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Changes of advertising copy should reach this office by 10 a. m. Monday preceding the date of publication, except the first issue of the month, for which changes of copy should be received two weeks prior to publication date. New advertisements for any issue will be accepted up to noon of Tuesday for the paper dated the following Saturday.

Of this issue of the Street Railway Journal 8000 copies are printed. Total circulation for 1907 to date, 206,050 copies, an average of 8242 copies per week.

The New Master Mechanic Changing Established Shop Methods

When a master mechanic takes charge of an already equipped shop, often one of the first things he does is to abandon many of the details of shop practice in use and substitute for them methods that are more in accordance with his own ideas. These changes are often made in such a short time and to such an extent that the whole shop is thrown into a more or less chaotic state, expenses are increased, and there is considerable interference with the regular work.

The advisability of making many radical changes just as soon as a man is placed in charge of a shop is rather doubtful. It is to his advantage to keep the shop maintenance expenses as low as possible, and it may be that the methods in use are peculiarly adapted to the conditions under which the work is being done, or else that the men have become so accustomed to working in one special way that the introduction of other methods will result in an increased rather than decreased cost. Even though the methods in use are hopelessly bad, more will generally be gained by making the changes gradually rather than by trying to effect them all at once. If sufficient time is taken, the men may be gradually accustomed to the changes, and a state of disorder which otherwise might be brought about is avoided. Again, where the former master mechanic did not leave of his own accord, it often happens that the workmen do not at once give the new man their confidences. Frequently the men are much attached to their former employer and seemingly regard the coming of a new man as usurpation. In such cases it is better to make as few changes as possible at the outset, as the men are inclined to feel that the abandonment of the methods of their former chief is a reflection on his ability.

Causes of Poor Vacuum in Turbine Plants

The efficiency of the steam turbine depends so closely for realization upon a high and maintained vacuum in its auxiliary condensing equipment that any defects in this part of a power plant are certain to make themselves felt in unduly large fuel bills. The adjustment of the condenser to the turbine is a matter to be settled long before an installation is begun, and the advice of manufacturers on this point is especially well worth bearing in mind. When troubles occur with the vacuum in an operating plant it is not always easy to fix the responsibility, and in some cases there is no remedy except the installation of a new and larger outfit. In other instances the trouble proves to be of an acute rather than of a chronic nature.

If the condensing plant is too small for the work, either as a whole or in any single part, the cost of rectifying the mistake is sure to be greater than the original investment in a proper layout would have been. It is almost invariably a more expensive matter to enlarge the capacity of a plant in piecemeal than to build it the proper size in the first place. The consulting engineer's advice nowhere should carry greater weight than in the recommendations which he makes as to the necessary cooling surface of condensers for turbo units, desirable size of circulating and vacuum pumps, and requisite cross section of exhaust and water piping.

Poor vacuum often arises from air leaks in that portion of the condenser and its connections where the pressure is below that of the atmosphere, or from leakage in one of the wet or dry vacuum pumps. Still another cause is the temperature of the cooling water running higher than was anticipated, especially in the warm season. The remedy for leaks is obvious, but it is a more serious problem to secure circulating water of the desired temperature. The cooling tower suggests itself at once, but space considerations may be unfavorable, the first cost of a tower may appear serious, and again, the cost of operating pumps and fans must be reckoned in. The conditions may call for a carefully planned cooling tower installation, and it is a fact that excellent operating economy is being attained in some of these cases, but the problem is peculiarily one for expert advice. If cooling water can be secured from a deep well, so much the better. With the exception of leaks, troubles in the condensing plant admirably illustrate the importance of the proverbial stitch in time.

Feeder Diagrams in Power Plants

In view of the fact that all feeder circuits in a direct current system of standard connections are primarily controlled from the power station switchboard, it is certainly an operating oversight that so few plants are provided with a set of feeder diagrams maintained in an up-to-date condition. On small roads the feeder system is usually a very simple affair, and in many instances there is doubtless slight need of working drawings of the overhead system as far as the conduct of the power house is concerned. At the same time it is well worth while to have at least a simple blue print of circuit breaker, trolley tap and line switch locations at hand for reference in times of emergency, especially when telephoned instructions have to be given to men on the road. As systems grow in size it becomes increasingly difficult to remember the exact layout of outside wiring, including the changes made from time to time by linemen. Even if the power house force can recall with promptness the outside conditions, it is important to save every possible item of mental energy at times when both inside and outside men must co-operate to keep things moving. Judgments exercised with instant grasp of unseen conditions are needed rather than feats of memory when things go wrong.

An excellent instance of the use of complete feeder diagrams in the power stations of a large city system may be cited in Boston. Every power plant there is furnished with a complete set of blue prints from the electrical engineer's office, showing the feeder circuits, trolley and third rail supplies, street and underground switches, the lines and territory fed from all the power houses on the system. Such diagrams prevent any working in the dark in the general distribution of power, as they enable the switchboard men to see the exact possibilities in the supply of current to the various surface, elevated, subway and tunnel lines. The sharing of loads between adjacent stations and the concentration of power at points of unusually heavy traffic are much facilitated by the availability of these diagrams for instant reference. While it would be hard to cite a more complex system than the Boston Elevated from a geographical standpoint, or one in which the technical organization is more complete, there is a wide usefulness for the feeder diagram in the power plants of smaller city roads. On the large system the effects of a change in feeder switching are less in proportion to the results than on a small road with few feeder sections, though the total amount of power involved may be greater in the former case. It is more a question of efficient distribution in the large city; in the small one the issue is mainly one of service reliability as expressed by the feeder capacity available. Feeder diagrams kept up-to-date in the power plant contribute to both these desirable conditions.

Steam Jackets

Many questions in engineering, whether steam or electrical, seem most satisfactorily settled by experiment alone. There is, of course, no real conflict between theory and practice when the theory is made broad enough to cover all the existing conditions. But until all of the laws of thermo-dynamics and electrical engineering can be reduced to simple formulæ and we know all about the properties of the materials with which we have to deal, differences of opinion will exist. An example of a subject upon which steam engineers have not yet reached a unanimous verdict is the question of heating steam in its passage through the engine. For instance, nothing seems so certain, from a cursory view of the situation, as that the receiver of a compound engine can economically be employed as a reheater. But the fact remains that the saving is so small it is very doubtful whether the reheater does pay. Very possibly the ordinary method of heating a receiver is wrong. It is usually made to do duty as an evaporator and to manufacture fresh steam from the water discharged into it, thus practically negativing the compound principle. Under abnormal conditions it might happen that the receiver could be put inside a brick chamber and heated by the waste gases from the boiler, but such opportunities will be rare. The very doubtful economy secured from ordinary reheaters leads to the belief that they ought not to be called on to act as evaporators. Instead, when used, an efficient separator should be used so that the working of the reheater may be confined purely to drying and perhaps slightly superheating the steam on its way to the low-pressure cylinder. One form of reheater employs as its heating agent superheated steam which has been made too hot to enter the high-pressure cylinder with safety. Whether this system can or cannot be more economically worked with a drained or an undrained receiver can best be determined by experiment, but even here there is a strong probability that the receiver should be drained and the superheat temperature kept as low as would be then necessary to supply steam of correct superheat to the first cylinder.

Similarly it would appear that steam jackets are good or are useless according to circumstances. To jacket a cylinder with steam of boiler pressure does not sound like good practice. There is more mass of metal and greater radiation surface, and that, too, of higher temperature, the jacket being now the outer vessel. To secure better results it has been suggested that the jackets might be fed by a special boiler at a pressure higher than that in the main boilers, so that there might be a constant flow of steam through the

jackets, all the steam passing by way of a suitable throttle valve to the main boilers. An extension of this principle would be to superheat the steam and pass it in series through the high-pressure jacket, the reheater and the low-pressure jacket, the first two numbers of the series being interchanged in precedence and the last number eliminated at times with a view to demonstrate its actual working efficieney.

Most of the experiments which have heretofore been made on jacketed engines may, perhaps, be better described as experiments with jackets that may or may not have been more or less filled with steam, air or water. The fact that there is a small economy with the thoroughfare jacket seems to point to the economy possible with all jackets if they are really steam jackets and free from heavy air, or heavier water, pockets. Those who make experiments on steam-jacketed engines appear to shut their eyes to the use of the air pump in the steam cycle and the impossibility of running long without one. The power to employ superheated steam brings forward considerable possibilities in steam engine working, and some of these may be capable of being turned to profit in the direction of jacketing. But experiment is wanted to determine just how far these things can be carried out with economy, for no certainty can be had from argument, no matter how apparently sound the basis of reason.

Economy in Car House Operation

Detailed observation of the efficiency of car movements on important electric railway systems proves that the manner in which cars are handled while off the street exerts a large influence upon the punctuality of the schedules. The responsibilities of the car house foreman or starter are not always appreciated in their relation to economical service, but few subordinate officials have it more within their power to insure smooth running of cars and to maintain satisfaction among the regular and extra platform men whose individual work counts for so much in the operation of the system. Promptness in starting cars on the precise minute or half-minute which the schedule demands, alertness in the provision of extras when the regular intervals are either too long or interrupted by delays, and skill in reducing idle movements within the car house and on its approaches to the minimum consistent with flexible service are all required of the employees whose successive shifts bring them in charge of these divisional operating centers.

The design of any car house obviously conditions the work which can be done inside its walls, but skill and tact in the handling of cars and men do not depend upon the track layout exclusively. Most car houses contain a number of parallel tracks carried to stub terminals at one end of the building, though in some late interurban installations a through arrangement of tracks has been provided, outlets being at both ends, as well as inlets. Experience has clearly shown that any car house storing rolling stock operated on short headway should be provided with separate tracks for inward and outward movements, even though the cars may be switched back and forth by a transfer table or interior cross-overs after they are run into the house. When a double-track trolley line passes a car house which is important as a route terminus or division headquarters the failure to provide separate inward and outward tracks in connection with the usual ladders or spurs opens the door for serious delays and obstruction to free movement.

Classification of cars according to routes and sometimes according to type of rolling stock are essential features of car house work on a large scale. Cars entering the house may be finally placed in positions remote from the entrances, but whether this is done by straightforward movements on spur tracks, by the use of convenient cross-overs, or by transfer table, it is important that the last crew to leave a car shall leave it in perfect condition to start out again at any time. The turning of the seats and trolley, adjustment of fenders and similar points require valuable time, and in the daylight hours it is desirable in a well-organized car house to keep each car's trolley against the wire ready for an immediate start, with the main and auxiliary switches cut out, however. The transfer table may not be justified in a small house holding but two dozen cars, but in a large house the movements become so frequent in the morning and evening rush hours that often a single transfer table is hard pressed to furnish cars in the proper sequence. These interior movements depend so much upon weather conditions and the variations in traffic volume, breakdowns and minor repair requirements that it is difficult to plan them with the detail which steam railroads practice in making up trains daily for suburban service. Too many interior cross-overs lead to wasted storage space and dangers of fouling, whereas the transfer table method requires a definite rectangle set apart for interior car movement and enables the balance of the trackage to be utilized to the last inch of clearance. In the exigencies of street railway service the last car in may not be the first car called out, and the handling of the interior movements with the least feasible dead mileage and delay is a task where experience counts for economical service.

The execution of minor repairs is invariably a feature of car house operation, and the facility with which cars may be jacked up, suspended and supported for overhauling beneath, rail sections dropped out for the replacement of wheels, and inspection as a whole carried on determines to a considerable extent the economy of light maintenance. These features of car house practice have often been emphasized in these columns and need not be detailed at this time save to point out one or two matters which still need attention on many roads. The importance of liberal pit lighting can scarcely be overestimated; the desirability of being able to run trucks as a whole into even small blacksmith shops and to have room to inspect from above, as well as below, are not always realized. Thorough organization in the stock room, the use of cradles in the pits with simple jib hoists above, and the provision of a few good machine tools are all helps to efficient work in large car houses. Comparatively few roads of the larger size do much repair work in their car houses, but the existence of splendidly equipped shops at some other point on a system should never be an excuse for the failure to provide the few good motor-driven tools, appliances and men who are needed for the light emergency repairs of the important divisional car houses.

NEW SHOPS AND SHOP PRACTICE OF THE OMAHA & COUNCIL BLUFFS STREET RAILWAY COMPANY

About one year ago the Omaha & Council Bluffs Street Railway Company completed the erection of new shops at Twenty-Sixth and Lake Streets, Omaha, and through the courtesy of W. A. Smith, general manager of the system, this publication now is enabled to give an account of the shops and the practice in them. The buildings were designed by and erected under the supervision of H. B. Noyes, chief engineer of the company. As completed, the shops contain every facility for carrying on the work, and it is estimated that the same repair work is done at about two-thirds the former cost.

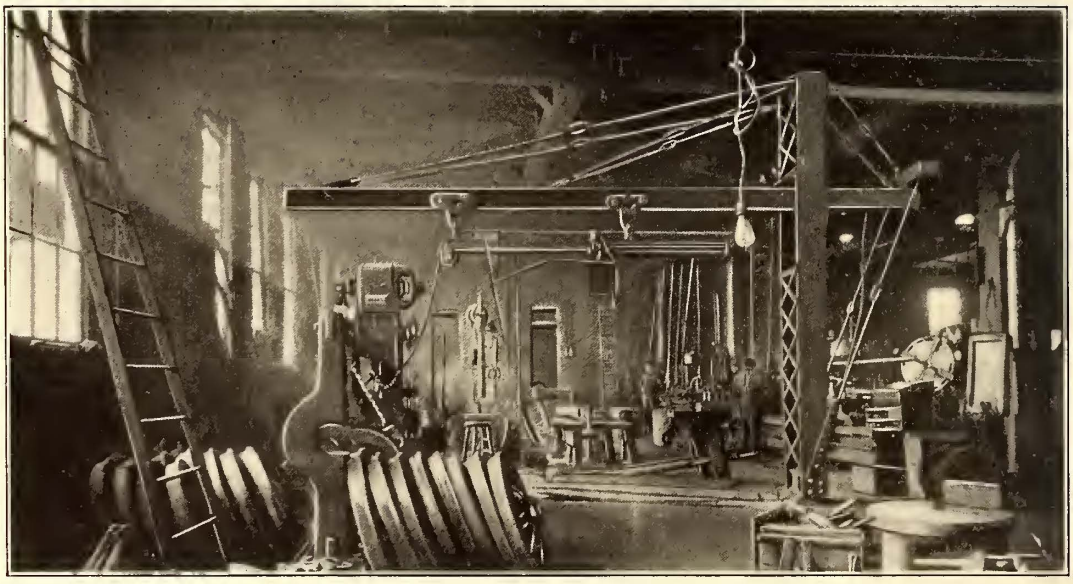
EXTERIOR VIEW OF THE OMAHA SHOPS

The exterior of the shop building is of rather pleasing appearance, as the walls are of dark colonial brick with limestone trimmings. The floors in the shops are all of concrete, while the roof is of mill construction and is covered with Carey's roofing. The shops are on a plot of ground of such size as to permit extensions to four times the present capacity. The main portion of the building is one story high, rectangular in section, and measures 245 ft. x 120 ft. An extension to the shop building proper contains offices, drafting room, toilet and locker rooms, a fireproof vault on the first floor and a boiler room in the basement. The thirteen tracks entering the shops are served by a transfer table traveling the full length of the building. The next building to be erected, and which will probably be put up during the coming season, will be built on the opposite side of the transfer table runway.

FIRE PROTECTION

Fire walls separate the rectangular building into five rooms, each devoted to a department of the repair work. The storeroom occupies the central portion and doorways from it lead directly into each of the other four rooms.

The whole shop is equipped with a dry sprinkler system, similar to that described in the Street Railway Journal of March 30, 1906. In the paint shop the heads are carried down between the cars at a height a few inches below the top of the side windows. In the other rooms they are placed just under the roof. There is a total of 818 heads of the Grinnell type installed in the building. A reserve water supply is maintained in a tank of 40,000 gals. capacity placed 30 ft. above the roof.



GENERAL VIEW OF MACHINE SHOP, SHOWING THE CRANE

The shop is also provided with fire lines connected to the city system, and numerous outlets are provided with hose. The division walls are all carried up above the roof and the passageways through them are provided with double fire doors. All of the rooms are piped with city gas mains and gas is used in melting solder, burning old paint off cars, heating soldering irons and various other purposes.

Compressed air is supplied to all portions of the building from a motor-driven air compressor with a 10-in. x 10-in. cylinder.

WIRING

All of the shop wiring is carried in loricated conduit. The power wiring runs under the floor, and the conduits are brought up at the bases of the machines, several of which have individual motor drive. One of the illustrations shows a combination fuse and switch box employed in the light wiring system. The box is of cast iron, and when the door is closed only the handle of the snap switch is exposed.

LIGHTING

The shop is lighted throughout with incandescent lights. Near each machine is a pipe post with a swing arm carrying a cluster of five lights. The wires are brought up through the floor and post so as to be entirely hidden. The open pits are lighted with lamps installed in the concrete piers. The wiring for these is carried underneath the floor and up through the pier.

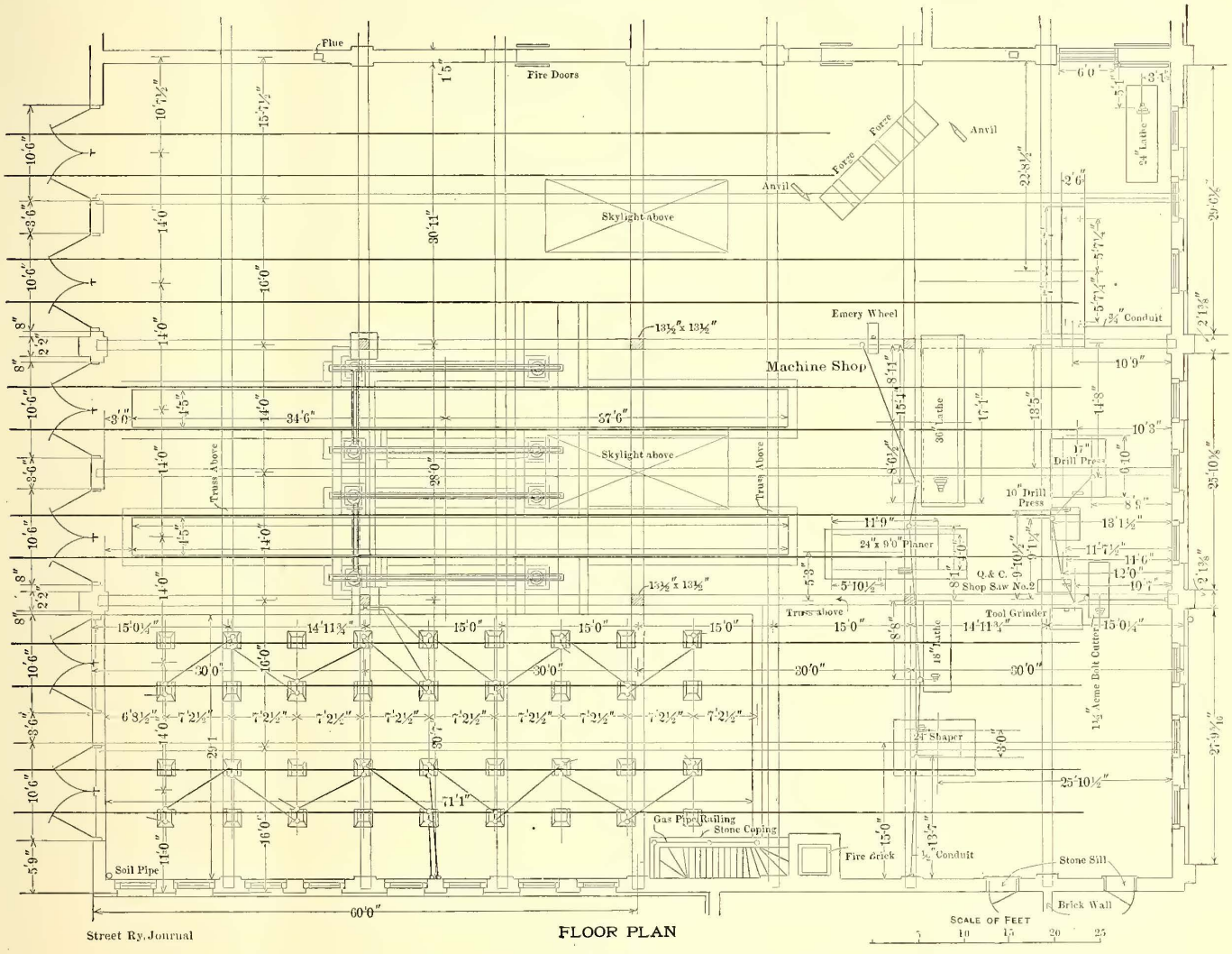
HEATING AND TELEPHONES

Heating is accomplished by a steam heating system, steam being obtained from a boiler in the basement under the offices. Each department is connected with the office by a private telephone system.

CRANES AND LIFTS

The machine shop, armature room and pits are provided with cranes and hoists which practically eliminate all heavy lifting. A specially constructed jib crane serves several of the machines in the machine shop. The post built of two 10-in. channel bars latticed together rests in Moffet roller bearings in such a manner that it can be turned through an arc of 360 degs. The boom is a 10-in. I-beam, and extends 17 ft. from the post. A double trolley running on the lower flange carried a 6-in. horizontal air hoist. By an ingenious arrangement this crane is employed in moving the attachments of the wheel press.

One illustration shows a crane outside the building for unloading wheels and other heavy materials from cars. This has a trussed wooden boom 32 ft. long, the base of which is swiveled in a plate against the wall. A chain secured to an eye bolt in the wall supports the upper end. The hoist is operated by a 10-in. air cylinder with a 4-ft. stroke placed inside of the building. Sheaves multiply the lift to 12 ft. A lever near the end of the boom controls the air so that one man can operate the crane.

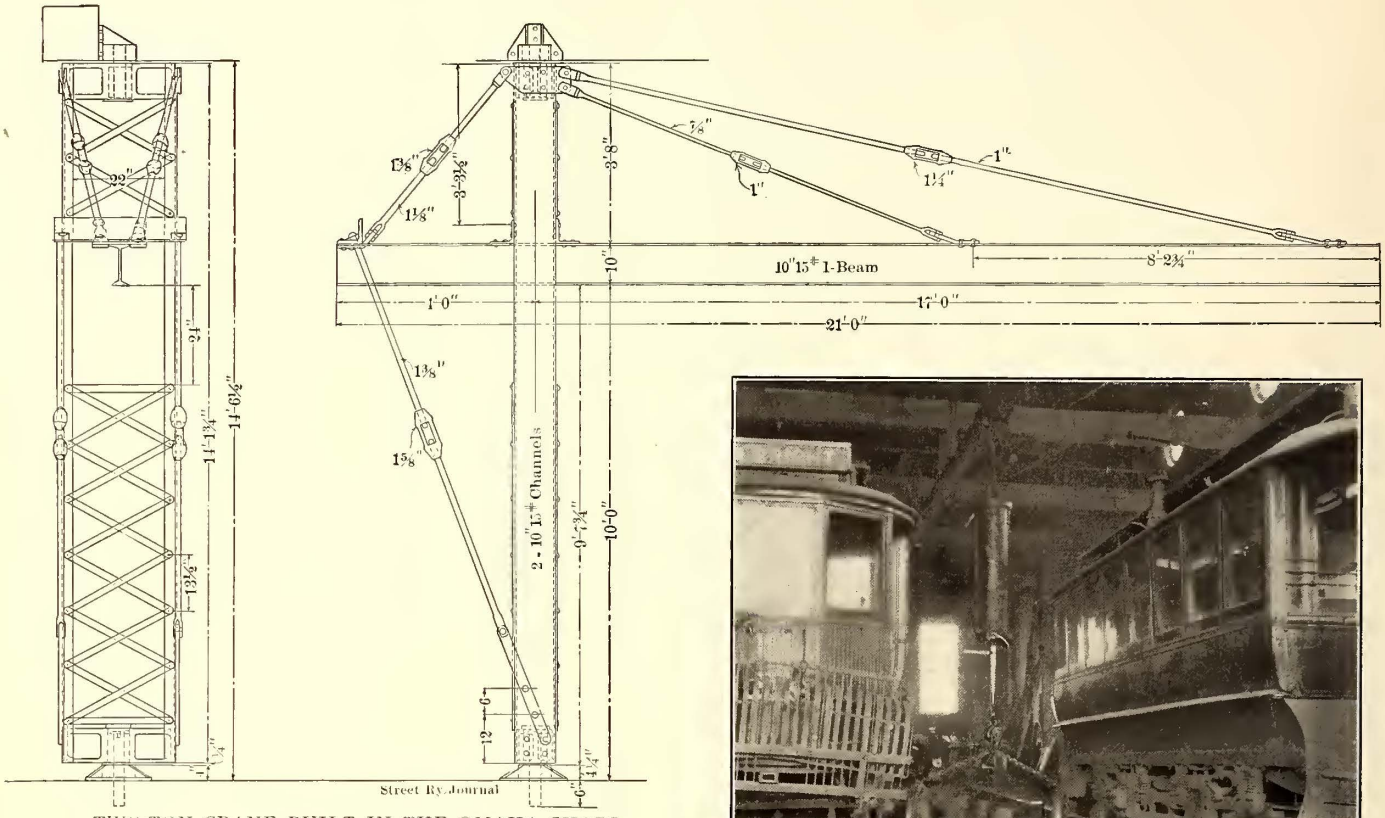


GENERAL PLAN OF THE SHOPS OF THE OMAHA & COUNCIL BLUFFS RAILWAY COMPANY

THE PITS

The repair pits have been located adjacent to the machine shop equipment so as to necessitate the least handling of wheels and heavy parts. Two of the four pits are of the open type and have the tracks supported at the floor

level of the concrete pit floors. To prevent accidents due to loose wheels and wheels out of gage, and to facilitate the handling of cars with broken axles, guard rails are bolted to the running rails over the pits. These open pits have been found better adapted to general repair work than those of the ordinary type, and as much of this work as possible is done over them. An overhead tramway runs the full length of the open pits between the tracks, and for work under the car Watson hand-operated hydraulic hoists are provided. Each track is provided with two sections of removable rails. The removable sections are hinged at the end so that they may simply be unbolted at one end and swung outward. At the hinge a 2-in. pipe is embedded in the concrete pier. The rail is bolted to a pin 18 ins. long which works in the pipe. One of the illustrations shows the rail sections at one point swung aside and the pit jack being used in lowering a pair of wheels. After being lowered a sufficient distance the jack, with the wheels, is hauled out between the tracks and the wheels are picked up by an overhead air hoist and conveyed to the machine shop floor. Using this method, two men usually change the wheels in six different cars in one day. The work includes getting the cars into the shop and in bringing the wheels in from the yards. The other two pits, which are of concrete and of the usual type, are provided with Pittsburg car hoists. Each hoist consists of two 10-in. I-beams, 25 ft. long, placed about 2 ft. outside the rails, and mechanism for raising them. The beams are supported at each end by a screw, and all four screws of each hoist are geared to a car motor installed in the pit. The beams have a travel of about 3 ft., and when lowered are flush with the concrete floor.



TWO-TON CRANE BUILT IN THE OMAHA SHOPS

OPEN PITS, SHOWING METHOD OF HANDLING WHEELS AND THE REMOVABLE SECTION OF TRACK

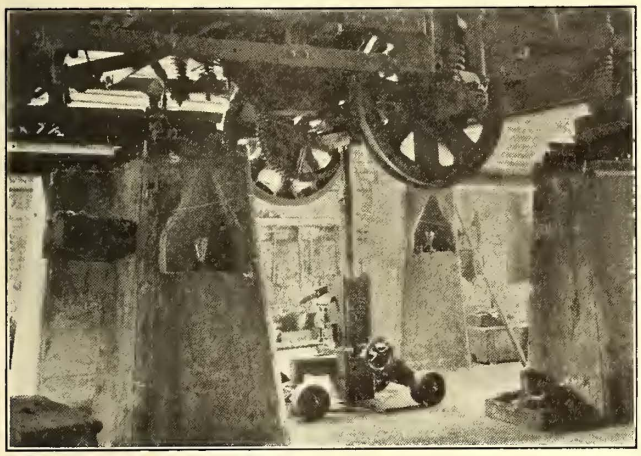
AIR-OPERATED CRANE FOR UNLOADING MATERIAL FROM CARS. A TRANSFER TABLE IS IN THE BACKGROUND

CHANGING OVER BODIES

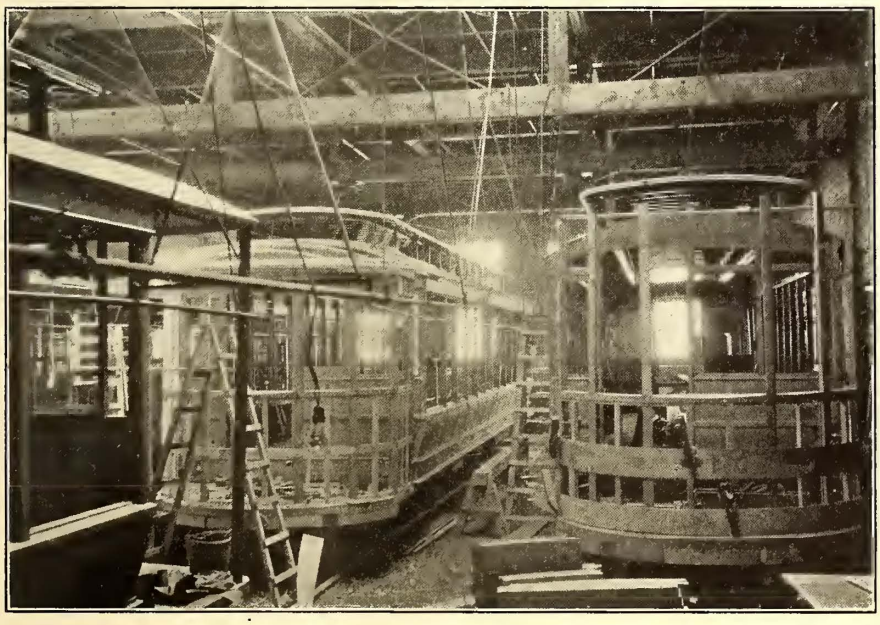
During the changing-over season a gang of six men change over from six to ten bodies per day by the use of the hoists just described. The open and closed bodies are placed on the hoists side by side and the dummy truck and the motor truck, with the aid of the transfer table, are interchanged in a minimum amount of time. In changing, the same truck is put back under the same body year after year.

SPECIAL MACHINES IN THE MACHINE SHOP

One of the illustrations shows a machine for punching iron. This was formerly hand operated and required the services of a man and a boy. The services of the boy have been eliminated by operating the machine by compressed air. The 7-in. brake cylinder is controlled by a straight air engineers' valve placed in a position convenient to the operator. A similar brake cylinder similarly controlled is bolted to one of the posts supporting the roof and is used in bending conduit and small bars.



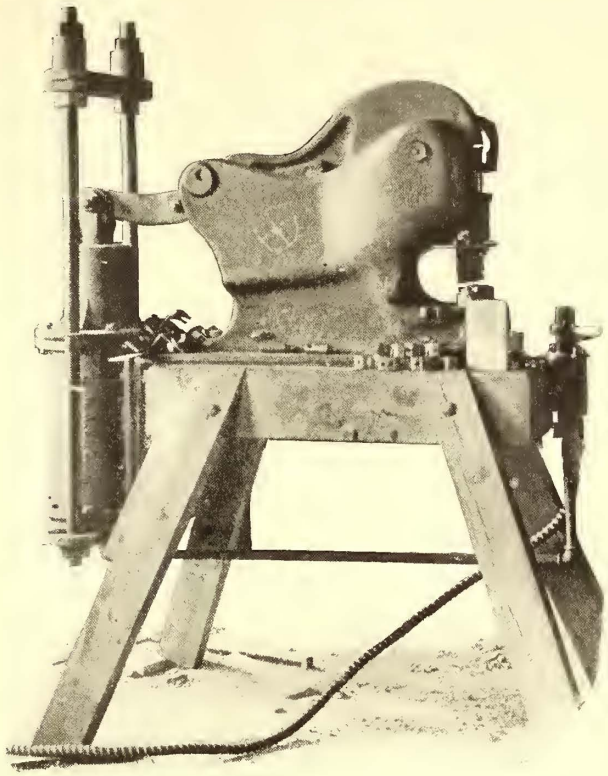
HANDLING WHEELS IN THE OMAHA SHOPS. THIS VIEW ALSO ILLUSTRATES THE METHOD OF PIT LIGHTING



SOME OMAHA CARS UNDER CONSTRUCTION. THIS VIEW ALSO SHOWS THE SHOP SPRINKLERS IN PLACE

THE WINDING ROOM

The winding room is well equipped and provided with conveniences. For testing armatures a special lamp circuit is arranged which gives the customary trolley voltage, and, in addition, three-fifths of this voltage. The lamps and plug sockets to which the test points are attached are supported by an overhead bracket, which may be turned through almost a complete circle. To give the reduced voltage, two of the lamps of a circuit of five are shunted by the test points. A snap switch connects the points either in the circuit of five or the circuit of three lamps. All of the reels of wire in the room are supported on a neat channel bar frame. The armature stands have cast-iron bases and iron pipe standards, and the armature bearings rest between rollers.



AIR-OPERATED MACHINE FOR PUNCHING IRON

GROOVING ARMATURES

Armature troubles have been considerably reduced by grooving the mica out between the commutator bars. For doing this a special lathe attachment has been gotten up. The tool post in the carrier is replaced by a post carrying a small screw-cutting saw. The saw is held in a vertical shaft having a small pulley at its upper end. The belt driving this pulley is carried around the larger of the cone pulleys and also passes over two guide pulleys, one of which, supported on a long arm under tension of a spring, acts as an idler and keeps the belt at the proper tension through considerable movement of the carriage. After the armature has been turned the grooving device is put in position and the process is carried out by moving the carriage back and forth before the armature is

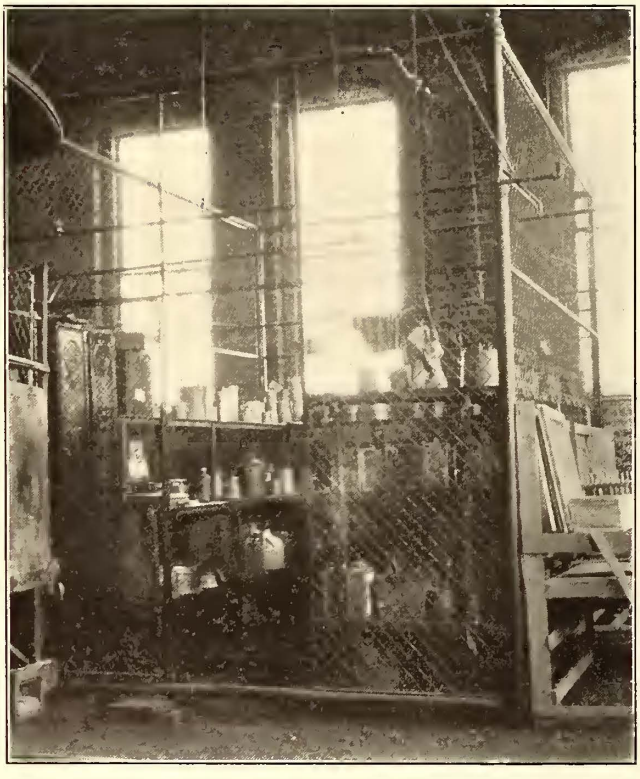
removed from the lathe. About twenty minutes is required to groove an armature and dress it up.

