UNITED STATES DEPARTMENT OF LABOR

DESCRIPTIONS OF OCCUPATIONS

METAL WORKING
BUILDING AND GENERAL CONSTRUCTION
RAILROAD TRANSPORTATION
SHIPBUILDING

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PREPARED FOR THE
UNITED STATES EMPLOYMENT SERVICE
BY THE
UNITED STATES BUREAU OF LABOR STATISTICS

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CODE WORDS

DESCRIPTIONS OF OCCUPATIONS: METAL WORKING, BUILDING AND GENERAL CONSTRUCTION, RAILROAD TRANSPORTATION, AND SHIPBUILDING

PREPARED FOR THE U. S. EMPLOYMENT SERVICE BY THE U. S. BUREAU OF LABOR STATISTICS

INTRODUCTORY STATEMENT

These descriptions of occupations are based on investigations, including private interviews and correspondence, extending over practically the entire United States.

The one outstanding fact coming from this investigation is that there are no standard or generally accepted occupational names or definitions. It has, therefore, been necessary for the Bureau of Labor Statistics to define certain occupational terms and classifications and to assume the acceptance of these definitions by those using the occupational descriptions herein contained. The bureau is fully aware of the fact that some important occupations have probably been omitted and that in some cases subdivisions may have been carried too far. These faults can be corrected only by suggestions and criticism arising from use of the descriptions in filling jobs. The users of these descriptions are urged to send to the Bureau of Labor Statistics all suggestions and criticisms as they arise so that eventually there will be developed a national standard of occupational descriptions.

Acknowledgment

The Bureau of Labor Statistics wishes to thank all those who have contributed to the compilation of the occupational descriptions herein contained. So many individuals and representatives of boards, societies, and corporations have been consulted that it is impossible to make special mention of such services.

The bureau, however, wishes to state that it has used wholly and in part many of the occupational descriptions contained in the "Trade Specifications and Occupational Index of the United States Army," written and compiled by John J. Swan, M. E., for the Committee on Classification of Personnel in the Army. For this privilege the Bureau of Labor Statistics wishes to thank the committee and Lieut. Col. Swan.

PREFATORY STATEMENT

IMPORTANT

The object of these descriptions is to furnish definitions of the various occupations in the industries, so that specifications for labor may be made uniform, and also to furnish a means by which the prospective employee may be informed as to the nature of the work he will be expected to do.

The descriptions herein contained must not in any case be interpreted as in any way affecting wage agreements either in industries controlled by the Government or by private interests.

If Government departments or boards, private individuals, organizations, or corporations choose to accept any or all of these definitions and descriptions as a basis for wage adjustments, then that is wholly a matter for agreement between the parties concerned.

The Department of Labor in working out and promulgating these tentative descriptions is concerned only in accurately stating what each occupation requires in the way of performance and qualifications. Furthermore, the acceptance of a position under any definition or description herein contained in no way implies that the qualifications of the individual accepting the position described is limited to the qualifications enumerated.

Each occupation has been described under the most generally accepted title, or in cases where terms are indefinite, conflicting, or ambiguous, occupation names have been chosen with the view of bringing about an occupational terminology which shall be uniform and definite. The descriptions in each industry or group have been carefully prepared with the view of stating clearly and briefly what is required, so that a foreman can specify definitely the position to be filled and the employment superintendent or clerk can readily pick the worker best fitted to fill the position in question. These descriptions have been submitted for criticisms and suggestions to employers and employees thoroughly acquainted with the occupations in each industrial group. After revision in the light of such criticisms it is believed that the descriptions are satisfactory.

A separate occupation has been made only in case a distinction is evident in the kind or size of work, in the tools or materials used, or in the physical conditions under which the work is done.

It is undesirable to subdivide any described occupation by the designations, expert, first class, second class, and third class. Where an evident difference in grade or kind of work exits this difference has been recognized by the use of a distinct occupational name and description.

There are so many conditions entering into the length of time required to master a given occupation that reference to such time has practically no value as a measure of competence. Therefore, all reference to time of service has been left out of these descriptions.

The statement of school requirements, under the subheading of "Schooling" does not have reference to those already in the industry but should be interpreted to mean that no one should enter the industry as an apprentice or learner at the present time without having the equivalent of the stated

schooling. When the term common school is used it means that to fulfill the requirements of the occupation described the applicant must have completed the common school and be prepared to enter the high school.

Directions for using descriptions and code words

The ALL-ROUND JOURNEYMAN is defined as one who has acquired a working knowledge of all the fundamentals of his trade and is able to apply these fundamentals under the varying conditions of different shops and different localities. See MACHINIST, JOURNEYMAN OR ALL-ROUND, page 39.

The term "HAND" used in connection with the name of any machine or kind of work means one who has a complete mastery of all machine and other operations connected with the given machine or designated kind of work. For example: PLANER HAND, SHAPER HAND, DRILL PRESS HAND, refer to workers who can do all standard work on the specified machines. See MACHINE HAND GROUP, page 29. The BENCH HAND can do all kinds of work known as bench work. See BENCH HAND, page 30.

The term OPERATOR, used in connection with the name of any machine, means one whose knowledge and experience is limited to special operations on the specified machine. See MACHINE OPERATOR, page 37.

The word ASSEMBLER, used in connection with any occupational description, signifies one with a knowledge of the kind of assembling specified, or that the special training necessary will be given by the employer. See MACHINE ASSEMBLER, page 29. See also MACHINE ERECTOR and MACHINE FITTER, page 29.

The term MACHINE SETTER means one fully qualified to set up the specified machine to do any standard work doable on that machine. See MACHINE SETTER, page 38.

If a worker is wanted who has training sufficient to do the work in any two or more occupations described the code words of these occupations should be combined into one word to indicate the combination of qualifications. For example: The code word designating a DIE MAKER and JIG AND FIXTURE MAN (see pages 42 and 43) would be DAWN-JAR; for a CABINET MAKER AND JOINER (see pages 55 and 58) would be CHICK-JACK.

INDEX: In order to find any occupational description always use the index.

CODE WORDS (see CODE WORDS): Each occupational description has a code word which, when communicated to any person having access to these descriptions of occupations will enable him to know exactly what is called for by referring to the description indicated by the code word.

METAL-WORKING INDUSTRIES

BLACKSMITH-SHOP GROUP

[For explanation of "hand" as used herein see prefatory statement and directions for using descriptions and code words, pages 2 and 3.]

BLACKSMITHING

NOTE.—It is desirable that all those engaged in blacksmithing be familiar with gas and electric welding.

ANGLESMITH **ABYSS**

Description: The duties of the anglesmith are to shape such work as metal frames for tanks, doors, and windows.

Qualifications: The anglesmith bends and welds short lengths and light angular shapes from flat-iron, channel-iron, and tee-iron stock; must be able to work from drawings, patterns, or templates, and with coal, coke, oil, or gas fires. He must direct the work of heaters, handers, and helpers. It is desirable that he be able to do oxyacetylene, electric-arc, and spot welding on this class of work. He should have good health and physical strength and at least an equivalent of an apprenticeship in the anglesmith trade.

Schooling: Common school, preferably high school.

ANGLESMITH, HEAVY FIRES. (*See* **Frame bender.**)

BACKHANDER. (*See* **Blacksmith's helper.**)

BENDING-MACHINE HAND **BEACH**

Description: The bending-machine hand runs a bending machine, usually under compressed-air power, for the shaping, hot or cold, of small pieces, such as pipe clamps, angle braces, and general small forgings.

Qualifications: The bending-machine hand must know the name, care, and use of the principal parts of his machine. He must be able to set up and adjust all tools and dies. He must understand coke, coal, oil, and gas fires. Must be able to direct the work of helpers. He must be physically strong and able to endure heat.

BLACKSMITH, FOREMAN **BED**

Description: The blacksmith's foreman makes and supervises the making of light and medium-size forgings and does general anvil work on production and repairs. He also does hardening, tempering, and annealing, including the high-speed steels.

Qualifications: The foreman blacksmith must be able to make from drawings or samples any medium-size or light forgings, do bending, drawing, upsetting, and welding of all grades of iron and steel, including tool steel. He must be able to do oil, air, and water tempering. He must be able to work with coal, coke, or gas-forge fires. He should be able to make sketches of ordinary work, order stock, and calculate sizes. He should

be able to run a hand or small power drill press, do rough emery grinding, and have some experience with a small steam hammer. He should understand oxyacetylene, electric, and thermite welding, and have ability to handle men. He should have good physical strength and should have had experience as a general blacksmith.

Schooling: Common school, preferably high school.

BLACKSMITH, GENERAL BEET

Description: The general blacksmith does light and medium-size forging and general anvil work on production and repairs.

Qualifications: The general blacksmith must be able to work from drawings, samples, or templates, and do any medium or light-size forging, including drawing, bending, upsetting, and welding. He should handle all grades of iron and steel, including tool steel. He should be able to do ordinary tempering, using water, oil, or air, and be able to direct the work of helpers. He should have had at least an equivalent of an apprenticeship in a general blacksmithing shop. It is desirable that he understand oxyacetylene and thermite welding.

Schooling: Common school.

BLACKSMITH, GENERAL REPAIR WORK AND HORSESHOEING BEGIN

Description: The duties of the blacksmith and horseshoer are to make new parts and to do repair work for carriages, wagons, and general machinery. He must also be qualified to do resetting and fitting of horseshoes, such as a man might do if employed around a mine, in a construction crew, or as a country blacksmith.

Qualifications: The blacksmith and horseshoer must be able to do bending, drawing, upsetting, welding and forming, and all light carriage and machine repairs; must be able to work with coal and coke fires, or with oil or gas, with hand or power blast; must be familiar with the various grades of iron and steel, including tool steel; should be able to order stock and calculate sizes. He should dress, harden, and temper all ordinary tools. He should be able to dress picks and pinch bars; should be able to make and repair crowbars, tongs, and special tools. He must be able to forge a new horseshoe or to punch and fit one from commercial stock. He should be able to remove a shoe, pare hoofs, sharpen or replace calks, and properly replace the shoe. This work requires good health and strength. He should have had at least an equivalent of an apprenticeship as a general blacksmith and horseshoer.

Schooling: Common school.

BLACKSMITH'S HELPER BEING

Description: The duties of the blacksmith's helper are to use the sledge at the direction of the blacksmith, to look after the forge fire, to cut and arrange stock, and to assist the blacksmith in any and all work assigned. He may be in training for the blacksmith's trade.

Qualifications: The blacksmith's helper should be a strong, healthy young man who has a desire to become a blacksmith. He should have a knowledge of ordinary arithmetic and should learn to read drawings.

Schooling: Preferably high school.

BLACKSMITH'S STRIKER. (*See* Blacksmith's helper.)

BOLT MAKER. (*See* Bolt-making-machine hand.)

BOLT-MAKING-MACHINE HAND **BELLE**

Description: The bolt-making-machine hand runs a machine on which are formed all sizes of bolts and all shapes of boltheads.

Qualifications: The bolt-making-machine hand must know the names, care, and use of the principal parts of the machine. He must be able to set up all the tools and make all necessary adjustments and measurements. He must know how to work on cold or hot iron and how to handle coke, coal, oil, or gas fires. He must be able to direct the work of the helper. He must be physically strong and able to endure heat.

BULLDOZER HAND **BELT**

Description: The bulldozer hand runs a machine, called the "bulldozer," that is equipped with dies for the making of off-sets and bends in the various stock sizes and shapes of iron.

Qualifications: The bulldozer hand should know the names, care, and use of the principal parts of the machine. He should be able to set up all tools connected with the machine; must be able to work hot or cold metal, and must understand the operation of coke, coal, oil, or gas fires. He must be able to direct the work of the helper. He must be physically strong and able to endure heat. He should have had experience equivalent to a complete apprenticeship to a bulldozer hand.

Schooling: Common school.

CHAIN MAKER **CHARM**

Kindred Occupation: General blacksmith.

Description: The chain-maker blacksmith forges either by hand or with steam hammer, and with or without the use of dies, all sizes of chains usually forged in a blacksmith shop.

Qualifications: The chain maker must be able to work from drawings; must be familiar with coke, coal, oil, or gas fires; must be able to direct the work of helpers, and understand the forging of all grades of iron and steel used in the manufacture of chains. He should have had previous experience equivalent to an apprenticeship as a chain maker. He must be physically strong and able to endure heat.

Schooling: Common school.

FIREMAN, LARGE COAL FIRE **FALSE**

Description: The fireman of a large coal fire feeds coal into the furnace and regulates the dampers so as to maintain a uniform temperature.

Qualifications: He must be physically able to shovel coal and stand heat; must understand the distribution and placement of coal on the fire in order to maintain a uniform temperature and not waste fuel.

Schooling: Common school.

FLUE WELDER **FAME**

Description: The flue welder's duties consist of welding and lengthening locomotive and other types of boiler tubes.

Qualifications: The flue welder must be thoroughly experienced in the process of roller or pneumatic hammer welding or reending of boiler tubes or flues. He must thoroughly understand the use of flue welding furnaces and the proper heating of tubes for perfect weld; and understand the danger of burning metal. He should also understand cutting out tubes and be able to prepare tubes for welding. He should have had experience as a flue welder in a locomotive plant, railroad locomotive repair shop, general boiler shop, or industrial shop.

FORGER, DROP AND DIE FORGING FAN

Description: The duties of the drop and die forger are to operate a drop hammer, or steam hammer, to form hot metal by the use of dies.

Qualifications: The drop and die forger must know how to operate and set up dies for all kinds of drop and steam hammers for roughing, finishing, and trimming forgings. He should understand the operation of large coal, coke, gas, and oil furnaces for heating the various kinds of iron and steel; must be able to direct the work of heaters and backhanders. He must have good physical strength and be able to endure heat. He should have an experience equivalent to an apprenticeship under a journeyman die forger.

Schooling: Common school.

FORGER, HEAVY FORGINGS FANCY

Kindred Occupation: Hammersmith.

Description: The heavy forger produces such work as large locomotive parts, ship forgings, and large gun forgings; uses steam or other heavy hammers and usually works on ingots ranging from 4 to 18 inches in diameter, but occasionally may be required to work smaller or larger ingots.

Qualifications: The forger must be able to work from drawings, samples, or templates. He should be able to do bending, drawing, upsetting, welding, and forming, from coal, coke, gas, or oil fires. He must be familiar with the various grades of iron and steel, including tool steel. He should be able to order stock and calculate sizes; should be able to direct the work of firemen, backhanders, strikers, and helpers. He should have good physical strength and be able to endure heat. The forger should have had the equivalent of an apprenticeship in a shop doing heavy forging.

Schooling: Common school, preferably high school.

FORGING-MACHINE HAND

Description: The forging-machine hand is one who runs a machine, such as the Ajax or Acme forging machine, for the making of all kinds of machine forgings.

Qualifications: The forging-machine hand should know the name, care, and use of the principal parts of either an Ajax or an Acme forging machine. He should be able to set up all tools and dies; should be familiar with coke, coal, oil, and gas fires. He should be able to handle all kinds of iron and steel and be able to make all necessary adjustments and measurements. He must be physically strong and able to endure heat.

FORGING-MACHINE HAND: 2 to 4 inch Ajax or Acme machine FAR

FORGING-MACHINE HAND: 4 to 6 inch Ajax or Acme machine FARCE

Note.—If a forging-machine hand, able to run all sizes of machines, is required, combine the two code words.

FRAME BENDER FARE

Description: The frame bender bends structural steel into shapes, working from patterns and templates furnished from the pattern or template maker.

Qualifications: He must be able to lay out forms on the bending floor, know how to clamp and hold material for bending, and must be familiar with press and hammer bending. He must be able to bend flat iron, angle iron, channel iron, tee iron, and I beams, and be able to use coke, coal, oil, or gas fires. He must have good physical strength, be able to stand heat, and be able to direct the work of helpers. He must have had an equivalent to an apprenticeship as a frame bender.

Schooling: Common school, preferably high school.

FURNACE MAN OR HEATER **FARM**

Description: The duties of the furnace man or heater are to operate coal, coke, gas, or oil fires for the heating of ingots or plates for the purpose of shaping or welding

Qualifications: He must know the name, care, and use of the principal parts of a furnace; must know how to control dampers and blasts so as to produce the required temperature; must understand the temperature required for the various forging and shaping operations on the different grades of iron and steel. He should understand relining furnaces. He must have good strength and be able to stand heat. He should have worked as a helper and as an independent furnace man.

FURNACE MAN, SLAB FURNACE **FAST**

Description: The slab furnace man operates the furnace in connection with the work done by the frame bender on the table or floor slab.

Qualifications: He should be able to operate and control the largest size furnaces and be able to regulate dampers so as to obtain the proper heat for all the work of a frame bender. Must be able to reline the furnace, direct the handling of hand and power cranes, and direct the work of furnace helpers. He should have had experience as a furnace helper and considerable experience as an independent furnace man. He should be physically strong and able to endure heat.

Schooling: Common school.

HAMMER RUNNER **HALF**

Description: The duties of the hammer runner are to manipulate the controlling devices on a steam or power hammer under the direction of the smith who handles the ingot. This is usually part of the helper's work.

Qualifications: He must have good physical strength, be able to endure heat, and should have had sufficient experience in manipulating a hammer to be thoroughly familiar with the blacksmith's signals and be able to carry out the smith's directions.

HAMMERSMITH **HALL**

Description: The hammersmith, with either light steam or trip hammer, forges machine parts similar to light locomotive work, ship parts, and small gun forgings, usually from ingots up to 8 inches. He may be required to forge from ingots of a larger diameter.

Qualifications: The hammersmith must be able to work from drawings, samples, or templates. He should be able to do bending, drawing, upsetting, welding, and forming, from a coal, coke, gas, or oil fire. He must be familiar with the various grades of iron and steel, including tool steel. Should be able to order stock and calculate sizes; should be able to direct the work of firemen, backhanders, strikers, and helpers. He should have good physical strength and be able to endure heat. He should have had the equivalent of an apprenticeship to a hammersmith.

Schooling: Common school, preferably high school.

HAMMERSMITH, HEAVY FIRES. (*See* **Forger, heavy forgings.**)

HORSESHOER, EXPERT **HARSH**

Description: The duties of the expert horseshoer are to do all work necessary to set shoes and to care for horses' feet.

Qualifications: The expert horseshoer should be able to forge, shape, and punch horseshoes and mule shoes from bar stock or from standard stock of shoes; should understand the physiology of the horse's foot so as to know how to correct for interference and for lameness; should be able to

pare hoofs and clean feet so as to keep them in a healthy condition. He should have physical strength sufficient to handle heavy horses and mules. He should have had an equivalent to an apprenticeship under a general horseshoer and considerable experience as a journeyman.

Schooling: Common school; preferably some work in a veterinary school.

INGOT PASSER. (*See* Blacksmith's helper.)

LABORER, BLACKSMITH SHOP LASH

The following occupations are included under Laborers: Ash man; , Clean-up man; Coal and coke shoveler; Furnace cleaner; Trucker.

NOTE.—Laborers specified and assigned under the code word for Laborer, blacksmith shop, may be assigned to any one or more of the above-mentioned jobs.

Qualifications: He should have good strength and health and ability to stand heat.

MACHINE TOOL DRESSER MANLY

Kindred Occupation: General tool dresser.

Description: The duties of the machine tool dresser are to forge, harden, and temper all kinds of carbon and high-speed lathe, shaper, and planer tools and make forgings for tool blanks.

Qualifications: He must be able to work from drawings or samples and forge, from the various kinds of carbon and high-speed tool steel, all kinds and shapes of tool-post tools required for lathe, planer, and shaper; must be able to make chisels and punches and various kinds of cutter blanks and special tool blanks. He must have a thorough knowledge of heating and tempering furnaces. He must understand annealing, oil and water tempering, understand the use of cyanide and other special hardening materials, and be familiar with the salt bath lead bath, and cyanide bath heat treating. He should have experience equivalent to an apprenticeship as a tool dresser.

Schooling: Common school; preferably should have some general knowledge of the physical properties of steel.

SHEAR HAND (Boiler shop, blacksmith shop, or plate shed) SIREN

Description: The duties of the shear hand are to run shears in the blacksmith shop, boiler shop, or plate shed for the cutting of all kinds of stock used in the respective departments.

Qualifications: He should know the name, care, and use of the principal parts of the machine; should be able to set the machine and check up measurements in drawings and specifications. He must be able to order stock and know how to cut stock for various purposes. He should have had experience as a helper and should have had considerable experience as a shear hand.

Schooling: Common school.

SPRING MAKER SEAR

Description: The spring maker's duties consist of forging, forming, and making railway locomotive, car, or automobile truck springs.

Qualifications: The spring maker must be thoroughly familiar with the machinery and up-to-date processes involved in general spring forging and the manufacture of leaf, coil, and all types of light or heavy springs. He must be capable of properly working alloy and spring steels; must be a competent hand or power hammer operator, able to work to draw-

lngs and samples, and to figure stock. He must understand annealing, proper heating, treating, and hardening, and should be able to fit and assemble leaf springs. He must be able to use spring forming, bending, and testing machines. He should have had an equivalent to an apprenticeship under a journeyman spring maker.

Schooling: Common school.

TOOL DRESSER (Quarry, mine, or well-drilling crew) TAX

Description: The duties of the tool dresser are to form, sharpen, harden, and temper all sorts of tool bits and contractor's tools.

Qualifications: The tool dresser in a quarry or mine or well drilling crew must be able to put on shanks, collars, and extensions on all shapes and sizes of well-drilling tools and rock drills. He must be able to make and repair calking tools, chisels, tongs, bending tools, flue tools, and rock drills; must be able to dress picks, bars, and other hand tools; should do general blacksmithing work and be able to do air, water, and oil tempering and to do annealing. He should be able to work from coal or coke fires, using hand or power blast, and to get the proper heat under unfavorable conditions. He must direct the work of strikers and helpers and have good physical strength and endurance. He should have completed at least an equivalent of an apprenticeship in a similar kind of work.

Schooling: Common school, preferably high school.

ACETYLENE GAS COMPRESSOR AND WELDING SHOP FOREMAN **ACID**

Description: The duties of the acetylene gas compressor and welding-shop foreman are to operate and supervise the operation of an acetylene gas compressor in a bottling or storage plant and supervise the making ready and welding of all kinds of repair or construction work.

Qualifications: He must be particularly experienced in the use and care of steam or motor driven gas compressors on high or low pressure. He must understand storage tanks and bottle charging and must be a thoroughly practical compressor engineman, able to make valve adjustments and operating repairs, be familiar with high-pressure piping, valves, and fittings and the handling of liquefied or inflammable gases in generators, tanks or bottles; must thoroughly understand the use of acetone in the making of gas mixtures. He should have had considerable experience as a gas welder and gas compressor tender; and should also have had independent charge of a gas and welding plant.

Schooling: Common school; preferably high school and technical training.

ACETYLENE GAS COMPRESSOR OPERATOR **ACME**

Description: The duty of the acetylene gas compressor operator is to manipulate the machinery connected with the compression of acetylene gases.

Qualifications: He must be experienced in the use and care of steam or other motor-driven compressors for high pressure gas compression. He must be a thoroughly practical compressor engineman, able to make valve adjustments and operating repairs. He must have had experience as an assistant in an acetylene compressor plant.

Schooling: Common school.

ACETYLENE GENERATOR TENDER **ACORN**

Description: The duty of the acetylene generator tender is the operation of a complete acetylene generating and gas storage plant.

Qualifications: He must be experienced in the care and use of such equipments and fully understand details of construction and operation of generators, purifiers, and driers, and the handling and use of carbide. He should be familiar with gas holders and piping. He should have had like experience in a commercial generating plant as a helper and considerable experience as an independent tender.

Schooling: Common school.

CHIPPER, WELDING SHOP OR FOUNDRY **CHORE**

Description: The duties of the chipper are to use either hand or pneumatic chisels in chipping away surplus metal.

Qualifications: The chipper should be skilled in the use of hand cold chisels and hammer, and in the use of pneumatic chipping machinery. He should be able to handle light or heavy work and to chip to a comparatively smooth surface.

ELECTRIC ARC WELDER HAND **EBB**

Description: The duties of the electric arc welding hand are the operation of electric-arc-welding equipment in welding general plate, tank, or framework for "building up" and repairs and the clamping and lining up of such work to prepare it for welding.

Qualifications: He must be experienced in all details of arc welding, using either graphite or metal electrodes. He should fully understand the use

and care of the apparatus and be able to set up and connect to service mains. He should understand cleaning, making ready, and clamping to insure correct form and solid work. He should have had experience as an assistant to an electric arc welder and have done considerable independent work.

Schooling: Common school.

ELECTRIC ARC WELDER OPERATOR ERUPT

Description: The electric arc welder runs an arc-welding equipment for the welding of plate, tank, and frames.

Qualifications: He must be experienced in the care and use of electric-arc-welding equipment for general plate, tank, and frame work after the parts have been lined up and clamped into position by another workman. He should have had experience as an assistant and considerable experience as an independent operator.

ELECTRIC SPOT WELDER HAND EBONY

Description: The duty of the electric spot welder hand is the operation of any standard make or size of electric spot welding machine, on any class of sheet metal or plate work.

Qualifications: He must be experienced in the use and care of electric spot welders and should have sufficient knowledge of electric wiring and welder construction to keep the equipment in good working order. He should be able to form, set, and adjust contacts, brackets, and supports for any variety of work and fully understand rapid and correct method of handling to insure positive welding of simple or intricate pieces. He should have had spot-welding experience in a metal furniture or large sheet-metal-products plant.

Schooling: Common school.

ELECTRIC SPOT WELDER OPERATOR ECHO

Description: The duty of the electric spot welder operator is to operate any standard make or size of electric spot welder on any class of metal or plate work after the work has been lined up and clamped ready for welding.

Qualifications: He must be experienced in the use and care of the electric spot welders sufficiently well to know how to complete properly a weld after the set-up of material has been made. He should have had experience as an assistant to a journeyman or expert welder.

Schooling: Common school.

GAS WELDER, FOREMAN, REPAIR WORK GAUNT

Description: The duties of the gas welder foreman, repair work, are the supervision and operation of any form of autogenous, oxyhydrogen or oxyacetylene gas burner for torch welding or cutting on any class of work and any metal.

Qualifications: He must be thoroughly experienced with the general apparatus and in the processes employed in the planning and handling of all forms of gas welding for manufacturing, shop, or emergency repair work. He must be skilled in the use of welding and cutting torches and able to weld, patch, or build up mild steel, cast-iron, bronze, and cast aluminum, in sheets, tubes, or fairly large sections. He should understand automobile chassis, frame, and tank welding and cylinder repairing, and be able to plait seams or joints. He must thoroughly understand preheat-

ing, blocking up, holding and clamping to maintain location, and alignment. He must have a practical knowledge of any kind of cutting work, such as sprues and spacers, or scrap stock or iron and steel foundry work. He should have had experience as an assistant to a gas welder on repair work for from one to two years.

Schooling: Common school.

GAS WELDER HAND, REPAIR WORK GAUZE

Description: The duties of the gas welder hand on repair work are to operate any form of autogenous, oxyhydrogen, or oxyacetylene gas burner for torch welding.

Qualifications: He must be experienced in the care and use of gas torches and in the planning and handling of all forms of gas welding for emergency shop repairs. He must be able to build up parts and to weld mild steel, cast iron, bronze, and cast aluminum in sheets or in tubes. He must understand reheating and annealing; must be able to patch, clamp, and maintain the alignment of parts. He should have had experience as an assistant to a gas welder on repair work.

Schooling: Common school.

GRINDER, ROUGH EMERY, WELDING SHOP AND FOUNDRY GAY

Description: The duties of the rough emery grinder in welding shop and foundry are to grind off all surplus metal left from chipping and welding, to grind off sprue lugs, and to grind rough places on castings.

Qualifications: The rough emery grinder must be able to dress and true emery wheels and keep the grinding stand in running order. He should have good health and strength.

OXYACETYLENE-BURNER HAND, CONSTRUCTION AND WRECKING

Description: The duty of the oxyacetylene burner or cutter is the operation of autogenous gas-cutting torches for any class of manufacturing, demolition or wreck-clearing work.

Qualifications: He must be thoroughly skilled in the use of oxyhydrogen or oxyacetylene cutters, gas torches of shop or portable type, and fully understand setting up. He must be expert in the use of all classes of manufacturing work, such as cutting holes, gusset plates, and shapes, such as channels and beams. He must also be capable of burning and cutting apart in clearing wreckage of buildings, bridges, railways, or heavy general machinery. He should have had experience as an assistant in a construction and wrecking crew with an acetylene operator.

Schooling: Common school.

OXYACETYLENE BURNER, BENCH OR GROUND WORK OGRE

OXYACETYLENE BURNER, SCAFFOLD WORK OATH

Note.—If work requires both ground and scaffold work, combine the code words.

SOLDERER AND BRAZER, GAS AND ACETYLENE TORCH SEAT

Description: The duties of the gas and acetylene torch brazer and solderer are to solder or braze machine parts for regular machine assembly work.

Qualifications: He must understand the manipulation of gas and acetylene torches, cleaning, assembling, and clamping work for soldering and brazing; the use of solder and smelter and solder and smelter flux. Should be sufficiently skilled in soldering and brazing to know when parts are thoroughly united and to leave a good clean joint.

Schooling: Common school.

THERMITE WELDER — TAXES

Description: The duties of the expert thermite welder are the repair of large broken metal parts of any character and size by means of the thermite process of steel welding.

Qualifications: He must be experienced in the planning and making of thermite welds on intricate or large and difficult pieces or small parts. He must be able to clean, set up, fit and line, and construct molds of proper shape and size to produce safe welds with minimum material. He must understand when preheating is required and the degree necessary to avoid chilling the cast, and must understand the use of gas, oil, or gasoline torches for this purpose. He should have a knowledge of hand, electric, or pneumatic chipping, drilling, and grinding and ability to clean large pieces before or after welding. He should have equivalent to an apprenticeship experience as an assistant to a thermite welder.

Schooling: Common school.

HARDENING, TEMPERING, AND HEAT-TREATING

CASEHARDENER — CHART

Description: The casehardener carbonizes or casehardens machine parts requiring hardened surfaces.

Qualifications: The casehardener must be familiar with and able to maintain the casehardening furnace and must thoroughly understand the use of carbonizing material. He should also be familiar with the temperature required to get the best results in casehardening and know the time required to harden to the proper depth. He must know the kind of baths to use to quench the heated part in order to get the best results for the different kinds of steel and for different kinds of work for which the part is to be used. He should have had experience as a helper and must have done some independent work as a casehardener.

Schooling: Common school; preferably some knowledge of the physical properties of steel.

FURNACE MAN, ANNEALER, AND HEAT TREATER, FOREMAN — FAT

Description: The foreman furnace man for annealing and heat-treating furnaces supervises the operation and care of the various types of heat-treating furnaces for the heat treatment of castings, forgings, tool steels, or sheet metals for draw-press work.

Qualifications: The furnace foreman must be a thoroughly experienced annealing or heat-treating furnace man, entirely familiar with the operation and upkeep of such furnaces using coal, coke, gas, or oil fuel. He must understand the use of pyrometer apparatus and be able to maintain uniform temperatures required for different classes of materials and work and should have some knowledge of the physical and chemical properties of metals. He must know the methods of proper heating and time for annealing of small or large steel castings and forgings. He must be skilled in annealing in boxes or open, and in heat-treatment hardening and drawing of carbon and alloy die and tool steels. He must thoroughly understand the processes and proper annealing of sheet metals, such as brass, steel, and copper in the flat or between drawing operations. He should be able to keep intelligent and accurate records of temperatures, times, and other necessary data, and should be able to test out various treatments of materials to insure best results. He should preferably have some knowledge of making malleable iron.

Schooling: High school, preferably technical training.

HARDENER

Description: The duties of the hardener are to harden and temper the various tools and machine parts that require hardening in the making of machinery of all kinds. Hardeners are usually described in relation to the type of furnace used or the type of material to be hardened and tempered.

Qualifications: All hardeners must have had experience as helpers and must have done at least some independent hardening.

Schooling: Common school.

HARDENER, CARBON STEEL, GAS OR OIL FURNACE HALO

The hardener of carbon steel on gas or oil furnaces must know how to regulate and maintain the proper temperature for hardening the different kinds of work to be done. He should know the use of air, water, and oil as a quenching medium and must be able to judge the kind of quenching material to use for any grade of steel. He must have good health and an accurate knowledge of judging the required heat.

HARDENER, COAL AND COKE FIRE HALT

The hardener on coal or coke fire must understand how to regulate the furnace and judge accurately the proper heat for hardening the various types of steel, including high-speed steel. He must understand the use of air, water, and oil baths for quenching. He must be able to endure the high heat of the furnace room. He must have good health.

HARDENER, HIGH-SPEED STEEL, GAS OR OIL FURNACE HALVE

The hardener of high-speed steel on gas or oil furnaces must know how to control the heat in a gas or oil furnace so as to maintain the proper temperature. He must thoroughly understand the use of air, water, and oil baths for quenching the various kinds of high-speed steel. He should have good health and ability to stand the high temperature of a hardening room.

