left Side of Center of Center Line of Side of Car, Where Doors Slide to Left. Lettering May be Placed on Right of Center Line of Side of Car.

Number Under Lettering. Capacity Under Number Light Weight Under Capacity Doors To Bear Lettering On Outside or Inside.

Ends To Show Lettering, Number Under Lettering and Light Weight Under Number, In Upper Half of End of Car.

Fig. 2758—M. C. B. Recommended Practice for Marking of Freight Cars. (M. C. B. Sheet G.)



Two Bars: 1st. Bar 1⅜" Diam. 67½" Long, Tapered to 76⅜"
2nd. Bar ⅞" Diam. 61¼" Long, Tapered to 66⅜"
Normal Wt. 1st. Bar 28 Lbs. 8 oz. Minimum Wt. 27 Lbs. 10 oz.
Normal Wt. 2nd. Bar 10 Lbs. 8 oz. Minimum Wt. 10 Lbs. 2 oz.
Outside Diameter 1st. Coil 7"; 2nd. Coil 4⅛"
Heights, 1st. Coil 7⅛" Free; 5¼" Solid; 6⅛" 8,270 Lbs. Capy. 15,530 Lbs.
2nd. Coil 6¹³⁄₁₆" Free; 5¼" Solid; 6⅛" 3,080 Lbs. Capy. 7,000 Lbs.
Cluster of Springs
Heights; 7⅛" Free; 5¼" Solid; 6⅛" 11,350 Lbs. Capy. 22,530 Lbs.

Two Bars: 1st. Bar 1½" Diam. 76½" Long, Tapered to 86¾"
2nd. Bar ¹⁵⁄₁₆" Diam. 74" Long, Tapered to 80"
Normal Wt. 1st. Bar 38 Lbs. 6 oz. Minimum Wt. 37 Lbs. 4 oz.
Normal Wt. 2nd. Bar 14 Lbs. 6 oz. Minimum Wt. 13 Lbs. 15 oz.
Outside Diameter 1st. Coil 8", 2nd. Coil 4⅞"
Heights, 1st. Coil 7¾" Free; 5⅝" Solid; 6⅝" 9,200 Lbs. Capy. 19,400 Lbs.
2nd. Coil 7¾" Free; 5⅝" Solid; 6⅝" 3,780 Lbs. Capy. 7,100 Lbs.
Cluster of Springs
Heights; 7¾" Free; 5⅝" Solid; 6⅝" 12,950 Lbs. Capy. 26,500 Lbs.

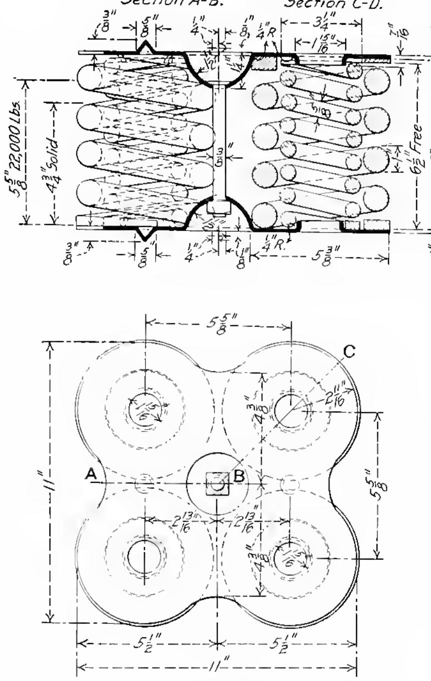
Two Bars: 1st. Bar 1⁹⁄₁₆" Diam. 74⅜" Long, Tapered to 84½"
2nd. Bar 1" Diam. 65½" Long, Tapered to 71¼"
Normal Wt. 1st. Bar 40 Lbs. 5 oz. Minimum Wt. 39 Lbs. 1½ oz.
2nd. Bar 14 Lbs. 8 oz. Minimum Wt. 14 Lbs. 1 oz.
Outside Diameter 1st. Coil 8", 2nd. Coil 4⅝"
Heights, 1st. Coil 7⅞" Free; 5¾" Solid; 6⅝" 11,940 Lbs. Capy. 20,300 Lbs.
2nd. Coil 7½" Free; 5¾" Solid; 6⅝" 5,030 Lbs. Capy. 10,060 Lbs.
Cluster of Springs
Heights; 7⅞" Free; 5¾" Solid; 6⅝" 16,970 Lbs. Capy. 30,360 Lbs.

Fig. 2759—M. C. B. Recommended Practice for Springs and Spring Caps for Freight Car Trucks. (M. C. B. Sheet H.) See also Fig. 2760.

Spring A

60,000 Lbs. Cars. (Arch Bar Trucks)

Section A-B. Section C-D.

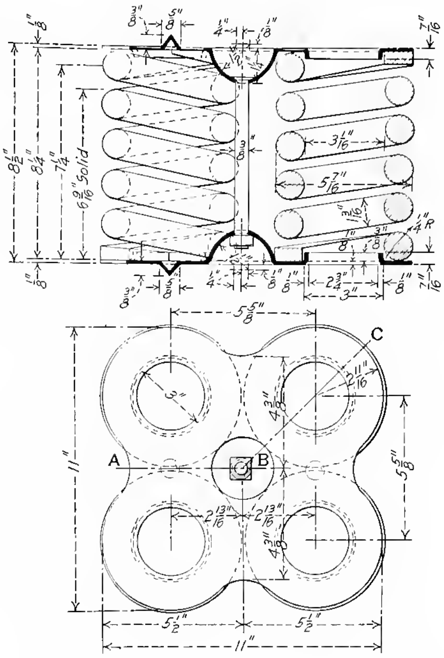


Eight Bars · Four Bars 1" Diam $65\frac{1}{4}$" Long, Tapered to $72\frac{1}{4}$"
Four Bars $\frac{5}{8}$" Diam $62\frac{1}{2}$" Long, Tapered to $66\frac{3}{4}$"
Normal Wt. of each 1st. Four Bars 14 Lbs. 12 oz Minimum Wt 14 Lbs 5 oz.
Normal Wt. of each 2nd. Four Bars 5 Lbs 6 oz. Minimum Wt 5 Lbs. 3 oz.
Outside Diam 1st. Four Coils $5\frac{3}{8}$", 2nd Four Coils $3\frac{1}{4}$"
Heights, 1st Four Coils $5\frac{5}{8}$" Free, $4\frac{3}{4}$" Solid, $5\frac{5}{8}$" 3,970 Lbs. Capy 7,440 Lbs.
2nd. Four Coils $6\frac{1}{2}$" Free, $4\frac{3}{4}$" Solid, $5\frac{5}{8}$" 1,530 Lbs Capy. 3,060 Lbs.
Cluster of Springs
Heights Exclusive of Caps $6\frac{5}{8}$" Free, $4\frac{3}{4}$" Solid, $5\frac{5}{8}$" 22,000 Lbs. Capy. 42,000 Lbs.

Spring "B"

70,000 Lbs Cars. (Arch Bar Trucks)

Section A-B. Section C-D.

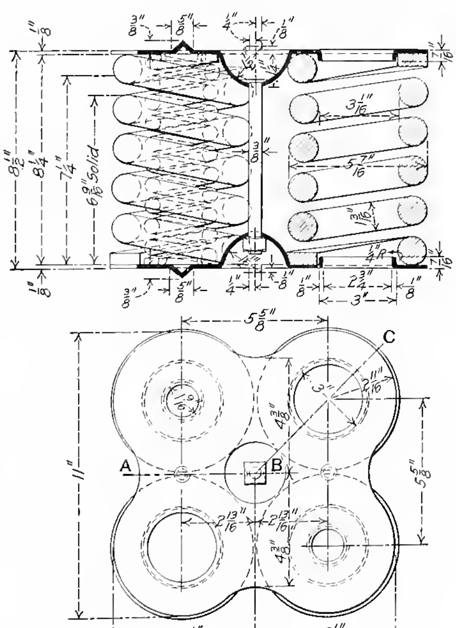


4 Bars $1\frac{3}{16}$" Diam. $73\frac{3}{4}$" Long, Tapered to $80\frac{3}{8}$"
Normal Wt of each Bar 23 Lbs Minimum Wt 22 Lbs. 5 oz.
Outside Diam $5\frac{7}{16}$"
Heights, $8\frac{1}{4}$" Free, $6\frac{9}{16}$" Solid, $7\frac{1}{4}$" 7,400 Lbs. Capy. 12,500 Lbs.
Cluster of Springs
Heights $8\frac{1}{4}$" Free, $6\frac{9}{16}$" Solid, $7\frac{1}{4}$" 29,000 Lbs. Capy 50,000 Lbs.

Spring "C"

80,000 Lbs. Cars. (Arch Bar Trucks)

Section A-B. Section B-C.

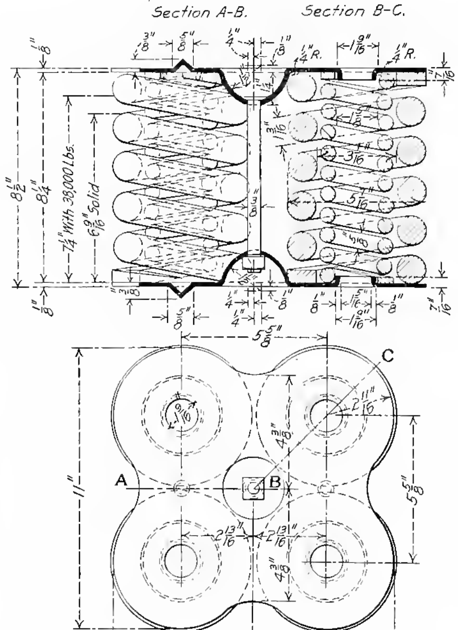


6 Bars:
4 Bars, $1\frac{3}{16}$" Diam. $73\frac{3}{4}$" Long, Tapered to $80\frac{3}{8}$"
2 Bars, $\frac{5}{8}$" Diam. $74\frac{1}{4}$" Long, Tapered to $77\frac{3}{4}$"
Normal Wt. of each 1st. four bars 23 Lbs. Minimum Wt. 22 Lbs. 5 oz
Normal Wt. of each 2nd. two bars 6 Lbs. 7 oz " " 6 Lbs. 4 oz.
Outside Diam. of 1st. four Coils $5\frac{7}{16}$", 2nd. two Coils $2\frac{7}{8}$"
Heights 1st. four Coils $8\frac{1}{4}$" Free; $6\frac{9}{16}$" Solid; $7\frac{1}{4}$" 7,400 Lbs. Capy. 12,500 Lbs
Heights 2nd. two Coils $8\frac{1}{4}$" Free, $6\frac{9}{16}$" Solid, $7\frac{1}{4}$" 2,100 Lbs. Capy. 3,500 Lbs.
Cluster of Springs
Heights without Caps: $8\frac{1}{4}$" Free, $6\frac{9}{16}$" Solid, $7\frac{1}{4}$" 33,800 Lbs. Capy. 57,000 Lbs.

Spring "D"

100,000 Lbs Cars. (Arch Bar Trucks)

Section A-B. Section B-C.



Eight Bars: 4 Bars $1\frac{3}{16}$" Diam. $73\frac{3}{4}$" Long, Tapered to $80\frac{3}{8}$"
4 Bars $\frac{5}{8}$" Diam. $74\frac{1}{4}$" Long, Tapered to $77\frac{3}{4}$"
Normal Wt of each 1st Four Bars 23 Lbs. Minimum Wt 22 Lbs 5 oz.
Normal Wt of each 2nd Four Bars 6 Lbs. 7 oz. " Wt 6 Lbs 4 oz
Outside Diam. of 1st. Four Coils $5\frac{7}{16}$", 2nd. Four $2\frac{7}{8}$"
Heights, 1st Four Coils $8\frac{1}{4}$" Free, $6\frac{9}{16}$" Solid, $7\frac{1}{4}$" 7,400 Lbs. Capy. 12,500 Lbs.
Heights, 2nd. Four Coils $8\frac{1}{4}$" Free, $6\frac{9}{16}$" Solid, $7\frac{1}{4}$" 2,100 Lbs. Capy. 3,500 Lbs.
Cluster of Springs
Heights Without Caps $8\frac{1}{4}$" Free, $6\frac{9}{16}$" Solid, $7\frac{1}{4}$" 38,000 Lbs Capy. 64,000 Lbs

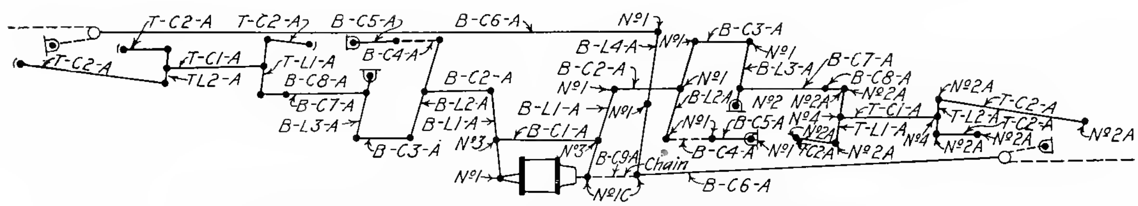
Fig. 2760—M. C. B. Recommended Practice for Springs and Spring Caps for Freight Car Trucks. (M. C. B. Sheet H.) See also Fig. 2759.

Table I
Schedule A
For Cars Weighing 80,000 to 100,000 Lbs.

14" Brake Cylinder Cylinder Lever BL1-A				
For Car Weighing	% Brk'g Power for Cyl. Pres. of 60 Lbs per Sq In	Lever No	A	B
		1	20"	16"
79,250 to 81,450	89.9 to 87.5	2	20¼"	15¾"
81,500 to 83,800	89.9 to 87.5	3	20½"	15½"
83,850 to 86,200	89.9 to 87.5	4	20¾"	15¼"
86,250 to 88,700	900 to 87.5	5	21"	15"
88,750 to 91,300	900 to 87.5	6	21¼"	14¾"
91,350 to 94,000	900 to 87.5	7	21½"	14½"
94,050 to 96,700	900 to 87.5	8	21¾"	14¼"
96,750 to 99,650	90.0 to 87.5	9	22"	14"
99,700 to 102,600	900 to 87.5	10	22¼"	13¾"
		11	22½"	13½"
Brake Beams should be suitable for Maximum Load at middle of Beam of 22,000 Lb's.				

Table II
Schedule A
For Cars Weighing 100,000 to 137,000 Lbs.

16" Brake Cylinder Cylinder Lever BL1-A				
For Car Weighing	% Brk'g Power for Cyl. Pres. of 60 Lbs per Sq In	Lever No	A	B
100,500 to 103,300	90.0 to 87.5	1	20"	16"
103,350 to 106,300	90.0 to 87.5	2	20¼"	15¾"
106,350 to 109,300	90.0 to 87.5	3	20½"	15½"
109,350 to 112,500	900 to 87.5	4	20¾"	15¼"
112,550 to 115,750	900 to 87.5	5	21"	15"
115,800 to 119,100	900 to 87.5	6	21¼"	14¾"
119,150 to 122,700	90.1 to 87.5	7	21½"	14½"
122,750 to 126,200	900 to 87.5	8	21¾"	14¼"
126,250 to 129,850	900 to 87.5	9	22"	14"
129,900 to 133,900	902 to 87.4	10	22¼"	13¾"
133,950 to 137,900	900 to 87.4	11	22½"	13½"
Brake Beams should be suitable for Maximum Load at middle of Beam of 28,000 Lb's.				



The use of the floating lever fulcrum connection and chain may be discontinued and cylinder and floating lever connection (B-C2-A) and intermediate and truck-lever connection (B-C7-A) made in one piece, thereby eliminating five parts: B-C5-A, B-C4-A, B-L2-A, B-C3-A, and B-L3-A.

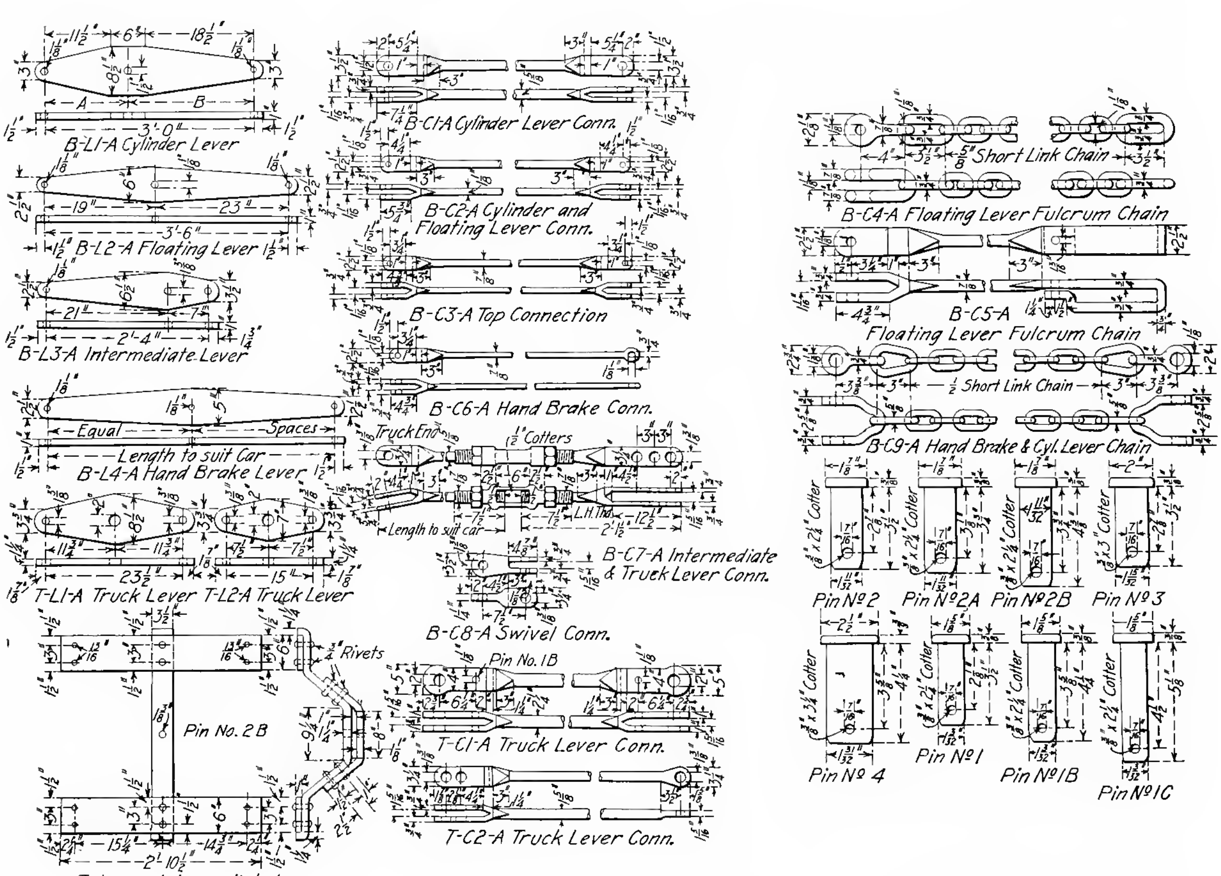


Fig. 2761—M. C. B. Recommended Practice for High Speed Foundation Brake Gear for Passenger Service; Schedule for Six-Wheel Trucks. (M. C. B. Sheet J.)

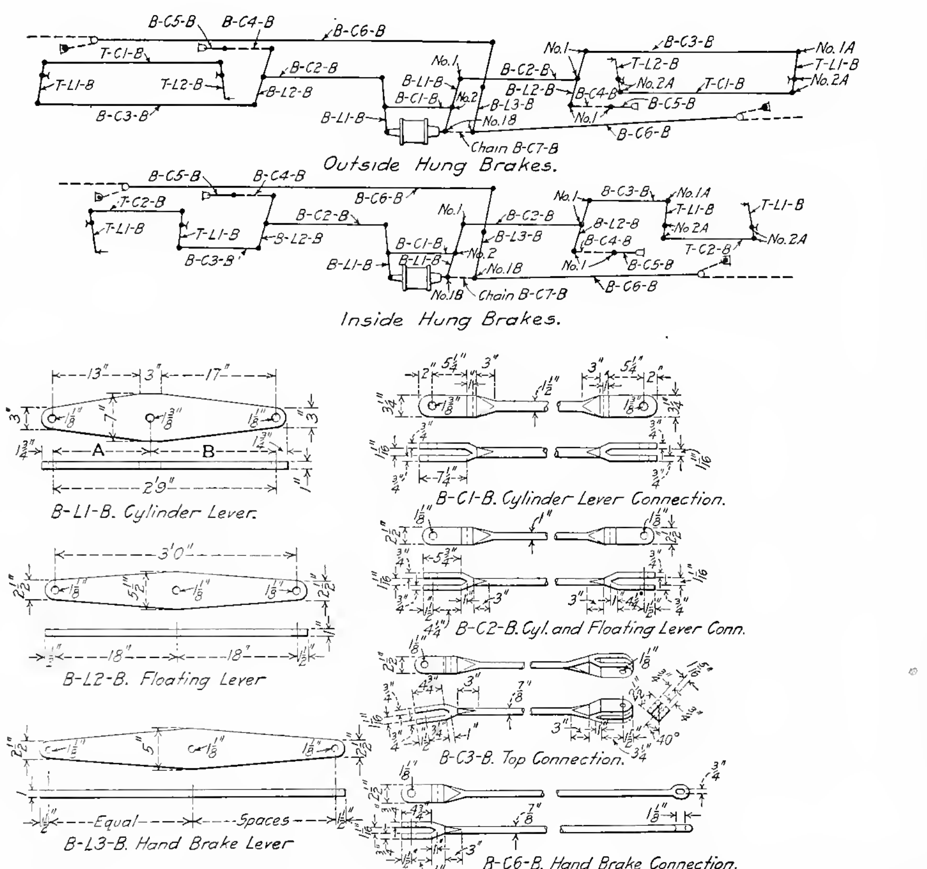
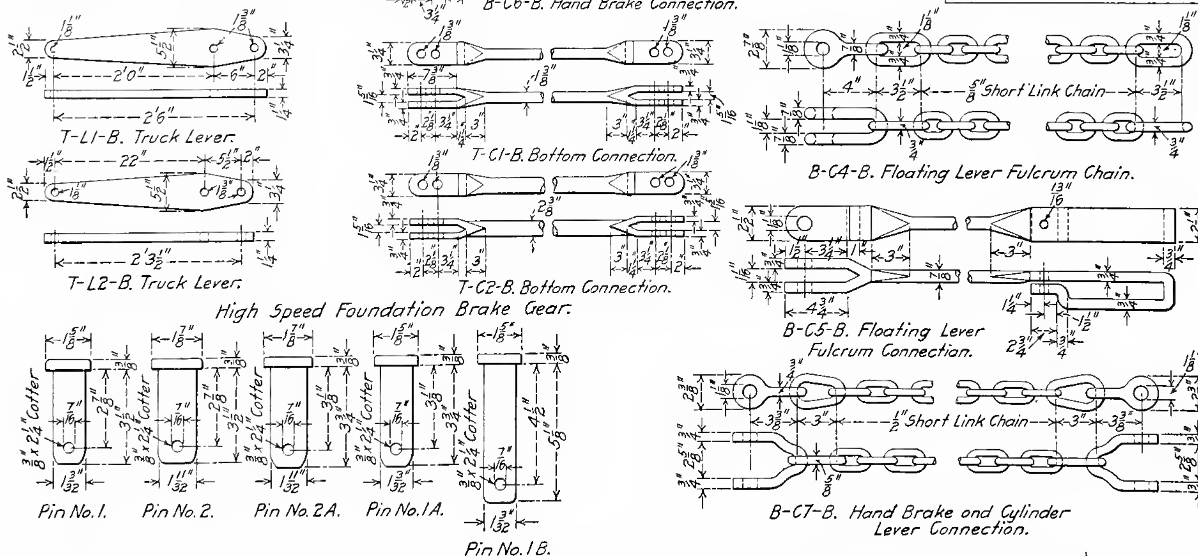


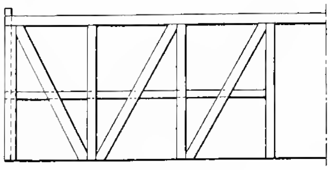
Table I.
Schedule B-1.
For Cars Weighing 50,000 to 70,000 Lbs.