BABBITING BEARINGS

Babbit for bearings is melted in a Motts gas furnace pot of the type used in newspaper offces for melting type metal. It has been found exceedingly well adapted to the work. Commutator end bearings are babbited by

LOCKER AND WASH ROOM FOR OMAHA SHOPMEN

means of the usual type of apparatus, consisting of a mandrel supported in a cast-iron base. One of the illustrations shows the device used in babbiting split bearings.



PAINT-MIXING CAGE IN OMAHA SHOPS

A half mandrel, with ridges for cutting out the oil ways, is bolted on each side of a place supported on a cast-iron base. After two bearing shells have been placed over the half mandrels enclosing shells are clamped over them.

THE MILL ROOM

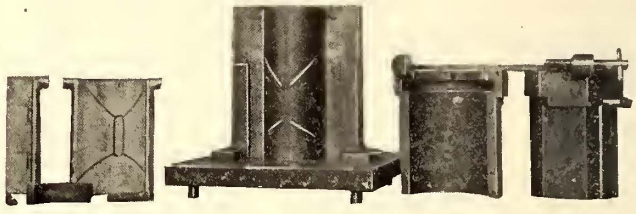
The mill room is provided with a complete equipment of machinery for building cars. The equipment consists of a hollow mortiser, 10-in. Hermance molder, 26-in. planer, universal woodworker, shaper, tenon machine, cut-off and rabbeting machine, combination cut-off and rip saw and a band-saw.

THE PAINT SHOP

At the present time a portion of the paint shop is being used as an erecting shop. Mention has already been made of the arrangement of the sprinklers in this room. Cars are washed in one corner of this shop over a concrete floor which has proper slope for drainage. A portable wire cage serves as a paint mixing room. The cage is 10 ft. x 12 ft. square and the wire is 2-in. mesh. A cage of this type was designed largely because it eliminated the use of wood and thereby reduced the fire hazard.

THE STOREROOM AND OIL STORAGE

A track extends through the mill room and into the

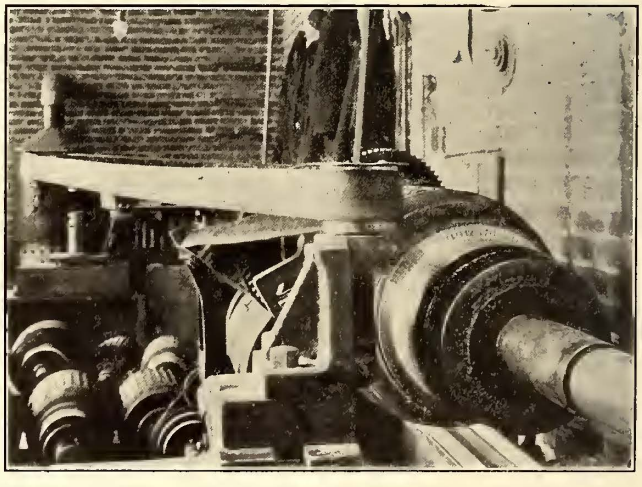


DEVICE FOR BABBITING BEARINGS AND BABBITED BEARINGS

storeroom to facilitate the handling of materials. Below a portion of the storeroom is a fireproof vault for the storage of oil. Bowser oil pumps in the storeroom are piped to the oil tanks below. The gasoline tank is buried in the yard outside the building, but is connected through piping to a pump in the storeroom. There are seven pumps for as many different kinds of oil and paint materials.

WASH ROOMS

The advantage of proper wash room facilities were appreciated, and very few railway car shops are as well equipped with wash basins, lockers and toilets. An illustration shows the arrangement of the twenty-four wash



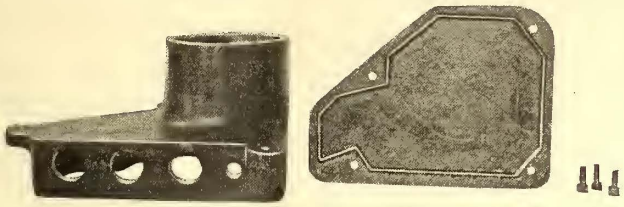
DEVICE FOR GROOVING COMMUTATORS. THE CIRCULAR SAW IS IN THE VERTICAL SHAFT AND AT THE LEVEL OF THE CENTER OF THE ARMATURE SHAFT

basins, which are supplied with hot and cold water. Each man is furnished with an expanded metal locker.

MISCELLANEOUS SHOP PRACTICE—CAR CONSTRUCTION

The company has begun the construction of cars and is now building eight of the semi-open type. One of the illustrations show some of these cars under construction.

They are built along the general lines of cars already in service, are 46 ft. 6 ins. long over bumpers, and measure 7 ft. 10½ ins. over sills. A channel bar, which is carried around the ends of the body, reinforces the side sill. A side panel extends up 18 ins. from the floor. The platform timbers are almost completely enclosed in two channel bars, one below and one above each timber. The motors

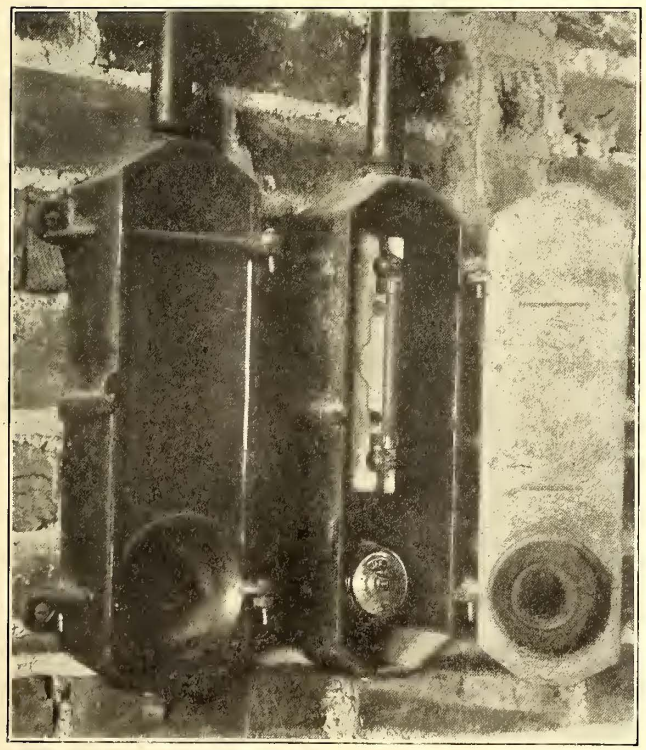


BOX USED AT THE BASE OF THE CONTROLLER, SERVING AS A TERMINAL FOR THE CONDUITS

of the new cars will be used under snow plows during the winter season.

CAR WIRING

All wiring for new cars is carried in conduit and all of the old cars have within the last year been rewired with conduit wiring. The wiring under the cars is especially well installed. One of the illustrations shows a special box in which all the conduits to the controller terminate. This box is bolted underneath the floor directly under the controller. The upper projection enters the controller

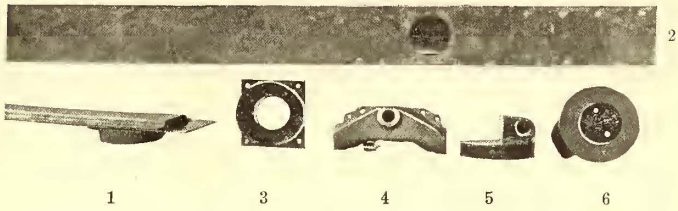


COMBINED FUSE AND SWITCH-BOX EMPLOYED IN WIRING THE OMAHA SHOPS

base and effectually prevents the entrance of water into the controller. At the motors the conduits end in General Electric connection boxes.

The light wiring is also carried in conduit. In many of the old cars the wires for the lights have been put in pipe conduit, carried under molding above the monitor windows and across to the center of the car above the headlining. In the accompanying illustration the cast junction (4) is employed where the branch cross pipe to the center of the car is taken off, that conduit running longitudinally above the monitor windows. The outlet box (5) and (6) brings the wires out of the conduit and into the cluster.

The light wiring of the new cars is being installed in specially constructed conduit (1) and (2). This conduit, built up of No. 14 gage iron, is 9/16 in. high and about



SPECIAL BOXES AND CONDUITS USED IN CAR-LIGHT WIRING

4½ ins. wide. The two parts are riveted at intervals of 3 ins. It is run through the center of the car with the flat side against the upper side of the headlining. Outlet boxes (3) are bolted to it at clusters where wires are brought out. In a few old cars this conduit will be placed on the roof of the car and covered with painted canvas.

REPAIRING CURTAINS

The life of old open car curtains is being increased several years by taking the curtains off the roller, turning them upside down and re-hemming them. A special hemming machine has been installed in the shop for this purpose.

CHANGING ARMATURES

When the new shops were first occupied the practice of changing the armatures of and making small repairs on all the cars in this shop was instituted. It was found, however, that the time saved by the better facilities in the new shop was more than lost in the long hauls to and from it, and the practice has been abandoned. Each division shop now changes armature and fields and makes small repairs.

BRAKE-SHOES

The practice of having brake-shoes cast by local foundries has been abandoned and the shoes are purchased from manufacturers. A hard shoe is used for air brakes and a softer one on cars equipped with hand brakes.

SAND BLASTING

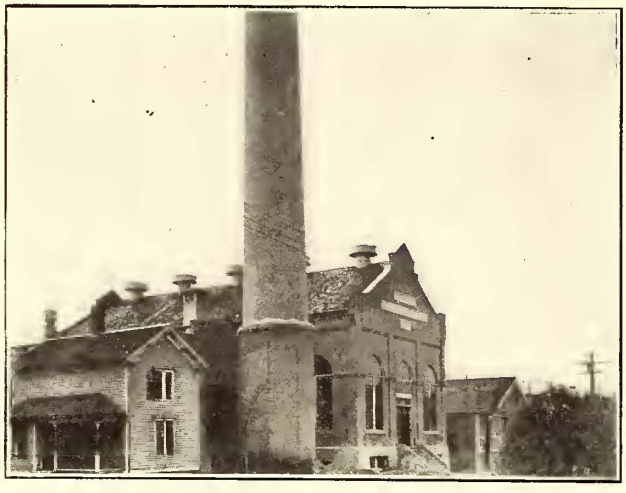
Ornamental glass is blasted by a sand blaster in the boiler room, compressed air for which is obtained from the shop air lines.

The shops are under the immediate charge of T. E. Wood, master mechanic, to whom acknowledgment is made for much of the information in this article.

The Rhode Island Company is to build two sub-stations, one, a temporary affair, to be located on Pawtucket Avenue, in East Providence, and the other near the village of Limerock. The East Providence station will be fed from the Manchester Street plant in Providence, and the Limerock building from the main station in Woonsocket. It was found necessary to erect the East Providence station in order to supply the demand of the lines to Boyden Heights, Vanity Fair and Crescent Park. The building at Limerock will be 34½ ft. by 54 ft., of brick with a concrete floor, and will contain two 400-kw rotary converters. The station in East Providence will be of wood and will contain two 400-kw rotary converters.

NEW POWER PLANT OF THE PITTSFIELD ELECTRIC STREET RAILWAY COMPANY

The Pittsfield Electric Street Railway Company, operating about 30 miles of urban and suburban tracks in Pittsfield, Mass., and its vicinity, has nearly completed a new steam-driven power station at a site on Seymour Street near the Housatonic River. The plant is of interest as an



EXTENSION OF THE PITTSFIELD STATION

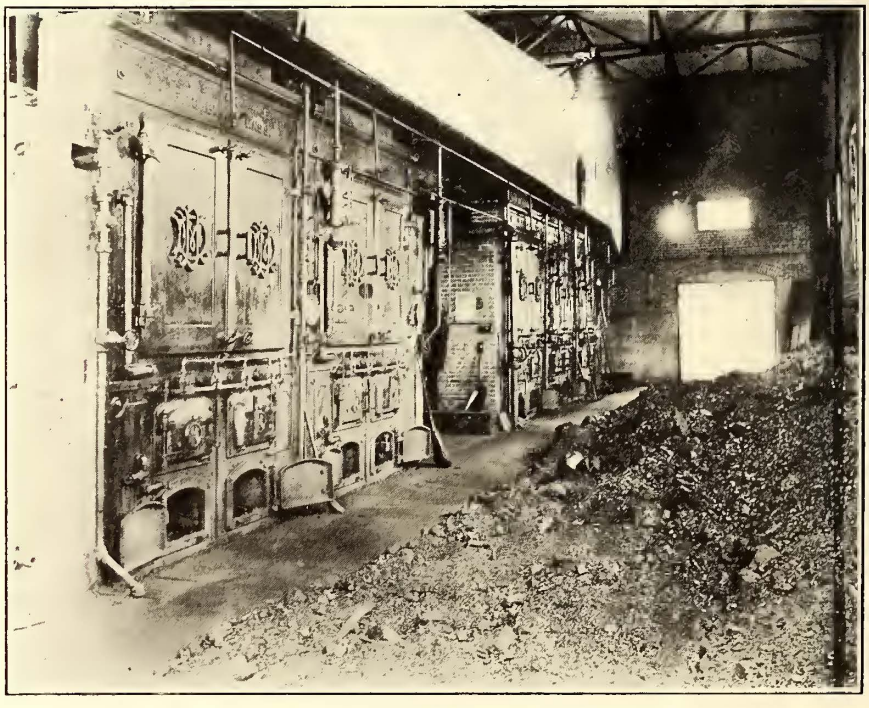
example of standard reciprocating engine practice proportioned to the requirements of economical operation in a small system. Pittsfield is an attractive Berkshire city of about 25,000 inhabitants, and besides containing a varied group of manufacturing plants, including the Stanley branch of the General Electric Company, paper, woolen and other mills, it is celebrated as a summer resort and urban center of the entire Berkshire region.

Previous to the inauguration of service from the new Seymour Street plant, which occurred in February, 1907, nine months after construction began, the company's power was supplied from machines located in the old central station of the Pittsfield Electric Company. These machines were run non-condensing, and the plant was not as near the electrical center of distribution as is the new station. The consulting engineer for the new plant was the late Charles K. Stearns, of Boston.

The new station is a brick and steel structure with the usual type of concrete foundations and a concrete roof with metal reinforcement. It is divided into a boiler room, 80 ft. long and 45 ft. wide, and an engine room, 100 ft. long and 57 ft. wide, with a 12-ft. basement beneath the latter. An 18-in. fire wall separates the boiler and engine rooms. At the Seymour Street side of the plant is erected an Alphonse-Custodis radial brick stack 7 ft. 6 ins. in internal diameter and 150 ft. high above the ground. A ladder was provided for both the inside and the outside of this stack, and this proved to be a great convenience during construction.

The boiler room is practically at the ground level, and it at present contains two batteries aggregating five Dillon boilers rated at 150 hp each. Each boiler has ninety-two 4-in tubes and is of the horizontal return tubular type, operating at 150 lbs. steam pressure. A good grade of soft Pennsylvania coal is at present brought to the plant and fired into the furnaces by hand; ultimately it is planned to bring coal to the station by trolley. Each boiler is equipped with a Climax smoke consumer arranged to operate when the doors are opened for firing. The stack was erected at the end of the boiler room to allow for free expansion of the plant westward in case it becomes necessary. All coal is weighed on special scales before being fired, and the ashes are wheeled by the firemen to the land on the west side of the plant toward the Housatonic River, where they are used for filling in the ground to a level with the boiler room floor. Later it is expected that some sort of coal storage will be effected on the west side of the station, thereby rendering the company less dependent upon the regularity of transportation by the coal cars to the plant. The scales will then be in direct line between the furnaces and the coal pile, so that no return motion of fuel will be necessary. The flue gases from the boilers are carried into a breeching which is supported above the fronts and discharged through a green fuel economizer located at the east end of the room and thence into the stack. The smoke flue is 4 ft. by 8 ft. in full cross section, and the damper arrangements provide for by-passing the economizer when desired. The economizer tube scrapers are motor driven.

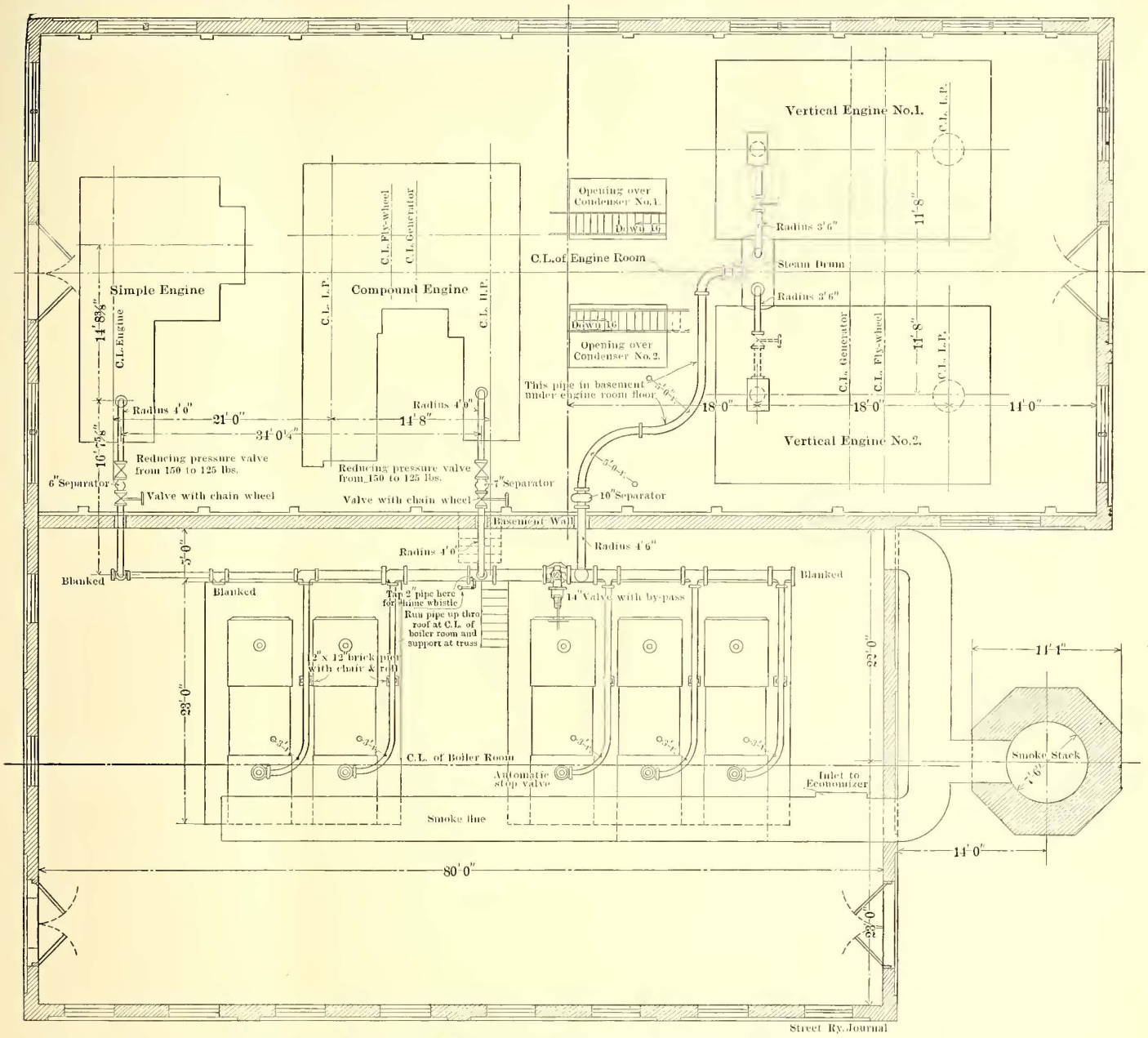
The company is fortunate in being able to draw water, both for condensing and boiler feed purposes, from the Housatonic River, although an emergency connection with the city water service is provided. The river is located about 550 ft. from the power plant, and about 50 ft. west of the plant a circular concrete well, 12 ft. in diameter and 11 ft. deep, has been built to receive water from the river by gravity. A wooden conduit or box tank 3 ft. square in cross section connects the river with the well, 2-in. x 2-in. slots being provided for screens at the outlet of the conduit into the well. From the well two 10-in. pipes lead to the



BOILER ROOM OF THE PITTSFIELD POWER STATION

condenser suctions, the discharge water from the condensers being returned by a single 20-in. pipe to the river below the inlet line. The boiler feed-water is drawn from the well to the feed-pumps by a 4-in. line. Two screen slots were provided so that one will always be in use while the other is being cleaned, and both condenser suction lines are provided with a separate valve operated by a hand wheel on a vertical spindle extending to the top of the well. The condenser discharge pipe only extends about 70 ft. from the power house at present, as an arm of the river extends close to the station. The company owns the land extending from the power house to the river, and there is room for indefinite enlargement of the power house in this direction. The boiler room is large enough so that a sixth boiler can be added without extending the building. The feed-pumps consist of two Blake duplex units, 7½ ins. by 4½ ins. by 10 ins. in cylinder dimensions, mounted in a passageway to the engine room between the two batteries of boilers. They are of ample size for the work and run at slow speed. The foundations of the feed-pumps extend 2 ft. 6 ins. above the floor, to facilitate inspection and repairs. The draft in the chimney is controlled by a Spencer automatic damper regulator. A 500-hp Erie City feed-water heater with by-pass is installed in the engine room basement.

Four generating units are installed in the engine room. These aggregate 1600 kw in normal rating. There are two 500-kw, 600-volt General Electric generators, each direct connected to an 18-in. by 36-in. by 36-in. Brown-Corliss



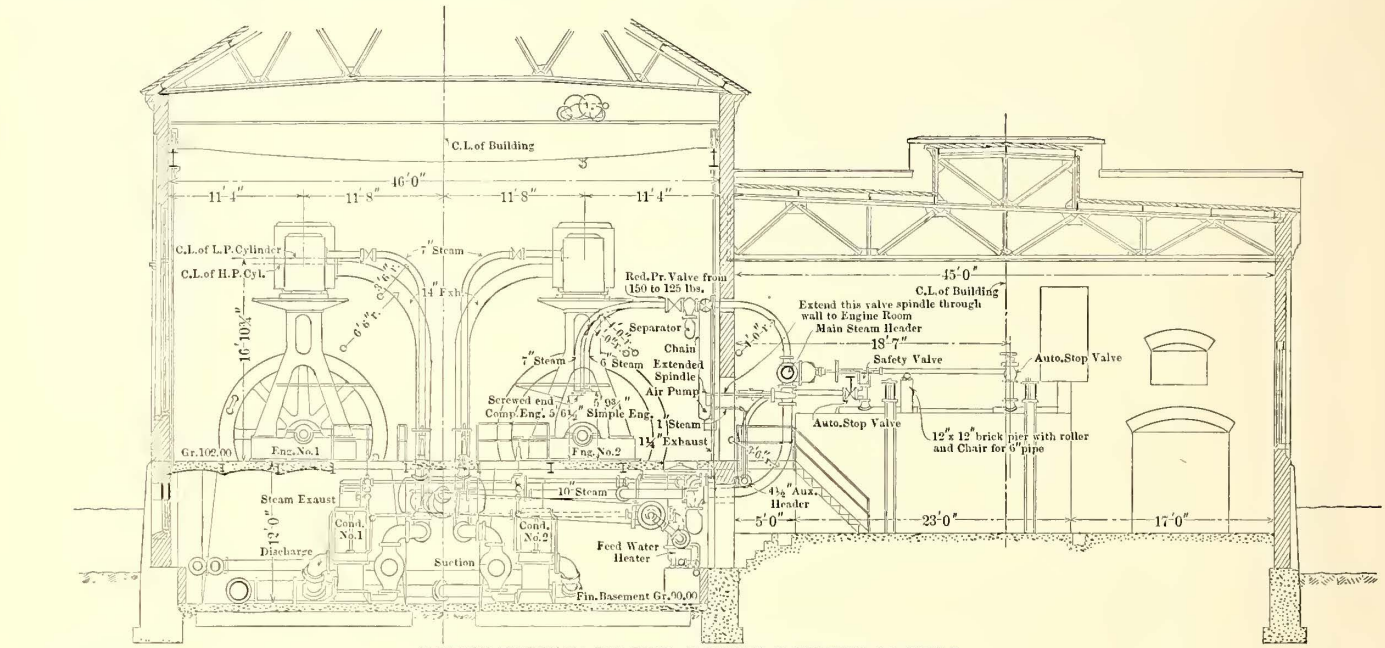
PLAN OF MAIN STEAM PIPING IN THE PITTSFIELD POWER STATION

vertical, cross-compound condensing engine operating at 135 r. p. m. and 150 lbs. steam pressure; a 350-kw, 600-volt General Electric generator direct driven by an 18-in. by 30-in. by 36-in. Knowlson & Kelley horizontal cross compound non-condensing engine, and an 18-in. by 36-in. engine of the same make driving a 250-kw Westinghouse 600-volt, direct-current railway generator. Both these two latter machines run at 120 r. p. m., and it is expected in the future to install a condenser in connection with the larger outfit.

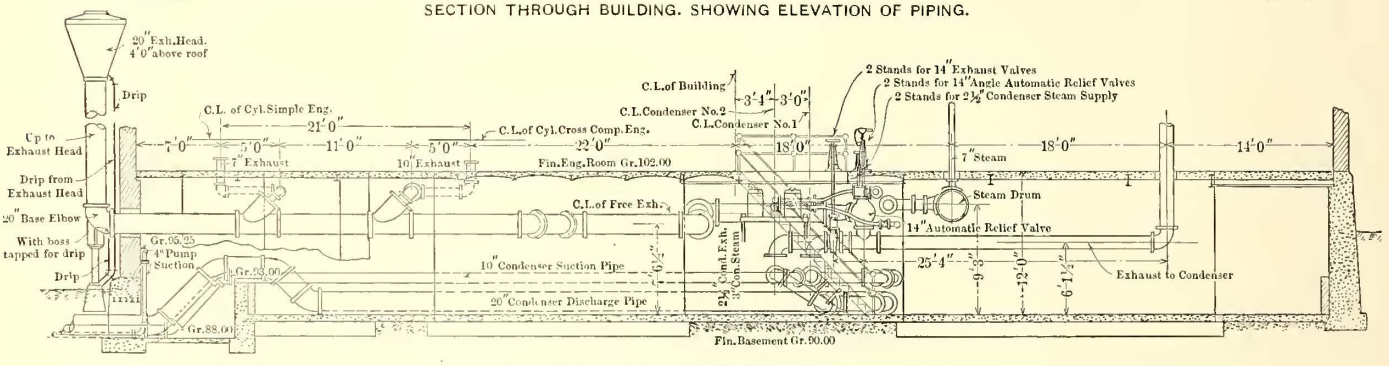
There is also a 15-kw, 225-volt generator in the engine room direct connected to a 7-in. by 7-in. Sturtevant vertical engine whose normal speed is 400 r. p. m. This is used

in lighting the power house, offices and car house, the two latter being located about 1000 ft. from the station at a point on the system passed by all the cars of the company. Three eight-hour shifts run the station, the small Sturtevant unit carrying the lighting load all through the night. A 15-ton Whiting hand-operated crane sweeps the entire engine room, and this was installed during construction to facilitate erection of machinery. On a raised platform about 20 ft. above the engine room floor is located a glass-enclosed office for the chief engineer, F. E. Eckerson. This office is reached by a spiral stairway, and engine room floor. The larger engine is supplied by a 7-in. steam line and the smaller one by a 6-in. line. Cochrane separators are used in both cases.

The auxiliary steam piping is all extra heavily fitted also, and a special 4½-in. header is located horizontally 4 ft. above the boiler room floor for this service. At the rear of each boiler steam drum is a 4½-in. riser with automatic stop valve connecting with the auxiliary header. The feed-pumps are supplied by a 2-in. branch line with 1½-in. taps for each pump, and the two condensers of the vertical engines are supplied through a 3½-in. main, the



SECTION THROUGH BUILDING. SHOWING ELEVATION OF PIPING.



LONGITUDINAL SECTION THROUGH ENGINE ROOM BASEMENT. SHOWING ELEVATION OF PIPING. Street Ry. Journal

ELEVATIONS OF THE MAIN AND EXHAUST STEAM PIPING IN THE PITTSFIELD POWER PLANT

it commands the entire engine room. Telephone service in a sound-proof booth is provided in the engine room.

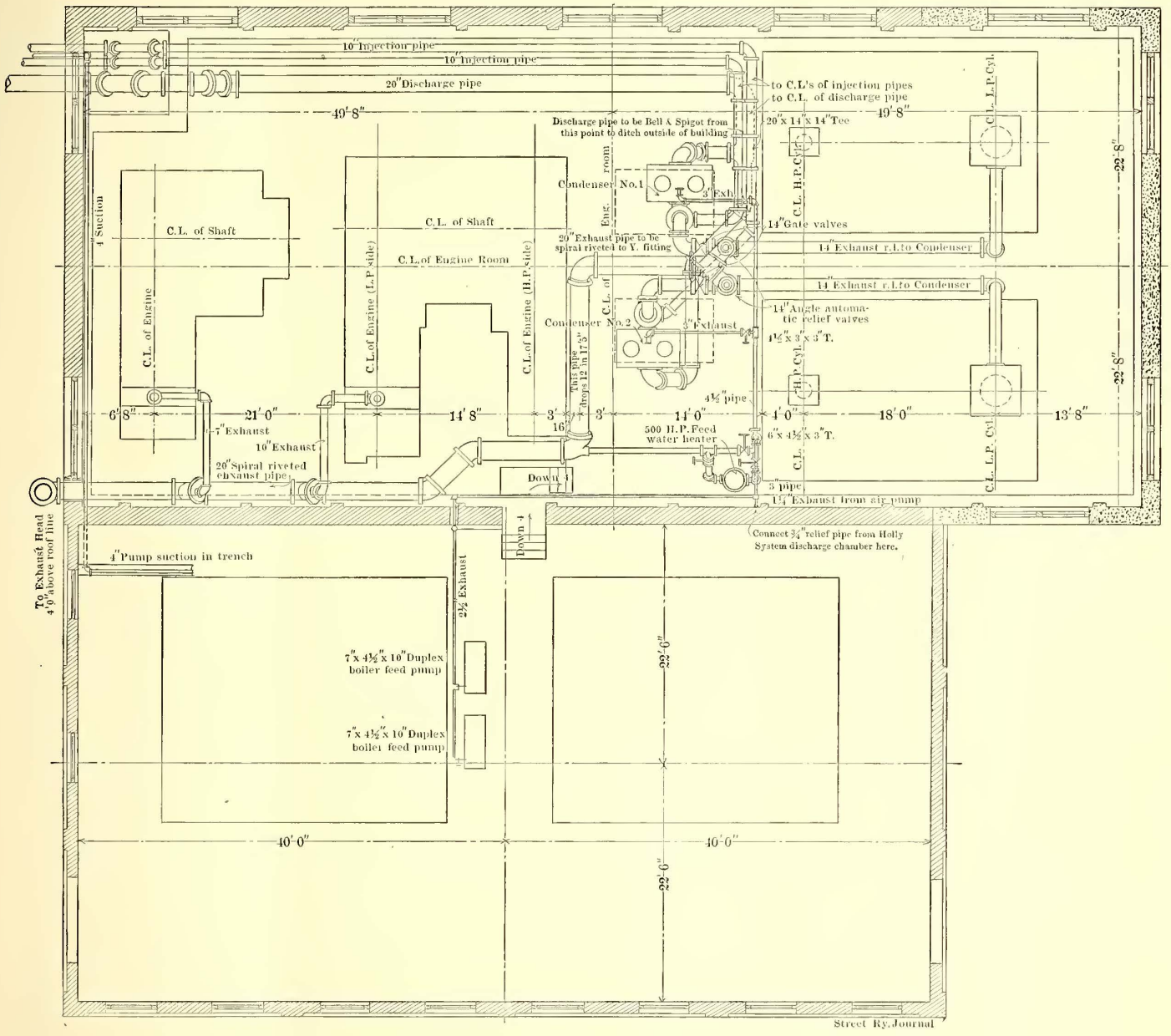
All the main steam piping is equipped with extra heavy fittings. Each boiler delivers live steam into a main header running parallel to the engine room wall through a 6-in. riser with stop valve at each boiler outlet. The main header varies in size from 14 ins. diameter in the center of the boiler room run to 12 ins. at the chimney end and 6 ins. at the west end. The two large vertical engines are fed jointly by a 10-in. steam line which drops down from the boiler room header and runs beneath the engine room floor to a steam drum between the two engine foundations, and from this drum each engine is supplied by a 7-in. steam riser equipped with a stop valve. The two smaller engines were designed for operation at 125 lbs. pressure, and in each of their supply lines, which are taken separately from the boiler room main, are installed a pressure reducing valve and a stop valve operated by a chain from the direct branches to the air pump steam cylinders being 2½-in. pipes. A Westinghouse steam-driven air compressor is installed on the engine room wall with a reservoir tank in the basement for storage purposes.

The exhaust piping provides for the operation of either or both vertical units non-condensing if desired, with the usual connections for operation with condensers. Each low-pressure cylinder exhausts into a 14-in. pipe leading directly to a Warren vertical twin jet condenser, 12 ins. by 25 ins. by 18 ins. in cylinder dimensions. Branches from the 18-in. exhaust lines from the engines are brought together by a Y and carried to the atmosphere in the shape of a 20-in. outboard exhaust main which terminates in a run of spiral riveted pipe extending to an exhaust head 4 ft. above the roof level. The condenser injection pipes are brought from the well in 10-in. lines, as previously described, and the discharge of each condenser is by a 14-in. line leading into the 20-in. trunk discharge running to

the river. The cross compound Knowlson & Kelley engine discharges into the main outboard exhaust by a 10-in. line beneath the engine room floor, and the smaller engine by a 7-in. exhaust line leading into the main at a point further west.

Both air pump steam cylinders exhaust into 3-in. lines leading into a 6-in. pipe which connects with the Erie City feed-water heater. The Westinghouse air compressor pump also exhausts into this line by a 1½-in. pipe connecting with a 3-in. line which carries the feed-pump exhaust steam into the heater. Each feed-pump exhausts by a 1½-in. pipe into a 2½-in. main, which joins the Westinghouse compressor line above mentioned at a point near the feed-water heater. All high-pressure drips are returned to the boilers by the Holly gravity loop system.

A gravity oiling system is in service in the plant. Oil is delivered to the engine and generator bearings by a pipe system running downward from two 70-gal. storage tanks located at the level of the engine room roof truss. After being used the oil is discharged into a 50-gal. rectangular tank located in the basement. This tank is divided into two compartments by a vertical partition. The lower portion of the tank is filled with water, while the oil discharges through an outlet near the top through an overflow pipe into two cross filters which connect with an 80-gal. storage tank near the floor level in the basement. The water entrained with the oil in the first compartment tank passes downward through one compartment, upward through the next, and out by a waste pipe. A valve in the water outlet controls the rate of flow. From the main storage tank the oil is pumped into the two roof tanks by a 2-in. by 1¼-in. by 2¾-in. Blake duplex oil pump, the lift being about 40 ft. This head gives a very positive flow in the bearings of the engine room machinery. The oiling arrangements were designed by Mr. Eckerson.

