Street Railway Journal

VOL. XXVI. NEW YORK, SATURDAY, AUGUST 12, 1905. No. 7.

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

MAIN OFFICE:

NEW YORK, ENGINEERING BUILDING, 114 LIBERTY STREET.

BRANCH OFFICES:

Chicago: Monadnock Block.
Philadelphia: 929 Chestnut Street.
Cleveland: Cuyahoga Building.
London: Hastings House, Norfolk Street, Strand.

Cable Address, "Stryjourn, New York"; "Stryjourn, London"—Lieber's Code used.

TERMS OF SUBSCRIPTION

In the United States, Hawaii, Puerto Rico, Philippines, Cuba, Canada, Mexico and the Canal Zone.

Street Railway Journal (52 issues).....$3.00 per annum
Combination Rate, with Electric Railway Directory and Buyer's Manual (3 issues—February, August and November) $4.00 per annum
Both of the above, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum
Single copies, Street Railway Journal, first issue of each month, 20 cents; other issues, 10 cents.

To All Countries Other Than Those Mentioned Above:

Street Railway Journal (52 issues), postage prepaid..... $6.00
25 shillings. 25 marks. 31 francs.
Single copies, first issue of each month, 40 cents; other issues, 15 cents.
Remittances for foreign subscriptions may be made through our European office.

NOTICE TO SUBSCRIBERS

REMITTANCES.—Remittances should be made by check, New York draft, or money order, in favor of the STREET RAILWAY JOURNAL.

Change of Address.—The old address should be given, as well as the new, and notice should be received a week in advance of the desired change.

Back Copies.—After July 1, 1905, no copies will be kept on sale beyond fifteen months prior to date of issue, except in bound volumes.

NOTICE TO ADVERTISERS

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

Of this issue of the Street Railway Journal 8000 *copies are printed. Total circulation for* 1905, *to date,* 261,550 *copies, an average of* 8157 *copies per week.*

Purifying Boiler Feed-Water

In spite of the advance that has been made in the past fifteen years in practical purification of feed-water for boilers to prevent scale formation, and the fact that such purification has been virtually reduced to a science, there appears still to be an idea in many quarters that it is a kind of mysterious thing to be treated by hit or miss experiments. The fact of the matter is that, as far as any ordinary feed-water is concerned, the engineer, with the aid of the chemist, can, in this day and generation, prescribe a method of treatment of boiler feed-water which will almost entirely prevent scale. Most of the scale-producing solids in boiler feed-water can be precipitated by certain cheap chemicals either before or after the water enters the boilers. The use of an open feed-water heater also assists greatly in such precipitation. There are a number of chemicals which will produce the results if used in the right proportions. Some are cheaper than others. There are also a number of patented methods of reducing the cost and labor of mixing proper proportions of chemicals and feed-water. Or, if the user prefers, he can do the mixing with main strength and awkwardness in settling tanks without the aid of any of these improvements. The important thing, however, is to find out what solids the waters contain by chemical analysis and prescribe the exact amount of reagent needed to precipitate these solids. As to whether they are to be precipitated outside or inside the boiler, is for the user to decide. While some waters may be peculiar and call for a certain amount of experimenting, the day for this kind of thing in general has passed.

Short Headway on Single-Track Roads

The question is beginning to be raised by some of the high-speed interurban roads with heavy traffic as to how frequent a service can be maintained on a single-track road. This matter of operating cars at frequent intervals on single roads has been thrashed out pretty thoroughly on many suburban roads, especially those in the East. It is a problem somewhat different on high-speed interurban roads of the type prevailing in the Middle West, although it differs in degree rather than in kind. About the shortest headway that is being regularly maintained by passenger cars on high-speed interurban roads of this kind is a car every half hour, which brings regular meeting points fifteen minutes apart for the regular schedule, in addition to which express and freight cars and extras must be provided for. To reduce this headway on such roads is a very difficult matter. In the first place the turn-outs are located for a meeting point every fifteen minutes. As long as the running time remains the same, the only way to reduce the headway between cars, without relocating the turn-outs, is to double the number of meeting points so as to provide for a fifteen-minute service, with meeting points every seven and a half minutes. This is certainly putting the meeting points in pretty thick for a high-speed road. If less than a half-hour headway is to be maintained between cars going in one direction and a fifteen-minute headway is too frequent, the only alternative is to change the running time or to change the location of the turn-outs. The present indications are that until companies feel that there is sufficient traffic to pay for making the line double track, the frequency of regular cars will not be reduced below thirty minutes on the fast roads, but that additional traffic will be taken care of by running double-headers, or by adding trailers or by putting two cars in a train on the multiple-unit system. The last method requires a special equipment, but outside of this fact is the most desirable.

The Accident Account

The statement of income and operating expenses per car-mile presented at the New York State convention and published in our issue of July 15, offers much chance for the profitable study of many matters. One of the items which may not be a subject of very profitable scrutiny, but which is nevertheless striking, is the damage account. The most notable thing about these figures is that the percentage of the gross receipts per car-mile going to pay damages and legal expenses incident thereto is much larger in the larger cities of the State than in the smaller. In fact, there seems to be something approaching a definite ratio between the percentage of gross receipts paid out for damages and the population of the city. The reasons for this are found both in natural operating causes and in an unnatural public sentiment. It is, of course, true that the density of population in the larger cities makes many more chances for accident in a large city than in a small for each mile a car runs. These are natural conditions which nothing can overcome. But these natural causes offer by no means the whole explanation of the enormous difference between the accident expenses per car-mile of a road operating in a city of 500,000 inhabitants and one operating in a city with a population of 50,000. No small part of the difference is caused by the large number of fraudulent and semi-fraudulent damage cases in large cities. On account of the smaller liability of detection, professional fake damage claimants always seek large cities for their operations. Further than this, public sentiment toward corporations in the larger centers is considerably different from that in the smaller cities, where the officers of the company are known personally to a large number, and where it is not so easy to obtain unreasonable verdicts from juries. Furthermore, in smaller cities, the corporation is usually of limited resources, and this being generally known, there is an unconscious public sentiment which spares a corporation, where in a large city the attempt would be to "stick the company" for the biggest damages that could possibly be obtained. In looking over the New York State figures, we see that the New York City Railway heads the list, with something over 8 per cent of its gross receipts going into the damage account. This is as might be expected, because the company operates in the densest population in the State. After this come the companies in other cities about in the order of the density of population, although, of course, there are many slight variations from this rule. The abnormal conditions which for several years caused the Brooklyn surface lines to be burdened with the heaviest accident accounts of any large city in the country have apparently ceased, so that the Brooklyn companies now pay out only a little over 6.5 per cent of their gross receipts for the settlement of damages. We have not the statistics before us from all the larger cities of the Middle West, but our impression is that damage accounts there do not run quite as high as in cities of corresponding size in the East. At least they do not in cities with which we are acquainted. How much this is due to wider streets, how much to an unpaternalized public which is accustomed to looking out for itself, and how much to more favorable public sentiment, it is hard to tell. Among the smaller companies, both city and interurban, the accident account is usually almost nominal. The chief thing to be feared in connection with these smaller properties is the occasional occurrence of some unusually serious accident, which may have considerable effect on the company's finances for a year or two, or more.

Direct-Connected Motors in Repair Shops

Considering recent progress in the direct application of electric motors to machine tools of all kinds, it is singular that the individual drive has on the whole received so little attention in the street railway repair shop. In a few cases, to be sure, the problem of obtaining maximum production with minimum expense is being worked out along the line of driving certain tools by direct-connected motors, but the usual practice is to group-drive the repair shop machinery by motors which have passed their period of usefulness for car service under the severe conditions of the present day. This method is natural enough, for it manifests a familiar trait of human nature, which always finds it difficult to get rid of anything that can still be turned to account. But it is an open question if the cost of repair shop operation, in terms of the work done, cannot in many cases be lowered by the substitution of modern equipment and a more discriminating arrangement in place of the antiquated installations so common in different parts of the country at the present time.

Setting aside for the moment the respective claims of group and individual driving, it is certain that the motors now being placed on the market for machine tool work are in general much more efficient and better adapted to their class of service than those designed a decade or more ago for the radically different cycle of duty found in operating a car on a street railway. The railway motor is fundamentally a machine suited to work on the axle of a car, and, although it can be rewound with a shunt field for constant speed in repair shop service, it is still essentially a makeshift for this class of work. On the other hand, great progress has lately been made in the design of special stationary motors capable of operating throughout speed ranges as great as 6 to 1 with high efficiency, and without sparking at all outputs from no load to 100 per cent overload. These machines may usually be set to operate at any given speed within their range, and will hold that speed practically constant through wide changes in output. Very little energy is wasted in the control, while special coils in series with the armature provide the magnetic flux necessary for good commutation. These features are inapplicable to a rewound railway motor. Of course, the purchase of new and improved equipment is always an expense of more or less weight, and there is often a strong temptation to use the old motors in some way as long as they can be made to turn, just as a steam road retires its locomotives from main line limited express service through a descending scale to the inglorious haulage of milk or gravel trains. At the same time one must remember that modern rolling stock cannot be economically maintained without the best repair shop equipment, and in matters of greater moment than the mere cost of power—important as that is in its yearly total—both the direct-connected and the improved group-drive motors of to-day stand for a broad intensifying of economical production which is far beyond the capabilities of the older apparatus.

No general rule can be formulated to enable one to decide in every case, at once promptly and intelligently, between group and individual driving. In very small repair shops it is probable that the conditions will seldom justify the extended use of direct-driven tools. The individual motor specially designed for machine tool work is often too expensive in first cost to warrant such outlay on the part of the smaller roads. But as the size of repair shops increases, the opportunity to apply individual motors to heavy machines doing intermittent work, or operating with a wide range of speed variation, grows

greater, until in the highly specialized shops of large systems we find a broad field of usefulness for both kinds of drive. It is desirable to avoid the power loss of idle belts and line shafts; to be able to shut down a part of the repair shop equipment without stopping the balance of the machines, and to reduce the danger of accidents by simplifying the driving apparatus; but of equal importance with the latter, and of first consequence always, is the question of increased productivity. The operations of the small repair shop are so much more varied per employee than is the case in the large shop that in the former case there is less opportunity to enjoy the full benefits of machine organization than in the latter. Small machines like grinders, hack saws, medium-sized lathes and shapers, constantly used, are generally better driven in groups, but in the heavier work with high-speed steels and variable cuts, the individual motor deserves wider recognition. It might well pay to equip a repair shop almost entirely with direct-driven outfits, if thereby space could be gained for the better installation and operation of an overhead traveling crane, which would enable the work to be pushed through more rapidly. Doubtless in many cases local conditions will be found to preclude the use of individual motors, but there is certainly room for closer study in this direction on many of the larger systems. Unlike the factory, the product of the street railway repair shop is seldom set aside and kept "in stock;" the time element is of vital consequence, and anything which enables more work to be forced out of the equipment without increased expense per piece or delays in actual service deserves the most careful thought on the part of street railway managers and master mechanics.

The Problem of London

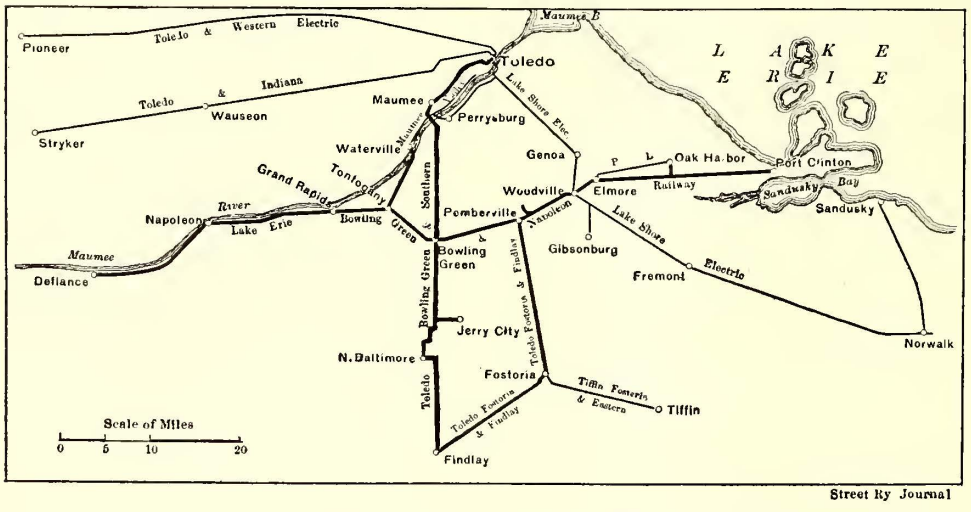
The English papers discussing the report of the Royal Commission are now before us, and emphasize the tremendous problem which the commission was set to solve, a problem which in London takes on its most intricate and generalized form. For London holds within its bounds the hugest aggregate of population that the world has ever seen. It is the heart of a world empire to which the dominions of Alexander and the Cæsars were as mere provinces. In it are centered the vital forces of the nation, and toward it every one of English birth naturally turns. As a result it now holds some seven million people, spread over a vast territory on both sides of the Thames, and the daily flow and ebb of the human tide to and from the City, or financial district—that is, the center of London's activity—is enormous in its volume. Add to this the fact that the whole metropolis is a maze of crooked streets that have been evolved from the footpaths of bygone centuries and one begins to have some conception of what rapid transit for London means. Not only must there be provision for carrying the great army of business back and forth, but there must be some adequate means of intercommunication between the great outlying districts. And as everyone knows, London to-day is almost as badly off as New York would be were we suddenly to go back to horse cars. The "tubes" do effective work locally, and so does the Underground, but the territory in the outer zones is so great and crowded that it cannot be adequately served by these or perhaps by any other means. It is a question whether transit difficulties, added to housing difficulties, will not inevitably become a limiting factor in the growth of cities.

Physically, rapid transit is entirely feasible even in London, but the cost of it is a matter very seriously to be reckoned with. At present, counting in local railways, omnibuses and trams, the traffic amounts to about 200 annual rides per capita, so that the aggregate cost, not including that to the credit of the largely patronized and excellent cab service, must rise to some £10,000,000. To meet the growing demand, added accommodations are imperatively necessary, and the recommendations of the commission to this end are valuable not only to London, but to every great city that in the future must deal with the matter. At the root of London's difficulties lies the fact of narrow streets that choke vehicular traffic of every kind. In an old metropolis this condition is very hard to remedy, and the commission's recommendation of two great avenues, each 140 ft. wide, crossing the city, strikes one as more magnificent than feasible. In the location suggested, the project would cost well-nigh as much as the Panama Canal, and the London papers may well be staggered, as they are, to conjure up practicable sources of revenue adequate to the need. In the long run it would seem wise at least to consider the advisability of building new avenues, not so as to perpetuate the present center of business, but so as to open radically new territory and to form new centers. An extended business area considerably simplifies rapid transit by averting the intense central condensation of traffic. Subways will undoubtedly help matters, but in old London conditions are such that the deep tubes will too often have to be used. The weak point of a subway system is its enormous cost, forbidding the extensive ramifications which are really necessary to secure general rapid transit, and we are not surprised that the commissioners went squarely upon record in favor of tramway extension.

From our American standpoint this is the most interesting part of their recommendations. Not only is it practicable commercially to build up a very complete system of communication by tramways, but in streets wide enough to allow double tracking the presence of the cars certainly does keep ordinary vehicular traffic in orderly motion. Those who remember lower Broadway in the horse car and omnibus days will realize the change that has been wrought. The electric car can handle more passengers per running foot of street than any other vehicle yet devised, and can do it more quickly and cheaply. And we note with interest that the commission lays no interdiction upon the trolley in its suggestions. The overhead trolley properly installed is at once the cheapest and most reliable means of getting current to a moving car, and makes it commercially possible to give a more complete network of tramways than any other system yet devised. In London or any other great city, surface tramways are a necessary part of the rapid transit systems, and ought to be encouraged. The judgment of the commission on motor omnibuses is interesting in this connection, for while the motor 'bus is far more thoroughly developed in London than anywhere else, the commission advises against any postponement of tramway extension on the ground of any visible prospect of the supersession of tramways by motor omnibuses. Another interesting suggestion is the recommendation of traffic crossings by bridges or sunken roads at certain important points. This plan might well be introduced at many points in New York, notably along West Street. Finally, the commission lays great stress upon the widening of many streets to give room for trams and other vehicles, and urges the immediate organization of connecting links between the existing tramway systems, which, strangely enough, are at present widely separated. It is a tremendous programme of reform, and in its entirety touches upon almost every phase of rapid transit. It is most unfortunate that reform has been so long delayed, since to-day it can be carried out only at prodigious cost.

IMPROVEMENTS TO A TOLEDO ROAD

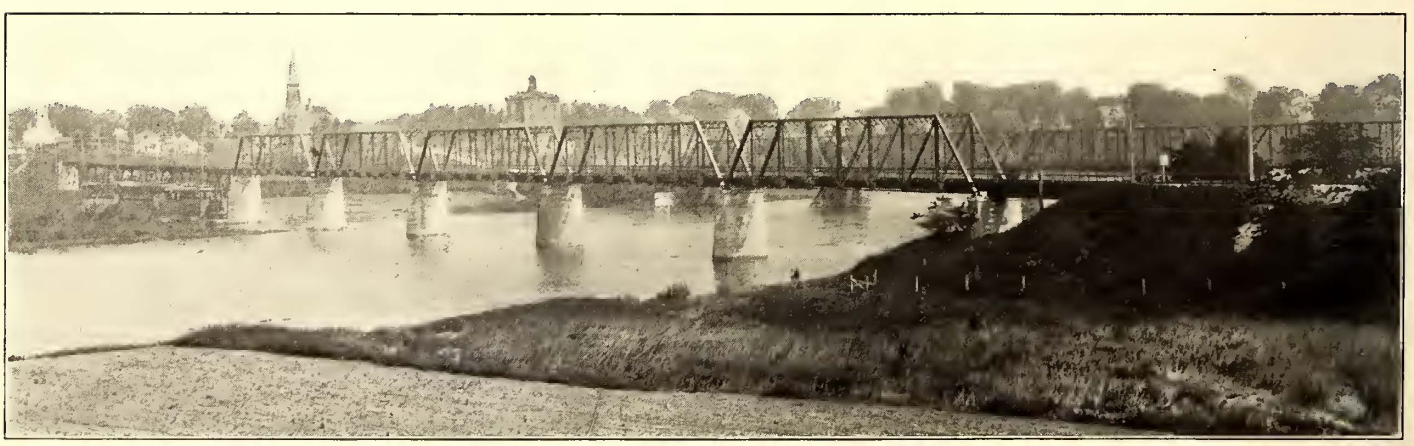
The Toledo, Bowling Green & Southern Traction Company, which operates an interurban line from Toledo to Findlay, Ohio, together with the city lines in Findlay and the lighting system in that place, has recently completed extensive improvements to its system. The interurban line was built up piecemeal, being a consolidation of the Toledo, Bowling Green & Fremont Railway and the Findlay Street Railway, the former operating from Perrysburg to Bowling Green and the latter from Findlay, north to Mortimer. The two lines were connected and consolidated under one management about three years ago. For a long time the system was handicapped by inadequate power furnished by three small direct-current stations, one of them a water-power; also by a poor entrance into Toledo, its chief terminal point. In securing this entrance, it was necessary to make traffic arrangements with two companies—the Toledo Railways & Light Company, operating the Toledo city lines, and the Maumee Valley Railway & Light Company, operating a belt line from Toledo to Maumee, on the west side of the Maumee River, returning by way of Perrysburg, on the east side of the river, the latter point being the northern terminus of the Bowling Green Company's property. The entrance was over a poorly constructed track, with numerous grades and long city haul, and the traffic arrangements were such that the interurban company got very little out of the long haul from Toledo to Perrysburg.



MAP SHOWING ROUTE OF THE TOLEDO, BOWLING GREEN & SOUTHERN RAILWAY AND CONNECTING LINES

From the south, the owners decided on three important improvements, viz., the building of an independent entrance into Toledo, the erection of a large central power station and the thorough rebuilding of the interurban line. These improvements are now nearing completion and constitute perhaps the most complete rehabilitation of an old road ever attempted in Ohio. To take care of this work, the Toledo Urban & Interurban Railway Company was formed, and the old properties have since been leased to and are now operated by this company.

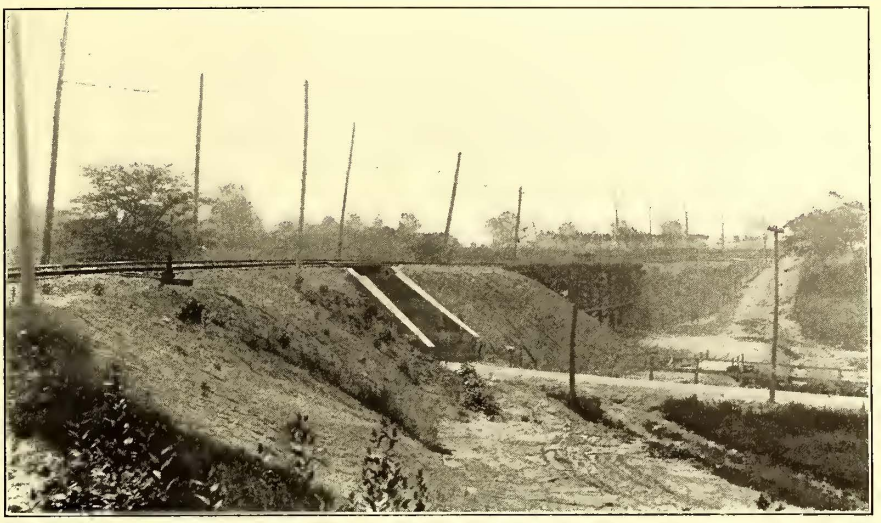
While a shorter entrance to Toledo could have been obtained by paralleling the west side of the river and entering Toledo from the south, it was deemed more advisable by the engineers to strike off south of Perrysburg and cross the river through Maumee, entering the city from the west, securing a portion of the business from Maumee and tapping a rich farming and manufacturing district southwest of the city. The new line is 10 miles long, and brings cars to within 3½ miles of the center of the city, which is entered as before over the tracks of the Toledo Railways & Light Company, to the union passenger and freight stations. The line was built on 50-ft. private right of way, with easy grades and curves. The track is laid with 70-lb. rail, with Weber joints and Ohio Brass Company's soldered bonds, and the overhead is all Ohio Brass Company's heaviest type. The new track, as well as the whole of the old line, has been heavily ballasted with rock. The old track was raised from 8 ins. to 20 ins., affording excellent drainage. Several good sized fills were made, and the maximum grade on the entire line is now less than 1½ per cent. There are, in fact, few grades as great as this, as the country is exceedingly level. Excellent crushed stone was secured at the uniform price of 40 cents per yard on the cars from two quarries to which sidings were laid. Between Cygnet and Van Buren the road makes a number of sharp turns to take in the village of North Baltimore and several smaller towns. It is the intention to build a direct line between the points mentioned, which will shorten the route between Findlay and Toledo from 49 miles to 46 miles, rendering it practically tangent for 40 miles. T-rail has been laid through all towns, including Findlay, which further improves the speed possibilities. The new entrance was opened about sixty days ago, and with inadequate power still to contend with, the running time from



MAUMEE RIVER BRIDGE, TAKEN FROM SITE OF FORT MEIGS, TOWN OF MAUMEE IN DISTANCE

Toledo to Findlay has been reduced from three hours and eleven minutes to two hours and thirty minutes. In the near future three limited trains each way will be instituted, with a schedule of one hour and fifty minutes. When the new cut-off is completed there will be a further quickening of schedules.