12" Brake Cylinder Cylinder Lever B-L1-B.				
For Cars Weighing	% Br'k'g. Power for Cyl Press of 60 Lbs Per Sq In	Lever No	A	B
49,000 to 50,500	90.0 to 87.3	1	13"	20"
50,600 " 52,100	90.0 " 87.4	2	$13\frac{1}{4}$"	$19\frac{3}{4}$"
52,200 " 53,700	90.0 " 87.5	3	$13\frac{1}{2}$"	$19\frac{1}{2}$"
53,800 " 55,300	90.1 " 87.6	4	$13\frac{3}{4}$"	$19\frac{1}{4}$"
55,400 " 57,200	90.2 " 87.4	5	14"	19"
57,300 " 59,000	90.0 " 87.4	6	$14\frac{1}{4}$"	$18\frac{3}{4}$"
59,100 " 60,800	89.8 " 87.3	7	$14\frac{1}{2}$"	$18\frac{1}{2}$"
60,900 " 62,700	90.0 " 87.3	8	$14\frac{3}{4}$"	$18\frac{1}{4}$"
62,800 " 64,600	90.0 " 87.5	9	15"	18"
64,700 " 66,700	90.0 " 87.4	10	$15\frac{1}{4}$"	$17\frac{3}{4}$"
66,800 " 68,700	90.0 " 87.5	11	$15\frac{1}{2}$"	$17\frac{1}{2}$"
68,800 " 70,800	90.0 " 87.5	12	$15\frac{3}{4}$"	$17\frac{1}{4}$"
Brake Beams should be suitable for maximum load at middle of beam of 22,000 pounds.				

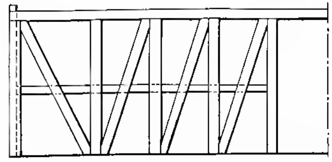
Table II.
Schedule B.
For Cars Weighing 70,000 to 90,000 Lbs.

14" Brake Cylinder Cylinder Lever B-L1-B.				
For Cars Weighing	% Br'k'g Power for Cyl. Press of 60 Lbs Per Sq In.	Lever No.	A	B
		1	13"	20"
68,800 to 70,900	90.0 to 87.4	2	$13\frac{1}{4}$"	$19\frac{3}{4}$"
71,000 " 73,200	90.0 " 87.4	3	$13\frac{1}{2}$"	$19\frac{1}{2}$"
73,300 " 75,500	90.0 " 87.5	4	$13\frac{3}{4}$"	$19\frac{1}{4}$"
75,600 " 77,900	90.0 " 87.4	5	14"	19"
78,000 " 80,300	90.0 " 87.4	6	$14\frac{1}{4}$"	$18\frac{3}{4}$"
80,400 " 82,800	90.0 " 87.4	7	$14\frac{1}{2}$"	$18\frac{1}{2}$"
82,900 " 85,400	90.0 " 87.4	8	$14\frac{3}{4}$"	$18\frac{1}{4}$"
85,500 " 88,000	90.0 " 87.5	9	15"	18"
88,100 " 90,800	90.0 " 87.4	10	$15\frac{1}{4}$"	$17\frac{3}{4}$"
Brake Beams should be suitable for maximum load at middle of beam of 28,000 pounds.				

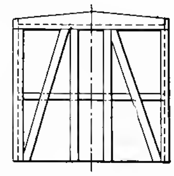




Elevation Half Side Framing for 60,000-Lb. Capacity Cars.



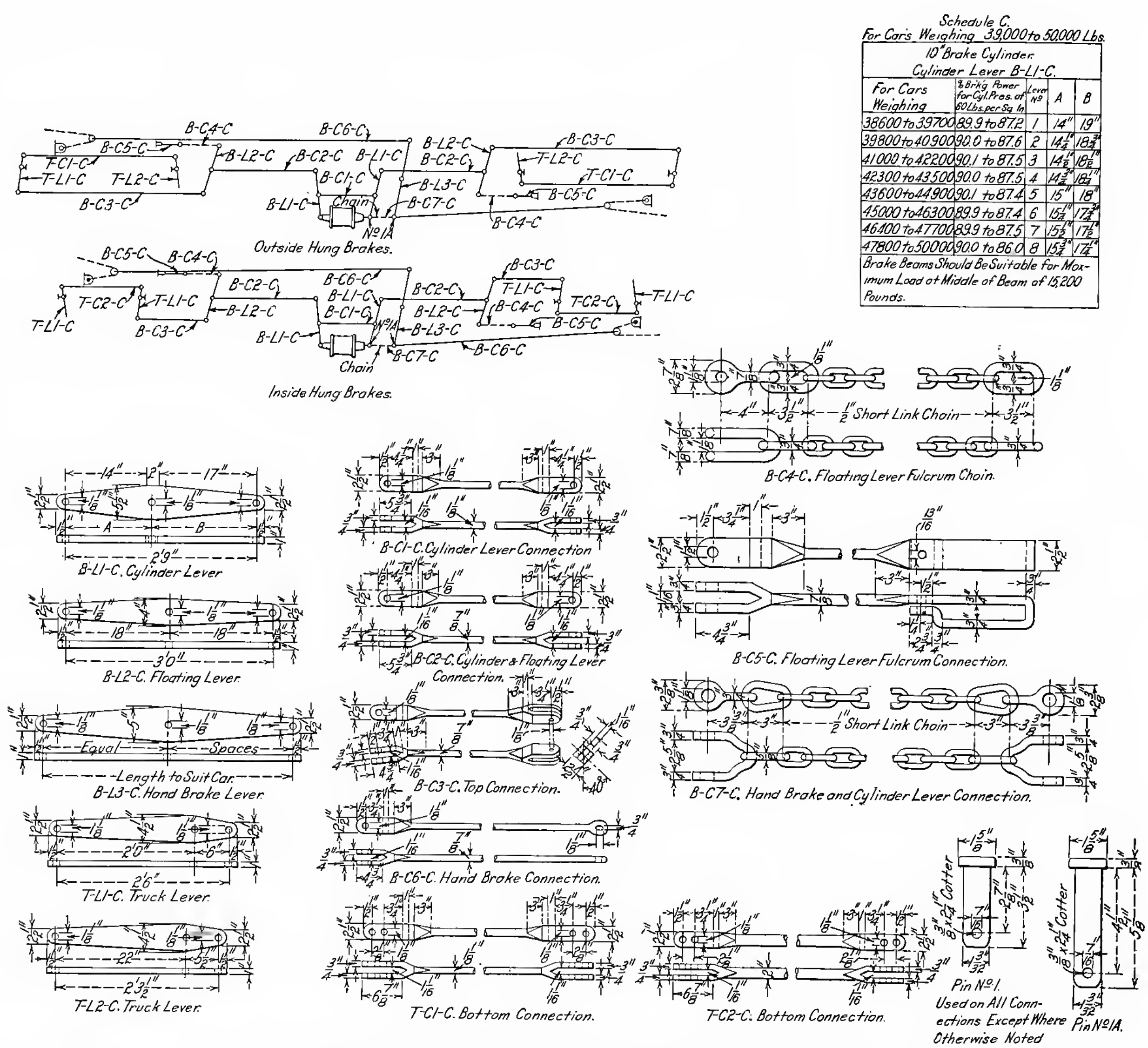
Elevation Half Side Framing for 80,000, and 100,000-Lb. Capacity Cars.



Elevation End Framing for 60,000, 80,000 and 100,000 Lb. Capacity Cars.

Framing of Box Cars.

Fig. 2762—M. C. B. Recommended Practice for High Speed Foundation Brake Gear for Passenger Service, Schedule for Four Wheel Trucks; and Framing for Box Cars. (M. C. B. Sheet K.) See also Fig. 2763.



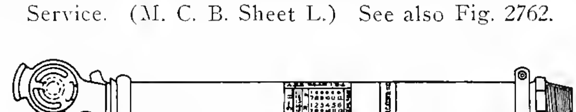
Schedule C.
For Cars Weighing 39,000 to 50,000 Lbs.

10" Brake Cylinder.
Cylinder Lever B-L1-C.

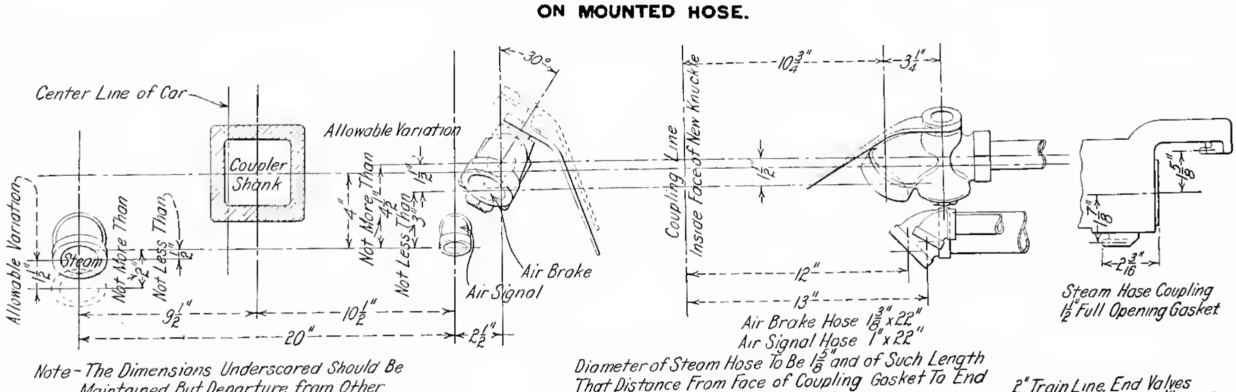
For Cars Weighing	% Brk'g Power for Cyl. Pres. of 60 Lbs. per Sq. In.	Lever Nº	A	B
38600 to 39700	89.9 to 87.2	1	14"	19"
39800 to 40900	90.0 to 87.6	2	14¼"	18¾"
41000 to 42200	90.1 to 87.5	3	14½"	18½"
42300 to 43500	90.0 to 87.5	4	14¾"	18¼"
43600 to 44900	90.1 to 87.4	5	15"	18"
45000 to 46300	89.9 to 87.4	6	15¼"	17¾"
46400 to 47700	89.9 to 87.5	7	15½"	17½"
47800 to 50000	90.0 to 86.0	8	15¾"	17¼"

Brake Beams Should Be Suitable for Maximum Load at Middle of Beam of 15,200 Pounds.

Fig. 2763—M. C. B. Recommended Practice for High Speed Foundation Brake Gear for Passenger Service. (M. C. B. Sheet L.) See also Fig. 2762.



POSITION OF AIR BRAKE HOSE LABEL ON MOUNTED HOSE.



Note - The Dimensions Underscored Should Be Maintained But Departure from Other Dimensions Are Allowable to Suit Conditions.

Air Brake Hose 1⅜" x 22"
Air Signal Hose 1" x 22"
Diameter of Steam Hose To Be 1⅝" and of Such Length That Distance From Face of Coupling Gasket To End of Nipple Will Be 31 Inches.

2" Train Line End Valves With Not Less Than 1½" Opening

Steam and Air Connections For Passenger Cars.

Fig. 2764—M. C. B. Recommended Practice for Steam and Air Connections, and Position of Air Brake Hose Label. (M. C. B. Sheet Q.)

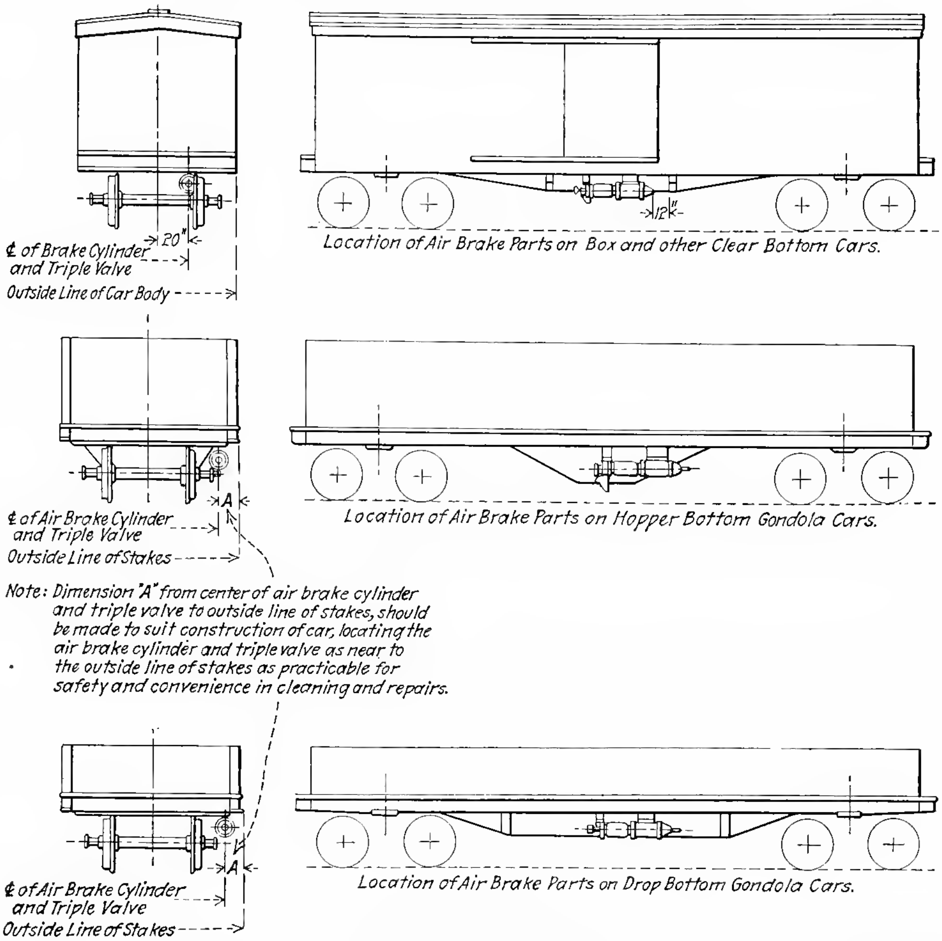


Fig. 2765—M. C. B. Recommended Practice for Location of Air Brake Parts on Freight Cars (M. C. B. Sheet Q.)

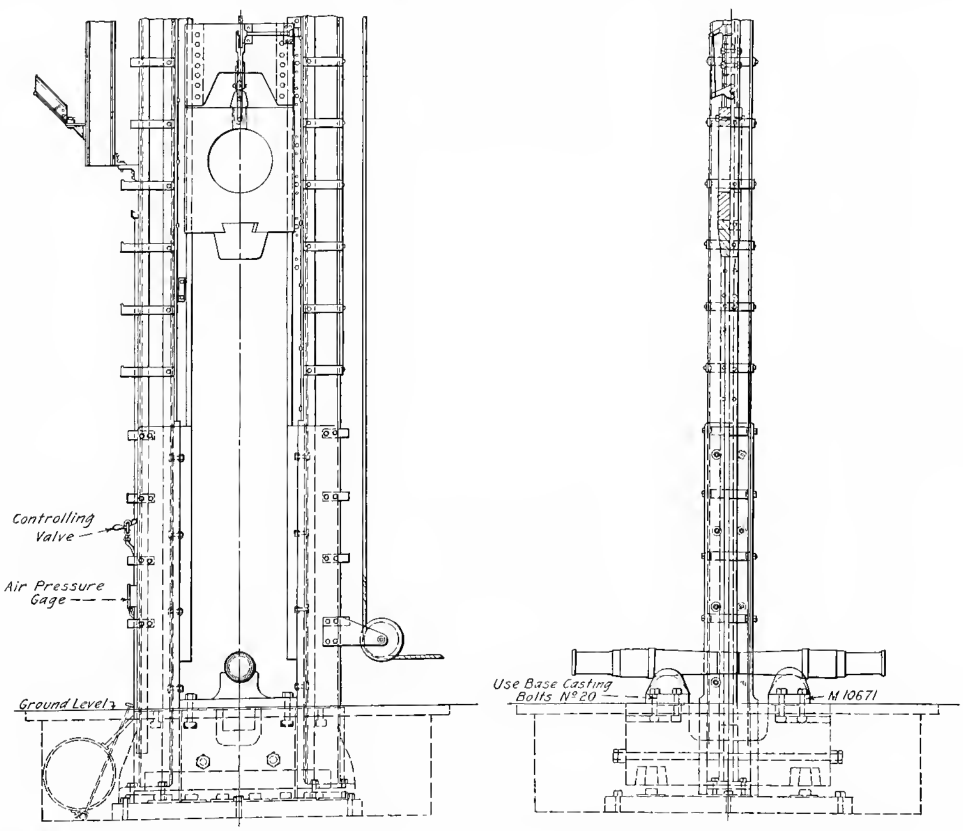


Fig. 2766—M. C. B. Recommended Practice for Axle Test. (M. C. B. Sheet I.) See also Fig. 2767.

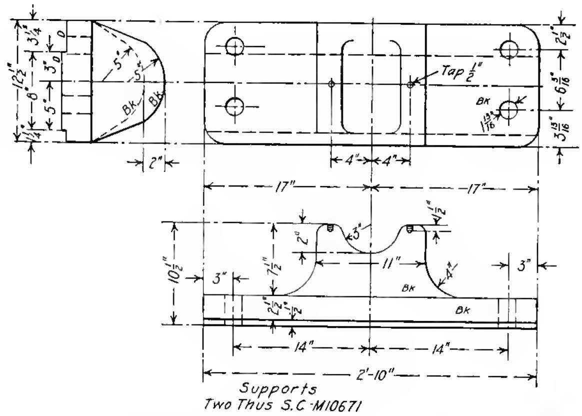
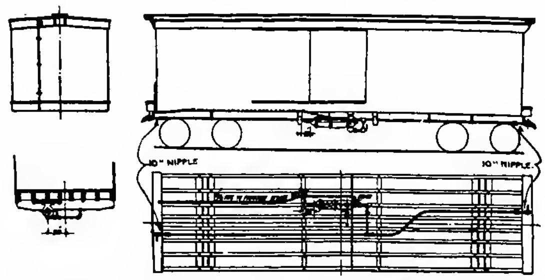


Fig. 2767—Detail for M. C. B. Recommended Practice for Axle Test. (M. C. B. Sheet I.) See also Fig. 2766.



PIPING FOR BOX AND OTHER CLEAR BOTTOM CARS.

Fig. 2768—M. C. B. Recommended Practice for Piping of Box and Other Clear Bottom Cars. (M. C. B. Sheet Q.)

