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THE STREET RAILWAY JOURNAL

VOL. I. { NEW YORK: }
 { 32 Liberty Street. }

NOVEMBER, 1884.

{ CHICAGO: } No. 1.
 { 8 Lakeside Building. }

William B. Lewis.

Street railway interests have sustained a severe loss in the subject of our illustration, whose sudden death occurred Oct. 15. William B. Lewis was a fitting type of the street railway manager and useful and respected public man. Born in Brooklyn in 1818, he there resided until, in 1874, his wife's ill health caused him to remove to Plainfield, N. J. His father was Sheppard Lewis, an old Brooklyn resident, but born in Hempstead, L. I.

At the age of seven, William B. was placed in Kingsley's private school, where he remained six years, with such good effect as the result of his studiousness, that the principal said that he could teach him no more. Against the lad's judgment, his father apprenticed him to the mason's trade, to which, as a dutiful son, he applied himself mind and body, learning practically every detail of the business acquirable by the apprentice; serving, meantime, after regular work-hours, as accountant to his father, an extensive and prosperous builder.

Following his trade for a short time, he started on his own account as builder and contractor; thus continuing a few years until drawn into public affairs. As Tax Department Clerk he proved himself an expert accountant, and was instrumental in systematizing the business details of that branch of city government; meantime studying the principles of city and State government, State and national law, history and parliamentary usage.

His activity and intelligence, and his information and interest in politics, attracting the attention of his party, he was elected Comptroller of Brooklyn; serving when that city and Williamsburg were consolidated. His term was a busy one; but his early training with his father, his attention, study, and practice of accounts and finance, together with a stern decision of character

fitted him to fulfill all the exactions of the position, in which he made an enviable record, not yet forgotten.

He was an earnest advocate, in face of much opposition, of the introduction of a public water supply in Brooklyn, and was one of the original Water Commissioners; being at this time Secretary of the Sewer Department.

Municipal interests called him to Albany, where he was thrown into contact with the

Bank Department, in those years of much greater importance than at present, hence his life at that time was one of great activity, labor and responsibility.

In acknowledgment of his satisfactory discharge of the Treasurer's duties, he was re-nominated; but was defeated through lack of party organization. Declining the Police Commissionership of New York and Brooklyn, he retired from political life.

Having during some time previously studied law by himself, he complied with his friends' urgings to be admitted to the bar, but he had only practiced a few months when Hon. Henry R. Pierson, President Brooklyn City R. R. Co., called on him to accept the office of secretary and cashier of that company. In this arduous position he continued until the hour of his death. His son, of the firm of Lewis & Fowler, is his successor as Secretary and Treasurer, and is also prominently identified with tramway interests.

We print below the action of the Directors in reference to the loss which his death occasioned to his family, the company and the community.

A special meeting of the Board of Directors of the Brooklyn City Railroad Company, held October 18th, 1884, to take action upon the death of WILLIAM B. LEWIS, Esq., its late Secretary and Cashier, at which it was ordered that the following minute be entered upon the records of the company:

WILLIAM B. LEWIS, whose death we mourn, was called to the office of Secretary of the Brooklyn City Railroad Company April 1st, 1880. His faithful service in places of honor and trust in our city and State, and his unusual knowledge of the laws governing the railroad interest, peculiarly fitted him for valuable service to this company. From his election he devoted

his entire energies to advance in every way in his power the interest of the company.

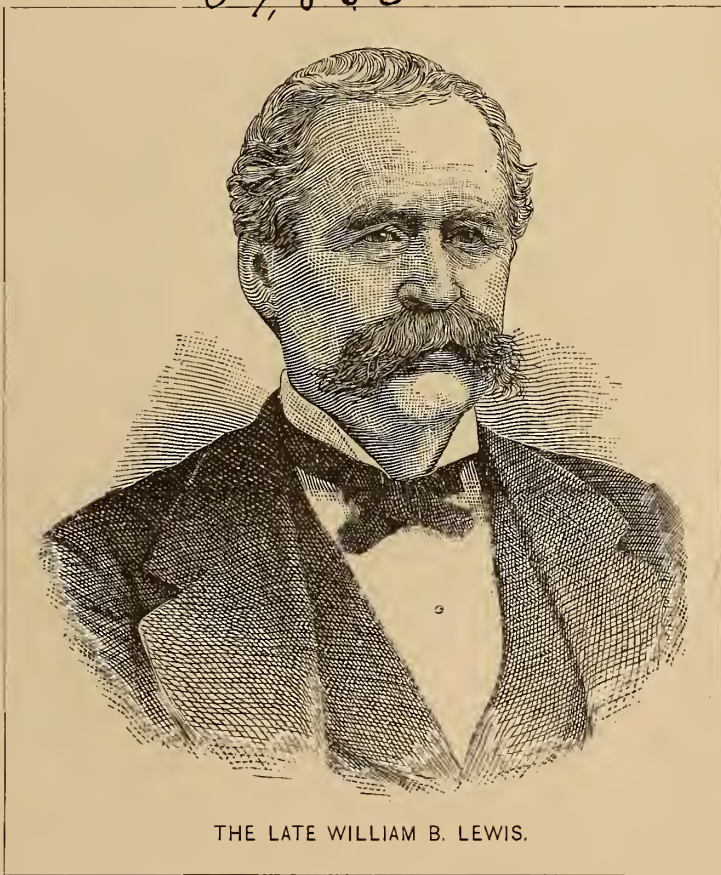
While discharging with conscientious care and fidelity the special duties of his office, he gave at the same time most careful attention to its financial interest.

To the general management of the Road, also, he gave thought and was frequently consulted in regard to it.

His judicious counsel has been of great value to the Company. For the eighteen years and a half of most faithful service we here bear testimony, while we regret the death of a faithful officer, we also mourn the loss of an old and respected friend.

For the family of William B. Lewis, we would express our sincere sympathy in their great sorrow.

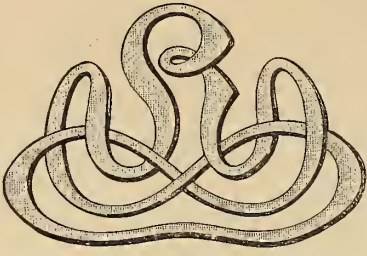
W. H. HAZZARD, President.



THE LATE WILLIAM B. LEWIS.

State officials, who recognized his worth; and during his Comptrollership he was elected Treasurer of the State of New York. During his tenure of this important office he became the intimate friend of Gov. Horatio Seymour, who confided many things to him: the two advising mutually on many matters of State.

His office of State Treasurer made him a member of the Canal and School boards; and also gave him much to do with the



American Street Railway Association.

OFFICERS, 1884-5.

President.—Calvin A. Richards, President Metropolitan Railroad Co., Boston, Mass.

First Vice-President.—Julius S. Walsh, President Citizens' Railway Co., St. Louis, Mo.

Second Vice-President.—Henry M. Watson, President the Buffalo Street Railway Co., Buffalo, N. Y.

Third Vice-President.—Edward Lusher, Secretary and Treasurer the Montreal City Passenger Railway Co., Montreal, Canada.

Secretary and Treasurer.—William J. Richardson, Secretary the Atlantic Avenue Railway Co., Brooklyn, N. Y.

Executive Committee.—President, Vice-Presidents and William H. Hazzard, President Brooklyn City Railroad Co., Brooklyn, N. Y.; James K. Lake Superintendent Chicago West-Division Railway, Chicago, Ill.; Charles J. Harrah President the People's Passenger Railway Co., Philadelphia, Pa.; William White, President Dry Dock, East B. & B. R. Co., New York, N. Y.; B. Du Pont, President Central Passenger Railroad Co., Louisville, Ky.

Track Cleaning and Removal of Snow and Ice.

[We give herewith the text of the report to the American Street Railway Association, at the recent convention, on the subject of Track Cleaning and the Removal of Snow and Ice. The discussion which ensued thereon was most interesting, and we regret that the lateness of the reception of the official report prevents our giving more than an abstract of a part thereof. The rest will be given in our next issue.]

Mr. President: Your committee for the consideration of "Track cleaning and removal of snow and ice: Is salt necessary? If so, is its use detrimental to the public health; and especially is it injurious to horses?"—having duly investigated the subject, beg leave to submit the following report:

On the 25th of July, 1884, Mr. William H. Hazzard, President of the American Street-Railway Association, addressed a circular-letter to the presidents and superintendants of all the street-railways in America, comprising a full series of questions, in relation to the propriety of the use of salt, in the cleaning of the tracks from snow and ice, and whether any better method could be suggested. The inquiry was very explicit, being intended for an exhaustive consideration of the subject; and to afford a criterion for the future policy of street-railway companies. The points to be determined relate to the necessity of the use of salt in the removing of snow and ice from the tracks, and to its helpfulness, both to the public, and to horses driven over the places where it had been employed.

This matter has been a theme of controversy for many years. It is a fact known to every tyro in science, that a mixture of snow or ice and salt will produce a temperature so low as to cause the mercury in the thermometer to fall to zero, F.; and it has been plausibly argued, accordingly, that the use of salt to melt the snow and ice upon tracks of railroads in large towns would result in the withdrawal of caloric from the atmosphere to an extent that would seriously affect the salubrity of the neighborhood and render those of the population of a sensitive constitution more than usually liable to contract dangerous maladies, as colds, pneumonia, pleurisy, scarlatina, diphtheria, etc. These complaints are frequent in winter, when snow is abundant, and give importance to the conjecture. The usual increase of mortality at such times is a grave matter, and deserves the most careful scrutiny.

It has also been asserted that horses traveling in the snow where salt has been used, are even greater sufferers. The chilliness created from the slush and melting snow disposes them, it is declared, to painful disorders of the chest, bowels and nervous system, and induces certain complaints, which were before hardly known. The feet are said to be specially affected. It is insisted by many that the intense cold produced in the snow in which the animals are driven, speedily benumbs and paralyzes them, and even freezes the hoof, so as often to destroy it entirely. This has been made the occasion for seeking legislative interposition to put an end to the practice of salting the streets. Nor can any man of common humane sentiments object to such a measure, if the alleged injury has occurred, or is likely to occur from this cause. It is of the greatest importance to ascertain the facts, in order to do away with whatever cruelty may be practiced in the case, and to devise any needed remedy which will avert all unnecessary interference with the passenger transportation of this continent.

The American Street Railway Association accordingly directed this inquiry, and appointed a committee to conduct the investigation. Almost every individual addressed has replied, making a vast accumulation of evidence bearing directly on the subject. A synopsis of these answers may be valuable, in the way of enabling intelligent action. It need not, necessarily be long. The conclusions, however, appear to be decidedly in favor of the free use of salt, even to a greater extent than is anywhere practiced.

In the warmer regions of the continent, little snow ever falls, and there is no incommencing experience, which requires extraordinary measures. There may also be objections when the temperature is lower than zero, as the salt will not then melt the snow and ice, but add to the difficulty. In Quebec and Ottawa, in the Dominion of Canada, few attempts are made to remove the snow in winter, but sleighs are put in use instead. The law requires this.

Public opinion somewhat differs in different places. Generally there has been no thought bestowed upon the matter, except by individuals connected with the street railway companies. In several of the larger cities, there exists a prejudice against the use of salt to remove snow. It appears to have its centre in the city of New York, and to radiate in those directions where the sentiment, paramount there, is most influential. Mr. Henry Bergh, president of the Society for the Prevention of Cruelty to Animals, is very decidedly opposed to the use of salt in the streets, and his views are largely shared by excellent citizens. The newspapers in several instances have adopted and advocated them. The Board of Health passed an ordinance against the practice, and it has been prohibited under penalty in the new Penal Code. The same sentiment prevails in Brooklyn as in New York; some are in favor and others opposed. A like diversity of opinion also exists in Boston; and the savants and men of culture are divided like others, some contending that the use of salt in the public streets is beneficial, and others asserting the contrary. In Lowell, the objection is very strong, but appears to be steadily diminishing. The most effectual argument, however, seems to have been made in New Bedford. "People who own carriages do not like it because when the salt comes in contact with varnish, it stains or removes it."

The testimony from other places is equally varied. In Manchester, New Hampshire, the parties are thus set forth: "People that are friendly to horse railroads do not object to the use of salt; the others do." In Baltimore, the people are represented as opposing it, together with everything else in connection with horse railroads, except the cheap fare. In Cleveland, Ohio, the opposition appears to be general, but more decidedly among the owners of sleighs. At Toledo, there is a divided sentiment, but a majority, we are told, would not object to its "reasonable use." The only argument offered, however, is "that it is so considered in other cities"—i.e., detrimental to the public health when used to remove snow and ice. It is evidently only a reflected public sentiment. The same thing ought, undoubtedly, to be said in other cases.

In Philadelphia there exists, perhaps, the greatest prejudice, anywhere known on this subject. The Board of Health added its influence; and the feeling thus created has extended to other cities of the State. The street railway companies are generally prohibited by ordinance from the use of salt on their roads. Mr. John B. Parsons, President of the Lombard and South Streets Passenger Railway Company, explains the cause of the difficulty, as follows: "We had no machinery such as we now have, and, as a consequence, depended solely upon the use of salt to turn the snow into a slush, so that the cars could be drawn by the horses. No particular attention was paid to keeping open the inlets, so that the slush could run off from street-corners and other natural depressions in the streets. As a consequence, the street-crossings were almost impossible, and much complaint came from the citizens. Many diseases were attributed to its use, and public clamor became so loud that the Councils passed ordinances limiting its use to certain portions of the city and prohibiting its use in other portions under a heavy penalty."

Many physicians, however, gave their judgment at the time, that salt was not detrimental, and the general opinion is beginning to change. The public journals of the city are now speaking approvingly of the use of salt, and the companies are beginning to use it again.

There is a strong prejudice against its use in Reading, which is ascribed to the influence of the excitement in Philadelphia; still salt is used, but the fact is not admitted. In Pittsburg there has been talk of applying to the Legislature for a prohibitory statute, on the ground that it spoils the fine "finish" on carriage wheels. Nevertheless, all vehicles seek the railway track in preference, because it is always open. The only opposition to the use of salt, upon which the public seem to agree, is that it benefits a corporation. The majority favor its employment.

In the other parts of the country, where street railroads are abundant and snow is abundant in winter, public sentiment appears to be generally unanimous in favor of the use of salt, because of the facilities which it gives in clearing away a most formidable obstruction to travel. No other method is known which would be more practical, more economical, and more satisfactory. The only thing suggested is a sweeping machine, combining a boiler, to which the snow may be carried and melted. This, it seems, can hardly be feasible, and even though it were, the same objections on the score of slush and detriment to health, would exist, and to a much greater extent.

The testimony appears to be unanimous so far as relates to the entire absence of injury to the animals employed. No precautions are used to protect their health, yet no disease has been observed, which might have been occasioned by the exposure. No special care seems to have been taken of those that traveled in the salt mixture, beyond rubbing them

off when taken from the cars to the stables. The inquiries were very explicit; relating to the effect on the nervous system, the general health, the effect on the feet, legs and bellies, the shell or lamina of the feet, and the frog or soft part of the feet; and the answers were unequivocal that no perceptible injury or hurt had been noticed. One correspondent had noticed scratches, and another mentioned the possibility of harm from too long exposure. Another, however, was of the opinion that the effect of the salt on the animals had been decidedly wholesome in regard to health of limbs and body. Indeed, Messrs. Haller, Beck & Co. of the Union Sa t Works at Albany City, declare that during twenty years, they have used from twenty-five to thirty horses, and never had any trouble on account of the salt. They never had a horse afflicted either with thrush or scratches. Their animals they consider as fine as any in the city. The salt seemed to have been salutary to them.

Another advantage was generally noticed. The slipping and straining so common in slippery roadways was far less frequent where the snow and ice had been so removed. Less than half the numbers of slips and falls were estimated to occur.

No other method known is so cheap or efficient for the purpose. One or two companies use ashes where the coating of ice is thin, but the result was hardly satisfactory. In Philadelphia, the tracks are cleared by scraping, but at a large cost. One company in Ohio used a heavy iron scraper procured in Detroit, to clear the ice from the rails, but it did not give satisfaction. It is for this purpose that the salt is more generally employed. Many companies use it in no other case, but depend on snow-ploughs and shoveling, but the inference is unavoidable, that if they were prohibited entirely, the street-railways in the northern cities of the Union would be impassable many weeks in each winter.

Careful examination has also shown that there is no ground whatever for apprehension in regard to the public health from this cause. There has been no epidemic or prevalent disorder set in operation or aggravated anywhere by the use of salt on thoroughfares. The rate of mortality has exhibited no alarming increase, nor does this appear to have been anywhere suspected. All complaint is confined to what may occur, some possible or hypothetical result. The slush and pools of water that are liable to be formed at low points in the streets or at the crossings, making pedestrianism unpleasant, and the injury to the paint and varnish on wheeled carriages constitute all the well-supported ground of complaint. It would not be difficult to obviate these, and it ought to be done. The fault lies, however, with the municipal authorities, who have been remiss in regard to furnishing the proper facilities for drainage.

Observations carefully made with the thermometer show that the mixing of salt with snow in the streets makes no perceptible change of temperature. It is no colder in the thoroughfares where it is done, than in others at a distance. This is the only objection which has a plausible foundation scientifically, and it appears to be utterly fallacious.

In conclusion, therefore, the Committee find that the use of salt for the removal of ice and snow from the railway tracks, to be an imperative necessity; and that there exists no reasonable cause for apprehension of injury, or detriment to the public health, or to the health and physical comfort of the animals employed. What objections really exist are easily removed, while the advantages are indisputable.

Indeed, it is evident that the weight of evidence, as well as argument, is on the other side. The removal of snow from the streets is a problem that has taxed the ingenuity of public officials in several of our large cities. Hundreds of thousands of dollars have been expended in New York for carting it away to the rivers, and yet it was found impossible to accomplish more than to clear the more public thoroughfares. It would have been a far greater economy if the City Government had instead, caused all the streets to copiously salted during the snow-storms, and taken efficient measures at the same time to drain the brine and slush immediately into the sewers. We trust that this subject will be taken into consideration at an early day.

The public health, so far from being injuriously affected, will be promoted by the free use of salt in such a way. The brine flowing into the sewers will, in a great degree prevent the decomposition of the various refuse material which are deposited there from the houses above; and as a direct result, the formation and disengagement of sewer-gas would be arrested, and its discharge into the living apartments consequently prevented. This alone would be a work of sanitation, of which too great an account can hardly be made.

At the present time, the exhalation from fermenting matter in the streets are an active cause of mischief. The air is poisoned, and many of the population if not made ill outright, suffer, nevertheless, from depressed nervous conditions, and lowered vitality. The squalor and misery endured by the inmates of tenement-houses and other abodes of poverty may thus be rationally accounted for. If some provision could be made for preventing this decomposition of refuse matter in the streets, the salutary effect upon the public health would be immediately perceivable. The utility of salt for this purpose is apparent. If it could be applied at stated periods during the warm season, these benefits would be assured.

The accumulation of snow and refuse of all kinds, which occurs every winter in many streets, has been frequently remarked. Every warm day the filthy mixture is thawed and more thoroughly compounded, while its noisome effluvia contaminate the air. This process usually continues till spring has advanced several weeks, and we are often fortunate if the festering mass is removed before the hot days of summer. It is easy to see how all this would be prevented, if the authorities would take the matter into their own hands, and instead of limiting, discouraging the use of salt to clear off snow and ice, would

employ it freely both for that purpose and to sweeten the atmosphere. The action taken by Board of Health in the matter shows rather a conforming to ignorant prejudice, than a proper and intelligent comprehension of the facts. A little scientific knowledge would go far toward the silencing of the clamor.

It is plain enough that the antiseptic virtues of salt are potent above those of many popular disinfectants, in the way of purifying the air. The salubrity of New York is largely to be attributed to the saline elements derived by the atmosphere from the salt water that surrounds it on every side. The analogy must hold good in regard to the same agencies artificially supplied in the manner indicated.

The objections which have been repeatedly offered in various quarters, to the use of salt by the street-railways companies, it will be seen, are not tenable. The more abundant use of it for the purposes in question would be fully justified. Instead of the burden of expense falling entirely upon them, as is now the case, the public ought to bear a reasonable proportion. We would all be the gainers by the convenience afforded from the speedy removal of the great mass of snow, and in addition, by the increased salubrity of the atmosphere. It is in every way advantageous, and to this conclusion the good sense of our people must eventually arise.

A. B. WHITNEY, M. D., Ch.
JOAB MULVANE, } Committee.
WM. HAGENSWILER, }

Stables and Care of Horses.

[The annexed report is most scholarly and practical and deserves the most careful perusal. The discussion thereon revealed wide differences of opinion and practice. We shall give it in our next issue. We hope that our many readers will not consider the discussion by any means closed, but will continue it in our columns.]

To the American Street Railway Association.

GENTLEMEN:—The Committee on Stables and Care of Horses, submits the following:

The importance of information upon this subject is shown by the fact that nearly two-fifths of the investment in street-railways is in buildings and horses; and of the expense of operating, upwards of 35 per cent. is consumed in the maintenance of stables and horses.

The care which the horse receives at the hands of the managers of street railways has much to do with the economy of operating; for it is evident that well-arranged stables, careful attendants, and skillful drivers, with wholesome and sufficient feed go a great way towards prolonging the life and usefulness of the horse in street-car service.

The subject of stables naturally claims attention first, and in this connection it must be understood that, at least, eighteen and, perhaps, twenty hours out of every twenty-four, the horses in this service are confined within the stables year in and year out. Thus three-fourths of the life of the horse is spent in the stable. Considering that plenty of light and pure air are essential to the healthy condition of the horse, to furnish this should be the first object in building a stable.

In selecting material, such should be chosen as will be least likely to absorb and retain the impurities, which will always be found within such buildings. Great care should be taken to have the drainage perfect, and if underground to have the drains so inclined, trapped, and tight in the joints, as to quickly and completely take away whatever is deposited in them. Arrangements should be provided to flush them often with water, and if possible to have all traps and catch-basins well ventilated, so as to carry outside of the stable any foul gases which may accumulate there. The theory of surface drainage for stables has many supporters, and deserves careful consideration from those about to build. If surface-drains are frequently flushed or washed, this manner of draining would seem to call for no objection. The matter of drainage being settled, the next question is light and ventilation.

Arrangements should be made to admit air in sufficient quantity without creating a draught.

Roof ventilation is desirable, but not sufficient, as the air of a stable containing many

horses is heavy and will not rise without a current of air from near the floor to assist. Light can be admitted from high openings in the sides of the building, but these should not be depended upon for side-ventilation as the height renders them insufficient to move the air, and the location, usually over the heads of the horses, causes them to be dangerous as means of a draught.

Doors on opposite sides of the stable connected by a passageway running behind the horses; this passageway having ventilation from the roof is a desirable means of ventilating a stable, as in case the wind blows too strongly in one direction the doors on that side of the building can be closed, while air is admitted from the opposite side.

As a matter of convenience it may be desirable to have all stalls upon the ground floor, but such an arrangement is not practical in large cities, on account of the high cost of land, and horses may be as well established on the second or third floor, provided these floors are constructed properly as regards the drainage, and provided with "runs" leading to the outside in two or more directions to be used as escapes in case of fire.

The stalls should be constructed with a view to give the horse as much freedom as possible consistent with economy in utilizing the space. Experience demonstrates that the width should not be less than four feet in the clear, or the depth less than nine feet. The height of the partition between the horses should be at least four feet, and at the heads, carried three or four feet higher in such a form, as to admit light and air without allowing the horses to bite and otherwise annoy each other. Single stalls are preferable, although double stalls, with swing-bars between the horses, are in favor with many good stable-experts. The floor of the stall should pitch toward the gutter about one and a half inches to the nine feet. A good construction for stall-floors is to lay the surface for about four feet inward from the gutter with close-grained hard wood, like maple, in strips of four or five inches wide and two inches thick, leaving a space between, three-quarters of an inch wide, to allow the urine to pass off without being absorbed in the bedding.

The best form of manger or feed-box, is of cast iron, formed so as to have no square corners for feed to accumulate, and of sufficient depth to prevent the horse from "nosing" his feed out. No rack is needed for loose hay, this can be fed in small quantities from the floor. A passageway, say four feet wide, between the heads, or in front of the stalls for the purpose of feeding is desirable, this should be ventilated by windows or doors at each end, and a flue leading to the roof above. The loft for feed should have a tight floor, so that the steam and ammonia from the stable underneath will not contaminate the provender stored therein. It should be constructed with windows to admit light and air from the sides, and with roof-ventilation at the top. Suitable receptacles should be provided for the manure *outside* the stable, and all refuse and manure should be removed frequently, and before it has had time to heat and steam.

The custom of building stables with cellars to receive the manure is not recommended; and unless there is yard-room enough to pile the manure compactly outside the building, it should be removed from the premises daily. The space allowed for rear floorway between the stalls should be sufficient to permit the removal of horses from one row without interfering with those on the other; for this purpose, ten feet is a fair allowance.

The plan of arranging stalls in sections, so as to have the horses allotted to the care of one man, stand together is a good one; also that of having a separate drinking-trough for his horses. If a common drinking-trough is used, it should be centrally located and supplied with running water.

Twelve feet in the clear is recommended as a good height for each story, although some advise more, and some are content with even less.

Arrangements outside the building to dry and air the bedding are very desirable when straw or hay is used, and if shavings or saw-dust, bins for storage should be provided. If any substance except wood is used for floors, bricks are recommended, as they are easily renewed when worn and less liable to cause the horses to slip than stone, asphalt or cement.

In coming to the subject of the "care of horses," it is suggested that the first care should be exercised in the selection of horses to be purchased. The theory that any kind of a horse that can be had for from \$100 to \$150 will do for Street-Railway use, is a bad one.

The buyer of Street-Railway horses has a somewhat difficult problem to meet from the fact that the horse most desirable to him, usually commands a higher price than he, *i.e.*, the corporation, however, he represents, is willing to pay. A good buyer, will always insist upon the necessary qualities in the horse he buys, without too much regard to price. In the first place, only sound horses should be bought. Although horses unsound in some respects, *may* be used to some advantage, it is never best to buy them in that condition, as every Railroad manager knows that the exacting labor they are subject to, will cause unsoundness in some form or another soon enough. A good disposition and easy gait should be considered as absolutely necessary. The head and general appearance of the countenance will show the disposition, and a trot of fifty feet, will show the gait. Color should have nothing to do in the selection except to cheapen the price, as is the case with white, grey, buckskin, and bald-faced horses. The feet and muscles of the legs should be carefully looked at, as these are the main-stay of a railroad horse.

A flat-footed horse should never be accepted.

The age should never be less than five or over nine years, as a general rule, a horse of twelve years of age, however, if sound, may be accepted at a considerable reduction in price.

After the horse is selected and placed in the stable, the first thing to do is to accustom him to the feed, and break him to the labor. We would never think of putting on a conductor or driver without first instructing him in the duty expected of him, and place him under the direction of an old hand for practice. This rule should be followed with the horse. The first day he should be allowed to rest. After that if he takes his feed well, he may be put to half-work with a careful driver, and should be worked no more than this, for the first six or eight weeks, at least. All green horses should be given in charge of the best drivers, who will take pains to break them in to the work.

The care of the horse in the stable, includes feeding and grooming. Upon the question of feed, perhaps, the first cost or what is termed "economy" has considerable to do.

It is generally admitted that cut hay and corn meal is the cheapest at first cost, of any feed in use; but experience has shown that this feed is too hearty and fattening, and that horses fed upon it for several years without change become more subject to eruptive diseases and also to colic, inflammation of the stomach and indigestion. It is calculated that at least five cents per day can be saved in this feed on each horse, over the cost of feeding oats and long hay, and that the extra loss on horses fed with meal only, will not amount to the sum saved at the end of the five or six years' service of a railway-horse. To the credit of railway managers it is found that this conclusion is not accepted generally; and that while some are found to strictly adhere to what is termed the nat-

ural feed of the horse—oats and long hay—very many compromise the question by giving one such feed daily, or, at least, lighten up the corn meal by mixing bran or wheat middlings, in proportion of about half and half by measure. The mixing or preparing of the feed should be entrusted to as few persons as possible; but the practice of each hostler dealing out the feed to the horses allotted to him, is not objectionable although many stable experts prefer to confine the hostler's duty simply to watering and grooming the horse and the care of his stall, and to provide one man to distribute the feed to each 100 or 125 horses. In general terms, it should be the care of the stable-master to make the horses under his charge as comfortable as possible, while keeping them in condition to do the work required of them. They should be watered frequently and fed regularly, not less than three feeds a day, and thoroughly groomed not less than twice a day. In warm weather, they should be carefully cooled off after coming in from work, and in cold weather well-blanketed. Disinfectants should be freely used; common lime, either dry or in the form of whitewash, is recommended as effective and inexpensive.

As shoeing is a matter of considerable importance of railway managers it is proper that all entrusted with the care of street-railway horses should inform themselves as to the best form of shoe, and the best manner of setting it. There is but little difference of opinion among the well-informed upon this subject, as to the desirability of a light shoe over a heavy one, and that for horses traveling over a paved street, a shoe made of soft iron is preferable to one made of steel, on account of its being less liable to slip. In all cases the shoe should be fitted to the foot and not the foot to the shoe. On the question of hot or cold fitting, W. H. H. Murray may be quoted. He says: "The weight of authority is nearly the same in either scale. The advocates of cold-fitting declare that they can fit a shoe with rasp and file as evenly as the necessities of the case require, and that this can be done at no great cost of time or skill. They, moreover, charge that both reason and analogy are in opposition to burning a horny surface and declare that it honeycombs the wall of the foot, and prevents its natural and healthy growth.

"The disciples of hot-fitting on the other hand, declare that few men can level the foot, or so hammer and file the shoe, that the fit shall be what is required, and that only by burning can the connection between steel and horn be made sufficiently close and solid."

It must be admitted that good arguments can be used on both sides of this question, but in the end both sides bring up with this fact, that whether by hot or cold-fitting the shoe must be fitted evenly and solidly to the foot. As a matter of interest in this connection, an estimate made by a French professor concerning the muscular fatigue resulting from the use of heavy shoes may be quoted.

"If at the termination of a day's work, we calculate the weight represented by the mass of heavy shoes that a horse is condemned to carry at each step, we arrive at a formidable array of figures, and in this way are able to estimate the amount of force uselessly expended by the animal in raising the shoes that surcharge his feet. The calculation I have made possesses an eloquence that dispenses with very long commentaries.

"Suppose the weight of a shoe is 1,000 grams (about 2½ lbs. avoirdupois). It is not excessive to admit that a horse trots at the rate of one step every second, or sixty steps a minute. In a minute then, the limb of a horse, whose foot carries one kilogram (2½ lbs.) makes an effort necessary to raise kilogram after kilogram, a weight of sixty kilograms (132 lbs.) For the four limbs, this weight in a minute is represented by $60 \times 4 = 240$ kilograms (528 lbs.) For the four feet during an hour,

the weight is 14,000 kilograms (30,800 lbs.) and for four hours the mean duration of a day's work in these omnibuses, the total amount of weight raised has reached the respectable figure of 57,000 kilograms (125,400 lbs.)

"But the movement communicated to these 57,000 kilograms represents an expenditure of power employed by the motor, without any useful result, and as the motor is a living one, this expense of strength represents an exhaustion, or if you like it better, a degree of fatigue proportioned to the effort necessary for its manifestation. This calculation is most simple and readily understood. It is to be noted, nevertheless, that I have omitted a considerable factor, which is, that the weights I have tabulated are situated at the extremities of the limbs and that the arms of the levers on which the muscles act to raise them being infinitely shorter than those of the physiological resistance to which these weights are added, the intensity of their action ought, therefore, to be singularly increased.

"But to measure this intensity of action would require a mathematical aptitude, which I do not possess. I will not, therefore, dwell upon this point, notwithstanding its importance, and am content to signalize it. Otherwise the figures speak for themselves, and tell us that the diminution in the weight of horse-shoes is not an unnecessary consideration, so far as the useful application of the horse's strength goes."

After a careful consideration of the above calculation, must not all admit that the lightest possible shoe consistent with the service, should be used upon street-railway horses.

The question of calking the shoe must be settled by the condition of the street over which the animal travels. Many believe that a calk is not necessary on paved streets, except in the winter season, when ice and snow are liable to interfere; and that if a calk is used at all it should be a low one, so as to raise the frog but slightly from contact with the street, and that care should be taken to have all calks of an even height, to allow the horse to set his foot squarely and evenly upon the ground.

Upon the question of nailing the shoe, a quotation from Fleming seems to "hit the nail on the head." "The shoe ought to be attached by nails to those parts of the wall where the horn is strongest and toughest. In the fore-foot, these parts are in front and along the sides to the quarters. There the horn becomes narrow and thin, and the nails find less support, and are nearer to the living textures. This is more particularly the case towards the heels, especially the inner one.

"In the hind foot the wall is generally strong toward the quarters and heel. These facts at once give us an indication as to the best position for the nail-holes. In the fore-foot, nails may be driven through the wall around the toe, as far as the inside quarter and a little nearer the heel on the outside. In the hind-foot they may be driven around the toe and even up to the heels with impunity."

Nails should be turned out as quickly as possible, as the higher they go the less thickness of hoof is found, and extreme care should be used not to prick or press the sensitive part of the foot. Too many horses are made almost worthless from the effect of "blind stabs," which means, driving the nail into the quick and then withdrawing it, and driving it again so close to the wound as to irritate it and cause it to suppurate within the foot and work out at the top. Such cases are the result of careless nailing, and frequently terminate in what is called "foot-rot." The difficulty in tracing the exact cause of such trouble, arises from the fact that the horse does not show lameness for one or two days.

As the feet of horses working only on paved streets and standing continuously upon wooden floors are liable to become hard and dry for lack of sufficient moisture,

it is necessary that the stable-master should adopt some measure of supplying this need. A simple way and one that can be followed in any stable is to furnish each hostler with a pail and sponge, and require him to wet the fore-feet of all his horses, once or twice a day. The water should be applied particularly to the part where the hair and horn meet, and to the heel and frog. A good idea is to dissolve about a half pint of clean salt in each pailful of water used. This plan should be continued daily, and not occasionally. The stable-master should inspect his horses daily, as to their fitness for work, and "lay off," and nurse any that do not "take their feed," or show lameness.

The next care that the horse requires at the hands of railway managers is that of furnishing suitable *drivers*. The best stabling, grooming, feeding and shoeing cannot counteract the effects of bad driving. Those men whose duty it is to select and educate the drivers on street cars, should be most faithful and efficient, and no man should be retained as a driver who has not the necessary patience and judgment. Many horses become vicious and balky, by ignorant and careless driving, and a quick tempered driver is liable to be a costly one.

The last care that comes to us in the treatment of the street-car horses is to select or sort out and dispose of those that have become unfit for the service.

This demands good judgment, for the difference between the price obtained for a worn-out horse and a new one to take the place, is considerable, yet it is folly, and worse than bad judgment, to retain and feed horses unable to work, for it does not take them long to "eat their heads off," as the saying goes. All horses should be disposed of as soon as it appears that their capacity for full railroad service is gone.

This report is submitted with the hope that some hint it may contain, will be useful to the members of this association. This subject is an important one, and to be treated fully, would require more space than the limits of this paper will allow, and demand more talent than this committee lays claim to.

As a conclusion to this report, the personal experiences of two members of this committee, Mr. John E. Brown, Sup't. of the Troy & Lansingburg Railroad, Troy, N. Y., and Mr. T. H. H. Robillard, Sup't. of the Montreal City Passenger Railway, Montreal, Canada, are added. Both these gentlemen have had large experience in the care and management of horses, and their views cannot fail to interest this convention.

For the Committee,

J. E. RUGG, Chairman.

The experience of the Superintendent of the Troy and Lansingburg Railroad Company relating to Stables and the care of Horses:

The aggregate length of the three lines operated is 17½ miles. The principal barn on the main line is located near that end of the road from which the travel starts in the morning for the city. The second barn on the main line is located two-thirds of the distance from the main barn to the opposite end of the road. At *this* barn on each trip, going each way, the driver and team stop and take the next car following, affording from four to six minutes time for watering and rest, under cover as in all cases when standing. This separates the conductor and driver; and gives a conductor three different drivers on each round-trip.

The third barn is located at that end of one of the branch lines from which the travel starts in the morning for the city. All three lines converge and pass the second barn referred to for the purpose before stated.

The barns are of brick, two stories, ceiled with spruce, have twelve feet ceilings, and aisles in rear and between the rows of stalls of fourteen feet. The stalls are five feet by ten feet. On top of the same, and between the heads of the horses facing each other, are wire gratings. In front of the

stalls, there are nine light windows, eight feet from the floor. Each stall is also numbered. There are no mangers, but iron feeding boxes.

The dry hay is eaten from the floor.

The hay and grain are stored in the second story, but there are no openings into the stalls below. The grain is delivered by spouts, the hay is cut above and let down in tight boxes into the mixing room. *Water* is so freely distributed through the barns, that horses cannot go out or come in without passing it.

All the horses can be released from their stalls and the outer-doors thrown open by one movement of a conveniently-placed lever. There is no access to the barns except by passing the office of the superintendent and his assistants.

At a distance of 100 feet from the main barn is the hospital barn, which will accommodate forty horses. The stalls are ten by twelve feet, inclosed with wire. Adjoining these barns, the company have 100 acres of well-shaded pasturage, with some inclosures.

The company owns 425 horses, and runs forty-six double cars. There are no one-horse cars. The length of the trips are eight and fourteen miles. Each horse makes from fourteen to sixteen miles per day, at an average speed of six miles per hour.

All horses are bought by the superintendent, generally in New York City; and each horse is examined by him. He seeks to obtain horses of good disposition, weighing from 1,050 to 1,150 lbs. When received, they are allowed to stand in the barn one day, then given one pint of raw linseed oil, in order to prevent constipation from shipping or long standing.

For the first week, the horse is given light feed and light work; then uated as best suited and assigned to the care of a suitable hostler, according to the disposition of the horse and of the man, much depending upon the adaptation of the man to the horse; and in assigning to a driver the same principle of adaptation is observed. This is done by the superintendent in person.

They stand in the stalls twenty hours out of twenty-four, bedded with straw at all times. This requires 1,040 pounds of straw to each horse per year.

The feed consists of twelve pounds of hay, and fourteen pounds of grain, five-eighths western corn meal and three-eighths wheat-middlings, mixed to weigh forty pounds to one bushel. They are fed as follows, viz.: Morning, four pounds grain and one pound cut hay mixed, and four pounds dry hay. Noon: five pounds grain, and one pound cut hay mixed with no dry hay. Night: five pounds grain and one pound cut hay mixed and five pounds dry hay. The above feeding is uniform the year round with out regard to the weather. For sick and invalid horses, carrots, potatoes and oats are used. The cost of feed per horse last year was 34 $\frac{6}{10}$ cents per day.

They are never fed salt except in cases of sickness. In hot weather Glauber salts are given after a hard day's work to prevent constipation. Each hostler has the entire care and responsibility of fourteen horses, the feed being mixed for them. Each one is assigned his place in the barn and furnished with a kit of tools which he is responsible for, consisting of a card, curry-comb, brush, wheelbarrow, fork, and two pails and a broom. A horse standing in the barn for more than two days is given one pint of oil and moderately exercised before being put to work. This is to prevent paralysis, now a very common disease.

Every horse is allowed all the water he wants whether heated or not. No limitation or restriction is placed on the watering of horses. On the contrary, a special rule requires any man leading a horse in or out of the barn to lead him first to the water-troughs.

The experience of the superintendent for thirty-five years, in fourteen of which he

was running a stage-line, and twenty-one with this company, in not using salt, and in freely watering horses regardless of weather or the condition of the horse has proved most satisfactory, never having had a horse foundered or sickened by drinking too much water.

Horses going out on early trips are inspected late the *night* before. In the *morning* the whole barn is inspected, and extra horses are assigned to the places of those unfit for work. As they are known only by number, the hitchers know by consulting the daily-slate, just what horses to send out, and when, and with what driver. This also provides for replacing any disabled during the day. Each team works the *same hours every day*, and they are assigned to such trips as the work, and their ability warrants. *Pitty and low-bred horses*, and those that cannot stand the sun, are assigned early and late trips.

Sick and disabled horses are cared for by the Superintendent and his assistants, the amount paid yearly for veterinary services being insignificant. Very little trouble is had from *colic, fevers* or other *sicknesses*. The principal, and it might be said, the whole trouble met with, proceeds from strains from slipping, affecting the *hind legs, back and kidneys*, producing in many cases *paralysis* from which they rarely wholly recovers. Many, however, recover sufficiently to work on light trips. Necessarily they suffer to some extent from *bruises* or accidental *injuries*, but most of such cases are successfully treated.

Some years since "Farcy" was found in the company's barns, vigorous measures were immediately taken by the destruction of every animal showing symptoms of the disease, and a thorough fumigation of the buildings, stamping it out completely with a loss of only seven horses out of 250 in the barns affected.

The treatment of paralysis, now a common disease, has been most unsatisfactory. The best success has been by stimulating, keeping the bowels open, mustard and penetrating liniments, and rest. There is a short connecting line from the main barn to a branch road, on which weak and partially disabled horses are used while recruiting. Any horses not able to do this work are sold or sent to the boiling-house.

The average period of usefulness of the horse is found to be from six and a half to seven years. The business has increased so rapidly in the last seven years, requiring the purchase of so many new horses, that the average, without question, is lower for that reason.

The company does its own shoeing at the main barn. At the other barns, the shoeing is done by contract, the cost per horse for shoeing for last year was \$19.64. Burden's medium shoes are used.

Experience of the Superintendent of the Montreal City Passenger Railway Company:

J. E. RUGG, Esq.,

Dear Sir:—In complying with your desire of having my views on the general maintenance of street railway stables, I have no hesitation to say that this part of the street railway business is one of the most important. This is very evident when we consider that its maintenance constitutes over one-third of the total operating expenses.

In my opinion, street-car horses should not be purchased younger than five and not older than seven years. Horses about these ages will last here on an average about eight years.

I consider that 30 pounds of feed is little enough for car-horses every day.

The mileage per horse with us, is about 14 miles per day.

We use hay and oats, but no cut feed; I consider that although there is a saving in cut and bruised feed, the extra expenses will counterbalance. Of course, we use no corn; I believe that there is a saving in horseflesh by excluding corn from the feed.

I find that by confining our feed to hay and oats, the average life of our horses is much longer than that of those where corn is used.

Now with regard to stabling. I believe the less wood in the construction the better for the healthy condition of the stables. Wood, in a very few years, will get soaked with all sorts of impurities, so much so, that the proper purifying of it becomes almost an impossibility; and as a matter of course, paralyzes, to a great extent, the proper ventilation.

Ventilation cannot be too perfect. I consider that the usual upper or roof ventilation is not sufficient, unless aided by side ventilation. I have often noticed that side ventilation in most stables is entirely insufficient, being generally too high. The thick atmosphere always charged with stable-ammonia is very heavy, and will rise with considerable difficulty if not aided by an under-current draught.

I consider under-floor drainage very bad. This kind of drainage is more a receptacle for disease-breeding matter, than it is a cleansing arrangement. The drainage should always be from the surface. Floors should be subjected to a thorough washing at least twice or three times a week. Lime and carbolic acid should be used freely.

With regard to shoeing, of course it must vary in accordance with the various systems of roadway.

I believe that on pavements flat shoes are the best. On macadamized, toes and calks are necessary as a protection to the feet. In the latter case heavy shoes are indispensable.

In my experience of several years, I have found that the observance of the above ways has succeeded in maintaining our stables in fine condition.

With regard to our buildings, they are of old construction and do not contain enough of the modern improvements to form a model subject for submission to the coming general meeting.

In my travels and visits I have found that your stables and those of the Sixth Avenue Railroad Company, of New York City, were about the most perfect.

We still groom with the old system of grooming. It appears that opinion is generally divided on the grooming machine.

I believe that hay and oats are by far the best feed for horses, with a small allowance of bran twice a week.

Our speed is about six miles an hour, which I believe quite enough.

The above detail, of course, I glean from my own observations on the working of our roads; but I believe our horses get as much work as any other stable on the continent, and their condition is inferior to none that I have seen.

Yours, very truly,
T. H. ROBILLARD,
Supt. M. C. P. R. Co.

DISCUSSION ON THE SALT REPORT.

Mr. A. W. WRIGHT, Chicago, said that the N. C. R. R. Co., had baths 48 x 54", 14' deep, 1 bushel salt in each, each horse spending 3 to 6 hours per day in them; strength 1 in 37, or twice that of ocean water. On streets they used 1 bushel salt per mile of single track; used snow-plows and sweepers; proportion of salt in melted snow only 1 in 14 $\frac{6}{10}$.

Mr. CLEMINSHAW, Troy, asked the object of the salt baths.

Mr. WM. WHITE emphatically agreed with the report, but it was deficient in one thing. In New York the *debris* caused the tracks to be a continuous cesspool in winter, which gave the horses thrush, sore legs and "scratches." Every sidewalk should have salt put on it to melt the snow; every household should be compelled to sweep the snow to the gutter, and the R. R. Co. to sweep into sewers.

MR. WM. RICHARDSON said, that in Brooklyn they had fought this question so that the city had not passed any ordinance against salting. They had got written testimony of Registrars of Vital Statistics and of Health Officers during 15 years that salting was beneficial; had brought statements of Dr. Hutchinson, Dr. Wm. M. Smith, Health Officer of New York City, and of Dr. Elisha Harris, Sec. State Board of Health Commissioners. They showed that scarlet fever, etc., had been most prevalent in unsalted streets, and from May to November. But after the matter was put in that part of the Penal Code relating to Cruelty to Animals, they had had to fight it.

MR. D. B. HASBROUCK, New York, said that in New York the feeling against salting was most wrought up.

MR. WRIGHT, Chicago, said that their salt baths were to remove soreness and to cause the hoofs to grow; they found this salting feet paid.

MR. ROBILLARD, Montreal, thought salt a good remedial agency.

DR. ELIJAH WHITNEY suggested salting streets from curb to curb, and sweeping into sewers. It was the *debris* that did the damage. Salting all the streets would add 20 to 30 per cent. to the health of New York City.

(To be Continued.)

The Cable System as a Motive Power.

The American Street-Railway Association.

GENTLEMEN:—So completely has the country been flooded with literature pertaining to "The Cable System of Motive Power," that the writer of this report has no hope of offering any new facts; but since the system has acquired such magnitude and prospects, it may be fitting that the archives of the Association should possess some brief record of its beginning and progress.

Climbing the steep hills of San Francisco, the fertile genius of Mr. A. S. Hallidie conceived the idea that transportation, which could not be accomplished by animal power, might be by endless ropes; and to him and his associates, all credit is due for the first successful construction and operation of the system, eleven years ago.

What seems so easy and natural in the retrospect, lay before those men an untried, and, in the opinion of many, a foolhardy undertaking. The money invested was regarded as squandered, and the whole scheme a trifling with the impossible. But through innumerable difficulties and trials, they persevered, until intelligent experiment and dauntless courage wrought success. Clay Street Hill became world renowned for its novel and ingenious railway, the advantages of which, soon caused parallel lines on steep grades to be constructed on Sutter Street, California Street, Geary Street, Union Street, and recently one on the more level line of Market Street and its branches.

After the first four lines had been built, covering short distances and carrying few people, a road was constructed in Chicago in 1881. The latter city claims not one iota of credit for the invention of the cable system, but did undertake the somewhat serious task of demonstrating

First: That the system could be utilized in a region of harsh winters, deep snow and frost, the antipodes of the balmy climate and perpetual summer of California, and,

Second: That it could be expanded into a suitable system for moving the vast population of our largest cities.

The former could not be accomplished by any fragile construction but required great strength and compactness to resist the strains inevitable in a large commercial city, and the powerful pressure of the frost in a Northern winter. The latter could not be accomplished by any mile, or mile and a half, of timid trying; but with unshaken faith in its method of construction and the possibilities of the system, twenty miles of track were constructed, and the daily trans-

portation of 100,000 people attained, with the ability to move five times as many.

In addition to the lines indicated above, cars have been moved by cable for fifteen months over the New York and Brooklyn Bridge; an extensive system is building in Philadelphia; a line in New York, one in Kansas City, and one in Hoboken, and comprehensive systems have been proposed for New York and Brooklyn. Recently under the superintendence of American engineers this purely American system has been introduced and short lines constructed in London, Eng., South Wales and New Zealand.

The construction consists of an underground tube through which the cable passes, (supported by grooved pulleys,) in constant motion and at uniform rate of speed. The tube is provided with sewer connections for drainage, and an open slot on the tops through which passes a gripping device which is attached to a car. The cable is kept in motion, and its speed regulated by a stationary engine or engines. The rope is endless and the splices must possess great strength, but not increased the diameter of the rope, as any enlargement would incur severe and dangerous abrasion. It should be coated with pine tar and lubricated with linseed oil to protect it from rust and the too harsh action of the grips. The drums which impart motion to the cable, and the sheaves which carry it around sharp corners, should have a diameter about one hundred times the diameter of the rope. Of what material the rope should be made to secure the best returns is a question of great importance, affected by climate, the rate of speed it is to run, the frequency of stopping and starting, the character of the gripping device and the manner of applying the same, and the hilly or level character of the road. In cases of sharp deflections from a level, pulleys are required to depress the rope, and as these must be small to allow the grip to pass below them, the wear upon the cable is serious. To meet these conditions, flexibility and toughness, combined with strength and freedom from crystallization are needed.

Another important feature in a cable system is the device for automatically securing the proper tension of the rope. The extent of vibration will depend on its length, amounting in one four miles long, to some five feet, and is caused by the sudden grappling of the cable by a heavily loaded train. As the rope settles some two and a half inches between every two carrying pulleys over the entire road, the sudden tightening and stretching of the cable produces an accumulation. If this were not instantly taken care of, the rope would drop from the carrying pulleys and sheaves and be destroyed; also violent surging of the trains would ensue. Were the rope to be drawn so rigidly as to prevent this settling, the intense strain would soon destroy the cable and the operating machinery. Provision is also made in this device for taking care of the permanent stretch of the cable amounting sometimes to two hundred feet.

The gripping attachment should be prompt and positive in its action, and, in the most successful forms yet devised, consists of an upper and lower jaw, between which the cable is seized by the movement of a lever, one pound of pressure on the handle of which produces four hundred pounds pressure on the cable. A small sheave is placed at each end of the jaw, upon which the cable rides while the car is standing. Provision is also made for throwing the cable out of the grip and entirely free from it at any time or place. Exigencies may arise when this is of the utmost importance. The length of the grip is such that it passes some three inches above the carrying pulleys and does not come in contact with them. The cable is brought into the open jaws by an elevating sheave placed at an angle on one side of the tube. The metal used for lining the grip performs 2000 miles of service, when it requires renewal.

In Chicago a speed of eight and a half

miles an hour is attained over one half the lines, and nine and one-half miles over the other half; except in a few places where the speed is one half the above rates and can be made as much less at any point as may be desired. To operate at this speed with safety, the cars are provided with ample guards which prevent any one from falling under the wheels, and powerful brakes, can be applied to every wheel in the entire train by the easy movement of a lever in the hands of the driver.

The system possesses special advantages in heavy snow-storms, as the power is not derived from friction on the rail, but the appliances for clearing and sweeping the track are drawn swiftly and at short intervals by an untiring power. More power is required during a snow-storm, but in ordinary conditions, the operation of twenty and one-fourth miles of cable in Chicago has required 477 horse-power; of this 389 was used in moving machinery and cables, and 88 to move the 240 cars and their passengers. The cable and its coating weighs about 270,000 pounds, and is doing work which would require 2,500 horses.

In hilly sections where horses and locomotives would be useless for the purpose, the cable system can move cars as quickly and swiftly as on a level road; and on level roads it is found to be only one-half as expensive in operation, as the ordinary horse-railway system, while its capacity for moving vast numbers of people is practically unlimited. It is the only system yet devised, which satisfactorily meets the uneven pressure for transportation with the least possible increase in expense. No difficulty is experienced in turning corners, either with main cables or auxiliaries.

As regards humanity for horses and consideration for the nerves of passengers, it commends itself to all. In point of cleanliness, a system which saves the use of thousands of animals in a city is of great sanitary value, and the comparative quietness of its operations is highly appreciated by those who reside beside it.

The speed at which it runs, and the quickness and ease with which it starts and stops adds to the comfort and well-being of its patrons; and when equipped with the present safeguards and appliances, is found to be far more safe to the general public than the ordinary horse-car. It has no will of its own to thwart the will and efforts of the faithful driver.

The increase in the value of real estate along the street where it operates, and on parallel and cross streets for several blocks each way, is many times the cost of its construction, being from 50 to 200 per cent. in a single year.

The cost of construction is much greater than that of an ordinary tramway, but the economy of operation far outweighs this objection, as it saves more than the interest on the increased cost.

In Chicago, the cost was perhaps greater than would be necessary in most cities, owing to the nature of the ground, reaching \$105,000 per mile of single track. Too much stress cannot, however, be laid upon the importance, *the absolute necessity*, of a substantial and durable structure which will not be broken or displaced by heavy trucks or by the pitiless frost. If all the parts and appliances are well and permanently built with ample safeties in point of strength, and vigilance attends its operation, it will prove a great and unalloyed blessing to any city, and bring satisfaction and recompense to its owners.

The limits of this report will not allow allusion to the manifold improvements made and making in many quarters, in its construction and appliances, but what has been accomplished in so short a time is ample guarantee that vast good is yet to come from "The Cable System as a Motive Power." In behalf of your committee, this report is respectfully submitted.

C. B. HOLMES,
Chairman.

CHICAGO, October 15th, 1884.

Labor and the Graduated System of Compensation.

GENTLEMEN:

Your committee on "Labor and the graduated system of compensation," beg leave to report as follows:—

The labor system of street railway companies has this peculiarity, viz.: it is intimately connected with metropolitan society, and is, consequently, much exposed to disturbing influences; it is also distinguished by the fact, that the entire income of the corporation is collected in small amounts by a numerous set of employees. These features render its regulation a matter of considerable perplexity, and make it all the more important that it should be systematized on simple, practical principles. Street railways are public carriers running through dense populations, their relations to the public being determined in a large measure by their employees. Hence it is, that at the outset of an inquiry as to the best means of regulating their labor system, arises the obvious necessity for mutual good-will between the companies and the labor they control.

In the acquisition of experience in managing street railways, and in closely watching the details of their operation, the stronger is our conviction that the best guarantee of the labor employed lies in the fidelity, competency and honesty of the men, rather than in any ingenuity of mechanical checks, or other protective or detective arrangements.

This conclusion may be regarded more as a sentiment than a safe tale of business, and others may question the practical economy of a proposition that savors of sentiment alone, than an enforcement of faithful service by arbitrary methods. From a purely business stand-point, it is true of all forms in which invested capital depends for returns on regular continuous labor, that to awake in the employees an interest in their duties and a personal friendship towards the corporation employing them, is the best basis for permanent profits. The moral average of men is as yet unknown, and wherever a large force is employed, there will always be found a certain percentage of disloyalty, duplicity and dishonesty.

To expect to find in artificial devices a complete substitute for personal honesty or for faithful services willingly rendered is fallacious; and we must look farther and sink deeper.

All appointments to positions should be made from that class which would dignify labor, and avoided from that class, which by habit, training or education are suited to higher avocations; and in no case should any device for safe guard in handling money be used that will blunt moral sensibilities.

The employees of railway corporations cannot properly be classified under the head of "skilled labor." The capital invested and its returns is largely at the mercy of the employees, and in few corporations does loss of money more immediately result from inefficient or wasteful labor, or profit more quickly accrue from intelligent and conscientious effort, than in street car companies. But, nevertheless, the services exacted from conductors, drivers and stablemen are not of such a character as to require an apprenticeship to understand. Any man of average intelligence can discharge the duties, and, although he may not be at first as efficient as an old hand, yet a few days, if he be industrious and attentive, will give all the experience that is really necessary. It is, therefore, unwise for them to represent themselves as skilled workmen, or to allow themselves to fall into the pernicious notion that they are as indispensable to their employers, and as difficult to replace as the craftsmen in specified trades and manufacturers. In presenting this view, it is only for the purpose of more forcibly referring to the vital importance of managing and directing the labor system. Unless employees of lines are faithful, energetic and

economical, it is impossible to obtain substantial success. The neglect or abuse of stock or the running gear of cars, the waste of feed, carelessness or insolence towards the public, and indifference or dishonesty in the collection of fares, are all means by which employees can impair the operations and entail losses upon these corporations.

To fully guard all these openings, to establish a system of checks by which fraud or negligence can be detected or prevented is, we are fully persuaded, almost impossible.

A corporation is an artificial person, existing only in the contemplation of law, but this does not deprive it of a certain individualism; and the employers are governed by a distinctive spirit, that in turn regulates their feeling of the service towards it. Sometimes that spirit is harsh, arbitrary and exacting; sometimes loose and improvident; sometimes strict in the enforcement of rules, but tempered with justice and moderation. Whatever it may be, the employees know it, and their services take color from it; and it is highly important that they should have a clear and definite understanding of the estimate placed on their labor. They should be taught in the first place, that the management does not regard them as skilled workmen; that a "strike" may interrupt, but can in no way stop operations; that if they were all to resign on the same day the company could go ahead the following, not perhaps satisfactorily, but sufficiently so to maintain business, and that but a short time would suffice to obliterate all effects of the interruption. While insisting upon this general feature respecting labor, the men should be made to feel that, if they are not classified as representing skilled labor, neither are they on the other hand regarded as regular day-laborers; that good judgment, promptitude and experience are fully appreciated; that the managements intend and aim to reward fidelity, and that as long as they are trustworthy, they are sure of their places, and that continued conscientious service will be recognized. Promising these general views, there remains to be noticed what in our opinion are the best means of producing the relations mentioned as most desirable.

It should be a settled principle that discharges as far as possible shall not be capricious or without cause, and that promotions will be made on the basis of length of service and personal merit. The labor system of an ordinary line is not sufficiently varied or extensive to embrace a regular scale of promotions, but the principle should be recognized and established, that the management is influenced by the relative merits of their employees; that there is no favoritism tolerated, and that a faithful and efficient man will not be overlooked or unfairly treated. When the men are educated to understand this, an "*esprit du corps*" will gradually spring up and a guarantee of good work secured, obtainable in no other way. In enforcing a system of fair promotions and a strictly equitable treatment of labor, much dependence must, necessarily, be placed upon the reports of other officers. It is, therefore, of essential importance that they should be honorable and just men, as well as energetic and vigilant, and that their reports should be reviewed carefully by the chief executive officer, through whose individuality flows the inspiration of management.

A graduated system of compensation, regulated according to length of service and general efficiency, would also, if judiciously introduced, be productive of beneficial results. Such a system could not be created summarily, but by establishing conditions as to the filling of vacancies and fixing a lower rate of pay for new appointees, and the terms upon which their advancement will take place, a complete system may soon be created, the features of which can be adjusted to suit the particular circumstances surrounding the operation of each particular line. A man who possesses experience, and whom the company has tested and

found reliable and competent, is certainly worth more wages than a comparatively new appointee.

His services are more pecuniarily profitable, and there is a corresponding loss when a new man is placed upon the same footing.

A graduated system of compensation should be based upon a permanent and well-known classification of the men, and by this means there might be, if desirable, a saving of wages and a better recognition of individual merit and demerit. The system once established would tend to promote fidelity and self-respect among the employees; seeing its justice they would cooperate in its maintenance; and at the same time it would improve the relation of capital and labor and give to the men a stronger personal interest in the permanency of their employment.

The use of all kind of registers and other detective arrangements and contrivances simply expresses distrust; all of them represent the same efforts of experience and ingenuity to devise a substitute for personal honesty; all of them are imperfect and irritating, tending to blunt moral sensibilities and foster want of confidence.

It is undoubtedly true that these devices cannot be dispensed with under the conditions that now exist, and the views here expressed have reference rather to general principles of the regulations of labor, than to the details of detective measures; yet we cannot fail to see in their introduction a great disturbing element. We will not, therefore, discuss the relative values of the various contrivances, but insist that were it an established fact, that these artificial means were indispensable, yet, even then, the principles herein set forth ought to control the labor system of street-railways. The losses incurred by strikes, from which we have not been exempt, the ceaseless discussion of the relation between labor and capital, incident to modern lines; and the increasing sensitiveness of capital to social disquiet, all unmistakably suggest, that, so far as possible, corporations employing large forces of men should ground their policy on equity, and avoid unnecessary antagonisms and consequent hostile legislation. We owe this duty to society, and we owe it to the large interests confided to our charge. It may be impossible to prevent occasional disputes, but when they arise, we should not be found evidently in the wrong, and bear the stigma of oppressing labor, or of neglecting wise and just rules for its employment and control.

We feel assured that the application of principles herein indicated will not increase the expense of operation, and will remove much of the anxiety and difficulty connected with the management of street railways.

We recommend no sudden and sweeping changes, because the labor system supporting all industrial investments of capital cannot be summarily altered without confusion or loss. It crystallizes in fixed forms with the passage of years; and changes, even for improvement, should be gradually introduced.

In conclusion, we recommend that the principles of management we have briefly outlined, should be steadily held in view in the treatment of labor, and so far as possible incorporated in the practical operation of railway lines.

Respectfully submitted,

JULIUS S. WALSH,
JACOB REHM,
HARVEY N. ROWE.

The following letter was submitted as a part of the report of the committee:

OFFICE OF THE NORTH CHICAGO }
CITY RAILWAY COMPANY, }
CHICAGO, October 10th, 1884. }

WM. H. HAZARD, Esq., President American Street Railway Association, Brooklyn, N. Y.

Dear Sir:—Having been appointed by you as an associate member of the com-

mittee on "Labor and the Graduating System of Compensation" (as refers to labor employed by street railway companies), I beg leave to report the following on the subject:

For several years our company has divided all of its drivers and conductors into four classes or grades, as experienced hands are of more value to the company than those just entering our service. We require every man in our employ to remain for the space of two months in the first class, receiving a compensation of \$1.50 per diem. After the expiration of two months he enters the second class or grade, remaining therein for four months, receiving a salary of \$1.75 daily for his services. After the expiration of the last-named four months, he advances into the third class or grade, remaining therein six months, and receiving the sum of \$2.00 as a daily compensation for his labor. Having thus served our company for the space of twelve months, and having become thoroughly acquainted with the duties to be performed by him, and fully able to discharge them intelligently, the laborer enters the fourth class, and his wages are advanced to \$2.25, which is a higher sum than any laboring man can earn.

The graduated system of compensation works well with us here, and makes "strikes" an impossibility. No honest and intelligent laborer will "strike" for higher wages, when he knows that by serving through a regular course, he will attain what he cannot possibly get anywhere else.

Any laboring man who enters our service and has been with us for two months is only too anxious to stay, because his wages will be increased for the coming four months. In short, the longer they stay the better is their pay.

Furthermore, this system furnishes us a reliable and trustworthy set of workmen, because the longer they stay the more efficient they become in the discharge of their several duties. Such a wage system secures to us steady and punctual men, who perform their work more cheerfully because they know that their value is acknowledged by the company, which remunerates them for their services with the highest possible wages.

This system of graduating the wages works well here with us. It works somewhat after the manner of a school of probation. After the men have worked through it, they find it to their interest to remain with us. We have all reason to be satisfied with the system, having by it secured a lot of good, steady and reliable men, who generally stay unless discharged for cause. The average hours per man per day is 11½ hours. I have the honor to be,

Your obedient servant,

JACOB REHM,
Vice-president, North Chicago
City Railway Co.

Completed Construction of New Road.

In the construction of street railways, it is evident that while we must endeavor to get the best roadway for the cars, due regard must be paid to the requirements of the general travel, and to the local laws governing the form of rail and other details; so that we are not at liberty to use the best means to accomplish the end desired. In fact, the matter is often so hampered with municipal regulations, that it is impossible to accomplish more than an imperfect and unsatisfactory solution of the question.

The best form of rail for the purposes of the railway company alone is, undoubtedly, the "centre-bearing," as the weight of the car wheel in this case bears directly upon the centre of the rail, and is transmitted evenly to the centre of the stringer, so that the track is in the best position to resist the outward pressure which is constantly tending to widen its gauge, and otherwise injure its condition. The spikes with this form are placed alternately on either side of the head, so that the rail, besides having a better bearing on the timber as above stated, is held down equally on both sides. The car wheels run more

smoothly and with less friction than upon any other form, as there can be no possible contact with any paving stones, and the open space provided on the outside has a tendency to keep the head of the rail free from dirt and grit. This is especially the case during cold weather, when one of the most serious difficulties in operating street railways arises from frozen mud, ice or snow getting upon the rails, even when the greatest care is taken to keep the track clear. The centre-bearing is the standard street rail now in use in New York City, and it is used to a considerable extent in Brooklyn and a few other places.

In the next form, known as the "slope-back," the bearing is approximately in the centre, the head being about three inches wide, and beveled or sloped off on the outer edge, so that to a certain extent it gives the advantages above enumerated for the centre-bearing rail, but only to a limited degree.

The "side-bearing" pattern, with its many variations, is that which is most generally in use in the United States; not because it is the best, but because it is the best that the railway companies are permitted to put down, as wagon wheels can readily get on the track, and it gives a good wide-tramway for general travel. This very fact, however, is a great detriment, as the general traffic is invited by its smoothness and other advantages to run upon it. Heavy teams going at a slow rate are constantly in the way of the faster moving cars, and the rails are not only worn out by this travel, but the speed of the cars and the general business of the road interfered with. A very serious objection to all side-bearing forms is that the weight of the cars being entirely on the outer side, that part of the rail wears into the stringer sooner than the other, causing the rail to roll out of level and to widen the gauge of the track. All forms in which the head of the rail is narrower than the tread of the car wheel should be avoided, as the wearing surface is too little, and in the side-bearing patterns this is especially the case, for unless the head is as wide as the tread the projecting edge of the wheel will be constantly striking against the paving stones outside of the rail when the track is new, or the pavement is relaid. This will only cease when the paving stones shall have been gradually worn away by the action of the wheels, which is a very objectionable and costly process, or when they shall have been knocked down or otherwise settled below the head of the rail.

Your committee, would, therefore, recommend the adoption of the centre-bearing form of rail in all cases that it will be allowed by the local authorities, especially where the streets or avenues are wide enough to provide the general travel of the street a good and sufficient roadway, outside of the space occupied by the railway.

Where the service is heavy, a rail weighing sixty pounds to the yard will be found the most satisfactory and in the end the most economical; but upon roads with lighter travel this is not necessary, though it should always be borne in mind that it is impossible to get satisfactory results when materials of poor quality or insufficient size or weight are used. It is not the first cost that should be regarded altogether, for if the railway is well built with good and sufficient materials, the annual wear and tear will be proportionately reduced, so that the profit and loss account from year to year will not be charged with constant repairs rendered needful by poor or scanty construction at the outset.

The spike-holes should be about twelve inches apart, so that when the rails are first laid it will be enough to spike every alternate hole, thus leaving new holes with their original countersink to be used when the others shall have become worn too large and be unfit to retain the spikes. The rails should be carefully inspected, and any that are not cut square at the ends or not straight and level should be rejected and returned to the mill.

As the gauge of street railways is almost always established by the local authorities to conform with the legal gauge of the ordinary vehicles of such city, there is in consequence no universal or standard gauge for them. Your committee is, however, of the opinion that from four feet eight inches to five feet two inches gauge will give the most satisfactory results as a general rule.

Where double tracks are laid, there should be ample space for the cars to pass each other on both the straight tracks and the curves without danger of striking. Five feet between gauge-lines, unless the cars are exceptionally large and wide, will be a sufficient distance; and with straight tracks it will also allow a man to stand between the cars while passing each other, which may prevent many accidents.

All joints of the rails should have rolled iron joint-plates not less than eighteen inches long, placed under them. These should have vertical flanges to fit against the sides of the rails, so as to keep them in line with each other and to increase the vertical strength of the joint-plate itself. If the track is laid in cold weather, the joints of the rails should be kept apart three-eighths of an inch to allow for expansion of the rails in summer; and this space should be less when the rails are laid, as the temperature rises, although the ends of the rails should never be laid less than one-eighth of an inch apart even in mid-day of the very hottest weather.

The rail spikes should be five and a half or six inches long, of one-half inch square iron, with countersink heads, to fit into and not project above the countersink in the rail itself. They should be of good tough iron, so that when driven, the heads will not fly off under the strokes of the hammer.

As street-railways are now usually constructed, the rails are placed upon longitudinal wooden stringers, resting upon transverse wooden cross-ties. Where it can be obtained at a reasonable cost, your committee

recommends the use of yellow pine, free from sap-growth, and cut from trees that have not been tapped. As a general rule, the best yellow pine-railroad lumber is brought from Georgia or Florida, and in all cities near the seaboard, at least, the rate of freight is low enough to justify its use for stringers and cross-ties. Of course, this may not be so in cities or towns far inland, and in such cases, other lumber must be used which can be more conveniently and reasonably obtained. The ties should be of equal size, in order to give a uniform bearing and support to the track; for if they are of unequal surface, the track will be better held up by the larger ties than the smaller ones, thus causing it to be uneven and irregular. For the same reason, they should be placed at a uniform distance apart, five feet from centre to centre, being probably the most desirable. Uniformity of dimensions can be more certainly had if the ties are sawed than if hewed, and in addition to this the stringers will then always have a good flat bearing upon them. The joints of the stringers should never be under the joints of the rails. The stringers should be not less than seven inches deep, and of the same width as the rail which is to lie upon them, unless it should be one of the narrow forms of rail, in which case the timber should project on both sides not more, however, than one half inch. It should then be beveled off on the upper edges to the width of the rail before putting down the pavement. The stringers should be, at least, twenty five feet long, in lengths divisible by five feet, so that there will be no waste in cutting off useless ends to allow the joints of the stringers to come exactly upon the cross-ties. Of course where there is exceptionally heavy service, it may be of advantage to place the ties four feet from centre to centre, and the size of the ties may then be increased to advantage, say five inches high by seven inches wide, although generally four inches by six inches is large enough. The ties should project outside of the stringers on both sides at least nine inches, and the stringers on the outside should be fastened to the ties by cast iron knees not less than six inches high and six inches long, and on the inside by similar knees three inches high and three inches long. The long knees on the outside tend to keep the stringer in a perpendicular position and so to preserve the gauge of the track; for tracks never get narrower, all the conditions of their use tending to press them outwards and to widen the gauge. At all joints of stringers, joint knees should be used on both the inside and outside of the stringers, and they should be broad enough to bear against and be spiked to the contiguous ends of the same, thus keeping them in line. The spikes used for these cast-iron knees should be three and a half or four inches long, and three-eighths of an inch square, with button-heads. The knees should be of good strong iron, so as not to break easily, in case the workman should miss the spike and accidentally hit the knee itself, and all the spike-holes should be carefully drifted out, so that in driving the knee-spikes, they will not wedge in the holes and split the knee.

It is very important to have the ties and stringers well and solidly tamped-up, and a straight line and even surface carefully obtained. This is a matter which is often slighted, but which should be attended to with great care.

A very troublesome and expensive item of repairs is often caused by the wheels of heavy wagons making ruts alongside of the rails, thus causing the track to get out of gauge, and otherwise wrenching and injuring it. This can be, in a great measure, prevented by putting a row of substantial square-shaped paving blocks on each side of each rail, which, after being thoroughly rammed, should be left about one-half inch above the rail, otherwise they will settle down so as to be below the rail, when their efficiency will be greatly lessened.

All the undisturbed bed between the cross-ties should be loosened up with the pickaxe, so that all of the pavement shall have the same bearing, and it will settle alike all over.

The best pavement for the horse path is probably had by using cobblestones about six inches long, about four inches wide and two or three inches thick. These dimensions give stones of moderate size, and of flat, oval form, so that when closely set on end they furnish a very good foothold for the horses, and the pavement can be kept in repair with a very reasonable cost. The horse path should be paved as nearly as possible level, and all crowning or elevation in the middle of the track should be avoided, so as to allow the horses' feet to travel evenly and squarely. The stones should be laid upon a bed of good, sharp gravel or coarse sand six inches deep; they should be thoroughly rammed three times, and left with a covering of the same material about one-half inch deep, from which all stones over an inch long should be raked off.

At proper and frequent intervals, suitable connections should be made with the sewers or with surface drains where sewers are not in use. If this matter is not properly attended to, great inconvenience and expense will be caused, especially in cities where the melting of snow during winter causes a great accumulation of water upon the track which, if not promptly removed, may, by a sudden change of weather freeze up solid on the track. In any event, no track can be properly kept in order unless the surplus water is promptly and adequately drained off. The general elevation of the whole track should be a little higher than the rest of the street, to aid in draining the water away from the track.

The radius of the curves will be governed by the width of the streets and other conditions, but it is always desirable to avoid curves of small radius. A curve of fifty or sixty feet radius is probably the most desirable when it can be laid down, but in many cities the width of the streets will not permit curves of more than thirty or thirty-five feet radius, which, however, if properly laid, will give all reasonable satisfaction. The curved rails should be of the grooved form on both the inside and outside flanges of the curve, although in curves of large radius it is not necessary to have the outer line laid with grooved rail; in such cases bending the rail used upon the

rest of the track to proper shape. The groove should be about one and a half inches wide, and the inner side or guard of the grooved rail should not be more than three eighths of an inch above the tread. Great care should be taken in laying the curves to have them of regular curvature, uniform gauge, and with no abrupt changes of surface. Ordinarily, a curve laid with the inner and outer rails on the same level will give the best results in service, but there are instances when, from the grade of the streets it will be found necessary to elevate one rail higher than the other. The outer rail may then be elevated a few inches above the inner without any disadvantage, and possibly in some cases to advantage; but the inner rail should never be higher than the outer if it can possibly be avoided, although a slight difference in this respect, where absolutely unavoidable, can be allowed, if the curve is very carefully and accurately laid down. The curves should always be so constructed and laid down that all four wheels of the car will bear equally upon the rails; as otherwise, if any one of the wheels should have its portion of the load removed from it by reason of a depression in the track, it will have a tendency to run off the curve at that point. The curved rails should be, when practicable, in lengths of thirty feet, so as to have as few joints as possible, and a straight guard-rail not less than seven feet long should be attached to each end of the inner line of the curve.

On single track railways where it is necessary to have turnouts or passing places, they should be so constructed as to allow the cars to run easily into and out of the turnout. This can be accomplished by making the curves leading into and out of the turnouts of large radius, say three hundred or three hundred and fifty feet. As, however, in cities the length required for this form of turnout is often inadmissible, it will then be necessary to use curves of shorter radius, and a turnout with grooved rails of seventy-five feet radius will probably be found the most desirable under such circumstances. Where the curved rails of the turnout are of three hundred or three hundred and fifty feet radius, it will not be necessary to use any grooved rails, as the ordinary rails when carefully curved, will be sufficient to guide the car wheels.

The castings for all switches, frogs, and crossings should be made from hard, tough iron, and of substantial size and weight. At each end of the casting there should be a recess or pocket of the right size and shape to support and retain in position the end of the adjoining rail; or, when two castings themselves abut together, the end on to which the cars run should rest in a pocket formed in the end of the other casting. Particular care should be taken to have all castings evenly and solidly bedded upon the timber supporting them, for otherwise they are liable to be broken by the shocks and strains of heavy loads crossing over them. At places where frogs or crossings are required and one of the tracks is used very much less than the other, it will often be found desirable to have the castings so made, as to allow a continuous rail to run through a recess in the casting, thus giving an unbroken rail to that one of the tracks which has much the greater travel, while the occasional cars running on the other track have their wheels so raised up that their flanges pass readily over the top of the continuous rail. "Toe-pieces," or slight projections, should be made on all castings, when, by the size or smoothness of the surfaces exposed, horses are otherwise liable to slip upon them, smooth spaces being left only where the car-wheels run.

The use of turntables should, wherever it is possible, be avoided, but as they will often be found necessary, it is important that those only should be used which will turn easily, present little or no obstruction in the street, and require but a reasonable amount of repairs when in use. They should be set on brick or stone foundations laid below the frost-line, and they should be thoroughly provided with drainage.

Within a recent period, and especially within the last five years, a very radical change has taken place in the manufacture of rails, whether for steam or horse-railroads; the material now used in the construction or repair of railways being almost universally steel instead of iron; in fact it is now very difficult to get iron rails, as the mills that formerly made them have mostly gone out of the business, or have changed their plant to make steel rails instead. The improvements in the manufacture of steel have been so great that there is now no inducement to use the inferior article, as the superior can be had at the same or a less price. The service of steel rails on an average street-railway is, probably, at least three times that of iron rails of equal size and weight, the wear of the steel rails being also more even and regular. One great cause of the rapid deterioration of iron rails furnished for street-railway use, arose from the fact that they would laminate and often split off in pieces of considerable size, so that the surfaces were not only worn away, but actually broken away and splintered off. Steel rails, on the contrary, being of homogeneous and tough material, are not subject to this objection, every particle that is worn off under service coming away by itself, but not dragging with it any other portion of the mass.

Before closing, we must not omit to refer to the various forms of girder rails introduced within the last few years to a considerable extent, by which wooden stringers are altogether avoided. One great advantage that they give is that a perfectly secure and level joint can be had at the ends of the rails, as fish-plate joints can be used, similar in general character to those in use on steam railroads. The deterioration of the roadway by reason of the decay and wearing away of the stringers under the rails is avoided, as no timber is used with them, excepting for cross-ties, and these are so far underground as to last a very much longer time than the stringers would last, not being exposed as they are to the constant changes of temperature and of moisture and dryness. It is quite possible that the standard street-

railway of the near future will be constructed with steel girder rails set on iron or steel cross-ties, and held to gauge by iron tie-rods.

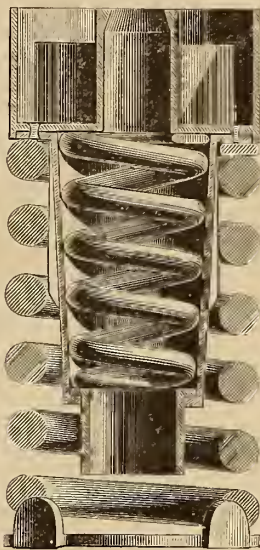
No reference is made in this report to the construction of cable-railways, as that whole subject is comparatively new, and no special system of construction for such railways can as yet be regarded as being proved to be the most desirable one.

WM. WHARTON, JR., *Chairman of Committee.*
President of Cape May and Schellenger's Landing R. Co., Cape May, N. J.

New York, October 15, 1884.

Vose's Graduated City Car Spring.

This is intended to do the same thing for horse cars as the graduated rubber cone spring made by the same firm.* The in-



tention is to make the car ride softly and easily when empty, by putting the weight on only one of the concentric springs, and to bring both in action when the car is heavily loaded.

* Richard Vose, 13 Barclay Street, N. Y. City.

Personal.

F. T. LERNED, formerly of the Baltimore Car Wheel Works, now with Andrews and Clooney, is certainly "to the manner born" as an entertainer. A large number of those in attendance went home with very pleasant feelings toward him and his firm for their efforts for their comforts and pleasure.

Car Starters.

Prof. J. E. Sweet, retiring president, American Society Mechanical Engineers, recently spoke of a car starter that was a "perfect mechanical success," but was condemned and thrown aside because it made balky horses.

Cracking of Varnish.

Can any of our readers assign any reason why varnish should crack across the grain of panels, etc.? Experiments show that the expansion of wood due to moisture is from five times as much crosswise as lengthwise in young ash, to 213 times as in ebony, and yet there are five crosswise cracks to one with the grain. It can hardly be heat that cracks varnish, because it gets elastic with heat; and in fact, in locomotive cabs Scheller has pointed out that all outside and inside surfaces are cracked across the grain, except the ceiling, which is the hottest part, and which has but few cracks except just above the side windows (where the cracks are cross grain).

It is probable that there are more things in paint and varnish than are dreamt of in our philosophy.

Only One Dollar.

That the STREET RAILWAY JOURNAL may be in the hands of every man actively engaged in street railway management, the subscription price has been placed at the very low price of one dollar per year.

Please send in your name at once, and begin with Vol. I, No. 1.

Street Railway Notes.

THE WASHINGTON STREET AND STATE ASYLUM road, Binghamton, N. Y., R. H. Midgley, President and General Manager, is building an extension of some two miles, adding cars and making various improvements.

At the John Stevenson Co.'s shops, New York, we notice a fair number of cars building, and on inquiring, find they are for all parts of the world, including Australia and various parts of Europe and South America.

Items.

THE BROADWAY (N. Y.) SURFACE RAILWAY has secured its new grant of the Board of Aldermen.

W. H. CAMPBELL of the Philadelphia Traction Co., has secured the controlling interest in the Transverse Railway of Pittsburgh. It is understood he will introduce here his traction system.

THE THIRD AVENUE (N. Y.) CABLE RAILWAY is pushing forward its extension from 8th to 10th Avenue on 125th Street.

THE HESTONVILLE & MANTUA Co., Phila. (Race and Vine and Arch St. lines) is adding to its equipment one car per month, built in its own shops, and is rapidly substituting horses for mules as motive power. About twenty horses are substituted for mules every two weeks, and, at this rate, it will not take long to abolish the long-eared hybrid entirely.

THE PEOPLES' PASSENGER RAILWAY Co. (Phila.) is building a new branch, running west from Germantown Ave., along Susquehanna Ave., to 23d St., south to Norris St., and east on Norris St. to Germantown Ave. This line will be a great convenience to the rapidly growing northern districts of Philadelphia. The route was originally projected and partially constructed by Mr. Singerly (Philadelphia Record) under the old Germantown Passenger Ry. Co.'s management. The new management is pushing it to completion with a large force of workmen.

The same company has recently fitted up, in comfortable style, its offices in the second story of the depot building, at Eighth and Dauphin Sts. They include the president's room, a room for the vice-president and directors, and a general business office. This company operates, at the present time, about 42 miles of street track, comprised in five divisions:—Fourth and Eighth Sts., Girard Avenue, Germantown, and Green Sts., and Fairmont Avenue and Calowhill St. The new Susquehanna Ave. line will add a sixth division.

It owns about 105 cars, all of which are being placed in first-class condition as rapidly as possible, and every attention is being paid to thoroughness of detail in every working department. The business of the year just closed shows an increase over that of the preceding one; the business year having amounted to over 20,000,000 passengers carried by the company's cars. The combination which goes by the title of the Peoples' Passenger Ry. Co., forms the largest street railway interest in Pennsylvania, with the single exception of the Philadelphia Traction Co.

G. B. H.

— THE —
STREET RAILWAY
JOURNAL.

MONTHLY, \$1.00 PER YEAR.

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Publishers' Salutory.

Every important industry needs a representative Journal. Most such industries have them. In the case of Street Railways this want became manifest, and has been expressed by tramway companies and those who wish to supply them.

A single department of the already crowded *Journal of Railway Appliances* having been proved, after 18 months' trial, to be insufficient to the requirements of the Street Railway interests, we have, in view of the fact that encouragement to do so has been plentifully held out, and that we had, probably, the best facilities in the country for doing so, resolved to issue this special trade and technical monthly.

The Street Railway Journal.

At the recent street railway convention, a number of leading men expressed the wish that there should be a journal devoted exclusively to street railway interests. Representatives of the AMERICAN RAILWAY PUBLISHING Co. became aware that this need was felt not only by the street railway managers and employees, as a source of information, and a means of exchange of ideas, but by those selling to them, as a medium of direct communication with their customers.

Seeing this, a careful canvass was made as to the probability of a special street railway journal being supported by readers and advertisers.

The promptness and enterprise of those in the supply trade, in this matter, as shown by our advertising pages, certainly proves a willingness on their part to do their full share towards making a first-class paper. With a similar response on the part of street railways, in the way of subscriptions, the encouragement will be all that we could ask, to make a journal in every way creditable to the street railways of America.

Our Editorial Policy.

The editorial policy of the new STREET RAILWAY JOURNAL will be to make the paper not only interesting and instructive, but *essential*, to street railway men; to avoid puffing and the publication of stale matter and copied items. The phenomenal success of *The American Journal of Railway Appliances* is in a large measure due to the unswerving adherence to such a policy, as announced in its initial number. By making the paper A No. 1 for the subscriber, the advertiser will be benefitted in the long run and even in the short run, more than by running a write-up sheet, with neither news, nor opinions, nor self-respect.

We call upon all interested to help us make the new paper a success; and can promise good-will in return.

Third Annual Convention.

The recent Convention of the American Street Railway Association was emphatically a success. There were able and exhaustive reports of committees on the various subjects assigned, and intelligent discussions on the reports. There was a remarkable increase in membership. The interest manifested was certainly gratifying to those who have the well-being of the association at heart, and who have labored for its success.

Coming Articles.

We have in type or on hand articles as follows:

The National Cable Railway System.*
 Demorest's Duplex Register.*
 Accidents on Cable Railways.
 Resistance to Traction on Tramways.
 Record of a Remarkable Horse, by Aug. W. Wright, C. E.
 Street Railway Joints, by Aug. W. Wright, C. E.
 Mr. I. Watson, President of the Buffalo St. R. R. Co., has kindly promised articles on Salt or no Salt.

Heating Cars (negative).
 Interchangeability of Tickets (*i. e.*, all Street Rw. tickets good in any town).

Mr. Wm. J. Richardson, Sec'y A. S. Rw. Association, is good enough to promise a communication on Fare Collecting.

Mr. W. W. Hanscom of San Francisco, will have some practical things to say about Cable Railways, and we have good hopes that Mr. Jas. K. Lake, Supt. Western Div. R. R., Chicago, will give us "points" enough to make some very interesting articles.

*Illustrated.

Our Contents.

The lack of variety of matter in this issue of the STREET RAILWAY JOURNAL is due to the large amount of space given to the very interesting reports presented, of the Convention.

Convention Proceedings.

We regret that up to the moment of going to press, the oral discussions of papers and the complete minutes of

proceedings of the convention are not ready for publication, and the only matter which we have been able to get from the secretary is the test of the reports and the discussion on the "salt" report. This annoyance to the secretary and the members is by reason of a misunderstanding in the matter of an official stenographer. The managers of this journal had provided an expert stenographer in the expectation of his being permitted to take notes. The association having decided that all reports should be made by the official stenographer, we relied on the latter.

Owing to the failure of the official stenographer to hand in his manuscript to the secretary, from whom we expected to receive them, we prefer publishing in this our initial number little else than some of the reports, as it is our intention to make the STREET RAILWAY JOURNAL, in its publication of matter coming from, or relating only to, the American Street Railway Association, practically, official, while preserving its complete independence of that body.

Crowding Cars.

There are some managements which have the good sense and keen business perception to see that it pays better to afford passengers at least plenty of room to stand, than to have them packed like herrings in a box; and that to give each passenger a seat pays better yet. Of course, there are times and unforeseen occasions when it is impossible to have a sufficient supply of cars on hand, and this is particularly the case on long lines. But we know of instances of rival parallel lines, running about the same distance and to about the same terminals, one of which lines generally manages to seat all its passengers, and the other does not, although the first line carries nearly double the passengers on extra occasions, and has about the same number of cars. The superintendent of the first line "watches the weather," and inspects the returns for the various hours of the day. He knows about how many people are out; when they will be likely to return in fair weather; and how fast they will crowd in if there is bad weather. His conductors have plenty of time and room to collect all the fares, and the road is made popular.

Choice of Stock.

We would suggest, as a good subject to discuss, the character of stock to be purchased; whether it pays best to buy heavy or light animals; young or old; compact or otherwise, etc.; there is certainly something worth thinking about when we consider the contrast between the magnificent Percheron stallions run by the Tramway and omnibus lines of Paris, or the fine stock between the shafts of the hansoms in London, and the "scrubs" which veterinary surgeons are expected to keep in perfect health and condition in many American street railways. It either pays, or it does not pay, to run good stock; whether it does or not is worth finding out by inspection of the records and comparison of notes and opinions through our columns, and if there are no records the notes and opinions will

have to do for the present. But there certainly should be records; there is too much money at stake for the owners of many horses not to have records of cost, maintenance and performance of each animal. If it pays a steam road to keep a history of each car-wheel from the first time it chews rail-heads until the last moment when the rail-heads rasp off its flange beyond the safety limit and the possibility of making more flange by lessening the tire thickness; then, we say, it will pay a street railway to

into him. This is cold business; shrewd and profitable, and what some people would consider as foolish, or complex, or costly, is bound to bring the ducats.

Power to Run Cable Roads and Resistance on Tramways.

ED. STREET RAILWAY JOURNAL:—

The Mining and Scientific Press, of San Francisco, in its issue of September 3d, 1881, gave the following table:—

RAILWAY APPLIANCES of October 15, on the origin of the word "tramway," I note that the *Mechanical World*, of London, Eng., thinks it proper to scout the popular and widely accredited derivation for a vague insinuation of its own, that it comes from the same root as trammel, and is probably something French.

Now is it not anyway rather splitting hairs to trace a resemblance between a trammel and a tramway?

In the county of Derby, Eng., is the village of Little Eaton, which is the terminus of a branch of the Grand Junction Canal.

NAMES OF ROAD.	CLAY STREET HILL R. R.	SULTER STREET R. R. Co.	CALIFORNIA STREET R. R.	GRAY STREET R. R.
Commenced operating	September 1, 1883.	January 27, 1877.	April 9, 1878.	February 16, 1880.
Length of Road, Double Track.	5,300 feet.	On Sulter st., 13,291 feet On Larkin st., 3,712 "	12,651 feet.	13,200 feet.
Heaviest Grade.	307 feet in 2,800 feet.	167 feet in 4,300 "	265 feet in 2,800 feet.	83 feet in 1,925 feet.
Number of Engines Employed.	Two.	4 on Larkin st., 2 on Cemetery ave.	Two.	Two.
Dimensions of Cylinders	14 x 28 inches.	12 x 24 inches.	22 x 36 inches.	18 x 48 inches.
Piston Speed per minute	532 feet.	340 feet.	540 feet.	368 feet.
Number of Boilers	Two	Six.	Thin fire-box.	Thin steel.
Diameter and thickness of shell.	{ 16 ft. x 54 in.,—5-16 thick } { 16 ft. x 48 in.,—5-16 " }	{ 2 each, 54" x 16"— $\frac{3}{8}$ thick } { 3 " 48 x 16 " $\frac{3}{8}$ " } { 1 " 52 x 16 " $\frac{3}{8}$ " }	57" diameter, 7-16 thick.	{ 52" diameter, 16', 0" long, } { $\frac{3}{8}$ thick. }
Number and size of Tubes	{ 42—3-inch. } { 56—3 $\frac{1}{2}$ " }	{ 53—3-inch. } { 53—3 " } { 58—3 " } { 49—3 " }	81 tubes, 3" dia., 12', 0" long	63 tubes, 3" diameter, steel.
Average pressure in Boilers	67 $\frac{1}{2}$ pounds.	100 pounds.	70 pounds.	65 pounds.
Pressure necessary to move empty rope.	16 "	40 "	15 "	9 "
Consumption of coal per day, and kind.	3,700 " Wallsend.	24,600 " Seattle Nut.	15,680 " Seattle Screen'gs	11,230 pounds Seattle Nut.
Weight of empty car	2,800 "	3,000 "	4,000 "	4,000 "
Weight of empty dummy.	2,100 "	2,000 "	3,000 "	4,800 "
Intervals of departure	3 to 5 minutes.	4 minutes average.	5 minutes average.	2 $\frac{1}{2}$ to 6 minutes.
Average Number Round Trips per day	221	253.	226.	228.
Cars and Dummies employed	7 of each.	14 of each.	14 of each.	16 week-days, 20 Sundays.
Hours run per day	17 $\frac{1}{2}$	19 $\frac{1}{2}$	19.	19.
Number of wire ropes in use.	One	4—Sulter st., 3, Larkin st., 1.	Two.	Two.
Lengths of Ropes used.	11,000 feet.	{ 11,587 feet. } { 7,849 " } { 9,800 " } { 8,500 " }	{ 8,840 feet. } { 17,055 feet. }	16,000 feet. 11,000 feet.
Circumference of Wire Ropes	3-1-16 inches.	3 inches.	4 $\frac{1}{2}$ and 4 inches.	3 inches.
Kind of Ropes	Crucible Steel. { 6 strand } { 19 wires }	Crucible Steel, { 6 strand } { 19 wires }	Norway Iron. { 6 strand } { 19 wires }	Crucible Steel. { 6 strand } { 19 wires }
Speed at which Rope travels.	528 feet per minute.	431 ft. p. min.; 786 ft. p. min.	537 feet per minute.	600 and 650 feet per minute.
Average life of Ropes.	547 days.	304 days.	373 days.	274 days.

keep a record of each quadruped, from the time he first enters the stable until he is carted off in the dead van. How much he cost, his average amount and cost of food, attendance, medicines, shoeing, insurance, interest, taxes, etc.; all those things which pertain to him alone, or differ from the same items for his mate, should be considered in connection with the number of days and miles service, and if possible in connection with the number of passengers whom he has hauled or helped to haul. One horse may be an easy keeper but not equal to hauling on a heavy car over a long route; another horse may be a perfect hog at the feed-trough but never in the sick-box, and so on.

The idea of keeping a record of cost and performance of each horse may be scouted at as involving complications and expense. So does keeping a cost book in a machine-shop or car-shop; but that pays. I have a friend in France, who, in connection with an immense establishment for distilling alcohol from sugar beets, has about 1,500 sheep and neat cattle constantly on hand to be fed on the pulp from which the juice has been expressed. Each animal eats about one-tenth of his weight of pulp daily. My friend buys the leanest steers he can, weighs each one, marks the weight on one of the horns, and weighs each steer twice a week. When a steer has ceased to gain in weight by the time of each successive weighing, he is sold at once. He is regarded as a machine for converting pulp into beef, and when the machine ceases to make beef, not a pound more of pulp is put

Mr. D. J. Miller, the Mechanical Engineer of the Chicago City Railway, in a communication to the *A. R. R. Journal*, March 3d, 1883, stated that the mere power required to operate the cable on that line is as follows:

At 6 p.m., when traffic is heaviest. 215 H. P.
For machinery and cable (no cars running). 138 "
For driving machinery and engine (no cable) 23 "

Concerning resistance to traction, Mr. Charles E. Emory made dynamometer tests on curve of 40 radius, and found it 53.57 lbs. per ton. On straighter track level 11.8 lbs. per ton. I presume the latter was on a "centre-bearing rail," the head of which is cleaner than the "step-rail."

In 1880 I made a hundred or more tests with a Fairbanks' dynamometer, and found the force required to keep a car in motion at five miles per hour on an old track, 32.3 pounds per ton; on new steel rails, 29.8 pounds per ton.

D. K. Clarke in his work on Tramways, gives 30 pounds per ton as the average for English roads. Henry P. Holt, 22.4 pounds per ton. M. Turner, 22.4 pounds per ton. You quote the experiments of Mr. Hughes.

This force varies between great extremes, depending upon the kind of rail, the condition of track, good or bad joints, clean or covered with dirt, etc., etc.

For steam railroads on "T" rail, clean and level track, this resistance is estimated as slow speed (5 miles per hour) at 6.1 pounds per ton. See Catechism of the Locomotive.

The above figures will therefore convince one that the resistance to traction on our tramways is from 4 to 5 times as great as upon steam railroads.

AUGUSTINE W. WRIGHT.

Chicago.

The Derivation of "Tramway."

ED. JOURNAL RAILWAY APPLIANCES:—
Referring to the article in JOURNAL OF

About seven miles from Little Eaton are the Kilbowra and Derby Collieries, in which, in years gone by, a certain Sir Francis Outram had an interest, and in order to facilitate the transportation of the products of those collieries to the canal he caused to be constructed a railroad, then called an "Outramway," and since corrupted into "Tramway." The trucks to run upon this Outramway had four flangeless wheels. The rails first used were of wood, and were afterwards changed to L shaped iron ones laid on the stone sleepers.

I believe it has always been credited to Derbyshire as having been the scene of the first Outramway or tramway. This tramway is still in use, and any one who cares to follow up the history of it will find it substantially as stated. For nineteen years my home was but 2 $\frac{1}{2}$ miles from this tramway, and I frequently saw it, and I learned its history from some of the "oldest inhabitants" as well as, like you, having read its history in my "curious youth."

I am yours very truly.

JAMES E. GREENSMITH.

Mason Machine Works.

We thank our correspondent for his communication on the subject of the etymology of "tramway." Our own information that the word was shortened from Outramway was got many years ago, probably from either Bourbaugh's admirable "Gleanings for the Curious" (now, we believe, out of print), or David A. Wells' "Things not Generally Known;" and these more particular data are most acceptable, because, not only confirmatory, but more explicit than our own. The only thing now that we wish to supply is as to the pronunciation of the proper name Outram; whether Ow-tram or Oo-tram; and on which syllable accented. If any one can supply this last-mentioned information we shall be very much obliged.

Only One Dollar.

That the STREET RAILWAY JOURNAL may be in the hands of every man actively engaged in street railway management the subscription has been placed at the very low price of \$1.00 per year. Please send in your name at once, and begin with Vol. I., No. 1.

Items.

THE RAILWAY REGISTER M'f'g Co., Buffalo & New York, have applied an eye signal to their Pond register by which the ringing of the rear bell of the car instead of the register bell is readily detected by the passenger.

THE STEINWAY & HUNTER'S POINT Railway Co. have bought P. J. Gleason's controlling interest in the Dutch Kills & Hunter's Point Railway, excepting the Calvary Cemetery line. Various improvements will be made, including material additions to rolling stock and live stock.

THE DETROIT CITY RAILWAY is being equipped with Lewis & Fowler's alarm passenger register.

ANDREWS & CLOONEY, New York, have just com-

pleted a number of street sweeping machines for the N. Y. Eighth Avenue road, a Pittsburg road and one or two others. They have recently made wheels for parties in South America, East Indies, Australia, England, &c.

THE LEWIS & FOWLER M'f'g Co., Brooklyn, who has recently taken hold of Small's automatic fare collector, have placed it on the Brooklyn & Coney Island Railway, Memphis City Railway, and have substantial encouragement elsewhere. The roads on which the collector was already in use are the Louisville City, Minneapolis Street, St. Paul and Baltimore City railways, the latter having just given orders to complete its equipment.

THE RANDALL GEAR (Lewis & Fowler M'f'g Co.) is being introduced on various roads.

THE CHAPLIN MANUFACTURING Co., of Hartford, is introducing its frictionless roller bearing for street car journals. Tests during the past three years have given excellent results. H. M. S.

THE HOLYOKE STREET RAILWAY Co., Holyoke, Mass., is now operating two miles of track, making forty trips a day on five cent fares.

A new line, for tramway service, is under consideration between Chicopee and Chicopee Falls, Mass.

The Wales Manufacturing Co., Syracuse, is filling an order from New Orleans for its new design street-car fare boxes. It has just issued a tasty catalogue containing street railway statistics. H. M. S.

Some very interesting experiments have been made by the Shanon Water and Steam Heater Co., of Boston, showing economy of fuel and perfect and rapid circulation through the radiating pipes. In street cars this heater occupies no seating room. In steam cars it is placed underneath the car and the draft is regulated, grate shaken, and ashes are dumped from within the car. H. M. S.

Manufacturing Notes.

THE BROOKLYN CITY R. R. has just added 33 new cars built by the John Stephenson Co. They have the Vose spring and the Baker box.

THE RAILWAY REGISTER M'f'g Co., Buffalo and New York, has issued a very neat catalogue.

THE 42D STREET RAILWAY, N. Y., has just added some 35 cars for its extension. They are built by Stephenson and have Andrews and Clooney's wheels.

SCOGGAN HUDSON & Co., Louisville, Ky., sold to the Minneapolis Street Railway Co., 135 mules in March and 235 in June, the last lot being shipped to Minneapolis by special train via Penn. and C. M. & St. P. R. R.'s, making the fastest time on record for stock train. The trip was made in 38 hours, including one stop of 6 hours to feed.

Twice a Month.

\$3.00 per Year.



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32 Liberty Street,

NEW YORK.

DAY'S IMPROVED STREET RAILWAY TRACK CLEANERS.

These Track Cleaners need no extended statement of their great superiority over all others invented. The fact of over two thousand pairs being now in use, is sufficient evidence of their necessity and utility. Are adaptable to all kinds of rails and styles of cars. To secure the largest benefit they should be attached to every car in use.



For new catalogue and price list, address,

AUGUSTUS DAY,

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THE BELLE CITY FEED CUTTER

IS THE

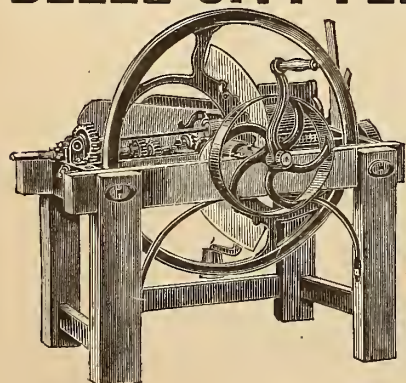
Strongest, Most Durable,
and on the the whole
it is the

BEST FEED CUTTER
IN THE WORLD.

For Street-Car Barns it has no equal. Write for Reference, Circular, &c., to

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CHAMPLAIN Forged Horse Nails

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VERGENNES, VT.

Hot Forged and Cold Hammered, Pointed, made of best Norway Iron, and warranted. Used on principal Street Car Lines in the United States. Special Patterns for Perkins', Burden's, Goodenough & Brydon's Horse Shoes. Samples and prices on application.

DURRIE & McCARTY, Agents,
97 Chambers St., New York.

WRIGHT'S PATENT JOINT FASTENING.

The accompanying cut shows a cross section through joint. A is the rail, B the joint chair, C the stringer, D the patent screw fastening, E the nut, F a slot in chair allowing rails to contract and expand. The chair cannot settle and the rail ends are held level with each other, preventing the many evils of ordinary construction.

For Further Particulars Address

AUGUSTIN W. WRIGHT,
NORTH-CHICAGO CITY RAILROAD,
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SPECIAL SHADES MADE TO ORDER.

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FINE VARNISHES AND JAPANS

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PURE READY MIXED PAINTS.*

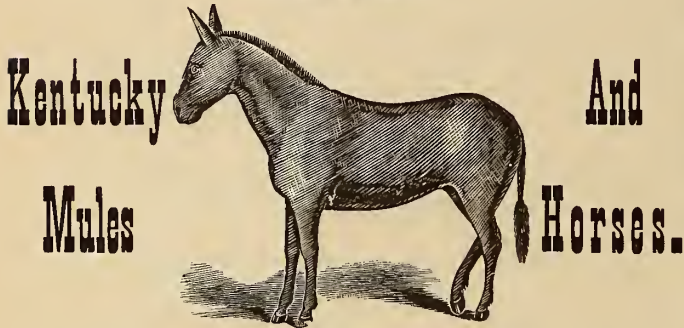
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G. W. Scoggan, H. L. Martin, J. P. Hudson, M. F. Thomson, H. J. Scoggan.

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Wholesale Dealers in



Having furnished Horses and Mules to the Street Railway Companies of Louisville, Ky., Minneapolis and St. Paul, Minn., New Orleans, La., Pittsburgh and Philadelphia, Pa. Richmond, Va., Atlanta, Ga., Chattanooga, Tenn., and a large number of other towns in the United States, we are thoroughly acquainted with what is wanted, and can fill orders promptly, as we always have

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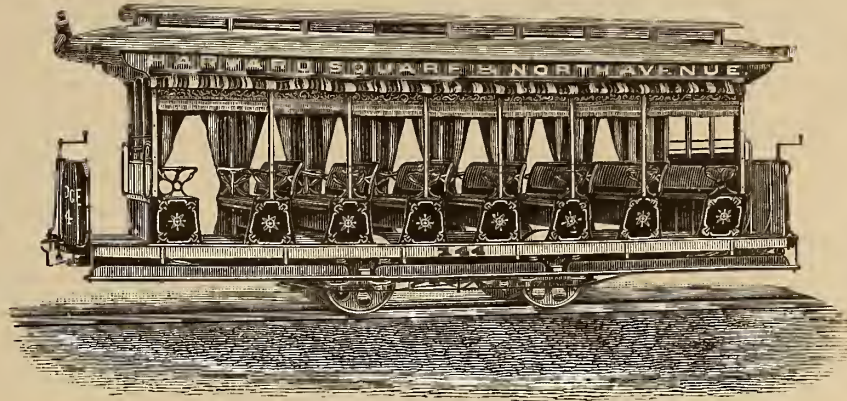
SEPTEMBER, 1883,

A Partial List of Awards Heretofore Given Valentine's Varnishes:

International Exposition, Philadelphia,	- - - -	1876
BRONZE MEDAL AND DIPLOMA.		
Exposition Universelle, Paris, France,	- - - -	1878
SILVER MEDAL.		
Melbourne International Exposition, Melbourne, Aus.,	- - - -	1880
SILVER MEDAL AND FIRST ORDER OF MERIT.		
Adelaide Exposition, Adelaide, So. Aus.,	- - - -	1881
SILVER MEDAL AND FIRST DEGREE OF MERIT.		
American Institute, of the City of New York,	- - - -	1859-1870
SILVER MEDAL AND DIPLOMA.		
Maryland Institute for the Protection of Mechanic Arts,	- - - -	1873
SILVER MEDAL.		
Massachusetts Charitable Mechanics' Association, Boston,	- - - -	1860
SILVER MEDAL AND DIPLOMA.		
Mechanics' and Agricultural Fair Association of the State of Louisiana,	- - - -	1873
DIPLOMA.		
Agricultural Society of New So. Wales,	- - - -	1877
BRONZE MEDAL.		
Mechanics' Institute, San Francisco, California,	- - - -	1877
SILVER MEDAL.		

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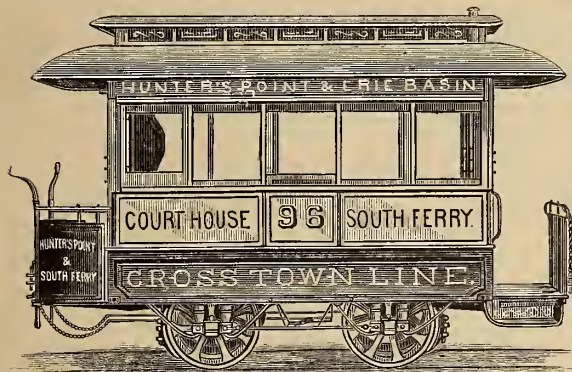
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RAILWAY



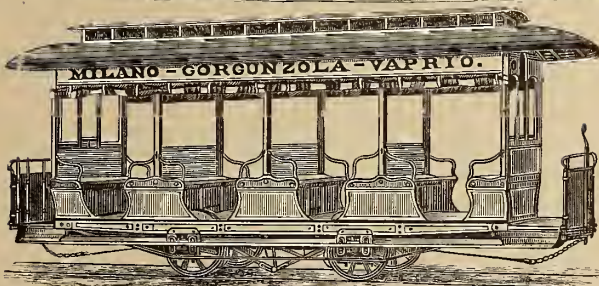
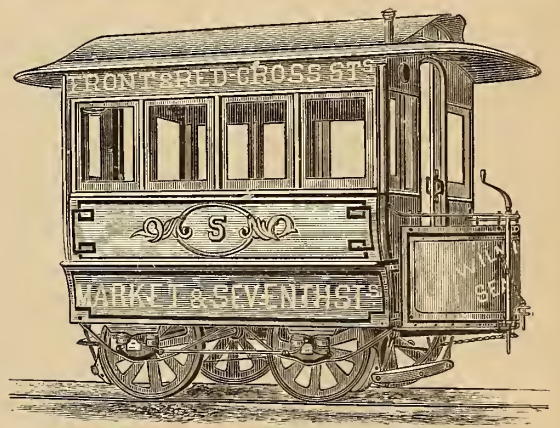
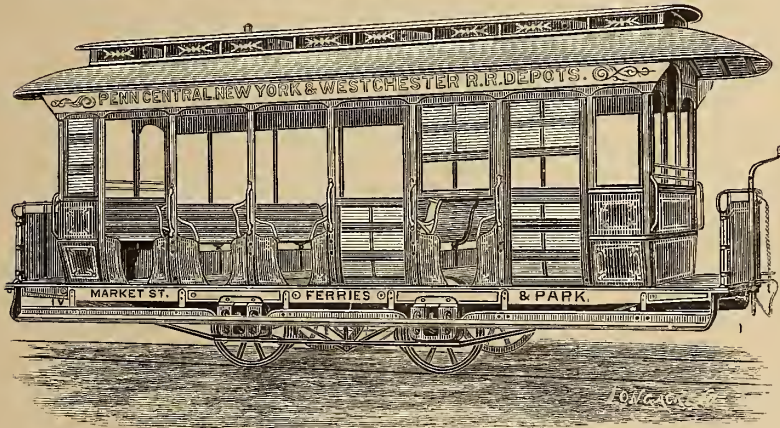
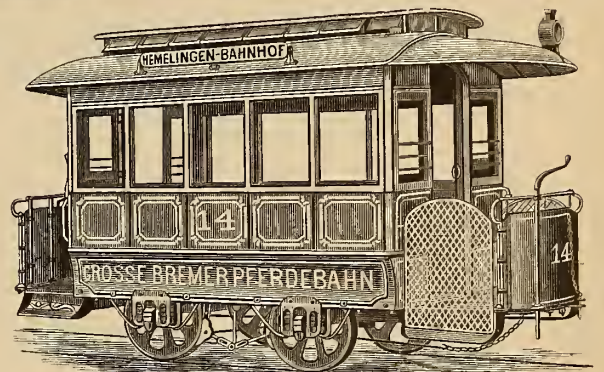
**TRAMWAY
CARS**

— AND —

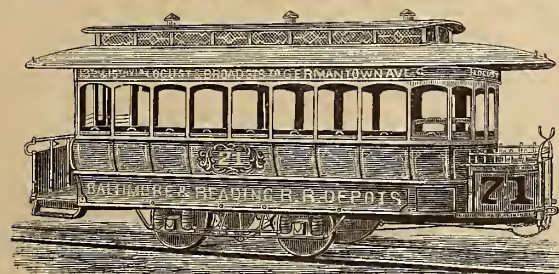
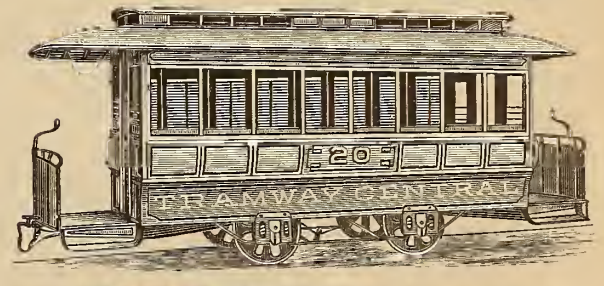
of all kinds.



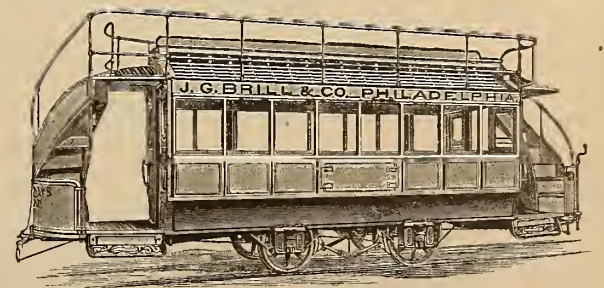
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The Advantages

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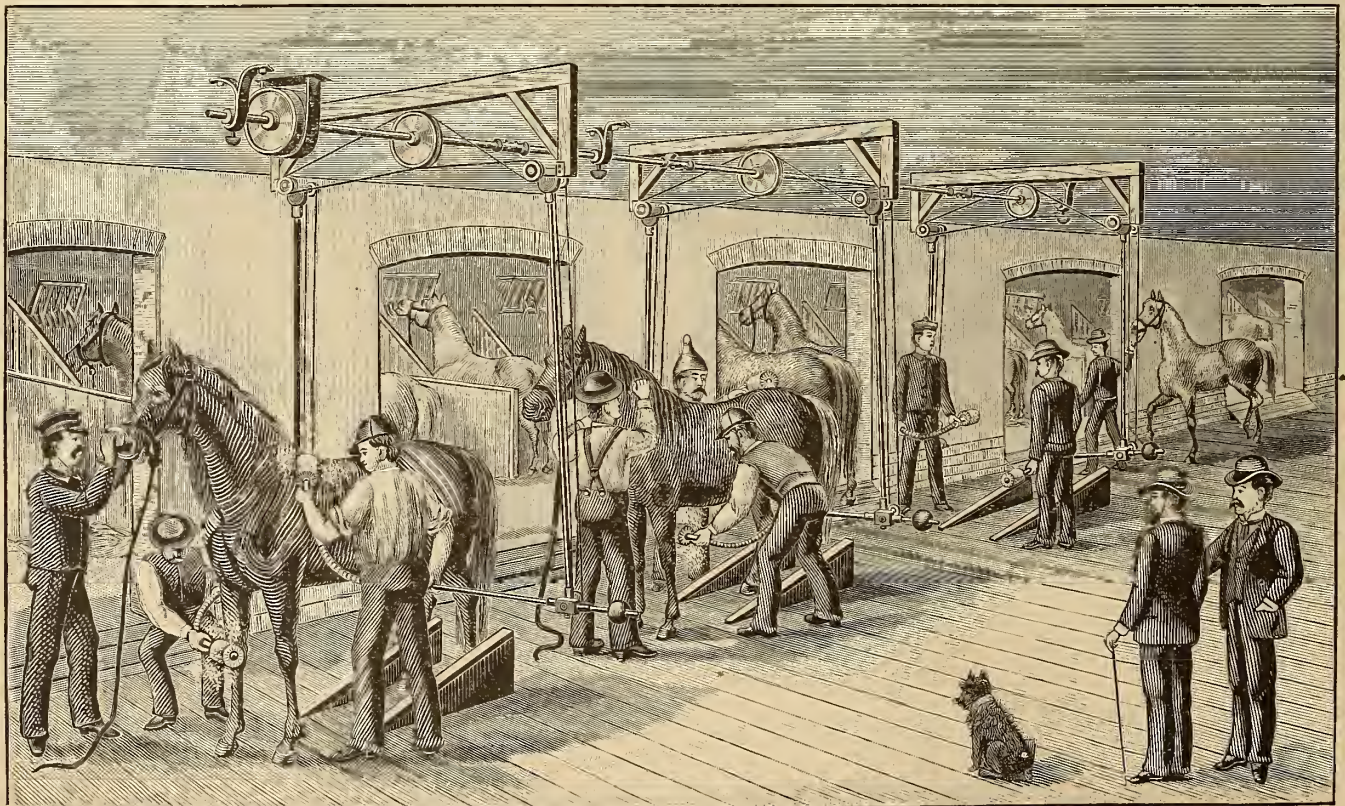


Patent No. 171,232, December 21, 1875.

In use on the Chicago West. Div. R'y.; Louisville City R'y Co.; Milwaukee City R'y; Transverse R'y Co., Pittsburg, Pa.; Citizens Street R'y Co., Pittsburg, Pa.; Pittsburg and Birmingham, Pittsburg, Pa.; Central City R'y, Peoria, Ill.; Grand Rapids R'y; Minneapolis St. R'y Co.; St. Paul City R'y; Houston City R'y, Texas; Superior Street R'y, Cleveland, O.; Cincinnati City R'y Co.; Fifth Ward Street R'y, Syracuse.; Detroit City R'y.; Ft. Wayne and Elmwood St. R'y, Detroit, Mich.; Galveston City R'y; Springfield City R'y, Springfield, Ill.; Toledo St. R'y, Toledo, O.; Adams St. R'y, Toledo, O.; Atlanta Street R'y, and others, in all on about 100 Street R'ys in United States and Canada, and a large number of other prominent Street R'y Companies throughout the Country. Send for descriptive Circular containing testimonials, prices, etc., to

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This machine for grooming may be driven by any known power, and can readily be placed for use in any stable or out-building. It can be operated by an ordinary groomer; its work is perfect; its action simple and effective. Stock owners will readily realize the importance of the machine. The perfection and rapidity of its work, and the benefits derived by its use, commend it to those interested in the care and use of all classes of thoroughbred and work stock. The most vicious animal readily submits to its use. Machine Grooming is found to be less expensive than hand grooming, saving in food and medicines, and materially increasing the value of the animal.

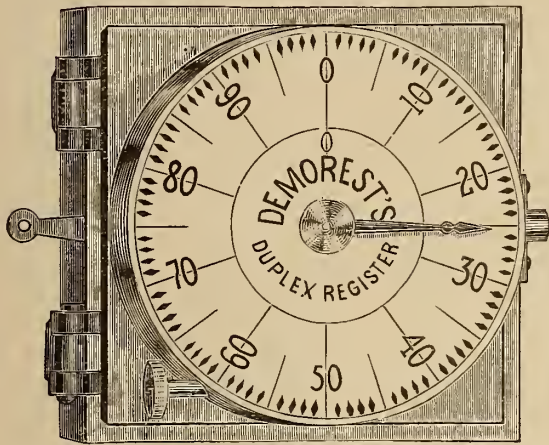
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This Grooming Machine is in daily use in some of the largest Street Railway Companies' stables, and has always given perfect satisfaction. Among those using it are the City R'y Co., Chicago, Ill.; Detroit City R'y Co., Detroit, Mich.; Central City R'y, Peoria, Ill.; M. W. Dunham, Wayne, Ill.; West Division Street R'y Co., Chicago, Ill.; Lindell Street R'y Co., St. Louis, Mo.; Pleasant Valley R'y Co., Allegheny City, Pa.; Marshall, Field & Co., Chicago, Ill.; Leroy Payn, Chicago, Ill.; Saginaw City R'y, Saginaw, Mich.; Pittsburg and Birmingham R'y Co., Pittsburg, Pa.; and a number of others who have given testimonials as to the perfect working of the machine. For prices, circular and other information apply to

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OUR INFALLIBLE DUPLEX REGISTER

Combines Simplicity, Efficiency, and Absolute Accuracy.

As each trip and each fare, when rung, is duplexed on an interior sheet that cannot be tampered with, the conductor is his own detective, collusion or fraud being impossible.

As an illustration of a practical and unanimous opinion, we present the following :

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I have gone through a thorough examination and trial of the Lewis & Fowler's and other stationary Registers, and have been using in the past the Hornum or Punch Company's Register. After looking over the matter thoroughly, I am satisfied that the *Half Trips on the Paper Dial* is the right principle, and have therefore adopted the Demorest Duplex Register.

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The Duplex Registers we are using on our Cars are giving us entire satisfaction, and can cheerfully recommend them to do all you claim for them.

M. P. TURNER.



OUR FARE-BOX WITH THE REGISTER.

Embodies the only perfect system for collecting and saving the Company ALL THE FARES on "One Horse" Cars without a Conductor.

1. The Register being part of the Fare-box, is in the most conspicuous place possible, in order to be noticed by the passengers.
2. It is the easiest to deposit the fares in, as the opening is larger than others.
3. It is impossible for the money to be taken out by an improper person : for
4. The box has no lock, therefore cannot (as others) be picked; and
5. There is no access to the Fare-box except through the Register.
6. The driver has more time to attend to his other duties when the Register is combined with the Fare-box.
7. Our system of trip slips is so effective and yet so simple in connection with the fare-box and register, that it cannot be surpassed.
8. There is an internal record on a dial sheet.
9. This dial sheet is removed from the Register once a day, with the money and trip slips They *must correspond*.
10. This method of tallying the fares assists both driver and receiver, and is a positive check on both, beyond the possibility of collusion.
11. The construction of the Register and Fare-box is simple, the parts are well made and will last. The material is of the best and mechanical adjustment perfect.
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We will place any number of our Duplex Registers (with or without the Fare-box, according to the kind of car) upon trial for any time desired, at a very slight cost. Our terms of purchase are quite reasonable. A trial is solicited. Address the proprietor,

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WOOD MATS ARE THE CHEAPEST MOST PRACTI
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Price per running foot, width to fit any car 90 cts. Net.

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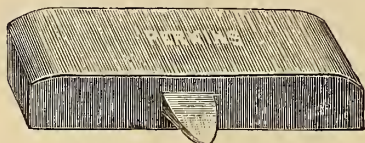
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The old style end prong Calks often cause shoes to break, as the prong is driven into the crease. Perkins' new Calk obviates this. They are cheaper than any others, and warranted to weld and harden. Special pattern for Street Railroad work. Samples and price on application.

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Fare Boxes and Change Receptacles

MADE BY

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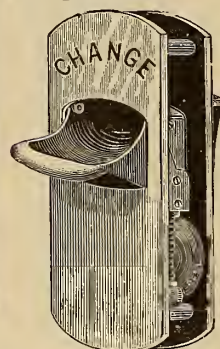
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Our Street Car Fare Boxes, for Simplicity of Construction, Cheapness and Practicability are Superior to Anything of Like Character in the Market.

Descriptive and Illustrated Circulars an application.



Front View. No. 3.



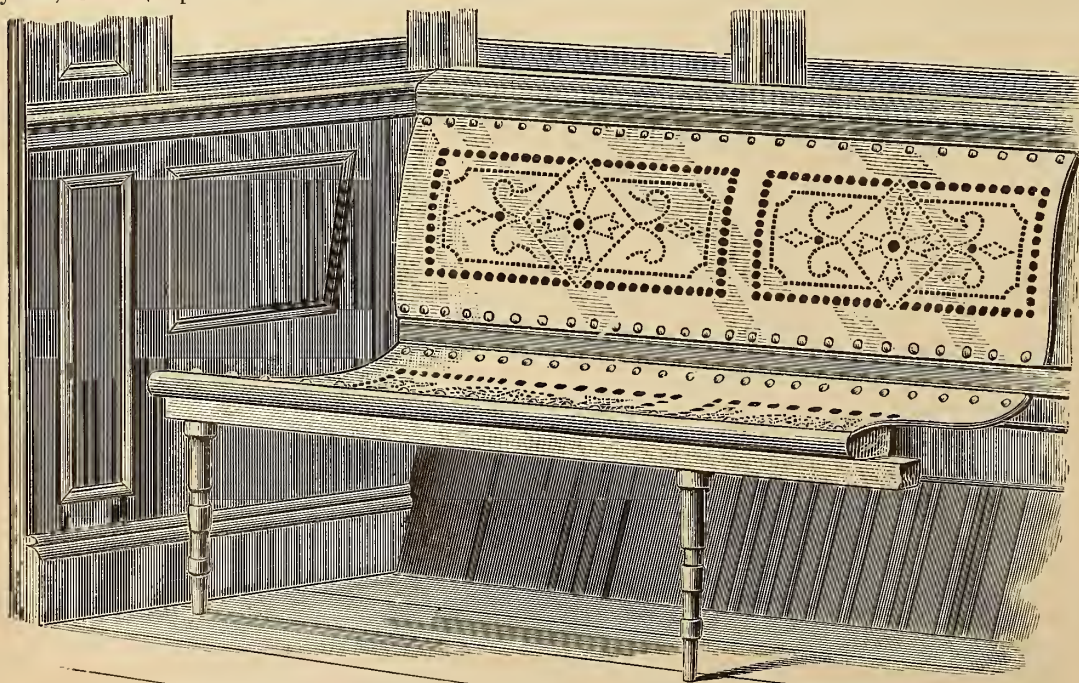
Back View. No. 3

STREET CAR SEATS AND BACKS.

This Seat and Back, so well known all over the world, has given much satisfaction. We cannot claim for it a merit which is not known and acknowledged.

It will recommend itself for its **lightness, cleanliness, healthfulness and beauty** as an ornamental seat; is also indestructible by moths, the great enemies of upholstery, and will not harbor vermin or insect, or carry or communicate contagion or disease.

On account of its cheapness and durability it is the most popular Seat in the market, and our trade in this line has grown, in nine years, to vast proportions.



To avoid trouble and mistake, our patrons in ordering will give length of inside of car, number of windows, width of back and depth of seat.

The woods used in construction of our Seat are **Birch, Walnut and Mahogany**; the Birch is most generally used, but Mahogany makes a very handsome seat.

We are making three-ply **White Wood Car Sides**, the foot and main panel which adds greatly to the strength of the car, and will not split. We make them full length of car without a joint. Our **decorated or plain three-ply Veneer** panels for sides and ceiling of car adds greatly to the beauty and is the cheapest way of decorating cars and gives better satisfaction than anything in the market.

We are prepared to make panels for all parts of cars. We are also making car roofs which give good satisfaction. Send for blue print.

PERFORATED VENEER STREET CAR SEAT AND BACK.

GARDNER, HOLMES & CO., 183 Canal Street, New York.

TOM L. JOHNSON'S IMPROVED FARE BOX,

Patented October 14th, 1873.

Now in general use in Cities throughout the United States.

One of the principal merits of these Fare Boxes over all others, consists in the fact that the fares are not turned out of sight at once by the drivers, leaving nothing but the bare word and memory of the parties as evidence of the payment, thereby making it easy for deception to be practiced, even though an officer is on the car, and endeavoring to see that the driver is faithfully performing his duties.

The boxes are so constructed that the fares are kept in sight from one end of the road to the other, and at any point on the line an officer of the Company, or indeed any other person can tally passengers with the fares.

The glass fronts and drops render it so transparent that a person sitting in the further end of the car can readily count the fares and make the tally, without making himself conspicuous in the matter, if desirable.

The drops can easily carry from seventy-five to eighty fares, and can be counted without mistake, and counterfeit money can be easily detected.

These boxes are very simple in construction, being cleaned, when required, in five minutes.

They are lighted from an outside lantern (which is only on the car at night, and should be taken off during the day), giving an excellent light, for the fares can be seen almost as plain as by day.

When the box is put in a car it can not be taken out of the car or tampered with, unless the keys are obtained from the office, and can not be robbed without violence.

A new pattern of the Yale Lock is used, having no two keys alike, and the keys can only be withdrawn when locked.

ROADS EQUIPPED WITH BOXES ON TRIAL, and if not satisfactory, returned without any expense to the company trying them.

Boxes made of Mahogany, Walnut, or any desired wood, and being nickel-plated throughout, are AN ORNAMENT TO ANY CAR

Reduction in prices where two (2) boxes are placed in one car. "THE BEST IS THE CHEAPEST."

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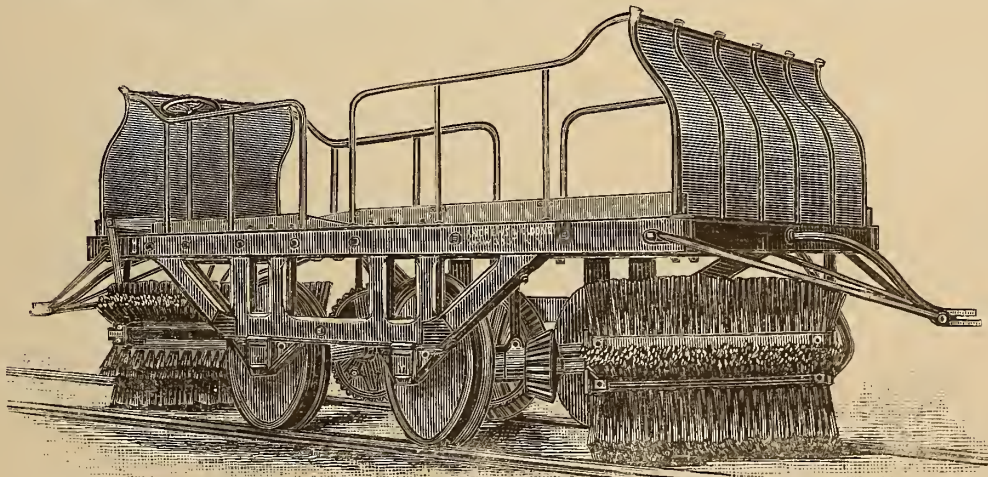
With Tom L. Johnson.

Indianapolis, Indiana.

F. H. ANDREWS.

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ANDREWS & CLOONEY,



STREET RAILROAD SNOW SCRAPERS AND PLOWS.

WORKS:

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OF EVERY DESCRIPTION.

CAR WHEELS, AXLES, PEDESTALS, BRAKE SHOES, BOXES, BRASS BEARINGS AND CASTINGS

OF ALL DESCRIPTIONS WHERE GREAT STRENGTH IS REQUIRED.

Also **SWEEPERS, SNOW PLOWS, TURN TABLES, TRACK WORK, AUTOMATIC SWITCHES, Etc.**
STEEL GROOVE RAILS AND MACHINERY.

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426 WALNUT STREET,

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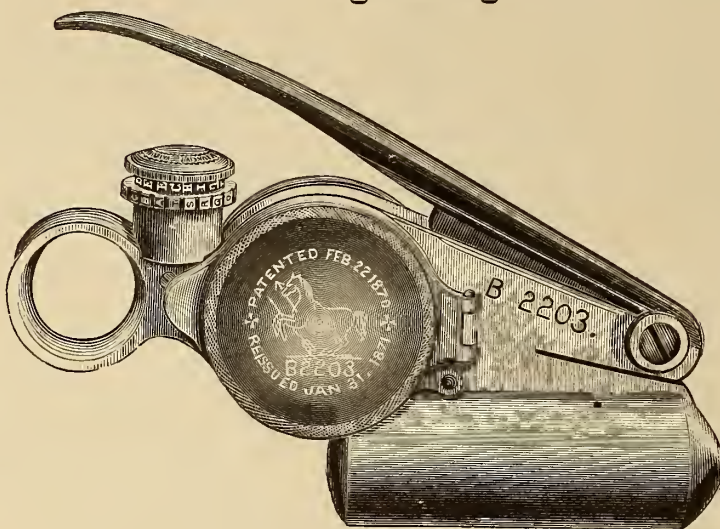


MANUFACTURERS AND OWNERS OF THE

Latest Designs, Improvements and Inventions in Registers, Indicators, Classifiers and Punches, for the Recording of Fares Collected on Street and Steam Railroads.

This Company owns over 100 Patents, embracing all the Valuable Features of Fare Registers, Indicators, etc., and was awarded three Medals at the Chicago Exposition of Railway Appliances.

The Alarm Registering Punch.



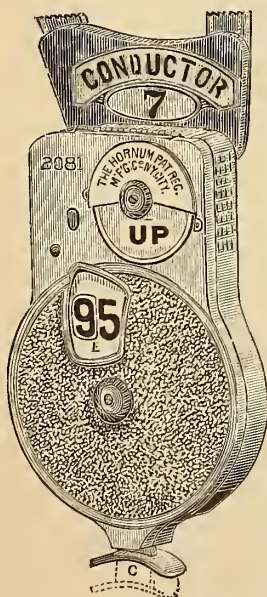
This Register, which is so generally used throughout the United States and Europe, we claim to be the most perfect check that has ever been placed before the public for the Collection and Registration of Fares on Street Railroads, especially where different rates of Cash fare and tickets are to be collected.

The Conductor is provided with Trip Slips numbered, of different colors for different rates of fare, on which he is obliged to punch out a number every time he receives a cash fare; there is a Register in the Punch

which records the number of times it is used; the Register and the receptacle for clippings are secured by a combination lock, which renders access to them impossible by any one unacquainted with the combination. When the Conductor renders his report to the office, he returns his Trip Slips, Tickets and Punch, and the Register Totals, Slips and Clippings must agree. Roads using tickets should not be without it.

This system has been found very perfect by the roads using it, some of the largest in the country.

The Hornum Register.



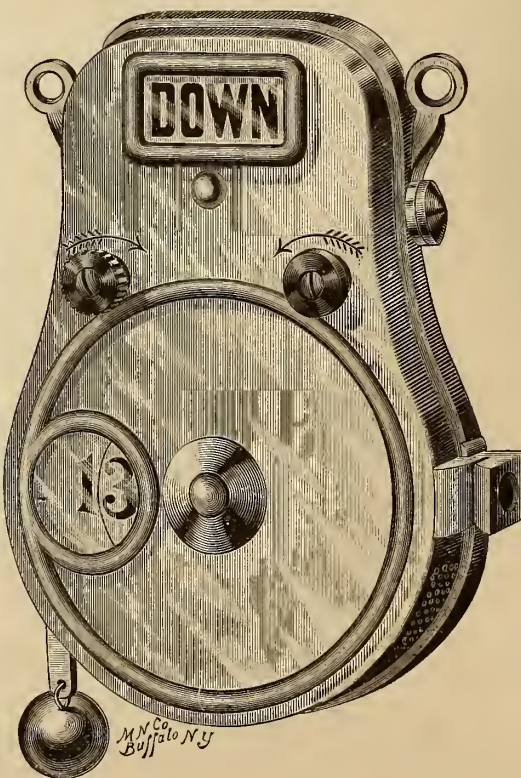
This Register is similar to the Benton, and it is a perfect check, not only upon the Conductor, but being a perpetual Register, is thoroughly reliable as to the Receiver in your office—collusion being impossible. A comparison of the Register with the Conductor's or Receiver's books displays all errors at a glance, and not only so for the moment, but can be traced back to the first fare registered by each instrument, being always a reliable and infallible detective. It does not increase the Conductor's labors, as he has the free use of both hands; he can collect fares from either side of the car, make change, and register the largest loads any closed or open car can carry, as has been for many months proved; so that perfect attention can be given passengers, and every fare registered in a second of time. It does not add to clerical labor at general office, as the General Register does not require to be set; the Trip Register is so constructed that it must be set back to 0, and only to 0, each half trip by the Conductor, while it prevents him making any fraudulent manipulations. This Register shows at a glance at its general index the total fares collected during the day; this index cannot be altered a single fare, except the instrument be destroyed.

Its daily record proves the Conductor's report, and the Receiver's account at once. It does more, and what is perhaps of greater importance, it shows in plain figures in full view, the number of fares collected each half trip, so that passengers, time inspectors, or any one interested, can at any time or place compare the number of passengers with the Register.

The Benton Register.

This Register, lately introduced, is a very perfect one; it is in use on several of the largest roads, and they express themselves as much pleased with it.

It shows a figure on front of Register for every cash fare or ticket taken, also has an indication plate, which the Conductor is obliged to turn at the end of the route, showing which way he is going, East, West, North, or South; the same movement also throws back the front Register to zero; the permanent Register records 1,000,000. It is also, when desired, provided with a Punch at side, to cancel passes or tickets, making in all a very perfect and handsome machine.



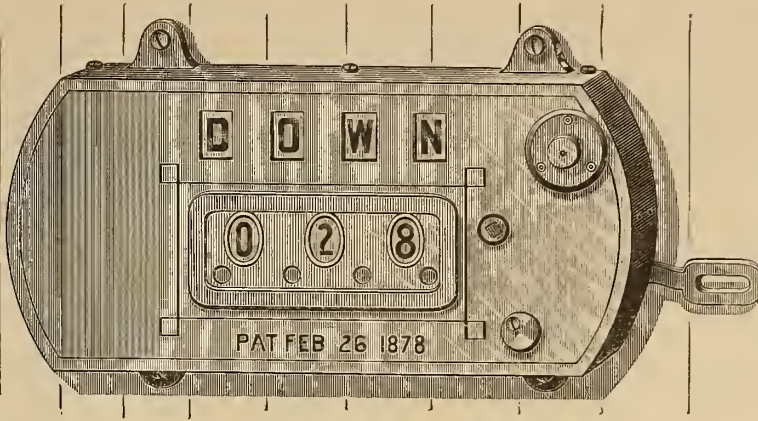
The Pond Register

This cut represents our Pond Fare Register with Indicator Plate. These machines are constructed so that at each pull of the lever an alarm is sounded, and, at the same time a record shows on the visible dials.

The permanent Register is viewed, when necessary, through the four small openings just below the visible Register; but when not being inspected the registration is covered by a slide, which is under the control of a lock and key.

The permanent Register records up to 10,000. Another peculiarity in this machine is the Indication Plate, which can be changed only when the visible Register is at 0. This device is intended to make it certain that a full transfer of the count of the visible Register has been made, as the plate cannot be changed until an entire transfer has been completed.

When it is absolutely necessary to set the visible Register back to zero at stated times, then this ma-



chine is invaluable, for it will show upon its face whether the change was made at the proper time.

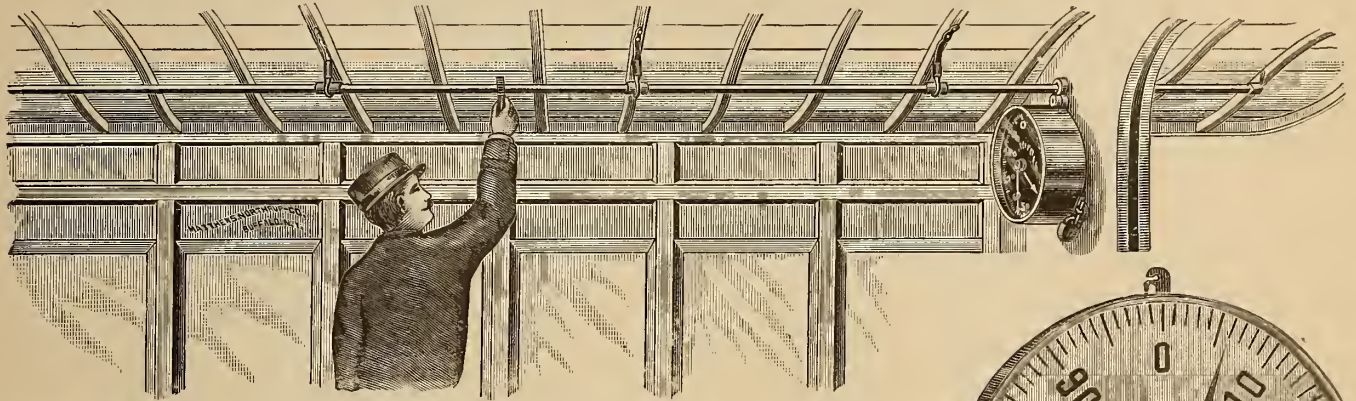
This machine is specially adapted for use on cars of Street Railways, to assist in the collection and proper returns of the fares collected. When used for this purpose the indication plate will show the direction the car is traveling, as Down or Up, or East and West, or North and South, and at the end of each trip the direction or Indicating Plate must be shifted, so as to denote the direction of the next trip or half trip.

This is done by turning a thumb-pin at the right hand upper corner of the machine, but before this can be done, the trip or visible Register must be first set back to zero.

This Register has been greatly improved, and we claim for it superiority over all permanent Registers now in use.

It is the only Register of its kind that shows a positive figure each time it is operated.

The Monitor Register



This Machine belongs to that class of Registers known as Stationary Registers; that is, the machine is secured in the car at one end, and connected with it is a small square rod passing through the car and out on the platform at each end, and as each fare is collected, the Conductor, by applying a wrench to the rod, records the fare. It can also be operated by a cord.

This Register is of the "Duplex" kind, and resembles a clock in appearance; the dial is divided into one hundred divisions and numbered prominently; a long hand or pointer moves over this dial, and records the fares taken on each trip. A smaller hand, in connection with a hundredth disk, records the totals, and constitutes what is known as the "Permanent Register" or Register of Totals. The Trip Register is set back to zero at the end of each trip by a key.

This machine is a very strong, durable Register, and when there is but one rate of fare to be recorded, it is one of the best Registers of its kind. The Conductor can record the fares on the platform as well as in the car.

This machine has a large bell, which can be distinctly heard from any part of the car. It also has our Up and Down attachment, a very valuable feature to a fare Register.

The cut herewith, shows the position of the Monitor in the car, and the Conductor about to record the fare he has just collected.

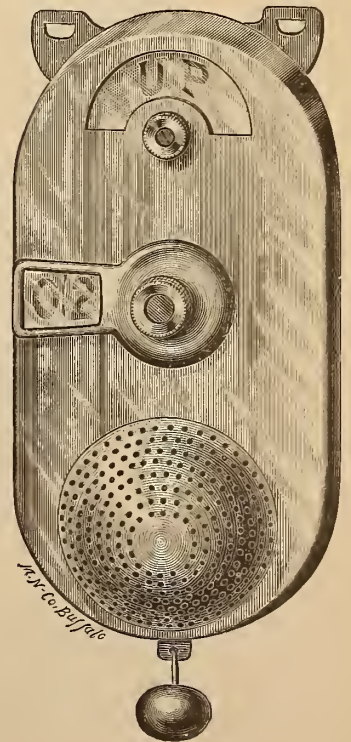
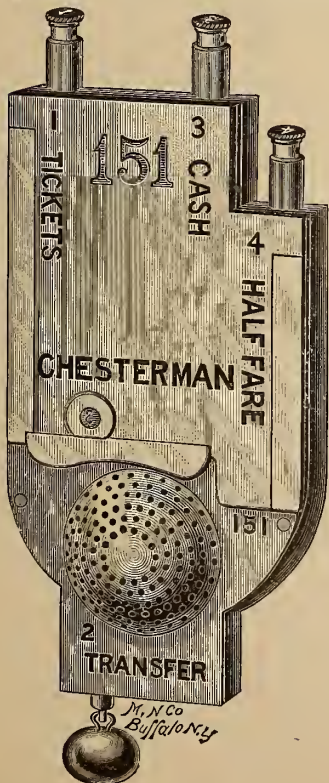
The rod connection used with this Register, can be applied to the Pond Register. We make all kinds of connections to be used with our machines, suitable for one-horse Cars, Omnibuses, etc.

This Register has also been lately improved and enlarged, it now has a ten inch silver dial, which enables the figures to be seen from any part of the car. If desired it can be operated with a cord instead of the rod connector.



Chesterman Register

These cuts represent the CHESTERMAN FARE REGISTER, now owned by this Company, as well as the patents under which they are constructed, and is an excellent Register for either one or four fares for Roads that do not require their tickets to be canceled when taken by the Conductor.



BEADLE & COURTNEY,

General Agents Railway Register Manufacturing Co.

1193 Broadway, New York.

Branch Office: 426 Walnut St., Philadelphia, Pa.

J. W. FOWLER,
President.

THE

DAN'L F. LEWIS,
Treasurer.

LEWIS & FOWLER M'F'G CO.

8 COLUMBIA HEIGHTS,

Near Fulton Ferry.

BROOKLYN, N. Y.

PATENTEES AND MANUFACTURERS OF

THE IMPROVED "ALARM" PASSENGER REGISTER.

This Register was awarded *and has received* the Highest Prize (Silver Medal) at the Chicago Exposition of Railway Appliances in 1883, against all competitors of any note for

"THE BEST STATIONARY REGISTERING DEVICE."

This Register is guaranteed to be the most

Complete, Durable and Perfect

Machine in this Country, for Registering fares on Street cars. We are now manufacturing a

Portable Register

for Railroad Companies desiring a machine of this style where tickets are required to be Cancelled and Registered at the same time.

SOLE AGENTS AND MANUFACTURERS OF

"RANDALL'S" PATENT CAR AXLE AND BOX,

—ALSO—

"SMALL'S PATENT AUTOMATIC FARE COLLECTOR"

FOR FARE BOX CARS. THIS DEVICE WILL SAVE MONEY NOW LOST AND POPULARIZE

THIS SYSTEM OF CARS.

RICHARD VOSE,

13 Barclay Street, . New York,

MANUFACTURER OF THE

Graduated Street Car Springs.

RUBBER CONE.

ADAPTED TO THE
 STEPHENSON,
 BEMIS,
 RANDALL,
 HIGLEY,
 BRILL,
 JONES,
 BALTIMORE,
 --AND--
 ALL OTHER BOXES.



No. 0, for 10-ft. Light Cars.
 No. 1, for 10-ft. Light Cars.
 No. 2, for 12-ft. Cars.
 No. 3, for 14-ft. Cars.
 No. 4, for 16-ft. Cars.
 No. 5, for 16-ft. Cars.
SINGLE PEDESTAL.
 No. 1, Cushion, for 16-ft. Cars.
 No. 2, Cushion, for 12 and 14-ft. Cars.

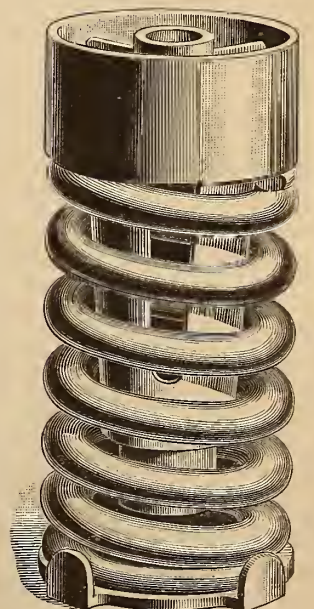
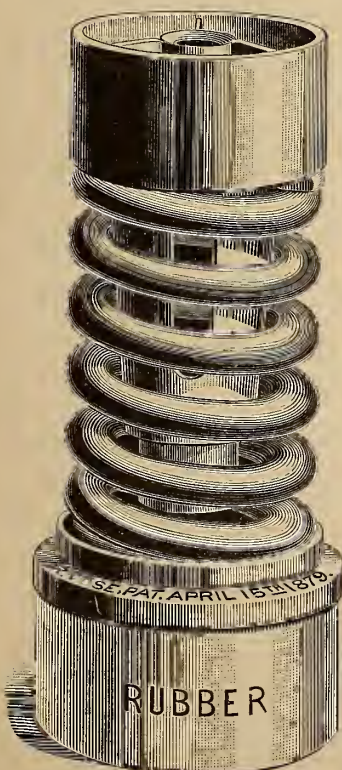
STEEL CONE CITY CAR SPRING.

Patented April 15, 1879—August 5, 1884.

The unprecedented popularity of the

"VOSE GRADUATED RUBBER CONE SPRING"

for HORSE CARS has induced the inventor to bring this class of Springs as near perfection as possible, and after a series of experiments and tests now presents for favor what he claims to be the *MOST PERFECT SPRING FOR HORSE CARS* ever offered. It is exceptionally **SOFT AND EASY** with the **EMPTY CAR** or with the **GREATEST LOAD**. It is believed to be the **MOST DURABLE**, being constructed upon a principle that seems to insure that the Spring must **ACTUALLY WEAR OUT**. The very **Finest Quality of Crucible Cast Steel** will always be used in these Springs.

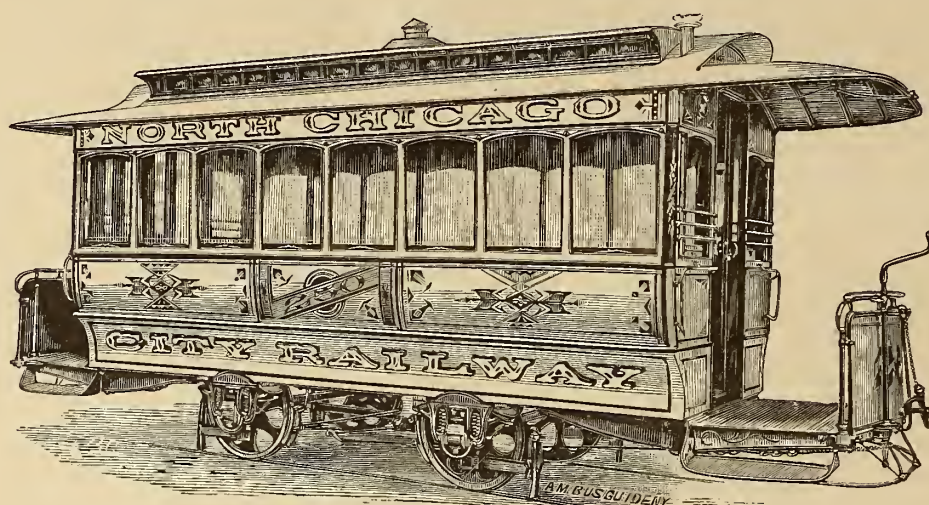


JOHN STEPHENSON CO.,

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New York.

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Every Description.

Best Materials.

Minimum Prices.

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All Climates Suited.

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THE STREET RAILWAY JOURNAL

VOL. I. { NEW YORK: }
 { 32 Liberty Street. }

DECEMBER, 1884.

{ CHICAGO: } No. 2.
 { 8 Lakeside Building. }

Cable Traction Railways in Chicago and San Francisco.

The system which we here illustrate* is the outgrowth of the inventions of Mr. A. S. Hallidie, as first put into operation on Clay Street Hill, San Francisco, in 1873.

Fig. 1 shows a transverse section through the driveway and road bed; also the tube, supporting pulley, rope and "grip."

Fig. 2 is an isometrical view. (See next page.)

Figs. 3, 4 and 5 show the grip of the Clay Street, and Presidio & Ferries roads. A vertical slide, working in a standard is moved up and down by a screw and hand wheel, and operated by the small screw going down through the large one. The screw operates wedges which open and close two horizontal gripping jaws with soft cast iron lining-pieces. On each side of the jaws, and attached to them, are two small sheaves, held by rubber cushions sufficiently in advance of the jaws to keep the rope therefrom, and yet to lead the latter fairly between the jaws without touching them, when they are opened out. In order to grip the rope the slide is drawn up by the small screw, and the wedge at the bottom not only closes

the jaws but forces the guide sheaves on to the rubber springs. The bracket carrying the standard of the slide is attached to a "dummy" car. The steel

shank of the standard is $\frac{1}{2}$ in. thick and $7\frac{1}{2}$ in. wide; the slot in the tube being $\frac{3}{4}$ in. wide.

The grip used on the South Street Line, San Francisco, is as shown in Fig. 6. The motion of the grip jaws being vertical; it takes and releases the rope sideways, instead of beneath as on Clay Street, and the jaws are operated by levers.

The California Street Railway has a lever grip taking the rope sideways.

The Grand Street Railway has a lever grip, vertical in its motion, and taking the rope from above; not so good an arrangement, as the jaws and rope are under the dot and catch the dirt therefrom.

The Presidio & Ferries Railway has a grip of the Clay Street type but heavier.

On this road there is a curve at the intersection of two streets, 2,600 feet from the start, and the rope is deflected by two 8-foot horizontal pulleys. The streets descend from both directions towards the curve, and about 30 feet before reaching the latter the rope is released, and picked up again after the curve is passed; gravity carrying the car and dummy around the curve.

The Market Street Line, being on level ground, uses a combined car and dummy.

In Chicago the tube is deeper than in San Francisco, and the rope is 30 in. above the tube bottom.

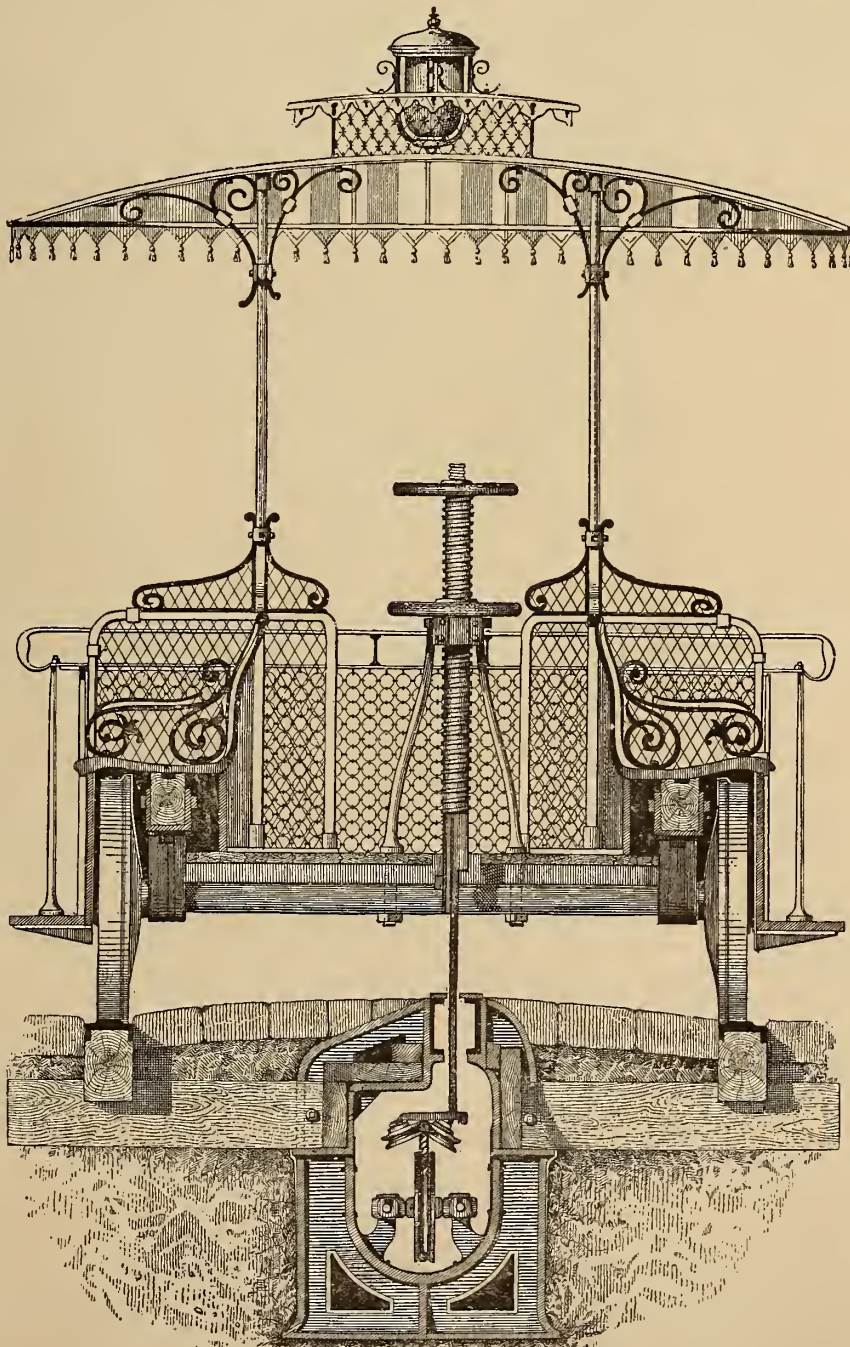


FIG. 1.

* National Cable Railway Co., 2 Wall Street, New York City.

Origin of the Word Tramway.

ED. STREET RAILWAY JOURNAL:—

The origin of the word "tramway" seems to be exciting not a little interest, as evidenced by your own columns as well as those of other technical journals. I have never seen what I believe to be the true origin of the word stated. In my opinion, it was derived from the word "trammle" and my reasons for this belief are as follows.

The word "trammle" is contained in Dr. Samuel Johnson's Dictionary, and as a verb is defined by him "to catch, to intercept." It had been in use for centuries in England at that time. The word 'tram' or 'tramway' or 'railroad' or 'railway' is not found in his dictionary, published first in 1755, nor in the copy I have dated 1828. In my copy of Smeaton's works published in 1812, I cannot find the word tramway, but in a report to Lady Irwin of January 27th, 1779, entitled an "account of the measures of coals at Newcastle and London" occurs the following, "since the invention of coal wagon roads," * * * and "since the laying of wagon ways in Yorkshire (the first of which is in Mr. Smeaton's memory) to carry coals to the navigable rivers," etc., etc. Nicholas Wood in his treatise on rail roads, published in 1827, states: "that cast iron rails with an upright ledge for the purpose of keeping the wheels upon the line of the former, were first adopted about 1767." In the year 1800, we are told that Mr. Benjamin Outram, an engineer, in adopting this rail on the public railway at Little Eaton, in Derbyshire, first introduced stone props instead of timber for supporting the ends and joining the rails.

Mr. Outram, however, was not the first who made use of stone supports, as the late Mr. Barnes employed them in forming the first railroad which was laid down in the neighborhood of Newcastle-upon-Tyne, viz.: from Lawson Main Colliery to the river, in 1797. In my copy of the Engineers' and Mechanics' Encyclopædia, by Hebert, now a rare book, under the head Railways it is stated:

"The earliest account we have of the introduction of railways is in the 'Life of

the Lord Keeper North,' from which it appears that about the year 1670 they were made use of at Newcastle-upon-Tyne for transporting coals from the mines to the shipping in the river. These railways were constructed of timber. It is stated by some authors that these wooden rails were subsequently improved upon by making ledges at their sides to prevent the wagons

as 1776, or twenty-four years before Outram built his road, although Smeaton, in writing to a lady, used the expression "coal-wagon roads" in 1779, probably because she might not understand the new word. Mr. Smiles, in his Life of Stephenson, accredits the origin of the word to Outram, by dropping the first syllable, but we have seen that Outram did nothing to warrant such distinction.

Mr. Wood was living at the same time, and we have seen that in his opinion Mr. Outram did nothing but use stone, and was anticipated therein by Mr. Barnes. If the use of stone was considered a matter of such prime importance by the people of that day, the roads should have been called "Barnesway," or some equivalent word recognizing the man who *did* introduce stone, anticipating Mr. Outram by *three years!!* I therefore do not think the word was derived from Outram, but rather from the old English word, or trammle. Webster's Dictionary of 1850 defined to trammel—1st, to catch, to intercept; 2d, to confine, to hamper, to shackle.

It had been in familiar use for years, yea centuries, in England, and what more natural than that it should be applied to those new roads, when they, by the use of upright ledges upon the rails, "confined" the wagons to the said tracks. They could not turn off, as was the case at an earlier day and is the case in the street railroad of today, and the word originated at this time, as we have seen.

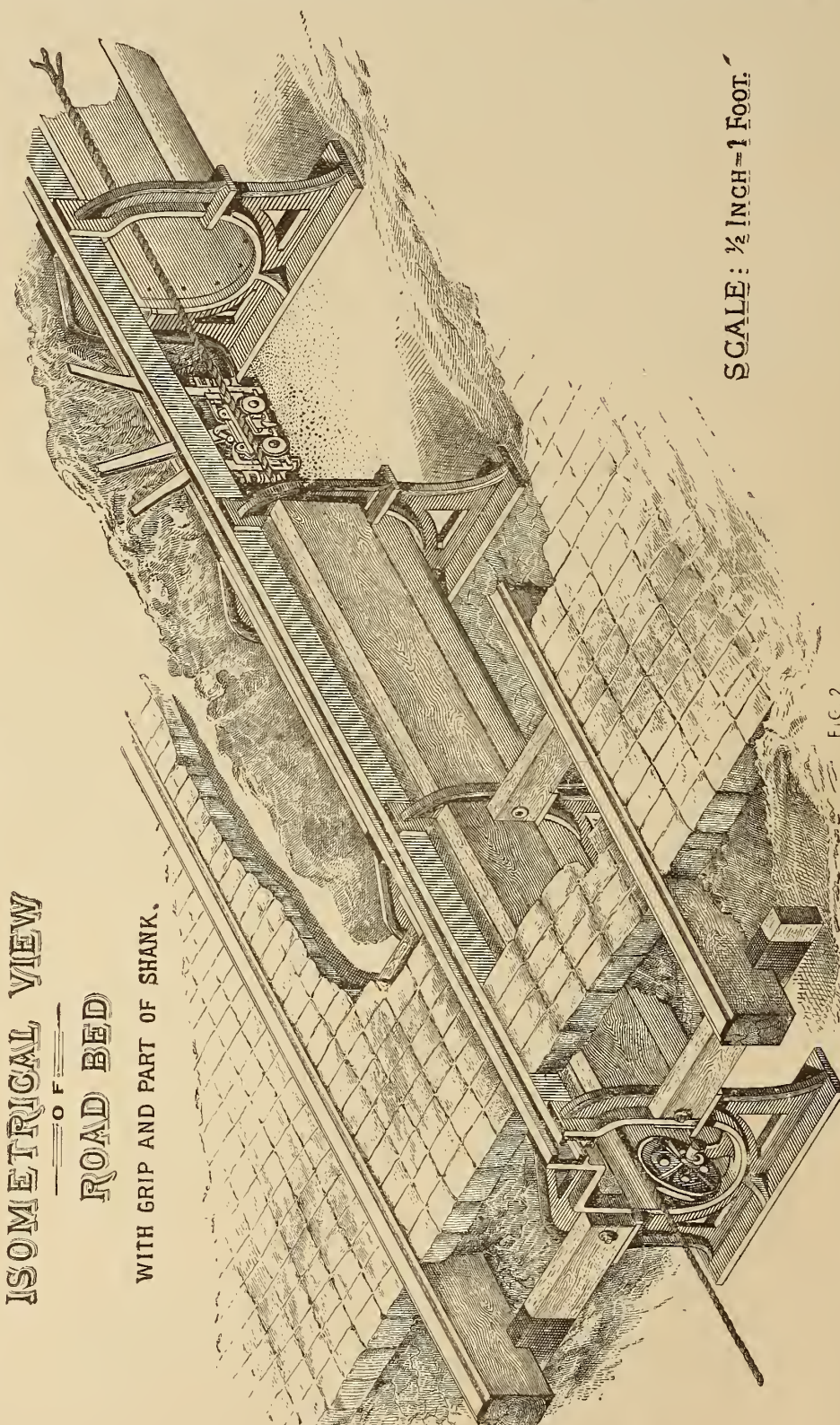
The word "tram" was not contained in Dr. Johnson's Dictionary, and I, therefore, think it originated from trammle.

Yours truly,
AUG. W. WRIGHT.
Chicago, Dec. 9, '84.

ED. STREET RAILWAY JOURNAL:—

With regard to the pronunciation of Outram I never heard it pronounced other than Oo'tram, accent on the first syllable, and I think that is correct, tho' don't quote me as an authority on that point.

With regard to my letter there is only one point on which I am dubious, whether the originator, Francis Outram, had a title or not. My reasons are this: James Outram, a descendant of the originator, was a prominent General during the Indian mutiny, and was created a Baronet for services therein. When he died, in 1863, he was succeeded by Francis Outram, now Sir Francis Outram and living in Staffordshire, I think. These



ISOMETRICAL VIEW

OF

ROAD BED

WITH GRIP AND PART OF SHANK.

SCALE: 1/2 INCH = 1 FOOT.

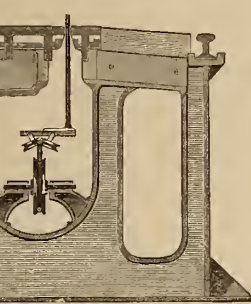
F. C. 2.

from going out of their tracks; a form which was subsequently given to them in cast-iron and termed *Tram Plates*. * * The introduction of cast-iron plates having an upright ledge was originally effected by Mr. Carr, at the Sheffield Colliery, about the year 1776."

The foregoing quotations prove that the word "tramway" was applied to railways with cast-iron rails having ledges as early

two, James and Francis, are always called the first and second Baronets; therefore, the originator could not have been a Baronet, though he may have been a knight, and if so; then, of course his title died with him.

Of course you know the title of knight dies with the person on whom it is conferred, and the title of Baronet is hereditary. I mention that the family seat of the Outram's was at Butterly Hall, Derbyshire.



AM. JOUR. OF RAILWAY APPLIANCES N.Y.
FIG. 3.

Mason Mach. Works, Taunton, Mass.

Resistance to Traction on Tramways.

ED. STREET RAILWAY JOURNAL :—

In the subjoined extract from a paper read before the "Western Society of Engineers," by Augustine W. Wright, C. E., Chicago, May 17, 1881, your correspondent "Xerxes" may receive an answer to his enquiry as to the "Resistance on Tramways," on page 124 of your last number.

Will you or any of your correspondents be kind enough to explain the cause of the increased resistance on the steel track over iron track, viz: 4.1 iron, and 7.1 times steel?

JOS. S. PAXSON.

Ambler, Montgomery Co., Pa.

"I recently made the following tests of the force required to start car No. 110, of the 'North Chicago City Railway Company,'

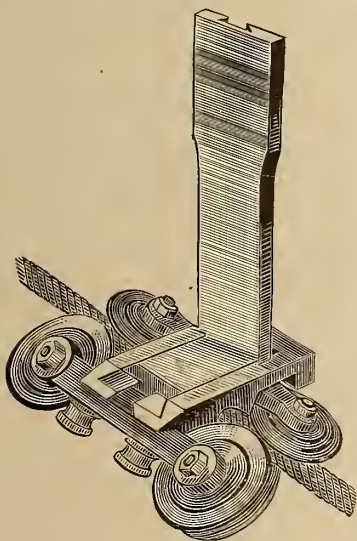


FIG. 4.

and to keep it in motion after it was under way, using a Fairbank's dynamometer. The track has a grade of two-tenths of a foot in each hundred, and was not very free from sand. Between Chicago Avenue and North Avenue, on Clark Street, Division and Clyburn Avenues, 88 tests with an average of 14.8 passengers weighing (estimated at 140 lbs.) with car 6,772 lbs., the force required to keep the car in motion at an average speed of five miles per hour, including stoppages, averaged 109½ lbs., or per ton 32.3 lbs. This is on an old worn-out rail. Between Chicago Avenue and Madison Street, on Clark Street, on new steel rails, 53 tests with an average of 20.9 passengers, gave 29½ lbs. as the force required to keep the car in motion. This

is an average of 15.6 lbs. per ton. The car made 17 starts on this track averaging 18.7 passengers. Average force exerted to start, 426.5 lbs; average per ton, 116.5 lbs. On the first mentioned track 30 tests with an average of 18.1 passengers gave an average force of 487 lbs.; average per ton, 134.6 lbs.

These tests indicate that on the steel rail about 7.1 times the force necessary to keep the car in motion must be exerted to start it. On the iron rail 4.1 times the force must be exerted to start the car than is required to keep it in motion.

These tests show the enormous loss of power required in making frequent stoppages.

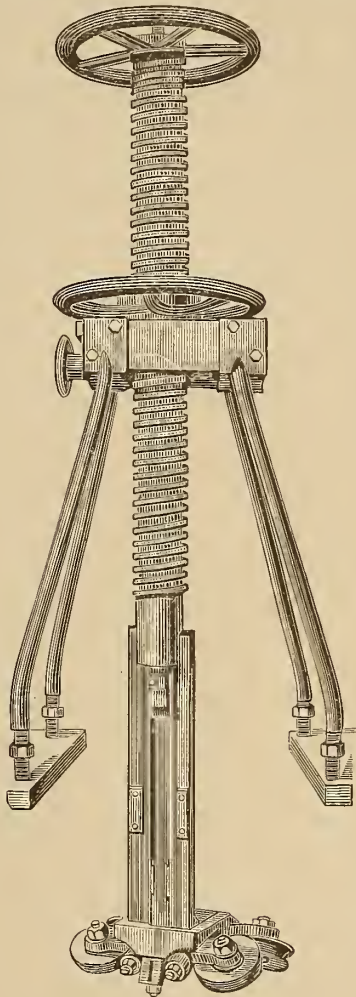


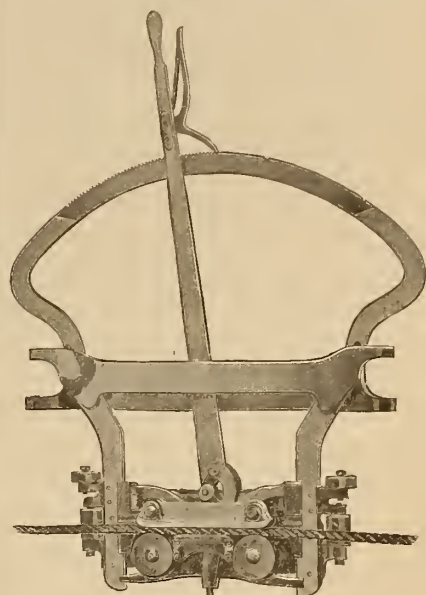
FIG. 5.

According to English engineers, a tractive force equal to 100 lbs., continuously exerted will draw on a level road as follows: common gravel, 15 cwt.; macadam, 2,700 lbs.; granite pavement, 3,500 lbs.; broken stone surface, 3,400 lbs., laid on an old flint road; same on rough stone pavement, 4,800 lbs.; wood pavement, 5,475 lbs.; stone pavement (good), 6,700 lbs.; iron railway track, 27,600 lbs. WHITNEY.

The St. Paul Street Railway.

We have to thank Mr. H. M. Littell, Superintendent for a copy of the annual showing for 1884, of this enterprising road. During the past year, the old cars have been condemned to destruction; old iron rails and vexatious delays at switches, supplanted by double steel tracks. New routes have been established and old ones abandoned for more convenient streets; 45,975 feet of new track were laid. Three new snow plows have been bought and one is building. The "fare conveyor" will be used throughout. New barns and offices have been erected, 244 feet on Forbes St., 286 on Oak St., and 67 on Ramsey St. President Lowry will build the Dayton's

Bluff line as soon as the fill will permit. St. Paul and Minneapolis will be connected. The year's work may be summarized as follows:



AM. JOUR. OF RAILWAY APPLIANCES N.Y.
Fig. 6.

FIG. 6.

Miles of track and paving (8.65), cost.....	\$128,700
New cars added (37), cost.....	50,000
Mules and horses added (200), cost.....	31,000
Offices, barns and other buildings, cost.....	75,000
Real estate, cost.....	30,000

Total cost of 1884's improvements. \$314,700

The \$50,000 for cars includes also other rolling stock and equipments. The road has cost, up to the present time, a trifle over a million dollars.

Toffler's Rolling Wood Mat.

The cut shows a make of wood mat* in which the slats are connected by two or

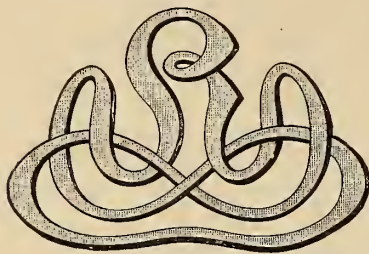


more continuous double chains, passed through small diametrical holes. The chains are of tinned wire.

* Warneck & Toffler, 111 E. 23d St., N. Y.

Reserved for Ladies.

A New York man suggests that one side of the street cars be reserved for ladies. One side should also be reserved for the man who sits cross-legged and occupies half the aisle with his feet, and soils the other half with tobacco juice—and that side should be the outside.—Norristown Herald.



American Street Railway Association.

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First Vice-President.—Julius S. Walsh, President Citizens' Railway Co., St. Louis, Mo.

Second Vice-President.—Henry M. Watson, President Buffalo Street Railway Co., Buffalo, N. Y.

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Electricity as a Motor.

The committee on electricity as a motor for railroad transportation is not prepared to make a report from personal inspection; but from the information received from different sources, they feel justified in reporting the possibilities of the new system to be very flattering. The experiments made in different places demonstrate beyond question its safety and practicability; and it will not be long before the question of economy will be fully determined by the experiments at Cleveland. In this country and in Europe, there are now several electric railroads in successful operation. The Litcherfelde road, in Berlin, has been for four years a financial success, and the results of the experiments at Coney Island, Menlo Park, and by Messrs Daft & Edison, at the Mechanics' Fair Building at Boston, Mass., have thus far been very satisfactory and encouraging. I herewith submit for your consideration the enclosed communication of Mr. W. A. Knight, of the Brush Electric Company, of Cleveland, Ohio, giving the result of the Cleveland experiment in detail. This letter, coming as it does, direct from the operator of the street railroad at Cleveland, in response to a request from this committee soliciting such information as would be valuable and interesting to the convention, is really the sum and substance of this report, and contains all the reliable information before this committee.

As chairman of the committee I confess that I have not given to the investigation of this question as much of my attention as its importance demanded; but the unusual pressure of official duties during the last six months has occupied all my time.

ED. C. PETERS, Chairman.

Brush Electric Company.

CLEVELAND, O., October }
8th, 1884. }

E. C. PETERS, Esq., Chairman, Committee on Electricity as a Motive Power of the American Street Railway Association.

DEAR SIR:—Your favor of the 30th ult. is at hand, and contents noted.

The electric railway which we are now operating here is about one mile in length, and at present only one car is run on it. The second car will soon be completed, and the line will then be extended across the railway-tracks to a distance of about one and a-half miles. This section, with its two cars, will be operated all winter without intermission, to demonstrate the "rough and ready" character of the motor, after which the system will be extended over the 20 miles of tramway owned by the East Cleveland Co.

Last winter we operated a trial railway, built in the yard of these works; and as it stood the tests of all kinds of weather, we have no doubt in our own minds as to its efficiency the year round.

Briefly the system may be described as follows:

Midway between the rails a conduit 8 inches deep is laid flush with the pavement, in the manner of a cable road. Two iron rails serving as conductors are supported within this conduit, and through a slot five-eighths of an inch wide in the top of the conduit a plow depends from the car, and by means of two brushes makes contact with the conductors. Through this plow the current is conveyed to the motor, which is situated between the wheels under the car, and is tightly boxed up to prevent access of dust, etc. The motor weighs half a ton, and the car is an ordinary two-horse box car, weighing, exclusive of motor, two tons. The motor is geared to the axles of the car by friction gear and link-belts. The movement is controlled by levers at either end of the car, these levers operating the commutator brushes on the motor to start, stop, or reverse the motor, or to make it go at any speed desired. It has been run at a speed of fifteen miles an hour.

The dynamo supplying the current is located about a mile from the line and is run by the engine used by the company for grinding corn. It is connected to the conductors in the conduit by an over-head line of No. 8 wire. In practice, no over-head line will be used and a greater economy may be anticipated. The power is sufficient to run two cars, as the engine and

dynamo after being started in the morning, runs all day without attention. Only one man is employed to do the firing, and the expense of power, including fireman, coal and oil is about four dollars per day.

With a larger plant, larger and more economical engines, boilers and dynamos would be used, and a much greater economy obtained.

The conduit will cost from five to seven thousand dollars a mile when made of steel, and it ought to last a lifetime. To equip an ordinary two horse car will cost in the neighborhood of \$1,500 and the power at the central station for each such car will be in the neighborhood of \$1,200. Each car will pull another car of the same size.

The steepest grade we have experimented with is 500 feet to the mile, and no difficulty was found in overcoming it.

The conduit is kept free from dirt, snow, etc., by a brush depending from the car through the slot. Catch basins are placed at intervals varying from 50 to 100 feet, and where possible a sewer connection is made.

The system is similar to a cable road in that it requires a conduit and a central power station; but it differs in every other respect.

It may be operated on single tracks, as well as on double tracks; and branches may run out from the main road in every conceivable manner. Any speed may be assumed at the will of the operator without wear of machinery. Ordinary car-drivers can operate it after five minutes instruction. Stoppages can be made quickly by reversing the motor. Running off the track does not injure the machinery, and a flexible connection on every car enables the motor to run the car back on to the track when the lever is reversed. A much smaller conduit can be used than with cables, and there is no machinery along the line. The conductors cost but \$200 a mile and the wear of the brushes upon them seems to be nil.

We use a high tension current because our investigations have showed us that when distances greater than one or two miles are to be overcome, no other current will give the necessary economy. The conductors are, however, inaccessible, and no danger is anticipated. We are ready to equip any road not exceeding 25 miles in length.

Hoping I have touched upon the main points of interest,

I am, very truly yours,

W. H. KNIGHT.

Uniform System of Accounts.

The American Street Railway Association:

GENTLEMEN—The committee appointed on "A Uniform System of Accounts," is of the opinion that what is wanted is "A Uniform System of Operating Expense Accounts,"

Sub-Divisions of Operating Expense Accounts, and of Construction, Equipment and Improvement Accounts.

1. CONDUCTING TRANSPORTATION.

- 1 Supervisors, Inspectors and Starters..... Labor—Starting Cars, supervising the running of Cars, and overseeing and keeping time of Conductors and Drivers.
- 2 Receivers and Clerks..... Labor—Receiving and reporting fares paid to Conductors, putting up and selling change, and handling fare boxes.
- 3 Conductors..... Labor—Conductor's wages.
- 4 Conductor's Extra Pay..... Conditional percentage on Conductor's earnings.
- 5 Switchmen, Flagmen, etc..... Labor—Switching, flagging and pushing, curve men, turntable men, gatekeepers, and driver of advertising car.
- 6 Car and Lamp Cleaners and Watchmen.... Labor—Lampman, Car and Lamp Cleaners, and Watchmen at Car Houses.
- 7 Lighting, Oiling and Cleaning Cars..... Oil, matches, etc., for lighting; oil, brooms, brushes, rags, sponge, etc., for oiling and cleaning, and straw used in Cars.
- 8 Stationery, etc..... Envelopes, slips, cards, notices, bill-boards, paste, school tickets, and employees' passes.
- 9 Registers and Punches..... Expense incident to use of same.
- 10 Furniture and Implements..... In Car Houses and Receiver's and Starter's Offices, including money satchels, boxes, and carts, and repairs of same.
- 11 Car License..... Payable to City.
- 12 Loss from Accidents..... Legal, medical and other expense growing out of injuries to persons and property.
- 13 Fuel, Light and Water..... Used in Car Houses and Receiver's and Starter's Offices.
- 14 Car Houses and Office Repairs..... Labor—Repairing, whitewashing, and cleaning Car Houses and Receiver's and Starter's Offices.
- 15 Car House and Office Repairs..... Materials, etc., used, and other expense of same not charged in No. 14.

2. MOTIVE POWER.

- 16 Animals.....Cost of Animals, and expense incident to purchasing same.
- 17 Care of Animals.....Salt, medicines, etc., and other expense not charged in Nos. 16 and 18.
- 18 Stable MenLabor—Foremen, Hostlers, Surgeon and Watchmen.
- 19 Forage.....Cost of same, including freight.
- 20 Handling Forage.....Labor—Hauling, weighing, storing, cutting, grinding, and otherwise handling and preparing food.
- 21 Stable Tools, Implements and Machinery.....Groomers, extinguishers and all Stable tools and machines, and repairs of same, not charged in No. 24.
- 22 Feed-mill, Implements and Machinery.....Machinery and Implements used in handling food, wagon license, inspecting scales, and all repairs not charged in No. 24.
- 23 Blacksmith's Tools.....Including material used, and other expense of making and repairing not charged in No. 24.
- 24 Shoeing Animals, etc.....Labor—Shoeing animals and repairing machinery, tools, etc., in Stables and Harness and Smith Shops.
- 25 Shoes and Nails.....Including material used, and freight on shoes, nails and material.
- 26 Harness and Repairs.....Labor—Making and repairing Harness.
- 27 Harness and Repairs.....Material and tools used in Harness Shop, and other expense of making and repairing not charged in No. 24.
- 28 Furniture and Repairs.....Elevator, Stoves, Clocks, etc., in Stables and Smith and Harness Shops.
- 29 Fuel, Light and Water.....Used in Stables and Smith Shops, including cost of wells and pumps on premises.
- 30 Drivers.....Labor—Driver's Wages.
- 31 Driver's Extra Pay.....Conditional percentage on Driver's earnings.
- 32 Stable and Smith Shop Repairs.....Labor—Repairing, whitewashing and cleaning Stables, Smith Shops, wells, pumps, fences, and yards adjoining.
- 33 Stable and Smith Shop Repairs.....Material used and expense incurred, not charged in No. 32.

3. MAINTENANCE OF WAY.

- 34 Track Repairers.....Labor—Supervisor, Foremen, Teamsters and Laborers on Track and Turntables.
- 35 Track Repairs.....Cost of Wood material used, including freight and work done on same, not charged in No. 34.
- 36 Track Repairs.....Cost of Iron material used, including freight and work done on same, not charged in No. 34.
- 37 Track Repairs.....Water, rock, gravel and other expense not elsewhere charged.
- 38 Track Cleaners.....Labor—Removing obstructions from track.
- 39 Cleaning Track.....Salt, residuum, oil, etc., used for this purpose, and expense of removing obstructions from track.
- 40 Road Tools and Implements.....Including plows and scrapers, road wagons and carts, license on same, and repairs not charged in No. 41.
- 41 Road Tools and Implements.....Labor—Making and repairing all tools, implements, vehicles, etc., used on road.
- 42 Incidental Road Expenses.....Any expense incident to Maintenance of Way not chargeable to other sub-accounts.

4. MAINTENANCE OF CARS.

- 43 Car Repairers.....Labor—Repairing Cars.
- 44 Car Repairs.....Cost of Material used, and other expense not charged in No. 43.
- 45 Car Furniture and Repairs.....Fare Boxes, poles, racks, signs, single and double trees, curtains, lamps, chimneys, etc., and repairs not charged in No. 46.
- 46 Car Furniture and Repairs.....Labor—Making and repairing any of same.
- 47 Shop Tools and Machinery.....Machinery, tools and furniture, used in Car and Paint Shops, and expense making and repairing not charged in No. 48.
- 48 Repairing Tools and Machinery.....Labor—Making and repairing same.
- 49 Furniture and Repairs.....Used in Car and Paint Shops.
- 50 Fuel, Light and Water.....Used in Car and Paint Shops.
- 51 Repairing Car and Paint Shops.....Labor—Repairing, whitewashing, and cleaning Shops and premises.
- 52 Repairing Car and Paint Shops.....Material used, and other expense not charged in No. 51.

5. GENERAL EXPENSE.

- 53 Salaries of General Officers.....President, Vice-President, Directors, Secretary, Treasurer and Superintendent.
- 54 Expenses of General Officers.....Traveling and other expense on Company business not chargeable to others sub-accounts.
- 55 Salaries of Clerks.....In Offices of Superintendent, Secretary and Treasurer.
- 56 Office Expenses.....Fuel, light, water, ice, postage, telegrams, wages of Janitor, etc.
- 57 Stationery and Printing.....Books, maps, blanks, stationery, printing, advertising, and other like expense, not chargeable to No. 8.
- 58 Telephone Service.....Cost of same, and repairs of Office telephone.
- 59 Furniture and Repairs.....Safes, counters, desks, chairs, clocks, money scales, awnings, etc.
- 60 Office Repairs.....Labor—Repairing General Offices.
- 61 Office Repairs.....Material used, and other expense not charged in No. 60.
- 62 Interest, Discount and Exchange.....Including expense of paying Coupons.
- 63 Sprinkling.....Sprinkling street in vicinity of General Offices.
- 64 Rents.....On Buildings and ground.
- 65 Taxes.....Payable to City and State.
- 66 Insurance.....Premiums on same.
- 67 Legal Expenses.....Attorney's and Clerk's fees, copies of Court records, City ordinances, etc., not chargeable to No. 12.
- 68 Detective Service.....Any expense of this character.
- 69 Real Estate Expenses.....Surveyor's fees and any expense incident to purchase and sale of Real Estate.
- 70 Gratuities.....Rebates of fares, and donations of every kind.

CONSTRUCTION, EQUIPMENT AND IMPROVEMENT ACCOUNTS.

- 71 Cars.....Labor—Building new Cars.
- 72 Cars.....Material used, and other expense of building new Cars not charged in No. 71.
- 73 Track.....Labor—Constructing new Track.
- 74 Track.....Material used and other expense of constructing new Track not charged in No. 73.
- 75 Buildings and Improvements.....Labor—On new Buildings, Sheds, etc.
- 76 Buildings and Improvements.....Material used, and other expense of new Buildings and Improvements not charged in No. 75.

rather than a Uniform System of General Accounts of Assets and Liabilities.

A circular was issued by the Chairman of this Committee to the several street railroad companies belonging to this Association, asking for a list of accounts kept by their respective companies. The Chairman wishes to report that the responses were promptly received from nearly every company in the Association, showing that a great

and general interest is felt in this matter. The information is gathered that there is a great diversity in the methods of keeping accounts, and it is certainly very evident that a uniform system of keeping operating expense accounts would result in very great good, not only for the opportunity it would afford for comparisons, but it might possibly furnish information which would result in savings to many companies.

Your committee take pleasure in presenting the system now in use by the Louisville City Railway Company, and of recommending and offering the same for your consideration and discussion.

The operating expense accounts kept by that company are as follows:

- No. 1.—Conducting transportation.
- No. 2.—Motive power.
- No. 3.—Maintenance of way.

- No. 4.—Maintenance of cars.
No. 5.—General expense.

Under these general headings are kept several sub-accounts, as shown in the accompanying form kindly furnished by the Louisville City Railway Company, and which is herewith presented by your committee as part of this report. The form may be modified to suit the different companies.

Respectfully,
E. K. STEWART,
Chairman.

Track Salting.

We continue from page 6 of our November issue our abstract of the official report of the discussion on and documentary evidence connected with the report of the special committee of the A. S. R. W. Ass'n on track cleaning, etc.:

Dr. Elijah Whitney said that both the railways and the city authorities should be taxed for the purpose of salting the streets and melting the snow. New York streets could be cleaned thus for one-fourth the cost of the present way, by horses and carts.

Mr. Johnson, of Cleveland, reported that they kept their track clean by salting, though against the ordinance.

Mr. William Richardson said that there was a very full investigation of this question in Philadelphia, in 1862, before Select Council, Board of Health, etc., and published in the *Sanitarian* some five or six years ago. It included thermometer and other tests, and was used before committee of Brooklyn Common Council, which I referred to, and had a very considerable effect.

[Association took a recess for an hour.]

In a letter from Mr. Richardson to the association, furnishing valuable letters and other documents, he desired to express the obligations he was under, in 1874, to James Watt, M. D., Registrar of Vital Statistics, who personally appeared before the Brooklyn Council Committee with a statement of valuable facts in refutation of the prejudice that the use of salt on the streets was injurious. In these he was supported by the Sanitary Superintendent, Dr. Avery Segur, and the Health Commissioners, Drs. Hutchison and Conklin, and James Jourdan, Esq., President of the Board.

The present Commissioner of the Health Department of Brooklyn, Joseph H. Raymond M. D., at the investigation in 1881, at which time he held the office of Sanitary Superintendent, in addition to writing the Committee a very full and statistical report (herewith appended) attended before the Committee; and gave emphatic evidence that there were no evil results from the use of salt, on public health. Dr. Raymond as Inspector, Sanitary Superintendent and Health Commissioner of Brooklyn, had for many years been an untrusting and anxious investigator of every question affecting, whether nearly or remotely, the health of the city. His written report had the emphatic endorsement of James Crane, M. D., at that time Health Commissioner of Brooklyn, and for many years connected with the Metropolitan Health Department.

Abstract of Report of Brooklyn Committee on Public Health, April 4, 1881.

The Committee on Public Health referred the matter to the Commissioner of the Department of Health, who referred it to the Sanitary Superintendent.

In Dr. Raymond's report he says in brief: The opponents of salt claim that its use tends to the spread and production of contagious diseases. The diseases of this nature in Brooklyn are: diphtheria, scarlet fever, measles and small-pox. I am unable to see the least relation between the use of salt and the prevalence or fatality of these diseases. The greatest mortality from diphtheria during 1880-81, was for the week ending November 6, 1880. Salt had not been used up to that time, nor was it used until nineteen days after.

In 1877 there were 730 deaths from scarlet fever; in 1878 there were 363 deaths, one-half as many as in the preceding year, while the salt used was about the same; in 1879 the deaths were 344, still lower than in 1878, while the amount of salt used was greater than in the two preceding years; during 1880 there were but 222 deaths from this disease, yet the railroad companies probably used more salt than ever before.

In November, 1880, there were two deaths from measles; in December, no deaths; in January, 1881, five deaths; and in February, three deaths; this is the time of the year when salt is principally used. In March, 1880, there were thirty-two deaths; in April, thirty-four deaths; in May, thirty-two deaths; and in June, twenty-one deaths; this was during the time when no salt was used.

From the summer of 1877 to the summer of 1880, there was absolutely no small-pox in Brooklyn, and yet during the winters of all these years, salt was used in the railroad streets. From May 30, 1877, to September 23, 1880, there was not a single death from this disease. It would seem to be a proper inference that the sprinkling of salt on the streets is not detrimental to the public health, through the medium of contagious diseases.

This subject was, during the year 1862, investigated in a most thorough and scientific manner by the best chemists and physicians of Philadelphia.

Professor Rogers, of the University of Pennsylvania, testified, that the "use of salt is calculated to preserve the atmosphere of the streets in a state of salubrity."

B. Howard Rand, M. D., testified "that the use of salt in thawing the snow cannot have any injurious effect on the health of the community. * * * In respect to its alleged tendency to produce epidemics, I do not think it a matter within the range of possibility even."

Dr. Kenderdine, of the Episcopal Hospital, testified: "I know of no injurious results from salting the streets, except the loss of professional business; it prevents falls; I have had no cases of fracture from such accidents since—at least, none happening on streets with railroads."

D. Hayes Agnew, M. D., testified: "Diphtheria, which is assumed to be one of the results of salted streets, is not a new disease, but has prevailed both in and out of cities, long before railroads of any kind had an existence."

At this investigation, a report was made by a Committee of the College of Physicians, which, in closing, presented the following resolution: "That in the opinion of the College of Physicians, there is no evidence that the practice of salting the railway tracks passing over the streets of the city exerts any injurious influence on the health of citizens." This was signed by the following eminent men: Casper Morris, Franklin Bache, Edward Harts-horn, J. M. DeCosta, and D. Francis Condie.

At a recent meeting of the Common Council Committee on Public Health, of this city, communications were read from Drs. Elisha Harris, of the State Board of Health, Joseph C. Hutchison, formerly Health Commissioner of this city, and Avery Segur, M. D., formerly Sanitary Superintendent, giving the weight of their names and opinions to sustain the statements made by the Philadelphia experts, that there was no evidence that the salting of tracks was a detriment to the public health.

In conclusion, permit me to say, that I have never been able to discover any facts which would, even in the slightest degree, tend to prove that this practice is detrimental to the public health, nor have I been able to find any such evidence on record.

The following letter is from Dr. Joseph C. Hutchison, alike eminent as a physician and surgeon, and formerly one of the Health Commissioners of Brooklyn. It was

sent to the Mayor of Brooklyn, at the time the question of prohibiting the use of salt was before the Common Council, in 1881.

BROOKLYN, January 10th, 1881.
HON. JAMES HOWELL, JR., Mayor of Brooklyn.

DEAR SIR:—Having been requested to express to you my opinion of the effect upon the public health of sprinkling salt upon railroad tracks for dissolving snow and ice to effect its speedy removal, I beg leave to state briefly and without reservation, that the results of the practice are not injurious to the health of the city.

On the contrary, the well-known anti-septic effects of common salt in preventing decomposition of vegetable and animal accumulations in our streets, which cause the exhalation of noxious gases, has a salutary effect upon the public health. "Salting," by preventing putrefaction, tends to make the atmosphere over the salted street more pure and salubrious, and the liquefied snow and salt running into the sewers purifies and corrects, to a certain extent, their offensiveness.

The public convenience would be promoted by having a trench made through the snow and ice, from the railway tracks to the inlets of the sewers, and keeping the inlets open, so as to carry off the liquid mixture. I presume from the fact that the sewer inlets are usually closed, that an ordinance is already in existence requiring that they be kept open!

The greatest sufferers from the use of salt upon the railroads are the doctors, both by reason of the purifying effects of the melted salt upon the streets and sewers, and the prevention of accidents—broken bones, etc.—from falls.

I beg leave to call your attention to an exhaustive report on the influence upon the public health of salting the streets for the removal of snow, made by the Philadelphia College of Physicians in 1862, in which it is clearly shown that the practice is in no way injurious to health.

I am, sir, very respectfully yours,
JOS. C. HUTCHISON, M. D.

The following endorsement is by the late Dr. Elisha Harris, for many years Registrar of Vital Statistics of the City of New York, and at the time of his death Secretary of the New York State Board of Health Commissioners:

I fully concur in the foregoing statement by Dr. J. C. Hutchison. This matter should be regarded as one of facts, as here stated, and not of mere opinion.

ELISHA HARRIS, M. D.

The following approval is from Dr. William M. Smith, the health officer of the port of New York:

I approve the opinion, and concur in the recommendation of Dr. J. C. Hutchison.
WILLIAM M. SMITH, M. D.

The following letter is from Dr. Avery Segur, for several years Sanitary Superintendent of the City of Brooklyn, and now Examining Physician of the Mutual Life Insurance Company, of New York:

281 HENRY STREET,
BROOKLYN, JAN. 31, 1881.

EDWIN BEERS, ESQ., President of the Broadway Railroad Company, Brooklyn:

SIR:—My attention was directed to the use of salt for removing snow by the horse-car railroad companies several years ago (1873-4) when I was in the service of the Health Department as Sanitary Superintendent.

I then learned that in the City of Philadelphia an investigation had been made by a medical commission, and that no evidence of injurious effects on health from such use of salt was found; and the result of the inquiry was that these medical experts affirmed that removal of snow with salt was not detrimental to the public health.

The same opinion was held by such of

our own physicians as I consulted about the matter. I was then, and have been always since interested in, and attentive to, all questions involving the causes of sickness in cities; and I have never seen any evidence from any source, either professional or the general public, to sustain the opinion that the use of salt to remove snow from the streets should be prohibited.

The importance of the sanitary condition of the streets to so large a portion of our population who pass a considerable time in the horse cars, and the difficulty of establishing the affirmative or negative of any proposition about causes of disease (as at present the allegation that the use of salt on snow in the streets is injurious as well as the contrary denial—more or less valuable opinions of individuals), have led me to consult the reports of various official bodies charged with the care of the public health. In all the volumes of reports of the New York city Board of Health since 1866, among the multitudes of matters, having a sanitary interest, upon which the board has acted, I do not find that this matter has demanded or received any adverse attention; although street-cleaning, street-filth, etc., are very prominent. So with the Massachusetts State Board of Health, although it has affirmed the proposition that the public streets should be no less safe to health than secure to limb. I hope the present inquiry of our Common Council will end in an important contribution to the knowledge of this subject, or, if that is not immediately practicable, to the suspension of opinion which opens the way to knowledge.

The experience of this winter has made me wish that all the streets in the city were as comfortable, dry and passable on foot or in vehicles, as are the streets in which the horse-cars run.

Very respectfully,

AVERY SEGUR, M. D.

The following letter is from Samuel Mitchell, foreman and veterinary of the Broadway Railroad Company, of Brooklyn:

EAST NEW YORK, January 21, 1881.

To the Health Committee of the Common Council of the City of Brooklyn:

GENTLEMEN:—Having been requested to give an opinion on the subject of salting the railroad tracks; and as I am the oldest railroad employee in Brooklyn, and having given the matter close observation both as regards its effects on man and horse for the last twenty years, I think I can dispel some of the erroneous ideas held by many of my fellow citizens on this greatly misunderstood subject. First, as regards its effects on the health of the drivers and other employees in the Broadway Railroad Company's service, several of whom have worked with me for the last twenty years, would say that they are as hearty and as healthy as I am, and few men of eighty-one years are better preserved than myself. It may be that the salt preserved me! As regards the horses, I never have found any trouble with them from the use of salt. I have the care and management of several hundred, and with ordinary attention to cleaning the snow and mud from their feet, the horses do as well in the winter as in the summer. If the persons who are opposed to salting the tracks would take the trouble to investigate the subject, they would find that salt is soluble in water, but is not volatile. By mixing eight ounces of salt in one gallon of water, and evaporating or distilling the dryness, the eight ounces of salt will be left. This plainly proves that none of it has mixed with the atmosphere. If salt were volatile and injurious to health, seamen and those living on the sea coast would suffer from it. If the fault-finders would learn a little practical chemistry they would think and speak differently concerning the use of salt.

Very respectfully, your obedient servant,
SAMUEL MITCHELL.

The following letter was sent by the (then) Professor of Chemistry of the University of Pennsylvania, R. E. Rogers, M.

D.,* to a special committee of the Select Council of the City of Philadelphia, in the year 1862:

UNIVERSITY OF PENNSYLVANIA, }
PHILADELPHIA, February 24, 1862. }

To the Committee of Select Council, having in charge the inquiry, respecting the influence on the public health of the practice of sprinkling salt upon the City Railroad tracks for removing Snow and Ice:

GENTLEMEN:—Having since my interview with you at your public sitting on January 24, obtained additional positive data relative to the cooling effect of salt when employed to hasten the removal of snow from the city railroad tracks, and believing that it is your wish to procure all information bearing practically upon the subject, I venture to address to you this communication, trusting that in a sincere desire to contribute to the cause of truth will be found my apology for so doing.

Satisfactory conclusions upon a question so important as this, involving, as it does, considerations of public health, cannot be reached by the dogmatic assertion of individual opinion, nor by the captious criticism, nor ridicule of the opinion of others who differ from us, neither by mere surmises as to causes and effects, nor the invention of hypothesis, however ingeniously devised or skillfully reasoned out, but alone by carefully ascertained facts, the results of observation and experiment.

I shall, therefore, not undertake to discuss or comment upon any of the voluminous and somewhat conflicting testimony, which has been elicited during the agitation of the subject, but confine myself to a line of demonstration.

As will be remembered, there occurred on the 3d instant a heavy fall of snow, commencing in the night, and continuing into the next morning. Availing myself of the opportunity it afforded of ascertaining by practical tests more fully than I had already been able to do, the extent to which salt, as used upon the city railroad tracks, really reduces the temperature, I made on the 5th inst. two series of observations, one upon the materials in which persons walking had to tread, the other upon the atmosphere.

The thermometer which I employed was correct in its indications, and graduated to half degrees. The day was clear and cool, the temperature at noon, in the shade, 33°. The railroad tracks had been, as I was informed, salted to the usual extent, and the snow along these portions of the lines exposed to the sun was thawing rapidly, while that sheltered from its influence had melted but little.

The first observations were commenced at 12 o'clock noon, and continued an hour and a half, and whereupon, the temperature of the melted or liquid mixture of salt and snow, which had accumulated at or near the crossings of Chestnut and Eighth, Ninth, Tenth, Eleventh, Twelfth and Thirteenth Streets, and upon that of the unmelted mixture of the same materials at several intermediate points between the intersections of these cross-streets and Chestnut, stood as follows:

The columns below exhibit the results.

TEMPERATURE OF THE MELTED OR LIQUID MIXTURE OF SNOW AND SALT.

Chestnut and 8th, the temperature of the liquid mixture was.....	27½°
Chestnut and 9th, the temperature of the liquid mixture was.....	28½
Chestnut and 10th, the temperature of the liquid mixture was.....	28
Chestnut and 11th, the temperature of the liquid mixture was.....	27½
Chestnut and 12th, the temperature of the liquid mixture was.....	27½
Chestnut and 13th, the temperature of the liquid mixture was.....	28
Average.....	27 ⁸³ / ₁₀₀ °

*Since deceased.

TEMPERATURE OF THE UNMELTED MIXTURE OF SNOW AND SALT.

At a point 50 feet above 8th, on Chestnut Street.....	26½°
At a point opposite the Continental Hotel.....	26½
At a point 50 feet above 9th, on Chestnut Street.....	27
At a point opposite the Markoe House.....	27
At a point midway between 10th and 11th, on Chestnut Street.....	26½
At a point midway between 11th and 12th, on Chestnut Street.....	27
At a point midway between 12th and 13th, on Chestnut Street.....	27

Average..... 26⁸⁸/₁₀₀°

The second observations were made on the afternoon of the same day, commencing at half-past three, and continued for an hour and a half. Their object was to ascertain whether there was any difference, and, if any, how great, between the temperature of the air which rested at a small elevation over the salted streets, and that over the snow, where no salt had been used.

The thermometer employed was the same used in the earlier part of the day, and was so carried that the lower end, or bulb, hung at a point three feet above the snow.

The afternoon was altogether calm, and, therefore, especially favorable for fair experiment. Starting from the intersection of 13th and Chestnut Streets, the thermometer at 33°, I proceeded down Chestnut to 9th, pausing occasionally to note the indications of the instrument. At each observation, a gradual diminution was apparent, and on reaching 9th Street, the temperature, as nearly as I could detect, had fallen to 32½°. Turning up 9th, I traversed that street as far as Arch, and in my progress observed a similar gradual decline in the temperature, and by the time I had arrived at the corner of 9th and Arch, the thermometer marked 32½°. I next walked up Arch Street to 12th; still the instrument showed a gradual fall, and on reaching 12th Street it stood at 32½°. From Arch, I proceeded down 12th to Walnut. Along this street was noticed a like progressive diminution in the temperature; and when I reached the corner of 12th and Walnut, it was just 32°.

Turning now down Walnut, I walked as far as 9th. During this interval the decline still continued, and at about the previous rate, so that when at the corner of 9th and Walnut streets the instrument recorded, as nearly as the eye could define, 31¾°. From 9th and Walnut, I walked towards Chestnut, and at the intersection of 9th and Sansom Streets, lingered 15 minutes to make my last observation. The temperature of the atmosphere had still continued to fall, and at this point was a minute fraction of 31½°. For clearer inspection, these results may be tabulated thus:

Commencement of observations at 13th and Chestnut, temperature 33°.

Along Chestnut to 9th (salted), fall from 33° to 32½°
“ 9th to Arch (unsalted), “ “ 32½ to 32½
“ Arch to 12th (salted), “ “ 32½ to 32½
“ 12th to Walnut (unsalted), “ “ 32½ to 32
“ Walnut to 9th (salted), “ “ 32 to 31¾
At intersection of 9th and Sansom (unsalted), fall from.....

From this record it was evident that the afternoon was steadily growing colder as the hour became later, and too, at about the somewhat uniform rate of about a quarter of a degree for every fifteen minutes. At 9 o'clock p.m., the thermometer stood at 28°. The diminution took place as rapidly, and to an equal extent, in one street as in another, thus conclusively proving that at an elevation of three feet above the surface of the material on the ground there was no essential difference between the atmosphere of the salted streets and that of those where no salt had been thrown; since had such a difference existed, the thermometer should have fallen more rapidly and to a greater extent, so soon as it was taken from an unsalted to a salted street, and then should

have risen again, or shown a more tardy rate of fall upon being removed from a salted to an *unsalted* avenue.

These observations of matters, purely of fact, while confirming statements previously made to your Committee, furnish, I conceive, evidence of significant bearing upon the question at issue, and will, I hope, tend to correct some of the misimpressions and misapprehensions which have prevailed on the subject. Thus, in the first place, it is shown that the belief that salt as used in the quantity employed by the City Railroad Companies for hastening the removal of snow from their tracks produces a mixture *intensely cold* to the feet, is *erroneous*, since the average reduction of temperature in the liquid mixture of snow and salt was, at the places of experiment, only 4.17° below that of snow water, and the average reduction in the unmelted mixture was but 5.23° below that of snow itself.

In the second place, it is demonstrated that a like error has prevailed in supposing that the atmosphere breathed by the men and horses over the salted streets is *greatly colder* than that which they inhale on the *unsalted* thoroughfares, the tables showing that, at an elevation of three feet above the ground, there is no appreciable difference between the temperature of the air resting over the salted snow and that of the snow alone. That the air *immediately in contact* with the salt and snow mixture is a *little colder* than that resting upon the snow itself, no one will doubt, but so little is the air a conductor of heat, that this small difference of temperature does not, as proved by experiment, extend to any considerable distance into the upper strata.

In regard to the point about which there may appear to be some difference of opinion, I would here reiterate the statement already elsewhere made, with a word of explanation, that so far as the admixture of salt with snow really cools the atmosphere immediately adjacent to it, an effect at most but very limited, so far does it tend to *condense*, and thus abstract the moisture which that atmosphere contains dissolved.

If then a portion be condensed, it must hold *less moisture* than it did before, therefore, it is *less wet*, *less damp*, in other words it is *drier*.

As the question is a *practical one*, these terms should be employed in that sense alone. An atmosphere to be wet or damp must by *common interpretation* be capable of communicating wetness or dampness to bodies in contact with it, and to do this, two conditions are requisite, the one, that it be in the language of the meteorologist, saturated, that is the "dew point," and the temperature of the atmosphere must correspond; the second, that *saturated atmosphere be warmer than the objects which it surrounds*.

It is, therefore, evident that in the case under consideration, the air, resting on the snow and salt mixture being *colder* than animals and the garments of persons, it cannot give to *them* any of its moisture—it (the air) cannot be to them *wet* or *damp*.

In conclusion, I would submit the following summary of what I regard to be the established points connected with this vexed question.

That salt does not itself volatilize or evolve either of its constituents, and being an antiseptic, or correction of putrefaction, *tends so far as it exerts any influence*, to preserve the atmosphere over the salted thoroughfares *pure and salubrious*.

That the practice of salting the railroad tracks is attended by the production in the liquid and semi-liquid mixture, of a temperature *not more than a few degrees colder than that of melted snow*.

That the use of salt, while it accelerates the thawing of the snow, likewise, by forming a solution less readily frozen at night or in cold weather, than simple snow water, *promotes and greatly hastens* the drainage of the city, and thereby in pro-

portion curtails the period to which the feet of persons and horses are subjected to the cold. That this depression of temperature is *only temporary*, and continues just so long as the snow is melting. The solution when once formed obeys the law of all other liquids, and may be warmed by the sun or other influences.

That the atmosphere at the elevation above the surface at which men and animals on the street breathe it, is not rendered *perceptibly* colder by the use of salt.

That so far as there is any *hygrometric* change produced in the air, the effect of salt is to render it more free from moisture, practically drier. This effect is at most but small, and only occurs near the surface of the cold mixture.

That leather is penetrated by salt and water less readily than by pure snow-water, and in consequence of the very small percentage of salt present, is not, when wet with it, sensibly more difficult to dry than when wet with pure water alone.

The erroneous impression which widely prevails that salt, as used in the streets, greatly promotes the absorption and retention of water by leather, is derived from the fact that, at the *sea shore*, shoes often remain damp, and are at times prone to moldiness upon the surface.

The cases are *not analogous*. The water of the sea is not merely a solution of *common salt* but contains likewise along with other ingredients *chloride of magnesium*, a substance which is remarkably *hygrometric*, or disposed to absorb moisture from the air. Besides, the air, itself during the prevalence of winds from the sea, is often so loaded with moisture as to explain, in itself the excessive dampness experienced.

That there is nothing corrosive in the solution of salt and water, nor any specific power to rot or disintegrate leather or fade colors.

In making this communication, which is intended as testimony chiefly on the scientific points involved, I would not have it understood, that I either ignore or undervalue the importance of that attention which it is the duty of the railroad companies to bestow, to keep the crossings clear, and to provide adequate outlets at intermediate points along their tracks for the escape of liquid accumulations.

On the contrary, I believe that much of what has been said in extenuation of the practice of "salting," depends upon their being a correspondingly free drainage.

I am, very respectfully, your obedient servant,

R. E. ROGERS, M. D.

(To be continued.)

Car Decoration.

Those of us who can remember a few years back, and call to mind the growth and change of car decoration, during twenty years, many perhaps ask themselves what we are drifting to in this direction. There was a time when light colors and curved mouldings were the only things "proper," and the ceilings were of various styles from jumble-esque to mixtoidal. Hard woods were religiously filled, painted, rubbed, and varnished, lest the too curious traveler should see that the Almighty had presumed to put a grain in wood. Rare and strange flowers lolloped all over the canvas; red tailed birds with marvelous purple crests hung horizontally in a lavender colored sky, and spread their yellow wings and displayed their sea-green breasts to the admiring gaze of beefy but boneless cherubs, who were engaged in weaving endless and useless wreaths and garlands, from trailing branches of endless length and great uniformity of leafage. The skilful application of grindstones and upper disks to glass, with a red or blue veneering, produced pineapples scarcely less prickly and uninviting than thistles, and fat comfortable nettles growing on the same stalk as

the classic acanthus, the civic oak, and fame's own laurel.

All this has changed.

Outside the cheerful canary and the honest though ugly buff have given place to hybrid olive and funeresque maroons.

Within, ash and butternut, cherry and bay, are Queen Anned and Eastlaked, graved; gouged and gargoyled; chamfered and daveled, filled and varnished "flat." Monochrome ceilings rest the eye. In some places, wicker-work overhead racks, more tasty than the brass bird cages which they supplanted, certainly give one the impression that if the car upset they wouldn't cut you very deep—at least not "on de bias, so 'twon't nebbber heal up."

And so through, around and over the car and its decorations—there have been some changes and some improvements, but the end is not yet; unity is absent; harmony seems to hate traveling; and the "eternal fitness of things" is largely unattained in car decoration.

We want to put more brains and less money in this line.—*Journal Railway Appliances.*

On. Title.

The publishers of this paper had so far decided to call it "the tramway," that they had the design for a heading prepared by an artist; but the prevailing opinion seemed so strong against the title, that the name was changed to the present one, more especially as the matter, though an unimportant one to us, seemed to be considered a serious one by the National Association. This latter body, had, in fact, requested another railway paper to change the name of one of its departments from "tramway" to STREET RAILWAY. So it may perhaps, be considered as settled that there are, officially, no "tramways" in America. In this connection, however, let us say that the prejudice against the word "tramway" is far from universal on this side of the water, even in quarters where Anglophobia is most pronounced.

In this connection we may say to those who object to the word "tramway" simply because it is English, that street railway men are largely responsible for the introduction of the word "railway" in America, instead of the word "railroad."

"Consistency, thou art a jewel."

Salting.

We think that this will be the last year that municipal corporations will try to stop track salting. Perhaps in the not distant future they will make it compulsory. Aldermen and Councilmen are strange beings.

Annual Reports.

The season for annual reports draws nigh, in fact, is at hand. We hope that the "crop" for '84 will make a favorable and satisfactory showing. We should take it as a favor if officers would see that we get early copies of their reports when issued.

Teaching Conductors to Steal.

We hope to have something to say at an early day upon the subject of the action of passengers in teaching conductors how to steal, and encouraging them in their peculations.

The Convention Reports.

In reply to numerous inquiries we have to make a general statement: that as the American Street Railway Association decided to exclude all reporters, except its own official stenographer, from the recent convention, and to limit the publication of reports and discussions until edited by the Secretary, we cannot give in this issue any part of any of the discussions on reports except that on salting.

— THE —

STREET RAILWAY JOURNAL.

MONTHLY, \$1.00 PER YEAR.

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P. G. MONROE.....General Western Manager.
ROBERT GRIMSHAW, M. E.Editor in Chief.
G. B. HECKEL.....Associate Editor.

AMERICAN RAILWAY PUBLISHING CO.

S. L. K. MONROE, Sec'y and Treas.

32 LIBERTY ST., NEW YORK.

8 LAKESIDE BUILDING, CHICAGO

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Editorial Notes.

THE number of subscriptions received for the STREET RAILWAY JOURNAL since the issue of its first number, and the words of commendation accompanying many of them are very gratifying to the publishers. If the subscriptions continue to come as they now bid fair to, our subscription list will soon be a tolerably good directory of the street railroads of the country, giving not only the general officers, but in some cases a dozen or more foremen, etc., as well.

WOULD it not be a good plan to see that the STREET RAILWAY JOURNAL reaches some of your foremen and other leading men, as well as the officers of the company?

SUBSCRIBERS to the *Journal of Railway Appliances*, who wish to transfer their subscription to the STREET RAILWAY JOURNAL will please write us to that effect. There are quite a number of names on the list of the former paper who took it on account of its street railway department, and who would now prefer the STREET RAILWAY JOURNAL, but we are not in all cases able to distinguish such, and would be glad to have them write us.

WE shall esteem it a great favor if our readers will notify us of changes on the roads with which they are connected, or of which they have knowledge. Such for instances as changes in officers; extension of track or addition to rolling or live stock, either made or to be made, and in short everything of interest, especially if you know of a proposed road. But don't assume that it requires some event of great importance to warrant your writing, *we want to hear from you.*

Coming Articles.

In coming issues of the STREET RAILWAY JOURNAL, the Reports and Discussions of the National and State Association Conventions will appear regularly. There will be plenty of short news items from all over the country, and, among other things, editorial and communicated articles about Car Painting, Heating, Lighting and Ventilation; Best Form and Material of Rails and Best Mode of Construction of Track; Grinding Wheels; Independent vs. Rigid Wheels; Choice and Care of Stock; Car Starters; Fare Collection; Motors and the Cable System; Shoeing Horses; The Refined Habits of the Louisville Street

Railway Mule; Humorous Incidents of Street Car Travel; the Kickers' Column (a sort of "Lion's Mouth" for memoranda concerning faults and abuses). All subjects considered by the National and State Street Railway Associations will be discussed editorially; and our columns will be open to communications from Street Railway men all over the country.

Our "Kicker's" Column.

We have already announced our intention to maintain our editorial independence, and while offering good will to all, to express at the same time our candid opinion on all subjects which may come to us for notice. We give the street railway interests credit for fair-mindedness and common sense, and are perfectly satisfied that they are willing to hear objections and acknowledge faults. No one would attempt to say that street railway service and methods could not, in some instances, be improved. These faults are, in most cases, trifles, but everything worth doing at all is worth doing not only well, but perfectly. Trifling faults are the most pernicious, because usually the last to be corrected, yet we have the word of a great master of trifles that "Trifles make up perfection, and perfection is no trifle."

Our "kicker"—omnipresent—always on the alert, will give his attention to these trifles, criticising with unsparing pen, where criticism is deserved, and commending where praise seems merited. On the other hand, we feel convinced that those criticised will take his comments (which will be *rigidly impersonal*) in the spirit in which they are made, and will heartily support his efforts to enhance the value of "trifles."

Which Side of a Tie Should Go Up?

[The following editorial from the Track Department of the JOURNAL OF RAILWAY APPLIANCES should prove interesting to those of our readers using timber for either cross-ties or stringers.]

There is one question on which there is a great diversity of opinion, although there are very few reasons adduced as to why one opinion or the other is formed, and that is whether the heart or the sap side of a tie should be laid uppermost; and in this we think our readers ought to be considerably interested, and might with great advantage exchange views, *with the reasons therefor.*

Opinions are plenty, but reasons, facts and figures scarce. In looking over the reports of a meeting of road masters on a well-known line, we find one claiming that "the heart side of a square sawed tie should be turned up in all cases, for the reason that a tie sawed in this way will warp to the heart, and if heart side down will make loose tracks and be difficult to keep in line or surface." Another gives us a reason for putting the heart side next the rail, that "when the timber is dry this is the rounding side of the tie, and being the hardest part of the timber is the best side for the rail to rest on, and will hold the spike the best." A third says that "the sap side would better be turned down, as ties rot first on top." A fourth calls for the sap side up, because "the sap side, when it becomes seasoned, throws off the water much better than the heart side." A fifth says (and this man is a "timber man"): "Take trees that will face 7 to 10 inches, and I do not think that it makes any difference in the durability of the tie, if it is properly hewn and so laid heart down or up. I do not think it makes much difference which side is up; I do not see why it should. * * *

A tie never seasons after it is laid in the ground; it will never season so as to check more on one side or the other. The durability is in this—that is, in having the back taken off."

Number six wants the sap side up, "be-

cause it checks from the heart and the water runs in."

And number seven says: "It is owing a good deal to the time when the timber was cut. In our country a good many cut their timber in the spring, and all the logs are either split or sawed, and in two or three months in summer you find two or three inches of sap rot that is not fit to go up under the rail, and you have got to turn it down to get some good part of the tie. What I claim about turning the heart down is this: if the tie be cut at the proper season of the year then the sap side of the tie would have no sap in it. The reason for turning the heart side down is that it will rot more quickly than the other side. Whether it is best to turn the heart side down or up is all owing to the time when the timber is cut. We buy timber at all seasons. When you cut large oak down in the spring just one-half of the life of the timber is gone on account of the sap being in it. Big heavy timber should not be cut in the spring."

The economical side of the matter calls for expert judgment; whether it pays best to get a longer life, or to hold the spikes better; and here comes in the opportunity for keen appreciation and wise balancing of the comparative and actual values of each advantage and disadvantage.

We hope that this question may interest our readers and call forth some expressions of opinion.

Jottings.

THE best pavement between the rails—upon which the animals appear to travel with greater confidence and less fatigue than any other possessing the requisite firmness and durability—is said to be one of rather small cobble stones laid with a slight inclination from the centre towards the rails. The top of the pavement should be of the same height as the adjacent edge of the rail. Horses should be shod with flat shoes, rather broad at the heel and without calks. The frog should not be cut away, so that a portion of the weight shall come upon it when even the animal treads upon an even surface. Horses on the Brooklyn City R. R.'s travel an average of 16½ miles daily. The average rate of speed on the New York City R. R.'s is from 6 to 6½ miles per hour, including stoppages.

A CAR weighing 4,000 lbs., carrying 28 passengers, would require the exertion of a force of 68½ lbs. ($\frac{2210}{130}$) to move it upon a level rail at a low speed.

By far the larger proportion of street cars used in the world are of American design and construction. The present tendency is to build cars light, thus economizing the dead weight to be hauled.

DOUBLE-DECKED cars are largely used upon the street railways of Europe. Such cars usually seat 22 passengers inside and 24 outside, and weigh about 5,000 lbs.

ONE-HORSE cars are said to be more economical in use and to cause a saving of time of about 15 per cent. over two-horse cars.

A HORSE can draw on a good stone tramway road a load 11 times as great as he can move with the same effort and the same speed on an ordinary gravel road. The force of the draught being only 1-189 of the load in the first instance, while in the second it is 1-16th. Even upon a very dry and smooth Macadamized road in its best condition, the traction power required is 3½ to 4 times as great as upon a firmly supported tramway. F. G. B.

Notes.

THE Cincinnati Street Railway has put in ten sets of Vose's new steel Cone Springs. The Cincinnati Inclined Plane Railway is also using the spring, and speaks very highly of it.

THE Globe Street Railway, Fall River, is putting on a number of new cars.

The Pronunciation of "Advertisement."

We were "brought up" to say advertisement, but got switched off to pronouncing it advertisement about half the time. On consulting the "booktionaries," we find that Perry, 1805; Smart, 1857; Cooley, 1863, and Cull, 1864, give the word as our home instructors of Lancashire English predilections started us. But Webster, 1864; Walker, 1806; Knowles, 1845, and Worcester, 1860, give both pronunciations as allowable; although every one of these last give advertisement first.

The word advertise is given with the accent on the last syllable by Webster, Perry, Walker, Knowles, and Cull. Smart and Cooley put the accent on the first syllable only, with a long *i* in the third syllable, and couldn't pronounce it that way to save their tongues. Worcester puts the accent on either the first or the third, and Cull on both, and the latter gets our vote.

Comments of our Kickers.

— Every time I pay six cents on a Philadelphia Street Railway, I feel myself defrauded to the amount of one cent. A cent is not much to me, but it is an unhandy coin, and when I hand out a dime I get four of these awkward discs of bronze to carry about in my pocket. They won't buy anything but stamps or newspapers, and I take the latter by the year and the former I buy in quantity, and the principle is what galls me most of all.

— Street cars will stop anywhere for any one in Philadelphia and some other towns. This is unfair for horses, passengers and drivers of other vehicles. Better the Chicago rule; stop only at the further side of street crossings. The lady who is too tired or too sick to walk half a block ought to stay indoors till she recovers or gets rested.

— The Allentown, Pa., street cars are very dirty, and usually "funky." Soap and water don't cost much and it should be remembered that "cleanliness is next to godliness," especially in cholera seasons.

— Opinion is divided between those favoring car windows to raise, and those favoring the pattern which drops. The question can be settled by coaxing the drop-window crowd to ride in one of their favorite cars on a right cold day. It will kill off the whole generation with congelation of the spinal marrow.

— The People's Co. (Philadelphia), uses disinfectants liberally about its depot. My comment is hearty endorsement.

— The Union Line (Philadelphia), charges six cents fare, and sells five tickets for thirty cents; wherefore the tickets? Same comment applies to all but three Philadelphia companies. P.

— When a conductor will not stop the car at West Warren Street, but insists on carrying me in a driving rain, some eighty or a hundred feet further, to Warren Street crossing, I can bring him to a stop in just twenty feet, by ringing in fares on him at the rate of 35 a minute. This is calculated so:—Velocity of car, eight miles, or $5,280 \times 8 = 42,240$ feet, in one hour or $60 \times 60 = 3,600$ seconds; that is, $42,240 \div 3,600 = 11.73$ feet per second, then as 20 is to 11.73, so is 60 a minute to 35 and a small fraction. How beautifully science aids us in our daily affairs!

— It might not be a bad idea for conductors to be furnished with tarred-ended sticks, with which to fish pennies out from between the cracks of the wooden mats on car floors.

— In Wilmington, Delaware, there was at one time a director of the city railway, who was in the habit of collecting cash car fares (seven cents) in the "bobtail" cars, and depositing tickets (20 for a dollar.) "How doth the Little Busy Bee," etc.

— Is there any particular use in having a car stop at No. 369, and then again at No. 375, on an up grade?

— "Kid-knockers" are needed on many lines. They prevent children from getting under the wheels, and often save the car-horses from serious injury.

— In some cities the centre bearing rail is the one allowed, and in others, it is absolutely prohibited. Is there not a good deal of whichness in this howness?

— Rubber covered steps are desirable in icy weather.

— The man who jumps backwards off a car, and thereby falls on his what-do-you-call-it, should be run over by a dray and put out of the world where his example does harm.

— How many conductors are lead to steal, by old drivers?

— On some lines, the old diphtheria-laden straw litter is still used in cars. That is the only thing good that I can see in the car store—it renders the use of straw impossible.

— Don't you think that drivers would see more passengers if they had nice warm "mitts" on?

— You can rest assured that if it costs a man \$12 a week to live, he will not be both honest and over-active if you pay him only \$10.

— They say that if the East New York and Bedford night cars down, on the the Fulton Street Line, Brooklyn, were just two minutes earlier, they would connect every time at the City Hall with the Court Street Line. It might pay somebody to cipher this out so that passengers would not be exasperated by seeing the hind green light about ten blocks ahead on Court Street. Both the Fulton Avenue and the Court Street lines lose night fares in damp weather on this account. "All of which I saw, and part of which I was."

— What redress is there for the countryman who puts his fifty cent piece in the box in the bobtail car, and has to whistle for his change?

— In Camden, N. J., the City Railway people are pious—at least they keep Sunday. From the fact that Sunday is about the only day that most Camden people have for exchange of family and friendly visits, I'm inclined to think that the piety is enforced on the street railway men.

— Car steps should have a back guard where the riser would be in a regular stair case. A passenger is liable to put his foot through and get his ankle broken or his head thumped.

— Has a thin man any rights that a fat woman is bound to respect? It's no fun to be "sat upon," as often happens, by a 340 pound sylph.

— How pleasant it is to have your face wiped by an umbrella in the hands of some one who has stacked it (the umbrella, not his hand nor your face) in the space where the window sash goes when the window is opened.

— The conductor who objects to taking all pennies for two six cent fares is apt to get nothing but pennies so long as this kicker rides in his car, which he does pretty often.

— Who should decide whether or not a silver piece is too smooth to pass? I've had conductors refuse to accept smooth pieces, and others insist on giving them in change. It would seem to me that the recipient should have the say in all cases.

— Has a driver any right to insist on receiving a fare before the passenger has ridden ten feet in "the wrong car" simply because he rang the fare up when the passenger touched the platform? Strangers unfamiliar with car-lines are just as much entitled to protection as though they needed none.

— Who shall decide whether an oversized eleven-year old boy is or is not entitled to ride for half fare? Must the boy carry a birth certificate with his photograph, attested each year by his pastors and masters?

— Hasn't a woman a right to nurse her baby in a crowded car? Has a conductor the right to suggest that the meal be de-

ferred in consideration of the mixed character of the load?
W.

Colors versus Oils, Dryers & Varnishes.

Take it in general, the manipulator of the above has very little or no knowledge of the chemical combination of the articles he uses, nor does he know anything about the chemical reactions, oxidation or decomposition of the same, and that through these almost all difficulties arise.

All colors, oils, dryers and varnishes should be divided into two classes: firstly, those containing sulphur, and secondly, those containing lead.

It is an old established fact, that whenever sulphur and lead become closely combined, they will form black sulphite of lead; and through the chemical action taking place, destroy the color crumble it down and separate a part of its constituency. Thus we find a white color—for instance, white lead if mixed with linseed oil, boiled with sulphate of zinc or sulphate of manganese, or a dryer containing any compound of sulphur turn yellow, crack and decay while had they been mixed with an oil dryer or varnish containing a manganese and lead complication, the action of the sulphuret of hydrogen could not have taken effect; at least not so soon.

Some of our best and finest colors contain sulphur; as for instance, cadmium yellow, vermilion (sulphate of mercury), sulphate of indigo, etc., and it is especially these colors which are the most brilliant used by painters. If these colors are mixed with an oil or dryer, or covered with a varnish containing lead, they certainly must go to pieces; for the sulphur will unite with the lead and form black sulphite, and through this will darken the color, or change it and destroy the luster.

It is often the case that a painter can work a certain color with one dryer, while he cannot begin to use it on another. This is simply because the one or the other color contained the opponent ingredient of the dryer used with it, and the sulphur or lead will unite, and the color instead of liquefying becomes thick as mud.

The same might be said of varnishes.

There is no doubt but every respectable house in the country manufactures good varnishes, which are appreciated and liked, where they are used on the articles and colors for which they were intended.

It is very often the case, that the poor varnish manufacturer is pounded down by reason of the want of chemical knowledge of the consumer of paints, oils and varnishes. Too often the dullness and cracking have nothing to do with the varnish, but lead and sulphur do it all.

Take for instance vermilion (sulphite of mercury) and its compounds, colors largely used by our different manufacturers. Why is it that so few varnishes will stand the test to retain color and brilliancy? Simply because they are destroyed by combining them either with other colors containing lead or with a dryer containing lead, or are mixed with a coloring varnish containing lead, or are finished with a finishing varnish containing lead.

The painter stands dumbfounded, and don't know what in the world did the mischief, for nothing but the lack of the knowledge of the different actions of one color, dryer or varnish on the other.

Therefore I would say:—

That all dryers and varnishes made with oil boiled with any lead compound are not fit to go on a color compounded with sulphur, and *vice versa*.

To be on the safe side, it is better to use neither one, but to adopt the so-called liquid manganese dryers.

They will mix with any raw oil, do not alter the colors, and are the best guard against the action of sulphuret of hydrogen.

W. ZEISS.
Akron, O. Practical Chemist.

Cracks in Varnish.

ED. JOURNAL RAILWAY APPLIANCES:—

We have not (and do not now) manufactured varnishes for some years, and therefore have never had the question regarding the cracks presented to us. We should say, however, that the varnish-filling in the pores and grain of the wood has a certain reserve to draw on when it comes to any expansion, while laterally there is no such reserve, and the cracks are formed in consequence.

D. F. TIEMANN & Co.

New York.

Cost of Working English Steam Tramways.

Engineering gives the following particulars of the working cost for twelve months of the engines referred to, in use on the Dewsbury Tramways, where they have been running for the past 4½ years. The line is equipped with nine Merryweather engines:—

	Cost per Mile run.
Coke	0.72
Oil and waste.....	0.11
Water.....	0.02
Firewood, etc., for lighting... ..	0.02
Locomotive repairs.....	0.59
“ drivers.....	0.83
Coke, watering and relief man.	0.11
Cleaners.....	0.17

Total cost of working per mile 2.57

Our exchange believes that these figures are the best yet shown by any makers of steam tramway locomotives, and says: “It will be noticed that the renewals and repairs only amount (after over 4 years’ work) to 5 per cent. per annum on the cost of the engines. It may be interesting also to note that the weight of coke consumed throughout the year has averaged 6.54 lb. per mile run, the number of miles traveled being 141,065.”

Personal.

— R. J. Wylie, Superintendent of the Forty-second Street, Manhattanville and St. Nicholas Avenue Railway, was for two years identified with the Cable Railway in Chicago.

— H. C. Simpson, Secretary of the Lewis & Fowler Mfg Co., will make a western trip about the first of January, taking in Pittsburgh, Columbus, Cincinnati, St. Louis, Chicago, Kansas City, St. Joseph, Omaha and Denver.

The Hind Roost.

In these days of heated cars, many persons find the rear platform more comfortable than the inside of the car; and, in fact the crowded condition of the cars at many times makes platform riding a necessity. This being the case, the action of these companies is commendable which give a four inch strip as a cover for the hind rail instead of compelling the open air passengers to sit on “hex” nuts.

Frequent Stoppages.

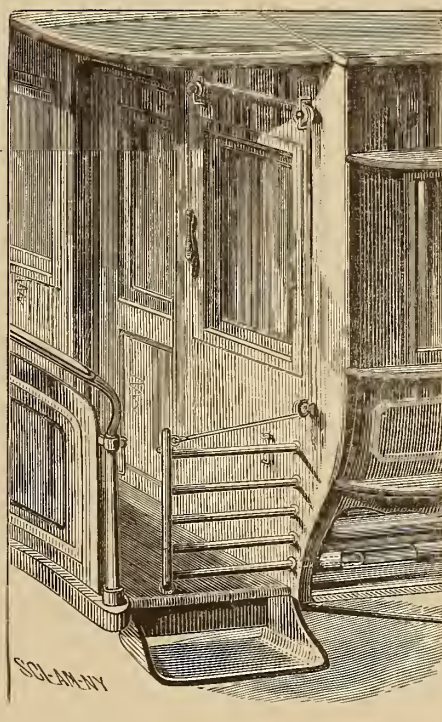
In our “Kicker’s Column” is a squib about frequent and unnecessary stoppages. Unreasonable passengers who call for stoppages every ten feet, especially on up grades, should be made to know that their selfishness, causes suffering and fatigue to the horses and loss of time to fellow passengers, to say nothing of the loss to the company. Just cipher it up and see how much shorter trips could be made with stoppages only at crossings.

Varnishing.

About half the trouble in car varnishing comes, not so much from purchasing poor varnish, as from improper care and unskilled use of what varnishes are bought; putting a fine grade on top of a cheap grade having different expansion and contraction under heat and cold, and so on. The varnish maker gets blamed in such a case as the last-named, because his varnish, warranted better than lower grades which had been used before, does not show up as well as when the last coat was of the cheap grade and just like the under coats.

Hughes’ Car Gate.

In the side wall of the car in a plate is inserted a series of tubes. The openings in the plate are made smaller in diameter than the tubes to prevent the bars from being drawn out. A gate, composed of the bars projecting through the end wall of the car into the tubes and secured at their outer ends to a vertical bar, is capable of sliding in or out over the car platform. The ends



of the bars have rollers to steady them in the tubes, and the vertical bar is provided at its lower end with a roller, which rests upon the car platform and supports the outer end of the gate. The openings in the plate, through which the bars slide, are made smaller in diameter than the tubes to prevent the rollers from being drawn out.

When the gate is closed the bars are partly withdrawn from the tubes, and when it is open the bars are pushed into them. The gate has an eye capable of being engaged by either of the hooks attached to the end of the car and to the platform rails to hold the gate in either an open or closed position. A cord, secured to an eye in the upper end of the bar, extends under a pulley attached to the side of the car and over other pulleys, which bring it within easy reach of the conductor or other person near the door of the car. By pulling this cord the gate is opened.

The patentee* claims that “this car gate will not open by lateral pressure, consequently no accidents can happen from crowding against the gate. It is applicable to street and railway cars, platform exits and entrances from and to cars, and can be applied without material change in the cars or in the building.”

*Dr. C. H. Hughes, 3000 Chestnut St., St. Louis, Mo.

Notes.

— The Third Avenue (N. Y.) Cable Railway is being rapidly pushed towards completion. A large quantity of the iron work such as that for carrying the rails, elevating sheaves, crossings, curves, etc., is being furnished by Andrews & Clooney, N. Y.

— The Forty-second Street, Manhattanville & St. Nicholas Avenue Railway Company’s lines, when all complete, will be as follows: 42d St., East and West; East 34th St. Ferry to First Ave., to 42d St., to Seventh Ave., to 45th St.; Broadway to 59th St.; Boulevard and Manhattan St. to Bull’s Ferry; West 34th St. Ferry to 12th Ave., to 42d St., to 10th Ave., to Manhattan St., to Bull’s Ferry; 109th St. at East River, to 1st Ave., to 110th St., to St. Nicholas Ave., to Manhattan St., and Bull’s Ferry, 34th St. East and West, 42d St., 110th St. and Broadway and Boulevard Lines are now complete; 600 men are now engaged in constructing. The 34th St. track will be laid in the spring. Iron work is furnished by Wm. Wharton & Co., Andrews & Clooney and Z. S. Ayers.

— The 42d Street, Manhattan & St. Nicholas Avenue Railway now have 25 cars running; are about adding 25 more, and will, soon after the first of the year, have 80 on the road. All are built by John Stephenson Company, have super springs, White wheel, and are first-class in all respects.

— Andrews & Clooney, New York, have a new graduated spring running on several of the roads which, it is claimed, is a success. It is said to carry the cars more steadily without the ducking motion so common, and to ride equally well with empty car as with heavy load. A. & C. report good orders on hand, and the outlook for the coming year flattering.

— The Broadway & Seventh Avenue road is putting on forty new cars built by Stephenson, thirty of which are to replace old cars.

— The 42d St. & Grand St. Ferries Railroad has, during the past eighteen months, put on 30 new cars, 15 of which were built by the John Stephenson Co., and the remainder at its own shop. Other cars are being rebuilt in the Company’s shop.

— The Kansas City Cable Railway Co. has just placed on its road ten grip and ten passenger cars, built by Stephenson. They have super springs and ventilating ceiling.

— The John Stephenson Company, N. Y., have in hand large orders for different parts of South America, including four different cities in Chili. Of the first-class cars now built at these works, about nine-tenths are fitted with the super spring, and a large proportion with the perforated ventilating ceiling.

— W. Jennings Demorest, N. Y., has a factory in Norwalk for the manufacture of his fare-register and other railway supplies, including a registering punch, etc. It is claimed that his duplex register accomplishes the same without the paper dial as other registers, and admits of using the permanent record dial at any time desired.

— The Troy and Lansingburg Railway is re-laying tracks with steel, and will double portions of its track as soon as permission can be had. Six open cars have been ordered for the new Green Line of this Company.

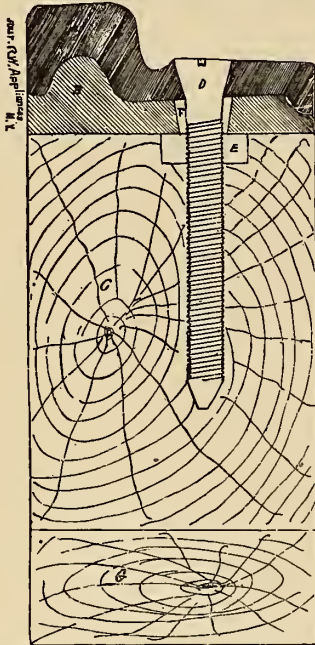
— The Troy and Lansingburg road will gain considerable new business on account of a large roller skating rink now building in Lansingburg. The company will issue tickets to the rink, and it is understood the enterprise was very materially encouraged by stockholders in the company. There may be in this a suggestion for other roads, which may be able to engineer similar enterprises to their profit. Other cases

Railroad Joints.

[Read before Wisconsin Society of Engineers, Sept. 2, 1884.]

The editor of the *American Journal of Railway Appliances* wrote: "A recent caller complained that he could not get any satisfaction out of the ordinary tram-rail 'joints,' that they were unstable and caused battering of the rail ends and uneven riding of the cars.

"We were not aware that on many of our tramway lines there was such a thing as 'joints' in the rails. There are periodical breaks or spaces or interruptions or something like that, but on careful examination and recollection we do not find anything which would justify us in swearing that there were 'joints.' The alleged joints remind us of a story concerning a certain

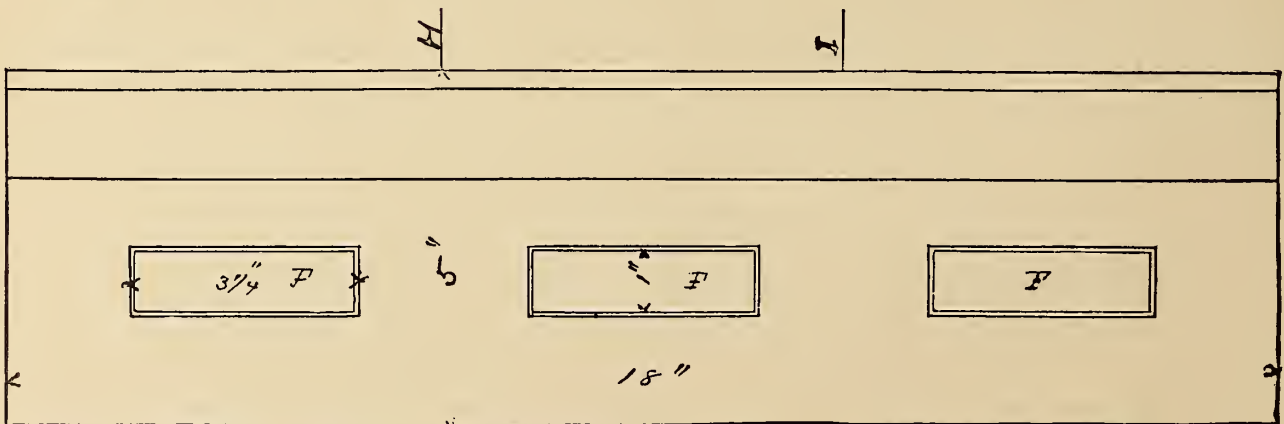
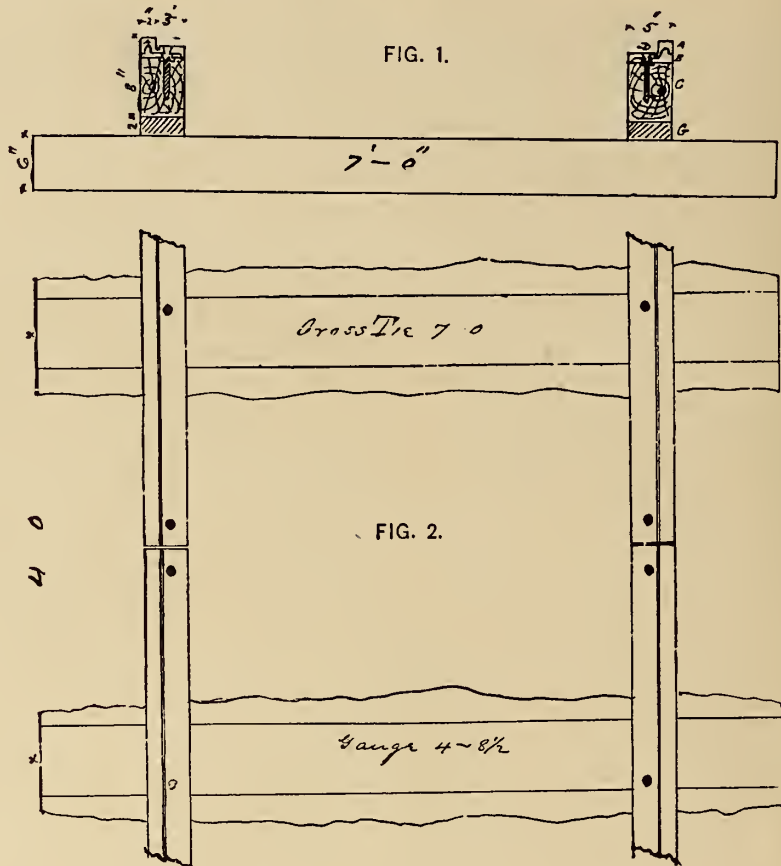


member of the theatrical profession, who was what is technically called by his fellows a 'barn-stormer' of the 'wild and terrible' variety. This individual was a witness in a legal case. Upon being sworn and asked his name he gave it as christened:

speaks of the practice then in vogue, of putting plates under the strap-rail joints. The specifications for track laying on the Utica & Syracuse R. R., contained the following: "As each joint of the iron plate (rail) end plates shall be neatly fitted into the oak ribbons, so as to bring their upper surfaces in the same horizontal place, the end plates shall be six inches long, 2½ inches broad (same width as rail) and ¼ inch thick." This was prior to 1843.