In crossing the Maumee River the company could have made use of a county bridge, but it preferred to erect a structure of its own which would give better grades and unobstructed traffic, enabling it to handle carload freight into Toledo, a feature which will be pushed extensively as soon as the new power house is completed. The bridge is one of the largest and most expensive ever constructed by an electric railway, the total length being 1800 ft. Crossing the stream there are five 100-ft. deck girder steel spans resting on solid concrete piers. A portion of the approach is timber trestle, while the balance crossing the high-water section of the valley is steel trestle. The foundations of this portion are protected from ice gorges by timber cribs filled with stone. The cost of the bridge was about $80,000. The steel work was erected by the American Bridge Company, while the structure, as well as the engineering work for the entire new entrance, were designed by Riggs & Sherman, of Toledo, and Mr. Darrow, the company's consulting engineer. The accompanying illustrations of the bridge and fills approaching it were taken from the ancient earthworks of Fort Meigs, a fortress commanding the Maumee River, erected by the Americans in the war of 1812. There is much of historic interest in this immediate district, and the road secures considerable pleasure traffic.



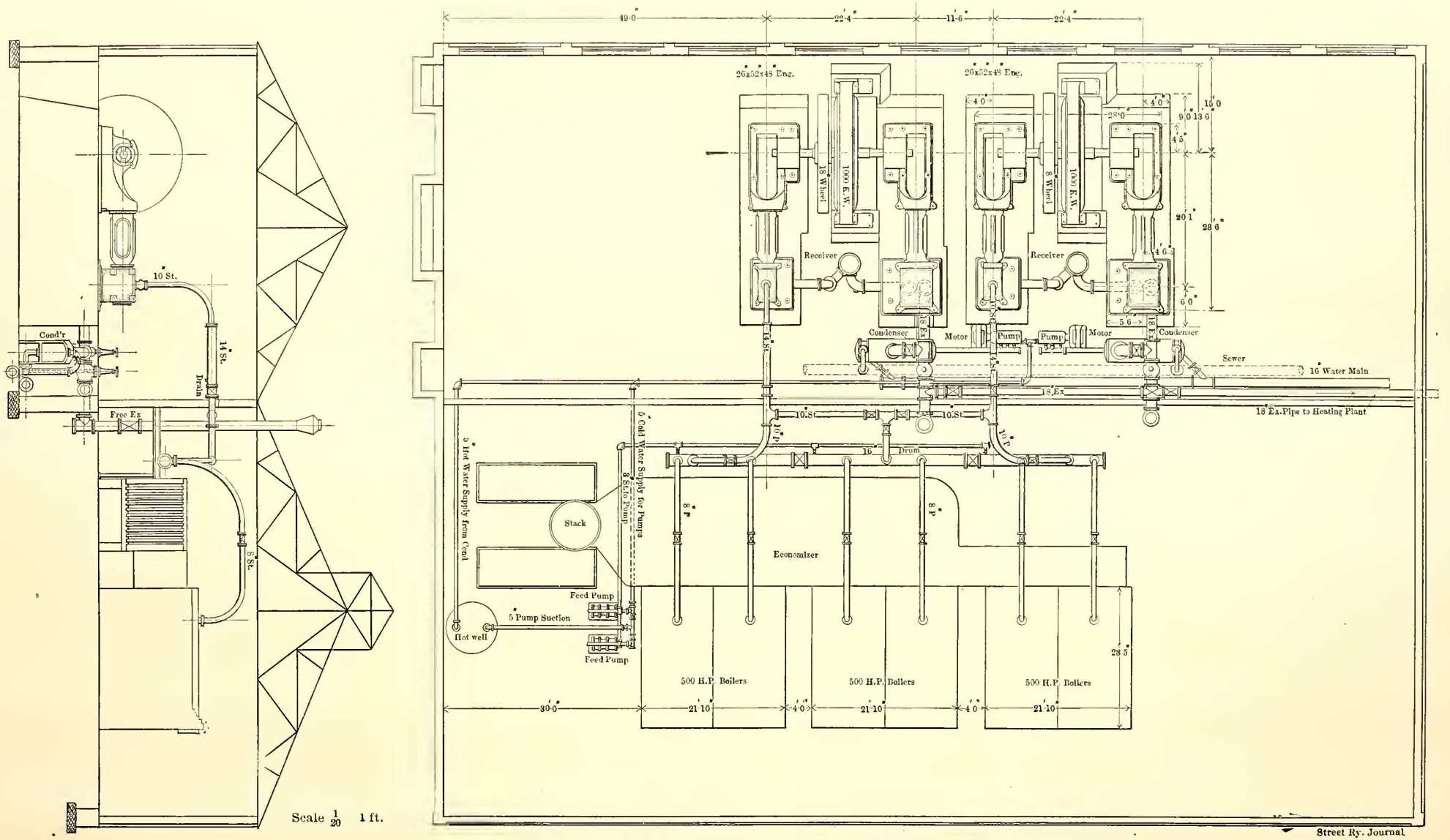
TRESTLE AND CONCRETE CROSSING, TOLEDO, BOWLING GREEN & SOUTHERN RAILWAY

FORT MEIGS STATION, HEAVY FILL APPROACHING MAUMEE RIVER BRIDGE, TOLEDO, BOWLING GREEN & SOUTHERN RAILWAY

In planning for its power station, the engineers decided to locate it in Findlay. Although at one end of the system it was considered most desirable, because of the company's lighting and heating system in that place, also because the Western Ohio Company's extension into Findlay will soon complete a chain of lines from Cincinnati to Toledo, and it is logical to suppose that some day these lines will be consolidated into one system. In this event there would be three large power stations located about equal distances apart and capable of taking care of the entire system of some 250 miles, viz., the new Cincinnati Northern station at Hamilton, the Western Ohio station at St. Marys and the Findlay station, and the station equipment and transmission lines were designed to handle 33,000 volts in common with the potential used on the other systems mentioned.

The building is located in the heart of the business district, adjoining the company's old station. It is of plain but pleasing design, 120 ft. x 150 ft., built of machine brick, with stone trimmings, having structural steel trussed roof. It is divided into two sections by heavy fireproof wall. The engine room is 52 ft. wide and the boiler room 60 ft., inside measurements, and both are on the same level. The building foundations, engine foundations and floors are all concrete. Each of the engine foundations is 30 ft. x 40 ft., and contains 500 cu. yds. of concrete. A steam-driven concrete mixer was set up in the building, the composition used being one part best American Portland cement, three of crushed rock and five parts sand.

The main units are two McIntosh-Seymour cross-compound condensing engines, cylinders 26-in. and 52-in. x 48-in. stroke, direct connected to 1000-kw revolving-field type General Electric a. c. generators, supplying 25-cycle 380-volt current and having an output of 1562 amps. per terminal at 94 r. p. m. The engines have water-jacketed bearings and pressure automatic lubricating system. They have a large overload factor, and with a normal temperature of 35 degs., they are guaranteed to run with 50 per cent overload for four hours with a 10-deg. rise in temperature. They have heavy duty frames and tail rods on both high and low-pressure cylinders. They are packed with Cook's metallic packing, no hemp being used. The main engine shafts are 24 ins. in diameter, and on each shaft is a 100,000-lb. 18-ft. fly-wheel. Each engine has an

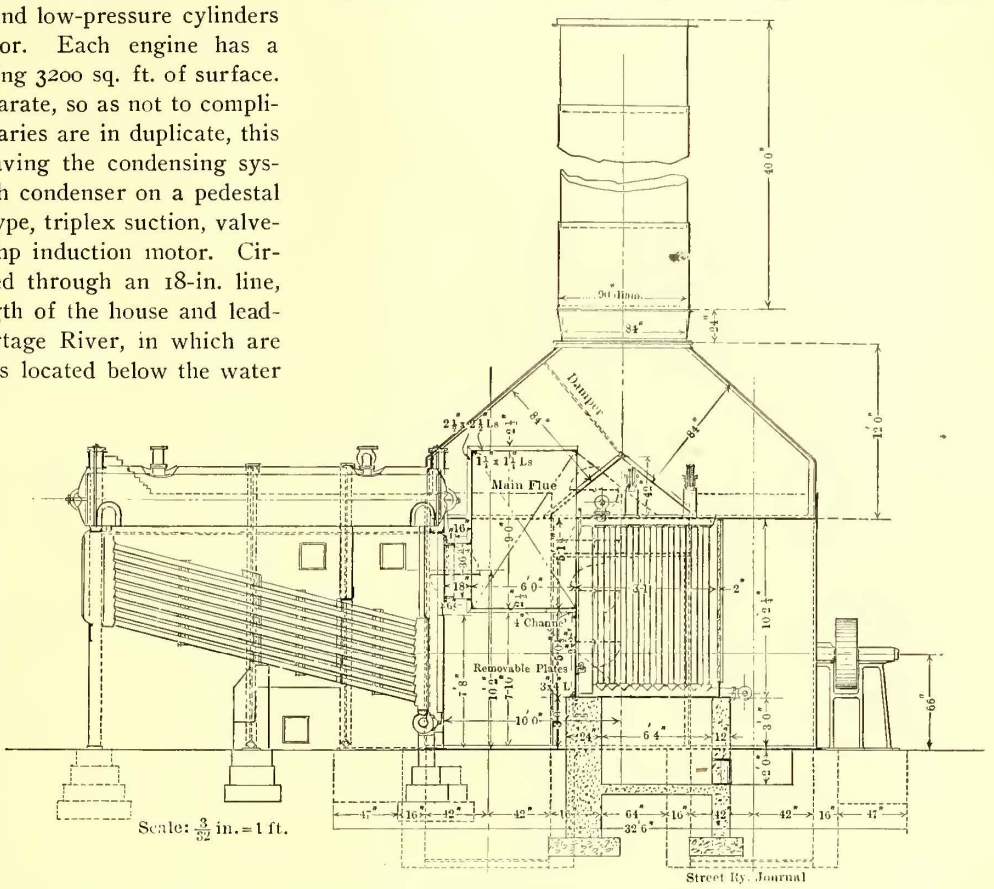


GENERAL PLAN AND SECTION OF POWER HOUSE

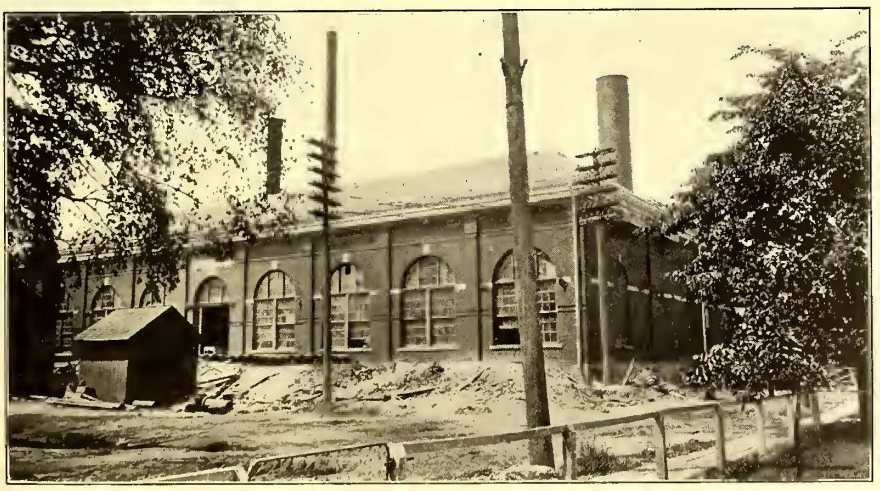
electrical governor acting on the throttle for synchronizing; also an auxiliary safety stop operating at 105 r. p. m. There is space in the engine room for a third unit of the same size, and the auxiliary equipment is designed for the extension. Between and below each pair of high and low-pressure cylinders is a Stratton receiver and separator. Each engine has a Worthington surface condenser, having 3200 sq. ft. of surface. The condensing systems are kept separate, so as not to complicate the piping, and, as all the auxiliaries are in duplicate, this was deemed more desirable than having the condensing systems interconnected. Adjoining each condenser on a pedestal is a vertical Worthington Edwards type, triplex suction, valveless air pump, gear-driven by a 20-hp induction motor. Circulating and feed-water are obtained through an 18-in. line, 2000 ft. long, extending the full length of the house and leading from a pump house on the Portage River, in which are three motor-driven centrifugal pumps located below the water line, so that they are always primed. The motors are controlled by switches in the station.

The company has a hot-water heating system, including about 5 miles of pipe and covering an area of 1½ miles from the power station. This has been supplied by independent heating apparatus in the old station, but in the future, under ordinary conditions, it will be taken care of by the hot water from the condensers in the new station, reinforced by the old apparatus in extremely cold weather. The condensers have two inlets and two outlets, and are provided with valves for cutting out the system. Half of the discharge passes to the sewer, while the balance passes through the heating system, leaving the station at about 150 degs. and being available at the limit of the system at about 100 degs. It returns, at a considerably lower temperature, to the station, where it furnishes half the condenser supply, the balance of the supply being taken from the cold-water main. The condensed steam is forced by the air pumps through a 6-in. line to a hot well in the boiler room. In case of loss of vacuum or accidents to the condensers, the engines may exhaust through the roof through 18-in. risers, which are provided with Blake automatic relief valves.

Many engineers in designing a station of this capacity do not consider it economical to install economizers and forced draft, particularly the latter, but there were unusual conditions which caused the designing engineer to adopt them in this case. Owing to quicksand and bad bottom, it would have been necessary to have done considerable pile driving to have secured a solid foundation for a self-supporting 175-ft. brick chimney of the kind considered, bringing the cost up to $10,000. The guarantee with the economizer installation provides that with water entering the economizers at 120 degs. and flue gases at 500 degs., to save 10 per cent of the coal burned under the boilers when developing 500 hp with 30 lbs. evaporation. The fan system, if operated to its full capacity, takes less than 3 per cent of the fuel consumption. Assuming a net gain of 7 per cent and a consumption of 50 tons per day of $2 coal, the saving would be $7 per day, or $2,500 per year, on an investment of $6,000 for the entire economizer installation and the short stack erected.



CROSS-SECTION OF BOILER ROOM ON LINE A-B, SHOWING MECHANICAL DRAFT APPARATUS



EXTERIOR OF FINDLAY POWER STATION

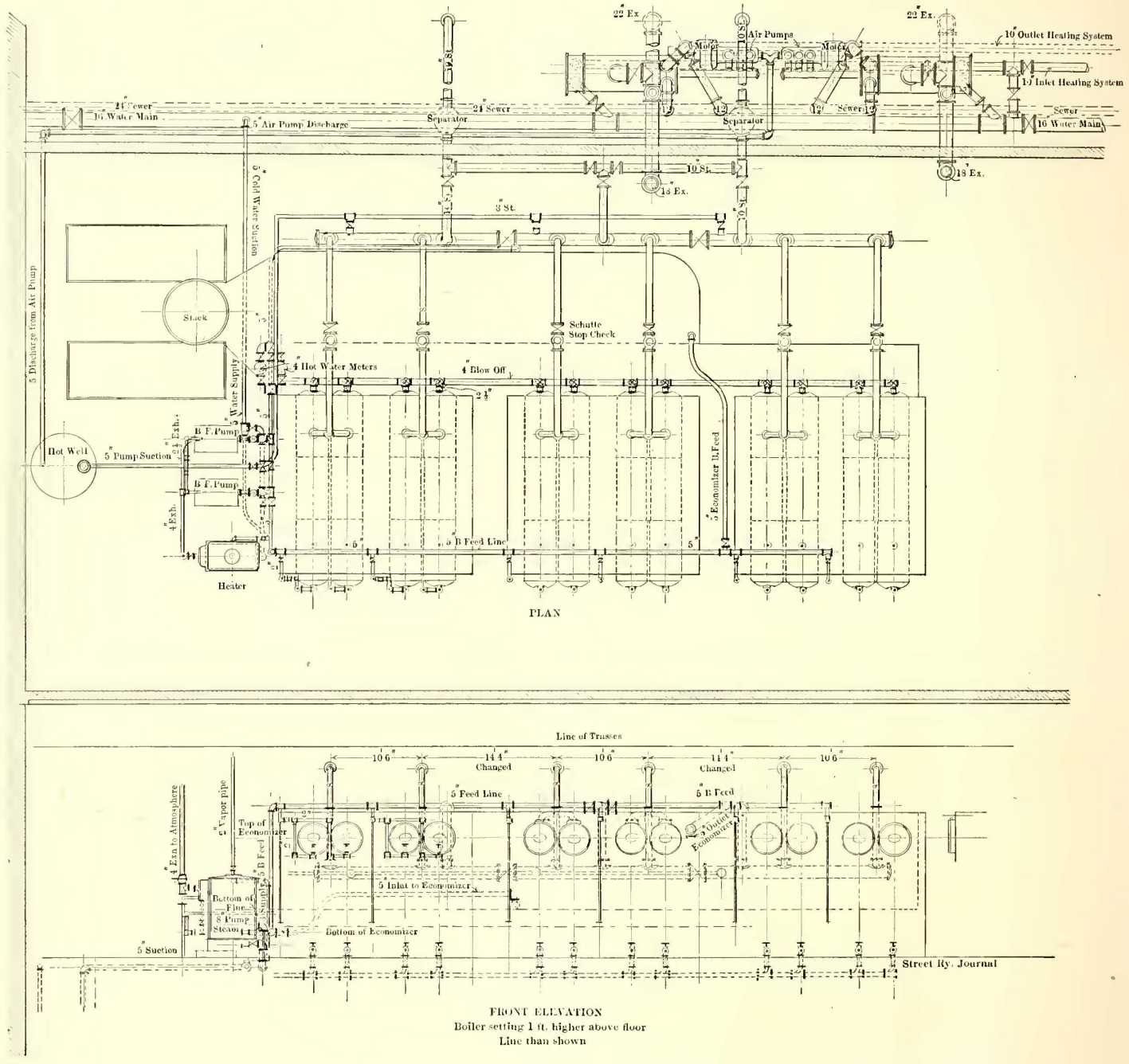
The economizer outfit occupies the entire space back of the boilers, and was installed by the Green Fuel Economizer Company. At one end of the boiler room are two fans in 25-ft. casings and having blades 15 ft. high and 7 ft. wide. Between them is a 55-ft. steel stack 10 ins. in diameter. Each fan is driven by an 8-pole 50-hp induction motor. The control of the motors is arranged so that 4 poles can be cut out, making it a 25-hp motor and giving half speed of 60 r. p. m., or all the poles can be used, giving 50 hp and 129 r. p. m. Either fan is sufficiently large to take care of 3000 hp of boilers, or double the present boiler capacity of the plant. The furnace gases are carried forward through a steel smoke drum, and then back through another breeching containing the economizer tubes. These tubes are provided with scrapers for removing soot; scrapers being driven through bevel gears by an induction

motor. The economizer breeching is provided with dampers so that the gases may pass through the fans without going through the economizer, if desired.

The boilers are the horizontal tubular type, built by the Aultman & Taylor Machinery Company, Mansfield, Ohio. They are arranged in three batteries, two 250-hp boilers to a battery. The boilers, as well as all high-pressure steam piping in the house, are designed for 250 lbs. pressure, although normally they will be run at 175 lbs. The grates are fired by Jones underfeed stokers. There are 2 ins. of draft in the breeching between the boilers and the fans. Steam from each pair of drums passes through an 8-in. line, provided with a Schutte stop check valve, to a 16-in. main header. The header rests on a platform, making all parts accessible for repairs, and it has recessed lap joints with steel flanges. The header may be cut into three sections by means of two 16-in. Chapman outside screw valves. Steam then passes through three 10-in. bends to a 10-in. auxiliary header along the rear wall. Each engine is supplied from this through a 10-in. bend to the high-pressure cylinder, steam passing on the way through a Stratton receiver separator, which removes any moisture. The scheme of using an auxiliary header gives a very flexible high-pressure system, enabling any pair of boilers to supply any engine.

The boiler feed-pumps adjoining the engines were supplied by the Advance Pump & Compressor Company, of Battle Creek, Mich. They are of the outside center packed plunger type, designed for a working pressure of 250 lbs., and constructed with 14-in. steam cylinder, 7-in. water plungers and 12-in. stroke. The valves are particularly accessible, being on top of the pump and provided with removable caps. On each valve is a device which acts as a throttle, so that the suction in the pumps may be broken while they are working against full pressure and at high speed with perfect safety. This feature will appeal to engineers who have had experience with pumps running away and wrecking themselves. A Cochrane open-type heater, made by the Harrison Safety Boiler Works, adjoins the feed-pumps. This receives exhaust steam from the boiler feed-pumps and from the stoker engines.

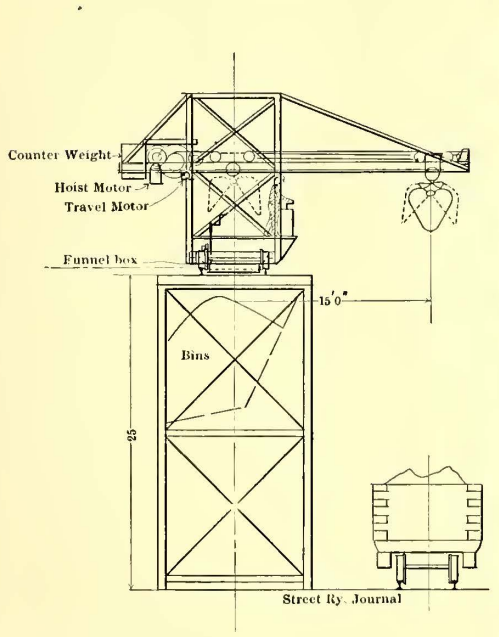
The feed-water pumps may take water either from a 6-ft. x 8-ft. hot well at the end of the boiler room, from the heater, or direct through a 5-in. cold-water suction from the circulating main. The hot well and heater are both elevated, so that the



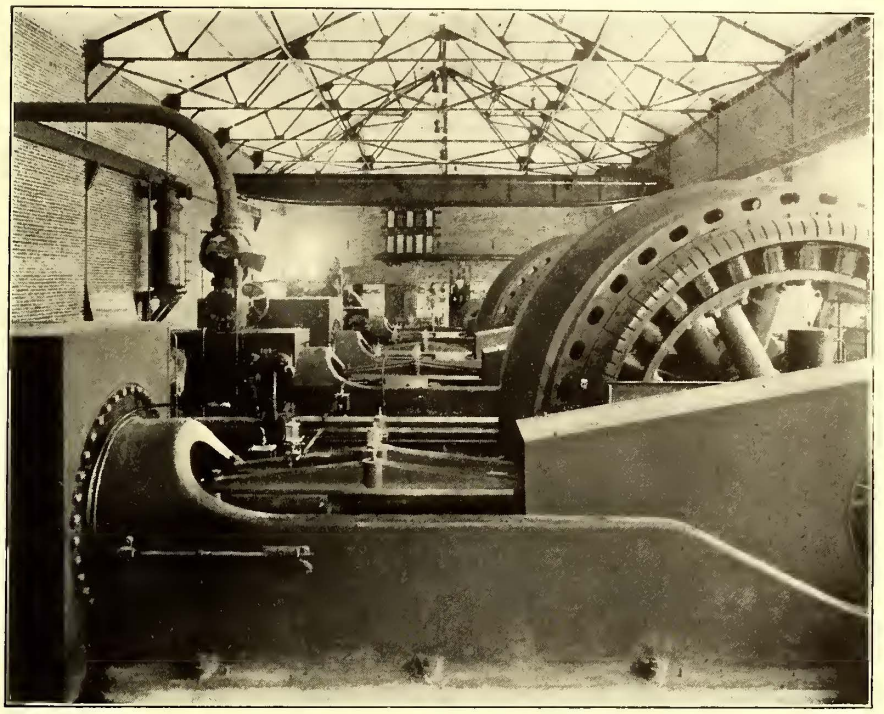
GENERAL PLAN OF PIPING AND FRONT ELEVATION OF BOILERS AT FINDLAY POWER STATION.

water flows by gravity to the pumps. The water in the heater is about 150 degs., and after being passed through the economizers it is raised to 250 degs. for the boilers. Between the pumps and the economizers the feed-water line is split into three sections, two of which are provided with Worthington 4-in. hot-water meters. Water and fuel will be carefully measured for the daily station log.