HARDENER, LEAD AND CYANIDE POT HAM

The lead or cyanide pot hardener must be experienced in the use of lead and cyanide pots for hardening the various machine parts and tools that can be hardened by these methods. He must understand the use of air, water, and oil quenching materials and be thoroughly familiar with the required heat for any sized stock. He must have good health and ability to stand heat.

BOILER SHOP AND PLATE SHOP OR SHIP SHED GROUP

[For explanation of "hand" as used herein see prefatory statement and directions for using descriptions and code words, pages 2 and 3.]

BENDING ROLL HAND — **BIRD**

Description: The duties of the bending roll hand are to bend flat plates on both square and diagonal work to layout furnished.

Qualifications: The bending roll hand must know the names, care, and use of the principal parts of the machine. He must be able to handle all sizes and thicknesses of boiler plate and ship plate. He must be able to adjust the rolls to bend the plate to any given layout and must be able to direct the work of helpers. He should have had similar experience in a general boiler shop, railroad shop, or ship shed.

BOILER LAYOUT MAN — **BISON**

Description: The duties of the boiler layout man are to indicate by lines and marks the exact positions of the holes, shaping, and bending of the various parts of the boiler.

Qualifications: The boiler layout man should be able to calculate and lay out from drawings all details of boiler construction. He must be able to lay out accurately templates for shell plates, heads, crown sheets, angles, braces, tubes, manholes, domes, and headers. He should have some knowledge of the boiler maker's hand tools and the regular punching, shearing, bending, and drilling machinery, so that he can lay out work in conformity to the shop requirements. He should have a thorough knowledge of sheet-metal drawing and pattern layout, should have a knowledge of applied mathematics, including trigonometry and the use of formulas. He should have been an assistant to a layout man.

Schooling: Common school, preferably high school.

BOILER MAKER — **BITE**

Kindred Occupation: Tank builder.

Description: The boiler maker's work consists of general new boiler construction and overhauling, patching, hot and cold retubing, and general repair and maintenance of boilers, both fire and water tube.

Qualifications: The boiler maker must be capable of working from blue prints, laying off plates and template forms, bending plates, punching, shearing, riveting, chipping, calking, and tube setting, and placing staging. He must have a practical knowledge of all phases of boiler construction and the use of boiler-shop machinery and tools. Must be capable of straightening buckled plates, patching, retubing, making general boiler repairs, and it is desirable that he possess a working knowledge of oxyacetylene welding and cutting.

Schooling: Common school.

BOILER MAKER FOREMAN, OR SHOP SUPERINTENDENT BLACK

Kindred Occupations: Boiler maker; Foreman, boiler maker; General boiler maker.

Description: The expert boiler maker foreman or shop superintendent lays out and supervises construction, erection, rebuilding, or extensive general repairs to various forms of water-tube, fire-tube, and locomotive fire-box boilers for stationary, portable, or marine service.

Qualifications: The expert boiler maker must be thoroughly experienced in all practical phases of standard boiler construction, and familiar with standard American Society of Mechanical Engineers' boiler code, able to work to drawings and sketches, and make necessary calculations for general and detail layout. Must also be able to lay out accurately templates for shell plates, heads, crown sheets, angles, braces, tubes, manholes, domes, and headers, and understand boiler assembly. Must thoroughly understand the processes of shearing, heating, straightening, bending, flanging, scarfing, punching, drilling, reaming, chipping, calking, and riveting with either hand or pneumatic tools and "squeezer." Must be skilled in tube fitting, setting and bending, rewelding, and replacement on all classes of boilers. Must be practically familiar with shears, single and gang punches, bending rolls, flanging presses, boiler-shop furnaces, and general boiler maker's equipment and tools, including pneumatic drills and hammer, electric drills, and autogenous welding apparatus. Must be able to test new or operating boilers, make quick surveys for repairs, and be thoroughly familiar with straightening buckled plates, and be able to make any sort of boiler repairs.

Schooling: Common school; should have had a high-school course, or should have studied independently mechanical drawing, sheet-metal pattern layout, and applied mathematics, including trigonometry and the use of formulas.

BOILER MAKER, LOCOMOTIVE BLADE

Kindred Occupation: General boiler maker.

Description: The locomotive boiler maker's work consists of the assembling, erecting, and rebuilding and of extensive general repairs to locomotive boilers of various types.

Qualifications: The locomotive boiler maker must be a thoroughly skilled, all-round boiler maker, experienced in all phases of fire-tube boiler construction and repair, and especially familiar with high-pressure locomotive boilers. He must be capable of working to drawings on assembly and erection of new locomotives, received "knocked down" or on any kind of repair of worn or damaged engines returned for overhauling. Must thoroughly understand removing and replacing plates, fire boxes, tubes, stays, stud bolts, front end, and ash pans. Must be a thorough patcher, hand, pneumatic, and electric riveter, chipper, and calker, and be familiar with the use of taps, dies, and flue beaders. Must understand heating of plates, bending, forming, and flanging, and standard boiler machine-shop tools, such as shears, bending rolls, punches, flanging passes, and stay-bolt shears. He should have an equivalent of an apprenticeship and considerable experience as a journeyman.

Schooling: Common school.

BOILER MAKER'S HELPER **BLANK**

Description: The duty of the boiler maker's helper is to assist the boiler maker in cutting out bolts, riveting by hand, and holding the club or "dolly" for the riveters. He is usually in training to become a boiler maker.

Qualifications: The boiler maker's helper should be a young man physically fit, with the desire to become a boiler maker.

Schooling: Common school; should either understand mechanical drawing and applied mathematics or be willing to pursue an independent course along these lines.

DRILLER AND COUNTERSINKER, OR DRILL-PRESS HAND IN SHIP SHED OR BOILER SHOP **DANDY**

Description: The duties of the driller and countersinker are to drill, ream, and countersink holes in plates, bars angle iron, and channel iron.

Qualifications: The driller and countersinker in a boiler-plate shop or ship shed must be able to handle and drill accurately to layout all sizes of boiler plate and ship plate. He must know how to make all set-ups and adjustments of the drill parts and must direct the work of helpers; should have a knowledge of speeds, feeds, and drill sizes. He should be able to grind drills and should have had similar experience in a railroad shop, ship shed, or general boiler shop.

FLANGE TURNER **FEAR**

Description: The duties of the flange turner are to flange plates, hot or cold, either by hand or by power press to lines laid out on plates.

Qualifications: The flange turner must use skillfully all hand and machine flange-turning tools and must make all machine adjustments. He must be able to straighten plate after flange is turned. He must direct the work of helpers. He should have had a similar experience in a boiler shop or in a ship shed.

FLUE SETTER, LOCOMOTIVE **FEAST**

Description: The locomotive-flue setter's work consists of making locomotive or other types of boiler-tube setting, cutting, and replacing.

Qualifications: The locomotive-flue setter must be thoroughly experienced in all phases of boiler-tube work, especially locomotive types for steam pressures up to 250 pounds pressure. Must be expert in boiler construction, placing, rolling, beading, and in tightening leaky tubes, cutting out defective tubes, and replacing. Must be skilled in the use of flue rollers, spring expanders, tube-cutting tools, and pneumatic hammers, and in chipping and calking. Should have had like experience in locomotive plant, railroad repair shop, or boiler shop.

Schooling: Common school.

FLUE WELDER **FAME**

Description: The flue welder's duties consist of welding and lengthening locomotive and other types of boiler tubes.

Qualifications: The flue welder must be thoroughly experienced in the process of roller or pneumatic hammer welding or reending of boiler tubes or flues. Must thoroughly understand the use of flue-welding furnaces and the proper heating of tubes for perfect weld; and understand the danger of burning metal. Should also understand cutting out tubes and be able to prepare tubes for welding. He should have had experience as a flue welder in a locomotive plant, railroad locomotive repair shop, general boiler shop, or industrial shop.

HOLDER ON AND BUCKER UP **HANDY**

Kindred Occupations: Riveter; Rivet heater; Structural erector's helper.

Description: The duties of the holder on and bucker up are holding the "dolly bar," or holding on hammer, and as riveter's helper on any class of hand or pneumatic riveting.

Qualifications: He must be experienced in the use of the "dolly bar," as "holder on" or "bucker up," and have sufficient knowledge of pneumatic and hand riveting to work with the riveter. He must be familiar with the proper handling and placing of rivets. It is desirable that he understand rivet heating. He should have had experience in structural, plate, tank, or boiler shop, or in field work on tank, bridge, or steel structures.

HYDRAULIC OR PNEUMATIC PRESS HAND **HANG**

Description: The duties of the press hand are to operate a hydraulic or pneumatic-operated press, to press or bend a plate to form indicated by the layout furnished.

Qualifications: The hydraulic or pneumatic press hand should know the names, care, and use of the principal parts of the tools; be able to set and adjust punches, and make all machine adjustments necessary for doing accurate punching according to the layout furnished. He should have worked as a helper and have done considerable independent punching on large plate work.

MANGLE ROLLER OR MANGLE-ROLL HAND **MARE**

Description: The duties of the mangle-roll hand are to straighten cold plates in rolls called the mangle rolls.

Qualifications: The mangle-roll hand must know the names, care, and use of the principal parts of his machine. He must be able to adjust the rolls so as to straighten all sizes and thicknesses of boiler plate and ship plate. He must be able to direct the work of helpers and should have had similar experience in a general boiler shop, locomotive shop, or in a ship shed.

OFFSETTING MACHINE HAND **OBEY**

Description: The duties of the offsetting machine hand are to run an offsetting or joggling press to bend plates, angle irons, tee irons, channel irons, and bars, and to make them overlap in the making up of joints and structural shapes.

Qualifications: The offsetting machine hand must know the names, care, and use of the principal parts of an offsetting machine; must be able to make all machine adjustments and all measurements necessary to offset plates, angle irons, channel irons, and bars. He must be able to direct the work of helpers and should have had a similar experience in a general boiler shop, railroad shop, or ship shed.

PLANER AND SCARFER, OR PLANER HAND IN BOILER SHOP **PEARL**

Description: The duties of the planer or scarfer are to plane off the edges of plates according to layouts furnished.

Qualifications: He must know the names, care, and use of the principal parts of his machine and be able to make all necessary machine adjustments. He must be able to handle large heavy plates and to direct the work of helpers.

PUNCHER, OR PUNCH PRESS HAND **PEASE**

Description: The duties of the puncher are to punch plates, channels, bars, angles, etc., to layout furnished by layout man.

Qualifications: He must be able to operate single and multiple punch presses working on large plates, channels, angles, etc., to set punches and dies and keep them in condition. He must be able to direct the work of helpers.

Schooling: Common school.

RIVETER, HAND **RAP**

Kindred Occupations: Blacksmith; Boiler maker; Riveter; Steel car framer; Tank builder.

Description: The duties of the hand riveter consist of hand riveting, calking, and chipping on any class of plate, tank, or structural work.

Qualifications: The hand riveter must have had thorough practical experience in the use of hand tools for riveting, chipping, and calking, in construction and repair work of all kinds on boilers, plates, tanks, structural steel frames, automobile frames and chassis. He must be thoroughly familiar with the use of drifts, reamers, hand reamers, holders on, and understand proper heating, riveting, and setting on any class of rivet work.

RIVETER, PNEUMATIC **RAPID**

Description: The pneumatic riveter on boiler plate, ship plate, and on structural steel must be able to do all classes of riveting on steel plates over one-fourth inch thick.

Qualifications: The pneumatic riveter must be able to operate skillfully all sizes and kinds of pneumatic hammers used in riveting. He should understand the proper drawing of rivets and the setting of joints to make them water tight and steam tight. He must direct the work of rivet heaters, holders on, and rivet passers.

RIVET HEATER **RARE**

Kindred Occupations: Blacksmith's helper; Riveter's helper.

Description: The duties of the rivet heater are rivet heating in connection with structural-steel work, boiler making, automobile truck frames, and railroad locomotive or car shops; or in shipbuilding.

Qualifications: He must be capable of operating all kinds of rivet-heating forges under all conditions and in difficult localities, and be able to maintain the forge at proper heat and deliver properly heated rivets to the riveter. He must be skilled in the rapid handling of rivets and in tossing or delivering them to the proper point. He should have had similar experience with erecting, manufacturing, or railroad construction work, or in a shipyard.

SAWYER, METAL SHOP **SERGE**

Description: The duties of the sawyer in the metal shop are to cut off with a toothless disk saw material such as beams, angle irons, channel irons, and eyebeams.

Qualifications: The sawyer must know the names, care, and use of the principal parts of the machine. He must be able to make all machine adjustments, regulate speeds and feeds, and cut off stock to correct dimensions furnished either on drawings or by a layout man. He must be able to direct the work of helpers and should have had a similar experience in a ship shed, locomotive shop, or on structural iron.

SHEAR HAND (Boiler shop, blacksmith shop, or plate shed) **SIREN**

Description: The duties of the shear hand are to run shears in the blacksmith shop, boiler shop, or plate shed for the cutting of all kinds of stock used in the respective departments.

Qualifications: He should know the name, care, and use of the principal parts of the machine, should be able to set the machine and check up measurements in drawings and specifications. He must be able to order stock and know how to cut stock for various purposes. He should have had experience as a helper and should have had considerable experience as a shear hand.

Schooling: Common school.

DRAFTSMAN, MECHANICAL, GROUP

For the purpose of this classification a mechanical draftsman will be considered in a group as follows:

Detailer.
Machine Designer.
Mechanical Draftsman.
Tool Designer.
Tracer.

DETAILER **DARBY**

Description: The duties of the detailer are to draw in detail from the general drawing the parts of any given machine.

Qualifications: He must be skillful in the use of the tee square, triangle, full set of drawing instruments, and the protractor. He must understand the relation of the mechanical drawing views; must be familiar with common stocks of material, such as bolts, nuts, and washers, and familiar with the standard sizes of drills, taps, and dies, and with the general principles of dimension drawings. He should know the common shop terms, such as drill, ream, tap, bore, grind, taper, face, and finish. He should be over 16 years of age. He should have good health and exceptionally good eyesight. He should have had experience as a tracer.

Schooling: Two years in high school, preferably trade school or technical high school.

MACHINE DESIGNER **MAST**

Description: The duty of the machine designer is to design new machines and machine attachments.

Note.—In specifying a designer under this code, if special experience is required, it will be necessary to specify with the code word the particular type of machine or machine part to be designed. For example: Adding machine, automobile transmission, automobile steering gear.

Qualifications: The designer should be an experienced mechanical draftsman (see Mechanical draftsman); should understand advanced projecting, trigonometry, mechanics, strength of material, and the theory of design. He should be familiar with a standard text and reference book. He should have good health and exceptionally good eyesight.

He should have had machine-shop experience and all-round factory experience, and must have a complete understanding of the working of the type of machine or machine part to be designed.

Schooling: Not less than high school; he should preferably be an engineering graduate.

Note.—In many cases the designer has grown up with the business and has obtained an equivalent to the schooling called for above without having attended any of the specified schools.

MECHANICAL DRAFTSMAN MAT

Description: The duties of the mechanical draftsman are to make drawings of machines from sketches or from data furnished by the designer.

Qualifications: He must use skillfully the tee square, triangle, full set of drawing instruments, and protractor, and must understand the relation of the views of mechanical drawings and must be able to make layouts and developments, such as are used in sheet metal work. He must be familiar with the common stocks of material, such as bolts, nuts, washers, and common sizes of stock iron and steel rods and bars, and familiar with the standard types and sizes of drill taps, dies, reamers, and gear cutters. He must understand mathematics and mechanics so that he can make all calculations, layouts, and developments, and know something of the principles of the strength of materials. He should be familiar with the use of reference books, such as hand books and catalogues. He should know the shop terms, such as drill, ream, tap, bore, grind, taper, face, and finish. He should know foundry and pattern room notations and be familiar with all drawing conventions. He should be 18 years of age or over; should have good health and exceptionally good eyesight.

He should have had experience as a tracer and detailer, and preferably one to two years' machine-shop experience.

Schooling: Not less than two years in high school or the equivalent, preferably trade school or technical high school.

TOOL DESIGNER TENOR

Description: The duties of the tool designer are to design special tools, jigs, and fixtures, such as screws, machine fixtures, turret lathe fixtures, milling machine tools, boring bars, and stamping, forming, and drawing dies.

Qualifications: He must be a skilled draftsman (see Mechanical draftsman) and should have had experience as a machinist working on the types of machines for which he is to design tools. He should have good health and exceptionally good eyesight.

Schooling: High-school graduate, preferably technical high school or college.

NOTE.—In many cases tool designers have worked themselves up through the shop and drafting room and have acquired the equivalent of the specified schooling without having attended the school.

TRACER TENSE

Description: The duties of the tracer are to copy drawings by tracing them with ink on transparent cloth or paper.

Qualifications: He should be able to use skillfully the tee square, triangle, ruling pen, bow pen, and compass pen. He should understand the relation of mechanical drawing views and be familiar with the conventions and symbols for such things as screw threads and bolt heads. He should do accurate and rapid free-hand lettering; should be able to file blue prints; have a good knowledge of common and decimal fractions. He should know the common shop terms, such as drill, ream, tap, bore, grind, taper, finish, and face. May be a man or woman. He must have good health and particularly good eyesight.

Schooling: Common school, preferably high school.

CHIPPER, WELDING SHOP OR FOUNDRY **CHORE**

Description: The duties of the chipper are to use either hand or pneumatic chisels in chipping away surplus metal.

Qualifications: The chipper should be skilled in the use of hand cold chisels and hammer, and in the use of pneumatic chipping machinery. He should be able to handle light or heavy work and to chip to a comparatively smooth surface.

CORE MAKER, GENERAL **CHUB**

Kindred Occupations: Core maker's helper; Molder.

Description: The core maker does core making of any kind and for any class of casting for which a core box is furnished.

Qualifications: The core maker must be practically experienced in general iron, brass, or steel foundry core making, with a thorough knowledge of materials, methods, and tools of the trade, and ability to make up small or large cores of green or dry sand, either molded or built up, both simple and intricate. Should know how to mix and make core stock and be familiar with coke or gas ovens for core baking. He should have had thorough experience in a large general iron or steel foundry or in a foundry of a large manufacturing plant.

CUPOLA TENDER **CHUCK**

Kindred Occupations: Foundry foreman; Iron foundry melter.

Description: The cupola tender attends to the operation and maintenance of cupolas in an iron foundry.

Qualifications: The cupola tender must be thoroughly experienced and practical, familiar with different grades of material used, and have a knowledge of proper beds for cupolas. He must be familiar with the proportion of fuel, iron, and flux producing different quantities and different grades of iron. He should be familiar with the lining up of cupolas and making minor repairs; must be able to determine the proper heat of weld for all grades of iron mixtures; and must be able to tap off and run in ladles. He must be competent to take entire charge of the operation of a cupola for an iron foundry. He should have had like experience in a general iron foundry or as cupola tender for a foundry or manufacturing plant.

FOUNDRY HELPER AND LABORER **FLASK**

As follows, Casting cleaner; Coke and coal heaver; Ladler; Pig breaker; Rattler; Rough grinder; Sand shoveler.

Description: Foundry helpers and laborers do the general cleaning up and help in pouring, cupola tending, and handling of stocks.

Qualifications: He should have good physical strength and ability to stand heat.

FOUNDRY MAN, FOREMAN **FEED**

Kindred Occupations: Foundry man; Steel foundry man.

Description: The foundry foreman has general supervision and operating charge of an iron or steel foundry.

Qualifications: The foundry foreman must be thoroughly experienced in all details of general foundry work and have had charge of a modern iron or steel foundry. He must be practically experienced in green and dry sand and loam molding and be familiar with all up-to-date foundry and cupola practice, with some knowledge of pattern making. He must possess good judgment in laying out work in a foundry according to drawings, the proper selection of materials, melting and mixing, direction, setting up and handling of large flasks on the floor, and the use of overhead cranes. He must fully understand proper treatment and care of furnaces and cupola lining and relining. He should have a thorough knowledge of core work and building up large or intricate molds, and understand use of sand blast, tumbling, and pickling. He should have had experience as foreman in a foundry of an industrial plant or in charge of a steel or iron foundry.

GRINDER, ROUGH EMERY, WELDING SHOP AND FOUNDRY GAY

Description: The duties of the rough emery grinder in welding shop and foundry are to grind off all surplus metal left from chipping and welding, to grind off sprew lugs, and to grind rough places on castings.

Qualifications: The rough emery grinder must be able to dress and true emery wheels and keep the grinding stand in running order. He should have good health and strength.

MELTER, BRASS, FOREMAN MARK

Kindred Occupations: Brass-furnace tender; Melter.

Description: The brass melter supervises the operation and maintenance of melting furnaces in a brass foundry.

Qualifications: The brass melter must be thoroughly skilled in handling common muffle, crucible, and open-hearth furnaces, stationary or tilting, and in melting special bronzes and common brass alloys, using coal, coke, gas, or oil fuel. He must possess a knowledge of various brass mixtures, such as manganese bronze, bearing metals, government bronze, general brass, and bronze castings, as well as antimony, zinc, and lead metals. He must be capable of producing definite alloys from specified proportions and of judging of compositions of various brass metals. He should have had experience as brass foundry furnace operator in an industrial concern.

MELTER, OPEN-HEARTH MARRY

Kindred Occupations: Foreman; Foundryman; Heater; Steel converter man; Steel mill melter.

Description: The open hearth melter attends to the operation and maintenance of open-hearth furnaces in a steel foundry.

Qualifications: The open-hearth melter must be thoroughly experienced in operating regenerative open-hearth furnaces for melting steel in the manufacture of steel castings, using oil or producer gas fuel. He must have a working knowledge of different mixtures of iron and scrap and of making the final addition to the metal; capable of determining when the metal is properly melted and ready to pour so that it will make satisfactory steel castings of predetermined composition. He should be capable of making minor repairs to the open-hearth furnace, keeping it in good condition, and should be familiar with the operation of oil burners and main gas and air valves. He should have had similar experience in a steel foundry making high-grade general castings or in a steel mill.

MOLDER, IRON AND BRASS (Bench and small floor castings) **MARSH**

Kindred Occupations: Foundry worker; Molder's helper; Steel foundry molder.

Description: The bench iron and brass molder does foundry work on molds for iron or brass castings on all sizes and shapes of castings.

Qualifications: The iron and brass molder must be a thoroughly experienced practical molder on miscellaneous and moderately large iron and brass foundry work. He should have thorough knowledge of general foundry practice and be able to produce first-class work for simple or intricate castings. He should be familiar with the nature of molding sands, able to mix the same, and make dry-sand facing washes. He should understand core making and setting, gating, and sprew placing for best results. He must be familiar with lifting and handling small and medium size molds, and should have some knowledge of the use of molding machines and best mixtures of sand, and have a knowledge of the casting temperatures of iron and brass. He should have had thorough experience in some commercial foundry.

MOLDER, LARGE FLOOR CASTINGS **MART**

Description: The floor molder erects molds for castings large enough to require crane ladles.

Qualifications: The floor molder of large castings must thoroughly understand the placing of molds and the setting of cores so as to obtain the best results in casting. He should thoroughly understand the placing of the molds so as to bring in all the parts of the castings that are to be machined in such position that they will not accumulate the slag or other impurities of the iron. He must be able to direct the work of helpers, know how to handle large masses of molten iron, and have a thorough mastery of sweep pattern making. He should have had experience as a helper and a journeyman molder, sufficient to handle such work as machine tool beds, cast columns, and heavy engine beds and fly wheels.

Schooling: Common school.

MOLDER, STEEL **MASH**

Kindred Occupations: Brass foundry molder; Iron foundry molder; Molder's helper.

Description: The steel molder does steel foundry work on molds for semi-steel or steel castings.

Qualifications: The steel molder must be a thoroughly experienced practical molder for small or large steel castings for any purpose. He should have comprehensive knowledge of general steel-foundry practice, and be able to produce first-class work for simple or intricate castings. He should be familiar with the nature of molding sands and core sands and their mixing, especially for steel castings, and understand mixing face washes. He should be thoroughly experienced in the making, setting, and supporting of cores of all kinds, and proper gating, sprewing, and lifting and handling molds. He should be capable of building floor molds and should understand the use of pneumatic rammers. He should have some knowledge of furnace mixtures and proper casting temperatures for desired results. He should have had general experience in a commercial steel foundry, or foundry of a large manufacturing plant, or in a general iron foundry.

PATTERN MAKER, METAL **PEAT**

Description: The duties of the metal pattern maker are to make metal forms by the use of which the foundry man shapes the mold for the purpose of producing metal castings.

Qualifications: The metal pattern maker must know the foundry requirements of the pattern; must be able to work from drawings sufficiently well to make all pattern layouts from the ordinary shop drawings. He should be able to scrape, file, chip, drill, solder, and do lathe work, milling-machine work, planer work, and drill-press work. He should understand pattern gauging and the making of metal core boxes. He should be thoroughly familiar with all types of wood pattern making. He should have good strength and ordinary health and endurance. He must have had experience as an apprentice and as a journeyman metal pattern maker.

Schooling: Common school; preferably trade school or technical high school.

PATTERN MAKER'S HELPER OR APPRENTICE, METAL PECK

Description: The duties of the metal pattern maker's helper are to make various parts of metal patterns under the direction of the pattern maker foreman or any skilled metal pattern maker.

Qualifications: The metal pattern maker's helper must be over 16 years of age and have shown a liking for the pattern-making trade, either being able to read mechanical drawings and do necessary mathematical calculations or have a willingness to pursue an independent line of studies along these lines. He must have good health, ordinary strength, and endurance.

Schooling: Common school; preferably trade school or technical high school.

PATTERN MAKER'S HELPER OR APPRENTICE, WOOD PEDAL

Description: The duties of the pattern maker's helper are to make various parts of wood patterns under the direction of the pattern maker and to assist him in getting out stock.

Qualifications: The pattern maker's helper must be over 16 years of age and have shown a liking for the pattern-making trade, either being able to read mechanical drawings and do necessary mathematical calculations or have a willingness to pursue an independent line of studies along these lines. He must have good health, ordinary strength, and endurance.

Schooling: Common school; preferably trade school or technical high school.

PATTERN MAKER, WOOD PEEL

Description: The duties of the wood pattern maker are to make the wooden forms by the use of which the foundryman shapes a mold for the purpose of producing metal castings.

Qualifications: As a woodworker the pattern maker must be an all-round skilled man in the use of common bench, woodworking, and turning tools, and in the operation of such woodworking machinery as the jointer, planer, circular saw, band saw, disk sander, and special core-box machinery. He must know the best kind of wood to use in any given pattern. He must understand draft and shrinkage as applied to pattern making and must have a thorough knowledge of the most complex mechanical drawings, so that he will be able to make a pattern drawing sketch from the shop drawing. He must understand core making and the allowance for core and core print in the construction of the pattern. He must be resourceful and able to determine quickly the best method of making the pattern. He must know pattern finishes and the care of finishing material and brushes. He must have good health, ordinary strength, and endurance. He must have had experience as a journeyman pattern maker.

Schooling: Common school; preferably technical high school or trade school.

MACHINE SHOP GROUP

INSPECTION GROUP

INSPECTOR OF FINAL ASSEMBLY — **IDLER**

Description: The duty of the inspector of final assembly is to check the assembling of all parts entering into the finished product.

Qualifications: The inspector of final assembly should be able to read drawings; should check all adjustments and understand tight, loose, and running fits; should know the requirements of machine finish and should know the importance of lock nuts, cotter pins, and similar devices and the general details of construction.

Note.—In specifying an inspector of final assembly it is necessary to use, with the code word, the name of the particular kind of machine that is to be inspected.

Schooling: Common school.

INSPECTOR OF MACHINE PARTS — **INDEX**

Description: The duties of the inspector of parts are to check all measurements with the drawings, to check all errors in machining and of flaws in material.

Qualifications: The inspector of parts must use the standard measuring tools, such as scales, calipers, micrometers, verniers, combination squares, protractors, plug, snap and special gauges and test fixtures. He should read drawings and be able to check drawing measurements. He must understand machine finish and adjustment of all pieces that he is inspecting.

Note.—When a specification is placed under the general heading of "Inspector of machine parts" it is understood that the inspector understands the use of standard measuring tools, but that the employer will give the necessary information concerning all special gauges and tools and the mechanical requirements of all pieces to be inspected.

Schooling: Common school.

INSPECTOR, ROUGH STOCK — **IDLY**

Description: The duties of the rough-stock inspector are to inspect all stock, such as plate stock, bar stock, forgings, and castings before they are delivered to the fabricating department.

Qualifications: The rough-stock inspector should be thoroughly familiar with castings, forgings, galvanizing, and plating. He should have a thorough knowledge of hot and cold rolled steel, machinery steel, and tool steel, and should be able to check sizes and determine whether or not they correspond to specifications. He should have had similar experience in a foundry and blacksmith shop, also in gas and electric welding department.

Schooling: Common school, preferably some technical training in the physical properties of metal.

MACHINE ASSEMBLER **MATCH**

The assembler is defined in this description as one who puts together the pieces that compose a part of, or all of, a machine. He is not supposed to remove stock more than to file off burrs or tool blemishes.

Qualifications: The assembler must learn the proper use of screw drivers, wrenches, and other assembling tools.

Note.—It is understood that if a specification calls for an assembler, under the general heading of "Machine assembler," the employer is prepared to, and expects to, give the necessary training for the work desired.

If an assembler for any particular machine or machine part is desired, the name of the machine or the part must be given with the code word for machine assembler.

MACHINE ERECTOR **MATE**

Description: In this description of occupations the machine erector is defined as one who makes the final assembly of a machine at the place of operation—such machinery as is usually shipped "knocked down" and assembled on a permanent foundation.

Qualifications: The machine erector should be able to read drawings sufficiently well to get a full understanding of all mechanical requirements. He should be qualified to take full charge of mounting and installing such machinery as large stationary engines, pumps, hoisting and mining machinery. He should be able to direct the work of helpers, set up and operate all portable and hand cranes, should be able to direct the work of power cranes, should have sufficient knowledge of the use of the machinery which he is erecting to put into complete operation and conduct the first working tests.

Schooling: Preferably high school or some general technical training.

Note.—When a machine erector is wanted for the erection of any particular type of machinery, the name of that particular type of machinery should be added to the code word for the machine erector.

MACHINE FITTER **MATER**

Description: The machine fitter is defined in this classification as one who puts together medium-size or light machine parts and is able to fit, file, scrape, and ream where necessary to make the proper mechanical adjustments.

Qualifications: The machine fitter must be able to apply the necessary test to keep his work in alignment and be able to adjust tight, loose, and running fits. He should read drawings sufficiently well to order all stock and tools for assembling the specified machine parts and to get a complete understanding of all mechanical requirements.

Schooling: Common school.

MACHINE HAND GROUP

[For explanation of "hand" as used herein see prefatory statement and directions for using descriptions and code words, pages 2 and 3.]

Description and Qualifications: For the purpose of this description of occupations a machine hand is defined as one who has mastered the operation

of the specified machine so that he can select and use the necessary standard tools to produce single parts. For example: Lathe hand, shaper hand, etc., indicates that a person bearing that title has complete mechanical mastery of those individual machines. One person may qualify on several machines. When he has qualified on the standard types of machines, including the lathe, milling machine, shaper, planer, drill press, and grinder, and has mastered bench and assembly erecting work, he is qualified as a journeyman, or all-round machinist.

A machine hand must read drawings sufficiently well to get from the shop blue print a full understanding of all mechanical requirements.

Schooling: Common school; preferably high school.

Machine hands are described as follows:

Bench hand.
Boring-mill hand, horizontal mill.
Boring-mill hand, vertical mill.
Drill-press hand.
Grinder hand.
Lathe hand, engine lathe.
Machine hand, special.
Milling-machine hand, plane miller.
Milling-machine hand, Universal miller.
Planer hand.
Screw-machine hand.
Shaper hand.
Turret-lathe hand.

BENCH HAND, OFFICE APPLIANCE MACHINES BECK

Description: The bench hand on office appliance machines is one who puts together and adjusts such machines as typewriters, adding machines, and comptometers.

Qualifications: He should be able to read drawings, be thoroughly familiar with all the small assembling and lay-out tools, such as wrenches, files, scrapers, taps, dies, and hand drills; should be able to do soldering; must be able to make fine machine instrument adjustments; and should be familiar with the requirements of the various office appliances. He should be able to grind and oilstone common hand tools and should have had considerable experience in assembling appliances in either typewriter, adding machine, or comptometer factory.

Schooling: Common school; preferably high school.

BENCH HAND ON SUCH WORK AS AUTO PARTS AND GAS ENGINES BLAST

The bench hand in this classification is defined as an all-round workman in light and medium size bench and assembly work.