When "street railways" for passenger service were inaugurated by the construction of the New York & Harlem, in the city of New York, 1832, operated by horse power and laid in the street, it at once

each other, and the latter the stringer and rails. The common practice in this country has been merely to spike the joints, through suitable openings in the chairs to the stringer beneath. If carefully laid this would give a reasonably smooth joint for a time, but the weight of the loaded car would press down the end of the rail upon which it rested, and no weight being upon the other rail end it would project a little. The wheel striking against this projecting end, deflects it, and bears a trifle from off the top of the chair and the bottom of the rail. This action taking place upon the passage of every car wheel soon makes a "bad joint." The chair I now show you



and when asked his profession he replied, 'I am an actor,' upon which every one of his comrades shouted by preconcerted arrangement, 'Perjury! your Honor! perjury!!' There is no good method known to us, by which the common flat street rail can be given a good, real substantial, durable, smooth acting joint."

I have given much study during some years to this question. The ordinary practice of our street railroads is practically the same that was introduced upon steam railroads with the use of "strap-rails" laid upon wooden stringers. Stevenson, in his *Civil Engineering of North America*, 1838,

became evident that to protect the general public in the use of the street, the rails should be low and offer as little obstruction as possible to the passage of vehicles. As other street railways were built the shape of the rail was fixed by ordinance. The rails have been designed, in the majority of instances, to serve merely as a protection to the timber substruction. They vary in size and shape, and joint chairs are made to correspond. When the bottom of the rail is flat, plates of sheet iron have been used at joints. Also chairs of cast iron, with tips on each side, top and bottom. The former to hold the rail ends in line with

was thus worn one quarter of an inch in four years. The spikes become loose almost from the start and rapid depreciation follows. To avoid these discomforts to the passengers, rapid destruction of the rails, wear and tear in rolling stock and horse flesh, different remedies have been proposed. In foreign countries, bolts have been used passing through the rails and stringer with a washer and nut on the bottom. Another fastening consisted of a "staple" driven into the side of the stringer, one leg passing through a suitable opening in the side of a specially designed rail. A little reflection will, I think, con-

vince you of the inutility of such joint fastenings. In the first place, unless the timber is thoroughly seasoned, it shrinks. Condit, in his work on painting, quotes the measurements of Karmasch in Germany on percentage of shrinkage of timber in seasoning. In the direction of yearly rings "pine" shrinks from 5.5% to 12.7%, white pine 4.1% to 8.13%. If no other objection existed to the bolt this would suffice, for very little, if any, track timber is thoroughly seasoned and the shrinkage will loosen the fastening and allow a little play at the joint to be soon increased by wear; but as all track men know, the water falling upon our tracks consisting of rain, sprinkling, etc., etc., follows along the flat "train-rail" until it reaches a rail joint, when it soaks through. The recess cut into the stringer for the chair beneath the rail joints, seems to retain this moisture and *this* is the first portion of the stringer to become soft and rotten. The load upon each wheel of a street railway car, upon "rush trips" at times equals *three tons*. This great weight forces the chair into the wood. If an ordinary spike has been used to fasten the joint, it does not follow, and the joint is then loose. This is also true of a bolt passing through the stringer with a nut beneath. The carpenter, who cuts into the stringer for the chair, may adze true and level, and the chair be "in wind" or have slight projections upon its lower surface, so that it does not take a firm bracing upon the wood until the weight of the loaded car wheel comes upon it. In such event, the joint will soon have play and rapid wear results. It has been proposed to fasten the rail ends to the joint chair beneath by short bolts, but this fastening bracing the joint unattached to the timber allows the whole joint to vibrate under passing trucks, and thus wear into the wood. The joint I have presented as the result of my investigation, is constructed as follows: The chairs may be of steel, wrought or cast iron. Those used by us were made of cast-iron, they correspond in width and shape with the bottom of the rail, 5 inches wide, $1\frac{1}{4}$ deep under rail head, which is rolled hollow, $\frac{5}{8}$ deep under train of rail 18 inches long. They are let into the stringer so that their tops project $\frac{1}{8}$ inch, and two-thirds of their length is laid *against* the traffic on tracks, when the travel is all in one direction. The form of rail and corresponding chair is immaterial. *Under the chair*, two or more nuts are let into the top surface of the stringer flush with the latter, and beneath the holes in the rail ends. The chair is then placed on three nuts, through which holes have been bored into the stringer, less in diameter than the opening through the nuts for the bolt to pass. Suitable openings are provided in the chairs through which these bolts pass, long enough to allow contraction or expansion of the rails. The rail is placed on the chair and the bolt secured through the nut into the stringer. The nut securely fastens the chair and rail ends together and prevents wear. It is longer across the stringer than it is wide, so that the wood acts as a nut lock and prevents its unscrewing by traffic vibrations. The prolonged screw beneath the nut fastens the entire joint to the stringer. Beneath the stringer, between it and the cross ties at the rail joint, I put in a piece of timber two inches thick, same width as stringer, to compensate for the timber cut away for the insertion of the chair. This construction renders the joint fastening independ-

ent of all shrinkage in the wood. Should the chair sink from any of the aforementioned causes, the nuts beneath carry *both* rail ends with them and no jar results. The nut also forces the screw down into the solid wood, and no vibration can take place. This joint will add to the life of the rails, for they first fail at the joint. The manager of a large rolling mill told me he thought it would prolong the rail service 10 per cent. It will save horse flesh, requiring less power to keep a car in motion and less effort to start, for the car is most apt to stop at a defective joint. It will save the rolling stock that is racked and strained passing over bad joints with heavy loads; and lastly, it will add to the popularity of a railroad by affording increased comfort to its patrons. I have used it in our tracks and would be pleased to have you notice Fullerton Avenue or Garfield Avenue. The track rides as if constructed with one solid rail. My aim has been to provide a *BETTER joint*, for the various rails now in use without any expense that would be involved by changes in them. This joint fastening is inexpensive and easily applied. In the accompanying drawings Fig. 1 shows a cross section of track; Fig. 2, a ground plan;

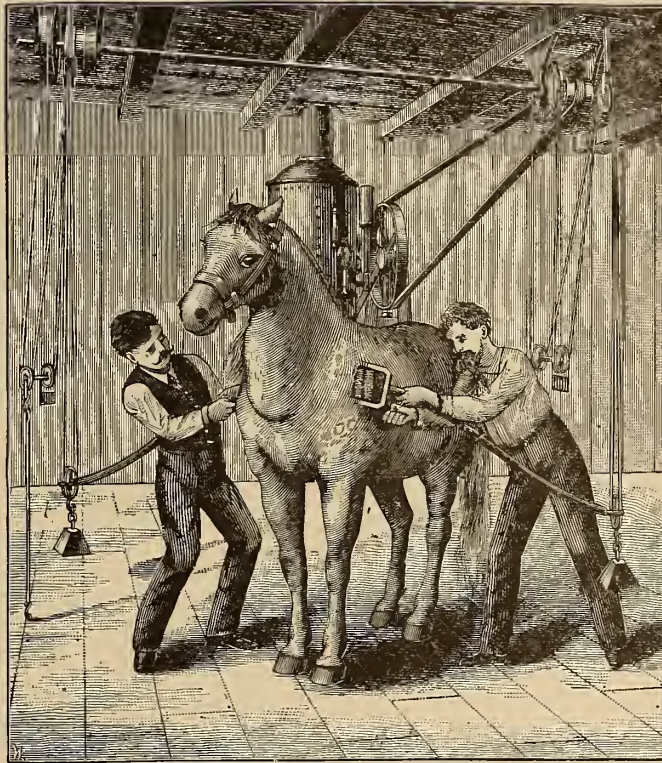


Fig. 3, top view of a chair; Fig. 4, section through the joint. *A* is the Chicago rail; *B* the chair; *C*, the stringer; *D*, the joint screw; *E*, the nut, fastening the rails to the chair; *F*, the opening through the chair for the bolt; *G*, the additional timber put under the stringer. In Fig. 3 the points *H* and *I* show where the rails join in the chair, the direction of the traffic regulating each of the tire points. This figure shows the openings through the chair *F*, for the fastening, allowing expansion or contraction of the rails.

AUGUSTINE W. WRIGHT.

Pennington's Grooming Machine.

The illustration herewith gives a very clear conception of a recently invented machine* for grooming horses and cattle rapidly and easily. It consists of a cylindrical brush, held so as to revolve in a suitable frame, carrying also an actuating set of beveled gear wheels. Motion is communicated from a flexible shaft passing

through the central grip or handle shown in the cut, and actuating the gears, and through them a cross shaft, from which a small belt carries the motion to the brush. A second handle, attached to one corner of the frame, facilitates manipulation. The vertical spindle operated directly from the flexible shaft, carries two gear wheels, either of which can be made to engage with the wheel of the horizontal shaft, thus causing the brush to revolve at will in either direction. Motion is provided by hand, steam or animal power, as may be most convenient. As all belts are swung from loose weighted pulleys, and the actuating shaft itself is flexible, great latitude and freedom of motion and application are provided.

The flexible shaft is enclosed by a stout leather casing which is stationary.

* Ellis Pennington, 204 Walnut Place, Philadelphia, Pa.

Rights of Street-Car Passengers.

A *Tribune* reporter mentioned to Lewis Lyon, President of the Third Avenue Railroad, the case of a man who had recently been fined \$10 for refusing to leave the car of one of the city companies, and asked his opinion upon it. The driver claimed that the man had not paid his fare, while he swore with equal vehemence that he had. Said Mr. Lyon: "The Judge must have been convinced in one way or another that the passenger's fare had not been paid. What safeguard have passengers against illegal ejection from street cars? Well, the practice on our line is this: We give our conductors the strictest orders never to turn a passenger out for non-payment of fare unless they can secure the testimony of two respectable witnesses to support them. We prefer to let a few rascals ride free rather than expose ourselves to possible lawsuits. There are some men who make a practice of provoking assaults with a view to bring suits for damages. It is the old cry: Anything to beat the corporations. If, however, a conductor should turn out a passenger for non-payment of fare and had no witnesses to support him, the jury would be obliged to decide whether they would believe the passenger or the conductor."

"What remedy would a passenger have who had been ejected after actually paying his fare?"

"He could recover whatever damages he could prove. It would be a case of assault, and the element of public disgrace and injury to the plaintiff's feelings might be used to swell the amount. There are some persons whose feelings become wonderfully delicate when they expose them to the scrutiny of a jury."

Car Decoration.

In future issues we shall treat of the question of car decoration, particularly as regards the production of a style and manner which shall combine beauty, appropriateness, durability and low cost. We shall show how it is possible so to decorate a car that there shall be a proper fitness and unity, and that the work shall not be expensive nor complicated, and that it shall be of a character which shall stand wear, tear and the action of heat and cold, wetness and dryness and their sudden alterations, as well as the gases peculiar to the street railway car stables or "barns."

could be sighted where the same thing is done successfully.

The Concord, N. H., Horse Railroad Co. is considering the purchase of motors to be used on the Penacook extension.

A new horse railway is under consideration at Gloucester, Mass.

Three leading lines of horse railway in Boston will reduce fares to five cents on Jan. 1st, and it is thought all other lines will adopt the same rate at that time.

H. M. S.

THE Susquehanna Avenue Line of the People's Passenger Railway Co. (Philadelphia), has been completed, and is equipped with 13 double team cars. (For route, see issue of Nov. 1884.)

THE Annual Meeting of the People's Co. (Phila.), takes place on the second Monday in January. The report will be a very favorable one; the increase for the year showing to date (Dec. 10th), an increase of 600,000 passengers carried over last year.

THE Philadelphia Traction Co's. car shops at 48th Street and Haverford Road, were burned on Saturday, Dec. 13th. All the machinery was lost (mostly new), and some cars in for repairs. Loss \$50,000, partially covered. Two of the new cars were burned, the rest being stored in a shed some distance away.

THE Hestonville & Mantua Co. (Philadelphia), is gradually getting into better shape, and it is currently believed that it will take but a short time to get the company back to its old fine condition. When accomplished it will be a fine business success; as, when the present owners took hold the road was worse than bankrupt, and no one ever expected to see it maintained in its integrity.

CABLE cars are running on Columbia Avenue, Philadelphia.

A NEW bridge is to be erected over the Schuylkill River, at Market Street, Philadelphia, wherein, we believe, provision will

be made for the conduction of the Traction Co's cable. This is possible in Philadelphia, the last draw-bridge being at South Street. G. B. H.

SYRACUSE (N. Y.), CITY RAILWAY CO.—Sanford D. Evans, for some ten or fifteen years Superintendent, died on the 4th inst., aged 71 years. Geo. Crampton formerly a conductor is elected to take his place.

THE Syracuse (N. Y.), & Geddes Railway has put on a number of new cars, laid new steel rail and made various improvements.

P. H. HERSEY of Hersey Brothers, manufacturers of machinery, South Boston, has been chosen President of South Boston Horse Railway Co.

THE Metropolitan Street Railway Co., of Boston has just opened a new line from Temple Place to Coolidge corners, a distance of four miles, cars every fifteen minutes; six cent fares.

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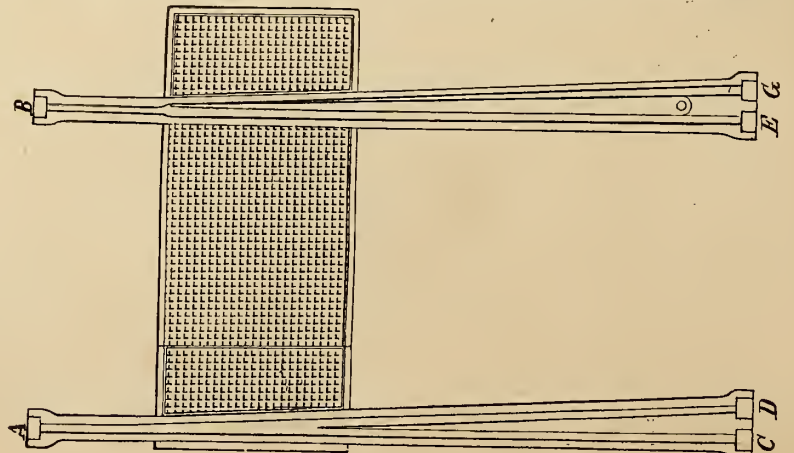
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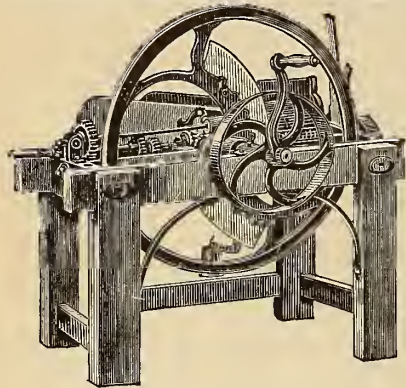
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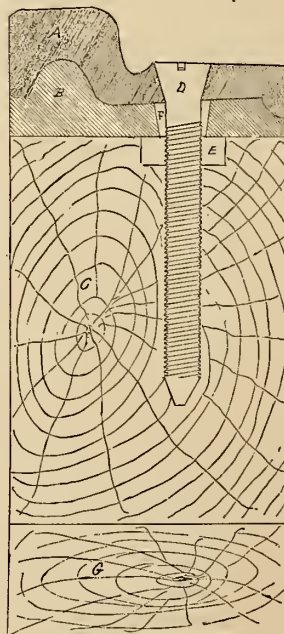
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WRIGHT'S

PATENT JOINT FASTENING.



The accompanying cut shows a cross section through joint. A is the rail, B the joint chair, C the stringer, D the patent screw fastening, E the nut, F a slot in chair allowing rails to contract and expand. The chair cannot settle and the rail ends are held level with each other, preventing the many evils of ordinary construction.

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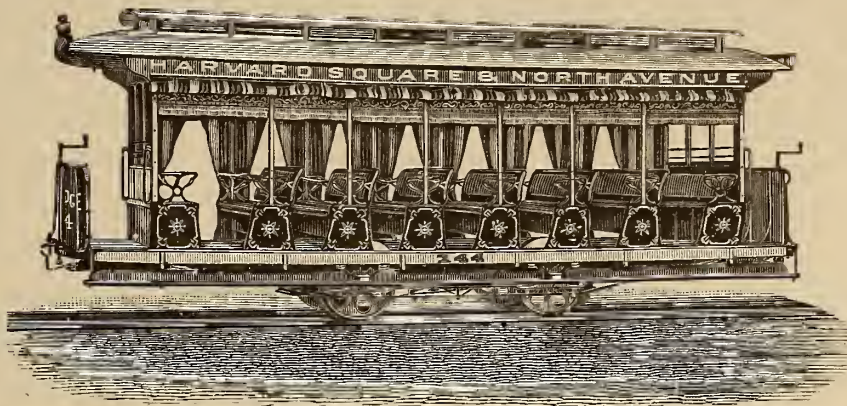
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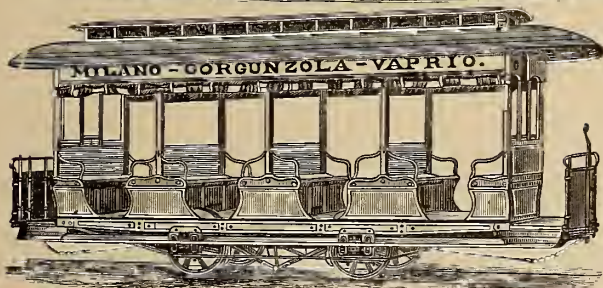
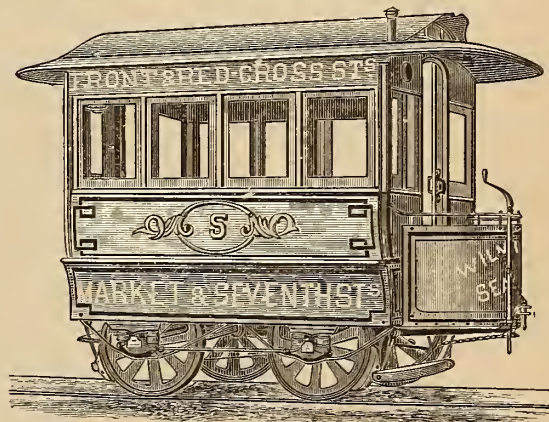
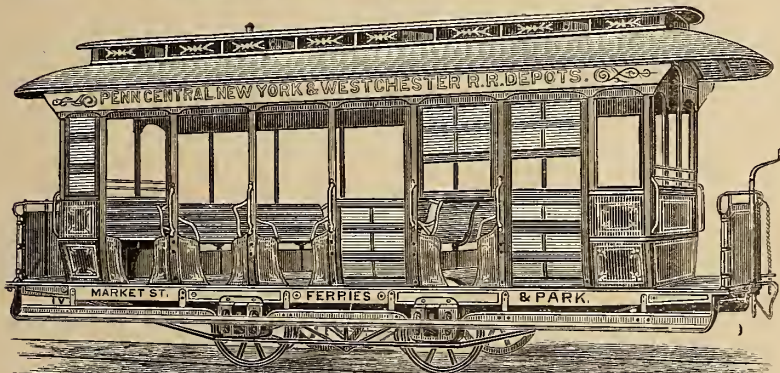
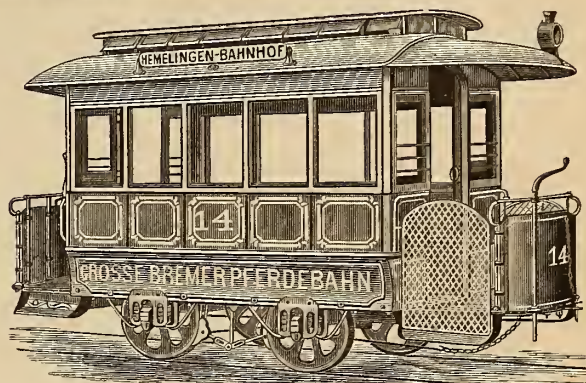
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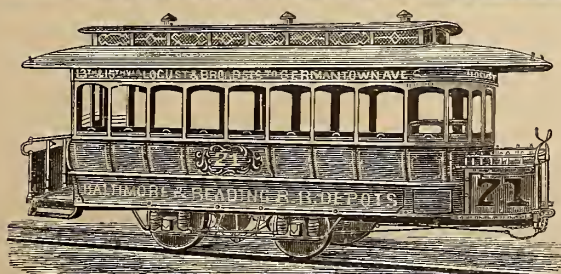


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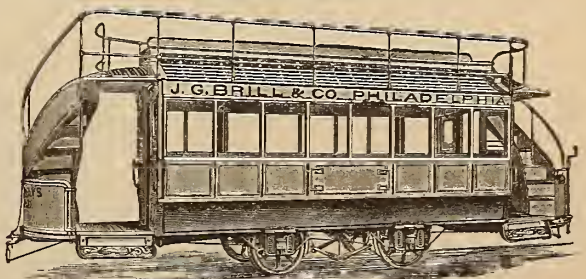
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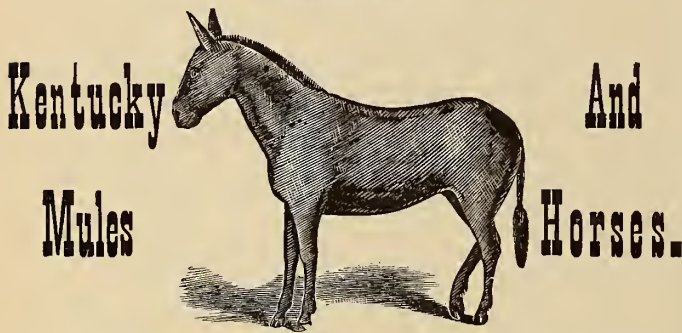
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Having furnished Horses and Mules to the Street Railway Companies of Louisville, Ky., Minneapolis and St. Paul, Minn., New Orleans, La., Pittsburg and Philadelphia, Pa. Richmond, Va., Atlanta, Ga., Chattanooga, Tenn., and a large number of other towns in the United States, we are thoroughly acquainted with what is wanted, and can fill orders promptly, as we always have

FROM 400 TO 600

HORSES AND MULES ON HAND.

OFFICE AND YARDS:

**Cor. 16th and Main Streets,
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Established 1832.

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VALENTINE & COMPANY,

Manufacturers of High Grade

**Coach and Car Varnishes and
Colors.**

NEW YORK,

245 Broadway.

BRANCH HOUSES:

CHICAGO,

68 Lake Street.

BOSTON,

153 Milk Street.

PARIS,

91 Champs Elysees.

PLUMBAGO BEARINGS.

—FOR—

CABLE ROADS.

Warranted to Run Cool, without Oil,
Grease or other lubricant.

4,000 IN NEW YORK.

2,600 IN KANSAS CITY.

J. J. RYAN & CO.,

62 & 64 W. Monroe St., CHICAGO.

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TRADE **VALENTINE'S** MARK

"THE STANDARD FOR QUALITY."

THE GOLD MEDAL

WAS AWARDED TO

Valentine's Varnishes

BY THE

Amsterdam International Exhibition,

SEPTEMBER, 1883.

A Partial List of Awards Heretofore Given Valentine's Varnishes:

International Exposition, Philadelphia,	- - - -	1876
BRONZE MEDAL AND DIPLOMA.		
Exposition Universelle, Paris, France,	- - - -	1878
SILVER MEDAL.		
Melbourne International Exposition, Melbourne, Aus.,	-	1880
SILVER MEDAL AND FIRST ORDER OF MERIT.		
Adelaide Exposition, Adelaide, So. Aus.,	- - - -	1881
SILVER MEDAL AND FIRST DEGREE OF MERIT.		
American Institute, of the City of New York,	- -	1859-1870
SILVER MEDAL AND DIPLOMA.		
Maryland Institute for the Protection of Mechanic Arts,	-	1873
SILVER MEDAL.		
Massachusetts Charitable Mechanics' Association, Boston,	-	1860
SILVER MEDAL AND DIPLOMA.		
Mechanics' and Agricultural Fair Association of the State of Louisiana,	- - - -	1873
DIPLOMA.		
Agricultural Society of New So. Wales,	- - - -	1877
BRONZE MEDAL.		
Mechanics' Institute, San Francisco, California,	- -	1877
SILVER MEDAL.		

LAKE & McDEVITT'S Patent ROPE TRACE

For Horse Railways, Omnibus Lines, Etc.

The Advantages

OF THE

ROPE TRACE

are its ready application to Horse-Car service, or to any other purpose where cheap harness is required. It only costs about half as much as leather traces, while at the same time one set of Rope Tugs will (when used on horse cars) take the place of three or more sets of leather traces, as the Tugs remain attached to the car all day, no matter how many changes of stock are made. The relief horses having hoo's attached to their hames, all that is necessary is to unhook the tugs from the working team back in the fresh horses, hook on the tugs, and the change is made. Railroad men will at once perceive their adaptability and economy from the above facts. They will also last longer than leather traces, and require but very little care. From their durability and cheapness they are also especially adapted for all kinds of farm use and heavy teaming, as farmers, etc., can easily repair them.



Patent No. 171,232, December 21, 1875.

In use on the Chicago West. Div. R'y.; Louisville City R'y Co.; Milwaukee City R'y; Transverse R'y Co., Pittsburg, Pa.; Citizens Street R'y Co. Pittsburg, Pa.; Pittsburg and Birmingham, Pittsburg, Pa.; Central City R'y, Peoria, Ill.; Grand Rapids R'y; Minneapolis St. R'y Co.; St. Paul City R'y; Houston City R'y, Texas; Superior Street R'y, Cleveland, O.; Cincinnati City R'y Co.; Fifth Ward Street R'y, Syracuse; Detroit City R'y.; Ft. Wayne and Elmwood St. R'y., Detroit, Mich.; Galveston City R'y; Springfield City R'y, Springfield, Ill.; Toledo St. R'y, Toledo, O.; Adams St. R'y, Toledo, O.; Atlanta Street R'y, and others, in all on about 100 Street R'ys in United States and Canada, and a large number of other prominent Street R'y Companies throughout the Country. Send for descriptive Circular containing testimonials, prices, etc., to

LAKE & McDEVITT, 161 South Robey Street, Chicago, Ill.

CLARK'S PATENT POWER GROOMING MACHINE, SINGLE OR DOUBLE.



TO STREET RAILWAY COMPANIES AND OTHER STOCK OWNERS.

This machine for grooming may be driven by any known power, and can readily be placed for use in any stable or out-building. It can be operated by an ordinary groomer; its work is perfect; its action simple and effective. Stock owners will readily realize the importance of the machine. The perfection and rapidity of its work, and the benefits derived by its use, commend it to those interested in the care and use of all classes of thoroughbred and work stock. The most vicious animal readily submits to its use. Machine Grooming is found to be less expensive than hand grooming, saving in food and medicines, and materially increasing the value of the animal.

The Curry Comb and Hand Process Superseded! Economy of Labor! Perfection of Work!

Three Hundred Head of Stock Thoroughly Groomed with Each Machine every Ten Hours.

This Grooming Machine is in daily use in some of the largest Street Railway Companies' stables, and has always given perfect satisfaction. Among those using it are the City R'y Co., Chicago, Ill.; Detroit City R'y Co., Detroit, Mich.; Central City R'y, Peoria, Ill.; M. W. Dunham, Wayne, Ill.; West Division Street R'y Co., Chicago, Ill.; Lindell Street R'y Co., St. Louis, Mo.; Pleasant Valley R'y Co., Allegheny City, Pa.; Marshall, Field & Co., Chicago, Ill.; Leroy Payn, Chicago, Ill.; Saginaw City R'y, Saginaw, Mich.; Pittsburg and Birmingham R'y Co., Pittsburg, Pa.; and a number of others who have given testimonials as to the perfect working of the machine. For prices, circular and other information apply to

161 SOUTH ROBEY STREET, CHICAGO, ILL.

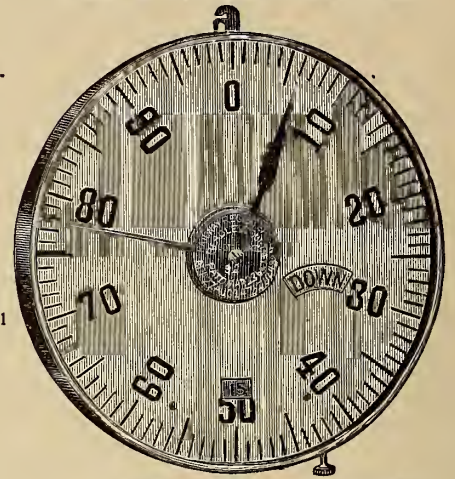
RAILWAY REGISTER MANUF'G CO. BUFFALO, N. Y.

THE MONITOR REGISTER.

MANUFACTURERS AND OWNERS OF THE

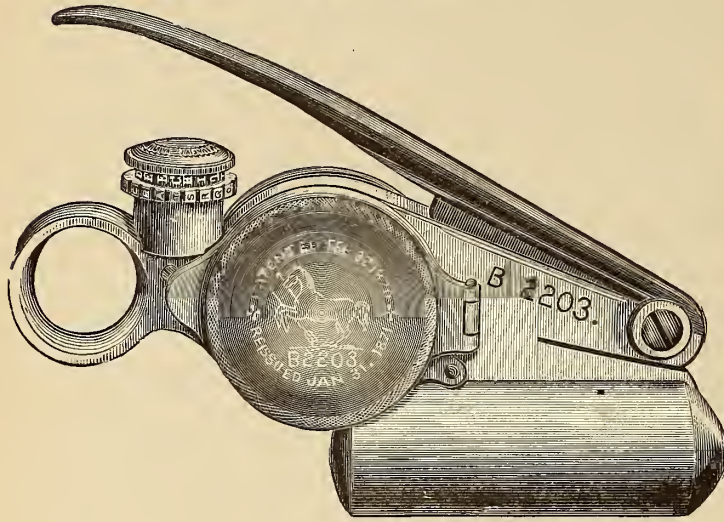
Latest Designs, Improvements and Inventions in Registers, Indicators, Classifiers and Punches, for the Recording of Fares Collected on Street and Steam Railroads.

This Company owns over 100 Patents, embracing all the Valuable Features of Fare Registers, Indicators, etc., and was awarded three Medals at the Chicago Exposition of Railway Appliances.

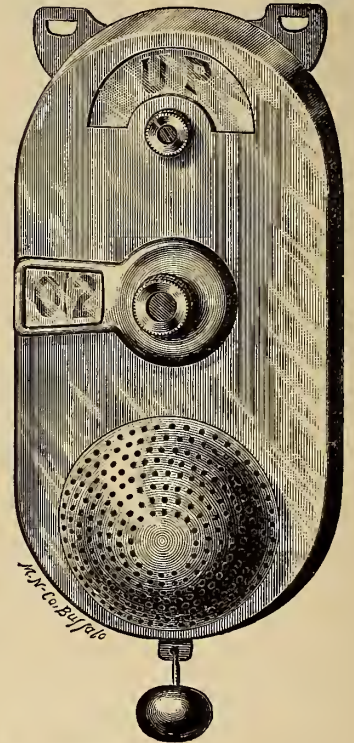
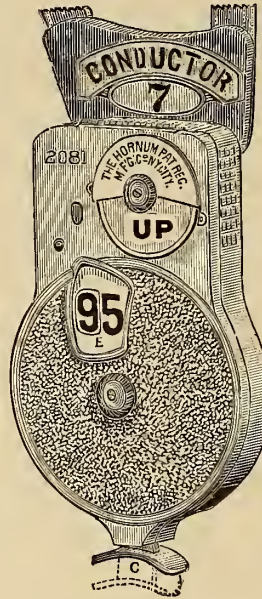


CHESTERMAN REGISTER.

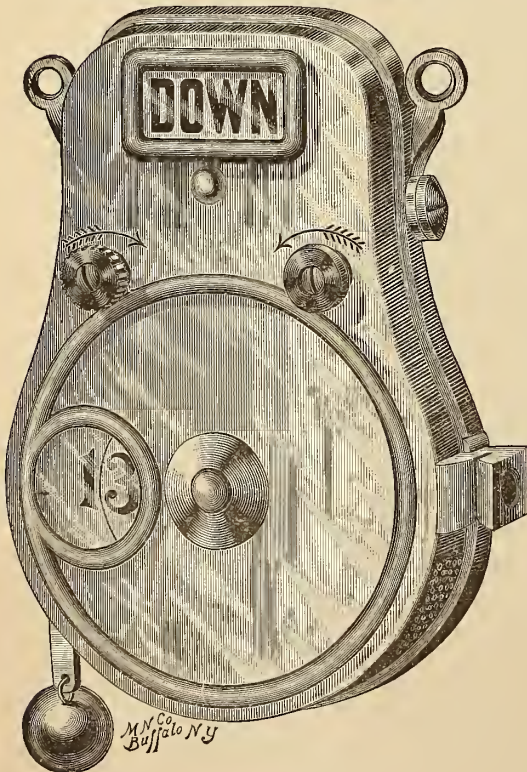
THE ALARM REGISTERING PUNCH.



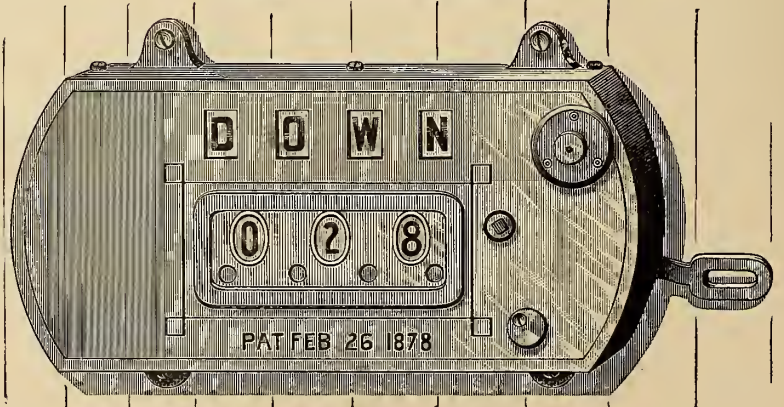
THE HORNUM REGISTER.



THE BENTON REGISTER.



THE POND REGISTER.



SEND TO

BEADLE & COURTNEY,
GENERAL AGENTS

Railway Register Manufacturing Co.,
1193 BROADWAY, NEW YORK.

Branch Office: 426 WALNUT STREET, Philadelphia, Pa.

FOR ILLUSTRATED CATALOGUE.

J. W. FOWLER,
President.

DAN'L F. LEWIS,
Treasurer.

THE

LEWIS & FOWLER M'F'G CO.

8 COLUMBIA HEIGHTS,

Near Fulton Ferry.

BROOKLYN, N. Y.

PATENTEES AND MANUFACTURERS OF

THE IMPROVED "ALARM" PASSENGER REGISTER.

This Register was awarded *and has received* the Highest Prize (Silver Medal) at the Chicago Exposition of Railway Appliances in 1883, against all competitors of any note for

"THE BEST STATIONARY REGISTERING DEVICE."

This Register is guaranteed to be the most

Complete, Durable and Perfect

Machine in this Country, for Registering fares on Street cars, We are now manufacturing a

Portable Register

for Railroad Companies desiring a machine of this style where tickets are required to be Canceled and Registered at the same time.

SOLE AGENTS AND MANUFACTURERS OF

"RANDALL'S" PATENT CAR AXLE AND BOX,

—ALSO—

"SMALL'S PATENT AUTOMATIC FARE COLLECTOR"

FOR FARE BOX CARS. THIS DEVICE WILL SAVE MONEY NOW LOST AND POPULARIZE

THIS SYSTEM OF CARS.

DEMOREST'S INFALLIBLE DUPLIX REGISTER

Combines Simplicity, Efficiency and Absolute Accuracy.

As each trip and each fare, when rung, is duplexed on an interior sheet that cannot be tampered with, the conductor is his own detective, collusion or fraud being impossible.

As an illustration of a practical and unanimous opinion, we present the following:

CLEVELAND, OHIO:

I have gone through a thorough examination and trial of the Lewis & Fowler's and other Stationary Registers, and have been using in the past the Hornum or Punch Company's Register. After looking over the matter thoroughly, I am satisfied that the *Half Trips on the Paper Dial* is the right principle, and have, therefore, adopted the Demorest Duplex Register.

TOM. L. JOHNSON.

NEW YORK:

The Demorest Duplex Register is an improvement on the one we are using, and is the best I have ever seen.

J. W. FOSHAY.

DES MOINES, IOWA:

The Duplex Registers we are using on our cars are giving us entire satisfaction, and can cheerfully recommend them to do all you claim for them.

M. P. TURNER.

We will place any number of our Duplex Registers (with or without the Fare-box, according to the kind of car) upon trial for any time desired, at a very slight cost. Our terms of purchase are quite reasonable. A trial is solicited. Address the proprietor,

W. JENNINGS DEMOREST,

15 EAST 14th STREET,

R. M. ROSE, Manager.

NEW YORK CITY.

Fare Boxes and Change Receptacles

MADE BY

WALES MANUFACTURING CO.,

76 and 78 East Water Street,

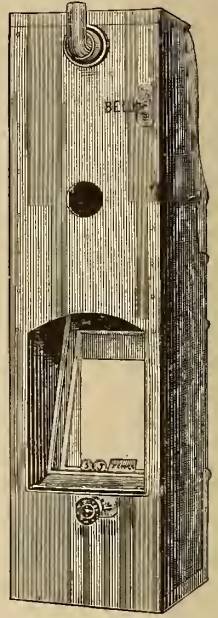
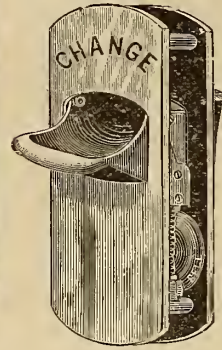
SYRACUSE, N. Y.

Our Street Car Fare Boxes, for Simplicity of Construction, Cheapness and Practicability are Superior to Anything of Like Character in the Market.

Descriptive and Illustrated Circulars an application.



Front View. No. 3.

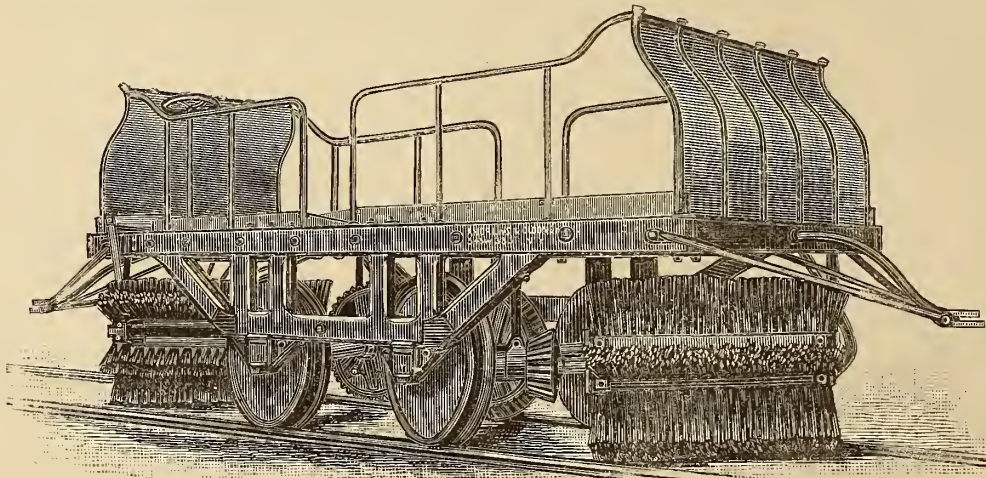


Back View. No. 3.

F. H. ANDREWS.

ANDREWS & CLOONEY,

B. A. CLOONEY.



STREET RAILROAD SNOW SCRAPERS AND PLOWS.

WORKS:

545 WEST 33d STREET,

535 to 551 WEST 33d AND
538 to 552 WEST 34th STREETS,

NEW YORK.

MANUFACTURERS OF

ELLIPTIC, SPIRAL, VOLUTE, CAR AND ENGINE SPRINGS

OF EVERY DESCRIPTION.

CAR WHEELS, AXLES, PEDESTALS, BRAKE SHOES, BOXES, BRASS BEARINGS AND CASTINGS

OF ALL DESCRIPTIONS WHERE GREAT STRENGTH IS REQUIRED.

Also SWEEPERS, SNOW PLOWS, TURN TABLES, TRACK WORK, AUTOMATIC SWITCHES, Etc.
STEEL GROOVE RAILS AND MACHINERY.

SEND FOR ILLUSTRATED CATALOGUE.

RICHARD VOSE,

13 Barclay Street, . New York,

MANUFACTURER OF

Graduated Street Car Springs.

RUBBER CONE.

Patented, April 15th, 1879.

ADAPTED TO THE
 STEPHENSON,
 BEMIS,
 RANDALL,
 HIGLEY,
 BRILL,
 JONES,
 BALTIMORE,
 —AND—
 ALL OTHER BOXES.



No. 0, for 10-ft. Light Cars.
 No. 1, for 10-ft. Cars.
 No. 2, for 12-ft. Cars.
 No. 3, for 14-ft. Cars.
 No. 4, for 16-ft. Cars.
 No. 5, for 16-ft. Cars.
 (Single Pedestal.)
 No. 1, Cushion, for 16-ft. Cars.
 No. 2, Cushion, for 12 and 14-ft. Cars.

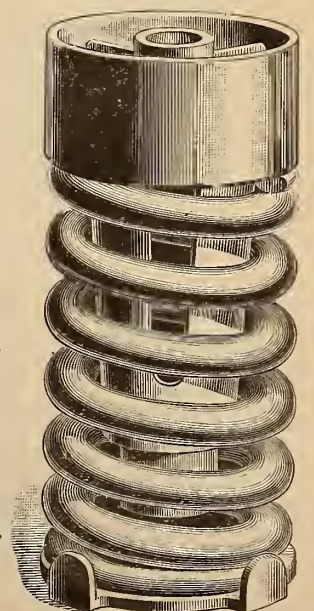
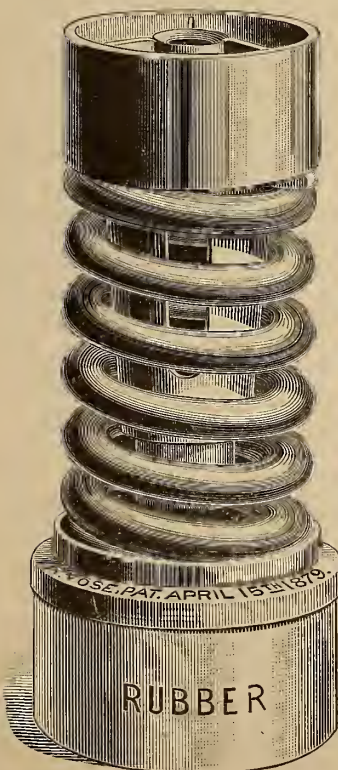
STEEL CONE CITY CAR SPRING.

Patented April 15, 1879—August 5, 1884.

The unprecedented popularity of the

“VOSE GRADUATED RUBBER CONE SPRING”

for HORSE CARS has induced the inventor to bring this class of Springs as near perfection as possible, and after a series of experiments and tests now presents for favor what he claims to be the *MOST PERFECT SPRING FOR HORSE CARS* ever offered. It is exceptionally *SOFT AND EASY* with the *EMPTY CAR* or with the *GREATEST LOAD*. It is believed to be the *MOST DURABLE*, being constructed upon a principle that seems to insure that the Spring must *ACTUALLY WEAR OUT*. The very *Finest Quality of Crucible Cast Steel* will always be used in these Springs.

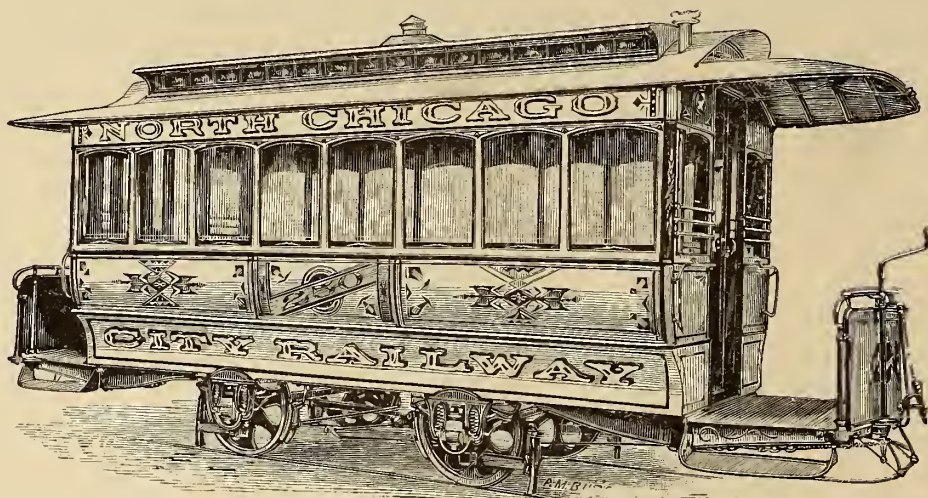


JOHN STEPHENSON COMPANY

(LIMITED),

New York.

TRAMWAY CARS



LIGHT, ELEGANT, DURABLE.

Every Description.

Best Materials.

Minimum Prices.

ORDERS QUICKLY FILLED. CAREFUL ATTENTION TO SHIPMENTS.

All Climates Suited.

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THE STREET RAILWAY JOURNAL

VOL. I. { NEW YORK: }
{ 32 Liberty Street. }

JANUARY, 1885

{ CHICAGO: } No. 3.
{ 8 Lakeside Building. }

Small's Automatic Fare-Collector.

This device,* intended for fare box cars, consists of a flat brass channel about an inch wide and one-quarter inch thick, placed on its edge, and running from the rear to the front end of the car at a slight inclination, and terminating in the money box. The tube is so constructed that the money or disk-shaped checks dropped into it are kept in sight, roll readily, and cannot be extracted until they are taken out of the locked box. Whatever is placed in it is visible to all who may be in the car. The ways, or "collectors," pass from the rear platform along each side of and around the corners of the car into the money box. The money passes into the collectors through boxes placed on each stanchion of the car, so that the passenger is enabled to pay the fare without leaving the place where he may be sitting or standing. In New York, Baltimore, Minneapolis, Louisville and other places where this system is in operation, we learn that the regular patrons of the cars make it a point to come

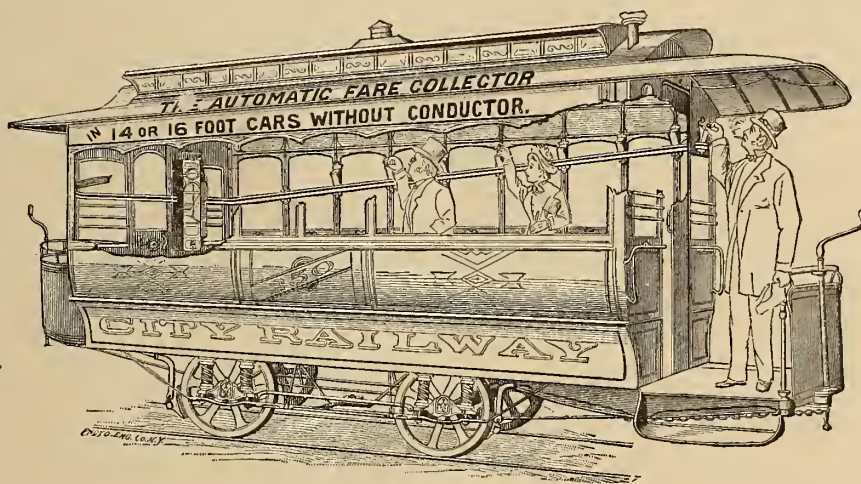
usually much cheaper than paper tickets. By the use of such "Automatic Collectors" cars sixteen feet in length can be operated by one man at least as easily as those of ten feet under the old money box system. Several open cars equipped with this invention have been running for the last three summers, on the One Hundred and Twenty-fifth Street branch of the

avoidance of sudden changes in temperature therein.

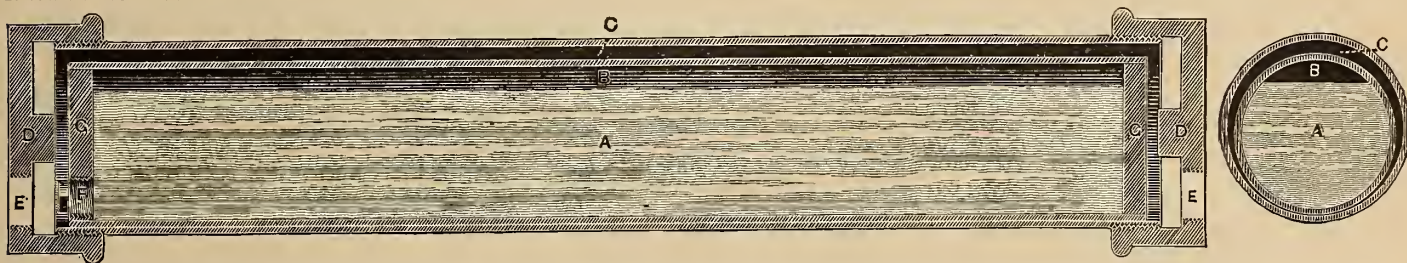
It consists of two wrought iron cylinders, one placed within the other. The inner one is four inches in diameter, filled four-fifths full of water strongly impregnated with salt to prevent freezing when the heater is not in use, it is closed at both ends and hermetically sealed. The outer cylinder is four and one-half inches in diameter, and the ends are closed with cast iron caps; each cap tapped to receive a one inch pipe, one for steam supply and the other to allow the water condensed to escape.

When steam is applied to the outer cylinder, the inner one absorbs and stores all the heat in the steam that is not radiated through the outer cylinder, and gradually gives it out for hours after the steam is shut off.

The economy of such heaters is apparent in their capacity to store heat where there is waste steam from any cause, and on railroads when running on down grades, stopping at stations, etc., or when there is an extra pressure in the boiler.



Third Avenue Line, New York. They were managed entirely by the driver, and frequently carried over fifty passengers at a time, the fares being paid and collected without the least inconvenience or trouble. On account of the difficulty of getting to the



provided with the exact fare, to save themselves the trouble and annoyance of going to the front end of the car to deposit the fare, or of asking others to do so for them, thus relieving the driver to a great extent from the troublesome and dangerous duty of making change. Hard rubber or celluloid checks are substituted for paper where tickets are used. They claim it to be more secure from counterfeiting, and event-

fare box it would hardly be possible to work these cars without a conductor, were it not for the "automatic fare collector." This system makes the open car entirely practicable without the aid of a conductor.

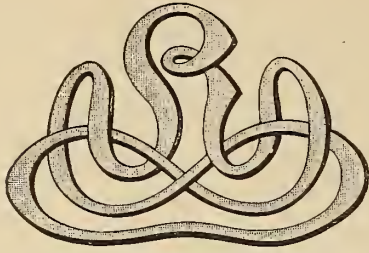
* Lewis & Fowler Mfg. Co., 8 Columbia Heights, Brooklyn, N.Y.

Gold's Heat Storing Apparatus.

This device * has for its principal objects the prevention of fire in cars, and the

For heating horse cars, a small stationary boiler at one end of the trip (when it does not exceed two and one-half hours duration) is all that is required; the cylinders are placed under the seats, thus saving the space occupied by a stove, and diffusing the heat more equally through the car.

* E. E. Gold & Co., 14 Vandewater St., N. Y.



American Street Railway Association.

OFFICERS, 1884-5.

President.—Calvin A. Richards, President Metropolitan Railroad Co., Boston, Mass.

First Vice-president.—Julius S. Walsh, President Citizens' Railway Co., St. Louis, Mo.

Second Vice-president.—Henry M. Watson, President the Buffalo Street Railway Co., Buffalo, N. Y.

Third Vice-president.—Edward Lusher, Secretary and Treasurer the Montreal City Passenger Railway Co., Montreal, Canada.

Secretary and Treasurer.—William J. Richardson, Secretary the Atlantic Avenue Railway Co., Brooklyn, N. Y.

Executive Committee.—President, Vice-presidents and William H. Hazzard, President Brooklyn City Railroad Co., Brooklyn, N. Y.; James K. Lake, Superintendent Chicago West-Division Railway, Chicago, Ill.; Charles J. Harrah, President the People's Passenger Railway Co., Philadelphia, Pa.; William White, President Dry Dock, East B. & B. R. R. Co., New York, N. Y.; B. Du Pont, President Central Passenger Railroad Co., Louisville, Ky.

The October Convention, A. S. R. W. A.

We are at last able, through the courtesy of Secretary Richardson, to present an abstract of the official meeting of the Fifth Annual Convention.

WEDNESDAY'S SESSION.

FIFTH AVENUE HOTEL, }
NEW YORK CITY, N. Y., October 15, 1884. }

The meeting was called to order at 10:25 A. M., by the President, Mr. William H. Hazzard, of Brooklyn, who announced the first business in order to be the reading of the minutes of the last meeting.

On motion of Mr. Thurston, of Jersey City, the reading of the minutes was dispensed with, inasmuch as each member had received a printed copy.

The President said: It becomes my duty to make a short speech to you. I will do it, however, by reading a brief address.

ADDRESS OF THE PRESIDENT.

The President then read the following address:

THE AMERICAN STREET RAILWAY ASSOCIATION:

Gentlemen: It is with pleasure I again meet so many of the representatives of the members, and the friends of this Association.

It is with deep regret we have learned that one of the gentlemen whom so many of us have had the pleasure of meeting at the two former meetings, Mr. L. Brayton, the President of the Union Railroad Company of Providence, has been taken from us by death.

This Association was organized in the city of Boston, December 13th, 1882, and held its second annual meeting in the city of Chicago, October 9th, 1883. We have come together to hold its third regular meeting. It is believed that this meeting will fully develop the value of the Association, to the street railroads of the United States and Canada. If the first two meetings have proved as beneficial to all the representatives of the association, as they

have to myself, I think that they will not regard as lost, the time or money they will have spent in attending this meeting. It is well for those who represent this important interest to meet together, and interchange thoughts regarding the management of our business. We, who are young in the business, will thereby learn from those who have been street railroad men for many years, what their experiences are as to the best way of operating street railroads in all their various parts and phases. We shall learn how their roads are run for the best accommodation of their patrons, both in the United States and Canada.

It seems as though we should all be able to gather some knowledge that will better fit us to fill the various positions we hold, whatever they may be in our respective companies.

As we progress with the business which may be brought before the convention, we hope that all will be brief in discussing the various subjects that may be introduced, taking care to give all who may desire to speak, a chance to be heard; for, no doubt, there will be many subjects brought before the meeting of great interest to us all.

I have not attempted to give you any statistics, for you will, undoubtedly, obtain them in the report of the Executive Committee.

The Secretary then called the roll. There were 76 delegates, representing 50 companies, and 35 cities and towns.

There were then added to the list—delegates, representing — companies in — cities.

Letters and telegrams were read from companies that were members and could not be present at the meeting—also from companies that were not members.

The Secretary then read the report of the Executive Committee, as follows:

NEW YORK, October 15th, 1884.

THE AMERICAN STREET RAILWAY ASSOCIATION.

Gentlemen:—Your Executive Committee would respectfully offer, as its report, the following *resumé* of the work of the Association during the past fiscal year:

SPECIAL COMMITTEES.

The selection of the titles of the Special Committees was deferred to the President, who, after consultation with members of the Executive Committee, determined on the following, viz.:

Completed Construction of New Road;
Repairs of Track;
Track Cleaning and Removal of Snow and Ice: Is Salt necessary! If so, is its Use Detrimental to the Public Health; and Especially, is it Injurious to Horses?
Stables and Care of Horses;
Electricity as a Motive Power;
The Cable System of Motive Power;
A Uniform System of Accounts;
Labor and the Graduated System of Compensation;
Ventilation, Lighting and Care of Cars, and
Taxation and License.

The committees were duly appointed, and, with one or two exceptions, will, doubtless, be prepared with reports. Cov-

ering, as the subjects do, a very wide range of vital questions regarding the street railway business, the reports and discussions arising therefrom should be very helpful to even the wisest of railroad men.

The street railway business requires of its managers knowledge concerning a greater number of distinct and separate lines of business than almost any other that can be mentioned. No man, however versatile his talents; however gifted in intellectual endowments, can ever hope to know this business so thoroughly, that he need concern himself to learn no more about it. Practical and experienced street railway men from widely separated sections of this great country will tell us their experiences in the management of their roads; and we shall be well repaid for our attention thereto.

NEW MEMBERS.

The Association left Chicago with a membership of sixty-two companies. During the year twelve companies have joined, as follows:

Niagara Falls and Suspension Bridge Railway Co., of Niagara Falls, N. Y.

Jersey City and Bergen Railroad Company, of Jersey City, N. J.

Citizens' Passenger Railway Company, of Philadelphia, Pa.

Richmond City Railway Company, of Richmond, Va.

The Brooklyn Street Railroad Company, of Cleveland, O.

Wilkes-Barre and Kingston Passenger Railway Co., of Wilkes-Barre, Pa.

Pittsburgh and Birmingham Passenger Railroad Company, of Pittsburgh, Pa.

The Fort Wayne and Elmwood Railway Company, of Detroit, Mich.

The Baltimore Union Passenger Railway Company, of Baltimore, Md.

Washington Street and State Asylum R. R. Co., of Binghamton, N. Y., and

The Springfield Street Railway Company, of Springfield, Mass.

The total membership, therefore, is seventy-four companies, many of which are among the largest in the country, and represent in the aggregate about one-half of the entire street railway wealth and business of America.

The Secretary has received notices from quite a number of companies that are not members, stating that they will be represented at this meeting and join the Association. The indications are, that the accessions at the New York meeting will nearly, if not quite, bring the membership up to one hundred companies. That the nucleus of thirty-one companies from amongst the number represented in Boston should have, in two years' time, increased over one hundred and fifty per cent., evidences very remarkable growth.

FREE PRINTED MATTER.

That the gain has been so considerable has, doubtless, very largely, been the result of the generous course adopted by your Committee in the circulation of the annual reports of the Association, and its other printed matter, copies of all of which, up to the present time, have been issued to all the street railroads in the United States and Canada—as well to those

companies that are not members, as to those that are.

It was considered advisable for the Association to do a certain amount of advertising of its objects and its work, that thereby the companies not members would see, not only the desirability of joining, but the necessity for so doing. It was believed that in no way could this advertising be done so satisfactorily and effectively as by the issue of this printed matter direct to the companies. The wisdom of this course is apparent.

The letter sent with the annual reports to companies not members, reads as follows:

OFFICE OF THE
AMERICAN STREET RAILWAY ASS'N, }
BROOKLYN, N. Y., Jan. 8th, 1884. }

Dear Sir:—A year ago a copy of the proceedings of the convention, which resulted in the organization of this Association, was sent to you. In this mail is sent a copy of the Report of the recent annual meeting, held in Chicago.

It has been deemed advisable to circulate this report as freely as was the former, believing that when the character of the work, which the Association is doing among and for its members, had become thoroughly known, the large majority of the street railway companies of America would join the Association.

You will, undoubtedly, carefully peruse its pages. They contain considerable valuable information concerning the street railway business. It is sent to you, confidently believing that you will find it to your interest to become associated with us. The unanimous desire of the members is that the Association shall embrace every street railway company in America—that it might be, indeed, as comprehensive as its name. It is needless to say that we should be pleased to welcome your company to membership. Will you kindly acknowledge the receipt of the Report, and oblige,

Yours truly,
W. J. RICHARDSON,
Secretary.

It would seem, however, as if the time had now come when the companies that do not contribute to the support of the Association should not be treated with the same consideration as those that do. Surely the management of the Association cannot be charged with illiberality, if, after two years of free distribution of its knowledge, it should decide that, for the future, the benefits arising from membership should be enjoyed by members exclusively, so far as the annual reports of the meetings of the Association and its other printed matter is concerned.

STATE RAILROAD REPORTS.

The following letter was sent to all the Secretaries of State of all the States in the Union:

OFFICE OF THE
AMERICAN STREET RAILWAY ASS'N, }
BROOKLYN, N. Y., Jan. 14th, 1884. }

TO THE HONORABLE THE SECRETARY OF STATE OF ———

Dear Sir:—I send you in this mail a copy of the Report of the Second Annual Meeting of this Association, held in Chicago, Ill., October 9th and 10th, 1883. You will

find that its pages contain considerable valuable information concerning the street railway business.

May I ask you to favor me with a copy of the last published State Engineer's Report, providing your State has such an officer, or, as in the State of New York, the Report of Railroad Commissioners, in order that I may be informed of the names and officers of the companies in your State, as well as the laws which may affect the same; provided, of course, that the latter are in compact printed form.

I do not desire to put you to unnecessary trouble, but should highly esteem the information asked for. It is our wish that this Association shall be a power for good in America, and in this connection refer you to Article II. of the Constitution, found on page 138, setting forth the objects of the Association.

I remain, very respectfully,
Your obedient servant,
W. J. RICHARDSON, Secretary.

In reply, copies of valuable reports were received from fifteen States, some of which are of service in ascertaining the operating companies.

INTERNATIONAL ASSOCIATION.

The following letter was sent to the General Manager of every tramway in operation in Great Britain and Ireland.

OFFICE OF THE
AMERICAN STREET RAILWAY ASS'N, }
BROOKLYN, N. Y., Feb. 15, 1884. }

Dear Sir:—I have the honor to be the Secretary and Treasurer of the American Street Railway Association, and take pleasure in forwarding you, in the accompanying mail, a copy of the Report of the Second Annual Meeting of this Association, recently held in Chicago, Ill. It will be found to contain considerable information that will be valuable to you.

I have noticed, with considerable interest, the preliminary proceedings in regard to the formation of the proposed "Tramways Institute." This organization will, doubtless, have a local significance, similar to kindred organizations, as in the individual States of New York and Ohio. It has occurred to me—and, indeed, the matter has been on my mind for over a year past—to correspond with the managers of tramways in Great Britain and Ireland, with a view to solicit opinions as to the practicability (of which I have no question), of your union with us, in an International Association.

I believe our members would be very glad to amend Article I. of the Constitution, so as to change the word "American" to "International." I see no reason why the Association should not be international in its scope. It now embraces Canada and the United States, and may enter any tramway in either North or South America. We have already a member, one company, in the State of Texas (which is as far away as England); and will, doubtless, soon have members from California, which is further away, both in distance and time, than some parts of Great Britain.

The circular-letter is, therefore, sent to the managers of all operative tramways

throughout Great Britain and Ireland, in the hope that the proposition will be considered favorably. Of course, it is well known that the United States is the great tramway country of the world, having upwards of four hundred and fifty street railways in actual operation, with an investment of one hundred and fifty million dollars. One feature of our work, just developing, is the publication of legal opinions regarding suits against the companies, and which can be gathered only through the medium of such an Association as this. Hoping to receive from your corporation a favorable reply, I remain.

Very respectfully and truly yours,
W. J. RICHARDSON,
Secretary.

(To be Continued.)

Jumping off Moving Cars.

The fools are not all dead yet, and the supply is not likely to be exhausted. Street Railway Companies get blamed, and mulcted, for many injuries which result solely from haste, ignorance, awkwardness and bullheadedness on the part of passengers. In this age of rush, people may have a right to risk their limbs and lives, jumping off rapidly moving cars, but the companies should not "pay the piper."

Track Salting.

[The following is the conclusion of the matter relative to the Track Salting question, which has been made public by the American Street Railway Association in advance of the discussions upon the other reports, and of the minutes of the meetings at the Fifth Avenue Hotel.]

REPORT OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA.

The names attached to the following report will be at once recognized as those of men of the highest rank in their profession:

The Committee to which was referred the communication addressed to the College by a Committee of the Select Council of the City of Philadelphia, "requesting the views of the College of Physicians in regard to the influence upon the public health of the practice of salting the railway tracks," respectfully report:

That in pursuance of the wishes of the College, they held repeated meetings, at which the subject was fully discussed. Two points especially claimed attention.

First—Could any appreciable physical phenomena, which would be capable of producing disease, result from the practice?

Second—Was there any evidence that could connect the prevalence of disease or increase of mortality with this mode of cleaning the railroad tracks from snow or ice?

The fall of snow and its accumulation in the streets being beyond human control, its removal by melting and evaporation is equally so. The question, therefore, is narrowed to the single point whether the rapid removal by chemical agents of a small portion of the snow in a few streets of the city can produce such a change in

the atmosphere, either in its temperature or hygrometric relations, as would give rise to new diseases, give greater intensity to those already known, or diminish the amount of vital resistance to lethal influences already operating.

Your Committee learned with great satisfaction, that a series of experiments had been performed by a Fellow of the College, to test these very points, and conscious of want of time in which to pursue similar investigations, as well as confident in the skill and faithfulness of the gentleman who had manifested his qualifications for the service, and interest in the cause, by his spontaneous investigations, your Committee solicited from him a statement of the result of his observations.

In compliance with this request, Dr. Rogers, Professor of Chemistry in the University of Pennsylvania, attended a meeting of the Committee, and made a detailed statement of the elaborate experiments conducted by him. It is certain that no influence can be exerted upon the atmosphere by its impregnation with saline matter, the chloride of sodium employed, not being volatilized at the temperature which prevails at the time it is employed for the purpose of melting the snow. It must be carried immediately off with the fluid as it runs away.

The only remaining influence is that caused by the reduction of temperature, consequent upon the rendering latent a certain amount of heat.

While it is evident, that at the moment of solution, a considerable change must be produced in the air, and snow and pavement, contiguous to the point at which the solution is being made, it is equally evident that this influence must be limited to a very small space, and can continue but a very short time, and is not greater than is often produced by purely natural causes. Your Committee believe it may be dismissed from consideration as an element of causation of disease. There is indeed one point of view, from which it might be determined that the influence of the application of salt is advantageous. The snow which has fallen must be melted; a given quantity of snow in a given temperature will be dissolved five times as quickly when salt is added to it, as without; thus diminishing in the same ratio, the duration of the impression of the melting snow. Nor is this all. When melted by the natural influences, much of the liquid becomes again congealed by the falling temperature to be again the agent in rendering latent the same amount of heat when again dissolved by a rising temperature, and this process is often repeated during many days and even weeks. Whereas the saline solution, not being again congealed, flows slowly and immediately off, so that if a free outlet can be maintained by keeping open the gutters and inlets to the sewers, those streets over which the railways pass and on which salt is applied, will be kept drier than those where no salt is used. If, therefore, an ordinance were passed, providing for the flow of melted snow and ice into the sewers without delay, a decided increase of the comfort, at least, of pedestrians would result. Having thus disposed

of the question of atmospheric influences, the attention of the Committee was next directed to the inquiry as to the effect of the application to the feet of the saline solution. It will be seen by reference to the experiments of Dr. Rogers, that the saline solution, of the density made by the railroad companies does not penetrate leather more quickly than simple water, nor does it produce a much greater degree of cold to the feet, when applied to the shoe, than is caused by the application of snow itself, melting as it does rapidly and constantly at every step. The argument offered primarily, as to the comparative rapidity with which the snow and ice are removed, diminishing the amount of exposure, is equally as applicable here. The number of days in which the feet of pedestrians are subjected to the wet, being only as one to five, while the opportunity for avoiding this influence almost entirely, afforded by the passenger-cars, diminishes still more this influence on health. The quantity of salt left in the leather of the shoes after drying, is so small to produce any appreciable influence in attracting the moisture from the air, as is done by those and other garments soaked in the water of the sea, which, moreover, contains other saline ingredients, in addition to the chloride of sodium. In order to ascertain by personal and practical observation, the influence of constant exposure of the feet and hands to solutions of salt water under circumstances very similar to those produced by the application of it to the railway tracks, a member of your committee made a visit to one of the extensive packing establishments, in which a large number of men are constantly engaged during the entire working hours of the day, with their hands in the melting salt, their feet wet, and their clothing more or less moistened by it. We found the floors of the various apartments covered with matter closely resembling the slush of the streets, while the temperature differed but little from that of the outer air. The cases might, therefore, be considered as nearly parallel.

The proprietor of the establishment not only gave his own testimony to the absence of any disease peculiar to the occupation, but put direct inquiries on the subject to the men, as we passed among them. They were healthy in appearance, and professed an entire exemption from disease of any kind, and, especially of the throat. Several of them had been many years in the establishment, and some spoke of the enjoyment of better health since they had entered it than they had previously. It is very certain that no deleterious influence emanates from the floors which are perfectly saturated with brine, and on which there is in many places a thick coating of half-dissolved salt mingled with animal fluid.

The second question is one much more difficult and requiring a much more extended inquiry. The statistics of disease and mortality have been of late years attracting the attention of the guardians of public health, in a degree even yet only partially commensurate with the importance of the interest committed to their care; and every one who has paid any at-

tention to the subject, must be impressed with the conviction, that we have not yet reached a point which enables us to prepare any exposition of the laws which govern disease and death. It is certainly true, as regards Philadelphia, that while the record of deaths in 1859 were only 9,742, in 1860 the number rose to 11,568, and in 1861, to 14,468, while the increase of population bore no relation at all corresponding. It was during this period that the new registration laws went into operation, and as the old were so confessedly imperfect as to require change, and the new are still liable to the uncertainty which must attend all changes, it would be evidently unfair to draw any positive deductions from these statistics. The great variation in the rates of disease and mortality caused by epidemic influences is familiar to us all, and so numerous and inscrutable are the causes which operate upon them, that it would be unjust to assign to any one the causation until the power of others had been detected and measured.

Your Committee is indebted to the kindness of a Fellow of the College, who has long been engaged in pursuits which render him familiar with the statistics of disease and death of this city, Dr. W. Jewell, for the accompanying statement, by which it will be seen that the relative mortality of the winter months to that of the entire year, has been varied greatly during the last decade, the extremes being 20.83 per cent. for the lowest, and 30.64 for the highest. The highest mortality being in the years of 1856-7, before the application of salt to the melting of snow was resorted to, while that of 1857-8, in which the salt was used, was the lowest in the entire period, with the exception of 1853-4 :

December, January, February.	Mortality. Three Months.	Mortality for Year.	Percentage to Total Mortality.
1851-52	2,594	10,258	25.28
1852-53	2,365	9,744	24.22
1853-54	2,455	11,784	20.83
1854-55	2,276	10,458	21.76
1855-56	2,684	12,334	21.76
1856-57	3,338	10,895	30.64
1857-58	2,315	10,697	21.64
1858-59	2,414	9,742	24.77
1859-60	2,614	11,568	22.59
1860-61	3,382	14,468	23.37
Mean, -	2,643.	11,191	23.69.

It is perfectly clear that the increased mortality of even those years in which it has been greatest, depends on influences operating during the summer as well as winter months; and even during the winter months, on some other cause than the application of salt to railway tracks—the mortality during the winter months having fallen from 30.64 per cent. in 1856-7 to 22.59 in 1859-60. Indeed, if we deduct from the entire mortality of 1861, the number 2,448 reported as dying from small-pox, scarlet fever and diphtheria, the increased mortality of that year is reduced to less than four per cent.

Such variations have been recurring at all times and in all places, which have been subject to observation. Neither of the diseases is new; and all have, at several periods, assumed the epidemic form with varying degrees of malignity, at times almost disappearing from observation, but only to return with renewed violence under

the influence of unknown and unappreciable causes.

To go no further back than the experience of many of the fellows now participating actively in the practice of medicine, we may refer to the sudden, unlooked-for and unaccountable epidemic of small-pox which commenced about thirty years ago, shaking the confidence of the community in the protective power of vaccination, and arousing the attention of the profession to the necessity of a more careful and active resort to it. Scarlet fever, which, during the years intervening between 1807 and 1827, had caused only 102 deaths out of 53,000, and only one death in 1827, nine in 1838, and only nine in 1829, at the time broke out upon us with a malignancy and wide-spread prevalence, which carried dismay into the community. The deaths from that disease in 1832 rose as high as 307.

Still confining our attention to our own city, though with a retrospective view, putrid sore throat or malignant angina (doubtless, identical with the disease now known as diphtheria), in the year 1735, raised the mortality of the city, as shown by the records of interment in the burial grounds of Christ Church, about 50 per cent. It was a work of supererogation to present facts to the College of Physicians, in proof of the absurdity of attributing to the practice of salting the railroad track, the prevalence of small-pox, scarlet fever or diphtheria, the diseases by which the great increase of mortality in the last few years has been induced. Yet, it may not be uninteresting nor inappropriate to present to the notice of the Fellows, the record of a fatal prevalence of one or both of these diseases of scarlet fever and diphtheria in this city in the year 1746. There is in the possession of our Fellow, G. W. Norris, a MS. tract by Dr. J. Kearsley (the liberal founder of the Asylum for widows and single women, known as Christ Church Hospital), describing the symptoms and treatment. So extensively did it prevail and so numerous were the fatal cases, that Dr. Kearsley says, "It baffled every attempt to stop its progress and seemed, by its dire effects, to be more like the drawn sword of vengeance to stop the growth of the Colonies than the real progress of the disease." This epidemic certainly could not be attributed to any influence under human control. It commenced in an inland village in the New England Colonies, where, according to Dr. Kearsley, "villages were almost depopulated."

While it is beyond doubt a duty owed by every citizen to the community in which he dwells, and by which he is protected and supported, to aid in every effort for the preservation of the health of the people, this duty presses with especial claims upon us as members of a profession to whose keeping are entrusted the health and lives of our fellow-citizens. Still stronger is the obligation which rests upon us in our corporate capacity, as the College Physicians of Philadelphia, since we find mentioned among other inducements to our originators, that "the objects of this College are to advance the science of medicine, and thereby to lessen human misery by investigating the diseases and remedies which

are peculiar to this country, by observing the effect of different seasons, climates and situation upon the body," etc., etc.

Your Committee, therefore, in closing this report, present the following resolutions:

First.—That in the opinion of the College of Physicians there is no evidence that "the practice of salting the railway tracks" passing over the streets of the city exerts any injurious influences on the health of the citizens.

Second.—That the College of Physicians respectfully suggest to the City Council the necessity of making provision by ordinance for keeping open the gutters and inlets to the same, in the period when the snow is melting, and keeping the footways at the intersections of the railways free from the melting snow and ice, or, of enforcing such ordinances, if already existing.

CASPER MORRIS, *Chairman.*
FRANKLIN BACHE.
EDWARD HARTSHORN.
J. M. DE COSTA.
D. FRANCIS CONDIE.

[*Letter from Messrs. Haller, Beck & Co.*]

The following letter (supported by affidavit) speaks for itself:

UNION SALT WORKS.
OFFICE OF
HALLER, BECK & CO.
ALLEGHENY CITY, Pa., Aug. 16, 1884.

MR. HARVEY N. ROWE,
Secretary of the P. O. & E. L. Passenger Railway Co., Pittsburgh, Pa.

DEAR SIR—As we have been asked time and again by many parties, whether or not salt had any bad effect on our horses' feet, on account of their being in it more than any others, we would simply say that we have been in the salt business for over twenty years, and so far have never had any trouble with our horses' feet being injured from salt. We work from twenty five to thirty horses, and claim to have the best stock in the city, to which we can get most merchants to testify. In twenty years we have never had a horse troubled with thrush; never any troubled with "scratches;" and our stable is open for inspection by any one, the agents of the Humane Society preferred. If salt were detrimental to horses' feet, we surely think ours are the first it would tell on, as they are in it about the works, and then in the car-tracks as much as car-horses.

Respectfully yours,
HALLER, BECK & Co.

OFFICE OF
THE AMERICAN STREET R'Y ASSOCIATION,
Corner Atlantic and Third Avenues,
BROOKLYN, N. Y., Nov. 6, 1884.
JAMES WATT, M.D.,

DEAR DOCTOR—In the year 1874, while you were Registrar of Vital Statistics of the City of Brooklyn, a resolution was introduced in the Common Council of this city, prohibiting the use of salt by the Street Railway Companies for the removal of snow and ice from the tracks.

The resolution was referred to a committee, before which you appeared, and, I believe, gave evidence to show that the use of salt for the removal of snow and ice was not detrimental to the public health,

and especially was not a causation of disease, particularly diphtheria, which, at that time, was prevalent in a very malignant form.

The American Street Railway Association, at its recent meeting in New York City, requested me to have printed in pamphlet form, certain attainable information, in reference to the subject of the removal of snow and ice. It is now in course of preparation, and will be issued within a day or two. I desire, for the purpose of its publication therein, that you will give me a statement of the facts in connection with your appearance before the Committee, and you will oblige,

Very truly yours,
WM. J. RICHARDSON,
Secretary.

[*Letter from James Watt, M. D., Registrar of Vital Statistics of Brooklyn, 1875.*]

384 COURT STREET,
BROOKLYN, Nov. 8th, 1884.

WM. J. RICHARDSON, ESQ.,
Sec. American Street Railway Association.

DEAR SIR—In reply to yours of the 6th inst., I would say that I appeared before the Health Committee of the Common Council during the winter of 1875, and laid before them such statistics as I had in my possession, in regard to the cause of the disease of diphtheria. This disease at the time prevailed to an alarming extent in this city, more than five per cent. of the death-rate being due to it; and the public mind was greatly exercised in relation thereto.

It was desired especially to ascertain whether the use of salt by the railroad companies on their tracks for the removal of snow and ice had any influence in the production and spread of the disease. The salting of the tracks was one of the causes assigned for the increased mortality by diphtheria. A number of other causes were given, such as sewer gas, the filling of low lauds with ashes, garbage, and street sweepings, etc.

I prepared a map showing the location of every case of diphtheria in the city. This was carefully examined by the committee, and showed that the majority of the cases did not occur upon the line of any railroad, or in its immediate vicinity.

So far as statistics were concerned, the use of salt by the railroad companies showed that it did not in any way contribute to the cause of the disease, for on those streets occupied by railroad tracks, and where salt was used for the removal of snow and ice, the death-rate was not increased in the least.

Very respectfully yours,
JAMES WATT, M.D.

[The lithographic map attached to this letter of Dr. Watt's, is of great interest. We should give an analysis of it in this issue of the STREET RAILWAY JOURNAL, but that there are other data which we should prefer to see before making any deductions, or expressing any opinion. In this connection, we may say that the map would have been even more convincing had it shown in some way the density of population, the location of sewers, and the elevation above tide-water; also, the cases of diphtheritic disease not resulting in death. We shall endeavor to obtain some, if not all of these data, and to work them up for the benefit of the Association—and the encouragement of track salting.]

Personal.

— James G. Speer, Vice-president of the P. M. & A. Railroad, Pittsburgh, has returned from New York very much improved in health.

— John G. Brill, of J. G. Brill & Co., Phila., is about making his annual trip through Mexico, taking in New Orleans and various other cities.

— Mr. Hildebrand, Supt., has severed his connection with the Union Line, Pittsburgh.

— Mr. Eberhard, Supt. of the Pittsburg, Oakland & East Liberty R. R., Pittsburg, has resigned.

— The following have been elected officers for the Brooklyn City Railroad for the ensuing year: Wm. H. Hazzard, Pres.; Wm. M. Thomas, Vice-pres.; Daniel F. Lewis, Sec'y and Treas.; Francis E. Wrigley, Asst. Sec'y. Directors: Seymour L. Husted, James How, George N. Curtis, Alexander Studwell, Wm. H. Husted, Crowell Haden, Wm. M. Thomas, Wm. H. Hazzard, George W. Bergen, John C. Barron, Abraham B. Baylis, Daniel F. Lewis, Edwin Packark.

Notes.

— At the annual meeting of the stockholders of the West Division Railway Co. of Chicago, held January 15, the following directors were elected for the ensuing year: B. H. Campbell, John A. Tyrrell, Jerome Bucher, S. B. Cobb, Nathan Corwith, J. R. Jones, and Wm. H. Bradley. Officers: Pres., J. R. Jones; Supt., James K. Lake; Sec'y, George L. Webb.

— The Bushwick R. R., Wm. N. Morrison, Supt., Brooklyn, is extending its line about a mile, double track, on Knickerbocker avenue.

— Another line of cable road, it is said, will probably be laid in one of the principal avenues of New York before the close of the present year. The details are not yet made public.

— M. Verner, Supt. of the Central R. R. of Pittsburg, has patented a device for carrying cars over a line of hose across the track without hindrance to the car or damage to the hose.

— The Central Park, North & East River Railroad has added to its depot, a building 75 ft. wide, and three stories, extending from 54th to 55th street, to accommodate the addition of a hundred or more horses and seventeen new cars. Of the latter, fifteen are smoking cars, two one-horse cars, all built by Stephenson. This road usually lays a hundred tons of new steel rails every year to replace old ones; last year a hundred and fifty were laid. A new eighty-horse engine has just been put in by them.

— The Ninth Avenue R. R. has extended its track to 126th street; is now running to 110th street. Eight new cars are added.

— The Broadway & Seventh Avenue R. R. is rebuilding a number of cars, and contemplates various improvements in the spring, but has not yet made definite plans.

— Supt. Bidgood, of the Sixth Avenue road, New York, speaking of the elegant new cars recently put on to that road to replace old ones, said in reply to an inquiry made by a representative of the JOURNAL: "Yes, I am very sure it pays to run nice cars. No, I have not any exact data on the subject; but have, no doubt, that our earnings have been very materially increased on account of substituting these new cars for the old ones formerly run. The people want a nice car; and while, of course, the fare is fixed at the same time they will pay for it." Mr. Bidgood here showed some of the new cars, which are of Stephenson's most approved pattern, fitted with super springs, ventilated ceiling, telephone signal, etc., nicely decorated and finished in every way. "I would not," said he, "run a car inferior to these. No, we have no new drivers on trial on our road at present; we adopt as a rule, however, most of the improvements brought out by Stephenson."

— The Brocton Horse Railroad Co. of Brocton, Mass., has, during the last year, extended its line from North End to Stoughton. The stock is all taken in a new Company, formed to build a line from Brocton to North Easton, five miles, and a line from Brocton to South Abington is under discussion. These new lines are discussing the feasibility of the Daft electric motor system, instead of horse-flesh as motive power.

— L. O. Crocker, of East Braintree, Mass., manufacturer of conductor's railway ticket-punches, among other work, is filling orders for punches from the Atchinson, Topeka & Santa Fé, Union Pacific, Delaware, Lackawanna & Western, Old Colony, Boston and Maine, Maine Central, Intercolonial and other companies.

— The New Bedford & Fairhaven Street Railway Co., New Bedford, Mass., operates 688 miles single track, 14 cars, 136 horses, 51 employees, with conductors for extra train and mill trips. For ordinary service the Carey fare box is used. This box "rings up" as each fare is deposited, and has glass side only visible to the driver. The October report shows operation of 313,415 miles, 60,226 round trips, carrying 1,591,890 passengers; 5 cent fares.

— The Oriental Metal Manufacturing Co., 48 Congress Street, Boston, commenced business October last, and has now leased the Atlantic works foundry at East Boston. This company makes a specialty of car journal bearings made from new process of hardened copper. It has orders for 184,000 pounds of metal, and is receiving orders for tons of metal in ingots from several roads that have been making tests. One test of street car journal bearing weighing 33½ lbs., after running 17 months, showed loss in wear of one-half an ounce by weight.

— The Baltimore Union Passenger Railway Co. has ordered its entire line equipped with the automatic fare collector.

— The People's Passenger Railway Co., Philadelphia, has ordered its Morris Street branch equipped with Lewis & Fowler's improved 12-inch alarm passenger register.

CAMBRIDGE R. R., BOSTON.—Mr. A. L. Richards has resigned as General Manager; remains a director. Mr. W. W. Hapgood, resigns as Superintendent, to take charge of his ranch in Nebraska. Mr. E. M. Bancroft, the new Superintendent, is a Harvard graduate of 1879, a lawyer, and a member of the Massachusetts legislature.

SOUTH BROOKLYN CENTRAL.—Mr. Wm. Richardson (President Atlantic Avenue Line), has purchased a controlling interest in the S. B. Price said to be \$125 per share. (A few years ago it could have been bought for 80 cents.)

ST. PAUL, MINN.—Mr. H. M. Littell has resigned as Superintendent of the St. Paul City Railway; succeeded by Mr. Goodrich, Superintendent of the Minneapolis Co., assisted by Mr. Scott, of Minneapolis.

Frauds on the Fare-box Cars.

HOW TO PREVENT THEM.

ED. STREET RAILWAY JOURNAL:—

A short time ago notices were prominently displayed in the Broadway stages to the effect that a reward of \$50 would be paid for information which would secure the conviction of any person taking fares under the pretense of passing them to the box and keeping them. This notice served to call public attention to one of the ways in which the Omnibus Co. was being swindled; but did no good otherwise; as no person has ever been known to give the desired information and claim the promised reward. It is fair to presume that this swindle is still going on. About a year ago a conspiracy was broken up on the Twenty-third Street line by the arrest and conviction of a number of persons engaged in defrauding the Company in the following manner: A confederate of the driver would seat himself in the forward end of the car and make himself useful by receiving fares to be passed into the box. About every third nickel, however, found its way into his pocket instead of the box, and the proceeds of his peculations were divided daily between himself and the driver. Public attention having been called to this system of fraud, it is not practiced so much as formerly, but has been superseded to a certain extent by another method not so likely to attract attention, and more difficult to detect.

The person who "works this racket" is not necessarily "in cahoot" with the driver. He may simply be a "shover of the queer" in a small way; and being provided with a quantity of small counterfeit coin, takes his seat near the money box, when the car is likely to be crowded, and as the fares are passed to him, adroitly slips a counterfeit into the box and retains the genuine coin of the passenger. As the base coin cannot be detected until the box has been opened and the money counted in the office, the swindle is a pretty safe one, and the innocent passenger who has been at so much trouble to see that his fare was passed to the box, is set down by the management as the perpetrator of the fraud.

It seems to me that the most effectual way to prevent these frauds, and at the same time please the patrons of the money-

box cars, would be to adopt the system now in use in this city, by which each passenger may deposit his own fare and see it go into the box, no matter where he may be sitting or standing—Gentlemen managers of the fare-box cars, try and make things a little more pleasant for your passengers and you will find it to pay better than damning the public.

JNO. H. VIRGIL.

Baltimore, Md., Jan. 15.

[We have taken the pains to get an illustration and description of this device, and present it on another page.—Eds.]

Extent of the Cable Road System.

Andrew S. Halliday, of San Francisco, who invented the system of cable railways in 1869, in a recent interview in the *N. Y. Tribune*, speaks as follows: "I invented my system in 1869, but the first cable street railway was not built and ready for use until September, 1873. The first bit of road was built in Clay Street, San Francisco, which was forty-nine feet from house to house, and was full of gas and water mains. People laughed at me and were afraid to invest in the scheme, the grade of the street was one in five, pretty steep, and the line was 2,800 feet long. The road soon became a success. It made money and carried passengers at a low rate. It was cleaner than a horse railroad. There were less delays upon it, and it was able to carry as many people as an almost continuous line of cars could carry.

"Soon afterward a horse railway company converted their line into a cable road and the shares of the company advanced in a short time from \$22 to \$102. A year later a cable road was built through California street. To-day there are thirty miles of single track cable roads in that city. More than half of this length of road has been converted from horse railways. There are over twenty miles of cable road in Chicago, and they worked last winter without losing a day, even when the ground was frozen to a depth of two and a half feet. The streets are kept clean with far less trouble with a cable road than a horse railway. Dunedin, New Zealand, a city of 30,000 inhabitants, has two cable roads. A company in Melbourne has just obtained a franchise for sixty miles, and will put stock to the amount of £1,500,000 on the market. Sidney, New South Wales, has adopted the system. The Premier of New South Wales visited San Francisco eighteen months ago to inspect it. Edinburgh, Scotland, has decided to adopt the system, and Birmingham and Manchester, England, are considering the advisability of following suit. Roads will shortly be built in Pachuca and Guajuato, Mexico.

"Seven millions of dollars have been spent in San Francisco in the construction of cable roads, and that sum is paying large interest. A well-equipped road will cost from \$75,000 to \$200,000 a mile. This includes power and equipment. I will go to London, England, to look after my interests. I have a short road there, which I built after a hard fight with the various carrying companies. From England I go to Australia."

Electric Motors for the Elevated Railroad.

The following report on this subject is extracted in a somewhat condensed form from the *Engineering and Mining Journal*:

Prof. Moses G. Farmer has furnished to Mr. Cyrus W. Field an estimate of the cost of operating the Second Avenue Elevated Railroad of this city by electric motors, as compared with locomotives.

The estimate is based on the following assumptions:

A stationary plant can be erected near the middle of the line, consisting of one or more stationary steam-engines of the best type, capable of developing one horse-power by the combustion of 1 3/4 lbs. of coal per hour per horse-power, the coal costing \$2.50 per ton of 2,240 lbs.

Each of the 20 locomotives in use on this line, at the busiest part of the day, indicates 110 horse-power, with a consumption of 5 lbs. of coal per hour per 1 H. P., the coal costing \$4 per ton of 2,240 lbs.

The present steel rails weigh 70 lbs. per yard, and a similar central rail will be laid to convey the electric current.

One mile of central rail will offer about 1/10 of an ohm's resistance, and the aggregate internal resistance of the dynamo's concerned in producing the current will not exceed 1/20 of an ohm.

Sufficient current will be supplied from the central stations to both tracks to energise at the same instant all of the 20 electric locomotives, no matter on what part of the tracks these motors may be situated.

One horse-power is the equivalent of 746 ampere volts, and 20 by 110 by 746=1,641,200 ampere volts in the aggregate will reach these motors.

The dynamos can convert 90 per cent. of the mechanical power applied to them into current electricity, and electric motors can convert 90 per cent. of the electricity that they receive into power used to draw the trains.

The Second Avenue Railroad is 6 1/2 miles long.

The following table is calculated on the above assumptions:

	No. volts.		
Indicated horse-power.....	500	1,000	2,000
Locomotive.....	2,200	2,200	2,000
Electric.....	3,369	2,879	2,757
Pounds coal consumed per hour:			
Locomotive.....	11,000	11,000	11,000
Electric.....	5,895	5,039	4,825
Saving by electricity.....	5,905	5,961	6,175
Cost of fuel per hour:			
Locomotive.....	\$19.65	\$19.65	\$19.65
Electric.....	6.58	5.62	5.38
Saving.....	\$13.07	\$14.03	\$14.27

This indicates that the lower and safer electro-motive force of 500 volts is only about 9 per cent. more expensive than 2,000 volts, and about 7 per cent. more expensive than 1,000 volts.

Fare Collecting.

ED. STREET RAILWAY JOURNAL:—

You asked my opinion about Fare Collecting. I should prefer to give it about Turning in Fares. There's not much trouble about collecting them. The greenest man

gets alive to the tricks of passengers, and takes a pride or satisfaction in not being "beaten" by the man with a newspaper, who holds his nickel in his hands for half an hour, and fobs it after he leaves the car. I would guarantee that any old hand would not miss collecting one fare in five hundred. In fact, I would like to bet that a sharp conductor would, out of five hundred passengers, collect five or six fares twice.

I think that conductors should not be appointed on the recommendation of politicians. That will save "leaks." Men with too large families should not be chosen. Those who have drifted around the country or the world, and have no family ties, have not as much incentive to turning in all the fares collected, as long residents of one locality. A man who drinks has his expenses raised and perhaps his sense of honesty blunted, and is in more risk of "knocking down," (as it is called by many. I prefer to call it stealing). The bell-punch can be beaten, and is beaten. The register in full sight is somewhat better, but nobody is going to count forty-two passengers and see that forty-two fares are registered, at starting.

The Slawson Box is a nuisance to passengers, and can be dickered with so that the last lot of coins or tickets deposited can be abstracted. Then it offers a good field for counterfeiters. In Philadelphia, a good many 3c. ferry tickets were put in for 6 1/4c. car tickets.

I haven't seen a really good system yet; and I don't know what would be a good one.

'OSCAR.

ED. STREET RAILWAY JOURNAL:—

What do we think about Fare Collecting? All sorts of things; mostly unpleasant, and calculated to ruin our faith in human nature—particularly when on wheels. Perhaps the iron rails exert a magnetic influence—but don't publish this, or some crank will be along wanting to re-metal our whole lines with copper or hard rubber; or to insulate the track, or something like that.

The bell punch is no good, by itself. Too easy to steal or counterfeit. These little private punches have earned a good deal of money for their owners or holders. The royalty on the legitimate ones is too high. We class the whole lot of tingling registers with the bell punch. Perhaps, a ringing dial-register suspended to the conductor's neck, could be better than the plain punch or ringing register, that does not show the number of fares collected. The clock-face register is all right enough after the car has started, to register an occasional jumper-on; but it gives opportunities in starting.

We tried the Slawson business, and found plenty of people paid all in pennies and the driver could't count them. Besides, there was always wrangling as to who had not paid his fare.

We do not wish our company's name mentioned, at least on this occasion; but shall probably take a hand in the fare-collecting discussion later on, over our company's proper title and address.

* * *

— THE —
STREET RAILWAY
JOURNAL.

MONTHLY, \$1.00 PER YEAR.

E. P. HARRIS, General Manager.
P. G. MONROE, General Western Manager.
ROBERT GRIMSHAW, M. E., Editor in Chief.
G. B. HECKEL, Associate Editor.

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Comments of Our Kicker.

— Buffalo east side cars contain clocks. They are posted on a circular board which bears the advertisement of an enterprising jeweler. I don't know whether he pays the company for his ad., or the company pays him for the clock, nor if so, how much.

— In Syracuse the mysterious wisdom of a Board of Aldermen is manifested by keeping all the four or five lines of street roads about a block from the centre of the town, so that go what way you will you must walk a block or two to get a car to continue your journey in the same direction. I suspect this is a scheme to make people stop in town.

— No, I don't suppose the cold trains on the Sixth Avenue Elevated Road can be accounted for on the ground that the company has an interest in the sale of cough remedies, which are kept by the news stands on the line.

— At the supper table the other night, our little girl said: "Mamma, when I was down town to-day a very old lady got on the car, and when the car started, it nearly jerked her down. Shouldn't you think the conductor would let old folks get sat down before he starts the car?"

— The Central City Railroad, Syracuse, has no check of any sort on its conductors.

— The *Tribune* thinks certain New York street railroads make money by a questionable system of collecting two fares from the passengers who get into the wrong line of cars by mistake. I wonder if the *Tribune* has any idea of the persistency manifested by a certain class of women in taking the wrong street, the wrong direction on the street, and the wrong car every time when it is possible?

— The Fulton Avenue Line, Brooklyn, has some cars—I think one of them is No. 49, on the night line—which "teeter" enough to make a sensitive person sea-sick.

— The night line cars on some lines are a disgrace to the community. Some of the

horses are so old, weak, poor and pitiful, and so covered with sores and blemishes, that the companies would not dare send them out in day time, lest the Society for the Prevention of Cruelty to Animals should get after them.

— How many horses do we see with galled shoulders, owing to the use of imperfectly fitting collars?

— Why is it that women are so discourteous to those of their own sex? I scarcely ever make a trip that I do not see a woman sitting cat-a-corner and taking up room for two, while some other woman is standing—perhaps carrying a baby, or with her arms full of packages.

— The Brooklyn City Road has a stringent regulation against carrying bundles and other articles in the cars. This is particularly to the effect that such articles must be carried in the hand or lap, and not put upon the seat or floor. It is generally carried out by conductors serving a notice upon mild-mannered people, and letting cheeky or tough-looking customers go un-notified.

— Wyckoff Street, Brooklyn, has had its name changed to St. Mark's Place, from Third Avenue upwards. It just happens that if a stranger is seeking a house above Third Avenue, and has got the address St. Mark's Place, the Third Avenue Line conductor always calls out Wyckoff Street, and by an equally unfortunate fatality, if the address has been given Wyckoff Street, the conductor calls out St. Mark's Place. As the cars pass both St. Mark's Place and Wyckoff Street, at this crossing, conductors should call both names. The other evening, a would-be obliging conductor got the names mixed, and amused the passengers by calling out, "Walkoff."

— The two double tracks at the intersection of Tompkins Avenue and Halsey Street, Brooklyn, are so much below grade that during a heavy rain passengers getting out there, have to wade through from one to three small brooks, according to which side of the street they live on.

— The meanest man in the world has been found by Mr. Small, formerly Managing Director of the London Tramway Company, and the inventor of the bell-punch, the automatic fare collector, etc. This meanest man is not, thank God, in this country, but in London; and he steals and sells the car horses' food.

— In some cities the spaces between the window sash and the car framing are used as umbrella racks by standing passengers. Once in a while some one gets his face wiped by a wet "Gamp."

— I hear "curses loud and deep" against the "latest wrinkle" of putting car stoves under the seats.

— Brooklyn conductors have a deservedly high reputation for patience, politeness and obliging dispositions.

— The lost property office of the Brooklyn City Passenger Railroad Company is managed with exceptional satisfaction to the traveling public.

— I should like to see added to the prohibitory notices in cars, an embargo against

passengers enveloped in dripping waterproofs and rubber coats, sitting down along side of clean, dry passengers, and on clean, dry seats.

— Passengers should consider that every time they stop a car unnecessarily, they are straining the horses and perhaps making fellow-passengers miss their boats or trains.

— Delays from patent coal carts are a specialty on the Sansom Street Line, Philadelphia.

— Philadelphia has a larger proportion of her car conductors appointed through politicians than any other city.

— The arrangement, or lack of arrangement, at the starting point at Fulton Ferry, Brooklyn, is confusing to passengers and dangerous to pedestrians.

— Has the driver of a bobtail car a right to make four passengers who have paid their fare miss their train, because of a difference of opinion between a fifth passenger and himself as to the latter's fare?

— There is too much swearing in the cars of certain lines I could name. If it is not stopped by next month I shall give the name of the line, and the numbers of the cars in the Kicker's Column.

Resistance to Traction on Tramways.

EDITOR STREET RAILWAY JOURNAL:

Mr. Jos. S. Paxton, on page 27 of the STREET RAILWAY JOURNAL, quotes a paper of mine and asks, "Will you or any of your correspondents be kind enough to explain the cause of the increased resistance on the steel track over iron track, viz., 4.1 iron and 7.1 times steel." If your readers will peruse the quoted article carefully, they will notice that I found the average force required to keep the said car in motion on the worn iron rail to be 32.3 lbs. per ton, while on the steel rail it was 15.6 lbs. per ton. The average force exerted to start on the old track was 134.6 lbs. per ton; on the new steel track, 116.5 lbs. per ton. A little consideration would have convinced Mr. Paxton that these results should have been expected. The resistance of the iron rail, worn with low joints, etc., was 32.3 lbs. per ton, as against 15.6 lbs. per ton on the new track with perfect joints, or more than double. This proves by practical experiment the loss street railway companies suffer in working poor tracks with bad joints. As your December number contained an article from my pen on the question of joints, I will simply refer to it. Now, the power exerted to start the same car on the iron track was found to be 134.6 lbs. per ton. On the new steel, 116.5 lbs. per ton. The resistance on the old iron track was, therefore, 16 per cent. greater than upon the new track. Dividing

$$\frac{134.6}{32.3} = 4.1 \text{ and } \frac{116.5}{15.6} = 7.1.$$

This means that whereas the actual force exerted per ton to keep the car in motion was really doubled on the old iron track over that force on the new track, yet it was only 4.1 times the force required to be exerted to keep the car in motion, while the good track, although it required less power to

start, required so *much* less to keep the car in motion, that it was 7.1 times the force exerted in starting. In other words, the *better* the track, the greater the percentage is the power required to *start* in proportion to the power exerted in maintaining the car in motion. I trust the above will explain the matter and answer Mr. P. He is mistaken, when he quotes me as saying the absolute resistance on the new steel rail was greater than upon the worn iron rail, for it was 50 per cent. less in maintaining the car's motion.

AUGUSTINE W. WRIGHT.

Chicago, Ill.

Accidents on Cable Railways.

The best constructed cable railways are liable to accident. These accidents, however, are usually slight, confined generally to breakage of cable, or ineffective working of the grip or the brake, imposing delays varying from half an hour to a couple of hours.

Accidents to individuals have been, as a rule, limited to the loss of a hand or a crushed foot, now and then, but on the whole there are less accidents from the cable railways than from the steam tramways.

A short time ago a very serious accident occurred on the Highgate cable road, London. The car was on a steep grade, and the grip failing to clutch the cable, notwithstanding the brake was shut down hard, the car ran down the hill into the car waiting at the bottom of the grade, completely demolishing both cars and injuring four people. The occupants of the waiting car perceiving their danger, having alighted, only those in the runaway car were injured.

Cases of this kind are of very rare occurrence, and although accidents to the brake or grip are not by any means uncommon, they do not usually result in more serious inconvenience than the failure to stop and start when desired.

ROTCIV.

Heating Cars.

"I am heartily in favor of anything that will tend to make the temperature in the street cars agreeable so long as it will not become a nuisance in itself," said Mr. C. B. Holmes, President of the South Side Railway Company, to a reporter for the *Tribune*.

"What is the real difficulty?" he was asked.

"Why, to get some sort of an apparatus that will heat the cars evenly, and not make it so warm for any one person or half a dozen that they are thrown into a sweat while the others are half frozen. There are many persons who ride on the cars who do not care to have them heated at all, but I would very much like to see them heated."

"What is the objection to stoves?"

"They do not distribute the heat sufficiently, and then there seems to be no way to get rid of the gas and flying cinders. I have talked with people from Minneapolis, New York, Brooklyn, and Cincinnati, where stoves have been tried, and I find that the people are dissatisfied with

them, and have been informed by the officers that they are sorry they adopted them, and that they would be glad to dispose of them if they could get back their investment. One man told me that during a visit to Minneapolis he rode on one of the cars, and that when the door was open for another passenger he was so completely covered with fine white ashes he looked like a miller, and that at the same time the air was charged with a suffocating odor of burning coal. In these cars, as in all others where stoves are now used, the stoves are placed in the end and take up the room of one passenger. All those who are seated near it are overheated, and those furthest off are about as cold as if there was no fire in the car at all. From what I have heard of the plan I consider it a failure. Other kinds of stoves have been suggested, but as yet none of them have proved satisfactory."

"Then you consider that there is at present no practical means of heating cars?" said the reporter.

"O, no; not that. We are experimenting all the while and hope to find some means of satisfying the demand. The cars certainly ought to be heated, and they will be if the proper thing can be found to create the heat. We have tried four or five different inventions, but there seemed to be some objection to all."

"What seems to have been the best of these?"

"It was a stove under the floor of the car, but it did not work as we thought it would, and proved a failure. It was located under the floor in the centre of the car. The stove was nearly flat and it was not necessary to raise the floor to make room for it."

"How about gas and oil stoves?"

"We have tried both with ill success. The trouble with them is that they emit an objectionable odor, especially if much heat is required."

"Do you not think it is possible to provide something which will take off so much of the chill in extremely cold weather that the danger of freezing one's nose and ears in a street car may be avoided? Could you not increase the temperature in extremely cold weather to something like 20° above zero?"

"O, we expect to do better than that. That would be too cold. We are trying everything, and I have no doubt we will soon discover something that will meet all the requirements."

"Is it likely to be a gas or oil stove?"

"I can't say yet. The gas we tried was generated from a mixture of oil and water placed in a tank. It heated tolerably well at times, but the odor was strong and disgusting. We are constantly examining new inventions, and it is only a question of time when the demand will be met, on the cable road at least."

Superintendent Lake of the West Side line, when approached on the subject last evening, said: "I have nothing to say concerning the matter. I have my own opinion about it and will not express it." Upon a suggestion that he might be said to be in favor of heating the cars, he replied that he had expressed his views, and that it was not worth while to exchange words on the subject.—*Chicago Tribune*.

Appreciation.

PUBS. STREET RAILWAY JOURNAL:—

I have received the first number of your publication, and think it is just what Street Railway Companies have been in need of for some time. You can put my name down with the many others which, no doubt, you will receive. Any officer connected with any Street Railway Co., after reading your Journal, who does not subscribe for it at least one year, is not doing justice to his profession.

GEORGE W. GRAETER,
Sec'y and Supt. Vincennes Citizens S. Ry Co.,
Vincennes, Ind., Dec. 24, 1884.

Mems.

THE capital stock of the Greenpoint (L. I.) and Lorimer Street Railroad Company, which has filed its articles of incorporation, is placed at \$120,000. The proposed road is to run through Broadway to Fifth Street, to Division Avenue, to Lee Avenue, to Gwinnett Street, to Broadway, to Lorimer Street, to Van Cott Avenue, to Manhattan, to Meserole, to Franklin Street, to Greenpoint Avenue, and thence to the Tenth and Twenty-third Street Ferries.

THE South Bend (Ind.) and Mishawaka Street Railway Company, which has a capital of \$100,000, has filed articles of incorporation. The directors of the company are Edward B. Dikeman, Perley H. Brown, Jeremiah W. Boynton, J. H. Knight and John Lyons.

BROCTON and North Easton, Mass., are to be connected with a street railway six and a half miles long.

TWO new street railways are reported in Texas; one in Fort Worth and one in Brenham.

A STREET RAILWAY is about to be constructed in Montgomery, Ala.

DAVENPORT, IOWA.—At a "canal and street car" meeting, Hon J. H. Murphy is quoted by the *Gazette*:

"The Hennepin canal subject was then taken up, and Congressman Murphy was called upon to make a statement of its status. He began by saying that while in Congress he had three objects in view—first, the Hennepin canal; second, the horse cars across the bridge; third, a new bridge across the Mississippi."

EDINBURGH, SCOTLAND.—The construction of the first street cable tramway in Scotland is about to be begun on the north side of Edinburgh.

THE Minneapolis Street Railroad is having built by the John Stephenson Co. and Brownell & Wight thirty 16-foot cars, to be equipped with Small's automatic fare collector. The company now has the collector on twenty cars.

THE Third Avenue R. R. Co. (N. Y.) has just closed a contract with Andrews & Clooney to furnish and lay the curves, switches and castings connected with the cable road depot to be built at Tenth Avenue and 125th Street.

— Richard Vose, New York, reports a large number of orders on his books for springs to be filled during the next 30 days.

— The Harlem Bridge, Morrisania and Fordham Ry. is building new car stables at 170th Street, where its offices are now located.

— Andrews & Clooney (N. Y.) report among other orders a number for wheels from South America, some 75 sets for John Stephenson Co., also a number for J. G. Brill & Co. and J. M. Jones' Sons. They have just completed some elevating sheaves for the Kansas City Cable Railway.

— The Third Avenue Railroad Co. has work on road bed nearly completed on about three miles of double track line on 10th Avenue, and about 1,600 feet on 125th Street. This experimental line of cable road is to run from the Harlem to the Hudson on 125th Street and from 125th Street north to the end of Tenth Avenue, which is above 225th Street. It is probable that cars will be running on a large portion

of the line by the first of April. If this trial of the cable system is satisfactory to the company and popular with the public, cable power will doubtless soon supersede horses on the old line of the company.

— President Lyon, of the Third Avenue Co., has spared neither pains nor expense in building cars for the new cable line of the company. The most noticeable features of the cars are a very high clear story, which carries the centre lamp well up out of the way and gives a very nice roomy appearance; the platforms are provided with two gates, only one on each being allowed to be opened, thus compelling passengers to get on and off the car on side nearest the walk; a woven wire screen on sides and wooden frame at ends prevent persons from slipping under the car; doors are hung from the top; six windows on a side.

— Superintendent Robertson, of the Third Avenue Co., N. Y., has designed and built an open car having two rows of reversible cane seats similar to an ordinary smoking car. The sides are closed, compelling

passengers to get on and off only at the end of car. It is probable that their new Tenth Avenue cable line will have a large summer traffic, and the company seems bound to deserve it.

— The Second Avenue R. R. Co. is completing its double track line from 59th Street to Harlem River. Forty super-gear, ventilated ceiling cars are building for the new line by the John Stephenson Co. The large stables on Second Avenue will be extended (185 × 201 feet, 3 storey) to First Avenue.

— The Paterson (N. J.) and Passaic Railway has been extended some three quarters of a mile during the past season.

— The Paterson (N. J.) City Railway Co. has added five new cars built by Jones, Schenectady, and will in the spring extend its track about five miles.

PRATT & LETCHWORTH, Buffalo, have recently filled orders for their Street Railway Hames for the Brooklyn City, and the Dry Dock, East Broadway & Battery railways.

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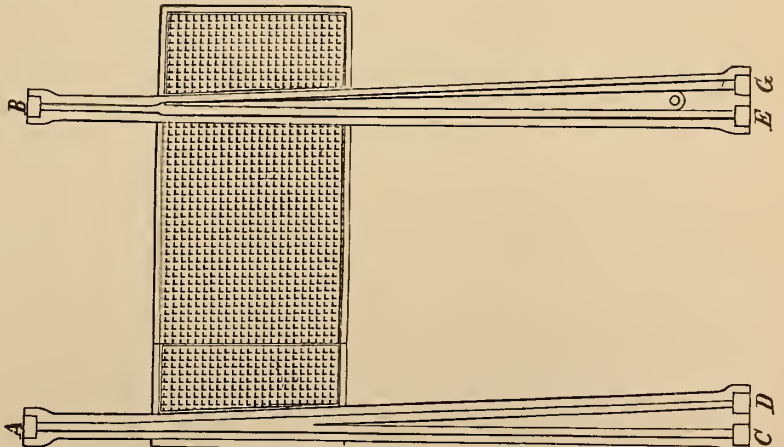
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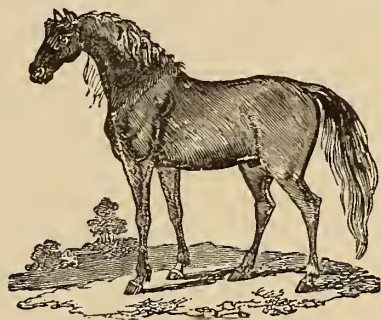
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medicine I have ever used. I have not
lost a horse since I commenced its use.
It gives relief in a short time after it is
taken. I can cheerfully recommend it
as a sure relief if given in time. I keep
it constantly on hand.

Truly yours,
FRANKLIN PRIEST,
President Decatur Street R. R.

MESSRS. JONES & ROACH:

Gentlemen: I cheerfully recom-
mend your European Colic Cure for
horses as being the best that I have
ever used. When once introduced no
horse owner can well afford to be with-

out it. I hope you will meet with the
success your cure deserves.

Truly yours,
VALENTINE BLATZ,
Per H. Lieb, Manager.

OFFICE OF NORTH HUDSON COUNTY
RAILWAY Co.
HOBOKEN, N. J., Oct. 4, 1884.

Gentlemen: It gives me pleasure
to say that I can heartily recommend
your European Colic Cure to all horse
own-ers, from a personal knowledge of
its curative qualities. I have used it in
our stables, containing about six hun-
dred horses, and have always found it
to be beneficial. Yours very truly,
ALBERT SAILLET,
Foreman and Veterinary Surgeon
for the North Hudson County Ry. Co.

Sample Bottles Furnished Street Railway Companies Gra'tis.

For further information, prices, etc., address

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**DAY'S IMPROVED
STREET RAILWAY TRACK CLEANERS.**

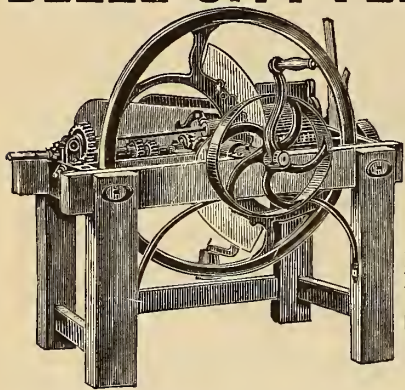
These Track Cleaners need no extended statement of their great superiority over all others invented. The fact of over two thousand pairs being now in use, is sufficient evidence of their necessity and utility. Adaptable to all kinds of rails and styles of cars. To secure the largest benefit they should be attached to every car in use.



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BELLE CITY FEED CUTTER**



IS THE
Strongest, Most Durable,
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BEST FEED CUTTER
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THE BELLE CITY M'FG CO.,
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MANUFACTURERS OF

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Of **T** patterns, weighing from 16 to 76 lbs. per yard.
CENTRE BEARING Street Patterns, 42 to 60 lbs. per yard,
TRAM Street Patterns 45 to 47 lbs. per yard,
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WORKS AT

STEELTON, DAUPHIN CO., PENN.

NEW YORK OFFICE, - 60 Broadway.

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New York, Jan. 1st, 1885.

*FOR 60 DAYS ONLY, from above date, we hereby offer to
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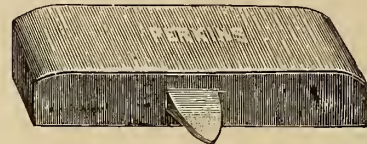
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*from our Regular Price, 90 cts. (NET) per Running Foot.
Awaiting your further favors, we remain,*

Very respectfully yours,

14 COOPER UNION, N. Y. **EUREKA ROLLING FLOOR CO.**

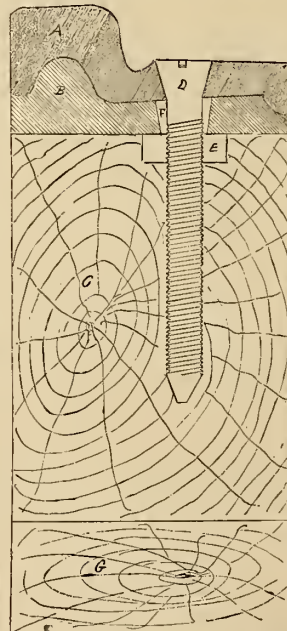
PERKIN'S TOE CALK
JUST OUT.



The old style end prong Calks often cause shoes to break, as the prong is driven into the crease. Perkins' new Calk obviates this. They are cheaper than any others, and warranted to weld and harden. Special pattern for Street Railroad work. Samples and price on application.

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PATENT JOINT FASTENING.**



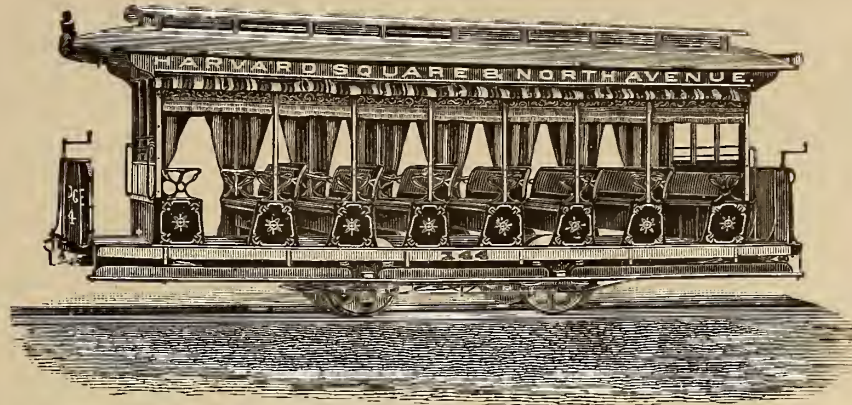
The accompanying cut shows a cross section through joint. *A* is the rail, *B* the joint chair, *C* the stringer, *D* the patent screw fastening, *E* the nut, *F* a slot in chair allowing rails to contract and expand. The chair cannot settle and the rail ends are held level with each other, preventing the many evils of ordinary construction.

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NORTH-CHICAGO CITY RAILROAD,
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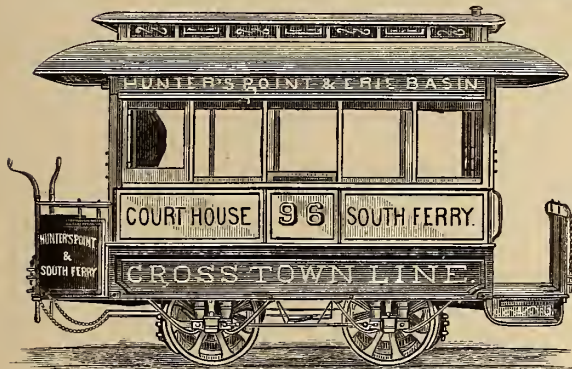
Builders of
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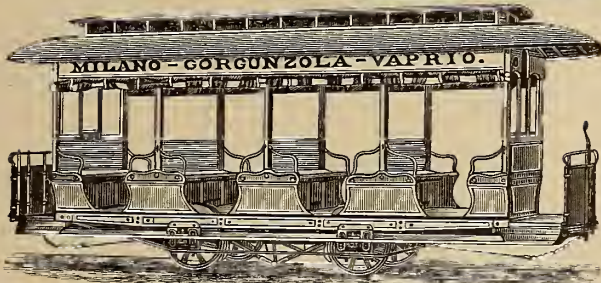
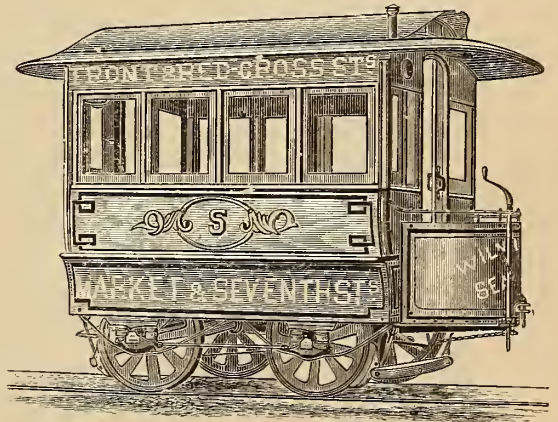
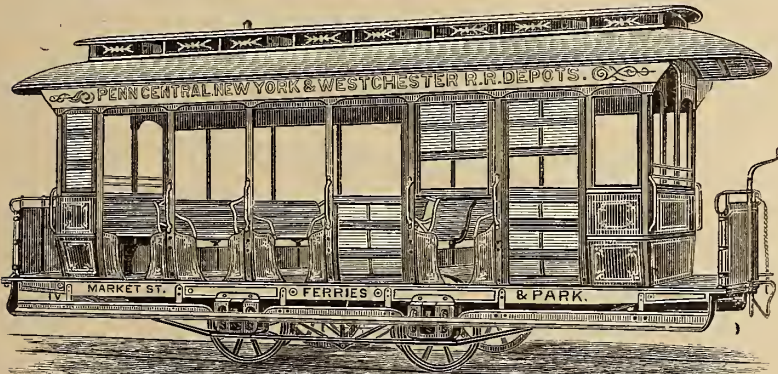
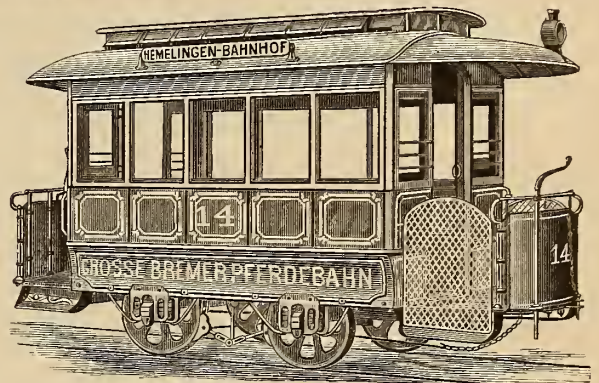
**TRAMWAY
CARS**

— AND —

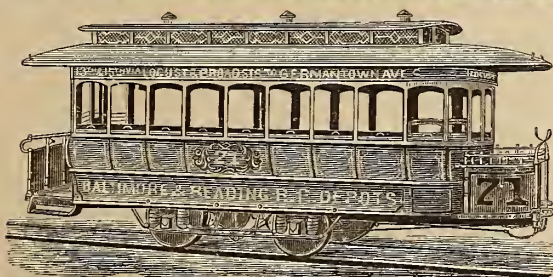
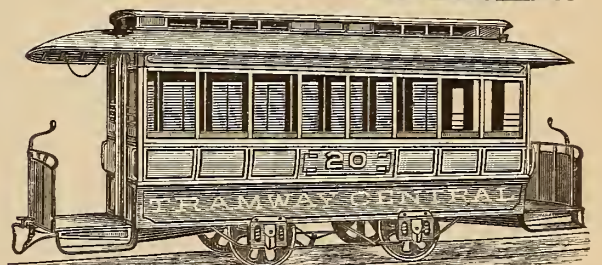
of all kinds.



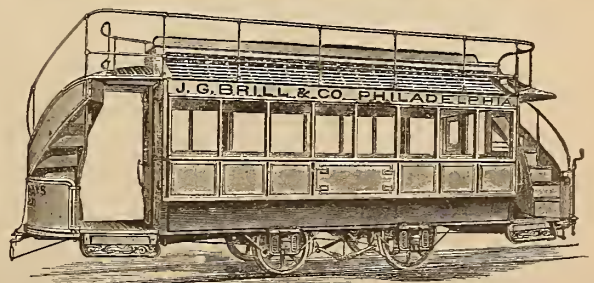
The
Construction
of which we
have brought
to a high degree
of
Excellence.



GOLD MEDAL
— FOR —
BEST
Tram Car,



Chicago
Exposition of
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Appliances,
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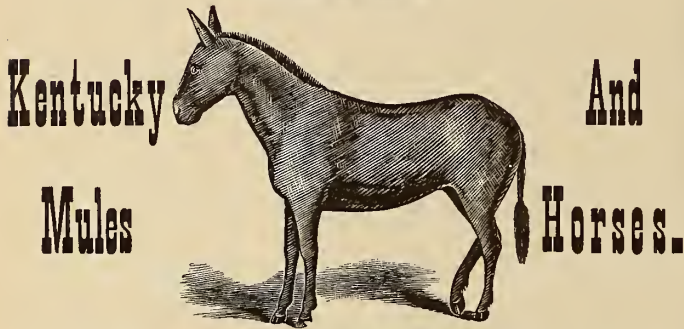
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International Exposition, Philadelphia.	- - - -	1876
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Exposition Universelle, Paris, France,	- - - -	1878
<small>SILVER MEDAL.</small>		
Melbourne International Exposition, Melbourne, Aus.,	- - - -	1880
<small>SILVER MEDAL AND FIRST ORDER OF MERIT.</small>		
Adelaide Exposition, Adelaide, So. Aus.,	- - - -	1881
<small>SILVER MEDAL AND FIRST DEGREE OF MERIT.</small>		
American Institute, of the City of New York,	- - - -	1859-1870
<small>SILVER MEDAL AND DIPLOMA.</small>		
Maryland Institute for the Protection of Mechanic Arts,	- - - -	1873
<small>SILVER MEDAL.</small>		
Massachusetts Charitable Mechanics' Association, Boston,	- - - -	1860
<small>SILVER MEDAL AND DIPLOMA.</small>		
Mechanics' and Agricultural Fair Association of the State of Louisiana,	- - - -	1873
<small>DIPLOMA.</small>		
Agricultural Society of New So. Wales,	- - - -	1877
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<small>SILVER MEDAL.</small>		

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For Horse Railways, Omnibus Lines, Etc.

The Advantages

OF THE

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are its ready application to Horse-Car service, or to any other purpose where cheap harness is required. It only costs about half as much as leather traces, while at the same time one set of Rope Tugs will (when used on horse cars) take the place of three or more sets of leather traces, as the Tugs remain attached to the car all day, no matter how many changes of stock are made. The relief horses having hooks attached to their hames, all that is necessary is to unhook the tugs from the working team back in the fresh horses, hook on the tugs, and the change is made. Railroad men will at once perceive their adaptability and economy from the above facts. They will also last longer than leather traces, and require but very little care. From their durability and cheapness they are also especially adapted for all kinds of farm use and heavy teaming, as farmers, etc., can easily repair them.



IF I USED ROPE TRACES

I WOULD NOT HAVE TO

CUT MY HARNESS.

LAKE & McDEVITT'S

PATENT

ROPE TRACES

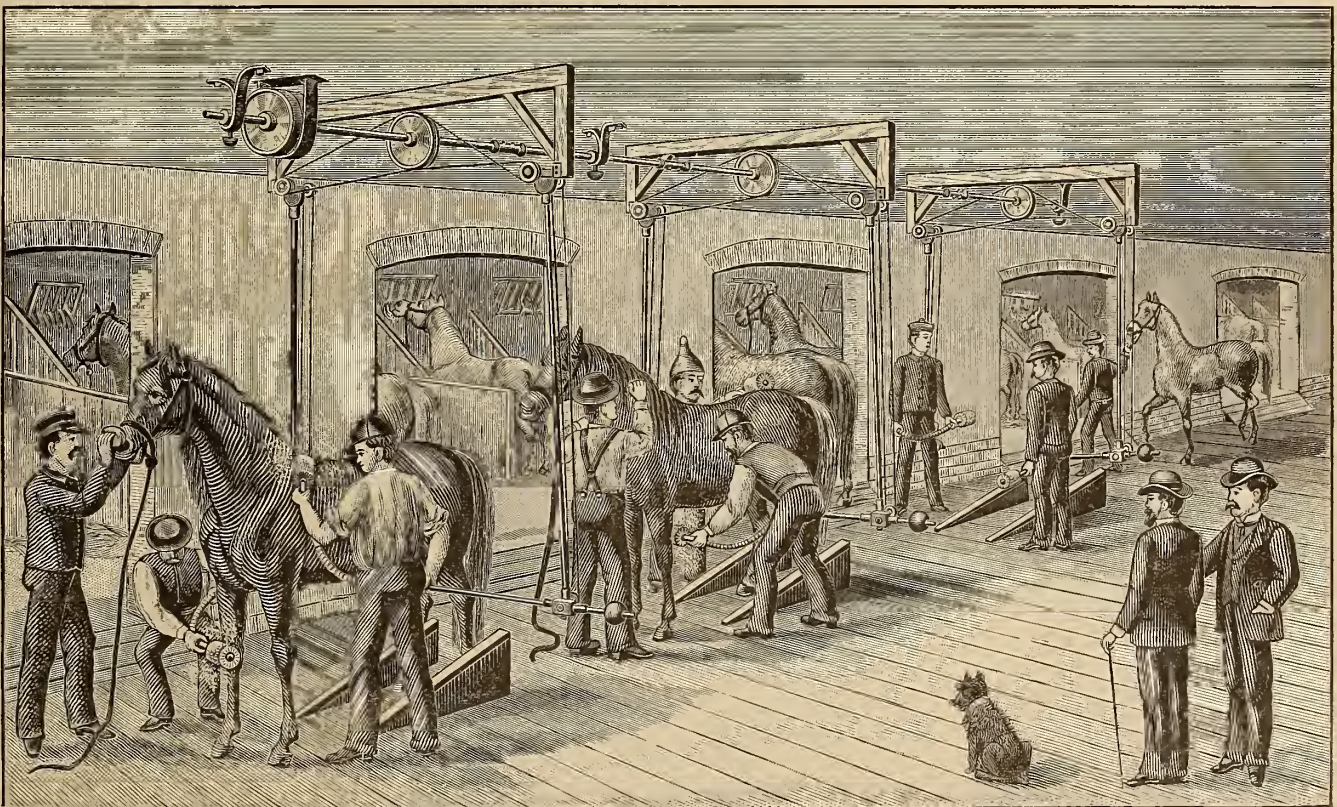
Give Perfect Satisfaction.

Patent No. 171,282, December 21, 1875.

In use on the Chicago West. Div. R'y.; Louisville City R'y Co.; Milwaukee City R'y; Transverse R'y Co., Pittsburg, Pa.; Citizens Street R'y Co., Pittsburg, Pa.; Pittsburg and Birmingham, Pittsburg, Pa.; Central City R'y, Peoria, Ill.; Grand Rapids R'y; Minneapolis St. R'y Co.; St. Paul City R'y; Houston City R'y, Texas; Superior Street R'y, Cleveland, O.; Cincinnati City R'y Co.; Fifth Ward Street R'y, Syracuse; Detroit City R'y.; Ft. Wayne and Elmwood St. R'y., Detroit, Mich.; Galveston City R'y; Springfield City R'y, Springfield, Ill.; Toledo St. R'y, Toledo, O.; Adams St. R'y, Toledo, O.; Atlanta Street R'y, and others, in all on about 100 Street R'ys in United States and Canada, and a large number of other prominent Street R'y Companies throughout the Country. Send for descriptive Circular containing testimonials, prices, etc., to

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TO STREET RAILWAY COMPANIES AND OTHER STOCK OWNERS.

This machine for grooming may be driven by any known power, and can readily be placed for use in any stable or out-building. It can be operated by an ordinary groomer; its work is perfect; its action simple and effective. Stock owners will readily realize the importance of the machine. The perfection and rapidity of its work, and the benefits derived by its use, commend it to those interested in the care and use of all classes of thoroughbred and work stock. The most vicious animal readily submits to its use. Machine Grooming is found to be less expensive than hand grooming, saving in food and medicines, and materially increasing the value of the animal.

The Curry Comb and Hand Process Superseded! Economy of Labor! Perfection of Work!

Three Hundred Head of Stock Thoroughly Groomed with Each Machine every Ten Hours.

This Grooming Machine is in daily use in some of the largest Street Railway Companies' stables, and has always given perfect satisfaction. Among those using it are the City R'y Co., Chicago, Ill.; Detroit City R'y Co., Detroit, Mich.; Central City R'y, Peoria, Ill.; M. W. Dunham, Wayne, Ill.; West Division Street R'y Co., Chicago, Ill.; Lindell Street R'y Co., St. Louis, Mo.; Pleasant Valley R'y Co., Allegheny City, Pa.; Marshall, Field & Co., Chicago, Ill.; Leroy Payn, Chicago, Ill.; Saginaw City R'y, Saginaw, Mich.; Pittsburg and Birmingham R'y Co., Pittsburg, Pa.; and a number of others who have given testimonials as to the perfect working of the machine. For prices, circular and other information apply to

161 SOUTH ROBEY STREET, CHICAGO, ILL.

J. W. FOWLER,
President.

DAN'L F. LEWIS,
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THE

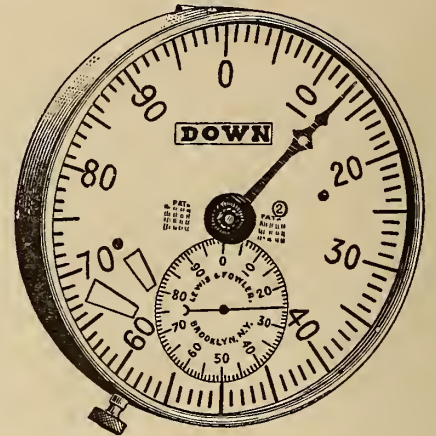
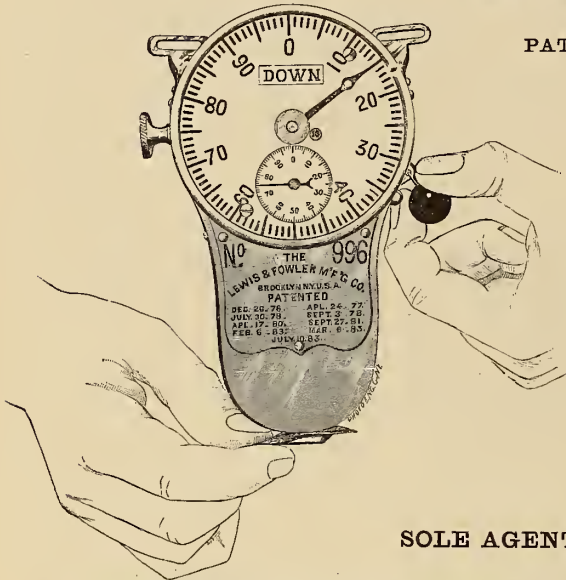
LEWIS & FOWLER M'F'G CO.

BROOKLYN, N. Y.

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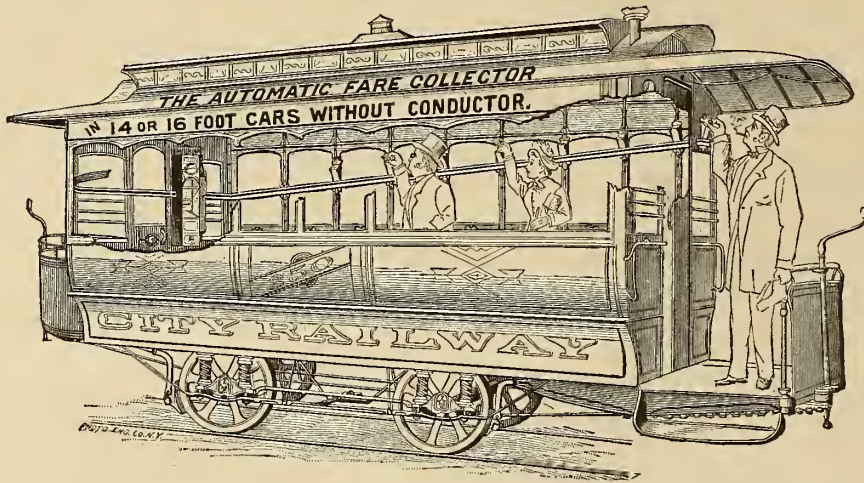
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Passenger Register,
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"SMALL'S PATENT AUTOMATIC FARE COLLECTOR"

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CARS.

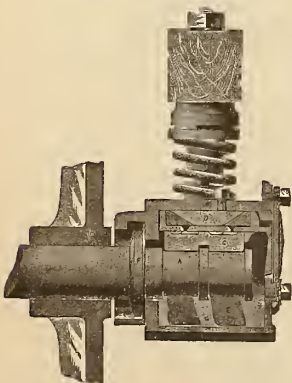
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"RANDALL'S" PATENT CAR AXLE AND BOX.

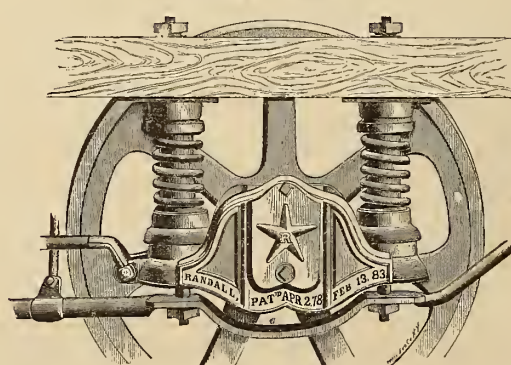
Sectional View.

Front View.

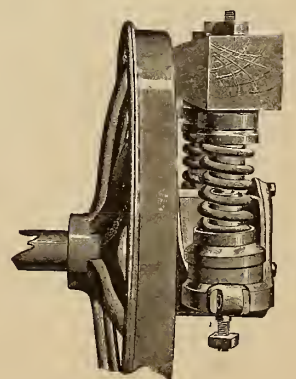
End View.



DUST TIGHT.



ANTI-FRICTION.



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THE MONITOR REGISTER.

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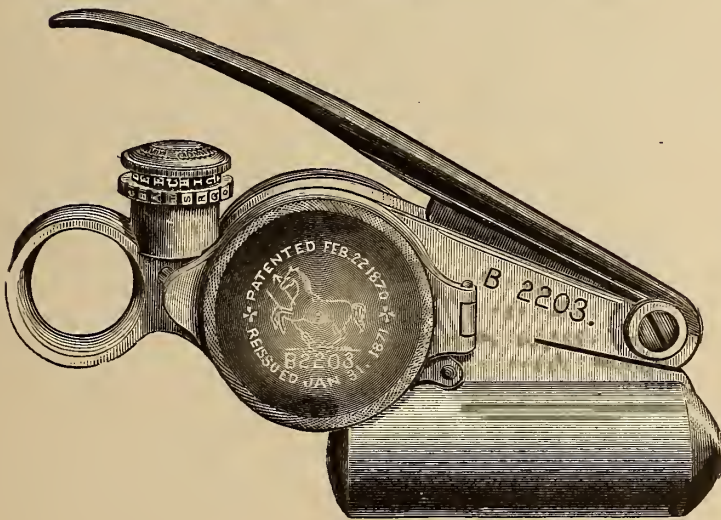
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This Company owns over 100 Patents, embracing all the Valuable Features of Fare Registers, Indicators, etc., and was awarded three Medals at the Chicago Exposition of Railway Appliances.

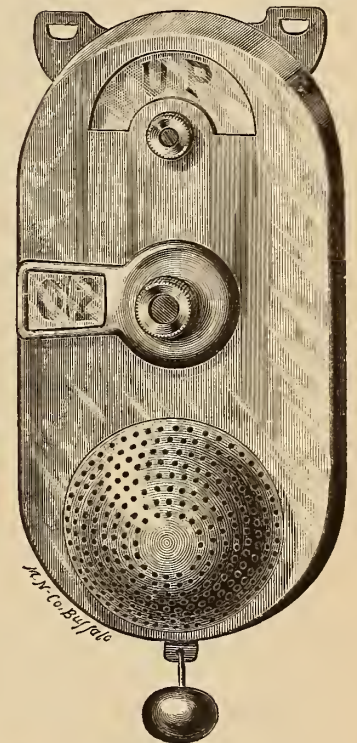
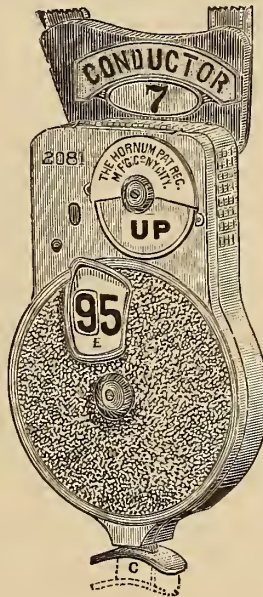


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THE ALARM REGISTERING PUNCH.

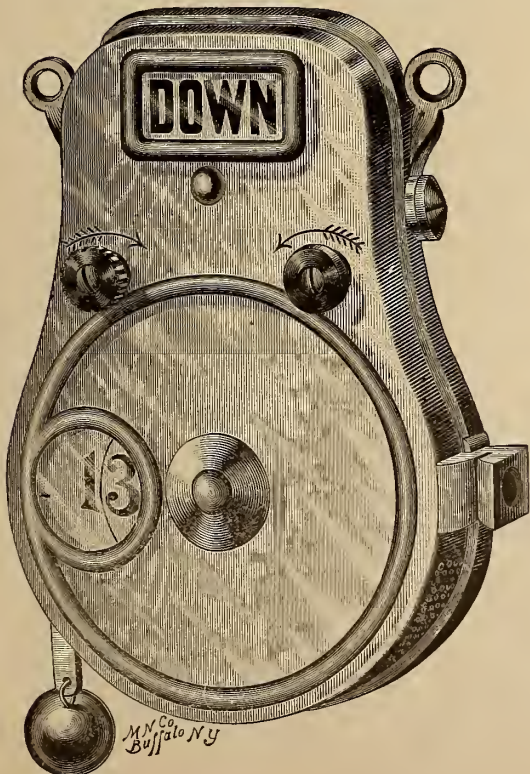
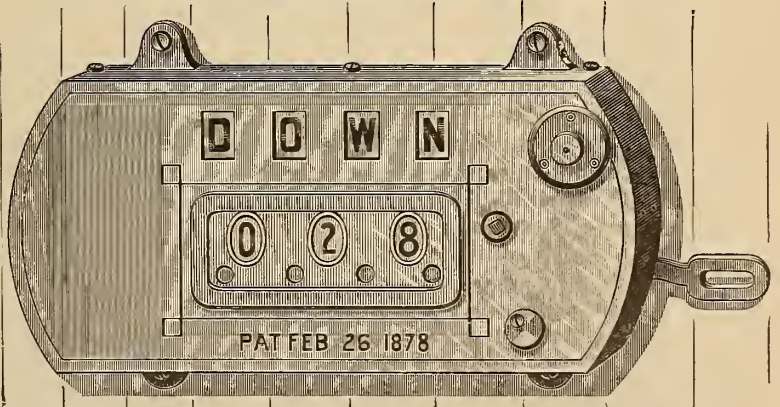


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We will place any number of our Duplex Registers (with or without the Fare-box, according to the kind of car) upon trial for any time desired, at a very slight cost. Our terms of purchase are quite reasonable. A trial is solicited. Address the proprietor,

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15 EAST 14th STREET,

R. M. ROSE, Manager.

NEW YORK CITY.

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MADE BY

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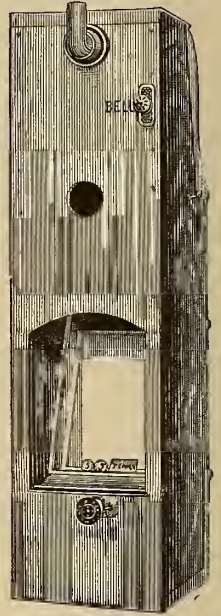
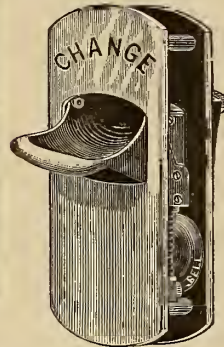
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Descriptive and Illustrated Circulars an application.



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Back View. No. 3.

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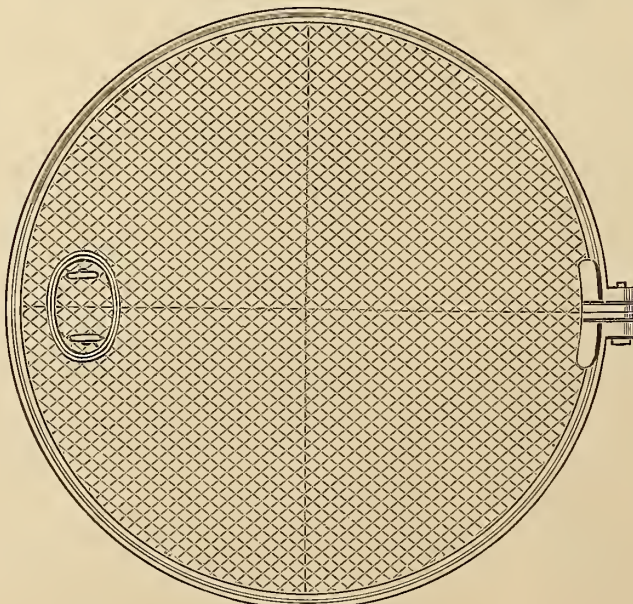
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ELLIPTIC, SPIRAL,
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SPRINGS

OF EVERY DESCRIPTION.

CAR WHEELS, AXLES,
BRAKE SHOES,
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Street Railway Turn-Table.

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of all Descriptions where great Strength is Required. Also

SWEEPERS,
SNOW PLOWS,
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Etc.

Steel Groove Rails and Machinery.

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RICHARD VOSE,

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Graduated Street Car Springs.

RUBBER CONE.

Patented, April 15th, 1879.

ADAPTED TO THE
STEPHENSON,
BEMIS,
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ALL OTHER BOXES.



No. 0, for 10-ft. Light Cars.
 No. 1, for 10-ft. Cars.
 No. 2, for 12-ft. Cars.
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 No. 4, for 16-ft. Cars.
 No. 5, for 16-ft. Cars.
 (Single Pedestal.)
 No. 1, Cushion, for 16-ft. Cars.
 No. 2, Cushion, for 12 and 14-ft. Cars.

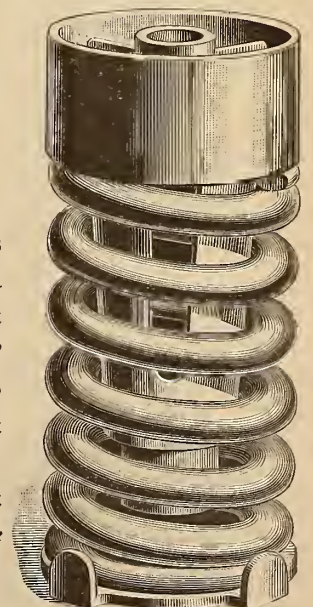
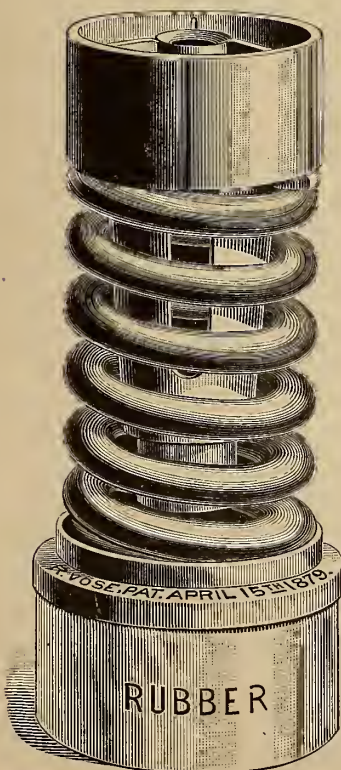
STEEL CONE CITY CAR SPRING.

Patented April 15, 1879—August 5, 1884.

The unprecedented popularity of the

"VOSE GRADUATED RUBBER CONE SPRING"

for HORSE CARS has induced the inventor to bring this class of Springs as near perfection as possible, and after a series of experiments and tests now presents for favor what he claims to be the *MOST PERFECT SPRING FOR HORSE CARS* ever offered. It is exceptionally **SOFT AND EASY** with the **EMPTY CAR** or with the **GREATEST LOAD**. It is believed to be the **MOST DURABLE**, being constructed upon a principle that seems to insure that the Spring must **ACTUALLY WEAR OUT**. The very **Finest Quality of Crucible Cast Steel** will always be used in these Springs.

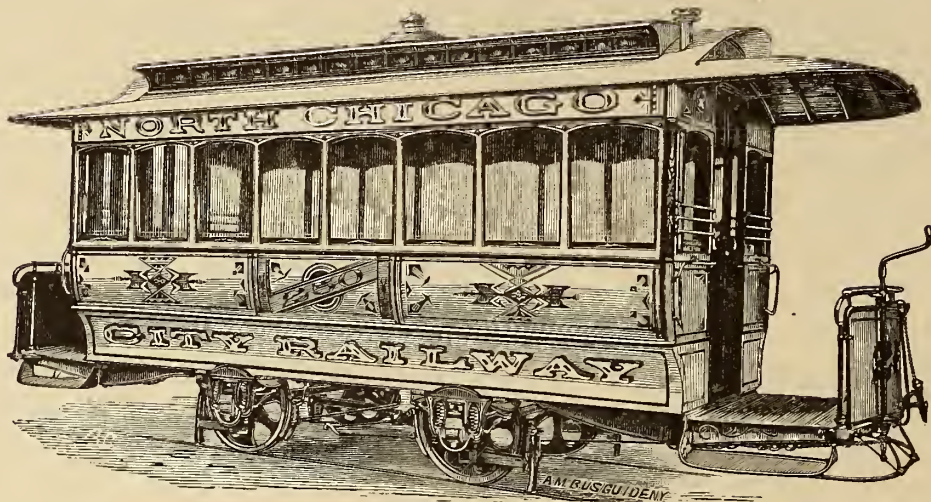


JOHN STEPHENSON COMPANY

(LIMITED),

New York.

TRAMWAY CARS



LIGHT, ELEGANT, DURABLE.

Every Description.

Best Materials.

Minimum Prices.

ORDERS QUICKLY FILLED. CAREFUL ATTENTION TO SHIPMENTS.

All Climates Suited.

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THE STREET RAILWAY JOURNAL



VOL. I. { NEW YORK: }
 { 32 Liberty Street. }

FEBRUARY, 1885.

{ CHICAGO: } No. 4.
 { 8 Lakeside Building. }

The Longstreet Rail.

The cut shows an isometric view of a track laid with a new variety of rail, partaking somewhat of the English "bull-head" type.* The web is quite thin. The head, which takes the compression strains under load, the wear of the flanges and of other wheels, and the lateral thrust of turning out, is comparatively heavy. The lower member, which takes the tensile strains due to the load, is rather lighter than we would make it, but that is probably a mere matter of opinion. Tie rods prevent track spreading. The lower edge of the rail rests in cast iron chairs, supported by concrete blocks. Some of this track is getting severely tested in the tracks of the Union Railroad, Providence, R. I., and we shall probably, at some later period, give a memorandum of its performance.

* D. F. Longstreet, Providence, R. I.

Doubtful Coin.

ED. STREET RAILWAY JOURNAL:—

Your "Kicker" queries who should be the judge of whether or not a worn or battered coin is legal tender—the conductor or the passenger. I fail to see that the conductor has any right to work off a doubtful coin in change on the passenger any more than on the receiver in making returns; nor that the passenger has any right to insist that the conductor shall take a piece that the latter deems suspicious or no longer a legal tender. Mutual concession must govern these things, but the

conductor, as representing the company, is more responsible than the passenger, and should be given the balance of power.

FIP.

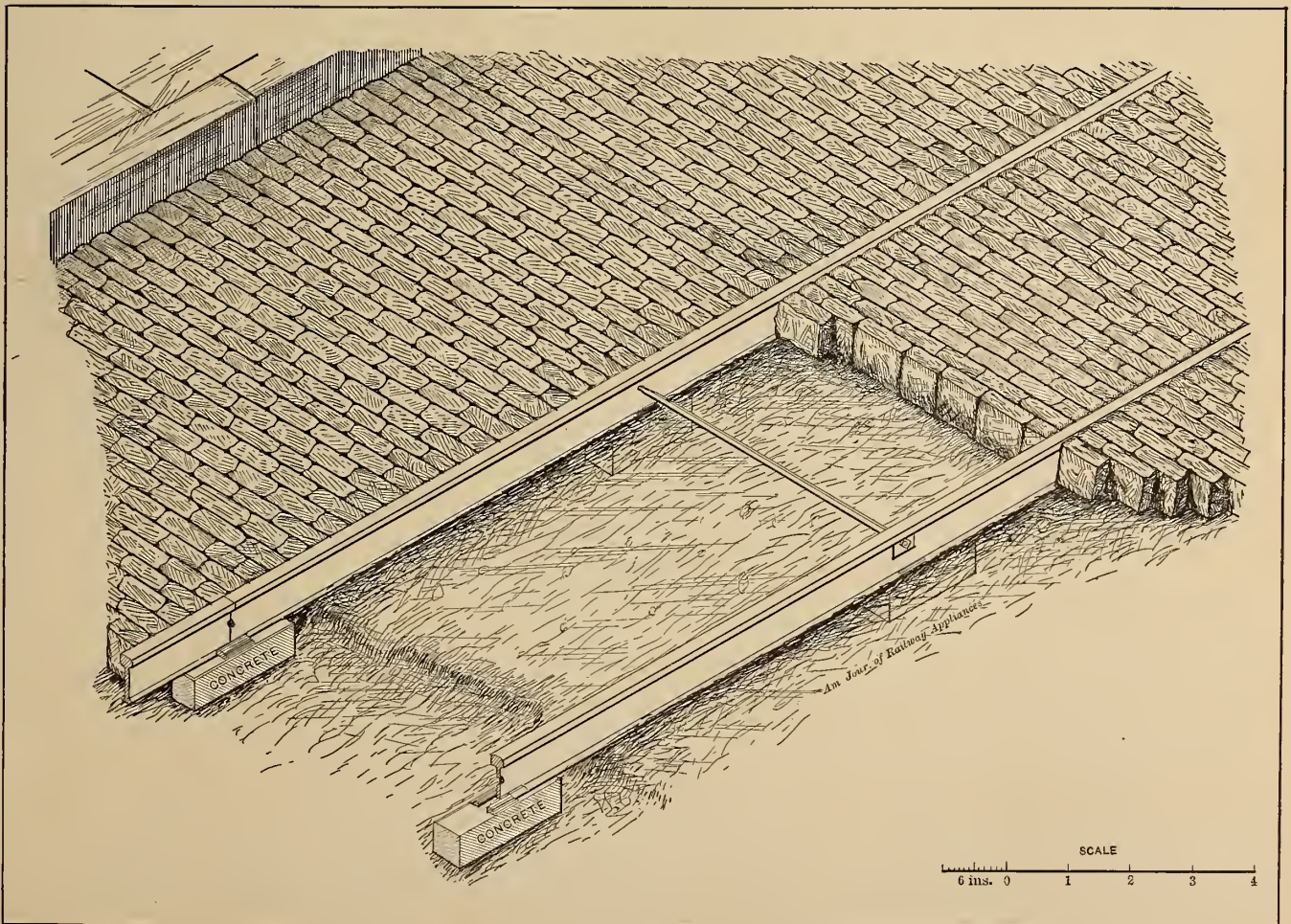
Philadelphia, Feb. 12.

Thank you kindly.

The following pleasant notice from the New York *Day Star*, is accepted in the kindly spirit which prompted it:

"THE STREET RAILWAY JOURNAL. Monthly. American Railway Company, 32 Liberty Street, N. Y. \$1 per annum.

This is a new and novel publication, devoted mainly but not exclusively to the topics suggested by its title. For all who are in any way interested in the practical affairs of street railways it appears to be a valuable publication."





American Street Railway Association.

OFFICERS, 1884-5.

President.—Calvin A. Richards, President Metropolitan Railroad Co., Boston, Mass.

First Vice-president.—Julius S. Walsh, President Citizens' Railway Co., St. Louis, Mo.

Second Vice-president.—Henry M. Watson, President the Buffalo Street Railway Co., Buffalo, N. Y.

Third Vice-president.—Edward Lusher, Secretary and Treasurer the Montreal City Passenger Railway Co., Montreal, Canada.

Secretary and Treasurer.—William J. Richardson, Secretary the Atlantic Avenue Railway Co., Brooklyn, N. Y.

Executive Committee.—President, Vice-presidents and William H. Hazzard, President Brooklyn City Railroad Co., Brooklyn, N. Y.; James K. Lake, Superintendent Chicago West-Division Railway, Chicago, Ill.; Charles J. Harrah, President the People's Passenger Railway Co., Philadelphia, Pa.; William White, President Dry Dock, East B. & B. R. R. Co., New York, N. Y.; B. Du Pont, President Central Passenger Railroad Co., Louisville, Ky.

The Convention Report.—(Continued.)

TRAMWAYS ASSOCIATION OF GREAT BRITAIN AND IRELAND.

In reply thereto, quite a number of letters were received favorable to the project and a cordial invitation was received from J. C. Robinson, Esq., the Chairman of the Tramways Association of Great Britain and Ireland, inviting delegates to be present at the June meeting in London. Members of the Association were apprised of this invitation by letter, under date of April 28th.

A Journal of Public Street Traffic, entitled "Tramways," and published in London monthly, prints in its March number, the following:

"We have been favored with a communication from Mr. W. J. Richardson, Secretary of the American Street Railway Association, an association young in years but promising, from the liberal support accorded to it, and the energy with which it is directed, a career of considerable prosperity and marked usefulness. Mr. Richardson states that the preliminary proceedings, in connection with the formation of the Tramways Association of Great Britain and Ireland, have been watched across the Atlantic with much interest, and he suggests an exchange of information and experience likely to be beneficial."

One result of the correspondence, perhaps, was to enable the managers of, and others connected with street railways, or tramways, as the roads are called abroad, the better to organize their Association, the name of which indeed was changed from the Tramways Institute to the Tramways Association.

It was formed, however, on a different basis from our own, in that individuals and not companies are the members, costing each person an annual subscription of one guinea. Members are those who control or manage tramways. Associate members are provided for and are defined as "those

interested in the development of tramway enterprise." This, as will be seen, opens a wide door, admitting supply-dealers, newspaper men, inventors and whoever may, for one reason or another, have his own personal or business "axe to grind."

Your Committee takes occasion to congratulate the members of this Association that the essential principle of its organization is the membership of companies—not individuals. In the strictest sense, ours is a Street Railway Association, the interests of whose members—the companies—are paramount to all personal considerations of the delegates representing the companies. We see in our sister Association across the water, elements of embarrassment, which, sooner or later, may manifest themselves to annoy—the natural outcome of the character of the membership. Personal advantage in such an association will almost inevitably take precedence of consideration over the companies themselves.

The following circular-letter was next sent to all the roads in America.

LEGAL OPINIONS.

OFFICE OF THE
AMERICAN STREET RAILWAY ASS'N, }
BROOKLYN, N. Y., March 12, 1884. }

Dear Sir:—Shortly after the organization of this Association, a circular-letter was sent to all the railroad companies in America, which, to a certain extent, outlined the work of the Association. Attention was called to the desire that we should be able to attain a very important advantage for the advancement of our interests, in the collation of facts and decisions regarding suits against street railway companies, either for injuries to persons or property, or in relation to patents. It was considered that this information would be of great value to members. It can only be properly gathered by the hearty co-operation of all the companies.

Until now it has not been feasible to undertake this work. In this mail is sent the first Opinion, issued in the line referred to, and which is sent for the purpose of ascertaining whether this feature of the Association work will be duly appreciated by railroad men. It is proposed to issue these decisions monthly. It seems to us that the advantage of having Opinions on such matters of vital importance to railroad companies, namely, law suits, published in advance of the law records, will be of great value to us; and we, therefore, solicit Opinions, especially of cases on appeal to the higher courts, and trust the railroad community will readily co-operate by promptly forwarding decisions as they may be received. Yours truly,

W. J. RICHARDSON,
Secretary.

This work of the Association has been very fully appreciated, and, probably, to it, more than to any other single feature of its work, is due the large increase in membership during the year. The companies recognize the fact that one of these Opinions may, sometime or another, easily save them thousands of dollars; and that, therefore, if for no other reason, they cannot afford to do without information that costs them so little to obtain.

Since the first Opinion was published in March, one has been issued monthly, including one already sent in October, and covering, in all, fifty-six octavo pages. Their titles and dates of issue are as follows:

March—William H. Wood against Detroit City Railway Co., of Detroit, Mich.

April—Edward S. Banks against Highland Street Railway of Boston, Mass.

May—Pittsburgh, Oakland and East Liberty Pass. Ry. Co., of Pittsburgh, Pa., against James Donaldson.

June—James W. Lauderbach against People's Pass. Ry. Co., of Phila., Pa.

July—Albert Heckrott against The Buffalo St. R. R. Co., of Buffalo, N. Y.

August—William Sutherland against The Jersey City and Bergen R. R. Co., of Jersey City, N. J.

September—John Parker and the Montreal Brewing Co. against the Montreal City Pass. Ry. Co. of Montreal, Can.

October—Lena Werner against the Citizens' Railway Co., of St. Louis, Mo.

In regard to the Opinion published in May, concerning the blocking of cars by vehicles while loading, we would state that the Board of Presidents of Philadelphia considered it so important, that they have had it published in handy pamphlet form, suitable for distribution. A copy is promptly served on any one, and with salutary effect, who thus interferes with a company in that city in the unobstructed running of its cars.

Neat magazine covers are now being made for the purpose of filing the Opinions, and one will be forwarded to each member with the next publication. Your Committee sincerely hope that, as cases arise and are determined either for or against the companies, that their managers will interest themselves for the general good, by forwarding the decisions promptly for publication. A case decided against a company may oftentimes be as helpful as the publication of one in its favor. The completest knowledge obtainable of street railroad law is desired by us all.

While on this subject, the Committee takes the opportunity to recommend you to cultivate the settlement of all cases that can be settled reasonably, and, of course, honorably; to resist "strikes" of every character, but to treat with especial favor any applicant who has received a *bona fide* injury, who comes to you without first having gone to see a lawyer.

TAXATION AND LICENSE.

The following circular-letter was likewise sent to all roads:

OFFICE OF THE
AMERICAN STREET RAILWAY ASS'N, }
BROOKLYN, N. Y., March 12, 1884. }

Dear Sir:—Toward the close of last year, a circular-letter was issued, requesting information as to what were the conditions of taxation and license relating to all the street railroads in all the States of the Union and Canada. Answers were received from a great many roads, but in a more or less unsatisfactory way; so much so, that it was quite impossible to compile in a proper manner the information thus obtained, and submit the same for general circulation.

The compilation and issue of the Report of the Second Annual Meeting has intervened since the issue of the letter, to prevent sending out a circular, to which uniform answers might be received. Here-with please find a comprehensive blank; and, so far as possible, will you fill out an answer to each question, *omitting none*, that the compilation may be perfect and complete, and return the same, *without delay*, to me.

As you are doubtless aware, a committee on the subject of "Taxation and License," has been appointed, headed by a lawyer, President of a member of the Association, who is to prepare the Report of the Committee to be presented at the regular meeting in October next. It is desired that replies be received from every railroad in the country, that an exhaustive report on the subject may be presented. All companies participating will be gladly furnished with a copy of the facts gathered.

Yours truly,
W. J. RICHARDSON,
Secretary.

Replies were received from eighty-three companies. The facts therein set forth have been compiled, and the information thus obtained should be of great value to those companies especially, whose burden of taxation is insufferable.

In order to assist the Chairman of the Committee in the preparation of his invaluable report on the removal of snow and ice, especially as regards the use of salt, the following circular-letter was sent by the President to all American roads :

REMOVAL OF SNOW AND ICE.

OFFICE OF THE
AMERICAN STREET RAILWAY ASS'N,
BROOKLYN, N. Y., July 25, 1884. }

TO THE PRESIDENT OR SUPERINTENDENT,

Dear Sir:—As the President of the American Street Railway Association, at the request of the Chairman of the Committee on "Track-cleaning and Removal of Snow and Ice; is Salt Necessary? If so, is its use Detrimental to the Public Health; and Especially, is it Injurious to Horses?" I deem it advisable to address, not only to the companies that are members, but to all the street railways of America, this circular letter.

For the purpose of aiding the Committee in the preparation of the report, questions are herewith respectfully submitted, and it is earnestly desired that full and definite answers will be made thereto, and this sheet returned to the Secretary of the Association, at above address, as soon as possible.

Yours truly,
WM. H. HAZZARD,
President.

Replies thereto were received from eighty-eight companies; and the report which has been prepared by a physician will very satisfactorily determine the question as to the effect on the public health of the use of salt for the removal of snow and ice from the tracks.

MISCELLANEOUS ITEMS.

Finally, notices were sent to all the American companies, apprising them of this meeting.

The duplicate sets of rules for the government of employees, received from fifty-five different companies, since increased by two, and which were noticed in the Secretary's report last year, have both been doing full duty during the year, in circulating from one company to another.

As the papers of the Association were accumulating rapidly, and a safe place was required for the protection of the permanent books from fire and loss otherwise, the cost of a safe was shared equally by this and the Street Railway Association of the State of New York, costing each \$37.50.

In looking back over the work of, and the advance made by the Association during the year, we are much pleased; the very considerable increase in membership being exceedingly gratifying.

We might add that every request for information made at the office of the Association, whether by a member or not, has been answered, and the information freely given.

OBITUARY.

We desire, in closing, to express our appreciation of the loss the Association has sustained in the death of our late friend and associate, L. Brayton, President of the Union Railroad Company of Providence. We shall miss his wise counsel and genial presence at our meetings.

We also record the death of Horace B. Whitney, the late President of the Harlem Bridge, Morrisania and Fordham Railway Company of New York City. Since the organization of this Association, Mr. Whitney had been an invalid, and was, therefore, prevented from meeting with us. He had, nevertheless, a lively interest in the welfare and success of the Association. We will be placed under lasting obligations at this meeting for the complete report prepared on a very important subject by the brother of our deceased friend, a director in the Company over which his brother faithfully presided.

We mourn the loss of our esteemed friend.

Respectfully submitted,

(Signed), WM. H. HAZZARD, }
JAS. A. LAKE, }
G. B. KERPER, }
D. F. LONGSTREET, } *Executive*
H. H. LITTELL, } *Committee.*
JNO. G. HOLMES, }
JULIUS E. RUGG, }
P. C. MAFFITT and }
JACOB SHARP. }

Mr. Woodworth, of Rochester, moved the adoption of the report of the Executive Committee.

Mr. Thurston said : I rise for the purpose of inquiring what it is that we are to adopt, whether there is any recommendation in the report that needs our adoption? We can receive the report, and order it spread upon the minutes and printed. If there are any recommendations requiring action, and which are to be adopted, then we should adopt the recommendations.

Mr. Woodworth said : I merely made the motion as indicating that the report meets the approval of this meeting.

The motion was carried.

MINUTES OF MEETINGS OF EXECUTIVE COMMITTEE.

Minutes of Special Meeting of the Executive Committee, held at the Grand Pacific Hotel, Chicago, Wednesday, October 10, 1883, at 9.40 o'clock, A. M.

There were present the President and Messrs. Hazzard, Cleminshaw, Walsh, Kerper, Longstreet and the Secretary.

The Secretary presented the following estimate of the receipts and expenses of the Association for the ensuing year:

RECEIPTS.	
Annual dues of sixty Companies, at \$15....	\$900.00
Admission fees to twenty Companies, at \$25..	500.00
Balance, cash in bank.....	143.13
Total.....	\$1,543.13

EXPENSES.	
Salary of Secretary and Treasurer, including clerk hire.....	\$1,000.00
Reporting and printing proceedings of annual meeting.....	225.00
Sundry printing.....	150.00
Postage.....	80.00
Incidental expenses, including stationery.....	15.00
Total.....	1,470.00
Adjourned.	

Minutes of Special Meeting of the Executive Committee, held at the Grand Pacific Hotel, Chicago, Thursday, October 11, 1883, at 8.45 o'clock, A. M.

There were present the President and Messrs. Littell, Rugg, Sharp, Longstreet, Kerper and the Secretary.

On motion of Mr. Rugg, it was resolved that the Secretary be and he is hereby directed to state immediately preceding the reports of Committees, in the printed report of the minutes of the meeting, that the Association assumes no responsibility for, or endorses, the reports presented by the Committees, and that the reports are published for the purpose of affording whatever information they may contain.

The report of the Committee on Track Construction having been referred to the Executive Committee, on motion of Mr. Longstreet, the report was ordered to be printed in full in the minutes.

Adjourned.

Minutes of Special meeting of the Executive Committee, held at the Fifth Avenue Hotel, New York City, Wednesday, October 15, 1884, at 9 o'clock, A. M.

There were present the President and Messrs. Lake, Longstreet, Rugg, Littell, Kerper, Cleminshaw, Holmes and the Secretary.

The minutes of Special Meetings, held in Chicago, October 9th, 10th and 11th, 1883, were read and approved.

The proposed report of the Executive Committee was read.

On motion of Mr. Longstreet, the report was adopted.

A letter to the Committee from the *American Railroad Journal*, proposing that it be recognized as the official organ of the Association, was read.

Mr. Kerper moved that as there are several, and will, probably, be more railroad papers that devote more or less space to street railway interests, that the Committee recommend to the Association that it does not consider it advisable to endorse any paper as its official organ, for the reason that such action would, at least, seem

to be invidious, and will certainly tend to deter other papers from the consideration of the interests of street railways, while the possible advantage to be gained by the action proposed would be more than offset by the evident disadvantage resulting therefrom.

The motion was unanimously adopted.

The question of the admission of any other person than the representative of a street railway to the meeting was discussed. The Secretary stated that in consequence of the expression of judgment on the part of members of the Committee, no notice had been sent to anyone except the representatives of street railways in America. It was further stated that the *American Railroad Journal* and the *American Journal of Railway Appliances* (whose business is the advancement of railroad interests), had proposed to be represented at the meeting, and had agreed that they would publish only those parts of the proceedings that would be approved by the Committee. It was the judgment of the Committee that these papers should be allowed representation on the basis proposed.

As to supply-men, inventors and others, it was the Committee's judgment that they should be admitted if there be sufficient room; but that they be allowed no part in the discussion, unless by unanimous consent.

The report of the Treasurer was presented, and, on motion, the President was authorized to certify to its approval on behalf of the Committee.

On motion, adjourned.

Minutes of Special Meeting of the Executive Committee, held at the Fifth Avenue Hotel, N. Y., Friday, October 17, 1884, at 2 o'clock, P.M.

There were present the President, Mr. Walsh and the Secretary.

The following list of Committees was decided upon for the next annual meeting:

- Repairs of Track.
- Progress of Electricity as a Motive Power.
- Progress of the Cable System of Motive Power.
- Ventilation, Lighting and Care of Cars.
- Taxation and License.
- Diseases Common to Car Horses and their Treatment.
- Rules Governing Conductors and Drivers.

Adjourned.

W. J. RICHARDSON,
Secretary.

The report of the Treasurer was read, showing a balance of \$1,933.13 in bank.

(To be continued.)

The Car Driver's Lament.

It's not so pleasant as it may seem,
To act all day as charioteer
Of a bumping car with a spavined team,
In weather wet and weather clear:
To turn the brake;
The lines to jog;
With cold to quake,
Or choke with fog,
Or swelter and sweat 'neath the "raging Dog!" *

* Poetical license (\$1,000 per annum) for Sirius, or the "Dog-Star."

Ah, well for the happy crowd inside—
The bost of fortunate passenjares—
Lulled half to sleep by the rocking ride,
Till life forgets its carking cares:
I turn the brake;
The lines I jog;
With cold I quake,
Or choke with fog,
Or swelter and sweat 'neath the "raging Dog!"

Ah, well for the lucky conductare,
Who stretches his legs and "feels his oats;"
Who smiles on the ladies young and fair,
And bows to the "nobs" in their broad-cloth coats:
I turn the brake:
The lines I jog;
With cold I quake,
Or choke with fog,
Or swelter and sweat 'neath the "raging Dog!"

The homeliest never looks at me;
On wealth and style I must turn my back;
And for "knocking down" an occasional "V"
I've never a chance, and the "Con." won't "whack":
I turn the brake;
The lines I jog;
With cold I quake,
Or choke with fog,
Or swelter and sweat 'neath the "raging Dog!"

Some day, in a bappier clime than this,
I may wear with pride th' official cap:
So I drive, and dream of that day of bliss,
When I shall "drop" on to a downy "snap":
Still I turn the brake;
The lines I jog;
With cold I quake,
Or choke with fog,
Or swelter and sweat 'neath the "raging Dog!"

JEHU.

Record of a Remarkable Horse.

EDITORS STREET RAILWAY JOURNAL:—

Permit me, on behalf of Mr. J. D. Han-aur, Foreman of the Larrabee Street stable, North Chicago City Railway, Chicago, Ill., to present you with the accompanying photograph of "Old Crooked Tail," a remarkable horse!

On March 15th, 1863, Mr. F. Marwood, a farmer of Cook County, Illinois, brought to Chicago a five year old gelding, and sold him to the North Chicago City Railway. The animal was at once put to work in drawing the company's cars, and continued in regular service until a recent date. He is now an "extra," and makes one regular trip of 6½ miles daily, with other trips, as required. So far as I can ascertain, he has "never lost a day" from any cause during this long-continued service! Our horses work seven days in the week, and Mr. F. P. Roach, of our office, calculates that this horse has during 8,545 days since he entered our service, traveled 17,090 round trips, or 102,540 miles, as a minimum, during the twenty-one years, five months past.

Age has not dimmed his eye! His head is as erect and he is as full of fire as many a colt! He is to-day sound in every respect, and without blemish—a bright bay, with black mane and tail, white face, sixteen hands high, weighing about 1,100 pounds.

When you consider, Messrs. Editors, that the average railroad life of street car horses is from three to four years, when they give out and have to be placed in other service, the performance of this remarkable horse stands forth in unequalled prominence, and I question if his record has ever been excelled among the many thousands of our equine assistants, who day by day, under the summer's broiling sun, or in the winter's biting cold, in times of rain or times of drought, do their part in the efforts of the street railways to provide the daily transportation, upon the regularity of which innumerable multitudes of the human race depend.

In an address to young men, Prof. Huxley said: "No life is wasted unless it ends in sloth, dishonesty or cowardice. No success is worthy of the name unless it is won by honest industry. * * *" This old horse has done his duty well, and, measured by the above rule, has achieved success. If there be a future resting place, where good horses go, he shall have his reward!

If any of your subscribers know of another street car horse anywhere who can beat this record, let them "trot him out."

Respectfully,
AUGUSTINE W. WRIGHT.

Boston Street Railways in 1884.

The comparative statement of the several street railways of Boston for the year ending Sept. 30th, 1884, shows the average receipts per mile run have been as follows:

Middlesex Railroad..	34 96-100 cents.
Cambridge Railroad.	27 61-100 "
Lynn and Boston Railroad.	32 64-100 "
South Boston Railroad.	32 25-100 "
Metropolitan Railroad.	28 95-100 "
Highland Railroad.	31 5-100 "
Charles River Railroad.	22 54-100 "

The average expenses per mile run have been as follows:

Middlesex Railroad.	26 48-100 cents.
Cambridge Railroad.	23 21-100 "
Lynn and Boston Railroad.	28 29-100 "
South Boston Railroad.	26 55-100 "
Metropolitan Railroad.	23 44-100 "
Highland Railroad.	25 39-100 "
Charles River Railroad.	21 58-100 "

The average number of passengers per round trip has been as follows:

Middlesex Railroad.	45
Cambridge Railroad.	42
Lynn and Boston Railroad.	50
South Boston Railroad.	40
Metropolitan Railroad.	38
Highland Railroad.	43
Charles River Railroad.	33

— Car horses wear out sooner than omnibus horses—for although the brakes save the former from the severe strain in stopping this is outweighed by the severe strain they undergo in starting the cars, which are so much heavier than the omnibuses.

The Refined Mule.

EDITORS STREET RAILWAY JOURNAL:—

In your December number, page 33, under the heading of "Coming Articles," you promise, among other things, an article on "The Refined Habits of the Louisville Street Railway Mule." The few remarks that Supt. Littell, of Louisville, made at the late meeting of the Street Railway Association, about the drainage of stable and the reference to the mules, etc., set those present to thinking, and afforded them a good deal of amusement, which was evidenced by nearly every one at the banquet, who had anything to say, going for our genial friend in a pleasant way.

Now, as all have had their fun out of this matter, I greatly hope you will prepare your article, not from what was said about Louisville mules alone, but investigate the matter and get some information on the subject. Mr. Littell stated nothing but facts; and if what is done in the South was put into practice in the hot, close, badly ventilated barns in New York, Boston, Cincinnati and other places, there would be less disease, better health and fewer blind animals.

The subject is not one to be ridiculed, but is of great importance and worthy of sober thought, and if you will think over the matter, personally examine some of the New York Railway Co.'s barns and inhale the strong fumes of ammonia impregnating the entire building (including the hay and grain), you will, I think, prepare an article on this subject that will lay the foundation for doing more good to the horse and mule than has been done by Bergh.

PHILETUS.

Cincinnati, January 20.

[Some years ago, when our occupation took us into fire engine houses, we "happened into" an engine house in the outskirts of the city of Newark, New Jersey, and there learned that the horse could be taught cleanliness, decency and punctuality, as readily as the average human being could. The engine house was one of those in which the horses stand in the same room that serves for engine house and for sitting-room for the men; and the latter, not relishing the perfumes of Araby the blest, which were wafted from the stalls, and no more relishing the necessity of frequent polishing of bright work, caused by the emanations, got the idea that if a cat or a dog could learn neatness of habit and acquire regularity of excretive functions, the horse—particularly the "fire-horse"—could get up to a civilized and sweetly-smelling plane. So the first time that a horse commenced to violate the, to him, unknown proprieties, whether his intended offering at the altar of carelessness was solid or a libation—he was soundly paddled with a "cob" made of $\frac{3}{4}$ -inch board neatly ornamented, as to its business end, with inch auger-holes. He was then led into the yard and left a moment. The instinct which led him to save himself trouble gradually faded away in the dawning light of that reason which associated former habits with new, vigorous, and decidedly unpleasant sensations. Under a patient tutelage which acted at once upon his rea-

soning powers and upon his sensory nerves, the noble brute gradually learned to exercise his reasoning powers—and control his sphincter muscles. Thus punctuality and propriety, delicacy and discipline joined hands; and there was joy in Newark—but no free ammonia in that engine-house. When we were there—in 1873 or 1874—the horses got their noon signals by electricity from head-quarters, a mile or so away;—their halters were released by the same current that caused the gong to strike—they left the clean stalls, excused themselves for a moment, and came back thanking their stars they were not as other nags were. In our wanderings we used to recount that triumph of matter, in the shape of a perforated board, over mind as developed in the brain of the Newark fire-horse: but we found that we were gaining an unenviable reputation as a disseminator of fairy stories, and we laid the history upon the dusty side of oblivion's topmost shelf. We never thought for corroboration and vindication out of the Blue Grass district. We little dreamed that in that land of beautiful women (and *such* whiskey!), and in the reviled person of a street-car mule, there was a silent force at work, raising that long-eared and hard-kicking animal to the level of the fire-engine horse, already embalmed in verse,—but no longer steeped in uric floods. We knew that the mule had quick perception—and a hair trigger on each hind leg—but in most hopeful moments we never thought that the blanket of the Newark horse was to descend upon his hybrid shoulders, and that his ample ears were to be the twin banners of education and elegance, in the brute kingdom.

In this matter we are heartily with Mr. Littell and with our correspondent, and commend the good sense and humanitarian spirit which has led to making a car-stable more of a barn and less of a pest-house and general nuisance.]

The Texas Mule.

We are very pleased to be enabled to present the ensuing communication from Mr. Belknap, who is, probably, more competent than any one else to speak on this interesting subject. Mr. Belknap in his accompanying personal note says, that he is in constant receipt of inquiries upon the subject from companies in the North. This article is calculated to forestall many inquiries:

SAN ANTONIO, Feb. 8th, 1885.

EDS. STREET RAILWAY JOURNAL:—

I notice in the several Journals already received, a great amount of information about horses as a motive power, etc. It has occurred to me as being singular that no one has mentioned our Texan-Mexican mule in this connection. We that have handled them are willing to assert that there is no animal better adapted to street car service than they are. They are got from our native mares (Mexican or Texas raised) by American jacks. Their average height is from 13 to 14 $\frac{1}{2}$ hands. A 14-hand mule is the best working size—he is close coupled, sound, compact and solid—weighs about 800 lbs., and is fully as strong as a horse of 15 hands, weighing from 300 to 400

lbs. more. One of these mules will, without distress, easily handle a car of 12 or 14 feet length, containing 60 passengers up a grade, and on a level track will strike a trot equal to seven or eight miles an hour on a Macadamized road and maintain it.

Their hoofs and legs are a marvel, never developing disease in either. With an experience of seven years' use of them, have had no complaints in this respect. They are seldom sick or off their feed. With 125 head in our stables we have not had a case of hoof or leg sickness. They can do twenty (20) miles work each day throughout the year, without shrinking or showing any ill effects. We don't know what a hospital department is. In seven years we have lost fourteen (14) animals from all causes—8 from accidental causes—6 from effects of Pink-eye or Epizootic. We have never sold one of these animals without bringing in more money than we paid for him. We buy them after passing three years of age and break them ourselves, a very simple process when understood. We consider them good for ten years, after which time if they grow fat and lazy, they bring good prices for farm and other uses. Have never seen but one mule that balked. We know they will pull, and pull till exhausted.

We select our mules in an unbroken state from herds passing, paying from \$75 to \$100 each. In two weeks' time we have them in good fix to take their daily work, beginning easy and gradually increasing. We make no hesitation in giving them twenty miles a day if compelled to do so, but as a rule confine it to eighteen miles.

Their feed averages per day, ten pounds of grain (oats), and ten to twelve pounds of hay. Our mules have none of the sluggishness of the Kentucky mules; in fact, one of our mules' work would kill either a Kentucky or Missouri mule within a year.

They require little care—give them opportunity to roll twice a week, and they *clean* and rest themselves better than through any other process.

For *pluck, endurance, strength, speed*, agility and health, they astonish every one not acquainted with their usefulness. We have many mules in our stables that have done seven (7) years' work. We intend to work them right along, till we see signs of failing, in order to arrive at an accurate estimate of length of time they will last in the service. From present appearances we believe them good for ten (10) years.

We think if a proper test were given these animals in the North, that in a short time their advantages would assert themselves, and the horse problem be solved to better advantage than through any other process. Yours sincerely,

SAN ANTONIO STREET RAILWAY CO.,
H. BELKNAP, President.

In Explanation.

Owing to great press of matter we have been compelled to defer to our next issue, the publication of several interesting articles and illustrations: Among others a description of the Pryor interchangeable horse-shoe, and an illustrated plan of car end framing by Mr. W. M. Gabrielson, late of the South Side (Chicago) Railway.

— T H E —
STREET RAILWAY
JOURNAL.

MONTHLY, \$1.00 PER YEAR.

E. P. HARRIS.....General Manager.
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AMERICAN RAILWAY PUBLISHING CO.

32 LIBERTY ST., NEW YORK.

8 LAKESIDE BUILDING, CHICAGO.

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Special Notice.

Street Railway officials and others interested, who have not yet subscribed for the STREET RAILWAY JOURNAL, should do so at once, so as to receive the back numbers. An index will be printed at the end of the year, embracing the first twelve numbers—constituting a most valuable fund of information. The price (ONLY ONE DOLLAR) should place it in the hands of every practical street railway man in the country.

What is Needed.

Two things are needed to make the STREET RAILWAY JOURNAL what it should be: (1), news notes and items of interest from the roads, and (2), more subscribers.

In sending news and items, don't stop to put them in shape for the printer (we can do that), but *send in the points.*

Every subscriber received will help to make the paper more valuable to all, as every dollar thus received will be expended in engravings and valuable articles for the reader.

"Manifold" Editorials.

We frequently have sent to us circular descriptions, written out, to accompany voluntary sendings of engravings which are furnished to several technical and trade papers.

We beg most respectfully to say, that under no circumstances will we knowingly accept for publication any matter which has been sent, or will be sent, to any other journal. If we accept it, the manuscript and copyright are ours, and if used by any other journal before we used it, we should act just as though the contemporary had got hold of and published matter which we had bought and paid for, before we had a chance to use it. If we published the matter first, we should expect that every other journal which used it, should credit it to

us, as we scrupulously do every one of the articles which we reproduce from other papers.

In being thus particular we are merely living up to our idea of what a good technical journal should be, and are looking after the interests both of subscribers and of advertisers. Our subscribers pay us for new and interesting matter. Our advertisers pay us to carry their advertisements to a large number of subscribers who will read the paper.

So we notify the public that all manuscript matter sent us for publication will be considered as intended for us only, unless the contrary is stated thereon by the sender.

Commissioner O'Donnell and the Street Railway Companies.

The accountant of the Railroad Commissioners of the State of New York has recently analyzed the yearly reports of several New York street railways, at the instance of Mr. Commissioner John J. O'Donnell, who has authorized the publication of the same, as a sort of minority report.

The animus of this action by Mr. O'Donnell is in pursuance of the proposition by him—which it is understood, however, is not favored by the other commissioners—in favor of recommending legislative action to enforce such a reduction of fares upon certain roads as shall cut down their yearly dividends to ten per cent. upon their original cost.

It may serve to enhance the popularity of this gentleman with his "patriotic" constituents as an "Anti-Monopolist" candidate, thus to strike at the street railway companies, but we can see no reasonable ground for apprehension on the part of the latter.

Surely no candid mind can make any deductions from his array of facts and figures, upon which to base a plausible pretext for asking such legislative interference with the railway companies as he suggests.

None of the exceptionally prosperous companies pay over fourteen per cent. in annual dividend; the majority pay but very small dividends, while many others pay nothing at all (as, for instance, the Second Avenue Railway of New York City, which for eighteen years paid no dividend whatever).

By Mr. O'Donnell's own showing, the most prosperous company he cites cannot reduce its fares one cent, and yield a ten per cent. yearly dividend, after paying expenses.

Stockholders in street railway companies embrace all classes, many of them relying on their dividends for support. Enterprise and wise management are as essential to success in the street railway business as in any other, and we can see no fairness in legislative enactments which discriminate against such companies because they are successful.

We hope and believe that further movement in this direction will be thought inexpedient by the Board of Railroad Commissioners, and that Mr. O'Donnell's suggestions will be speedily pigeon-holed and forgotten. G.

Cheap Fares.

Apropos of the contemplated reduction of fares by the New York Railway Commission, Mr. Richardson, President of the Atlantic Avenue Line, Brooklyn, claims that it is actually cheaper to pay five cents for a six-mile ride in one of his cars, than to pay the shoemaker—to say nothing of the savings of time, strength and energy. He also avers that street car riding is the cheapest commodity in the market.

Independent Wheels.

With the coming year, the JOURNAL OF RAILWAY APPLIANCES intends to continue its discussions and criticisms on what it considers faulty methods and structures in rail-roading. Perhaps the most vicious and discreditable thing that retards railway progress and reduces railway dividends is the rigid axle.

If you were to go to Thibet, or Abyssinia, and see a half naked native making or using a two-wheeled cart, having both wheels fast to the axle, you would either laugh at him, or try to teach him better.

If that same savage were to carry out your practical hints to the advantages of independent wheels on single-axle vehicles, and were to study the reason, and then come over here and see one of our trucks having two and even three parallel axles, incapable of radiating, and each having "rigid" wheels, he would probably think that we had called attention to the mote in his mechanical eye, without knowing or caring for the beam in our own.

Just how many millions of rigid axles are grunting out criticisms upon our lack of knowledge or our indifference to common sense in this matter, we cannot say, not having the figures at hand. But there are enough rigid wheels skidding and enough more slipping, while you read these lines, to make a good fortune if you had a dollar apiece for them.

Independent wheels haul easier on curves, ride smoother, take less lubricant, are easier on brasses, and give better mileage than "rigid" wheels.

We do not say that a perfect independent car wheel has been either tried or invented. We do not think that it has. We do know that the saving in fuel, lubricant, bearing metal, wheels and rails, and the increase in passenger traffic, due to increased comfort and quiet, would make it pay any railroad to discard every rigid wheel today in use, and replace it with a good independent wheel.

This is not written in any private interest, nor with any particular independent wheel in view. It is simply to call attention to a cold fact.

Failing of Varnish.

There are many subjects in connection with car painting, on which car painters need considerable enlightenment; as for instance, the questions of cracking, peeling, and perishing. There is not so much trouble in assigning the causes of these three modes of disappearance of varnish; they are sun, rain, cold, air, and friction; and there is not much chance for lessening the causes themselves; but knowledge, skill and experience may enable the lessening of the effects, and it is to the interest of all varnish makers and varnish users that knowledge of all the means by which the effects can be lessened, shall be disseminated, and notes compared.

We should be glad to hear from practical men on this subject, more particularly as to "powdering" caused by the evaporation of water from the surface of the varnish, resulting in the gum separating from the varnish.

Beating the Conductor.

A sharp Milwaukee Avenue (Chicago) street car conductor has been unburdening his soul to a local reporter on the subject of "beats."

He estimates the company's loss through this means, as about 10%. "Every one," said he, "is bent on beating us, especially the women, some of 'em will come into a car with four or five children whom they scatter around promiscuously among the other passengers, and when I go in to collect the fares the mother, who has been looking out the window, starts up surprised, and after keeping me waiting about five minutes will pull out five cents and declare that she has no children with her except 'my little 2-year-old Johnny here.'

"A man is always nervous when he plays one of those tricks, and I can spot him every time. He'll always keep a quarter or a half-dollar in his hand, too, so that he can crawl out by saying he forgot the children. When a man gets on and I can't spot him as soon as I go in for fares, I walk along the car slowly and look hard at all of 'em. The average man will weaken at this and reach for his ticket or nickel. But with the tough customers this scheme don't work as well. When they are on board I go out and speak to the driver. He looks around hard at the passengers and I look at the same time, and then nod to him as if I had spotted the man. It makes him so fidgety and red that I can spot him then. But nothing of that kind affects a woman. One of 'em will look daggers at a man, who may have two children and a lap full of bundles with him, if he don't get up and give her his seat in the car, but when she gets on a crowded seat she won't even pull in her skirts to make room for a tired shop-girl or tired mother who holds to a strap with one arm and has a fretful child in the other."

Car Starters to the Front,

The Dutch Society for the Promotion of Local Rail and Tramways offers a prize of 300 guilders for the best means of reducing and diminishing the pull and strain upon the horses in bringing the tram-cars into motion and to their normal speed, either by utilizing and turning to account the force wasted by frequent application of the brakes, or by any other contrivance answering the same purpose. The apparatus must be so constructed as to allow of its being used in both directions, when the car is in motion. Clear and distinct duplicate drawings or models—the latter are preferred—must be sent in franco on or before July 1st, 1885, to the Secretary of the Society, Balistraat 2b, the Hague, and must be provided with a mark or symbol. The name and address of the sender must be enclosed in a sealed letter, with the same indications on it for identification. The letters containing the name or names of the sender or senders of these plans will be opened by the directors of the Society, and the projector or projectors will be requested to produce at their own expense and cost their apparatus, in such

statistics as to the number of passengers a manner as to allow of its being applied to one of the tram-cars of the Amsterdam Omnibus Company, before April 1st, 1886. After each apparatus has been in use and practically tried on such a car for one month, the jury will make its award, which must be published before August 1st, 1886. The apparatus will remain the property of the inventors, who are at perfect liberty, if they choose, to take out patents for them. The managers of the Society may come to an agreement with the inventor of the prize apparatus as to the compensation to be granted, should the apparatus be used on the lines of members of the society. The drawings and models to which no prizes have been awarded will be kept secret, and forwarded to the addresses given by the senders.

Bob Tail Cars.

We take the following from the *N. Y. Tribune*:

"A Brooklyn Judge has decided that the 'bob-tail' car must be provided with a conductor. The Common Council, some time ago, passed an ordinance to that effect, but it has never been enforced. One of the companies that indulges in 'bob-tails' made a test case, and the Court holds that the ordinance is valid. The public will view this result with diverse feelings. There is no denying that from some points of view the 'bob-tail' is a nuisance; but at the same time a 'bob-tail' car is much better than no car at all. If the companies have to employ conductors as well as drivers, it is inevitable that they will run fewer cars and at longer intervals. Consequently, while passengers will gain in safety and convenience, they will lose in waiting on street corners. The use of the one-horse conductorless car is by no means general in Brooklyn; they are used on but few roads, which run for longer or shorter distances through sparsely-settled neighborhoods."

With all due respect to the decision above rendered, we cannot help thinking of a statement made by one of Dickens's characters, we forget whom—"the law is an ass." The average bob-tail car is a nuisance, but why is it more of a nuisance and why is it more in need of special legislation than a Broadway stage on this side of the river, or a Montague Street "bus" on the Brooklyn side.

Fare Collection.

ATTENTION, INVENTORS!

The Dutch Society for the Promotion of Local Rail and Tramways publishes the offer of a prize for the best answer to the following requirements:—A good system for control of the passenger conveyance by tram. In judging of the answers, the following points will be taken into consideration: (1) The system must be simple and not too costly in practice. (2) It must cause as little trouble as possible to the passengers and a minimum of delay. (3) Frauds on the part of the public and on the part of the guards must be reduced to a

minimum. (4) It must afford complete conveyance and the distance traveled over by them. Existing systems may also compete. Specimens of the tickets and the other papers, etc., requisite for a due control must be sent in. The answers must be sent in not later than July 1st, 1885, free to the secretary of the above-mentioned Society, Balistraat, No. 2b, the Hague. The answers may be written in the Dutch, French, German, or English languages, sparing the half of each side of the leaf—folio—but not in the author's own handwriting. The contributions may not be signed by the author himself, but must be identified by another name, by a proverb or some other symbol. The same symbol must appear on the sealed letter accompanying the answer, which letter must contain the name and address of the competitor. If no prize is awarded, the above-mentioned letter will be destroyed unopened six months after the jury has made its award; the sender may demand the return of his answer on indicating the symbol used by him, and that within six months. The prize answer, as well as those not claimed within the above-mentioned limit of time, will remain the property of the Society. The answer accepted by the jury will receive a prize of 300 guilders. If the jury consider that none of the prizes submitted to them are deserving of the prize, the Society may, if it thinks fit, divide the 300 guilders among those who have sent in the best answers.

There are enough devices in use and prepared in this country to warrant a large representation from America; whether or not it will be made, deponent saith not, not knowing. It is our impression that no one device in use in this country completely fills the bill—but then the questions asked by the Dutch Society do not fill the bill, either.

To Car Builders.

Suppose each car builder lets us have a memorandum of each "kink" or improvement in car designs or construction, that he brings out, and we will give it publicity. The progressive designer and builder need never be afraid of giving points away to his rivals. They will nearly always sneer at them at first, before adopting them; and as the progressive builder starts ahead of the "moss-backs" and runs faster, he need have no fear of "getting left" in life's race.

— Passenger street cars were first used in cities in the United States as early as 1840. Their introduction was at first very bitterly opposed by the omnibus lines and by property holders as well as owners of vehicles who claimed that the rails tore off their wheels and obstructed general traffic.

— The London horse car, which runs about 70 miles per day, usually requires ten horses each; thus each horse has 14 miles of work; but to maintain this service 11 horses are provided, to allow for occasional rest. But where the cars are light and the gradient very favorable horses are worked 16, 18, and even 20 miles a day.

Car Heating in Chicago.

The following, from our own correspondent, will be found interesting. In connection therewith, our correspondent notes as follows:

"At the meeting of the Committee on Railways it was agreed that the ordinance introduced by Ald. Young should be reported upon favorably, which was done at the Council meeting on Monday evening. Ald. Young then moved a suspension of the rules, that the bill might be taken up. The motion was lost, and the bill deferred.

The ordinance referred to, in substance, orders that from November to March the temperature of the Chicago city street cars shall be kept at a comfortable point."

[The tabling of this ordinance has a very "jobby" and "lobby" look.—EDS.]

* * * * *

On January 2d, a meeting of the Chicago City Council Committee was held, at which Mr. Winston read an ordinance about heating street cars.

The chairman seeing Mr. C. B. Holmes, Superintendent of the Chicago City Railway Co., present, called upon him personally to know if he had anything to say touching the matter.

Mr. Holmes spoke in substance as follows:

The Chicago City Railway Company is desirous of heating its cars if a satisfactory device can be found. If it could be done it would largely increase our revenue. I have here between 25 and 30 descriptions of as many different methods of heating cars. In 1875 I commenced making experiments with a view of finding some means which would not be open to the objections which prevail and obtain against most heaters. On our outside lines running out in the town of Lake and Hyde Park we are now, and always have heated our cars with stoves placed in the middle.

That answers the purpose reasonably well in that quarter, for it is an open prairie, and the car doors are opened but a very few times after the car leaves the terminus. The passengers ride from one end to the other as a rule, and it is comparatively easy to keep the cars warm with an ordinary small stove. In the city, the cars are necessarily more crowded, and when the car arrives in that portion of the city where the buildings are three to seven stories, the wind swirls down between the building and street intersections, and as the door has to be opened frequently, it causes a down current through the smoke-pipe, and the gas or the ashes from the stove penetrate all parts of the car. The gas from burning hard coal is not only obnoxious but poisonous.

One of our first experiments in the way of heating was with a hot cannon ball. We heated it to a white heat and placed it in an iron case with non-conducting material placed between, and the register at the top. There was no difficulty in heating the cars and of retaining the heat for the time it took to make the round trip; but the effect on the air in the car seemed to be to burn out the oxygen, and destroy the vitality of the air. It did not bring in fresh, warm air, but destroyed the virtue of the air that was in the car.

We also tried heating cars by lime in a metal casing, and slacked as the car was passing along, and that gave out quite an amount of heat but it could not be regulated. It gave out more than was necessary on a not very cold day, and a less amount on a cold day. We arranged at one time for the right to use a heater beneath the car, and the Board of Directors passed a resolution authorizing the heating of the cars, but after making patterns and trying some six or eight cars with the heater attached, it utterly failed and was abandoned. We have tried heating cars with naphtha, but the odor was so disagreeable that it was impossible to stay in the car with the heater in operation.

We tried another heater that burned kerosene oil, and attempted to burn it into gas at the point of combustion, but we found that there were fatal objections to that. The company of itself, and the parties who have brought us heaters, and which we have tried, have spent altogether between \$2,500 and \$3,000 in experiments.

We have watched with a good deal of interest the experiments made in New York and Brooklyn with a heater composed of pipes with chemicals into which steam is injected at the end of the route. The experiment so far as carried was three years ago quite unsatisfactory. Last winter it failed to give satisfaction, but this winter improvements have been made on it and better results obtained; but on a very cold day, when heat is needed the most, it fails to accomplish the object. To describe every one of the large number of experiments that have been made would consume hours. The company which I represent is now experimenting with some recently invented devices, with which we hope succeed in producing the desired result. The stove invented by Mr. Herr, and which he urges the companies to use, contains many desirable features, but is still open to the same objections which obtain against all stoves—namely, the filling of the car with gas at times, and the inability to regulate it to the extent that is necessary; and in making one part of the car too warm and the rest of the car not warm enough, making it very unpleasant to those near the stove, and not giving the desired benefit to those further away. At one time the North Chicago Railway Company had all its cars heated with stoves, but was obliged, under the pressure of public sentiment, to take them out, as they proved so objectionable.

The Committee then called upon Mr. Lake, Superintendent of the Chicago West Division Railway Company, who corroborated what had been said by the previous speaker, and stated that his company was perfectly willing to adopt any device which should be proved to be of real benefit in the case. There were so many objections existing against anything he had yet seen, that he had been waiting, and still was waiting for something to be invented which would meet the case.

The Committee then voted to adjourn for two weeks to see what result, if any, should be attained by further experiments.

[In commenting upon Mr. Holmes's remarks concerning the hot cannon ball, we wish to enter our most decided pro-

test against the assertion that a red-hot cannon ball, or a white-hot cannon ball, or any other red-hot or white-hot man of iron, "burns out the oxygen and destroys the vitality of the air." For oxygen to be burned out of the air, necessitates that the iron be changed into oxide of iron, or iron rust; and such rusting or oxidizing of a pound of iron would consume many days, and use up very few pounds of oxygen. A coal stove does use up the oxygen of the air, and in this respect would be much worse than the hot ball. But for all that, the air thus vitiated in the stove should be passed out and up the chimney; the carbonic acid and carbonic oxide formed by the oxidation of the carbon in the coal, not returning into the car. If there is proper draft up the chimney, there must be a hundred cubic feet of fresh air drawn into the car for every hundred cubic feet vitiated and passed up the chimney; so that where the chimney draws up and cannot draw down, a stove is a purifier of the air and a ventilating device in the car. But a hot cannon ball destroys less oxygen than a stove of the same degree of temperature. If proper provision was made for adding moisture to the air when it was heated, there would be much less discomfort from hot stoves or hot cannon balls.

As regards the down drafts backing up on the stove:—that could be prevented by proper swiveling cowles upon the tops of the stove pipes. A street car, particularly if running, is no harder to get up a draft in, than many a shanty wedged up against the side of a tall factory building.

As to the question of heat or no heat for street cars; while heating may be of doubtful expediency in some places, we can testify from agonizing experience, to the fearful necessity for increased comfort in the street cars of Chicago, during cold weather. Some years since we lived in Chicago, far up towards Lincoln Park, and later, on the West Side, out towards Western Avenue. Coming in or going out, on cold days, was positive torture, and every business man living in the outskirts (and the residence portions of Chicago are nearly all in the outskirts), would bless the street railway companies for the accession of comfort and abatement of peril from pneumonia, which could be attained by heating their cars.—Eds.]

Electric Railways.

Dr. N. Adams, of St. Louis, in a paper before the Engineers' Club of that city, presented the claims of electric transmission as a motive power for railways. The motive power does not need to be hauled over the road. [This advantage is shared by the cable system.] The efficiency claimed is 60 to 65 per cent; and it was stated that the Chicago Cable Railway gave only 19 per cent. below the results of most unfavorable electric experiments. Dr. A. proposed to use small wheels and put the armature of the "dynamo" on one of the main axles of the car.

— Among engineers and others qualified to judge, there seems to be a tacit understanding that some other method of traction will soon supplant that of horses, and that the cost of such service may be reduced at least half from its present rate.

Comments.

— Some day, the festive parlor match and the joyous salt hay will cement their marriage, and there will be roast passenger to grace the wedding board.

— There are two people (whether a pair of lovers or a married couple we are unable to say) who make passengers on the Third Avenue Line, Brooklyn, sick at their stomachs, and drive them out of the car to take refuge on the hind platform, where they would sooner face the cold blasts of Boreas, than the warm sighs of the other fellow. A considerate conductor would turn down the lights, instead of permitting the fond dalliances to be made a public show. Some day our esteemed friend, A. Comstock, Esq., will run the conductor in for keeping a disorderly house.

— Is your line one of those on which one can estimate the distance traveled by the number of back teeth knocked out? A molar to the mile is the average on some lines.

— The woman who sits cat-a-cornered and lets a mother with a babe in her arms stand, may almost give place to the dudine who accepts your seat, and then when there is a vacancy made alongside of her, beckons her dudelet to take the seat. Swine take care of a swain, it seemeth.

— There are, on some lines, plenty of hampering regulations as to carrying packages, etc., and these very same lines will let passengers accumulate reservoirs of tobacco-juice, phlegm, and other nastinesses between the bars of the wood-mats.

— I have taken considerable time and trouble to analyze the atmosphere of one of our east and west (Philadelphia) lines, and send you the result for comparison:

PARTS.

Cyano-Hydrate of Old Rye.....	3.6
Nitrogen-Dioxide or Laughing Gas...	17.3
Amido-dichlorophenolanide of Erin...	371.0
Trithionate of Conductor.....	9.4
Hyposulphide of Old Cushions....	3.1
Artho-Nitrophylate of "Venerable Hay".....	109.4
Sulpho-Hydrate of Stale Tobacco Juice	78.7
Hydro-Carbonate of "Tough".....	231.1
Oxygen and Nitrogen.....	Traces.
Carbo Bisulphide of Mule.....	176.3
Total.....	1000.0

— We know a conductor who glares at the audacious passenger who dares to hand him five cents all in coppers.

Fare Collection.

ED. STREET RAILWAY JOURNAL:—

We have tried almost all the methods offered to get all the fares in, and think that while the Slawson Box is in many ways unpopular and unsatisfactory, it pays because it does away with the expense of the conductor's wages and stealings. W.

NORTH-WEST.

[We have several more letters on the subject, and hope to give them in our next issue. EDS.]

Personal.

— Leander C. Brown, son of Superintendent J. E. Brown, of the Troy & Lansingburg Railroad, has been appointed Assistant Superintendent of that road.

— D. W. Pugh, of the John Stephenson Co., has gone to the New Orleans Exposition. John Thackaberry, Superintendent of the same company, has returned from the Exposition.

— H. C. Simpson, Secretary of the Lewis & Fowler Manufacturing Co., is about starting on a Western trip, which has been deferred for some weeks.

— Col. W. S. G. Baker, Superintendent Baltimore Car Wheel Works, is, we hear, at work on a new car box and bearing.

— J. G. Brill & Co., who were shut down some days recently, have started up again, "with" (as one of the firm expressed it) "considerably more work, and a better outlook than when we stopped."

— Michael Feigel, of the Feigel Car Works (the son in the late firm of M. Feigel & Son), is dead. He had lately returned from an extended trip west for his health, returning via New Orleans.

— Jos. G. Spear, of Minneapolis, and Thomas Lowry, of Pittsburg, and their wives, are in New Orleans.

— D. J. Miller, Chief Engineer of the Tenth Avenue (N. Y.) Cable Road, is about to build another cable road in Sydney, Australia.

— Abram Lent Smith has resigned the Superintendency of the Dry Dock, East Broadway & Battery R.R., to accept the position of General Manager and Superintendent of the 42d Street, Manhattanville & St. Nicholas Avenue R.R.

Notes.

— The Jones Car Works, West Troy, are building ten cars for the Rochester City (N. Y.) & Brighton R. R.; 16 for the Detroit (Mich.) Ry. Co., and five for the Charles River Railway Co., of Boston, all of which are equipped with Lewis & Fowler's Randall gear.

— W. P. Craig, of New York, is to build a road at Saratoga, N. Y., as soon as the weather permits.

— The Railway Register Mfg. Co., Buffalo, has recently sent 50 of their portable machines, or "Beer Punches," to the Melbourne Omnibus & Tramway Co., of Melbourne, Australia.

— Andrews and Clooney have just filled a large order for wheels for the Botanical Garden Railway Co., of Rio Janeiro, and also a large order for Buenos Ayres.

— Jessup & Co., dealers in railroad spikes, have secured an order for furnishing all the materials, rails included, for a new road in this vicinity, at prices said to be lower than could be obtained from first hands.

— M. M. White & Co., of New York, have recently placed their switches on the following roads: Brooklyn City; Atlantic Avenue (Brooklyn); Brooklyn Cross-town; Broadway (N. Y.) and Seventh Avenue;

Dry Dock, 42d Street, Manhattanville and St. Nicholas Avenue; Union (Providence), Highland Street (Boston); Orange and Newark, N. J.; Hartford and Weathersfield, besides various others.

— At the works of the John Stephenson Co., N. Y., we notice in process of construction nicely fitted cars for the North Chicago road, the new First Avenue line (N. Y.), canopy cars for South America, and various other orders.

— The Lewis & Fowler Mfg. Co. has closed the contract for equipping the Charles River road in Boston, with the new L. & F. portable register.

— The Grand Street and Newtown road, Brooklyn, will add five new cars, to be built by J. G. Brill & Co., Philadelphia.

— The Buffalo Street Railway, Henry M. Watson, President, is adding a number of new cars, built by Brill-Bemis box and Vose spring. Under the excellent management of Col. Watson, this road has shown marked improvement during the past few years. New timbers and rails have been put in, the equipment improved in every way, and the financial results brought to a condition which should be gratifying to the stockholders and the management.

— John Stephenson, speaking on the subject of car heating and ventilation, expresses the opinion that the Nelson heater and perforated ceiling give the most satisfactory results among all things yet devised for the purposes. The heater mentioned consists of a stove under the seat, opening outside the car, the stove-pipe running along under the seat to the corner of the car, thence up. A mirror or other tasteful finish may be so arranged as to conceal the pipe.

— The Third Avenue R.R. (N. Y.), having tried various systems of heating, has come back to ordinary stoves, and its new cable cars are fitted in this way.

— The Third Avenue R.R. Co.'s Tenth Avenue cable line will be capable of moving thirty to forty thousand people daily.

— Two new street railroads are about to be built at Chattanooga, Tenn. E. V. C.

— A dispatch dated Kansas City, Jan. 10, says that negotiations are practically completed for the purchase of a controlling interest in the street railway system of that city. The purchaser will, it is reported, associate with himself in the enterprise a number of capitalists and leading business men of the city.

— At the annual meeting of the stockholders of the Chicago City Railway, on Jan. 11, the following directors were elected: Samuel W. Allerton, S. B. Cobb, Daniel A. Jones, E. M. Phelps, O. K. Pearson, C. S. Hutchison and C. B. Holmes. The directors are considering the question of heating the cars.

This reminds us of the story of the "Arkansaw Traveler."

"Why don't you fix your roof?" said he to the squatter, "it leaks."

"'Cause," replied the squatter, "when it rains, it's too wet to fix it, an' when it's cl'ar it don' need no fixin'."

By the time the directors reach a conclusion there will be no need of car heating.

— Stephenson's patent passenger telephone signal, with which many cars are now being fitted, is a device for attracting the attention of the conductor. It consists of a metallic air chamber in each end of the car, from which the air is forced through a whistle by a piston to which is attached a cord extending along the side of the car behind the passenger.

— The Worcester, Mass., Street Railway Co. has its road and cars in first-class condition, and is operating $5\frac{1}{2}$ miles, 11 cars, 90 horses, 40 men, conductors on all cars. They are at present building two open cars and are repairing others. New cars will be fitted with the Bemis journal box. Their stock is in fine condition owing to good care and the fact that only four to five hours' work a day is required of each horse.

— Jerome Wheelock, of Worcester, Mass., manufacturer of steam engines, is building a pair 30 x 60 ft., to furnish 1200 horse power for the Chicago cable street railway.

EAST RIVER BRIDGE TRAVEL:—Mr. C. C. Martin, Chief Engineer and Superintendent, has examined and declared against a proposed method of increasing the car accommodation, by a different plan of handling and switching. He says the only feasible method, and one by which the capacity can be doubled, is by increasing the trains to four cars each. This will be possible only when more switching room is obtained at the New York terminus. The rolling stock now on hand is ample for this increased service. One and a half minutes is as close as safety will permit trains to be run, as it requires one minute to unload the cars.

ST. LOUIS CABLE ROAD:—Col. M. A. Downing has let the contract for 39 cars, including 15 grip-cars, and 24 coaches. The contract for the conduit has been let; it includes 1,900 tons of metal.

— The Brocton, Mass., and Stoughton people are talking strongly of a street railway to connect the two places.

— The Portland, Me., Street Railway Co. is overhauling its plant and is placing the road and equipment in first-class condition. The track ($7\frac{3}{8}$ miles) is being laid with new rails on 5 x 8 Juniper ties. And they have completed a new brick stable 84 x 124, two stories. Ten new Brill cars have been added to the equipment, and all cars on out-of-town lines are fitted with heaters in the centre, surrounded by wire netting and a half circle of galvanized iron next the seat, which saves room. The equipment consists of 27 cars, 148 horses, 60 men, with conductors on all cars; six cent fares.

— The Merrimac Valley Horse Railway of Lawrence has a system of alternating conductors by which each conductor makes a trip on each line once in three days. The line comprises 6 miles of track, 20 cars, 67 horses, employing 26 men, carrying an average of 1,500 people a day.

— In 1860 George Francis Train obtained permission to lay experimental tramways in London. The opposition to them was very fierce. The rails were unfortunately constructed and the lines were unsuccessful. They were condemned by the authorities and the tracks were removed in 1861. The introduction of the new system in England was thus deferred until, in 1869, Parliament sanctioned the first Metropolitan lines which have since been so extensively multiplied and extended.

— It was in the early days of tramways in Europe that George Francis Train obtained audience of the Emperor Louis Napoleon in order to secure his consent to their introduction in Paris. Mr. Train stated that they would enhance the ease and shorten the time of getting about the city and descanted upon their convenience to the citizens. "But we don't want any such new-fangled Yankee Notions," replied the Emperor; "let Paris remain as she is—the city of beauty and fashion and pleasure."

— In England and France the principle has become firmly established that the

National Government alone shall have power to grant concessions for street railways. In Germany and Italy, the granting of such concessions is left to the local authorities.

— In London it has been found more economical—apart from merely humane considerations, to work the horses for moderate distances only. The great London General Omnibus Company, by careful selection of its horses and proper treatment has raised the work life of its animals from $3\frac{1}{2}$ to 5 years.

— S. M. Carpenter, Fulton Foundry, Cleveland, O., recently shipped to the Citizens Street Railway Co., of Wheeling, W. Va., one of his patent turntables; this being the fourth order from the same source.

— Andrews & Clooney have been awarded a medal of superiority by the American Institute, for wheels, springs and castings. They have an exhibit at New Orleans.

THE COVERT MFG. CO., of West Troy, N. Y., has added to its business the manufacture of chains of all sizes and styles.

MR. GOODMAN, of the Eureka Folding Mat Company, is quite cheerful over late large orders for his goods, which he attributes to the fact that street railways have been comparatively little affected by the "hard times;" that the times are improving, and especially to the fact that he has made known the value and excellence of his wares through the advertising columns of the STREET RAILWAY JOURNAL.

THE AJAX METAL CO., Philadelphia, Pa., reports recent sales to several prominent railways, among others, the N. Y. W. S. & B.; the N. Y. C. & H. R.; the C. & G. T.; the C. I. St. L. & C., and the C. H. V. & T. It has been adopted as the standard for axle and driver boxes on the N. Y. C. & H. R. R.R., and the N. Y. W. S. & B. Railway. The company reports business improving, and testifies to the statement by handling in cards for each of this Company's three publications—the JOURNAL OF RAILWAY APPLIANCES, POWER, and the STREET RAILWAY JOURNAL.

G. B. H.

THE WHEELER REFLECTOR CO., of Boston, is now in its new quarters, 18 and 20 Washington Street, where it has extra facilities for the manufacture of their system of reflectors.

L. O. CROCKER, of East Braintree, Mass., manufacturer of conductor's railway ticket punches, among other work, is furnishing the Atchison, Topeka and Santa Fé, Union Pacific, Delaware, Lackawanna and Western, Old Colony, Boston and Maine, Maine Central, Intercolonial and other companies.

POWER.

A practical Journal devoted entirely to the Generation and Transmission of Power. Specimen Copies Free.

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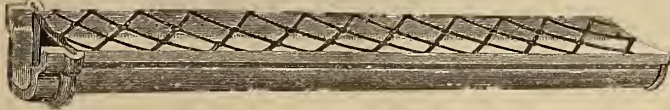
Also manufacturers of General House and Office Furniture of the Most approved patterns and designs. Estimates, circulars, and samples furnished on application.

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A situation with some Street Railway Company by a gentleman who has been brought up in the business, and has had experience in its every department. Is now Superintendent of 25 miles of Street Railway, and desires to make a change March 1st. Satisfactory reasons given for leaving present position, and best of reference given, including present employers. Address,

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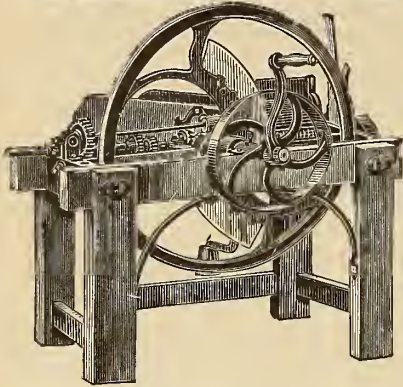
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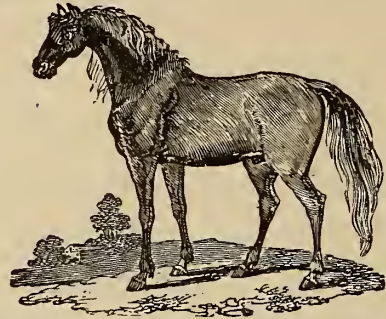
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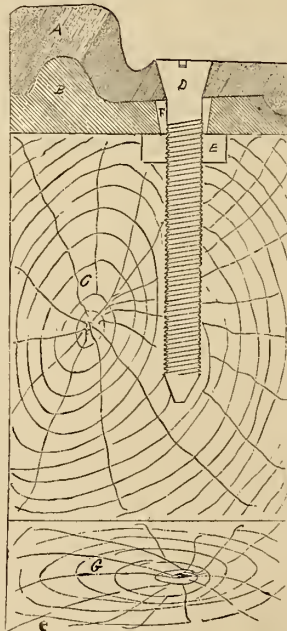
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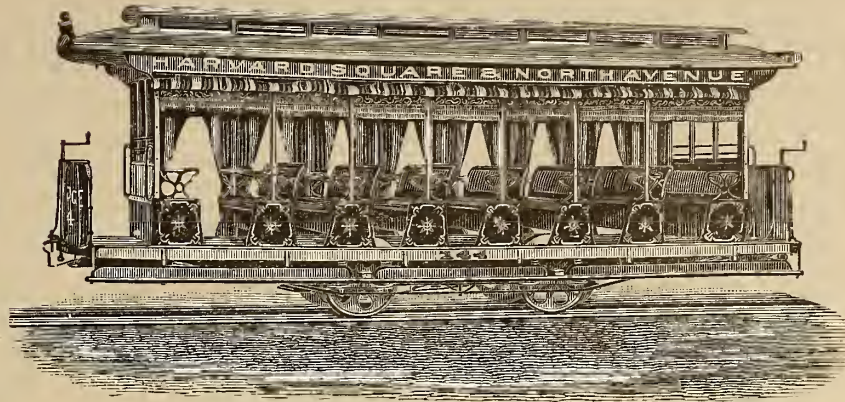
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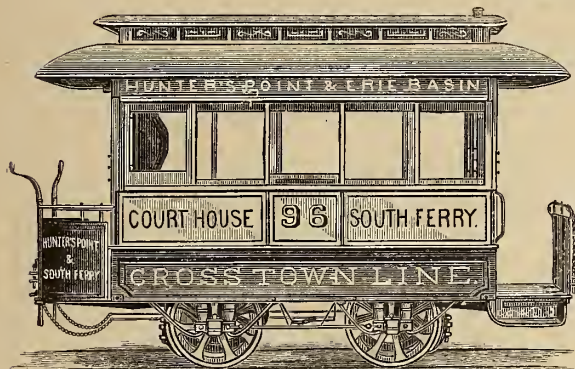
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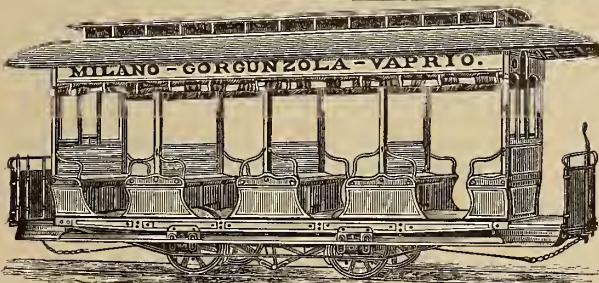
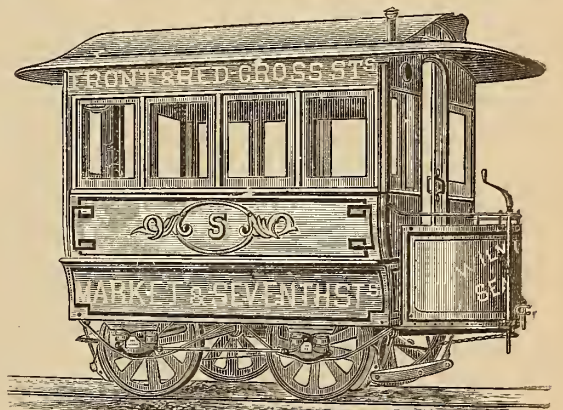
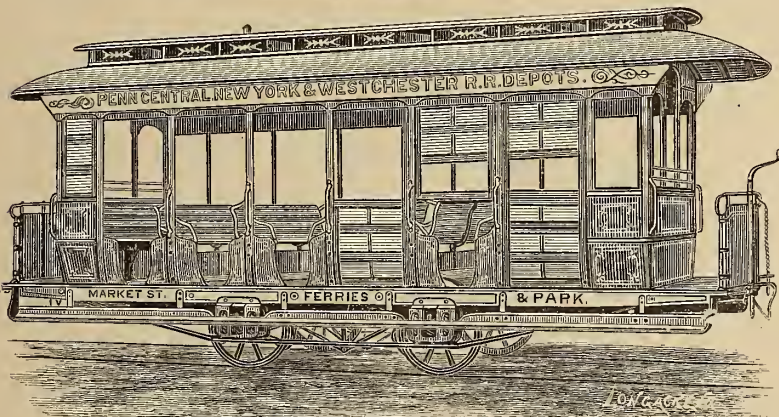
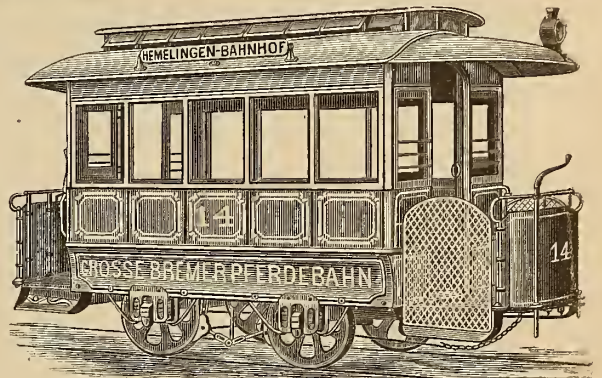
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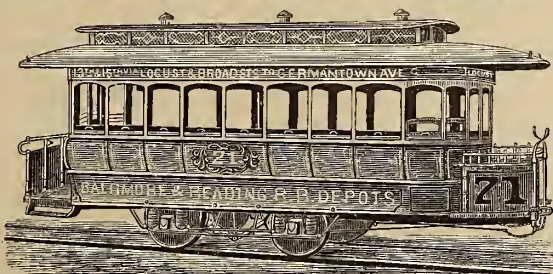
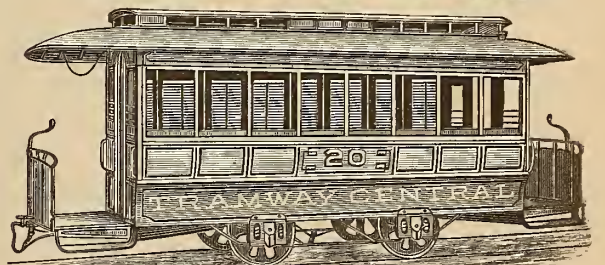


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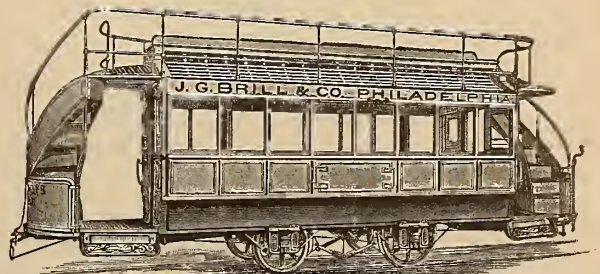
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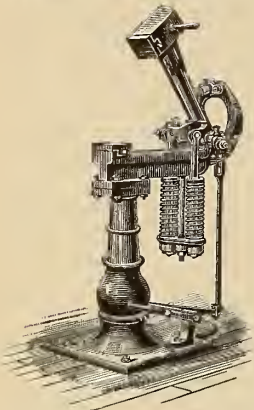


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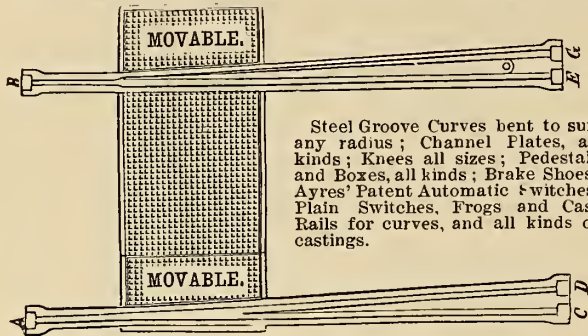
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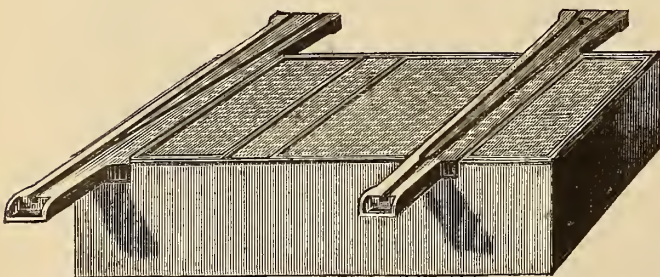
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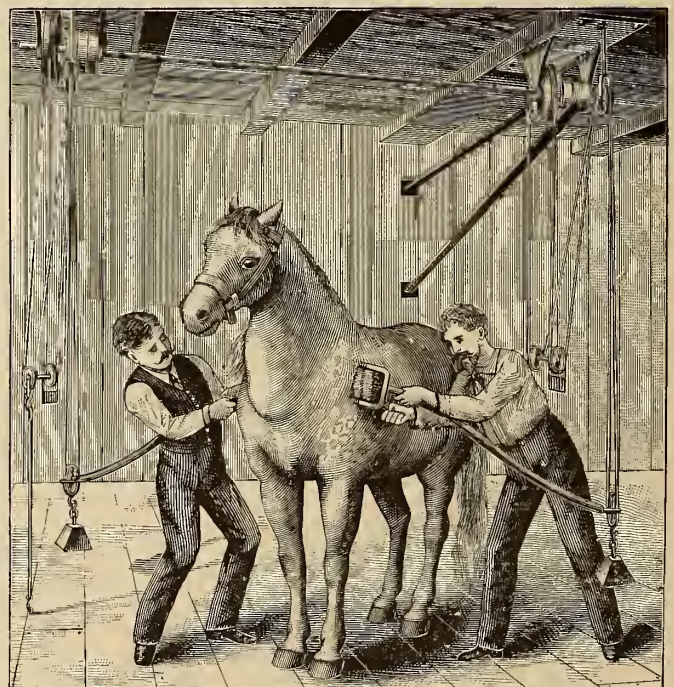


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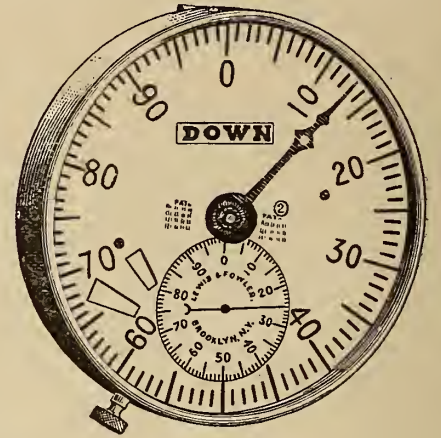
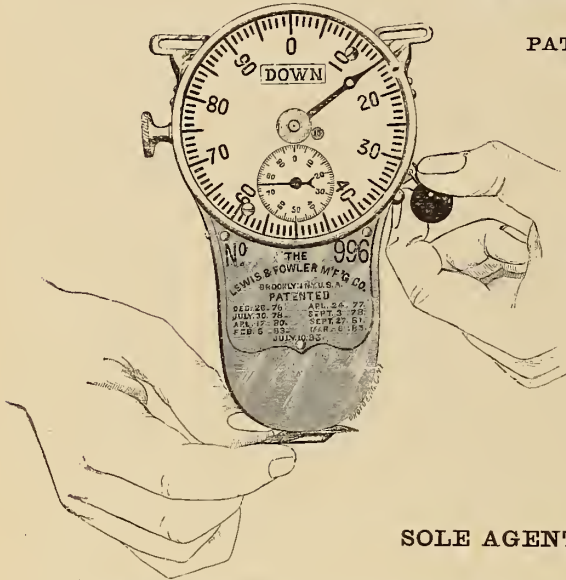
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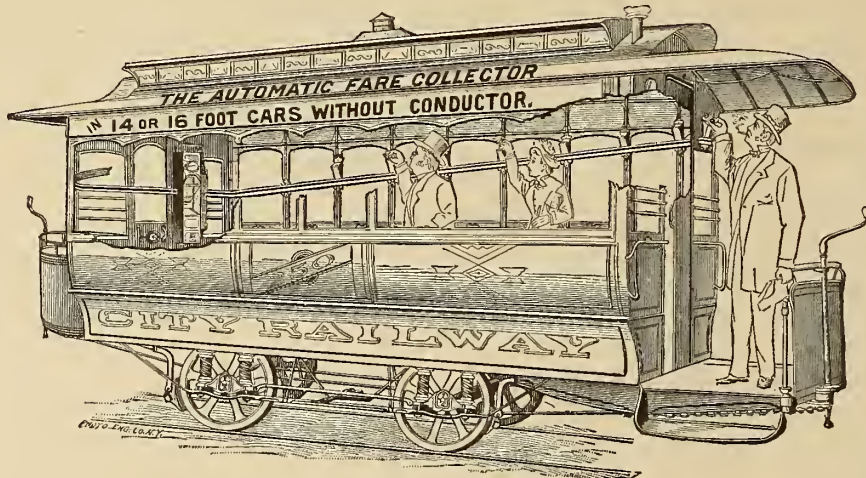
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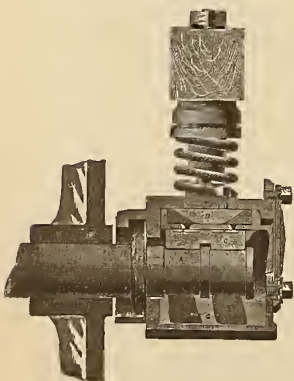
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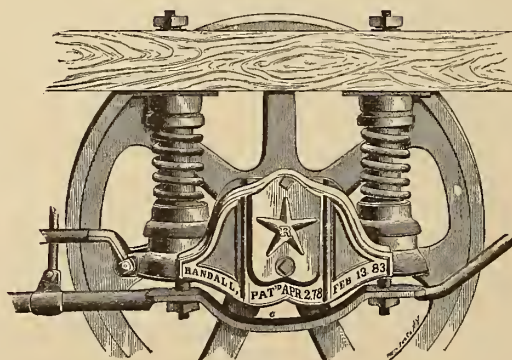
Sectional View.

Front View.

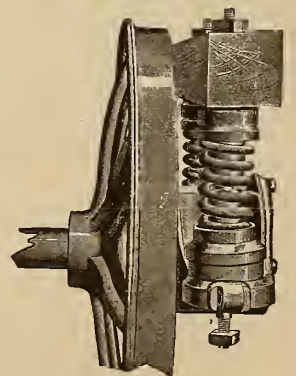
End View.



DUST TIGHT.



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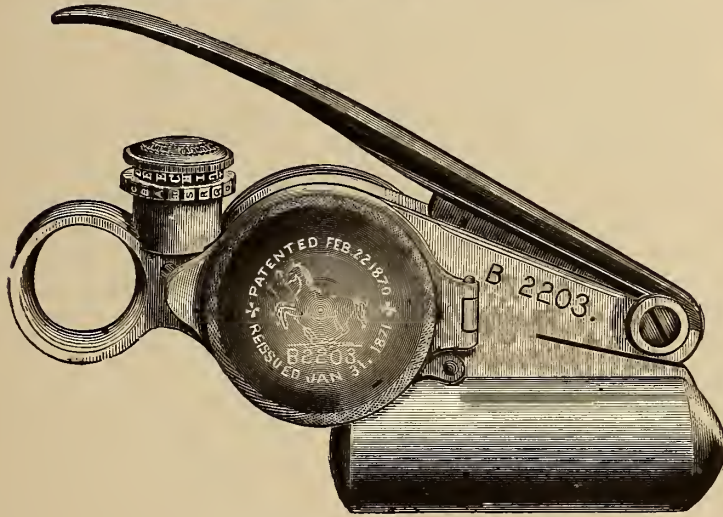
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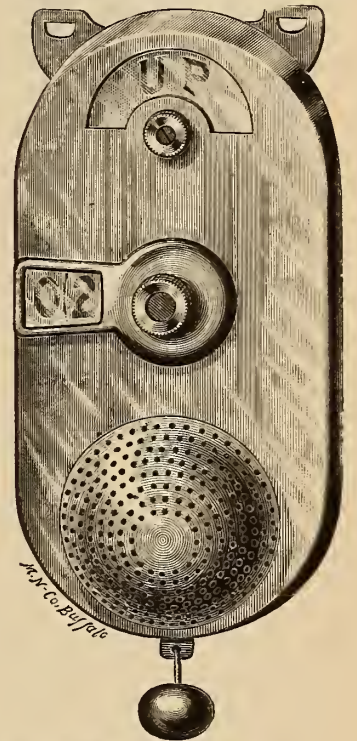
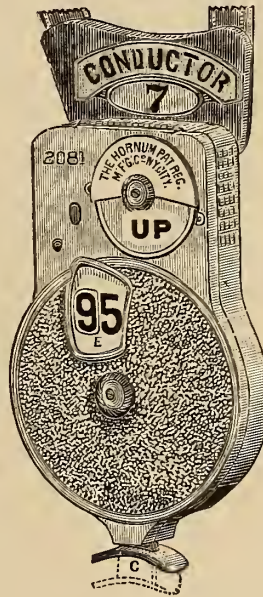


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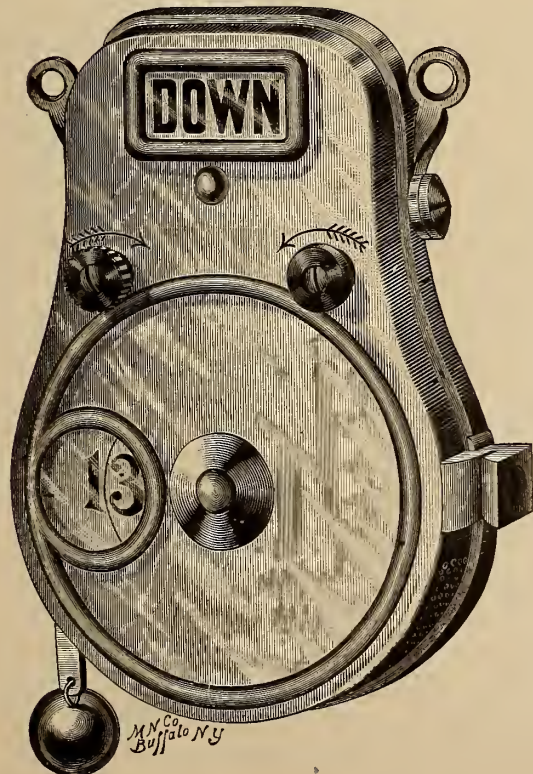
THE ALARM REGISTERING PUNCH.



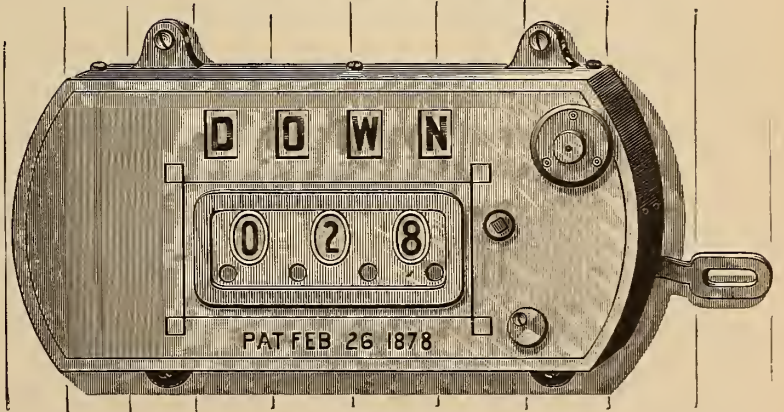
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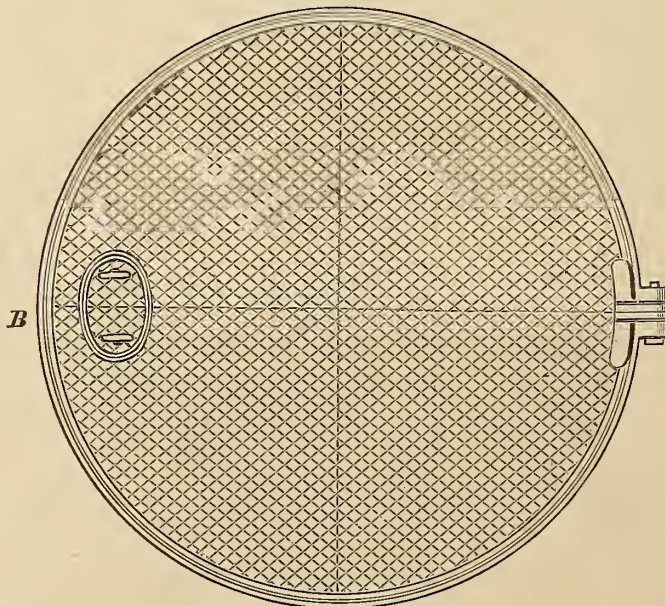
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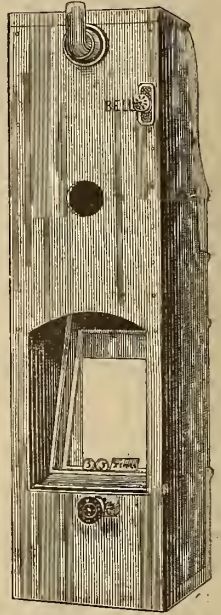
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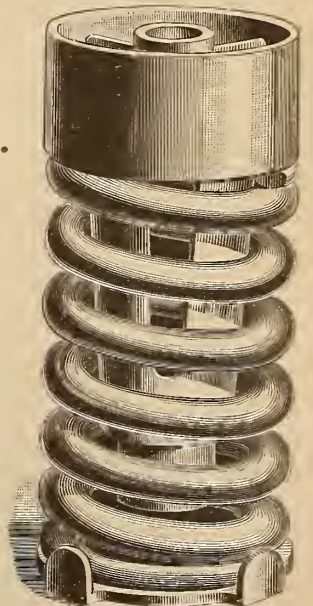
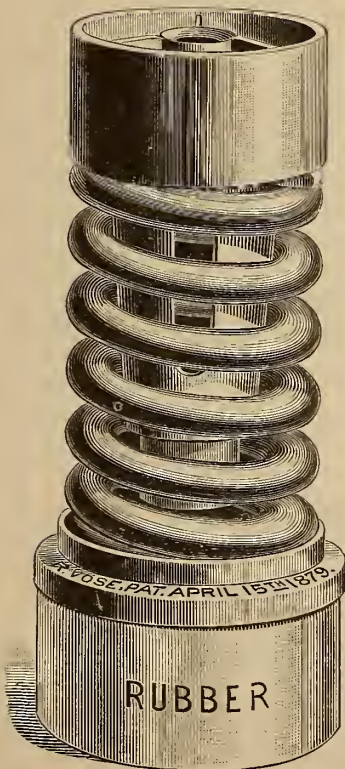
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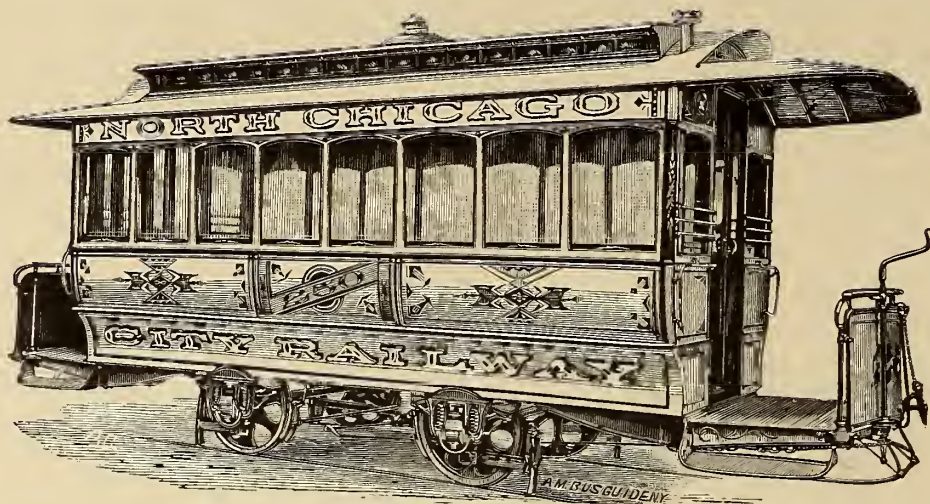


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THE STREET RAILWAY JOURNAL

VOL. I. { NEW YORK: { 32 Liberty Street. }

MARCH, 1885.