An interesting fueling outfit has been worked out. Over a timber structure outside the boiler room are sloping bins, above which travels a coal hoist of 2 tons capacity. A clam shell bucket having a transverse travel of 15 ft. is operated by a motor. The bucket has a capacity of 1000 lbs., and takes fuel from cars on a side-track adjoining the bins. The travel of the crane on the elevated tracks is by means of a hand gear, as it moves very slowly and only a few feet at a time. Fuel from the bins is fed through chutes to the stokers. The bins have a capacity of 250 tons, and nut and slack will be used.



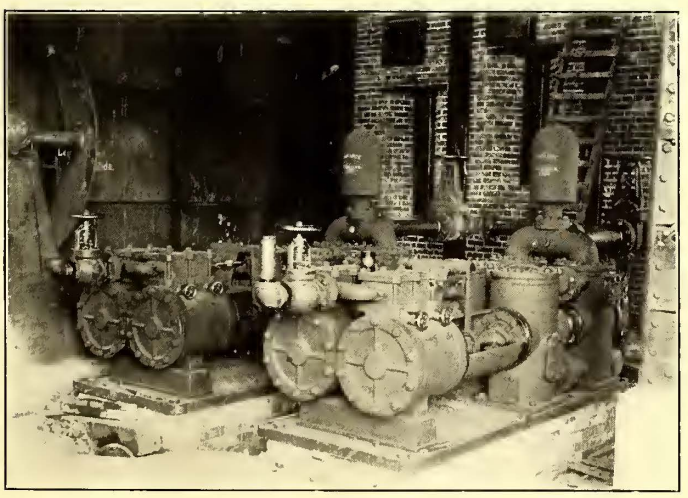
COAL TRAVELER HOIST, 2-TON CAPACITY



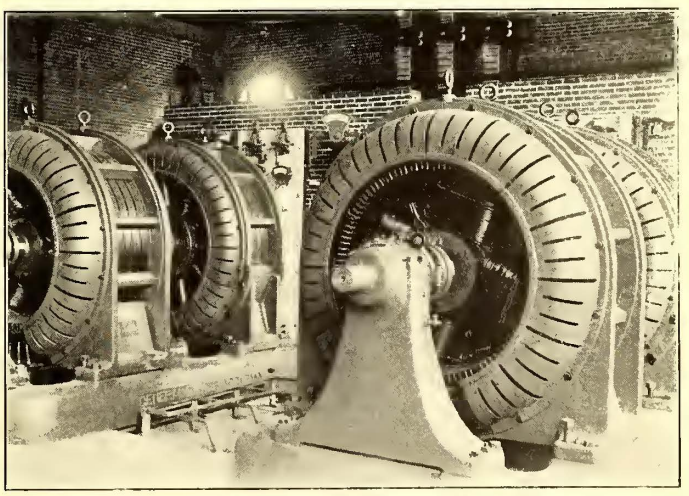
INTERIOR OF FINDLAY POWER STATION

Going back to the electrical equipment, current for exciting the fields of the main generators is supplied by 50-kw 125-volt d. c. generators, belted to the fly-wheels of the large engines.

As stated, the company supplies light and power in Findlay. The present lighting output is about 4000 kw-hours daily, including 250 city lights, a three-wire, three-phase incandescent system operating at 110 volts, besides several hundred horsepower of a. c. motors. It was not desirable to install separate generating apparatus for these various systems, especially as it was figured that the lighting load would have a steadying effect upon the regulation of the entire load. It was therefore necessary to install frequency changers, changing the lighting portion of the load from 25-cycle current to 60-cycle current. The frequency changers consist of two 330-kw, 25-cycle, 370-volt, three-phase synchronous motors, each direct connected to a 300-kw, 60-cycle, three-phase generator. Taps are taken off from the primary side at 1150 volts for the incandescents and at 5000 volts from the series side for the city lighting, this current passing through five 50-light air-cooled tub transformers. Exciting current for the two generators just mentioned comes from the main generator exciters, and each of these is also large enough to supply the station lighting. Lighting current, when the station is closed down, is supplied by a small steam-driven exciter set.



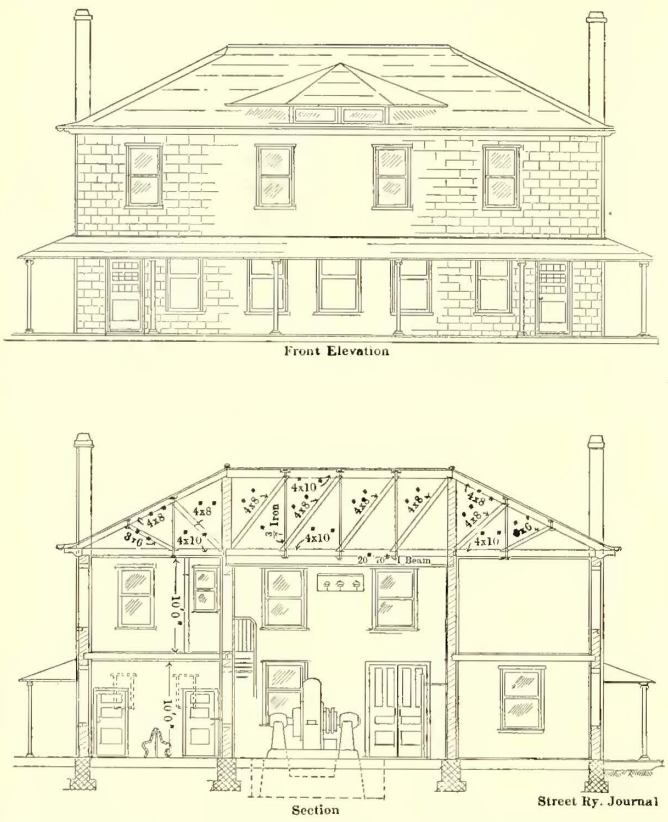
FEED-WATER PUMPS, MAIN STATION



FREQUENCY CHANGER, MOTOR-OPERATED SETS, FINDLAY STATION

Twelve 1,500,000-circ. mil asbestos-covered cables lead from the main generators to a set of 370-volt buses, consisting of

flat copper bars extending nearly the full length of the switchboard; the switchboard, consisting of thirty-two panels, extends across the room at one end of the house. The generator leads pass through circuit breakers between generators and buses. Instead of the usual oil switches, these are motor-operated laminated brush carbon circuit breakers. They are located back of the switchboard and have small control switches on the front of the panel, together with automatic trips and overload releases. From the bus-bar, lines run



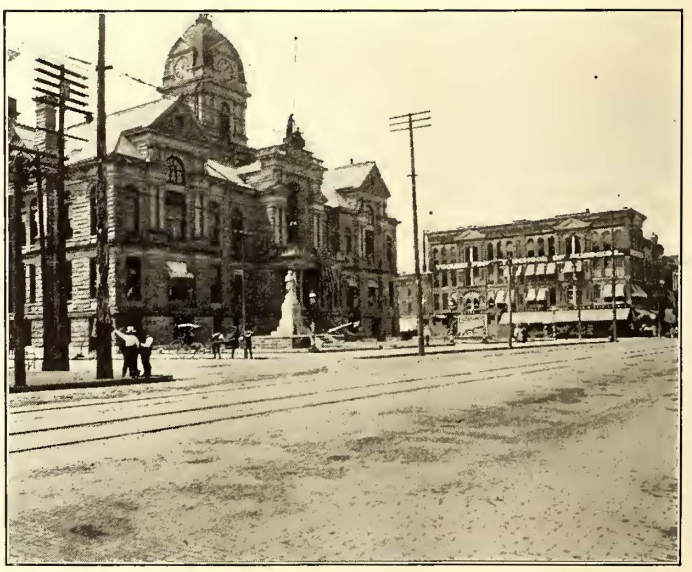
FRONT ELEVATION AND SECTION OF COMBINED SUB-STATION, PASSENGER AND FREIGHT DEPOT AND RESIDENCE AT MAUMEE

through similar circuit breakers and through a brick wall back of the switchboard and into a transformer room, where they connect with the low-tension deltas of two sets of 375-kw self-cooling oil transformers. The transformers are connected up so that by throwing a switch on the board any one of a bank of three may be cut out without interfering with the action of the other two, two transformers being of sufficient capacity to carry the load in case of emergency. The primary sides of the transformers have five taps, giving varying voltages from 19,050 volts to 33,000 volts. From the high-tension sides of the transformers the lines are taken through standard form-H motor-operated oil switches back of the transformers, and from the switches to a set of high-tension bus-bars mounted in brick and concrete compartments in the basement. One outgoing high-tension line is at present connected direct to the high-tension buses. Some time in the future a second set will be installed, and form-H motor-operated switches will be interposed between the outgoing lines and the bus-bar. Single-pole knife-blade disconnecting switches are placed in each leg of the high-tension circuit between the form-H switches and the buses, and between the buses and the outgoing lines. The outgoing lines leave the building through a standard GE line anchorage. The line is protected by standard GE lightning arresters and choke coils interposed in the outgoing lines between the point where the arresters are tapped off and the disconnecting switches. The lightning arresters are elevated back of the oil switches and are accessible from a small balcony.

There is a 400-kw rotary in the station, and between this and the motor-generator frequency changers is a board of four panels, one controlling the rotary, two the motor-generator sets and the fourth being a transfer panel for half-voltage current from the main transformers, which is used for starting both rotary and motor generators. The switches on the four panels are double pole, double throw, the half-voltage transfer panel throwing current from half-voltage taps from either bank of transformers into a set of bus-bars extending across the four panels. Full voltage is brought from the main 370-volt bus-bars to a set of bus-bars extending across the lower side of three of the panels. The switches on these three panels when thrown into upper position will give current to either rotary or motor-generator sets at half voltage, and full voltage when the switches are thrown down. The current for the rotary and motor-generator sets after leaving these starting panels passes through solenoid-operated form-K triple-pole switches located in the basement, and in the circuit of the rotary the usual reactive coil for compounding is interposed. The rotary has the usual end play and speed limit and field reversing switch for bringing polarity right side up.

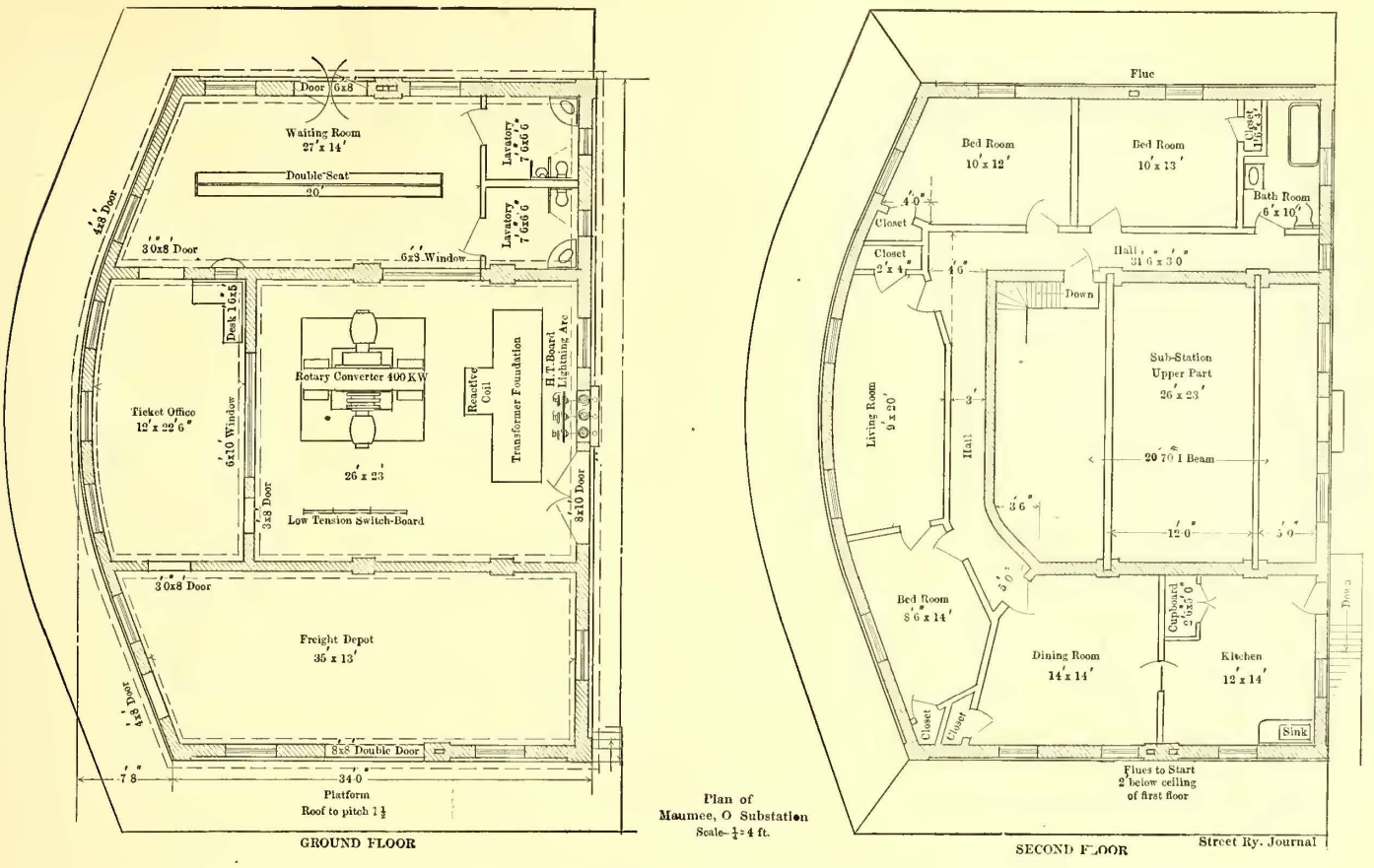
Only the two outside legs of the three-phase circuit go through starting switches, the center leg being carried direct to form-K oil switches.

The switchboard is gray Vermont marble, with black instruments. Beginning from the left, the first two are exciter panels with switches throwing excitation current to main generators and to the frequency changer generators. The next two are the main generator panels. Each has a balanced three-phase indicating wattmeter, balanced three-phase recording wattmeter, voltmeter and ammeter, and double-throw switches for throwing the potential circuit of the indicating wattmeter across the two outside legs of the three-phase circuit to measure the wattless component; also double-throw switch controlling the engine-governor motor on the generator; also a control switch for controlling the motor-operated circuit breakers in the main generator circuit. The next two are trans-



MAIN STREET IN FINDLAY, LAID WITH T-RAIL

former panels, each having two control switches, one controlling the motor-operated circuit breaker in the low-tension side of the step-up transformers, the other controlling the form-H switches in the high-tension side of the step-up transformers. The next two panels control the a. c. and the d. c. sides of the rotary, respectively, and the next is a d. c. feeder panel. Then there are four panels, the first two controlling the motor ends of the frequency changers and the other two the generator ends of these machines. The next two are feeder panels controlling the outgoing lines for the motor gen-

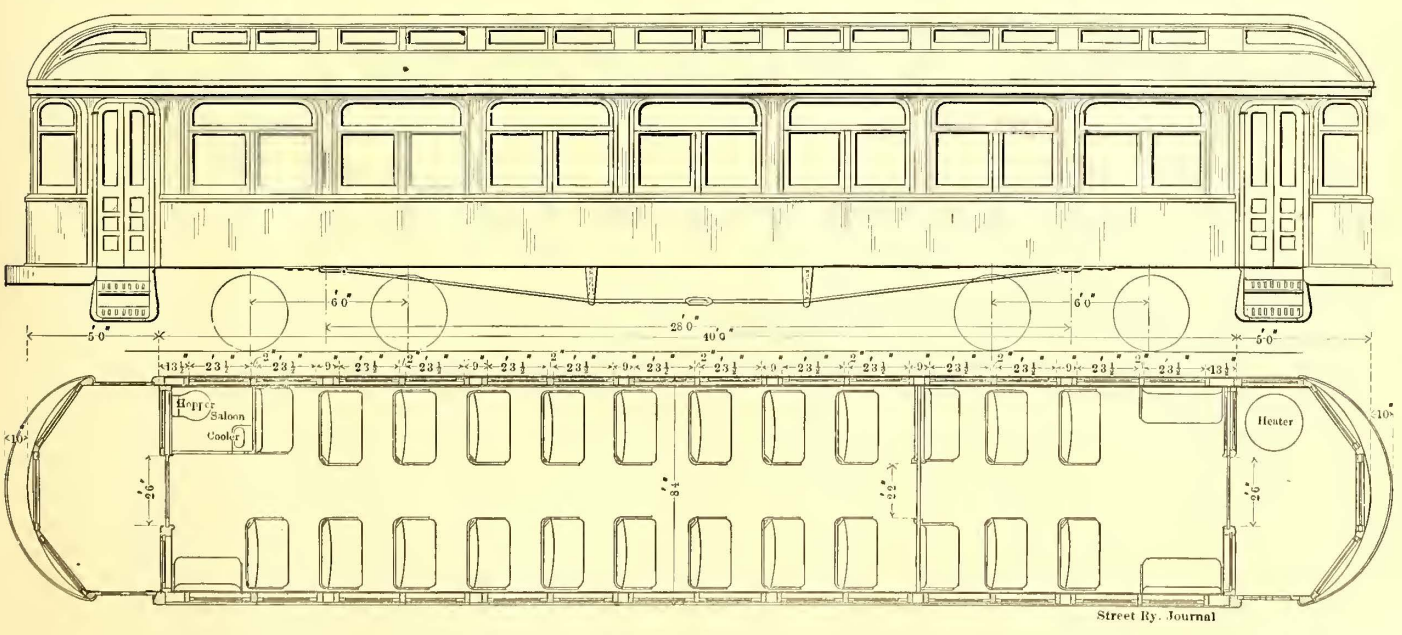


PLAN OF GROUND AND SECOND FLOORS OF SUB-STATION, DEPOT AND RESIDENCE AT MAUMEE

erators supplying three-phase lighting throughout the city. At the extreme end of the board five panels will be added to control the arc lighting and the single-phase a. c. now being done from the old plant. At the right-hand end of the board is a synchronizer for synchronizing the motor-generator sets, and on the left-hand end is a synchronizer for the generators; also an exciter voltmeter. The electrical outfit was installed by the General Electric Company, with E. K. Dewey and W. S. Culver erecting engineers.

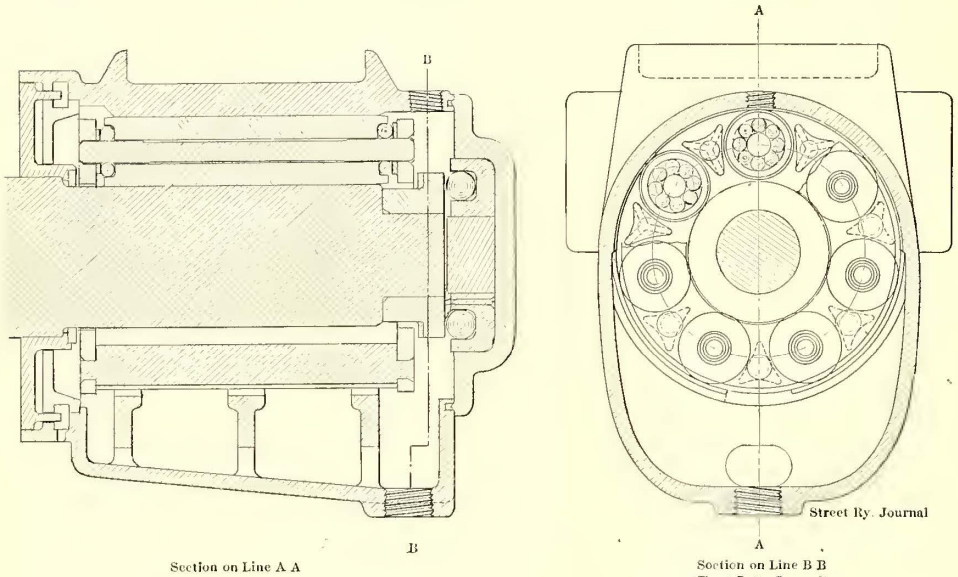
In addition to the sub-station in the house, there will be three sub-stations, each equipped with a 400-kw rotary, the average distance between rotaries being about 12 miles. The sub-station at Bowling Green and Maumee are of particularly attractive design. They are two-story buildings, built of concrete blocks, with tile roofs, and having sub-station room, waiting room, ticket office, freight station and lavatories below, and a dwelling house including bath room, three bed rooms, living room, dining room and kitchen above. Attendants will be paid $50 per month, with house rent free. The fourth sub-station is in a portable car, the outfit being a duplicate of that of the Cincinnati & Columbus Traction Company, described in the STREET RAILWAY JOURNAL of July 8.

The company has just received for its limited service three very fine cars built by the Cincinnati Car Company. They are 50 ft. over all, and are equipped with Curtis trucks and four Westinghouse No. 93 (60-hp) motors. On account of the character of the country through which the road passes, a large proportion of its patrons being oil men who wear greasy



PLAN AND SIDE ELEVATION OF STANDARD CAR

clothes, all cars are equipped with cane seats in both smoking and passenger compartments. On several of its cars the company has been experimenting with roller-bearing axles, and is so pleased with the results that it will adopt them on all cars. The device is an adaptation of the Moffett roller bearing for other vehicles, and in the future the electric railway field will be cultivated by a company to be known as the Moffett Electric Railway Bearing Company, of Cincinnati, the outfits referred to herewith being the first experimental work done by the company. The bearing portion of the axle is 4¼ ins. in diameter, and is case-hardened and ground. Surrounding it are seven solid steel rollers. They are kept apart by separators and have rows of balls at either end to provide against end thrust. The rollers revolve in a casing which is case-hardened and ground, and the whole bearing is in an elliptical cast-steel box, which serves as an oil reservoir. The bearing is oil-tight and practically dustproof. In practical tests, the company used two cars identical in every item of equipment, except that one had plain bearings while the other had roller bearings. An accurate record of current consumption was taken at frequent intervals, and between March 23 and May 6, 1905, each car covered 10,000 miles. The plain bearing car consumed 3.62 kw-hours per car-mile, while the one with the roller bearing used 3.01 kw-hours per car-mile. The bearing showed no perceptible signs of wear and required no attention or reoiling. With a saving of 12 per cent in power consumption at the car, the engineer figures that it represents a saving of 18 per cent to 20 per cent at the power station, and with current at 1 cent per kw-hour, that the saving is something like $2 per car per day, or $750 per car per year. The bearing adds but a trifle to the cost of car.