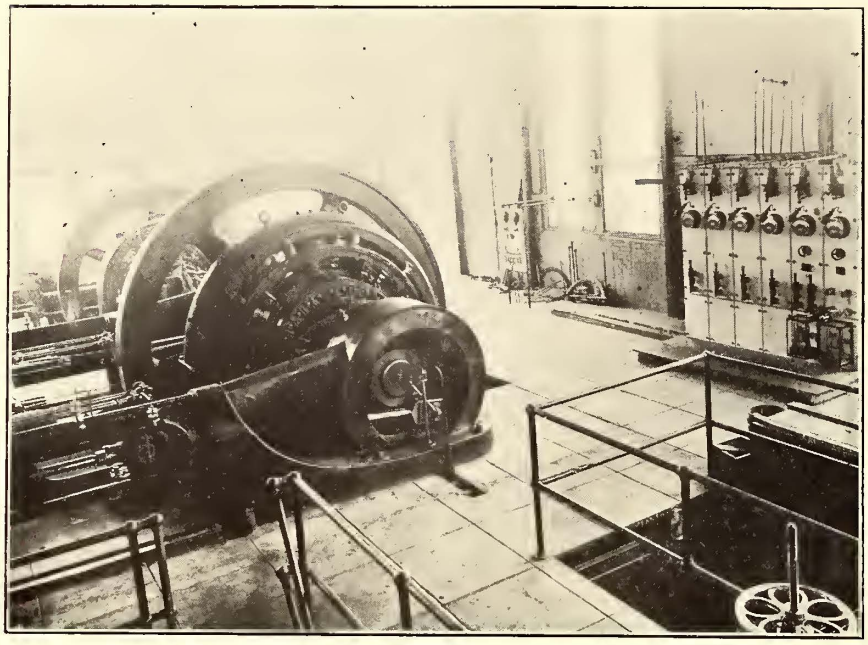


PLAN OF THE EXHAUST PIPING, PITTSFIELD POWER HOUSE

The system of electrical distribution is simple in this plant, and when the station is completed the switchboard will consist of twelve panels, including four generator, one totalizing station panel and seven feeder panels.

In addition to the power house construction the company has recently enlarged its car houses and added several four-motor open cars to its list of rolling stock. At

this time of year the schedules are maintained by a minimum of ten cars, about twenty cars being required at times of heavy travel. Cities the size of Pittsfield seldom have a rush-hour traffic of much magnitude, but in this case a heavy flow of travel occurs at morning, noon and night. Usually six extra cars are operated at these periods to take care of the travel to and from the Stanley Works. The company maintains double equipments for winter and summer service, believing that the cost of changing over frequently in the face of the sudden weather fluctuations encountered at an altitude of about 1000 ft. above the sea-level is greater than the expense of maintaining the two sets of motors. Acknowledgments are due to General Manager Dolan for courtesies extended in the preparation of this article.



LOOKING TOWARD THE HORIZONTAL UNITS AND SWITCH BOARD IN THE PITTSFIELD STATION

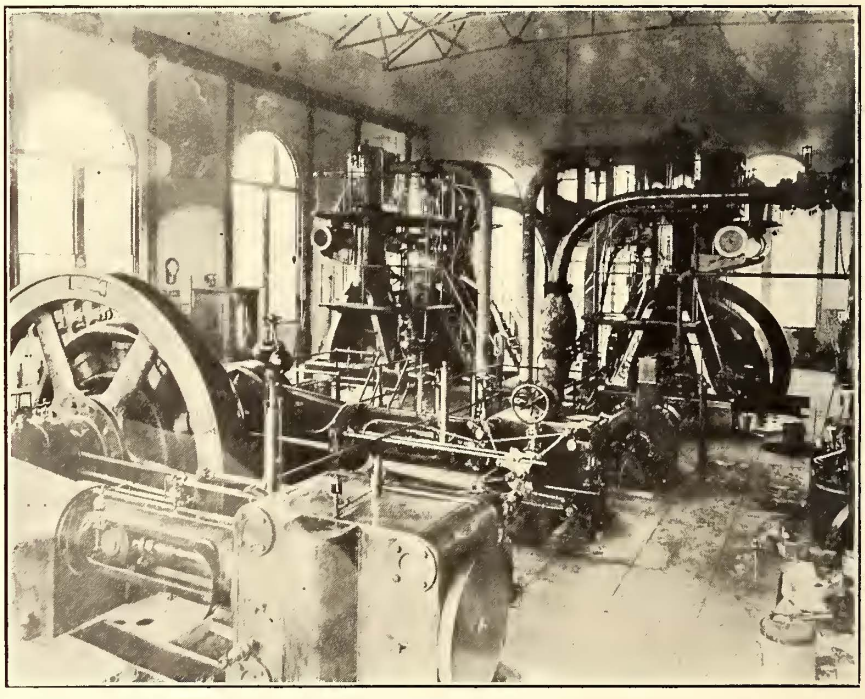
NEW ENGLAND TROLLEY TRIPS

The passenger department of the Boston & Northern and Old Colony Street Railway Companies has issued two separate trolley publications, one covering the Old Colony system and entitled "Trips by Trolley," and the other covering the Boston & Northern and entitled "Trolley Trips." The feature of the publications this year is a large four-colored map of Eastern Massachusetts east of Worcester, Southern New Hampshire and Northern Rhode Island, showing not only all the trolley lines of these companies, but all trolley lines in the district, as well as all the parks, groves and other inland and shore pleasure resorts. The map forms the inside of both folders, while the rest of the space is devoted to schedules showing the routes, distances, fares and mileage on the various lines. Everything is arranged in as condensed a form as possible. The covers of the two folders are in colors. That of the Boston & Northern shows an attractive view of a cool, rocky shore, a bay with an island in the distance, all on a background of striking red. The Old Colony cover is a delightfully typical little country scene. The books are published for gratuitous distribution.

CONNECTICUT TOURING CARS

Among the innovations which the Consolidated Railway Company will install this summer on its lines will be a tourist car which will leave Waterbury every Sunday at 8 a. m. for New Haven. After traveling over the local lines in New Haven, the car will proceed to Bridgeport, when a tour will be made of that city. The return trip will be made reaching Waterbury at about 9 o'clock in the evening. All the places of interest along the route will be announced to the passengers by a lecturer with a megaphone, after the fashion of the sight-seeing omnibuses or cars in operation in all the large cities.

In connection with the talk of legislation to be passed at the next Assembly in Ohio, President Horace E. Andrews, of the Cleveland Electric Railway Company, has expressed the opinion that a non-partisan State Board should be established, to have charge of the granting of franchises in municipalities. He believes that this power should be vested in a disinterested body of men with power to act after public hearings have been held.



INTERIOR OF THE PITTSFIELD STATION, SHOWING THE VERTICAL ENGINES

The Cincinnati Board has decided to give commissions as private policemen to all traction company inspectors.

CYLINDER LUBRICATION

BY W. H. BOOTH

If oil lubrication is still to be employed in modern steam engines, may not some exception be taken to the very usual custom as to the feeding of valve oil into the steam so that it is thoroughly atomized in the steam? With modern temperatures and superheating, the steam at the entrance to the engine is hotter than it is at any point on its passage through the engine, for as it travels towards the exhaust it becomes gradually colder from loss of heat by radiation, by the heat interchanges between the cylinder and the steam and by the ordinary effect of expansion. The object of lubrication is to produce smooth running. When oil is mixed with steam and the steam is condensed to any extent upon the cylinder surfaces some of the sprayed oil must be deposited upon the surfaces. Since the two main surfaces exposed to steam initially are the face of the piston and the face of the cylinder cover, the greater portion of the deposited oil must arrive at those two surfaces, neither of which stands in any need of any lubrication whatever and both of which will shed the oil upon the bottom of the cylinder if the latter is horizontal. If oil be heated it loses much of its lubricating power. Where steam is worked pretty hot the glazed brick walls of an engine room will sometimes be found varnished over with a sticky brown film. This is mineral oil that has been volatilized by heat and has become deposited by condensation upon the cold walls of glazed brick. It would appear, from a careful consideration of all the facts of lubrication, that the system of feeding oil into the steam is not so correct as has been thought. With wet steam no doubt quite a lot of the oil does get carried to where it is wanted, but even with wet steam it appears very probable that the bulk of the oil simply goes straight through to the condenser.

It would seem that the more correct place to lubricate would be the middle band of the cylinder over which the piston travels, and that oil should be introduced at this zone and caused to spread all round the circumference of the cylinder, the piston carrying it gradually toward the ends, whence it can only escape to the condenser after full use has been made of it. The central part of a cylinder is never exposed in ordinary practice to the highest temperature of the steam. The piston has traveled half the stroke plus its own length before the central band is ever touched by the steam and cut off has almost surely taken place long enough before the exposure of this central part by the moving piston takes place. Expansion has commenced and all superheat has gone, and the piston has a fairly cool oil to sweep onward. Every reason points to the central zone of the cylinder being the place where oil should be introduced. Properly distributed, it should prove as effective as several times the quantity introduced by way of the steam pipe, and, which is of great ultimate advantage, the oil will probably be very much less emulsified and there will be less difficulty in separating it from the condensed steam after it has done its work.

It seems rational on other grounds also to suppose that the middle of the cylinder is the proper place to put in oil. In the first place, it is as far removed as possible from the exhaust port, and must, therefore, travel the maximum distance to get out of the cylinder. It can only travel along the cylinder barrel by virtue of the rubbing to and fro of the piston, that is, by doing the very thing it should do—getting in the way of the piston. When an engine starts, a slight flush of oil will naturally be run in to act as a commencement, after which each successive drop should certainly be very much more efficient than each drop flowing into the steam pipe and carried more or less into the cylinder. Such a method may, in a sense, have served its purpose with saturated steam, especially if we are to believe, as many tell us, that wet steam without oil is a sufficient lubricant alone. But how can it be right to turn the oil into dried, parched superheated steam? It cannot be good practice. In the cylinder the temperature of superheat never extends very far. There is rarely a cylinder without water at the time cut-off is reached, so that the oil entering by the middle of the cylinder cannot be toasted out of its life, for it gets little or no higher in temperature than it would do in a cylinder fed with initially saturated steam.

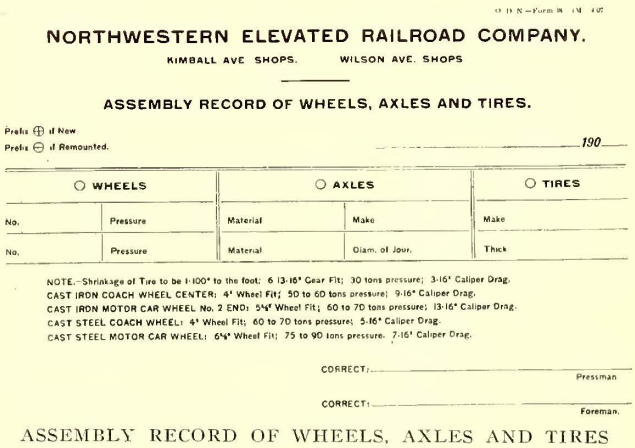
CORRESPONDENCE

NORTHWESTERN ELEVATED RAILROAD COMPANY

CHICAGO, ILL., June 14, 1907.

Editors STREET RAILWAY JOURNAL:

The accompanying illustration is a copy of the wheel axle and tire assembly record used on this system. To make the indicated record a pair of dividers is required by the



NORTHWESTERN ELEVATED RAILROAD COMPANY.

KIMBALL AVE. SHOPS. WILSON AVE. SHOPS

ASSEMBLY RECORD OF WHEELS, AXLES AND TIRES.

Prelim ⊕ of New
Prelim ⊖ of Remounted. 190

○ WHEELS		○ AXLES		○ TIRES
No.	Pressure	Material	Make	Make
No.	Pressure	Material	Diam. of Jour.	Thick

NOTE.—Shrinkage of Tire to be 1-100" to the foot: 6 13-16" Gear Fit; 30 tons pressure; 3-16" Caliper Drag.
CAST IRON COACH WHEEL CENTER: 4" Wheel Fit; 50 to 60 tons pressure; 9-16" Caliper Drag.
CAST IRON MOTOR CAR WHEEL No. 2 END: 5¼" Wheel Fit; 60 to 70 tons pressure; 13-16" Caliper Drag.
CAST STEEL COACH WHEEL: 4" Wheel Fit; 60 to 70 tons pressure; 5-16" Caliper Drag.
CAST STEEL MOTOR CAR WHEEL: 6¼" Wheel Fit; 75 to 90 tons pressure; 7-16" Caliper Drag.

CORRECT: Pressman

CORRECT: Foreman.

ASSEMBLY RECORD OF WHEELS, AXLES AND TIRES

lathe hand, the points of which are spaced the amount of the caliper drag required and drawn in a parallel plane to the axle on the wheel or gear seat. One leg of the caliper is held on one of the lines drawn while the other leg of the caliper should just engage the other line.

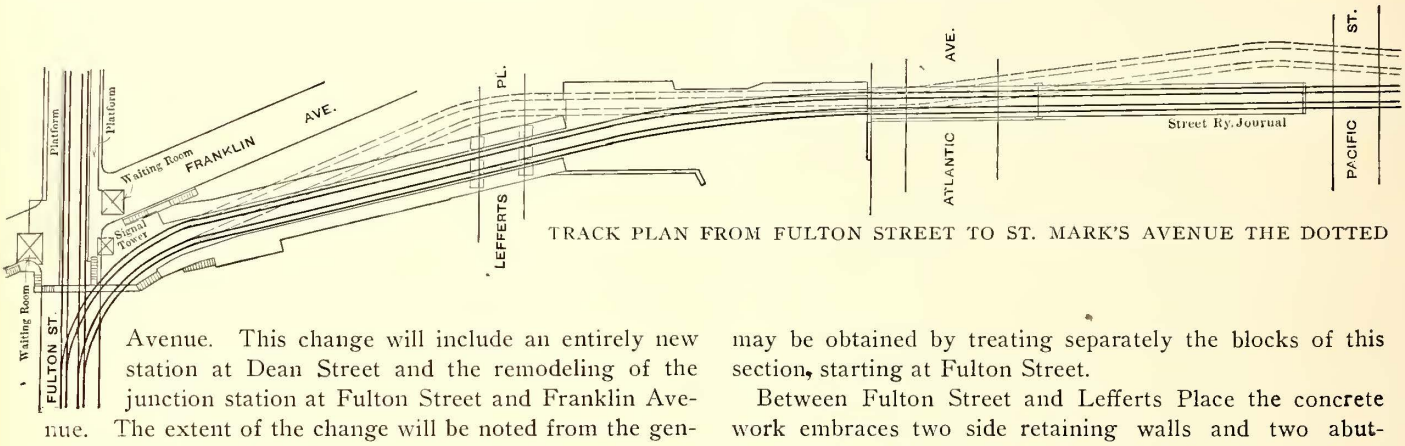
During my experience in making crank-pin fits, etc., I have found this method more reliable than any other.

J. E. OSMER, Master Mechanic.

The formal opening of the new direct express line of the Eastern & South Bethlehem Transit Company took place on Saturday, June 15, when the first car left at 5:35 o'clock a. m. Cars leave every hour until and including 12:35 o'clock a. m. The last car reaches Center Square in the County Seat at 1:30 o'clock a. m., according to schedule. The car leaving Third and New Streets at 11:35 o'clock p. m. is the last to make connections for Butztown. Cars leave Easton for Freemansburg and South Bethlehem on the half hour, except the first car, which will leave Center Square, the starting point, at 5:35 o'clock a. m., and is scheduled to make the run to the Bethlehem Steel Works in 50 minutes.

THE FRANKLIN AVENUE IMPROVEMENT ON THE BRIGHTON BEACH LINE OF THE BROOKLYN RAPID TRANSIT COMPANY

In connection with the other extensive improvements which the Brooklyn Rapid Transit Company is carrying out on its Brighton Beach elevated-surface line, work is now under way on the re-alignment of an elevated section about 1500 ft. long between Fulton Street and St. Marks Avenue. This change will include an entirely new station at Dean Street and the remodeling of the junction station at Fulton Street and Franklin Avenue. The extent of the change will be noted from the general plan, on which the present tracks are shown in broken lines and the future route in full lines. It is evident that the realignment will effect a considerable improvement by removing the two sharp curves now between Fulton and Bergen Streets.



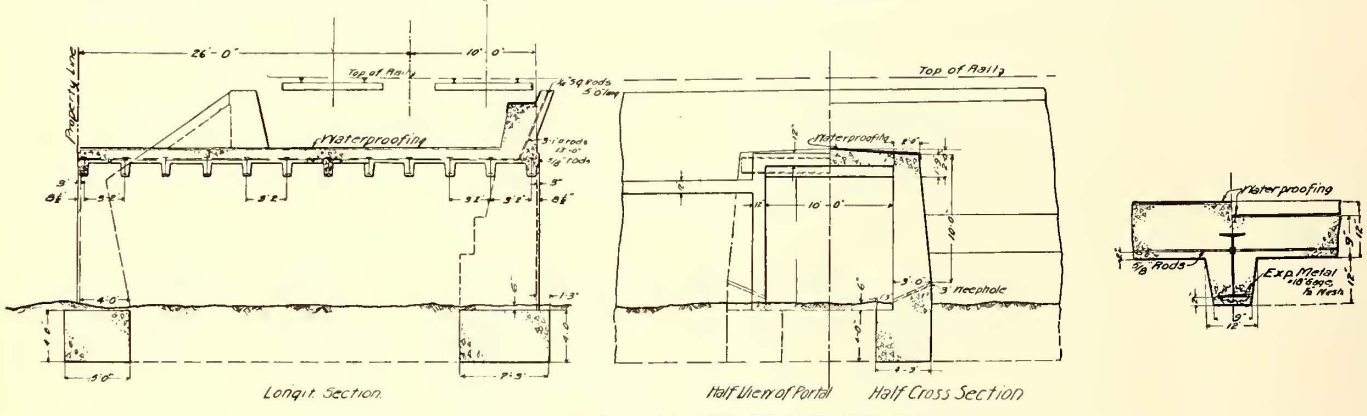
TRACK PLAN FROM FULTON STREET TO ST. MARK'S AVENUE THE DOTTED

For a time the company was undecided whether the section to be changed should be of the ordinary steel column and girder type or carried over a fill supported by concrete side walls and abutments. The latter method finally was adopted for the greater part of the route and enough property purchased to permit the eventual construction of a four-track line between Park Place and Fulton Street.

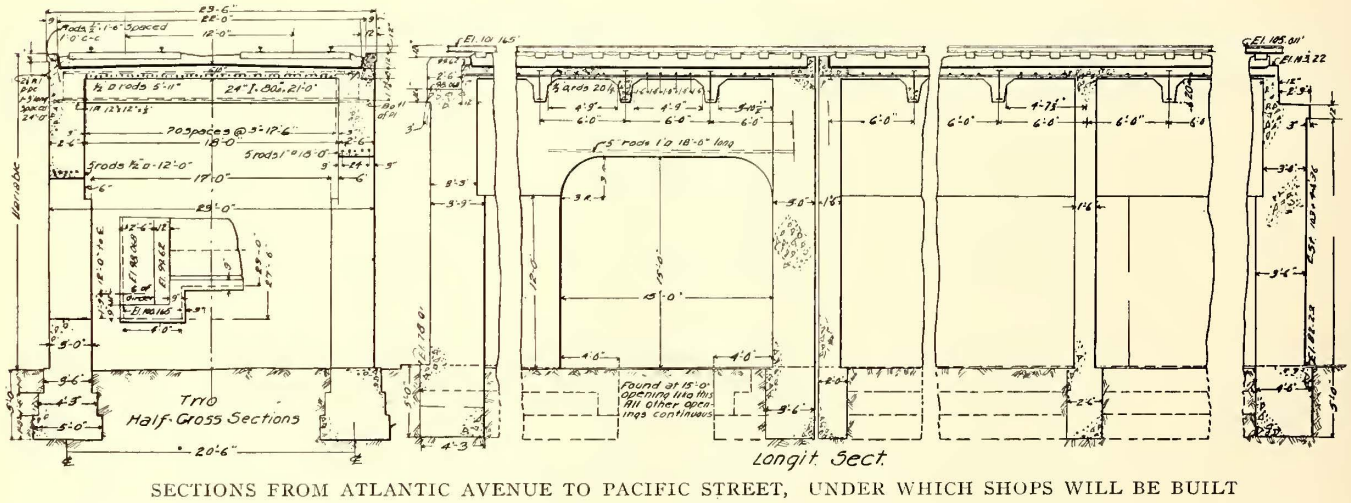
CONCRETE WORK

As different conditions as to clearances and loads were encountered in building the retaining walls and overgrade street crossings, a clearer idea of the character of the work may be obtained by treating separately the blocks of this section, starting at Fulton Street.

Between Fulton Street and Lefferts Place the concrete work embraces two side retaining walls and two abutments. The side walls have a vertical free face and are battered on the rear; the footings are 9 ft. x 6 ft. Both the walls facing Franklin Avenue and the other are 2 ft. wide at the top. The Fulton Street abutment at the Franklin Avenue station is 41 ft. 5 11-16 ins. wide, and the Lefferts Place abutment is of similar section and type, with a total width of 72 ft. 4½ ins. From the Lefferts Place abutment four girders are carried across the street



SPECIAL SECTIONS AND FLOOR DETAIL

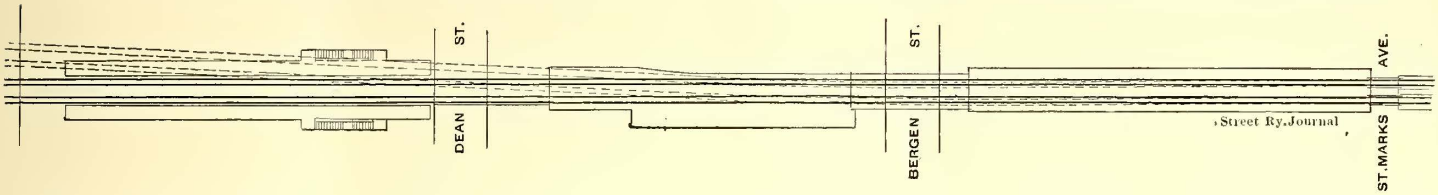


SECTIONS FROM ATLANTIC AVENUE TO PACIFIC STREET, UNDER WHICH SHOPS WILL BE BUILT

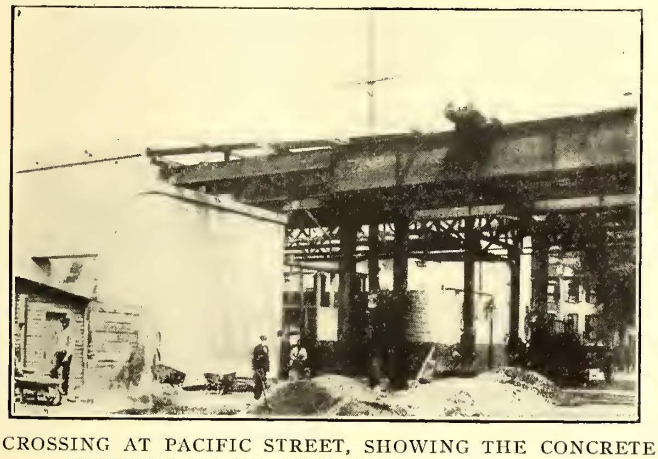
to a corresponding abutment. These girders are carried at intermediate points on both sides by opposite sets of three steel columns carrying an average load of 3100 lbs. per sq. ft.

The concrete work on the following block, Lefferts Place to Atlantic Avenue, consists of a side retaining wall running along Franklin Avenue for the entire length of the block. This is of similar section to the Fulton Street and Lefferts Place wall, which faces Franklin Avenue, and, with a second but shorter and smooth-faced wall, forms the support for the fill on this block. The street abutments do not differ materially from those previously described. The two sets of three columns for supporting the girders at intermediate points are designed for an average load of 3000 lbs. per sq. ft.

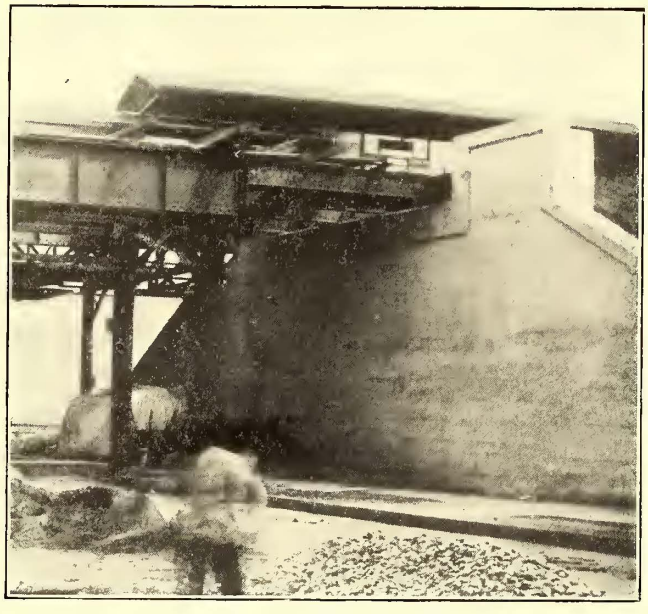
Between Atlantic Avenue and Pacific Street the line crosses the yard of the railroad company used by the superintendent of buildings for lumber storage and a carpenter shop. Through this section the construction assumes the form of a concrete viaduct 23 ft. wide with side walls and a reinforced concrete roof. This, while a part of the track support, also forms a roof for a carpenter shop, blacksmith shop and planing mill. The side walls have doors and windows. Reference to the plan shows that



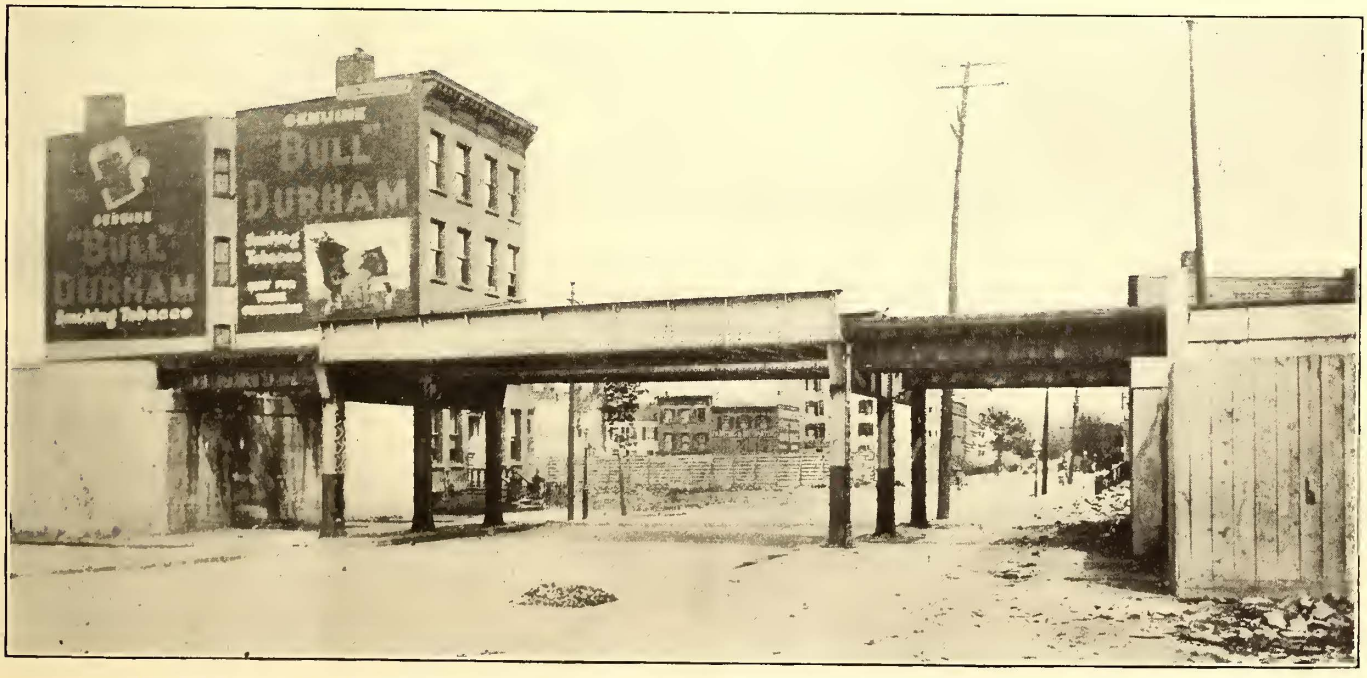
LINES SHOWING THE OLD ROUTE AND THE FULL LINES, THE NEW ONE



CROSSING AT PACIFIC STREET, SHOWING THE CONCRETE BUILDING TO BE USED FOR SHOP PURPOSES



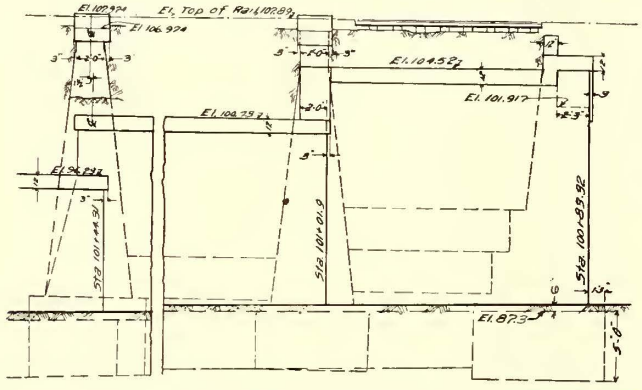
THE PACIFIC STREET END OF THE DEAN STREET STATION, SHOWING AN ABUTMENT



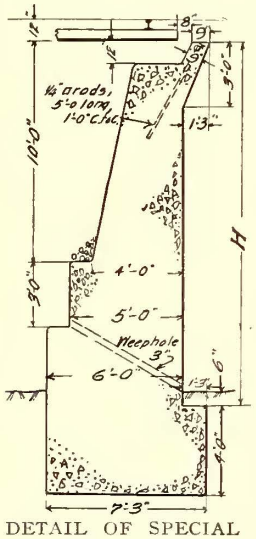
CROSSING AT ST. MARK'S AVENUE, ILLUSTRATING THE USUAL MANNER OF CROSSING THE STREET

the roadbed rests on 80-lb. I-beams laid transversely at intervals of 4 ft. 9 ins. on 12-in. x ½-in. x 12-in. foot-plates bearing in the concrete. The beams have their top and bottom members covered with No. 18 ½-in. mesh expanded metal. The floor is longitudinally reinforced by ½-in. square rods, 20 ft. long, embedded in 10-in. concrete. The crossing over Pacific Street is over the usual abutments and two sets of two columns each carrying 2700 lbs. per sq. ft.

As the block between Pacific and Dean Streets will be occupied by a station, there are, in addition to the usual abutments and retaining walls, three concrete piers on each side of the track for carrying the platform girders. These piers will be spaced 42 ft. 6½ ins., and will have footings 6 ft. x 8 ft. 1 in. carried to depths varying with the condition of the soil. Cuts on this page illustrate the north and west side elevations of the abutment on Dean Street. The views on page 1107 are of particular interest as showing the construction at platforms and the position of the four through-girder spans over Dean Street. These girders are also supported by two pairs of intermediate columns designed for 3600 lbs. per sq. ft.

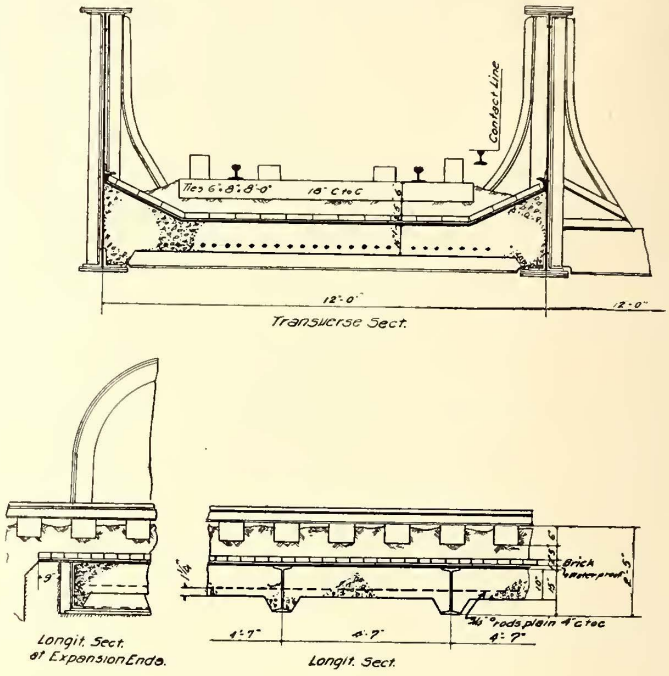


PART ELEVATION OF RETAINING WALL ON WEST SIDE OF DEAN STREET ABUTMENT



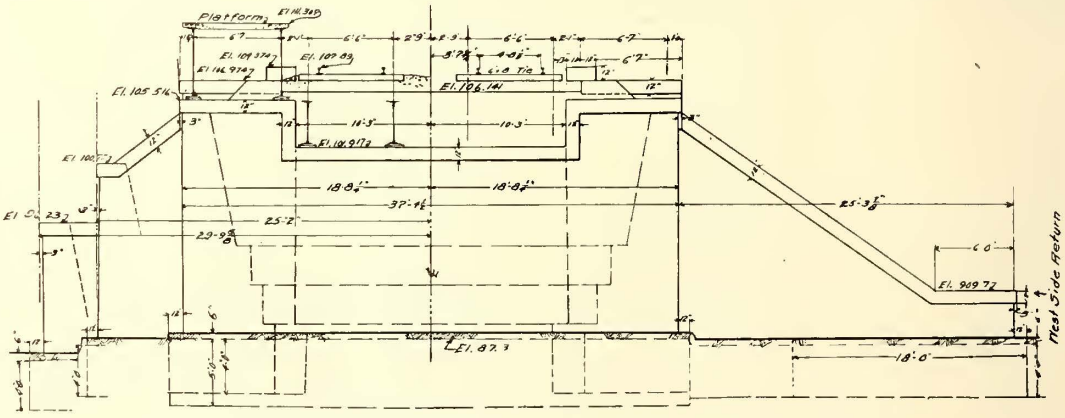
DETAIL OF SPECIAL SECTION OF RETAINING WALL BETWEEN DEAN AND BERGEN STREETS

The section between Dean and Bergen Streets is completely enclosed by the retaining walls and abutments, but owing to special conditions there are several variations in construction. In the first place, it was necessary to allow for the construction of a 10-ft. x 10-ft. driveway under the middle of this division for wagons from a brewery located alongside the property. Over this tunnel the roadbed is carried on 15-in., 42-lb. I-beams embedded in concrete at intervals of 3 ft. 2 ins. and covered at the base with No. 18 gage ½-in. mesh expanded metal. There is also a reinforcement of ⅝-in. rods. Another special feature is the pipe duct for the brewery built in the structure. This is 3 ft. wide and 3 ft. 2 ins. high. The roof of this duct is of 6-in. concrete reinforced with ⅜-in. square rods. The type of retaining wall used alongside the brewery is particularly interesting, as the clearance was so small along this property that to permit the passage of cars on the adjacent freight tracks it was necessary to build a sloping top. Since a straight concrete construction would be too weak to carry the load, this portion is reinforced with 5-ft. ¼-in. square rods spaced every 12 ins.



TYPICAL FLOOR FOR THROUGH SPANS

The retaining walls and abutments between Bergen Street and St. Marks Avenue form a perfect rectangle. In general, they are like the standard walls already mentioned, with footings 7 ft. 9 ins. x 7 ft. 3 ins.



ELEVATION OF DEAN STREET ABUTMENT ON THE NORTH SIDE

ROADBED

Roadbed sections on through and deck spans also are shown on this page. The rails rest directly on wood ties laid in rock ballast. The latter, in turn, is placed on a single layer of 2-in. brick with grouted joints, which covers 1-in. waterproofing laid on the reinforced concrete floor. A similar construction is used at the Dean Street station platform.