Qualifications: The bench hand should know the names, care, and use of the common tool-room tools. He should use skillfully the assembling layout and fitting tools, such as wrenches, files, scrapers, chisels, hack saws, parallel strips, V blocks, taps, dies, hand reamers, hand drills, breast drills, soldering coppers, blow torch, and fire pot. He must be familiar with machine adjustments and be able to adjust tight, loose, and running fits, and do chipping, filing, scraping, babbitting, soldering, and layout work; and use care and judgment in adjusting parts. He should be able to grind and oilstone the common hand tools, and to read drawings sufficiently well to obtain from the shop blue print a complete understanding of all mechanical requirements. The bench hand should have good eyesight.

Schooling: Common school; preferably high school.

BORING MILL HAND, HORIZONTAL MILL BLAZE

Description: The horizontal boring mill hand is defined in this classification as one who can do all classes of work on a horizontal boring mill.

Qualifications: The boring mill hand should know the names, care, and use of the principal parts of the machine and the machine attachments. He should use skillfully the scale, square, inside and outside calipers, micrometers, combination squares, dividers, center gauge, height gauge, depth gauge, and vernier. He must be familiar with the special types of drills, reamers, boring bars, and with the jigs and forms supporting boring bars.

He should read drawings sufficiently well to obtain from the blue print a complete understanding of all mechanical requirements. He should have good eyesight, general good health, and ordinary strength.

Schooling: Common school; preferably high school.

BORING MILL HAND, VERTICAL MILL BLEAK

Description: The vertical boring mill hand is defined in this classification as one who can do all classes of vertical boring mill work.

Qualifications: The vertical boring mill hand should know the names, care, and use of the principal parts of his machine, should know the names, care, and use of the standard tool-room tools and should use skillfully the scale, square, inside and outside calipers, dividers, combination square and vernier. He must know how to chuck face, turn, bore, and ream.

He should be able to read drawings sufficiently well to get a thorough understanding of all mechanical requirements.

He should have good eyesight, general good health, and ordinary strength.

Schooling: Common school; preferably high school.

DRILL PRESS HAND DEER

Description: It is the duty of the drill press hand to do all kinds of drill press work considered under the divisions given below.

Qualifications: The drill press hand should know the names of the principal parts of the machine, such as table, base, and upright. He should know the name, care, and use of the common tool-room tools and machine attachments. He should use skillfully the scale, square, center gauge, inside and outside calipers, thread gauge, micrometer, combination square, depth gauge, height gauge, surface gauge, and vernier.

He should be able to do skillfully drilling flat and circular work, boring, countersinking, facing, reaming, jig work, and tapping. He should have a good understanding of sharpening drills, counterbores, reamers, and taps.

He should read drawings sufficiently well to obtain a complete understanding of all mechanical requirements.

He should have good health and ordinary strength.

Schooling: Common school; preferably high school.

DRILL PRESS HAND, GEARED OR RADIAL DRILL DARK

Description: This drill press hand operates a large upright geared and radial drill press.

Qualifications: The same as for general drill press hand but should have had all-round experience on large geared upright and radial drill presses.

DRILL PRESS HAND, SENSITIVE DRILL **DARE**

Description: The drill press hand, sensitive drill, operates a sensitive drill on small work, ordinarily using drills not over three-fourths of an inch in diameter.

Qualifications: In addition to having a general knowledge of the drill press, the sensitive drill press hand should be able to manipulate jigs skillfully, place the work with care into the jig, and when drilling small holes, with or without the jig, to feed the machine sensitively in order to prevent drill breakage. He should understand the necessity of keeping the jig and drill table free from chips and should be able to so manipulate the work as to insure long life to the tools used.

FLOOR HAND **FILM**

Description: The duties of the floor hand as defined in this description of occupations are to put together machines or machine parts of such a size that the assembly is made on the floor instead of on the bench, all work being done in the shop where the machine is manufactured.

Qualifications: The floor hand should know the names, care, and use of all common tool-room tools; should use skillfully assembling, layout, and fitting tools, such as wrenches, files, scrapers, chisels, hack saws, parallel strips, V blocks, taps, dies, hand reamers, hand drills, breast drills, soldering coppers, blow torches, levels, and trammel points. He must be familiar with machine adjustments and be able to make tight, loose, and running fits, must do chipping, filing, scraping, babbitting and general layout work. He must have special skill in adjusting all machine parts, should be able to grind and oilstone common hand tools, must be able to direct the work of hand and power cranes, must be able to read drawings sufficiently well to get an understanding of all the mechanical requirements. He should have had experience in the erection of the larger type of machines, such as large machine tools, large stationary, hoisting, pumping, and power engines and mining machinery.

Schooling: Common school; preferably high school.

GRINDER HAND

Description: A grinder hand is defined in this classification as one who can do one or more of the classes of work indicated below.

Qualifications: The grinder hand should know the names, care, and use of the principal parts of the grinder, such as bed, carriage, spindle, and index. He must use skillfully the scale, square, center gauge, inside and outside calipers, micrometer, bevel protractor, height gauge, depth gauge, and surface gauge.

He should be able to do skillfully plane cylindrical grinding or horizontal and vertical surface grinding and internal grinding. He should be able to trim, balance, and dress grinding wheels.

The grinder hand should read drawings sufficiently well to obtain from the shop blue print a complete understanding of all mechanical requirements.

EXTERNAL GRINDER HAND **EKE**

GAUGE GRINDER HAND **GAZED**

INTERNAL GRINDER HAND **IDOL**

SURFACE GRINDER HAND **SERVE**

TOOL AND CUTTER GRINDER HAND **TENT**

LATHE HAND, ENGINE LATHE

Description: A lathe hand is defined in this classification as one having mastery of all types of lathe work as indicated in the three groups given below.

Qualifications: A lathe hand should know the names, care, and use of the principal parts of the machine, such as bed, head stock, tail stock, carriage apron, saddle, compound rest. He should know the names, care, and use of the common tool-room tools and machine attachments. He should use skillfully the scale, square, center gauge, inside and outside calipers, thread gauge, micrometer, and combination square. He should be able to do quickly and accurately, turning, boring, drilling, steady rest and following rest work, reaming, chucking, face plate work, taper turning, thread cutting, knurling, and polishing; and should be able to grind and oilstone tools. He should read drawings sufficiently well to obtain from the shop blue print a complete understanding of the mechanical requirements. He should have good health and strength.

Schooling: Common school; preferably high school.

For the purpose of this standardization engine lathe hands are classified relatively with regard to the size of the machine and the work they are doing.

BENCH LATHE HAND **BLEED**

A man having the standard qualifications for an engine lathe hand and whose work is on a bench lathe producing parts similar to those required for instruments and small tools. Besides having the regular lathe hand qualifications, he should be able to use the grinding attachments.

ENGINE LATHE HAND—UNDER 16-INCH **ELAN**

An engine lathe hand with standard qualifications (see lathe hand, engine lathe) who ordinarily works on floor lathes ranging up to 16-inch swing, and who is qualified to work on parts of the size and variety similar to automobile and small gas engine work.

ENGINE LATHE HAND—16-INCH AND OVER **ELATE**

An engine lathe hand with standard qualifications (see lathe hand, engine lathe) who works on lathes ranging over 16-inch swing, machining such work as heavy locomotive parts, large pump parts, mining machinery, and marine engine parts.

MACHINE HAND, SPECIAL **MESS**

Description and Qualifications: For the purpose of this description of occupations it is understood that the machine hand qualified for the following machines is skilled in the use of measuring tools, such as scales, inside and outside calipers, micrometers, combination squares, bevel protractors, plug, snap, and special gauges; and knows the care and use of standard tool-room tools. He must read drawings sufficiently well to obtain a complete understanding of all mechanical requirements. In addition to this knowledge he must have a thorough mechanical mastery of the specified machine. He should have good health and strength.

Note.—In specifying a special machine hand under this code it will be necessary to use a code word indicating the special machine for which a hand is desired.

If a machine hand is desired for any machine not given in this list the name of the machine should be added to the code word for "machine hand, special."

BROWN & SHARPE GEAR SHAPER HAND	BLINK
FELLOWS GEAR SHAPER HAND	FEEL
GLEASON'S GEAR SHAPER HAND	GEAR
GOULD & EBERHARDT GEAR SHAPER HAND	GEM
JOURNAL BEARING MACHINE HAND	JAM
SLOTTER HAND	SET

MILLING MACHINE HAND, PLANE MILLER — **MAUL**

Description: The plane milling machine hand in this classification is one who can do plane milling on all kinds of milling machines.

Qualifications: The plane milling machine hand should know the names, care, and use of the principal parts of the machine, such as table, bed, cone, spindle, overarm, arbor, arbor trace, and collet.

He should know the names, care, and use of all common tool-room tools. He should use skillfully the scale, square, center gauge, inside and outside calipers, height gauge, and depth gauge. He should be able to do accurately and quickly plane horizontal milling, slotting, sawing, end milling, vertical milling, taper milling, drilling, boring, and reaming, cut and slot bolt heads and do cam milling. He should read drawings sufficiently well to obtain from the shop blue print a complete understanding of all mechanical requirements.

He should have good eyesight and good health.

Schooling: Common school; preferably high school.

MILLING MACHINE HAND, UNIVERSAL MILLER — **MAUVE**

Description: A universal milling machine hand in this classification is one who can do plane and universal milling on all kinds of milling machines.

Qualifications: The universal milling machine hand should know the names, care, and use of the principal parts of the machine, such as table, bed, cone, spindle, back gear, overarm, arbor, arbor trace, dividing head, and collet. He should know the names and use of common tool-room tools. He should use skillfully the scale, square, center gauge, inside and outside calipers, micrometer, thread gauge, combination square, bevel protractor, height gauge, depth gauge; and he should be able to do quickly and accurately plain horizontal milling, slotting, sawing, end milling, vertical milling, taper milling, drilling, boring, reaming, plain and compound, indexing, as applied to bolt heads, nuts, straight fluting, stagger fluting, and spiral fluting; graduating, gear cutting, rack cutting, hobbing, cam milling.

He should read drawings sufficiently well to obtain from the shop blue print a complete understanding of the mechanical requirements. He must have good eyesight and good health.

Schooling: Common school; preferably high school.

PLANER HAND

Description: A planer hand in this classification is defined as one who can do all kinds of work on a planer, subject to the two divisions of plane work given below.

Qualifications: The planer hand should know the names of the principal parts of the machine, such as bed, uprights, table, or platen, cross head and headways. He should also know the names, care, and use of the common tool-room tools and the special machine attachments. He should

be able to do quickly and accurately planing, horizontal and vertical surfaces, taper planing, slotting, key seating, and circular planing. He should be able to grind all planer tools. He should have good eyesight and be physically strong.

Schooling: Common school; preferably high school.

PLANER HAND ON PLANERS UP TO 36-INCH CROSS HEAD **POUND**

PLANER HAND ON PLANERS OVER 36-INCH CROSS HEAD **PEER**

PUNCH PRESS HAND

Description: The duties of the punch press hand are to set up dies, make all machine adjustments, and run punch presses for all kinds of work usually done on a punch press.

Qualifications: He should know the name, care, and use of the principal parts of standard punch presses, must especially know how to use all safety and controlling devices. Must be able to order all stock, to check all punchings with the drawings and specifications, and take full charge of setting up dies and checking dies and fixtures in and out of the tool room. He should have had considerable experience as a punch press operator and have done some work as a punch press hand.

Schooling: Common school.

PUNCH PRESS HAND **PLATE**

Punchings and stampings similar to those made in the manufacture of typewriters, adding machines, and comptometers.

PUNCH PRESS HAND **PLUG**

On work similar to that made up for general automobile parts, crank cases, and all general heavy punching and drawing work.

SCREW-MACHINE HAND, HAND AND AUTOMATIC MACHINES **SHOAL**

Description: For the purpose of this description of occupations it is understood that all screw machine hands have the following general qualifications:

Qualifications: The screw machine hand must read drawings, know the names, care, and use of the principal parts of the machine and of the common tool-room tools. He should be skilled in the use of the measuring tools, such as scales, inside and outside calipers, micrometers, and be familiar with plug, snap, and special gauges; also thread gauges.

In addition to this he must be able to do all kinds of work usually done on the machine, including the set-up.

Schooling: Common school; preferably high school.

Note.—In specifying a screw machine hand under this group it will be necessary to use the code word in the following list indicating the machine for which the hand is desired.

If a screw machine hand is wanted for a machine not given in this list add the code word for screw machine hand to the name of the special machine for which the hand is desired.

AUTOMATIC SCREW MACHINE HAND

ACME AUTOMATIC SCREW MACHINE HAND **ADAPT**

BROWN & SHARPE AUTOMATIC SCREW MACHINE HAND **BLESS**

CLEVELAND AUTOMATIC SCREW MACHINE HAND **CRUDE**

DAVENPORT AUTOMATIC SCREW MACHINE HAND **DART**

GRIDLEY AUTOMATIC SCREW MACHINE HAND	GENT
NEW BRITAIN AUTOMATIC SCREW MACHINE HAND	NAP
WARNER & SWASEY AUTOMATIC SCREW MACHINE HAND	WAKE

SCREW MACHINE HAND, HAND MACHINE

ACME SCREW MACHINE HAND, HAND MACHINE	ADDER
BROWN & SHARPE SCREW MACHINE HAND, HAND MACHINE	BLIND
CLEVELAND SCREW MACHINE HAND, HAND MACHINE	CHURN
DAVENPORT SCREW MACHINE HAND, HAND MACHINE	DASH
GRIDLEY SCREW MACHINE HAND, HAND MACHINE	GHOST
NEW BRITAIN SCREW MACHINE HAND, HAND MACHINE	NASAL
WARNER & SWASEY SCREW MACHINE HAND, HAND MACHINE	WAKEN

SHAPER HAND — SEW

Description: A shaper hand is employed to do all classes of shaper work, such as shaping regular, horizontal, and vertical surfaces, taper planing, irregular shaping, slotting, key seating, shaping on centers, rack cutting.

Qualifications: The shaper hand should know the names, care, and use of the principal parts of the machine, such as column, ram, cross rail, table, cone, extension base, back gears, gear box, stroke index, tool head, cross feed, vertical feed.

He should know the names, care, and use of the common tool-room tools and machine attachments. He must use skillfully the scale, square, center gauge, inside and outside calipers, micrometers, thread gauge, combination square, bevel protractor, height gauge, and depth gauge.

He should read drawings sufficiently well to obtain from the shop blue print of any given piece of work a complete understanding of the mechanical requirements. He should be able to grind all shaper tools.

Schooling: Common school; preferably high school.

TURRET LATHE HAND — THROW

Description: For the purpose of this description of occupations it is understood that a turret lathe hand has the following general qualifications:

Qualifications: The turret lathe hand must read drawings sufficiently well to get a thorough understanding of all mechanical requirements. He must know the names, care, and use of the principal parts of the machine and the machine attachments. He must know the names, care, and use of all standard tool-room tools, and must use skillfully such measuring tools as scales, inside and outside calipers, inside and outside micrometers, combination square, bevel protractor, snap, plug, and special gauges and thread gauges.

He must use skillfully all standard tool post and turret tools. He must do chucking, facing, boring, drilling, reaming, and turning; must be familiar with the use of special boring bars, drills, reamers, and taps. In addition to this general knowledge he must be able to order and set up the tools for any given piece of work on the specified machine.

Note.—In specifying a turret lathe hand under this description it is necessary to use the code word indicating the special machine for which a hand is wanted.

If a turret lathe hand is wanted for a machine not given in this group, add the code word for turret lathe hand to the name of the machine for which a hand is wanted.

GISHOLT TURRET LATHE HAND	GIANT
JONES & LAMSON TURRET LATHE HAND	JAP
LIBBY TURRET LATHE HAND	LATCH
MONITOR TURRET LATHE HAND	MAW
POTTER & JOHNSTON TURRET LATHE HAND	PEG
STEINLE TURRET LATHE HAND	SEWER

MACHINE OPERATOR GROUP

[For explanation of "operator" as used herein see prefatory statement and directions for using descriptions and code words, pages 2 and 3.]

MACHINE OPERATOR — MAY

Description: For the purpose of this classification of occupations the machine operator is defined as one who uses a special or standard set of tools on the specified machine for the making of a single part or group of parts, in duplicate.

Qualifications: The machine operator must know how to stop and start the machine; must know how to control the feeds and speeds and oil all necessary parts. He should know how to use all snap and plug gauges and all special gauges. It is desirable that he know how to use the scale, inside and outside calipers, and micrometers.

Note.—In specifying an experienced operator for any machine for which a code word is not given it is necessary to add the name of the machine to the code word for machine operator.

It is understood that if the specification uses only the code word for machine operator the employer is prepared to, and expects to, give the necessary training to fit the person for the particular machine to be assigned.

AUTOMATIC SCREW MACHINE OPERATOR

ACME AUTOMATIC SCREW MACHINE OPERATOR	ADDLE
BROWN & SHARPE AUTOMATIC SCREW MACHINE OPERATOR	BLOOM
CLEVELAND AUTOMATIC SCREW MACHINE OPERATOR	CHUTE
DAVENPORT AUTOMATIC SCREW MACHINE OPERATOR	DATE
GRIDLEY AUTOMATIC SCREW MACHINE OPERATOR	GIBE
NEW BRITAIN AUTOMATIC SCREW MACHINE OPERATOR	NAT
WARNER & SWASEY AUTOMATIC SCREW MACHINE OPERATOR	WALK

MACHINE OPERATOR, HAND SCREW MACHINE

ACME SCREW MACHINE OPERATOR, HAND MACHINE — ADIEU

BROWN & SHARPE SCREW MACHINE OPERATOR, HAND MACHINE — BLUE

CLEVELAND SCREW MACHINE OPERATOR, HAND MACHINE — CIDER

DAVENPORT SCREW MACHINE OPERATOR, HAND MACHINE — DATER

GRIDLEY SCREW MACHINE OPERATOR, HAND MACHINE — GIDDY

NEW BRITAIN SCREW MACHINE OPERATOR, HAND MACHINE — NATAL

WARNER & SWASEY SCREW MACHINE OPERATOR, HAND MACHINE — WALL

PUNCH PRESS OPERATOR

Description: The duties of the punch press operator are to run a punch press for stamping and drawing after the dies have been set and adjusted by another.

Qualifications: The punch press operator must be thoroughly familiar with the controlling and safety devices found on standard punch presses. He must understand the method of feeding the stock into dies and know the necessity for keeping the stock well lubricated.

PUNCH PRESS OPERATOR — PLOT

Punchings and stampings similar to those made in the manufacture of typewriters, adding machines, and comptometers.

PUNCH PRESS OPERATOR — PLUSH

On work similar to that made up for general automobile parts, crank cases, and all general heavy punching and drawing work.

MACHINE SETTER GROUP

[For explanation of "machine setter" as used herein see prefatory statement and directions for using descriptions and code words, pages 2 and 3.]

MACHINE SETTER — MISER

Description: For the purpose of this classification of occupations the machine setter is defined as one who by actual operation of the machine has learned the detail of setting a special machine and adjusting and manipulating the tools.

Qualifications: The machiue setter must be able to read mechanical drawings and to order all the tools and materials necessary for any given piece of work. He must know the name, care, and use of the principal parts of the machine and of all the common tool-room tools.

He should be able to use skillfully the inside and outside calipers, micrometers, thread gauges, plug, snap, and special gauges necessary to check all measurements.

He should be qualified to teach the operator how to manipulate the machine and tools for any specified piece of work. The machine setter usually sets and supervises the work on several machines. He must have good eyesight, good general health and strength.

Schooling: Common school.

Note.—In ordering a machine setter under this code it will be necessary to use the code word indicating the special machine that is to be set.

If a machine setter is desired for which a code word is not given, the name of the machine must be added to the code word for machine setter.

AUTOMATIC SCREW MACHINE SETTER

ACME AUTOMATIC SCREW MACHINE SETTER	ADMIT
BROWN & SHARPE AUTOMATIC SCREW MACHINE SETTER	BOARD
CLEVELAND AUTOMATIC SCREW MACHINE SETTER	CIGAR
DAVENPORT AUTOMATIC SCREW MACHINE SETTER	DAUB
GRIDLEY AUTOMATIC SCREW MACHINE SETTER	GIFT
NEW BRITAIN AUTOMATIC SCREW MACHINE SETTER	NAVAL
WARNER & SWASEY AUTOMATIC SCREW MACHINE SETTER	WAND

SCREW MACHINE SETTER, HAND MACHINE

ACME SCREW MACHINE SETTER, HAND MACHINE	ADOPT
BROWN & SHARPE SCREW MACHINE SETTER, HAND MACHINE	BOAST
CLEVELAND SCREW MACHINE SETTER, HAND MACHINE	CINCH
DAVENPORT SCREW MACHINE SETTER, HAND MACHINE	DAUNT
GRIDLEY SCREW MACHINE SETTER, HAND MACHINE	GLIB
NEW BRITAIN SCREW MACHINE SETTER, HAND MACHINE	NAVY
WARNER & SWASEY SCREW MACHINE SETTER, HAND MACHINE	WANE

MACHINIST GROUP

MACHINIST, JOURNEYMAN OR ALL-ROUND — MAZE

Description: A machinist, classified as a journeyman or all-round machinist, is employed in the construction and repair of the metal portions of all types of machines and tools.

Qualifications: He should read drawings to the extent of making orders for materials, making construction layouts, and obtaining a full comprehension of mechanical requirements from the shop blue prints.

He should use skillfully the ordinary machinist's tools, consisting of steel rule, square, hammer, center punch, scratch awl, dividers, screw drivers, inside and outside calipers, combination set, protractor, surface gauge, trammel points, depth gauge, vernier caliper, bar caliper, drill gauge, thread gauge, thread micrometer.

It is desirable that he know the mathematics of pulley ratios, feed-gear ratios, back-gear ratios, taper computations, speeds and feeds, and change gears for thread cutting. This would require a knowledge of the following mathematics: Common fractions, decimals, proportions, simple algebraic equation, use of formulas, square root, making and reading of graphs, solution of right-angled triangles.

He should have a general shop knowledge as follows: Belts, pulleys, lubricants, to include oils, greases, and cutting compounds, counter shafts, line shafts, cone and geared head machines, motor drives, fits and finishes, cutting speeds, gear combinations, general knowledge of thread systems, standard V and square threads, special threads, double and triple threads, standard tapers, and polishing materials, use of handbooks, reference books, and catalogues.

He should know the names, care, and use of common machine-shop tools, such as wrenches, clamps, dogs, arbors, chisels, hack saws, files, scrapers, dies and die holders, reamers, hand drills, and breast drills. He should have a working knowledge of cast iron, wrought iron, malleable iron, machinery steel, cold-rolled steel, tool steel, high-speed steel, brass, copper, Babbitt metal, and solder.

He should also know stock sizes of common machine-shop materials such as washers, bolts, nuts, machine screws, cap screws, set screws, etc.

He should operate skillfully the standard machines to do the types of work indicated below, and should be able to grind and oilstone all cutting tools used.

Bench hand.

Chipping and filing.
Assembling.
Scraping.
Laying out work.
Babbitting.
Soldering.

Drill press.

Making layout.
Drilling.
Flat work.
Circular work.
Boring.
Countersinking.
Facing.
Beaming.
Jig work.
Tapping.

Engine lathe.

Care of centers.
Turning on centers.
Turning on mandrel.
Chuck and faceplate work.
Boring.
Facing.
Reaming.
Thread cutting.
Taper cutting.
Knurling.
Filing.
Polishing.

Grinder.

Plain cylindrical grinding.
Surface grinding.
Internal grinding.
Taper grinding.
Cutter, drill, and reamer grinding.

Floor hand.

(Same as "Bench hand," only on large machine.)

Milling machine.

Plain, horizontal milling.
Slotting.
Sawing.
End milling.
Vertical milling.
Taper milling.
Drilling.
Boring.
Counter reaming.
Reaming.
Plain and compound indexing, as applied to bolt heads, nuts, straight fluting, spiral fluting, and stagger fluting.
Graduating.
Gear cutting.
Rack cutting.
Hobbing.
Cam milling.

Planer.

Planing, regular, horizontal, and vertical surfaces.
Taper planing.
Slotting.
Key seating.
Circular planing.

Shaper.

Planing, regular, horizontal, and vertical surfaces.
Taper planing.
Irregular shaping.
Slotting.
Key seating.
Shaping on centers.
Back cutting.

Schooling: Not less than common school; preferably high school or college.

Occupations in Group 1 and in Group 2, given below, have become such generally accepted occupations, demanding special requirements of an all-round journeyman machinist, that a separate code word has been assigned to each.

Group 1.

Layout man.
Repair man, general machine repair.
Repair man, machine tool repair.

Group 2.—Toolmaker.

Die maker.
Diesinker.
Gauge maker.
Jig and fixture man.

GROUP 1

LAYOUT MAN **LATE**

Description: The layout man indicates by lines and marks the exact position of all holes, the shaping, and the bending that are not provided for in the operation of the machine to which the work is to be assigned.

Qualifications: The layout man should be a journeyman machinist (see Machinist, journeyman) who has specialized on laying out work. He must know the methods of spotting and indicating any part of the layout for the various machines and for bench and floor hands. He should use skillfully all the measuring tools, such as scale, calipers, verniers, micrometers, bevel protractors, trammel points, and dividers. He must have a special knowledge of applied mathematics; must be familiar with projections as applied to the development of cams and sheet metal fittings. He must also have a thorough knowledge of the reading of mechanical drawings. He should have good eyesight and good health.

Schooling: Common school; preferably high school.

REPAIR MAN, GENERAL MACHINE REPAIR **RASH**

Description: The general machine repair man is a journeyman machinist (see Machinist, journeyman) who has specialized on machine repairs.

Qualifications: The general repair man must be especially skillful in making machine adjustments such as bearing adjustments, leveling and lining up machinery, scraping and babbitting. He must be resourceful and able to accomplish results with limited equipment. He should have ability to read drawings sufficiently well to order all necessary stock and tools and to obtain from the drawings of any given piece of work a complete understanding of the mechanical requirements. He must be able to work to micrometer measurements. He should have good eyesight and good health.

Schooling: Common school; preferably high school.

REPAIR MAN, MACHINE TOOL REPAIR **REAM**

Description: The machine tool repair man is a journeyman machinist (see Machinist, journeyman) who has specialized on machine tools to the extent of knowing how to replace parts and keep the machine in exact alignment. By the machine tools is meant all types of lathes, milling machines, screw machines, grinders, turret lathes, boring mills, punch presses, and drill presses.

Qualifications: (See Machinist, journeyman.) He should have good eyesight and good health.

Schooling: Common school; preferably high school.

GROUP 2.—TOOLMAKERS

The toolmaker is a journeyman machinist (see Machinist, journeyman) who has specialized in any or all of the following divisions of tool making:

Die maker.
Diesinker.
Gauge maker.
Jig and fixture man.

This work requires a high degree of skill and accuracy in the use of tools.

DIE MAKER, GENERAL **DAWN**

Description: The die maker is a journeyman machinist (see Machinist, journeyman) who has specialized in making, stamping, and forming dies for punch-press work.

Qualifications: The die maker must know sheet-metal gauges; should know how to order, cut, and handle stock for stamping, drawing, and forming.

Schooling: Common school; preferably high school.

DIE MAKER **DAY**

Die maker experienced in making, blanking, and forming dies for parts similar to those used on adding machines, typewriters, telephone jack parts, and small gun and automobile parts.

DIE MAKER **DAZE**

Die maker experienced in making blanking dies for armature laminations, electric-motor castings, and medium-sized automobile parts.

DIE MAKER **DALE**

Die maker experienced in making forming dies for small trays, stock boxes, helmets, crank cases, and large cartridge shells.

DIESINKER

Description: For the purpose of this standardization diesinkers are divided into three groups:

Diesinker who specializes in the making of dies for forgings.
Diesinker who specializes in the making of dies or molds or die castings.
Diesinker who specializes in making dies for art and tableware.

DIESINKER FOR FORGING DIES **DEAL**

Description: The diesinker for forging dies is a journeyman machinist (see Machinist, journeyman) who has specialized on the making of dies for forgings.

Qualifications: The diesinker for forging dies requires special skill in the making of templates and in the use of routing tools and profiling tools; also special ability to interpret drawings. This work requires a physically strong man.

Schooling: Common school; preferably high school.

DIESINKER FOR DIE-CASTING DIES **DEAN**

Description: The diesinker for die-casting dies is a journeyman machinist (see Machinist, journeyman) who has specialized on the making of molds or dies in which metal is cast.

Qualifications: The diesinker for die-casting dies must be familiar with shrinkage and draft, as the terms are used in reference to pattern making, must understand the necessary methods of dividing the molds and of clamping and otherwise holding the parts in place while the metal is being poured. He must be skillful in making templates and in the use of routing tools, and must have special ability to interpret drawings. This work requires a physically strong man.

Schooling: Common school; preferably high school.

DIESINKER, ART AND TABLEWARE **DEAF**

Diesinker experienced in making dies for art metal work and tableware. This class of die makers find it difficult to make dies where close measurements are required.

GAUGE MAKER **GILL**

Description: The gauge maker is a journeyman machinist (see Machinist, journeyman) who has specialized on the making of plug, snap, and special gauges for the use of inspectors and machine men in keeping the sizes of their work within the specified limits.

Qualifications: The gauge maker must be able to work to the closest measurements, often being compelled to measure to one ten-thousandth of an inch. He must understand grinding and lapping and other special methods for bringing metal to exact dimensions. He is usually recruited from the ranks of the higher class toolmakers. He must read mechanical drawings thoroughly and must be skillful in designing gauges. This will require a special knowledge of applied mathematics and layouts. He must have good eyesight and health; also good control of nerves and muscles.

Schooling: High school.

JIG AND FIXTURE MAN **JAR**

Description: The jig and fixture man is a journeyman machinist (see Machinist, journeyman) skilled in the making of drilling jigs, screw-machine fixtures, and turret-lathe fixtures.

Qualifications: The jig and fixture man must have a thorough knowledge of the use of special drills, cutters, reamers, boring bars, taps, dies, gauges, and templates. He must understand sheet-metal gauges; must know how to select, cut, order, and handle metal for stamping and forging.

Schooling: Common school; preferably high school.

METAL PLATING GROUP

ELECTROPLATER, FOREMAN **EJECT**

Description: The duties of the electroplater foreman consist of the operation, upkeep, and supervision of a complete electroplating plant for general factory plating.

Qualifications: The electroplater foreman must be a thoroughly experienced general plater, expert in all phases of copper and nickel plating, and familiar with galvanizing process; and have ability to handle men. He must understand the operation and maintenance of belted generators and motor generators, bus bars, tank bars, and connectors, rheostats, and instruments. Must understand handling acids and mixing various standard solutions for pickling, washing, and plating, and the filling and emptying of tanks, and the care of steam kettles, hot wash, and sawdust drying boxes or tumble barrel dryers. Must understand hanging articles and anodes for best results, and the proper current and time for various kinds and grades of work. He should have a working knowledge of box or automatic plating-tank equipments for quantity work. Must be familiar with use and care of buffing and polishing stands and roughing, polishing, bufling, and finishing wheels of various kinds. He should have had all-round experience in a general plating shop or plating shop of a large manufacturing plant.

Schooling: Preferably not less than high school; should have some knowledge of general chemistry and electric chemistry.

GALVANIZER **GAZE**

Description: The galvanizer acid dips and cleans all kinds of plates, pipes, castings, and wire and passes them through or suspends them in the molten galvanizing solution for the purpose of coating them with zinc.

Qualifications: He must be able to direct the work of hand or power cranes, must thoroughly understand acid dipping and washing, and must know the proper heating of the galvanizing solution and be able to secure a good uniform surface coating of metal. He should have worked as a helper in a galvanizing department and as an independent worker sufficiently long to understand thoroughly all the processes of galvanizing.

Schooling: Common school.

METAL PLATER'S HELPER **MIRTH**

Description: The duties of the metal plater's helper are acid dipping, or brush scrubbing, or stock handling, or tank cleaning, or trucking, or washing, or drying, or tumbling. The metal plater's helper may be assigned to any one or more of the above-mentioned occupations in the metal-plating department.

Qualifications: Good physical strength and a willingness to work in the metal-plate department.

METAL POLISHER AND BUFFER **MASON**

Kindred Occupations: Foreman plater; Foreman polisher.

Description: The metal polisher and buffer's duties consist of the operation of grinding, polishing, and buffing equipments in the preparation of all classes of work for plating and finishing.

Qualifications: The metal polisher and buffer must be thoroughly experienced in the operation, use, and care of emery wheels and the various grades and shapes of wheels for general polishing and buffing, such as rag, felt, rawhide leather, fiber, scratch brushes, and wire-brush wheels. Must have a thorough knowledge of how to build up, glue, surface, dress, and balance all kinds of roughing, dressing, polishing, and buffing wheels. Must be skilled in the grinding and finishing of brass, bronze, or steel, either dull or bright, for plating, lacquering, coloring, or bluing. He should have had general training in a modern polishing shop or large manufacturing plant.

Schooling: Common school.

NITER BLUER **NAME**

Kindred Occupations: Hot galvanizing kettle worker; Lead melter; Tinplater.

Description: The niter bluer's duties consist of the operation of fused saltpeter-manganese dioxide type of metal bluing or coloring equipment.