{ CHICAGO: { 8 Lakeside Building. } No. 5.

Hydraulic Turntable.

The accompanying illustration shows an hydraulic turntable specially designed to meet the requirements of Mr. F. E. Duckham, the engineer of the Millwall Dock Company, * for lifting grain trucks and turning them simultaneously on to lines at right angles to the lower level of rails. There are some cases (as in Cleveland) where the device might be applicable for lifting street cars from one level to another.

At the Millwall Docks, where the chief grain trade of London is conducted, Mr. Duckham has introduced a system of storage in traveling railway bins, or covered trucks of some 20 tons capacity, enabling rapid discharge from ship to be made, combined with prompt deliveries of cargoes in large or small lots into carts, barges, or railway trucks as may be desired, at any part of the dock premises. Certain portions of the dock quay could not, however, be utilized for delivery into barges, owing to their position and elevation as compared with contiguous lines of rails, until the turntables which we now illustrate were designed and erected.

The tables are twelve feet in diameter, and in addition to raising a full truck load of grain, weighing some twenty-two tons, are sufficiently strong to allow engines to run over them at full speed when fixed for the lower line of rails. It will be seen that a double worm or thread is cast on the lifting cylinder, having a pitch of fourteen feet. A drum forming part of the moving portion is turned to fit the cylinder, and is provided with internal steel rollers working in the grooves previously referred to on the cylinder. When the hydraulic pressure is

admitted to the cylinder, the upward motion of the ram is combined with the rotary motion required by the friction of the rollers against the grooves. Separate turning cylinders are therefore unnecessary.

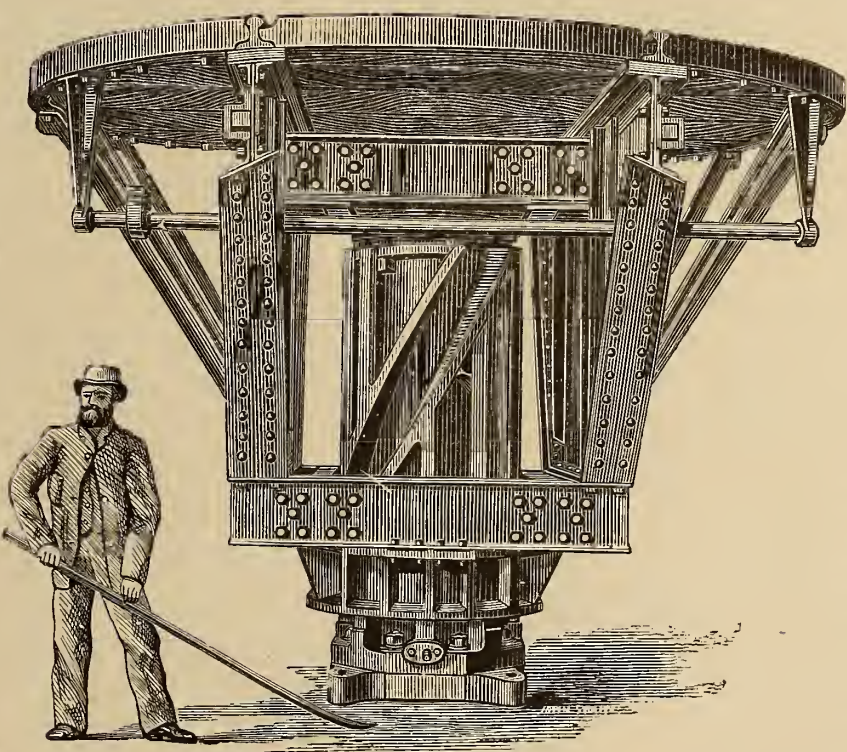
In conclusion, we may say that the Millwall Docks are well worth a visit, the company's whole system of discharge and delivery of cargoes, especially of grain, being among the most successful and efficient in the world. Wherever hydraulic power can be used and cost of labor reduced, there you may be sure to find machinery suited to the work.

to 23 of their cents * per kilometer † (7.4d. per mile), composed of the following items :

	Their Cents.	Our Cents.
Driving engines.....	4.7	1.88
Heating boilers.....	2.3	.92
Coals.....	14.0	5.60
Packing, lubricating, etc.....	2.0	0.80
Total.....	23.0	9.20

More recently the cost of haulage has been only 17 of their cents per kilo (5.24d. or 10.48 of our cents per mile), the price of coal being 2l. per ton. The consumption of fuel was at first 6 kilogrammes per kilometer (21.3 lb. per mile), but recently it has fallen to two-thirds of that amount. Repairs of boilers and engines have cost two cents per kilometer, and have consisted chiefly in returning the wheel tires and renewing the felt on the boilers.

* 5 of their cents equal two of ours.
† 3/8 mile.



The First Steam Tramways in London.

A foreign exchange says: "The commodious new workshops and running sheds of the North London Tramway Company are now nearing completion, and the handsome steam motors for working the line continue to arrive. An engine has been running recently with most satisfactory results. The horses passed on the road.

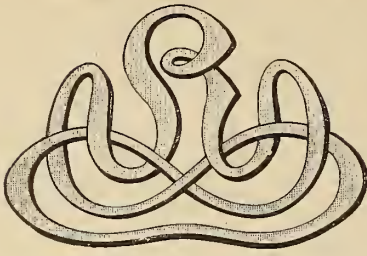
Fireless Tramway Engines.

The Batavia Steam Tramway Co. has 21 of the Lamm-Francq fireless locomotives, and 5 stationary boilers (of which three are reserves). They work 12 hours per day, filling an engine every 1 1/2 minutes during these hours; every ten minutes during other times. Pressure, 180 lbs. per sq. in.; trains, two to three cars; track nearly level and nearly straight.

The cost of haulage amounted last year

although the line is a single one, took no notice of the machines, a result which may fairly be ascribed to the absolute absence of steam, vapor, or noise from the engine. The first-class workmanship put into these engines—which are the outcome of some ten or twelve years' constant experience in this class of work—necessarily makes them somewhat high in cost, but £100 paid to the makers in this way is more than recouped by economy in maintenance and repairs alone every year they are running afterwards."

* East Ferry Road Engineering Works Company, Limited, East Ferry Road, Millwall, E., London, England.



American Street Railway Association.

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President.—Calvin A. Richards, President Metropolitan Railroad Co., Boston, Mass.

First Vice-president.—Julius S. Walsh, President Citizens' Railway Co., St. Louis, Mo.

Second Vice-president.—Henry M. Watson, President the Buffalo Street Railway Co., Buffalo, N. Y.

Third Vice-president.—Edward Lusher, Secretary and Treasurer the Montreal City Passenger Railway Co., Montreal, Canada.

Secretary and Treasurer.—William J. Richardson, Secretary the Atlantic Avenue Railway Co., Brooklyn, N. Y.

Executive Committee.—President, Vice-presidents and William H. Hazzard, President Brooklyn City Railroad Co., Brooklyn, N. Y.; James K. Lake, Superintendent Chicago West-Division Railway, Chicago, Ill.; Charles J. Harrah, President the People's Passenger Railway Co., Philadelphia, Pa.; William White, President Dry Dock, East B. & B. R. R. Co., New York, N. Y.; B. Du Pont, President Central Passenger Railroad Co., Louisville, Ky.

Discussion on Stables and Care of Horses.

Continuing the report of the recent convention:—

Mr. Littell, of Louisville, moved that the report of the Committee on "Stables and Care of Horses" be accepted and spread on the minutes.

Mr. Longstreet, of Providence: I would like to make some inquiries in reference to stable floors, where horses are kept overhead. Until recently, we have kept our horses on the ground floor. When this was done there was no trouble; but we are now up in the air. What kind of a floor is best adapted for this purpose?

Mr. Sharp, of New York, did not know what is best, but has horses on the fourth floor, piled up three deep. He uses felt covered with asphaltum between the planks. First an ordinary tongued and grooved floor, planed on one side; then felt, and then the spruce plank on top. The felt is covered with asphaltum and is laid in while hot.

The President said: The best method that I know of, and I have had considerable experience as a builder, is to lay the lower floors on the slant that you wish for your horses; then lay the flooring and tar it over, covering it with tarred paper. Then take the next flooring, and, putting plenty of asphaltum on, shove it together while it is hot, so that the asphalt will come between the joints. Put the slat floor above that. So far as the felt is concerned, and laying it in asphaltum, it can be used under the gangways. I would put down the lower floor first, then lay the paper in pitch.

In reply to a question by Mr. Longstreet, the President said, the asphaltum used is precisely the same as they use for the best gravel roofing. The second flooring, or the middle flooring, where there are three, is the most important.

Mr. Longstreet: What is better for the second flooring under the stalls than spruce?

Mr. Sharp: We use slats for the horses to

stand upon; spruce on the floor under that.

The President said: Spruce will last a great many years where it is kept dry; if wet and dry alternately, it will rot in three years.

Mr. Longstreet remarked: This is, of course, a case where it will be wet and dry.

The President: Spruce is better to cut; it has not so many knots; but pine will last longer, wet and dry, than spruce.

Mr. Patrick said: I would, from my experience, except to several items contained in the report. In the first place, the size of the stall is given as four feet. A five foot stall is about the smallest that will accommodate a horse of 1,100 pounds comfortably. Secondly, an inch and a-half inclination to the floor puts the horse higher in front than behind; and, as a rule, he stands lower in front than behind when not working, and the weight of the horse is about two-thirds on his front and one-third on his hind limbs. When we would floor a horse comfortably, we have the clay under his front feet about an inch and a-half lower than the floor on which his hind feet stand, so that he invariably stands up to his manger. We rarely find a horse backing away from his manger. A floor on which their front feet are higher than their hind feet, necessarily creates a tendency to backing out and shaping themselves to ease their front parts, and if they cannot find an easy position by reason of the halter, they shove their shoulders forward. Another part of the report—that which relates to putting on of a hot shoe—does not meet my approval. It has been my observation that the application of heat to the horny substance of the hoof, immediately extracts the oil and makes it brittle. A hot shoe at the edge of the hoof will extend its influence for an inch, and until that grows down, the hoof is diseased and will crumble away. [Mr. Patrick illustrated by referring to the effect of heat on the human nail.] With reference to the feed; we have found it desirable to give a horse as much variety as we could, feeding corn mixed with bran and cut hay. With these exceptions I feel disposed to accept the conclusion of the report.

The President: What is meant by bran.

Mr. Patrick: Our mills, grinding flour under the new process, take the hull from the wheat, leaving a small portion of gluten attached, which is all there is in it.

The President said his company had come to the conclusion that there is not a pound of nutriment in a hundred bushels of new process bran or "shorts."

Mr. Thurston, of Jersey City, said: The Jersey City and Bergen Railroad Company has seven different stables and is now building a new stable for one hundred and fifty horses. The stalls are five feet at the widest and four feet at the narrowest part. In the new stable they are four feet three inches. They use simply partitions between the stalls, and consider yellow pine best for the purpose. Where horses have five feet space they can break the partition; whereas, with less space they cannot get a purchase. When a horse is lying down and pressing against the two sides, he cannot break the partition as he can with five foot

space. In Jersey City, land being cheaper than in New York, they stable horses on the ground floor. In the stable now building, and in two already built, there is a steep, slanting roof, with a skylight running through the centre, so all the windows desired may be opened. For the ground-work of the stable, wood flooring is entirely dispensed with. There is a system of wells with man-hole coverings at proper spaces, and the whole floor is graded, with a pitch of one and one-half inches towards the centre, which is twenty-seven feet wide, nine feet for stalls on one side, nine feet for passageway and nine feet for stalls on the other side. After the ground work is thoroughly prepared it is overlaid with six inches of sand. Over this bricks are laid with Portland cement. On that is a coating of two inches of a mixture of equal proportions of sharp sand and cement. Over that is the yellow pine flooring, with the strips of about half an inch space between, to provide for the urine of the horses, and so arranged that they can be taken out of each stall and the hose used to clean it thoroughly. This water all flows to the central wells. From the roof all the rain water flows into different pipings, so as to scour out all these wells. It commences with six-inch piping and runs to twelve-inch piping, to the sewer. For the mangers they use two-inch slate, laid perfectly smooth the whole width of the stall. In summer the horse likes to put his nose down on the slate and cool it. It is sweet and easily kept clean, and free from rats. Whitewash is applied semi-annually.

Mr. Holmes (Pittsburgh), wanted to know if they had any trouble with rheumatism among the horses in such stables. In such a stable Mr. Holmes had experienced this trouble.

Mr. Thurston: We have had no trouble from rheumatism at all in our stables. I think the fault is attributable to something else.

Mr. Robillard, of Montreal, said: According to Mr. Patrick's ideas, the horse with his front feet a little lower than his hind feet is in a natural standing position, and in that way gets rest. There is no better judge of this than the horse. When not occupied, or feeding, or not lying down, he will back until he brings his hind feet three inches lower than the front. A horse will cut or rot the timber at the bottom of the stall to prepare this place. When it is necessary to have clay, or something else to soften the foot, it has to be done; it is a bad idea to accustom a horse to it. Ten or twelve years ago, this plan was adopted by our road. After we commenced it, it had to be continued. When it was stopped, the horses became restless; but gradually we got them reconciled to the change. They came in, and after cleaning and washing their feet, we then let them go on the clay. After some experience, it left no doubt that it was better to leave them alone; cleaning the feet properly. We use cold water in proper seasons; in frosty weather, we use straw or rags. The horses, as they come in, in the summer, are brought out to the wash-tub, the legs cleaned, the shoulders bathed, and, if possible, their heads. Not one of our horses suffers under that;

they have no sores about the neck. Out of four hundred and sixty, there is not a sore neck or sore foot. The remark of the Chairman of the Committee in his report, that no horse with flat feet should be bought, is perfectly correct. If you put such a horse on a hard road for some time, with a foot perfectly flat on the pavement, where frequent shoeing is necessary, every time a little of the foot becomes pared off, and he will soon be unfit for use. Horses should have their feet properly cleaned. In Montreal, we have the worst kind of roads—all Macadam—loose stones. Yet, the condition of our horse's feet is equal to those of any stable in the country. Our slope is too little—two inches in every nine feet, and the horse, finding he has not enough, will step back. I think this idea of putting the horse's forward feet in a lower place for the purpose of resting him, is a mistake. If you let a horse alone, he will extend his legs, not forward, but backward. This, undoubtedly, has been remarked in every stable.

Mr. Patrick inquired: Did you ever see a horse out in the field? For every one that stands with his hind legs lower, a thousand will stand with their forward legs lower than their hind. The horse moves back from his manger, when he is standing on the incline, simply because the stall floor is inclined.

Mr. Littell, of Louisville, said: I differ from both of the gentlemen in regard to the horse stepping back to get his hind feet lower. I think it is to be attributed to the fact that in all of your stables, you have built the line of the stall floor a little higher than the gutter behind. If you will notice, instead of getting his hind feet lower than the floor, he stands up in that position and elevates his toe to get his level, simply because you put high heels on his shoes. If you will lower his heels, the horse will not back. If a horse backs and stands in that position, he does not stand below the floor, but gets his foot on the floor. If he digs a hole there, he will get his heel in the lower part of it. Our company has one thousand two hundred and sixteen head of mules. We drain our mules out in the yard, and so it should be in all stables. A stable saturated with ammonia is a fault of the manager. This idea is from New Orleans. In that city, the cars that go to Canal Street, stand there; and if a mule attempts to urinate on the street, the driver prevents it by whipping him up, and won't allow him to do it until he gets to the barn. What is the use of having a stall in your barn? We are building a stable with virtually no stalls. There is a space between the animals' heads; nine feet apart, we have posts that support the upper floor, and it is twenty-two feet across from post to post. We stand two animals between these posts. Between the posts and the manger, two and one-half feet, there is a partition of wrought iron to keep one mule from getting in another one's way. If we can stand two together, why not stand twenty-six together, with partitions a suitable distance apart? We are investing seventeen thousand five hundred dollars in this barn, without any stalls. There is a partition between every other animal: there is a par-

tion just above the manger. The feed-box is two feet long and twelve inches deep. The bottom of the feed-box, where we put ground corn and oats, is eighteen inches wide. In a majority of the stables here, they are two feet and a half. We put the feed in dry—oats and corn, sometimes whole corn, generally shelled, and we usually crack or grind it. We know what each mule is getting, having a measure which holds just so many pounds. Our stable floors are level and flat, and we have no trough running along there for the horses to get back on.

Mr. Cleminshaw inquired: Do you have fresh drinking water running all the time?

Mr. Littell replied: Mr. Johnson is the man to tell all about that. I learned almost all I know about watering horses from him. I was in Indianapolis four years ago; Mr. Johnson took me into his barn; I found there running water. I adopted his system; changed it a little. In the barn we are building, we have a metal basin in the centre of the trough, so that two mules can drink from one basin; it is supplied by pipes from a tank in the corner of the building; the top is level with the top of these basins, and is supplied from the water works. When a horse drinks, a fresh supply flows in. A horse can have all he wants. We do not lead him by the water.

Mr. Wright, of Chicago, said: I expressed my views very fully in the report last year. There is, however, a question I would like to ask. Can any one state how much air a horse requires? I have consulted half a dozen veterinary surgeons, and seven or eight physicians; have examined every book in the libraries of Chicago, that bears on the question. I have assumed that the horse breathes as much air as a man; but that amount varies. One allowance is three to four cubic feet a minute; another allows but one. The Committee's recommendation of stables twelve feet high, is rather small. I make ours sixteen feet. We have fresh air inlets to let in air in addition to the doors. We are laying stable floors on four inches of asphalt, which prevents all moisture, vermin, and rats burrowing through. It keeps the floor all water-tight and comfortable. We put down two-inch pine flooring. The stalls have an inclination of two inches in nine feet. Our horses are shod without calks; bearing taken upon the frog. We have very little, if any, trouble from horses backing out. Ninety-five out of a hundred remain in their stalls without backing out.

Mr. Johnson, of Cleveland, said: Mr. Littell referred to the water-trough system. We adopted it five years ago. We discussed the matter at length. We reasoned this way, that our animals drank a great deal of water. It was really their most important item. There is three times the amount of water consumed as feed. It is certain that he will be watered when he goes out and comes back, but there is no reliable watering after that. Some hostlers are very careless. I had seen very frequently a horse go to the trough and look as if he would drink a barrel of water. We built a stable, furnishing water to each stall. We have troughs holding half a

gallon of water each. The animals will not take too much when hot. We have now nearly nine hundred head. It has since been adopted in Louisville and two or three other places, with no bad results. As a humane measure, they think it a good one. This Report corroborates our experience. One of the gentlemen appears to think they will take too much. Where they can get it at all times, they do not drink too much.

Mr. Edward Lusher, of Montreal, said: I must confess that I have heard one or two astonishing things here. I have never been aware that horses, coming in fresh from a journey and heated, might have without injury, any amount of water. Our experience has been, that after horses have been brought in heated, the best thing is to let them rest half an hour. If you can give them as much water as you choose without doing them harm; and that after a time they will not take more than is good for them, they are very different from all the other animals. It seems to me a dangerous experiment. They try it sometimes in spite of us, and the result is very bad. One gentleman says cut-feed is right. For years we have never given them anything but natural food. They do not swallow so rapidly when they have to chew. Some railways use cut-feed, and their horses look very well; and the tendency of the whole discussion seems to be as to their longevity. * * * There is one interesting question; the cost of veterinary surgeons and medical attendance to each company per horse. One company has cut-feed, and gives it to its horses whenever they want it. What the mortality of these horses is, compared with horses fed with whole feed at stated periods, would be interesting. Our company gives whole feed at stated times only. We only lose as many as twelve, sometimes but two to four a year. Ten horses a year it will average, perhaps, out of four hundred and fifty. We are away up in the northern clime, and they have to do a great deal more work than the average car-horse. We have to run sleighs in the winter in order to keep the horses. We would be very glad to rent all the horses and cars out in the winter, and buy them again in the spring. The horses are used up more in the winter than they are in the summer, with our hills and bad condition of track, and in consequence of Macadamized roads. Our horses are all very hard worked, but I have not seen any better than ours.

Mr. Humphrey, of Concord, said: I handled horses before I saw a horse railroad. If you give water to a horse when he is hot, you are pretty sure so founder him. As regards watering horses, when running the cars or when in the stable, I am very careful not to let mine drink too much. When the horse is warm, it founders him, and stiffens him up to give him water. About feed. I am feeding three-quarters oats and one-quarter whole corn. I fed our horses on oats altogether at one time; also on cracked corn and oats. We can get along pretty cheaply. I have not heard anything about how fast we can drive. I have been running a horse-railroad only three years, and keep my horses right up to the handle. They do splendidly, traveling

fourteen or fifteen miles a day. Last spring we extended our road three miles further, giving them seven miles to run. I tried to put them through in an hour—we were running against a steam railroad! The consequence was that I took the flesh off every horse I had. I got over that fancy, and have brought them down to five miles an hour, and they are picking up again nicely.

Mr. Cleminshaw, of Troy, said: The report of Superintendent Brown covers longevity. As to watering, it is a hobby up our way. If you will bear in mind what I shall say, you will go home and try our experiment, and never forget it. It is a humbug about a horse not drinking when he is warm. When I became connected with the Troy and Lansingburgh Road, I learned the habit of the Superintendent regarding watering. I had been taught that a horse must never drink and never eat when he was warm. I asked him why he did it and looked into his theories. Experience is worth more than all the theories ever generated. His report was written two years ago; therefore, the statistics, percentages, etc., should be dated back two years. Since Mr. Brown has been Superintendent, in winter or summer, it makes no difference which, as soon as the horse comes in from the car, his harness is taken off, and he is led to the trough and allowed to drink all he wants. When brought out from the stall, he is treated the same way. At stopping points, he is taken from car to watering-trough for all he wants. In the fourteen years that Mr. Brown has run the line—I will vouch for the last twelve years—we never have had a foundered horse, or one affected in any manner, shape or form in that way. His theory is that foundering comes from after giving a horse drink or food; allowing him to stand in a draught, and taking cold. The report states the average life of a horse as about seven and one-half or eight years. We take the value of our horses, and base the calculation on that value of the horse; because a horse worth one hundred dollars yesterday, may not be worth fifty dollars to-day. Our average for 1882, was, between seven and eight years. Last year it was less. Of course we are doing more business, and we put in more new horses. The new horses will wear out faster than the old ones.

Mr. Robillard said: We have had horses that were foundered, and invariably it has been traced to their getting water from the tub when coming in from work hot. Horses have been foundered on the street, and it has been traced to the same source. I drive a first-class spirited horse, and coming home one night with him, not hotter than usual, I stopped on the way at a spout, about half a mile before getting to the stables. I gave him a drink, and that was the first he had had after leaving the stables. I let him run for about a mile after I started; and in two or three minutes we were in the stables, and the horse was stiff in very limb. He did not get in any draught. He got over it, and I never tried the experiment again. In the country, around our place, when they get home they let the horse go to the bucket; from the

age of two or three years they do that all the time. If you buy seven or eight year old horses, and try this, it will kill them.

Mr. Cleminshaw replied: Every horse we get goes through the same process.

Mr. Humphrey said: Has anybody in driving horses when warm and sweating, ever had a shower come upon them and founder them? I got caught in just this way, and did not know what was the matter. I put my horse up in the stall, and he showed it right off next day. He did not drink a drop of water that I know of. The veterinary asked me if I had been out in a shower? I replied that I had, when he said, that explains it. So I do not see why the horses on the horse-railroads do not get caught in the same way.

Mr. Littell said: I would like to ask Mr. Robillard how long it was since his horse had drank, previous to the time he was driving?

Mr. Robillard replied: About three hours. If a horse is foundered through water, it will be apparent in an hour.

Mr. Littell said: You can not keep a horse away from water, and then let him drink all he wants, without doing harm. Let him have all he wants right along.

(To be continued.)

Mr. Fuller on Cable Railways.

Mr. Lawson N. Fuller was up before the Cable Railway Commissioners (N. Y.), on Thursday morning (12th ult.), and is reported by the *Telegram* to have said:—"I represent nearly all the property owners on 155th Street. The elevated roads were built, notwithstanding the many and strenuous objections urged at the time. Now they carry in a year 500,000,000 passengers—so many, in fact, that people are huddled together like sheep in a cattle train, and often are obliged to stand during the entire trip. We were told that the value of property along the route would be destroyed, yet it has increased more than \$150,000,000. The first rides I took in public conveyances in this city were in the Knickerbocker stages. I had to hold on to a strap and stand up all the way down town, and I have been holding on to a strap ever since. The city is constantly and rapidly growing, and the facilities for travel are wholly inadequate. I have seen the working of the cable road in Chicago, and it is in every respect admirable. I have counted eighty passengers in one car going from the Astor House to 155th Street. The lawyers appearing here in opposition to the proposed cable road are nearly all employed by the horse railroads. The grant of a surface road in Broadway should compel the company to carry passengers from one end of the island to the other for five cents, and give transfers to all parts of the city. The Sharp people want the franchise for a road in Broadway, and only propose to carry passengers to Fifty-ninth Street.

Mr. Rehm on Car Heating.

A local reporter recently interviewed Mr. Jacob Rehm, of the North Chicago Railway Co., with the following result:

"When asked whether the north side

railway cars were likely ever to be heated, Mr. Crawford said that was a question he did not wish to discuss. Jacob Rehm, who owns a controlling share of the stock of the corporation, was present, and he was asked to solve the problem. Mr. Rehm shook his head and did not want to talk. 'Why don't folks insist on the omnibuses and other vehicles being heated?' he evasively asked.

"There are fewer people who ride in omnibuses, and then for shorter distances," answered the interviewed reporter.

"Well, the majority of the people don't want the cars heated—wouldn't have them heated—and would be mad if they were heated," insisted Mr. Rehm, waxing eloquent. 'I've talked with them' (meaning the people) 'and I know what they think about it. Nine out of ten people don't want them heated. They don't get cold riding the little distance to business in a street car, with heavy overcoats and warm rubbers.'

"But," timidly interposed the reporter, 'when people are not able to clothe so warmly, or when they are well clad and have a long ride of three or four miles, they do get cold. Isn't there some way of making it more comfortable to your passengers in severely cold weather? You had stoves on your cars at one time.'

"Yes; but they were not practicable and we took them off. I haven't seen any way of heating street cars yet that is practicable. They are trying something on the south side somewhere now, but it is no good. I've been watching these things.'

"Do you know anything about the system used in heating the cars in Brooklyn?"

"Oh, yes; but it don't amount to anything. They pretend to heat them but don't have any fire in them once in ten days. It's only a certain unreasonable set that want to keep bothering us that ask to have the cars warmed. The next thing we know they will want us to put down a carpet for them to walk on from the doors of their houses to the car,' and having thus delivered himself, Mr. Rehm fell into a state of abstract reflection."

[Mr. Rehm's reported statement, that the Brooklyn cars do not have any fire in them once in ten days, is erroneous. We ride in one or another of the Brooklyn lines twice every day, and have not yet struck a car in which there was no fire.]

Regarding a Spring Car Motor.

EDS. STREET RAILWAY JOURNAL:—

Inclosed you will find an article cut from the *American R.R. Journal* of February and March 1884, in regard to Automatic Spring Motor. Will you please let me know through the columns of your JOURNAL, what has become of it? I was in hopes at one time, that it would be a success.

Yours truly,

JAS. O'HERN, Sec'y.

Hannibal (Mo.) Street Railway Co.

[In pursuance of our inquiries upon the subject, we saw Mr. J. Francis Bacon, of 131 S. Fourth St., Philadelphia, formerly Secretary and still an active director of the

Philadelphia company referred to: *i. e.*, the "Automatic Spring Motor Car & Carriage Co."]

Mr. Bacon's reply is embodied in the following communication from him:—

PHILADELPHIA, Feb. 19th, 1885.

EDS. STREET RAILWAY JOURNAL:—

In answer to your inquiry concerning the Automatic Spring Motor, I will say, that the company is at present pushing the matter as fast as possible. As with every new thing, difficulties have occurred which were not expected in the beginning, and obstacles arisen which required time and patience to overcome. At the present time nearly all the perplexities have been removed; the springs have been made and tested; the large car (except the top or wood part) completed, and a final test will be made in a short time, just as soon as the machinery can be properly adjusted and the durability of the springs ascertained. The company has every reason to believe that it will be the success claimed; but past experience has taught us that a great deal of patience is requisite. The descriptions of the motor given in the articles handed me are in the main correct, and need no comment or enlargement on my part upon them.

Hoping the above may be satisfactory to you,

I remain

Very respectfully yours,

FRANCIS BACON.

The description referred to is in substance as follows:—

" * * * * * A car is being constructed in Philadelphia which will contain eighty springs, eight seats of ten springs each. Each set will be inclosed in separate cylinders, and each will have its own gearing. The power of eighty springs is sufficient for a run of eight miles. The entire force will not be used at any time. That of one set of springs will be exhausted before that of another set is used, and each set will carry the car one mile. No difficulty is anticipated with regard to grades, the calculation being that a grade of six hundred feet to the mile can be covered without trouble. The grade question is met in this way; progress will be made on the level with one set of springs. Reaching a grade, should it become necessary, force will be augmented by working another lever, thus bringing into play another set of springs, and so on, to the use of as many as may be found necessary. The new car will have a front swing truck, lessening friction and enabling it to take short turns. It is likewise anticipated that, by means of such truck, the car will be easily removable from the track in case of obstruction, and may be run around it. To stop the car, there will be provided a treadle to act upon a double-action band brake, locking both axles, and stopping the car within the space of six feet.

"Some minor features of the invention are a governor which may be set to determine the maximum speed of the car, and an indicator that will show the amount of reserve force left in each set of springs. It will be seen that the breakage of one spring would reduce the power of an eighty-

springed car, only one-eightieth part, with the corresponding proportionate loss of speed. At the end of the route the broken spring would be repairable at a cost of five dollars, in two hours.

" * * * * * Not more than two good stationary steam engines of fifteen to twenty horse-power will be necessary to any ordinary city railroad to wind the springs. The steam engines can be placed at both ends of the route, and when not in use for winding, can run the company's repair shops. No new tracks, new switches or turn-tables, will be necessary, as the car can run backwards or forwards."

There are (or were) two other spring car motor companies in Philadelphia, working in different ways, upon the same problem. Eds.]

Rapid Transit in Level Cities.

EDS. STREET RAILWAY JOURNAL:—

A prominent Street Railway official of the city of Chicago claims to have solved this problem, and in the course of an interview with a representative of the JOURNAL, disclosed his solution of the matter. The following is a condensed report of his plan:

"The track will be underground and in the centre of the street, using a double arch for a double track. This plan is considered by practical engineers beyond question or doubt, to be feasible, practical, and unobjectionable, particularly as regards the Streets of Chicago. It is preferable to the elevated systems for many reasons. It does not interfere in any way with the property holder; it not being calculated to deteriorate the value of property in any way. It is more accessible than the elevated system, requiring only about 18 inches more depression than the grade of the basements of buildings as they are now constructed, so that eleven ordinary steps would take the passenger from the present sidewalk to the train. The elevated system requires two to three times that number, is unsightly, and in no small measure deteriorates the value of property adjoining. With electricity as now perfected, the surroundings would be as comfortable and pleasant as a parlor by gaslight, and the temperature would not be subject to the sudden and radical changes experienced on roads above ground.

"For propelling power compressed air or electricity might be used, neither of these producing smoke or gas, and either of them making attainable a speed of 25 or 30 miles per hour.

"Trains could be moved without danger of collision, and the cost is within easy reach of those who may desire to become interested, and not necessarily greater than the elevated system."

The gentleman from whom the above was gleaned, is a man of great experience in his line, and has devoted considerable time and money to the solving of the problem of rapid transit in large cities. Plans of his underground system have been prepared, and it is now only a question of time when the underground system will drive the cable system to the wall, it not being subject to the many objections and difficulties that operate to the detriment of the latter system. W. O.

Another Remarkable Horse.

EDS. STREET RAILWAY JOURNAL:—

Your issue for this month contains the "history of a remarkable horse," owned by one of the Chicago Street Railway Companies.

I would give you the history of a horse owned by our company, which may prove interesting to some street railway men.

In February, 1882, we purchased a horse aged 12 years, weight about 1,100 lbs., which had been trained for pacing on the track. He could pace fast, but was an incurable bolter. This bad habit also spoiled him for road work, and after passing through the hands of several horsemen, who failed to break him of his bolting propensities, he came to the street railway stables.

After trying to control him with severe bits, the superintendent ordered him to be worked against two horses as the only possible way of keeping him so he would do his work without alarming the passengers, or breaking his harness.

Accordingly, from March 1st, 1882, he was worked 26 miles a day; if he was let off with 15 miles a day for a few days, he would get so the drivers could not handle him.

About once a month, some one would take a fancy to him and come to buy him for road work; but one trial drive after him single, and he would invariably be brought back to the barn.

When he died from a severe attack of colic, in September, 1884, he had a credit of 19,764 miles (nineteen thousand seven hundred and sixty-four.)

Every driver in the employ of the company rejoiced at his death, as even with the most severe bits, and constant work, he kept a driver very busy holding him on the track.

Allow me to say that the STREET RAILWAY JOURNAL is appreciated here, and that we look forward with impatience for each issue. It treats on matters that we understand and take an interest in.

Yours respectfully,
WM BOND,
Stable Foreman,
St. C. M. & Thorold St. Ry. Co.
St. Catharine's, Ont., Canada, Feb. 16th.

The Chaplin Frictionless Bearing.

EDS. STREET RAILWAY JOURNAL:—

J. E. Rugg, Esq., Superintendent of Highland Street Railway, Boston, has given us permission to say that our bearings have run on the "Gov. Rice" car of his road, since spring of 1881, with perfect satisfaction. There was not one cent of repairs put on box or axle until August of 1884, when the car was overhauled and painted, and our bearings repaired and put at work again and are now running. The "Gov. Rice" is a close car, and is run seven months in the year; open car replacing it in the summer months. There is a very noticeable saving of draft, and the car takes curves with great ease. At the shop we were told it was the exception to have a box run as long without repairs. The boxes were put on by us as an experiment, and no attempt has ever been made to put them on the market. This road uses the Higley box, and we have been treated very courteously in the testing of ours, and thank you for your valued notice.

Respectfully yours,
E. P. CURRISS, Treas. and Mgr.

— THE —
STREET RAILWAY
JOURNAL.

MONTHLY, \$1.00 PER YEAR.

E. P. HARRIS, General Manager.
P. G. MONROE, General Western Manager.
ROBERT GRIMSHAW, M. E. Editor in Chief.
G. B. HECKEL, Associate Editor.

AMERICAN RAILWAY PUBLISHING CO.

32 LIBERTY ST., NEW YORK.

8 LAKESIDE BUILDING, CHICAGO.

S. L. K. MONROE, Sec'y and Treas.

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Special Notice.

Street Railway officials and others interested, who have not yet subscribed for the STREET RAILWAY JOURNAL, should do so at once, so as to receive the back numbers. An index will be printed at the end of the year, embracing the first twelve numbers—constituting a most valuable fund of information. The price (ONLY ONE DOLLAR) should place it in the hands of every practical street railway man in the country.

Car Wheels.

Roundness of car wheels means ease of traction and economy of track, wheels and motive power. We know of but one city on this continent where really round wheels are used, and that is Chicago, where the wheels are ground.

It is not enough that a wheel be round in the ordinary sense of car wheel roundness, which generally means that the tire or tread approximates a circle which is approximately concentric with an axle which is approximately straight. The tire or tread must be absolutely circular in any plane at right angles with the axle; the rim or felloe must be of equal thickness in all parts of any circumference; the wheel must be truly centred and the axle must be perfectly straight, and its journals and wheel seats absolutely parallel and "in line." The material of the wheel must be free from local fissures, blow-holes (either opened or flattened) and *strained places*; must be of equal density, hardness and toughness in all parts having similar shape, place and duty.

Gradually, master car builders have taken up the questions of roundness and size of wheels, and incidentally have tried to produce wheels which were bored concentrically with their tires.

We believe that these lines are the first to point out another probable cause of rough

running and short life of wheels, namely: non-parallelism in and non-alignment of axle journals and wheel seats.

If the journals and wheel seats are round and straight, but those on one end of the axle not parallel with those on the other end, naturally, the two wheels on that axle will not lie in parallel planes, but will be inclined to one another, and thus will result a wobbling, which must of necessity cause rough riding and encourage sharp flanges.

If the journals and wheel seats are round, straight and parallel, but not axially concentric, that is, "in line," there must ensue rough riding and flat spots on the treads.

Having pointed out the desiderata and essential features of a proper car wheel and axle, and wherein the average product does not fulfil the requirements, it may be worth a few words, to point out how these *desiderata* are to be attained.

As to roundness, we think that in these days no one will dispute the assertion that nothing was ever cast truly round. The lathe or special wheel turning mill has had to supplement the molder's work, and has produced results which passed for round until their non-circularity was exposed. No four jawed chuck was ever known to turn out truly round work, and we believe that no chuck having an even number of jaws can be made to turn anything round or anywhere near round, as modern machinists understand the word. We will go further and say, that no lathe ever turned anything which would pass for round in Pratt & Whitney's, or Brown & Sharpe's machine shops, and that there never was anything which was round, that was not *ground so*.

The lathe gives but an approximation. But whether lathe or abrading disk is employed to produce a car wheel from a casting, the process is one which is doubly wasteful; for the turning process is paying money out for the purpose of removing the best part of the wheel, the "precious metal". The conclusion which should naturally result from this reflection is, that we should try some method of producing wheels which are commercially, practically round and true in the tread. This may perhaps best be accomplished by preparing dies which have, by lathe and emery wheel, been rendered absolutely round, true, and to size, and then producing die-forgings therefrom, by the action of press or hammer on homogeneous metal "cheeses," either cast or forged.

As to freedom from blow-holes (either distended or flattened, but in either case harmful), that may in certain measure be secured by improvements in melting and pouring; but the probability is that absolute certainty in this respect will be difficult and costly to arrive at. Here again the pressing and hammering processes suggest themselves as valuable auxiliaries, for they are even more effective in improving the internal character of the mass than in battering the outline and surface. In the matter of equal thickness of rim or tread, pressing or hammering here again has the advantage over pouring.

True concentricity of bore and tire may be got by the use of a proper boring mill,

using a chuck having a *prime number* of jaws.

The axle should have its wheel seats and journals turned on both ends at once; and then the journal should be *ground*, without re-chucking the piece, the grinding being effected by a pair of wheels for each journal, hung in a swing frame so as to constitute a pair of calipers, as in grinding paper rolls.

This latter proposition will be very promptly laughed at. If it were as laughable as the results by present methods, it would be very ridiculous. The saving in traction alone would pay for doubling the expense of fitting, in order to secure such good results; but properly managed, the system would come as cheaply as under the present method.

We have a friend who *curries his cows*. He gets laughed at, too; but the *extra milk* more than pays for curry-combs and labor.

Heating the Chicago Cars.

A correspondent of the *Chicago Tribune* writes to that paper as follows:

"Noticing various articles in your paper treating upon the heating of street cars, I have become sufficiently interested to procure some information on the subject from the Secretary of the Cream City Railway Company at Milwaukee, which company has its cars at a very comfortable temperature at all times during the winter—never overheated and never cold.

"The heater it uses is a small coal stove on the driver's platform, incased in sheet iron, the heat passing into the car through a radiator at the side of the door—hence no danger of scorching clothing, or of the hay or straw in the bottom of the car igniting.

"The heaters complete and in place in the car cost about \$95 each. The quantity of coal required will average a cost of from 30 cents to 60 cents per car per day.

"My apology in troubling you with this is the common interest I have with you in suffering street car patrons, who from necessity contribute liberally to the treasury, and certainly deserve better from the corporations.
J. A. BROWN."

Borrowing.

"For such kind of borrowing as this, if it be not bettered by the borrower, among good authors is accounted Plagiaré."—*Iconic clastes*.

It has been a constant and justifiable source of pride to the publishers and editors of this journal, that its contents have been almost without an exception, however trifling, original; and that whenever special circumstances have called for the reproduction of matter from other publications, the source has been scrupulously indicated.

It has been an equal source of pride that most of those contemporaries which are not jealous of our well-earned influence and financial success have done us the honor to reproduce many of our articles, with due credit.

Occasionally, however, we find an exchange (or a contemporary, not an exchange) using our ideas and information, clothed in other words; and some even go to the length of copying our paragraphs and articles without giving us proper credit;

sometimes without even "beating the devil round the bush" by vaguely adding "*Exchange*," which means so much and yet so little.

Messieurs et chers confrères, you are, until further notice, welcome to our articles so long as you credit them. Otherwise, please keep the scissors away from them.

Stable Ventilation Pays.

Did it ever occur to those in power, that by permitting their stables to be pest-houses and funk-magazines, they are losing money in several ways?

We have in mind now a set of stables, in a large city, and in a quarter thereof which would naturally be desirable for residences, on account of its high ground, and central location, its dry, firm soil, and the character of the property and improvements all around it. But within a radius of two blocks of these stable, each lightest wind conveys to the residents of the neighborhood, *not*

"Sabean odours from the spicy shore
Of Arabia the blest,"

but whiffs and wafts of ammonia and sulphuretted hydrogen, and unmentionable and unanalyzable gases, varying only in their pungency and offensiveness, and in their relative unhealthful effect.

As a consequence, "rents are down" in that neighborhood; and the population is of a class which rides but little. In other words, the unventilated stables are the centre of a town of five blocks in length and the same in width, which contribute but very slightly to the revenue of the road.

Further, the health and eyesight of the horses is not improved by the lack of ventilation. In fact, it can be shown that the strength and durability of the horses are lessened and the medicine bill increased by the lack of ventilation.

In addition to this, the harness rots sooner in an unventilated stable than in one in which both man and beast can find "the two noblest things, which are sweetness and light."

Steam on Street Railways.

The Hon. R. C. Parsons recently read before the British institution of civil engineers a paper concerning the progress of steam locomotion on street railways. He asserted that very little success had attended efforts to introduce steam motors on the common highway, while special legislation in behalf of the street railway companies has led to comparative success in that direction.

The British "Board of Trade" regulations have been amended so as to protect the public, without hampering the use of steam. A special type of engine, with vertical cylinders, carried well up above the axles and fitted with long connecting rods, coupled directly to the leading axles, has been applied to the street cars. "All four wheels are connected by coupling rods, as in the locomotive, and the exhaust steam is concealed by various expedients. The surface condenser was considered more economical than super-heating, to produce efficiency, and air condensers were thought practicable. Engine and passenger car were often combined—a method used in

various American systems—in one of which (Rowan's) the engine can be removed and another substituted in a few minutes. Depreciation was allowed for at 10%. Depreciation on the line alone was taken as 3%. The cost of operation was stated at 2.28 pence per mile, while the total of all expenses was given at 9.33 pence per mile, and every penny per mile above this figure should give 2.2% in dividends. The line intended for such steam traffic should be very substantially built, and large cars and moderate fares were advised."

Mr. Shellshear described the street railways of Sydney, New South Wales, all of which are worked by the ordinary railway system. The number of passengers carried in 1882, on twenty-two miles of road was 15,269,100, or about 200,000 per mile; and the earnings were over \$40,000 per mile, or about 2% per mile. The gauge is 4 feet 8½ inches and the number of engines employed 57, including several American (Baldwin) tank engines, which work more smoothly than English or home-made engines. The government is having other steam cars, on the American system, built at the Baldwin Locomotive Works. The result is believed to have demonstrated that horse-power must yield to mechanical traction.

Keyed and Bolted Car Wheels.

A rather novel method of fastening car wheels to the axles has been recently patented* and satisfactorily tested on the D. L. & W. R'y.

The method consists essentially of recessing the wheel bearing of the axle and providing the inside of the wheel hub (or hole) with lugs corresponding in number and position to the grooves in the axle. Or simple keys may be substituted for the lugs. The wheel is secured to a collar or abutment on the axle, by means of bolts passing the abutment and the wheel hub, and secured by suitable nuts.

It is claimed that this method of fastening wheels decreases their liability to fracture, as the wheel is secured without the immense pressure (25 to 40 tons) required to force home the ordinary wheel; a pressure that is claimed to frequently cause crystallization of the axle, which combined with the internal strain on the wheel hub, ultimately leads to fracture of the axle or wheel.

On the authority of a letter from Mr. Walter Dawson, M. M., countersigned by Mr. W. A. Halstead, Gen'l Supt., D. L. & W. R'y, we can say that wheels thus fastened gave a mileage of 15,000 miles without repair or apparent strain on the fastenings.

The method appears to us eminently applicable to street railway service. G. B. H.

*Michael Jordan, Scranton, Pa.

Growth of Travel in New York.

The wonderful growth of the passenger traffic of New York City in the last thirty odd years is an interesting study, and the following figures are deduced from a table published by the New York Arcade Railway Co.:

In 1850 there were only two railway lines

in the city, and the total number of passengers carried was less than 7,000,000; in 1884, the total of passenger traffic for all railways and omnibus lines were 302,183,362. This is an average increase of over 9,000,000 per year. In 1850 the population of the city was 515,547; while in 1880 it was 1,206,299. Taken by decades, the increase of travel has reached 141 per cent., and the growth in population only 46 per cent.

The elevated railways carry nearly one-third of the moving mass, or in 1884, 96,702,620; but as the natural growth of passenger travel between 1877 and 1884 was over 120,000,000, or more than 23,000,000 above the presented capacity of the elevated lines, it would seem that the rapid transit problem is yet to be solved. The more railways there are the more they seem to be used, and the statistics prove that increased facilities invariably bring about an increased ratio of travel. In 1855, four railways carried, each, over 4,500,000 passengers; in 1865, twelve roads carried nearly 7,000,000 each; in 1875, nineteen roads nearly 9,000,000 each, and in 1884, twenty-three lines transported over 12,350,000 passengers each.

The publication referred to, basing its figures upon the semi-decade of 1875-80, showing the lowest percentage of increase in travel, viz.: 15 of population and 27 of traffic, estimates that in 1890, an increase in passenger traffic of 138,000,000 will have to be provided for; and in 1900, or fifteen years from now, the increased demand will reach the enormous figures of 561,000,000.

If these deductions are even approximately correct, it is very evident that the facilities for travel in the city of New York must be vastly extended to meet the possible demand of the next few years. There appears to be room for nearly, if not quite all, of the various transit projects afloat, both elevated and underground cable roads and ordinary tramways.—*Unknown Exchange*.

To Street Railway Officials.

We should be very much obliged to officials, or others, if they will let us have by "closing day" of our next number, any memoranda of interest in street railway circles.

Copy should reach us on the 25th of each month, for the issue dated the first of the subsequent month.

Cost of Keeping London Omnibus Horses.

The principal food of the horses of the London General Omnibus Company, is maize; and maize has not been so cheap since 1879. It cost only £1 5s. 2d. per 480 lbs., against £1 13s. 8d. in 1882. We quote from a recent English note on this subject: "No other food is so suitable for horses. It is heat giving, well adapted for flesh forming, and where speed is not particularly required, is altogether an admirable fodder. Beans make up a staying power, and these, too, have been cheap—fully 3s. a quarter less than in 1883. Oats have been a shade dearer, but very little is required. The same applies to hay. Maize is the great thing, as it means 95 per cent. of the whole fodder, and there is always a fair chance of its being obtained at a fair price." This company paid 12½% in 1884, as against 10% in 1883.

A Changeable Horseshoe.

We illustrate herewith a novel pattern of combination horseshoe, for which the inventor* claims several points of special convenience.

The shoe, made of malleable iron, comprises two parts, one of which is provided with heel and toe calks, and the other with side rows of holes, in the usual manner. The upper portion is nailed to the hoof in the same manner as the common shoe. The method of uniting the two parts will be understood from the cut. The lower portion, constituting the shoe proper, is slipped into the flanged recess in the upper permanent part, constituting the shoe carrier, and the two lugs at the heel enter openings provided, and are firmly held by split keys. In icy weather the smooth shoe can be replaced by one formed with calks, in a very short time; the operation is simple and easy and can be performed by any one. The carrying plate, being subjected to very little wear, is calculated to outwear many ordinary shoes, and while that portion lasts, shoeing does not require the aid of a blacksmith. When the hoofs require trimming, the same shoe is replaced after the operation. Should the horse interfere, when shod with calks, or should he become uneasy in the stable, the under part can be taken off. If it is considered necessary, an elastic layer can be placed between the two parts. It is claimed that by the use of these shoes the services of the blacksmith are in less frequent demand, and the cost of shoeing will be proportionately reduced.

* David J. Pryor, Roxbury, Mass.

On Horse Shoeing.

EDS. STREET RAILWAY JOURNAL:—

I have been reading the STREET RAILWAY JOURNAL, find it very interesting, and would not be without it.

As I have seen nothing in it about horse shoeing, I thought I would give what I found to be the best system for horses in the use of the street railways. In the ten years that I have been in the employ of the Chicago West Div. R.R. Company I have tried many different kinds of shoes to keep the horses from going lame, but none of them proved satisfactory until I tried the tip system of shoeing. In nine cases out of ten, lameness in the foot comes from contraction; when anything is the matter with the foot the shoes are taken off, and as a result the horse gets better. Now, then, if we can shoe a horse so that he gets the same effect as if he was barefooted, we have made our point. The only place that needs to be protected is around the toes back to the quarters of the foot, so as to give the frog and heels full pressure on the ground. A horse shod on the tip system is more sure-footed on slippery pavements than a horse shod with heels and toe-calks. The great trouble with the farrier is, in place of assisting nature, he destroys what nature put on the foot to

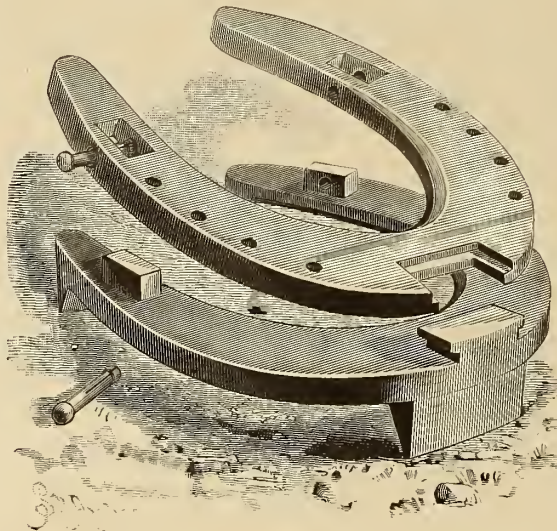
protect it. The frog should never be cut away, and the sole of the foot should be let alone; it will shed itself; keep the toe short as possible with safety; rasp the heels and wall down to the proper state; only take off what is surplus growth from the protection of the shoe; there is no such thing as a horse's frog wearing away or becoming bruised or the heels getting sore from coming in contact with the pavement.

The shoe that I use only weighs ten ounces, and they will wear as long as shoes put on the full length of the foot, that would weigh from two to two and a half lbs., heeled and toed.

As I have no shoe to sell or axe to grind in the matter, but only the interest I feel in the horse, therefore I don't recommend any firm's shoe in particular. At present I am using the Goodenough shoe.

By taking the No. 1 army pattern and cutting one inch off the heels, makes a shoe that can be manipulated very easily to any foot.

I can prove to any one that may be skeptic on this system of shoeing that there is no need of having bad feet or lame horses, as I can convince them by showing the horses' feet that I am now shoeing on



the tip system: they are as sound as horses that never had a shoe on.

I also wish to say that railroad companies can shoe their horses with half the expense by adopting this system of shoeing, besides the saving of horseflesh. I have already taken up more space in your paper than I intended to, but the old system of shoeing is so wrong that it seems as if there should be a law that would compel men to make a change, and I know if the horses had a voice in the matter they would certainly demand it.

Yours respectfully,
THOS. LEGGETT,
Foreman W. Div. (Chicago) Shoeing Dept.

Nursing Babies in Street Cars.

The query in your "Kicker's Column," as to the right of a woman to nurse her baby in a street car could have emanated only from the brain of a crusty old bachelor, a personage who has no rights that any well ordered baby is bound to respect.

I insist that a baby can best judge of the necessity and expediency of taking its usual refreshment, and when it has signified its imperial wishes to its mother, she has a divine right to turn any conveyance into a dining car if she pleases, and there is no indelicacy in the act.

Respectfully yours,
MRS. M.

Pans for the Elevated Roads.

A bill was recently introduced in the N. Y. Assembly requiring elevated railroads to place iron pans under the structures, so as to protect pedestrians from dropping coals, water and grease. An officer of the Manhattan Railway Company said about it: "It is the same bill that was presented last winter. It was sent to the Board of Railroad Commissioners for an opinion as to its practicability, with naturally an unfavorable result. Any sensible man would see at once that such a plan could not be carried into effect. In the first place the pans would seriously obstruct light, but in addition to that they would be practically be useless, for they would be filled with snow and ice in the winter months, and in the summer every rain storm would overflow them. The bill is an old stand-by."

Street Railway for China.

Whether John Chinaman buys his boots as large as he can for the money, is an open question, but it is certain that he is fond of riding in street cars and goes in for getting his money's worth, even if he has to walk back part way. This being the case, it seems strange that in all the countless large cities of the Flowery Land there is no street railway. India, Japan, the East and West Indies, Mexico, Brazil, the states of South America, etc., are all endowed with these conveniences of modern civilization, but the tinkle of the bell-punch has never yet been heard in populous, ride-loving China. We can state, however, upon good authority, that parties are here arranging for such plant and appliances as are necessary and that Yankee street cars will soon be rolling through the streets of at least one city in the Celestial Empire.

F. B. G.

Surface Drainage and Blindness.

Does or does not surface drainage of stables cause or promote blindness in horses? This will be a good text for a few short sermons, which would lead to the betterment of the condition of car horses and the dividends of the companies.

THE KANSAS CITY RAILWAY CO. has adopted the bell punch as a check on conductors. Edward J. Lawlers, Superintendent, had five years experience with the punch on the Sutton Street road in San Francisco.

Car End Framing.

EDS. STREET RAILWAY JOURNAL:—

I send you a cut representing a skeleton frame of street car end, all framed together before being put into place. Several years ago, while connected with the South Side City Railway Co., of Chicago, by permission of the Master-Mechanic of that company, I proposed to him to build the whole end of street car in one frame; which to my knowledge had not been done before. The foreman was somewhat in doubt whether it could be made practical, and as cheap as the old way, yet it proved so in a very short time to their entire satisfaction, and the same method is now constantly resorted to wherever new cars are built.

That this system of construction is cheaper, I think can be easily demonstrated by any one willing to make the experiment. Not only is it practical for street cars, omnibusses, etc., but may also be employed on the regular railway coaches. There is no necessity of building a car as one would a frame house, fastening first one stud, then another, and so forth. The putting together of frames of this kind is much easier—some large iron clamps and trusses may be built for the purpose, so that the workmen can get all around their work and do it much quicker and better in every respect than by the old way of climbing up and down on scaffoldings, that sometimes occupy as much space as the structure itself.

First, of course, it is necessary to have all parts that enter into the frame mortised, tenoned, bored, grooved, and smoothed up in good shape. When that is done, then frame door post and head together; the same with end or head plate, and ventilator carling. Then frame together strainers with top and bottom rails, left and right hand side; and when everything is ready to clamp together take a perfectly laid out end sill and slip in all tenons of posts and strainers, then glue the same, having all measurements correct.

This completes the end, ready to be set up.

W. M. GABRIELSON.

New York, 1-26.

Future Management of the Brooklyn Bridge.

The bill providing for the future management of the Bridge, prepared by the Trustees' Committee on Legislation, has been read by Oswald Ottendorfer. According to Mr. Ottendorfer the principal features are as follows: The Bridge is made a State work. The new Board of Trustees will consist of the Mayors and Comptrollers of New York and Brooklyn. To provide for repairs, accidents, etc., income bonds may be issued. The Brooklyn terminus of the Bridge is placed at the City Hall Park, while the New York terminus "has been and is still at or near the City Hall Square,"

and "any structure to be erected on the New York side shall be subject to the approval of the Mayor."

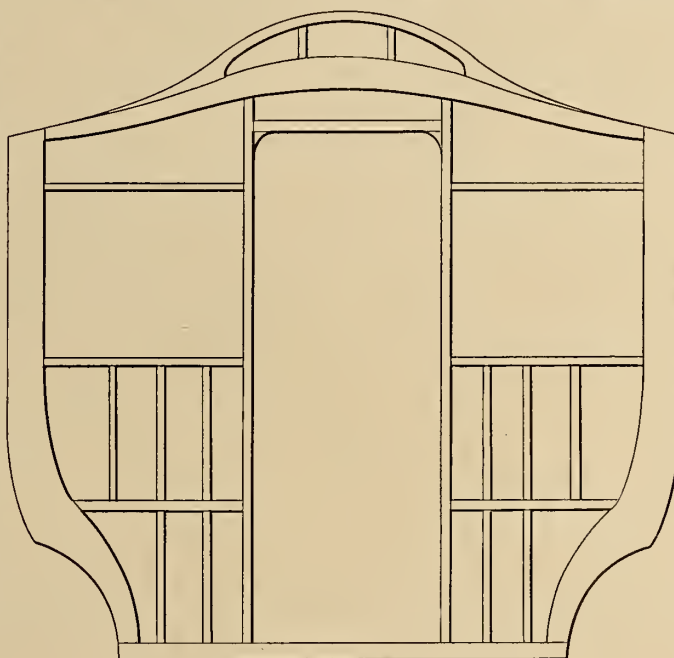
Personal.

JNO. F. COURTNEY, of the Railway Register M'fg. Co., will soon make a trip West.

S. A. GREEN, Superintendent of the Rochester City & Brighton R.R., has resigned, to take effect April 1st.

Comments.

— A street car conductor was punished in Baltimore, the other day, for starting his car too soon, and dragging a gentleman through the mud. My opinion is that a good many conductors ought to have some sort of a lesson on this point; but it is not often you find a person aggrieved who will so far forget his personal dignity as to be



willing to act as both jury and sheriff in such case.

— What is the matter with the riding of new car No. 33 of the Fulton Ave. Line, B. C. R.R. Co., Brooklyn? Passengers with false teeth keep their mouths firmly closed to prevent their being shaken out. Would suggest that Conductors be provided with ear trumpets to better understand the questions put to them by the passengers.

— Two portly, middle-aged ladies were compelled to stand, as I did, on a Sixth Avenue car the other day. As they stepped off at 42d Street, I heard one observe to the other,—"Faith, Mrs. Murphy, I find it a good deal aasier to get a seat in a shreet car, whin I put on me good clothes!"

— I don't object to Philadelphia street car conductors wearing ear muffs in cold weather, but I do object when they shut their eyes as well at their ears. I lost a train the other day through failure of a 20th Street Line conductor to look about

him at a street crossing. He had his ears muffled, and couldn't hear; and naturally the weather was pretty warm in my vicinity at that moment.

— There is a fool of a driver on the Race and Vine Street, Line, Phila., who insists on making all passengers, old and young, male and female, mount his car while it is in motion. Sometime he'll meet an artillery captain, or break some one's leg; and then the company will look into his record and discharge him.

N. B.—After paying damages to the "breakee." J. C.

Notes and Items.

CHICAGO CABLE ROADS.—For the first time, we believe, since the South Side (Chicago) Cable lines started up, there are reports of failure, on account of snow and ice during the recent cold snap. We can't see, however, that this is any argument against the cable, as horse car lines were stopped at the same time all over the United States.

CHICAGO.—A grip was broken on the Madison Street switch the other evening, and all switching from one track to the other, on both the State and Cottage Grove lines, was done with the assistance of horses.

IN BALTIMORE, the other day, Captain Ramsay, of the 2d U. S. Artillery, assaulted a Blue Line (Calvert Street) conductor for starting the car too soon, and dragging his official dignity through the mud. Undoubtedly the conductor deserved punishment for his carelessness, but we can't see how a slugging matinee of the kind described by the papers is going to restore the dignity of a U. S. Artillery captain, tarnished with civilian mud.

THE WINNIPEG, MANITOBA, Commercial says:—"It is reported that Stone-wall is about to have a street railway."

THE PLATE PORTRAIT of Mr. Wm. H. Hazzard, Prest. Brooklyn City Pass. Ry., and Prest. of the Nat. Assoc., published in the report of the late convention, is a good likeness, very appropriate, and well worthy of a frame for office adornment.

A STREET RAILWAY CAR CHAIR has been patented—No. 312,259—by B. F. Curtis, of Atlanta, Ga.

THE BROWNELL & WIGHT CAR Co., St. Louis, Mo. have in course of construction, equipment for two new street railroads to be built in St. Louis in the spring, one of them to be operated by cable. They have in addition a large amount of work for other cities; among these orders being one from Mexico. Their car for the New Orleans Exposition is ready for shipment, they having held it until the rush of freight was over, so as to avoid long exposure in freight yards. This car is intended for use in summer or winter and comprises

many novel points. It must certainly attract the attention of all street railroad men who see it, and receive the favorable opinion of those who are anxious to have comfortable cars in summer without being compelled to have a double equipment.

E. V. C.

M. A. CUTTER, of Galveston, Texas, has patented a street car—No. 312,556.

L. DAFT'S (Greenville, N. J.), latest patent on electric railways is numbered 213,557.

J. H. POLHEMUS, of Brooklyn, N. Y., is the inventor of a cable grip—No. 312,507.

MR. RANDALL, Master Mechanic of the Metropolitan R.R. of Boston, and inventor of the Randall gear, is building 20 open cars with all the latest improvements for that road.

C. L. VAN WORMER, President and General Manager of the Oriental Metal Manufacturing Co., 48 Congress Street, Boston, Mass., has lately received orders for over 200,000 lbs. of their metal, including one order of 5 tons in ingots for export. The wearing qualities of their Journal bearings are said to be remarkable. Mr. Richards, President of the Metropolitan R.R. after thoroughly testing it, uses nothing else for bearings, as may be said also of the Lynn & Boston, R.R. and others. E. O.

ST. LOUIS CABLE ROAD.—An exchange has the following: "The contracts for St. Louis Cable road have all been let, except that for the steel rails. The power station at Franklin & Channing Avenues is nearly completed. The New Albany Rail Mill Company, of New Albany, Ind., has the contract for the conduits. Each will be made of $\frac{1}{4}$ inch sheet iron, riveted every $4\frac{1}{2}$ feet to ribs or yokes made of 40 pound steel railroad iron. It will be made in sections of eighteen feet in length and placed in position, when it will be riveted together in one continuous piece. There will be two conduits, one for each track, making the entire distance covered six and two-fifths miles. These conduits will be surrounded with a layer of concrete not less than six inches thick. The twenty-four passenger and fifteen grip cars will be of the most approved pattern, and are to seat forty passengers each. The boilers will be three in number, 60 inches in diameter and 20 feet long, to furnish power for 250 horsepower engine. The Fulton Iron Works have the contract for the winding machinery, pulleys, drums, etc.; Philip F. Stifel for the granite and the paving between the rails, and John A. Roebing's Sons Company, of Trenton, N.J., the contract to furnish the 34,500 foot $1\frac{1}{4}$ inch cable.

STATEN ISLAND RAPID TRANSIT—Erastus Wiman, of the Staten Island Rapid Transit Company, has published the confession of a lobbyist who got through the New Jersey Legislature, in the closing hours of the last session, a resolution opposing the bill he has in Congress to authorize the bridging of Staten Island Sound at Elizabeth and Perth Amboy. The story is one of the most ridiculous descriptions of a ridiculous scene which I have ever read. The

only "influence" which the lobbyists says he employed was the embodying in the preamble to the resolution the one fact that Mr. Wiman is a British subject and the falsehoods that the Staten Island Rapid Transit Company is domiciled in London and composed of English capitalists. The Irish members put the resolution through with a yell.—*Daily Paper*.

THE CREAM CITY (Milwaukee) Railway Company's cars are all heated during the winter.

"DEMOCRAT CATCHER."—Mr. McDevitt, Master Car Builder of the North Chicago Railway Co., has invented a device which he facetiously terms a "Democrat Catcher," and which has been applied to all cars belonging to that company. It consists of a piece of strong pipe some two inches in diameter, and stretches from step to step on each end of the car in semi-circular form, and covering the lower end of the brake-staff. The object is to prevent the cutting of the horse's flanks either by step or brake-staff, should the horse fall and the car run up on it. Since it has been adopted on this line not one horse has been cut by the car in cases where a fall occurred.

ELEVATED RAILWAY SCHEMES in Chicago and Philadelphia seem fated not to be. The Philadelphia councils have invariably refused to sanction the various propositions looking to quicker transit by this means; while the Chicago papers are inclined to think the State Street projects will fall through on account of an Illinois law (Rev. Statutes, Chap. 47, Sec. 1), which provides that "Private property shall not be taken or damaged for public use without just compensation, and that in all cases in which compensation is not made by the State in its corporate capacity such compensation shall be ascertained by a jury." This will give enterprising property owners a chance to find sudden bonanzas in their holdings, which will, it is thought, be beyond the reach of the available capital.

MESSRS. M. C. MOSEMAN & BROS. catalogue cost them over \$5,000. There's enterprise, and "there's wisdom for you," too, as Capt. Cuttle would rise to remark, for it has *paid*. They carry a full line of horse furniture, and number among their numerous street railway customers Sharp's crosstown roads, the 42d and Boulevard road, Broadway and 7th Avenue, Fourth Avenue, Broadway road of Brooklyn, and others out of town. G.

THE SAGINAW STREET RAILWAY LINE is thus complimented by the Saginaw (Mich.) *Daily Times*: * * * * Our citizens have no complaints to make. There has hardly been a single hour's delay during the whole winter from the great snow fall. The tracks are kept in perfect readiness and repair. The system of heating adopted by our street cars is all that can be desired and calls forth the admiration of every patron. No smoke, dust, gas, or anything unpleasant, and the car is as cosy, warm and comfortable as a parlor. If some of the managers of street railway lines in other cities would visit this city they could learn how to equip a road that would give entire

satisfaction to the public. If there is a better equipped or managed street railroad line in America than can be found in this city we would be pleased to know of it."

JOSEPHINE D. SMITH, 352 Pearl Street, New York, has got out a new extension chimney for street car centre lamps, so arranged as to fit different sizes of globes.

ANDREWS & CLOONEY, New York, report an increasing business, especially in their wheel department. Their spring business is also good. They have just completed a job of turntable work for export.

THE NEW KANSAS CITY RAILWAY will not be ready to start on the first of March as expected.

IN THE SUIT of the Railway Register M'fg. Co. against the Belt Line and the Broadway and Seventh Avenue roads, for using the "Standard" register, Judge Wheeler's decision in favor of the Railway Register M'fg. Co. covered all the points claimed by them. An appeal has been argued for a rehearing. Decision will soon be given.

ANDREWS & CLOONEY have just made for the Kansas City Cable road, and are now making for the 10th Avenue (N. Y.), Cable road, a number of springs to be so applied as to relieve the cable of sudden strain. They are graduated in such a manner as to indicate at any time the amount of resistance of the car. Why would it not be a good plan to attach to such a graduated spring a pencil to mark on a ribbon of paper to move by clockwork in such a way as to indicate the exact amount of load at any part of the trip, and the average amount of power required to haul the car or train?

THE WESTCHESTER COUNTY RAILROAD Co.—W. C. Hurd, President, Yonkers, N. Y., having obtained the consent in writing of a majority of the property owners along the proposed line, to build a road, has formally asked the Common Council for its decision.

A CAR DRIVERS' STRIKE is talked of in New York for April 1st. It's well that the would-be strikers have given themselves plenty of time to think about such a strike, for the more it is thought about the less likely it is to occur.

A BILL HAS BEEN INTRODUCED into the New York Legislature to reduce the fare to three cents on all street railroads in the State which pay 20 per cent. on their cost. Certainly; but, by the by, will the legislature also make the fare seven cents on roads paying little or no dividends?

ASSEMBLYMAN EARLE, of New York State, has a bill to limit a day's work for conductors and drivers to twelve hours. Isn't it a little hard on an industrious man to say how many hours of his own time out of the twenty-four he may sell to his employer?

A CABLE ROAD has been patented by Mr. Francis de Vooght, of Antwerp, Belgium. The invention covers means for retaining the cars on the rails on curves, and for holding them down to prevent overturning on steep; means for conducting a cable

through a shield over or under ground, and for obviating friction; hooks of peculiar form for attaching and detaching cars; means for obviating opening and closing the shield to permit the car attachment to communicate with and be carried by the cable; means for crossing transverse cables and for adapting the same car to run either way on the same track, with provision for automatically disconnecting the hook from the cable and notifying the car driver thereof, at crossings, and other novel features in cable motive practice.

RECENT PATENTS.—The following list of patents relating to the street railway interests, granted by the U. S. Patent Office during the month of February, 1885, is specially reported for these columns by Franklin H. Hough, Solicitor of American and Foreign Patents, 925 F Street, N.W., Washington, D.C.:

311,537—Cable and Car, traction—J. H. Smith, Newark, Ohio.

311,627—Car-starter — A. R. Whitmer, Safe Harbor, Pa.

312,273—Cable Tramway—C. M. Huson, South Pueblo, Colo.

312,507—Cable Grip—J. H. Polhemus, Brooklyn, N. Y.

312,556—Car, street—M. A. Cutter, Galveston, Tex.

312,258—Railway Chair, street—B. F. Curtis, Atlanta, Ga.

312,711—Cars, Grip Attachment for Cable—J. J. Endres, Hoboken, N. J.

THE PRODUCTION OF BESSEMER steel rails in the United Kingdom in 1884 was 784,968 tons, against 1,097,174 in 1882. There has therefore been a diminished make of 312,206 tons in 1884.

NEW TRAMWAY FOR TOURS (France).—The President of the French Republic has signed a decree, permitting the building of an extension of the Tours street railways from the barriers of Vouvray to the *depôt* of Saint-Symphorien. The necessary arrangements for the execution of the work must be completed within a year from date (Jan. 25th, 1885).

THE FRENCH TRAMWAYS COMPANY of the Department of the North, has rented

of the city corporation, under certain limitations, all the street railways of Lille; lease to terminate in 1918.

THE CONTRACT for the girder rails for the Melbourne tramcars has been placed, we understand, in the hands of Messrs. Dick, Kerr and Co., of London, this being the second contract that has been placed in connection with these tramways, the present one amounting to about 9,000 tons. The same firm have also just shipped the whole of the ironwork for the Brisbane tramways.

ELECTRIC TRAMWAY.—The Blackpool (England) Town Council General Committee has resolved to employ electric power for the new tramways to be there laid.

EVERY TRAVELER IN FRANCE will welcome a long expected railway reform effected by the Minister of Public Works. A circular has been sent to the boards of all the railway companies, requesting them to arrange by the 1st of April that free access shall be given to the platform and trains to all passengers provided with tickets. The misery of prolonged incarceration in *salles d'attente* will, therefore, soon become a thing of the past.

THE COVERT MFG. Co., of West Troy, N. Y., has added to its business the manufacture of chains of all sizes and styles.

Twice a Month.

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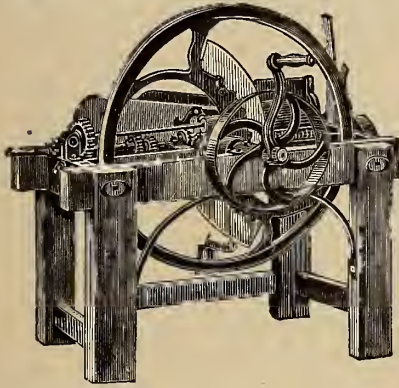
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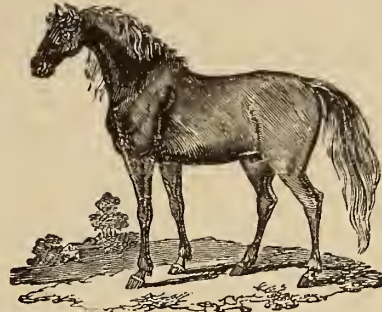
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DECATUR, ILL., Oct. 2, 1884.
 MESSRS. JONES & ROACH, Chicago, Ill.
 I have used your Colic Cure for my horses and mules on my street car lines and found it the best and surest medicine I have ever used. I have not lost a horse since I commenced its use. It gives relief in a short time after it is taken. I can cheerfully recommend it as a sure relief if given in time. I keep it constantly on hand.
 Truly yours,
 FRANKLIN PRIEST,
 President Decatur Street R. R.

MESSRS. JONES & ROACH:
 Gentlemen: I cheerfully recommend your European Colic Cure for horses as being the best that I have ever used. When once introduced no horse owner can well afford to be with-

out it. I hope you will meet with the success your cure deserves.
 Truly yours,
 VALENTINE BLATZ,
 Per H. Lieb, Manager.

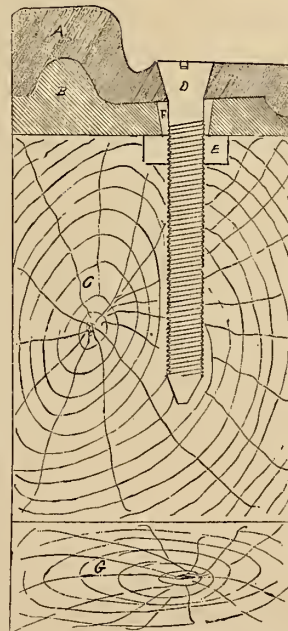
OFFICE OF NORTH HUDSON COUNTY RAILWAY Co.
 HOBOKEN, N. J., Oct. 4, 1884.
 Gentlemen: It gives me pleasure to say that I can heartily recommend your European Colic Cure to all horse owners, from a personal knowledge of its curative qualities. I have used it in our stables, containing about six hundred horses, and have always found it to be beneficial. Yours very truly,
 ALBERT SAILLET,
 Foreman and Veterinary Surgeon for the North Hudson County Ry. Co.

Sample Bottles Furnished Street Railway Companies Gratis.

For further information, prices, etc., address

JONES & ROACH, 259 Fremont Street, Chicago.

WRIGHT'S PATENT JOINT FASTENING.

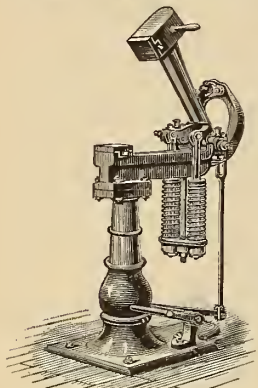


The accompanying cut shows a cross section through joint. A is the rail, B the joint chair, C the stringer, D the patent screw fastening, E the nut, F a slot in chair allowing rails to contract and expand. The chair cannot settle and the rail ends are held level with each other, preventing the many evils of ordinary construction.

For Further Particulars Address

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THE STANDISH FOOT-POWER HAMMER



Is specially adapted to making light forgings, for welding in dies having impressions cut to the shape of the work required. They are superior to power hammers, as the hammer is under as perfect control as the Smith's hand hammer, and are used in the carriage business for welding Dashes, Shifting Rails, Top Props, shaping and forming ALL SMALL WORK equal to drop forging, and are in use by the principal manufacturers of the United States. Send for circulars. Address.

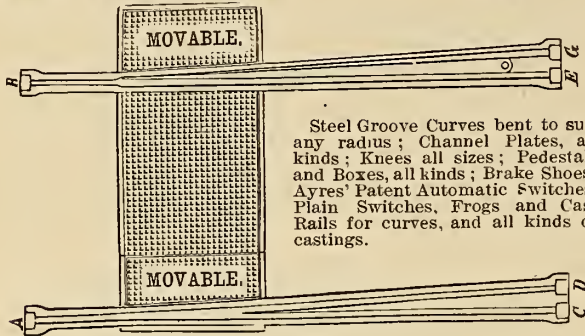
The Capital City Machine Works,
COLUMBUS, O.

Patented July 10, 1883.

A. AYRES, Manufacturer and Patentee.

Send me full size section of rails to be used at points A, B, C, D, E, G.

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Steel Groove Curves bent to suit any radius; Channel Plates, all kinds; Knees all sizes; Pedestals and Boxes, all kinds; Brake Shoes; Ayres' Patent Automatic Switches, Plain Switches, Frogs and Cast Rails for curves, and all kinds of castings.

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CABLE ROADS.

Warranted to Run Cool, without Oil,
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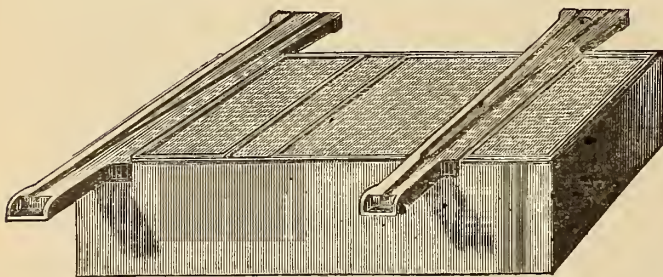
62 & 64 W. Monroe St., CHICAGO.

PLUMBAGO BEARINGS.

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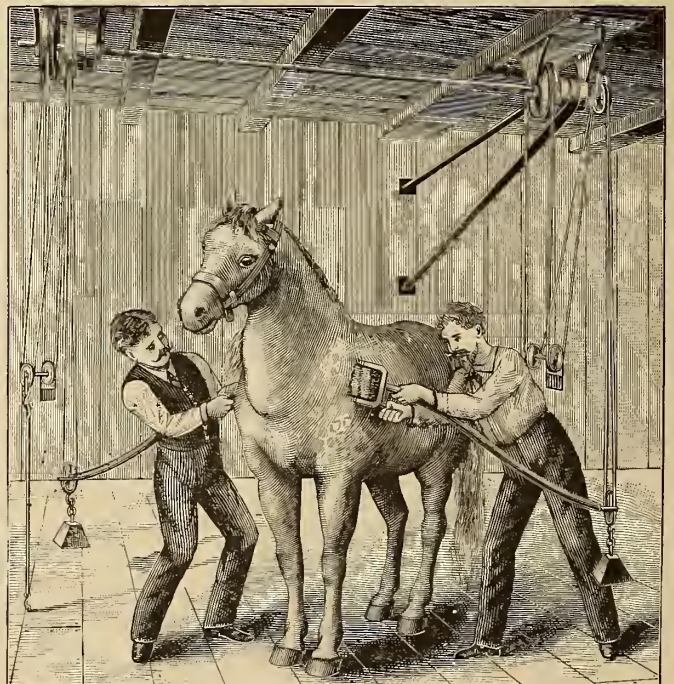


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Patent Automatic Switch

FOR STREET RAILROADS.

Pennington's Grooming Machine.



The brush is caused to revolve by gear wheels actuated by a flexible shaft. Both hands free to handle brush. Swings and turns in any direction. Direction of motion quickly changed. The cheapest and best Grooming Machine yet invented. Motion supplied by hand, steam or animal power. Rights to use or manufacture. For full particulars and rates apply to

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LAKE & McDEVITT'S Patent ROPE TRACE

For Horse Railways, Omnibus Lines, Etc.

The Advantages

OF THE

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are its ready application to Horse-Car service, or to any other purpose where cheap harness is required. It only costs about half as much as leather traces, while at the same time one set of Rope Trugs will (when used on horse cars) take the place of three or more sets of leather traces, as the Tugs remain attached to the car all day, no matter how many changes of stock are made. The relief horses having hooks attached to their hames, all that is necessary is to unhook the tugs from the working team back in the fresh horses, hook on the tugs, and the change is made. Railroad men will at once perceive their adaptability and economy from the above facts. They will also last longer than leather traces, and require but very little care. From their durability and cheapness they are also especially adapted for all kinds of farm use and heavy teaming, as farmers, etc., can easily repair them.

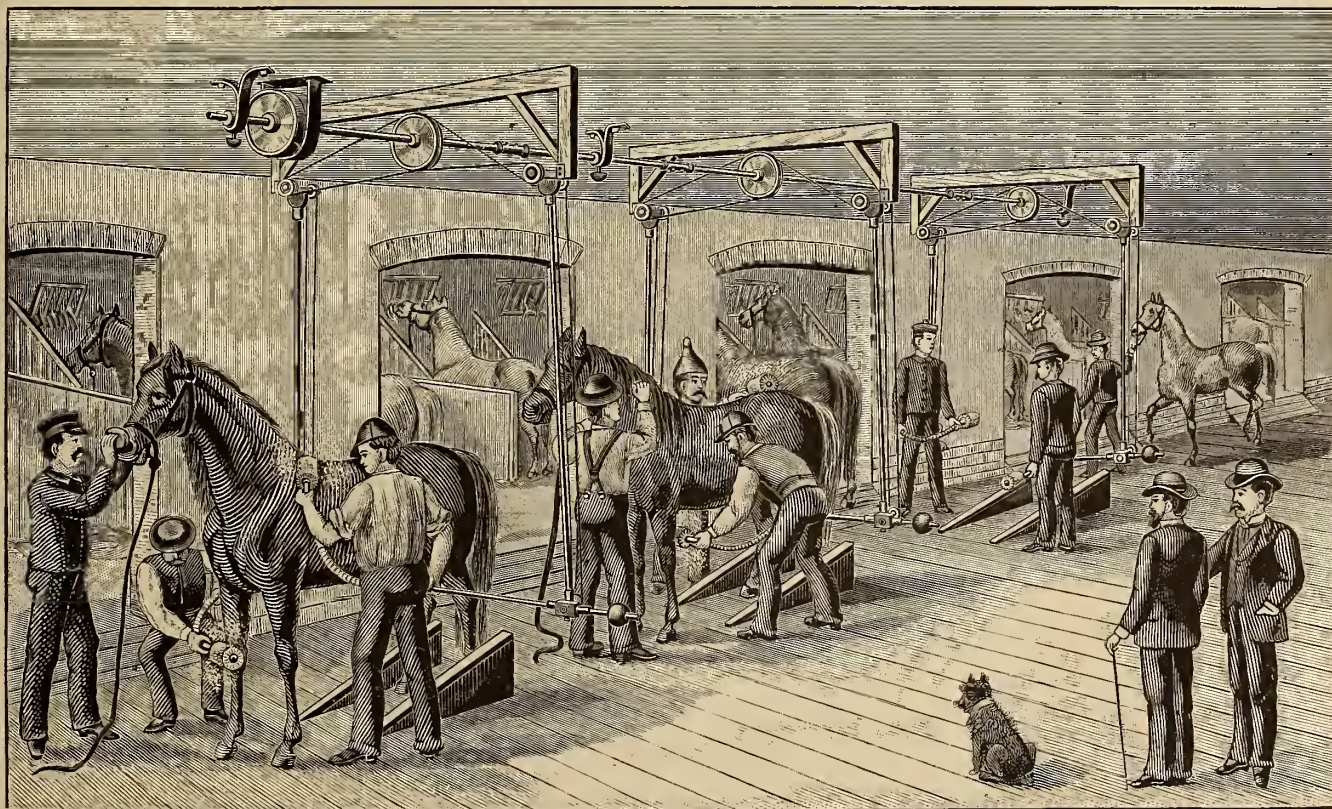


Patent No. 171,232, December 21, 1875.

In use on the Chicago West. Div. R'y.; Louisville City R'y Co.; Milwaukee City R'y; Transverse R'y Co., Pittsburg, Pa.; Citizens Street R'y Co., Pittsburg, Pa.; Pittsburg and Birmingham, Pittsburg, Pa.; Central City R'y, Peoria, Ill.; Grand Rapids R'y; Minneapolis St. R'y Co.; St. Paul City R'y; Houston City R'y, Texas; Superior Street R'y, Cleveland, O.; Cincinnati City R'y Co.; Fifth Ward Street R'y, Syracuse.; Detroit City R'y.; Ft. Wayne and Elmwood St. R'y, Detroit, Mich.; Galveston City R'y; Springfield City R'y, Springfield, Ill.; Toledo St. R'y, Toledo, O.; Adams St. R'y, Toledo, O.; Atlanta Street R'y, and others, in all on about 100 Street R'ys in United States and Canada, and a large number of other prominent Street R'y Companies throughout the Country. Send for descriptive Circular containing testimonials, prices, etc., to

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Patented December 15th, 1874.

Patented January 9th, 1883.

TO STREET RAILWAY COMPANIES AND OTHER STOCK OWNERS.

This machine for grooming may be driven by any known power, and can readily be placed for use in any stable or out-building. It can be operated by an ordinary groomer; its work is perfect; its action simple and effective. Stock owners will readily realize the importance of the machine. The perfection and rapidity of its work, and the benefits derived by its use, commend it to those interested in the care and use of all classes of thoroughbred and work stock. The most vicious animal readily submits to its use. Machine Grooming is found to be less expensive than hand grooming, saving in food and medicines, and materially increasing the value of the animal.

The Curry Comb and Hand Process Superseded! Economy of Labor! Perfection of Work!

Three Hundred Head of Stock Thoroughly Groomed with Each Machine every Ten Hours.

This Grooming Machine is in daily use in some of the largest Street Railway Companies' stables, and has always given perfect satisfaction. Among those using it are the City R'y Co., Chicago, Ill.; Detroit City R'y Co., Detroit, Mich.; Central City R'y, Peoria, Ill.; M. W. Dunham, Wayne, Ill.; West Division Street R'y Co., Chicago, Ill.; Lindell Street R'y Co., St. Louis, Mo.; Pleasant Valley R'y Co., Allegheny City, Pa.; Marshall, Field & Co., Chicago, Ill.; Leroy Payn, Chicago, Ill.; Saginaw City R'y, Saginaw, Mich.; Pittsburg and Birmingham R'y Co., Pittsburg, Pa.; and a number of others who have given testimonials as to the perfect working of the machine. For prices, circular and other information apply to

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DAN'L F. LEWIS,
Treasurer.

THE

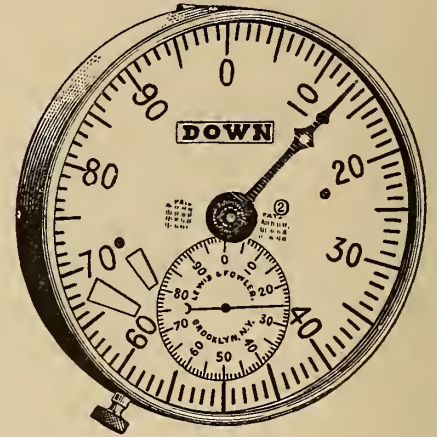
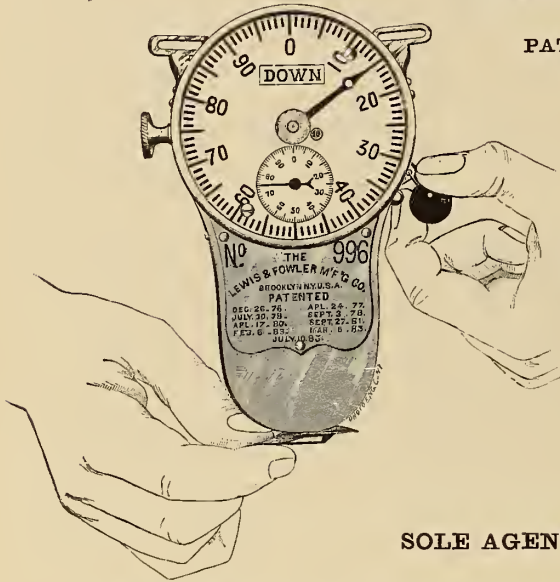
LEWIS & FOWLER M'F'G CO.

BROOKLYN, N. Y.

PATENTEES AND MANUFACTURERS OF

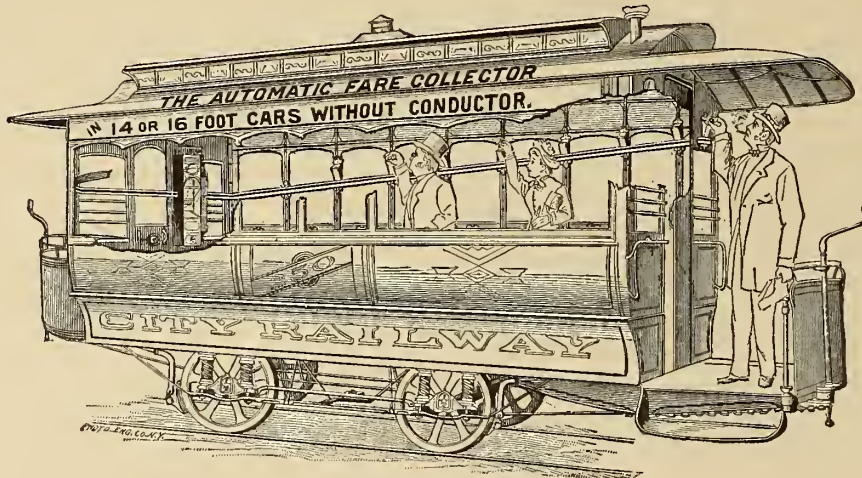
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"ALARM"
Passenger Register,
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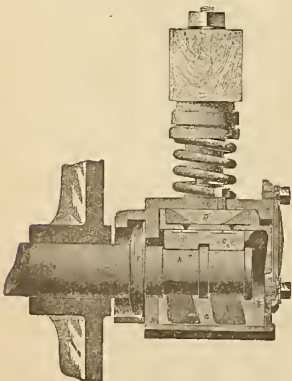
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CARS.

ALSO

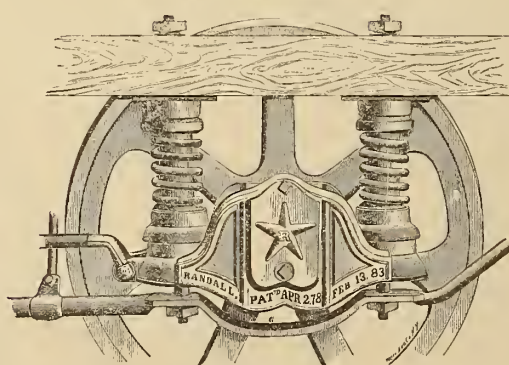
"RANDALL'S" PATENT CAR AXLE AND BOX.

Sectional View.



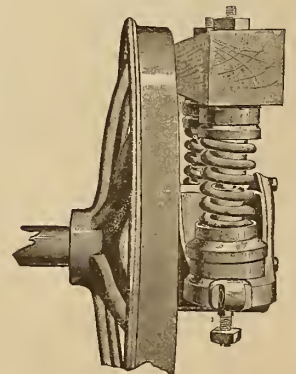
DUST TIGHT.

Front View.



ANTI-FRICTION.

End View.



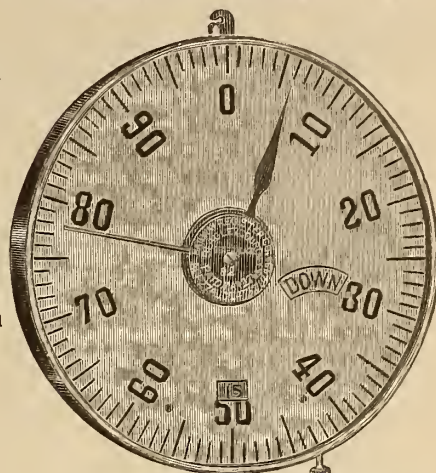
RAILWAY REGISTER MANUF'G CO. BUFFALO, N. Y.

THE MONITOR REGISTER.

MANUFACTURERS AND OWNERS OF THE

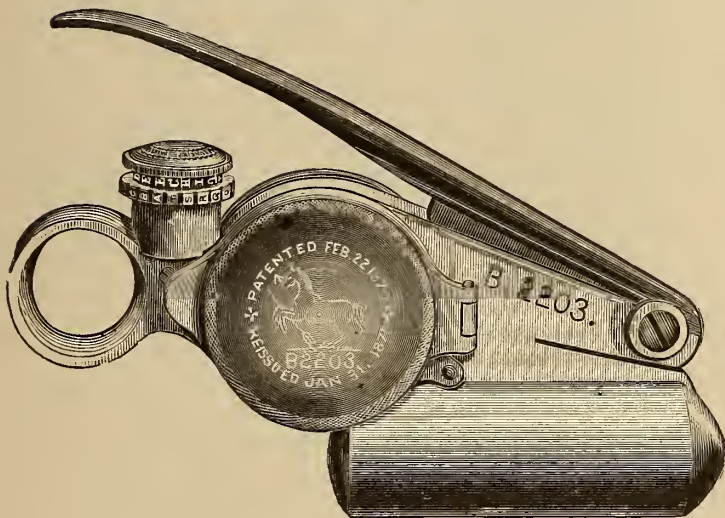
Latest Designs, Improvements and Inven-
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Railroads.

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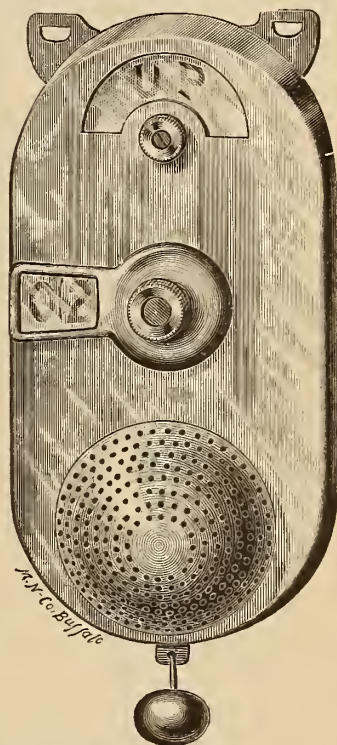
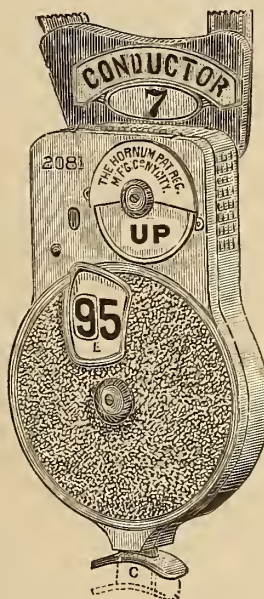


CHESTERMAN REGISTER.

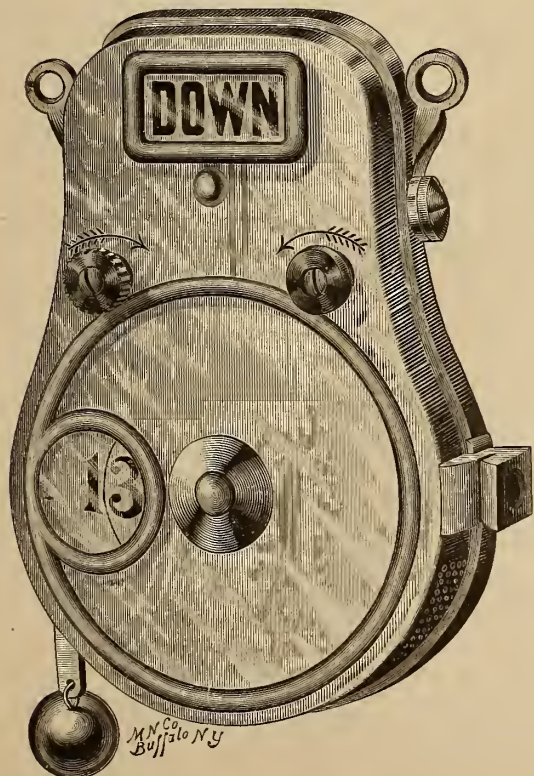
THE ALARM REGISTERING PUNCH.



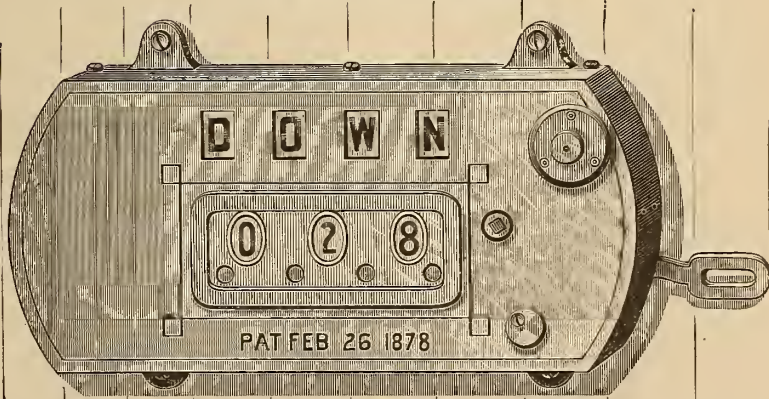
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Fare Boxes and Change Receptacles

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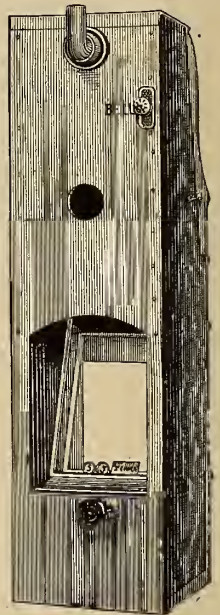
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Our Street Car
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Front View. No. 3.



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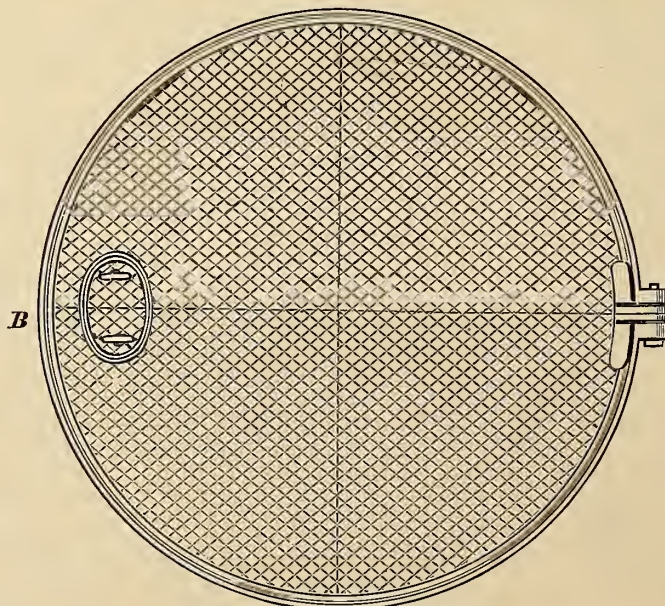
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SWEEPERS,

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ADAPTED TO THE
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ALL OTHER BOXES.



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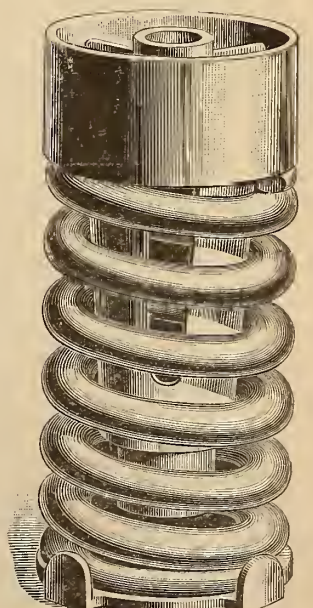
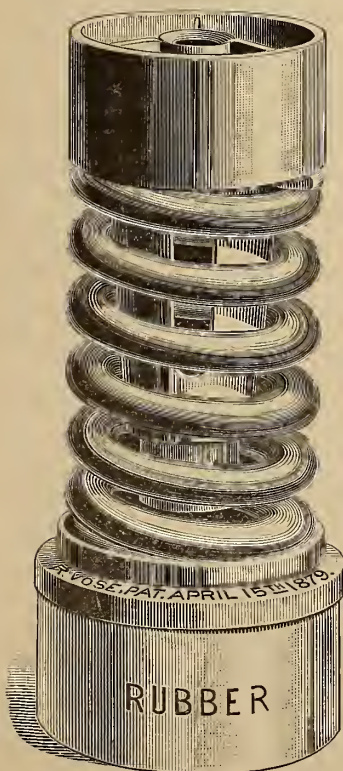
STEEL CONE CITY CAR SPRING.

Patented April 15, 1879—August 5, 1884.

The unprecedented popularity of the

"VOSE [GRADUATED RUBBER CONE SPRING]"

for HORSE CARS has induced the inventor to bring this class of Springs as near perfection as possible, and after a series of experiments and tests now presents for favor what he claims to be the *MOST PERFECT SPRING FOR HORSE CARS* ever offered. It is exceptionally *SOFT AND EASY* with the *EMPTY CAR* or with the *GREATEST LOAD*. It is believed to be the *MOST DURABLE*, being constructed upon a principle that seems to insure that the Spring must *ACTUALLY WEAR OUT*. The very *Finest Quality of Crucible Cast Steel* will always be used in these Springs.

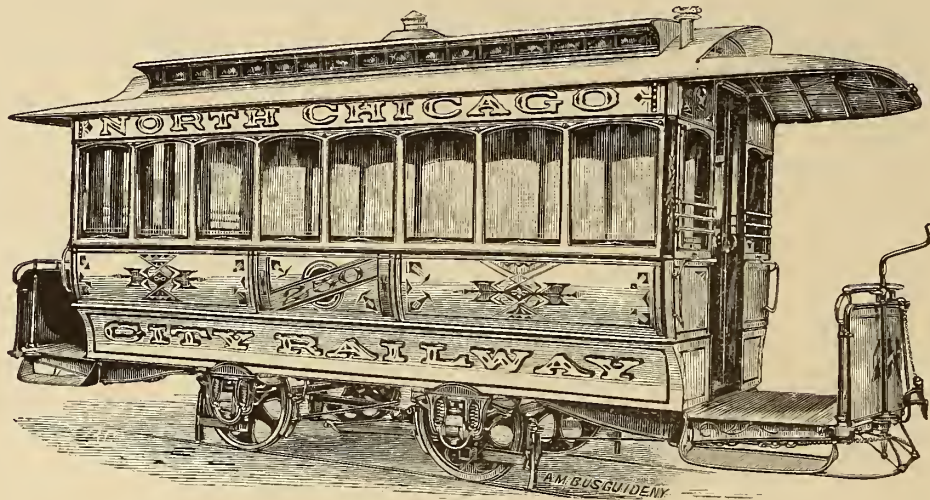


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TRAMWAY CARS



LIGHT, ELEGANT, DURABLE.

Every Description.

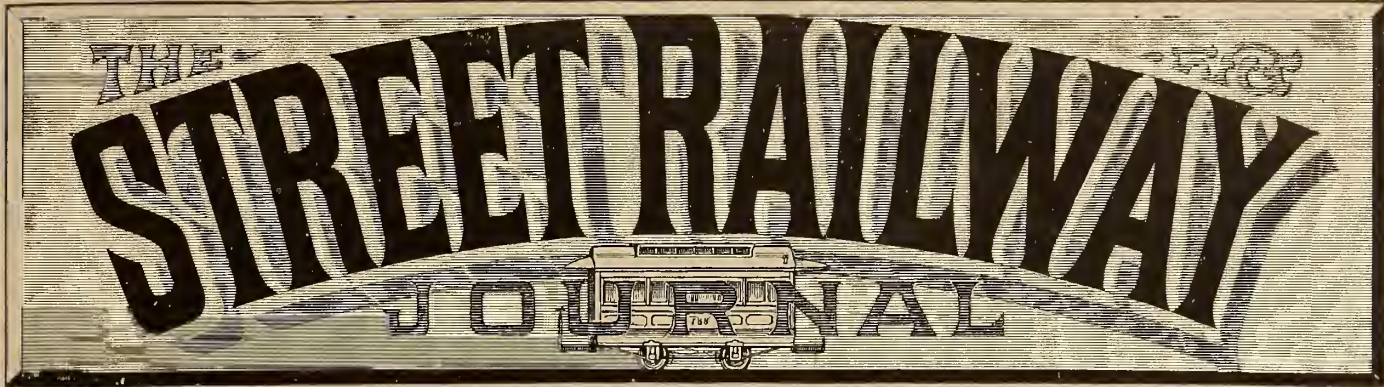
Best Materials.

Minimum Prices.

ORDERS QUICKLY FILLED. CAREFUL ATTENTION TO SHIPMENTS.

All Climates Suited.

OCT 2 1885
U. S. PAT. OFF.



VOL. I. { NEW YORK: 32 Liberty Street. } APRIL 1885. { CHICAGO: 8 Lakeside Building. } No. 6.

Demorest's Duplex Fare Register.

The cut shows the style of conductor's daily register report, made internally and automatically by the Duplex fare register,* showing each half trip during the day.

This sheet or dial is turned in at the Receiver's office at the end of the day, to correct any errors made by the conductor in his daily report. It must tally exactly in every particular, in order to relieve him from all responsibility, thus making the conductor his own detective.

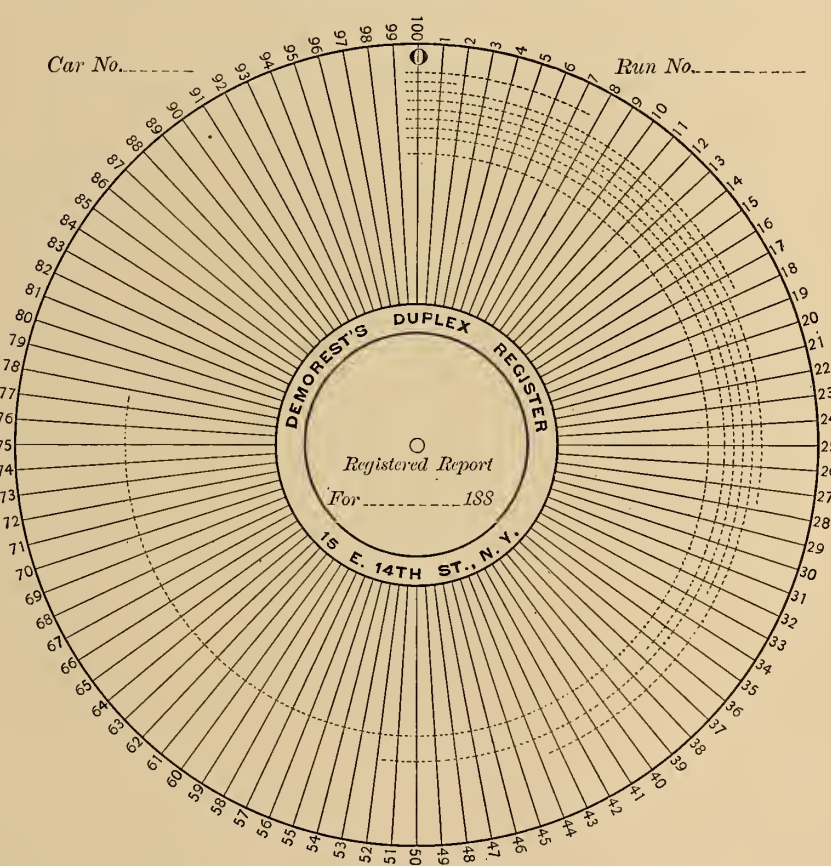
It will also be observed, that as the register is being used by the conductors, they are required to sign their names, time used, and the number of passengers the hand indicates on its face, which identifies each man. This is claimed to avoid the necessity of employing men to keep the records, as is the case with the use of other registers. The conductor in resetting

this register each half trip, must put the number (indicated on its face by the "index hand") in the place provided on this sheet, which is "duplexed" upon the paper dial.

Referring to the copy of a supposed page register, and to the dial register, our read-

ers will find reported 7 fares short of what the index hand indicates; and we would like to have them determine which conductor did it, and on what trip it was done. To enable them to count or check the Duplexed Record (made mechanically), and the conductor's figures taken from the index

hand, we give the following instructions: Take the first figure made by the conductor, which is 7, then compare it with the radial line which has figure 7 on the outside of the "dial circle;" and if the perforated dots cross the line and do not cross line No. 8 the tally is correct, and so on, until all the trips have been checked. If found incorrect, the conductor is charged with the difference between what he reports and where the perforations stop. By this system the maker claims that you can positively check the man who handles your money, without the assistance of any one else, thereby saving money, and rendering collusion and fraud impossible.



* W. Jennings Demorest, 15 East 14th St., N. Y. C.

EACH CONDUCTOR MUST SIGN HIS NAME OR NUMBER BEFORE USING THE REGISTER.

Trips.					Trips.					Trips.				
Time used.		Number of conductor.	Total pass.		Time used.		Number of conductor.	Total pass.		Time used.		Number of conductor.	Total pass.	
A	M				A	M				A	M			
E.	5.30	Haines,	7	E.	9.30	Adams,	70	E.			M			
W.	6.00				1			W.				W.		M
E.	6.30	Page,	17	E.		M		E.			M			
W.	7.00				27			W.		M			W.		M
E.	7.30	Riley,	43	E.		M		E.			M			
W.	8.00				32			W.		M			W.	
E.	8.30	Jones,	51	E.		M		E.			M			
W.	9.00				36			W.		M			W.	



American Street Railway Association.

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President.—Calvin A. Richards, President Metropolitan Railroad Co., Boston, Mass.

First Vice-president.—Julius S. Walsh, President Citizens' Railway Co., St. Louis, Mo.

Second Vice-president.—Henry M. Watson, President the Buffalo Street Railway Co., Buffalo, N. Y.

Third Vice-president.—Edward Lusher, Secretary and Treasurer the Montreal City Passenger Railway Co., Montreal, Canada.

Secretary and Treasurer.—William J. Richardson, Secretary the Atlantic Avenue Railway Co., Brooklyn, N. Y.

Executive Committee.—President, Vice-presidents and William H. Hazzard, President Brooklyn City Railroad Co., Brooklyn, N. Y.; James K. Lake, Superintendent Chicago West-Division Railway, Chicago, Ill.; Charles J. Harrah, President the People's Passenger Railway Co., Philadelphia, Pa.; William White, President Dry Dock, East B. & B. R. R. Co., New York, N. Y.; B. Du Pont, President Central Passenger Railroad Co., Louisville, Ky.

Report of the Convention.—Continued.

STABLES AND HORSES.

Continuing our report of the discussion at the Annual Convention from page 92 of our March issue :

Mr. Patrick : What is the rule among the gentlemen here present, with reference to the number of miles traveled per day, and what is the percentage of longevity on the greatest distance traveled ; meaning : First, longevity of horses on a line of any given distance ? Second, the greatest number of miles made by the horses of any street line represented here, in a day ?

Mr. Clark, of Cincinnati, replied : We have eleven different lines. In one case four teams make seventy-five miles ; four make sixty-seven ; four, sixty-seven ; four, sixty-four ; four, sixty-seven ; four, sixty-seven ; four, sixty-four ; four, sixty-nine ; four, seventy ; four, sixty-eight, and four make seventy-five miles. This represents about eighteen hundred horses. We cannot notice any difference in their length of life. This depends a great deal with the sort of street they travel over. We have boulder, or cobblestones, Macadam and Nicholson pavements. We find those that travel over boulder are longer lived, and in a better condition every way. We use, in nearly all our stables, a clay floor. A rather curious fact with regard to this matter was noticed the last time the epizooty was in Cincinnati. One of our stables represents about six hundred horses. The stable is divided into two parts, with a street about the width of this room between them. The stable with the wooden floor was decidedly affected. The other one was clay, and in this stable there was not a case of epizooty, while in the other there were numerous cases. The horses, as soon as they come in, are taken immediately to the watering-trough, then to the stalls and cleaned off.

Mr. Parsons, of Philadelphia, said : I would like to inquire of the gentleman whether the averages he gave were the stable averages of the horses ?

Mr. Clark replied : No, sir ; the working

averages. Seventy-five is the largest, and sixty-four the smallest.

Mr. Thurston said : It is a very important question in regard to the mileage of the horses, to know whether they are used only six or seven days in the week. In New York City and vicinity, they use them seven. In many cities they use them only six. Our experience is that fourteen miles per day is sufficient for a horse used seven days a week.

Mr. Clark said : The largest business done in the week is done on Sunday ; probably one-third larger than on a week day.

Mr. White said : I would like to ask the gentleman from Montreal a question. He states that the percentage of deaths is two and one-half. I would like to know what his renewal is year by year. That would bring it in better relation with the Committee's report.

Mr. Lusher replied : Out of four hundred, we can get along with a renewal every year of fifty.

Mr. White rejoined : That puts it alongside of our own experience. In New York and Brooklyn, there are a number of roads that run from sixteen to twenty per cent., which would make his renewal fall below and above that average. The average life of a horse in New York and Brooklyn would not come up to the Montreal statement, although there they have much harder roads to work on. The hills and pavement they travel over are abominable.

Mr. Lusher said : When you say twenty per cent., that is one-fifth ; the renewal is twenty-five per cent. We have, however, the advantage in climate.

Mr. White said : The question of veterinary attendance has nothing to do with renewal. We have about one thousand one hundred and fifty horses, and have no veterinary. Once in a while we get a case in which we are a little puzzled. We send for a doctor. After we get the benefit of his advice, we are prepared for a recurrence. Mr. Patrick misunderstood one item ; the grade of the stalls. It called for slats laid upon the floor at an inclination of one and one-half inches. The common experience is to take nine feet for length of stall, and four feet three inches for width ; cutting slats to a feather edge, to bring the heel three inches higher than the shoulder, thereby indicating that the grade for the urine of the horse would bring the stall level, and carry the heels to the same level as the forepart. We have an excellent plan for chaining, which prevents the horse from burrowing into the gutter. We would not be able to maintain a wooden gutter for any length of time, unless the horse was kept on a level. The strip will last six times as long with the three inches at the heel, while the feather edge under the forefeet scarcely shows any service. Our floors are laid with one inch and a quarter cement. We put the floor down on that with about three courses of tarred paper, laid in asphalt. On this we lay and secure the stringers to which we nail the upper floor ; the joints at the gutters and where the urine is likely to go, are all calked, and then we run in hot tar. That makes a perfectly water tight floor, and a comparatively sweet stable. As to the

odor of ammonia, there is nothing better as a disinfectant than common plaster, and it should be used frequently in warm weather. The hostler and stable foreman should make it their duty to use it freely. It is neither costly nor offensive ; is even more desirable than lime, as it is more readily used. It goes towards disinfecting the manure, when it gets into the pit. When the manure is thrown out, it is sweetened by the the plaster. * * I think our horses on our four lines average about fifteen miles of service a day.

Mr. Patrick inquired : At about what rate of speed do they travel ?

Mr. White replied : They travel about six miles an hour. We endeavor to give one day's rest out of seven ; we may not accomplish it exactly, but we endeavor to keep enough extra stock to be able to do it.

Mr. Parsons said : I must confess that I have heard a great deal of news in the last hour. One of the most astounding things is that of giving an unlimited quantity of water. We have had a great many horses foundered by giving water when hot. Another astounding thing to me has been this—the small number of miles run. We do not think we are getting any work if we do not get nineteen to twenty-one miles a day. We do not think that our stable average should be less than fourteen or fifteen miles ; the entire number of miles run—the entire work done by all. We do not want to get lower than fourteen and one-half or fifteen miles a day. We get an average of four years out of our horses. We make a time-table, absolutely running five miles an hour, including stops. We did drop this to $5\frac{2}{10}$; but we found that the traffic was so great that, in turning in and out, we were really going between seven and eight. The stopping for and picking up passengers, and the stoppage by reason of wagons being in front of them, made it very rapid driving. In all the longevity mentioned, nothing has been said about percentage of extra horses to number employed, nor in regard to percentage of lame horses unfit for work. Eight years is exceedingly long, unless you have a large percentage of extra horses. Ours that do nineteen miles a day keep in good condition ; do their work comfortably and conveniently. The loss, out of three hundred and fifty, runs from twenty-five to thirty per cent. When twelve years old, they are unfit for work. The percentage of losses in our stables does not run over five per cent., including deaths from accident or the effects of the sun. In deaths for the year just closed, out of fifteen lost, four are directly attributable to accident ; coming in contact with a wagon, or being run into by a fire engine. I should certainly like to know in what this longevity consists ; what their percentage of extra horses is in proportion to the number of horses worked, and what is the percentage of horses unfit for work.

Mr. Thurston said : I would like to ask the gentleman who has just sat down, first, the character of his road, that is, the style of pavement ; second, the maximum number they carry at a time on a car ; third, the maximum grades ?

Mr. Parsons replied : Our pavement is the ordinary common cobblestones ; grade

comparatively level, and with but slight indentations in the street. So far as the number of passengers goes, taking an average trip, it is difficult to state. It may be said to range from fifteen to ninety. Of the lires of our Company, one is comparatively level. But three have grades, the maximum being seven to nine in a thousand. One has a grade of about six in a thousand.

Mr. Robillard said: Our average laid up is one per cent., including the extra horses.

Mr. Parsons inquired: How many horses do you allow to a car?

Mr. Robillard replied: Some cars have twelve; some ten; some eight. The average number of miles traveled is fourteen. They last fully eight years. A gentleman said awhile ago that he was surprised to hear a great many things. I have been a good deal taken by surprise to hear that horses are not played out doing twenty-one miles a day.

Mr. Parsons remarked: I think the general service is about twenty.

Mr. Wright said: We figured that our per cent. is twenty; on Nicholson pavement twenty-five. On cobble-stones, at twenty. We have about twelve horses to a car, and they drive from fourteen to sixteen miles. Stable average a little less than twelve miles.

Mr. Thurston said: I am now taking out about two miles of Belgian pavement and putting in small cobbles; I think they are the best for the horses.

The Secretary said: I want to call attention to one item touched upon by Mr. White; his arrangement for resting his horses one day in seven. Some two years ago it was seemingly necessary to start building a road in Brooklyn on Sunday [laughter], and to which considerable antagonism was manifested. This developed much discussion and information, statistical and otherwise, in reference to Sunday horse-car running. I do not know but the very nature of our business, deadens our consciences somewhat, and makes it seem to us that our horses should be run seven days in the week year in and year out. I have this to say, however, that I believe from what I have learned on this subject from those who have tried resting their horses one day in the week—not always giving to all of them Sunday, of course, but arranging that out of the seven days, the horse will have one day of complete rest—that the life of the horse will be increased over and above, in actual profit to the Company, from the loss of his services for one day in seven, something like fifteen per cent. Now, if that be a fact—and it is certainly well worth verifying—our horses should all have accorded to them one day's rest in the week.

Mr. Parsons said: I would like to know what percentage the sales of the blind, lame and decrepit horses bear to their purchase money?

The President replied: That depends very largely upon the Company; whether they work their horses to death, or sell them when they can do a day's work.

Mr. Thurston further replied: Our death rate is about fourteen and one-half, our

selling rate about ten, and our purchase rate about twenty.

Mr. Richards said: With what little strength I have left after sitting in this den, I desire to say a few words in a general way upon this Report. I should have spoken an hour ago better than now. If we do not exercise more sense in ventilating our stables than we do this room, we will kill all our horses. I have been very much entertained, pleased, delighted and instructed with all that I have heard. I believe that any man of intelligence, who has sat and listened and reflected upon the different items of information brought forth, must go home from this Convention, feeling that he has learned a great deal. In regard to the horses, the rule which has always governed me in my management of them should govern everybody, because it is based on common sense: Use your horses as you would use yourself. The connection between humanity and the animal life is so near and delicate, that it is misunderstood to a great extent by men who do not reflect upon it. A horse has every disease that a man has, only known by other names. You have simply to give your horses the same remedies in quantities four times as large as you would take yourself. All the debate that we have had has tended to one point, that you should give the horse proper quarters, fresh air and proper food. If you speak of ventilation, if you speak of the different methods of building your stable, of his food or his drink, it simply means that you would do for him as you would do for yourself. We would not construct our houses in such a manner that all the ventilation should remain under the floor; nor would we shut them up so close—except we met at the Fifth Avenue Hotel—that they could get no air. Their duties are like your own, but in a different direction. Would you, when very much heated after a run or other violent exercise, go directly to the water pail; or would you load your stomach at that time, when the organs are not in a proper condition for digestion? Would you then sit down and eat a hearty meal, or sit by and cool off, and allow the heated brain and the rapid pulse to decline, and then sit down and take such refreshment as you needed?

In warm weather, on the streets, when our horses are toiling on heavy roads with large loads, it is very hard on them. I have a plan of stationing molasses tubs with water at different points, which stand open and in the sun frequently, and into it we mix oatmeal, making a little porridge. This is not so much to assuage his thirst, as to help the horse in his faintness. Some men like a drink of whisky; I suppose Mr. Johnson will feel a little that way, but you and I, Mr. Chairman, will take a little porridge. That is the reason we give it to the horses. [Laughter.]

As regards ventilation in stables, or rather cleanliness in stables, I conceived the idea some time ago of taking tar and boiling it and washing the insides of the stalls all over with it, and do this instead of using whitewash. I found it so effectual as a disinfectant, that we now use it entirely in all the new stables. I have built

during four years stables for over three thousand horses; and there is no such thing to use as this tar. It is very cheap; and where it is used a horse will never crib. Use rosin-tar or coal-tar. Common pine-tar is also good. We take it and heat it in the caldrons. Our hostlers can apply it as well as anybody else, simply taking a brush and going all over the stall. If you have a glandered horse or a farcied horse, you are twice as safe. It has an agreeable odor, is healthful, and, on the whole, very advantageous.

Mr. Hasbrouck said: In our city, where the contract requires the manure pits to be emptied every day, they do not quite get to the bottom; they leave a little layer, and it is anything but agreeable. What is best to throw into the pit to disinfect that? Many say carbolic acid. I have a friend with whom carbolic acid is a hobby; he holds that it should be used all around everybody's stable and everybody's house. He took a barrel of it down to Greenwood Cemetery, and gave it to one of the men to try. He said, I will come down here next week, and I want you to tell me how it works. He used it freely in a receiving vault. A week afterwards my friend went down and said: "How do you like the new disinfectant?" "Well, sor, to tell ye the truth, I like the old smell best!" [Laughter.] There are various new-fangled disinfectants brought to our notice, and they are continually asking a trial of them.

Mr. Johnson said: There seems to be two schools, one in favor and one against the free use of water. We are greatly in the minority; but we have this advantage: we have tried it, and have educated our horses. The merit of the case is in educating them to it. You who are opposed to it have not tried it; therefore, your negative theory or idea does not amount to as much as our positive assertion of fact. It is one of those things you cannot force people to adopt; but in time, our system of watering will be adopted by a great many. Mr. Richards says treat your horses as you would treat yourself; but he did not carry it out in his own case when he gave them oatmeal. As to his insinuation about water and whisky—I am a Kentuckian, and we don't believe that water improves whisky down there. [Laughter.]

Mr. Ladd, of New Bedford, said: The question we have been discussing about the life-time of a horse has not been as definitely answered as it might be. The Metropolitan Railroad has some three thousand horses; they knew what the valuation of those horses was on the first day of October, 1883, and how much they spent on that valuation since that time up to the last day of September, 1884. That would give the actual percentage of the money spent on renewals and the number they got.

Mr. Richards replied: I can only give approximately the figures. It costs us fifty thousand dollars a year to renew our horses. We have three thousand six hundred. They cost us between one hundred and fifty and one hundred and sixty dollars each.

The President said: Our loss is about twenty-two and a half per cent. per annum.

We run about sixteen or seventeen miles ; six miles an hour.

Mr. Robbins, of Baltimore, said : The life of a street car horse depends upon the character of the road he is working on, and the amount of labor. The evidence that we heard is that on some roads the average life in New York city and Brooklyn is five years ; also, that in Lansingburgh they last eight years. I would like to ask what is the character of the street that the horse runs on, between Lansingburgh and Troy.

Mr. Cleminshaw replied : It is a cobblestone pavement.

Mr. Robbins inquired : Are you interfered with much by the ordinary vehicles on the street ?

Mr. Cleminshaw replied : Not as much as in New York ; but we haven't the same number.

Mr. Robbins continued : The question appears to me to be reduced to this : If we get five years' labor out of a horse in the city, it is equal to seven or eight years' labor on a suburban road. It is very hard on a horse in these crowded streets—here and in Boston ; frequent stopping and starting, weight of the cars, number of passengers—all make a very severe service compared with any suburban road. I am operating a suburban road, and a road in the city over paved streets, and know there is a quite a difference in the wear of the horses.

My instruction about watering is, while out on the road to give them all they want, or a little feed. Upon what they get on the street will depend how tired they will be when they come in. My instructions are to give the horses whatever they want ; to give them water sufficiently frequent, that they will not get very thirsty and take too much. The mule is a different animal ; and he is more hardened, more muscular, more vigorous. You can subject him to entirely different treatment from what you can a horse. He will stand a change of driving or of feed. My friends up North do not use mules ; but in the South they are pretty generally used. They are very serviceable ; when you consider the species of animal they come from, you find a very vigorous animal. In cold climates, especially where there is much snow and ice, in the winter time, when they get on the ice, if they fall down, they get up and stay there. [Laughter.] We have got over that kind of fun. They possess more natural sense than the horse ; they are a very much abused animal. I started to use them, prejudiced against them, but have come out in love with them, on account of their intelligence.

Mr. Littell said : The gentleman remarks about mules not doing well in the North. I would like to say something in regard to that. You all know Col. Lowry—if you do not, you ought to. He is the President of two roads ; one in St. Paul and the other in Minneapolis. "It snows up there about 365 days in the year." He recently tried mules, and the result was, he bought \$48,150 worth lately in Louisville for use in those cities.

Mr. Robbins rejoined : I'll bet he will have mules to sell next spring ! [Laughter.]

Mr. Cleminshaw moved that the report

be adopted as the sense of the Convention. Carried.

Mr. Cleminshaw said : I understand that some of the delegates want to get home as soon as possible ; and suggest that we have evening sessions.

The President said : So far as the Chair is concerned, he is here at the service of the Convention. You put me here, and as long as I am here, I will obey your orders.

Mr. Woodworth moved that when we adjourn, it be until ten o'clock to-morrow morning. Carried.

Mr. Cleminshaw said : I was going to refer to a matter which has been customary in the past, and I suppose it will be in this Convention. I make the suggestion whether it would not be well to appoint a Committee on Nominations this evening. Suppose we should only have to-morrow's session and close up. Let us appoint the Committee and give them a certain time to-morrow to report.

Mr. Johnson said : There was quite a number of us that talked the matter over last year, and many have thought it best for the Convention to form itself into a committee of the whole and ballot for the President and other officers. It is a question that all feel interested in. It is a delicate work for the Committee to do. I do not think any gentleman here wants to undertake it. I was once on that Committee myself, and it was a very delicate duty. I believe greater satisfaction will be had by having open nominations and balloting. It is very quickly done ; it gives one an opportunity to speak.

Mr. Cleminshaw said : It is for that very reason that I have brought this matter up. It is a delicate question ; but it is more delicate for this whole Convention to do it than it would be for a Committee. It has been the practice of this Association, in designating the officers, to look the whole country over ; selecting one here, another there, and one at some other point, so that all parts would be represented. I think the system of appointing a Committee is the right one.

Mr. Thurston said : My experience has been, and I have had about half a century of experience in these matters, that if you go into convention and ballot for A, B and C, and you are there to elect men without regard to the different localities, or whether they have held the positions already, or are qualified for them, then this committee of the whole may be all right. My belief is that the Committee appointed to select officers would judiciously discriminate, so that the different sections would be properly represented. I would cheerfully vote for the officers that Committee might recommend. If Mr. Wharton, or any one else, should come to me and say, this is the man, vote for him, I might be induced to do so. I would a great deal rather that the names be submitted to me by some Committee. I believe that the Chair in selecting a Committee to nominate officers, would select those that would present to this body such names that we could consistently vote for.

Mr. Flagler said : I move, for the purpose of getting this matter before the Convention, that the Chair appoint a Committee of seven to report officers.

The vote on this motion stood, thirty-five for, and nine against its adoption. The motion was declared carried.

The Chair appointed the following Committee :

Mr. Charles Cleminshaw, of Troy, N. Y.
Mr. Benjamin Flagler, of Niagara Falls, N. Y.

Mr. Tom L. Johnson, of Indianapolis, Ind.
Mr. C. B. Thurston, of Jersey City, N. J.
Mr. T. C. Robbins, of Baltimore, Md.
Mr. Charles B. Holmes, of Chicago, Ill.
Mr. Edward Lusher, of Montreal, Canada.

On motion of Mr. Lusher, the meeting adjourned until ten o'clock to-morrow morning.

[To be Continued.]

Fireless Locomotives for Elevated and Street Railways.

Between two and three years ago European mechanical papers contained some description of the Lamm-Francq fireless locomotive, Lamm being a New Orleans, La., engineer and Francq a French engineer. The engines were then being used very successfully on the Vienna (Austria), Elevated Railroad.

The last number of *Engineering* to hand enables us to give its subsequent history and data concerning it which, we think, will be of considerable interest to our readers, and especially those interested in Elevated and Street Railways.

These engines are built in Europe, by the Hohenzollern Engine Co. of Dusseldorf and are fitted with the Joy valve gear. The mechanism, wheels, springs, etc., are of the ordinary type, but the fire grate is conspicuous by its absence. The boiler consists of a plain cylindrical reservoir with dished ends and steam dome at top. This reservoir is originally filled within a short distance of the top with cold water and then placed in communication with a high pressure stationary boiler. A current of highly heated steam is thus passed into the reservoir, which gradually heats the water up to boiling point, then fills the steam space and finally raises the pressure until it equals that in the stationary boiler. To heat the water as uniformly as possible, the inlet pipe is continued through the reservoir to the middle of its length, near the bottom, where it joins a horizontal pipe extending the whole length of the reservoir and pierced all over with holes.

The steam escapes through these holes and bubbles up through the water to the surface. When sufficient steam has been introduced and the pressure raised to 250 lbs., the engine is disconnected from the fixed boiler and is ready for work. The steam is taken from the reservoir by a pipe opening high in the steam dome, delivering into a steam expander or special valve chest which reduces the pressure to about 50 lbs., at which it enters the cylinders. The pipe leading from the expander to the cylinders is large in size to form a receiver for the expanded steam and is carried diagonally through the reservoir, whereby the steam is to some extent superheated and completely dried ; the object being to prevent the admission of the steam to the cylinders at a high pressure and yet retain a high pressure in the reservoir.

Loss from radiation from the outside of the reservoir during the journey is effectually prevented by a deadening consisting of a thickness of felt and sheet iron with an air space between.

The advantages of the fireless system are summarized, as follows :—

1. By the use of fixed boilers burning cheap fuel, high pressure steam can be generated with much greater economy than is possible in the grate of an ordinary locomotive.

2. No firing being required on the engine one driver is ample. Two firemen will suffice for a pair of boilers capable of supplying four engines each : so that six firemen are saved for eight engines as com-

pared with systems where two men are needed on each locomotive.

3. There being practically no wear and tear in the reservoir repairs are not needed and the stock of engines in reserve may be much smaller than in ordinary cases.

4. There being no fire, there is no smoke, sparks, cinders, etc., to annoy the public, and no danger of explosion, while the exhaust steam can readily be condensed if required.

5. There is no need to spend time and fuel in "firing up" early each morning; the engine being left charged over night, and loses only 30 to 40 lbs. pressure, so that it is ready to make its first trip at any moment. It is thus never allowed to get cold.

6. The large store of energy maintained on the engine can be drawn on just as required, and utilized to keep up the speed when ascending steep gradients, etc., or overcome exceptional difficulties.

This system has been tried on a very extensive scale in Batavia and has given so much satisfaction that it is to be extended.

The Batavia Steam Tramway Co. owns a line divided into two portions, the first from Batavia to Kramat (5 miles). The haulage is effected by 21 fireless locomotives and five stationary boilers. Two of the boilers are at Batavia and three at Kramat, but only one is in use at each station at a time, the others being in reserve. They are worked twelve hours a day and fill an engine every 1½ minutes, during about three hours in the day, and every 10 minutes at other times. An engine charged to a pressure of twelve atmospheres will draw two or three passenger cars from Batavia to Kramat and from Kramat to Cornelis up and down again to Kramat. Part of the line was opened in July, 1883, and from the last annual report it appears that the cost of haulage amounted last year to 14.33 cts. (U. S.) per mile, made up as follows:—

Driving Engines.....	1.88	cents (U. S.)
Heating boilers	0.92	" "
Coal.....	5.60	" "
Packing, lubricating, etc.	0.80	" "

9 ³/₁₀ cents per kil.
Or 14.33 per mile.

More recently the cost of haulage has been only 6.80 cents per kil. or 10.84 cents per mile. The price of coal is \$10 per ton. The fuel consumption was at first 21 ³/₁₀ lbs. per mile, but has recently been decreased ¹/₂.

The repairs to boilers and engines have been ⁸/₁₀ cents per kil., and have consisted chiefly in re-turning wheel tires and renewing the felt on boilers. Since the completion of the road the monthly receipts have been 22,800 florins; total expenses, 12,800 florins; leaving total monthly profit, 10,000 florins, or \$4,000. The fare is five cents for a 4-mile run or any part of it.

The engines (which are also fitted with the Joy Valve Gear) give every satisfaction. They are in native hands and run constantly with little or no attention and no break downs. Two more have been ordered and will be shipped this month.

W. T.

Compressed Air Motors in Cincinnati.

Mr. Geo. A. Clarke, of Cincinnati, has a project for street car propulsion by compressed air, an outline of which we give below, on the authority of the Cincinnati *Commercial Gazette*:

"Cars are constructed with double metal bottoms for air chambers. Compressed air which is known to be about ten per cent. more efficient than steam at the same pressure, will be utilized to run the car both forward and backward and stop and start it on any grade. By a simple contrivance the motion of the car continually replenishes the constantly exhausting air, but, of course, only partially. Means must be provided for refilling.

"At each end of the line is a simple twelve horse-power engine. The entire length of the line, between the tracks if double, or at the side of a single track, is laid fifteen inches beneath the surface, an iron pipe four or five inches in diameter. This is perfectly jointed, and every piece tested to stand a pressure of one hundred and twenty-five pounds. The engines keep this pipe constantly filled with air at a pressure of about one hundred pounds. At intervals of a square, this pipe will be tapped, and it is estimated that connection can be made with the car and pressure taken on in six seconds time. A pressure of eighty pounds to the square inch in the air chambers of the car will give a propelling force equal to six horses. This will always be sufficient to drive the car through snow and slush, or assist it on the track should it be derailed, and if greater force is necessary, it can be obtained from the pipe to the extent of one hundred pounds pressure, for the air chambers like the pipe will be tested to stand one hundred and twenty-five pounds. Some advantage will be had in running two cars together. Both will be filled at the engine to eighty pounds pressure. One will be allowed to do the work until its force is exhausted. By this time the motion will have increased the pressure in the other car to about ninety pounds. Then it will be allowed to propel the two until exhausted, when the first will have a pressure of perhaps forty or fifty pounds. By doubling cars and the automatic filling, it is estimated that a distance of about three miles may be covered without resorting to the ground pipe for more air.

"The advantages claimed over horses, steam, electricity or cable are considerable. The inventor claims that any line which is now in operation can be equipped with compressed air cars, air pipe line, engines and all complete for less than \$7,000 per mile; that the change can be made without stopping travel for a single hour, or obstruction of the street; that once equipped, the expense of running is reduced to the minimum. No horses to buy and feed, no cable to renew, no stables to rent or stablemen to pay. The engines are so small and simple that any man competent to run a car can tend one. There is no steam to frighten horses, no disagreeable dust, no fire and no smoke; there is no tearing up streets for repairs as with the cable, and expresses and wagons can use

the track as now, which can not be safely done on the cable. There are no electrical shocks during a storm, as is the case on electric roads, to frighten ladies and endanger life. With the compressed air line, there need be no change of cars to go from Fountain Square to the farthest suburban point, as is necessarily the case with the cable. Moreover, the same air that serves as a motor can be so utilized as to warm the bottom of the car, a point which certainly would be appreciated in such weather as we had last week.

"We hear that Mr. Clarke will contract to run any line of street cars and guarantee the company owning it five per cent. larger dividend on the capital stock than they are now paying. This is worth looking into.

"Here are some figures that may be interesting. A cable road will cost to build from \$80,000 to \$100,000 per mile. The cable must be renewed every thirteen months at a cost of \$8,000 a mile. To illustrate the saving over the present system, take a single line running twenty cars. The points of expense in running incurred by the compressed air line, which the horse car line would not have are, for one year:

Two engineers.....	\$1,600
Fuel.....	2,000
<hr/>	
Total.....	\$3,600

"The horse car line will have expenses to meet not found by the air line, as follows:

Horse feed.....	\$8,700
Horse shoeing.....	2,680
Horsemen.....	4,500
Harness.....	600
New horses.....	4,000
<hr/>	
Total.....	\$20,480
Total air line expenses.....	3,600
Difference in favor of compressed air line.....	\$16,880

"It is presumed that other expenses, such as drivers, conductors, repairs, &c., will be equal in the two systems. It should be observed, however, that the horse car line is not charged with the continual repair of the track necessitated by the wear of the horses' feet, which the air line will not have. This and other small items will undoubtedly increase the savings to \$20,000 per annum; but suppose it is only \$17,000.

"From these figures some startling deductions are easily drawn. The saving amounts to about \$47 per day, or \$2.35 per car. In a city using three hundred cars, which is approximately the number used in Cincinnati, the saving would be \$705 per day, \$22,750 per month, \$257,325 per year.

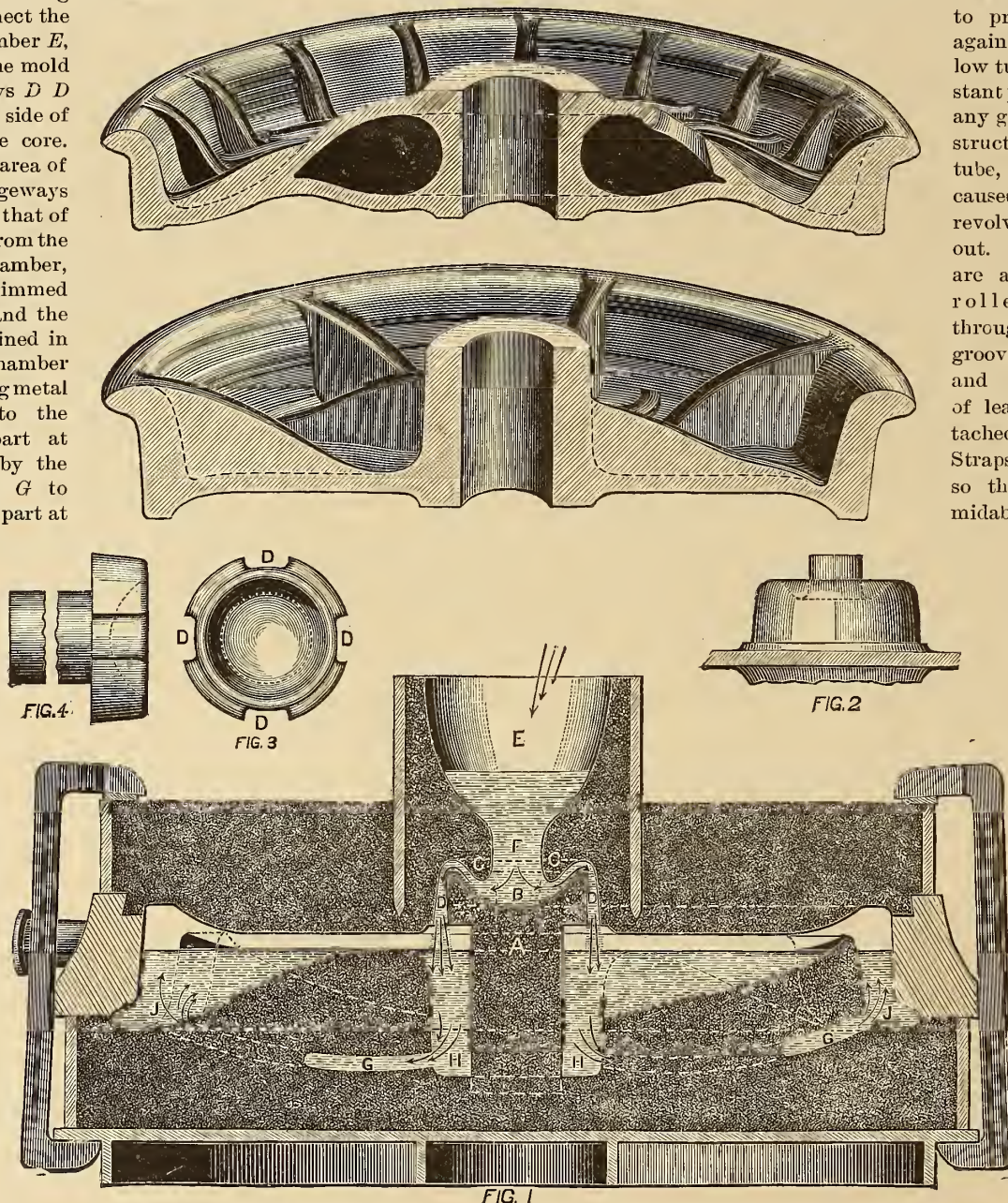
"The amount of additional business which must be done by a horse car line to make its profits equal those of the air line is also surprising. To make up this difference of \$705 per day in running expenses, the old line must carry 17,625 passengers, at four cents each, more than the new line every day, 523,750 a month, and 6,433,125 a year. If the horse car lines of this city were paralleled by compressed air lines, they would find it difficult to compete for the trade."

Casting Chilled Car Wheels.

We show herewith the method employed by the Baltimore Car Wheel Company in casting chilled wheels to prevent tread defects, the ordinary mode of pouring from the ladle into the hub part of the mould and then letting the metal overpour down the brackets to the chill, produces cold shot, seams, &c. In the arrangement here shown the hub core *A* has a concave top *B*, and the core seat *C* is convex, its centre part being lower than the perimeter of the top of the core. Figs. 3, 4, show the core *A* in side elevation and in plan. Fig. 2 is a core point forming a space to connect the receiving chamber *E*, above, with the mold by passageways *D D* formed in the side of the top of the core. The combined area of these passageways being less than that of the conduit *F* from the receiving chamber, the metal is skimmed of impurities and the latter are retained in the receiving chamber *E*. The entering metal flows first to the lower hub part at *H H*, thence by the sprue-ways *G G* to the lower rim part at

get ahead of us on the electric tramway question. We quote from the *Mechanical World* of London: "The proposed electric tramway along the esplanade, two miles in length, at Blackpool, is of interest, as the principle upon which it is to be worked forms a new departure from any hitherto used. In the arrangement in question, which is that of Mr. M. Holroyd Smith, of Halifax, engineer to the company, the rails are laid in the usual way, but in addition a central channel is employed through which the electric current is conveyed from stationary engines and dynamos. This channel is formed of

carrier, and for dirt or wet to fall through to a drain space formed of shaped granite or artificial stone beneath. Sump holes connected with the main street drain are formed at intervals, in which any mud that accumulates can be removed. Also hand holes for the purpose of fixing or removing the collecting carrier which collects the electric current from the copper half tubes and by means of a dynamo attached to the car that propels it along. This collector consists of two sets of fluted rollers free to revolve on spindles, which are held by knuckle joints drawn together by springs in such a manner as to press the rollers against the two hollow tubes with a constant pressure. Should any grit or other obstruction occur in the tube, the spiral flute causes the rollers to revolve and throw it out. Two steel plates are attached to the rollers passing through the slot or groove in centre rail, and are by means of leather straps attached to the car. Straps are adopted so that on any formidable obstruction



JJ, being again skimmed at the mouth of the sprue-ways. Thus the rim fills as rapidly as the hub and the metal is of a uniform and high temperature when it reaches the chill.

In the wheels made by this firm, every alternate rib is connected with the rim and runs off to nothing near the hub; the intermediate ribs are attached to the hub and diminish in width toward the rim.

Blackpool Electric Tramway.

It looks as though Europe was going to

two angle irons laid with about $\frac{1}{2}$ in. space between them, being supported at intervals by cast-iron chairs laid upon wood sleepers. The chairs also carry the substitute for the electric cables, being two rows of half round copper strips, hollow in section, like a tube cut in two longitudinally, by means of insulated vulcanite blocks. The ends or junctions of the copper half tubes are joined together by brass clamps which make electric contact, and they are laid about $1\frac{1}{2}$ in. or 2 in. apart and kept quite separate, so that a free passage is left for the collecting

occurring they will break without injuring the car, which will then stop, as the electric circuit which passes by a wire from the collector to the dynamo will be broken. The cars will be driven by one of Siemens' or other dynamos, revolving in the space between the axles of car by means of an endless chain passing round a stud wheel keyed to one of the wheel axles. Although the Blackpool line will be the first on a practical scale on this system, the inventor has already laid down 100 yards of rails on the 4 ft. 8 $\frac{1}{2}$ in. gauge as an experiment in a

field near Manchester, upon which a car has been run. He has also had a small pleasure line at work during last summer at the Winter Gardens, Blackpool, so that the practicability of the arrangement has already been tested to a limited extent. It is proposed to lay the new line, which is to be on the 4 ft. 8½ in. gauge, in time for the summer season, and we understand contracts for the cars, stationary engines, which are of the Robey type, boilers and other necessary fittings, have already been given out."

Chaplin's Anti-Friction Journal Bearings.

Referring to the illustration:—

The axle is surrounded by a series of cylindrical rollers, nearly as long as the hub in which they are placed; at the centre of their lengths, the rollers are reduced in size, forming a neck, the object of the necks being to retain in the proper position another series of anti-friction rollers, which are placed between the necks to prevent the surface of the bearing rollers from coming in contact with each other.

The diameter of the separator rolls is less than the diameter of the body of the bearing rollers, but greater than that of the necks; by this arrangement the circular retaining bands, which are placed both inside and outside of the roller necks, in order to retain all the parts in proper position around the shaft, are supported entirely on the separator rolls, and do not come in contact with the axle, the necks of the rollers, or the inside of the hub, but only on the separating rolls, where the bearings cannot be put on the shaft from the end, the retaining bands are hinged. Thus four independent rolling motions are secured, that at every point at which any weight or pressure is applied a rolling contact is provided, and the bearing becomes strictly anti-friction.

The makers* say that careful experiments have demonstrated that the weight on shaft is always distributed over at least three rollers: also that the pressure on the rollers, is always directly toward the centre of the shaft or axle, consequently the weight of the load does not tend to crowd the rollers together, and the separate rolls and bands are not liable to wear.

* Chaplin Manufacturing Co., Hartford, Conn.

Hoboken's Elevated Road.

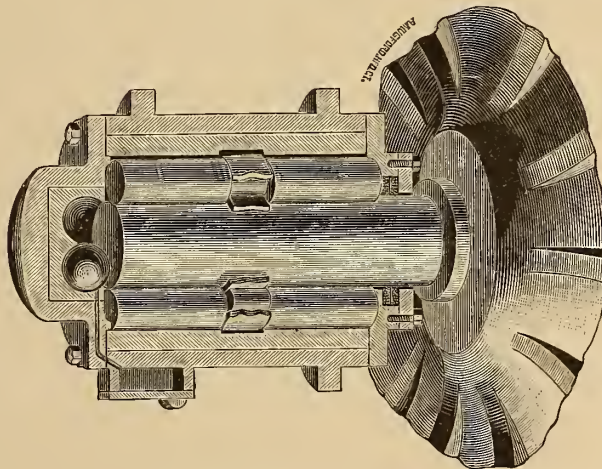
Hoboken is to have an elevated railway; trestles are up, tracks laid, paint on, etc. Everything substantial. North Hudson C. R. R. has the franchise.

Structure all wrought iron, resting on heavy brick piers, built on piles driven ninety feet (in meadows 100 feet). At this point grade very heavy, the highest point ninety-seven feet from ground. Peculiar feature in construction of the iron trestle is the lattice work on every column, beam and girder. It is designed to run cars by trac-

tion cable similar to that on the Brooklyn Bridge. Traction plant built by Poole & Hunt, Baltimore; two 500-H.P. engines been built by Watts & Campbell, of Newark. Both ready for use. Building on Palisade Avenue, top of hill, 120 by 80, will contain engines and traction plant; upper part used as terminal depot.

Here the tracks, which are fourteen feet above surface, will pass over driving apparatus and machinery. Large boiler house been built, solid brick, adjoining depot; four steel boilers, 125-horse power each, put in. One end of boiler house occupied by chimney ten feet square at base and 100 feet high.

At Hoboken Ferry the depot is 170 by 40 feet; tower story a massive brick structure, carrying handsome frame superstructure for elevated station above. Ground floor will be used for offices and waiting rooms. Proposed to have three stations between Pullman & Co. are building cars; not yet received. Company hopes to have road open for travel by June. Engineer Endrus is supervising work, and pushing it as fast as practicability will permit. Although road is not quite a mile and a quarter long, it is estimated to have cost over half a million.



It is said that as soon as road is in operation company will extend to Court House and Union Hill. Intention is to eventually run to Fort Lee, which will afford magnificent view of the Hudson from the Palisades.

Ordinary Stoves for Heating Street Cars.

W. J. Hart, Supt. G. & W. and S. & G. Street Railways, Syracuse, we believe was the first in this country to heat street cars, beginning some nineteen years ago. In reply to a representative of the STREET RAILWAY JOURNAL, Mr. Hart said: "Yes, we have used stoves for heating our cars now for nineteen years and we like the methods better than any other we know of. The excellent ventilation obtained by constantly taking the bad impure air out of the bottom of a car is a very great advantage of the stove. It is a good idea to surround the stove with wire netting to prevent clothing from getting against it and being burned." Mr. Hart is firmly of the

opinion that heating cars pays financially. Thinks that if their stoves were taken out their receipts would fall off at least ten per cent.

Horse Mileage.

A reader desires to obtain, through the STREET RAILWAY JOURNAL, the experience and practice of some of his fellow managers of street railways relative to feeding. He asks, "What is the character of feed?" "How prepared, whole or ground?" "How much hay?" "How cut, long or short?" "Time of feeding?"

These questions are also asked, "How many miles per day do you drive your horses?" and "How many hours?"

We hope each practical street railway man will consider these questions addressed to him personally.

Recent Patents.

- 313,824—Car-starter—C. A. Iversen, Copenhagen, Denmark.
- 313,513—Fare-register—C. A. Neuert, Boston, Mass.
- 314,519—Car-starter—F. Dawson, Sr., and F. Dawson, Jr., Williamsport, Pa.
- 314,299—Car-starter—N. J. Roberts, Battle Creek, Mich.

The National Cable Railway Company.

EDS. STREET RAILWAY JOURNAL:

In answer to your inquiry I beg to state that the National Cable Railway Company is a corporation of the State of New York, organized in July, 1883, for the purpose of exploiting the cable system of traction covered by the patents of A. S. Hallidie and others, for which this company owns the exclusive rights for the United States, east of the 106th meridian. All the cable railways in the world, now or heretofore in successful operation, excepting only one in San Francisco, have been constructed and are operated under licenses for the use of these patents.

The roads so constructed and operated are as follows:

Clay Street Railway, San Francisco, operated since Sept. 1st, 1873; Sutter Street Railway, San Francisco, operated since Jan. 27th, 1877; California Street Railway, San Francisco, operated since April 9th, 1878; Geary Street Railway, San Francisco, operated since Feb. 16th, 1880; Presidio Street Railway, San Francisco, operated since Oct. 23d, 1880; Chicago Street Railway, Chicago, operated since Jan. 28th, 1882; Roslyn Tramway, New Zealand, operated since 1880; Highgate Hill Tramway, London, Eng., operated since 1884; a road in Liverpool, Eng., operated since 1883.

There are several roads in foreign countries being constructed under contract to use this system, among which is a road in Sydney, New South Wales. The railway

in San Francisco which has not taken out a license to use the Hallidie patents is being prosecuted by the Hallidie Company in San Francisco for infringement of its patents.

The advantages of the cable system of traction are very fully set forth in the report of the Committee upon Motive Power of the Street Railway Association, made at a meeting of the Association, held in Chicago in October, 1883, and the discussion upon the report.

The twelve miles of cable railway constructed in Philadelphia during the past year, which are now being heralded abroad as a failure, were not built under the patents of the company, but, on the contrary, the failure of those roads is directly due to an effort to evade the patents controlled by this company, the cost of which would have been but a fraction of the expense of remedying the mistakes already made, while we regard it as certain that they will infringe our patents even with the imperfect construction which they will have through their efforts to evade them. If the patents of this company had not sufficient value to enable them to control the construction of cable roads, yet the experience gained by the companies that have constructed roads under these patents would be worth more than the cost of a license. Parties occupying the streets of a great city should not be at liberty to experiment upon new devices to their heart's content, tearing up the same streets over and over again when there are devices in existence which ten years' experience has proved to be adapted to their wants, and the use of which can be had by the payment of a reasonable license fee.

The cable railway on the Brooklyn Bridge has been a conspicuous example of partial failure, which we have found has operated greatly to the prejudice of our system. The problem on the bridge is very different from that of building a cable railway in a public street and is much easier of satisfactory solution. The bridge trustees having declined our offer to license them the use of our patents and our later offer to operate the cable cars for a rate of two cents per passenger, adopted other devices which, while they have answered the purpose to a considerable extent, have frequently failed, causing much delay and complaint, which has generally been supposed to be inseparable from the cable system. Had our system been adopted no such vexatious delays need have occurred, and had our proposition to operate the cable at two cents per passenger been adopted when it was made in November, 1883, the bridge would have fulfilled during the year 1884 the object for which it was constructed, which was, not to earn money, but to afford a prompt, rapid and satisfactory means of transit between the great cities of New York and Brooklyn.

The advantages of the cable system where the travel is sufficient to warrant its adoption, have proved to be so great that it appears remarkable to those who have become familiar with them through observation or use, that anybody should object to their introduction. They are:

First.—Greater capacity for traffic when a additional capacity is needed.

Second.—Greater economy in cost, averaging 25 to 40 per cent.

Third.—Greater speed attainable, the only limit being the ordinances of the city relating to surface travel.

Fourth.—Saving in time owing to the ability to stop and start quicker than a horse-car.

Fifth.—The avoidance of the nuisance caused by the voidings of horses in the public streets.

Sixth.—Less liability to accidents causing injury to persons, resulting from the ability to make quicker stops.

There is at present considerable interest exhibited in the subject of cable traction, and inquiries addressed to our company at the office of the President, No. 22 Cortlandt Street, will be promptly answered and the information desired will be furnished if in our possession.

WM. P. SHINN,

President.

NEW YORK, March 21, 1885.

Mr. Hallidie's Affidavit.

GENERAL TERM OF THE SUPREME COURT.

FIRST DEPARTMENT.

IN THE MATTER

of

The petition of the NEW YORK CABLE RAILWAY COMPANY for Appointment of Commissioners.

City and County of New York, ss.:

ANDREW S. HALLIDIE, being duly sworn, deposes and says: I have only arrived quite recently from across the Atlantic Ocean, on the other side of which I went to see the construction of a cable railroad, and I am now on my way to San Francisco, intending to depart for that place late this evening. I am the inventor of the cable system of railroads for the transportation of passengers and freight. The cable system was matured in 1870 by myself, and being a new method with which the public were not familiar it was necessarily slow in being introduced; I found it impossible at first to persuade the public, or those I thought ought to take an interest in the construction of a better system of transit to take an interest in my invention from a lack of faith in the system; it was new, and being new they were unfamiliar with it, and naturally had a great doubt as to its feasibility. Eventually, in or about the year 1872, I organized a company in San Francisco and endeavored to sell stock, got rid of a hundred shares and abandoned that undertaking. I let it rest for about a year, and meantime conversed with several of my friends in whom I had confidence, and two gentlemen who came forward and said if I had enough confidence in that system to join them in the expense of its construction, they would share equally with me the expense; and in connection with them and one other gentleman of San Francisco, I built the first cable road there, costing about \$100,000. The road was completed in 1873, in or about the month of September, and has been running ever since quite successfully. Previous to maturing this system of cable road I had completed another system for the transportation of material and ore over mountainous and difficult roads, and that is now in use throughout the country quite successfully, and is known as the rope-way system. It is used in almost all mountain districts of the

United States where it is impossible to build roads or railroads. As the result of that investigation I gave my attention to a better system of carrying passengers in cities. In San Francisco there are a great many hills; a portion of the city is hilly and the other portion is level; the hilly portion, in passing from one part of the city to another, has to be traversed, and there are three or four blocks on which the horse railroads in the most busy parts of the day had to put on some two or three extra horses to carry the passengers, and frequently the horses would slip and fall and the loaded car carry them in a prostrate position to the street below before the same could be stopped; that directed my attention to this system. I was partly aware at that time of what had been done; I was familiar with the system of mountain railroads and with the Blackwall Railroad in London, entirely different from the cable system, and until that period of 1873, when the San Francisco Railroad was completed, there was no road in existence in the world of that kind. The road in 1873 was about half a mile long and ran up a very narrow street; the street was only forty-nine feet wide between the houses: taking from that the width of the sidewalks, about twelve feet each side, left about twenty-five feet for the roadway; we built there a three and a half foot gauge cable road, and the grade varied from one foot in three feet to one foot in five and a half feet. From 1873 up to the present time that railroad has been running without intermission; I have, of course, worked at and overcome some general defects; from that time until the present it has run successfully. Three years later another road propelled by horses on Sutter Street, about four and a half to five miles long, was converted into the cable system; that road runs through a wider street, sixty-eight feet, but through a very densely populated portion of the city; the horses moved along slowly, and the business was increased so that it was almost impossible for them to carry their passengers on that system, and they converted it to the cable system. They have infringed on my patents, and I have had to sue them, and got judgment for the infringement; during the trial they stated that there was a saving of thirty-five per cent. by the adoption of the cable system; they admitted a saving of 25 per cent. in the operating expenses of the cable road as compared with the horse railroad. The property on the line of the cable road, after it was finished, became at once in demand and the real estate dealers in advertising property on Sutter Street or in its vicinity would generally head it "on the line of Sutter Street cable road," so that the property brought an enhanced value. Just before the building of the Clay Street railroad I purchased on the top of the hill, for the purpose of putting up a residence, a piece of property costing \$3,000, right adjoining "Nob Hill," before it was Nob Hill. Eighteen months afterwards I sold it for \$9,000. That I cite as an instance to show what effect on real estate the construction of the cable road had; and it was so through the whole line of the road.

A year after the Sutter Street road was completed, in or about the month of April, 1878, another road was constructed on the line of California Street, and run through Nob Hill. The people who had fine residences there found that the cable system was so noiseless and unobjectionable, doing away with the use of horses, so certain and regular in its operations, petitioned the Board of Supervisors to build a road there and that road was built. That runs through the most fashionable part of San Francisco and passes the houses of many of the most wealthy men and among others of Governor Stanford, Charles Crocker, Gen. Colton, Mark Hopkins, and others.

That road is about three miles long. There is also a road built on Geary Street, and another on Union Street and Market Street, and on various branches, so that

there are to-day about twenty miles of cable roads with double tracks, and built at a net cost of about \$5,000,000, including the cost of condemnation of property and other things.

The construction of those roads and conversion of the other roads from horse roads to cable roads dispense with the services of about three thousand horses in the City of San Francisco. Of course, when you take into consideration three thousand horses with their natural droppings, and consider the effect they must have on the sanitary condition of a large city, it must at once strike you that the cable system has an immense advantage over the horse system. Moreover, in the cable system there is a better system of management; it is more like managing a locomotive railroad, and you direct your men more like you do an army of soldiers, and besides there is not the demoralization that there is in connection with stables. I have operated a short horse railroad myself, and I know that between the two classes of men employed around the stables and on the cars of horse railroads, and the men around the engine-room of a cable system and on its cars, there is a vast difference. It is more easy to manage those men in the engine-room than the men who have more stable about them and less stability.

The cost of the cable railroads in San Francisco has varied according to circumstances, but I may say, generally, that the road-bed and rolling-stock would cost from \$100,000 to \$220,000 a mile for double tracks. When you spend an amount like that on a street railroad in its absolute construction, it carries its own conviction that you cannot afford to build it imperfectly. The road-bed, the surface of the road, must be better; it must be as perfect as it is possible to build a surface of any road, because the cost of and the finishing of the surface are small as compared to the cost of constructing the underground work and tube.

The roads in San Francisco are run at various rates of speed, but generally at from five to eight and nine miles an hour. That speed could be increased if advisable; but there is a limit under the Municipal Act which prohibits a speed of more than eight miles within the city's limits on the surface.

Now with respect to the control of the cars, the control of the management and the stopping and starting of the cars. That has been tested in almost every conceivable circumstance, and I cannot conceive of any manner of stopping a car and bringing the same to an absolute stop in so short a time as is done under the cable system. The man in charge of the grip takes the place of the man in charge of the horses on horse railroads. A horse has a mind of his own, has a brain and heels, and requires the attention of the man in charge to look after him as well as the brake. In the cable system the gripman looks after the brake and has no horses to look after, and consequently has immediate and absolute control over the starting and stopping of his car. Moreover, he stops it absolutely. When a passenger gets off there is no jerking and grasping hold of the strap to keep his equilibrium, but the car is stopped at once. I have seen on Clay Street, in San Francisco, where the car has been stopped and a tumbler filled with water held in the hand of the superintendent standing in the car, and the car then started without spilling a drop of the water. This shows what control of the motion of the car a man with some experience at the grip possesses.

Now, as to noiselessness. All the clatter of the horses is done away with. The cable car moves along smoothly and quietly and regularly, without jerking or thumping on the grades or anything. In fact, the grade makes no difference, so long as it is not so steep as to tumble the passengers into one end of the car. There are grades in San Francisco on the line of the cable railroads from one foot in five feet, and in the City of Dunedin, in New Zea-

land, the cars are running on a grade of one foot in four and a half feet, and in the City of London they are running over grades varying from one foot in twelve feet to one foot in seven feet.

There is also another point to be considered, and that is with regard to the capacity of the cars and the carrying capacity of the road. This capacity is almost unlimited, because there is no limitation to the number of cars which can be used within the horse-power of the engine, and cars can be added within the range of the engine, so as to meet all the varying demands of travel. Single-deck cars or double-deck cars can be used, which can be run in trains of one, two, three, or four extra cars to one grip car, or can be made up and operated as a single car and grip car which can be run every quarter of a minute, or with just time enough to keep the way clear. Double-deck cars can be made to carry forty-four inside and thirty-two outside comfortably seated, and with this system there should be no difficulty under ordinary circumstances of furnishing a seat to each passenger, so that the capacity of the system must be considered as unlimited.

In my recent visit to England I took particular notice of the style of rail they are using there, and I must say, that on this side we are far behind them on the form of the rail and construction of the road-bed generally on our horse-car lines in the United States as compared with the European countries. The general form there is a kind of V groove, and the whole of the street is flush. There is a foundation of concrete or Macadam, on top of which are the stone blocks, or stone sets, as they are called there, about four and a half inches deep to six or seven inches long, and three inches wide that set along side the rails. The rail is very like an ordinary T rail and has a flange at the bottom. There is no projection, as you find here, in the centre of the rail, offering an obstruction to the wagons crossing it. I suppose you cannot cross safely a railroad track here at a less angle than fifteen or twenty degrees. There the obstruction is so slight that an angle of three to five degrees you can cross over. I would suggest to the Commissioners here and those who are interested in the construction of roads, whether it would not be well for them to consider that in the construction of the cable system; it would be a convenience to the public.

As to the economy of the system. The economy increases in the cable system in proportion to the amount of business done. That applies to all roads, but you can save from sixty to seventy-five per cent. in the cost of operating a cable road as compared with a horse railroad. This means that you can operate your road and carry people at a less fare. That affects the public more than anything else. It means also that if you can build a road at a cost of \$250,000 a mile, the public will be saved the amount of money that is necessary to obtain from it in the way of fares to pay the interest on the enormous amount of bonds for which I am informed the various horse railway companies in the city of New York have bonded their properties and franchises, and amounting, on an average, as I am informed, to something like \$300,000 or \$400,000 a mile. I think that there is no doubt that under the cable system the people could be carried at a fare of five cents, or even less; and there is no question that five cents fare should enable the cable railroad company to let a passenger ride on its road all over the island.

As to the popularity of the system. In San Francisco, as in Chicago, it was found that the horse railroads were not paying so well as they might, and they had to change them to some other system; and some of them were converted into cable roads, and such are now paying handsomely. The Sutter Street road, which prior to its conversion into a cable road had its stock selling for \$22 or a little less, is a successful road, and its stock is selling now at \$100.

They give transfers along their main line running east and west and north and south, parallel with the ocean. The Geary Street railroad, which cost \$37.50 a share to build, to the original stockholders, is selling for from \$97 to \$103. So it is with the other roads. So it is with the Chicago roads; the stock has advanced.

Then with respect to severe winters, such as you have in Chicago; to the cable system they present no difficulty. With a rope attached to a steam engine any accumulation of snow can be removed. It can be put on freight cars or on flat cars and carried away and got rid of, instead of being thrown on each side of the track as is done in the cities by the horse railway companies. It is impossible to prevent the running of the cable cars if proper attention is given to the business. When the horse cars must stop the cable road can run.

Now as to accidents to horses. I have seen a little discussion with regard to horse-shoes being torn off horses by the slot in the centre of the cable roads. In all my connection with the cable system I have known but one case in San Francisco during twelve years where a horseshoe has been detached from the hoof of a horse, and then the driver said it had been loose. There is no need for such occurrences. If the slot is properly constructed there is no need for such an accident. I doubt whether in a great city with good pavement it is proper to allow the use of heavy calks on horses' shoes. It is not allowed in European cities where they keep good pavement. And the question of humanity to the horse arises in that connection which should also be considered, but with which Mr. Bergh has probably more to do than we have.

As to the effect of the cable system on trade, here is an experience with respect to San Francisco. The principal street in San Francisco was Montgomery street. It was the street on which was situated the popular retail stores, jewelry, fancy dry goods stores and other stores of a similar character, which the ladies were accustomed to patronize on their shopping excursions; in fact, it bore the same relations to the city of San Francisco as Broadway does to the city of New York. At the time when the city was becoming converted to the horse cars from the old omnibuses a general railroad act and charter to run horse cars was passed, and an endeavor made to locate a road on Montgomery Street. The residents of Montgomery Street opposed the road, and successfully opposed it, and the road was not built on that street, and the company had to go down to one street below to a street that was occupied by wholesale dealers and warehouses, and was not so prominent. That street was Sansome Street. Kearney Street was shortly afterwards widened, and on that street the railroad company put down a double track. The shopkeepers of Montgomery Street soon found that business was leaving Montgomery Street and going to Kearney Street, where the railroad was running. The fact was that people could ride in the cars, and it was a convenience to step from them into the stores. The Montgomery Street tradesmen sent to the railroad company and invited it to lay a track through Montgomery Street. This was done, and business partially came back to Montgomery Street, but not as it had been previously.

As to operating the cable roads in narrow streets. In London the cable system runs through a street that is very narrow, and in the lower portion of it is about eighteen feet from curb to curb, and then it widens to about forty feet, with varying width, and is quite steep and tortuous. The upper portion has a double track with two tubes, and the lower portion has but one tube, the road converging from the double track into a single track and both ropes running through a single tube, thus requiring switches and sidings and so on. That road has been in operation since May, and is quite an attraction, just as the cable system was in San Francisco and is to-day in Chicago. There

has been spent about \$3,000,000 in converting the Market Street road in San Francisco into a cable road, and wherever the cable system has been constructed there has been a demand for property. The cable road has increased the amount of building in the vicinity, and it has had the effect of bringing back from the suburbs of San Francisco a large amount of population formerly removed into the adjacent villages and towns because of the formerly insufficient accommodations afforded by the horse railroad companies. The cable system has enhanced the value of property in San Francisco fully thirty per cent., and has prevented that exodus of citizens which took place because of the lack of facilities for getting to business from the suburbs to San Francisco when travel by the old horse system was so uncertain.

In the city of Melbourne they are now laying down a very important series of lines under the cable system, and propose to expend seven million of dollars in the construction of it. They have already sold bonds in the city of London, $4\frac{1}{2}$ per cent. bonds, to the amount of two million five hundred thousand dollars, and are rapidly constructing the line. The city of Sydney is at present operated by steam motors, and they have become so obnoxious that it has been determined to supplant them by the cable system. The city of Edinburgh has already entered into a contract for the construction of cable lines there. The City of Glasgow is negotiating for a similar construction there. In Liverpool they are about to change their gauge from 4 feet $8\frac{1}{4}$ inches to 3 feet 6 inches, and they propose at the same time to change their system and put down the cable system. Other cities, Sheffield, Manchester and others, are moving in the same direction. A franchise has also been granted to the Cable Tramways Company to build underground railways in London, and to connect those now operated by steam by the cable system underground. The present system of operating the underground railways is by steam motors, and the result is that the tunnel is filled with gases, and while the people are compelled in order to save time to employ that mode of transportation, they would not adopt it from choice, because it by no means adds to their health. It is now proposed there to introduce the cable system, and to run the cars at about eleven miles an hour, including stops, which is about the speed on the New York elevated railroad, and about equal to the present speed of the several subways in London. That will remove all objections to the underground road in respect to gases, foul air, ventilation, etc. If that is applicable to subways, it is equally applicable to elevated roads. It is intended to expend on this conversion in the subways of London somewhere from £7,000,000 to £10,000,000 sterling.

I don't know that I can add very much more except to state that wherever the cable system has been introduced and tried, people are pleased with it. They feel relieved, from the simple fact that it does away with any anxiety as to trouble with the horses, and they feel they are not imposing upon animals to exert themselves to do all they can and more than they should in carrying them in their daily travel; besides, they are carried surer, quicker, cheaper and more agreeably. It is found by experience that there is less danger in entering and alighting with respect to cable railroad cars. This is a matter of great importance, especially in respect to children, aged and infirm persons; and I have been told more particularly by persons of advanced years, who find it difficult to get on and off street cars propelled by horses, that the cable system has relieved them of the immense anxiety in this respect. This is because the man in charge of the grip has nothing to do but to run that. His business is to manage the grip. His mind is left free except in regard to the grip, and he has complete control of it.

I have no statistics with respect to accidents with me, but from recollection I can state that last year there were nine accidents from horse railroads and seven from the cable cars; but, of course, the number of passengers carried by the cable cars greatly exceeded the number of passengers carried by the horse cars, probably four times as many. The bottoms of the cable railroad cars are guarded by fenders. It is only in cases of carelessness that accidents can happen. The fenders come within two inches of the surface. The fenders, however, do not run alongside the cars in all cases; in some cases they omit them because the companies consider that their use is not necessary, accidents being so few. While the system was new, an accident on the cable road was a great thing, and excited much comment, while an accident on a horse railroad was not considered, that being an old thing. But now we can run at a much higher speed, and with greater safety, than a horse car.

The space occupied in the street under the cable system is less than is occupied by horse railroads, and in the cars themselves, all the space possible is utilized for carrying passengers; everything, in fact, excepting a small space devoted to the grip.

A cable car can be stopped almost instantly. I have seen this incident on the grade of one foot in six feet: three men, apparently miners, had come to the town probably to see the sights, and apparently had indulged in somewhat of a spree, and under those conditions boarded a cable railroad car. It was in the summer time, and they took front seats and enjoyed the breeze, a gust of which lifted off the hat of one of them, who jumped off to get it, in front of the car, and fell within three and one half feet of it, and directly in front. The man with the grip saw him, released the grip from the rope, put his foot on the brake, and stopped the car before reaching the man, while the friends of the man, who had risen up in horror, ran forward expecting to find him mangled.

The capacity in the cable system is almost unlimited, and seats can be provided that cannot be provided in the horse railroad cars; double-deck cars can be run, or single-deck cars, or numbers of cars in trains in connection with one grip car; the necessities of travel can be met as they arise. There is generally a grip car. These vary according to the size; on the heavier grades they are lighter. They are made to run with seven passengers on a seat on each side up to twenty-four on each side. On the small cars where the dummy will seat seven on each side and the car will seat fourteen, I have known as many as sixty-five passengers to ride. Great altitudes can be overcome. In San Francisco the greatest is three hundred and seven feet in a distance of twenty-six hundred feet; it is on Clay Street. The cross streets are level, so that the cars must run up-hill and then level and then up-hill and so on.

I have no connection with the New York Cable Company. I have a small interest in the Cable Railroad Company of San Francisco, which has made some arrangement with the National Cable Company of the United States, but that is throughout the United States, and has no connection with the New York Company.

The Mexican Cable Tramway Company are about constructing cable roads in some of the cities of Mexico—where the temperature runs up to 100° and over in the shade. And in the city of Los Angeles, California, a cable line is being constructed, where the weather is very hot, and I may add that, while the cable system has demonstrated itself of so much value in a cold climate, subject to heavy snows, like Chicago, it has in like manner proved its very great value in extremely hot weather—this you will

realize in this City of New York during some of the exceptionally hot days of summer.

A. S. HALLIDIE.
Sworn to before me this 10th }
day of February, 1885. }

JOSIAH W. THOMPSON,
Notary Public,
N. Y. Co.

Mr. Holmes' Affidavit.

STATE OF ILLINOIS, }
County of Cook, City of Chicago, } ss.

CHARLES B. HOLMES, being duly sworn, deposes and says: That he resides in the City of Chicago, and has resided in said city for a period of fourteen years; that he is now President and Superintendent of the Chicago City Railway Company, and has been connected with that company for the period of twelve years last past; that the territory covered by said company is what is known as the South Side in the City of Chicago, which embraces a large portion, and almost the entire business portion of said City of Chicago, and that the number of miles under operation by said railway company is eighty-seven (87) miles of track, a portion of which extends south of the city limits of the said City of Chicago; that said railway is operated from Lake Street in said city southward on State Street to Sixty-third Street, a distance of seven miles, with a track also upon Wabash Avenue extending to Twenty-second Street; thence on Twenty-second Street and Cottage Grove Avenue to the city limits, a distance of five miles, and that up to the year 1882 the cars on said street railway had been drawn by horses, and that upon an investigation of the so-called cable system, as it was then in operation, in the City of San Francisco, a cable system was adopted in the City of Chicago by said Chicago City Railway Company, and since the year 1882, and up to the present time, has been in active and successful operation; that the cable system is in operation on said road on State Street, north of the city limits, and on Wabash Avenue, Twenty-second Street and Cottage Grove Avenue, and, in general terms, this affiant says that the cable system has been, both so far as the public and the company are concerned, eminently successful. That for the first few months after said cable system was adopted, it was, to a certain extent, experimental, and necessarily so, and that for the first six months after the inauguration of the cable system the accidents were more numerous than at any other like period of time under the old system of drawing by horses. This affiant states that in all the accidents that occurred during those first six months, there was but one which was not fairly and directly attributable to the carelessness of the parties injured; that methods were immediately devised by said company for preventing such accidents, and that since that period of time, with the application of these methods, the accidents under the operation of the cable system have been less in point of number and severity than under the old system, and under the present management and methods an accident which would be at all serious in its character is almost an impossibility. The wheels are so guarded and protected that it is impossible, even with the utmost recklessness, for a person to get beneath the wheels, and it is practically impossible that an injury at all serious in its character should be suffered by any one in the streets or traveling upon said cars.

This affiant further says, that the rate of speed under the present cable system in the City of Chicago averages about nine miles per hour, and that under the old horse system the maximum rate of speed was six miles per hour. Under the present system, whenever occasion demands it, long trains made up of several cars are drawn, which would be an impossibility under the old method, and that by means

of the automatic momentum brake employed on the roads of which this affiant is president and superintendent, the brake is brought to bear upon every wheel in the train, and the cars can be stopped more readily even than a single car drawn by horses, and the longest train can be brought to an absolute stop within a distance of ten to thirty feet. This statement is not theoretical, but is the result of actual experiment and experience. Ten cars, containing over one thousand people, have been drawn behind one grip and stopped as stated.

In the practical operation of the cars under the cable system, great advantages are found in the rapidity and ease with which cars may be started. They may be brought from a dead stop into a rate of speed of nine miles per hour almost instantly, and without jerking or surging of the cars.

The supposed injury to horses by the slot is imaginary and fanciful, and perhaps that is about all that can be said on that subject. The slot can be so protected that the injury to horses from it is practically an impossibility, by having the top of the irons which form the slot made of an oval shape.

As to the sanitary effect of drawing cars by cable instead of by horses, thus getting rid of the voiding of about twenty-five hundred horses, as is actually done, this branch of the subject may be considered, perhaps, as somewhat theoretical; but, that there is a most substantial difference in sanitary effects from this one cause, is too obvious to require comment. The most superficial observation of those streets where horses are used, compared with those where the cable system is employed, will be sufficient to demonstrate the importance of this consideration as between the two methods.

With regard to the effect upon the values of real estate by the cable system, much more definite conclusions can be reached, and this affiant is prepared to state that such appreciation over the lines operated by the company of which he is the president and superintendent as aforesaid, are very marked and decided. A few instances will perhaps illustrate this branch of the case. A house and lot purchased for \$1,000 two months before the construction of the cable system, was sold within six months after the line was in operation for the sum of \$5,440, a gain of \$4,440, attributable exclusively to the construction and operation of the cable system, and that is only a fair sample of many instances. The whole extent of the appreciation of real estate by reason of the substitution of the cable for the horse system can, with entire safety, be said to be largely in excess of the expense of the entire system itself. The substitution of the cable system in place of the horse method has added to the value of real estate on the lines where it has been operated many millions of dollars, and it is really and substantially so much added to the real and substantial wealth of the city, or that portion of the city wherein the cable system is in operation. The appreciation of real estate is not limited to the mere streets upon which the cable road is operated, but to the cross and parallel streets for quite a distance either way.

Affiant states that with all the experience which he has had under the cable system, he has been unable to discover that there are any objections to it based merely upon the ground that certain streets over which it passes are narrow, but that, where the street is narrow, experience has demonstrated that cable-cars are greatly superior to horse-cars, for the reason that the rate of speed may be absolutely regulated—starting and stoppages are under complete control, and for these reasons the cable system, as to narrow streets, is greatly to be preferred in practical operation to the old method of drawing by horses. In San Francisco many of the streets are very nar-

row, and the cables are operated without difficulty. Any objection that the cable system upon narrow streets interferes with truckage, absolutely fanciful, and the actual experience of this affiant is in that case as stated. This affiant states from observation and theorizing on the question as a matter of actual experience, that, under the cable system, the turning of short corners is as feasible and practicable as under the horse-car system. We know that it can be done, even to so short a curve as a thirty-five foot radius.

This affiant further says that he has passed over the lines of the New York system, as illustrated in the map annexed to the affidavit of A. S. Hallidie, and in the judgment of this affiant, after a careful examination of those lines, the system as applied to and operated upon those lines, is entirely feasible, and can be operated without the slightest injury to any other interest, and with perfect practicability.

Testing the operation of the cable system in the city of Chicago by public opinion, it will perhaps be sufficient to say that the surest way to raise a public clamor is to attempt, when any accident occurs which renders it necessary, the substitution of horses for the cable, and under which the public would have the same facilities precisely as it formerly had. In the city of Chicago, and particularly upon the South Side, in public judgment the cable has become a necessity, and is finally demanded as a right, and nothing draws down upon the Chicago City Railway Company more hearty denunciation and criticism than the substitution of horses for the cable system, even for an hour, whenever the emergency does demand it.

It is proper to state in this connection that there are less break-downs and accidents under the cable system than under the horse system. This statement is made with reference to the running of cars during the winter season; but during any season of the year accidents, of a character which prevent the operation of the cable roads, are very infrequent and of very short duration, and not sufficient to weigh a moment against it as a regular system of transportation.

We have had in our experience under the cable system two detentions of short duration, and during which we were compelled to operate with horses on a portion of the lines, owing to weakness and defects in the machinery, which were promptly and easily remedied. Experience corrects all accidents and evils of this character, and the longer the roads are operated the less and less frequent become such detentions, until finally the system has, with us, ripened very nearly into perfection, and it is safe to say with regard to the practical operation of the cable system in the city of Chicago, that if it were put to vote, not one person of either sex out of ten thousand would cast his or her ballot for the restoration of the old method.

It is proper in this connection to say that the alleged failure of the cable-car system in other cities ought not to weigh against the system itself. In San Francisco and in the city of Chicago the system has been a success, and in the latter city a most marked and decided success, even during the most inclement winters which we have for a quarter of a century experienced.

A cable road operated on a basis of mere cheapness, with defective machinery and with an enforced economy which declines to pay royalties for patents indispensable for the proper operation of the system, cannot be made successful any more than a horse railway system can be successfully operated where the horses are crippled, and an economy attempted to be exercised by the use of poor or disabled horses, simply because they can be purchased for a less price than animals adapted for the purpose for which they were intended. I do not

say that any and all systems of cable roads can be made effective, but I do say that such a system as is in operation in the city of Chicago is effective, and has been so for several years, and both, so far as the company and the public are concerned, useful and remunerative.

It is a notable fact worthy to be here mentioned, that the intense frosts that we have had in the city of Chicago for the last three years have not affected the construction one particle. During the past winter the thermometer has ranged for week after week below zero; great bodies of snow have fallen, and yet the cable roads have been operated without a detention worthy of note or mention. In one instance the machinery was broken after the storm was over. This applied only to a portion of the line. The delay was something over two days, during which time, over the line thus affected, horses were substituted, and the defect was permanently remedied by strengthening the parts which were found upon investigation to be weak.

This affiant further says that if his company were so situated that it could not use horses, or had none to use in case of accident, all contingencies could be well covered by having machinery and cables in duplicate, which would prevent any detentions whatever, with small additional original outlay.

Practical experience has also demonstrated that the system can be operated as effectually in hilly regions as in level ones—such as is the territory occupied in Chicago—and in such regions the cable system possesses great advantages, obvious to the most superficial observer, over the horse-car method. The cable system does not tire; it never becomes fatigued, and operates at fifty per cent. greater speed than is possible with horses, even on level lines.

In point of fact, it is the conclusion of this affiant that the horse-car system must gradually go out of operation, and that it will soon, under the decisive teachings of practical experience, become a scheme and method of the past, especially in large cities.

The most marked and decided effect of the adoption of the cable over the horse system is the improvement in the grade of men employed, and not only an improvement in the grade of men generally, but improvement in the same man, when he is promoted from the driving of a horse to the handling and management of a cable car.

CHARLES B. HOLMES.

Subscribed and sworn to before me }
this 16th day of March, A. D. 1885. }

EDWARD JAEGER,

[L.S.]

Notary Public.

STATE OF ILLINOIS, }
Cook County, } ss.

I, M. W. RYAN, Clerk of the County Court of Cook County, the same being a Court of Record, do hereby certify that Edward Jaeger, Esq., whose name is subscribed to the annexed jurat, was, at the time of signing the same, a notary public in Cook county, duly commissioned to administer oaths; that I am well acquainted with his handwriting, and I verily believe that the signature to the said jurat is genuine.

In testimony whereof, I have hereunto set my hand and affixed the seal of said Court, at the City of Chicago, in the said county, this 16th day of March, 1885.

[L.S.]

M. W. RYAN,

Clerk.

SUBSCRIBE.—If you have not already become a subscriber for the STREET RAILWAY JOURNAL it will pay you to send a dollar, and receive the paper regularly. It is the aim of the publishers to make various improvements in the paper.

Car Heating.

EDS. STREET RAILWAY JOURNAL:—

Allow me to give the readers of your journal the benefit of our experience in heating cars. We use a small anthracite stove (made by a New York firm), which is devoid of complication and which takes up the room of but one passenger (a piece of the seat being removed and the stove placed therein). To this stove we had the following objections:

First. The bottom of the stove being round would not permit the use of an ash-pan, and the conductor or driver had to remove the ashes, a small shovel full at a time, into a bucket, which sent the dust all over the car.

Second. The accumulation of foul air, gas, &c.

Third. Passengers spitting on the floor and stove.

Objection first we overcame by having a cast-iron box attached to the bottom of the stove, inside of which is an ash-pan that is emptied from the *outside* of the car, thus promoting cleanliness and saving time.

Objection No. 2 we overcame by taking the glass out of two ventilators on each side of the car and putting in fine screen wire, thus permitting pure air to circulate at all times.

As to objection No. 3, we have partly overcome it by having the following card placed prominently in the cars: "Gentlemen are requested not to spit upon the floor." When an alleged gentleman fails to notice it we call his attention to the same.

There is not the slightest doubt in our minds that the stoves increase

travel, and when properly cared for will be a source of financial gain to any company and a comfort which the traveling public has a right to expect.

C. W. G.

The First American Street Car.

47 East 27th St., New York, }
March 27, 1885. }

MESSRS. EDITORS:—THE STREET RAILWAY JOURNAL of February, 1885 says to its readers:

"Passenger street cars were first used in cities in the United States as early as 1840." See cut herewith of the car "John Mason" which was designed, constructed and used at the opening of the first section of the first street railroad by the New York & Harlem R.R. at that time extending from Prince Street to 14th Street, *via* the Bowery in the City of New York. The writer was there and rode in the car with the Mayor, Aldermen and invited guests of the City of New York.

JOHN STEPHENSON.

Ventilation of Stables.

The following paper, by Mr. Augustine W. Wright, member of the Western Society of Engineers, and Superintendent of Track

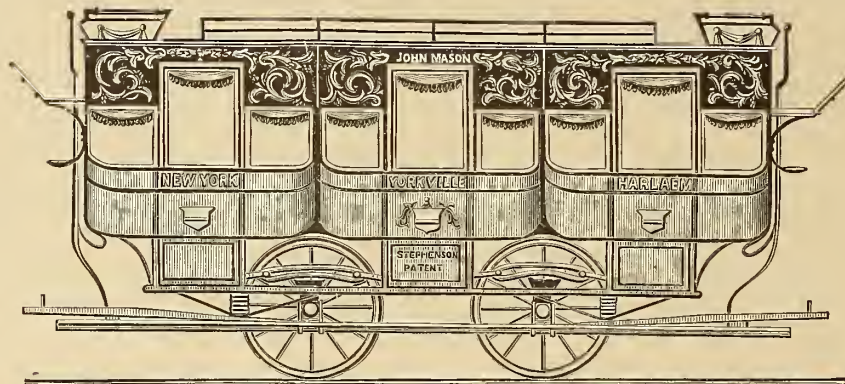
and Construction, North Chicago Railway, was read before the Association on February 3d, 1885. We copy from the *Journal of the Association of Engineering Societies*. It will repay a careful reading:

About six years ago, it became my duty to prepare plans for a stable to contain two hundred horses engaged in the street railway service of this city. These horses spend about twenty of the twenty-four hours per diem in the stable. The horse is a sensitive animal, and his diseases closely resemble many of those under which his master, man, suffers. I enlarged upon this fact in a paper that I had the honor to read before you, entitled "Stable Construction," in July, 1884, and I trust you were so convinced of these facts, that it is not now necessary to say more upon that subject. Realizing the paramount importance of ventilation, I desired to ascertain the proper amount of air to provide for each animal. I turned to my engineering library, and consulted book after book, in vain, for the desired information. I then went to one of the prominent engineers of this city, and asked him "How much air does a horse breathe per minute?"

He said: "Well, I don't happen to remember just now, but about the same

"How much air does a horse breathe per minute?" He said: "He breathes—he breathes (hesitatingly)—well, I don't remember just now." I asked in vain four other physicians, and veterinary surgeons. All *started* to answer the question, hesitated, and finally said they did not remember, but would look it up. This they did in vain. One said he had a friend, a physician, in the country, who was greatly interested in the horse, and no doubt *he* would know; but he could not answer, and I was perforce compelled to assume a certain amount, and made by ventilators 6' x 6' on plan, tapering to 4' x 4', and 20' height, allowing one such for each forty horses. Assuming that air expands $\frac{1}{450}$ of its volume per degree Fahrenheit, and that it is winter weather, the interior of the stable being 15 degrees warmer than the exterior air—for in my opinion the horse enjoys better health if the stable temperature varies only 10 to 20 degrees from the exterior air than he does in a hot stable—the air inside the stable would lose in weight $20 \times \frac{1}{450} = .612$ foot. That is, it would be lighter than the outside air by the weight of a column of air .612 foot high. The velocity with which the outside column would try to get in at the base of this shaft would be governed

by the same law as that of a body falling through the space of this excess of height. The formula for this velocity is $V = \sqrt{2gh}$, *g* representing the force of gravity, here 32 about, and *h* the height or space through which the fall is made; substituting, we have $V = 8 \sqrt{0.612} = 6.26$ cubic feet per second; but we must deduct from this amount the loss by friction of the air against



FIRST AMERICAN STREET CAR.—BUILT BY JOHN STEPHENSON.

amount as a man." I thought it must be greater, and turned to the Public Library, where I examined every book that I thought might contain the information, but could not find it. Not disheartened at my failure, I looked through half a dozen other leading works upon the horse, but could not secure the coveted information, although Stonehenge contained the following: "By common consent, it is allowed that no stable, divided into stalls, should give to each horse less than 800 or 1,000 cubic feet;" and the *Civil Engineers and Architects' Journal*, 1841, page 103: "The committee of the Academy of Paris, to whom the question, What is the quantity of air necessary for the healthful respiration of the horse? was referred by the Minister of War, reported that in a building where the air is properly renewed, and that result is effected by a skillful and efficient system of ventilation, a horse can never suffer so long as he has from 25 to 30 cubic meters of air," 883 to 1,060 cubic feet. These statements did not solve the problem. I had arranged already to give each horse 1,216 cubic feet of space, but I desired to know *how much air per minute* he must have. I now turned to the medical profession, and to a well-known doctor propounded the question:

the sides of one ventilator. Being a straight box with smooth sides, this loss will probably not exceed 0.3 of 6.26 cubic feet, say 1.90 cubic feet. Deducting this amount from the former leaves 4.36 cubic feet per second passing through each ventilator; multiplying by 3,600, the number of seconds in one hour, and dividing by 40, the number of horses supplied by the said

$$\text{ventilator, } \frac{4.36 \times 3,600}{40} = 392.4 \text{ cubic feet}$$

per hour per horse, as supplied under the foregoing conditions. In summer the doors and windows are open; and as most of my stables have light and air from four sides, through many openings, there is no trouble about ventilation at that time of year, I located my gas burners that light the stable under the said ventilators. The part they perform, assisting in the ventilation, is important. There are two four foot burners under each ventilator. The quantity of heat evolved by the combustion of a cubic foot of ordinary illuminating gas is estimated at 700 heat units. The two burners would therefore evolve $2 \times 4 \times 700 = 5,600$ heat units per hour, or 93.3 per minute. The specific heat of air is 0.238 nearly. A

cubic foot of air at 45° weighs 552 grains
552
— = .0789 lb., so that to ascertain how
7000

many cubic feet of air at 45° would be
heated 1° by burning two four-foot burners
per hour we have $\frac{93.33}{.0789 \times 0.238} = 49,701$ cubic

feet, or 15,696 cubic feet, the amount pass-
ing through as per above estimate, heated
3.1°. Air expanding $\frac{1}{490}$ [for each 1° of

temperature, we see here additional power
to carry off the impure air. These figures
apply to the ventilator provided to carry
off the impure air. Provision is made to
admit fresh air through flues beneath the
floor, extending clear across the stable,
with an exterior opening at each end, cov-
ered with iron grates, to exclude rats, etc.
Its cover is perforated, so that the air is
broken up and admitted without drafts.
The mangers on each side are boarded up
44 inches high, affording additional protec-
tion to the horse against drafts. The ven-
tilator above the roof was first built with
slats on its four sides, like ordinary blinds,
moved by ropes extending to the first floor
to regulate the amount of opening; but we
found it impossible to prevent downward
drafts, chilling the horses. I then changed
the construction; took out the slats, and
put in a slide with an angle board inclined
at 45° on the four sides. The wind is thereby
deflected upward. These slides are moved
by ropes extending to the ground floor, and
we now have no trouble from a current in
the wrong direction. I would also state
that I built numerous air flues in the brick
walls at first, but had to stop them up, as
the current passed through in the wrong
direction. Instead of going out, cold air
came down, and blowing upon the adjacent
horses, chilled them.

Some months since the Boston *Journal of
Chemistry* opened its columns for "Ques-
tions and Answers" to matters of general
interest. Recognizing the eminent ability
of Dr. Nichols, and believing that amid its
numerous readers were many among the
owners of the fourteen millions of horses
possessed by this country, I propounded
my so often asked question, "How much
air does a horse breathe per minute?" It
was not answered until the January num-
ber of the present year contained an edi-
torial entitled "Ventilation of Stables,"
from which I quote: "According to author-
ities on ventilation, a man makes twenty
inspirations of air per minute, each inspi-
ration being of a volume equal to 40 cubic
inches; so that he requires 800 cubic inches
per minute of fresh air to supply him with
the necessary health-giving pabulum for
his lungs. Each expiration unfits for
breathing twice the bulk of fresh air; that
is, the 800 cubic inches expired per minute
contaminate 1,600 cubic inches of fresh air,
or nearly a cubic foot. Hence, in round
numbers, a man requires a cubic foot of
fresh air per minute, or 60 cubic feet per
hour. * * * A horse or cow is said to
have six times the breathing capacity of a
man; so that it will require 360 cubic feet
per hour. These figures agree quite closely

with the amount I furnish each horse, as
above stated, 392.4 cubic feet.

According to Pettenkoffer, an average
pair of human lungs exhale about 15 cubic
feet of air per hour, but authorities differ
as to the proper amount of fresh air needed
to keep the air in a fit state of purity.
Péctet, calculating from the quantity of
carbonic acid produced, says 5 cubic feet
per minute per individual. Reid, adding
for an amount to carry off all the contam-
inations resulting from human life, says 10
cubic feet. Arnott and Roscoe, 20 cubic
feet per minute. Worthen allows 3 cubic
feet per minute. Haswell states: "Each
person requires from 3 to 4 cubic feet of air
per minute." Box considers $3\frac{1}{2}$ cubic feet
per minute the minimum quantity neces-
sary for cleanly and healthy persons. Phil-
breck thinks 50 cubic feet per minute the
proper allowance, and Dr. Billings allowed
60 cubic feet per minute in the John Hop-
kins Hospital. Curtis, in his "Fresh Air
in the House," states: "The mean number
of respirations per minute in the case of
1,407 healthy males was found to be
eighteen. * * * Then, if we take 230
cubic inches for the quantity of air neces-
sary to a man of medium height for each
breath and multiply this by the number of
respirations per minute, we shall get some-
thing like the quantity required, and which
will give us 2.39 cubic feet as the fullest
measure." Surgeon-Major F. de Chaumont,
in a paper "On the Theory of Ventilation,"
estimates the cubic feet of air needed per
individual per hour, calculated from Angus
Smith's estimate, that the amount of car-
bonic acid expired per hour per individual
= 0.450, at from 530 to 2,460 cubic feet; by
Dr. Parke's formula, CO₂ = 0.600, from
700 to 3,280; by Pettenkoffer's estimate,
CO₂ = 0.705, from 825 to 3,850. He adopts
Dr. Parke's formula. Seven hundred cubic
feet per hour per individual gives "a very
close atmosphere; 3,280 cubic feet 'fresh,'
no appreciably different sensation from the
outer air." Gen. Morin, by actual experi-
ment, found "different numbers of cubic
meters of air per hour are required for dif-
ferent purposes. In hospitals for ordinary
illness, 60 to 70 per hour, for each patient;
the wounded require 100. Persons suffering
from epidemics, 150. In prisons 50 are
enough. In ordinary workshops, 60. In
barracks—by day, 30; by night, from 40 to
50. In theatres, 40. In stables and stalls,
180 to 200." These figures, being in cubic
meters, must be multiplied by 31.3156 to
reduce them to cubic feet. Having done
this, we find that from 939 cubic feet for
the individual in the barracks to 4,697
cubic feet for the wounded are deemed
necessary for each individual per hour by
Gen. Morin, and from 5,637 to 6,263 cubic
feet per hour for each horse. The English
army regulations at the present time are
said to allow to each horse a space of 1,605
cubic feet, 100 square feet of floor and 2,466
cubic feet of fresh air per hour. Philbreck,
in his admirable work, "American Sanitary
Engineering," states: "The standard of
purity (of the air) must be a conventional
and arbitrary one, fixed by experience and
adapted to the class of occupants by whom
a building is to be used." Applying these
words to stable ventilation, permit me to

affirm that experience demonstrates that
our ventilation is sufficient. R. Atkins,
Superintendent of the Horse Department
North Chicago City Railway, reports:
"The number of horses owned at the pres-
ent time, 1,658; average number owned
during 1884, 1,500; average number unfit
for duty from all causes, 38½; but this in-
cludes a number of new horses (over 150)
purchased fresh from the country to stock
a new line, who suffered from distemper in
being acclimated. Excluding them the
average was 32, or about 2 per cent. Forty-
five horses died during the past year—14
from accidental injuries, 10 from colic, 5
from lung fever, 4 from paralysis, and 12
from 8 other diseases." Deducting the 14
from accidents and 10 from colic, leaves 21
deaths only that might have been remotely
affected by ventilation, or 1.4 per cent.
Surely this experience indicates ample ven-
tilation. Having given so much time to
this matter and believing it to be of general
interest, I take great pleasure in submitting
the same for your consideration.

The "Providence" Rail and Track.

In reply to inquiries we give, on the au-
thority of Mr. Longstreet of Providence,
who controls the steel girder rail track
shown on the front page of our issue of
February, the following estimate of the cost
of material for one mile of street railway:

1. ORDINARY TRAM RAIL CONSTRUCTION.	
	52 lb. steel rail.
82 Tons Rail at \$40	\$3,280
352 Joint Plates at 60c	211
6 Tons Knees at \$50	300
3,200 lbs Spikes at 3¼c	100
32 m. ft. Hard Pine at \$23	736
700 Chestnut ties at 35c	245
700 Iron Ties at 35c	245
	\$5,147
2. PROVIDENCE STEEL GIRDER RAIL CON- STRUCTION.—Same wearing head.	
82 Tons Rail at \$48	\$3,936
25 Tons Castings at \$45	1,125
700 Iron Ties at 35c	245
60 Bbls. Cement at \$1.30	78
	\$5,384
Less saving in labor over No. 1, at least	300
	\$5,084

MEMO.—The girder rail is figured at \$8 per ton ad-
vance over tram, which will cover extra cost of man-
ufacture and all patent rights.

The St. Louis Cable Railway.

The contracts for the St. Louis Cable
Railway are let, and work begun. The
new road will connect the central business
portion of the city, from near the entrance
to the great steel bridge over the Mississippi,
with the western suburbs, whence connec-
tions are made with the West End Narrow
Gauge Railway, extending some twenty
miles into the country. The route is from
Sixth and Locust Streets, between the Gould
and Barr buildings, west to Thirteenth
Street, thence north to Lucas Avenue,
thence west to Fourteenth, thence north to
Wash, thence west to Leffingwell, thence
to Franklin Avenue, thence west to Grand,
thence south to Morgan, thence west to
the Narrow Gauge Depot. The route down
town will be the same, taking in the new
post office and the new exposition building.

— THE —
**STREET RAILWAY
JOURNAL.**

MONTHLY, \$1.00 PER YEAR.

E. P. HARRIS, General Manager.
P. G. MONROE, General Western Manager.
ROBERT GRIMSHAW, M. E. Editor in Chief.
G. B. HECKEL, Associate Editor.

AMERICAN RAILWAY PUBLISHING CO.

32 LIBERTY ST., NEW YORK.

8 LAKESIDE BUILDING, CHICAGO.

S. L. K. MONROE, Sec'y and Treas.

BRANCH OFFICES:

Eastern District, 8 EXCHANGE PLACE, BOSTON, MASS.
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delphia, Pa. G. B. HECKEL, Manager.

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Special Notice.

Street Railway officials and others interested, who have not yet subscribed for the STREET RAILWAY JOURNAL, should do so at once, so as to receive the back numbers. An index will be printed at the end of the year, embracing the first twelve numbers—constituting a most valuable fund of information. The price (ONLY ONE DOLLAR) should place it in the hands of every practical street railway man in the country.

Street Railways Public Benefactors.—I.

It is our intention in this paper and the following numbers of the series, to review the relations, past and existent, of the street railways to the public. The number now in hand will be confined to merely a general review of the subject, and in succeeding numbers we shall glance over the history of the institution, its development—showing that it has kept in advance of needs rather than behind them; legislation; improvement in methods, appliances and aids to comfort; closing finally, with a synopsis of the plans, work and possibilities of the National Association in America.

It may be laid down as a broad general principle, that no great enterprise can ever succeed unless there first exists a necessity demanding it. But present success is not always the most important thing to be attained, and often, where no demand exists for a thing, its very creation may awaken such a demand, and its prosperity be thus finally secured. The man or corporation that thus establishes an important device or system, and therewith creates, as it were, a necessity for his invention, is to be honored as a public benefactor of the highest order. And in this category the originator of the street railway—not Outram, whose honor is, after all, but perfunctory, but he who first opened up the streets of a great city to rapid and regular passenger transport—may well be classed.

In the ante-tramway (or, as we prefer to call it, street railway) days, city streets were narrow, foul-smelling, ill-paved, and, at night, dark and dangerous. The lumbering stage coach, indeed, performed its "semi-occasional" journeys from town to town, and the European modification of the Japanese *jin-riki-sha*, or "man-power carriage"—the chair borne through the narrow lanes and alleys of unprogressive cities—together with a few detached hacks or cabs, but poorly represented the service and convenience now performed in every borough of the United States and the rest of the civilized world.

To understand the importance of this modern means of transit to commercial and personal life in cities, it must be remembered:

(1.) That a street railway is impossible without at least passably good road-beds, and good roads almost necessitate fair sidewalks.

(2.) That good drainage is requisite to the maintenance of good roads.

(3.) That a street railway requires something wider than a mere lane or alley, and that wide streets mean light, air, ventilation and health to the dwellers thereon.

(4.) That the regular transit of closed vehicles, which may be used at a cheap fixed price, renders locomotion possible in all weathers without prejudice to health or comfort, and thus improving the facilities for business and social intercourse directly benefits all the inhabitants of a town possessing such facilities, and directly improves the value of properties situated on streets having them.

(5.) That corporations operating upon a large scale and having the special privileges for which only such corporations can offer adequate returns, are enabled to perform at a smaller expense and on a lower percentage of profits, more regular and satisfactory and cheaper services than the enterprises of individuals could possibly offer.

(6.) That success is always dependent upon the acceptable performance of needful services, and that success, in the case of street railway companies, is therefore dependent upon the adequate accommodation of the public, and that the greater the success, the greater, necessarily, the benefits rendered.

On these propositions we shall base our future articles. M

The Car Heating Question.

In view of the fact that our past comments on this subject appear to have misled some of our readers, and placed us in a false light before them, we publish this in explanation of our position.

The question whether cars shall or shall not be heated is, we take it, one which concerns the street railway companies alone, and in its settlement the public has absolutely no right to consideration, save in the light of patrons. It is a matter solely of dollars and cents, and the only problem to be solved is this:—Will it pay better to heat cars or not to heat them? It is, furthermore, a local question, and the fact that car-heat-

ing has proven successful or unsuccessful in one city cannot decide whether it would be profitable or unprofitable in another. If the people refuse to patronize unheated cars, or if a sufficient additional number would use the heated cars, there is no company which would not hasten to supply the desired accommodation, always providing that a practicable method can be found. But in cases where companies refuse to heat their cars, we take it that after canvassing the grounds, they have come to the conclusion that the prospective increase of profits will not justify the added expense. It is usual with unreflecting people to look at such matters from a sentimental or a partisan standpoint. Street railways, like all other enterprises, are purely business ventures, and a passenger has no more moral right to demand of the corporation heat in the car which he patronizes than he has to demand a pound of sugar as a bonus on the pound of tea which he buys of his grocer. "The public," in the eyes of newspaper writers, is a sort of gigantic autocratic monster, to be worshipped and flattered and pampered, like a Burmese white elephant, and possessed of an inherent right to set foot, when the whim moves it, upon a whole detachment of its devotees and crush them out of entity. But the fact is that the public is merely a collection of individuals, each naturally desiring to get what he wants at the lowest price; and the public has no "right" which obligate any corporation or individual to give it something for nothing, or, in other words, to perform an unprofitable service?

If it will pay to heat our cars, let us heat them; if it will not pay, they should remain unheated—now, are we comprehended? C.

Beneficent Monopolies.

Just now (the past year having been an election year), readers of the daily press are condemned to see a great deal of philippic literature directed against "grinding monopolies." In New York and some few other unfortunate states the target of abuse is, at present, the street railways, just as in the far West, the steam roads are made the scapegoat of "near"-eyed grangers and wide-mouthed borough politicians.

It is a rather startling proposition to advance, but has it ever occurred to our readers that in the present age of free competition, there can be no such thing as a "grinding monopoly?"

If a *fiat* law could give to a single man or body of men, the unlimited and exclusive control of one of the absolute necessities of life, that would be a "grinding monopoly;" but in regard to things which people are able to accept or reject, we fail to see how a monopoly can be oppressive.

In the case of a street railway, a body of individuals, under certain just or unjust restrictions, is permitted to erect facilities for performing a certain service, and in return is guaranteed certain privileges. If the services are poorly performed, the road is not patronized, loses money, and, in the natural course of events, finally finds its way into more capable hands. A line in this final condition of successful manage-

ment, catering to the demand it has assisted in creating, enhances the value of adjacent property, attracts investment and settlement, and (*sometimes!*) reaps a handsome reward. Now, why, in the name of logic and common sense, should a successful road of this latter class be considered more obnoxious than an unsuccessful one—or indeed, as much so?

Undeserved success, be it remembered, is next to the problematical "honest man" of Diogenes, the rarest thing in the world; and when a street railway company (or, in fact, any other sort of company) attains the happy position of being able to say heavy dividends, it is nine chances to none that its superior success is due to superior enterprise and merit.

We have been trying to comprehend, but have not yet succeeded in doing so, why a street railway company earning more than a penurious dividend, should be subject to public crimination, newspaper abuse and the hounding of legislative demagogues, any more than a bank or a manufacturing corporation. The anomaly is all the more apparent when it is remembered that there are very few commodities to be had at such a ridiculously low figure as street railway transportation. In Philadelphia, for instance, one may ride something like fifteen miles on a single six cent fare; in New York, five cents will entitle one to ride about fourteen miles; in Brooklyn the same amount will cover about eight miles, while in Chicago for the same price, nearly the same distance may be traveled. These figures are merely approximate, but it will serve to illustrate the general cheapness of this commodity, when it is remembered that steam railway transportation is considered very low at two cents per mile, and that shoe leather costs a constantly walking man at least three dollars per month; all things considered it seems more rational to attack the shoemakers than the street railways.

These points are worth considering, and holders of street railway securities need not fear but that the calm good sense of the community will finally repudiate any action looking to the curtailment of their facilities or the crippling of their resources, in spite of the biased pleadings of interested politicians. M.

Some Features.

It will be observed that this issue of the STREET RAILWAY JOURNAL is considerably enlarged, and we trust our readers will find it also materially improved. This enlargement will be permanent, at least to the extent of four pages increase over our past editions; while we hope to make each number more acceptable to our readers than the one preceding. Our object is to represent in every sense of the word, the street railway interests of the Americas, and (as far as they care for our assistance) those of other lands. To this end we invite assistance and co-operation. Tell us what you want and we'll try to furnish it; tell us what is least valuable to you that we may know what we can afford to omit. Our sole aim is to be useful to you,

and so merit your hearty support; and to this end we shall always esteem frank criticism even more highly than frank commendation. If any of our articles displease you, tell us so, giving your reasons; for we are privileged, by the rules of rhetoric, to consider silence as giving assent.

In this number will be found considerable cable railway matter, which should be of interest at the present time, and with other interesting articles and notes, a specially valuable paper on stable ventilation, by Mr. Augustine Wright, M. E., of the Chicago North Side Railway. We hope in the future to have a first-class "horse" department, and until we can secure the proper organization for its thorough conduct, will try to give hints and notes in that line, which shall not be without value.

Now, can we rely on our readers for hearty assistance?

Concerning an "Equine" Department.

Several very good friends of the STREET RAILWAY JOURNAL (friends in words, in deeds and in dollars) have urged upon us the great desirability of a veterinary, or more properly speaking, an "Equine" department. The more we think of the suggestion, the better we think of it; the horse is at present the important factor of both profit and expense in the street railway business, and it is a perfectly safe assertion to make, that less is generally known about the animal (physiologically and psychologically) than about anything else connected with the business. How little is known definitely, for instance, about feeding—the proper food for certain work, or the proper variations of food with the changing seasons. This is ignorance of equine hygiene, and ignorance in matters of equine pathology is even more striking. Yes, we are convinced that an "Equine" department would be valuable, and we promise our subscribers such a department as soon as we can arrange for its conduct by a competent specialist—for it demands a specialist to make such a department of permanent, practical value. Meanwhile, the following notes may be found useful by some of our readers:

Anthrax or *Charbon*: This disease—common in some portions of Europe, where it becomes, at periods, a veritable plague, is, fortunately, rather rare in this country. Pasteur, and other eminent microscopists, have demonstrated it to be a "germ" disease, communicable only by direct infection, but very virulent. In one district of France, it was shown that earthworms, by carrying the germs from buried cattle which had died of the disease, to the surface, spread the contagion through the grazing herds of an entire district. Dr. R. S. Finlay, V. S. (Veterinary Editor of Wilkes' *Spirit of the Times*), says of it in that paper:

"Anthrax (called by some *charbon*, from the fact that the tissues diseased are of a black color; also termed splenic apoplexy, gloss anthrax, carbuncular fever, miltzbrand, black leg, black quarter, splenic fever, Texan fever, etc.) The same indica-

tions for treatment are manifest, with slight modification, according to seizure. Symptoms: An animal that has been thriving well is suddenly found feverish, with rapid heart's action increased to 100 to 120 pulsations per minute, mouth hot and dry, conjunctiva deeply injected, with, in many cases, petechial spots visible. In a short time swellings are noticeable in the quarters or loins, tender to the touch, with stiffness in moving, lies down a good deal, with unwillingness to get up, appetite lost, rumination suspended, bowels constipated, urine scanty and very highly colored, almost blood-like. Second stage: The swellings increase and lose their sensibility to touch, become dead, gases form in their interstices, producing crepitation when handled, from their breaking down and decomposition; absorption of the putrid substance occurs, resulting in blood poisoning, delirium and convulsions or the opposite condition, coma, with failure of the heart's action, and death in some cases, in a few hours. Post-mortem appearances are those of tarry-colored extravasations of blood found in every organ, with petechial spots in the bowels, and, in some cases, ulceration. Pasteur thinks well of vaccination with a modified virus. His experiments are published, and are worth while perusing. He has proven the existence of a specific virus, communicable from one animal to another. We are of the opinion that a timely adoption of a strict quarantine, with isolation and the administration of sulpho-phenol, alternated with ammonia-phenol, will check the incubation and invasion of the disease."

He also says that he has frequently found "following in the trail of 'epizootic,' certain structural changes in the membranous lining of the respiratory passages," which produce symptoms showing difficulty in breathing, under work, without other marks of disease. As "epizootic" has been epidemic in most parts of this country at some time during the past few years, Dr. Finlay's prescription may be found of value in many places. He says that these cases "require care in feeding to avoid dust or over-distension of the stomach. We would advise the food to be of a laxative nature and as small in bulk as possible. The use of ground flaxseed, as an addition to the feed, would answer the purpose, together with the following powders in the feed and watering a little and often, would be attended by beneficial results:

Acidi arsenicum, 1 drachm.

Glycyrrh. pulv. rad., 4 ounces.

Misce. Sig. Tablespoonful in the feed twice a day."

We Will Try to Deserve It.

Mr. Chas. W. Goodnough, of the Pittsburgh Union Passenger Railway Co., writes us pleasantly:—"We hope your paper will be a success, as we consider it of great value, and believe that it fills a long felt want in the street railway business."

To this we can only modestly return our thanks, and the assurance that we will try right along to deserve the success which our efforts so far have obtained.

"The Demon Varnish."

Following up some remarks in the JOURNAL OF RAILWAY APPLIANCES upon the cussedness of inanimate objects, as especially exemplified in varnish,* the discussion which had led to one or two animadversions against contract work, brought to his feet one gentleman who said:—"I am one of those contract fellows they talk about. I have tried this board method. I have tried the half and half method. The board method did some good, although I have seen some differences in boards I have used. I had rather hear the railroad men in regard to that matter, but any additional light I can offer I shall be very pleased to do so."

("The board method" consisted in painting a board and varnishing one half of it with one varnish, and the other with another. The "half-and-half method" consisted in varnishing one half of each side and of each end of a car with one varnish and the other with another varnish.)

It will be seen that even "the smallest worm will turn, being trodden on."†

It does not appear, however, that the "railroad men" who were so free to criticize the contract system, cleared their own skirts at all; for they in no wise showed where and why the contract system was wrong, nor how it could be bettered. This is all that was said in response:—"Mr. Stines: 'I think it is nothing more than fair to give those varnish men a chance.'" In other words, the railroad men knocked off the contract men's hats, and cut and ran.

But the ultimate result was that one varnish maker who had the good sense not to think that he "knew it all," got up and said:—"I would like to ask the gentlemen what they think the best varnish, that which dries with a strong tack, or one that dries without any tack with a hard surface at once."

This was "carrying the war into Africa." Customers growled, and he wanted to know what they were growling about, and what they wanted. He added:—"I have been a practical varnish maker for over thirty years, and my experience is that the varnish that dries on the surface will never stand as well as that that dries with a strong tack. If you take a microscope of ten power and look through it at the side of a car you will notice that the surface of the car is full of holes and still every one of these holes takes in the atmosphere, and in a little while that takes away the power of adhesion that is in the oil."

But even this gentleman, one "of the guild," could not resist this fling:—"Some varnish men pretend to say that they have got a varnish that will dry from the bottom up. I don't believe it."

Hit 'im again, he has no friends! He continues:—"When a varnish is dry it is composed of oil and gum, or ought to be. You will find that all varnishes crack from the surface, and paint cracks from the bottom."

Now what we want to know is why is it impossible for varnish to dry from the bottom, and yet possible for paint to crack from the bottom?

But the speaker adds something worth noting:—"If you could put on two coats of varnish rub it a very little and then polish it and close up all the pores, you would have a job that would last longer than any work we have at the present time."

He then adds, what we cannot agree in:—"The ammonia in the atmosphere is what destroys varnish. The presence of that ammonia in the atmosphere is what gives more trouble than anything else."

How about salt air? No ammonia in salt. But perhaps the next statement atones for the heterodoxy on the ammonia question. "I think that after a while you will all come to rubbing varnish with the hand. You thus fill up all the pores and the work will last longer than with two or three coats of finishing varnish without rubbing. I think it is better to rub in the first coat."

A member replies:—"You make them come together by the force of adhesion. Now by rubbing this surface off you scrape up this varnish on the same principle that the plasterer scrapes up his wall before putting on the second coat. The only objection I can see is to closing up the pores."

Here we have one man complaining that the pores do the damage, and another asserting that to close them up would be injurious. It reminds us of the two roads to Heaven, described by a darky preacher:—

"One am a broad and narrer way dat leads to destruction, and de udder am a narrer and broad way dat leads to perdition." "In dat case," ejaculated one of his sable hearers, "dis nigger take to de woods."

The pertinacious varnish maker, however, says in reply:—"I speak from experience. I have had for twenty-two years a customer who varnishes coach bodies. He has never used a particle of finishing varnish. He polishes up a coach with his hand and then sends it out as finished, and his coaches are not revarnished for five years. They last longer because he closes up the pores."

He adds as a parting shot against rival houses. "One man will send you a varnish that is half turpentine. It must get out and there is nothing for the paint to do but crack."


"Hits bleedzed ter be so" says Uncle Remus.

Now rises up a champion for the much berated varnish and says:—"I heard a theory advanced here this morning that varnish will crack paint. I never knew a varnish to crack paint, I have known varnish to crack, but that was the fault of the paint."

The last speaker of all leaves the matter about where it all started, on the border line between uncertainty and lack of definite knowledge:—"I think that the time a car should run before revarnishing is not a matter before the meeting to be determined; we cannot control it. I know some roads that allow their cars to run and never wash them, they let them run until they get so

dirty that they have to bring them in and paint them. I know others that wash their cars once a year. We wash our cars twice a year with soap and water. I find that a car washed in this way won't stand more than three washings before it needs revarnishing. We all know cars need washing before repainting. Another thing, the wear of varnish will depend upon the weather. A car run out now will wear longer than one run out next spring. To run them out of the shop and let them stand in the hot sun is worse than letting them run all the time, but as I said before, I do not think it is a matter we can decide. Our passenger cars will average two years before revarnishing, and they look as well as cars that have been revarnished in sixteen or eighteen months."

Double Lip Joint Plate.

A wrought iron continuous double lip joint plate* for 5-inch base centre bearing rail, to which our attention has been called, is approximately  shape in section; is reversible, and should in great measure protect the timber from the wet, between joints, and prevent it from rotting.

* A. Ayres, 625 Tenth Av., N.Y.

The Metropolitan Street Railway Co. of Boston is building thirty new summer cars, to be finished the first of May. The company will then have seven hundred and twenty full-size cars running on its road. It is introducing B. L. Randall's Eureka brake, which is considered a benefit both to the car and driver, giving him complete and easy control of the car at all times. It is also using Eaton's patent loose axle, in which each wheel acts independently, thus saving much friction in turning curves.

E. L. B.

IN LONDON the great Hughes Locomotive Works broke down by reason of their prolonged efforts to force the use of steam upon street railways and do away with horses.

THE PIONEER CAR is the "bobtail," but it soon gives way to the two-horse car. Three-fifths of all the cars now running in the U.S. are of the bobtail persuasion.

Power to Run the Brooklyn Bridge Cars.

Mr. A. H. Mathesius states that the "26x48" engines on the Brooklyn Bridge cable, working under 60 lbs. initial cylinder pressure, develop a maximum of 270 indicated horse-power; of which 56 H. P. (or about 20 per cent.) are needed to drive the machinery and cable. The minimum is 54 H. P.; mean, 162 I. H. P., got with a coal expenditure of 3 lbs. per hour per I. H. P. The "cabled" part of the run is 5,600 feet; grade, 3¼ per cent.; speed, 10 miles per hour, say 900 feet per minute; weight of train and load, 26 tons. Mr. M. thinks that if four-car trains were run, under the present distribution, they would run away with the machinery.

* See page 98 of our issue of March 2.
† Henry IV., Part III., ii., 2.

Personal.

MR. J. B. SLAWSON, President of the Central Cross-town R.R., N.Y., and Treasurer of the John Stevenson Co., is just recovering from a severe attack of pleuropneumonia.

A THOUSAND FRIENDS of Mr. Bidgood, General Superintendent of the 6th Ave. (N.Y.) line will learn with regret that he has resigned his position and gone south to regain his shattered health. Mr. Moore has succeeded to his position.

MR. ABRAM L. SMITH, late General Superintendent of the Dry Dock E. B. & B. R. R.R. Co. (N.Y.), has succeeded Mr. Wiley as General Superintendent of the 42nd Street, Manhattanville and St. Nicholas Ave. R.R. Co.

Notes and Items.

THE contract for wire cable for the St. Louis Cable Railway, has been given to Jno. A. Roebling, Sons & Co., Trenton, N. J. It is of steel wire, endless, 1½ in. diameter, 34,000 feet long, weighing 75,000 pounds.

WE have trustworthy information that the Citizens' Railway Company of Pittsburgh has leased the Transverse Railway Company's line, to take possession April 1st.

THE BROWNELL-WIGHT CAR MANUFACTURING COMPANY, St. Louis, received the contract for the rolling stock for the new St. Louis Cable Railway, consisting of 24 passenger and 15 grip cars. Cars must be run at intervals not exceeding five minutes, and the fare will be five cents.

THE NEW ALBANY RAIL MILL COMPANY received the contract for the conduit of the St. Louis Cable Railway, requiring 1,900 tons of iron.

THE SMITH, BEGGS & RANKIN MACHINE COMPANY, St. Louis, took the contract for engine and boilers for the St. Louis Cable Railway. There will be one Corliss engine, 24x48, sixty-nine revolutions, and three boilers, 60 inches diameter by 20 feet long, giving a capacity of 250 horse-power. Foundations for duplicate sets of machinery will be put in.

THE FULTON IRON WORKS, St. Louis, received the contract for the winding machinery, pulleys, sheaves, drums, etc., for the new cable railway in that city.

THE ATLANTIC AVENUE RAILWAY COMPANY, of Brooklyn, has (as we previously noted), recently purchased the Bergen Street Railway, and will connect the two at several different points. The contracts for the switches and other appliances for these connections, has been given to Mr. David W. Binns, of Walworth St. (27 to 39), Brooklyn.

ECONOMICAL STEAM TRAMWAY. — The Dewsbury, Batley, and Bristol Steam Tramways—the first ever constructed in England—worked by Merryweather 7-in. engines, show in the half-year's working accounts that the total cost of the running of the engines is 2.57 pence per mile, and the total expenses of the whole establishment, including locomotive charges, 5.16 pence per mile. This is one of the most economically worked lines in England.

LOUISVILLE CITY RAILWAY COMPANY.—The stockholders held their annual meeting March 12th, and elected as directors: Major Alex. H. Davis, Syracuse, N.Y.; H. B. Hanson, Saratoga Springs, N.Y.; St. John Boyle, E. C. Bohne, Theodore Harris, Alex. P. Humphrey and H. H. Littell, all of Louisville, Ky. The directors organized and elected Major Alex. H. Davis, President; St. John Boyle, Vice-president; H. H. Littell, Superintendent; R. A. Watts, Secretary and Treasurer. A dividend of three per cent. from the earnings of the past six months (payable April 1st) was declared.

AMOS FREE has been made Superintendent of the Watervliet Turnpike and R.R. Co., vice M. C. Foster, resigned. Mr. Free was stable foreman. The office of president of that company is at present vacant.

ALFRED EGERTON, Superintendent of the Albany (N.Y.) R.R. Co., is investigating the various systems of cable traction, with a view to adopting one of them. He invites correspondence on the subject. A few cars and some track will be added this spring.

THE TORONTO (CAN.) STREET RAILWAY Co. is extending its line and has ordered a lot of American cars, we understand, of West Troy make.

CHARLES HATHAWAY, President of the Superior Street Road, Cleveland, has purchased the St. Clair Street line, and will devote his personal attention to its development.

THE consolidation of the West Side and Woodland Ave. roads in Cleveland has been consummated, and a number of cars are being added. They are built by Jones, West Troy.

THE DETROIT CITY RAILWAY Co. is changing its one-horse cars on Woodward Avenue line, for two-horse cars built by Jones.

THE NORTHAMPTON (MASS.), STREET RAILWAY Co.'s line extending to Florence, has a very fine equipment, and being compelled to compete with a steam road, cars are run to make time regardless of several heavy grades. The equipment consists of eight men, twenty-four horses and six cars. Some additions will be made this season.

WORK will begin as early as the weather will permit on the College City Street Railway of Galesburg, Ill.,—a city of fifteen thousand—heretofore without anything of the kind. Mr. E. O. Flood, of Dallas, Texas, is President.

THE RACE & VINE ST. COMPANY (PHILA.), has just put into service two new cars (Nos. 24 and 40), built in its own shops. Five new summer cars are also being pushed to completion in the company's shops.

MR J. E. RUGG, Superintendent Highland Street Railway, Boston, Mass., writes us that "the Highland Street Railway Co. have added eight new cars to its different lines during the past winter, all having the Higby gear and Everett sash, and made by J. M. Jones' Sons, West Troy, N. Y.

ANDREWS & CLOONEY report that they are "running overtime in their works on wheels, axles and railroad castings, and automatic and plain switches. Business is steadily increasing, they having just closed some large contracts for material for sev-

eral new roads, have orders for 100 sets of our new Andrews and Clooney rubber centre spring, which has met with great success."

SEVERAL CAPITALISTS ON STATEN ISLAND have incorporated the Richmond County Railroad for the purpose of running horse cars from the shores to the interior of the island. The line is intended to make accessible a locality where elegant residences are being rapidly constructed. The capital stock of the company is \$30,000. The road will be in operation within three months.

MR. WM. P. CRAIG is to furnish the material and build about six miles of street road in New Bedford, Mass., using the Johnson steel girder rail. He writes that his prospects are good for building several more roads in the eastern states, using this rail. He has contracted to build an extension to the Buswick Road, in Brooklyn, E. D., comprising about 2½ miles of track. He also expects, in a few days, to commence work on laying the curves and switches connecting the cable road on Tenth Avenue, New York, with the depot, and this road is expected to be running as soon as this work is completed.

THE SECOND AVENUE R.R. of this city tried for seven years to introduce steam upon their line, but finally abandoned the idea.

THE VENERABLE JOHN STEPHENSON, of New York, who has spent 54 years in the manufacture of street cars and omnibuses, says that omnibus lines have nearly gone out of date, being supplanted by street cars. In all this time he has never had a strike in his shops. Last year the John Stephenson Company did the largest amount of work of any in his experience, but the prices were low and profits not commensurate with his increased business. They are now completing, with other orders, a lot of seventeen cars for the 4th Avenue road of this city, which are to have all the modern convenient and elegant appliances.

AFTER an experience of five years, and exhaustive tests of twenty-one different systems, the Paris Tramway Company has abandoned the use of steam and reverted to the use of horses as a cheaper and, in all respects, more satisfactory motive power. Scarcely a week has passed without some accident on the steam line, which proved costly to the company and led to complaints from the public. At last the authorities forbade the use of steam, and the company was entirely ready to acquiesce.

IN CHICAGO the Cable Road Company have expended some hundreds of thousands of dollars in constructing divergent lines from the main lines, which they have not utilized.

MEN of large experience in street railway affairs assert that no motor can now be practicable which depends for its propulsive power upon the revolution of a wheel upon the vehicle.

THE 42D STREET, MANHATTANVILLE AND ST. NICHOLAS AVENUE RY. Co. (N.Y.) will open its road, through the boulevard, to Manhattanville about the middle of May. A depot is erecting for the company at 129th Street and Eleventh Avenue.

An experience of half a century has practically demonstrated the fact that surface street cars cannot with safety be run at a greater rate of speed than six miles an hour. This rate is also the legal limit of fast driving of any kind of vehicle in most American cities.

WHAT is required in a mechanical motor for street cars is that it shall work well under all circumstances. Nothing has yet been found to meet this requirement.

THE BALDWIN LOCOMOTIVE WORKS of Philadelphia spent much time and money in the effort to apply steam motors to street railways. They were not successful, but the experiments upon the Market Street lines developed two facts—first, that the cars were under better control than with horses; and second, that horses in the streets were not as much frightened as was expected.

THE WALES MANUFACTURING CO., Syracuse, N.Y., is bringing out a new fare box. Shipments of boxes have recently been made to Mobile, Mo.; Columbus, O.; New Orleans and Elmira.

THE TROY AND LANSINGBURG R.R. will this spring erect a new barn on their "Blue Line," which may involve some changes in running arrangements.

THE BROOKLYN CITY RAILROAD REPAIR SHOPS.—The rapid growth of the Brooklyn City Railroad has been such as to necessitate more commodious quarters for doing repairs. The new shops situated on Myrtle Avenue are very complete. The receiving shop will hold thirty-five cars, the wood shop twelve and the paint shop twenty-two. The blacksmith shop with seven fires, and all other departments are supplied with the latest improved machinery for car building, and can run through the shops five cars per day. Mr. A. W. Dickey, the superintendent,

has taken great pains in making plans for the shops to enable work to be pushed with the utmost despatch. The superintendent's office and draughting-room are nicely fitted up; speaking-tubes being so fitted up that fore-men can be called from any part of the building. The president and superintendent are awake to the wants of the traveling public, and there are many things in their management which other roads would do well to pattern after.

THE LEWIS AND FOWLER CO. has just finished for the Oriental Metal Co., of Boston, a finely executed *basso-relievo* plaque of a horse in metal. It is handsomely framed on a mat mounting of black velvet, and is a very tasteful piece of work.

JOHN STEVENSON, among other work now in hand, has orders from Lisbon, Portugal, where the original supply of street rolling stock was supplied by him in 1873.

THE LEWIS AND FOWLER M'FG. Co. have the sole agency in the U.S. for the Oriental Metal M'fg. Co., of Boston, for their goods as used in street car journal bearings.

THE OLD TIME HACKS that ran from the Grand Central Depot (N.Y.) to the 6th Avenue elevated cars have been replaced by the cars of the 42d Street line, which run every minute.

THE 42D STREET, MANHATTANVILLE AND ST. NICHOLAS AVENUE (N.Y.) line will, when completed, have upwards of 16 miles of track. Cars are now running to 72d Street only, but the track is laid to 110th Street, and as soon as the frost is out of the ground rails will be laid to the up-town ends. It will be one of the longest roads in New York.

NOTHING has yet been devised in electricity which is applicable and practical as a motor for street cars, and nothing stands

nearer to the front than the cable system at present.

WHEN asked his opinion of the cable system, Mr. John Stephenson said he had spent ten days in examining the cable road in Chicago, and the sense of his convictions was that for use under all circumstances the system was open to some objections, which time and experience would probably overcome, and that it had not yet passed entirely out of the realm of experiment as to its superiority to horses. He thought, however, that it was in advance of any other system or device which had been suggested as an alternative for horses, and was especially applicable to hilly ground.

Mr. LEWIS, of Lorimer Street, Brooklyn, says: "the balmy days of spring are blossoming out" for him more orders for his wood mattings for street railway cars than he can fill.

APRIL 1st the former Superintendent of the Rochester City & Brighton R.R. Co., Thomas J. Brower, after a rest of two years, resumed his old position of Superintendent, which he has held, with this exception, for the past fifteen years.

WANTED.

By a first-class mechanic, a situation with some Street Railway Co. as foreman in Paint Shop at contract prices or day's wages. First-class reference given as to ability, &c.

Address, "PAINTER,"

STREET RAILWAY JOURNAL,

8 Lakeside Building, Chicago, Ill.

STEEL STREET RAILS.

The Pittsburgh Bessemer Steel Co., Limited.
48 Fifth Ave., Pittsburgh, PA.

Section No. 17
46 lbs. per Yard

ORIENTAL METAL MANF'G CO.

48 CONGRESS ST., BOSTON, MASS.

C. L. VAN WORMER, President.

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THE AJAX METAL CO.

WE CLAIM FOR AJAX METAL.



25 to 50 per cent. more mileage.
33 1-3 " greater tensile strength.
100 " greater crushing strength.
20 " less friction and wear upon journals.
85 " less hot journals than any known Bronze named or unnamed.

Costs no more than copper, and tin or gun metal.

AJAX METAL CO.,

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EXTENSIVE MAKERS OF PATENTED CAR SEATS AND SPRINGS.

SPECIAL PATTERNS FOR STREET CARS.

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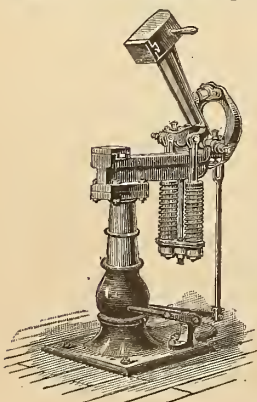
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Descent 1/4 in. per foot. Pieces 5 feet lengths. Short pieces furnished to suit any length. Spouts to connect with Sewer, &c.

BOWLER & CO., Cleveland, Ohio.

THE STANDISH FOOT-POWER HAMMER



Patented July 10, 1883.

Is specially adapted to making light forgings, for welding in dies having impressions cut to the shape of the work required. They are superior to power hammers, as the hammer is under as perfect control as the Smith's hand hammer, and are used in the carriage business for welding Dashes, Shifting Rails, Top Props, shaping and forming ALL SMALL WORK equal to drop forging, and are in use by the principal manufacturers of the United States. Send for circulars. Address.

**The Capital City Machine Works,
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Envelopes For Street Railway Companies.

UNION RATTAN MANUFACTURING CO.

Office: 125 Chambers Street, N. Y.

The subscribers beg leave to inform all purchasers of

ENVELOPES FOR STREET RAILWAYS

that they are largely engaged in manufacturing

Envelopes of All Kinds,

especially those used for

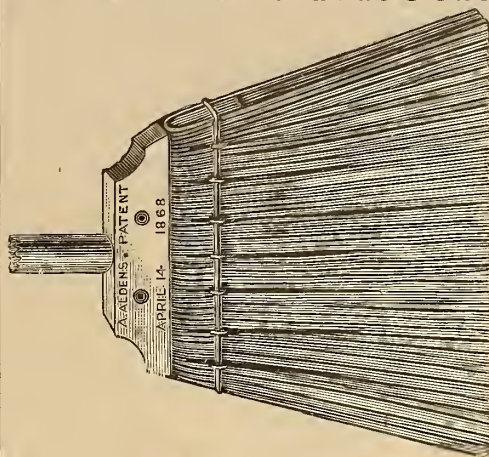
C H A N G E .

They have recently introduced a new style, making each denomination of a *different colored paper*, thus more easily distinguished by the driver. All well made and gummed.

Samples sent when requested.

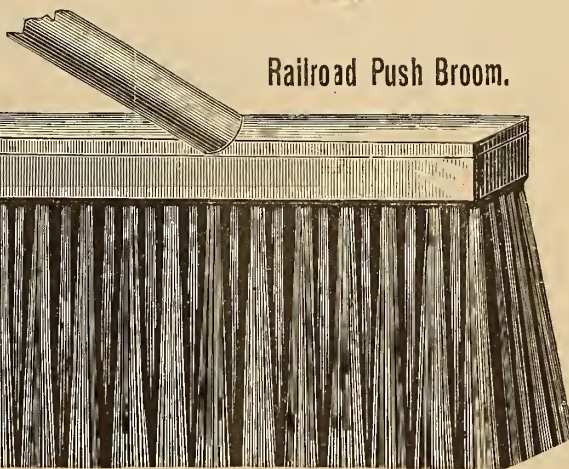
SAMUEL RAYNOR & CO.,

117 WILLIAM ST., NEW YORK.



Alcen Upright.

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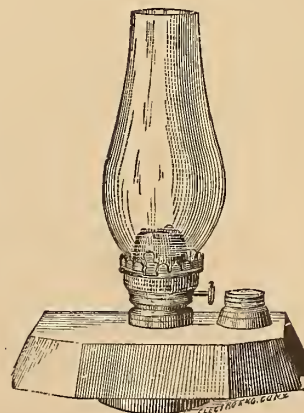
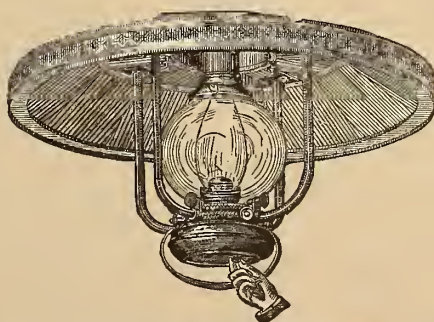
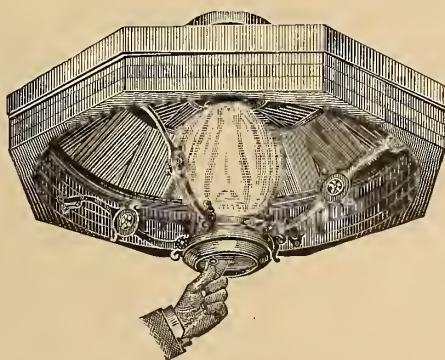
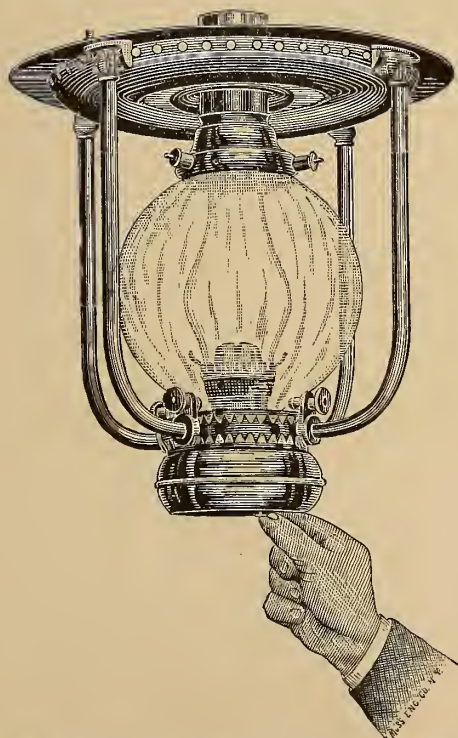
Railroad Push Broom.

