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### Evaluating the Right of Way

A modern high-speed interurban road must be operated over a private right of way throughout a large part of its length if it is to give fast service. This is one of the truisms of progressive railroading, and yet when a new line is projected in some parts of the country it is often difficult to secure the money necessary to keep the cars off the traveled highways. In the interests of first-class

service at good schedule speeds it is most important that the actual money value of the right of way be appreciated as an operating asset. Exact figures may be difficult to secure, but some sort of arithmetical estimating of the difference it will make if a right of way is not secured ought to be attempted in the great majority of cases, just as the financial cost and value of a terminal station in the heart of a great city are weighed.

In a recent case which was very carefully figured it was found that if a proposed line should be built with 25 per cent additional highway trackage, the schedule time between terminals would be increased 50 per cent. Speed-time curves were plotted for a given motor equipment and schedule, and then a new set of curves was plotted for the same equipment, changing 25 per cent of the route from the private right of way to the highway. Careful allowance was made for the grades, curves and peculiar operating conditions of both routes, and the result emphatically demonstrated the importance of figuring the influence of the right of way, while in the case in point it showed clearly that the sacrifice of time resulting from too much highway running would be prohibitive to the best modern service.

It is not the purpose of these paragraphs to urge the private right of way upon all new trolley enterprises, for in many instances it is unquestionably the better policy to build a moderate speed road on the highway. But where fast time is desired, and by this is not necessarily meant record-breaking spurts at forty to sixty miles per hour but a high average speed, including stops, the highway is no place for success. There are many aspects of the private right of way which are forgotten in some of these projects, which grow out of the old-time conditions of local step-by-step service from door to door. Thus, a reduction of the accident bills is one certain result of keeping off the highway, while another is the important point that the equipment selected for a given running time need not be as powerful for private right of way operation as it would have to be in case it was required to propel the same weight of car over the highway in the same running time between terminals. The acceleration needed will not be as stiff, and the maximum speed which the equipment and the road must be built for can be lower for the same schedule, in favor of the private right of way. Less powerful equipment on the cars means a lower power station and distribution investment for the same time-table service, and a reduced cost of roadbed, bridges and track.

There is no question that operating expenses on a private right of way are less for the same service than on a highway. It is difficult to present actual figures proving this in specific cases, for the service capacity of a road with a high percentage of private right of way is so much be-

yond that of a parallel highway line, that it almost always results in a faster and better service being given in the former case. Even comparing the cost of operation per car mile on a private right of way interurban with the cost on a highway system making slower schedule speeds, there is little to expect but a result favorable to the interurban by perhaps 20 to 30 per cent. Promoters of new lines often shy at the cost of the necessary strip of land, especially after the farmers who own the soil in the region to be traversed get wind of the prospective development, but in all cases where fast service is required it is a necessity to keep out of the speed throttling obstacles which abound even on the average country highway. In some instances a saving of 10 or 15 minutes on a run may mean all the difference between the success or failure of a competing service.

### Engine Room Signals

As the capacity of power plants increases, the need of reliable signals in the engine room becomes more and more important. Hand signals between the switchboard and the generating room floor are perhaps the simplest means of communication in regular use, but in large installations it is absolutely essential to insure that there shall be no misinterpretations. Interlocks against mistakes are features of the most carefully planned switchboard practice, and the use of both visual and audible signals in the engine room are characteristic of much recent power house operation on a large scale.

Steam and air whistles, gongs, telegraphic indicators, lamps, telephones and speaking-tubes have all been pressed into this kind of service, and to a considerable extent the conditions determine the choice in a given plant. The use of long and short blasts or rings to indicate what is desired is open to the objection that counting or its equivalent is necessary in times of emergency, and perhaps the simplest and most reliable plan thus far developed is to call the attention of the men on the floor or gallery by an audible signal, leaving the subsequent indications to be given by an electrically lighted transparency. It is not a matter of serious expense to provide transparency signals at any desired point in the station, and the arrangement precludes the errors of interpretations that are so often outgrowths of complete dependence upon audible signals. The transparency and its circuits are easily maintained in good order, and are flexible in the extreme.

While unmistakable and simple signals are necessary between the floor and the switchboard gallery of a large plant, the communication essential between the engine or turbine room floor and the auxiliary or pump room below or at one side need not be of the same highly developed character to insure good results. Turbine auxiliaries are started and stopped on word from the operating engineers, but the absence of sensitive regulation and adjustment here enables the simple gong and speaking-tube to fill the need. In a recent installation the transparency is located in the middle of the switchboard gallery, indicating the machine number and all the necessary operating movements by remote control from the switchboard itself. The pump and condenser room is located beneath the turbine room floor. When an engineer wants anything done in the pump room, a me-

chanical gong is struck in the basement with the number of the machine affected. The pump operator at once gets in touch with the turbine room through a speaking-tube of the same number, below the corresponding generating unit, and the instructions are given and received orally. Complication is avoided, and the operation of the station becomes a simple matter on the score of internal communication. Emergency whistle or bell signals are of course desirable supplements in case of a failure of the lighting current used in the transparencies.

### Making Special Apparatus in the Shop or Purchasing It

The first impulse of many enterprising master mechanics who go into a shop where there are no special appliances or facilities for performing various special operations, is to design and build such machines as will either expedite the work or cheapen it. The devices which can be gotten up are as numerous as are the operations necessary in caring for apparatus, but the frequency of their use determines, to a great extent, whether or not it will pay to spend time and money in constructing them. The small shop may not find it economical to construct many. If, for example, pinions are to be pulled only once in two or three months, there is probably no economy in going to the expense of building a device which will save a few hours during the year. On the other hand, if the work can be done better with a special piece of machinery than by hand, it may pay to build or purchase such an appliance, although the saving in time alone will not warrant the necessary expense.

Estimates of the cost of construction of such machinery, made before it is made in the shop, are usually far below the actual costs. Frequently a great deal of experimenting and many changes must be made before the device can be gotten to work successfully, and sometimes the idea is an utter failure. And in the cost estimates the time and energies of the master mechanic or superintendent are not usually considered. But the money value of the attention given by the superintendent in devising and constructing a special device is sometimes so great as to make the cost of getting it up greater than the lessened costs or benefits resulting from its use. Within the last few years several manufacturers have undertaken to supply apparatus designed for special operations in the car house. There are now to be found on the market pinion pullers, armature stands and carts, banding machines, pit hoists, babbitting machines, and a number of other repair-shop devices, which have passed the experimental stage, and which a purchaser may feel assured will do the work they were built for in a satisfactory manner. In many instances it would, no doubt, be more economical for master mechanics or car-house foremen to purchase these devices from manufacturers instead of going to the trouble to build them themselves.

The master mechanic who considers that he is a special genius in getting up homemade devices need not feel that the opportunities to work along this line will be destroyed by purchasing those devices on the market. Their number is so small, compared with that of the possible devices that can be put to good use, that there will still be demand for all the energies he cares to devote to the work.

### Traffic Congestion and the Conduit System in New York

Plans for reducing street congestion in New York City have again been actively taken up, this time by the Public Service Commission of the First District, which has found time, in spite of its other multifarious duties, to hold several hearings on the subject during the past week. The problem is confessedly one difficult of solution, and the testimony shows that the blockades and delays to all surface traffic caused by the street congestion are constantly becoming more serious. Under the law the Public Service Commission has no jurisdiction over any traffic except that of the street railway companies, as power over the streets, so far as ordinary vehicles are concerned, lies with the Board of Aldermen. It is possible, however, that the hearings are being held by the Commission to determine to what extent improvement is possible and that the plan is to embody some recommendations on this subject in the forthcoming petition of the Commission to Albany for enlarged powers.

The testimony so far given has developed nothing particularly new. It is an old story that, owing to the peculiar topography of New York, including as it does many streets which were planned for the requirements of a Dutch village but not those of a modern city, the natural conditions seem to be about as bad as they could be, although the present tendency of erecting tall office buildings is constantly making them worse. As usual, certain of the witnesses consider the surface cars cause some of these delays. Perhaps they do, but there is one point in this connection which has not been clearly brought out; that is, that the companies are handicapped in giving good service by an unfortunate system of conducting current to their cars. It was not of their selection and they cannot be held responsible for its adoption. After it was forced upon them they called to their assistance the most expert knowledge in the country. Their engineers have practically made the system possible and have concentrated their attention constantly upon its improvement. The fact remains, however, that the underground conduit system is not and never can be as satisfactory or as reliable a system for street car propulsion as the overhead trolley. It has never been claimed to be so by anyone connected with the New York companies. It cannot be made as desirable because its troubles are inherent to the system.

Those residents of New York who see the cars on the streets and do not visit the repair shops, may believe that it is as simple an undertaking to collect current from conductors in a conduit as it is from a wire 18 ft. above the track, but anyone acquainted with the properties of electricity knows that the nearer the conductor is to the ground the greater are the troubles, and that when the conductors are carried in what is practically a small open drain in the middle of the street, the difficulties become enormous. Take the design of the plow itself; realize that it involves the maintenance of an efficient set of collectors in a position entirely out of sight, and the protection of comparatively high-potential leads in a shank of steel 9/16 in. wide and exposed to great side wear, and the mechanical difficulties of the problem are apparent. Its seriousness is shown by the fact that an average of one hundred electric cars per day, out of eighteen hundred or two thousand in use on Manhattan Island, are disabled from trouble with plows

alone, although the plow has been greatly improved since its original design, and still is being given constant attention.

Other difficulties encountered in the system are in the maintenance of a constant width of the slot and a constant distance between the conductors. A track can be kept to gage by tie-rods, and a slight difference in width of gage can be accommodated by the treads of the wheels; in fact, in large-radius curves the gage is frequently widened a quarter of an inch. With a slot seven-eighths of an inch wide, however, the conduit engineer is working with small dimensions and has no way of tying the slot rails together, except by bracing them from below on the yoke or from the sides by rods. In summer these rods often expand sufficiently to allow the slot to get tight, while in winter the slot rails are forced toward each other by the ice which forms between the interstices of the block paving. Tight slots constitute a constant menace and are avoided only by the greatest vigilance. Even this is not always adequate, however, as is shown by the fact that one day last winter eight hundred cars out of eighteen hundred were disabled from this cause. If the trouble had been confined to the destruction of the plow alone it would not have been so disastrous, but the plow is heavy and has to be held so firmly on the truck that a tight slot usually disables the truck and other parts of the car.

Troubles connected with keeping the conductor bars in alignment are probably not so severe as those already mentioned, but the work is a great undertaking. Its extent and importance can be realized by any engineer who will consider that it corresponds to keeping in alignment, to the fraction of an inch, conductor bars equivalent in length to the distance from New York to Buffalo, located not in the open where they can be easily seen, but in a conduit too small to admit the passage of a man. Add to these conditions the occasional setback of sewage and salt water in the conduit during a high tide or after a heavy rainfall and the drifting into it of snow in winter, and the difference between overhead and underground construction can easily be appreciated. In fact, the operation of the New York City railway system at all has been due only to the exercise of constant watching and the expenditure of a large amount of money on the part of the street railway company, with the application to the problem of the best expert knowledge available.

These facts are not introduced because they are particularly new. They have been a matter of common knowledge to all who have been acquainted with the actual operating conditions in New York City, and there has been no concealment of them by either the operating managers or the engineers of the company. They have been mentioned briefly under the belief that the general public in New York is not familiar with the special difficulties which accompany conduit railway operation, and to explain some of the facts which developed at the hearing of the Public Service Commission in New York. They may also be of assistance in other cities where there is occasionally an insensate demand for the substitution of the conduit system for the trolley, on the part of those who are not acquainted with the difficulties connected with conduit operation in New York City.

## POWER PLANT IMPROVEMENTS AT EL PASO

During the past two and one-half years the lighting, power and railway load of the El Paso Electric Railway Company has been increasing so rapidly that it has been necessary to add 1500 kw in turbo-alternators to the station equipment, which originally had a normal capacity of about 1000 kw. On account of the limited space available in the station for expansion and the unfavorable conditions in regard to water supply the carrying out of the changes necessary introduced several interesting problems into the work from time to time, which will be outlined in the following paragraphs. The design and construction work at El Paso was handled by the Stone & Webster Engineering Corporation, of Boston, Mass.

The arrangement of apparatus in the El Paso station at the time the first important increase in capacity was made is shown in Fig. 1. About two and one-half years ago the station contained eight boilers aggregating 1150 hp, five generating units normally good for upward of 1000 kw, a 20-in. x 30-in. x 24-in. Blake jet condenser rated at 1000

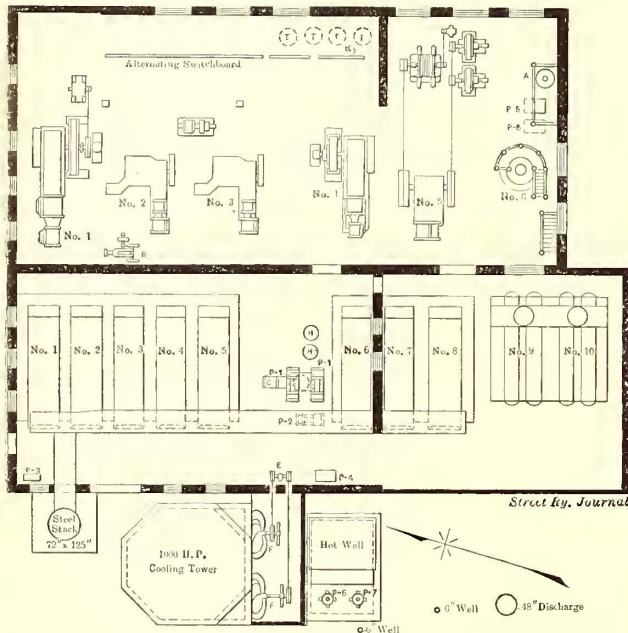


FIG. 1.—OLD GENERAL PLAN OF EL PASO STATION

### LEGEND

- Boilers. Nos. 1, 2, 5, 6, 7 and 8.—72" x 20", 150 hp each; steam pressure 130 lbs.  
 Nos. 3 and 4.—66" x 20", 125 hp each; steam pressure, 130 lbs.  
 Nos. 9 and 10.—Each 350 hp; steam pressure, 150 lbs.  
 A.—8" x 8" oil pressure accumulator.  
 B.—10" x 8", 150 r. p. m., 15 hp individual motor, 220 volts, 600 r. p. m.  
 C.—20" x 30" x 24" 1000 hp condenser.  
 E.—35 hp engine 9 x 6, 400 r. p. m.  
 F.—108" fan, 250 r. p. m., 164,000 cu. ft. per minute.  
 Unit No. 1.—450 hp, 19-32 x 22, 150 r. p. m., 300 kw., altern. 2  $\phi$  60 ~ 2200 volts, 20-kw exciter, 125 volts.  
 Units Nos. 2 and 3.—150 hp, 12 $\frac{3}{4}$ -20 x 14, 250 r. p. m.; 100 kw, alt. 2  $\phi$  60 ~ 2200 volts.  
 Unit No. 4.—300 hp, 15 x 25 x 20, 200 r. p. m., 200-kw generator, 575 volts.  
 Unit No. 5.—300-hp 14 $\frac{1}{2}$  x 24 x 16, 220 r. p. m.; two 100-kw generators, 550 volts, 650 r. p. m.; 200-kw No. 7 alternator, 2  $\phi$  60 ~ 2200 volts, 600 r. p. m.; 5-kw ex., 60 volts.  
 Unit No. 6.—500-kw turbo-generator, 2  $\phi$  60 ~ 2200 volts, 1800 r. p. m.  
 T.—50 light constant-current transformers.  
 Ex.—15 hp ind. motor, 2  $\phi$  220 volts, 1200 r. p. m.; 10-kw General Electric generator, 125 volts.  
 P-1 6-3 $\frac{1}{2}$  x 6 boiler-feed pump.  
 P-2 8-6 x 10 boiler-feed pump.  
 P-3 Fuel oil-feed pump.  
 P-4 Fuel oil-feed pump.  
 P-5 4 $\frac{1}{2}$  x 4 oil pressure pumps.  
 P-6 6-in. volute pump, 1000 gals. per minute.  
 15-hp General Electric ind. motor, 220 volts, 1200 r. p. m.  
 P-7 8-in. volute pump, 1800 gals. per minute.  
 30-hp ind. motor, 220 volts, 900 r. p. m.

hp, a steel stack 125 ft. high and 72 ins. inside diameter, and a 1000-hp cooling tower outfit. Crude oil from the Texas fields was burned beneath the boilers at a cost of from 80

cents to \$1 per barrel. The boiler grates originally supplied had been laid at one side and burners fitted beneath the water heating spaces, the oil being vaporized by steam pressure upon its admission to the fire boxes. The station is located about 100 yards from the banks of the Rio Grande River, but as this stream runs dry for two or three months each year, water for the boilers and condensing system is drawn from artesian wells. Some four or five years ago the engineering department of Stone & Webster designed a cooling tower to enable the water to be used over and over, taking simply enough from the ground to supply the losses in evaporation and by other causes.

At this time the station building consisted of a boiler room about 101 ft. long by 40 ft. wide, and an engine room of about the same length but 47 ft. in width. The cooling tower was located on the ground outside the boiler room, with a hot well adjoining. The following boilers were in service:

Six 72-in. x 20-ft. 150-hp longitudinal return tubulars, 130 lbs. steam.

Two 66-in. x 20-ft. 125-hp longitudinal return tubulars, 130 lbs. steam.

The generating units consisted of:

Unit No. 1, 450-hp Ridgway 19-in. x 32-in. x 22-in. engine, direct connected to a 300-kw General Electric, 2200-volt, two-phase, 60-cycle alternator, 150 r. p. m.

Units Nos. 2 and 3, 150-hp Ames 12 $\frac{3}{4}$ -in. x 20-in. x 14-in. engine, each direct connected to a 100-kw Stanley, 2200-volt, two-phase, 60-cycle alternator, 250 r. p. m.

Unit No. 4, 300-hp Ridgway 15-in. x 25-in. x 20-in. engine, direct connected to a 200-kw Westinghouse, 575-volt, direct-current generator, 200 r. p. m.

Unit No. 5, 300-hp Ball & Wood 14 $\frac{1}{2}$ -in. x 24-in. x 16-in. engine, belted to two 100-kw General Electric, 550-volt generators, 550 r. p. m., and to one 200-kw Stanley, 2300-volt alternator, 600 r. p. m.

These machines, while for the greater part compound direct connected sets, were of too low capacity to meet the expanding loads upon the plant, and it was decided to extend the boiler room 12 ft. to the southward and to install a 500-kw Curtis turbine at the south end of the engine room. To supply steam for this unit two boilers, No. 9 and No. 10, were installed, each consisting of a 350-hp Aultman & Taylor unit built for 150 lbs. working pressure. The settings of these boilers were built without grates, to give a larger combustion chamber for the burning of fuel oil. It was found that if the grates were to be left in, the furnaces would become so contracted that the tubes would be burned out by the intense flames from the oil burners. Each of these boilers was provided with a stack 50 ft. high and 4 ft. inside diameter.

In the original installation the 1000-hp jet condenser referred to above received the exhausts of the low-capacity engines mentioned, and as a temporary expedient the new 500-kw turbine was connected to this condenser. This overloaded the condenser at times of peak load, but the operating situation was eased off by running some of the reciprocating units non-condensing when heavy outputs were required. It was felt that the turbine made better use of the condenser than the reciprocating units, so the former was given full benefit of the condensing apparatus. From the jet condenser the condensation water was carried to the cooling tower hot well and pumped to the top of the tower by two vertical shaft Worthington 6-in. and 8-in. pumps, P-6 and P-7 in Fig. 1. One pump has a capacity of 1000 gals. per minute and the other 1800 gals.,

the two being driven by a 15-hp, 220-volt General Electric induction motor making 1200 r. p. m., and a 30-hp motor of the same make and voltage, whose speed is 900 r. p. m. The original cooling tower, and this is still in service, was provided with two 108-in. Davidson fans, each driven at 250 r. p. m., with a capacity of 164,000 cu. ft. of air per minute, by a 35-hp, 9-in. x 6-in. Sturtevant engine making 400 r. p. m. The fans are belted to the engine pulleys, the latter being mounted inside the boiler room. The increase in plant capacity by the addition of the 500-kw turbine was thus effected by a very small addition to the floor area. There was very little space available for expansion on account of adjoining property.