Qualifications: The niter bluer must be experienced in the operation and practical upkeep of a bluing equipment for coloring metals, especially screws, pins, rifle parts of steel, or parts of accouterments of any metal. Must understand coal, coke, gas, or oil heated saltpeter kettles or pots, and the proper temperatures and times for melting down ingredients and imparting desired color to different materials; must be able to keep records. Must understand proper cleaning and drying for best effects and permanency and dipping in quantity to insure uniformity and to avoid danger.

Schooling: Common school.

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MISCELLANEOUS GROUP

MILLWRIGHT, FOREMAN **MASS**

Kindred Occupations: Maintenance engineer; Factory millwright; Plant engineer.

Description: The millwright foreman's duties consist of laying out, installing, and maintaining general power and transmission machinery and equipment of any shop, plant, or factory, for any purpose.

Qualifications: The millwright foreman must be a thoroughly experienced general millwright, able to lay out from drawings or sketches, set up and generally keep in order any class of general power transmission and operating machinery. He should be able to install and maintain hangers, shafting, pulleys, belts of all types, machine tools, cranes, and general equipment. He should be a thorough belt and practical power transmission man, able to lay out and erect stringers and hanger bases, and must be a block and tackle man, equal to handling tackle quickly and safely, and heavy machinery with the use of jacks, hoists, slings, blocks, skids, and cribbing, or under unfavorable conditions. He should have some knowledge of concrete form and concrete work for foundations. He should also be capable of supervising work of this general character and have had such experience in rolling mill, large manufacturing plant, or machine shop, or had experience on general construction or railway wrecking operations or in charge of erecting work for railway or power station.

MILLWRIGHT, MACHINE TOOL **MERIT**

Kindred Occupations: General millwright; General mechanic; Machinery erector.

Description: The machine tool millwright's duties consist of installing general machinery or machine tools in any shop, plant, or factory.

Qualifications: The machine tool millwright must be an experienced factory or shop machinery hand, able to read drawings and sketches, lay out and set up machine tools, such as lathes, shapers, milling machines, grinders, or general machinery. He must be able to put up hangers, hang shafting, pulleys, and countershafts, and figure and make up endless and other belts. He should be a good bench and tackle man and have had all-round millwright experience in a moderate sized machine shop, rolling mill, or manufacturing plant.

SHOP ROUTER **SHAD**

Description: The duty of the shop router is to classify all work going into the shop and to assign it to the various departments; also to specify the machine on which the work is to be done.

Qualifications: The shop router must be a person thoroughly familiar with the equipment and organization of the shop in which the work is

to be routed. He must have a thorough knowledge of shop materials and of the supply of stock on hand. He must also have a thorough knowledge of each machine in the shop and understand general methods of billing, checking, and follow up. He should read drawings to the extent of fully comprehending every detail of material and mechanical requirements. He should have good health.

Schooling: Common school; preferably high school.

STOCK CHASER **SHADE**

Description: The stock chaser is a man who follows up all routing of materials from the various departments to see that they arrive on time and reports to the router as often as necessary the progress of any given order from the factory.

Qualifications: The stock chaser should be familiar with billing and with stock orders, and should be keen to detect any cause for delay in the process of construction. He should be recruited from a good billing clerk. He should read drawings. The stock chaser should have good health and strength.

Schooling: Common school.

BUILDING AND GENERAL CONSTRUCTION

BRICKLAYERS, MASONS, STONE SETTERS, MARBLE SETTERS, PLASTERERS, AND TILE LAYERS GROUP

BRICKLAYER, APPRENTICE — **BAFF**

Description: The duties of a bricklayer apprentice is to assist the bricklayer in laying up walls, beginning usually on back and cross walls, and gradually taking more exact work under the direction of the foreman.

Qualifications: He should be a strong, healthy young man desiring to learn the bricklayer's trade. He should learn how to read drawings and make layouts, and should be willing to attend school continuously for from two to three months a year during the slack season.

Schooling: Not less than eighth grade.

BRICKLAYER, FOREMAN — **BAGOT**

Description: The bricklayer foreman lays and supervises the laying of brick walls for any purpose. Also sets and supervises the setting of light stone trim, terra cotta, and all kinds of general wall tile and brick substitutes.

Qualifications: He should be able to read drawings, make layouts for all openings in the building, properly place any stone or ornamental work, and must thoroughly understand the laying of the various kinds of brick bond, lining walls, running-up corners, laying in all wall openings and setting arches. He must understand the mixing of cement and lime mortars. Should have a general knowledge of other building trades so that he can work in cooperation with the general contractor. He must be qualified to direct the work of men, order all materials, and take full charge of all interior and exterior brick work on buildings of any size.

Schooling: High school; preferably some technical training.

BRICKLAYER, JOURNEYMAN — **BAIZE**

Description: The journeyman bricklayer must lay, under the direction of the foreman, all kinds of interior and exterior walls for buildings, using soft brick or glass brick, set terra cotta and light ornamental stone work. He must also be able to set any of the gypsite or other substitutes for brick used in fireproof cross walls.

Qualifications: He should be able to read drawings, lay all forms of ornamental bond, and follow properly the layout furnished by the carpenter or bricklayer foreman. He must be able to run up corners and wall openings and set arches that have been laid out by the bricklayer or carpenter foreman.

Schooling: Not less than eighth grade.

CEMENT FINISHER — **COWRY**

Description: The duties of the cement finisher are the finishing of surfaces on cement floors, base boards, stair treads, and other cement work needing a finished surface.

Qualifications: He must be able to work to drawings, be able to line and level cement surfaces, and know how to provide for the proper drainage of surfaces; should be able to do all finishing on either horizontal or vertical work. Should have had experience as apprentice and considerable experience as a cement finisher.

Schooling: Common school.

GRANITE CUTTER GLEAN

Description: The duties of the granite cutter are to cut and shape any form of granite, marble, or other hard stone by means of hand or pneumatic tools.

Qualifications: He must be able to read drawings and to work to templates; must be able to select and use the proper kind of hand or pneumatic tools for roughing and finishing. He must know how to level or true stone and prepare it for layout. He must be able to make the proper layout, and must have had an equivalent to an apprenticeship and have done considerable work as a journeyman.

Schooling: Common school.

LATHER, METAL LEAST

Description: The duties of the metal lather are to nail metal lath on the ordinary studding, to build up drop ceilings and column covers, and completely prepare same for the plasterer.

Qualifications: He should understand how to check up walls to see that they are true and ready for lathing, and should be thoroughly familiar with the use of rods and angle irons for building up drop ceilings and column covers; should have had similar experience on general large building construction work.

Schooling: Common school.

LATHER, WOOD LEAVE

Description: The duties of the wood lather are to nail lath on studding and other supports and prepare the wall for the plasterer.

Qualifications: He must be able to check up studding to see that they are level and ready for lathing; must fully understand the breaking of joints and preparing walls for the receiving of plaster in such a way that the expansion of the lath will not crack the wall.

Schooling: Common school.

MARBLE SETTER MINUS

Description: It is the duty of the marble setter to put into place all kinds of ornamental and structural marble.

Qualifications: He should be able to read drawings and follow layouts made by the bricklayer foreman or carpenter foreman. He must be thoroughly familiar with the mixing and use of cement and lime mortars. Must understand thoroughly the methods of supporting marble veneer on brick, stone, or cement walls. Must be able to place all kinds of ornamental and structural marble work in such places as entrances and stairways, and all kinds of fine building construction. He must be able to use and direct the use of all hand and power derricks generally used in marble setting, should have had an equivalent of an apprenticeship, and should also have done considerable work as a journeyman.

Schooling: Not less than eighth grade.

MASON, STONE **MIND**

Description: The duties of the stone mason, as distinguished from the stone setter, are to lay foundation and rough walls from ordinary quarry stone or from miscellaneous round stone.

Qualifications: He must thoroughly understand the mixing of cement and lime mortars. Should be able to read drawings, run up corners, set arches, and properly joint and point up a rough stone wall. He should have had experience as a stone mason's helper and should have done considerable independent work.

Schooling: Not less than eighth grade.

PLASTERER, JOURNEYMAN **POET**

Description: The duties of the journeyman plasterer are to do all kinds of plain and ornamental plastering under the direction of the foreman.

Qualifications: He should be able to read drawings, must thoroughly understand various kinds of scratch and smooth plasterwork, and know how to put on clean cement finish; must be able to run baseboards and moldings and place all kinds of interior and terra-cotta ornamental work; must be able to work on scaffolding and be a thoroughly competent independent worker. He should have had experience equivalent to a complete apprenticeship at the trade.

PLASTERER'S HELPER OR APPRENTICE **POD**

Description: The duties of the plasterer's helper or apprentice are to assist the journeyman plasterer in placing ornaments and general interior finish work and to do rough plastering under the direction of the foreman.

Qualifications: He should be a physically strong young man with a desire to learn the plasterer's trade. If he can not read drawings and make calculations for materials he should be willing to pursue a course of study long these lines.

Schooling: Common school.

STONECUTTER **SOAP**

Description: The duties of the stonecutter are to cut any form of sand or soft stone by hand or pneumatic tools.

Qualifications: He must be able to read drawings and work to templates; must understand leveling and truing stone and make it ready for the layout. He must be able to select and use the proper hand and pneumatic tools for roughing and finishing. He should have served an equivalent to an apprenticeship as a stonecutter.

Schooling: Common school.

STONE SETTER **SLUR**

Description: The duties of the stone setter are to put into place all heavy ornamental and structural stone where the quantity is such that it is not done by the regular bricklayers.

Qualifications: He should be able to read drawings, and should thoroughly understand stone markings so that he can place the various sections into the wall quickly and accurately. He must understand the setting and handling of hand and power derricks. He must be familiar with the various riggings used for hoisting stone. He must be able to direct the work of men, order all materials, and check all work with plans and specifications. He must thoroughly understand all methods of fastening stone veneer to brick, stone, and cement walls. He should have served a full apprenticeship at his trade.

Schooling: Not less than eighth grade.

TILE LAYER **TEAK**

Description: The duties of the tile layer are to lay all kinds of floor tile and wall tile, such as are used in the protection of bathroom walls and floors, and to set all ornamental tile used in mantels, entrances, and stairways.

Qualifications: He should be able to interpret the layout drawings furnished by the architect. He should also be able to lay tile to any design furnished and should thoroughly understand the cement base on which the tile is set and know how to make proper joints, leaving a hard and smooth surface. He should have a thorough mastery of all trowels and other tools used in connection with tile setting. He should have served an equivalent to an apprenticeship and have had considerable experience as a journeyman tile setter.

Schooling: Common school.

BRIDGE AND STRUCTURAL-IRON WORKER GROUP

BRIDGE AND STRUCTURAL-IRON WORKER — **BAFFY**

Description: The duties of the bridge and structural-iron worker are the erection of steel buildings and any kind of steel structure.

Qualifications: He must be an all-round experienced structural-iron worker; practically familiar with setting columns, beams, girders, trusses, and general structural steel in buildings, and plate girder or truss bridges. He should be an experienced hand and pneumatic riveter on heavy work. He should be a good climber, loader and handler of steel members, and possess some knowledge of rigging, shifting, setting, and guying derricks, and hoisting equipment. He should have had experience on high building erection, railway girder and general bridge construction.

Schooling: Common school.

BRIDGE AND STRUCTURAL-IRON WORKER, FOREMAN — **BAKED**

Description: The duties of the bridge and structural-iron worker foreman are the supervision of the placing and erecting of steel members on any form of steel buildings, trusses, and bridges.

Qualifications: He must be able to read drawings; must understand thoroughly all systems of marking structural-iron members for placement on buildings; must be a thoroughly experienced structural-iron worker, familiar with setting columns, beams, girders, and trusses; should be an experienced riveter and have a thorough knowledge of setting and anchoring all forms of cranes used in handling structural steel. He should have a knowledge of general building construction so that he can cooperate effectively with the work of the general contractor. He should have had experience as a structural-steel worker on large buildings and some experience in handling men.

Schooling: Common school; preferably technical training.

ORNAMENTAL-IRON WORKER — **OFTEN**

Description: The duties of the ornamental-iron worker are to install various kinds of iron grills, gratings, special stairways, ornamental inclosures, and other iron work not included as structural-iron work.

Qualifications: He must be able to read drawings, make layouts, and install all forms of ornamental-iron work. It is desirable that he know how to use the hand forge and do ordinary bending and welding. He should have had the equivalent of an apprenticeship and should have done considerable work as a journeyman ornamental-iron setter.

Schooling: Common school.

RIVETER, HAND — **RAP**

Kindred Occupations: Blacksmith; Boiler maker; Riveter; Steel car framer; Tank builder.

Description: The duties of the hand riveter consist of hand riveting, calking, and chipping on any class of plate, tank, or structural work.

Qualifications: The hand riveter must have had thorough practical experience in the use of hand tools for riveting, chipping, and calking, in construction and repair work of all kinds on boilers, plates, tanks, structural steel frames, automobile frames and chassis. He must be thoroughly familiar with the use of drifts, reamers, hand reamers, holders-on, and understand proper heating, riveting, and setting on any class of rivet work.

RIVETER, PNEUMATIC **RAPID**

Description: The pneumatic riveter on boiler plate, ship plate, and on structural steel must be able to do all classes of riveting on steel plates over one-fourth inch thick.

Qualifications: The pneumatic riveter must be able to operate skillfully all sizes and kinds of pneumatic hammers used in riveting. He should understand the proper drawing of rivets and the setting of joints to make them water-tight and steam-tight. He must direct the work of rivet heaters, holders on, and rivet passers.

RIVET HEATER **RARE**

Kindred Occupations: Blacksmith's helper; Riveter's helper.

Description: The duties of the rivet heater are rivet heating in connection with structural-steel work, boiler making, automobile truck frames, and railroad locomotive or car shops; or in shipbuilding.

Qualifications: He must be capable of operating all kinds of rivet-heating forges under all conditions and in difficult localities, and be able to maintain the forge at proper heat and deliver properly heated rivets to the riveter. He must be skilled in the rapid handling of rivets and in tossing or delivering them to the proper point. He should have had similar experience with erecting, manufacturing, or railroad construction work, or in a shipyard.

CARPENTER GROUP

BENCH HAND, CARPENTER SHOP — **BEST**

Description: The bench hand, carpenter shop, should do all kinds of hand bench work and assembly of mill made furniture parts and interior wood finishing.

Qualifications: The bench hand must be thoroughly skilled in the use of bench carpenter tools. He should be able to work to drawings and sketches, understand glueing and nailing, and the use of screws. He must be thoroughly familiar with furniture and building hardware. He should have had considerable experience in a furniture factory or in a planing mill, assembling interior woodwork.

Schooling: Common school.

BOAT BUILDER, WOOD — **BEVEL**

Kindred Occupations: Boat carpenter; Canoe builder; Joiner; Pattern maker.

Description: The duties of the wood boat builder are the building and repair of small wooden boats, floats, pontoons, and motor boats.

Qualifications: He should be experienced in the details of construction of all classes of flush and clinker built or canvas covered pleasure or life boats or canoes, small yachts or cruising boats of all sorts. He must be capable of building or repairing pontoons or wooden floats. He should be skilled in the use of carpenter's, boat builder's, and joiner's tools, and familiar with all kinds of wood used in boat building, and be an expert gluer and a capable, accurate worker.

Schooling: Common school; preferably high school.

BRIDGE CARPENTER — **BIAS**

Kindred Occupations: Dock carpenter; General construction carpenter; Railway mine timberman.

Description: The duties of the bridge carpenter are the construction of timber trestles, bridges, and docks, or general heavy timbering for any purpose.

Qualifications: He must be a practical heavy timber carpenter skilled in bridge or trestle construction and experienced in laying out from drawings and sketches and in heavy framing work for trestles, truss or beam bridges, foundation grillage, heavy building framing, flumes, and bridge caissons, and dock and pier construction. He must also be able to frame ties and stringers. He should understand pile work, capping, shoring, underpinning, and the handling and working of heavy dressed timbers, round or hewn timber, for permanent or temporary highway, railway, dock, or construction work. He should be a thoroughly good cross-cut saw, ax and adz worker, with a knowledge of the use of pneumatic borers, and drift bolt drivers, and be capable of placing and bolting up iron work.

Schooling: Common school; preferably high school.

CABINETMAKER CHICK

Kindred Occupations: Furniture maker; Joiner; Skilled carpenter on interior finish.

Description: The duties of the cabinetmaker are the making of all kinds of wood cabinets and fine woodwork.

Qualifications: He must be practically experienced in the selection and use of hard woods and veneered woods, and be able to work to drawings and sketches, laying out and making or repairing all kinds of furniture, cabinets, desks, instrument cases, and fine wood work. He should be a skilled bench hand and have had some experience in the use of woodworking machinery.

Schooling: Common school; preferably high school.

CAR CARPENTER CREED

Kindred Occupations: General carpenter; House carpenter; Railroad carpenter.

Description: The duties of the car carpenter are the construction, assembly, and repair of railway freight cars, employing wood in part or whole.

Qualifications: He must be experienced in the building of various kinds of wood body, side or box standard railway freight cars. He must be able to work to drawings, lay out and build wood frames, make and hang doors, lay floors, and put on roofs, sides, and ends on either wood or steel frame cars, or make repairs to such cars. He must be a thoroughly capable general carpenter, skilled in the use of tools and having some experience with woodworking machinery. He should have worked as general car carpenter in a railroad car shop or car building plant as decker, door hanger, roofer, or liner.

Schooling: Common school; preferably high school.

CARPENTER, CONCRETE FORM CHIDE

Kindred Occupations: Building carpenter; Concrete carpenter; General carpenter, foreman; House carpenter.

Description: The duties of the concrete form carpenter are the construction and erection of all kinds of forms for concrete or reinforced concrete construction work.

Qualifications: He must be a thoroughly experienced concrete form builder and erector, and able to supervise such work. He should be a skilled general carpenter, able to work to drawings and sketches, lay out foundations, and locate columns, walls, and openings, make and erect every class of wooden form of concrete column, girder, or slab and foundation construction work, forming same to imitate stone work. He must understand bracing, locking, and supporting. He must be thoroughly familiar with various types of reinforcing, such as bent rod, made-up rod trusses, or wire mesh, the placing of hanger supports, hole blocks, and openings. He should have a thorough knowledge of the several types of concrete building construction, such as girder and slab, and mushroom, and understand retaining wall, abutment, pier, and arch construction. He should understand form stripping, resetting and scaffolding.

Schooling: Common school; preferably high school.

CARPENTER, EXPERT CHIEF

Kindred Occupations: Boss carpenter; Builder; Contractor; Foreman carpenter.

Description: The duties of the expert carpenter are the supervision and general construction of wooden buildings of any character for any purpose.

Qualifications: He must be a thoroughly experienced, all-round carpenter on house building or general frame construction. He should be able to estimate quantities and be capable of working to drawings and sketches and laying out general work. He must be familiar with the framing and building of frame warehouses, barracks, or sheds, and be able to supervise carpentry construction work of any character. He should be a competent inside worker, able to hang sashes, doors, and blinds, lay flooring, and should have a practical knowledge of stair building and builder's hardware. He should have a thorough working knowledge of all carpenter tools and some experience with woodworking machinery. He should have had broad experience as foreman carpenter on large operations, factory, or building construction, or as house carpenter, contracting carpenter or builder.

Schooling: Common school; preferably high school.

CARPENTER, GENERAL **CHILD**

Kindred Occupations: Carpenter's helper; House carpenter; Mill carpenter.

Description: The duties of the general carpenter are carpentry work of any character.

Qualifications: He must be a practical general carpenter on all kinds of construction or repair work, capable of working to drawings or sketches on buildings, barracks, or shed construction and repair. He must understand framing and sheathing, and must be able to make all layouts for windows, door frames, and other openings ahead of bricklayers, cement workers, and other building crews. He should be skilled in the use of usual carpenter tools and materials, and be a good hatchet and saw man, capable of doing rapid rough work. He should have some knowledge of concrete form work and roofing with shingles or paper. He should have had experience on concrete work or as a house carpenter.

Schooling: Common school; preferably high school.

CARPENTER, PACKER **CHILL**

Kindred Occupations: Boxer and packer; Cabinetmaker; Joiner.

Description: The duties of the packer carpenter are boxing and packing for shipment any class of material in stores or warehouses.

Qualifications: He must be a thoroughly expert boxer, crater, and packer, capable of laying out all kinds of boxes, crates, and frames for packing, handling, and shipping for export, delicate instruments, light or large, bulky or heavy, delicate pieces, and machinery. He must be a skilled general carpenter familiar with tools and usual boxing woodworking machinery and be able to box securely and safely or crate any kind of article. He should have had experience as a boxer or shipper for a cabinet and furniture factory, or as a boxer for a large manufactory of light machinery.

Schooling: Common school; preferably high school.

CARPENTER, SHIP, FOREMAN OR SHIPWRIGHT **CHIN**

Kindred Occupations: Boat builder; Skilled general carpenter; Timber carpenter.

Description: The duties of the foreman ship carpenter are to supervise the building of wooden ships, large pontoons, barges, and other classes of floating craft. In steel ship work he supervises all necessary wood construction except the interior finishing, which is done by the ship joiner.

Qualifications: He must be a skilled all-round ship carpenter, experienced in building barges, pontoons, and wooden ships, including all such work as laying out, framing, stage building, fastening, planking, calking, hewing, deck laying, etc. He must be experienced in building launching ways, launching cradles, and in the actual launching of wooden and steel ships.

Schooling: Common school; preferably high school.

CARPENTER, SHIP, GENERAL CHINA

Description: The general ship carpenter on wooden ships does the usual kind of ship carpentry, such as planking, beveling, dubbing, scarfing, squaring, strapping, and spar making. On steel ship work he erects staging, lays wooden decks, builds launching ways and launching cradles, and assists in launching.

Qualifications: He must be thoroughly skilled in the use of the ordinary carpenter's tools and in addition have special training with the adz, broadax, and other special ship tools. He should be able to work to drawings and understand framing and sheathing work and should be capable of doing rapid rough work, both by hand and with the ordinary woodworking machines.

Schooling: Common school.

CARPENTER, TANK CHINK

Kindred Occupations: Barrel or tube maker; Cooper; General wood mill worker; Tank or stave pipe factory worker.

Description: The duties of the tank carpenter are the construction and erection of wooden stave tanks and pipes.

Qualifications: He must be a practically experienced wooden stave tank or pipe builder and erector skilled in the manufacture of wooden staves and bottoms and in the fitting and assembling and banding of wooden tanks and stave pipes, and their repair. He should have a thorough knowledge of wood for tanks and be experienced in the use of woodworking machinery, such as circular and band saws, planers, jointers, groovers, and shapers, and stave making machinery and tools in general. He should have sufficient knowledge of rigging and scaffolding to be able to erect tanks or stave pipes in the field.

Schooling: Common school; preferably high school.

COOPER CHIP

Kindred Occupations: Cask maker; Joiner; Tank builder.

Description: The duties of the cooper are the repairing and assembling of barrels, casks, and tierces.

Qualifications: He must be a thoroughly skilled barrel, tierce, or cask maker, able to make completely or assemble barrels and casks shipped "knocked down" and to repair thoroughly those damaged in transit or to open and rehead barrels. He must be thoroughly familiar with the various woods used in making barrels or casks, and the methods used in drying, bending, shaping, fitting, and assembling staves and heads. He should have had similar experience in refineries, distilleries, flour mills, oil refineries, or cooperage.

Schooling: Common school; preferably high school.

JOINER JACK

Kindred Occupations: Cabinetmaker; Furniture maker; Skilled carpenter.

Description: The duties of the joiner are to construct high grade woodwork and to assemble machine-made woodwork.

Qualifications: He must be an experienced hand, capable of reading drawings and sketches and laying out and doing all classes of joinery work. He must be able to do all classes of wood assembly work, such as making sashes and window frames, doors and door frames, and general house building, wood fixtures, desks, file cases and special boxes, and instrument cases, and installing mill-made interior finish. He must be a competent bench hand and should have had some experience in the use of woodworking machinery.

Schooling: Common school; preferably high school.

JOINER, SHIP JADE

Description: The ship joiner does the interior finishing on the ship, including cabin and stateroom work, stair building, etc. He also builds and assembles furniture, sideboards, bookcases, and deckhouses.

Qualifications: The ship joiner must be able to read drawings, to do all kinds of cabinetmaking and joinery, to operate woodworking machinery and be familiar with the peculiarities of ship construction, such as the use of the bevel and bevel board.

Schooling: Common school.

MACHINE HAND, WOODWORKING MACHINERY MAPLE

Description: For the purpose of this description of occupations the machine hand, woodworking machinery, is defined as one who has a complete mastery of the work to be done on a specified machine.

Qualifications: The machine hand, working on woodworking machinery, should be able to set up the machine for any standard work and to make all adjustments and measurements to drawings, patterns, or templates. He should have sufficient knowledge of the machine to report when all is not working right and should know when cutters are working effectively or when they are dull.

Schooling: Common school.

Note.—In specifying a machine hand under this code it will be necessary to add the name of the machine for which a hand is desired to the code word for a machine hand.

MACHINE OPERATOR, WOODWORKING MACHINERY MAR

Description: For the purpose of this description of occupations the machine operator, woodworking machinery, is defined as one who runs a machine after it has been set up and adjusted by another.

Note.—If a machine operator is specified under the general code word for machine operator it is understood that the employer is prepared to, and expects to, give the necessary training for the operation of the machine to which the operator is to be assigned.

If an operator is desired who has had experience on any particular machine the name of the machine must be added to the code word for machine operator.

MACHINE REPAIR AND UPKEEP MAN, WOODWORKING MACHINERY MARCH

Description: The duties of the parquetry floor layer are to lay all kinds of working machinery are to make all general repairs to machines and transmission devices.

Qualifications: He must be a thoroughly qualified woodworking machinery repair man, able to install and adjust all kinds of woodworking machinery and connect them to shafting or to motors. He should have a thorough understanding of the lubricating of high speed machinery; also a thorough understanding of the care, adjustment, and use of all safety devices. He should be able to work from drawings and to make sketches that can be sent to a general repair shop when machine work is required.

PARQUETRY FLOOR LAYER **POINT**

Description: The duties of the parquetry floor layer are to lay all kinds of ornamental parquetry floor designs according to layouts furnished by the architect.

Qualifications: Must be able to read drawings and interpret all layouts; must be skilled in the use of all small woodworking tools, especially the square, plane, and saw. Should have had experience as a joiner and considerable experience as a layer of parquetry flooring.

Schooling: Common school.

STAIR BUILDER **SENNA**

Description: The stair builder erects all kinds of complicated stairs, including banisters and newel posts.

Qualifications: The stair builder must be a thoroughly experienced carpenter and joiner, able to work to drawings and patterns, to lay out and construct any form of stairs, and install banisters and newel posts in a thorough, workmanlike manner. He should have had an experience equivalent to an apprenticeship under a journeyman carpenter and joiner and should have done considerable independent stair building work.

Schooling: Common school; preferably high school giving courses in general drawing and building and stair layout.

WOODWORKER, MACHINE, GENERAL **WAIVE**

Kindred Occupations: Factory carpenter; Millman; Wood mill worker.

Description: The duties of the general machine woodworker are the operation and upkeep of general woodworking or mill machinery of any kind.

Qualifications: He must be experienced and practically skilled in the operation and use of general woodworking or mill machinery. He must be able to work to drawings and sketches, and capable of running band saws, circular saws, swing saws, planers, jointers, edgers, mortise and tenon machines, molders, lathes, and the general run of power driven woodworking machine tools found in a well equipped cabinet factory, railway car shop, or general mill, automobile, wagon, or furniture factory. He should be able to set and operate and make usual adjustments or minor repairs. He should have had experience in a general mill, furniture factory, or wagon plant.

Schooling: Common school; preferably high school.

CRANE, DERRICK, CAPSTAN, DITCHING, HOISTING, PILE DRIVING, STEAM SHOVEL WORK, AND WELL DRILLING GROUP

CAPSTAN OR DRUM AND CABLE MAN — CROWN

Kindred Occupations: Boom crane operator; Crane director; Derrick operator; Hoisting engine man; Steam shovel man (boom or scoop shovel); Steam shovel man (clam shell or drop bottom type of bucket).

Description: The duty of the capstan or drum and cable man is to operate the controlling devices of a capstan or drum and cable for the skidding of logs, moving of buildings, and such other work with capstan or drum cable as involves the use of the steam engine and boiler.

Qualifications: He should know how to anchor and support a cable; should be thoroughly familiar with all the parts of the machinery connected with a small hoisting engine; should be able to make repairs, move his engine, boiler, and machinery from place to place; have a thorough knowledge of the operation of a small steam boiler, steam engine, and pump; should be able to operate an outfit under unfavorable conditions in logging camps or in general construction work. He should have good physical strength and endurance and good eyesight and hearing. He should have had experience as fireman and assistant to a capstan or drum and cable man.

CRANE MAN — CHEER

Description: The duties of the crane man are to select and attach all lifting devices and to direct the crane operator in the lifting and the shifting of loads. He must also warn persons who might be in danger when material is being lifted or carried.

Qualifications: The crane man should be thoroughly familiar with all the hitches, ties, and devices for lifting loads. He should be a good judge of weights; should know all the crane man's signals, and be thoroughly familiar with all the rules for safety. He should be physically fit and alert and pass an examination for eyesight, color sight, and hearing. He should have been an assistant to a crane man.

Schooling: Common school.

CRANE OPERATOR, BOOM CRANE — CHEF

Description: The duty of the crane operator on a boom crane is to operate the controlling devices of a boom crane in lifting and placing material on such work as building and bridge construction and in ship building.

Qualifications: The boom crane operator should thoroughly understand all the controlling devices on the crane. He must be able to fire a small portable boiler and to run a small hoisting engine. He must be able to make all minor repairs, such as repairs to valves, pipe fittings, and general machinery. He should know enough about all the parts of the machinery to make reports when it is not working right. He should be physically fit and alert and pass an examination for eyesight, color sight, and hearing. He should have had experience as fireman or an assistant to a boom crane operator.

CRANE OPERATOR, TRAVELING ELECTRIC CRANE CHESS

Description: The duties of the traveling electric crane operator are to manipulate controlling devices of an electric crane in the lifting and shifting of material.

Qualifications: The traveling electric crane operator must be able to handle the lifting devices on the crane and make single or double lifts under the direction of the crane man. In addition he must know how to oil the machinery of the crane and be familiar enough with all the working parts to make reports when they are not working right. He must be thoroughly familiar with all the signals used by the crane man. He must be physically fit and alert and must pass an examination for eyesight, color sight, and hearing and be able to think and act quickly.

Schooling: Common school.

DERRICK OPERATOR DAMP

Description: In this classification the derrick operator is defined as one who operates the controlling devices of a derrick or boom crane, similar to the derrick operated by a construction or wrecking crew of a railroad, and to supervise the work of a fireman.

Qualifications: The derrick operator must be experienced in the operation of the standard types of a small steam engine such as are used on locomotive cranes, well drillers, pile drivers, and dredges. He must know how to operate all the controlling devices on the derrick. He should be able to make all minor repairs to the general machinery, repair and set engine valves, make pipe fittings, and keep the engine and machinery in good running condition. He should be familiar with every part of the machinery so as to make a report when all is not working right. He should have good physical health, good eyesight, color sight, and hearing.

Schooling: Common school.

HOISTING ENGINEMAN HAND

Description: The duties of the hoisting engineman are to operate a large hoisting engine in hoisting coal, ore, or rock from a mine or from a shaft.

Qualifications: He must understand thoroughly the operation of a large stationary steam engine and boilers. He should know how to control all the hoisting devices, make all minor repairs to the hoisting machinery, and have sufficient knowledge of all the machinery to make reports when all is not working right. He must thoroughly understand the operation of cable and drum hoists and be able to hoist at a rapid rate. He must be thoroughly conscious of the danger to others in any misuse of the machinery and in disobedience of signals. He must be physically fit, alert, and equal to any emergency; must have good eyesight and hearing. He must have had experience in a boiler and engine room as assistant to a hoisting engineman.

Schooling: Common school; preferably high school.

PILE DRIVER OPERATOR PATCH

Kindred Occupations: Dredge engineman; Hoisting engineman; Steam shovel operator; Yard or wrecking crane operator.

Description: The pile driver operator attends to the operation and maintenance of standard types of pile drivers on any character of work.

Qualifications: The pile driver operator must be a thoroughly experienced and practical steam pile driver operator on both drop and steam ram types. He must be able to set up a machine, either land or floating type,

and operate and maintain it on any class of work. He should be a good steam boiler fireman, able to make minor repairs on boilers, including cutting out and replacing or reexpanding flues, and able to operate and maintain engine pumps, piping, and accessories; must be a good rope man and rigger, also able to splice cables, reeve ropes and guy frames. He should have a good general knowledge of piles, know when they are sound and right to drive, and how to point and put shoes on. He should understand pulling piles. He should have been a member of a pile driving crew in the building of docks, piers, foundation or trestle work.