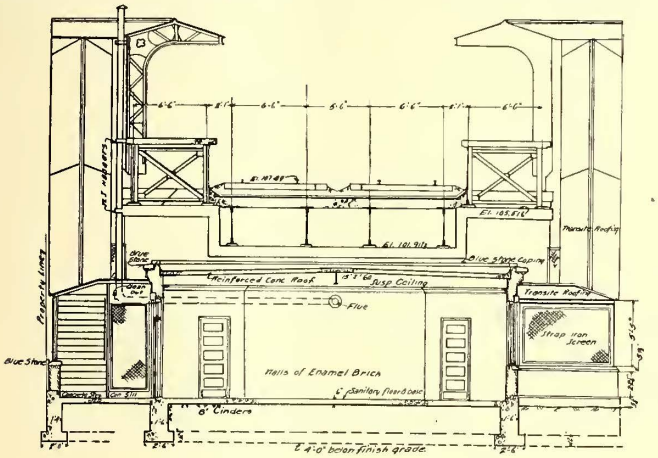
DRAINAGE

From the cut on page 1104, showing the construction betwen Atlantic Avenue and Pacific Street, it will be noted that the roadbed is drained through a depression in the concrete, which throws off water through 2½-inch wrought-iron pipes set at intervals of 24 ft. In general, the walls are drained through 3-in. weepholes pierced at various intervals.

THE DEAN STREET STATION

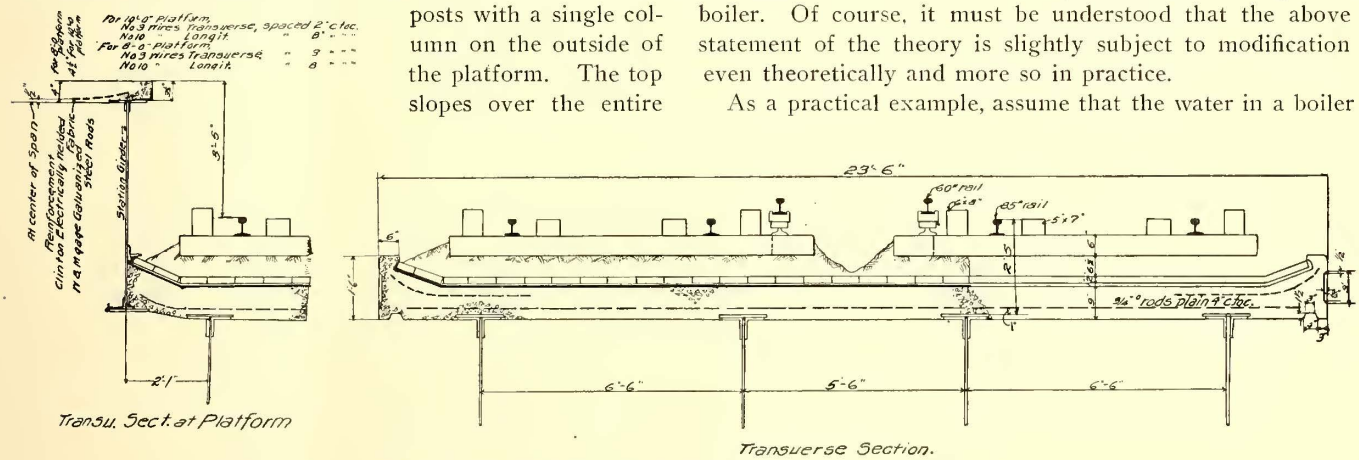
The station at Dean Street will be built at the street level with a stairway leading to each side platform. The exterior of the building will be of hard-burned brick with bluestone copings, and the interior will be faced with white enameled brick.

Each of the two platforms will be carried on 50-ft. span girders resting directly on the concrete piers forming a part of the retaining walls. They will have ornamental



SECTION OF DEAN STREET STATION

iron paneled fences, and the platform floor will be of reinforced concrete. The innovation in the platform fences is that their sheet-iron panels are constructed to the exact size of standard advertising posters, thereby eliminating the unsightly advertising boards so commonly used on elevated station platforms. The canopy is constructed of steel posts with a single column on the outside of the platform. The top slopes over the entire canopy roof, which, like the station building and stairway roofs, is covered with Johns-Manville transite.



TRANSVERSE SECTIONS OF FLOORING ON DECK SPANS

The station building is furnished with the usual ticket office, turnstile and news stand. The toilet accommodations are excellent, porcelain closets being used with nickel-plated pipes for the exposed fittings. To add to the general healthfulness, the floor of the building is of non-absorbent material throughout. The entire installation, including the stairways, is lighted by series incandescent lamps on the 600-volt railway circuit.

BOILER EFFICIENCY

Experiments now being conducted by the boiler division of the United States Geological Survey fuel-testing plant at St. Louis, Mo., on the nature of boiler efficiencies have suggested that stationary boilers ought to be made to do ten to twenty times as much work per unit of heating surface as they do now. This great increase in capacity is to be obtained by subdividing the heating surface and water streams more finely, by allowing less restriction of the water inside the boilers and by using high forced and induced draft to put a large mass of gases through the boiler at a very high speed.

Up to the present time there have been only vague ideas among engineers as to what factors influenced the efficiency of the steam boiler portion of the steam generator apparatus so as to cause it to absorb more or less of the heat generated by the combustion. John Perry, a distinguished mechanical and electrical engineer of England, went into the subject mathematically a few years ago and set forth general conclusions tentatively in his book on the "Steam Engine and Gas and Oil Engines."

About a year ago the government testing plant took up the mathematical investigation of the theory of the steam boiler and of heat absorption and extended Mr. Perry's theory somewhat. For some weeks past Walter T. Ray, assistant engineer, acting under the supervision of Prof. L. P. Breckenridge, engineer-in-charge of the boiler division, has been conducting a series of experiments on small multi-tubular boilers dimensioned as to enable the theory to be verified, or modified, or refuted. The boilers are fed with air heated electrically. Mr. Perry's theory states that modifying conditions being omitted from consideration, every boiler will always absorb by convection from the gases passing through it the same percentage of heat which could possibly be absorbed by any boiler containing water at a given steam temperature. This efficiency is, therefore, independent of the temperature of the entering gases and of the amount of gases flowing through the boiler. Of course, it must be understood that the above statement of the theory is slightly subject to modification even theoretically and more so in practice.

As a practical example, assume that the water in a boiler circulates with entire freedom, which is an unwarranted assumption, and that its temperature is 300 degs. F.; let the gases enter the boiler at 1300 degs. F., then the difference between the two is 1000 degs. F., and consequently it would be possible for a boiler infinitely long to reduce the temperature of the gases passing through it to 300 degs. F. Let us assume, however, that the gases leave the boiler at 500 degs. F., which is 200 degs. above steam temperature. The efficiency of the boiler then is 80 per cent, because it has reduced the temperature 800 degs. out of a

possible reduction of one thousand degrees Fahrenheit.

If the same boiler be supplied with gases at 2300 degs. F., the gases enter the boiler at 2000 degs. F. above steam temperature. Mr. Perry's theory states that this particular boiler will reduce these gases 80 per cent as much in temperature as would a boiler infinitely long, that is, to 400 degs. above steam temperature, which is 20 per cent of 2000 degs., or to 700 degs. F. It will be noticed that the mass of gases does not enter into consideration at all.

This surprising deduction is being accurately verified by the aforementioned division of the Survey, from which it is found, when keeping other conditions the same and when keeping the initial temperature of the gases constant, that the final temperature of the air remains the same whatever the amount of air sent through the boiler per second. So far the upper limit has not been reached with tubes clean inside and out, although the rate of evaporation has already been pushed up to many times that obtained even in locomotive practice.

Perry's theory takes into consideration four fundamental features affecting heat absorption at any point of the heating surface:

First. Temperature difference between the gases outside any portion of the boiler tube and the water inside.

Second. The number of molecules per cubic inch in the gases outside the boiler tube.

Third. The specific heat of the gases at constant pressure.

Fourth. The velocity of the gases parallel to the heating surface.

Of the four above factors, only the first has usually been considered. It will be readily seen that if we increase the temperature of the gases we decrease the number of molecules beating against any square inch of tube heating surface, and thus the second factor largely neutralizes the first, especially at high furnace temperatures.

The third factor can be taken as constant equal to 0.24.

The fourth factor is the new and surprising one. Mr. Perry considers that a high velocity of gases parallel to the heating surface scrubs off more or less of the dense film of gases adhering to the metal surface, which film of gases has already become cold by proximity to the metal. The higher the velocity of gases the more the scrubbing effect, and consequently the greater the amount of heat transmitted. This theory necessarily assumes that the ability of the metal to transmit heat is practically infinite, and when we consider that we ordinarily never put through a boiler tube more than 1/1000 of heat it could possibly carry, it will be realized that this assumption is warranted.

Mr. Perry's theory and the Survey's verification of it will result in placing the steam boiler on a fairly secure mathematical basis, the same as generators and motors are now on. Thus far the experiments check out the theory excellently. The theory and results will be embodied in a special bulletin to be published in two or three months, to be followed by later bulletins as the work proceeds.

REPORT FROM RIO DE JANEIRO

The Rio de Janeiro Tramway, Light & Power Company, in its first annual report, which is for the year ending Dec. 31, 1906, shows gross earnings of $5,575,000 and operating expenses $4,010,000, leaving the net profits at $1,565,000. The earnings of the first three months of 1907 are at the rate of $5,583,748 of gross earnings, $3,775,000 of working expenses, and $1,808,748 of net earnings.

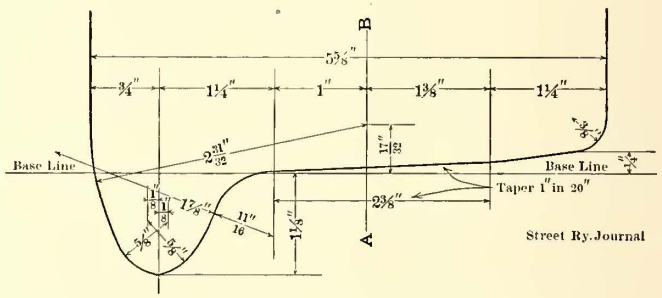
NEW M. C. B. WHEEL STANDARD

The report of the standing committee of the Master Car Builders' Association on cast-iron wheels rendered at the Atlantic City convention on June 18 was in favor of the modified section suggested at the last convention. This section differs, so far as the flange and tread are concerned, from that formerly used, in three particulars, viz.: (1) the main coning of the tread has been increased to a taper of 1 in. in 20 ins., the coning on the outside 1¼ ins. of the wheel remaining the same as before; (2) the thickness of the flange has been increased ⅛ in.; (3) the radius of the throat has been increased 1/16 in.

The committee stated that the new section has the endorsement of a committee representing the car wheel makers of the United States, the personnel of which is as follows:

C. A. Lindstrom, Pennsylvania and Central Car Wheel Companies.
S. H. Blewitt, American Car & Foundry Company.
W. C. Dickerman, American Car & Foundry Company.
A. G. Wellington, Maryland Car Wheel Works.
G. P. Rhodes, National Car Wheel Company.
Rudolph Ortmann, Griffin Wheel Company.
Thomas Griffin, Griffin Wheel Company.
W .W. Lobdell, Lobdell Car Wheel Company.
J. W. Nute, St. Louis Car Wheel Works.
P. H. Griffin, chairman, Wheel Makers' Committee, New York Car Wheel Company.

Joint meetings were held by the two committees during February and April, 1907, at New York City. The committee recommends the diameter of chill molds for 33-in.



SECTION (HALF SIZE) OF NEW M. C. B. STANDARD WHEEL

wheels to be 33½ ins., and that for 30-in. wheels to be 30⅜ ins., measured on the line A B (see illustration).

At the meeting on June 18, A. W. Gibbs, of the Pennsylvania Railroad, said that in 1904 his company had increased the thickness of its flanges to 1⅛ ins., which is above the M. C. B. standard, and in 1903 it began the use of the coned tread. The number of failed flanges was much less than formerly. Several members referred to the failure of wheels due to the development of a seam in the throat of the flange. This was not attributed to blows which the flange received, but to the peening effect caused by the rails, and one member inquired whether it would not be desirable to increase the radius of the throat still further. Mr. Gartsang, of the committee, replied that this radius had already been increased 1/16 in. from the old dimension, and that the flange had been increased a thickness of an eighth of an inch. These changes were about as far as the committee felt was required at the present time, although some of the prominent railroads are using a throat of ¾-in. radius.

It was decided to adopt the report of the committee and that it be referred to a letter ballot. The new wheels will be marked "M. C. B., 1907."

MOTOR CARS FOR LIGHT PASSENGER SERVICE

At the Atlantic City Convention of the American Railway Master Mechanics' Association, the committee on the "Development of Motor Cars for Light Passenger Service" presented a series of statements on the principal self-propelled cars used in this country and abroad. The report opened with a reference to the Union Pacific Company's gasoline motor cars, described in W. R. McKeen, Jr.'s, paper read before the New York Railroad Club on April 19 and published in the STREET RAILWAY JOURNAL of April 27, 1907. The only other American gasoline motor car with mechanical transmission mentioned is the "Sunny Brook," built recently at Indianapolis for service in Yellowstone Park. This car has a four-cylinder gasoline motor with 6-in. x 6-in. cylinders, the engine developing 50 hp at 700 r. p. m. The vehicle is built like a street car and weighs 30,000 lbs. The maximum speed claimed is 35 miles an hour.

The gasoline motor cars with electric transmission discussed in the report are the Strang, St. Joseph Valley and the second Delaware & Hudson car built by the General Electric Company. The Strang cars were described in the STREET RAILWAY JOURNAL of March 3, 1906, and Aug. 18, 1906, and three are now in regular service between Kansas City and Olathe, the first for over a year and the second and third between six and seven months. It is claimed that the gasoline consumption is but 0.45 gal. of gasoline per car-mile for 60,000 miles. The St. Joseph Valley Traction Company's car was described in the STREET RAILWAY JOURNAL of April 8, 1905, but the equipment was destroyed by fire within the past two months. The service of this car consisted in hauling one to three trailers three round trips a day over a line 11½ miles long. The half trip was made in 35 minutes, with four stops, and the heaviest grade did not exceed 1½ per cent. It is stated that the fuel consumption with one trailer was 0.75 gals. per mile. The General Electric Company's new car is said to be a considerable improvement over the original Delaware & Hudson car. The equipment will consist of an eight-cylinder gasoline motor of 150 to 175 hp, direct connected to an interpole 90-kw generator with a 3½-kw exciter to excite the main generator fields and effect control by varying the voltage. There are also two 65-hp motors, one on each truck. The report on American cars concluded with a reference to the steam motor car of the Canadian Pacific Railway, in operation all last summer between Montreal and Vaudreuil, a distance of 24 miles, giving three round trips per day, including twelve stops. When the car was first placed in service 1.8 gals. of crude oil were consumed per mile, but this was reduced later to 1.6 gals. No other statistics of operating cost were given.

The only foreign gasoline motor car with mechanical transmission discussed in the report is the German Daimler car, which is used on the Wurtemburg State Railways, the Swiss Federal Railways and other lines. It is only 33 ft. long and seats thirty-six. Power from the 30-hp engine is transmitted from the four-cylinder motor through a leather-faced cone friction clutch and a sliding gear transmission to one of the axles.

The report also takes up the gasoline motor cars with electric transmission operated in England by the Great Northern Railway and in Hungary by the Arad & Csnadar Railway. Operating statistics on these cars were contributed by H. G. Chatain in the discussion on Mr. McKeen's paper. Mr. Chatain also gave similar statistics on the steam motor car of the Great Western Railway of England and on the Paris-Orleans road, where the Purrey system is used. The other foreign cars mentioned in the report are those built by the Taff-Vale Railway and the Lancashire & Yorkshire Railway, of England; the Ganz Company, of Hungary; the Serpollet car, and the Komarek car. The Taff-Vale cars have a total length of 70 ft., seat forty-three, and weigh 42 tons. In general, the cars resemble those of the Great Western Railway, the chief difference being in the construction of the boiler. The car is capable of running 35 miles an hour, and will ascend a 2½ per cent grade at 20 miles an hour. The Lancashire & Yorkshire cars are similar to the Taff-Vale cars. The Ganz cars have been described several times in these columns. The Serpollet cars differ from the Purrey and Ganz types chiefly in that the boiler is of the flush type and petroleum is generally used as fuel. They are used on the Paris-Lyons-Mediterranean Railway, where they are stated to have been rather unsatisfactory because of tube troubles attending the high degree of superheat. The Komarek car is used to some extent by the Austrian State Railways. It is capable of running at 25 miles an hour while hauling trailers comprising a total of 50 tons. The operating cost is given at 5 cents per train-mile, exclusive of the guards' pay, with coal $3.25 per ton. On a mileage basis, the cost is as follows: Coal, 0.0253; oil, 0.0014; labor, 0.0046; maintenance of material, 0.0011; driver, 0.0116, making a total of 0.0484 cent. The car is 51 ft. long, seats thirty-five persons and weighs empty 20 tons. The length of the boiler and fuel compartment is 10 ft., coal capacity 1100 tons, water capacity 420 gals. The motor is of the two-cylinder, cross-compound type.

The conclusions of the committee are that there is a field for the rail motor car, its extent being now limited only by the development of motor car power equipment. Steam has always possessed the distinctive advantage of flexibility of control, as well as reliability, but the internal combustion motor within certain defined limits of size has developed to that stage of excellence where it partakes of these advantages. It is probable that both types of power equipment will have their distinctive fields, depending upon the availability of the fuel.

SHOP ADDITIONS AND PARK IMPROVEMENTS AT MOBILE

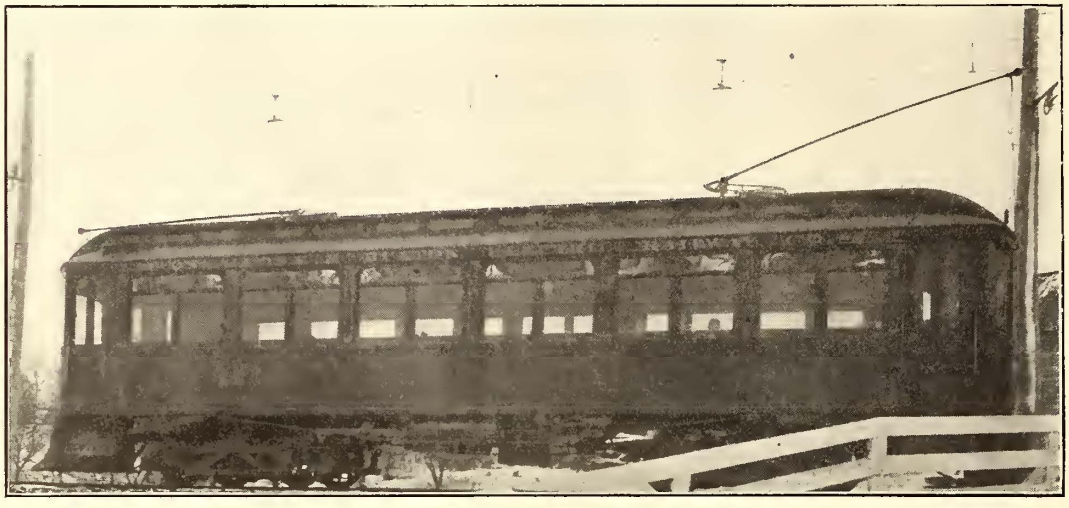
A new storage barn, 225 ft. x 47 ft., is being completed by the Mobile Light & Railroad Company. The barn is of fireproof construction with brick walls and concrete roof and rolling steel doors. It is divided into two compartments, each containing two tracks. To the repair shops adjacent is being built an addition, 55 ft. x 60 ft., which will be used largely for machine tools and a formerly open space between two buildings, 30 ft. x 75 ft., is being roofed over for utilization by the shop department.

At Monroe Park the Mobile Light & Railroad Company is building a pier 1400 ft. out into Mobile Bay. The pier will terminate in a promenade 150 ft. square.

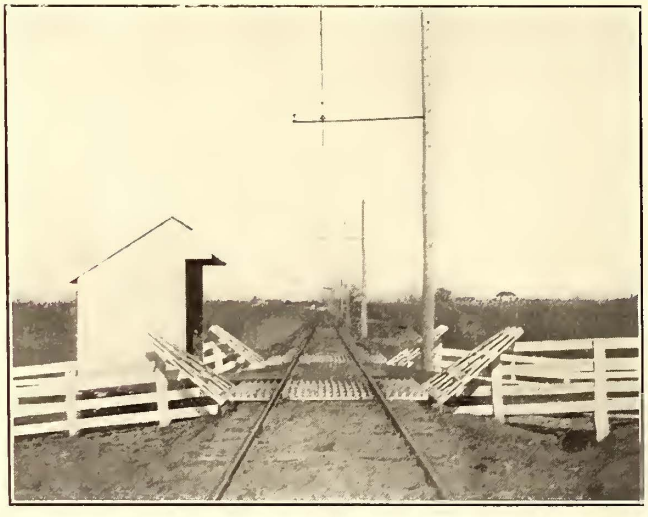
A combination car storage building and picnic pavilion has recently been erected. The building, which is provided with a concrete floor and latticed sides, is intended for the storage of cars during the winter. During the park season, however, it is utilized by club and Sunday school picnic parties, and it serves as a shelter in the event of showers. A new band stand and a refreshment stand have also been built.

THE OSKALOOSA-BEACON DIVISION OF THE OSKALOOSA-BUXTON ELECTRIC RAILWAY COMPANY, IOWA

The interurban line between Oskaloosa and Buxton, Ia., has been completed and is being operated to Beacon, a town of about 300 people located 3 miles south west of Oskaloosa. This short road has the distinction of being the first road in Iowa built with catenary construction. When the line is extended it is the intention to operate it with alternating current from a power house in Oskaloosa. The ultimate terminal of the road, Buxton, is a coal-mining town of about 6000 people, 18 miles distant from Oskaloosa, and it is owned outright by the company operating the mines in the vicinity. The proposed road will also pass through Lakonta and White City, two smaller mining towns, and several small mining camps.



STANDARD CAR OF THE BUXTON ELECTRIC RAILWAY COMPANY



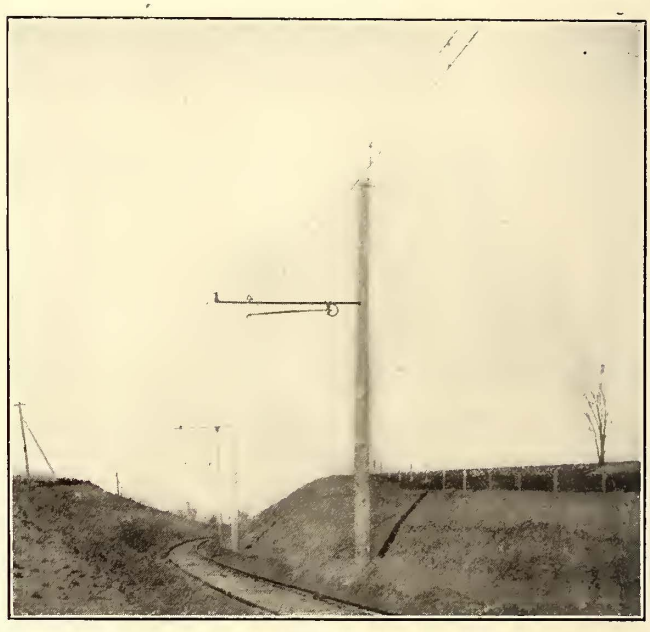
TYPE OF SHELTERS ERECTED AT ALL ROAD CROSSINGS ON THE OSKALOOSA-BEACON LINE OF THE OSKALOOSA & BUXTON ELECTRIC RAILWAY COMPANY

The Oskaloosa-Beacon line is built on private right of way 70 ft. wide. The roadbed, which is ballasted with cinders, contains one grade of about 2½ per cent 200 ft. long, but other than this the grades are all under 1 per cent. There is one 20-ft. cut on the line and several fills 10 ft. to 20 ft. high.

The rails are 70 lbs. and are in 30-ft. lengths. Cedar poles, 35 ft. long and spaced 100 ft. apart, carry only the bracket supporting the messenger. The poles are, however, of sufficient height to carry the high-tension wires to be installed when the line is extended. The trolley brackets are of angle iron with cast heads, into which the rods supporting the end are screwed. The trolley is of No. 000 grooved wire. It is placed 18 ft. above the rail and is suspended to the messenger at intervals of 10 ft. On curves the trolley is held over the center of the track by a steady strain at each bracket. The inner end of the steady strain is secured by a special insulator, which, in turn, is clamped to the angle iron bracket by a clevis bolt.

Power for the line is obtained from the power house of the Oskaloosa Traction & Light Company, in which two 200-kw units are installed. A single No. 0000 feeder extends from the power house to about the central point of the line.

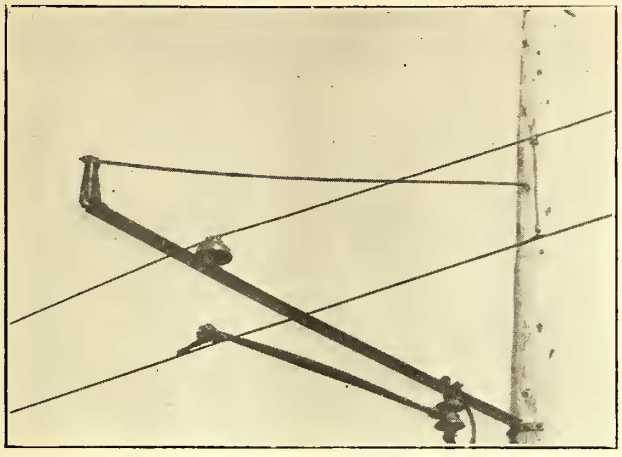
A forty-minute schedule is maintained with one car. The car is 41 ft. over bumpers, and is equipped with two Westinghouse 101 B motors and National air brakes. One extra car of smaller size is provided. The equipment is cared for in the shops of the Oskaloosa Traction & Light Company. The cash fare between terminii is 10 cents and the round-trip fare 15 cents.



CATENARY CONSTRUCTION ON CURVES ALONG THE OSKALOOSA-BEACON LINE

The road is operated in connection with the Oskaloosa Traction & Light Company, of which H. W. Garner is general manager. The construction work was done by the Engineering Construction & Securities Company, of Chicago.

The accompanying illustrations give a good idea of the interesting features of the system. Although the road has



ANGLE-IRON BRACKET AND STEADY BRACE ON THE OSKALOOSA-BEACON LINE

been in operation but a few months, its earnings have been such as to encourage extending it as originally planned.

OPENING OF THE ELECTRIFIED WEST SHORE BETWEEN UTICA AND SYRACUSE

Regular passenger service over the electrified division of the West Shore Railroad between Utica and Syracuse began on Sunday, June 16, but as a fitting preliminary, C. Loomis Allen, general manager of the Oneida Railway Company, made preparations for an inaugural trip on June 15. Invitations were issued, therefore, to a large number of prominent citizens in the towns along the line, to officials of affiliated railway companies, electrical apparatus manufacturers and representatives of the daily and technical press. Owing to the size of the party and to make the trip more convenient for the guests, it was found advisable to run one two-car train from Utica, in charge of Mr. Allen, and a similar train from Syracuse, in charge of Wm. J. Harvie, electrical engineer of the Oneida Railway Company.

The Utica party started at 9:40 a. m. from the company's headquarters and reached the city line at 10:01 a. m. The distance of 44 miles between the limits of Utica and Syracuse was covered in 69 minutes, but Frank Blume, who acted as motorman after Mr. Loomis gave up that position, showed the possibilities of the equipment by running a mile in 66 seconds. At Syracuse greetings were exchanged with the other party, and after a trip to the business center the party returned to Utica, stopping on the way, however, for an inspection of the sub-station at Clark's Mills. The weather was splendid and the trip proved very enjoyable. On reaching Utica, the guests were taken to Baggs' Hotel, where a fine luncheon was served to the combined parties by Mr. Loomis, as host.

Among those who were invited to this trip were C. E. Parsons, chief engineer of the Hudson River Electric Power Company; M. J. Brayton, general manager Utica Gas & Electric Company; S. Piek, superintendent Niagara, Lockport & Ontario Power Company; Paul T. Brady, of the Westinghouse Electric & Manufacturing Company; H. N. Ransom, of the General Electric Company; N. M. Garland, New York manager of the Ohio Brass Company; J. J. Stanley, viee-president of the Oneida Railway Company; A. L. Linn, Jr., general auditor of the Oneida Railway Company; Chas. H. Clark, engineer maintenance of way International Railway Company; M. J. French, engineer maintenance of way Utica & Mohawk Valley Railway Company; W. K. Vanderbilt, Jr.; James H. McGraw, of the McGraw Publishing Company and Street Railway Journal.

THE ROCK ISLAND GASOLINE CAR

The Rock Island Railroad has been operating between Stearcy and Higginson, Kan., a Sheffield gasoline motor car furnished by Fairbanks, Morse & Co., of Chicago. The line is one where the passenger traffic does not warrant the maintenance of a regular train schedule. The cost of operation is given as follows:

	Miles Per Gallon	Cost Per Gallon	Cost Per Mile
Gasoline	8	.15	1.8
Lubricating oil	60	.40	.6
Operator, per day	$2.50	...	1.4
Repairs	....	...	.15
			3.93

It is figured that if the car were operating on a basis of 180 miles, the actual cost per mile would come down to 3 cents.

The motor equipment consists of a four-cylinder Sheffield engine connected to a planetary transmission with meshed gears and a separate clutch for each speed. Now there are two speeds in each direction and the control of the car is considered very satisfactory. The car can be started from rest and run to maximum speed without throwing any severe strain on the engine. It is not necessary to tease the engine by throwing a friction clutch in and out.

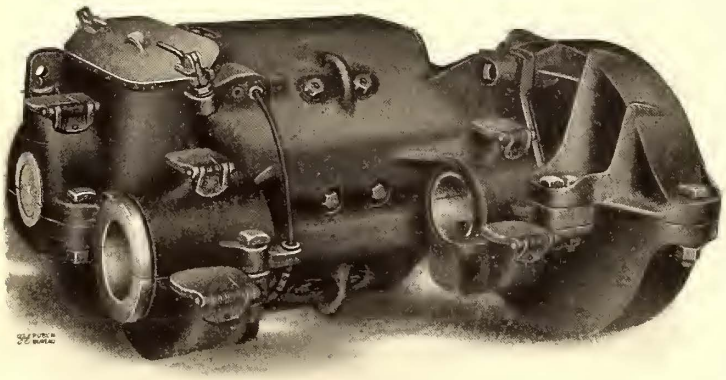
The car runs in either direction at the same speed, and has a controller at each end. All parts are readily accessible and interchangeable. The engine is mounted in one end of the car and radiators of ample size are located in either end under the car and protected by steel pilots. A water tank of sufficient size is furnished, and circulation by means of a vane pump keeps the cylinders cool. A 30-gal. tank of gasoline is furnished, good for a 240-mile run. There is an auxiliary tank for supplying the immediate wants of the engine, which, when the gasoline falls below a certain level, gives warning to fill the tank from the reserve store.

The car body is of steel and has a seating capacity of twenty-one people.

The Pacific Electric Company has petitioned the Board of City Trustees of Monrovia for the freight-carrying privileges of a "railroad with electric motive power" on its main line between the east and west city limits for a period of fifty years. In towns of less than 5000 a municipal permit is not necessary. The ordinance decrees that all switching must be done within the company's yards; only parcel freight can be moved from 6 o'clock a. m. to 8 o'clock p. m., and the cars used must be of the regular passenger type; lumber and other heavy freight, necessitating flat or box cars, may be moved only between 8 p. m. and 6 a. m. An exception was made of company construction and repair material, which may be hauled at any time. Action has been deferred by the city until objecting property owners in the vicinity are given a hearing.

GENERAL ELECTRIC COMMUTATING POLE RAILWAY MOTORS

Commutating pole motors have been used for a long time in stationary work, but up to within recently no attempt has been made in this country to employ this design for railway service. Within the last few months, however, several large orders have been taken by manufacturers in this country for motors fitted with commutating poles, and the General Electric Company is now prepared to supply them in six different sizes, varying in output from 50 hp to 200



EXTERIOR OF NO. 204 COMMUTATING POLE MOTOR

hp. These motors are called GE-202, GE-204, GE-205, GE-206, GE-207 and GE-208, arranged in order of size. The principal advantage claimed is practically sparkless commutation even on heavy loads, lower magnetic densities and smaller core loss. At present these motors are being wound for 600 volts as standard, and have a liberal margin of safety at this voltage. One of these motors was exhibited at the Columbus convention, but although there has been a great deal of speculation as to the construction of these machines, information has only just been made public.

The two smallest motors, namely, the 202 and the 204, are constructed with a split frame designed to allow the bottom part to be swung down into a pit for inspection or renewal of parts. The largest motors are of the box frame type with large bored openings at each end through which the armature can be inserted or removed. The general construction of both types is similar to that employed in the standard motors, the chief point of difference lying in the addition of commutating poles.

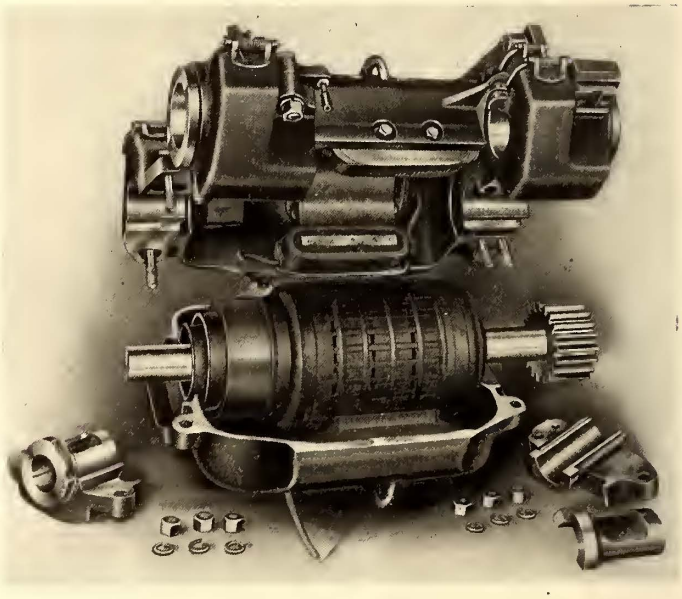
The commutating poles, located between the main exciting pole pieces, are connected up with their windings in series with one another and with the armature. The magnetic strength of the commutating poles varies, therefore, with the current through the armatuure, and a magnetic field is produced of such intensity as to reverse the current in the armature coils short-circuited during commutation. The pole pieces are so proportioned and wound as to compensate for armature reaction and practically insure nonflashing and sparkless commutation up to the severest overloads. As the magnetizing current around the commutating poles is reversed with the armature, the poles perform their functions equally well in whichever direction the motors are running.

Due to the remarkably good commutating characteristics of the motors, a more rugged form of motor is obtained which is less subject to injury through careless handling by motormen than the present standard railway motor. This fact is of importance on heavy grades or where cars are provided with equipments geared for high-speed work, and at the same time are required to stop and start frequently in cities. If for electric locomotives or other special applications forced ventilation is used, high continuous outputs can be obtained from these motors, as the current input can be considerably increased without commutation difficulties occurring, the heating of the motor being kept within normal limits by the increased ventilation, which may be effected by means of a blower.

As will be seen, the main exciting pole pieces are bolted to the frame at an angle of 45 degs. to the horizontal, while the comutating pole pieces are bolted to the frame at points midway between the exciting poles. Small holes fitted with malleable iron covers and gaskets are provided at both ends of the motor for inspection or ventilation whenever service conditions will permit.

With the box type of frame the main exciting pole pieces are located at the top, bottom and sides with the commutating poles between. In both types of frame the opening over the commutator is inclined at an angle to allow the brush-holders being readily reached either from under the car, or if desired, through a trap door in the floor of the car. All bearings are designed for oil and waste lubrication.