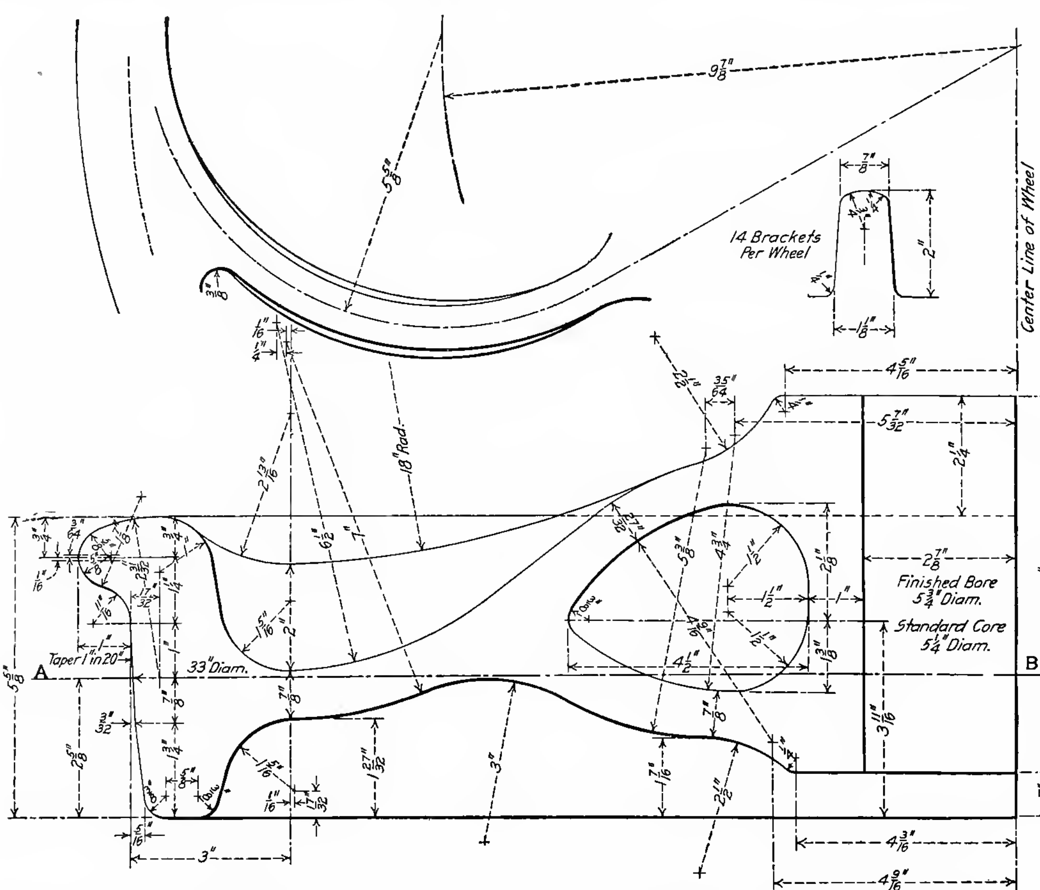


Fig. 2769—M. C. B. Recommended Practice for Cast Iron Wheels for 30-Ton Capacity Cars. (M. C. B. Sheet N.)

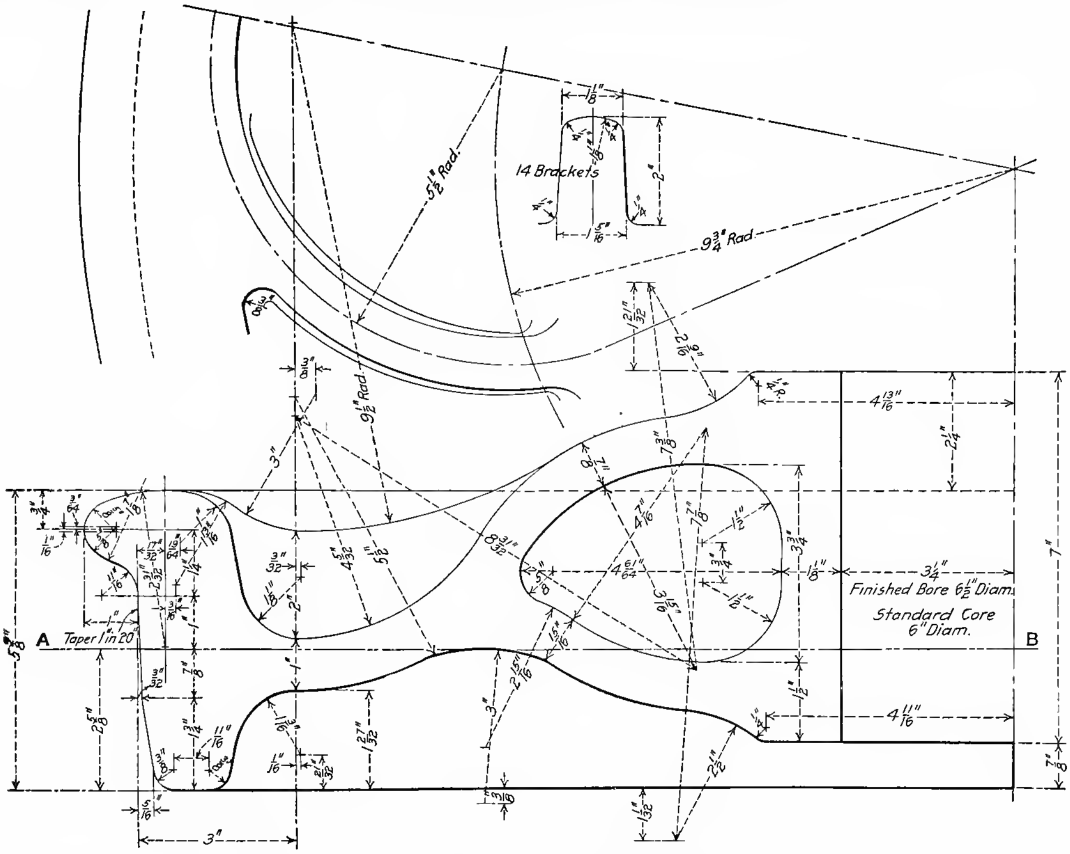


Fig. 2770—M. C. B. Recommended Practice for Cast Iron Wheels for 40-Ton Capacity Cars. (M. C. B. Sheet O.)

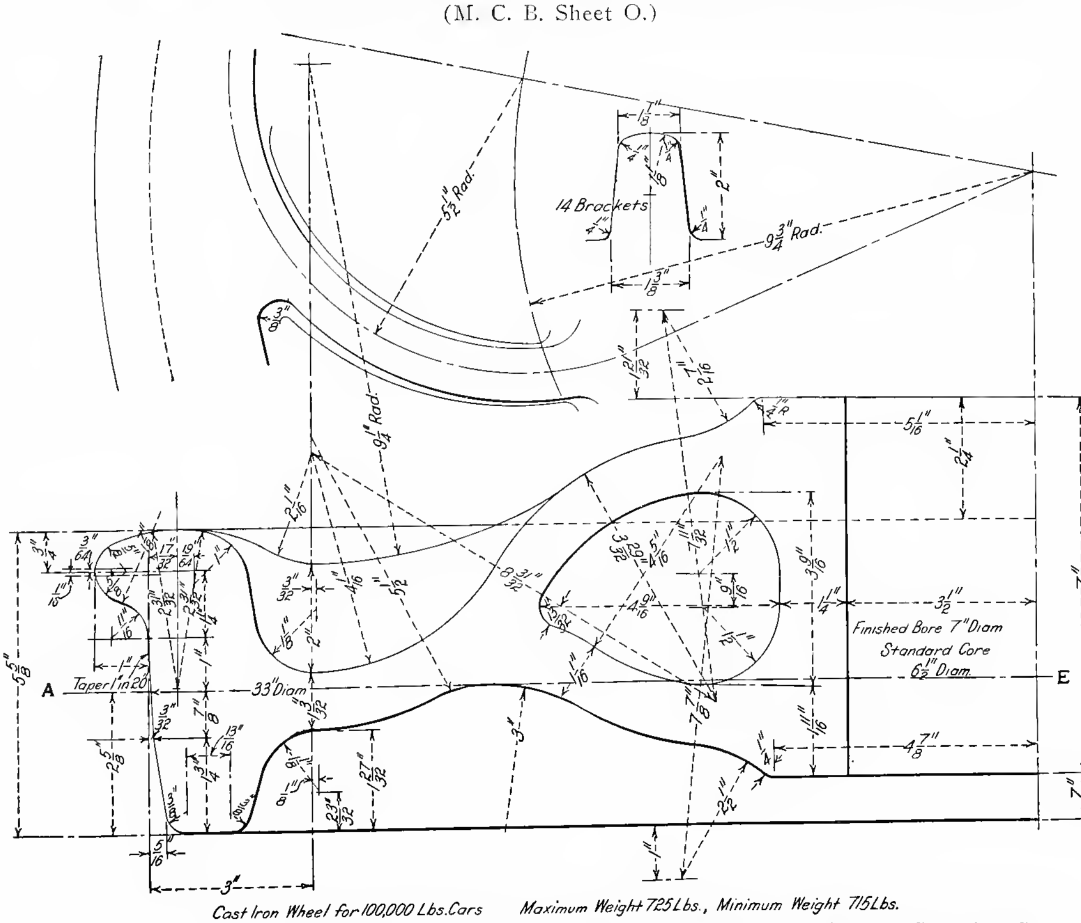


Fig. 2771—M. C. B. Recommended Practice for Cast Iron Wheels for 50-Ton Capacity Cars. (M. C. B. Sheet P.)

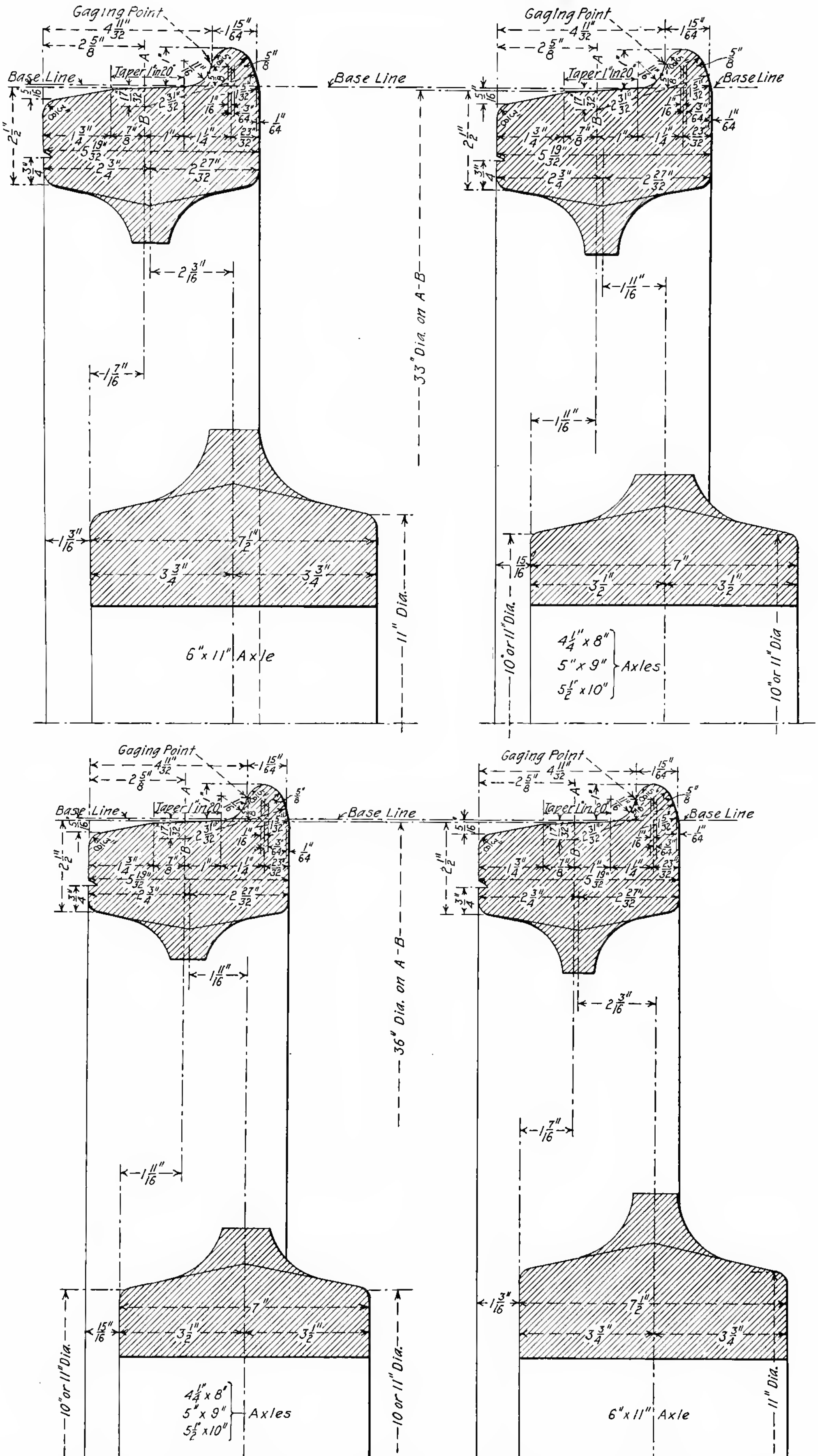


Fig. 2773—M. C. B. Recommended Practice for Solid Steel Wheels for Freight and Passenger Service. (M. C. B. Sheets R and S.) See also Fig. 2774.

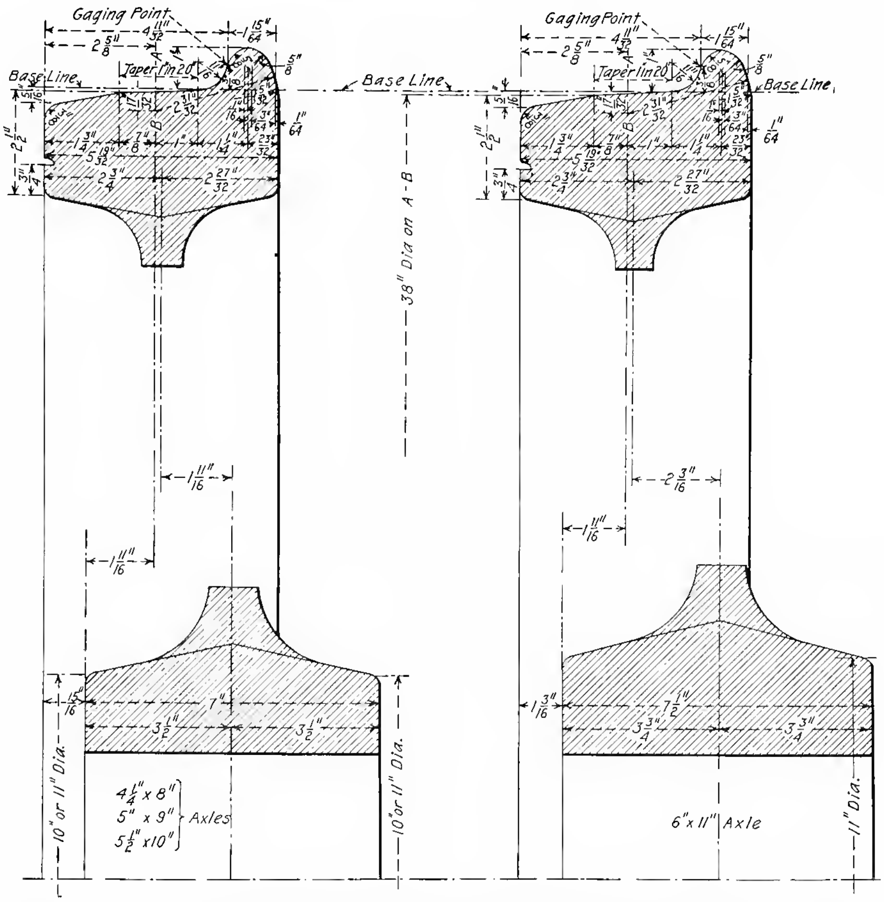


Fig. 2774—M. C. B. Recommended Practice for Solid Steel Wheels for Freight and Passenger Service. (M. C. B. Sheet T.) See also Fig. 2773.

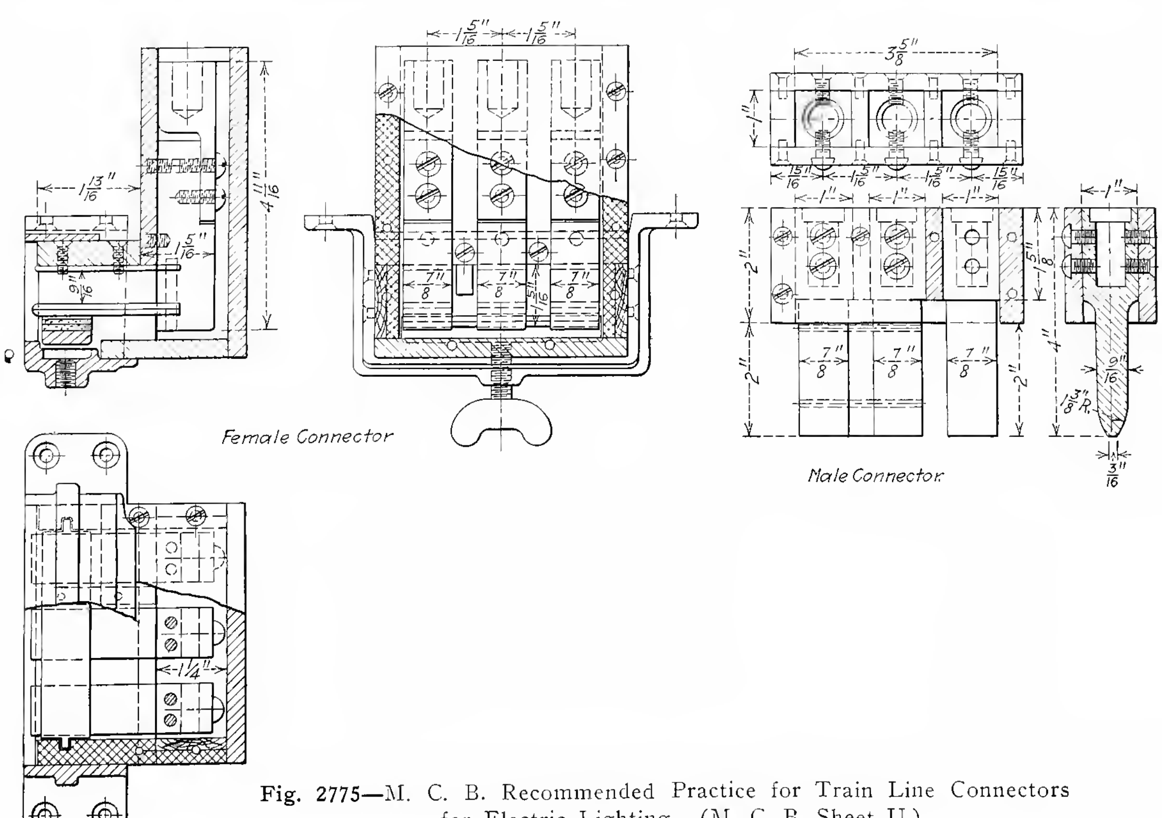


Fig. 2775—M. C. B. Recommended Practice for Train Line Connectors for Electric Lighting. (M. C. B. Sheet U.)

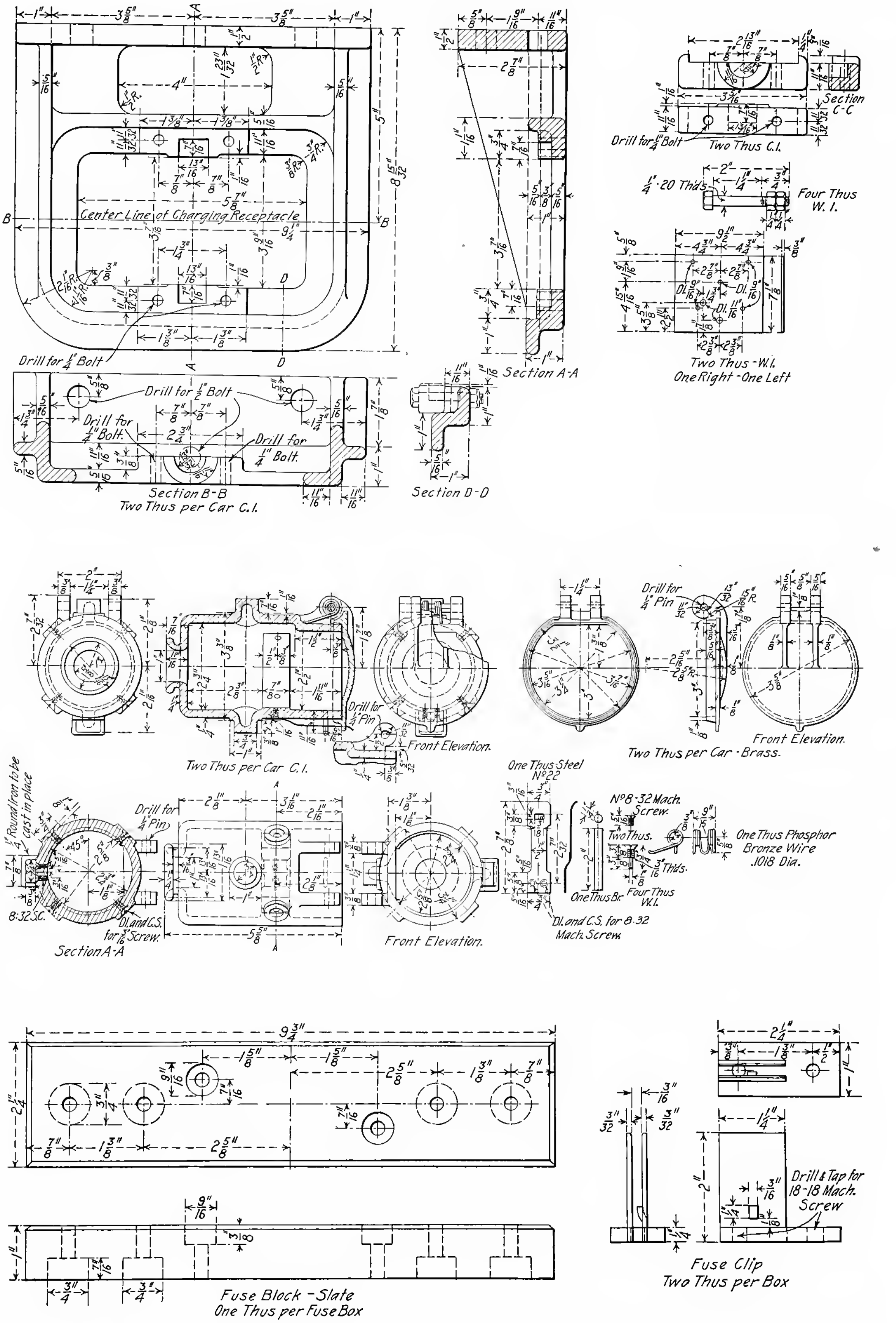


Fig. 2776—M. C. B. Recommended Practice for Electric Lighting; Charging Receptacle and Details. (M. C. B. Sheets U1 and U2.) Fuse Box Slate and Fuse Clip, (M. C. B. Sheet U5).