During the past winter it was seen that further additions to the generating capacity of the station were necessary, and so fast did the load increase that 1000 kw was determined as the requisite immediate addition. It was found that two 500-kw Curtis turbo-alternators could be delivered sooner than one 1000-kw unit, and the equipment shown in Fig. 2 was therefore placed under contracts. Some of the old equipment was torn out, and the station as a whole underwent a noteworthy change in its make-up. Engine units 1, 2, 3 and 4 were retained in service. In place of the first five boilers of the old plant two new 520-hp Babcock & Wilcox units were installed and connected with the old flue by a cross breeching as shown. An addition was built on the west side of the boiler room about 45 ft. x 30 ft. in extreme dimensions, and in this area three 350-hp Stirling water tube boilers built for 150 lbs. steam pressure and 150 degs. F. superheat were installed. These were set in a full and half battery, with a 66-in. stock for each section, designed for oil burning. In connection with the new boiler installation a 2500-hp open type Cochrane feed water heater and purifier was purchased and placed in the boiler room near the original condenser pit.

The three 500-kw turbines each drive a two-phase, 2300-volt, 60-cycle General Electric generator, at 1800 r. p. m., and are all connected to a Worthington jet condenser equipped with two pumps of the crank and flywheel type. The space was too limited to permit the installation of three separate condenser outfits, so all the exhausts, which were 18 ins. each in diameter, were brought together into a 36-in. cast-iron trunk exhaust line leading into the condenser chamber. The condenser consists of two 14 in. x 26 in. x 18 in. vertical crank and flywheel pumps, each connected on the suction side to a central condensing chamber. Either pump may be out of service without interfering with the proper operation of the equipment. In the top of the condensing chambers a spray plate of rolled brass is located, and within the body of the condenser are located a combined air cone and separator of gray iron, designed to collect air and non-condensable vapors at or near the water surface in the condenser, remove all water and water vapors, and deliver them to the air cooling arrangement. The air cooling device is attached to the top of the condenser and consists of an annular chamber in which the outgoing air is brought into intimate contact with the cold entering injection water, thus reducing the volume of air to be discharged. With this installation two 8 in. x 14 in. x 12 in. rotative dry vacuum pumps were provided.

It was also necessary to install a second cooling tower and hot well, when the turbine exhaust was taken away from the old condenser and brought to the new unit. The tower and its equipment were supplied by Henry R. Worthington. The tower is of the fan type, located on the ground considerably beyond the first tower, west of the boiler room, and it is provided with interlocking pipe filling. It is a cylindrical sheet steel stock resting on a masonry foundation, and is 34 ft. high and 22 ft. in diameter. The hot delivery water is carried through a central vertical discharge pipe to a level above the filling and into a revolving distributor provided with radial arms from which the water issues through numerous brass spouts, the reaction of the jets serving to revolve the distributor. The moving portion of the distributor is provided with a babbitted bearing revolving upon a hemispherical bronze journal, and is lubricated by a hand oil pump. The lower portion of the stack is furnished with four circular steel castings riveted to the shell and provided at the outer ends with angle iron rings, to which are bolted four 108-in. circular semi-pressure

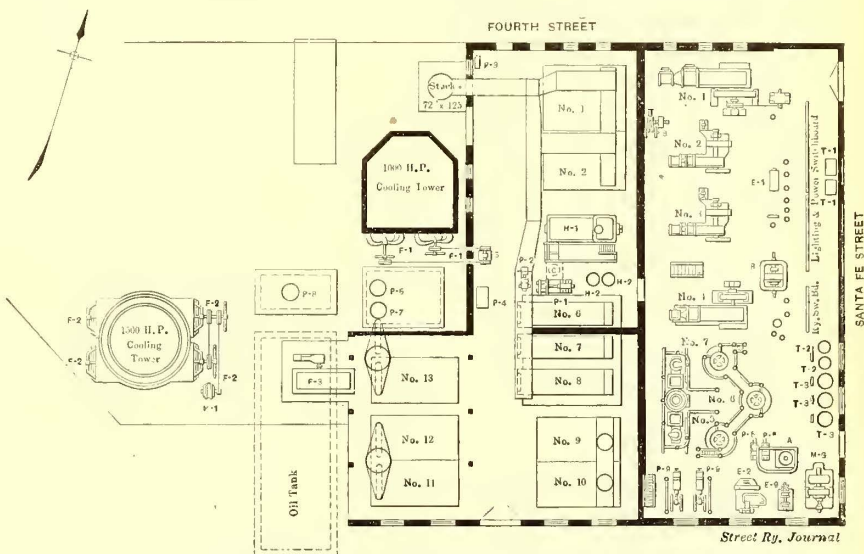


FIG. 2.—NEW GENERAL PLAN OF EL PASO POWER STATION

LEGEND

- Boilers. No. 1 and No. 2.—520-hp steam pressure, 150 lbs.
- Nos. 6, 7 and 8.—72 x 20", 150 hp each, steam pressure, 130 lbs.
- Nos. 9 and 10.—350 hp, steam pressure, 150 lbs., 150° superheat.
- Nos. 11-12 and 13.—350-hp, 150 lbs., 150° superheat.
- A.—8" x 8" oil pressure accumulator.
- B.—10 x 8 1/2 r. p. m., 15 hp ind. motor, 220 volts, 600 r. p. m.
- C-1.—1000-hp condenser, 20-30 x 24 single pump.
- C-2.—1500-kw, 2-14-26 x 18 vert. pumps.
- G.—35-hp engine, 9 x 6, 400 r. p. m.
- F-1.—108" fan, 250 r. p. m., 164,000 cu. ft. per min.
- F-2.—72" fans, 295 r. p. m.
- H-1.—2500-hp open heater.
- X.—102" forced draft fan.
- M-1.—75-hp 8 x 10 engine, ind. motor, 2300 volts, 600 r. p. m.
- F-3.—82-6" forced draft fan, 8 x 10 eng., 195 r. p. m.
- Pumps. P-1.—14-8 x 12 duplex feed pump.
- P-2.—8-6 x 10 boiler feed pump.
- P-3.—Fuel oil feed pump.
- P-4.—Fuel oil feed pump.
- P-5.—6-2-6 pressure pumps.
- P-6.—6" submerged pump, 1000 gals. per minute; 15-hp ind. motor, 220 volts, 1200 r. p. m.
- P-7.—8" submerged pump, 1800 gals. per minute; 30-hp G. E. ind. motor, 220 volts, 300 r. p. m.
- P-8.—12" submerged pump, 690 r. p. m.; cap. 3500 gals. per minute; 100-hp ind motor, 2300 volts.
- P-9.—8" 14 x 12 dry vacuum pump.
- Unit No. 1.—450-hp, 19-32 x 22, 150 r. p. m.; 300-kw altern., 2 φ 60 ~ 2200 volts, 20-kw exciter, 125 volts.
- Unit Nos. 2 and 3.—150 hp, 12 3/4-20 x 14, 250 r. p. m.; 100-kw, 2 φ 60 ~ 2200 volts.
- Unit No. 4.—300 hp, 15 x 25 x 20, 200 r. p. m.; 200-kw gen., 575 volts.
- Units No. 5, 6, 7.—500-kw turbo-gen., 2 φ 60 ~ 2300 volts, 1800 r. p. m.
- R.—300-kw rotary 2 φ 60 ~ 550 volts, 600 r. p. m.
- M-6.—300-kw motor gen., 600 volts, 720 r. p. m., 2 φ 60 ~ 2300 volts. syn. motor.
- E-1.—10-kw co. motor exciter, 125 volts, 1200 r. p. m., 2 φ 60 ~ 220 volts, ind. motor.
- E-2.—30-kw exciter, 125 volts, 350 r. p. m., 8 x 9 Batis engine ind.
- E-3.—35-kw motor exciter, 125 volts, 850 r. p. m., 2300 volt ind. motor.
- T-1.—105-kw transformers for rotary 2200/419 volts.
- T-2.—100 lt. constant current transformers.
- T-3.—50 lt. constant current transformers.

fans making 295 r. p. m. The fans being belt driven by a Westinghouse 75-hp 2300-volt induction motor making 690 r. p. m. There are two fan shafts, each being extended at one end and provided with pulleys to allow of cross belting.

In the center of the tower and set into the ground is a concrete suction tank or cold well. The cooling surface of the tower rests on a grating placed over I-beams, and consists of galvanized tubes arranged vertically in courses with the joints broken, so that the walls of each tube intersect the open centers of the tubes in adjoining courses, so that the water descending over each tube is distributed over the surface of several tubes in the next lower course, thus obtaining at each joint a complete redistribution of the descending water and of the ascending air, which performs the operation of cooling. The capacity of the cooling tower is 192,000 gals. of water per hour, from 110 degs. F. to 85 degs. F. at 70 degs. F. outside temperature and 70 per cent humidity.

brings the cooled water back to the condenser of the turbines from the cooling tower cold well.

Power for railway service is now available from three machines: The 200-kw engine driven generator previously mentioned; a 300-kw, 550-volt, two-phase Westinghouse rotary ammeter, and a 300-kw. motor generator set wound for 600 volts on the direct current side.

During the latter part of August and early part of September of this year it became necessary by reason of the increased price of fuel oil to make a change in the boilers to enable them to burn coal instead. The price of crude oil had advanced from about 90 cents per barrel to \$1.63 f. o. b. El Paso, and it was found that coal costing about \$2.50 per ton would effect a considerable saving over the expense of operating with the high priced oil. The experiment has been tried of burning pea and slack coal with forced draft, with very gratifying results. In order to make the change it was necessary to take out the oil burners and put new

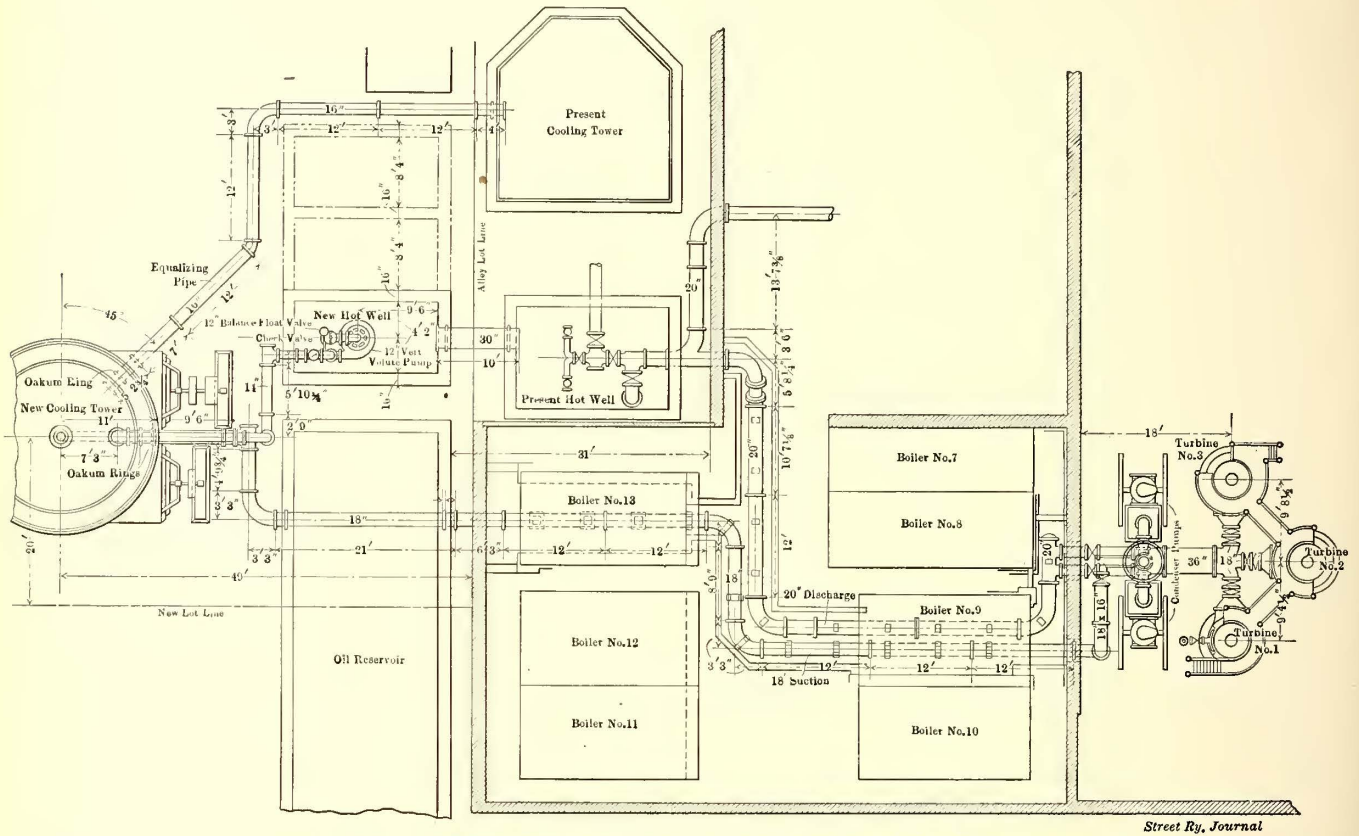


FIG. 3.—CIRCULATING PIPING PLAN OF THE EL PASO STATION

The completion of the plans for the turbine installation included the connection of the cold wells of the two cooling towers by a 16-in. cast-iron pipe serving as an equalizer between them, and various changes in the suction and discharge lines. Fig. 3 illustrates the circulating piping layout as completed. The remaining reciprocating engines exhaust into the original 1000-hp condenser hot well through a 20-in. line; and the discharge of the new condenser serving the three turbines is brought out by two 16-in. lines which join in a 20-in. main that leads to the same hot well. A new hot well was built in connection with the new cooling tower and connected with the old well by a 30-in. pipe. The whole condensing system was thus tied together. From the new hot well the water is pumped into the new cooling tower by a 12-in. Worthington submerged pump, having a capacity of 3500 gals. per minute. This pump is direct connected to a 100-hp, 2300-volt Westinghouse induction motor whose normal speed is 690 r. p. m. An 18-in. suction line

grates with  $\frac{3}{8}$ -in. air space under boilers 1, 2, 9, 10, 11, 12 and 13, and also to install a fan system capable of supplying the necessary draft. It was found possible in this work to utilize as a duct the pipe conduit which connects the condensers and the hot wells, a cross section of this conduit. This conduit is built of concrete, 6 ft. wide and  $6\frac{3}{4}$  ft. deep, with the pedestals and piping left in place. The general scheme of air supply to the boiler grates is shown in Fig. 4.

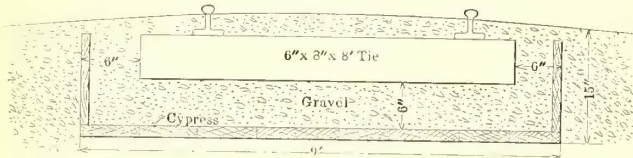
The under side of each boiler is supplied with air at 1 oz. pressure by a 24-in. tile duct and outlet leading from the pipe tunnel. A detail of the outlet is shown, the nozzle having been purposely turned away from the grates to allow a better distribution of the air. The discharge from the outlet is almost horizontal, and the air is deflected against the furnace walls before it reaches the grates. The fan was mounted on a reinforced concrete foundation over an underground oil reservoir formerly used in the plant, and



**TRACK CONSTRUCTION IN SOME SOUTHERN CITIES**

**SAN ANTONIO**

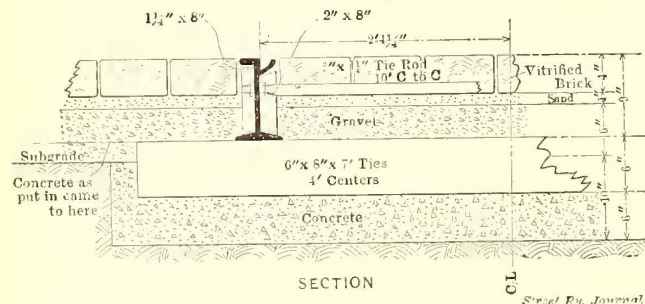
Practically all of the track in San Antonio has been rebuilt within the last three years. In paved street 6-in. grooved rails were completely immersed in a bed of concrete. This bed, which extends 4 ins. below the tie, is 14 ins. thick in asphalted and 11 ins. thick in bricked street. The track gage is only 4 ft. and a tie but 6 ft. long was used in the concrete construction. Ties used in about 12 miles of track were treated with dead oil of coal tar and zinc chloride.



TRACK CONSTRUCTION IN HOUSTON, USING A CYPRESS TROUGH TO KEEP OUT WATER

In most of the construction the ties were placed about 2 ft. center to center, but the latest practice in asphalted streets is to put them 6 ft. apart. No tie-bars are used. Natural cement was used in the concrete and the mixture was in the proportions 1, 2 and 4. The concrete was allowed to set well before the track was used. In unpaved streets a 4-in. T-rail is employed. The ties, which are 7 ft. long, have 6 ins. of gravel underneath them.

In all track A. S. C. E. angle-bar splices are used. Bonds are largely of the pin terminal type. Cross-bonds are 1000 ft. apart. Track centers of double track are 9 ft. apart or the distance between the gage line is 5 ft. Switches and curves are of standard construction with hardened centers. The method of constructing steam-road crossings in San Antonio is of special interest. Upon a 2-ft. bed of gravel 8-in. x 12-in. ties are placed crosswise of the steam-road track and as close together as they can be put. This gravel and tie foundation is used in preference to concrete because it is believed that concrete makes a too solid crossing. Instead of the usual gusset or corner plates the steam-road rails rest on a 3/4-in. steel plate 10 ft. long and about 15 ins. wide. The rail spikes are driven through spike holes in the



HOUSTON CONSTRUCTION FOR 9-IN. GIRDER RAIL IN BRICK-PAVED STREETS

plate. J. J. King, general superintendent of the system, had charge of the reconstruction of the track.

**HOUSTON**

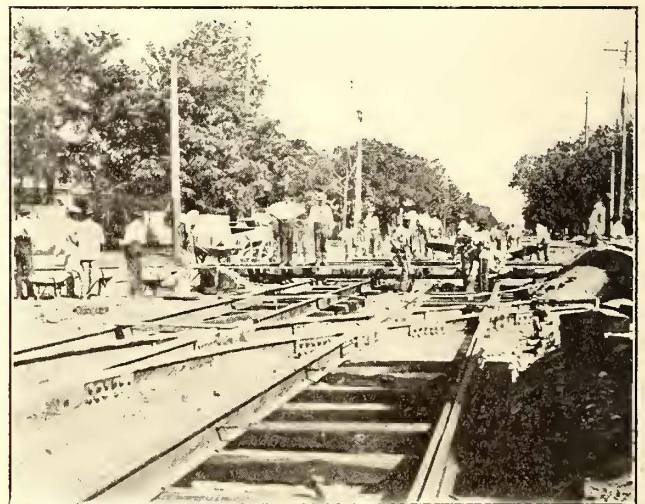
The spongy nature of the soil in Houston necessitates a rather peculiar type of track construction in unpaved streets. Where the track is laid in the usual manner the spongy earth in a very short time works up through the gravel and the track gradually sinks. To prevent this the track is laid in a trough of "pecky cypress." This wood will not rot or decay so long as it is kept damp. In track con-

struction 1-in. material in various widths and lengths is used. It costs about 13.50 per 1000 ft. at the mills, or about \$700 per mile of track. In the track construction after the excavation has been made, the boards are thrown into the bottom to make a floor about 9 ft. wide comparatively free from large openings. However, no attempt is made to make close fits, as openings an inch or two wide are not detrimental. The ties are then laid directly on this floor and the rails are spiked and bolted in position. Gravel ballast is then dumped in and the track jacked up and the ties tamped. While this is being done 12-in. side boards are placed 6 ins. beyond the ends of the ties to retain the ballast. These are held in position only by the earth on one side and the gravel ballast on the other. The top of the board comes flush with the top of the tie and this gives 6 ins. of gravel under the tie. The gravel ballast is brought within 2 ins. of the top of the rail so as to protect the tie and the top of the side board. The creosoted ties employed are placed 27 ins. center to center.

In suburban track construction small waterways are crossed by a special type of concrete culvert. The chief feature of the design is that it permits ties to be replaced without injury to the concrete. The two ties supported by the walls and to which the 4-in. floor of the culvert is nailed, are placed in a recess so that after removal of the spikes and the ballast immediately behind the top of the culvert they may be slipped back to clear the concrete and then pulled out sidewise. Other ties may then be replaced by reversing the process. The culverts are made in various sizes. The cost of one for a single track and with an opening 2 ft. wide is about \$25. Of this the concrete costs about \$12, the flooring \$4, and the labor \$9.