In addition to the advantages of sparkless commutation, the manufacturers claim these motors have less wear on the commutator, increased life of brushes, they are cleaner and more reliable because of the reduced carbon and copper dust



COMMUTATING POLE MOTOR WITH FRAME LOWERED AND ARMATURE IN LOWER HALF

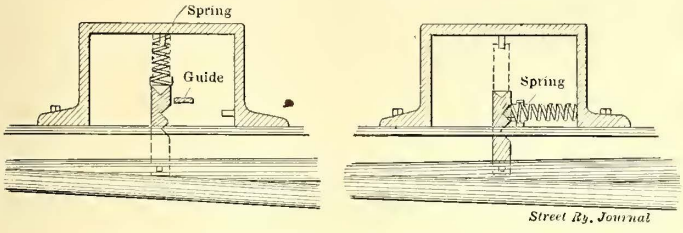
from brushes and commutator, and they have increased efficiency and free running capacity, because of lower core and commutator losses.

The capacities of these motors for continuous service are high owing to their good electrical efficiency and ventilation. No announcement is made by the manufacturers of any voltage for these motors higher than 600.

The Brooklyn Rapid Transit Employees' Association has decided to co-operate with the railroad company in caring for members retired on a pension by paying their association dues.

NEW ANTI-STRADDLING DEVICE

A variation from the usual form of anti-straddling devices for switch tongues has recently been devised by Alfred Oldfield, lately engineer of the Winnipeg Electric Railway Company. A horizontal link is attached to the base of the tongue near its point and slides, with the movement of the tongue, in guides in a switch box. In the side of this link are two notches which engage with a spring detent

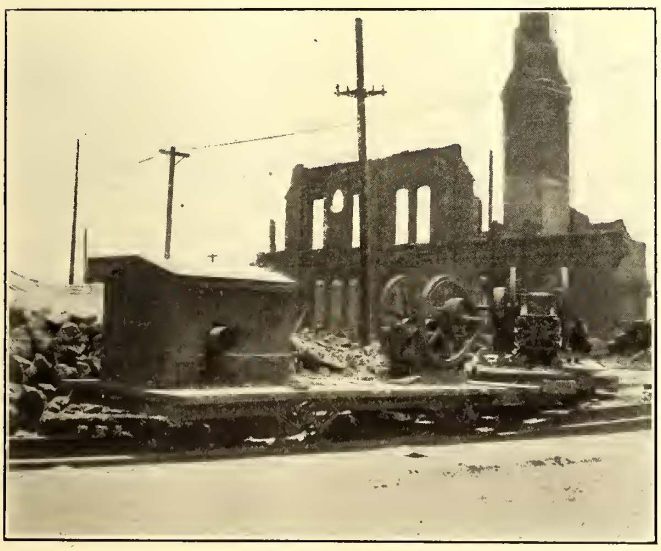


ANTI-STRADDLING DEVICE FOR SWITCH TONGUES

enclosed in the box. The spring detent holds the tongue on either side, as shown in the right-hand drawing, but does not prevent the tongue from being thrown over with a switch iron. If a spring switch is desired, the spring is moved from the side to the end of the lever, as shown in the left-hand drawing. The device is in use in Winnipeg.

TRACK BALLASTING IN SAN FRANCISCO

In equipping its principal cable roads with the overhead trolley system, the United Railroads of San Francisco decided to use for reballasting the lines the concrete torn up when the bed and iron braces of the cable roads were removed, and in this work is using several ballasting machines, which consist of small rock crushers mounted on platform cars, the crushers being operated by electricity from the trolley wire. The shattered fragments of con-

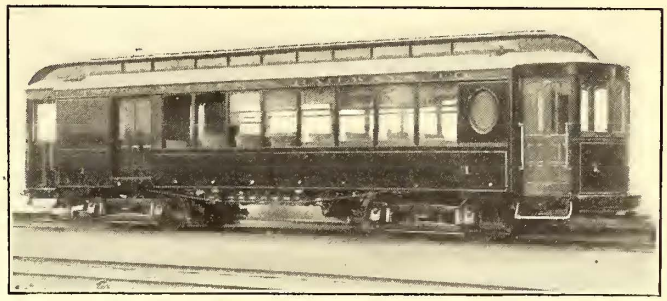


FLAT CAR EQUIPPED WITH CRUSHER FOR BALLASTING

crete, broken stone, etc., are tossed into the hoppers of the crusher and are very quickly reduced to small pieces, the crushed material falling between and on either side of the tracks, where it is rapidly spread by the ballasters. The cars on which the crushers are mounted are moved forward as rapidly as the work progresses. While the idea of the portable crusher is not new, its use in this particular instance and way is novel, and is of interest, especially as it has helped greatly to dispatch the reconstruction work.

INDIANA COUNTY RAILWAY SYSTEM IN OPERATION.

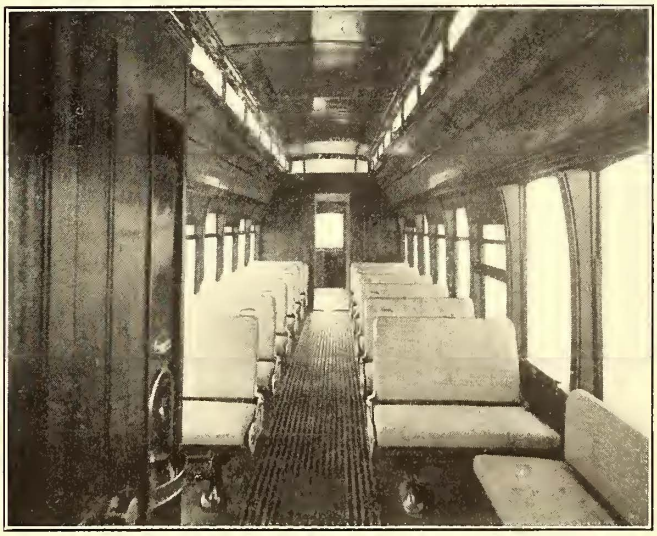
The combination passenger and baggage car, of which an illustration is presented, was the first car to be operated on the new Indiana County railway system, which is con-



EXTERIOR OF COMBINATION CAR FOR INDIANA COUNTY RAILWAY

trolled by the Jefferson Traction Company, which also operates the railway lines in Punxsutawney. Only 6 miles of track are laid at present on the new line, namely, from Indiana, which is about 30 miles south of Punxsutawney and 50 miles east of Pittsburg, to Ernest and Creekside. Fifteen miles have been graded from Indiana to Clymer, where connections will be made with the Pennsylvania Railroad and New York Central Railroad. The other proposed route, which it is expected will be graded this summer, is from Indiana to Blairsville, 16 miles due south.

The type of car shown, which was furnished by the J. G. Brill Company, is an excellent example of a straight-sided, grooveless post, semi-convertible car, and resembles in many respects the semi-convertible coaches which are doing service in Punxsutawney. It measures 34 ft. 4 ins. over the end panels and 43 ft. 9 ins. over the crown pieces and vestibules, and the width over sills, including sheathing, is



INTERIOR OF COMBINATION CAR FOR INDIANA COUNTY RAILWAY

8 ft. 6 ins. The side sills are 4 in. x 7¾ in.; end sills, 5¼ in. x 6⅞ in. Sill plates are 15 in. x ⅜ in. The baggage compartment is 9 ft. 2 ins. long. The passenger compartment is finished in cherry with birch ceilings. Other features in this compartment, including the saloon, are shown in the illustrations. The trucks are the No. 27-E1 with 6-ft. wheel-base. Four 45-hp motors are installed to each car. The weight of car, including trucks and complete electrical equipment, is 48,700 lbs.

EXHIBITS AT ATLANTIC CITY

In addition to the manufacturers named in these columns last week, the following firms were exhibitors and had representatives on the Steel Pier, Atlantic City, in connection with the American Railway Master Mechanics and Master Car Builders conventions:

AMERICAN AUTOMATIC VENTILATOR COMPANY OF NEW YORK—A pleasant feature of the convention was the trip arranged by the American Automatic Ventilator Company, of New York, on Saturday. A party made up of a number of the delegates with several newspaper representatives traveled to Philadelphia by the Reading Railroad on a special car which was equipped with automatic ventilators. Lunch was served to the party at the Bellevue-Stratford, and the party returned to Atlantic City in time to attend the ball game in the afternoon. In addition the company exhibited on the exhibition tracks a train of Pennsylvania cars equipped with automatic ventilators, and was also represented in the steel car of the New York Central Railroad, built by the St. Louis Car Company. Among those in attendance at the convention were Ross Taylor and George H. Ford.

THE ST. LOUIS CAR COMPANY, of St. Louis, Mo., was represented at the convention by two cars which were shown on the exhibit tracks of the Reading Railroad at Mediterranean and Virginia Avenues. One of these cars was for electric service the other for steam. The former was one of the steel cars which the St. Louis Car Company is building for the direct-current zone of the New York Central; the latter was a handsome dining car constructed for the American Palace Car Company.

THE GOLDSCHMIDT THERMIT COMPANY, of New York, had an exhibit on the steel pier at which were shown samples of sections of locomotive frames, rails, wrought iron pipes and other specimens of its work. The company also made demonstrations at the exhibit tracks every afternoon during the convention. The representatives present were A. M. Guenther and W. R. Hulbert, who had an attractive souvenir. It was in the form of a stick pin representing a thermit crucible.

THE WALTER H. FOSTER exhibit of the Landis Machine Company included a 2-in. double head bolt-threading machine and a Lassiter stay-bolt threading and reducing machine with four spindles. In addition to Mr. Foster the company's interests were looked after by B. D. Jackson and G. R. Willis.

THE BICKFORD TOOL & DRILL COMPANY, of Cincinnati, Ohio, showed a three-speed 4-ft. drill, size No. 1, motor-driven. The company was represented by H. M. Norris.

THE GARVIN MACHINE COMPANY, of New York, had on view a No. 14 motor-driven plane miller, a No. 2 universal miller, a die slotter, a No. 2 automatic tapper, a No. 22 vertical miller, and a No. 14 vertical spindle miller. The company's representatives were George J. Thompson and H. R. Garvin.

J. H. WAGENHORST & COMPANY, of Youngstown, Ohio, showed their well-known blue printing machine in care of Donald Parson.

THE KALAMAZOO RAILWAY SUPPLY COMPANY, of Kalamazoo, Mich., had a fine exhibit of Root scrapers, Moore track drills, Kalamazoo velocipede and hand-car wheels, etc. F. N. Root was in charge.

THE JOSEPH DIXON CRUCIBLE COMPANY, of Jersey City, N. J., had a handsomely equipped pavilion, where it exhibited a wide line of its graphite specialties. C. H. Spotts, L. H. Snyder, J. J. Tucker, H. A. Nealley, W. A. Houston, A. C. Bowles and R. A. Brown represented the company.

THE McCONWAY & TORLEY COMPANY, of Pittsburg, presented an extensive array of couplers and showed its draft gear as applied to car framing. The merits of the apparatus were explained by E. M. Grove, William McConway, Jr., H. C. Buhoup, I. H. Milliken, S. C. Mason and G. W. McCandless.

THE LANDIS TOOL COMPANY, of Waynesboro, Pa., was represented by T. H. King, who explained the merits of his company's No. 16 gap grinder and a 1½-in. universal grinding machine.

THE CHICAGO PNEUMATIC TOOL COMPANY, of Chicago, had a very elaborate display of electric and pneumatic hoists and drills, compressors, etc. Thomas A. Aldcorn was in charge, and during the week J. W. Duntley, president, and W. O. Duntley, vice-president of the company, were also present, together with several works managers and sales agents.

THE KEYSTONE LUBRICATING COMPANY, of Philadelphia, was represented by C. A. Hopper and A. C. Buzby, president and general manager. Mr. Hopper was in charge of the exhibit, which consisted of Keystone grease and model machinery showing the use of Keystone lubrication.

THE UNION SPRING & MANUFACTURING COMPANY, of Pittsburg, showed locomotive and car springs, pressed steel spring plates and journal-box lids. Its representatives were A. M. McCrea, L. G. Woods, C. S. Foller and T. B. Arnold.

THE WATSON-STILLMAN COMPANY, of New York, exhibited hydraulic jacks, rail benders, crank pin presses, bar straighteners and wheel presses. George L. Gillon and E. A. Johnson were the representatives.

THE WEST DISINFECTING COMPANY, of New York, showed a fine line of disinfecting materials and appliances, such as chloro-napthaleum, liquid soap, Taussig fumigating lamps, etc. E. Taussig and C. A. Ekstromer represented the company.

THE STOEVER FOUNDRY & MANUFACTURING COMPANY, of Myerstown, Pa., showed a pipe bending and a pipe threading machine in charge of Ralph McCarty, E. R. Euston and A. A. Schaefer.

H. B. UNDERWOOD & COMPANY, of Philadelphia, had a portable boring bar outfit and a portable rotary planer. A. D. Pedrick, C. O. Ralph and F. E. Emery represented the company.

THE AMERICAN STEAM GAUGE & VALVE MANUFACTURING COMPANY, of Boston, presented Thompson indicators, pop safety valves, steam gages, gage testers, etc. R. B. Phillips, G. Cornett, C. A. Allen and Horace Parker represented the company.

THE ANGLO-AMERICAN VARNISH COMPANY, of Newark, N. J., distributed samples of material and advertising matter through William Marshall and F. W. Fort.

ARMSTRONG BROS. TOOL COMPANY, of Chicago, had a line of lathe and planer tool holders, ratchet drills, tool posts, boring bars, etc. The representatives were Paul Armstrong and John McBride.

AMERICAN STEEL FOUNDRIES, of Chicago, had a large variety of bolsters, wheels, frames and other truck parts, together with couplers for freight and passenger service. Among those looking after the company's interests were W. V. Kelley, R. P. Lamont, W. W. Butler, G. E. Slaughter, D. T. Kelley, G. E. Murray, T. E. Crook, W. F. Schults, I. S. Andrews, D. W. Coll, P. J. Kalman, J. S. Smith, H. P. Shaw, J. R. Stuart, E. H. Bauer, W. E. Fowler, Jr., R. H. Ripley, W. R. Gravener, F. B. Ernst and G. G. Floyd.

THE AMERICAN MASON SAFETY TREAD COMPANY, of Boston, showed numerous varieties of its tread as applied to different conditions. H. C. King and L. H. Myrick were on hand.

THE BALDWIN STEEL COMPANY, of New York, had for inspection a number of Hudson high-speed tools, twist drills, reamers, milling cutters, together with high-speed steels, tool steels, etc. It was represented by C. F. Simmons, J. A. Collom, Edward Milnor and W. L. Stone.

THE LODGE & SHIPLEY COMPANY, of Cincinnati, showed a 24-in. standard engine lathe driven by a 10-hp motor. R. D. Betts and R. G. English were in charge of the exhibit.

THE AMERICAN LOCOMOTIVE COMPANY was represented by W. H. Marshall, H. F. Ball, G. M. Basford, J. D. Sawyer and F. J. Cole.

THE CARBORUNDUM COMPANY, of Niagara Falls, N. Y., had a full array of carborundum specialties. E. J. Eames, W. W. Sanderson, R. B. Fuller, C. C. Schumaker, Charles Nicholson and C. O. Taylor were on hand.

THE CLING SURFACE COMPANY, of Buffalo, N. Y., was represented by W. D. Young and C. F. Chase.

THE COMMERCIAL ACETYLENE COMPANY, of New York, showed its acetylene safety storage method for signal and car lighting, headlights, lamps and other railway appliances. W. P. Hix, R. J. Faure, Oscar F. Ostley and C. N. Neilson cared for the company's interests.

S. F. BOWSER & COMPANY, INC., of Fort Wayne, Ind., were represented by C. A. Dunkelberg, N. T. Simpson and W.

A. Pitcher, who discoursed on the merits of the company's hand and power oil pumps and storage cabinets.

THE BRIDGEPORT SAFETY EMERY WHEEL COMPANY, of Bridgeport, Conn., had a motor-driven 80-in. guide bar grinder, motor-driven tool grinder and various grinding wheels.

THE BUDA FOUNDRY & MANUFACTURING COMPANY, of Chicago, made a prominent exhibit of hand-car wheels, track drills, grinders, jacks, replacers, etc. T. J. Stocks and W. R. Burrows represented the company.

THE FLEXIBLE COMPOUND COMPANY, INC., of Philadelphia, illustrated by tests the advantages of its flexible compounds, flexible black enamels, etc. Thos. H. Downward and S. F. Osbourn were on hand.

THE FOX MACHINE COMPANY, of Grand Rapids, Mich., exhibited the Fox heavy pipe cutter, Thomas core box machine, mitering machine, milling machine, universal wood trimmers, adjustable saw dado, etc. The company was represented by George Schow and S. O. Livingston.

THE DRESSEL RAILWAY LAMP WORKS, of New York, had an attractive display of headlights, signal and marker lamps. The representatives were F. W. Dressel, Robert Black, F. W. Edmunds, H. S. Hoskinson, J. M. Brown and E. W. Hodgkins.

THE ELECTRIC STORAGE BATTERY COMPANY, of Philadelphia, had an exhibit of car lighting batteries and other types, one being for electrified steam railroads. E. L. Reynolds, Chas. Blizzard, E. H. Hunt, A. Taylor and Robert Hull.

THE HESS-BRIGHT MANUFACTURING COMPANY, of Philadelphia, was represented by Henry Hess, who showed a complete axle and wheels mounted on ball bearings.

THE KINNEAR MANUFACTURING COMPANY, of Columbus, Ohio, illustrated the principle of its well-known rolling doors. F. B. Billhcimer and F. C. Schmidt were on hand.

THE LANDIS MACHINE COMPANY, of Waynesboro, Pa., had a 2-in. double-head bolt-cutting machine, dies, etc. J. G. Benedict and H. L. Fisher represented the company.

EDWIN HARRINGTON, SON & COMPANY, of Philadelphia, showed the Peerless spur gear hoists, screw hoists, travelers and stay-bolt threading machine. W. J. Somerset, E. Van Note and J. A. Slaughter were on hand.

THE PENN STEEL CASTING & MACHINE COMPANY, of Chester, Pa., was represented by W. S. Bickley and T. Burd Zell, and showed high-pressure steam valves, etc.

THE CLEMENT RESTEIN COMPANY, of Philadelphia, showed, through Norman Miller, steam hydraulic packings.

THE RIVERSIDE METAL COMPANY, of Riverside, N. J., had a display of white metal, german silver, phosphor bronze, nickel castings, etc. The representatives were W. P. McGlynn, H. W. Berroth, L. J. Kane and W. K. McGlynn.

JOHN LUCAS & COMPANY, of Philadelphia, Pa., had a number of comical mirrors for amusement in addition to a display of their coach colors for instruction. The representatives were W. C. McMullin, E. W. Storey and H. A. Clark.

THE MERCHANT & EVANS COMPANY, of Philadelphia, exhibited their Star ventilators and samples of babbitt metals. W. C. Thomas was on hand.

The V. O. LAWRENCE COMPANY, of Philadelphia, which makes the anti-waste grabber and Filson folding vestibule trap, was represented by V. O. Lawrence and N. P. Lane.

JOHN R. LIVEZEY, of Philadelphia, showed granulated and sheet cork for cold storage work and refrigerators, asbestos air cell coverings for steam and exhaust pipes, models of cold storage construction and hard pressed cork for electrical insulation. He was assisted by Harry E. Souder.

A. O. NORTON, INC., of Boston, showed a line of bridge, journal and car jacks in care of H. A. Norton, J. O. St Pierre, B. B. Terrill, F. L. Gormley, F. M. Twombly, A. O. Norton and C. G. Erickson.

THE OIL WELL SUPPLY COMPANY, of Pittsburg, was represented by Joseph C. Bruff, who exhibited railroad globe and angle valves.

THE PANTASOTE COMPANY, of New York, which was represented by John H. High and D. E. Bonner, showed samples of car seats and curtains.

THE STANDARD PAINT COMPANY, of New York, showed ruberoid types of roofing for cars and buildings, insulating papers, Ruberine varnishes, P & B insulating tapes, etc. J. N. Richards, J. H. Thomas, C. Earnshaw, B. C. Beckman, J. G. Satterthwait and E .F. Vandewater were among the company's representatives.

THE STANDARD STEEL WORKS, of Philadelphia, showed a line of forged and rolled steel wheels as well as steel-tired wheels. The company was represented by E. S. Lewis, H. DeH. Bright, F. Carpenter, C. Ridell, E. B. Halsey, H. W. Sheldon and W. P. Evans.

THE RUBBERSET BRUSH COMPANY, of Newark, N. J., had a line of paint and varnish brushes in care of A. L. Holtzman and T. B. Denton.

THE SHELBY STEEL TUBE COMPANY, of Pittsburg, Pa., made its seamless tube exhibit especially interesting. Seventeen seamless steel locomotive bells were each tuned differently and electrically played. H. S. White, H. A. Flagg, J. E. Minetree and C. H. Wood represented the company.

THE BALDWIN LOCOMOTIVE WORKS, Philadelphia, had a booth where visitors were welcomed by Charles Ridell, Chicago; Wm. Vollmer, Philadelphia; E. B. Halsey, St. Louis; H. W. Sheldon, H. DeH. Bright, Philadelphia, and W. P. Evans.

THE AMERICAN BLOWER COMPANY, of Detroit, Mich., presented an interesting exhibit in its booth 229-231. The working model of the A .B. C. "Moist Air" dry kiln showed the method of drying lumber without damage to the product. A complete line of fans—both steam and motor-driven—applicable to any service where air is to be moved, were shown, and the new vertical fully enclosed self-oiling high-speed engine of the "A" type designed to run for long periods without attention. The company was represented by C. W. Old and R. B. Bedford.

THE DEARBORN DRUG & CHEMICAL WORKS, of Chicago, had an exhibit displaying the qualities of their water-purifying preparations. Attending the convention were Robt. F. Carr, vice-president and general manager; George R. Carr, assistant general manager, Chicago; D. E. Cain, manager Denver office; H. G. McConnaghy, New York office, and Frank Demler, of the Philadelphia office.

THE MODOC SOAP COMPANY, of Philadelphia, had an exhibit of Perfectol car and locomotive cleaner, and also gave daily demonstrations on the exhibit tracks.

THE WELLS LIGHT MANUFACTURING COMPANY, New York, was represented by G. H. E. Robinson and Howard Manahan.

THE DUFF MANUFACTURING COMPANY, Pittsburg, showed a complete line of Barrett jacks, Barrett geared ratchet jacks, Duff crane roller and ball-bearing jacks in chage of T. A. McGinley and George A. Edgin.

McCORD & COMPANY, of Chicago, showed a line of locomotive and automobile lubricators, besides the McCord journal box, McCord draft gear, copper gaskets and the Gibraltar bumping post.

BAEDER, ADAMSON & COMPANY, of Philadelphia, showed their line of glue, curled hair, sand and emery papers, emery cloth and garnet paper and hair felt.

THE ADAMS & WESTLAKE COMPANY, of Chicago, showed an Adlake-Newbold axle-lighting equipment in operation, together with an elaborate display of car interior lighting fixtures. The Adlake acetylene lighting system was also shown, with signal lamps and lanterns, car hardware and trimmings. The company was represented by F. B. Jones, E. L. Langworthy, R. M. Newbold, F. N. Grigg and A. S. Anderson.

THE GOLD CAR HEATING COMPANY, New York, showed a complete steam and hot water system in operation for car heating and also its hydro-carbon system of car lighting. Messrs. Ward, Gold, Robbins, Ivers, Weir, Kitchen, Voges, Baumbaugh, Stosks, Feldes and Wilson were in attendance.

RICHARD DUDGEON, of New York, showed a complete line of jacks and pumps. Manager J. W. Nelson was in charge.

THE ROSTAND COMPANY, of Milford, Conn., represented by F. A. Barbey and P. N. Landine, showed five types of the McCarthy baggage rack.

THE NERNST LAMP COMPANY'S lamps were used to light the reception room of the Westinghouse space. For this purpose there was one of its new ceiling type six-glower lamps as a center piece. This lamp is an ingenious modification of the standard six-glower indoor lamp to fit against a ceiling serving as fixture and lamp. Fitted with a large holophane hemisphere its distribution is all that can be desired. This is surrounded by six of the new one-glower 110-watt, 115-cp. lamps just put on the market. The four three-glower lamps lighting the ends of the space differed from the standard a. c. lamps somewhat in appearance. All the lamps for lighting this space are d. c. lamps. This company also had an exhibit showing standard indoor lamps such as are used for offices, shops, stations, warehouses, etc., and outdoor lamps for various places.

THE COOPER HEWITT LAMP COMPANY'S exhibit was in the Westinghouse space. This consisted of four small and two large lamps, all in service for lighting the machinery space of the Westinghouse exhibit. It attracted considerable attention by reason of the peculiar form of lamps and quality of the light. The consumption of energy is less than one-half that of d. c. arcs for the same light, and the lamp requires no renewals except at intervals of several thousand burning hours, therefore, where current is not below ordinary costs it is a money saver. A substitution of these lamps for arcs in cases of "overloaded plant" is often found to be worth the price of the lamps, and its adoption on new work has frequently effected a saving sufficient to more than cover the first cost, to say nothing of lower operating cost or better light. It is doing good work for lighting railroad shops at surprising heights, 40 ft. to 60 ft. over traveling cranes not being unusual.

OFFICERS OF A. R. M. M. & M. C. B. ASSOCIATIONS

The election of officers at the meeting of the American Railway Master Mechanics' Association last week resulted as follows:

President, William McIntosh, Central Railroad of New Jersey.

First vice-president, H. H. Vaughan, Canadian Pacific Railroad.

Second vice-president, G. W. Wildin, Lehigh Valley Railroad.

Third vice-president, F. H. Clark, Chicago, Burlington & Quincy Railroad.

Executive members, C. A. Seley, Chicago, Rock Island & Pacific Railroad; F. M. Whyte, New York Central Railroad; A. E. Mitchell, New York, New Haven & Hartford Railroad.

On June 19 the following gentlemen were elected officers of the Master Car Builders' Association for the coming year: President, G. M. Dow, Lake Shore & Michigan Southern Railroad; first vice-president, R. F. McKenna, Delaware, Lackawanna & Western Railroad; second vice-president, R. W. Burnett, Canadian Pacific Railroad; third vice-president, T. M. Ramsdell, Chesapeake & Ohio Railroad.

The executive committee consists of six, of whom the following were elected this year: D. F. Crawford, Pennsylvania Railroad system; T. H. Curtis, Louisville & Nashville Railroad, and F. H. Clark, Chicago, Burlington & Quincy Railroad. The following gentlemen hold office from last year: J. F. Walsh, Chesapeake & Ohio Railroad; S. N. Hibbits, Lehigh Valley Railroad, and F. P. Hyndman, New York, New Haven & Hartford Railroad.

ENTERTAINMENTS AT THE CONVENTION

An elaborate program of entertainments was provided at Atlantic City for convention week. It included balls, concerts, vaudeville entertainments, progressive euchre parties and the annual baseball game between nines representing the supply men in the East and the West. All were well attended and proved very acceptable. While it would be difficult to discriminate, perhaps the vaudeville entertainment, given in the ballroom on the Steel Pier on Monday evening, June 17, was the most popular. It was followed by a three-act farce entitled "Arabian Nights," and later by informal dancing. The remarkable aggregation of talent was a pleasant surprise to all, and it is evident that the members of the association and supply members comprise a number of talented actors and actresses. Their efforts were highly appreciated by a large audience.

MILWAUKEE MERCHANTS FAVOR FROST FRANCHISE

The members of the Merchants & Manufacturers' Association, of Milwaukee, have voted unanimously in favor of urging the Common Council to pass the Chicago & Milwaukee Electric Railway Company's franchise ordinance over the veto of Mayor Becker. No official announcement of the action taken by the association has been given out, the communication having been sent to the city clerk in a sealed envelope which will remain unopened until the Council meets. President A. C. Frost, of the Chicago & Milwaukee line, was in the city last week, and appeared before the association before that body had decided to present its recommendations to the Aldermen. It has been argued by those who are opposed to the so-called "exclusive" franchise that the proposition advanced by President Frost in his request for the use of Wells Street as far east as Second is not an unreasonable one. For the rights on three additional blocks, he is giving up his privileges on sixteen other blocks, and has agreed to make traffic arrangements with other roads entering the city on Wells Street in exchange for reciprocal rights on their lines. These arguments were presented to the Merchants & Manufacturers' Association by Mr. Frost.

INLAND EMPIRE COMPANY COMPLETING NEW LINK IN SYSTEM

Simultaneous with the inauguration of the summer train schedule on the Coeur d'Alene division of the Inland Empire system the new extension of the line to Liberty Lake will be opened. The Coeur d'Alene division has 42 miles of track, the extension from Liberty Lake junction on the main line to the lake being a fraction over 2 miles. The new summer schedule provides for eleven trains to Liberty Lake, the first in the morning leaving Spokane at 6 o'clock, and going direct to the lake. All other Coeur d'Alene trains connect at Liberty junction up to the 6 p. m. train, with the exception of the Shoshone Flyer. Saturdays and Sundays an extra will leave Spokane at 7:30 p. m. direct for the lake.

Two new trains will be added in either direction between Spokane and Coeur d'Alene, one in the morning and one in the afternoon, thus making practically an hourly service. The morning trains will leave Spokane at 6:30, 8:00, 9:00 (Shoshone Flyer), 10:00, 11:00 a. m.; 1:10, 3:00, 4:25, 5:00, 6:00, 7:00, 11:20 p.m., and on Saturday and Sunday nights an extra at 9 o'clock. The 4:25 afternoon train will be known as "The Campers' Limited," and will make but three stops, Liberty Lake junction, Spokane Bridge and Post Falls, and will run through from Coeur d'Alene to Hayden Lake. Three new depots are under construction at Liberty Lake, Liberty Lake junction and at Dalton Gardens on the Hayden Lake division. The type of structure being followed on the Coeur d'Alene division is similar to the depot recently erected at Hayden Lake, which is of Swiss chalet style, with long umbrella sheds. Two miles of the new double track are completed and in use, and it is expected the remaining 4 miles of the 6 miles between Spokane Bridge and Greenacres will be ready by July 1.

NEW MEXICAN ROAD PROPOSED

It is reported that Dr. J. W. Lim, of Torreon, Mexico, one of the stockholders of the Banco de China y Mexico, and other wealthy Chinamen of Torreon and Northern Mexico, have just secured from the State government the right to build and operate an electric line between Torreon and Matamoros, Coah., a city about ten kilometers from Torreon and situated in the heart of the cotton-producing country of Mexico, known as the Laguna district. Matamoros has a population of about 500 people. The doctor says that the machinery has been ordered from the United States and that the work will begin at a very early date. The engineering is now being done by Lineberg & Rone, a local engineering firm of Torreon.

LEGAL DEPARTMENT*

REASONABLE REGULATIONS AS TO TRANSFERS

The First Appellate Division of the New York Supreme Court has recently decided two cases which liberally recognize the discretionary power of street railways to regulate the issue of transfers. The first decision was by a unanimous court, and there ought to be no dispute among just and reasonable people as to the propriety of the court's determination. It was held (Ketchum v. New York City Railway Company, March, 1907, 103 N. Y. Supp. 486) that a regulation, posted conspicuously and advertised so as to bring it to the notice of the public generally, that passengers would be required to demand transfers at the time of paying fares is reasonable and valid and that a company would not be liable to the penalty prescribed by section 105 of the Railroad Law for refusal to give a transfer where a passenger had neglected to apply for it when paying his fare. The rule is so obviously a fair one that it seems scarcely necessary to quote from the argument of the court. It may not be amiss, however, to give the following brief extract containing the practical gist of the reasoning:

"The evidence shows, and common experience verifies the fact, that at certain hours the defendant's cars are very crowded, and it would be imposing upon the conductors an impossible task to require them to carry in memory every passenger to whom has been given, in the course of a long trip, a transfer, and, although in a given case a conductor might be quite sure that he had given a transfer to a demanding passenger, the heavy penalty imposed by the railroad law in case of refusal, with the impossibility of producing any proof beyond his own recollection, would make it very hazardous to refuse to give a transfer upon demand. If, therefore, the statute must be so construed as to entitle a passenger to demand and receive a transfer at any time during his trip, the company would be practically powerless to protect itself against repeated demands by the same passenger. It does not in our opinion require such a construction, and we consider that it is reasonable to make a rule fixing upon a definite point in each trip when the right to demand a transfer shall be exercised."

The other decision was in Kelly v. New York City Railway Company (May, 1907, New York "Law Journal," June 13, 1907). It was therein held that the regulation of the defendant street railway company for the issue of transfers and permitting the use thereof only in the same general direction of a passenger's initial trip is a reasonable one and does not violate section 104 of the Railroad Law, requiring when street surface railway companies have entered into a contract of consolidation or co-operation that "every such corporation shall * * * give to each passenger paying one single fare a transfer entitling such passenger to one continuous trip to any point or portion of any railroad embraced in such contract, to the end that public convenience may be promoted by the operation of the railroads embraced in such contract substantially as a single railroad with a single rate of fare." The propriety of this decision is not as clear as was that of the other; indeed, two members of the court dissent. The practical positions taken may, perhaps, best be shown by the following tangible illustrations suggested respectively in the prevailing and the dissenting opinions:

"Suppose, for instance, that we are at Union Square and desire to go to the Fifth Avenue Hotel opposite Madison Square. The Boadway cars will take us directly past the hotel by traveling a few blocks, and every consideration of public convenience is served by that line. But we could take a Fourth Avenue car to Forty-Second Street, thence by another car to Broadway, and down Broadway to the Fifth Avenue Hotel, thus making a circuitous route. If the plaintiff's construction of the statute is right, this supposititious case could be complicated by a great variety of transfers. This does not embrace any element of public convenience. It would be merely an indulgence of an individual desire to ride rather than a purpose to make one continuous trip between such points.

"A large portion of the population in the city of New York resides on either side of Central Park, which extends from Fifty-Ninth Street to 110th Street, and the only car line which the defendant has running through such park is at Eighty-Sixth Street, so that there is no way by which persons residing on either side of such park can get to the other side, if they live north or south of Eighty-Sixth Street—traveling by defendant's railway—except by going partly in one direction and then partly in a reverse direction. Thus, if A lives at Seventy-Ninth Street and Broadway and desires to go to Seventy-Ninth Street and Madison Avenue, he must take a car and go south, then transfer east and go north, or else take a car and go north, transfer east and go south, and to say that he is not entitled to such transfer is to nullify the statute by destroying the very object sought to be accomplished by it."

This latter decision was by an intermediate court of appeal, and whether it will be sustained by the court of last resort it is, of course, impossible to say. It seems, however, not improbable that what is apparently the only method of preventing a passenger from riding all day and in all directions for the sum of 5 cents will be judicially ratified as a reasonable rule, notwithstanding the unquestionable force of the consideration that a passenger sometimes is required to travel in a direction opposite to that first taken in order to complete a legitimate, definite trip. The action of the Court of Appeals in an earlier case in denying the right to recover cumulative penalties, in spite of the language of a statute and its own former decisions, indicates that broad views of reasonableness and justice may lead to the upholding of the company's regulation.

LIABILITY FOR NEGLIGENCE

ILLINOIS.—Trial—Instructions—Impeachment of Witnesses—Impeachment — Appeal — Review — Harmless Error — Street Railways—Injuries to Travelers—Care Required.

1. Where the only basis for an instruction on the impeachment of witnesses was in the alleged fact that witnesses who testified for defendant were contradicted by those who testified against it, and that one of defendant's witnesses had made statements regarded by defendant as inconsistent with his sworn testimony, it was improper to change that, if any witness had been "successfully impeached," or had willfully sworn falsely to any material matter, the jury, as a matter of law, might disregard his or their entire testimony except in so far as it had been corroborated, etc., without further defining the words "successfully impeached."