JOSEPHINE D. SMITH,

Successor to the late WILLARD H. SMITH,

350 & 352 Pearl St.,

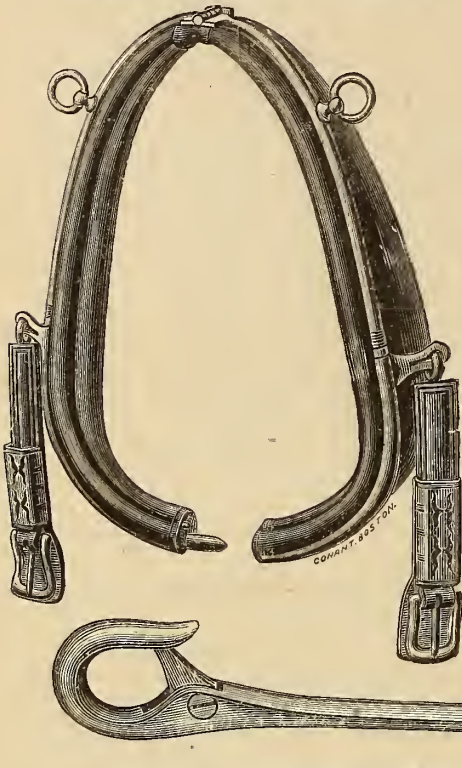
New York.



Manufacturer of RAILROAD CENTRE LAMPS AND REFLECTORS

AND ALL KINDS OF SHIP AND MARINE LAMPS.

BERRY'S PATENT HAMES.



**Lightness, Strength,
Durability, Quick-
ness and Sim-
plicity.**

They have the advantage of easy adjustment. No buckles or straps are used. They can be applied in an instant, being fastened to the collar. The collar is divided and there is no strain upon the collar or the eyes of the horses.

In case of accident the whole harness can be removed at once.

They are adapted to the use of Fire Departments, Horse Railroads, Express Wagons, Teams and Light Carriages, and are in use in over one hundred cities and towns in the United States and Canadas.

WE ALSO MANUFACTURE THE

REGAN PATENT SNAP.

They are made of the best gun metal and malleable iron, with a brass spring which is inclosed in a water-tight socket and made rust and dust proof. It is an impossibility for it to become detached. Write for illustrated catalogue and prices.

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IMPORTANT.

We insert this advertisement for the purpose of impressing upon Street Railway Companies the importance of adopting the

DEMAREST DUPLEX REGISTER.

Should the officers and directors of your company conclude to discontinue the use of a portable register and adopt in its stead a permanent register (a wise conclusion), the first question which would arise, would naturally be—What system of registering is the best for our use? Do we desire one that is continuous and visible, so that the conductor may, at all times, see and read the state of the register? Or one that indicates and duplexes each trip or half trip for the day, upon a paper dial, to be returned into the office at night for inspection?

We propose to solve these questions by showing that Railway Companies who use the DEMAREST DUPLEX REGISTER, have, in its adoption, combined both systems of registering, in such a way, as to do away with the objections against either system; and, in fact, have at their command, as they may prefer, both methods of registering.

Our ringing device (which is very simple) is so arranged that the Duplex system of recording each half or whole trip for the day, upon a paper dial, can be easily discontinued whenever desired, and in its place can be put a visible continuous register reading up to 10,000, in such a way, that, as each fare is registered, the figures change consecutively, and can be distinctly read without mistake.

In justice to ourselves and the inventor we call attention to the fact that our improved continuous visible register is positive: that is to say, it has no springs or traps to get out of order. One is not compelled to look at several places on the dial to find out what the reading of the register is, but only to look at one place and get the facts.

It will, therefore, be understood that Railway Companies adopting the DEMAREST DUPLEX REGISTER have successfully met all objections now raised and all questions as to which is the best system are at once answered, for IT COMBINES BOTH. Our Fare Box and Register Combined is also subject to the same change. In ordering, all that will be necessary is to state what system your directors wish to try first, as the other method may be substituted in the same instrument, as your experience may prompt you or the necessities of your road demand.

We will place any number of our Duplex Registers (with or without the Fare Box, according to the kind of car), upon trial for any time desired, at a very slight cost. Our terms of purchase are quite reasonable. A trial is solicited.

Address the proprietor,
W. JENNINGS DEMAREST,
R. M. ROSE, Manager.
15 EAST 14th STREET, NEW YORK.

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MANUFACTURERS OF

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Of **T** patterns, weighing from 16 to 76 lbs. per yard.
CENTRE BEARING Street Patterns, 42 to 60 lbs. per yard,
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Fare Boxes and Change Receptacles

MADE BY

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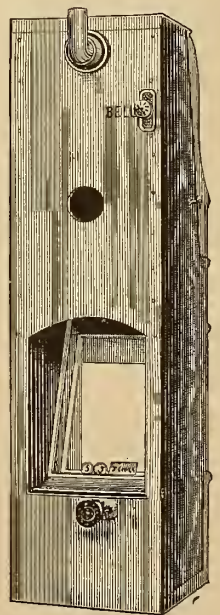
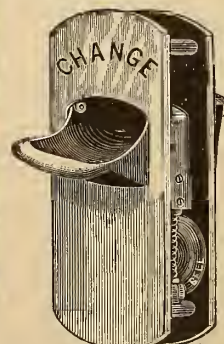
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Our Street Car Fare Boxes, for Simplicity of Construction, Cheapness and Practicability are Superior to Anything of Like Character in the Market.

Descriptive and Illustrated Circulars an application.



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Always on Hand or Made to Order.

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MANUFACTURERS OF

RUBBER CAR SPRINGS

OF EVERY STYLE AND SHAPE,

CUSHIONS, BRAKE PADS, RUBBER MATTING
and STEP PLATES, HOSE, DOOR STOPS, &c.

Being one of the oldest manufacturers in the business, we have a MOST COMPLETE assortment of moulds.

WRITE FOR PRICES.

FRED. J. KALDENBERG,

SUCCESSOR BY PURCHASE TO THE

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MANUFACTURER OF SUPERIOR QUALITY

VULCANIZED RUBBER CAR SPRINGS,

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Correspondence Solicited.

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CAR WHEEL WORKS,

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CAST CHILLED WHEELS,

AXLES AND BOXES

FOR EVERY KIND OF SERVICE.

Street Railway Wheels of all Sizes.

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(Established 1852),

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GROUND IN JAPAN.

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We furnish special body colors to Pennsylvania R.R., New York Central New York & New Haven, Lehigh Valley, New Jersey Central and other large Railroads.

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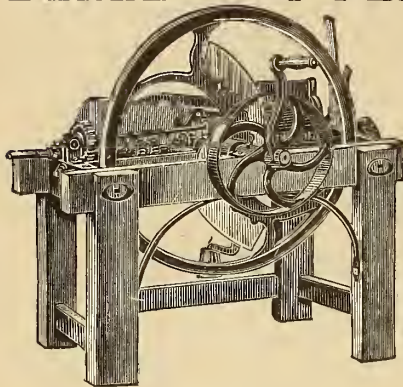
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IS THE
Strongest, Most Durable,
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BEST FEED CUTTER
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For Street-car Barns it has no equal. Write for Reference, Circular, &c., to

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THE BRYDEN FORGED HORSE SHOE WORKS

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Are making a plain, narrow-webbed shoe, with beveled surfaces for Horse Railroad work. It is "FORGED" from the very best Iron, and is tougher and harder than any shoe heretofore made, and will be sold to consumers at a small advance on the prices charged for ordinary mill shoes. They also make a Calked Shoe with a Square Toe, just the same as hand made, and the company warrants them to wear as long as the very best hand work.

Among others who are using this Shoe, are the

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- North Hudson County Railroad Co., Hoboken, N. J.
- Jersey City and Bergen Railroad Co., Jersey City, N. J.
- Ridge Avenue Passenger Railway Co., Philadelphia, Pa.
- Citizens' Passenger Railway Co., Philadelphia, Pa.
- Buffalo Street Railway Co., Buffalo, N. Y.
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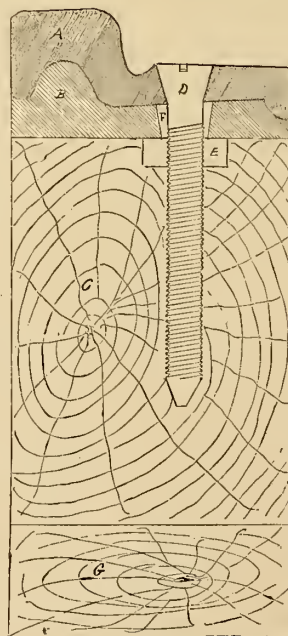
Also fully prepared to furnish any kind, weight or shape of shoe desired. Estimates on cost of producing such special patterns will be furnished on receipt of model, with estimate of the probable number of kegs required.

The Rates of Freight are as Low from their Factory West and East AS THE LOWEST.

A Mild Tough Steel Shoe supplied at a small advance over Iron Shoes.

WRIGHT'S

PATENT JOINT FASTENING.



The accompanying cut shows a cross section through joint. A is the rail, B the joint chair, C the stringer, D the patent screw fastening, E the nut, F a slot in chair allowing rails to contract and expand. The chair cannot settle and the rail ends are held level with each other, preventing the many evils of ordinary construction.

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AUGUSTIN W. WRIGHT,
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Special attention given to laying Switches, Curves, Turnouts, Connections and Turn-tables; also Building Tracks for Excavation, Grading, Mining and Factories.

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THE STREET RAILWAY LUBRICANT
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Will last FOUR TIMES AS LONG, and is CHEAPER and MORE ECONOMICAL than Oil. Samples free on application.

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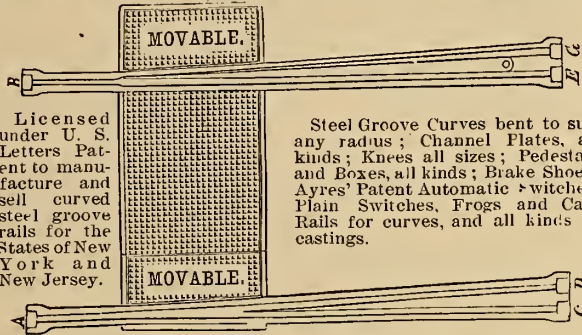
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Used by Pittsburgh Transverse Railway Co.

A. AYRES,
Manufacturer and Patentee.

Send me full size section of rails to be used at points A, B, C, D, E, G.

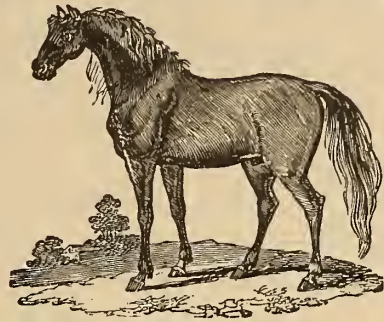
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Licensed under U. S. Letters Patent to manufacture and sell curved steel groove rails for the States of New York and New Jersey.

Steel Groove Curves bent to suit any radius; Channel Plates, all kinds; Knees all sizes; Pedestals and Boxes, all kinds; Brake Shoes; Ayres' Patent Automatic Switches, Plain Switches, Frogs and Cast Rails for curves, and all kinds of castings.

EUROPEAN COLIC CURE.



A speedy and sure cure for Colic--has saved hundreds of horses where all other remedies have failed. Horse need not be run or trotted around to start the wind. Let him stand or lie down as he feels inclined and he will be ready for work almost immediately after recovery. A cure guaranteed in ninety-nine cases in a hundred. Endorsed by the leading street railway companies of the country, some of which we append.

DECATUR, ILL., Oct. 2, 1884.

MESSRS. JONES & ROACH, Chicago, Ill.

I have used your Colic Cure for my horses and mules on my street car lines and found it the best and surest medicine I have ever used. I have not lost a horse since I commenced its use. It gives relief in a short time after it is taken. I can cheerfully recommend it as a sure relief if given in time. I keep it constantly on hand.

Truly yours,

FRANKLIN PRIEST,
President Decatur Street R. R.

MESSRS. JONES & ROACH:

Gentlemen: I cheerfully recommend your European Colic Cure for horses as being the best that I have ever used. When once introduced no horse owner can well afford to be with-

out it. I hope you will meet with the success your cure deserves.

Truly yours,

VALENTINE BLATZ,
Per H. Lieb, Manager.

OFFICE OF NORTH HUDSON COUNTY RAILWAY CO. HOBOKEN, N. J., Oct. 4, 1884.

Gentlemen: It gives me pleasure to say that I can heartily recommend your European Colic Cure to all horse-owners, from a personal knowledge of its curative qualities. I have used it in our stables, containing about six hundred horses, and have always found it to be beneficial. Yours very truly,

ALBERT SAILLET,
Foreman and Veterinary Surgeon for the North Hudson County Ry. Co.

Sample Bottles Furnished Street Railway Companies Gratis.

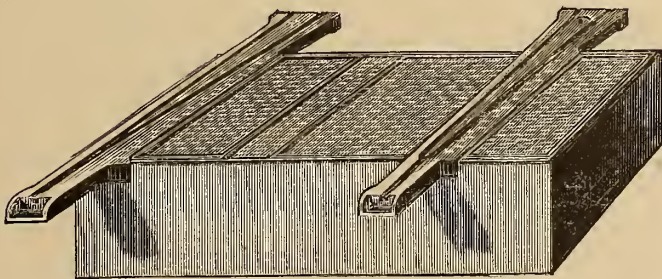
For further information, prices, etc., address

JONES & ROACH, 259 Fremont Street, Chicago.

M. M. White & Co.,

531 WEST 33d STREET,

NEW YORK.



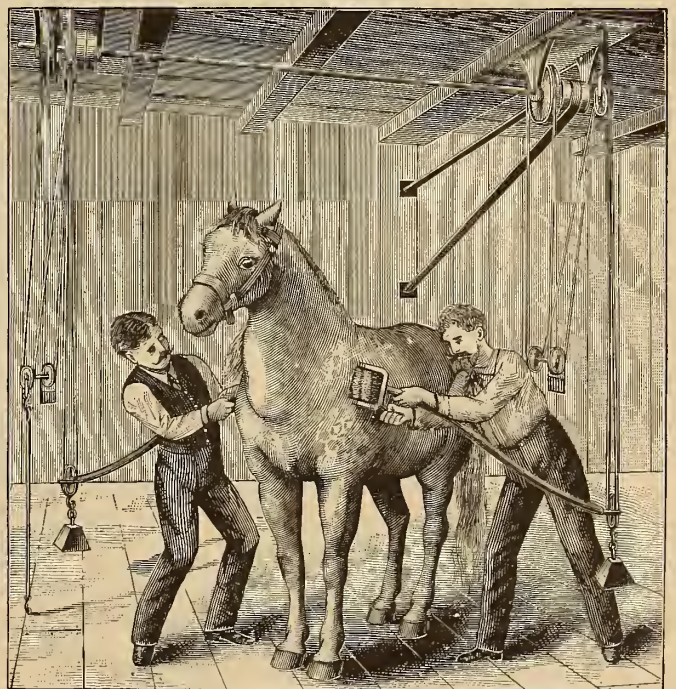
OWNERS AND BUILDERS OF

H. DOUGLASS'

Patent Automatic Switch

FOR STREET RAILROADS.

Pennington's Grooming Machine



The brush is caused to revolve by gear wheels actuated by a flexible shaft. Both hands free to handle brush. Swings and turns in any direction. Direction of motion quickly changed. The cheapest and best Grooming Machine yet invented. Motion supplied by hand, steam or animal power. Rights to use or manufacture. For full particulars and rates apply to

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LAKE & McDEVITT'S Patent ROPE TRACE

For Horse Railways, Omnibus Lines, Etc.

The Advantages

OF THE

ROPE TRACE

are its ready application to Horse-Car service, or to any other purpose where cheap harness is required. It only costs about half as much as leather traces, while at the same time one set of ROPE TRACES will take the place of three or more sets of leather traces, as the Tugs remain attached to the car all day, no matter how many changes of stock are made. The relief horses having hoo's attached to their hames, all that is necessary is to unhook the tugs from the working team back in the fresh horses, hook on the tugs, and the change is made. Railroad men will at once perceive their adaptability and economy from the above facts. They will also last longer than leather traces, and require but very little care. From their durability and cheapness they are also especially adapted for all kinds of farm use and heavy teaming, as farmers, etc., can easily repair them.

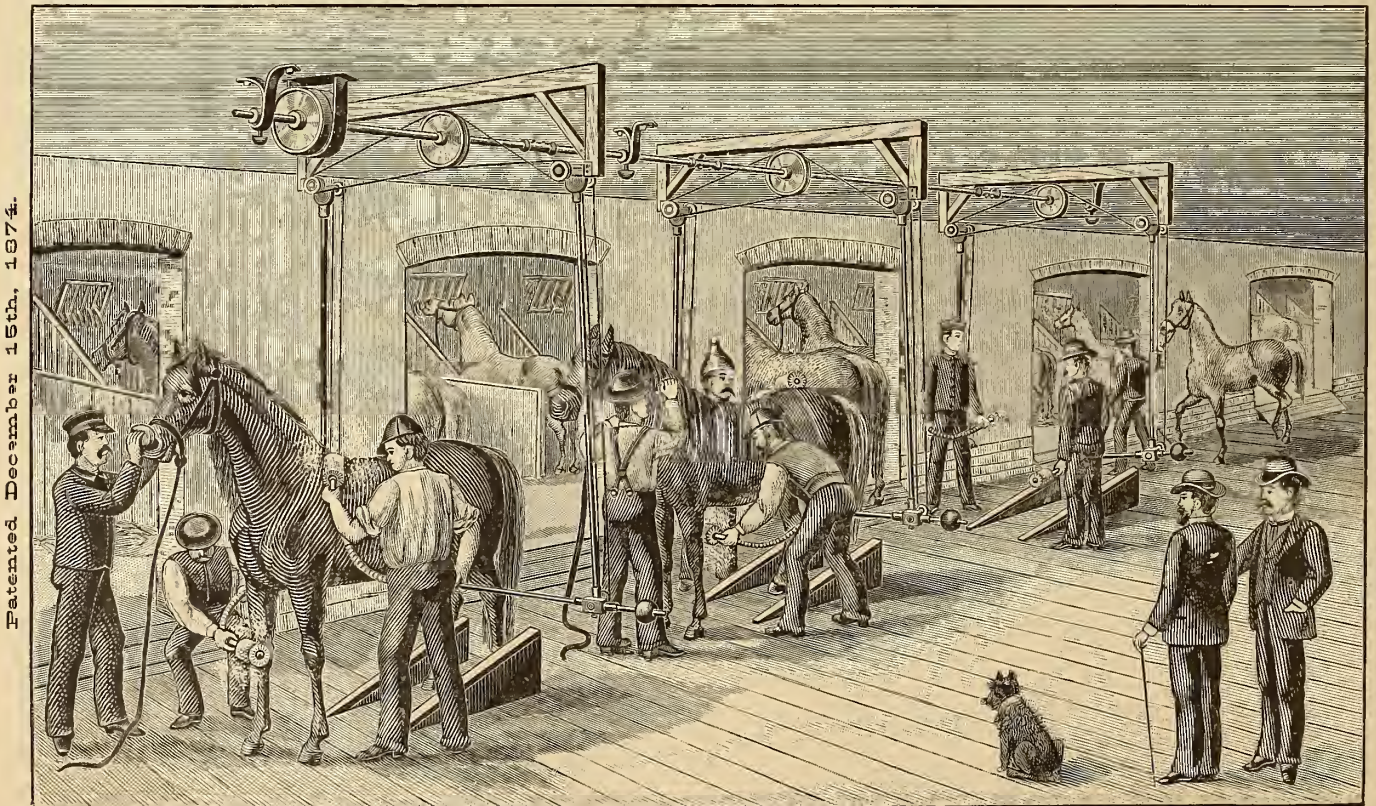


Patent No. 171,232, December 21, 1875.

In use on the Chicago West. Div. R'y.; Louisville City R'y Co.; Milwaukee City R'y; Transverse R'y Co., Pittsburg, Pa.; Citizens Street R'y Co., Pittsburg, Pa.; Pittsburg and Birmingham, Pittsburg, Pa.; Central City R'y, Peoria, Ill.; Grand Rapids R'y; Minneapolis St. R'y Co.; St. Paul City R'y; Houston City R'y, Texas; Superior Street R'y, Cleveland, O.; Cincinnati City R'y Co.; Fifth Ward Street R'y, Syracuse.; Detroit City R'y.; Ft. Wayne and Elmwood St. R't, Detroit, Mich.; Galveston City R'y; Springfield City R'y, Springfield, Ill.; Toledo St. R'y, Toledo, O.; Adams St. R'y, Toledo, O.; Atlanta Street R'y, and others, in all on about 100 Street R'ys in United States and Canada, and a large number of other prominent Street R'y Companies throughout the Country. Send for descriptive Circular containing testimonials, prices, etc., to

LAKE & McDEVITT, 161 South Robey Street, Chicago, Ill.

CLARK'S PATENT POWER GROOMING MACHINE, SINGLE OR DOUBLE.



TO STREET RAILWAY COMPANIES AND OTHER STOCK OWNERS.

This machine for grooming may be driven by any known power, and can readily be placed for use in any stable or out-building. It can be operated by an ordinary groomer; its work is perfect; its action simple and effective. Stock owners will readily realize the importance of the machine. The perfection and rapidity of its work, and the benefits derived by its use, commend it to those interested in the care and use of all classes of thoroughbred and work stock. The most vicious animal readily submits to its use. Machine Grooming is found to be less expensive than hand grooming, saving in food and medicines, and materially increasing the value of the animal.

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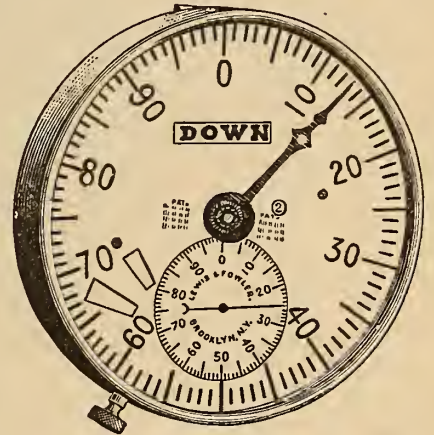
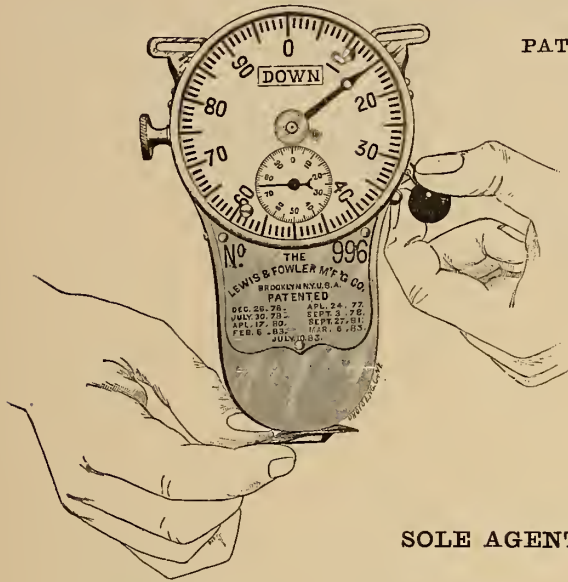
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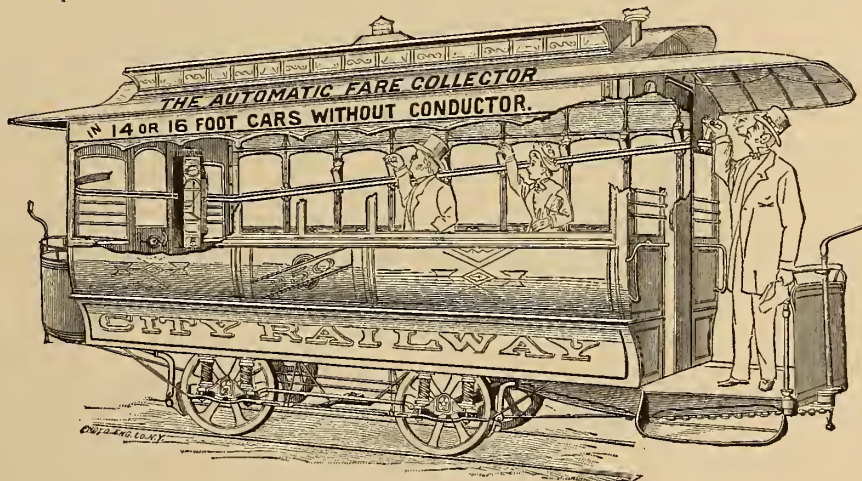
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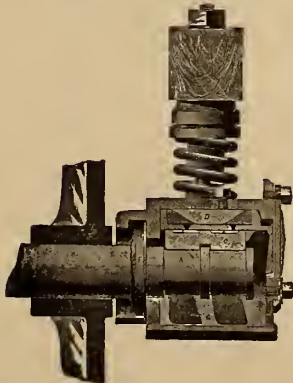


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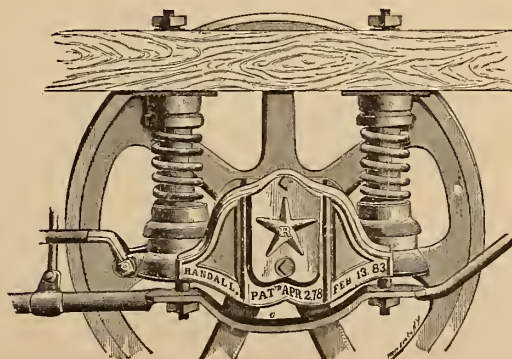
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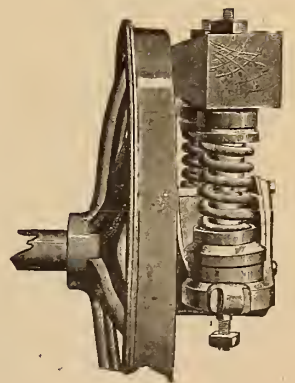
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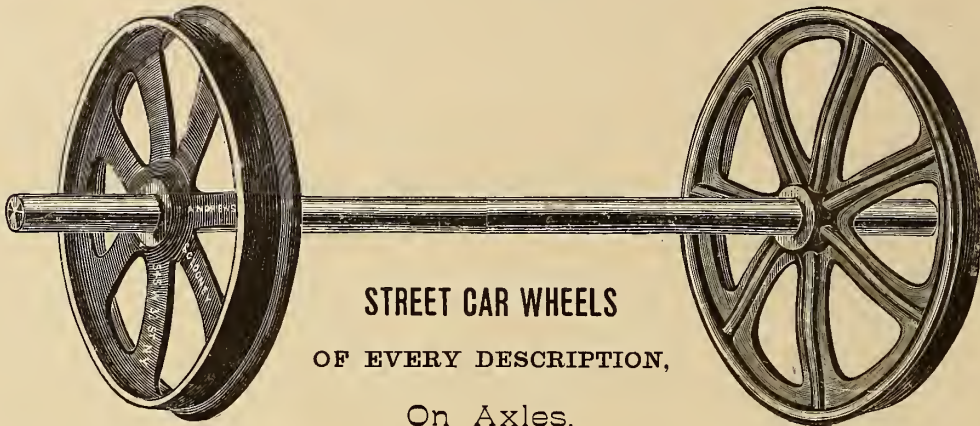
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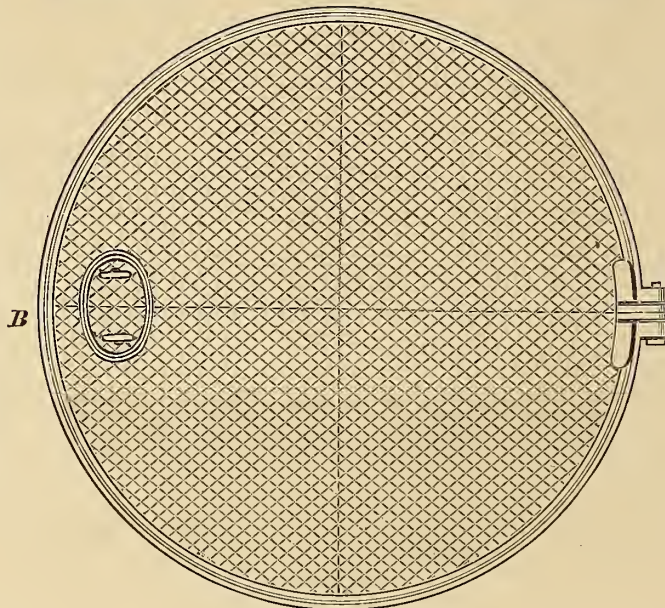
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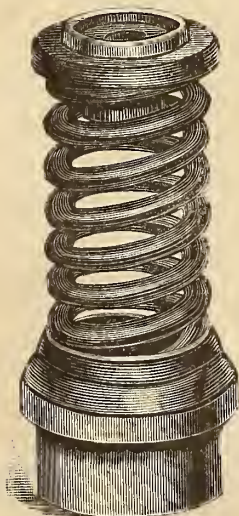
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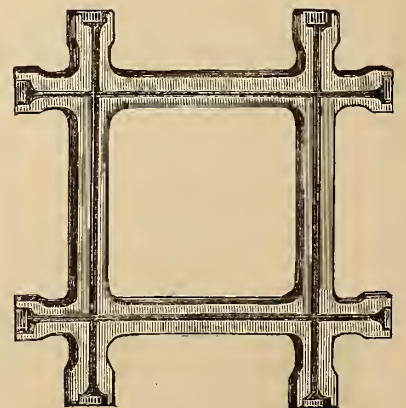
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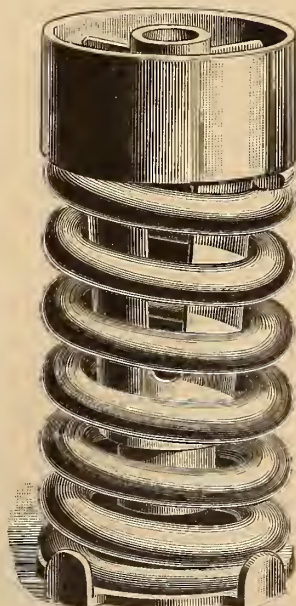
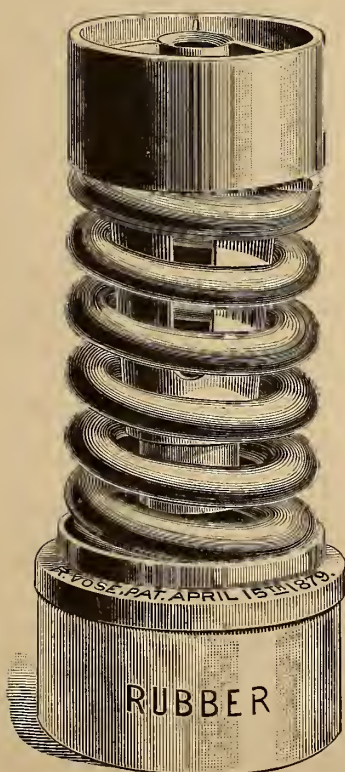
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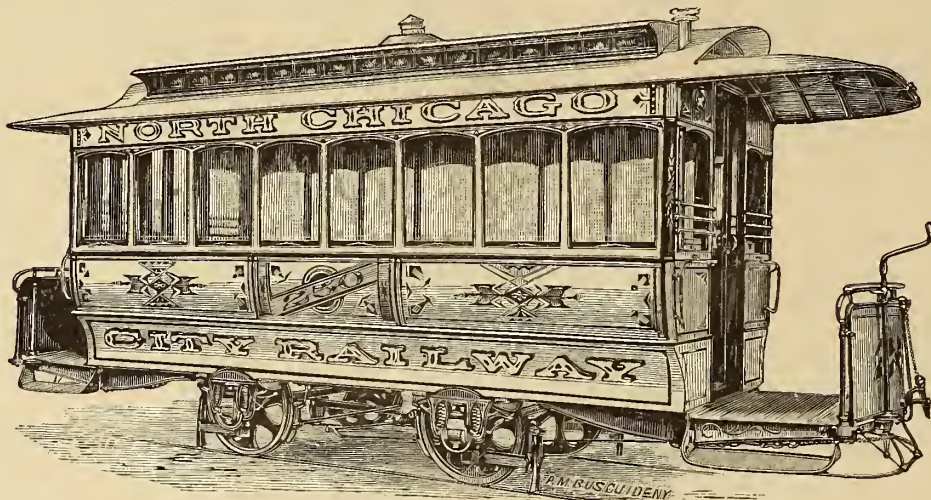


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THE STREET RAILWAY JOURNAL



VOL. I. { NEW YORK: }
{ 32 Liberty Street. }

MAY, 1885.

{ CHICAGO: } No. 7.
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Street Railways Public Benefactors.

II.

The first proposition in our preceding article was that "A street railway is impossible without, at least, passably good road-beds, and good roads almost necessitate good sidewalks."

Now, while it may appear like "begging the question" to attribute all or a greater part of the improvements with which we are familiar in our modern city highways, these improvements are certainly to be credited to the street railways more largely than is generally supposed. To any one familiar with the requirements of tramway traffic, this assertion will require no proof; but the general public may need to be reminded that a street car horse requires good road to travel upon, or he will wear out rapidly, the same as any other horse. Then the very laying of the track requires: first, that the foundation should be firm; second, that the grade should be regular in cross section; third, that there should be no abrupt breaks (or ruts) in the continuity of the road-bed; and fourth (as we said in the second proposition of our previous article), that the street, in order to render possible the maintenance of such a road-bed, should be adequately drained.

So much for the general aspects of the case; further than this we have to consider the peculiar benefits rendered by a street railway company as a common carrier.

The principal reason why corporations of this class are not accorded the same justice which is accorded by the popular mind to ordinary business firms or individual business men is that their business, once established, becomes a public necessity. This may sound paradoxical, but the paradox is the strongest form of argument.

A street railway company usually has enough difficulty to secure its franchises. When the first road is proposed in a town, the populace opposes it on general principles, as "new fangled"—much on the grounds Louis Napoleon took, when George Francis Train wished to introduce the street railway system into Paris. The story runs as follows: "In the early days of tramways in Europe George Francis Train obtained audience of the Emperor Louis Napoleon, in order to secure his consent to their introduction in Paris. Mr. Train stated that they would enhance the ease

and shorten the time of getting about the city and descanted upon their convenience to the citizens. 'But we don't want any such new-fangled Yankee Notions,' replied the Emperor; 'let Paris remain as she is—the city of beauty and fashion and pleasure.'"

People don't want the noise, object to the dust, object to the tracks, object to street cars, as liable to explosion, and object to the men composing the companies, as likely to absorb the town.

After the franchise has once been secured, and the populace accustomed to the accommodations afforded by the line, they arrange their daily life accordingly, and rely upon it in the conduct of their business. Then, the new means of transport having become a business necessity, anything tending to disturb existing relations is looked upon as a direct injury. So it comes about that as a street railway becomes more and more useful, more and more of a public benefactor, the public becomes more and more factious regarding it, and complaints against it, and efforts to restrict its independence become more and more persistent.

But, looking at the matter calmly and from a purely impersonal business standpoint, why should a street railway company, any more than a baker, be expected to do anything which is not profitable?

Leaving the question here for consideration, we shall try in our next to show that the average street railway does more for a smaller return than almost any other public or private enterprise. M.

Street Railroad Tracks.

EDS. STREET RAILWAY JOURNAL:—

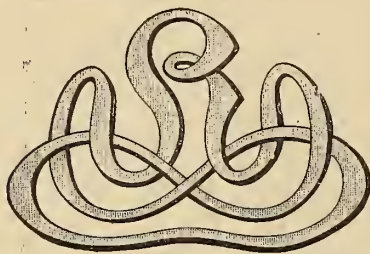
As spring work upon street railroads will soon commence, it behooves the officials to consider well upon various matters pertaining to track construction, and among the most important is that of rails, quality and kind of material, shape, etc., etc. I wrote an article entitled *Iron vs. Steel for Street Rails*, that excited much discussion. I brought the matter before the last Convention of the American Street R.R. Association and asked for the practical experience of the members as to the relative durability of steel and iron rails, but did not obtain much information. Some members thought steel the most durable, others thought iron would wear equally as long. Of course a

good quality of steel and of iron is assumed. If the iron will wear as long as the steel, no street railroad can afford to use steel. The best cash offer I can get to-day for old steel worn out after four years and two months' service is \$10.00 per ton. I could get \$18.00 per ton for old iron! I would say that the above-mentioned steel rails developed no imperfections in the wear. They wore quite uniformly excepting at the joints, and actual measure of a number showed that 50% of the head had worn off during that time, but the joints had lost much more metal, and it was this great wear at the joint that caused me to perfect my patent fastening. (If you will pardon the egotism, it is the best fastening for the ordinary street rail in use to-day. The only objection ever offered was that the nut would rust fast to the bolt and interfere with repairs when they became necessary. Experience has demonstrated that the grease applied to the bolt effectually prevents this rusting, and I have yet to hear of one that cannot be unscrewed. The tracks laid with this fastening ride so smoothly that passengers, as well as employees, notice and speak of the absence of all jars in passing over the road, and this will prolong the useful life of the rail at least 10%.)

From a point of view, considering the question of the railshape, as affecting transportation in the cars, the centre bearing rail is undoubtedly the best. It is more free from mud, etc., and offers less resistance to be overcome in propelling the cars. The track is more stable for the weight of the car and its load is not carried upon one edge of the stringer, but from a "paving" point of view, the advantage is on the side of the step rail. Loaded vehicles seek the lines of rails from a greater distance, and nothing can be provided to maintain this traffic cheaper than the metal rail. This wear is so great with us that although we have eighty cars passing in sixty minutes on rush trips, the tram wears about as fast as the head. It is, therefore, good economy to maintain the paving in such condition that the heavily loaded vehicles can everywhere get into the tram, rather than cut grooves into the stone alongside the rails. This is a matter frequently overlooked, although well worth consideration.

AUGUSTINE W. WRIGHT.

Chicago, April 9th, 1885.



American Street Railway Association.

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Completed Construction of New Roads.

[The following is a record of the discussion on the Report of the Completed Construction of New Roads at the last Convention of the American Street Railway Association. The full text of the report itself will be found on page 8 of our November issue.]

Mr. Wright said: I am not entirely clear upon the question of best material for rails. I would be glad to have the practical experience of this Convention on that subject.

D. K. Clarke, says: "It does not seem to be certain that the steel rail is the most durable." I have a piece of steel rail here (exhibiting rail) that has had two years' service, taken out and the ends cut off. That does not speak very well for that rail. In August, 1879, in my own track, I laid down half a mile of steel rail, and my first duty upon returning will be to take it up. It is worn out.

Mr. Richardson inquired: Is that made (indicating a depression in the rail) by an iron chair? Did it make that abrasion in the steel?

Mr. Wright answered: Yes, sir. I have brought a rail joint chair from Chicago to show the wear of joints. This chair has had four years' wear in my track (producing chair). The rail has cut into the chair a quarter of an inch with a corresponding wear on the bottom of the rail. At the last Convention, I was asked as to the relative durability of steel and iron, and I stated, from my steam road experience, that it was six to one, that a steel rail would outwear six iron rails. I have talked with some steam railroad men since, and, I think there are very few steam railroad men who can give the actual tonnage that steel rails will carry. Requirements of a rail on a steam railroad and on a horse railroad are different. Upon a steam railroad, Prof. Dudley, of the Pennsylvania, advances this theory: The force acting upon the steel rail upon the steam railroad,

can be divided into two general heads. Gravity, of course, tends to break the rail, whether the train is in motion or standing still, which is a constant force. You can conceive that force great enough to break the rail. The action upon the driver he divides into two heads. There is an adhesion between the head of the rail and each car wheel, necessary to overcome the journal friction. Unless that force is greater than the journal friction the wheel slides. If greater, the wheel revolves. That is very light; it is estimated at six pounds per ton on an ordinary steam railroad track. Then there is the force that the locomotive exerts in propelling the train, the adhesion of the driving wheels upon the rail, which must exceed the sum total of all the friction of the train, as well as its own friction, to overcome its own dead weight. Mr. Chanute, of the Erie, experimented with a locomotive, and raised it off the rail. He painted it with white lead, and found that the driver, with five feet diameter, bore one-quarter of a square inch on the rail head. The weight on that driver was ten thousand pounds. The Pennsylvania Class K engines have sixteen thousand pounds upon a driver; but are seven feet in diameter, say sixty thousand pounds to the square inch. Upon the steam road, you are passing beyond the ultimate strength of iron. Iron won't stand that strain; it requires steel. A mild steel, such as Mr. Wharton makes, will outwear the harder steel. The Wharton rail will outwear the hard steel rail. A mild steel rail is the best for street railroads generally. I would be glad to have some statistics from the gentlemen present, as to the actual wear.

Mr. Moxham, of Cleveland, said: Mr. President; The matter resolves itself into either one of two things: pure technicality, absolute practice. I should like to follow Mr. Wright into the technicalities; but it would be making a long story, and that we would not have one-half the information that we could get by referring to practice. Mr. Wright urges, because statistics have proved that some iron rails will outlast some steel rails, that we must come to a general deduction. Before you can make a comparison of any sort, you must define what you are comparing. * * * I have for fifteen years manufactured iron; but have given it up; been forced to by the competition of steel. I could make an iron rail that would very nearly compete with steel in durability; simply because it is hard to find the exact point of division between iron and steel. Experts have endeavored to find this dividing point, but so far have failed. Making an iron which in certain cases has been proved to be, theoretically and practically, the best iron that could be made, analyzing it and finding what I had, I could not determine whether I had iron or steel. But it is not a question of a special quality of iron. When we speak of an iron tram rail, we mean that quality which is furnished commercially; and there is as much, or a greater difference between that ordinary quality and a specially made iron, as there is between a good steel and a poor iron. Even assuming the special quality of iron to equal the ordinary steel, its price is so much greater that this consideration would decide the matter in favor of steel; or we may institute again a comparison between the poorer qualities of both. Mr. Wright has shown us a sample which, according to his supposition, lived but two years. Let us accept the supposition that a steel rail only lives two years. (I do not think that there is a street railroad man here that has used steel to any extent that does not know that the ordinary steel rail will last indefinitely longer than that.) Either that the steel was of poor quality or had been subjected to unusually hard conditions of wear. I will assume that the steel was of poor quality. We will, therefore, compare that to iron of poor quality. I have known, and, perhaps Mr. Littell will bear me out, that iron rails have

been put into use in Louisville, and have lived six months only. If we assume that an iron rail of poor quality lasts only six months, and the steel rail of poor quality two years, there is four to one in favor of the steel. It is possible to make an iron that will last as long as a steel rail. This leads to this suggestion: Whether this material that is equal to steel, that is, a special class of iron, is the iron we speak of when we speak of iron rails. It is not. It is, therefore, a worthless discussion, if we are to take an iron that would cost so much money that we cannot put it into a tram rail. The question is unworthy of any prolonged discussion. We hear that soft steel is preferable to hard. I do not see why the street railroad man cannot rest in perfect confidence with the quality of steel generally furnished; it is made precisely of the same kind of steel that is put into the "T" rail. We all know of the great experience and knowledge that has been brought to bear upon that part of the question by railroad engineers. It being considered cheaper and better for the larger business of steam railroads, it is better to stick to that for the incidental demands of street railroads. The quality of rails can be safely left to those who have made it a study.

Mr. Wharton said: As to that particular sample which has been offered by Mr. Wright, as showing a steel rail of two years' service in Philadelphia. I think I can explain what that rail end is. I have been laying for the Philadelphia Traction Company, a number of miles of cable railroad. In taking up the old railway, there were a great number of steel rails which had been down, not two years, but, to the best of my knowledge and belief, ten years. I am sure, that two years is not correct. But even if that were correct, these rails were laid upon a poor foundation; in some cases, upon old timber. It is a great mistake, for a railroad company ever to put good rails on bad timber. If you put down steel rails, give them a fair chance. These rails put down on old timber, soft and spongy, are liable, to be battered out at the joints. These particular rails, of which this is a piece, the end having been cut off, were thus battered down at some of the joints, and I recommended that it would be economy if the Company would allow us to cut that portion of the rails off from the end. That was done, and these rails are now under the new cable railway; the ends only being cut off, giving a good railway that will, probably, last ten years more in service.

Mr. White said: I think that Mr. Wharton furnished to our corporation the first steel curve furnished to any street railway in the United States; and also, the same corporation contributed a large share towards the expense of making rolls for the purpose of running steel rails; something like thirty-six hundred dollars. He furnished us, also, the first steel rails that were ever used by a street railroad company in this country. We have about a thousand tons now in use, all made by the Pennsylvania Steel Company. The first curve was laid at the corner of Avenue D and Fourteenth Street, and mutually used by the Central Park, North and East River Railroad Company and one line of our cars. About a year and a half ago that was renewed, and it had a continuous service of sixteen years, or very nearly. The first steel rails we laid were laid on our Grand Street road, which was and is a road of very large traffic; the largest, with the exception of Broadway, just opposite the Fifth Avenue Hotel. These rails were bought at an enormous price. The first portion was laid at the beginning of or during the war. We had a rail sixty-three pounds to the yard. Since that we have had sixty pounds. That rail will never wear out. The defect in the service is only in one regard—the steel being soft, the traffic has worn off the head of the hp, and we have to keep continually spiking and re-spiking to get more service out of it. The question in my mind,

when I bought the last rails, ran in the line of the experience of our Chicago friend. I said that complaint was made, and it was discovered by actual test, that in the competition of prices, they were making the steel a little softer, and that we would not get the service out of it. I did not state that I thought we had service enough; and I do not think that the rails will last as long if made softer. He said he did not know that that was so; that the process was a homogeneous one, and was pursued by all reputable works, and what was made by one reputable concern was as good as that made by any other; that there was no difference in quality. I have taken up this year about ninety tons of iron rails, which have been in constant service for about thirteen years on our roads, and been renewed but once since the corporation has had its existence. That is on Avenue D and Lewis street. Those were made at Pottsville, and they are a good rail, and much called for. Our corporation has never bought a cheap rail. We do not want cheap stock of any kind. There is very little wear or tear to steel rails. Heavy trucking will make and carry off slivers of the iron rails, which does not occur with the steel. An iron rail honestly made is worth the money, even to-day, and a steel rail honestly made is infinitely preferable at current prices. There is not to be understood to be any comparison of the cost or service, according to my judgment, between an iron rail and a steel rail at the same price. Economy lies in taking the steel. I would make one criticism on Mr. Wharton's report. The time is coming when we will consider the necessity of a pocket casting longer in its outgoing end to receive the rail entered on. As to the plates which we use to support our joints, the entering end of the plate could be, at least four inches longer than we now use them.

Mr. Wharton remarked: If Mr. White notices my report, he will find that I made no allusion to this matter.

Mr. White replied: The report states that it should be made with pockets. I make the suggestion, not respecting the size, but the length to admit the new rail. It should be longer at the exit than it is at the entrance—a proper bearing to increase the service.

Mr. Patrick, of Pittsburgh, said: We have both iron and steel rails on our line in Pittsburgh. For the last five years, we have used the Pennsylvania Steel Works forty-eight pound rail. We also use the Cambria Steel Works forty-eight pound rail, and we have used our own iron. The rail you use here is different in its construction from ours. We have a five-inch rail, with three-inch roadway and two-inch tramway. Our gauge is five feet and two and a half inches; yours four feet and eight inches. You are not required to put down a rail for the accommodation of the public, and consequently, the wear is made much heavier on the tram than with ours. The gentleman is right, that that character of rail is not liable to wear out. The rail we put down is half an inch on the roadway, and two inches on the tramway, leaving three inches for the public. The public, as a rule, follows the track having the vehicles running along the roadway of our line. We find the steel rail in the central part of the city has lasted us five years. It is now about worn out; that is, the roadway. The trams are not worn out. The iron rail made at one of our works there in the city has lasted about the same time. The question, then, is, which is the cheaper to put down, the steel or the iron? If I have to pay ninety dollars a ton for the steel rail (which I did pay for the rail now in use), and forty-five dollars a ton for the iron rail, there would be very little question as to which is the cheaper. I can now buy the steel rail for thirty-six dollars a ton, and I cannot buy the iron rail for less than forty dollars a ton. Hence, if they had an equal life, steel would be cheaper. But if the steel rail is made from

thirty-five to forty carbon, it will stand longer by one-third than the best iron rail we can put down. The only trouble is, that if there is a very heavy frost and a very hard winter, a forty carbon steel rail is liable to break. The rails used on the Pennsylvania road, is a thirty-five carbon rail. The iron wheel we are using weighs about two hundred pounds to the wheel. We wanted it lighter, to make the cars light as possible. We made cast steel wheels, weighing one hundred and twenty-five pounds to the wheel, saving a considerable amount in weight, say 300 pounds to the car. It was about the first of March. They were forty carbon. From March to December they were run and there was not any perceptible wear on the wheels. It is an admirable wheel. We had a very heavy frost last December. One morning the car was started out on the track as usual, and after going about two squares, the rim of the wheels run off, leaving the spokes. Some say it was shrinkage from the cold; some that it was defective construction; but it was done.

Returning to the matter of rails: A steel rail, such as we have, with the three-inch roadway for tram work, is worn out by our wagons, and the life of it is about five years. The life of the best iron rail we have had is about five years. The life of some of our iron rails has been, as a minimum, about three years.

Mr. Wharton said: I think a very good illustration of the comparative service of the steel rail as against the iron rail would be shown by an examination of the tracks in Fulton street, of this city. When the track was relaid, about eight years ago, the centre-bearing steel rail, forty seven pounds to the yard, was put down. That rail is there to-day. It is very little worn. It is solid on the timber. The surface is as good as it ever was, and the rail has a prospect of being good for eight or nine years more. It is a street used by heavy trucks to a very great extent and a great many heavy stages and omnibuses are constantly passing over it, turning in and out, and wearing the sides of the rail. Mr. Sharp, the President of the Twenty-third Street Railway, operating that road, can undoubtedly corroborate me. When you compare iron with steel rails, it is hardly fair to bring up any particular instance. I will, however, bring up a case, as it has been done by others here. In the year before the Centennial Exposition, in Philadelphia, the roads were very desirous of renewing and putting their tracks in order. Among others, the Hestonville Railroad Company wanted to relay their tracks, and they got iron rails made at Pottsville. At the same place many excellent and good rails have been made. Iron rails are very uncertain; they do not mean anything in particular. Now this special lot of iron rails was put down across the bridge over the Schuylkill, and in about two weeks' time I had to take them up and put down other iron rails. My men said to me: "Mr. Wharton, we wish you would go out and look at those rails, they are worn out." I said: "It is impossible; for they have been there only two weeks." They replied: "Yes, but they are worn out; go and look at them." I took two or three men with me, as I wanted to show them they were mistaken. When we got there we found slivers of iron from the top of the rails, varying from an inch to three feet long, scattered all over the bridge. I got them to gather them up by the armful, and throw them into the river. I got a second lot of iron rails to replace them. I made the mill renew the rails. They did it without a great deal of fuss. I put down the second lot of iron rails. They were not much better than the others; they lasted three months, and I had to take them up for the same reason. I put down a third lot, and the Company commenced to get tired. The third lot of rails lasted a good while longer; and the railroad company let up on the whole business, and let them go although, practically

the rails lasted only about a year, when they were replaced by steel rails. When you speak of an iron rail, it does not mean anything in particular. The steel rails are there yet.

Mr. Ladd said:—"I have had some little experience with iron and steel rails, on a road operated by steam, while acting as Superintendent of the New Bedford & Taunton Railroad. In 1869 we put into our track twenty tons of John Brown's steel rail, and they have been in constant use fifteen years. I examined them a year or two ago very carefully, and did not notice any abrasion; in fact, they were, seemingly, in as good condition as they were on the day they were placed in the track. These steel rails have been there fifteen years, and are just as good now as ever. I think that is evidence enough that an iron rail is not worth as much as a steel rail. There is also quite a difference in the quality of iron rails. The New Bedford & Taunton Railroad was built in 1840. Its rails were imported from Wales, and were of excellent quality. Some of them remained in the track for five and twenty years, and the old rails, when removed, brought in the market two and a half dollars more per ton than any other old rail, on account of the extra quality of the iron used in their construction.

The New Bedford & Fairhaven Street Railway was built in 1872. The rails were iron, manufactured at Pottsville, Penn., by Mr. Hayward. They have now been in use twelve years, and we have not removed, on account of wear more than a half dozen of them. The track from New Bedford to Fairhaven was laid with a rail weighing thirty-five pounds per yard, and the rest with a forty-five pounds per yard rail. For the last two years, we have put down steel rails, weighing fifty pounds per yard, and we believe them to be better and cheaper in the end."

Mr. Wharton: How many months do you run sleighs instead of horse cars?

Mr. Lusher: We run over the rails from eight to nine months. There are three or four months, in which we do not run over the rails, but, as a general thing, we use the rails from eight to nine months. The scraps are very valuable, indeed, and are very much sought after.

Mr. Wm. Richardson said: The road which my friend White refers to, as having laid some rails fourteen years ago, was laid with fifty pound iron rails, or what was then supposed to be the best quality of rails. They have been replaced with steel, which has been used since that period, and these rails are said to be good to-day. I think the travel of Grand Street is fifty per cent. greater with trucks and other vehicles than when the iron rails were there. The width of the street is as trying to the rails on the track, as it is on the Broadway and Seventh Avenue road in Broadway, without any exception, unless on Broadway, a very short distance below the Fifth Avenue Hotel, where, because of the narrowness at that point, all vehicles have to follow the track. As to Fulton Street, it is certainly as heavy and trying in its traffic on that part of the street, where the Bleeker Street and Fulton Ferry Railroad runs, as it could be on any portion of Broadway. So far as trucks and other vehicles can test the severity of the use of rails, the places specified afford a more thorough test than can be found on any other street railroad in the country, and possibly, as great as it would be on many steam roads. One thing has been suggested by Mr. Wright, that is, the test made by the Pennsylvania Railroad. In Pittsburgh, they found that iron rails would last, switching in and out with their trains and running over them, about six months; while steel rails would last for three years and six months. Possibly no more thorough test can be made than in a place of that kind. Having made the motion to adopt the report, and approve its conclusions, it seems now the proper time to have specified

any objections to be made to that report. As a whole it is a most important paper; valuable to every street railroad man in the country. I can give no better advice than this, that before making a contract for the building of a road with William Wharton, Jr., & Company (limited), or any other contractors for the building of street railroads, you should carefully study that paper. But as to ties. Yellow pine ties, as well as stringers are suggested. At the North, where chestnut ties are accessible, we cannot have anything better than chestnut. We can get a much larger size tie than we can afford to get of yellow pine, and it costs about two-thirds as much. I certainly will not go back on chestnut. I doubt if I would on white oak, as in preference to chestnut ties, where buried in the ground. As to laying a track with a pitch in it of four or five inches, or an inch to the foot, in the straight track, I would not do it in any case, all the Common Councils in the country to the contrary notwithstanding.

Mr. Wharton remarked: I do not know what the gentleman alludes to.

Mr. Richardson replied: I allude to the part where I understood you to say that it was desirable to have the tracks on a level; and at any rate, where, under the circumstances, it might require it, never to have one rail more than a few inches higher than the other.

Mr. Wharton said: My whole intention was to convey the idea that the straight track should be level, and the curves also; but that it was sometimes impossible to get the curves level, when we should do the best we could under the circumstances. The particular part to which Mr. Richardson alludes, refers to curves only. "Great care should be taken in laying the curves to have them of regular curvature, uniform gauge, and with no abrupt changes of surface. Ordinarily, a curve laid with the inner and outer rails on the same level will give the best results in service, but there are instances when, from the grade of the streets, it will be found necessary to elevate one rail higher than the other. The outer rail may then be elevated a few inches above the inner without any disadvantage, and, possibly, in some cases to advantage; but the inner rail should never be higher than the outer, if it can possibly be avoided, although a slight difference in this respect, where absolutely unavoidable, can be allowed, if the curve is very carefully and accurately laid down."

Mr. Richardson said: I stand corrected. On streets where there has been a slight deviation in the track, I would sooner put a foot difference between the tracks than I would in the tracks. About the gauge of tracks. If I did not misunderstand the gentleman, he said that the gauge had been fixed by local ordinance with a view to accommodating the width of the vehicles used in the respective cities. Am I correct?

Mr. Wharton said: I do not wish to convey the idea that it was established by that only. I will read: "As the gauge of street railways is almost always established by the local authorities to conform with the legal gauge of the ordinary vehicles of such city, there is, in consequence, no universal or standard gauge for them. Your Committee is, however, of the opinion that from four feet eight inches to five feet two inches gauge will give the most satisfactory results, as a general rule." I have been in different cities and conversed with parties getting up specifications for new railways; and that was one of the governing causes which determined very largely the gauge of the street railway. It was one of the first things brought up.

Mr. Richardson said: That is exactly as I understand it—that the gauge of railways in different cities has been fixed with a view to the accommodation of the width of the vehicles that were to run in them, other than the cars. It struck me very much as in the case of the old gentleman who said that he had "noticed that by a wise dis-

persation of Providence, large rivers always run by great cities." I think that the gauge was fixed in this city, and greatly throughout the country, in the first place, by the fact that the New York and Harlem Railroad here, and the Brooklyn and Jamaica Railroad in Brooklyn, adopted the four feet eight inches gauge of track. Then came on the other street railroads, each following the four feet eight and one-half inches gauge of track; and which has been thoroughly fixed in this city and Brooklyn, growing out of these facts. It has been so strongly fixed, that it could not now be changed to any other gauge, however much it might be of advantage to the railroads to change. It would require the concurrent action of so many companies. The fashion has been followed generally in that way in Philadelphia. They have a gauge of five feet and five feet two and one-half inches. We have nothing here in the way of a law, so far as I know, to regulate the gauge of tracks, and that accounts for the manner and the extent to which the centre-bearing rail has been used. Too much cannot be said as to the advantage of using that form of rail for economy of operation, both in reference to the cars and the rails. The only regulation that has been made, so far as I know, is the legislative provision that that form of rail should be used that is most in accordance with public convenience. The railroad companies considered that to be for the public convenience, and have preferred to provide for the easy riding of street cars rather than for other vehicles. They consider that they have consulted the public convenience by having that form of rail which is easier for the rider, than for the man who drives the omnibus or wagon. Sometimes there has been opposition on the part of property owners to the centre-bearing rail being laid. On one occasion on the Fifth Avenue line, we were gradually changing the flat rail, and a great deal of trouble was made about it. We succeeded in getting a resolution through the Common Council, allowing us to use the centre-bearing rail on the grades. That street proved to have so many grades, and to be so up-hill and down-hill, that by the time the centre-bearing rail was laid, there was very little that was not centre-bearing. [Laughter.] As to the form of rail, of what earthly use is that lip on the rail? What was it put there for? Who originated that idea to prevent this spreading tendency? The timber is chamfered away to make room for it, and if that very lip was above instead of below, it would help vehicles to turn out of the track. What you want, is a perfectly flat undersurface, which shall have an even edge. The lips that were formerly cast or rolled in the centre-bearing rail are everywhere discarded, and we have a flat, even surface. As to the tendency to wear on this joint-plate, it would certainly indicate, to my mind, that the timber was in such condition that it gave way under the rail, which made a continual ramming on the plate; so that this depression was caused to an extent that it would not be on solid timber. As to the joint-plates of eighteen inches in length, to which Mr. Wharton referred, they are certainly the very best thing we can get; laying them one foot under one rail, and six inches under the other rail, so as to give the greater support to the rail on which the car is coming.

Mr. Richardson said: The report as a whole, is so good, so instructive, so thoroughly beneficial to the horse-car interests of the country, I cannot say too much in indorsement of it. It is a hand-book of instruction for those who are about to lay tracks. One thing, in conclusion, in regard to what the length of the rail ought to be. Mr. Wharton speaks of thirty feet. I would say get them just as long as you can get the mill to roll them, and have just as few joints as possible.

Mr. Littell said: I would like to ask the Chairman one question in regard to laying a curve. Should the curve be of the same

gauge as the track, or should there be a difference?

Mr. Wharton replied: The best way to do it is to put the curve down to the regular standard gauge.

Mr. Kemp, of Troy, said: Why is this lip on the bottom of the flat rail? In our city we have tried to use the centre-bearing rail, and after having a resolution passed unanimously by the Common Council permitting its use, we are still obliged to live up to the requirements originally laid down, that we should use the Philadelphia pattern. Last Summer I was about to order two hundred tons of rail, to be laid down in a part of our city where we have a single track, and where the authorities would not allow anything but a single track. On our track is carted all the ingots made at the Bessemer Steel Works, at Troy. They have wagons loaded with about five tons of these ingots, and when they get on our track there is a regular procession of them. As the cars come down and meet them, they are obliged to turn out. In doing so, the wheels of the carts crowd on the flanges of the rails. The question came up by the party who desired to sell us rails, in regard to that lip which Mr. Richardson said is useless. The party trying to sell the rails insisted that the spikes could hold the rails. We were very much afraid to rely solely on the spikes, because, as every wagon turned out, it appeared the rails parted. I submitted the matter to the scientific men of the Polytechnic Institute and I told them to give me their opinion whether this lip was of any use. I told them, that in order to use the lip, we were obliged to chamfer off the edge of the timber, and that enough timber was cut off to allow it to fit snugly. They decided it was of some benefit to us, if it was crowded down in the timber, and that it would hold to a considerable extent. I decided I would keep the lip on the rail; but I want to get rid of it, if it is of no earthly benefit.

Mr. Wharton said: The question of laying street rails, like many others, has progressed. When I first became connected with the business, it was very common, it was universal, not only to have the lip on the inner edge of the rail, but on the outer edge also; and both of them very much deeper than they are at present. In fact, I have noticed, and the gentleman from Brooklyn will also remember, that the earlier forms of centre-bearing rails had that lip. The spike-holes were of the usual size, and the rail working a little up and down, finally enlarged the holes, so that they were cut entirely round. They reduced the size of the lip. I believe that I was the first one who absolutely insisted upon having the rails rolled without the outer lip on the rails. I quite recently have had rails made without that lip. I have been always advocating them without any lip. I can imagine in some particular instances and under certain circumstances, it may be valuable to hold the rail in position. I would take the risk, on every railroad in which I was ever interested, to dispense with the lip and give the rails a full bearing over the five inches. It would be well to put the spike-holes nearer together and have extra spike-holes, so that when the holes in use get too large, or the spike-heads are worn away, you would have an entirely separate and new set of spike-holes through which to drive fresh spikes into new and sound timber. I think the lip is an expensive notion, and I do not see where you get the good of it. In Philadelphia they stick to the lip, partly because they do not care to make a change, and partly because they do not know any better. In Philadelphia we always plane the portion on which the lip rests, so as to provide for it, as nearly as possible, a good solid bearing. I do not advocate it at all. I think it is a mistake.

Mr. Richardson said: I would like to say that I have not the slightest doubt, if the gentleman wants anything to protect his rail, he will be obliged to have it much

deeper than that [indicating the lip* on the rail produced by Mr. Wright]. If he has the width of the timber coming down a few inches further, it might do what the Polytechnic professor thought it would do in this case. The next best thing is cutting, that is, planing it just the size you want to fit it. There is not enough of it to prevent the rail from spreading. I would suggest, in addition to spikes, to have good solid paving, coming well up to or above the rail on the outside. That will do more than all the lips on the inside.

Mr. Wharton said: In regard to the ties which Mr. Richardson alluded to, I have never seen in the construction of railroads, that the hewed ties furnished were to any degree of uniform size. They are universally some large and some small; some straight and some twisted. The reason why I mentioned yellow pine is, that in this part of the world they are the cheapest in cost, the easiest to get, and they are the best ties. They can be obtained of uniform size, and give a uniform bearing to the rail, when they are placed at regular distances apart. They have been proved upon steam railroads to be the best, and we presume them to be the best on horse railroads. It is a very serious matter to have ties of varied surfaces, because the track is held up better with large ties than with small ones. Instead of not endorsing chestnut or white oak, I would say that I think they are better than yellow pine; but they do not come in this part of the world sawed to uniform dimensions and of regular size, so as to be as cheap as yellow pine sawed ties.

Mr. Parsons, of Philadelphia, said: It is not often that I have had the chance of finding fault with Mr. Wharton. But as I have the opportunity now, and also for the purpose of deriving a little instruction, I find fault with him, and would like to ask for some information. In the first place, in Brooklyn and New York, Mr. President, they make more money than we do in Philadelphia, and they build their roads according to their own ideas. In Philadelphia, we have to conform to the city regulations. Mr. Wharton says that the rails, as originally laid in Philadelphia, have undergone many changes. I do not agree with him.

Mr. Wharton replied: I did not say that the rails in Philadelphia had undergone a great many changes. Unfortunately, they have not, I said "street rails;" by that I did not allude to Philadelphia. They have a great many railroads, and there are a great many rails in Philadelphia; and I take great pride in that city. I alluded to the street rail, as changed. Unfortunately, however, they have not changed very much.

Mr. Parsons continued: Street railways in large cities are better constructed now than they were originally; they are more substantially built, and to a great extent

OFFICE OF THE
NORTH CHICAGO CITY RAILWAY CO., }
CHICAGO, November 19, 1884. }
* Mr. W. J. RICHARDSON, Secretary American Street
Railway Association.

Dear Sir:—At the last annual meeting, the question came up as to the advantage of having a lower "lip" on the bottom of rails to prevent them from sliding outwards on the stringers. Some of the gentlemen present thought this lip of no benefit. I do not agree therein. Trautwine, in his Engineer's Pocketbook, p. 181, speaking of the defrutive strength of pine and spruce, says: "We have very little experimental data on this subject. What there is on timber is in the direction of the fibres, and, consequently, does not apply to beams which are exposed to shearing at right angles to the direction of the fibres * * * The resistance to pine and spruce parallel to the fibres (which is much the weaker direction), is said to be from 500 to 800 lbs. per square inch." The ordinary width of stringer being five inches, and rail thirty feet long, we have 30 ft. x 12 in. x 4½ in. = 1,620 square inches at 500 lbs. per in. = 810,000 lbs. as the force required to split the stringer off. All the lateral strain on our tracks tends to force the rails outward, and I consider it advantageous to have this strength of material preventing the rails from moving upon the stringer, and relieving the spikes. Of course I assume a good fit as between the rail and the stringer. I thought the above might be of interest to you to insert as a footnote under the discussion. It would be a mistake to leave off the lip on the rail.

Respectfully,
AUG. W. WRIGHT,
Supt., Track and Construction.

differently. Instead of using wooden beams, tie-rods are used, making the tracks more substantial and less liable to spread, but we still have exposed to all the street traffic the spike, which, as we all know, soon wears off on the head; and as a consequence, the rail becomes loose if it cannot be fastened down securely. I think that the lip is of great advantage, if it is properly fitted into the string-piece; but as the spike becomes loose, the rail gets a wavy motion. It seems to me that we should therefore, make some changes in the construction of our rail. For that reason, I am very anxious to hear from those present using the "girder rail," which has a smooth joint, and where there are no spikes exposed to the heavy street traffic, and no way for the rail to get loose. If there are any companies represented here that have used the girder rail, I would like to know what their experience has been in the matter; and also as to its cost. In addition to the heavy expense of repair in the present form, you will never have a solid bearing or a firm road.

Mr. Humphrey said: I have been highly gratified with the discussion relating to street railways in the large cities. As I represent a small road, it does not apply so much to us. We have a narrow gauge road. When we started, and had been going along for a few years, some of those whom the politicians call "Mugwumps" [Laughter], found fault with our road, and said that the street railway would last ten years, and then we would have to take it up. Now, I have learned from the discussion here, that our rail ought to last thirty years; and I consider my stock in the road raised up to one hundred and twenty-five! [Laughter.] There is another point not represented here. The "T" rail laid in the city, and also outside—in the suburban portion of the city. The road that I represent has seven miles; five miles are laid the same as a steam road. I did not know but that there were other companies represented here that have a certain portion of their road outside the city and not paved, and from whose delegates I could get some information. What I want to get at is the way to take care of that. I thought this question would come up here. I am greatly interested in the report, and think it is a very valuable paper; but the discussion seems to be confined almost entirely to the large cities. I should like to get some information on this subject.

Mr. Rodgers, of Columbus, said: My friend, who has just taken his seat, said he came from one of the smaller towns; and he hoped to have the experience of persons representing larger interests, and of very much more extensive experience in the construction and erection of street railways, than his own. The time for the discussion is limited, and, therefore, I propose to occupy but a moment. I arose more for the purpose of asking an expression from those who have had considerable experience with the girder rail; or, rather in regard to the forms of rail generally. I have observed in use largely here, and in other cities, the centre-bearing rail; and I presume there is no question as to the desirability of that rail, where it may be used according to the city regulations. So far as the girder rail is concerned, it is a matter of considerable interest to those who are operating railroads in localities where repairs are difficult to make and expensive. I can say, in reference to the company that I represent, that we have made some repairs with the girder rail. For a short distance we have laid some of the rail, and it has been used now for something over a year. The experiment has been entirely successful. It has answered our purpose very well, and gives general satisfaction to the riding public. So far as the city authorities go, there has been no objection made to it by them. I should be very glad to hear expressions from those who have used, in other places, the same rail; and especially, as to its use in the larger cities, if

it has been introduced in such. The rail we have used is the fifty-two pound rail, on an old Macadamized road. I have found no difficulty with it in any respect. It has operated very successfully, and I should be very glad to hear from others who have had any experience in any form of girder rails. The question was asked as to the cost of construction. My impression is that the cost of laying the track is considerably less; at least, we have found it so. I am not prepared to say, however, what the difference in the expense is; but it certainly is laid at less expense than the other track laid in the ordinary way. In our case, it has certainly been laid at less expense.

Mr. Holmes, of Chicago, said: In my opinion the allusion to the girder rail is a most important one. I do not believe it is the only rail we should use. That rail has been used in San Francisco for over nine years; and having made some very protracted visits to that city, I have studied into the use of it, and am certain that the people of San Francisco have no idea of giving it up. The construction with that rail is very much cheaper, and there is no possible objection to it on account of the public, any more than there is with any other, and it gives such smooth, easy riding. I really believe that in five years' time it will be the rail of the country.

At the request of the Convention, Mr. Longstreet, of Providence, exhibited a model of a girder rail track which had been patented by Mr. Brayton and himself, and of which some 300 tons had already been laid in Providence. The model was to scale, and showed the method of construction. The rail was supported by, and keyed to, cast-iron plates two feet long by six inches wide, resting on concrete foundations, and held together by tie-rods of iron. No wood or spikes were used in the construction, and the expense was shown to be below the cost of a substantial tram rail track.

Mr. Littell said: Mr. President, I do not want to consume, unnecessarily, the time of the Convention, but I wish to say that we have put down seven hundred tons of girder rails. We laid them in 1881; and in 1883 we laid six hundred tons of centre-bearing rails like them. We like the rail very much, and our people like it. It makes a very smooth road.

Mr. Moxham said: Before the subject is dismissed, it might be proper for me to say that I have made a special and careful study of this question. Mr. Holmes has alluded to the San Francisco rail. I have concluded, from all I have been able to gather, that that rail was the first used in the country; I am a little inclined to think in any country. The next and more important effort seems to have been in England and on the Continent. In England they have gone to the extreme in the use of the girder rail. In this country there has been a great deal done in various forms of girder rails. Mr. Longstreet has given the matter a great deal of thought. There is no one system, no one rail, but a number of them to choose from. I believe, with Mr. Holmes, that the girder-rail is the coming one for the purposes of street railways.

On motion, the report of the Committee was adopted.

Our News Column.

We take special pride in calling attention to the great quantity of Street Railway news in this issue of our paper. In nine cases out of ten, the items are official; and in most other instances they are supplied us by traveling agents of street railway supply houses, from notes taken while on the ground.

We have clearly demonstrated (1), that there was an opening for a Street Railway Journal; (2), that this Street Railway Journal has filled that opening.

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32 LIBERTY ST., NEW YORK.

8 LAKESIDE BUILDING, CHICAGO.

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Luminous Railway Cars.

"Know ye the land where the Halsey and Myrtle
 Have emblems on cars that are run on their line;
 When the rage of the driver, the love of the turtle
 Now melt into sorrow, now madden to crime?"
 —*Bride of Abydos*, i-1

Our venerable and esteemed contemporary, at once the Phoenix and the Methusaleh of American railroad literature, is not satisfied with having given to the world the brilliant idea of luminous harness for street railway service, but has added to the literature of railway illuminations the following:

"The Swiss railway companies now cover a portion of their carriages with a phosphorescent preparation which makes them visible at night."

The Phoenix proves itself to have the piercing vision of the graceful lynx, and the deep wisdom of the silent sphinx. It has discovered and announced a hint which should make the fortune of the first line adopting it.

No longer

"That orb'd maiden, with white fire laden,
 Whom mortals call the moon"

shall reign the night and illumine the noisy street or dusky track.

Rich and rare cars, fair beyond compare,

"Blue, darkly, deeply, beautifully blue"

and luminous with golden sheen, shall rejoice the home-wending citizen, when

"Night's candles are burnt out, and jocund day
 Stands tip-toe on the misty mountain tops,"

and attract the yokel from a distant land, in no less measure than now does the Greatest Show on Earth.

How inspiring! In day time, the down car

"Fills
 The air around with beauty"

as it climbs the first grade; and then passes over the summit where live the "nobs."

"So sinks the day star in the ocean bed,
 And yet anon repairs his drooping head,
 And tucks his beams, and with new spangled ire
 Flames in the forehead of the morning sky."

It recalls, the while, those sweet lines

"Spake full well, in language quaint and olden,
 One who dwelleth by the castled Rhine,
 When he called the flowers, so blue and golden
 Cars, that on earth's firmament do shine;"

and makes us young again.

The Luminous Car! Bright essence of Pearl Street sagacity, I see thee now ("in my mind's eye") as thou rollest by St. Mark's Place,

"Time writes no wrinkle on thine azure brow,
 Such as the painter's eye heheld, thou rollest now."

How sweet! In the house opposite, in the twilight, sits an aged man, serenely waiting for the summons. His gaze, too, seeks down the long vista, the glowing fleck which betokens the 6:40.

"Unto dying eyes
 The horse car slowly grows a glimmering square."
 —*Princess*.

The patriarch smiles; he gently waves his emaciated hand, blessed with good doing. He has seen the luminous car and has no more wish nor need to live. His eyes close for aye, and, like the car itself, his soul is

"Gone, glimmering through the dream of things
 that were."

Of this car it might be truly said:

"Rich and rare were the paints she wore,
 And a bright gold light on her front she bore."

No more shall the growling "cit." complain of the car which at once cheers him, transports him from place to place, and affords him symbolism and a subject for philosophical reflection. No! he shall rather say, with Eliza Cook:

"I love it—I love it, and who shall dar,
 To chide me for loving that old *hoss car*."

The Luminous Car! Indeed,

"She [rides] in beauty, like the night
 Of cloudless climes and starry skies;
 And all that's best of dark and bright
 Meet in her dashboard, and her eyes
 Thus mellowed to that tender light,
 Which Heaven to gaudy day denies."

The Luminous Car! Think of the good it will do at night; at once a "guide, philosopher and friend."

"Thus, when the lamp that lighted
 The traveler, at first goes out,
 He feels awhile benighted,
 And looks around in fear and doubt.
 But soon, the prospect clearing
 By cloudless starlight on he treads,
 And thinks no lamp so cheering
 As that light [the horse car] sheds."
 MOORE—*I'd Mourn the Hopes*.

The Luminous Car! Think of the inspiration it will afford the early milkman and the night patrolman. When

"Morn,
 Waked by the circling hours, with rosy hand
 Unharred the gates of light."

their souls have been prepared for poesy; and if

"The horse car came down, and the milk wagon
 poled,
 And its panels were gleaming in purple and gold."

instead of the milkman giving the reckless car driver in charge to the policeman, he would turn to the latter, and pointing to

the glowing rear dashboard of the luminous car, would feelingly quote:

"She was a form of life and light,
 That, seen, became a part of sight;
 And rose, where'er I turned mine eye,
 The morning car of memory."
 —*Giaour*.

We shall have a special luminous donation car of our own, made by contributions from all the car builders and inventors in the country. It will be

"The princeps copy, clad in blue and gold."

Then when

"The sentinel [cars] set their watch in the sky"

we shall softly roll homeward, shedding azure radiance around us, and emitting an aurea as we go.

We shall keep our special donation Luminous Car in first-class condition at the expense of the donors, their heirs, executors, administrators and assigns, forever; for it hath been sweetly, truly said, that

"The [car] is fairest when 'tis [painted] new,
 And [varnish] brightest when [it's free from
 streaks]."

And yet, while in the Luminous Car there is poesy, mystic symbolism, the concord of sweet rays and the epitome of bright hopes, is there consolation therein? Were not the old ones better? Ah me!

"I remember, I remember
 The horse cars dark and high,
 I used to think their painted tops
 Were close against the sky.
 It was a childish ignorance,
 But now 'tis little joy.
 To know I'm further off from heaven,
 Then when I was a boy."

Though there will be aptness and truth in the quotation,

"Blossomed the lovely cars, the forget-me-nots of the angels;"

though we may with telling fitness, in referring to the grand concourse of theatre cars up Fulton Street at 11:15, recall to our best girl the charming lines:

* * "Now glowed the firmament
 With living sapphires,"

etc., we doubt whether we shall be much happier—unless the man-who-hugs-his-girl-up-in-the-corner is suppressed by an unpoetic conductor.

We wish it distinctly understood (and in saying this we speak entirely in the interest of our semi-centenarian though still poetic neighbor), that the Luminous Car principle, present and to come, will be no less adapted to the gorgeous Pullman than to the despised bob-tail; no less to steam roads than to those urban ways on which the effulgent vehicles are propelled by the refined mules of Louisville. Head-lights on steam roads need, in fact, be unnecessary; the cars themselves will announce their coming; and our proposed eighteen-hour train between New York and Chicago will appear like a glowing streak of light having a length of about 600 miles, or the exact distance traveled between sunset and sunrise, or from 18 to 6 o'clock.

As we live we learn.

"'Tis the sunset of life gives me mystical lore,
 And [incoming trains] cast their shadows before."

The Value of Street Railways.

Rapid transit lines, stage routes, elevated and underground railways, but more especially *street railways* are most potent in influencing the destinies of cities, because they work into the economy of society under the subtle yet constantly operative law of the DIVISION OF LABOR.

"My time is worth more than my street-car fare" is the correct result of many mental calculations constantly made, because an organized system for transportation can accomplish the task for the people of even a small town—much more than that of a wide-spread metropolis—cheaper and better than they can do it for themselves. Instance, a plumber and his assistant about to execute a job at even so short a distance as half or three-quarters of a mile; it is obvious that the unlucky (?) patron would prefer to pay for the "time" plus the street car fare than to liquidate the bill including time spent in walking one or two miles.

From this extreme example to the case of the poor sewing woman carrying home the results of her long and pitiful industry and including almost every conceivable condition of business and industry, the real fact remains that "the time is worth more than the cost of the fare."

This is the suggested thought: That in the division and subdivision of the multitudinous employments of the toilers—and the people of a city are fearful workers—of a greater or a lesser city, "the company" can do its part of the general work in transporting cheaply and conveniently the great multitude better, in every sense, than the people can do it for themselves. Second: That without this cheap and convenient system of internal transportation, working within and in co-operation with the other greater or lesser divisions of labor that the modern great city could not exist. Cities of a million population now are few in number and those several cities in the near future with *five millions population* would never exist except in the imagination of sanguine and false prophets, but which by the aid of street transportation will be facts to be learned from the geography of our children.

T. A.

Crowded Cars.

"All that board the platform are but a handful to the tribes that struggle in its bosom."

Once in a while comes from the traveling public a wail of woe as to crowded cars, and the suggestion that the French system be adopted—that of limiting the number of passengers carried to the actual seating capacity of the conveyance, and furnishing numbered cards to those in waiting at the terminals or stations, so that the first come is the first served.

There are some good points about this plan where the line is short and the "headway" also, and the climate somewhat regular, but for long lines and infrequent cars, and the capricious weather of most American towns, it won't work; *particularly on the last car!*

We will just suppose the case of a man with wife and child, arriving in a pouring

rain in time to catch the "last car," and being confronted with the sign "full;" or being handed one ticket. Shall he ride home and leave wife and child? or send his wife home alone and he and the child sleep in the waiting room; or how?

Still there is no doubt about it that the extreme impatience and haste of passengers often produces unreasonable crowding and not only causes discomfort, but opens the door for quarrels and pocket picking, and contagion.

There might be imposed a certain limit of crowding under ordinary circumstances: as for instance where the cars run on short headway, the weather clear and likely to continue so, and the driver knows that no advertised trains or public entertainments will be missed by a few minutes' wait on the part of the excluded ones.

There is, too, a probability that more fares would be collected. Some few people might walk instead of riding; but then again there are many who will not try to ride on certain lines during the crowded hours; and the conductors would miss fewer fares of those who did get on.

A Handsome Lithograph.

We have received and have to return thanks for a sheet of vignettes of the Officers of the American Street Railway Association from its organization in 1882 to the present time. It is a complimentary souvenir (and, be it said, a very neat one), published by J. M. Jones' Sons, of West Troy, N. Y. The sheet is heavy paper, 22x30 inches, and contains around the edges square "cabinet" portraits of each member of the Executive Committees for the three years, the Secretary and Treasurer, and the Vice-presidents; and across the centre, on round plaques, portraits of the four Presidents. Under these is a perspective view of a street railway barn, and a summer car passing a close car at full speed. The pictures are in black and brown tint, on white surface, and the whole piece is worthy of a good frame, and place over the office desk.

In Low Latitudes.

One would think that in the enervating climate peculiar to territory south of Mason & Dixie's line, people would need no education, as far as riding on street cars is concerned; but to one who has traveled to any extent 'neath southern skies, and visited southern cities, it must appear strange that even where there are street car lines, the majority of the people walk in preference to riding.

A solution of this seemingly paradoxical problem may be that the poverty of the Southerners since "the late unpleasantness" causes them to save every penny for the absolute necessities of life, and never to pay out a nickel for riding from one given point to another, when that nickel might be saved by hoofing it. However that may be, I cannot but incline to the belief that this is false economy; the money expended with cobbler during the course of the year might be more than proportionally reduced

by being deposited in the fare boxes of ye festive bobtails.

Up to the present time comparatively few southern cities have any surface transportation facilities outside of the regulation "carriages," or fever boxes.

With commercial traffic always on the increase, one would think that a line built wherewith to connect most depots and hotels, would pay in almost any city with a regular population of anything from five to ten thousand inhabitants; yet even in such towns as Raleigh and Wilmington in North Carolina, and Portsmouth and Roanoke, Va., we find a sad lack of cheap transportation facilities. Montgomery, Ala., is another, and in all of these towns much business is done, two of them being State Capitals. However, I am glad to say that a line has recently been projected in Montgomery, and will probably be built and opened for business in the near future.

How many other towns of any importance are still without street railways in this land of sun and hoe cake, remains to be seen, but one thing strikes me as significant, and that is wherever we find a street railway we find projections for more. At Chattanooga, where there is but one, another is to be immediately built, and the Chattanooga street railway is to be extended in the spring, to the mountain, one and one-half miles from its present terminus. At Nashville, I had the pleasure of meeting Mr. D. Dederick, Superintendent Line Street R.R., and the patentee of a new turn-table, of which nothing but clever words have been said. Mr. Dederick is also Superintendent of the Cherry & Jefferson, Broadway & Vanderbilt, and the Church & Spruce Street Railroads. Twenty-three close cars are run over these four lines, of which 19 were built by the John Stevenson Co., equipped with its gear and super springs; and the remaining four cars were furnished by the Brownell & Wight Car Co. of St. Louis; besides the above, the Company owns 3 summer cars, built by the Laclède Car Co. And right here does it not seem remarkable to Northerners that out of a total of 25 cars run by one company in a southern city, but 3 are summer cars, while winter cars used during the heated term in higher latitudes are intolerable, and not to be endured? In justice to Nashville, however, I must say that its inhabitants claim for it cooler weather during the dog-days than many northern cities are blessed with. How true this may be I do not care to say, but from personal experience in both zones, I prefer summer rustication in the classic Cream or Garden Cities, rather than in that of the rocks.

After a delightful run through Eastern Tennessee over the admirably equipped N. C. & St. Q. R.R. to Chattanooga, and from there via the East Tennessee, Virginia & Georgia, through Cleveland, we find a welcome at the Hatter House at Knoxville. Here, the street railway is held in high regard; an interview with Mr. T. L. Beaman, Secretary, Treasurer and Superintendent of the Knoxville Street Railway Co.—at present the only street railroad in that enterprising place—elicits the fact that two more lines are about to be laid; one from Market Square to Mechanicsville via Asylum

Street, about one mile in length; and the other from Gay Street, by way of Crozier and Hardy Streets, to the Fair Grounds, distance above the same as the other. The first is incorporated for \$20,000, with officers (so far) as follows:

Dr. Tadlock, President, W. H. Simmons, Esq., Secretary and Treasurer; Superintendent not yet decided upon, but rumor says that — I was asked "not to give it away," so please excuse details.

Mr. Beaman has recently patented a rail, embracing the finer points of the T, centre bearing and side bearing; and it was darkly hinted by outside parties, that this rail is to be adopted on one of the new lines.

Leaving Knoxville in the evening, or rather a trifle after midnight (for any time after noon is "evening" here), I reached Bristol in time for breakfast, proceeding at once toward Norfolk, over the N. & W. R'y. At Petersburg, Va., a halt is made to pay my devoirs to Mr. Geo. Beadle, sole proprietor of the Petersburg Street R.R. The growth of this line has been rapid: Projected in October '82, chartered in November of same year, and opened for traffic the following September; it is readily seen that but little time was lost in its construction. The total cost of the road was \$50,000, including 9 cars, two "second-handers," and seven furnished by the Jones Car Co. of Schenectady, N. Y.; all bobtails. Mr. Beadle is the inventor of the fare-box (now made by Wales Mfg. Co. of Syracuse) used on his road. In discussing the relative merits of horses and mules, Mr. Beadle gave it as his experience that the festive mule will withstand the heat, and the effects of starting cars on heavy grades better than the horse does. I noticed that the cars were equipped with the Higley gear, of which I may have occasion to refer at a later day. A visit to the stables convinced me that the refined habits of the Louisville mule were by no means unknown here, and the abominable odor of uric acid was conspicuous by its absence. Thanks to the courtesy of Mr. Frank Beadle, a son of Mr. Geo. Beadle, and Superintendent of road, my brief sojourn in Petersburg, of historic memory, was rendered most enjoyable, and the cordial invitation extended to me to "come again" will assuredly be accepted in the near future. It was with feelings similar to those experienced on leaving old friends, that I again boarded the cars for the seaboard, via Richmond. And here I find another projection, that of a road from the corner of 8th and Broad Streets via 8th, over the free bridge to south end of Hull Street, Manchester, a distance of two miles. The charter for this line was granted as early as '82, but lack of funds and enterprise prevented the projection materializing. However, times move with the sun and there is to be no more delay; it is expected that the road will be open for business sometime this summer; the estimated cost will be in the neighborhood of \$50,000, including equipment.

Major Bolton, President of the Richmond Street R.R., and Chief Engineer of the R. & D. R.R. system, was away from the city, so I was disappointed in one of our objects in visiting the old Confederate capitol.

And here I must leave you for the present; let me record the fact, however, that wherever it goes, the STREET RAILWAY JOURNAL has an assured welcome, the only complaint being that it "don't come often enough."

E. V. CAVELL.

Green Cove Springs, Fla.

Street Railways and the Daily Press.

EDS. STREET RAILWAY JOURNAL:—

At the last Convention of the American Street Ry. Association, the president of a prominent company expressed his regret that the daily press had not been notified of the convention, that they might have had reporters present to give to the public the utterances of those gentlemen in convention assembled representing the chief street railroads of the American Continent. Inasmuch as I entered a protest against the admission of the representatives of the daily press, I take this opportunity of expressing more at length my reasons therefor.

For what purpose is a street railway company organized? I answer for one of two reasons. Either to develop an otherwise inaccessible property, or to derive a profit from the transportation of people. The latter incentive has been in the great majority of instances the avowed purpose, and, in the words of M. M. Kirkman, "In the operations of railroads the objective point of endeavor is the revenue that accrues from the business. It is for this that the proprietors contribute money for the construction of railroads; it is for this that they are operated."

A certain district having been built up, and the people experiencing great inconveniences in getting to and fro on business or pleasure, some energetic individual thinks it will be to his pecuniary interest to furnish transportation. He talks up the matter, and probably with great difficulty interests others in the project. A charter is obtained from the State Legislature, and subsequently an ordinance from the local authorities, granting permission to construct the tracks, in certain streets, upon certain conditions. In other words, a contract is entered into as between the company on the one hand and the people, through their representatives, on the other hand. The latter expect to receive full value for the rights and privileges granted the company. Individuals are induced to subscribe for the stock, and in due course of time the road is constructed. The people at once derive the benefits incident to the operations of the road. Not so the stockholders. The records will show that many of the prosperous roads of to-day passed many a weary year without earning the expected dividends upon the investment. "Hope deferred maketh the heart sick" is a trite but not the less true proverb. As dividends failed to materialize, the original stockholders would in many instances be forced to part with their stock, unless their financial condition was such that they could wait for the good time coming. The expenses of operating a railroad are in a measure independent of the traffic. The cost of motive power, cars, horses, build-

ings, vary in a great degree with the traffic. Not so the track expenses. The track will cost nearly as much if used by one car as if used by a hundred. Actual count at a point in Chicago showed that the sixteen feet of street pavement maintained by a horse railroad was used FORTY TIMES while the balance of the street was used once.

But our street railway having entered upon its service to the public, affording convenient and frequent conveyance to and fro along its lines at the lowest possible cost, tends to create traffic and reacts to the public good. The value of all the property in its neighborhood is increased; new life is instilled, and buildings commence to spring up on every hand. Business seeks a location along its lines, because the people are drawn thither from each side. In constructing the street railroad, therefore, the projectors, although actuated by selfish motives, "have built better than they knew." Over a century ago that wonderful man, Adam Smith, wrote: "Every individual is continually exerting himself to find out the most advantageous employment for whatever capital he can command. It is his own advantage, indeed, and not that of the society which he has in view. But the study of his own advantage naturally, or rather necessarily, leads him to prefer that employment which is most advantageous to the society."

The street railroads give employment to many thousands of deserving men. Permit me to quote the Hon. Moody Merrill, of Boston, who said, upon taking the chair at the first street railroad convention, 1882: "There are now organized and doing business in this country and Canada, four hundred and fifteen street railways. These companies employ an army of about 35,000 men. They run 18,000 cars, which with the horses attached would make a solid line of cars reaching from Boston to Albany. More than 100,000 horses are in daily use, and, calculating that the average life of a horse in street railway service is four years, it makes the annual consumption of horses 25,000, a fact of much importance to the farmers of the country, east, west, north and south. To feed this vast number of horses requires annually 150,000 tons of hay and 11,000,000 bushels of grain. These companies own and operate over 3,000 miles of track—nearly enough to span the country from Boston to San Francisco. The whole number of passengers carried annually is over 1,212,400,000, or a number nearly equal to the entire population of the globe. The amount of capital invested in these railways exceeds \$150,000,000, with absolutely no security, but the faithful and satisfactory service rendered the traveling public by the companies themselves."

As the street railway business is growing rapidly these figures must be increased for to-day, and the *indirect* value of these railways to the country at large is seen to be immense, and in the ramifications of the interest benefit the merchant and the manufacturer, etc., etc., but especially the former.

Returning to the supposed railway whose fortunes we were following. After weary waiting, perchance for years, the increased traffic, which is largely due to the con-

struction and operation of the said street railway, permits the payment of a regular dividend. The stock begins to be in demand and the price is appreciated. Instantly the public begins an outcry against the *monopoly*, forgetting in its wilfulness the years that passed *without* dividends. The cry is at once for more and better cars, etc., etc., etc. The interests of the corporation and the public appear to differ. The corporation is managed in the opinion of its officials for the best interests of the company, and these are always best for the public, did the public but judge intelligently. The daily press with a few exceptions, far between, instantly takes up the popular cry and its columns are filled with attacks upon that dread monster, "monopoly." The corporation had no organ by which to make its side of the case heard and the verdict went by default. It is this unfair spirit, evinced day by day upon the part of the daily press, that caused my objection to its presence at our convention. It would not allow us credit for ANY good qualities, but would hasten to curry popular favor by seizing upon anything and everything that it could distort into reprehensible views or actions.

What would be the condition of the cities of the world to-day without the street railroad? The value of property would be depreciated many millions of dollars, and the inconvenience to the masses would be simply indescribable. No other system compares with it in cheapness and regularity of service, and it transports the myriads of its patrons with unexcelled frequency and cheapness. Under the summer's sun, in winter's biting blast, in sunshine and in rain it never fails. AUGUSTINE W. WRIGHT.

Mileage, Feed, &c.

EDS. STREET RAILWAY JOURNAL:—

In answer to a "A Reader" in your last issue asking information about mileage, feed, &c., I submit the following method as followed by this company.

We use for feed—hay, corn, oats and bran. The corn is crushed, not ground, a portion of the hay is cut and mixed with the corn. Eight working horses are allowed to each car, and each team runs 19 miles daily. The horses are fed two hours before work, and are on the street 4 hours out of 24. The amount of feed we allow a working horse daily is as follows:

Corn (crushed).....	15 lbs.
Hay (cut).....	6 "
" (long).....	7 "
Bran.....	¾ "
Straw for bedding.....	3 "

We feed oats to fresh horses and those that are "off their feed" from various causes.

JNO. B. PARSONS,
President.

Lombard & South Streets }
P. Ry. Co., Phila. }

[We have to thank Mr. Parsons for his trouble, and ask others to give their usage. We wish the STREET RAILWAY JOURNAL to be a medium of exchange among street railway men. Each one, by putting questions and giving information, encourages others to do the same.—EDS.]

Shoeing Horses.

EDS. STREET RAILWAY JOURNAL :

I fail to see what is new in the "best system" of shoeing horses in the use of street railways, as offered us in your March issue by Mr. Thos. Leggett, unless it be as a novel advertisement.

He has no "shoe to sell or axe to grind!" His interest is only for the horse! But still it is a strikingly plain fact that his alleged "new system" is only the well known old plan of a particular horse-shoe manufacturer, and he is most careful to explain that it is a certain pattern of this manufacturer's shoes that he uses!

If Mr. Leggett has anything new and truly worthy to impart on this subject, let us have it by all means; but why foist upon us "best systems" that are novel or available only as a new form of advertisement for some manufacturer? No doubt, "if the horses had a voice in the matter, they would demand a change;" but I suspect they would confine their demands to their own needs, and not to urging the wares of any manufacturer who sees his pet system of shoeing gone out of adoption, unsupported by the test of experience, and in favor of better methods.

For I submit, that it is well known, certainly here in the East, that the toe system of shoeing has not proved sufficient to keep horses' feet in the best condition possible with their work on street railways, and that this system is an abandoned one. While it is indeed desirable to give the frog and heel part of a horse's foot all the free action possible, it is not true, that, in allowing such parts to pound pavements wholly unprotected, no injury will be done them; for their natural action is exceeded or carried too far, and results in breaking the bar between the frog and heel, and in bruises and undue wear.

It is generally recognized here, that since the whole (and not the toe alone) of a horse's foot is subjected to the unnatural work of pounding pavements, all parts of the foot should be protected in proportion as the work they are put to is in excess of their natural use. So, then, we use a full shoe extending back and protecting the heel; and we consider that nothing less than a full shoe can be used. The shoe should, of course, be light; and yet it should be thin enough to give the heel all necessary movement, and the frog all the pressure upon the ground that it can stand, at the same time protecting both heel and frog from undue wear.

And I will add, that I recommend no particular manufacturer's shoes.

RAILROADER.

[The foregoing is a *bona fide* communication from a street railway man. We submit that he has not disproved any of Mr. Leggett's statements, nor proved any of his own. Suppose Mr. L. takes the matter up again and gives us some data; then let RAILROADER take the advise that he offers to Mr. Leggett and does not take himself: "If he has anything new and truly worthy to impart on this subject, let us have it by all means."—EDS.]

Street Car Horses.

Car horses, said the foreman of the Third Avenue Street Railroad Company to a *Tribune* reporter, are injured in a variety of ways. They run the greatest risks during the hottest part of the summer and the coldest of winter. These two periods aggregate about four and a half months. The month of September was the hardest month of last year for car horses. An intensely warm term came on the heels of a cool period and the result was the prostration of a large number of car-horses in this city as well as in many other parts of the country. Leaving intensely hot and cold weather out of the question, the most perilous season for the car horse is dry, windy weather. The cobble stones over which he travels are then as smooth as polished glass. Not a particle of any foreign substance can get a foothold on them, and the sharply shod hoof will slip from them with the same ease as the human foot will slide off the smooth side of a banana skin. Some of the roadbeds offer even more than the usual facilities for accidents of this nature. They are constructed on the shape of a watershed, sloping from the centre to the tracks. On these the car horse has a hard time indeed in wintry and windy weather. Comparatively few accidents happen in wet weather. Unless they happen to break a limb, only a small percentage of horses which slip and fall suffer permanent injury. With rest and care they generally recover from sprains and strains. Out of 1,700 horses the Third Avenue Company loses but one a week, according to its foreman. The latter has ninety-three hostlers under his eye, besides a large number of men employed in other capacities. Each hostler is expected to groom twenty horses per day, and to feed and bed them.

The stables are as clean as it is possible to keep them. The horses are in keeping with their surroundings. Horses are purchased at all seasons, but the best are bought in the fall. The seller is willing to take much less at the beginning than at the end of winter. The company has a standing price of \$155. Some splendid specimens of horseflesh have been bought for this figure. Gray is the color preferred. Horses of this color are said to suffer less from the heat than blacks and bays. From eight to ten horses are used in a snow sweeper, and one team possessed by the company attract much attention as they rattle through the avenue. The ten grays whirl the huge sweeper along as if it were a light road wagon. Several of these horses stand seventeen hands high. Every new purchase is subject to an attack of pinkeye. This is attributed to change of climate and surroundings. Most of the horses come from the West, and they are found to require from a week to two weeks to obtain their "sea legs." It is a common opinion that the lot of the car horse is not a happy one. In comparison with the fate of a large number of horses which receive but little sympathy, the car horse is to be greatly envied. He is not overworked; he is well fed, well housed, and is seldom ill-treated with impunity.

Mr. Holmes on the Traction Company's Troubles.

Mr. C. B. Holmes, Superintendent of the Chicago City Railway Company, was recently interviewed by a reporter on one of the Chicago dailies, and expressed himself as follows on the subject of the Philadelphia Traction Company's mechanical difficulties:

"The first piece of cable road constructed in Philadelphia was put in one year ago last summer, and was something like a mile in length. The projectors of the road had previously visited this city and we made them familiar with our methods of construction and our various appliances; but they expressed the conviction that our expenditure of money had been too great, and they endeavored to construct an equally effective road at a cost of about half the money.

"Their first construction cost them, I am told by their engineer, something in the neighborhood of \$146,000, and it proved an utter failure. It was taken up and thrown away. Last season the same company constructed from twelve to sixteen miles of cable track, which was in some respects an improvement on the first experimental mile put in a year before, but the construction was altogether too light and had no ability to resist the lateral pressure of frost, which is simply enormous. If our construction here had been made in the same way, it would have given us even more trouble than they had, as our frost goes so much deeper and its pressure is so much greater.

"I notice in the papers that the cost of this road is stated to be \$600,000, but it is my impression, received from various sources, that the expenditure was much greater—probably over a million. This construction had no ability to resist the great lateral pressure, and as soon as the frost came the slot closed. The engineer of the construction told me that they had taken up the pavement, inserted wedges in the slot, and forced the slot open, and had attempted to hold it open by inserting bolted rods between the slot-iron and the stringers upon which the rails are placed. But this afforded only temporary relief, for as soon as the temperature changed again the slot not only closed but drew the rails themselves toward the slot, so that in operating the cars with horses a large number of wheels and axles on the cars were broken.

"This information," said Superintendent Holmes, "was given me by the President of one of the companies in Philadelphia. We have never had the slightest trouble with our construction here in Chicago in the way of the slot closing, as we made special provision to guard against that, it being the thing to fear most. That feature of the construction was made perfectly secure. As is known to all the citizens of Chicago, the iron-work and the concrete which inclose the iron-works were made with special reference to intense frost.

"Statements have been made in the Eastern papers that the cable line here had been troubled with its slot closing up. These reports are wholly without founda-

tion. The only thing that could have given rise to any such impression was the fact that in the construction of the road we received a few car loads of slot-iron that had a ragged edge from imperfect rolling. The parties who furnished this iron instructed us to return it at their expense, but we had 1,500 men at work, and the streets torn up, and we could not afford to wait for new shipments of iron, but were obliged to use this, purposely placing the slot-irons closer together than a finished state would permit, and afterwards chipping off the ragged edges. That was all, or nearly all, that was done before the cars commenced operating. A few spots were finished afterward, but with this exception there has been nothing to give any impression whatever that our slot had ever closed on us.

"There have been a few cases, especially in the early days of the system, when inexperienced drivers have held on to cables too long and thereby cut them, but experience has relieved us of all trouble of this sort. We have had two cases when minor portions of the machinery have proved of insufficient strength under the intense strain at times brought to bear upon them, but we have strengthened these parts by adopting much heavier machinery. In February one section of this heavy machinery was placed in position, and to-day we have received and are hauling to the works the last of this heavy machinery. When occasion arises, or as soon as it is possible to do so, we shall remove the last portion of light work and insert this heavier construction in its place.

"The last winter has been an unprecedented one in severity of frost and volume of snow, but it has been of use to us in enabling us to discover wherein were the weak points of our construction, and so completely remedy them. The weak and imperfect construction adopted in Philadelphia should not weigh against the true merits of the cable system.

"It is absolutely necessary," said Mr. Holmes, in conclusion, "that the construction should be strong and stable to insure comfort to the public and to the operators. When this is done, there is no system yet devised which will compare in excellence with the cable system for transportation in large cities."

Additional Transportation Facilities in New York City:

EDS. STREET RAILWAY JOURNAL:—

The present need for additional transportation facilities in the City of New York will be conceded by any one who has occasion to come down town between the hours of 6 and 10 o'clock A.M., or to go up-town between the hours of 4 and 7 o'clock P.M.; and the future necessity thereof will be made even more manifest by reference to the following statistics and estimates:

POPULATION OF NEW YORK CITY.			
		Increase.	
In 1850....	515,547	.....	..
In 1860....	813,669	298,122	58 per cent.
In 1870....	942,292	128,623	14 "
In 1880....	1,206,299	264,077	28 "
Increase in 30 years....		690,752	

—being an average of 33 per cent. in each decade upon the population at the beginning of each. As the second decade included the period of the civil war, and the third covered the great financial and industrial depression following the panic of 1873, it will be safe to estimate a like decennial increase of 33 per cent. during the ensuing thirty years, which would make the population:

In 1890.....	1,604,380
In 1900.....	2,133,800
In 1910.....	2,837,950

—the latter being over 2½ times the population in 1880.

The number of passengers transported per annum upon city surface and elevated railways has been for the years ending September 30th of each year, as follows:

Years.	On Horse Roads.	On Elevated Roads.	Totals.
1855	18,488,459	.....	18,488,459
1860	36,455,242	.....	36,455,242
1865	82,054,516	.....	82,054,516
1870	115,139,553	.....	115,139,553
1875	165,997,602	920,571	166,918,173
1876	166,401,018	2,012,953	168,413,971
1877	160,924,436	3,011,862	163,936,298
1878	160,952,832	9,236,670	170,189,502
1879	142,038,391	45,945,401	187,983,792
1880	150,390,391	60,831,757	211,222,348
1881	155,800,993	75,585,778	231,386,771
1882	166,510,617	86,361,029	252,871,646
1883	176,625,434	92,124,443	268,749,877
1884	187,413,242	96,702,620	284,115,862

The above figures indicate how rapidly travel increases when additional, and especially when superior facilities are furnished. It is worthy of note that the transportation facilities on the elevated railways reached their maximum in 1881 as the following record shows:

Miles run by trains in 1881.....	6,117,238
" " 1882.....	5,917,051
" " 1883.....	5,919,931
" " 1884.....	6,056,766

Despite which their traffic increased from 1881 to 1884 by 21,116,842 passengers, or 28 per cent.

With the increase in population, the additions must go farther and farther from the centre of business, necessitating a constantly increasing ratio of travel to population.

The increase of travel from 1870 to 1880 was 96,082,785 being 83⅓ per cent. of the amount in 1870, upon which basis the amount of traffic would be—

In 1890.....	388,103,940
In 1900.....	712,558,834
In 1910.....	1,308,261,919

The increase from 1880 to 1884, without any increase in the transportation facilities, has been 72,893,514 being 34⅓ per cent., upon which basis the travel would be

In 1890.....	450,000,000
In 1900.....	956,000,000
In 1910.....	2,031,000,000

In view of the increase of population, its greater distance from the business centre, and the additional facilities of a superior quality to be furnished by the New York Cable Railway Company's system of cable

roads, it is safe to estimate the travel at an average of the two estimates, say

In 1890, 420,000,000, an increase over 1884 of.....	136,000,000
In 1900, 835,000,000, an increase over 1884 of.....	551,000,000
In 1910, 1,670,000,000, an increase over 1884 of.....	1,386,000,000

which certainly indicates that plenty of traffic awaits the new enterprise, and clamors for its completion.

If the cable roads should all be built by 1890, and should attract only 75 per cent. of the increased travel, they would carry 102,000,000 passengers.

The east side axial line (Lexington Avenue) would have, within two blocks on either side, the following existing traffic to draw from without any allowance for increase :

In 1884 Third Avenue elevated carried.....	47,695,460
In 1884 Second Avenue elevated carried.....	10,249,263
In 1884 Second Avenue surface carried.....	19,397,072
In 1884 Third Avenue, surface carried.....	31,395,490
In 1884 Fourth Avenue surface carried.....	15,038,579
Total.....	123,775,864
of which elevated roads carried... ..	57,944,723
and surface roads carried.....	65,831,141
	<hr/>
	123,775,864

while the increase in this territory will be at least 9,000,000 per annum during the five years from 1885 to 1890, if facilities are furnished, for which there is now no adequate provision.

A reasonable estimate would allow the Lexington Avenue cable line one-fourth the aggregate traffic of this district in 1886, say.....	33,000,000
and one-third the increase in 1887, say.....	36,000,000
and one-third the increase in 1888, say.....	39,000,000
and one-third the increase in 1889, say.....	42,000,000
and one-third the increase in 1890, say.....	45,000,000

These figures but partially indicate the value of the cable railway projected on Lexington avenue to this district of the city.

WM. P. SHINN.

Answering Questions.

We have received a letter containing some questions which have been unsuccessfully submitted to others for answer, and which involve considerable work. We wrote the sender (a non-subscriber) that we should answer them in our columns. He replied asking if it would not be equally convenient to answer by mail.

It might be just as easy and convenient for us to answer the questions by letter, but we see no reason why we should do so. Our time is sold to this Publishing Co., and we have a certain interest in the profits of the business. To take from one to five hours to answer questions which have already been sent back by three persons would be unreasonable. We should prefer taking the

same time and answering the questions in editorial columns, where they will benefit others than the querist, especially as those others contribute to the support of the papers by their subscriptions.

Our correspondent will pardon our frankness; but our regular business is that of scientific expert, and such questions should be accompanied by a check of \$20.00, to order of our Company, if immediate and personal attention and reply is wished.

While the hospital physicians treat cases free at clinics, for the benefit of the students who have paid their fees, they always charge for attendance at the house and for private treatment at their own offices. The cases are parallel.

Collection of Fares—I.

The Atlantic Avenue Railroad Company, of Brooklyn, exclusively uses an alarm-register with which to check the collection of fares, known as "Richardson's Time Alarm-Register." It is the invention of Mr. W. J. Richardson, the secretary of the company, and has been in continuous use on the lines of that company over a year. It is said to have been so satisfactory that there are now being made improved registers, outwardly similar to those now in use, with which to equip the new cross-town line. This line, it is expected, will be in operation about June 1st, and will run from Hamilton Ferry, at the extreme southerly end of the city, to the Brooklyn terminus of the great East River Bridge.

This alarm-register is used exclusively for recording adult and half fares. Where there are many different rates of fare, as is notably the case with the Concord (N. H.), road,* the use of this register is not recommended, as it was not designed for that purpose. The five-cent or adult register will record one thousand fares, and the three-cent register one hundred and fifty; both sets of dial hands being so constructed as to preclude the possibility of tampering with them in any way. The dials are obscured from the conductors' view.

Every conductor is obliged to have two dollars in change, and just that amount with him when he goes to work. At the end of every half-trip, he must deduct the amount of money he starts with, namely, two dollars, and turn the balance of the money into the office. The conductor ascertains the number of cash fares received, by dividing the balance by five, after having deducted the amount of cash received in three cent fares. These calculations must be made at least sixteen times a day, and on one line as many as twenty-two times a day.

By this system, no excuse should be made by the conductor for not turning in just the number of fares his register shows him to have recorded. Unless by such a system as this, conductors never will count their money, and they are thereby induced to get into a loose habit of keeping their cash and accounts. By this system, they are required to count their money, and turn into the company's office the balance over and above the amount of two dollars.

* See page 171, report of the American Street Railway Association, 1884-5.

The five-cent or adult fare-bell is large and gives a clear resonant ring. In connection with the register is the watch movement, which carries at all times the standard time of the company. The attachment of this movement to the register has had the effect of almost entirely doing away with "loafing" or running behind time.

The register being wholly under the control of the conductor, in case of a fire with hose across the rails, preventing the further progress of the cars, the conductor's accounts are never mixed, as is necessarily the case oftentimes, with the stationary registers. The conductor likewise cannot charge that his register has been tampered with, either in his possible absence from the car, or by malice or from any other reason, on the part of the passengers or others. Fares can be collected with it more quickly than with any other register used.

It is the judgment of Mr. Richardson that no register, portable or stationary, is worth anything unless it is supplemented by a thorough detective system; for perfection in an alarm-register is only to be attained by the invention of a machine that will fit inside of a man and make him honest. Till then all systems of checks will be but helps to keep men honest.

C. B. L.

Street Railway Insurance.

The formation of a street railway fire insurance company is being seriously considered by the managers of some of the leading street railway companies of America. The rates on the depot buildings and equipment owned by these companies has long been fixed outrageously high. There has been, as it were, a combination made by the insurance companies, equivalent to a "strike" against the street railway companies, by which they have arbitrarily placed the rates on the property at a figure to suit themselves, and in no sense justly proportionate to the character of the risks. Those companies that have not entered the "tariff" combination, are equally high in their rates of insuring this class of property.

It is conceded by the managers of all fire insurance companies that the moral character of the risk of street railway property is of the highest order; for incendiarism, to them, for the purpose of making money, can never be a temptation. Should the running of a railroad be unprofitable, and the owners desire to dispose of the stock, they could do it to better advantage, and make more money, by selling their property to the highest bidder, than they possibly could by a resort to incendiarism.

As to the arbitrary action of the companies, take, for instance, the cities of New York and Brooklyn. The "tariff companies," so called, forming the combination, have fixed the rate for all street railway, brick buildings, at one and a half per cent., and all frame buildings at two per cent. Wherein, we ask, is the justice of any such rating of property as this? We have in mind two pieces of property; the first, a one-story brick stable, that is about as liable to burn as rails under water; the other, a large depot building with several

floors, surrounded by lumber yards. The rates on both pieces of property are the same, simply because the companies have determined that the rates shall arbitrarily be set, as before stated.

The insurance statistics of street railway property, covering the business of nearly two hundred companies all over the country, from their dates of operation, show that not one dollar in three of premiums paid has been paid back by the fire insurance companies in losses. The insurance companies have no way of determining the losses on special lines of property, as, for instance, street railway property, except as each company shall determine what the rates shall be according to the business done by it, covering any special line of property. While the losses in one company may have been considerable, in another company they may have been little or nothing. The company that has lost largely will fix its rate accordingly; and the company that has lost but little or nothing will grade its rate according to that fixed by the company which has the highest rate.

Such a company as is proposed to be formed, should have almost a monopoly of the fire insurance of street railway property in America. The company should be controlled by representative street railway men, to be assisted by an underwriter, as inspector, of large and extended experience. The company, though provided with an absolute capital of say, not less than half a million, should be based upon and controlled by the essential idea of mutual insurance.

It is an indisputable fact, that mutual insurance of all kinds, whether life, fire, marine or casualty, have been universally and invariably successful, while uniformly able to insure at less cost to the insured than joint stock companies.

The expense of conducting the business of stock companies is a very considerable item in the cost of insurance, by reason of the payments to agents in soliciting business, as well as the cost of maintaining several high salaried officers.

The Street Railway Association of the State of New York will have interested with it the managers of some of the leading street railway companies in America in the organization of such a company as has been outlined. This company expects to be the insurance company of American street railways; and it is confidently believed that the saving it will be able to effect to those companies that insure with it will not be less than 33½ per cent., and possibly 50 per cent.

WILLIAM J. RICHARDSON.

Notes.

THE CHICAGO CITY RY. Co. is building 70 open cars.

LINCOLN (Ia.), is going to extend its street railway track.

THE HOLYOKE ST. R.R. Co. (Mass.), may buy two open cars.

SYRACUSE, N. Y., just opened a new line, H. J. Hart, Superintendent.

THE NAUMKEAG CO. OF SALEM (Mass.), is building two new open cars.

THE KANSAS CITY CABLE RAILWAY CO. (Kan.), is not in operation yet.

THE LYNCHBURG (VA.), ST. RY. Co. expects to add two summer cars.

CHARLESTON, S. C., is to have a new street railway; I. S. Riggs, President.

SOUTH CHICAGO, 12 miles from Chicago, is building a new street railway.

THE ORGANIZATION of the Sayre, St. R. W. Co., of Sayre, Pa., is not yet completed.

THE BELLAIRE, CHILlicothe & CANTON is a new Ohio Street Railway Company.

BROCKTON, MASS., is to have another street railroad running to South Abington.

THE MADISON ST. RAILWAY Co. (Wis.), will lay about two miles of track this year.

THE FONDA & FULTONVILLE RAILWAY Co. (N. Y.), is abandoned and the rails torn up.

THE WHEELING & ELM GROVE R.R. (W. Va.), may extend its road 1½ miles in the fall.

THE WASHINGTON & GEORGETOWN R.R. Co. (D. C.), will add five more double box cars.

THE ACUSHNET ST. RAILWAY Co., New Bedford (Mass.), has not yet commenced to build.

THE WILMINGTON CITY RAILWAY Co. (Delaware), is doing nothing but ordinary repairs.

THE KEOKUK STREET RAILWAY Co. (Ia.), will lay two miles of additional track this summer.

THE LA FAYETTE ST. RY. Co. (Ind.), expects to build one mile of road during the summer.

THE LOMBARD & SOUTH ST. PASS. RY. Co. (Phila.), intends running 6 cars more than last year.

THE CHARLES RIVER ST. R.R. Co. will build 1½ miles of track and buy 10 cars and 100 horses.

THE PEOPLES' PASS. R. W. Co. (Phila.), expects to increase the average of cars run, probably by 20.

THE CITY R.R. Co. of Poughkeepsie thinks of improving its track but can't tell to what extent.

THE NORTH HUDSON COUNTY RAILWAY Co. (N. J.), will open its cable railway for business July 1.

THE AKRON ST. RY. AND HERDIC Co. (Ohio), is arranging to build three miles of road this season.

KENTUCKY STREET RAILWAY Co., Louisville.—Mr. Z. Phelps has recently resigned and sold his interest.

THE CITIZENS' STREET RAILWAY Co., Springfield (Ill.), will lay a half-mile of new track this spring.

THE CENTRAL PARK, NORTH AND EAST RIVER R.R. Co. will probably increase the number of its cars and horses.

THE FRANKFORD & SOUTHWARK P. R.R. Co. (Phila.), expects to add two to four cars as the occasion requires.

NEW BEDFORD (Mass.)—We understand that 36 new cars have been ordered for the new street railway in this town.

THE CITY AND SUBURBAN RY. Co., of Sa-

vannah, Ga., proposes to lay part of its present track with steel rails.

THE TOLEDO CONSOLIDATED STREET RAILWAY Co. (O.), will put new rails on four miles of their track this summer.

THE PITTSBURGH, OAKLAND & E. LIBERTY P. R.R. is relaying its tracks and expects to put a cable in in the near future.

THE PEOPLES' RAILWAY Co., Springfield (Mo.), will add three new cars and an additional mile of track this season.

THE SALEM & DANVERS STREET RAILWAY Co. (Mass.), will build three miles of road to connect Danvers with Peabody.

OSWEGO, N. Y., is to have a street railroad. Amount necessary to build all subscribed; work to commence at once.

THE TRENTON (N. J.), HORSE R.R. Co. contemplates enlarging its stable and car house and adding more horses and cars.

THE UNION RATTAN COMPANY, of 125 Chambers Street, has a new broom designed especially of street railway stables.

THE METROPOLITAN R.R. Co., Boston, which is always making additions, as business increases, is building 50 new cars.

THE CITIZENS' STREET RAILWAY Co., Little Rock (Ark.), expect to construct from one to two miles of track this summer.

THE LEWIS & FOWLER MANUFACTURING Co., Brooklyn, reports that it was never so busy as now; being 30 days behind orders.

THE NEW WILLIAMSBURG & FLATLAND R.R. Co. will repair about 20 blocks of tram rail with 50 lbs. centre-bearing steel.

THE STILLWATER & MECHANICVILLE ST. R. W. Co. (Minn.), has to add more cars and horses to accommodate the travel.

THE SOUTHERN RAILWAY Co., of St. Louis, intends putting down one mile of track with the Johnson rail and will re-lay one mile.

THE ROCHESTER CITY & BRIGHTON R.R. Co., adds 10 new cars this spring; has some extensions to make and old track to relay.

THE HIGHLAND ST. R.R. Co. (Boston), is building a new brick stable for 200 horses, at Grove Hall, for the West Roxbury Park travel.

THE PHILADELPHIA CITY PASS. RY. Co. is leased to the West Philadelphia Pass. Ry. Co. for the term of 900 years from January 1, 1884.

THE CONEY ISLAND, SHEEPSHEAD BAY & OCEAN AVENUE R.R., is going to make alterations, of which we are promised particulars.

THE BENTON, BELLEFONTAINE RAILWAY Co., St. Louis (Mo.), has put on two new cars and will make a half-mile extension this season.

THE CHARLESTON CITY RAILWAY Co. (S. C.), intends to double its track where it is now single track, with the centre-bearing street rail.

THE SPRINGFIELD STREET RAILWAY Co. (Mass.), is relaying a part of its track, using Kyanized lumber, and Jones is building 3 open cars for it.

THE SECOND AVENUE R.R. Co., New York City, is building an addition to its depot,

185 x 200 feet; and will start its First Avenue line about May 1st.

THERE is now a street railway from Pittsburgh to Wilkesburg, Pa.; and there is some talk of building one from Beaver Falls to New Brighton.

THE CREAM CITY R.R. Co., Milwaukee (Wis.), will have some new summer cars this season. They will extend their double track about one-half mile.

FOUR hundred men are at work on the upper portion of the 42nd and Manhattanville line, New York City, and double cars will run to 40th Street shortly.

THOS. BROWER, former Superintendent of Rochester & Brighton Railroad, Rochester, N. Y., is back again in his old position after an absence of two years.

PITTSBURGH now has a People's Park Railway with ten cars, 75 horses and mules. Pres., Wm. McCreery; Treas., Jas. Boyle; Supt., Wm. J. Crozier.

THE WASHINGTON ST. & STATE ASYLUM, R.R. Co. (Binghamton, N. Y.), will extend its line to the Insane Asylum, a distance of 1½ miles, using cable power.

THE PROSPECT PARK AND CONEY ISLAND RY. Co. is now improving and reconstructing its road-bed with new ties and stringers and new steel centre-bearing rails.

APRIL has been a more satisfactory and prosperous month, with street railway lines all over New York City and in Brooklyn, than was the month of March.

THE MINNEAPOLIS ST. RY. Co. is having built by the Jno. Stephenson Co., 16 new cars, 16 feet long, all to be equipped with "Small's" Automatic Fare Collectors.

THE HESTONVILLE, MANTUA & FAIRMOUNT P'ASS. R.R. Co., has within the last year added 10 new open cars and expects to rebuild its old cars as soon as possible.

THE 5TH WARD R.R. Co., Syracuse (N. Y.), intends adding two cars, July 1, to increase its service double (from 10 to 5 minutes headway) during a portion of the day.

MR. JOHN STEVENSON says that his company is running full time but affairs are not as lively yet as was expected, and there are few signs of immediate improvement.

THE EAST CLEVELAND R.R. Co. (O.), are building five open cars in their shops. They will build one mile of new track (electric conduit) to Fairmount Reservoir this spring.

THE FEDERAL ST. & PLEASANT VALLEY P. R. Co. (Pittsburgh), is laying about 75 tons of new curves, frogs and steel rails and will probably make some additions to its rolling stock.

THE BROOKLYN STREET RAILWAY Co., Cleveland (O.), are using the Demorest Duplex Register with much satisfaction. They will extend their tracks one and one-half miles this season.

THE CONEY ISLAND AND BROOKLYN R.R. Co. is discussing, but has not decided upon, the desirability of changing motive power below the city line, from horses to locomotive, cable, electricity or any other device.

THERE is a new cross town line from Hamilton Ferry, Brooklyn, to the Bridge, belonging to the Atlantic Avenue Co. and

to be started about June 1. The Atlantic Avenue line will add largely to its facilities.

THE Cable Cars are not yet running in Tenth Avenue, New York, but will start up shortly. This company has just purchased 100 sets of hand-made harness from J. F. Leahy, the manufacturer, 245 Tenth Avenue.

ALL the conductors, inspectors, starters, etc., on the 42nd St., Manhattanville and St. Nicholas Avenue Railway, New York, are (says Superintendent Smith) to wear handsome uniforms of police cloth with special buttons.

BAYONNE, N. J., must wait yet a little longer before it gets an independent line; also Montclair, as the Railroad Bill in the last Legislature failed to be reached in the Senate before adjournment. It passed the Assembly unanimously.

MIDDLESEX R.R. Co., Boston. The increase in the business requires this company to make extensions of tracks and further increase in stable accommodations, which will be done this year, as has been done about every year in the past.

THE NEW HORSE CAR SPRING patented by I. H. Randall, M. M. of the Metropolitan Railroad, Boston, Mass., and made by Andrews & Clooney, New York (Lewis & Fowler Manufacturing Company, Brooklyn, Agents), is being praised very highly by those companies which are trying them.

THE METROPOLITAN R.R. Co. Washington (D. C.), proposes to relay its track with centre-bearing rails, to the amount of 200 tons, and to add 18 open cars for summer use; also to build a new brick car house 256 x 58 feet, two stories high, and a frame car house 120 x 37 feet for its branch road.

THE HOUSTON, WEST STREET & PAVONIA Ferry R.R. Co. (N. Y. City), will soon put on 10 new one-horse cars to shorten the headway from the Grand Central Depot to Avenue C. and 10th St., and will transfer there to the cars now running from Green Point Ferry (E. 10th St.) to Pavonia Ferry, Chambers St.

THERE is a well authenticated rumor that Mr. Bidgood, late Superintendent of the Sixth Avenue line, New York City, is about to take the Superintendency of the Fourth Avenue line. Mr. B's numerous friends rejoice that he has returned from his Southern trip much improved in health.

THE STEINWAY AVENUE & HUNTER'S POINT R.R. Co., of Queen's Co., has just completed 8 new open cars, built by its Master Mechanic, Mr. Hess; all are equipped with the "Randall" gear. The enterprise exhibited by the General Manager of this company, Mr. C. J. Campbell, is highly commendable.

ROBT. McCULLOUGH, General Manager of the Benton & Bellefontaine Street Railway Co., of St. Louis, is about trying "Small's" Automatic Fare Collector on one of his cars. As Mr. McCullough is recognized as an authority in St. Louis on R.R. matters, he must see merit in this device.

THE LEWISTON & AUBURN HORSE RAILWAY got a charter from the Maine Legislature, March 7, authorizing it to operate

about three miles of its road which runs to Lake Grove on the borders of Lake Auburn, out of the city, by steam. This will be done this season. The road carried to that summer resort last year 40,000 passengers in 11 weeks.

THE STEINWAY & HUNTER'S POINT R.R. Co., of Long Island City, N. Y., has just increased its capital stock from \$60,000 to \$250,000 and merged in it the Astoria & Hunter's Point R.R., the Steinway Avenue and Bowery Bay R.R., the Broadway & Bowery Bay R.R., and the Jackson & Steinway Avenue R.R., all with the consent of the Commissioners, as per their decision of April 7.

THE recent decision of Judge Shipman, in the United States Court, in case of Fairhaven and Westville R.R. Co. vs. Augustus Day of Detroit, will be of interest to parties using the "Day Patent Track Scraper." Suit was brought by the patentee for royalty for the use of the patent which the street railway had paid once in good faith to other parties. The decision was in favor of the Fair Haven and Westville road after continued litigation.

THE WOODLAND AVENUE ROAD, Cleveland, O., running on the east side of the river, and the West Side St. R.R. Co. are now consolidated as the Woodland Avenue and West Side St. R.R. Co. and carry passengers 8 miles for one fare of 5 cents or a ticket. This makes the largest plant in Northern Ohio and covers the entire west side of the city, besides running through the most important business streets of the east side, passing from east to west side market houses.

THE HOUSTON, WEST STREET & PAVONIA Ferry R.R. runs from the Grand Central Depot to the foot of Chambers Street, via 34th Street, 23rd Street, 10th Street and Houston Street ferries. Judge Richard Kelley (President of the Fifth Avenue National Bank) was recently elected President of this road and the new administration. It is proposed to divide this long line and make two independent lines, with transfer of passengers at 10th Street without charge.

NEW HAVEN is particularly fortunate in having not only one but five different horse railway companies operating lines in the city, each having cars on its own track.

FAIRHAVEN AND WESTVILLE R.R. Co. is operating a line from Fairhaven to Westville. It has seven miles of track, employs sixty men, and has twenty-two cars, mostly Stevenson, and one hundred and fifty-eight horses. In repairing cars it is using the "Bemus Car Box" to replace the Higley Gear; also uses a new patent switch, which straightens the track ahead of the cars.

THE DAFT ELECTRIC LIGHT COMPANY is equipping a surface road in Baltimore, known as the Baltimore & Hampden Line—two-and-a-half miles in length—with their electric motors. A third rail has been laid which is to be used as the positive conductor. The dynamo machine to supply the current is on its foundations and all that is now required to complete matters is the motive power. One motor is

already built and tested, and the remainder will be ready in two weeks. They are constructed to draw two cars each. It is expected that they will be in operation inside of three weeks, and their success demonstrated.

Cable Railway Notes.

THE New York Cable Railway Company proposes to use these patents.

THE 125th Street and 10th Avenue route will probably try another system.

THE National Cable Railway Company controls the A. S. Hallidie grip patents.

THE National Cable Railway Company reports being in negotiation with companies in Baltimore, Washington and Cincinnati and has sold a license for Omaha.

THERE is a Commission, now sitting in the Tribune Building, appointed by the Supreme Court to consider the applications to the court for permission to construct roads upon all the routes laid out.

THE 155th Street Elevated Railway, New York City, has as yet done nothing. Its projectors expect to obtain the consent of nearly all the property owners. The required consent of the Board of Aldermen has been obtained.

THE grip used on the Brooklyn Bridge appears to be no good. Whereas a good system should take three cars with one grip, on the Bridge one grip is needed for each car. By a proper system the car should start at once with the grip at the Brooklyn end and not use locomotives at all.

THE Chicago Cable Company claims to have run right along during the past winter when the steam roads were completely blockaded up with snow. Some say that its stock has depreciated since using the cable; others say the reverse; we call for the figures.

IN Brooklyn, a cable railway company has been reorganized and a commission appointed. The Nassau Cable Railway Company is the company's name. The commission reported that a cable road was not needed. This report has not yet been acted upon by the Court.

IN Philadelphia an experimental grip and tube are being fooled with. A mile and a quarter was laid from Columbia Avenue to the Park, and had to be thrown out. Now 15 miles are down, of the Bonzano wrought iron tube, and this has so far proved a failure, from all that we can hear. It will probably cost more to experiment and reconstruct than for a license to use some well tried system.

THE National Cable Railway Company made a proposition some time ago, to put its system on the Brooklyn Bridge and carry passengers for 2 cents each, instead of nearly 4. The reduction of fare by the Bridge people is claimed to be the direct result of this proposition. The Cable Railway people would have sold sixty car tickets for a dollar and let foot passengers go free.

THE KANSAS CITY CABLE ROAD made a trial trip with the Board of Directors on the 2d inst., and it was in every way successful. By the time we go to press, they will probably be running regularly. This road is built on the two-cable system owned by D. J. Miller, who is constructing the Third Avenue Railroad Cable line in New York City, and which so far seems to possess great advantages over the single cable system, there being at least six railroads in New York City and vicinity which are awaiting the opening of the Third Avenue line about June 1st, which, if as successful as predicted and as Kansas City is, they will at once adopt and commence to build.

THE New York Cable Railway Company, if the Commission reports favorably and the court approves the report, and then the Board of Aldermen will give its consent, will go in vigorously, commencing with Lexington Avenue, to supply the future wants of New York City pretty liberally. The movement by rail in New York City was 284 millions of passengers in 1884, and will probably be 420 millions in 1890, and 830 millions in 1990; so there must be 136 millions to be provided for in six years. The great bulk of the

people see no more people in the street now than formerly. They don't recognize the increase, though in 4 years there has been an increase of 72 millions carried by the street railroads in New York City. The elevated roads have had an increase of about 21 millions in 3 years; about 40 millions since 1880.

Car Ventilation.

[We take the following from our other paper, the JOURNAL OF RAILWAY APPLIANCES, because it contains so much that is here applicable.]

One master car-builder writes, thanking us for opening out the subject of car ventilation, and another one says that we have "merely opened a bottle of discontent.

Better a bottle of discontent than a vial of wrath and a cave of pestilence. Cars as now built and run are foul and unhealthful, very largely because they do not give their passengers clean, pure air of proper temperature and the right degree of moisture.

A little more moisture in the air would add greatly to the comfort and health of passengers and to the revenue of the road. It would not, perhaps, increase the receipts of physicians, but it is not the promise of car builders to help the doctors along, any more than for the doctors to help the undertakers.

Seems to us that the time has about arrived when each sleeping car or long run passenger coach should have in it a buffet containing remedies for the headaches and sore throats occasioned by alternate overheating and under-cooling, and by entire neglect to provide moisture in the atmosphere.

It seems ridiculous—and it would be more so if it didn't cost lives and money—that cars cannot have an equable temperature, a graded degree of moisture, and a full, draftless supply of clean air; unflavored with bouquet de stogie and aroma de baked bean.

Is there any reason why a passenger should be made to breathe the second-hand air?

WANTED.—A situation with some Street Railway Co. as track foreman. Am strictly temperate and have had long experience—several years with a prominent contractor, and have good recommendations. Address, TRACK FOREMAN, Care STREET RAILWAY JOURNAL, 32 Liberty St., N. Y.

The "BROADWELL CAR STARTER," having been subjected to practical tests, is now placed on the market at a very low price.

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EXTENSIVE MAKERS OF PATENTED CAR SEATS AND SPRINGS.

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Will last FOUR TIMES AS LONG, and is CHEAPER and MORE ECONOMICAL than Oil. Samples free on application.

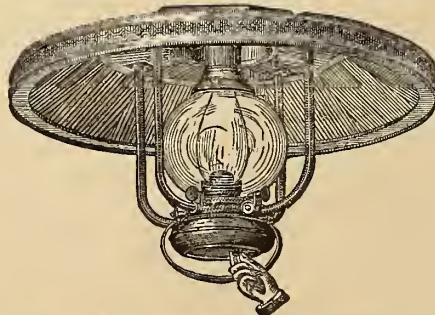
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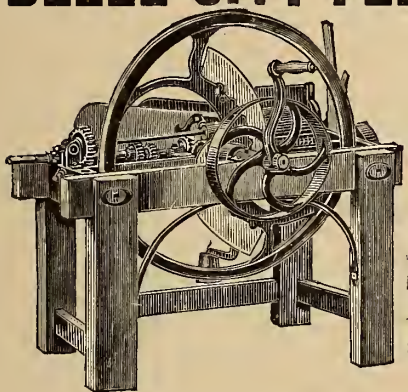
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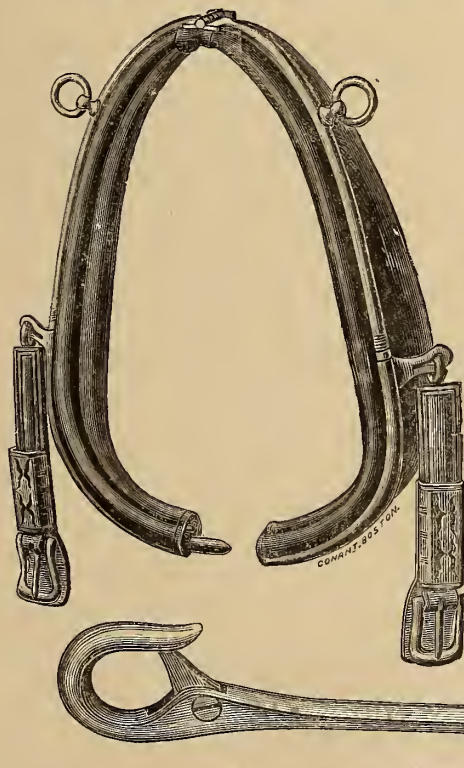
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They are made of the best gun metal and malleable iron, with a brass spring
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Send for Catalogue.

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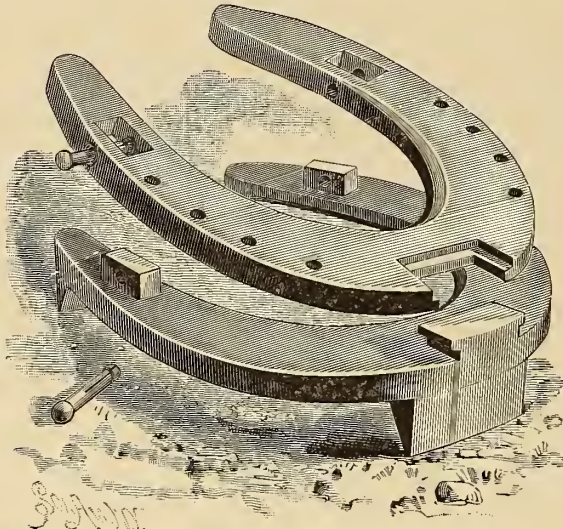
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Descent 1/8 in. per foot. Pieces 5 feet lengths. Short pieces furnished to suit any length. Spouts to connect with Sewer, &c.

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Shoe can be replaced easily by any one at the rate of 200 a day. If a horse is subject to calking himself, the calks can be removed. Elastic layer can be placed between the two parts. Specially adapted for Horse Railway Service, and costs about half the price of ordinary shoeing. Send for circular.

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Among others who are using this Shoe, are the

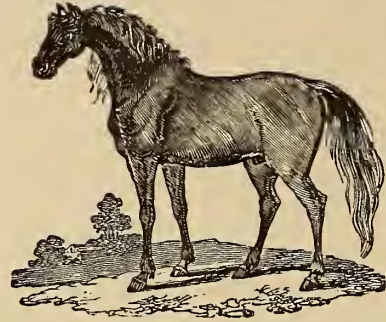
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MESSRS. JONES & ROACH:

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out it. I hope you will meet with the success your cure deserves.

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OFFICE OF NORTH HUDSON COUNTY
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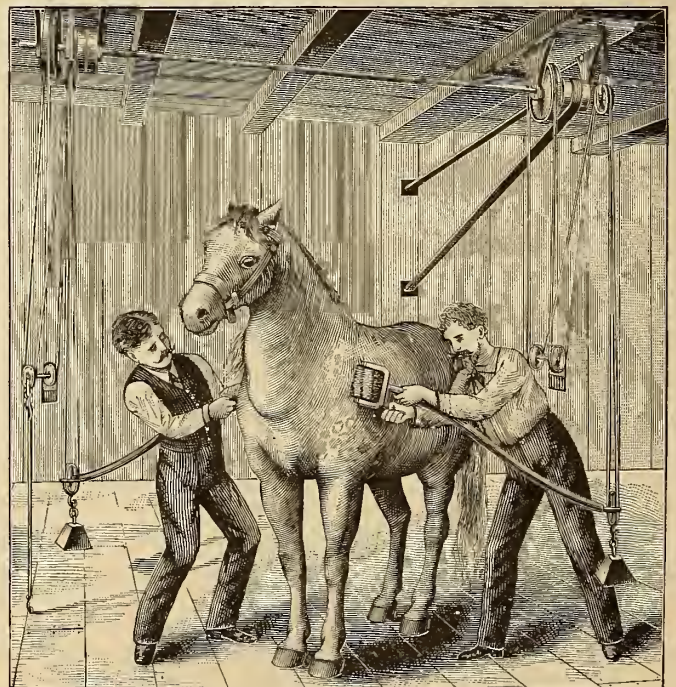
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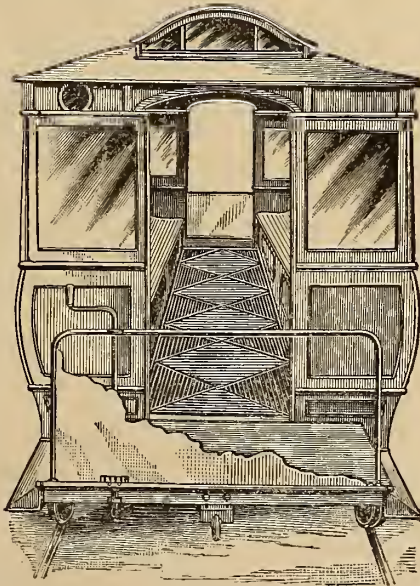
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Fare Boxes and Change Receptacles for Street Cars,

WALES MANUFACTURING CO.,

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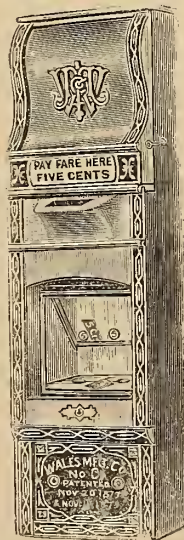
Our Boxes are constructed with great care and of the best material. The case or wood, is of cherry, neat in design, and the front of Money Drawer and front edges of box are of metal, nickel plated in the best manner. The front of Box is very easily detached in one piece, and the inside or glass chute is quickly removed for cleaning. In addition to the glass chute through which the money passes, there are two additional glass plates, 1/4 of an inch thick, one in front and one in back of box, so that in case the outer plate should be broken, the money is still protected. The Money Drawer is metal, and securely fastened by two safe drawer locks, the keys of which can only be removed when the drawer is locked, thus proving a safeguard to the collector.

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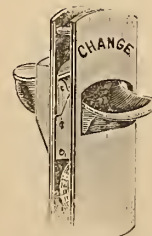
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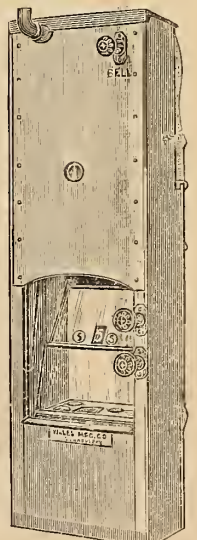
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25 to 50 per cent. more mileage.
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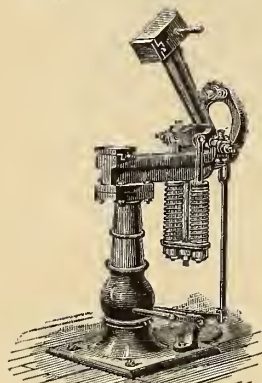
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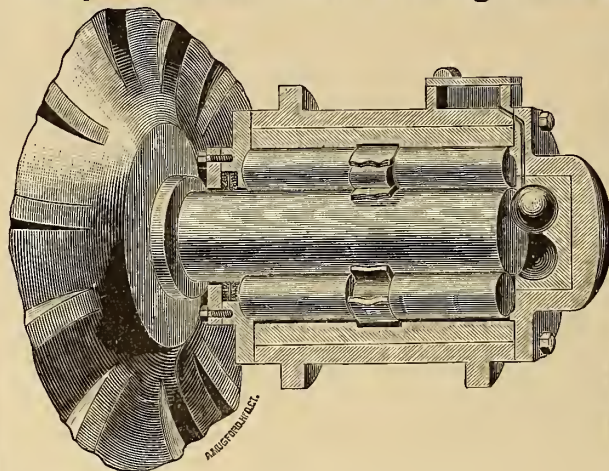
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Have been in use for four years, proving durable and showing great saving in draft. By use of ball balls curves easily, will start and draw with one-half the power of plain journals. Steel rolls, 1 1/2 in. diameter, 8 in. long, run on brass. Manufactured by THE CHAPLIN MANUFACTURING CO., Hartford, Conn.

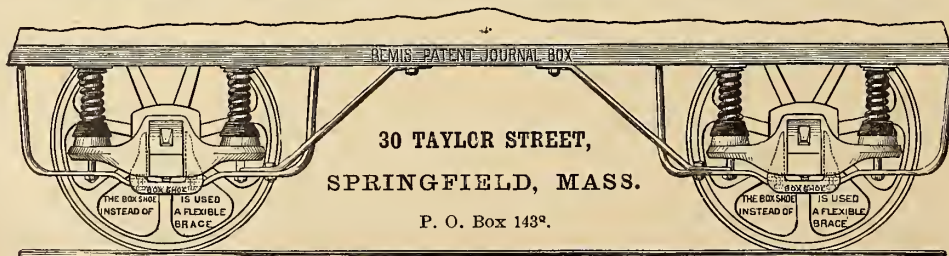
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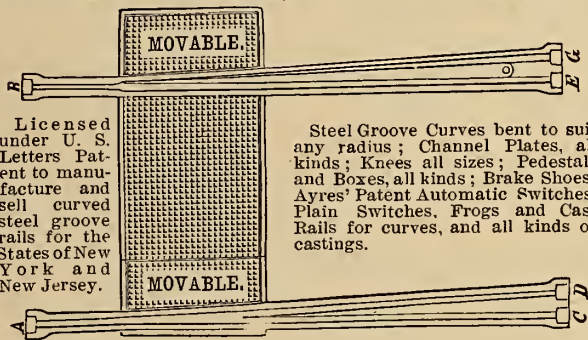
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Send me full size section of rails to be used at points A, B, C, D, E, G.
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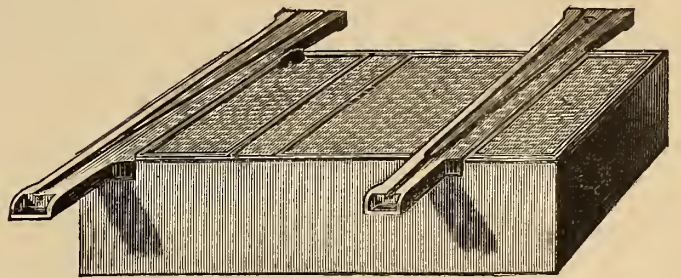


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Of **T** patterns, weighing from 16 to 76 lbs. per yard.
CENTRE BEARING Street Patterns, 42 to 60 lbs. per yard,
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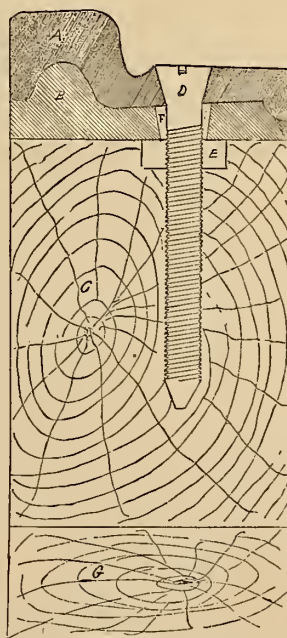
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NEW YORK OFFICE, - 160 Broadway.
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WRIGHT'S

PATENT JOINT FASTENING.



The accompanying cut shows a cross section through joint. *A* is the rail, *B* the joint chair, *C* the stringer, *D* the patent screw fastening, *E* the nut, *F* a slot in chair allowing rails to contract and expand. The chair cannot settle and the rail ends are held level with each other, preventing the many evils of ordinary construction.

For Further Particulars Address

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LAKE & McDEVITT'S Patent ROPE TRACE

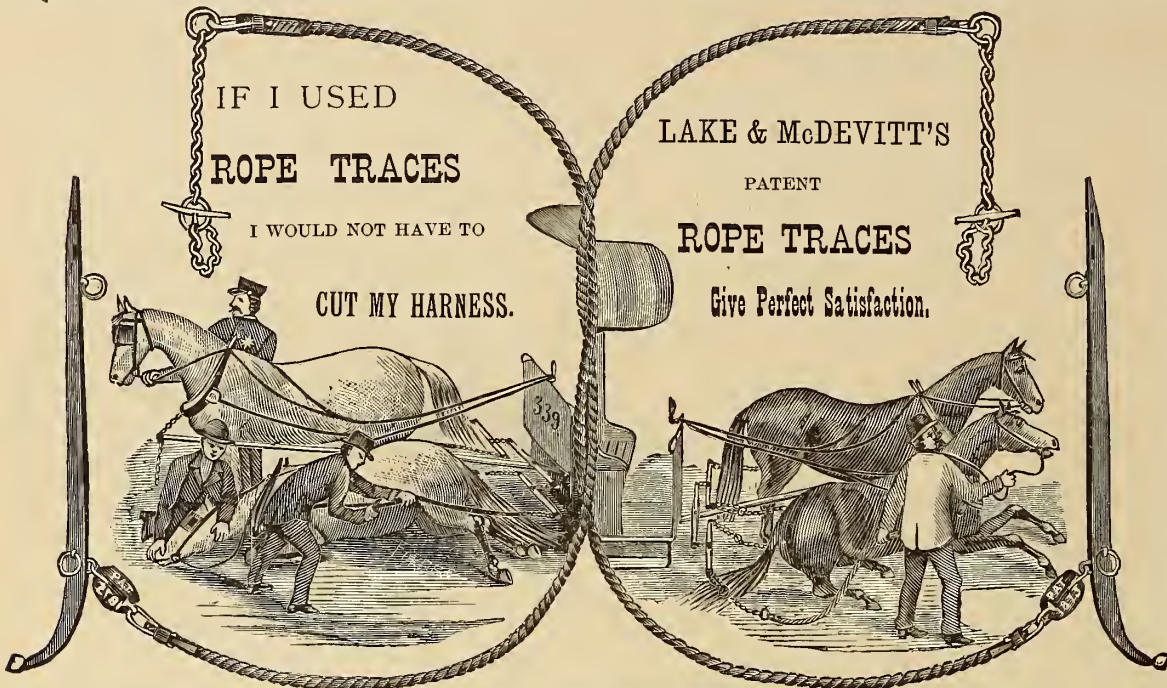
For Horse Railways, Omnibus Lines, Etc.

The Advantages

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ROPE TRACE

are its ready application to Horse-Car service, or to any other purpose where cheap harness is required. It only costs about half as much as leather traces, while at the same time one set of Rope Tugs will (when used on horse cars) take the place of three or more sets of leather traces, as the Tugs remain attached to the car all day, no matter how many changes of stock are made. The relief horses having hooks attached to their hames, all that is necessary is to unhook the tugs from the working team back in the fresh horses, hook on the tugs, and the change is made. Railroad men will at once perceive their adaptability and economy from the above facts. They will also last longer than leather traces, and require but very little care. From their durability and cheapness they are also especially adapted for all kinds of farm use and heavy teaming, as farmers, etc. can easily repair them.

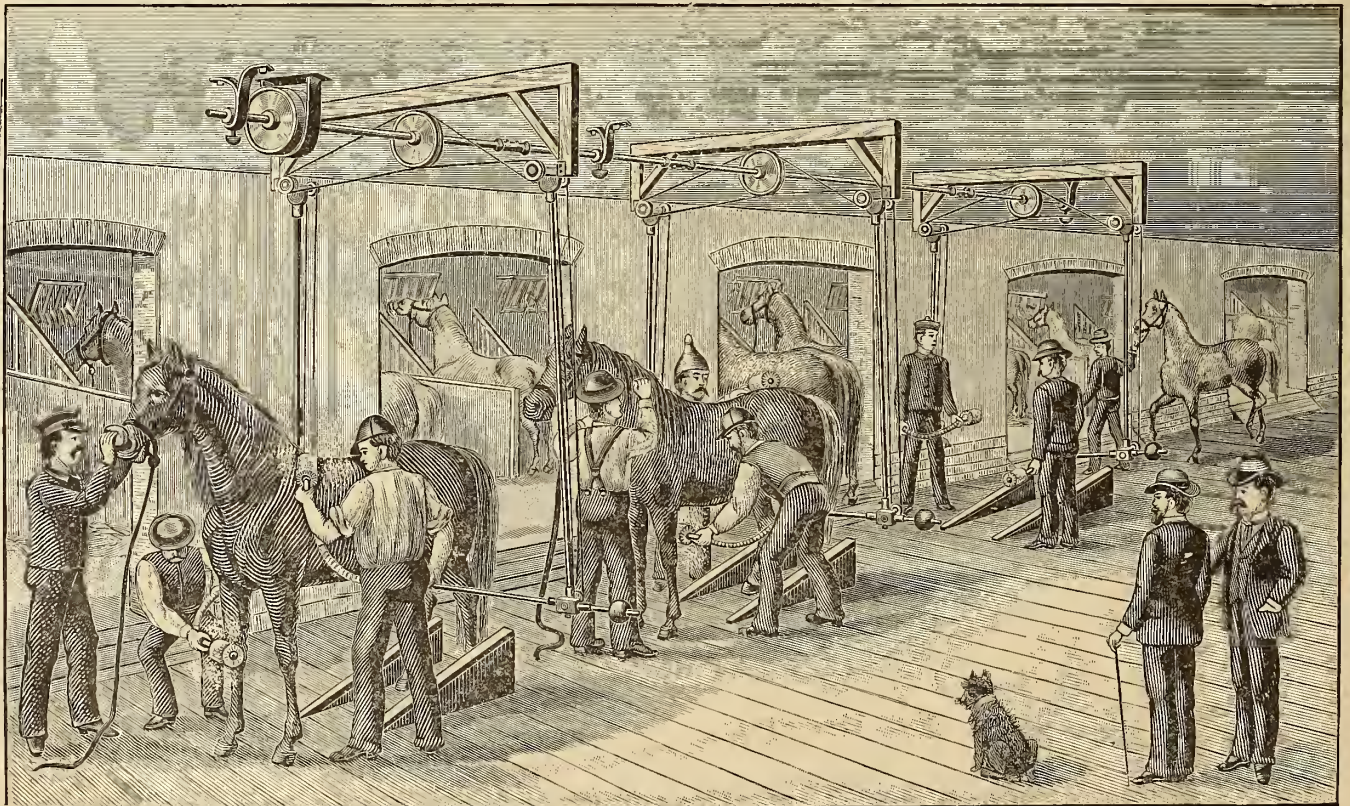


Patent No. 171,232, December 21, 1875.

In use on the Chicago West. Div. R'y.; Louisville City R'y Co.; Milwaukee City R'y; Transverse R'y Co., Pittsburg, Pa.; Citizens Street R'y Co., Pittsburg, Pa.; Pittsburg and Birmingham, Pittsburg, Pa.; Central City R'y, Peoria, Ill.; Grand Rapids R'y; Minneapolis St. R'y Co.; St. Paul City R'y; Houston City R'y, Texas; Superior Street R'y, Cleveland, O.; Cincinnati City R'y Co.; Fifth Ward Street R'y, Syracuse.; Detroit City R'y.; Ft. Wayne and Elmwood St. R'y, Detroit, Mich.; Galveston City R'y; Springfield City R'y, Springfield, Ill.; Toledo St. R'y, Toledo, O.; Adams St. R'y, Toledo, O.; Atlanta Street R'y, and others, in all on about 100 Street R'ys in United States and Canada, and a large number of other prominent Street R'y Companies throughout the Country. Send for descriptive Circular containing testimonials, prices, etc., to

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CLARK'S PATENT POWER GROOMING MACHINE, SINGLE OR DOUBLE.



Patented December 16th, 1874.

Patented January 9th, 1883.

TO STREET RAILWAY COMPANIES AND OTHER STOCK OWNERS.

This machine for grooming may be driven by any known power, and can readily be placed for use in any stable or out building. It can be operated by an ordinary groomer; its work is perfect; its action simple and effective. Stock owners will readily realize the importance of the machine. The perfection and rapidity of its work, and the benefits derived by its use, commend it to those interested in the care and use of all classes of thoroughbred and work stock. The most vicious animal readily submits to its use. Machine Grooming is found to be less expensive than hand grooming, saving in food and medicines, and materially increasing the value of the animal.

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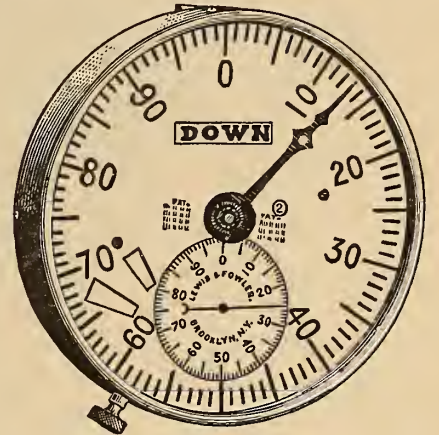
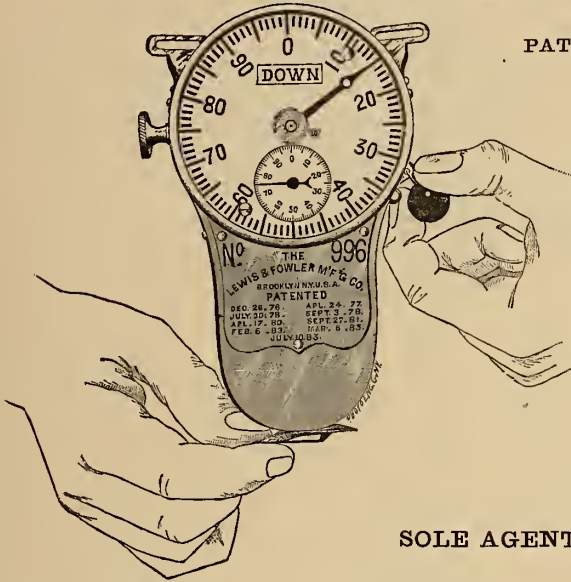
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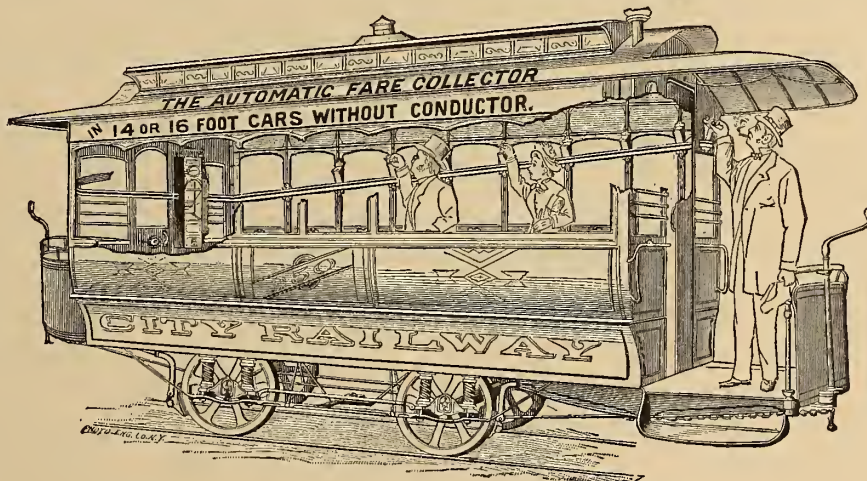
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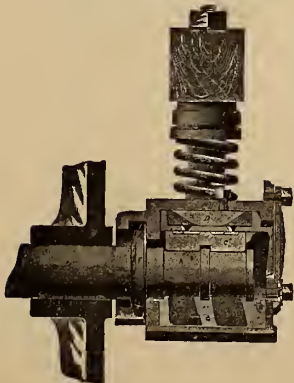


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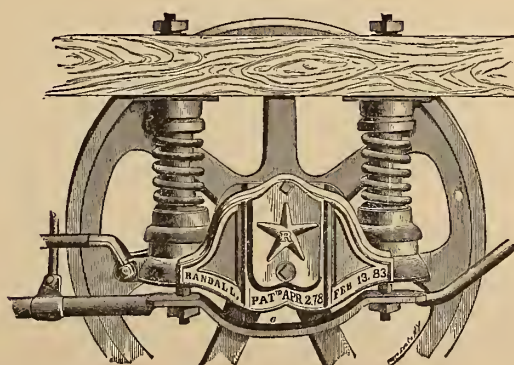
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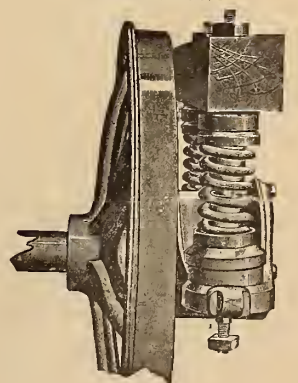
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Front View.



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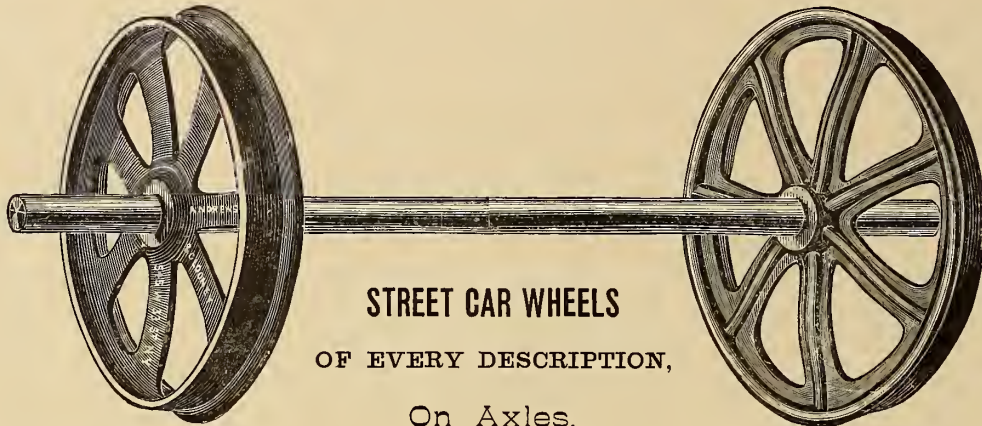
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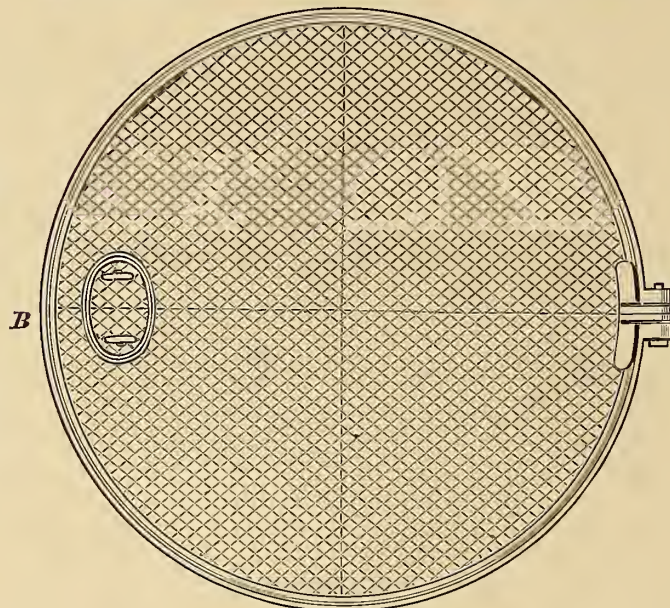
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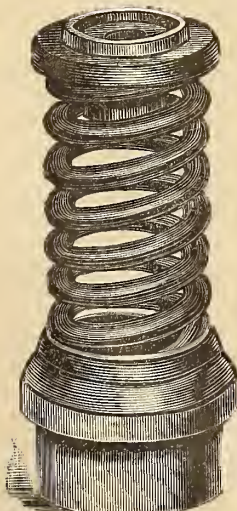
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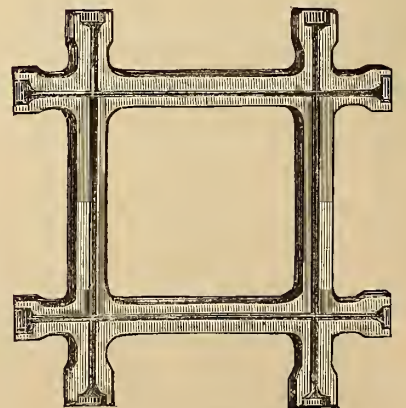
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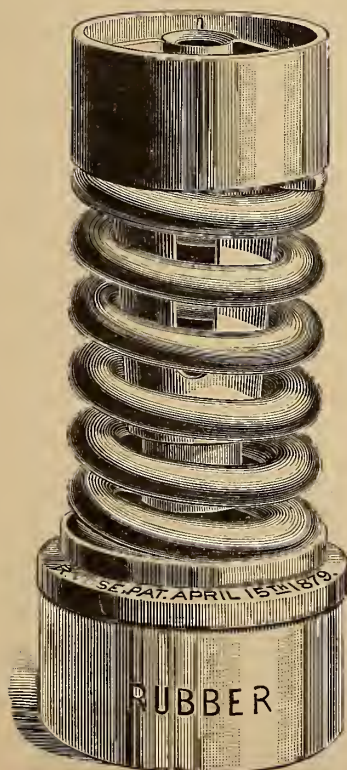
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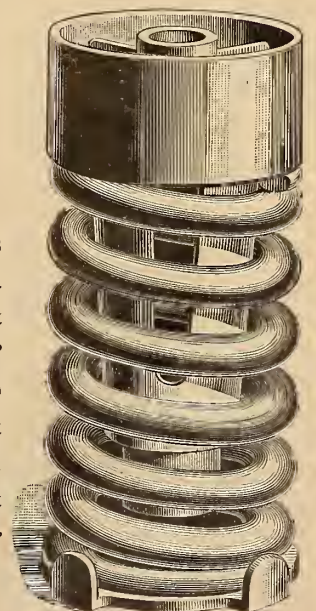
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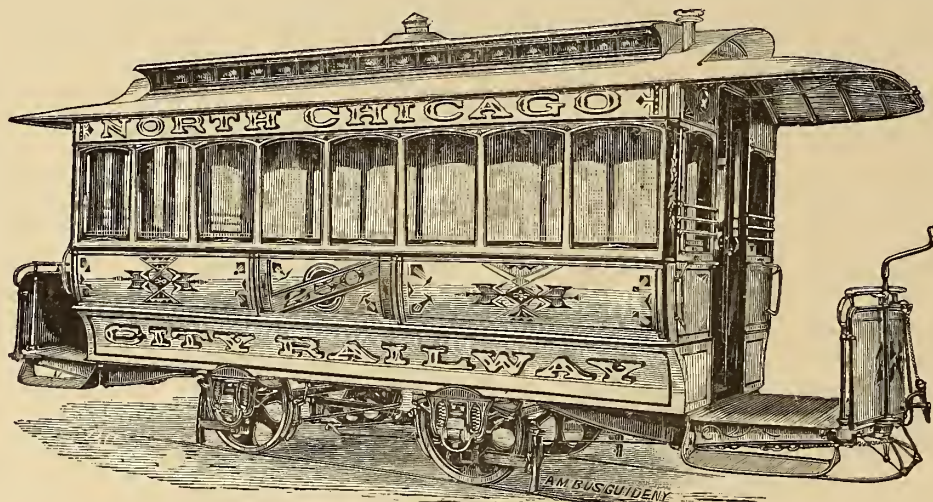


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THE STREET RAILWAY JOURNAL

VOL. 1. { NEW YORK: }
32 Liberty Street.

JUNE, 1885.

{ CHICAGO: } No. 8.
12 Lakeside Building.

A Model Car.

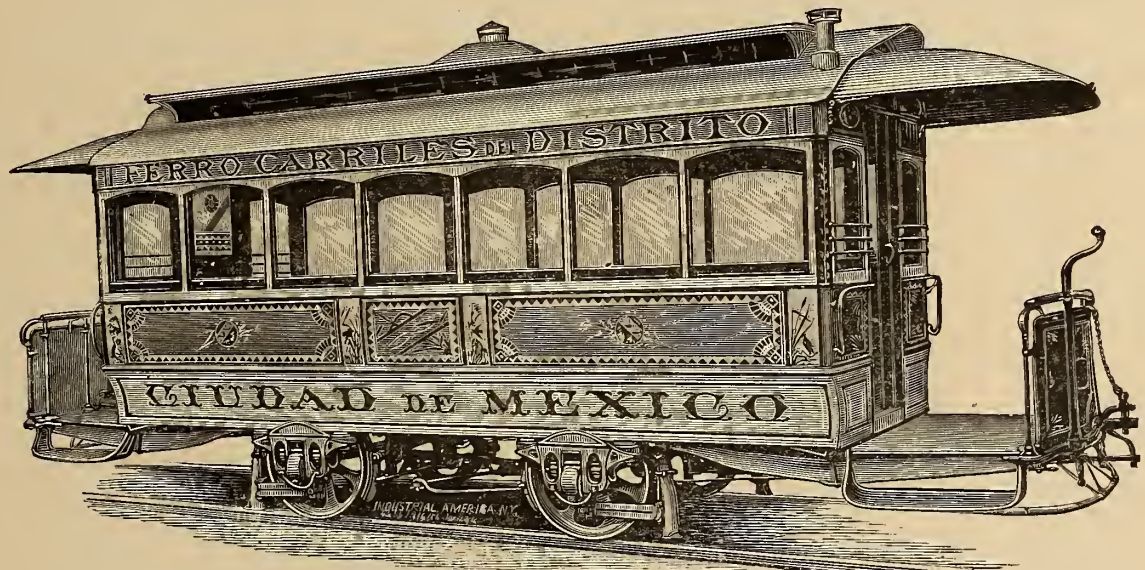
The car here illustrated* is the one which took four first-class medals and an honorable mention at the New Orleans Exposition. The awards were for the following features :

(1.) For the CAR as a combination of ex-

Honorable mention was made of the brake, affording the driver special facility for stopping the car.

The Super spring system of running gear, which is an essential element in the make up of this car, received the first premium for street car running gear at the Chicago Exposition.

“light”? Where is the grip or traction to come from? That was the trouble with the early locomotives of Stephenson and others; they had not weight enough to get any “grip” on the rails. The tractive power of a steam or compressed air dummy depends upon the piston area and stroke, the average steam pressure in the cylinders, and the



A MODEL TRAM CAR.

cellencies with elegance of finish. First class medal.

(2.) On the system of ventilation. Every window in the car, including end corners and doors, has glass sashes letting down to the belt rail, affording free sweep of air in every direction; and the roof is ceiled with perforated panels having a moveable air space between the ceiling and roof, with exit at the verges for the warm or foul air, which passes off without objectionable currents. First class medal.

(3.) Sashes made with metal channel bar stiles, filled with a core of rubber having a slot or groove for holding the glass quiet. The stiles are of such small dimensions as to leave the field of vision nearly unobstructed. First class medal.

(4.) Passenger's telephone, by which seated passengers can signal the Conductor, at whatever part of the car he may be. First class medal.

Is there a Satisfactory Light Motor for Street Railways?

The president of a Southern street railway company having several miles of country track, for which they purchased a dummy engine, writes us, in a letter on other matters, as follows:

“The dummy is not in use, not being of a satisfactory kind. We are looking anxiously for an economical light motor, and trust the many promises in this direction will be realized at an early day. We desire others to do the experimenting.”

[The Frankford & Southwark R. R. Co., Phila., has had for twenty years and more, that we can remember, a steam dummy line running about six miles to Frankford. Dummies using compressed air in connection with a hot water reservoir, are in successful operation in various parts of Europe. Merryweathers of London build a great many steam tramway dummies.

Why should a motor necessarily be

diameter of the drivers, and a pressure of about one-fifth of the weight on the drivers is enough to make them grip.—Eds.]

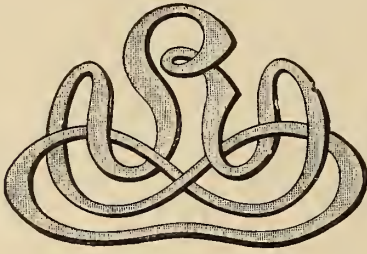
The Paper for Street Railway Men.

The following from the President and Purchasing Agent of a prominent Southern street railway company speaks for itself :
EDS. STREET RAILWAY JOURNAL;

Your May number of the STREET RAILWAY JOURNAL, which I have received and carefully read, is without doubt a capital paper, containing, as it does, so many interesting items and articles of value to all interested in street railway investments and the management of them. I take pleasure in giving you this unsolicited testimonial to your ably edited journal, and most cordially recommend it to all presidents, superintendents and other officials of street railway companies.

Jno. G. RIGGS,
Pres. Charleston City Ry. Co.
CHARLESTON, S. C.

* The Stephenson Company, New York.



American Street Railway Association.

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Electricity as a Motive Power.

[The following is the discussion on the report on Electricity as a Motive Power at the last convention. The full text of the report will be found on page 28 of our December issue.]

Mr. Wright said: I have believed for years that electricity was the coming motive power for street railways, and I have regarded everything connected with its development with a great deal of interest, and closely watched all attempts in various quarters of the globe to utilize this force. The Siemens and Halske process used one rail to carry the current, and another for the return. That was unsatisfactory, because passing horses in several instances got on both rails and the current passed through them. At the Paris Exposition they changed the construction, and carried the current by a wire overhead, on which ran a trolley completing the connection with the dynamo. A gentleman who was at the Paris Exposition told me there was one great difficulty with it, however, the trolley would get off the track. At the Portrush road, in Ireland they have, seventeen inches above the ground and twenty-two inches from the track, an iron "T" rail to carry the current and then it passes through the motor to the rails, which are insulated, and back to the generating machine. At each road crossing this "T" rail had to be left out, and the current carried across by buried insulated copper wires; of course, if the car happened to stop in one of these openings it could not start again. To obviate this trouble, they had a brush at each end of the car, with which to make connection and take up the electricity. At the Brighton railroad, England, they built a wooden box in the centre

of the track, and carried the electricity through copper bands. The contact there was made by chains that dropped from the motor and came in contact with these copper conductors. Thomas, of Cincinnati, had a very ingenious method. In his system, the electric current from the stationary dynamo is conveyed along the tracks by two copper wires placed in an iron tube between the tracks. The tube is open top and bottom; the former to allow contact with the wires from the motor, and the latter to allow water and dirt to drop through and keep the wires clean. The Siemens-Halske overhead wire would not be permitted in our crowded streets. The courts are compelling the telegraph companies to take down the wires they now have, and will be loth to permit other wires to be put up. Edward Bentley, of the Patent Office, said some time ago that "on a large scale, electricity as a motor, is only useful in transferring power to convenient localities, as when a machine which generates a current is driven by a distant waterfall; but the transmission of power into electricity and then its re-translation from electricity into power entails serious losses. The electric motor must remain subordinate to steam, water, or original force, until a new and cheaper source is discovered." It is, probably, known to the gentlemen of this Convention that the application of electricity for railroad purposes is not new, but in the earlier days, they used a battery. The following quotation will serve to illustrate: "Professor Page, of Salem, in 1845, revived and gave to the subject a new impetus by the invention of a new form of electric engine based upon the principle of the axial force of electro-magnetism, which proved to be the most perfect electric motor ever invented up to that time. A few years later Professor Page proposed electricity as a motive power for railroads, through the instrumentality of his own electric engine. The engine proved so successful and attracted so much attention, that the idea gained favor to such an extent, as to induce Congress to appropriate and place at Professor Page's disposal a sum of money—thirty thousand dollars—adequate to construct and operate an electric locomotive in accordance with his plans. Such a locomotive was built in 1851, and used to propel a train of cars between the cities of Washington and Bladensburg, a distance of five miles. As was natural, such an undertaking created great excitement and discussion in the scientific world, both at home and abroad, more especially because of the governmental sanction and assistance lent the enterprise. The great mathematician and scientist, Dr. Joule, and many others, very properly contended that the system would be too expensive, and that electricity, as then generated, could not be used as a motive power with sufficient economy to warrant its adoption on a commercial scale. In fact, it was this very discussion which led Dr. Joule to that long and laborious investigation of the mechanical equivalent of heat, which now forms the basis of all our works on thermo-dynamics, and without which we should be groping in

the dark. It was on the 29th day of April, 1851, that Dr. Page made the trial of his locomotive. It ran at the rate of nineteen miles per hour, making the trip of five miles in thirty-nine minutes. The locomotive itself weighed ten and one-half tons, including the batteries, and carried seven passengers. There were many stops and delays on account of the breaking of his battery cells, which were carried upon the locomotive, the jars fulfilling the office of a steam locomotive boiler and furnace, zinc and sulphuric acid in the former case constituting the fuel. The sulphuric acid and zinc were consumed or burned in the production of electricity. This is the principle upon which it was sought to operate all the electric engines thus far referred to. Electricity was here called upon to serve as a prime motor, utilizing the energy stored in sulphuric acid and zinc. The folly of such an effort is manifest, since one pound of zinc costs twenty-five times more, and is not capable of being transformed into as much dynamic force, as one pound of coal. Although Dr. Page's hopes were not realized, as far as refers to the commercial aspect of the enterprise, he, nevertheless, accomplished a great feat, and, to the day of his death, he contended that the time would surely come when electricity would be economically used as a motive power upon railroads." A French syndicate made an experiment in regard to manufacturing electricity; and tested the system of transmitting electricity in Paris. "In these experiments," to give another quotation, "it appeared that 6.21 horse power was put into one dynamo-machine, revolving at the rate of five hundred revolutions per minute, and connected by wires to another machine, making 365 revolutions per minute; the length of wire corresponded to 5.28 miles. The latter machine gave out 2.03 horse power upon the brake. This amounts to a useful duty of 32.7 per cent., the rest being lost." It is but fair to state that a much larger percentage of useful effect is claimed for electricity. Dr. Wellington Adams, of St. Louis, has experimented in electricity. I have an interesting paper, in which he states: "Considering this question of electric transmission of power from its two principal standpoints, first, as regards the electric current developed from the mechanical power, the steam engine, for instance; and second, as regards the amount of mechanical power reclaimed from this current at the distant point, through the instrumentality of an electro-dynamic motor, the efficiency of the system is seventy per cent., allowing seven per cent. for loss by leakage in, and resistance of, the connecting conductor. The amount of energy lost by the two conversions from mechanical motion into electrical energy, and from electrical energy back again into mechanical motion, is a fixed quantity, and practice has demonstrated this to be thirteen per cent. from the first, and ten per cent. from the second process, when the most efficient types of electric generator and motor are used. The other element of loss, that by leakage in and resistance of the connecting conductor

will naturally vary with the conditions in each individual case, and will depend entirely upon the size and insulation of the connecting conductor. In general, it will, in my opinion, be best to base a calculation upon a seven per cent. loss in the conductor, allowing five per cent. for resistance and two per cent. for leakage." I have heard that Mr. Edison has experimented at Menlo Park, in an effort to obtain electricity directly from the coal, without passing through the steam-engine process; and I think that whenever a cheaper method of manufacturing electricity is obtained, it will possess advantages which cannot be found in any other direction. Other experiments seem to demonstrate that the adhesion of the wheel upon the rail is increased by the electric current. In this lies the advantage of the cable system; their motive power is independent of adhesion of the wheel to the rail. We are dependent upon adhesion in any other system, except that of the cable and animal power. Without direct experiment, I question if the adhesion on a street rail is more than one-quarter of that upon a "T" rail, while the resistance to progression is greater. Experiments which I have made would indicate that this resistance is from three to five times greater; in other words, that the engine or motor would have to be from twelve to twenty times as heavy as a locomotive engine upon a clean "T" rail, when you depend upon adhesion to propel your car. That the electric current increases the adhesion has, it is claimed, been demonstrated by experiments, and that is a very great advantage. I think that the day is coming when electricity will be very generally used as a motive power.

Mr. Hasbrouck said: A number of gentlemen from New York and Brooklyn, including myself, went to Menlo Park to witness the performance of the electric railway. There is a track about two miles long, with some pretty short curves. My friend, Mr. Wharton, who was there, said he was frightened, and expected that the car would get off the track. I told him I did not feel frightened, and did not know anything about it to make me so. All I know of electricity is about as much as the boy's father did about steam, who said to his son, while looking at the engine on a steamboat: "You see that thing, and you see this; well, that connects with this over here, and this connects over there, and that makes the steamboat go."

Mr. Wharton said: There is no doubt that the advance made in electricity will call forth greater effort for improvement in the systems of propelling cars. On the particular occasion alluded to by Mr. Hasbrouck, when we took a ride at Menlo Park, it was upon a poorly constructed road, part of it around sharp curves and across trestle work, and we ran a portion of the time at forty miles an hour. We started off with the electric motor behind us, the car being pushed in front of it, which I did not like very well. As to going rapidly, that can be no doubt successfully done by electricity. It appeared to me then to be a question principally of economy. A large stationary

steam engine was used in the engine house, and nobody could tell us how much of its power was required to propel the electric motor and the car, which was a small one, similar to a one-horse car on a street-railway. We went rapidly, and often too rapidly, to be safe or pleasant. The gauge of the track I think was three feet six inches, and some of the curves were of very short radii. We were pushed one way, and pulled the other, by the electric motor. In Philadelphia lately an experimental railroad was put down, about 1,000 feet in length. It was worked during the three or four days previous to the close of the Electrical Exposition. This railway consists of an ordinary track of two "T" rails, with a third "T" rail in the centre, which conveys the electric current in one direction. This passes through the dynamo on the car and through one of the car wheels, and returns by one of the other rails. It worked successfully. It does appear to me that in some way or other electricity will be utilized for this purpose.

Mr. Wm. Richardson inquired: What system was that in Philadelphia?

Mr. Wharton: The Electric Dynamo Company's, of which Mr. W. W. Griscom is the President.

Mr. Hasbrouck remarked: Mr. Cyrus W. Field was in attendance. He prophesied that in two years he would have it in operation on one of the elevated roads of New York.

Mr. C. A. Richards said: I speak of this matter with no ordinary interest. I know nothing about the machinery necessary for the application of electricity as a power, but for a number of years, I have been an interested reader of all matters connected with the subject. I have followed, so far as I could, the investigations of science as published. I have asked myself the question, "What is it to be, and what is to come of it?" No man living can tell what electricity is. There is no one, there is no scientist in the world—no matter how deep his research—who can tell. It is something that pervades the atmosphere; it is around us; it is everywhere, and we know nothing about it. It seems to me, that when the Creator desires to confer a new blessing on the world, it is never done at once. Compare it, if you please, with our human lives. We come into the world helpless, poor and naked; but there are tender hands to lead us on. They care for us, and as life goes on, we are educated, until we arrive at perfect manhood; so the Creator presents this power of electricity to us. When we say as we frequently do, that this or that invention is in its infancy, go with me in my thoughts, as I have gone to the infancy of manhood. I believe, sir, we are but on the border line; we but stand within the shadow of this great power, and I think it presumptuous in any man to tell us what the future will be. Trace with me, for a moment, what we have seen since we were boys. I scarcely look upon a face in this room but that can go back with me to the birth of the telegraph; when Morse, in his crude way, even on shipboard, stretched a wire from one part of the ship to

the other, and then and there this great power was conceived and had its birth. Soon after that we found intelligence flashing around the world, and to-day it and it alone has changed the force of nations. Trade no longer seeks the same channels. Intelligence, which is the guiding star of our lives, flashes around us everywhere; from where the sun rises to where it sets! What follows? Another man, taking this child by the hand, leads it on; and what does he present? Why, sir, you may write me a letter from one distant clime to another; you may give me every means that shall tell me that it is you at one end and I at the other; but when I stand and listen and hear the audible tones of your voice, something tells me that the child is being led, is growing, and has taken a further step toward manhood. Who shall tell me, who dares to rise and assert that the next thing shall not be a motor? To ignorant minds like ours, you may use all the scientific terms that you please; you may take us to Philadelphia, or elsewhere, as I have been, and show us some engine, or a car, running on a track, and say that its motive power is electricity—it receives its power from here and is imparted there, and the car runs. I stand aghast! I know nothing, but I see one thing—that a step is being taken toward its manhood. I firmly believe that this idea, being born and given by the Creator to the world, that now all the scientific men and all the scientific intelligence and knowledge of the world is at work upon it. Not with the brain of Morse, who conceived it; not with the energy of Bell, who used it; but each and all lending their aid in its grand development. And now, sir, who shall dare tell me, when I walk at night under its light, which almost equals the sun at noonday; when I can speak to my friend so many miles away, and when I can stand here now, if need be, and hear the voices of dear ones at home, who shall dare tell me that we shall not have a motor impelled by that power? What is a motor to us? It is simply the power to drag our cars. To-day, for the most of us here, it is horses. A step has been taken with steam, and that is the cable; and the next step, gentlemen, as sure as God reigns, is going to be electricity! As I stood in England before the first steam engine that was made, and when, as I looked upon its uncouth and grotesque form, seemingly but the child in its very infancy of machinery; and then, when the first train passed by me, with its mighty rattle and roar, driven by its great throbbing locomotive, I felt that I had on the one hand the infant child, and on the other the full grown man. We come here and listen wisely and intelligently to my friend here, who has preceded me on this subject. I was an earnest listener to his remarks and to the study that he had given to the subject, and the earnestness that he evinced in the matter. But, my dear sir, you and I, and all of us, are in the shadow yet of this all-pervading and yet unseen power. I have been urged to use cables upon my road; to use engines; to put steam upon it; to find all sorts of substitutes for the horse, but I said no; I am settled in my

conviction, and while, perhaps, with a native shrewdness, I let others experiment and spend their money, I simply say, "Wait." Wait in silence and with enduring faith. There, gentlemen, is my text upon electricity. I trust you will pardon me for the time I have taken; but all I have to say on electricity as a motive power is—Wait! [Applause.]

Dr. Elijah Whitney said: Mr. President, I would like to say a word. While I approve most heartily of the remarks that have been made, and of the suggestions advanced, I wish to say, first, that we live in an age of progress. It is not wise to take great exceptions to the progress that is being made around us; and, I had almost said, within us. We know not what we may be. The conditions of our knowledge of the mode of the application of electricity for the purpose of a motive power is no more obscure than it was when we first learned the condition of the application of steam as a motive power. We might compare the question as presented here to-day with that which was presented early in the history of steam. That produced as much of a marvel in the community as does electricity to-day. We knew, perhaps, more about steam, how to produce it, but no more how to use it and apply it than we know to-day about electricity, and how to apply it. But we have learned something on both these points. One of the marvels of electricity is, that we do not know exactly what it is. The gentleman who has just taken his seat has asked whether any one could tell what it may be. I would say that electricity is that fluid which pervades all nature. It is not alone around us, but it is within us; and if we shall attempt to explain it, I should say that it has an analogy to that principle which we call life. It might be, for ought I know, the principle which underlies all the thought that we have of life itself. I cannot say when I raise this arm and attempt to give it that power which will cause it to fall heavily upon my neighbor, that it is not electricity. I think there is more probability that electricity has much more to do with all our movements and with all our actions than we are aware of. I do not think that it cannot be applied as a motive power for the movement of machinery. I have alluded to the production of steam, and the difficulty of its application to the steam engine. It was because I traversed the Sound in the first steamboat that ran from Providence to New York. We got on board of the boat at eleven o'clock, and we landed at ten o'clock in the evening of the next day, and thought we had done wonders. A more frightened multitude I never saw in my life, and never expect to see again, than I did when we approached Hell Gate. It seemed as though the captain and pilot were as much frightened at the approach to Hell Gate as the multitude aboard the boat, and the boat was very full. Yet we came into New York safely, and we rejoiced in the great exploit of coming from Providence to New York by steam. I stood also in Baltimore, watching the movement of this great power of electricity upon the wire that was stretched from Washington to

Baltimore—the first wire that ever conveyed an intelligent message from one point to another. I stood there when the message came, and heard it read, and heard the communication that went back in answer to it. In a few moments came back the second answering message intelligently. There people were talking with each other at a distance of some forty miles. When I recall these remembrances, these things that occurred in days that are past, I cannot help believing that electricity will ultimately be used as a motive power—used as we now use steam! Mr. President, you will excuse me for these remarks. I suppose they are not very well constructed, as I am suffering, like many others, from the infirmities of age, for, if I am permitted to live until the 26th day of November next, I shall see my eighty-seventh birthday!

Dr. Whitney's remarks were received with applause.

Fare Collecting.—II.

[In our May issue we published the method of fare collecting adopted on the Atlantic Ave. line, Brooklyn, and its dependencies. The following from the President and Purchasing Agent of the Knoxville (Tenn.) S. R. R. Co., is offered as the second of the series.—Eds.]

We do not employ conductors, having fare boxes in our cars. But we have a check on our drivers in the form of daily reports, more properly trip reports, which I designed for our own use three years ago, and which we have been using with much satisfaction ever since. It is unpatented and I give any one the liberty to use it. I send you the report

Personal.

J. F. COURTNEY, of Bradley & Courtney, is in San Francisco.

Mr. F. F. Low, President of the Sutter Street R. R. Co., of San Francisco, is in Europe.

CHAS. E. BERRY, of Cambridge, Mass. has been awarded a gold medal at New Orleans, for his patent hames.

J. D. OXNER, VICE PRESIDENT, of the Houston & West sts. & Pavonia Ferry Ry. Co. for many years, has resigned.

RICHARD VOSE, 13 Barclay st., New York, has lately invented several new styles of Graduated Springs—for which application for Patents has been made.

MR. JAS. G. HOLMES, President of the Citizens' Street Railway Co., Pittsburgh, was in New York on the 18th ult. Also Mr. Sharp of the Detroit City.

MR. EGERTON, Supt. of the Albany St. Ry. Co., stated recently in our office that he kept his track stiff and to gauge without knees, by putting granite paving blocks flatwise against the stringers each side as bearers for the paving blocks. Some of his track gets heavy loads from the stone-cars carrying material for the new State House, yet it keeps its place perfectly.

MR. LEWIS, of Lorimer Street, Brooklyn, has recently received large orders for his wood mattings from John Stevenson & Co., from the Second Avenue R. R., and from Western Street Railways. Mr. Lewis says he makes no more of the *folding-wood mats* unless they are specially ordered, as his experience shows them to be practically much inferior to his newer devices.

Knoxville Street Railway.									
PERFORATED LINE.	TRIP NO.	Saturday, April 25, 1885.							
	1	3	20	15	17	9	25	16	18
	2	13	18	20	7	15	12	8	
	3	10	12	5	9	26	24	7	
	TOTALS.	26	30	40	33	50	61	31	18
Remarks.....	Car No. 5. Total No. Passengers carried.... 309. Car Started 10:07. Car Stopped Running.... 9:30. JNO. F. JOHNSON, Driver.								

of car No. 5 for April 25. Any person can see at a glance how it is to be used. It operates both as a check on the driver and receiver; it gives the number of passengers carried at any trip during the day. The blanks are torn off at the perforated line. Forty (40) minutes are required to run a trip, the line being two miles long. Although I do not claim it to be by any means a perfect check on the driver, yet it is a very efficient one. I have also some special books of my design for receiving tickets, sales tickets and cash fares, record of passengers and driver's record.

T. L. BEAMAN.

A New Street Railway Supply House.

THE firm of Pugh & Russell has just established itself for the purpose of dealing exclusively in street railway supplies for home and export trade, a business for which there has for some time been a need. Mr. Pugh has had the advantage of a practical experience in the manufacture of cars, having served an apprenticeship of some years in the Stephenson Car Works, and Mr. Russell has acquired a thorough knowledge of business, having filled an important position for several years past in the office of Maitland, Phelps & Co.

The Broadway, N. Y., Surface Line.

The Supreme Court, General Term, has confirmed the report of the Commissioners in favor of Jacob Sharp's Broadway surface (horse car) railroad from Fourteenth Street to the Battery. Judges Daniels and Brady concurred. Judge Davis dissented. Judge Daniels says among other things:

"The fact that the company was not able to obtain the consent of the owners of one-half in value of property on Broadway is not a controlling circumstance. That a majority of the persons owning property were opposed does not appear to be the fact. A majority are favorable to the construction of a railroad, but differ as to the description of road.

"Railroad tracks will not interfere with the speedy transit of fire engines. In case of parades the cars might be excluded from the street for the time and the business of the road suspended.

"Five per cent of the gross earnings, besides \$40,000 a year, is a sufficient payment to the city.

"The company should be required to keep the street in repair between the tracks and and two feet on either side, to remove the snow from the same parts of the streets and avenues immediately after it falls, and not pile it up, but cart it away; and if it failed to do these things it should forfeit its franchise. It should be obligated in the same manner, without contingency or uncertainty, to carry its passengers for five cents over the entire distance from the Battery to Central Park.

Judge Brady balances the benefits and injuries and concludes that the benefits will be the greater. Judge Davis says:

"No scheme is devised by which these benefits and injuries can be equalized; and it is therefore a duty to see to it that at least the general benefits to the whole city are such as to justify the infliction of injury upon a portion of the public for the good of the whole. In this case I do not think that can be done. I am firmly convinced that in the throng of traffic below the City Hall the road will not only be detrimental to property, but a serious public nuisance. Broadway, between the points of the contemplated railroad, is the central street of a narrow island, and is rapidly being absorbed by that kind of business which most demands facility for transporting merchandise and property rather than persons. Its chief traffic must hereafter be with the country instead of the city, or, in other words, a wholesale and not a retail trade. It is now almost the sole longitudinal street in the lower part of the city of which surface roads are not in possession; and, being so, it ought, in my judgment, to be kept free for the use most largely beneficial to all classes of our people.

But if Broadway is to be given up to the use of a surface railway the public have a right to demand that a franchise so valuable shall not be granted except upon terms and conditions justly compensatory to the city. There should be an opportunity for competition. It is well known that all compensation was debarred by the action of the Board

of Aldermen, when it was manifest that other corporations were seeking to enter the field as competitors. I am not willing to sanction the success of any sale and purchase of a great public franchise, accomplished by the arbitrary exclusion of all other bidders. My brethren think it right, as I do, to impose additional conditions upon the confirmation of the report. The same principle justifies me in imposing the condition that the petitioner shall enjoy the franchise only by becoming the highest bidder upon a fair competition sale to be made under the direction of the Mayor of the city or its other authorities."

The Prevention of Tramway Accidents in England.

From an English exchange we learn that Major-General Hutchinson, of the Board of Trade, attended an adjourned inquest held at Rochdale, England, respecting the death of a child killed by a tram-engine. Mr. Worth was present on behalf of the Rochdale and Bury Steam Tram Company. At a previous inquiry the coroner had suggested that a network be placed in front of each tram-engine, supported in any suitable manner, which would have the effect, he thought, of knocking the legs of any child or other person from under them who happened to be in the way. The persons so treated would then fall into the network and so escape injury. A model of the arrangement was shown by the engineer of the company as well as one constructed on the American cow-clearer plan, both of which were carefully inspected by the jury. Major-General Hutchinson said he had taken great interest in the suggestions of the coroner for the prevention of fatal accidents, but he was of the opinion that the plans exhibited were hardly practicable ones, as the width of the engines would be increased thereby, and the projection on each side would probably be more dangerous than the present engine sides. It must be remembered also that the Board of Trade restricted the width of the engines to between 5ft. 6in. and 6ft. Besides this there would be considerable loss of time in moving the nets from one end of the engines to the other at the completion of each journey, or if nets were provided at each end then access in and out would be barred as the doors could not be opened. He thought the most practicable plan was that on the cow-clearer principle. The jury ultimately agreed to a verdict of accidental death, and recommended the Tram Company to bring the suggestions, made by the coroner and Major-General Hutchinson, before the Tram Companies' Institute, in order, if possible, to adopt some arrangement for general use of tramways for the prevention of street accidents.

Mr. A. AYERS, of 625 Tenth avenue, New York, has patented a new automatic switch for one-horse cars, which appears to meet a want. It is so arranged that the car may be deflected either to the right or left, or continued on in a straight line, without getting the horse outside of the track. One of these switches may be seen in use on the corner of Court street and Atlantic avenue, Brooklyn. It is much liked by the road.

A New Car-Starter.

MR. JOHN T. SCHAFFER of Rochester, N. Y., has invented a car-starter of novel principle, which is thus mentioned by a local paper:—"A test of the John T. Schaffer 'vacuum and air chamber' patent for relieving horses from sudden strain on starting cars and relieving draft timbers from severe shocks, was made on car 102 of the Rochester City and Brighton Street Car company's line running along the State street and Mt. Hope avenue route recently. The device comprises an air cylinder with contained piston, and valves at each end of the cylinder. When the piston rod is drawn forward through the chamber the valve in front opens and allows the air between that end of the chamber and the piston head to escape gradually, at the same time the valve at the rear end closes, forming a vacuum between that end of the chamber and the piston head. The cylinder has a five inch bore and the piston head travels eight inches from end to end. The cylinder is fastened to the draft timber under the forward part of the car. The forward end of the piston rod is hook shaped and to this the whiffletrees are attached, so that in starting a car the horse draws on the piston rod, the air chamber in front of the piston head forms a cushion. Attached to the cylinder are appliances permitting side and up and down movements." A company is to be formed to introduce the patent.

Recent American Patents.

The following list of patents relating to the street railway interests, granted by the U. S. Patent Office during the past month, is specially reported by Franklin H. Hough, Solicitor of American and Foreign Patents, 925 F Street, N. W., Washington, D. C.:

- 314,995—Cables or ropes used to propel vehicles, coverings for—C. Bullock, N. Y.
- 315,258—Car-starter—C. F. Dodge, Pochontas, Ill.
- 315,178—Ticket-clip—W. Souter, Leeds, Mass.
- 315,325—Cable railway grip—J. H. Parkinson, assignor to himself and J. D. Kerbaugh, Bodie, Cal.
- 315,355—Passenger recorder—A. Torrey, Detroit, Mich., & D. J. Casey, Cylon, Wis.
- 315,704—Car-starter—B. F. Bergh, N. Y.
- 315,620—Car-starter—A. L. Higley, Troy, N. Y.
- 315,988—Street-car—G. M. Brill, Philadelphia, Pa.
- 315,737—Fare-receiver—W. A. Connolly, Boston, Mass.
- 315,963—Fare register and recorder—J. H. Rose, Norwalk, Conn.
- 315,491—Moving street cars on curves—N. A. Fisher, Sacramento, Cal.
- 315,992—Cable railway—H. Root, San Francisco, Cal.
- 316,417—Car-starter—R. M. Thompson, East Rockport, Ohio.
- 316,831—Car safety attachment, cable—H. J. Rohrback, Chicago, Ill.
- 316,730—Car-starter—J. S. Briggs, Kankakee, Ill.

A Proposed Street Railway Insurance Company.

[The following is the text of an important bill to incorporate a Street Railway Insurance Co. The bill has passed both Houses and is still (June 3) awaiting the Governor's signature.]

AN ACT TO INCORPORATE THE AMERICAN STREET RAILWAY MUTUAL INSURANCE COMPANY.

SECTION 1. The following persons named in this section and their successors, namely; William White, Charles J. Harrah, James W. Foshay, Calvin A. Richards, William H. Hazzard, D. F. Longstreet, William Richardson, Alexander H. Davis, Charles Clem-inshaw, Samuel Little, G. Hilton Scribner, Thomas Lowry, Henry M. Watson, John B. Parsons and William J. Richardson are hereby constituted a body corporate by the corporate name of the American Street Railway Mutual Insurance Company, and shall possess the usual powers and be subject to the usual duties of fire insurance corporations in the state of New York; and its principal place of business shall be at the city of New York, in the county and state of New York.

§ 2. The corporation hereby created shall have power to insure against loss and damage by fire, buildings, shops, depots, cars, machinery, fixtures, furniture, equipment, live stock and property of all kinds and description owned, leased or used by surface street railway companies in the United States and Canada, and the said corporation may issue its policies to such companies, and such companies are authorized to receive the same, agreeing to pay all loss or damage that may be sustained by fire upon any such property by the holders of such policies, not exceeding the sum named in the policy. The premiums upon all policies issued shall be paid in cash.

§ 3. The above-named persons shall be the first directors of said corporation. Their respective terms of office shall be determined by lot, so that five shall hold office for one year, five for two years, and five for three years, respectively, from the first Tuesday in June, eighteen hundred and eighty-five. After the expiration of such terms of office, respectively, the succeeding terms shall be for three years from such expiration. Directors to fill vacancies occurring by the expiration of the term of office shall be chosen at the general meeting of the corporation, which shall be held on the first Tuesday of June in each year, and continued by adjournment or otherwise until such vacancies are filled. Directors to fill vacancies occurring before the expiration of the term of office shall be chosen by the board of directors to hold office for the unexpired portion of the term, and directors shall continue to hold their respective offices after the expiration of their terms until their successors shall have been duly chosen and qualified. Directors shall be officers of surface street railway companies.

§ 4. The president, vice president, secretary and treasurer, and all other officers

shall be chosen by the board of directors, and shall hold office during the pleasure of the board. Their duties and compensation shall be such as shall be fixed by the board.

§ 5. Before the treasurer shall enter upon the duties of his office, he shall execute and deliver to the directors a bond, with sufficient sureties to be approved by such directors, conditioned for the faithful performance of his duties as such treasurer.

§ 6. This corporation may purchase or rent such real estate as may be requisite for the convenient transaction of its business, and may otherwise invest its funds in such manner and in such securities as fire insurance companies are authorized to invest in, by chapter four hundred and sixty-six of the laws of eighteen hundred and fifty-three, entitled "An act to provide for the incorporation of fire insurance companies," and the acts amendatory thereof and supplementary thereto. All investments of the funds of the corporation shall be in the corporate name, and only upon the approval of the board of directors.

§ 7. Every surface street railway company insured by this corporation shall be a member thereof. At each general meeting of this corporation, a full statement of its affairs shall be submitted, verified by the oaths of the president and secretary and treasurer.

§ 8. The board of directors of this corporation shall have power to make such by-laws, not inconsistent with this act and the constitution and laws of the state of New York, as may be deemed necessary for the holding of meetings of the corporation and its board of directors, the government of its officers and the conduct of its affairs, and the same, when necessary, to alter and amend, and to adopt a corporate seal, and to change and alter the same at their pleasure.

§ 9. Policies may be issued by this corporation when the superintendent of the insurance department shall have ascertained and certified that the capital hereinafter required of this corporation has been paid in, and is possessed by it in money or in such stocks and bonds and mortgages as are required by the said eighth section of chapter four hundred and sixty-six of the laws of eighteen hundred and fifty-three, and the acts amendatory thereof and supplementary thereto.

§ 10. When the just claims for losses and expenses unpaid against this company shall exceed the funds in the hands of the treasurer, over and above the cash capital hereinafter mentioned and the unearned premiums on outstanding policies, its directors may assess such sums as may be necessary to pay all claims and keep such capital intact, upon the members holding policies, in proportion to the premiums paid by each: such assessments not to exceed the amount of the note hereinafter mentioned and to be paid within thirty days after notice thereof shall have been received by any such member. To secure the prompt payment of such assessments, the directors shall receive from each member a note for not more than twice the amount of the current annual premium paid by such member. Such note

shall constitute all the liability of the member and may be enforced to the extent of the amount with interest from the date of any and every assessment made thereon, and remaining unpaid thirty days after notice thereof shall have been received by any such member.

§ 11. The directors may from time to time at a general or special meeting provide in what manner and to what extent members shall participate in the profits of the company.

§ 12. The corporation, as an additional security to its members, over and above their cash premiums, and the notes hereinbefore mentioned, shall unite a cash capital, which shall be at least five hundred thousand dollars, and may be increased from time to time to an amount not exceeding two million dollars to be divided into shares of one hundred dollars each to such members of this corporation as shall subscribe and pay for the same; and such members, being surface street railway companies, are hereby authorized to subscribe and pay for said shares to such amount as its directors may determine, which shares shall be transferable on the books of the company but to members only, subject to such regulations as the directors shall from time to time prescribe. Only holders of cash capital paid in shall be entitled to vote, and such holders shall be entitled at all meetings of said company to one vote for each share of said stock held by them, respectively, such votes to be given by an officer, or proxy duly authorized. The directors may allow such rate of interest on its capital and such participation in profits as they may from time to time determine, in accordance with the laws of the state regulating the payments of dividends by corporations, and such cash capital shall be liable as the capital stock of the corporation in payment of its debts; provided, however, that if said capital should become impaired to the extent of twenty per cent of the amount fully paid in, it shall be the duty of the superintendent of the insurance department to issue a requisition on the stockholders for the payment of the deficiency; and all proceedings thereunder shall be the same as are now fixed and determined by law for the payment of deficiencies by requisition of the said superintendent on joint-stock fire insurance companies of this state.

§ 13. Within ten days after notice of a loss has been received, a committee of not less than three directors shall determine the liability of the corporation on said loss, and if such determination shall not be satisfactory, or in case any difference of opinion shall arise as to the rights of parties under any policy, the subject thereof shall be referred to three disinterested men as referees, the directors and the insured each choosing one of the three referees, and the two so chosen selecting a third, and the decision of a majority of said referees shall be final and binding upon the parties, and any amount determined to be due by the corporation shall be paid within thirty days after such decision has been certified by the referees, or a majority of them, to the corporation.

§. 14. Any member of the corporation may withdraw therefrom by giving a written notice of such withdrawal to either of the officers at the office of the company, and upon such member paying all assessments theretofore or thereafter made upon it for losses and expenses which have been incurred before the receipt of such notice, any note or notes given by such member to secure the payment of assessments in the manner hereinbefore provided shall be relinquished and given up, and membership shall thereupon cease; and upon such cessation of membership, the member shall be entitled to the usual short rate return premium, and shall be exempt from all further liabilities and forfeit all further benefits from said corporation, except such liabilities and benefits as may arise from continued ownership of any of the capital stock thereof.

§ 15. Nothing in this act contained shall be construed to relieve or exempt said corporation from making statements and reports to the insurance department; or as releasing from the payment of such taxes and fees as are now or hereafter may be required from fire insurance companies organized under the general insurance laws of this state.

§ 16. All acts and parts of acts inconsistent with the passage of this act are hereby repealed.

§ 17. This act shall take effect immediately

Information on Street Railway Construction and Management.

Mr. T. M. Smedes, Superintendent for the Vicksburg (Miss.) Wharfboat and Elevator Co., sends us his subscription (for which he has our thanks) and says: "If convenient, please have circular sent me in which I can find the name of some good work on construction and operation of street railways."

Probably "*Tramways, their Construction and Working*," by J. Emerson Dowson and Alfred Dowson, A. A. S. C. E., will give Mr. Smedes the information he wants. We can furnish the book to any one who wishes it, at the regular publishers' price, \$1.50.

THE Winuipeg Street Railway Company run sleighs all winter heated with a small coal stove in the forward end. The sleighs are ventilated same as the box cars in summer and they have no complaints of gas or foul air. They say that American manufacturers cannot place the cost of sleighs low enough to enable them to place orders in this country.

WHEN you see a man
In a Car,
Sprawling all his limbs,
Near and far,
Taking twice the room
That he ought,
And for other's rights
Carling naught,
You may judge his mind's
In a fog—
That he's drunk—or else,
He's a hog.

—[Wilmington Star.

Improvements in Jersey City.

A correspondent sends us the following clipping from a local paper:—

In his recent annual message Mayor Collins alluded to the Lafayette extension of the J. C. & B. Railroad in rather sharp terms. He said:

"Additional horse car facilities were promised Lafayette, and your honorable body passed an ordinance permitting the use of certain streets for that purpose. I think that you should insist upon the immediate construction and operation of the new line, otherwise repeal the franchise."

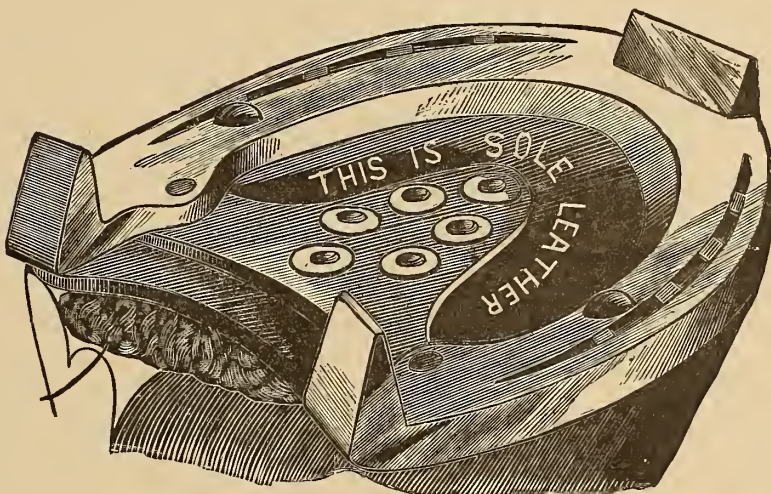
President Thurston, in a letter to the JOURNAL, reviewed this paragraph. Mr. Thurston called attention to the fact that since he has had charge of the road no expense or effort has been spared to make it effective, and said that if Mayor Collins had

Improvements on N. Y. City Roads.

In the best street cars as now built in New York, the brakes are all inside, that is between the wheels instead of outside. This disposition prevents in a great measure the pitching forward of passengers when the car is stopped. Another improvement is for a signal to the conductor; convenient hand-pulls at the back of the seats operate on a rope which connects with a piston moving in a small air chamber provided with a whistle at its free end. By a pull at the rope the whistle is blown and the conductor is advised of the fact that he is wanted.

The Lockie Horse Shoe Pad.

This pad* is of stout sole leather, covering the entire bottom of the foot, and inserted between hoof and shoe. It has a stiffening



THE LOCKIE HORSE PAD.

investigated he would not have so harshly reflected upon the management. Mr. Thurston showed that the ordinance permitting the Lafayette extension was passed so late last fall that no work could be done until this spring. The rails are procured, the cars are being built, the track is being laid, etc. It is hoped, Mr. Thurston said, that the extension will be open by July 1. If the Mayor had read his JOURNAL with his usual care, he would have seen that Mr. Thurston was pushing things, and would have been spared the necessity of taking back his hasty criticism of the railroad management. With his usual manly frankness he has written thus to Mr. Thurston:

MAYOR'S OFFICE.
JERSEY CITY, MAY 7, 1885 }

C. B. Thurston, Esq.:

DEAR SIR—The censure of your letter in to-night's JOURNAL is just. In my resume of the year, I thought of the Lafayette extension and wondered why it was not built, especially as I saw so much being done along the car tracks generally, and I jotted down the passage referred to mainly as a memorandum, fully intending to see you about it before sending in the message. I not only forgot to do that but forgot the passage itself. Please excuse something to a very busy man. Your explanation is satisfactory. I will leave out the paragraph from the message, as it will be published in pamphlet form. Yours truly,
GILBERT COLLINS.

piece riveted on at the back, as may be seen by the cut. It is fastened to the shoe by rivets at the heel. Between the leather and the frog is a sponge to keep out the dirt, and act as a cushion, besides giving the frog a certain portion of the weight to bear. The pad also acts as a prevention of injuries from picking up nails or stepping on broken glass.

* Lockie Horse Shoe Pad Co., 181 Kinzie Street, Chicago, Ills.

The Origin of the Word Tramway.

Mr. Augustine W. Wright, of the North Chicago Street Railway Co., appears to be an accomplished philologist as well as a progressive engineer. In a paper before the Western Society of Engineers he follows up the discussion of the origin of the word tramway, which was started in the Street Railway Department of our JOURNAL OF RAILWAY APPLIANCES. Mr. Wright does not at all believe in the Outram derivation, and he apparently proves that "tram" being the northern word for "a small carriage, on four wheels, distinguished from a sledge," that is the proper derivation.

THE restrictions of the city council of Harrisburg, Pa., will deprive the citizens of that city of additional accommodations and improvements which the City Passenger Co. had intended making.



MONTHLY, \$1.00 PER YEAR.

E. P. HARRIS.....General Manager.
P. G. MONROE.....General Western Manager.
ROBERT GRIMSHAW, M. E.....Editor-in-Chief.
G. B. HECKEL.....Associate Editor.

AMERICAN RAILWAY PUBLISHING CO.

32 LIBERTY ST., NEW YORK.
12 LAKESIDE BUILDING, CHICAGO.

S. L. K. MONROE, Sec'y and Treas.

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St. Louis, Mo.

The Luminous Car Again.

No radiant pearl, which crested Fortune wears,
No gem, that twinkling hangs from Beauty's ears,
Not the bright stars, which night's blue arch adorn,
Nor rising suns that gild the vernal morn,
Shine with such lustre as the car that goes
Down Fulton's muddy street, and ever glows.
[Darwin's Loves of the Plants, (amended).]

It seems that our V. & E. C., at once the Methuselah and the Thomas Alva Edison of railroadism, has not produced (or at least published) anything new during the past month. The luminous burners and the luminous car have doubtless absorbed the attention of its giant intellect, in perfecting the mechanical, chemical and optical details, and working up to public appreciation and to par the stocks of the Great American Refulgent Car Co., and the Helvetio-Pearl Street Fluorescent Harness Association, Limited.

So in default of novelties from the oft fire-swept district where the clang of the Franklin Press rivals the rattle and the roar of the Elevated Railway—we shall have to take up anew the consideration of the luminous harness and the luminous car; its Beauties and its Benefits, and the Bulging Brains of its Binocular, Benign, and Beneficent, but not yet Besainted Business Boomer.

First, as the apt quotation which heads these appreciative lines most clearly indicates—the luminous car, (especially in combination with the luminous harness) is “a thing of beauty,” if not “a joy forever.” If it is true that the luminous car is a good thing, it is at once an example of “the true, the good, and the beautiful,” and as such deserves commendation and encouragement.

Second, it affords the poet and the journalist several new similes and metaphors, or at least, a new simile or a new metaphor for several time-worn though heart-loved and excellently rhyming subjects.

A girl, filled with the glamour of the skating rink, elopes with a caoutchouc-legged “professor” of the skatorial art. The *Eagle* can then thus head its announcement of the fact:—

And like a passing [car] she fled
In light array.

A politician or a faction “gets left,” at a ward primary. The opposition part says of him—

’Tis the last car of summer
Left blooming alone.

Of Miss Honora de Flaherty the poetic novelist may say—

Her blue eyes sought the west afar
For lovers love the latest car.

The express train comes in bearing the President, or Mrs. Langtry; a thousand people await its arrival; and the *Chicago Times* may aptly cite—

But when the [car] in all [its] state
Illumed the eastern skies, &c., &c.

The Rev. Mr. Ballmatch, in alluding to the depravity of the theater, the heroism of the six hundred, the refined influence of the Louisville mule, the devotion of Florence Nightingale, and the not-apt-to-get-left-itude of some street railway men of whom we wot, as all combining to make a variety in the this-ness, and an uncertainty in the then-ness, of existence, may impressibly voice these lines:—

Life like a [car] of many colored glass
Stains the white radiance of eternity.

Oh, the luminous car ought to be a bonanza for professionals, short of ideas.

Third, there's millions in it. Col. Eschol Sellers would have had it, as one of the principal features of his celebrated railroad, that the line he advocated had none but luminous cars, of a special and copyrighted color, calculated to inspire the timid with confidence, deter the train-wrecker from wrong, sooth the ever wakeful babe in arms, thrill the hymeneal neophytes with soft extatism,* and convert the evil drummer from schemes of scalped tickets and borrowed mileage books.

Our very pleasant social relations with our genial and accomplished *confrere* over in Pearl Street, as well as the necessity for observing the proper *convenances* † prevent us from giving details the publication of which might appear as a violation of confidence whispered through the incense-like clouds of a burnt offering of Latakia; but this we can say, without any breach of trust, or unwarrantable prematurity of expression, or particularity of personal designation,—that there is yet to come the announcement of still another refinement in cars—the return of evenings with the *maestri* and mornings with the *virtuosi*—the culmination of critical culture in car construction.

This, dear readers,—this *acme* and *ne plus ultra* ‡ of Art in Transit, as distinguished from Transitory Art, is the Musical Car!

Think of it!!

Wait for it!!!

We hope to have full particulars in our next.

* All rights reserved.

† The compositor omitted the first of these words from an article of ours in our last issue (subject forgotten) and the second was one intended for our leader on the Refinement of the Louisville Mule; but we lost the slip on which it was written, and have had no previous chance to work it in. This seems a good place for it.


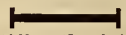
‡ This is Latin; a language much used by Lawyers to conceal their ignorance and by Congressmen to show off how much they know.

Track Laying.

We have just been watching the laying of steel center bearing rails on a track over which we ride almost daily; and we have to say that we consider that there is yet a good deal to learn in that branch of street railway work.

First, as regards the stringers themselves. The knees are far too light and permit the stringers to rock laterally. Fewer knee braces of longer reach would do the work much better, and keep the track in gauge. A well-gauged track saves wear and tear of rails and of wheel flanges. Setting the stringers on tarred seats on the cross beams would probably considerably lengthen the life of both stringers and cross-pieces by doing away with soaking places into which water both enters and remains by capillary attraction.

The timbers would last much longer if *properly* treated with some *insoluble* anti-septic solution, put in at one end under pressure until it showed at the other end. If the plant for such treatment were rightly designed and constructed, and a suitable material chosen, this antiseptic treatment would pay, in the increased life of timber.

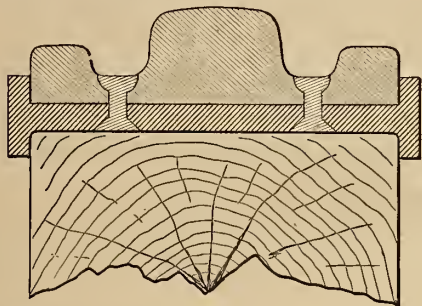
The joint pieces are of the old “channel” sections, thus: ; and hence have very little natural stiffness. We think that the new double channel or  sections would considerably stiffen the joints; and they certainly need it.

The spikes are of a character to mash their way through the fibres, breaking and crippling them and crowding them out of the way in such a way as to give them little hold on the spikes. If the holes were cleanly bored, or if spikes were made with clean cutting chisel parts, or were got up in the same way as wire nails, the spikes would do more to hold the nails down to the stringer, against the prying-up action which takes place at the back end of a rail every time that the load bears down the “far end” (the term “back end” and “far end” being named from the direction in which the car or other load is going).

We think that if the holes in the rail flanges were punched somewhat obliquely; that is, pointing towards each other and the center of the rail, so that the spikes would have somewhat of a clinching effect, there would be more holding-down power. As the spikes are now laid, they only keep the rail from being crowded sidewise off the top of the stringer.

There is too much rail-end-wearing and spike loosening done by the prying up of the rails at one end, owing to the depression due to load at the other end. If we give the spikes a better grip, and the joint pieces more vertical stiffness, and then unite the chairs and the rails by rivets permitting endwise motion due to expansion and contraction and preventing the rail ends from lifting away from the chairs, we ought to have improved the joint. The rivets can be put through the holes in the chair, before the latter is laid on the stringer; and the second heading could easily be accomplished when the rails were in place over the chairs.

The riveting up would of course have to be done before either rail was spiked to the stringer, and the surface of the latter would be too soft to rivet against. The holes in the chair to be round; those in the rail-flange oblong, with proper countersink; or the chair could have oblong holes with oblong countersink, so that the "first head"



of the rivet could readily travel therein as the rail end moved with expansion and contraction.

While for many reasons the "cobblestone" is an excellent pavement for the space between the rails, yet, as ordinarily laid, the best laid of that ordinary cobble foot-way soon looks like a relief map of the moon. The stones being of unequal size, the small ones sink deeper into the bed than the large ones; hence, those which offer most resistance to foothold and traction and give the roughest riding to ordinary vehicles.

It is necessary to bed the largest stones next the stringers to give the stringer and rail lateral stiffness; but the rest of the cobbles are generally put in higgledy-piggledy, without reference to their size and shape.

If, now, the cobbles were sorted more, laying the very largest in a row next the stringers, and the next largest in a lengthwise row next that, and so on, with the smallest in the center, the road being made with excessive crown, the small stones in the center line would sink more than those in the side rows, but they would sink with greater uniformity, so as to bring the road to a lower curve than at first, but a more nearly smooth surface than is now found. A better foot-way would decrease the amount of lameness, give the horses better foothold in starting, give cleaner tracks, and cost less in maintenance. Incidentally, public opinion would be favorably affected.

Snow Plows For Street Railroads.

Mr. G. G. Gibson, Superintendent of the Cass Avenue and Fair Ground Railway, St. Louis, Mo., says: "I wish you would ask through the columns of your JOURNAL if any horse railroad company had a snow plow that did its work well and satisfactorily last winter. If there is one, I want to see it. Some people think it is bad taste to talk of such things now, but I believe 'in times of peace, prepare for war.'"

We have received from the Fulton Foundry, 202 Merwin St., Cleveland, O., a neat leather bound catalogue of the street railway specialties manufactured there. It is dated March, 1885.

One-Horse Street Cars.

The greatest strains which a street car has to meet, seem to be those incident to rounding sharp curves at street corners.

My best wagon, unloaded, weighs three-fourths of a ton, without a box. With one-fourth ton of stone rack and four tons of stone it weighs five tons. This is a heavy load but it is not the limit on good level road. It takes less power to move the load on a circle of twenty-five feet radius than it does to move it on a straight line. Some of my horses, dumb brutes as they are, know enough to swing from side to side of the road on a steep climb, to permit a serpentine wheel track, where it can stand as evidence that their driver was drunk. Said wagon has loose wheels and radial axles. A "bob-tail" should be as well fixed for rounding curves; it can be provided with means for rounding a sharp curve, with less traction resistance than needed for the straight line. When this happens there will be no need of letting the empty car weigh half what it will when full loaded.

One horse should trot along, with a full load of passengers, on a level track, with resistance, for one ton of car, twelve and one-half pounds, and for one and one-half ton of passengers, at five pounds per ton, or twenty pounds in all. If the car weighs two tons with the same live load the resistance will be $(2 \times 12\frac{1}{2}) + (1\frac{1}{2} \times 5) = 32\frac{1}{2}$ lbs. With an "easy" street grade of one in twenty to mount, gravity gets hold of the "bob's tail" and makes the horse put out effort enough to overcome $20 + (\frac{2\frac{1}{2}}{20} \times 2,000) = 120$ lbs. in the light car and $32\frac{1}{2} + (\frac{2\frac{1}{2}}{20} \times 2,000) = 132\frac{1}{2}$ lbs. in the heavy one. The twelve and one-half pounds may not seem much of a difference, but they are at the right end of the calculation, "the last feather." Such climbs do not admit of rapid motion. The resistances cited are for the slowest conceivable speed.

Gravity is well known as being everywhere all the time, and yet many good sinners act as though they do not understand its unremitting, undeviating influence. It always knows what its about; any one disbelieving can test it, by working up the grade described at different speeds. If he does not find it takes twice as much effort per unit of distance to ascend forty feet of the grade as it does to ascend twenty feet, in a given time, we would be very glad to get his data. Of course axle friction does not necessarily increase with the speed.

There is no use trying to make a light street car of wood; it will take hard and tough eye beam sections for the skeleton; paper board cover; the best lucked glass windows and Lincrusta Walton inside finish, on Acme steel wheels, to bring the dead weight and traction resistance down to half what it is now.

ED. B. MEATYARD.

SUBTERRANEAN CABLE RAILWAY AT BRUSSELS.—The plan proposed by Prof. Aug. Gillon, of the University of Liege, is to unite by a double track cable railway the Putterie quarter and the Place Royale; and later to be extended to the Porte Namur; the conditions are the same as at Constantinople.

Olive's Tables and Diagrams.

Tables and Notices for Curving Tramway Rails and for Making and Laying-in Railway Crossings. Published by W. T. Olive, C.E., 90 Landsdown Road, Didsbury, England.

These tables are intended for the use of Tramway and Railway Engineers, Crossing Makers and Platelayers.

Table No. 1 gives in condensed form results of calculations required for the curving of tramway rails to any radius by template or otherwise. The advantage of this table becomes more apparent when it is considered that the tendency is to have very heavy section rails, suitable for steam traffic, and that all the bending for street corners, etc., should be done by template on the rails before they are sent out on to the ground.

Tables Nos. 2 & 3 enable railway crossings to be made and laid in at the correct distances from switches, without the labor of calculation—typical cuts being furnished to which the various crossings and leads required in ordinary practice are referred. The gauge dealt with is 4' 8 $\frac{1}{2}$ " but the different formulæ are so detailed as to make them apply to any required gauge by a single calculation.

They have been carefully compiled with a view to ready reference, are tastefully got up and should prove useful to railway and tramway men.

They will be sent post-paid at one dollar each, by the American Railway Pub. Co., (proprietors of this journal) 32 Liberty St., N.Y. City.

Melting Steel in an Ordinary Cupola.

It will interest all who have been considering the relative merits of steel and of iron rails, to know that one great obstacle to the utilization of old steel rails has been successfully removed. This should raise the price of old steel rails.

Mr. R. E. Masters, of the Columbus (Ga.) Iron Works, cuts the rails into one foot lengths and melts with one pound of fuel for five pounds of steel, making fine castings.

Heretofore, the Sweet cementation process has used up some old steel rail scrap; some has been worked up into wire, and some (not nearly enough, into nail, and a trifle has found its way into cast car wheels; but now, frogs, crossings, chairs, draw-heads, buffer plates, sockets, corner pieces, and a hundred other kinds of pieces can be cast from old steel rail scrap.

Lighter Cars Wanted.

EDS. STREET RAILWAY JOURNAL:

I wish to get some one-horse cars for a line with heavy grades and light uniform travel. Our present cars weigh about 3,500 pounds and are too heavy. Cannot they be made to weigh from 1,500 to 2,000 pounds?
SUPT.

[We think that Mr. E. B. Meatyard's communication headed "One-Horse Street Cars," in this issue, covers the ground fairly well.]

Notes and Items.

CANTON (O.) has a new street railway.

THERE is a new street railway in Madison, Miss.

THERE is a new street railroad in Kalamazoo, Mich.

NEVADA (Mo.) is talking of having a new street railway.

THE JOHNSTOWN (Pa.) STREET RAILWAY is to be extended.

A new street railway is contemplated in Hutchinson, Kan.

ST. LOUIS (Mo.) is to have a new street railway—the Northern Central.

MOLINE (Ills.) has a new street railroad—the Fifteenth Street River R.R.

THE DALLAS STREET RAILROAD Co. (Tex.) are building a two mile extension.

THE DULUTH STREET RAILWAY Co. (Minn.) will add four new cars this spring.

THE SANDUSKY (O.) STREET RAILWAY is building a new line, two miles long.

THE SEDALIA (Mo.) STREET RAILWAY Co. will extend their track this summer.

A street railway is to be built between South Bend and Mishawaka, Indiana.

THE DES MOINES STREET RAILROAD Co. will build a one-mile extension this year.

THE BIRMINGHAM STREET RAILWAY Co. (Ala.) will buy some new cars this spring.

THE MINNEAPOLIS (Minn.) STREET RY. Co. will build a four-mile extension this season.

THE STONEHAM STREET RAILROAD Co. will water their track this season with water cars.

THE BURLINGTON (Ia.) STREET RAILROAD Co. are laying one and one half miles of new track.

THE BELT STREET CAR LINE is a new company running cars on the streets of Dallas, Texas.

BEAVER FALLS, PA., is to have a street railway. Track is building and orders given for five cars:

THE STREET RAILWAY Co. of Grand Rapids, (Mich.) will expend \$3,000 in improvements this season.

THE NEWPORT AND DAYTON (O.) Street Railway Co. have just completed a \$5,000 brick stable.

THE EMPORIA CITY RAILWAY Co. (Kan.) put on an extra car and build a mile extension this season.

THE LEXINGTON (Ky.) CITY RAILWAY Co. expects to build one and one-half miles of track, this year.

THE SAN ANTONIO STREET RAILWAY Co. will extend their track and add several new cars this summer.

FORT WORTH, Texas, has a new street railway. It is operated by the Rosedale Street Railway Co.

THE CENTRAL CITY HORSE RAILWAY Co., Peoria, (Ills.) will make an extension of one mile this summer.

THE JACKSON STREET RAILWAY (Tenn.) is chartered but not built. Work will be commenced on it this fall.

THE LAWRENCE TRANSPORTATION Co. (Kan.) will build three-quarters mile extension line this season.

BURLINGTON (Ia.) has two new lines of street railway, the Union Street Railway Co. and the Belt Line.

THE CHATTANOOGA STREET RAILROAD Co. (Tenn.) will extend their road one and one-half miles this year.

THE CHESTER (PA.) STREET RAILWAY Co. talks of building two miles of additional track during the season.

THE CALVARY, GREENPOINT AND BROOKLYN line will, if all goes well, begin operations on Decoration Day.

THE TRANSVERSE PASSENGER RAILWAY Co., of Pittsburg, (Pa.) are changing their cars from single to double ends.

THE HAMILTON STREET RAILWAY Co. (O.) will extend their track one-half mile this season and add two new cars.

THE PINE STREET, Jacksonville, (Fla.) street railway put on five new cars and built an extension of three miles.

THE MARKET SQUARE AND ASYLUM ST. RY. is the name of a new company operating on the streets of Knoxville Tenn.

THE SIOUX CITY (Ia.) STREET RAILWAY Co. will add three new cars to their equipment and lay one mile of new track.

ANDREWS & CLOONEY are making the iron work and W. P. Craig is laying the new Lorimer Street (Brooklyn) road.

THE HANNIBAL STREET RAILWAY Co. (Mo.) are replacing sixteen pound T rails with thirty-six pound center bearing.

THE BOONE AND BOONSBORO STREET RAILWAY Co. (Ia.) will put in two more switches and add another car this spring.

A new street railway has just begun operations in Tokio, Japan. The "Japs" are delighted and patronize it liberally.

THE SPRINGFIELD STREET RY. Co., St. Louis, (Mo.) contemplate building one-half mile double track and one mile of single track.

THE BROADWAY (N. Y.) SURFACE RAILROAD Co., it is understood on good authority, has placed the contract for building its track.

THE DUBUQUE (Ia.) STREET RAILROAD Co. has bought the material to add two miles to its tracks. The work will be done this season.

AT LOS ANGELES, CAL., the three street railways have adopted the Horman register, also the Corrigan Consolidated roads of Kansas City.

THE QUEBEC STREET RAILWAY Co. (Can.) have ordered a new car and will extend their tracks this season if they obtain the right of way.

THE THIRD AVENUE RAILWAY Co. (N. Y. city) have just finished twenty new open cars and propose to thoroughly overhaul all their Harlem cars.

MR. JOHN E. BROWN, for fifteen years superintendent of the Troy and Lansingburgh (N. Y.) Street Railway, died, April 27th, of heart disease.

THE LEWIS AND FOWLER MFG. Co., Brooklyn, has secured the sole right to manufacture and sell the Van Tassell brake handle.

THE OSWEGO (N. Y.) STREET RAILWAY Co. (new) will build two miles of track and about four cars for officers—see our Directory.

THE LOUISVILLE PASSENGER RAILWAY Co., H. H. Littell, Gen. Supt., has placed an order with the Brownell & Wigler Car Co. for sixteen cars.

THE COURTLAND AND HOMER HORSE RAILROAD Co., Troy, (N. Y.) will complete their track by building about two and one-half miles this summer.

THE IOWA CITY AND DES MOINES RIVER Motor Street Railway Company is a new corporation operating on the streets of Boonsboro, Iowa.

THE HOUSTON (Tex.) STREET R. R. Co. are building a new stable and will increase their motive power (mules). They will also build a one-half mile extension.

THE HARLEM BRIDGE, MORRISANIA AND FORDHAM RY. new cars are equipped with the Wales Fare Box. This company is starting a new line to Port Morris.

THE FT. WORTH STREET RAILWAY Co. (Texas) will build a large brick stable and car sheds during the present summer, and expects to extend its tracks one mile.

THE street railway for a city in China, referred to in a former number of the STREET RAILWAY JOURNAL, has not yet materialized, but the plan is by no means abandoned.

THE WICHITA (Kan.) CITY RAILWAY Co. are building three and one-half miles of new track; it will be completed the 15th inst., and will make the total length of their line six miles.

THE RANDALL GEAR will be placed on new cars of the Baltimore City and Central City (Baltimore) Railroad Companies'; also on thirty new cars of the Rooper Passenger Ry. Co., Philadelphia.

MANCHESTER, ENG., is the centre of some one hundred and fifty miles of the best laid tram roads in that country, over forty miles of which have been laid by Mr. William T. Olive, C. E., of that city.

THE LEWIS AND FOWLER REGISTER is used on the Dry Dock, East Broadway (N. Y.) and Battery; Forty-second street Manhattanville and St. Nicholas avenue; and the Jersey City and Bergen railroads.

THE FOURTH AVENUE line has just ordered fifteen new cars of the John Stephenson Co. They are intended to be run through to Harlem and are to be of his best A1, three-ply, double-and-twist-warranted-to-wash kind.

THE BEMIS CAR BOX Co. and BALTIMORE CAR WHEEL Co., which have been for some time in litigation over plans, it is understood have adjusted their difficulties by some sort of consolidation of the interests involved.

MR. WELLINGTON ADAMS of St. Louis has recently been in New York in behalf of a new electric motor for street cars, which involves novel principles and which he avers has been tested with the utmost satisfaction.

THE CHICAGO CITY RY. are just finishing seventy new cars for their line.

THE NEW ROAD in So. Chicago (Ills.) is the Chicago Horse & Dummy R. R.

THE LONDON (Cal.) STREET RAILWAY have recently added two new cars to their equipment.

AURORA, Ills. is to have one mile of new track—an extension of the Aurora City Railway Co.

THE LEXINGTON (Ky.) CITY R.R. Co. will build one and one half miles of new track this season.

THE SAVANNAH (Ga.) COAST LINE will build about one-third of a mile of new track this summer.

THE ELIZABETH & NEWARK (N.J.) will add several new cars this summer, and are putting in new switches.

THE CONSOLIDATED ST. R.R. Co. of Columbus, O., will build and add some new cars to their rolling stock.

THE NORFOLK (Va.) CITY R.R. Co. have just completed a half mile extension, and added two cars to their rolling stock.

THE CHARLES RIVER ROAD, Boston, are building a new line to Somerville, which will shorten the distance about a mile.

THE BOON AND BOONSBORO (Ia.) STREET RAILWAY Co. will build 2½ miles new track, and add two new switches and two cars.

WOODSOCKET, R.I., a town of about twenty thousand inhabitants, has no street railways, and it would seem to be a good point for one.

THE GLOBE STREET RAILWAY Co., Fall River, (Mass.) have added two cars, and contemplate building a two mile extension this season.

THE NEW BROADWAY SURFACE ROAD, now building, are putting in the Douglass Patent Automatic Switch manufactured by H. M. White & Co. of this city.

THE PEOPLES' RY. Co. of Baltimore, Md. have just finished a two story brick and stone car house 100 x 110 feet; and building a new stable for 225 horses.

THE CITY RAILROAD Co. Mobile, (Ala.) will add one mile to their country track and connect their street tracks with the river front. They will add three freight cars to their equipment.

THE WICHITA CITY RAILWAY Co. is building 3½ miles of new track, which is to be finished by June 15th prox. This will make six miles of track, and the equipment will be increased to eight cars.

LAWRENCE (Kan.) TRANSPORTATION Co. claim to have the best track in the country. It is laid with 38 pound Johnson rails. The President says they run their horses twenty miles a day and they do well.

KANSAS CITY, (Mo.) has three new street railway companies: The Kansas City and Westport; The Kansas City and Rosedale, and a cable road, double track, about one and three-fourths of a mile long.

THE MT. ADAMS & EDEN PARK INCLINED R.R. Co. of Cincinnati, O., are building and will have in operation July 15th one

and one half miles of cable road. It is built under patents of H. M. Lane, M.E.

THE MILWAUKEE (Wis.) CITY RY. Co. will extend their track four blocks, to the Base Ball Park. They are relaying most of their fifteen miles double track with 45 pound steel rails and cobble stone paving.

THE BROWNELL & WRIGHT CAR COMPANY, St. Louis, have just closed with the Louisville City Railway, Louisville, Ky., for the equipment of their new line, the contract calling for cars finer in finish than any now in use.

LOS ANGELES, (Cal.) has three new street railways, viz:—The Main Street and Agricultural Park Railway; the Central Railroad, and the Boyle Heights Railroad. The City Railroad Co., of that city intend to extend their line three miles.

THE HARLEM BRIDGE, MORRISAINA AND FORDHAM Railway Co. of this city, have just completed a double track on east 138th street, from No. 3rd ave. to Long Island Sound, and are now purchasing the equipment to operate the new line.

THE BROWNELL & WRIGHT CAR COMPANY, St. Louis, have now in course of completion cars for Canton, Ohio; Little Rock, Ark.; Galesburg, Ill.; Oshkosh, Wis., and Louisville, Ky., besides those for four different companies in St. Louis.

WORK was commenced May 1, on the Aushnet Street Railway; also on the Lorimer street and Greenpoint Ferry Railroad. Mr. William P. Craig, the contractor, writes us he expects to have both roads completed and running by June fifteenth.

THE NASHVILLE AND EDGEFIELD STREET RAILWAY Co. are thinking of replacing their sixteen pound iron rails with sixteen or twenty pound steel rails. They own a suburban park, base ball ground, etc., which they make attractive to the public.

THE SOUTH BROOKLYN CENTRAL CITY RAILROAD Co. will change their line from Hamilton to South Ferry via Atlantic Avenue, and by transfer, take passengers for one fare to Hamilton, Wall Street, Fulton and Catherine Ferries, or to the bridge.

THE WALES MFG. Co., SYRACUSE, N. Y. has recently filled orders for their new fare boxes, for Metropolitan R. R. Co., Washington, D. C., Lombard & South Street R. R. Co., Phila., and the Harlem Bridge, Morrisania & Fordham St. Railway Co., of New York.

THE BOURBON COUNTY STREET RAILROAD Co., Fort Scott, (Kan.) is for sale, on account of the poor health of the owner. He will build an extension of two miles this season if he does not find a purchaser at once. It is a good opening for a live horse railroad man.

THE STREET RAILWAY from Waterford to Cohoes (N. Y.) has been leased to and is operated by the Troy and Lansingburgh R.R. Co. The latter company has completed a new stable and will replace their old iron with steel rails on about two miles of their road.

M. M. WHITE & COMPANY, New York, among recent orders have made White Automatic Switches for the Atlantic Ave-

nue, Brooklyn, Brooklyn City, Second Avenue, New York and Union, of Providence. The firm has some interesting work in progress in New York.

THE BROOKLYN CITY RAILROAD Co. has contracted with Mr. Joseph Campbell for new stables and other conveniences, to be erected at the corner of Halsey street and Broadway. They are to be completed by Sept. 1st, and will be among the most complete and comfortable buildings of that class in the country.

THE WINNIPEG STREET RAILWAY Co., Manitoba (Can.) is the only street railway in Manitoba or the North Western Territories. They are building a double track on Main street, also block paving it. The street is 132 feet wide and the tracks are twenty feet apart, with the sewer between the tracks.

THE CENTRAL RAILROAD Co., of San Francisco (Cal.) contemplate making a cable road of their two-horse line, three miles. They are running parallel with and in opposition to four cable roads. The cable roads all pay. While the company using horses make as good time they are losing money.

THE CITIZENS' ST. RY. Co. recently organized in Rochester, New York, have elected the following officers: Pres. Wm. H. Jones; Sec. and Treas. J. E. Pierpont. S. A. Green, for two years past superintendent of the Rochester City & Brighton road, was the originator of the scheme and will probably be the superintendent.

THE BROWNELL & WRIGHT CAR COMPANY, St. Louis, have recently shipped to the Minneapolis Street Railway of Minneapolis, Minn., some of the most elegantly finished street cars now in service. The interior finish of these cars was mahogany and other choice woods, relieved by beveled plate glass mirrors. The effect was rich and elegant.