**HOUSTON PAVED STREET CONSTRUCTION**

In paved streets a concrete foundation is used. The con-



TRACK CONSTRUCTION IN HOUSTON, SHOWING ELEVATED CROSSING

crete, which is mixed in the proportion 1, 3 and 6, extends 6 ins. underneath and level with the top of the ties. The concrete was allowed to set several days. Wherever possible cars were rerouted while the street was being improved. The illustration shows a temporary cross-over used by the temporarily rerouted cars in crossing over the tracks being rebuilt. The ties are of cypress and are placed with centers 4 ft. apart. The paving is laid on a 1-in. sand cushion. A 4-in. bed of gravel intervenes between this cushion and the concrete and ties underneath.

A 9-in. grooved girder rail having a 1-in. flangeway is



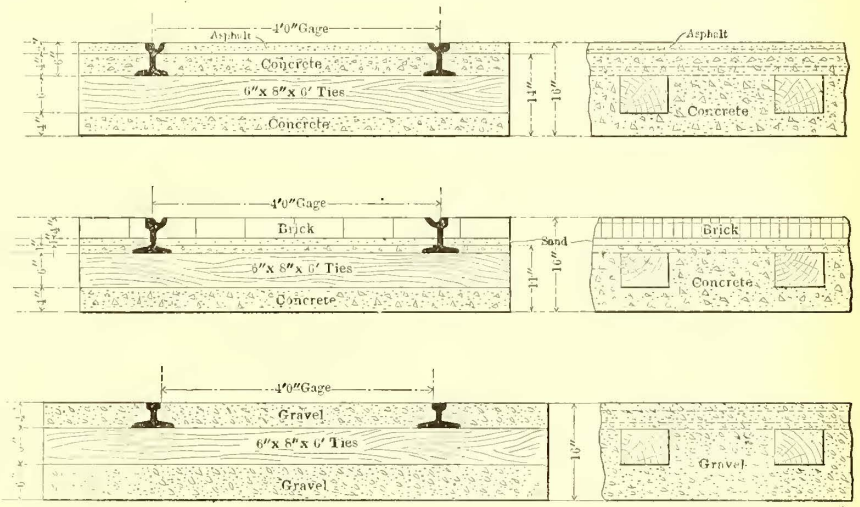
employed. The rail is filled out to the edge of the flange-way on both sides with cypress fillers. Tie-rods of 3/8-in. x 1 1/4-in. iron are placed 10 ft. center to center. The brick are grouted with a mixture of one part cement and two parts sand.

In asphalted streets the asphalt was formerly laid up against the rail, no intervening paving blocks being used. The asphalt went to pieces next to all rails except the Lorain Steel Company section 96-357. With this section no asphalt repairs have been made in four years except at defective joints. Rails in paved track are bonded with two No. 0000 plug bonds. Double tracks are laid with 10-ft. centers. The company pays for the paving 1 ft. outside of rails. In the 60-lb. construction the frogs are all home made. They are built up in the field by colored labor. The only materials used in addition to the rails are two bolts fastening the rails together and a 3/8-in. x 12-in. x 18-in. plate placed underneath. Some of these frogs have been in service ten years.

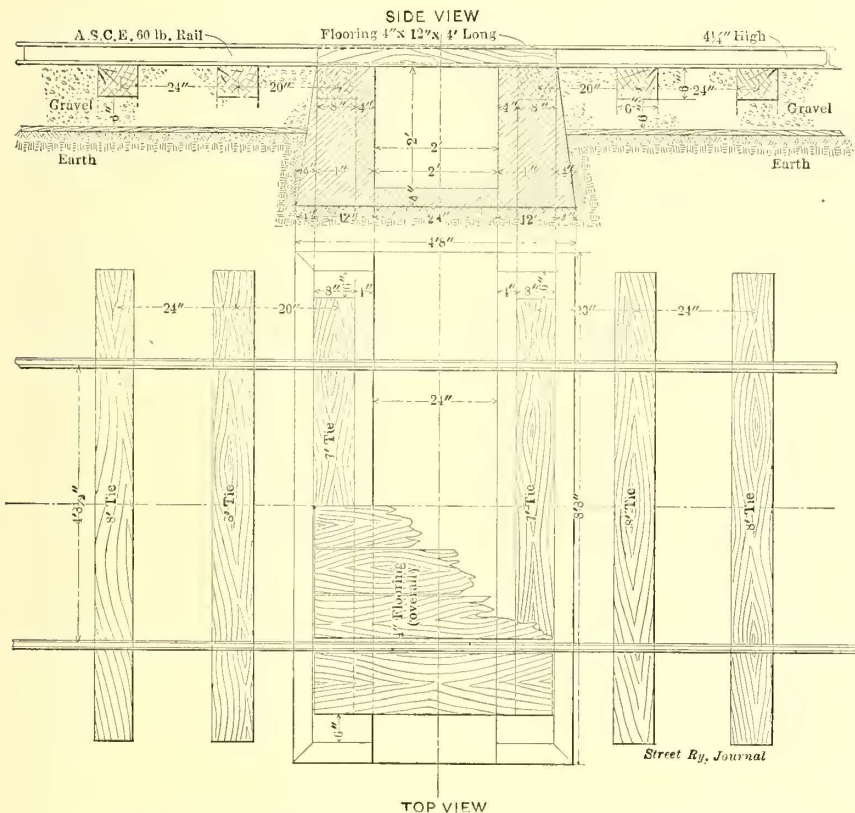
The improvements in Houston are being made by the Stone & Webster Engineering Corporation, for which Walter Goodenough is engineer in charge for all the work in the State. The work is being done under the immediate supervision of C. H. Ladd, with the aid of Flint McGregor, engineer of way.

89, No. 319 Lorain Steel Company rail in business district, and Sec. 90, No. 392 in the residence district.

In paved streets a concrete beam type of construction is being employed. In the business district the beam extends 9 ins. under the 9-in. rail and is 16 ins. wide at the bottom and 18 ins. at the bottom of the rail; in the residence district the beam extends 7 ins. under the 7-in. rail is 15 ins. wide at bottom and 16 ins. at base of rail. The two beams are connected and held rigid by the layer of concrete placed under the paving by the city. The rails are connected by 1/2-in. x 2 1/2-in. tie-rod placed at the middle of the web



SAN ANTONIO TRACTION COMPANY'S STANDARDS



DETAIL SECTION AND PLAN OF CULVERT FOR HOUSTON, TEXAS

MOBILE

. In Mobile, approximately 40 miles of single track out of a total of 50 miles have been rebuilt within the last two years. The track replaced consisted of 35 and 40-lb. low "T" and 70-lb., 7-in. T-rails. In the new work 60 and 70-lb. A. S. C. E. rails are being used in suburban work and Sec.

at 7-ft. intervals, and pine ties are placed 4 ft. apart.

Where creosoted blocks are not used exclusively, there are placed next to the rails creosoted pine blocks 4 ins. x 4 ins. x 8 ins. so that the sheet paving is kept 8 ins. from the rails.

Continuous rail-joints are used in paved streets. The rails of each track and double tracks are cross-bonded with No. 0000 bonds at 1000-ft. intervals. Ohio brass compressed terminal bonds are used, except at switches, where American Steel & Wire Company plug bonds are employed. The rails are laid to gage on tangents and 1/4 in. wider on curves. The company pays for the paving between rails and 18 ins. outside the rails. In unpaved streets, at curves and switch points the street between rails is paved with brick to keep the sand off and avoid wear.

On unpaved streets nothing but creosoted pine ties are used in both city and interurban track construction. These are cut in the vicinity of Mobile, the company buying them direct from the cutters. They are hauled on the company's cars to a creosoting plant in

Mobile, where they are treated.

E. T. Wagenhall, who has charge of the reconstruction of the tracks and overhead in Mobile, has adopted a novel plan of getting track bolts at joints tight. He has made a standing offer to the men doing the work in paved streets of 10 cents for every bolt they break. The track wrench is

fitted to a pipe 5 ft. long, one man hammers joints and one handles the wrench. No expansion is allowed in rail-joints when work is done in summer.

#### CHATTANOOGA

The Chattanooga Railways Company has rebuilt twenty-four steam railroad crossings within the past two years. These were constructed with a 20-in. bed of concrete underneath the ties. The bed extends over about 6 ft. underneath the wing rails. The crossings are built with 100-lb. steel. Railroad crossings are bonded both underneath and overhead. In addition to the usual rail-bonds, a bond wire is carried from the rails on one side of the crossing up a pole and overhead and down to the rails on the other side. About 4 miles of track in paved street has been built recently. In this work an 80-lb. 7-in. T-rail was used. The ties were laid with 2-ft. centers on an 8-in. bed of concrete, which extends 6 ins. beyond the ends of the ties. Concrete was tamped in between the ties, and in brick paving they were immersed 2 ins. in concrete. A special nose brick was used next to the rail and continuous rail-joints were employed. Pennsylvania Steel Company 80-lb. special work with hardened centers was employed. The standard construction in suburbs is with a 60-lb. rail with 10 ins. of bal-last underneath the ties.

The company makes its own bonds by soldering No. 8 wires or other sizes into compressed terminals purchased from supply houses. Old fields and other wire which would otherwise be sold as scrap is utilized in making these bonds. The terminals are driven tightly into the drilled hole and then compressed.

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#### STEEL RAILS

A paper on this subject was presented at a meeting of the Central Railway Club in Buffalo, Nov. 8, by Franklin E. Abbott, of the Lackawanna Steel Company. The speaker described in detail the present methods of making rails by the Bessemer process, and commented on some of the clauses used in different specifications for rails. The clause that "no bled ingots shall be used" is not necessary at the present time. In the early days it was the practice to throw ingots on their sides as soon as they were taken from the molds, and if the surface crust at the ends should break open the fluid metal at the center of the mass would bleed out, leaving a hole which would almost certainly result in piped rails. The present practice is to allow the metal to solidify in the molds and also to keep the ingots in a vertical position in the reheating furnaces. Mr. Abbott continued that if open hearth steel is to succeed Bessemer, it will take a term of years and the expenditure of an enormous sum of money to build furnaces enough to provide the steel needed for rails alone. Before this could be accomplished it is more than probable that the .085 phosphorus Bessemer ores would run out, and with an inadequate production of open hearth steel, the railroads would have to either get along with a short supply, or import the tonnage lacking. In the event of such sources not being able to keep pace with the demands, their only alternative would be to take a grade of Bessemer steel far inferior in wearing qualities to what they are now getting. To avoid this apparent short cut to the end of good quality Bessemer rail steel, the makers insist that the phosphorus limit shall be left as it has been for a number of years past, at .10 per cent, and a somewhat modified carbon content be used. It is entirely practicable to use enough carbon with .10 per cent phosphorus to make perfectly sound, safe and

serviceable Bessemer steel, and with that limit accepted, the manufacturers will be able to produce good quality Bessemer steel rails for many years to come. The speaker also discussed the proposal to discard 25 per cent from the top of the ingot, an amount which he considered excessive, as perfectly sound rails of standard composition can be secured if the clause reads that sufficient material shall be discarded from the top of the ingot to insure sound rails.

In referring to the history of the T section, he stated that Robert L. Stevens, president and chief engineer of the Camden & Amboy Railroad, in 1830 invented the first rail ever rolled with a base. The shape was similar in outline to the present rail, with a head 2 ins. wide, a base 3 ins. wide and a height of 3½ ins. Following the Civil War so many various sections were brought out that a committee was appointed in 1889 by the American Society of Civil Engineers to consider a standard section. The result of this study was what is now known as the A. S. C. E. sections. The distribution of metal in these sections is: In the head, 42 per cent; in the web, 21 per cent; in the base, 37 per cent. This distribution of metal is very satisfactory to the manufacturers, as there is but five points difference between the head and the base. Any revised rail section should be obtained through the co-operation of both manufacturers and users. The speaker suggested that in comparison with the A. S. C. E. sections, both head and base shall be reinforced, and that the distribution of metal be nearly balanced, making that in the base equal or slightly greater than in the head. It is also proposed that width of base shall be less than height of rail, which will admit of forming thicker flanges. The advantages of a balanced section, with comparatively thick base, are:

First. Lower temperature of the whole section at the final pass—hence a colder finish of the rail head, giving denser and better wearing material.

Second. Less cambering and better hot straightening, reducing, as much as possible, the objectionable cold straightening work.

Third. A reinforced head to provide against splits and other head failures.

Fourth. A reinforced base to overcome the weakness that seems so prominent in present pattern rails.

It is expected, also, that with this pattern of rail the higher carbon steel from grades of ores now available may be made with safety, and by longer service prove a benefit to the railroads. The balanced sections can be made easily and economically, and will thereby contribute to the interest of the manufacturer.

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#### MANHATTAN RAILWAY EARNINGS

The Manhattan Elevated Railway Company, of New York, reports for the year ended Sept. 30, gross income of \$8,816,101, against \$8,061,554 for the year ended Sept. 30, 1906, an increase of \$754,547. Its net income for the same period was \$5,592,595, against \$4,859,972, an increase of \$732,623. The surplus after the annual dividend amounted to \$1,392,595, or 9.32 per cent upon its entire capital stock. The net income of the Interborough Rapid Transit Company for the same period, which income is primarily applicable to the dividends on Manhattan stock, amounted to over 13 per cent on the entire Manhattan Railway Company's capitalization. The Manhattan Railway Company's balance sheet shows that this company has on hand in cash \$1,530,943, and its only current liabilities amounted to \$10,586, showing a profit and loss surplus of \$8,278,406. The only taxes it has in litigation amount to \$19,866.

## CORRESPONDENCE

## HIGH SPEED OF ELECTRIC LOCOMOTIVES ON GRADES

SCHENECTADY, N. Y., Nov. 18, 1907.

EDITORS STREET RAILWAY JOURNAL:

I notice that in your editorial on "The Twentieth Century Locomotive," commenting on my Institute paper, you state that "we are not inclined to lay very much stress on the mere increase in speeds up grade" and doubt "whether high speed up grades is worth the while in case of freight haulage." You give as a reason the desirability of uniformity in station load. You must realize that the generating station of electrically operated railroads occupies the position of an auxiliary and must conform in its practice and economy to the demands of the operating department, which latter are paramount. Electric power is manufactured and distributed not as an economic industry in itself, but solely to promote the general movement of trains, and the operating department cannot be put to any inconvenience or have its facilities for moving freight in any way abridged by an inadequate supply of power, or by any consideration of extreme demands upon the generating and distribution system. The expense to shipper and railroad incurred through delays occasioned by insufficient or restricted use of power may easily exceed the interest on the difference in first cost between a power supply capable of taking care of all exigencies of service operation and a smaller supply proportioned for average demands only.

Returning to the question of speed on mountain grade divisions, while the sight of two or more steam locomotives laboring heavily up a grade is only a pathetic incident to the casual onlooker, it is a most serious matter of expense to the management, and furthermore, it is inseparable from steam locomotive operation. My Institute paper, therefore, points out the lesson of increased speed, its benefit to the road, the shipper and the traveling public. Furthermore, the conclusions reached indicate that electrification of steam roads is not attractive either financially or otherwise if the electric locomotive is called upon simply to duplicate the present performance of the steam locomotives. It is largely in connection with increased speed that the supporters of electrification hope to make a showing sufficient to warrant the expense of electrification.

Considered in its broadest application, the introduction of the electric locomotive not only gives the operating department a means of quickening the passage of freight and passenger trains over heavy grade divisions with resulting reduction in operating expenses, but it also permits an increase in the tonnage capacity of congested track sections by reason of this increased speed. Take away from the electric locomotive this asset of increased speed, and one must fall back on such reasons for electrification as control such cases as the New York Central Terminal, New Haven, Baltimore & Ohio, and other tunnel installations, that is, reasons other than economy, but commanding a full knowledge of the full capabilities of the electric locomotive, we are unable to justify the electrification of many main line divisions, both on grade and even on level sections where such local conditions as heavy traffic, poor water, etc., may obtain. Furthermore, reasons for electrification can be demonstrated in dollars and cents, and that, too, with such conservatism based upon actual operating expenses as to be all-convincing to those giving the subject careful attention.

A. H. ARMSTRONG.

## TESTING RAILS, NOT LOCOMOTIVES

Articles which have appeared during the past week in the daily papers, concerning certain tests which the Pennsylvania Railroad has been making on the West Jersey & Sea Shore Railroad, near Clayton, N. J., have created an entirely erroneous impression. It has been stated that the company was racing steam and electric locomotives, with a view to determining the speed capacity of each type. The Pennsylvania Railroad has other, more accurate and much less dangerous methods of testing the speed of locomotives than trying them out in such a manner as this. Furthermore, the types of electric and steam locomotives which have been used in these experiments were not designed primarily for speed, and any inference based on their performance in this regard would be incorrect. What the company is doing is this: Experience indicates that the operation of electric locomotives, owing to their lower center of gravity, has an effect upon the track entirely different from that due to the action of steam engines. It is to ascertain the exact nature and extent of this pressure upon the rails that the Departments of Electric Traction and of Motive Power have devised the apparatus which is being utilized at Clayton.

A stretch of track about 166 ft. in length has been equipped with rails and cast steel ties, designed and made especially for this purpose. Instead of attaching the rail to the ties by spikes, a special form of block has been substituted, which allows a slight movement of the rail as the engine goes over it; this movement registers the force with which the flanges of the wheels strike or press against the rails. It is expected that a large number of experiments with this apparatus will show the company quite accurately what the effect is of both steam and electric locomotives moving at different speeds over both straight and curved track. Necessarily to make these tests, the engines must move at different speeds, and at times each attains its maximum speed. An electric apparatus has been devised to measure the precise amount of time elapsing while the different locomotives pass over this 166 ft. of track, in order that in computing the effect upon the track the exact speed attained may be known.

The electric locomotives used are Nos. 10,001, 10,002 and 10,003, which have been described in these columns. As No. 10,003 is designed for single-phase traction, special connections were required to permit it to operate on the direct current system of the West Jersey & Sea Shore Railroad. These are provided in a baggage car which is attached to the locomotive, and which contains the direct current control apparatus. The tests are being conducted under the general management of George Gibbs, chief engineer of electric traction, and Hugh Pattison is in direct charge. Philip Mohun is assisting Mr. Pattison. Various types of steam locomotives are also being tested, and the trials will continue for some time.

The Columbus, Delaware & Marion Railway Company is considering novel plans for converting one of its cars into a funeral car. The plan is to have a black leather covering, to be buttoned onto the side, including the panels between the windows, by means of carriage buttons, making an entirely black car. This can be removed and the car used in the regular service at other times. It is expected that removable black drapery for the inside of the car will also be designed. The plan was devised by L. W. Harrington, passenger and freight agent of the company in Columbus.

## THE NEW SULLIVAN SQUARE ELEVATED STORAGE YARD OF THE BOSTON ELEVATED RAILWAY

The Boston Elevated Railway Company has lately completed a new storage yard for elevated cars at its Sullivan Square terminal, which is of special interest on account of the use of reinforced concrete in the design of the deck or yard floor. Additional car storage facilities have been necessitated by the growth of traffic, and as it was deemed desirable to extend the existing yard at Sullivan Square rather than to build storage tracks at a point more remote from the company's main elevated repair shops, plans were worked out for the installation of 8 new parallel tracks immediately north of the existing car house and repair shop built in connection with the original elevated lines

The new yard is entirely in the open air, and the floor is level, the base of rail being at a grade 23 ft. 11 ins. above the surface car-house floor. The parallel tracks in the yard are spaced 12 ft. apart on centers, and have a car capacity varying from twelve to seven cars each, according to length. The total area of the reinforced concrete section of the yard is 47,000 sq. ft., and about 1,380,000 lbs. of steel were used in the construction. Typical details of the floor construction and a general layout of the floor are illustrated herewith.