SECTIONS OF ROLLER BEARING

On the old portion of the road the high-tension lines were placed on separate poles ranging from 50 ft. to 70 ft. in height, so as to clear all trees and other wires. There are two cross-arms, designed for two sets of high-tension lines. The high-tension wires are No. 4 bare copper, and the insulators are Locke porcelain, 8 ins. x 8 ins., designed for 90,000 volts. For protection against lightning, a barbed iron wire is carried at the top of the pole and grounded at every tenth pole. No line lightning arresters are used, the station and sub-station choke coils being considered sufficient.

Heretofore the company has had most of its repair work done outside, but it is now fitting up a shop at Bowling Green. It has installed a 36-in. lathe, 150-ton wheel press, small lathes, drill presses, etc.; also four 20,000-lb. air jacks for lifting cars and equipment. Air will be used throughout the shop for cleaning car seats, blowing out armatures, etc.

The Toledo, Bowling Green & Southern Traction Company has been one of the most prosperous interurban roads in Ohio, despite the handicaps of poor terminals and expensive power production. Last year the earnings were about $300,000, or about $6,000 per mile. With current costing over 2 cents per kw-hour, it operated for less than 60 per cent. With the new power station producing current at less than 1 cent per kw-hour, and with the advantages of an improved entrance to Toledo, together with the possibilities for developing the freight and through passenger business, it is figured that the property will show immense improvement in net earnings within the next year.

George B. Kerper, of Cincinnati, is president of the company; John Kilgour, Cincinnati, vice-president; A. J. Becht, Cincinnati, secretary-treasurer, and C. F. Smith, general manager. Eleazar Darrow, E. E., is chief engineer of the company, and had entire charge of the designing and installation of the power station and sub-stations, and practically all other recent improvements to the property. This paper is indebted to Mr. Darrow for most of the information presented herewith.

Since the above was written, it is understood that the property described has been leased to the Widener-Elkins syndicate, of Philadelphia, which controls a number of Ohio and Indiana interurban properties, and that it will be used as a link in the through system from Cincinnati to Toledo.

DAILY NEWSPAPER SCIENCE

In describing a new power station near Wabash, Ind., a daily paper of that city indulges in the following:

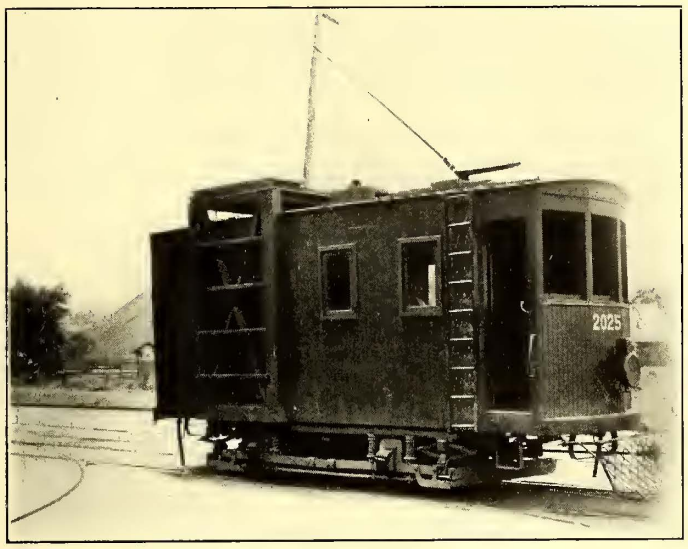
The power house will be a place of miracles to the lay mind which may then watch electricity sucked from the air at 370 volts and multiplied to 33,000 volts by processes which electricians know as phenomena, and not as science. The reason why, is apparently beyond mortal ken, but the results satisfy the commercial purposes, and the tendency of the great mass is "to let it go at that." The transformer that by the power that is called "induction,' for lack of a better name, will step up the number of volts, will be enclosed in oil, and the apartment walled in will have doors so that if it gets out of repair it can be easily and safely handled. It will be dangerous to approach it within 6 ft., and will be controlled at a safe distance by those in charge.

AN OVERHEAD LINE CAR FOR THE SCRANTON RAILWAY COMPANY

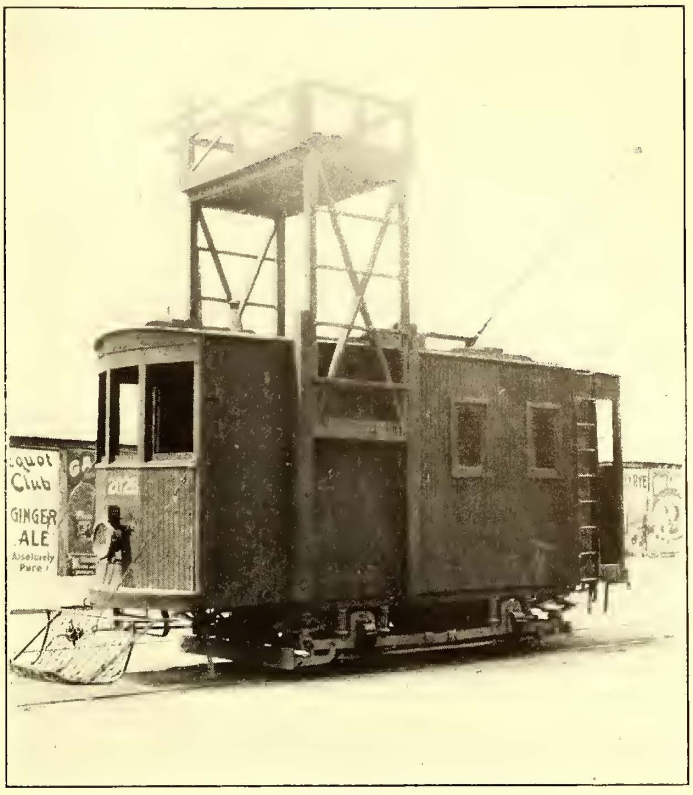
A new design of tower car has recently been placed in service by the Scranton Railway Company. It is 20 ft. in length over the body and has an interior width of 6 ft. Ample space is thus afforded for transporting all kinds of material. In many respects it follows the general lines of construction of cars for this service, but has an interesting and novel arrangement of elevating platform or tower, as well as a reel for paying out new wire. As the car has been found very serviceable in Scranton, diagrams showing its construction in detail are presented herewith.

The framework is simple, yet strong, involving 4-in. x 6-in. sill members and 4-in. x 4-in. side posts, surmounted by a heavy roof framing for carrying the linemen. On the outside of the body are two sets of guides, one on either side of the car, in which the four legs of the platform framework slide. The guides consist of 4-in. x 4-in. timbers, covered by ¼-in. x 5-in. straps. The platform itself is provided with hinged railings,

and is supported upon four 4-in. x 4-in. timbers, which are strongly cross-braced. It is lifted from within the car by a hand windlass, which is connected by a chain on each side to the lower side of the platform framework. The total lift provided for is approximately 8 ft. When lowered and with the railings folded down, the top of the platform is only about 10 ins. above the car roof.



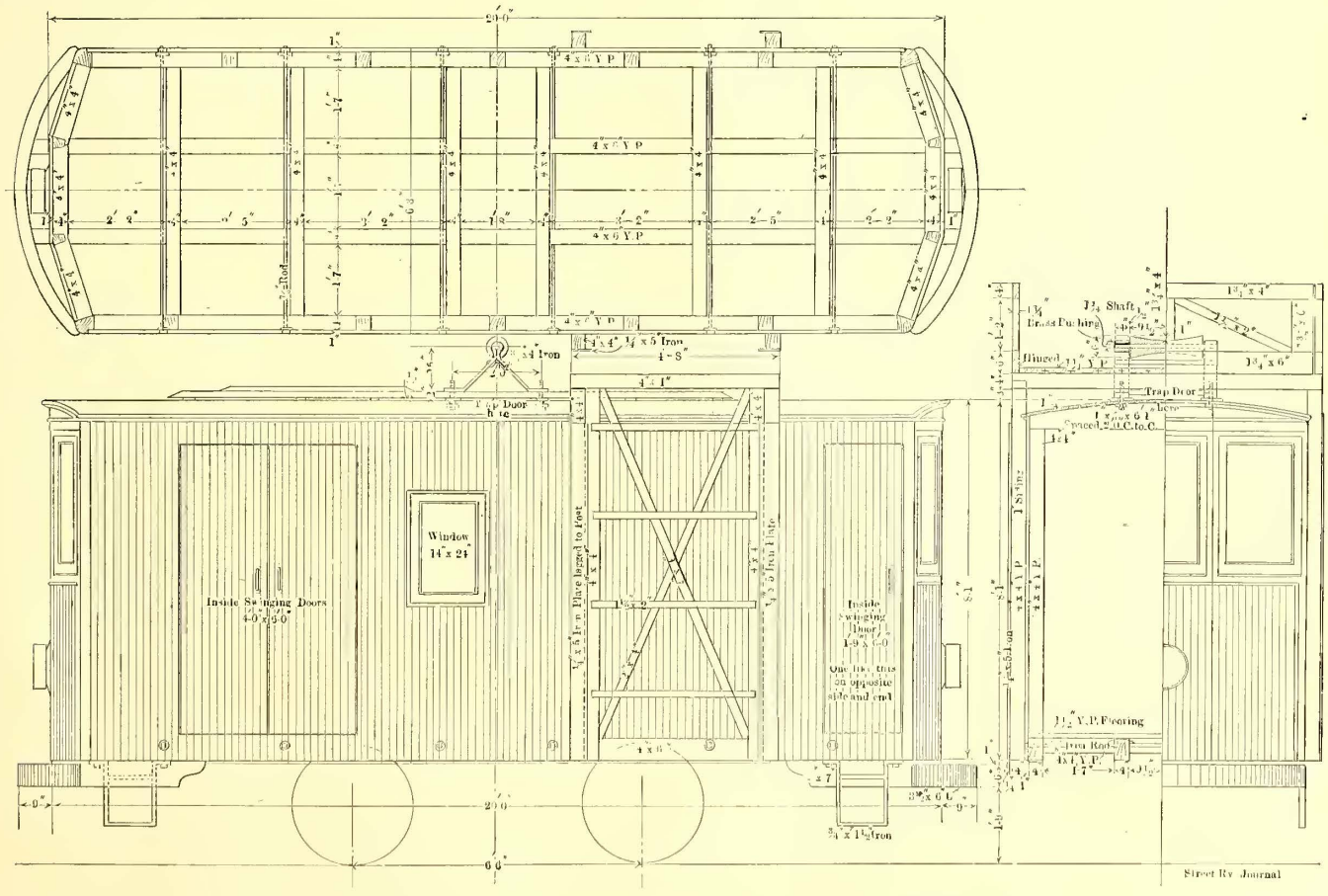
TOWER CAR WITH TOWER DOWN



TOWER CAR WITH TOWER RAISED

When used for erection purposes, the trolley wire is paid out alive through a trap door in the roof. The roller over which the wire runs is supported on the roof by brackets, as shown, and is well insulated by the car body. The reel carrying the new wire is mounted in a pair of wooden struts on the car floor, and is provided with a band brake, so that the wire will not pay out too rapidly. With this car it has been found possible to remove and replace the trolley wire upon over a mile length of track in a single night of five hours.

A finding for $120,023.43 for the owners of the Hotel Essex, Boston, against the Boston Elevated Railway Company, on account of the operation and maintenance of its elevated structure, has been handed down by the Superior Court.



FLOOR PLAN, SIDE ELEVATION AND SECTION OF SCRANTON TOWER CAR

THE QUESTION BOX

With one or two exceptions, the answers in the Question Box this week relate to problems confronting the mechanical departments. A variety of subjects is discussed, and answers are to be found to a number of questions about which there seems to be considerable difference of opinion. Foremost in interest, perhaps, is the discussion by D. A. Hegarty upon despatching systems for interurban roads.

A 49.—Information is requested relative to good despatching systems on interurban roads.

The trains running one way have even numbers, and those running the opposite way have the odd numbers. All orders given out by the despatcher are recorded in a book known as the "Despatcher's Order Book." These orders are forwarded to the motorman along the line who copies the same on his order blank, handing a copy to his conductor. The conductor then repeats the order over the telephone to the despatcher as it has been given him by the motorman, and if the repeated order is correct, the despatcher O. K's. the same, marking the O. K. in his book opposite the conductor and motorman's names, the conductor and motorman marking the orders O. K. also. These orders are all kept in cases made for that purpose, and are turned in at the terminal at the end of the run. The orders are then compared by the chief despatcher with the orders in the book to see that there is no discrepancy in them. By this method, both the conductor and motorman would have to forget their orders before carrying them out incorrectly. We have schedules printed especially for employees showing the passing point of each train, in heavy type, and all rules in regard to running the trains are printed on the bottom of the schedule. All motormen and conductors must know these rules perfectly, and are liable to be called for examination at any time by the chief despatcher in regard to orders and signals. No excuse is taken for misinterpretation of orders, as the risk of accident is too great to allow of any excuse by the trainmen. In case conditions arise that might cause an accident, and the cars should be in such location that they could not be reached by the despatcher, we have a direct wire from the despatcher's office to the power house, and at the ringing of the alarm signal, the man at the power house immediately cuts the power off from the road. The conductors and motormen have strict orders to bring cars to a standstill immediately in such cases. This is, however, only provided for cases of emergency, and as yet we have had no occasion for using this means. We use standard despatchers' train sheet, showing the location of trains, the same as in use on steam railways.

D. A. Hegarty, Gen. Supt.,
Railways Company General, New York City.

E 53.—Are you in favor of having the gear case cast as a part of the lower half of the motor frame? Why?

No. The bottom half of gear-cases generally have holes punched into them by too high or misplaced street pavings. Also if car should leave the track suddenly, the gear-case would strike the rail and break the case, destroying the lower half of motor.

J. L. Sullivan, Foreman Motor and Truck Dept.,
United Railways Co., St. Louis, Mo.

E 57.—A road has had trouble with wheels becoming loose on axles. What is the probable cause and what the remedy?

Fitted too loosely. Make fit so tight that 30 to 50 tons are required to press wheels on axle.

J. Chas. Ross, Gen. Mgr.,
Steubenville (Ohio) Tract. & Lt. Co.

Cause.—Wheels pressed on axles with probably 18 or 20 tons pressure. (This would be sufficient if wheels were used under light cars, for light traffic, with hand brake). If the wheel is bored too large, and in pressing it on axle it does not reach 20 tons pressure until it is almost to the proper position on axle, you are almost sure to have a loose wheel, especially where air brakes are used, as the power is often applied to the motors while the brake is set. Remedy.—See that all wheels are pressed on axles with from 30 to 40 tons pressure.

J. L. Sullivan, Foreman Motor and Truck Dept.,
United Railways Co., St. Louis, Mo.

Wheels should be pressed on 4-in. axles at a pressure of from 35 to 45 tons.

Master Mechanic.

Improper fit. Should require at least 5 tons pressure to press wheels on axle.

H. A. Tiemann, New York City.

Poor fit between wheel and axle; too loose when pressed on. A new wheel should be put on and the loose wheel kept until an axle large enough to make a tight fit is found.

Francis G. Daniell, New York City.

E 58.—When pressing wheels on axles, what difference do you allow between diameter of axle and wheel bore?

This depends largely on the metal in wheels, some are very hard, others soft. On a hard wheel allow about the thickness of writing paper, or a little less than 1-64 of an inch; on a soft wheel 1-32 of an inch.

J. L. Sullivan, Foreman Motor and Truck Dept.,
United Railways Co., St. Louis, Mo.

E 59.—At what pressure should wheels be forced on oxles?

After wheel is half-way on, the pressure should not drop below 30 tons the rest of the way.

J. L. Sullivan, Foreman Motor and Truck Dept.,
United Railways Co., St. Louis, Mo.

E 69.—What is the best size and shape of trolley wheels for city service?

On this road trolley wheels that have been in service on interurban cars and have become too badly worn for high-speed work are taken off, turned down in the lathe, refitted and used on local or city cars. We do not have to buy new trolley wheels for city work, as there are enough worn wheels taken from the interurban lines to equip all the city cars. We use a 6-in. trolley wheel.

Schenectady Ry. Co.

E 107.—If a car is sent out of the shop in good, all-round condition, what part of the equipment—accidents barred—will first require the return of the car to the shop?

As a general rule the renewal of shoes will be the first thing that requires the return of the car to the shop after it has been thoroughly inspected.

Master Mechanic.

E 108.—When a car is sent to the shop for some particular trouble—say low bearings—how much additional general inspecting and overhauling should be done at that time?

When a car is sent to the shop for any trouble, every part of it should be inspected, and it should go out in first class working order, and with the expectation that it is not to be returned for at least the life of the shoes.

Master Mechanic.

E 152.—How do you straighten a bent trolley pole?

Take a hardwood block 8 ins. thick, 12 ins. wide, and 4 ins. long, bore a hole through this the wide way, about 8 ins. from the end. The hole should be just large enough to allow the large end of the trolley to pass through easily. Fasten to a post in the car house or shops in some convenient place. This is a very good method of strengthening poles when they are not so badly bent that they have to be straightened by heating.

J. L. Sullivan, Foreman Motor and Truck Dept.,
United Railways Co., St. Louis, Mo.

If kink is short we use swage and heavy hammer. If pole is only slightly bent, straighten in vise or between two posts.

J. Chas. Ross, Gen. Mgr.,
Steubenville (Ohio) Tract. & Lt. Co.

E 184.—Suggestions are requested as to the best layout for car houses and shops. What do you consider the "ideal" arrangement for car house and shops? Please give your ideas, suggestions, sketches, etc.

What we consider the ideal car house is one that is built up of brick or stone, using angle-iron beams for uprights; eye beams for cross connections; steel rolling doors, and pits underneath cars, the track being laid on heavy piling of slow-burning construction.

R. H. Young, Master Mechanic,
Lincoln (Neb.) Tract. Co.

E 184b.—What is the best form of roof for car houses?

Gravel roofing.

R. H. Young, Master Mechanic,
Lincoln (Neb.) Tract. Co.

E 184d.—What is the best material for car house floors? How should floors be laid?

For car house floors use 2 x 4-in. hard pine, tongued together, diagonally laid.

R. H. Young, Master Mechanic,
Lincoln (Neb.) Tract. Co.

E 184e.—What is the best form of pit for car houses?

One that affords plenty of room underneath, with track laid on 12 x 12 in. upright beams, and 2 x 4-in. hard pine flooring.

R. H. YOUNG, Master Mechanic,
Lincoln (Neb.) Tract. Co.

E 184f.—What are good ways of lighting pits?

Side lights on level with track; also one lamp on each beam, using five-light series and test on the ground end of the circuit.

R. H. YOUNG, Master Mechanic,
Lincoln (Neb.) Tract. Co.

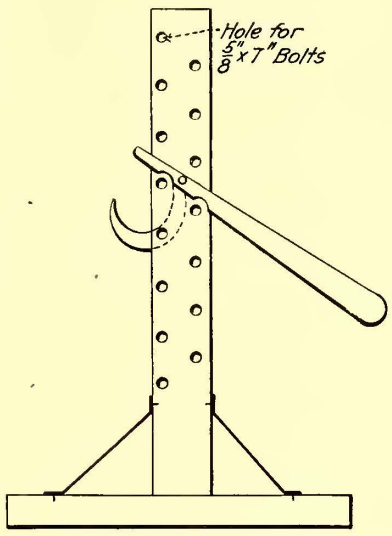
E 184g.—What are good ways of heating pits?

Steam radiators or pipes. R. H. YOUNG, Master Mechanic,
Lincoln (Neb.) Tract. Co.

E 184h.—What form of hoist or jack do you use for lifting car bodies? If the hoist was made from your own plans, please give details and drawings.

We have a home-made car jack made of 2-in. x 7-in. hardwood, as per sketch.

R. H. YOUNG,
Master Mechanic,
Lincoln (Neb.) Tract. Co.



HOME-MADE CAR JACK

E 184i.—For the average repair shop, what is the best method of driving the tools?

Electric drive.

R. H. YOUNG, Master Mechanic, Lincoln (Neb.) Tract. Co.

E 184j.—What specific acts or precautions instituted by your company have resulted in reducing fire risks at your car houses and shops?

By the placing of hose racks, hydrants and other means of extinguishing fires; making all wiring according to the underwriters' rules and regulations; placing galvanized-iron tanks for the deposit of oily waste; using steel or iron as much as possible, and allowing no combustible material to accumulate.

R. H. YOUNG, Master Mechanic,
Lincoln (Neb.) Tract. Co.

F 20.—What is a cheap and simple method of determining amount of feed-water used in boilers at a small or medium size plant?

By using two measuring tanks.

E. J. HINDERT, Chief Engr.,
Cleveland & Southwestern Trac. Co.

F 9.—Without mentioning trade names, can you give any suggestions on best ways of securing good boiler steam pressure regulation on railway loads?

A damper regulator coupled to the damper at the opening of the flue into the stack base will hold the steam pressure at almost constant pressure under ordinary variations of trolley station loads.

D. F. CARVER.

F 12.—Describe what you consider to be the proper method of blowing down a boiler.

If boiler is equipped with a surface skimmer and settling chamber, open valve slowly and leave open about five seconds, then close. On ordinary boiler open valve slowly and then slowly close immediately. E. G. HINDERT, Chief Engineer,
Cleveland & Southwestern Trac. Co.

F 14.—What is a practical method of keeping a boiler in service when a leak develops in the tubes, either fire-tube or water-tube?

If a leak develops in a tubular boiler, get two plugs made out of a piece of soft pine. Drive one into each end of the tube. This can ordinarily be done without shutting down the boiler. The water soon soaks into the wood, making it very tight. Iron plugs can be used and last longer. Also rods can be run through tube, and plates with gasket underneath can be used for drawing up the nuts. This will answer, but I would prefer plugs. A water-tube boiler would have to be cut out of service long enough to drive in plugs if there is no time to obtain new tubes.

E. G. HINDERT, Chief Engineer,
Cleveland & Southwestern Tract. Co.

G 4.—To what various uses do you employ compressed air in the engine room?

Compressed air is used to clean all generators, and for cooling purposes. E. G. HINDERT, Chief Engr.,
Cleveland & Southwestern Trac. Co.

Compressed air at about 20 lbs. pressure is used for cleaning generator armatures, windings, etc., where it would be impossible to clean with waste or a brush.