THE BEAVER VALLEY STREET RAILWAY Co. is a new company, chartered Sept. 22d, 1884. They broke ground May 5th and will complete their road, three and one-tenth miles in length, and equipment this season. M. L. Knight is superintendent of construction of buildings, and J. C. Whittle, superintendent of construction of the road.

THE BROWNELL & WRIGHT CAR COMPANY, St. Louis, have just completed an equipment of summer cars for the Olive Street line, St. Louis, one of the most important in the city. They are also building the cars or the new line to Forest Park, as well as those for the new cable line now in process of construction; also some summer cars for the Bellefontaine Road.

THE WOODLAND AVE. & WEST SIDE ST. R.R. Co. of Cleveland, O. have recently completed a slated roofed frame barn for one hundred horses; and added three open cars to their rolling stock. The cars are twenty-four foot length, manufactured by J. M. Jones' sons, West Troy, N.Y. Among other improvements, the company will build a one mile track extension and relay two miles of track in June.

THE JERSEY CITY AND BERGEN (N. J.) R. R. Co. will during this summer lay about 450 tons of steel rail, which they have on hand. About one third of this quantity will be used in new construction, and the rest in repairs. It is expected to erect new stable, car house, etc., at Greenville, N. J., with stalls for 200 horses, during the summer. The company's equipment will then be increased.

THE MONTGOMERY (ALA.) STREET RAILWAY COMPANY is in receipt of eight new cars, four coaches and four open cars, which will be put to work at once. The fare will be five cents to any part of the city. The track is laid and ready for business, from the Union Depot to the Cemetery gate—a distance of one mile. The route is up Commerce street on Dexter Avenue, thence to Madison street, and thence east to the cemetery.

"THE JOHN STEPHENSON COMPANY, Limited," have at the New Orleans Exposition a tram car (close) excelling, it is claimed, all former street cars, for which the jury have made the following awards: tram car (close), medal of first class; tram car conductor's telephone, medal of first class; tram car, with ventilating ceiling, medal of first class; tram car window sash with metal and rubber stiles, medal of first class; tram car adjustable brake handle, honorable mention.

THE 42D STREET, ST. NICHOLAS AND MANHATTANVILLE line has displaced its one-horse cars from the Grand Central Depot to 72d Street, and put on two-horse cars of the best make. They are patronized beyond the expectations of the directors. They expect to run through to Manhattan (the "ville" is no longer "good form") in about two weeks. Immediately after this event the company will extend the line from 129th Street, Manhattan, via St. Nicholas Avenue and 11th Street to the Astoria Ferry, and the recently discarded one-horse cars will be put on that section of the line.

THE SIXTH AVE. R. R., of New York City, is pronounced by people who are qualified to judge, to be a model of excellent management. Its car service is frequent and regular, its cars are filled with all the new devices which enhance the comfort and convenience of passengers, and its conductors and drivers are obliging and well disciplined. The President, Mr. Curtis, is a vigorous and trenchant business man, but he is also courteous, approachable, and popular. Mr. E. E. Moore, late of the Belt Line, brings to his new position, as Superintendent, (succeeding Mr. Bidgood) the railway experience and training of a life time. "Wait," he says, "'till the 'Star Eyed Goddess of Reform' has a chance to get a good hold of her new broom and the Sixth ave. shall be the best street railway in the world."

THE CHICAGO (ILL.) HORSE & DUMMY R. R. Co., incorporated in 1883, have commenced track laying and have the track down on Adams Street from Fifth Avenue to the river on the east side and from Clinton to Des plains Street on the west side. On Des plains Street the track is laid from Adams to Harrison Street and they began track

laying on Harrison Street, May 25. The line of road is on Adams Street from Clark to Des plains south, on Des plains to Harrison west, on Harrison to Western Avenue south, on Western Avenue to Twelfth Street west, on Twelfth Street to Crawford Avenue, (City limits). The road is equipped with the Johnston Rail, standard gauge. The officers so far elected are: D. L. Huff, Pres., E. R. Bliss, Sec., A. C. Calkins, Tres. Total length of track is about five miles. It is said that the stockholders are among Chicago's most prominent capitalists and that there is no stock for sale. The equipments, aside from ties and rails, have not yet been contracted for though bids are being received at this writing. The cars are to be of the latest style and the whole road equipped according to the latest improvements in street railway building.

BROADWAY SURFACE RAILWAY, N. Y. C.—After years and years of fighting, Mr. Jacob Sharp is at last getting his surface road on Broadway. Quoting from the *Morning Journal* of May 25: "Only the down track is being laid, and it is expected that it will be down before the end of two weeks. Then the up track will be laid and a connection established from the Battery to Central Park. The Broadway track will join that of the present Broadway road at Fourteenth Street, and through cars will be run to the terminus at Fifty-ninth Street.

"As soon as the new road is running, probably by August 1, the Broadway stages will become a thing of the past. They will all be sold and with them will vanish one of the relics of old New York. Summer travellers will probably encounter the old 'bus with its time honored pictures of Dexter and Mississippi steamboat races at mountain retreats and sea beaches hundreds of miles from the pavements which they made hideous for so many long years.

"The stage-drivers, too—that peculiar class of Jehus, some of whom have rolled up and down Broadway for a generation or more and can point out every celebrated or notorious promenade—will have to descend from their lofty perches and handle the brake, where their proverbial skill with the ribbons will be of little use to them.

"Some twelve hundred stage-horses will also be adopted by the railroad company, and perhaps half of the number will be retained. When the cars jingle up and down, Broadway will be a strange thoroughfare for a day or so to the crowds and then things will resume their normal condition."

Wm. Wharton, Jr., of Philadelphia, has the tract contract.

Electric Motors in New York.

SOME DELAYS, BUT NOW NEARLY READY.

"We had hoped to have the Manhattan car at the Edison works, No 104 Goerck street, ready for exhibition before this," said Mr. Johnson, of the Electric Railway Company, of the United States. "Its completion is only a question of a few days. The Eames Vacuum Brake Company caused us a little delay by new requirements for their apparatus. The rails for the third rail from Chatham square to the Harlem river and back are now being delivered, but the strike at Scranton delayed them somewhat. Our generating station near Second avenue, in Twenty-fifth street, will be ready for use before we need it. The boilers and engines I accepted as satisfactory yesterday.

I will not name the precise date for starting an electric motor on the Second avenue 'L,' but June is the month for the event, I am confident."

Reminiscence of Street Railway Beginnings in New York City.

A GENTLEMAN of this city, a veteran in experience and connection with Street Railway affairs, recently gave a representative of the STREET RAILWAY JOURNAL some of his early reminiscences:

"I remember," said he, "when I could buy stock in the Third ave., Sixth ave., Second ave., or Belt Line for 15 cents. on a dollar." "Those were times," he continued, "when the President of the Belt Line had to come over to my office on Saturday's to borrow \$1,500 or \$2,000 for a few days to pay off with—and they were then in doubt as to whether it would not be best to relinquish the undertaking and close things up. The Second ave. line was a long time in a moribund condition. The brothers Wm. and J. O'Brien, Bankers, of Wall St., were then largely interested in the road. One of the brothers proposed to withdraw from it and pass their investment over to profit and loss, but the other said, no, let us hold on and help it out, and we shall live to see the day that the stock will bring par. They advanced the road \$600,000 and the result showed their financial sagacity and foresight."

The Allen Elevated Railroad.

At Rockaway Beach there is now on exhibition a working model of the Allen Elevated Railroad, invented by Norman Allen. He has invented a car propelled by a spring for a short distance route, and for long distances he uses a bicycle engine for motive power. The trains are run on an elevated double track, with only a single rail to each train. Between the two tracks is an upright frame surmounted by a double-grooved rail, on either side of which runs a wheel attached to the upper side of the car. The car wheels are mounted on swivels which enables them to round almost any curve. The propelling springs are placed in the centre of the car and are calculated with one winding to drive it from one station to the next. Each station will have a small stationary engine, which by cable attachment, will start the train and propel it for about 20 feet, during which time the springs will be rewound by a pinion attachment, working in the teeth of a beam arm at the side of the track. The superstructure for the road is to be erected on a single line of posts made of 4-inch tubing. Among the benefits claimed for the invention are light running expenses, lack of noise and jar, ability to surmount heavy grades without additional weight on the tracks, and to round curves at a high rate of speed without increase of friction. The tracks for long distance roads are to be constructed the same as for the city roads. The bicycle engine will weigh less than ten tons, and is to be constructed with a 15-foot driving wheel running between the two boilers. The driving shaft works over the boilers. With a bicycle engine on an Allen track the inventor expects to cover the ground at the rate of two miles a minute. The uprights for the structure are supplied with a device which enables them to be easily raised or lowered in case their foundations settle.—*New York Times.*

An interesting interview with George Francis Train, on his efforts to introduce tramways in Europe, and kindred topics is unavoidably crowded out. It will appear in our next.

OFFICIAL LIST OF THE STREET RAILWAYS IN THE UNITED STATES & CANADA.

Compiled from data furnished the editors of "The Street Railway Journal," by the officers of the various roads.

[The following is a complete list of the Street Railways of the United States and Canada, so far as we have received the official returns from the various roads. We hope to receive returns from all those roads unreported, in season for our next issue and prefer to publish the list as it stands to completing it from the present inaccurate lists and directories. Will those roads unrepresented kindly fill out the blanks sent them and mail to us without delay so that they may be properly represented in the July STREET RAILWAY JOURNAL.]

ABBREVIATIONS—m, miles; g, gauge; lb r, pounds rail to the yard; c, cars; h, horses; mu, mules.

Officer's address are the same as the road unless otherwise specified.

AKRON, O.—Akron St. Ry. & Herd Co. 2½ m, 6c, 31 h. Pres. Ira M. Miller, V. Pres. James Christy, Treas. B. L. Dodge, Sec. F. M. Atterholt, Supt. John T. Metlin.

ALBANY, N. Y.—Watervliet Turnpike R.R. Co. 7½ m, 26-45 lb r, 27 c, 143 h. Pres. Chas. Newman, Sec. & Treas. P. Way, Supt. M. C. Foster.

The Albany Ry. 9-3-5 m, 4-8 g, 33-47 lb r, 42 c, 191 h. Pres. and Treas. John W. McNamara, Sec. Jas. H. Manning, Supt. Alfred Egerton.

ALLENTOWN, PA.—Allentown Pass. R.R. Co. 3½ m, 6 c, 22 h. Pres. Samuel Lewis, Treas. & Sec. Joseph E. Ballett, Supt. Russel A. Thayer.

ALTON, ILL.—Alton & Up. Alton Horse Ry. Co.

ALTOONA, PA.—City Pass. Ry. Co. of Altoona. 3½ m, 5-3 g, 43 lb r, 17 c, 38 h. Pres. John P. Levan, Sec. & Treas. L. B. Reiffsnelder, Supt. John J. Buch.

AMSTERDAM, N. Y.—Amsterdam St. Ry. Co. 1½ m, 4-8 g, 25 lb r, 3 c, 10 h. Pres. Henry Herrick, Treas. David Cady, Sec. M. L. Stover.

ANNISTON, ALA.

ASHTABULA, O.—Ashtabula City Ry. Co. 4 m, 4-8½ g, 49 lb r, 6 c, 60 h. Owner & Prop. Jno. N. Stewart.

ATCHISON, KAN.—Atchison St. Ry. Co. 5½ m, 4-8½ g, 20-30 lb r, 19 c, 60 h. Pres. & Gen. Man. J. H. Beeson, Treas. H. M. Jackson, Sec. J. P. Adams.

ATLANTA, GA.—West End & Atlantic R.R. Co. 2m, 4-8½ g, 20 lb r, 6 c, 34 mu. Pres. J. D. Turner, V. Pres. T. L. Langston, Sec. & Treas. B. H. Brumhead, Man. & Purch. Agt. Jno. S. Brumhead.

Gate City St. R.R. Co. 2½ m, 4-8½ g, 16 lb r, 7 c, 26 h. Pres. L. B. Nelson, V. Pres. L. DeGlive, Sec. & Treas. John Stephens, Solicitor, A. Remharat.

Atlanta St. R.R. Co.

Metropolitan St. R.R. Co.

ATLANTIC, N. J.—Atlantic City Ry. Co.

AUBURN, N. Y.—Auburn & Owasco Lake R.R. Co. 1½ m, 4-8½ g, 23-30 lb r, 3c, 12 h. Pres. D. M. Osborne, Sec. & Treas. C. B. Koster, Supt. B. F. Andrews.

East Genesee & Seward Ave. Ry. Co. 1½ m, 4-8½ g, 30 lb r, 6 c, 25 h. Pres. David M. Osborne, Sec. & Treas. C. B. Fosters, Supt. B. F. Andrews.

AUGUSTA, GA.—Augusta & Somerville R.R. Co.

AURORA, ILL.—Aurora City Ry. Co. 5 m, 4-8½ g, 28 lb r, 7 c, 10 h, 30 mu. Pres. H. H. Evans, V. Pres. S. W. Thatcher, Sec. A. J. Hopkins, Treas. E. W. Truth, Supt. J. B. Chattee.

BABYLON, N. Y.—Babylon Horse R.R. Co. 1½ m, —g, —lb r, 2 c, 3 h. Pres. W. F. Norton.

BALTIMORE, MD.—Baltimore & Powhatan Ry. Co. 6 m, 5-4½ g, 4 c, 17 h. Pres. & Treas. E. D. Freeman, Sec. R. B. Clark, Supt. I. M. Ketricck.

Baltimore City Pass. Ry. Co. 40 m, 5-4½ g, 46 lb r, 15 c, 1000 h. Pres. Oden Bowie, Treas. John Bolgian, Sec. S. L. Bridge.

Central Ry. Co. 5½ m, 5-6 g, 40 lb r, 22 c, 180 h. Pres. Peter Thompson, Sec. & Treas. Walter Blakistone.

Baltimore & Catonsville Ry. Co.

Baltimore & Halls Spring R.R. Co.

Baltimore & Pimlico & Pikesville R.R. Co.

Baltimore Union Pass. Ry. Co.

Citizen's Ry. Co. 20 m, 5-4½ g, 46 lb r, 34 c, 360 h. Pres. Jos. S. Hagarty, Treas. Wm. S. Hammersley, Supt. C. C. Speed.

Monumental City Ry. Co.

North Baltimore Passenger Ry. Co.

People's Pass. Ry. Co. 6½ m, 5-4½ g, 42 45 lb r, 30 c, 200 h. Pres. R. E. Hamilton, Treas. Gustavus Ober, Sec. Supt. & Pur. Agt. Wm. A. House, Jr. Office, Fort Ave. & Johnson St. Soon move to Druid Hill Ave.

York Road R.R. Co.

BATTLE CREEK, MICH.—Battle Creek Ry. Co. 5 m, 3-6 g, 28 lb r, 8c, 18 h, 3 mu. Pres. & Owner, A. J. White, V. Pres. H. H. Brown, Sec. Chas. Thomas, Supt. John A. White.

BAY CITY, MICH.—Bay City St. Ry. Co. 7½ m, 4-8½ g, 18 lb r, 13 c, 35 h. Pres. James Clements, Treas. Wm. Clements, Sec. Edgar A. Cooley.

BEAVER FALLS, PA.—Beaver Valley St. Ry. Co. 3½ m, (now building). Pres. M. L. Knight, Sec. & Treas. J. F. Merriman, Supt. of Construction, J. C. Whitta.

BELLAIRE, O.—Bellaire St. R.R. Co.

BELLEVILLE, ILL.—Citizen's Horse Ry. Co.
BELLEVILLE, ONT., CAN.—Belleville St. R.R. Co.

BEREA, O.—Berea St. Ry. Co. 1½ m, 3-6 g, 28 lb r, 2 c, 2 h. Pres. C. W. D. Miller, V. Pres. T. Chinchward, Sec. & Treas. A. H. Pomeroy, Supt. A. W. Bishop.

BINGHAMPTON, N. Y.—Washington Street & State Asylum R.R. Co. 4½ m, 4 g, 16-25 lb r, 13 c, 23 h. Pres. B. H. Meagley, V. Pres. Geo. Whitney, Sec. C. O. Root, Treas. F. E. Ross.

Binghampton & Port Dickinson R.R. Co. 5 m, 4-8½ g, 20-30 lb r, —c, —h. Pres. Harvey Westcott, Sec. & Treas. G. M. Harris, Supt. N. L. Osborn. (Leased to Mr. Osborn).

Main, Court & Chenango St. R.R. 5 m, 4-8g, 40 lb r, 10 c, 25 h. Supt. & Lessee, N. L. Osborn.

Binghampton Central R.R. Co. 3½ m (2½ lald), 3 g, 28 lb r, 6 c (not in operation). Pres. Geo. L. Crandall, V. Pres. Nelson Stow, Sec. & Supt. Chas. O. Root, Treas. H. J. Kneeland.

BIRMINGHAM, ALA.—Birmingham St. Ry. Co. 3½ m, 4-8 g, 16 lb r, 4 c, 12 m. Pres. B. F. Roden, Sec. & Treas. J. H. Williams.

BLOOMFIELD, N. J.—Newark & Bloomfield R. R.

BLOOMINGTON, ILL.—Bloomington & Normal Horse Ry. Co.

BOONE, IOWA—Boone & Boonsboro St. Ry. Co. 1½ m, 3 g, 20 lb r, 3 c, 10 h. Pres. L. W. Reynolds, Treas. T. B. Hodges, Sec. & Supt. A. B. Hodges.

BOONSBORO, IOWA.—Twin City & Des Moines River Motor St. Ry. Co.

BOSTON, MASS.—Highland St. Ry. Co. 19 m, 4-8½ g, 50 lb r, 187 c, 925 h. Pres. Moody Merrill, Clerk, R. B. Fairbairn, Treas. Samuel Little, Supt. J. E. Rugg.

Metropolitan R.R. Co. 80 m, 4-8 g, 50 lb r, 700 c, 3,600 h. Pres. C. A. Richards, Sec. H. R. Harding, Treas. Chas. Boardman. Office, 16 Kilby St.

Middlesex R.R. Co. 26 m, 4-8½ g, 50 lb r, 150 c, 700 h. Pres. Chas. E. Powers, Treas. & Supt. John H. Studley. Address, 27 Tremont Row, Boston.

Lynn & Boston. 25½ m, 114 c, 514 h. Pres. A. F. Breed, Treas. & Sec. E. F. Oliver, Supt. E. C. Foster.

So. Boston Ry. Co. 13 m, 4-8½ g, 42-50-60 lb r, 193 c, 900 h. Pres. Chas. H. Hersey, V. Pres. Jas. C. Davis, Sec. & Treas. Wm. Reed, Supt. Daniel Colledge.

BRADFORD, PA.—Bradford & Kendall R.R. Co. 1½ m, 4-8½ g, 38 lb r, 3 c, 4 h. Pres. James Brodey, Sec. N. B. Parsons, Gen. Man. & Supt. Enos Parsons.

BRIDGEPORT, CONN.—The Bridgeport Horse R.R. Co. 5 m, 4-8½ g, 42 lb r, 14 c, 70 h. Pres. Albert Eamer, Sec. & Treas. F. Hurd, Supt. B. F. Lashar.

BROCKTON, MASS.—Brockton St. Ry. Co. 3½ m, 14 c, 56 h. Pres. W. W. Cross, Treas. & Sec. Z. C. Keith, Supt. H. B. Rogers.

BROOKLYN, N. Y.—The Atlantic Avenue R. Co. of Brooklyn. 24½ m, 4-8 g, 60 lb r, 244 c, 882 h. Pres. William Richardson, Sec. W. J. Richardson, Treas. Newburg H. Frost.

Broadway R.R. Co. 10-1-10 m, 4-8½ g, 45-50-60 lb r, 166 c, 657 h. Pres. Edwin Beers, Sec. & Treas. Robert Sealey, Supt. Joshua Crandall.

Brooklyn Cross Town R.R. Co. 8 m, 4-8½ g, 40-60 lb r, 72 c, 400 h. Pres. Henry W. Slocum, V. Pres. Ezra B. Tuttle, Sec. & Treas. John R. Connor, Supt. D. W. Sullivan.

Bushwick R.R. Co. 20 m, 4-8½ g, 45-50-60 lb r, 172 c, 600 h. Pres. Frank Cromwell, V. Pres. Wm. H. Husted, Treas. & Sec. S. D. Hallowell, Supt. Wm. M. Morrison.

The Brooklyn, Brushwick & Queens County R.R. 6 m, 4-8½ g, 42-47 lb r, 41 c, 117 h. Pres. Richard H. Green, V. Pres. James W. Elwell, 59 South St. N. Y. Sec. John D. Elwell, Treas. Wm. W. Greene.

Brooklyn City R.R. Co. 44 m, 4-8½ g, 60 lb r, 761 c, 3,045 h. Pres. William H. Hazzard, V. Pres. William M. Thomas, Sec. & Treas. Daniel F. Lewis, Asst. Sec. Francis E. Wrigley.

Coney Island and Brooklyn R.R. Co. 11-2-5 m, 45 lb r, 4-8½ g, 103 c, 316 h. Pres. James Jourdan, Sec. Ed. F. Drayton, Supt. William Parrell.

Brooklyn City & Newtown R.R. Co. 11 m, 4-8½ g, 45-60 lb r, 128 c, 419 h. Pres. Louis Fitzgerald, N. Y. City, Sec. & Treas. H. A. Schuz, Supt. H. W. Bush.

Coney Island, Sheepshead Bay & Ocean Avenue R.R. Co. Pres. A. A. McClemer, V. Pres. Daniel Mone, Sec. John McMahon, Sheepshead Bay, Treas. Horace Valkuliyh.

Grand St. & Newtown R.R. Co. 8½ m, 4-8½ g, 45-50 lb r, 67 c, 238 h. Pres. Martin Joost, Sec. & Treas. Wm. E. Horwill, Supt. Walter G. Howey.

Grand Str et, Prospect Park & Flatbush R.R. Co. 4½ m, 4-8½ g, 50 lb r, 75 c, 244 h. Pres. Louis Fitzgerald, 120 Broadway, N. Y. Sec. & Treas. Duncan B. Cannon, Supt. Jno. L. Heins.

The New Williamsburgh & Flatbush R. R. Co. 6½ m, 4-8½ g, 47-50 lb r, 74 c, 255 h. Pres. Geo. W. Van Allen, 54 Ann St. New York, Sec. W. B. Waitt, 34th St. & 9th Ave. New York, Treas. C. B. Cottrell, 8 Spruce St., N. Y. City, Supt. Chas. E. Harris, Norderum Ave. & Canal St. Brooklyn.

Prospect Park & Flatbush R.R. 1½ m, 4-8½ g, 34 lb r, 70 c, 260 h. Pres. Loftis Wood, Sec. & Treas. Sam'l Parkhill, Supt. Loftis Wood.

Calvary Cemetery, Greenpoint & Brooklyn Ry. Co. Crosstown Line, Hamilton Ferry to Bridge.

Prospect Park & Coney Island R.R. Co. 4-7-10 m, 45-50 lb r, 4-8½ g, 69 c, 214 h. Pres. A. K. Culver, Treas. A. C. Washington, Sec. George H. Smith, Eng. Supt. R. Schermerhorn, Supt. Robert Attlesley.

Van Brunt St. & Erie Basin R.R. Co. 1½ m, 4-8½ g, 45 lb r, 7 c, 24 h. Pres. John Cunningham, Sec. & Treas. Edmund Terry.

Greenpoint & Lorimer St.

South Brooklyn Central R.R. Co. 7 m (4½ m lald), 4-8½ g, 60 lb r, 42 c, 192 h. Pres. Wm. Richardson, Sec. Wm. J. Richardson, Treas. N. H. Frost, Supt. James Kuddy.

The Union Railway Co. of the City of Brooklyn (not in operation).

BRUNSWICK, GA.—Brunswick St. R.R. Co.

BUFFALO, ILL.—See Mechanicsburg, Ill.

BUFFALO, N. Y.—Buffalo St. R.R. Co. 17½ m, 4-8½ g, 50 lb r, 96 c, 510 h. Pres. Henry M. Watson, V. Pres. P. P. Pratt, Sec. S. S. Spaulding, Treas. W. H. Watson, Supt. Edward Edwards.

Buffalo East Side St. R.R. Co. 24-4-5 m: 4-8½ g, 42 lb r, 47 c, 218 h. Pres. S. S. Spaulding, V. Pres. Joseph Churchyard, Sec. H. M. Watson, Treas. W. H. Watson, Supt. Edward Edwards.

BURLINGTON, IA.—Burlington City R.R. Co.

Union St. Ry. Co.

CAIRO, ILL.—Cairo St. R.R. Co.

CAMBRIDGE, MASS.—Cambridge R.R. Co. 43 m, 4-8½ g, 50 lb r, 245 c, 1,410 h. Pres. Prentiss Cummings, Treas. & Clerk, F. T. Stevens, Exec. Com. I. M. Simpson, P. Cummings, O. S. Brown, Clerk of Directors, O. S. Brown, Supt. Wm. A. Bancroft.

Charles River St. Ry. Co. 10-4-5 m, 2-8½ g, 50 lb r, 50 c, 330 h. Pres. Chas. E. Raymond, Corp. Clerk, C. E. Harden, Treas. Daniel U. Chamberlain, Supt. John N. Akarman.

CAMDEN, N. J.—Camden & Atlantic St. Ry.

Camden Rorse R.R. Co. 9 m, 5-1 g, 35-47 lb r, 26 c, 85 h. Pres. Thos. A. Wilson, Sec. Wilbur F. Rose, Treas. & Supt. John Hood.

CANTON, O.—Canton St. R.R. Co. (new road.)

CAPE MAY, N. J.—Cape May & Schellenger, Landing Horse R. R.

CARTHAGE, MO.

CEDAR RAPIDS, IA.—Cedar Rapids & Marion St. Pass. Ry. Co.

CHAMPAIGN, ILL.—Champaign R.R. Co.

Urbana & Champaign St. R.R. Co. (See Urbana.)

CHARLESTOWN, S. C.—Charlestown City Ry. Co. 8½ m, 4-8½ g, 38-42 lb r, 22 c, 84 h. Pres. Jno. S. Kiggs, Treas. Ewan Edwards, Sec. Frank Whelden, Supt. Jno. Mohlenhoff.

Enterprise R.R. Co. 12 m, 5 g, 42 lb r, 14 c, 51 h. Pres. A. F. Ravenel, Sec. & Treas. U. E. Hayne, Supt. T. W. Passalalgere.

CHATTANOOGA, TENN.—Chattanooga St. R. R. Co. 2½ m, 4-8½ g, 16-25 lb r, 8 c, 50 h. Pres. J. H. Warner, Sec. C. R. Gaskill, Supt. A. B. Wingfield.

CHESTER, PA.—Chester St. Ry. Co. 5½ m, 5-2½ g, 12 c, 70 h. Pres. Richard Peters, Jr., Solicitor, Geo. B. Lindsay, Treas. Sam'l A. Dyer, Sec. E. M. Cornell.

CHICAGO, ILL.—Chicago City Ry. Co. 87 m, 4-8½ g, 45 lb r, 567 c, 1,416 h, cable doing work of 2,500 h. Pres. C. B. Holmes, Sec. H. H. Windsor, Treas. T. C. Pennington, Supt. C. B. Holmes.

Chicago West Division Ry. Co. 40 m, 4-8½ g, 40 lb r, 620 c, 3,425 h. Pres. J. R. Jones, Sec. George L. Webb, Supt. Jas. K. Lake.

North Chicago City Ry. Co. 35 m, 4-8½ g, 45 lb r, 316 c, 1,700 h. Pres. & Gen. Supt. V. C. Turner, V. Pres. Jacob Rehn, Sec. & Treas. Hiram Crawford, Supt. of Track & Construction, Augustine W. Wright, Asst. Supt. Fred L. Thredy, Supt. Horse Dept. Robt. Atkins, Purch. Agt. John W. Roach, Master Mechanic, J. Miller.

CHILlicothe, O.—Chillicothe St. R.R. Co. 1½ m, 3 g, 16 lb r, 7 c, 10 h. Pres. E. P. Safford, Sec. A. E. Wenis, Treas. William Polanel, Supt. Ewel McMartin.

CINCINNATI, O.—Cincinnati Inclined Plane Ry. Co. 3 m, 5-2½ g, 43 lb r, 24 c, 150 h. Pres. Geo. A. Smith, Sec. & Supt. James M. Doherty, Treas. Jos. S. Hill.

Columbia & Cincinnati St. R.R. Co. 3½ m, 3 g, 35 lb r, 3 c, 6 dummy c. Pres. C. H. Kilgour, V. Pres. John Kilgour, Treas. B. F. Branman, Sec. A. H. Meier, Mt. Lookout, O. Supt. J. J. Henderson, Mt. Lookout, O.

Cincinnati St. Ry. Co. 98 m, 5-2½ g, 43 lb r, 254 c, 1,815 h. Pres. John Kilgour, Sec. & Aud. James A. Collins, Treas. R. A. Dunlap, Con. Eng. F. R. Wetzeneker, Supt. John Harris.

Cincinnati & Mount Auburn R.R. Co.

Mt. Adams & Eden Park Inclined R.R. Co. 3½ m, 5-2½ g, 42 lb r, 40 c, 320 h. Pres. & Treas. J. P. Kerper, Sec. J. R. Murdoch, Supt. Chas. Whitlin.

So. Covington & Cincinnati. (See Covington, Ky.) South Side St. Ry. Co.

St. Clair Street Ry. Co.

West Side R.R. Co.

CLEVELAND, O.—The Brooklyn St. R.R. Co. 8½ m, 4-8½ g, 52 lb r, 66 c, 375 h. Pres. Tom. L. Johnson, V. Pres. A. J. Moxham, Sec. J. B. Hoegen, Treas. John McConnell, Supt. A. L. Johnson.

Broadway & Newburg St. R.R. Co. 6 m, 4-8½ g, 10 c, 160 h. Pres. & Supt. Joseph Stanley, V. Pres. Sam'l Andrews, Sec. & Treas. E. Fowler.

The East Cleveland R.R. Co. 20 m, 4-8½ g, 35-40 lb r, 92 c, 450 h, 1 electric motor. Pres. A. Everett, V. Pres. Chas. Wason, Sec. & Treas. H. A. Everett, Supt. E. Duty. Offices, 1154 & 1158 Euclid Ave.

Superior St. R.R. Co. 15 m, 4-8½ g, 45 lb r, 46 c, 225 h. Pres. Frank De H. Robison, V. Pres. John Koch, Sec. Treas. & Supt. M. S. Robison, Jr.

Woodland Avenue & West Side St. R.R. Co. 17 m, 4-8½ g, 43 lb r, 100 c, 550 h. Pres. M. A. Hanna, V. Pres. C. F. Emery, Sec. J. B. Hanna, Gen. Supt. George G. Mulhen.

CLINTON, IOWA—Lyons & Clinton Horse R.R. Co. (See Lyons.)

COLUMBUS, GA.—Columbus St. R.R. Co. 3 m, 4-8½ g, 16 lb r, 6 c, 25 h. Pres. Cliff B. Grimes, Sec. L. G. Schnessler, Treas. N. N. Curtis, Supt. J. A. Gaborgh.

COLUMBUS, O.—Columbus Consolidated St. R.R. Co. 19 m, 5-2 g, 30-16 lb r, 83 c, 350 h. Pres. A. Rodgers, V. Pres. H. T. Chittenden, Sec. & Treas. E. K. Stewart, Supt. J. H. Atcherson.

Glenwood & Greenlawn St. R.R. Co. 4½ m, 3-6 g, 24 lb r, 9 c, 25 c. Pres. A. D. Rodgers, V. Pres. R. S. Brown, Sec. R. S. Rokey, Treas. S. S. Rickley, Supt. Jonas Wilcox.

CONCORD, N. H.—Concord Horse R.R. Co.

CORTLAND, N. Y.—Cortland & Homer Horse Ry. Co. 4 m (2½ laid), 4-8½ g, 25-30 lb r. Pres. Chas. H. Garrison, Troy, N. Y. Sec. J. M. Milne, Treas. S. E. Welch, Supt. S. E. Welch. (Leased to D. N. Miller.)

COUNCIL BLUFFS, IA.—Council Bluffs St. R.R. Co.

COVINGTON, KY.—So. Covington & Cincinnati St. Ry. Co. 17½ m, 5-2½ g, 43 lb r, 46 c, 296 h. Pres. E. F. Abbott, Sec. S. C. Buntion, Treas. G. M. Abbott.

DALLAS, TEX.—Dallas St. Ry. Co. 4½ m, 4-8½ g, 20-38 lb r, 12 c, 4 h, 72 mu. Pres. Wm. J. Keller, Sec. Harry Keller, Supt. C. E. Keller.

Commerce & Way St. R.R.
DANVILLE, ILL.—Citizens' St. Ry. Co. 4 m, 4 g, 20 lb r, 7 c, 35 mu. Pres. Wm. I. Cannon, V. Pres. & Gen. Man. Wm. Stewart, Sec. & Treas. Adam P. Samuel.

DAVENPORT, IA.—Davenport Central St. R.R. Co. 2½ m, 4-8½ g, 20 lb r, 10 c, 30 h. Pres. James Grant, Supt. R. A. McGughlin.

Davenport City Ry. Co.
Brady St. Ry. Co.
DAYTON, KY.—Newport & Dayton St. Ry. Co. 2 m, 5-2½ g, 44 lb r, 9 c, 36 h. Pres. & Supt. W. W. Bean.

DAYTON, O.—Dayton St. R.R. Co. 3½ m, 4-8½ g, 44 lb r, 23 c, 66 h. Pres. J. W. Stoddard, V. Pres. H. S. Williams, Sec. B. Clegg, Supt. A. W. Anderson.

Oakwood St. Ry. Co. 3-1-3 m, 4-8½ g, 38 lb r, 13 c, 60 h. Pres. Charles B. Clegg, Sec. M. P. Moore, Supt. Wm. Davis.

The Wayne & Fifth St. R.R. Co. 3 m, 4-8½ g, 34-38 lb r, 5 c, 30 h. Pres. Geo. M. Shaw, Sec. & Treas. Eugene Winchet, Supt. N. Routhahn.

DECATUR, ILL.—Decatur Horse Ry. Co.

Citizens' Street R.R. Co.

DEERING, ME.—See Portland.

DENNISON, TEX.—Dennison St. Ry. Co.

DENVER, COL.—Denver City Ry. Co. 16 m, 3-6 g, 16 lb r, 50 c, 250 h. Pres. Geo. H. Holt, 10 Wall St. New York City, Sec. G. D. Lhuillier, 10 Wall St. New York City, Treas. & Man. G. E. Randolph.

DES MOINES, IA.—Des Moines St. Ry. Co. 10 m, 3 g, 25-30-38-52 lb r, 18 c, 100 h. Pres. M. P. Turner, Sec. M. A. Turner.

Des Moines & Sebastopol St. Ry. Co.

DETROIT, MICH.—Fort Wayne & Elmwood Ry. Co. 6 m, 4-8½ g, 45 lb r, 30 c, 180 h. Pres. H. B. Brown, V. Pres. Edward Kanter, Treas. George B. Pease, Sec. N. W. Goodwin, Supt. Geo. S. Hazard.

Grand River St. Ry. Co. 2½ m, 4-8½ g, 43 lb r, 13 c, 110 h. Pres. & Treas. Jos. Dailey, Sec. J. W. Dailey, Supt. C. M. Dailey.

Detroit City Ry. Co.

DOVER, N. H.—Dover Horse R.R. Co. 2-2-5 m, 3 g, 30 lb r, 4 c, 14 h. Directors, Z. S. Wallingford, Chas. H. Sawyer, Jas. E. Lothrop, C. W. Wiggins, Harrison Haley, Frank Williams, Cyrus Littlefield, Treas. Cyrus Littlefield.

DUBUQUE, IA.—Dubuque St. R.R. 5 m, 4-8½ g, 21 c, 45 h. Pres. J. A. Rhonberg, Sec. & Treas. B. E. Linehan, Supt. J. J. Linehan.

DULUTH, MINN.—Duluth St. Ry. Co. 3 m, 3-6 g, 30 lb r, 6 c, 7 h, 31 mu. Pres. A. S. Chase, V. Pres. O. P. Stearns, Sec. & Treas. L. Mendenhall, Supt. & Pur. Agt. W. T. Hoopes.

EAST OAKLAND, CAL.—Oakland, Brooklyn & Fruitvale R.R. Co.

EAST SAGINAW, MICH.—Street R. R. Co. of East Saginaw. — m, 4-8½ g, 30 lb r, 14 c, 35 h. Pres. & Supt. W. J. Barton, Sec. W. H. Hark, Treas. J. B. Peter.

EAST ST. LOUIS, ILL.—East St. Louis St. R.R. Co.

EASTON, PA.—The Easton & So. Easton Passenger Ry. Co. 1½ m, 5-2½ g, 45 lb r, 4 c, 20 h. Pres. H. A. Gage, Sec. & Treas. H. W. Cooley, Supt. Ellsha Burwell, So. Easton.

The West End Passenger Ry. Co.

EAU CLAIRE, WIS.—Eau Claire City Ry. Co.

ELGIN, ILL.—Elgin City Ry. Co.

ELIZABETH, N. J.—Elizabeth & Newark Horse R.R. Co. 14 m, 5-2½ g, 4-10½ g, 30 lb r, 24 c, 74 h. Pres. & Treas. Jacob Davis, Sec. & Supt. John P. Pritchard.

ELKHART, IND.—Elkhart City R.R. Co.

ELMIRA, N. Y.—The Elmira & Horseheads Ry. Co. 9-2-3 m, 4-8½ g, 25-30-40 lb r, 18 c, 24 h. Pres. & Treas. George M. Diven, V. Pres. Geo. W. Hoffman, Sec. Wm. S. Kershner, Supt. Henry C. Silsbee.

EL PASO, TEX.—El Paso St. Ry. Co.

EMPORIA, KAN.—Emporia City Ry. Co. 3½ m, 5 g, 20 lb r, 6 c, 23 m. Pres. Van. R. Holmes, Treas. A. F. Crowe, Sec. & Man. J. D. Holden.

ENTERPRISE, MISS.—Enterprise St. Ry. Co. 1¼ m, 3-6 g, 24 lb r, 2 c, 6 h. Pres. John Kampe, V. Pres. E. B. Gaston, Sec. & Treas. Jno. Gaston.

ERIE, PA.—Erie City Passenger Ry. Co. 4 m, 13 c, 46 h. Pres. Wm. W. Reid, Treas. J. C. Spencer, Sec. Titus Berst, Supt. Jacob Berst.

EUREKA SPRINGS, ARK.—Eureka Springs City Ry. Co.

EVANSVILLE, IND.—Evansville St. Ry. Co. 12 m, 4-8 g, 28 lb r, 31 c, 190 mu. Pres. John Gilbert, Sec. P. W. Raleigh, Treas. John Gilbert, Supt. W. Bahr.

FALL RIVER, MASS.—Globe St. Ry. Co. 12 m, 4-8½ g, 40-46-47 lb r, 40 c, 160 h. Pres. Wm. H. Jennings, Treas. F. W. Brightman, Sec. M. G. B. Swift, Supt. John H. Bowker, jr.

FORT SCOTT, KAN.—Bourbon County St. Ry. Co. 1 m, 4 g, 22 lb r, 2 c, 4 m. Pres. Isaac Iradden, V. Pres. Benj. Files, Sec. Wm. Perry, Treas. J. H. Randolph.

FORT SMITH, ARK.—Fort Smith St. Ry. Co. 2 m, 3-6 g, 16-28 lb r, 5 c, 16 h. Pres. Sam'l M. Loud, Sec. & Treas. Geo. T. Sparks.

FORT WAYNE, IND.—Citizens' St. R.R. Co.

FORT WORTH, TEX.—Fort Worth St. Ry. Co. 7½ m, 4 g, 25-38 lb r, 16 c, 73 m. Pres. K. M. Vanzandt, Treas. W. A. Hoffman, Acting Sec. & Gen. Man. S. Mims.

FRANKFORT, N. Y.—Frankfort & Ilion Street Ry. Co. 2½ m, 5 g, 4 c. Pres. A. C. McGowan, Frankfort, Sec. D. Lewis, Ilion, Treas. P. Remington, Ilion, Supt. Fredk. Gates, Frankfort.

FREDONIA, N. Y.—Dunkirk & Fredonia R.R. Co. 3½ m, 4-10 g, 25 lb r, 5 c, 8 h. Pres. Wm. M. McKinstrey, Sec. & Treas. M. N. Fenner, Supt. Z. Elmer, Wheelock.

GAINESVILLE, FLA.—Gainesville St. Ry.

GAINESVILLE, TEX.—Gainesville St. Ry. Co.

GALESBURG, ILL.—Galesburg Horse R.R. Co.

GALVESTON, TEX.—Galveston City R.R. Co.

GLOUCESTER, MASS.—Gloucester City R.R.

GRAND RAPIDS, MICH.—Street Ry. Co. of Grand Rapids, Mich. 13 m, 4-8½ g, 30-35 lb r, 21 c, 175 h. Pres. C. A. Otis, Cleveland, O. V. Pres. L. H. Withey, Grand Rapids, Treas. M. S. Crosby, Grand Rapids, Sec. J. M. Weston, Grand Rapids, Asst. Sec. Jas. Plekand, Cleveland, O.

GREEN CASTLE, IND.—Green Castle City St. Ry. Co. 2 m, 4-8½ g, 23 lb r, 3 c, 12 h. Pres. & Supt. D. Rogers, Sec. James S. Nutt, Treas. Budolph Rogers.

GREENVILLE, S. C.—Greenville City Ry. Co. 1 m, 5 g, — lb r, 5 c, 20 h. Proprietors, Gilreath & Harris.

HAMILTON, O.—The Hamilton St. Ry. Co. 4 m, 3 g, 28 lb r, 11 c, 12 h. Pres. James F. Griffin, Sec. O. V. Parrish, Treas. H. L. Morey, Supt. J. C. Bigelow.

HANNIBAL, MO.—Hannibal St. Ry. Co. 2 m, 4-8½ g, 16-36 lb r, 6 c, 22 h. Pres. & Supt. M. Doyle, Sec. & Treas. James O. Hearn.

HARRISBURGH, PA.—Harrisburgh City Passenger Ry. Co. 2½ m, 5-2½ g, 42-47 lb r, 15 c, 36 h. Pres. H. A. Kelker, V. Pres. Daniel Eply, Sec. John T. Ensminger, Treas. R. F. Kelker, Supt. S. B. Reed.

HARTFORD, CONN.—Hartford & Wethersfield Horse R.R. Co.

HAVERTHILL, MASS.—Haverhill & Groveland St. Ry. Co. 4½ m, 4-8½ g, 30 lb r, 10 c, 19 h. Pres. Jas. D. White, Treas. John A. Colby, Supt. L. R. Mitchell.

HELENA, ARK.—Helena St. Ry. Co.

HERKIMER, N. Y.—Herkimer & Mohawk St. Ry. Co. 1½ m, 4-8½ g, 25 lb r, 3 c. Pres. J. M. Anshen, Sec. Joab Small, Treas. H. D. Alexander.

HOBOKEN, N. J.—North Hudson County Ry. Co. 16½ m, 4-7 g, 50-60 lb r, 116 c, 630 h. Pres. John H. Bonn, Sec. F. J. Mallory, Treas. Fredk. Mickel, Union, Supt. Nicholas Goetz, Union.

HOLYOKE, MASS.—Holyoke St. Ry. Co. 2 m, 4-8½ g, 35 lb r, 8 c, 24 h. Pres. Wm. A. Chase, Treas. C. Fayette Smith, Supt. H. M. Smith.

HOT SPRINGS, ARK.—Hot Springs R.R. Co. 3 m, 4 g, 25 lb r, 11 c, 30 h. Pres. S. W. Fordyce, Sec. C. E. Maurice, Supt. J. L. Butterfield.

HOUSTON, TEX.—Houston City St. Ry. Co. 13 m, 4-8½ g, 20-30-40 lb r, 40 c, 118 m. Pres. Wm. H. Sinclair, Galveston, V. Pres. & Gen. Man. H. F. McGregor, Houston, Supt. Henry Friend, Houston, Sec. & Treas. F. J. DeMeritt, Galveston.

HUTCHINSON, KAN.—Hutchinson St. Ry. Co.

HYDE PARK, ILL.—Ewing Avenue Horse Ry. Co.

ILION, N. Y.—Frankfort & Ilion Ry. Co. 2½ m, 5 g, 25 lb r, 4 c, 6 h. Pres. A. C. McGowan, Sec. D. Lewis, Treas. F. Remington, Supt. Frederick Gates.

INDIANAPOLIS, IND.—Citizens' St. Ry. Co. 35 m, 4-8½ g, 20-33-40-52 lb r, 70 c, 530 h. Pres. A. W. Johnson, Indianapolis, Treas. Tom L. Johnson, Cleveland, O. Sec. A. A. Anderson, Indianapolis, Man. W. T. Steele, Indianapolis, Auditor, P. Woodridge, Louisville, Ky.

IRVINGTON, N. J.—Newark & Irvington R.R. Co.

JACKSON, MICH.—Jackson City Ry. Co. — m, — g, — lb r, 11 c, 40 h. Pres. Hiram H. Smith, Treas. Samuel Hopewell, Gen. Supt. Henry H. Smith.

JACKSON, MISS.—Jackson Street Ry. Co.

JACKSON, TENN.—Jackson Street Ry. Co.

JACKSONVILLE, FLA.—Pine St. R.R. Co. 2½ m, 5 g, 25 lb r, 4 c, 18 m. Owner & Gen. Man. G. H. Backinstae, Sec. & Treas. F. W. Backinstae.

JACKSONVILLE, ILL.—Jacksonville Ry. Co.

JAMAICA, N. Y.—Jamaica & Brooklyn R.R. Co. 9 m, 4-8½ g, 45-57 lb r, 24 c, 31 h. Pres. Aaron A. DeGrauw, Sec. Martin J. Durea, Treas. Morris Fosl-dick, Supt. Wm. M. Scott.

JAMESTOWN, N. Y.—Jamestown St. Ry. Co. 2 m, 4-8½ g, 30-42 lb r, 7 c, 9 h. Pres. John T. Wilson, Sec. C. R. Lockwood, Treas. John Langford, Supt. John F. Wilson.

JERSEY CITY, N. J.—Jersey & Bergen R. R. Co. 21 m, 4-10 g, 60 lb r, 73 c, 494 h. Pres. Chas. B. Thurston, V. Pres. Wm. Keeney, Treas. C. B. Place, Sec. Warren E. Dennis, Newark, Supt. Thos. M. Sayre.

Pavonia Ferry Ry. Co.

JOHNSTOWN, N. Y.—The Johnstown, Gloversville & Kingsboro Horse R.R. Co. 5½ m, 4-8½ g, 26 lb r, 6 c, 16 h. Pres. James Younglove, V. Pres. R. Fancher, Sec. & Treas. I. M. Law.

JOHNSTOWN, PA.—Johnstown Pass. R.R. Co. 6½ m, 5-3 g, 41-43 lb r, 13 c, 56 h. Pres. James McMillen, Sec. B. L. Yeagley, Treas. W. H. Rosenslect, Jr.

JOPLIN, MO.—

KALAMAZOO, MICH.—Kalamazoo St. Ry. Co. 10 m, 4-8½ g, 35 lb r, 28 c, 80 h. Pres. Fred Bush, Sec. J. W. Boynton, Treas. P. H. Brown.

KANSAS CITY, MO.—Kansas City Cable Ry. Co. 2½ m, 4-8½ g, 45 lb r, 10 pass. cars, 10 dummy cars. Pres. Wm. J. Smith, Sec. W. H. Lucas, Eng. Robert Gillham.

Corrigan Consolidated St. Ry. Co. 20 m, 4-1 g, 30 lb r, 80 c, 350 h. Pres. Bernard Corrigan, Gen. Man. Thos. Corrigan, Sec. Jas. T. Kelley.

Jackson County Horse R. R. Co.

Kansas City & Rosedale St. Ry. Co.

Kansas City & Westport St. R.R. Co.

KEOKUK, IA.—Keokuk St. Ry. Co. 4 m, 4-8½ g, 27 lb r, 10 c, 42 h. Pres. Jas. H. Anderson, V. Pres. Jos. G. Anderson, Sec. R. Anderson, Treas. & Supt. W. Z. Anderson.

KINGSTON, ONT., CAN.—Kingston St. R.R. Co. ¾ m, 3-6 g, 9 lb r, 10 c, 36 h. Pres. Robert Carson, Sec. & Treas. F. Sargent, Man. William Wilson.

KNOXVILLE, TENN.—Knoxville St. Ry. Co. 2 m, 4-8½ g, 22 lb r, 5 c, 2 hacks, 30 h. Pres. W. W. Woodruff, Sec. Treas. & Supt. T. L. Beaman.

LACONIA, N. H.—Laconia & Lake Village Horse R.R. Co. 3 g, 34 lb r, 5 c, 17 h. Pres. A. G. Folsom, Treas. Edmund Little, Man. Bela S. Kenniston.

LA CROSSE, WIS.—City Ry. Co. of La Crosse. 2½ m, 4-9 g, 24 lb r, 5 c, 16 h, 3 mu. Pres. Geo. F. Gund, V. Pres. B. E. Edwards, Sec. Mills Tourtel-lotte, Treas. Fred Tillman, Gen. Supt. Joseph Tu-teur, Supt. Geo. F. Smith.

La Crosse St. Ry. Co.

LAFALETTE, IND.—LaFayette St. Ry. Co. 2½ m, 4-8½ g, 35 lb r, 6 c, 38 h. Pres. F. B. Caldwell, LaFay-ette, Sec. & Treas. E. G. Jones, Decatur, Ill. Supt. F. Greer, LaFayette.

LAKE CITY, FLA.—Lake City St. Ry. Co.

LAMPASAS SPRINGS, TEX.—Lampasas St. Ry. Co.

LANCASTER, PA.—Lancaster & Millerville St. Ry. Co.

Lancaster City St. Ry. Co.

LARCHMONT, N. Y.—Larchmont Manor Co. 1 m, 4-8 g, 25 lb r, 2 c, 8 h. Pres. C. H. Murray, Treas. S. H. French, 38 East Fourteenth St. N. Y. City.

LAWRENCE, KAN.—Lawrence Transportation Co. 3½ m, 4-1 g, 38 lb r, 7 c, 30 h. Pres. H. Tisdale, Sec. W. H. Bangs.

LAWRENCE, MASS.—Merrimack Valley Horse R.R. Co. 5-4-5 m, 4-8½ g, 48 lb r, 20 c, 70 h. Pres. Wm. A. Russell, V. Pres. James Walton, Methuen, Clerk & Treas. James C. Eaton, Supt. A. N. Kimball, Lawrence.

LEWISTON, ME.—Lewiston & Auburn Horse R.R. Co. 7½ m, 4-8½ g, 32 lb r, 16 c, 45 h. Pres. Frank W. Dana, Lewiston, Clerk, H. C. Little, Lewiston, Treas. H. C. Packard, Auburn, Supt. E. P. Stinch-field, Auburn.

LEXINGTON, KY.—Lexington City Ry. Co. 5 m, 4-10 g, 20 lb r, 20 c, 85 h. Pres. John Cross, V. Pres. C. R. Diver, Sec. & Supt. Bert. Cross.

LEXINGTON, MO.—Lexington St. Ry. Co.

LIMA, O.—Lima St. Ry. Co.

LINCOLN, NEB.—Capital City Ry. Co.

LITTLE ROCK, ARK.—Little Rock St. Ry. Co. Citizens' St. Ry. Co. 4½ m, 4-10 g, 20 lb r, 22 c, 80 h. Pres. John Cross, Sec. and Treas. F. C. Reed, Supt. C. K. Diver.

Hot Springs St. Ry. Co.

LOGANSPORT, IND.—2 m, 4 g, 23 lb r, 6 c, 29 mu. Pres. Frank H. Joselyn, Sec. M. Jacques, Supt. Wm. P. Jacques. Office, Urbana, Ill.

LONDON, CAN.—London St. R.R. Co. 3 m, 4-8½ g, 30 lb r, 12 c, 30 h. Pres. V. Cronga, Sec. Jas. H. Flock, Supt. Henry Thos. Smith.

LONG ISLAND CITY, N. Y.—Steinway & Hunter's Point R.R. Co. 26½ m, 4-8½ g, 47 lb r, 60 c, 150 h. Pres. Wm. Steinway, Steinway Hall, N. Y. City. V. Pres. Henry A. Cassebeer, Jr., Steinway, P. O., Long Island City, N. Y. Sec. & Treas. Chas. F. Traubar, Steinway Hall, N. Y. City.

Long Island City & Newtown Ry. Co. 3 m, 4-8½ g, 45-55 lb r, 25 c, 60 h. Pres. Isaac Buchanan, N. Y. City, Sec. Geo. S. Crawford, Brooklyn, N. Y. Treas. Patrick J. Gleason, Supt. Michael Conway.

Dutch Kills & Hunter's Point R.R. — m, — g, — lb r, — c, — h. Pres. R. J. Gleason.

LONGVIEW, TEX.—Longview & Junction St. Ry. Co. 3 m, 3-6 g, 2 c, 4 h. Pres. F. T. Renteria, Sec. R. B. Levy, Treas. F. L. Whaley, Supt. C. W. Booth.

LOS ANGELES, CAL.—Boyle Heights R.R. Co. Los Angeles & Aliso Ave. St. R.R. Co. City R.R. of Los Angeles. 4½ m, 4-8½ g, 36 lb r, 9 c, 75 h. Pres. I. M. Hellman, V. Pres. W. J. Broditch, Sec. John O. Wheeler, Supt. W. H. Hawks. Main St. & Agricultural Park R.R. Central R.R. Co. Sixth & San Fernando St. R.R. Co.

LOUISVILLE, KY.—Kentucky St. Ry. Co. 5 m, 5-2 g, — lb r, 22 c, — h. Pres. T. J. Minary, Sec. & Treas. Thos. Donigan. Central Pass. R.R. Co. Louisville City Ry. Co. Crescent Hill Ry. Co.

LOWELL, MASS.—Lowell Horse R.R. Co. 6 m, 4-8½ g, 28-47 lb r, 28 c, 100 h. Pres. Wm. E. Livingston, Gen. Man. J. A. Chase.

LYNCHBURG, VA.—Lynchburg St. R.R. Co. 2 m, 5-1 g, 26 lb r, 6 c, 31 h. Pres. Stephen Adams, Treas. John L. Adams, Supt. William M. Payne.

LYONS, IA.—Clinton & Lyons Horse Ry. Co. 4½ m, 3-8 g, 19-30 lb r, 15 c, 40 h. Pres. D. Joyce, V. Pres. & Man. R. N. Rand.

MACON, GA.—

MADISON, IND.—Madison St. Ry. Co. 2½ m, 4 g, 15 lb r, 7 c, 8 h, 10 m. Pres. Jacob Wendle, V. Pres. Peter F. Robertus, Supt. & Treas. Chas. F. Tuttle.

MADISON, WIS.—Madison St. Ry. Co. 2½ m, 3 g, 23 lb r, 6 c, 24 h. Pres. E. W. Keyes, Sec. Jas. R. Zearing, Treas. Lucius Clark.

MANCHESTER, N. H.—Manchester Horse R.R. 4½ m, 3-½ g, 27-34 lb r, 12 c, 41 h. Pres. S. N. Bell, Treas. Frederick Smyth, Clerk, J. A. Weston, Supt. A. Q. Guage.

MARYSVILLE, CAL.—City Pass, R.R. Co. (No returns.)

MECHANICSBURG, ILL.—Mechanicsburg & Buffalo Ry. Co. 3½ m, 3-10 g, 16 lb r, 3 c, 4 mu. Pres. J. N. Fullenwelder, Treas. A. T. Thompson, Sec. J. T. Fullenwelder.

MEMPHIS, TENN.—Memphis City R.R. Co.

MERIDIAN, MISS.—Meridian St. Ry. Co. 1½ m, 4-8 g, 16 lb r, 3 c, 12 h. Pres. J. J. Shannon, V. Pres. J. L. Handley, Sec. R. M. Houston.

MIDDLETOWN, O.—Middletown & Madison St. Ry. Co.

MILLERSVILLE, PA.—Lancaster & Millersville St. R.R. Co.

MILWAUKEE, WIS.—Cream City R.R. Co. 8-1-6 m, 4-8½ g, 27-38 lb r, 74 c, 307 m, 2 h. Pres. Winfield Smith, V. Pres. Christian Pressner, Treas. Ferdinand Knehn, Sec. Wm. Damkoehler, Supt. Henry Berg.

Milwaukee City Ry. Co. 15 m, 4-8½ g, 27 lb r, 75 c, 430 h. Pres. Peter McGeoch, Sec. & Treas. Geo. O. Wheatcroft.

West Side St. Ry. Co.

MINNEAPOLIS, MINN.—Minneapolis St. Ry. Co. 45 m, 3-6 g, 27-35-45 lb r, 146 c, 725 h and mu. Pres. Thos. Lowry, V. Pres. C. Morrissey, Treas. W. W. Herrick, Sec. & Supt. C. G. Goodrich.

MOBILE, ALA.—City R.R. Co. 17½ m, 5-2 g, 36-70 lb r, 68 c, 240 h. Pres. John Maguire, Sec. I. Strauss, Treas. Myer I. Goldsmith, Supt. A. Moog.

Dauphin & Lafayette St. Ry. Co. 2 m, 5-2½ g, 40 lb r, 9 c, 22 h. Pres. D. P. Bestor, V. Pres. G. Y. Overall, Sec. & Treas. James W. Gray, Pur. Agt. & Man. J. G. Robertson.

Mobile & Spring Hill R.R. Co.

MOHAWK, N. Y.—Mohawk & Ilion R.R. Co. 1½ m, 4-8½ g, 30 lb r, 4 c (contract for motive power). Pres. O. W. Bronson, V. Pres. John Brown, Sec. H. D. Alexander, Treas. R. M. Devendorff, Supt. O. W. Bronson.

MOLINE, ILL.—Fifteenth Street River R.R. Co. Moline & Rock Island St. Ry. Co. — m, — g, — lb r, — c, — h. Pres. J. Hamilton, Sec. I. M. Butord, Treas. C. Lyons, Supt. Wm. Gamble.

Moline Centre St. Ry. Co. — m, — g, — lb r, — c, — h. Pres. S. W. Wheelock, Sec. Chas. Hemingway.

MONTREAL, CAN.—Montreal City Pass. Co. 21 m, 4-8½ g, — lb r, 76 c, 465 h. Pres. Jesse Joseph, V. Pres. Wm. Smith, Sec. & Man. Ed. Tusher, Supt. T. H. Robillard.

MOULTREEVILLE, S. C.—Middle St. & Sullivan's Landing Ry.

MUSKOGON, MICH.—Muskegon Ry. Co. 4½ m, 3-6 g, 20 lb r, 8 c, 26 h, 8 mu. Pres. F. A. Nims, V. Pres. Chas. Merriam, Boston, Mass. Sec. Thomas Munroe, Treas. G. R. Sherman, Supt. C. H. Newell.

NASHUA, N.H.—Nashua St. Ry. Co.

NASHVILLE, TENN.—Nashville & Edgefield R.R. Co. Fotherland Street Railway Co. North Edgefield and Nashville St. R.R. Co., one management. 5 m, 5 g, 16 lb r, 21 c, 100 h. Pres. John C. Bramford, Sec. Percy Kennard, Supt. Jno. T. Voss.

South Nashville St. R.R. Co. 4½ m, 5 g, 16-20 lb r, 10 c, 68 h. Pres. W. M. Duncan, Sec. Treas. & Supt. C. L. Fuller.

McGavock & Mt. Vernon Horse R.R. Co. Nashville D. & N. St. R.R. Co.

NEVADA, MO.—Nevada Street Ry. Co.

NEW ALBANY, IND.—New Albany St. Ry. Co. 6 m, 4-11 g, 25 lb r, 15 c, 50 h. Pres. Geo. T. Vance, Sec. G. Vance, Treas. Letitia V. Vredenburgh, Supt. Wm. L. Timberlake.

NEWARK, N.J.—The Newark & Bloomfield St. R.R. Co. 7 m, 5-2½ g, 47 lb r, 22 c, 140 h. Pres. S. S. Battin, Sec. W. L. Mulford, Supt. H. F. Totten.

Broad St. R.R.

NEW BEDFORD, MASS.—New Bedford & Fairhaven St. Ry. Co. 7½ m, 4-8½ g, 35-40 lb r, 38 c, 138 h. Pres. Warren Ladd, Treas. Andrew G. Pierce, Clerk Edward T. Pierce.

Acushnet St. R.R. Co., (not in operation.) Pres. Chas. E. Cook, Sec. & Treas. A. P. Smith.

NEWBURYPORT, MASS.—Newburyport & Amesbury Horse R.R. Co. 6-1-3 m, 12 c, 54 h. Pres. W. A. Johnson, Treas. N. H. Shepard, Sec. Geo. H. Stevens.

NEW HAVEN, CONN.—Fair Haven & Westville R.R. Co. 7 m, 4½ g, 42 lb r, 23 c, 151 h. Pres. H. B. Ives, Sec. & Treas. G. Cander, Supt. Walter A. Graham.

State Street Horse R.R. Co. 2½ m, 4-8 g, 43 lb r, 4 c, 40 h. Pres. C. A. Warren, Sec. & Treas. C. C. Blatchen.

The Whitney Ave. Horse Ry. 2½ m, 4-8½ g, 25 lb r, 3 c, 25 h. Pres. Geo. H. Watsons, Sec. George D. Watson, Treas. Eli Whitney, Jr.

New Haven & Centreville Horse R.R. Co. 2½ m, 4-8½ g, 42 lb r, 4 c, 30 h. Trustee Cornelius Pierpont.

NEW ORLEANS, LA.—Canal & Claiborne St. R.R. Co. 13 m, 5-2½ g, 37 lb r, 40 c, 200 h. Pres. E. J. Hart, Sec. & Supt. John H. DeGrange.

St. Charles St. R.R. Co. 15 m, 5-2½ g, 35 lb r, 60 c, 366 m. Pres. & Supt. Alden McLellan, Sec. Vincent Riviere.

Crescent City R.R. Co. 26 m, 5-2½ g, 35-45 lb r, 90 c, 400 h. Pres. Frank Roder, Sec. & Treas. Jno. J. Juden, Supt. A. F. Smith.

New Orleans & Carrollton R.R. Co. 8 m, 4-8½ g, 30-45 lb r, 65 c, 200 h, 19 engines. Pres. Wm. Benthuysen, Sec. Walter F. Crouch, Supt. C. V. Halle.

New Orleans City & Lake R.R. Co. 64 m, 5-2½ g, 46-40 lb r, 180 c, 39 coaches, dummy engine, 1050 mu. Pres. J. A. Walker, Sec. W. E. Leverich, Supt. F. Wintz.

New Orleans St. R.R. Co.

NEWPORT, KY.—Newport St. R.R. Co.

NEW YORK, N.Y.—Ninth Ave. R.R. Co. 8 m, 4-8½ g, 60 lb r, 45 c, 380 h. Pres. W. H. Hays, Sec. & Treas. James Affleck, Supt. Herman B. Wilson.

The Second Ave. R.R. Co. 13 m, 4-8½ g, 60 lb r, 316 cars, 1750 h. Pres. W. Thorn, V. Pres. J. Wadsworth, Sec. & Treas. J. B. Underhill.

Sixth Ave. R.R. Co. 4 m, 4-8½ g, 60 lb r, 127 c, 1296 h.

South Ferry Ry. Co. ½ m, 4-8 g, 60 lb r, 13 c, 41 h. Pres. Henry Hart, Sec. Wm. N. Cohen, Treas. Albert J. Elias, Supt. Chas. H. Weeks.

The Third Ave. R.R. Co. 13½ m, 4-8½ g, 60 & 74 lb r, 318 c, 2150 h. (3½ m of cable road on 10th ave.) Pres. Lewis Lyon, 739 Madison ave., V. Pres. Henry Hart, 110 Tribune Building, Sec. Alfred Lazarus, 436 W. 61st st., Treas. John Beaver, 211 E. 112th st., Supt. John H. Robertson, 307 E. 65th st.

Twenty-third St. R.R. Co. 7 m, 4-8½ g, 54 lb r, 102 c, 692 h. Pres. Jacob Sharp, Sec. Thos. H. McLean, Treas. Lewis May, Act-Supt. George Ferry.

New York City St. Ry. Co. 10 m, (not in operation) Pres. Loomis L. White, Sec. W. L. McCorkle, Treas. Wm. L. Skidmore.

Christopher & Tenth St. R.R. Co. 5 m, 4-8 g, 45 lb r, 47 c, 290 h. Pres. Jacob Sharp, Treas. W. T. Hatch, Sec. & Supt. George W. Lynch.

Eighth Ave. R.R. Co. 10 m, 4-8½ g, 60 lb r, 112 c, 1155 h. Pres. W. H. Hays, Sec. & Treas. James Affleck, Supt. H. B. Wilson.

Harlem Bridge, Morrisania & Fordham Ry. 4½ m, 4-8½ g, 45-60 lb r, 65 c, 233 h. Pres. Henry Sprafley, V. Pres. Richard M. Hoe, Sec. & Treas. Wm. Caldwell.

Jerome Park R.R. 1 m, 4-8½ g, 50-56 lb r. Pres. Leonard M. Jerome, Sec. Fred A. Lovcraft, Treas. Theodore Moss.

Houston, West Street & Pavonia Ferry R.R. Co. 5 m, 4-8½ g, 60 lb r, 50 c, 400 h. Pres. Richard Kelly, Sec. & Treas. Daniel B. Hasbrook.

Central Park North & East River R.R. Co. 14 m, 4-8½ g, 60 lb r, 162 c, 1,225 h. Pres. J. H. Scribner, V. Pres. C. D. Wyman, Sec. H. H. Scribner, Treas. J. L. Valentine, Supt. M. W. A. Harris.

New York & Harlem R.R. Co. 7 m, 4-8½ g, 56-75 lb r, 122 c, 1,321 h. Pres. W. H. Vanderbilt, V. Pres. & Sec. Cornelius Vanderbilt, Treas. Ed. V. W. Rosstter, Supt. Alfred Skitt.

Broadway & Seventh Ave. R.R. Co. 6 m, 4-8½ g, 47-60 lb r, 150 c, 1,350 h. Pres. James W. Foshay, Sec. & Treas. Thos. B. Kerr, Supt. Henry A. Newell.

Central Crosstown R.R. Co. 2½ m, 4-8½ g, 52 lb r, 42 c, 231 h. Pres. John B. Slawson, V. Pres. A. Cammack, Sec. M. J. Masson, Treas. John L. Macaulay.

Forty-Second Street & Grand Street Ferry R.R. Co. 5½ m, 8-4 g, 64 lb r, 50 c, 500 h. Pres. Chas. Curtis, Sec. & Treas. E. S. Allen, Supt. John M. Calhoun.

Dry Dock, East Broadway & Battery R.R. Co. 11½ m, 4-8½ g, 60 lb r, 187 c, 1,132 h. Pres. William White, Auditor E. T. Landon, Sec. & Treas. Richard Kelly, Supt. Fred F. White. Offices 605, Grand st.

NIAGARA FALLS.—Niagara Falls & Suspension Bridge Ry. Co. 2½ m, 4-8½ g, 33-42 lb r, 8 c, 36 h. Pres. Benj. Flagler, V. Pres. Alva Chich, Sec. W. J. Mackay, Treas. A. Schoellkopf.

NORFOLK, VA.—Norfolk & City R.R. Co. 3½ m, 5-2 g, 44 lb r, 18 c, 65 h. Pres. John B. Whitehead, Treas. H. C. Whitehead, Supt. E. W. Savage.

NORTHAMPTON, MASS.—Northampton St. Ry. Co. 3½ m, 4-8½ g, 32 lb r, 7 c, 26 h. Pres. Oscar Edwards, Sec. M. H. Spaulding, Treas. & Sup. E. C. Clark.

NORWALK, CONN.—Norwalk Horse R.R. Co. 2 m, 4-10 g, — lb r, 7 c, 20 h. Pres. James W. Hyatt, V. Pres. & Sec. Edwin G. Hoyt, Sup. James W. Hyatt.

NORWICH, CONN.—Norwich Horse R.R. Co.

OAKLAND, CAL.—Alameda, Oakland & Piedmont R.R. Berkley Villa R.R. Broadway & Piedmont St. R.R. Co.

Fourteenth St. R.R. Co. Oakland R.R. Co.

OGDEN, CITY, UTAH.—Ogden City Ry. Co. 3 m, 4-8½ g, 20 lb r, 4 c, 21 h. Pres. L. W. Shurtleff, Ogden City, V. P. & Supt. O. P. Arnold, Salt Lake City, Sect. & Treas. H. S. Young, Ogden city.

OLCAN, N.Y.—Olcen St. Ry. Co. 1-1-10 m, 3-6 g, 25 lb r, 3 c, 8 h. Pres. M. B. Fobes, Sec. & Treas. M. W. Barse.

OMAHA, NEB.—Omaha Horse Ry. Co.

OSHKOSH, WIS.—Oshkosh St. R.R. Co. 3½ m, 4-8½ g, 27 lb r, 9 c, 24 h. Pres. Tom Wall, V. Pres. F. Zentner, Sec. & Treas. J. Y. Hull, Sup. P. L. Thompson.

OSWEGO, N.Y.—Oswego St. Ry. Co. 2 m, 4-8½ g, — lb r, 3 c, — h. Pres. Jas. T. Johnson, V. Pres. R. J. Oliphant, Sec. Harris L. Hart, Treas. Robt. G. Post. (Not in operation yet.)

OTTAWA, ONT.—Ottawa City Passenger Ry. Co. 3 m, 4-8½ g, 34 lb r, 1 c, 40 h. Pres. Thomas C. Keefler, V. Pres. R. Blackburn, Sec. James D. Traser.

OTTUMUA, IA.—Ottumua St. R.R. Co.

PADUCAH, KY.—Park R.R. Co.

PARIS, TEXAS.—Paris St. Ry. Co.

PATERSON, N.J.—Paterson & Passaic R.R. Co. Paterson City R.R. Co.

PENSACOLA, FLA.—Pensacola St. Ry. Co.

PEORIA, ILL.—Central City Horse Ry. Co. 4½ m, 4-8½ g, 40 lb r, 60 c, 135 h. Pres. H. R. Woodward, Sec. M. Pfeiffer, Treas. H. N. Wheeler, Supt. John Strong.

Fort Clark Horse Ry. Co. Peoria Horse Ry. Co. 7½ m, 4-8½ g, 40 lb r, 63 c, 140 h. Pres. H. Woodward, Sec. M. Pfeiffer, Treas. H. N. Wheeler, Supt. John Strong.

PETERSBURGH, VA.—Petersburgh St. Ry. Co. 3½ m, 4-8½ g, 42 lb r, 9 c, 44 h. George Beadle, Proprietor.

PHILADELPHIA, PA.—Citizens Pass. Ry. Co. 10½ m, 5-2 g, 45-47 lb r, 92 c, 420 h. Pres. John McCarthy, Sec. & Treas. John J. Adams, Supt. Sam'l Cline.

Frankford & Southwark Phila. City Pass. R.R. Co. 18-1-10 m, 5-2 g, 47 lb r, 91 c, 8 dummy c, 580 h. Pres. Henry Geiger, Sec. & Treas. Geo. L. Gaudy, Supt. W. H. Janney.

Hestonville Mantau & Fairmont Pass. R.R. Co. 20 m, 5-2 g, 43 lb r, 50 c, 480 h. Pres. Charles F. Lafferty, Sec. & Treas. W. C. Foster.

Lombard & South St. Pass. Ry. Co. — m, 5-2 g, 43 lb r, 51 c, 278 h. Pres. John B. Parsons, Sec. & Treas. Francis Hatzelhurst, Supt. Jno. M. Gaughen.

Peoples' Pass. Ry. Co. 41 m, 5-2 g, 47 lb r, 125 c, 1,080 h. Pres. C. J. Harrah, V. Pres. C. J. Harrah, Jr. Sec. & Treas. Jno. C. Dessoat, Supt. Wm. Hagenswiler.

Philadelphia City Pass. Ry. Co. 7 m, 5-2½ g, 47 lb r, — c, — h. Pres. Wm. W. Colket, Sec. & Treas. T. W. Pennypacker.

Philadelphia & Gray's Ferry Pass. R.R. Co. 10-1-3 m, 40 c, 200 h. Pres. Matthew Brooks, Treas. J. C. Dawes, Sec. J. Crawford Dawes, Supt. Patrick Lovett.

Seventeenth & Nineteenth St. Pass. Ry. Co. 7½ m. Pres. Matthew S. Quay, Sec. & Treas. John B. Peddle. (Leased to Philada. Traction Co.)

Philadelphia Traction Co. 109 m, 5-2½ g, 45-78 lb r, 595 c, 3,160 h. Pres. W. H. Kemble, V. Pres. P. A. B. Widener & W. L. Elkins, Sec. & Treas. D. W. Dickson.

Ridge Avenue Pass. Ry. Co. 14 m, 5-2 g, 47 lb r, 55 c, 352 h. Pres. E. B. Edwards, V. Pres. John Lambert, Sec. & Treas. Wm. S. Blight, Supt. William Ingles.

Second & Third Sts. Pass. Ry. Co. 37 m, 116 c, 669h. Pres. Alexander M. Fox, Treas. William F. Miller, Sec. Charles D. Matlack, Supt. David W. Stevens.

Thirteenth & Fifteenth St. Pass. Ry. Co. 14 m, 5-2 g, 43 lb r, 73 c, 452 h. Pres. Thos. W. Ackley, Sec. & Treas. Thos. S. Harris, Supt. Wm. B. Cooper.

Union Pass. Ry. Co. 70 m, 348 c, 1,724 h. Pres. Wm. H. Kemble, Sec. & Treas. John B. Peddle, Supt. Jacob C. Petty.

West Philadelphia Pass. Ry. Co. 18½ m, 122 c, 646 h. Pres. Peter A. B. Widener, Sec. & Treas. D. W. Dickson. (Leased by the Phila. Traction Co.)

Lehigh Ave. Pass. Co. Pres. John Lamont, Sec. Chas. A. Porter, Treas. John L. Hill. (Track not laid.)

PHILLIPSBURGH, N. J.—Phillipsburgh Horse Car Ry. Co. 2½ m, 4-8 g, 35 lb r, 4 c, 13 h. Pres. Daniel Runkle, Sec. & Treas. James W. Long.

PITTSBURGH, PA.—Central Pass R.R. Co. 3 m, 16 c, 95 h. Pres. J. F. Cluley, Sec. F. L. Stephenson, Treas. E. R. Jones, Supt. R. G. He ron.

Citizens' Pass. Ry. Co. 16½ m, 5-2½ g, 47 lb r, 40 c, 337 h. Pres. Jno. G. Holmes, Sec. C. M. Gormly, Supt. Murry Verner.

Federal St. & Pleasant Valley Pass. Ry. Co. 26 m, 5-2½ g, 46-50 lb r, 20 c, 154 h. Pres. Wm. H. Creery, Treas. James Boyle, Supt. Wm. J. Crozier, Allegheny City.

Pittsburgh, Allegheny & Manchester Pass. Ry. Co. 5 m, 5-2½ g, 46 lb r, 40 c, 275 h. Pres. Chas. Alwell, Sec. & Treas. Chas. Seibert, Supt. James C. Cotton.

Pittsburg & Birmingham Pass. R.R. Co. 3½ m, 5-2½ g, 48 lb r, 20 c, 170 h. Pres. W. W. Patrick, Sec. D. F. Agnew, Treas. John G. Holmes.

Pittsburg, Oakland & East Liberty Pass. Ry. Co. 11 m, 5-4½ g, 47 lb r, 32 c, 110 h, 61 mu. Pres. J. T. Jordan, Sec. John G. Traggardth, Treas. D. W. C. Bidwell, Supt. H. M. Cherry.

Pittsburg & West End Pass. Ry. Co. 2½ m, 13 c, 68 h. Pres. John Reilly, Sec. & Treas. Thomas S. Bigelow, Supt. William J. Burns.

Second Avenue Pass. Ry. Co.

Transverse Pass. Ry. Co. $6\frac{1}{2}$ m, 5-2 g, 52 lb r, 39 c, 243 h. Pres. C. L. Magee, V. Pres. C. F. Klopfer, Sec. & Treas. Wm. R. Ford, Supt. Miller Elliot.

South Side Pass. R.R. Co. $2\frac{1}{2}$ m, 13 c, 82 h. Pres. D. Z. Brickell, Sec. & Treas. W. T. Wallace, Supt. W. M. Rosborough.

Pittsburg Union Pass. R.R. Co. 5 m, 5-2 $\frac{1}{2}$ g, 45 lb r, 29 c, 170 h. Pres. James H. Sewell, Treas. J. J. McDonnell, Sec. Chas. Seibert, Pittsburg, Cash. Charles W. Goodnow, Supt. Joe S. Murray.

Pittsburg & Wilkinsburg St. Ry. Co.

Peoples' Park Pass. Ry. Co. 2 m, 5-2 $\frac{1}{2}$ g, — lb r, 10 c, 75 h. Pres. Wm. McCreery, Treas. James Boyle, Supt. Wm. J. Crozier, Allegheny City.

Beaver Falls & New Brighton Ry. Co.

PITTSBURGH, PA.—Pittston St. R.R. Co. $1\frac{1}{2}$ m, 3 c, 5 h. Pres. Thomas Griffith, Treas. M. W. Morris, Sec. William Allen.

PLATTSMOUTH, NEB.—Plattsmouth St. R.R. Co.

PORT HURON, MICH.—Port Huron St. Ry. Co.

PORTLAND, ME.—Ocean St. R.R. Co.

Portland R.R. Co. $7\frac{1}{2}$ m, 4-8 $\frac{1}{2}$ g, 30-33-45 lb r, 34 c, 154 h. Pres. H. J. Libby, Treas. & Gen. Man. E. A. Newman, Supt. Geo. W. Soule.

PORTSMOUTH, O.—Portsmouth St. R.R. Co. 2 m, 3-6 g, 18 lb r, 4 c, 10 h. Pres. James Skelton, Treas., Sec. & Supt. Enas Reed.

POTTSVILLE, PA.—Peoples' Ry. Co. $9\frac{1}{2}$ m, 16 c, 56 h.

POUGHKEEPSIE, N. Y.—City R.R. of Poughkeepsie. 3 m, 4-8 $\frac{1}{2}$ g, 35 lb r, 11 c, 38 h. Pres. Aaron Innis, V. Pres. G. B. Adrance, Sec. A. B. Smith, Treas. Hudson Taylor, Supt. C. M. Davis.

PROVIDENCE, R. I.—Union R.R. Co. 50 m, 4-8 $\frac{1}{2}$ g, 24-54 lb r, 240 c, 1,200 h. Pres. Jessie Metcalf, V. Pres. & Gen. Man. D. F. Longstreet, Sec. and Treas. C. A. Babcock, Aud. B. A. Jackson.

QUEBEC, CAN.—Quebec St. Ry. Co. 3 m: 4-8 $\frac{1}{2}$ g, 45 lb r, 9 c, 40 h. Pres. Chas. St. Michel, Quebec, V. Pres. G. Renfrew, Quebec, Sec. Treas. & Supt. Samuel Moore, Book-keeper, Francis Boomer.

Quebec R.R. Co.

St. John St. R.R.

QUINCY, ILL.—Quincy Horse Ry. & Carrying Co. 6 m, 5 g, 71 lb r, 21 c, 118 mu. Pres. Lorenzo Bull, Sec. C. H. Bull, Supt. E. K. Stone.

RACINE, WIS.—Belle City St. Ry. Co.

READING, PA.—Reading City Pass. Ry. Co. 2-1-5 m, 5-2 $\frac{1}{2}$ g, 45 lb r, 19 c, 44 h. Pres. B. F. Owen, V. Pres. Jas. E. Douglass, Sec. & Treas. H. A. Muhlenberg, Supt. J. A. Riggs.

Perkiomen Ave. Pass. Co. 2-1-5 m, 5-2 $\frac{1}{2}$ g, 45 lb r, 14 c, 36 h. Pres. Chas. Brenner, Sec. & Treas. Isaac Hester, Supt. John H. Houpp.

RED OAK, IA.—Red Oak St. R.R. Co. $1\frac{1}{2}$ m, 4-2 $\frac{1}{2}$ g, flat r, 2 c, 2 h, 2 mu. Pres. J. W. Judkins, V. Pres. Geo. West, Sec. F. M. Byrket, Treas. & Supt. F. O. Judkins.

RICHMOND, IND.—Richmond City Ry. Co.

RICHMOND, ILL.—Richmond St. R.R. Co.

RICHMOND, VA.—Richmond City Ry. Co. 7 m, 4-8 $\frac{1}{2}$ g, 60-40 lb r, 40 c, 180 h. Pres. J. H. Schooler, Sec. & Treas. F. D. Melen, Man. C. M. Bacton, Supt. Charles Sleders.

ROCHESTER, N. Y.—Rochester City & Brighton R.R. Co. 22 m, 4-8 $\frac{1}{2}$ g, 45 lb r, 120 c, 500 h. Pres. Patrick Barry, Sec. C. C. Woodworth, Treas. C. B. Woodworth, Supt. Thomas J. Brower.

Citizens' St. Ry. Co. Pres. Wm. H. Jones, Sec. & Treas. J. E. Pierpont, Supt. S. A. Green.

ROCKFORD, ILL.—Rockford St. Ry. Co. 6-2-5 m, 4-8 $\frac{1}{2}$ g, 30 lb r, 13 c, 52 h, 16 m. Pres. Anthony Haines, Sec. H. H. Robison, Treas. N. E. Lymann.

ROCK ISLAND, ILL.—Rock Island & Milan St. Ry. Co. 7 m, 4-8 $\frac{1}{2}$ g, 20-30-42 lb r, 10 c, 7 h. Pres. & Supt. Bally Davenport, Sec. E. H. Gayer, Treas. John Peety.

RONDOUT, N. Y.—Kingston City R.R. Co. 2-4-5 m, 4-8 $\frac{1}{2}$ g, 40 lb r, 10 c, 40 h. Pres. James G. Lindsey, V. Pres. S. D. Coykendall, Sec. & Treas. John C. Romeye, Supt. Wm. H. DeGarmo.

SACRAMENTO, CAL.—Sacramento City St. R.R. Co.

SAGINAW, MICH.—Saginaw St. R.R. Co. $2\frac{1}{2}$ m, 4-8 $\frac{1}{2}$ g, 42 lb r, 10 c, 50 h. Pres. David H. Jerome, V. Pres. Geo. F. Williams, Sec. & Treas. Geo. L. Burrows, Supt. Fred G. Benjamin.

SALEM, MASS.—Salem & Danvers St. Ry. Co. 6 m, 4-8 $\frac{1}{2}$ g, 35-47 lb r, 15 c, 45 h. Pres. Benj. W. Russell, Sec. G. A. Vickery, Treas. Geo. W. Williams, Supt. W. B. Ferguson, Asst. Supt. David N. Cook.

Naumkeag St. Ry. Co. — m, 4-8 $\frac{1}{2}$ g, 30-35-45 lb r, 50 c, 140 h. Pres. Chas. Odell, Clerk, Joseph F. Hickey, Treas. Henry Wheatland, Supt. Willard B. Ferguson.

SALT LAKE CITY, UTAH.—Salt Lake City R.R. Co. 13 m, 4-8 $\frac{1}{2}$ g, 20 lb r, 20 c, 115 mu. Pres. John Taylor, Sec. David McKenzie, Treas. James Jack, Supt. Orson P. Arnold.

SAN ANTONIO, TEX.—San Antonio St. Ry. Co. 15 m, 4 g, 30 lb r, 38 c, 125 mu. Pres. A. Belknap, San Antonio, V. Pres. F. W. Pickard, N. Y. City, Treas. I. Withers, San Antonio, Sec. E. R. Norton, Supt. John Robb.

Prospect Hill St. Ry. Co.

SANDUSKY, O.—Sandusky St. Ry. Co. 2 m, — g, — lb r, — c, — h. Pres. Chas. B. Ods, Sec. & Treas. A. C. Morse, Supt. Chas. Road.

SAN FRANCISCO, CAL.—California St. R.R. Co. Central R.R. Co. 6 m, 4-8 g, 45 lb r, 31 c, 290 h. Pres. Chas. Main, V. Pres. Jos. Roseberg, Treas. A. J. Gunnison, Sec. C. G. LeBreton, Supt. J. F. Clark.

Clay St. Hill R.R. Co. 1 m, 3-6 g, 30 lb r, 11 c, 12 dummy cars. Pres. Joseph Britton, V. Pres. James Moffit, Treas. Henry L. Davis, Sec. Chas. P. Campbell, Supt. Joseph Britton.

The City R.R. Co. $5\frac{1}{2}$ m, 5 g, 48 lb r, 73 c, 285 h. Pres. R. B. Woodward, V. Pres. Geo. B. Baum, Sec. M. E. Willis, Treas. J. H. Goodman, Supt. William Woodward.

Ceary St. Park & Ocean R.R. Co.

Market St. Cable Ry. Co. 10-9-10 m, 4-8 $\frac{1}{2}$ lb r, 137 c, 2 motors, 73 h. Pres. Leland Stanford, V. Pres. Chas. F. Crocker, Treas. N. T. Smith, Sec. J. L. Willcutt.

North Beach & Mission R.R. Co. 8 m, 5 g, 46 c, 400 h. Pres. Jos. Rosenberg, Sec. H. W. Hathorne, Treas. Carl Ahfel, Supt. M. Skelly.

Omnibus R.R. & Cable Co. $8\frac{1}{2}$ m, 5 g, 35-45 lb r, 50 c, 364 h. Pres. Gustav Sutro, V. Pres. D. Callaghan, Sec. G. Rugg, Supt. M. R. Martin.

Portrero & Bay View R.R. Co. $1\frac{1}{2}$ m, 5 g, 35 lb r, 20 c, 64 h. Pres. Leland Stanford, V. Pres. Chas. Crocker, Treas. N. T. Smith, Sec. J. L. Willcutt.

Sutter St. R.R. Co. $5\frac{1}{2}$ m, 4-11 g, 35-45 lb r, 30 c, 125 h. Pres. R. F. Morrow, Sec. A. K. Stevens, Treas. M. Schmitt, Supt. James McCord.

Telegraph Hill St. Ry. Co. 1,707 ft, 4-11 g, 36 lb r, 3 c, — h. Pres. Gustav Sutro, V. Pres. E. O. Demick, Sec. & Treas. C. J. Werner.

SAN JOSE, CAL.—San Jose & Santa Clara R.R. Co.

First St. & San Pedro St. Depot R.R. Co.

Market St. & Willow Glen R.R. Co.

North Side R.R. Co.

Peoples' R.R. Co.

SANTA BARBARA, CAL.—Santa Barbara St. R.R. Co. 1 m, 3-6 g, 3 c, 8 mu. Pres. A. W. McPhail.

SAUGATUCK, CONN.—Westport & Saugatuck Horse R.R.

SAVANNAH, GA.—City & Suburban Ry. Co. 18 $\frac{1}{2}$ m, 5 g, 16-30 lb r, 49 c, 110 h, 3 engines. Pres. J. H. Johnson, Asst. J. W. Alley, Treas. E. Schmidt.

Coast Line R.R. Co. 7 m, 5 g, 30 lb r, 17 c, 37 h. Pres. Geo. Parsons, New York, Sec. Treas. & Gen. Man. R. E. Cobb, Savannah.

SAYRE, PA.—Sayre St. Ry. Co. Pres. Howard Elmer (organization not completed).

SCRANTON, PA.—Peoples' St. Ry. Co. $9\frac{1}{2}$ m, 4-8 $\frac{1}{2}$ g, 25-52 lb r, 19 c, 70 h. Pres. Wm. Matthews, Sec. & Treas. J. C. Platt.

SEARCY, ARK.—Searcy & West Point R.R. Co.

SEDALIA, MO.—Sedalia St. Ry. Co. $2\frac{1}{2}$ m, 4-10 g, 54 lb r, 6 c, 31 h. Pres. Joseph D. Sieber, V. Pres. Louis Deutsch, Treas. F. H. Guenther, Sec. & Supt. Chas. S. Conrad.

SELMA, ALA.—Selma St. R.R. $2\frac{1}{2}$ m, 18 lb r, 5 c, 8 h. Pres. E. Gillman, Sec. & Treas. J. H. Hollis, Supt. W. Bohlia.

SHERMAN, TEX.—Sherman City R.R. Co.

SHREVEPORT, LA.—Shreveport City R.R. Co. $1\frac{1}{2}$ m, 4-4 g, 46 lb r, 6 c, 14 h. Pres. Peter Youree.

SILVER CLIFF, COL.—Silver Cliff St. R.R. Co.

SILOUX CITY, IA.—Sioux City St. Ry. Co. 5 m, — g, — r, 6 c, 8 h, 4 mu. Pres. Fred T. Evans, V. Pres. D. A. Magee, Sec. & Treas. F. T. Evans.

SOUTH CHICAGO, ILL.—Chicago Horse & Dummy R.R.

SOUTH PUEBLO, COL.—Pueblo St. R.R. Co.

SPRINGFIELD, ILL.—Citizens' St. R.R. Co. $9\frac{1}{2}$ m, 3-6 g, 20-36 lb r, 23 c, 100 h. Pres. J. H. Schrick, Treas. Frank Reisch, Sec. Chas. F. Harman.

Springfield City Ry. Co.

SPRINGFIELD, MASS.—Springfield St. Ry. Co. 4-8 $\frac{1}{2}$ g, 33-40 lb r, 28 c, 115 h. Pres. John Olmstead, Auditor, L. E. Ladd, Clerk, Gleason Wells, Treas. A. E. Smith, Supt. F. E. King.

SPRINGFIELD, MO.—The Peoples' Ry. Co. of Springfield, Mo. $3\frac{1}{2}$ m, 4-10 g, 33 lb r, 5 c, 30 h. Pres. J. C. Cravens, Sec. Benj. N. Massey, Treas. Chas. Sheppard, Supt. H. F. Denton.

Springfield St. R.R. Co.

SPRINGFIELD, O.—Citizens' St. R.R. Co. 10 m, 4 g, 29 c, 135 h. Pres. D. W. Stroud, V. Pres. A. S. Bushnell, Treas. Rose Mitchell, Sec. F. S. Penfield, Supt. W. H. Hanford.

STATEN ISLAND, N. Y.—Staten Island Shore Ry. Co.

ST. CATHARINES, ONT.—St. Catharines, Meriton & Thorold St. Ry. Co. $5\frac{1}{2}$ m, 4-8 $\frac{1}{2}$ g, 30 lb r, 7 c, 30 h. Pres. E. A. Smythe, Sec. S. R. Smythe, Supt. E. A. Smythe.

ST. JOSEPH, MO.—Citizens' St. R.R. Co. 3 m; 4-8 $\frac{1}{2}$ g, 28 lb r, 14 c, 52 mu. Pres. Richard E. Turner, Sec. & Treas. Arthur Kirkpatrick, Supt. John F. Meriam.

Frederick Ave. Ry. Co.

St. Joseph & Lake St. R.R. Co.

Union Ry. Co.

ST. LOUIS, MO.—Baden & St. Louis R.R. Co. $3\frac{1}{2}$ m, 4-10 g, — lb r, 7 c, 21 h. Pres. George S. Case, V. Pres. William Z. Colman, Supt. J. H. Archer.

Benton & Bellefontaine Ry. Co. $7\frac{1}{2}$ m, 4-10, 45 lb r, 29 c, 200 h. Pres. J. G. Chapman, Sec. Robert McCulloch.

Cass Avenue & Fair Grounds Ry. Co. 8 m, 4-10 g, 38 lb r, 37 c, 293 h. Pres. W. R. Allen, V. Pres. Geo. W. Allen, Sec. Treas. & Supt. G. G. Gibson, Cashier, O. H. Williams.

Springfield Ry. Co. 2 m, 4-8 $\frac{1}{2}$ g, 25-40 lb r, 7 c, 40 h. Pres. C. W. Rogers, St. Louis, Sec. & Treas. B. F. Hobart, Springfield, Supt. J. A. Stoughton, No. Springfield, Asst. Supt. Frank B. Smith, No. Springfield.

Northern Central.

Southern Ry. Co. 7-4-5 m, 4-10 g, 35-52 lb r, 47 c, 250 h. Pres. E. R. Coleman, Man. W. L. Johnson.

Union R.R. Co.

Union Depot R.R. Co.

Tower Grove & Lafette R.R.

St. Louis R.R. Co.

South Market St. R.R.

Peoples' R.R.

Mound City R.R. Co.

Missouri R.R. Co.

Lindell Ry. Co. $13\frac{1}{2}$ m, — g, — r, 65 c, 475 h. Pres. John H. Maqon, V. Pres. John H. Lightner, Sec. & Treas. Geo. W. Baumhoff, Supt. Jos. C. Llewellyn.

Jefferson Ave. Ry. Co.

Citizen's Ry. Co.

ST. PAUL, MINN.—Wabash St. Ry. Co.

St. Paul City Ry. Co. 25 m, 4-8 $\frac{1}{2}$ g, 80 c, 150 h, 294 mu. Pres. Thos. Lowry, V. Pres. C. G. Goodrich, Sec. J. H. Randall, Treas. Clinton Morrison, Supt. A. L. Scott.

STERLING, ILL.—Sterling St. Ry. Co.

STILLWATER, N. Y.—Stillwater & Mechanicsville St. Ry. Co. $4\frac{1}{2}$ m, 4-8 $\frac{1}{2}$ g, 25-30 lb r, 3 c, 6 h. Pres. S. Rowley, V. Pres. W. L. Denison, Sec. H. O. Bailey, Mechanicsville, Treas. E. N. Smith.

STROUDSBURGH, PA.—Stroudsburg Passenger R.R. Co. 1-4-5 m, 4-8 $\frac{1}{2}$ g, 28-30 lb r, 3 c, 9 h. Pres. & Treas. J. Lantz, Sec. Jacob Houser.

SYRACUSE, N. Y.—Syracuse & Onondagua R.R. Co. 2-3-5 m, 4-8 g, 28-47 lb r, 9 c, 18 h. Pres. Peter Burns, Sec. & Treas. Lyman C. Smith, Supt. Henry Thompson.

Syracuse & Geddes Ry. Co. 2 m, 4-8 $\frac{1}{2}$ g, 35-45 lb r, 10 c, 32 h. Pres. R. Nelson Gere, Sec. & Treas. Rasselias A. Bonta, Supt. Wm. J. Hart.

New Brighton & Onondagua Valley R.R. Co. $1\frac{1}{2}$ m, 4-8 g, 16-35 lb r, 2 c, 4 h. Pres. Matthias Britton, Sec. T. W. Meacham, Treas. J. H. Anderson, Supt. J. H. Anderson.

Genesee & Water St. R.R. Co. 4 m, 4-8 $\frac{1}{2}$ g, 18-30 lb r, 10 c, 35 h. Pres. Robt. G. Wynkoop, Sec. & Treas. Geo. J. Gardner, Supt. W. J. Hart.

Fourth Ward R.R. Co.

Fifth Ward R.R. Co. $2\frac{1}{2}$ m, 4-8 $\frac{1}{2}$ g, 35-56 lb r, 8 c, 30 h. Pres. P. B. Brayton, Sec. & Treas. O. C. Potter, Supt. Hugh Purnell.

Central City Ry. Co. $2\frac{1}{2}$ m, 4-8 $\frac{1}{2}$ g, 40 lb r, 12 c, 37 h. Pres. George N. Kennedy, V. Pres. Daniel Pratt, Sec. & Treas. James Barnes, Supt. George Crampton.

TAUNTON, MASS.—Taunton St. Ry. Co. $4\frac{1}{2}$ m, 4-8 g, 14 c, 44 h.

TERRE HAUTE, IND.—Terre Haute St. Ry. Co. $4\frac{1}{2}$ m, 4-8 $\frac{1}{2}$ g, 28 lb r, 16 c, 48 h. Pres. T. C. Buntin, V. Pres. Joseph Collett, Sec. John R. Hagen, Supt. John T. Shriver.

TEXARKANA, ARK.—Texarkana St. Ry. Co.

TOLEDO, OHIO.—Toledo Consolidated St. Ry. Co. 17 m, 4-8 g, 42 lb r, 37 c, 181 h. Pres. John E. Bailey, Sec. A. E. Lang.

Toledo Street R.R. Co.

Monroe Street R.R.

Metropolitan St. Ry. Co.

The Central Passenger R.R. Co. of Toledo, O. 8 m, 3 g, 27 lb r, 17 c, 70 h. Pres. F. E. Seagrave, V. Pres. & Treas. James Pazner, Sec. Chas. F. Parks, Supt. A. R. Seagrave.

Adams Street Ry. Co.

TOPEKA, KAN.—Topeka City Ry. Co. 9 m, 4 g, 25-48 lb r, 25 c, 90 h. Pres. Joab Mulvane, V. Pres. D. W. Stormont, Sec. & Treas. E. Wildes, Supt. Jesse Shaw.

TORONTO, CAN.—Toronto St. Ry. Co. 18 m, 4-10 $\frac{1}{2}$ g, 30 lb r, 136 c, 670 h. Pres. Frank Smith, Sec. James Green, Supt. John J. Franklin.

TRENTON, N.J.—Trenton Horse R.R. Co. $1\frac{1}{2}$ m, 5-2 g, 43-47 lb r, 10 c, 31 h. Pres. Gen. Lewis Perrine, Sec. & Treas. Lewis Perrine, Jr. Supt. Thomas Sillorri.

City Ry. Co. 3 m, 5-2 g, 45 lb r, 15 c, 69 h. Pres. Adam Exlor, V. Pres. W. H. Skinn, Sec. H. B. Howell, Treas. & Mang. Director Chas. J. Bramford.

TROY, N.Y.—Cortland & Homer Horse R.R. Co. 4 m, 4-8 $\frac{1}{2}$ g, 25-30 lb r, 2 c, — h. Pres. C. H. Garrison, Troy, V. Pres. E. A. Fish, Cortland, N.Y., Treas. Jas. M. Allen, Cortland, Sec. S. E. Welch, Cortland.

Troy & Albia Street Ry. Co. $3\frac{1}{2}$ m, 4 g, 35-45 lb r, 9 c, 41 h. Pres. Thos. A. Knickerbocker, Sec. & Treas. Theo. E. Haslehurst, Supt. W. R. Bean.

Troy & Lansingburgh R.R. Co. $2\frac{1}{2}$ m, 4-8 $\frac{1}{2}$ g, 47 lb r, 91 c, 466 h. Pres. William Kemp, V. Pres. Charles Clemishaw, Sec. & Treas. Joseph J. Hagen, Supt. Leander C. Brown.

URBANA, ILL.—Urbana R.R.

Urbana & Champaign St. Ry. Co. 2 m, 4-8 $\frac{1}{2}$ g, 33 lb r, 4 c, 20 h. Pres. Wm. Parks, Sec. & Treas. Frank G. Jacques, Supt. W. Parks.

UTICA, N.Y.—Utica, Clinton & Binghamton St. R.R. $7\frac{1}{2}$ m, 4-8 $\frac{1}{2}$ g, 43-56 lb r, 17 c, 82 h. Pres. Isaac Maynard, Sec. & Treas. Robt. S. Williams, Supt. Roger Rock.

The Utica & Mohawk R.R. Co. $2\frac{1}{2}$ m, 4-8 $\frac{1}{2}$ g, 25-40 lb r, 9 c, 5 h. Pres. Chas. W. Hutchinson, V. Pres. Nathan S. Haynes, Sec. Geo. M. Weaver, Treas. Joshua W. Church.

VAITSBURGH, N.J.—Newark, So. Orange, Ferry St. & Hamburg Place R.R. Co.

VALEJO, CAL.—Valejo St. Ry. Co.

VICKSBURG, MISS.—Vicksburg St. Ry. Co.

VINC

WALTHAM, MASS.—Waltham & Newton St. Ry. 3½ m, 4-8 g, 6 c, 14 h.

Anticosta & Patomac River Ry. Co. 3 m, 4-8 g, 37 lb r, 9 c, 24 h. Pres. H. A. Griswold, Anticosta, D.C. Treas. Edw. Temple, Sec. T. E. Smithson.

WALTHAM, MASS.—Waltham & Newton St. Ry. Co. 3½ m, 4-8½ g, 30 lb r, 6 c, 14 h. Pres. R. E. Robbins, Sec. & Treas. Henry Bond.

WASHINGTON, D.C.—Capital, No. O. St. & So. Washington R.R.

Washington & Georgetown R.R. Co. 10 m, 4 8½ g, 42 lb r, 161 c, 750 h. Pres. H. Hurt, Sec. & Treas. C. M. Koonen, Gen. Supt. C. C. Sallee.

Metropolitan R.R. Co. 21½ m, 4 8 g, 38 lb r, 90 c, 400 h. Pres. George W. Pearson, V. Pres. A. A. Wilson, Sec. & Treas. William M. Morse, Supt. L. W. Emmart.

Columbia R.R. Co. of the District of Columbia. 2½ m, —g, —lb r, 19 c, 56 h. Pres. H. A. Willard, Sec. & Treas. Wm. H. Clayette, Supt. Thos. E. Benson.

WATERFORD, N. Y.—Waterford & Cohoes R.R. Co. 2 m, 4-8½ g, 45 lb r. Pres. Thos. Breslin, Sec. & Treas. C. B. Ormsby. (Leased by the Troy & Lansingburgh R.R. Co.)

WEST HURON, CONN.—New Haven & West Haven R.R. Co.

WESTPORT, CONN.—Westport & Saugatuck Horse R.R.

WICHITA, KAN.—Wichita City Ry. Co. 6 m, 8 c. Pres. J. W. Ground, Sec. & Mangr. E. R. Powell.

WHEELING, W. VA.—Citizens Ry. Co.

Wheeling & Elm Grove R.R. 7 m, 4-8½ g, 30 lb r, 12 c, 4 Baldwin Motors. Pres. J. D. DuBois, Sec. E. J. Rutter.

WILKESBARRE, PA.—Wilkesbarre & Kingston Pass. R.R.

Wilkesbarre & Ashley Passenger R.R. Co.

Coalville Passenger R.R. 2½ m, 4-8½ g, 20-34 lb r, 4 c, 10 h. Pres. Chas. A. Miner, Sec. & Treas. George Loveland, Supt. Albert G. Orr.

WILLIAMSPORT, PA.—Williamsport St. R.R. Co.

WILMINGTON, DEL.—Front & Union St. Passenger Ry. Co.

Wilmington City Ry. Co. 4½ m, 5-2½ g, 45 lb r, 20 c, 82 h. Pres. W. Canby, Sec. & Treas. John F. Miller, Supt. Wm. H. Burnett.

WINDSOR, CAN.—Sandwich & Windsor Passenger R.R. Co.

WINNIPEG, MANITOBA, CAN.—The Winnipeg St. Ry. Co., 5 m, 4-8½ g, 35 lb r, 13 c, 75 h. Pres. Duncan MacArthur, Sec. & Mangr. Albert W. Austin, Supt. Geo. A. Young.

WINONA, MINN.—Winona City Ry. Co. 4 m, 3 6 g, 27 lb r, 10 c, 39 h. Pres. John A. Mathews, V. Pres. B. H. Langley, Sec. & Treas. C. H. Porter.

WOBURN, MASS.—No. Woburn Horse R.R. 2½ m, 4 8 g, 4 c, 4 h. Pres. & Treas. John Carter, Sec. J. G. Maguire, Supt. Dexter Carter.

WORCESTER, MASS.—Worcester St. Ry. Co. 5½ m, 4-8½ g, 45 lb r, 19 c, 100 h. Pres. Geo. H. Seeley, N. Y. city, V. Pres. Nathan Seeley, N. Y. city, Treas. & Supt. Harry S. Searls, Worcester.

YOUNGSTOWN, O.—Youngstown St. R.R. Co.

ZANESVILLE, O.—Bellare, Chillicothe & Canton. Zanesville & McIntire St. Ry. Co. 3 m, 3 6 g, 33 lb r, 12 c, 54 m. Pres. J. Bergen, Sec. W. C. Townsend, Treas. T. B. Townsend.

Kinds of Knowledge.

"Knowledge is of two kinds. We know a subject ourselves, or we know where we can find information upon it."

We don't remember who wrote the foregoing, and have no time to look it up. Furthermore, as we do not sneeze simply because some great man takes snuff, we can endorse the sentiment without knowing its author.

What of it?

Much of it.

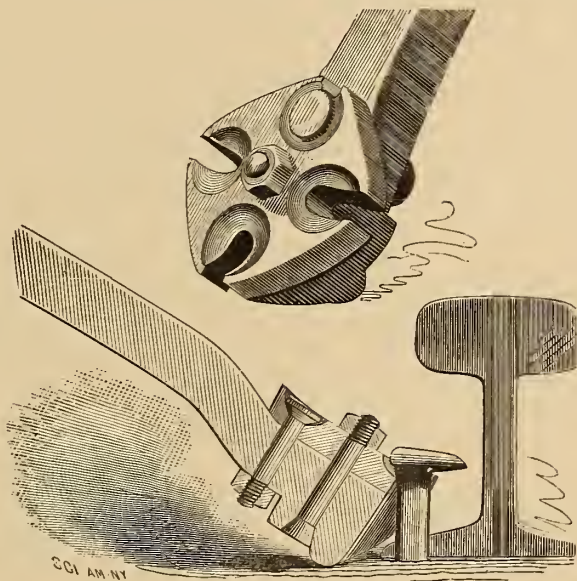
There are a few men in every ten thousand or so, who have memories, fully stored, carefully pigeon-holed, and easily accessible; so that they need not refer, in most of their work or actions to any written or printed sources of information. But, perhaps, neither you nor the writer could be called, as was Lord Macauley, "a book in breeches." Perhaps if we have to extract cube root, or multiply by logarithms, or lay out a quarter-twist belt, or specially harden a drill, or unscale a boiler, or calculate the proper gears for cutting a fractional screw, or any one of nine hundred and eighty things that we have to do, some time or other, and have to do rightly when it is done, perhaps we can't depend on memory. Perhaps, in fact, we never knew. Then, in such cases, the next best thing to

knowing right away, is to have a note book, or a scrap book to refer to. And the next best thing to having a well-filled scrap book, or note book, is having an index book, with memoranda as to where to apply in case we want to know anything.

If we know where or to whom to apply for each kind of data, or information, or advice, that is the next best thing to knowing off-hand or having the notes, and such knowledge is of the second class alluded to in the quotation at the head of this article, perhaps, in fact, the cheaper and more easily obtained of the two.—Power.

Hardwick's Claw Bar.*

The square face-plate of hardened steel has its corners bent upwards, rounded, and recessed to form claws for receiving the body and head of a spike; the under side is slightly convexed to fit snugly upon the curved upper side of the bar, to which it is united by means of a pivot bolt and nut.



The bar is formed substantially the same as an ordinary claw bar for drawing railroad spikes, with a recess in the end for the body of the spike. Through the bar, directly in the rear of the pivot bolt, is a hole, through which is passed a bolt whose head rests in one of the claw recesses of the face-plate; the under side of the bar is rabbeted to form a bearing for the nut. If the claws which are in use should break, by removing the rear bolt another pair of jaws may be brought over the recess in the bar. The recesses in the face-plate may be of different widths to adapt the bar to spikes of different sizes.

It is claimed that this claw bar will wear four times as long as the ordinary bar, and that by renewing the worn-out plate, can be quickly refitted for use; also that as the plate can be more nicely finished and better tempered than the end of the common bar, still greater durability is insured.

* James L. Hardwick, Lock Box 569, Cedar Rapids, Iowa.

Drop Us A Line.

"Reading maketh a full man, conference a ready man, and writing, an exact man."—Bacon.

There is wisdom and common sense in every word of the foregoing quotation.

Reader, if you wish to advance in your calling, you must post yourself as to what your neighbors are doing; what those at a distance are doing; as to what your friends are doing, and what your rivals are doing. By reading, you can best do this; and your mind will be filled, in many a crack and cranny now somewhat empty.

Next, confer with your friends as to what you have read and what you have done, or are going to do, or are thinking of doing.

If you have been in a hole and have got out, tell them about it and see if you got out of it the best way, and how not to get in another one like it. If you are not yet out of the hole, conference will make you all the more "ready" in getting out of it this time and the next time, if there should be a next time.

Nor is this all. Write to the editors of the best paper that you take (we assume that you take more than one, no matter how poor you are, or how busy you are), and tell what you have learned by reading and conference, and what you have not learned by either.

The technical paper affords its subscriber and correspondent all three methods of benefiting himself, laid down by Francis of

Verulam, in the lines heading these friendly paragraphs.

He may read and fill the storehouses of his mind. He may confer and become ready with expedient when emergency bursts upon him. And he may write and crystallize in his own mind the ideas which reading and conference and experience have given.

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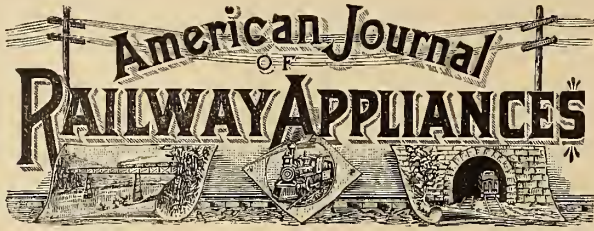
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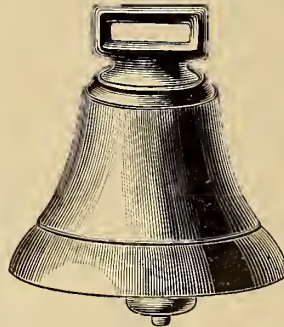
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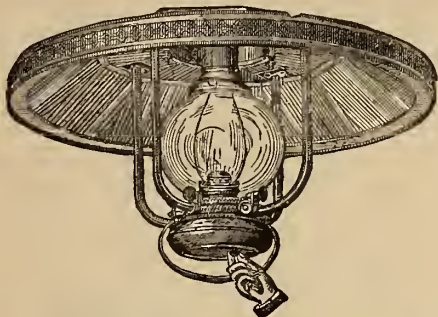
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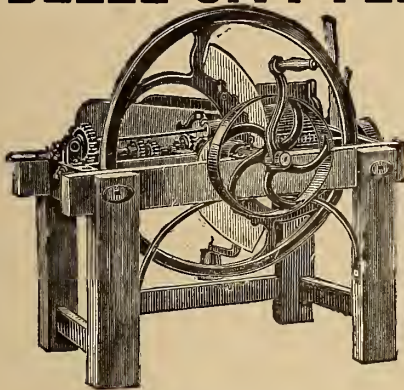


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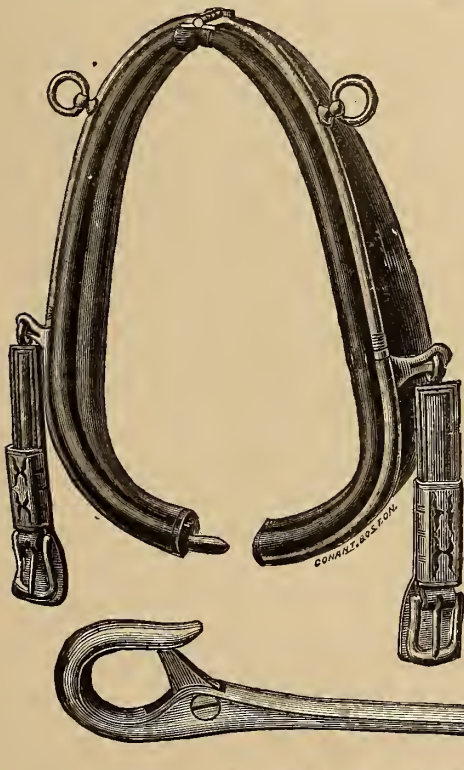
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- Bushwick Railroad Co., Brooklyn, N. Y.
- Crosstown Railroad Co., Brooklyn, N. Y.
- Coney Island and Brooklyn Railroad Co., Brooklyn, N. Y.
- North Hudson County Railroad Co., Hoboken, N. J.
- Jersey City and Bergen Railroad Co., Jersey City, N. J.
- Ridge Avenue Passenger Railway Co., Philadelphia, Pa.
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OF EVERY STYLE AND SHAPE,

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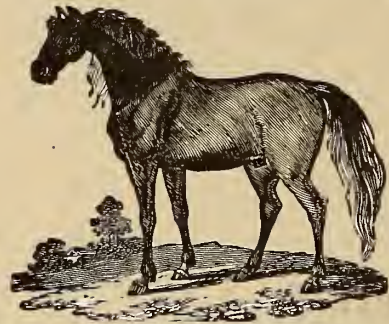
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I have used your Colic Cure for my horses and mules on my street car lines and found it the best and surest medicine I have ever used. I have not lost a horse since I commenced its use. It gives relief in a short time after it is taken. I can cheerfully recommend it as a sure relief if given in time. I keep it constantly on hand.

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Truly yours,

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OFFICE OF NORTH HUDSON COUNTY
RAILWAY CO.
HOBOKEN, N. J., Oct. 4, 1884.

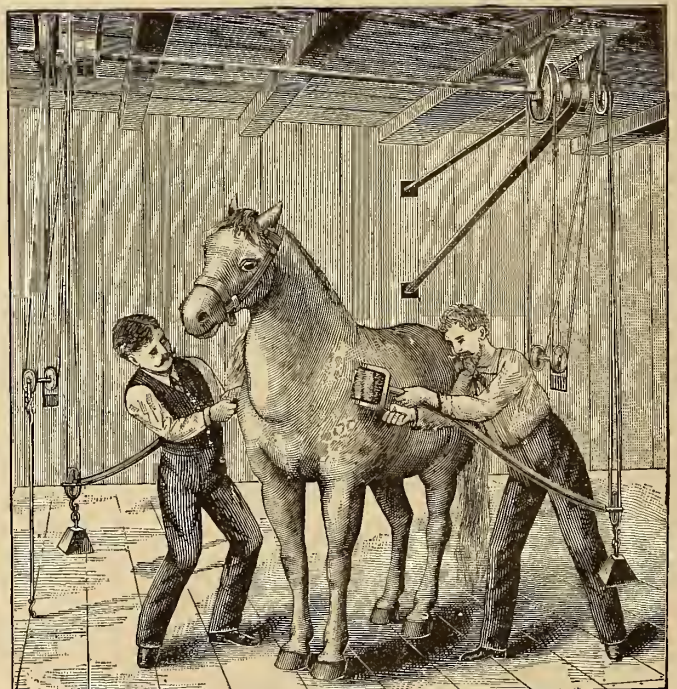
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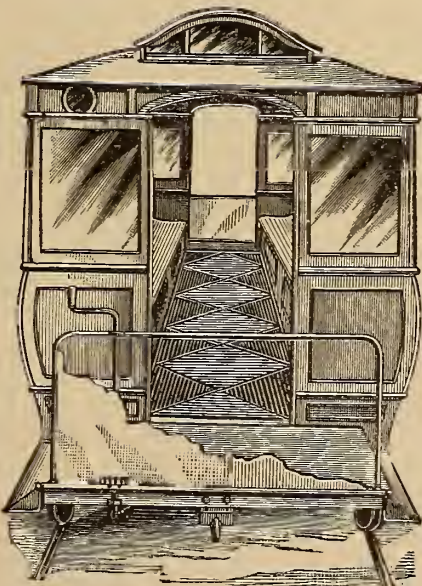
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Fare Boxes and Change Receptacles for Street Cars,

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Our Boxes are constructed with great care and of the best material. The case or wood, is of cherry, neat in design, and the front of Money Drawer and front edges of box are of metal, nickel plated in the best manner. The front of Box is very easily detached in one piece, and the inside or glass chute is quickly removed for cleaning. In addition to the glass chute through which the money passes, there are *two additional glass plates*, $\frac{1}{4}$ of an inch thick, one in front and one in back of box, so that in case the outer plate should be broken, the *money is still protected*. The Money Drawer is metal, and securely fastened by two safe drawer locks, the keys of which can only be removed when the drawer is locked, thus proving a safeguard to the collector.

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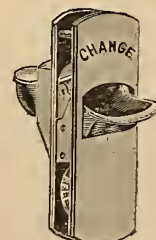
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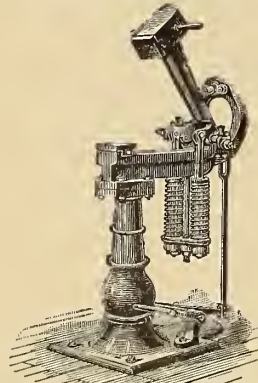


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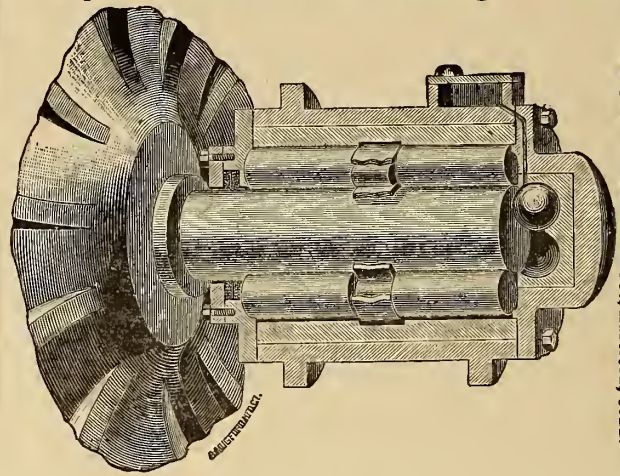
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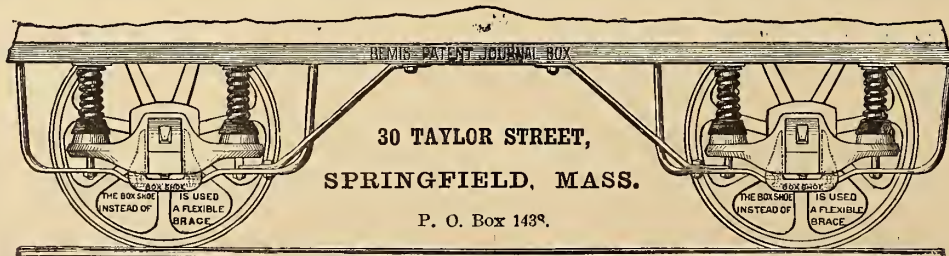
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CAST CHILLED WHEELS,
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FOR EVERY KIND OF SERVICE.
Street Railway Wheels of all Sizes.

THE BEMIS CAR BOX CO.,

Light Draft, Easy Riding, Durable Economical.

Brasses are warranted for 10 years and Journal for 20 years.



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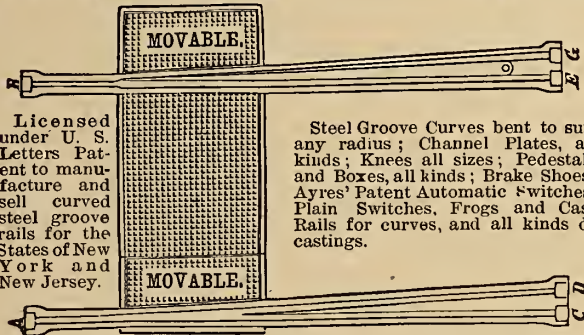
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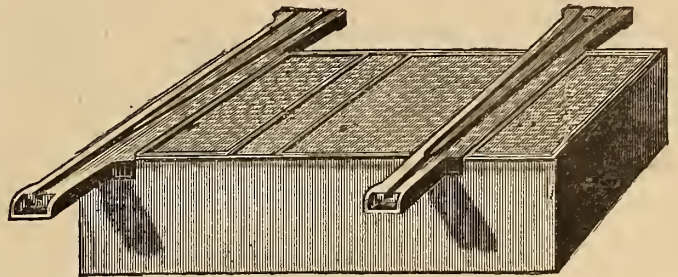
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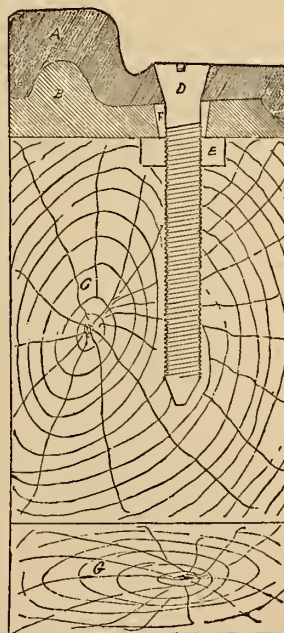
H. DOUGLASS'

Patent Automatic Switch

FOR STREET RAILROADS.

WRIGHT'S

PATENT JOINT FASTENING.



The accompanying cut shows a cross section through joint. *A* is the rail, *B* the joint chair, *C* the stringer, *D* the patent screw fastening, *E* the nut, *F* a slot in chair allowing rails to contract and expand. The chair cannot settle and the rail ends are held level with each other, preventing the many evils of ordinary construction.

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For Horse Railways, Omnibus Lines, Etc.



The Advantages

OF THE

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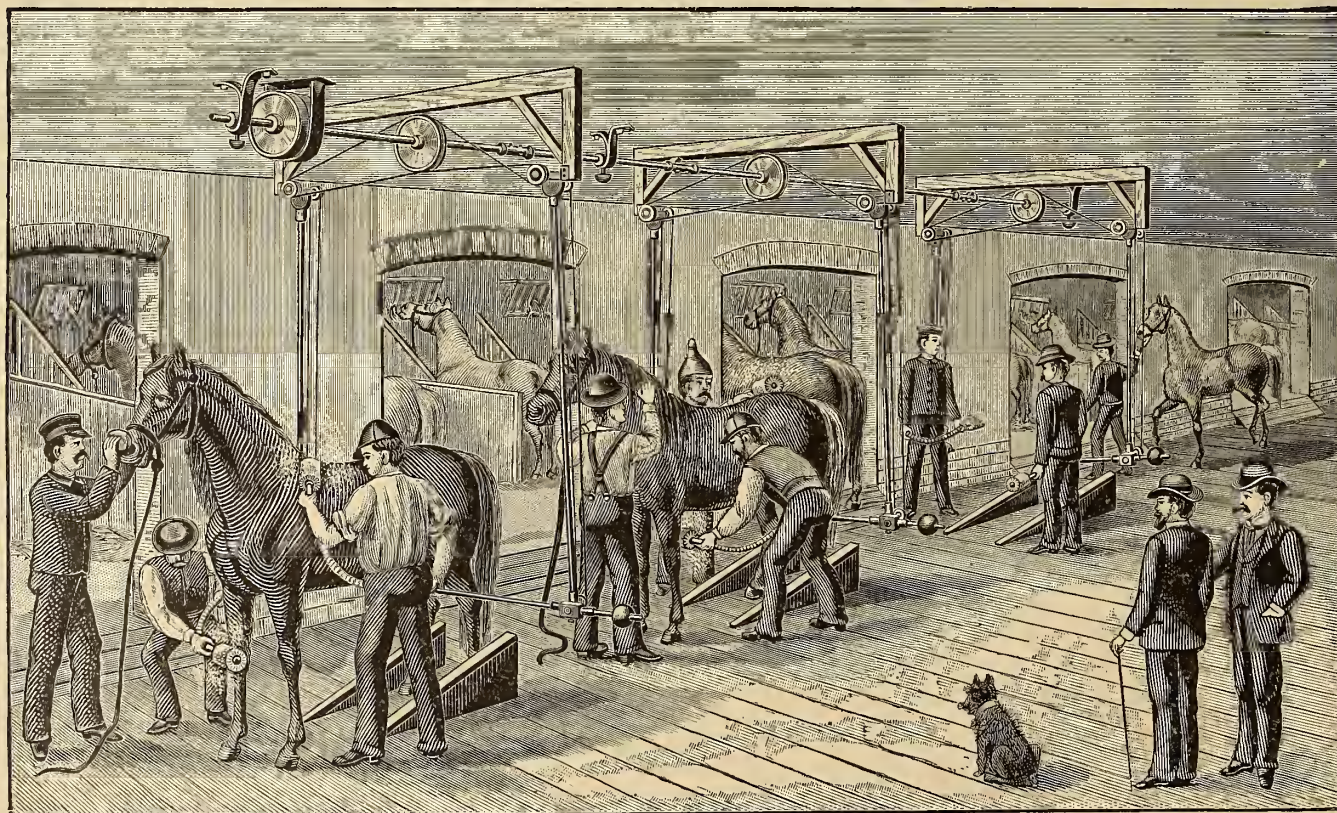
are its ready application to Horse-Car service, or to any other purpose where cheap harness is required. It only costs about half as much as leather traces, while at the same time one set of Rope Traces will (when used on horse cars) take the place of three or more sets of leather traces, as the Tugs remain attached to the car all day, no matter how many changes of stock are made. The relief horses having hooks attached to their hames, all that is necessary is to unhook the tugs from the working team back in the fresh horses, hook on the tugs, and the change is made. Railroad men will at once perceive their adaptability and economy from the above facts. They will also last longer than leather traces, and require but very little care. From their durability and cheapness they are also especially adapted for all kinds of farm use and heavy teaming, as farmers, etc., can easily repair them.

Patent No. 171,232, December 21, 1875.

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This machine for grooming may be driven by any known power, and can readily be placed for use in any stable or out-building. It can be operated by an ordinary groomsmen; its work is perfect; its action simple and effective. Stock owners will readily realize the importance of the machine. The perfection and rapidity of its work, and the benefits derived by its use, commend it to those interested in the care and use of all classes of thoroughbred and work stock. The most vicious animal readily submits to its use. Machine Grooming is found to be less expensive than hand grooming, saving in food and medicines, and materially increasing the value of the animal.

The Curry Comb and Hand Process Superseded! Economy of Labor! Perfection of Work!

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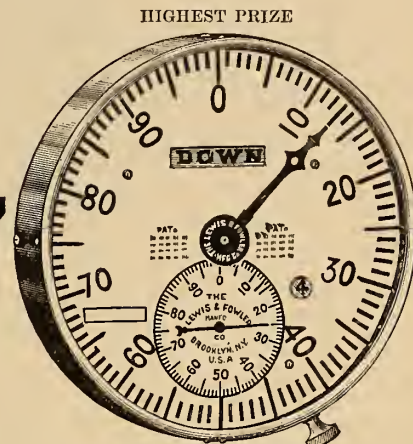
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PASSENGER REGISTER.



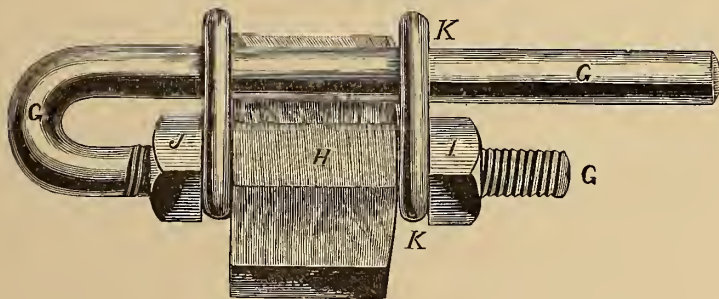
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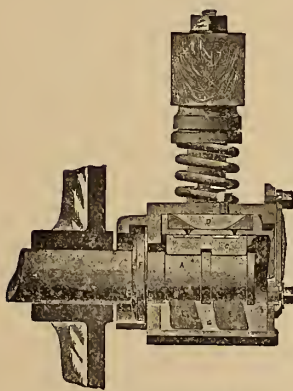


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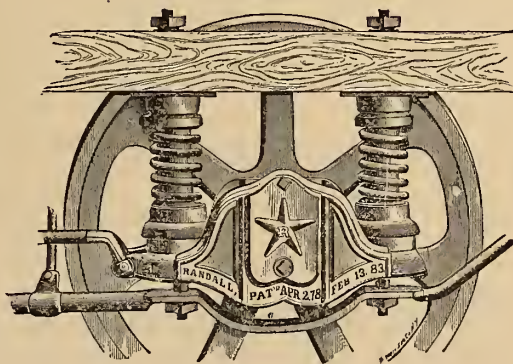


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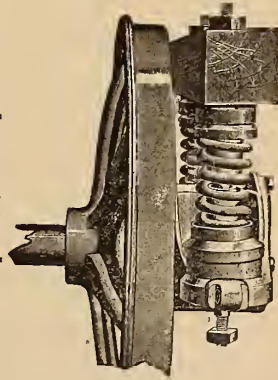
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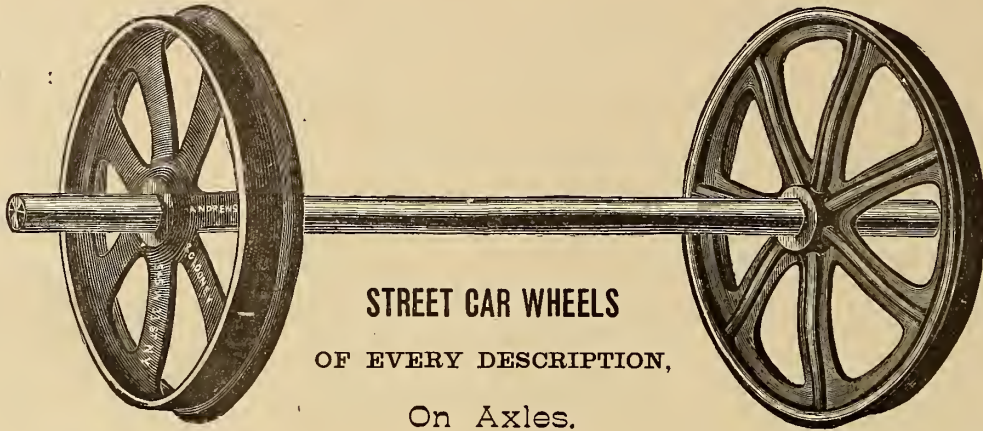
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STREET CAR WHEELS
OF EVERY DESCRIPTION,
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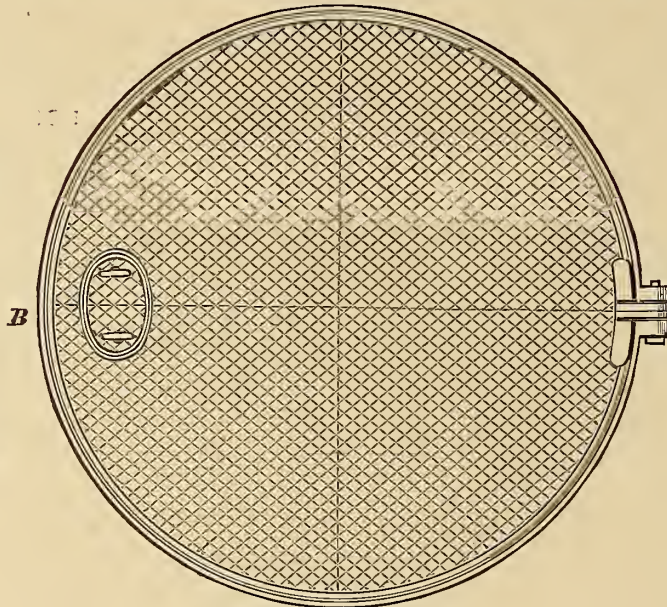
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Car Wheels,
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of all Descriptions where great
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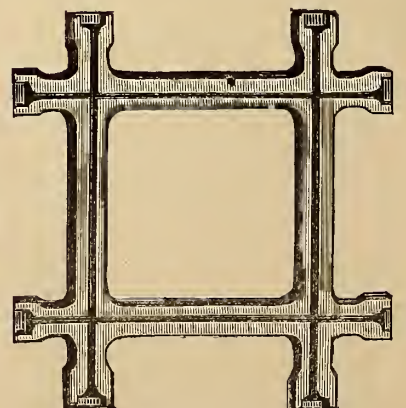
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Street Car Springs.

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No. 0, for 10-ft. Light Cars.
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 No. 5, for 16-ft. Cars.
 (Single Pedestal.)
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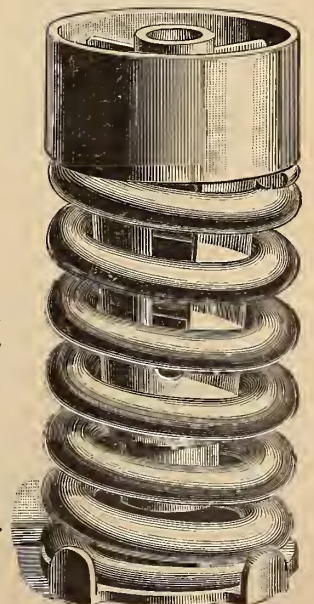
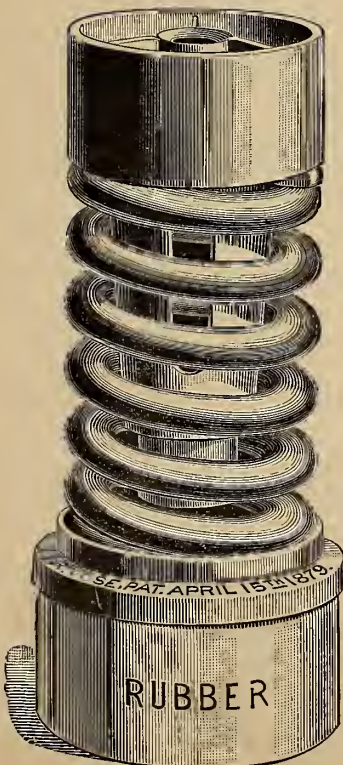
STEEL CONE CITY CAR SPRING.

Patented April 15, 1879—August 5, 1884.

The unprecedented popularity of the

“VOSE GRADUATED RUBBER CONE SPRING”

for HORSE CARS has induced the inventor to bring this class of Springs as near perfection as possible, and after a series of experiments and tests now presents for favor what he claims to be the *MOST PERFECT SPRING FOR HORSE CARS* ever offered. It is exceptionally *SOFT AND EASY* with the *EMPTY CAR* or with the *GREATEST LOAD*. It is believed to be the *MOST DURABLE*, being constructed upon a principle that seems to insure that the Spring must *ACTUALLY WEAR OUT*. The very *Finest Quality of Crucible Cast Steel* will always be used in these Springs.



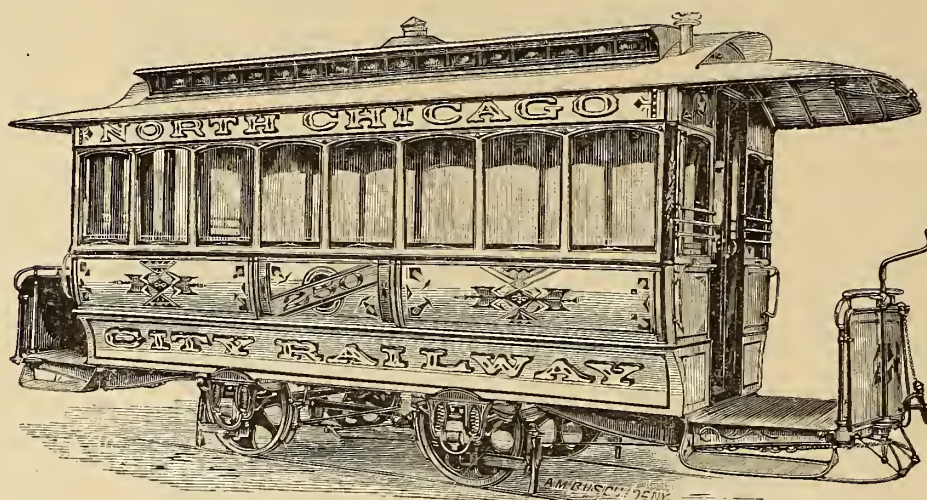
JOHN STEPHENSON COMPANY

(LIMITED),

New York.

TRAMWAY CARS

MEDAL OF FIRST CLASS, WORLD'S INDUSTRIAL COTTON EXPOSITION, NEW ORLEANS, 1885.



LIGHT ELEGANT, DURABLE.

Every Description.

Best Materials.

Minimum Prices.

ORDERS QUICKLY FILLED. CAREFUL ATTENTION TO SHIPMENTS.

All Climates Suited.



To Stablemen and Drivers.

The Bible has long been recognized as a pretty good book to preach a sermon from, and as this is intended more as a sermon than as a lecture, we will take for our text the verse, "A merciful man is merciful to his beast," which, by the way, ought to be painted up in "letters of light" in every stable of the world.

Now a street-car horse is not generally an animal calculated to inspire much sentiment, and still less so is the average street-car mule. Poets, from "Mr." Homer to "Lord" Tennyson, indeed, have sung the horse in many a sounding line; but it has always been the horse as a noble abstraction, or the horse in some particularly elevated sphere of action. No poet of ancient or modern times has found in the street-car horse an inspiration to lofty sentiment enshrined in glowing verse. Even the eloquent prose writers have passed him by without a word of eulogy or recognition, and our most esteemed contemporary, though quick to recognize the luminous car and the picturesque possibilities of beauty in luminous harness, has found no source of inspiration in the street-car horse or his humble hybrid cousin with the "bar sinister" on his armorial bearings. The Bible alone is impartial, and in defining the attitude of the "merciful man" towards his "beast" makes no preferences to the injury of the humblest of animals, but in the eyes of the author of our text the meanest mule that splashes the omnipresent limestone mud in the streets of St. Louis and the most abject "critter" that climbs the hills of Kansas City or Dubuque, is entitled to equal consideration with the finest thoroughbred in the stables of Pierre Lorillard or Colonel Marshall. At the hands of the merciful man the Texas mule, too tired to kick even an intermeddling "small-boy," will receive treatment as gentle as would the celebrated beauty that bore the "Prioress" on the pilgrimage to Canterbury, centuries since.

There are a great many drivers born with a deep-rooted theory that car-horses are made for blows and abuse, and car-mules for kicks and curses; and not a few stablemen seem to be trained with the same heresy. The truth is that a horse's strength does not improve with abuse, nor a mule's

endurance with ill-treatment, any more than does a stableman's or driver's.

The heated season is now upon us, when animals and men alike naturally suffer more or less distress, with the very important difference that a man can take care of himself, while a horse depends for care entirely upon the consideration and mercy of those in whose interests he labors. He cannot speak to tell when he is thirsty, overheated or overworked, and it is one of the characteristics of a merciful man to interpret his dumb sufferings, and forestall them as far as possible. We have no theories regarding the quantities of water to be furnished, but we do know that the laws of physiology demand for the horse as for the man, that it should be freest when perspiration is freest. We know also that suffering and annoyance of any kind demand powers that, were they not required to resist such discomforts, could be utilized for hauling cars; therefore, it becomes a matter of economy to provide against such discomforts. So, anything which tends to add to the comfort of an animal, necessarily increases its usefulness. Stablemen and drivers with common sense will know what this means: sponging of the nostrils, frequent cleaning, plenty of drinking water, "easy" treatment, and a thousand and one things of the kind will occur in this connection. But owners and care-takers alike should remember always that "a merciful man is merciful to his beast," and that it pays in more ways than one to be a "merciful man."

Repairs in the Brooklyn Bridge Cable.

The *Sun* says: Preparations are being made to put in two large new sheaves for the traction rope at the New York end of the Brooklyn Bridge. Advantage will be taken of this interruption of the railroad travel to cut the rope and shorten it when splicing it together again. The rope has now been in constant operation for twenty-one months, dragging heavy trains of two cars each over the bridge each way. There has been some wear, but about the only noticeable effect of the strain has been to lengthen the rope about 1½ per cent. It is said that ropes used by the Chicago street cars last about nine months. The workmen about the bridge assert that the bridge rope is good for two years more.

In speaking of the grip used on the bridge Col. Paine said that the greatest difficulty experienced at first was in closing the little grip wheels on the rope with just the right force. "When the sheave lining was new the wheels scarcely opened wide enough to let the rope up between them, and the toggle joints which brought them toward each other had so little purchase that the men turning the brakes had to use all their power to keep the grip from slipping. But, as the lining wore away, of course the purchase of the toggle joints grew more powerful, and the brakemen, still throwing their weight on the brakes, set the grip six or eight times tighter than necessary. That held the car fast enough, but it indented the sheave linings and wore them unevenly, so that the grip was likely to catch every time at the same spot of the circumference. To overcome this an automatic device was put on the grip, which regulates the pressure on the rope so that it can never be too great nor too small. Before that was adopted the sheave linings wore out in sixty days. They will now last twice as long."

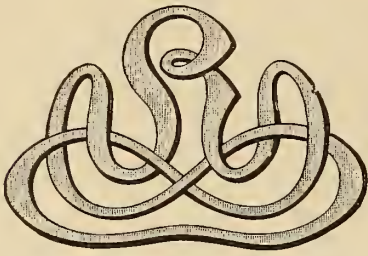
This rope will be strong enough, it is said, when the additional traffic is put on after the tracks are extended across Centre street, New York.

A rope gives way because the wires are worn out by the friction of the grip, but there is no danger that the rope will at any time break apart and allow the cars to run down into the stations.

An Old Street Railway Man's Opinion.

J. E. Hellman, an old street railroad man, recently said:

"Do you know what the street railroad will do for Broadway? It will make it the great 'shopping' street of the city. The street railroads made the Bowery, Third avenue and Sixth avenue. Broadway has been given up, below Fourteenth street, to such store patronage as came in carriages. It was necessarily limited. Ladies did not like the 'busses. But you will find the street cars will take them to any store on the street. Stewart's old stand will be in a measure restored to its former position. I shouldn't be surprised if a big museum or two came over from the Bowery to animate the class of people who will come there who do not now go to the Bowery.



American Street Railway Association.

OFFICERS, 1884-5.

President.—Calvin A. Richards, President Metropolitan Railroad Co., Boston, Mass.

First Vice-president.—Julius S. Walsh, President Citizens' Railway Co., St. Louis, Mo.

Second Vice-president.—Henry M. Watson, President of the Buffalo Street Railway Co., Buffalo, N. Y.

Third Vice-president.—Edward Lusher, Secretary and Treasurer the Montreal City Passenger Railway Co., Montreal, Canada.

Secretary and Treasurer.—William J. Richardson, Secretary the Atlantic Avenue Railway Co., Brooklyn, N. Y.

Executive Committee.—President, Vice-presidents and William H. Hazzard, President Brooklyn City Railroad Co., Brooklyn, N. Y.; James K. Lake, Superintendent Chicago West-Division Railway, Chicago, Ill.; Charles J. Harrah, President the Peoples' Passenger Railway Co., Philadelphia, Pa.; William White, President Dry Dock, East B. & B. R. R. Co.; New York, N. Y.; B. Du Pont, President Central Passenger Railroad Co., Louisville, Ky.

NOTICE.—The next regular meeting of the American Street Railway Association will be held in St. Louis, Mo., the third Wednesday in October (the 21st), 1885.

The Cable System of Motive Power.

The discussion on this subject at the meeting of the Association is given below. The committee's report in full will be found in our November issue, page 6.

Mr. Wm. Richardson: Reference has been made in the report to the originator of the system in San Francisco. In connection with that, it states that certain roads have been built since, namely, as amongst them, and as the latest, the Market street road. I would like to ask of the writer of that report, whether the Market street road is operated under the patent and plans of Mr. Hallidie?

Mr. Holmes replied: As to that question, I should like to say, first, as to the points in that report, I make no mention whatever of patents; second, that there has been instituted, as I understand it, by the parties who own it, a suit by the owners of the Hallidie patents against the Market street road, for the use of the patents which they claim for their own. As to that, however, I do not know. There are a number of patents merged in the cable system, as to the merits of which I offer no remarks whatever. In drawing the report, as chairman of the committee, and at the request of the other members, I felt it my duty to make that report, and have done so without the least possible desire in the world to ask this Convention to use its influence in favor of a patent. It was simply to state to you a few simple facts, which are known to all intelligent people of the United States, that the cable lines in San Francisco have been operated successfully for the last ten or eleven years,

and it is very generally known that the lines in Chicago have been operated successfully for the last year or year and a half.

Mr. Sharp inquired: Is the Market street road in operation?

Mr. Richardson replied: I am speaking of the Market street road in San Francisco, which is mentioned as one of those which has been of the latest construction and successfully operated. It was mentioned in the report, that Mr. Hallidie was entitled to the credit of originating this system. I inquired whether the Market street road is not being operated under the patents of that gentleman. The author of the report says that the owner of the Hallidie patent has commenced a suit against the owner of the patent under which the other road is operated; therefore, it cannot be the same. I do not want to ask for names; I do not want to ask about any man's particular invention. I think the writer of that report has kept clear of that. I do not think he could very well have omitted mentioning the fact as to who was the inventor of the system. I would like to ask for information, and I ask it as one whose attention is drawn in this direction. I would like to inquire how many horses are now owned by the Chicago City Railway Company.

Mr. Holmes: One thousand three hundred and twenty-five.

Mr. Richardson: You say you have fifty-seven miles of track all told; are you engaged in further extending the cable system?

Mr. Holmes: Thirteen miles more will be, probably, constructed next season; we are preparing plans now.

Mr. Bolton, of Richmond: How much a mile does the cable cost?

Mr. Holmes: The cost of the cable itself is estimated at twenty-five cents a foot.

Mr. Wharton: What percentage of power is required to propel the cable?

Mr. Holmes: The total amount of power required for ordinary operation is four hundred and seventy-seven horse power. Of that, it takes three hundred and eighty-nine to move the machinery and the cable. The cable weighs two hundred and seventy thousand pounds, showing that the remaining eighty-eight horse power is used for the propulsion of the cars, of which there are two hundred and forty. You must remember the cable is in motion, and two hundred and seventy thousand pounds of cable in motion will tend greatly in itself to move the cars.

Mr. Sharp: How often is your road broken down, either through the cable or the machinery?

Mr. Holmes: The impression has gotten abroad that we have a great deal of trouble in that respect. I will say, directly to that point, that we operated our main cables for nine months, without a single moment's delay on any account. We had, a few weeks ago, a little interruption by the breaking of one of our cog-wheels. This interfered with our running a part of our cables a few days, and that is liable to occur in any machinery.

Mr. Sharp: How many days were you stopped?

Mr. Holmes: From Tuesday until the next Monday morning.

Mr. Sharp: How would you have got along if you had not had any horses?

Mr. Holmes: We should have hired horses in that case.

Mr. Wm. Richardson: I have read the report of the remarks of the gentleman, made at Chicago, and at that time he was asked about the length of service of the rope of the cables, which question, he said, he was not fully able to answer, from the fact of the shortness of the time they had been running, and that he expected that such and such would be the result. Another thing, as to the best size of cable to be used. I would like to inquire if the gentleman will have the kindness to give us this information now.

Mr. Holmes: We find, from the experience that we have had, that we can depend on the rope running without any flaws for the term of twelve months. As to the size, we find an inch and a quarter in diameter to be the most desirable size of rope. We have the Swedish iron rope. We used ropes of Swedish steel, of ten to twelve carbon. We have recently ordered from Germany an improved style of rope, which we hope will give better results. But this subject, gentlemen, is comparatively in its infancy, and experiments are being made all the time; improvements are being constantly developed.

Mr. Richardson: Do you not find that considerable damage is done in the catching on and letting go of the cable by inexperienced hands?

Mr. Holmes: We find by actual experience that old car drivers are the best. During the first month or six weeks that we operated, we had expert locomotive engineers. We supposed that they would make the best drivers, but when the car was stopped they would apply the grips too abruptly; we find the old drivers the best. I am ready to answer any question you may be pleased to ask me, gentlemen.

Mr. Richardson: What I want to know is, as to the amount of wear on the rope by the grip. I think I saw it stated a short time ago, that while the cable was going at the usual rate of speed, they could just as readily as not bring the motion of the car down to three miles an hour in case of necessity. Now, what I want to get at is, as to the effect of the cable passing through the grip at the rate of eight and one-half miles an hour, yet, by the action of the grip, the speed of the car is brought down to three miles an hour. Is there not there an intensity of friction which rapidly destroys nearly everything?

Mr. Holmes: The jaws of the grips are lined with a species of brass, and after it has been used for fifteen minutes, it would be as smooth and polished as glass. The rope itself is kept in a constant state of lubrication. At first we operated with wood in the place of metal, thinking that that would be less liable to crystalize the cables; but we found that the wear was worse on the cables. The wooden dies would wear on the cable much more, and the wood

would wear out quickly, especially after a shower. We find that this metal lining will give us 2,000 miles of service, and then it is necessary to replace it with a new lining. It costs one-tenth of one mill per mile to keep the grips lined up. We also have the pulleys lined with metal, so as to work easily on the rope. We find that it costs about fourteen cents a year each to keep these pulleys in working order. There is a small wheel at each end of the grip; the cable runs on these wheels when the car is standing still. We are running both systems. We find it costs just about one-half to move a car by cable that it does to move it by horses.

Mr. Walsh: What is the relative expense of operation, or cost of operation, between the cable and the horse-car?

Mr. Holmes: The cable can be operated for one-half; that is, the expense of operating the cable cars is one-half that of operating the horse-cars, for the same amount of service.

Mr. Richardson: Will the gentleman who has seen the operation of the cars on the New York and Brooklyn Bridge by cable state to us if there is any difference in the mode of operating the cars of his line and that of the Bridge? Can he illustrate it to us—the system upon which his cars are operated?

Mr. Holmes: There is a radical difference between the system on the Brooklyn Bridge, and that in Chicago and San Francisco. It lies in the grip. The grip is the focus point of the whole thing. Perhaps the gentleman is familiar with the grip on the Bridge? There are four wheels, and the cable is grasped by those four wheels. When the cable touches the wheels a friction is caused, and in that way the car is brought into motion. The effect upon the cable is just as severe as with the grip that we use. We have moved ten cars with one grip, loaded with a thousand people, in a single train, whereas, on the Brooklyn Bridge, it is found impossible, I am told, to move more than one car with one grip. They put on two cars, but they utilize more grips. If they changed their grip, they would do away with their locomotives, and handle all the people they would have to handle without any difficulty whatever.

LABOR AND THE GRADUATED SYSTEM OF COMPENSATION.

The Committee's report may be found in our November issue, page 7. Following is a report of the discussion:

Mr. Longstreet: I believe that this is the best system that can possibly be adopted. It gives every man an interest in the business. We certainly would not depart from it for a great deal.

Mr. Wm. Richardson: I would like to ask the author of the report, whether on the road of which he has charge, he uses any device for helping the conductor to keep a correct record of his fares?

Mr. Walsh: We use the fare-box and the register.

Mr. Richardson: We do not like to have anything on the car or used by the conduc-

tor that will shock his moral sense; but we have always considered that this was on the same principle as the merchant who sells goods. The money is received by the clerk, who calls out "cash," and it is given to the boy to be taken to the cashier or the bank teller, who has his account revised at night, and sees that his cash balances. I have always tried to instil this idea into the minds of conductors, that the man whether president, superintendent, inspector, receiver, conductor, or one in any other position in life, where called upon to handle money or do business for any other person or persons, who resents being watched by some legitimate system, is just the man who ought to be watched; and further, that the man who is doing his duty faithfully, whether to stockholders or under a superintendent, as conductor, if he is doing his duty honestly, wants to be watched, being satisfied that those who are interested will better appreciate his services, just for being watched and found to be honest. We are often met with the remark: "This does not make a man honest." Of course it doesn't. Putting a man in a cell in the penitentiary does not make him honest, but it greatly restricts his tendency to the commission of crime—so the register restricts the opportunity for peculation.

Mr. White: Mr. President, I think my friend is right; but, from my experience, I think it is necessary to keep up the moral sense of the community that ride in our cars. That is the thing to which we ought to give more prominence. We carry gentlemen in our cars—gentlemen of as apparent respectability as you who sit here before me—and who, while they would shrink from the crime of forgery, burglary, or anything of that kind, which would send them to state-prison, yet do not shrink from robbing you or me, and educating our conductors to be the most infernal scoundrels outside the state-prison. I might give you my experience in one particular instance; I found, on three night cars, which we were running for the public accommodation at a loss, that our receipts fell off to next to nothing. I put three detectives on the cars, whom I specially employed, and their instructions were to get on and go east and west, as the line runs, and on every half trip they should change. They were to give me the reports in the morning. Among other reports came one, that upon one half-trip, coming from the Pennsylvania Railroad Ferry, at the foot of Desbrosses street, there got on thirteen men. The conductor failed to collect any fares for a little way, and by-and-by came into the car, and said: "D—n the Company; I might as well have the fares as the Company." Every passenger on the car gave that vagabond five cents! I hold that every man should go to the penitentiary who robs the Company. I do hope, gentlemen of our common fraternity, that you will lift up your voices against that part of the community who lead on and help our conductors to become peculating scoundrels. If we are to keep our state-prisons free from conductors educated on street cars to be thieves, we have got to get some grip on the public.

Mr. Richards of Cambridge: All that Mr. White stated is so. I was told by the ladies, as the representative of the Company, that we have the meanest company on the face of the earth; that we were keeping our conductors and drivers at work too long. Of course when they had said that, they had forgot that the middle class existed. All that Mr. White has said about the people who ride on the cars is actually so. I hold that the conductors are not one-half as much to blame as the class referred to, who call themselves respectable, who attend our churches, and who are ready at any time to ride upon a transfer-ticket twice.

Mr. Richards of Boston: I certainly listened with a great deal of pleasure to what Mr. White said. I suppose it is a matter of fact that our experience is about the same. We are simply dealing with the public. My experience is, that they are the same wherever you find them. As for the various devices that we put into the cars, I never found much difference in them. I have never found but one register, or heard or saw but one, that I would give any amount of money for its patent, or its use. I was sitting in my office one day, busily writing, when a Catholic Father came in to see me, and laid quietly on my desk a one hundred dollar bill. I asked him what that was for. I could not conceive how it could be for me. He said, "That is for your corporation; it belongs to you." "Who is this from?" He raised his hand and simply shook his head and went out. Our old Treasurer, who has been there thirty or forty years, said to me: "We often have that happen; that, undoubtedly, comes from some old conductor who is on his death bed, and that is his confession to the priest, and he is obliged to make restitution, and that is the money." Mr. Chairman, there was a register, planted in here—indicating the heart—by God Almighty, and until we can appeal to that and make that work; until we can appeal to the moral sense of these men in some way, and as Mr. White has said, until we can draw away from them the influences which make them do wrong, all the registers and bell-punches will avail as helps to honesty only. We must bring these men to believe that taking the company's fares is stealing—is theft. The worst part of our duty, as my friends here will bear me out, is when some poor trembling wife, or mother, or sister comes to us, imploring that the discharged conductor be taken back, and in the rigor of our position, we have to say to the dependent one: "You must go; you must go;" and when, with tears streaming down their faces, they appeal to us and say, "For God's sake, what shall I do? Do not discharge my son," or "my brother," or "my husband," as the case may be; when they appeal to the most tender sentiments that animate us as men, then, I think, in refusing such applications as these, we have performed the worst part of our duty. Unfortunately, I have a great deal of that to do; and yet my duty, if that man has done wrong, and has been shown to have done wrong, determines me to carry out the rule, which is embraced in

and spread upon our records, that no man, once discharged from our road for stealing, shall be taken back under any circumstances. If the influences which send that mother or sister to us, if the purity and the better and higher thoughts which send that mother or sister to appeal for him, would animate him, we should have no stealing. I have little faith, gentlemen, that we shall ever find anything that will make men honest. I agree entirely with Mr. White, that there are a great many men who are ready to steal five cents from a railroad, that would not steal five dollars in any other way. They seem to think it cunning and nice to do what they call "beating" the Company or the conductor. There is that public sentiment underlying the community, which seems to make them ready to do that under all circumstances. I admire the denunciation of Mr. White, and wish that his remarks could resound from one end of this country to the other, and throw back this assertion which is made against us, and say to the public at large, "You, yourselves, are largely the cause."

Mr. Wm. Richardson: I have listened with interest to the gentleman who has just spoken. If he can stand all the beseeching of the wives, sisters, or mothers of the discharged conductors, and after listening to their appeals, say no; he can do what I have never attempted to do. When I say to them, It makes me think very meanly of your husband, or brother, or son, or whoever he may be, that he sends you instead of coming himself, it generally brings out the protest: "He did not know anything about it." Then I say, I am willing to tell *him* very plainly what he is discharged for. I give them to understand that they must excuse me from dealing with them. But, sir, I believe in a great many cases our drivers are responsible for the dishonesty of our conductors. The conductor is appointed; he goes to work for his wages. The driver comes to him and says: "Ain't you going to stand treat? I want a piece of pie; I want a cup of coffee." The driver gives the conductor to understand, in a very plain way, that the piece of pie, the cup of coffee or the cigar, he expects him to pay for; and the conductor thinks that what he gets for the driver he ought to get for himself, and before he knows it, he is right into it. As Mr. Richards said, these things—register or punch—cannot make a man honest; but they very greatly restrict his propensities for being dishonest; and they are a safeguard to the young conductor. He can more firmly say to the driver: "I am not going to steal for myself, and I will not steal for you." In the old times, before we had these things, it was the general thing for the driver to expect something from the conductor. I do believe that it is very necessary for us to have something in the way of a check on our conductors. I have very little choice in regard to many of these things, but I think that anything is better than nothing, that shall operate as a check on the conductor or safeguard on the dishonest man.

Mr. Hasbrouck: We have fare-boxes on

our cars only, and no conductors to debauch or be debauched by the public. I rise simply to say, we have some drivers who are also conductors, who have been in the service of the Company from its organization. They were old stage-drivers for the Company which we succeeded, and I would trust them with untold gold. They think as much of their teams as if they owned them, and they have been with us now for twelve years. They are men of family, and consider themselves as part of the concern. I do not believe they would steal a nickel any more than cut off their little finger. Perhaps I am mistaken, but I think not.

Mr. Arnold, of Salt Lake City: Our plan for collecting fares is that we simply trust our drivers. We run short cars, which are called "bob-tail" cars. We have run our cars twelve years. We have never had a fare-box or any other check. When the times are anything like good, we have good receipts; as high as thirty dollars a day. Still, I think I will adopt a fare-box; but, as I say, we have never had any check of any kind. I know that some of our drivers are just as honest as the day is long. I have had some drivers since the road first opened. I do not believe that they ever took a nickel. I have known from passengers that ride on the cars that have tried to tempt them. We get along very well. Our regular single fare is ten cents. We have reduced that, however. That is the only fare we had the first three years. We have reduced it to four tickets for twenty-five cents, and twenty for a dollar. We have no other prices. When we put on the fare-boxes, we will charge the uniform fare of five cents. I think when you trust entirely to their honesty, and try to select the best men you can get, you can do a great deal better than with something insufficient. As to having a check, just as soon as you begin to watch the conductor, he gets suspicious, and he does not do as well for you. I have found out that to be the case where we have tried to watch men. I think only in three instances I have had to discharge a man for dishonesty. That is in over eleven years.

Mr. Cleminshaw: We find that the honest men will not object to being watched. We offer an invitation to an honest man to become dishonest under the old system, where the money went into their pockets, without any device whereby the number of fares collected was registered. I have talked with conductors who have been reported or discharged, and they have told me how they first commenced. In some cases it was buying an apple, getting a newspaper or buying peanuts. They commenced in that way. I think the best system, and the only system, is to well watch all your employees.

Mr. Humphrey: Mr. President, I have been in this business three or four years. I do not know about watching at all. I have this impression, that it is the best thing you can do, to get honest men, if possible. I like to go back to their ancestors; to know whether they come of good stock. I can prove that men riding in our cars, supposed to be honest, and you would take their word anywhere in business, will cheat you

out of a fare; that is one thing which I learned of the community since I touched horse cars. I did not believe that the public were such scoundrels, to get in and try to cheat you out of five cents. So far as our fare arrangement goes, it would be impossible to put any check on the conductors, because we have eighteen different fares in running seven miles! [Great laughter.] So you can judge what a conductor has to contend with, and we all have to contend with.

Mr. Richardson: What do you charge for the seven miles?

Mr. Humphrey: For seven miles, when a man pays his fare in cash, seventeen cents; when he gets tickets, fifteen cents; children, half price. A little further down towards the stream, five cents; and so it goes, all the way through—different prices. I was thinking last night about keeping accounts, when the report on "A Uniform System of Accounts" was being read. There were so many different accounts in the report, that I concluded if I had to keep accounts in that way, it would be necessary to keep a force of clerks to keep our fares all right. I will tell you what I do: I use a register; I require a man to register every fare collected. I know then how many passengers he has carried, and then they have the trip-slips. They take cash fares at a certain point, six cents; the next point, ten cents; and the next, seventeen cents, for which they have slips. Then there are the half fares. Then comes in what we call a "steamboat fare," if the trip is made in the day time. When we run late at night, as we have to run sometimes, we get a double fare. It requires a little common sense to get that all through your head. If any of you will call on me, I will be pleased to show you how we do it. I have got honest men; good, honest fellows, and I find out who bred them! [Laughter.]

Mr. Richardson: In New York and Brooklyn we have at least learned this: Not to go too far back in the ancestry of our men. This much is true—it would not do to say that the conductors of our friend Humphrey are not skilled laborers. [Laughter.]

Mr. Parsons, of Philadelphia: Honesty is such a rare material, not only with conductors, but with others who handle large sums of money, I would like to know, as a matter of information, where these honest conductors are drawn from. I have no doubt that there are men employed as conductors, who are as honest as the sun ever shone upon. I have always found that four-fifths of the public are in sympathy with the conductors, and the other fifth does not care either way. It is only from a system of watching and checks that any result is satisfactory to the management or stockholders. I often heard it quoted that there are three things that are easy to run: "A railroad, a hotel, and a newspaper." I have heard men say: "I should not suppose you wanted men of experience around you."

Nine patents for street railway appliances were granted in May.

"Spinal Meningitis" in Horses.

At the last meeting of the American Street Railway Association, Mr. White, on request, gave the following as his method of treatment for this disease:

This disease is an epidemic. In New York city, within a few years, it has done a great deal of mischief. In our own stables at one time, we had over sixty cases. The course of treatment, at that time, was belladonna treatment, which proved a sad failure. Since that time, we have had in our stables cases which have not been epidemic. It occurs when we have our most sudden changes of weather. I think it most always ensues upon a weakened condition of the animal, and from sudden changes in temperature, with a little too much work and a little increased strain in a debilitated condition. I turned my attention to some other mode of treatment. I found that a remedy used in human practice was tincture of gelsemium. One day, while reading a scientific work, I found, in connection with the treatment of sciatic troubles, that they had used chloral hydrate. This, exposed to the air, becomes liquid; and it was used with a camel's-hair brush on the sciatic nerves. Leave it in that condition, it was absorbed, but on covering it, a blister would ensue; so, I thought the matter over, and with these two facts presented to my mind, I treated the next case of spinal meningitis which we had, according to my own notions. In the meantime I procured some chloral hydrate and tincture of gelsemium, and consulted a medical work, and found the dose given to a human being, and then I was prepared for the next case. My treatment is as follows:

On the first symptoms of weakness in the hind parts, take the animal from work, put in a quiet stall and place in a sling. Take a good scrubbing-brush, and rub the articulating joints and spine well. Powder one ounce of chloral hydrate and sift it over the spot rubbed; put on two or three thicknesses of paper, and pat the powder to the skin through the hair with the brush used; mix in a pail some good fresh ground mustard for a paste and put over the spot just treated, and cover with a newspaper cover; paste the hind legs to the hocks with mustard, and when legs get warm, wash off and hand rub and bandage well, but not too tightly, with flannel bandages four inches wide, in rolls; give at once fifteen minims of fluid extract of gelsemium, and repeat hourly until the eyes show its effects, when this may be stopped. Give an active cathartic ball, and attend to drawing the water with a catheter. When the ball has operated, give for three days three doses of sulphate cinchonidia forty grains; then thirty grains and twenty grains each for three days; then a few grains, with the usual gentian tonic. Feed any nourishing food the horse will take, clean out all not eaten, and try anything to tempt the appetite. Keep in slings until strong enough to get up and lie down without help. Keep the chloral in ounce bottles ready for use, for all depends on promptness to ensure quick recovery.

I find, as a matter of experience after seven years, that we rarely have a horse we cannot put to work at the end of a fortnight. My own experience leads me to say, I would rather have fifty horses suffering from spinal meningitis than five suffering from epizooty.

In this treatment, it is often necessary to draw the water with a catheter. I have found that to be often the cause that produces paralysis of the bladder, and leaves the horse in a helpless condition. In using the slings, they must be of adequate breadth; and the slings should be of sufficient width as well as length, that the horse may be kept in a comfortable condition.

Mr. Elijah Whitney fully concurred in the course suggested. According to his experience in the use of the gelsemium, it is one of the best remedies in such cases when administered judiciously, and in proper doses. Its action is very prompt and energetic, and requires special care in its use. In combination with *veratrum viride*, or some other appropriate remedy, such as indications require, its happiest results may be obtained with speedy relief and prompt cure.

The Song of the Open Car.

Oh, what delight,
On a soft June night,
To ride in an open car!
You can stand the expense—
It's only five cents—
No matter how poor you are.

Just five in a seat
Make the fare complete
When you ride in an open car:
But some people green
Will stand in between,
And so get un-pop-u-lar.

In the three rear pews,
You may smoke if you choose,
'Tis the rule of the open car;
But you'll hear, I'm afraid,
Some fussy old maid
Say, "Oh, that horrid cigar!"

See the maiden fair,
With the rippling hair,
As she jumps from the open car;
With her face to the rear,
She goes off on her ear,
Like a sky-rocket shooting star.

But enough of this song,
It's getting too long,
This song of the open car;
The very next verse
Might be very much worse,
So we'll stop right where we are.

—Somerville Journal.

Change in Public Opinion.

Commenting on the Broadway road, the *Brooklyn Eagle* says: There seems to be an absolute unanimity of opinion as to the practical working of the road itself. In a single day men have become of one mind through the testimony of their eyes, and the protracted hostility to what is a demonstrated and enormous improvement, is a curious commentary on the shortsightedness of a class who have gained a reputation for conspicuous shrewdness—the merchants of the metropolis. The Broadway retail shopkeepers, with that phenomenon of success, the late A. T. Stewart, at their head, fought the railroad with a fatuous determination which seems incredible.

Stewart said that the street would be blocked by the cars and made impassable, although he could see daily for himself that the confusion was caused by the slow and lumbering omnibuses which he insisted upon keeping there; while, as appears to-day, the swifter cars, confined to a narrow channel, not only make no block themselves, but actually clear the way for other travel. He said that pedestrians, if tracks were laid, would be afraid to cross the street, his dull eye refusing to see that the lawless and vagrant stages were a constant menace and terror to women and children and even to men. He said that private carriages would not and could not draw up at his store if cars were put upon the street, although as he drove uptown he passed the doors of his rivals where the finest carriages in the city could be seen while cars constantly ran by; and although on some thoroughfares these rivals and successors are in the full tide of prosperity, with an elevated railroad in front whose rush and clatter they would now on no account remove. Stewart and those who agreed with him—as almost all the Broadway shopkeepers below Fourteenth street did—opposed the railroad because it would drive off their trade. Their opposition succeeded. The stages remained, but the trade slipped away. Looking at the matter from the vantage ground of a later day, it is hard to conceive that these business men could have made so tremendous a mistake.

Every one of their objections was conclusively answered in the busy hours of a single day. There was less noise than ever known on a week day. There was no block. The traffic of the street by the cars and by other vehicles, was conducted with astonishing smoothness, swiftness and order. When it is remembered that what surprised and delighted the Broadway wayfarer yesterday was not an elevated road, or in any sense what is known as rapid transit, that it was a means of travel in city use for more than thirty years simply employed in the place where it was wanted, there could not be a better demonstration of the folly of defying the plain rule that methods of travel, new or old, should follow the natural and established lines of travel.

There are those who believe that even the horse railroad may restore to the lower part of the great New York highway something of its old character and business. Perhaps it is too late for that; but it is not too late for us of Brooklyn, provided we lose not another hour, to profit by the lesson of Broadway.

If some clever writer, whether of fact or fiction, is hunting for a subject with a flavor of old time and yet with a present interest, let him now put together the "Diary of a Broadway Stage Driver" or something to that effect. It would afford wide scope for description and reminiscence, and scores of lively stories could be woven from the glimpses a driver gets of his daily passengers, their tastes, habits and caprices. We charge nothing for the suggestion except, if the work be really good, that we be allowed advance sheets for purposes of making extracts, says the *Commercial Advertiser*.

Citizen Train on Tramways.

[It was supposed that Citizen Train lost his Tramway Millions when, a quarter of a century ago, he sacrificed "Millionairedom" for the Union? but he claims that Oakey Hall says he is still entitled to his tramway royalty!

An exchange of Postal Cards resulted in an interview which makes the spicy Introductory to Citizen Train's "History of Street Railways through Cosmos," promised for the STREET RAILWAY JOURNAL! (provided "Psycho-Affinity" is strong enough to draw copy from Madison square? As G. F. T. is nothing if not original, we type him as he talks!]

STREET RAILWAY JOURNAL. Though your postal card evades us, saying you will not be interviewed, perhaps you will pencil us (as the children whom you love so dearly, and whom alone you permit to "interview" you, are not yet out of school,) a Yes or a No to the paragraph in our April issue, concerning attitude of Louis Napoleon when you undertook to benefit Paris by street railways?

G. F. T. If you will take a seat on that bench over there (some 20 yards away) and pencil your questions, I will gladly answer so courteous a journal! The silence of the press on what Cosmos wishes to know, ("Psycho-ism") is most remarkable event of "Typo Age." Yes That Napoleon story of Paris is true! He was a thick-headed, stupid old man, who showed his Balloon Force at Sedan ("falling on his sword,") and in allowing his Doctors to hack him to pieces at Chiselhurst!

Success, Not Failure?

STREET RAILWAY JOURNAL. This paragraph from an English exchange suggests failure rather than success in England? The success was in sowing the seed, we thought, though others reaped the harvest:

Tramways are rapidly increasing in number and popularity in England, and yet when George Francis Train tried to introduce them some years ago he encountered the bitterest hostility! In London street railroads are not to be found in leading streets, which, indeed, are too crowded for them. The rails are laid down with much greater care than here, but it is beyond dispute that carriages suffer!

G. F. T. Yes! I lost them fighting for the Union against all Europe, (*vide* Peterson, five vols., "Union Speeches," '61-2?) and getting into Dozen Jails!

JOURNAL. Have you copies of your Street Railway Publications when introducing Tramways (in 1860) in Europe, Asia, Africa, Australia and South America? I hear that the *Engineer* credits you as "Pioneer and Argonaut" of the Street Railway system in foreign lands?

G. F. T. Yes! My late private secretary for two decades (living now I believe in Omaha,) has all these works! I have a thousand Auto-letters from notables in Europe (ten auto-books) endorsing my "Tramway Boom." But your space is too valuable for details! Some other time if you like I will type "History of Street Railways" for your JOURNAL? (When "Psycho-Affinity" commands?)

STREET RAILWAY JOURNAL. As we keep

posted on Street Railways the world over, you may not have seen how great is your English success at the end of twenty-six years. These official figures show Tramways are becoming popular in Great Britain. The length of line open for public traffic, 1884, is given 752 miles, against 671 miles, 1883; and number passengers 1884 was 330,794,405, against 295,721,171 ending June 30, 1883. The total capital paid up 1884 was £11,008,121, against £9,929,789 in 1883. On how much could you reckon up your claims for royalty when you chose to present your bill? It is said that Oakey Hall in his *Brooklyn Eagle* letters asserts your claim to be good.

G. F. T. Oh, yes! "Psychos" never make mistakes? "Promoter," (as well as Patentee). My rights flow on like the beautiful river. Five hundred pounds royalty per mile was what I got for Darlington, Staffordshire, and Birkenhead roads! And Marble Arch, Victoria Street, Kensington Gate, and Westminster lines in London! On 800 miles completed, my share is four hundred thousand pounds! (Two Million Dollars.) But what could I do with so many stamps? Yes! only score of years ahead of time. Ask Geo. Augustus Sala if my claim is not *bona fide*?

(Why not collect this for Palace Home of street railway laborers, conductors, drivers, who will come to grief? See *New York Herald*!)

JOURNAL. What year was your debate with the British Association (the late Lord Derby in the chair) at Oxford, on the "Introduction of Street Railways into Europe?"

G. F. T. 1860! What changes since then! Yes! If you some day wish to refer to my address I will send for it. But my speech on opening Birkenhead Railway in August, 1859, you will find in full in *New York Herald* about middle of September, that year! It foreshadowed quarter of a century progress which you describe in STREET RAILWAY JOURNAL.

Yes! All my lines are now running, though ripped up then! The Birkenhead road alone stood fire? Even our old car factory at Birkenhead is still under way (like Stephenson's concern), employing several hundred men and furnishing cars for all the world! Its chief is my old Australian clerk of 1853, and English partner of 1860, George Starbuck, Jr., an American from Nantucket! Here are official figures of growth of ideas there since I sacrificed five millions to checkmate Yancey, Lord John Russell and Napoleon in acknowledging the Confederacy!

Too Late for Cheers.

Approbation and sympathy
I courted long! They never came!
And then I roamed through land and sea
And forced Cosmos to honor name!
(In enterprise of Manhood, Fame?)
And now that Fame in cheers come round,
And friends are coming far and near,
My ears are deaf to hollow sound,
That echoes Falsehood's Demon cheer!
Cosmos cut off! *Too late! Too late!*
The world not I) is desolate!
That little baby talks to me
Life language that I understand?
And when I press its little hand
'Tis "Lifehood's Electricity!"
(The freedom of true Liberty?)

Wonderful Progress?

STREET RAILWAY JOURNAL. Do you note any great improvements in street railways? any important changes since your Birkenhead road in 1859?

G. F. T. Yes and no! Fall in cars and rails
Of course is change! The price of Cars
To one-third off, of rails one-half!
But no Street Railway ever fails
To keep up with the Telegraph
In far off towns (of stripes and stars),
Two hundred millions every year
Use surface roads here in New York,
(And hundred millions on the "L,"
Besides, who do not care to walk,
Where Rapid Transit rings the bell!)
Just think of it? In Canada
And States Five Hundred Street Railway
Companies make dividends pay,
Labor for driver, horse and car!

Some forty thousand working men
Employed, some Twenty Thousand cars!
One hundred thousand horses make
An army! Three thousand miles bars,
(Atlantic to Pacific sea)
To represent rail energy
And success what men undertake,
To enterprise street rails again!
Fourteen hundred millions each year
Passengers on our railways here!
Two hundred millions money spent
To iron rail the Continent!
Two hundred thousand tons of hay,
And twenty million bushels grain
To feed street railway stud to-day,
Each year to add to labor gain!
These changes are astounding facts
To mark the JOURNAL'S railway tracks!

No Bell Punches Then!

STREET RAILWAY JOURNAL. You did not, I suppose, invent the "Bell Punch?" (That is a decided change?)

G. F. T. No doubt! Stamp a man with Stripes and he will see Stars. This is "age of spotters." Everybody is watching somebody!

I said "No change!" "No change!" Oh, yes!
In ways and means to watch the change.
In checks and points to score success,
By giving Cash Box closer range!
New system confidence bereft,
Organizes Street Railway theft!
No "Alarm Register" to tell
Its tale when I first started cars!
No "Automatic Alarm Bell!"
No "Fare Collector" (behind bars)
"Self-made conductors" were unknown
In Auld Lang Syne! "Bell punches" then
Were rare (as "spotters" on the men!)
Apply same "Rules" to "Rings" and "Boards"
To corporation "Chiefs and Kings,"
And "Private pools of public hordes"
Might dividend shareholder Rings!
(With "Punch Bell Change" in changing things!)

Street Railways had no Infancy!
Same Cars and Rails are used today
I introduced! John Stephenson
Made my first Car! His Industry
I imported at Birkenhead
Where Cars are built (on his Platform)
And now they build them there instead!
(Where Dividends are sure to pay?)
Both kinds of Rail as Patentee
And Cars I used! (What History?)
Please interview John Stephenson
(Johnson just passed my Bench in Square)
Whose Railway Car (last page upon)
Exactly Copies Car sent there?
Changes indeed? Your Journal shows
(Type! Paper! Editorial Brains!)
How rapidly Street Railways grow
(Dozen "Ad" Pages of Railway Trains)
Rail Enterprise and Energy
Street Railway typed both sides the Sea!

STREET RAILWAY JOURNAL. Just one more question! What year did Napoleon shut you out of Paris?

G. F. T. Just quarter of Century ago (one fourth one hundred years)! See my

book (illustrated) in French, on Street Railways, 1860!

Ask Olive Logan (Mrs. Wirt Sykes)
 Then Mrs. DeLille! (Friend of Moequard)
 What Louis said about my car
 Stephenson made! (and Czar's dislikes?)
 See James McHenry (with me then),
 The lives of our Railway Men?
 Count DeMorny endorsed my plan
 (And Walewski and Persigny?)
 But Bonaparte was not the Man,
 Though I was backed by Eugenie!
 Paris is "Cosmos *Ville De Luxe*"
 (He said) "We want no 'Yankee Spooks'!"
 Yes! Europe! Asia! Africa!
 Australia! South America!
 Credit "Street Railway Boom to Me"
 As Argonaut and Pioneer
 Of "Cosmos Tramway History!"
 (As in your Journal Courtesy!) G. F. T.

The Broadway 'Bus.

The New York *Tribune* soliloquizes sensibly, as follows: "In a few weeks the Broadway 'Bus will be but a memory. At the edict of Jacob Sharp it will have faded into the limbo of the past, and have become a subject for the folk-lore of the future. Yet this imminent change need not evoke gloomy thoughts. The Broadway 'Bus, to say sooth, can well be spared. In fact, it could have been spared some time ago; and there are those who go so far as to maintain that its room would have been better than its company at any moment since its first introduction. For it must be acknowledged that the Broadway 'Bus is not a Thing of Beauty. It combines more ugliness and discomfort than were ever crowded together in one vehicle. During all the years it has lumbered and rumbled down Broadway it has elicited the liveliest expressions of amazement from strangers within our gates—amazement, for the most part, that so progressive and inventive a people should tolerate a mode of conveyance as far behind the age as an old mail-coach is behind a Pullman drawing-room car. Of all kinds of public conveyances ever devised it is the most clumsy and inconvenient.

The passenger is almost sure to knock his head both getting in and out, and if he does not also tread on the feet of his fellow-sufferers on both occasions he and they may congratulate themselves. The arrangements for shooting passengers out into the mud suddenly are unsurpassed, unless it be by the facilities for compelling them to plunge wildly forward toward the horses when they enter. The Broadway 'Bus is cold in winter and stuffy in summer. It has a perennially frowsy smell; a flavor of remote antiquity; of the strange period when people used straight, hard-seated, high-backed chairs, and otherwise mortified the flesh in their domestic arrangements. Its exterior always suggested the idea that the inventor of the machine had designs for a circus band-wagon floating through his powerful mind when he conceived this chaste and unique creation, and that these reminiscences were fused with hazy glimpses of the decorations of a dime museum. But he repressed these vagrant fancies, and confined the working of his artistic imagination rigidly to the ornamentation of the external panels. No hint of comfort or convenience was per-

mitted to interfere with the grim realism of the vehicle as a whole. The Broadway 'Bus may be said to have typified that awkward period of the Republic's adolescence when it was thought necessary to advertise our democracy in all ways and when somehow the admission of any concession to public convenience was thought to savor of bloated aristocracy.


In fact the Broadway 'Bus perpetuates the *sans culotte* craze of the great American Republic; an interesting but yet a raw and crude time, when we were still not accustomed to our own institutions, and were inclined to suspect all the world of looking askance at us. All that feeling has passed away, but the Broadway 'Bus has remained as a landmark and an anachronism to remind us of bygone days. And yet, though there never was such a grotesque old rattle-trap, and though its name will go down like that of the piratical old party mentioned by Byron, "linked with one virtue and a thousand crimes," no doubt there are many New Yorkers who will regret the disappearance of the familiar vehicle, and will fondly recall the associations with which its noisy career has been bound up. What, too, will become of the Broadway 'Bus drivers?

Will they take office under Sharp? Will they ring up fares on the new surface railroad, instead of knocking them down on the high boxes of their old stages? Or will Sharp found a Home for Decayed 'Bus Drivers, and allow them to end their days peacefully driving the last of the Broadway 'Busses round and round in the back-yard, and tumbling one another out in the mud after the good old fashion? We know not how this will be, but it is certain that the days of the Broadway 'Bus are numbered, and that before autumn puts on her splendid robes of gold and russet and crimson the place that knew it shall know it no more."

Elevated R. R. Smokers.

The good people of Brooklyn seem not a bit "backward in coming forward." An item in the *Sun* says: "A petition, signed by several hundred patrons, has been presented to the Elevated Railroad Company asking it to place a smoking car on each of the trains." Well, if the Elevated Railway Company comes to the conclusion that the introduction of these luxuries will pay it in gold dollars and cents, very probably the petitioning patrons will get what they want. But it does look very much as if Mr. Jacob Rehm knew what he was talking about when, sometime last winter, he told a Chicago reporter that if you give the public one accommodation it was sure to demand another; "if you heat the cars, the next thing they will want is Axminster carpets and satin cushions." Who can tell that, having got their smoking cars, the Brooklyn petitioners will not demand dining cars and buffet cars on the line. Strange, what a sense of proprietorship the payment of ten or twenty cents a day will start in imaginative minds; and yet, there is a long, long difference in definitions between the terms "patron" and "proprietor."

Brake Rod for Street Cars.*

The object of this invention is to prevent the breaking of treet-car brake rods, and it consists in a brake-rod made with a  bend at its rear end. The brake-beam is placed upon the short arm of the brake-rod, and the two arms are connected at the forward side of the said brake-beam by two links, so that the bending of the rod from the turning of the brake-beam will be made to occur in the body of the rod.

Heretofore the brake rod has been made straight and passed directly through the brake-beam, and the constant jarring crystallized the iron, and thus made it brittle, so that when the brake was applied and the brake-beam was raised and turned by the friction of the brake-shoes against the wheels, the tendency of the brake-rod to bend at the forward side of the brake-beam and the weakening of the rod by the screw-thread caused the said brake-rod to break at that point.

* Matthew Van Tassel, 86 Woodbine St., Brooklyn, E. D.

Correction.

MESSRS. EDITORS: We note in your issue of June, the statement that the contractor for the Broadway Surface R. R. is Wm. Wharton, Jr. This is an error, we being the contractors, and Mr. Wharton, as an officer of this association, is looking after our interests in New York in the matter of this contract and others which we have there. Mr. Wharton is not in business on his own account in any way, nor has he been since 1881. You will be good enough to have the necessary correction made, and oblige,

Yours truly,

WM. WHARTON, JR., & Co., Limited.
 PHILADELPHIA.

[The item alluded to was printed as furnished us. Had Messrs. Wm. Wharton, Jr., & Co., Limited, been kind enough to furnish the information themselves, the error would not have occurred. Eds.]

Recent Patents.

The following list of patents relating to the street railway interests, granted by the U. S. Patent Office during the month of May, 1885, is specially reported by Franklin H. Hough, solicitor of American and foreign patents, 925 F street, N. W., Washington, D. C.:

- 317,394.—Car starter—J. Lowbridge, Allegheny, Pa.
- 317,085.—Cable railway—G. B. Bryant, Philadelphia, Pa.
- 317,008.—Cable railway—J. H. Pendleton, Brooklyn, N. Y.
- 317,086.—Cable railway grip—G. B. Bryant, Philadelphia, Pa.
- 317,139.—Cable railway mechanism—T. L. Johnson, Cleveland, O.
- 317,140.—Cable railway system—T. L. Johnson, Cleveland, O.
- 317,282.—Street railway switch—O. Bangs, New Haven, Conn.
- 318,274.—Street car—W. D. Mayfield, Fort Worth, Texas.
- 318,717.—Street car driving gear.—F. G. Freese, Philadelphia, Pa.

Street Railway Insurance.

Senator Daggett's bill (Senate Bill 309), of which we gave the full text in our last issue, page 166, has at last (June 9) received Gov. Hill's signature, and by the provisions of the act, the American Street Railway Mutual Insurance Association has now a corporate existence. The incorporators are William White, Pres., Dry Dock & East Broadway & Battery R.R. Co., N. Y., and member of the present Executive Committee Am. Street Ry. Asso.; Chas. J. Harrah, Pres. of The People's Pass. Ry. Co., Phila. and member of present Ex. Com.; Jas. W. Foshay, Pres. Broadway & Seventh Ave. Ry., N. Y., and last year Pres. N. Y. State Street Ry. Assoc.; Calvin A. Richards, Pres. Metropolitan R.R. Co., Boston, and now Pres. of the Amer. Assoc.; William H. Hazzard, Pres. Brooklyn City R.R. Co., and now 1st Vice Pres. N. Y. State Assoc. and member Exec. Com. Amer. Assoc., last year Pres. Amer. Assoc.; D. F. Longstreet, V. Pres. & Gen. Man. Union R.R. Co., Providence, and last year V. Pres. Amer. Assoc.; Wm. Richardson, Pres. Atlantic Ave. R.R. Co., Brooklyn; Alex. H. Davis, Pres. Louisville (Ky.) City Ry. Co. (of which road H. H. Littell, the first Pres. of the Amer. Assoc. is Gen. Manager); Charles Cleminshaw, V. Pres. Troy & Lansingburg R.R. Co., Troy, N. Y., and now Pres. N. Y. State Assoc.; Samuel Little, Treas. Highland Street Ry. Co., Boston; Hon. G. Hilton Scribner, Pres. Cent. Park, North & East Riv. R.R. Co., N. Y.; Thos. Lowry, Pres. Minneapolis & St. Paul Ry. Co.; Henry M. Watson, Pres. The Buffalo (N. Y.) Street R.R. Co., and now 2d V. Pres. Amer. Assoc.; John B. Parsons, Pres. Lombard & South St. Ry. Co., Phila.; and Wm. J. Richardson, Sec. The Atlantic Ave. R.R. Co., Brooklyn, and now Sec. & Treas. of both the Amer. & N. Y. State Associations.

The standing of the corporation is thus assured beyond cavil by the prominent positions of the incorporators, and we take pleasure in commending it to the confidence and support of our readers.

The varying insurance laws of the different states made it absolutely necessary that the corporation should be chartered under the laws of some one state, and as the recognized authority in such matters of the N. Y. State Superintendent, Hon. John A. McCaull, places the standing of companies chartered under the laws of this state higher than those chartered elsewhere, New York was preferred by those interested. The idea of the institution, however, is to make it National in scope, and it is thought that it will be able to save a great deal to the street railways.

The present rate of insurance on street railway property ranges from 75 cents ($\frac{3}{4}$ of one per cent) up to five per cent, while the total losses—basing the calculation on reports from 190 companies—have not averaged one dollar in three dollars of premium paid in. It is readily seen that a mutual association could effect a saving of at least 50 per cent to those interested.

Another feature worthy of note is the absolute stability of the capital, which cannot

fall below \$500,000.00, and which it is anticipated by the projectors of the enterprise will cover the legal limit of two million dollars when once the methods and plans of the institution are understood. The lowest legal limit for other insurance companies in New York and Brooklyn is \$200,000.00 capital, and it does seem somewhat ridiculous for street railway companies with a property running up into the millions in value, to insure with concerns whose entire capital stock could not repay the loss of a single item of losses on staples.

Light Shades vs. Dark Colors on Cars.

At the Master Car Painters' Convention, the economy of painting cars light instead of in the, at present, more fashionable dark colors was strongly urged. Painting being so considerable an item in the first cost of a car, and it being a protection to all other parts of the work, it must be watched carefully and treated at the proper time. Twenty-five years ago, most cars were painted a light color—yellows of different shades being generally used. White lead was the foundation and the finish of the car. But a change came in the color of cars, competition brought out new colors, a ground work was introduced for the sole object of setting off the decoration on the outside of the car to greater advantage. Economy was not thought of; but a change was made from the straw colors to the umbers or darker shades, which involved an expense of one-third more in the first cost of painting, while the life and service of the car was one-third less than it had been with the light colors.

Just as soon as a change is made from a lead finish to any of the popular shades, such as umber brown, chocolate, Pullman color, olive and Quaker green, Tuscan red, or, in fact, any color where no lead enters into the mixture, we lose at once the wearing quality, for it is the exposed surface of a paint that tells. This is the protection to the entire body, and a lead foundation will not help the finishing color if composed of the pigments we have named, but carry the lead all through and we have a durable surface; we have a car that will pay for the labor expended on it. No other pigment bears more oil than a pure white lead; pure linseed oil combines with it better than with any other of the vegetable or earth pigments. A lead pigment is more durable and forms a denser coating than any other employed in the paint-shop. A solid body, and one that has depth to it, is the main object in a paint. A coat of Tuscan red may have coloring-matter sufficient to cover the work, but that is simply a stain; there is no wear in it; lead gives a solid foundation, and will hold out the varnish well on its surface.

Heat is the great enemy of paint, and such colors as are in general use on cars draw the sun's heat, which burns the oil and the life out of the varnish and paint. By repeated tests of light and dark colors, we find that white presents the coolest surface in a hot sun, and black the hottest. A grad-

ual scale may be run up, and the heat-absorbing power increases as the colors become darker, the effect being to expand and soften the darker colors. A continual heat would make the paint and varnish elastic, and while in this state, were it suddenly exposed to cold air, the contraction would crack the painted surface; but take a light color and put it to the same test, and we find that it does not draw nearly the same amount of heat.

Light color has less absorbing power, hence its durability and less liability to injury by solar heat, than dark shades, or the reds which are so common on coaches the last few years, and which suck in the heat and moisture, making but feeble resistance to the attack of storm, having no solid body to resist the sudden changes of weather. The life of a dark color on a car, particularly in the Southern States, is less than half what a buff or a straw color is. The dark color in one case referred to is of an olive shade, which I am informed the heat soon changes to a deep black olive, and frequently the dark cars have to be repainted after only twelve months service, the paint being too far gone to revarnish, while the buff-colored cars run from eighteen months to two years, and then clean up well and are revarnished.

The shades of color suitable for cars, that will resist the deadening effects of solar heat the best are the various shades of straw, lemon, cream, deep gold, old gold and buff. Many shades may be made between a pure white and an orange, in all of which white lead predominates, and the best brands of chrome yellow and yellow ochre with venetian red. No shade of color should have the strong yellow cast that we have seen on some roads; it should always be toned down, which enriches it.

Light colors retain the oil a greater length of time; and that dark colors absorb and retain heat has been proved by numerous tests.

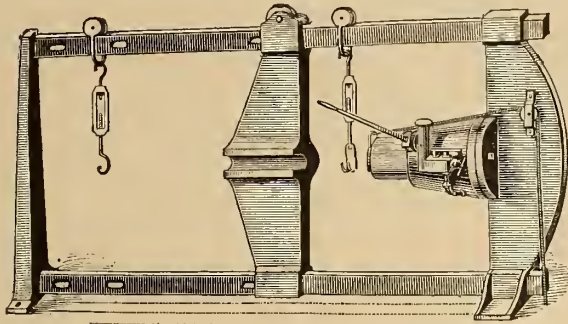
Did you ever see two women board a street car? No. Well, they do it somewhat after this fashion: "Is this our car, Celia?" "No, Martha, I don't think it is. I think that is ours just back of it." And they wait until the car has passed them, and then hail it with their parasols. This proves ineffectual, so several men begin to whistle for it on their fingers. It is at last brought to a standstill, and one of them says, "Now, you get on first." "No, I won't; you get on." "I shan't do it." "But you must." "There, now, I've left my handkerchief in that store, oh, dear!" "Can't you wait, conductor, while she goes back to look for it?" "Oh, never mind, I will call there again tomorrow and see if it has not been found. Now, you get on, Celia." "No, you!" "This car goes up Columbus avenue, doesn't it, conductor?" Conductor—"No, ma'am," and then he pulls the string.—*Boston Record.*

The DeKalb Avenue line in Brooklyn is making some needed improvements in its Washington street bridge terminus.

Hand Power Hydraulic Wheel Press.

This is a light but powerful wheel press, designed for use in small shops, and especially adaptable for street railway use. They are made in two sizes, namely:—60 ton press for 30" wheel—weight about 1,800 lbs.; and 100 ton press, for 36" wheel—weight, about 2,500 lbs. In these jacks the valves are made large, and drop into the seat, instead of being small, and dropping away from the seat, or lying upon the side, a very familiar form of construction.

The piston is entirely enclosed, thus pre-



HAND POWER HYDRAULIC WHEEL PRESS.

venting all grit or foreign material getting into the pump and cutting it or preventing its working. The cylinder and bottom, on which it rests, are made from one piece of steel, thus relieving the reservoir casing of strain and dispensing with one packing and making a jack which is claimed to be stronger and lighter than one having a wrought-iron cylinder. Accessibility of parts and ease of repairing are points claimed in its favor by the manufacturers.*

* Watson & Stillman, 470 Grand Street, New York.

New York City Owns its Streets.

Judge Ingraham, in the Superior Court, (New York City,) recently dismissed an action brought by a Mr. W. P. Abendroth, a merchant owning property at No. 282 Pearl street, for an injunction restraining the Manhattan Railway Company and the New York Elevated Railway Company from maintaining their elevated structure in that street.

In his opinion the judge declares that even though it was proven that the elevated structure deprives the plaintiff of light and air, no *property* having been taken from him by the defendant, Mr. Abendroth has no ground on which to bring suit.

To substantiate his assertion of non-ownership, the judge goes back to the earliest history of the city, and the line of reasoning is interesting. He points out that the absolute fee vested in the Crown, and that no one had a present or reversionary title in the soil of the public highway on the ground that he was the owner of the lands through which it was laid. By the Dougan charter and also by the act of March 7, 1793, all the title of the people in the streets or highways of the city became vested in the city.

"It is clear," the judge proceeds, "that the owners of property abutting on this

street at the time of the conquest of the city by the English, as distinct from the other inhabitants, had no right or property in Pearl street, and unless it appears that they acquired some interest in the street since that time, no property of the plaintiff has been taken by the defendants." The city, he says, has remained the absolute owner of the street, and, subject to the control of the Legislature, can make any use of the street not inconsistent with the right acquired by the public by the dedication. This gave to the abutting owner no property in the street. As distinct from the

public, he acquired no easement in the street itself. Therefore there is nothing in the case of Mr. Abendroth on which could be predicated a decree in his favor.

This opinion may prove of value in other instances, where individual selfishness, obstinacy or greed obstructs the course of improvements calculated to benefit the general public.

Notes and Items.

BRENNHAM, TEXAS, has a new street railway.

THE CENTRAL RY. of Los Angeles, Cal., is building four new cars.

THE LYNN & BOSTON (Mass.) Co. is adding more horses and cars to its equipment.

THE BROOKLYN CITY RAILROAD is having built by Stephenson forty-three new cars.

THE LAMPASAS (TEXAS) CITY RAILROAD Co. has added two new summer cars to its equipment.

THE JAMESTOWN (N. Y.) STREET RAILWAY Co. will extend its line across the creek, to the village of Brooklyn.

THE ERIE CITY PASSENGER RAILWAY Co., Erie, Pa., intends extending its tracks one mile during the season.

THE GULF CITY STREET RAILWAY AND REAL ESTATE Co. has built a new street railway in Galveston, Texas.

THE LEWIS AND FOWLER Register is used on the new cars of the Calvary Cemetery, Green Point & Brooklyn Railroad.

THE BROCKTON (MASS.) STREET RAILWAY Co. is about extending its tracks 4.65 miles, and will considerably increase its stock.

THE OMAHA (NEBRASKA) HORSE RAILWAY Co. is making some improvements in its property. Character of same not stated.

THE LOUISVILLE (KY.) CITY RAILWAY Co. has twenty-one new cars now building, and is just completing about ten miles of new track.

THE SOUTH FERRY RAILWAY Co., of New York City, will build four open cars and about five box or close cars during this season.

WALTER A. JONES, of J. M. Jones' Sons' car works, will sail for Europe on the Cunnard steamer Servia, July 11, for a three months' vacation.

THE CHICAGO WEST DIVISION RAILWAY is building a new car house for its Milwaukee Ave. Line. The building will be 125' x 175', of brick and stone, two stories.

THE METROPOLITAN RAILROAD, Boston, is building thirty-five open cars. Track is being extended two miles to Winthrop, and one mile to West Roxbury Park.

THE SECOND AVENUE (N. Y.) R. R. Co. has withdrawn its application for permission to build a track in Fifty-seventh st., to connect its lines in Second and First aves.

J. M. JONES' SONS turn over their Schenectady shops to the New York Central Sleeping Car Company July 1, having sold them to that company some weeks since.

THE PITTSBURGH (PA.) & WEST END PASSENGER RAILWAY Co. contemplates making considerable extensions of track and additions to its equipment during the next year.

THE GREEN POINT AND LORRIMER STREET (Brooklyn) RAILROAD. Twelve new open and twelve closed cars built by J. M. Jones' Sons will be equipped with the Randall gear and Lewis & Fowler register.

THE BRIDGEPORT & WEST STRATFORD (Ct.) Street Railway is likely to be built at an early day, as the sum of twenty thousand dollars has already been subscribed to the stock of the proposed enterprise.

MR. WM. RICHARDSON, Pres. Atlantic ave. R. R. Co., Brooklyn, has secured a permit to erect a \$50,000.00 stable for the company's new Bergen St. line, at the corner of Boerum place and State street, Brooklyn.

J. M. JONES' SONS, West Troy, have just delivered to the Brooklyn City Railway four elegant cars for the Fort Hamilton steam road. These cars have improved trucks, vacuum brakes and all the modern improvements.

THE SIXTH & SAN FERNANDO STREET RAILROAD Co., of Los Angeles, Cal., has been merged into the Central Railway Company of that city, and the line is now "making ten minute time, instead of fifteen or twenty minutes, as heretofore."

THE JOHN STEPHENSON Co. is building cars for the Beaver Valley Street Railway; the Minneapolis Street Railway; a large order for the Forty-second St., Manhattan & St. Nicholas Avenue Railroad, and various other American roads; also for Monte Video, Lisbon (Portugal) and various roads in Mexico.

THE NEW BROADWAY (N. Y.) SURFACE RAILROAD has ordered seventy-five new cars, a part of which are to be built by the John Stephenson Company, and the remainder by a Western company. We believe Andrews & Clooney make the wheels; on a part the Vosespring and the Bemis gear will be used, and on others the Stephenson super gear.

THE DOVER (N. H.) HORSE RAILROAD, 2½ miles long, running from Sawyer's Mills to Garrison Hill, having proved successful, business men are now agitating its extension from Garrison Hill to Great Falls, 4 miles. The cost would be about \$25,000.

THE IRON STEAMBOAT Co. has its boats running regularly to Concy Island, and probably ere this reaches the eye of the reader will have its Long Branch line in operation. Its boats have all been thoroughly overhauled and are now in first-class condition.

DR. MORRIS MATTSO, who died on June 14th, at his residence in New York City, was a director in the Second Avenue Street Railroad Co. He was the inventor of several well-known surgical appliances (including the "Mattson syringe"), and leaves a fortune of nearly half a million.

THE CHICAGO WEST DIVISION RAILWAY, among other additions, is building an extension to its North Milwaukee Ave. Stables, with stalls for 200 horses. The building is of brick and stone, 167' x 138', two stories. The stalls will all be on the ground floor, the second being used for forage, etc.

THE use of metal checks instead of paper tickets on the Brooklyn Elevated road is being watched by the New York Elevated road managers with interest, and may, eventually, be adopted here. They are considered much safer and more handy, except where transfers are given.—*N. Y. World.*

THE SOUTHERN RAILWAY Co., of St. Louis, Mo., has bought, since April last, seventy head of horses, and is still buying. About two-thirds of a mile of street occupied by its tracks are soon to be reconstructed with granite paving, and the company will relay its tracks (7¾ miles) with over 100 tons of Johnson steel girder rails, fifty-two pounds to the yard.

AN item in our last issue relative to the Bemis Car Box company and the Baltimore Car Wheel company, though obtained from what was deemed a reliable source, was without authority from either company, and we find upon investigation had no foundation in facts, and that the litigation referred to was decided by the courts July 14, 1884, in favor of the defendant.

THE DENISON (TEXAS) STREET RAILWAY Co. contemplates building about one mile of additional track, making about four miles total, including turnouts, and putting on two additional cars, with an adequate number of mules, during the present season. The company now has sixteen mules and will increase the number to twenty or twenty-two very soon.

HOBOKEN.—The large steel cable, intended to operate the cars on the North Hudson County Railway Company's elevated road between the Hoboken Ferry and the brow of the hill, arrived yesterday [June 10th]. It was made by Roebling & Son, is 12,000 feet in length, and exclusive of the wooden drum upon which it is coiled, weighs twenty-four tons. It is said to be the longest cable ever made.—*New York Tribune.*

PRESIDENT JOHNSON, of the Electric Railway Company of the United States, just returned from a trial of the New Edison Motor, said to a *Mail and Express* reporter: "I must say that the various devices which were experimental now perform their several functions admirably, and I have sent the following cable message to Mr. Cyrus W. Field, in London: 'Motor now working perfectly. Reversing apparatus frictional devices fulfil our expectations. No sparking. JOHNSON.'"

B. J. HUGHES, a New York car conductor, who brought suit against a certain Mr. F. J. Warneck to recover \$10,000 for slander, received a verdict of \$125.00. The conductor, in pursuance of his duties, collected extra fare from Mr. Warneck, a passenger on his car, when the latter called him a "thief." Warneck was ejected from the car, and on complaint to the company, the conductor was discharged. The damages will not cover the conductor's salary from the time of discharge.

THE BROADWAY (N. Y.) SURFACE RAILROAD Co. having been unable to secure right of way from the Belt Line and the Church Street and South Ferry Line, through State and Whitehall Streets to South Ferry, Mr. James Richmond says: "Our lines are being laid to-day around the circle of Bowling Green, so that we shall run there and back without breaking connection, and shall connect them at Bowling Green with South Ferry with the stages taken off Broadway. The stages will carry passengers free."

M. M. GREEN, PRES. HOCKING VALLEY RAILROAD, is reported to have said, in a recent interview:—"The cable railroads of San Francisco beat all the surface street roads in existence. They run up hill and down, sometimes at an angle of forty-five degrees, with perfect ease and great rapidity and security. The cars are some of them fifty or sixty feet in length. They can increase or decrease the speed through their clutch on the cable, and when they come to a clear space they shoot ahead with great rapidity. The cable roads of Chicago are mere tranways compared with the San Francisco cable roads."

THE HIGHLAND STREET RAILWAY, Boston, is connecting its stables with repair shop by a 1000 foot wire rope, to transmit power for feed cutting. Track, cars, and horses are in excellent condition. Clark's power grooming machine has been in use for some time and is found to do the work nicely. Most cars are equipped with the Shattuck journal box, which is claimed to be an improvement on the Higley gear, oil being in bottom of box feeding upward; the box is cast in one piece, with removable lid. One of these boxes has made a record of 21,600 miles without oiling. The company's car, "Governor Rice," is fitted with the Chaplin roller bearing, said to give excellent results in securing a positive reduction of friction.

MR. GEORGE P. FRICK, who died at his residence in this city yesterday [June 9th] was one of Baltimore's representative business men, and contributed in many ways to the city's growth and prosperity. He was

a gentleman of great energy and rare administrative capacity, as was shown in his management of the street-car system popularly known as the "Frick Line," which he inaugurated and pushed to successful development, and in his direction of the affairs of the Baltimore and Ohio Telegraph and Express organizations, as well as of other important enterprises. Mr. Frick was personally known to a large number of our citizens, and was held in high esteem for his integrity and many amiable qualities.—*Baltimore Sun.*

THE HALL'S SPRINGS LINE.—The Baltimore City Passenger Railway Company, which some time since negotiated the purchase of the Hall's Springs line, is engaged in putting the tracks in order, but is not yet ready to put on its cars. President Bowie says his company bought the line, has built new cars and bought the horses and harness to equip it. But all of the stock of the old Hall's Springs Railway Company has not been turned over to his company, and the line will not be operated until that is done. Several times the date has been set for this final stock transfer, but there has always been some hitch in closing the transaction. He would be ready in a week to put cars on the line, and there will be no delay on the part of his company. He expects the old stock will be all in within the next few days. While any of that stock remains outstanding the City Passenger Company cannot completely own the line, and the road will be at a standstill until all the shares are in President Bowie's hands.

Wanted, a Safety Brake.

At the last meeting of the American Street Railway Association the necessity of having a reliable safety brake for steep hills was urged by Mr. Bolton, who said: "A difficulty that we have in our roads, and many others have the same, and we can get no help for, is that, with our special brake for steep hills, we cannot stop the cars. With our ordinary brake, we can stop a wheel, and after that the car slides. We have not been able to find any device to assist us in the matter. We have used sand. We have sand-pipes on every one of our cars. After the wheel stops revolving, the car slides. In approaching the foot of the hill, we go down there at lightning speed; and what we want is something in the way of a safety brake; something to put on after the other has failed to stop our cars. Our head painter was in Pittsburgh a short time ago, and he mentioned something he saw out there, that struck me as the best I ever heard of. I wrote there, but have received no reply. It is under the car. If any one present knows anything about it, I should be glad to hear from him."

No satisfactory answer to his question having been received, we would be glad to hear from any of our readers who have dealt successfully with this difficulty. Rushing down steep grades is injurious to stock, destructive to equipment and dangerous to human life, especially where streets cross the track at or near the foot of the hill.

Feeding and Care of Horses.

[We print below a letter from a correspondent who desires enlightenment on the matter of feeding. We also print interviews with several local companies on the same subject. This matter is so important that we would be glad to have the practice of each of our subscribers, with record of general results. Eds.]

MESSRS. EDITORS: I should like to see a little more written upon the subject of the best and cheapest way of taking care of and feeding street car horses.

My horses make twenty miles per day. I feed nothing but straight feed, such as corn, oats and hay—the best the market can afford.

The build, as well as the disposition of a horse, have a great deal to do with the feed required to keep him up and still not over-feed him. A horse possessed of an even temperament will not require the same feed as one of a nervous temperament.

My horses are all in fine trim and good health, and I have fed from April 1, 1884, to April 1, 1885, for less than seventeen cents a head.

It appears to me that a great mistake is made generally in feeding street car horses; I think the safest and best way is to come as near as possible to the original intention of nature—let him do his own grinding, and he will last much longer. As for mash feed I am opposed to it, on these grounds: A street car horse does not walk, but is compelled to trot, and that will jolt the feed through him in an unnatural condition, which will tend to weaken a horse. For a slow draught horse, soft feed will do, but not for a horse whose regular gait is faster than a walk.

I am young in the railway business, and like all new beginners have it all to learn, and shall appreciate it if you will find space in your JOURNAL for these few remarks. They may be the means of bringing out ideas from some of the older and wiser railway officials, from whom I might learn something about the care and feeding of horses as well as railroading in general.

WM. DAVIS,

Supt. Oakwood Street Railway Co.
DAYTON, O.

[In relation to this subject, Mr. Charles H. Meeks, Superintendent of the South Ferry Road, New York City, says: "I think the best results can be had by grinding feed in all cases, and it must be borne in mind that, while the horse trots on the road, he is liable to lie down soon after feeding at night. For forty horses we use each day about 650 pounds of hay (cut say about four inches long), one bag ground oats, seven bags ground corn, one bag middlings, wet, salted and well mixed. We feed three times a day, giving a light feed at about 4 A. M., full feed at 9 A. M., and full feed again at night."

Mr. Peter Petrie, General Foreman of the Atlantic Avenue Railroad Co., Brooklyn, interviewed on the subject, says: "We have two stables and about 1,100 horses. We feed ordinarily three times a day, but

in severe weather we feed four times, without, however, increasing the total quantity of feed allowed daily per horse. About five o'clock A. M. we give half a peck of oats to each horse, and this is the only 'straight' feed we give. At 10 A. M. we give a mixed feed composed of ground corn and cut hay, and between 5 and 6 P. M. we feed again with the same mix. The total quantity of feed daily per horse is half a peck of oats, twelve pounds of cut hay and fifteen pounds of corn meal. When horses are changed on long trips, we give them while standing, a little long hay, but we feed oats only in the early morning, while the horse is cool. Our experience with whole corn is that while a driving horse or an animal that does but little work will possibly chew it thoroughly at his leisure, a working horse will swallow the corn before it is properly masticated, and thus retard digestion. Whether it is that they have not the sense or are too tired to masticate thoroughly, I am not prepared to say, but it is a fact that they swallow the food half ground, and do not digest it perfectly; so you can see that there is not only health but economy in feeding ground corn. In the event of a horse contracting the 'lampers' from eating only 'soft' feed, of course we feed a little whole corn as a corrective, but as a rule, it saves in horses' stomachs and feed bills to grind the corn and cut the hay."

Mr. Daniel F. Lewis, Secretary and Treasurer Brooklyn City Railroad Co., said: "We give our stock only cut feed and ground meal, composed of one part of oats to two of corn. Of this meal we give an average of seventeen pounds per day to each horse, with an average of ten pounds of cut hay per horse, mixed with the meal. We feed three times a day, morning, noon and night. As the oats we feed is ground up in the meal, we feed no clear oats except to sick horses. We have 3,100 head, and out of that number the average of those not working at all is under forty. The average travel for each horse is about seventeen miles a day, though in the hottest weather we have relays to relieve the teams, and allow them a little breathing spell. We water frequently along the line, and in the water mix a little oatmeal, which we find to be very grateful and more refreshing to the horses than clear water. The average cost of feed per horse per day from June 1, 1884, to June 1, 1885, did not exceed thirty cents."

Let us hear from others. Eds.]

Obituary.

A Baltimore dispatch, dated the ninth ultimo, announces the death in that city of Geo. H. Frick, a prominent resident and president of the North Baltimore Passenger Railway Co., at the age of fifty-eight years. The Baltimore *Sum* of the 10th of June, contains quite a lengthy résumé of Mr. Frick's life, from which we extract the following, concerning his street railway experience:—

"Mr. George P. Frick, president of the North Baltimore Passenger Railway Company, died about 4 o'clock yesterday morning at his residence, No. 400 Park avenue,

of fatty degeneration of the heart, from which he had been suffering for a couple of months. Mr. Frick was 60 years of age, and a native of Baltimore. He was a son of the late Judge William Frick, who had a distinguished public career. He was a graduate of St. Mary's College in Baltimore, and in early manhood entered upon mercantile life, having been for a number of years a member of the wholesale dry goods house of Geo. P. Frick & Co.

Mr. Frick was best known to the Baltimore public as the principal in the organization of the North Baltimore Passenger Railway Company, of which he continued president until his death. He had strong faith in street railways as a sure means of developing the city and as property in which to invest capital. In 1872 he organized the North Baltimore Railway Company, which from a small beginning has grown to large proportions, and its several routes are called the Frick lines by nearly every one. Among the incorporators with Mr. Frick were James L. McLane, Wallace King, C. Oliver O'Donnell, Cumberland Dugan, James W. Tyson, James A. Gary, Daniel J. Foley, and Chas. E. Dickey. The company started about ten cars, and their line ran from the center of the city to Boundary avenue, near Mt. Royal reservoir. The lines of the company are now operated to Waverly, in Baltimore county; to the York road, at Huntingdon avenue; to the neighborhood of Druid Hill Park by way of Linden avenue extended; from the Eastern section of the city, at the Johns Hopkins Hospital, on East Monument street, to a western terminus at Fulton and Edmondson avenues; on South Howard street to Camden stations; and along Fremont and McMeechen streets, connecting the Edmondson avenue and Linden avenue lines. About sixty cars are running every day, and the Frick company has followed the policy of steadily pushing out into other territory. A few years ago Mr. Frick assumed the general management of the telegraph and express organizations of the Baltimore & Ohio Railroad Company, which enterprises were then in formative stages. He worked with these a couple of years, but the street railways in which he had such large pecuniary interests demanded closer attention from him, and he retired from the Baltimore & Ohio service. Mr. Frick, with Mr. James L. McLane and other gentlemen, were the originators of the United States Electric Light Company of Baltimore, and he continued to have a leading interest in it. He was a director in the Merchants' National Bank, a zealous member of the Baltimore Board of Trade, and took a conspicuous part in other enterprises. With Mr. Frick strong will, indomitable energy and courageous faith in the ultimate good results to follow from his business ventures were characteristics. In his death the city has lost a public spirited, progressive citizen. The board of directors of the North Baltimore Passenger Railway Company held a meeting on June 9th, and took appropriate action upon the death of their president and general manager."

For this account we are indebted to Mr. S. L. Bridge, Sec. Baltimore City Pass. Ry. Co., who kindly sent us a marked copy of the paper containing it.



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AMERICAN RAILWAY PUBLISHING CO.

32 LIBERTY ST., NEW YORK.

12 LAKESIDE BUILDING, CHICAGO.

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The Next Association Meeting.

It will be well for each of our readers to remind himself at the present time that the next regular meeting of the American Street Railway Association is but little more than three months away, and to prime himself thoroughly with good ideas for that occasion. No one who has not been present at one of these meetings will have any idea of the kind of men of which this organization is composed. We confess to a reversal of our own opinion, only two years since, and to our astonishment at the very superior class of men it embraces. A union of intelligence, culture and experience of this high order, in an association organized for the purpose of improving methods and simplifying practice, cannot fail to result in great general utility; and more so in proportion as those interested give their attention to the objects in view. These objects are defined in the constitution (Article II.) as follows:

"II. The object of this Association shall

be the acquisition of experimental, statistical and scientific knowledge, relating to the construction, equipment and operation of street railways, and the diffusion of this knowledge among the members of this Association, with a view of increasing the accommodation of passengers, improving its service and reducing its cost; the establishment and maintenance of a spirit of fraternity among the members of the association by social intercourse, and the encouragement of cordial and friendly relations between the roads and the public."

Nothing could be broader, and we refer to the proceedings of the last convention to show how thoroughly these ideas are being carried out. But until every street railway company in North America becomes a member of the Association, its full usefulness cannot be attained, and on January 1st of the present year not more than five per cent of the total number had sent in their memberships. Let it be remembered that always in such an organization as this each member becomes possessed practically of the knowledge, judgment and experience of every other member, and as "in a multitude of counsellors there is wisdom," every street railway man must become a wiser street railway man from his association with others in his line. No one, though he were wise as Solomon and judicious as Rhadamanthus, can know it all; but certainly an association including all, must know all that is known. We cannot too heartily commend the association and urge our readers to fall in line and help it along.

The New Broadway Line in Operation.

Sunday, June 21, at 1:30 P. M., the cars commenced running to the Battery. The new line has been leased to the Broadway and Seventh Avenue Company for nine hundred and ninety-nine years, the latter company assuming the liability for the interest on \$2,500,000 of the bonds issued by the new company.

Stages will be run from Bowling Green to South Ferry to accommodate passengers who wish to reach the Broadway cars. No fare will be charged. There will be no stages run on Madison avenue or Twenty-third street and Ninth avenue, but there will be a line running up Fifth avenue from Fourteenth to Fifty-ninth street.

There will not be as many people thrown out of employment as has been generally supposed. Although the new line purchased altogether about two hundred and fifty stages, there were 150 drivers employed, and many of these will be retained on the Fifth avenue and South Ferry stages, while others will be employed on the cars and in the care of the 1,400 horses which were purchased with the stages.

The new cars will not be ready for five or six weeks, and for the present about 100 of the old Broadway line will be put on to start with, beginning at five o'clock in the morning and run at a minute and a half headway.

Cars will still be run along Church street and University Place, but the number will

be gradually reduced as the travel decreases along that route. The new road will be under the management of President Forshay, of the Seventh Avenue line.

Our Street Railway Directory.

Not having as complete returns as we desire from the companies unreported in our last issue, we omit the directory from this number. While requesting officers of those companies to send in early and complete returns, we would urge upon their attention the desirability of being correctly represented in the directory of our paper—the only street railway journal in America. It has become the recognized authority of this great interest, and is consulted and read by all interested in the building, equipment and maintenance of street roads. As such, it is to the interest of stockholders, purchasing agents, manufacturers, dealers and builders—and, in fact, all parties concerned—that this directory should be complete; and we again urge those who have not sent in full particulars to do so as soon as possible. The directory will reappear in our August issue.

Self-Countersinking Wood Screws.

We recently saw, among the effects of an inventor some six years deceased, some self-countersinking wood screws which struck us as being highly desirable for car builders and for other workers in wood. The head of each screw was so cut as to form a conical cutter, with two cutting edges, the intent of which was to make a conical countersink in the wood exactly the size of the screw head, so that the latter would seat itself flush, or even lower if desired. In the latter case there would be a better job made than where a separate countersinking tool was used, as there would be no possibility of the countersinking screw head cutting out a cone of larger base than itself.

We do not know whether or not the device was patented. It is worth looking into.

THE NEW YORK *World* somewhat reminds us of a certain Hibernian of ancient fame who, on being asked his politics, professed himself "agin the government." After doing its worst to defeat the much needed Broadway surface road, it now (June 15th) suggests that "it would be well for the property-owners to apply for an injunction against the operation of the railroad until a decision on its legality has been rendered by the Court of Appeals;" also, scorning to give the gentleman the whole name to which he is entitled, it calls the projector "Jake" Sharp. Decidedly the *World* is "agin" Mr. Jacob Sharp and the Broadway Surface Road. Meanwhile some of the best and quickest street railway work ever accomplished, has been done on this line. It is no small feat to lay tracks on a thoroughfare like Broadway, without closing it to travel. We venture the prediction that two years from now the *World* would be as strongly "agin" the abolition of the line, as it is now "agin" its establishment.

Blisters and Cracks in Paint and Varnish.

Our readers will remember an interesting and valuable article by a chemist, published in our December issue, page 6, on "Colors vs. Oils, Dryers and Varnishes." The following on "Blisters and Cracks" will be found equally valuable and instructive, by car painters and others interested.

Looking at a piece of wood, iron, or any painted or varnished substance under a microscope we find numerous pores, extending through them.

The function of these air holes, or so called "hydraulic pumps," is, to inhale atmospheric moisture, thus producing either a contraction or an expansion; and there being a constant change in the air, a friction of one or the other takes place, through which the cells wear out, and destruction takes place. Thus we find that all articles left exposed to the weather, decompose twice as quick as those kept under cover.

To prevent this decaying we must fill up these cells, so as to form a compact substance, through which no more inhaling can take place, and especially on painted woods and iron. Every piece of wood or iron should have a heavy coat of raw linseed oil on either side, and should not be touched, at least for a few days, in order to allow the hydraulic pumps to saturate the wood or iron thoroughly. The oil becoming hardened forms a basis for paint.

Some painters, after having sand-papered the oiled wood, wash the same with a solution of coach japan and turpentine (equal parts), so as to fill the least pores left open by the oil.

The writer had a case about a year ago, with a certain safe company. The paint would peel off after it had been put on a few months. The matter was referred to me, and the advice was to give the iron a heavy coat of raw linseed oil on either side, and wait at least a week before putting the cement into the frame. They have had no trouble since. The trouble had been that the cement entered the pores of the iron, and oxidized the same, causing the paint to fall off.

After the above process, the car, coach or wagon is ready for a coat of lead.

In applying the different coats of paint, a great many painters make mistakes, from which many bad results occur, as, for instance, blistering or cracking.

All paints should be applied so that the lower coats should have the least quantity of oil, and, as you add more coats, the paint should be mixed with more oil, so that the rays of the sun would strike the lower coats at an angle of 45°. These remarks may also be applied to varnish. The coloring varnish contains the least oil, rubbing varnish more, and finishing varnishes double, and sometimes even more than double, the quantity of oil used in rubbing; thus making the last coat most elastic and giving the undercoats time to expand in harmony with the upper.

We may divide blisters into three classes, namely:

- (1) Wood or acetic acid gas blisters.
- (2) Oil blisters.
- (3) Varnish blisters.

1. *Wood or Acetic Acid Gas Blisters.*—All woods contain more or less acetic acid, and, if not perfectly dry, the acid will form a gas, which is produced through heat, and pressing upward makes a blister on the surface of the paint or varnish.

2. *Oil Blisters.*—If too large an amount of either raw or boiled oil is used in paint, the work will have blisters, especially with raw oil, as the myristine of the oil cannot escape quickly enough before a skin is formed and a blister is raised.

3. *Varnish Blisters.*—If a new car, buggy or wagon is run out into the heat of the sun or from a cold place into a warm one, the pores of the varnish will at once expand, and, should the vehicle strike cold air, it will chill, and be very apt to blister the first time it is exposed to the sun, simply because the pores of the finishing coat closed too suddenly, not permitting the moisture of the atmosphere to escape. The sun striking it, heats the closed-up water-cells and raises a blister.

Cracking and checking of paint and varnish is a certain sign of want of oil, that is, the oil once existing in the paint has disappeared, and the paint, having nothing more to keep it together, shrinks and cracks.

A great many painters say, it is impossible to fill up cracks, but it can be done if these directions are followed. As stated above, the oil in cracked work has performed its duty, and disappeared. It consequently must be replaced before any paint can be applied; therefore, before doing anything else, give your cracked coat one or two coats of raw linseed oil, in fact, feed it with oil as long as it will absorb it. Then let it stand until dry, sand-paper and you are ready for painting.

The theory is, that, if you do not oil the buggy or coach first, the oil contained in the newly applied paint, will be pumped into the empty cells of the cracked parts and soften them; the new paint, being deprived of its oil, will sink when dry, and the cracks will appear again.

W. Z.,

Chemist of King Varnish Co.

AKRON, Ohio.

A constant complaint is made by passengers about the small size of car windows, both on street and steam roads. On steam roads the small-size windows of old are fast going out of use, and the ones now put in are none too large to suit the patrons. On street and surface roads and on the cars of the elevated roads, where during the hours of heavy traffic many are obliged to stand, passengers cannot get a glimpse out of the car without stooping, on account of the small size of the windows, and where the windows are of anything like a satisfactory size the top part is often of ground glass or obstructed by the double blind with a short lift. Curtains are far preferable to blinds, if of proper material and design. They ought not to hang loose, but should have a rod and guides to keep them in position, and dress to the side of the window rather than to the top.

The Cold Street Cars.

Street cars should be warmed, it is true, but between an overheated car and a cold one the latter is preferable. There is no place like a railway car, as it is usually warmed, for taking cold. The temperature within railway cars is too often like that of an oven, and the passenger entering it or going out from it into the cold does so at his peril. On suburban trains prudent passengers will stand in the middle of a car rather than sit near a door that is opened at every stop. This is the great objection to street car heating, as in this case both front and rear doors are open frequently, and often both at the same moment. Riding in cars heated by a stove, with a temperature unequal in the various parts of the car and varying from time to time, and necessarily exposed to draughts, would be injurious to the health of passengers.

But it is possible to make street cars comfortable in cold weather without this drawback. There should be no stove within the car, but a system of pipes upon the floor, beneath the foot-board. These, fed by steam or hot air from an anthracite or oil-burning furnace on the front platform, would raise the temperature of the car evenly in all its parts, and permit an evenness of heat throughout the day. People who ride in street cars in cold weather dress warmly, and do not remove their wraps. It is not for their bodies that they need heat. The temperature of the car need be only slightly higher than that of the air outside if they can keep their feet warm. Here the warm pipes would be invaluable, and from them passengers could derive comfort while sitting in and breathing an atmosphere sufficiently cold to render draughts harmless.

The pipes which warm the entire railway car are fed by a furnace requiring no more space than the ordinary parlor stove. A street car could be made comfortable by pipes warmed from a furnace so small that it would not be an inconvenience upon the front platform.

The driver could easily give it what little attention it would need during trips, and could keep his own feet warm upon one of the pipes, which should also be extended to the conductor's station upon the rear platform.—*Chicago Herald.*

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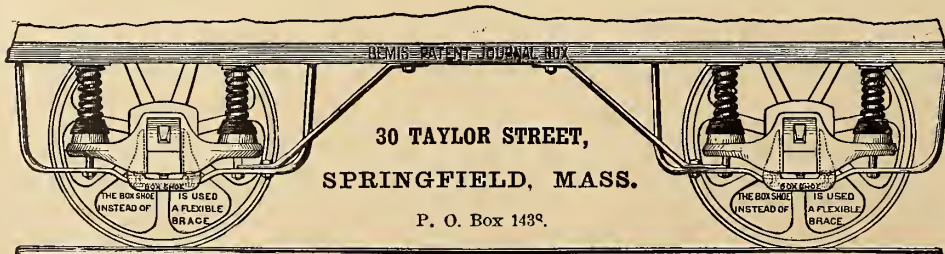
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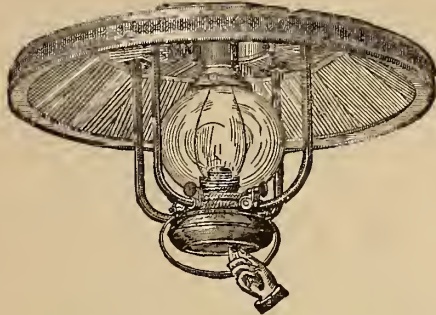
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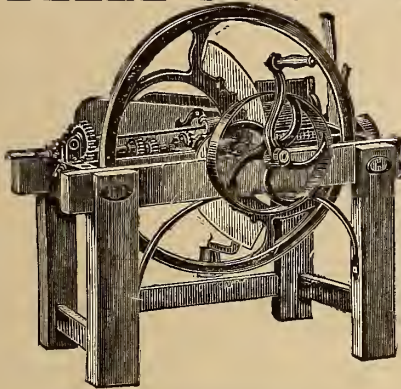


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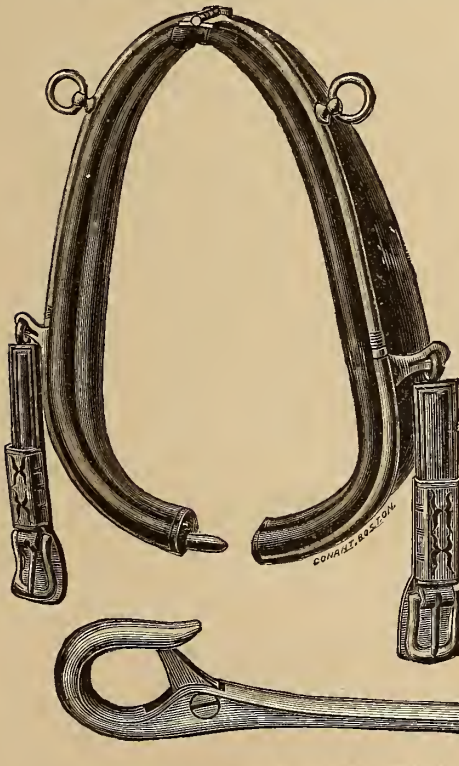
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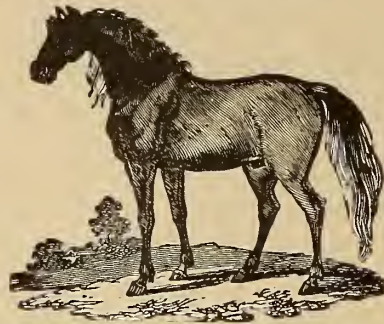
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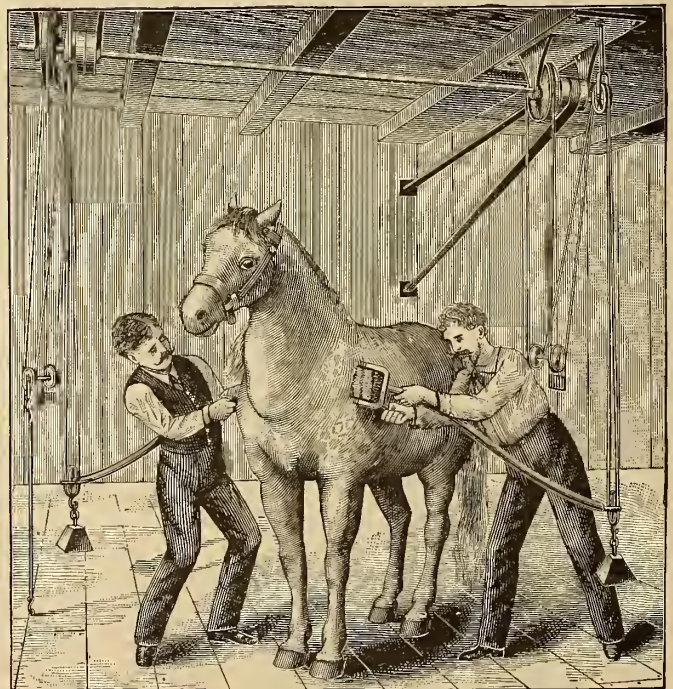
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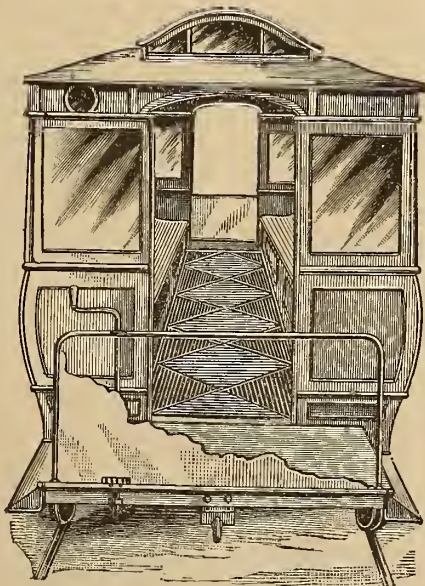
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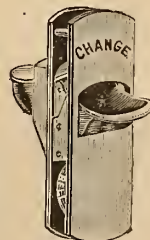
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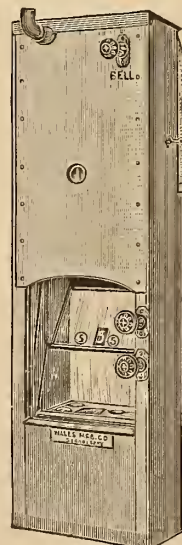


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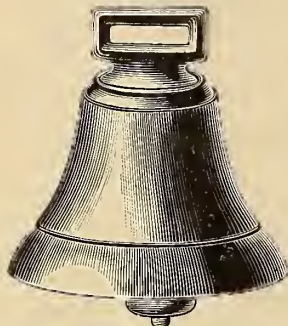
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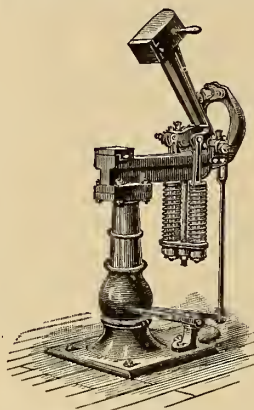
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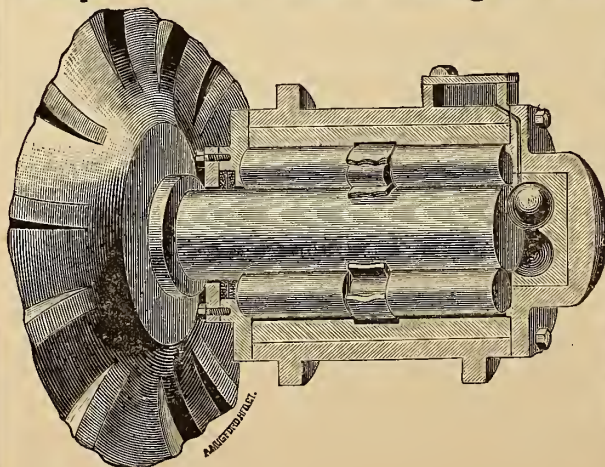
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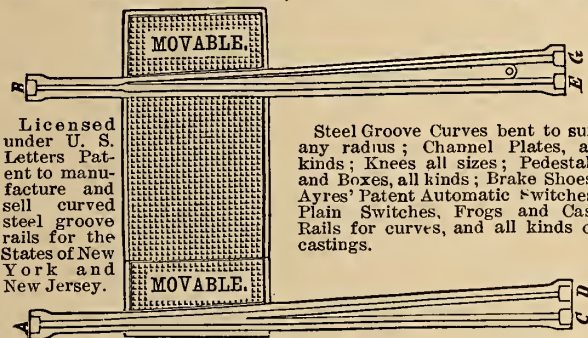
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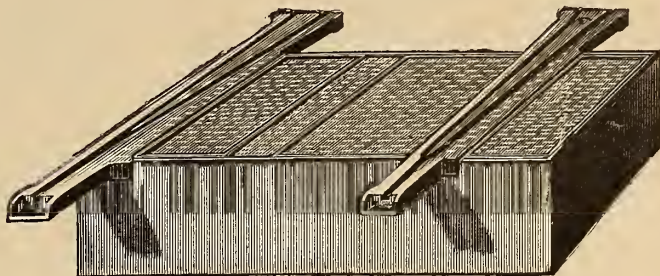
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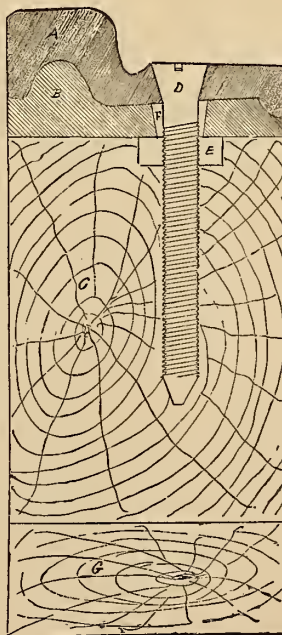
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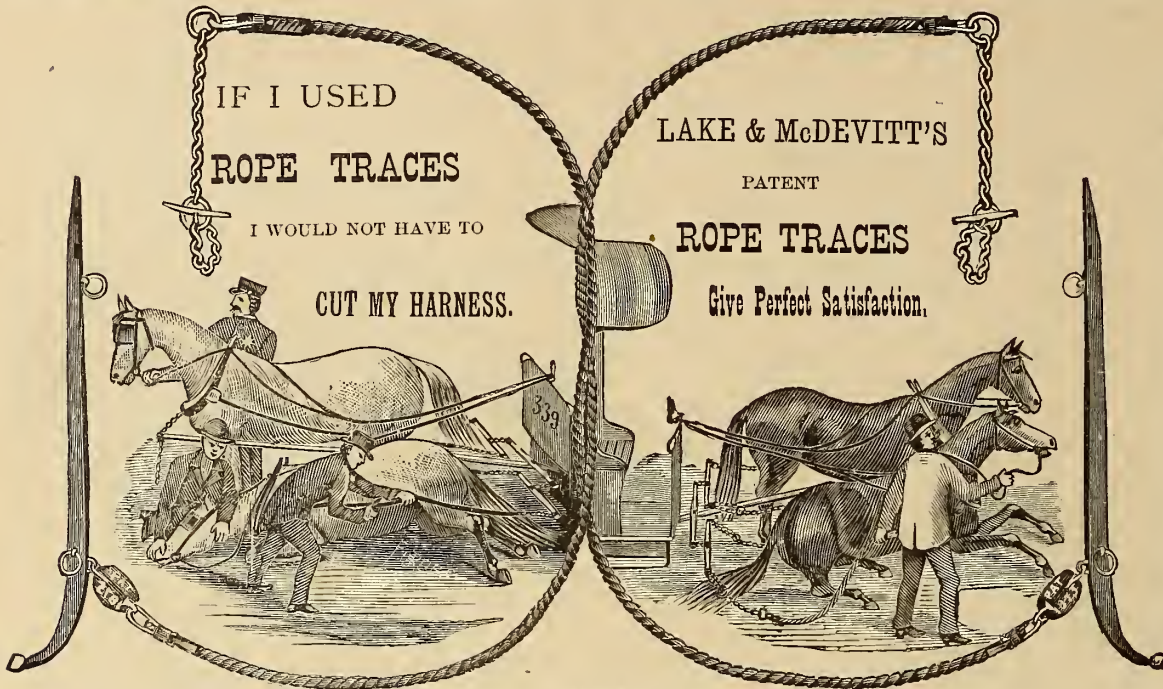
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are its ready application to Horse-Car service, or to any other purpose where cheap harness is required. It only costs about half as much as leather traces, while at the same time one set of ROPE TRACES (when used on horse cars) take the place of three or more sets of leather traces, as the Tugs remain attached to the car all day, no matter how many changes of stock are made. The relief horses having hoods attached to their hames, all that is necessary is to unhook the tugs from the working team back in the fresh horses, hook on the tugs, and the change is made. Railroad men will at once perceive their adaptability and economy from the above facts. They will also last longer than leather traces, and require but very little care. From their durability and cheapness they are also especially adapted for all kinds of farm use and heavy teaming, as farmers, etc., can easily repair them.