The floor construction in general consists of a supporting slab of rock concrete 4 ins. thick, reinforced with steel, on which is laid a four-ply waterproof seal over the entire area, and flashed up all around the floor drains, making the work perfectly water tight. On top of the water-

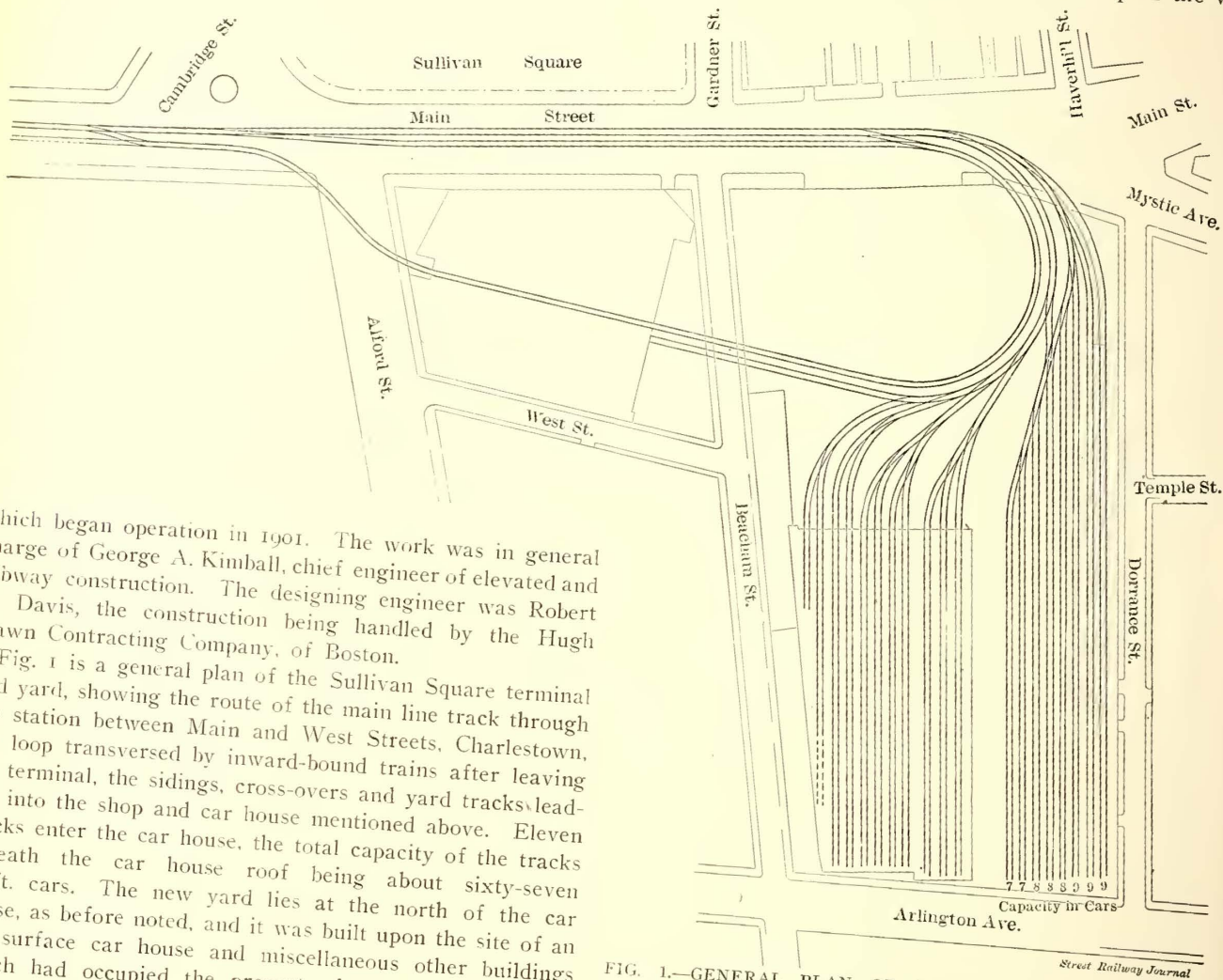


FIG. 1.—GENERAL PLAN OF SULLIVAN SQUARE STORAGE YARD, BOSTON

which began operation in 1901. The work was in general charge of George A. Kimball, chief engineer of elevated and subway construction. The designing engineer was Robert B. Davis, the construction being handled by the Hugh Nawn Contracting Company, of Boston.

Fig. 1 is a general plan of the Sullivan Square terminal and yard, showing the route of the main line track through the station between Main and West Streets, Charlestown, the loop transversed by inward-bound trains after leaving the terminal, the sidings, cross-overs and yard tracks leading into the shop and car house mentioned above. Eleven tracks enter the car house, the total capacity of the tracks beneath the car house roof being about sixty-seven 47-ft. cars. The new yard lies at the north of the car house, as before noted, and it was built upon the site of an old surface car house and miscellaneous other buildings which had occupied the property for many years. The surface car house was torn down, with the other buildings, and the ground floor utilized as a new storage space for surface cars, the floor of the elevated yard being designed to serve as a water-tight roof for the surface car storage beneath. The capacity of the new elevated yard is about 70 cars, exclusive of a little additional space near the ladder track and beyond Bent 32 in the direction of Main Street. The new yard connects directly with the westerly side track on Main Street, and with the westerly loop track in the original yard, over which movements between the shops and the terminal take place. Heavy repair work takes place on the ground floor of the original shop and car house, an elevator being provided for the handling of trucks and motors.

proof seal is laid cinder concrete having a minimum thickness of 2 ins. at the low point at drains, and a thickness of 3½ ins. at the summit. On top of the cinder concrete is a granolithic finish not less than 1 in. thick at any point, and varying in thickness under track stringers from 1 in. at the summit to 2½ ins. at the low point. The granolithic surface is jointed to form panels. The under surface of the floor is level, the finished top of the floor being laid to successive grades, to shed water from the summit to the low point, or line of floor drains.

All steel members forming the floor system, with the exception of plate girders, are protected with cinder concrete extending to the line of floor slabs. The soffits of beams are wrapped with metal fabric and plastered 1½ ins. thick.



The slab construction over plate girders is shown in the accompanying typical sections. As there are no haunches on the plate girders, bent hanger rods are provided over the top flanges of the girders to support longitudinal rods on each side of the girder flange, this reinforcement taking care of the total shear in the slab at this section.

The reinforcement for 4-in. concrete slabs consists of 0.25 sq. in. of steel per foot of slab width. The minimum thickness of concrete below the steel reinforcement is  $\frac{3}{4}$  in. In general, longitudinal beams beneath track rails consist of 18-in. 55-lb. I-beams enclosed in cinder concrete. The rails are laid on 6 in. x 12 in. hard pine stringers. The latter are held in position by metal stringer ties of the construction illustrated, 6 ft. 5  $\frac{13}{16}$  ins. long and 5 ins. wide each. Seven hundred of these were required, made of structural steel having an ultimate tensile strength of

quarters below the elevated tracks. The girders over the transfer span are 4 ft. 6 ins. deep and are not surrounded by concrete. All columns are encased in concrete.

At the easterly bent of the transfer span a copper expansion joint is installed the full width of the floor. A cross section of this joint is shown. The copper is 18 oz. cold rolled, bent to form a gutter 2 ins. wide and 3 ins. deep between stop angles. On the outside of these angles the copper was turned down and flashed for 2 ins. on the waterproof seal by mopping it with coal-tar pitch.

In order to drain the floor, grades of about  $\frac{1}{16}$  in. per foot were provided, leading to 190 cast-iron floor drains with perforated covers 8 ins. inside diameter, the outlet pipes being 4 ins. in diameter. The lower flanges of the drains were placed at the grade of the waterproofing and mopped with hot coal-tar pitch to make a tight joint, the

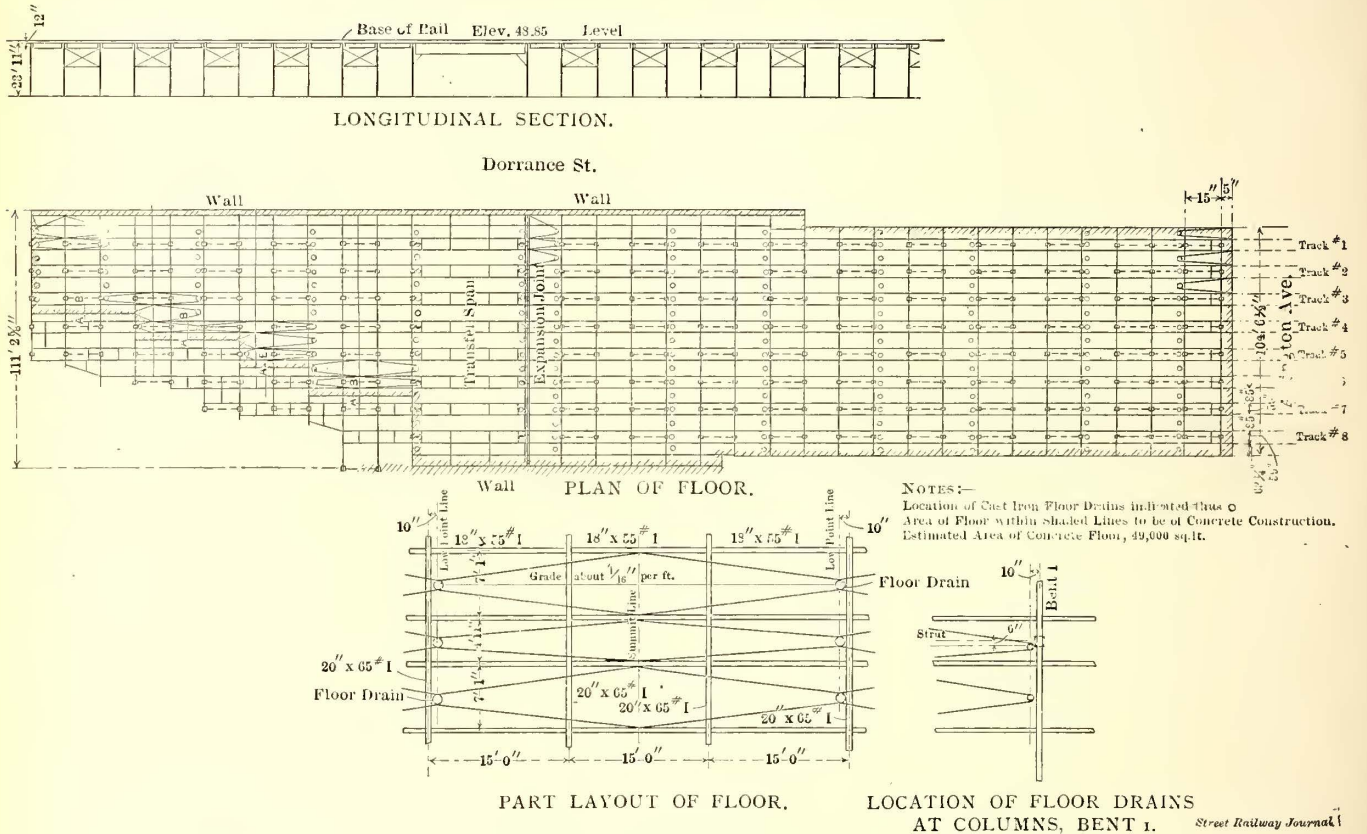


FIG. 3.—PLAN AND SECTIONS OF REINFORCED CONCRETE FLOOR, SULLIVAN SQUARE STORAGE YARD, BOSTON

55,000 to 65,000 lbs. per sq. in. The tie bar is  $\frac{1}{4}$  in. thick, and at each end are riveted a pair of bent plates 7 ins. high and  $11\frac{3}{4}$  ins. apart on the inside, placed exactly square with the tie-bar. These metal ties were placed in position by the company's engineers, the tie-bars and about  $2\frac{1}{2}$  ins. of the angles being surrounded by granolithic concrete. The granolithic finish under track stringers was made absolutely true and level to the grade given by the engineers, with a clean finish around the projecting angles of the metal ties, so that the track stringers could be placed in position without the necessity of cutting away any of the granolithic. The metal ties are placed 5 ft. apart on centers and the track stringers are secured to them by two  $\frac{5}{8}$ -in. lag screws at each tie. The entire yard is provided with 85-lb. third-rails.

In general, cross beams are spaced 15 ft. apart on centers and consist of 20-in. 65-lb. I-beams surrounded by cinder concrete. About 300 ft. west of the end of the storage yard a 50-ft. span is provided on account of a transfer table which is in service in the surface car storage

upper flange being set at the grade of the granolithic finish.

Waterproofing was laid over the entire floor area on top of the rock concrete slab after the latter was dry. The waterproofing consists of four-ply Beehive roofing felt laid in straight run coal-tar pitch. The top of the rock concrete slab was thoroughly mopped with hot coal-tar pitch, and the roofing felt applied while the latter was hot, the felt being pressed down and mopped before the next layer was put down. The top layer was also mopped over, and special care taken to flash with the waterproofing all around openings for floor drains and against all steel work or brick walls forming outer sides of the floor.

Portland cement was used, and the broken stone was crushed to a maximum size of 1 in. The floor was built to withstand a load of 150 lbs. per sq. ft. in addition to its own weight. The proportions of the concrete used were:

Rock concrete: Portland cement, 1; sand,  $2\frac{1}{2}$ ; broken stone, 5.

Cinder concrete: Portland cement, 1; sand, 2; cinders 4.

Granolithic finish: Portland cement, 1; fine crushed stone, 1½.

The granolithic finish of the floor was kept moist with wet sand or sawdust for several days after completion to prevent its drying too rapidly.

## TWO THOUSAND VOLT D. C. RAILWAY IN GERMANY

Further particulars are available of the German 2000-volt direct-current railway, the locomotive for which was illustrated in the *STREET RAILWAY JOURNAL* for May 4, 1907. This line has been recently installed by the Siemens Schuckert Werke, in Lorainne, to connect the Moselhütte iron mines and some blast furnaces owned by the same company at Ste. Marie. The line is 8.7 miles in length and one-meter gage, and with steam locomotives about 2600 tons of ore have been hauled per day. Both empty and loaded trains have to be taken over grades ranging up to 3 per cent. Two locomotives are used and the round trip takes about two hours. The weight of the train is from 200 to 300 tons. Owing to the severe loads and the desire to increase the capacity to 4000 tons per day, it was decided to install electric locomotives in place of steam locomotives.

Three-phase current at 5700 volts was available at either end of the line, but three-phase traction was considered unsuitable on account of the number of trolley wires required and 800-volt d. c. owing to the length of transmission. Estimates were consequently prepared on 2000-volt d. c. and 6000-volt single-phase. Owing to the narrow gage, 60 hp was the maximum output for the largest single-phase motor which could be used, but it was found that a d. c. motor of 160 hp could be built within the space allowed between the wheels of the locomotive.

Current is supplied by two sub-stations, one at each end of the line. Each contains a motor-generator made up of a synchronous three-phase motor giving 880 hp at 375 r. p. m., its starting motor, a 2000-volt d. c. generator and a 65-volt exciter for both generator and motor. The armatures of these four machines are mounted on one shaft. Especial care is devoted to the insulation of the commutator of the high-tension generator which is of the interpole type, and brushes of opposite polarity are separated by insulating barriers.

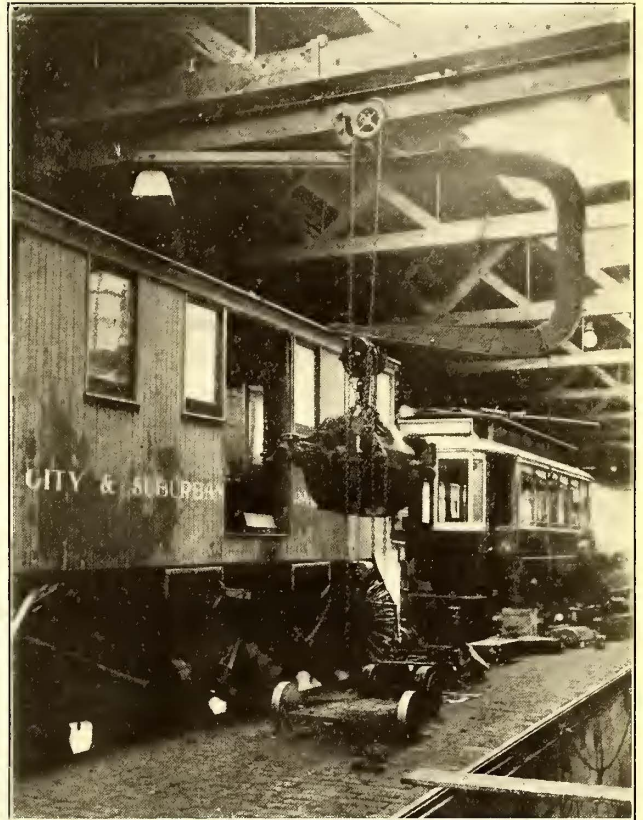
Two overhead trolley wires are used. They are carried 5 in. apart and are supported from a single catenary. A bow collector is employed on the locomotive.

Each of the locomotives, of which three have been delivered, weighs 55 tons and is equipped with four 160-hp interpole geared motors. The motors are permanently collected in two groups of two in series. The motor armatures have 61 slots, each of which has twelve coils of flat copper. The commutator is built with 83 segments. The controller is of the ordinary cylinder type, although larger than employed for tramway service, so as to give the necessary space for the insulation required for 2000 volts. The main circuit breaker is of the horn type, as it was found that this gave less surging in the circuit than either a magnetic blow-out or oil switch. The information given above is taken from a recent issue of *London Electrical Engineering*.

A "newspaper special" was run by the Indianapolis & Louisville Traction Company Nov. 13, starting from Louisville, coming as far north as Seymour and returning to Louisville. The car was in charge of General Manager A. A. Anderson, and his guests included representatives of the newspapers in towns and cities along the line.

## A CRANE FOR HANDLING MOTORS IN CARS

Motors installed in snow plows are frequently removed from them and used under the passenger equipment during the summer season. To those master mechanics on whose systems this practice is followed and who have experienced difficulties in getting the motors in and out of the sweepers, a "C" crane in use in the shops of the Washington Railway & Electric Company will probably be of interest. The crane, which is shown in the accompanying reproduction, was designed by Gordon Campbell, purchasing agent and master mechanic of the Washington Railway & Electric Company, especially for use in removing motors from and installing them in the bodies of snow plows and sweep-



"C" TYPE CRANE IN WASHINGTON

ers. It is suspended from an overhead traveler running on a transverse I-beam. The weight shown on the inner end is required to balance it properly. The suggestion presents itself that a similarly designed crane could be used in storerooms or about freight houses or other places where heavy materials are loaded into box cars.

## SUBWAY IN BUENOS AYRES

The Argentine legation has requested American railway contractors to submit bids for the construction in the city of Buenos Ayres of two of the principal lines constituting the proposed system of Metropolitan subway electric railways. It also requests bids for the purpose of lease of the exploitation of the two lines as soon as the construction work is completed. Bases for the bids and some of the plans containing data regarding the proposed railways, it is explained, may be seen by interested parties at the Argentine legation and the consulate at Washington. They are in Spanish, which is the official text, and French and English translations. All bids for the construction and exploitation of the railways are to be sent to the municipal intendente of Buenos Ayres, so that he shall receive them before May 1, 1908, on which day the bids will be opened.

## CLASSIFICATION OF ACCOUNTS PROPOSED BY INTER-STATE COMMERCE COMMISSION

Owing to the recently enlarged powers of the Interstate Commerce Commission and the appointment of various public service and railroad commissions in States which hitherto have not possessed bodies of this character, the question of classification of accounts of steam railroad and street railway companies has suddenly been brought to the front. As has been stated in these columns, the New York Public Service Commission have been actively debating the subject with committees of the American Street and Interurban Railway Accountants' Association and the Street Railway Association of the State of New York, and a number of joint meetings have been held. As the readers of this paper know, the subject also occupied a considerable portion of the time of the Atlantic City convention of the Accountants' Association, at which a tentative classification of operating accounts was presented differing in a number of respects from that which has hitherto been standard. This classification, with the changes adopted at Atlantic City, was published in this paper last week, although it has not yet been formally adopted by the association or recommended by it. The Interstate Commerce Commission has also been engaged upon the work and has under consideration a classification of accounts which differs quite radically from that of either the old or the new standard of the Accountants' Association, as the operating accounts number 103, while there are forty-four construction accounts. The decision of the Interstate Commerce Commission on the subject is considered of great importance owing to its possible effect on the boards of railroad commissions of the different States.

A meeting of state and interstate railroad commissioners for considering this subject has been called by the commission, to be held at the rooms of the Interstate Commerce Commission, at Washington, on Friday, Nov. 22. It is expected that the Street Railway Accountants' Association will be represented by its committee on standard classification of accounts, Messrs. Ham, Henry and Duffy, and that the American Street and Interurban Railway Association and the New York State body will also be represented at the hearing by a number of its prominent members.