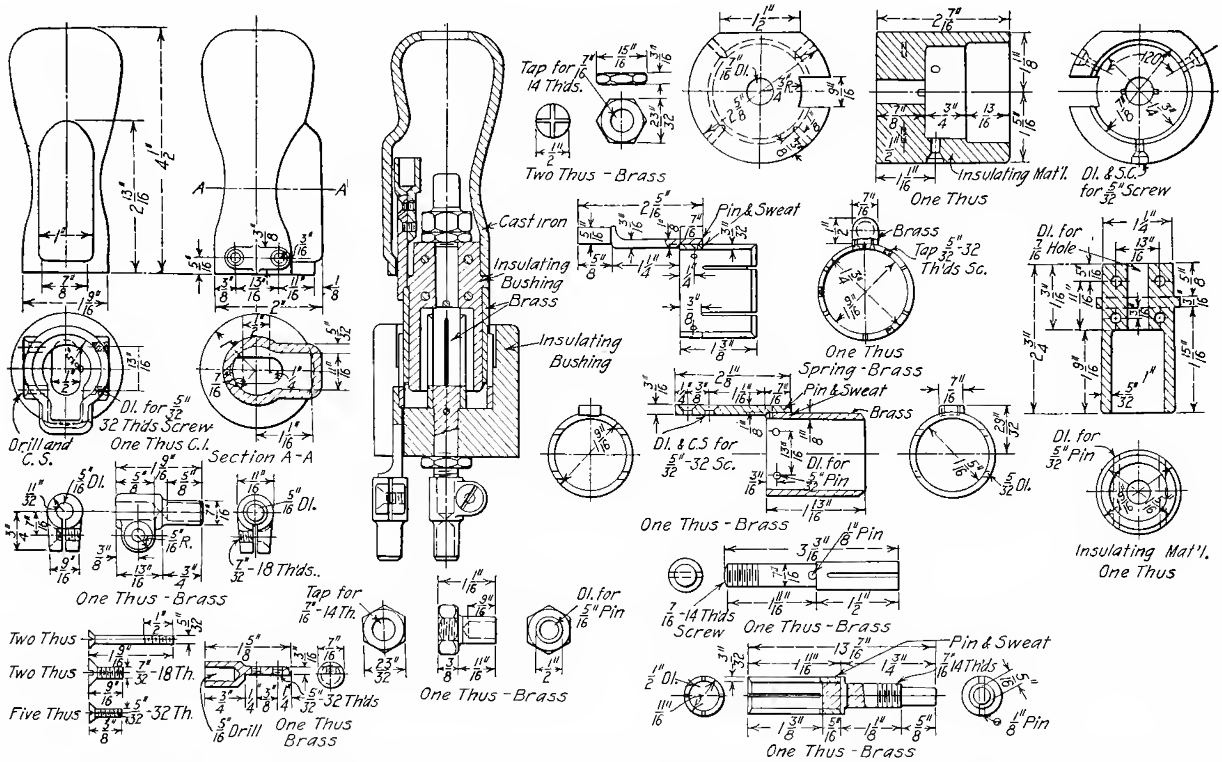


Fig. 2777—M. C. B. Recommended Practice for Charging Receptacle Details for Electric Lighting. (M. C. B. Sheet U3.) See also Fig. 2776.

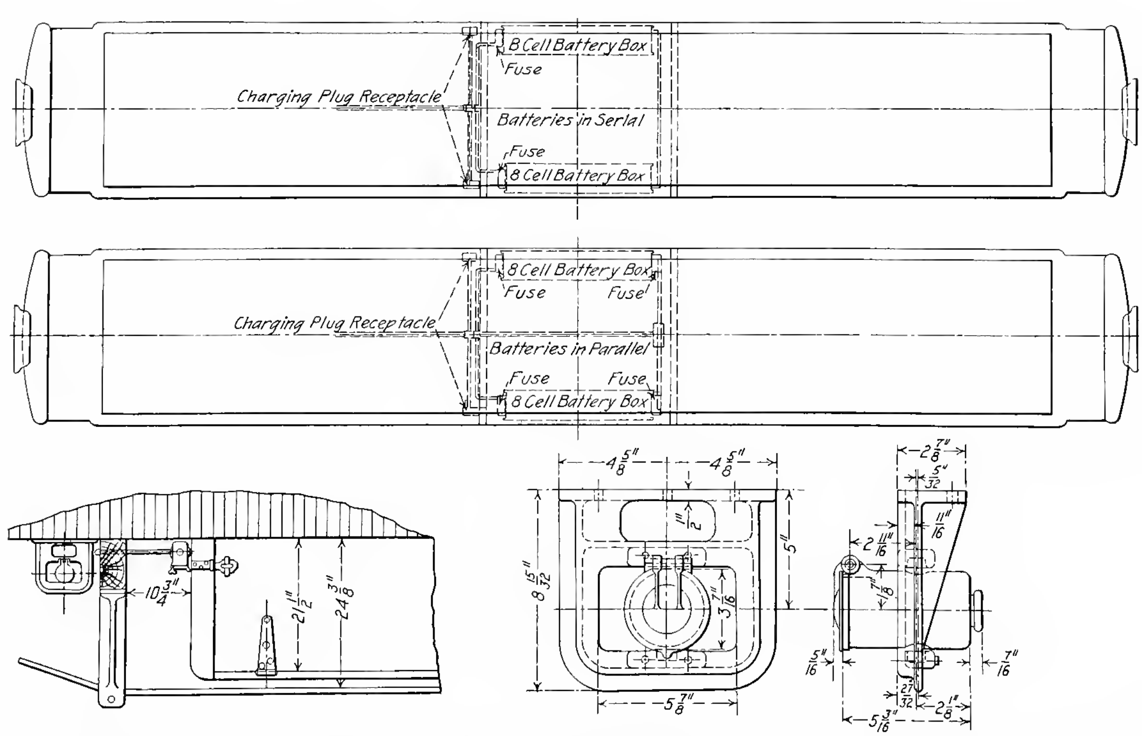
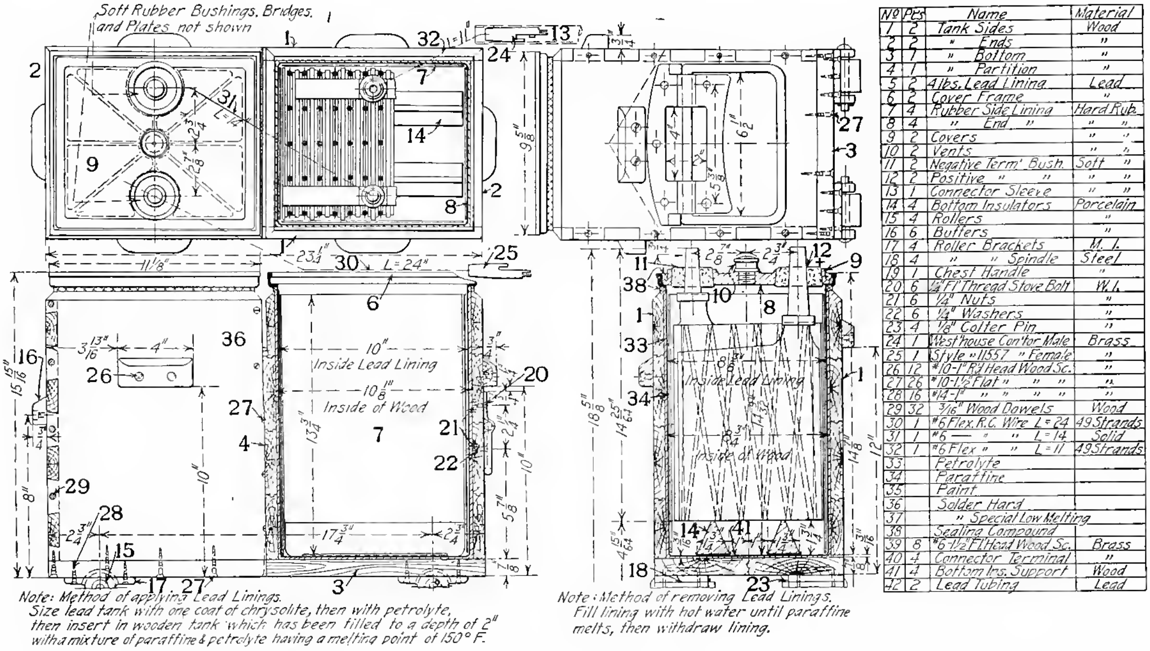
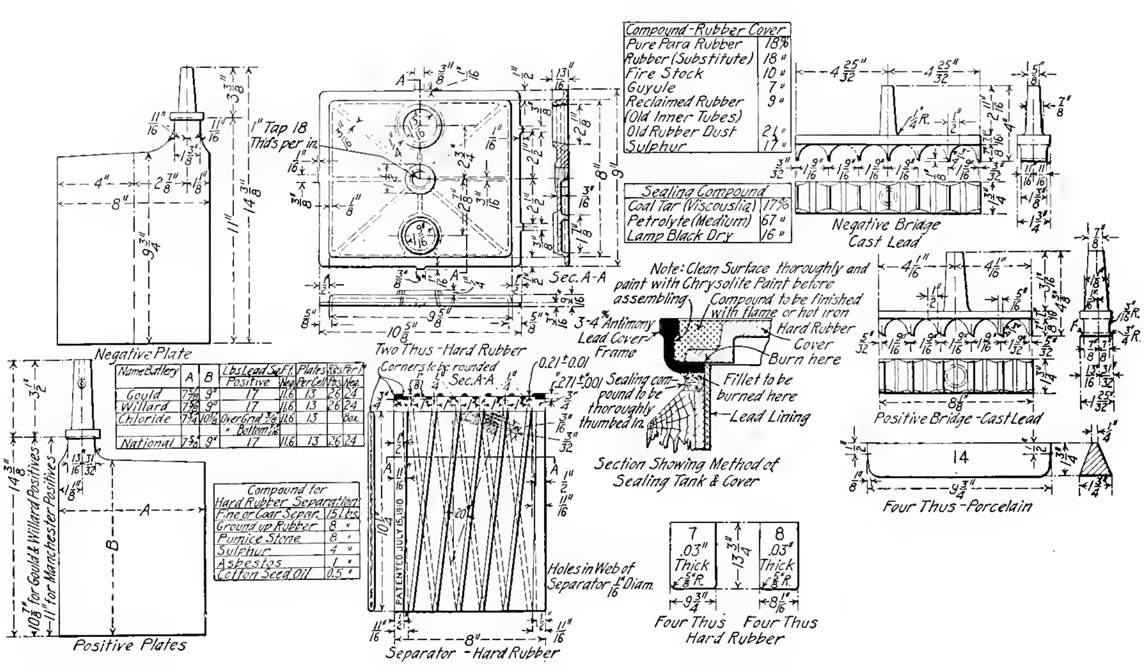


Fig. 2778—M. C. B. Recommended Practice for Application of Fuse Block for Electric Lighting. (M. C. B. Sheet U4.)



Nº	Pcs	Name	Material
1	2	Tank Sides	Wood
2	2	" Ends	"
3	1	" Bottom	"
4	1	" Partition	"
5	2	4 lbs. Lead Lining	Lead
6	2	Cover Frame	"
7	4	Rubber Side Lining	Hard Rub.
8	4	" End "	" "
9	2	Covers	" "
10	2	Vents	" "
11	2	Negative Term' Bush.	Soft "
12	2	Positive " "	" "
13	1	Connector Sleeve	" "
14	4	Bottom Insulators	Porcelain
15	4	Rollers	"
16	6	Buffers	"
17	4	Roller Brackets	M. I.
18	4	" " Spindle	Steel
19	1	Chest Handle	"
20	6	1/4" Fl' Thread Stove Bolt	W. I.
21	6	1/4" Nuts	"
22	6	1/4" Washers	"
23	4	1/8" Colter Pin	"
24	1	West'house Con'tor Male	Brass
25	1	Style " 11557 " Female	"
26	12	#10-1" R'd Head Wood Sc.	"
27	26	#10-1 1/2" Flat " " "	"
28	16	#14-1" " " " "	"
29	32	3/16" Wood Dowels	Wood
30	1	#6 Flex. R.C. Wire L=24	49 Strands
31	1	#6 — " " L=14	Solid
32	1	#6 Flex " " L=11	49 Strands
33		Petrolyte	
34		Paraffine	
35		Paint	
36		Solder Hard	
37		" Special Low Melting	
38		Sealing Compound	
39	8	#6-1 1/2" Fl. Head Wood Sc.	Brass
40	4	Connector Terminal	"
41	4	Bottom Ins. Support	Wood
42	2	Lead Tubing	Lead

Fig. 2779—M. C. B. Recommended Practice for Double Compartment Tanks for Lead Storage Batteries for Electric Lighting. (M. C. B. Sheet U6.)



Compound-Rubber Cover	
Pure Para Rubber	18%
Rubber (Substitute)	18 "
Fire Stock	10 "
Guyule	7 "
Reclaimed Rubber (Old Inner Tubes)	9 "
Old Rubber Dust	21 "
Sulphur	17 "

Sealing Compound	
Coal Tar (Viscouslig)	17%
Petrolyte (Medium)	67 "
Lamp Black Dry	16 "

Name Battery	A	B	Lbs Lead Sq. Ft. Positive	Neg.	Plates Per Cell	Pos.	Neg.
Gould	7 7/8	9"	17	11.6	13	26	24
Willard	7 7/8	9"	17	11.6	13	26	24
Chloride	7 1/4	10 1/8	Over Grid 1/8 " Bottom 1/16	11.6	13		Box.
National	7 5/8	9"	17	11.6	13	26	24

Compound for Hard Rubber Separation	
Fine or Coar Separ.	15 Lbs.
Ground up Rubber	8 "
Pumice Stone	8 "
Sulphur	4 "
Asbestos	1 "
Cotton Seed Oil	0.5 "

Fig. 2780—M. C. B. Recommended Practice for Double Compartment Tank Details for Electric Lighting. (M. C. B. Sheet U7.)

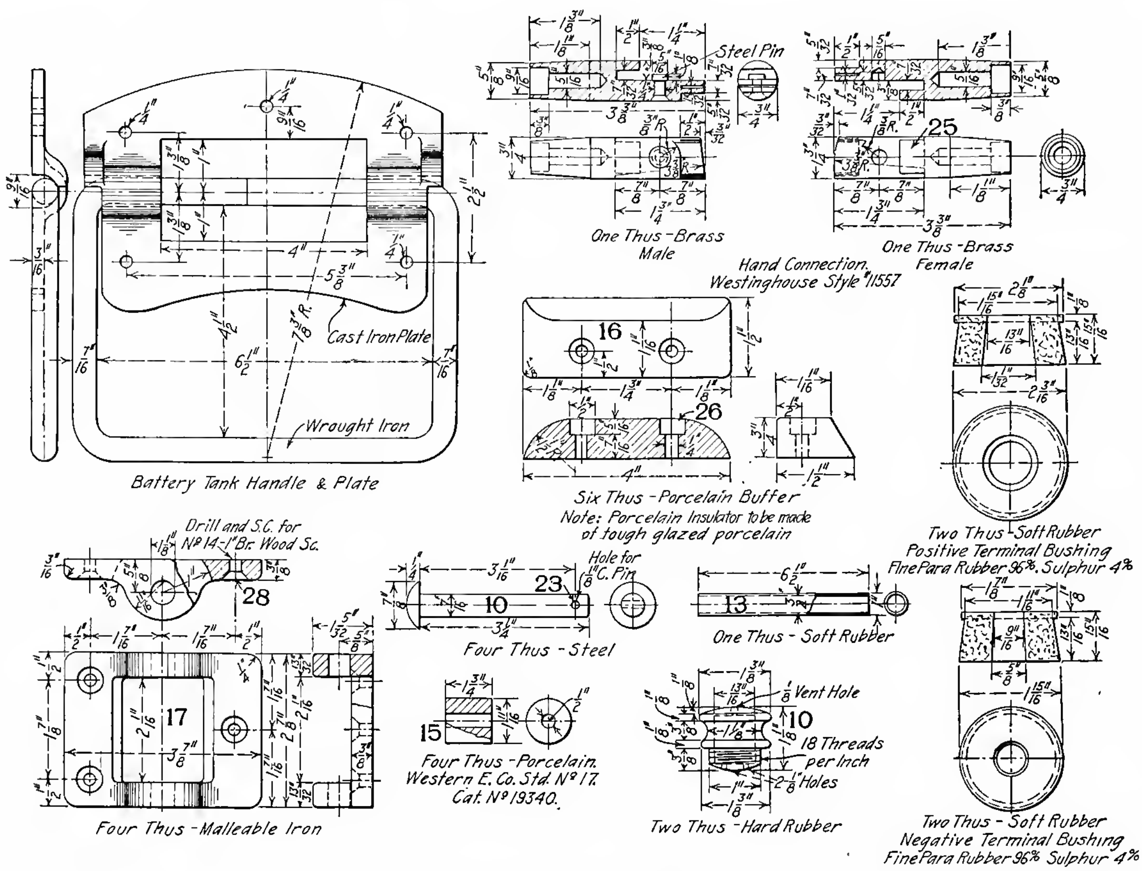


Fig. 2781—M. C. B. Recommended Practice for Double Compartment Tank Details for Electric Lighting. (M. C. B. Sheet U8.)

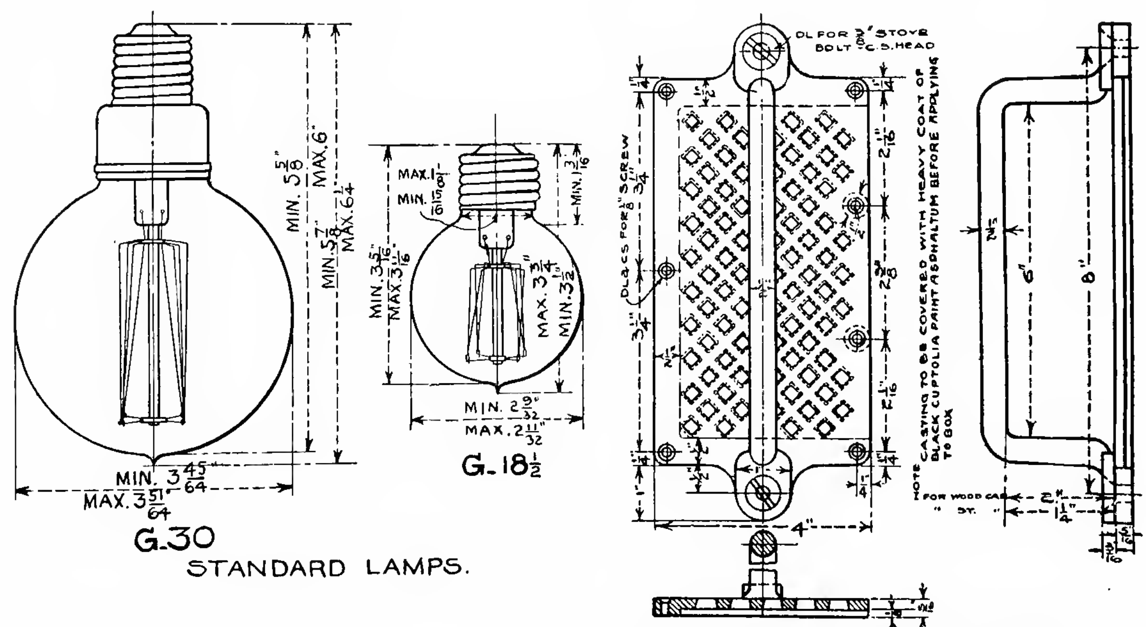


Fig. 2782—M. C. B. Recommended Practice for Battery Box Door Vent and Standard Lamps for Electric Lighting. (M. C. B. Sheet U9.)