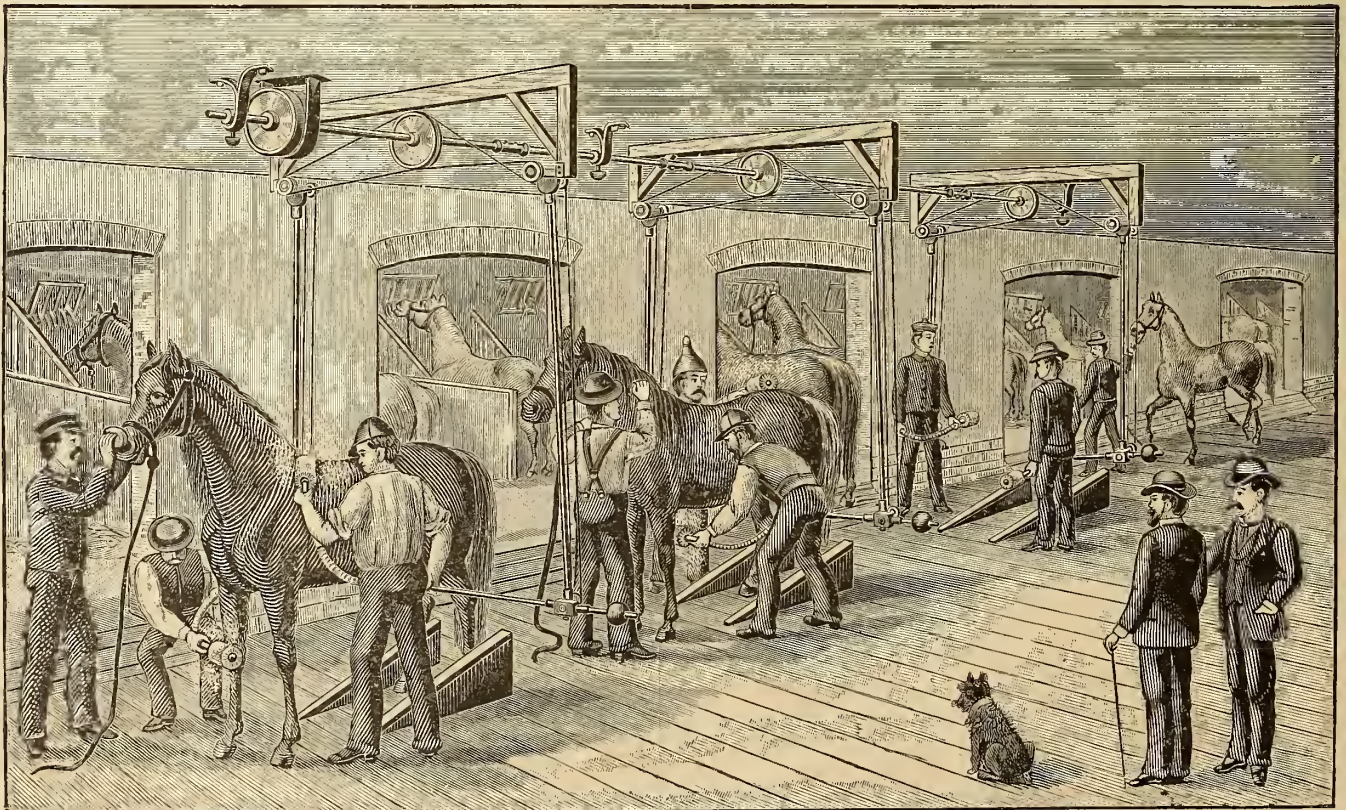


Patent No. 171,232, December 21, 1875.

In use on the Chicago West. Div. R'y.; Louisville City R'y. Co.; Milwaukee City R'y.; Transverse R'y. Co., Pittsburg, Pa.; Citizens Street R'y. Co., Pittsburg, Pa.; Pittsburg and Birmingham, Pittsburg, Pa.; Central City R'y., Peoria, Ill.; Grand Rapids R'y.; Minneapolis St. R'y. Co.; St. Paul City R'y.; Houston City R'y., Texas; Superior Street R'y., Cleveland, O.; Cincinnati City R'y. Co.; Fifth Ward Street R'y., Syracuse; Detroit City R'y.; Ft. Wayne and Elmwood St. R'y., Detroit, Mich.; Galveston City R'y.; Springfield City R'y., Springfield, Ill.; Toledo St. R'y., Toledo, O.; Adams St. R'y., Toledo, O.; Atlanta Street R'y., and others, in all on about 100 Street R'ys in United States and Canada, and a large number of other prominent Street R'y. Companies throughout the Country. Send for descriptive Circular containing testimonials, prices, etc., to

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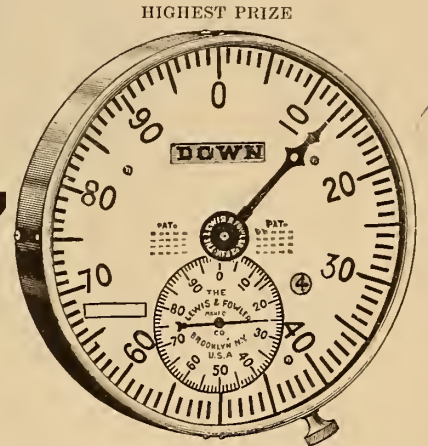
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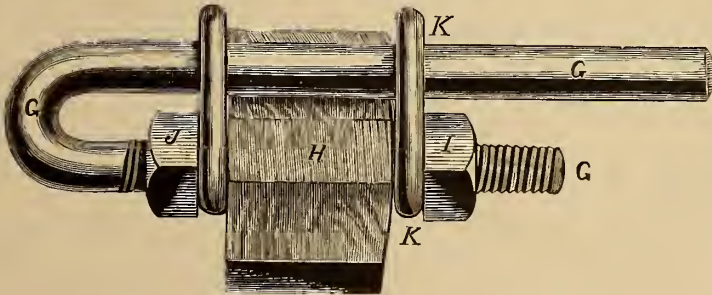
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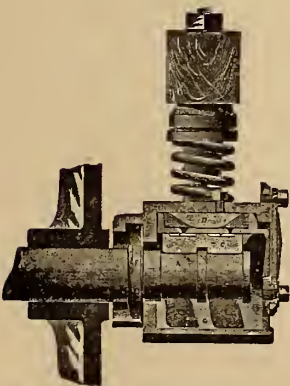


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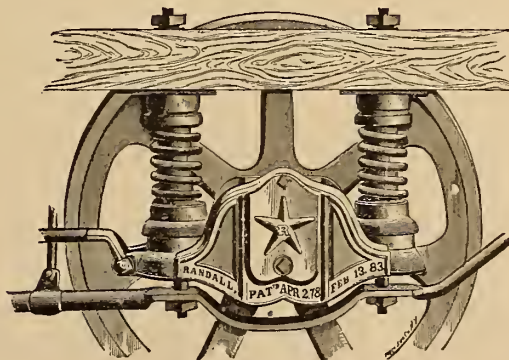


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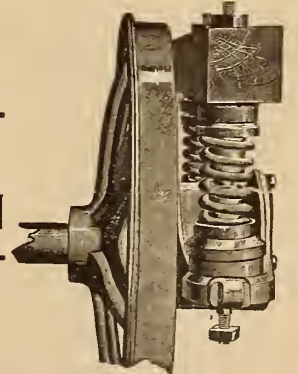
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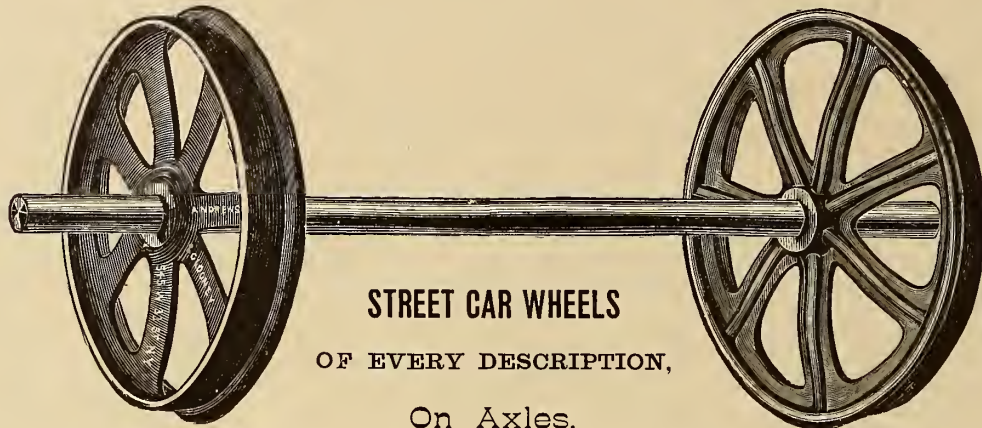
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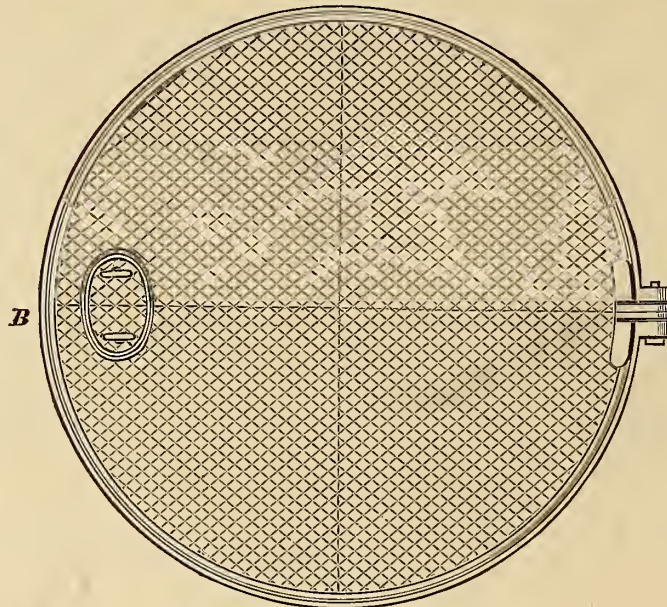
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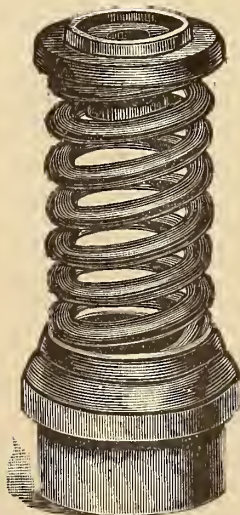
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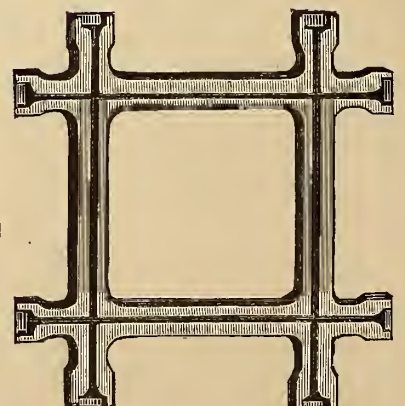
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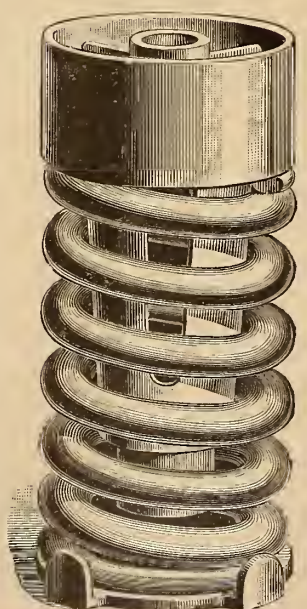
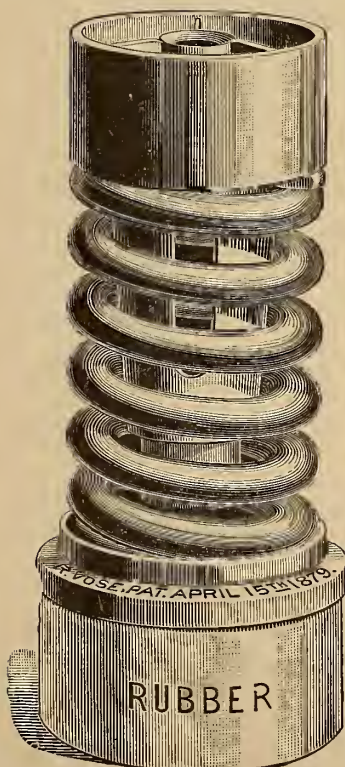
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Patented April 15, 1879—August 5, 1884.

The unprecedented popularity of the

"VOSE GRADUATED RUBBER CONE SPRING"

for HORSE CARS has induced the inventor to bring this class of Springs as near perfection as possible, and after a series of experiments and tests now presents for favor what he claims to be the *MOST PERFECT SPRING FOR HORSE CARS* ever offered. It is exceptionally *SOFT AND EASY* with the *EMPTY CAR* or with the *GREATEST LOAD*. It is believed to be the *MOST DURABLE*, being constructed upon a principle that seems to insure that the Spring must *ACTUALLY WEAR OUT*. The very *Finest Quality of Crucible Cast Steel* will always be used in these Springs.



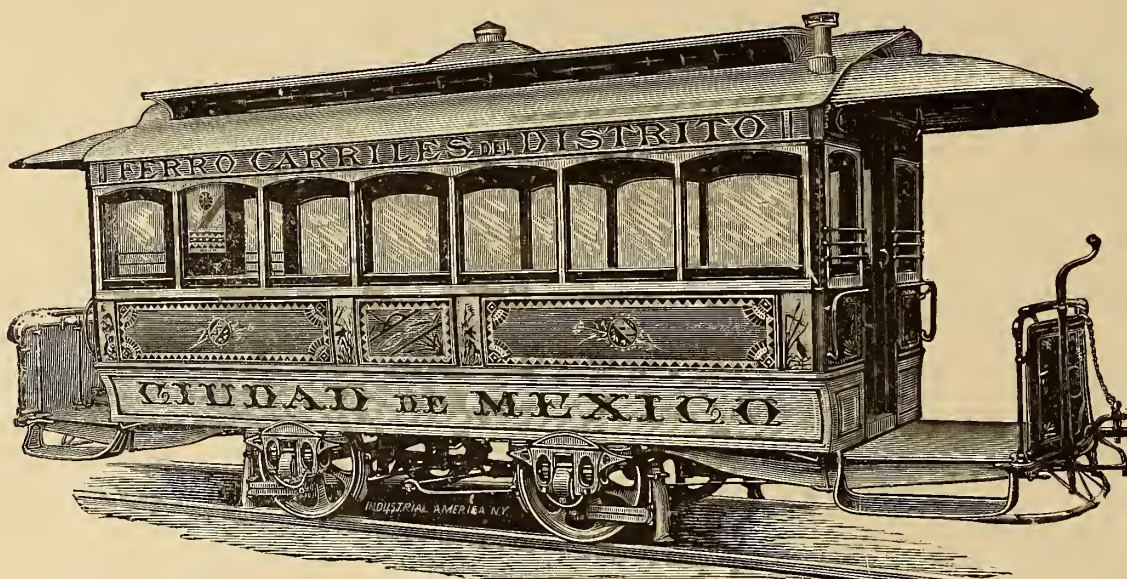
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MEDAL OF FIRST CLASS, WORLD'S INDUSTRIAL COTTON EXPOSITION, NEW ORLEANS, 1885.



LIGHT ELEGANT, DURABLE.

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All Climates Suited.

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THE STREET RAILWAY JOURNAL

VOL. I. { NEW YORK: }
32 Liberty Street.

AUGUST, 1885.

{ CHICAGO: } No. 10.
12 Lakeside Building.

Gibbon's "Metallic Street Railway."

In this plan for track*, there are hollow cast iron boxes, (1), broader at the base than at the top, and suitably slotted along their closed tops to permit the entrance of a web or tongue projecting vertically from the flanged base of a rail (2) which is otherwise like the ordinary centre-bearing type. Trenches are dug for these boxes, which are partly of the nature of chairs, and partly like longitudinal stringers. They are laid in the trenches and tamped. T-shaped mortises

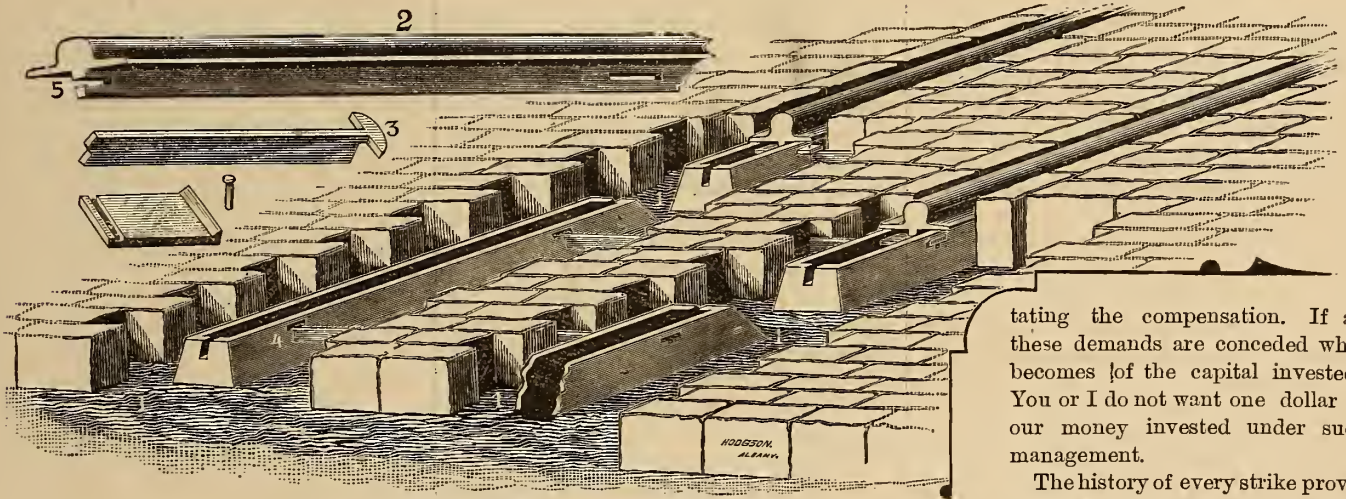
The story was derided by many, who said it was overdrawn and portrayed a condition of things that would never exist in this country.

The recent strike of the employees of the West Division Railway in Chicago Ill., seems to prove that the unknown author was correct in his views as to the trouble to be expected between Capital on the one hand and Labor Combinations upon the other.

Briefly stated, the Conductors and Driv-

state the discharged men and the strike occurred.

It would undoubtedly have been wiser to have borne with the violation of rules, rather than have discharged the men and taken the chances of a strike, so far as dollars and cents are concerned; but if it is conceded that the employees of any company are to dictate to its management who shall be discharged, it follows, as a matter of course, they shall dictate who shall be employed. They already arrogate the privilege of dic-



GIBBON'S METALLIC STREET RAILWAY.

(4) in their sides, accommodate in their vertical portions the heads of flat strips (3), which are at once track gauges and lateral tie rods. The rail is then so placed on the boxes that the slots in its web come opposite the mortises in the boxes; and horizontal checkplates (shown in the cut) are then driven through the horizontal part of the T-shaped mortises (4) of the boxes and through suitable horizontal slots in the web of the rail.

* The Metallic Street Railway Supply Co., Albany, N. Y.

"Street Railroad Strikes."

MESSRS. EDITORS:—Many of your readers perused "The Bread Winners," a story that created a widespread interest and was received with great favor or the reverse as men viewed that question of vital importance to each and every man, woman and child living in these United States,

ers' Benevolent (?) Union, composed of employees of the Chicago West Division Railway Co., made certain demands upon the officers of that company. These demands consisted of increased compensation, the discharge of an obnoxious official and several minor matters. The official resigned and the company acceded to certain demands. The Union was satisfied and passed resolutions complimenting the company's officials; peace and quiet reigned.

The superintendent of the said company discharged within the following two weeks, ten or more employees for violation of rules. These men have been more or less prominent in the Benevolent Union, and the Union at once said that they had been really discharged because of the part they had taken in its deliberations, and notified the West Division Ry. to reinstate them or a general strike would result upon Tuesday morning, June 30. The company did not rein-

tating the compensation. If all these demands are conceded what becomes [of the capital invested? You or I do not want one dollar of our money invested under such management.

The history of every strike proves that the Union sooner or later falls into the hands of unprincipled men

as portrayed in "The Bread Winners." While it is undoubtedly the right of each individual to decide for himself or herself what rate of compensation he or she will accept for services, it is *not* right that he or she shall by force prevent others accepting the said compensation or less as they may elect. Herein lies the wrong of all strikes. The strikers will not continue at work, nor will *they permit others to take their places*, resorting to force, when intimidation and persuasion does not suffice.

Every other Trade Union in Chicago is said to have lent moral or pecuniary assistance to these deluded strikers. They assisted in obstructing the tracks of the company by every means in their power, and the delectable Member of Congress, having risen from tending a saloon to that exalted position by the votes of just such men from that district, addressed the strikers with encouraging words. I presume your readers have

read "Solid for Mulhooly." If not we would advise them to do so. It pictures American political life in an inimitable manner and with a master pen.

What is to become of the street railways of this country, if they are to be governed by the conductors and drivers? 'Tis a most serious question and concerns each and every one of your readers.

Consider the riots at Pittsburgh, at Cincinnati, at Cleveland, at Chicago, in the Hocking Valley; and the attendant loss of life and damage to property, not to be measured by millions of dollars.

The conflict thus inaugurated between Capital and Labor will shake the foundations of our government, and many a wise man in his heart of hearts trembles for the future. Not many years since the Judge of one of the chief courts of this government, at Washington, died. It was the privilege of the writer to have many conversations with this great man, who for many years assisted in guiding the affairs of this nation. He welcomed death, for he was thereby spared the greater pain of witnessing the struggle that he felt assured must in the near future take place between Capital and Labor, and to which he considered the War of the Rebellion to compare as a babe to a strong man.

It behooves every thoughtful mind to consider well upon this subject. While this "is a government of the people by the people," the very liberty thus offered all those oppressed or downtrodden elsewhere who seek our hospitable shores, this very fact brings us the most turbulent and unruly from every land, and at times I shudder for the future in store for my beloved country.

Adam Smith wrote "Civil government, so far as it is instituted for the security of property, is in reality instituted for the defense of the rich against the poor, or of those who have some property against those who have none at all."

The Hon. Moody Merrill stated at the first Convention of the American Street Ry. Association, "The amount of capital invested in these railways exceeds one hundred and fifty millions of dollars, with absolutely no security but the faithful and satisfactory service rendered the traveling public by the companies themselves." Common prudence will dictate that the companies having now an organization should through it afford, each the other, all possible support. Let this matter receive the consideration its importance demands at the next convention.

"AUX ARMES."

Elevated Information.

Signs were placed on the lower stations of the Brooklyn (N. Y.) Elevated Railroad recently, indicating the names of the streets on which the stations are built. The signs show the street names in bold white letters on a black ground, and are placed on the stations of both the up and down tracks. It is a great convenience to people not thoroughly informed.

Cable Railways.

The inherent desire in the human race on the American continent, especially in cities, is to consume the least quantity of time in moving from one place to another, and although a business man may waste ten minutes in idle or fruitless conversation with another, while conveyances are passing at one or two minute intervals; yet when he has concluded to start, he is impatient at the delay of one or two minutes in waiting for a car or omnibus. The general traveler over street railroads, when business or pleasure calls him to go from one part of a city to another, will consider the various routes which lead to the desired point, and will take that line which will soonest transport him to his destination. He will mentally examine the road which has the least detention and which also makes the fastest time, of which a small per cent can be saved in traveling to be wasted at either end of his route. This mental process goes on in the brains of most business men whenever about to ride upon street cars, and by and by by mere force of habit becomes second nature; so that whenever attention is called to any new or projected line of street railroad, this consideration of time and space with reference to its termini and points on its route, most always takes place and is an important factor in the operation of forming an opinion favorable or otherwise as to the merits of the undertaking. In this consideration also now comes up the motive power of the cars to be moved, and since steam motors and cable roads have come into use the merits and disadvantages of each are compared. To some nothing is more safe or sure than horses—to another, perhaps a steam motor may offer decided advantages, while to a citizen of San Francisco probably the cable system combines more good qualities than any other method. To those who are unacquainted with the cable system probably, if it enters his mind at all in this mental examination, he says that it is impracticable that a slender thread-like cable can run along a public street and draw cars containing passengers or anything else, and he thinks that even if it were feasible the promiscuous street traffic would have to be stopped or the stoppage of a car drawn by a cable would be so frequent that it would be impracticable. Then, too, suppose some team should get in front of a cable car, there would be a collision with a liability of serious accidents. In addition the cable is liable to break and every car on the line must stop until the break can be repaired, and no one knows how long it might take to splice or repair a broken cable. These are some of the thoughts that suggest themselves to one unacquainted with cable roads, and these questions are often propounded by those desiring information concerning the cable roads already in existence, such as:

Suppose a cable breaks, how long does it take to repair it?

If one car gets disabled, what is done that the other cars may be stopped in the shortest possible length of time?

Supposing some malicious person or some accident should cause the breaking of the cable or the tube in which the cable runs should become broken, what would be the effect?

How many accidents do you have per year on the cable roads that are caused by the cable road, because it is a cable road?

Is this system adapted to underground or elevated roads, or is it only adapted for surface roads?

The first question may be answered by saying that to splice a cable takes from three to four hours, sometimes a little less than two and one-half hours, the latter for making a single splice, and from three to four hours if a piece of cable has to be added, which causes two splices to be made.

It is proper to say that while this length of time is required for repairing a cable it does not follow that all breaks occur when running during the busy hours of day or that all splices have to be made when cars should be running, for although, during the early days of cable roads, breaks occurred during the running hours of the road, yet by continued experience gained in the working of cables it has through care and the exercise of intelligent judgment been found not difficult to wear out a cable with but one or two stoppages from accident during its lifetime. In other words it is common even now to run and wear out cables with stoppages not exceeding one minute on an average per day during its life. This care is no more nor so great perhaps as that bestowed upon the rolling stock and engines of a steam railway. Take for instance the elevated roads of New York. Each and every engine is not only subject to an inspection at the end of every trip, but at night or when the day's work is over an additional and more thorough inspection is made, so that all needed repairs may be made before the engine goes on the road again; and it is believed that no engine is allowed on the road when there is a question in the slightest degree of its completing a trip without failure. Now each engine requires an inspection. In cable roads there are usually duplicate engines and boilers, and the engineer has much easier or better opportunities of understanding or noticing the particular condition of his engine than does the engineer of a locomotive, because his attention is directed particularly to his engine and boiler almost solely, while a locomotive engineer has many important calls for care in running his engine and train over the road, so that the chances between a breakdown on the elevated road and a breakdown of the engines of a cable road are multiplied in the former. The cable seems the part most likely to break, but as before stated, with increasing experience the indications of weakness in a cable are apparent days before there is any probability of its giving out, and as soon as these signs betray themselves care is taken to make all needed repairs the first stop at night after the cars cease running.

If a car gets disabled, the grip is simply disconnected from the cable and the next

car coming along pushes it to the engine house, where it is taken in and needed repairs are made and a spare car sent out in its place.

The grips are so constructed that they will require five or six times their usual load before they will slip on the cable. On one road in San Francisco having steep grades the load often brings a resistance of 4,000 pounds, under which the grip easily does its work; so that for comparatively level lines it will be a simple matter for a disabled car to be pushed ahead of another train.

If maliciously disposed persons cause the breakage of the cable or the destruction of the tube, there is no other way but to repair it. I am not aware that this has ever happened in the history of any cable road in operation. The tubes or conduits are usually constructed strong enough to withstand the heaviest drays and trucks that city ordinances usually allow to be drawn through the streets, and nothing but such a character and disposition as manifests itself in obstructing by a tie or otherwise the rails of a steam railway would ever dare to injure the cable or destroy the tube of a cable railway.

As to accidents: Cable roads are liable to have them the same as horse cars, but I never to my recollection knew of an accident occurring where it would be most natural to suppose it would occur—that is, in crowded streets, when people most frequently cross in front of moving trains; but almost invariably in San Francisco, at least, they occur when no one is near the train except the passengers about to step off or on. I think six accidents have occurred in San Francisco during the past year and from the passengers either getting on or off while the car was moving—not waiting for the car to stop in either case. About 25,000,000 of passengers are carried yearly in the cable cars in San Francisco, so that it will be seen that the accidents are not necessarily numerous in proportion to the number carried. The control of the cars or trains is, I believe, more absolute than when horses are used, from the fact that more perfect brakes are employed, and as the speed of the most of the cable roads in San Francisco is eight miles per hour, especially in the streets having the heaviest traffic, I think that they are adapted where conditions will admit of this speed being maintained. It is a question for each particular locality or the conditions and requirements of that locality to determine whether it is best adapted for underground, surface or elevated roads.

I believe that with proper considerations given to the rolling stock, it is practicable to maintain a speed of ten miles per hour in the cable, so that natural obstructions would determine when that speed could be utilized. The present experience in cable roads is limited to a few cities, therefore its anticipated capabilities have not been tested, but the promises which it gives of future benefits to the traveling community warrant its construction and operation in many places well known to be favorably situated,

without attempting any novel methods of construction, or its construction in localities with well-known difficulties of access from congested traffic.

W. W. HANSCOM.

♦♦♦
The Mule:—

CONSIDERED ETYMOLOGICALLY, HISTORICALLY, ROMANTICALLY; GENEALOGICALLY; PHYSICALLY, MENTALLY, MORALLY; ANALYTICALLY, SYNTHETICALLY, PRACTICALLY, ARTISTICALLY, DYNAMICALLY; WITH SOME SUGGESTIONS AS REGARDS HIS PRESENT USEFULNESS, AND SPECULATIONS CONCERNING HIS POSSIBLE IMMORTALITY.

In the consideration of this interesting subject, one is met at the outset by the difficulty in deciding whether to treat him as a work of art, or as a freak of nature. Then again, the actualities are so immeasurable, and the possibilities so innumerable, that less able writers would hesitate their complete recital and consideration; and indeed, the mule has been almost unchronicled in history, and unsung in fable. Fame unending has been awarded those writers who have rehearsed the deeds and qualities of those other hybrids or mongrels, the hideous hydra, the silent and mysterious sphynx, the kingly basilisk, the reckless and impetuous centaur and hippocentaur, the voracious minotaur, the fierce griffin and hippogriff, the huge, ubiquitous, and startling kraken or sea-serpent, the dreadful and flame-emitting dragon, the fiery and graceful unicorn, and the modest and musical mermaid. Let it be reserved for us to go down to future centuries and peoples as the faithful and admiring chronicler of the *feats*, and champion of the *standing*, of the much abused, greatly neglected, and unappreciated, but altogether admirable, *Mule*.

It might be well to premise these remarks by a glance at the etymology of his name, which we derive from the latin word *mulus*, the forms in most of the various languages which know and name this interesting animal being like him to whom they apply, almost the same wherever met, "*semper idem*." The Greeks knew him as *μηλιονος* (*hemi-onos*) or "half-ass"—but he must not be confounded with *Ἡφαιστίων* (*hephaistion*) or, vulcan;—and they also called him *ὄρεως* (*oreus*), a word which the poets (Homer in particular) knew or used as *οὐρεως* (*oureus*). Referring to the Latin derivation, which concerns us more particularly, it might be suggestive to note hastily the striking similarity between the word *mulus*, and *mulier*, or woman. To avoid confusion it should be noted that of the two, the woman is *mulier*.

The mule is cosmopolite and doubtless pre-historical. Physically he is a study worthy our close observation. He has fore feet in front, and two behind, giving, at will, a stability which is proverbial, a sure-footedness almost miraculous, or a pedal range far-reaching and striking. His feet are small and finely formed, as indicative of superiority; their texture firm; although facilities for close investigation (especially by prolonged handling) are rarely and charily afforded. It is asserted on the authority of a Cincinnati editor, (who dedi-

cates the information to naughty little boys), that there is contained in the hind foot of every mule, a small lump of gold, extractable by means of a pocket knife. [It is here worthy of remark, in justice to myself, that, whatever physical characteristics of my subject I may have noticed and here noted, are derived solely from studies from *life* (supplemented by drawings to scale and working models), as no one has ever yet seen or heard of a dead mule. For this reason our views of his internal economy are vague and altogether theoretical, and hence unsatisfactory.]

Concerning the mule's feet, which have a quickness, freedom, and force of action truly surprising, we should say that he is "quadruped" *par excellencé*, as the monkey is in a like degree four-handed. *Ex pede Herculem*. The centipede's excel his in their number, and the elephant's in their size, but his have a convenience and promptness of action, almost galvanic; indeed their stroke has been compared in range, velocity, and unexpectedness, to that of the lightning itself.

In this connection, perhaps a leaf from his paternal history might not be out of place. In Porkopolis (or Swine-cinnati) a donkey belonging to one of the public parks was attacked by a lion escaped from a traveling menagerie, but the open jaws of the terrible brute were met with crashing onsets from the heels of the donkey; and stunning blows, rained upon the head of the lion at each attack, caused the great monarch of the African forests to beat an ignominious retreat. The victor is now quite a *lion* in his native city. The devastation wrought by the jaw of an ass in the hands of Samson, is a matter of history; and the jaw of an ass is even to-day a terrible weapon, greatly feared in our debating societies, &c.

But, *revenons a nos moutons*—that is, to our mule.

It has been said that a mule can kick a fly off his own (or any other) ear, with any desired or disengaged foot, or with all, at will; and that he can throw a rider, and kick him with all four feet consecutively *or* at once, before he touches the ground.

To effect such extent, variety, precision, and force of range, would seem to necessitate what will doubtless be found the actual structure, should a dead mule ever be found:—*viz.*, telescopic tubular legs, with universal or "ball and socket" joints, spiral springs, and "hair triggers."

A tribute to his kicking powers is here subjoined, from *Scribner's Monthly*:

You Nebuchadnezzah, whoa, sah!
 What is you tryin' to go, sah?
 I'd hab you for to know, sah,
 Ps a holdin' ob de lines.
 You'd better stop dat prancin';
 You's pow'ful fond ob dancin',
 But I'll bet my year's advancin'
 Dat I'll cure you ob your shines.

 Look heah, mule! Better min' out—
 Fust t'ing you know you'll fin' out
 How quick I'll wear dis line out
 On your ugly stubbo'n back.
 You needn't try to steal up
 An' lif' dat previous heel up;
 You's got to plow dis fiel' up,
 You has, sah, for a fac'.

Dar, dat's de way to do it!
 He's comin' right down to it;
 Jes' watch him plovin' t'roo it!
 Dis nigger ain't no fool.
 Some folks dey would 'a' beat him!
 Now, dat would only heat him—
 I know jes' how to treat him:
 You mus' reason wid a mule.

He minds me like a nigger.
 If he was only bigger,
 He'd fotch a mighty figger,
 He would, I tell you! Yes, sah!
 See how he keeps a-clicken'!
 He's as gentle as a chicken,
 An' never thinks o' kickin'—
 Whoa dar! Nebuchadnezzah!

Is dis heah me, or not me?
 Or is de debbil got me?
 Was dat a cannon shot me?
 Hab I laid heah more'n a week?
 Dat mule do kick amazin'!
 De beast was sp'iled in raisin'—
 But now I 'spect he's grazin'
 On de oder side de creek.

His head is capacious, and its structure suggestive of meditation, patience and firmness. His ears are large and flexible, denoting an exquisitely sensitive and highly generous disposition, and possibly a high capacity for music, especially the *Wag'n Ear-ian* school. The eye is slightly melancholy, although watchful, far-seeing and quick to warn him of approaching or suspected danger.

The nose, which is strongly formed, is frequently Roman in outline, corresponding with the indomitable firmness and tireless energy which we know him to possess. His skin, contrary to what we might expect in one of his exquisitely sensitive disposition, is thick and tough; a wonderful provision of providence to protect our much persecuted hero from the merely physical, although frequent and severe, and even galling, persecutions with which he is visited.

The lips are full, but firm; and there is in them a slight suggestion of that biting sarcasm in which we know him to indulge at times. His body is that of one framed for endurance and suffering. It is well that he possesses in an eminent degree the virtue of patience; as Nature, while endowing him with a Spartan firmness and indisposition to fly from torments, has not only exposed him to torments from flies, but has been niggardly as regards the brushing qualities of his tail, which member resembles that of his paternal progenitor.

His voice, in the frequent use of which he greatly delights, is full, resonant, and exceptionally far-reaching; it is generally thought to be *base*, and is never a *hoarse* one, or at all *neigh-sal*.

His constitution is hardy and rugged; his body tireless, and his appetite unbounded; although he has been known to subsist upon hemlock splinters and burdock leaves. He has shown a marked appetite for the tails of others of his species; browsing upon them cheerfully and abstractedly, while evolving new mechanical movements and gyrations, while he practices with his heels, on the slightest opportunity—*creating* the opportunity if necessity require.

We have now considered the physical features of the mule; his mental and moral characteristics may next engage our attention. His sage appearance doubtless does not

believe his powers of mind, schooled in diplomacy and ripened by meditation and experience. It is his sagacity that leads him to determine, in a moment, friend or foe; his classification being so effected as to bring within the latter characterization the noble equine and entire human race, as feudal enemies. That he is capable of making abstruse mathematical calculations is evinced by his skill in contriving and executing complicated movements of the heel and toe; and his engineering skill is attested by the masterly way in which he so applies his legs as struts or braces, as to render it impossible to move him in any direction, and more impossible to move him forward than any other way. His aptness as a scholar is attested by Mr. Daniel Rice, the humorist, whose educated mules have attained world-wide fame, which they have reflected in part upon their teacher. His memory is of the highest order. A circus mule has been known to remember for years the boy who rosined his hands to prevent being thrown; and to address to him ironical remarks in pantomime, so forcible in their nature as to completely upset him. If we were to venture an opinion upon his reading, we should say that his favorite author is Kick-ero.

Let us not underrate his engineering abilities, or common sense. A mule heavily laden with a side-projecting burden, and traveling on narrow mountain paths, instinctively keeps to the *outer* edge of the path, although the chasm may be 2,000 feet deep, and a single miss-step would end his days and usefulness.

A horse will shrink from the edge of the precipice, at the much greater risk of striking his load against the wall and being thrown outward and over.

This cannot be instinct, or inherited, for those that are thrown over could rarely leave behind them progeny inheriting the sense of the danger. Besides, all mules do it, and no mule could have had a parent by whose experience and loss to profit. Further, no mule ever had a mule for a parent, anyhow.

Ergo, it is engineering skill or common sense of the highest order. Q. E. D.

Morally, his is a strong character. As we have said, he is possessed of indomitable firmness, an unconquerable will, and a still more uncompromising *won't*. That he is upright, has never been questioned; that he is downright, none dare deny. A leading characteristic is pertinacity and tenaciousness of opinion. Inflexibility of will is strongly developed; as also are stubbornness, and obstinacy. He is at times headstrong and dogmatic, but these last are owing to his desire for consistency and for liberty of thought and freedom of action.

His tenacity of purpose has perhaps never been more strongly developed or established than in our "late unpleasantness," where the army mule, frequently impressed into the service from the opposing side, or perhaps from Quaker ownership, has expressed in actions, which spoke more strongly than words, his willingness to become a martyr for opinion's sake. It is recorded of those army mules that their determination not to pull could not be counteracted by words, how-

ever forcible or personal, or blows, however vigorous; and that it having frequently become necessary to build a fire under them to induce them to reconsider the question, it has at times absolutely become necessary to *draw* the *fire*, since the mule would not *draw* the *wagon*, even when addressed in such *glowing* eloquence.

Debarred by his hybrid nature from the joys, privileges, and responsibilities of pater-nity, we must not wonder that his trains of thought and his plans in life differ from those of other animals more favored in this respect. His affectional emotions are bestowed upon his companions—having learned to work "in team," the yearning for companionship leads him to refuse to work when his mates are changed.

Whether the Horatius Cocles who held the bridge over the Tiber and has come down to us with undying fame, renewed in song by a Macaulay—was not indeed a *mule*, is an historical question well worthy our investigation. The supposition originates (it is believed) with ourselves; and should a suitable committee of this "or any other body" investigate and favorably decide the question, (by the customary vote of eight to seven), we hereby give notice of our intention to apply for domestic and foreign letters patent on certain new uses and applications of the mule in defensive (and perhaps even in offensive) warfare.

The Harlem Cable Road.

Rumor says that the long line of cable road under construction in the upper part of New York belongs practically to the Third Avenue Company. Rumor may be wrong; but in any event the line, when open, will be a powerful rival to the elevated roads, and will have a strong influence on the future development of the city. It will open a section of the city which is now inaccessible to any of the elevated lines, and will have an important influence in bringing about a great change in the manufacturing portion of New York City. That the Harlem flats will, at some time in the future, be devoted to manufactories, appears to be inevitable. These flats lie low, are near the rivers, and have little attraction for the better class of people. They are now being rapidly covered with cheap dwellings. The unhealthiness of the location will in a short time drive out the better tenants. Then the cheap property will attract the manufacturer. Washington Heights and the highlands beyond will become the fashionable quarter of the city, while Westchester County, along the river and sound, and Long Island City, will provide homes for the workers in the factories on the flats. In view of the changes which have taken place within the last ten years and the present rapid movement of the population, it is not unreasonable to expect an entire change in the character of New York within the next fifteen years.—*Ind. America.*

Every street railway official needs to profit by the experience of his fellows in other companies. The place to obtain it is in the STREET RAILWAY JOURNAL. One dollar per year.

Cable Railway Directors.

The last meeting of the old board of directors of the Cable Railway Company was held at No. 206 Broadway, Tuesday, July 7; and a new board was elected for the ensuing year by the stockholders. There are 20,000 shares into which the capital stock is divided, and 19,995 of these were voted on at the meeting. All but nine of them were voted on by Mr. Charles P. Shaw as attorney or owner. Mr. Shaw reported on behalf of the retiring directors, in his capacity as counsel to the board, the transactions of the past year. He said in substance that no legislation had been made against the company, and that he saw nothing in the way of the cable railway being constructed in the near future. The assaults on the company's charter and franchises by interested parties must fail of their object, for no objection had been raised that had not been fully answered. Of the \$15,000,000 5 per cent 50-year gold bonds authorized by the company for construction purposes only, not one had been withdrawn from the trust company. Of the \$25,000,000 of second mortgage income bonds now in preparation for issuing, not one had been sold in advance or promised to any one. So the assets of the company consisted of 95 per cent of every share of the 20,000 shares of capital stock, and all the mortgage bonds, aggregating \$40,000,000, with \$2,000,000 capital stock, and all were available. All the expenses of the company thus far had been borne out of the private pockets of the syndicate, and the company, being entirely out of debt, was equipped, by its securities and right to call for assessments on its stock to the extent of \$1,900,000, in a satisfactory manner to build its roads.

The following directors were then elected for the coming year: Wallace C. Andrews, Homer A. Nelson, Augustin C. Moss, Joshua B. Shaw, Rowland N. Hazard, John J. O'Brien, Thomas W. Evans, Samuel B. P. Higgins, and William S. Williams.

Electric Railways in San Francisco.

It is expected that in a few weeks the Pacific Coast Electric Construction Co. will have an experimental electric road running from the Southern Pacific depot to the Union Iron Works at the Protrero, in San Francisco. For some time past experiments have been made in this direction, and the plans are now said to be complete. The road will be similar to the cable-road, only, instead of a cable underneath the track, there will be a negative and positive wire. These, when brought together by the grip of the dummy, will complete the circuit and provide the motive power. When the car stops the wires will be released; thus the power necessary to drive the car will be saved while it is at rest. The generating machines are also so arranged that as soon as a car stops they will cease to generate the amount of electricity to propel the car. Should the experimental line prove a success, electricity as a motive-power will, no doubt, be adopted on many of the street-railway lines in San Francisco.—*Times*.

Starting Cars on Cable Roads.

Mr. W. W. Hanscom, commenting on suggestions in the *Machinist* on the advantages of giving cable cars the speed of the cable by gravity before applying the grip, says:

"The desirability of giving the car on cable roads a speed equal to that of the cable before applying the grip so as to avoid the shock of starting so suddenly and the consequent abrasion of cable and grip, is acknowledged by all. Some of the roads in San Francisco are so situated that the car may be started at one end of the line by gravity; at the other end the car has to be started on an up grade. This causes great wear to the cable and the jaws of the grip, the latter having to be replaced by new ones very often.

"While it is often practicable to have sufficient grade at the end of the line to start the car by gravity, on at least one half of the round trip cars must of necessity be started on an up grade unless all points of stoppage of trains can be controlled and the grades of streets happen to be favorable. From 90 to 95 per cent of the starts are made on the route and generally not more than 45 per cent of these on a down grade or level, so that while starting cars by gravity at the termini is of some importance, it is not of that paramount consequence it would seem."

The Uptown Cable Road.

It looks as if New York would soon be able to judge of the merits of cable railroad-ing. Everything but the cable is ready for the road that is to run from 125th street and Eighth avenue, through Tenth avenue to 187th street. The officials say that cars will be run by the cable August 1st. Then the road is to be extended along 125th street to the East River if no legal troubles arise. The slit between the car tracks, which opens into the cylinder through which the cable runs, is about an inch wide. An iron shank runs from the bottom of the car through the slit and grips the cable. The grip is similar to that in use in Chicago, and is not at all like that in use on the East River Bridge. In place of the wood lined sheaves there is a lower jaw which is stationary and an upper jaw which rises and falls, having a bearing of 20" on the rope. When the cars are to be started the "driver" closes down on the jaws, which pinch the rope like a vice. It is said by the officials of the road that the cars will start and stop easier than the horse cars do. At first they will be run at the rate of about seven miles an hour. This is a little more than a mile an hour faster than the average speed of the horse cars. The cable cars of Chicago attain a speed of between nine and ten miles an hour, and when things get into good working shape this will probably be the speed on the New York line.

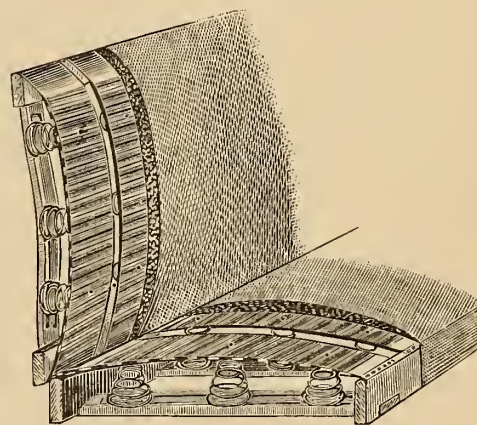
The Fourth Avenue horse railroad is pushing its line up beyond Eighty-sixth street, its present terminus. By the first of October it is expected that the road will be in operation to 137th street.

Tramway Construction in Cincinnati.

The Cincinnati Street-Railroad Company notified the Board of Public Works that Rees E. & George F. McDuffie recently assigned their interest under ordinances and contract with the city in the right to construct and operate Street-Railroad Route No. 21 (the Warsaw Pike and Price Hill Route) to the Consolidated. They desire to proceed promptly, but say they are confronted with the difficulty of doing so properly by the condition in which the work done on Warsaw pike and Hawthorne street has been completed. The original contract requires a metal of 16", but the pike as completed has only 9" of metal. This would cause the track, if laid, to stand 3 to 6" above the metal. They urge the board to have the stakes set for the railway to the established grade, and that the metal be at once provided to complete the street as the track progresses.—*R. R. Journal*.

Rattan Sectional Spring Seat and Back.

This seat and back are covered with woven rattan cemented to canvas duck; the



springs are riveted to an elastic slatted top, with spring-steel cross pieces between. It is made in "spring edge" form.

* Hale & Kilburn Mfg. Co., 48 N. 6th Street, Phila.

To Warn Elevated R. R. Engineers.

Fire-Commissioner Purroy of New York City has issued an order that danger signals be carried on each hook and ladder truck to warn engineers on the elevated trains. The signals will consist of two red flags to be used in the daytime and two globe hand lanterns with red glass for the night-time.

In case of fire in a building located on any street or avenue which is occupied by the elevated railway tracks, and it is deemed necessary by the officer in command of the fire not to allow the trains to pass, either for the purpose of the force working from the tracks or that it would be dangerous for the trains, a danger signal will be displayed on each track at a distance of not less than 100 yards from the fire, and immediate notice will be sent to those in charge of the first station in each direction that the trains must not pass until, in the judgment of the officer in command, it is safe for them to do so, when the danger signals will be removed.



MONTHLY, \$1.00 PER YEAR.

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AMERICAN RAILWAY PUBLISHING CO.

32 LIBERTY ST., NEW YORK.

12 LAKESIDE BUILDING, CHICAGO.

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Capital and Labor.

The overshadowing error of the day consists in the assertion that physical labor is the only source of wealth. The teachers of these false doctrines hold that the intellectual and the moral have such an infinitesimal effect upon the accumulation of property that they cannot be given any assignable quantity. If it were possible that this theory is true, then the cathedral "with glistening spires and pinnacles adorned," the suspension bridge that spans the broadest river, the steam engine that furnishes the greatest power, the electric cable over which messages are transmitted with the velocity of lightning, have their existence to-day without the aid of the intellectual force of the architect, the engineer or the inventor. If there were not dangerous political demagogues engaged in the vocation of infusing these poisonous dogmas into the society in which we live, thus periling the very existence of the commonwealth itself, it would hardly be necessary to combat such a statement, that carries its refutation upon its face.

Muscle and bone are set above the conceits of Newton, Morse and Ericsson. If one admits the absurd premise of these wranglers, then it follows that all we see about us that characterizes our civilization belongs as a matter of right to the men who simply carried out the details of invention and discovery. All material improvements, the highway, the railway, even the social structure itself is said to be owned by those who performed the manual labor that was employed in the production of the realized wealth of the country. On the basis of natural right this claim could never have been made good, even in the very earliest stages of hunting and pastoral life.

However, the growth and development of the arts and sciences have determined that these claims for the exclusive rights of

labor are not sustained. The steam engine has doubled the productive power of the world, and the people have just so much more time for mental improvement. The thought which comes through the mental labor of centuries greatly relieves the laborer of physical work. While the inventor and the discoverer benefit mankind, the legislator, the jurist and the moral teacher show how it is possible to conduct a commonwealth in such a manner as to ensure the rights of all.

Although this last statement seems to assume the character of a platitude, still it is well known that there are those, who with questionable motive, teach the existence of classes who divide upon the question of capital and labor; teach that between these classes there exists an irrepressible conflict—that they are arrayed against each other in hostile camps.

The process of organizing labor against capital, against property, against corporations, and even against law itself, has progressed to such an extent that actual violence and force have manifested themselves in many sections of the country. Peaceful and orderly combination does not seem to be the object of these movements. Whole communities are terrorized by mob violence, and labor demonstrations develop into incipient revolutions.

Work of Operating Elevated R.R. Trains.

Some recent experiments made by Mr. Angus Sinclair on the N. Y. Elevated R. R., and published in the *Car Builder*, go to show that a 21½ ton engine with 11"×16" cylinders and 42" drivers, pulls 4 cars weighing 23,850 lbs. each, and 170 passengers weighing 130 lbs. each, at from 72 to 174 revolutions of driver, with an average of 163.4 indicated H. P., with a water consumption of 42,959 lbs. and a coal consumption of 5760 lbs. in the 20 hours' service.

Mr. S. ciphers it out that the mean effective pressure in the cylinders was 81.5 lbs. per square inch, and that the total tractive force was 3759 lbs; and that deducting 10 per cent for friction there was a net tractive force of 3384 lbs., or a little over 42 lbs. per gross ton. From this, the remarkable conclusion is made that "if the Elevated Railroad trains were run through without making stops, they could be operated with a draw-bar tension of about 8 or 10 lbs. per train ton, but the conditions under which they are moved require a draw-bar tension of about 40 lbs. per train ton to be maintained while the engine is using steam."

The steam engine indicator is a remarkable and a useful instrument; but even its most enthusiastic admirers, up to the present time, have not offered it as a means of measuring draw-bar tension.

However, assuming these figures of draw-bar tensions to be correct, and taking Mr. Sinclair's figures for average horse power, based on the engine's having taken steam only ¼ of the time and hence reducing the average to 77.8 H. P., or 77.8×63=4901.4 H. P. for the 63 trains on the road—we have this to say as to his conclusions against the

use of cables driven by stationary engines:—

The train weight, including a 21½ ton engine, is 80 tons; then we should have a saving of $21\frac{1}{2} \div 80 = 26\frac{1}{2}$ per cent in train weight at once, by the use of the cable.

The next saving is in the amount of traction per train ton. Quoting Mr. Sinclair's own words: "If the locomotive had nothing to do but get the train up to its average speed of fifteen miles an hour and keep it going at that velocity, the work would be very light. But that is not the way the work is done. During the run of 8½ miles from Harlem to South Ferry, the train makes twenty-five stops, and the trip is made in forty-two minutes. The work done by the engine is a succession of twenty-five spurts, when the train is forced rapidly from a state of rest to a speed of about twenty-five miles an hour, then suddenly brought back to rest by the action of the brakes. The operation of the locomotive pulling one of these trains strikingly resembles the recurring work done by the engine of a pile-driving machine, which is constantly raising a heavy weight that is suddenly dropped and has to be raised again."

If the cable was used, not only would the train weight be only 73 per cent of what it now is, but the traction per train ton could be reduced to 15 lbs., which is only 35.7 per cent of 42. Thus we get traction down to 35.7 of 73=26 per cent of Mr. Sinclair's figures for locomotive service.

Mr. S. places the coal consumption per indicated H. P., in the case he cites, at 5.8 lbs. per hour per H. P. Stationary engines capable of developing up to 4900 H. P. could very well get along with just half that; so that our 26 per cent is still further divided by two, and we have all the margin between 13 per cent and 100 per cent to cover the friction of the cable.

Then, again, we have the wages of most of the locomotive engineers and some of the locomotive firemen saved by the use of the cable.

Mr. S. concludes his article with the following unpleasant admission:

"With the terminal steam pressure so high as these small engines have to maintain it that the work required may be done, there is no opportunity to use steam economically, and no improvement can be effected unless heavier engines with larger cylinders are employed or a lighter load given them to pull, *changes which in this case are inadmissible* and are not advisable, since the achieving of any net economy would be by no means assured."

The italics are our own; and assuming the correctness of Mr. Sinclair's test, there is ample reason for looking into the cable system for the shakily elevated roads of New York.

Women Alighting from Cars.

Can anyone, tell why a woman in alighting from a horse car almost invariably faces to the rear instead of the front of the car? It is the cause of most of the accidents to ladies. An exchange suggests that the car having passed the point they want to stop at, they naturally turn that way.

The Legal Aspect of the Chicago Riot.

Under the circumstances set forth in an article in another column, headed, "Account of the Chicago Riot" it would eminently be proper to inquire into the nature of the statute law that obtains in the State of Illinois, relating to the subject matter. It provides for the punishment of any person who shall willfully and maliciously obstruct the railway tracks or the passing of cars. The city ordinances provide that "any person who shall make, aid, countenance or assist in making any improper noise, riot, disturbance, breach of the peace in the street or elsewhere in the city, and all persons who shall collect in bodies or crowds for unlawful purposes to the annoyance or disturbance of citizens or travelers shall be fined," and the laws of the State provide that such persons be confined in the county jail; and in case of injury to property or persons that each person concerned shall be imprisoned in the penitentiary not more than five years.

The law of 1875 provides that the Mayor shall have power to call on every male inhabitant of the city over eighteen years of age to aid in enforcing the law, and to call out the militia to aid in suppressing riots and other disorderly conduct, and further, if he (the Mayor) be guilty of a palpable omission of duty he shall be liable to indictment, and on conviction shall be fined and removed from office.

The facts herein narrated show that an assemblage of persons took forcible possession of the principal thoroughfares of the city of Chicago, for the avowed purpose of preventing the operation of one of its most important institutions. The immediate cause of this riot was the demand on the part of the employees for the re-instatement of the discharged men; and the company's refusal to comply.

The rules which the conductors sign upon entering the service of the railway, provide that the contract may be terminated and the conductor be discharged on any day, at any hour of the day, by notice, either verbal or written, by the Superintendent of the company, given to the conductor at any time, without stating any cause of discharge; and the conductor has the same privilege to similarly and summarily terminate the contract.

The effect of the demand by the men was to require the company to change its very rules of management; and not only to deny the railway's right to conduct its own affairs, but to force it to act under the dictation of the men whom it employed.

The employees discharged themselves by their refusal to work. The severance of their connection from the company was complete. The next seen of them, or most of them, was when they took their place along the route of the cars, to incite disorderly conduct among their sympathizers and friends, if not to use actual violence and force themselves.

It was at this time that the different labor unions took up the quarrel of the strikers, and what is still more alarming a strong socialistic element backed up the unionists,

This feature of the *émeute* must not be overlooked. State socialism, which demands that the government shall conduct railways, telegraphs and education is not necessarily wrong, because it is simply and openly urging the advantages of a certain theory; but the great danger of that phase of socialism which exists in Chicago is that it partakes of the character of anarchic democracy, and has a decided tendency to attack civil government, pillage property, destroy life, and sweep away existing institutions. The scenes that have often taken place in that city prove beyond a scintilla of doubt that one of the worst forms of revolutionary democracy obtains there, and whatever was the origin of this so-called strike, the condition of things, already described, was nothing more than a dangerous uprising, closely allied with anarchism, if not with nihilism itself.

Instead of treating the facts before the public as a question of violation of the plain provisions of the law, imposing a duty on the part of the Mayor to suppress the riot, that officer was not only guilty of an omission to promptly arrest the criminals, but in all the published interviews had with him he pleaded that the difficulty was of the nature of a dispute between the railway on one side and employees on the other, and recommended arbitration while a mob held possession of the public streets.

This proposition, coming from the chief executive officer of the city, was most extraordinary, as it degraded the company to an equal footing with rioters who had virtually seized the property of the corporation.

It was not until the 6th day of July that the Mayor issued a proclamation that the property of the railway would be protected while in the performance of its chartered rights. But the preamble of this document ignored the actual condition of facts by calling the riot an "excitement growing out of a strike."

Although it will be readily admitted that this high official personage did not intend to coquette with these law breakers, still the natural effect of his dilatory course was to mislead the crowd into the commission of acts of bloodshed and pillage. The real conflict was between the law and the criminal; between anarchy and peace; and the course of the Mayor should have been sharp and decisive.

Regarding the cause that led to the troubles between the corporation and its employees, it may be remarked that the whole combination of the drivers and conductors is an unnatural one, for the reason that their duties are entirely different. The conductors are money collectors. The civil rules of the United States Government exempt the officers who collect money and account for it. All banks claim the right to discharge immediately any of their employes. If publicity were to be given to the charge of dishonesty in all cases of discharge, endless trouble would ensue.

The West Side Railway Company has a very small interest involved in the issue raised by the labor demonstration in Chicago, compared to those of the vast

business, commercial and financial corporations of the country. If there cannot be some limitation placed upon the power and acts of those who claim that mere manual labor is entitled to dictate its own terms and conditions of employment, then the whole property of the land, both private and corporate, lies at the mercy of the first mob which may be incited to rise.

The great peculiarity of our existing civilization is interdependence. One section of the country is dependent upon the productions or manufactures of another. This internal commerce is made possible by rail-intercommunication. The corporations that have this vast interest in keeping, employ an army of skilled laborers and other employees. If these men could by an extended combination, cease to work at a given time and also prevent the employment of others to take their places, there would exist a revolution of a most destructive and disastrous kind, involving in its direful effects the very fabric of our liberties.

Undoubtedly, labor has its rights and privileges. It is armed with the ballot, and the proper course for it to pursue is to bring its wrongs, if it deem it have any, into the issues of peace, and at the proper time to deposit its votes upon the subject in dispute in that urn that should contain the will, the morals and the conscience of the people. The light of intelligence will then "beat upon" the questions under consideration, and the masses will be taught that there should be in reality no conflict between labor and capital.

Superintendent Lake.

Relative to the impression conveyed by Eastern papers that one of the conditions of the West Division R. R. striking conductors returning to work was the dismissal of Superintendent Jas. K. Lake, nothing could be more erroneous.

The men struck because (ostensibly) fifteen of their number were discharged, and among the fifteen, prominent members of the association. They demanded that the fifteen be re-instated or they would strike. Their demand was refused, hence the strike.

The compromise was this. The men were first to return to work, then the fifteen were to have an examination before President Jones, and he was to decide if there was cause for their dismissal. They were so examined; eleven of them reinstated. No demand was made for any official's dismissal. None would have been entertained a moment. Superintendent Lake would not have to be asked for his resignation twice. He is too well known as a street railway official to be at loss for a position, and aside from this, his private fortune is such that he need not engage in any business if he does not wish to. There has been a great deal of talk by cheap papers who aim to cater to the trade union labor element, but it's all senseless "yawp." No man stands higher in the community or has the good will of the better classes in Chicago, both as citizen and official, than James K. Lake.

Account of the Chicago Riot.

The West Division Railway of Chicago runs its cars through the principal streets on the west side of that city, and has forty-five miles of double track. It employs some 1300 drivers and conductors.

Prior to June 27, a dozen men were discharged by the company. On the evening of that day the Conductors' and Drivers' Association passed resolutions requesting the company to reinstate the discharged men. Superintendent Lake replied in a written communication that he had always regarded the Association as a *benevolent* organization; and had encouraged it by giving preference to its members; that the men were discharged for cause; and it would be idle folly for the company to accede to the demands of the men; that the company desired to pay fair wages and to treat all its employees with humane consideration; that to accede to present demands would mean that the company would no longer have control of its conductors and drivers; that the labors of the President and the Board of Directors would be done away with and security for the stockholders gone; and that the proposed strike was due to a few unprincipled men.

Upon the receipt of this letter a strike was determined upon, to commence on the 30th of June. At a meeting of the Association, delegates from the Trades Association, the Sailors' Union, the Iron Union, the Telegraphers, and other Trades Unions, all pledged their sympathy and financial support. It was then openly declared by these laborers that they would not ride on cars run by "scabs;" nor in fact allow such cars to be run. Mayor Harrison stated to a committee from the Association that in case of a strike no interference would be permitted on the part of the police, unless the law was transgressed.

In the early part of the 1st of July there was an attempt to run cars on Madison street, under the protection of the police. When these cars reached Union street the crowd, which numbered 3000, began throwing paving blocks, beer kegs and ash barrels into the middle of the street, and pieces of timber were also placed across the track. The mob, however, being frustrated in its intent to stop the cars, began throwing paving blocks, cobble stones, beer kegs and whatever missiles it could lay hands on, at the cars and the police. The mob then upturned the car. A policeman defended it as best he could, and fired his pistol in his defence. The crowd called for a rope to hang the policeman. The whole day was spent in disorderly and riotous conduct. The rioters had everything their own way.

Mayor Harrison, Sheriff Hanchett, Chief of Police Doyle, Corporation Counsel Winston, and Superintendent Lake held a three hours' conference. The Mayor thought that it was a physical impossibility for the police and the Sheriff to protect all the cars on all the lines. He thought that if the company was in the right the people would come to it; if the strikers were right public sentiment would come to them. He said,

"I assume that it is not my duty, nor even proper, for me to decide the question." His duty was, he claimed, to preserve the peace and protect property through the police; not to act as judge between disputants; that he did not express opinion one way or the other; that it was not his place to advise the company. Congressman Lawler claimed in a conversation with the Mayor that the company had not treated its employees fairly and had no right to expect the city government to back it, and that the masses sympathized with the strikers.

At five o'clock on the morning of July 2, strikers, unionists, laborers and other friends of the strike gathered on Western avenue and along Madison street, prepared for any sortie that the company might attempt. No cars were run; and the rioters having their own way the peace of the city was broken only by occasional acts of violence. Several new drivers were assaulted; and in the afternoon of this day a police officer named Kelley drove up to the barns and began an address to the crowd. He assured the strikers of his sympathy, and hoped that their cause would succeed. This officer was not arrested, but was merely required to drive on. In the evening fully 5000 laborers held a mass meeting. One speaker advised the people to organize. Congressman Lawler openly incited a riot by counselling that the "scabs" be hit with bricks, and blamed the Mayor for "forcing the police on the oppressed."

On the afternoon of this day the mayor had counselled arbitration. On the morning of July 3d, three cars were filled with policemen at the barns on Western avenue, and with an escort of patrol wagons started for the city. An immense crowd composed chiefly of outside labor organizations with a strong "hoodlum" element then rushed for Madison street, and began blocking the thoroughfare by piling up iron gas pipes, heavy timbers, and all the building stone, bricks and other materials that could be found. The police after some time removed these obstructions. At other points there were huge barricades found on the track. A rush was made for the cars, but the officers drove back the rioters with their clubs. Acts of violence continued during the day. Still the opinion of the mob seemed to be that there was no objection to the police riding occasionally on Madison street, so long as no passengers attempted to enter the cars.

The anniversary of American independence was comparatively quiet, as the company made no effort to run any cars, and the police allowed the people to assemble on the streets. The Mayor addressed two letters, substantially the same—one to the strikers and one to the company. He stated that differences had led to a strike, "in which each side claims itself to be in the right and in which both sides may be in the wrong," that the public had a right to expect the company will afford it the accommodation which its charter imposed on it, that the public agrees with him that the dispute can be settled by arbitration. "If you" (the company), he added, "refuse"

(to arbitrate), "and riot and bloodshed should result from a continuance of the strike, the public may feel inclined to hold you" (the company) "responsible."

Sunday followed the fourth, and the day was marked by the holding of meetings of a more or less communistic nature in different parts of the city. One of the speeches at the Trades and Labor Assembly urged the City Council to declare the charter of the railway forfeited and that it assume the control and running of the lines for the people. Another person made a ferocious speech dealing in arguments favoring the use of stones, clubs, powder and dynamite; and alleged that the Trades-Union was acting and should act upon the socialistic idea. He recommended that they organize a Zouave company. The Socialists gathered in large numbers on the lake front to listen to incendiary remarks from their leaders. The oppression on the part of the favored classes, the need of armed resistance to law and order were all talked about. One man from St. Louis denounced all property rights, advocated armed resistance to authority and claimed that only the knife, pistol and torch could bring the capitalistic class to a realization of the wrongs that labor suffered under. He talked for an hour in an address full of blood, burning and killing, and was urged on by the cheers of his audience. This man was followed by another who made a highly inflammable harangue. "How many of you have guns and pistols?" he shouted.

"I have! I have!" came the cry from all sides. "Then get them ready, for in a few days or perhaps tomorrow we may want to use them. We can march down the Boulevards, Michigan and Prairie avenues—those avenues of the purse proud and aristocratic—and sweep them from the earth if we are only armed and united." Great cheers followed these remarks. He then denounced many prominent capitalists and employers, the West Division Street Railway, Marshall Field, Geo. M. Pullman and J. Russell Jones as the enemies of mankind. The crowd said, "Down with them!" "Now is the time to strike!" At this point a number of revolutionary circulars was distributed among the audience. The crowd now demanded "Blood and riot." The prevailing advice was to arm and take possession of Madison street in the morning, when the red flag should be displayed. It is utterly impossible even to outline the expression of communistic sentiment that flowed out of the labor demonstrations that were held on this day.

On Monday, the Mayor, for the first time, issued a proclamation to the effect that the police would, on the following day, protect the property of the company while in the performance of its chartered rights; still he characterized the riot, as the "excitement growing out of a strike." Superintendent Lake, on his part, issued a very conciliatory bulletin to the effect that he would employ all the old men who would go to work, except those who had been guilty of any act of violence.

During the day a number of cars were

run under police protection, but in the afternoon there were two demonstrations which showed that the riotous element was not subdued and that the mob had watched its opportunity for doing mischief. On Van Buren street a car was ditched and an employee making a switch was assaulted. At seven o'clock the thirty-three cars that had been run on the four lines were withdrawn and further cause for disturbance removed for the day.

On Tuesday morning the cars were run more frequently, with one or two policemen on each car. Between twelve and one o'clock 400 workmen gathered at the corner of Jefferson and Randolph streets, and hooted the cars as they passed. The police dispersed them. On the afternoon the cars were crowded with passengers and the so-called strike was at an end.

The proposition of President J. Russell Jones was accepted; to the effect that all men should resume work, except those who had been guilty of violence, and the sixteen discharged men, whose cases should be examined; and if it was found that there was no cause for the action of the company, they were to be reinstated. In pursuance of the agreement most of the discharged men have been restored and the men virtually gained their object.

The Right to Discharge and the Right to Quit.

Why don't employees look in a common sense way at some of the questions concerning their every-day life? Why do men with families to support let themselves be influenced by demagogues into becoming fools or criminals, or both?

Here in the case of the Chicago riot, Superintendent Lake discharged sixteen men because he wanted to, and had the right to, and the whole Western District was torn up by the roots because there were no reasons given for the discharge. Suppose some conductor or driver gets mad and quits because he doesn't like his route, or his hours, or his pay, or for any one of a hundred other reasons or whims, would Superintendent Lake have any right to refuse to pay that man's friends because that man quit either with or without reasons? By the terms of the contract with most street railway companies handling a large number of men, the company has a right to discharge a man when it pleases, without giving reasons, and the employee has a right to quit when he pleases, without giving reasons.

The Superintendent has a right to discharge a man because he don't look honest or because he don't look sober, or because he wants to reduce the force, or because he wants to put another man in the discharged man's place.

The employee has an equal legal right to quit without assigning reasons, no matter how much inconvenience he causes the employer. He may quit because he don't like his mate, or wants to go on some other road, or because he wants to loaf, or because he thinks he may be going to get the g. b." And the company has no redress.

A railway company has a right to go out of business if it thinks it isn't making money. It has a right to reduce wages if it thinks it isn't making enough money. It has in many cases no right to increase fares, although it may have its taxes increased at the whim of unfriendly, or to pay expenses incurred by extravagant, legislation.

The conductor or the driver has a right to quit if he thinks he is not making enough money. He needn't consider the company a moment. He has the advantage of the company that he can more readily offer his labor in another market than the company can put its capital in another investment.

The right to discharge and the right to quit, without assigning reasons in either case, should be remembered by both parties to the contract, and protected by the proper authorities.

The "Novelties" Exhibition.

We take pleasure in calling the attention of our readers to the "Novelties" Exhibition of the Franklin Institute, to be held in Philadelphia from September 15 to October 31, of the present year. Numerous and excellent as previous exhibitions have been, it is probable that the "Novelties" will exceed in merit and popularity all its predecessors. The management has already effected much, and the list of applicants for space has attained large proportions. It is stated by prominent officials that the buildings will prove too small to accommodate all would-be exhibitors, and there can be no doubt that procrastination is likely to result in disappointment. Other things being equal, the early birds consume a larger amount of insect life than the later arrivals; and we should exceedingly regret seeing any really meritorious firms denied admission because they deferred too long the period of application.

The Stable.

R. B. Sturges, stable foreman of the Brooklyn City and Newtown Road, thinks salt is about the best remedy for ordinary cases of colic. He instructs his men to give a large spoonful. He also uses salt in cases of foundered or sore footed horses. Bathes part in brine or makes a bran poultice and saturates with brine. He thinks the less medicine is given the better. Uses the Bryden shoe and thinks it excellent for the foot.

The same gentleman gives the following about feeding: Horses make twenty miles per day, are fed three times, 4:30 and 10:30 A. M., and 4:30 P. M. First and last feed consists of four to four and one-half lbs. cut hay, five lbs. meal, two and one-half lbs. ground oats. Noon feed long hay and five quarts of oats, making about twenty-nine lbs. feed per day. No bran is fed unless horses are out of sorts.

A SYSTEM of rails for street railways, introduced by M. Marsillon, is under trial by the Compagnie des Omnibus, of Paris. It consists of an ordinary bridge rail and counter rail of the same section, bolted in an iron longitudinal sleeper. The absence of wood makes the system a very durable one, but it is very inelastic.

Hose Jumpers.

Street railway men may find a good subject for thought in the following paragraph, from the N. Y. *Morning Journal* of July 15, referring to the fire in Liberty street the day before:

"During the fire Broadway and New Church street were packed with people, and the hose of the firemen prevented the Broadway cars from running. A long string of cars extended from above the City Hall, and the traffic was impeded for over an hour and a half."

The idea suggests itself to us that there must have been a good many fares lost to the street car lines, by reason of the hose impeding the traffic, and that this loss is one that is very often repeated on a greater or less scale, from the same cause.

If the evil were irremediable this loss would be a fit subject for bewailment; but the fact of the matter is, that simple and effective hose jumpers are so cheaply made and so easily carried, that companies deserve the losses that they incur from such blocks at fires. Most of us remember when hose-bridges and jumpers were regularly carried and used; and we believe that the reason for their discardal was a silly squabble as to whose place it was to pay for them and carry them; the firemen's or the street railway men's. The railroads insisted that it was the place of those who laid the hose lines across the street, to prevent them obstructing travel. The fire department, on the other hand, claimed that it was the duty of those who didn't want to be bothered by such delays, to obviate them. Perhaps the railway men had the right of it, but the firemen have the best of it; and we suggest that it will pay the railways to carry hose jumpers.

There are two principal classes.

In one, there is for each rail a regular wooden bridge with a gentle incline on each side, and from two to four arches through which the hose lines lie. The bridge is about 6' long, and 6' in greatest height; and is preferably hinged in the centre of its length so as to be folded up compactly.

In the other kind, there is a simple piece of six-ply rubber belting, 6' long, about 10" to 12" wide, and having flush-bolted across it, about 4" apart, a few wooden strips as long as the belt is wide, and about 2" wide and 2" high. Between these strips the hose-lines are laid; and there is for a cover, a similar strip of belting, without the wooden strips. At suitable places there are short chains with iron pins, to hold the jumper down. One jumper goes on each rail. If every sixth car were to carry such a jumper, street-car blocks at fires, owing to hose laid across the track, would be of short duration and little expense.

A NEW street rail with a four inch upper surface and wide base, giving a section similar to ordinary railway iron, is being put on the market. It weighs 56 lbs. to the yard. Joints are made with fish plate and bolts, and the rail rests on steel chairs five inches high, spiked to white oak ties six feet apart.

The American Street-Railway Mutual Insurance Co.

A meeting of the Directors of the American Street-Railway Mutual Insurance Company was held at the office of the Broadway and Seventh Avenue Railroad Company, in New York City, June 18, 1885, and a temporary organization effected by the election of Mr. Samuel Little, of Boston, Chairman, and Mr. W. J. Richardson, of Brooklyn, Secretary, pro tem.

The following communication with reference to the subject of street-railway fire insurance was issued to the various surface street railway companies of the United States and Canada:

Mutual Mill Insurance in the New England States is an established success of many years. It has done much to improve the character of the risks, by its restrictions upon bad practices and gross carelessness; and its suggestions of improvement have greatly reduced the number of losses and cheapened the cost of insurance. Before the establishment of the mutual companies, the rates exceeded \$1.50. Now it is estimated that thirty cents per one hundred dollars is a sufficient premium to pay the actual cost of insurance; although the mutual companies usually charge eighty cents, and return the profits in dividends. In England, where first-class construction prevails, the rates are about one-fourth of what they are in the United States, while in France and Germany they are even less. Why, then, cannot we successfully mutually insure our own property, when it is manifestly greatly to our pecuniary advantage to do so? Indeed we can much better afford to undertake the insurance of street-railway property, for the reason that the moral character of the risk is admittedly of the highest order. In that regard, it is superior to almost every other kind of property. Incendiarism can never be profitable under any circumstances to a railroad corporation.

The moral hazard is a very grave question to the insurers of stocks of merchandise. When insuring street-railway property, this is not taken into consideration. The high character of the risk should be regarded; but instead of doing so, the insurance companies have combined to organize a gigantic "strike" against street-railways. Hence the organization of this mutual company to meet the "strike," as the best available means by which the fire companies could be successfully brought to terms.

The men who have undertaken to form this company, and manage its affairs, are most of them known to the executive officers of companies that are members of the American Street-Railway Association.

The company has been incorporated under the laws of the State of New York; first, by reason of the fact that the plan has been developed by the Street-Railway Association of this State; secondly, because of the national reputation of the Hon. John A. McCall, Jr., Superintendent of the New York State Insurance Department; his certificate giving unquestioned and immediate entrance to a company in every State of the

Union. We learn that he gives his hearty co-operation, and approval of the company's plan of insurance.

The company is limited "to insure against loss and damage by fire," "surface street-railway property only;" and that the liability of each member is limited to "not more than twice the amount of the current annual premium paid by such member." Only surface street-railway companies shall be members.

While individual stockholders in street-railway companies will be indirectly benefited, the company has not been formed in the interest of individuals; who, by the investment of their own personal funds, might endeavor to control the insurance of street-railway property. It will for this reason, we believe, commend itself to the managers of every street-railway.

Under date of February 14th, 1885, Mr. W. J. Richardson, as Secretary of the Street-Railway Association of the State of New York, sent out a letter containing a summary of the insurance statistics gathered by him as Secretary of the American Street-Railway Association, from one hundred and seventy-eight companies in the United States and Canada.

The following summary, prepared by him, contains the statistics of one hundred and eighty-seven companies:

Total valuation of property.....	\$23,599,782.28
Insured for.....	14,784,561.03
Percentage of insurance to value 67 per cent nearly.	
Amount of premiums paid last year..	207,472.26
Total losses since operation of roads.	1,300,007.33
Estimated total premiums paid since commencement of operation.....	3,714,126.18
Percentage of premiums on losses....	35 per cent.

The present rates can probably be safely reduced about one-third. Each risk will be considered by itself and rated according to its material, construction, situation and fire extinguishing facilities, so that the cost of insurance may be equitably determined for all.

For the cities of New York and Brooklyn, the insurance companies have combined to make what they call a "tariff rate" of not less than 1½ per cent on all brick stables, and 2 per cent and upwards on all frame or partially frame, regardless of any of the qualifications just noted. The objection that this rating is unjust has been met practically with the reply—"Take it or leave it alone;" while the few companies that are not in the combination are as unyielding in rates as are the "tariff" companies. The result has been that in some cases, "without either rhyme or reason," rates have been increased 150 per cent.

Fire insurance must be thoroughly reliable to the insured; and a fairly large guarantee paid up capital is absolutely necessary to give a company this character. This is arranged for in this mutual company, by the provision for a "cash capital which shall be at least five hundred thousand dollars." The board has determined that this shall be the amount secured, before the company shall commence business.

This company, though organized under the laws of New York State, expects to be American in its scope. In the matter of

placing the stock, therefore, it has been determined to give the opportunity to every surface street railway company in the United States and Canada to subscribe. It is a mutual company for all, and by it all will be advantaged.

While the cost of insurance will be materially lessened, it will be seen by section twelve of the act that the profits of the business, beyond the acquirement of a proper surplus, will be apportioned according to the stock held by each surface street railway company as a member.

The most equitable basis upon which stock can be taken by the members is, undoubtedly, that of the gross receipts from passengers. The capital stock may not, and oftentimes does not, give any indication relatively of the business done.

The following resolution was adopted: *Resolved*,—That all street railway companies in the United States and Canada that become insurers of property with this company, shall have the privilege of subscribing for its stock pro rata, on the basis of the amount of their cash gross receipts from passengers during the year 1884.

Frankfort-Offenbach Electric Railroad.

W. Howard White in a letter to the *R. R. Gazette* from Frankfort-on-the-Main, says the electric railroad between that place and Offenbach has been in operation eleven months. It is 4.2 miles in length. It consists of a single line tramway of one metre gauge, with three turn-outs. The rail is the usual European tramway pattern, with a deep, narrow flange groove, which will not allow the heavy wheels of European vehicles to drop into it, but would be liable to give trouble to light American buggies. The track is laid along one side of the roadway. It crosses two steam railroads at grade. The cars are, in outward appearance, very much like our horse cars; but the seats are arranged face to face, double seats on one side of the car and single on the other; the doors being at one side of the centre, while each platform has a single set of seats, for three persons, and there is standing room for twelve persons, the total being thirty.

The electric conductor is carried overhead along the curb line of the street. It consists of a gas pipe of about 1¼" in diameter, with a slot in the lower side. The runner is a shuttle-shaped bolt with two narrow lugs, which project through the tube and carry a rectangular frame, to the lower bar of which the electric conductor to the car is attached by a slide, which causes its pull to come always on the head end of the frame, whichever way the car is moving, thus avoiding any tendency to jam the shuttle in the tube. The electric conductor to the car is inclosed in a wire rope, from which it emerges about a foot from the runner frame. The wire rope is then continued by a slack piece connected to the middle of the upper bar of the runner frame, presumably to avoid leaving the runner behind in case the electric connection parts on a down grade, where the cutting off of the current would not stop the car.

The posts are set at a maximum distance of a little over 100' on straight line—closer together on curves in proportion to their sharpness. Round these the tube bends without any particular attempt at uniform curvature, which is of course unnecessary in view of the loose nature of the connection to the car.

The conductor tube is double. The connections with the car take current from one tube and return it to the other (the tubes have no other connection than through cars). The car dynamo is placed in a locked box under the car midway between the axles, and communicates its motion to one of the latter by gearing placed outside the wheels (between them and the axle boxes), the speed of the dynamo being geared down apparently to one-seventh or one-eighth its own angular velocity by four gears, two being placed on an intermediate shaft between the main dynamo shaft and the car axle.

The turn-outs, both in the track and in the conductor, are automatic. The track is arranged as on many horse-car tracks, with a fixed switch point, so placed that a car running toward it will always go to the right. The switch in the conductor is held by a spring, so as to throw the shuttles always into the right-hand tube, the shuttle pushing the switch aside in coming out of it. The main tube has a tapering slot cut into its side deep enough to allow the switch tongue to catch the point of the shuttle.

The trains run every fifteen minutes, and consist of one and two cars alternately, which run pretty regularly full. The capacity of the present apparatus is four trains of three cars each at about eight miles per hour, or perhaps somewhat faster, if the police would permit. The cars are at present run at an average speed of 7.2 miles per hour, including stops.

The running is controlled by the driver on the front platform, who turns the current on and off with a brake handle which fits over a square head on an upright shaft like an ordinary brake shaft. The handle is kept by the driver like a key, so that the car can not be tampered with when he is absent from his place. He brakes with his right hand with a similar handle.

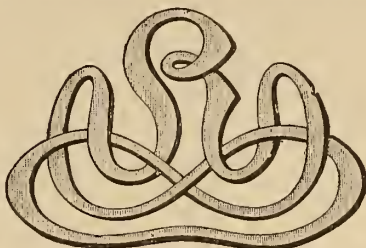
The driving station is about midway of the run. The engine is a double horizontal one of 250 H. P., of which only one-half is kept in use, developing a *maximum* of 100 H. P. to run eight cars.

The cost of the electric conductor, set up with its supports, is \$1 per foot, with ordinary day labor at 50 cents per day, skilled labor 75 cents to \$1.

The cost of operation of the electric road is said to be so great that the general opinion seems to be that it is not going to pay interest on the investment, in spite of the fact that the cars are nearly always well filled.

In regard to regularity and certainty of operations, Dr. Siemens asserts that the traffic is satisfactory in this respect. In a recent address, however, to the local technical club (apropos of another motor), the

speaker referred to the frequent interruptions of the traffic. On a recent round trip by the writer the passengers had to transfer to another car both in going and coming, on account of a crossing out of order. The road was three days out of operation for the purpose of repairs to the steam engine.



American Street Railway Association.

OFFICERS, 1884-5.

President.—Calvin A. Richards, President Metropolitan Railroad Co., Boston, Mass.

First Vice-president.—Julius S. Walsh, President Citizens' Railway Co., St. Louis, Mo.

Second Vice-president.—Henry M. Watson, President of the Buffalo Street Railway Co., Buffalo, N. Y.

Third Vice-president.—Edward Lusher, Secretary and Treasurer the Montreal City Passenger Railway Co., Montreal, Canada.

Secretary and Treasurer.—William J. Richardson, Secretary the Atlantic Avenue Railway Co., Brooklyn, N. Y.

Executive Committee.—President, Vice-presidents and William H. Hazzard, President Brooklyn City Railroad Co., Brooklyn, N. Y.; James K. Lake, Superintendent Chicago West-Division Railway, Chicago, Ill.; Charles J. Harrah, President the Peoples' Passenger Railway Co., Philadelphia, Pa.; William White, President Dry Dock, East B. & B. R. R. Co., New York, N. Y.; B. Du Pont, President Central Passenger Railroad Co., Louisville, KY.

NOTICE:—The next regular meeting of the American Street Railway Association will be held in St. Louis, Mo., the third Wednesday in October (the 21st), 1885.

Street Railway Stock as an Investment.

President Richards sends us the following in reply to a query about the coming meeting of the Association:—

"Beyond some crude ideas, I have no formal or settled plans about the next meeting. I can say, however, that during this year I have been in correspondence with many gentlemen connected with the street railways of America, and have been exceedingly gratified to learn that they feel the deepest interest in the success and welfare of our Association, and that I can already see that its object being the promotion of a more successful and intelligent management, has been productive of great good. The intercourse with each other, that has been engendered by our social gatherings, has imparted a spirit of emulation that has given a new life to our daily duties, and kindled a higher and stronger regard for the business in which we are engaged.

"I also am more than pleased to learn that the year will undoubtedly prove to be generally successful in a financial point of view. I am also satisfied that the public have now come to consider the street railway as the most important factor in the growth and prosperity of cities and towns everywhere, and that they have adopted it

as not only a necessity in the business of the day, but also as a means of recreation and pleasure for themselves and families.

"The introduction of open cars in the summer season has been the means of promoting a desire to ride for pleasure alone, thus supplanting the old state of affairs when people only rode from necessity. A careful observer will consequently find that the stock of all the street railways in this country has been advancing steadily the past few years, and such investments now take their place amongst the most permanent of anything in this country.

"In all the principal cities of the country, this class of securities are now sought for by a class of investors who would not touch them in times past. This is also the case with many if not all of our suburban roads, many of which are now established upon a firm dividend-paying basis, that a few years since were looked upon as worthless. I can but feel when consulting an experience of many years, in my present occupation, that I do not err in judgment when I say that in my opinion an investment made to-day in any well managed street railway, will be sure to yield a sure and steady income, and will also advance in value as the city or town in which it is located increases its population, and that the day of a dull and doubtful existence for such institutions has passed away forever. It must not be overlooked in this estimate that the street railway is a home affair, and is patronized by all, rich and poor, every hour of the day. Its receipts are in small money, but every day so much cash is received, and it only depends upon what the management do with it, to solve the problem of success.

C. A. RICHARDS."

Kurrachee Steam Tramways.

The East India Tramways Company have completed the main line of their system of tramways in Kurrachee. In view of possible military operations in Afghanistan, this new line of communication between the shipping port and the town may probably render important service in bringing up stores to the Government depôts, and to the railway station. The line is laid with steel rails weighing 70 lb. per yard, and continuously supported upon a concrete bed. The gauge is 4 ft. The engines are of the make of Messrs. Kitson and Co., of Leeds. The passenger stock consists of long bogie carriages upon eight wheels with a continuous central communication. The goods wagons, like the passenger cars, are provided with a simple form of continuous brake, all the wheels of the train being braked by a steam cylinder carried upon the footplate of the engine. Branches and sidings for the working of the goods traffic are constructed at Keamari, at the native jetty, in the goods yard of the Kurrachee terminus of the Scinde, Punjaub, and Delhi Railway, and in the grain compounds of some of the principal exporting merchants.—*Engineering.*

This is the only paper devoted wholly to street railway interests. \$1.00 a year.

An Elevator for an Elevated Railroad Station.

During the six years that the Manhattan Elevated Road has traversed that region bounded by 110th and 120th streets and Morningside Park and Fifth avenue, and placed a station at 116th street and Eighth avenue, excepting the few houses now constructing, not a single building has been erected in the vicinity of the station, and but very few improvements have been made upon the plateau which embraces lots more favorably situated for building purposes, both as to soil and proximity to Central Park, than almost any other section in the City of New York. During this same period upwards of two thousand fine dwellings, stores and flats, have been erected in the vicinity of the stations at 125th and 135th streets, a mile beyond. The price of building lots has materially risen in that section, whilst they have been neglected and unsalable at a price anything near their intrinsic value below 120th street.

The reason of this fact is obviously that the station at 116th street is too high for practical use. Women, children, and infirm persons can make use of it only at serious inconvenience and detriment to health. On stormy and windy days it is positively dangerous to ascend or descend. It is sixty-five feet above the level of the street, and involves mounting eighty-eight steps to the platform. This region, therefore, is practically not served with rapid transit. To remedy these defects, to make lots within the territory from Morningside Park to Fifth avenue as available and productive for building purposes and at least as valuable as lots beyond 120th street, it is proposed to build elevators at the stations at 116th street and Eighth avenue. To produce this desirable result of making these lots available and marketable, a number of gentlemen have associated themselves under the name of the North Central Park Improvement Company to build these elevators. They have not the slightest personal interest in relation to the business of the enterprise, nor do they receive any benefit from its management that is not entirely in common with every person from whom they ask a payment.

A circular sent in the spring of last year to property owners, resulted in a subscription of something less than \$40,000. A lot was purchased at the corner of 116th street and Eighth avenue, and property owners are now asked to complete the subscription upon the basis of \$50 a lot, so that the elevators may be built. They will be operated after their construction, free of expense to the subscribers, by the railroad. The building and elevators will cost about \$100,000.

Steam Street Railroads.

Steam tramways are taking preference among the public over those worked by horses. The two tramways between the Hague and Scheveningen—a fashionable seaside resort some three miles from the former place—run almost side by side, the

one being a horse tram and the other worked by steam. On Whit-Monday the traffic was very great on the steam line, each tram carrying from 100 to 120 passengers, whereas the horse cars were barely filled, frequently having no more than three to six passengers per journey. A similar preference was shown on the North London tramways, and it is one that continues to exist. Both these tramways are worked by the Merryweather locomotive, having 7" by 11" steam cylinder and weighing nine tons.—*Engineering.*

Electric Trams.

A paper on "Electric Trams" was read by Mr. A. Reckenzaun before the Institute recently. After a comparison of horse, steam, and compressed air traction, with electrical traction, the difference of the electric trams from electric tramways and railways was pointed out to be that, whereas in electric tramways the energy is conveyed from the generating station to the rails or other conductor communicating with the motor which turns the car-wheels, the electric car carries its own energy within itself, and is quite independent of external influence, and the car can travel over any road or rail for whatever system, ordinary or specially designed. For tramcar propulsion it is absolutely necessary that the motor should have high efficiency, and at the same time be of small dimensions and light weight.

An improved machine of the author's had these qualifications. For the car there are two motors, each capable of working up to nearly nine horse-power, and weighing 420 lbs. Each motor is carried separately upon a small bogie, in such a way that each bogie forms a small locomotive engine upon which the car rests. One axle of each bogie is a driving axle; thus are actuated four small driving wheels. The speed of the motors is high, about 1,000 revolutions per minute when the car is running at seven miles an hour. Thus it is necessary to introduce reducing gear between the motor shaft and the driving axle. The gearing employed is a worm on each motor shaft, and worm wheels on the driving axles giving a ratio of about one to twelve. This worm-gearing is cased in and the wheels work in oil, the lubrication being perfect.

The variation of speed and power is obtained by means of a compound switch, which arranges the motor circuits so that the machines shall work in series, in parallel or singly; thus the resistance of the circuit being varied, the power and speed vary accordingly; when a greater range of speed is desirable, the motor-circuits are still further divided by arranging the field-magnet wires apart from the armatures. This obviates cumbersome gearing, which would add to the weight and the expense, increasing first cost and the maintenance as well. Brake-power, both mechanical and electrical, is efficiently applied. The most economical steam tramway locomotives, burn from nine to eleven pounds of coal per mile. The coal for charging the electric tram-car batteries, amounts to four pounds

per indicated horse-power. Reckoning the coal at eighteen shillings per ton, the fuel per car mile would be less than one penny. *London Architect.*

Ohio State Tramway Association.

A neat little pamphlet comes to us from Cleveland, O., containing the doings of the association at their last annual meeting. Fourteen companies were represented. Interesting and valuable papers were read by H. A. EVERETT, of Cleveland, on "Electricity as a Motor for Street Railways;" F. DEH. ROBISON, of Cleveland, on "The Labor and Wages of Street Railway Employees;" D. W. STROUD, of Springfield, on "The Care and Feed of Horses;" A. D. ROGERS, of Columbus, on "Taxation of Street Railway Property;" O. S. BRUMBACK, of Toledo, on "The Liability of Street Railway Companies for Negligence;" and A. J. MULLANE, of Cincinnati, on "State and City Legislation for Street Railways." All the papers except Mr. Robison's and Mr. Stroud's are printed in the volume, and Mr. Brumback's will be found especially valuable, as it cites some fifty references to authorities in Ohio State statutes and court practice.

The association resolved that "companies, upon the presentation of any decisions of lower courts or important briefs by their attorneys, shall send sufficient copies to the secretary for distribution among its members."

The officers elected for the year are: President, Geo. B. Kerper, President of the Mt. Adams & Eden Park Inclined Plane Railway Company, of Cincinnati; Vice-President, Chas. B. Clegg, President Oakwood Street Railway Company, of Dayton; Secretary, Henry A. Everett, Secretary and Treasurer East Cleveland R. R. Co., of Cleveland; Treasurer, Wm. B. Hayden, of the Consolidated Street Railway, of Columbus.

The next annual meeting will be held in Toledo, in November.

In the evening the Columbus Consolidated Street Railway Company entertained the association, during which much wit and goodfellowship was enjoyed over an elegant elaborate dinner, the menu of which would make every street railway man wish he was "from Ohio."

Recent Patents.

The following list of patents relating to the Street Railway interests, granted by the United States Patent Office during the month of June, 1885, is specially reported by Franklin H. Hough, solicitor of American and foreign patents, 925 F street, N. W., Washington, D. C.:

ISSUE OF JUNE 2, 1885.

Car heater, street—F. S. Hunter, Fort Ritner, Ind.
Car starter—S. Rockafellow, Muscatine, Iowa.
Fare box—T. Raake, Baltimore, Md.

ISSUE OF JUNE 9, 1885.

Car sand-box, street—J. Gilson and J. W. Houston, Providence, R. I.
Car starter—D. W. Copeland, Syracuse, N. Y.
Fare register—C. E. Pratt, Chicago, Ill.

ISSUE OF JUNE 23, 1885.

Car motor tram—J. Banks and D. Barnes, Melbourne, Victoria, Australia.

Notes and Items.

[All our readers are particularly requested to send us, at the earliest possible moment, notes concerning actual or projected improvements in street railways. It is by this means that the STREET RAILWAY JOURNAL will increase its usefulness to each one who receives it.]

CANTON, O., has a new street railway just completed.

A NEW street railway is projected in Knoxville, Tenn.

A NEW street railway is to be built in Charleston, S. C.

JACKSONVILLE, Fla., expects to have a new street railway.

THE BROOKLYN ELEVATED ROAD is now in successful operation.

THE MINERAL SPRINGS ST. RY. is a new road in Ottumwa, Ia.

THE NEW STREET RAILWAY, at Bridgeport, is reported a settled fact.

THE LEXINGTON (Ky.) STREET RAILWAY will probably be extended.

THE BUFFALO EAST SIDE RAILROAD has added a number of new cars.

THERE is a talk of extending the Chattanooga (Tenn.) street railway.

WORK is shortly to commence on a street railway in Oswego, N. Y.

TWENTY-FIVE miles of underground railway are to be constructed in Paris.

THE GENESEE & WATER ST. RY. Co., Syracuse, is building a new stable.

THE new cable road on Atlantic avenue, Brooklyn, N. Y., has been commenced.

THE HOBOKEN CABLE ROAD will be running, engineer Endris says, by Aug. 5th.

THE ONSET BAY (Mass.) STREET RAILWAY is being built by contractor Gore of Boston.

BOWLING GREEN, KY., is said to be agitating the question of building a street railroad.

THE JAMAICA & BROOKLYN (N. Y.) R. R. Co. may build four miles of new track this season.

THE FONDA (N. Y.) & FULTONVILLE STREET RAILWAY has been abandoned and the tracks removed.

THE PHILADELPHIA CITY PASSENGER RAILWAY has been leased to the West Philadelphia Railway Co.

THE CITIZENS' STREET RAILWAY Co., Memphis, Tenn., intends laying some sixteen miles of new track.

THE ORANGE BELT ROAD is complete from Longwood to Myrtle Lake (Fla.), and is being extended to Paola.

THE JACKSONVILLE (Fla.) SUBURBAN RAILROAD Co. has given out the contract for building a road 1½ miles long.

THE BROWNELL & WIGHT CAR COMPANY, St. Louis, is now making cars for South Bend St. R. R., South Bend, Ind.

THE METROPOLITAN STREET CAR Co. will erect a car house and workshop in Washington, D. C., to cost \$7,000.—*Ex.*

R. B. VANCE, C. M. McLeod and M. J. Fagg have obtained the privilege of building a street railroad in Asheville, N. C.

ROME, Ga., is having a new street rail-

road. Brownell & Wight Car Company, St. Louis, is building the cars for it.

THE OSWEGO STREET RAILROAD's new cars building by J. M. Jones' Sons will be equipped with the Lewis & Fowler register.

THE ROCHESTER CITY & BRIGHTON road is having ten cars built by Jones, with Randall gear, and Andrews & Clooney wheels.

THE WOLF CREEK TRAM ROAD Co. has been incorporated to operate in Pocahontas county, with office at Rowlesburg, W. Va.

SIX miles of new street railway will be built by the Elyton Land Co., in Birmingham, Ala. Stables are now building for the line.

THE ERVAY, MAINE & SAN JACINTO STREET car lines, Texas, will be extended at a cost of about \$75,000.—*Balto. Manufacturers' Record.*

THE FULTON & CORTLANDT ST. R. R. Co. have petitioned the N. Y. board of aldermen for permission to construct a new cross town line.

WATSON & STILLMAN have improved their car wheel press by the addition of a sleeve and stop to prevent wheel from going on too far.

THE BROWNELL & WIGHT CAR COMPANY, St. Louis, is now finishing up a large order for fine cars for Louisville City R. R., Louisville, Ky.

THE PIERRE (Dakota) STREET RAILWAY is being rapidly pushed forward, the rails having arrived, and it is expected to be in operation in a few weeks.

THE PATERSON CITY (N. J.) RY. Co. is enlarging its stables so as to put horses in second story. Increase of business makes the changes imperative.

THE LINCOLN STREET R. R., Lincoln, Neb., have commenced operations on its new road. Brownell & Wight Car Company, St. Louis, has contract for the cars.

THE EL PASO ST. RY. Co. (Texas) takes only American money on its trip from El Paso to Paso del Norte, Mexico. On its return trip it takes both Mexican and U. S. coin.

THE BUFFALO STREET RAILWAY COMPANY has nicely fitted up its office, opened four miles of track on Broadway, and added seven open cars. This road has excellent stock and cars.

THE BROWNELL & WIGHT CAR COMPANY, St. Louis, has recently delivered twelve cars for the new cable line in that city; and is now at work on thirty more for the same company.

THE COLUMBUS ST. R. R., Columbus, Ga., has added to its equipment cars built by Brownell & Wight Car Company, St. Louis, and shipped in thirty days after receipt of order.

BATTLE CREEK's (Mich.) entire street railway system was sold June 6th to Gotte Detevilier of Chicago for \$43,000. It consists of five miles of rail, including the road to Goguas Lake.

SIX new cars have been added to the Putnam ave. line of the B. C. R. R. Co. Brooklyn, N. Y., from the works of the John Stephenson

company, with the new ventilating ceiling and passenger telephone.

COMMISSIONERS have been appointed by the N. Y. Supreme Court to decide whether the Bleecker street & Fulton Ferry R. R. Co. shall run its cars through Mail street from Park row to Broadway.

THE BIRMINGHAM ST. R. R., Birmingham, Ala., has completed its new line, and is now in successful operation. The new cars for the road were built by the Brownell & Wight Car Company, St. Louis.

THE vacancy caused by the death of Mr. Wm. H. Jennings, president of the Globe St. Ry. Co. of Fall River, Mass., on the 13th, has been filled by the election of Mr. Frank S. Stevens to that position.

WILLIAM RICHARDSON, president of the Atlantic Avenue Railroad Company, of Brooklyn, was recently presented with a costly gold watch and chain by the surface railroad companies of New York State.

THE METROPOLITAN STREET RAILWAY, of Boston, has broken ground, and foundation commenced for their new shops. They expect to have the building completed before winter.

THE SANDUSKY ST. R. R. Co., Sandusky, Ohio, has recently added new cars to its equipment, built by the Brownell & Wight Car Company, St. Louis, which firm, by the way, built all the new cars operated on this road.

THE GRAND STREET & NEWTOWN RAILROAD, Brooklyn, now has 250 horses and 72 cars. The new stable of the company is about 200' square and costs \$22,000. The company is laying a quantity of new 60 lb. steel rail.

THE COLLEGE CITY RAILWAY, Galesburg, Ills., commenced operations a short time ago. Their equipment was built by the Brownell & Wight Car Co., St. Louis. The company are doing nicely and will extend their system.

THE SHEFFIELD AND TUSCUMBIA (Ala.) STREET RAILWAY Co. has been incorporated to build a street railroad, presumably to connect the two points named. J. N. Sampson and D. L. Duncan head the list of incorporators.

NEW BEDFORD, (Mass.) An exchange says:—"The aldermen of the city are in a quandary. Two or three years ago a board of aldermen granted a location through Union street to the New Bedford and Fairhaven Street Railway Company. Another board has since granted a location in the same street to the Acushnet Street Railway Company. It is one of the principal business streets, and is not wide enough to accommodate two tracks and leave room for general travel. Popular opinion is in favor of having only one track, but the city solicitor says the aldermen have no right to authorize one company to use the other's track unless the authority is petitioned for. This has not been done, and the aldermen are obliged to give a location to each company."

THE CHARLES RIVER RAILWAY, of Boston, has just received four new open cars made by J. M. Jones' Sons, Troy. These cars and all new ones ordered by this company are

equipped with the Bemis patent car box and gear. This makes sixteen cars now equipped with this gear.

THE first cable-car over the Ninth street incline of the new street railway in Kansas City, Mo., descended recently on its trial trip to the Union depot. The test was entirely satisfactory, and the road will shortly be opened for business.

A NEW street railway company has been organized at Ithaca, N. Y. Otis E. Wood, Freeville, N. Y. is president, and Alonzo Chase, Ithaca, N. Y., secretary. It is probable that cable will be used to propel cars up the hill to the college.

THE DE KALB AVE. (Brooklyn, N. Y.) line is being re-laid on Washington street, and the city is widening the street one foot on each side, and repairing with granite blocks. The main avenue to the bridge, when completed, will be one of the best in the city.

BROWNELL & WIGHT CAR COMPANY, St. Louis, has among other contracts one from the Bellefontaine Railway, St. Louis. From 1870 to 1880, the Bellefontaine Company bought fifty-four cars from this establishment, and the present order is the sixth it has placed with the above firm since 1880.

THE JOHN STEPHENSON Co. is delivering the new Broadway cars; is also at work on a lot of cars for Bleecker street, Fourth avenue, and Forty-second street and Boulevard (N. Y.), Queensland, and various other points.

THE NEW YORK CABLE RY. Co. met at 210 Broadway, July 18th, and elected Wm. S. Williams, president, Homer A. Nelson, vice president, Thos. W. Evans, treasurer, A. L. Earle, secretary, and Chas. P. Shaw, counsel. It expects to commence laying track inside of three months.

It is reported that the horses in the Atlantic ave., Brooklyn, (N. Y.) stables on Butler street and Van Nostrand ave., are troubled with glanders. Two have died and more are sick. Mr. Richardson and Dr. McLean of the Board of Health have the matter in charge.

J. R. MAXWELL, president of the Brooklyn & Long Island Elevated Cable Railroad Company, says:—You can depend on it that if any people can make the cable road a thorough success we can and will. We are going to build a structure strong enough to bear a Pullman car, and that is about equal to a thirty-five ton locomotive.

SENECA FALLS (N. Y.) STREET RAILWAY. The route of the projected street railway through Seneca Falls is to be along Fall street to the bridge built for the Sodas Bay road, across the river to Bayard street, Bayard to Spring street, Spring to Garden, and thence to the lake. The company will probably use dummy engines.

LIMA (Ohio) STREET RAILWAY. An exchange says:—John H. Rose of Norwalk, Conn., is negotiating with the stockholders of this road for a lease of the line for three years. If the lease is consummated, the rolling stock is to be put in thorough order and thirty-five trips a day will be run over the line. [This is *not* the Mr. Rose connected with the Demorest Register.—Eds.]

THE BROOKLYN CITY & NEWTOWN RAILROAD Co. is relaying and improving its tracks to the extent of \$8000. The Brooklyn Elevated road reduces the B. C. & N. Ry.'s earnings about \$150 per day, but the officials of the road are confident that the L. road will eventually be a benefit to the surface road.

PRESIDENT RICHARDS of the Metropolitan R.R. Co., writes us:—"Last week I obtained the consent of all the other Boston roads, and we all abolished the sale of all tickets upon our roads, our cash fares having been lately reduced to five cents. We now permit the U. S. Government to print our only ticket, viz:—the five cent nickel."

THE CENTRAL PARK, NORTH & EAST RIVER R.R. Co., (Belt line) having determined upon building a cable road on West street & Tenth ave., below 59th street, gave an audience and hearing to representatives of the different cable systems or parts of systems on Thursday the 23d. Its decision as to which one it would adopt (if it arrive at any decision) was not made known.

THE BROADWAY (N. Y.) RAILROAD's new cars building by John Stephenson Co. will be first-class in every respect. We notice on those now being delivered passenger telephone call, metal sash, drop sash in doors, and in all windows, including those behind the door when open, perforated ceiling, super gear, J. S. patent brake-handle, and various other admirable features, all of course with the best of finish.

ANDREW TRIMBILL, secretary of the Ewing Avenue Street-Railway Company, of Chicago, which has been granted an ordinance by the village trustees to construct a street railway in South Chicago, states that the company has begun work on the construction of the line. Ties are being laid along the proposed route, and the rails are on the way from Cleveland, Ohio.

THE WORCESTER STREET RAILWAY COMPANY will probably be granted permission to lay its double track in Main street. It is understood the company has in contemplation the establishment of an independent line on Front street, to run from Main street to the Union station, and that it will soon apply to the Aldermen for permission to lay a double track on the route.

THE NATIONAL CABLE RAILWAY Co. met at 142 Broadway, Saturday, July 18. The board of directors was reduced in number from thirteen to nine. President Shiner reported that twenty-seven suits had been begun against parties infringing upon the Hallidie patents: three in Cincinnati, six in Kansas City, two against the Brooklyn Bridge, six against the Third ave. Horse Ry. Co., and the rest in Philadelphia.

THE BLEECKER STREET track has been connected with the Third avenue track at Park row and Beekman street, and in a few days the Broadway cars will run to Fulton Ferry by that line, returning by way of Ann street. The Third avenue line is connected with the Broadway line below the Post office. The intention is, as soon as right of way through Mail street is secured, to leave Broadway above the Post-office and return through Ann street below the Post-office.

A POCKET MANUAL giving the streets on which the cars run, the streets they cross, how early and late they run, time of passing certain points, how long it takes to make a trip, color of cars run on each line, rates of fare, and much other valuable information relative to the Buffalo Street Railways is issued by A. J. Crafts, the advertising agent of the companies. It is a very useful and novel method of advertising, and contains the business cards of some forty firms. We believe the idea is President Watson's.

THE LYNN & BOSTON RAILROAD has built ten new open cars this season, and is building four new cars for winter use. It is building a "band car," which will be used to advertise its line to Crescent and Revere Beaches. The car is 25' long with a platform raised about 3' above that of the driver, upon which will be placed chairs for the use of the band only. The car is handsomely painted and trimmed with gilt and gold leaf, and will be decorated with flags and bunting. This company is using the Bemis box upon its new cars.

THE METROPOLITAN STREET RAILWAY Co. of Boston, will build a new car and repair shop at the corner of Bartlett and Washington streets, and change its present shops into stables. The new building will be of brick, 420 x 85', with car room, store room, machine shop, blacksmith shop, and foundry, on first floor; wood-working and painting rooms on second floor. Each floor will have centre track from the elevator with turn-tables to tracks at right angles on either side for the reception of cars. The building will be fitted with steam power.

THE BUFFALO STREET R.R. is laying steel rails in place of its iron track. Supt' Edwards in reply to a local reporter recently said:—"We are buying steel rails altogether. They are more inexpensive than iron, in the long run. Besides, we can buy them more cheaply now than ever before, and it pays us to take advantage of the low prices. The market has been very dull; there has been comparatively no demand, and rail makers have been glad enough to work up their surplus stock and sell the rails at cost, so as to get their money back."

THE WALES MANUFACTURING COMPANY, of Syracuse, N. Y., has issued a little pamphlet, the object of which is to answer the most important questions that come up on the organization and construction and equipment of street railways. It contains much that is of value and some interesting statistics. The relative merits of "The Conductors vs. Farebox System," are fully presented from the manufacturer's standpoint, and to those who are wrestling with this vexing question of fare collecting and checks on temptation to petty stealings, the book may be an acceptable solution. Send for it.

THE ALBANY RAILWAY proposes consolidating its stables, by the disposal of its property on South Pearl street, and the erection of a new stable adjoining its present one on Central avenue.

The new stable is to be of brick, three

stories high, the first or ground floor to be used entirely for car shed; the second story for stable to accommodate 160 horses; and the third story for hay, feed, &c. The stable it is presumed will cost between \$25,000 and \$30,000.

The erection of this stable will necessitate the building of some two miles of additional track which will have to be laid this fall.

MESSRS. F. W. JESUP & Co. of Liberty street, New York, whose long experience as contractors and dealers in railway supplies should render their opinion valuable, say that there is a better feeling among railroad men throughout the country. This improved tone is, they assert, growing slowly but surely, and especially in the southern and south-western states. They report an enhanced demand for rails, spikes, and street railway supplies generally, and note some street railway enterprises lately inaugurated, and others which are under discussion. Messrs. Jesup & Co. think that railway interests have seen the worst, and that henceforth they will go on improving.

THE UNION RAILROAD Co. of Providence, D. F. Longstreet, treasurer, has just completed an addition to its car house at South Providence, 45' x 159', making the building 120' x 159'; and new cast curve tracks are being laid to the main line in front of the building. At the shop this line is building twenty-one new open cars, twelve being 21 long with seven seats, six being 24' with eight seats, three are 26' with nine seats. All are being equipped with the Bemis patent car box and gear. Nearly all cars of the line are now equipped with the Bemis box, which we hear gives perfect satisfaction after trying all others.

THE BROOKLYN CITY RAILROAD COMPANY is building a model of a closed and an open car each about 23" over all, to be taken into court in cases of suit for damage, &c. They will be built to scale and a very complete *fac simile* of their standard cars. In order to readily show the inside of the car, which is complete even to mats, the roof of the car is made to take off. It would seem that an apparatus of this kind would have a tendency to prevent the giving of such verdicts for instance as allowing a driver damages for being knocked off the left side of the platform by a defective brake, when such a blow could only be given from left to right.

THE CHRISTOPHER STREET & JAMES SLIP FERRY RAILWAY COMPANY has forwarded to Albany articles of association for a new surface railroad corporation. Its proposed route, four miles with branches, extends from Christopher street at the North river down West to Spring street and through this to Mott street, with a double track. A branch running down Mulberry street from Bleecker will cross the other track and continue to Chatham street, to Roosevelt street, to James slip, and back through James street to Chatham street. The capital stock is \$500,000. The seven directors for the first year are Charles Spear, John H. Davis, Edward P. Beach, A. H. Walsh, O. S.

Cockey, S. F. Pierson, and Edward P. North. Seven million people use the James Slip Ferry annually, and there are no car conveniences for them. The consent of a majority of the property-owners along the route has been obtained for the new road.

THE THIRD AVENUE CABLE LINE. Steam was turned on and the machinery for working the cable of the Third Ave. R.R. (cable line), on Tenth avenue and 125th street, was started for the first time on Tuesday, the 21st inst., at 12.30 P. M. in the presence of president Lyons, chief engineer Miller, superintendent Robertson, and a large number of stockholders and invited guests, including some of the most prominent civil and mechanical engineers in the country.

The immense engines and working machinery moved off noiselessly, and as perfectly, in obedience to the touch of chief engineer Miller, as though they had been in motion for years, amidst the loud and prolonged cheering of the assembled company.

The engines (two of them) are of 350 H. P. each, with cylinders 24" x 48". The driving machinery outside of the engines proper weighs over 300 tons, including four pairs of driving drums, each operated independent of the other, especially arranged for the double cable system.

The cables will be placed in position on the 27th inst., and it is expected to have the road in operation by August 1st.

MORRIS AVENUE RAILROAD COMPANY. Articles of association of the Morris Avenue Railroad Company, of New York, have been filed with the Secretary of State. The road is to begin in East 134th street, near St. Clair avenue, and continue along East 134th street to Third avenue, to 137th street, to Lincoln avenue, to Morris avenue, to 149th street, to Cortlandt avenue, to 161st street, to Railroad avenue, to the New York and Harlem Railroad, westerly side; to Teller avenue, to 165th street, to Webster avenue, to Kingsbridge. Also from Morris avenue at 148th street, to Cortlandt avenue to 149th street. Also, from Lincoln avenue, at 137th street, through Lincoln avenue, to 136th street, to North Third avenue. Also, from North Third avenue, at 135th street, to Lincoln avenue, to 134th street, to the place of beginning. The capital is \$600,000, and the trustees are Messrs. Jordan L. Mott, John J. Waterbury, A. S. Rosenbaum, Walter S. Baldwin, John Holloran, Charles Jones, John Haffen, Daniel Kelly, James Kearney, Frank A. Shepherd, William H. Scott, Jr., Julius F. Chesebrough, and James B. Johnston.

LATE in July, as a representative of the STREET RAILWAY JOURNAL jumped upon a Sixth Avenue car, in one of the cañons through which that well-managed line makes its way, he saw Mr. Superintendent Moore sitting placidly in a corner. He was perspiring freely, for the day was, as Mr. Mantalini would remark, "demnition hot and moist."

"Why are you not at Newport or Saratoga, Mr. Superintendent, or to be still more in good form, at home in your back base-

ment with the front shutters closed and the curtains drawn?" asked the writer.

"Because, in the first place, there is no law to compel us to go, and in the second place, we couldn't go if we wanted to in July, which is the worst month of the year on our poor horses."

"What, worse than August?"

"Yes, for although the weather in August is generally hotter than in July, and the flies more abundant, the hygrometrical conditions—or some other conditions—are more favorable, or perhaps the horses get more used to the heat, anyhow, they suffer more and die faster in July.

"No, not always hotter in August than in July. Seasons vary; for instance," continued Mr. Moore, "take my record of the last two years. Mean monthly temperature:—

JULY 1883.	73.3	JULY 1884.	70.1
AUG. "	70.8	AUG. "	71.5

"And this record tallies exactly with that of Mr. Eichelberger, observer in charge of the U. S. Signal office on the Equitable building."

"Continue your remarks, Mr. Moore, they are words of wisdom and experience," said the writer.

"I can't, it's too hot," was the reply, "and besides I must get off here to look after a sun-struck horse—good by."

Personal.

MR. JACOB SHARP, of the Broadway line, is at Richfield Springs.

MR. WM. J. RICHARDSON, Secretary of the American S. R. W. Assn., and of the Atlantic Ave. S. R. W., Brooklyn, has gone to Europe; expecting to be back about the middle of August.

B. A. Clooney, of Andrews & Clooney, is at Colorado Springs on his vacation.

J. S. Silver, secretary National Car Spring Co., will soon start on a western trip, going as far as San Francisco.

W. H. Hazzard, S. L. Husted, Wm. M. Thomas, and James Howe, comprising the executive board of the Brooklyn City Railroad, have been recently inspecting the new cable railroad in Cleveland.

H. H. Littell, Gen'l Manager of the Louisville City R.R. Co. of Louisville, Ky., was in this city this week, but was driven back to Louisville by the excessive heat.

Mr. Chas. B. Thurston, president of the Jersey City & Bergen R.R. Co. of Jersey City, was quite severely shaken up by an accident at the cable depot, on Tenth ave., last Saturday, the 18th, whilst viewing the cable plant with some friends. He inadvertently stepped upon a loose plank, which precipitated him into the wheel vault below, a distance of 12', cutting his left cheek open and otherwise bruising him.

Street Railroad Men on Strike.

A strike occurred at Cleveland, Ohio, July 23, on the Payne avenue street railway line, because three men had been discharged. It grew to such proportions that for five hours the strikers had command of the road, interrupting travel.

OFFICIAL LIST OF THE STREET RAILWAYS IN THE UNITED STATES & CANADA.

Compiled from data furnished the editors of "The Street Railway Journal," by the officers of the various roads.

[The following is a complete list of the Street Railways of the United States and Canada, so far as we have received the official returns from the various roads. Will those roads not reported kindly fill out the blanks sent them and mail to us without delay, so that they may be properly represented in the STREET RAILWAY JOURNAL.]

ABBREVIATIONS—m, miles; g, gauge; lb r, pounds rail to the yard; c, cars; h, horses; mu, miles. Officers' addresses are the same postoffice as the company unless otherwise specified.

AKRON, O.—Akron St. Ry. & Herdic Co. 2 1/2 m, 6c, 31 h. Pres. Ira M. Miller, V. Pres. James Christy, Treas. B. L. Dodge, Sec. F. M. Atterholt, Supt. John T. Metlin.

ALBANY, N. Y.—Watervliet Turnpike R.R. Co. 7 1/2 m, 26-45 lb r, 27 c, 143 h. Pres. Chas. Newman, Sec. & Treas. P. Way, Supt. M. C. Foster. The Albany Ry. 10 m, 4-8 1/2 g, 33-47 lb r, 51 c 194 h. Pres. and Treas. John W. McNamara, Sec. Jas. H. Manning, Supt. Alfred Egerton.

ALLENTOWN, PA.—Allentown Pass. R.R. Co. 3 1/2 m, 6 c, 22 h. Pres. Samuel Lewis, Treas. & Sec. Joseph E. Balliet, Supt. Russel A. Thayer.

ALTON, ILL.—Alton & Up. Alton Horse Ry. Co. ALTOONA, PA.—City Pass. Ry. Co. of Altoona. 3 1/2 m, 5-3 g, 43 lb r, 17 c, 38 h. Pres. John P. Levan, Sec. & Treas. L. B. Reifsnider, Supt. John J. Buch.

AMSTERDAM, N. Y.—Amsterdam St. Ry. Co. 1 1/2 m, 4-8 g, 25 lb r, 3 c, 10 h. Pres. Henry Herrick, Treas. David Cady, Sec. M. L. Stover.

ANNISTON, ALA.—ASHTABULA, O.—Ashtabula City Ry. Co. 4 m, 4-8 1/2 g, 40 lb r, 6 c, 60 h. Owner & Prop. Jno. N. Stewart.

ATCHISON, KAN.—Atchison St. Ry. Co. 5 1/2 m, 4-8 1/2 g, 20-30 lb r, 19 c, 60 h. Pres. & Gen. Man. J. H. Beeson, Treas. H. M. Jackson, Sec. J. P. Adams.

ATLANTA, GA.—West End & Atlantic R.R. Co. 2m, 4-8 1/2 g, 20 lb r, 6 c, 34 mu. Pres. J. D. Turner, V. Pres. T. L. Langston, Sec. & Treas. B. H. Brunhead, Man. & Purch. Agt. Jno. S. Brunhead.

Atlanta St. R.R. Co. Gate City St. R.R. Co. 2 1/4 m, 4-8 1/2 g, 16 lb r, 7 c, 26 h. Pres. L. B. Nelson, V. Pres. L. DeGivie, Sec. & Treas. John Stephens, Solicitor, A. Remharst. Metropolitan St. R.R. Co.

ATLANTIC, N. J.—Atlantic City Ry. Co. AUBURN, N. Y.—Auburn & Owaseo Lake R.R. Co. 1 1/2 m, 4-8 1/2 g, 28-30 lb r, 3c, 12 h. Pres. D. M. Osborne, Sec. & Treas. C. B. Koster, Supt. B. F. Andrews.

East Genesee & Seward Ave. Ry. Co. 1 1/2 m, 4-8 1/2 g, 30 lb r, 6 c, 25 h. Pres. David M. Osborne, Sec. & Treas. C. B. Fosters, Supt. B. F. Andrews.

AUGUSTA, GA.—Augusta & Somerville R.R. Co. AURORA, ILL.—Aurora City Ry. Co. 5 m, 4-8 1/2 g, 28 lb r, 7 c, 10 h, 30 mu. Pres. H. H. Evans, V. Pres. S. W. Thatcher, Sec. A. J. Hopkins, Treas. E. W. Truth, Supt. J. B. Chatterie.

BABYLON, N. Y.—Babylon Horse R.R. Co. 1 1/4 m, —, — lb r, 2 c, 3 h. Pres. W. F. Norton. BALTIMORE, MD.—Baltimore & Powhatan Ry. Co. 6 m, 5-4 1/2 g, 4 c, 17 h. Pres. & Treas. E. D. Freeman, Sec. R. B. Clark, Supt. L. M. Ketricik.

Baltimore City Pass. Ry. Co. 40 m, 5-4 1/2 g, 46 lb r, 154 c, 1000 h. Pres. Oden Bowie, Treas. John Bolgiau, Sec. S. L. Bridge.

Baltimore Union Pass. Ry. Co. Baltimore & Catonsville Ry. Co. Baltimore & Halls Spring R.R. Co. Baltimore & Pimlico & Pikesville R.R. Co.

Central Ry. Co. 5 1/2 m, 5-6 g, 40 lb r, 22 c, 180 h. Pres. Peter Thompson, Sec. & Treas. Walter Blakistone.

Citizen's Ry. Co. 20 m, 5-4 1/2 g, 46 lb r, 34 c, 360 h. Pres. Jos. S. Hagarty, Treas. Wm. S. Hammersley, Supt. C. C. Speed.

Monumental City Ry. Co. North Baltimore Passenger Ry. Co. People's Pass. Ry. Co. 6 1/2 m, 5-4 1/2 g, 42-45 lb r, 30 c, 200 h. Pres. R. E. Hamilton, Treas. Gustavus Ober, Sec., Supt. & Pur. Agt. Wm. A. House, Jr. Office, Fort Ave. & Johnson St. Soon move to Druid Hill Ave.

York Road R.R. Co. BATTLE CREEK, MICH.—Battle Creek Ry. Co. 5 m, 3-6 g, 28 lb r, 8c, 18 h, 3 mu. Pres. & Owner, A. J. White, V. Pres. H. H. Brown, Sec. Chas. Thomas, Supt. John A. White.

BAY CITY, MICH.—Bay City St. Ry. Co. 7 1/2 m, 4-8 1/2 g, 18 lb r, 13 c, 35 h. Pres. James Clements, Treas. Wm. Clements, Sec. Edgar A. Cooley.

BEAVER FALLS, PA.—Beaver Valley St. Ry. Co. 3 1/2 m, (now building). Pres. M. L. Knight, Sec. & Treas. J. F. Merriman, Supt. of Construction, J. C. Whitla.

BELLAIRE, O.—Bellaire St. R.R. Co. BELLEVILLE, ILL.—Citizen's Horse Ry. Co. BELLEVILLE, ONT., CAN.—Belleville St. R.R. Co.

BEREA, O.—Berea St. Ry. Co. 1 1/4 m, 3-6 g, 28 lb r, 2 c, 2 h. Pres. C. W. D. Miller, V. Pres. T. Chinchward, Sec. & Treas. A. H. Pomeroy, Supt. A. W. Bishop.

BINGHAMTON, N. Y.—Washington Street & State Asylum R.R. Co. 4 1/2 m, 4 g, 16-25 lb r, 13 c, 23 h. Pres. B. H. Meagley, V. Pres. Geo. Whitney, Sec. C. O. Root, Treas. F. E. Ross. Binghamton Central R.R. Co. 3 1/2 m (2 1/2 laid), 3 g, 28 lb r, 6 c (not in operation). Pres. Geo. L. Crandall, V. Pres. Nelson Stow, Sec. & Supt. Chas. O. Root, Treas. H. J. Kneeland.

Binghamton & Port Dickinson R.R. Co. 5 m, 4-8 1/2 g, 20-30 lb r, — c, — h. Pres. Harvey Westcott, Sec. & Treas. G. M. Harris, Supt. N. L. Oshorn. (Leased to Mr. Osborn.)

Main, Court & Chenango St. R.R. 5 m, 4-8 g, 40 lb r, 10 c, 25 h. Supt. & Lessee, N. L. Osborn. BIRMINGHAM, ALA.—Birmingham St Ry. Co. 3 1/2 m, 4-8 g, 16 lb r, 4 c, 12 m. Pres. B. F. Roden, Sec. & Treas. J. H. Williams.

BLOOMFIELD, N. J.—Newark & Bloomfield R. R. BLOOMINGTON, ILL.—Bloomington & Normal Horse Ry. Co.

BOONE, IA.—Boone & Boonsboro St. Ry. Co. 1 1/2 m, 3 g, 20 lb r, 3 c, 10 h. Pres. L. W. Reynolds, Treas. I. B. Hodges, Sec. & Supt. A. B. Hodges.

BOONSBORO, IA.—Twin City & Des Moines River Motor St. Ry. Co.

BOSTON, MASS.—Highland St. Ry. Co. 19 m, 4-8 1/2 g, 50 lb r, 187 c, 925 h. Pres. Moody Merrill, Clerk R. B. Fairbairn, Treas. Samuel Little, Supt. J. E. Rugg.

Lynn & Boston, 3 1/2 m, 4-8 1/2 g, 25-48 lb r, 114 c, 514 h. Pres. Amos F. Breed, Treas. & Sec. E. Francis Oliver, Supt. Edwin C. Foster. Metropolitan R. R. Co. 80 m, 4-8 g, 50 lb r, 700 c, 3,600 h. Pres. C. A. Richards, Sec. H. R. Harding, Treas. Chas. Boardman. Office, 16 Kilby St.

Middlesex R.R. Co. 26 m, 4-8 1/2 g, 50 lb r, 150 c, 700 h. Pres. Chas. E. Powers, Treas. & Supt. John H. Studley. Address, 27 Tremont Row, Boston.

So. Boston Ry. Co. 13 m, 4-8 1/2 g, 42-50 lb r, 193 c, 900 h. Pres. Chas. H. Hersey, V. Pres. Jas. C. Davis, Sec. & Treas. Wm. Reed, Supt. Daniel Coolidge.

BRADFORD, PA.—Bradford & Kendall R.R. Co. 1 1/2 m, 4-8 1/2 g, 38 lb r, 3 c, 4 h. Pres. James Brodey, Sec. N. B. Parsons, Gen. Man. & Supt. Enos Parsons.

BRIDGEPORT, CONN.—The Bridgeport Horse R.R. Co. 5 m, 4-8 1/2 g, 42 lb r, 14 c, 70 h. Pres. Alhert Eamer, Sec. & Treas. F. Hurd, Supt. B. F. Lashar.

BROCKTON, MASS.—Brockton St. Ry. Co. 3 1/2 m, 24 c, 97 h. Pres. W. W. Cross, Treas. & Sec. Z. C. Keith, Supt. H. B. Rogers.

BROOKLYN, N. Y.—The Atlantic Avenue R.R. Co. of Brooklyn. 2 1/2 m, 4-8 g, 60 lb r, 244 c, 882 h. Pres. William Richardson, Sec. W. J. Richardson, Treas. Newburg H. Frost.

Broadway R.R. Co. 10-1-10 m, 4-8 1/2 g, 45-50-60 lb r, 166 c, 657 h. Pres. W. H. Husted, V. Pres. Edwin Beers, Sec. & Treas. Robert Sealey, Supt. Joshua Crandall.

Brooklyn Cross Town R.R. Co. 8 m, 4-8 1/2 g, 40-60 lb r, 72 c, 400 h. Pres. Henry W. Slocum, V. Pres. Ezra B. Tuttle, Sec. & Treas. John R. Connor, Supt. D. W. Sullivan.

Bushwick R.R. Co. 20 m, 4-8 1/2 g, 45-50-60 lb r, 172 c, 600 h. Pres. Frank Cromwell, V. Pres. Wm. H. Husted, Treas. & Sec. S. D. Hallowell, Supt. Wm. M. Morrison.

The Brooklyn, Bushwick & Queens County R.R. 6 m, 4-8 1/2 g, 42-47 lb r, 41 c, 117 h. Pres. Richard H. Green, V. Pres. James W. Elwell, 59 South St. N. Y. Sec. John D. Elwell, Treas. Wm. W. Greene.

Brooklyn City R.R. Co. 44 m, 4-8 1/2 g, 60 lb r, 761 c, 3,045 h. Pres. William H. Hazzard, V. Pres. William M. Thomas, Sec. & Treas. Daniel F. Lewis, Asst. Sec. Francis E. Wrigley.

Brooklyn City & Newtown R.R. Co. 11 m, 4-8 1/2 g, 45-60 lb r, 128 c, 419 h. Pres. Louis Fitzgerald, N. Y. City, Sec. & Treas. H. A. Schuz, Supt. H. W. Bush.

Calvary Cemetery, Greenpoint & Brooklyn Ry. Co. Coney Island and Brooklyn R.R. Co. 11-2-5 m, 45 lb r, 4-8 1/2 g, 103 c, 316 h. Pres. James Jourdan, Sec. Ed. F. Drayton, Supt. William Farrell.

Coney Island, Sheepshead Bay & Ocean Avenue R.R. Co. Pres. A. A. McClemer, V. Pres. Daniel Mone, Sec. John McMahon, Sheepshead Bay, Treas. Horace Valkulch.

Crosstown Line, Hamilton Ferry to Bridge. Grand St. & Newtown R.R. Co. 8 1/2 m, 4-8 1/2 g, 45-50 lb r, 72 c, 250 h. Pres. Martin Joost, Sec. & Treas. Wm. E. Horwill, Supt. Walter G. Howey.

Grand Str-et, Prospect Park & Flatbush R.R. Co. 4 1/2 m, 4-8 1/2 g, 50 lb r, 75 c, 244 h. Pres. Louis Fitzgerald, 120 Broadway, N. Y., Sec. & Treas. Duncan B. Cannon, Supt. Jno. L. Heims.

Greenpoint & Lorimer St. Prospect Park & Coney Island R.R. Co. 4-7-10 m, 45-50 lb r, 4-8 1/2 g, 69 c, 214 h. Pres. A. R. Culver, Treas. A. C. Washington, Sec. George H. Smith, Eng. Supt. R. Schermerhorn, Supt. Robert Attlessey.

Prospect Park & Flatbush R.R. 1 1/2 m, 4-8 1/2 g, 34 lb r, 70 c, 260 h. Pres. Loftis Wood, Sec. & Treas. Sam'l Parkhill, Supt. Loftis Wood.

South Brooklyn Central R.R. Co. 7 m (4 1/2 m laid), 4-8 1/2 g, 60 lb r, 42 c, 192 h. Pres. Wm. Richardson, Sec. Wm. J. Richardson, Treas. N. H. Frost, Supt. James Tuddy.

The New Williamsburgh & Flatbush R. R. Co. 6 1/2 m, 4-8 1/2 g, 47-50 lb r, 74 c, 255 h. Pres. Geo. W. Van Allen, 54 Ann St. New York, Sec. W. B. Waftt, 34th St. & 9th Ave. New York, Treas. C. B. Cottrell, 8 Spruce St., N. Y. City, Supt. Chas. E. Harris, Nost-rand Ave. & Carroll St., Brooklyn.

The Union Railway Co. of the City of Brooklyn (not in operation).

Van Brunt St. & Erie Basin R.R. Co. 1 1/2 m, 4-8 1/2 g, 45 lb r, 7 c, 24 h. Pres. John Cunningham, Sec. & Treas. Edmund Terry.

BRUNSWICK, GA.—Brunswick St. R.R. Co. BUFFALO, ILL.—See Mechanicsburg, Ill.

BUFFALO, N. Y.—Buffalo St. R.R. Co. 17 1/2 m, 4-8 1/2 g, 50 lb r, 96 c, 510 h. Pres. Henry M. Watson, V. Pres. P. Pratt, Sec. S. S. Spaulding, Treas. W. H. Watson, Supt. Edward Edwards.

Buffalo East Side St. R.R. Co. 24-4-5 m, 4-8 1/2 g, 42 lb r, 47 c, 218 h. Pres. S. S. Spaulding, V. Pres. Joseph Churchyard, Sec. H. M. Watson, Treas. W. H. Watson, Supt. Edward Edwards.

BURLINGTON, IA.—Burlington City R.R. Co. 2 1/2 m, 4-8 1/2 g, 22 lb r, 9 c, 30 h. Pres. John Patterson, Sec. & Man. C. T. Patterson. Union St. Ry. Co.

CAIRO, ILL.—Cairo St. R.R. Co. CAMBRIDGE, MASS.—Cambridge R.R. Co. 43 m, 4-8 1/2 g, 50 lb r, 245 c, 1,410 h. Pres. Prentiss Cummings, Treas. & Clerk F. T. Stevens, Exec. Com. I. M. Simpson, P. Cummings, O. S. Brown, Clerk of Directors, O. S. Brown, Supt. Wm. A. Bancroft.

Charles River St. Ry. Co. 10-4-5 m, 2-8 1/2 g, 50 lb r, 50 c, 330 h. Pres. Chas. E. Raymond, Corp. Clerk C. E. Harden, Treas. Daniel U. Chamberlain, Supt. John N. Akarnan.

CAMDEN, N. J.—Camden & Atlantic St. Ry. Camden Horse R.R. Co. 9 m, 5-1 g, 35-47 lb r, 26 c, 85 h. Pres. Thos. A. Wilson, Sec. Wilbur F. Rose, Treas. & Supt. John Hood.

CANTON, O.—Canton St. R.R. Co. (new road.) CAPE MAY, N. J.—Cape May & Schellenger Landing Horse R.R.

CARTHAGE, MO.—CEDAR RAPIDS, IA.—Cedar Rapids & Marion St. Pass. Ry. Co. CHAMPAIGN, ILL.—Champaign R.R. Co. Urbana & Champaign St. R.R. Co. (See Urbana.)

CHARLESTON, S. C.—Charleston City Ry. Co. 8 1/2 m, 4-8 1/2 g, 38-42 lb r, 22 c, 84 h. Pres. Jno. S. Riggs, Treas. Evan Edwards, Sec. Frank Whelden, Supt. Jno. Mohlenhoff.

Enterprise R.R. Co. 12 m, 5 g, 42 lb r, 14 c, 51 h. Pres. A. F. Havenel, Sec. & Treas. U. E. Hayne, Supt. T. W. Passallagere.

CHATTANOOGA, TENN.—Chattanooga St. R. R. Co. 2 1/2 m, 4-8 1/2 g, 16-25 lb r, 8 c, 50 h. Pres. J. H. Warner, Sec. C. R. Gaskill, Supt. A. B. Wingfield.

CHESTER, PA.—Chester St. Ry. Co. 5 1/2 m, 5 2/2 g, 12 c, 70 h. Pres. Richard Peters, Jr., Solicitor Geo. B. Lindsay, Treas. Sam'l A. Dyer, Sec. E. M. Cornell.

CHICAGO, ILL.—Chicago City Ry. Co. 87 m, 4-8 1/2 g, 45 lb r, 567 c, 1,416 h, cable doing work of 2,500 h. Pres. C. B. Holmes, Sec. H. H. Windsor, Treas. T. C. Pennington, Supt. C. B. Holmes.

Chicago West Division Ry. Co. 40 m, 4-8 1/2 g, 40 lb r, 620 c, 3,425 h. Pres. J. R. Jones, Sec. George L. Webb, Supt. Jas. K. Lake.

Chicago & Hyde Park St. — m, — g, — lb r, — c, — h. Pres. Douglas S. Clarke. North Chicago City Ry. Co. 35 m, 4-8 1/2 g, 45 lb r, 316 c, 1,700 h. Pres. & Gen. Supt. V. C. Turner, V. Pres. Jacob Rehn, Sec. & Treas. Hiram Crawford, Supt. of Track & Construction, Augustine W. Wright, Asst. Supt. Fred L. Threedy, Supt. Horse Dept. Robt. Atkins, Purch. Agt. John W. Roach, Master Mechanic J. Miller.

CHILLICOTHE, O.—Chillicothe St. R.R. Co. 1 1/2 m, 3 g, 16 lb r, 7 c, 10 h. Pres. E. P. Safford, Sec. A. E. Wenis, Treas. William Poinel, Supt. Ewel McMartin.

CINCINNATI, O.—Cincinnati Inclined Plane Ry. Co. 3 m, 5-2 1/2 g, 43 lb r, 24 c, 150 h. Pres. Geo. A. Smith, Sec. & Supt. James M. Doherty, Treas. Jos. S. Hill.

Cincinnati St. Ry. Co. 98 m, 5-2 1/2 g, 43 lb r, 254 c, 1,815 h. Pres. John Kilgour, Sec. & Aud. James A. Collins, Treas. R. A. Dunlap, Con. Eng. F. R. Weizenecker, Supt. John Harris.

Cincinnati & Mount Auburn R.R. Co. Columbia & Cincinnati St. R.R. Co. 3 1/2 m, 3 g, 35 lb r, 3 c, 6 dummy c. Pres. C. H. Kilgour, V. Pres. John Kilgour, Treas. B. F. Branman, Sec. A. H. Meier, Mt. Lookout, O. Supt. J. J. Henderson, Mt. Lookout, O.

Mt. Adams & Eden Park Inclined R.R. Co. 3 1/2 m, 5-2 1/2 g, 42 lb r, 40 c, 320 h. Pres. & Treas. J. P. Kerper, Sec. J. R. Murdoch, Supt. Chas. Whith... So. Covington & Cincinnati. (See Covington, Ky.)

South Side St. Ry. Co. St. Clair Street Ry. Co. West Side R.R. Co. CLEVELAND, O.—The Brooklyn St. R.R. Co. 8 1/2 m, 4-8 1/2 g, 52 lb r, 66 c, 375 h. Pres. Tom. L. Johnson, V. Pres. A. J. Moxham, Sec. J. B. Hoefgen, Treas. John McConnell, Supt. A. L. Johnson.

Broadway & Newburg St. R.R. Co. 6 m, 4-8 1/2 g, 10 c, 160 h. Pres. & Supt. Joseph Stanley, V. Pres. Sam'l Andrews, Sec. & Treas. E. Fowler.

Superior St. R.R. Co. 15 m, 4-8 1/2 g, 45 lb r, 46 c, 225 h. Pres. Frank De H. Robison, V. Pres. John Koch, Sec. & Supt. M. S. Robison, Jr.

The East Cleveland R.R. Co. 20 m, 4-8 1/2 g, 35-40 lb r, 92 c, 450 h, 1 electric motor. Pres. A. Everett, V. Pres. Chas. Wason, Sec. & Treas. H. A. Everett, Supt. E. Duty. Offices, 1154 & 1158 Euclid Ave.

Woodland Avenue & West Side St. R.R. Co. 17 m, 4-8 1/2 g, 43 lb r, 100 c, 550 h. Pres. M. A. Hanna, V. Pres. C. F. Emery, Sec. J. B. Hanna, Gen. Supt. George G. Mulhen.

CLINTON, IA.—Lyons & Clinton Horse R.R. Co. (See Lyons.)

COLUMBUS, GA.—Columbus St. R.R. Co. 3 m, 4-8 1/2 g, 16 lb r, 6 c, 25 h. Pres. Cliff B. Grimes, Sec. L. G. Schnessler, Treas. N. N. Curtis, Supt. J. A. Ga-bourgh.

COLUMBUS, O.—Columbus Consolidated St. R.R. Co. 19 m, 5-2 g, 30-46 lb r, 83 c, 350 h. Pres. A. Rodgers, V. Pres. H. T. Chittenden, Sec. & Treas. E. K. Stewart, Supt. J. H. Atcherson. Glenwood & Greenlaw St. R.R. Co. 4 1/2 m, 3-6 g, 24 lb r, 9 c, 25 c. Pres. A. D. Rodgers, V. Pres. B. S. Brown, Sec. R. S. Ro-kley, Treas. S. S. Rickley, Supt. Jonas Wilcox.

CONCORD, N. H.—Concord Horse R.R. Co. 8 m, 3 g, 30-33 lb r, 10 c, 14 h, 2 steam motors. Pres. Moses Humphrey, Treas. H. J. Crippin, Clerk E. C. Hoag.

CORTLAND, N. Y.—Cortland & Homer Horse Ry. Co. 4 m (2 1/2 laid), 4-8 1/2 g, 25-30 lb r. Pres. Chas. H. Garrison, Troy, N. Y. Sec. J. M. Milne, Treas. S. E. Welch, Supt. S. E. Welch. (Leased to D. N. Miller.)

COUNCIL BLUFFS, IA.—Council Bluffs St. R.R. COVINGTON, KY.—So. Covington & Cincinnati St. Ry. Co. 17 1/2 m, 5-2 1/2 g, 43 lb r, 46 c, 296 h. Pres. E. F. Abbott, Sec. S. C. Buntin, Treas. G. M. Abbott.

DALLAS, TEX.—Dallas St. Ry. Co. 4 1/2 m, 4-8 1/2 g, 20-38 lb r, 12 c, 4 h, 72 mu. Pres. Wm. J. Keller, Sec. Harry Keller, Supt. C. E. Keller. Commerce & Way St. R.R.

DANVILLE, ILL.—Citizens' St. Ry. Co. 4 m, 4 g, 20 lb r, 7 c, 35 mu. Pres. Wm. I. Cannon, V. Pres. & Gen. Man. Wm. Stewart, Sec. & Treas. Adam P. Samuel.

DAVENPORT, IA.—Davenport Central St. R.R. 2 1/2 m, 4-8 1/2 g, 20 lb r, 10 c, 30 h. Pres. James Grant, Supt. R. A. McGugin. Brady St. Ry. Co. Davenport City Ry. Co.

DAYTON, KY.—Newport & Dayton St. Ry. Co. 2 m, 5-2 1/2 g, 44 lb r, 9 c, 36 h. Pres. & Supt. W. W. Bean.

DAYTON, O.—Dayton St. R.R. Co. 3 1/2 m, 4-8 1/2 g, 44 lb r, 23 c, 66 h. Pres. J. W. Stoddard, V. Pres. H. S. Williams, Sec. C. B. Clegg, Supt. A. W. Anderson. Oakwood St. Ry. Co. 3-1-3 m, 4-8 1/2 g, 38 lb r, 13 c, 60 h. Pres. Charles B. Clegg, Sec. M. P. Moore, Supt. Wm. Davis. The Wayne & Fifth St. R.R. Co. 3 1/2 m, 4-8 1/2 g, 34-38 lb r, 5 c, 30 h. Pr. S. Geo. M. Shaw, Sec. & Treas. Eugene Winchet, Supt. N. Routzahn.

DECATUR, ILL.—Decatur Horse Ry. Co. Citizens' Street R.R. Co. 2 m, 4-8 1/2 g, 20 lb r, 7 c, 47 h & mu. Pres. D. S. Shellabarger, Sec. & Treas. & Supt. A. E. Kinney.

DEERING, ME.—See Portland. DENISON, TEX.—Denison St. Ry. Co. 3 m, 3-6 g, 16 lb r, 5 c, 22 mu. Pres. C. A. Waterhouse, Supt. S. A. Robinson.

DENVER, COL.—Denver City Ry. Co. 16 m, 3-6 g, 16 lb r, 50 c, 250 h. Pres. Geo. H. Holt, 10 Wall St., New York City, Sec. G. D. Lhuillier, 10 Wall St., New York City, Treas. & Man. G. E. Randolph.

DES MOINES, IA.—Des Moines St. Ry. Co. 10 m, 3 g, 25-30-38-52 lb r, 18 c, 100 h. Pres. M. P. Turner, Sec. M. A. Turner. Des Moines & Sebastopol St. Ry. Co.

DETROIT, MICH.—Fort Wayne & Elmwood Ry. Co. 6 m, 4-8 1/2 g, 45 lb r, 30 c, 180 h. Pres. H. B. Brown, V. Pres. Edward Kanter, Treas. George B. Pease, Sec. N. W. Goodwin, Supt. Geo. S. Hazard.

Detroit City Ry. 30 m, 4-8 1/2 g, 40-43 1/2 lb r, 130 c, 700 h. Includes Jefferson Ave. line, Woodward Ave. line, Michigan Ave. line, Gratiot Ave. line, Brush St. line, Cass Ave. line, Congress & Baker line. Pres. Sidney D. Miller, Treas. George Hendrie, Sec. James Hough, Gen. Supt. Robert Bell, Mast. Mech. John Willis. Grand River St. Ry. Co. 2 1/2 m, 4-8 1/2 g, 43 lb r, 13 c, 110 h. Pres. & Treas. Jos. Dalley, Sec. J. W. Dalley, Supt. C. M. Dalley.

DOVER, N. H.—Dover Horse R.R. Co. 2-2-5 m, 3 g, 30 lb r, 4 c, 14 h. Directors, Z. S. Wallingford, Chas. H. Sawyer, Jas. E. Lothrop, C. W. Wiggins, Harrison Haley, Frank Williams, Cyrus Littlefield, Treas. Cyrus Littlefield.

DUBUQUE, IA.—Dubuque St. R.R. 5 m, 4-8 1/2 g, 21 c, 45 h. Pres. J. A. Rhonberg, Sec. & Treas. B. E. Linehan, Supt. J. J. Linehan.

DULUTH, MINN.—Duluth St. Ry. Co. 3 m, 3-6 g, 30 lb r, 6 c, 7 h, 31 mu. Pres. A. S. Chase, V. Pres. O. P. Stearns, Sec. & Treas. L. Mendenhall, Supt. & Pur. Agt. W. T. Hoopes.

EAST OAKLAND, CAL.—Oakland, Brooklyn & Fruitvale R.R. Co.

EAST SAGINAW, MICH.—Street R. Co. of East Saginaw. —m, 4-8 1/2 g, 30 lb r, 14 c, 35 h. Pres. & Supt. W. J. Barton, Sec. W. H. Hark, Treas. J. B. Peter.

EAST ST. LOUIS, ILL.—East St. Louis St. R.R. Co.

EASTON, PA.—The Easton & So. Easton Passenger Ry. Co. 1 1/2 m, 5-2 1/2 g, 45 lb r, 4 c, 20 h. Pres. H. A. Sage, Sec & Treas. H. W. Cooley, Supt. Elisha Burwell, So. Easton.

The West End Passenger Ry. Co. 1 1/2 m, 5-2 1/2 g, 45 lb r, 6 c, 20 h. Pres. H. A. Sage, Sec. & Treas. H. W. Cooley, Supt. Samuel Berry.

EAU CLAIRE, WIS.—Eau Claire City Ry. Co.

ELGIN, ILL.—Elgin City Ry. Co.

ELIZABETH, N. J.—Elizabeth & Newark Horse R.R. Co. 14 m, 5-2 1/2 g, 4-10 1/2 g, 30 lb r, 24 c, 74 h. Pres. & Treas. Jacob Davis, Sec. & Supt. John F. Pritchard.

ELKHART, IND.—Elkhart City R.R. Co.

ELMIRA, N. Y.—The Elmira & Horseheads Ry. Co. 9-2-3 m, 4-8 1/2 g, 25-30-40 lb r, 18 c, 34 h. Pres. & Treas. George M. Diven, V. Pres. Geo. W. Hoffman, Sec. Wm. S. Kershner, Supt. Henry C. Silsbee.

EL PASO, TEX.—El Paso St. Ry. Co. 2 1/2 m, 4-8 1/2 g, 20 lb r, 8 c, 25 h. Pres. G. B. Zimpelman, V. Pres. A. Krockauer, Treas. F. Magoffice, Sec. & Supt. I. A. Tays.

EMPORIA, KAN.—Emporia City Ry. Co. 3 1/2 m, 5 g, 20 lb r, 6 c, 23 m. Pres. Van R. Holmes, Treas. A. F. Crowe, Sec. & Man. J. D. Hoideu.

ENTERPRISE, MISS.—Enterprise St. Ry. Co. 1 1/2 m, 3-6 g, 24 lb r, 2 c, 6 h. Pres. John Kampe, V. Pres. E. B. Gaston, Sec. & Treas. Jno. Gaston.

ERIE, PA.—Erie City Passenger Ry. Co. 5 m, 4-8 1/2 g, 30-40 lb r, 17 c, 70 h. Pres. Wm. W. Reid, Treas. J. C. Spencer, Sec. A. L. Lettell, Supt. Jacob Berst.

EUREKA SPRINGS, ARK.—Eureka Springs City Ry. Co.

EVANSVILLE, IND.—Evansville St. Ry. Co. 12 m, 4-8 g, 28 lb r, 31 c, 190 mu. Pres. John Gilbert, Sec. P. W. Raleigh, Treas. John Gilbert, Supt. W. Bahr.

FALL RIVER, MASS.—Globe St. Ry. Co. 12 m, 4-8 1/2 g, 40-46-47 lb r, 40 c, 160 h. Pres. Frank S. Stevens, Treas. F. W. Brightman, Sec. M. G. B. Swift, Supt. John H. Bowker, Jr.

FORT SCOTT, KAN.—Bourbon County St. Ry. Co. 1 m, 4 g, 22 lb r, 2 c, 4 m. Pres. Isaac Staddon, V. Pres. Benj. Files, Sec. Wm. Perry, Treas. J. H. Randolph.

FORT SMITH, ARK.—Fort Smith St. Ry. Co. 2 m, 3-6 g, 16-28 lb r, 5 c, 16 h. Pres. Sam'l M. Loud, Sec. & Treas. Geo. T. Sparks.

FORT WAYNE, IND.—Citizens' St. R.R. Co.

FORT WORTH, TEX.—Fort Worth St. Ry. Co. 7 1/2 m, 4 g, 25-38 lb r, 16 c, 73 m. Pres. K. M. Vauzandt, Treas. W. A. Hoffman, Acting Sec. & Gen. Man. S. Mims.

FRANKFORD, N. Y.—Frankfort & Ilion Street Ry. Co. 2 1/2 m, 5 g, 4 c. Pres. A. C. McGowan, Frankfort, Sec. D. Lewis, Ilion, Treas. P. Remington, Ilion, Supt. Fredk. Gates, Frankfort.

FREDONIA, N. Y.—Dunkirk & Fredonia R.R. Co. 3 1/2 m, 4-10 g, 25 lb r, 5 c, 8 h. Pres. Wm. M. McCinstry, Sec. & Treas. M. N. Fenner, Supt. Z. Elmer, Wheelock.

GAINESVILLE, FLA.—Gainesville St. Ry.

GAINESVILLE, TEX.—Gainesville St. Ry. Co. 2 1/2 m, 3-6 g, 17 lb r, 4 c, 12 h. Pres. C. N. Stevens, V. Pres. J. T. Harris, Sec. & Treas. F. R. Sherwood.

GALESBURG, ILL.—Galesburg Horse R.R. Co.

GALVESTON, TEX.—Galveston City R.R. Co. 18 m, 4-8 1/2 g, 30 lb r, 68 c, 169 mu. Pres. Wm. H. Sinclair, Sec. & Treas. F. D. Merrit, Supt. M. J. Keeuan, Gulf City St. Ry. & Real Estate Co.

GLOUCESTER, MASS.—Gloucester City R.R.

GRAND RAPIDS, MICH.—Street Ry. Co. of Grand Rapids, Mich. 13 m, 4-8 1/2 g, 30-35 lb r, 21 c, 175 h. Pres. C. A. Otis, Cleveland, O., V. Pres. L. H. Wilthey, Grand Rapids, Treas. M. S. Crosby, Grand Rapids, Sec. J. M. Weston, Grand Rapids, Asst. Sec. Jas. Pickands, Cleveland, O.

GREEN CASTLE, IND.—Green Castle City St. Ry. Co. 2 m, 4-8 1/2 g, 23 lb r, 3 c, 12 h. Pres. & Supt. D. Rogers, Sec. James S. Nutt, Treas. Rudolph Rogers.

GREENVILLE, S. C.—Greenville City Ry. Co. 1 m, 5 g, — lb r, 5 c, 20 h. Proprietors, Gilreath & Harris.

HAMILTON, O.—The Hamilton St. Ry. Co. 4 m, 3 g, 28 lb r, 11 c, 12 h. Pres. James F. Griffin, Sec. O. V. Parrish, Treas. H. L. Morey, Supt. J. C. Bigelow.

HANNIBAL, MO.—Hannibal St. Ry. Co. 2 m, 4-8 1/2 g, 16-36 lb r, 6 c, 22 h. Pres. & Supt. M. Doyle, Sec. & Treas. James O. Hearn.

HARRISBURGH, PA.—Harrisburgh City Passenger Ry. Co. 2 1/2 m, 5 2/3 g, 42-47 lb r, 15 c, 36 h. Pres. H. A. Kelker, V. Pres. Daniel Epply, Sec. John T. Ensminger, Treas. R. F. Kelker, Supt. S. B. Reed.

HARTFORD, CONN.—Hartford & Wethersfield Horse R.R. Co. 12 m, 4-8 1/2 g, 45 lb r, 49 c, 250 h. Pres. & Treas. E. S. Goodrich, Sec. Geo. Sexton.

HAVERHILL, MASS.—Haverhill & Groveland St. Ry. Co. 4 1/2 m, 4-8 1/2 g, 30 lb r, 10 c, 19 h. Pres. Jas. D. White, Treas. John A. Colby, Supt. L. R. Mitchell.

HELENA, ARK.—Helena St. Ry. Co.

HERKIMER, N. Y.—Herkimer & Mohawk St. Ry. Co. 1 1/2 m, 4-8 1/2 g, 25 lb r, 3 c. Pres. J. M. Ansmen, Sec. Joab Small, Treas. H. D. Alexander.

HOBOKEN, N. J.—North Hudson County Ry. Co. 16 1/2 m, 4-7 g, 50-60 lb r, 116 c, 630 h. Pres. John H. Bonn, Sec. F. J. Mallory, Treas. Fredk. Mickel, Union, Supt. Nicholas Goetz, Unton.

HOLYOKE, MASS.—Holyoke St. Ry. Co. 2 m, 4-8 1/2 g, 35 lb r, 8 c, 24 h. Pres. Wm. A. Chase, Treas. C. Fayette Smith, Supt. H. M. Smith.

HOT SPRINGS, ARK.—Hot Springs R.R. Co. 3 m, 4 g, 25 lb r, 11 c, 30 h. Pres. S. W. Fordyce, Sec. C. E. Maurice, Supt. J. L. Butterfield.

HOUSTON, TEX.—Houston City St. Ry. Co. 13 m, 4-8 1/2 g, 20-30-40 lb r, 40 c, 118 m. Pres. Wm. H. Sinclair, Galveston, V. Pres. & Gen. Man. H. F. McGregor, Houston, Supt. Henry Friend, Houston, Sec. & Treas. F. J. DeMertit, Galveston.

HUTCHINSON, KAN.—Hutchinson St. Ry. Co.

HYDE PARK, ILL.—Ewing Avenue Horse Ry. Co.

ILION, N. Y.—Frankfort & Ilion Ry. Co. 2 1/2 m, 5 g, 25 lb r, 4 c, 6 h. Pres. A. C. McGowan, Sec. D. Lewis, Treas. F. Remington, Supt. Frederick Gates.

INDIANAPOLIS, IND.—Citizens' St. Ry. Co. 35 m, 4-8 1/2 g, 20-33-40-52 lb r, 70 c, 530 h. Pres. A. W. Johnson, Indianapolis, Treas. Tom L. Johnson, Cleveland, O., Sec. A. A. Anderson, Indianapolis, Man. W. T. Steele, Indianapolis, Auditor P. Woodridge, Louisville, Ky.

IRVINGTON, N. J.—Newark & Irvington R.R. Co.

JACKSON, MICH.—Jackson City Ry. Co. —m, —g, —lb r, 11 c, 40 h. Pres. Hiram H. Smith, Treas. Samuel Hopewell, Gen. Supt. Henry H. Smith.

JACKSON, MISS.—Jackson Street Ry. Co.

JACKSON, TENN.—Jackson Street Ry. Co.

JACKSONVILLE, FLA.—Pine St. R.R. Co. 2 1/2 m, 5 g, 25 lb r, 4 c, 18 m. Owner & Gen. Man. G. H. Backinast, Sec. & Treas. P. W. Backinast. Jacksonville St. Ry. Co. 2 1/2 m, 5 g, 25 lb r, 10 c, 36 m. Pres. H. S. Haines, Savannah, Ga., V. Pres. & Sec. Geo. R. Foster, Treas. W. P. Hardee, Savannah, Ga., Supt. G. W. Haines.

JACKSONVILLE, ILL.—Jacksonville Ry. Co.

JAMAICA, N. Y.—Jamaica & Brooklyn R.R. Co. 10 m, 4-8 1/2 g, 56-60 lb r, 29 c, 56 h. Pres. Aaron A. De-graw, Sec. Martin J. Durea, Treas. Morris Fos-dick, Supt. Wm. M. Scott.

JAMESTOWN, N. Y.—Jamestown St. Ry. Co. 2 m, 4-8 1/2 g, 30-42 lb r, 7 c, 9 h. Pres. John T. Wilson, Sec. C. R. Lockwood, Treas. John Langford, Supt. John F. Wilson.

JERSEY CITY, N. J.—Jersey & Bergen R. R. Co. 21 m, 4-10 g, 60 lb r, 73 c, 494 h. Pres. Chas. B. Thurston, V. Pres. Wm. Keency, Treas. C. B. Place, Sec. Warren E. Dennis, Newark, Supt. Thos. M. Sayre. Pavonia Ferry Ry. Co.

JOHNSTOWN, N. Y.—The Johnstown, Gloversville & Kingsboro Horse R.R. Co. 5 1/2 m, 4-8 1/2 g, 26 lb r, 6 c, 16 h. Pres. James Younglove, V. Pres. It. Fancher, Sec. & Treas. I. M. Law.

JOHNSTOWN, PA.—Johnstown Pass. R.R. Co. 6 1/2 m, 5-3 g, 41-43 lb r, 13 c, 56 h. Pres. James McMillen, Sec. B. L. Yeagley, Treas. W. H. Rosensleet, Jr.

JOPLIN, MO.—

KALAMAZOO, MICH.—Kalamazoo St. Ry. Co. 10 m, 4-8 1/2 g, 35 lb r, 28 c, 80 h. Pres. Fred Bush, Sec. J. W. Boynton, Treas. P. H. Brown.

KANSAS CITY, MO.—Kausas City Cable Ry. Co. 2 1/2 m, 4-8 1/2 g, 45 lb r, 10 pass. cars, 10 dummy cars. Pres. Wm. J. Smith, Sec. W. H. Lucas, Eng. Robert Gillham. Corrigan Consolidated St. Ry. Co. 20 m, 4-1 g, 30 lb r, 80 c, 350 h. Pres. Bernard Corrigan, Gen. Man. Thos. Corrigan, Sec. Jas. T. Kelley. Jackson County Horse R. R. Co. Kansas City & Rosedale St. Ry. Co. Kansas City & Westport St. R.R. Co.

KEOKUK, IA.—Keokuk St. Ry. Co. 4 m, 4-8 1/2 g, 27 lb r, 10 c, 42 h. Pres. Jas. H. Anderson, V. Pres. Jos. G. Anderson, Sec. R. James Anderson, Treas. & Supt. W. Z. Anderson.

KINGSTON, ONT., CAN.—Kingston St. R.R. Co. 3 1/2 m, 3-6 g, 9 lb r, 10 c, 36 h. Pres. Robert Carson, Sec. & Treas. F. Sargent, Man. William Wilson.

KNOXVILLE, TENN.—Knoxville St. Ry. Co. 2 m, 4-8 1/2 g, 22 lb r, 5 c, 2 haeks, 30 h. Pres. W. W. Woodruff, Sec. & Supt. T. L. Beaman.

LA CONIA, N. H.—Laconia & Lake Village Horse R.R. 2 1/2 m, 3 g, 34 lb r, 5 c, 17 h. Pres. A. G. Folsom, Treas. Edmund Little, Man. Bela S. Kennison.

LA CROSSE, WIS.—City Ry. Co. of La Crosse. 2 1/2 m, 4-9 g, 24 lb r, 5 c, 16 h, 3 mu. Pres. Geo. F. Gund, V. Pres. B. E. Edwards, Sec. Mills Tourtelotte, Treas. Fred Tillman, Gen. Supt. Joseph Tutur, Supt. Geo. F. Smith. La Crosse St. Ry. Co.

LA FAYETTE, IND.—LaFayette St. Ry. 2 1/2 m, 4-8 1/2 g, 35 lb r, 6 c, 38 h. Pres. F. B. Caldwell, LaFayette, Sec. & Treas. E. G. Jones, Decatur, Ill., Supt. F. Greer, LaFayette.

LAKE CITY, FLA.—Lake City St. Ry. Co.

LAMPASAS SPRINGS, TEX.—Lampasas City Ry. Co. 3 1/2 m, 4-8 1/2 g, 22 lb r, 6 c, 15 h. [Owned by Mrs. L. R. Snodgrass.] Gen. Mnu. Geo. M. Snodgrass.

LANCASTER, PA.—Lancaster & Millerville St. Ry. Co. Lancaster City St. Ry. Co.

LARCHMONT, N. Y.—Larchmont Manor Co. 1 m, 4-8 g, 25 lb r, 2 c, 8 h. Pres. C. H. Murray, Treas. S. H. French, 38 East Fourteenth St., N. Y. City.

LAWRENCE, KAN.—Lawrence Transportation Co. 3 1/2 m, 4-1 g, 38 lb r, 7 c, 30 h. Pres. H. Tisdale, Sec. W. H. Bangs.

LAWRENCE, MASS.—Merrimack Valley Horse R.R. Co. 5-4-5 m, 4-8 1/2 g, 48 lb r, 20 c, 70 h. Pres. Wm. A. Russell, V. Pres. James Walton, Methuen, Clerk & Treas. James C. Eaton, Supt. A. N. Kimball, Lawrence.

LEWISTON, ME.—Lewiston & Auburn Horse R.R. Co. 7 1/2 m, 4-8 1/2 g, 32 lb r, 16 c, 45 h. Pres. Frank W. Dana, Lewiston, Clerk, H. C. Little, Lewiston, Treas. H. C. Packard, Auburn, Supt. E. P. Stinchfield, Auburn.

LEXINGTON, KY.—Lexington City Ry. Co. 5 m, 4-10 g, 20 lb r, 20 c, 85 h. Pres. John Cross, V. Pres. C. R. Diver, Sec. & Supt. Bert. Cross.

LEXINGTON, MO.—Lexington St. Ry. Co.

LIMA, O.—Lima St. Ry. Co.

LINCOLN, NEB.—Capital City Ry. Co. 3 m, —g, —lb r, 5 c, —h. Pres. E. B. Durfee, Sec. & Supt. H. B. Durfee.

LITTLE ROCK, ARK.—Little Rock St. Ry. Co. Citizens' St. Ry. Co. 4 1/2 m, 4-10 g, 20 lb r, 22 c, 80 h. Pres. John Cross, Sec. and Treas. F. C. Reed, Supt. C. R. Diver. Hot Springs St. Ry. Co.

LOGANSPORT, IND.—Logansport Ry. Co. 2 m, 4 g, 28 lb r, 6 c, 29 mu. Pres. Frank G. Jaques, Sec. M. Jaques, Supt. Wm. P. Jaques, Office, Urbana, Ill.

LONDON, CAN.—London St. R.R. Co. 3 m, 4-8 1/2 g, 30 lb r, 12 c, 30 h. Pres. V. Cronga, Sec. Jas. H. Flock, Supt. Henry Thos. Smith.

LONG ISLAND CITY, N. Y.—Stelway & Hunter's Point R.R. Co. 2½ m, 4-8½ g, 47 lb r, 60 c, 150 h. Pres. Wm. Stelway, Steinway Hall, N. Y. City. V. Pres. Henry A. Cassebeer, Jr., Steinway, P. O., Long Island City, N. Y. Sec. & Treas. Chas. F. Traubart, Steinway Hall, N. Y. City.

Dutch Kills & Hunter's Point R.R. — m, — g, — lb r, — c, — h. Pres. R. J. Gleason.

Long Island City & Newtown Ry. Co. 3 m, 4-8½ g, 45-55 lb r, 25 c, 60 h. Pres. Isaac Buchanan, N. Y. City, Sec. Geo. S. Crawford, Brooklyn, N. Y., Treas. Patrick J. Gleason, Supt. Michael Conway.

LONGVIEW, TEX.—Longview & Junction St. Ry. ¾ m, 3-6 g, 2 c, 4 h. Pres. F. T. Rembert, Sec. R. B. Levy, Treas. F. L. Whaley, Supt. C. W. Booth.

LOS ANGELES, CAL.—Boyle Heights R.R. Co. Central R.R. Co. and the Sixth & San Fernando St. R.R. Co. 7 m, 3-6 g, 16 lb r, 13 c. — h. Pres. E. T. Spencer, Sec. F. X. Palmer, Supt. J. A. Fairchild.

City R.R. of Los Angeles. 4½ m, 4-8½ g, 36 lb r, 9 c, 75 h. Pres. I. M. Hellman, V. Pres. W. J. Brodrick, Sec. John O. Wheeler, Supt. W. H. Hawks.

Los Angeles & Aliso Ave. St. R.R. Co. Main St. & Agricultural Park R.R.

LOUISVILLE, KY.—Kentucky St. Ry. Co. 5 m, 5-2 g, — lb r, 22 c, — h. Pres. T. J. Minary, Sec. & Treas. Thos. Donigan.

Central Pass. R.R. Co. Crescent Hill Ry. Co.

Louisville City Ry. Co. 63 m, 5 g, — lb r, 49 c, 1300 h. Pres. Maj. Alexander Henry Davis, Syracuse, N. Y., V. Pres. St. John Boyle, Sec. & Treas. R. A. Watts, Supt. H. H. Littell.

LOWELL, MASS.—Lowell Horse R.R. Co. 6 m, 4-8½ g, 28-47 lb r, 28 c, 100 h. Pres. Wm. E. Livingston, Gen. Man. J. A. Chase.

LYNCHBURG, VA.—Lynchburg St. R.R. Co. 2 m, 5-1 g, 26 lb r, 6 c, 31 h. Pres. Stephen Adams, Treas. John L. Adams, Supt. William M. Payne.

LYONS, IA.—Clinton & Lyons Horse Ry. Co. 4½ m, 3-8 g, 19-30 lb r, 15 c, 40 h. Pres. D. Joyce, V. Pres. & Man. R. N. Rand.

MACON, GA.—Macon & Suburban St. Ry. Co. 6 m, — g, 20 lb r, 10 c, 50 h & mu. Pres. T. J. Carling, Sec. & Treas. H. R. Brown. Office, 151 Second St.

MADISON, IND.—Madison St. Ry. Co. 2½ m, 4 g, 15 lb r, 7 c, 8 h, 10 mu. Pres. Jacob Wendle, V. Pres. Peter F. Robenilius, Supt. & Treas. Chas. F. Tuttle.

MADISON, WIS.—Madison St. Ry. Co. 2½ m, 3 g, 23 lb r, 6 c, 24 h. Pres. E. W. Keyes, Sec. Jas. R. Zearing, Treas. Lucius Clark.

MANCHESTER, N. H.—Manchester Horse R.R. 4½ m, 3-½ g, 27-34 lb r, 12 c, 41 h. Pres. S. N. Bell, Treas. Frederick Smyth, Clerk J. A. Weston, Supt. A. Q. Guage.

MARYSVILLE, CAL.—City Pass. R.R. Co. (No returns.)

MECHANICSBURG, ILL.—Mechanicsburg & Buffalo Ry. Co. 3½ m, 3-10 g, 16 lb r, 3 c, 4 mu. Pres. J. N. Fullenweider, Treas. A. T. Thompson, Sec. J. T. Fullenweider.

MEMPHIS, TENN.—Memphis City R.R. Co.

MERIDIAN, MISS.—Meridian St. Ry. Co. 1½ m, 4-8 g, 16 lb r, 3 c, 12 h. Pres. J. J. Shannon, V. Pres. J. L. Handley, Sec. R. M. Houston.

MIDDLETOWN, O.—Middletown & Madison St. Ry. Co.

MILLERSVILLE, PA.—Lancaster & Millersville St. R.R. Co.

MILWAUKEE, WIS.—Cream City R.R. Co. 8-1-6 m, 4-8½ g, 27-38 lb r, 74 c, 307 m, 2 h. Pres. Winfield Smith, V. Pres. Christian Pressner, Treas. Ferdinand Knehn, Sec. Wm. Dankoehler, Supt. Henry Berg.

Milwaukee City Ry. Co. 15 m, 4-8½ g, 27 lb r, 75 c, 430 h. Pres. Peter McGeoch, Sec. & Treas. Geo. O. Wheatcroft.

West Side St. Ry. Co.

MINNEAPOLIS, MINN.—Minneapolis St. Ry. Co. 45 m, 3-6 g, 27-35-45 lb r, 146 c, 725 h and mu. Pres. Thos. Lowry, V. Pres. C. Morrissey, Treas. W. W. Herrick, Sec. & Supt. C. G. Goodrich.

MOBILE, ALA.—City R.R. Co. 17½ m, 5-2 g, 36-70 lb r, 68 c, 240 h. Pres. Jno. Maguire, Sec. I. Strausse, Treas. Myer I. Goldsmith, Supt. A. Moog.

Dauphin & Lafayette St. Ry. Co. 2 m, 5-2½ g, 40 lb r, 9 c, 22 h. Pres. D. P. Bestor, V. Pres. G. Y. Overall, Sec. & Treas. James W. Gray, Pur. Agt. & Man. J. G. Robertson.

Mobile & Spring Hill R.R. Co. 8 m, 5-2½ g, 35 lb r, 15 c, 35 h, 1 dummy. Pres. Daniel M. Neill, Sec. & Treas. C. F. Sheldon, Man. F. Ingato.

MOHAWK, N. Y.—Mohawk & Hlon R.R. Co. 1½ m, 4-8½ g, 30 lb r, 4 c (contract for motive power). Pres. O. W. Bronson, V. Pres. John Brown, Sec. H. D. Alexander, Treas. R. M. Devendorf, Supt. O. W. Bronson.

MOLINE, ILL.—Moline Central St. Ry. Co. 1½ m, — g, — lb r, 3 c, 11 h. Pres. S. W. Wheelock, V. Pres. M. Y. Cady, Sec. W. R. Moore, Treas. C. F. Hemenway.

Moline & Rock Island St. Ry. Co. — m, — g, — lb r, — c, — h. Pres. J. Huntoon, Sec. I. M. Buford, Treas. C. Lyons, Supt. Wm. Gamble.

MONTREAL, CAN.—Montreal City Pass. Co. 21 m, 4-8½ g, — lb r, 76 c, 465 h. Pres. Jesse Joseph, V. Pres. Wm. Smith, Sec. & Man. Ed. Lusher, Supt. T. H. Robillard.

MOULTRIEVILLE, S. C.—Middle St. & Sullivan's Landing Ry.

MUSKEGON, MICH.—Muskegon Ry. Co. 4½ m, 3-6 g, 20 lb r, 8 c, 26 h, 8 mu. Pres. F. A. Nims, V. Pres. Chas. Merriam, Boston, Mass., Sec. Thomas Munroe, Treas. G. R. Sherman, Supt. C. H. Newell.

NASHUA, N. H.—Nashua St. Ry. Co.

NASHVILLE, TENN.—Nashville & Edgefield R.R. Co. Fatherland Street Railway Co. North Edge-

field and Nashville St. R.R. Co., one management—5 m, 5 g, 16 lb r, 21 c, 100 h. Pres. John S. Bransford, Sec. Percy Kennard, Supt. Jno. T. Voss.

McGavock & Mt. Vernon Horse R.R. Co.

Nashville D. & N. St. R.R. Co. 7½ m, 5 g, 16-32 lb r, 25 c, 140 mu. Pres. Jno. P. White, V. Pres. B. F. Wilson, Sec. & Treas. H. B. Stubblefield, Supt. D. Deadrick.

South Nashville St. R.R. Co. 4½ m, 5 g, 16-20 lb r, 10 c, 68 h. Pres. W. M. Duncan, Sec., Treas. & Supt. C. L. Fuller.

NEVADA, MO.—Nevada Street Ry. Co.

NEW ALBANY, IND.—New Albany St. Ry. Co. 6 m, 4-11 g, 25 lb r, 15 c, 50 h. Pres. Geo. T. Vance, Sec. G. Vance, Treas. Letitia V. Vredenburg, Supt. Wm. L. Timberlake.

NEWARK, N.J.—The Newark & Bloomfield St. R.R. Co. 7 m, 5-2½ g, 47 lb r, 22 c, 140 h. Pres. S. S. Battin, Sec. W. L. Mulford, Supt. H. F. Totten.

Broad St. R.R.

NEW BEDFORD, MASS.—New Bedford & Fairhaven St. Ry. Co. 7½ m, 4-8½ g, 35-40 lb r, 38 c, 138 h. Pres. Warren Ladd, Treas. Andrew G. Pierce, Clerk Edward T. Pierce.

Acushnet St. R.R. Co., (not in operation.) Pres. Chas. E. Cook, Sec. & Treas. A. P. Smith.

NEWBURYPORT, MASS.—Newburyport & Amesbury Horse R.R. Co. 6-1-3 m, 12 c, 54 h. Pres. W. A. Johnson, Treas. N. H. Shepard, Sec. Geo. H. Stevens.

NEW HAVEN, CONN.—Fair Haven & Westville R.R. Co. 7 m, 4½ g, 42 lb r, 23 c, 151 h. Pres. H. B. Ives, Sec. & Treas. G. Cander, Supt. Walter A. Graham.

New Haven & Centreville Horse R.R. Co. 2½ m, 4-8½ g, 42 lb r, 4 c, 30 h. Trustee Cornelius Pierpont.

State Street Horse R.R. Co. 2½ m, 4-8 g, 43 lb r, 4 c, 40 h. Pres. C. A. Warren, Sec. & Treas. C. C. Blatchen.

The Whitney Ave. Horse Ry. 2½ m, 4-8½ g, 25 lb r, 3 c, 25 h. Pres. Geo. H. Watsons, Sec. George D. Watson, Treas. Eli Whitney, Jr.

NEW ORLEANS, LA.—Canal & Claiborne St. R.R. Co. 13 m, 5-2½ g, 37 lb r, 40 c, 200 h. Pres. E. J. Hart, Sec. & Supt. John H. DeGrange.

Crescent City R.R. Co. 26 m, 5-2½ g, 35-45 lb r, 90 c, 400 h. Pres. Frank Roder, Sec. & Treas. Jno. J. Juden, Supt. A. V. Smith.

New Orleans & Carrollton R.R. Co. 8 m, 4-8½ g, 30-45 lb r, 65 c, 200 h, 19 engines. Pres. Wm. Bonthuysen, Sec. Walter F. Crouch, Supt. C. V. Halle.

New Orleans City & Lake R.R. Co. 64 m, 5-2½ g, 46-40 lb r, 180 c, 39 coaches, dummy engines, 1050 mu. Pres. J. A. Walker, Sec. W. E. Leverich, Supt. F. Wintz.

New Orleans St. R.R. Co.

Orleans R.R. Co. — m, — g, — lb r, 32 c, 140 h & mu. Pres. & Supt. H. Larque, Sec. & Treas. P. Cougot. Office, cor. White & Laharpe Sts.

St Charles St. R.R. Co. 15 m, 5-2½ g, 35 lb r, 60 c, 366 m. Pres. & Supt. Alden McLeilan, Sec. Vincent Riviere.

NEWPORT, KY.—Newport St. R.R. Co.

NEW YORK, N.Y.—Ninth Ave. R.R. Co. 8 m, 4-8½ g, 60 lb r, 45 c, 380 h. Pres. W. H. Hays, Sec. & Treas. James Affleck, Supt. Herman B. Wilson.

Broadway & Seventh Ave. R.R. Co. 7 m, 4-8½ g, 47-60 lb r, 150 c, 1,350 h. Pres. James W. Foshay, Sec. & Treas. Thos. B. Kerr, Supt. Henry A. Newell.

Central Crosstown R.R. Co. 2½ m, 4-8½ g, 52 lb r, 42 c, 231 b. Pres. John B. Slawson, V. Pres. A. Cammack, Sec. M. J. Masson, Treas. John L. Macaulay.

Central Park North & East River R.R. Co. 14 m, 4-5½ g, 60 lb r, 162 c, 1,225 h. Pres. J. H. Scribner, V. Pres. C. D. Wyman, Sec. H. Scribner, Treas. J. L. Valentine, Supt. M. W. A. Harris.

Christopher & Tenth St. R.R. Co. 5 m, 4-8 g, 45 lb r, 47 c, 290 h. Pres. Jacob Sharp, Treas. W. T. Hatch, Sec. & Supt. George W. Lynch.

Dry Dock, East Broadway & Battery R.R. Co. 11½ m, 4-8½ g, 60 lb r, 187 c, 1,132 h. Pres. William White, Auditor E. T. London, Sec. & Treas. Richard Kelly, Supt. Fred F. White. Offices, 605 Grand St.

Eighth Ave. R.R. Co. 10 m, 4-8½ g, 60 lb r, 112 c, 1,155 h. Pres. W. H. Hays, Sec. & Treas. James Affleck, Supt. H. B. Wilson.

Forty-Second Street & Grand Street Ferry R.R. Co. 5½ m, 8-4 g, 64 lb r, 50 c, 500 h. Pres. Chas. Curtis, Sec. & Treas. E. S. Allen, Supt. John M. Calhoun.

Harlem Bridge, Morrisania & Fordham Ry. 4½ m, 4-8½ g, 45-60 lb r, 65 c, 233 h. Pres. Henry Sprately, V. Pres. Richard M. Hoe, Sec. & Treas. Wm. Caldwell.

Houston, West Street & Pavonia Ferry R.R. Co. 5 m, 4-8½ g, 60 lb r, 50 c, 400 h. Pres. Richard Kelly, Sec. & Treas. Daniel B. Hasbrook.

Jerome Park R.R. 1 m, 4-8½ g, 50-56 lb r. Pres. Leonard M. Jerome, Sec. Fred A. Lovcraft, Treas. Theodore Moss.

New York City St. Ry. Co. 10 m, [not in operation]. Pres. Loomis L. White, Sec. W. L. McCorkle, Treas. Wm. L. Skidmore.

New York & Harlem R.R. Co. 5½ m, 4-8½ g, 56-75 lb r, 144 c, 1,408 h. Pres. W. H. Vanderbilt, V. Pres. & Sec. Cornelius Vanderbilt, Treas. Ed. V. W. Rossler, Supt. Alfred Skitt, Pur. Agt. Chas. Reed.

Sixth Ave. R.R. Co. 4 m, 4-8½ g, 60 lb r, 127 c, 1296 h.

South Ferry Ry. Co. ¾ m, 4-8½ g, 60 lb r, 13 c, 41 h. Pres. Henry Hart, Sec. Wm. N. Cohen, Treas. Albert J. Elias, Supt. Chas. H. Meeks.

The Second Ave. R.R. Co. 13 m, 4-8½ g, 60 lb r, 316 cars, 1750 h. Pres. W. Thorn, V. Pres. J. Wadsworth, Sec. & Treas. J. B. Underhill.

The Third Ave. R.R. Co. 13½ m, 4-8½ g, 60 & 74 lb r, 318 c, 2,150 h. (¾ m of cable road on 10th ave.) Pres. Lewis Lyon, 739 Madison ave., V. Pres. Henry Hart,

110 Tribune Building, Sec. Alfred Lazarus, 436 W. 61st st., Treas. John Beaver, 211 E. 112th st., Supt. John H. Robertson, 307 E. 65th st.

Twenty-third St. R.R. Co. 7 m, 4-8½ g, 54 lb r, 102 c, 692 h. Pres. Jacob Sharp, Sec. Thos. H. McLean, Treas. Lewis May, Act-Supt. George Ferry.

NIAGARA FALLS, N. Y.—Niagara Falls & Suspension Bridge Ry. Co. 2½ m, 4-8½ g, 38-42 lb r, 8 c, 36 h. Pres. Benj. Flagler, V. Pres. Alva Chich, Sec. W. J. Mackay, Treas. A. Schoellkopf.

NORFOLK, VA.—Norfolk & City R.R. Co. 3½ m, 5-2 g, 44 lb r, 18 c, 65 h. Pres. John B. Whitehead, Treas. H. C. Whitehead, Supt. E. W. Savage.

NORTHAMPTON, MASS.—Northampton St. Ry. Co. 3½ m, 4-8½ g, 32 lb r, 7 c, 26 h. Pres. Oscar Edwards, Sec. M. H. Spaulding, Treas. & Sup. E. C. Clark.

NORWALK, CONN.—Norwalk Horse R.R. Co. 2 m, 4-10 g, — lb r, 7 c, 20 h. Pres. James W. Hyatt, V. Pres. & Sec. Edwin G. Hoyt, Sup. James W. Hyatt.

NORWICH, CONN.—Norwich Horse R.R. Co.

OAKLAND, CAL.—Alameda, Oakland & Piedmont R.R. Berkley Villa R.R. Broadway & Piedmont St. R.R. Co.

Fourteenth St. R.R. Co. 6 m, 5 g, 20-30 lb r, 6 c, — h. Pres. & Supt. Walter Blair, Sec. P. J. Van Loben, Oakland R.R. Co.

OGDEN CITY, UTAH.—Ogden City Ry. Co. 3 m, 4-8½ g, 20 lb r, 4 c, 21 h. Pres. L. W. Shurtleff, Ogden City, V. P. & Supt. O. P. Arnold, Salt Lake City, Sec. & Treas. H. S. Young, Ogden City.

OLEAN, N.Y.—Olean St. Ry. Co. 1-10 m, 3-6 g, 25 lb r, 3 c, 8 h. Pres. M. B. Fobes, Sec. & Treas. M. W. Barse.

OMAHA, NEB.—Omaha Horse Ry. Co. 15 m, 4-8½ g, 35 lb r, 40 c, 300 h. Pres. Frank Murphy, V. Pres. Guy C. Barton, Treas. W. W. Marsh, Supt. W. A. Smith.

ONEIDA VILLAGE, N. Y.—Oneida St. Ry. — m, — g, — lb r, — c, — h. Pres. Jerome Heacock.

OSHKOSH, WIS.—Oshkosh St. R.R. Co. 3½ m, 4-8½ g, 27 lb r, 9 c, 24 b. Pres. Tom Wall, V. Pres. F. Zentner, Sec. & Treas. J. Y. Hull, Sup. F. L. Thompson.

OSWEGO, N.Y.—Oswego St. Ry. Co. 2 m, 4-8½ g, 45 lb r, 3 c, — h. Pres. Jas. F. Johnson, V. Pres. R. J. Olyphant, Sec. Haynes L. Hart, Treas. Robt. G. Post, Gen. Man. James O'Connor. [Not in operation yet.]

OTTAWA, ONT.—Ottawa City Passenger Ry. Co. 3 m, 4-8½ g, 34 lb r, 1 c, 40 h. Pres. Thomas C. Keeler, V. Pres. R. Blackburn, Sec. James D. Traser.

OTTUMWA, IA.—Ottumwa St. R.R. Co. 2 m, 3-6 g, 27 lb r, 4 c, 2 h, 14 mu. Pres. J. M. Hedrick, Sec. & Treas. H. L. Hedrick, Supt. C. M. Hedrick.

Mineral Springs St. Ry. Co. 1 m, 1 c.

PADUCAH, KY.—Park R.R. Co.

PARIS, TEX.—Paris St. Ry. Co.

PATERSON, N. J.—Paterson & Passaic R.R. Co. 7 m, 4-10 g, 33 lb r, 16 c, 24 h. Pres. John N. Terhune, Treas. John I. Brown, Sec. E. S. Brown, Man. & Pur. Agt. Ambrose T. King, Supt. M. O. Rourke.

Paterson City R.R. Co. 6½ m, 4-8½ g, 35 lb r, 12 c, 31 h. Pres. Garrett Planten, Treas. Helmas Romalne, Sec. Albert A. Wilcox.

PENSACOLA, FLA.—Pensacola St. Ry. Co.

PEORIA, ILL.—Central City Horse Ry. Co. 4½ m, 4-8½ g, 40 lb r, 60 c, 135 h. Pres. H. R. Woodward, Sec. M. Pfeiffer, Treas. H. N. Wheeler, Supt. John Strong.

Fort Clark Horse Ry. Co.

Peoria Horse Ry. Co. 7½ m, 4-8½ g, 40 lb r, 63 c, 140 h. Pres. H. Woodward, Sec. M. Pfeiffer, Treas. H. N. Wheeler, Supt. John Strong.

PETERSBURGH, VA.—Petersburgh St. Ry. Co. 3½ m, 4-8½ g, 42 lb r, 9 c, 44 h. George Beadle, Proprietor.

PHILADELPHIA, PA.—Citizens Pass. Ry. Co. 10½ m, 5-2 g, 45-47 lb r, 92 c, 420 h. Pres. John McCarthy, Sec. & Treas. John J. Adams, Supt. Sam'l Cline.

Frankford & Southwark Phila. City Pass. R.R. Co. 18-1-10 m, 5-2 g, 47 lb r, 91 c, 8 dummy c, 580 h. Pres. Henry Gelger, Sec. & Treas. Geo. L. Gaudy, Supt. W. H. Janney.

Hestonville, Mantua & Fairmount Pass. R.R. Co. 20 m, 5-2 g, 43 lb r, 50 c, 480 h. Pres. Charles F. Lafferty, Sec. & Treas. W. C. Foster.

Lehigh Ave. Pass. Ry. Co. Pres. John Lamon, Sec. Chas. A. Porter, Treas. John L. Hill. [Track not laid.]

Lombard & South Sts. Pass. Ry. Co. — m, 5-2 g, 43 lb r, 51 c, 278 h. Pres. John B. Parsons, Sec. & Treas. Francis Hazelhurst Supt. Jno. M. Gaughan.

People's Pass. Ry. Co. 44 m, 5-2 g, 47 lb r, 125 c, 1,080 h. Pres. C. J. Harrah, V. Pres. C. J. Harrah, Jr., Sec. & Treas. Jno. C. Dessalet, Supt. Wm. Hagenswiler.

Philadelphia City Pass. Ry. Co. 7 m, 5-2½ g, 47 lb r, — c, — h. Pres. Wm. W. Colket, Sec. & Treas. T. W. Pennypacker.

Philadelphia Traction Co. 109 m, 5-2½ g, 45-78 lb r, 595 c, 3,160 h. Pres. W. H. Kemble, V. Pres. P. A. B. Widener & W. L. Elkins, Sec. & Treas. D. W. Dickenson.

Philadelphia & Gray's Ferry Pass. R.R. Co. 10-1-3 m, 40 c, 200 h. Pres. Matthew Brooks, Treas. J. C. Dawes, Sec. J. Crawford Dawes, Supt. Patrick Lovett.

Ridge Avenue Pass. Ry. Co. 14 m, 5-2 g, 47 lb r, 55 c, 352 h. Pres. E. B. Edwards, V. Pres. John Lambert, Sec. & Treas. Wm. S. Blight, Supt. William Ingles.

Second & Third Sts. Pass. Ry. Co. 37 m, 116 c, 669h. Pres. Alexander M. Fox, Treas. William F. Miller, Sec. Charles D. Matlack, Supt. David W. Stevens.

Seventeenth & Nineteenth Sts. Pass. Ry. Co. 7½ m.

Pres. Matthew S. Quay, Sec. & Treas. John B. Peddie. [Leased to Philada. Tracton Co.]

Thirteenth & Fifteenth Sts. Pass. Ry. Co. 14 m, 5-2 g, 43 lb r, 73 c, 452 h. Pres. Thos. W. Ackley, Sec. & Treas. Thos. S. Harris, Supt. Wm. B. Cooper.

Union Pass. Ry. Co. 70 m, 348 c, 1,724 h. Pres. Wm. H. Kemble, Sec. & Treas. John B. Peddie, Supt. Jacob C. Petty.

West Philadelphia Pass. Ry. Co. 18½ m, 122 c, 646 h. Pres. Peter A. B. Widener, Sec. & Treas. D. W. Dickson. (Leased by the Phila. Tracton Co.)

PHILLIPSBURGH, N. J.—Phillipsburgh Horse Car Ry. Co. 2½ m, 4-8 g, 35 lb r, 4 c, 13 h. Pres. Daniel Runkle, Sec. & Treas. James W. Long.

PITTSBURGH, PA.—Central Pass R.R. Co. 3 m, 16 c, 95 h. Pres. J. F. Chuley, Sec. F. L. Stephenson, Treas. E. R. Jones, Supt. R. G. He ron.

Beaver Falls & New Brighton Ry. Co.

Citizens' Pass. Ry. Co. 16½ m, 5-2½ g, 47 lb r, 40 c, 337 h. Pres. Jno. G. Holmes, Sec. C. M. Gormly, Supt. Murry Verner.

Federal St. & Pleasant Valley Pass. Ry. Co. 26 m, 5-2½ g, 46-50 lb r, 20 c, 154 h. Pres. Wm. H. Creery, Treas. James Boyle, Supt. Wm. J. Crozier, Allegheny City.

People's Park Pass. Ry. Co. 2 m, 5-2½ g, — lb r, 10 c, 75 h. Pres. Wm. McCreery, Treas. James Boyle, Supt. Wm. J. Crozier, Allegheny City.

Pittsburgh, Allegheny & Manchester Pass Ry. Co. 5 m, 5-2½ g, 46 lb r, 40 c, 275 h. Pres. Chas. Atwell, Sec. & Treas. Chas. Seibert, Supt. James C. Cotton.

Pittsburgh, Oakland & East Liberty Pass. Ry. Co. 11 m, 5-4½ g, 47 lb r, 32 c, 110 h, 61 mu. Pres. J. T. Jordan, Sec. John G. Traggardth, Treas. D. W. C. Bidwell, Supt. H. M. Cherry.

Pittsburgh Union Pass. R.R. Co. 5 m, 5-2½ g, 45 lb r, 29 c, 170 h. Pres. James H. Sewell, Treas. J. J. McDonnell, Sec. Chas. Seibert, Pittsburgh, Cash. Charles W. Goodnow, Supt. Joe S. Murray.

Pittsburgh & Birmingham Pass. R.R. Co. 3½ m, 5-2½ g, 48 lb r, 20 c, 170 h. Pres. W. W. Patrick, Sec. D. F. Agnew, Treas. John G. Holmes.

Pittsburgh & West End Pass. Ry. Co. 3½ m, 5-2 g, 35 lb r, 13 c, 75 h. Pres. John C. Kelly, Sec. & Treas. Thomas S. Bigelow, Supt. William J. Burns.

Pittsburgh & Wilkesburg St. Ry. Co.

Second Avenue Pass. Ry. Co.

South Side Pass. R.R. Co. 2½ m, 5-2½ g, 45 lb r, 12 c, 80 h. Pres. D. Z. Brickell, Sec. & Treas. W. T. Wallace, Supt. W. M. Rosborough.

Transverse Pass. Ry. Co. 6½ m, 5-2 g, 52 lb r, 39 c, 243 h. Pres. C. L. Magee, V. Pres. C. F. Klopfer, Sec. & Treas. Wm. R. Ford, Supt. Miller Elliot.

PITTSBURGH, PA.—Pittston St. R.R. Co. 1½ m, 3 c, 5 h. Pres. Thomas Griffith, Treas. M. W. Morris, Sec. William Allen.

PORT HURON, MICH.—Port Huron St. Ry. Co.

PORTLAND, ME.—Ocean St. R.R. Co.

Portland R.R. Co. 7½ m, 4-8 g, 30-33-45 lb r, 34 c, 154 h. Pres. H. J. Libby, Treas. & Gen. Man. E. A. Newman, Supt. Geo. W. Soule.

PORTSMOUTH, O.—Portsmouth St. R. R. Co. 2 m, 3-6 g, 18 lb r, 4 c, 10 h. Pres. James Skelton, Treas., Sec. & Supt. Enas Reed.

POTTSVILLE, PA.—People's Ry. Co. 9½ m, 16 c, 56 h.

POUGHKEEPSIE, N. Y.—City R.R. of Poughkeepsie. 3 m, 4-8 g, 35 lb r, 11 c, 33 h. Pres. Aaron Innis, V. Pres. G. B. Adrance, Sec. A. B. Smith, Treas. Hudson Taylor, Supt. C. M. Davis.

PROVIDENCE, R. I.—Union R.R. Co. 50 m, 4-8 g, 24-54 lb r, 240 c, 1,200 h. Pres. Jesse Metcalf, V. Pres. & Gen. Man. D. F. Longstreet, Sec. and Treas. C. A. Babcock, Aud. B. A. Jackson.

QUEBEC, CAN.—Quebec St. Ry. Co. 3 m, 4-8 g, 45 lb r, 9 c, 40 h. Pres. Chas. St. Michel, Quebec, V. Pres. G. Renrew, Quebec, Sec., Treas. & Supt. Samuel Moore, Book-keeper, Francis Boomer. Quebec R.R. Co. St. John St. R.R.

QUINCY, ILL.—Quincy Horse Ry. & Carrying Co. 6 m, 5 g, 71 lb r, 21 c, 118 mu. Pres. Lorenzo Bull, Sec. C. H. Bull, Supt. E. K. Stone.

RACINE, WIS.—Belle City St. Ry. Co.

READING, PA.—Reading City Pass. Ry. Co. 2-15 m, 5-2½ g, 45 lb r, 19 c, 44 h. Pres. B. F. Owen, V. Pres. Jas. L. Douglass, Sec. & Treas. H. A. Muhlenberg, Supt. J. A. Riggs.

Perkiomen Ave. Pass. Co. 2-15 m, 5-2½ g, 45 lb r, 14 c, 36 h. Pres. Chas. Breneliser, Sec. & Treas. Isaac Hiestler, Supt. John B. Houp.

RED OAK, IA.—Red Oak St. R.R. Co. 1½ m, 4-2 g, 44 lb r, 2 c, 2 h, 2 mu. Pres. J. W. Judkins, V. Pres. Geo. West, Sec. F. M. Byrket, Treas. & Supt. F. O. Judkins.

RICHMOND, IND.—Richmond City Ry. Co. 3 m, 3 g, 26 lb r, 9 c, 30 h. Pres. J. Y. Miller, V. Pres. Joseph Ratliff, Treas. H. I. Miller, Supt. F. M. Francisco.

RICHMOND, ILL.—Richmond St. R.R. Co.

RICHMOND, VA.—Richmond City Ry. Co. 7 m, 4-8 g, 60-40 lb r, 40 c, 180 h. Pres. J. H. Schoolcraft, Sec. & Treas. F. D. Mellen, Man. C. M. Baeton, Supt. Charles Steders.

ROCHESTER, N. Y.—Rochester City & Brighton R.R. Co. 22 m, 4-8 g, 45 lb r, 120 c, 600 h. Pres. Patrick Barry, Sec. C. C. Woodworth, Treas. C. B. Woodworth, Supt. Thomas J. Brower.

Citizens' St. Ry. Co. Pres. Wm. H. Jones, Sec. & Treas. J. E. Pierpont, Supt. S. A. Green.

ROCKFORD, ILL.—Rockford St. Ry. Co. 6-2-5 m, 4-8 g, 30 lb r, 13 c, 52 h, 16 m. Pres. Anthony Haines, Sec. H. H. Robinson, Treas. N. E. Lyman.

ROCK ISLAND, ILL.—Rock Island & Milan St. Ry. Co. 7 m, 4-8 g, 20-30-42 lb r, 10 c, 7 h. Pres. &

Supt. Bally Davenport, Sec. E. H. Gayer, Treas. John Peety.

RONDOUT, N. Y.—Kingston City R.R. Co. 2-4-5 m, 4-8 g, 40 lb r, 10 c, 40 h. Pres. James G. Lindsley, V. Pres. S. D. Coykendoll, Sec. & Treas. John C. Romeye, Supt. Wm. H. DeGarmo.

SACRAMENTO, CAL.—Sacramento City St. R.R. Co.

SAGINAW, MICH.—Saginaw St. R. R. Co. 2½ m, 4-8 g, 42 lb r, 10 c, 50 h. Pres. David H. Jerome, V. Pres. Geo. F. Williams, Sec. & Treas. Geo. L. Burrows, Supt. Fred G. Benjamin.

SALEM, MASS.—Salem & Danvers St. Ry. Co. 6 m, 4-8 g, 35-47 lb r, 15 c, 45 h. Pres. Benj. W. Russell, Sec. G. A. Vickery, Treas. Geo. W. Williams, Supt. W. B. Furgurson, Asst. Supt. David N. Cook.

Naumkeag St. Ry. Co. — m, 4-8 g, 30-35-45 lb r, 50 c, 140 h. Pres. Chas. Odell, Clerk Joseph F. Hickey, Treas. Henry Wheatland, Supt. Willard B. Ferguson.

SALT LAKE CITY, UTAH.—Salt Lake City R.R. Co. 13 m, 4-8 g, 20 lb r, 20 c, 115 mu. Pres. John Taylor, Sec. David McKenzle, Treas. James Jack, Supt. Orson P. Arnold.

SAN ANTONIO, TEX.—San Antonio St. Ry. Co. 15 m, 4 g, 30 lb r, 38 c, 125 mu. Pres. A. Belknap, San Antonio, V. Pres. F. W. Pickard, N. Y. City, Treas. I. Withers, San Antonio, Sec. E. R. Norton, Supt. John Robb.

Prospect Hill St. Ry. Co.

SANDUSKY, O.—Sandusky St. Ry. Co. 2 m, — g, — lb r, — c, — h. Pres. Chas. B. Ods, Sec. & Treas. A. C. Morse, Supt. Chas. Root.

SAN FRANCISCO, CAL.—California St. R.R. Co. Central R. R. Co. 6 m, 4-8 g, 45 lb r, 31 c, 290 h. Pres. Chas. Main, V. Pres. Jos. Roseberg, Treas. A. J. Gunnison, Sec. C. G. LeBreton, Supt. J. F. Clark.

Clay St. Hill R.R. Co. 1 m, 3-6 g, 30 lb r, 11 c, 12 dummy cars. Pres. Joseph Britton, V. Pres. James Moffit, Treas. Henry L. Davis, Sec. Chas. F. Campbell, Supt. Joseph Britton.

Clay St. Park & Ocean R.R. Co.

Market St. Cable Ry. Co. 10-9-10 m, 4-8 g, 137 c, 2 motors, 73 h. Pres. Leland Stanford, V. Pres. Chas. F. Crocker, Treas. N. T. Smith, Sec. J. L. Willcutt.

North Beach & Mission R.R. Co. 8 m, 5 g, 46 c, 400 h. Pres. Jos. Rosenberg, Sec. H. W. Hathorne, Treas. Carl Ahfel, Supt. M. Skelly.

Omnibus R.R. & Cable Co. 8½ m, 5 g, 35-45 lb r, 50 c, 364 h. Pres. Gustav Sutro, V. Pres. D. Callaghan, Sec. G. Ruegg, Supt. M. Martin.

Portrero & Bay View R.R. Co. 1½ m, 5 g, 35 lb r, 20 c, 64 h. Pres. Leland Stanford, V. Pres. Chas. Crocker, Treas. N. T. Smith, Sec. J. L. Willcutt.

Sutter St. R.R. Co. 5½ m, 4-11 g, 35-45 lb r, 30 c, 125 h. Pres. R. F. Morrow, Sec. A. K. Stevens, Treas. M. Schmitt, Supt. James McCord.

Telegraph Hill St. Ry. Co. 1,707 ft, 4-11 g, 36 lb r, 3 c, — h. Pres. Gustav Sutro, V. Pres. E. O. Demlecke, Sec. & Treas. C. J. Werner.

The City R.R. Co. 5½ m, 5 g, 48 lb r, 73 c, 285 h. Pres. R. B. Woodward, V. Pres. Geo. E. Raum, Sec. M. E. Willis, Treas. J. H. Goodman, Supt. William Woodward.

SAN JOSE, CAL.—San Jose & Santa Clara R.R. Co. First St. & San Pedro St. Depot R.R. Co. Market St. & Willow Glen R.R. Co. North Side R.R. Co. People's R.R. Co.

SANTA BARBARA, CAL.—Santa Barbara St. R.R. Co. 1 m, 3-6 g, 3 c, 8 mu. Pres. A. W. McPhall.

SAUGATUCK, CONN.—Westport & Saugatuck Horse R.R.

SAVANNAH, GA.—City & Suburban Ry. Co. 18½ m, 5 g, 16-30 lb r, 49 c, 110 h, 3 engines. Pres. J. H. Johnson, Asst. J. W. Alley, Treas. E. Schmidt.

Coast Line R.R. Co. 7 m, 5 g, 30 lb r, 17 c, 37 h. Pres. Geo. Parsons, New York, Sec., Treas. & Gen. Man. R. E. Cobb, Savannah.

SAYRE, PA.—Sayre St. Ry. Co. Pres. Howard Elmer (organization not completed).

SCRANTON, PA.—People's St. Ry. Co. 9½ m, 4-8 g, 25-52 lb r, 19 c, 70 h. Pres. Wm. Matthews, Sec. & Treas. J. C. Platt.

SEARCY, ARK.—Searcy & West Point R.R. Co. 8 m, 4-8 g, 20 lb r, 7 c, 6 mu. Pres. A. W. Yarnell, Sec. W. H. Lightle, Treas. Jasper Hicks.

SEATTLE, W. T.—Seattle St. Ry. Co. — m, — g, — lb r, — c, — h. Pres. F. H. Osgood.

SEDALIA, MO.—Sedalia St. Ry. Co. 2½ m, 4-10 g, 54 lb r, 6 c, 31 h. Pres. Joseph D. Sicher, V. Pres. Louis Deutsch, Treas. F. H. Guenther, Sec. & Supt. Chas. S. Conrad.

SELMA, ALA.—Selma St. R.R. 2½ m, 18 lb r, 5 c, 8 h. Pres. E. Gilman, Sec. & Treas. J. H. Hollis, Supt. W. Bohlla.

SENECA FALLS, N. Y.—Seneca Falls St. Ry. Co.

SHERMAN, TEX.—Sherman City R.R. Co.

SHREVEPORT, LA.—Shreveport City R.R. Co. 1½ m, 4-4 g, 46 lb r, 6 c, 14 h. Pres. Peter Youree.

SILVER CLIFF, COL.—Silver Cliff St. R.R. Co.

SIoux CITY, IA.—Sioux City St. Ry. Co. 5 m, — g, — r, 6 c, 8 h, 4 mu. Pres. Fred T. Evans, V. Pres. D. A. Magee, Sec. & Treas. F. T. Evans.

SOUTH CHICAGO, ILL.—Chicago Horse & Dummy R.R. 5 m, 4-8 g, — lb r, — c, — h. Pres. D. L. Huff, Treas. A. C. Calkins, Sec. E. R. Bliss. [Not in operation.]

SOUTH PUEBLO, COL.—Pueblo St. R.R. Co.

SPRINGFIELD, ILL.—Citizens' St. R.R. Co. 9½ m, 3-6 g, 20-36 lb r, 23 c, 100 h. Pres. J. H. Schrick, Treas. Frank Relsch, Sec. Chas. F. Harman.

Springfield City Ry. Co.

SPRINGFIELD, MASS.—Springfield St. Ry. Co.

4-8 g, 33-40 lb r, 25 c, 115 h. Pres. John Olmstead, Auditor L. E. Ladd, Clerk Gidcon Wells, Treas. A. E. Smith, Supt. F. E. King.

SPRINGFIELD, MO.—The People's Ry. Co. of Springfield, Mo. 3½ m, 4-10 g, 33 lb r, 5 c, 30 h. Pres. J. C. Cravens, Sec. Benj. N. Massey, Treas. Chas. Sheppard, Supt. H. F. Denton.

Springfield St. R.R. Co.

SPRINGFIELD, O.—Citizens' St. R.R. Co. 10 m, 4 g, 29 c, 135 h. Pres. D. W. Stroud, V. Pres. A. S. Bushnell, Treas. Rose Mitchell, Sec. F. S. Penfield, Supt. W. H. Hanford.

STATEN ISLAND, N. Y.—Staten Island Shore Ry. Co.

ST. CATHARINE'S, ONT.—St. Catharine's, Merrilton & Thorold St. Ry. Co. 5½ m, 4-8 g, 30 lb r, 7 c, 30 h. Pres. E. A. Smythe, Sec. S. R. Smythe, Supt. E. A. Smythe.

ST. JOSEPH, MO.—Citizens' St. R.R. Co. 3 m, 4-8 g, 28 lb r, 14 c, 52 mu. Pres. Richard E. Turner, Sec. & Treas. Arthur Kirkpatrick, Supt. John F. Merland.

Frederick Ave. Ry. Co. 1½ m, 3 g, 16 lb r, 6 c, 16 h. Pres. Thomas E. Tootle, V. Pres. Winslow Judson, Sec. W. D. B. Motter, Treas. Thomas W. Evins, Supt. S. Rowen.

St. Joseph & Lake St. R.R. Co. Union Ry. Co.

ST. LOUIS, MO.—Baden & St. Louis R.R. Co. 3½ m, 4-10 g, — lb r, 7 c, 21 h. Pres. George S. Case, V. Pres. William Z. Coleman, Supt. J. H. Archer.

Benton & Bellefontaine Ry. Co. 7½ m, 4-10 g, 45 lb r, 29 c, 200 h. Pres. J. G. Chapman, Sec. Robert McCulloch.

Cass Avenue & Fair Grounds Ry. Co. 8 m, 4-10 g, 38 lb r, 37 c, 209 h. Pres. W. R. Allen, V. Pres. Geo. W. Allen, Sec. & Supt. G. G. Gibson, Cashier O. H. Williams.

Citizens' Ry. Co. Jefferson Ave. Ry. Co.

Lindell Ry. Co. 13½ m, — g, — r, 65 c, 475 h. Pres. John H. Maquon, V. Pres. John H. Lightner, Sec. & Treas. Geo. W. Baumhoff, Supt. Jos. C. Llewellyn.

Missouri R.R. Co. Mound City R.R. Co. Northern Central.

Springfield Ry. Co. 2 m, 4-8 g, 25-40 lb r, 7 c, 40 h. Pres. C. W. Rogers, St. Louis, Sec. & Treas. B. F. Hobart, Springfield, Supt. J. A. Stoughton, No. Springfield, Asst. Supt. Frank B. Smith, No. Springfield.

Southern Ry. Co. 7-4-5 m, 4-10 g, 35-52 lb r, 49 c, 250 h. Pres. E. R. Coleman, Sec. J. S. Minary, Man. W. L. Johnson.

St. Louis R.R. Co. and the People's R.R. One management. 11 m, 4-10 g, 38-44 lb r, 58 c, 375 h. Pres. Chas. Green, Sec. & Treas. John Mahoney, Supt. Patrick Shea.

Tower Grove & Lafette R.R. Union Depot R.R. Co. Union R.R. Co.

STONEHAM, MASS.—Stoneham St. R.R. Co. 2½ m, 4-8 g, 33 lb r, 10 c, 28 h. Pres. A. V. Lynde, Melrose, Treas. & Clerk William Dyke, Supt. John Hill.

ST. PAUL, MINN.—Wabash St. Ry. Co.

St. Paul City Ry. Co. 25 m, 4-8 g, 80 c, 150 h, 294 mu. Pres. Thos. Lowry, V. Pres. C. G. Goodrich, Sec. J. H. Randall, Treas. Clinton Morrison, Supt. A. L. Scott.

STERLING, ILL.—Sterling St. Ry. Co.

STILLWATER, N. Y.—Stillwater & Mechanicsville St. Ry. Co. 4½ m, 4-8 g, 25-30 lb r, 3 c, 6 h. Pres. S. Rowley, V. Pres. W. L. Denison, Sec. H. O. Bailey, Mechanicsville, Treas. E. N. Smith.

STROUDSBURGH, PA.—Stroudsburgh Passenger R.R. Co. 14-5 m, 4-8 g, 23-30 lb r, 3 c, 9 h. Pres. & Treas. J. Lantz, Sec. Jacob Houser.

SYRACUSE, N. Y.—Syracuse & Onondaga R.R. Co. 2-3-5 m, 4-8 g, 28-47 lb r, 9 c, 18 h. Pres. Peter Burns, Sec. & Treas. Lyman C. Smith, Supt. Henry Thompson.

Central City Ry. Co. 2½ m, 4-8 g, 40 lb r, 12 c, 37 h. Pres. George N. Kennedy, V. Pres. Daniel Pratt, Sec. & Treas. James Barnes, Supt. George Crampton.

Fifth Ward R.R. Co. 2½ m, 4-8 g, 35-56 lb r, 8 c, 30 h. Pres. P. B. Brayton, Sec. & Treas. O. C. Potter, Supt. Hugh Purnell.

Genesee & Water St. R.R. Co. and Fourth Ward R.R. Co. 4 m, 4-8 g, 18-30 lb r, 10 c, 35 h. Pres. Robt. G. Wynkoop, Sec. & Treas. Geo. J. Gardiner, Supt. W. J. Hart.

New Brighton & Onondaga Valley R.R. Co. 1½ m, 4-8 g, 16-35 lb r, 2 c, 4 h, 1 dummy. Pres. Matthias Britton, Sec. T. W. Meacham, Treas. J. H. Anderson, Supt. J. H. Anderson.

Syracuse & Geddes Ry. Co. 2 m, 4-8 g, 35-45 lb r, 10 c, 32 h. Pres. R. Nelson Gere, Sec. & Treas. Rasselas A. Bonta, Supt. Wm. J. Hart.

TAUNTON, MASS.—Taunton St. Ry. Co. 4½ m, 4-8 g, 14 c, 44 h.

TERRE HAUTE, IND.—Terre Haute St. Ry. Co. 4½ m, 4-8 g, 28 lb r, 16 c, 48 h. Pres. T. C. Buntin, V. Pres. Josephus Collett, Sec. John R. Hagen, Supt. John T. Shriner.

TEXARKANA, ARK.—Texarkana St. Ry. Co.

TOLEDO, OHIO.—Toledo Consolidated St. Ry. Co. 17 m, 4-8 g, 42 lb r, 37 c, 180 h. Pres. John E. Bailey, Sec. A. E. Lang.

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The Central Passenger R.R. Co. of Toledo, O. 8 m, 3 g, 27 lb r, 17 c, 70 h. Pres. F. E. Seagrave, V. Pres. & Treas. James Pazneer, Sec. Chas. F. Parkis, Supt. A. R. Seagrave.

Toledo Street R.R. Co.

TOPEKA, KAN.—Topeka City Ry. Co. 9 m, 4 g, 25-48 lb r, 25 c, 90 h. Pres. Joab Mulvane, V. Pres. D. W. Stormont, Sec. & Treas. E. Wildes, Supt. Jesse Shaw.

TORONTO, CAN.—Toronto St. Ry. Co. 18 m, 4-10½ g, 30 lb r, 136 c, 670 h. Pres. Frank Smith, Sec. James Green, Supt. John J. Franklin.

TRENTON, N. J.—Trenton Horse R.R. Co. 1½ m, 5-2 g, 43-47 lb r, 10 c, 31 h. Pres. Gen. Lewis Perrine, Sec. & Treas. Lewis Perrine, Jr., Supt. Thomas Sillorris.

City Ry. Co. 3 m, 5-2 g, 45 lb r, 15 c, 69 h. Pres. Adam Extor, V. Pres. W. H. Skinn, Sec. H. B. Howell, Treas. & Mang. Director Chas. J. Bramford.

TROY, N. Y.—Cortland & Homer Horse R.R. Co. 4 m, 4-8½ g, 25-30 lb r, 2 c, — h. Pres. C. H. Garrison, Troy, V. Pres. E. A. Fish, Cortland, N. Y., Treas. Jas. M. Milen, Cortland, Sec. S. E. Welch, Cortland.

Troy & Albion Street Ry. Co. 3½ m, 4 g, 35-45 lb r, 9 c, 41 h. Pres. Thos. A. Knickerbocker, Sec. & Treas. Theo. E. Haslehurst, Supt. W. R. Bean.

Troy & Lansingburgh R.R. Co. 20½ m, 4-8½ g, 47 lb r, 91 c, 466 h. Pres. William Kemp, V. Pres. Charles Clemmshaw, Sec. & Treas. Joseph J. Hagen, Supt. Leander C. Brown.

URBANA, ILL.—Urbana R.R.

Urbana & Champaign St. Ry. Co. 2 m, 4-8½ g, 33 lb r, 4 c, 20 h. Pres. Wm. Park, Sec. & Treas. Frank G. Jaques, Supt. W. Park.

UTICA, N. Y.—Utica, Clinton & Binghamton St. R.R. 7½ m, 4-8½ g, 43-56 lb r, 17 c, 82 h. Pres. Isaac Maynard, Sec. & Treas. Robt. S. Williams, Supt. Roger Rock.

The Utica & Mohawk R.R. Co. 2½ m, 4-8½ g, 25-40 lb r, 9 c, 5 h. Pres. Chas. W. Hutchinson, V. Pres. Nathan S. Haynes, Sec. Geo. M. Weaver, Treas. Joshua W. Church.

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WACO, TEX.—Waco St. Ry. Co. 5 m, 4-8 g, 14-18 lb r, 9 c, 44 h. Pres. E. Rotan, Sec. & Treas. W. R. Kellum, Supt. J. W. Sedbury.

WALTHAM, MASS.—Waltham & Newton St. Ry. Co. 3½ m, 4-3½ g, 30 lb r, 6 c, 14 h. Pres. R. E. Robbins, Sec. & Treas. Henry Bond.

WASHINGTON, D. C.—Capital, No. O. St. & So. Washington R.R.

Anacostia & Potomac River Ry. Co. 3 m, 4-8 g, 37 lb r, 9 c, 24 h. Pres. H. A. Griswold, Sec. Edward Temple, Treas. T. E. Smithson.

Columbia R.R. Co. of the District of Columbia. 2½ m, — g, — lb r, 19 c, 56 h. Pres. H. A. Willard, Sec. & Treas. Wm. H. Clayette, Supt. Thos. E. Benson.

Metropolitan R.R. Co. 21½ m, 4-8 g, 38 lb r, 90 c, 400 h. Pres. George W. Pearson, V. Pres. A. A. Wilson, Sec. & Treas. William M. Morse, Supt. L. W. Emmart.

Washington & Georgetown R.R. Co. 10 m, 4-8½ g, 42 lb r, 161 c, 750 h. Pres. H. Hurt, Sec. & Treas. C. M. Koonés, Gen. Supt. C. C. Sailles.

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WESTPORT, CONN.—Westport & Saugatuck Horse R.R.

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WILMINGTON, DEL.—Front & Union St. Passenger Ry. Co.

Wilmington City Ry. Co. 4¼ m, 5-2½ g, 45 lb r, 20 c, 82 h. Pres. W. Canby, Sec. & Treas. John F. Miller, Supt. Wm. H. Burnett.

WINDSOR, CAN.—Sandwich & Windsor Passenger R.R. Co.

WINNIPEG, MANITOBA, CAN.—The Winnipeg St. Ry. Co. 5 m, 4-8½ g, 35 lb r, 13 c, 75 h. Pres. Duncan MacArthur, Sec. & Mangr. Albert W. Austin, Supt. Geo. A. Young.

WINONA, MINN.—Winona City Ry. Co. 4 m, 3-6 g, 27 lb r, 10 c, 39 h. Pres. John A. Mathews, V. Pres. B. H. Langley, Sec. & Treas. C. H. Porter.

WOBURN, MASS.—No. Woburn Horse R.R. 2½ m, 4-8 g, 4 c, 4 h. Pres. & Treas. John Carter, Sec. J. G. Maguire, Supt. Dexter Carter.

WORCESTER, MASS.—Worcester St. Ry. Co. 5½ m, 4-8½ g, 45 lb r, 19 c, 100 h. Pres. Geo. H. Seeley, N. Y. City, V. Pres. Nathan Seeley, N. Y. City, Treas. & Supt. Harry S. Searis, Worcester.

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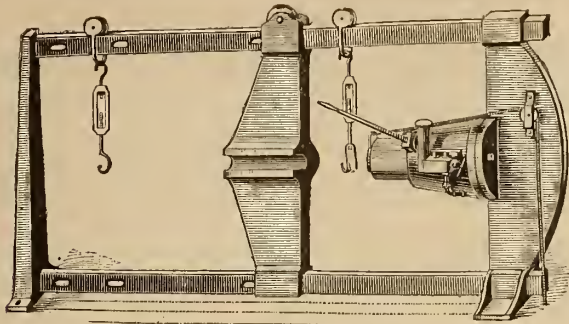
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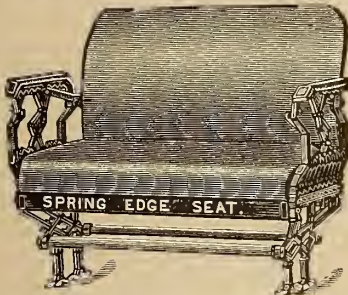
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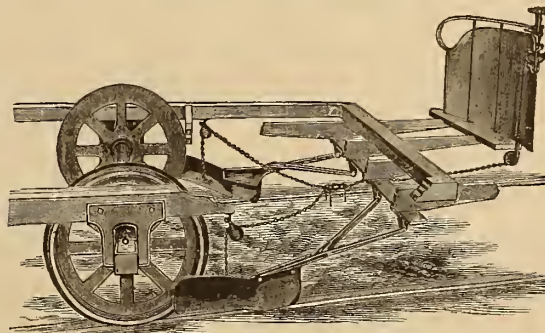
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Lynn & Boston R. R., Boston, Mass.	68 "
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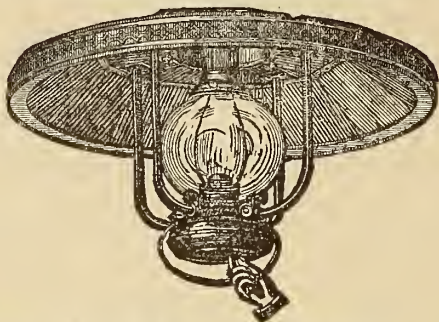
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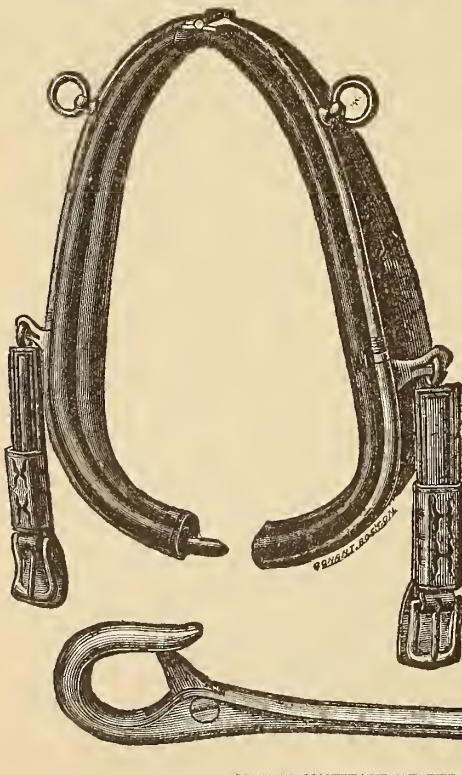
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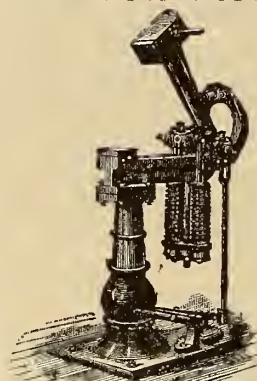
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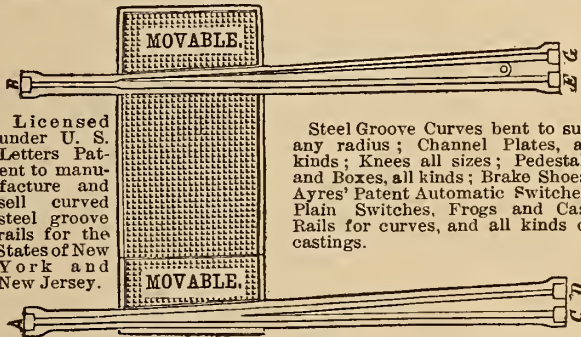
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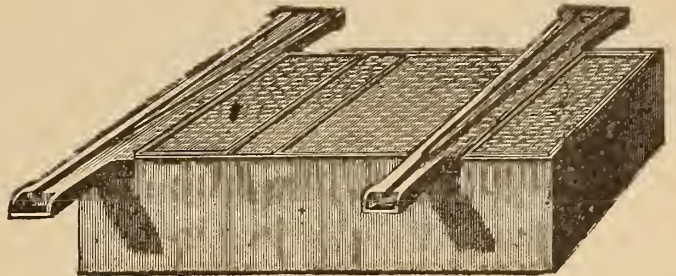
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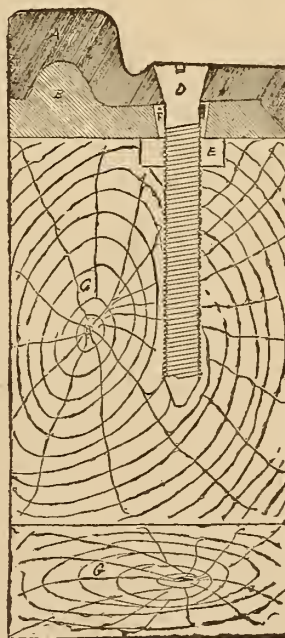
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WE CLAIM FOR AJAX METAL.



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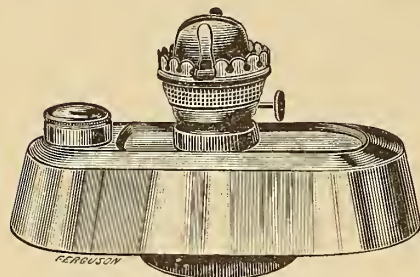
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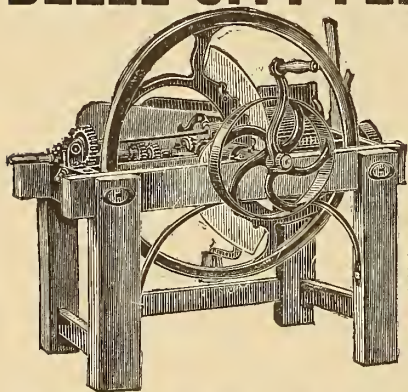
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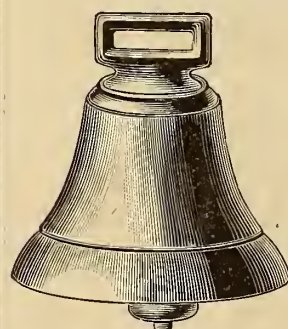
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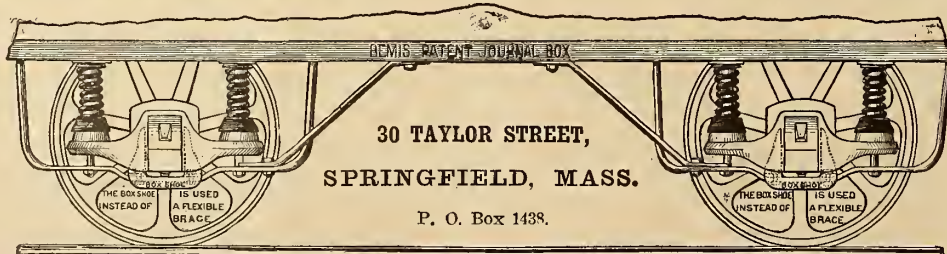
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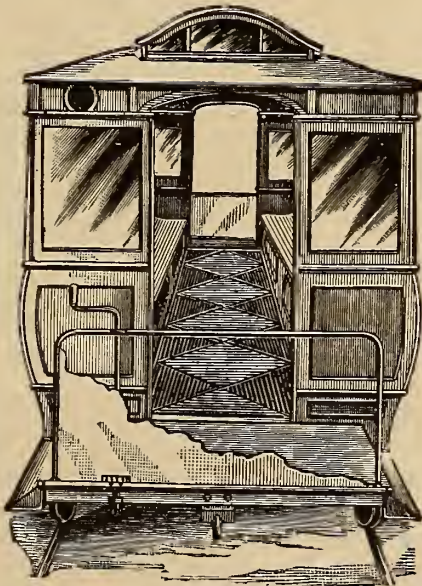
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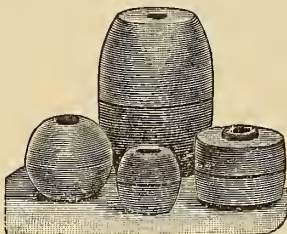
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- Crosstown Railroad Co., Brooklyn, N. Y.
- Coney Island and Brooklyn Railroad Co., Brooklyn, N. Y.
- North Hudson County Railroad Co., Hoboken, N. J.
- Jersey City and Bergen Railroad Co., Jersey City, N. J.
- Ridge Avenue Passenger Railway Co., Philadelphia, Pa.
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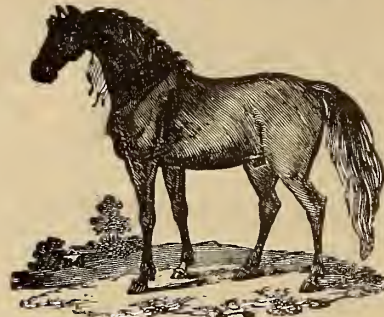
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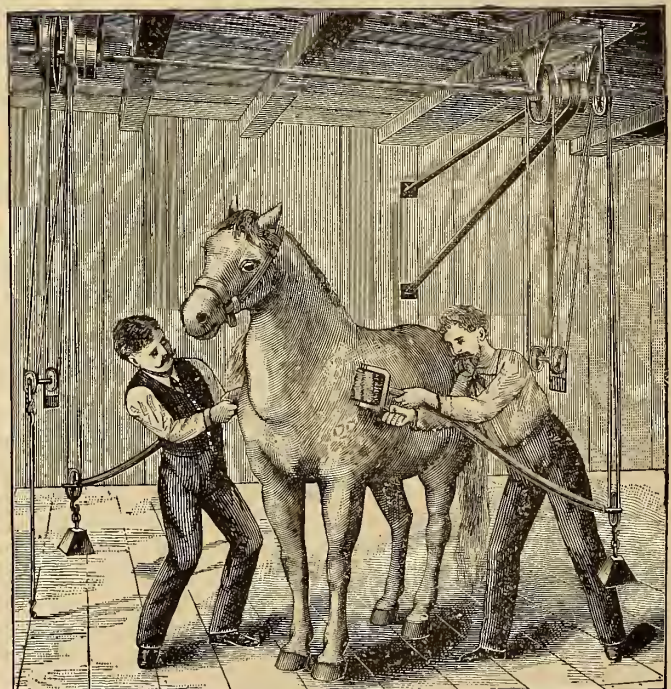
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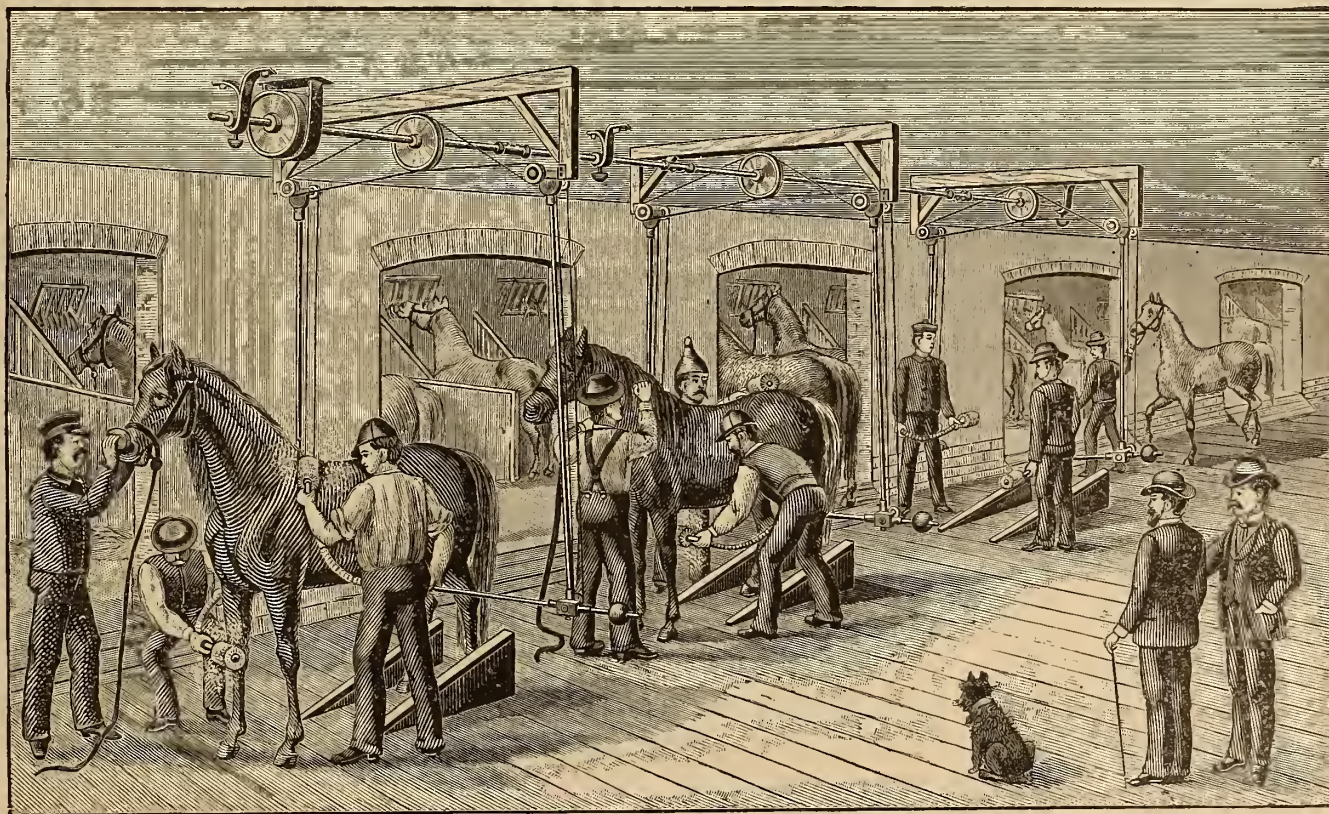


Patent No. 171,232, December 21, 1875.

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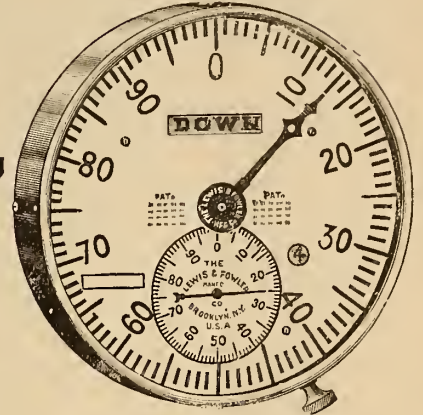
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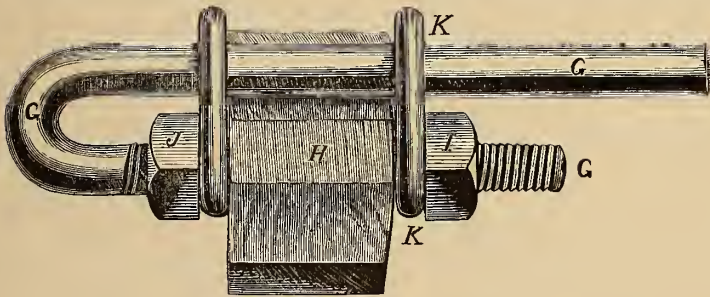
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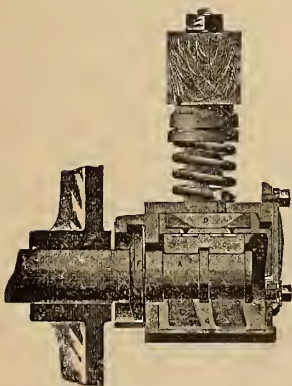


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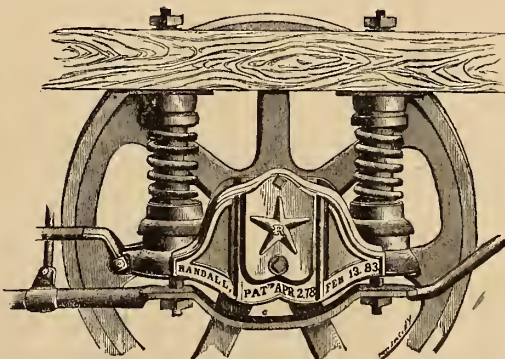


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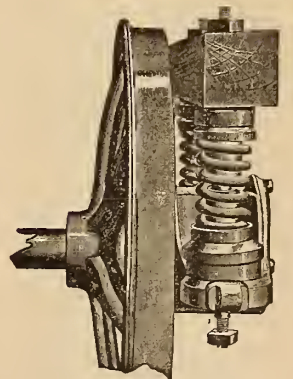
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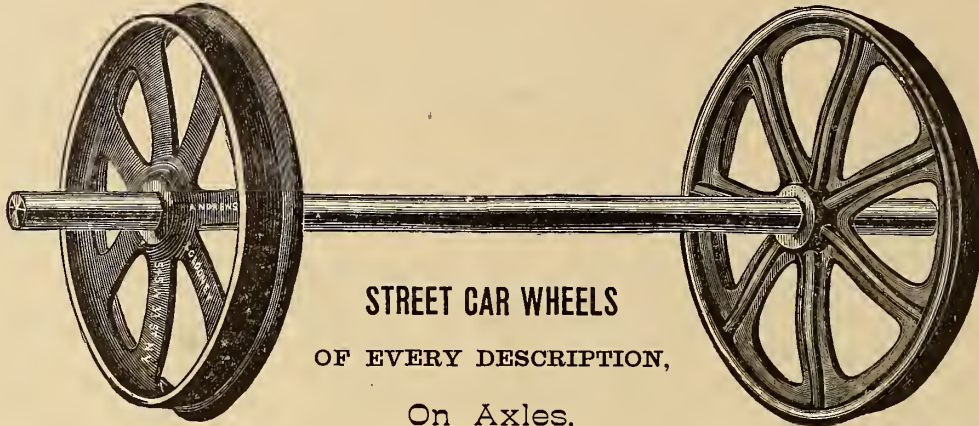
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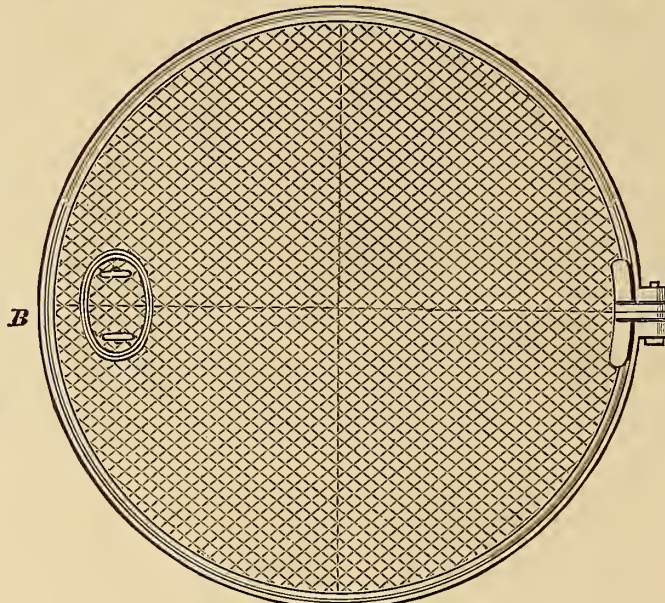
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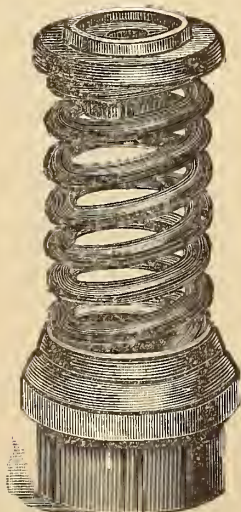
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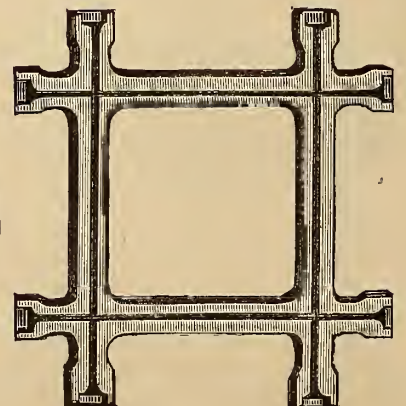
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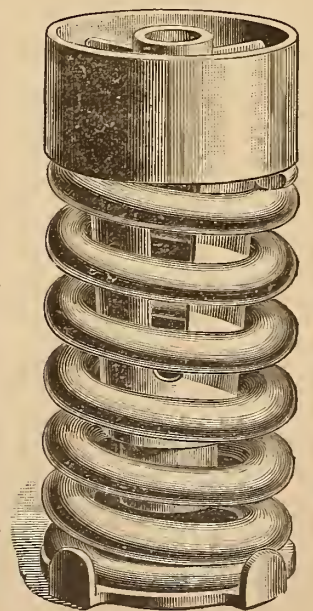
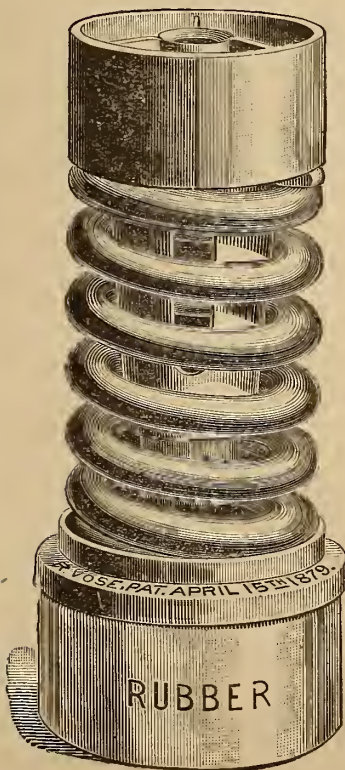
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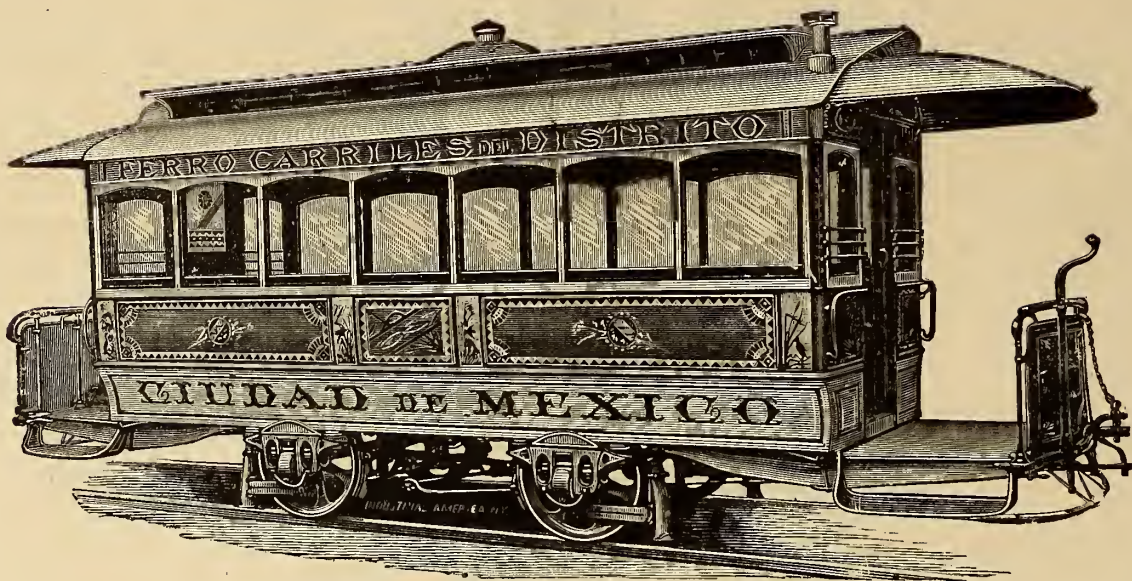
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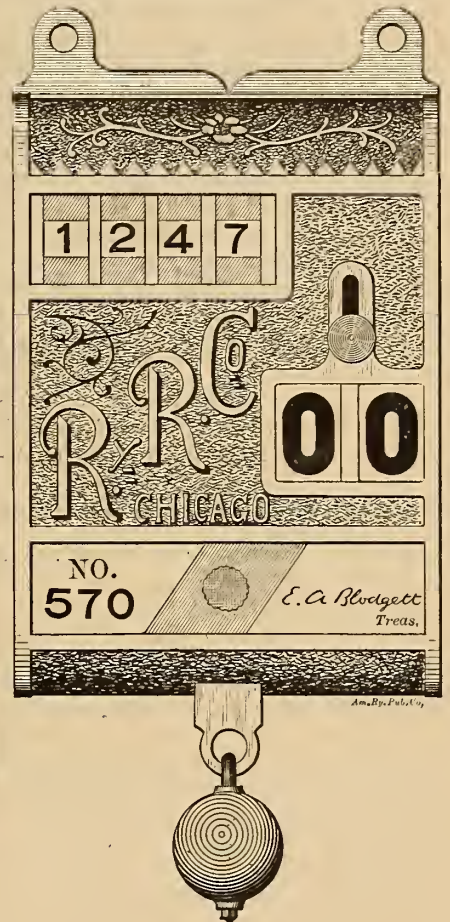
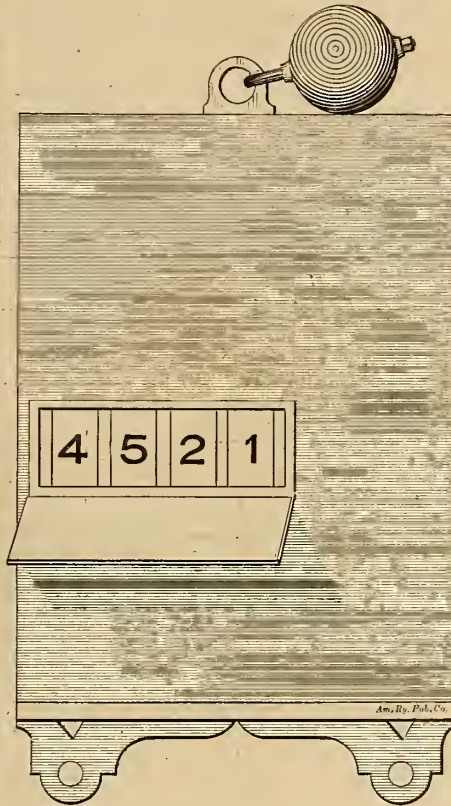
THE STREET RAILWAY JOURNAL



VOL. I. } NEW YORK: }
 } 32 Liberty Street. }

SEPTEMBER, 1885.