O. A. HONNOID, Opr. Engr.,
Utah Light & Ry. Co., Salt Lake City.

Compressed air in the engine room may be employed to very great advantage for various purposes; namely, blowing carbon dust and other foreign accumulations from the exposed armature windings and field windings, as well as for general dusting around the station. With the air hose the station attendant is able to reach the accumulation of dust and dirt that cannot be readily reached by any other method. CHAS. H. COX, Gen. Mgr.,
Lincoln (Neb.) Tract. Co.

Air is used for blowing dirt out of dynamos, blowing whistles for signals, cleaning around witchboards, etc.

FRANCIS G. DANIELL.

G 5.—How do you obtain compressed air for the various uses about the power house? At what pressure do you use the air?

Compressed air is obtained by means of a portable air compresser, which is also attached to a system of piping. Air pressure is kept at about 80 lbs. E. G. HINDERT, Chief Engr.,
Cleveland & Southwestern Trac. Co.

Compressed air is obtained by a small Christensen electrically-driven air pump, discharging into a reservoir about 6 ft. high by 20 ins. in diameter. O. A. HONNOLD, Opr. Engr.,
Utah Light & Ry. Co., Salt Lake City.

By either a steam or motor-driven air pump. If the repair shops are in the same building with the engine room, or are within a reasonable distance of the engine room, it will be found to be an excellent idea to pipe the air to the armature winding room and car house pits for the purpose of cleaning out motors and armatures, beating and dusting the cushions, and otherwise cleaning the inside of cars. CHAS. H. COX, Gen, Mgr.,
Lincoln (Neb.) Tract. Co.

Motor-driven air compressor similar to those used on cars for air brakes. Pressure should be 85 lbs. per square inch.

FRANCIS G. DANIELL.

G 6.—Please state in detail what trouble you have had with lightning at your power house. Then please state in full what steps you have taken to prevent damage from lightning.

Speaking of transformer work particularly, we have never had more serious damage from lightning than transformer windings burning out, the same being replaced in about three days by new coils kept in stock. Many heavy discharges, of course, will shut down the station for a minute or two, but with proper lightning arresters and choke coils installed, the ordinary discharges are taken

care of. We do not believe, however, that a lightning arrester has ever been built that will take care of the heavy discharges, and a shut down cannot be prevented. Speaking of direct-current railway feeders, generators, etc., we believe in connecting as many different types of arresters as there is room for, both of the standard manufacturers' types, but particularly is the "home-made" water tank arrester of good large capacity, one of the most effective that can be used. Good large contacts should be allowed, and the conductivity such that when the arresters are connected, a considerable amount of current may flow. In most severe storms it is perhaps the most advisable to open the circuit breakers and thus take away the temptation for damage by lightning that might prove far greater than the loss due to the service being interrupted.

O. A. Honnold, Opr. Engr.,
Utah Light & Ry. Co., Salt Lake City.

We have but little trouble with lightning. We have had generators grounded, but during the past three years beyond machines flashing, have had no trouble. We have a tank arrester and standard arresters on feeders. The high-tension system is also protected by standard lightning arresters.

E. J. Hindert, Chief Engr.,
Cleveland & Southwestern Trac. Co.

We have had switchboard circuit breakers opened with lightning, but since installing the ordinary wooden box arresters about every mile of trolley line, with three arresters just outside our station, all of different types, and one arrester on each switchboard panel in the building, we have had no trouble.

L. M. Levinson, Mgr.,
Shreveport (La.) Tract. Co.

I 28.—What is a good method of testing rail-bonds?

In the writer's private opinion the best method to test bonds is by means of a testing instrument which gives readings across the joint in comparison with straight lengths of rails.

J. Stanley Richmond, Consulting Expert,
New York City.

I 31.—In using bond tester on special work in which each joint is bonded in addition to long bonding, what is the method of procedure in case the tie-rods span two or more joints?

Bond testing across special work is carried out in the same way as on straight rail. J. Stanley Richmond, Consulting Expert,
New York City.

I 32.—What is the best form of portable rheostat to use in connection with bond-testing instrument?

In the car shops can generally be found (near the armature repair shop) a barrel-rheostat. This can usually be borrowed and rigged up on a flat-car or some other sort of car to serve the purpose of giving current in the rails from the trolley during such periods as no cars are in operation.

J. Stanley Richmond, Consulting Expert,
New York City.

ADDITIONAL QUESTIONS RELATING TO THE POWER HOUSE

Replies to the following questions are particularly requested:

F 74.—What has been found to be the best construction for ash hoppers under boilers?

F 75.—What is the most economical method of handling ashes from the hoppers to a storage bunker or to receptacles for their removal?

F 76.—What satisfaction do belt or bucket conveyors give when used for this purpose? Are conveyors better than cars?

F 77.—Is it possible to remove oil from exhaust steam mechanically? If it is done, what make of commercial separator is best for the purpose?

F 78.—What results have been attained by the use of the open heater? Are open heaters giving satisfaction? Would the users of open heaters please give their experiences?

REPORT OF THE ROYAL COMMISSION ON LONDON TRAFFIC

A brief digest of the report just issued by the Royal Commission on London Traffic was published on page 152 of the Street Railway Journal for July 22. The more complete copies of the report which are now available indicate that the commission made a most thorough study of the traffic conditions and requirements of London and permit of a longer abstract.

The Royal Commission on London Traffic was appointed on Feb. 9, 1903, and consisted of Sir David Miller Barbour, K.C.S.I., K.C.M.G. (chairman); the Right Hon. Earl Cawdor, the Right Hon. Viscount Cobham, the Right Hon. Lord Ribblesdale, the Right Hon. Sir Joseph Cockfield Dimsdale, Bart., K.C.V.O., M.P.; Sir John Poynder Dickson-Poynder, Bart., D.S.O., M.P.; Sir Robert Threshie Reid, G.C.M.G., K.C., M.P.; Sir John Wolfe-Barry, K.C.B., F.R.S.; Sir Francis John Stephens Hopwood, K.C.B., C.M.G.; Sir George Christopher Trout Bartley, K.C.B., M.P.; Sir George Stegmann Gibb, Charles Stewart Murdock, C.B.; Felix Schuster and Lynden Macassey, M.A., B.SC., LL.D. (secretary).

The report issued is entitled Part I. In addition to Part I., the commission will issue seven other parts or appendices, devoted principally to the evidence taken, maps, diagrams, etc.

The commission held 112 meetings, not including many subcommittee meetings, and examined orally 134 witnesses. The chairman and four other members of the commission (Lord Ribblesdale, Sir John Dickson-Poynder, Sir George C. T. Bartley, Sir George S. Gibb), together with Lynden Macassey, the secretary, visited, in September, 1903, New York, Boston, Philadelphia and Washington. On this visit evidence on the subject of transportation was secured by personal study as well as by interviewing prominent American railway experts, among them H. H. Vreeland, William Barclay Parsons, B. J. Arnold and Gen. W. A. Bancroft. Mr. Vreeland also gave testimony before the commission in London.

The report states that the population of Greater London in 1901 was 6,500,000 persons, and the number of rides per capita per annum was 200, compared with 300 in New York and 270 in Berlin. The facilities for locomotion in the district occupied by the working class are particularly deficient. In the central districts the population per acre is 148; in the rest of the county of London, 54; in districts adjacent to the county, 16.6, and in the rest of "Extra London," 2.5. Upward of 1,500,000 persons live in the central districts. In the central districts the average weekly rent of newly-erected working class houses is 3s. 3½d. per room; in the rest of the county, 2s. 4½d., and in "Extra London," 2s.

The commission states that the importance of cheap locomotion is not confined to the working class, but affects the comfort and efficiency for work of the whole community. The vast majority of people who go to their business in the center of London possess very limited incomes, and the payment of fares for transportation constitutes an appreciable pecuniary burden. In this connection the commission states: "It is sometimes said that London is a city under conditions special to itself, and in respect to facilities for locomotion cannot be judged by the standard of other cities. The remark appears to us to be true in the opposite sense to that in which it is generally used. The magnitude of the population of London, and the extent of the area over which that population is spread, make the problem of locomotion specially important for London, and, if the standard of movement cannot be raised to the level attained elsewhere, London must fall behind in competition with other cities, and the life and growth of the metropolis will be slowly, but not the less surely, strangled by the choking of the great arteries of traffic."

The recommendations of the commission relate principally to the widening of streets, the installation of tramways and

railways, and the regulation of traffic. One of the most radical recommendations of the commission is for the construction of two main avenues through London, one 4¾ miles from west to east, and the other 4½ miles from north to south. Each avenue would be 140 ft. in width, from house to house, with subways for water mains; with four lines of tramway on the surface and four lines of railway below the surface for express and local stopping trains. The east and west avenue, with its subways, railways and tramways, is estimated approximately to cost about £15,550,000, and the north and south avenue about £8,550,000. The commission does not recommend the immediate establishment of these avenues under existing conditions, but believes that their advantages should be carefully considered. It also recommends the widening of other streets.

RECOMMENDATIONS AS TO TRAMWAYS

One of the most important and interesting of the recommendations relates to surface tramways, which figure prominently in the recommendations of the commission for the relief of the present conditions. The report points out that London is conspicuously deficient in tramway facilities, and that there are extensive districts, especially in the West End and the center of London, which are entirely unprovided for. Even where tramways exist there is an absence of through communication. At the six principal present tramway terminals nearly 250,000 passengers alight daily in the street, resulting in great congestion and confusion.

The competitor for the tramways for a short distance is the omnibus, which many think will always serve a useful purpose in London. The commission evidently considers, however, that if the tramways are extended, the omnibuses, or at least the horse omnibuses, will largely disappear, and that even if motor omnibuses are developed tramways will continue to be the most efficient and the cheapest means of street conveyance. The commission therefore cannot recommend the postponement of tramway extension in London on the ground of any visible prospect of the supersession of tramways by motor omnibuses.

WIDTHS OF STREETS FOR TRAMWAYS

Considerable consideration is given to the width of streets for tramways. The report says: "The opinon is widely held that the streets of London are too narrow for tramways on a great scale. No doubt many streets are too narrow. The real question is whether this disadvantage is so widespread as to necessitate the postponement of a great tramway extension until costly operations of widening have been carried through."

In this connection the commission states that the London County Council aims at a minimum width of 33 ft. between the curbs, but the commission thinks that a greater width than 33 ft. is desirable, as a rule, for a double line of tramway, save that for short distances or in less frequented thoroughfares even a less width may be accepted. A single line might be laid in still narrower streets, either for traffic in both directions, with passing places at intervals, or for traffic in one direction only. Such an arrangement is common abroad, and appears to work satisfactorily.

"Judged by the above standards of width," the report proceeds, "many of the main thoroughfares of London will admit of tramways. Of course, the decision must depend partly upon the extent to which the street is crowded as well as upon its width. Certainly some street improvement is necessary in places, from any point of view; and we have already recommended that preference should be given, as far as possible, to improvements which would widen roads intended for tramways; but we are persuaded that a great deal can be done in the way of tramway extension without any great expense of this kind."

THROUGH ROUTEING AND MUNICIPAL OPERATION

Great stress is also laid on the necessity of running through cars over tramway systems, even if separately owned. The commission does not deal directly with the question of the municipal operation of tramways as being outside the terms of its reference. The report states, however, that the commissioners think it reasonable that some profit should be derived from the tramways for the benefit of the municipality; but that it does not follow that the best way of securing the largest profit will be that the municipality, even if it finds the money for construction, should undertake the task of operating.

UNDERGROUND RAILWAYS

The commissioners then discuss the practicabilty of securing the construction of further underground railways in London. They express their reliance on private enterprise in the following terms:

"A sufficient number of successful underground railway schemes, however, remain to justify the hope that there is no need, as yet, to make an alteration in the present system of private promotion in the direction of looking to public sources for any part of the funds required for railway enterprise, unless undue financial obligations are thrown upon the railway undertakings, either in respect of works or compensation, or in regard to the carriage of passengers at unremunerative fares, or otherwise.

"All that, in our judgment, is necessary is to see that no discouragement shall be created for private enterprise by the system of procedure under which railway undertakings are authorized, or by the imposition of undue burdens proposed on or exaction of impossible conditions from promoters."

TRAFFIC REGULATION

Considerable space is devoted to the question of regulation of traffic in the streets and measures which should be taken to prevent and remedy obstructions in the streets. One grave cause of obstruction is the standing of vehicles at the sides of streets. For example, the report says that "where a business is of such a nature that the owner practically converts the street opposite his place of business into a private yard, to the serious inconvenience of the general public, we think he might not unreasonably be required to provide a suitable place for loading and unloading. In regard to future buildings this should be made compulsory."

PERMANENT BOARD

In conclusion, the report recommends the establishment of a Traffic Board which should report yearly to Parliament, and which would have jurisdiction over the entire subject of traffic in London.

The West Chester Street Railway has introduced a new wrinkle in its passenger department, that of running a thrice-a-week excursion over its Downingtown and Kennett lines. Large open cars, brilliantly lighted, are used, and the trip occupies three and three-quarter hours. An excursion fare of 50 cents is charged, and the service has been well patronized.

The Chattanooga Electric Railway has increased the wages of its employees who have been in the service exceeding a year 1 cent per hour. Prior to July 1, the wages received by these men was 17 cents; from henceforth they will receive 18 cents, which increase in the course of a month runs up a considerable total. It is understood that another new feature will be introduced by this company relative to the wages of its employees. Each successive year of service will bring a specified raise in salary, thus affording an inducement to the best men to remain with the company.

THE LEWIS AND CLARK EXPOSITION

While not so large as the St. Louis or the Chicago fairs, the Lewis and Clark Exposition, now in progress at Portland, Ore., is attracting a large attendance and possesses many interesting exhibits. The provisions made by the Portland Consolidated Railway Company to handle the traffic to the fair are noteworthy and will be described in an early issue of this paper. In the present article a few particulars of the most important buildings will be given, together with a description of the principal electric railway exhibits.

THE GOVERNMENT BUILDINGS AND CONNECTING BRIDGE

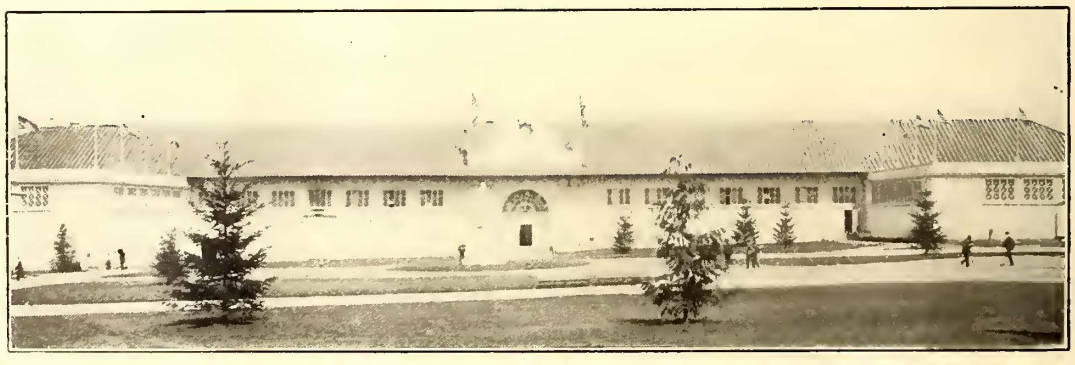
The site is a tract of 190 acres on a lake of nearly 300 acres, which divides the grounds into two portions, connected by a monumental bridge. On the south side the land rises to an elevation of 100 ft. above the lake, and here the important buildings have been located and a park laid out. Across the lake are the Government buildings.

The United States Government buildings are five in all, the main structure being connected with three smaller ones by ornate peristyles, while the fourth smaller building, the United States Life Saving Station, is located west of the group, on the shore of the lake. The front of the main building is spanned by five arches, each 40 ft. wide, supported by Corinthian columns 44 ft. high. The building is graced by two towers, each of which is 260 ft. high and surmounted by a dome. The roof of the main building is arched, the highest point being 130 ft. from the ground, while at each end is a half dome. Constructed in the Spanish Renaissance style of architecture, in harmony with the other main exhibition palaces, the building is, from an architectural standpoint, one of the finest in exposition history. The minor buildings are in the same style as the main structure, but they have less ornamentation.

The Mines and Metallurgy Building is 200 ft. long x 100 ft. wide, and contains 20,000 sq. ft. of exhibit space. It is covered with decorative staff, which has been tinted a pleasing gray, restful to the eye. Decorative effort has been expended principally on the main entrance, located in the center of the south facade. Three wide doorways are separated and flanked by fluted pilasters with Ionic capitals. The windows of the building, except a few over the doors, are set high up on each of the four sides, and are composed of a number of small, ground glass panes. Overhanging eaves, made wider by the fact that underneath them the walls swell out for a considerable distance, produce an unusually attractive effect. The Mines and Metallurgy Building has an addition 30 ft. wide x 60 ft. long, which extends across part of the west facade. The addition was necessitated by the unexpected requirements for space in which to house the unusually attractive displays from the Oregon mines.

The longest building on the Exposition grounds is that devoted to machinery, electricity and transportation, which has a length of 500 ft. The main building is 100 ft. wide, but at each end, where projecting wings 100 ft. square are added, the width is doubled. The wings were made necessary by the unexpected demand for exhibit space on the part of large manufacturing concerns. The building is a plain structure, with comparatively little attempt at ornamentation. A red hip roof covers the building, with the exception of the wings, which are flat-topped. Decorative efforts have been confined almost entirely to the main entrance, which is located in the center of the west facade. The entrance is through an arch ornamented with flanking pilasters, a cornice of liberal projection supported by classic brackets adding to the attractiveness. Above the cornice an extending wall is adorned in the center by a star window, and at each angle supports a pinnacle and flag staff.

The Forestry Building is the unique structure of all expositions. It is a gigantic log house, exemplifying in its composition the forest wealth of Oregon and Washington. In its construction 2 miles of 5-ft. and 6-ft. fir logs, 8 miles of poles and tons of shakes and cedar shingles were used. The logs have been left in the rough with the bark on. The base logs of the building are 6 ft. in diameter and 52 ft. long. The logs above the base are 3 ft. through and vary in length. Colonnades of immense fir trees 30 ft. high and 6 ft. in diameter support splendid loggias or galleries over the main entrances. The portico over one entrance is supported by giant spruce trees, and the other shows a colonnade of magnificent hem-

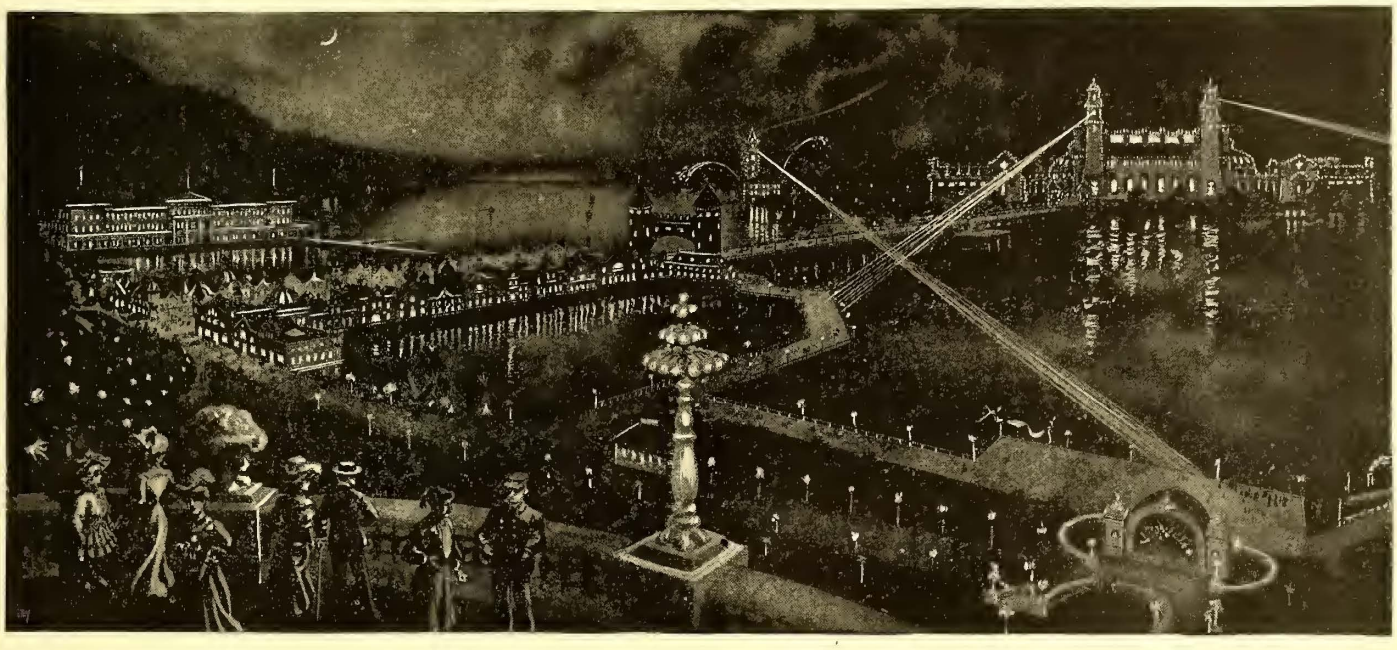


THE MACHINERY, ELECTRICITY AND TRANSPORTATION BUILDING

locks. The upper part of the building is supported by cedar bark shingles laid 18 ins. to the weather. An overhanging roof adds much to the attractiveness of the structure.

In the construction of this building no carpentry work was employed, the logs being framed together with tree-nails and old-fashioned wooden pins. The trees used were cut in the forests bordering on the Columbia River. They were formed into rafts and floated down the Columbia and Willamette Rivers into the lake. From the lake they were raised to the site of the building in Centennial Park by means of a skidway 1500 ft. long. The distance traveled by the logs in the water was 75 miles.

The grounds, buildings and parks are lighted by incandescent lamps, 7000 of them being required for the park alone. All the buildings are outlined with frosted 8-cp lamps, and the roadways and bridge have post electroliers, which are shown in the view of the Government Building. The design and installation of the lighting equipment has been under the direction of James R. Thompson, current being furnished by the Portland General Electric Company, whose president, Henry W. Goode, is also president and director-general of the Exposition.