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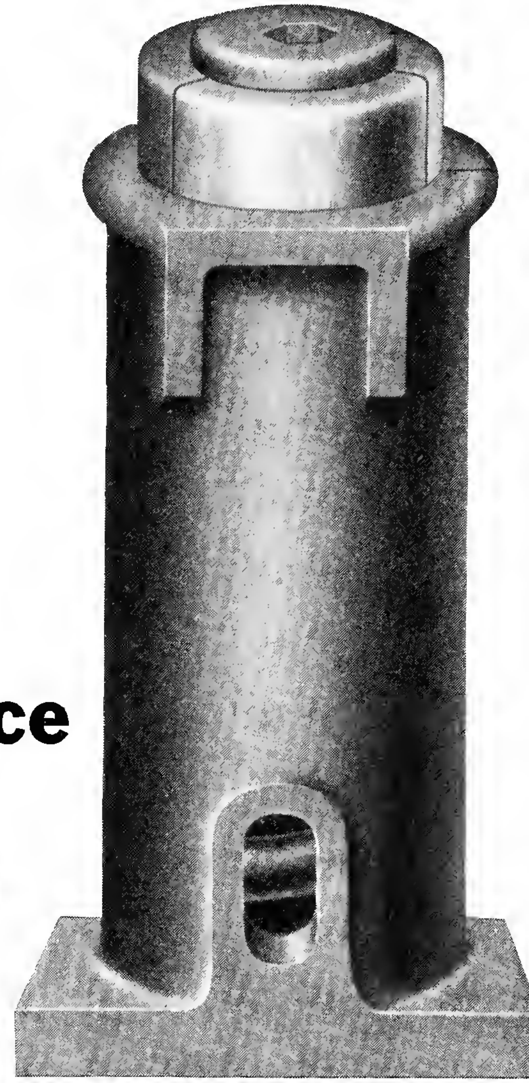

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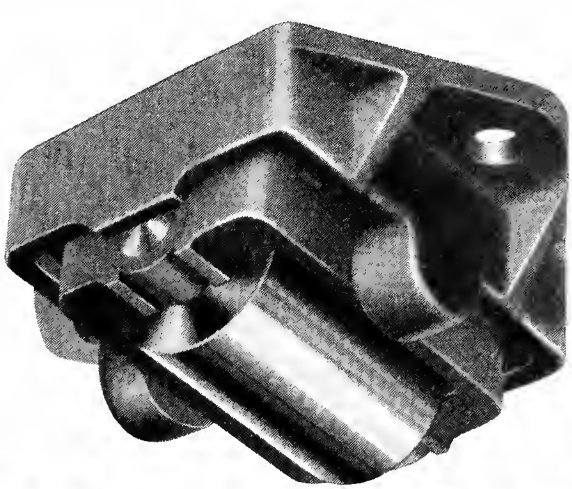

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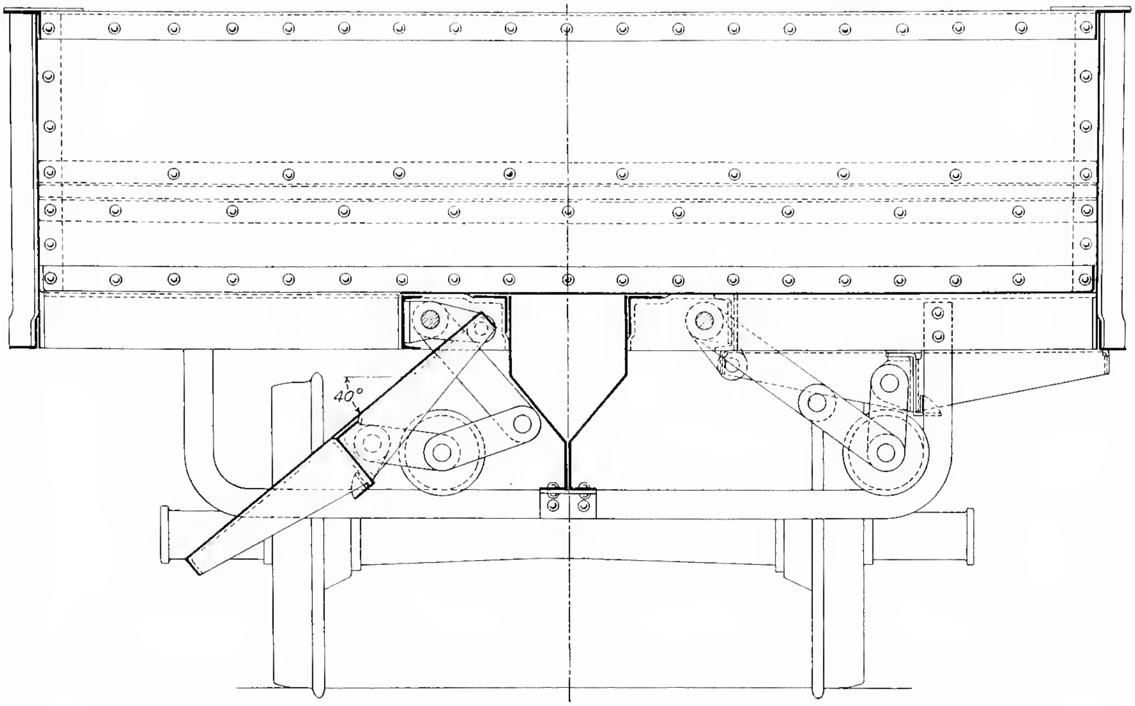

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General Electric Co.
Howard & Co., James L.

LAVATORY SUPPLIES.
Adams & Westlake Co.
Dayton Mfg. Co.
Duner Co.
Howard & Co., James L.

LIGHTING FIXTURES.
Adams & Westlake Co.
Commercial Acetylene Railway Light & Signal Co.
Dayton Mfg. Co.
Safety Car Heating & Lighting Co.

LOCK NUTS.
Boss Nut Co.
Columbia Nut & Bolt Co.
Grip Nut Co.
Jones Positive Nut Lock Co.

MOLDINGS, METAL.
Dahlstrom Metallic Door Co.
Edwards Co., O. M.

MOTORS.
General Electric Co.

NUTS AND BOLTS.
Cleveland City Forge & Iron Co.
Columbia Nut & Bolt Co.

OILS, PAINT.
Kay & Ess Co.

PADLOCKS.
Edwards Co., O. M.

PAINTS.
Kay & Ess Co.
Lehon Co.
U. S. Metal & Mfg. Co.

PLANING MACHINERY.
Hilles & Jones Co.

PLATFORMS, CAR.
Commonwealth Steel Co.
Gould Coupler Co.
Standard Coupler Co.

POSTS, SIDE, END, DOOR AND WINDOW.
Cleveland Car Specialty Co.
Forsyth Brothers Co.

PRISMATIC GLASS.
Pressed Prism Plate Glass Co.

PUNCHING AND SHEARING MACHINERY.
Hilles & Jones Co.

RAIL BENDERS.
Buda Co.

REGULATORS, TEMPERATURE.
Chicago Car Heating Co.
Consolidated Car Heating Co.
Parker Car Heating Co., Ltd.
Railway Utility Co.

RESERVOIRS, AIR.
Westinghouse Air Brake Co.

RIVETING MACHINERY.
Hilles & Jones Co.

ROOFING, CAR.
Franklin Railway Supply Co.
General Railway Supply Co.
Hutchins Car Roofing Co.
Lehon Co.
U. S. Metal & Mfg. Co.

RUBBER GOODS, MECHANICAL.
Wood, Guilford S.

SASH LOCKS AND BALANCES.
Adams & Westlake Co.
Curtain Supply Co.
Dayton Mfg. Co.
Edwards Co., O. M.
General Railway Supply Co.
Howard & Co., James L.

SASH RATCHETS, DECK.
Forsyth Brothers Co.
General Railway Supply Co.

SCREENS, CAR WINDOW.
General Railway Supply Co.

SEATS, CAR.
Barney & Smith Car Co.
Brill Co., J. G.

SHAFTING.
Krupp (Prosser & Son).
Prosser & Son, Thos.

SHEETS, PRESSED STEEL.
Krupp (Prosser & Son).
Prosser & Son, Thos.

SIDE CAR CONSTRUCTION, UNIT SECTION.
Forsyth Brothers Co.

SIDE FRAMES.
American Steel Foundries.
Simplex Railway Appliances Co.

SPRING DAMPENERS.
McCord & Co.

SPRINGS.
American Steel Foundries.
Railway Steel-Spring Co.
Simplex Railway Appliances Co.
Standard Steel Works Co.

STEEL, TOOL.
Krupp (Prosser & Son).
Prosser & Son, Thos.

STRAIGHTENING MACHINERY.
Hilles & Jones Co.

STRAINERS, AIR.
Westinghouse Air Brake Co.

TESTING MATERIAL.
Hunt & Co., Robert W.

TIRES, STEEL.
Krupp (Prosser & Son).
Prosser & Son, Thos.
Railway Steel-Spring Co.
Standard Steel Works Co.

TRAP DOORS AND RIGGING.
Barney & Smith Car Co.
Edwards Co., O. M.
General Railway Supply Co.
Gould Coupler Co.

TRAPS, STEAM.
Chicago Car Heating Co.
Consolidated Car Heating Co.
Parker Car Heating Co., Ltd.

TREADS, CAR STEP.
American Abrasive Metals Co.
American Mason Safety Tread Co.

TRUCKS.
American Car & Foundry Co.
Barney & Smith Car Co.
Bettendorf Axle Co.
Brill Co., J. G.
Central Locomotive & Car Works.
Clark Car Co.
Commonwealth Steel Co.
Gould Coupler Co.
Laconia Car Co.
McConway & Torley Co.
Pressed Steel Car Co.
Standard Car Truck Co.
Standard Steel Car Co.
Whipple Car Co.

TURNBUCKLES.
Cleveland City Forge & Iron Co.

UNDERFRAMES.
American Car & Foundry Co.
Barney & Smith Car Co.
Bettendorf Axle Co.
Commonwealth Steel Co.
Pressed Steel Car Co.
Ralston Steel Car Co.

UPHOLSTERY.
Hale & Kilburn Co.
Pantasote Co.
Scarritt-Comstock Furniture Co.
U. S. Metal & Mfg. Co.

VACUUM CAR CLEANERS — (SEE CAR CLEANERS, VACUUM).

VALVES.
Chicago Car Heating Co.
Consolidated Car Heating Co.
Edwards Co., O. M.
Parker Car Heating Co., Ltd.
Westinghouse Air Brake Co.
Western Railway Equipment Co.

VARNISHES.
Kay & Ess Co.
U. S. Metal & Mfg. Co.

VELOCIPEDES, HAND AND MOTOR.
Buda Co.

VENTILATORS.
Automatic Ventilator Co.
Brill Co., J. G.
Globe Ventilator Co.
Parker Car Heating Co., Ltd.
Railway Utility Co.

VESTIBULE FIXTURES.
Acme Supply Co.
Adams & Westlake Co.
Curtain Supply Co.
Edwards Co., O. M.
Gould Coupler Co.

VESTIBULES.
Gould Coupler Co.

WASHERS.
Jones Positive Nut Lock Co.
National Malleable Castings Co.

WASTE.
Howard & Co., James L.

WATER CLOSETS AND WASHSTANDS — (SEE LAVATORY SUPPLIES).

WELDING, OXY-ACETYLENE.
Commercial Acetylene Railway Light & Signal Co.

WHEELS.
American Car & Foundry Co.
American Steel Foundries.
Barney & Smith Car Co.
Baume & Marpent, Ltd.
Krupp (Prosser & Son).
Laconia Car Co.
Mt. Vernon Car Mfg. Co.
National Malleable Castings Co.
Nickel-Chrome Chilled Car Wheel Co.
Pressed Steel Car Co.
Prosser & Son, Thos.
Railway Steel-Spring Co.
Simplex Railway Appliances Co.
Standard Steel Car Co.
Standard Steel Works Co.

WHEELS, PRESSED STEEL.
Buda Co.

WINDOW FIXTURES.
Acme Supply Co.
Adams & Westlake Co.
Dayton Mfg. Co.
Edwards Co., O. M.
Forsyth Brothers Co.
Howard & Co., James L.

WIRE.
Kerite Insulated Wire & Cable Co.

WRENCHES.
Coes Wrench Co.

TRADE NAME INDEX

A

ACME Brake Slack Adjuster; Pipe Clamps. Western Railway Equipment Co.
ACME Diaphragms; Weatherproof Window; Steel Ladder; Anti-Pinch Hinge; Vestibule Curtain Outfit. Acme Supply Co.
ADLAKE. Adams & Westlake Co.
AGASOTE Headlining; Panel Board. Pantasote Co.
AJAX Brake Beams. American Steel Foundries.
ALLIANCE Couplers. American Steel Foundries.
ALLSTEEL Car Seats. Hale & Kilburn Co.
AMERICAN Automatic Slack Adjuster. American Brake Co.
ANDREWS Side Frames. American Steel Foundries.
ANGLO-AMERICAN Varnish. U. S. Metal & Mfg. Co.
ARDEE Sash Lock. Dayton Mfg. Co.
ASCO Weatherstrip. Acme Supply Co.
ASHTON Gages; Rear End Train Brake and Signal Cock. Ashton Valve Co.
AUTOMATIC Car Ventilators. Automatic Ventilator Co.
AVERY Acetylene Car Lighting System. Dayton Mfg. Co.

B

BALANCED Door Dump Cars. Clark Car Co.
BALTIMORE Ball Center Bearings; Roller Side Bearings. T. H. Symington Co.
BARBER Trucks; Center Plates; Side Bearings. Standard Car Truck Co.
BOSS Lock Nuts. Boss Nut Co.
BUDA Bumping Posts; Motor Cars; Pressed Steel Wheels; Car Replacers. Buda Co.
BUFFALO Brake Beam. Buffalo Brake Beam Co.
BUFFALO Journal Box. Pratt & Letchworth Co.
BUHOUP Flexible Truck. McConway & Torley Co.
BUTLER Friction Draft Gear; Drawbar Attachment. Butler Drawbar Attachment Co.

C

CAMEL Freight Car Doors; Carlines; Hose Bands; Automobile Car Door Fixtures; Freight Car Door Locks. Camel Co.
CARBELASTIC Paint. Kay & Ess Co.
CARDWELL Friction-Draft Gear. Union Draft Gear Co.
CHAFFEE Deck Sash Ratchets; Drawbar Centering Device. Forsyth Brothers Co.
CHANARCH Car Flooring. Acme Supply Co.
CHAPMAN Jacks. Chapman Jack Co.
CHICAGO Couplers. National Malleable Castings Co.
CHLORIDE ACCUMULATOR Storage Battery. Electric Storage Battery Co.
CHRISTIE Brake Heads and Shoes. American Brake Shoe & Foundry Co.
CLEVELAND Carline. Cleveland Car Specialty Co.
CLIMAX Couplers; Journal Boxes. National Malleable Castings Co.
COES Wrenches. Coes Wrench Co.
COLUMBIA Lock Nuts. Columbia Nut & Bolt Co.
COLUMBIA Lock Nuts. U. S. Metal & Mfg. Co.
CRECO Brake Beams; Roller Side Bearings; Slack Adjusters; Journal Boxes and Lids; Sliding Third Point Brake Beam Support. Chicago Railway Equipment Co.
C S C O Diaphragms. Curtain Supply Co.
CURTIS Pivoted Coupler. McConway & Torley Co.

D

DAHLSTROM Interior Trim and Fireproof Products. Dahlstrom Metallic Door Co.
DATONIA Paint Oils. Kay & Ess Co.
DAVIS Wheels. American Steel Foundries.
DAYTON Car Trimmings. Dayton Mfg. Co.
DEDENDA Gongs. J. G. Brill Co.
DETROIT Car Door. Hutchins Car Roofing Co.
DIAMOND Brake Beams. Chicago Railway Equipment Co.
DIAMOND "S" Steel Back Brake Shoe. American Brake Shoe & Foundry Co.
DOWNING Card Holders. Western Railway Equipment Co.
DREXEL Brake Beam. Chicago Ry. Equip. Co.
DRY-ART Insulating Paper. Lehon Co.
DUDGEON Jacks; Hydraulic Machinery. Richard Dudgeon.
DUMPIT Sand Boxes. J. G. Brill Co.
DUNHAM Freight Car Doors. Camel Co.
DUNHAM Hopper Door Device. U. S. Metal & Mfg. Co.
DUPLEX STRUTS. Chicago Ry. Equipment Co.

E

ECKERT Water Closets. Dayton Mfg. Co.
ECLIPSE Deck Sash Ratchets. General Railway Supply Co.
EDISON Storage Batteries. Edison Storage Battery Co.
EMPIRE Truck Bolster; General Service Doors. U. S. Metal & Mfg. Co.
E. T. O. Heating Equipment; Steam Couplers. Parker Car Heating Co., Ltd.
EXHAUST Ventilators. J. G. Brill Co.
EXIDE Battery. Electric Storage Battery Co.

F

FARLOW Draft Gear and Draft Gear Attachments. T. H. Symington Co.
FEASIBLE Drop Brake Staff. U. S. Metal & Mfg. Co.
FELTLINO Steel Car Insulation. Union Fibre Co.
FERALUN Safety Step Treads; Brake Shoes. American Abrasive Metals Co.
FLEXOLITH Composition Flooring. General Railway Supply Co.
FLEX Shade Holder. Dayton Mfg. Co.
FLORY Carry Iron; Striking Plate. Commonwealth Steel Co.
FORSYTH Fixtures. Curtain Supply Co.
FOX Trucks. Pressed Steel Car Co.
FRANKLIN Flexible Metallic Car Roof. Franklin Railway Supply Co.

G

G-E Electrical Apparatus. General Electric Co.
GLOBE Car Lamp Jacks; Car Ventilators. Globe Ventilator Co.
GRAPHOLITE Paint. Kay & Ess Co.
GRIP Nuts. Grip Nut Co.

H

HALF-BALL Brake Hangers. J. G. Brill Co.
HARTMAN Ball Bearing and Roller Bearing Center Plates. Joliet Railway Supply Co.
HERCULES Brake Beams. American Steel Foundries.
HINSON Car Buffers; Draft Gear; Emergency Knuckles. National Car Coupler Co.
HOERR Draft Gear. Western Railway Equipment Co.
HOWARD Locks. James L. Howard & Co.
HUNTOON Brake Beams; Automatic Adjustable Brake Heads. Joliet Railway Supply Co.
HUTCHINS Car Roofing. Hutchins Car Roofing Co.

I

IMPERIAL Body Bolster. U. S. Metal & Mfg. Co.
IMPERIAL Car Window Screens. General Railway Supply Co.
IMPERIAL Prism-Plate Ornamental Glass; Special Designed Prismatic Glass for Passenger Cars. Pressed Prism Plate Glass Co.
INTEGRAL Steel Car Window Construction. Hale & Kilburn Co.
INTERCHANGEABLE Journal Bearings and Wedges. Western Railway Equipment Co.

J

JANNEY Pilot Coupler; Fender Coupler; X Pivoted Pilot Coupler; X Freight Coupler. McConway & Torley Co.
J-C Jacks. Joyce-Cridland Co.
JONES POSITIVE Nut Locks. Jones Positive Nut Lock Co.

K

K & S Canvas Roof Preservative; Locomotive Black Varnish; Baking Goods. Kay & Ess Co.
KARBOLITH Composite Car Flooring. American Mason Safety Tread Co.
KARBORUNDUM KAR KARBOLITH Floor Surfacing. American Mason Safety Tread Co.
KASCOL Oil. Kay & Ess Co.
KERITE Wires and Cables. Kerite Insulated Wire & Cable Co.
KEWANEE Brake Beam. Chicago Ry. Equip. Co.
KEY Wrenches. Coes Wrench Co.
KLING Bolt. U. S. Metal & Mfg. Co.
KNIFE-HANDLE Wrenches. Coes Wrench Co.

L

LA FLARE Insulation for Refrigerator Car Doors. W. H. Miner.
LATROBE Couplers. National Mall. Castings Co.
LEHON Insulating Board and Paper; Plastic Cab Roofing; Waterproof Curtain Cloth. Lehon Co.
LINOFELT Car Insulation. Union Fibre Co.

M

MALTHA Paint. Kay & Ess Co.
McCORD Draft Gear; Journal Boxes; Spring Dampener. McCord & Co.
METALLIC Steel Sheathing. General Railway Supply Co.
MIDGET Industrial Car Couplers. National Car Coupler Co.
MINIER Window Cleaning Device. Dayton Mfg. Co.
MONARCH Brake Beam. Chicago Ry. Equip. Co.
MONITOR Bolsters. Chicago Ry. Equipment Co.
MONOGRAM Train Pipe Bracket. Guilford S. Wood.

N

NATIONAL Equalizing Wedge. McCord & Co.
NATIONAL Hollow Brake Beam. Chicago Railway Equipment Co.
NATIONAL Improved Car Couplers; Open Hearth Steel Car Castings; Car Coupler Knuckles; Coupler Centering Devices. National Car Coupler Co.
NATIONAL Journal Boxes; Brake Jaws; Dead Lever Guide; Safety Brake Lever; Safety Car Door Fasteners. National Malleable Castings Co.
NATIONAL Steel Vestibule Trap Doors; Vestibule Curtain Catches; Standard Roofing. General Railway Supply Co.
NEVERBREAK Car Seats. Hale & Kilburn Co.
NINETY-SIX Brake Beam. Chicago Railway Equipment Co.
NO REPAIR Carline. Cleveland Car Specialty Co.

O

OAKMONT Metal Windows. Dahlstrom Metallic Door Co.
OMECA Metal Furniture; Valves. O. M. Edwards Co.

P

PANTASOTE Curtain Material; Upholstery Leathers. Pantasote Co.
PARKER SYSTEMS Car Heating; Car Ventilating. Parker Car Heating Co., Ltd.
PAOWNYC Window Fixtures. O. M. Edwards Co.
PENN Pivoted Coupler. McConway & Torley Co.
PER-BONA Insulating Paper. Lehon Co.
PERFECTION Window Sash Balances. General Railway Supply Co.
PERRY Roller Side Bearings. Joliet Railway Supply Co.
PITT Freight Coupler. McConway & Torley Co.
PITSBURG Ratchet Drop Brake Handle. Dayton Mfg. Co.
PLUS-TEX Waterproofed Cloth. Lehon Co.
POLAR-BEAR Insulating and Sheathing Papers. Lehon Co.
POLLAK Steel Axles. U. S. Metal & Mfg. Co.
POSITIVE Bolt Fasteners; Nut Locks. Jones Positive Nut Lock Co.

R

RELIANCE Brake Beam. Chicago Railway Equipment Co.
REPUBLIC Draft Gear. Western Railway Equipment Co.
RESISTO Steel Car Insulation. General Railway Supply Co.
REX Removable Bottom Car Basket Rocks. Dayton Mfg. Co.
REX Rollers. Curtain Supply Co.
RING Fixtures. Curtain Supply Co.
ROOFRITE Roofing; Waterproofed Canvas; Sill Covering. Lehon Co.
RUSSEL Cars. Russel Wheel & Foundry Co.

S

ST. LOUIS Car Doors. Western Railway Equipment Co.
SAMPSON Industrial Car Couplers. National Car Coupler Co.
SECURITY Dust Guards. Western Railway Equipment Co.
SECURITY Freight Car Doors. Camel Co.
SEPARABLE Body Bolster. Commonwealth Steel Co.
SESSIONS Draft Gear. Standard Coupler Co.
SHARON Couplers. National Mall. Castings Co.
SHIM Slack Adjuster. Standard Coupler Co.
SIMPLEX Cast Steel Bolsters; Couplers. American Steel Foundries.
STANWOOD Car Step. American Mason Safety Tread Co.
STANDARD Steel Platforms; Buffers. Standard Coupler Co.
STANDARD Steel Tires; Steel Tired Wheels; Solid Forged and Rolled Steel Wheels; Steel and Iron Axles; Steel and Iron Forgings and Castings; Springs; Rolled Steel Gear Blanks. Standard Steel Works Co.
STAY-DRI Iron Paint. Lehon Co.
STAY-LASTIC Iron Paint. Lehon Co.
STEEL HANDLE Wrenches. Coes Wrench Co.
STERLINGWORTH Brake Beam. Chicago Railway Equipment Co.
STREETER Steel Back Brake Shoes. American Brake Shoe & Foundry Co.
SUSEMIHL Side Bearings. American Steel Foundries.
SYLPHON Packless Valves. Consolidated Car Heating Co.
SYMINGTON Journal Boxes and Lids; Flexible Dust Guards. T. H. Symington Co.