One of the features of the tentative classification of operating accounts drawn up by Henry C. Adams, the statistician of the commission, for consideration is the method of making provision for depreciation. Upon this point the report says:

### CONSIDERATION OF DEPRECIATION.

A number of points have been raised by correspondents relative to depreciation that call for the following general statements, all of which bear upon the manner in which depreciation accounts should be treated:

1. The question of depreciation is fundamentally a question of values, and not a question of maintaining the original capacity, or a standard of operating efficiency, or of keeping full the numbers in equipment series.

2. The depreciation rules may be worked either on the basis of the value of individual cars and locomotives or on the basis of the value of series of cars and locomotives. On this point accounting officers are at liberty, until advised to the contrary, to follow whichever method seems to them the more appropriate.

3. The basis of accumulation—that is to say, the amount to which the percentage rate is applied—ought, in strict theory, to be the original cost. For the current year, however, accounting officers are at liberty to accept original cost (estimated, if not known), record value, or purchase price. The term "record

value" should not be interpreted to mean the value of the equipment as it stands in the capital account (unless that account represents the original value of the equipment on hand), but the actual cost of value of all equipment, regardless of where charged when purchased; and in case purchase price be accepted as the basis of the percentage charge to depreciate, the percentage rate should be limited to the rate required to replace the price paid. A second-hand car, for example, is not called upon to provide for its replacement, when abandoned, by a new car. As stated above, it is values and not cars with which depreciation charges deal.

4. The application of depreciation charges for the current year and subsequent years must not be influenced by the practice of years past. In case property has been appreciated by excessive charges to operating expenses in years past, the value thus placed in the property must be regarded as a permanent undivided asset to the stockholders. On the other hand, in case property has depreciated on account of insufficient charges to operating expenses in years past, this fact must not be permitted to influence the determination of the depreciation rate for the current year.

5. The monthly charges to operating expenses for "depreciation" on the several classes of equipment will, of necessity, create or require corresponding liability accounts to which such depreciation may be credited. To that end carriers will be required, beginning \_\_\_\_\_, \_\_\_\_\_, to set up an appropriate liability depreciation account for each of the several classes of equipment upon which depreciation is charged. These accounts should be designated as follows:

- (a) Electric Locomotives—Replacement.
- (b) Passenger-Train Cars—Replacement.
- (c) Freight-Train Cars—Replacement.
- (d) Electric Equipment of Cars—Replacement.
- (e) Work Equipment—Replacement.

To these replacement accounts should be credited monthly the amount of accrued depreciation on each class of equipment, respectively. Such credits should invariably equal the gross charges to maintenance for depreciation.

To these several replacement accounts under their appropriate heads should be charged, at cost, all equipment purchased, built or otherwise acquired for the purpose of maintaining the value of a carrier's equipment.

The monthly charges to operating expenses for "renewals" of the several classes of equipment will be similarly treated.

It is not intended that these accounts should be restricted to individual cars or locomotives, or that carriers are not at liberty to renew or replace equipment upon which depreciation has accrued prior to the retirement of such equipment. On the other hand, the several amounts standing to the credit of those replacement accounts should be available to carriers for the purpose of replacement of equipment to the extent of such credits; however, all replacements in excess of such credits must be considered as Betterments or Additions, and charged either to income or to capital.

After referring to the questions of per diem and rental payments, the report defines the operating accounts, of which there are 103, as follows:

### TENTATIVE CLASSIFICATION OF OPERATING EXPENSES OF ELECTRIC RAILWAYS.

#### GENERAL ACCOUNTS.

- I. Maintenance of Way and Structures.
- II. Maintenance of Equipment.
- III. Traffic Expenses.
- IV. Transportation Expenses.
- V. General Expenses.

#### PRIMARY ACCOUNTS.

- I. Maintenance of Way and Structures.
  1. Superintendence.
  2. Ballast.
  3. Paving.
  4. Ties.
  5. Rails.
  6. Other Track Material.
  7. Roadway and Track.
  8. Removal of Snow, Sand, and Ice.
  9. Tunnels.
  10. Bridges, Trestles and Culverts.
  11. Over and Under-Grade Crossings.



12. Grade Crossings, Fences, Cattle Guards and Signs.
13. Snow and Sand Fences and Snowsheds.
14. Signals and Interlock Plants.
15. Telegraph and Telephone Lines.
16. Electric Power Transmission.
17. Buildings, Fixtures and Grounds.
18. Docks and Wharves.
19. Roadway Tools and Supplies.
20. Work Equipment—Repairs.
21. Work Equipment—Renewals.
22. Work Equipment—Depreciation.
23. Injuries to Persons.
24. Stationery and Printing.
25. Insurance.
26. Other Expenses.
27. Other than Railway Operations—Cr.
28. Maintaining Joint Tracks, Yards and Other Facilities—Dr.
29. Maintaining Joint Tracks, Yards and Other Facilities—Cr.

II. Maintenance of Equipment.

30. Superintendence.
31. Electric Locomotives—Repairs.
32. Electric Locomotives—Renewals.
33. Electric Locomotives—Depreciation.
34. Passenger-Train Cars—Repairs.
35. Passenger-Train Cars—Renewals.
36. Passenger-Train Cars—Depreciation.
37. Freight-Train Cars—Repairs.
38. Freight-Train Cars—Renewals.
39. Freight-Train Cars—Depreciation.
40. Electric Equipment of Cars—Repairs.
41. Electric Equipment of Cars—Renewals.
42. Electric Equipment of Cars—Depreciation.
43. Shop Machinery and Tools.
44. Power Plant Equipment.
45. Injuries to Persons.
46. Stationery and Printing.
47. Insurance.
48. Other than Railway Operations—Cr.
49. Other Expenses.
50. Maintaining Joint Equipment at Terminals—Dr.
51. Maintaining Joint Equipment at Terminals—Cr.
52. Equipment Borrowed—Dr.
53. Equipment Loaned—Cr.

III. Traffic Expenses.

54. Superintendence.
55. Outside Agencies.
56. Advertising.
57. Traffic Associations, Fast Freight and Traffic Bureaus.
58. Stationery and Printing.
59. Insurance.
60. Other Expenses.

IV. Transportation Expenses.

61. Superintendence.
62. Operating Power Plants.
63. Power Transferred—Cr.
64. Other than Railway Operations—Cr.
65. Purchased Power.
66. Dispatching Trains.
67. Motormen.
68. Road Trainmen.
69. Train Supplies and Expenses.
70. Lubricants for Electric Locomotives.
71. Other Supplies for Electric Locomotives.
72. Carhouse Expenses.
73. Station Employees.
74. Weighing and Car-Service Associations.
75. Station Supplies and Expenses.
76. Yardmen.
77. Yard Supplies and Expenses.
78. Interlockers, Block and Other Signals—Operation.
79. Crossing Flagmen and Gatemen.
80. Drawbridge Operation.
81. Clearing Wrecks.
82. Telegraph and Telephone—Operation.
83. Stationery and Printing.
84. Insurance.
85. Other Expenses.

86. Loss and Damage—Freight.
87. Loss and Damage—Baggage.
88. Damage to Property.
89. Damage to Stock on Right of Way.
90. Injuries to Persons.
91. Operating Joint Tracks, Yards and Other Facilities—Dr.
92. Operating Joint Tracks, Yards and Other Facilities—Cr.
93. Salaries and Expenses of General Officers.
94. Salaries and Expenses of Clerks and Attendants.
95. General Office Supplies and Expenses.
96. Law Expenses.
97. Insurance.
98. Relief Department Expenses.
99. Pensions.
100. Stationery and Printing.
101. Other Expenses.
102. General Administration Joint Tracks, Yards and Other Facilities—Dr.
103. General Administration Joint Tracks, Yards and Other Facilities—Cr.

CONSTRUCTION ACCOUNTS.

The tentative classification of expenditures for road and equipment for electric railways provides the following accounts:

GENERAL ACCOUNTS.

- I. Road.
- II. Equipment.
- III. General Expenditures.

PRIMARY ACCOUNTS.

- I. Road.
  1. Engineering.
  2. Right of Way and Station Grounds.
  3. Real Estate.
  4. Grading.
  5. Tunnels.
  6. Bridges, Trestles and Culverts.
  7. Ties.
  8. Rails.
  9. Frogs and Switches.
  10. Ballast.
  12. Paving.
  13. Track Laying and Surfacing.
  14. Roadway Tools.
  15. Fencing Right of Way.
  16. Crossings and Signs.
  17. Interlocking and Other Signal Apparatus.
  18. Telegraph and Telephone Lines.
  19. Station Buildings and Fixtures.
  20. General Office Buildings and Fixtures.
  21. Shops, Carhouses and Turntables.
  22. Shop Machinery and Tools.
  23. Dock and Wharf Property.
  24. Electric Light Plants.
  25. Electric Power Plants.
  26. Electric Power Transmission.
  27. Gas-Producing Plants.
  28. Miscellaneous Structures.
  29. Transportation of Men and Material.
  30. Rent of Equipment.
  31. Repairs of Equipment.
  32. Earnings and Operating Expenses During Construction.
  33. Cost of Road Purchased.
- II. Equipment.
  34. Electric Locomotives.
  35. Passenger-Train Cars.
  36. Freight-Train Cars.
  37. Electric Equipment of Cars.
  38. Work Equipment.
- III. General Expenditures.
  39. Law Expenses.
  40. Stationery and Printing.
  41. Insurance.
  42. Taxes.
  43. Interest and Commissions.
  44. Other Expenditures.

### CHICAGO CITY RAILWAY COMPANY'S INSTRUCTIONS FOR HANDLING PAY-AS-YOU-ENTER CARS

The Chicago City Railway Company has just issued a neat 3½-in. x 6-in. 26-page pamphlet covering the rules made for the use of motormen and conductors operating the pay-as-you-enter cars. The booklet includes illustrations showing the correct position of the conductor on the divided platform and when requesting passengers to take the next car; also the proper method of collecting fares on the rear platform when the passengers are entering, and a seating and platform plan of the car with arrows to designate the passengers' movements. The instructions point out to the conductor the advantage the new car possesses in eliminating platform accidents, and impresses upon him the importance of recommending the passengers not to board a car already carrying more than the eighty passengers considered as the desirable maximum. The conductor must also see that the exit portion of the rear platform is kept clear at all times and the entrance portion occupied only by passengers while paying fares. Only the last few passengers taken on before the car becomes fully loaded are allowed to remain on the rear platform.

### CHICAGO CITY RAILWAY COMPANY

#### Traffic Slip

LINE Indiana Ave. CAR No. 5226

DATE 10-17 07 TIME LEAVING TERMINAL 7.30 A. M. P. M.

GREATEST NUMBER PASSENGERS ON CAR AT ONE TIME

NORTH 44 SOUTH 56

CONDUCTOR BADGE No. 1478

CONDUCTOR'S TRAFFIC SLIP

As the method of collecting fares on the rear platform before the passengers enter the car is a novel one in Chicago, there will be at the outset a certain amount of leeway allowed by the conductors to guard against delays to traffic for disturbances caused by misunderstandings with the passengers. The conductor, however, is expected to minimize such troubles by courteously requesting passengers to "Have your fares ready, please." In general, the conductor will not enter the car to collect fares except where, on account of some accident, he has been obliged to leave the platform while passengers were boarding the car and going inside. To assist in the rapid collection of fares, all conductors will be supplied daily with a change carrier containing \$15.

The guard rail on the front platform protects the motorman from the crowding of passengers, relieves him from much annoyance and insures quicker action on his part in case of accident. The front platform is the only place where smoking is permitted.

The company has adopted a dispatching system which by the use of telephones and starters places the movement of the cars upon all parts of a line directly under the control of the dispatcher at all times, thus insuring greater flexibility in case of delays and closer regulation to traffic requirements. The office of the dispatcher will adjoin that of the division superintendent and will be connected with signal boxes located on the streets. These boxes, to which

each conductor and motorman will be given a key, will contain a telephone for direct communication with the dispatcher. Trainmen will use these telephones in calling for the repair wagon or on other emergency occasions. In the loop district the signal boxes are supplied also with a signal whereby the wagon located in that section may be called by the simple turning of a lever. At the outer end of each line the company will maintain depots with telephones and starters who will act as assistants to the dispatcher in controlling the starting of cars by signal bells. Runs will be assigned as heretofore, except that cars will leave the outer ends of lines only as directed by the starters, and will be operated upon such running time as he may designate by the display of a number in plain view. Printed running time-cards in accordance with these numbers displayed will be supplied to each crew. Traffic slips of the type shown in the accompanying cut will be filled out by the conductor on each half trip. The slips will be turned in at the starter's terminal depot each round trip. The relieving conductor will take up and use the slip of the conductor relieved.

President T. E. Mitten, under whose direction the foregoing procedure has been devised, announces that in a few days information cards will be distributed to passengers before the pay-as-you-enter cars are placed in service.

### MEETING OF THE MASSACHUSETTS STREET RAILWAY ASSOCIATION

At a meeting of the Massachusetts Street Railway Association, at Young's Hotel, Boston, held Nov. 13, Lee H. Parker, of the Stone & Webster Engineering Corporation, presented a paper suggesting certain economies in railway operation. One point mentioned was the importance of providing as closely as possible for future requirements of the road. A fairly close estimate can be made of future business by a study of statistics. The speaker recommended the plotting of curves showing (1) population, (2) passengers per capita, (3) car-miles per passenger carried, (4) average weight of cars, (5) watt-hours per ton-mile. The product of the last two gives the energy per passenger, and the product of all five the kw-hour output. By a study of these curves the manager should be able to determine fairly closely the probable maximum kilowatt capacity required for a given period in the immediate future. This having been determined, a study of saving by redistribution of feeder copper can be taken up. The writer referred to the facilities for investigations of this kind possessed by large engineering firms. He also referred to some recent electric railway projects in Texas, notably one between Dallas and Sherman, a distance of 63 miles, and one between Galveston and Houston, 45 miles. The former will use 80-lb. rail, creosoted pine ties, gravel ballast, No. 00 overhead wire, and single cars with four 75-hp motors. These cars will also be fitted with multiple-unit control, and will have a schedule speed of 24 m. p. h. and a maximum speed of 45 m. p. h. The total cost of this road, including engineering contingencies and interest during construction, will be about \$36,000 per mile. On the road between Galveston and Houston trains of two cars will be run, operating d. c. when on the lines of the existing city systems and single-phase between the city limits. The schedule speed will be 45 m. p. h. with seven or eight stops, and the maximum speed 65 to 70 m. p. h. The motor cars will weigh 50 tons and will be equipped with four 125-hp motors and will haul 25-ton trailers. The cost of the single-phase section only of this line will be \$40,000 per mile.

**TELEPHONE BLOCK SIGNAL SYSTEM**

The Rochester, Charlotte & Manitou Beach Railway Company has been using during the past summer a block signal system with semaphore control, manufactured by the Telegraph Signal Company, of Rochester. The line is about eight miles in length, and reaches Manitou Beach and Manitou Beach Park, attractive pleasure resorts near Rochester, and operates only during the summer. The signal system is controlled by the dispatcher's office.

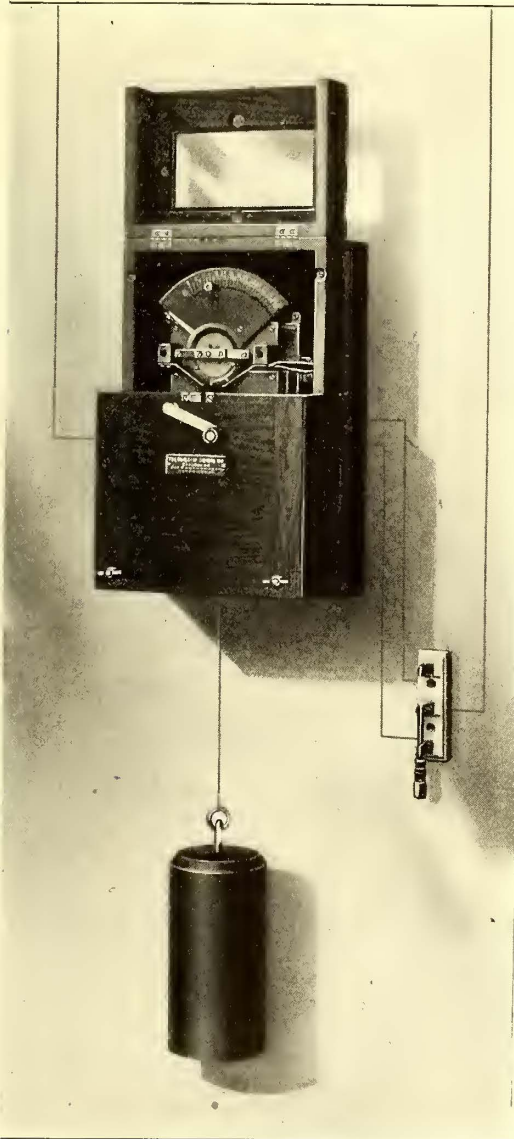


FIG. 1.—MASTER SWITCH IN DISPATCHER'S OFFICE

The semaphore stations, which are erected at every siding, consist of a small booth about 4 ft. x 4 ft., and 8 ft. high, and contain the station signal appliance and a telephone. Adjoining the station is a single blade semaphore governing both directions. The mechanism for operating the semaphore is arranged to be operated by the trolley circuit if desired, and all of the semaphores are controlled from the dispatcher's office by a master machine. The train crews, as usual, operate under train orders, which specify the stations at which they are to stop or sidings at which they are to pass, and the signal system is used to notify them to communicate with the dispatcher. If the latter wishes to halt a train at any of the stations on the line and give the crew new or changed orders, it is within his power to do so in a very few seconds.

To illustrate; let it be supposed that the dispatcher has

given orders in the regular course of business for train No. 3 going west and train No. 4 going east to meet at station No. 6. Before giving these orders he, desiring to utilize the system, as a reminder of orders, places the plug in No. 6 on the dial shown in Fig. 1. In ten seconds or less the semaphore at station No. 6 has been thrown to danger, and that fact certified upon the dispatcher's tape register. After communicating with the dispatcher, the conductor places the signal at clear and both trains proceed normally.

Again, let it be supposed that a change of orders is desirable, and that it is the purpose to cause two trains to meet at other than the regular meeting point; for instance, station No. 4. First the dispatcher places his master machine plug in No. 4 on the dial. The semaphore blade at No. 4 will go to danger and record that face on the dispatcher's tape register. To facilitate traffic, save time and render the meeting point absolutely certain, the dispatcher, in rapid succession, occupying but a few seconds' time, throws signals at stations No. 3 and No. 5, getting his

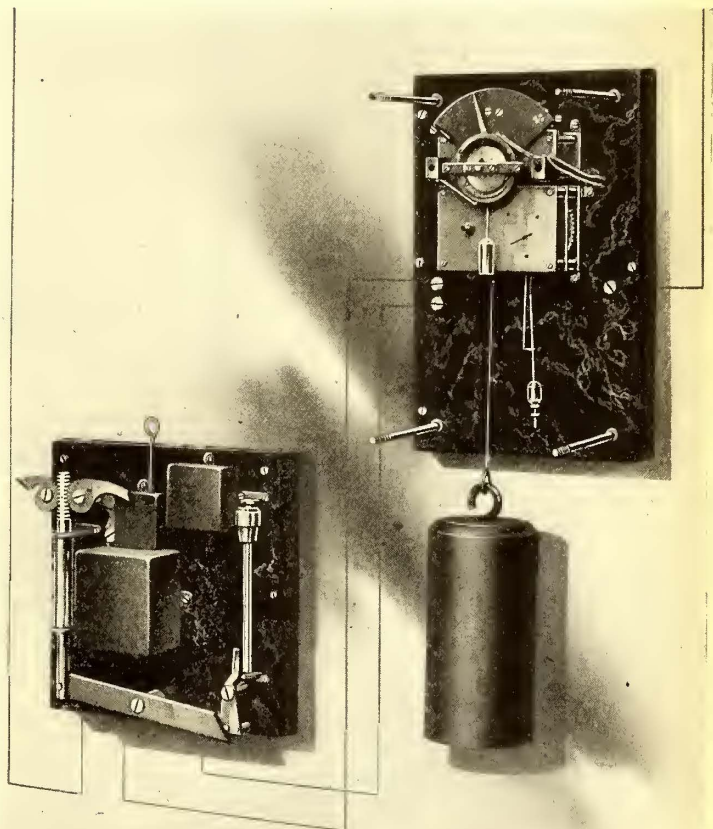


FIG. 2.—SIGNAL DEVICE AT BLOCK STATION, COVER REMOVED

record on his tape register, the three throws occupying less than 20 seconds time. The crew of the westbound train, therefore, finds the signal set against them at station No. 3, and, opening the booth, they get orders to run to switch No. 4, and there meet the eastbound train. Likewise the crew on the eastbound train finds the signal at station or switch No. 5 against them, and opening the booth receives orders to meet the westbound train at station No. 4. If for any reason there was a misunderstanding or orders by either crew, both crews would find semaphore signals set against them at station No. 4, the prescribed meeting place. After reporting to the dispatcher the semaphore signal is drawn to clear and the trains proceed. Fig. 2 represents the station appliance and trip with the case removed.