GENERAL VIEW OF EXPOSITION GROUNDS AT NIGHT

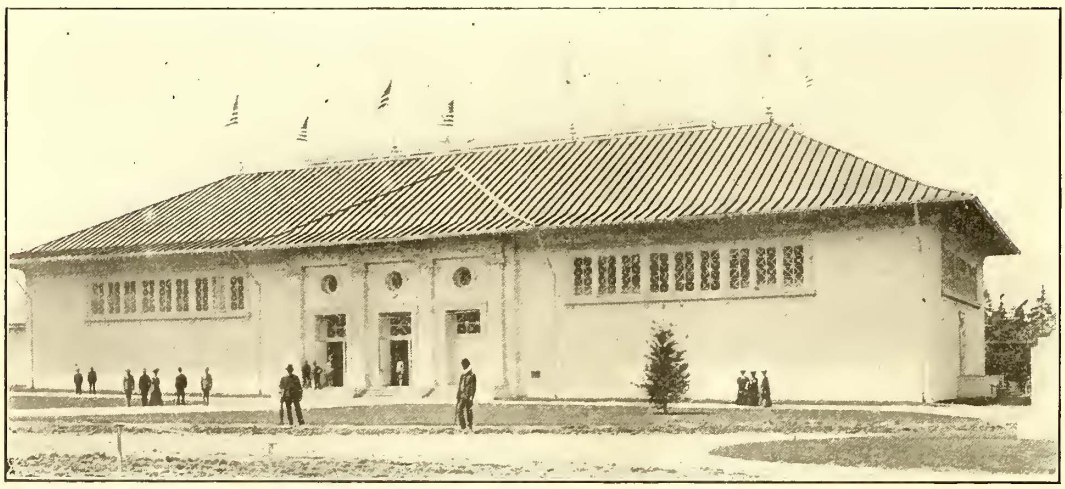
Following are descriptions of the principal railway exhibits:

THE EXHIBITS

The General Electric Company has an exhibit covering 6000 sq. ft. in the Machinery, Electricity and Transportation Building, already described, and occupies the largest space consigned to any exhibitor on the grounds. In the center of the exhibit is a colonial office and reception booth, comfortably and tastefully furnished and carpeted, while radiating from it are several aisles passing through different sections of the exhibits, and leading to the exits and entrances. Near one of the many entrances is a 60,000-volt oil switch in operation, and also a four-motor equipment of the GE 67-hp motors mounted on Brill trucks, with K-10 controllers. This equipment, by the way, is identical with that supplied to the Washington Water Power Company, of Seattle, Wash. The power machinery comprises new types of single and three-phase a. c. motors; the "CR and CQ" types of direct-current motors, as well as a Curtis direct-current turbo-generator set. The latter has aroused a great deal of interest among the visitors. The new power house of the Portland General Electric Company has lately installed two 1500-kw three-phase Curtis turbo generators, which supply all the current used for illuminating and operating the machinery of the Exposition. The display of street railway appliances is very thorough in every detail, comprising all classes of line and track specialties, as well as high-capacity railway switchboard equipments. In the southern portion of the exhibit, and near one of the side entrances, is an 8-ton electric mining locomotive with special cable reel, operated by either reel or trolley on a 30-ft. track. Exhibits of wire, cable sockets, fuses, lightning arresters and porcelain specialties occupy another section, and nearby is a complete line of indicating and recording instruments, mounted on display boards, where the operating parts may be readily inspected. A 30-amp. mercury arc rectifier changing 220-volt, 60-cycle alternating current into 110 volts direct current is seen in operation near the reception booth, and a complete display of the incandescent lamps manufactured at the company's works in Harrison, N. J., is situated in an adjoining section. In the department of motor applications the General Electric Company, in conjunction with a number of manufacturers, has a very instructive and interesting display. The exhibit which would more particularly attract the casual sight-seer in this section is probably that of a generator direct connected to a 30-in. Pelton water wheel. A three-phase induction motor is shown direct connected to a Platt Iron Works triplex pump; an electric hoist manufactured by the Willamette Steel & Iron Company, Portland; a Price centrifugal pump, direct connected to an induction motor, as well as many other motor applications.

The Westinghouse Electric & Manufacturing Company has 1500 sq. ft. of space. The section devoted to the display of power machinery is particularly attractive, a very prominent feature being a Westinghouse-Parsons steam turbine direct connected to a 400-kw generator, set up immediately adjoining the main entrance to their exhibit, and so arranged as to show the interior mechanism of the turbine. Several types of smaller generators, and a small Ohmen high-duty steam engine, direct connected to a 2-kw type "S" Westinghouse generator, are situated in the western section of the display space and facing one of the main aisles of the building, while the interior is occupied by more power machinery, comprising, among others, a motor-generator set, type "TR" motor, revolving field a. c. generator, 100-hp induction motor, type "HF." In the extreme southern portion the Sanitary Devices Manufacturing Company displays, in conjunction with this exhibit, a complete one-sweeper outfit, driven by a type "S" motor. Near by is a hoist having for motive power a type "F" induction motor

with controller and requisite appliances. The rear section contains some distinctive types of the Westinghouse transformers, a special feature in this connection being a 110-kw air-blast machine. Immediately adjoining on the floor and suspended against the wall are type "OD" transformers, ranging in capacity from ¼ kw to 25 kw. Standard switchboard instruments mounted on display boards, and comprising voltmeters, wattmeters, ammeters, power factor indicators, etc., so arranged to exhibit their mechanical operations, are also seen in this vicinity. Among the railway appliances exhibited are a 50-hp motor, showing the interior construction of the same; a No. 107 a. c. single-phase street railway motor of 75 hp capacity, having the commutator thrown back; and the unit-switch system of multiple control, placed on a stand with the cover taken off to show the operating details. The portable instruments manufactured by the company are displayed in a show case opposite the main entrance to the exhibit, and directly in the rear are the following: a type "C" 3-pole 33,000-volt electrically-operated circuit breaker; a type "B" circuit breaker for 2300 volts; lightning arrester and choke coil; a static interrupter; and a type "D" double-throw oil switch with fuses arranged on display boards. The display space is surrounded on three sides by Westinghouse enclosed arc lamps, hung on artistically designed iron goose-necks, and in this connection it may be mentioned that the Machinery, Electricity and Transportation Building is illuminated by Westinghouse lamps of similar pattern.



THE MINES AND METALLURGY BUILDING

Facing one of the main aisles of the exhibit building the Baldwin Locomotive Works have installed two steam locomotives, each typifying a standard example of its class. One is a Southern Pacific consolidated type Harriman standard locomotive, 208,000 lbs. weight, with 32-in. x 30-in. cylinders and 57-in. drivers, using an oil burner. The other is a logging engine. Across the aisle opposite, and facing the steam locomotives, is a Baldwin-Westinghouse 70-hp electric locomotive, weighing 20,000 lbs., designed for industrial plants and contractors' use, and fitted with 250 volts, direct-current Westinghouse motors. In another section of the exhibition is displayed the company's interurban railway truck, identical with those at present used by the Twin City Rapid Transit Company, of Minnesota. The truck is made entirely of wrought iron and steel. The company manufactures several sizes of railway trucks, ranging from 5300 lbs. weight, suitable for street railway service, to 12,500 lbs. for interurban service.

Adjoining the Baldwin Locomotive Works, the Standard Steel Works, of Philadelphia, Pa., exhibit steel springs of various kinds, as well as wheels and tires, showing several rolled steel wheels, suitable for steam or street railway service, made from a steel ingot hammered and rolled into shape.

The Western Electric Company, of Chicago, occupies a space of some 2400 sq. ft., every available portion of which is utilized by exhibits typifying the various products of the company. Situated in the center of the exhibit is a 500-kw, single-phase, revolving-field, engine-type Western electric generator, while on a pyramidal form adjoining are shown the different types of motors manufactured by the company, and ranging in size from a 1-12 hp to a 50 hp. Opposite the motors is a section devoted to the display of arc lamps from ⅜-in. carbon to the series alternating lamps in operation, suspended from iron trees, and capable of being lowered for closer examination when desired. This section includes, among others, five series-multiple, 500-volt lamps; 220-volt, 2-in. series-multiple lamps, and 110-volt multiple alternating and direct-current lamps. Encircling the entire display space of the Western Electric Company and hung about 8 ft. or 9 ft. from the floor, are fifty alternating enclosed arc lamps, with transformers and regulators, making an exceptionally fine showing. In another section near by, arranged on display board and stands, are the various supplies handled by the company, among which may be mentioned Bryant & Perkins' goods, Thomas high-potential porcelain insulators, Electrose overhead railway material, D. & W. enclosed fuses as well as ventilator exhaust, desk and ceiling fans, several of which are in operation. A Rateau steam turbine direct connected to a 15-kw Western Electric 220-volt, direct-connected generator, is soon to be added to the display, and will, no doubt, prove a valuable adjunct to this already interesting and instructive exhibition.

The exhibit of the Fairbanks-Morse Company, of New York City, N. Y., has already been described in this paper. It is devoted almost entirely to the various electric sign clusters and lights for their display. Near this unit are gas, gasoline, kerosene and crude oil engines, which this company manufacture. Its display in their railway department is especially thorough, comprising gasoline motor cars, push cars, railroad jacks and general track tools and a 100-ton railroad scale with printing beam. The company is also exhibiting a full line of scales, comprising everything from a grocery to the above-mentioned 100-ton railroad scale.

A scheme has just been adopted for the transformation of a steam railway line into an electric railway by the public authorities of Tunis. The line is a single road, which starts from Tunis and leads to summer resorts on the seashore. The length is, roughly, 18 km. It belonged originally to an English company and later to Italians. Finally it was bought for 8,000,000 francs by the Compagnie de Bona-Guelma (French), which holds all the railways in this country. Negotiations are pending between the 13me Guelma, the local tram company (Cie. Francaise des Tramways de Tunis), and the Director of Public Works. The line would be bought at the original price, it is said, by the tram company. One drawback is the tariff of fares, which is higher than usual rates. A similar scheme is on hand to cover the opposite side of the lake of Tunis. The idea is to build a tram line (electric) 16 km in length to join localities situated on the seaboard. The concession will probably be awarded to the Compagnie Francaise des Tramways de Tunis.

SOME EXPERIENCES WITH DRAW-BARS FOR ELECTRIC CARS

BY W. T. VAN DORN

The question of draft rigging and couplers for electric railway cars has been given but little attention by operating electric railway men generally. Probably this is because comparatively few of them have of recent years needed anything worthy the name of car coupler, as the decreasing use of trailers for several years made it unnecessary to couple cars together except in rare emergency cases. A large part of the most valuable experience with automatic couplers suited to electric roads has been gained on the elevated railroads of this country, where it has been necessary to operate cars in trains and where the best obtainable automatic coupler is necessary. Recent developments, however, have revived interest in couplers for surface roads, as they have shown a tendency to get back to the use of trail cars during the rush hours of the day on city railway systems and the use of cars connected together in multiple-unit trains for carrying extra heavy traffic on interurban roads. Some of the writer's experiences on coupler matters may therefore be of interest and value at this time.

I have frequently made the statement that for the operation of multiple-unit trains a very much heavier draw-bar is required than would be neeessary if trains of the same weight were to be pulled by a locomotive at the head of the train. As this assertion seems rather peculiar at first thought and has been questioned many times by those to whom I have made it, a statement of a few observed facts may be in order. This question first came up when the engineers of the Boston Elevated Railway Company discussed with me the question of automatie couplers for the elevated lines of that company. At that time the Metropolitan Elevated in Chicago, which was equipped with Van Dorn couplers, was operating five-car trains with a motor ear at the head of the train, the couplers having stems 1⅞-in. x 2⅜-in. solid iron. The engineers of the Boston Elevated, in placing the order for couplers, maintained that there would not be any use for as heavy draw-bars on the Boston Elevated lines as had been formerly built for this class of serviee, beeause the multiple-unit system was to be used in Boston with motors under every car, whereas on the Metropolitan Elevated in Chicago the single-motor car system was employed. The theory, of course, was that on a multiple-unit train there would be almost no strain upon the draw-bars, as each car had its own motive power, and all that the draw-bars would have to do would be to equalize any slight differences between the motors or between the brake adjustments of the various cars. I felt, nevertheless, that it was best to be on the safe side, and furnished couplers for the Boston Elevated roads with stems 2-in. x 2½-in. solid rolled steel. After these couplers had been in use eighteen months in Boston, 171 stems were either broken or kinked. I was called to Boston to look over the situation and see what could be done. After running special trains through the subway and over the balance of the road to learn what had caused all this trouble, we found that when the trains went over certain grades or rounded short curves there was considerable strain on the draft rigging; in faet, so much that it would occasionally give way. There was evidently something wrong in the theory as to what multiple-unit draw-bars had to do, as here we had draw-bars of considerably greater strength than those in service on the Metropolitan in Chicago, and still they were evidently not strong enough. I recommended the trial of a coupler of considerably greater strength, with draw-bars having 3-in. x 3-in. stems instead of the 2-in. x 2½-in. stems, with which the road was equipped. A few trains were equipped for test to see what effect this increased strength would have. The results can best be judged by the fact that after thirty days' test the heavier stems were ordered for fifty more cars, and a short time afterward all the cars in service were so equipped. These have been running now some two years, and nothing has gone wrong from that day to this. A somewhat similar experience was had in the equipment of the first trial train for the New York Subway. This had couplers with 2-in. x 2½-in. stems, which were later changed to 3-in. x 3-in. In Brooklyn all the motor cars were equipped with a heavy stem, 3-in. x 3-in.; the trailers with a heavy seetion of T-rail. As the result of this

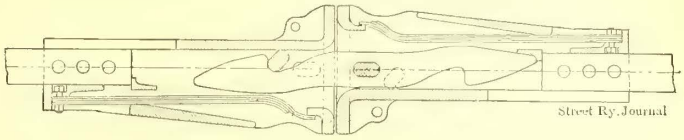


FIG. 1.—1902 COUPLER, AFTER COUPLING

experience, I believe in nothing lighter than a draw-bar with 3-in. x 3-in. stem for use on multiple-unit elevated trains of six cars. The Metropolitan Elevated in Chicago, in changing from the motor car to the multiple-unit system, has adopted heavier draw-bars with heavy stems. I do not think anyone

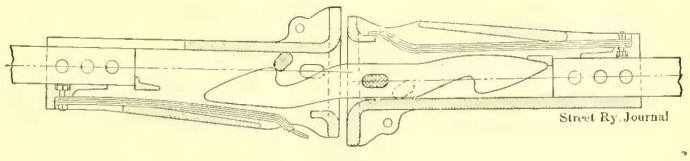


FIG. 2.—1902 COUPLER IN PROCESS OF COUPLING

connected with that road can be found who would favor a retention of the lighter draw-bars which were used with the motor-car system. These are the facts found by experience, account for them how we will.

While a multiple-unit train may start, stop and run and

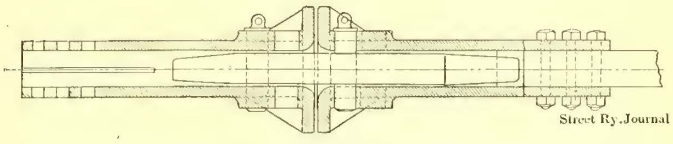


FIG. 3.—VERTICAL SECTION THROUGH 1902 COUPLER

seem to have comparatively little draw-bar pull for days at a time, all at once something may happen to give the draft rigging a severe strain. Something may for an instant prevent good contact between the third rail and the contact shoes on one or more cars near the head of the train. The brakes may temporarily stick on the first cars, the head of the train may be in a curve or on a grade, or any one of a number of little things may happen which will cause the motor cars on the rear to push temporarily those further ahead in the train. It is well known that the first rush of current into motors as a train is started is usually sufficient to start every motor car in the train with something almost approaching a jerk, and if there is anything in front of those motor cars in the way of an obstruction to be moved, there is considerable shock. Consider in connection with this another still more important point. On a train with a motor car at the head and with all cars equally braked, the principal strain on the draft rigging is in pushing rather than pulling, except, of course, at the instant cars are being coupled. In the multiple-unit train, the strain on the draw-bars is likely to be a pushing strain. Now, if it were possible to equip electric roads with fixed draw-bars like those on steam railroads, providing for but little sideway movement, this pushing strain would not be troublesome. Electric cars, however, have usually to be built to go around short radius curves, and this calls for a swivel draw-bar. With both draw-

bars swiveling, it is only the rigidity of the coupling device proper which prevents the whole draft-rigging apparatus from buckling and ultimately bending or breaking one way or the other. By providing a coupler with a minimum of lost motion at the point of coupling, the tendency to such buckling and bending is very much reduced. Nevertheless, with any form of commercial coupler that can be devised there must be some lost motion, however slight. It is therefore the push and not the pull that needs most consideration.

This brings us to the importance of a design of coupler which shall have the smallest possible amount of play or lost motion between the coupler heads when the coupling is made. In steam railroad practice the principal object in doing away with lost motion is to obviate jerk or shock. In electric railway practice we must go still further, because, with draw-bars which swivel, the amount that these draw-bars can be pushed one way or the other from a straight line depends on the amount of lost motion between them. When one car is pushing another, then the lost motion determines the liability of that draw-bar to injury and governs the amount of material that must be put into a draw-bar in order to make it withstand sudden pushing stresses. It is evident that no draw-bar can be a success in electric railway work where swiveling draft rigging is necessary that does not insure a very small amount of play or lost motion after the coupling is made. Much of the success of the Van Dorn coupler is due to a recognition of this fact. It is a rule in the manufacture of these couplers to let nothing leave the factory with more than 1-16 in. lost motion after the coupling is made, and frequently this lost motion is not over 1-32 in. It is hardly necessary to say that as accurate work as this cannot be obtained from tough castings, but accurately forged links, and the faces of the couplers machined off.

The real action of the present form of Van Dorn automatic coupler is probably but little understood even by its users. Figs. 1, 2 and 3 have been prepared showing sections through the 1902 form of coupler. Fig. 1 shows the position of the link and coupler heads after a coupling has been completed.

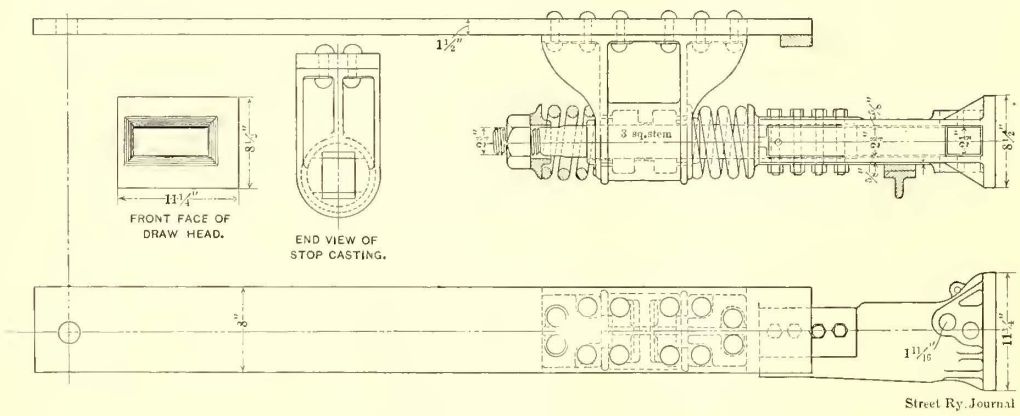


FIG. 4.—ROUND PIN DRAW-BAR

In Fig. 2 the couplers are shown in the process of coupling. Fig. 3 is a vertical section through the same coupler, Figs. 1 and 2 being horizontal sections. The first thing to notice is that in Figs. 1 and 2 the link has been inserted in the right-hand coupler and fixed by the center pin which has been dropped through the link. The point of the link that is inserted into the head is held in position by the abutment block, as shown, and the part of the link that projects out is in position for automatic coupling with the opposite head. When the cars come together the point of the link will strike the pin that is against the side wall. The link is deflected past the pin and comes in contact with springs in the side of the draw-head, which are forced out until the point of the hook passes the pin. It is readily seen from Fig. 2 that with a link having an elongated point sufficient in length so that when the strain sideways is brought to bear, the point of the link on the spring is close to where the springs fulcrum in the side wall of the draw-bar; the link under no conditions can be twisted out in train service, no matter what the strain may be.

The design of a link to prevent the uncoupling of cars under all conditions has been a matter of much thought. Previous to 1902, a form of link was used with shorter points, and when they became badly worn they could be accidentally disengaged on the shove, although they served their purpose admirably in the work which draw-bars were called upon to perform at that time. The 1902 pattern was designed to prevent any possibility of trouble with the unusual strains of the multiple-unit system.

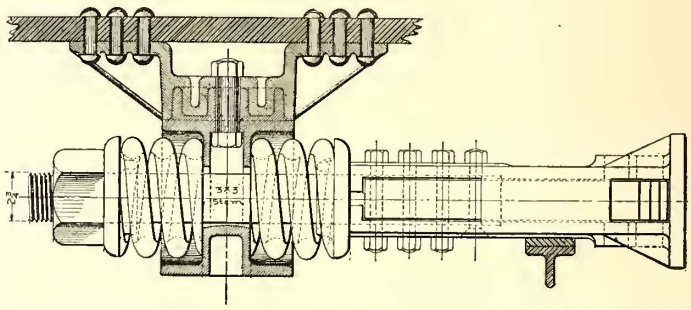


FIG. 5.—DRAW-BAR FOR STEEL MOTOR CARS WHERE THE BAR HAD TO MAKE A SHORT SWIVEL AND WHERE NO OTHER STYLE COULD BE APPLIED

All Van Dorn draw-bars are now made of the pattern shown.

The tight coupling with little lost motion, before mentioned as such an important matter, is made possible by the present design of coupler, which is such that the essential dimensions—that is, the location of the holes with reference to the coupler faces and the dimensions of the links, can be made a matter of accurate machine work.

A coupler having once been made accurately, it is next in order to inquire what are the chances that, after the wear of years, it will remain reasonably accurate. The wearing points are evidently the coupler faces, the pin holes and the hooks on the link. In the first place each coupling head had two pin holes, and that insures double the wear. Each link is automatic at each end. Place the bar in either head and the pin through the center aperture and couple automatically to the opposite head (the wear on pins is only on the pull and not on the shove), and the wear is only on the two pin holes that are in operation at this time. Place the bar in the opposite head and it is vice versa; and that assures double the life of both coupling heads and coupling bar. The coupling bar is made out of the best quality of steel forgings, and after years of wear can be readily upset to a standard length. One of the greatest features of the Van Dorn couplings is their great durability and the possibility of making them as good as new with a very slight cost, and of their maintaining a tight lock over a long period of years.

Besides performing an important function in the simple act of coupling cars together, the spring in the coupler head has to perform another part with which it is probably not generally credited. It requires about 1 ton pressure to couple two large draw-bars. This helps to cushion the shock at the instant of coupling.

The company with which the writer is connected has lately brought out a very heavy type of coupler, and in this heavy type has embodied some new features, including large round

pins. This assures great durability as well as strength, and longer life of pins and links. The round pin draw-bar, No. 19, illustrated in Fig. 4, is of this design. It is sufficiently heavy for such use as would be given in any steam railroad service or on an electrically-equipped steam road.

It takes more than a pair of coupler heads and a coupling device to successfully operate cars and trains. The draft rigging under the car is no less important. In this connection it may be interesting to look at some of the common forms of draft rigging used on elevated and interurban roads. Fig. 4 shows a general form of draft rigging which is quite commonly used. The stem of the draw-bar goes through a stop casting, on either side of which are the buffing springs. The stop casting is riveted to a solid steel plate 8 ins. wide and 1½ ins. thick. This plate runs back to the king bolt of the truck on which it swivels, or to any other swivel that may be provided. A modification of this plan is shown in Fig. 5, where nothing but a short swivel can be used because of the arrangement of car and platform sills. Fig. 6 is another way of securing a long swivel, and can be used where plenty of room is available.