{ CHICAGO: } No. 11.
{ 12 Lakeside Building. }



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Conductors and the Collection of Fares.

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The aggregate yearly revenue, accruing from the transportation of passengers upon the street railways of this country, is a sum so vast, that it cannot be comprehended by human intellect; but great as is the total amount, 'tis collected in dribblets, five cents at a time! Truly an emphatic example that we should

Think naught a trifle, though it mean appear:
Small sands, the mountains; moments make the year;
and trifles—life.

The collection of fares, the employment of honest men, the safeguards put forth to deter the weak from becoming dishonest, and to detect those who steal, are matters of such great moment, that they are discussed at each succeeding convention of the American Street Railway Association.

I have given a cordial welcome to the

STREET RAILWAY JOURNAL, and congratulate the editors upon its value to the street railway interests of this country; but to the latter, I would say, "Help the editors by contributing to its columns the facts gained in your experience." It will then become a power in the land, and of inestimable advantage to all who have to do with street railway interests.

I am willing to do my part, as its columns will prove, and I further venture these remarks, upon so important a subject as that under consideration.

To secure a satisfactory conductor, the company must pay a fair salary. Adam Smith wrote in his "Wealth of Nations," "The proper performance of every service seems to require that its pay or recompense should be, as exactly as possible, proportioned to the nature of the service. If any service is very much underpaid, it is

very apt to suffer by the meanness and incapacity of the greater part of those who are employed in it. If it is very much overpaid, it is apt to suffer, perhaps, still more by their idleness and negligence."

Treat your employees fairly and justly. If the management of a road has established a reputation for harsh and unfair treatment of employees, good men will be loath to enter its service. Allow the men time for meals. Do not require an unreasonable number of hours' service. And above all, when you have secured the services of a good, honest man, do not be hasty in discharging him.

Upon the question of honesty of mankind in general, I believe the world has changed, and for the better, since Shakespeare wrote

AY, sir; to be honest, as the world goes, is to be one man picked out of ten thousand.

Honesty is a matter of education, no

natural to mankind, and our friend Humphrey, of New Hampshire, showed his New England shrewdness, when he said, "When I employ a conductor, I ask him, 'Who got you?' 'Who was your father?' 'Who, your mother?'"

Other things being equal, the man who as a child was taught to tell the truth, to be honest and true, to do unto others as he would they should do unto him, will not steal your nickels.

Montaigne, that profound student of human nature, wrote three hundred years ago,

"Plato, reprehending a boy for playing at some childish game, 'Thou reprovost me,' said the boy, 'for a very little thing.' 'Custom,' replied Plato, 'is no little thing.' Our greatest vices derive their first propension from our most tender infancy; our principal education depends upon the nurse."

The italics are mine.

In employing a conductor, therefore, the superintendent should, so far as possible, ascertain something of his family and past life. Upon the large roads it is impossible to do this, save through references, for "men can be estimated by those who know them not, only as they are represented by those who know them," wrote the great Samuel Johnson.

Yet an experienced observer can frequently judge the character of an individual by a careful scrutiny of his countenance.

At a glance thou judgest well; years could add little to thy knowledge,
When honesty's open brow, or the weazel face of cunning, is before thee.

Having made your selection and employed an honest man, "lead him not into temptation." Throw safeguards about, so that if he wavers, he may not fall. The universal adoption of some check upon the conductor's honesty, proves its necessity, and the roads employ a fare register of some kind, supplemented by a detective system. These registers are classed under two heads. "Stationary" and "Portable." The committee of the A. S. Ry. A. reported, 1884, that "having carefully investigated the several kinds of registering devices now in the market," they considered "good portable machines undoubtedly superior to stationary ones for several reasons," which they proceeded to give.

I believe a portable register to be preferable, and think the conductor should turn in all collections every round trip, having thus less opportunities for speculation.

The register patented by J. W. Meaker is the best that has been brought to my observation. It surpasses in simplicity and accuracy, not containing wheels, clock work or any complicated mechanism to get out of order. The motion is transmitted by strong, endless chains sliding in grooves. It weighs about one-half as much as the Benton, a decided relief to the conductor. Examination of the interior is prevented by a sealed lock, which is in fact a large display seal, inserted by the company using this register. This enables

the company in case a register is lost or stolen or a counterfeit used, to detect the same at all times, as these seals are duly numbered and signed by an officer of the railway, thus making it necessary to commit a forgery in order to use an unauthorized register. The coloring or lettering of these seals can be at any time changed at trifling expense, thus permitting a ready detection of any spurious register. This can be done as often as the railway thinks desirable, and then it has virtually new registers, so far as detection is concerned. The total reading is shown in bold figures, either on face or back, or the trip on face and total on back, &c., &c. The accompanying cuts show some forms of this register so plainly that no description can be necessary.

AUGUSTINE W. WRIGHT.

Car Transit by Endless Cable.

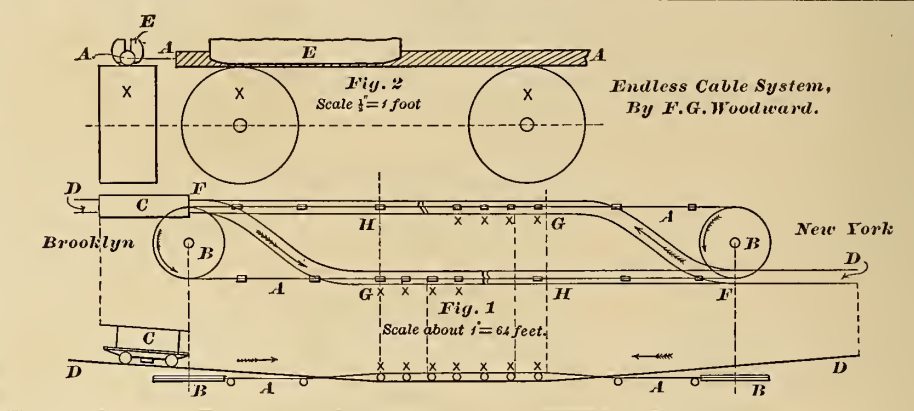
A correspondent of the *American Machinist* (to which journal we are indebted for the accompanying engraving) says:

In an article upon this subject in the *Machinist*, it is stated, among other things, that if the cable moves with a con-

stantly in contact with these plain carriers, provided it escapes the grooved carriers along the line.

It is suggested, in the article above referred to, that "the cable might be raised to the range of the grip" by the weight of the car acting upon a suitably arranged lever at the foot of the incline. But in view of the slight elevation of cable necessary to meet the conditions of the case, it might be better to carry the cable permanently elevated, as indicated in the sketch. The plain carriers, X, should be placed close enough together to keep the cable A straight with the track for a distance of 25' to 30', or a sufficient distance to give the brakeman ample time to operate the grip. The grip should be a simple clamp of considerable length, as shown at E, Fig. 2, lined with hard, slightly elastic rubber, conforming to the shape of the cable, as shown in end plan, Fig. 2, so as to preserve the integrity of the cable.

It will be observed that the cable is here represented as carried on a single sheave, B, at each end of the line, the diameter of the sheaves being equal to the distance between the centre of the tracks D, and the sheaves being so placed as to carry the



tinuous speed of eight or ten miles an hour the car should have a like headway at the instant it is attached to the cable, in order to avoid all shock and wear and tear of cable and gripping device. To bring about this important condition of things, the following scheme is presented: The desired headway may be given to car C by a slight incline, H D G, at each end of the line, the momentum of the car being sufficient to impel itself up the incline from H to any desired position above the switch F, the car being held at this position by the car-brake till ready to start for the other end of the line. The car, then, being released, will move by its own gravity down the curve to the opposite track to G, attaining at this point of its progress a speed equal to that of the cable A. The brakeman now grips the cable firmly, and the car continues without slip or shock to the other end of the line, where the same process is repeated. The cable is held up to the range of the grip by a few plain-faced carriers, X, as shown.

The grip is formed somewhat as shown at E, Fig. 2, and being so attached to the car as to be capable of slight vertical play, no harm can result if the grip passes

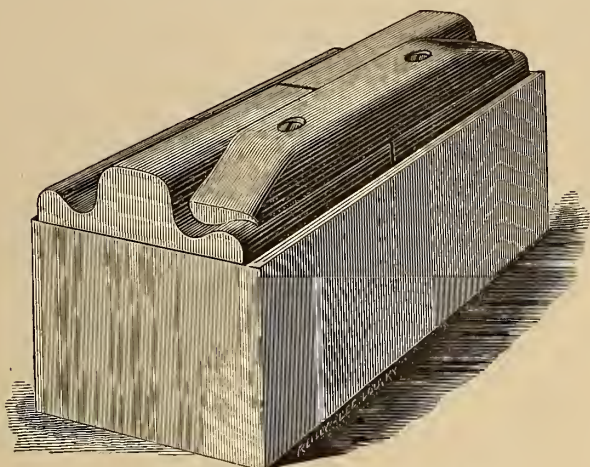
cable level with its working position along the line, as shown. In cases where conditions are favorable, this method of mounting the cable would be preferable to the more complex arrangement, as it would absorb much less money and power. One of the sheaves should be so mounted as to serve as a tightener to adjust the tension of the cable, and compensate for its variation in length from change of temperature. With due attention to timing the cars, so as to balance their work on the inclines, their absorption of power would be quite uniform and not excessive. The tractive power of wire cables working over large sheaves has been tested pretty thoroughly for driving heavy machinery, and has been found ample for pretty severe labor when applied simply as an open belt; and in cases where excessive tractive power is needed, a single turn of the cable around the sheaves has given ample adhesion for every emergency.

F. G. WOODWARD.

"MAN-WHO-HUGS-HIS-GIRL-IN-THE-CAR" is still around with his scalp untaken. The probabilities are that said scalp will remain where it is until M-w-h-g-i-t-c marries Girl-who-Loves-to-be-Squeezed-in-the-Car.

Littell's Car Replacing Splice Bar.

We have several times, in the STREET RAILWAY JOURNAL, and in its predecessor, the street railway department of the JOURNAL OF RAILWAY APPLIANCES, called attention to the fact that the ends of street railway rails are not united in such a manner as to afford a smooth and easy passage over the joints, avoid jar and concussion, and prevent the rail ends from being broomed and battered. The object of the invention* here



LITTELL'S CAR REPLACING SPLICE BAR.

illustrated is to make a proper rail-end joint, and at the same time afford a ready and convenient means of replacing a car upon the track when it has from any cause been derailed.

It consists of a metal bar secured upon the outside flange of the abutting ends of centre-bearing rails. The top of the bar is beveled transversely to conform to the bevel of the wheel tread; and the ends are so cut away and beveled lengthwise as to enable the wheel flanges to readily get on them and run up thereon so as to restore the car to the track. The lower side of the bar is moulded to fit the upper side of the rail flange, so that the pressure of the wheel on its upper inclined side shall aid in locking the joint plate in its operative position. As the bar rests on top of the rail flange, and its upper inclined face is in the same plane with the rail head, the tendency is to bear the weight of the wheel and car, sufficiently beyond the rail ends to prevent their being inordinately depressed so that they shall be driven into the stringer, and the car jarred. The joint-bar is fastened by spikes (which we do not by any means recommend, unless barbed), screws, or bolts, passing through suitable longitudinal slots, allowing for expansion and contraction of the rails.

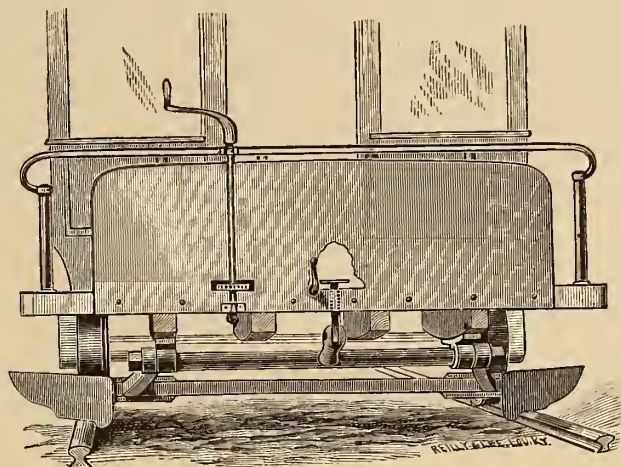
* Hardin H. Littell, Louisville, Ky.

Littell's Track Scraper.

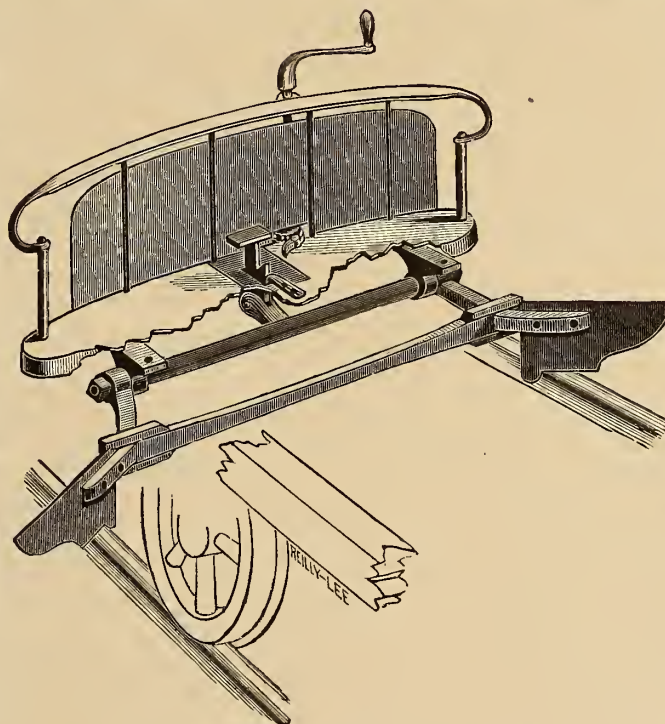
The illustrations represent with sufficient detail and accuracy a track scraper for street railways, the intention of which is to provide a cleaner that can be easily and

quickly operated when used, for removing snow, stones, &c., and yet be strong enough to withstand shocks.

To the frame of any ordinary street car is attached a transverse rock shaft, across the front of the under part; working in hangers bolted to the beams. At the centre of this rock shaft projects an arm, having at its end a rectangular recess. In this recess is pivoted a foot-lever working in an elongated slot in the platform and in a



LITTELL'S TRACK SCRAPER. FRONT VIEW.



LITTELL'S TRACK SCRAPER. REAR VIEW.

plate acting as a guide therefor. A suitable ratchet device keeps the scraper up when not wanted. To prevent jarring out of the ratchet, there is a wedge fitting in the slot and chained to the dashboard. From the rock shaft are arms at a diverging angle, and again bent to another diverging angle, at which point the scrapers are secured. These arms and scrapers are held in line with the track by a stay brace, forming an essential feature of the invention. It has at each end a steel end head, and straps which can be slipped on the steel ends over the scraper arms. This cross bar stiffens the frame and keeps the scrapers in position.

Both the patentees* are prominent street railway superintendents, which perhaps entitles the device to special consideration.

* Harvey M. Littell, St. Paul, Minn.; and Hardin H. Littell, Louisville, Ky.

Failure of the Philadelphia Cable Road.

The road is constructed through 12 miles of the principal streets of the city, and has cost the projectors \$600,000, but it is esti-

mated that \$1,250,000 more will be required to correct mistakes. When the iron conduits through which the cable passes were laid, iron rods were run through the stringers and bolted to the top of the conduits just below the slot where the grip passes down to the cable under the street. Every change of temperature has been found to affect the width of the slot and hinder the passage of the grip. (*Sci. Am.*)

[It is no more than right that we should call attention to the fact that the failure of the Philadelphia road is the result of experimenting on too large a scale with devices intended to supplement the successful but patented appliances used in San Francisco and in Chicago.

The expenses of tearing out the unsuccessful conduit will many times overweigh the royalty on the successful (but patented) devices, and there is more than a probability that the Chicago plan will be adopted after all. The New York Cable Commission has reported in favor of the Chicago system for the proposed cable roads in this city.]

Steam vs. Horses.

On the North London (England) tramways the cars are run alternately with steam power and by horses. That the public favor the use of steam is shown by the fact that many more passengers ride on the cars operated by steam than on those drawn by horses.



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AMERICAN RAILWAY PUBLISHING CO.

32 LIBERTY ST., NEW YORK.

12 LAKESIDE BUILDING, CHICAGO.

S. L. K. MONROE, Sec'y and Treas.

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The Convention.

The next regular meeting of the American Street Railway Association will be held at the Southern Hotel, St. Louis, beginning Wednesday, October 21.

Manufacturers of street railway appliances who wish to exhibit samples at the convention will do well to address the publishers of the STREET RAILWAY JOURNAL for particulars.

The Consequences of Strikes.

There is a story on record, which it will do well for the recent strikers in Chicago to remember and apply. It is concerning a certain "smart Aleck" who undertook to saw a limb off a tree, and having with more zeal than knowledge straddled the limb with his feet against the trunk, he very wisely and efficiently proceeded to saw off the limb between himself and the tree.

This is the general result of strikes in which employees with real or fancied grievances undertake to combine brute force with organized opposition, and to produce results by momentum rather than inertia.

There has rarely been a cause that was just, which could not be settled by just means, or which warranted the employment of force before persuasion had been tried. The more honest the difference between employer and employee, the less justifiable the use of obstructive force or forcible obstruction on the part of either party to the dispute.

The general consequences of strikes in which force has been employed by either side as a means of coercing the other to an immediate settlement, are a reversal of public opinion in favor of those who have been actively coerced. A quiet lock-out or an

orderly strike may leave the general public divided and moderate in opinion; but the instant that coercion appears on the scene, the public mind has sown therein the seeds of distrust for the party which finds it necessary to substitute force for reasons. Ever after, should subsequent differences arise, the side which before made use of force is assumed to be wrong, "on general principles," and without the merits of the case being gone into.

The Chicago strikers have by their action prejudiced the public mind against the employees of street railways all over the country, in whatever future quarrel they may be involved with their employers. The employees are now assumed to constitute the party of lawlessness and disorder.

This is a pretty state of affairs, but one for which the strikers have no one but themselves to thank; and other employees who might at some future time want to "go out," have no one but those west-side strikers to thank.

In view of the occurrences of that most unfortunate period, we should not be a bit surprised if street railway companies should at an early date decide to demand as security against the repetition of such lawless conduct, that employees should on entering service sign an agreement by which they bind themselves under security to accept discharge at a moment's notice and without assignment of reason, and at the same time to give at least a week's notice should they wish to quit.

The justification for such a form of contract is evident. Concerted, simultaneous quitting on the part of a large number of employees produces serious loss to the companies and inconvenience and loss not only to the purely local public, but to the general public as well. But the discharge of one to a hundred employees by a company doing as large a business as the West Side, could hardly affect seriously either the company or the general public, or the working classes from which the employees are drawn.

If now it were a question of the forfeit of a week's wages to any employee leaving without a week's notice, and if this were supplemented by an additional forfeit on the part of his bondsman, concerted inimical action would be less likely than under the present system to take place on a large scale.

The rule, like that of savings banks, about giving two weeks' notice of withdrawal of deposits, could be held in abeyance until its enforcement appeared necessary or desirable.

It would, beyond all question, be a one-sided arrangement; but so is the demanding a deposit by the employer as a security for his return in good order of property entrusted to his care; but the dangerous attitude assumed by the strikers and their friends, and their incendiary speeches and hostile actions, in the past, would warrant its adoption.

We think that the strikers will be proved to have sawed off the limb between themselves and the tree.

Legislation Concerning Fares.

[THE AMERICAN JOURNAL OF RAILWAY APPLIANCES, issued by this Company, has the following, which is particularly applicable to Street Railway matters, their rates of fare, franchise, etc., being more frequently affected by legislation than steam roads as a rule.]

If there is any one thing in railroading which is more absurd than another, it is the fixing of railway fares and limiting of railway profits by legislative enactment. This applies as well to urban as to State or interstate lines, to steam roads and to horse railways. Of the two branches of this absurdity, which is also an injustice, that limiting the profit is the most prominent, as it is now known.

Post facto legislation has been recognized as, and decided to be, unconstitutional and unfair. What shall we say of its reverse? of fixing the selling price, entirely ignoring the questions of cost and of amount of business? The item of interest in the expense account remains practically the same from decade to decade; but every other fluctuates. Popular whims and senseless competition advance the grade and cost of service. A foolish labor agitation may send up the wages account and the item for fuel anywhere from ten to twenty-five per cent. Climatic changes and seasons of famine and flood may greatly increase the operating expenses, while at the same time decreasing the amount of traffic. Civil or foreign war may demoralize the whole business. It is the duty of every railroad management to provide for contingencies and emergencies, and it should be its privilege to advance its rates in the face of increased expenses or risks, just as it is compelled to reduce them in the face of competition.

The State which imposes a limit to the charges without guaranteeing a monopoly, is calling for "the cake and the penny too."

The effect of such legislation is too often the bankruptcy of the original projectors and the purchase of the plant and franchise (?) at such a discount as to yield the purchaser most of his dividend in the form of saving from one-half to two-thirds the interest on bonded indebtedness.

In one of our exchanges we find the following paragraph:—

"Whether the price charged for any article sold or any service done is reasonable or not depends upon two things: (1) The cost to the one who sells the article or performs the service, (2) What the article or service is worth to the one who wants it. To make either of these the measure without reference to the other is unjust."

This does not go far enough. It does not consider the question of what has been the previous loss upon the business. All such legislation, if it be permitted at all, should be with some proviso referring to past losses and future risks. It might be provided that all profits over 10 per cent. or 15 per cent. should be paid into the State Treasury, after deducting and distributing back interest; in other words, the interest limit should be averaged.

Furthermore, if the State has any right to tinker with the dividends, and if it has a right to insist that insurance companies shall have a reserve for the protection of the investors, why should it not call for such a reservation before limiting the profits?

There is still another aspect in which to consider this question. Such limiting or meddling legislation is practically inoperative, and is a public temptation to and premium upon evasion, lying, and perjury. We know of roads actually yielding nearly double the legal limit, and yet always returning as having made within one per cent., or one-half a per cent., or a quarter of a per cent. of the limit. Such coincidences would be amusing if they were not demoralizing.

The Musical Street Car.

O [horse-car] shall I call thee Bird
Or but a wandering voice?

—WORDSWORTH.

To the genius and æsthetic taste of a contemporary we owe the discovery of the Luminous Harness, and the invention of the Luminous Car. It is now our privilege and pleasing duty to definitely announce to the street railway world the near advent of the Musical Street Car. We have already more than hinted at the probable early appearance of this crowning glory of the Pearl street sanctum; but we have been unable to say with anything like certainty that this bright child of thought was soon to be in our midst.

Ring out, wild bells, to the wild sky,
and announce that soon, with sweet current like the

Liquid lapse of murmuring streams,
the musical street car will be winding its tuneful way among the narrow ways of the metropolis, and the inhabitants will be

Hanging upon its notes like a bee upon a
Jessamine flower.

Yes! We are soon to have the musical street car!

We feel that we are happier than we know.

We are soon to have the tuneful street car,

Bright gem, instinct with music, vocal spark.

Forth from the car-sheds will issue these melodic vehicles,

In perfect phalanx, to the Dorian mood
Of flutes and soft recorders.

Paradise Lost.

No more the jarring, jangling, common car which has so long

Filled the air with barbarous dissonance.

In time to come, the musical car shall pass along,

Untwisting all the chains that tie
The hidden soul of harmony;

and its sweet strains will carry the romantic soul of the passenger to

* * where the Attic bird

Trills her thick-warbled notes the summer long;
and,

In notes by distance made more sweet,
will so enchant the pedestrian that by the time it reaches him, he will give up his economical ideas, save his shoe leather, and yield his willing nickel.

O Music! sphere-descended maid,
Friend of pleasure, wisdom aid!

Thou art now the patron saint of the street railway.

The desire of the dude for the car,
Of the night for the morrow,

shall henceforth be sung with redoubled emphasis, redoubled appropriateness.

The methods by which the musical car will discourse sweet melody have not as yet been made public in all their interesting details; but we have learned enough to feel justified in saying that there will be a strong and powerful spring, which will act as a reservoir of power, and drive the mechanism of the itinerant music box, when the car is not in motion. When the car is in motion, either forwards or backwards, direct connection by gearing with the forward axle will either drive the music-box mechanism, or wind up the reserve springs, according as the stop is "on" or "off."

The number of tunes which each car can play will be gauged very largely by the length of the route, and by the varying character of the population in the districts through which the car passes.

Thus, as the car pervades the Irish quarter, it will play "Wearing o' the Green," "Dad's Dinner Pail," and "Lanigan's Ball."

For the Italians it will discourse, during the day-time, "*No, non e ver,*" and "*Il sospiro del mio cor,*" and at night, "*Canti, Ridi, Dormi.*"

The ex-dwellers in *la belle France* will be regaled with "*A mon pays,*" "*Partant pour la Syrie,*" and "*La Marseillaise,*" and these will give place to the "*Wacht am Rhein,*" and "*Hey du lieber Augustine,*" for our good German citizens.

The "Scots wha hae wi' Wallace bled," and "Maxwilton's braes are bonnie," will greet the ears of those who bless the Duke of Argyll; and the sons of St. David will be moved to tears as though by green leeks, at the sound of the "*Llanwgyllysteddfoedwryplastanybulch à gogpenmaewrw,*" and "*Cfarthfa gyf gnagawis bo staffacascrstwvrwg.*" But this last will be played only on state occasions and high feast days, as the pins for these airs have to be made of specially prepared "Acme" steel, hard and tough, liquid forged and duplex hammered.

If by our next issue we can arrange to make a trial trip upon one of these great boons and wonderful inventions, we shall do so and report the results. We earnestly hope that we shall be able to do this, at least before the annual convention of the American Street Railway Association.

"Back to Back" Seats.

We have been for some weeks looking into the question of the "back to back" seats usually found in open cars, and have come to the conclusion that as at present constructed and arranged they are a constant source of annoyance and the occasional cause of altercations between passengers. The reason is that two passengers sitting back to back are apt to touch one another with their shoulders. This is un-

comfortable, in warm weather, to any one, and to ladies it is often very annoying to be either jostled or touched so intimately. About one man in five sits on the small of his back and hangs on by his shoulder-blades. It is evident that those on both sides of the present thin, low back cannot do that without touching. Sometimes we have been touched by the shoulders of our *dos à dos*, although our back was nearly an inch and a half from the back of the seat. Some passengers throw their arms over the seat back. Often one wants to know if the other is trying to crowd him out, or has paid for two seats; and sometimes the altercations are rather hot and even become scuffles.

The remedy is to put between every pair of stanchions, above the seat backs, two or more rods, such as are put over the backs of the front and rear seats.

To each Conductor.

You have been chosen as a representative of your company to the public. Your company relies upon your honesty in collecting and accounting for its money, your civility in the treatment of its customers, and your ability to manage your car. Are you faithful to the trust? Are you careful to collect and account for a fare for each person who rides on your car? Or are you tempted to retain some of the company's money and call it "knocking down," and smooth it over to your own conscience on the grounds that the act is common, that your pay is small, and that the company distrusts you, and treats you as though you were dishonest? Don't confuse yourself by calling things by wrong names. The conductor who keeps back five cents or five dollars intentionally *steals* the amount so kept. He is a *thief*. His wife has for a husband, and his children have for a father, a *thief*. He is guilty of more than the common thief, he has both stolen and betrayed a trust. Do the fare register and bell punch brand you as a thief? Not at all. The officers and clerks of your company have in their books the same sort of checks placed upon them, and are held to account by the stockholders as you are by the officers. Not because dishonesty is the rule, but to guard against possible crookedness, as well as error.

Defalcations are frequent, but for every thief thus brought prominently before the public eye there are thousands of honest men in places of trust who value honesty more than gold.

Are you always civil? The passenger looks upon you as a representative of your company, and you should seek to promote its interests by treating each passenger in such a way as to retain his custom. It is in your power to greatly increase the importance of your position, and to thus further the interests of yourself and your company.

NOW IS THE SEASON when railroad officials receive baskets of Maryland peaches from unknown!!! friends, Eh, Col?

Fare Collection.

We have in previous issues of the STREET RAILWAY JOURNAL* published editorial and contributed articles upon this subject, as well as the report and discussion thereon at the last annual convention of the American Street Railway Association.

With a view to informing ourselves still further as to the general usages in this connection, we sent out circulars and blank forms to every street railway in the United States and Canada, asking these two questions:—

(1) What system of checks on conductors, if any, do you use?

(2) How do you like it?

The following companies report, without comment, using the bell-punch:—

Mt. Adams & Eden Park Incline (Cinc.).

Sutter St. (San Francisco).

Thirteenth and 15th Sts. (Phila.).

Citizens' (Pittsburgh, Pa.).

Pittsburgh & West End (Pa.).

The following companies report using the bell-punch, and make comments thereon:—

Globe (Fall River, Mass.): "Very well, owing to variety of fares."

Easton & S. Easton (Pa.): "Very well."

Newport & Dayton* (Ky.): "First rate."

Dayton (Ohio): "During the summer much better than none, but not infallible."

Woodland Avenue & West Side (Cleveland, O.): "Fairly well."

South Covington & Cincinnati (Ky.): "Satisfactory."

Cincinnati† (O.): "Well pleased with it."

Columbia & Cincinnati (O.): "Best we can find."

Middlesex (Boston): "Has been in use for a number of years, and we consider it the best device there is at present."

Salem & Danvers (Mass.): "Fairly well."

Perkiomen Ave. (Reading, Pa.): "Very well."

Reading (Pa.): "Like it only because it insures more accurate book-keeping."

Union† (Providence, R. I.): "Satisfactory."

Pittsburgh, Oakland & E. Liberty (Pa.): "Good."

Harlem Bridge, Morrisania & Fordham (N. Y.): "Do not like it much."

Holyoke (Mass.): "Very well."

Portland (Me.): "Consider it is as good as any check in use where there are different rates of fare."

Washington & Georgetown (D. C.): "Very well."

Worcester (Mass.): "Have used it ever since the road was operated by the present company—some ten or twelve years."

Troy & Lansingburgh (N. Y.): "Perfectly satisfied."

Naumkeag (Salem, Mass.): "We think it is the best thing in use for roads having more than one fare."

Stillwater & Indianville‡ (N. Y.): "We like it."

North Beach & Mission (San Francisco): "Satisfactory."

Central (of San Francisco): "Best ever tried."

People's of Luzerne Co. (Scranton, Pa.): "Better than nothing."

Citizens' (of Springfield, Ohio): "Very well."

Syracuse & Geddes (N. Y.): "Works well."

Lynn & Boston (Mass.): "Best thing out yet."

Genesee & Water St. (Syracuse): "Like it well."

Telegraph Hill† (San Francisco): "Consider it the best for our use."

The "bell-register" is reported by the Phillipsburgh Co. (Pa.); and "registering punches" ("liked very well") by the Newark & Bloomfield Co. (N. J.)

The following roads report, without comment, using "drop boxes" or "fare boxes:"

Duluth (Minn.).

Wayne & Fifth Sts. (Dayton, O.).

Chillicothe (O.).

Charleston‡ (S. C.).

Glenwood & Green Lawn (Columbus, Ohio).

Battle Creek‡ (Mich.).

West End & Atlanta (Ga.).

Akron (Ohio).

Citizens'¶ (of Springfield, Ills.).

Federal St. & Pleasant Valley (Pittsburgh, Pa.).

Ogden City§ (Utah).

South Nashville (Tenn.).

Nashville & Edgefield¶ (Tenn.).

New Orleans & Carrollton (La.).

Crescent City (N. Orleans).

Madison (Wisconsin).

Lynchburg (Virginia).

City (of La Crosse, Wis.).

Kingston (Ontario, Canada).

Jackson (Michigan).

Citizens'¶ (of Indianapolis).

Hamilton (Ohio).

Johnstown‡ (Pennsylvania).

Columbia‡ (Washington, D. C.).

Winnipeg (Manitoba, Canada).

Metropolitan ‡ (Washington, D. C.).

Utica & Mohawk (N. Y.).

Shreveport¶ (La.).

Citizens' ¶ (of St. Joseph, Mo.).

Fourteenth St. ‡ (Oakland, Cal.).

Omaha‡ (Nebraska).

The following roads use fare boxes and send in comments thereon:—

Denison‡ (Texas): "Think of doing away with same soon, and substituting small boys to collect fare."

Winona (Minn.): "Have no particular system of check on drivers."

Elmira & Horseheads** (N. Y.): "Probably the best arrangement for amount of travel we have."

Oakwood (Dayton, O.): "Tried bell-punch; no good. Fare box in our judgment best way of collecting fares."

Chester‡ (Pa.): "Like it very well, but think of using the register in addition."

Enterprise (Charleston, S. C.): "Entirely satisfied."

Bridgeport (Ct.): "No other check; we like this method."

Baltimore & Powhatan‡ (Md.): "Like it."

Rockford‡ (Ills.): "As good as anything we know of."

Red Oak (Iowa): "Like it well."

Quincy (Ills.): "Like them pretty well."

Nashville¶ (Tenn.): "Like it reasonably well."

Dauphin & Lafayette (Mobile, Ala.): "Very well."

Harrisburgh‡ (Pa.): "Seem to be satisfactory."

Toronto (Canada): "Have been in use only a short time."

Salt Lake City‡ (U. T.): "Like them well."

St. Catherine's (Ontario, Canada): "Satisfactory."

Anacostia & Potomac River (Washington, D. C.)‡: "Well."

Gainesville (Texas)¶: "All right."

The roads here named report "No Conductors," and we may perhaps assume them to use drop boxes:—

St. Charles St. (New Orleans).

Toledo Consolidated (Ohio).

Dallas (Texas).

Chattanooga (Tenn.).

Houston (Texas).

St. Paul (Minn.).

Sioux City (Iowa).

East Saginaw (Mich.).

Ottumwa (Iowa): "Checks. Entirely satisfactory."

Paterson & Passaic (N. J.): "Drivers use envelopes."

As regards registers, the following companies report using them, but do not say how they like them:—

South Brooklyn Central (N. Y.)‡.

Ashtabula (Ohio)‡.

Norfolk City (Va.)‡ ¶.

Kansas City (Mo.)‡.

Lindell (St. Louis)‡.

The following companies report using registers, and express their opinions about them:—

Milwaukee§§: "On open cars during summer. Shall try it for first time this season. Have previously used 'Hornum,' which answered our purpose very well."

Elizabeth & Newark (N. J.)‡‡: "Very good."

Fort Wayne & Elmwood (Detroit)¶¶: "Satisfactory."

Denver‡‡: "Very well."

Chicago§§: "Best of any known to us."

Cleveland***: "Very well."

East Cleveland‡‡‡: "Like it very much indeed."

Cincinnati Inclined Plane‡‡: "Very much."

Prospect Park & Coney Island (Brooklyn, N. Y.)‡‡: "Satisfactory."

Baltimore‡‡: "Very well."

People's (of Baltimore)‡‡: "Could not do without them."

New Williamsburgh and Flatbush (N. Y.)‡‡‡: "Good."

Highland (Boston)‡‡‡: "Gives good satisfaction."

Brooklyn, Bushwick & Queens Co. (N. Y.).

* Vol. I., No. 3, Jan., 1885, pp. 54, 55; No. 4, Feb., pp. 75, 77; No. 6, Apr., p. 110; No. 7, May, p. 147; No. 8, June, p. 164.

† The "Buffalo," ‡ The "Railway Register," †† "Crocker punch and slips," ‡ Slawson's, ¶ Johnson's, § Clawson's [supposed to be Slawson's, Eds.],

** Beadle's new boxes, †† Stevenson's; presumably Slawson's.

Atlantic Ave. (Brooklyn)¶¶¶: "Like it better than any other register. It is the latest invented, and is used exclusively by this company."

Brooklyn Cross Town¶¶: "Like it well."

Metropolitan (of Boston): "First rate."

Brooklyn City (N. Y.)¶¶: "Gives perfect satisfaction."

Third Ave. (N. Y.)¶¶ §§: "Very good."

City & Suburban (of Savannah, Ga.)¶¶: "Are satisfied with it."

Richmond (Va.)¶¶: "With close attention. Can't say we like it."

Quebec (Canada)¶¶ ¶¶: "Two cars have the Lewis & Fowler and the rest the Hornum. Most approve of the L. & F."

People's (Phila.)¶¶ ¶¶: "Prefer the Lewis & Fowler dial."

Lombard & South Sts. (Phila.): "Gives general satisfaction."

Pittsburgh & Birmingham (Pa.)¶¶: "Like it very well."

Hestonville, Mantua & Fairmount (Phia)¶¶: "Very well."

Transverse (Pittsburgh)¶¶: "Well."

Union (Pittsburgh)¶¶: "Satisfactory every way."

Central City (Peoria, Ill.)¶¶: "Like it very much."

Peoria (Ills.)¶¶: "Very well."

Pittsburgh, Alleghany & Manchester (Pa.)¶¶: "Do not deem it a perfect safeguard, but we find it useful and it gives satisfaction."

Dry Dock, E. Broadway & Battery (N. Y. City)¶¶: "Well."

Central Park, North & East River (N. Y. City)¶¶¶: "Very much."

Second Ave. (N. Y.)¶¶: "Like it better than any other article seen."

Forty-Second St. & Grand St. Ferry (N. Y.): "Work satisfactorily."

New Haven & Centerville (Conn.)¶¶: "Very well."

Broadway & Seventh Ave. (N. Y.)¶¶: "Very satisfactory."

Minneapolis¶¶: "Works well."

Lowell§§: "Think we like the punch quite as well."

Steinway & Hunter's Point (N. Y.): "Fairly."

Jersey City & Bergen¶¶: "Very satisfactory."

North Hudson Co. (N. J.)¶¶: "Very well."

Des Moines (Iowa)***: "Very well."

Wilmington (Del.)¶¶: "Well. Have saved company money. Would not be without them."

Trenton (N. J.)¶¶: "Very well."

Benton-Bellefontaine (St. Louis): "Think it is good."

Southern (St. Louis)§§: "Think it is good."

Saginaw (Mich.)§§: "Like it well."

Clay St. Hill (San Francisco)¶¶: Yes.

Springfield (St. Louis)¶¶: "Have just adopted them."

Cass Ave. & Fair Ground (St. Louis)¶¶: "Still room for improvement."

Central (Los Angeles)¶¶: "Very much."

South Side (Pittsburgh)¶¶: "Works satisfactorily."

Jamaica & Brooklyn (N. Y.)¶¶: "Good."
Louisville (Ky.)¶¶: "Pleased with it."
The following companies employ different devices:—

Grand Rapids (Mich.): No conductors, except on dummy line; and there, bell punch; "only system tried."

Southern (St. Louis)§§: Register and "officers." "Fairly well."

Omnibus R. R. & Cable Co. (San Francisco): Bell punch and slips on one line, fare box|| on Howard St. line. "Consider the bell punch best."

Potrero & Bay View (San Francisco): Alarm registering punches and fare boxes. "Satisfactory."

Market St. (San Francisco): Alarm registering punches and fare boxes. "Satisfactory."

Fifth Ward (Syracuse): "Fare boxes|| and registers¶¶. "Best system we know of."

City (Trenton, N. J.): Boxes|| and registers¶¶. "Like same very much."

Keokuk (Iowa): "Have fare boxes and April 1 put in registers¶¶ as additional check. Think it an improvement."

City (Mobile): "In closed cars, boxes; in open cars, punches. Not satisfactory, but the best we can do."

Niagara Falls & Suspension Bridge: Bell punch and register¶¶. "Very well."

Frankford & Southwark (Phila.): Pistol punch and registers¶¶. "Better than anything else, as they can't beat the device, but steal by ignoring it only."

Rochester City & Brighton (N. Y.): Use mostly one-horse cars with fare boxes|| and registers¶¶. "Satisfactory in the main."

City (Altoona, Pa.)¶¶: "Have conductors only part of the time; during the Summer months use register; like it."

Boone & Boonsboro (Iowa): "Fare boxes and stationary registers; good system."

Columbus Consolidated (O.): "Bell punch (alarm register) on all conductor cars and fare boxes on the others; like both well."

Cumden (N. J.): "Prunt's system."

Birmingham (Ala.): "Use celluloid check."

Citizens' (Phila.): "Have detectives."

Oshkosh (Wis.): Tickets; no conductors; "all right."

Lewiston & Auburn (Me.): Fare boxes on regular lines.

People's (Springfield, Mo.): "Use boys for conductors, and tickets; not entirely satisfactorily."

Brooklyn, Bushwick & Queens Co. (N. Y.): Register§§§; inspectors meet every car; "pretty well."

Charles River (Cambridge, Mass.): Register§§ and inspectors; "consider it the best."

Superior St. (Cleveland, O.): "Register in cars; have open and private spotters; like it well."

North Chicago: Register§§ and detectives.

Coney Island & Brooklyn (N. Y.): Register¶¶ and private spotters; "open to discussion."

Topeka (Kan.): Register¶¶; require blanks furnished drivers to agree with register.

The South Ferry Co. (N. Y.): Use inspectors.

On the Baden & St. Louis Ry. (Mo.), the drivers make slip reports every trip.

The Montreal Co. (Canada) uses fare boxes and detectives; "answers better than all clocks and registers combined."

Paterson (N. J.): Fare boxes and slips. "Very well."

New Bedford & Fairhaven (Mass): Fare boxes on most of the cars.

Greenville (S. C.)||: Envelope system and fare boxes.

Bourbon County (Fort Scott, Kansas): Fare boxes and printed tickets.

Emporia (Kan.): Drop box|| with their own attachment, "which we find necessary."

Evansville (Ind.): Cars mostly double enders; fare box|| in each end; no conductors; "registers¶¶ some benefit as a check."

Citizens' (Baltimore): Drop box|| without conductors, except in open cars in Summer, and they have registers.¶¶

Aurora (Illinois): Drop boxes with envelopes; "the best where no conductors are employed."

City (San Francisco): One-horse cars have fare boxes; use bell punch on two-horse cars; "both give good satisfaction."

Kingston (Rondout, N. Y.): Drop boxes; no check upon conductors except the watchfulness of the Superintendent.

Lawrence (Kan.): Two drop boxes|| in each tight car; with open cars use conductors with no system of checks.

Lafayette (Ind.): Fare boxes¶; also, drivers are required to punch slip register for each fare.

Zanesville & McIntire (O.): Use tickets put into fare boxes; drivers collect fares; evenings and all Sundays run four Summer cars, weather permitting; use conductors only on Summer cars.

Sedalia (Mo.): Use drop boxes|| on three cars; "like them first rate;" on the other three use conductors.

Houston, West St. & Pavonia Ferry (N. Y. C.): No conductors; all two-horse bob-tails; "are just now considering question of indicators;" have fare boxes.||

Springfield (Mass.): Bell punch, and are trying register.***

The following roads report without comment, that they have no checks on conductors:—

- El Paso (Texas) S. Ry. Co.
- Lampasas City (Texas.)
- Stoneham (Mass.)
- Terre Haute (Ind.)
- Central (Toledo, O.)
- Urbana & Champaign (Ills.)
- Wheeling & Elm Grove (W. Va.)
- Waltham & Newton (Mass.)
- Haverhill & Groveland (Mass.)
- Hannibal (Mo.)
- Laconia & Lake Village (N. H.)
- Longview & Junction (Tex.)
- Merrimack Valley (Lawrence, Mass.)
- Mohawk & Ilion (N. Y.)
- Cream City (Milwaukee, Wis.)

¶ Lewis & Fowler's. ¶¶ Hornum. §§ Benton's. || "Standard." *** Demorest's. ++ Marshall's Classifying. ## Chesterman. ¶¶¶ Richardson's "Time Alarm." §§§ Monitor.

Meridian (Miss.)
 Canal & Claiborne Sts. (New Orleans.)
 City (of Poughkeepsie, N. Y.)
 Gate City (Atlanta, Ga.)
 Aurora (Ills.)
 Van Brunt St. & Eric Basin (Brooklyn, N. Y.)
 Columbus (Ga.)
 Greencastle (Ind.)
 Grand River (Detroit.)
 Dubuque (Iowa.)
 Enterprise (Miss.)
 Fort Smith (Ark.)
 Fort Worth (Tex.)

The following roads report having no checks on conductors, and make the comments annexed to their names:—

Washington St. & State Asylum (Binghamton, N. Y.) "Do not like it!"

Mohawk & Ilion (N. Y.): "We had a pay-box on cars two years; did not like it; passengers would not pay, when a crowd on cars. We took it out. Should like to sell the thing."

City (Los Angeles, Cal.): "Satisfactory."

San Antonio (Tex.): "Run on general average, from which we receive more satisfaction than any other."

Central (of Syracuse, N. Y.) keep a record and examine the same of each conductor's receipts, and if he falls behind, without good reason, discharge him. We treat conductors as if they are honest, until proved the reverse.

Norwalk (Conn.) "We pay our men enough to keep them honest."

Coast Line (Savannah, Ga.) "The best system of checks is to keep good men, pay them fair wages, and show them they are men and not a gang of thieves."

There is more than a probability that the words "check" and "register" have been understood somewhat differently by different companies; and probably some devices appear under two names; but we prefer not to "edit" the statistics received.

Wherever the maker or patentee of a device has been named by the company reporting, we have been careful to announce it as reported to us. Where we have known what device is used, but it has not been named by the company reporting, we have not mentioned the name.

Looking hastily over the report, we find that 237 companies have reported. Of these, 37, or say, 15.6%, use only the bell punch;* 50, or 21.1%, use drop boxes; 59, or 24.9%, "registers;" and 46, or 15.1%, use either combinations of two systems, in one car, or different systems on different cars.

There are but 35, or 14.8% of the companies reporting on the subject, which use no check of any kind upon the conductor.

There are ten companies, or 4.2% of those reporting, who state that they have "no conductors," but they do not positively state whether they use drop boxes, or the driver acts as conductor.

We extend thanks for our readers and for ourselves, to those who so courteously reported in this matter. Perusal of their replies can not fail to prove interesting and profitable.

* Two of these report "bell register" and "registering punches" respectively.

Extra Conductors.

Almost any one taking a seat favorably placed for observation in one of the Broadway cars, N. Y., will probably note that after the car is fairly full, at least 15% of the fares are not "rung in." Some of these are probably not collected; some probably collected and not turned in. The cars make good time and most of the rides are short distances, and consequently there are more passengers for a given length of time than on cars of almost any other line in N. Y. City. Consequently the conductor has a poorer chance to collect fares, and a better opportunity to collect others without turning them in or ringing them in.

Perhaps a good way out of this would be to have two conductors, one at each door. Each would collect as many fares as he could, and ring up his own collections on his own register or alarm. Passengers should be asked for their fares at once on entering, even on the platform. They would then get in the habit, as a general thing, of having their nickels ready; and there being two conductors, probably all the fares would be collected, and all turned in that were collected. The extra man would be for collections only.

Starting too Soon.

Absence makes the heart grow fonder.
Bayley.
 What vigor absence adds to love.
Flatman.

These lines often come with great force to what is left of our mind after struggling all day with editorial duties. They are generally inspired by the rear view of the dashboards of the cars on several of the Brooklyn lines, which have a most disgusting habit of starting on a time-table ingeniously calculated to miss the maximum possible number of ferryboats, rapid transit and Long Island Railroad trains, and cars crossing their track. We hear frequent complaints from others about the same thing, and feel justified in suggesting that it would be money in their pockets if some of these lines would take a look at their time-tables and see if they could not make it so that passengers would not have to wait so long. We are satisfied that many passengers travel less frequently, particularly in bad weather and after dark, by reason of imperfect connections of street car lines.

The same remarks hold good for many steam railroads throughout the United States.

Fare Collection.

The amount of room taken up by the rehearsal of facts connected with the Chicago strike, and of comments thereon, prevented our giving in the August issue of the STREET RAILWAY JOURNAL, quite a quantity of matter which we have in hand, concerning Fare Collection and other subjects. By our next issue we hope to have disposed of all accumulations of "copy." Our readers will excuse our calling their particular attention to the great desirability of their carefully reading and critically commenting upon the communicated articles and editorials upon such important topics.

Conductors vs. Clerks.

Car conductors call for sympathy and higher wages; or if they cannot get both, higher wages anyhow; and to some extent they have interested a certain class of public sympathy; posing as representatives of the poorest paid and hardest worked of all wage-winners.

It might be well worth looking into (especially by those who pile paving blocks and beer kegs upon car tracks as a means of testifying their sympathy with car conductors), to see which gets the hardest work and the least pay, the average car-conductor or the average clerk. The confinement of the latter is an offset to the long hours of the former; his requisite acquirements are greater, his work demands intelligence, education, experience and certificates of good character and good habits, far beyond those offered by, or asked for in, the candidate for the conductorship.

The wages of the clerk are low, because the supply is greater than the demand, and for no other reason. They will probably continue low, for the same reason. The same may be said in reference to the conductor, who, take it all in all, is as well off as the clerk, if not better off; and certainly gives more trouble to his employers.

Send in Items.

THE STREET RAILWAY JOURNAL has so far been able to give its many and widely scattered readers, a great many items concerning street railways, present and future. For these items it has to thank friends nearly all over the country, who have supplemented the assiduous efforts of the regular news-gatherers of the journalistic staff. If now every one connected with street railways will remember to send us a memorandum of whatever comes to his notice, concerning street railways and their kindred interests, the STREET RAILWAY JOURNAL will be, in the matter of news, as infallible as it is now welcome.

Spotters in the Olden Days.

In Ingoldsby's "Lay of St. Nicholas" we find the following lines:

Th' accusing Byers flew up to Heaven's Chancery,
 Blushing like scarlet with shame and concern;
 The Archangel took down his tale, and in answer he
 Wept. (See the works of the late Mr. Sterne.)

It appears that this Byers was in the habit of noting what stage drivers overloaded, and of reporting them to the Justices, so that he might get a portion of the fine imposed. He was, in fact, an amateur—or rather an independent—spotter.

The Convention.

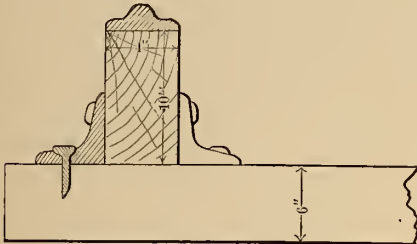
The next regular meeting of the American Street Railway Association will be held at the Southern Hotel, St. Louis, beginning Wednesday, October 21.

Manufacturers of street railway appliances who wish to exhibit samples at the convention will do well to address the publishers of the STREET RAILWAY JOURNAL for particulars.

Lateral Stiffness of Street Railway Track.

Concerning lateral stiffness of street railway tracks, particularly in reference to the knees, which are supposed to prevent the longitudinal stringers of the ordinary construction, from turning upon the cross-ties which support them.

The centre-bearing or the side-bearing rail is laid on a stringer which is intended to give vertical stiffness and support to the

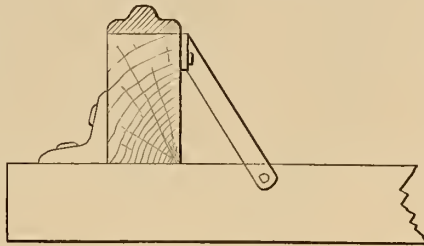


track, and has, in consequence, a height greater than its width, say in the proportion of 8 or 10 to 4. The tendency of the direct weight of the car when standing still on a straight track which is in cross-level, is, supposing the gauge tight, simply to bend the rail and stringer. The tendency of the car when running is to crowd the rails sidewise, and to widen the gauge and turn the stringer upon the cross-tie. To resist these last tendencies, of the car when running, there are employed cast iron knees which are spiked to both the tie and the stringer, every other knee brace being with and the other without. The tendency of the sliding stresses is to shear all the vertical spikes, tear the cross-tie fibers out by sliding them lengthwise, and draw the horizontal spikes of the inner knees from the stringers. The tendency of the turning of the stringer on the cross-timber is to close the outer knees, open the inner knees, slightly bend and slightly draw both the vertical and the horizontal spikes of the outer knees, draw the vertical spikes of the inner knees from the cross-ties, and bend and slightly draw the horizontal spikes of the inner knees from the lengthwise stringers.

We see knees 4" high and 3" base working against the leverage of a stringer 10" deep. While the opening and closing action is inappreciable, the vertical holes in the cross-ties are, by the endwise crushing of the fibers of the wood, made longer and a trifle wider, so as to permit sliding of the stringer and opening of the gauge. By cross-wise crushing of the fibers of the stringers, the spike holes in the stringers are enlarged so as to permit turning or tilting of the stringers. The spikes get loose; water enters around them, rusts the iron, rots the wood; the holes still further enlarge, and the track gets out of gauge and rickety.

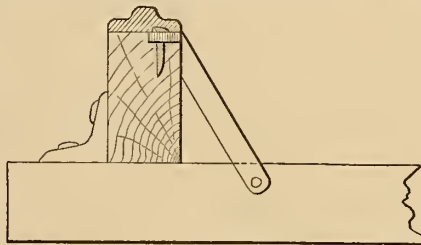
It is our impression that it would be much cheaper to substitute long, flat, wrought iron, diagonal tension-braces or tie-braces, on the inside, for the short cast iron braces or knees, which are mostly only useful to resist compression; and to arrange the fastenings so that there would be

no tendency to draw spikes. A flat brace 2" wide, 1/4" thick, and 14" to 15" long, reaching from the edge of the cross-tie, to which it would be fastened by a horizontal spike, to the top of the side of the stringer, where it would be twisted so that its upper end would lie flat against the upper part of the side of the stringer, and it



would be fastened to the stringer with a horizontal spike—would much more effectually resist turning of the stringer, than the short inner cast-iron knee.

By slightly boxing out the top of the stringer so that the upper end of the flat tie-rod could be turned over and spiked with a vertical spike to the stringer before the rail was put on the stringer, the resis-



tance to turning would be even greater than where the upper end of the tie was spiked by a horizontal spike to the side of the stringer.

We have not had time nor opportunity to get estimates on cost of making and putting in these properly applied tension pieces, as against the compression pieces at present wrongly used and improperly applied as tension-members; nor as to their probable time of lasting and keeping the track firm; should like the opinion of our readers on the whole subject.

What Are Taxes For?

In view of the recent Chicago riot, the question arises—What are taxes for?

The answer is simple: partly to pay for water, paving and other such matters, necessary to health, comfort, proper transaction of business, and easy intercourse, and pleasant to the senses; and partly to pay for jails, police, militia, and other guardian agencies which protect the law-abiding from the vicious, and the intelligent from the uneducated.

The people who pay most of the money for jails and police are not those who mostly occupy the one or require the attention of the other.

A decent, law-abiding citizen pays taxes for years, that in the event of a burglary, or an assault, or other crime against him, he may find prompt and efficient protection. When that protection is called for, he wants it at once; he wants it badly, he wants it to be ungrudged.

A conductor and a grocer quarrel on the

street about money matters. One thinks himself aggrieved and threatens to settle his grievance by "taking it out of the hide" of the one who he thinks has charged him too much, or not paid him enough. Suppose that in such an event the one threatened with assault and obstructed in his on-going should call in a policeman, and be told by the latter that it was not a case of interference by him as the representative of the law, but that the one threatened with assault should stay where he was and have the matter settled by arbitration.

If the conductor were the assailed party, what would he think of the officer who allowed him to be obstructed in his passage, and threatened with physical injury, simply on account of a difference of opinion on money matters?

The analogy between such a case and the Chicago West Side strike and riot is quite strong.

In this case the railroad company has been for years paying heavy taxes, part of which were to be used for the company's protection in case of an emergency. The emergency arrived, and the protection was not afforded. The authorities are to be censured for their failure to punish all offering obstruction and violence; and we hope that the city will be sued for the pecuniary damage resulting to the company and to citizens from the obstruction to transit, during the aggressive part of the strike.

The Memphis Strike.

The concessions made by the Chicago West Division Company to the recent strikers on that road have speedily borne fruit in Memphis, as will be seen by an account in another column of a strike in that city. We regret to say that the result in Memphis is quite as damaging to the interests of the street railway companies of the country as was that of the Chicago strike. In both cases the strikers *gained by a strike*, what, by other means, they were unable to obtain. This too, notwithstanding in both instances violence was used by the employees. It is not our intention to criticise either company in the conduct of its private affairs, which the well-known ability of each renders it perfectly competent to manage, but in behalf of the street railway community we do regret that Superintendent Lake, of Chicago, was not allowed to maintain what seems to us to be a position well taken.

Whatever course the individual interests of these companies may have seemed to justify, their action has gone far to produce the pernicious impression that strikes are profitable to the strikers.

Special Rates to the Convention.

An effort will be made to procure special rates of fare, special sleeping cars, &c., to the St. Louis Convention. A party will probably start from New York on Monday, Oct. 19th. We should be glad to hear from any or all who intend going from or *via* this point.

A New Cable System.

President W. H. Hazzard and Directors Seymour L. Husted, James Howe and W. M. Thompson, of the Brooklyn City Railroad, and Messrs. Fitzgerald and Lynch, of the De Kalb Avenue line, have recently been in Cleveland, O., inspecting a new cable system of propelling cars. It is known as the Johnson patent and is just being introduced. Mr. Hazzard is very favorably impressed with it, judging from the following notes, which we take from the *Eagle*:

According to Mr. Hazzard and the samples of cable brought back by the committee, the appliances differ in almost every particular from those commonly used in the few cable roads now in operation. The cable consists of two wire ropes made up of six one-quarter inch strands, wrapped around a half-inch cotton cord and held an inch apart by steel clamps or cross bars placed at five-inch intervals. This runs over wheels set at a slight angle, not more than an inch below the slot in the roadway, in a conduit just large enough to hold it. The grip is a big wheel half an inch thick, just fitting in the slot, and looking much like an overgrown buzz saw, the teeth of which do the gripping. As the car starts the wheel revolves its teeth, fitting between the cable bars, and when once braked up the car runs at the full speed of the cable. By loosening the brake so that the grip wheel can revolve slowly the speed of the car may be diminished. The conduit can be cleaned by merely dropping the cable to its floor, and letting it run for a few moments. This sweeps the dirt into pits placed at intervals whence it can be readily removed. No difficulty is observed in turning corners. The lot in which the trial took place was a square holding five hundred feet of track. All the cars were pulled around its four corners without trouble.

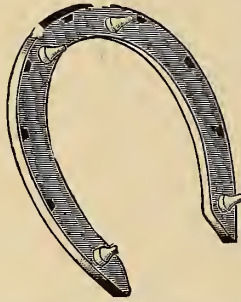
"It is the best cable contrivance I have yet seen," said Mr. Hazzard. "Will we adopt it? Ah, that I cannot tell. Our committee will consider it. The question of the adoption of any system has not yet been reached by us. We inspect everything which seems to possess practical value. The system I have outlined to you possesses many advantages, apparently. We would not need to cut our cross ties to utilize it, the conduit being so small, and it is estimated that our lines would be equipped with it at a cost of not more than \$40,000 per mile, including everything."

The Neverslip Horse-Shoe.

We illustrate herewith the "Neverslip" horse-shoe. This is a new method of shoeing especially adapted for winter use. The best shoe, applied in the best manner, is a very important matter, both for economic and humane reasons. The manufacturers* of this shoe claim to have solved the question in the most satisfactory manner, judged from either standpoint. The characteristic feature of this horse-shoe is the removable,

*The Neverslip Horse-Shoe Co., 36 India Wharf, Boston.

steel-centred and self-sharpening calks. These are made of a core of fine steel within an outside of the best of iron—a combination which should give calks great strength and durability. From their peculiar structure and shape, the iron tends to wear away



faster than the steel wherever they penetrate the ice or ground, and the calks always remain sharp. Besides the sharp calks, two other shapes—the blunt and half-blunt—have been devised for use where sharp calking is not required, but where some calking is needed.

They claim the following special advantages:—It never slips in any direction. The horse soon learns this fact, and consequently, whether pulling or trotting, will always do his best. It saves the horse from sprains and bruises which consequently result from insecure footing. It avoids the injury to the horse's feet caused by a too frequent re-setting of the shoes. It greatly lessens the danger of injury from calking. It saves the time, both of the horse and owner, as the insertion of new and sharp calks is the work of only a few minutes. It is safety and comfort both to horse and driver.

Inter-State Industrial Exposition of Chicago.

The Thirteenth Annual Exposition of this organization will open Wednesday, September 2, and close Saturday, October 17, 1885.

Twelve years of success have placed these annual Industrial and Art Exhibitions beyond rivalry.

The population of Chicago alone numbers at least 650,000. Its commercial and manufacturing enterprises and general business are in the hands of intelligent, energetic, aggressive business men. The region tributary to the city in past years has given an attendance at the annual expositions of about 400,000 paid admissions, or nearly 10,000 persons daily for 40 days.

The management do not try to make the annual expositions sensational or amusement shows. They are intended, rather, for the substantial education of those who study them, in all that relates to mechanic and fine arts, to natural history and to all other departments of human activity which may properly find a place in such exhibitions.

Busy Broadway.

Four men were recently stationed at Fulton street and Broadway, before Mr. Sharp got his permit from the Court to lay his track, to count the vehicles passing through Broadway at that point

from 7 A. M. to 6 P. M. The total number was 22,308 for the period of eleven hours—about 2,000 an hour, thirty-three a minute, or one every two seconds. The largest number of any one kind of vehicles was of single and double trucks, 7,384; the smallest number was two; these were ambulances. There were 3,390 single and double express wagons. The 2,310 stages and the 1,022 cabs were next in order of quantity, peddlers' wagons numbering 938, produce wagons 446, rag trucks 375, carriages 354, coal carts 324, and venders' wagons 300. Then there was a drop to hacks 288, and butcher wagons 223. The variety of vehicles was striking, there having been eighty kinds according to the schedule. Every conceivable article of transfer appears to be poured into Broadway.

Another Car Drivers' Strike.

A Memphis dispatch dated Aug. 18, says: "The drivers on the several lines of the Memphis Street Railway Company struck this morning, and travel has been greatly interrupted. The cause of the dissatisfaction was the issuing of an order by the company reducing the pay of all drivers who have not been in the employ of the company for six months, from 12½ cents per hour to 10 cents. The strike was general, and commenced at 6 o'clock. The company managed to send out a few cars on each line, but by 7 o'clock the strikers began to interrupt travel by throwing the cars from the track. The police were called on, but the meagre force was unable to give the necessary protection, and stranded cars were to be seen in all directions. Three or four arrests were made, and each car running is being guarded by police officers. Three of the new drivers were assaulted, but so far no serious injury has been done to them.

"The striking drivers held a meeting, and a committee of five was appointed to confer with the street railway company with a view of compromising matters and restoring wages to the old rates. The committee reported to-night that the officers of the company refused to treat with them. Cars were run during the afternoon by raw hands, but at 8 o'clock to-night were all withdrawn. Everything is quiet, and the strikers hope to carry their point by peaceful means. No disturbances occurred during the afternoon, and in all probability none will happen to-night, although the strikers have the sympathy of all the trades unions of the city."

Later advices are to the effect that the drivers demanded ten cents per hour for new drivers for the first month, eleven and a half for the second, and thirteen and a half thereafter. A telegram of the 20th states:

"The drivers have accepted the terms of compromise made by the officers of the street railway company, and travel was resumed on all the lines this morning. The terms agreed upon are ten cents per hour for the first month, eleven cents for the second, and twelve and a half cents for the third and succeeding months; thirteen and a half cents to be paid to all drivers who have been in the employ of the company for the period of one year.

Compressed Air Motors Wanted.

[We have the following communication from the secretary of a street railway company, who can be addressed through our columns.]

EDITORS STREET RAILWAY JOURNAL:—

Would you be kind enough to give me the address of any company manufacturing compressed air motors?

Or I would like to enter into correspondence with some expert on the subject of compressed air as a motive power.

Within a convenient distance of our track for the whole length (over five miles) there is abundance of water-power which could be utilized for compressing air; and if you can place me in the way of communicating with any parties that will assist me to find a substitute for horses, you will confer a favor.

I am convinced that we cannot use a steam motor, as its weight would prevent us using it on our track as at present built.

We have some grades of 6' and 7' to the 100', running 1500' in one case and shorter distances in the others; with slight curves in every case.

Gauge of track (inside distance between rails) is 4' 8½"; one mile is T rail and four miles flat; all iron; weight, 30 lbs. per yard. Cross-ties are 6" wide, 4" deep, 48" apart from centre to centre for the flat rail, and 24" for the T rail. Shortest curves are 45' radius.

The service required is to haul one car, weighing, with its loading, 6,000 lbs., up the grade of 7' per 100'. Each car weighs, empty, about 2200 lbs. The wheels are fastened on axles; the journals run in oil boxes; rate of speed, six miles per hour.

The Baldwin Locomotive Works have built a considerable number of pneumatic locomotives, most of which have been designed for use in mines; and will send, on application, a copy of their catalogue of mine and pneumatic locomotives, which contains some description of them. A pneumatic tramway locomotive would require to be somewhat more complicated, and should be fitted with an inter-heater and special cut-off valves, in order to secure greater efficiency from the air under compression. The Baldwin Works built some time ago a locomotive having the special features of construction invented by Mr. Robt. Hardy, which was operated experimentally on the elevated roads in New York; and say that the same features have been applied with much success to tramway service. Mr. Hardy now has a pneumatic car running from Brooklyn to the town of Steinway; and the builders say that they have been favorably impressed with its operation, and that if our correspondents desire, they could undertake the construction of tramway cars of separate motors, incorporating these special features.

We have no data as to the cost of operating. So far as we know, the above is the only instance in which pneumatic power is used upon tramways in this country. The cost of the machinery would depend entirely upon the work to be done, namely, loads to be hauled, length of line, and the curves to be overcome.

An exchange says of this motor: The machinery of this motor was originally built at the Grant Locomotive Works for a street railroad in Paterson, N. J., but for

some reason the company did not accept it. John Stephenson built the car, and it is a model of convenience for the purpose it was built for. The chambers for holding the compressed air, are placed under the seats, under the car, and in any place that affords room without taking any passenger space. Air of high tension is used, and its pressure is regulated by a reducer before passing to the cylinders. When the chambers have been filled, the car will run twelve miles before the pressure becomes exhausted.

A representative of this journal called upon Mr. Hardy for the purpose of getting information for our correspondent, but returned with the statement that Mr. Hardy would give no particulars; from which we conclude that he does not care to do any business.

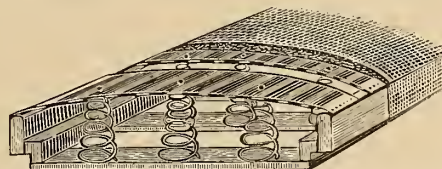
Electric Railway in Philadelphia.

An experiment is about to be made in Philadelphia, though not much can be learned from trial trips with a single car. It does not need any demonstration that a single car or train can be run in this way, but the interesting question to be determined is the controllability and economy of the system when a dozen or a score of cars are being run on the same track. It would be a good thing now to have some other railway company try compressed air on one of the improved systems. The air reservoir cars have just been introduced in London with apparent success, and there is the California system of distribution, supplementary to the reservoir system, which still awaits trial on a commercial scale. With a cable, an electrical and a compressed air railway, all operating at the same time, our passenger railway companies would have a good opportunity to compare all the various systems of car propulsion. With or without the distributing plant, compressed air costs the least for experimental trials.—*Phila. Ledger.*

[The system mentioned is that of the Bidwell Electric Railway Company, which will build a line from Dauphin street to Laurel Hill, which will be peculiarly satisfactory as an experimental road, on account of its numerous heavy grades and curves. The company is in the market to purchase a hundred H. P. engine, and will use an improved dynamo. The system showed very good promise at the Electric Exhibition of the Franklin Institute.—Eds.]

Sectional Seat Spring with Drop-Down Frame.

This seat* has spiral springs riveted to an elastic slatted top with spring steel



cross-pieces between; is in spring edge form; and is here made with "drop-down" frame.

*Hale & Kilburn Manufacturing Co., 48 N. 6th st., Philadelphia.

Personal.

R. G. MATTERN of Pittsburgh, new southern and western representative of the firm of Andrews & Clooney, is now making his first western trip in his new capacity.

F. H. ANDREWS, of Andrews & Clooney, is spending a few days in the Adirondacks. Mr. Clooney has returned from the west.

Notes and Items.

[All our readers are particularly requested to send us, at the earliest possible moment, notes concerning actual or proposed improvements in street railways. It is by this means that the STREET RAILWAY JOURNAL will increase its usefulness to each one who receives it.]

DENVER, COLO., has eighteen miles of street railway tracks.

BARTOW, FLA., wants a street railway, according to one of our exchanges.

THE MIDDLESEX (BOSTON) RAILROAD's new belt line is running very successfully.

THE HAMILTON (O.) STREET RAILROAD Co. has ordered a number of new cars.

THE LEWIS & FOWLER MFG. CO., Brooklyn, has the sole agency for the Otis safety coupling pin.

TAMPA, FLA. The capital stock, \$50,000, of the Tampa Street Railroad Co., Tampa, Fla., has all been taken.

THE COLUMBUS (O.) CONSOLIDATED STREET RAILROAD has adopted the Lewis & Fowler register on one of its lines.

THE SEATTLE (Wash. Ter.) STREET RAILWAY Co. proposes to extend its line one and one-fourth miles very soon.

THE COLUMBUS (O.) CONSOLIDATED RAILROAD has ordered ten new cars of the Brownell & Wight Car Co., St. Louis.

THE NEW YORK & HARLEM ROAD—A. Skitt, Supt.,—has ordered of Andrews & Clooney a snow plough and a snow sweeper.

THE PEOPLE'S PASSENGER RAILWAY Co. of Philadelphia is equipping its new cars with the Josephine D. Smith centre lamp.

A NEW ADJUSTABLE SLOT for cable railways has been tried with satisfaction in Philadelphia: it will be fully described in these columns.

THE JOHN STEPHENSON Co.'s forty-three new cars for the Brooklyn City R.R. Co. are lighted with Josephine D. Smith's centre lamp.

DALLAS, TEX. W. H. Prather and others, of Dallas, Texas, have incorporated the Dallas Land and Street Railroad Co.; capital stock, \$100,000.

THE DAVENPORT (Ia.) CENTRAL R.R. Co. will expend some \$3,000 in rolling and live stock, and repair road-bed and track quite extensively this season.

ALFRED EDGERTON has resigned the office of Superintendent of the Albany (Street) Railway. Mr. John W. McNamara, President, will also act as Superintendent.

THE DAYTON (O.) COUNCIL has ordered work to be resumed within thirty days on the new street railroad in that city, and that the road be completed in six months.

THE JOHN STEPHENSON COMPANY report abundant orders from all quarters for new street cars, and anticipate an active and excellent business for the Fall and Winter.

JOSEPHINE D. SMITH'S CENTRE CAR LAMPS are used in the new cars of the Green Point & Lottimer Street (Brooklyn) Railway; and also in new cars on the Broadway (New York) road.

WE HAVE HEARD THE GOURDIER Rubber Cushioned Bar Horse Shoe recommended

for use upon street car horses; and it is our intention to examine it and refer to it again in a future number.

A NEW TWENTY-TWO TON CABLE is to be put into the conduits on the eastern end of the Market street, Philadelphia, line. A new method (not stated) is to be employed in putting it into place.

THE ATLANTIC AVENUE R.R. Co., Brooklyn, N. Y., takes out licenses for ninety-two cars—eight more than it ran last year. The city license is \$20.00 a car, so the company pays this year \$1,840.00.

THE LANE NATIONAL CABLE RAILWAY Co., capital stock \$300,000, has been organized in Covington, Ky., by H. N. Lane, G. B. Kerper, S. M. Lemont, Albert G. Clark and John Kilgour, to manufacture cable railway machinery.

THE BROOKLYN ELEVATED R.R. The iron for the extension and ferry terminus at the Bridge pier is being rapidly delivered and put into position. Many old houses and business blocks had to be altered or taken down to make room for the structure.

GREENPOINT (Brooklyn, L. I.). M. W. Conway is relaying track on Greenpoint avenue, from the Ferry to Manhattan avenue, for the Bushwick R. R. Co.; using 60 lb. steel centre bearing rail. The street is repaved for about a mile with granite blocks (Godet patent).

THE TRACTION COMPANY, in Philadelphia, appears to have stolen a march on the local law-makers, so that it will *not* be compelled to lower its fares from six cents to five cents, as was intended. The local law-maker as well as the local passenger, is, consequently, moved to wrath.

THE CONTRACTS FOR SUPPLYING THE IRON for the Glens Falls, Sandy Hill & Fort Edward R.R. have been taken by Messrs. Humphreys & Sayce of this city. The road will be running in about thirty days. This road is 6½ miles in length, and connects the above named cities.

ANDREWS & CLOONEY, New York, have completed their contract for furnishing iron work for switches, curves, entrances to depots, &c., for the cable road of the Third Avenue Railroad Company. The contract amounted to over \$10,000.

THE CHRISTOPHER STREET & JAMES SLIP FERRY RAILROAD COMPANY organized Aug. 8th, with the choice of the following officers:—President, Samuel F. Pierson; Vice-President—A. H. Welch; Secretary—Nathaniel S. Smith; and Treasurer—A. W. Spear.

BROOKLYN, L. I. The Broadway R.R. Co. is about to commence a new branch road on Ralph avenue from Broadway to Atlantic avenue, about two miles, using 60 lb. centre bearing rail. M. W. Conway has the work by contract. A good deal of other street railway work is pending.

ANDREWS & CLOONEY are building snow sweepers for the Charles River road, Boston; Naumkeag, Salem; Union Depot road, St. Louis; Third and Fourth avenue roads and Broadway road, New York. There are over 200 of these sweepers now in use

in New York, Brooklyn, Philadelphia and Pittsburgh.

PHILADELPHIA, or at least the northern portion of that city, needs very badly a cross-town line, to connect Tioga with Richmond and Frankford, on the one hand, and the Falls or some other Schuylkill river point, on the other. It might be run advantageously by any one of the three northern suburban lines.

NO MORE TRACKS ON FORTY-SECOND ST. A permanent injunction was granted July 21 by Judge Ingraham in the Superior Court restraining the Forty-second Street & Manhattanville Railroad Company from laying its tracks on Forty-second street. The injunction was granted on the application of the Third Avenue Railroad Company.

FRANCHISE FOR A NEW STREET RAILROAD. The committee on railroads has reported in favor of granting a franchise to the Wall, Fulton and Cortlandt Street Railroad Company to construct and operate a surface railroad from Fulton, Wall and Cortlandt street ferries. The report was accepted, and an ordinance passed granting the franchise.

MESSRS. HUMPHREYS & SAYCE, of No. 1 Broadway, N. Y., dealers in iron and steel rails, report a greatly stimulated inquiry for steel rails within the last few days. They say that inquiries for upwards of a hundred thousand tons are in the market, and that the price has consequently stiffened about two dollars a ton within the last ten days.

THE GOODENOUGH HORSE-SHOE COMPANY, 156 & 158 East Twentieth street, issues a handsome, elaborately illustrated pamphlet, quarto size, which very fully sets forth the merits of its system of shoeing, and is supplemented with many testimonials from some of the largest horse users in the country in support of its methods. Parties interested may obtain the pamphlet by addressing Charles W. Russell, Manager, at the above address.

THE COLUMBIA AVENUE LINE of the Philadelphia Traction Co. is using two cables of 1¼" wire rope, respectively 19,000' and 10,000' in length. They are run by two 260 H. P. engines, carrying 40 lbs. of steam. The engineers are Joseph Craig and George Armitage, the latter a member of the Chester, Pa., National Association Stationary Engineers.

WM. WHARTON, JR. & Co., LIM., Phila., have just finished a handsome new office building, in connection with their works at Twenty-fifth street and Washington avenue. Mr. Samuel, of this company—formerly our national representative to the country of the "Sublime Porte"—is now summering somewhere "far down" east, on the coast of Maine. Mr. Samuel is not one of those whom the stringent laws of that State are likely to trouble.

ELECTRIC ELEVATED ROAD IN CHICAGO. The Chicago & Cook County Railway proposes to build an elevated road on State street from Adams to Sixty-third street and along Forty-third street to the Stock-yards branch. It will pay land owners \$10 a foot for right of way from Adams to Twenty-second street and \$5 per foot from Forty-

first street to the Stock-yards. On State street it will pay \$2 per foot to Sixty-third street, making a total of over \$100,000.

BROOKLYN STREETS. Fourth avenue, from Flatbush avenue to Union street, is being repaved. Granite is being laid in the centre to a width of 24'. The Smith street car line is taking up its track in York street and relaying it in Prospect street, from Jay to Main streets, making a double track on the latter, and both streets are being repaved with cobble stone. A part of Park avenue has just been repaved, the grade near Nostrand avenue being raised about two feet.

BROOKLYN (N. Y.)—City Works Commissioner Fleeman has been advised by the Law Department that he can issue a permit to the Prospect Park & Coney Island Railroad Company to open Park avenue, from Vanderbilt avenue to Broadway, for the purpose of extending its road. The company has a right under its charter to make the extension, as that instrument covers the whole of Park avenue. The road on Park avenue now turns into Vanderbilt, and extends thence to Culver's Railroad depot, at Ninth avenue and Twentieth street. The Commissioner will issue the permit.

BRIDGEPORT, Ct. Work was commenced on a new horse railroad on August 17. The road is two miles long, commencing at the depot of the New Haven & Hartford R.R., and runs along Stratford avenue to East Stratford, with a branch on East Main street to the Singer Sewing Machine Factory. M. W. Conway, of Brooklyn, is the contractor, and D. F. Hollister is President. The company will use cars built by the John Stephenson Company. The road will be in operation Sep. 10.

THE KINGS COUNTY ELEVATED RAILROAD COMPANY handed the consents of the owners of property abutting on Fulton street from Hudson avenue to East New York to Mayor Low of Brooklyn, Aug. 14th; and they are now in the hands of the Corporation Counsel. They do not cover the whole route, and it appears that several details are omitted, such as ward, lot and block numbers, all of which must be furnished before any verification is made by the city's legal adviser. Gen. Stewart L. Woodford is counsel for the road, which is all ready to build, having placed its stock to the extent of some \$1,200,000. The right of way asked for was given it some years ago, and taken away again on account of inaction of the company.

THOMAS L. JOHNSON, President of the Cleveland St. Railway Co., and inventor of the new cable system, has examined the plant of the Brooklyn City Railroad Co. with a view to the use of his system on its road. He will prepare a minute estimate of the expense of putting his system on Fulton street from the Ferry to East New York. The estimate will cover every item pertaining to the road from the cost of laying conduits and establishing the driving plants with their big boilers and giant engines to the wear and tear on the grip, so that the exact cost of building and maintenance may be ascertained beyond question. No system yet shown Mr. Hazzard and his associates has appeared to possess so many advantages as this of Mr. Johnson.

THE BROOKLYN ELEVATED RAILROAD COMPANY is seeking permission to extend its road down Myrtle avenue. President Uhlman says the company is in earnest, and if the right to build is granted the road will be in operation in Myrtle avenue in six months. Before starting, the company will consult the property owners as to what sort of a road they want. The majority of the property owners in Myrtle avenue are said to be opposed to the proposed road, and should the city authorities give their consent they will fight it in the courts.

LOUISVILLE (KY.). Probably no city in the world is better equipped with street car lines than is Louisville. Few streets do not contain tracks, and by a very liberal arrangement of "transfers" it is said that one can make a complete circuit of the city for the payment of a single fare. The fare is five cents on all lines. The street cars are drawn by mules, without exception, and the cars move at a rate of speed which seems remarkable to one accustomed to riding behind the fagged-out horses which draw the cars in most cities. The two miles from Main street to the Exposition grounds is usually made in from fifteen to twenty minutes.

BESSEMER STEEL RAILS. At a convention of producers, held at Long Branch last week, which embraced all the leading manufacturers of the country, an agreement was entered into restricting the production of steel rails in the U. S. to 750,000 tons per annum. It was also a general understanding that ruling prices should be enhanced to something like \$30 per ton. It seems to be the general opinion among leading iron men that the lowest prices have been reached, and that henceforth better prices will obtain. Locomotive and other railway equipment participate in the stiffening of prices.

THE BROOK AVENUE RAILROAD Co. applied Aug. 15, to the Aldermen for permission to construct and operate a surface railroad from One Hundred and Twenty-ninth street and Harlem River to Third avenue, to the Harlem River bridge, across it to North Third avenue, to the Southern Boulevard, to Lincoln avenue, to One Hundred and Thirty-fourth street, to Brook avenue, to One Hundred and Forty-ninth street, to Robbins avenue, to Westchester avenue, to Forest avenue, to One Hundred and Sixty-seventh street, to Union avenue, to Stebbins avenue, and thence to place of beginning. The application was referred to the Committee on Railroads.

NEW CARS ON BROADWAY. The new cars of the Broadway surface road carry great numbers of admiring passengers. They are very handsome and are equipped with several novelties. The new car is light yellow in color and is lettered "Battery *via* Broadway to Central Park" on each side at the top, and just above the wheels the single word "Broadway." The interior is brilliant with brass trimmings and is well lighted at night. The top is composed of panels of perforated maple. Numerous ventilating transoms of red ground glass open through the roof on each side and

over each door, bearing the word "Broadway." The windows are very wide, there being but seven on a side, instead of eight, as has heretofore been the rule. Passenger electric signal stops run through the car, the straps being within easy reach. Beneath each platform is a curved guard-rail which acts as a fender or "cow-catcher."

BALTIMORE UNION PASSENGER RAILWAY. The electric motors on this road made six trips between Roland and Huntingdon avenue recently, carrying over forty passengers each time. The round trip was made in twenty-five minutes, allowing five minutes for stoppage at Woodberry. A number of people went out merely for the pleasure of the trip, and came back during the driving rain. No difficulty is experienced on the heavy grades from slipping, as in steam locomotion. The directors of the road held a meeting in the afternoon at the office at the stables of the Baltimore & Hampden Car Company for the purpose of devising a plan for encasing the electric rail. Several accidents to live stock have occurred at points along the track, and it is feared that damage suits might result to the company if the rail is left uncovered. The board decided to place deep strips of timber on each side of the central rail, which will effectually screen the electricity from all contact.

PETITIONING FOR CABLE ROADS. A petition, signed by nearly seventy thousand *bona fide* names, in favor of the cable road system, has been presented to the Board of Aldermen. The petitioners complain that the present means of transit in this city are totally inadequate, and that the charge of a second fare when a change is made from one line of cars to another is an injustice. The New York Cable Railway Company, says the petition, proposes to remedy these causes of complaint by building several trunk lines of railway from Kingsbridge and the Harlem river to the Battery, with cross-town branches, connecting with all the ferries on both sides of the city, and to charge a fare of five cents, without any extra charge on change of cars. In view of the benefits the cable road will confer on the working people, whose fares constitute the largest part of the revenues of the railroad companies in this city, the petitioners request the Board of Aldermen to consent to the application of the company to construct and operate its system of railways.

ELEVATED ROAD TO HAMILTON FERRY. Brooklyn has still another elevated road scheme to talk about in the proposed road to connect Hamilton Ferry with Gunther's road. E. B. Litchfield and Wm. Ziegler, with other well-known capitalists, are in the syndicate. Starting at Hamilton Ferry the new road will run up Hamilton avenue to Sackett street, up Sackett to Bond, along Bond to Butler street, up Butler to Fifth avenue and along the last named thoroughfare to the end of Greenwood Cemetery, where it will gradually connect with the existing surface tracks of the Brooklyn, Bath & Coney Island Railroad. It is confidently asserted by those interested that, in addition to the Coney Island

travel, which the new route would surely monopolize, the route will be a paying one from South Brooklyn, New Utrecht and Bath traffic all the year round. Bath and other places along the line of Gunther's road are rapidly growing in population, and it is confidently affirmed that, with continuous connection with Hamilton Ferry, that section will become more eligible than East New York as a place of residence.

NEW SURFACE CAR LINE TO HARLEM, *via* Madison avenue. Work has been progressing for some time on the extension of the Madison avenue line northward from Eighty-sixth street to the Harlem river, and cars commenced running over it on Aug. 1. About thirty of them are now in use on that section of the road. Some of them run from the car stables at Thirty-second street, but as a rule transfers are made at Eighty-sixth street, though no extra fare is required. The running schedule has not yet been perfected, but cars above Eighty-sixth street are run on about five minutes headway. During the summer months only sixty cars are used on the older portion of the line, and they are run on three minutes headway. This month this number will be doubled, and cars will be run through to Harlem without change. The opening of the extension is an event of importance to residents of the section adjacent to Madison avenue in Yorkville and Harlem. Real estate men say it will not only cause rents to be raised along the line but also increase the value of property.

A NEW FARE REGISTER. A new organization has been effected in Boston, entitled the Boston Electric Register Company, with office at Room 31, Phoenix building, 54 Devonshire street; officers as follows:—

Pr. sident, Richard M. Johnson; Sec. & Treas., George J. Morse; Directors, Richard M. Johnson, George J. Morse, Hobart M. Cable, William Meehan, Thos. E. Faunce.

The company has organized for the purpose of developing and introducing an electric device to be used by conductors on street railways for registering fares.

The device consists of an electric battery and system of wires enclosed in the framework of car, with push buttons at convenient places for completing the circuit, and thus by electrical rapidity operating the indicating register.

In order to place the push buttons, which resemble ordinary electric bell buttons, out of reach of careless or malicious persons, they are counter-sunk in the framework of the car, still easily accessible to the conductor. The device registers half fares, tickets, and cash fares, on separate dials, and working with electrical rapidity and certainty, seems to be an absolute safeguard to the habit prevailing among conductors, of "ringing ahead of register," "rapid ringing," &c. In a later number of the STREET RAILWAY JOURNAL we shall probably describe this invention more fully; meantime a complete working model may be seen at the company's office.

THE ELEVATED ROADS are being connected with the Bridge in New York by an extension of platform, so that passengers from up-town for the bridge or passengers on the bridge for up-town will not have to go down stairs to the street and climb up stairs again for the cars.

OFFICIAL LIST OF THE STREET RAILWAYS IN THE UNITED STATES & CANADA.

Compiled from data furnished the editors of "The Street Railway Journal," by the officers of the various roads.

[The following is a complete list of the Street Railways of the United States and Canada, so far as we have received the official returns from the various roads. Will those roads not reported kindly fill out the blanks sent them and mail to us without delay, so that they may be properly represented in the STREET RAILWAY JOURNAL?]

ABBREVIATIONS—m, miles; g, gauge; lb r, pounds rail to the yard; c, cars; h, horses; mu, mules. Officers' addresses are the same postoffice as the company unless otherwise specified.

AKRON, O.—Akron St. Ry. & Herdic Co. 2 1/2 m, 6c, 31 h. Pres. Ira M. Miller, V. Pres. James Christy, Treas. B. L. Dodge, Sec. F. M. Atterholt, Supt. John T. Mealin.

ALBANY, N. Y.—Watervliet Turnpike R.R. Co. 7 1/2 m, 26-45 lb r, 27 c, 143 h. Pres. Chas. Newman, Sec. & Treas. P. Way, Supt. M. C. Foster.

The Albany Ry. 10 m, 4-8 1/2 g, 33-47 lb r, 51 c, 194 h. Pres., Supt. and Treas. John W. McNamara, Sec. Jas. H. Manning.

ALLENTOWN, PA.—Allentown Pass. R.R. Co. 3 1/2 m, 6 c, 22 h. Pres. Samuel Lewis, Treas. & Sec. Joseph E. Ballet, Supt. Russel A. Thayer.

ALTON, ILL.—Alton & Up. Alton Horse Ry. Co. ALTOONA, PA.—City Pass. Ry. Co. of Altoona. 3 1/2 m, 5-3 g, 43 lb r, 17 c, 38 h. Pres. John P. Levan, Sec. & Treas. L. B. Reifsnider, Supt. John J. Buch.

AMSTERDAM, N. Y.—Amsterdam St. Ry. Co. 1 1/2 m, 4-8 g, 25 lb r, 3 c, 10 h. Pres. Henry Herrick, Treas. David Cady, Sec. M. L. Stover.

ANNISTON, ALA.—ASHTABULA, O.—Ashtabula City Ry. Co. 4 m, 4-8 1/2 g, 40 lb r, 6 c, 60 h. Owner & Prop. Jno. N. Stewart.

ATCHISON, KAN.—Atchison St. Ry. Co. 5 1/2 m, 4-8 1/2 g, 20-30 lb r, 19 c, 60 h. Pres. & Gen. Man. J. H. Beeson, Treas. H. M. Jackson, Sec. J. P. Adams.

ATLANTA, GA.—West End & Atlantic R.R. Co. 2m, 4-8 1/2 g, 20 lb r, 6 c, 34 mu. Pres. J. D. Turner, V. Pres. G. L. Langston, Sec. & Treas. B. H. Brumhead, Man. & Purch. Agt. Jno. S. Brumhead.

Atlanta St. R.R. Co. Gate City St. R.R. Co. 2 1/2 m, 4-8 1/2 g, 16 lb r, 7 c, 26 h. Pres. L. B. Nelson, V. Pres. L. DeGave, Sec. & Treas. John Stephens, Solicitor, A. Remharat.

Metropolitan St. R.R. Co. ATLANTIC, N. J.—Atlantic City Ry. Co.

AUBURN, N. Y.—Auburn & Owaseo Lake R.R. Co. 1 1/2 m, 4-8 1/2 g, 28-30 lb r, 3c, 12 h. Pres. D. M. Osborne, Sec. & Treas. C. B. Koster, Supt. B. F. Andrews.

East Genesee & Seward Ave. Ry. Co. 1 1/2 m, 4-8 1/2 g, 30 lb r, 6 c, 25 h. Pres. David M. Osborne, Sec. & Treas. C. B. Fosters, Supt. B. F. Andrews.

AUGUSTA, GA.—Augusta & Somerville R.R. Co. AURORA, ILL.—Aurora City Ry. Co. 5 m, 4-8 1/2 g, 28 lb r, 7 c, 10 h, 30 mu. Pres. H. H. Evans, V. Pres. W. W. Thatcher, Sec. A. J. Hopkins, Treas. E. W. Truth, Supt. J. B. Chattee.

BABYLON, N. Y.—Babylon Horse R.R. Co. 1 1/2 m, — g, — lb r, 2 c, 3 h. Pres. W. F. Norton.

BALTIMORE, MD.—Baltimore & Poyhatan Ry. Co. 6 m, 5-4 1/2 g, 4 c, 17 h. Pres. & Treas. E. D. Freeman, Sec. H. B. Clark, Supt. I. M. Ketrick.

Baltimore City Pass. Ry. Co. 40 m, 5-4 1/2 g, 46 lb r, 154 c, 1000 h. Pres. Oden Bowie, Treas. John Bolgan, Sec. S. L. Bridge.

Baltimore Union Pass. Ry. Co. Baltimore & Catonsville Ry. Co. Baltimore & Halls Spring R.R. Co. Baltimore & Pimlico & Pikesville R.R. Co.

Central Ry. Co. 5 1/2 m, 5-6 g, 40 lb r, 22 c, 180 h. Pres. Peter Thompson, Sec. & Treas. Walter Blakstone.

Citizen's Ry. Co. 20 m, 5-4 1/2 g, 46 lb r, 34 c, 360 h. Pres. Jos. S. Hagarty, Treas. Wm. S. Hammersley, Supt. C. C. Speed.

Monumental City Ry. Co. North Baltimore Passenger Ry. Co. People's Pass. Ry. Co. 6 1/2 m, 5-4 1/2 g, 42-45 lb r, 30 c, 200 h. Pres. R. E. Hamilton, Treas. Gustavus Ober, Sec., Supt. & Pur. Agt. Wm. A. House, Jr. Office, Fort Ave. & Johnson St. Soon move to Druid Hill Ave.

York Road R.R. Co. BATTLE CREEK, MICH.—Battle Creek Ry. Co. 5 m, 3-6 g, 28 lb r, 8c, 18 h, 3 mu. Pres. & Owner, A. J. White, V. Pres. H. H. Brown, Sec. Chas. Thomas, Supt. John A. White.

BAY CITY, MICH.—Bay City St. Ry. Co. 7 1/2 m, 4-8 1/2 g, 18 lb r, 13 c, 35 h. Pres. James Clements, Treas. Wm. Clements, Sec. Edgar A. Cooley.

BEAVER FALLS, PA.—Beaver Valley St. Ry. Co. 3 1/2 m, (now building). Pres. M. L. Knight, Sec. & Treas. J. F. Merriman, Supt. of Construction, J. C. Whitia.

BELLAIRE, O.—Bellaire St. R.R. Co. BELLEVILLE, ILL.—Citizens' Horse Ry. Co. BELLEVILLE, ONT., CAN.—Belleville St. R.R. Co.

BERA, O.—Berea St. Ry. Co. 1 1/2 m, 3-6 g, 28 lb r, 2 c, 2 h. Pres. C. W. D. Miller, V. Pres. T. Chinchward, Sec. & Treas. A. H. Pomeroy, Supt. A. W. Bishop.

BINGHAMTON, N. Y.—Washington Street & State Asylum R.R. Co. 4 1/2 m, 4 g, 16-25 lb r, 13 c, 23 h. Pres. B. H. Meagley, V. Pres. Geo. Whitney, Sec. C. O. Root, Treas. F. E. Ross.

Binghamton Central R.R. Co. 3 1/2 m (2 1/2 laid), 3 g, 28 lb r, 6 c (not in operation). Pres. Geo. L. Crandall, V. Pres. Nelson Stow, Sec. & Supt. Chas. O. Root, Treas. H. J. Kneeland.

Binghamton & Port Dickinson R.R. Co. 5 m, 4-8 1/2 g, 20-30 lb r, — c, — h. Pres. Harvey Westcott, Sec. & Treas. G. M. Harris, Supt. N. L. Osborn. (Leased to M. Osborn).

Main, Court & Chenango St. R.R. 5 m, 4-8 g, 40 lb r, 10 c, 25 h. Supt. & Lessee, N. L. Osborn.

BIRMINGHAM, ALA.—Birmingham St. Ry. Co. 3 1/2 m, 4-8 g, 16 lb r, 4 c, 12 m. Pres. E. F. Roden, Sec. & Treas. J. H. Williams.

BLOOMFIELD, N. J.—Newark & Bloomfield R. R. BLOOMINGTON, ILL.—Bloomington & Normal Horse Ry. Co.

BOONE, IA.—Boone & Boonsboro St. Ry. Co. 1 1/2 m, 3 g, 20 lb r, 3 c, 10 h. Pres. L. W. Reynolds, Treas. L. B. Hodges, Sec. & Supt. A. B. Hodges.

BOONSBORO, IA.—Twin City & Des Moines River Motor St. Ry. Co.

BOSTON, MASS.—Highland St. Ry. Co. 19 m, 4-8 1/2 g, 50 lb r, 187 c, 925 h. Pres. Moody Merrill, Clerk R. B. Fairbairn, Treas. Samuel Little, Supt. J. E. Rugg.

Lynn & Boston. 34 1/2 m, 4-8 1/2 g, 25-48 lb r, 114 c, 514 h. Pres. Amos F. Breed, Treas. & Sec. E. Francis Oliver, Supt. Edwin C. Foster.

Metropolitan R.R. Co. 80 m, 4-8 g, 50 lb r, 700 c, 3,600 h. Pres. C. A. Richards, Sec. H. R. Harding, Treas. Chas. Boardman. Office, 16 Kilby St.

Middlesex R.R. Co. 26 m, 4-8 1/2 g, 50 lb r, 150 c, 700 h. Pres. Chas. E. Powers, Treas. & Supt. John H. Studley. Address, 27 Tremont Row, Boston.

So. Boston Ry. Co. 13 m, 4-8 1/2 g, 42-50-60 lb r, 193 c, 900 h. Pres. Chas. H. Hersey, V. Pres. Jas. C. Davis, Sec. & Treas. Wm. Reed, Supt. Daniel Coolidge.

BRADFORD, PA.—Bradford & Kendall R.R. Co. 1 1/2 m, 4-8 1/2 g, 38 lb r, 3 c, 4 h. Pres. James Brodey, Sec. N. B. Parsons, Gen. Man. & Supt. Enos Parsons.

BRIDGEPORT, CONN.—The Bridgeport Horse R.R. Co. 5 m, 4-8 1/2 g, 42 lb r, 14 c, 70 h. Pres. Albert Eamer, Sec. & Treas. F. Hurd, Supt. B. F. Lashar.

BROCKTON, MASS.—Brockton St. Ry. Co. 3 1/2 m, 24 c, 97 h. Pres. W. W. Cross, Treas. & Sec. Z. C. Keith, Supt. H. B. Rogers.

BROOKLYN, N. Y.—The Atlantic Avenue R. R. Co. of Brooklyn. 24 1/2 m, 4-8 g, 60 lb r, 244 c, 882 h. Pres. William Richardson, Sec. W. J. Richardson, Treas. Newburg H. Frost.

Broadway R.R. Co. 10 1-10 m, 4-8 1/2 g, 45-50-60 lb r, 166 c, 657 h. Pres. W. H. Husted, V. Pres. Edwin Beers, Sec. & Treas. Robert Sealey, Supt. Joshua Crandall.

Brooklyn Cross Town R.R. Co. 8 m, 4-8 1/2 g, 40-60 lb r, 72 c, 400 h. Pres. Henry W. Slocum, V. Pres. Ezra B. Tuttle, Sec. & Treas. John R. Connor, Supt. D. W. Sullivan.

Bushwick R.R. Co. 20 m, 4-8 1/2 g, 45-50-60 lb r, 172 c, 600 h. Pres. Frank Cromwell, V. Pres. Wm. H. Husted, Treas. & Sec. S. D. Hallowell, Supt. Wm. M. Morrison.

The Brooklyn Bushwick & Queens County R.R. Co. 6 m, 4-8 1/2 g, 42-47 lb r, 41 c, 117 h. Pres. Richard H. Green, V. Pres. James W. Ellwell, 59 South St. N. Y. Sec. John D. Elwell, Treas. Wm. W. Greene.

Brooklyn City R.R. Co. 44 m, 4-8 1/2 g, 60 lb r, 761 c, 3,045 h. Pres. William H. Hazzard, V. Pres. William M. Thomas, Sec. & Treas. Daniel F. Lewis, Asst. Sec. Francis E. Wrigley.

Brooklyn City & Newtown R.R. Co. 11 m, 4-8 1/2 g, 45-60 lb r, 128 c, 419 h. Pres. Louis Fitzgerald, N. Y. City, Sec. & Treas. H. A. Schuz, Supt. H. W. Bush.

Calvary Cemetery, Greenpoint & Brooklyn Ry. Co. Coney Island and Brooklyn R.R. Co. 11 2-5 m, 45 lb r, 4-8 1/2 g, 103 c, 316 h. Pres. James Jourdan, Sec. Ed. F. Drayton, Supt. William Farrell.

Coney Island, Sheepshead Bay & Ocean Avenue R.R. Co. Pres. A. A. McClemer, V. Pres. Daniel Mone, Sec. John McMahon, Sheepshead Bay, Treas. Horace Valkulyh.

Crosstown Line, Hamilton Ferry to Bridge. Grand St. & Newtown R.R. Co. 8 1/2 m, 4-8 1/2 g, 45-50 lb r, 72 c, 250 h. Pres. Martin Joost, Sec. & Treas. Wm. E. Horwill, Supt. Walter G. Howey.

Grand Street, Prospect Park & Flatbush R.R. Co. 4 1/2 m, 4-8 1/2 g, 50 lb r, 75 c, 244 h. Pres. Louis Fitzgerald, 120 Broadway, N. Y., Sec. & Treas. Duncan B. Cannon, Supt. Jno. L. Heins.

Greenpoint & Lorimer St. Prospect Park & Coney Island R.R. Co. 4 7-10 m, 45-50 lb r, 4-8 1/2 g, 69 c, 214 h. Pres. A. R. Culver, Treas. A. C. Washington, Sec. George H. Smith, Eng. Supt. R. Schermerhorn, Supt. Robert Atlesey.

Prospect Park & Flatbush R.R. 1 1/2 m, 4-8 1/2 g, 34 lb r, 70 c, 260 h. Pres. Loftis Wood, Sec. & Treas. Sam'l Parkhill, Supt. Loftis Wood.

South Brooklyn Central R.R. Co. 7 m (4 1/2 m laid), 4-8 1/2 g, 60 lb r, 42 c, 192 h. Pres. Wm. Richardson, Sec. Wm. J. Richardson, Treas. N. H. Frost, Supt. James Ruddy.

The New Williamsburgh & Flatbush R. R. Co. 6 1/2 m, 4-8 1/2 g, 47-50 lb r, 74 c, 255 h. Pres. Geo. W. Van Allen, 54 Ann St. New York, Sec. W. B. Waitt, 34th St. & 9th Ave. New York, Treas. C. B. Cottrell, 8 Spruce St. N. Y. City, Supt. Chas. E. Harris, Nost-rand Ave. & Carroll St., Brooklyn.

The Union Railway Co. of the City of Brooklyn (not in operation).

Van Brunt St. & Erie Basin R.R. Co. 1 1/2 m, 4-8 1/2 g, 45 lb r, 7 c, 24 h. Pres. John Cunningham, Sec. & Treas. Edmund Terry.

BRUNSWICK, GA.—Brunswick St. R.R. Co. BUFFALO, ILL.—See Mechanicsburg, Ill.

BUFFALO, N. Y.—Buffalo St. R.R. Co. 17 1/2 m, 4-8 1/2 g, 50 lb r, 96 c, 510 h. Pres. Henry M. Watson, V. Pres. P. Pratt, Sec. S. S. Spaulding, Treas. W. H. Watson, Supt. Edward Edwards.

Buffalo East Side St. R.R. Co. 24 4-5 m, 4-8 1/2 g, 42 lb r, 47 c, 218 h. Pres. S. S. Spaulding, V. Pres. Joseph Churchyard, Sec. H. M. Watson, Treas. W. H. Watson, Supt. Edward Edwards.

BURLINGTON, IA.—Burlington City R.R. Co. 2 1/2 m, 4-8 1/2 g, 22 lb r, 9 c, 30 h. Pres. John Patterson, Sec. & Man. C. T. Patterson.

Union St. Ry. Co. CAIRO, ILL.—Cairo St. R.R. Co.

CAMBRIDGE, MASS.—Cambridge R.R. Co. 43 m, 4-8 1/2 g, 50 lb r, 245 c, 1,410 h. Pres. Prentiss Cummings, Treas. & Clerk F. T. Stevens, Exec. Com. I.

M. Simpson, P. Cummings, O. S. Brown, Clerk of Directors, O. S. Brown, Supt. Wm. A. Bancroft.

Charles River St. Ry. Co. 10 4-5 m, 2-8 1/2 g, 50 lb r, 50 c, 330 h. Pres. Chas. E. Raymond, Corp. Clerk C. E. Harden, Treas. Daniel U. Chamberlain, Supt. John N. Akarman.

CAMDEN, N. J.—Camden & Atlantic St. Ry. Camden Horse R.R. Co. 9 m, 5-1 g, 35-47 lb r, 26 c, 85 h. P. es. Thos. A. Wilson, Sec. Wilbur F. Rose, Treas. & Supt. John Hood.

CANTON, O.—Canton St. R.R. Co. (new road). CAPE MAY, N. J.—Cape May & Schellenger Landing Horse R.R.

CARTHAGE, MO.—CEDAR RAPIDS, IA.—Cedar Rapids & Marion St. Pass. Ry. Co.

CHAMPAIGN, ILL.—Champaign R.R. Co. Urbana & Champaign St. R.R. Co. (See Urbana).

CHARLESTON, S. C.—Charleston City Ry. Co. 8 1/2 m, 4-8 1/2 g, 38-42 lb r, 22 c, 84 h. Pres. Jno. S. Riggs, Treas. Ewan Edwards, Sec. Frank Whelden, Supt. Jno. Mohlenhoff.

Enterprise R.R. Co. 12 m, 5 g, 42 lb r, 14 c, 51 h. Pres. A. F. Ravenel, Sec. & Treas. U. E. Hayne, Supt. T. W. Passallagere.

CHATTANOOGA, TENN.—Chattanooga St. R. R. Co. 2 1/2 m, 4-8 1/2 g, 16-25 lb r, 8 c, 50 h. Pres. J. H. Warner, Sec. C. E. Gaskill, Supt. A. B. Wingfield.

CHESTER, PA.—Chester St. Ry. Co. 5 1/2 m, 5-2 1/2 g, 12 c, 70 h. Pres. Richard Peters, Jr., Solicitor, Geo. B. Lindsay, Treas. Sam'l A. Dyer, Sec. E. M. Cornell.

CHICAGO, ILL.—Chicago City Ry. Co. 87 m, 4-8 1/2 g, 45 lb r, 567 c, 1,416 h, cable doing work of 2,500 h. Pres. C. B. Holmes, Sec. H. H. Windsor, Treas. T. C. Pennington, Supt. C. B. Holmes.

Chicago West Division Ry. Co. 40 m, 4-8 1/2 g, 40 lb r, 620 c, 3,425 h. Pres. J. R. Jones, Sec. George L. Webb, Supt. Jas. K. Lake.

Chicago & Hyde Park St. — m, — g, — lb r, — c, — h. Pres. Douglas S. Clarke.

North Chicago City Ry. Co. 35 m, 4-8 1/2 g, 45 lb r, 316 c, 1,700 h. Pres. & Gen Supt. V. C. Turner, V. Pres. Jacob Rehn, Sec. & Treas. Hiram Crawford, Supt. of Track & Construction, Augustine W. Wright, Asst. Supt. Fred L. Threedy, Supt. Horse Dept. Robt. Atkins, Purch. Agt. John W. Roach, Master Mechanic J. Miller.

CHILLICOTHE, O.—Chillicothe St. R.R. Co. 1 1/2 m, 3 g, 16 lb r, 7 c, 10 h. Pres. E. P. Safford, sec. A. E. Wenis, Treas. William Polanel, Supt. Ewel McMartin.

CINCINNATI, O.—Cincinnati Inclined Plane Ry. Co. 3 m, 5-2 1/2 g, 43 lb r, 24 c, 150 h. Pres. Geo. A. Smith, Sec. & Supt. James M. Doherty, Treas. Jos. S. Hill.

Cincinnati St. Ry. Co. 98 m, 5-2 1/2 g, 43 lb r, 254 c, 1,815 h. Pres. John Kilgour, Sec. & Aud. James A. Collins, Treas. R. A. Dunlap, Con. Eng. F. R. Weizenecker, Supt. John Harris.

Cincinnati & Mount Auburn R.R. Co. Columbia & Cincinnati St. R.R. Co. 3 1/2 m, 3 g, 35 lb r, 3 c, 6 dummy v. Pres. C. H. Kilgour, V. Pres. John Kilgour, Treas. B. F. Branman, Sec. A. H. Meier, Mt. Lookout, O. Supt. J. J. Henderson, Mt. Lookout.

Mt. Adams & Eden Park Inclined R.R. Co. 3 1/2 m, 5-2 1/2 g, 42 lb r, 40 c, 320 h. Pres. & Treas. J. P. Kerper, Sec. J. R. Murdoch, Supt. Chas. Whithin.

So. Covington & Cincinnati. (See Covington, Ky.) South Side St. Ry. Co. St. Clair Street Ry. Co. West Side R.R. Co.

CLEVELAND, O.—The Brooklyn St. R.R. Co. 8 1/2 m, 4-8 1/2 g, 52 lb r, 66 c, 375 h. Pres. Tom. L. Johnson, V. Pres. A. J. Moxham, Sec. J. B. Hoefgen, Treas. John McConnell, Supt. A. L. Johnson.

Broadway & Newburg St. R.R. Co. 6 m, 4-8 1/2 g, 10 c, 160 h. Pres. & Supt. Joseph Stanley, V. Pres. Sam'l Andrews, Sec. & Treas. E. Fowler.

Superior St. R.R. Co. 15 m, 4-8 1/2 g, 45 lb r, 46 c, 225 h. Pres. Frank De H. Robison, V. Pres. John Koch, Sec., Treas. & Supt. M. S. Robison, Jr.

The East Cleveland R.R. Co. 20 m, 4-8 1/2 g, 35-40 lb r, 92 c, 450 h, 1 electric motor. Pres. A. Everett, V. Pres. Chas. Wason, Sec. & Treas. H. A. Everett, Supt. E. Duty. Offices, 1154 & 1158 Euclid Ave.

Woodland Avenue & West Side St. R.R. Co. 17 m, 4-8 1/2 g, 43 lb r, 100 c, 550 h. Pres. M. A. Hanna, V. Pres. C. F. Emery, Sec. J. B. Hanna, Gen. Supt. George G. Mulhern, Supt. J. H. Ateheron.

CLINTON, IA.—Lyons & Clinton Horse R.R. Co. (See Lyons).

COLUMBUS, GA.—Columbus St. R.R. Co. 3 m, 4-8 1/2 g, 16 lb r, 6 c, 25 h. Pres. Cliff B. Grimes, Sec. L. G. Schnessler, Treas. N. N. Curtis, Supt. J. A. Gabbourgh.

COLUMBUS, O.—Columbus Consolidated St. R.R. Co. 19 m, 5-2 g, 30-46 lb r, 83 c, 350 h. Pres. A. Rodgers, V. Pres. H. T. Chittenden, Sec. & Treas. E. K. Stewart, Supt. J. H. Ateheron.

Glenwood & Greenlawn St. R.R. Co. 4 1/2 m, 3-6 g, 24 lb r, 9 c, 25 c. Pres. A. D. Rodgers, V. Pres. B. S. Brown, Sec. R. S. Rockley, Treas. S. S. Rickley, Supt. Jonas Wilcox.

CONCORD, N. H.—Concord Horse R.R. Co. 8 m, 3 g, 30-33 lb r, 10 c, 14 h, 2 steam motors. Pres. Moses Humphrey, Treas. H. J. Crippin, Clerk E. C. Hoag.

CORTLAND, N. Y.—Cortland & Homer Horse Ry. Co. 4 m (2 1/2 laid), 4-8 1/2 g, 25-30 lb r. Pres. Chas. H. Garrison, Troy, N. Y., Sec. J. M. Milne, Treas. S. E. Welch, Supt. S. E. Welch. (Leased to D. N. Miller).

COUNCIL BLUFFS, IA.—Council Bluffs St. R.R. COVINGTON, KY.—So. Covington & Cincinnati St. Ry. Co. 17 1/2 m, 5-2 1/2 g, 43 lb r, 46 c, 296 h. Pres. E. F. Abbott, Sec. S. C. Bunton, Treas. G. M. Abbott.

DALLAS, TEX.—Dallas St. Ry. Co. 4 1/2 m, 4-8 1/2 g, 20-38 lb r, 12 c, 4 h, 72 mu. Pres. Wm. J. Keller, Sec. Harry Keller, Supt. C. E. Keller.

Commerce & Way St. R. R.

DANVILLE, ILL.—Citizens' St. Ry. Co. 4 m, 4 g, 20 lb r, 7 c, 35 mu. Pres. Wm. I. Cannon, V. Pres. & Gen. Man. Wm. Stewart, Sec. & Treas. Adam P. Samuel.

DAVENPORT, IA.—Davenport Central St. R.R. 2 1/2 m, 4-8 1/2 g, 20 lb r, 10 c, 30 h. Pres. James Grant,

Sec. O. S. McNeill, Treas. S. F. Smith, Supt. R. A. McGugin.
 Brady St. Ry. Co.
 Davenport City Ry. Co.
DAYTON, KY.—Newport & Dayton St. Ry. Co. 2 m, 5-2½ g, 44 lb r, 9 c, 36 h. Pres. & Supt. W. W. Bean.
DAYTON, O.—Dayton St. R.R. Co. 3½ m, 4-8½ g, 44 lb r, 23 c, 66 h. Pres. J. W. Stoddard, V. Pres. J. S. Williams, Sec. C. B. Clegg, Supt. A. W. Anderson. Oakwood St. Ry. Co. 3-1-3 m, 4-8½ g, 38 lb r, 13 c, 60 h. Pres. Charles B. Clegg, Sec. M. P. Moore, Supt. Wm. Davis.
 The Wayne & Fifth St. R.R. Co. 3½ m, 4-8½ g, 34-38 lb r, 5 c, 30 h. Prs. Geo. M. Shaw, Sec. & Treas. Eugene Winchet, Supt. N. Routhan.
DECATUR, ILL.—Decatur Horse Ry. Co. Citizens' Street R.R. Co. 2 m, 4-8½ g, 20 lb T r, 7 c, 47 h & mu. Pres. D. S. Shellabarger, Sec., Treas. & Supt. A. E. Kinney.
DEERING, ME.—See Portland.
DENISON, TEX.—Denison St. Ry. Co. 3 m, 3-6 g, 16 lb r, 5 c, 22 mu. Pres. C. A. Waterhouse, Supt. S. A. Robinson.
DENVER, COL.—Denver City Ry. Co. 16 m, 3-6 g, 16 lb r, 50 c, 250 h. Pres. Geo. H. Holt, 10 Wall St., New York City, Sec. G. D. L'huillier, 10 Wall St., New York City, Treas. & Man. G. E. Randolph.
DES MOINES, IA.—Des Moines St. Ry. Co. 10 m, 3 g, 25-30-38-52 lb r, 18 c, 100 h. Pres. M. P. Turner, Sec. M. A. Turner.
 Des Moines & Sebastopol St. Ry. Co.
DETROIT, MICH.—Fort Wayne & Elmwood Ry. Co. 6 m, 4-8½ g, 45 lb r, 30 c, 180 h. Pres. H. B. Brown, V. Pres. Edward Kanter, Treas. George B. Pease, Sec. N. W. Goodwin, Supt. Geo. S. Hazard.
 Detroit City Ry. Co. 30 m, 4-8½ g, 40-43½ lb r, 130 c, 700 h. Includes Jefferson Ave. line, Woodward Ave. line, Michigan Ave. line, Gratiot Ave. line, Brush St. line, Cass Ave. line, Congress & Baker line. Pres. Sidney D. Miller, Treas. George Hendrie, Sec. James Heugh, Gen. Supt. Robert Bell, Mast. Mech. John Willis.
 Grand River St. Ry. Co. 2½ m, 4-8½ g, 43 lb r, 13 c, 110 h. Pres. & Treas. Jos. Dalley, Sec. J. W. Dalley, Supt. C. M. Dalley.
DOVER, N. H.—Dover Horse R.R. Co. 2-2-5 m, 3 g, 30 lb r, 4 c, 14 h. Directors, Z. S. Wallingford, Chas. H. Sawyer, Jas. E. Lothrop, C. W. Wiggins, Harrison Haley, Frank Williams, Cyrus Littlefield, Treas. Cyrus Littlefield.
DUBUQUE, IA.—Dubuque St. R.R. 5 m, 4-8½ g, 21 c, 45 h. Pres. J. A. Rhonberg, Sec. & Treas. B. E. Linehan, Supt. J. J. Linehan.
DULUTH, MINN.—Duluth St. Ry. Co. 3 m, 3-6 g, 30 lb r, 6 c, 7 h, 31 mu. Pres. A. S. Chase, V. Pres. O. P. Stearns, Sec. & Treas. L. Mendenhall, Supt. & Pur. Agt. W. T. Hoopes.
EAST OAKLAND, CAL.—Oakland, Brooklyn & Fruitvale R.R. Co.
EAST SAGINAW, MICH.—Street R. R. Co. of East Saginaw. — m, 4-8½ g, 30 lb r, 14 c, 35 h. Pres. & Supt. W. J. Barton, Sec. W. H. Hark, Treas. J. B. Peter.
EAST ST. LOUIS, ILL.—East St. Louis St. R.R. Co.
EASTON, PA.—The Easton & So. Easton Passenger Ry. Co. 1½ m, 5-2½ g, 45 lb r, 4 c, 20 h. Pres. H. A. Sage, Sec. & Treas. H. W. Cooley, Supt. Elisha Burwell, So. Easton.
 The West End Passenger Ry. Co. 1½ m, 5-2½ g, 45 lb r, 6 c, 20 h. Pres. H. A. Sage, Sec. & Treas. H. W. Cooley, Supt. Samuel Berry.
EAU CLAIRE, WIS.—Eau Claire City Ry. Co.
ELGIN, ILL.—Elgin City Ry. Co.
ELIZABETH, N. J.—Elizabeth & Newark Horse R.R. Co. 14 m, 5-2½ g, 4-10 g, 30 lb r, 24 c, 74 h. Pres. & Treas. Jacob Davis, Sec. & Supt. John F. Pritchard.
ELKHART, IND.—Elkhart City Ry. Co.
ELMIRA, N. Y.—The Elmira & Horseheads Ry. Co. 9-2-3 m, 4-8½ g, 25-30-40 lb r, 18 c, 34 h. Pres. & Treas. George M. Diven, V. Pres. Geo. W. Hoffman, Sec. Wm. S. Kershner, Supt. Henry C. Silsbee.
EL PASO, TEX.—El Paso St. Ry. Co. 2½ m, 4-8½ g, 20 lb r, 8 c, 25 h. Pres. G. B. Zimpelman, V. Pres. A. Krockauer, Treas. F. Magoffice, Sec. & Supt. I. A. Tays.
EMPORIA, KAN.—Emporia City Ry. Co. 3½ m, 5 g, 20 lb r, 6 c, 23 m. Pres. Van R. Holmes, Treas. A. F. Crowe, Sec. & Man. J. D. Holden.
ENTERPRISE, MISS.—Enterprise St. Ry. Co. 1½ m, 3-6 g, 24 lb r, 2 c, 6 h. Pres. John Kampe, V. Pres. E. B. Gaston, Sec. & Treas. Jno. Gaston.
ERIE, PA.—Erie City Passenger Ry. Co. 5 m, 4-8½ g, 30-40 lb r, 17 c, 70 h. Pres. Wm. W. Reid, Treas. J. C. Spencer, Sec. A. L. Lettell, Supt. Jacob Berst.
EUREKA SPRINGS, ARK.—Eureka Springs City Ry. Co.
EVANSVILLE, IND.—Evansville St. Ry. Co. 12 m, 4-8 g, 28 lb r, 31 c, 190 mu. Pres. John Gilbert, Sec. P. W. Raleigh, Treas. John Gilbert, Supt. W. Bahr.
FALL RIVER, MASS.—Globe St. Ry. Co. 12 m, 4-8½ g, 40-46-47 lb r, 40 c, 160 h. Pres. Frank S. Stevens, Treas. F. W. Brightman, Sec. M. G. B. Swift, Supt. John H. Bowker, Jr.
FORT SCOTT, KAN.—Bourbon County St. Ry. Co. 1 m, 4 g, 22 lb r, 2 c, 4 m. Pres. Isaac tadden, V. Pres. Benj. Files, Sec. Wm. Perry, Treas. J. H. Randolph.
FORT SMITH, ARK.—Fort Smith St. Ry. Co. 2 m, 3-6 g, 16-28 lb r, 5 c, 16 h. Pres. Sam'l M. Loud, Sec. & Treas. Geo. T. Sparks.
FORT WAYNE, IND.—Citizens' St. R.R. Co.
FORT WORTH, TEX.—Fort Worth St. Ry. Co. 7½ m, 4 g, 25-38 lb r, 16 c, 73 m. Pres. K. M. Vanzandt, Treas. W. A. Hoffman, Acting Sec. & Gen. Man. S. Mims.
FRANKFORT, N. Y.—Frankfort & Ilion Street Ry. Co. 2½ m, 5 g, 4 c. Pres. A. C. McGowan, Frankfort, Sec. D. Lewis, Ilion, Treas. P. Remington, Ilion, Supt. Fredk. Gates, Frankfort.
FREDONIA, N. Y.—Dunkirk & Fredonia R.R. Co. 3½ m, 4-10 g, 25 lb r, 5 c, 8 h. Pres. Wm. M. McClnstry, Sec. & Treas. M. N. Fenner, Supt. Z. Elmer, Wheelock.
GAINESVILLE, FLA.—Gainesville St. Ry. Co.

GAINESVILLE, TEX.—Gainesville St. Ry. Co. 2½ m, 3-6 g, 17 lb r, 4 c, 12 h. Pres. C. N. Stevens, V. Pres. J. T. Harris, Sec. & Treas. F. R. Sherwood.
GALVESTON, ILL.—Galveston Horse R.R. Co.
GALVESTON, TEX.—Galveston City R.R. Co. 18 m, 4-8½ g, 30 lb r, 68 c, 169 mu. Pres. Wm. H. Sinclair, Sec. & Treas. F. D. Merritt, Supt. M. J. Keenan. Gulf City St. Ry. & Real Estate Co.
GLOUCESTER, MASS.—Gloucester City R.R.
GRAND RAPIDS, MICH.—Street Ry. Co. of Grand Rapids, Mich. 13 m, 4-8½ g, 30-35 lb r, 21 c, 175 h. Pres. C. A. Otis, Cleveland, O., V. Pres. L. H. Withey, Grand Rapids, Treas. M. S. Crosby, Grand Rapids, Sec. J. M. Weston, Grand Rapids, Asst. Sec. Jas. Pickands, Cleveland, O.
GREEN CASTLE, IND.—Green Castle City St. Ry. Co. 2 m, 4-8½ g, 23 lb r, 3 c, 12 h. Pres. & Supt. D. Rogers, Sec. James S. Nutt, Treas. Rudolph Rogers.
GREENVILLE, S. C.—Greenville City Ry. Co. 1 m, 5 g, — lb r, 5 c, 20 h. Proprietors, Gilreath & Harris.
HAMILTON, O.—The Hamilton St. Ry. Co. 4 m, 3 g, 28 lb r, 11 c, 12 h. Pres. James F. Griffin, Sec. O. V. Parrish, Treas. H. L. Morey, Supt. J. C. Bigelow.
HANNIBAL, MO.—Hannibal St. Ry. Co. 2 m, 4-8½ g, 16-36 lb r, 6 c, 22 h. Pres. & Supt. M. Doyle, Sec. & Treas. James O. Hearn.
HARRISBURGH, PA.—Harrisburgh City Passenger Ry. Co. 2½ m, 5-2½ g, 42-47 lb r, 15 c, 36 h, Pres. H. A. Kelker, V. Pres. Daniel Epply, Sec. John T. Ensminger, Treas. R. F. Kelker, Supt. S. B. Reed.
HARTFORD, CONN.—Hartford & Wethersfield Horse R.R. Co. 12 m, 4-8½ g, 45 lb r, 49 c, 250 h. Pres. & Treas. E. S. Goodrich, Sec. Geo. Sexton.
HAVERHILL, MASS.—Haverhill & Groveland St. Ry. Co. 4½ m, 4-8½ g, 30 lb r, 10 c, 19 h. Pres. Jas. D. White, Treas. John A. Colby, Supt. L. R. Mitchell.
HELENA, ARK.—Helena St. Ry. Co.
HERKIMER, N. Y.—Herkimer & Mohawk St. Ry. Co. 1½ m, 4-8½ g, 25 lb r, 3 c. Pres. J. M. Ansmen, Sec. Joab Small, Treas. H. D. Alexander.
HOBOKEN, N. J.—North Hudson County Ry. Co. 16½ m, 4-7 g, 50-60 lb r, 116 c, 630 h. Pres. John H. Bonn, Sec. F. J. Mallory, Treas. Fredk. Mickel, Union, Supt. Nicholas Goetz, Union.
HOLYOKE, MASS.—Holyoke St. Ry. Co. 2 m, 4-8½ g, 35 lb r, 8 c, 24 h. Pres. Wm. A. Chase, Treas. C. Fayette Smith, Supt. H. M. Smith.
HOT SPRINGS, ARK.—Hot Springs R.R. Co. 3 m, 4 g, 25 lb r, 11 c, 30 h. Pres. S. W. Fordyce, Sec. C. E. Maurice, Supt. J. L. Butterfield.
HOUSTON, TEX.—Houston City St. Ry. Co. 13 m, 4-8½ g, 20-30-40 lb r, 40 c, 118 m. Pres. Wm. H. Sinclair, Galveston, V. Pres. & Gen. Man. H. F. McGregor, Houston, Supt. Henry Friend, Houston, Sec. & Treas. F. J. DeMeritt, Galveston.
HUTCHINSON, KAN.—Hutchinson St. Ry. Co.
HYDE PARK, ILL.—Ewing Avenue Horse Ry. Co.
ILION, N. Y.—Frankfort & Ilion Ry. Co. 2½ m, 5 g, 25 lb r, 4 c, 6 h. Pres. A. C. McGowan, Sec. D. Lewis, Treas. F. Remington, Supt. Frederick Gates.
INDIANAPOLIS, IND.—Citizens' St. Ry. Co. 35 m, 4-8½ g, 20-33-40-52 lb r, 70 c, 530 h. Pres. A. W. Johnson, Indianapolis, Treas. Tom L. Johnson, Cleveland, O. Sec. A. A. Anderson, Indianapolis, Man. W. T. Steele, Indianapolis, Auditor P. Woodrige, Louisville, Ky.
IRVINGTON, N. J.—Newark & Irvington R.R. Co.
JACKSON, MICH.—Jackson City Ry. Co. — m, — g, — lb r, 11 c, 40 h. Pres. Hiram H. Smith, Treas. Samuel Hopewell, Gen. Supt. Henry H. Smith.
JACKSON, MISS.—Jackson Street Ry. Co.
JACKSON, TENN.—Jackson Street Ry. Co.
JACKSONVILLE, FLA.—Pine St. R.R. Co. 2½ m, 5 g, 25 lb r, 4 c, 18 m. Owner & Gen. Man. G. H. Backinstae, Sec. & Treas. F. W. Backinstae.
 Jacksonville St. Ry. Co. 2½ m, 5 g, 25 lb r, 10 c, 36 m. Pres. H. S. Haines, Savannah, Ga., V. Pres. & Sec. Geo. R. Foster, Treas. W. P. Hardee, Savannah, Ga., Supt. G. W. Haines.
JACKSONVILLE, ILL.—Jacksonville Ry. Co.
JAMAICA, N. Y.—Jamaica & Brooklyn R.R. Co. 10 m, 4-8½ g, 56-60 lb r, 29 c, 56 h. Pres. Aaron A. Degrauw, Sec. Martin J. Durea, Treas. Morris Fosdick, Supt. Wm. M. Scott.
JAMESTOWN, N. Y.—Jamestown St. Ry. Co. 2 m, 4-8½ g, 30-42 lb r, 7 c, 9 h. Pres. John T. Wilson, Sec. C. R. Lockwood, Treas. John Langford, Supt. John F. Wilson.
JERSEY CITY, N. J.—Jersey & Bergen R.R. Co. 21 m, 4-10 g, 60 lb r, 73 c, 494 h. Pres. Chas. B. Thurston, V. Pres. Wm. Keeney, Treas. C. B. Place, Sec. Warren E. Dennis, Newark, Supt. Thos. M. Sayre.
 Pavonia Ferry Ry. Co.
JOHNSTOWN, N. Y.—The Johnstown, Gloversville & Kingsboro Horse R.R. Co. 5½ m, 4-8½ g, 26 lb r, 6 c, 16 h. Pres. James Younglove, V. Pres. R. Fancher, Sec. & Treas. I. M. Law.
JOHNSTOWN, PA.—Johnstown Pass. R.R. Co. 6½ m, 5-3 g, 41-43 lb r, 13 c, 56 h. Pres. James McMullen, Sec. B. L. Yeagley, Treas. W. H. Rosensleet, Jr.
JOPLIN, MO.
KALAMAZOO, MICH.—Kalamazoo St. Ry. Co. 10 m, 4-8½ g, 35 lb r, 28 c, 80 h. Pres. Fred Bush, Sec. J. W. Boynton, Treas. P. H. Brown.
KANSAS CITY, MO.—Kansas City Cable Ry. Co. 2½ m, 4-8½ g, 45 lb r, 10 pass. cars, 10 dummy cars. Pres. Wm. J. Smith, Sec. W. H. Lucas, Eng. Robert Gillham.
 Corrigan Consolidated St. Ry. Co. 20 m, 4-1 g, 30 lb r, 80 c, 350 h. Pres. Bernard Corrigan, Gen. Man. Thos. Corrigan, Sec. Jas. T. Kelley.
 Jackson County Horse R. R. Co.
 Kansas City & Rosedale St. Ry. Co.
 Kansas City & Westport St. R.R. Co.
KEOKUK, IA.—Keokuk St. Ry. Co. 4 m, 4-8½ g, 27 lb r, 10 c, 42 h. Pres. Jas. H. Anderson, V. Pres. Jos. G. Anderson, Sec. R. James Anderson, Treas. & Supt. W. Z. Anderson.
KINGSTON, ONT., CAN.—Kingston St. R.R. Co. ¾ m, 3-6 g, 9 lb r, 10 c, 36 h. Pres. Robert Carson, Sec. & Treas. F. Sargent, Man. William Wilson

KNOXVILLE, TENN.—Knoxville St. Ry. Co. 2 m, 4-8½ g, 22 lb r, 5 c, 2 hacks, 30 h. Pres. W. W. Woodruff, Sec., Treas. & Supt. T. L. Beaman.
LA CONIA, N. H.—Laconia & Lake Village Horse R.R. Co. 2½ m, 3 g, 34 lb r, 5 c, 17 h. Pres. A. G. Folsom, Treas. Edmund Little, Man. Bela S. Kenniston.
LA CROSSE, WIS.—City Ry. Co. of La Crosse. 2½ m, 4-9 g, 24 lb r, 5 c, 16 h, 3 mu. Pres. Geo. F. Gund, V. Pres. B. E. Edwards, Sec. Mills Tourtelotte, Treas. Fred Tillman, Gen. Supt. Joseph Tuteur, Supt. Geo. F. Smith.
 La Crosse St. Ry. Co.
LA FAYETTE, IND.—LaFayette St. Ry. 2½ m, 4-8½ g, 35 lb r, 6 c, 38 h. Pres. F. B. Caldwell, LaFayette, Sec. & Treas. E. G. Jones, Decatur, Ill., Supt. F. Greer, LaFayette.
LAKE CITY, FLA.—Lake City St. Ry. Co.
LAMPASAS SPRINGS, TEX.—Lampasas City Ry. Co. 3½ m, 4-8½ g, 22 lb r, 6 c, 15 h. [Owned by Mrs. L. R. Snodgrass.] Gen. Man. Geo. M. Snodgrass.
LANCASTER, PA.—Lancaster & Millerville St. Ry. Co.
 Lancaster City St. Ry. Co.
LARCHMONT, N. Y.—Larchmont Manor Co. 1 m, 4-8 g, 25 lb r, 2 c, 8 h. Pres. C. H. Murray, Treas. S. H. French, 38 East Fourteenth St., N. Y. City.
LAWRENCE, KAN.—Lawrence Transportation Co. 3½ m, 4-1 g, 38 lb r, 7 c, 30 h. Pres. H. Tisdale, Sec. W. H. Bangs.
LAWRENCE, MASS.—Merrimack Valley Horse R.R. Co. 5-4-5 m, 4-8½ g, 48 lb r, 20 c, 70 h. Pres. Wm. A. Russell, V. Pres. James Walton, Methuen, Clerk & Treas. James C. Eaton, Supt. A. N. Kimball, Lawrence.
LEWISTON, ME.—Lewiston & Auburn Horse R.R. Co. 7½ m, 4-8½ g, 32 lb r, 16 c, 45 h. Pres. Frank W. Dana, Lewiston, Clerk, H. C. Little, Lewiston, Treas. H. C. Packard, Auburn, Supt. E. P. Stinchfield, Auburn.
LEXINGTON, KY.—Lexington City Ry. Co. 5 m, 4-10 g, 20 lb r, 20 c, 85 h. Pres. John Cross, V. Pres. C. R. Diver, Sec. & Supt. Bert. Cross.
LEXINGTON, MO.—Lexington St. Ry. Co.
LIMA, O.—Lima St. Ry. Co.
LINCOLN, NEB.—Capital City Ry. Co. 3 m, — g, — lb r, 5 c, — h. Pres. E. B. Durfee, Sec. & Supt. H. B. Durfee.
LITTLE ROCK, ARK.—Little Rock St. Ry. Co. Citizens' St. Ry. Co. 4½ m, 4-10 g, 20 lb r, 22 c, 80 h. Pres. John Cross, Sec. & Treas. F. C. Reed, Supt. C. R. Diver.
 Hot Springs St. Ry. Co.
LOGANSPOUT, IND.—Logansport Ry. Co. 2 m, 4 g, 28 lb r, 6 c, 29 mu. Pres. Frank G. Jaques, Sec. M. Jaques, Supt. Wm. P. Jaques, Office, Urbana, Ill.
LONDON, CAN.—London St. R.R. Co. 3 m, 4-8½ g, 30 lb r, 12 c, 30 h. Pres. V. Cronga, Sec. Jas. H. Flock, Supt. Henry Thos. Smith.
LONG ISLAND CITY, N. Y.—Steinway & Hunter's Point R.R. Co. 26½ m, 4-8½ g, 47 lb r, 60 c, 150 h. Pres. Wm. Steinway, Steinway Hall, N. Y. City. V. Pres. Henry A. Cassebeer, Jr., Steinway, P. O., Long Island City, N. Y. Sec. & Treas. Chas. F. Tratbar, Steinway Hall, N. Y. City.
 Dutch Kills & Hunter's Point R.R. — m, — g, — lb r, — c, — h. Pres. R. J. Gleason.
 Long Island City & Newtown Ry. Co. 3 m, 4-8½ g, 45-55 lb r, 25 c, 60 h. Pres. Isaac Buchanan, N. Y. City, Sec. Geo. S. Crawford, Brooklyn, N. Y., Treas. Patrick J. Gleason, Supt. Michael Conway.
LONGVIEW, TEX.—Longview & Junction St. Ry. ¾ m, 3-6 g, 2 c, 4 h. Pres. F. T. Rembert, Sec. R. B. Levy, Treas. F. L. Whaley, Supt. C. W. Booth.
LOS ANGELES, CAL.—Boyle Heights R.R. Co. Central R.R. Co. and the Sixth & San Fernando St. R.R. Co. 7 m, 3-6 g, 16 lb r, 13 c, — h. Pres. E. T. Spencer, Sec. F. X. Palmer, Supt. J. A. Fairchild.
 City R.R. of Los Angeles. 4½ m, 4-8½ g, 36 lb r, 9 c, 75 h. Pres. I. M. Hellman, V. Pres. W. J. Broditch, Sec. John O. Wheeler, Supt. W. H. Hawks.
 Los Angeles & Aliso Ave. St. R.R. Co.
 Main St. & Agricultural Park R.R. Co.
LOUISVILLE, KY.—Kentucky St. Ry. Co. 5 m, 5-2 g, — lb r, 22 c, — h. Pres. T. J. Minary, Sec. & Treas. Thos. Donigan.
 Central Pass. R.R. Co.
 Crescent Hill Ry. Co.
 Louisville City Ry. Co. 63 m, 5 g, — lb r, 199 c, 1300 h. Pres. Maj. Alexander Henry Davis, Syracuse, N. Y., V. Pres. St. John Boyle, Sec. & Treas. R. A. Watts, Supt. H. H. Littell.
LOWELL, MASS.—Lowell Horse R.R. Co. 6 m, 4-8½ g, 28-47 lb r, 28 c, 100 h. Pres. Wm. E. Livingston, Gen. Man. J. A. Chase.
LYNCHBURG, VA.—Lynchburg St. R.R. Co. 2 m, 5-1 g, 26 lb r, 6 c, 31 h. Pres. Stephen Adams, Treas. John L. Adams, Supt. William M. Payne.
LYONS, IA.—Clinton & Lyons Horse Ry. Co. 4½ m, 3-8 g, 19-30 lb r, 15 c, 40 h. Pres. D. Joyce, V. Pres. & Man. R. N. Rand.
MACON, GA.—Macon & Suburban St. Ry. Co. 6 m, — g, 20 lb r, 10 c, 50 h & mu. Pres. T. J. Carling, Sec. & Treas. H. R. Brown, Office, 151 Second St.
MADISON, IND.—Madison St. Ry. Co. 2½ m, 4 g, 15 lb r, 7 c, 8 h, 10 mu. Pres. Jacob Wendle, V. Pres. Peter F. Robenlus, Supt. & Treas. Chas. F. Tuttle.
MADISON, WIS.—Madison St. Ry. Co. 2½ m, 3 g, 23 lb r, 6 c, 24 h. Pres. E. W. Keyes, Sec. Jas. R. Zearing, Treas. Lucius Clark.
MANCHESTER, N. H.—Manchester Horse R.R. 4½ m, 3-¾ g, 27-34 lb r, 12 c, 41 h. Pres. S. N. Bell, Treas. Frederick Smyth, Clerk J. A. Weston, Supt. A. Q. Guage.
MARYSVILLE, CAL.—City Pass. R.R. Co. (No returns.)
MECHANICSBURG, ILL.—Mechanicsburg & Buffalo Ry. Co. 3½ m, 3-10 g, 16 lb r, 3 c, 4 mu. Pres. J. N. Fullenwelder, Treas. A. T. Thompson, Sec. J. T. Fullenwelder.
MEMPHIS, TENN.—Memphis City R.R. Co.
MERIDIAN, MISS.—Meridian St. Ry. Co. 1½ m, 4-8 g, 16 lb r, 3 c, 12 h. Pres. J. J. Shannon, V. Pres. J. L. Handley, Sec. R. M. Houston.
MIDDLETOWN, O.—Middletown & Madison St. Ry. Co.

MILLERSVILLE, PA.—Lancaster & Millersville St. R.R. Co.

MILWAUKEE, WIS.—Cream City R.R. Co. 8-1-6 m, 4-8 1/2 g, 27-38 lb r, 74 c, 307 m, 2 h. Pres. Winfield Smith, V. Pres. Christian Pressner, Treas. Ferdinand Knehn, Sec. Wm. Damkoehler, Supt. Henry Berg.

Milwaukee City Ry. Co. 15 m, 4-8 1/2 g, 27 lb r, 75 c, 43 h. Pres. Peter McGeoch, Sec. & Treas. Geo. O. Wheatcroft.

West Side St. Ry. Co. Minneapolis, MINN.—Minneapolis St. Ry. Co. 45 m, 3-6 g, 27-35 1/2 lb r, 146 c, 725 h and mu. Pres. Thos. Lowry, V. Pres. C. Morrissey, Treas. W. W. Herrick, Sec. & Supt. C. G. Goodrich.

MOBILE, ALA.—City R.R. Co. 17 1/2 m, 5-2 g, 36-70 lb r, 68 c, 240 h. Pres. Jno. Maguire, Sec. I. Strausse, Treas. Myer I. Goldsmith, Supt. A. Moog.

Dauphin & Lafayette St. Ry. Co. 2 m, 5-2 1/2 g, 40 lb r, 9 c, 22 h. Pres. D. P. Bestor, V. Pres. G. Y. Overall, Sec. & Treas. James W. Gray, Pur. Agt. & Man. J. G. Robertson.

Mobile & Spring Hill R.R. Co. 8 m, 5-2 1/2 g, 35 lb r, 15 c, 35 h, 1 dummy. Pres. Daniel M. Neill, Sec. & Treas. C. F. Sheldon, Man. F. Ingato.

MOHAWK, N. Y.—Mohawk & Lion R.R. Co. 1 1/2 m, 4-8 1/2 g, 30 lb r, 4 c (contract for motive power). Pres. O. W. Brouson, V. Pres. John Brown, Sec. H. J. Alexander, Treas. R. M. Devendorf, Supt. O. W. Brouson.

MOLINE, ILL.—Moline Central St. Ry. Co. 1 1/2 m, —g, —lb r, 3 c, 11 h. Pres. S. W. Wheelock, V. Pres. M. Y. Cady, Sec. W. R. Moore, Treas. C. F. Hemenway.

Moline & Rock Island St. Ry. Co. —m, —g, —lb r, —c, —h. Pres. J. Huntoon, Sec. I. M. Buford, Treas. C. Lyons, Supt. Wm. Gamble.

MONTREAL, CAN.—Montreal City Pass. Co. 21 m, 4-8 1/2 g, —lb r, 76 c, 465 h. Pres. Jesse Joseph, V. Pres. Wm. Smith, Sec. & Man. Ed. Lusker, Supt. I. H. Hobbland.

MOULTREVILLE, S. C.—Middle St. & Sullivan's Landing Ry.

MUSKOGON, MICH.—Muskegon Ry. Co. 4 1/2 m, 3-6 g, 20 lb r, 8 c, 26 h, 8 mu. Pres. F. A. Nims, V. Pres. Chas. Merriam, Boston, Mass., Sec. Thomas Munroe, Treas. G. R. Sherman, Supt. C. H. Newell.

NASHUA, N. H.—Nashua St. Ry. Co. Nashville, TENN.—Nashville & Edgefield R. R. Co. Patherland Street Railway Co. North Edgefield and Nashville St. R.R. Co., one management. 5 m, 5 g, 16 lb r, 21 c, 100 h. Pres. John S. Bransford, Sec. Percy Keenan, Supt. Jno. T. Voss.

McGavock & Mt. Vernon Horse R.R. Co. Nashville D. & N. St. R.R. Co. 7 1/2 m, 5 g, 16-32 lb r, 25 c, 140 mu. Pres. Jno. P. White, V. Pres. B. F. Wilson, Sec. & Treas. H. B. Stubbsfield, Supt. D. Dead-erick.

South Nashville St. R.R. Co. 4 1/2 m, 5 g, 16-20 lb r, 10 c, 68 h. Pres. W. M. Duncan, Sec., Treas. & Supt. C. L. Fuller.

NEVADA, MO.—Nevada Street Ry. Co. NEW ALBANY, IND.—New Albany St. Ry. Co. 6 m, 4-11 g, 25 lb r, 15 c, 50 h. Pres. Geo. T. Vance, Sec. G. Vance, Treas. Letitia V. Vredenburg, Supt. Wm. L. Timberlake.

NEWARK, N.J.—The Newark & Bloomfield St. R.R. Co. 7 m, 5-2 1/2 g, 47 lb r, 22 c, 140 h. Pres. S. S. Batin, Sec. W. L. Mulford, Supt. H. F. Totten.

Broad St. R.R. NEW BEDFORD, MASS.—New Bedford & Fairhaven St. Ry. Co. 7 1/2 m, 4-8 1/2 g, 35-40 lb r, 38 c, 138 h. Pres. Warren Ladd, Treas. Andrew G. Pierce, Clerk Edward T. Pierce.

Acushnet St. R.R. Co. (not in operation.) Pres. Chas. E. Cook, Sec. & Treas. A. P. Smith.

NEWBURYPORT, MASS.—Newburyport & Amesbury Horse R.R. Co. 6-1-3 m, 12 c, 54 h. Pres. W. A. Johnson, Treas. N. H. Shepard, Sec. Geo. H. Stevens.

NEW HAVEN, CONN.—Fair Haven & Westville R.R. Co. 7 m, 4 1/2 g, 42 lb r, 23 c, 151 h. Pres. H. B. Ives, Sec. & Treas. G. Cander, Supt. Walter A. Graham.

New Haven & Centreville Horse R.R. Co. 2 1/2 m, 4-8 1/2 g, 42 lb r, 4 c, 30 h. Trustee Cornelius Pierpont, State Street Horse R.R. Co. 2 1/2 m, 4-8 g, 43 lb r, 4 c, 40 h. Pres. C. A. Warren, Sec. & Treas. C. B. Chien.

The Whitney Ave. Horse Ry. 2 1/2 m, 4-8 1/2 g, 25 lb r, 3 c, 25 h. Pres. Geo. H. Watsons, Sec. George D. Watson, Treas. Ed. Whitney, Jr.

NEW ORLEANS, LA.—Canal & Claiborne St. R.R. Co. 13 m, 5-2 1/2 g, 37 lb r, 40 c, 200 h. Pres. E. J. Hart, Sec. & Supt. John H. DeGrange.

Crescent City R.R. Co. 26 m, 5-2 1/2 g, 35 1/2 lb r, 90 c, 400 h. Pres. Frank Roder, Sec. & Treas. Jno. J. J. J. Supt. A. V. Smith.

New Orleans & Carrollton R.R. Co. 8 m, 4-8 1/2 g, 30-45 lb r, 65 c, 190 engines. Pres. Wm. Benthuysen, Sec. Walter F. Crouch, Supt. C. V. Haile.

New Orleans City & Lake R.R. Co. 6 1/2 m, 5-2 1/2 g, 46-40 lb r, 180 c, 39 coaches, dummy engines, 1050 mu. Pres. J. A. Walker, Sec. W. E. Leverich, Supt. F. Wintz.

New Orleans St. R.R. Co. Orleans R.R. Co. —m, —g, —lb r, 32 c, 140 h. & mu. Pres. & Supt. H. Larque, Sec. & Treas. P. Congot, Office, cor. White & LaHarpe Sts.

St. Charles St. R.R. Co. 15 m, 5-2 1/2 g, 35 lb r, 60 c, 366 m. Pres. & Supt. Alden McLellan, Sec. Vincent Riviere.

NEWPORT, KY.—Newport St. R.R. Co. NEW YORK, N.Y.—Ninth Ave. R.R. Co. 8 m, 4-8 1/2 g, 60 lb r, 45 c, 380 h. Pres. W. H. Hayes, Sec. & Treas. James Affleck, Supt. Herman B. Wilson.

Broadway & Seventh Ave. R.R. Co. 7 m, 4-8 1/2 g, 47-60 lb r, 150 c, 1,350 h. Pres. James W. Foshay, Sec. & Treas. Thos. B. Kerr, Supt. Henry A. Newell.

Central Crosstown R.R. Co. 2 1/2 m, 4-8 1/2 g, 52 lb r, 42 c, 231 h. Pres. John B. Slawson, V. Pres. A. Can- nack, Sec. M. J. Masson, Treas. John L. Macaulay.

Central Park North & East River R.R. Co. 14 m, 4-8 1/2 g, 60 lb r, 162 c, 1,225 h. Pres. J. H. Scribner, V. Pres. C. D. Wyman, Sec. H. Scribner, Treas. J. L. Valentine, Supt. M. W. A. Harris.

Christopher & Tenth St. R.R. Co. 5 m, 4-8 g, 45 lb r, 47 c, 290 h. Pres. Jacob Sharp, Treas. W. T. Hatch, Sec. & Supt. George W. Lynch.

Dry Dock, East Broadway & Battery R.R. Co. 11 1/2 m, 4-8 1/2 g, 60 lb r, 187 c, 1,132 h. Pres. William White, Auditor E. T. Landon, Sec. & Treas. Richard Kelly, Supt. Fred F. White. Offices, 605 Grand st.

Fourth Ave. R.R. Co. 10 m, 4-8 1/2 g, 60 lb r, 112 c, 1155 h. Pres. W. H. Hays, Sec. & Treas. James Affleck, Supt. H. B. Wilson.

Forty-Second Street & Grand Street Ferry R.R. Co. 5 1/2 m, 8-4 g, 64 lb r, 50 c, 500 h. Pres. Chas. Curtis, Sec. & Treas. E. S. Allen, Supt. John M. Calhoun.

Harlem Bridge, Morrisaula & Fordham Ry. 4 1/2 m, 4-8 1/2 g, 45-60 lb r, 65 c, 233 h. Pres. Henry Spratley, V. Pres. Richard M. Hoe, Sec. & Treas. Wm. Cald-well.

Houston, West Street & Pavonia Ferry R.R. Co. 5 m, 4-8 1/2 g, 60 lb r, 50 c, 400 h. Pres. Richard Kelly, Sec. & Treas. Daniel B. Hasbrook.

Jerome Park R.R. 1 m, 4-8 1/2 g, 50-56 lb r. Pres. Leonard M. Jerome, Sec. Fred A. Lovcraft, Treas. Theodore Moss.

New York City St. Ry. Co. 10 m, [not in operation]. Pres. Loomis L. White, Sec. W. L. McCorkle, Treas. Wm. L. Skidmore.

New York & Harlem R.R. Co. 5 1/2 m, 4-8 1/2 g, 56-75 lb r, 144 c, 1,408 h. Pres. W. H. Vanderbilt, V. Pres. & Sec. Cornelius Vanderbilt, Treas. Ed. V. W. Ross-ter, Supt. Alfred Skitt, Pur. Agt. Chas. Reed.

Sixth Ave. R.R. Co. 4 m, 4-8 1/2 g, 60 lb r, 127 c, 1296 h.

South Ferry Ry. Co. 3 1/2 m, 4-8 1/2 g, 60 lb r, 13 c, 41 h. Pres. Henry Hart, Sec. Wm. N. Cohen, Treas. Albert J. Elias, Supt. Chas. H. Meeks.

The Second Ave. R.R. Co. 13 m, 4-8 1/2 g, 60 lb r, 316 cars, 1750 h. Pres. W. Thorn, V. Pres. J. Wadsworth, Sec. & Treas. J. B. Underhill.

The Third Ave. R.R. Co. 13 1/2 m, 4-8 1/2 g, 60 & 74 lb r, 318 c, 2150 h. (3/4 m of cable road on 10th ave.) Pres. Lewis Lyon, 739 Madison ave., V. Pres. Henry Hart, 110 Tribune Building, Sec. Alfred Lazarus, 436 W. 61st st., Treas. John Beaver, 211 E. 112th st., Supt. John H. Robertson, 307 E. 55th st.

Twenty-third St. R.R. Co. 7 m, 4-8 1/2 g, 54 lb r, 102 c, 692 h. Pres. Jacob Sharp, Sec. Thos. H. McLean, Treas. Lewis May, Act-Supt. George Ferry.

NIAGARA FALLS, N. Y.—Niagara Falls & Sus- pension Bridge Ry. Co. 2 1/2 m, 4-8 1/2 g, 38 1/2 lb r, 8 c, 36 h. Pres. Benj. Flagler, V. Pres. Alva Chich, Sec. W. J. Mackay, Treas. A. Schoellkopf.

NORFOLK, VA.—Norfolk & City R.R. Co. 3 1/2 m, 5-2 g, 44 lb r, 18 c, 65 h. Pres. John B. Whitehead, Treas. H. C. Whitehead, Supt. E. W. Savage.

NORTHAMPTON, MASS.—Northampton St. Ry. Co. 3 1/2 m, 4-8 1/2 g, 32 lb r, 7 c, 26 h. Pres. Oscar Edwards, Sec. M. H. Spaulding, Treas. & Sup. E. C. Clark.

NORWALK, CONN.—Norwalk Horse R.R. Co. 2 m, 4-10 g, —lb r, 7 c, 20 h. Pres. James W. Hyatt, V. Pres. & Sec. Edwin G. Hoyt, Supt. James W. Hyatt.

NORWICH, CONN.—Norwich Horse R.R. Co. OAKLAND, CAL.—Alameda, Oakland & Pied- mont R.R. Berkeley Villa R.R. Broadway & Piedmont St. R.R. Co. Fourteenth St. R.R. Co. 6 m, 5 g, 20-30 lb r, 6 c, —h. Pres. & Supt. Walter Blair, Sec. P. J. Van Loben.

Oakland R.R. Co. OGDEN CITY, UTAH.—Ogden City Ry. Co. 3 m, 4-8 1/2 g, 20 lb r, 4 c, 21 h. Pres. L. W. Shurtieff, Ogden City, V. P. & Supt. O. P. Arnold, Salt Lake City, Sec. & Treas. H. S. Young, Ogden City.

OLEAN, N.Y.—Olean St. Ry. Co. 1-10 m, 3-6 g, 25 lb r, 3 c, 8 h. Pres. M. B. Fobes, Sec. & Treas. M. W. Barse.

OMAHA, NEB.—Omaha Horse Ry. Co. 15 m, 4-8 1/2 g, 35 lb r, 40 c, 300 h. Pres. Frank Murphy, V. Pres. Guy C. Barton, Treas. W. W. Marsh, Supt. W. A. Smith.

ONEIDA VILLAGE, N. Y.—Oneida St. Ry. Co. —m, —g, —lb r, —c, —h. Pres. Jerome Heacock.

OSHKOSH, WIS.—Oshkosh St. R.R. Co. 3 1/2 m, 4-8 1/2 g, 27 lb r, 9 c, 24 h. Pres. Tom Wall, V. Pres. F. Zentner, Sec. & Treas. J. Y. Hull, Sup. F. L. Thompson.

OSWEGO, N.Y.—Oswego St. Ry. Co. 2 m, 4-8 1/2 g, 45 lb r, 3 c, —h. Pres. Jas. F. Johnson, V. Pres. R. J. Olliphant, Sec. Haynes L. Hart, Treas. Robt. G. Post, Gen. Man. James O'Connor. [Not in operation yet.]

OTTAWA, ONT.—Ottawa City Passenger Ry. Co. 3 m, 4-8 1/2 g, 34 lb r, 1 c, 40 h. Pres. Thomas C. Keef- er, V. Pres. R. Blackburn, Sec. James D. Traser.

OTTUMWA, IA.—Ottumwa St. R.R. Co. 2 m, 3-6 g, 27 lb r, 4 c, 2 h, 14 mu. Pres. J. M. Hedrick, Sec. & Treas. H. L. Hedrick, Supt. C. M. Hedrick.

Mineral Springs St. Ry. Co. 1 m, 1 c. PADUCAH, KY.—Park R.R. Co. PARIS, TEX.—Paris St. Ry. Co. PATERSON, N. J.—Paterson & Passaic R.R. Co. 7 m, 4-10 g, 33 lb r, 16 c, 24 h. Pres. John N. Ter- mane, Treas. John L. Brown, Sec. F. S. Brown, Man. & Pur. Agt. Ambrose T. King, Supt. M. O. Rourke.

Paterson City R.R. Co. 6 1/2 m, 4-8 1/2 g, 35 lb r, 12 c, 31 h. Pres. Garrett Pianten, Treas. Helmas Romaine, Sec. Albert A. Whiteox.

PENSACOLA, FLA.—Pensacola St. Ry. Co. PEORIA, ILL.—Central City Horse Ry. Co. 4 1/2 m, 4-8 1/2 g, 40 lb r, 60 c, 135 h. Pres. H. R. Woodward, Sec. M. Pfeiffer, Treas. H. N. Wheeler, Supt. John Strong.

Fort Clark Horse Ry. Co. Peoria Horse Ry. Co. 7 1/2 m, 4-8 1/2 g, 40 lb r, 63 c, 140 h. Pres. H. Woodward, Sec. M. Pfeiffer, Treas. H. N. Wheeler, Supt. John Strong.

PETERSBURGH, VA.—Petersburgh St. Ry. Co. 3 1/2 m, 4-8 1/2 g, 42 lb r, 9 c, 44 h. George Beadle, Proprietor.

PHILADELPHIA, PA.—Citizens Pass. Ry. Co. 10 1/2 m, 5-2 g, 45-47 lb r, 92 c, 420 h. Pres. John Mc- Carthy, Sec. & Treas. John J. Adams, Supt. Sam'l Cline.

Frankford & Southwark Phila. City Pass. R.R. Co. 18-1-10 m, 5-2 g, 47 lb r, 91 c, 8 dummy c, 580 h. Pres. Henry Geiger, Sec. & Treas. Geo. L. Gaudy, Supt. W. H. Janney.

Hestonville, Mantua & Fairmount Pass. R.R. Co. 20 m, 5-2 g, 43 lb r, 50 c, 480 h. Pres. Charles F. Laffer- ty, Sec. & Treas. W. C. Poster.

Lehigh Ave. Pass. Ry. Co. Pres. John Lamon, Sec. Chas. A. Porter, Treas. John L. Hill. [Track not laid.] Lombard & South Sts. Pass. Ry. Co. —m, 5-2 g, 43 lb r, 51 c, 276 h. Pres. John B. Parsons, Sec. & Treas. Francis Hazelhurst Supt. Jno. M. Gaughan.

People's Pass. Ry. Co. 44 m, 5-2g, 47 lb r, 125 c, 1,080 h. Pres. C. J. Harrah, V. Pres. C. J. Harrah, Jr., Sec. & Treas. Jno. C. Dessalet, Supt. Wm. Hagenswiler.

Philadelphia City Pass. Ry. Co. 7 m, 5-2 1/2 g, 47 lb r, —c, —h. Pres. Wm. W. Colket, Sec. & Treas. T. W. Pennypacker.

Philadelphia Traction Co. 109 m, 5-2 1/2 g, 45-78 lb r, 595 c, 3,160 h. Pres. W. H. Kemble, V. Pres. P. A. B. Widener & W. L. Elkins, Sec. & Treas. D. W. Dick- inson.

Philadelphia & Gray's Ferry Pass. R.R. Co. 10-1-3 m, 40 c, 200 h. Pres. Matthew Brooks, Treas. J. C. Dawes, Sec. J. Crawford Dawes, Supt. Patrick Lov- ett.

Ridge Avenue Pass. Ry. Co. 14 m, 5-2 g, 47 lb r, 55 c, 352 h. Pres. E. B. Edwards, V. Pres. John Lam- bert, Sec. & Treas. Wm. S. Blight, Supt. William Ingles.

Second & Third Sts. Pass. Ry. Co. 37 m, 116 c, 669h. Pres. Alexander M. Fox, Treas. William F. Miller, Sec. Charles D. Matlack, Supt. David W. Stevens.

Seventeenth & Nineteenth Sts. Pass. Ry. Co. 7 1/2 m. Pres. Matthew S. Quay, Sec. & Treas. John B. Ped- die. [Leased to Philada. Traction Co.]

Thirteenth & Fifteenth Sts. Pass. Ry. Co. 14 m, 5-2 g, 43 lb r, 73 c, 452 h. Pres. Thos. W. Ackley, Sec. & Treas. Thos. S. Harris, Supt. Wm. B. Cooper.

Union Pass. Ry. Co. 70 m, 348 c, 1,724 h. Pres. Wm. H. Kemble, Sec. & Treas. John B. Peddie, Supt. Jacob C. Petty.

West Philadelphia Pass. Ry. Co. 18 1/2 m, 122 c, 646 h. Pres. Peter A. B. Widener, Sec. & Treas. D. W. Dickson. (Leased by the Phila. Traction Co.)

PHILLIPSBURGH, N. J.—Phillipsburgh Horse Car Ry. Co. 2 1/2 m, 4-8 g, 35 lb r, 4 c, 13 h. Pres. Daniel Ruukle, Sec. & Treas. James W. Long.

PITTSBURGH, PA.—Central Pass R.R. Co. 3 m, 16 c, 95 h. Pres. J. F. Culey, Sec. F. L. Stephenson, Treas. E. R. Jones, Supt. R. G. He ron.

Beaver Falls & New Brighton Ry. Co. Citizens' Pass. Ry. Co. 16 1/2 m, 5-2 1/2 g, 47 lb r, 40 c, 337 h. Pres. Jno. G. Holmes, Sec. C. M. Gormly, Supt. Murry Verner.

Federal St. & Pleasant Valley Pass. Ry. Co. 26 m, 5-2 1/2 g, 46-50 lb r, 20 c, 154 h. Pres. Wm. H. Creery, Treas. James Boyle, Supt. Wm. J. Crozier, Allegheny City.

People's Park Pass. Ry. Co. 2 m, 5-2 1/2 g, —lb r, 10 c, 75 h. Pres. Wm. McCreery, Treas. James Boyle, Supt. Wm. J. Crozier, Allegheny City.

Pittsburgh, Allegheny & Manchester Pass. Ry. Co. 5 m, 5-2 1/2 g, 46 lb r, 40 c, 275 h. Pres. Chas. Atwell, Sec. & Treas. Chas. Seibert, Supt. James C. Cotton.

Pittsburgh, Oakland & East Liberty Pass. Ry. Co. 11 m, 5-4 1/2 g, 47 lb r, 32 c, 110 h, 61 mu. Pres. J. T. Jordan, Sec. John G. Traggardth, Treas. D. W. C. Bidwell, Supt. H. M. Cherry.

Pittsburgh Union Pass. Ry. Co. 5 m, 5-2 1/2 g, 45 lb r, 29 c, 170 h. Pres. James H. Sewell, Treas. J. J. McDonnell, Sec. Chas. Seibert, Pittsburgh, Cash. Charles W. Goodnow, Supt. Joe S. Murray.

Pittsburgh & Birmingham Pass. R.R. Co. 3 1/2 m, 5-2 1/2 g, 48 lb r, 20 c, 170 h. Pres. W. W. Patrick, Sec. D. F. Agnew, Treas. John G. Holmes.

Pittsburgh & West End Pass. Ry. Co. 3 1/2 m, 5-2 g, 35 lb r, 13 c, 75 h. Pres. John C. Reilly, Sec. & Treas. Thomas S. Bigelow, Supt. William J. Burns.

Pittsburgh & Wilkensburg St. Ry. Co. Second Avenue Pass. Ry. Co. South Side Pass. R.R. Co. 2 1/2 m, 5-2 1/2 g, 45 lb r, 12 c, 80 h. Pres. D. Z. Brickell, Sec. & Treas. W. T. Wal- lace, Supt. W. M. Rosborough.

Transverse Pass. Ry. Co. 6 1/2 m, 5-2 g, 52 lb r, 39 c, 243 h. Pres. C. L. Magee, V. Pres. C. F. Klopfer, Sec. & Treas. Wm. R. Ford, Supt. Miller Elliot.

PITTSBURGH, PA.—Pittsburg St. R.R. Co. 1 1/2 m, 3 c, 5 h. Pres. Thomas Griffith, Treas. M. W. Morris, Sec. William Allen.

PORT HURON, MICH.—Port Huron St. Ry. Co. PORTLAND, ME.—Ocean St. R.R. Co. Portland R.R. Co. 7 1/2 m, 4-8 1/2 g, 30-33-45 lb r, 34 c, 154 h. Pres. H. J. Libby, Treas. & Gen. Man. E. A. Newman, Supt. Geo. W. Soule.

PORTSMOUTH, O.—Portsmouth St. R. R. Co. 2 m, 3-6 g, 18 lb r, 4 c, 10 h. Pres. James Skeiton, Treas., Sec. & Supt. Enas Reed.

POTTSVILLE, PA.—People's Ry. Co. 9 1/2 m, 16 c, 56 h.

POUGHKEEPSIE, N. Y.—City R.R. of Pough- keepsie. 3 m, 4-8 1/2 g, 35 lb r, 11 c, 38 h. Pres. Aaron Imms, V. Pres. G. B. Adrance, Sec. A. B. Smith, Treas. Hudson Taylor, Supt. C. M. Davis.

PROVIDENCE, R. I.—Union R.R. Co. 50 m, 4-8 1/2 g, 24-54 lb r, 240 c, 1,200 h. Pres. Jesse Metcalf, V. Pres. & Gen. Man. D. F. Longstreet, Sec. and Treas. C. A. Babcock, Aud. B. A. Jackson.

QUEBEC, CAN.—Quebec St. Ry. Co. 3 m, 4-8 1/2 g, 45 lb r, 9 c, 40 h. Pres. Chas. St. Michel, Quebec, V. Pres. G. Renfrew, Quebec, Sec. Treas. & Supt. Samuel Moore, Book-keeper, Francis Boomer.

Quebec R.R. Co. St. John St. R.R.

QUINCY, ILL.—Quincy Horse Ry. & Carrying Co. 6 m, 5 g, 71 lb r, 21 c, 118 mu. Pres. Lorenzo Bull, Sec. C. H. Bull, Supt. E. K. Stone.

RACINE, WIS.—Belle City St. Ry. Co. READING, PA.—Reading City Pass. Ry. Co. 2-1-5 m, 5-2 1/2 g, 45 lb r, 19 c, 44 h. Pres. B. F. Owen, V. Pres. Jas. L. Douglass, Sec. & Treas. H. A. Muhlen- berg, Supt. J. A. Riggs.

Perkiomen Ave. Pass. Co. 2-1-5 m, 5-2 1/2 g, 45 lb r, 14 c, 36 h. Pres. Chas. Brenner, Sec. & Treas. Isaac Hester, Supt. John B. Houpp.

RED OAK, IA.—Red Oak St. R.R. Co. 1 1/2 m, 4-2 1/2 g, flat r, 2 c, 2 h, 2 mu. Pres. J. W. Judkins, V. Pres. Geo. West, Sec. F. M. Byrket, Treas. & Supt. F. O. Judkins.

RICHMOND, IND.—Richmond City Ry. Co. 3 m, 3 g, 25 lb r, 9 c, 30 h. Pres. J. Y. Miller, V. Pres. Joseph Karliff, Treas. H. I. Miller, Supt. F. M. Francisco.

RICHMOND, ILL.—Richmond St. R.R. Co.

RICHMOND, VA.—Richmond City Ry. Co. 7 m, 4-8 1/2 g, 60 40 lb r, 40 c, 180 h. Pres. J. H. Schoolcraft, Sec. & Treas. F. D. Mellen, Man. C. M. Baeton, Supt. Charles Steders.

ROCHESTER, N. Y.—Rochester City & Brighton R.R. Co. 22 m, 4-8 1/2 g, 45 lb r, 120 c, 500 h. Pres. Patrick Barry, Sec. C. C. Woodworth, Treas. C. B. Woodworth, Supt. Thomas J. Brower.

Citizens' St. Ry. Co. Pres. Wm. H. Jones, Sec. & Treas. J. E. Pierpont, Supt. S. A. Green.

ROCKFORD, ILL.—Rockford St. Ry. Co. 6 2-5 m, 4-8 1/2 g, 30 lb r, 13 c, 52 h, 16 m. Pres. Anthony Haines, Sec. H. H. Robinson, Treas. N. E. Lyman.

ROCK ISLAND, ILL.—Rock Island & Milan St. Ry. Co. 7 m, 4-8 1/2 g, 20-30 lb r, 10 c, 7 h. Pres. & Supt. Bally Davenport, Sec. E. H. Gayer, Treas. John Peety.

RONDOUT, N. Y.—Kingston City R.R. Co. 2 4-5 m, 4-8 1/2 g, 40 lb r, 10 c, 40 h. Pres. James G. Lindsley, V. Pres. S. D. Coykendoll, Sec. & Treas. John C. Romeyer, Supt. Wm. H. DeGarmo.

SACRAMENTO, CAL.—Sacramento City St. R.R. Co.

SAGINAW, MICH.—Saginaw St. R.R. Co. 2 1/2 m, 4-8 1/2 g, 42 lb r, 10 c, 50 h. Pres. David H. Jerome, V. Pres. Geo. F. Williams, Sec. & Treas. Geo. L. Burrows, Supt. Fred G. Benjamin.

SALEM, MASS.—Salem & Danvers St. Ry. Co. 6 m, 4-8 1/2 g, 35-47 lb r, 15 c, 45 h. Pres. Benj. W. Russell, Sec. G. A. Vickery, Treas. Geo. W. Williams, Supt. W. B. Furgurson, Asst. Supt. David N. Cook.

Naumkeag St. Ry. Co. — m, 4-8 1/2 g, 30-35 45 lb r, 50 c, 140 h. Pres. Chas. Odell, Clerk Joseph F. Hickey, Treas. Henry Wheatland, Supt. Willard B. Ferguson.

SALT LAKE CITY, UTAH.—Salt Lake City R.R. Co. 13 m, 4-8 1/2 g, 30 lb r, 20 c, 115 mu. Pres. John Taylor, Sec. David McKenzie, Treas. James Jack, Supt. Orson P. Arnold.

SAN ANTONIO, TEX.—San Antonio St. Ry. Co. 15 m, 4 g, 30 lb r, 38 c, 125 mu. Pres. A. Belknap, San Antonio, V. Pres. F. W. Pickard, N. Y. City, Treas. I. Withers, San Antonio, Sec. E. R. Norton, Supt. John Robb.

Prospect Hill St. Ry. Co.

SANDUSKY, O.—Sandusky St. Ry. Co. 2 m, — g, — lb r, — c, — h. Pres. Chas. B. Ods, Sec. & Treas. A. C. Morse, Supt. Clark Rude.

SAN FRANCISCO, CAL.—California St. R.R. Co. Central R.R. Co. 6 m, 4-8 g, 45 lb r, 31 c, 290 h. Pres. Chas. Main, V. Pres. Jos. Roseberg, Treas. A. J. Gunnison, Sec. C. G. LeBreton, Supt. J. F. Clark.

Clay St. Hill R.R. Co. 1 m, 3-6 g, 30 lb r, 11 c, 12 dummy cars. Pres. Joseph Britton, V. Pres. James Moffit, Treas. Henry L. Davis, Sec. Chas. F. Campbell, Supt. Joseph Britton.

Clay St. Park & Ocean R.R. Co.

Market St. Cable Ry. Co. 10-9-10 m, 4-8 1/2 lb r, 137 c, 2 motors, 73 h. Pres. Leland Stanford, V. Pres. Chas. F. Crocker, Treas. N. T. Smith, Sec. J. L. Willcutt.

North Beach & Mission R.R. Co. 8 m, 5 g, 46 c, 400 h. Pres. Jos. Rosenberg, Sec. H. W. Hathorne, Treas. Carl Ahfel, Supt. M. Skelly.

Omnibus R.R. & Cable Co. 8 1/2 m, 5 g, 35-45 lb r, 50 c, 364 h. Pres. Gustav Sutro, V. Pres. D. Callaghan, Sec. G. Ruegg, Supt. M. Martin.

Portrero & Bay View R.R. Co. 1 1/2 m, 5 g, 35 lb r, 20 c, 64 h. Pres. Leland Stanford, V. Pres. Chas. Crocker, Treas. N. T. Smith, Sec. J. L. Willcutt.

Sutter St. R.R. Co. 5 1/2 m, 4-11 g, 35-45 lb r, 30 c, 125 h. Pres. R. F. Morrow, Sec. A. K. Stevens, Treas. M. Schmitt, Supt. James McCord.

Telegraph Hill St. Ry. Co. 1,707 ft, 4-11 g, 36 lb r, 3 c, — h. Pres. Gustav Sutro, V. Pres. E. O. Demick, Sec. & reas. C. J. Werner.

The City R.R. Co. 5 1/2 m, 5 g, 48 lb r, 73 c, 285 h. Pres. R. B. Woodward, V. Pres. Geo. E. Raum, Sec. M. E. Willis, Treas. J. H. Goodman, Supt. William Woodward.

SAN JOSE, CAL.—San Jose & Santa Clara R.R. Co.

First St. & San Pedro St. Depot R.R. Co. Market St. & Willow Glen R.R. Co. North Side R.R. Co. People's R.R. Co.

SANTA BARBARA, CAL.—Santa Barbara St. R.R. Co. 1 m, 3-6 g, 3 c, 8 mu. Pres. A. W. McPhail.

SAUGATUEK, CONN.—Westport & Saugatuek Horse R.R.

SAVANNAH, GA.—City & Suburban Ry. Co. 18 1/2 m, 5 g, 16-30 lb r, 49 c, 110 h, 3 engines. Pres. J. H. Johnson, Asst. J. W. Alley, Treas. E. Schmidt.

Coast Line R.R. Co. 7 m, 5 g, 30 lb r, 17 c, 37 h. Pres. Geo. Parsons, New York, Sec., Treas. & Gen. Man. R. E. Cobb, Savannah.

SAYRE, PA.—Sayre St. Ry. Co. Pres. Howard Elmer (organization not completed).

SCRANTON, PA.—People's St. Ry. Co. 9 1/2 m, 4-8 1/2 g, 25-52 lb r, 19 c, 70 h. Pres. Wm. Matthews, Sec. & Treas. J. C. Platt.

SEARCY, ARK.—Searcy & West Point R.R. Co. 8 m, 4-8 1/2 g, 20 lb r, 7 c, 6 mu. Pres. A. W. Yarnell, Sec. W. H. Lightle, Treas. Jasper Hicks.

SEATTLE, W. T.—Seattle City Ry. Co. 3 1/2 m, 4-8 1/2 g, 35 lb r, 5 c, 20 h. Pres. F. H. Osgood, Sec. Geo. Kinnear.

SEDALIA, MO.—Sedalia St. Ry. Co. 2 1/2 m, 4-10 g, 51 lb r, 6 c, 31 h. Pres. Joseph D. Sicher, V. Pres.

Louis Deutsch, Treas. F. H. Guenther, Sec. & Supt. Chas. S. Conrad.

SELMA, ALA.—Selma St. R.R. 2 1/2 m, 18 lb r, 5 c, 8 h. Pres. E. Gilman, Sec. & Treas. J. H. Hollis, Supt. W. Rohlla.

SENECA FALLS, N. Y.—Seneca Falls St. Ry. Co.

SHERMAN, TEX.—Sherman City R.R. Co.

SHREVEPORT, LA.—Shreveport City R.R. Co. 1 1/2 m, 4-4 g, 46 lb r, 6 c 14 h. Pres. Peter Youree.

SILVER CLIFF, COL.—Silver Cliff St. R.R. Co.

SLOUX CITY, IA.—Sloux City St. Ry. Co. 5 m, — g, — r, 6 c, 8 h, 4 mu. Pres. Fred T. Evans, V. Pres. D. A. Magee, Sec. & Treas. F. T. Evans.

SOUTH CHICAGO, ILL.—Chicago Horse & Dummy R.R. 5 m, 4-8 1/2 g, — lb r, — c, — h. Pres. D. H. Huff, Treas. A. C. Calkins, Sec. E. R. Bliss. [Not in operation.]

SOUTH PUEBLO, COL.—Pueblo St. R.R. Co.

SPRINGFIELD, ILL.—Citizens' St. R.R. Co. 9 1/2 m, 3-6 g, 20-36 lb r, 23 c, 100 h. Pres. J. H. Schrick, Treas. Frank Reisch, Sec. Chas. F. Harman. Springfield City Ry. Co.

SPRINGFIELD, MASS.—Springfield St. Ry. Co. 4-8 1/2 g, 33-40 lb r, 28 c, 115 h. Pres. John Olmstead, Auditor L. E. Ladd, Clerk Gideon Wells, Treas. A. E. Smith, Supt. F. E. King.

SPRINGFIELD, MO.—The People's Ry. Co. of Springfield, Mo. 3 1/2 m, 4-10 g, 35 lb r, 5 c, 30 h. Pres. J. C. Cravens, Sec. Benj. N. Massey, Treas. Chas. Sheppard, Supt. H. F. Denton.

Springfield R.R. Co. 2 m, 30-40 lb r, 4-8 1/2 g, 7 c, 19 h, 19 mu. Pres. C. W. Rogers, St. Louis, Sec. & Treas. B. F. Hobart, Supt. J. A. Stoughton, No. Springfield.

SPRINGFIELD, O.—Citizens' St. R.R. Co. 10 m, 4 g, 29 c, 135 h. Pres. D. W. Stroud, V. Pres. A. S. Bushnell, Treas. Rose Mitchell, Sec. F. S. Penfield, Supt. W. H. Hanford.

STATEN ISLAND, N. Y.—Staten Island Shore Ry. Co.

ST. CATHARINE'S, ONT.—St. Catharine's, Merrilton & Thorold St. Ry. Co. 5 1/2 m, 4-8 1/2 g, 30 lb r, 7 c, 30 h. Pres. E. A. Smythe, Sec. S. K. Smythe, Supt. E. A. Smythe.

ST. JOSEPH, MO.—Citizens' St. R.R. Co. 3 m, 4-8 1/2 g, 28 lb r, 14 c, 52 mu. Pres. Richard E. Turner, Sec. & Treas. Arthur Kirkpatrick, Supt. John F. Merlam.

Frederick Ave. Ry. Co. 1 1/2 m, 3 g, 16 lb r, 6 c, 16 h. Pres. Thomas E. Toodle, V. Pres. Winslow Judson, Sec. W. D. B. Motter, Treas. Thomas W. Evans, Supt. S. Rowen.

St. Joseph & Lake St. R.R. Co.

Union Ry. Co.

ST. LOUIS, MO.—Baden & St. Louis R.R. Co. 3 1/2 m, 4-10 g, — lb r, 7 c, 21 h. Pres. George S. Case, V. Pres. William Z. Coleman, Supt. J. H. Archer.

Benton & Bellefontaine Ry. Co. 7 1/2 m, 4-10 g, 45 lb r, 29 c, 200 h. Pres. J. G. Chapman, Sec. Robert McCulloch.

Cass Avenue & Fair Grounds Ry. Co. 8 m, 4-10 g, 38 lb r, 37 c, 290 h. Pres. W. R. Allen, V. Pres. Geo. W. Allen, Sec., Treas. & Supt. G. G. Gibson, Cashier O. H. Williams.

Citizens' Ry. Co.

Jefferson Ave. Ry. Co.

Lindell Ry. Co. 1 1/2 m, — g, — r, 65 c, 475 h. Pres. John H. Maquon, V. Pres. John H. Lightner, Sec. & Treas. Geo. W. Baumhoff, Supt. Jos. C. Liewellyn.

Missouri R.R. Co.

Mound City R.R. Co.

Northern Central.

Springfield Ry. Co. 2 m, 4-8 1/2 g, 25-40 lb r, 7 c, 40 h. Pres. C. W. Rogers, St. Louis, Sec. & Treas. B. F. Hobart, Springfield, Supt. J. A. Stoughton, No. Springfield, Asst. Supt. Frank B. Smith, No. Springfield.

Southern Ry. Co. 7 4-5 m, 4-10 g, 35-52 lb r, 49 c, 250 h. Pres. E. R. Coleman, Sec. J. S. Minary, Man. W. L. Johnson.

St. Louis R.R. Co. and the People's R.R. One management. 11 m, 4-10 g, 38-44 lb r, 58 c, 375 h. Pres. Chas. Green, Sec. & Treas. John Mahoney, Supt. Patrick Shea.

Tower Grove & Lafayette R.R.

Union Depot R.R. Co.

Union R.R. Co.

STONEHAM, MASS.—Stoneham St. R.R. Co. 2 1/2 m, 4-8 1/2 g, 33 lb r, 10 c, 28 h. Pres. A. V. Lynde, Melrose, Treas. & Clerk Lyman Dyke, Supt. John Hill.

ST. PAUL, MINN.—Wabash St. Ry. Co.

St. Paul City Ry. Co. 25 m, 4-8 1/2 g, 80 c, 150 h, 294 mu. Pres. Thos. Lowry, V. Pres. C. G. Goodrich, Sec. J. H. Randall, Treas. Clinton Morrison, Supt. A. L. Scott.

STERLING, ILL.—Sterling St. Ry. Co.

STILLWATER, N. Y.—Stillwater & Mechanicsville St. Ry. Co. 4 1/2 m, 4-8 1/2 g, 25-30 lb r, 3 c, 6 h. Pres. S. Rowley, V. Pres. W. L. Denison, Sec. H. O. Bailey, Mechanicsville, Treas. E. N. Smith.

STROUDSBURG, PA.—Stroudsburg Passenger R.R. Co. 1 4-5 m, 4 8/10 g, 28-30 lb r, 3 c, 9 h. Pres. & Treas. J. Lantz, Sec. Jacob Houser.

SYRACUSE, N. Y.—Syracuse & Onondaga R.R. Co. 2 3-5 m, 4-8 g, 28-47 lb r, 9 c, 18 h. Pres. Peter Burns, Sec. & Treas. Lyman C. Smith, Supt. Henry Thompson.

Central City Ry. Co. 2 1/2 m, 4-8 1/2 g, 40 lb r, 12 c, 37 h. Pres. George N. Kennedy, V. Pres. Daniel Pratt, Sec. & Treas. James Barnes, Supt. George Crampton.

Fifth Ward R.R. Co. 2 1/2 m, 4-8 1/2 g, 35-56 lb r, 8 c, 30 h. Pres. P. B. Brayton, Sec. & Treas. O. C. Potter, Supt. Hugh Purnell.

Genesee & Water St. R.R. Co. and Fourth Ward R.R. Co. 4 m, 4-8 1/2 g, 18-30 lb r, 10 c, 35 h. Pres. Robt. G. Wynkoop, Sec. & Treas. Geo. J. Gardiner, Supt. W. J. Hart.

New Brighton & Onondaga Valley R.R. Co. 1 1/2 m, 4-8 g, 16-35 lb r, 2 c, 4 h, 1 dummy. Pres. Matthias Britton, Sec. T. W. Meacham, Treas. J. H. Anderson, Supt. J. H. Anderson.

Syracuse & Geddes Ry. Co. 2 m, 4-8 1/2 g, 35-45 lb r, 10 c, 32 h. Pres. R. Nelson Gere, Sec. & Treas. Rasselias A. Bonta, Supt. Wm. J. Hart.

TAUNTON, MASS.—Taunton St. Ry. Co. 4 1/2 m, 4-8 g, 14 c, 44 h.

TERRE HAUTE, IND.—Terre Haute St. Ry. Co.

4 1/2 m, 1-8 1/2 g, 28 lb r, 16 c, 48 h. Pres. T. C. Buntin, V. Pres. Joseph Collett, Sec. John R. Hagen, Supt. John T. Shriver.

TEXARKANA, ARK.—Texarkana St. Ry. Co. TOLEDO, OHIO.—Toledo Consolidated St. Ry. Co. 17 m, 4-8 g, 42 lb r, 37 c, 180 h. Pres. John B. Bailey, Sec. A. E. Lang. Adams Street Ry. Co.

Metropolitan St. Ry. Co. 8 1/2 m, 3 g, 29 c, 88 h. Pres. Jno. J. Shilphord of Cleveland, Treas. H. E. Wells of Cleveland, Gen. Man. T. F. Shilphord, Supt. Jno. A. Watson.

Monroe Street R.R.

The Central Passenger R.R. Co. of Toledo, O. 8 m, 3 g, 27 lb r, 17 c, 70 h. Pres. F. E. Seagra e, V. Pres. & Treas. James Pazner, Sec. Chas. F. Parks, Supt. A. R. Seagrave.

Toledo Street R.R. Co.

TOPEKA, KAN.—Topeka City Ry. Co. 9 m, 4 g, 25-48 lb r, 25 c, 90 h. Pres. Joab Mulvane, V. Pres. D. W. Stormont, Sec. & Treas. E. Wildes, Supt. Jesse Shaw.

TORONTO, CAN.—Toronto St. Ry. Co. 18 m, 4-10 1/2 g, 30 lb r, 136 c, 670 h. Pres. Frank Smith, Sec. James Green, Supt. John J. Franklin.

TRENTON, N. J.—Trenton Horse R.R. Co. 1 1/2 m, 5-2 g, 43-47 lb r, 10 c, 31 h. Pres. Gen. Lewis Perrine, Sec. & Treas. Lewis Perrine, Jr, Supt. Thomas Killorri. City Ry. Co. 3 m, 5-2 g, 45 lb r, 15 c, 69 h. Pres. Adam Exlor, V. Pres. W. H. Skinn, Sec. H. B. Howell, Treas. & Mang. Director Chas. J. Bramford.

TROY, N.Y.—Cortland & Homer Horse R.R. Co. 4 m, 4-8 1/2 g, 25 30 lb r, 2 c. — h. Pres. C. H. Garrison, Troy, V. Pres. E. A. Fish, Cortland, N. Y., Treas. Jas. M. Milen, Cortland, Sec. S. E. Welch, Cortland. Troy & Albia Street Ry. Co. 3 1/2 m, 4 g, 25 45 lb r, 9 c, 41 h. Pres. Thos. A. Knickerbocker, Sec. & Treas. Theo. E. Halsehurst, Supt. W. R. Bean.

Troy & Lansingburgh R.R. Co. 2 1/2 m, 4-8 1/2 g, 47 lb r, 91 c, 466 h. Pres. William Kemp, V. Pres. Charles Clemmishaw, Sec. & Treas. Joseph J. Hagen, Supt. Leander C. Brown.

URBANA, ILL.—Urbana R.R.

Urbana & Champaign St. Ry. Co. 2 m, 4-8 1/2 g, 33 lb r, 4 c, 20 h. Pres. Wm. Park, Sec. & Treas. Frank G. Jaques, Supt. W. Park.

UTICA, N.Y.—Utica, Clinton & Binghamton St. R.R. 7 1/2 m, 4-8 1/2 g, 43-56 lb r, 17 c, 82 h. Pres. Isaac Maynard, Sec. & Treas. Robt. S. Williams, Supt. Roger Rock.

The Utica & Mohawk R.R. Co. 2 1/2 m, 4-8 1/2 g, 25-40 lb r, 9 c, 5 h. Pres. Chas. W. Hutchinson, V. Pres. Nathan S. Haynes, Sec. Geo. M. Weaver, Treas. Joshua W. Church.

VAITSBURGH, N. J.—Newark, So. Orange, Ferry St. & Hamburg Place R.R. Co.

VALEJO, CAL.—Valejo St. Ry. Co.

VICKSBURG, MISS.—Vicksburg St. Ry. Co.

VINCENNES, IND.—Vincennes St. Ry. Co.

WACO, TEX.—Waco St. Ry. Co. 5 m, 4-8 g, 14-18 lb r, 9 c, 44 h. Pres. E. Rotan, Sec. & Treas. W. R. Kellum, Supt. J. W. Sedbury.

WALTHAM, MASS.—Waltham & Newton St. Ry. Co. 3 1/2 m, 4-3 1/2 g, 30 lb r, 6 c, 14 h. Pres. R. E. Robbins, Sec. & Treas. Henry Bond.

WASHINGTON, D.C.—Capital, No. O. St. & So. Washington R.R.

Anacostia & Potomac River Ry. Co. 3 m, 4-8 g, 37 lb r, 9 c, 24 h. Pres. H. A. Griswold, Sec. Edward Temple, Treas. T. E. Smithsonian.

Columbia R.R. Co. of the District of Columbia. 2 1/2 m, — g, — lb r, 19 c, 56 h. Pres. H. A. Willard, Sec. & Treas. Wm. H. Clayette, Supt. Thos. E. Benson.

Metropolitan R.R. Co. 2 1/2 m, 4-8 g, 38 lb r, 90 c, 400 h. Pres. George W. Pearson, V. Pres. A. A. Wilson, Sec. & Treas. William M. Morse, Supt. L. W. Emmart.

Washington & Georgetown R.R. Co. 10 m, 4 8/10 r, 42 lb r, 161 c, 750 h. Pres. H. Hurt, Sec. & Treas. C. M. Koonen, Gen. Supt. C. C. Sallee.

WATERFORD, N. Y.—Waterford & Cohoes R.R. Co. 2 m, 4-8 1/2 g, 45 lb r. Pres. Thos. Breslin, Sec. & Treas. C. B. Ormsby. (Leased by the Troy & Lansingburgh R.R. Co.)

WEST HURON, CONN.—New Haven & West Haven R.R. Co.

WESTPORT, CONN.—Westport & Saugatuck Horse R.R.

WICHITA, KAN.—Wichita City Ry. Co. 6 m, 8 c, Pres. J. W. Ground, Sec. & Mangr. E. R. Powell.

WHEELING, W. VA.—Citizens Ry. Co.

Wheeling & Elm Grove R.R. 7 m, 4-8 1/2 g, 30 lb r, 12 c, 4 Baldwin Motors. Pres. J. D. DuBois, Sec. E. J. Ruffer.

WILKESBARRE, PA.—Wilkesbarre & Kingston Pass. R.R.

Wilkesbarre & Ashley Passenger R.R. Co.

Coalville Passenger R.R. 2 1/2 m, 4-8 1/2 g, 20-34 lb r, 4 c, 10 h. Pres. Chas. A. Miner, Sec. & Treas. George Loveland, Supt. Albert G. Orr.

WILLIAMSPORT, PA.—WilliamSPORT St. R.R. Co.

WILMINGTON, DEL.—Front & Union St. Passenger Ry. Co.

Wilmington City Ry. Co. 4 1/2 m, 5-2 1/2 g, 45 lb r, 20 c, 82 h. Pres. W. Canby, Sec. & Treas. John F. Miller, Supt. Wm. H. Burnett.

WINDSOR, CAN.—Sandwich & Windsor Passenger R.R. Co.

WINNIPEG, MANITOBA, CAN.—The Winnipeg St. Ry. Co. 5 m, 4-8 1/2 g, 35 lb r, 13 c, 75 h. Pres. Duncan MacArthur, Sec. & Mangr. Albert W. Austin, Supt. Geo. A. Young.

WINONA, MINN.—Winona City Ry. Co. 4 m, 3-6 g, 27 lb r, 10 c, 39 h. Pres. John A. Mathews, V. Pres. B. H. Langley, Sec. & Treas. C. H. Porter.

WOBURN, MASS.—No. Woburn Horse R.R. 2 1/2 m, 4-8 g, 4 c, 4 h. Pres. & Treas. John Carter, Sec. J. G. Maguire, Supt. Dexter Carter.

WORCESTER, MASS.—Worcester St. Ry. Co. 5 1/2 m, 4-8 1/2 g, 45 lb r, 19 c, 100 h. Pres. Geo. H. Seeley, N. Y. City, V. Pres. Nathan Seeley, N. Y. City, Treas. & Supt. Harry S. Searls, Worcester.

YOUNGSTOWN, O.—Youngstown St. R.R. Co.

ZANESVILLE, O.—Bellair, Chillicothe & Canton.

Zanesville & McIntire St. Ry. Co. 3 m, 3-6 g, 38 lb r, 12 c, 54 m. Pres. J. Bergen, Sec. W. C. Townsend, Treas. T. B. Townsend.

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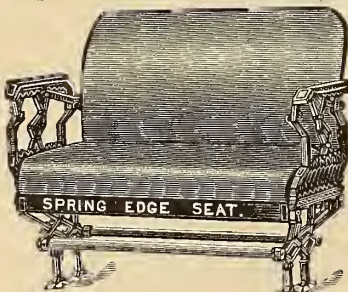
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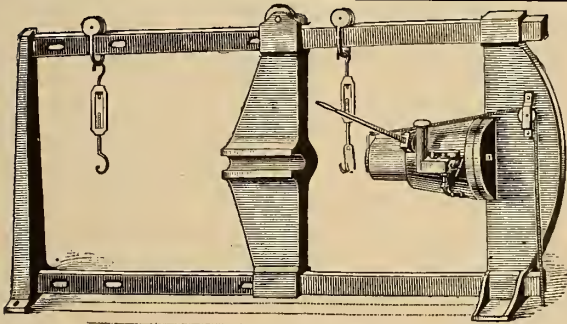
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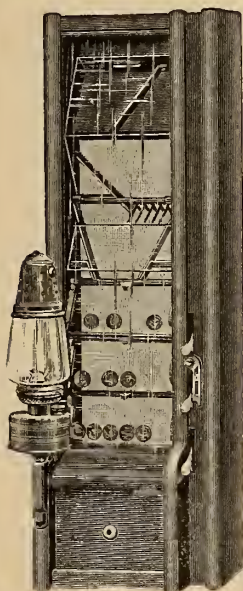
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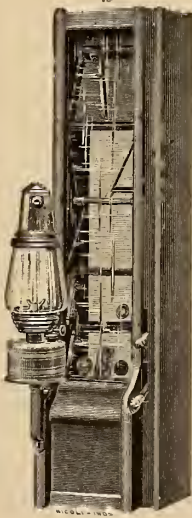
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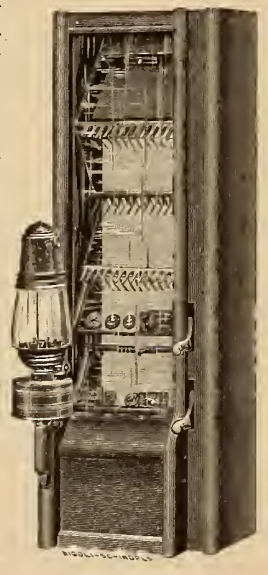
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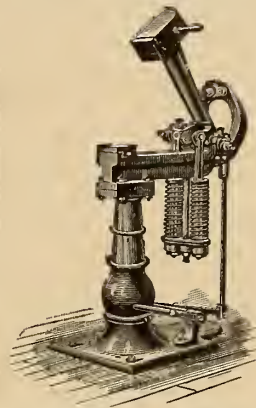
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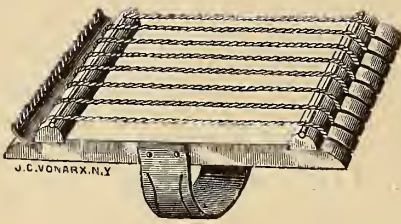


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- Christopher Street Railroad Co., New York.
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- Bushwick Railroad Co., Brooklyn, N. Y.
- Crosstown Railroad Co., Brooklyn, N. Y.
- Coney Island and Brooklyn Railroad Co., Brooklyn, N. Y.
- North Hudson County Railroad Co., Hoboken, N. J.
- Jersey City and Bergen Railroad Co., Jersey City, N. J.
- Ridge Avenue Passenger Railway Co., Philadelphia, Pa.
- Citizens' Passenger Railway Co., Philadelphia, Pa.
- Buffalo Street Railway Co., Buffalo, N. Y.
- New Orleans City and Lake Railroad.
- Philadelphia Traction Company, Philadelphia.
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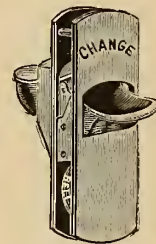
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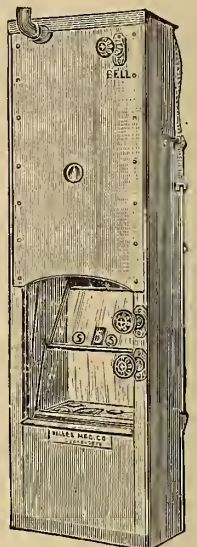
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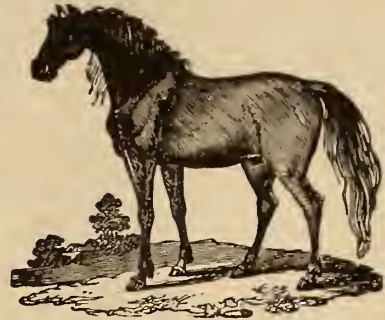
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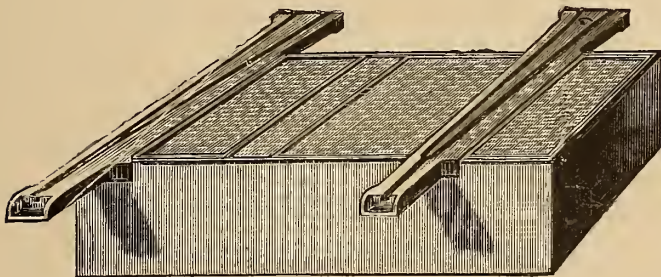
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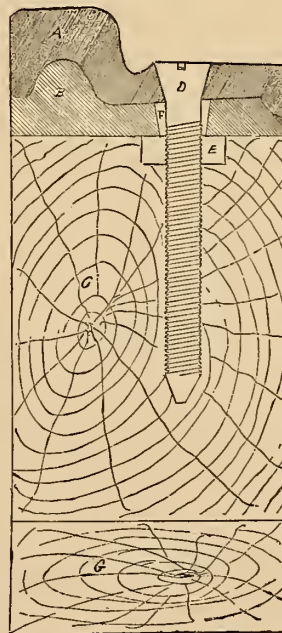
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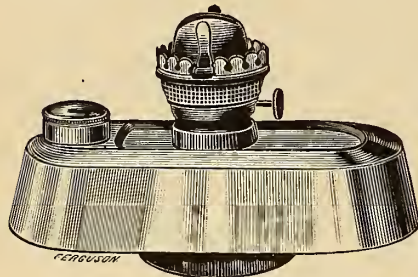
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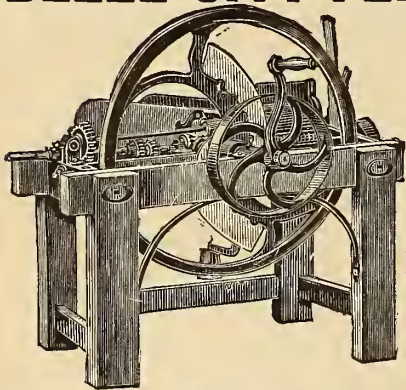


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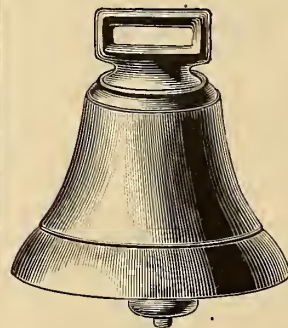
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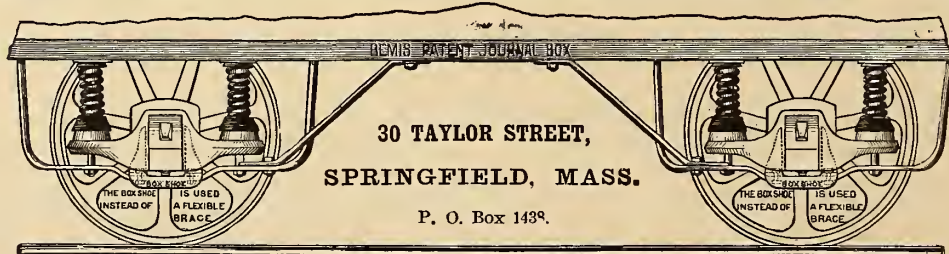
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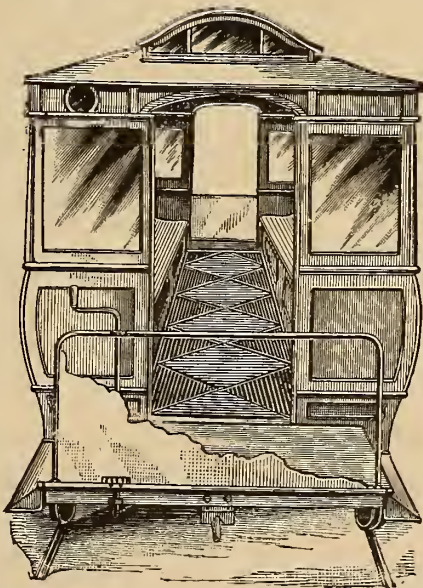
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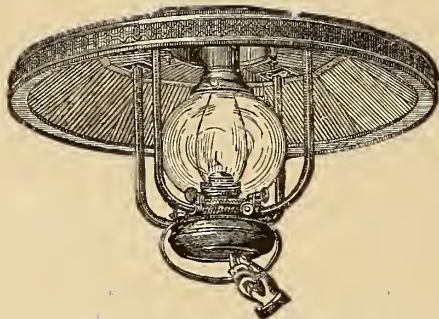
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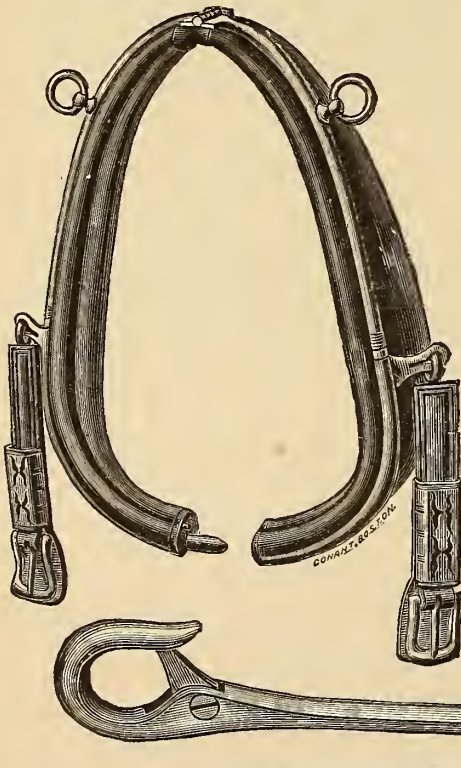
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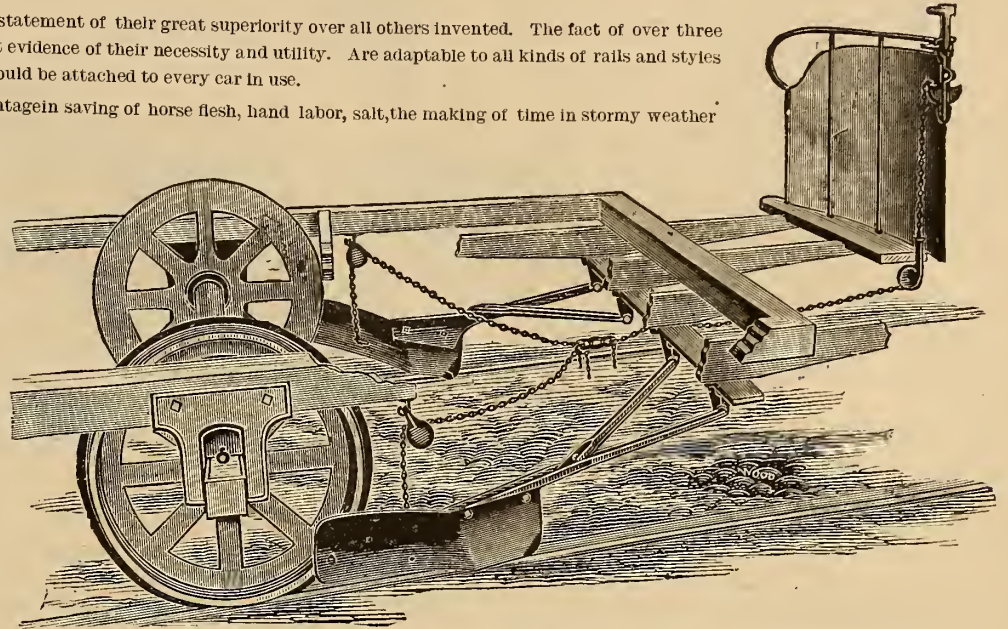
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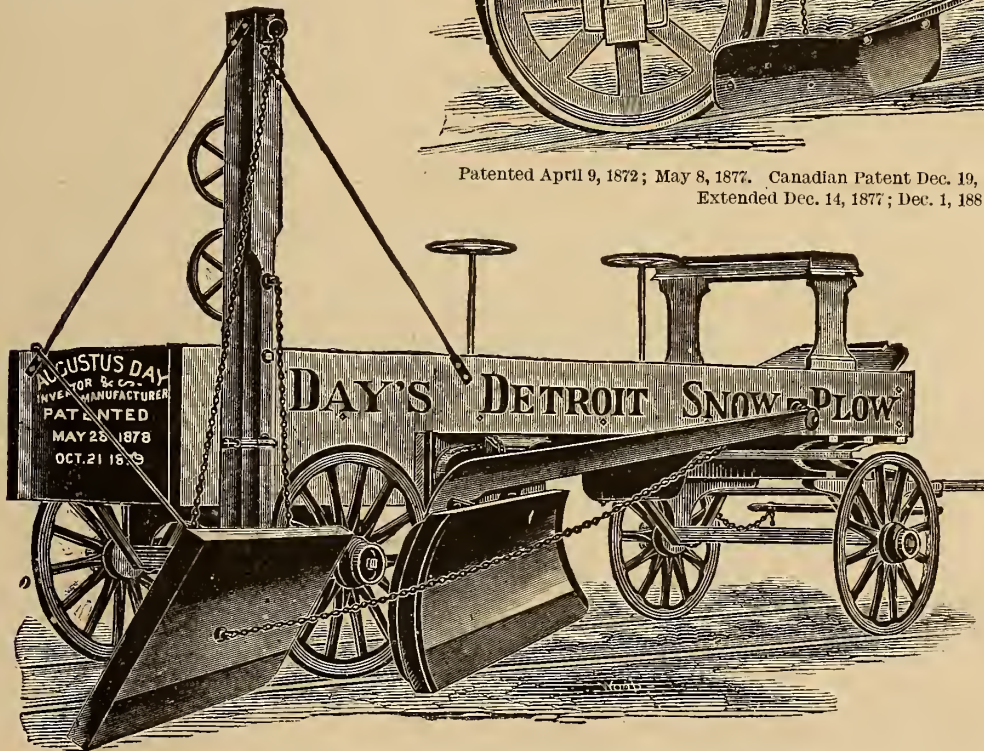
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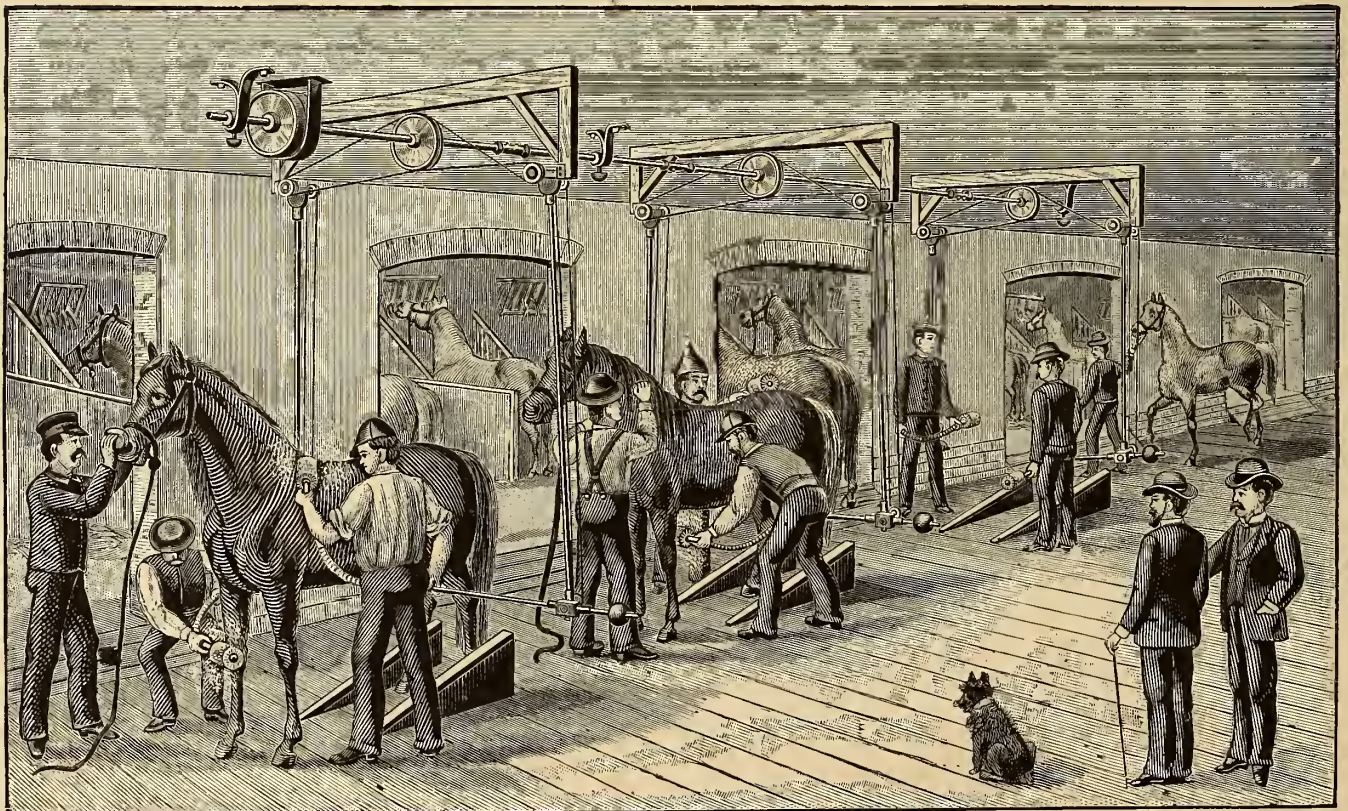
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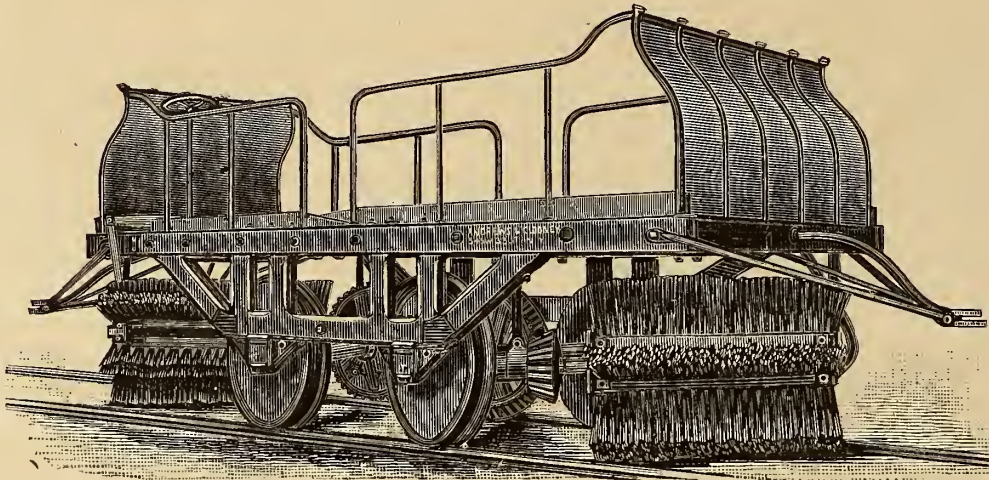
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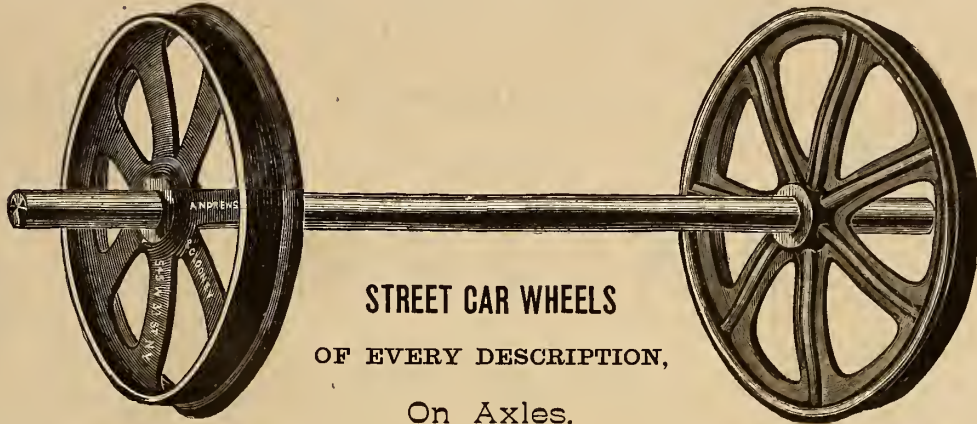
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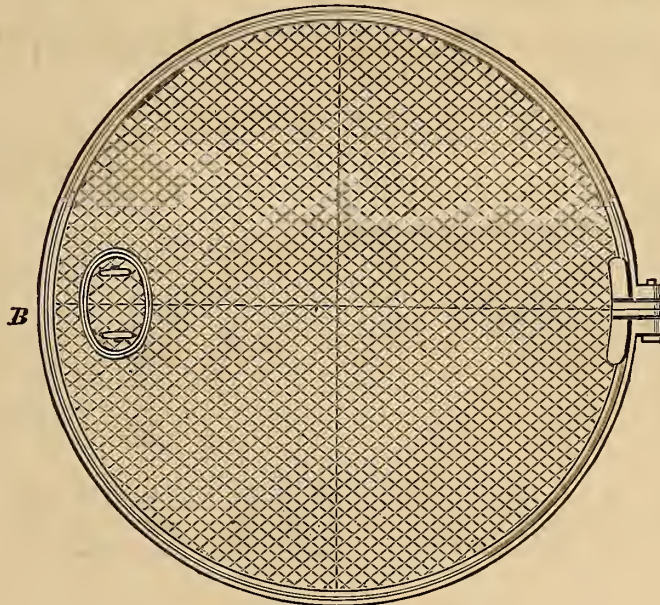
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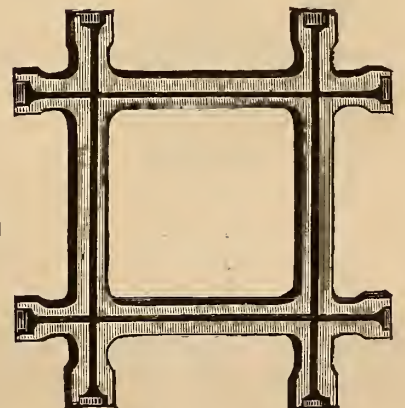
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Patentees and Manufacturers of

IMPROVED

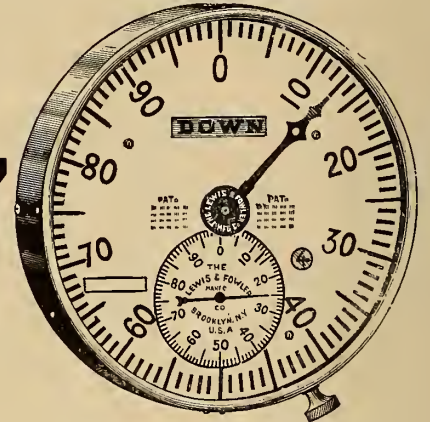
"ALARM"

PASSENGER REGISTER.

—SOLE AGENTS AND MANUFACTURERS—



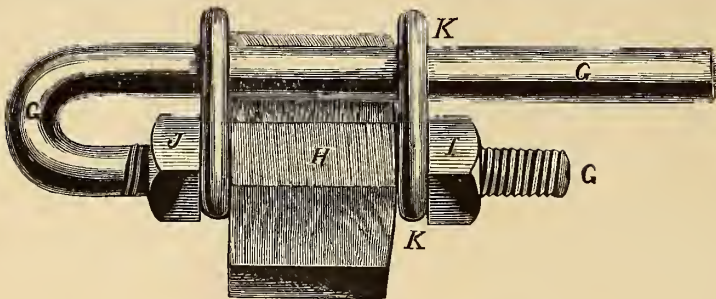
HIGHEST PRIZE.



SILVER MEDAL, CHICAGO, 1883.

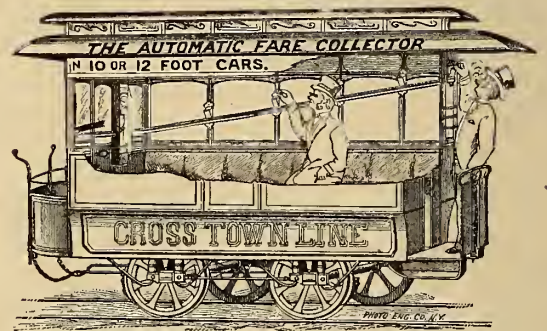
VAN TASSEL'S Patent Brake Rod

FOR STREET CARS.

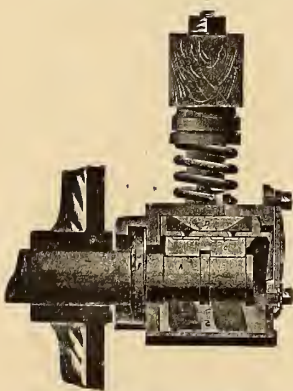


SMALL'S Automatic Fare Collector.

FOR FARE BOX CARS.

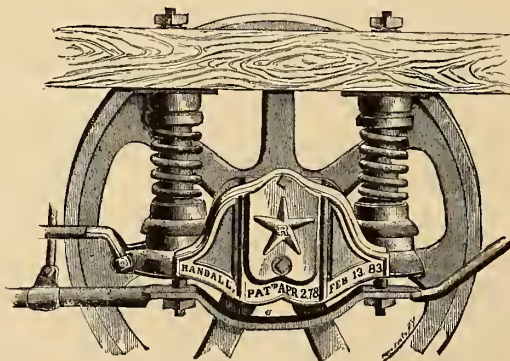


"RANDALL'S" PATENT CAR AXLE AND BOX.



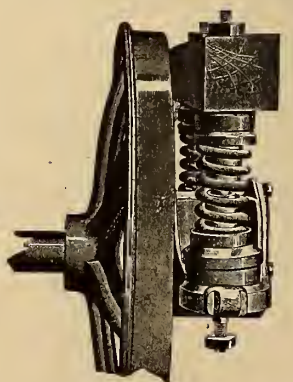
SECTIONAL VIEW.

DUST
TIGHT.



FRONT VIEW.

ANTI-
FRICTION



END VIEW.

Agents for ORIENTAL METAL for Street Car Journal Bearings.

RICHARD VOSE,

13 Barclay Street, . New York,

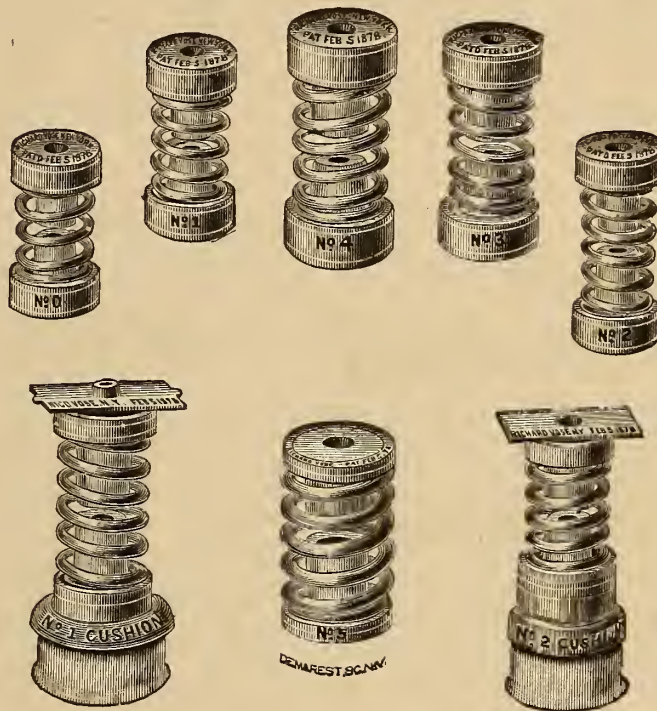
PATENTEE AND MANUFACTURER OF

Graduated Street Car Springs.

RUBBER CONE.

Patented, April 15th, 1879.

ADAPTED TO THE
STEPHENSON,
BEMIS,
RANDALL,
HIGLEY,
BRILL,
JONES,
BALTIMORE,
 —AND—
ALL OTHER BOXES.



- No. 0, for 10-ft. Light Cars.
- No. 1, for 10-ft. Cars.
- No. 2, for 12-ft. Cars.
- No. 3, for 14-ft. Cars.
- No. 4, for 16-ft. Cars.
- No. 5, for 16-ft. Cars.
(Single Pedestal.)
- No. 1, Cushion, for 16-ft. Cars.
- No. 2, Cushion, for 12 and 14-ft. Cars.

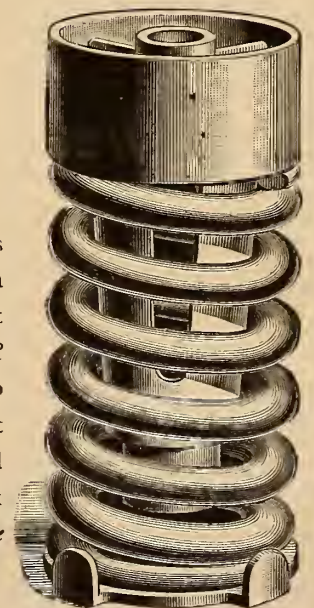
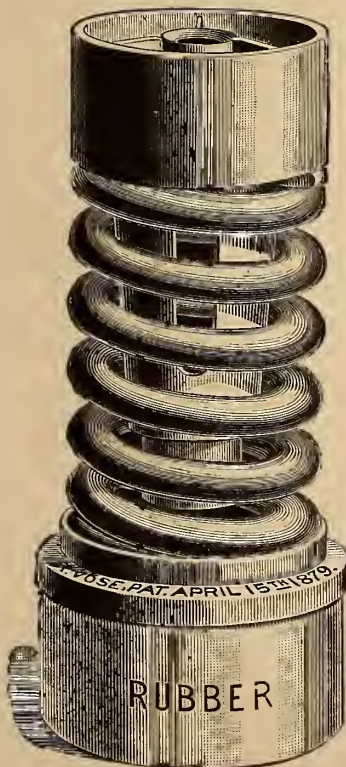
STEEL CONE CITY CAR SPRING.

Patented April 15, 1879—August 5, 1884.

The unprecedented popularity of the

“VOSE GRADUATED RUBBER CONE SPRING”

for HORSE CARS has induced the inventor to bring this class of Springs as near perfection as possible, and after a series of experiments and tests now presents for favor what he claims to be the *MOST PERFECT SPRING FOR HORSE CARS* ever offered. It is exceptionally *SOFT AND EASY* with the *EMPTY CAR* or with the *GREATEST LOAD*. It is believed to be the *MOST DURABLE*, being constructed upon a principle that seems to insure that the Spring must *ACTUALLY WEAR OUT*. The very *Finest Quality of Crucible Cast Steel* will always be used in these Springs.



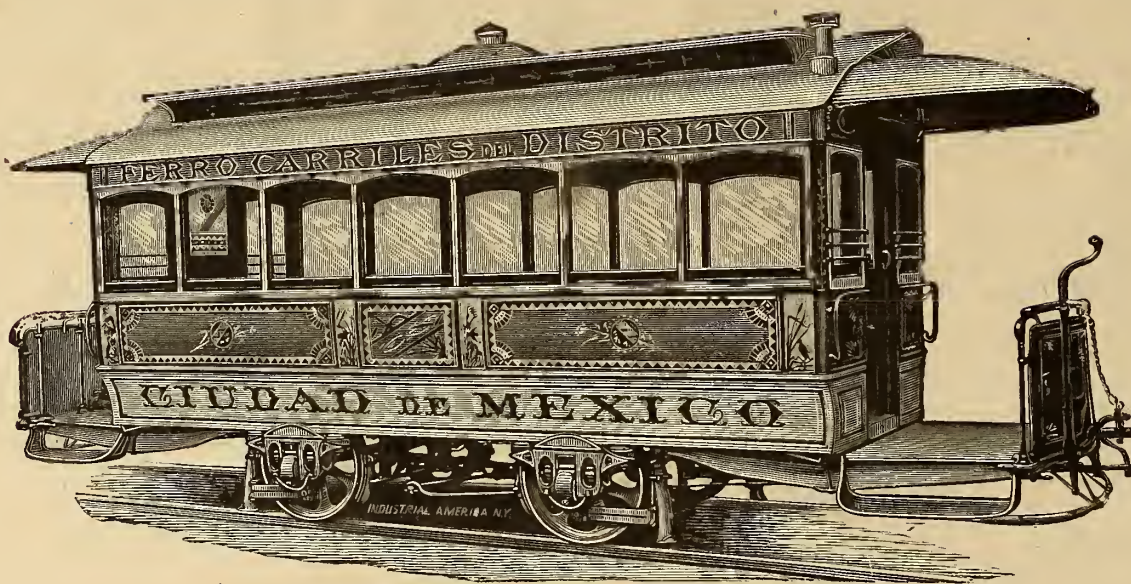
JOHN STEPHENSON COMPANY

(LIMITED),

New York.

TRAMWAY CARS

MEDAL OF FIRST CLASS, WORLD'S INDUSTRIAL COTTON EXPOSITION, NEW ORLEANS, 1885.



LIGHT ELEGANT, DURABLE.

Every Description.

Best Materials.

Minimum Prices.

ORDERS QUICKLY FILLED. CAREFUL ATTENTION TO SHIPMENTS.

All Climates Suited.

VOL. I. { NEW YORK: }
32 Liberty Street.

OCTOBER, 1885.

{ CHICAGO: } NO. 12.
12 Lakeside Building.**President Calvin A. Richards.**

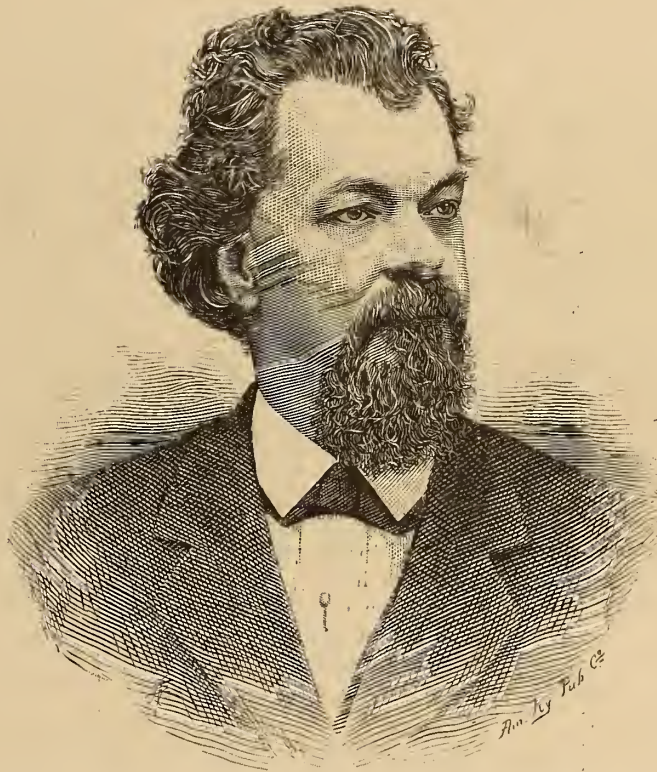
The subject of our sketch, President of the American Street Railway Association and of the Metropolitan Railroad, of Boston, was born in Dorchester Mass., fifty-seven years ago, and received his education in the public schools of Boston. His business training was received with his father, an old and honored merchant of Boston.

Mr. Richards was engaged in business, himself, until 1872, when he retired from active work, and with his family, made a long visit to Europe. On his return from abroad, he was induced to take the position of director in the Metropolitan Railroad Co.; this position he held for eight months, when he was chosen President of the corporation. The directors were desirous of having a man at the head of the corporation whose executive ability had been proven by his former success in life. When he assumed the presidency of the road he knew nothing more about street railroads than any other merchant, but he did not accept the position until he had had the most positive assurances from the directors that he should manage the road alone, with what is called "one man power," until he had placed its affairs on a footing satisfactory both to himself and to them.

When he finally took the position he found that the affairs of the road, through loose and inattentive management, were in great disorder. It took him from three to five years to lift the corporation out of its difficulties and to place it upon a plane, which its almost unbounded success since would seem to have warranted. He attributes the success of the road solely to the fact that he has always endeavored to furnish the public with the best class of accommodations, keeping always in

advance of the times; to do that, has now become a motto with him and guides him in all his railroad transactions.

The railroad which he represents is now probably the largest street railroad in the world in equipment, in miles of track, and in the number of passengers carried.



C. A. RICHARDS, PRES. AMERICAN STREET RAILWAY ASSOCIATION.

When he assumed the charge of it, twelve years ago, it was but one fourth as large as it is now. Its growth has been steady, strong, and successful, and yet to-day the public demand for its services requires its present equipment, and it is necessary, to satisfy and gratify the public.

Early in life, Mr. Richards had a wide parliamentary experience, serving as councilman, public land commissioner, and as alderman of his native city, Boston; an experience which gave him a thorough knowledge of municipal affairs.

He is five feet, eleven inches in height, and weighs two hundred pounds. As for his taste outside of "cold hard business," he is entirely domestic, his home and

family circle engrossing all his time outside of business hours.

The Car Timer's Last Gasp.

"Timers is like machines," said a gray, oracular driver on the Third avenue line.

"Timers is like machines. They gets so used to timin' that they can't let up, but keeps along at it sleepin' or wakin'. If some o' them fellers was a-dyin' they'd want to spot the ticker afore peggin' out, just to see if death was up to the scratch. Why, there was Pete Long—the allfiredest particularist man I ever see. You couldn't be a second afore or behind but Pete wus after you wid a sharp stick. Well, Pete wus a-timin' up at the end o' the line, and one day he was so cussed took up with layin' out a driver that a truck tongue fetched him in the back and laid him out. Then the hosses tramped about on him some, and he wus all broke up when they got him to the sidewalk. There wasn't sense enough in him t' open his eyes as he laid there, and they wus thinkin' o' pourin' some whiskey in him, as likelier than anything to fetch him to, when

along comes Forty-nine half a minute late.

"Pete rolls over on his side and grabs his silver bull's-eye super. Then he opened his eyes and set 'em on the ticker and began t' gasp like's he was a-dyin'."

"'Hev you enny message?' says one o' the boys, thinkin' he had sumthin' for his famerly to hear.

"'Yes,' gasps Pete Long.

"'Wot is it?' says the feller.

"'Tell Forty-nine,' says Pete, still a-gaspin', 'tell Forty-nine that he's a half behind; and tell him,' says he a-settlin' down weak as a child, 'tell him that another go o' that kind and—the old man 'll—give him—the grand bounce.'"

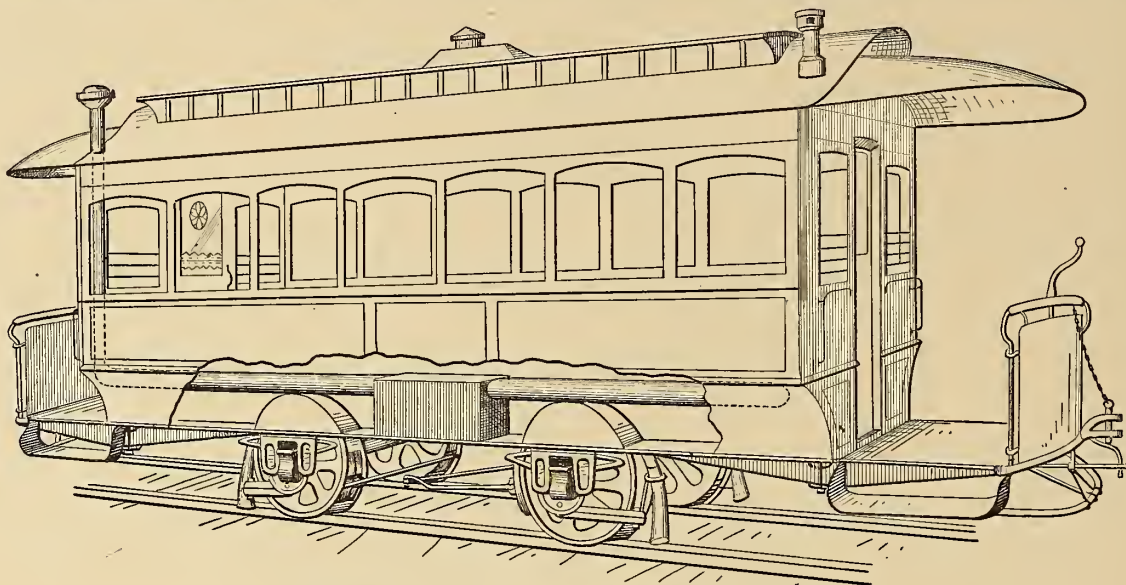
"Then he swooned."

Car Heating.

MESSEURS, EDITORS:—I saw in the *JOURNAL* an article from the *Chicago Tribune* on the subject of car heating, in which the author claims "that it is possible to make street cars comfortable in cold weather by means of a furnace on the front platform, provided with pipes to distribute the heat through the car near the floor." I agree with the gentleman to a certain extent; but the alternate change of front renders the system slightly impractical for general purposes, and suggests that a greater experience than can be obtained with pen and ink is absolutely necessary to give a practical solution of this subject, that has involved the attention of captains, colonels and generals, with the aid of some of the most enterprising street car companies in testing hot sand, hot slugs, and the various devices for storing up heat, together with oil stoves, coal stoves and furnaces of dif-

every case, without any exception, where we obtain the greatest satisfaction for the the amount paid. The success of the rapid transit roads, the competition of parallel surface lines and the profits of every enterprise that meets a general demand, all tend to the one result, and the time is not far distant when street cars will be provided with heaters under the seat that will supply a uniform heat at any desired temperature during the entire day's run without special attention. This will again present something new, and danger will be the cry, but only a cry without an echo, for the usefulness of Nature's provisions is just in proportion to the development of intelligence and skill in handling them, which is fully verified by the history of the previously unknown, invisible power that was first halted by the illustrious Ben Franklin, and is to-day being handled, harnessed, and used for various purposes with no greater degree of intelligence than is necessary in

welfare of their patrons (so far as it will pay) was the principal reason that led to the production of the invention represented by the accompanying illustration,* which portrays a car heater of modern design. It is not the result of twenty-five or thirty years experience in the business, and did not require brain-racking work by the midnight lamp, or the long undivided efforts of a wonderful inventive genius, but was simply invented by rule, and is not justly entitled to the favor of such weighty evidence, although it will meet the requirements to the nearest point of perfection that can be obtained without some modification in the design of cars. Perhaps the reader of this article may have some curiosity in reference to this rule, therefore I will explain that it is only necessary at first to obtain a correct knowledge of the requirements of the subject and then form an unknown combination of the best known principles to meet such requirements.