On interurban lines the appliance is worked on open cir-

cuts. On the Rochester, Charlotte & Manitou Beach line kerosene oil lamps are used in the signal, burning day and night. These lamps are trimmed every four days and are filled every six days.

In steam railroad single-track service the signal system is varied somewhat from that described. The master-machine and various appliances at each station are cut in, if desirable, on the dispatcher's train order wire, operating, of course, with closed circuit. By means of a simple device for short-circuiting the operator's key, the dispatcher at his office is enabled exactly, as in the case of the interurban trolley line, to throw the regular semaphore against a train going in either direction regardless of the operator. Thus, in a case of emergency, where a mistake or a misunderstanding of orders has been discovered, the dispatcher can set the target at a selected station at danger where the operator is absent, disabled, or even dead.

If the operator's key at the station is open a prescribed number of seconds that key is automatically cut out of circuit, and to be effective on the line must be restored. Thus, if the operator has closed his office and left his key open, the key is automatically cut out of circuit. Thus the semaphore at that station and those at all stations are placed at the disposition of the dispatcher. The telegraph signal appliance is connected with the regular semaphore in the usual manner.

Installation of this system has just been completed on the line of the Indiana Union Traction Company, between Wabash and Anderson, and installation is under way on the International Railway, Buffalo to Olcott Beach.

It should be understood that the telegraph signal system, both on trolley and trunk railways, is independent of any existing signal system, and properly supplements such system for emergency semaphore control.

### NEW VOLUME OF RAILWAY LAW IN MASSACHUSETTS

What is regarded in railway and railroad circles as an important publication is now about to issue from the offices of the Massachusetts Railroad Commission. It is the new compilation of railway, railroad and interurban laws, as at present standing on the books, with an elaborate and minute index and marginal references and citations. The book, now coming off the press, is to be bound in boards, and will comprise about 200 pages.

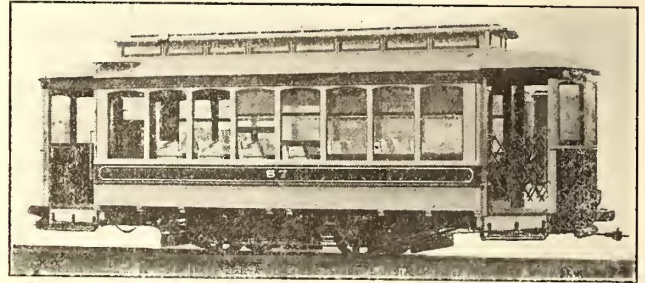
This is the third compilation of these laws issued by the commission since Charles E. Mann became clerk of the board in 1903. Each volume, under Mr. Mann's painstaking editing, has shown improvements in arrangement and annotation over those preceding, and the volume now about to issue will include such markings as will enable a lawyer to find at once not only the particular section he is after, but also to tell at a glance what chapter it came from and what decisions in the courts have acted to modify or to define it. More than this, the index has been so extended and amplified that under some headings the list of titles is increased in twofold or threefold ratio.

The annual report of the board, which has been making its appearance earlier and earlier each year since Clerk Mann entered upon his duties, is expected to be ready practically as soon as the Legislature comes in in January. An effort will be made to have it complete at that time, without the need of supplementary report, and if this is successfully achieved the report will provide the special reports required by the last Legislature with reference to fares in the Boston suburban district, and the condition of the Bos-

ton & Albany Railroad with reference to whether the State should or should not terminate the lease to the New York Central & Hudson River Company. The report on suburban fares, intended to determine whether some general readjustment is necessary to the public interest, will be of interest to street railway men, inasmuch as the increase of street railway lines has an important bearing on fares for suburban travel on the steam roads.

### NEW ROLLING STOCK FOR COLUMBIA, S. C.

The Columbia Electric Street Railway, Light & Power Company, of Columbia, S. C., has just received from the G. C. Kuhlman Car Company three semi-convertible cars



EXTERIOR OF COLUMBIA CAR

mounted on No. 21-E trucks. The company operates 22 miles of track and forty-one cars, and its service increased from 1,827,770 passengers in 1904 to 2,446,274 in 1905, and 2,975,472 in 1906. In eight months during the present year 2,166,344 passengers were hauled, and new rolling stock became imperative, and it is expected that still more cars will be ordered in the near future. The principal dimensions of the new cars for Columbia are as follows: Length over end panels, 20 ft. 8 ins.; over crown pieces, 30 ft. 1 in.; width over sills, including panels, 7 ft. 8½ ins.; over posts at belt, 8 ft.; size of side sills, 3⅝ ins. x 5 ins.; end sills, 3½ ins. x 8⅜ ins.; sill plates, 12 ins. x ⅜ in. The trucks have a wheel base of 7 ft. 6 ins. The inside finish is of cherry. The slat seats are of Brill make, as are numerous



INTERIOR OF COLUMBIA CAR

specialties used throughout the cars, such as angle-iron bumpers, radial drawbars, etc.

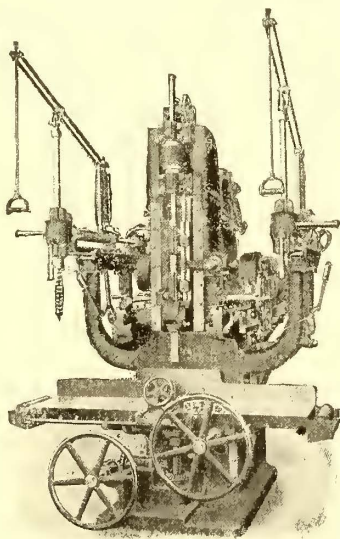
All the principal street railway systems in South Carolina—Anderson, Charleston, Columbia and Greenville—operate with semi-convertible cars, and in the last city the convertible is operated as well.

## HANDLING PRESS COMMENTS ON THE NEW HAVEN

It is the practice of the New York, New Haven & Hartford Railroad Company, through its press bureau, to bring to the attention of all the officials of the company news items appearing in the daily papers throughout the territory which both the steam and the electric properties cover. In this work is used a four-page folder of heavy cardboard, which is dated at New Haven. Each page is divided into three columns, leaving considerable margin, and at the top of the first page, as a cross heading, is the caption, "Comments of the Press." Each morning the Press Bureau pastes up the clippings, cutting the date and the name of the paper from the paper itself and pasting them at the beginning of the clipping. On the last page of the folder a space is set apart for the signatures of the president, assistant to the president, the two vice-presidents, the attorney, the general manager, the passenger traffic manager and the freight traffic manager. The folder, when it has been prepared for the day, is first sent to the president's office, after which it is passed on to the other officers.

## A CAR MORTISER DESIGNED FOR HEAVY WORK

The latest car mortiser built by the J. A. Fay & Egan Company, of Cincinnati, is designed for heavy work in both car and bridge construction, and is made with one, two or no auxiliary boring attachments. It has a capacity for mortises from  $\frac{1}{2}$  in. to 3 ins. square, and up to 6 ins. deep; or, by reversing timbers, 12 ins. deep. The frame is a single-cord casting with wide base of immense weight. The housing is securely gibbed to the frame with provision for taking up wear and moves transversely on frictionless rollers by hand wheel and can be securely locked in any position desired. The chisel ram is gibbed to the housing, and has a vertical travel of 18 ins. The auger spindle is driven at the proper speed by a belt with take-up so that the strain is constant regardless of the position of the housing. The reciprocating motion of the chisel ram is produced by a pinion in a rack operated by friction pulleys, giving a constant and positive drive. The table is made either stationary or traveling. The stationary table is 6 ft. 6 ins. long and is provided with stops to regulate the length of mortise. It is operated by hand wheel, rack and pinion and can be raised and lowered by hand. The traveling table can be furnished any length desired. It is made of steel I-beams, has automatic feed under instant control of the operator and is provided with adjustable stops for regulating the distance between mortises. The countershaft is self-contained in the base of the machine, convenient for direct connection of motor drive. It has tight and loose pulleys 18-in. x  $8\frac{1}{2}$ -in. face, and should make 840 r. p. m. The auxiliary boring attachments

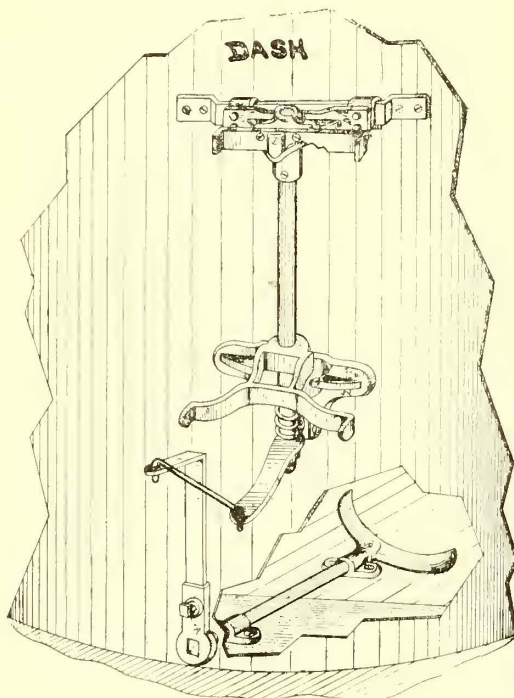


CAR MORTISER FOR HEAVY WORK

angle 30 degs. in either direction. The two spindles have a vertical stroke of 18 ins. and a lateral adjustment of 18 ins., and are driven by independent counter shafts, having tight and loose pulleys 10-in. x  $4\frac{1}{2}$ -in. face, and should make 750 r. p. m.

## AN ADJUSTABLE ARC HEADLIGHT HOLDER

An adjustable arc headlight holder, designed along new lines with the object of having the light illuminate the track in rounding curves and not spend its rays on the adjacent roadway and leave the car unprotected, has recently been perfected and placed on the market by the Adams & Westlake Company of Chicago. It is known as the Gardner-Furber Headlight Adjustable Holder, and is a simple shiftable support, requiring no change in the headlight or in the dash-bracket in which it is hung, the device itself being hung in the bracket and the headlight on the device in the same manner that it is ordinarily hung on the dash-board. A T-shaped treadle is secured to the floor of the platform, and from it a rod extends through the dash-board carrying an upright rod connecting with the lower part of the support, as shown in the accompanying illustration. The treadle is in front of the motorman's right foot, three-quarters of an inch above the floor, and a downward pressure on either side of the treadle shifts the position of the headlight and throws the light rays to the right or left to take in any curve of track. This swing of the holder may also be taken advantage of to throw the glare of the light out of, or away from, a frightened horse's eyes, and still have part of the rays on the track. The device centers it-



DETAILS OF ADJUSTABLE HEADLIGHT HOLDER EXPOSED

self and stays on the center when the motorman's foot is not on the treadle, and can of course be moved from one end of the car to the other. It has no bolts to be screwed in the front of the car, can be applied in a very few minutes by any ordinary mechanic and can be used on open or vestibuled cars. It has been thoroughly tested in practical service and is adapted for use in connection with Mosher, Wagenhals, Wellman, Eureka, Venus, Monitor, and other types of outside dash electric arc headlights.

## FINANCIAL INTELLIGENCE

WALL STREET, NOV. 20, 1907.

### The Money Market

Further improvement was reported in the local money market during the past week, due in part to the continued heavy importations of gold from Europe and to the heavy liquidation in gilt-edged bonds on the part of individuals and also by some financial institutions, the latter representing the closing out of loans. Money on call ranged between 15 per cent and 5 per cent, the average rate for the week being about 9 per cent. The time-loan department was again at a standstill, the banks and trust companies being entirely out of the market, so that only small amounts were available. Sixty-day money was quoted at 14 per cent and ninety-day funds at 12 per cent. The inquiry for time money was not large, borrowers generally realizing the impossibility of obtaining any considerable amount, but at the same time round amounts could be placed at the above rates if money was available. A feature of the week has been the continued heavy transfers of currency to the interior points, the local institutions showing a loss since last Friday of \$5,000,000 on their operations with the Sub-Treasury. Foreign exchange has ruled firm, but nevertheless a considerable amount of gold continues to be engaged by our bankers in Europe. During the week the engagements of the yellow metal aggregated about \$15,000,000, bringing the total engagements to date up to about \$75,000,000. Of this amount \$40,000,000 has been received. Quite an active business has been transacted in currency at premiums ranging from 2 to 4 per cent. The demand for small bills and for gold came from practically all parts of the country and especially from the West and South, where money is needed for crop-moving purposes. At the close of the week, however, there was a material falling off in transactions of this character, and the premiums ran off to below 2 per cent. By far the most important development in the monetary situation during the week was the decision of the Secretary of the Treasury to afford immediate and effective relief to the money market. According to the plans of the Treasury Department it is proposed to issue \$50,000,000 bonds of the Panama Canal loan to bear interest at the rate of 2 per cent. Bids for these bonds will be received up to Nov. 30. The Department will also offer at par and accrued interest \$100,000,000 certificates of indebtedness. These certificates will be in denominations of \$50. As both the Panama Canal bonds and the certificates of indebtedness will be accepted by the Treasury Department as the basis for new circulation, it is expected that these issues will do much to bring about normal conditions in the money market inasmuch as it will put into circulation about \$200,000,000, providing the Secretary of the Treasury deems it necessary to issue the full amount of certificates of indebtedness. It is stated by the Secretary of the Treasury that in order that the certificates may be properly distributed throughout the country, \$50,000,000 will be allotted by the Secretary in his discretion, and the remaining \$50,000,000 will be allotted through the Assistant Treasurers at San Francisco, New Orleans, St. Louis, Chicago, Cincinnati, Boston, Baltimore, Philadelphia and New York, and through the Treasurer of the United States at Washington. It is expected that the issue of the Panama Canal bonds and the certificates of indebtedness will be successful, and that as a result of the effective measures adopted by the Treasury Department, the premiums on currency will entirely disappear and that money which has been withdrawn from the banks and hoarded, will again be returned to the usual business channels. The object in issuing the certificates of indebtedness above referred to is not only to release moneys hoarded by individuals, but also to bring out the bills of small denominations now held by many financial institutions. As a matter of fact the latest relief plans have already been reflected in a decidedly better feeling in financial circles, and it is expected by dealers who have made a specialty of the currency business for the past fortnight that the market for currency will gradually disappear, and that

by the end of a week the premium will have entirely disappeared.

The bank statement, published on last Saturday was about as expected. Loans increased \$4,694,000 and deposits increased \$425,700. Cash decreased \$1,135,900, but as the reserve required was \$506,425 larger than in the preceding week, the deficit was increased by \$1,742,325. The total deficit now stands at \$53,666,950, as against a deficit of \$51,924,625 in the preceding week, a surplus of \$2,371,675 in the corresponding week of last year and surplus of \$2,915,150 in 1905.

### The Stock Market

By far the most important development in the financial world during the week, and for that matter, for months past, was the action of the Secretary of the Treasury, with the approval of President Roosevelt in deciding to issue \$100,000,000 certificates of indebtedness, if such an amount should be found necessary to relieve the situation, and in offering for public subscription \$50,000,000 Panama Canal bonds, all of which may be made the immediate basis for taking out circulation by the banks. This announcement was hailed with delight by the entire business community because it will afford a great measure of help to the strained monetary position of the country. With the National Government now pledged to give such substantial relief as that above indicated, however, and with a return to practically normal conditions in banking circles, at least in so far as New York is concerned, a much more cheerful sentiment is gradually being developed and prices for securities generally are recovering, though this movement must necessarily be rather slow. The immediate effect of the Government's intention is apparent in the decided decline in the premium on currency and in a somewhat easier tone to the local call money market. Disappointment is felt over the failure of the enormous gold imports from Europe—now amounting to more than \$70,000,000—to exert a better influence here, especially as concerns the statement of the Associated Banks, as well as because of the refusal of the Bank of France to send any gold to this country unless under some sort of an arrangement with the United States Government. However, the proposed issue of certificates of indebtedness by our Treasury will overcome the latter obstacle should it be found necessary to bring further amounts of the precious metal from abroad, while it is thoroughly understood that the reason the heavy gold imports have not figured in the reserves of the local banks has been the disposition on the part of out-of-town banks to hoard money, frequently building up by them of unusually big reserves.

The stock market has at times suffered some from liquidation, notably on the part of Pittsburg and some of the Western cities, as also from heavy selling of United States Steel bonds for the account of members of the defunct Tennessee Coal & Iron pool. In a general way, however, the trend of values has been upward, although the industrials have not advanced with as much freedom as the railroads on account of the fact that because of lack of capital at a time when unusually large orders are on hand, many of the manufacturing concerns are being forced to suspend operations in whole or in part, and at the same time either cut or discontinue dividends. The Government's action is expected to do much to alleviate this condition, and it is the consensus of opinion in banking circles that by Jan. 1, if not before, there will be more money in circulation than for years past. Sentiment in Europe is distinctly better, and these facts, together with the practically unprecedented investment yields which many securities now afford, are counted upon still further to improve the general situation.

The local traction shares as a group have been quiet and without noteworthy feature, though participating in the general improvement that followed the action of the Treasury in coming to the relief of the money market. The extremely low prices at which many of these stocks are now selling, and the fact that the properties which they represent are not near so apt to feel the influence of any protracted business depression as are the great railroad systems and industrial enterprises, are

attracting buyers and the result may be seen in a substantial enhancement in value when least expected.

**Philadelphia**

Trading in the local traction group continued on a comparatively small scale during the past week and prices generally sustained further substantial losses. Philadelphia Rapid Transit was the leader of the group in point of activity, and after an early advance to 16¼, the price yielded to 12, a net loss for the week of nearly four points and the lowest price on record. Union traction was fairly active at prices ranging from 46¾ to 43¾. Philadelphia Traction was somewhat firmer, with sales at 82¾ @ 83. Consolidated Traction lost 2 to 55 and United Companies of New Jersey sold at 226. American Railways sold at 45, and Philadelphia Company common at 34.

**Baltimore**

Interest in the traction issues at Baltimore during the week centered largely in the United Railway issues, and especially the 4-per cent bonds, which scored a sharp advance on investment buying. Opening at 82, the price ran off to 80½, but subsequently there was a recovery to within ½ point of the highest. The income bonds, however, were under pressure practically throughout the week, about \$75,000 selling from 43½ to 42½. The refunding 5-per cent bonds sold at 69½ and 69, and the stock at 87½ @ 9. Other transactions included Baltimore City Passenger 5s at 99½ @ 99 and Knoxville Traction 5s at 104½.

**Other Traction Securities**

Trading in the Boston market was comparatively quiet, but prices moved with considerable irregularity. Boston Elevated declined from 119½ to 118½. Massachusetts Electric common from 9¾ to 9½, while the preferred declined from 40 to 38, on light transactions. On the other hand West End common advanced to 80½, while the preferred moved up from 94 to 95. Boston & Worcester common sold at 16, and the preferred at 57. The Chicago market was practically at a standstill, transactions being confined entirely to odd lots. Chicago & Oak Park sold at 2½ @ 2, South Side Elevated at 68 and Metropolitan Elevated preferred at 48.

Traction has been very weak on the Cleveland Stock Exchange the past week, and little trading has been done. Cleveland Electric sold in small lots as low as 33, while a number of other issues have been equally as low. Cincinnati, Dayton & Toledo was quoted at 26 and Northern Ohio Traction & Light at 16½. Forest City was up a few points, the closing figures being 99½ bid and 101¼ asked. Washington, Baltimore & Annapolis certificates remain between 10 and 11.