In conclusion, it can be said that the production of a successful automatic coupler for electric roads is much more difficult than the production of an automatic coupler for steam roads, because of the necessary introduction of the swiveling feature on any electric railway draw-bar and the frequent pushing strains with the multiple-unit system. At the same time good automatic couplers are even more necessary on electric than on steam roads, because of the dangers in coupling on electric railways with makeshift types of non-automatic draw-bars, as the radius bar in such times is liable to shift in position or buckle out, and this makes it more dangerous than it was formerly on steam roads with a hand couple.

Many people have been under the impression that the M. C. B. type could be used to work on a radial bar. I have had plenty of experience with this, and have found it is absolutely impossible to make a successful draw-bar on these lines. There is trouble making a tight lock, and further, for interurban service, the cars overhang so far from the trucks that unless the tracks are free from sudden changes of grade and almost perfect, the draw-bars oscillate up and down, and one will go right over the top of the other. The coupling must be such that they are held rigidly together, so that no difference what the unevenness of the track may be, they cannot separate. If the lock is not absolutely tight, the bars will swing sideways and buckle on the push.

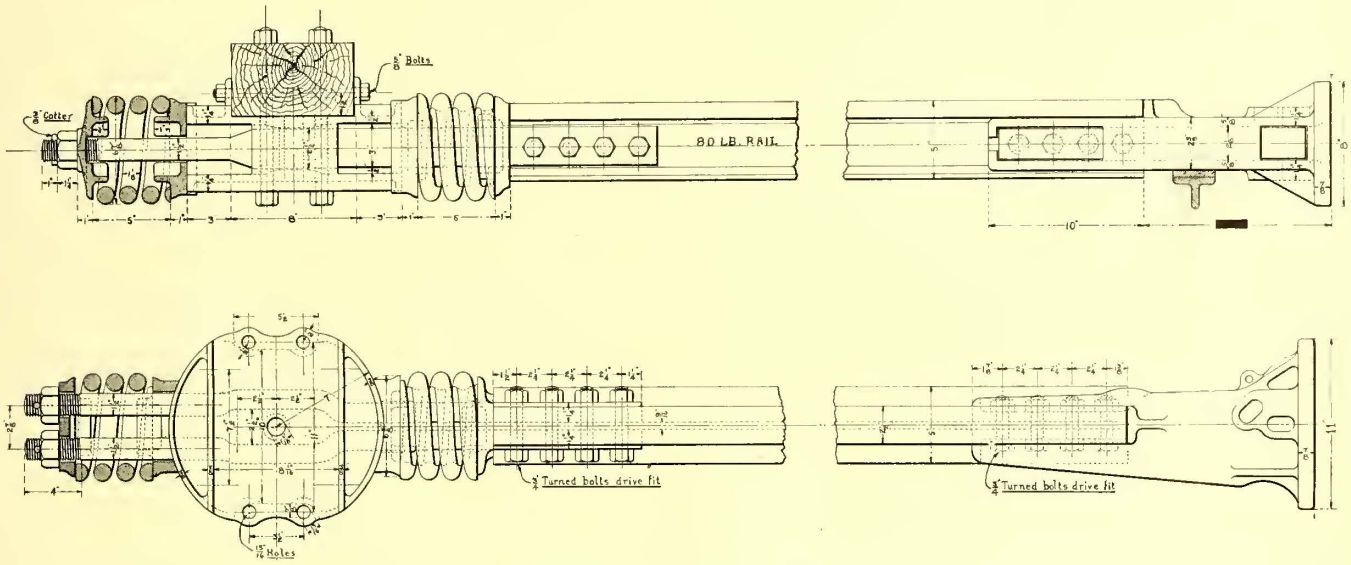


FIG. 6.—LONG SWIVEL DRAW-BAR

PROGRESS OF THE ELECTRIC RAILWAY IN GERMANY

A recent number of the "Elektrotechische Zeitschrift" contains some interesting statistics on the electric railway in Germany. The report is divided into three parts. The first part relates to those electric railways which were in operation on Oct. 1, 1904; the second, the electric railways in course of construction; third, trackless trolley system, of which there are six in Germany. The following table shows the state of electric traction in the years 1896, 1900, 1903 and 1904:

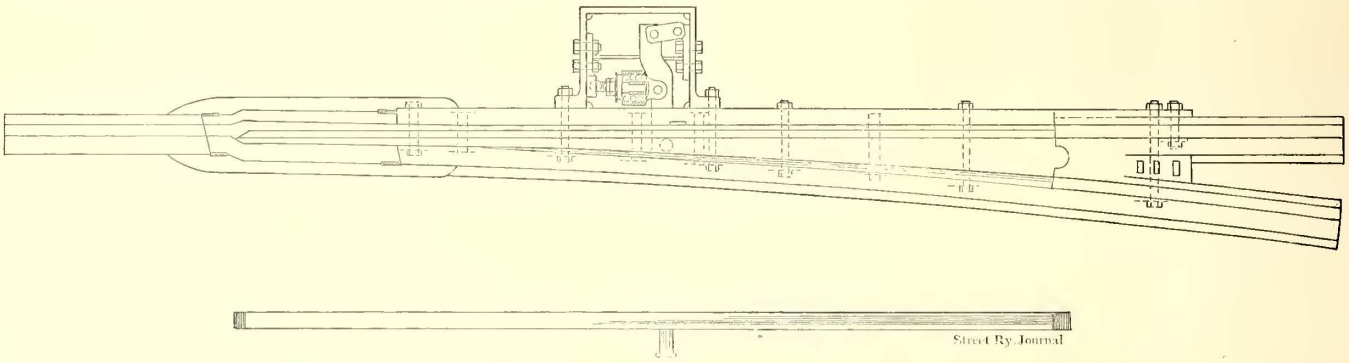
	1896	1900	1903	1904
Number of main centers of electric railway systems	42	99	134	140
Length of roads in kilometers	582	2,868	3,692	3,791
Length of single track in kilometers	854	4,254	5,500	5,670
Number of motor cars	1,571	5,994	8,702	9,034
Number of trailers	989	3,962	6,190	6,477
Capacity of electric machines in kilowatts	18,560	75,608	133,151	133,326
Capacity of storage batteries in kilowatts	.....	16,890	38,736	39,809

A table is also given which shows the capacity of the generators per kilometer of single track and per motor car. These figures vary, of course, greatly in different cities, according to local conditions. The highest figures for track are for Gotha (maximum grade 6.7 per cent), namely, 61.1 kw per kilometer of single track and 33 kw per motor car. On the Barmen rack railway, with a maximum grade of 20 per cent, they are 40.4 kw and 28.4 kw, respectively. In Wiesloch, with a maximum grade of only 1.6 per cent, the machine capacity per motor car reaches the very high figure of 60 kw. The lowest figures are in the case of Bremerhafen and Frankfurt; here these figures are 7.8 kw and 8.6 kw per kilometer of single track and 6.6 kw and 6.0 kw per motor car. The average figures from seventy-four cities are 20.7 kw per kilometer of single track and 17.0 kw per motor car.

The various traction companies using the Indianapolis Traction & Terminal Station have moved their freight department into the new freight houses at Capitol Avenue and Ohio Street. The Indianapolis & Northwestern will occupy the east building in company with the Indianapolis, Columbus & Southern. The Indianapolis & Eastern, the Martinsville Rapid Transit Company and the Shelbyville and Rushville divisions of the Indianapolis & Cincinnati will occupy the middle building, and the west building will be occupied by the two divisions of the Indiana Union Traction Company.

ANTI-STRADDLING TONGUE SWITCH

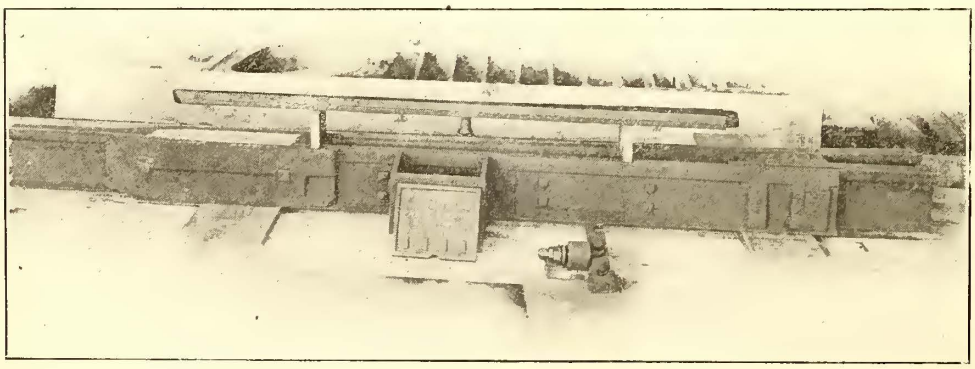
One fault with the ordinary type of tongue switch is that there is nothing positive to hold the tongue to either side of its travel. This may be a cause for accidents with a facing switch, because when a car passes into the switch the first truck leaving the tongue may shift it so that the rear truck will take the opposite track, and there is trouble. Another defect is that the heel or large end of the tongue drives down into the bed of the switch when the line of travel is running from the point. This driving or grinding down of the heel of the tongue is owing to a slight movement of the tongue every time a car passes over it. The tendency of the tongue is to go with the travel just the same as rails, and the only thing that prevents it from creeping ahead is the heel pin, which soon wears, leaving the tongue loose.



PLAN OF ANTI-STRADDLING SWITCH AND SIDE ELEVATION OF TONGUE

To overcome these defects the New York Switch & Crossing Company has perfected a self-locking device tongue switch which keeps the tongue with spring tension to either side of its travel, as well as firmly down on to its bed, so that when the wheels strike it from either direction there is not the slightest motion. By being held firmly down, the company claims there is no wear between tongue and bed, therefore no driving down at the heel. A short description of this switch was published in the Street Railway Journal for Oct. 8, 1904, but a diagram of its construction is now available.

Instead of the usual heel pin, the tongue is beveled at the heel end—that is, the bottom is longer than the top, and the receptacle, or socket, which the tongue fits into has the same bevel reversed, so that when the spring tension is applied to the pin at about the center of the tongue it forces the tongue down as well as back, insuring a perfect fit at the heel, and also holds it firmly down on to its bed.

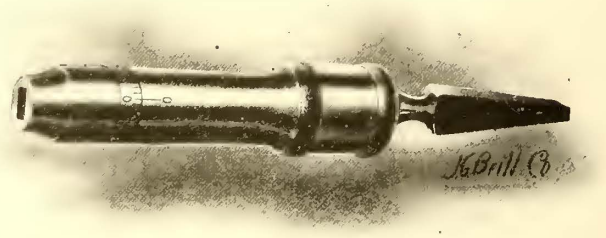


SIDE VIEW OF SWITCH WITH TONGUE SHOWN ON BLOCKS ABOVE BED

The locking device is located in a cast-iron box at one side of the switch. It consists, as shown, of a lever, one end of which is pivoted to the under side or side of the tongue, while the other end is pivoted to a short link or strut. This strut forms a short radius center, which prevents the tongue from resting except at either side of its travel. The lever is held in position by a strong spring placed about midway between pivot points of lever. When the spring is tightened it causes pressure on tongue, holding it to either side, back into its socket and down on to its bed. This tongue can be thrown with the switch iron as readily as any tongue, and it will stay where it is put.

A CURTAIN-ROLLER SPRING ADJUSTER

The J. G. Brill Company is manufacturing a curtain-roller spring adjuster—one of its recent inventions—which does away with all guess work in winding up springs. The gage upon it enables any workman to determine the proper amount of tension and to tighten all the springs alike in a car. Instead of the nuisance of having cars with some curtains that fly up at the slightest provocation and others that crawl down continually, companies that provide themselves with this tool are able to keep their car curtains in perfect condition for raising and lowering, save them from being pulled out or torn by the rough handling of passengers or conductors irritated by what they consider to be pure perversity on the part of the curtains, and save much time in winding. The adjuster is 6 ins. long, of simple mechanism that can never get of order, and will operate with any brace.

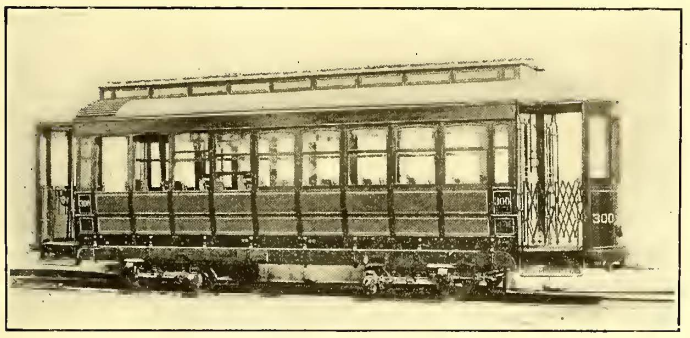


CURTAIN-ROLLER SPRING ADJUSTER

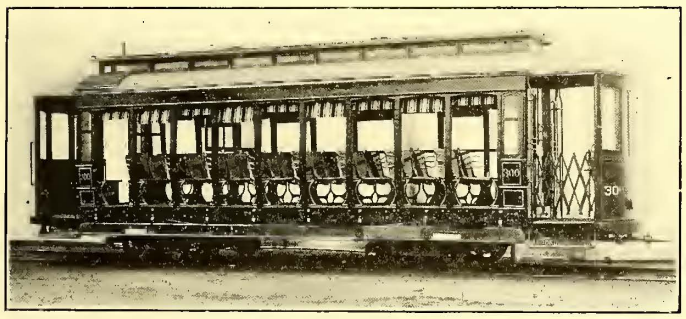
As an experiment, the employees in the ticket office of the Michigan Traction Company, at Kalamazoo, Mich., placed a fare register near the window for the purpose of registering every question asked. At the end of twenty-five minutes it was discovered that 156 questions had been asked, or an average of more than six a minute; a question every ten seconds and a word or two more.

CONVERTIBLE CARS FOR PHILIPPINE ISLANDS

The J. G. Brill Company has recently shipped fifteen of its patented convertible cars, ordered through the engineering firm of J. G. White & Company, to the Manila Electric Railroad & Light Company for use on the lines which were opened to traffic April 10, 1905. The railway system was fully described on page 766 of the STREET RAILWAY JOURNAL of April 29, 1905.

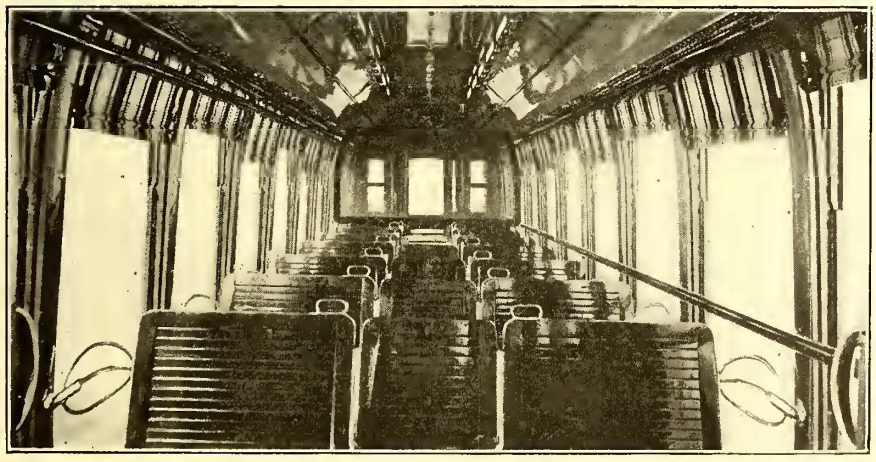


EXTERIOR OF CAR, CLOSED



EXTERIOR OF CAR, OPEN

Both the framing and the finish of the cars are of teak, a durable East Indian timber. This wood is used because of the peculiar climatic conditions of Manila and the presence in great quantities of white ants. An interesting innovation of the cars is the arrangement whereby aisle "filler" seats are provided for use when the settled summer weather has set in, the heavy duck curtains, which may be drawn to the floor, serving as a protection against storms. Thus in summer the cars have as large a seating capacity as the standard open type, and during the other seasons the "filler" seats are stored in the car houses, and the cars may be quickly and easily converted or partly converted, and are always prepared for any sudden change of weather. The social conditions of Manila demand two compartments to a car, and in this case a partition is used, consisting, as the illustrations show, of a wooden frame of the same material as the cars, with a fine brass screen. The frame is adjusted by means of brass bolts which slip into sockets in the backs of the seats and in the curtain roller box. This partition, while serving all the purposes of a wooden partition, permits the conductor to see the entire car from any point, and also economizes space. The partition is arranged to be used in different parts of the car. The illustration shows the style of partition used when the cars are closed.



INTERIOR OF CONVERTIBLE CAR, OPEN, SHOWING EXTRA SEAT IN AISLE

The cars are mounted on the Brill "Eureka" maximum-traction trucks, which carry them practically as low as a single truck, and are easier on the rails. The seats are 31½ ins. long, with the exception of the corner seats, which extend only to the door opening, and the aisles are 16½ ins. wide. The backs of the seats are reversible. Brackets connect the backs of the seats with the posts, forming convenient handles, which encourage passengers to face in the right direction when leaving the cars. The ceilings are of aluminum. The vestibule sashes are composed of single lights and are arranged to drop into pockets. The general dimensions of the cars are as follows: Length over end panels, 25 ft. 9 ins.; over crown pieces and vestibules, 34 ft., and over bumpers, 35 ft.; from panel over crown piece, 4 ft. 1½ ins.; width over sills and panels, 6 ft. 8 ins., and over posts at belt, 7 ft. 3 ins.; sweep of posts, 3½ ins.; side sills, Z-bar, 8 ins. x 3 ins. x ½ in.; end sills, 4¾ ins. x 7 ins.; thickness of corner posts, 3¾ ins., and of side posts, 3⅜ ins.; height from track to running board, 18½ ins., and from running board to car floor, 16 ins.; height from track to top of roof, not including trolley board, 11 ft. 5¼ ins. The "Eureka" maximum-traction trucks have a 4-ft. wheel base and 33-in. and 20-in. wheels. Among the Brill patented specialties are angle-iron bumpers, "Dedenda" gongs, "Retriever" signal bells, "Dumpit" sand boxes and folding gates.

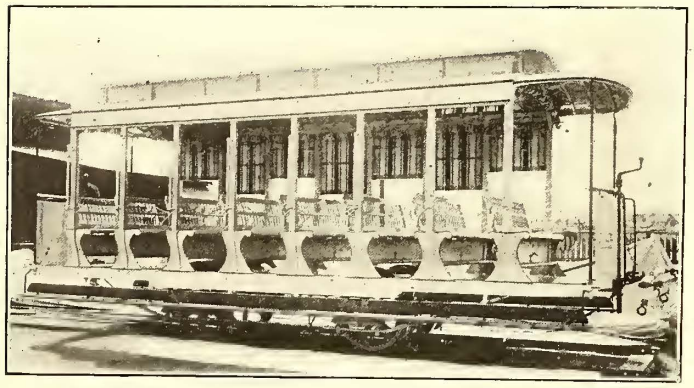
INTERIOR OF CONVERTIBLE CAR, CLOSED

The third annual picnic of the Schenectady Railway Benefit Association was held at Forest Park, on the line of the company, on Aug. 8. There was a varied programme of athletic and aquatic events in the afternoon, for which the cash prizes for winners and those who showed totaled $75. At 9 p. m. there was a display of fireworks. A special feature of the day was a prize waltz, the winner of which was to receive a cash prize of $10.

OPEN CARS FOR MEXICO

A number of open cars of the type illustrated have lately been delivered to the F. C. Urbano y Agricola de Oaxaca, Mexico, by the American Car Company. The cars will be operated in Oaxaca, a city of some pretensions in the southern part of Mexico. The railway company operates fifty cars on its 18 miles of track in and about the city. The American Car Company has supplied a large number of horse cars to Latin America, the car illustrated being a representative type.

The new cars have a seating capacity of forty, the seats having reversible backs. Curtains are provided which may be drawn to the floor, the Brill patented round-corner seat-end panels which are used being so arranged in connection with



OPEN CAR FOR OAXACA, MEXICO

the grooves in the posts as to permit the curtains to come down over the post outside of the panels, a continuation of the grooves of the posts being formed in the exterior surface of the panel. The panel also provides for an easy entrance, as there are no sharp projecting corners, and increases the safety of passengers compelled to stand on the running board. The interiors are finished in cherry and ash, with ceilings of carline finish. Brill gear trucks with a 7-ft. wheel base and 30-in. wheels are used. "Dedenda" gongs, ratchet brake handles and "Retriever" bells of the same manufacture are also included.

The cars measure 17 ft. 3 ins. over the end panels and 22 ft. 11 ins. over crown pieces; from panel over crown, 2 ft. 10 ins.; width over sill facing, 5 ft. 10 ins., and over posts at belt, 6 ft. 6 ins.; center of posts, 2 ft. 5 3-14 ins.; side sill size, 3½ ins. x 5 ins.; thickness of corner and side posts, 2¾ ins.; height of steps, 17 ins., and of risers, 13½ ins.

PASSENGER STATION FOR ROCHESTER

Plans are being considered for the construction of a central terminal station for the use of the interurban lines entering Rochester. The station will be built by the Rochester Railway, which has given considerable thought to the project, and over whose lines the interurban roads enter the city. Plans are still in embryo. On the return of President C. M. Clark, of the company, from Europe the project will be formally taken up, however, and the plans finally perfected. According to R. E. Danforth, general manager of the company, several sites are under consideration that offer special advantages for the kind of station it is proposed to build. Within the next two years, it is figured, more than ten interurban lines will run into the city, and all, or nearly all, of them will use the union passenger station. The lines that now enter Rochester, or which will do so within a short time, are the Rochester & Sodus Bay division, the Charlotte division, the Summerville division, the Rochester & Suburban, or Sea Breeze division, of the Rochester Railway, the Rochester & Eastern Rapid, the Rochester & Interurban, the Lockport, Albion & Rochester line, the Rochester & Southern, and the Rochester, Syracuse & Eastern.

ANNOUNCEMENT OF THE PHILADELPHIA CONVENTION

The official announcement of the Philadelphia convention has been issued by the secretary of the American Street Railway Association, giving the details decided upon. As already stated, the meetings will be held in the South Building, Philadelphia Museum, Thirty-Fourth Street, Philadelphia, Sept. 25-30, 1905. The Mechanical and Electrical Association and the Claim Agents' Association will meet Monday and Tuesday, the 25th and 26th; American Street Railway Association, Wednesday and Thursday, the 27th and 28th; Accountants' Association, Thursday, Friday and Saturday, the 28th, 29th and 30th.

The report of the reorganization committee will be presented and acted upon, a new constitution and by-laws have been prepared, and it is the desire of the executive committee that as many of the members as possible be present to consider them. Papers will be presented on gas and other engines, organization and single-phase system for street railways. The allied association, the Manufacturers' Association, will have the largest and best exhibition of appliances ever shown at any convention. As this will be the first exhibition held under its auspices, it is expected to be a great success. The hall has over 60,000 sq. ft. of space. The passenger associations have granted the various associations rates of fare and one-third on the certificate plan. Delegates should be sure and get certificates from the ticket agent when they purchase their tickets, and leave them with the clerk when they register. Return tickets will then be ready before the meeting is over.