2. Where a witness is contradicted as to a material matter, or evidence is offered showing that he has made statements at another time inconsistent with his testimony as to a material matter, he is not thereby impeached, unless the jury believe from the contradiction or proof of inconsistent statements that the witness has willfully sworn falsely as to the material matter in reference to which he has been contradicted or has made inconsistent statements at another time.

3. Where, in an action for injuries, there was no such contradiction of defendant's witnesses that the jury could have believed that they had been "successfully impeached," defendant was not prejudiced by an instruction that, if any witness had been successfully impeached or had willfully sworn falsely as to any material matter, etc., they might disregard his entire testimony except as corroborated, etc.

4. In an action for injuries to a traveler on a highway by a collision with a street car, the court defined ordinary care to mean such a degree of care under the circumstances in which plaintiff was placed "at the time" as an ordinarily prudent person would exercise under like circumstances. A subsequent instruction declared that, in going across or near defendant's track at the time and place in question, it was plaintiff's duty to exercise ordinary care to avoid injury from the approaching car, and, if he failed to do so, he could not recover. Held, that the first instruction was not objectionable as limiting the time at which plaintiff was required to exercise care to the moment of the collision.—(Chicago City Ry. Co. vs. Ryan, 80 N. E. Rep., 116.)

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INDIANA.—Carriers—Carriage of Passengers—Injuries—Actions—Pleading—Passenger or Employee—Death—Damages—Amount—Accident to Train—Collision—Negligence—Street Railways—Regulation—Ordinance—Crossing Railroad Tracks—Trial—Direction of Verdict for Defendant—Evidence—Competency—Similar Evidence by Other Party.

1. In an action against a carrier to recover for the death of an employee while riding on defendant's car, plaintiff alleged that decedent was employed by defendant, and that after finishing his day's work he was given a ticket by defendant, good on any of its cars to enable him to ride home. Held, that the allegations as to his employment were not inconsistent with the allegation that he was a passenger on defendant's car.

2. In an action against a carrier to recover for the death of plaintiff's intestate, the jury found that he was in defendant's employ; that on the day of the accident he was riding home on defendant's car, after finishing his day's work, on a ticket given him for that purpose by defendant's foreman, in accordance with a custom of defendant; that he did not pay for the ticket, and the ticket was not furnished as a part of the contract of employment; that tickets were furnished employees when sent out on the road on the company's business, and were also furnished on other occasions; that the intestate, when killed, was riding on the car in the same manner as any other passenger; that he had nothing to do with operating the car; and that there was no contract between defendant and the intestate by reason of his using such ticket. Held, that such findings are not in irreconcilable conflict with a general verdict finding that intestate was a passenger.

3. In an action against a carrier to recover for the death of a passenger who was fifty-eight years old, industrious, in good health, earning $10.50 a week, and who left a widow, a minor child, and five grown children, the jury returned a verdict for $5,000. Under the statute, they might have fixed the amount at $10,000. Held, that no abuse of discretion was shown.

4. A street car company is negligent where it runs its car across the track of a steam railroad directly in front of an approaching train, without any effort to stop the car, and without any attempt by the conductor to ascertain whether the way is clear.

5. An ordinance making it unlawful for a street car to cross the track or tracks of a steam railroad until the conductor crosses the tracks on foot and signals the motorman is valid.

6. A refusal to direct a verdict for defendant is not error, where there is evidence tending to sustain the material allegations of the complaint.

7. Where defendant questions his own witnesses about a certain matter, he cannot complain if plaintiff questions his witnesses about the same matter.—(Indianapolis Traction & Terminal Co. vs. Romans, 79 N. E. Rep., 1068.)

INDIANA.—Pleading—Complaint—Motion to Make More Specific—Carriers—Injury to Passenger—Trial—Verdict—Interrogatories—Findings Consistent with General Verdict—Appeal—Harmless Error—Admission of Evidence Cured by Instructions—Instructions—Undue Prominence to Testimony — Depositions —Objections — Necessity for Making Before Trial.

1. Where a complaint against an electric railway company alleged that plaintiff was injured through the motorman negligently starting the car while plaintiff was alighting, it was not error to overrule a motion to make the complaint more specific by stating whether the car had, prior to its sudden start, been stopped or was slowly moving.

2. A street railway company was liable for injuries to a passenger while alighting at a usual stopping place which had been announced by the conductor caused by the motorman negligently starting the car.

3. Where, in an action for injuries to a passenger while alighting from a street car after leaving his seat in response to the conductor's announcement that his destination was reached, there was no finding that he was thrown off on account of the release of the brake, a verdict in his favor was not in conflict with findings that after the car entered a curve it became necessary to release the brakes, that such release gave the car additional speed without application of more current, that the release of a brake usually increases the momentum of a car, that the speed of the car was not excessive, that more power was applied than was necessary, that all street cars have jars and sways natural to their progress when operated in a lawful way, and that cars upon curves are subject to violent motions, lurches, and jerks.

4. In an action for injuries to a passenger while alighting from a street car caused by the motorman starting the car, any error in admitting testimony that at the time of the accident the conductor said to the motorman, "When you stop, why in the devil don't you give people a chance to get off?" was cured by an instruction not to consider the testimony.

5. Where, in an action for injuries to a passenger while alighting from a street car, there was testimony that at the time of the accident the conductor said to the motorman, "When you stop, why in the devil don't you give people a chance to get off?" an instruction that the jury should not consider the testimony was not objectionable, as directing attention to the testimony of a witness whom it was sought to impeach by evidence of contrary statements.

6. Under the express provisions of Burns' Ann. St. 1901, Sec. 443, a motion to suppress depositions must be made before the beginning of the trial.—(Louisville & S. I. Traction Co. vs. Leaf, 79 N. E. Rep., 1066.)

KENTUCKY. — Evidence — Expert Testimony — Street Railways—Injuries to Persons on Track—Violation of Speed Ordinance—Misleading Instructions—Right of Way Over Tracks—Care Required Towards Persons Walking on Track.

1. In an action for the death of one struck by a street car, plaintiff could not show by expert testimony what would be a reasonably safe rate of speed for a car to be operated over such a street as the one in which the accident occurred, it being for the jury to determine from the evidence whether the car was traveling at a dangerous rate of speed or not.

2. In an action for the death of one struck by a street car, that at the time of the accident the company was violating an ordinance limiting the speed of cars was no evidence of negligence toward decedent.

3. In an action for the death of one struck by a street car, an instruction that the company had a right to use its track was not objectionable as tending to lead the jury to believe that the company's right was exclusive.

4. Though street railway companies have no exclusive right to the use of their tracks, they have the right of way, and it is the duty of persons, whether on foot or in vehicles, to give unobstructed passage to the cars.

5. Where decedent was walking along the edge of a street car track, the motorman of a car moving towards him had a right to believe that, upon hearing the bell, he would leave the track in time to avoid being struck by the car, and was not required to stop the car or to take steps to avoid injuring him until it became reasonably apparent that he was not going to get out of the way.—(Ford's Adm'r vs. Paducah City Ry., 99 S. W. Rep., 355.)

MARYLAND.—Appeal—Record—Necessity of Bill of Exceptions — Railroads — Accidents at Crossings — Contributory Negligence—Unobstructed View—Country Crossings—Degree of Care Required.

1. A ruling of the trial court not included in a bill of exceptions will not be considered on appeal, though the prayer upon which the ruling was based is appended to the record and printed therein immediately after a bill of exceptions.

2. It was contributory negligence, barring recovery against an electric railway company for injuries at a crossing, for one to attempt to ride a horse across the track, where he could have seen the approaching car in time to have avoided a collision, but failed to look.

3. Since a higher rate of speed in the movement of electric cars is permissible in the open country than along the streets of a city, more caution is demanded of one crossing tracks in the country than in cities.—(Phillips vs. Washington & R. Ry. Co., of Montgomery County, 65 Atl. Rep., 422.)

MICHIGAN.—Street Railways—Injuries to Travelers—Contributory Negligence.

Where plaintiff, having stopped his horse and looked for an approaching street car at a point where he could see 75 to 100 ft. up the track, and seeing no car, proceeded to cross the track, he was not guilty of contributory negligence as a matter of law in failing to again stop his horse to look for a car, after he had passed an awning on an adjoining store building which obstructed his view, and when his horse's feet would have been within 4 feet of the rail and the horse's head within 2 feet of

the track, and on a line with the projecting car body.—(Hebblethwaite vs. Detroit United Ry., 108 N. W. Rep., 433.)

MICHIGAN.—Carriers—Injury to Passengers—Contributory Negligence—Negligence—Alighting from Moving Car—Trial—Verdict—Inconsistent Findings.

1. A street car passenger is not guilty of contributory negligence in alighting where the car comes to a stop for the purpose of permitting him and other passengers to alight, and while he is alighting it suddenly starts.

2. It is negligence to start a street car while a passenger is alighting therefrom at the express or implied invitation of the carrier.

3. It is not negligence per se for a street car passenger to attempt to alight at a usual stopping place if he has given the proper signal for the car to stop, and at the time that he makes such attempt he believes the car has stopped though it has not, but is moving so slowly that a prudent person under the same circumstances would alight.

4. Where, in an action for personal injuries to a passenger while alighting from a street car, the jury, in their general verdict and answers to special questions, found that the car started when plaintiff was alighting, an affirmative answer to a special question, "Was the car at a full stop when plaintiff stepped or got off?" was not inconsistent, since, the question being ambiguous, it would be inferred that the answer is merely a finding that the car was at a full stop when plaintiff "stepped," and not that it was stopped when he "got off."—Burke vs. Bay City Traction & Electric Co., 110 N. W. Rep., 524.)

MISSOURI.—Master and Servant—Personal Injuries—Assumption of Risk—Question for Jury—Contributory Negligence—Dangerous Conditions—Knowledge of Servant—Action for Injuries—Proof and Variance.

1. In an action for personal injuries suffered by plaintiff through having come in contact with a charged trolley wire while working as a carpenter in defendant's street car house, evidence held to justify submission to the jury of the question whether plaintiff assumed the risk.

2. In an action for personal injuries suffered by plaintiff through having come in contact with a charged trolley wire while working as a carpenter in defendant's street car house, evidence held to justify submission to the jury of the question whether plaintiff was guilty of contributory negligence.

3. A servant, working in proximity to trolley wires not required in the prosecution of the master's business to be kept charged with electricity, is not required to assume that they are so charged.

4. In an action for injuries to a servant, an allegation that plaintiff was ordered to do a certain thing by his foreman was supported by proof that plaintiff and another were ordered to perform the act, without specifying which of the two should do it.—(Cessna vs. Metropolitan St. Ry. Co., 95 S. W. Rep. 277.)

MISSOURI.—Carriers—Injuries to Passengers—Street Cars—Secure Position—Duty of Conductor—Negligence—Petition—Issues—Proof—Insecure Position—Speed—Contributory Negligence—Instructions.

1. Where the conductor of an open street car knew that decedent's position on the end of a seat and in front of an upright stanchion was not reasonably safe, it was his duty to control the running of the car with a degree of care proportioned to the danger to which decedent was exposed.

2. Where a petition charges negligence specifically, the acts charged, or some of them, as constituting negligence, must be proved in order to entitle plaintiff to a verdict.

3. Where the seat in defendant's street car, which deceased occupied at the time of the accident, was insecure, the conductor would be presumed to have had knowledge thereof, and deceased having been thrown from the car because of her insecure and dangerous position in connection with the swaying of the car, it was immaterial to plaintiff's right to recover whether the car was running at an excessive rate of speed or not.

4. In an action for death of a passenger by being thrown from a street car, defendant requested the court to charge that if deceased, of her own volition got off from the car while in motion, and in consequence of her own act in getting off, was thrown to the ground and sustained injuries from which she died, plaintiff could not recover though the car had not sufficient guards to the seats or was unduly crowded or was running at an unusual rate of speed, or though the track was rough and caused jerks and shocks of the car as it proceeded over the same. The court modified the instruction by adding a clause, unless the jury believe that the crowded condition of the car, the insufficiency of the guards on the seats or the running at an unusual speed or the roughness of the tracks, jerks, etc., or all combined, was the proximate cause of the injury. Held, that the instruction in its original form correctly presented defendant's defense of contributory negligence, and that the modification was improper.

5. Where, in an action for death of a passenger by being thrown from a street car, certain instructions presented the theory that if deceased voluntarily placed herself in a position of peril or voluntarily left the car "without the knowledge of the conductor or motorman in charge of the car or before they could interpose to prevent her," the carrier was not liable, such instructions did not cover an instruction that if decedent of her own volition got off the car while in motion and in consequence of her own act was thrown to the ground, and sustained injuries of which she afterwards died, the verdict must be for defendant, whether the conductor or motorman knew or might have known that she was in the act of getting off the car, or whether they took any steps to prevent her doing so.—(Van Horn vs. St. Louis Transit Co., 95 S. W. Rep., 325.)

MISSOURI.—Street Railroads—Collision with Team—Contributory Negligence—Evidence—Negligence—Instructions.

1. Testimony of plaintiff, who was driving on the right side of the street, that, on account of iron pipes lying in the gutter, he was obliged to drive so near the street car track as to be in the way of any passing car, but that, when he heard and saw the car coming 150 ft. behind him, he immediately turned his horses out from the track and in a moment's more time would have been out of the way, does not show contributory negligence.

2. Evidence, in an action for collision of a street car with an unloaded lumber wagon, coupled up short, so that the coupling pole, which alone was struck, projected 10 to 12 ft. to the rear, the accident occurring at night, when it was dark and somewhat misty, but opposite a Welsbach gas light, with one 75 or 80 ft. distant in either direction along the road, the car having a headlight, and the horses being large and white or gray, held sufficient to show negligence of the motorman.

3. The instruction in an action for collision of an electric car with a team, requiring that the motorman should have kept a vigilant watch for vehicles, is proper, not only under the "Vigilant Watch" ordinance of the city of St. Louis, but under the common law.—(Mertens vs. St. Louis Transit Co., 99 S. W. Rep., 512.)

MISSOURI.—Appeal—Review—Acquiescence in Instructions—Carriers—Injury to Passenger—Negligence—Burden of Proof—Instruction—Trial—Erroneous Instruction—Cure by Others.

1. Defendant does not asquiesce in an erroneous instruction, given for plaintiff, putting the burden of proof on defendant, before plaintiff has made a prima facie showing where, after instructions asked by defendant, declaring the contrary rule, have been denied, it asks an instruction containing a statement that such burden is on it, its purpose being to present the issues as favorably as possible to its defense, under the theory as to the burden adopted by the court.

2. An instruction, in an action for injury to a passenger on an electric street car, on the ground of an explosion, causing panic among the passengers, that, if an explosion occurred in the machinery of the car, causing a panic among the passengers, and plaintiff without fault received the alleged injury, then defendant had the burden of proving that the machinery was safe and sound, and that the explosion was caused by inevitable accident, or defects that could not have been known by the exercise of the highest human skill, diligence, and foresight, is erroneous, as making the explosion prima facie evidence of negligence under the doctrine of res ipsa loquitur, notwithstanding there was evidence to show that the explosion was not a dangerous one, but due to the combustion of fuses, such as often happens on electric cars when well constructed and operated, and not sufficient to excite a panic among persons of average intelligence.

3. Error of an instruction in putting on defendant the burden of proof, before plaintiff had made out a prima facie case of negligence, is not cured by an instruction that, if certain facts were found, defendant was not liable.—(Trotter vs. St. Louis & Suburban Ry. Co., 99 S. W. Rep., 508.)

MISSOURI.—Trial—Instructions—Applicability to Issues—Carriers—Injuries to Passengers—Care Required of Carrier—Findings—Contributory Negligence—Question for Jury—Pleading.

1. An instruction as to the liability of a carrier where a car started before the plaintiff had a reasonable time to alight was not erroneous, though the adjective "reasonable" was omitted from the averment of the petition relating to the time given plaintiff to leave the car.

2. Though a car remained stationary for a time, sufficient to have enabled a passenger to alight in safety by the exercise of reasonable diligence, this would not justify the starting of the car while she was in the very act of stepping to the street, and the carrier would be liable for resulting injuries without regard to the violence of the start.

3. In an action for injuries to a passenger, where the evidence showed that the only warning to the passenger was given almost simultaneously with the starting of the car, so that, under the circumstances detailed by the witnesses for either party, it would not affect the carrier's liability, there was no error in an instruction in failing to require a finding that the car was started without any warning being given to plaintiff.

4. Except where the risk involved in stepping from a moving car appears to be so great that an ordinarily prudent person would not incur it, the question of negligence in the act is for the jury.

5. Though the cause of action pleaded is the negligent act of a carrier in suddenly starting a stationary car while plaintiff was stepping from it, she would be entitled to recover where the proof showed that the car was moving, but not enough to enhance the danger of her act.—(Green vs. Metropolitan St. Ry. Co., 99 S. W. Rep., 28.)

MISSOURI.—Street Railways—Operation—Violation of Speed Ordinance—Cause of Injury—Trial—Instructions—Application of Law to Facts.

1. The violation of a speed ordinance by a street railway company is negligence per se, but plaintiff, injured in a collision with a car, cannot recover because of such violation unless it caused the injury and he used ordinary care to avoid the injury.

2. In an action against a street railway company to recover for injuries received in a collision, the giving of an instruction correctly defining the duty of the motorman without applying the law to the facts of the case is error, as it is the duty of the court to tell the jury what they must find to arrive at a correct verdict.—(Campbell vs. St. Louis Transit Co., 99 S. W. Rep., 58.)

MISSOURI. — Carriers — Street Railways — Negligence — Res Ipsa Loquitur—Action—Issues and Proof—Variance—Inspection—Trial—Instruction—Applicability to Evidence.

1. The collapse of a trap door forming a part of the floor of a street car, under the weight of a passenger who was simply walking thereon, resulting in injury to her, was evidence of negligence under the doctrine res ipsa loquitur.

2. Where, in an action for injuries to a street car passenger by a defect in the floor, the petition charged that the floor was rotten, worn, loose, and unfit for use, plaintiff was not confined to proving the defect of rottenness, but the petition was sustained by evidence that the floor was loose and unsafe.

3. Where a petition for injuries to a street car passenger alleged that the floor of the car was unfit for use, proof that the injury was caused by a defect in a trap door which formed a part of the floor did not constitute a variance.

4. In an action for injuries to a street car passenger by a defect in the floor of a car, an instruction that, if the car was inspected on the day it was sent out and was found in a safe condition with respect to a trap door forming a part of the floor through which plaintiff fell, then the allegation of defendant's negligence in maintaining the door was not sustained by the evidence, was properly refused as basing defendant's liability on the question of inspection, regardless of the character thereof.

5. Where, in an action for injuries to a passenger, several qualified physicians who attended her swore that the pleurisy and miscarriage from which she suffered were the direct and proximate consequences of the injury she received in falling through the floor of defendant's street car, instructions that there was no evidence that such injuries were due to the accident were properly refused, though defendant's physicians positively testified that plaintiff's condition was due to tuberculosis and was not caused by the injury.—(Jorden vs. St. Louis & M. R. R. Co., 99 S. W. Rep., 492.)

MISSOURI.—Street Railroads—Actions for Juries—Instructions—Speed—Appeal to Allege Error—Negligence—Actions—Instructions—Street Railroads—Action for Injuries—Instructions—Stopping Car—Trial—Ignoring Issues—Evidence — Conclusions — Objections — Witnesses — Credibility and Impeachment—Inconsistent Statements.

1. In an action against a street railway company for causing the death of plaintiff's son, the court instructed that "defendant had the right to operate its car at the place mentioned in the testimony at a rate of speed not exceeding 10 miles per hour. Before, therefore, you can find against the defendant on account of the excessive speed, you must find either that defendant operated its car in excess of the speed of 10 miles an hour, or at such a speed, which, under the evidence and circumstances given in the testimony, amounted to negligence, and unless you so find, and also further find that such excessive or negligent speed was the cause of the death of plaintiffs' son, the plaintiffs are not entitled to recover on account of such speed." Held, that the instruction was not objectionable as telling the jury that defendant had the absolute right to run its car then and there at the rate of 10 miles an hour regardless of circumstances, and the parties having admitted, to obviate the necessity of introducing an ordinance, that the speed limit was 10 miles an hour, defendant had the right to an instruction that it could run its car 10 miles an hour.

2. Plaintiffs cannot complain of an instruction drawn by defendant which followed the allegations of plaintiffs' petition.

3. Where several acts of negligence are charged, any one of which, it is alleged, caused or contributed to cause the accident, if the jury should find that one particular act was not the sole cause of the accident, they should not for that reason be instructed to disregard it entirely.

4. In an action against a street railroad company for causing the death of plaintiffs' son, the jury were instructed that defendant was not negligent in failing to stop its car after the plaintiffs' son was in a position of peril, unless he was in a position of peril a sufficient length of time to enable those in charge of the car to stop or check it, so as to avoid striking him, in the exercise of ordinary care on their part and with the means and instrumentalities at hand for stopping the car. Held, that the instruction was not objectionable as leaving out of view the duty of the motorman to be on the lookout for danger.

5. In an action against a street railroad company for causing the death of plaintiffs' son, the jury were instructed that if the son tried to run across the street in front of a moving car, and while it was so close to him as to prevent the motorman, in the exercise of ordinary care, from stopping his car so as to avoid striking him, whereby he was struck and killed, defendant was not liable. Held, that the instruction was not objectionable as ignoring defendant's liability for dragging the boy, when the evidence did not show that he lost his life thereby, and, if the evidence had raised such a question, this instruction did not eliminate it; neither was it objectionable as leaving out of view the question of excessive speed, as it follows plaintiffs' theory as shown by pleading and instructions.

6. In an action against a street railway company for causing the death of plaintiffs' son, a witness testified that deceased started to cross the street "and just as he got inside the east-bound track he stumbled; evidently, as I found later, there was a hole where the bricks had been sunken was what caused the child's fall. He stumbled there—" An objection was interposed here to the testimony on the ground that it was a conclusion. Held, that it was properly sustained as relating to the reason stated for the fall of deceased.

7. In an action against a street railway company for causing the death of plaintiffs' son, evidence of a witness who saw the accident from a house nearby that the motorman at the time "evidently was talking to someone on the platform," was inadmissible as being a conclusion.

8. In an action against a street railway company for causing the death of plaintiffs' son, the motorman, on cross-examination, said he was present at the coroner's inquest, but did not testify. Plaintiffs then produced a transcript of the evidence at the coroner's inquest by which it appeared that the motorman was sworn and in answer to questions, stated his name, residence, and business, but when asked as to the accident, said, "I don't care to testify. I might incriminate myself." Held, that it was proper to exclude that statement from the jury as the statement that he had not testified at the inquest was substantially true, and plaintiffs were not entitled to have the jury draw any inference to defendant's prejudice from the motorman's refusal

to testify.—Masterson et ux. vs. St. Louis Transit Co., 98 S. W. Rep., 504.)

MISSOURI.—Justices of the Peace—Pleading—Aider by Verdict—Defects in Petition—Street Railroads—Collisions—Contributory Negligence—Question for Jury—Negligence—Question for Jury—Evidence—Opinion Evidence—Competency of Witnesses—Trial—Requests for Instructions—Statutes.

1. Under Rev. St. 1899, Sec. 3852, providing that no formal pleadings shall be required in a justice's court, but that plaintiff shall file a statement of the facts constituting the cause of action, a statement in an action in justice's court against a street railway company for injuries to a vehicle in a collision with a car, alleging that the company was indebted to plaintiff for damages sustained by reason of a collision on a specified date and place in breaking a vehicle for a certain amount, sufficiently charges that the damage was negligently inflicted by the company as against an objection raised for the first time by motion in arrest of judgment.

2. One driving across a street car track at a time when an approaching car is 350 ft. away is not as a matter of law guilty of contributory negligence, though the paving between the track rails and adjacent thereto had been removed, leaving a space about 6 ins. deep for the vehicle, an ordinary carriage, to pass over.

3. Whether, in an action against a street railway company for damages to a vehicle in a collision with a car, the motorman in charge of the car kept a vigilant watch for the driver and vehicle, and at the first appearance of danger exercised ordinary care to check the speed of the car and avert the collision. Held, under the evidence, for the jury.

4. In an action against a street railway company for damages to a vehicle in a collision with a car, several witnesses testified that the car was operated on the company's tracks, that it was the same color as its cars, and bore its name painted on one side thereof. Held, that the issue whether the company was operating the car was for the jury.

5. A non-expert witness possessing the usual knowledge of time and distance is competent to give his opinion of the speed of a stret car.

6. Rev. St. 1899, Sec. 748, providing that either party "may" move the court to instruct, and the court "may" of its own motion give instructions, does not require the court to give instructions in a civil action where no instructions are requested.—(Hall et al. vs. St. Louis & S. Ry. Co., 101 S. W. Rep., 1137.)

MISSOURI.—Pleadings — Amendment — Departure — Street Railways—Negligence—Personal Injuries—Collision with Vehicle—Contributory Negligence—Question for Jury—Appeal—Questions for Review—Theory of Trial.

1. In an action against a street railway for injuries through negligence, there was no departure between an original petition alleging that the rate of speed of defendant's car was 30 miles an hour, and an amended petition stating that the speed was in excess of 20 miles an hour.

2. In an action against a street railway for injuries received by plaintiff in a collision between the vehicle in which he was driving and defendant's car, the question of plaintiff's contributory negligence held for the jury.

3. In an action against a street railway for injuries received by plaintiff in a collision between the vehicle in which he was driving and defendant's car, the question whether the running of a car approaching a street crossing in a city in the night time at a speed of 25 miles an hour was an act of negligence held for the jury.

4. Where, in an action against a street railway for personal injuries through negligence, defendant tried the case on the theory that it was the owner of and operating the car which caused the injury, its instructions recognizing that its agents were in charge of the car and its defense being that plaintiff was guilty of contributory negligence, it could not on appeal contend that the evidence did not show that it was the owner or in possession and operating the road at the time of the injury.—(Carey vs. Metropolitan Street Ry. Co., 101 S. W. Rep., 1123.)

MISSOURI.—Street Railroads—Injuries to Children—Acts of Motorman—Scope of Employment—Pleading—Instructions—Trial—Instruction—Omission—Request to Charge—Appeal—Evidence—Review.

1. An allegation that defendant was operating a street car in charge of a motorman on a public street, and that the motorman negligently left his post as he approached plaintiff, a child of tender years, near the track, and negligently waved to plaintiff, and so frightened him as to cause him to start to run across the track in front of the car, so that, before the motorman was able to regain his post and stop the car, plaintiff was struck and injured, sufficiently showed that the act of the motorman was within the scope of his employment.

2. In an action for injuries to a child by being struck by a street car while he was playing in the street, an instruction that if plaintiff was on the street north of defendant's track, and as the car approached defendant's motorman stepped onto the step of the front platform and reached towards plaintiff and frightened him, and by reason of plaintiff's want of discretion he was caused to run in front of the car and was knocked down and injured, and the motorman did not exercise ordinary care in so reaching toward plaintiff and causing him to be frightened, etc., plaintiff was entitled to recover, was not objectionable as failing to submit to the jury that the act of the motorman was within the scope of his duties.

3. Where, in an action for injuries to a child in collision with a street car, an instruction submitting defendant's liability was correct so far as it went, and defendant was not requested to charge that the motorman's action objected to must be found to have been within the scope of his duties in order to entitle plaintiff to recover, defendant could not object that such requirement was omitted.

4. The Supreme Court will not weigh the evidence on reviewing an objection that the verdict is the result of passion and prejudice.—(Wahl vs. St. Louis Transit Co., S. W. Rep., 1.)

MISSOURI.—Evidence — Experts — Hypothetical Question — Trial—Instructions—Requests—Duty to Request—Damages—Injuries to Passengers—Negligence.

1. Where, in an action for injuries an expert had previously testified as to the condition of plaintiff's leg, and a hypothetical question was directed solely to the condition of the leg when the doctor examined it, and to procure the physician's opinion as to whether the injury would be permanent, the question was not objectionable, because it did not assume all the facts proved, including the manner in which the injury was inflicted and its treatment.

2. Where a hypothetical question to a medical expert merely assumed that plaintiff's injury was the result of a sudden blow, such as a man might ordinarily get by being suddenly thrown or falling, or as would produce a wound such as would make the scar in question, which condition occurred about a year prior to the witnesses' examination, and was asked only to ascertain whether the condition was permanent, it was not objectionable as assuming that the injury of any part thereof was inflicted by defendant.

3. Where evidence was admitted for a special purpose only it was the duty of the party desiring to limit the evidence to such purpose to request an instruction to that effect.

4. Where plaintiff was injured while boarding a street car, and defendant claimed that the manner of treatment which plaintiff applied to his injury caused blood poisoning, which subsequently developed, plaintiff was not precluded for that reason from recovering for such injuries, unless the treatment given was negligent.—(Rosier vs. Metropolitan Street Ry. Co., 101 S. W. Rep., 1111.)

MISSOURI.—Appeal—Issues in Lower Court—Scope—Review—Harmless Error—Erroneous Admission of Evidence—Damages—Personal Injuries—Measure of Damages—Instructions.

1. Where, in an action against a street railway company for injuries to a person on its track, defendant's counsel in his opening statement stated that the motorman could not see plaintiff within a sufficient distance to stop the car, and that it was a question of the motorman not being able after seeing plaintiff to stop the car in time to avoid the accident, defendant, on appeal from a judgment against it, could not urge that there was a failure to prove that it either owned or operated the railroad or car.

2. Where, in an action against a street railway company for injuries to a person struck by a car, there was substantial evidence on the question of the negligence of defendant in failing to observe plaintiff on the track and to check the car in time to avoid the accident, the error, if any, in admitting the testimony of an expert on the question of the distance a car would move before it could be stopped because of the insufficiency of the hypothetical question propounded, was not prejudicial.

3. The error, if any, in the admission of a deposition on the ground that the party offering it had failed to show the non-residence of the witness, was harmless, where his testimony only tended to prove a fact otherwise established by competent and uncontroverted evidence, and the court could not, under the express provisions of Rev. St. 1899, Sec. 865, reverse the judgment on that ground.

4. An instruction on the measure of damages for personal injuries that the jury will award plaintiff such sum as shall compensate him for the mental and bodily pain and suffering endured by him consequent on the injury, and for the mental and bodily pain "which may be sufferecl by plaintiff in the future by reason of such injuries, if any, for any permanent injuries suffered by plaintiff, if * * * he has suffered any such permanent injury," does not permit the jury to award compensation for future pain and permanent injury, unless the same is reasonably certain to follow as a result of the injury.—(O'Keefe vs. United Rys. Co. of St. Louis, 101 S. W. Rep., 1144.)

MISSOURI.—Appeal—Reservation of Grounds of Review—Motion in Arrest of Judgment—Master and Servant—Injuries to Servant—Actions—Complaint—Allegation of Negligence—Instruction—Appeal Estoppel to Allege Error—Instructions—Master and Servant—Injuries to Servant—Actions—Assumption of Risk—Appliances—Duty of Master to Furnish—Trial—Refusal of Instruction—Instructions Already Given.

1. Where there is a motion in arrest of judgment which questions the sufficiency of the petition, the petition will be considered on appeal, though after a demurrer to the petition was overruled defendant answered.

2. A petition, in an action for injuries to an employee, while on a work car of defendant street railway company, which described the defective condition of the car, and averred that the defendant was negligent in furnishing the car for the work in the defective condition, is sufficient, without alleging that defendant knew, or could have known by the exercise of reasonable diligence, of the defects complained of.

3. In an action for injuries to an employee, alleged to be due to the defective condition of a car, an averment of the petition that the bearings over the truck did not slide or follow the turn of the car, but were rigid, and thus would cause the car to become derailed, was sufficiently definite to fully apprise the defendant of the issue to be met.

4. Where injuries were averred to be due to the defective condition of a car, and the evidence showed that the defect was in the bearings of the car alone, it was not error to instruct that if the jury found that the car and its appliances and bearings were defective, and that thereby it was caused to leave the track and injure the plaintiff, then he might recover.

5. Defendant cannot complain of expressions in instructions given, when instructions given at its request contain in effect the same expressions.

6. The fact that an employee knew of the defective condition of a car, and consented to ride on it, will not of itself preclude a recovery for injuries received in consequence of such defect, unless it was so glaring as to threaten immediate injury, or such that a person of ordinary prudence would not have used it to ride upon.

7. A master is not an insurer of the safety of his servants, and, where a car had been tested and inspected before it was used, the master was liable only for failure to exercise reasonable care to make the car safe, and was not bound to know of hidden defects in the car not discoverable by the exercise of reasonable care.

8. In an action for injuries to a servant, alleged to be due to the defective condition of a car, it was error to refuse an instruction that defendant was not an insurer of plaintiff's safety, but was obliged only to exercise reasonable care to provide a reasonably safe car, and was not bound to know of hidden defects not discoverable by the exercise of reasonable care, on the ground that it was covered by a given instruction that if the car was reasonably safe on the morning of the day of plaintiff's injury, and became ocut of repair later, so as to cause the accident, plaintiff could not recover unless defendant knew, or by the exercise of reasonable care might have known, of its defects.—(Clippard vs. St. Louis Transit Co., 101 S. W. Rep., 44.)

MISSOURI.—Carriers—Street Railways—Negligence—Injuries to Passenger—Instructions—Riding on Plantform—Evidence—Judicial Notice—Carriers—Injuries to Passengers—Evidence—Trial—Instructions.

1. In an action against a street railway for injuries received by a passenger, by being thrown off the platform of one of defendant's cars by a sudden lurch, an instruction that it is not necessarily negligent for one to ride on the rear platform of a car, though the same is crowded; that if when crowded defendant's car stopped, and plaintiff and others boarded it as passengers without objection by defendant, plaintiff was not negligent in boarding the car and remaining on the platform thereon, unless the danger was so obvious that a reasonably prudent person would have refrained from so doing, and unless after boarding the car plaintiff failed to exercise due care, was not erroneous, as taking from the jury the question whether plaintiff was guilty of negligence in riding on an overcrowded car.

2. It is not negligence as a matter of law for one to board and ride on the platform of a car.

3. It is not negligence as matter of law for one to board a street car without special invitation to do so.

4. The court takes judicial notice that in the operation of street cars they stop at street crossings for the purpose of taking on and letting off passengers, and that such stoppage is in the nature of a general invitation to all persons who desire passage to get aboard, whether the car be crowded or not.

5. In an action against a street railway for injuries received by a passenger through being thrown from the platform of a car by a sudden lurch, an instruction permitting a recovery on the ground of excessive speed when there was no allegation that the car was going at an excessive rate was not erroneous, the petition alleging generally that the injury resulted from defendant's negligence "in the construction, maintenance and operation of said line and car."

6. It is not error to refuse a requested instruction substantially covered by an instruction given.—(Baskett vs. Metropolitan St. Ry. Co., 101 S. W. Rep., 138.)

MISSOURI.—Carriers—Injuries to Passenger—Action—Issues—Questions for Jury—Evidence—Sufficiency—Trial—Nonsuit—Evidence—Opinions—Examination of Experts.

1. In an action for injuries to a passenger, where the petition contains a general allegation of negligence, and alleges specifically the failure of the defendant's employees to stop a train before beginning the descent of an incline where the accident occurred, in not providing suitable means nor exercising reasonable care in the use of those furnished, in the failure of the employees to be at their proper posts of duty, and in causing one train to follow another down the incline, there is no presumption of negligence from the accident, but the specific allegations must be proved.

2. In an action for injuries to a passenger, where the petition alleged that the employees of defendant, in violation of a rule of the company and of ordinances of the city, failed to stop a cable train before it began the descent of an incline, and the evidence showed oral instructions to the motormen, and that the grip was likely to be loosened from the cable just before reaching that point, the refusal of an instruction withdrawing from the consideration of the jury that allegation of negligence was proper.