RIGGER, BRIDGE AND STRUCTURAL **RANGE**

Description: The bridge and structural rigger's duties consist of attaching all lashings and tackle necessary to lift all trusses, beams, or timbers into place on bridge or structural work of all kinds.

Qualifications: The bridge and structural rigger must be a thoroughly experienced bridge and structural erecting rigger, familiar with handling heavy beams, columns, girders, and steel bridge or structural building members. He must thoroughly understand the erecting and use of traveling bridge cranes, boom derricks, and electric or portable hoisting equipments used on such work. He must be thoroughly familiar with roping and rigging sheaves, blocks, pulleys, and guying of poles, booms, "A" frames, tripods, and the reeving, running, and splicing of hemp or steel cables and ropes for any purpose. He must understand lashing, hitching, and hooking with loops, wire ropes, or chains and be able to balance beams and upend columns. He should be able to handle heavy irregular pieces and raise or lower accurately on erection work in general.

RIGGER, HEAVY MACHINERY **RANK**

Description: The duties of the rigger on heavy machinery consist of the lifting and placing of heavy machinery by means of any type of hoisting machinery.

Qualifications: He must be thoroughly familiar with roping and rigging sheaves, blocks, pulleys, and guying of poles, booms, "A" frames, tripods, and reeving and running of hemp or steel cables and ropes for the purpose of hoisting machinery such as engine beds, boilers, large booming machinery, or large shipping machinery of any kind. He must thoroughly understand the erecting and use of traveling bridge cranes, boom derricks and electric or portable hoisting equipment used on such work. He should have had experience in a crane crew as a helper and should have had considerable experience as a rigger on heavy work in shipyards or on large structural work.

STEAM SHOVEL MAN (Boom or scoop shovel) **SEINE**

Description: The duty of the steam shovel man is to operate a boom or scoop shovel for general excavating or handling of coal, ore, or loose rock.

Qualifications: He should have a practical knowledge of the manipulation of boom shovels, must know how to change the position of the shovel, how to keep a machine shovel close to the bank, and how to drive from place to place. He must be familiar with the care and operation of small steam boilers, engines, pumps, and such other apparatus and equipment that usually go to make up a steam shovel outfit. He should be able to make ordinary repairs and must have sufficient knowledge of all the machinery to report when it is not working right; and be quick in

any emergency and know the danger of cave-ins when excavating in the various types of rock and earth. He should be physically fit and alert, and have good eyesight and hearing. He should have had experience firing and assisting with a steam shovel.

Schooling: Common school.

STEAM SHOVEL MAN (Clam shell or drop bottom type of bucket) SEIZE

Description: The duties of an operator of a clam shell or drop bottom shovel are to remove sand, soft rock, crushed rock, or earth in general dredging and excavating and in the handling of ore and coal.

Qualifications: The clam shell or drop bottom shovel operator should be familiar with the use of cable, tackle block, cable drums, and with carrying cables; should know how to anchor and support carrying cables and be thoroughly familiar with all parts of the machinery connected with the hoisting engine and with moving the bucket; should be able to make all minor repairs, and have sufficient knowledge of all the machinery to make a report when it is not working right; should have a thorough knowledge of firing and operating small steam boilers, engines, and pumps. He should be a man equal to any emergency and know the danger of cave-ins when excavating in the various types of rock and earth. He should have good physical strength and endurance; good eyesight and hearing. He should have had experience as fireman and assistant where clam shell and drop bottom buckets are used.

Schooling: Common school.

WELL DRILLER (Domestic water supply) WAIST

Kindred Occupations: Boom crane director; Pile driver.

Description: The duties of the well driller are the operation of a portable churn well drilling outfit in the drilling of wells to supply water for farm or household use.

Qualifications: He must be thoroughly familiar with the operation of a small well drilling outfit operated either by horsepower, gasoline power, or steam power. He must be capable of moving and setting up his outfit and operating it under difficult conditions. He must be able to drive, draw, seal, and cap casings. Must be able to fish for drills and recover casings, and be able to dress well tools. He should be experienced in drilling wells up to 200 feet with holes from 2 to 4 inches. He should have had experience as an assistant to a driller of small wells.

WELL DRILLER (Oil, gas, and artesian) WAIT

Kindred Occupations: Artesian well driller; Oil well driller.

Description: The duty of the well driller is the operation of portable or semiportable churn type well drilling outfits.

Qualifications: He must be thoroughly experienced and conversant with methods and apparatus for drilling up to 500 feet and holes up to 8 or 10 inches. Must be capable of moving, locating, setting up and operating, driving or drawing casing, sealing and capping. Must be able to recover casing, or fish for tools, and must be skilled in dressing tools, able to run gasoline, oil, or steam engine equipments, and make all field repairs, and able to operate in difficult locations or under unfavorable conditions. Should be able to drill 6 or 8 inch holes for churn drill blasting operations, for quarry or breaking of ore. Should have a knowledge of shooting wells, and experience with Star or Cyclone outfits. Should have had experience at oil well general drilling, or artesian well drilling.

Schooling: Common school.

DRAFTSMAN, SPECIAL, GROUP

ARCHITECTURAL DRAFTSMAN — **ACRID**

Description: The duties of the architectural draftsman are planning buildings, working up architectural details, and making general building designs.

Qualifications: He must be thoroughly familiar with general building construction and materials, have a good knowledge of architectural styles and features, and be able to plan and supervise artistic features of any class of building operations. He must be capable of making free-hand sketch designs and details, and able to make engineering computations involved in the strength of materials, beams, and trusses. Must be able to work up finished designs from architects' sketches. Must be capable of making usual computations, such as estimates of quantities and costs of houses, barracks, warehouses, and other general buildings. Should have had experience in an architect's office or with an architectural engineering concern.

Schooling: Preferably high school or the equivalent.

COMMERCIAL DRAFTSMAN — **CHEAP**

Description: The commercial draftsman should do general all-round drafting required by any commercial firm or institution, such as laying out location of buildings, plans of arrangements in offices, large rooms, and factories, drawing all kinds of forms, records, and charts.

Qualifications: He must be skilled in the use of all drafting instruments required for this kind of work, such as pens, compasses, dividers, "T" squares, straight edges, triangles, and scales, and in the use of various paints and washes for coloring drawings. Must have had similar experience in drafting in an industrial, commercial, or other drafting room.

Schooling: Preferably high school or the equivalent.

HULL DRAFTSMAN. (*See* Ship and boat draftsman.)

MAP MAKER — **MANNA**

Description: The duties of the map maker are compiling, drawing, and copying maps (not topographical) of cities, towns, counties, townships, States, Territories, continents, road maps, railroad maps, statistical maps, charts or graphs or map work of a similar general nature.

Qualifications: He must be thoroughly experienced in the use of drafting instruments, and free-hand ruling, writing, and profiling pens required for drawing boundaries, shore lines, rivers, railroads, roads, and mountains on maps or charts of any kind for general use or reproduction purposes. Must be a neat and rapid letterer, and be familiar with the use of water color paints and brushes for coloring maps. Must be capable of working on drawing paper, or tracing linen. Should have had experience in detailing and lettering under the direction of an experienced map maker.

Schooling: Preferably high school or the equivalent.

MARINE ENGINE AND AUXILIARY DRAFTSMAN MANOR

Description: The duties of the marine engine and auxiliary draftsman are to prepare assembly and detail drawings of marine engines and auxiliary ship equipment.

Qualifications: He must be a thoroughly experienced mechanical draftsman, with special knowledge of general design and details of marine engines, either single, compound, or triple expansion, steam turbines, boilers, pumps, condensers and feed water heaters, piping, and auxiliary apparatus. He must be familiar with the layout of foundations and supports of power and operating equipment in ships of different types. Must be thoroughly familiar with materials of construction, able to calculate and proportion dimensions of parts, capable of making sectional drawings of any part or parts of the main power or auxiliary apparatus. Must be capable of turning out complete finished drawings in connection with any part of the mechanical equipment of a ship.

Schooling: Preferably technical school graduate.

MINE DRAFTSMAN MANY

Description: The duties of the mine draftsman are to draw to scale machine and structural designs worked out by the mining engineer or mine superintendent; to make sketches and blueprints of all mine workings, both plain and sectional; and to plot survey notes turned in by the mine surveyor.

Qualifications: The mine draftsman must first be a mechanical draftsman (see Mechanical draftsman); must be a good letterer in Roman and block type of letter; must be familiar with mining machinery and mine terms; and must have a knowledge of topographic and map work. He should have good health and good eyesight. He should have had experience in a drafting room, making drawings under the direction of a mining engineer or mining superintendent, and should have had considerable independent experience.

Schooling: Technical high school, preferably college graduate.

RAILROAD SHOP DRAFTSMAN RAM

Description: The duties of the railroad shop draftsman are to make drawings for locomotives, all general machine parts, and for railway car equipment.

Qualifications: He must have a thorough knowledge of strength of materials and their use as applied to rolling stock, and be experienced in the design of locomotive parts; must be familiar with shop practices, including machine tool work, pattern and foundry work; must be a thoroughly skilled general designer and draftsman; and must be familiar with railroad practice. He should have had experience in mechanical design and drafting in railroad shops.

Schooling: High school or the equivalent; preferably some technical training.

REINFORCED CONCRETE DRAFTSMAN RAMIE

Description: The duties of the reinforced concrete draftsman are the designing and detailing of all classes of work involving reinforced and concrete construction.

Qualifications: He must be an experienced draftsman and designer of various types of concrete buildings, arches, dams, abutments, piers, conduits, and retaining walls, either mass or reinforced. He should have knowl-

edge of the physical properties and chemistry of cement, and various kinds and grades of sands and stones, and their relative adaptability for use in reinforced concrete. He must be capable of calculating proportions, size, and spacing of reinforcing and the placing of same, and be able to calculate quantities and costs, and must be able to design in detail forms and framing for concrete work of all sorts. He should have had experience on general contracting, bridge building, hydraulic or civil engineering or railroad work.

Schooling: He should be a graduate of a technical school.

SHIP AND BOAT DRAFTSMAN—HULL DRAFTSMAN SECT

Description: The ship and boat draftsman must do ship drafting in connection with the design and construction of hulls for large boats or ships.

Qualifications: He must be an experienced draftsman with a thorough knowledge of the various types of ships, including the principal dimensions, lines, beam members, and structural details, and be capable of making all drawings, such as horizontal and longitudinal cross sections, deck plans, transverse, bulkhead, rigging details, cargo boom and fittings, water-tight doors, stem, stern frame and rudder arrangements and details, and air ports. He must have had experience in the employ of shipbuilding designers, contractors, or marine architects, and should have done considerable hull drafting.

Schooling: Preferably a technical school graduate.

STRUCTURAL DRAFTSMAN SEDGE

Description: The duties of the structural draftsman are the designing and detailing of plans involved in any construction employing structural steel.

Qualifications: He must be a thoroughly competent and experienced structural draftsman for bridges and buildings. Must have a thorough knowledge of the design of bridge trusses, plate girders, roof trusses, trestle bridges, columns, and such steel as would enter into viaducts, and also skilled in structural design and fabrications of buildings. Must have a knowledge of building requirement such as of reinforced concrete work, arches, abutments, piers and retaining walls, including a knowledge of material and erecting equipment. Must be competent to calculate quantities, and prepare estimates of materials and costs. He should have had similar experience in general structural engineering, bridge construction, railroad or architectural building work.

Schooling: Preferably a technical school graduate.

ELEVATOR CONSTRUCTION GROUP

ELEVATOR CONSTRUCTOR, ELECTRIC ELEVATOR **ERROR**

Description: The electric elevator constructor assembles and installs all kinds of freight service and passenger elevators.

Qualifications: He should be able to read mechanical drawings and electric wiring diagrams and have a general knowledge of all operating machinery. He should be able to make electric wiring connections after the electrical units have been put in place by the electricians. He should know how to place the elevator on the foundations, assemble the car and platform, put up brackets and rails and all overhead construction, install cables and counter weights, install and adjust all safety and controlling devices. He should have served an equivalent to an apprenticeship and should have done considerable work as a journeyman.

Schooling: Preferably technical high school or technical college training.

ELEVATOR CONSTRUCTOR, FOREMAN **ERECT**

Description: The duties of the elevator constructor foreman are to install and supervise the installation of all forms of electric and hydraulic passenger and freight service elevators.

Qualifications: He must be able to read mechanical drawings and electrical wiring diagrams. He should have a thorough knowledge of elevator foundations and hatchways; be able to do or supervise plumbing of the hatchways, setting of brackets and rails, and assembling of the machinery controlling devices; to check up electrical or hydraulic machinery, to set up tackle and rigging for the hoisting of all overhead machinery, to inspect and pass upon the installation of all cables, controlling and safety devices, signal wiring and power wiring. He should have had considerable experience as a journeyman elevator constructor and also considerable experience in handling men.

Schooling: Preferably technical graduate.

ELEVATOR CONSTRUCTOR, HYDRAULIC **ERRED**

Description: The duties of the hydraulic elevator constructor are to put into place ready for use all forms of elevators run by hydraulic power.

Qualifications: He must be able to read mechanical drawings, have a thorough knowledge of setting elevators, putting in plungers, setting brackets and rails, plumbing hatchways, setting up overhead machinery, and installing all safety and controlling devices. He should have served an equivalent to an apprenticeship and should have done considerable work as a journeyman elevator constructor.

Schooling: Preferably technical high school or technical college work.

ENGINEMAN AND FIREMAN GROUP

ENGINEMAN AND FIREMAN (Portable outfit) **ECLAT**

Kindred Occupations: Fireman; Stationary engineer; Steam engineer.

Description: The duties of the engineman and fireman are the operation and upkeep of small portable or semiportable equipments, including engines and boilers and small isolated steam power plants.

Qualifications: He must have an all-round experience in handling both engines and boilers of comparatively small capacity. He must be familiar with boilers and engines such as are used in connection with donkey engines, hoisting engines, pile driver engine equipment, tractors, railroad pumping stations, or small isolated steam driven power plants. He must be thoroughly familiar with all the parts, fittings, and appurtenances of small engine and boiler units, and be capable of making all usual running repairs. He should possess a knowledge of pipe fitting, valves, water and steam connections, and be capable of keeping all in first-class running condition. He should have had similar experience in road building, mine, contracting, or railroad construction work.

Schooling: Common school.

ENGINEMAN, CHIEF, POWER HOUSE **ETCH**

Description: The chief engineer has charge of the power plant and all men working there. He supervises the operation of turbine generators, exciters, convertors, condensers, pumps, and boilers. He keeps charts and records of the operation of each separate engine, the coal used, the total load carried on all feeding lines, the kilowatt hours, and the voltage. He supervises all repairing, construction, testing, and cleaning, and directs the transfer of coal from barges or cars to the bins and the removal of ashes.

Qualifications: He must have a first-class license, granted upon examination. His knowledge and experience must cover all the equipment in the plant—turbine generators, boilers, pumps, convertors, exciters, condensers, conveyors, switchboards, storage batteries, feed wires and indicators of all kinds; their operation, maintenance, and repair. He must be a good mathematician and able to read drawings and to keep charts and graphs. The position also requires that he have the ability to select and to deal with and handle the men under him.

Schooling: Common school; technical school or its equivalent.

ENGINEMAN, GAS, OIL, OR GASOLINE ENGINE **EDDY**

Kindred Occupations: Gasoline engineman; Isolated plant engineer; Truck driver.

Description: The gas, oil, or gasoline engine engineman's duties consist of the operation and maintenance of standard makes of internal-combustion engines, either gas, gasoline, or fuel oil, for portable or stationary work.

Qualifications: He must be a thoroughly practical gas or fuel oil engine operator, familiar with the various makes and types of gas, oil, or gasoline engines, and be capable of taking full operating charge of such engines used for any purpose, such as driving generators, pumps, general machinery, construction, or excavating appliances. He must be capable of making all necessary adjustments and able to make usual repairs, such as scraping and adjusting bearings, grinding and adjusting valves, cleaning cylinders, and replacing piston rings. He must be able to adjust carbureter to secure maximum power and have some knowledge of belts. It is desirable that he have a knowledge of isolated power plant electrical apparatus, air compressors, and power pumps for excavations and emergency work. He should have had similar experience with such engines for power purposes in shop, lighting or power plant, subway, quarry or mining operations.

Schooling: Common school.

ENGINEMAN, GASOLINE LOCOMOTIVE EDGE

Kindred Occupations: Auto mechanic; Steam engineman or fireman with auto driving experience; Tractor driver; Truck driver.

Description: The gasoline locomotive engineman's duties consist of the operation and care of various types of oil or gasoline driven locomotives.

Qualifications: The gasoline locomotive engineman must have a thoroughly practical knowledge of various makes of oil or gasoline locomotives, gasoline railway motor cars, or gasoline electric cars. He must have a knowledge of construction and upkeep of internal-combustion engines in general, including valve grinding and operating adjustments, and all operating repairs to gasoline engines, air brakes, and light locomotive running gear, and should be familiar with railroad operating rules and regulations to some extent. He should have had experience as heavy auto truck or tractor driver and mechanic.

Schooling: Preferably high school.

ENGINEMAN, LARGE STEAM POWER PLANT OPERATOR EVENT

Kindred Occupations: Chief engineer; Mechanical engineer; Operating engineer; Power plant engineer.

Description: The duties of the engineman operating a large steam power plant are the supervision, operation, and maintenance of steam power plant equipment of a central power or lighting plant.

Qualifications: He must be a licensed engineman, familiar with and capable of directing all details of operation of stationary steam engines and turbines of all types and capacities, including boilers, pumps, condensers, feed water heaters, air compressors, steam and water piping, and methods of storage and handling coal. He must also have a thorough knowledge of operation and control of direct or alternating current generators, high or low tension, exciters, switchboards, and understand all transforming, switching, protective, and other auxiliary apparatus. He must be capable of making performance tests of engines, generators, and boilers, and of keeping complete and accurate records of plant operations, and supervising the maintenance of plant equipment. He should have had experience as operating engineman in a large steam power plant.

Schooling: Preferably a technical school graduate.

ENGINEMAN, MARINE EDICT

Kindred Occupations: Assistant engineman; Stationary power plant engineman; Steam locomotive engineman.

Description: The duties of the marine engineman consist of the operation and the supervision, maintenance, and repair of marine engines and engine-room auxiliary apparatus.

Qualifications: The marine engineman must be a thoroughly experienced licensed marine engineman, capable of assuming entire charge of the engine-room of a large steamer, and capable of operating single, double, or triple expansion condensing marine engines, or high and low pressure steam turbines. He must be capable of maintaining engine and auxiliary apparatus in such condition that the maximum power may be delivered at short notice under all conditions of weather. He must be thoroughly familiar with the operation of all engine and boiler room auxiliary equipment, such as electric generators, pumps, condensers, feed water heaters, and hoisting equipment. He must be able to make all operating and emergency repairs. He must have had similar experience in steam power driven water craft, such as ocean-going liners, for freight or passengers, inland steamers, ferry boats, or large tug boats.

Schooling: Preferably a technical school graduate.

ENGINEMAN, PORTABLE EDIFY

Kindred Occupations: Erecting man on derricks, hoists, or shovels; Hoisting engineman; Stationary engineman; Steam engineman.

Description: The duties of the portable engineman consist of the setting up, operation, and care of any kind of small portable or semiportable steam engine used in erecting, contracting, construction, or for portable or semiportable work.

Qualifications: The portable engineman must be experienced with the operation of standard types and makes of small steam engines used on locomotive cranes, pile drivers, derricks, well drillers, dredges, steam shovels, hoists, or other portable or semiportable power plant requiring both engineman and fireman. He must be capable of erecting and taking entire charge, and be able to make usual repairs to engine valves and fittings and keep engine in good running condition under unfavorable conditions. He should be familiar with the operation of the boiler, using either coal, wood, or oil, and be able to assist in making pipe connections. A practical knowledge of hitching, raising, lowering, and shifting heavy weights is also desirable.

Schooling: Common school.

ENGINEMAN, REFRIGERATION EDIT

Kindred Occupation: Steam engineman.

Description: The refrigerator engineman attends to the operation and upkeep of mechanical equipment in ice or refrigeration plant.

Qualifications: The refrigerator engineman must be a licensed engineer and have had practical experience as chief or watch engineer in ice, refrigeration, or cold-storage plant. He must be skilled in the care of ammonia compressors, steam or motor driven, tanks, expansion coils, receivers, ammonia systems, ammonia piping, pumps and auxiliary apparatus. He should have a working knowledge of boilers, pumps, heaters, and general power plant equipment.

Schooling: Preferably a technical school graduate.

ENGINEMAN, STATIONARY, STEAM EEL

Kindred Occupations: Power station steam engineer; Stationary engineer; Steam engineer.

Description: The duties of the stationary steam engineman consist of the operation and maintenance of any type or size of stationary steam engine,

steam turbine, air or gas compressor, and steam pumping machinery, for any purpose.

Qualifications: The stationary steam engineman must have had thorough general experience as a licensed stationary steam engineer, and have had responsible operating charge of various types and makes of steam driven engines. He must be thoroughly capable of operating any slide valve or Corliss reciprocating engine, noncondensing or condensing, and high or low pressure steam turbines for driving either direct or belt driven lighting or power generators, or mill or factory power apparatus of any kind. He must also be capable of operating steam engines driving air or gas compressors, steam pumps, and any auxiliary power or steam apparatus in a central power house or factory. He must be thoroughly competent to make usual minor repairs, such as locating pounds, taking up bearings, scraping and refitting brasses, or packing piston rods and pistons of engines, and able to overhaul and supervise upkeep of equipment. He must be familiar with the steam generating apparatus, such as boilers, feed water heaters, economizers and injectors, valves and piping; some knowledge of electrical generators and switchboard control is desirable. He should have had steam engine operating experience in a central power or lighting station or isolated power plant.

Schooling: Preferably a technical school graduate.

ENGINEMAN, STEAM LOCOMOTIVE EGG

Kindred Occupation: Experienced locomotive fireman.

Description: The duties of the steam locomotive engineman consist of running or driving standard passenger or freight locomotives of various types.

Qualifications: The steam locomotive engineman must be a thoroughly experienced railroad locomotive engineer, with wide experience on express or through freight service with some large American railroad. He must be thoroughly familiar with such types of locomotives as camelback, compound, or mallet, and with various types of valve gears. He must have a thorough knowledge of care, upkeep, and ordinary running repairs on locomotives, and be able to take entire charge of the engine on any class of work, either through, local or yard work, using coal, oil, or wood fuel. He must have a thoroughly practical operating knowledge of all the details of the locomotive, such as boiler injectors, reversing mechanism, air pumps, and all auxiliary equipment and their upkeep. He must have an intimate knowledge of the standard signal systems and rules used on American railroads.

Schooling: Common school; preferably high school.

ENGINEMAN, WATCH, POWER HOUSE ETHER

Description: The watch engineman is in direct charge of turbine generators, condensers, pumps, exciters, converters, and boilers during the period of his watch, usually eight hours. He takes readings from the indicators of the engines and watches the load carried and the coal supply. The work of the switchboard operator, oilers, and firemen is under his supervision. He assists in and directs repairing and testing of the engines, and looks out for the safety of the men.

Qualifications: He must be a licensed engineman. He must be able to keep accurate records and to supervise the work of and instruct the men under him.

Schooling: Common school; technical school or its equivalent.

FIREMAN, CHIEF, POWER HOUSE **FIRST**

Description: The chief fireman has immediate charge of the boiler room and his helpers. He sees that all the fires are properly tended, that the grates are free from clinkers, and also that the required steam is maintained. He operates and regulates water pumps; operates the automatic coal feeds and the agitators; assists in the periodic testing of the boilers; and cleans boiler tubes with compressed air or steam.

Qualifications: He must have physical strength and endurance and must understand the maintenance of a good fire with the economic use of coal. He should be able to use a slice bar and a peel bar, and should have a thorough experience with boilers and fires. He must be qualified to direct and instruct his helpers.

Schooling: Common school desirable.

FIREMAN, LOCOMOTIVE **FATE**

Kindred Occupation: Locomotive hostler.

Description: The locomotive fireman's duties consist of the firing of the usual type of railroad locomotives.

Qualifications: The locomotive fireman must be capable of keeping up steam with any available fuel that can be used, on heavy grades, with frequent stopping, long or short hauls, heavy or light loads, under all kinds of weather conditions. He should have a thorough knowledge of the care and operation of locomotive furnaces, tender tanks or cisterns and injectors. He should be familiar with the operation of the air-brake equipment and must know all operating signals. He should have a thorough knowledge of the standard rules and regulations. He should have had experience as fireman on a locomotive boiler, and possess the necessary physical fitness.

Schooling: Common school; preferably high school.

FIREMAN, MARINE BOILER **FAULT**

Kindred Occupations: Fireman, river or lake craft; Locomotive fireman; Stationary boiler fireman.

Description: The marine boiler fireman fires or stokes any type of marine boiler.

Qualifications: The marine boiler fireman must be experienced in firing and caring for marine boilers of any type. He must be thoroughly experienced in maintaining a proper fire bed and steam pressure under all marine conditions under forced or natural draft. He must have a practical knowledge of safety valves, steam and water gauges, blow-off cocks, and be able to act as water tender. He should have some knowledge of condensers, feed water heaters, feed pumps, and ejectors.

Schooling: Common school.

FIREMAN, PORTABLE BOILER **FAUN**

Kindred Occupations: Fireman; Stationary boiler fireman.

Description: The portable boiler fireman fires a portable or semiportable steam boiler.

Qualifications: The fireman of a portable boiler must be thoroughly experienced in the operation, care, and cleaning of fire tube boilers, either vertical or horizontal, portable or semiportable types, and capable of maintaining proper steam pressure, using various grades of coal or wood fuel. He must have a knowledge of, and be experienced in, the

use of injectors, pressure and water gauges, and safety appliances. He must be familiar with the operation of steam boilers used on portable or semiportable power plants, such as traction engines, steam shovels, hoisting equipments, derricks, pile drivers, cranes, and dredges.

Schooling: Common school.

FIREMAN'S HELPER **FISH**

Description: The fireman's helper keeps the fires in shape under the direction of the head fireman. He operates the automatic coal feeders and the agitators. He assists in testing boilers and in blowing out boiler tubes with compressed air and steam.

Qualifications: He must be a strong, steady worker. Should have had experience in a large boiler plant.

FIREMAN, STATIONARY BOILER **FAVOR**

Kindred Occupations: Fireman; Locomotive fireman; Marine boiler fireman.

Description: The stationary boiler fireman fires boilers in a power station, factory power plant, or heating plant.

Qualifications: The stationary boiler fireman must be an experienced general fireman of stationary fire or water tube boilers of standard types and able to act as water tender. He must be thoroughly capable of firing, operating, blowing off, cleaning and keeping in good condition any type of fire or water tube stationary boiler, burning any grade of coal or fuel oil. He must have a knowledge of operating chain grate or automatic stokers, forced and induced draft fans, draft regulators, coal handling equipment and economizers. He must be thoroughly familiar with the operation of various safety appliances, injectors, feed water heaters and pumps, and smoke consuming devices. He should have some knowledge of valves and piping. He should have had experience as fireman in a power or steam plant of a central station or industrial plant.

Schooling: Common school.

LABORER, GENERAL, POWER HOUSE **LEDGE**

Description: The general laborer in the power house may be called upon to do any ordinary work such as cleaning and assisting. He may have such regular work as the operation of the coal crusher and the bucket conveyor for transferring coal from the crushes to the bin or for removing ashes from the pit to the hopper. He also assists in hauling away ashes.

Qualifications: He must have physical strength and endurance and be willing to work under the above conditions.

OILER, POWER HOUSE **ONION**

Description: The oiler does cleaning, oiling, and packing on turbine generators, exciters, converters, condensers, and pumps. He looks after hot bearings and frequently operates the controlling levers on the engines under the direction of the watch engineer. He assists in testing and repairing and may be required to do general cleaning in the power house.

Qualifications: It is desirable that he have experience as an oiler.

Schooling: Common school.

REPAIR MAN, POWER HOUSE **READY**

Description: The power house repair man does the repair work on boilers, condensers, pumps, and piping. Occasionally he is required to repair the automatic stokers and to do brick and concrete work.

Qualifications: He must be skilled in pipe fitting, steamfitting, and pump and boiler work. It is desirable that he also be able to do brick and concrete work.

Schooling: Common school.

LABORER GROUP

LABORER, BUILDING TRADES **LED**

As follows: Shovelers in excavations, sand shovelers, cement handlers, brick, terra cotta, and lumber handlers.

Description: The worker employed under the general title of Laborer, building trades, will be assigned to one of the occupations enumerated above.

Qualifications: Should be physically able to stand such work.

Schooling: Preferably, should be able to read and write the English language.

PAINTER AND PAPER HANGER GROUP

GLAZIER **GILT**

Description: The glazier does cutting and setting of window or skylight glass, or glazing of any character.

Qualifications: He must be thoroughly familiar with general glazing, cutting, fitting, and setting of plain, plate, and ornamental glass in house windows, wood frame, and metal sash, factory windows, and skylights. He must be experienced in packing and transporting all kinds of glass and be able to work under adverse conditions. He should have had experience as glazier for a mill, factory, or on building contract.

PAINTER, AUTOMOBILE OR CARRIAGE **PEKAN**

Kindred Occupations: Furniture painter; House interior finisher.

Description: The duties of the automobile or carriage painter are general painting and finishing of automobile and truck bodies and chassis.

Qualifications: He should be experienced in general automobile or carriage painting and able to clean up thoroughly preparatory to painting, on new or repair work. He must understand the application of priming, glazing, filling, and ground coats, and varnish. He must have practical knowledge of rubbing and preparation for final finishing. He should know how to mix paint and care for paints and brushes. He should have had general experience in automobile body painting.

Schooling: Common school.

PAINTER, GENERAL **POLE**

Kindred Occupations: Fresco painter; Large sign painter.

Description: The duties of the general painter are general painting of houses, buildings, or structures of any character.

Qualifications: He must be an experienced practical house or structural painter, capable of doing any general work, must be experienced in covering large surfaces, and be able to paint canvas, wood, or metal. He should be familiar with cleaning or removing paint from metal or wood for repainting. He should be able to match and mix paints to proper consistency from paste, have a knowledge of paint solvents and thinners, and must understand fully the care of brushes and be a good rigger and scaffold man. He should have a knowledge of interior brush painting and the use of cold-water paints or washes. He should have had experience as house painter, bridge painter, or general painter on building contract work.

Schooling: Common school.

PAINTER, SIGN **PELT**

Description: The duties of the sign painter are any class of sign or bulletin painting.

Qualifications: He must be experienced in painting large wall signs, bulletins, or banners, and skilled in design make-up and painting of all kinds of outdoor advertising signs, wall, railway, or roadside board signs, all

kinds of bulletins, scene or cutout signs, campaign banners, painted flags, and hanging signs, where large areas are covered or scenes depicted. He must be able to paint on canvas cloth, sheet metal, or board sections, and able to imitate trees, bushes, or landscapes. He must also be able to enlarge from sketches or color design paintings. He should have a thorough knowledge of paint mediums, mixing and matching colors, and the use and care of brushes and painters' materials and apparatus, and be able to estimate on quantities. He should have knowledge of rigging and scaffolding and ability to work outdoors under unfavorable conditions.

Schooling: Common school.

PAINTER, SIGN LETTERER **PEN**

Kindred Occupations: Department store sign and card letterer; Office building door letterer; Sign painter.

Description: The duties of the sign letterer painter are designing, painting, or lettering all sorts of small-sized signs, or card signs.

Qualifications: He must be thoroughly experienced in all phases of artistic sign work, such as design, make-up, laying out, painting, lettering, stripping, gilding, graining, and varnishing. He must be expert in the laying out, proportioning, blocking in, and finishing of all styles of letters, and in free-hand letter painting of small card signs, bulletins, and notices. He must be skilled in gold-leaf sign work, and understand mixing of paints and proper use and care of brushes.

PAINTER, STRUCTURAL STEEL AND BRIDGE WORK **PENCE**

Description: The duties of the painter on structural steel and bridge work are to paint or cover with any antirust coating structural steel or bridge work in the process of erection.

Qualifications: He should know how to prepare metal surfaces for the receiving of paint; should be familiar with paints generally used on structural steel and bridge work; understand the care and use of all tools and paint brushes; should be able to judge the proper consistency of paint to be used; and should be able to work on scaffolding or climb upon structural work. He should have had experience on similar work or on bridge construction crew or on large buildings.

Schooling: Common school.

PAINT MIXER **PENAL**

Description: The paint mixer mixes and grinds pigments and white lead used in the manufacture of paint.

Qualifications: He must be able to run paint-mixing machines of standard makes and sizes; also able to prepare material for the manufacture of putty and operate a machine for the same. He should be an experienced paint-mill operator and be familiar with paint-making processes and with the handling and packing of paints, leads, etc.

Schooling: Common school.

PAPER HANGER **POLAR**

Description: The duties of the paperhanger are to prepare walls for receiving paper and to hang the paper and border.