T

TEXODERM Seat Upholstering. U. S. Metal & Mfg. Co.
THERMOFELT Car Insulation. Union Fibre Co.
THERMO-JET Car Heating System. Safety Car Heating & Lighting Co.
TOWER Couplers. National Mall. Castings Co.
TRANSOM Draft Gear. Commonwealth Steel Co.
TUDOR ACCUMULATOR Storage Battery. Electric Storage Battery Co.

U

U-S-L Lighting System and Equipment; Storage Batteries. U. S. Light & Heating Co.
UNIVERSAL Drawbar Yokes; Twin Spring Draft Gear; Draft Gear Attachments; Draft Lugs. Universal Draft Gear Attachment Co.
UTILITY Car Ventilators; Electric Thermometer Control for Car Heating; Freight Car Door Locks; Vacuum Car Cleaners; Hose Couplers. Railway Utility Co.

V

VANDERBILT Brake Beams. Buffalo Brake Beam Co.
VAPOR Car Heating System. Consolidated Car Heating Co.
VAPOR System of Car Heating. Chicago Car Heating Co.
VULCAN Brake Beams; Side Frames. American Steel Foundries.

W

WALKOVER Car Seats. Hale & Kilburn Co.
WEDGE-SHAPED Steam Coupler Gaskets. Parker Car Heating Co., Ltd.
WESTERN Flush Car Doors; Steel Carlines; Brake Jaws; Sill and Carline Pockets; Tie Daters. Western Railway Equipment Co.
WOOD Flexible Nipple End Hose Protector. Guilford S. Wood.
WOODS Anti-Friction Side Bearings; Center Plates. Edwin S. Woods & Co.

OUR MERITS

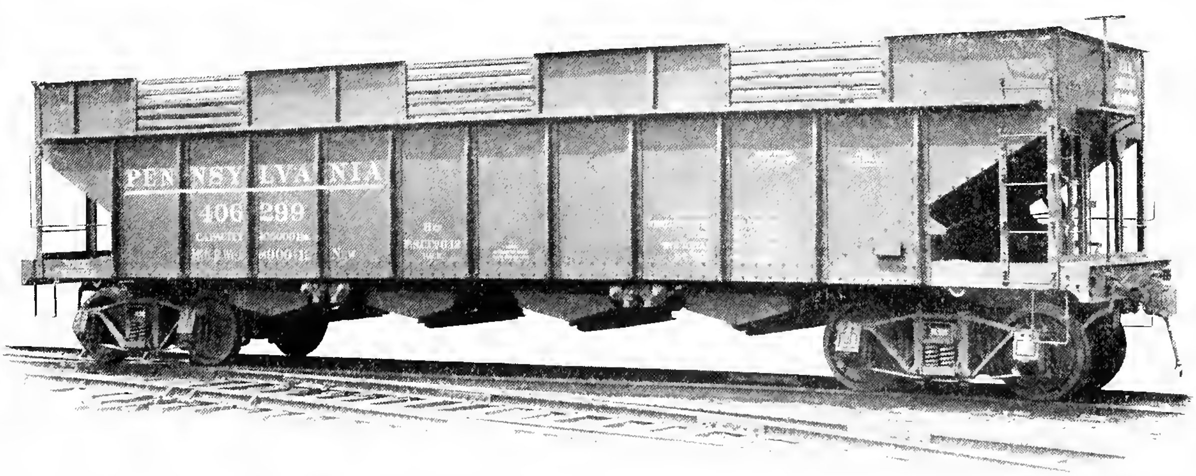
Longest Experience
Unexcelled Facilities
Progressive Designs
Proper Construction

The advantages to be gained by placing your orders with us are worthy of careful consideration

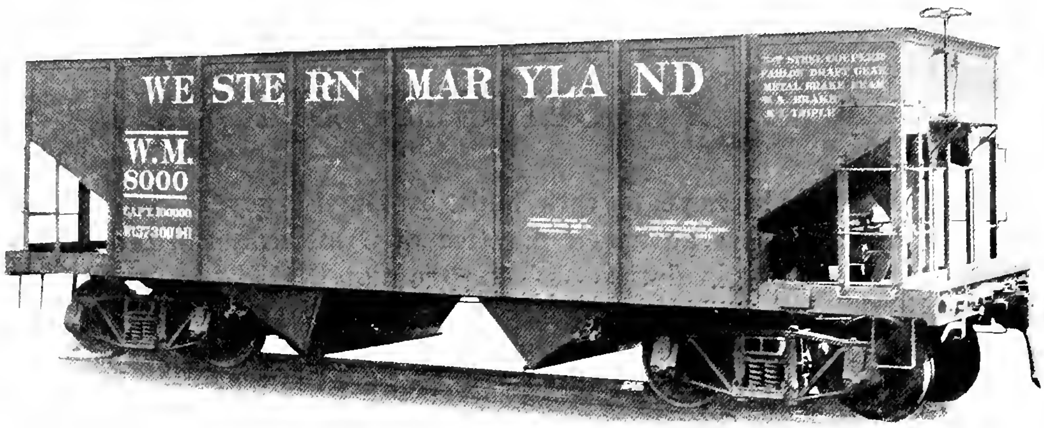
PASSENGER AND FREIGHT CARS

PRESSED STEEL CAR COMPANY

NEW YORK PITTSBURGH CHICAGO WASHINGTON, D. C.



Standard Steel Car Co.

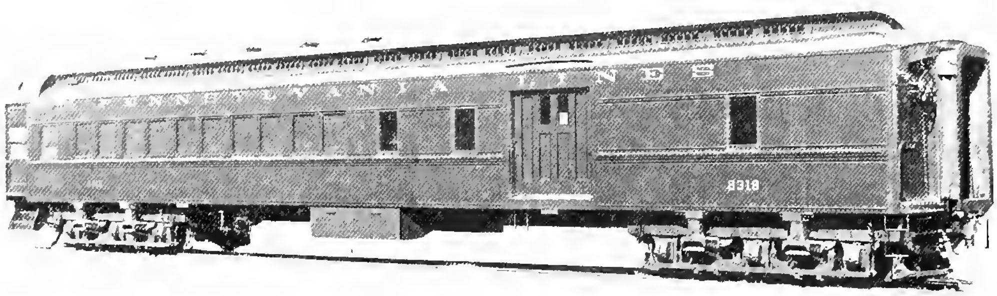


STEEL AND COMPOSITE

FREIGHT CARS

AND ALL STEEL

PASSENGER EQUIPMENT



Capacity 60,000 Cars Per Annum

General Office:

Pittsburgh, Pa., Frick Bldg.

Branch Offices:

New York, 170 Broadway   Chicago, Fisher Bldg.

Works:

Butler, Pa.   New Castle, Pa.   Hammond, Ind.

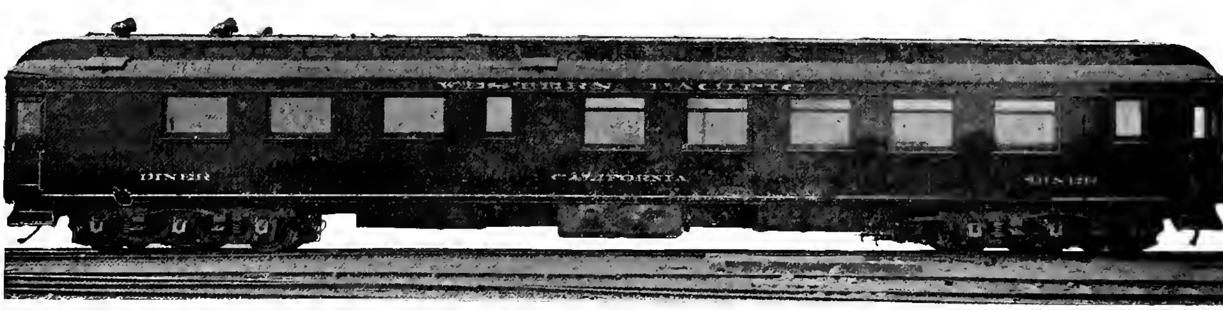
The Scope of the "Best Cars"

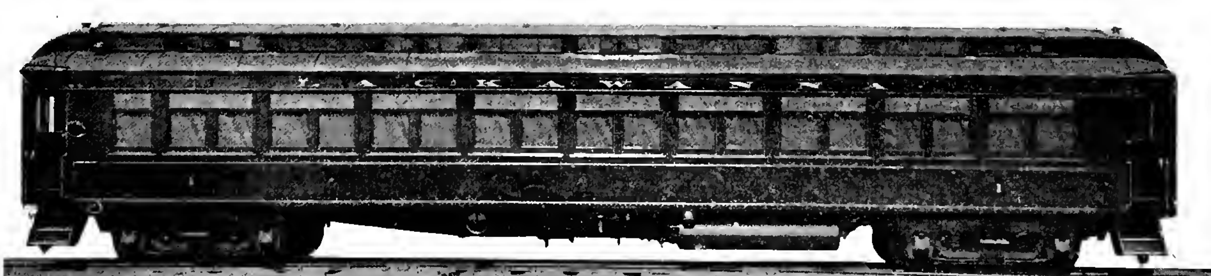
PASSENGER SERVICE

For sixty-three years cars built by the Barney & Smith Car Co. have stood for the most advanced practice on American railroads. Every practical improvement in design and construction that has been developed to meet modern high-speed, large capacity and safe transportation, is best exemplified in Barney & Smith cars.

We point with pardonable pride to a manufacturing equipment and a reputation for integrity that has grown as our business has grown—and the scope of our business embraces every type of all steel, all wood and composite cars for both passenger and freight service.

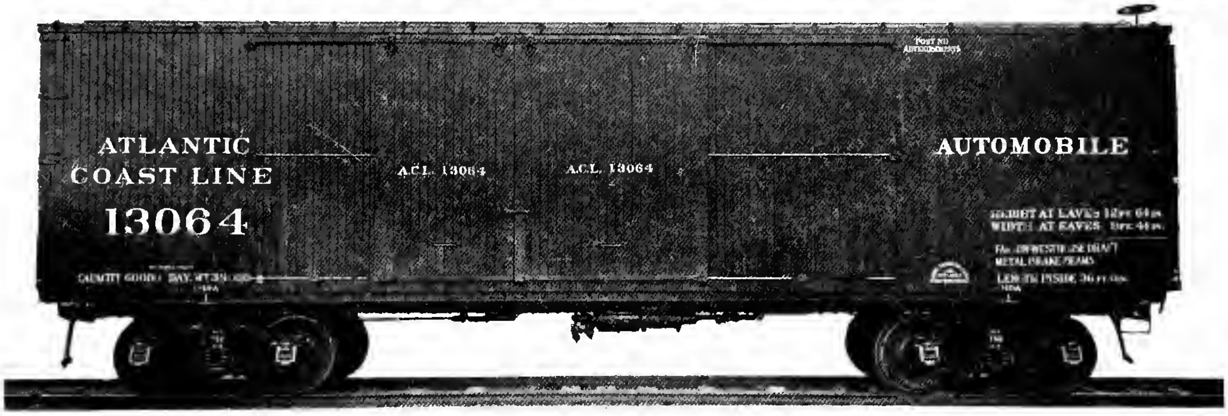
Our cars are the best that resources, experience, ingenuity and skill can produce.

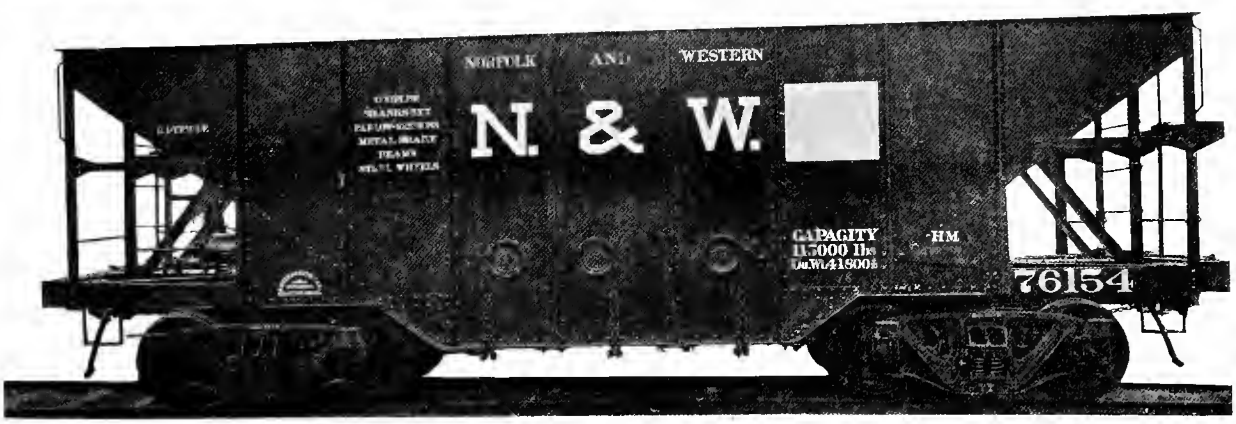




Barney and Smith Plant of Every Type

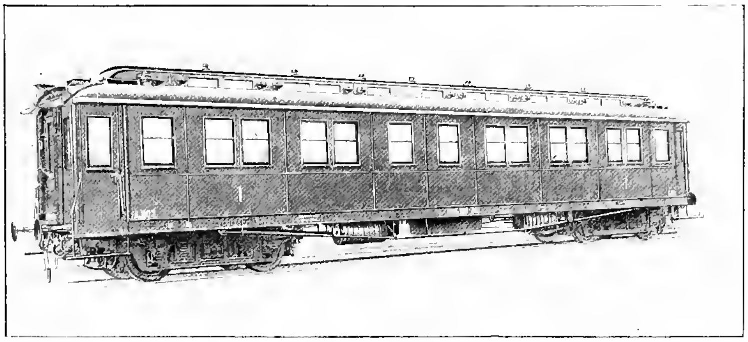
FREIGHT SERVICE

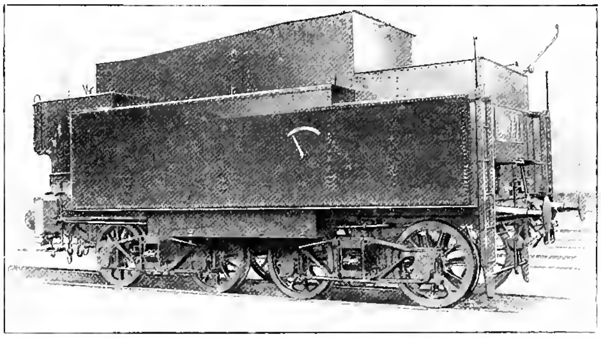


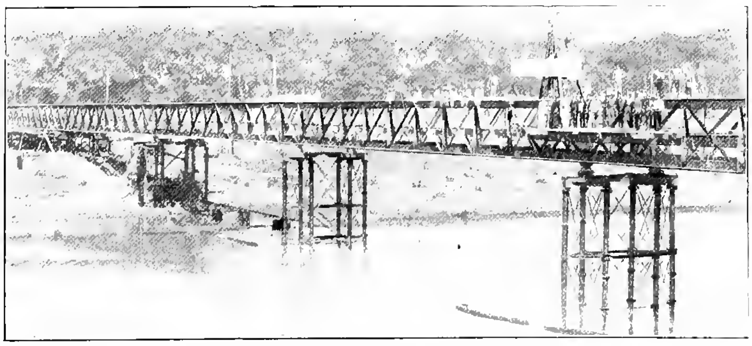


THE BARNEY AND SMITH CAR CO.

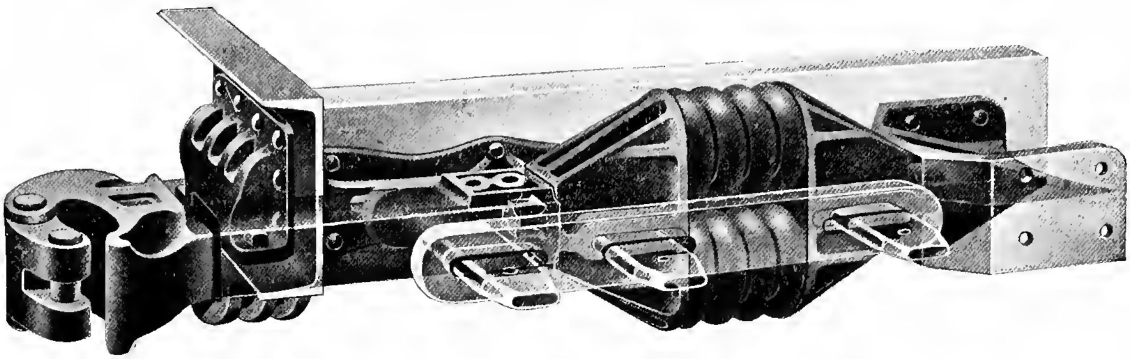
DAYTON, OHIO







Approved DRAFT GEAR Practice For AUTOMATIC COUPLERS



The Farlow Draft Attachment

has superseded yoke draft gears for modern railway cars. The Farlow Attachment protects the car frame by properly distributing shocks in excess of the capacity of the cushioning device and also preserves the cushioning apparatus against the effects of overload.

STRONG SIMPLE DURABLE PROVEN

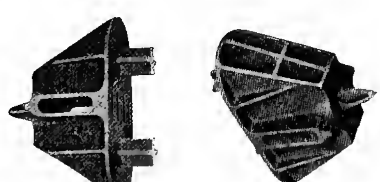
used with

SINGLE SPRINGS TWIN SPRINGS FRICTION GEARS

Farlow Parts For One Car

Twin Spring design

4 Malleable Iron Cheek Plates



4 Malleable Iron Follower Blocks

6 Steel Draft Keys—
5″ x 1⅛″

4 Steel Side Links—4½″ x 1⅛″

Refer to text pages 483 and 484.

Correspondence invited.

THE T. H. SYMINGTON COMPANY

New York, N. Y., U. S. A.

NATIONAL DUMP CAR CO.

Makers of

General Service Gondola Cars
Ore Cars (Absolutely Self Cleaning)
Dumping Stock Cars (For Hauling Coal on Return Trip)

PIONEERS IN THESE TYPES OF CARS

RAILWAY EXCHANGE CHICAGO

HART CONVERTIBLE CAR

For Ballast, Coal and General Service

RODGER BALLAST CAR CO.

RAILWAY EXCHANGE, CHICAGO

GOODWIN CAR COMPANY

1524 Otis Building, Chicago, Ill. 17 Battery Place, New York City

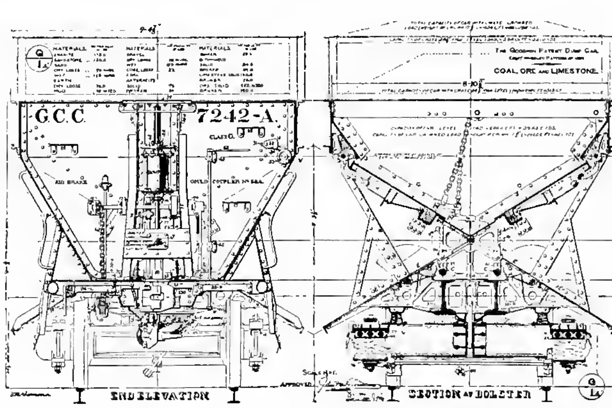
Trade-Mark.

Trade-Mark.

THE GOODWIN STANDARD CLASS "G" DUMP AND BALLASTING CAR

AIR DUMPING AND AIR REPLACING

The Standard "Class G" Dump and Ballast Car



Capacity 80,000 100,000 Pounds

Do you know why you have so many broken couplers, knuckles and knuckle pins? They break because the right kind of a draft gear is not between them and the car body to destroy the shocks of switching, buffing and pulling strains.

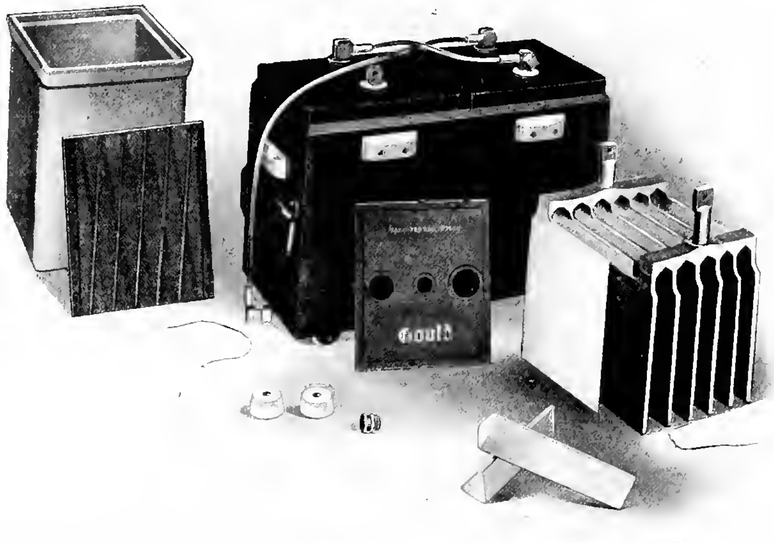
The fact that a car roof leaks is not necessarily an indication that the car roof is a poor one. It probably means that the draft gear with which the car is equipped is not a shock destroyer, and the jolting and jarring that the car gets in service has opened up the roof.

Grain does not leak from a car because the flooring and the siding has not been properly constructed. The grain leaks are accounted for by the fact that the car is not equipped with a draft gear which destroys the shocks of switching service. It is the impact of a 300,000 or 400,000 pound blow given one car by another that causes the trouble.

Broken shipments of eggs or tiling, lumber driven through the ends of the cars, side doors on the track, couplers torn out, break-in-twos and their disastrous results, are remedied by putting in a draft gear that is a shock destroyer, that does not allow the blow or impact of a locomotive or car to be distributed all through the car.

It isn't in the treatment of symptoms but in the treatment of causes that we are going to find the solution of the difficulties incident to car maintenance. If a car is going to stand still, a good coat of paint will keep it in repair, but if that car is going to be moved there is nothing but the best friction draft gear made that will insure it against damage.