VANDEMARK'S STREET CAR HEATER APPLIED TO A CAR,

erent designs; and with all this experimenting have not, up to this date of 1885, produced *one good street car heater* that is known to the trade. I claim the right to know something about this business, having had an experience costing me a few hundred dollars, and think I can convey some idea of a heater that will meet the requirements, sufficient to satisfy the public quite as well, if not much better, than rubber-lined crevices, or a bale of straw. Street cars can and will be made comfortable. The public demands it, and the wonderful inventions of the last few years have shown conclusively that the word *impossible* has, together with canal packets and stage coaches, gone out of date for want of use. The rapid strides of progress in every branch that adds to the comfort and convenience of the human family are to continue unchecked, regardless of that class who are always ready to handicap anything new, and honestly believe that the practical point of success for all purposes is limited within the scope of their extensive education and experience.

"Competition is the life of business." We take our choice and *pay our money* in

managing the historical hind-footed mule.

The system of heating street cars with straw is one of the old, well demonstrated methods, and is undoubtedly so very old that the modern public fails to appreciate the generous motive manifested by its liberal use.

Rubber-lined crevices are new for the purpose, and have only been adopted by some of the most enterprising roads. I have not been favored with the extreme pleasure of stepping from a temperature of zero into one of these comfortable air-tight conveyances, and can only imagine that the exhilarating effect of the commingled redistilled products that would naturally emanate from the respiration of a car load of passengers would immediately inspire a feeling of thankfulness for the privilege of partaking of such a concentrated conglomeration of all the good eatables and drinkables, with the addition of an indescribable variety of flavors, for the small sum of five cents.

This is an age of improvement. The success of every industry depends on keeping pace with the times; and the manifest interest of corporations in the comfort and

The heating of street cars evidently requires the finest system that can be produced to give perfect satisfaction, which is sustained by the fact that it has not been heretofore attained. The heater must not occupy any useful space; must be free from danger, dust, dirt and odor; must supply just the desired temperature throughout the car at all times and under all the conditions to which it is subjected, with sufficient ventilation to maintain a wholesome atmosphere.

To meet such requirements necessarily involves the best known principle for producing and circulating heat that can be applied to this particular purpose. The only practical heat producing substances for the purpose are coal and oil.

The difficulty encountered with the use of coal is to safely dispose of the remaining hot mass at the close of the day; and to maintain the necessary supply of heat, and regulate it to any desired degree, bids defiance to all that human skill can do.

The oil used with the illustrated appliances is atomized and burned without a wick, and can be regulated to any desired

* A. B. Vandemark, 1584 Broadway, N. Y. City.

temperature and extinguished by the turn of a valve. It is claimed by some of the street railway officials that it is the most desirable to have the heater extend below the sills of the car; but it is very evident that the reason for such a conclusion is not based on the fact that 150 cubic feet of cold air through the stove for the combus-

Knocking Down Fares.

EDS. STREET RAILWAY JOURNAL:—

It really seems that the main idea of many men is not to make themselves as valuable as possible to their employers, but to devote a large part of their time to devising some means whereby they can acquire

and was given a job on the Milwaukee Avenue line, where, so far as is actually known, all went well, until about two or three weeks ago, when it came to the knowledge of the company that he had been previously employed on another line of street railway. A close investigation was at once set on foot, and it was found that the man had originally been farming in a place not very far from Chicago, that, about a year and a half ago, at the earnest recommendation of an ex-official of the city, he was given work on the North Chicago Railway, with which he stayed for nine or ten months, when he was discharged for "running a low card;" which, being interpreted, signifies stealing. His real name is Herrman Rhode, by which he was known while in the employ of the N. C. Ry. Co., affecting the *alias* of William Peters when he applied to the W. D. Ry. for work. It has not been fully determined what punishment will be meted out to him; that matter is still occupying the attention of the road. It is an open fact at headquarters that a heap of this kind of robbery is going on, and the company is in full possession of sufficient evidence to make it pretty warm for quite a number of these "knockers-down." The above circumstances show pretty conclusively how easily a company can be imposed upon, and deceived by false representations, or what might well be regarded as the very best of recommendations.

Replying to a question as to how the company felt after the effects of the recent strike, the superintendent said, "The bad effects of the strike were very noticeable for two or three weeks after cars had recommenced running; the men would do their work in a most off-hand, careless, slovenly manner, which caused us no little inconvenience; but we gave the matter close attention, and by weeding out the objectionables, we are now in pretty good running order once more—in fact in a far better condition than before the strike commenced—so, out of all apparent evils, good cometh."

ARTHUR VERNON TREVOR.

[FOR THE STREET RAILWAY JOURNAL.]

The Coming Race.

BY CITIZEN GEORGE FRANCIS TRAIN.

When thought is heard by Microphone
And truth detected by Machine
Mankind can play Race game alone
In "Psycho-Transformation scene!"

Invention marching on apace
Electric wires Cosmos around
To evolve the Human Race
With energy electric bound!

When Bulwer's coming race arrives
And truth and manhood find their own,
The fittest man who race survives
Will occupy the "Psycho-throne."

The "Psycho-throne" of universe
With Ego dead to world rehearsal!
That shadow which all nations see
Is "Universal-sympathy!"
(Not "Ghost hand Immortality!")

This is the only paper devoted wholly to street railway interests. \$1.00 a year.

Fig. 2

Fig. 1

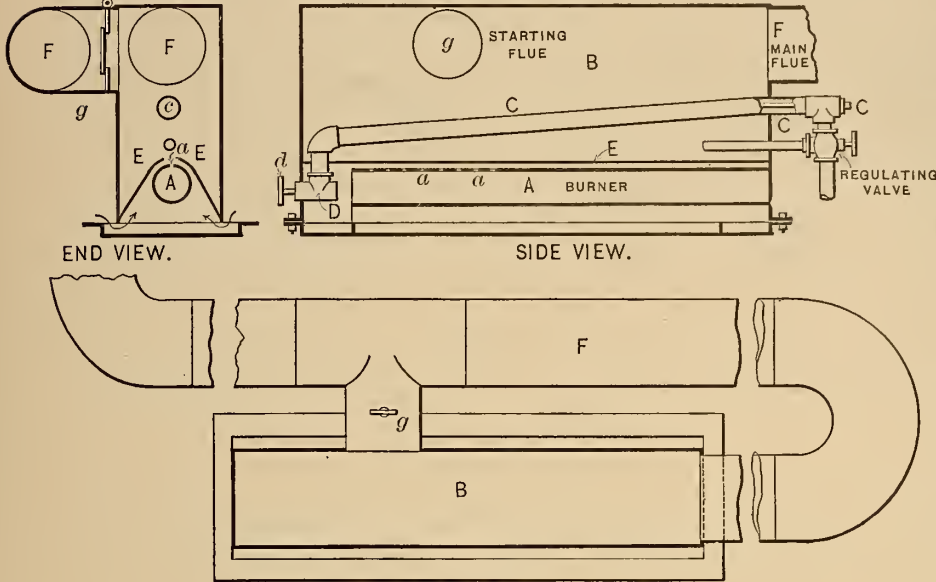


Fig. 3

tion of each pound of coal used, together with the necessary circulation around it, for the protection of the car, would constitute a refrigerating process that would be slightly detrimental to the comfort of the passengers in extremely cold weather. However, the principle of extending the fire-box outside is first-class for summer or even winter use in a warm climate.

The amount of heat transmitted through a heating surface is just in proportion to the difference in the temperature of the heat on one side and the substance to be heated on the other, which is the foundation of the design of the illustrated system for circulating and distributing the heat throughout the car by means of the smoke pipe. This heater has been thoroughly tested.

HEATER.

Carriage of Goods on Tram Lines.

In England the heavy rates charged by railway companies, and the comparative freedom from opposition which they enjoy, make every new experiment for carrying either goods, parcels, or passengers of interest. Tramways are spreading in all directions, and at Stoke and neighborhood, Manchester and its suburbs, Birmingham and the towns in the Black Country, the carriage of goods and parcels is likely to become a lucrative and successful business. One of the first experiments of the kind is that of the South Staffordshire and Birmingham Steam Tramways Company. Negotiations are going on for committing to the company the carriage of parcels throughout the entire district. From the inherent facilities which tramways afford for the collection and distribution of goods, it is thought a good profit can be obtained from the new traffic.

wealth easily, by robbing their employers of their due, in moneys collected for fares. A case in point has just come to light in Chicago.

The Chicago West Division Railroad, which behaved so liberally toward those engaged in the late strike, suspecting that all was not as straight as it might be with some of its conductors, had them closely watched; and on August 17 circumstances proved that its suspicions were not unfounded, when the assistant superintendent of the company corralled one, calling himself William Peters, and compelled him to unbutton his vest, and he took therefrom an ingenious device known among the fraternity as the "brother-in-law."

The device consists of a bell, cased in a piece of perforated zinc, with a wire attached, ending in a brass button, of similar pattern to those used on the uniform. The *modus operandi* is simple in the extreme:—In a crowded car, where the conductor has hard work to worm his way through, collecting fares, it is a hard matter for any one to notice—even if they wished to—what "register" the conductor uses for tallying the fares; so, instead of pulling the knob of the bell punch, the button is pulled, and out rings the little registering bell, as clearly and innocently as one can imagine. The company had undoubtedly lost considerable money by this course of systematic robbery. In the course of the day the writer chanced upon some of the officers of the company, and referred to what had appeared in the dailies about the "brother-in-law," and the party caught using it.

It appears that said Peters came to seek employment of the West Division Company about the middle of last May; he was well endorsed by a prominent Chicago banker,

The Freese Electric Car Motor.

This new motor,* patented only last February, has been put through a successful trial on the Hestonville, Mantua & Fairmount R. R. Co.'s tracks, in West Philadelphia; and other motors, we understand, are now building for this road.

Power is supplied by a Shipman oil en-

gine. Another drive connects this with a similar split sprocket on the rear axle. To secure greater leverage in starting, rounding curves and ascending grades, a 6" sprocket friction pulley is provided on the counter-shaft, to which the power can be shifted at will; enabling the car, also, to run at reduced speed, without slowing the engine.

The fuel is kerosene oil of 110° test, and is carried in a tank under the car seat. It requires only oil and water to run.

In the preliminary trial, its regular 4 H. P. engines not being ready, the company used a small 2 H. P. engine, which, however, gave entire satisfaction. As stated above, the engines to be used in regular practice are of the Shipman patent,

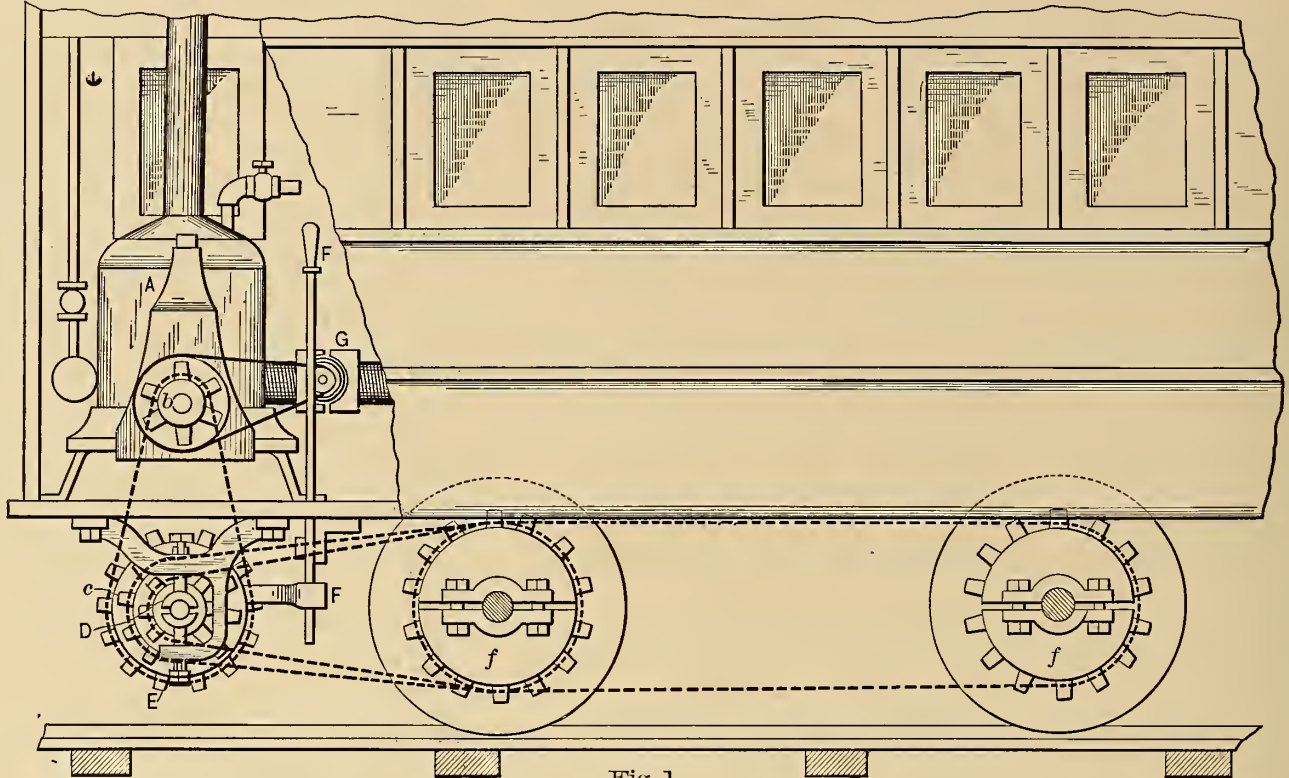


Fig. 1

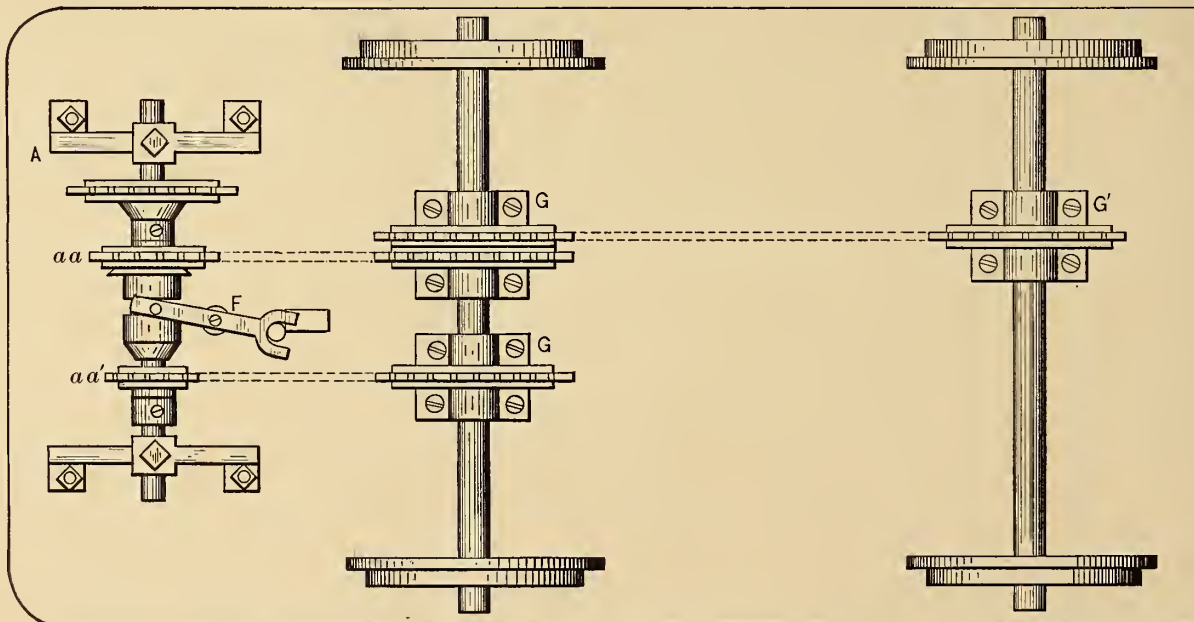


Fig. 2

Am. Py. Pub. Co.

THE FREESE ELECTRIC CAR MOTOR.

gine, placed on the front platform of the car. An 8" sprocket wheel *A A* is connected by a chain drive or "link belt" with a 15" sprocket wheel *A* on the counter-shaft *B*. A 12" sprocket friction pulley, also on the counter-shaft, connects through a drive chain, with an 18" twin split sprocket wheel *E* on the front axle of the

The engine need never be stopped, except for backing, but the car is set in motion by shifting a lever *F* to one side or the other, so as to bring into play one or the other of the two friction gears on the counter-shaft. This gear is shown in detail by Fig. 2. When the car is stopped, the lever is placed in the centre "notch," so that both clutches are freed.

and will have cylinders 4" in diameter by 6" stroke, making 275 revolutions per minute, giving, when geared from an 8" sprocket to the 15" sprocket on the counter-shaft, and from the 12" friction pulley to the 18" sprocket on the car axle, 6 7/8 H. P., and a speed of 7 1/2 miles per hour; and, when geared through the 6" friction pulley to the second combination, it will generate

* Automatic Car Motor & Electric Lighting Co., P. O. Box 449, Philadelphia, Pa.

9½ H. P., and a speed of 3½ miles per hour.

The compactness of the device and its simplicity commend it, the engine being so small that it can be set on the platform of an ordinary street car, with little alteration, the only addition necessary being two stringers under the platform,—where the steps are usually placed—to strengthen it. The actual space occupied by the machine is 36"x27" on the floor by 40" in height, so that there will be plenty of room left for the attendant to work in. The total weight is 800 lbs. Under one seat will be placed the water tank and under the other the oil tank.

The Shipman engine being automatic and very simple, requires no experienced engineer, but only a man of ordinary intelligence to run it; his only care being to keep his two tanks supplied. The entire apparatus can be placed on a car ready for running, within twenty-four hours. The

A New Plan for Electric Conveyance.

An ingenious Philadelphian has invented a device for telegraphing passengers and goods through the air. The field it purposes to occupy is a comparatively narrow and modest one, as it does not seek to rival the locomotive, but is satisfied with the prospect of operating in districts incapable of furnishing traffic adequate to the support of a railway. Sturdy posts may perhaps be called its road-bed, as they support its two cables, one of which is 8' higher than the other, additional cables being supplied to insure absolute safety. The cars are suspended from the upper and supported by the lower cable. Steam engines and dynamos at each end of the line supply the driving power, and by means of the car wheel axles and intervening wires the current is passed through an electrical motor working under or by the side of the car.

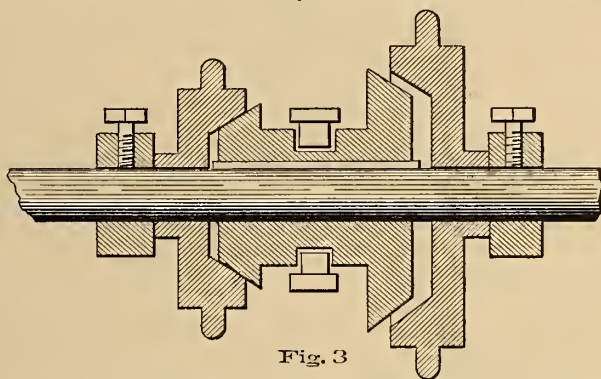


Fig. 3

fire is so arranged as to light and extinguish itself, if occasion requires it, so that when the engine stops, expense ceases. Thirteen gallons of oil are required for running a car fifteen hours: that is, say \$1 per day, a saving of about \$10 per day, per car, over horse power. It is further proposed to run pipes around the car, so as to heat it during the winter time, and do away with the diphtheria breeding wet straw, which has been so often condemned by the authorities. In summer the exhaust steam will be condensed under the car, so as to obviate visible vapor, and to deaden the sound of the exhaust. Sand boxes will be carried under the seats, for use in slippery weather. The friction gear will be encased, so as to prevent wear from dirt. Furthermore, as the engine is constantly in motion, it is proposed to attach a small dynamo, and run four incandescent lights, two inside the car, and one on each platform.

An engine, now under way, will be 4 H. P., with double cylinders and reversing bar, slide throttle, etc., a very complete machine. The boiler is of a new pattern, made of coiled wrought iron pipe, and having fifty square feet of heating surface, and will be fully able to make steam for a 5 H. P. engine, while being at the same time unusually light in weight.

The inventors write us that their first complete car will be in practical operation the latter part of the present month, and that they believe they have "struck the *sumum bonum* of car motors."

G. B. H.

The carrying capacity of the cables varies, inclusive of cars, from several hundred-weight up to a ton, and repeated tests have demonstrated that smooth and swift motion can be attained. During its stay at Manly & Cooper's, Forty-second street and Elm ave., this curious appliance attracted much attention.—*Bulletin of the Franklin Institute Novelties Exhibition.*

The Elevated Road Traffic During the Grant Obsequies.

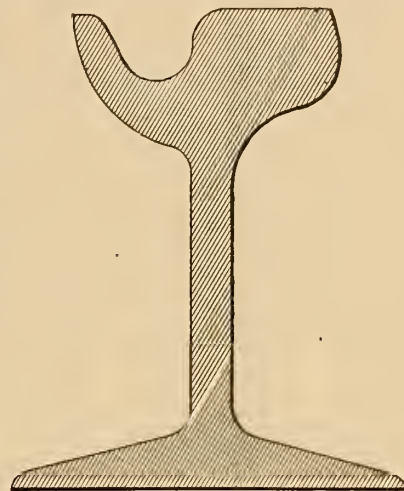
Instructions were issued for ticket agents to make up memoranda of their sales during the day of the Grant obsequies, and collectors were afterwards sent out to gather them up and bring them down to the main office at Rector street and Broadway. Up to 11 A. M. the travel on the Sixth avenue line amounted to 54,000 passengers, an excess of 22,000 over bridge day; on the Third avenue line 71,000 passengers were carried; on the Ninth 23,000, and on the Second 11,000. This total of 159,000 passengers was an excess of 45,000 over bridge day up to that hour. The rush began before eight o'clock, and at South Ferry it seemed as if most of the residents of Brooklyn and Staten Island were hurrying into town to crowd the trains. The trains were all heavily laden up to noon at the lower stations. From 11 o'clock to 7.30 in the evening, when the second and last calculation of the passenger traffic of the day on the elevated roads ended, the tide of travel continued to set in strongly. The Sixth avenue road carried in all during the

day 163,000 passengers; the Third, 143,000; the Ninth, 46,000, and the Second, 26,000, making a grand total of 378,000 passengers. On bridge day the elevated roads carried 316,000 passengers up to 7.30 P. M.

An English Girder Tram Rail.

We think that we are justified in saying that there is a strong tendency towards insisting on greater and greater vertical strength in rails for regular steam roads and for tram ways.

The strap rail has given place to the bull-head and the "T" or Vignolles section; and both the "Philadelphia" and the

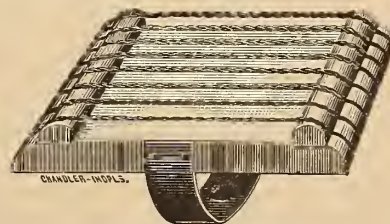


"centre-bearing" tram rails are gradually getting combined with iron girders to replace the separate wooden stringer. We show herewith a section which is meeting with favor in England. As will be seen, it has the deep web and broad flange desirable to give vertical stiffness with comparative lightness and all requisite lateral stiffness; and at the same time its head, which is in section a compound of the Philadelphia and the centre-bearing types, adds to the vertical and lateral stiffness and to the wearing qualities.

Properly fished or otherwise joined, this should for many reasons make a good rail; although for the narrow tires used by most light American vehicles it might prove more dangerous than to the British "flat-footed" wheels.

The Jay-Eye-See Curry Comb.

Herewith we illustrate an article claimed by the manufacturers* to have many points of superiority over the ordinary curry



comb. It is light, cannot scratch or hurt the horse, cleans off mud and sweat with ease and rapidity, and will wear a long time.

*Muncie Novelty Co., Muncie, Ind.

Covert's Breast Chain.

This chain* is so made as to be adjustable to different lengths when it is desired to change a team from one wagon to another, or to change teams on a car. There is a "Covert snap" in the top link on each side, and one plain link after another may be taken up or dropped out to change the length; the snap-link uniting the hame-ring with the plain links of the chain. The snap connection in the centre of the chain is saddle-shaped and is intended to obviate the wear that chains and neck-yoke rings are subjected to, and to do away with the necessity of thickening the chain in the

construction of the device and the way it is applied are very clearly shown in the cut. The tendency of the springs is to force the knee back to its normal position, and straighten the leg.

*Alphonse Cote, 850 Seventh Avenue, New York City.

Reliance Slip Link and Safety Hook.

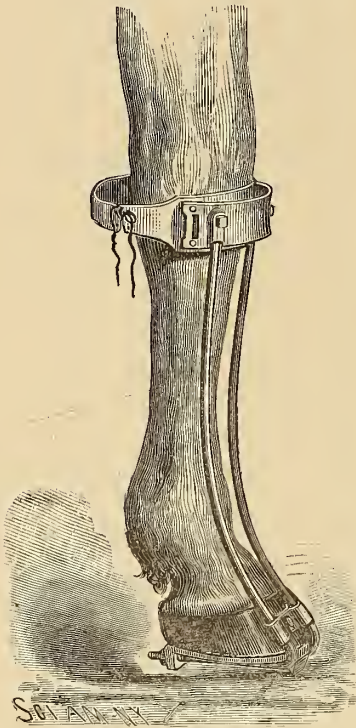
This is designed to afford an easy means of disengaging from chain or hooks. It is especially useful for horses, and the illustrations we give show various applications of it as applied for harness links.* When a

This slip link is intended to afford an easy means of releasing a fallen horse before it has had time to injure itself or others in its frantic endeavors to rise. The larger illustration shows clearly the principle of the link. By pressing the trigger ring—which is held in position by the spring shown in dotted lines—the catch is released and the link opened; when closed the tendency of the pull is to tighten the hold.

* Phoenix Metal Die & Engineering Co., 29 Addington st., York Road, Lambeth, England.

The Mekarski System.

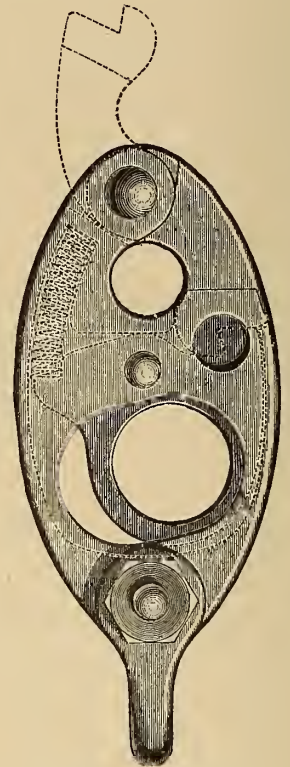
A writer in an English contemporary, referring to a certain car worked at the Inven-



COTE'S SELF-ACTING SPRING LEG BRACE.



COVERT'S BREAST CHAIN.



LYON'S SLIP RING AND SAFETY HOOK.

centre of its length. The link snaps are also utilized by horse railroad companies as temporary repair links when a chain breaks while on the road; their easy adjustment rendering them particularly desirable for that purpose.

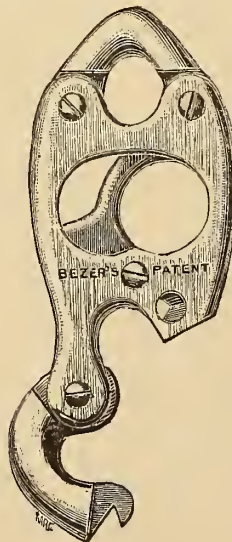
* Covert Mfg. Co., West Troy, N. Y.

Cote's Self-Acting Spring Leg Brace.

The engraving represents a self-acting spring leg brace which the inventor* guarantees will cure any knee-sprung or ankle cocked horse in a few weeks.

Laced at the knee joint is a strap, to the opposite sides of which are attached the ends of a metal band which is so curved that it touches the band only at the ends. Secured to this band are the ends of two springs which pass down and under the foot, being kept from spreading by a metal clasp, and being held securely in place by being passed through holes in the rear corks, nuts being screwed on the ends. The

horse falls or meets with an accident much danger is incurred and time lost from its



being found impossible to release an animal from its harness quickly after it has fallen,

tions Exhibition by compressed air, which had been described as on the Mekarski principle, says that it is not the invention of Mekarski. This plan was invented by James Glazebrook, an Englishman, in the year 1797. A few years since some Stock Exchange schemers and company promoters, as well as some financial speculators, aided by the efforts of a highly scientific consulting engineer, got up a company to purchase the "invention" of Mekarski for some £5,000, and asked the public to contribute £250,000 to enable them to do so! On these facts as to the non-originality of the invention coming to the ears of those on the board who were not cognizant of the state of the case, they "bust up" the whole concern, since which time it has not been heard of until cropping up at the Inventories. Read over and consider Glazebrook's specifications, and then read and consider No. 3,498 of 1875, that of Mekarski. It will be seen that the wonderful invention and principle of Mekarski in 1875 were recorded in the Patent Office by an Englishman in 1797 and in 1801.

Demorest's Duplex Fare Register.

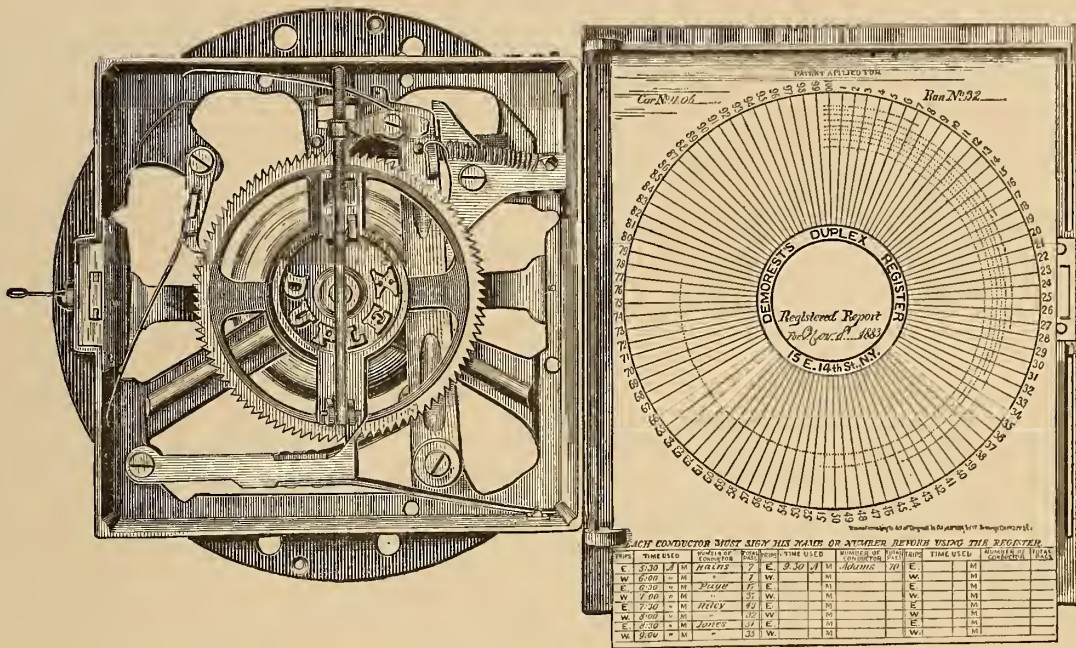
This apparatus* is called "duplex" because it makes a pencilled register upon a removable paper dial sheet inside the case and under the ordinary dial, showing by an index hand the total number of passengers properly accounted for by the conductor during each trip (or half trip). The outer and visible dial plate shows to all in the car each passenger accounted for, and as fast as accounted for. On the inner and concealed paper dial, is recorded in pencil, the number of passengers thus accounted for on the outer dial during each half trip, during the day's work. The conductor on

changed, so that at each subsequent "round" the pencil makes a separate trace, concentric with the previous ones.

The "skip" between the end of one half trip and the beginning of another is accomplished by moving the ratchet wheel outward on its axis, a distance equal to the thickness of the plate, so as to disengage the lower ratchet-pawl; a stop in the proper position automatically re-setting the index and pencil at zero.

The makers have another form of register, which marks continually, at a much less price than the former; its construction is substantially the same, so far as simplicity is concerned. This continuous record-

pavements, macadamized roads, etc., and seems especially applicable to street car horses. Mr. Gourdier says his invention is the result of many years experience with horses, and that it is based upon well-known principles of veterinary science, and that his shoes will cure any case of lameness due to quarter crack, contracted feet or corns, and many other cases of lameness whose cause is obscure. He is prepared to guarantee freedom from such equine pedal ailments as long as his shoes are worn. Its practical efficiency is vouched for by numerous street railway men, among whom we note the name of Mr. Superintendent Wilson, of the Eighth Avenue line, where these shoes ar



DEMOREST'S DUPLEX FARE REGISTER.

commencing his day's work must sign the sheet, which will contain the permanent record of each half trip for that day.

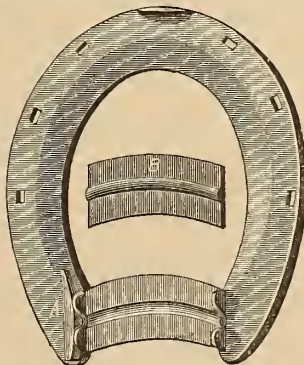
The sheet or dial is turned in at the receiver's office at the end of the day, to check any errors made by the conductor in his daily report. It must tally exactly with the report, in order to relieve the conductor from all responsibility. This system tends to make the conductor his own detective.

As will be seen by reference to the engraving, the front of the case on being unlocked, can be hinged back, thus swinging clear of the inner paper dial, the front dial and its index hand, as well as the actuating and the recording mechanisms. The index hand is worked by an ordinary ratchet wheel and double pawled lever. A pencil borne on a threaded rod, travels in unison with the index hand, being always directly underneath it; so that if the "zero" radial line on the paper dial sheet is under O on the outer dial plate, the pencil will commence to record at zero; and if the last fare rung up and shown by the index hand is No. 100, the pencil line will be a complete circle. At the end of each half trip, the distance of the recording pencil from the center of the dials is

ing device is used in connection with the makers' new combined fare-box and register, as well as on cars with conductors.

The Gourdier Horse-Shoe.

MESSRS. EDITORS:—I recently examined the rubber cushioned bar horse-shoe*. The illustration herewith represents the upper and lower surfaces of this shoe, which is made of steel, with or without heel expanders, and in fifteen sizes, readily adapted to



all kinds of feet. Its distinguishing feature is the use of the rubber cushioned bar, which furnishes an elastic support for the frog of the foot, the lack of which support, it is claimed, is the cause of most of the lameness in horses.

The Gourdier shoe is designed for use on

in constant use. Mr. Gourdier does not claim a simple bar horse-shoe as novel, but even without his rubber cushion he claims for his shoe a superiority in shape and economy over those forged by the blacksmith. He invites correspondence and a trial.

T. B. G.

* Henry Gourdier, 1584 Broadway, N. Y.

Elevated and Surface Travel.

It appears that of the \$32,500 a month received by the Brooklyn Elevated Railway Company less than \$2,000 is taken from the Greene and Gates avenue line. This route meets very closely the rapid transit competition. It seemed certain that it would suffer greatly, and it was even predicted that its business would be practically destroyed. The prediction is not verified. Of course other routes have been drawn upon by the new road. The DeKalb avenue holds the same generally parallel relation to the elevated as the Greene and Gates, and its losses may be roughly estimated at the same amount. The Nostrand avenue, Reid avenue, Franklin avenue and Broadway cars have lost, but not so largely. Allowing for all of these concessions of old passengers to the rapid transit road it is evident that this line and also the horse car routes have gained and are constantly gaining new customers by the increase of the population of the city. Before long the additional travel will have made up to the surface lines all they have surrendered, and eventually their business will be extended.

*A. J. Demorest, 15 E. 14th street, N. Y.



MONTHLY, \$1.00 PER YEAR.

E. P. HARRIS, General Manager. P. G. MONROE, Gen. Western Manager.

American Railway Publishing Co.,

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New York District, HENRY D. COZENS, Advertising Manager.

Special Rates to the St. Louis Convention.

Very advantageous rates have been secured from eastern points to St. Louis and return, for the purpose of attending the Street Railway Convention. Tickets good from October 17 to 27, for the round trip, will be sold at the following rates: From Boston and Worcester, \$25; Springfield, \$24; from New York, Albany and Schenectady, \$20; from Syracuse, Rome and Utica \$19; from Rochester \$18. Tickets can be procured in New York of Mr. C. F. Doane, G. P. A. of the Central, 413 Broadway, in Boston at the office of the B. & A. R. R., on Washington Street, and at the various other points mentioned at the ticket offices of the Central road. A certificate signed by Wm. J. Richardson, Secretary of the Association, will enable parties to procure these tickets. A party will doubtless leave the Grand Central Depot, New York, at six o'clock Monday evening, October 19, arriving in St. Louis at 7:30 the morning of the 21st.

Exhibition of Street Railway Appliances at the St. Louis Convention.

For the convenience of manufacturers of street railway appliances and others who desire to exhibit goods at the Convention of the American Street Railway Association, to be held at the Southern Hotel, St. Louis, October 21, next, the publishers of the STREET RAILWAY JOURNAL have arranged with the proprietors of the hotel for such space as may be required for that purpose. By this plan exhibits may be attractively arranged, and unless desired by the exhibitor, need not be accompanied by a man in special charge. No charge will be made for space and no expense need be incurred by the exhibitor except transportation charges, and such incidental expenses as unpacking and placing in position. Freight or express should be prepaid, and goods sent to our address, in care of Southern Hotel, St. Louis.

Quite a number of large manufacturers of street railway appliances have signified their intention of taking part in this

exhibition. Among them we may mention; The John Stephenson Co., Andrews & Clooney, Lewis & Fowler M'fg. Co., Railway Register M'fg. Co., A. A. Anderson, J. S. & W. S. Silver, and the Neverslip Horse Shoe Co.

The St. Louis Convention.

The following is from a recently issued circular from the Secretary's office:—

The American Street Railway Association has now a membership of one hundred and twenty-three companies.

The fourth regular annual meeting will be held at the Southern Hotel, St. Louis, Mo., the third Wednesday in October (the 21st), 1885, commencing at 10 o'clock, A. M.

Committees will be prepared to report on the following important subjects: "Diseases common to car horses, and their treatment;" "progress of the cable system of motive power;" "progress of electricity as a motive power;" "repairs of tracks;" "rules governing conductors and drivers;" "taxation and license;" "ventilation, lighting and care of cars."

It will be seen that a large amount of work has been laid out for the Association, and it will, therefore, be desirable that delegates from a distance should reach St. Louis the evening previous, in order that the business of the Convention may be proceeded with promptly. It is also desirable, on account of the privilege thus afforded for renewing and making acquaintances.

During and since the last meeting of the Association the membership has been doubled, and it is known that a large number of companies, especially in the west, will be added at this meeting. Each company should be represented.

In order to obtain the best accommodation available at the Hotel, it is desirable that each company inform the proprietor at its earliest convenience, as to the accommodation it will require.

Street Car Seat and Floor Coverings.

It is not an uncommon occurrence to hear passengers on our surface roads complaining that seats are not as comfortably upholstered as formerly. They miss the old three-inch cushions and upholstered backs. It is a reason for devout thankfulness that this ancient harbinger of filth and vermin is gone forever. Though they might be comfortable for a few weeks they soon became hard and uncomfortable to sit on, and worn, torn, and slovenly in appearance. The more modern seat of cane or lattice benches, covered with soft durable material, or uncovered even, is much to be preferred, for comfort, cleanliness, durability, and attractiveness. The furnishings of a car should be simple, attractive and durable—and the progress made in this direction in the last two or three years is very gratifying.

The floor covering is another feature in which the modern car far excels. The old hemp carpet was a constant accumulator of dirt, filth and disease. The wood car-mats keep the car floor comparatively clean in

the worst weather, as the mud drops through the slats. They are readily removed, allowing of frequent and thorough cleaning, and are a decided improvement. Any one who has seen a hemp mat taken from a car after a day's service will agree with us that health and decency demand its eternal condemnation.

Bother and Worry.

It is a peculiarity of the human mind, and one which is more strongly impressed upon the American mental organization than upon any other, that it is as necessary to work and plan in order to keep the mind in strength and good health, as it is to take a certain amount of bodily exercise in order that the bodily functions shall be normally maintained. Hence, to sigh for absolute and continuous leisure is unwise. Mental stagnation is akin to physical "atony." Cares are but the daily toil, necessary or self-imposed, which keep the mental brawn and sinew firm and tense; they are "good for our wholesome."

Yet, while keeping this in mind, we must equally remember that "bother and worry," incessant and gnawing, about pettiments and nothings, are straining influences which are akin to those excessive and long-continued bodily exercises that eventually wreck the system.

Between the idler who is

... a watch that wants both hands,
As useless when it goes as when it stands,
Life's cares are comforts; such by heaven designed;
He that has none, must make them or be wretched.
Young, II, 160.

... soft buzzing slander; silly moths that eat
An honest name
Low-breath'd talkers, minion lispers,
Cutting honest throats by whispers,
Be thou as chaste as ice, as pure as snow,
Thou shalt not escape calumny.

Hamlet, III, 1.

and the fretful worker who chafes his soul-case to early destruction, there is the *juste milieu* of earnest, regular mental and physical activity, which strengthens the faculties while it yields grateful and ample return for the labor and thought expended.

THE DAFT ELECTRIC MOTOR—Experiments have been going on for some time with the new motor Benjamin Franklin. Every night after the trains on the road have stopped running, the motor glides silently from the switch to the main track with an occasional lightning-like flash. Mr. Daft and assistants are busy with the motor all night testing its powers, and the peculiar phases that have developed in applying this system to an elevated roadway.

Last week four cars making the regular train that is used on the elevated roads were attached to the motor. In the first experiments only one car was used. Two cars were subsequently tried, and these having moved to Mr. Daft's satisfaction the trials with four cars were made. The result was fully as successful as with three. The train does not start with a jerk as when a steam engine is used, but the instant the electric current is turned on the motor and the train begin to move in a smooth gliding motion. The speed slackened at the steep grades on the Ninth Ave. road above Twenty third-st. This Mr. Daft said was owing to the fact that only half the current was used

Notes and Items.

[All our readers are particularly requested to send us, at the earliest possible moment, notes concerning actual or proposed improvements in street railways. It is by this means that the STREET RAILWAY JOURNAL will increase its usefulness to each one who receives it.]

ATHENS, GA., is organizing a street railway company.

BURLINGTON, VERMONT, is to have a new street railway.

THE CITY RAILWAY Co. of Mobile, Ala., is laying down some 35 lb. T rail.

THE MACON (GA.) & SUBURBAN R. R. Co. will build two miles of new track soon.

THE GREENPOINT & LORMER ST. ROAD, Brooklyn, will add to its equipment.

THE TRACTION COMPANY of Philadelphia has declared a dividend of \$1.50 per share.

JACKSONVILLE, FLORIDA. Work has been begun on the City & Suburban Street Railway.

THE THIRD AVENUE (N. Y.) road uses the Lewis & Fowler register on its new cable road.

THE SEVENTH AVE. (N. Y. CITY) LINE is being repaved through Sullivan and Thompson streets.

MILWAUKEE, WIS. Washington Becker is the owner and manager of the West Side Street Railway Co.

THE JOLIET (Ill.) Street Railway is owned by J. A. Henry Esq., A. Bischman is Supt. and J. E. Henry cashier.

THE UNION PASSENGER RAILWAY Co. of Baltimore it is understood is now using the Daft motor with success.

THE CITIZENS STREET RAILWAY, of Indianapolis, Ind., has adopted the Josephine D. Smith Center Car Lamp.

J. & W. S. SILVER, 13 Barclay street, New York, have taken the agency for the Randall patent brake rod.

THE BATTLE CREEK (Mich.) STREET RAILWAY has elected George Detwiler, President; and J. W. Hahn, Gen. Manager.

GEORGIA. A bill is before the Georgia legislature, to incorporate the Baltimore Place and Peters' Park Street Railway Co.

NEW ORLEANS, LA. Bids are invited by the Board of Management for an electrical railway on the exposition grounds, New Orleans, La.

THE ELGIN CITY (ILL.) RAILWAY Co., owned by B. C. Paine, Esq., we are informed, is thinking of taking a partner, or an outright sale.

THE PHILADELPHIA TRACTION Co.'s cable road is now running, we understand without difficulty. Some fifteen new "motor" cars will be added.

THE SIXTH AVENUE (New York) road has adopted the Lewis & Fowler register beginning September 1st. A portable register was formerly used.

MADISON, WIS.—D. K. Tenney has been chosen Vice-president, Secretary and Treasurer, of the Madison Street Railroad Co., and G. W. Case Supt.

THE EWING AVENUE HORSE RAILROAD Co.

(Hyde Park Ill.) is now in process of construction. Andrew Rehm is President and Andrew Kimball Secretary.

THE HOUSTON, WEST STREET AND PAVONIA FERRY RAILROAD COMPANY has petitioned the Board of Aldermen for permission to extend its present tracks.

THE TENTH AVE. (N. Y.) CABLE ROAD'S new cars are elegant specimens of the Master Car Builder's skill. They were built at the Third Ave. Company's shops.

THE SIXTH AVE. R.R. Co., (New York,) has just put on ten new cars built by the John Stephenson Co. They are equipped with the Josephine D. Smith Center Lamp.

CLARKSVILLE, TENN., is to have a street railway, the Clarksville Street Railway Co. having been organized at that point by J. F. Shelton, H. H. Sharpe and others, to build the road.

THE PORT HURON (Mich.) STREET RAILWAY'S officers for the ensuing year are, Pres.—Jno. P. Sanborn; Vice-Pres.—Frank A. Beard; Sec., Treas. & Gen. Man.—J. R. Wastell.

ROCKFORD, ILL. The following are changes in the officers of the Rockford Street Railway Co.: L. Rhodes, Vice-Pres.; Miss A. C. Arnold, Sec.; Fred Haines, Supt.

THE NASHVILLE & EDGEFIELD (Tenn.) STREET RAILWAY has elected officers for the ensuing year, as follows:—Pres.—John P. White; Sec. & Treas.—H. B. Stubblefield; Supt.—Daningerfield Deaderick.

THE THIRD AVE. R.R. Co., (New York,) lights all its new cars with the Josephine D. Smith improved Center Lamp. The new Tenth Avenue cable road uses the same lamps in its new cars.

THE BLEECKER STREET (N. Y. CITY) LINE is discontinuing the use of fare boxes and has conductors on its cars now, many of which are "bob-tails." Its new cars, we understand, are all two horse length.

THE BROOKLYN ELEVATED RAILWAY COMPANY has carried two million people since it began operations last May, without injuring one of them. The only delay was one of ten minutes on the day after the road was opened.

THE BLEECKER STREET (N. Y. CITY) LINE has put on some very handsome cars from the works of the John Stephenson Company, recently. They are equipped with ventilated roof, passenger telephone, the Smith centre lamp, &c.

THE LEWIS & FOWLER Mf'g. Co. has secured from the Philadelphia Traction Co. a large order for registers. When the road is fully equipped the order will be the largest the Lewis & Fowler Co. has had from a single road.

THE METROPOLITAN STREET RAILWAY Co. of Boston, is building ten new closed cars, eight to be done by November first. Work on its new shops and stables is to be vigorously pushed, with the idea of having them completed this season.

THE PHILADELPHIA TRACTION Co. is grappling with the question of five cent fares,

the *Press* having opened up the question by sending reporters over the line, who insist on paying only five cents on the grip cars. The fight promises to be lively.

YONKERS, N. Y. A new street railway is contemplated by capitalists to connect Yonkers, N. Y., with New Rochelle, thus having a complete connection with the Sound and Hudson River. There are at present two lines of stages, which have all they can do.

ALBANY N. Y. The Metallic Street Railway Co. has awarded Messrs Andrews & Clooney of New York city, the contract for all the iron required for the construction of the Greenbush Street Railway, and will when finished connect that village with the capital city.

THE RAILWAY REGISTER Mf'g. Co. in its suit against the North Hudson R. R. Co., has received a decision from Judge Nixon in its favor and against the Lewis & Fowler Mfg. Co. relative to the removable push key register heretofore used by the latter company.

THE PEOPLE'S PASSENGER RAILWAY Co., Philadelphia, has recently added thirty new cars, of improved pattern, high and roomy, to the equipment of its Girard Avenue line, and has in process of construction ten additional cars. They are all built in the company's shops.

THE JOHN STEPHENSON Co. has done a much larger business during the year ending September 1st. than the previous year. We notice various lots of cars in the process of construction, among them cars for the Fourth Avenue and Sixth Avenue, New York and the Brooklyn City, of Brooklyn.

THE BEAVER FALLS (PA.) STREET RAILWAY Co. is reported as doing an excellent business. It built three and one-half miles of track and had cars running in forty-one days. The road is paved with coarse and fine slag from blast furnaces, and gives evidence of making a first-class road bed.

MESSRS. PUGH & RUSSELL, manufacturers and dealers in street railway supplies, No. 27 Park Place, inform us that they will occupy, on the 1st inst., new and commodious offices in the Stewart Building—Broadway, Reade and Chambers streets—their quarters having proved inadequate to their increased business.

A SURFACE ROAD THROUGH CENTRAL PARK is proposed by a company headed by Ex-Postmaster-General Thomas P. James. The company has petitioned the Board of Aldermen for a franchise for a road from Eighty-fifth street and Madison ave. to Fifth ave., thence across the Park to Eighty-sixth street and Eighth ave. to the Hudson river.

PROPOSED CROSS-TOWN LINE IN PHILADELPHIA. The franchises, right of way, &c., for a new cross-town line on Lehigh ave., in the northern section of Philadelphia, have been in the hands of (we believe) the Traction Co. for some time; such a line would be very useful, but there should be one still further north, on Tioga or Venango streets, for instance.

DUNCAN'S MANUAL of British and Foreign Tramways, with maps and abstracts of accounts, traffic tables and directory for 1885, is at hand. We note several of our enterprising manufacturers and dealers, John Stephenson Co., Andrews & Clooney, A. Whitney & Son, etc., are in the advertising pages with their announcements.

THE BROOKLYN RAILWAY SUPPLY Co. says it is very busy now upon orders for its improved snow sweeper and plow, equipped with the cylinder broom and other devices. It is claimed for these machines that with the same outlay of power they will do more rapid and more thorough work than any other sweeper. They may be operated either by animal or steam power.

THE DENVER ELECTRIC RAILROAD Co. will commence operating its road this month. It has three miles of track laid and graded, and proposes to lay twelve more by next Spring. The electric system and motor have been designed and patented by Prof. Short of the Denver University, who is also the patentee of a dynamo for electric lighting as well as other electrical appliances.

THE NEW BROADWAY CARS built by the Pullman company are about the same length as the old cars, but of greater height. The tallest man can stand erect in one without damaging his high silk hat. The windows run to the roof, enabling passengers standing to see clearly to the sidewalk without stooping. The seats are elegantly cushioned and have spring bottoms.

THE QUEBEC STREET RAILWAY has the Lewis & Fowler register on six of its cars. The Hornum is used on its other cars. It approves of the L. & F. as the most conspicuous, taking the attention of the passengers; and less likely to be put out of order. It has purchased one hundred tons of steel rails this Summer and is relaying a portion of the track with them. Traffic is scarcely equal this year to that of last, but not a deficiency to cause despondency. The road always pays good dividends.

THE BROADWAY UNDERGROUND RAILWAY scheme is again being agitated, and it is said the two companies now holding charters intend consolidating at an early date, and commence at once a continuous underground roadway from the Battery to Forty-second street. Gen. McClellan has given his opinion, as an expert engineer, that the expense will not exceed \$1,200,000 a mile, complete and in running order. Jay Gould is reported to be actively interested in the new company.

THE REPORT OF THE MANHATTAN ELEVATED RAILROAD, for the quarter ending June 3, 1885, compared with last year is:—Gross earnings from operation, 1884—\$1,126,413 50; 1885—\$1,773,523 15. Operating expenses (excluding all taxes), 1884—\$651,011 41. 1885—\$914,441 22. Net earnings from operation, 1884—\$475,402 09; 1885—\$859,081 93. Income from other sources than operation, 1884—\$15,177 65; 1885—\$17,284. Gross income from all sources, 1884—\$490,579 74; 1885—\$876,365 93. Deduction from income for interest, taxes and rentals, 1884—\$268,808 91; 1885—\$462,431 91. Net in-

come from all sources, 1882—\$221,770 83; 1885—\$413,934 02.

THE FIFTH AVENUE RAILWAY COMPANY, with a capital stock of \$2,500,000, has been incorporated. Its object is to build a road from the southerly end of South Fifth avenue at Canal street, with double tracks in, through and along South Fifth avenue and the public street, through Washington square to Fifth avenue; hence through Fifth avenue in a continuous line to the Central Park at or near Fifty-ninth street. The opposition to the scheme bids fair to be as great as was encountered by the Broadway road; but the gradual but steady encroachment of business up the avenue makes it evident that it will soon become a great shopping thoroughfare, and the success of the promoters is only a question of time.

THE THOMPSON CAR STARTER. We hear that considerable success has been achieved on various street railways with the use of this car starter. We learn that it is in use on several street railroads in Cleveland, and gives entire satisfaction, and that they do not have any trouble with its making horses balky, an objection which has been generally raised against the use of car starters. During the course of a public test recently made of the starter we hear that the car on which it was applied was stopped on a steep hill at a point where there was a sharp curve. The horses could not start the car at that point, but without any help from them the starter put the car in motion, after which the horses easily kept it going.

ATTEMPT TO MURDER A RAILWAY SUPERINTENDENT:—Superintendent James T. Gorman, of the Philadelphia Traction Company, was induced to leave his home, Sept. 4th, by a message that he was needed at his office. When he reached Budd and Haverford road he saw two men, one of whom put a pistol to his head and told him to get down on his knees. Instead of doing so, Mr. Gorman grappled with the man, took the pistol from him, and then handed him over to a policeman. The assailant was James P. Powers, who had been a gripman for the Traction Company, but who had been discharged by Mr. Gorman. Powers had a hearing at the Central Station, where he was represented by counsel, who intimated that his client was drunk. The prisoner was held in \$1,500 for assault and battery with intent to kill and \$500 for carrying deadly weapons.

THE (N. Y.) THIRTY-SECOND STREET LINE. The Railroad Committee of the Board gave another hearing in the case of the Thirty-second and Thirty-third Street Railroad Company. Several persons appeared against granting the franchise. William De Groot, chairman of the committee of property owners, presented a protest signed by 478 owners of 604 lots, valued at \$12,000,000, against the proposed road. President Cammain of the Real Estate Exchange, Dr. George B. Brooks and others objected to the route. C. Y. Bell, representing residents in Thirty-second

and Thirty-third streets east of Fourth avenue, favored granting the franchise and presented a petition signed by more than 2,000 persons. The hearing was adjourned to September 30, at 1 P. M.

THE BROADWAY AND BLEECKER ST. LINE'S CONNECTIONS. The order for a peremptory mandamus granted by Justice Ingraham, in the Superior Court, Special Term, requiring the Commissioner of Public Works to grant permits to Jacob Sharp's Twenty-third St. Railway Company for the removal of the pavement in Broadway at the intersection of Ann, Canal and Bleecker sts., in Center st., near the Hall of Records, and at Canal and Elm sts., for the purpose of laying such connections, switches, curves and turn-outs as may be necessary to connect with the Broadway Railroad, has been settled. It is ordered that the permits contain such directions as to the restoring of the pavements as in the judgment of the Commissioner will be most conducive to the public interests, and that the Commissioner pay \$50 costs to the railroad company.

THE BROOKLYN ELEVATED TO CONNECT WITH THE BRIDGE. The bridge workmen are engaged in tearing out a panel on the Washington street side of the station to prepare for the new stairway to connect with the extension of the elevated, active work on which will commence at once. A regular double trackway will be built from Washington and York streets up to the trestle now standing at Sands and Washington, but no rails are to be laid on it this Fall as it is not intended to run trains up to the bridge entrance. Instead a covered walk will be built under the road, above the ground, and resting on cross girders supported by the main columns, running to the foot of the new bridge stairway. A toll box will be placed at the top of the steps after the manner of the one in New York, so that passengers will not be compelled to climb the stairways. Cooper, Hewitt & Co. have assured Superintendent Martin that the necessary iron is all made up, and that there will be no delay in the work of erection.

THE BROOKLYN CITY RAILROAD COMPANY has ordered forty-three new cars from the John Stephenson Company's works of New York. Eight of them have been received, but the completion of the others has been slightly delayed, with the consent of the railroad company, in order to allow the car company to fulfill a previous contract. The cars will be distributed to the various branches of the City Railroad. They are of the most approved pattern, have ventilating roof, a telephone call, which summons the conductor by a whistle, operated by a bellows and string, windows set in narrow metal sashes in place of wide, wooden ones, and a patent bumper that prevents the whiffletrees from parting from the car in case the horses attempt to run away. Perforated wood, covered with carpet, is used for seats. Several of these cars will be placed on the Halsey street line, and in the course of a month they will be housed in the \$75,000 depot now in process of construction, at the junction of Halsey street and Broadway.

VETERINARY COLLEGE OF THE UNIVERSITY OF PENNSYLVANIA. The new college of the Pennsylvania University was opened on September 2d. Dr. R. S. Huidekoper is Dean of the veterinary faculty. The new college buildings are at Thirty-sixth and Pine streets, with the other college buildings. They have a frontage of 245' and are two stories high. They are fitted up with all the varied appliances that are called into use in the treatment of sick horses, and include even a large blacksmith shop, with eight double forges, where students will be taught the scientific method of shoeing horses and making shoes out of old as well as new iron. There is an armory for the keeping of the necessarily large instruments. The school will not begin operations until October. Animals will be received at the college between 10 A. M. and 3 P. M. daily, and will be treated free of charge for those unable to pay. Those who are able to pay will be charged \$1 per day for the keep of the horse, and a reasonable extra charge for treatment. The cost of building the college was \$50,000, of which \$18,000 was loaned for interest and incidental expenses during the opening year. Next year the students of the first three years' course will be graduated.

THE FORTY-SECOND-ST. AND ST. NICHOLAS AVE. LINE. Justice Barrett in the Supreme Court has dissolved the injunction restraining the Forty-second Street, Manhattanville and St. Nicholas Avenue Railway Company from constructing and operating a railroad in Eighty-sixth street, between Tenth ave. and Riverside Drive. The company was organized in August, 1878, under the general railway law, and took by assignment the franchise to construct a railroad in Eighty-sixth st., and other streets and avenues, granted by the Legislature of 1873. Justice Barrett in his opinion says: The Act of 1873 (Chapter 835) is in my judgment controlling. There is no getting over the fact that the franchise in question is thereby expressly made assignable. The defendant, lawfully incorporated under the general railway act of 1850, was competent to take, as assignee, this franchise. Having done so it was in the same position as many other horse railroads, namely, a corporation organized as such under the general act operating under a special charter. The right of a corporation thus to construct and operate a horse railroad in this city has become so firmly established that it cannot well be questioned at this late day. . . . It is entirely clear, too, that the charter of 1873 was not affected by the constitutional amendment of 1875. The latter was undoubtedly prospective and not retroactive in its operation. . . . The same may be said of the Act of 1884, which expressly reserved existing rights.

NEW YORK CITY CROSS-TOWN LINES. Mr. Cleary, at the meeting of the Aldermen Saturday, September 19, presented a petition from the Twenty-eighth and Twenty-ninth Street Crosstown Railroad Company, which seeks a franchise to construct a railroad. This will begin at the foot of East Twenty-third street, running along Twenty-

third street with a double track to Avenue A, to Twenty-fourth street, to First avenue, to Twenty-sixth street, to Second avenue, to Twenty-ninth street, by single track to Tenth avenue, by double track to Twenty-sixth street, to Thirteenth avenue, to Fourteenth street, returning along Thirteenth avenue to Twenty-sixth street, to Tenth avenue, to Twenty-eighth street, by single track to Second avenue, to Twenty-fourth street, to Avenue A, to Twenty-third street, to the ferry; also from Twenty-ninth street and Tenth avenue along Tenth avenue by double track to Thirty-fourth street, and thence to the North River; also from Second avenue and Twenty-eighth street through Twenty-eighth street by a single track to First avenue, up First avenue, and by a double track through Thirty-third street to the East River; also from Twenty-ninth street and Second avenue easterly by single track to First avenue, or by and through the nearest streets and avenues to the streets and avenues mentioned. Rastus S. Ransom, as President of the company, made the application. It was referred to the committee on railroads.

PROPOSED SURFACE ROADS IN NEW YORK CITY. Articles of incorporation have been filed of three street railways, in all of which Rastus S. Ransom and Joseph Kunzmann, of New York; Josiah F. Bailey, Frederick M. Walton and John J. Patterson, of Philadelphia; Harry G. Hinton, of Brooklyn; and Edward J. Knauer, of Astoria, are named as the directors, and in each of which \$4,000 is subscribed (\$1,000 per mile) and \$400 paid in. The roads are as follows:—

The Broome, Delancy and Spring Street Road to run through Delancy-st., Bowery, Spring, West, Desbrosses, Watts, Sullivan, and Broome sts., beginning at the ferry at the east end of Grand-st. The capital stock is \$1,000,000, to be divided into \$100 shares.

The Twenty-eighth and Twenty-ninth Street Cross-Town Railway of New York, the location asked for being given in another item in this paper. Capital stock \$750,000.

The One-hundred-and-sixteenth Street and Fort Lee Ferry Company, to begin near the east end of One-hundred-and-sixteenth-st., through that street to New-ave., One-hundred-and-twenty-sixth-street, Lawrence-st., Broadway, West One-hundred-and-thirtieth-st., North River. Capital stock \$500,000.

ELECTRIC RAILWAYS IN BALTIMORE. The trials of the electric railway in Baltimore are reported in the local papers as very satisfactory. The *American* says: The electric motors, Morse and Faraday, did a prosperous business on the trial day, transporting passengers to and from Hampden, Baltimore county. The two large Catonsville cars were attached to the motors and carried over one hundred passengers every trip. Over one thousand persons from Baltimore went out to get a ride behind the motors. The majority of the young men and boys crowded about the centre rail in

squads, from the stable yard to a considerable distance up Huntington avenue, and experimented with the rail charged with electricity. The more timid, however, stood at a respectful distance and watched the experiments. No harm resulted from standing on the centre rail with one foot and resting the other on the protectors, but woe to the man who would touch the ground while one foot rested on the rail. The shock was so great that some were knocked down. A person standing on a piece of dry wood may touch the centre rail when it is charged with electricity, and may also grasp it firmly with one or both hands, without being shocked in the least; but if the wood is damp, he cannot bear the shock a second. Mr. Robbins permitted the rail to be thus tampered with in order to let the people know that it was dangerous to be too familiar with it. The armature of "Morse" became overheated in the afternoon, and the motor was taken to the yard for repairs.

PHILADELPHIA TRACTION Co. The annual meeting of the stockholders of this Company was held on September 1. The following officers were elected for the ensuing year: President, William H. Kemble; First Vice President, P. A. B. Widener; Second Vice President, William L. Elkins; Secretary and Treasurer, D. W. Dickson; Directors, W. H. Kemble, P. A. B. Widener, W. L. Elkins, Thomas Dolan, James McManes, Joseph B. Altemus.

The following statement of business of the Traction Company for the year ending June 30, 1885, was presented: Receipts, \$2,553,652.55; expenses and rentals, \$2,227,795.57; net profit, \$325,856.98.

James T. Gorman, for a number of years Superintendent of the West Philadelphia Passenger Railway, has been appointed General Superintendent of the entire cable system of the Philadelphia Traction Company. Mr. P. A. B. Widener stated that the Columbia avenue and Seventh and Ninth streets sections of the cable road would be put in operation in about a month. He said everything could be got in readiness in ten days from the present time for putting on the cars, but the management prefers to wait until the Market street cable is fairly tested. He also stated that the cable on the latter road had been in continuous operation for the past two days, and he thought that all difficulties had now been surmounted, and that there would be no delay hereafter to be attributed to defective construction of the cable or machinery. Mr. Widener said further that it is the intention of the Traction Company, in the course of a month, to turn the cars now running on the southern end of Seventeenth and Eighteenth streets into Chestnut and Walnut streets, as is now done with the Nineteenth and Twentieth streets branch, thus carrying passengers through to and from Front and Walnut streets without change of cars and for one fare. —Ledger.

Subscribe for STREET RAILWAY JOURNAL, Only \$2.00 a year.

OFFICIAL LIST OF THE STREET RAILWAYS IN THE UNITED STATES & CANADA.

Compiled from data furnished the editors of "The Street Railway Journal," by the officers of the various roads.

[The following is a complete list of the Street Railways of the United States and Canada, so far as we have received the official returns from the various roads. Will those roads not reported kindly fill out the blanks sent them and mail to us without delay, so that they may be properly represented in the STREET RAILWAY JOURNAL?]

ABBREVIATIONS—m, miles; g, gauge; lb r, pounds rail to the yard; c, cars; h, horses; mu, mules. Officers' addresses are the same postoffice as the company unless otherwise specified.

AKRON, O.—Akron St. Ry. & Herdic Co. 2 1/2 m, 6c, 31 h. Pres. Ira M. Miller, V. Pres. James Christy, Treas. B. L. Dodge, Sec. F. M. Atterholt, Supt. John T. Metlin.

ALBANY, N. Y.—Watervliet Turnpike R.R. Co. 7 1/2 m, 26-45 lb r, 27 c, 143 h. Pres. Chas. Newman, Sec. & Treas. P. Way, Supt. M. C. Foster. The Albany Ry. 10 m, 4-8 1/2 g, 33-47 lb r, 51 c, 194 h. Pres. Supt. and Treas. John W. McNamara, Sec. Jas. H. Manning.

ALLENTOWN, PA.—Allentown Pass. R.R. Co. 3 1/2 m, 6 c, 22 h. Pres. Samuel Lewis, Treas. & Sec. Joseph E. Ballet, Supt. Russel A. Thayer.

ALTON, ILL.—Alton & Up. Altion Horse Ry. Co. 3 1/2 m, 5-3 g, 43 lb r, 17 c, 38 h. Pres. John P. Levan, Sec. & Treas. L. B. Reifsnider, Supt. John J. Buch.

AMSTERDAM, N. Y.—Amsterdam St. Ry. Co. 1 1/2 m, 4-8 g, 25 lb r, 3 c, 10 h. Pres. Henry Herrick, Treas. David Cady, Sec. M. L. Stover.

ANNISTON, ALA.—Ashtabula City Ry. Co. 4 m, 4-8 1/2 g, 40 lb r, 6 c, 60 h. Owner & Prop. Jno. N. Stewart.

ATLANTON, GA.—Acheson St. Ry. Co. 5 1/2 m, 4-8 1/2 g, 30-30 lb r, 19 c, 60 h. Pres. & Gen. Man. J. H. Beeson, Treas. H. M. Jackson, Sec. J. P. Adams.

ATLANTA, GA.—West End & Atlantic R.R. Co. 2m, 4-8 1/2 g, 20 lb r, 6 c, 34 mu. Pres. J. D. Turner, V. Pres. F. L. Langston, Sec. & Treas. B. H. Brumhead, Man. & Purch. Agt. Jno. S. Brumhead. Atlanta St. R.R. Co. Gate City St. R.R. Co. 2 1/2 m, 4-8 1/2 g, 16 lb r, 7 c, 26 h. Pres. L. B. Nelson, V. Pres. L. DeGivie, Sec. & Treas. John Stephens, Solicitor, A. Remharat. Metropolitan St. R.R. Co.

ATLANTIC, N. J.—Atlantic City Ry. Co. 1 1/2 m, 4-8 1/2 g, 28-30 lb r, 3c, 12 h. Pres. D. M. Osborne, Sec. & Treas. C. B. Koster, Supt. B. F. Andrews. East Genesee & Seward Ave. Ry. Co. 1 1/2 m, 4-8 1/2 g, 30 lb r, 6 c, 25 h. Pres. David M. Osborne, Sec. & Treas. C. B. Posters, Supt. B. F. Andrews.

AUGUSTA, GA.—Augusta & Somerville R.R. Co. AURORA, ILL.—Aurora City Ry. Co. 5 m, 4-8 1/2 g, 28 lb r, 7 c, 10 h, 30 mu. Pres. H. H. Evans, V. Pres. S. W. Thatcher, Sec. A. J. Hopkins, Treas. E. W. Truth, Supt. J. B. Chattee.

BAByLON, N. Y.—Babylon Horse R.R. Co. 1 1/4 m, — g, — lb r, 2 c, 3 h. Pres. W. F. Norton. BALTIMORE, MD.—Baltimore & Powhatan Ry. Co. 6 m, 5-4 1/2 g, 4 c, 17 h. Pres. & Treas. E. D. Freeman, Sec. R. B. Clark, Supt. I. M. Ketricik. Baltimore City Pass. Ry. Co. 40 m, 5-4 1/2 g, 46 lb r, 15 c, 1000 h. Pres. Oden Bowie, Treas. John Bolgian, Sec. S. L. Bridge. Baltimore Union Pass. Ry. Co. Baltimore & Catonsville Ry. Co. Baltimore & Halls Spring R.R. Co. Baltimore & Pimlico & Pikesville R.R. Co. Central Ry. Co. 5 1/2 m, 5-6 g, 40 lb r, 22 c, 180 h. Pres. Peter Thompson, Sec. & Treas. Walter Blakistone. Citizen's Ry. Co. 20 m, 5-4 1/2 g, 46 lb r, 34 c, 360 h. Pres. Jos. S. Hagarty, Treas. Wm. S. Hammersley, Supt. C. S. Speed. Monumental City Ry. Co. North Baltimore Passenger Ry. Co. People's Pass. Ry. Co. 6 1/2 m, 5-4 1/2 g, 42-45 lb r, 30 c, 200 h. Pres. R. E. Hamilton, Treas. Gustavus Ober, Sec., Supt. & Pur. Agt. Wm. A. House, Jr. Office, Fort Ave. & Johnson St. Soon move to Druid Hill Ave. York Road R.R. Co.

BATTLE CREEK, MICH.—Battle Creek Ry. Co. 5 m, 3-6 g, 28 lb r, 8 c, 18 h, 3 mu. Pres. Geo. Det-J. White, V. Pres. H. L. Brown, Sec. Chas. Thomas, Supt. John A. White, Gen. Man. J. W. Hahn.

BAY CITY, MICH.—Bay City St. Ry. Co. 7 1/2 m, 4-8 1/2 g, 18 lb r, 13 c, 35 h. Pres. James Clements, Treas. Wm. Clements, Sec. Edgar A. Cooley.

BEAVER FALLS, PA.—Beaver Valley St. Ry. Co. 3-1-10 m, 5 c, 21 h. Pres. M. L. Knight, Sec. & Treas. J. F. Merriman, Supt. of Construction, J. C. Whittle.

BELLAIRE, O.—Bellaire St. R.R. Co. BELLEVILLE, ILL.—Citizen's Horse Ry. Co. BELLEVILLE, ONT., CAN.—Belleville St. R.R. Co.

BEREA, O.—Berea St. Ry. Co. 1 1/2 m, 3-6 g, 28 lb r, 2 c, 2 h. Pres. C. W. D. Miller, V. Pres. T. Chinchward, Sec. & Treas. A. H. Pomeroy, Supt. A. W. Bishop.

BINGHAMTON, N. Y.—Washington Street & State Asylum R.R. Co. 4 1/2 m, 4 g, 16-25 lb r, 13 c, 23 h. Pres. B. H. Meagley, V. Pres. Geo. Whitney, Sec. C. O. Root, Treas. F. E. Ross.

Birmingham Central R.R. Co. 3 1/2 m (2 1/2 laid), 3 g, 28 lb r, 6 c (not in operation). Pres. Geo. L. Crandall, V. Pres. Nelson Stow, Sec. & Supt. Chas. O. Root, Treas. H. J. Kneeland.

Binghamton & Port Dickinson R.R. Co. 5 m, 4-8 1/2 g, 20-30 lb r, — c, — h. Pres. Harvey Westcott, Sec. & Treas. G. M. Harris, Supt. N. L. Osborn. (Leased to Mr. Osborn).

Main, Court & Chenango St. R.R. 5 m, 4-8 g, 40 lb r, 10 c, 25 h. Supt. & Lessee, N. L. Osborn.

BIRMINGHAM, ALA.—Birmingham St. Ry. Co. 3 1/2 m, 4-8 g, 16 lb r, 4 c, 12 m. Pres. B. F. Roden, Sec. & Treas. J. H. Williams.

BLOOMFIELD, N. J.—Newark & Bloomfield R. R. Co. BLOOMINGTON, ILL.—Bloomington & Normal Horse Ry. Co. BOONE, IA.—Boone & Boonsboro St. Ry. Co. 1 1/2 m, 3 g, 20 lb r, 3 c, 10 h. Pres. L. W. Reynolds, Treas. L. B. Hodges, Sec. & Supt. A. B. Hodges.

BOONSBORO, IA.—Twin City & Des Moines River Motor St. Ry. Co. BOSTON, MASS.—Highland St. Ry. Co. 19 m, 4-8 1/2 g, 50 lb r, 187 c, 925 h. Pres. Moody Merrill, Clerk R. B. Fairbairn, Treas. Samuel Little, Supt. J. E. Rugg.

Lynn & Boston. 3 1/2 m, 4-8 1/2 g, 25-48 lb r, 114 c, 514 h. Pres. Amos F. Breed, Treas. & Sec. E. Francis Oliver, Supt. Edwin C. Foster.

Metropolitan R.R. Co. 89 m, 4-8 g, 50 lb r, 700 c, 3,600 h. Pres. C. A. Richards, Sec. H. W. Harding, Treas. Chas. Boardman, Office, 16 Kilby St.

Middlesex R.R. Co. 26 m, 4-8 1/2 g, 50 lb r, 150 c, 700 h. Pres. Chas. E. Powers, Treas. & Supt. John H. Studley. Address, 27 Tremont Row, Boston, 100 h, So. Boston Ry. Co. 13 m, 4-8 1/2 g, 42-50 lb r, 193 c, 900 h. Pres. Chas. H. Hersey, Supt. Jas. C. Davis, Sec. & Treas. Wm. Reed, Supt. Daniel Coolidge.

BRADFORD, PA.—Bradford & Kendall R.R. Co. 1 1/2 m, 4-8 1/2 g, 35 lb r, 3 c, 4 h. Pres. James Brodey, Sec. N. D. Parsons, Gen. Man. & Supt. Enos Parsons.

BRIDGEPORT, CONN.—The Bridgeport Horse R.R. Co. 5 m, 4-8 1/2 g, 42 lb r, 14 c, 70 h. Pres. Albert Eamer, Sec. & Treas. F. Hurd, Supt. B. F. Lashar.

BROOKTON, MASS.—Brookton St. Ry. Co. 3 1/2 m, 2-4 c, 97 h. Pres. W. W. Cross, Treas. & Sec. Z. C. Keith, Supt. H. B. Rogers.

BROOKLYN, N. Y.—The Atlantic Avenue R.R. Co. of Brooklyn. 2 1/2 m, 4-8 g, 60 lb r, 24 c, 882 h. Pres. William Richardson, Sec. W. J. Richardson, Treas. Newburg H. Frost.

Broadway R.R. Co. 10-1-10 m, 4-8 1/2 g, 45-50-60 lb r, 166 c, 657 h. Pres. W. H. Husted, V. Pres. Edwin Beers, Sec. & Treas. Robert Sealey, Supt. Joshua Crandall.

Brooklyn Cross Town R.R. Co. 8 m, 4-8 1/2 g, 40-60 lb r, 72 c, 400 h. Pres. Henry W. Slocum, V. Pres. Ezra B. Tuttle, Sec. & Treas. John R. Connor, Supt. D. W. Sullivan.

Bushwick R.R. Co. 20 m, 4-8 1/2 g, 45-50-60 lb r, 172 c, 600 h. Pres. Frank Cromwell, V. Pres. Wm. H. Husted, Treas. & Sec. S. D. Hallowell, Supt. Wm. M. Morrison.

The Brooklyn, Bushwick & Queens County R.R. 6 m, 4-8 1/2 g, 42-47 lb r, 41 c, 117 h. Pres. Richard H. Green, V. Pres. James W. Elwell, 59 South St. N. Y. Sec. John D. Kilwell, Treas. Wm. L. Greene.

Brooklyn City R.R. Co. 4 1/2 m, 4-8 1/2 g, 60 lb r, 761 c, 3,045 h. Pres. William H. Hazzard, V. Pres. William M. Thomas, Sec. & Treas. Daniel F. Lewis, Asst. Sec. Francis E. Wrigley.

Brooklyn City & Newtown R.R. Co. 11 m, 4-8 1/2 g, 45-60 lb r, 128 c, 419 h. Pres. Louis Fitzgerald, N. Y. City, Sec. & Treas. H. A. Schuz, Supt. H. W. Bush. Calvary Cemetery, Greenpoint & Brooklyn Ry. Co. Coney Island and Brooklyn R.R. Co. 11-2-5 m, 45 lb r, 4-8 1/2 g, 103 c, 316 h. Pres. James Jourdan, Sec. Ed. F. Drayton, Supt. William Farrell.

Coney Island, Sheephead Bay & Ocean Avenue R.R. Co. Pres. A. A. McClemer, V. Pres. Daniel Mone, Sec. John McMahon, Sheephead Bay, Treas. Horace Valkuly.

Crosstown Line, Hamilton Ferry to Bridge. Grand St. & Newtown R.R. Co. 8 1/2 m, 4-8 1/2 g, 45-50 lb r, 72 c, 250 h. Pres. Martin Joost, Sec. & Treas. Wm. E. Horwill, Supt. Walter G. Howey.

Grand Street, Prospect Park & Flatbush R.R. Co. 4 1/2 m, 4-8 1/2 g, 50 lb r, 75 c, 244 h. Pres. Louis Fitzgerald, 120 Broadway, N. Y., Sec. & Treas. Duncan B. Cannon, Supt. Jno. L. Helms.

Greenpoint & Lorimer St. Prospect Park & Coney Island R.R. Co. 4-7-10 m, 45-50 lb r, 4-8 1/2 g, 69 c, 214 h. Pres. A. R. Culver, Treas. A. C. Washington, Sec. George H. Smith, Eng. Supt. R. Schermerhorn, Supt. Robert Attlesey.

Prospect Park & Flatbush R.R. 1 1/2 m, 4-8 1/2 g, 34 lb r, 70 c, 260 h. Pres. Loftis Wood, Sec. & Treas. Sam'l Parkhill, Supt. Loftis Wood.

South Brooklyn Central R.R. Co. 7 m (4 1/2 m laid), 4-8 1/2 g, 60 lb r, 42 c, 192 h. Pres. Wm. Richardson, Sec. Wm. J. Richardson, Treas. N. H. Frost, Supt. James Huddy.

The New Williamsburgh & Flatbush R. R. Co. 6 1/2 m, 4-8 1/2 g, 47-50 lb r, 74 c, 255 h. Pres. Geo. W. Van Allen, 54 Ann St. New York, Sec. W. B. Waitt, 34th St. & 9th Ave. New York, Treas. C. B. Cottrell, 8 Spruce St., N. Y. City, Supt. Chas. E. Harris, Nstrand Ave. & Carroll St., Brooklyn.

The Union Railway Co. of the City of Brooklyn (not in operation). Van Brunt St. & Erie Basin R.R. Co. 1 1/2 m, 4-8 1/2 g, 45 lb r, 7 c, 24 h. Pres. John Cunningham, Sec. & Treas. Edmund Terry.

BRUNSWICK, GA.—Brunswick St. R.R. Co. BUFFALO, ILL.—See Mechanicsburg, Ill.

BUFFALO, N. Y.—Buffalo St. R.R. Co. 17 1/2 m, 4-8 1/2 g, 50 lb r, 96 c, 510 h. Pres. Henry M. Watson, V. Pres. P. P. Pratt, Sec. S. S. Spaulding, Treas. W. H. Watson, Supt. Edward Edwards.

Buffalo East Side St. R.R. Co. 2-4-5 m, 4-8 1/2 g, 42 lb r, 47 c, 218 h. Pres. S. S. Spaulding, V. Pres. Joseph Churchyard, Sec. H. M. Watson, Treas. W. H. Watson, Supt. Edward Edwards.

BURLINGTON, IA.—Burlington City R.R. Co. 2 1/2 m, 4-8 1/2 g, 22 lb r, 9 c, 30 h. Pres. John Patterson, Sec. & Man. C. T. Patterson. Union St. Ry. Co.

CAIRO, ILL.—Cairo St. R.R. Co. CAMBRIDGE, MASS.—Cambridge R.R. Co. 43 m, 4-8 1/2 g, 50 lb r, 245 c, 1,410 h. Pres. Prentiss Cummings, Treas. & Clerk F. T. Stevens, Exec. Com. I.

M. Simpson, P. Cummings, O. S. Brown, Clerk of Directors, O. S. Brown, Supt. Wm. A. Bancroft. Charles River St. Ry. Co. 10-4-5 m, 2-8 1/2 g, 50 lb r, 50 c, 350 h. Pres. Chas. E. Raymond, Corp. Clerk C. E. Harden, Treas. Daniel U. Chamberlain, Supt. John N. Akerman.

CAMDEN, N. J.—Camden & Atlantic St. Ry. Camden Horse R.R. Co. 9 m, 5-1 g, 35-47 lb r, 26 c, 85 h. Pres. Thos. A. Wilson, Sec. Wilbur F. Rose, Treas. & Supt. John Hood.

CANTON, O.—Canton St. R.R. Co. (new road). CAPE MAY, N. J.—Cape May & Schellenger Landing Horse R. R. Co.

CARTHAGE, MO.—CEDAR RAPIDS, IA.—Cedar Rapids & Marion St. Pass. Ry. Co. CHAMPAIGN, ILL.—Champaign R.R. Co. Urbana & Champaign St. R.R. Co. (See Urbana.)

CHARLESTON, S. C.—Charleston City Ry. Co. 8 1/2 m, 4-8 1/2 g, 38-42 lb r, 22 c, 84 h. Pres. Jno. S. Riggs, Treas. Evan Edwards, Sec. Frank Whelden, Supt. Jno. Mohlenhoff. Enterprise R.R. Co. 12 m, 5 g, 42 lb r, 14 c, 51 h. Pres. A. F. Ravenel, Sec. & Treas. U. E. Hayne, Supt. T. W. Passaligaere.

CHATTANOOGA, TENN.—Chattanooga St. R. R. Co. 2 1/2 m, 4-8 1/2 g, 16-25 lb r, 8 c, 50 h. Pres. J. H. Warner, Sec. C. R. Gaskill, Supt. A. B. Wingfield.

CHESTER, PA.—Chester St. Ry. Co. 5 1/2 m, 5-2 1/2 g, 12 c, 70 h. Pres. Richard Peters, Jr., Solicitor, Geo. B. Lindsay, Treas. Sam'l A. Dyer, Sec. E. M. Cornell.

CHICAGO, ILL.—Chicago City Ry. Co. 87 m, 4-8 1/2 g, 45 lb r, 567 c, 1,416 h, cable doing work of 2,500 h. Pres. C. B. Holmes, Sec. H. H. Windsor, Treas. T. C. Pennington, Supt. C. B. Holmes. Chicago West Division Ry. Co. 40 m, 4-8 1/2 g, 40 lb r, 620 c, 3,425 h. Pres. J. R. Jones, Sec. George L. Webb, Supt. Jas. K. Lake. Chicago & Hyde Park St. — m, — g, — lb r, — c, — h. Pres. Douglas S. Clarke. 35 m, 4-8 1/2 g, 45 lb r, 316 c, 1,700 h. Pres. & Gen. Supt. C. W. Turner, V. Pres. Jacob Rehn, Sec. & Treas. Hiram Crawford, Supt. of Track & Construction, Augustine W. Wright, Asst. Supt. Fred L. Threedy, Supt. Horse Dept. Robt. Atkins, Purch. Agt. John W. Roach, Master Mechanic J. Miller.

CHILLICOTHE, O.—Chillicothe St. R.R. Co. 1 1/2 m, 3 g, 16 lb r, 7 c, 10 h. Pres. E. P. Safford, Sec. A. E. Wenis, Treas. William Polanel, Supt. Ewel McMartin.

CINCINNATI, O.—Cincinnati Inclined Plane Ry. Co. 3 m, 5-2 1/2 g, 43 lb r, 24 c, 150 h. Pres. Geo. A. Smith, Sec. & Supt. James M. Doherty, Treas. Jos. S. Hill. Cincinnati St. Ry. Co. 98 m, 5-2 1/2 g, 43 lb r, 254 c, 1,815 h. Pres. John Kilgour, Sec. & Aud. James A. Collins, Treas. R. A. Dunlap, Con. Eng. F. R. Wellzenecker, Supt. John Harris. Cincinnati & Mount Auburn R.R. Co. Columbia & Cincinnati St. R.R. Co. 3 1/2 m, 3 g, 35 lb r, 3 c, 6 dummy c. Pres. C. H. Kilgour, V. Pres. John Kilgour, Treas. B. F. Bramman, Sec. A. H. Meier, Mt. Lookout, O. Supt. J. J. Henderson, Mt. Lookout, O.

Mt. Adams & Eden Park Inclined R.R. Co. 3 1/2 m, 5-2 1/2 g, 42 lb r, 40 c, 320 h. Pres. & Treas. J. P. Kerper, Sec. J. R. Murdoch, Supt. Chas. Whithin. So. Covington & Cincinnati. (See Covington, Ky.)

CLEVELAND, O.—The Brooklyn St. R.R. Co. 8 1/2 m, 4-8 1/2 g, 52 lb r, 66 c, 375 h. Pres. Tom. L. Johnson, V. Pres. A. J. Moxham, Sec. J. B. Hoefgen, Treas. John McConnell, Supt. A. L. Johnson. Broadway & Newburg St. R.R. Co. 6 m, 4-8 1/2 g, 10 c, 160 h. Pres. & Supt. Joseph Stanley, V. Pres. Sam'l Andrews, Sec. & Treas. E. Fowler. Superior St. R.R. Co. 15 m, 4-8 1/2 g, 45 lb r, 46 c, 225 h. Pres. Frank De H. Robinson, V. Pres. John Koch, Sec., Treas. & Supt. M. S. Robinson, Jr. The East Cleveland R.R. Co. 20 m, 4-8 1/2 g, 35-40 lb r, 92 c, 450 h, 1 electric motor. Pres. A. Everett, V. Pres. Chas. Wason, Sec. & Treas. H. A. Everett, Supt. E. Duty. Offices, 1154 & 1158 Euclid Ave. Woodland Avenue & West Side St. R.R. Co. 17 m, 4-8 1/2 g, 43 lb r, 100 c, 550 h. Pres. M. A. Hanna, V. Pres. C. F. Emery, Sec. J. B. Hanna, Gen. Supt. George G. Mulhen. South Side St. Ry. Co. St. Clair Street Ry. Co. West Side R.R. Co.

CLINTON, IA.—Lyons & Clinton Horse R.R. Co. (See Lyons.)

COLUMBUS, GA.—Columbus St. R.R. Co. 3 m, 4-8 1/2 g, 16 lb r, 6 c, 25 h. Pres. Cliff B. Grimes, Sec. L. G. Schnessler, Treas. N. N. Curtis, Supt. J. A. Gabourgh.

COLUMBUS, O.—Columbus Consolidated St. R.R. Co. 19 m, 5-2 g, 30-46 lb r, 83 c, 350 h. Pres. A. Rodgers, V. Pres. H. T. Chittenden, Sec. & Treas. E. K. Stewart, Supt. J. H. Atcherson. Glenwood & Greenlawn St. R.R. Co. 4 1/2 m, 3-6 g, 24 lb r, 9 c, 25 c. Pres. A. D. Rodgers, V. Pres. B. S. Brown, Sec. R. S. Ro kley, Treas. S. S. Rickley, Supt. Jonas Wilcox.

CONCORD, N. H.—Concord Horse R.R. Co. 8 m, 3 g, 30-33 lb r, 10 c, 14 h, 2 steam motors. Pres. Moses Humphrey, Treas. H. J. Crippin, Clerk E. C. Hoag.

CORTLAND, N. Y.—Cortland & Homer Horse Ry. Co. 4 m (2 1/2 laid), 4-8 1/2 g, 25-30 lb r. Pres. Chas. H. Garrison, Troy, N. Y., Sec. J. M. Milne, Treas. S. E. Welch, Supt. S. E. Welch. (Leased to D. N. Miller.)

COUNCIL BLUFFS, IA.—Council Bluffs St. R.R. COVINGTON, KY.—So. Covington & Cincinnati St. Ry. Co. 17 1/2 m, 5-2 1/2 g, 43 lb r, 46 c, 296 h. Pres. E. F. Abbott, Sec. S. C. Buntou, Treas. G. M. Abbott.

DALLAS, TEX.—Dallas St. Ry. Co. 4 1/2 m, 4-8 1/2 g, 20-38 lb r, 12 c, 4 h, 72 mu. Pres. Wm. J. Keller, Sec. Harry Keller, Supt. C. E. Keller. Commerce & Way St. R.R. Co.

DANVILLE, ILL.—Citizens' St. Ry. Co. 4 m, 4 g, 20 lb r, 7 c, 35 mu. Pres. Wm. I. Cannon, V. Pres. & Gen. Man. Wm. Stewart, Sec. & Treas. Adam P. Samuel.

DAVENPORT, IA.—Davenport Central St. R.R. 2 1/2 m, 4-8 1/2 g, 20 lb r, 10 c, 30 h. Pres. James Grant,

Sec. O. S. McNeil, Treas. S. F. Smith, Supt. R. A. McGugin.
 Brady St. Ry. Co.
 Davenport City Ry. Co.
DAYTON, KY.—Newport & Dayton St. Ry. Co. 2 m, 5-2½ g, 41 lb r, 9 c, 36 h. Pres. & Supt. W. W. Bean.
DAYTON, O.—Dayton St. R.R. Co. 3½ m, 4-8½ g, 44 lb r, 23 c, 66 h. Pres. J. W. Stoddard, V. Pres. H. S. Williams, Sec. C. B. Clegg, Supt. A. W. Anderson.
 Oakwood St. Ry. Co. 3 1-3 m, 4-8½ g, 38 lb r, 13 c, 60 h. Pres. Charles B. Clegg, Sec. M. P. Moore, Supt. Wm. Davis.
 The Wayne & Fifth St. R.R. Co. 3½ m, 4-8½ g, 34-38 lb r, 5 c, 30 h. Pr. s. Geo. M. Shaw, Sec. & Treas. Eugene Winchet, Supt. N. Routzahn.
DECATUR, ILL.—Decatur Horse Ry. Co.
 Citizens' Street R.R. Co. 2 m, 4-8½ g, 20 lb T r, 7 c, 47 h & mu. Pres. D. S. Shellabarger, Sec., Treas. & Supt. A. E. Kinney.
DEERING, ME.—See Portland.
DENISON, TEX.—Denison St. Ry. Co. 3 m, 3-6 g, 16 lb r, 5 c, 22 mu. Pres. C. A. Waterhouse, Supt. S. A. Robinson.
DENVER, COL.—Denver City Ry. Co. 16 m, 3-6 g, 16 lb r, 50 c, 250 h. Pres. Geo. H. Holt, 10 Wall St., New York City, Sec. G. D. L'huillier, 10 Wall St., New York City, Treas. & Man. G. E. Randolph.
DES MOINES, IA.—Des Moines St. Ry. Co. 10 m, 3 g, 25-30-38-52 lb r, 18 c, 100 h. Pres. M. P. Turner, Sec. M. A. Turner.
 Des Moines & Sebastopol St. Ry. Co.
DETROIT, MICH.—Fort Wayne & Elmwood Ry. Co. 6 m, 4-8½ g, 45 lb r, 30 c, 180 h. Pres. H. B. Brown, V. Pres. Edward Kanter, Treas. George B. Pease, Sec. N. W. Goodwin, Supt. Geo. S. Hazard.
 Detroit City Ry. 30 m, 4-8½ g, 40-43½ lb r, 130 c, 700 h. Includes Jefferson Ave. line, Woodward Ave. line, Michigan Ave. line, Gratiot Ave. line, Brush St. line, Cass Ave. line, Congress & Baker line. Pres. Sidney D. Miller, Treas. George Hendrie, Sec. James Heugh, Gen. Supt. Robert Bell, Mast. Mech. John Willis.
 Grand River St. Ry. Co. 2½ m, 4-8½ g, 43 lb r, 13 c, 110 h. Pres. & Treas. Jos. Dalley, Sec. J. W. Dalley, Supt. C. M. Dalley.
DOVER, N. H.—Dover Horse R.R. Co. 2-2-5 m, 3 g, 30 lb r, 4 c, 14 h. Directors, Z. S. Wallingford, Chas. H. Sawyer, Jas. E. Lothrop, C. W. Wiggin, Harrison Haley, Frank Williams, Cyrus Littlefield, Treas. Cyrus Littlefield.
DUBUQUE, IA.—Dubuque St. R.R. 5 m, 4-8½ g, 21 c, 45 h. Pres. J. A. Rhonberg, Sec. & Treas. B. E. Linehan, Supt. J. J. Linehan.
DULUTH, MINN.—Duluth St. Ry. Co. 3 m, 3-6 g, 30 lb r, 6 c, 7 h, 31 mu. Pres. A. S. Chase, V. Pres. O. P. Stearns, Sec. & Treas. L. Mendenhall, Supt. & Pur. Agt. W. T. Hoopes.
EAST OAKLAND, CAL.—Oakland, Brooklyn & Fruitvale R.R. Co.
EAST SAGINAW, MICH.—Street R. R. Co. of East Saginaw. — m, 4-8½ g, 30 lb r, 14 c, 35 h. Pres. & Supt. W. J. Barton, Sec. W. H. Hark, Treas. J. B. Peter.
EAST ST. LOUIS, ILL.—East St. Louis St. R.R. Co.
EASTON, PA.—The Easton & So. Easton Passenger Ry. Co. 1½ m, 5-2½ g, 45 lb r, 4 c, 20 h. Pres. H. A. Sage, Sec. & Treas. H. W. Cooley, Supt. Elisha Burwell, So. Easton.
 The West End Passenger Ry. Co. 1½ m, 5-2½ g, 45 lb r, 6 c, 20 h. Pres. H. A. Sage, Sec. & Treas. H. W. Cooley, Supt. Samuel Berry.
EAU CLAIRE, WIS.—Eau Claire City Ry. Co.
ELGIN, ILL.—Elgin City Ry. Co. 2 c. Pres. Sec. Treas. Supt. & Owner, B. C. Payne.
ELIZABETH, N. J.—Elizabeth & Newark Horse R.R. Co. 14 m, 5-2½ g, 4-10½ g, 30 lb r, 24 c, 74 h. Pres. & Treas. Jacob Davis, Sec. & Supt. John F. Pritchard.
ELKHART, IND.—Elkhart City R.R. Co.
ELMIRA, N. Y.—The Elmira & Horseheads Ry. Co. 9-2-3 m, 4-8½ g, 25-30-40 lb r, 18 c, 34 h. Pres. & Treas. George M. Diven, V. Pres. Geo. W. Hoffman, Sec. Wm. S. Kershner, Supt. Henry C. Silsbee.
EL PASO, TEX.—El Paso St. Ry. Co. 2½ m, 4-8½ g, 20 lb r, 8 c, 25 h. Pres. G. B. Zimpelman, V. Pres. A. Krookauer, Treas. F. Magoffine, Sec. & Supt. I. A. Tays.
EMPORIA, KAN.—Emporia City Ry. Co. 3½ m, 5 g, 20 lb r, 6 c, 23 m. Pres. Van R. Holmes, Treas. A. F. Crowe, Sec. & Man. J. D. Holden.
ENTERPRISE, MISS.—Enterprise St. Ry. Co. 1½ m, 3-6 g, 24 lb r, 2 c, 6 h. Pres. John Kampe, V. Pres. E. B. Gaston, Sec. & Treas. Jno. Gaston.
ERIE, PA.—Erie City Passenger Ry. Co. 5 m, 4-8½ g, 30-40 lb r, 17 c, 70 h. Pres. Wm. W. Reid, Treas. J. C. Spencer, Sec. A. L. Letteli, Supt. Jacob Berst.
EUREKA SPRINGS, ARK.—Eureka Springs City Ry. Co.
EVANSVILLE, IND.—Evansville St. Ry. Co. 12 m, 4-8 g, 28 lb r, 31 c, 190 mu. Pres. John Gilbert, Sec. P. W. Raleigh, Treas. John Gilbert, Supt. W. Bahr.
FALL RIVER, MASS.—Globe St. Ry. Co. 12 m, 4-8½ g, 40-46-47 lb r, 40 c, 160 h. Pres. Frank S. Stevens, Treas. H. W. Brightman, Sec. M. G. B. Swift, Supt. John F. Bowker, Jr.
FORT SCOTT, KAN.—Bourbon County St. Ry. Co. 1 m, 4 g, 22 lb r, 2 c, 4 m. Pres. Isaac Stadden, V. Pres. Benj. Files, Sec. Wm. Perry, Treas. J. H. Randolph.
FORT SMITH, ARK.—Fort Smith St. Ry. Co. 2 m, 3-6 g, 16-28 lb r, 5 c, 16 h. Pres. Sam'l M. Loud, Sec. & Treas. Geo. T. Sparks.
FORT WAYNE, IND.—Citizens' St. R.R. Co.
FORT WORTH, TEX.—Fort Worth St. Ry. Co. 7½ m, 4 g, 25-38 lb r, 16 c, 73 m. Pres. K. M. Vanzandt, Treas. W. A. Hoffman, Acting Sec. & Gen. Man. S. Mims.
FRANKFORT, N. Y.—Frankfort & Ilion Street Ry. Co. 2½ m, 5 g, 4 c. Pres. A. C. McGowan, Frankfort, Sec. D. Lewis, Ilion, Treas. P. Remington, Ilion, Supt. Fredk. Gates, Frankfort.
FREDONIA, N. Y.—Dunkirk & Fredonia R.R. Co. 3½ m, 4-10 g, 25 lb r, 5 c, 8 h. Pres. Wm. M. McClinty, Sec. & Treas. M. N. Fenner, Supt. Z. Elmer, Wheelock.
GAINESVILLE, FLA.—Gainesville St. Ry. Co. 2½ m, 3-6 g, 9 lb r, 10 c, 36 h. Pres. Robert Carson, Sec. & Treas. F. Sargent, Man. William Wilson

GAINESVILLE, FLA.—Gainesville St. Ry. Co. 2½ m, 3-6 g, 9 lb r, 10 c, 36 h. Pres. Robert Carson, Sec. & Treas. F. Sargent, Man. William Wilson
KNOXVILLE, TENN.—Knoxville St. Ry. Co. 2 m, 4-8½ g, 22 lb r, 5 c, 2 hacks, 30 h. Pres. W. W. Woodruff, Sec., Treas. & Supt. T. L. Beaman.
LACONIA, N. H.—Laconia & Lake Village Horse R.R. 2½ m, 3 g, 34 lb r, 5 c, 17 h. Pres. A. G. Folsom, Treas. Edmund Little, Man. Bela S. Kenniston.
LA CROSSE, WIS.—City Ry. Co. of La Crosse. 2½ m, 4-9 g, 24 lb r, 5 c, 16 h, 3 mu. Pres. Geo. F. Gund, V. Pres. B. E. Edwards, Sec. Mills Tourtelotte, Treas. Fred Tillman, Gen. Supt. Joseph Tuteur, Supt. Geo. F. Smith.
 La Crosse St. Ry. Co.
LA FAYETTE, IND.—LaFayette St. Ry. 2½ m, 4-8½ g, 35 lb r, 6 c, 38 h. Pres. F. B. Caldwell, LaFayette, Sec. & Treas. B. G. Jones, Decatur, Ill., Supt. F. Greer, LaFayette.
LAKE CITY, FLA.—Lake City St. Ry. Co.
LAMPASAS SPRINGS, TEX.—Lampasas City Ry. Co. 3½ m, 4-8½ g, 22 lb r, 6 c, 15 h. [Owned by Mrs. L. R. Snodgrass.] Gen. Man. Geo. M. Snodgrass.
LANCASTER, PA.—Lancaster & Millerville St. Ry. Co.
 Lancaster City St. Ry. Co.
LARCHMONT, N. Y.—Larchmont Manor Co. 1 m, 4-8 g, 25 lb r, 2 c, 8 h. Pres. C. H. Murray, Treas. S. H. French, 38 East Fourteenth St., N. Y. City.
LAWRENCE, KAN.—Lawrence Transportation Co. 3½ m, 4-1 g, 38 lb r, 7 c, 30 h. Pres. H. Tisdale, Sec. W. H. Bangs.
LAWRENCE, MASS.—Merrimack Valley Horse R.R. Co. 5-4-5 m, 4-8½ g, 48 lb r, 20 c, 70 h. Pres. Wm. A. Russell, V. Pres. James Walton, Methuen, Clerk & Treas. James C. Eaton, Supt. A. N. Kimball, Lawrence.
LEWISTON, ME.—Lewiston & Auburn Horse R.R. Co. 7½ m, 4-8½ g, 32 lb r, 16 c, 45 h. Pres. Frank W. Dana, Lewiston, Clerk, H. C. Little, Lewiston, Treas. H. C. Packard, Auburn, Supt. E. P. Stinchfield, Auburn.
LEXINGTON, KY.—Lexington City Ry. Co. 5 m, 4-10 g, 20 lb r, 20 c, 85 h. Pres. John Cross, V. Pres. C. R. Diver, Sec. & Supt. Bert. Cross.
LEXINGTON, MO.—Lexington St. Ry. Co.
LIMA, O.—Lima St. Ry. Co.
LINCOLN, NEB.—Capital City Ry. Co. 3 m, — g, — lb r, 5 c, — h. Pres. E. B. Durfee, Sec. & Supt. H. B. Durfee.
LITTLE ROCK, ARK.—Little Rock St. Ry. Co. Citizens' St. Ry. Co. 4½ m, 4-10 g, 20 lb r, 22 c, 80 h. Pres. John Cross, Sec. & Treas. F. C. Reed, Supt. C. R. Diver.
 Hot Springs St. Ry. Co.
LOGANSPORT, IND.—Logansport Ry. Co. 2 m, 4 g, 25 lb r, 6 c, 29 mu. Pres. Frank G. Jaques, Sec. M. Jaques, Supt. Wm. P. Jaques, Office, Urbana, Ill.
LONDON, CAN.—London St. R.R. Co. 3 m, 4-8½ g, 30 lb r, 12 c, 30 h. Pres. V. Cronga, Sec. Jas. H. Flock, Supt. Henry Thos. Smith.
LONG ISLAND CITY, N. Y.—Steinway & Hunter's Point R.R. Co. 26½ m, 4-8½ g, 47 lb r, 60 c, 150 h. Pres. Wm. Steinway, Steinway Hall, N. Y. City. V. Pres. Henry A. Cassebeer, Jr., Steinway, P. O., Long Island City, N. Y. Sec. & Treas. Chas. F. Traubart, Steinway Hall, N. Y. City.
 Dutch Kills & Hunter's Point R.R. — m, — g, — lb r, — c, — h. Pres. R. J. Gleason.
 Long Island City & Newtown Ry. Co. 3 m, 4-8½ g, 45-55 lb r, 25 c, 60 h. Pres. Isaac Buchanan, N. Y. City, Sec. Geo. S. Crawford, Brooklyn, N. Y., Treas. Patrick J. Gleason, Supt. Michael Conway.
LONGVIEW, TEX.—Longview & Junction St. Ry. ¾ m, 3-6 g, 2 c, 4 h. Pres. F. T. Rembert, Sec. R. B. Levy, Treas. F. L. Whaley, Supt. C. W. Booth.
LOS ANGELES, CAL.—Boyle Heights R.R. Co. Central R.R. Co. and the Sixth & San Fernando St. R.R. Co. 7 m, 3-6 g, 16 lb r, 13 c, — h. Pres. E. T. Spencer, Sec. F. X. Palmer, Supt. J. A. Fairchild.
 City R.R. of Los Angeles. 4½ m, 4-8½ g, 36 lb r, 9 c, 75 h. Pres. I. M. Hellman, V. Pres. W. J. Brodrich, Sec. John O. Wheeler, Supt. W. H. Hawks.
 Los Angeles & Aliso Ave. St. R.R. Co.
 Main St. & Agricultural Park R.R.
LOUISVILLE, KY.—Kentucky St. Ry. Co. 5 m, 5-2 g, — lb r, 22 c, — h. Pres. T. J. Minary, Sec. & Treas. Thos. Donigan.
 Central Pass. R.R. Co.
 Crescent Hill Ry. Co.
 Louisville City Ry. Co. 63 m, 5 g, — lb r, 199 c, 1300 h. Pres. Maj. Alexander Henry Davis, Syracuse, N. Y., V. Pres. St. John Boyle, Sec. & Treas. R. A. Watts, Supt. H. H. Littlell.
LOWELL, MASS.—Lowell Horse R.R. Co. 6 m, 4-8½ g, 28-47 lb r, 28 c, 100 h. Pres. Wm. E. Livingston, Gen. Man. J. A. Chase.
LYNCHBURG, VA.—Lynchburg St. R.R. Co. 2 m, 5-1 g, 26 lb r, 6 c, 31 h. Pres. Stephen Adams, Treas. John L. Adams, Supt. William M. Payne.
LYONS, IA.—Clinton & Lyons Horse Ry. Co. 4½ m, 3-8 g, 19-30 lb r, 15 c, 40 h. Pres. D. Joyce, V. Pres. & Man. R. N. Rand.
MACON, GA.—Macon & Suburban St. Ry. Co. 6 m, — g, 20 lb r, 10 c, 50 h & mu. Pres. T. J. Carling, Sec. & Treas. H. R. Brown, Office, 151 Second St.
MADISON, IND.—Madison St. Ry. Co. 2½ m, 4 g, 15 lb r, 7 c, 8 h, 10 mu. Pres. Jacob Wendle, V. Pres. Peter F. Robenilus, Supt. & Treas. Chas. F. Tuttle.
MADISON, WIS.—Madison St. Ry. Co. 2½ m, 3 g, 23 lb r, 6 c, 24 h. Pres. E. W. Keyes, V. Pres. Sec. & Treas. D. K. Tenney, Supt. G. W. Carse.
MANCHESTER, N. H.—Manchester Horse R.R. 4½ m, 3-½ g, 27-34 lb r, 12 c, 41 h. Pres. S. N. Bell, Treas. Frederick Smyth, Clerk J. A. Weston, Supt. A. Q. Guage.
MARYSVILLE, CAL.—City Pass. R.R. Co. (No returns.)
MECHANICSBURG, ILL.—Mechanicsburg & Buffalo Ry. Co. 3½ m, 3-10 g, 16 lb r, 3 c, 4 mu. Pres. J. N. Fullenweider, Treas. A. T. Thompson, Sec. J. T. Fullenweider.
MEMPHIS, TENN.—Memphis City R.R. Co.
MERIDIAN, MISS.—Meridian St. Ry. Co. 1½ m, 4-8 g, 16 lb r, 3 c, 12 h. Pres. J. J. Shannon, V. Pres. J. L. Handley, Sec. R. M. Houston.
MIDDLETOWN, O.—Middletown & Madison St. Ry. Co.

GAINESVILLE, TEX.—Gainesville St. Ry. Co. 2½ m, 3-6 g, 17 lb r, 4 c, 12 h. Pres. C. N. Stevens, V. Pres. J. F. Harris, Sec. & Treas. F. R. Sherwood.
GALESBURG, ILL.—Galesburg Horse R.R. Co.
GALVESTON, TEX.—Galveston City R.R. Co. 18 m, 4-8½ g, 30 lb r, 68 c, 169 mu. Pres. Wm. H. Sinclair, Sec. & Treas. F. D. Merritt, Supt. M. J. Keenan.
 Gulf City St. Ry. & Real Estate Co.
GLOUCESTER, MASS.—Gloucester City R.R.
GRAND RAPIDS, MICH.—Street Ry. Co. of Grand Rapids, Mich. 13 m, 4-8½ g, 30-35 lb r, 21 c, 175 h. Pres. C. A. Otis, Cleveland, O., V. Pres. L. H. Whitley, Grand Rapids, Treas. M. S. Crosby, Grand Rapids, Sec. J. M. Weston, Grand Rapids, Asst. Sec. Jas. Pickands, Cleveland, O.
GREEN CASTLE, IND.—Green Castle City St. Ry. Co. 2 m, 4-8½ g, 23 lb r, 3 c, 12 h. Pres. & Supt. D. Rogers, Sec. James S. Nutt, Treas. Rudolph Rogers.
GREENVILLE, S. C.—Greenville City Ry. Co. 1 m, 5 g, — lb r, 5 c, 20 h. Proprietors, Gilbreath & Harris.
HAMILTON, O.—The Hamilton St. Ry. Co. 4 m, 3 g, 28 lb r, 11 c, 12 h. Pres. James F. Griffin, Sec. O. V. Parrish, Treas. H. L. Morey, Supt. J. C. Bigelow.
HANNIBAL, MO.—Hannibal St. Ry. Co. 2 m, 4-8½ g, 16-36 lb r, 6 c, 22 h. Pres. & Supt. M. Doyle, Sec. & Treas. James O. Hearn.
HARRISBURGH, PA.—Harrisburgh City Passenger Ry. Co. 2½ m, 5 2½ g, 42-47 lb r, 15 c, 36 h, Pres. H. A. Kelker, V. Pres. Daniel Epply, Sec. John T. Ensinger, Treas. R. F. Kelker, Supt. S. B. Reed.
HARTFORD, CONN.—Hartford & Wethersfield Horse R.R. Co. 12 m, 4-8½ g, 45 lb r, 49 c, 250 h. Pres. & Treas. E. S. Goodrich, Sec. Geo. Sexton.
HAVERHILL, MASS.—Haverhill & Groveland St. Ry. Co. 4½ m, 4-8½ g, 30 lb r, 10 c, 19 h. Pres. Jas. D. White, Treas. John A. Colby, Supt. L. R. Mitchell.
HELENA, ARK.—Helena St. Ry. Co.
HERKIMER, N. Y.—Herkimer & Mohawk St. Ry. Co. 1½ m, 4-8½ g, 25 lb r, 3 c. Pres. J. M. Ansman, Sec. Joab Small, Treas. H. D. Alexander.
HOBOKEN, N. J.—North Hudson County Ry. Co. 16½ m, 4-7 g, 50-60 lb r, 116 c, 630 h. Pres. John H. Bonn, Sec. F. J. Mallory, Treas. Fredk. Mickel, Union, Supt. Nicholas Goetz, Union.
HOLYOKE, MASS.—Holyoke St. Ry. Co. 2 m, 4-8½ g, 35 lb r, 8 c, 24 h. Pres. Wm. A. Chase, Treas. C. Fayette Smith, Supt. H. M. Smith.
HOT SPRINGS, ARK.—Hot Springs R.R. Co. 3 m, 4 g, 25 lb r, 11 c, 30 h. Pres. S. W. Fordyce, Sec. C. E. Maurice, Supt. J. L. Butterfield.
HOUSTON, TEX.—Houston City St. Ry. Co. 13 m, 4-8½ g, 20-30-40 lb r, 40 c, 118 m. Pres. Wm. H. Sinclair, Galveston, V. Pres. & Gen. Man. H. F. McGregor, Houston, Supt. Henry Friend, Houston, Sec. & Treas. F. J. DeMeritt, Galveston.
HUTCHINSON, KAN.—Hutchinson St. Ry. Co.
HYDE PARK, ILL.—Ewing Avenue Horse Ry. Co. 4-8½ g. Pres. Andrew Rehm, Sec. A. Krimbill.
ILION, N. Y.—Frankfort & Ilion Ry. Co. 2½ m, 5 g, 25 lb r, 4 c, 6 h. Pres. A. C. McGowan, Sec. D. Lewis, Treas. F. Remington, Supt. Frederick Gates.
INDIANAPOLIS, IND.—Citizens' St. Ry. Co. 35 m, 4-8½ g, 20-33-40-52 lb r, 70 c, 530 h. Pres. A. W. Johnson, Indianapolis, Treas. Tom L. Johnson, Cleveland, O. Sec. A. A. Anderson, Indianapolis, Man. W. T. Steele, Indianapolis, Auditor P. Woodrige, Louisville, Ky.
IRVINGTON, N. J.—Newark & Irvington R.R. Co.
JACKSON, MICH.—Jackson City Ry. Co. — m, — g, — lb r, 11 c, 40 h. Pres. Hiram H. Smith, Treas. Samuel Hopewell, Gen. Supt. Henry H. Smith.
JACKSON, MISS.—Jackson Street Ry. Co.
JACKSON, TENN.—Jackson Street Ry. Co.
JACKSONVILLE, FLA.—Pine St. R.R. Co. 2½ m, 5 g, 25 lb r, 4 c, 18 m. Owner & Gen. Man. G. H. Backinast, Sec. & Treas. F. W. Backinast.
 Jacksonville St. Ry. Co. 2½ m, 5 g, 25 lb r, 10 c, 36 m. Pres. H. S. Haines, Savannah, Ga., V. Pres. & Sec. Geo. R. Foster, Treas. W. P. Hardee, Savannah, Ga., Supt. G. W. Haines.
JACKSONVILLE, ILL.—Jacksonville Ry. Co.
JAMAICA, N. Y.—Jamaica & Brooklyn R.R. Co. 10 m, 4-8½ g, 56-60 lb r, 29 c, 56 h. Pres. Aaron A. DeGrauw, Sec. Martin J. Durea, Treas. Morris Fosdick, Supt. Wm. M. Scott.
JAMESTOWN, N. Y.—Jamestown St. Ry. Co. 2 m, 4-8½ g, 30-42 lb r, 7 c, 9 h. Pres. John T. Wilson, Sec. C. R. Lockwood, Treas. John Langford, Supt. John F. Wilson.
JERSEY CITY, N. J.—Jersey & Bergen R.R. Co. 21 m, 4-10 g, 60 lb r, 73 c, 494 h. Pres. Chas. B. Thurston, V. Pres. Wm. Keeney, Treas. C. B. Place, Sec. Warren E. Dennis, Newark, Supt. Thos. M. Sayre.
 Pavonia Ferry Ry. Co.
JOHNSTOWN, N. Y.—The Johnstown, Gloversville & Kingsboro Horse R.R. Co. 5½ m, 4-8½ g, 26 lb r, 6 c, 16 h. Pres. James Younglove, V. Pres. R. Fancher, Sec. & Treas. I. M. Law.
JOHNSTOWN, PA.—Johnstown Pass. R.R. Co. 6½ m, 5-3 g, 41-43 lb r, 13 c, 56 h. Pres. James McMullen, Sec. B. L. Yeagley, Treas. W. H. Rosensieck, Jr.
JOLIET, ILL.—Joliet City R.R. Co. 3½ m, 4-8½ g, 40 lb r, 16 c, 30 h, & mu. Owner, J. A. Henry, A. Bleschman, Cash. J. E. Henry.
JOPLIN, MO.—
KALAMAZOO, MICH.—Kalamazoo St. Ry. Co. 10 m, 4-8½ g, 35 lb r, 28 c, 80 h. Pres. Fred Bush, Sec. J. W. Boynton, Treas. F. H. Brown.
KANSAS CITY, MO.—Kansas City Cable Ry. Co. 2½ m, 4-8½ g, 45 lb r, 10 pass. cars, 10 dummy cars. Pres. Wm. J. Smith, Sec. W. H. Lucas, Eng. Robert Gillham.
 Corrigan Consolidated St. Ry. Co. 20 m, 4-1 g, 30 lb r, 80 c, 350 h. Pres. Bernard Corrigan, Gen. Man. Thos. Corrigan, Sec. Jas. T. Kelley.
 Jackson County Horse R.R. Co.
 Kansas City & Rosedale St. Ry. Co.
 Kansas City & Westport St. R.R. Co.
KEOKUK, IA.—Keokuk St. Ry. Co. 4 m, 4-8½ g, 27 lb r, 10 c, 42 h. Pres. Jas. H. Anderson, V. Pres. Jos. G. Anderson, Sec. R. James Anderson, Treas. & Supt. W. Z. Anderson.
KINGSTON, ONT., CAN.—Kingston St. R.R.

MILLERSVILLE, PA.—Lancaster & Millersville St. R.R. Co.

MILWAUKEE, WIS.—Cream City R.R. Co. 8 1/2 m, 4-8 1/2 g, 27-38 lb r, 74 c, 307 m, 2 h. Pres. Winfield Smith, V. Pres. Christian Pressner, Treas. Ferdinand Knehn, Sec. Wm. Damkoehler, Supt. Henry Berg. Milwaukee City Ry. Co. 15 m, 4-8 1/2 g, 27 lb r, 75 c, 430 h. Pres. Peter McGeoch, Sec. & Treas. Geo. O. Wheatcroft.

West Side St. Ry. Co. Owner & Manager, Washington Becker, Supt. — Naughton.

MINNEAPOLIS, MINN.—Minneapolis St. Ry. Co. 45 m, 3-6 g, 27-35-45 lb r, 146 c, 725 h and mu. Pres. Thos. Lowry, V. Pres. C. Morrissey, Treas. W. W. Herrick, Sec. & Supt. C. G. Goodrich.

MOBILE, ALA.—City R.R. Co. 17 1/2 m, 5-2 g, 35 lb T-r, 68 c, 240 h. Pres. Jno. Maguire, Sec. I. Strausse, Treas. Myer I. Goldsmith, Supt. A. Moog. Dauphin & Lafayette St. Ry. Co. 2 m, 5-2 1/2 g, 40 lb r, 9 c, 22 h. Pres. D. P. Bestor, V. Pres. G. Y. Overall, Sec. & Treas. James W. Gray, Pur. Agt. & Man. J. G. Robertson.

Mobile & Spring Hill R.R. Co. 8 m, 5-2 1/2 g, 35 lb r, 15 c, 35 h, 1 dummy. Pres. Daniel M. Neill, Sec. & Treas. C. F. Sheldon, Man. F. Ingato.

MOHAWK, N. Y.—Mohawk & Ilion R.R. Co. 1 1/2 m, 4-8 1/2 g, 30 lb r, 4 c (contract for motive power). Pres. O. W. Bronson, V. Pres. John Brown, Sec. H. D. Alexander, Treas. R. M. Devendorff, Supt. O. W. Bronson.

MOLINE, ILL.—Moline Central St. Ry. Co. 1 1/2 m, — g, — lb r, 3 c, 11 h. Pres. S. W. Wheelock, V. Pres. M. Y. Cady, Sec. W. R. Moore, Treas. C. F. Hemenway.

Moline & Rock Island St. Ry. Co. — m, — g, — lb r, — c, — h. Pres. J. Huntoon, Sec. I. M. Buford, Treas. C. Lyons, Supt. Wm. Gamble.

MONTREAL, CAN.—Montreal City Pass. Co. 21 m, 4-8 1/2 g, — lb r, 76 c, 465 h. Pres. Jesse Joseph, V. Pres. Wm. Smith, Sec. & Man. Ed. Lusher, Supt. T. H. Rohlland.

MOULTREVILLE, S. C.—Middle St. & Sullivan's Landing Ry.

MUSKOGON, MICH.—Muskegon Ry. Co. 4 1/2 m, 3-6 g, 20 lb r, 8 c, 26 h, 8 mu. Pres. F. A. Nims, V. Pres. Chas. Merriam, Boston, Mass., Sec. Thomas Munroe, Treas. G. R. Sherman, Supt. C. H. Newell.

NASHUA, N. H.—Nashua St. Ry. Co.

NASHVILLE, TENN.—Nashville & Edgefield R.R. Co. Fatherland Street Railway Co. North Edgefield and Nashville St. R.R. Co. one management. 5 m, 5 g, 16 lb r, 21 c, 100 h. Pres. Jno. P. White, Sec. & Treas. H. B. Stubblefield, Supt. Daingerfield Deaderick.

McGavock & Mt. Vernon Horse R.R. Co. Nashville D. & N. St. R.R. Co. 7 1/2 m, 5 g, 16-32 lb r, 25 c, 140 mu. Pres. Jno. P. White, V. Pres. B. F. Wilson, Sec. & Treas. H. B. Stubblefield, Supt. D. Deaderick.

South Nashville St. R.R. Co. 4 1/2 m, 5 g, 16-20 lb r, 10 c, 68 h. Pres. W. M. Duncan, Sec., Treas. & Supt. C. L. Fuller.

NEVADA, MO.—Nevada Street Ry. Co.

NEW ALBANY, IND.—New Albany St. Ry. Co. 6 m, 4-11 g, 25 lb r, 15 c, 50 h. Pres. Geo. T. Vance, Sec. G. Vance, Treas. Letitia V. Vredenburg, Supt. Wm. L. Timberlake.

NEWARK, N.J.—The Newark & Bloomfield St. R.R. Co. 7 m, 5-2 1/2 g, 47 lb r, 22 c, 140 h. Pres. S. S. Battin, Sec. W. L. Mulford, Supt. H. F. Totten.

Broad St. R.R.

NEW BEDFORD, MASS.—New Bedford & Fairhaven St. Ry. Co. 7 1/2 m, 4-8 1/2 g, 35-40 lb r, 38 c, 138 h. Pres. Warren Ladd, Treas. Andrew G. Pierce, Clerk Edward T. Pierce.

Acushnet St. R.R. Co. (not in operation.) Pres. Chas. E. Cook, Sec. & Treas. A. P. Smith.

NEWBURYPORT, MASS.—Newburyport & Amesbury Horse R.R. Co. 6 1-3 m, 12 c, 54 h. Pres. W. A. Johnson, Treas. N. H. Shepard, Sec. Geo. H. Stevens.

NEW HAVEN, CONN.—Fair Haven & Westville R.R. Co. 7 m, 4 1/2 g, 42 lb r, 23 c, 151 h. Pres. H. B. Ives, Sec. & Treas. G. Cander, Supt. Walter A. Graham.

New Haven & Centreville Horse R.R. Co. 2 1/2 m, 4-8 1/2 g, 42 lb r, 4 c, 30 h. Trustee Cornelius Pierpont. State Street Horse R.R. Co. 2 1/2 m, 4-8 g, 43 lb r, 4 c, 40 h. Pres. C. A. Warren, Sec. & Treas. C. C. Blatchen. The Whitney Ave. Horse Ry. 2 1/2 m, 4-8 1/2 g, 25 lb r, 3 c, 25 h. Pres. Geo. H. Watsons, Sec. George D. Watson, Treas. Ell Whitney, jr.

NEW ORLEANS, LA.—Canal & Claiborne St. R.R. Co. 13 m, 5-2 1/2 g, 37 lb r, 40 c, 200 h. Pres. E. J. Hart, Sec. & Supt. John H. DeGrange.

Crescent City R.R. Co. 26 m, 5-2 1/2 g, 35-45 lb r, 90 c, 400 h. Pres. Frank Roder, Sec. & Treas. Jno. J. Juden, Supt. A. V. Smith.

New Orleans & Carrollton R.R. Co. 8 m, 4-8 1/2 g, 30-45 lb r, 65 c, 200 h, 19 engines. Pres. Wm. Benthussen, Sec. Walter F. Crouch, Supt. C. V. Halle.

New Orleans City & Lake R.R. Co. 64 m, 5-2 1/2 g, 46-40 lb r, 180 c, 39 coaches, dummy engines, 1050 mu. Pres. J. A. Walker, Sec. W. E. Leverich, Supt. F. Wintz.

New Orleans St. R.R. Co. Orleans R.R. Co. — m, — g, — lb r, 32 c, 140 h & mu. Pres. & Supt. H. Largue, Sec. & Treas. P. Cougot. Office, cor. White & Laharpe Sts.

St Charles St. R.R. Co. 15 m, 5-2 1/2 g, 2 1/2 lb r, 60 c, 366 m. Pres. & Supt. Alden McLellan, Sec. Vincent Riviere.

NEWPORT, KY.—Newport St. R.R. Co.

NEW YORK, N.Y.—Ninth Ave. R.R. Co. 8 m, 4-8 1/2 g, 60 lb r, 45 c, 380 h. Pres. W. H. Hays, Sec. & Treas. James Affleck, Supt. Herman B. Wilson.

Broadway & Seventh Ave. R.R. Co. 7 m, 4-8 1/2 g, 47-60 lb r, 150 c, 1,350 h. Pres. James W. Foshay, Sec. & Treas. Thos. B. Kerr, Supt. Henry A. Newell.

Central Crosstown R.R. Co. 2 1/2 m, 4-8 1/2 g, 52 lb r, 42 c, 231 h. Pres. John B. Slawson, V. Pres. A. Cammack, Sec. M. J. Masson, Treas. John L. Macaulay.

Central Park North & East River R.R. Co. 14 m, 4-8 1/2 g, 60 lb r, 162 c, 1,225 h. Pres. J. H. Scribner, V. Pres. C. D. Wyman, Sec. H. Scribner, Treas. J. L. Valentine, Supt. M. W. A. Harris.

Christopher & Tenth St. R.R. Co. 5 m, 4-8 g, 45 lb

r, 47 c, 290 h. Pres. Jacob Sharp Treas. W. T. Hatch, Sec. & Supt. George W. Lynch.

Dry Dock, East Broadway & Battery R.R. Co. 11 1/2 m, 4-8 1/2 g, 60 lb r, 187 c, 1,132 h. Pres. William White, Auditor E. T. Landon, Sec. & Treas. Richard Kelly, Supt. Fred F. White. Offices, 605 Grand St.

Eighth Ave. R.R. Co. 10 m, 4-8 1/2 g, 60 lb r, 112 c, 1155 h. Pres. W. H. Hays, Sec. & Treas. James Affleck, Supt. H. B. Wilson.

Forty-Second Street & Grand Street Ferry R.R. Co. 5 1/2 m, 8-4 g, 64 lb r, 50 c, 500 h. Pres. Chas. Curtis, Sec. & Treas. E. S. Allen, Supt. John M. Calhoun.

Harlem Bridge, Morrisania & Fordham Ry. 4 1/2 m, 4-8 1/2 g, 45-60 lb r, 65 c, 233 h. Pres. Henry Spratley, V. Pres. Richard M. Hoe, Sec. & Treas. Wm. Caldwell.

Houston, West Street & Pavonia Ferry R.R. Co. 5 m, 4-8 1/2 g, 60 lb r, 50 c, 400 h. Pres. Richard Kelly, Sec. & Treas. Daniel B. Hasbrook.

Jerome Park R.R. 1 m, 4-8 1/2 g, 50-56 lb r. Pres. Leonard M. Jerome, Sec. Fred A. Lovcraft, Treas. Theodore Moss.

New York City St. Ry. Co. 10 m, (not in operation). Pres. Loomis L. White, Sec. W. L. McCorkle, Treas. Wm. L. Skidmore.

New York & Harlem R.R. Co. 5 1/2 m, 4-8 1/2 g, 56-75 lb r, 144 c, 1,408 h. Pres. W. H. Vanderbilt, V. Pres. & Sec. Cornelius Vanderbilt, Treas. Ed. W. Rossiter, Supt. Alfred Skitt, Pur. Agt. Chas. Reed.

Sixth Ave. R.R. Co. 4 m, 4-8 1/2 g, 60 lb r, 127 c, 1296 h.

South Ferry Ry. Co. 3/4 m, 4-8 1/2 g, 60 lb r, 13 c, 41 h. Pres. Henry Hart, Sec. Wm. N. Cohen, Treas. Albert J. Elias, Supt. Chas. H. Meeks.

The Second Ave. R.R. Co. 13 m, 4-8 1/2 g, 60 lb r, 316 cars, 1750 h. Pres. W. Thorm, V. Pres. J. Wadsworth, Sec. & Treas. J. B. Underhill.

The Third Ave. R.R. Co. 13 1/2 m, 4-8 1/2 g, 60 & 74 lb r, 318 c, 2150 h. (3 1/2 m of cable road on 10th ave.) Pres. Lewis Lyon, 739 Madison ave., V. Pres. Henry Hart, 110 Tribune Building, Sec. Alfred Lazarus, 436 W. 61st st., Treas. John Beaver, 211 E. 112th st., Supt. John H. Robertson, 307 E. 65th st.

Twenty-third St. R.R. Co. 7 m, 4-8 1/2 g, 54 lb r, 102 c, 692 h. Pres. Jacob Sharp, Sec. Thos. H. McLean, Treas. Lewis May, Act-Supt. George Ferry.

NIAGARA FALLS, N. Y.—Niagara Falls & Suspension Bridge Ry. Co. 2 1/2 m, 4-8 1/2 g, 38-42 lb r, 8 c, 36 h. Pres. Benj. Flagler, V. Pres. Alva Chich, Sec. W. J. Mackay, Treas. A. Schoellkopf.

NORFOLK, VA.—Nortolk & City R.R. Co. 3 1/2 m, 5-2 g, 44 lb r, 18 c, 65 h. Pres. John B. Whitehead, Treas. H. C. Whitehead, Supt. E. W. Savage.

NORTHAMPTON, MASS.—Northampton St. Ry. Co. 3 1/2 m, 4-8 1/2 g, 32 lb r, 7 c, 26 h. Pres. Oscar Edwards, Sec. M. H. Spaulding, Treas. & Sup. E. C. Clark.

NORWALK, CONN.—Norwalk Horse R.R. Co. 2 m, 4-10 g, — lb r, 7 c, 20 h. Pres. James W. Hyatt, V. Pres. & Sec. Edwin G. Hoyt, Supt. James W. Hyatt.

NORWICH, CONN.—Norwich Horse R.R. Co.

OAKLAND, CAL.—Alameda, Oakland & Piedmont R.R.

Berkley Villa R.R. Broadway & Piedmont St. R.R. Co. Fourteenth St. R.R. Co. 6 m, 5 g, 20-30 lb r, 6 c, — h. Pres. & Supt. Walter Blair, Sec. P. J. Van Loben. Oakland R.R. Co.

OGDEN CITY, UTAH.—Ogden City Ry. Co. 3 m, 4-8 1/2 g, 20 lb r, 4 c, 21 h. Pres. L. W. Shurtleff, Ogden City, V. P. & Supt. O. P. Arnold, Salt Lake City, Sec. & Treas. H. S. Young, Ogden City.

OLEAN, N.Y.—Olean St. Ry. Co. 1-10 m, 3-6 g, 25 lb r, 3 c, 2 h. Pres. M. B. Fobes, Sec. & Treas. M. W. Barse.

OMAHA, NEB.—Omaha Horse Ry. Co. 15 m, 4-8 1/2 g, 35 lb r, 40 c, 300 h. Pres. Frank Murphy, V. Pres. Guy C. Barton, Treas. W. W. Marsh, Supt. W. A. Smith.

ONEIDA VILLAGE, N. Y.—Oneida St. Ry. — m, — g, — lb r, — c, — h. Pres. Jerome Heacock.

OSHKOSH, WIS.—Oshkosh St. R.R. Co. 3 1/2 m, 4-8 1/2 g, 27 lb r, 9 c, 24 h. Pres. Tom Wall, V. Pres. F. Zentner, Sec. & Treas. J. Y. Hull, Sup. F. L. Thompson.

OSWEGO, N.Y.—Oswego St. Ry. Co. 2 m, 4-8 1/2 g, 45 lb r, 3 c, — h. Pres. Jas. F. Johnson, V. Pres. R. J. Oliphant, Sec. Haynes L. Hart, Treas. Robt. G. Post, Gen. Man. James O'Connor. [Not in operation yet.]

OTTAWA, ONT.—Ottawa City Passenger Ry. Co. 3 m, 4-8 1/2 g, 34 lb r, 1 c, 40 h. Pres. Thomas C. Keefe, V. Pres. R. Blackburn, Sec. James D. Traser.

OTUMWA, IA.—Otumwa St. R.R. Co. 2 m, 3-6 g, 27 lb r, 4 c, 2 h, 14 mu. Pres. J. M. Hedrick, Sec. & Treas. H. L. Hedrick, Supt. C. M. Hedrick.

Mineral Springs St. Ry. Co. 1 m, 1 c.

PADUCAH, KY.—Park R.R. Co.

PARIS, TEX.—Paris St. Ry. Co.

PATERSON, N. J.—Paterson & Passaic R.R. Co. 7 m, 4-10 g, 33 lb r, 16 c, 24 h. Pres. John N. Terhune, Treas. John I. Brown, Sec. F. S. Brown, Man. & Pur. Agt. Ambrose T. King, Supt. M. O. Rourke.

Paterson City R.R. Co. 6 1/2 m, 4-8 1/2 g, 35 lb r, 12 c, 31 h. Pres. Garrett Plantan, Treas. Helmas Romaine, Sec. Albert A. Wilcox.

PENSACOLA, FLA.—Pensacola St. Ry. Co.

PEORIA, ILL.—Central City Horse Ry. Co. 4 1/2 m, 4-8 1/2 g, 40 lb r, 60 c, 135 h. Pres. H. R. Woodward, Sec. M. Pfeiffer, Treas. H. N. Wheeler, Supt. John Strong.

Fort Clark Horse Ry. Co. Peoria Horse Ry. Co. 7 1/2 m, 4-8 1/2 g, 40 lb r, 63 c, 140 h. Pres. H. Woodward, Sec. M. Pfeiffer, Treas. H. N. Wheeler, Supt. John Strong.

PETERSBURGH, VA.—Petersburgh St. Ry. Co. 3 1/2 m, 4-8 1/2 g, 42 lb r, 9 c, 44 h. George Beadle, Proprietor.

PHILADELPHIA, PA.—Citizens Pass. Ry. Co. 10 1/2 m, 5-2 g, 45-47 lb r, 92 c, 420 h. Pres. John McCarthy, Sec. & Treas. John J. Adams, Supt. Sam'l Cline.

Frankford & Southwark Phila. City Pass. R.R. Co. 18-10 m, 5-2 g, 47 lb r, 91 c, 8 dummy g, 580 h. Pres. Henry Geiger, Sec. & Treas. Geo. L. Gaudy, Supt. W. H. Janney.

Hestonville, Mantua & Fairmount Pass. R.R. Co. 20

m, 5-2 g, 43 lb r, 50 c, 480 h. Pres. Charles F. Lafferty, Sec. & Treas. W. C. Foster.

Lehigh Ave. Pass. Ry. Co. Pres. John Lamont, Sec. Chas. A. Porter, Treas. John L. Hill. [Track not laid.] Lombard & South Sts. Pass. Ry. Co. — m, 5-2 g, 43 lb r, 51 c, 278 h. Pres. John B. Parsons, Sec. & Treas. Francis Hachhurst Supt. Jno. M. Gaughen.

People's Pass. Ry. Co. 44 m, 5-2 g, 47 lb r, 125 c, 1,080 h. Pres. C. J. Harrah, V. Pres. C. J. Harrah, Jr., Sec. & Treas. Jno. C. Dessolet, Supt. Wm. Hagenswiler.

Philadelphia City Pass. Ry. Co. 7 m, 5-2 1/2 g, 47 lb r, — c, — h. Pres. Wm. W. Colket, Sec. & Treas. T. W. Pennypacker.

Philadelphia Traction Co. 109 m, 5-2 1/2 g, 45-78 lb r, 595 c, 3,160 h. Pres. W. H. Kemble, V. Pres. P. A. B. Widener & W. L. Elkins, Sec. & Treas. D. W. Dick-son.

Philadelphia & Gray's Ferry Pass. R.R. Co. 10 1-3 m, 40 c, 200 h. Pres. Matthew Brooks, Treas. J. C. Dawes, Sec. J. Crawford Dawes, Supt. Patrick Lovett.

Ridge Avenue Pass. Ry. Co. 14 m, 5-2 g, 47 lb r, 55 c, 352 h. Pres. E. B. Edwards, V. Pres. John Lambert, Sec. & Treas. Wm. S. Blight, Supt. William Ingles.

Second & Third Sts. Pass. Ry. Co. 37 m, 116 c, 669h. Pres. Alexander M. Fox, Treas. William F. Miller, Sec. Charles D. Matlack, Supt. David W. Stevens.

Seventeenth & Nineteenth Sts. Pass. Ry. Co. 7 1/2 m. Pres. Matthew S. Quay, Sec. & Treas. John B. Peddle. [Leased to Philada. Traction Co.]

Thirteenth & Fifteenth Sts. Pass. Ry. Co. 14 m, 5-2 g, 43 lb r, 73 c, 452 h. Pres. Thos. W. Ackley, Sec. & Treas. Thos. S. Harris, Supt. Wm. B. Cooper.

Union Pass. Ry. Co. 70 m, 348 c, 1,724 h. Pres. Wm. H. Kemble, Sec. & Treas. John B. Peddle, Supt. Jacob C. Petty.

West Philadelphia Pass. Ry. Co. 18 1/2 m, 122 c, 646 h. Pres. Peter A. B. Widener, Sec. & Treas. D. W. Dickson. (Leased by the Phila. Traction Co.)

PHILIPSBURGH, N. J.—Phillipsburgh Horse Car Ry. Co. 2 1/2 m, 4-8 g, 95 lb r, 4 c, 13 h. Pres. Daniel Runkle, Sec. & Treas. James W. Long.

PITTSBURGH, PA.—Central Pass R.R. Co. 3 m, 16 c, 95 h. Pres. J. F. Cluley, Sec. F. L. Stephenson, Treas. E. R. Jones, Supt. R. G. Heiron.

Beaver Falls & New Brighton Ry. Co. (Citizens' Pass. Ry. Co. 16 1/2 m, 5-2 1/2 g, 47 lb r, 40 c, 337 h. Pres. Jno. G. Holmes, Sec. C. M. Gormly, Supt. Murry Verner.

Federal St. & Pleasant Valley Pass. Ry. Co. 26 m, 5-2 1/2 g, 46-50 lb r, 20 c, 154 h. Pres. Wm. H. Creery, Treas. James Boyle, Supt. Wm. J. Crozier, Allegheny City.

People's Park Pass. Ry. Co. 2 m, 5-2 1/2 g, — lb r, 10 c, 75 h. Pres. Wm. McCreery, Treas. James Boyle, Supt. Wm. J. Crozier, Allegheny City.

Pittsburgh, Allegheny & Manchester Pass Ry. Co. 5 m, 5-2 1/2 g, 46 lb r, 40 c, 275 h. Pres. Chas. Atwell, Sec. & Treas. Chas. Seibert, Supt. James C. Cotton.

Pittsburgh, Oakland & East Liberty Pass. Ry. Co. 11 m, 5-4 1/2 g, 47 lb r, 32 c, 110 h, 61 mu. Pres. J. T. Jordan, Sec. John G. Traggardth, Treas. D. W. C. Bidwell, Supt. H. M. Cherry.

Pittsburgh Union Pass. R.R. Co. 5 m, 5-2 1/2 g, 45 lb r, 29 c, 170 h. Pres. James H. Sewell, Treas. J. J. McDonnell, Sec. Chas. Seibert, Pittsburgh, Cash. Charles W. Goodnow, Supt. Joe S. Murray.

Pittsburgh & Birmingham Pass. R.R. Co. 3 1/2 m, 5-2 1/2 g, 48 lb r, 20 c, 170 h. Pres. W. W. Patrick, Sec. D. F. Agnew, Treas. John G. Holmes.

Pittsburgh & West End Pass. Ry. Co. 3 1/2 m, 5-2 g, 35 lb r, 13 c, 75 h. Pres. John C. Reilly, Sec. & Treas. Thomas S. Bigelow, Supt. William J. Burns.

Pittsburgh & Wilksburg St. Ry. Co.

Second Avenue Pass. Ry. Co.

South Side Pass. R.R. Co. 2 1/2 m, 5-2 1/2 g, 45 lb r, 12 c, 80 h. Pres. D. Z. Brickell, Sec. & Treas. W. T. Wallace, Supt. W. M. Rosborough.

Transverse Pass. Ry. Co. 6 1/2 m, 5-2 g, 52 lb r, 39 c, 243 h. Pres. C. L. Magee, V. Pres. F. G. Klopfer, Sec. & Treas. Wm. R. Ford, Supt. Miller Elliot.

PITTSBURGH, PA.—Pittstun St. R.R. Co. 1 1/2 m, 3 c, 5 h. Pres. Thomas Griffith, Treas. M. W. Morris, Sec. William Allen.

PORT HURON, MICH.—Port Huron St. Ry. Co. 6 1/2 m, 4-8 1/2 g, 7 c, 22 h. Pres. Jno. P. Sanborn, V. Pres. Frank A. Beard, Sec. Treas. & Man. J. R. Was-tell.

PORTLAND, ME.—Ocean St. R.R. Co.

Portland R.R. Co. 7 1/2 m, 4-8 1/2 g, 30-33-45 lb r, 34 c, 154 h. Pres. H. J. Libby, Treas. & Gen. Man. E. A. Newman, Supt. Geo. W. Soule.

PORTSMOUTH, O.—Portsmouth St. R. R. Co. 2 m, 3-6 g, 18 lb r, 4 c, 10 h. Pres. James Skelton, Treas., Sec. & Supt. Enas Reed.

POTTSVILLE, PA.—People's Ry. Co. 9 1/2 m, 16 c, 56 h.

POUGHKEEPSIE, N. Y.—City R.R. of Pough-keepsie. 3 m, 4-8 1/2 g, 35 lb r, 11 c, 38 h. Pres. Aaron Innis, V. Pres. G. B. Adrance, Sec. A. B. Smith, Treas. Hudson Taylor, Supt. C. M. Davis.

PROVIDENCE, R. I.—Union R.R. Co. 50 m, 4-8 1/2 g, 24-54 lb r, 240 c, 1,200 h. Pres. Jesse Metcalf, V. Pres. & Gen. Man. D. F. Longstreet, Sec. and Treas. C. A. Babeock, Aud. B. A. Jackson.

QUEBEC, CAN.—Quebec St. Ry. Co. 3 m, 4-8 1/2 g, 45 lb r, 9 c, 40 h. Pres. Chas. St. Michel, Quebec, V. Pres. G. Renfrew, Quebec, Sec. & Supt. Samuel Moore, Book-keeper, Francis Boomer.

Quebec R.R. Co.

St. John St. R.R.

QUINCY, ILL.—Quincy Horse Ry. & Carrying Co. 6 m, 5 g, 71 lb r, 21 c, 118 mu. Pres. Lorenzo Bull, Sec. C. H. Bull, Supt. E. K. Stone.

RACINE, WIS.—Belle City St. Ry. Co.

READING, PA.—Reading City Pass. Ry. Co. 2-1-5 m, 5 2/2 g, 45 lb r, 19 c, 44 h. Pres. B. F. Owen, V. Pres. Jas. L. Douglass, Sec. & Treas. H. A. Muhlen-berg, Supt. J. A. Riggs.

Perkinston Ave. Pass. Co. 2-1-5 m, 5-2 1/2 g, 45 lb r, 14 c, 36 h. Pres. Chas. Brenelser, Sec. & Treas. Isaac Hlester, Supt. John B. Houpp.

RED OAK, IA.—Red Oak St. R.R. Co. 1 1/2 m, 4-2 1/2 g, flat r, 2 c, 2 h, 2 mu. Pres. J. W. Judkins, V. Pres. Geo. West, Sec. F. M. Byrket, Treas. & Supt. F. O. Judkins.

RICHMOND, IND.—Richmond City Ry. Co. 3 m, 3 g, 25 lb r, 9 c, 30 h. Pres. J. Y. Miller, V. Pres. Joseph Radliff, Treas. H. I. Miller, Supt. F. M. Francis.

RICHMOND, ILL.—Richmond St. R.R. Co.

RICHMOND, VA.—Richmond City Ry. Co. 7 m, 4-8 1/2 g, 60-40 lb r, 40 c, 180 h. Pres. J. H. Schoolcraft, Sec. & Treas. F. D. Mellen, Man. C. M. Baeton, Supt. Charles Steders.

ROCHESTER, N. Y.—Rochester City & Brighton R.R. Co. 22 m, 4-8 1/2 g, 45 lb r, 120 c, 600 h. Pres. Patrick Barry, Sec. C. C. Woodworth, Treas. C. B. Woodworth, Supt. Thomas J. Brower.

Citizens' St. Ry. Co. Pres. Wm. H. Jones, Sec. & Treas. J. E. Pierpont, Supt. S. A. Green.

ROCKFORD, ILL.—Rockford St. Ry. Co. 6 2-5 m, 4-8 1/2 g, 30 lb r, 13 c, 52 h, 16 m. Pres. Anthony Haines, V. Pres. L. Rhodes, Sec. Miss A. C. Arnold, Treas. N. E. Lyman, Supt. Fred. Haines.

ROCK ISLAND, ILL.—Rock Island & Milan St. Ry. Co. 7 m, 4-8 1/2 g, 20-30-42 lb r, 10 c, 7 h. Pres. & Supt. Bally Davenport, Sec. E. H. Gayer, Treas. John Peety.

RONDOUT, N. Y.—Kingston City R.R. Co. 2 4-5 m, 4-8 1/2 g, 40 lb r, 10 c, 40 h. Pres. James G. Lindsley, V. Pres. S. D. Coykendall, Sec. & Treas. John C. Romeye, Supt. Wm. H. DeGarmo.

SACRAMENTO, CAL.—Sacramento City St. R.R. Co.

SAGINAW, MICH.—Saginaw St. R.R. Co. 2 1/2 m, 4-8 1/2 g, 42 lb r, 10 c, 50 h. Pres. David H. Jerome, V. Pres. Geo. F. Williams, Sec. & Treas. Geo. L. Burrows, Supt. Fred G. Benjamin.

SALEM, MASS.—Salem & Danvers St. Ry. Co. 6 m, 4-8 1/2 g, 35-47 lb r, 15 c, 45 h. Pres. Benj. W. Russell, Sec. G. A. Vickers, Treas. Geo. W. Williams, Supt. W. B. Furgurson, Asst. Supt. David N. Cook.

Naumkeag St. Ry. Co. — m, 4-8 1/2 g, 30-35-45 lb r, 50 c, 140 h. Pres. Chas. Odell, Clerk Joseph F. Hickey, Treas. Henry Wheatland, Supt. Willard B. Ferguson.

SALT LAKE CITY, UTAH.—Salt Lake City R.R. Co. 13 m, 4-8 1/2 g, 20 lb r, 20 c, 115 mu. Pres. John Taylor, Sec. David McKenzie, Treas. James Jack, Supt. Orson P. Arnold.

SAN ANTONIO, TEX.—San Antonio St. Ry. Co. 15 m, 4 g, 30 lb r, 38 c, 125 mu. Pres. A. Belknap, San Antonio, V. Pres. F. W. Pickard, N. Y. City, Treas. I. Withers, San Antonio, Sec. E. R. Norton, Supt. John Robb.

Prospect Hill St. Ry. Co.

SANDUSKY, O.—Sandusky St. Ry. Co. 2 m, — g, — lb r, — c, — h. Pres. Chas. B. Ods, Sec. & Treas. A. C. Morse, Supt. Clark Rude.

SAN FRANCISCO, CAL.—California St. R.R. Co.

Central R.R. Co. 6 m, 4-8 g, 45 lb r, 31 c, 290 h. Pres. Chas. Main, V. Pres. Jos. Roseberg, Treas. A. J. Gunnison, Sec. C. G. LeBreton, Supt. J. F. Clark.

Clay St. Hill R.R. Co. 1 m, 3-6 g, 30 lb r, 11 c, 12 dummy cars. Pres. Joseph Britton, V. Pres. James Moffit, Treas. Henry L. Davis, Sec. Chas. P. Campbell, Supt. Joseph Britton.

Clay St. Park & Ocean R.R. Co.

Market St. Cable Ry. Co. 10 9-10 m, 4-8 1/2 lb r, 137 c, 2 motors, 73 h. Pres. Leland Stanford, V. Pres. Chas. F. Crocker, Treas. N. T. Smith, Sec. J. L. Willcutt.

North Beach & Mission R.R. Co. 8 m, 5 g, 46 c, 400 h. Pres. Jos. Rosenberg, Sec. H. W. Hathorne, Treas. Carl Ahfel, Supt. M. Skelly.

Omnibus R.R. & Cable Co. 8 1/2 m, 5 g, 35-45 lb r, 50 c, 364 h. Pres. Gustav Sutro, V. Pres. D. Callaghan, Sec. G. Ruegg, Supt. M. M. Martin.

Portrero & Bay View R.R. Co. 1 1/2 m, 5 g, 35 lb r, 20 c, 64 h. Pres. Leland Stanford, V. Pres. Chas. Crocker, Treas. N. T. Smith, Sec. J. L. Willcutt.

Sutter St. R.R. Co. 5 1/2 m, 4-11 g, 35-45 lb r, 30 c, 125 h. Pres. R. F. Morrow, Sec. A. K. Stevens, Treas. M. Schmitt, Supt. James McCord.

Telegraph Hill St. Ry. Co. 1,707 ft, 4-11 g, 36 lb r, 3 c, — h. Pres. Gustav Sutro, V. Pres. E. O. Demick, Sec. & Treas. C. J. Werner.

The City R.R. Co. 5 1/2 m, 5 g, 48 lb r, 73 c, 285 h. Pres. R. B. Woodward, V. Pres. Geo. E. Raum, Sec. M. E. Willis, Treas. J. H. Goodman, Supt. William Woodward.

SAN JOSE, CAL.—San Jose & Santa Clara R.R. Co.

First St. & San Pedro St. Depot R.R. Co. Market St. & Willow Glen R.R. Co. North Side R.R. Co. People's R.R. Co.

SANTA BARBARA, CAL.—Santa Barbara St. R.R. Co. 1 m, 3-6 g, 3 c, 8 mu. Pres. A. W. McPhail.

SAUGATUCK, CONN.—Westport & Saugatuck Horse R.R.

SAVANNAH, GA.—City & Suburban Ry. Co. 18 1/2 m, 5 g, 16-30 lb r, 49 c, 110 h, 3 engines. Pres. J. H. Johnson, Asst. J. W. Alley, Treas. E. Schmidt.

Coast Line R.R. Co. 7 m, 5 g, 30 lb r, 17 c, 37 h. Pres. Geo. Parsons, New York, Sec. & Treas. & Gen. Man. R. E. Cobb, Savannah.

SAYRE, PA.—Sayre St. Ry. Co. Pres. Howard Elmer (organization not completed).

SCRANTON, PA.—People's St. Ry. Co. 9 1/2 m, 4-8 1/2 g, 25-52 lb r, 19 c, 70 h. Pres. Wm. Matthews, Sec. & Treas. J. C. Platt.

SEARCY, ARK.—Searcy & West Point R.R. Co. 8 m, 4-8 1/2 g, 20 lb r, 7 c, 6 mu. Pres. A. W. Yarnell, Sec. W. H. Lightie, Treas. Jasper Hicks.

SEATTLE, W. T.—Seattle St. Ry. Co. 3 1/2 m, 4-8 1/2 g, 35 lb r, 5 c, 20 h. Pres. F. H. Osgood, Sec. Geo. Kinnear.

SEDALLA, MO.—Sedalla St. Ry. Co. 2 1/2 m, 4-10 g, 54 lb r 6 c 31 h. Pres. Joseph D. Sicher, V. Pres.

Louis Deutsch, Treas. F. H. Guenther, Sec. & Supt. Chas. S. Conrad.

SELMA, ALA.—Selma St. R.R. 2 1/2 m, 18 lb r, 5 c, 8 h. Pres. E. Gilman, Sec. & Treas. J. H. Hoolls, Supt. W. Bohlla.

SENECA FALLS, N. Y.—Seneca Falls St. Ry. Co.

SHERMAN, TEX.—Sherman City R.R. Co.

SHREVEPORT, LA.—Shreveport City R.R. Co. 1 1/2 m, 4-4 g, 46 lb r, 6 c, 14 h. Pres. Peter Yourec.

SILVER CLIFF, COL.—Silver Cliff St. R.R. Co.

ST. LOUIS, MO.—St. Louis City Ry. Co. 5 m, — g, — f, 6 c, 8 h, 4 mu. Pres. Fred T. Evans, V. Pres. D. A. Magee, Sec. & Treas. F. T. Evans.

SOUTH CHICAGO, ILL.—Chicago Horse & Dummy R.R. 5 m, 4-8 1/2 g, — lb r, — c, — h. Pres. D. L. Huff, Treas. A. C. Calkins, Sec. E. R. Bliss. [Not in operation.]

SOUTH PUEBLO, COL.—Pueblo St. R.R. Co.

SPRINGFIELD, ILL.—Citizens' St. R.R. Co. 9 1/2 m, 3-6 g, 20-36 lb r, 23 c, 100 h. Pres. J. H. Schrick, Treas. Frank Relsch, Sec. Chas. F. Harman. Springfield City Ry. Co.

SPRINGFIELD, MASS.—Springfield St. Ry. Co. 4-8 1/2 g, 35-40 lb r, 28 c, 115 h. Pres. John Olmstead, Auditor L. E. Ladd, Clerk Gideon Wells, Treas. A. E. Smith, Supt. F. E. King.

SPRINGFIELD, MO.—The People's Ry. Co. of Springfield, Mo. 3 1/2 m, 4-10 g, 33 lb r, 5 c, 30 h. Pres. J. C. Cravens, Sec. Benj. N. Massey, Treas. Chas. Sheppard, Supt. H. F. Denton.

Springfield R.R. Co. 2 m, 30-40 lb r, 4-8 1/2 g, 7 c, 19 h, 19 mu. Pres. C. W. Rogers, St. Louis, Sec. & Treas. B. F. Hobart, Supt. J. A. Stoughton, No. Springfield.

SPRINGFIELD, O.—Citizens' St. R.R. Co. 10 m, 4 g, 29 c, 135 h. Pres. D. W. Stroud, V. Pres. A. S. Bushnell, Treas. Rose Mitchell, Sec. F. S. Penfield, Supt. W. H. Hanford.

STATEN ISLAND, N. Y.—Staten Island Shore Ry. Co.

ST. CATHARINE'S, ONT.—St. Catharine's, Merlinton & Thorold St. Ry. Co. 5 1/2 m, 4-8 1/2 g, 30 lb r, 7 c, 30 h. Pres. E. A. Smythe, Sec. S. R. Smythe, Supt. E. A. Smythe.

ST. JOSEPH, MO.—Citizens' St. R.R. Co. 3 m, 4-8 1/2 g, 28 lb r, 14 c, 52 mu. Pres. Richard E. Turner, Sec. & Treas. Arthur Kirkpatrick, Supt. John F. Meriam.

Frederick Ave. Ry. Co. 1 1/2 m, 3 g, 16 lb r, 6 c, 16 h. Pres. Thomas E. Tootle, V. Pres. Winslow Judson, Sec. W. D. Motter, Treas. Thomas W. Evans, Supt. S. Rowen.

St. Joseph & Lake St. R.R. Co.

Union Ry. Co.

ST. LOUIS, MO.—Baden & St. Louis R.R. Co. 3 1/2 m, 4-10 g, — lb r, 7 c, 21 h. Pres. George S. Case, V. Pres. William Z. Coleman, Supt. J. H. Archer.

Benton & Bellefontaine Ry. Co. 7 1/2 m, 4-10 g, 45 lb r, 29 c, 200 h. Pres. J. G. Chapman, Sec. Robert McCulloch.

Cass Avenue & Fair Grounds Ry. Co. 8 m, 4-10 g, 38 lb r, 37 c, 290 h. Pres. W. R. Allen, V. Pres. Geo. W. Allen, Sec. Treas. & Supt. G. G. Gibson, Cashier O. H. Williams.

Citizens' Ry. Co.

Jefferson Ave. Ry. Co. Lindell Ry. Co. 1 1/2 m, — g, — r, 65 c, 475 h. Pres. John H. Maquon, V. Pres. John H. Lightner, Sec. & Treas. Geo. V. Baumhoff, Supt. Jos. C. Llewellyn.

Missouri R.R. Co.

Mound City R.R. Co.

Northern Central.

Springfield Ry. Co. 2 m, 4-8 1/2 g, 25-40 lb r, 7 c, 40 h. Pres. C. W. Rogers, St. Louis, Sec. & Treas. B. F. Hobart, Springfield, Supt. J. A. Stoughton, No. Springfield, Asst. Supt. Frank B. Smith, No. Springfield.

Southern Ry. Co. 7 4-5 m, 4-10 g, 35-52 lb r, 49 c, 250 h. Pres. E. R. Coleman, Sec. J. S. Minary, Man. W. L. Johnson.

St. Louis R.R. Co. and the People's R.R. One management. 11 m, 4-10 g, 38-44 lb r, 58 c, 375 h. Pres. Chas. Green, Sec. & Treas. John Mahoney, Supt. Patrick Shea.

Tower Grove & Lafette R.R.

Union Depot R.R. Co.

Union R.R. Co.

STONEHAM, MASS.—Stoneham St. R.R. Co. 2 1/2 m, 4-8 1/2 g, 33 lb r, 10 c, 28 h. Pres. A. V. Lynde, Melrose, Treas. & Clerk Lyman Dyke, Supt. John Hill.

ST. PAUL, MINN.—Wabash St. Ry. Co.

St. Paul City Ry. Co. 25 m, 4-8 1/2 g, 80 c, 150 h, 294 mu. Pres. Thos. Lowry, V. Pres. C. G. Goodrich, Sec. J. H. Randall, Treas. Clinton Morrison, Supt. A. L. Scott.

STERLING, ILL.—Sterling St. Ry. Co.

STILLWATER, N. Y.—Stillwater & Mechanicsville St. Ry. Co. 4 1/2 m, 4-8 1/2 g, 25-30 lb r, 3 c, 6 h. Pres. S. Rowley, V. Pres. W. L. Denison, Sec. H. O. Bailey, Mechanicsville, Treas. E. N. Smith.

STROUDSBURGH, PA.—Stroudsburgh Passenger R.R. Co. 1 4-5 m, 4 1/2 g, 28-30 lb r, 3 c, 9 h. Pres. & Treas. J. Lantz, Sec. Jacob Houser.

SYRACUSE, N. Y.—Syracuse & Onondaga R.R. Co. 2 3-5 m, 4-8 g, 28-47 lb r, 9 c, 18 h. Pres. Peter Burns, Sec. & Treas. Lyman C. Smith, Supt. Henry Thompson.

Central City Ry. Co. 2 1/2 m, 4-8 1/2 g, 40 lb r, 12 c, 37 h. Pres. George N. Kennedy, V. Pres. Daniel Pratt, Sec. & Treas. James Barnes, Supt. George Crampton.

Fifth Ward R.R. Co. 2 1/2 m, 4-8 1/2 g, 35-56 lb r, 8 c, 30 h. Pres. P. B. Brayton, Sec. & Treas. O. C. Potter, Supt. Hugh Purnell.

Genesee & Water St. R.R. Co. and Fourth Ward R.R. Co. 4 m, 4-8 1/2 g, 18-30 lb r, 10 c, 35 h. Pres. Robt. G. Wynkoop, Sec. & Treas. Geo. J. Gardner, Supt. W. J. Hart.

New Brighton & Onondaga Valley R.R. Co. 1 1/2 m, 4-8 g, 16-35 lb r, 2 c, 4 h. Pres. Matthias Britton, Sec. T. W. Meacham, Treas. J. H. Anderson, Supt. J. H. Anderson.

Syracuse & Geddes Ry. Co. 2 m, 4-8 1/2 g, 35-45 lb r, 10 c, 32 h. Pres. R. Nelson Gere, Sec. & Treas. Rasselas A. Bonta, Supt. Wm. J. Hart.

TAUNTON, MASS.—Taunton St. Ry. Co. 4 1/2 m, 4-8 g, 14 c, 44 h.

TERRE HAUTE, IND.—Terre Haute St. Ry. Co.

4 1/2 m, 4-8 1/2 g, 28 lb r, 16 c, 48 h. Pres. T. C. Buntin, V. Pres. Josephus Collett, Sec. John R. Hagen, Supt. John T. Shriver.

TEXARKANA, ARK.—Texarkana St. Ry. Co.

TOLEDO, OHIO.—Toledo Consolidated St. Ry. Co. 17 m, 4-8 g, 42 lb r, 37 c, 180 h. Pres. John E. Bailey, Sec. A. E. Lang, Adams Street Ry. Co.

Metropolitan St. Ry. Co. 8 1/2 m, 3 g, 29 c, 88 h. Pres. Jno. J. Shipherd of Cleveland, Treas. H. E. Wells of Cleveland, Gen. Man. T. F. Shipherd, Supt. Jno. A. Watson.

Monroe Street R.R.

The Central Passenger R.R. Co. of Toledo, O. 8 m, 3 g, 27 lb r, 17 c, 70 h. Pres. F. E. Seagrave, V. Pres. & Treas. James Paznczer, Sec. Chas. F. Parks, Supt. A. R. Seagrave.

Toledo Street R.R. Co.

TOPEKA, KAN.—Topeka City Ry. Co. 9 m, 4 g, 25-48 lb r, 25 c, 90 h. Pres. Joab Mulvane, V. Pres. J. W. Stormont, Sec. & Treas. E. Wildes, Supt. Jesse Shaw.

TORONTO, CAN.—Toronto St. Ry. Co. 18 m, 4-10 1/2 g, 30 lb r, 126 c, 670 h. Pres. Frank Smith, Sec. James Green, Supt. John J. Franklin.

TRENTON, N. J.—Trenton Horse R.R. Co. 1 1/2 m, 5 2 g, 43-47 lb r, 10 c, 31 h. Pres. Gen. Lewis Perrine, Sec. & Treas. Lewis Perrine, Jr., Supt. Thomas Sillorrits.

City Ry. Co. 3 m, 5-2 g, 45 lb r, 15 c, 69 h. Pres. Adam Extolr, V. Pres. W. H. Skinn, Sec. H. B. Howell, Treas. & Mang. Director Chas. J. Bramford.

TROY, N.Y.—Cortland & Homer Horse R.R. Co. 4 m, 4-8 1/2 g, 25-30 lb r, 2 c, — h. Pres. C. H. Garrison, Troy, V. Pres. E. A. Fish, Cortland, N.Y., Treas. Jas. M. Milen, Cortland, Sec. S. E. Welch, Cortland.

Troy & Albion Street Ry. Co. 3 1/2 m, 4 g, 35-45 lb r, 9 c, 41 h. Pres. Thos. A. Knickerbocker, Sec. & Treas. Theo. E. Hasehurst, Supt. W. R. Bean.

Troy & Lansingburgh R.R. Co. 20 1/2 m, 4-8 1/2 g, 47 lb r, 91 c, 466 h. Pres. William Kemp, V. Pres. Charles Clemmishaw, Sec. & Treas. Joseph J. Hagen, Supt. Leander C. Brown.

URBANA, ILL.—Urbana R.R.

Urbana & Champaign St. Ry. Co. 2 m, 4-8 1/2 g, 33 lb r, 4 c, 20 h. Pres. Wm. Park, Sec. & Treas. Frank G. Jaques, Supt. W. Park.

UTICA, N.Y.—Utica, Clinton & Binghamton St. R.R. 7 1/2 m, 4-8 1/2 g, 43-56 lb r, 17 c, 82 h. Pres. Isaac Maynard, Sec. & Treas. Robt. S. Williams, Supt. Roger Rock.

The Utica & Mohawk R.R. Co. 2 1/2 m, 4-8 1/2 g, 25-40 lb r, 9 c, 5 h. Pres. Chas. W. Hutchinson, V. Pres. Nathan S. Haynes, Sec. Geo. M. Weaver, Treas. Joshua W. Church.

VAITSBURGH, N. J.—Newark, So. Orange, Ferry St. & Hamburg Place R.R. Co.

VALEJO, CAL.—Valejo St. Ry. Co.

VICKSBURG, MISS.—Vicksburg St. Ry. Co.

VINCENNES, IND.—Vincennes St. Ry. Co.

WACO, TEX.—Waco St. Ry. Co. 5 m, 4-8 g, 14-18 lb r, 9 c, 44 h. Pres. E. Rotan, Sec. & Treas. W. R. Kellum, Supt. J. W. Sedbury.

WALTHAM, MASS.—Waltham & Newton St. Ry. Co. 3 1/2 m, 4-3 1/2 g, 30 lb r, 6 c, 14 h. Pres. R. E. Robbins, Sec. & Treas. Henry Bond.

WASHINGTON, D.C.—Capital, No. O. St. & So. Washington R.R.

Anacostia & Potomac River Ry. Co. 3 m, 4-8 g, 37 lb r, 9 c, 24 h. Pres. H. A. Griswold, Sec. Edward Temple, Treas. T. E. Smithson.

Columbia R.R. Co. of the District of Columbia. 2 1/2 m, — g, — lb r, 19 c, 56 h. Pres. H. A. Willard, Sec. & Treas. Wm. H. Clayette, Supt. Thos. E. Benson.

Metropolitan R.R. Co. 2 1/2 m, 4 8 g, 38 lb r, 90 c, 400 h. Pres. George W. Pearson, V. Pres. A. A. Wilson, Sec. & Treas. William M. Morse, Supt. L. W. Emmart.

Washington & Georgetown R.R. Co. 10 m, 4-8 1/2 g, 42 lb r, 161 c, 750 h. Pres. H. Hurt, Sec. & Treas. C. M. Koonce, Gen. Supt. C. C. Sallies.

WATERFORD, N. Y.—Waterford & Cohoes R.R. Co. 2 m, 4-8 1/2 g, 45 lb r. Pres. Thos. Breslin, Sec. & Treas. C. B. Ormsby. (Leased by the Troy & Lansingburgh R.R. Co.)

WEST HURON, CONN.—New Haven & West Haven R.R. Co.

WESTPORT, CONN.—Westport & Saugatuck Horse R.R.

WICHITA, KAN.—Wichita City Ry. Co. 6 m, 8 c Pres. J. W. Ground, Sec. & Mangr. E. R. Powell.

WHEELING, W. VA.—Citizens Ry. Co.

Wheeling & Elm Grove R.R. 7 m, 4-8 1/2 g, 30 lb r, 12 c, 4 Baldwin Motors. Pres. J. D. DuBois, Sec. E. J. Rutter.

WILKESBARRE, PA.—Wilkesbarre & Kingston Pass. R.R.

Wilkesbarre & Ashley Passenger R.R. Co.

Coalville Passenger R.R. 2 1/2 m, 4-8 1/2 g, 20-34 lb r, 4 c, 10 h. Pres. Chas. A. Miner, Sec. & Treas. George Loveland, Supt. Albert G. Orr.

WILLIAMSPORT, PA.—Williamsport St. R.R. Co.

WILMINGTON, DEL.—Front & Union St. Passenger Ry. Co.

Wilmington City Ry. Co. 4 1/2 m, 5-2 1/2 g, 45 lb r, 20 c, 82 h. Pres. W. Canby, Sec. & Treas. John F. Miller, Supt. Wm. H. Burnett.

WINDSOR, CAN.—Sandwich & Windsor Passenger R.R. Co.

WINNIPEG, MANITOBA, CAN.—The Winnipeg St. Ry. Co. 5 m, 4-8 1/2 g, 35 lb r, 13 c, 75 h. Pres. Duncan MacArthur, Sec. & Mangr. Albert W. Austin, Supt. Geo. A. Young.

WINONA, MINN.—Winona City Ry. Co. 4 m, 3-6 g, 27 lb r, 10 c, 39 h. Pres. John A. Mathews, V. Pres. B. H. Langley, Sec. & Treas. C. H. Porter.

WOBBURN, MASS.—No. Woburn Horse R.R. 2 1/2 m, 4-8 g, 4 c, 4 h. Pres. & Treas. John Carter, Sec. J. G. Maguire, Supt. Dexter Carter.

WORCESTER, MASS.—Worcester St. Ry. Co. 5½ m, 4-8½ g, 45 lb r, 19 c, 100 h. Pres. Geo. H. Seeley, N. Y. City, V. Pres. Nathan Seeley, N. Y. City, Treas. & Supt. Harry S. Searls, Worcester.
YOUNGSTOWN, O.—Youngstown St. R.R. Co.
ZANESVILLE, O.—Bellaire, Chillcothe & Canton. Zanesville & McIntire St. Ry. Co. 3 m, 3-6 g, 38 lb r, 12 c, 54 m. Pres. J. Bergen, Sec. W. C. Townsend, Treas. T. B. Townsend.

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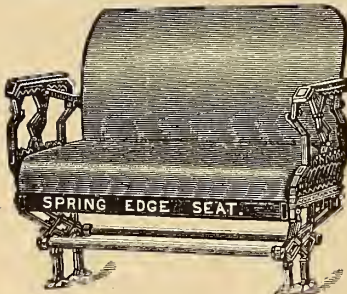
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Inventors and General Manufacturers of

PATENTED CAR SEATS AND SEAT SPRINGS,

Of the Latest and Most Improved Patterns.

Complete Seats in Plush or Rattan, with Metal or Wood Ends, a Specialty.



EXCLUSIVE MAKERS OF THE **PATENT RATTAN (CANVAS LINED) SEAT COVERING.** The most durable in the world.

Also sole makers of the **ELLIPTIC (COBB PATENT) STEEL SPRINGS.** SEND FOR CATALOGUE.

NOS. 48 & 50 NORTH SIXTH STREET, PHILADELPHIA, PA.



Parrott Varnish Co.

FINE COACH AND CAR VARNISHES.

Bridgeport, Conn., U.S.A.

THE STREET RAILWAY LUBRICANT "VICTOR"

Will last FOUR TIMES AS LONG, and is CHEAPER and MORE ECONOMICAL than Oil. Samples free on application.

HENRY F. ROHBOCK,

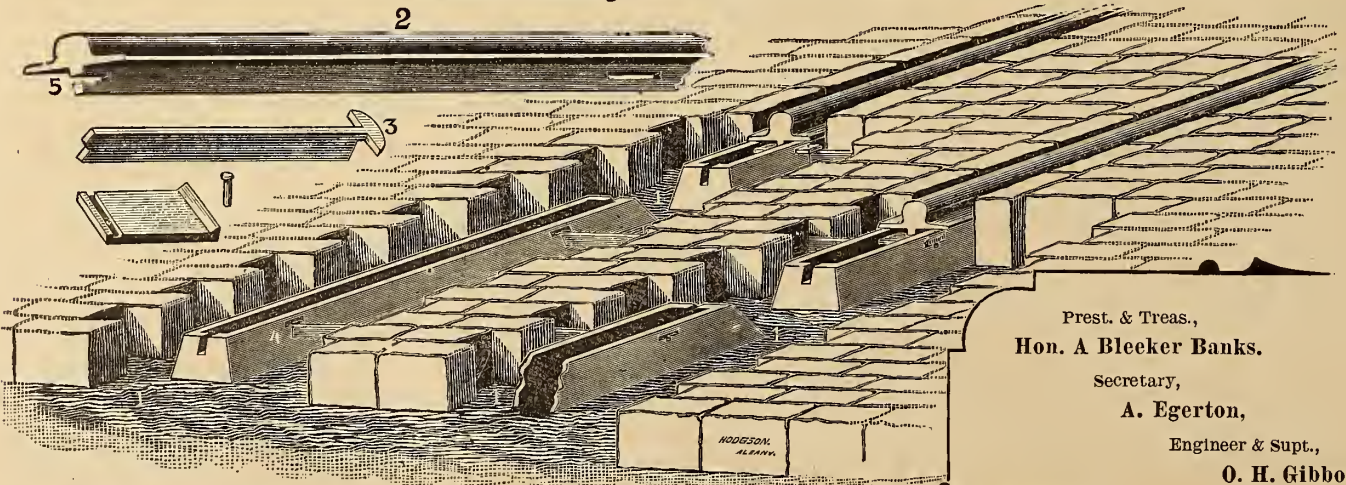
109 WOOD ST., PITTSBURGH, PA.

Used by Pittsburgh Transverse Railway Co.

The Metallic Street Railway Supply Company,

GIBBON'S PATENT,

Albany, N. Y.



Prest. & Treas.,
Hon. A. Bleeker Banks.

Secretary,

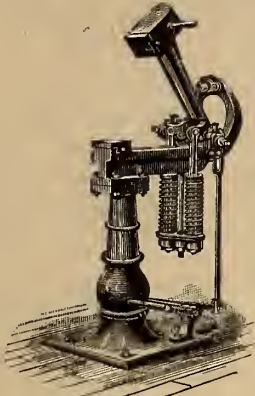
A. Egerton,

Engineer & Supt.,

O. H. Gibbon.

Cheapest, quickest, laid, and most durable track known. Dispenses with all timbers, butts, spikes, knees, etc. Estimates and particulars sent on application.

THE STANDISH FOOT-POWER HAMMER



Is specially adapted to making light forgings, for welding in dies having impressions cut to the shape of the work required. They are superior to power hammers, as the hammer is under perfect control as the Smith's hand hammer, and are used in the carriage business for welding Dashes, Shifting Rails, Top Props, shaping and forming ALL SMALL WORK equal to drop forging, and are in use by the principal manufacturers of the United States. Send for circulars. Address,

The Capital City Machine Works,
COLUMBUS, O.

Patented July 10, 1883.

THE NATIONAL CAR HEATER,



Especially Adapted
FOR
Warming Horse
OR
Street Rail Road
CARS.

Brick Lined, Rotating
and Dumping Grate,
Safety Door Catch.

For Neatness of Appearance, Compactness in Space, and Safety it has no equal.

These Car Heaters are in use on Railroad Lines in different Cities and Towns of the Union, and are giving entire satisfaction.

Sole Manufacturers,

**NATIONAL
Stove Co.,**
243 Water St.,
NEW YORK CITY

Perfection in Car Heating AT LAST.

Vandemark's Improved Car Heater.

This Heater occupies no available space, is entirely free from ash, dust, dirt and odor; is absolutely safe, and the least expensive of any yet introduced, as has been demonstrated by actual trial.

I am prepared to obligate by contract to supply street cars with heaters that will meet the requirements to perfection in point of safety, efficiency and economy.

A. B. VANDEMARK,
1584 BROADWAY, N. Y. CITY.

F. W. DEVOE & CO.

(Established 1852),

FULTON ST., cor of WILLIAM, NEW YORK,

MANUFACTURERS OF

COACH AND CAR COLORS

GROUND IN JAPAN.

For these colors we received the highest award, the Gold Medal, at the National Exposition of Railway Appliances in Chicago, last year.

SPECIAL SHADES MADE TO ORDER.

We furnish special body colors to Pennsylvania R.R., New York Central New York & New Haven, Lehigh Valley, New Jersey Central and other large Railroads.

FINE VARNISHES AND JAPANS

FOR COACHES AND CARS,

Wood Fillers, Wood Surfacer, Wood Stains, Hard Oil Finish.

Manufacturers of FINE BRUSHES for painting, varnishing, striping, etc.

ARTISTS' MATERIALS.

Tube Colors, Artists' Brushes, Drawing Paper.

ENGINEERS' GOODS.

Mathematical Instruments, Theodolites, Transits, Cross Section Papers.

Illustrated Catalogues of 250 pages and 800 Illustrations on request.

MANUFACTURERS OF

WHITE LEAD, COLORS IN OIL, DISTEMPER COLORS, PURE READY MIXED PAINTS,

COFFIN, DEVOE & CO., 176 Randolph Street, CHICAGO.

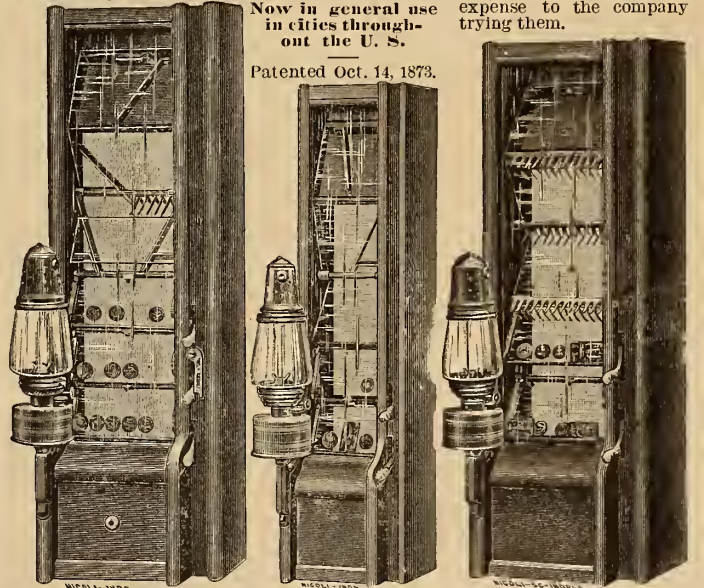
TOM L. JOHNSON'S IMPROVED FARE BOX.

Ornamental to any car. Reduction in price where 2 boxes are placed in one car.

Now in general use in cities throughout the U. S.

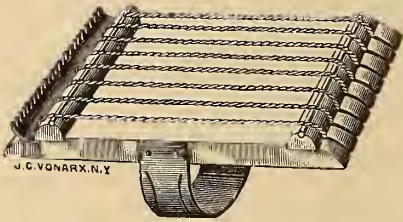
Roads equipped with boxes on trial, and if not satisfactory, returned without any expense to the company trying them.

Patented Oct. 14, 1873.



One of the principal merits of these Fare Boxes over all others, consists in the fact that the fares are not turned out of sight at once by the drivers, leaving nothing but the bare word and memory of the parties as evidence of the payment, thereby making it easy for deception to be practiced, even though an officer is on the car, and is endeavoring to see that the driver is faithfully performing his duties. They are so constructed that the fares are kept in sight from one end of the road to the other, and at any point on the line an officer of the company, or indeed any other person, can tally passengers with the fares. The drops can easily carry from 75 to 80 fares, and can be counted without mistake, and counterfeit money can be easily detected. These boxes are very simple in construction, being cleared, when required, in five minutes, whereas any other box takes a much longer time. The glass fronts and drops render them so transparent that a person sitting in the further end of car can readily count the fares and make the tally, without making himself conspicuous in the matter, if desirable. They are lighted from an outside lantern, (which is only on the car at night, and should be taken off during the day,) giving an excellent light, for the fares can be seen almost as plain as by day. When the box is put in a car it can not be taken out or tampered with, unless the keys are obtained from the office, and can not be robbed without violence. Special attention given to correspondence on the subject of street railway construction, equipment and operation. Address all correspondence to A. A. ANDERSON, with Tom L. Johnson, Indianapolis, Indiana.

JAY-EYE SEE Patent Curry Comb.



Best in the World. Can't Scratch or Hurt the horse. Cleans off mud and sweat with ease and rapidity. Most Durable and Lightest Comb made. Give it a trial. Needed in all Car Stables.

MUNCIE NOVELTY CO., Muncie, Ind.

MALTBY, CURTISS & CO., O. S. CHAMBERLAIN,
 No. 20 WARREN ST., New York, 55 DEARBORN ST., Chicago,
 Eastern, Southern & Export Agents. Gen. Western Agent.

N. J. Car Spring and Rubber Co.,

Cor. WAYNE and BRUNSWICK STS.,
 JERSEY CITY, N. J.,

MANUFACTURERS OF

RUBBER CAR SPRINGS

OF EVERY STYLE AND SHAPE,

CUSHIONS, BRAKE PADS, RUBBER MATTING
 and STEP PLATES, HOSE, DOOR STOPS, &c.

Being one of the oldest manufacturers in the business, we have a MOST COMPLETE assortment of moulds.

WRITE FOR PRICES.

THE BRYDEN FORGED HORSE SHOE WORKS

(Limited),

Catasauqua, Lehigh County, Penn.,

Are making a plain, narrow-webbed shoe, with beveled surfaces for Horse Railroad work. It is "FORGED" from the very best Iron, and is tougher and harder than any shoe heretofore made, and will be sold to consumers at a small advance on the prices charged for ordinary mill shoes. They also make a Calked Shoe with a Square Toe, just the same as hand made, and the company warrants them to wear as long as the very best hand work.

Among others who are using this Shoe, are the

- Third Avenue Railroad Co., New York.
- Eighth Avenue Railroad Co., New York.
- Twenty-third Street Railroad Co., New York.
- Christopher Street Railroad Co., New York.
- Brooklyn City and Newtown Railroad.
- Bushwick Railroad Co., Brooklyn, N. Y.
- Crosstown Railroad Co., Brooklyn, N. Y.
- Coney Island and Brooklyn Railroad Co., Brooklyn, N. Y.
- North Hudson County Railroad Co., Hoboken, N. J.
- Jersey City and Bergen Railroad Co., Jersey City, N. J.
- Ridge Avenue Passenger Railway Co., Philadelphia, Pa.
- Citizens' Passenger Railway Co., Philadelphia, Pa.
- Buffalo Street Railway Co., Buffalo, N. Y.
- New Orleans City and Lake Railroad.
- Philadelphia Traction Company, Philadelphia.
- Second and Third streets Railroad Company, Philadelphia.
- Atlantic Avenue Railroad Company, Brooklyn, N. Y.

Also fully prepared to furnish any kind, weight or shape of shoe desired. Estimates on cost of producing such special patterns will be furnished on receipt of model, with estimate of the probable number of kegs required.

The Rates of Freight are as Low from their Factory West and East AS THE LOWEST.

A Mild Tough Steel Shoe supplied at a small advance over Iron Shoes.

"PAY HERE." Fare Boxes and Change Receptacles for Street Cars.

OUR NEW FARE BOX NO. 3.

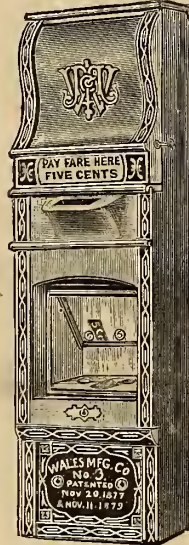
The following are some points of superiority in this box over others:

SIMPLICITY OF CONSTRUCTION, QUICKNESS AND CONVENIENCE OF CLEANING, SECURITY OF MONEY DRAWER, BEAUTY OF FINISH, and MUCH CHEAPER IN PRICE.

We have just added to this box a very valuable improvement, viz., a small mirror placed back of first slide or rest, which presents to driver's view the back side of fare as well as front, when resting on first rest. He can by this quickly detect any spurious or mutilated coin or ticket that may be split and put in box.

It often happens in all Fare Boxes, to the annoyance of driver and passenger, when several fares are resting on first slide, one or more coins are liable to be

behind a ticket, and the driver cannot see them, and quite often a passenger is "rung up," when his fare is concealed behind the ticket, from the driver. This arrangement gives driver view of both sides of fare.



Box No. 3.
 Front or Passengers' View.



CHANGE RECEPTACLE.

The only satisfactory arrangement in use for making change with the driver.

Descriptive and illustrated circular on application. Get our prices before buying.



Box No. 3.
 Back or Driver's View.

WALES MFG. CO., 76 & 78 E. Water St., Syracuse, N. Y.

Gourdier's Steel, Rubber Cushioned BAR HORSE SHOE.

For Street Railway Horses.

A POSITIVE CURE FOR LAMENESS.

It saves Horseflesh. Its use Guarantees Soundness.



Address

It furnishes a proper support for the frog; ensures better health, more speed and greater endurance, and is more economical than any other shoe. It is theoretically the only true shoe for horses, and is the result of over thirty-five years practical experience and observation with horses. It is recommended by many eminent veterinary surgeons and endorsed by numerous metropolitan railway lines where it is in constant use. The Gourdier shoes are made in fifteen sizes.

DIRECTIONS. Pare the foot ready for shoeing; make a careful tracing of the hoof on paper, and mail it to us. We will furnish sample shoes to R. R. companies for trial, free.

Henry Gourdier & Co.,
 1584 Broadway, N. Y.

WM. P. CRAIG,
Street Railway Builder and dealer in Railway Supplies.

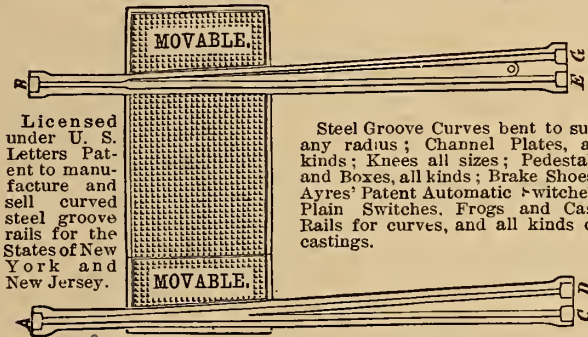
OLD ROADS RE-LAID, GRADING, PAVING, &c.
Special attention given to laying Switches, Curves, Turnouts, Connections and Turn-tables; also Building Tracks for Excavation, Grading, Mining and Factories.
Office, 95 LIBERTY STREET, - NEW YORK.

STEEL STREET RAILS.
The Pittsburgh Bessemer Steel Co., Limited.
48 Fifth Ave., Pittsburgh, PA.

Section No. 17
46 lbs. per Yard

A. AYRES,
Manufacturer and Patentee.

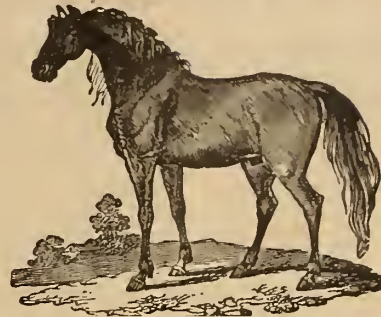
Send me full size section of rails to be used at points A, B, C, D, E, G.
No. 625 TENTH AVENUE, NEW YORK.



Licensed under U. S. Letters Patent to manufacture and sell curved steel groove rails for the States of New York and New Jersey.

Steel Groove Curves bent to suit any radius; Channel Plates, all kinds; Knees all sizes; Pedestals and Boxes, all kinds; Brake Shoes; Ayres' Patent Automatic Switches, Plain Switches, Frogs and Cast Rails for curves, and all kinds of castings.

EUROPEAN COLIC CURE.



A speedy and sure cure for Colic--has saved hundreds of horses where all other remedies have failed. Horse need not be run or trotted around to start the wind. Let him stand or lie down as he feels inclined and he will be ready for work almost immediately after recovery. A cure guaranteed in ninety-nine cases in a hundred. Endorsed by the leading street railway companies of the country, some of which we append.

DECATUR, ILL., Oct. 2, 1884.
MESSRS. JONES & ROACH, Chicago, Ill.

I have used your Colic Cure for my horses and mules on my street car lines and found it the best and surest medicine I have ever used. I have not lost a horse since I commenced its use. It gives relief in a short time after it is taken. I can cheerfully recommend it as a sure relief if given in time. I keep it constantly on hand.

Truly yours,
FRANKLIN PRIEST,
President Decatur Street R. R.

MESSRS. JONES & ROACH:

Gentlemen: I cheerfully recommend your European Colic Cure for horses as being the best that I have ever used. When once introduced no horse owner can well afford to be with-

out it. I hope you will meet with the success your cure deserves.

Truly yours,
VALENTINE BLATZ,
Per H. Lieb, Manager.

OFFICE OF NORTH HUDSON COUNTY RAILWAY Co.
HOBOKEN, N. J., Oct. 4, 1884.

Gentlemen: It gives me pleasure to say that I can heartily recommend your European Colic Cure to all horse owners, from a personal knowledge of its curative qualities. I have used it in our stables, containing about six hundred horses, and have always found it to be beneficial. Yours very truly,
ALBERT SAILLET,
Foreman and Veterinary Surgeon for the North Hudson County Ry. Co.

Sample Bottles Furnished Street Railway Companies Gratis.

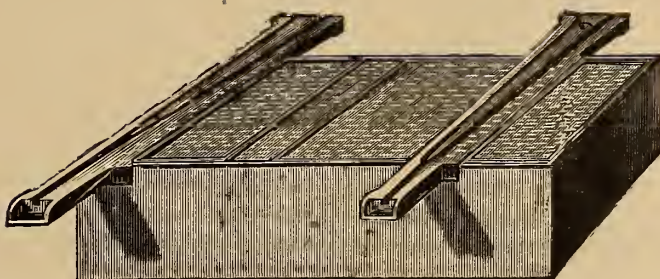
For further information, prices, etc., address

JONES & ROACH, 259 Fremont Street, Chicago.

M. M. White & Co.,

531 WEST 33d STREET,

NEW YORK.



OWNERS AND BUILDERS OF

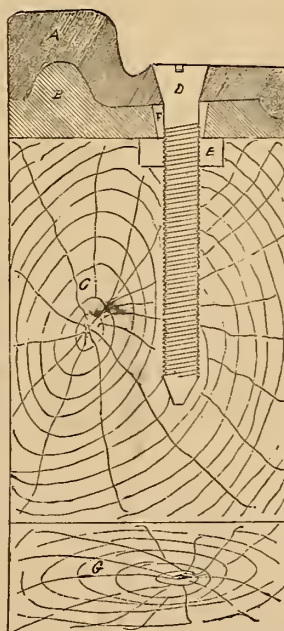
H. DOUGLASS'

Patent Automatic Switch

FOR STREET RAILROADS.

WRIGHT'S

PATENT JOINT FASTENING.



The accompanying cut shows a cross section through joint. A is the rail, B the joint chair, C the stringer, D the patent screw fastening, E the nut, F a slot in chair allowing rails to contract and expand. The chair cannot settle and the rail ends are held level with each other, preventing the many evils of ordinary construction.

For Further Particulars Address

AUGUSTINE W. WRIGHT,
NORTH CHICAGO CITY RAILROAD,
CHICAGO, ILL.

**STREET RAILWAY WHEELS AND TURNOUTS.
Graded Stable Gutter with Straight or Curved Cover.**



Descent 1/4 in. per foot. Pieces 5 feet lengths. Short pieces furnished to suit any length. Spouts to connect with Sewer, &c.

BOWLER & CO., Cleveland, Ohio.

THE AJAX METAL CO.

WE CLAIM FOR AJAX METAL.



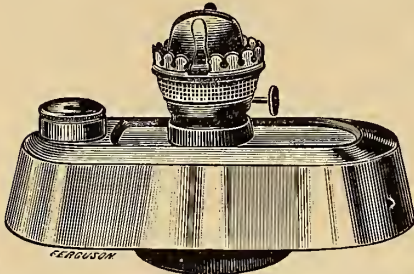
PATENTED 1883.
25 to 50 per cent. more mileage.
33 1-3 " greater tensile strength.
100 " greater crushing strength.
20 " less friction and wear upon journals.
85 " less hot journals than any known Bronze named or unnamed.

Costs no more than copper, and tin or gun metal.

AJAX METAL CO.,

2040 No. Tenth Street, PHILADELPHIA, A.

**CLUTE PATENT
DOUBLE-BOTTOM
STREET CAR LAMP.**

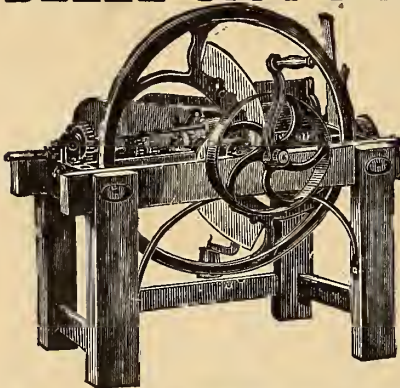


Is one that assures Safety, Durability, and is perfect in regard to Leakage.

GEO. M. CLUTE, Sole Manufacturer.

Also Dealer in Car Reflectors, Chimneys, Burners, &c.,
WEST TROY, N. Y.

THE BELLE CITY FEED CUTTER



IS THE Strongest, Most Durable, and on the whole it is the

BEST FEED CUTTER IN THE WORLD.

For Street-car Barns it has no equal. Write for Reference, Circular, &c., to

THE BELLE CITY M'FG CO.,

RACINE, WIS., U. S. A.

**F. W. JESUP & COMPY.,
67 LIBERTY ST., NEW YORK,
Street Railway Supplies,
OF EVERY DESCRIPTION.**

Steel Rails, all patterns; Cars; Automatic Switches; Turntables; Curved Rails; Channel Plates; Frogs; Crossings and other Track Castings, Knees, &c. Countersunk Spikes, specially adapted for Centre-bearing Rails.

Iron City Foundry and Machine Works.

Cast Iron Turnouts, Crossings, Switches and all kinds of Car Castings. SOUTHERN STREET RAILWAY WORK A SPECIALTY.

AIKIN & LIGHTON,

BIRMINGHAM, ALABAMA.

The "BROADWELL CAR STARTER," having been subjected to practical tests, is now placed on the market at a very low price.

C. B. BROADWELL,

169 Laurel Street, - New Orleans, La.

**PUGH & RUSSELL,
Manufacturers and Dealers in
STREET RAILWAY SUPPLIES**

Of every Description, for Home and Export Trade.

Stewart Building, Broadway, Reade and Chambers Sts., New York.

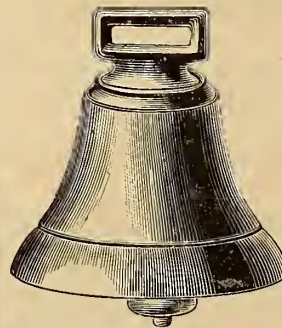
P. O. Box 3524.

THE BARTON BELL CO.,

East Hampton, Conn.,

MANUFACTURERS OF

Common and Pure Bell Metal
HORSE CAR BELLS.

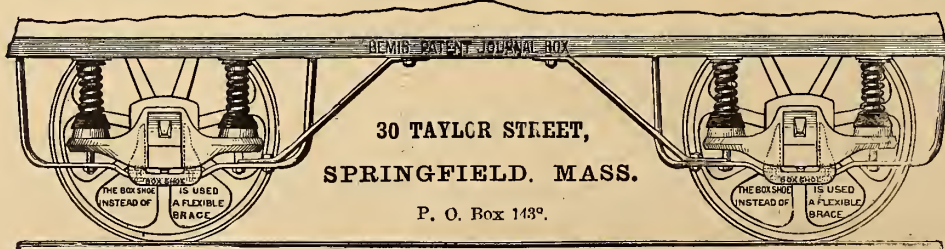


Malleable Iron Loop and Clapper Holder (Extra strong and durable.)

Samples and prices sent on application.

THE BEMIS CAR BOX CO.,

Light Draft, Easy Riding, Durable Economical. Brasses are warranted for 10 years and Journal for 20 years.



30 TAYLOR STREET,
SPRINGFIELD, MASS.

P. O. Box 143.

Requires oiling or inspecting but once in 12 months.

Boxes are positively dust proof.

MANUFACTURERS OF

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ESTABLISHED 1857.

INCORPORATED 1875.

BROWNELL & WIGHT CAR COMPANY,

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BUILDERS OF

Street Cars

OF EVERY STYLE AND SIZE,

For Horse, Cable or Other Motive Power.

EXCLUSIVE MANUFACTURERS OF

BROWNELL'S PATENT COMBINATION CARS

FOR SUMMER AND WINTER SERVICE.

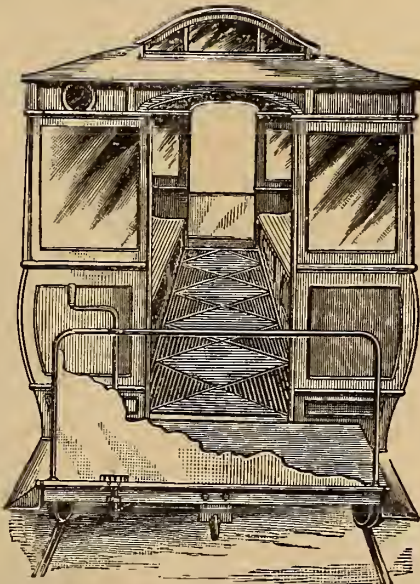
ESTABLISHED 1869.

LEWIS'

Improved Sectional Diamond and Plain CAR MAT

IS THE

LIGHTEST,
STRONGEST,
CHEAPEST,
HANDSOMEST,
EASIEST
CLEANED AND
MOST DURABLE
MAT FOR RAIL-
WAY CARS
EVER DESIGNED



*Used extensively
all over the World.*

SAMUEL LEWIS, Patentee & Sole M'r,

12 to 18 LORIMER STREET (near Broadway),

BROOKLYN, E. D., N. Y.

J. M. JONES' SONS,

AGENTS,

Street Railway Car Builders

WEST TROY,

NEW YORK.

PENNSYLVANIA

STEEL COMPANY,

MANUFACTURERS OF

STEEL RAILS

Of T patterns, weighing from 16 to 76 lbs. per yard.
CENTRE BEARING Street Patterns, 42 to 60 lbs. per
yard, TRAM Street Patterns 45 to 47 lbs. per yard,
and Street Patterns for STEAM ROADS.

WORKS AT

STEELTON, DAUPHIN CO., PENN.

NEW YORK OFFICE, - 160 Broadway.

Philadelphia Office, 208 South Fourth St.

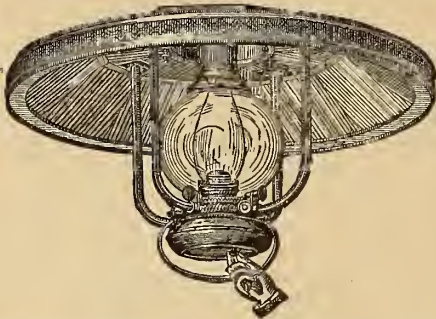
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**A. WHITNEY & SONS,
CAR WHEEL WORKS,
PHILADELPHIA, PENN.**

**CAST CHILLED WHEELS,
AXLES AND BOXES
FOR EVERY KIND OF SERVICE.
Street Railway Wheels of all Sizes.**

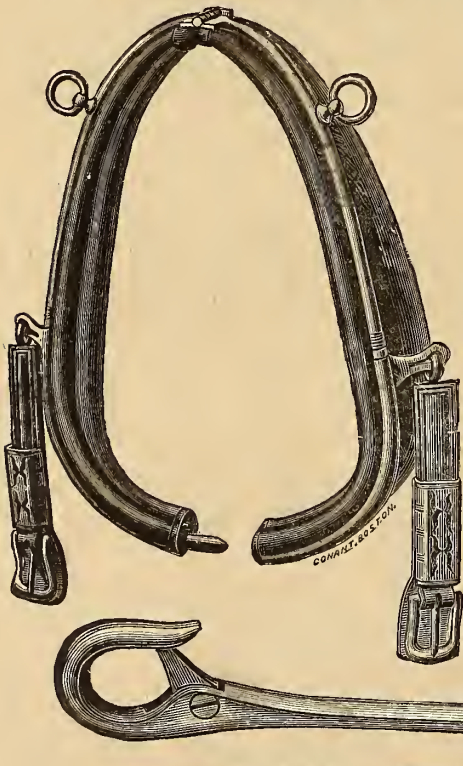
JOSEPHINE D. SMITH,

Successor to the late WILLARD H. SMITH,



**Manufacturer of Railroad Centre Lamps and Reflectors
AND ALL KINDS OF SHIP AND MARINE LAMPS.
350 & 352 Pearl St., New York.**

BERRY'S PATENT HAMES.



**Lightness, Strength,
Durability, Quick-
ness and Sim-
plicity.**

They have the advantage of easy adjustment. No huckles or straps are used. They can be applied in an instant, being fastened to the collar. The collar is divided and there is no strain upon the collar or the eyes of the horses.

In case of accident the whole harness can be removed at once.

They are adapted to the use of Fire Departments, Horse Railroads, Express Wagons, Teams and Light Carriages, and are in use in over one hundred cities and towns in the United States and Canada.

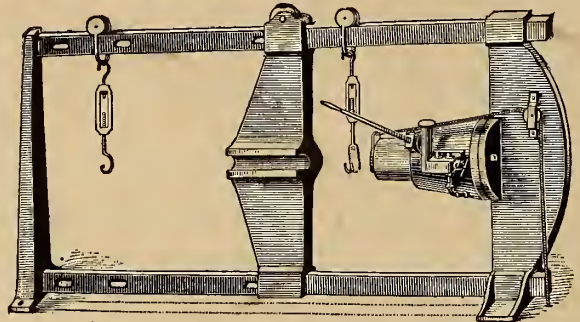
WE ALSO MANUFACTURE THE

REGAN PATENT SNAP.

They are made of the best gun metal and malleable iron, with a brass spring which is inclosed in a water-tight socket and made rust and dust proof. It is an impossibility for it to become detached. Write for illustrated catalogue and prices.

CHARLES E. BERRY, Cambridge, Mass.

HAND POWER, LEVER AND HYDRAULIC PRESSES.



HAND AND POWER CAR-WHEEL PRESSES. (See page 197, July, 1885.)

**Screw and Hydraulic Jacks.
WATSON & STILLMAN,
471 S. GRAND ST., N. Y.**

FRED. J. KALDENBERG,

SUCCESSOR BY PURCHASE TO THE

NEW ENGLAND CAR SPRING CO.

(ESTABLISHED 1851),

MANUFACTURER OF SUPERIOR QUALITY

**VULCANIZED RUBBER CAR SPRINGS,
AND ALL KINDS OF
RUBBER HOSE, VALVES, ETC.**

FACTORY AND OFFICE :

**213 to 229 E. Thirty-third St., New York,
(Bet. 2d and 3d Aves.)**

TELEPHONE CALL, NASSAU 696.

Correspondence Solicited.

DOWNTOWN OFFICE: 125 FULTON ST.

P. O. Box 91. Send for Price List.



(This Trade Mark on all Genuine Covert Goods.)

We call particular attention of all horse railroad companies to our celebrated

- HARNESS SNAPS,**
- SWIVEL SNAPS,**
- OPEN EYE BIT, CHAIN AND TRACE SNAPS,**
- ROPE AND WEB HALTERS,**
- HALTER LEADS,**
- BREAST CHAINS,**
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- TRACE CHAINS,**
- REIN CHAINS AND**
- BREAK CHAINS.**

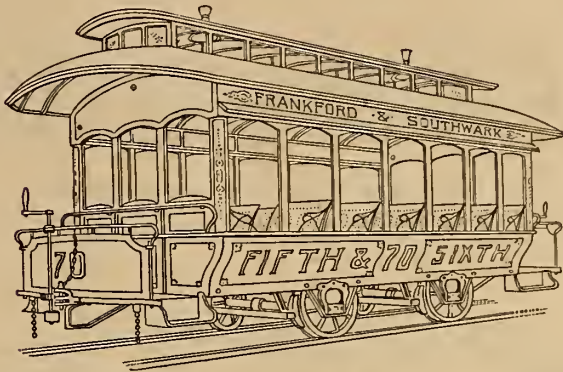
Send for illustrated catalogue and price list.

COVERT MANUFG. CO.,

SOLE MANUFACTURERS,

WEST TROY, N. Y.

FOR SALE.



Four Summer Cars, good as new, built in very best manner, perforated seats bronze trimmings, etc., centre aisle, seating room for 30. The company having discontinued the use of summer cars offer the same for sale on very reasonable terms. For description and price apply to FRANKFORD & SOUTHWARK R.R. CO., 2501 Kensington Ave., Philadelphia.

1885.

Inter-State Industrial Exposition OF CHICAGO.

Will Open Wednesday Evening, September 2, and Close Saturday Evening, October 17.

Every department will be replete with the newest in SCIENCE, INDUSTRY & ART.

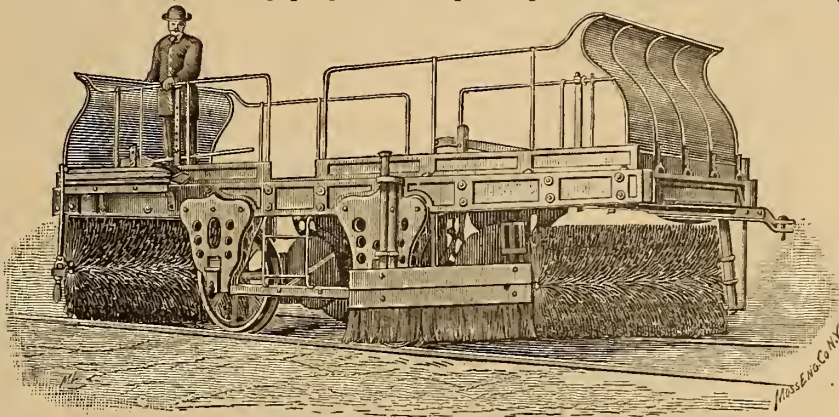
The immense demand for space to date is a guarantee of a magnificent Exhibition. Railroads centring in the city will carry passengers at hard-pan rates.

ADMISSION:

ADULTS 25c. | CHILDREN 15c.

The Brooklyn Railway Supply Company's Snow Sweeper and Plow.

Best Materials only used in construction. White oak frames. Many improvements. The famous cylinder brooms, for heavy snows, under United States Letters Patent, supersede old six wing sectional broom.

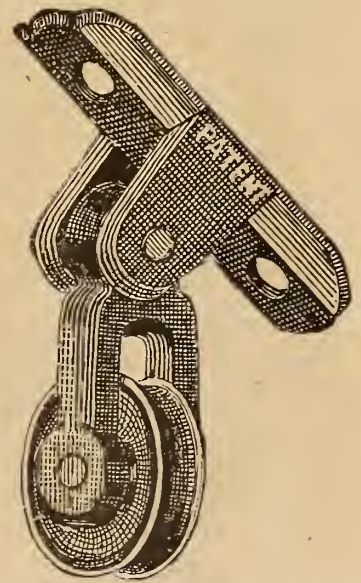
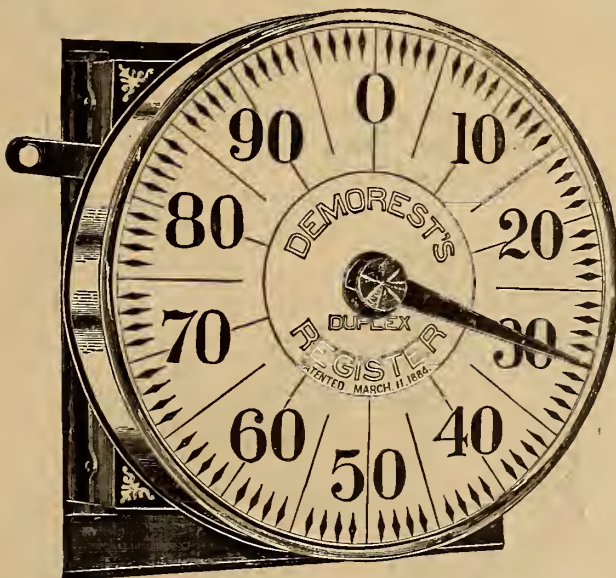


Refer to the larger companies who have used all kinds of snow sweepers, and can therefore speak from actual experience.

WORKS:

37 AND 39 Walworth St. BROOKLYN, N. Y.

DEMOREST'S DUPLEX FARE REGISTERS.



The Half Trip system and the perfect safety in allowing the conductor to reset his register by being required to sign his name, surpass anything of its kind ever before offered to the public.

All companies who use the Duplex Register will be indemnified.

We will place any number of our Duplex Registers (with or without the fare box, according to the kind of car), upon trial for any time desired, at a very slight cost. Our terms of trial are quite reasonable. A trial is solicited.

Address the proprietor,

W. JENNINGS DEMOREST,

R. M. ROSE, Manager.

15 East 14th Street, New York City.

The fare-box and register combined is the only perfect system of checking the driver in neglect to register fares put in the box, and marking the registrations upon a paper dial serves as an infallible record to be filed away for future reference.

Patent Hinge Rib Pulley is acknowledged the best.

Railroad companies should be careful in ordering this line of goods. As owner of the patents we are the only ones to order from.

J. W. FOWLER, President.

THE

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LEWIS & FOWLER M'F'G CO.

MANUFACTURERS' SOLE AGENTS FOR THE UNITED STATES FOR THE

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SAFETY

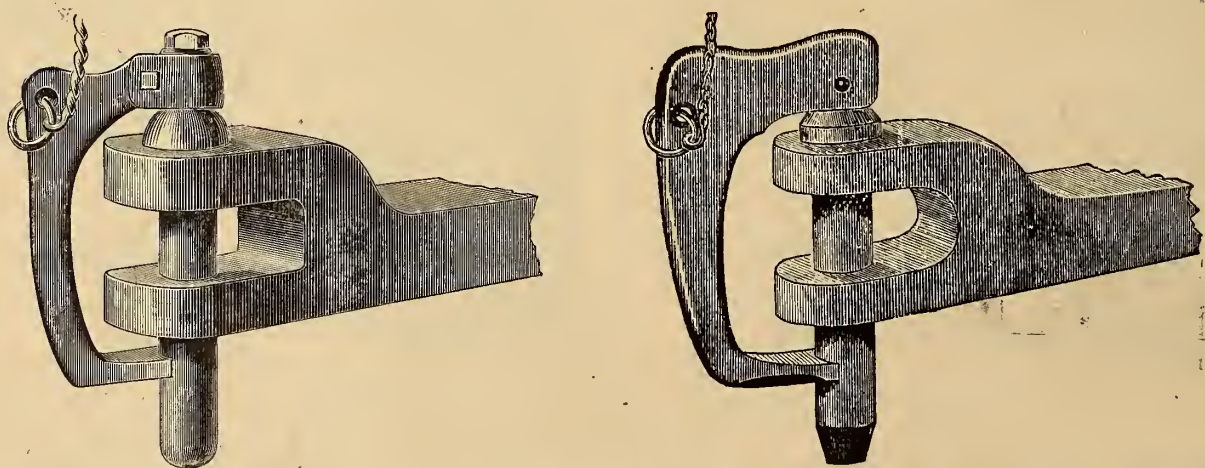
COUPLING

PIN,



FOR STREET CAR

PURPOSES.



THE LEWIS & FOWLER MFG. CO.,

8 COLUMBIA HEIGHTS, BROOKLYN, N. Y.

J. W. FOWLER, President.

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DAN'L F. LEWIS, Treasurer.

LEWIS & FOWLER M'F'G CO.

P. O. BOX 102.

BROOKLYN, N. Y.

Patentees and Manufacturers of

IMPROVED

"ALARM"

PASSENGER REGISTER.

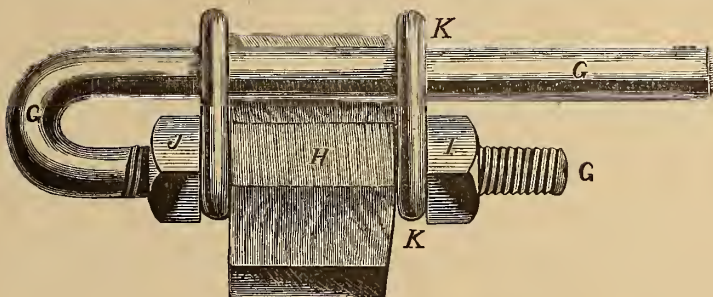


—SOLE AGENTS AND MANUFACTURERS—

SILVER MEDAL, CHICAGO, 1883.

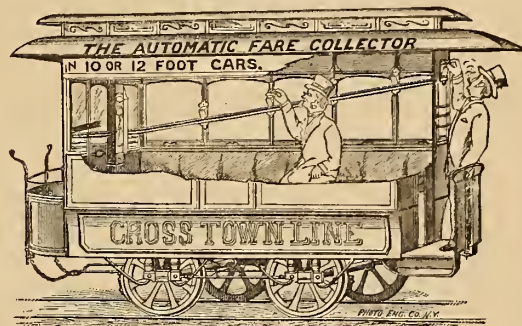
VAN TASSEL'S Patent Brake Rod

FOR STREET CARS.

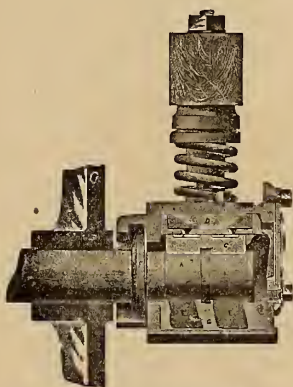


SMALL'S Automatic Fare Collector.

FOR FARE BOX CARS.

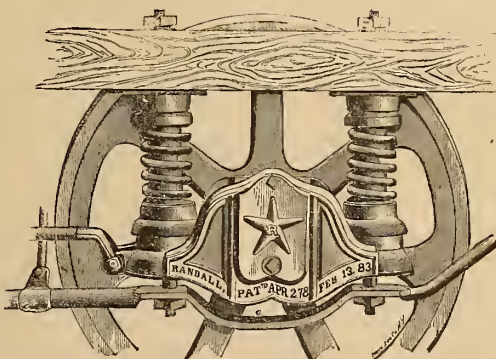


"RANDALL'S" PATENT CAR AXLE AND BOX.



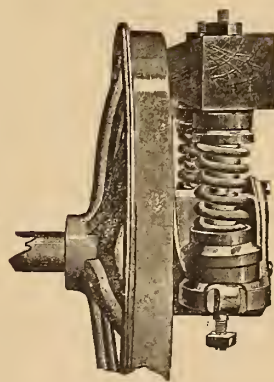
SECTIONAL VIEW.

DUST
TIGHT.



FRONT VIEW.

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FRICTION



END VIEW.

Agents for ORIENTAL METAL for Street Car Journal Bearings.

The Goodenough System

OF

HORSE-SHOEING.

The Goodenough System of Horse-Shoeing, of which the GOODENOUGH HORSE-SHOE is the exponent, is an endeavor to take from the hand of unthinking and barbarous method, the important art of farriery.

In the correct use of the system and proper application of the shoe, the sole bars and frog of the horse's foot are never cut, the rasp and knife being applied only to the wall of the foot, and no fire is used in the fitting.

The shoe is very light and narrow (Army pattern), easily worked cold and allowing frog bearing, without which there can be no good horse-shoeing.

FROG PRESSURE

is as important a factor to the health of the horse's foot as air is to the lungs or food to the stomach. It is the

KEY-STONE OF THE ARCH.

The advantages of the Goodenough System are, first and foremost, **SOUND HORSES; Secondly, CHEAP HORSE-SHOEING.**

Horse railroads using the system in its entirety not only buy much less iron and pay for much less labor, but have also much more serviceable stock.

Said a horse railroad superintendent of now the largest road in the United States:

"We don't wear iron nowadays, we wear frogs and cobble stones; nature provides frogs and Boston finds cobble stones."

To those who desire to read further upon the subject we will send upon application free of cost our pamphlets entitled,

"HORSE-SHOEING," and "FACTS FOR HORSE-OWNERS."

THE GOODENOUGH COMPANY,

156 and 158 East Twenty-Fifth Street,

NEW YORK.

LAKE & McDEVITT'S Patent ROPE TRACE

For Horse Railways, Omnibus Lines, Etc.



The Advantages

OF THE

ROPE TRACE

are its ready application to Horse-Car service, or to any other purpose where cheap harness is required. It only costs about half as much as leather traces, while at the same time one set of ROPE TRACES will (when used on horse cars) take the place of three or more sets of leather traces, as the Tugs remain attached to the car all day, no matter how many changes of stock are made. The relief horses having hooks attached to their harness, all that is necessary is to unhook the tugs from the working team back in the fresh horses, hook on the tugs, and the change is made. Railroad men will at once perceive their adaptability and economy from the above facts. They will also last longer than leather traces, and require but very little care. From their durability and cheapness they are also especially adapted for all kinds of farm use and heavy teaming, as farmers, etc., can easily repair them.

Patent No. 171,232, December 21, 1875.

In use on the Chicago West. Div. R'y.; Louisville City R'y Co.; Milwaukee City R'y; Transverse R'y Co., Pittsburg, Pa.; Citizens Street R'y Co., Pittsburg, Pa.; Pittsburg and Birmingham, Pittsburg, Pa.; Central City R'y, Peoria, Ill.; Grand Rapids R'y; Minneapolis St. R'y Co.; St. Paul City R'y; Houston City R'y, Texas; Superior Street R'y, Cleveland, O.; Cincinnati City R'y Co.; Fifth Ward Street R'y, Syracuse; Detroit City R'y; Ft. Wayne and Elmwood St. R'y, Detroit, Mich.; Galveston City R'y; Springfield City R'y, Springfield, Ill.; Toledo St. R'y, Toledo, O.; Adams St. R'y, Toledo, O.; Atlanta Street R'y, and others, in all on about 100 Street R'ys in United States and Canada, and a large number of other prominent Street R'y Companies throughout the Country. Send for descriptive Circular containing testimonials, prices, etc., to

LAKE & McDEVITT, 161 South Robey Street, Chicago, Ill.

CLARK'S PATENT POWER GROOMING MACHINE, SINGLE OR DOUBLE.



Patented December 15th. 1874.

Patented January 9th. 1883.

TO STREET RAILWAY COMPANIES AND OTHER STOCK OWNERS.

This machine for grooming may be driven by any known power, and can readily be placed for use in any stable or out-building. It can be operated by an ordinary groomer; its work is perfect; its action simple and effective. Stock owners will readily realize the importance of the machine. The perfection and rapidity of its work, and the benefits derived by its use, commend it to those interested in the care and use of all classes of thoroughbred and work stock. The most vicious animal readily submits to its use. Machine Grooming is found to be less expensive than hand grooming, saving in food and medicines, and materially increasing the value of the animal.

The Curry Comb and Hand Process Superseded! Economy of Labor! Perfection of Work!

Three Hundred Head of Stock Thoroughly Groomed with Each Machine every Ten Hours.

This Grooming Machine is in daily use in some of the largest Street Railway Companies' stables, and has always given perfect satisfaction. Among those using it are the City R'y Co., Chicago, Ill.; Detroit City R'y Co., Detroit, Mich.; Central City R'y, Peoria, Ill.; M. W. Dunham, Wayne, Ill.; West Division Street R'y Co., Chicago, Ill.; Lindell Street R'y Co., St. Louis, Mo.; Pleasant Valley R'y Co., Allegheny City, Pa.; Marshall, Field & Co., Chicago, Ill.; Leroy Payn, Chicago, Ill.; Saginaw City R'y, Saginaw, Mich.; Pittsburg and Birmingham R'y Co., Pittsburg, Pa.; and a number of others who have given testimonials as to the perfect work of the machine. For prices, circular and other information apply to

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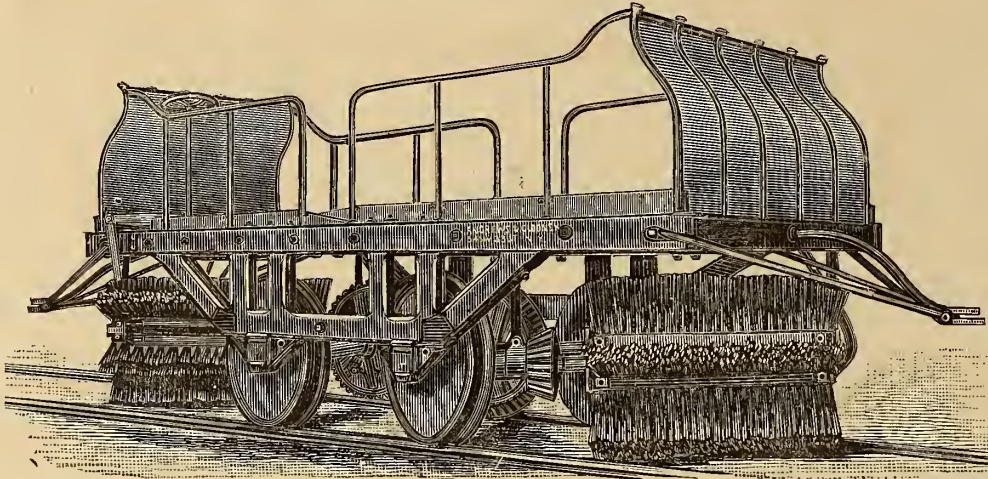
ANDREWS & CLOONEY,

F. H. ANDREWS.

F. T. LERNED, Gen. Agent.

B. A. CLOONEY.

Snow Sweepers, Ploughs & Sand Cars.



THE STREET RAILROAD SNOW SWEEPER

KNOWN AS THE

“White” or “New York” Sweeper.

MADE EITHER WITH SECTIONAL BROOMS, AS SHOWN IN THE ABOVE CUT, OR WITH CYLINDRICAL BROOMS.

Sectional brooms are provided unless otherwise ordered, owing to their superiority in heavy snows. In localities having only light snows a cylindrical broom answers the purpose. No patents on either kind, all having expired. No difference in price.

We make two sizes: Full Size for 8 and 10 Horses; 3-4 Size for 6 and 8 Horses.

Over One Hundred are in use in New York, Brooklyn and Philadelphia,

And we are now building (August, 1885) sweepers for Chicago, St. Louis, Boston, Salem, Mass., and six additional ones for roads in New York City. References can be made to any or all of the roads in New York City or Brooklyn; Philadelphia City Pass. Ry. Co. (Chestnut & Walnut St.), Second and Third St. Pass. Ry. Co., Union Pass. Ry. Co.; Phila. Traction Co., all of Philadelphia; Citizens' Ry. Co., Pittsburgh; Pittsburgh & Birmingham R. R. Co.; Pittsburgh, Allegheny & Manchester R. R. Co., Pittsburgh; Rochester & Brighton R. R. Co., Rochester, N. Y.

Sweepers made with Brooms propelled by Steam if required.

NOTE.—No Patent on Broom Heads or manner of arranging the same.

Works: 535 to 551 West Thirty-third Street,
and 538 to 552 West Thirty-fourth Street.

Office: 545 West Thirty-third Street,
NEW YORK CITY.

F. H. ANDREWS.

F. T. LERNED, GEN'L AGT.

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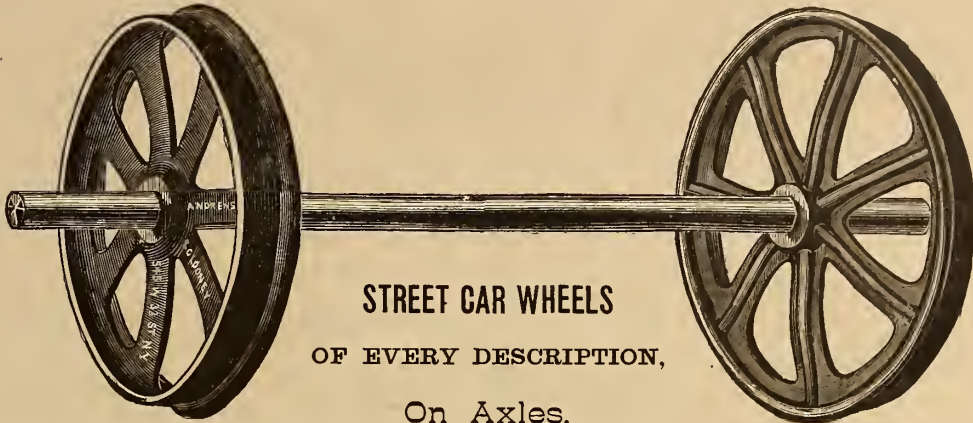
ANDREWS & CLOONEY,

OFFICE :

545

W. 33d St.,

NEW YORK.



STREET CAR WHEELS
OF EVERY DESCRIPTION,
On Axles.

WORKS :

535 to 551

West 33d St.,

AND

538 to 552

West 34th St.,

NEW YORK.

Manufacturers of

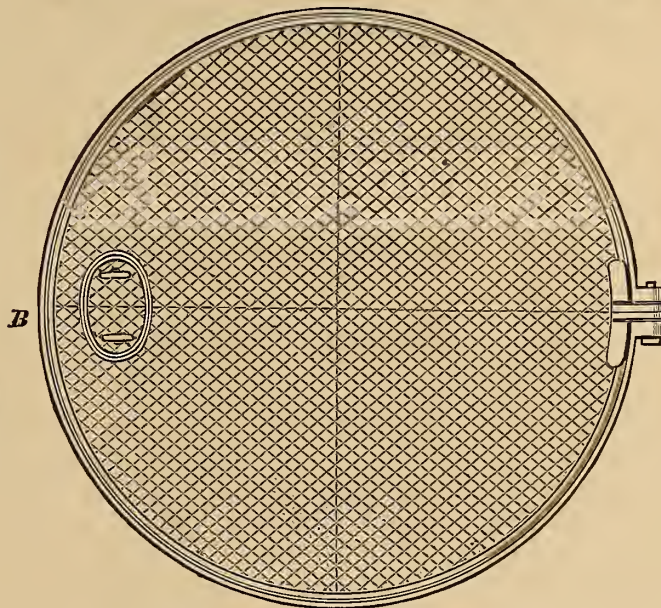
Elliptic, Spiral,

Volute, Car and

Engine

SPRINGS

Of Every Description.



Street Railway Turn-table.

Car Wheels,
Axles,
Brake Shoes,
Pedestals,
Boxes,
Brass Bearings
AND
Castings

of all Descriptions where great
Strength is Required.

Also,

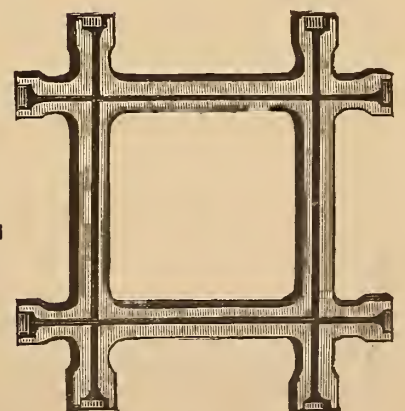
SWEEPERS, SNOW PLOWS,
TURN-TABLES,

Track Work, Automatic Switches, Etc.

STEEL GROOVE RAILS AND MACHINERY



Street Car Springs.



Street Railway Crossings.

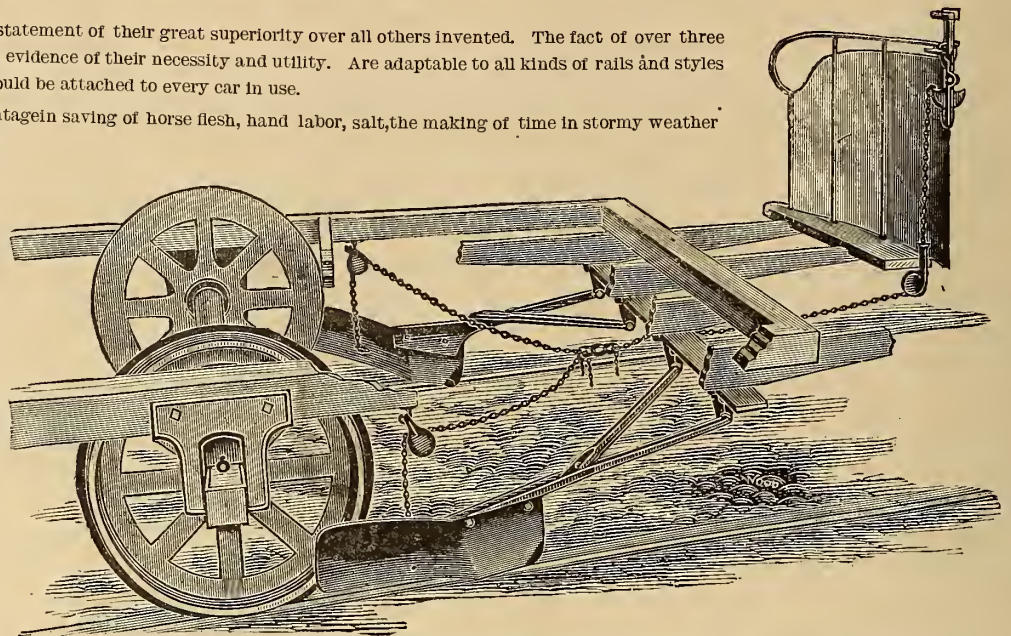
SEND FOR ILLUSTRATED CATALOGUE.

DAY'S IMPROVED STREET RAILWAY TRACK CLEANERS.

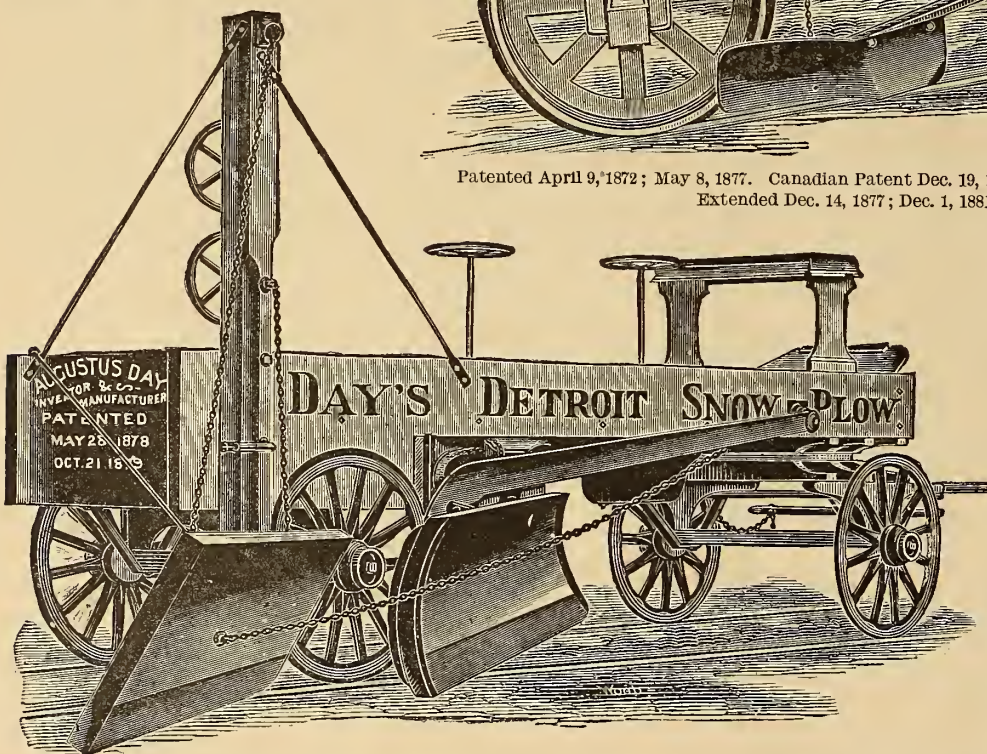
These Track Cleaners need no extended statement of their great superiority over all others invented. The fact of over three thousand pairs being now in use is sufficient evidence of their necessity and utility. Are adaptable to all kinds of rails and styles of cars. To secure the largest benefit they should be attached to every car in use.

No estimate can be made of their advantage in saving of horse flesh, hand labor, salt, the making of time in stormy weather. Since their introduction new and valuable improvements have been made in their construction, mode of attachment, and convenience of handling. They are finished in a thorough, workmanlike manner of the best material obtainable, the design being to manufacture the best and most efficient article in preference to other considerations. Method of sale and price considerably changed.

Reference is made to a few of the many roads using these Cleaners, with respective numbers of each, viz.:



Patented April 9, 1872; May 8, 1877. Canadian Patent Dec. 19, 1872; Dec. 18, 1876. Reissued Aug. 27, 1878. Extended Dec. 14, 1877; Dec. 1, 1881; Dec. 12, 1882.



Fort Wayne & Elmwood Ry., Detroit, Mich.....	30 pair.
Detroit City Ry., Detroit, Mich.....	135 "
Chicago City Ry., Chicago, Ill.....	350 "
Rochester City & Brighton R. R., Rochester, N. Y. . . .	75 "
Albany Ry., Albany, N. Y. . . .	40 "
Waterville Turnpike & R. Co., Albany, N. Y. . . .	24 "
Elmira & Horseheads R. R., Elmira, N. Y.	11 "
Lynn & Boston R. R., Boston, Mass.	68 "
Boston Highland Ry., Boston, Mass.	46 "
Lowell Horse Ry., Lowell, Mass.	27 "
Grand Rapids Street Ry. . . .	50 "
Naumkeag Street Ry., Salem, Mass.	40 "
Merrimack Valley Ry., Lawrence, Mass.	21 "
Louisville City Ry., Louisville, Ky.	55 "
Cream City Ry., Milwaukee, Wis.	37 "
Milwaukee City Ry., Milwaukee, Wis.	40 "
Buffalo Street Ry.	40 "
And many others.	

Taunton Street Ry., Taunton, Mass.	10 pair.
New Haven & West Haven Ry., New Haven, Conn.	16 "
Bridgeport Horse Ry., Bridgeport, Conn.	32 "
Adams Street Ry., Toledo, Ohio.	14 "
Toledo Street Ry., Toledo, Ohio.	13 "

For Illustrated Circular and New Price List, address

AUGUSTUS DAY,
76 State Street. Detroit, Mich., U.S.A.

RICHARD VOSE,

13 Barclay Street, . New York,

PATENTEE AND MANUFACTURER OF

Graduated Street Car Springs.

RUBBER CONE.

Patented, April 15th, 1879.

ADAPTED TO THE

STEPHENSON,
BEMIS,
RANDALL,
HIGLEY,
BRILL,
JONES,
BALTIMORE,
—AND—
ALL OTHER BOXES.



- No. 0, for 10-ft. Light Cars.
- No. 1, for 10-ft. Cars.
- No. 2, for 12-ft. Cars.
- No. 3, for 14-ft. Cars.
- No. 4, for 16-ft. Cars.
- No. 5, for 16-ft. Cars.
(Single Pedestal.)
- No. 1, Cushion, for 16-ft. Cars.
- No. 2, Cushion, for 12 and 14-ft. Cars.

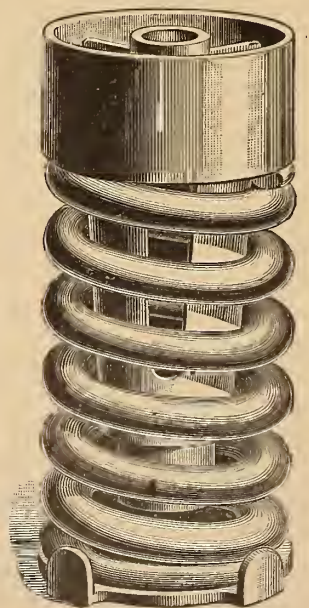
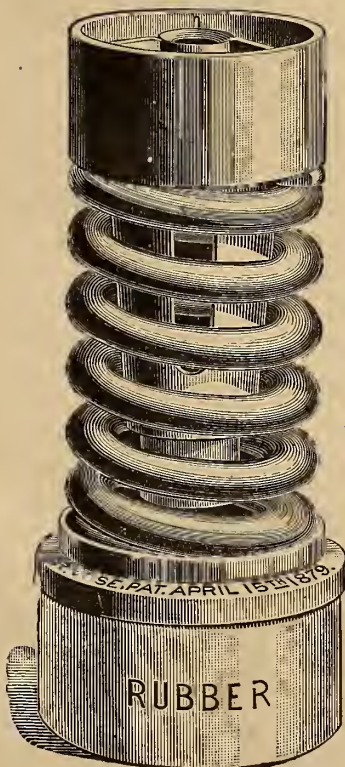
STEEL CONE CITY CAR SPRING.

Patented April 15, 1879—August 5, 1884.

The unprecedented popularity of the

“VOSE GRADUATED RUBBER CONE SPRING”

for HORSE CARS has induced the inventor to bring this class of Springs as near perfection as possible, and after a series of experiments and tests now presents for favor what he claims to be the *MOST PERFECT SPRING FOR HORSE CARS* ever offered. It is exceptionally *SOFT AND EASY* with the *EMPTY CAR* or with the *GREATEST LOAD*. It is believed to be the *MOST DURABLE*, being constructed upon a principle that seems to insure that the Spring must *ACTUALLY WEAR OUT*. The very *Finest Quality of Crucible Cast Steel* will always be used in these Springs.



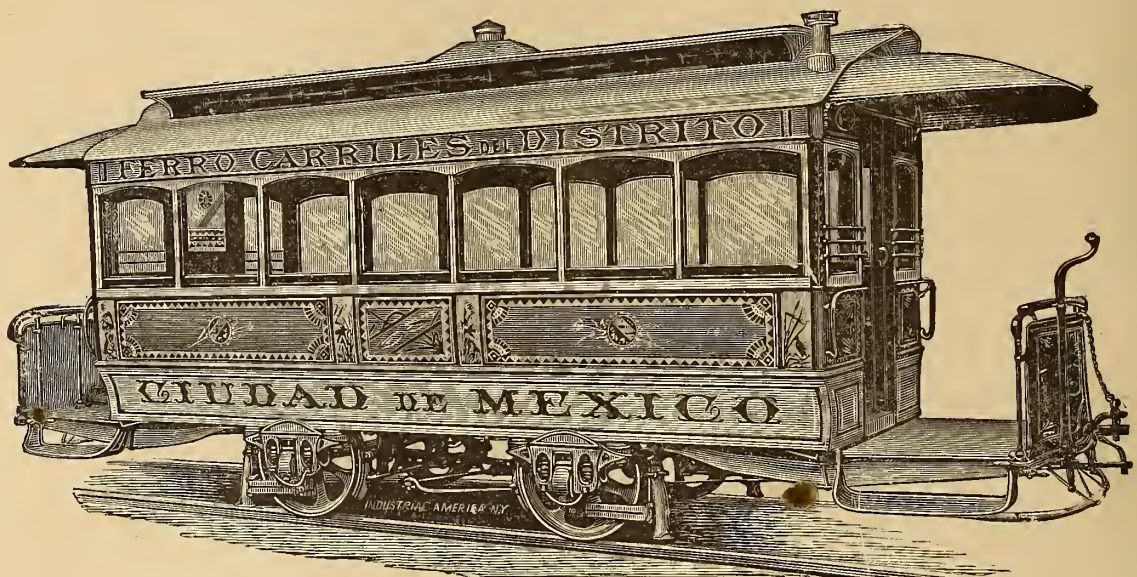
JOHN STEPHENSON COMPANY

(LIMITED),

New York.

TRAMWAY CARS

MEDAL OF FIRST CLASS, WORLD'S INDUSTRIAL COTTON EXPOSITION, NEW ORLEANS, 1885.



LIGHT ELEGANT, DURABLE.

Every Description.

Best Materials.

Minimum Prices.

ORDERS QUICKLY FILLED. CAREFUL ATTENTION TO SHIPMENTS.

All Climates Suited.





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