Qualifications: He should know how to size and patch walls for receiving paper, and should know how to mix flour, starch, and commercial paste. He should have a thorough knowledge of all paperhanging tools, including edgers, paste brushes, and squeegee rollers; must know how to make

butt and lap joint, match patterns and run borders, and have a thorough knowledge of the various qualities of paper and their appropriate use as to color and location in rooms used for different purposes. He should have had experience as a paperhanger's helper or apprentice and should have had considerable work as a journeyman.

Schooling: Common school.

PAPER HANGER'S HELPER POLKA

Description: The duties of the paperhanger's helper are to assist the paperhanger in trimming and pasting paper and sizing walls.

Qualifications: He should be a young man who desires to learn the paperhanging trade. He should study the matching of colors and the various working out of color schemes.

Schooling: Common school.

STEEPLE JACK SHAFT

Description: The duties of the steeple jack are to paint smokestacks, water tanks, and steeples or other high buildings.

Qualifications: He must be a thoroughly experienced painter, familiar with all kinds of paint generally used for the painting of tanks, smokestacks, and steeples; must be able to prepare all surfaces for receiving the paint. He should be able to arrange and adjust tackle or direct the making of scaffolding necessary to reach all parts of any tank, steeple, or smokestack.

VARNISHER AND WOOD FINISHER VAIL

Description: The duties of the varnisher and wood finisher are to prepare wood surfaces of all kinds for varnish, and to apply stain, varnish, wax, and other similar materials.

Qualifications: The varnisher and wood finisher should understand thoroughly all methods of bringing wood to the desired finish before applying varnish. He must thoroughly understand all methods of filling open-grain wood and priming close-grain wood. He must understand the care and use of varnish brushes and tools, know how to use water, oil, naphtha, or spirit stains, and be familiar with the various grades of shellacs, varnishes, and wax compounds used for varnishing. He should understand sandpapering and rubbing various kinds of varnish and know how to make wax and bright and dull varnish finishes. He should have had experience on high-grade furniture work, interior office work, and on high-grade residence work.

Schooling: Common school.

WOOD FINISHER. (*See* Varnisher and wood finisher.)

PLUMBER, STEAM FITTER, PIPE FITTER, AND PIPE COVERER GROUP

CALKER, LEAD **CHEST**

Kindred Occupations: Hand chipper; Plumber.

Description: The duties of the lead calker are calking and sealing bell and spigot cast-iron pipe of all kinds. The work is usually done by a plumber.

Qualifications: He must be practically experienced in the laying and calking of cast iron bell ends and gas mains of the sizes generally used on inside construction. Should be capable of setting and centering pipe, elbows, crosses, valves, and plugs, and yarning, damming, melting lead, and calking with the hand or pneumatic calking hammer and tools. Should have a thoroughly practical knowledge of all ordinary tools and be able to work on any class of work under adverse conditions. He should have had like experience with city water works or private gas or water company or considerable experience as pipe lead calker on large building operations.

Schooling: Common school.

PIPE COVERER **PATE**

Kindred Occupations: Asbestos worker; Heat and frost insulator.

Description: The duty of the pipe coverer is to apply heat and frost insulation material (including covering and insulation with asbestos, mineral wool, or felt) to all kinds of pipes, tanks, and boilers.

Qualifications: He must be experienced in applying insulating coverings of any character to steam, water, or refrigerating piping and engine cylinders. Must also be able to plaster properly and canvas-cover special apparatus, valves, and fittings on any class of work. Should be skilled in mixing insulating plaster, and in the use of the trowel for laying and finishing. He should have had like experience on large contract or power station work.

Schooling: Common school.

PIPE FITTER, AMMONIA **PATEN**

Kindred Occupations: Expert pipe fitter; Steam fitter.

Description: The duties of the ammonia pipe fitter are the erection and maintenance of all pipe work required in connection with the ammonia system of a refrigerating plant.

Qualifications: He must be experienced in erecting and maintaining ammonia piping and general piping around ice or cold storage plants. He must have a thorough, practical knowledge of ammonia valves, fittings, and connections, and be able to install, according to layout drawings, a complete ammonia piping system. Should have a good knowledge of boiler-room piping, pump and tank connections, and should be familiar with erecting and supporting large pipe. He should have had a like experience in a large commercial cold storage plant.

Schooling: Common school.

PIPE FITTER, FOREMAN PATH

Description: The duties of the foreman pipe fitter are the supervision, erection, or maintenance of extensive piping systems for general purposes.

Qualifications: He must be a thoroughly experienced and skilled pipe fitter, capable of handling any kind or sized job. Must be experienced in all classes of water, gas, oil, or compressed-air piping, using screw thread or flanged pipe in large sizes for low or high pressure or hydraulic work. Must have thorough, practical knowledge of valve fittings and tank, pump, or boiler constructions. Must be able to work to drawings or sketches and competent to supervise general piping erection, inside or outside, such as engine and boiler piping for power stations or large pumping installations. Should be skilled in the use of ropes and blocks for rigging, and setting temporary or permanent supports, and must understand providing for expansion and drainage. Should be experienced in factory or power-plant piping and installation work.

Schooling: Preferably some technical training.

PIPE FITTER, JOURNEYMAN PATTY

Kindred Occupations: Plumber; Steam fitter.

Description: The duties of the journeyman pipe fitter are to install pipe fittings for general purposes.

Qualifications: He must be a thoroughly practical pipe fitter, able to lay out from drawings or sketches, and do any general work in connection with installing permanent or temporary gas, air, oil, or water piping. Should have general knowledge on steam pipe work, boiler and pump connections, and steam apparatus, and should be competent to work under direction on installation or plant maintenance work. He should have had general experience as plant pipe man, or fitter on contract work, or have served a regular apprenticeship.

Schooling: Common school.

PIPE FITTER, LOCOMOTIVE PAUSE

Kindred Occupations: Pipe fitter, expert; Plumber; Steam fitter.

Description: The duties of the locomotive pipe fitter are all kinds of pipe work involved in the construction or repair of steam locomotives.

Qualifications: He must be thoroughly skilled and experienced in all kinds of pipe work and be able to cut, bend, and fit to drawings or specifications, steam pipes for pressure up to 250 pounds per square inch, and do all other kinds of pipe fitting and work involved in fitting and connecting steam, water, and air pipes to outlets, fixtures, and operating apparatus forming parts of a locomotive. Must thoroughly understand the operation of hand and power driven pipe cutting and threading machines and pipe cutters. Must have a practical knowledge of standard valves, fittings, tank, pump, and boiler connections. Must be capable of performing tasks on converted pipe work under water pressure. He should have had experience on locomotive, factory, or power plant piping installation work.

Schooling: Common school.

PIPE FITTER, OUTSIDE PAVE

Kindred Occupations: Pipe fitter; Plumber; Steam fitter.

Description: The duties of the outside pipe fitter are general outdoor pipe erection, or fitting work around mines or quarries, or construction work of any character.

Qualifications: He must be a practical general pipe fitter, experienced on outside piping for compressed air, gas, steam, or water. Must be experienced in emergency pipe installation or repairs, and in running long or temporary air or steam pipe lines in quarries, mines, or any kind of construction work, for operation of rock drills, hoists, or pumps used for emergency pumping. Should be able to cut and fit from sketches and be capable of doing light work in the open under unfavorable conditions, and should have general knowledge of the use of standard valves, fittings, and pipe, and should preferably have some knowledge of proportioning pipes and mains, and be familiar with pipe covering and insulation of exposed lines. He should have served an equivalent to an apprenticeship with an outside pipe fitter.

Schooling: Common school.

PIPE FITTER'S HELPER **PAWN**

Kindred Occupations: Plumber's helper; Steam fitter's helper.

Description: The duties of the pipe fitter's helper are to carry tools, keep the pipe fitter supplied with general materials, cut pipe and threads, and make minor fittings under the direction of the general pipe fitter.

Qualifications: He should be a good healthy young man who has shown a desire to learn the pipe fitter's trade. If he can not read drawings and make the necessary calculations for cutting pipes, he should be willing to pursue a course of study along these lines.

Schooling: Common school, preferably trade school.

PIPE FITTER, SPRINKLER SYSTEMS **PAY**

Kindred Occupations: General pipe fitter, journeyman; Plumber, journeyman; Steam fitter, journeyman.

Description: The duties of the sprinkler-system pipe fitter are to install all piping and fixtures used in a sprinkler system, including all hydrant, pump, and nozzle connections.

Qualifications: He must be a thoroughly experienced pipe fitter, able to work to drawings and templates; be able to order all stock and materials; must have a thorough knowledge of all pipe fittings, including valves and sprinkler nozzles. He should have had experience as a helper, equivalent to a regular apprenticeship.

Schooling: Common school, preferably high school.

PIPE LAYER, TRENCH, FOREMAN **POISE**

Description: The duties of the trench pipe layer foreman are to lay and supervise the laying of pipe lines of any size or any character for general pipe line service.

Qualifications: He should be able to read drawings and specifications, must be practically experienced in laying and supervising the laying of all kinds of water, gas, and oil pipes. He must be experienced in pipe line work, such as laying, jointing, leveling and grading small and large pipes, whether of wrought iron, cast iron, or wood staves. He must be thoroughly familiar with valves and pipe fittings, must understand fully the use of cutters, pipe dies, wrenches, tongs, and pneumatic tools for chipping and calking either lead joints or riveted sections. He should have a thorough knowledge of placing sheet piling for the prevention of cave-ins in trenches, should have a general knowledge of building of manholes and making pipe connections. He should have had experience in laying city water lines, sewers, and gas pipe lines.

Schooling: Preferably technical school graduate.

PIPE LAYER, TRENCH, JOURNEYMAN POKE

Description: The duties of the pipe layer trenchman are the laying of pipe lines of any size or character and for any service.

Qualifications: He must be practically experienced in the laying of all kinds of water, gas, and oil pipes, on surface and in trenches. Must be thoroughly experienced in pipe-line work such as laying, jointing, leveling, grading, and supporting small and large pipes of wrought iron, cast iron, bell and spigot or wood stave pipe. Must be thoroughly familiar with valves and pipe fittings. Should understand fully the use of cutters, pipe dies, wrenches, tongs, and pneumatic tools for chipping and calking, either lead joints or riveted sectional pipe. Should have a thorough practical knowledge of driving sheet piling or placing sheeting in trenches, handling heavy pipe, and building manholes. Should have had experience in laying city water lines or sewers, or with municipal or private water or gas companies, oil or gas pipe lines, hydraulic power lines and steam piping. He should have had considerable experience as helper and independent worker.

Schooling: Common school.

PLUMBER, FOREMAN PEA

Kindred Occupations: General plumber; Pipe fitter foreman.

Description: The duties of the foreman plumber are the supervision, installation, and maintenance of all classes of sanitary plumbing and fixtures.

Qualifications: He must be an all-round licensed plumber, experienced in installing all kinds of interior and exterior sanitary plumbing. Must be able to work to drawings and specifications on any sized job, and to lay out and supervise work for service connections throughout to the sewer connections. Must have a thorough, practical knowledge of construction use of all kinds of standard sanitary plumbing and other equipment, including hot water and steam heating systems used in connection with toilet, laundry, and sinks. Must be an experienced pipe fitter capable of installing water or heating piping, and be skilled in lead pipe work. Must have a complete working knowledge of maintenance and repair of sanitary appliances. Should have had wide experience on large contract work, such as plumbing in factories, hotels, or office buildings. Should have had considerable experience as an all-round journeyman plumber.

Schooling: Common school.

PLUMBER, JOURNEYMAN PEACE

Kindred Occupations: Pipe fitter, journeyman; Steam fitter, journeyman.

Description: The duties of the journeyman plumber are the installation and repair of all plumbing and fixtures.

Qualifications: He must be a practical general plumber, experienced in installing sanitary plumbing and appliances, such as toilets, sinks, drains, and waste pipes. He must be familiar with general piping and lead pipe work, pipe fittings, calking joints, and making service connections. Should have some knowledge of hot water and steam heating systems. Should have had an experience equivalent to an apprenticeship to a general plumber.

Schooling: Common school.

PLUMBER, MARINE **PEACH**

Kindred Occupations: Pipe fitter, journeyman; Plumber, journeyman; Steam fitter, marine.

Description: The duties of the marine plumber are the installation and repair of all kinds of plumbing equipment and fixtures on board ship.

Qualifications: He must be a practical plumber, experienced in installing all kinds of sanitary plumbing appliances, such as toilets, sinks, drains, and waste pipes. He must have a thorough knowledge of all kinds of pipe fittings. Must be able to work from drawings or templates and be able to make his own templates.

The marine plumber must be especially skilled in bending all sizes of pipe, and in handling large sizes of lead pipe. He should have not less than an equivalent to an apprenticeship under a journeyman plumber.

Schooling: Not less than common school, preferably trade school or technical high school.

PLUMBER'S HELPER **PEAK**

Kindred Occupations: Pipe fitter's helper; Steam fitter's helper.

Description: The duties of the plumber's helper are to carry tools, keep the plumber supplied with general materials, cut pipe and threads, and make minor fittings under the direction of the general plumber.

Qualifications: He should be a good healthy young man who has shown a desire to learn the plumber's trade. If he can not read drawings and make calculations necessary for cutting pipes, he should be willing to pursue a course of study along these lines.

Schooling: Common school, preferably trade school.

STEAM FITTER, FOREMAN **SELAH**

Kindred Occupations: Pipe fitter, foreman; Plumber, foreman.

Description: The duties of the foreman steam fitter are to supervise the running of steam lines, the making of pump, boiler, oil, air, and radiator connections, and the connecting up and adjusting of steam thermostats and gauges.

Qualifications: The foreman steam fitter should be skilled in the use of all types of steam fitters' tools; should be able to install either vertical or horizontal steam lines, using all sizes of pipe and on both high and low pressure work; should have a thorough knowledge of setting and adjustment, and also a thorough knowledge of thermostat heat control; should have a general knowledge of pipe fitting other than for steam work; should be able to order materials, calculate and cut lengths of pipe, and have ability to control men and to lay out work from drawings, sketches, or templates. He should have had considerable experience as a journeyman steam fitter.

Schooling: Not less than common school, preferably trade school or technical high school.

STEAM FITTER, JOURNEYMAN **SELF**

Kindred Occupations: General plumber, journeyman; Pipe fitter, journeyman.

Description: The duties of the journeyman steam fitter are to fit all types and sizes of steam pipes; to make pump, boiler, oil, air and radiator connections, under the direction of a superintendent or foreman.

Qualifications: He should be able to work from drawings or templates; should have a thorough mastery of all common steam fitting tools; should

be able to place and adjust all types of steam valves and gauges, calculate and cut lengths of pipe, and order materials. He should have had experience equivalent to an apprenticeship under a journeyman steam fitter.

Schooling: Not less than common school, preferably trade school or technical high school.

STEAM FITTER, MARINE SELL

Kindred Occupations: Pipe fitter, marine; Plumber, marine.

Description: The duties of the marine steam fitter are to install any or all portions of a steam pipe system, including pump connections, boiler connections, oil, air, and radiator connections, working under the direction of a superintendent or foreman.

Qualifications: He should be able to work from drawings or templates and should be able to make his own templates. He should have a thorough mastery of all common steam fitting tools and be able to calculate and cut all lengths of pipe and order all materials. He must understand the setting and placing of all steam valves.

The marine steam fitter must be especially skilled in bending all sizes of pipe. He should have had experience equivalent to an apprenticeship under a journeyman marine steam fitter.

Schooling: Not less than common school, preferably trade school or technical high school.

STEAM FITTER'S HELPER SEND

Kindred Occupations: Pipe fitter's helper; Plumber's helper.

Description: The duties of the steam fitter's helper are to assist the steam fitter in holding pipe, handling tools, and cutting threads and pipe, and making pipe connections under the direction of the steam fitter. The helper is usually in training to become a steam fitter.

Qualifications: He should be a healthy young man who has shown a desire to learn the trade. When he becomes an apprentice, he should be able to read drawings and make ordinary measurements, or should be willing to pursue a course of study along these lines.

Schooling: Common school, preferably trade school.

THERMOSTAT MAN TEASE

Description: The duties of the thermostat man are to install, connect, and adjust heat control devices of all kinds in connection with heating systems.

Qualifications: He should be thoroughly familiar with the principles of thermostat heat control; should be familiar with all the various standard thermostats; should know how to adjust and repair, and how to replace parts; should be able to work from drawings and to order stock and supplies. He should have had experience as an apprentice or as a helper equivalent to a full apprenticeship.

Schooling: Common school.

ROOFER GROUP

ROOFER, COMPOSITION **READ**

Description: The duties of the composition roofer are to lay all kinds of commercial composition for the surfacing of roofs.

Qualifications: He must know how to mix commercial roofing compositions, understand the laying of papers or canvas or any other materials ready to receive the final coating. He should have had experience as a helper and should have done considerable work as a journeyman roofer.

Schooling: Common school.

ROOFER, SLATE AND TILE **REACT**

Description: The duties of the tile and slate roofer are to lay tile and slate for all kinds of roofing work.

Qualifications: He must be able to work to specifications, perforate tile and slate for the receiving of nails, line tile or slate for roofing and place ridge pieces necessary for forming a complete slate or tile roof. He should have had experience as an apprentice and considerable experience as a journeyman roofer.

SHEET METAL WORKER GROUP

BUMPER **BAND**

Description: The duties of the bumper are to use a small power machine known as the bumper, to form special shapes of sheet metal.

Qualifications: He should be able to read drawings, work to samples or templates and must be able to make his own templates. He must be thoroughly familiar with all forming tools over which metal is formed by staking or bumping processes. He must be thoroughly familiar with annealing processes and annealing furnaces used in connection with drawing, spinning, or forming sheet metals. He should have served an equivalent to an apprenticeship and have done considerable work as a journeyman bumper.

Schooling: Common school, preferably a special course in sheet-metal drawing and layout work.

COPPERSMITH **CHEAT**

Kindred Occupations: Sheet metal worker; Tinsmith.

Description: The duties of the coppersmith are to make and repair copper utensils, to install and repair copper piping and connections on such work as boilers, chemical apparatus, and distilling equipment.

Qualifications: He must be experienced in all phases of coppersmith work and able to work to drawings, sketches, templates, or samples and lay out and form from sheet copper such articles as copper kettles and funnels, to install copper pipes for marine and stationary engines and install pipes and make fittings for gas ejector equipment. He must be skilled in bending, shaping, and fitting pipes for high pressure steam, water, or other purposes. He must also be capable of tipping wooden parts with sheet metal, soldering joints, repairing gas tanks and radiators. He must be thoroughly familiar with sheet metal pattern layout and making, the use of proper fluxes in brazing, and skilled in the use of brazing furnaces and gasoline blow torches. He must also be familiar with working other metals, such as brass and sheet aluminum. He should have had similar experience in a railroad or industrial shop.

Schooling: Preferably trade school or technical high school.

METAL SPINNER **MINCE**

Description: The duties of the metal spinner are to shape by spinning special sheet metal forms.

Qualifications: He should read drawings, be able to work to templates and samples; should be able to make his own layouts and templates; should use skillfully all spinner's tools; understand the making and use of spinning forms. He should be thoroughly familiar with the various annealing furnaces and annealing processes used in drawing and spinning sheet metal. He should have had experience equivalent to an apprenticeship as a metal spinner and have done considerable work as a journeyman.

Schooling: Common school, preferably a special course in sheet metal layout work.

PUNCHER, OR PUNCH PRESS HAND **PEASE**

Kindred Occupation: Blacksmith, boiler shop or plate shed group.

Description: The duties of the puncher are to punch holes in plates, channels, bars, or angles to layout furnished by layout man.

Qualifications: He must be able to operate single and multiple punch presses working on large plates, channels, or angles, to set punches and dies and keep them in condition. He must be able to direct the work of helpers.

Schooling: Common school.

SHEET METAL LAYOUT MAN AND PATTERN DEVELOPER **SEED**

Description: The sheet metal layout man lays out by lines and prick punch marks all sheet metal patterns and forms.

Qualifications: He must be thoroughly skilled in the use of all layout tools; thoroughly understand projections and developments as used in sheet metal work; should have sufficient experience as a sheet metal worker to be thoroughly familiar with the possibilities and limitations of the machines for which the layout is made. He should have served at least an equivalent to an apprenticeship as a sheet metal worker, and should have done considerable sheet metal drawing and pattern development.

Schooling: Common school and an independent course in sheet metal drafting and layout; preferably some technical training.

SHEET METAL WORKER, BUILDING TRADES **SLAVE**

Description: The sheet metal worker in the building trades makes and installs all kinds of sheet metal fittings usually required in building construction.

Qualifications: He must be capable of working to drawings, patterns, and templates and capable of making and hanging all kinds of cornices and ornamental sheet metal work for buildings, and making and installing ventilating equipment, including ventilating ducts, ventilators, fan housings and connections, furnace casings and connections, and air heater casings of any kind. He should also have a knowledge of light angle and channel frames used in stiffening or carrying sheet metal construction. He should do skillfully all riveting and soldering work and use skillfully all sheet metal bench and floor tools. He should have served at least an equivalent to an apprenticeship to a journeyman sheet metal worker.

Schooling: Common school; preferably high school.

SHEET METAL WORKER, METAL FROM 16 TO 10 GAUGE **SEEP**

Description: The sheet metal worker on metal ranging from 16 to 10 gauge, for the purpose of this classification of occupations is defined as a man employed in the manufacture of such work as light tanks, range boilers, air and gas pressure tanks, and gas buoys.

Qualifications: He must be able to work from drawings, samples, or patterns, use skillfully all the ordinary sheet metal bench and floor tools, including metal breaks, bending rollers, rotary shears, and straight shears. He should have a thorough knowledge of riveting, hot or cold, and it is desirable that he understand electric spot welding. He should be able to bend and shape light angle and T-irons where they are used for supporting sheet metal work. He should have had experience equivalent to an apprenticeship under a sheet metal worker.

Schooling: Common school; preferably trade school or technical high school.

TINSMITH **TEA**

Description: The work of the tinsmith is ordinarily confined to the making of utensils, such as pans, pails, light pipes, and liquid conveyors.

Qualifications: He should be able to work to drawings, patterns, or templates. He must use skillfully all tinner's bench tools; must be able to use skillfully soldering coppers and blow torch and be able to do general repair work on automobile lamps and general thin metal utensils. Should understand the laying of tin roofing or the covering of large surfaces with tin where the various kinds of sheet metal joints are used. He should have had experience equivalent to an apprenticeship to a regular tinsmith.

Schooling: Not less than common school with an independent study of sheet metal drafting and layout, preferably trade school or technical high school.

SURVEYOR AND CIVIL ENGINEER GROUP

AXMAN **ACTOR**

Kindred Occupation: Wood chopper.

Description: The duties of the axman in a surveying crew are to clear the ground of weeds, brush, or trees, in order that the transit man may obtain a clear sight along a desired course. The axman also drives the stakes for the rodman and frequently assists in carrying instruments or camp outfits in changing camp locations.

Qualifications: The axman must have ability to handle an ax and hatchet, and have physical strength and endurance in walking, and especially be able to endure outside exposure.

Schooling: Common school.

CHAINMAN (Surveyor's assistant) **CHECK**

Description: The duties of the chainman are to measure distances with a steel tape or a surveyor's chain under the direction of the surveyor, transit man, or level man. There are usually two chainmen—head and rear. The head chainman usually carries a flag or a sight pole, selecting the point where the axman drives a stake to mark the points indicated by the surveyor or transit man. The rear chainman merely holds the tape or chain at zero at the last marking station.

Qualifications: The chainman must have good physical strength and ability. He must be hardened to outdoor work and have had experience as chainman in a surveyor's crew.

Schooling: Common school; preferably high school.

CIVIL ENGINEER **CRAG**

Description: The duties of the civil engineer are the planning, designing, and supervising of all classes of general construction operations.

Qualifications: He must be thoroughly familiar with the mathematical and mechanical principles and engineering features of designs, construction, or operation in connection with land surveying; structural, bridge, or building work of any kind; highway construction; hydraulic development; municipal engineering in connection with water works; drainage and sewerage; railroad survey and construction; harbor, canal, and dam construction, such as wharfs, piers, excavation, and dredging.

Must be thoroughly familiar with the use of all types and classes of construction machinery used in civil engineering developments, such as cranes, hoists, derricks, shovels, hydraulic dredges, pumps, excavators, concrete mixers and distributors.

Must be thoroughly familiar with all materials used in construction work and be capable of preparing specifications and contracts for materials or equipments of any kind involved in such classes of work.

Schooling: Must be a technical graduate with a broad practical experience in the various branches of civil engineering.

CIVIL ENGINEER'S HELPER CREAM

Description: The civil engineer's helper assists the civil engineer in laying out roads, railways, chutes, buildings, etc.

Qualifications: The civil engineer's helper must have a knowledge of drafting, surveying, and engineering problems.

Schooling: High school or college.

RODMAN (Surveyor's assistant) RAND

Description: The duties of the rodman are to work with the transit or levelman, handle the transit rod, level rod, stabia rod, and chain and steel tape.

Qualifications: The rodman must make accurate chain measurements and offset measurements, and be able to locate turning points and bench marks. He should be able to use the hand level; must understand the taking and plotting of field notes and sketching. He must have a general knowledge of surveying instruments. He should have had experience as a chainman or an equivalent in an engineering school. He must have good physical strength and be able to stand outdoor exposure.

Schooling: Should be a college graduate in civil engineering.

SURVEYOR, GENERAL SIEGE

Kindred Occupations: Civil engineer; Instrument man.

Description: The general surveyor makes surveys in connection with water systems, pipe lines, land boundaries, and surveying work of a general nature.

Qualifications: The general surveyor must be capable of making preliminary and location surveys, compass surveys, topographical sketches, leveling for grades and flow, profile and cross-section surveys, and laying out reservoirs; must be capable of making complete and intelligent field notes and plotting them in regular form. Must be thoroughly familiar with various types of transits, levels, and compasses, and capable of making all necessary adjustments. He must be a rapid and accurate computer on civil engineering work, and be familiar with the use of mathematical tables and engineering data. He should have had general surveying experience in municipal contracting or engineering work.

Schooling: Technical school graduate.

SURVEYOR, HIGHWAY SIEVE

Kindred Occupations: General surveyor; Instrument man; Railroad surveyor.

Description: The highway surveyor makes the layout and establishes the grade for highway construction and repairs.

Qualifications: The highway surveyor must be capable of making complete survey from preliminary location to final stage of completed road, including making profile and cross-section surveys, plane-table surveys, topographical sketches, offsets, locating fences, buildings, and intersecting roads, establishing grades and bench marks, staking out cuts, fills, drains, culverts, and abutments. He must be thoroughly familiar with adjustments and care of all instruments used, and possess a knowledge of various types of road construction, methods of subsoil drainage, various types of culverts, arches, and highway bridges. He should have had experience as surveyor or instrument man with governmental, State, or

county highways or topographical department, or worked on road building with contractors or on railroad operations.

Schooling: Technical school graduate.

SURVEYOR, MINE SIFT

Kindred Occupations: Civil engineer; General surveyor; Mining engineer.

Description: The mine surveyor does underground and mine surveying of any character.

Qualifications: The mine surveyor must be a technical civil engineer, practical, experienced in general surveying and especially underground or mine surveying of all kinds, such as prospecting, exploration, mine and tunnel alignment, and must be skilled in the use of transit and reflectors, compass and level, and must be familiar with their adjustment and care. He must be able to read vertical angles, using prism eyepiece, be experienced in the use of adjustable leg tripod and in the use of signal lamps, tripod lamps, plumb-bob lamps, and angle reading or three-tripod method and steel tape for distance in the case of sloping drifts and tunnels. He must understand thoroughly the use of prismatic mining transits for vertical lines, long plumb-bob lines, and be able to drop transit points for alignment in deep shafts with greatest accuracy for line construction. He must be familiar with use of compass and skilled in calculating latitudes and departures. Must thoroughly understand underground leveling and the use of illuminated rods and cross-section work with sunflower cross sectioner. Must be able to make complete and accurate sketches and field notes. Should understand the use of dip needle and magnetic surveys. He should have had experience in field work.

Schooling: Technical school graduate.

SURVEYOR, RAILROAD SIGH

Kindred Occupations: Civil engineer; General surveyor; Instrument man.

Description: The railroad surveyor does layout of construction work and railroad surveying.

Qualifications: The railroad surveyor must be a trained engineer, capable of making complete preliminary and location surveys, and be a competent transit man and levelman, capable of carrying out profile and cross-section work. Must be able to locate and stake out curves, sidings, grades, cuts, fills, yards, buildings, abutments, and piers. He must have a thorough knowledge of the adjustment and care of all surveying instruments. Must be capable of taking and plotting all field notes, and estimating quantities and costs. He should have had experience as chief of party or instrument man in a preliminary, location, or construction railroad survey.

Schooling: Technical school graduate.

SURVEYOR, TOPOGRAPHICAL SILK

Kindred Occupations: Civil engineer; Highway surveyor; Map surveyor.

Description: The topographical surveyor is engaged in making topographical maps and surveys, and in tabulating data.

Qualifications: The topographical surveyor must be capable of making actual map survey and construction of topographical maps resulting therefrom, using various scales and contour intervals. He must be capable of making rapid field sketches and be competent to interpret terrain and to report correctly concerning it, to use maps and locate correctly men or parties on the ground. He must be thoroughly experienced

in the use of plane-table, stadia, theodolite, engineer's wye level and transit, drafting instruments, and in free-hand drawing and sketching. He must be familiar with various map methods and conventional signs, symbols, and colors used on topographical maps. He should have had experience as assistant or instrument man on geodetic, topographical, or highways survey.

Schooling: Technical school graduate.

SURVEYOR, TOPOGRAPHICAL PHOTOGRAPHIC SILVA

Kindred Occupations: Civil engineer; Outdoor photographer; Topographical surveyor.

Description: The topographical photographic surveyor does photographing from the ground or air (airplane), and from such photographs making or revising topographical maps.

Qualifications: The topographical photographic surveyor must be capable of using transit, plane-table, level, and surveying camera, and of making free-hand drawings and sketches. He must have a thorough knowledge of plane, spherical, and analytical geometry and trigonometry, be experienced in making topographical maps, and also experienced in taking and using photographs for topographic surveying. He should have had experience in topographical surveying.

Schooling: Technical school graduate.

SURVEYOR, TOPOGRAPHICAL TRIANGULATOR SINCE

Kindred Occupations: Civil engineer; Topographical surveyor.

Description: The topographical triangulator surveyor makes geodetic or triangulation surveys over large areas.

Qualifications: The topographical triangulator surveyor must be capable of taking charge as chief of triangulation party where control is over large areas, and using micrometer theodolites or large vernier instruments reading to 20 seconds of arc or less and where the sight lines are more than a mile in length. He must be skilled in the use of theodolites, transits, hand levels, aneroid barometers, and in handling tools necessary for simple repairs to instruments, such as resetting level vials, inserting cross hairs, and making substitutes for broken parts. Must understand general methods of base-line measurement and computing methods necessary for preliminary computations of the results of field triangulation. He must be familiar with topographic mapping on a small scale and handy with carpenter's tools needed in erecting observing platform or tall signals. He should have had reasonable experience as railroad locating engineer or as party chief of a governmental geological, topographical, or geodetic survey.

Schooling: Technical school graduate.

TOPOGRAPHICAL FIELD ASSISTANT TEACH

Kindred Occupations: Instrument man; Surveyor.

Description: The topographical field assistant is the general assistant and instrument man of the topographical survey field party.

Qualifications: The topographical field assistant must be capable of using plane-table, stadia, engineer's wye level and transit, and drafting instruments. He should have had field experience using an instrument in a surveying party or during a civil engineering college course.

Schooling: Technical school graduate.

RAILROAD TRANSPORTATION

ACCOUNTANT, ROAD DEPARTMENT AGUE

Kindred Occupations: Accountants in other branches of railroad service; Bookkeeper.

Description: Road department accountants keep record of material and labor used on a division, charging such material and labor to the different operating expense accounts, and prepare vouchers for material purchased on a division, etc.

Qualifications: Must be familiar with the Interstate Commerce Commission rules for classification of accounts, and should be familiar with the principles of bookkeeping; should also be familiar with the materials used in maintenance of way work.

Schooling: Common school or equivalent and business course.

AGENT, STATION. (*See* **Station agent.**)

AGENT, TRANSFER STATION ADULT

Description: The transfer agent sees that shipments are properly transferred, making necessary notations on waybills; keeps a record of cost incurred on each separate transfer, and a complete record of such transfer, noting special conditions.

Qualifications: Must understand loading and unloading freight of all kinds and be able to handle laborers. He should have been an agent at smaller stations.

Schooling: Common school or equivalent.

AIR BLEEDER. (*See* **Helper, railway shop.**)

AIR-BRAKE MAN, CAR ADZ

Description: The air-brake man installs and repairs air-brake equipment on cars.

Qualifications: An air-brake man should have taken a course covering mechanism and repairs to air brakes, and should have passed an examination along this line. He must be able to remove, adjust, repair, and replace any part of the air-brake equipment.

Schooling: Common school.