**Security Quotations**

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

	Nov. 13.	Nov. 20.
American Railways .....	44½	44½
Boston Elevated .....	119½	117½
Brooklyn Rapid Transit.....	30¾	30½
Chicago City .....	150	150
Cleveland Electric .....	37	30
Consolidated Traction of New Jersey.....	55	56
Detroit United .....	32¼	31
Interborough-Metropolitan .....	5¾	5
Interborough-Metropolitan (preferred) .....	16½	15
International Traction (common).....	40	40
International Traction (preferred) 4s.....	258½	57¼
Manhattan Railway .....	108	110
Massachusetts Elec. Cos. (common).....	9½	9¼
Massachusetts Elec. Cos. (preferred).....	39	38
Metropolitan Elevated, Chicago (common).....	21	21
Metropolitan Elevated, Chicago (preferred).....	48	45
Metropolitan Street .....	—	23
North American .....	40¼	39½
North Jersey Street Railway.....	40	40
Philadelphia Company (common).....	34	33
Philadelphia Rapid Transit.....	15¾	12½
Philadelphia Traction .....	84½	83
Public Service Corporation certificates.....	54	54
Public Service Corporation 5 per cent notes.....	89	89
South Side Elevated (Chicago).....	69	67
Third Avenue .....	15	18
Twin City, Minneapolis (common).....	74½	74¼
Union Traction (Philadelphia).....	45½	44½

a Asked.

**Metals.**

According to the "Iron Age" there is a slightly better feeling in the iron trade, which has settled down to a practical solution

of the problem facing it. One fact is being reflected in the order books of the producers, and that is that both consumption and buying are continuing at a rate which appears to be somewhat between 60 per cent and 65 per cent of full capacity. The pig iron markets have been quiet, and while prices have been irregular and generally lower, the situation has not been clearly defined.

Copper metal displays an easier tendency, and prices are slightly below those heretofore prevailing. Lake 12¾ @ 13½, electrolytic 12¾ @ 12¾, and castings 12¾ @ 12¾.

**NEW ORDINANCES PRESENTED IN CLEVELAND**

Seven new street railway ordinances were presented for consideration at the regular meeting of the Cleveland City Council Monday evening. Five of these provide for fixing compensation for the use of certain tracks of the Cleveland Electric on the West Side by the Forest City Railway Company. The others relate to the routing of cars in the down-town district. One provides that the tracks on Superior Avenue, between East Ninth Street and the Public Square, shall be relocated. A pair of tracks are to be located on each side of the street, with a devil strip five feet wide between each pair. The members of Council seem to think that this will be better than having the tracks together in the middle of the street. The other provides that the city shall spend \$40,000 in building temporary tracks for the use of the Cleveland Electric in re-routing its cars so as to avoid congestion in the down-town district. This money is to be taken from the \$84,000 which the company paid the city for the use of Central Avenue and Quincy Street after the franchises had expired. The board may put in as many tracks as it sees fit, providing that the cost is kept within the limits of the sum set aside by the ordinance.

**RECEIVER FOR INDIANAPOLIS, NEW CASTLE & TOLEDO ELECTRIC RAILWAY**

The Indianapolis, Newcastle & Toledo Electric Railway Company and the Newcastle-Indianapolis Construction Company were placed in the hands of the Union Trust Company, of Indianapolis, as receiver, on Nov. 8. The proceedings on which the action was taken in the Superior Court of Indiana were instituted by the Electrical Installation Company, of Chicago, which alleged that the defendant owed it about \$650,000. Attorneys for the defendant admitted their client's indebtedness and joined in the petition for receiver. There has been invested up to this time about \$1,100,000 in rights-of-way, franchises, material and labor, and only for the existing financial condition the road would have been in operation by Jan. 1, 1908. Plans for completion under the receivership are maturing, and it is expected the road will be finished in the spring.

**EARNINGS IN ST. LOUIS FOR OCTOBER AND FOR TEN MONTHS**

The gross earnings of the United Railways Company of St. Louis for October, 1906, show an increase, while the net earnings show a small decrease. The increase in the net earnings indicates heavier traffic. The decrease in the net earnings and the net income is due to larger expenses, taxes and depreciation charges. The company has invested considerable money in reconstructing its own lines and also in improving what was formerly the Suburban property. The following is the comparative statement for the month and year to date:

	MONTH OF OCTOBER	
	1907	1906
Gross earnings and other income.....	\$971,322	\$933,613
Expenses, taxes and depreciation.....	607,450	558,915
Net earnings .....	\$363,872	\$374,698
Charges .....	231,483	231,984
Net income .....	\$132,389	\$142,714
	JAN. 1 TO OCT. 31	
Gross earnings and other income.....	\$9,087,659	\$8,566,571
Expenses, taxes and depreciation.....	5,906,466	5,344,588
Net earnings .....	\$3,181,193	\$3,221,983
Charges .....	2,315,214	2,318,131
Net income .....	\$865,979	\$903,852

## THE CLEVELAND SITUATION

People of Cleveland were disappointed last Thursday when it was found that the Cleveland Electric and Mayor Johnson were about as far apart as ever on a settlement of the troublesome question of fare and franchises. The fact that both plans proposed by the Cleveland Electric Railway contained an agreement to arbitrate made them distasteful to the Mayor, who had insisted upon a proposition to turn the properties over to a holding company. In other words, the Mayor wanted the company to name a stock value at which the directors would be willing to transfer the properties to a holding company on a leasing plan. The proposition of the Cleveland Electric was contained in the following communication to the Council committee of the whole, including the Councilmen-elect and the Mayor:

NOVEMBER 14, 1907.

HON. TOM L. JOHNSON, Chairman,  
Council Committee of the Whole,  
Cleveland, Ohio.

DEAR SIR:—

In response to your suggestion that this company advise the public as to its present position with reference to a renewal of its street railway franchises, we avail ourselves of this opportunity again to assure you and the public that this company is now, as it has at all times been, ready to contract with the city for the maintenance and operation of its system of street railway, and to build all needed extensions, under a grant which shall provide such a rate of fare as will pay the cost of operation, taxes, maintenance and depreciation, furnish a service satisfactory to the public, and return to the company 6 per cent per annum upon the fair valuation of its present property, to be determined by any competent, disinterested parties, and that will be sufficient to justify, in ordinary times, the investment of sufficient money in new stock of the company to provide for such extensions of the property and betterment of the service as the steady growth of the city will undoubtedly require from time to time.

As a business proposition, we have not believed, and do not now believe, that the property could be so maintained and operated at the rate of fare of three cents within and five cents without the city limits. We are, however, willing to make the city the following proposition in order positively to prove or disprove its possibility:

1. In consideration of a new grant to be made, we will surrender all of our Cleveland grants under which we are permitted to charge a cash fare of five cents, with tickets at the rate of 11 for 50 cents.

2. In consideration of such surrender, the city to make to the company a 25-year grant covering its entire city system, including the Central and Quincy Avenue route.

3. The rate of fare under the new grant to be finally determined after a test of six months.

During this period the rate of fare shall be three cents within the city limits and our present authorized fare outside the city limits. During the test period the city to have access to the accounts of the company, and, at the end of the period, the results of the test to be placed in the hands of a board of arbitration made up of impartial, competent experts, they to determine whether the rate of fare collected has earned such 6 per cent on the cost of reproduction of the property, including pavements, foundations and special street improvements, and also upon the value of its unexpired grants as of December 1, 1907.

If it is found that the rate of fare produces the said 6 per cent, then that rate of fare is to continue during the remainder of the term of the grant. If, however, it is found that such six per cent has not been earned, after making due allowance for operating expenses, taxes, maintenance and depreciation, then a rate of fare shall be fixed for the remainder of the term of the grant that will return such rate of interest. During the test period the city is to approve all operating schedules and to have control of the routing of the cars.

4. The result of this arrangement would be to put into effect at once over the entire system of this company the rate of fare now provided by the ordinances of the Forest City & Low Fare Railway Companies, and to continue that rate of fare for 25 years, if it is found that a return of such six per cent is obtained.

While we are ready to make this test, we can but still feel that the low rate of fare advocated by you will not return the 6 per cent interest referred to; and, although we favor a plan like the foregoing, yet we are willing to consider the "holding company" plan originally proposed by you; but we would have certain suggestions to make—among others, that the value of the property and franchises of this company should not be arbitrarily fixed by either party, but should be referred to a competent board of arbitration made up of disinterested experts, and that upon the award so made the rental should be at the same rate as is fixed in the agreement of lease between the Forest City Railway Company and the Municipal Traction Company. This arbitration, in our judgment, need not consume more than thirty days, as a complete inventory of the physical property of the company was made less than a year ago, and can be used, with modifications, as a basis for new estimates, saving a great deal of time. In the grants which have been made by the city to the Forest City Railway Company, the value of the property at the expiration of the grants is to be determined by arbitration. We would also suggest that inasmuch as the holding company proposed has no financial responsibility, some provision should be made out of the earnings of the holding company, for a fund which will adequately take care of depreciation, claims for damages on account of accidents, etc. There are other details which we would suggest if the holding company plan is to be further discussed, among which, of course, would be a method of providing funds for the future growth of the system.

This letter was unanimously approved at a meeting of the board of directors held this morning, and is submitted by order of the board.

HORACE E. ANDREWS,  
President.

The discussion which followed the reading of this communication was confined mainly to the Mayor, although President Andrews at times took occasion to reply to some of the state-

ments made. Mayor Johnson strenuously objected to any plan that smacked of arbitration. He said that in the first plan suggested the company wanted to arbitrate fares, and in the second it wanted to arbitrate the value of the stock if it accepts the holding plan. Regarding the proposition to provide for a fund for taking care of depreciation, accidents and other things of the kind, he said the old company would receive a franchise that would protect it in all these matters. He thought this the best security a company could have.

As to the valuation of the stock, the Mayor said that an agreement can be reached in a very short time, if the company will name a figure instead of proposing arbitration. He stated several times that the people had made him and the City Council the arbitrators and that they had rejected the proposition of the Cleveland Electric and refused it a franchise. In answer to his demand for the price at which the company holds its stock so far as the holding plan is concerned, President Andrews stated that the directors have not considered the question of price and that he was not authorized to make other propositions than those contained in the communication. He said his company wants no advantage over the city and he believed that the city desires to take no undue advantage of the company.

President Andrews said that his offer respecting the holding plan contemplated the same arrangement that the Forest City Railway Company has. The mayor denied this because, he said, the value of the franchises was not taken into consideration in fixing the price of the stock of that company. He says that value was the actual cost of the property.

The mayor contended that the value of the properties in the suburbs should not be taken into consideration in fixing a leasing price, but President Andrews combatted that assertion vigorously. He said that the suburban lines and franchises are valuable and should be taken into consideration in anything that may be done.

Pinned down to the basis price he is willing to consider, the Mayor said he would stand by the offer made in April of this year, which was 60 with a drop of two points for each month of delay in accepting the offer. That would make his offer 46 at the present time, but he also suggested that some of the track had been torn up since then and that the figure should be still lower than that to be in accord with the spirit of the offer. He objected to a suggestion from a councilman that a board of experts fix a price for the guidance of both sides and said no good could come of any arbitration unless both sides are bound by it. The city, he said, could legally enter into no arbitration agreement, although President Andrews cited the Chicago case and said he believed that the plan in that city could be followed with propriety.

When the second meeting convened Saturday morning, it was found that the Cleveland Electric was not officially represented, but instead a short communication was received, in which it was stated that the board of directors could see but one fair and honorable manner of arriving at a valuation of the properties for holding company purposes and that is by arbitration and arbitration only. The directors refused to say what will be done with the tracks on the West Side streets, where it is claimed the franchises expire in February next. The Mayor suggested to the Councilmen that the directors be asked to name representatives to meet with the council committee of the whole and negotiate on values and that if they can not agree upon certain points, experts be called in to give an opinion. However, the Mayor still insisted that no arbitration could be binding upon the Council, which he says has been named by the people as their arbitrators. He forgets that almost one-half of the voters did not agree to these men and himself as arbitrators and in his consideration of the matter has not included them at all.

In a supplemental petition in the circuit court in the two cases appealed from the common pleas court a few weeks ago, the Cleveland Electric asserts that the curative franchise passed on Aug. 3 is illegal, because Mayor Johnson, in procuring the new ordinance, acted as agent for men who were persuaded to invest their money upon the assurance of the Mayor of the safety of the investment. The petition further states that the curative act is illegal because it attempts to release the Forest City Railway Company from obligations imposed by the original Denison Avenue franchise. The statement in the new ordinance, that the company cannot be compelled to issue transfers unless 6 per cent is earned on the cost of construction, constitutes an increase in the rate of fare, the petition states.



## MEETING OF THE NEW ENGLAND STREET RAILWAY CLUB

Thanksgiving coming on the fourth Thursday in the month, the New England Street Railway Club has decided to hold its meeting and smoke talk in the auditorium of the Edison Electric Illuminating Company, Boston, on Thursday, Nov. 21. Lunch will be served at 6:45, and the regular business meeting will begin at 7:45. Following the business meeting, Hon. George W. Bishop, member of the Massachusetts Board of Railroad Commissioners, will address the club, his subject being "Experience and Observation in Transportation Matters."

## TO ELIMINATE GRADE CROSSINGS IN INDIANA

The Indiana Railroad Commission, in a recent circular to the railroads in Indiana, sounds a warning for failure upon the part of engineers and motormen to signal at grade crossings and failure on the part of the roads to keep grade crossings in proper care, two things which the commission says, if properly attended to, will lessen the fatalities at grade crossings. Twenty-eight people were killed on grade crossings in Indiana in July, August and September. The commission recommends to the companies to issue special instructions to the roadmasters and supervisors to put these crossings in first-class shape, and requests managers and superintendents to issue special instruction as to the manner of giving signals. In order that motormen and engineers may be fully informed, and, therefore, not subject themselves to the severe penalties of the law, the commission further requests that the attention of operators be called to the following statute bearing on this subject: "Burns statutes, section 2299. Whoever having charge of a locomotive engine or motor car upon any railroad, fails or neglects when such engine is approaching any road crossing to sound the engine whistle at a distance of not more than one hundred nor less than eighty rods from such crossing, shall be fined not more than \$50 nor less than \$10; and if any person be injured or killed by reason of such failure or neglect, he shall be imprisoned in the state prison not more than fourteen years nor less than two years. But nothing herein contained shall be so construed as to interfere with any ordinance or by-law that has been or may be passed by any city or town regulating the management or running of engines or trains within such city or town."

## INTERURBANS NOT COMMON CARRIERS IN MINNESOTA

Attorney-General Young's ruling that the Twin City Rapid Transit Company's suburban lines are under the jurisdiction of the State Railroad and Warehouse Commission does not affect the company's lines operating within the city limits of St. Paul and Minneapolis. The ruling was based on a decision of the Supreme Court last May, in which it held that the suburban lines were common carriers and railroads, and hence had the right of eminent domain.

In that case the Supreme Court held that the company had a right to condemn certain property in towns along its projected extension of the Lake Minnetonka line. Attorney-General Young's ruling has raised the question whether the fact that the company, so far as these lines are concerned, is a railroad company does not put it in the position of paying the 4 per cent gross earnings tax exacted from the railroads.

While the attorney-general has not examined the question thoroughly, he is of the opinion that this would be the result. However, the taxation of the company for this year already has been provided for by the local assessment officials and the state board of equalization, and it is probable that the matter will be submitted to the next Legislature for such action as may be deemed proper.

The statute provides that railroad companies shall pay a percentage of their gross earnings in lieu of other taxes, but the statute defining common carriers expressly excepts streets railways so far as relates to the carriage of persons or property wholly within the limits of any municipality or municipalities. This would exempt the St. Paul-Minneapolis lines from the operation of the gross earnings law at any rate, as well as the other lines running wholly within the limits of either city or both cities.

## MEETING OF NEW PARK ASSOCIATION IN NEW YORK

An important meeting of the National Amusement Park Association was held at the Hotel Knickerbocker on Thursday, Nov. 14. There were in attendance a distinctly representative number of amusement men from both amusement parks and street railway interests. Among those in attendance were representatives from Boston, New York City, New Jersey, Pennsylvania, Virginia, Kentucky, the trans-Mississippi country and the Southwest. The meeting was called to order by the president of the association, Jas. B. Pratt, of the United Railways & Electric Company, of Baltimore. The committee on by-laws reported a form of administrative government for the organization, which was unanimously adopted, and it was decided, in order to attract and stimulate membership in the association, to have Secretary-Treasurer Oberheide visit different parts of the country in an effort to interest amusement park people in the new organization. Two important committees were appointed, one on reciprocity and the other on statistics. The members of the committee on reciprocity are Fred C. Schanberger, Baltimore, chairman; J. J. Weaver, Cincinnati; C. H. Oberheide, Trenton. The members of the committee on statistics are L. B. Sloss, Scranton, chairman; A. S. McSwigen, Pittsburg; C. H. Oberheide, Trenton. After the appointment of these committees the meeting was adjourned subject to call by the president.

An address of welcome was extended to those present by Secretary-Treasurer Oberheide, of the association, in which some very pertinent remarks were made on the conduct of parks in general and on the relation of park managers to the public. Mr. Oberheide said that the first consideration in planning a park was that of scenery. He said that recreation was what was desired by the masses, and that in providing it for them the park managers should see to it that the landscape scene was attractive and that suitable provision was made for women and children. As regards attractions, Mr. Oberheide expressed the opinion that music was both cheap and effective. He said that the three R's of park management were rest, recreation and revenue, and that to secure revenue the public must be given an attractive park, properly policed and kept in good sanitary condition, and that suitable rest features and recreation should be provided. He said, however, that no property could be a success if there were inadequate transit facilities, and proposed a more harmonious relation between the street railway manager and the park manager where the two properties are not controlled by the same interests. Mr. Oberheide expressed the opinion that if parks were not successful the reason could be traced either to inadequate transportation or faulty management on the part of the park managers themselves in not supplying what the public wanted. He said that no general specific could be offered for the selection of park attractions, but that each manager should make a careful study of the people upon whom he would have to depend for patronage, and select his attractions carefully to meet the requirements. He said that the matter of advertising was very important, but heretofore it had been carried on in a makeshift way, if at all. An association such as the National Amusement Park Association, Mr. Oberheide said, was just what was needed to make a success of the amusement park business, as it would provide an exchange where men having common interests could meet and discuss the problems of how to please the public, how to run the park, how to co-operate with the street railways, how to advertise, how to provide for the safety and comfort of patrons, and consider other questions that confront the capitalist, and the manager and his assistants.

The object of the association, as stated in the by-laws, is "to secure unity of action, to promote a more friendly intercourse among its members, to adjust differences between them, to foster business and protect it against unjust or unlawful exactions, to reform abuses, collect statistics and generally to advance the interests of the owners and managers of places of amusement on the North American Continent."

Any owner or lessee of a park is eligible to membership in the association. The initiation fee is \$50 and the annual dues \$25. The regular annual meeting of the association will be held on the third Tuesday of November of each year at a place to be selected by the president and the board of trustees of the association. Special meetings will be held from time to time by order of the president or vice-president at the request in writing of five members of the association.

### CONSOLIDATION OF YORK COMPANIES

The electric railway properties in York County have been merged into one consolidation, under the title of The York Railways Company. Letters patent for the new company have been issued and it will become operative in a short time. The following companies are in the merger: The York Street Railway Company, Wrightsville & York Street Railway Company, the York & Dover Electric Railway Company, the York & Dallastown Railway Company, York Haven Street Railway Company, Red Lion & Windsor Street Railway Company, Hanover & York Street Railway Company. The capital of the consolidation will consist of \$10,000,000 in bonds and \$450,000 stock. The officers of the new company are: Hon. W. F. Bay Stewart, of York, president; A. H. Haywood, of York, vice-president; David Young, Jr., manager; George S. Schmidt, treasurer and secretary.

### WILL TEST SAFETY APPLIANCE LAW

The inspectors employed by the Indiana Railroad Commission have been investigating the causes of several accidents that have occurred recently upon the interurban railroads, and as a result the commission has ordered the attorney general to file suit against one company for the alleged violation of the new safety appliance law. This is the first suit filed by the commission to collect the statutory penalty from an interurban railway for the violation of the safety appliance law. The prosecution grows out of a collision between an interurban car of the road in question and a city car, during a heavy fog, while entering the city of Indianapolis. It is the purpose of the commission, if possible, to discover whether this accident and the several others that have recently occurred in the state, resulting in loss of life and injury to passengers, were due to lack of appliances required by law. A penalty of \$100 is provided for each violation of the safety appliance law, and it is made the duty of the commission to collect the penalty by bringing suit, if necessary. It is also the purpose of the commission to find out if the testimony will fix the responsibility of the accidents in question.