3. In an action for injuries to a passenger, an instruction that there is no evidence that defendant failed to provide proper means to hold the grip of the cable train firmly attached to the cable, and to stop the same when not attached thereto, was properly refused, where there was slight evidence of the first element of negligence named.

4. In an action for injuries to a passenger, evidence held to present a question for the jury whether the servants of the defendant were negligent in not properly using the appliances for controlling the movement of the cable train.

5. In an action for injuries to a passenger, evidence held insufficient to show that either the gripman or motorman of the cable train was not at his post of duty.

6. In an action for injuries to a passenger, where, at the close of plaintiff's case, there was evidence before the jury of the insufficiency of the appliances to stop the car on the incline where the accident occurred with the cable out of the grip, a non-suit was properly refused.

7. In an action for injuries to a passenger, questions to medical experts as to what they would attribute the cause of pains and his inability to sleep, if prior to the accident he was free from pains in the head, was able to sleep well, and was normal in his health, and after a street car collision, sufficient to

throw him out of the car and cause various bruises, he suffered from pains in the head and back, which he had not had prior to the occurrence, were not permissible, as they called for opinions on matters directly in issue.—(Roscoe vs. Metropolitan St. Ry. Co., 101 S. W. Rep., 32.)

MISSOURI.—Appeal—Preservation of Grounds—Exceptions—Scope—Motions—Statement of Grounds—Pleading—Petition—Election Between Counts—Appeal—Harmless Error—Rulings on Pleadings—Pleading—Waiver of Objections—Street Railroads—Collisions—Action—Questions for Jury—Care Required as to Persons on Track—Instructions.

1. Rev. St. 1899, Secs. 599, 603, 612, 613, 619, 640 and 641, contemplate that pleadings, demurrers and motions of like character shall be in writing. Defendant moved in writing that plaintiff be required to elect as to which count of the petition he would proceed upon, and the motion was overruled, and at a subsequent term on the trial he orally renewed the motion, which was overruled and exception taken. No exception to the ruling at the first term was preserved by a bill of exceptions. Held, that the ruling could not be reviewed on appeal, as the oral motion could not become a part of a bill of exceptions.

2. Rev. St. 1899, Sec. 640, provides that all motions shall be accompanied by a written specification of the reasons upon which they are founded, and no reason not so specified shall be urged in support of the motion. Held, that where defendant, in a motion to compel plaintiff to elect as to the count of the petition upon which he would rely, specified certain grounds of the motion, he could not be heard to rely on appeal upon any other ground.

3. In an action against a street railroad for the death of plaintiff's intestate in a collision between his vehicle and a car, the gist of the specifications of negligence in the petition being that deceased was killed through defendant's fault in, first, running in excess of a speed ordinance, and, second, in not stopping the car when a stop was called for and could have been made, there was no such contradiction or inconsistency in the allegations as to require the granting of a motion to require plaintiff to elect as to the allegations on which she would rely.

4. In an action for personal injuries, it is proper to rely in the same count on common law and statutory negligence, so long as the violated duties produce the one injury and the one damage constituting the subject matter of the action.

5. In an action against a street railroad for the death of one killed in a collision between his vehicle and a car, the petition counted on negligence in exceeding a speed ordinance, and in the violation of an ordinance requiring the operatives of a street car to keep a vigilant watch for vehicles and to stop the car in the shortest time and space possible on the first appearance of danger, and a motion to require plaintiff to elect as to which ground he would rely upon was overruled, but the theory as to the speed ordinance was eliminated from the case by the instructions. Held, that the vigilant watch ordinance being merely declarative of the common law, there was no error of which defendant could complain in denying the motion.

6. Where defendant moved to compel plaintiff to elect as between the various grounds of negligence relied on in the petition, but on the overruling of the motion filed an answer and went to trial, there was an abandonment of the motion, the allegations of the petition not being so contradictory as to be self-destructive.

7. In an action for the death of one killed in a collision between his vehicle and defendant's street car, the question of negligence held for the jury.

8. Though one driving a vehicle placed himself in a position of peril on a street railroad track, the railroad was liable for his death in an ensuing collision, where the operatives of the car failed to exercise ordinary care to prevent injuring him, though the conduct of the operatives of the car was not characterized by wilfulness, recklessness or wantonness.

9. In an action for the death of one killed in a collision between his vehicle and a street car, the court instructed that if the motorman saw decedent on his wagon on the track or so near the same as to be in danger of injury, and could have stopped the car without injury to the same or its passengers, and by stopping the car within the shortest time and space possible under the circumstances could have avoided injury to decedent and neglected to do so, in consequence of which neglect to stop, decedent was killed, plaintiff was entitled to recover. Held that the instruction was proper.

10. It was proper to instruct that the negligence of decedent must have directly contributed to the collision, in order to bar plaintiff's recovery, and that though decedent was negligent in going on the track, still, if defendant by ordinary care could have stopped the car with safety to it and its passengers in time to prevent the collision after the motorman discovered decedent's peril, if he did discover it, and thereafter negligently failed to stop the car whereby the collision ensued, plaintiff was entitled to recover.—(White vs. St. Louis & M. R. R. Co., 101 S. W. Rep., 14.)

NEW JERSEY.—Carriers—Passengers—Collision—Negligence—Proximate Cause of Injury—New Trial—Damages—Excessive Damages—Injuries to Person.

1. Plaintiff was injured while a passenger on a trolley car on a siding, in a collision with another which came upon the siding because of the open switch. It was the custom on the trolley line for each motorman to move the switch to suit his purpose and leave it for the next to do the same. Held, that the motorman on the second car was negligent in approaching the switch at such a rate of speed that he was not able to stop after he took the switch until he collided with the car in which plaintiff was a passenger.

2. Where plaintiff was injured by a motorman allowing his car to collide with the car in which she was a passenger, the negligence of the motorman was the proximate cause of her injury.

3. In an action for personal injuries resulting in a verdict for $15,000 for plaintiff rendered eight months after the injury, where the evidence as to whether or not the injuries were permanent, was in conflict, and it is shown that the lapse of a reasonable time will afford an opportunity to determine this question with a fair degree of certainty, a new trial will be granted.—(Stevens vs. New Jersey & H. R. Ry. Co., 65 Atl. Rep., 874.)

NEW JERSEY.—Street Railroads—Injuries to Travelers—Bicycles—Negligence—Contributory Negligence.

1. Plaintiff was riding a bicycle within a foot or two of defendant's street car track. He suddenly turned to cross the track, not at a street crossing, without looking to the rear, and was immediately struck by a car following him on such track. Held, that the motorman was not guilty of negligence in failing to anticipate that plaintiff would cross the track, and in failing to ring the gong or stop the car after plaintiff started to cross in time to prevent a collision.

2. Where plaintiff, while riding a bicycle along a street car track, and within a foot or two therefrom, attempted to cross the same immediately in front of a moving car, which was following him, he was guilty of contributory negligence in failing to look behind him before attempting to cross the track.—(Harbison vs. Camden & Suburban Ry. Co., 65 Atl. Rep.)

NEW JERSEY.—New Trial—Personal Injuries—Inadequate Damages.

In an action for personal injuries a verdict for the plaintiff for substantial damages will not be set aside as inadequate when it appears that all the substantial elements of damage were in dispute as to their extent, and it appears that the verdict may be the result of the application of good judgment to such conditions as might be fairly found from the evidence.—(Killen vs. North Jersey St. Ry. Co., 65 Atl. Rep., 836.)

NEW JERSEY.—Street Railroads—Care of Pedestrian—Obstructions to View.

1. It is the duty of a foot passenger crossing a street containing a car track to use his powers of observation while in a place of safety to discover approaching cars which may put him in danger.

2. If obstacles intervene to prevent observation, reasonable prudence requires delay until such observation as is requisite has been made.—(Hageman vs. North Jersey St. Ry. Co., 65 Atl. Rep., 834.)

NEW JERSEY.—Carriers—Injury to Passengers—Negligence—Question for Jury.

1. It appeared in evidence that a passenger boarded an open car and attempted to get upon the front platform, and was told by the conductor to get off and turned around and went along the run-board of the car, and then the car gave a sudden jerk when they put on full force, and the passenger fell to the ground and was injured. Held, in the absence of evidence to the contrary, that it was for the jury to say whether the defendant's negligence was established by the testimony.

2. The verdict for the plaintiff set aside; it appearing by the clear preponderance of evidence that the accident happened in an

entirely different way, and that the passenger's own negligence contributed directly to the happening of the accident.—(Budner vs. Public Service Corporation of New Jersey, 65 Atl. Rep., 8893.)

NEW JERSEY.—Carriers—Injury to Passengers.

It is negligence in the conductor of a trolley car which has come to a stop at a street corner, for the purpose of taking on passengers, to start it until he has exercised due care to ascertain whether all the persons there waiting to take it have safely boarded the car.—(Speer vs. West Jersey & S. R. Co., 65 Atl. Rep., 896.)

NEW YORK.—Street Railroads—Injuries to Infants—Contributory Negligence—Duty to Look and Listen—Instructions.

Plaintiff, an infant 6½ years old, but with sufficient age and discretion to appreciate to some extent the necessity for caution in crossing the street car track, was injured in attempting to cross in front of a car which was approaching him at a distance of not more than 15 ft. He attempted to cross between street crossings in daylight when the car was running slowly, and did not look in the direction of the car before attempting to cross. The court charged that there was no hard and fast rule requiring a person to look up and down the street when about to cross the track of a street surface railroad, and that, if the car was a sufficient distance away that a person exercising ordinary care might get across in safety, then the failure to look was not evidence of negligence. Held, that such instruction was erroneous and inappropriate, as plaintiff's failure to look was at least some evidence of negligence.—(Peterson vs. Interurban St. Ry. Co., 103 N. Y. Sup., 8.)

NEW YORK.—Damages—Personal Injuries—Evidence.

In an action for injuries to a passenger, the only evidence of damage with reference to lost time was that plaintiff at the time of the accident operated a small grocery store with the assistance of his wife; that for a period of four weeks after the accident he was unable to attend to his business, during which period it was run by the wife, assisted by a boy, who was paid $5 a week and board. There was no evidence as to the cost of the board, and plaintiff testified that he would have had to pay a person doing such work as plaintiff did in operating the store $15 per week. Held, that the evidence was insufficient to sustain a recovery for lost time except to the extent of $5 per week.—(Friedman vs. Brooklyn Heights R. Co., 102 N. Y. Sup., 526.)

NEW YORK.—Street Railroads—Collisions—Actions—Contributory Negligence.

In an action against a street railway company for injuries to a carriage and horses in a collision with a northbound car, the driver testified that, after stopping to let a southbound car pass, he drove onto the northbound car track without looking for a car, and that there was nothing ahead of the northbound car to prevent the motorman from seeing the carriage. Plaintiff, sitting on the back seat of the carriage, testified that he saw the northbound car approach a block away, and knew that the carriage stopped to let a southbound car pass, and that he did not say anything to the driver. Held to show, as a mater of law, contributory negligence, precluding a recovery.—(MacGuire vs. New York City Ry. Co., 102 N. Y. Sup., 750.)

NEW YORK.—Carriers—Injuries to Passengers—Warning of Danger.

The duty of a subway company to inform persons boarding its trains of the existence of a space between the car platform and the platform of the station was fulfilled, and the company was guilty of no negligence, where the guard on the train uttered the words, "Watch the step!" in such a manner that a person paying ordinary attention to what was going on about him would naturally hear the warning.—(Wertheimer vs. Interborough Rapid Transit Co., 102 N. Y. Sup., 706.)

NEW YORK.—Street Railroads—Collision with Vehicle—Contributory Negligence—Evidence.

The driver of a vehicle, who, when 10 or 15 ft. from an electric street railroad track, could see no car approaching within a distance of 500 ft., was not guilty of contributory negligence as a matter of law in attempting to cross the track.—(Heitz vs. Yonkers R. Co., 102 N. Y. Sup., 964.)

NEW YORK.—Street Railroads—Operation—Collisions with Vehicles—Contributory Negligence—Care Required—Signal Given.

1. Plaintiff, while driving on the tracks of defendant in the street and knowing that a car was approaching, turned from the tracks sufficiently to allow the car to pass, but before it did so turned again upon the tracks, without taking any precaution for his safety, and was struck by the car. Held, as a matter of law, that the plaintiff was guilty of negligence, precluding a recovery.

2. Whether notice was given of the approaching car was immaterial, because plaintiff knew it was approaching.—(Robinson vs. Crosstown St. Ry. Co. of Buffalo, 103 N. Y. Sup., 58.)

NEW YORK.—Master and Servant—Injuries to Third Persons—Negligence of Servant—Scope of Employment—Carriers—Street Railroads—Injuries to Passengers—Res Ipsa Loquitur—Trial—Joint Defendants—Reception of Evidence—Effect.

1. Plaintiff, a passenger on an open street car, was injured by the pole of a wagon belonging to defendants S. being driven into the car in a collision at a street crossing. The driver of the wagon disobeyed instructions, and permitted a boy to drive the team prior to the collision. The boy drove the team at a trot toward the crossing, and, seeing he was unable to stop in time to prevent the collision, called to the driver, who seized the reins, which had been at all times within his reach, but was unable to stop in time. Held, that the boy at the time of the accident, though not within the employ of defendants S., was engaged in their business, and that they were therefore liable both for his negligence and the negligence of the driver.

2. Where an open street car approached a street crossing at a high rate of speed, and was driven over the same without reducing the speed, resulting in a collision with an approaching team, so that the pole of the wagon penetrated the car near the rear, and injured plaintiff, a passenger, the circumstances of the accident were sufficient to raise a prima facie case of negligence of the carrier under the doctrine "Res ipsa loquitur."

3. Defendant railway company and defendant S. were joint defendants in an action for injuries to a passenger. Each interposed a separate answer and appeared by different counsel. Plaintiff offered evidence to charge both defendants with negligence, and rested, and, after a motion for non-suit by each defendant had been denied, the railway company examined its witnesses and renewed its motion for non-suit, which being denied the railway company took no further part in the case, after which defendant S. examined his witnesses, some of whose testimony tended to show negligence on the part of the railroad company. At the close of the evidence counsel for all the parties summed up the case. A verdict was returned against both defendants. Held, that the railway company having withdrawn from the case after the denial of its second motion for non-suit, the testimony subsequently given by its co-defendant could not supply defects in the evidence as against it, and should have been disregarded.—(Bamberg vs. International Ry. Co. et al., 103 N. Y. Sup., 297.)

NEW YORK.—Appeal—Review—Dismissal of Complaint—Master and Servant—Electric Railroads—Negligence—Personal Injuries—Change in Running Time—Evidence—Duty of Railroad—Question for Jury—Contributory Negligence.

1. On appeal from a judgment dismissing the complaint at the close of plaintiff's evidence, plaintiff is entitled to the most favorable inferences properly deducible from the evidence.

2. In an action against an electric railroad for injuries to a motorman received in a collision, it was properly held, on motion for a non-suit, that evidence that, though the published schedule running time between two points was 1 hour, yet the all-night car which plaintiff was operating when injured had for about a year been making the trip during certain hours of the night in 45 minutes, and that defendant's assistant superintendent, who directed the movements of cars, when asked by plaintiff for instructions as to making the trips in 45 minutes referred the latter to the conductor, who instructed plaintiff to make the trips in 45 minutes tended to show that defendant had changed the running time.

3. In an action against an electric railroad for injuries received in a collision between the car of which plaintiff was motorman and a work car, evidence that for several days prior to the accident the conductor of the work car had seen plaintiff's car arrive ahead of the published schedule time, which, according to defendant's rules, it was such conductor's duty to follow, did not tend to show knowledge on the part of the conductor of the work car that the running time had been changed by defendant.

4. Where, while making repairs in its line, an electric railroad

began to operate its cars in opposite directions over the same track, it was charged with the duty of guarding the safety of its employees by giving notice of a change in the running time of its cars.

5. In an action against an electric railroad for injuries received in a collision between the car whereof plaintiff was motorman and a work car, resulting from a change of the running time of plaintiff's car, the question of defendant's negligence in failing to notify its employees of the change was for the jury.

6. In an action against an electric road for injuries received in a collision between the car whereof plaintiff was motorman and a work car, the fact that plaintiff failed to inform his conductor that the headlight of his car had gone out, and that, being unable to adjust it, he had replaced it with a red lantern, did not show contributory negligence on plaintiff's part; it not appearing what the conductor would or could have done that was not done by plaintiff.—(Baldwin vs. Schenectady Ry. Co.)

NEW YORK.—Street Railroads—Negligence—Contributory Negligence—Knowledge of Danger.

Plaintiff was riding near the defendant's track in a one-horse open grocery wagon driven by his servant, when the wagon was struck by the car of defendant and he was injured. Held error to refuse to instruct the jury that, if the servant saw the car approaching, the question of the warning given by the motorman was unimportant.—(Kerin vs. United Traction Co., 102 N. Y. Sup., 423.)

PENNSYLVANIA.—Street Railroads—Rights of Public on Track—Collision with Traveler.

1. The right of the public to use the track of a street railway company is subordinate only to the right of the company to have a clear track.

2. In an action by husband and wife against a street railway company to recover for personal injuries by collision with a street car while they were riding at night in a buggy, the question of defendant's negligence was for the jury.—(Barto et ux. vs. Beaver Valley Traction Co., 65 Atl. Rep., 792.)

TEXAS.—Trial—Instructions—Charge on Weight of Evidence—Appeal—Assignments of Error—Sufficiency—Negligence—Physical Injury from Fright—Recovery.

1. An instruction, in an action against a street railway company for injuries to a passenger while boarding a car, that if the jury believe from the evidence the passenger attempted to board, and while holding on with one hand, with one foot on the running board, the car was suddenly started, throwing her to the ground, she was entitled to a verdict, was not a charge on the weight of the evidence, in that it assumed that the passenger was holding to the car with one hand, with one foot on the running board, at the time of the accident, for it required the jury to find such fact before a verdict in her favor could be rendered.

2. Where, in an action against a street railway company for injuries to a passenger, the uncontradicted evidence showed that the passenger was holding to the car, with one foot on the running board, with the other lifted above it, in her effort to enter the car, when it was set in motion, and there was nothing to show that her fall was caused otherwise than by its sudden starting while she was boarding it, an instruction that, if the passenger attempted to board the car, and in so doing, and while holding on with one hand to the car, with one foot on the running board and attempting to mount the car, it was suddenly started, throwing her to the ground, she was entitled to a verdict, was not a charge on the weight of the evidence.

3. An assignment that the court erred in refusing an instruction will be overruled, where no evidence is stated in appelant's brief, under the assignment, showing the applicability of the instruction, though it contained a correct principle of law.

4. Where a physical injury results from a fright caused by the wrongful act of another, and the wrongful act is the proximate cause of the injury, the person injured may recover for the damages sustained.—(El Paso Electric Ry. Co. vs. Furber, 100 S. W. Rep., 1041.)

TEXAS.—Street Railroads—Injury to Person on Track—Discovered Peril—Instruction—Liability of Company—Issue as to Injury—Necessity for Instructions.

1. In an action against a street railway company for injury received in collision with a street car, testimony that plaintiff, on driving into the street along which the track extended, looked but saw no car coming; that, as he drove up the rack a car struck his wagon; that the car was 35 or 40 ft. away when the motorman saw plaintiff was not going to stop; that he immediately reversed the car, and did all he could to stop it, but that it could not be stopped within that distance; and that if the car had been equipped with sand appliances he could have stopped it in time to have avoided the collision—was sufficient to require the giving of a charge on discovered peril.

2. Contributory negligence of one struck by a street car in attempting to cross the track in front of a moving car will bar recovery, if the motorman could not have stopped with the appliances at hand in time to have avoided the collision, though he could have stopped in time with the appliances that ought to have been provided but were not.

3. Contributory negligence of one injured, while attempting to cross a street railway track in front of a moving car, will prevent recovery, if the motorman did not actually see plaintiff's peril in time to have stopped the car, though he could have seen him in time in the exercise of ordinary diligence.

4. Where plaintiff sued a street railway company for injuries received in collision with a car, and there was testimony that the car pushed the wagon in which plaintiff was riding 6 or 8 ft.; that, after the car and wagon stopped plaintiff alighted upon his feet, and at no time fell to the ground; that he said he was not hurt, but that his team was nearly killed—the court should have instructed affimatively upon the negative side of the issue as to whether plaintiff was injured.—(Dallas Consol. Electric St. Ry. Co. vs. Conn, 100 S. W. Rep., 1019.)

VIRGINIA.—Carriers—Injuries to Passengers Alighting from Street Car—Negligence.

Where a passenger testified that the street car did not stop long enough to enable him to alight in safety, that as he was in the act of stepping to the rear platform the car suddenly started, that he was "rushed" out on the platform by the momentum, that the conductor "grabbed" him as he was attempting to seize the handhold, and that in that manner he was thrown from the car and injured, but this theory was rendered highly improbable by the construction of the car and other physical facts, he did not show a right to recover.—(Berkley St. Ry. Co. vs. Simpson, 56 S. E. Rep., 332.)

VIRGINIA.—Pleading—Objection to Evidence—Variance—Waiver—Trial—Instructions—Form—Appeal and Error—Harmless Error—Instructions—Trial—Instructions—Application to Evidence—Carriers—Injury to Passenger—Contributory Negligence—Questions for Jury.

1. Va. Code 1904, Sec. 3384, provides that, if at the trial there appears to be a variance between the evidence and allegations, the court, if justice will be promoted, may allow the pleadings to be amended, or direct the jury to find the facts, and, after such finding, if it considers the variance such as could not have prejudiced the opposite party, shall give judgment according to the rights of the case. Held that where no objection was made to the admissibility of evidence and no motion made to exclude on account of a supposed variance, the objection must be considered on appeal as waived.

2. Instructions should be concrete, and should not enunciate merely abstract propositions of law.

3. The giving of an instruction enunciating merely an abstract proposition of law, instead of being concrete, is no ground for reversal, unless it appears that it was calculated to mislead or confuse the jury.

4. Where, in an action against a carrier for injuries to a passenger, the evidence for plaintiff showed the accident to be the result of the negligence of the motorman in prematurely starting the car when plaintiff was alighting, and the defense was that plaintiff stepped from the car while it was moving, an instruction that, though plaintiff was guilty of contributory negligence, yet, if the jury believed that the conductor knew of such negligence and could have avoided the accident, plaintiff's negligence would not defeat a recovery, was reversible error, as involving a hypothesis having no foundation in the evidence and tending to deprive the defendant of the defense of contributory negligence.

5. Where the operatives of a street car negligently carry a passenger beyond his destination, such conduct does not absolve him from contributory negligence in jumping from the car while it is in motion.

6. It is not negligence as a matter of law for a passenger to alight from a moving street car; but the question is for the jury under all the circumstances of the particular case.—(Newport News & O. P. Ry. & Electric Co. vs. McCormick, 56 S. E. Rep., 281.)

FINANCIAL INTELLIGENCE

Wall Street, June 19, 1907.

The Money Market

A decidedly firmer tendency developed in the local money market during the past week, rates for all classes of accommodation ruling ¼ to ½ per cent higher than those prevailing at the close of last week. The inquiry from stock commission houses was extremely light, owing to the inactivity in the securities market, and there was also a noticeable falling off in the demand from the railroads and other corporations. Nevertheless, there was no pressure of funds upon the market, and even at the higher rates the supply was very moderate. There was a disposition on the part of the financial institutions to strengthen their position in view of the heavy drafts soon to be made upon their resources. Last Saturday's bank statement revealed a further substantial loss in cash which carried the surplus reserve of the Clearing House institutions to the lowest point recorded in any corresponding period for the past ten years, and there are indications of a still further loss in cash during the current week. A feature has been the pronounced strength in the foreign exchange market rates for prime demand sterling, making a new high record for the year at 4.87.35. Under ordinary conditions, the advance in money rates and the recent heavy exports of gold would have been sufficient to bring about a decidedly easier exchange market, but those factors failed to have the slightest influence upon the course of the exchange market. The fact of the matter is that very little exchange has been sold against the gold exported, bankers not being disposed to draw long sterling bills owing to the uncertainty regarding the crops. The demand for gold at Paris appears to be as urgent as ever, and during the week $5,500,000 gold has been shipped to that center, making the total exports to date $15,900,000. Money at Chicago and other Western centers, however, is rather easier, and the rates of exchange at the interior points to a fairly heavy movement of funds in this direction, which will partly offset the week's loss in cash resulting from gold exports. Government disbursements for pensions, etc., are likely to be large from now on. A favorable development, and one that will have a very important bearing on the local money situation during the summer, is the shipment of gold from the Klondike to San Francisco, which in turn will doubtless be transferred to New York by telegraph, thus making the receipts from that source immediately available in New York. The first shipment amounting to $1,000,000 was made this week. Present indications are that the market will rule at about the present level until the close of this month, when the usual flurries in rates are to be expected as a result of the half-yearly interest and dividend disbursement. These payments are estimated at $175,000,000, the largest on record, and in addition provision must also be made for the $29,000,000 4 per cent bonds to be sold by the City of New York on the 28th inst. After July 1, payment to the Government on account of the $30,000,000 special deposits will be made, but this amount, as well as the moneys disbursed for interest and dividends on July 1, will soon be returned to the banks.

The bank statement made public on last Saturday was rather disappointing. Loans increased $1,689,500 and deposits decreased $4,369,200. The loss in cash amounted to $2,683,200, but as the reserve required was $1,217,300 less than in the preceding week, the surplus reserve was decreased by $1,465,900. The surplus now stands at $4,514,900, as compared with $7,073,375 in 1906, $7,209,500 in 1905, $38,869,975 in 1904, $10,099,575 in 1903, $12,158,250 in 1902, $6,611,350 in 1901 and $17,498,750 in 1900. Money on call loaned at 2 per cent and at 3½ per cent, the average rate for the week being about 2½ per cent. Money for fixed periods ruled at 4 per cent for sixty days, 4¼ per cent for ninety days, 4¼ per cent for four months, 5 per cent for five and six months and 5¾ and 6 per cent for seven and eight months.

The Stock Market

There was no material change in the position of the stock market during the past week. Dealings were upon an extremely small scale and prices showed no decided tendency in either direction. Speculation was again purely professional, the volume of outside business being unimportant. At times the market displayed a strong undertone, but every advance was met by fresh selling by bearish operators, and the net result for the week was a moderate loss in values. The chief influence at work was the resumption of the gold export movement to Paris, notwithstanding the heavy increase in the gold holdings by the Bank of France. During the week $5,500,000 gold has been shipped to the French capital, and as the position of exchange both here and at Paris favor French bankers, there is every indication of further shipments of the yellow metal later in the week. The result of this outflow of gold has been to materially reduce the reserve of the local banks, and to cause more or less apprehension regarding the immediate future of our money market. Rates for money in the local market have advanced ¼ to ½ per cent during the week, and should shipments of the yellow metal continue, a further hardening in interest charges will undoubtedly result. In addition to the drain upon the resources of the local banks by gold exports, preparations must soon be made for paying the July 1 interest and dividends, which promise to break all previous records, and also for the payment of the $30,000,000 special Government deposits on July 10. Taking these matters into consideration, to say nothing of the lesser demand for money, the monetary situation at present is not at all encouraging.

The statement by Chairman Knapp, one of the most conservative members of the Interstate Commerce Commission, in which he took a very optimistic view of the future of the railroads and their relation to the Government was well received, and brought about a decided improvement in values. Sentiment was also improved by the decision of the Adams Express Company to disburse about $24,000,000 to its stockholders in the shape of a scrip dividend. Crop news was also more encouraging, but the effect of these favorable developments were only temporary, and at the close all of the improvements were lost. The failure of the Central Railroad of New Jersey directors to increase the dividend was interpreted to mean that there would be no increase in the Reading dividend, action on which was scheduled for late in the week.

The local traction shares were weak. Interborough-Metropolitan continued the downward movement, despite the statement made in usually well-informed quarters that payment of the preferred stock dividend would be continued for the balance of the year at least. Brooklyn Rapid Transit also shared in the general weakness.

Philadelphia

Extreme dullness characterized the market for local traction shares during the past week. Trading included a very small number of issues, none of which displayed any degree of activity. Prices, however, ruled firm. Philadelphia Rapid Transit, which has been the leader of the group, was traded in for less than 5000 shares at from 23 to 24⅜. American Railways fell a fraction to 48⅝, and Philadelphia Company common eased off to 39⅞. Union Traction lost a point to 57, but subsequently recovered on light transactions. Philadelphia Traction and United Companies of New Jersey each advanced a point to 92½ and 243½ respectively. Railways' General also improved at the close, the price rising ¾ to 5¾.

Chicago

Further progress is reported in the reorganization of the Chicago Union Traction Company, and it is expected that within another week all differences will be satisfactorily adjusted. The Chicago City Railway Company has authorized an issue of $10,000,000 twenty-year first mortgage bonds, of which $6,000,000 will be made available at once, the remaining $4,000,000 to be held in reserve. Of the $6,000,000, one-half the amount will be used to take up $3,000,000 5 per cent three-year

notes which have been called for redemption on July 1, and the remainder will be used for equipment and other purposes of rehabilitation.

Trading in the traction shares was considerably more active during the week, and prices for all of the shares of the street railways ruled decidedly stronger. City Railway stock advanced 7½ points to 157½. West Chicago rose 7 points to 34, and North Chicago advanced to 42. Chicago Union Traction sold at 3½ and 3⅝, and the preferred brought 17. Other transactions included Chicago & Oak Park Elevated at 3½ and 3⅛, preferred at 17¼, and South Side Elevated at 83¾ and 83.

Other Traction Securities

Very little interest was manifested in the Boston market. Boston & Worcester held firm, with sales at 23 and 23½. Massachusetts Electric common and preferred each dropped a point to 15 for the first named and 56 for the latter West End common sold at 86 and 86½ and the preferred at 101¾ and 101. In the Baltimore market a fairly large number of issues was traded in, but the individual totals were small. United Railway issues were heavy, the 4 per cent bonds selling at 85¾ to 85, the incomes from 50½ to 50¼, and the refunding 5s from 79¼ to 78¾. United Railway stock sold at 11⅜ and 11, and Norfolk Railway & Light stock brought 17¼. Other transactions included Norfolk Railway & Light 5s at 95¼, and Knoxville Traction 5s at 104½.

But little activity was shown in tractions on the Cleveland Stock Exchange the past week. A few small blocks of Cleveland Electric sold at 48 and Forest City at 89. In fact, the Exchange made a record for light business in all securities.

Security Quotations

The following table shows the present bid quotations for the leading traction stocks, and the active bonds, as compared with last week:

	June 12	June 19
American Railways	48	48
Boston Elevated	133	a134
Brooklyn Rapid Transit	53½	52¾
Chicago City	150	155
Chicago Union Traction (common)	3	3
Chicago Union Traction (preferred)	17	14
Cleveland Electric	46	47
Consolidated Traction of New Jersey	71	71
Detroit United	63	63¼
Interborough-Metropolitan	16	16
Interborough-Metropolitan (preferred)	46	44½
International Traction (common)	45	—
International Traction (preferred), 4s	68½	—
Manhattan Railway	134	129¼
Massachusetts Elec. Cos. (common)	15	15
Massachusetts Elec. Cos. (preferred)	56	56
Metropolitan Elevated, Chicago (common)	22	22
Metropolitan Elevated, Chicago (preferred)	63	63
Metropolitan Street	80	81
North American	68	66
North Jersey Street Railway	40	40
Philadelphia Company (common)	39	39½
Philadelphia Rapid Transit	23½	24⅛
Philadelphia Traction	91¼	92
Public Service Corporation certificates	64	64
Public Service Corporation 5 per cent notes	92	92
South Side Elevated (Chicago)	83	83
Third Avenue	105	105
Twin City, Minneapolis (common)	91½	92
Union Traction (Philadelphia)	*57¼	58

* Ex-dividend. a Asked.

Metals

The "Iron Age" says that the pig iron markets are dull throughout the country and in some localities are distinctly weaker. Under more liberal offerings by steel works, both East and West, the steel market has weakened perceptibly. The demand for steel rails for delivery during the year 1908 from our own railroads has been to some extent held up, owing to the uncertainty as to the new specifications.

Copper metal remains practically unchanged, the large selling agencies quoting 25½c. for Lake and 25¼c. for electrolytic.

DETAILS OF THE PUEBLA TRAMWAY, LIGHT & POWER COMPANY'S ACQUISTIONS

The details are announced of the acquisition by the Puebla Tramway, Light & Power Company of the tramway system in Puebla, which is one of the largest cities in Mexico, and has a population of about 150,000. The company's concessions in the city are perpetual and give the sole right to operate tramways within the city for a term of fifty years, while the suburban franchise does not expire till 1988. The company intends to extend its present mileage (being 16 miles) to a distance of 40 miles. and to convert the whole system into electric traction, beginning with the belt line in the city and the suburban line to Chaluba.

The company has also acquired the entire electric lighting plant now operating in the city, and has secured an exclusive contract for the city street lighting till 1929, and negotiations are now pending for the extension of this contract. The electric lighting company in 1905 was supplying some 12,000 lamps, from which the net profit was $70,500 (gold). The company has also entered into a contract on advantageous terms with the Fortezuela Power Company for supplying power up to 2000 hp for twenty years.

Among the company's assets is one of the most valuable water powers in the Republic of Mexico. This power will develop at least 20,000 hp in the dry season, and the cost per horse-power for development it is stated will not be over one-half of the average cost of such installations. This power is situated at Tuxpangom, in the State of Vera Cruz, near the city of Orizaba, about 80 miles from Puebla. The transmission lines will pass through a country in which it is expected there will be a large demand for power in the future.

The company is incorporated in Canada and has a capital stock of $5,000,000 and an authorized bond issue of $6,000,000.

A TRAFFIC RECORD IN BROOKLYN

The Brooklyn Rapid Transit Company experienced one of the busiest days in its history on Sunday, June 16. The recent unfavorable weather deterred riding for pleasure, and so when Sunday proved so favorable all the lines to the beaches and pleasure resorts were crowded from early in the morning until long after midnight. Though the company planned a very liberal allowance on all lines and pressed into service all the available equipment, it was severely handicapped. No official figures of the day's business have been announced, but the returns are understood to have been about $80,000. About 4 o'clock in the afternoon the power station of the company in Kent Avenue succumbed under the heavy strain and a number of the machines had to be shut down temporarily. Passengers were not seriously inconvenienced by this, however, for the company called on the Edison Company for assistance, and after the short delay incident to interconnecting the lines there was no further trouble.

The company this year is making even a more systematic effort than ever before to suppress the rowdy, and with good effect. President Winter says of this work:

"The special policemen employed by the company are carefully selected and regularly in the service. The work cut out for them is to preserve order and to protect so far as possible the passengers of this company and the public generally while on our property from the disorderly element. Window jumping is a specific violation of the law and has been the occasion of many complaints, public and private, against this company. In its efforts to stop the rowdy practice and otherwise guard the comfort and safety of passengers, the company is hiring special police and paying them out of its own pocket.

"Our only object in employing these policemen is to provide some measure of safety and comfort for our patrons. We want to make it possible for women and children to go to and from Coney Island without being insulted and trampled down. The only way we can accomplish this is to police our cars in the most thorough manner possible. For that purpose we have hired a large force of special police, with the advice and endorsement of the city officers. Without these special police doing effective service one can easily imagine what the situation would quickly become."