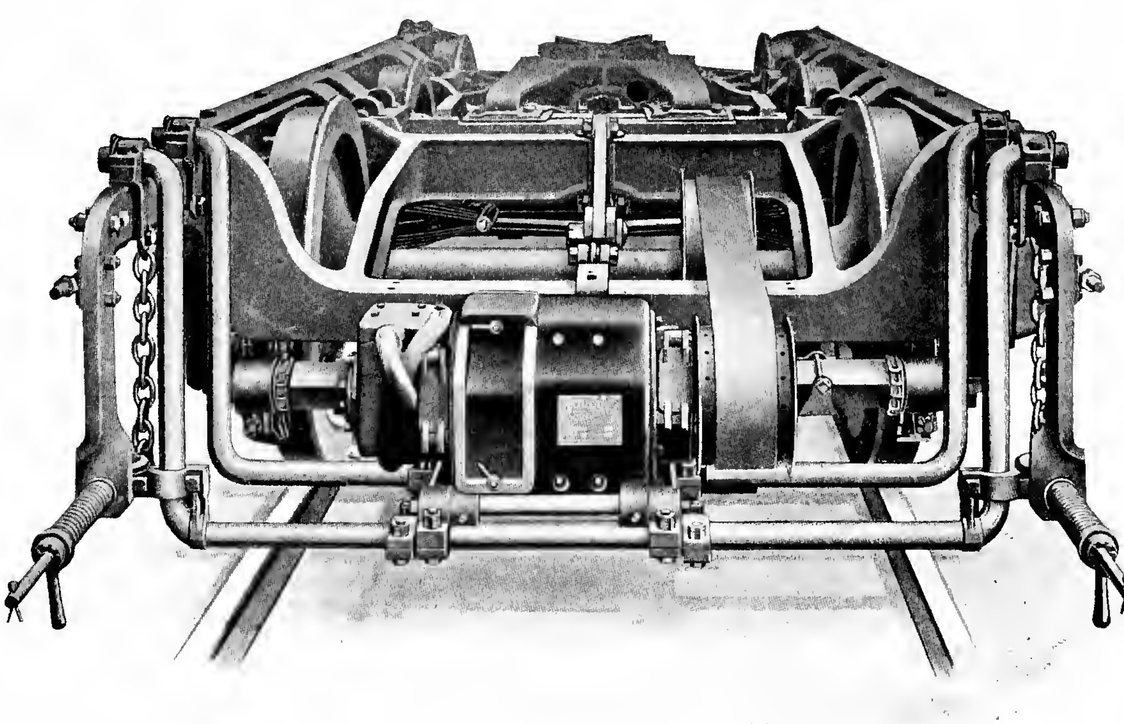
Gould Storage Battery Co., 341-347 Fifth Ave., N. Y.



GOULD
ELECTRIC CAR LIGHTING

"GOULD"
Car Lighting
Batteries

GOULD
"Simplex"
System



See pages 835 to 841.

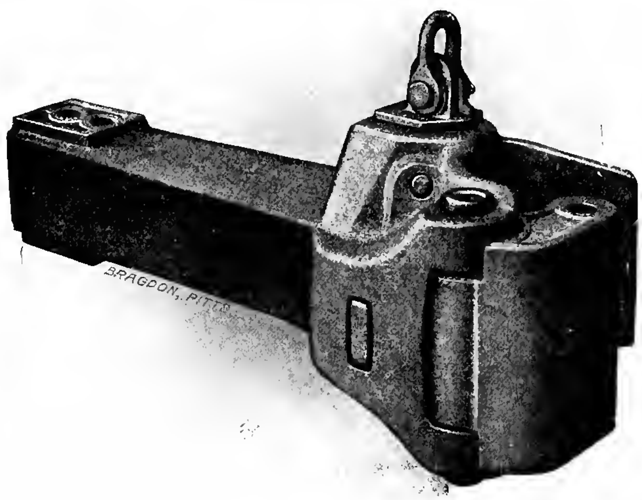
Gould Coupler Co. 341-347 Fifth Ave., N. Y.

The McConway & Torley Co.

Pittsburgh, Pa.

Original Manufacturers of the M. C. B. Coupler,

The Janney, Penn, Pitt and



Janney X Freight Car Couplers

All made from acid, open-hearth steel and with all the up-to-date features required or recommended by the

M. C. B. ASSOCIATION.

The Buhoup 3-Stem Passenger Equipment

The most complete, strongest and the largest used passenger coupler equipment on the market. Has important and desirable features not possessed by any other coupler equipment.

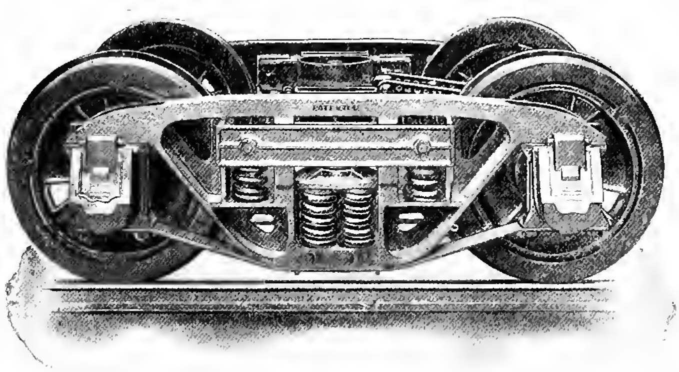
The Buhoup Vestibule

A complete, effective and thoroughly up-to-date and satisfactory vestibule; easy to apply and cheap to maintain.

Steel Castings, Malleable Iron Castings

For Railroad and Car Work

The Buhoup Flexible Truck



A Cast Steel Truck with Vertical Flexibility Is Always Square

The truck consists of two cast steel side frames in combination with a cast steel bolster.

Does not depart from established M. C. B. standards.

Takes any style of standard oil boxes as used with the arch bar truck.

Brake hanger brackets attached to the inside of the side frames.

Flexible to vertical movement, but rigid to any twisting or angular horizontal movement.

Vertical flexibility allows the truck to adapt itself to all uneven conditions of track, high or low joints, with all wheels firmly on the rails, without any undue strains to any part of the truck.

Dispenses entirely with the usual spring plank.

Has wide distribution of load.

Has increased spring capacity.

Either Spiral or Elliptic Springs can be used.

The acme of simplicity.

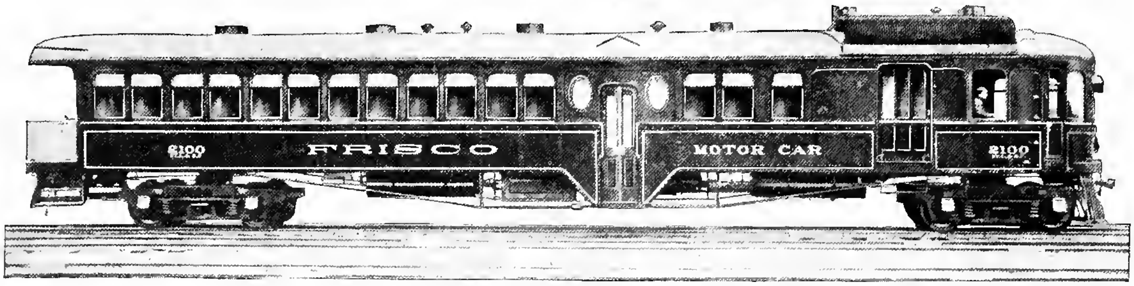
Would you like to try a set of these trucks under one of your locomotives?

Service tests have demonstrated all these desirable features.

Manufactured by

THE McCONWAY & TORLEY CO.

PITTSBURGH, PA.



Type of Gas-Electric Car Used on the Frisco Lines.

Gas-Electric Motor Car

A complete train in itself—the gas-electric motor car is fast becoming the standard equipment for branch line passenger runs. The absence of dirt, dust and smoke and the easy running characteristics of this car attract the public. The low operating costs, due to the compact design, its freedom from water tanks, ash pits and coaling stations, and the low cost of generating electric power from a gasoline engine, reduces operation expenses on the average branch line, one-third to one-half.

The Prime Mover. In the General Electric motor car is a gas engine coupled to an electric generator forming a compact power plant, the electrical energy from which is transmitted to motors on the driving wheels.

The generator is built on standard lines and is similar to thousands now in successful use.

The electric motors used on these cars are standard G-E Railway motors, primarily designed for heavy high-speed traction work.

Control. The speed of the car is controlled by the variation of the voltage impressed on the motors. This is obtained by the well-known series—parallel arrangement with the added feature of voltage variation by adjustment of the generator field strength. Entire control of the car in both directions is obtained by the manipulation of three small levers conveniently located.

By means of this control the entire power of the plant may be used either in the form of great tractive effort at low speed or small tractive effort at high speed or any combination between.

The ability to instantly reverse the motors without stopping the engine furnishes a means, independent of the brakes of stopping the car in cases of emergency. This feature is also of prime importance in switching and yard service.

Accessibility. The electric drive admits the engine being placed entirely above the floor line in the cab, where it is flexibly supported, and is free from dirt and dust.

Trucks. The trucks are of the swing bolster type with elliptic bolster springs and coil equalizer springs. The bearings and wedges are of M. C. B. standard pattern. Both the motor and trailer trucks have standard 33-in. solid rolled steel wheels with M. C. B. treads and flanges mounted on axles of hammered open hearth steel.

Air Signals and Brakes, Etc. All these parts are M. C. B. and will be familiar to all railroad men.

Car Bodies. The car bodies are of substantial steel construction made in a wide variety of standard types. Electric lighting and hot water heating is used.

bulletins—on request.

ric Company

henectady, N. Y.

ville, Ky.	Nashville, Tenn.	Philadelphia, Pa.	Richmond, Va.	St. Louis, Mo.	Springfield, Mass.
his, Tenn.	New Haven, Conn.	Pittsburg, Pa.	Rochester, N. Y.	Schenectady, N. Y.	Syracuse, N. Y.
ukee, Wis.	New Orleans, La.	Portland, Ore.	Salt Lake City, Utah.	Seattle, Wash.	Toledo, Ohio.
apolis, Minn.	New York, N. Y.	Providence, R. I.	San Francisco, Cal.	Spokane, Wash.	Youngstown, Ohio.

3879

THE EDISON STORAGE BATTERY FOR TRAIN LIGHTING

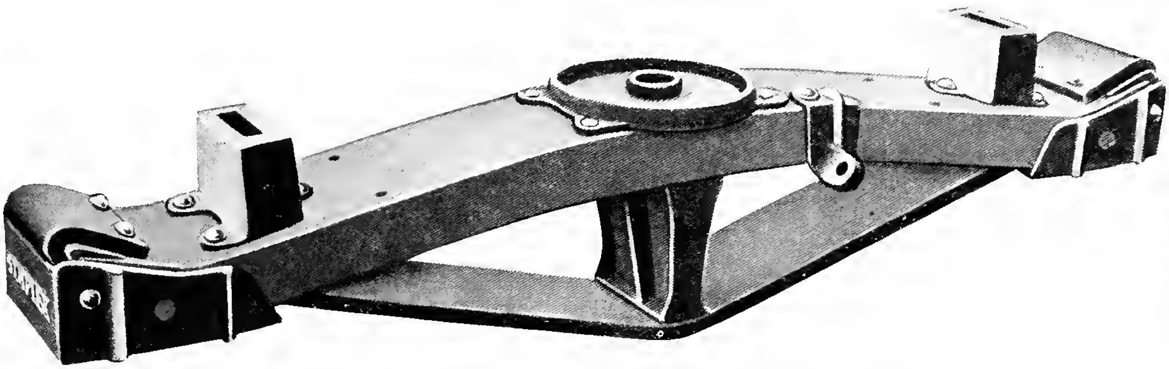
The Greatest Invention of the Greatest Inventor

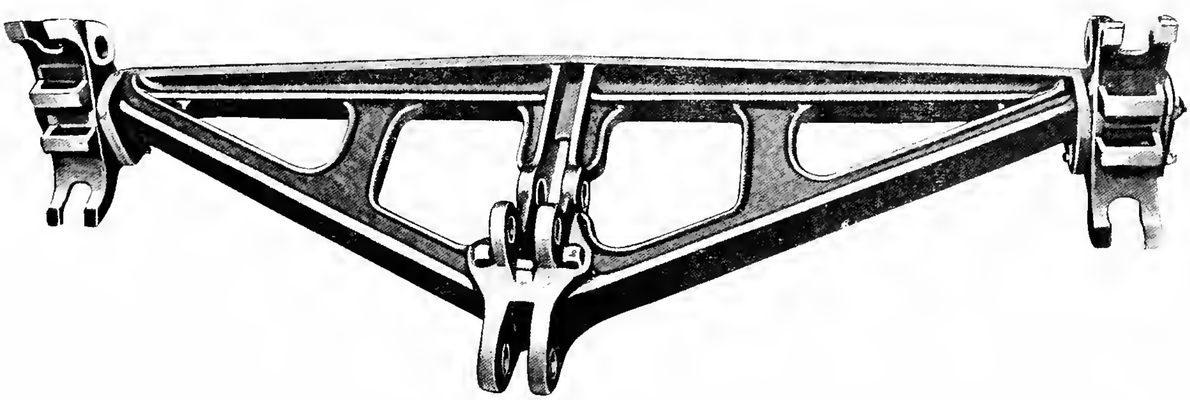
Low cost of maintenance
Long Life
Freedom from operating troubles
No Sulphating   No Buckling   No Sediment
Greatly reduced weight
One half the space occupied by other types

Completely described in Booklet No. 1018

Edison Storage Battery Co.

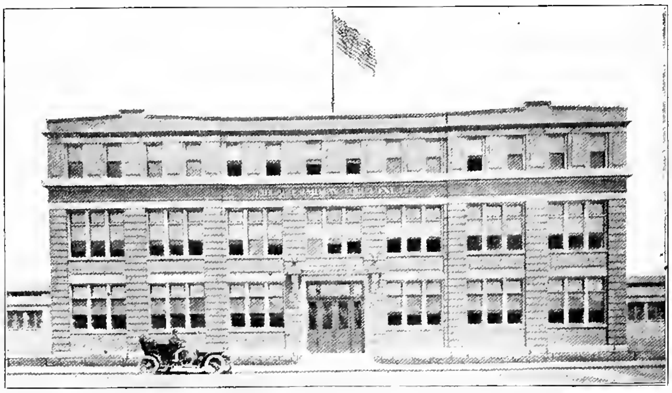
167 Lakeside Ave., Orange, N. J.





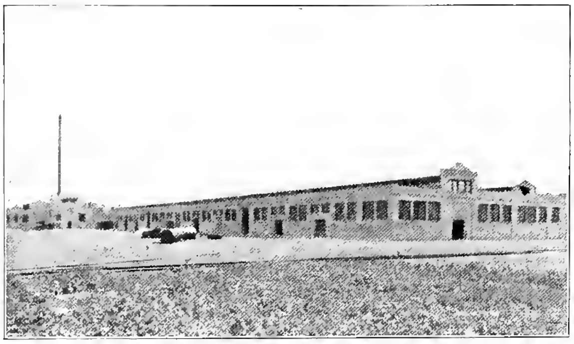
CRECO The "Safety First" Brake Beam

OVER
SIX MILLION
BRAKE BEAMS
SOLD



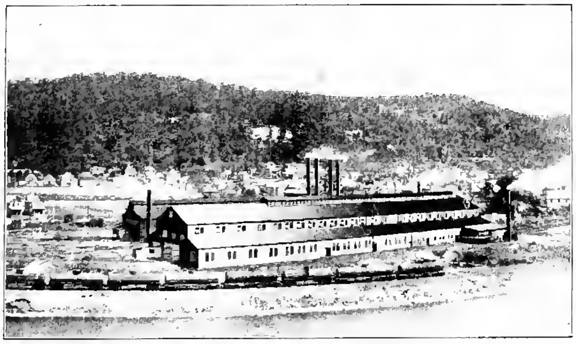
General Offices, 46th, Robey and Lincoln Sts., Chicago.

CRECO IS
THE HIGHEST
TYPE OF
BRAKE BEAM
CONSTRUCTION

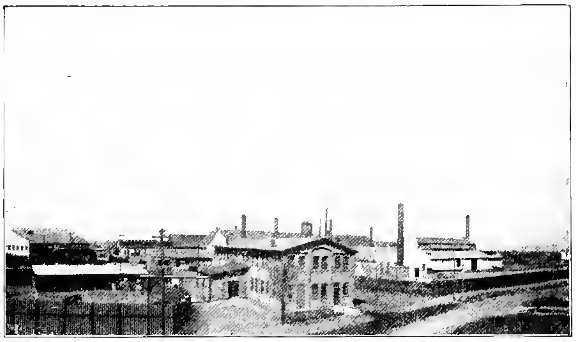


General View of Chicago Plant.

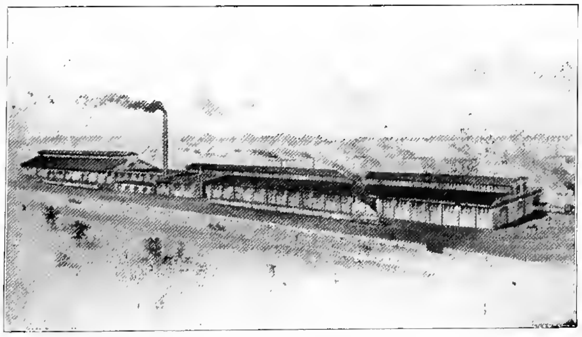
General View of Chicago Plant.



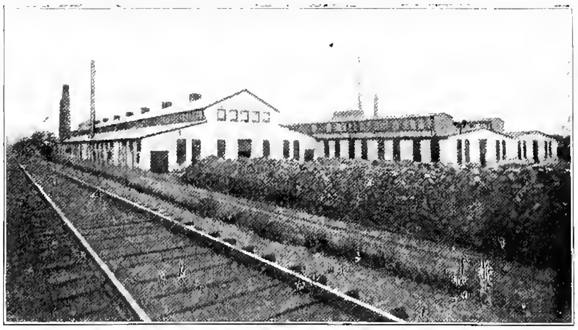
Plant at Franklin, Penn.



Plant at Marion, Ind.



Plant at Detroit, Mich.



Plant at Grand Rapids, Mich.

CHICAGO RAILWAY EQUIPMENT COMPANY

have been the pioneers and originators in all that is best in Brake Beam Construction. They have always been and are to-day the

WORLD'S BRAKE BEAM BUILDERS

The Adams & Westlake Co.

MANUFACTURERS OF

Railway and Steamship Supplies

[illegible] OFFICE
[illegible] TERMINAL BLDG.
50 CHURCH STREET

EASTE[illegible] OFFI[illegible]
[illegible]
PH[illegible]

MAIN OFFICE AND WORKS, CHICAGO, U.S.A.
ESTABLISHED 1869

HEAD LININGS
HEAD LIGHTS
LONG TIME BURNERS
STEAMSHIP FITTINGS
DOOR LOCKS AND HINGES
STEEL AND BRASS SWITCH LOCKS
WHITE METAL WASHSTANDS AND FOLDING LAVATORIES
NON-SWEATING STEEL COACH AND CABOOSE TAIL LAMPS
NON-SWEATING STEEL AUTOMATIC ENGINE SIGNAL LAMPS
ACETYLENE GAS CAR LIGHTING SYSTEM
AXLE GENERATION ELECTRIC CAR LIGHTING SYSTEM
ACME BURNER OIL CAR LIGHTING SYSTEM
NON-SWEATING STEEL SEMAPHORE AND BLOCK SIGNAL LAMPS
NON-SWEATING PRESSED STEEL SWITCH LAMPS
NON-SWEATING DISTANT SIGNAL LAMPS
STEEL AND WIRE GUARD LANTERNS
TRAM AND COACH TRIMMINGS
VESTIBULE FITTINGS
SASH LOCKS AND LIFTS
BASKET RACKS
RECLINING CHAIRS

ADLAKE

WESTERN RAILWAY EQUIPMENT CO.

LOUIS A. HOERR, President · S. H. CAMPBELL, Gen. Sales Agent · R. L. LANGTIM, Mech. Supt.

ACME BRAKE SLACK ADJUSTERS
WESTERN BRAKE JAWS
ACME PIPE CLAMPS
LINSTROM SYPHON PIPES
INTERCHANGEABLE CAR DOORS
HOERR CAR DOORS

WESTERN SILL AND CARLINE POCKETS
REPUBLIC DRAFT GEAR
LINSTROM ECCENTRICS
WESTERN FLUSH CAR DOORS
TIE DATING NAILS
ST. LOUIS FLUSH CAR DOORS

SECURITY DUST GUARD

DOWNING CAR HOLDERS
WESTERN BELL RINGER
FISH HOOK TIE PLATES

ECONOMY SLACK ADJUSTERS
CAR DOOR FASTENINGS
BRAKE PINS

INTERCHANGEABLE JOURNAL BEARINGS AND WEDGES

GENERAL OFFICES: CENTRAL NATIONAL BANK BUILDING

ST. LOUIS, MO.

CAMEL COMPANY, 332 South Michigan Avenue, CHICAGO, ILL.

CAMEL No. 27 DOOR FIXTURES
CAMEL No. 30 DOOR FIXTURES
SECURITY No. 8 DOOR FIXTURES
SECURITY No. 5 DOOR FIXTURES
END DOOR FIXTURES
CAMEL BURGLAR PROOF COMBINATION STOP AND LOCK

For
Box Cars
Ventilated Box Cars
Automobile Cars
Stock Cars
in
Either Steel or Wood

See Fig. Nos. 775 to 779, pages 516, 517, 518

J. M. HOPKINS, President · W. W. DARROW, Secretary · P. M. ELLIOTT, General Mgr.

LINOFELT

STANDARD INSULATING QUILT FOR REFRIGERATOR CARS

A large sheet of Linofelt which extends from one door of a refrigerator car around the end of car to the other door. Note the bound edges.

Linofelt is made from degummed flax fibre chemically prepared, combed and felted by machinery into a flexible felt ½ inch thick. It is then quilted between two layers of waterproof paper and furnished in any size sheets the car builder specifies.