### ANOTHER MANUFACTURER OF BIG GAS ENGINES

As an indication of the rapid development in the manufacture of big gas engines and the importance of the field occupied by this type of prime mover, it is of interest to note that another manufacturer of large Corliss steam engines has actively taken up the manufacture of gas engines, and is bidding strongly for engines in medium and large sizes.

The Wisconsin Engine Company, with works at Corliss, Wis., which has built some very large and successful Corliss steam engines, is constructing gas engines in sizes from 400 hp to 5000 hp. The engines utilize natural gas, producer gas, coke-oven gas or blast-furnace gas in the Otto cycle (4-cycle), and are of the horizontal tandem and twin-tandem double-acting type. This company controls the Sargent patents on internal combustion engines and has employed Charles E. Sargent as the engineer of its gas engine department. Mr. Sargent has a wide reputation as an engineer, and in 1898 designed a horizontal tandem double-acting gas engine claimed to be the first of that type. It is a notable fact that the largest and most successful gas engines of the present day are of this form.

The gas engines built by the Wisconsin Engine Company bear some of the distinctive features of their big Corliss engines, and utilize in design most of the Sargent patents. The design is remarkably simple, and embodies features which are of considerable interest to the engineer and power user; e. g., there is but one poppet valve for each explosion chamber, and as this is located on the bottom of the cylinder the cumbersome and unsightly air and gas pipes, as well as the stairs, galleries, and railings found on most horizontal tandem engines, are entirely eliminated; provision is made for preventing the dangerous pressures caused by possible preignitions; and the engines are started automatically. Tests of even small Sargent engines show a heat consumption of less than 9000 B. t. u. per brake hp-hour.

This company has recently shipped some large steam engines to such concerns as the Illinois Steel Company, Jones & Laugh-

lin Steel Company, Packard Motor Car Company, American Sheet & Tin Plate Co., Amoskeag Mfg. Co., New Hampshire Spinning Mills, National Tube Company, City of Milwaukee, Carnegie Steel Company, American Woolen Company, United States Envelope Company, and the Carnegie Natural Gas Company, and has built up an unusual reputation for shipping "on time." It promises to do as well on gas engine orders.

### SEVENTH ANNUAL REPORT OF THE INTERNATIONAL RAILWAY EMPLOYEES' ASSOCIATION

The trustees of the International Railway Employees' Association have presented the seventh annual statement of the association. The membership is 1527, which is an increase of sixty-eight over the previous year, and comprises 58 per cent of all employes of the International Railway system, trackmen excepted. The increase in receipts for the year was \$1,404.89, and increase in death benefits paid was \$550. The increase in sick benefits and medical attendance paid during the year was \$889 over the previous year. Notwithstanding these increased expenditures, the surplus has increased during the year \$3,048.85, reaching a total of \$14,269.18. During the year the association invested \$3,930 in International Traction Company 4 per cent gold bonds; the total amount invested in securities of all kinds being \$12,367.50. The International Railway Company contributed \$3,082.56 toward the expenses of the association in addition to the free use of the club rooms at Virginia Street. Since the organization of the association seven years ago, the members have paid for dues and initiation fees \$56,989.32, and with payments to the beneficiaries of thirty-seven members who have died since its organization and also payments to members for sick benefits and medical attendance, the members have paid into the association but \$724.81 more than has been returned to them and their beneficiaries. There is at present a surplus of \$14,269.18, resulting almost entirely from donations from the International Railway Company and others, interest on securities and profits from the annual ball. Following is a comparative statement of membership:

Total for year.....	1906	1907
Dropped from roll.....	994	1158
	949	1090
Increase for year.....	45	68
Previous membership.....	1414	1459
Membership at end of year.....	1459	1527

The treasurer's comparative report for year ending Oct. 31, 1906, and year ending Oct. 31, 1907, shows as follows:

#### INCOME ACCOUNT—CLASS "R"

RECEIPTS	Year Ending Oct. 31, 1906	Year Ending Oct. 31, 1907
Initiations, Class "R".....	\$865.00	\$967.00
Dues, Class "R".....	8,249.50	8,730.00
Toilet supply.....	97.20	117.25
Interest receivable.....	296.20	608.16
Sale of lost articles.....	106.50	85.06
Net proceeds of ball.....	1,679.40	2,191.22
	\$11,293.80	\$12,698.69

DISBURSEMENTS	Year Ending Oct. 31, 1906	Year Ending Oct. 31, 1907
Sick benefit, Class "R".....	\$4,541.00	\$6,430.00
Death benefit, Class "R".....	650.00	1,200.00
Medical attendance, East Side..	849.96	849.96
"    "    West Side..	849.96	849.96
"    "    South Side..	99.96	99.96
Medical attendance, Niagara Falls, N. Y.....	120.00	120.00
Medical attendance, Lockport..	99.96	99.96
Net surplus for 1906.....	\$4,082.96	
Net surplus for 1907.....		\$3,048.85

#### PROFIT AND LOSS ACCOUNT

CREDIT	1906	1907
Net surplus, Oct. 31, 1905.....	\$7,137.37	
Net surplus, Oct. 31, 1906.....		\$11,220.33
Surplus in income account for the year.....	4,082.96	3,048.85
Profit and loss surplus, Oct. 31, 1906.....	\$11,220.33	
Profit and loss surplus, Oct. 31, 1907.....		\$14,269.18

#### GENERAL BALANCE SHEET

	1907	1906
Assets	Liabilities	
International Traction Co. 4 per cent bonds (par value for 1906, \$10,000, and for 1907, \$15,000)...	\$11,867.50	
Reserve fund (Buffalo Railway Co. 6 per cent debenture bond).....	500.00	
Cash on deposit.....	1,988.18	
Deposit for locker keys.....		\$41.00
Honorary members' fund.....		45.50
Surplus.....		14,269.18
	\$14,355.68	\$14,355.68

**BOSTON & PROVIDENCE COMPANY GETS CERTIFICATE**

The Massachusetts Railroad Commissioners have granted the certificate of public exigency for the Boston & Providence Interurban Electric Railroad, as promised by their so-called interurban decision made public about six weeks ago. The actual issue of the certificate has been delayed pending the settlement of a difference between the company and local authorities in Hyde Park as to the route through that town, but this matter has been settled by the acceptance of the route first proposed. The company's next step is to go ahead with the securing of locations from local authorities all along the line, these to be subsequently approved by the Railroad Commission. It is understood to have these locations already pretty well secured by options on private property.

**THE CHICAGO REORGANIZATION**

An advertisement signed by the reorganization committee of the Chicago Union Traction Company and addressed to the holders of the securities of the underlying companies, which has been appearing in Chicago papers during the week, urges holders of securities to deposit them in acceptance of the modified plan and agreement recently approved by Prof. John C. Gray and Judge Grosscup. Those who have already made deposits under the former plan, dated Aug. 9, are urged to transfer the securities to a deposit under the modified plan. The Harris Trust & Savings Bank, Chicago, and the Farmers' Loan & Trust Company, New York, are named as depositaries. Deposits may be made on or before Monday, Nov. 25.

Regarding the success of the new reorganization plan, W. W. Gurley, general counsel for the Union Traction Company, on his return from New York recently is quoted as saying that prospects are brighter than ever before for the success of the new plan. The trustees, with the exception of the Guaranty Trust Company, are a unit for it and the opposition of this company is not active. Representatives of the creditors and the stockholders also endorse it.

**THE B. R. T. HEARING—UTILITIES BILL UPHELD BY COURT**

The Public Service Commission of the first district of New York resumed its consideration of affairs of the Brooklyn Rapid Transit Company, on Wednesday, and inquired into an alleged agreement said to have been entered into some time ago between the Brooklyn Rapid Transit Company and the Long Island Railroad regarding the division of territory on Long Island. Neither President Winter nor Vice-President Williams seemed to know about the alleged compact, and it was shown that its very purpose was being defeated to-day, as both companies were doing and had done things said to have been prohibited.

By a divided court, the Appellate Division, Third Department, upholds the right of the Legislature to delegate its powers to fix a tariff of rates for a public service corporation to a commission. The constitutionality of the new Public Service Commission act was also involved in this case. The prevailing opinion is by Presiding Justice Smith. Justices Chester and Cochrane concur. Justice Kellogg in an opinion dissents, and is concurred with by Justice Sewell. The appeal was from an order of the State Commission of Gas and Electricity, recently succeeded by the Public Service Commission in the Second District, fixing a maximum charge for gas and electricity within the village of Saratoga Springs.

**STREET RAILWAY PATENTS**

UNITED STATES PATENTS ISSUED NOV. 5, 1907.

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

869,955. Switch for Trolley Wires; Frank M. Zimmerman, Aurora, Ill. App. filed Oct. 23, 1905. Provides at a turn-out a movable double conductor element which swings into alignment either for the direct track or the turn-out.

869,970. Railway Signal and Safety Appliance; Charles J. Kintner, New York, N. Y. App. filed Jan. 18, 1907. Includes mechanical features and electrical circuits, having among other features a train stop lever on the roof of the car which is engaged by an arm from the semaphore signal.

869,987. Means for Keeping Switch and Signal Apparatus Free From Snow and Ice; Francis G. Shaw, Boston, Mass. App. filed April 29, 1907. A casing constituting a heating chamber extending beneath the rails between the ties and supported independently of the ties, and heat generating means therein.

870,029. System of Motor Control; Jay H. Hall, Cleveland, Ohio. App. filed March 19, 1906. A system of controlling one or more electric motors from a distant point. The motor has a magnetically operated switch and an auxiliary switch magnetically opened by the closure of the main switch.

870,051. Car Door and Step Operating Mechanism; Harold Rowntree, Chicago, Ill. App. filed May 13, 1907. The step is lowered to usable position coincident with the opening of the door and raised when the door is closed.

870,080. Trolley Wheel; Charles P. Bostian and Homer C. Bostian, Milton, Pa. App. filed July 15, 1907. Among other features provides V-shaped spurs in the peripheral groove of the trolley wheel for breaking up ice on the conductor.

870,089. Railway; Mark St. Clair Ellis, of the U. S. Navy. App. filed Aug. 23, 1907. A monorail pleasure railway operated by gravity.

870,101. Sand Box; Charles G. Hensley, New York, N. Y. App. filed March 2, 1907. A sand box of that type in which the valve is a swing gate valve, adapted to swing on an axle and to control the flow of sand. The swing valve in this instance has a curved bottom made on a large arc, so that there will be no leak of the sand when the valve is closed.

870,111. Sand Box; Joseph L. Levy, New York, N. Y. App. filed March 2, 1907. See preceding patent.

870,139. Track Relay; John D. Taylor, Swissvale, Pa. App. filed April 18, 1907. An alternating current relay in the form of a wattmeter which operated with only one current frequency. The rotation makes contact through a centrifugal device.

870,145. Electric Signaling System for Railways; Harry J. Warthen, Washington, D. C. App. filed Jan. 13, 1907. A system of that type in which audible and visible signals are displayed in the cab and has automatic means for recording the exact time at which the signal was received and the length of time the train is running after the receipt of such signal.

870,147. Multiple-Unit-Controlling System for Electric Locomotives or Motor Cars; Ragnar Wikander, Westeras, Sweden. App. filed Jan. 5, 1907. Provides means whereby the respective voltages supplied to the motors of each unit may be independently regulated.

870,181. Railway Track Construction; Henry B. A. Keiser, Akron, Ohio. App. filed June 11, 1902. A continuous track support consisting of transversely stiffened metallic plates secured directly to each other at their ends, means for securing the rail-bases directly to the plates, which plates form the sole support for the rails.

870,188. Brake for Vehicles; Joseph N. Mahoney, Brooklyn, N. Y. App. filed June 2, 1905. Relates to brakes of that class which are actuated by springs placed under tension by electric motors.

870,189. Brake for Power Driven Vehicles; Joseph N. Mahoney, Brooklyn, N. Y. App. filed Oct. 30, 1905. See above patent.

870,232. Signaling Device for Railways; George S. Getchell, Los Angeles, Cal. App. filed Jan. 24, 1907. Has a plurality of features, including depressible tappets adjacent the track rail, which are impelled to close the signal circuits by the wheels of a passing train.

870,255. Composite Railway Tie; John Smith, El Paso, Tex. App. filed April 3, 1907. A reinforced concrete tie having recesses in which wooden blocks are inserted for the reception of the rail engaging spikes.

870,284. Safety Device for Air-Brakes; John W. Guffey, Arkansas City, Ark. App. filed Aug. 28, 1907. A pipe section rigidly secured to the platform of the car and communicating with the train pipe, and frangible portions carried by the opposite ends of the pipe section and adapted to be broken by contact with the adjacent car wheels upon the derailment of the car.

870,328. Electric Signaling Mechanism; Jean F. Webb, Jr., Chicago, Ill. App. filed May 31, 1907. Embodies a step-by-step uni-directionally rotatable shaft upon which is an escapement wheel and a ratchet disc which co-operate with the escapement

verge and pawl respectively, carried by the armature of the operating magnets, and a contact carrying wheel also mounted on the uni-directionally rotatable shaft to which one terminal of an electric circuit is connected, the contact wheel carrying a contact plate which is adapted to be engaged by a dog, which is electrically connected to the other terminal of an electric circuit.

870,385. Reversible Car Seat; Eugene P. Rideout, East Oakland, Cal. App. filed Feb. 20, 1907. The seat and back portions of the seat are interchangeable. Means for reversing all the seats on one side of the car simultaneously.

870,427. Train Controlling Apparatus; William Germiner, Pueblo, Colo. App. filed April 2, 1907. Includes a series of independent track circuits, normally open circuits carried by the locomotives and adapted to be closed in conjunction with each other and with any one of the track circuits, an electromagnet in each of the locomotive circuits, and a bleed valve for the train pipe operated on the movement of the armature.

870,440. Horizontal Roller Coaster; Burton A. Karr, Omaha, Neb. App. filed Aug. 12, 1907. Details of construction.

870,489. Amusement Device; John W. Bourke, New York, N. Y. App. filed Dec. 8, 1906. An "autowheel" in which the car has a depending member on which is a roller which engages the under side of a rail hung from a bracket to thereby keep the car on its track at all times.

## PERSONAL MENTION

MR. WILLIAM LOEB, secretary of the President, has declined the presidency of the Washington Railway & Electric Company.

MR. THOMAS McCAFFERTY has been appointed master of transportation of the Pacific Electric and Los Angeles Interurban railways of the Huntington lines.

MR. R. E. BURRISS has resigned as superintendent of the Anderson Traction Company, of Anderson, S. C. Mr. L. R. Nelson, late with the General Electric Company, succeeds Mr. Burriess.

CAPT. J. V. MEIGS, of Lowell, Mass., who, about twenty years ago, attracted considerable attention by proposing a peculiar form of elevated railroad construction for Boston, is dead. It is said that part of the Boston Elevated Railway Company's system is built over a route originally granted to Mr. Meigs.

MR. C. C. REYNOLDS, formerly general manager of the Indianapolis & Northwestern Traction Company, but now general superintendent of the merger system known as the Terre Haute, Indianapolis & Eastern Railway, was painfully injured in an automobile accident at Lebanon, Nov. 12, when the car in which he was riding collided with a wagon.

MR. S. MITSUI, an engineer of Osaka, Japan, is making a visit of a few weeks in this country. Mr. Mitsui's purpose is to inspect electric railway and lighting plants and electrical apparatus ordered in this country by electric lighting and railway companies in Japan. He was in New York last week, and from this country will go to Switzerland, where he will spend several months studying hydraulic installations.

MR. C. S. YOUNG, formerly in charge of the engineering work of the New Orleans & Baton Rouge Railroad, and recently in charge of the Fort Worth-Dallas Electric Railway, operated by Stone & Webster, has been appointed chief engineer of the Fort Worth & Mineral Wells Interurban Electric Railroad, with headquarters in Fort Worth. The new electric line is being built by the Gid. Turner Construction Company.

MR. FLETCHER N. DURBIN, recently appointed general manager of the Evansville & Southern Indiana Traction Company, of Indianapolis, Ind., was graduated from Williams College in 1903, and from that time until he was appointed to the Evansville & Southern Indiana Company, was connected with the Indianapolis Traction & Terminal Company, working through the operating department and serving as assistant superintendent during the last three years of his connection with that company.

MR. S. MATSUMO, mechanical engineer of the Imperial Government Railway of Japan, has arrived in Pittsburg to pay a visit to the Westinghouse Works at East Pittsburg, with a

special view to inspecting the Westinghouse single-phase alternating-current railway system. He will also be taken on a trip over the Pittsburg & Butler Electric Railway to show him this system in practical operation, and will inspect some of the other large local industrial plants. Mr. Matsumo expects to depart for England at the end of this week.

MR. JOHN F. REARDON, of Everett, Wash., who, as announced in the STREET RAILWAY JOURNAL for Nov. 9, has been appointed superintendent of the Lehigh Valley Transit Company of Allentown, Pa., was born in Northern Michigan, 35 years ago, and first entered the street railway business eighteen years ago in Minneapolis, Minn., where he was employed by the Twin City Rapid Transit Company for ten years. After leaving Minneapolis, he went to Everett, Wash., where he became master mechanic of the Everett Railway, Light & Water Company. Later he was made superintendent of the company, which position he resigned to come to Allentown.

MR. JOHN F. McCABE is purchasing agent for all lines in Massachusetts controlled by the New England Investment & Security Company and is office assistant to the vice-president, with headquarters in Boston. In 1891 Mr. McCabe was appointed clerk in the store-keeper's department of the West End Street Railway Company, of Boston, where he remained for a few months and was then transferred to the auditor's office in the passenger revenue department as clerk. After a year's service here he was temporarily appointed as assistant clerk in the office of the president, and in May, 1902, he was transferred to division 6 of the same company, as assistant clerk, having in charge track department accounts and division correspondence. Here he remained until March, 1901. Subsequently he was appointed chief clerk to Mr. R. T. Laffin, general superintendent of the Worcester Consolidated Street Railway Company, at Worcester, Mass., in charge of all purchases, inspection and office work. In 1903, he was given the title of purchasing agent, with no change of duties.

MR. JAMES F. JACKSON, chairman of the Massachusetts Railroad Commission, has resigned his position to take up the private practice of law. Mr. Jackson will form a business relationship with former Attorney-General Herbert Parker, of Massachusetts, and Brigadier-General Hugh Bancroft, son of Major-General William A. Bancroft, president of the Boston Elevated Railway Company, and will open offices in Barristers' Hall, opposite the Court House in Pemberton Square, Boston. Mr. Parker is already engaged in private practice here, and Brigadier-General Bancroft is filling out the unexpired term of Mr. George A. Sanderson as district attorney of Middlesex, which expires with the incoming of the new year. Mr. Jackson for some time has made no secret of the fact that he intended to retire from the service of the Commonwealth, and the principal reason, without much doubt, is that the salary paid the chairman of the Railroad Commission in Massachusetts, \$6,000 per annum, is considerably less than a lawyer of Mr. Jackson's ability and experience may reasonably expect to make in private practice. Mr. Jackson requested that his resignation take effect Nov. 30, and Gov. Guild has written him a letter commending his service and accepting his resignation.

MR. A. L. WHIPPLE, Eastern manager of the Curtain Supply Company, of Chicago, has resigned that position to become second vice-president of the Telharmonic Securities Company, of New York. This company is the financial agent of the Cahill Telharmonic Company, of New York, whose system for the distribution of music by electricity from its central station at Thirty-Ninth Street and Broadway constitutes a center of great interest from both an electrical and musical standpoint to all visitors to the metropolis. Mr. Whipple is very well known in railway circles in this country, through the active part taken by him in organizing the entertainments at the last street railway convention and at previous conventions of the Master Car Builders and Master Mechanics. He has been connected with the Curtain Supply Company for the last nine years, and has been engaged in the railway supply field for fourteen years. During the last convention of the Master Car Builders' and Master Mechanics' Associations, at Atlantic City, Mr. Whipple made an effort to have telharmonic music transmitted by wire from New York to Atlantic City. It was largely through the negotiations carried on in connection with this proposal that Mr. Whipple became intimately acquainted with the system of the Telharmonic Company, and this led up to the present engagement.