THE SAN FRANCISCO SITUATION

An indication of the speedy termination of the San Francisco strike, if strike it can be called, is the action of the United Railroads in discharging from its employ 200 men whose two months' contracts, consummated last April, expire soon. Many of the men asked to be allowed to continue in the employ of the company, but the policy of the United Railroads is to give local men the preference. By dispensing with the services of these men the old carmen and others are given the opportunity to go back to work on a wage scale ranging from 25 cents to 33 cents an hour. Operating the cars now are scores of ex-union men, who, disgusted at the condition of union affairs, have gladly returned to work. Every line of the United Railroads is now running.

PROPOSED SINGLE-PHASE ROAD IN THE ADIRONDACKS

It is reported that the Paul Smith Electric Light, Power & Railroad Company, which is the owner of a 7-mile spur from Lake Clear Junction to Paul Smith's, is proposing the equipment of the line by electric power. A single-phase locomototive will be used with catenary overhead construction. The potential of the trolley wire will be 5500 volts and the locomotive will be equipped with mercury arc rectifiers which will deliver direct current to four G. E. 57 motors. Twelve 40-amp. rectifier tubes will be used with the necessary transformers. This locomotive, it is expected, will be able to haul three Pullman cars on a level at the rate of 30 m. p. h., Current will be taken from the power plant of the Paul Smith Company, which is developing a water power at Union Falls, 18 miles distant, from which power will be transmitted at 22,500 volts. It is hoped to have the line in operation this summer.

TRANSIT MATTERS IN NEW YORK

The Rapid Transit Commission has decided upon the principal conditions which will be incorporated in the form of contract for the construction of the Fourth Avenue and Coney Island subway. Acting on the suggestion of Mr. Rives, counsel to the Commission, the Commission decided to omit the clause which makes the contractor responsible for damages to abutting property on the entire route south of Flatbush Avenue. In other streets, however, such as Ashland Place and Flatbush Avenue, this clause will be incorporated in the contract. Mr. Rives explained that south of Flatbush Avenue such a condition in the contract was unnecessary inasmuch as Fourth Avenue is a wide street and there is very little danger that any of the abutting property will be injured by the tunnel excavating. The Commission also decided how the excavating is to be done. South of Flatbush Avenue along the entire route the street will be opened. It was explained that the small grass plots which are located in the center of Fourth Avenue can be used as open ditches through which the excavations will be hauled to the street. By this arrangement traffic will not be interferred with, as Fourth Avenue is almost 100 ft. wide. In Ashland Place and the other streets north of Flatbush Avenue the excavating will be done under cover. Chief Engineer Rice informed the Commission that the contract had been divided into fourteen sections, and that the estimated cost of construction for each would be approximately $1,500,000. This led to some discussion if it were not possible to economize to some extent.

The Bradley Contracting Company was the lowest bidder for each of the three remaining sections of the subway loop to connect the bridges in Manhattan upon which bids were opened last Thursday. All told there were thirteen bidders. The bid of the Bradley Company for the first section from Pearl Street to Park Row was $998,328; for the second, Delancey Street, from Center Street to the Bowery, $1,518,302; for the third, from the Bowery to Norfolk Street in Delancey, $1,229,136. The aggregate bid by the same firm for the pipe galleries in the three sections was about $120,000. The total cost of the loop will be $8,900,000. Two franchises were voted by the board to the Long Island Railroad. They cover two stretches of track each a mile and a half long. The tracks are to be used as cut-offs connecting the main line with the Montauk division at Glendale, so as to give quick access to the East River tunnels at Long Island City.

Chief Engineer Rice, of the Rapid Transit Commission, has told the members that it was a paramount necessity to improve the subway service between Ninety-Sixth and 103d Streets. Between these two points there were, he said, only two tracks, and this compelled the running of expresses and locals on the same track. He recommended that an additional track be built between those points, and said that the work would cost $850,000 and take sixteen months to complete. The Commission authorized the construction of the track. Chief Engineer Rice has also been authorized to extend the ventilation system of the subway on the Broadway branch north of Ninety-Sixth Street, at a cost not to exceed $280,000. The city has already spent $390,000 for ventilating the subway.

CHICAGO TRACTION NOTES

The Chicago City Railway has authorized a bond issue of $10,000,000 to be used in rehabilitating the system under the supervision of the board of engineers, of which Bion J. Arnold is chairman. The directors decided to place $6,000,000 of the issue on the market at once and hold the remainder in reserve. The issue is made up of twenty-year first mortgage 5 per cent bonds. It is said that arrangements have been made with the First Trust & Savings Bank to take up the whole of the $6,000,000 issue.

The management of the Illinois Tunnel Company has been changed, and it is probable that the tunnels, which have lain practically idle so far as freight transportation is concerned, will become an important factor in the handling of freight between railway stations and wholesale and retail establishments in the down-town district. J. Ogden Armour and Eastern capitalists are now in control. Samuel McRoberts, treasurer of Armour & Company, has been made president to succeed Albert G. Wheeler. The tunnel system embraces about 50 miles of tunnels under the down-town district, together with about 1200 cars of various types and about eighty locomotives, the majority of them electric. In constructing the tunnel there were issued about $17,000,000 of 5 per cent bonds, and there is $5,500,000 floating debt. The interest charges are more than $1,000,000 per year, and last year the earnings were about $225,000. The immediate result of the change in management will be to finish the tunnels now in the course of construction and to make connections with the basements of retail establishments and complete connections with various sources of freight. For this purpose it is said Mr. Armour and E. H. Harriman have agreed to raise $4,000,000.

The ordinance to allow the Chicago, Milwaukee & St. Paul Railroad to electrify its Evanston branch has again been brought before the local transportation committee. As agreed upon, the ordinance provides a 5-cent fare within the city limits and prohibits the use of the third rail.

The protective committee of the Chicago, West Division Railway Company and the North Chicago City Railway Company met in joint session Thursday, June 13, and agreed to accept a compromise proposition satisfactory alike to Judge Peter S. Grosscup and to the Union Traction interests, with which the underlying companies have been in conflict over the reorganization program. The action of the underlying committee puts at rest the possibility of law suits and condemnation proceedings, which the continuation of the controversy would have entailed. It insures the acceptance of the ordinances by the Chicago Railways Company, the new company that is to be formed out of the five now operating in the North and West Sides, and it also means the rapid rehabilitation of these lines, bringing the service up to the high standard required in the ordinances.

The Western representatives of the Chicago Union Traction Company and some of its underlying companies, who were in New York last Saturday, have returned to Chicago after having held several conferences there. It is understood that their trip to New York at this time had to do chiefly with the consideration of a plan of agreement under which the minority holders of Chicago West Division and North Chicago City Railway Companies would be willing to deposit their shares as the majority holders of the North and West Companies and the Chicago Union Traction Company have already done, preparatory to the acceptance of a new ordinance and a reorganization of the Chicago Union Traction Company through the Chicago City Railways Company. If the modifications are accepted the stock will be deposited and the ordinance formally accepted by the Chicago Railways Company in behalf of the companies which it will succeed.

IMPROVEMENTS PLANNED BY THE BUFFALO & LAKE ERIE COMPANY

The Buffalo & Lake Erie Traction Company, whose car house and twenty-two cars were recently destroyed by fire at Blasdell, has contracted with the General Electric Company for a new power plant which will be built near Athol Springs. Plans are also being made for a modern new car house. The company has also closed a contract with the Cincinnati Car Company for twenty-five cars.

NEW YORK CAR HOUSE DESTROYED BY FIRE

The car houses of the New York City Railway Company in Madison Avenue, between Eighty-Fifth and Eighty-Sixth Streets, were completely destroyed by fire early Sunday afternoon, June 16, entailing a loss estimated from $150,000 to $200,000. The fire was discovered at 12:40 o'clock in the southeastern end of the car houses, where about forty electric automobiles belonging to the New York Transportation Company were stored, and in less than 15 minutes the structure was aflame. Fortunately, most of the cars of the company were in operation at the time of the fire, so that there were only about a dozen cars in the car houses. Traffic on the Madison Avenue line was at a standstill practically the entire afternoon, but in order to relieve the congestion as much as possible the company operated extra cars on the Lexington, Third and Eighth Avenue lines.

THE CLEVELAND SITUATION

A postal card canvass is being made by the publicity department of the Cleveland Electric Railway in order to ascertain the sentiment of the people in various portions of the city. After that is done a good idea will be obtained as to where work in opposition to Mayor Johnson is needed. Whether the question is brought into politics or not a strong effort will be made to defeat him this fall.

A permit has been granted the Cleveland Electric to relay the track on East Ninth Street, so that the freight cars of the interurban roads may reach their station. Only a short stretch of this track was taken up, but the road has not been used since the company decided to cease operation on it with the other two streets.

Legal action has been taken to compel the Cleveland Electric to pave between its tracks for a certain distance on Detroit Avenue. The company objects to doing this work at its own expense when the city authorities threaten not to renew its franchise on this street next February, when it expires. The company will perhaps fight this through the courts rather than to put the extra expense on the street.

Active work has been continued through the week by the Cleveland Electric in its postal card campaign and the replies are said to be very gratifying both in number and substance. The company has not asked the aid of any political party in its fight against Mayor Johnson, but is making an independent fight against his re-election. With the opposition of the Republican party, and a split that occurred in his own party when County Clerk Charles P. Salen advised against allowing him to dictate the nominations on the Democratic ticket, it would seem that his fight will be a hard one.

W. B. Colver, president of the Low Fare Railway Company, has been given a permit to begin the construction of a line a quarter of a mile long from Woodland Avenue to Quincy Street. This, like the Sumner Avenue route of the Low Fare Company, lies along the side of a cemetery, where the consents of property owners are not necessary or may be given by the city. This grant will allow extensions toward the down-town district in case the Low Fare Company gets the right to build a road on Quincy Street.

The case of Edward S. Isom against the Low Fare Railway Company, appealed from Common Pleas Court, was taken up in Circuit Court Monday. The Judges are Harrison Wilson, of Sidney; S. A. Widlman, of Toledo, and Morris H. Donahue, of New Lexington. Mr. Isom has applied for an injunction against the company to prevent the construction of a road on the old Central Avenue-Quincy Street route, on the ground that the company did not have consents of the property owners, and that consents could not be transferred from the Forest City Railway Company to the Low Fare Railway Company. Judge Phillips sustained these contentions.

IMPROVEMENTS OF THE UNION ELECTRIC COMPANY

The Union Electric Company, of Dubuque, Ia., does not propose to enter immediately into contracts of importance, though the money which is realized from the sale of the stock will be sufficient to finance the improvements and extensions for a period of three or more years. These improvements will consist largely of the purchase of additional rolling stock, transformers, meters and lamps required through the growth of the light and power business, heavier rails for some of the track now in operation, permanent improvements at company's park, and at a future date the construction of three or four additional miles of track.

THE CINCINNATI, NEWPORT & COVINGTON LEASE

In order to comply with the requirements of the Ohio laws in the lease of the Cincinnati, Newport & Covington Light & Traction property, those interested in the Columbia Company will shortly incorporate the Columbia Gas & Electric Company of Ohio. The lease will be made to this company and assigned to the Columbia Company of West Virginia. The lease is for ninety-nine years, and will be dated April 1, 1907. The lessee agrees to guarantee the interest on all outstanding bonds, the 4½ per cent dividend on the preferred stock and a graduated scale on the common stock, beginning with 3½ per cent the first year and increasing to 6 per cent in the sixth year, which is the rate to be paid thereafter. The first quarterly dividend on the common stock will be paid on July 15.

Holders of ten shares or more of the original railroad stock may subscribe for bonds of the Columbia Company on the basis of 90 per cent of the face value of such bonds to the extent of 50 per cent of their holdings and the same amount of common stock as a bonus. Those who have less than ten shares of stock may subscribe for one $500 bond, paying for it $450, and receiving $500 stock as a bonus.

A statement made to the stockholders shows that the bond issue of $25,000,000 of the Columbia Company will be used for the following purposes: $9,000,000 for the purchase of the Cleveland gas properties, $6,000,000 to build a pipe line to Cleveland, $6,500,000 to build a pipe line to Cincinnati, $1,000,000 to acquire gas fields in West Virginia, and $2,500,000 to provide a guaranty fund and take care of future developments.

RAILWAY ENGINEERING AT UNIVERSITY OF ILLINOIS

The Bulletin of the University of Illinois, descriptive of its courses in railway engineering and administration for 1907-08, has just been issued. As already announced in these columns the university has recently made railway engineering and administration the subject of special instruction, which is divided up into four courses: (1) Railway civil engineering; (2) railway mechanical engineering; (3) railway electrical engineering; (4) railway administration. The first two are intended primarily for those who intend to enter the service of steam roads in the departments of way and of motive power, the third for those who will find employment in electric railways, and the fourth to prepare men for service in all departments of railway work other than engineering and legal. Each course occupies four years. It is understood that the position of professor of railway engineering at the university is still vacant and that candidates are being considered. The man selected for this position will be the head of the newly-formed railway engineering department and will have general charge of the engineering work.

HANDLING FREIGHT IN PENNSYLVANIA

In some instances the electric railways of Pennsylvania will enter into contracts with outsiders to handle the freight business allowed under the new law. This is the case at Scranton, where the Quick Delivery Express Company has entered into a long-term contract with the American Railway Company for the exclusive right of carrying freight over the street car lines from Pittston to Forest City. At present several quick delivery cars are operated on certain lines, but from this time on great quantities of freight will be thus transported over every line of the Scranton Railway Company. One of the features of the enlarged scheme is to erect stations in every town along the lines, all of which will be connected with the main tracks by switches. The central station will be in this city, and when the service is in full operation 100 men will be employed.

VARIOUS RAILROAD PROJECTS HEADED FOR SACRAMENTO

Northern California has been the field for some time of a number of railway projects, some under construction and others building, and of these lines no less than eight appear to be headed for Sacramento, the capital of the State. These are in addition to the four Southern Pacific steam lines and half dozen steamship lines centering in Sacramento. Beginning on the north the first new railroad is the main line of the Western Pacific, building from Ogden, Utah, to San Francisco. This company, which it is rumored may use electric power for part or all of its system, is now working 10,000 teamsters and graders on its lines through Nevada, Plumas, Butte, Yuba and Sacramento Counties, and promises to be running construction trains into Sacramento to Twentieth and J Streets by Nov. 1 next.

The second railway is that of the Northern Electric Company, previously mentioned in the Street Railway Journal at different periods. This company expects to have construction trains running to its main depot at Eighth and K Streets, Sacramento, by Aug. 1.

The third railway is the Vallejo & Northern Electric line, headed by President Melville Dozier, Jr., which has already applied for a franchise to cross the river at the foot of P Street. This line will run from Vallejo through Fairfield and Woodland to Sacramento with branches to Suisun and other points, tapping one of the richest parts of Northern California.

Number four is the Sacramento Southern steam railway, owned by the Southern Pacific, which has several hundred men under Chief Engineer Wheeler now working on the levees and grades near the Johnston place, 20 miles down the river. This line will tap the main Southern Pacific line a mile this side of Antioch, and run 45 miles, following the river to this city, giving a route of almost exactly 100 miles from Sacramento to Third and Townsend Streets, San Francisco, without a single ferry en route. When this line is completed it is expected that the company will have no difficulty in shortening the distance between Sacramento and San Francisco to 2½ hours. Number five is the Central California Traction Company's railroad building now from Stockton via Lodi and Elk Grove to this city, which also proposes to run lines into Calaveras and Mariposa Counties. This railroad, which is already in operation this side of Lodi, will enter the city on the eastward over its private right of way, between J and M Streets, through what is known as the Smith tract. Number six is the Lake Tahoe & Eastern Electric Line, which has just been financed in New York, and which will begin construction some time this summer on its line from Sacramento to the eastern shore of Lake Tahoe via Placerville, a distance of about 100 miles. Number seven is the Santa Fe, which is now making preparations to extend its line from Stockton to this city as soon as the labor market lets up a little. This line will probably run from Antioch, which is already tapped by the Santa Fe, requiring about 45 miles' construction to reach Sacramento. Number eight is the Grass Valley & Midland, which has just put a corps of surveyors in the field running from Grass Valley to Marysville. At a point about 10 miles west of Grass Valley it is proposed to run a branch line into Sacramento direct, tapping another rich and fertile region.

THE CONESTOGA COMPANY PERFECTING ITS PLANS FOR IMPROVEMENTS

The boards of directors of the Conestoga Traction Company, the Edison Illuminating Company and the Columbia Electric Light Company and the executive committee of the Susquehanna Railway & Light Company held meetings June 12 for the transaction of routine business and to arrange for extensions and improvements. A dividend of 5 per cent, payable on July 1, was declared on the preferred stock of the Lancaster County Railway & Light Company. It was announced that an agreement has been signed with W. J. Hayes & Company, who constructed and now operate the Philadelphia, Coatesville & Lancaster road, who also operate a line between Coatesville and Parkesburg, and partly constructed a line between Parkesburg and Christiana, whereby they agree to sell their property to the Susquehanna Railway & Light Company. The executive committee of the latter company has passed resolutions directing its officers to proceed with all possible speed to improve the line between Coatesville and Christiana, to reconstruct that part of the line between Parkesburg and Christiana, and to build the remainder. This line between Christiana and Coatesville will be operated by the Conestoga Traction Company in connection with the Lancaster & Eastern Company. It is expected that within a few months through cars will be run between Lancaster and Coatesville. Between the latter place and Philadelphia there are several lines in operation. For these extensive improvements, and also the enlargement of the Engleside power plant, and the erection of a new car house, financial arrangements have been made.

A NEW ISSUE OF BONDS AT BIRMINGHAM

The stockholders of the Birmingham Railway, Light & Power Company have ratified the action of the directors in calling for the issuance of $35,000,000 of bonds for the retirement of outstanding bonds and securing funds for most extensive developments. Principal among the new improvements will be the building of a $1,500,000 power house at North Birmingham on a tract of 23 acres already obtained. A large number of new cars will be bought for the interurban service.

ANNNUAL CONVENTION OF A. I. E. E.

The annual convention of the American Institute of Electrical Engineers will be held June 25-29, at Niagara Falls. The Institute headquarters during the convention will be at the Cataract Hotel. The following program has been adopted:

TUESDAY, JUNE 25

President's address, "The Properties of Electrons," by Samuel Sheldon; "Protective Apparatus Engineering," by E. E. F. Creighton; "Practical Testing of Commercial Lightning-Arresters," by Percy H. Thomas; "A Proposed Lightning Arrester Test," by N. J. Neall; "Interaction of Synchronous Machines," by Morgan Brooks; "The Heating of Copper Wires by Electric Currents," by A. E. Kennelly; "Deflocculated Graphite," by E. G. Acheson.

WEDNESDAY, JUNE 26

High-Tension Transmission Committee.—"Choke Coils vs. Extra Insulation on the End Windings of Transformers," by S. M. Kintner; "Protection of the Internal Insulation of a Static Transformer Against High-Frequency Strains," by Walter S. Moody; "Transmission Line Towers and Economical Spans," by D. R. Scholes; "Lightning Rods and Grounded Cables as a Means of Protecting Transmission Lines Against Lightning," by Norman S. Rowe; "The Transmission Plant of the Niagara, Lockport & Ontario Power Company," by Ralph D. Mershon; "Location of Broken Insulators and Other Transmission-Line Troubles," by L. C. Nicholson; "A New Type of Insulator for High-Tension Transmission Lines," by E. M. Hewlett; "Some New Methods in High-Tension Line Construction," by Harold W. Buck; "Switchboard Practice for Voltages of 60,000 and Upward," by S. Q. Hayes; "Some Power Transmission Economics," by F. G. Baum; "One-Phase High-Tension Power Transmission," by E. J. Young; "Commutating Pole Direct Current Railway Motors," by E. H. Anderson.

THURSDAY, JUNE 27

Topical Discussions.—(a) "Single-Phase vs. Three-Phase Generation for Single-Phase Railways," by A. H. Armstrong. (b) "The Choice of Frequency for Single-Phase Alternating-Current Motors," by A. H. Armstrong. (c) "Twenty-Five vs. Fifteen Cycles for Heavy Railway Service," by N. W. Storer. Report of the committee on a code of ethics; "The Attitude of the Technical Schools Toward the Profession of Electrical Engineering," by H. H. Norris; "The Concentric Method of Teaching Electrical Engineering," by Vladimir Karapetoff; report on the proposed revision of the standardization rules by the standardization Committee.

FRIDAY, JUNE 28

"Track-Circuit Signaling on Electrified Roads," by L. F. Howard; "Regeneration of Power with Single-Phase Electric Railway Motors," by William Cooper; "Notes on Transformer Testing," by H. W. Tobey; "Inductive Disturbances in Telephone Lines," by Louis Cohen; "Fractional Pitch Windings for Induction Motors and Alternators," by C. A. Adams, W. K. Cabot and G. Æ. Irving, Jr.; "Power Factor, Alternating-Current Inductive Capacity, Chemical and Other Tests of Rubber-Covered Tires of Different Manufacturers," by Henry W. Fisher; "The Vector Diagram of the Compensated Single-Phase Alternating-Current Motor," by W. I. Slichter; "Zigzag Leakage of Induction Motors," by R. E. Hellmund.

ALLIS-CHALMERS RAILWAY EQUIPMENT USED IN TRACTION SYSTEMS

Since its advent in the electric railway field the Allis-Chalmers Company has equipped six complete electric traction systems aggregating a total of 318 miles of trackage. Of these 150 miles are already completed and in daily operation. Descriptions have been published in this paper of several of these roads, but a summary may prove of interest. These six systems are as follows: (1) The Toledo, Port Clinton & Lakeside. This road has a trackage of 46 miles, two 800-kw engines and generators, 50-foot cars equipped with quadruple 50-hp motors, and three sub-stations of 400 kw each. (2) The Cincinnati, Milford & Loveland Traction Company. The total trackage of this company with extension now under construction is approximately 40 miles. The power station is equipped with two 500-kw engines and generators, transformers, rotary, etc. There are three sub-stations, and the cars are propelled by 40-hp motors. (3) The Winona Interurban Railway Company. This road runs from Warsaw and Winona Lake to Goshen, Ind., with an extension to Peru, Ind., giving a total trackage of approximately 77 miles. The power station is equipped with two 600-kw engines and generators, transformers, rotaries, etc., to provide for a transmission voltage of 33,000 volts, on which the system is operated. Seven sub-stations of 300 kw each, all complete, and sixteen cars equipped with quadruple 75-hp equipments are provided. The cars are 60 feet over-all, and are designed for a speed of 56 m. p. h. (4) Indianapolis, New Castle & Toledo. This system, which is now nearly completed, extends from Indianapolis to New Castle, Richmond and other cities in Indiana, with the intention of ultimately reaching Toledo, Ohio. The total trackage now under construction is 90 miles. The power station consists of two 1000-kw steam-driven units, transformers, rotary, etc. The transmission voltage used is 33,000. There are ten 60-foot cars equipped with 75-hp equipments, and four sub-stations of 400 kw each. (5) The Indianapolis, Crawfordsville & Western. This system will operate from Indianapolis westward to the city of Crawfordsville, Ind., and is intended to connect with the McKinley syndicate lines in Illinois. It will be 45 miles in length. The power station consists of two 700-kw engine and generator sets with transformers, etc. Transmission voltage is 33,000 volts. There are three sub-stations of 300 kw each. Ten cars fitted with quadruple 75-hp equipments are provided. (6) The Milwaukee Northern Railway. This line will operate from Milwaukee to the town of Port Washington, Wis., over a trackage approximately 25 miles in length. The power house consists of three 1000-kw twin tandem gas engines and generators, and complete auxiliaries, including transformers for 22,000-volt transmission. This installation will constitute the largest in America of gas-engine-driven electrical units used for traction purposes. Eight sub-stations with complete equipments, including switchboards, are included.

SPECIAL MESSAGE ON ELECTRIC RAILWAYS IN CONNECTICUT

Governor Woodruff, of Connecticut, sent to the Legislature last week a special message dealing with trolley legislation. The Governor deplores the present method by which each company secures a separate grant, some with more or less liberal stipulations, and favors a general statute to give eminent domain to the electric railways for right of way only. The Governor is of the opinion that the power of eminent domain is essential to securing right of way for a street railway corporation; that power should be embodied in a general statute in which all street railways of the present day, as well as those to be chartered in the future, can operate.

"In some charters," says the Governor, "the right is given not only for right of way to operate a railway, but to establish and maintain upon private lands and upon public grounds lines of poles and wires, and underground conduits and wires and cables; the board of directors being allowed to be the judges of what is necesary for the conduct of their business in that particular. I cite that because I believe it against public policy to permit any corporation to exercise powers of such wide latitude, and because I believe that the Railroad Commissioners should have the power of supervision in such cases. I believe also that there should be a more careful provision of law concerning the location of power houses and that such matters differing from right of way should not be left subject to power of eminent domain."

The Governor has drawn the following bill in accordance with his ideas and has urged that the Assembly pass it at this session:

THE BILL PROPOSED

State of Connecticut, General Assembly,
January Session, 1907.

An Act Concerning the Taking of Land by Railway Companies.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. In this act "street railway" or "railway" means a railroad or railway including poles, wires or other appliances and equipments connected therewith of a class operated by motive power other than steam and usually constructed on the public ways and places; but it shall not apply to a railroad company operating its railroad or a part thereof under the provisions of section 3697 of the general statutes.

Sec. 2. When any company shall have been chartered by the General Assembly for the purpose of operating street railways, such company may construct and operate its railway with one or more tracks and all necessary equipments and appliances upon private lands permitted by said company's charter and the amendments thereof, but before such company shall proceed to construct such railway or lay additional tracks, it shall cause a plan to be made showing the lands through which it proposes to lay its tracks, the location of the same as to grade and the center line of the proposed construction of such railway, and such changes as are proposed to be made in said private lands, and the boundaries of its proposed location shall be shown thereon. And said plans shall be presented to the Railroad Commissioners with a petition for their approval of said location. Before the Commissioners shall approve the layout and location of any railway or the taking of any real estate for the purposes of said railway or any change or alteration of the same, they shall give reasonable notice to all persons having an interest in said real estate to attend and be heard, and the appraisers as hereinafter provided for shall cause a like notice to be given to all persons interested in said real estate. If any person resides out of this State or is a femme covert, infant, or cestui que trust, or is non compos mentis, any judge of the Superior Court may prescribe the notice to be given to said person.

If the layout and location of said railway is approved by the Railroad Commissioners the railway company may take as much real estate as said Commissioners may have found necessary for the proper construction and security of said railway, but said Commissioners shall first prescribe the limits within which real estate shall be taken for said purposes, and no railway shall lay out or finally locate its road without the written approval of the location by said Commissioners. Said Commissioners may on application of any railway company and after due notice and within the limitations and methods heretofore set forth amend or change any order as to location and layout approved under the provisions of this act.

Sec. 3. When a railway has secured its location and layout and the approval of the taking of lands as provided in section 2 of this act, said company shall have the right to take land in the manner provided in section 3657 of the general statutes.

Sec. 4. Except as herein provided, no railway company shall exercise the right of eminent domain, and this act shall be an amendment to all charters granted or hereafter granted to railway companies.

Sec. 5. This act shall take effect from its passage.

STREET RAILWAY PATENTS

[This department is conducted by Rosenbaum & Stockbridge, patent attorneys, 140 Nassau Street, New York.]

UNITED STATES PATENTS ISSUED JUNE 4, 1907

855,492. Conduit for Electric Railways; John S. Alexander, New York, N. Y. App. filed March 14, 1904. The conduit comprises a pair of insulated clamps which grip the conductors. The clamps have a removable upper portion whereby the conductors may be easily removed and replaced.

855,601. Electric Railway Switch; Edward F. Winfield, Los Angeles, Cal. App. filed July 7, 1903. Electromagnetic means for closing the switch when the car is a definite point from the switch, and means intermediate of said point and the switch for causing the switch to open when the car takes more than a definite amount of the electric current.

855,723. Electric Regulating Device; James F. McElroy, Albany, N. Y. App. filed July 10, 1905. A dynamo-regulating device including a motor and contacts in the motor circuit adapted to be closed by a magnet set to act at a voltage greater than that required by the motor when exerting the maximum torque imposed by the devices which it operates.

855,727. Electric Signaling System; Edward L. Orcutt and Richard Sheldon, New York, N. Y. App. filed Sept. 1, 1906. Provides a signaling circuit on the train adapted to be governed by a controller which is operated by the track rail circuit.

855,876. Ratchet Brake Mechanism; Joseph M. Bosenbury, Decatur, Ill. App. filed Aug. 25, 1906. A vertical brake staff has a horizontal bevel gear wheel meshing with a vertical bevel gear wheel to which the brake lever is attached.

855,966. Electric Signaling Device; Edward L. Orcutt, New York, N. Y. App. filed Sept. 1, 1906. Comprehends an electric train-stop device having circuits including only the usual track rails by which the alarm circuits, etc., are operated in the engine cab.

855,967. Electric Signaling Device; Edward L. Orcutt, New York, N. Y. App. filed Sept. 1, 1906. Modifications of the above.

855,968. Electric Signaling Device; Edward L. Orcutt, New York, N. Y. App. filed Sept. 1, 1906. Further modifications.

855,971. Railway Signal; Charles C. Phillips, Owensboro, Ky. App. filed Aug. 6, 1906. A sector-shaped semaphore arm swings in a circular casing under the influence of separate operating locking magnets.

856,010. Electropneumatic Braking Device for Railway Cars; Ragnar Wikander, Westeras, Sweden. App. filed Dec. 26, 1906. Provides an electropneumatic braking device in which only one valve body will be required and in which an automatic adjustment of the braking pressure can be effected by means of each of the two controlling systems.

856,087. Rail Joint; Charles L. McVoy, Pensacola, Fla. App. filed Jan. 16, 1907. The webs of the rails are thickened at abutting ends and the base, web and tread of the rails interlap at different points.

856,094. Electrical Signaling Device for Railroads; Edward L. Orcutt, New York, N. Y. App. filed Oct. 13, 1905. Relates to that type of railway signal in which the track rails are energized by an alternating current and means for displaying signals in the locomotive cab.

856,095. Electric Semaphore; Edward L. Orcutt, New York, N. Y. App. filed Sept. 1, 1906. Details of construction of a semaphore for use in the above system.

856,125. Concrete Tie; Manley E. Woodbury, Bowling Green, Ohio. App. filed March 11, 1907. Consists of a plurality of trapezoidal sections having their adjacent ends spaced apart and their upper faces formed with seating grooves for the reception of the rails, and brace rods connecting the rails and serving to maintain the tie sections in spaced relation.

856,127. Rail-Bond; James J. Brennan, Fort Wayne, Ind. App. filed Sept. 24, 1906. Consists of two terminals having upon their inner face a longitudinal recessed lug adapted to receive the rift-pin which is adapted to be expanded by contact with the bottom thereof and a flexible portion connecting the terminals and secured thereto by soldering.

856,179. Electric Signal; Robert Pfeil, Grunewald, Berlin, Germany. App. filed Jan. 19, 1906. An electrically-operated signal having manually operated means for controliing the setting of the circuit and means dependent upon the conditions to be indicated by the signal for causing the motor to return the signal to corresponding position.

856,184. Means for Keeping Switch and Signal Apparatus Free from Snow and Ice; Francis G. Shaw, Boston, Mass. App. filed Nov. 8, 1906. Relates to the construction of a housing for the parts containing a gas burner.

856,186. Brake Head and Shoe; Charles P. Smith, Canton, Ohio. App. filed March 16, 1907. Details of construction.

856,188. Brake-Shoe; John J. Tatum, Baltimore, Md. App. filed Sept. 11, 1906. A brake-shoe provided in its wearing face with recesses adapted to receive the attaching and guide lugs upon the back of another shoe, and a locking means at the rear of the first-mentioned shoe for securing the latter thereto.

856,192. Car Replacer; William F. Brann, Des Moines, Ia. App. filed May 7, 1907. Details.

PERSONAL MENTION

MR. W. P. BRENNING has been appointed assistant master mechanic of the Alton, Granite & St. Louis Traction Company.

MR. J. JORDAN has been appointed general manager of the Cleveland, Painesville & Eastern and the Cleveland, Painesville & Ashtabula Railroads.

MR. P. L. DORONS and MR. A. F. BENTLEY have been elected first and second vice-presidents, respectively, of the Belton Traction Company, of Belton, Tex.

PROF. ALBERT S. RICHEY, head of the department of electric railway engineering at the Worcester Polytechnic Institute, was married June 14 to Miss Holman, of Worcester.

MR. E. E. LYTLE, president of the Pacific Railway & Navigation Company, of Portland, Ore., has been elected president of the United Railways Company, of which he recently acquired control.

MR. HERMAN E. LA BREEQUE, of the Portland Railway, Light & Power Company, has resigned to become assistant superintendent of the Jersey Central Traction Company, of Keyport, N. J.

MR. FRANK ARNOLD has resigned as manager of the Oswego Traction Company, of Oswego, N. Y., to become general manager of the Fort Dodge, Des Moines & Southern system, of Des Moines, Ia.

MR. W. W. STREET has been appointed to succeed Mr. Thomas Woods as superintendent of transportation of the Illinois Traction Company. Mr. Street, who was superintendent of the Tri-City lines and East St. Louis terminals, will be succeeded by Mr. C. W. Cain.

MR. A. L. GILLETTE, for the past two years superintendent of motive power of the Escanaba Electric Street Railway, of Escanaba, Mich., has resigned to accept the position of superintendent of the Sterling, Dixon & Eastern Railway. Mr. Gillette has been identified with electric railway operation for about fifteen years.

MR. SAMUEL MARTIN has returned to New York from Rio de Janeiro, Brazil, where he has been directing the construction of rolling stock equipment for the Trazano de Medeiros & Company. Mr. Martin was connected with the subway division of the Interborough Rapid Transit Company before going to South America.

MR. FRANK R. HENRY, auditor of the United Railways Company of St. Louis, has been elected second vice-president of the American Street and Interurban Railway Accountants' Association, to fill the place made vacant by the recent resignation of Mr. C. F. Bryant, formerly comptroller of the Connecticut Railway & Lighting Company.

MR. L. C. BRADLEY, who recently resigned as general manager of the Scioto Valley Traction Company, of Columbus, Ohio, to become connected with J. G. White & Company, of New York, has been appointed by that company to the position of superintendent of the Eastern Pennsylvania Railways Company, of Pottsville, Pa., which is controlled by Messrs. White & Company.

MR. W. B. BROCKWAY, of Ford, Bacon & Davis, and Mr. ROBERT N. WALLIS, treasurer of the Fitchburg & Leominster Street Railway Company, contribute interesting articles to the May issue of the "Journal of Accountancy." The title of Mr. Brockway's article is "Reporting a Street Railway Examination from the Client's Point of View," that of Mr. Wallis is "Accounting of Depreciation by Electric Railways."

MR. HARRY C. YOUNG has resigned as general passenger agent of the Lake Shore Electric Railroad, with headquarters at Norwalk. Mr. Young came to the Lake Shore about a year ago, after a number of years in the passenger departments of large railroads. The duties of the general passenger agent's office have been divided for the time. Mr. John Miller, who has been with the company for several years in the auditing and passenger departments, has been made traveling passenger agent, reporting to Mr. A. C. Henry, the auditor of the company, who will exercise a general supervision over this part of the work.

MR. E. H. RICHARDS, who for several years was division superintendent of the Brockton division of the Old Colony Street Railway, and who has recently been essociated with the Newport division of the system as superintendent, has resigned to accept a similar position with the New Bedford Street Railway Company. Mr. Richards entered street railway service as a conductor on the Bridgewater-Taunton line. He was at one time assistant to present Superintendent Conway at the Campello car houses, and afterwards succeeded him as division superintendent of the road when Mr. Conway was transferred to Quincy. Leaving this position, Mr. Richards was associated with the Boston & Worcester Railway, and was then manager of the Taunton-Attleboro-Providence line.