AIR-BRAKE TEST-ROOM INSPECTOR. (*See* **Inspector, air-brake test room.**)

APPRENTICE, TRACK FOREMAN. (*See* **Track foreman, apprentice.**)

ASSISTANT. (*See under specific occupations:* **Engineer; Road foreman; Signal maintainer; Station master; Yardmaster.**)

BAGGAGE CHECKER BODY

Description: The duties of the baggage checker are to check baggage through to destination and to cancel permits on transportation; to determine and collect all excess baggage.

Qualifications: He must understand the various classes of transportation and baggage permits, and must know how to calculate excess baggage. He must be physically strong.

Schooling: Common school.

BAGGAGEMAN, TRAIN BOGUS

Description: The baggageman on the train has charge of baggage carried on baggage cars of passenger trains, which includes railroad service mail and United States mail in pouches. Occasionally he is required to handle express packages.

Qualifications: Must pass a physical examination, including eyesight, hearing, and colors. Must have worked over the division long enough to become familiar with stations and transfer points.

Schooling: Common school.

BAGGAGE-MASTER. (*See* Baggageman, train.)

BALLAST INSPECTOR. (*See* Inspector, ballast.)

BRAKEMAN AND FLAGMAN, FREIGHT TRAIN BOIL

Kindred Occupation: Yard brakeman.

Description: Freight brakemen and flagmen, under the direction of the freight conductors, assist in the handling of freight trains, mixed trains, work trains, or wreck trains, according to the class of service to which they may be assigned.

Qualifications: Must pass an examination on color, eyesight, hearing, and physical condition. He should be familiar with signals and know all the regulations governing the running of trains on the main line, and must own a standard watch.

Schooling: Must be able to read and write.

BRAKEMAN AND FLAGMAN, PASSENGER TRAIN BOLT

Description: The brakeman and flagman is an employee in passenger service who assists the conductor in handling the train.

Qualifications: Must pass a physical examination with special reference to eyesight, hearing, and colors. Must pass an examination as to ability and fitness for flagman, and must be familiar with all train orders and special rules governing the running of trains on the main line, and must own a standard watch.

Schooling: Common school or equivalent.

BRAKEMAN, YARD BOUND

Kindred Occupation: Road freight brakeman.

Description: The yard brakemen, under the direction of yard conductors, couple and uncouple or ride cars in breaking up and making up trains and placing cars for pick-up and delivery service.

Qualifications: Must pass a physical examination; also examination as to hearing, eyesight, and colors. He must be able-bodied and active.

Schooling: Equivalent to common school.

BRIDGE CREW FOREMAN **BADLY**

Description: The foreman of a railway bridge crew takes entire charge of a crew of men for the construction of small bridges and trestles.

Qualifications: The foreman of a railway bridge crew must be able to take the plans and specifications of an ordinary trestle or bridge and with his force of men erect it without any supervision. He must be able to order all materials, to check stock and check the completed work with the plans and specifications. He should have had considerable experience in a bridge and trestle crew.

Schooling: Common school, preferably technical training.

BULLETIN-BOARD ATTENDANT **BOWER**

Description: The bulletin-board attendant posts on the bulletin board general orders and general notices relative to the movement of trains. This work is generally performed by crew dispatcher, engine dispatcher, or yardmaster's clerk.

Qualifications: Must be able to read and write.

CALL BOY. (*See* Crew caller.)

CAR CARPENTER **CREED**

Kindred Occupations: General carpenter; House carpenter; Railroad carpenter.

Description: The duties of the car carpenter are the construction, assembly, and repair of railway freight cars, employing wood in part or whole.

Qualifications: He must be experienced in the building of various kinds of wood body, side or box standard railway freight cars. He must be able to work to drawings, lay out and build wood frames, make and hang doors, lay floors, and put on roofs, sides, and ends on either wood or steel frame cars, or make repair to such cars. He must be a thoroughly capable general carpenter, skilled in use of all tools and having some experience with woodworking machinery. He should have worked as general car carpenter in railroad car shop or car building plant as decker, door hanger, roofer, or liner.

Schooling: Common school; preferably technical training.

CAR CLEANER **CIVIL**

Kindred Occupations: Scrub woman in office buildings; Window washer; Sweeper.

Description: A laborer employed in cleaning passenger cars.

Qualifications: Must be able to do moderately heavy work.

CAR INSPECTOR. (*See* Inspector, car.)

CARPENTER'S CREW FOREMAN **CRAB**

Description: The foreman of the railway carpenter crew takes entire charge of the workmen and works without close supervision on the construction and repairs of buildings on a railroad.

Qualifications: He must be able to take plans and specifications of an ordinary depot or other building and with his force of men erect a building without any supervision. He must be able to handle men, and stand an examination on signal rules and pass a physical test on hearing and color sight. He should have had considerable experience in a railway carpenter crew and should have had experience as a foreman.

Schooling: Common school, preferably technical training.

CAR REPAIR MAN, METAL CLAY

Description: The duties of the metal-car repair man are to repair all metal portions of freight and passenger cars, including the truck frame and car body.

Qualifications: He must have a thorough knowledge of steel-car frames and car-body construction. He must use skillfully hydraulic, ratchet, and other forms of jacks used in the lifting of car bodies from the trucks. He must be able to make all light or general repairs and able to do pneumatic-hammer and hand riveting. He should be able to operate pneumatic or electric drills, and cut out and replace any part of the frame of the car body. He should be able to make sketches and layouts for any parts to be made in the shop. He should have had an all-round experience in a car-manufacturing shop.

Schooling: Common school.

CAR REPAIR MAN, STEEL CLAIM

Description: The steel-car repairer is skilled in work with steel and sheet metal and able to use rivet machines and welding machines.

Qualifications: He should have a knowledge of riveting, cutting and bending sheet steel, and blacksmith work, to enable him to fix up springs.

Schooling: Common school.

CAR REPAIR MAN, WOOD CLEAN

Description: The duties of the car repair man on wooden cars are to repair all wooden parts of passenger and freight cars.

Qualifications: He must be thoroughly skilled in the use of all hand-carpentry tools and should have a general knowledge of the ordinary woodworking machine tools such as crosscut and rip saws, planers, joiners, and band saws. He should be able to remove and replace any wooden portion of a car. He should have had considerable experience in a car-building shop.

Schooling: Common school.

CONDUCTOR, DINING CAR CROSS

Description: The dining-car conductor has charge of the dining car while en route, is responsible for the work of the car crew (cooks and waiters), and for all supplies for kitchen; also linen, silver, kitchen utensils, buffet supplies, etc.

Qualifications: Some ability to handle men. Courteous in manner and neat in appearance. Must have knowledge of menus and have proper dining room service.

Schooling: Common school.

CONDUCTOR, FREIGHT CLAN

Kindred Occupation: Yard conductor.

Description: Freight conductors are in charge of freight trains and mixed trains and their crews; may also take charge of work and wreck trains and their crews.

Qualifications: Must pass a rigid examination on train rules, signals, schedules, and air-brake rules; a good physical examination, and especially so as to colors, eyesight, and hearing. Must have a reliable watch. Must have been a brakeman and flagman.

Schooling: Common school; preferably high school.

CONDUCTOR, PASSENGER CLANG

Description: The passenger conductor is in direct charge of passenger train and crew.

Qualifications: Must pass physical examination, especially as to eyesight, hearing, and color sight. Must pass an examination on train rules, signals, air-brake rules, and schedules. Must be familiar with book of rules and all orders. Must be thoroughly familiar with all classes of transportation and rules regarding same. He must have served as brakeman and freight conductor.

Schooling: Common school or equivalent.

CONDUCTOR, YARD CLANK

Kindred Occupation: Freight-train conductor.

Description: The yard conductor has charge of engines and crews in yard switching and yard work train service.

Qualifications: Must pass an examination on train rules, also on eyesight, hearing, and colors, together with a general physical examination; be qualified on book of rules, pass examination on yard rules and special instructions; must have copy of all general orders and be familiar with all orders. He is usually promoted from brakeman.

Schooling: Equivalent to common school.

COOK, BUSINESS-CAR OR DINING-CAR SERVICE CLAP

Description: The cook is engaged in preparing meals on trains. He may be assigned either to dining-car service, business-car service, or special buffet-car service.

Qualifications: Must be able to prepare meats, fish, vegetables, cereals, etc., with the equipment usually furnished on dining cars. Should be able to order supplies for his car.

Schooling: Common school or equivalent.

COOPER CLASH

Kindred Occupation: Rough carpenter.

Description: The cooper makes and repairs damaged shipping packages. Should not be confused with barrel maker.

Qualifications: Must be handy with handsaw, plane, and hammer.

Schooling: Common school.

CREW CALLER CLASP

Description: The crew caller calls either road train crews, road engine crews, or both. Within a certain prescribed distance from the yard office crew callers must have each member of the train and engine crew sign a call book on many roads. Outside of these limits crews can be called by telephone on many roads. Crew callers are furnished with the names of the members of the crew to be called at some places, while at others they check the registers to find such information.

Qualifications: Positions are filled by boys 18 years or over and by incapacitated men. Must be familiar with streets and numbers within prescribed distance from yard office where signatures to call book are required.

Schooling: Equivalent to common school.

CREW DISPATCHER CLASS

Description: The crew dispatcher, located only at the larger terminals, has charge of crew callers and the assignment of engine and train crews to runs or service in accordance with their seniority rights.

Qualifications: Must be a man of quick decision and have ability to handle men, in order to provide the necessary crews for trains and to assign the service to those entitled to it. He should have had previous experience in road or yard service as engineman, trainman, or clerk.

Schooling: Common school.

CROSSTIE INSPECTOR. (*See* **Inspector, crosstie.**)

DISPATCHER, LOCOMOTIVE. (*See* **Engine dispatcher.**)

DIVISION ENGINEER **DAZED**

Description: The division engineer is the officer in charge of the maintenance of roadway and track on his division, and is also in charge of roadway clerks and accountants. Track supervisors, signal supervisors, supervisors of bridges and buildings, and assistant engineers report to him; also such construction forces as steam-shovel engineers, ditcher engineers, etc., report to him. He must keep proper records of all material used on his division, keep forces supplied with materials, be responsible for maintenance of track and construction of additional tracks.

Qualifications: Must have a thorough knowledge of operating and maintenance of way rules and regulations. Must be able to handle men. Must have a good address and be able to deal with the public, and must have a thorough knowledge of track construction and maintenance, and should be a good accountant. Should have been an assistant engineer, track supervisor, or signal supervisor.

Schooling: College or university technical training.

DRAFTSMAN. (*See* **Railroad shop draftsman.**)

DRAW TENDER **DEWY**

Description: The draw tender opens and closes drawbridges to permit boats to pass. He must know how to operate the turning machinery, which is usually driven either by electricity or by gasoline-driven engines; must also operate interlocking signals to protect the track when the drawbridge is opened.

Qualifications: Must pass a physical examination for eyesight, hearing, and colors, and pass an examination on flagging rules. Must also be familiar with the operation of machinery used in turning drawbridges.

Schooling: Common school.

ENGINE CLEANER. (*See* **Helper, railway shop.**)

ENGINE DISPATCHER **ELFIN**

Description: The engine dispatcher is engaged in controlling the movements of locomotives in terminal territory and keeps the time of arrival and departure of all locomotives.

Qualifications: Must be a man of quick decision and especially proficient in the handling of men in order to provide the necessary engines to move trains without delay. Must have been a clerk in an engine house.

Schooling: Common school.

ENGINEER, ASSISTANT (Maintenance-of-way work) **ENVY**

Description: An assistant engineer on a division, with a force of instrument men, rodmen and draftsmen, is supposed to do all engineering work on a division, including preparation of preliminary plans and estimates

for improvement work, staking out improvement work, and, where such work is done by contract, award the work to contractors and see that it is properly carried out.

Qualifications: Should be familiar with department rules and practices, and be able to get along with men and conduct negotiations with outside parties. Should have had considerable experience in railroad engineering work.

Schooling: College or university technical training.

ENGINEER, ROAD CONSTRUCTION **ESSAY**

Description: The road construction engineer is employed by the railroad to supervise the construction of new lines built under contract. He is usually given a section of track from 7 to 10 miles in length, on which he sets the stakes, watches the work to see that it is properly carried out, and prepares monthly and final estimates on which is based the payments made to the contractor.

Qualifications: He must be thoroughly competent to supervise and direct the work of contractors and to check all work done and materials used. He should be a graduate engineer with an extended experience in railroad construction.

Schooling: College graduate.

ENGINEER, TERMINAL CONSTRUCTION **ERR**

Description: The duties of the engineer on railway terminal construction are to supervise the construction, maintenance, and improvement of all buildings, such as depots, roundhouses, freight sheds, and shops.

Qualifications: He must be a thorough building construction engineer, qualified to check all materials with the drawings and specifications and to supervise and direct the construction of all terminal buildings. He should have had extended experience as a foreman or contractor on similar work.

Schooling: Technical school graduate.

ENGINEMAN, GASOLINE LOCOMOTIVE **EDGE**

Kindred Occupations: Auto mechanic; Steam engineman or fireman with auto driving experience; Tractor driver; Truck driver.

Description: The gasoline locomotive engineman's duties consist of the operation and care of various types of oil or gasoline driven locomotives.

Qualifications: The gasoline locomotive engineman must have a thoroughly practical knowledge of various makes of oil or gasoline locomotives, gasoline railway motor cars, or gasoline-electric cars. He must have a knowledge of construction and upkeep of internal-combustion engines in general, including valve grinding and operating adjustments, and all operating repairs to gasoline engines, air brakes, and light locomotive running gear, and should be familiar with railroad operating rules and regulations to some extent. He should have had experience as heavy auto truck or tractor driver and mechanic.

Schooling: Preferably high school.

ENGINEMAN, STEAM LOCOMOTIVE **EGG**

Kindred Occupations: Experienced locomotive fireman; Freight engineer; Locomotive engineer; Shifting engine engineer.

Description: The duties of the steam locomotive engineman consist of running or driving standard passenger or freight locomotives of various types, on main line service.

Qualifications: The steam locomotive engineman must be a thoroughly experienced railroad locomotive engineer, with wide experience on express or through freight service with some large American railroad. He must be thoroughly familiar with such types of locomotives as camelback, compound or mallet, and Walschaerts or Stevenson type of gear rigging. He must have a thorough knowledge of care, upkeep and ordinary running repairs on locomotives, and be able to take entire charge of the engine on any class of work, either through, local or yard work, using coal, oil, or wood fuel. He must have a thoroughly practical operating knowledge of all the details of the locomotive, such as boiler injectors, engine, valve-gearing reversing mechanism, air pumps and all auxiliary equipment and their upkeep. He must have an intimate knowledge of American standard railroad signal rules and systems and railway rules and regulations. He should have a knowledge of locomotive and wrecking crane operation and the rigging and slinging of heavy weights such as guns and mounts.

Schooling: Common school; preferably high school.

FIREMAN, LOCOMOTIVE FATE

Kindred Occupations: Locomotive crane fireman; Steam shovel fireman; Steam tractor fireman.

Description: The locomotive fireman's duties consist of the firing and operating usual types of railroad locomotive and all kinds of yard or industrial switching locomotive boilers.

Qualifications: The locomotive fireman must be a thoroughly experienced passenger or freight locomotive fireman, preferably on some trunk line, and capable of keeping up steam with any available fuel that can be used, on heavy grades, with frequent stopping, long or short hauls, heavy or light loads, under all kinds of weather conditions. He must have a thorough knowledge of the care and operation of the locomotive furnaces, tender tank or cistern, injectors, safety valves, pressure gauges, and flues. He must be familiar with the care and operation of the air-brake system and all signals. He should have a thorough knowledge of the standard rules and regulations and in case of necessity be able to run a locomotive temporarily. He should have had experience as fireman on any kind of locomotive boiler, and possess the necessary physical fitness.

Schooling: Common school; preferably high school.

FLAGMAN AND GATEMAN, CROSSING FERN

Description: The crossing flagman and gateman has charge of keeping the public from railroad crossings, either with a flag, sign, or by lowering gates.

Qualifications: Good hearing and alertness; good color sight. These men are frequently those who have been injured in railroad service and are unable to perform other duties.

FOREMAN. (*See under specific occupations:* **Bridge crew; Carpenter's crew; Freight house foreman; General foreman locomotive output departments; Painter's crew; Pole setter; Road foreman; Road foreman, assistant; Section foreman.**)

FREIGHT CALLER FERRY

Description: It is the duty of the freight caller to call by name to the checker the freight as it is loaded or unloaded from the car.

Qualifications: He should have been a trucker or warehouseman.

Schooling: Common school.

FREIGHT CHECKER. (*See* Freight talleyman.)

FREIGHT HANDLER. (*See* Freight trucker.)

FREIGHT HOUSE FOREMAN FETCH

Description: The freight house foreman is in charge of the freight house and freight house laborers. He has charge of the placing of cars at the warehouse, the loading and unloading of freight and the direction of men performing this work.

Qualifications: Ability to handle men; must know how freight should be packed and stored, both in the freight house and in cars. Should also know how to file and classify freight. Usually has had experience as a warehouseman and a checker.

Schooling: Common school or equivalent.

FREIGHT TALLEYMAN FLAW

Kindred Occupation: Freight checker.

Description: The freight talleyman checks the freight into and out of the depot, station, and car.

Qualifications: He should know classes of freight and be able to check consignments. He is usually promoted from trucker caller or warehouseman.

Schooling: Common school or equivalent.

FREIGHT TRUCKER FEUD

Description: The freight trucker is engaged in trucking freight from and to cars and warehouse.

Qualifications: Good health and strength.

Schooling: Ability to read letters and numbers only.

GANG LEADER GIPSY

Description: The gang leader has charge of a gang composed of from 20 to 50 men either individual or group workers. Looks after, in detail, the work performed by the men under his charge. Orders all stocks and supplies for his men. Keeps a record of their time.

Qualifications: Usually promoted from group leader and is in line for promotion to foreman.

Schooling: Common school education or better.

Note.—The name of the department to which the gang leader is to be assigned must be given with the code word.

GENERAL FOREMAN LOCOMOTIVE OUTPUT DEPARTMENTS GIRL

Description: The general foreman has supervision of locomotive erecting shops, tank repair shop, truck and frame repair shop, wheel shop, boiler shop, flue and general pipe work, and paint shop.

Qualifications: Should have had practical experience in all departments over which he has supervision and know the relations of those departments to the complete organization.

Schooling: Common school; preferably high school.

GROUND MAN, FOREMAN. (*See* Pole setter, foreman.)

GROUP LEADER **GIRTH**

Description: The group leader has charge of two or more men assigned a specific line of duties; for example, a group that fits and applies driving boxes, hangs links, reach rods, etc.; a group that wheels and unwheels locomotives, strips and erects and fits up spring rigging, repairs pedestal caps, line guides, etc.; a group that removes and replaces ash pans, removes, replaces, and repairs shaker grates and rigging, etc.

Qualifications: He is picked out from the better workmen and promoted to group leader after becoming familiar with the work to be performed by his group.

Schooling: Common school or better.

Note.—The kind of work to be done must be named with the code word.

HELPER, RAILWAY SHOP **HARD**

Description: The helper, railway shop, may be assigned to any one of the following occupations: Ash-pan inspector; air bleeder; ash-pit man; boiler washer; box packer; engine cleaner; engine oiler; engine sponger; engine watchman; fire knocker; front-end inspector; grease-cup filler; sander; shop oiler.

Qualifications: The helper, railway shop, is a laborer who has shown himself faithful and dependable and who has been taught to do one or more of the kinds of work indicated. He always works under the supervision of the group leader or foreman. He should have good health and strength.

INSPECTOR, AIR-BRAKE TEST-ROOM **INLAY**

Description: The air-brake test-room inspector must be familiar with all air-brake parts, such as air pumps, brake valves, and distributing valves, and be able to couple them to an air-pressure line and test the parts to see that they are properly adjusted.

Qualifications: Must be familiar with the methods of testing various air-brake parts.

Schooling: Common school education.

INSPECTOR, BALLAST **INFER**

Description: The ballast inspector is stationed at ballast quarries to inspect and pass upon the quality of ballast loaded by contractors for delivery to the railroad, and make reports of cars of ballast shipped and quantity of ballast in each car.

Qualifications: He should be able to read and write English; should know the qualities of stone and gravel used for railroad ballast; should be able to make weights and make reports of quantities.

Schooling: Common school.

INSPECTOR, CAR **INERT**

Description: The car inspector inspects all freight and passenger cars at terminals and determines whether or not the car is in proper condition to continue in service. Laborer who has been given special instructions on what to look for and how to report defects. Must read and write and make necessary reports.

Qualifications: The inspector is usually promoted from the car-repair crew and must be thoroughly competent to judge the conditions of all parts of a car.

Schooling: Common school.

INSPECTOR, CROSSTIE INGOT

Kindred Occupation: Lumber inspector.

Description: The crosstie inspector inspects ties that are to be purchased by the railroad, and, on some roads, purchases ties and acts as tie agent, urging producers to make ties to be sold to the railroad.

Qualifications: A knowledge of the different kinds and grades of timber, familiarity with specifications, and a familiarity with use and life of ties; also should have a good address and be able to deal with tie producers without friction. Six to ten years on track work. (Tie inspection is frequently handled by track supervisors.)

INSPECTOR, LUMBER INK

Kindred Occupation: Crosstie inspector.

Description: The lumber inspector inspects at loading point lumber purchased for railroad use.

Qualifications: Must be familiar with the different species of wood and able to interpret and apply specifications; must also be able to get along amicably with lumber companies from whom lumber is purchased. Two or more years as carpenter or any other position where he becomes familiar with the quality and use of timber.

Schooling: Common school.

INSPECTOR, MASONRY INKER

Description: The masonry inspector inspects concrete, brick, or stone masonry work and is charged with duty of seeing that such work is properly executed.

Qualifications: Should know how masonry work should be done, and should be able to interpret plans and give measurements and stake out the work.

Schooling: To be qualified for promotion or better position, should have college or university training.

INSPECTOR, SCALE INLET

Description: The duties of the scale inspector are to inspect and adjust all track and platform scales on an assigned division of the road.

Qualifications: He must be thoroughly familiar with all types of track and platform scales, able to make all minor adjustments, and keep the scales in good order, so as to weigh accurately. He must understand the use of ordinary hand tools, such as wrenches, hammers, chisels, and other special tools used in the adjustment of scales.

Schooling: Common school.

INSPECTOR, SIGNAL. (*See* Signal inspector.)

INTERLOCKING MAINTAINER IMAGE

Description: The interlocking maintainer cares for and maintains all interlocking and signal devices, whether mechanical or electrical, on his assigned district.

Qualifications: He must have a knowledge of mechanical and electrical signal devices and the rules in connection with their operation. He is usually promoted from the signal-construction force.

Schooling: Common school or equivalent.

JANITOR, STATION JAW

Kindred Occupations: Window washer; Scrubber and sweeper.

Description: The station janitor is engaged in the cleaning of station buildings.

Qualifications: Strong physically.

Schooling: Must be able to read and write.

LABORER, OUTSIDE, RAILWAY UPKEEP LAUGH

As follows: Cement handler; Coal heaver; Fence builder; Laborer, bridge crew; Derrick crew; Section hand; Shoveler; Wrecking crew; Laborer, building construction.

Description: The railway laborer on outside work may be assigned to any of the above-named crews to do general outside labor.

Qualifications: Good health and strength; ability to stand outdoor work.

LAMPLIGHTER. (*See* Signal lamp man.)

LAMP-ROOM ATTENDANT LAVA

Description: The lamp-room attendant takes charge of the hand lamps and markers when delivered by inbound passenger crews, issuing checks therefor. Lamps belonging to crews having the home lay-over at the division headquarters are filled with oil.

Qualifications: Good eyesight and use of arms. Position usually filled by incapacitated employees from other departments.

Schooling: Must be able to read and write.

LEVER MAN LAW

Description: The lever man lines up switches, controlled from a tower, for movement of trains.

Qualifications: He must be trustworthy, have good vision and color perception, and have a knowledge of the interlocking plant and rules governing the movement of trains. He is usually promoted from telegrapher or an employee of the signal department.

Schooling: Common school or equivalent.

LINEMAN, FOREMAN LEASH

Description: The duties of the foreman lineman are to supervise the stringing and installation of all wires, terminal boxes, transformers, and protection devices on telephone, telegraph, and signal systems for any purpose.

Qualifications: He must be able to read electrical wiring drawings and specifications; must be able to take entire charge of a group of men and properly install any telephone, telegraph, or signal wiring system without any general supervision. He must thoroughly understand the connection of all wires to the insulators, wire and stretching devices, the relation of signal lines to high tension lines, understand the rules for making highway crossovers. He must have a general knowledge of all station equipment, such as telegraph instruments, telephone and signal equipment and be able to make proper connection therewith. He should have had considerable experience as a lineman and should have had some experience as a foreman.

Schooling: Common school; preferably technical high school.

LINEMAN, TELEGRAPH, TELEPHONE, AND SIGNAL WORK LEGAL

Description: The lineman on railway telegraph, telephone, and signal work must be able to string all kinds of signal, telephone, and telegraph lines, be able to make all terminal connections.

Qualifications: He must be able to read electrical wiring drawings and specifications, must understand the proper methods of insulating telephone, telegraph, and signal wires, must know the functions of transformers, lightning arresters and terminal boxes, and must have a thorough knowledge of connecting the same. He should have had considerable experience as a lineman, particularly on railway work.

Schooling: Common school; preferably trade school or technical high school.

LOCOMOTIVE DISPATCHER. (*See* Engine dispatcher.)

LOCOMOTIVE ENGINEMAN. (*See* Engineman, steam, locomotive.)

LOCOMOTIVE FIREMAN. (*See* Fireman, locomotive.)

LUMBER INSPECTOR. (*See* Inspector, lumber.)

MAIL CARRIER **MIRE**

Description: The mail carrier carries the mail either for the Government, the company, or both, between the depot and the post office.

Qualifications: Must be able to read and write.

MASONRY INSPECTOR. (*See* Inspector, masonry.)

MATRON, STATION **MEND**

Kindred Occupations: Employees in the information bureau.

Description: The duties of the station matron are to keep the ladies' retiring room clean and in good condition and look after the comfort of women and children.

Qualifications: Courteous to women passengers.

Schooling: Must be able to read and write.

MATRON, TRAIN **MERCY**

Kindred Occupation: Matron in waiting rooms or retiring rooms at stations or hotels.

Description: The train matron is employed on Pullman-car trains to look after the comfort of lady passengers.

Qualifications: Courteous in manner.

Schooling: Must be able to read and write.

PAINTER'S CREW FOREMAN **POWER**

Description: The duty of the foreman in a railway painter's crew is to supervise the painting necessary to keep all buildings and bridges properly painted.

Qualifications: He must be able to take entire charge of the crew of men and do any necessary interior or exterior painting without any supervision; must be a thoroughly practical painter and able to properly mix paints and care for all painting equipment. He must be thoroughly familiar with painter's scaffolds and other rigging. He should have had considerable experience as a painter and should have worked for some time in a railway painting crew.

Schooling: Common school.

PARCEL-ROOM ATTENDANT **PHLOX**

Kindred Occupation: Cloak-room attendant at hotels and restaurants.

Description: The parcel-room attendant is engaged in the checking of passenger's hand baggage in depots, but does not do any checking of baggage for transportation.

Qualifications: Carefulness; strength. Must be able to check and keep account of cash and checks.
Schooling: Common school.

PIPE FITTER, LOCOMOTIVE PAUSE

Kindred Occupations: Pipe fitter, expert; Plumber; Steam fitter.
Description: The duties of the locomotive pipe fitter are all kinds of pipe work involved in the construction or repair of steam locomotives.
Qualifications: He must be thoroughly skilled and experienced in all kinds of pipe work and be able to cut, bend, and fit to drawings or specifications, steam pipes for pressure up to 250 pounds per square inch, and do all other kinds of pipe fitting and work involved in fitting and connecting steam, water, and air pipes to outlets, fixtures, and operating apparatus forming parts of a locomotive. Must thoroughly understand the operation of hand and power driven pipe cutting and threading machines and pipe cutters. Must have a practical knowledge of standard valves and fittings, and tank, pump, and boiler connections. Must be capable of performing tasks on converted pipe work under water pressure. He should have had experience on locomotive, factory, or power plant piping installation work.
Schooling: Common school.

POLE SETTER, FOREMAN, ELECTRIC LIGHT AND SIGNAL LINES PUMP

Description: The duty of the foreman pole setter on electric light and signal lines is to supervise the erection of poles, placing of cross arms and insulators and preparing them completely for the stringing of wires by the lineman.
Qualifications: The foreman pole setter should be thoroughly familiar with all post hole tools; must thoroughly understand tamping and truing of poles and placing of guy wires, cross arms, and insulators completely to prepare the pole line for the stringing of wires by the lineman. He should have ability to handle men and supervise all trucking and loading of poles. He should have had experience in a pole erecting crew.
Schooling: Common school.

POLICE CAPTAIN, RAILWAY SERVICE PIANO

Description: The duties of the police captain are to have general charge of the police department and the employment and control of the persons engaged in such service.
Qualifications: He should be neat in personal appearance; should have good control over men, be courteous, and at the same time be able to enforce his authority on all occasions. He should have had considerable experience as a policeman.
Schooling: Common school.

POLICEMAN POOR

Description: The policeman is intrusted with the power of arrest, detention, and prosecution in cases of offense against the laws and ordinances. He guards against depredation, fire, or trespass of company property or that intrusted to his care. He assists the conductors in keeping order on trains and in yards, and, so far as possible, protects the company's patrons from annoyance by disorderly persons.
Qualifications: He must be physically strong, having good physical and moral courage, be courteous in manner, yet able and willing to enforce his authority. He should have had previous experience either with a large company or on some police force.

PORTER, PULLMAN **PHONE**

Description: A Pullman porter is assigned to a single Pullman car. His duties are to make beds, keep towels in wash room, check all railroad linen, keep the car clean, look after the comfort of the passengers, and to take hand baggage on and off the train.

Qualifications: Must be strong physically, neat, and courteous.

Schooling: Common school.

PORTER, STATION **PHOTO**

Kindred Occupation: Hotel porter.

Description: The station porter assists passengers with baggage, and assists the infirm to and from trains.

Qualifications: The porter must be strong, neat, and courteous.

Schooling: Should be able to read and write.

PUMPER **PLUM**

Description: A pumper has charge of a roadside water station and runs a pump engine which keeps the water tank filled with water. This pump may be operated with steam, in which case it is necessary for the pumper to fire the boiler; or, the pump may be operated by an oil or gasoline driven engine or an electric motor.

Qualifications: Must know how to operate the engine which he has charge of, and how to make minor repairs on same.

Schooling: Must be able to read and write.

PUMP MAN, SMALL PUMPS, WATERING STATIONS **PICK**

Description: The pump man must operate pumps and keep a constant water supply in tanks or troughs. He must be able to run any sort of small gasoline, electric, or steam pump. He should understand the firing and care of a small steam boiler.

Qualifications: The pump man should know enough about the machinery to keep it oiled and to report at once the need of necessary repairs.

Schooling: Common school.

PUMP REPAIR MAN **PLY**

Kindred Occupation: Machinist.

Description: Two or three pump repair men are usually located on each division, and it is their duty to keep all pumping equipment at the different water stations on a division in repair. When a pumper reports repairs needed at his water station, one or more of these men go to his station and make repairs. The same men are also used in installing new pumping equipment, laying water pipe lines, etc., and sometimes in looking after plumbing work in buildings on a division. Should be a good general machine repair man.

Qualifications: Should be a fairly good machinist.

Schooling: Must be able to read and write.

RAILROAD SHOP DRAFTSMAN **RAM**

Description: The duties of the railroad shop draftsman are to make drawings for locomotives, all general machine parts, and for railway car equipment.

Qualifications: He must have a thorough knowledge of strength of materials and their use as applied to rolling stock, and be experienced in the design of locomotive parts; must be familiar with shop practices, including machine tool work, pattern and foundry work; must be a thor-

oughly skilled general designer and draftsman, and familiar with railroad practice. He should have had experience in mechanical design and drafting in railroad shops.

Schooling: High school or the equivalent. Preferably some technical training.

RESIDENT ENGINEER. (*See* Engineer road construction and Engineer terminal construction.)

ROAD DEPARTMENT ACCOUNTANT. (*See* Accountant, road department.)

ROAD FOREMAN RATIO

Kindred Occupation: Traveling engineer.

Description: The road foreman supervises the condition of locomotives and work of firemen and enginemen. He reports directly to the superintendent.

Qualifications: Must have executive ability and a thorough understanding of working conditions, locomotive operation, and maintenance. Usually promoted from assistant road foreman.

Schooling: Common school.

ROAD FOREMAN, ASSISTANT RAVE

Description: The assistant road foreman supervises the condition of locomotives and work of firemen and enginemen. He reports to the road foreman.

Qualifications: Must have executive ability and a thorough understanding of working conditions, locomotive operation and maintenance. Usually an experienced engineman. Usually promoted from traveling engineman.