It is unaffected by water, either cold or boiling, and is not damaged by acids. Long usage and severe tests prove that it will not decay and that it is perfectly sanitary and hygienic, not carrying taint or odor It is easily applied and extremely durable. Its insulating value is admittedly the highest of any form of refrigerator car lining.

The leading railroads in the United States use Linofelt and are convinced of its superiority over all other insulating materials.

Sample and booklet sent you upon request and the services of our engineers are at the service of prospective customers.

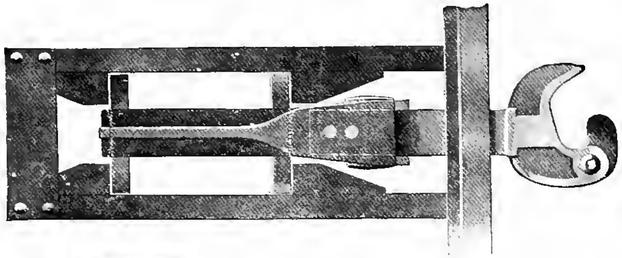
We also manufacture felts and boards for steel cars

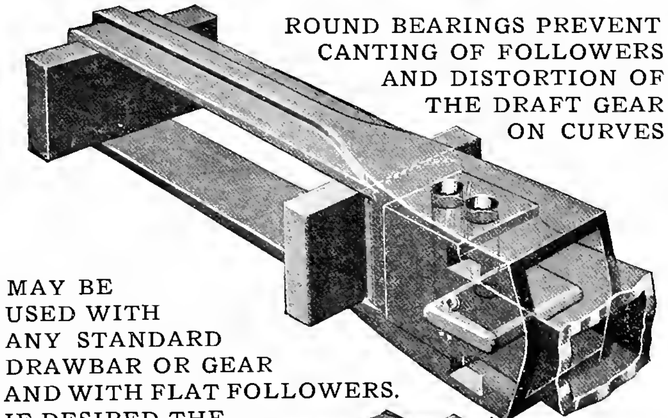
UNION FIBRE COMPANY, WINONA, MINN.

Philadelphia · Chicago · San Francisco

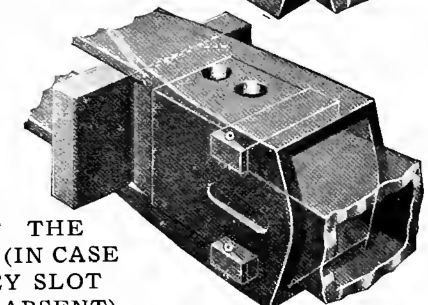
FORSYTH "PLAIN" KEYED YOKE

(Where Construction of Pocket Will Not Permit Use of "Radial" Yoke and Followers.)





ROUND BEARINGS PREVENT CANTING OF FOLLOWERS AND DISTORTION OF THE DRAFT GEAR ON CURVES



MAY BE USED WITH ANY STANDARD DRAWBAR OR GEAR AND WITH FLAT FOLLOWERS. IF DESIRED THE FORSYTH YOKE IS ALSO FURNISHED WITH SLOTS FOR TOP AND BOTTOM KEYS FOR ENGAGING THE SHOULDERS OF THE DRAWBAR BUTT (IN CASE THE CENTER KEY SLOT IN DRAWBAR IS ABSENT).

FORSYTH "RADIAL" KEYED YOKE AND FOLLOWERS

—Permit connection with drawbar by means of key, or yoke rivets (when key is not available).
—May be used with any Standard Drawbar or Draft Gear.
—Allow BOTH drawbar and yoke to swing freely into the straight line of draft or buff on curves (thus eliminating the injurious side strains).
—Especially on cross-overs, or when cars are backed onto sharp commercial curves.
—Returns BOTH to an automatic coupling position—and this without the use of a single extra part!
—Eliminates shearing of yoke rivets, and distortion of draft gear.

WHAT INSUFFICIENT

Yoke and Drawbar Side Clearance Means

(Due to Enormous Side Strains.)

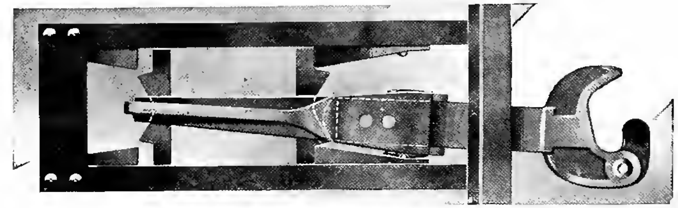
1. HIGH MAINTENANCE COSTS.
2. BAD ORDER CARS.

EXCESSIVE WEAR AND FAILURES OF:

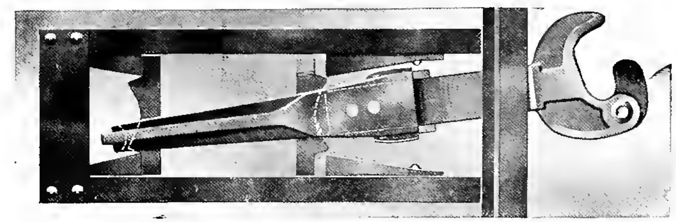
COUPLERS—Including Knuckles, Guard Arms and Shanks.
YOKE RIVETS—Shearing of same.
DRAFT GEAR—Distortion.
WHEEL FLANGES—Unnecessary Wear and Breakage.
Journal Ends; Center Bearings and Car Members Generally.

ON USE OF KEYS

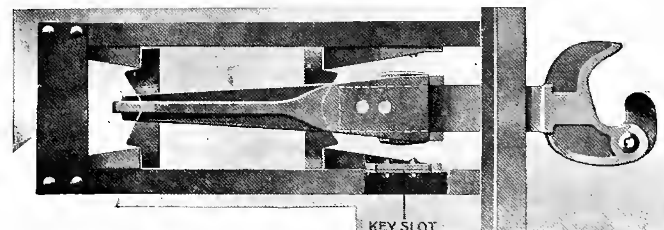
If keys are extended through center sills, then key slots should be made so long that there will be no danger of keys striking ends of slots before full travel of gear; especially on curves, when keys are of necessity at a slant to the sills—



DRAWBAR AND YOKE UNDER DRAFT ON CURVES.



DRAWBAR AND YOKE UNDER BUFF ON CURVES.



DRAWBAR AND YOKE RETURNED TO AN AUTOMATIC COUPLING POSITION.

We also manufacture:

DRAFT GEAR AND BUFFING DEVICES; PRESSED METAL "UNIT" SECTIONS FOR CARS; METAL POSTS, CARLINES AND DOORS; BRASS SASH, "SAFETY" DECK SASH RATCHETS, ETC.

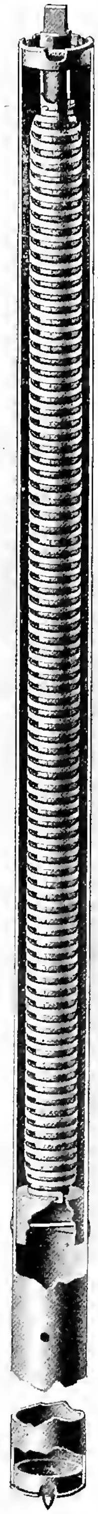
Eastern Office: NEW YORK **FORSYTH BROS. CO.,** **Chicago**

In This Advertisement

We cannot hope to tell you all of the good things about Acme devices here, because the line is too extensive;

However

Quite a few cuts of our products are shown in this book. Supplementary literature or personal interview will gladly be furnished on request.



Skeleton view Acme All Steel
Vestibule Curtain Roller

A List of Acme Products

Vestibule Diaphragms
- Sectional
- Simplex
- Gould
- Apex

Vestibule Diaphragm Attachments

Vestibule Curtain Outfit
- All Steel Roller
- Revolving Shields
- Stationary Casing
- Curtain
- Handles and Hooks

Window Curtain Fixtures
- Tuco Friction
- Tuco Rack

Weatherproof Window
- Weatherstrips
- Post Construction
- Lock Device
- Cinder Deflector
- Anti Rattler
- Asco Weatherstrips

Deck Sash and Fixtures

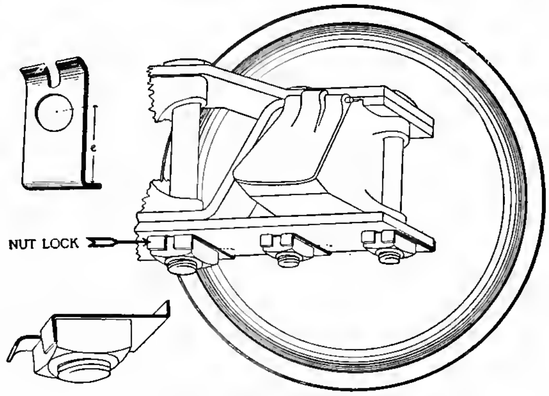
Steel Doors
- Sliding
- Swinging

Anti Pinch Door Hinge
Drawn Steel Moulding
All Steel Box Car Ladder
Chanarch Car Flooring
Brass Foundry Work

ACME SUPPLY COMPANY

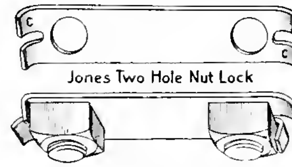
CHICAGO

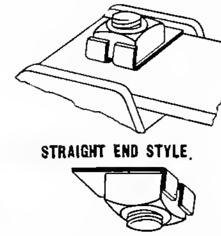
EASTERN OFFICE: TRANSPORTATION UTILITIES CO., NEW YORK



See Figs. 1426-1428, page 678.

POSITIVE NUT LOCKS for use on both wood and iron surfaces, on all bolts in car construction and repair work.





Also, POSITIVE BOLT FASTENERS that prevent bolts from turning and backing out of nuts.

THE JONES POSITIVE NUT LOCK CO.

2812-16 South Wabash Ave., Chicago, Ill.

60

EDWIN S. WOODS & COMPANY

Established 1903

Monadnock Block, Chicago

Manufacturers of

Anti-Friction Side and Center Bearings for Freight, Passenger Cars and Tenders

See Figs. 1029-1032 and 1034-1037, Page 593.

THE

O. M. Edwards Company

TRADE
"PAOWNYC"
MARK

SYRACUSE, N. Y.

METAL TRAP DOORS for either wood or steel equipment. Spring action is perfect and can be adjusted to open automatically or partially. No mechanism under platform. All adjustments made from outside of car.

TRAP DOOR LOCKS with starting device which contacts with bottom of door and insures its opening automatically. No hand lift required.

WINDOW FIXTURES of the most approved type. Forty designs to meet all requirements. Their use eliminates binding and sticking of sash in guideways.

WEATHER STRIPPING for top, bottom and sides of all types of sash. Interlocking, frictionless side metal weather stripping eliminates dust and air and prevents sash stiles from warping and twisting.

ALL-METAL SHADE ROLLERS with locking attachment which absolutely secures extension when adjusted to proper length.

For catalogs and further information address

THE O. M. EDWARDS COMPANY

SYRACUSE, N. Y.

Window Fixtures	*Metal Trap Doors*
All Metal Sash Balances	*Trap Door Locks*
All Metal Shade Rollers	*Railway Padlocks*

Huntoon Brake Beams

Huntoon Automatically Adjustable Heads

Hartman Centering Center Plates and

Perry Frictionless Roller Side Bearings

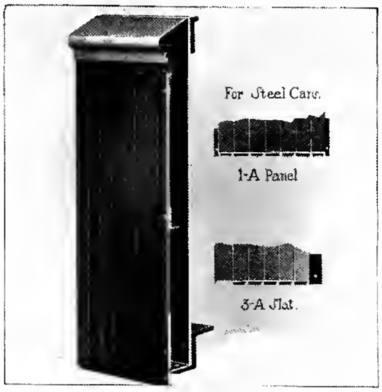
For all Classes of Freight and Passenger Cars and Locomotive Tenders

JOLIET RAILWAY SUPPLY CO.

WORKS:

JOLIET, ILL. CHICAGO, ILL.

Metallic (Steel) Sheathing.



National Trap Door and Lifting Device.

Metallic (Steel) Sheathing goes a long way toward making steel passenger cars warm in winter and in addition is easily applied, attractive in appearance, and in case of accidental injury to the car, can be renewed in sections from the outside.

Resisto Insulation is a non-conductor of heat and is non-absorbent. It thus provides the three necessary conditions for protection against varying temperatures, fire and water.

Flexolith Composition Flooring is fireproof, non-absorbent and sanitary. It is no heavier than yellow pine and wears longer. Laid in plastic form, it is without cracks or joints.

National Trap Door and Lifting Device prevents accidents to passengers and its construction, pressed steel, renders it durable. Should it be damaged in service, all parts are accessible for repair.

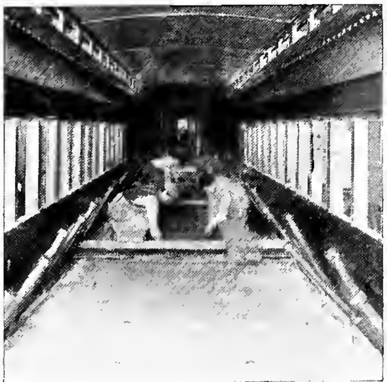
We also manufacture the Perfection Sash Balance, National Standard Roofing, the Eclipse Deck Sash Ratchet, Imperial Car Window Screens and the National Vestibule Curtain Catch.

All of these devices give you the results of the continuous painstaking progress in the design and manufacture of railway supplies that can only be offered by specialists of the highest type, who realize that their continued business depends on the satisfactory service rendered by their appliances.

GENERAL RAILWAY SUPPLY CO.

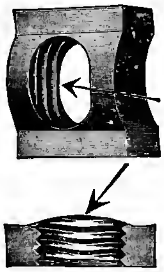
Marquette Building

CHICAGO



Flexolith Composition Flooring.

Resisto Insulation.



This cut shows an exaggerated curve in thread pitch—or more than is given in practice, in order to emphasize this feature.

WHY GRIP NUTS LOCK

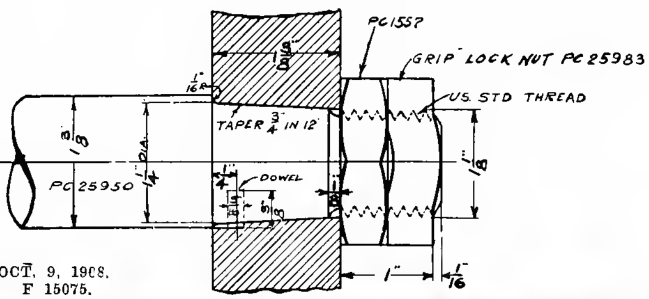
Each bar of steel has an arch running through the center of it. The nut is blanked out and threaded through this arch, after which it is accurately gauged, then deflected by pressure upon the crown of the arch by automatic machinery, thus producing a locking friction upon the threads, as shown in the illustration.

GRIP HOLDING NUTS

Grip Holding Nuts are made of heavier steel than the Grip Lock, or Check Nuts, and have 94 per cent. of the ultimate strength of the bolts. Made in all sizes, Hexagon or Square, and are used where a single nut only is required, furnishing both Holding and Locking features.

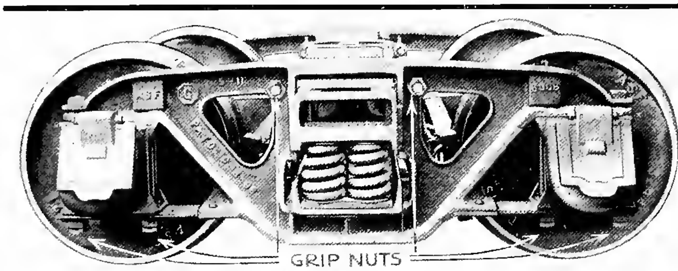
The following is a detailed report of tests, giving the pull necessary to apply, release and turn off various sizes of Grip Nuts, submitted, for the purpose of ascertaining what reduction of locking quality is involved in the re-application of Grip Nuts 21 times, also stripping tests, following:

SIZE OF NUT		TO APPLY NUT			TO RELEASE NUT		
		Application pull in lbs. at 10 in. radius.					
¾″	Sq. G. N.	1st application	24	lbs.	Release	16	lbs.
		11th "	24	"	"	20	"
		21st "	20	"	"	16	"
1″	Hex. G. N.	1st "	25	"	"	23	"
		11th "	20	"	"	16	"
		21st "	16	"	"	16	"
1⅛″	Sq. G. N.	1st "	52	"	"	49	"
		11th "	30	"	"	28	"
		21st "	30	"	"	26	"

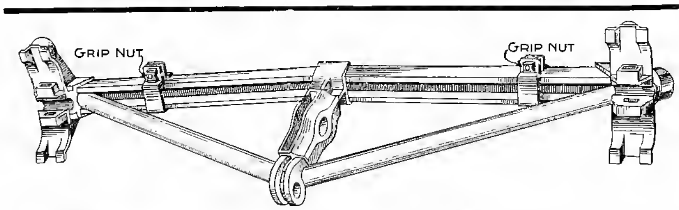


OCT. 9, 1908.
F 15075.

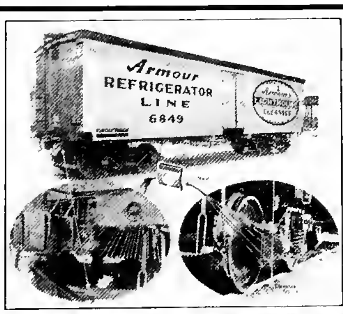
The Westinghouse Air Brake Company have applied Grip Nuts to their 9½ inch piston rod for some years, as will be observed by the date on this blue print. We continue to receive orders from this Company, for application at this point, which is our reason for believing that the Grip Nut is proving satisfactory to them.



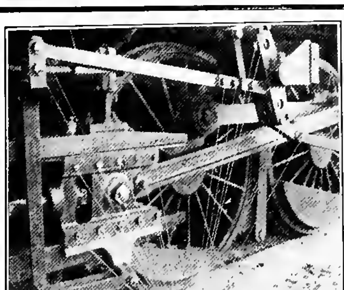
Grip Nuts are extensively used on Brake Beam Hanger Bolts and oil box bolts, as shown, and are the only lock nut upon the market that will stand up under this test.



Grip Nuts Standard on Brake Beams.



This cut shows car of which the enlarged sections are reproduced, showing Grip Nuts on the draft rigging, box and column bolts, etc. The greatest economy from Grip Nut application is found on those cars where practically every bolt and nut is protected by a Grip Nut.



GRIP NUTS.

This picture was taken 14 months after the Grip Nuts were applied. The report is that not a nut was loose; the test was entirely satisfactory and that Grip Nuts will be generally used as a result of this test.

The test was instituted and conducted by an official of the mechanical department of a leading railroad whose name will be furnished to proper parties by permission.

They are not a spring or jam nut but a lock nut. It is the only lock nut on the market that locks itself upon the threads of the bolt, and no amount of vibration can loosen it.

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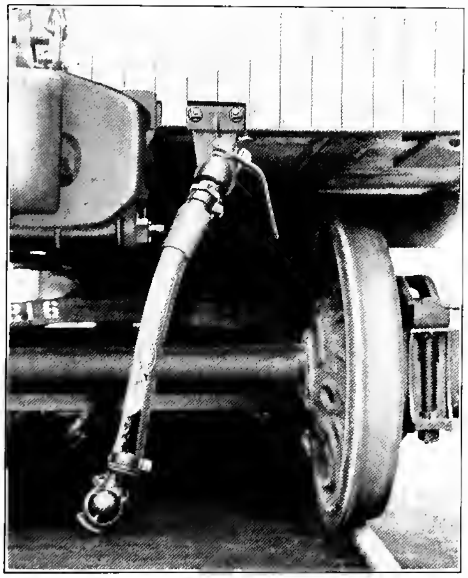
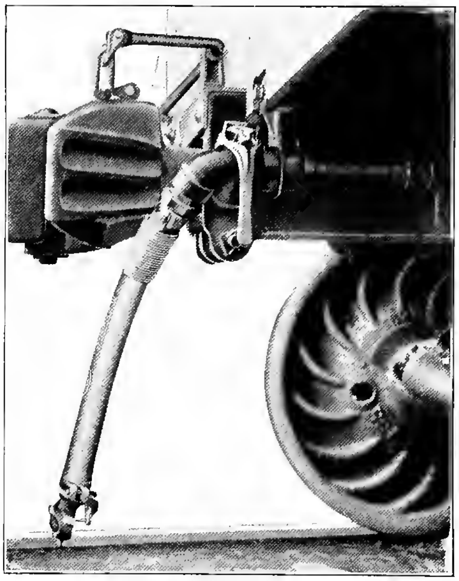


FRONT VIEW



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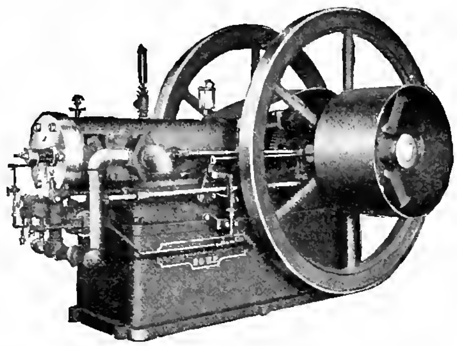

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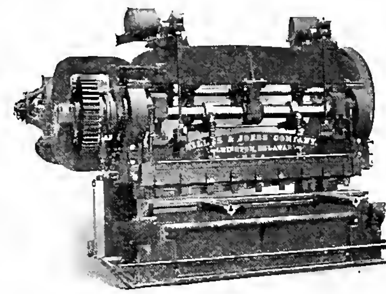

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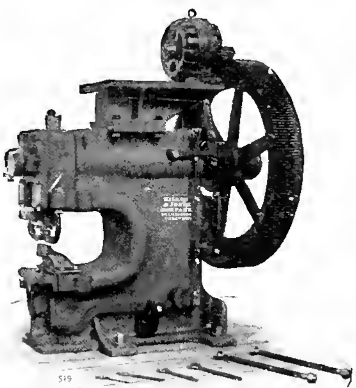

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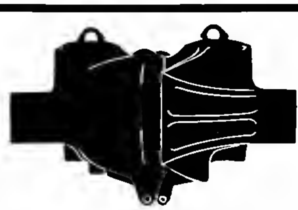
SHARON  COUPLERS

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