Schooling: Common school.

ROADMASTER. (*See* Division engineer.)

SANDER. (*See* Helper, railway shop.)

SCALE AGENT SHAPE

Description: Scale agents weigh and record carload freight. They have charge of weighing and billing cars and proper operation of scales. They must account for money collected and maintain proper records.

Qualifications: Ability to weigh and record carload shipments. Knowledge of routing and rating weight limits and most of the duties of a freight agent. He should have been weighmaster, rate clerk, billing clerk, and account clerk.

Schooling: Common school or equivalent.

SCALE INSPECTOR. (*See* Inspector, scale.)

SECTION FOREMAN SHARE

Description: The section foreman has charge of a force of men engaged in maintaining an assigned section of roadbed, keeping the fences in repair, and the right of way free from weeds, long grass, etc. Must go over and inspect his section every day.

Qualifications: Ability to handle men. Must know how to replace ties, remove and install frogs, switches, and track crossings. Must know all the rules for signaling trains and all rules for running hand or gasoline cars on main track and switches.

Schooling: Common school or equivalent.

SIGNAL FITTER SMIRK

Description: A signal fitter fits parts of signal apparatus together in constructing automatic block signals, interlocking plants, etc.

Qualifications: Must be an experienced machinist and electrical worker.

Schooling: Common school.

SIGNAL FOREMAN SMITE

Description: A signal foreman has charge of a gang of men consisting of laborers, helpers, fitters, wiremen, and a blacksmith, who erect automatic block signals or interlocking plants.

Qualifications: Must be an experienced signal fitter and wireman; must be able to handle men. Must pass examination on colors, eyesight, hearing, and examination on flagging rules; and must be able to understand blue prints; must have had considerable experience on signal construction work.

Schooling: Preferably technical training.

SIGNAL HELPER SNAG

Description: Signal helpers assist signal fitters, wiremen, etc., in construction and maintenance of work in connection with electric automatic block signals, interlocking plants, etc.

Qualifications: Six months or longer as a laborer on signal construction or maintenance work.

Schooling: Common school.

SIGNAL INSPECTOR SNEER

Description: Signal inspectors are employed as assistants to the signal engineer, travel over the railroad, make inspections of signal apparatus on the different divisions, and assist the division signal employees in locating trouble that may be experienced with signal apparatus, and direct the division employees as to proper method of making repairs, etc.

Qualifications: Must be thoroughly familiar with all signal apparatus in common use; usually promoted from position of assistant signal supervisor.

Schooling: College or university technical training.

SIGNAL-LAMP MAN SHEAF

Description: The signal-lamp man cleans, fills, and lights oil lamps; also cares for electric lamps in signals and assists in making repairs at interlocking plants.

Qualifications: He must be trustworthy and active, and have good vision and color perception.

Schooling: He must be able to read and write.

SIGNAL MAINTAINER SHEAR

Description: The signal maintainer keeps the signal apparatus in a certain specified territory (which may be one interlocking plant or 25 miles of single track equipped with interlocking signals) in good operating condition, making daily inspection of all apparatus to see that it is in proper working order and making such repairs as he finds necessary. He is subject to call, day and night, when signal apparatus is not properly working.

Qualifications: Must pass physical examination, with reference to eyesight, hearing, and colors; must pass examination on flagging rules, and must be a capable electrical worker; must have had considerable experience on signal construction work.
Schooling: Common school or equivalent.

SIGNAL MAINTAINER, ASSISTANT SNUFF

Kindred Occupation: Signal helper.
Description: Assistant signal maintainers assist signal maintainers in maintenance of signals or interlocking plants.
Qualifications: Must pass physical examination with reference to eyesight, hearing, and colors; and pass examination on flagging rules.
Schooling: Common school or equivalent.

SIGNAL REPAIR MAN SOIL

Description: A signal repair man is a shop employee in a signal repair shop who repairs apparatus used in automatic block signaling and interlocking plants.
Qualifications: Must be a competent machine repair man and electrical trouble shooter; must have had considerable experience on signal construction and maintenance work.
Schooling: Common school.

SIGNAL SUPERVISOR SOBER

Description: The signal supervisor has charge of all signal apparatus on his division and all division signal employees report to him.
Qualifications: A thorough knowledge of signal apparatus. A thorough familiarity with operating and maintenance of way rules and regulations, and ability to handle men; experience in signal construction and maintenance.
Schooling: Technical education at college or university.

SIGNAL WIREMAN SODA

Description: Signal wireman does electric wiring, connects up motors, operating signals, and switch throwing apparatus in connection with the construction of automatic block signals, electric interlocking plants, etc.
Qualifications: Must be a first-class electrical worker.

STATION AGENT SHED

Description: The station agent has charge of the railway records, property, and employees at his station; attends to the sale of tickets; receives, delivers, and forwards freight and collects for same.
Qualifications: He must be posted as to requirements of the traffic, accounting, treasury and claim departments, and know how to deal with the public. He is usually promoted from telegrapher, cashier, or assistant agent.
Schooling: Common school or equivalent.

STATION ATTENDANT SHEEN

Station attendants are grouped as follows: Gateman; Train caller or usher; Porter or red cap; Bulletin board poster.
Description: The duties of the station attendants are to attend gates, call trains, post bulletin boards, assist passengers, or to do any similar kind of work connected with the conduct of the station.
Qualifications: He must be neat in appearance and courteous in manner.

Schooling: He should be able to read and write.

NOTE.—A person employed under the code word for station attendant may be assigned to any one of the occupations listed above.

STATION MASTER SHARP

Description: The station master has charge of making up and dispatching local passenger trains, receiving and dispatching through trains, looking after the necessary shifting of such trains, sees that crews are provided for all trains and that they are on hand promptly to take charge of same. Has general charge of all employees about the station and reports any neglected duty.

The station master's assistant has the same qualifications as the station master and works when the station master is off duty or, in the larger stations, relieves the station master of part of his work.

Qualifications: Ability to maintain station in proper condition and attend courteously to wants of passengers. Physical examination, including sight, hearing, and colors. Must have worked in some capacity, such as assistant yard master or train employee, to gain the knowledge necessary in handling train movements about the station.

Schooling: Common school.

STATION MASTER, ASSISTANT. (*See* Station master.)

STOREKEEPER, ROAD DEPARTMENT DIVISION SLAY

Description: A road department division storekeeper takes care of a stock of track supplies used on a division, issues supplies to foremen and others on requisitions, and makes report to the accountant of supplies issued, also approves bills for supplies received, and makes requisition for additional material to keep up his stock.

Qualifications: Should be familiar with road department material and its use. Should have been section foreman or in similar position.

Schooling: Common school education.

SUPERVISING AGENT SHEEP

Description: The supervising agent has general charge of passenger, baggage, freight, and scale agents; has charge of the station, grounds, buildings, and sidings within his jurisdiction; and has the employment and supervision of the men engaged in this service.

Qualifications: He should be able to handle men and understand thoroughly the work over which he is to have supervision. He should be a good judge of men and able to pick the man qualified to do the work to which he is to be assigned. He should have had actual experience in the freight house and scale house and in the general conduct of affairs about a railroad yard and depot.

SUPERVISOR, BRIDGES AND BUILDINGS SLUSH

Description: The supervisor of bridges and buildings is the officer in charge of maintenance and reconstruction of all buildings on his division. All carpenter and painter forces, pile driver engineers, etc., report to him.

Qualifications: Must be able to handle men, be familiar with operating and maintenance of way rules and regulations, be a first-class carpenter, and thoroughly familiar with method of handling timber, steel, and masonry construction. Preferably technical training. Should have been foreman of bridge and building gang.

Schooling: Common school.

SUPERVISOR, TRACK SMACK

Description: A track supervisor has charge of the maintenance of track on from 40 to 100 miles of railroad. He is supposed to spend practically all of his time either with the various sections or extra gangs, or riding over the road inspecting the track and giving instructions to the section gangs with reference to the manner of carrying out their work. He should be present when any unusual or important work is undertaken, and should go immediately to the scene of any accident. He should make a check of the time-books, accident reports, etc., of the different section and extra gang foremen. The foremen of all track gangs employed in his district report to him. (On some roads this position is called roadmaster.)

Qualifications: Ability to handle men. Must know fully train rules and road department rules, be thoroughly posted in construction and maintenance of track, and have 3 to 5 years as section foreman.

Schooling: Common school or equivalent.

SUPERVISOR, WATER STATIONS SMEAR

Description: The supervisor of water stations has charge of all water supply work on a division. The pumpers and pump repairmen report to him, and work under his direction.

Qualifications: Must be thoroughly familiar with all types of pumping engines, and know how to make repairs on same. Should be a fair carpenter and machinist, and be able to handle men. Should be a good pump repairer, with some experience as carpenter.

Schooling: Common school.

SWITCHMAN. (*See* Brakeman, yard.)

SWITCH TENDER, YARD SHAVE

Description: The switch tenders, yard, are employees other than those in towers controlling switches and signals, whose duty is to operate yard switches for trains and engines using them. They keep the switches in good condition and free from obstruction.

Qualifications: Good eyesight and hearing. Required to pass examinations on eyesight, hearing, and color, together with physical examinations. Position is filled by incapacitated men from train service.

Schooling: Equivalent to common school.

TELEGRAPHER TRADE

Description: The telegrapher receives and transmits messages, receives and delivers train orders, blocks trains, must keep a full set of signals and use the same as required by the rules.

Qualifications: He must be a skilled telegrapher, capable of receiving and sending not less than 25 words per minute. He must understand the use of the telephone and the rules prescribed by the railway for the operation of both the telegraph and the telephone. He must know all the rules concerning train orders and operating trains in the yards and on the main line. He must have good hearing and good color sight.

TELEPHONE AND TELEGRAPH MAINTAINER. (*See* Telephone and telegraph repairman.)

TELEPHONE AND TELEGRAPH REPAIR MAN **TORN**

Description: The duties of the telephone and telegraph repairman are to keep all telephone and telegraph apparatus in a certain specified territory in working order, making frequent inspections and all necessary repairs.

Qualifications: He should be able to read wiring and electrical drawings and specifications; should have a thorough knowledge of the construction of telephone and telegraph instruments. He should know how to maintain storage batteries and to install either dry cell or storage batteries. He must thoroughly understand all terminal box and cable connections, heat coils, lightning arresters, cut-outs, and devices protecting against high tension currents. He must be able to test for short circuit and ground, and able to take out and replace any portion of the instrument or line distribution, protection or controlling device. He should have served an equivalent to an apprenticeship and had considerable experience as a telephone repairman.

Schooling: Common school; preferably trade school or technical high school.

TICKET CLERK **THEME**

Description: The duties of the ticket clerk are to sell tickets under the supervision of the passenger-ticket agent and to assist him in various clerical duties.

Qualifications: The ticket clerk must understand all classes of transportation, be familiar with the various train-schedule books, and be able to fill out all kinds of special and coupon tickets under the direction of the ticket agent. He should be a good penman, neat in personal appearance, and courteous.

Schooling: Common school.

TICKET COLLECTOR. (*See* **Train ticket collector.**)

TICKET EXAMINER **THANK**

Description: The ticket examiner opens and closes gates for the passage of incoming and outgoing passengers, examines and punches tickets, and directs passengers to right trains.

Qualifications: Neat in appearance and courteous in manner. Must have had sufficient experience in handling tickets and other transportation equivalent to pass the examination required by the auditing department.

Schooling: Common school.

TOWERMAN. (*See* **Leverman.**)

TRACK FOREMAN, APPRENTICE **TIARA**

Description: The apprentice foreman is an assistant to the section foreman or extra gang foreman under whom he is employed, and takes charge of the force, if it is necessary for the foreman to be absent for any reason, or takes charge of a part of the force, if it is necessary to divide the force into two gangs.

Qualifications: Ability to handle men and knowledge of track work.

Schooling: Common school or equivalent.

TRACK SUPERVISOR. (*See* **Supervisor, track.**)

TRACK WATCHMAN THYME

Description: The track watchman walks the track, inspecting ties and rail joints for imperfections. It is also his duty to see that all fences are in repair and to close all private gates. He should be thoroughly familiar with the construction of all frogs, switches, and rail crossings; familiar with all signal devices, also with methods of signaling trains.

Qualifications: Should have good health, be alert, and thoroughly reliable. Sufficient experience as track laborer to understand his work thoroughly.

TRAIN CALLER THAT

Description: Employee in passenger depot whose duty it is to announce the departure of trains.

Qualifications: Ability to read and write and talk English.

TRAIN DIRECTOR THAW

Description: The duties of train director are to receive orders from the train dispatcher for the movement of trains and transmit them to the train crews.

Qualifications: Must be an expert telegrapher and telephoner. Must have good eyesight, especially with reference to colors, and understand all the rules of the road for the movement and signaling of trains.

Schooling: Common school or equivalent.

TRAIN DISPATCHER TRICK

Description: The train dispatcher is a telegraph or telephone operator whose duty it is to direct the movement of all trains moving on a certain specified operating division of a railroad. It is his duty to transmit orders to the local telegraph operators, who, in turn, issue orders to the conductor for the movement of trains. The train dispatcher must know at all times the exact location and running schedule of each train on his division.

Qualifications: Must be an expert telegrapher and telephoner. Must advance to the position as train dispatcher through experience gained as train dispatcher's clerk and chief dispatcher's clerk.

TRAIN GATEMAN. (*See* Ticket examiner.)

TRAINMAN. (*See* Brakeman and flagman, passenger train.)

TRAIN TICKET COLLECTOR THEFT

Description: The train ticket collector assists the conductor in collection of fares, tickets, and other transportation authority. On heavy runs he collects all tickets while the conductor attends to proper handling of passengers and train.

Qualifications: Should have knowledge of different classes of transportation and should know train rules.

Schooling: Common school or equivalent.

TRANSFER AGENT. (*See* Agent, transfer station.)

WAITER WARD

Kindred Occupation: Waiter in hotels and restaurants.

Description: The waiter takes orders for food from patrons of dining cars, removes dishes from the table, and sees that the table is properly arranged for such service.

Qualifications: The waiter should be neat, careful, and courteous.

Schooling: Ability to read and write.

WAREHOUSEMAN **WARE**

Kindred Occupation: Storage warehouseman.

Description: Warehousemen are engaged in storing freight in warehouses. They load freight from warehouse to cars and unload from cars to warehouse, stow freight in warehouse, and receive and deliver from shippers to consignees.

Qualifications: Good health and strength.

Schooling: Common school.

WATCHMAN **WEARY**

Kindred Occupation: Watchman at industrial plants.

Description: The watchman is appointed to watch or look after the railroad company's property at a certain point.

Qualifications: This man is often a laborer or section man detailed for this duty. He is usually a retired or superannuated employee.

Schooling: Common school.

WATCHMAN, ENGINE HOUSE. (*See* **Helper, railway shop.**)

WATCHMAN, TRACK. (*See* **Track watchman.**)

WEIGHMASTER OR WEIGHMAN **WARN**

Description: It is the duty of the weighmaster to weigh and keep a record of car-load shipments passing over the scales at the point he is located. He must keep records on a standard blank form.

Qualifications: Ability to weigh and keep detailed record of shipments passing over his scale.

Schooling: Common school or equivalent.

YARD BRAKEMAN. (*See* **Brakeman, yard.**)

YARD FOREMAN. (*See* **Conductor, yard.**)

YARDMASTER **YACHT**

Kindred Occupation: Conductor, road, freight, and switch.

Description: The yardmaster has immediate supervision over yard forces and yard operation. On some railroads he has also supervision over the calling of train crews and the train seniority list.

Qualifications: Good color sight and hearing; the ability to stand exposure. He must be thoroughly familiar with the rules governing, and the duties of employees connected with, train service; must know the reports and records necessary in the discharge of his duties, see that cars are not unnecessarily delayed in passing through his yard, and see that waybills are received for cars arriving and delivered to conductors for cars departing. Must be familiar with book of rules and see that all orders are properly given and executed.

Schooling: Equivalent to common school.

YARDMASTER'S ASSISTANT **YAK**

Kindred Occupation: Conductor, freight train and yard.

Description: Yardmaster's assistants are employees other than yard clerks who assist the yardmaster in the performance of his duties.

Qualifications: He must be thoroughly familiar with the rules governing, and the duties of, employees connected with the train service; know the reports and records necessary in the discharge of his duties, see that cars are not unnecessarily delayed in passing through his yard, and see that waybills are received for cars arriving and delivered to conductors for cars departing.

Schooling: Equivalent to common school.

SHIPBUILDING OCCUPATION GROUP

ARCHITECT, MARINE — **ACUTE**

Kindred Occupations: Marine designer; Marine engineer; Mechanical engineer; Naval architect.

Description: The marine architect's duties consist of planning and designing the hull and details of steamships and ships in general and supervising the construction of water crafts.

Qualifications: The marine architect must be a thoroughly experienced marine architectural engineer specialist in design, construction, and repair of steel or wooden ships and barges. He must have a thorough knowledge of the laws of water pressure, strength of materials, and design of structural steel frames, columns, arches, and roof structures, especially as related to hulls and design and treatment of ship interiors.

He must be familiar with design, installation of power, heating, ventilating, refrigerating, plumbing and lighting systems as applied to marine service, and capable of the complete layout of a ship's interior, or tearing down and reconstructing interiors for special purposes.

He must be capable of preparing all specifications and contracts, supervising the purchase and inspection of all materials, and be able to act in an advisory and consulting capacity in all matters pertaining to ship hull construction.

He should have had similar experience in connection with a large shipbuilding plant, or operating steamship company.

BITUMASTIC APPLIER — **BILL**

Description: The bitumastic applier lays composition material on the inner bottoms of tanks and waterways, in pockets and curves about brackets and frames, in joints between plates and foundations for tiles, and on decks and floors.

Qualifications: The bitumastic applier must be able to mix composition material for work to be done and use a trowel and other cement forming tools.

BOAT BUILDER, STEEL — **BIND**

Description: The steel boat builder in a shipyard constructs, fits up, and repairs all kinds of small steel boats, pontoons, and floats.

Qualifications: The steel boat builder must be a skilled sheet metal worker, capable of working all gauges of steel up to and including 10 gauge. He must be able to work from drawings and templates. In addition he must have a full knowledge of all steel boat builder's tools; be able to solder with soldering copper or blow torch; must be able to set forms, bend frames, lay decks, and line up a boat. He should have served an equivalent of an apprenticeship under a journeyman or steel boat builder.

Schooling: Common school.

BOAT BUILDER, WOOD BEVEL

Kindred Occupations: Boat carpenter; Canoe builder; Joiner; Pattern maker.

Description: The duties of the wood boat builder are the building and repair of small wooden boats, floats, pontoons, and motor boats.

Qualifications: He should be experienced in the details of construction of all classes of flush and clinker built or canvas covered pleasure or life boats or canoes, small yachts or cruising boats of all sorts. He must be capable of building or repairing pontoons or wooden floats. He should be skilled in the use of carpenter's, boat builder's, and joiner's tools, and familiar with all kinds of wood used in boat building, and be an expert gluer and a capable, accurate worker.

Schooling: Common school; preferably high school.

BOLTER UP BIRCH

Description: The bolter up works in conjunction with the plate hanger, regulator or ship fitter, placing and drawing up bolts in ship plates and frame work, in advance of reamers and riveters.

Qualifications: The bolter up must be familiar with working about scaffolds and stagings, and capable of using wrenches, mauls, and drift pins.

CALKER, WOOD CHIRP

Description: The duties of the wood calker are to fill in the seams in the planking in the hull, with cotton, oakum, rosin, white lead, putty or pitch, as circumstances require, to make them water-tight. A wood calker may also calk wooden decks.

Qualifications: The wood calker should thoroughly understand calking tools and the process of calking, so as to make the seams perfectly water-tight.

CANVAS WORKER CHIVE

Kindred Occupations: Awning maker; Canvas sewing machine operator; Canvas working machine operator; Sail maker.

Description: The duties of the canvas worker are the laying out, cutting, and sewing of canvas and duck.

Qualifications: He must be thoroughly experienced in canvas work and skilled in the operations involved in the manufacture of articles of canvas or duck, such as tents, awnings, bags, and sacks. He must be able to lay out from drawings or samples, and cut, sew, or skillfully perform operations involved in the process or manufacture of such articles.

Schooling: Common school.

CARPENTER, SHIP, FOREMAN, OR SHIPWRIGHT CHIN

Kindred Occupations: Boat builder; Skilled general carpenter; Timber carpenter.

Description: The duties of the foreman ship carpenter are to supervise the building of wooden ships, large pontoons, barges, and other classes of floating craft. In steel ship work he supervises all necessary wood construction except the interior finishing, which is done by the ship joiner.

Qualifications: He must be a skilled all-round ship carpenter, experienced in building barges, pontoons, and wooden ships, including all such work as laying out, framing, stage building, fastening, planking, calking,

hewing, deck laying, etc. He must be experienced in building launching ways, launching cradles, and in the actual launching of wood and steel ships.

Schooling: Common school; preferably high school.

CARPENTER, SHIP, GENERAL CHINA

Description: The general ship carpenter on wooden ships does the usual kind of ship carpentry, such as planking, beveling, dubbing, scarfing, squaring, strapping, and spar making. On steel ship work he erects staging, lays wooden decks, builds launching ways and launching cradles, and assists in launching.

Qualifications: He must be thoroughly skilled in the use of the ordinary carpenter's tools and in addition have special training with the adz, broadax, and other special ship tools. He should be able to work to drawings and understand framing and sheathing work and should be capable of doing rapid, rough work, both by hand and with the ordinary wood-working machines.

Schooling: Common school.

CEMENTER. (*See* Bitumastic applier.)

CHIPPER AND CALKER, MACHINE CHOIR

Kindred Occupation: Structural steel chipper.

Description: The machine chipper and calker cuts, chips, splits, files, and calks angles and seams on steel plate work to make joints water-tight.

Qualifications: The machine chipper and calker must thoroughly understand the use of the pneumatic hammer and necessary tools for chipping and calking. He should be able to work on scaffolding and in all sorts of difficult places. He should have done similar work in shipyard or boiler shop.

DEVELOPER. (*See* Loftsman.)

DRILLER AND REAMER, PORTABLE, OUTSIDE DANCE

Description: The duties of the operator of the portable drill in outside work in the shipyards are to drill, ream, countersink, and tap small holes, and to do cutter-bar work for the inserting of patch bolts.

Qualifications: The portable-drill operator must be able to operate and adjust all kinds of electrical or other types of portable power-driven drills, breast drills, or ratchet drills. Must be able to fix all brackets and clamps for the supporting of the drill, and be able to adjust and sharpen cutters.

ELECTRICIAN, CHIEF SHIP EGO

Kindred Occupations: Electrician; Interior wireman; Power-plant electrician.

Description: The duties of the chief ship electrician are the installation and operation of electrical equipment of all kinds on large ships.

Qualifications: He must be a thoroughly experienced ship electrician, capable of installing according to drawings the complete electrical-wiring systems used in ship construction for lighting, auxiliary, power, telephone, bells, annunciators, and all signaling devices. He must be thoroughly skilled in water-tight conduit work and the use of various types of marine conduits, outlets, switches, and wiring devices of all kinds. He must have a knowledge of the care and operation of generators,

motors, searchlights, storage batteries, and other auxiliary apparatus. Must be capable of locating and repairing all kinds of wiring defects and of making minor repairs on various types of ship electrical appliances, such as motors, searchlights, cooking ranges, ovens, fans, and irons. He should have a knowledge of the construction of wireless systems and have had similar experience on any large passenger, freight, or war ship.

ENGINEER, MARINE EGRET

Kindred Occupations: Mechanical engineer; Naval architect.

Description: The duties of the marine engineer are to supervise and design construction and installation of all mechanical elements of ships, marine equipment, and docks.

Qualifications: He must be a technical engineer with thorough theoretical knowledge and broad practical experience in planning and design, construction and installation of the complete power and machinery equipment, including main engines, condensers, pumps, electrical equipment, boilers, piping systems, and steering gear of river, lake, or ocean-going ships, tugs, and special craft, such as oil tankers, floating derricks, and large dredges. He must also be thoroughly familiar with the mechanical equipment of floating lock gates and pumping plants for emptying dry docks. He should be familiar with dock and cargo-handling apparatus, such as winches, hoists, and conveyers. He should have a knowledge of fabricating and handling machinery used in ship construction and have some knowledge of hull design and construction, with relation to installation of a ship power plant and operating machinery.

Schooling: He should be a graduate of a technical school.

ERECTOR LEADER EMBER

Description: The duties of the erector leader are to look after the receipt of fabricated material and the placement in position in the hull. The erector leader is stationed on the ship and assists all hull assemblers in the placing of the ship plate and frames.

Qualifications: He must be capable of handling plates, channels, beams, and structural material of all sorts used in the make-up of the hull, and familiar with bending, locating drifting holes, and bolting up, leaving the work ready for the riveters. He must also understand all marks and symbols used to designate the location of parts.

JOINER, SHIP JADE

Description: The ship joiner does the interior finishing on the ship, including cabin and stateroom work, stair building, etc. He also builds and assembles furniture, sideboards, bookcases, and deck houses.

Qualifications: The ship joiner must be able to read drawings, to do all kinds of cabinetmaking and joinery, to operate woodworking machinery, and be familiar with the peculiarities of ship construction, such as the use of the bevel and bevel board.

Schooling: Common school.

LEAD BURNER LASS

Description: The duties of the lead burner consist of connecting storage battery terminals and leads, making lead lined tanks and construction or repair of lead chemical apparatus.

Qualifications: The lead burner must be a thoroughly experienced and skilled lead burner, familiar with all classes of lead-burning work, especially battery terminals and connections for stationary and portable storage batteries, lead or lined chemical tanks, retorts, and apparatus. He should have had such experience in a storage battery manufacturing plant or chemical works.

LINER MAN LASSO

Description: The duties of the liner man are to measure up for and make wood templates for metal liners and to square and put liners into place after bending or tapering.

Qualifications: He must be capable of working on scaffolding and able to do climbing. He should know how to use the ordinary hand carpentry tools and be able to fit and bolt up liners.

LINESMAN. (*See* Loftsman.)

LOFTSMAN, LINESMAN, DEVELOPER LAST

Description: A loftsman is a man who lays out the lines of the ship full size on the floor or scrive board from tables and drawings furnished by the drawing office, and develops and makes full-size wooden or paper templates for the different parts of the ship. A linesman is an expert loftsman. A developer is a loftsman particularly skilled in work requiring development of curved plates.

Qualifications: He must know geometric construction and developments thoroughly. He must be thoroughly familiar with hand carpentry tools and with the ordinary machine tools, such as crosscut, rip, and cut-off saws, planers, jointers, and band saws.

Schooling: High school or equivalent.

MARINE ENGINE AND AUXILIARY DRAFTSMAN MANOR

Description: The duties of the marine engine and auxiliary draftsman are to prepare assembly and detail drawings of marine engines and auxiliary equipment.

Qualifications: He must be a thoroughly experienced mechanical draftsman, with special knowledge of general design and details of marine engines, either single, compound, or triple expansion, steam turbines, boilers, pumps, condensers and feed water heaters, piping, and auxiliary apparatus. He must be familiar with the layout of foundations and supports of power and operating equipment in ships of different types. Must be thoroughly familiar with materials of construction, able to calculate and proportion dimensions of parts, capable of making sectional drawings of any part or parts of the main power or auxiliary apparatus. Must be capable of turning out complete finished drawings in connection with any part of the mechanical equipment of a ship.

Schooling: Preferably high school or technical graduate.

NAVAL ARCHITECT. (*See* Architect, marine.)

PACKER PORT

Description: The duties of the packer are to introduce paper, canvas, or other substances to act as stopwaters between metal surfaces.

Qualifications: He must be experienced in the use of the hammer, lap wedge, and ramming wedge.

PLATE HANGER **POACH**

Description: The duties of the plate hanger are to put ship plates into place under the direction of the erector leader and make it ready for the bolter-up.

Qualifications: He must be able to work on scaffolding and staging and must be capable of using mauls, wrenches, and drift pins.

PLATE-SHED OR SHIP-SHED FOREMAN **PEAR**

Description: The duties of the ship-shed foreman are to supervise the handling, laying out, and fabricating of all the plates and structural-steel parts of the ship, including both hand and machine work.

Qualifications: A ship-shed foreman must be familiar with all the operations required in fabricating structural steel, such as bending, punching, shearing, drilling, etc.; must understand proper methods of laying out for ship work, and be capable of handling large numbers of men distributed in the various gangs throughout the shop.

Schooling: Common school; preferably high school.

PLUMBER, MARINE **PEACH**

Kindred Occupations: Pipe fitter, journeyman; Plumber, journeyman; Steam fitter, marine.

Description: The duties of the marine plumber are the installation and repair of all kinds of plumbing equipment and fixtures on board ship.

Qualifications: He must be a practical plumber, experienced in installing all kinds of sanitary plumbing appliances, such as toilets, sinks, drains, and waste pipes. He must have a thorough knowledge of all kinds of pipe fittings. Must be able to work from drawings or templates and be able to make his own templates. The marine plumber must be especially skilled in bending all sizes of pipe, and in handling large sizes of lead pipe. He should have not less than an equivalent to an apprenticeship under a journeyman plumber.

Schooling: Not less than common school; preferably trade school or technical high school.

RIGGER, SHIP **RACER**

Description: The ship rigger's duties consist of the installing of all tackle and the fitting of wire and manila cable used on board ship; also manufacturing and installing shrouds, stays, lifts, braces, and life lines and other rigging fitted to masts, spars, and booms.

Qualifications: The ship rigger must be able to work to drawings and specifications furnished by the draftsman; must be able to lay out and cut material. He should be able to sew canvas either by hand or on machine. He should be able to splice manila rope and wire cable and do all work necessary completely to rig the ship. He should have served in a ship rigging crew long enough to be thoroughly familiar with the required work.

Schooling: Common school.

SAILMAKER **SENSE**

Kindred Occupations: Canvas worker; Tailor; Tentmaker.

Description: The duties of the sailmaker are to lay out and make complete sails for any kind of water craft.

Qualifications: He must be a thoroughly experienced sailmaker, capable of measuring for or laying out to drawings all types of sails, and skilled in sewing by hand or machine, binding and attaching all necessary reefs, rings, and ropes required for the rigging of a sail on a ship. He must be familiar with all grades and weights of canvas and duck, capable of patching and repairing sails of all kinds and have a general knowledge of ship rigging. He must have had similar practical experience as a sailmaker or canvas worker.

SHIP AND BOAT DRAFTSMAN—HULL DRAFTSMAN **SECT**

Description: The ship and boat draftsman must do ship drafting in connection with the design and construction of hulls for large boats or ships.

Qualifications: He must be an experienced draftsman with a thorough knowledge of the various types of ships, including the principal dimensions, lines, beam members, and structural details, and be capable of making all drawings, such as horizontal and longitudinal cross sections, deck plans, transverse, bulkhead, rigging details, cargo boom and fittings, water-tight doors, stem, stern frame and rudder arrangements and details, and air ports. He must have had experience in the employ of shipbuilding designers, contractors, or marine architects, and should have done considerable hull drafting.

Schooling: Preferably a technical graduate.

SHIP FITTER **SERF**

Description: The ship fitter follows the plate and frame erectors and makes templates and layouts for special forms and shapes that must be made directly from the ship.

Qualifications: He must be able to work to drawings, make wooden templates, and make or direct the shaping and fitting of the special parts for which he has made the layout. He should be familiar with the ordinary hand carpentry tools, be able to run ordinary woodworking machinery, such as crosscut, rip, and cut-off saws, planers, joiners, and band saws. He must be thoroughly familiar with developments and layouts. He should have had sufficient experience in a ship-fitter's crew so that he can do independently ordinary ship-fitter's work.

Schooling: Common school.

STEAM FITTER, MARINE **SELL**

Kindred Occupations: Pipe fitter, marine; Plumber, marine.

Description: The duties of the marine steam fitter are to install any or all portions of a steam pipe system, including pump connections, boiler connections, oil, air, and radiator connections, working under the direction of a superintendent or foreman.

Qualifications: He should be able to work from drawings or templates, and should be able to make his own templates. He should have a thorough mastery of all common steam fitting tools and be able to calculate and cut all lengths of pipe and order all materials. He must understand the setting and placing of all steam valves. The marine steam fitter must be especially skilled in bending all sizes of pipe. He should have had experience equivalent to an apprenticeship under a journeyman marine steam fitter.

Schooling: Not less than common school; preferably trade school or technical high school.

TANK TESTER **TEND**

Description: The duties of the tank tester are to test and make tanks tight under water or oil pressure.

Qualifications: He should be able to calk, chip, drill, tap, and insert packing to make seams water-tight.

TEMPLATE MAKER **TOWEL**

Description: The template maker is a man working in a large shipbuilding loft who makes templates for the loftsman, linesman, or ship fitter.

Qualifications: He must be skilled in the use of the ordinary hand carpentry tools and in the ordinary power woodworking machinery, such as crosscut, rip, and cut-off saws, planers, joiners, and band saws.

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