The headquarters will be at the Bellevue-Stratford Hotel, the rates of which are as follows—European plan: Single rooms, without bath, $2.50 per day and up; single rooms, with bath, $3 per day and up; if two persons occupy a single room, the rate will be $1 more; double rooms, without bath, two persons, $3.50 per day and up; double rooms, with bath, two persons, $4.50 per day and up. Rooms should be reserved well in advance.

To reach the convention hall take Walnut Street cars to Thirty-Fourth Street. Stages will be in waiting to convey delegates to the hall without charge. A light lunch will be served at the hall at moderate cost, so all may stay there until the meetings are over. The annual banquet will be held Thursday evening at the Bellevue-Stratford Hotel. Tickets will be sold to all at cost.

McCLINTOCK BLOCK-SIGNAL SYSTEM ON INDIANA NORTHERN

The Indiana Northern Traction Company's line, which extends from Marion to Wabash, has been equipped for about 2½ miles of its length with a block signal which is the invention of Edward McClintock, and is manufactured by the McClintock Manufacturing Company, of St. Paul, Minn. The system requires two light rails laid between the regular track rails and insulated from the ground for signaling purposes. These light rails, together with the track rails, comprise track circuits. A small truck rides on and makes contact with the light signal rails. The signal rails are divided into sections or blocks, insulated from each other. The signals are located on the car instead of along the road. Communication by telephone or telegraph can also be carried on between moving cars or between cars and a station. Motor generators on the cars furnish current for operating the signals. A system of relays is provided, which in connection with the signal rail circuits indicates the presence of any train within the same block and its direction. The cost of equipment of a road with this system is stated to be $1,000 to $1,500 per mile.

The New York Central Railroad has placed an order with the American Car & Foundry Company for 175 cars to be used on its lines out of New York.

FINANCIAL INTELLIGENCE

Wall Street, Aug. 9, 1905.

The Money Market

There was no material change in the money market this week. The tone was easy throughout, and rates for all maturities ruled practically the same as those prevailing at the close a week ago. Money on call was again under pressure, bankers generally being inclined to employ their money in this department rather than to tie up their funds for fixed periods. Rates ranged from 1½ to 2 per cent, with most of the transactions reported at the high figure. The time money market was more active, a better demand being reported from stock commission houses and from mercantile sources. Sixty and ninety-day contracts were made at 2¾ and 3 per cent, respectively, and four months' funds were obtainable in quantity at 3½ per cent. The demand was chiefly for five months or longer, which would carry the borrower well into the new year. Some loans for six months were reported at 3¾ per cent, but it is understood that these transactions were of a special nature. January money was in excellent demand at 3¾ per cent, but the banks and other lenders were not inclined to make the slightest concession in rates. The general market quotation was 4 per cent, and practically all the transactions were made upon this basis. Commercial paper was more active at slightly higher rates. Specialists reported a moderate increase in the offerings of good names, and the absorption was fair, the largest buyers being the nearby out-of-town institutions. Local banks were practically out of the market and were not inclined to deal with other than their own customers. Rates were quoted at 4 per cent for prime double names, and 4 to 4¼ per cent for choice single names. Sterling exchange ruled weak at 4.8640 for prime demand bills. The feature of the bank statement published last Saturday was an increase in loans of $1,316,300 to $1,146,163,700, making a new high record for the loan item. There was a decrease in cash of $3,797,100, while the surplus reserve decreased $3,142,450. The European markets were practically unchanged. The discount rate at London was quoted at 1 13-16, and at Paris and Berlin the rates were unchanged at 1 5-16 and 2⅛ per cent, respectively.

At the close indications pointed to a firmer market in the near future. The movement of currency to the South has begun, and it is expected that the usual autumn outflow to the West for crop-moving purposes will begin within the next week or ten days. In addition, the bank reserves are now considerably smaller than in the corresponding period of previous years. The bank statement of last week showed the surplus reserve to be $12,163,525. This compares with a reserve of $56,308,850 in the corresponding week of 1904, $21,587,075 in 1903, $13,738,125 in 1902, $23,165,350 in 1901 and $29,144,875 in 1900.

The Stock Market

There was a decided improvement in the stock market this week. Trading, although largely professional, was upon a much larger scale, and apart from temporary reactions caused by sales to realize profits, the general tone of the market was decidedly strong. London was not a factor at any time during the week, and while commission house business continued light, there was evidence at the close of a growing interest in the speculation on the part of the outside public. The influences of the week were the continued ease in the monetary situation, the activity in the iron and steel industry, the strong position of copper metal, favorable reports of railway earnings for the month of July and for the fiscal year, and the encouraging reports concerning the growing crops. In the early dealings the market displayed a reactionary tendency on selling by traders, but the declines were limited to fractions. A feature of the week was the ready absorption of all stocks offered. In the later dealings, the upward movement was resumed, but at the close of last week there was another effort to depress prices by the speculative element, the selling being based upon a further shrinkage in the bank reserves of over $3,000,000. There was no unfavorable development over Sunday, and at the beginning of the present week prices developed considerable strength, and in many instances established new high records. A noteworthy feature was the fact that all the advances in the standard issues were made upon comparatively light trading. Delaware, Lackawanna & Western made another sensational gain to 450, the highest price at which the stock has ever sold, while American Smelter and Jersey Central also established record prices. In many other instances the highest prices in the present movement were reached. Northern Pacific sold at the highest price recorded since May 9, 1901. Other conspicuously strong features were Canadian Pacific, Reading, Delaware & Hudson, Northwestern, Great Northern, Illinois Central, Erie common and preferred, Union Pacific and Baltimore & Ohio. The feature of the late trading was the heavy absorption of the Steel issues, especially the preferred stock, which sold at 105 ex the dividend. The bond market was fairly active and strong, in sympathy with the strength in the stock market. The closing was strong at the highest prices of the week.

The local traction issues were extremely quiet and failed to respond to the improvements made elsewhere in the market. The price fluctuations, however, were within a range of a point.

Philadelphia

Considerable activity developed in the local traction issues this week, and prices with few exceptions made substantial gains over those prevailing at the close of last week. Interest shifted to Philadelphia common, which was marked up sharply on unusually heavy transactions. The opening transaction was made at an advance of 1⅝ to 46½, and after reacting to 44⅞ on profit-taking sales, it rose to 47 and closed within ¼ of the highest. In all, about 23,000 shares were traded in. Numerous rumors accompanied the advance, but none of them could be verified. The preferred stock was practically neglected, only a few odd lots changing hands at 49. The usual semi-annual dividend of 2½ per cent has been declared upon the preferred stock, payable on Sept. 1. United Gas & Improvement was also conspicuously strong, the price advancing from 95⅞ to 100⅞ on the exchange of about 14,000 shares. Philadelphia Rapid Transit displayed more animation and a buying accredited to New York interests, the price advancing steadily from 27½ to 28⅞, a net advance of 1½ points. More than 7500 shares were dealt in. Philadelphia Traction was firm, practically all of the transactions taking place at 100. Union Traction displayed strength, the price fluctuating between 60½ and 61, the final transaction being made at a small fraction below the highest. Upwards of 800 shares were traded in. Other transactions included Consolidated Traction of New Jersey at 81¾, Union Passenger Railway at 237, United Traction of Pittsburg preferred at 50, American Railways at 51¾ to 52, Fairmount Park & Transportation at 16½ to 16¾, and United Railways of San Francisco preferred at 88 and 89.

Chicago

Little interest was manifest in the local traction stocks. Trading was extremely dull and prices showed practically no change. Metropolitan Elevated common was the most active issue dealt in, upwards of 300 shares changing hands at from 24 to 24⅞. An odd lot of the preferred brought 97½. Chicago & Oak Park common sold at 5½ for 100 shares, and 211 shares of the preferred stock brought 18½ and 19. A small lot of Northwestern Elevated sold at 21½. South Side held decidedly firm at 95, at which price 65 shares changed hands.

Other Traction Securities

The market for traction issues at Baltimore was fairly active and strong. Interest centered largely in the United Railway issues, all of which were fairly animated and firm. The free stock sold at 14 to 14½ for about 1000 shares, while trust certificates representing 675 shares brought 14½. The 4 per cent bonds were firm, $30,000 selling at 93¾ and 94. A like amount of the incomes brought 61 to 60½, and $10,000 trust receipts brought 59½. Virginia Electric Railway & Development 5s were active, $31,000 selling at 100. Other sales were: 100 Norfolk Railway & Light stock at 13, $3000 Augusta Railway & Electric 5s at 104½, and $1000 Baltimore Traction Consolidated 5s at 101½. The Boston market continued quiet and featureless. Boston Elevated was traded in ex the dividend at 154½ and 154. Boston & Worcester held firm at 75. The earnings of the company are said to be very large, the gross returns for the month of July being in excess of $60,000, an increase of $5000, or 9 per cent over the earnings in the corresponding period of 1904. Massachusetts Electric common was quiet and steady, with sales at 17½ to 17¼, but the preferred was weak, odd lots changing hands at from 61¾ down to 60. Boston & Suburban preferred brought 68¼, and West End common and preferred sold at 97½ and 113, respec-

tively. In the New York Curb market Interborough Rapid Transit developed considerable activity, but the dealings were accompanied by violent price fluctuations. From 216 at the opening the price ran off to 215, but later advanced on heavy purchases to 222¼. At the close heavy profit taking developed, which carried the price off 4½ points. In all, about 17,000 shares changed hands. Washington Railway preferred was a strong feature, the price advaneing from 92½ to 94 and closing within ½ of the highest. About 3000 shares ehanged hands. The bonds sold at 89 and 88. New Orleans Railways common sold at 31½ to 30¼ for 600 shares, and about 400 of the preferred changed hands at 72½ to 72. The 4½ per cent bonds brought 89 for $10,000.

Security Quotations

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

	Aug. 2	Aug. 9
American Railways	51¼	52½
Boston Elevated	154½	*153
Brooklyn Rapid Transit	68⅜	69⅝
Chicago City	185	—
Chicago Union Traction (common)	9	9¼
Chicago Union Traction (preferred)	38	35⅝
Cleveland Electric	78	78
Consolidated Traction of New Jersey	82	82
Consolidated Traction of New Jersey 5s	108½	108½
Detroit United	92½	92½
Interborough Rapid Transit	215	218
International Traction (common)	—	26½
Internation Traction (preferred) 4s	—	63
Manhattan Railway	166	166⅝
Massachusetts Electric Cos. (common)	17½	17½
Massachusetts Electric Cos. (preferred)	61	60
Metropolitan Elevated, Chicago (common)	23	24
Metropolitan Elevated, Chicago (preferred)	64	63
Metropolitan Street	127⅛	127⅝
Metropolitan Securities	81⅝	83⅜
New Orleans Railways (common), W. I.	30¼	30⅜
New Orleans Railways (preferred), W. I.	72	72¾
New Orleans Railways 4½s	89	88¾
North American	99½	100⅝
North Jersey Street Railway	25	25
Philadelphia Company (common)	45¾	46¼
Philadelphia Rapid Transit	27½	29⅛
Philadelphia Traction	100	100
Public Service Corporation 5 per cent notes	—	—
Public Service Corporation certificates	68½	68½
South Side Elevated (Chicago)	95	95
Third Avenue	127	127
Twin City, Minneapolis (common)	113½	117
Union Traction (Philadelphia)	60½	60½
West End (common)	97	97
West End (preferred)	113	a113½

a Asked. W. I., when issued. * Ex. div.

Iron and Steel

The "Iron Age" says that the most interesting fact in connection with the pig iron market is that the United States Steel Corporation may re-enter the market as a buyer for next month, if the demand for the lighter steel products develops as expected, and as indicated thus far. As an indication of the pressure for iron, it may be noted that with the blowing in during the past few days of one furnace at South Chicago and one at Joliet, the Illinois Steel Company has every stack in the Chicago district in operation. The pressure in the rail trade continues and the mills are full of work. The monthly pig iron statistics show that production in July, a month of thirty-one days, was 1,741,935 gross tons, as compared with 1,793,289 in June.

SURVEY OF THE ALTON, JACKSONVILLE & PEORIA RAILWAY

Surveyors for the Alton, Jacksonville & Peoria Railway last week began in Alton the permanent survey for the new electric interurban line from Alton to Jaeksonville. The route will run through several important cities, including Jerseyville, Carrollton, White Hall and Roodhouse. The line from Alton to Jacksonville will be built first, after which that from Jacksonville to Peoria will be constructed. The engineers started at the foot of Piasa Street. The line as surveyed will run up Piasa Street to Fifth, on Fifth to Belle and on Belle to the city limits, and through North Alton to Godfrey. From Godfrey to Jerseyville the surveyors will locate an air line, and the new electric line will be shorter than either of the steam roads between Alton and Jerseyville. The road between Alton and Jacksonville as surveyed will be about 64 miles long, and will run through one of the most prosperous and populous sections of Illinois. The engineering work is under the direction of F. E. Fisher, president of the Fisher Construction Company, of Joliet, Ill. Mr. Fisher is president of the Joliet, Plainfield & Aurora Railroad, which has just been opened to the public. The locating survey will be completed in thirty or forty days. A. O. Auten, of Chicago, is president of the company; Robert Cuddie, of Alton, vice-president, and A. W. Cross, president of the National Bank, of Jerseyville, treasurer.

KANSAS CITY RAILWAY & LIGHT REPORT

The financial report of the Kansas City Railway & Light Company (controlled by Armour-Blair interests) for the year ended May 31 shows gross earnings amounting to $4,449,000, as compared with $3,878,350 in the preceding year. The net was $2,213,800, as compared with $1,788,100, and the net income $728,599, compared with $540,853. From the earnings $55,000 was deducted to pay off that amount of the so-called Corrigan bonds. The income figures for the year to May 31, 1905, are as follows:

Gross earnings	$4,449,134
Operating expenses	2,235,260
Net earnings	$2,213,873
Other income	16,589
Gross income (less operation)	$2,230,462
Deductions from income	1,501,863
Net income	$728,599

The balance sheet as of May 31 is as follows:

ASSETS

Stocks and other securities		$28,314,684
Metropolitan Street Railway advances		1,816,915
Central Electric Railway advances		11,375
Kansas City Electric advanees		133,474
Accounts receivable		93,217
Cash		232,642
Treasury stock:		
Preferred	$283,200	
Common	977,920	1,261,120
Metropolitan Street Railway stocks:		
Preferred	$2,695,000	
Common	1,886,500	4,581,500
Total		$36,444,928

LIABILITIES

Common stock	$12,500,000
Preferred stock	12,500,000
First lien bonds	7,325,000
Collateral notes (three years)	3,000,000
Bills and accounts payable	734,222
Dividend (paid June 1)	119,026
Surplus	266,680
Total	$36 444,928

A summary of what has been done during the year by the company, submitted by Charles N. Black, the general manager, to President Corrigan, presents briefly the present condition of the physical property. In this summary Mr. Black refers to the means pursued to insure increased power, the plans for bridges and viaducts, the additions made to the rolling stock, etc. The output of the new central power station at Second and Grand Avenues will be increased by the installation of a 5000-kw steam turbine on Dec. 1. In addition to this, the Central Avenue power house of the Lighting Company has been rearranged so as to permit the use of oil for fuel. Sub-stations have been built at Fifteenth and Walnut Streets and at Twelfth and Cleveland Streets. In addition to the forty cars of the Intramural Railway at St. Louis, which the company bought last fall, it has added six 14-bench cars to the rolling stock. The hope is expressed that an early arrangement will be made with the city for the conversion to electricity of the Twelfth Street line, the only one now operated by cable.

UNITED RAILWAYS TAKES OVER ST. LOUIS, ST. CHARLES & WESTERN

The United Railways Company took over the St. Louis, St. Charles & Western Railway, Aug. 1, when the formal transfer was made through the Mercantile Trust Company to John I. Beggs, president of the United Railways Company. The latter company has virtually had possession of the line since Festus J. Wade bought it at a trustees' sale last week, as noted in the STREET RAILWAY JOURNAL of Aug. 5. The property was sold under a mortgage foreclosure by the old Colonial Trust Company, as trustees for holders of a $500,000 bond issue, made three years ago. The $495,000 in cash which Mr. Wade paid for the road was put up by the United Railways, it was stated. Mr. Wade had no interest in the deal except as agent. Mr. Beggs says that he will establish a through service on the St. Charles line by running the cars down-town if the company is permitted to exclude from the cars passengers for points inside the city limits. That is, fast service will be given on the interurban line to the center of St. Louis, if the public will educate itself not to use the cars for service inside the city limits. The tracks of the new line will be connected with the United Railways at Wellston, where a double loop will be built for the joint use of the Easton, Olive and St. Charles lines. A new waiting station will also be built at Wellston, and the premises turned into a pretty park. The cars will be painted the new lemon color, the standard adopted by the United Company. The regular fare on the St. Charles line will remain the same as now, but the special rates will be raised, as the company cannot afford to carry passengers for 1 cent a mile in the country. Louis Hesrich, general superintendent of the road, will continue to operate it for the present.

ANNUAL MEETING OF THE CENTRAL PENNSYLVANIA COMPANY

At the annual meeting of the stockholders of the Central Pennsylvania Traction Company, of Harrisburg, plans for betterments to the company's service were adopted, and these directors were elected for three years: Edward Bailey, Harris Cohen, S. F. Dunkle, H. A. Kelker and B. F. Meyers. At a subsequent meeting the present officers of the company were all re-elected. President Musser's report showed that the company's business has increased considerably, the total number of passengers carried during the past year having been 13,379,111, as compared with 12,606,637 the year previous. The total number of miles traveled was 2,021,976, a gain of 100,015 over the year previous. Gross receipts were $539,567, and operating expenses $273,769, leaving net earnings of $265,798. Taxes, rentals and interest on bonds footed up $201,717, leaving a surplus of $64,080. Of this amount $12,000 has been reserved for the construction of the proposed subway under the Philadelphia & Reading Railway tracks at Paxtang. The company has relaid considerable track throughout the system with 9-in. side-bearing girder rails, and is about to begin the laying of a double track on Reily Street from Second to Sixth, and a single line of track on Maclay Street from Second to Fourth. The double-tracking of the Second Street line to Maclay Street is about completed. During the coming year the company expects to reconstruct its double-track line through Front Street, Steelton, and pay its share of the cost of paving that thoroughfare, the total outlay requiring about $60,000. It is expected to complete the line between Harrisburg and Hummelstown by Nov. 15 of this year. That portion between Paxtang and Rutherford station has been in service for some time. Track construction in Hummelstown has been completed. The company has now 59.55 miles of track in operation. The committee on new power plant has decided upon the style of plant to build, and expects to fix upon a suitable location within the next week. The large new repair shops and storage houses on North Cameron Street are about completed. The company's lease on Paxtang Park has been extended for eighteen years, and 20 acres additional have been secured adjoining the park. Work on the new subway at the park will be started at the close of the present amusement season. During the coming year a stock assessment of at least $5 per share will be levied for betterment purposes. During the year there were issued $105,000 of bonds on the Linglestown & Blue Mountain Electric Railway Company to reimburse the Central Pennsylvania Company for the money expended in building the line from Progress to Linglestown. The company has also been advancing to the Harrisburg & Hummelstown Electric Railway Company the money needed for the construction of the line between these two points. This will be returned to the company either by a bond issue on the new line or a stock assessment on the Central Company to purchase all the stock of the Harrisburg & Hummelstown Company.

TO STUDY QUESTION OF MUNICIPAL OWNERSHIP

At the request of its departments of industrial economics and trade agreements, the Executive Council of the Civic Federation has appointed a commission to investigate national and municipal ownership and operation of public utilities. In a statement just issued in reference to the appointment of the commission and its aims the Executive Council of the Federation says:

"The current discussion and acute agitation of this subject indicate its hold upon the popular mind and the necessity for its analytical and comprehensive examination. Its present debate is often misleading, because of contradictory or unsatisfactory statements of fact. It is intended, therefore, that this investigation shall disclose the actual results of public ownership and operation, as far as they have been undertaken in the United States, and of their more extensive practice in foreign countries. The ascertainment of these facts will afford a solid basis upon which to found discussion and conclusions for the guidance of future policy. The scope of this inquiry will cover the relative advantages of public ownership and operation, as compared with public ownership and private operation. Each system will be examined with regard to its effect upon wages, hours and conditions of labor, collective bargaining, cost and character of service, political conditions, civil service, spoils system, and municipal corruption, financial results and taxation."

The commission will meet early in the fall and arrange its programme and methods of work. It contains the names of leading merchants, bankers, railroad presidents, lawyers and others throughout the country. The list includes among many others: Melville E. Ingalls, president of Big Four Railroad; Isaac N. Seligman, treasurer of Citizens' Union; Oscar S. Straus, Dr. Albert Shaw, editor of "The Review of Reviews;" Franklin MacVeagh, of Chicago; Alexander H. Revell, president of the Chicago Civic Federation; Robert W. De Forest, Edward Rosewater, editor of the St. Louis "Republican;" Austen G. Fox, John G. Agar, Frank A. Vanderlip, W. D. Mahon, president of the Association of Street Railway Employees; John Mitchell, president of the United Mine Workers of America; Samuel Gompers, president of the American Federation of Labor; E. E. Clark, grand chief of the Brotherhood of Railway Conductors; Prof. F. W. Taussig, of Harvard; Prof. Edwin R. A. Seligman, of Columbia; Prof. J. W. Jenks, of Cornell; Prof. Henry W. Farnam, of Yale; Prof. Frank J. Goodnow, of Columbia University; Prof. Leo S. Rowe, of the University of Pennsylvania; Walton Clark, vice-president of the U. G. I. Company of Philadelphia; Samuel Insull, president of the Edison Company of Chicago; Hamilton Holt, editor of the "Independent;" Lawrence F. Abbott, editor of the "Outlook;" Talcott Williams, editor of the Philadelphia "Press;" Frank Parsons, president of the National Public Ownership League of Boston; Charles A. Conant, V. Everit Macy and Marcus M. Marks, of New York.

FLORIDA "JIM CROW" LAW UNCONSTITUTIONAL

The "Jim Crow" law of Florida has been declared unconstitutional by the Supreme Court of that State. The law went into effect July 1, and immediately a boycott was declared which affected all the street railway companies of the State. In Jacksonville, to whose citizens is due the credit of defeating the law in the courts, most peculiar conditions obtained. In that city are two companies. One of them is owned by Stone & Webster, of Boston; the other is owned by local colored capitalists and is the only line of its kind in the United States. In enforcing the law on the latter system, the arrangement was adopted of giving the colored people the forward part of the car, while the rear was reserved for the whites. This caused considerable amusement and gave rise to the variation, "I've got a white man ridin' back of me."

The decision of the Supreme Court in this case is final, for the State took the appeal and the State cannot take the case to the United States Supreme Court.

The grounds set forth in the application for the writ of habeas corpus, when the case came before Judge Call, were seven in number, but Judge Call only declared that one of them was well taken and that was the one reading as follows:

"Because Section 7 of this act not only gives to certain portion of colored people, to wit, colored nurses having the care of white children, and colored servants in charge of sick white people, rights and immunities denied to other colored people, contrary to the fourteenth amendment of the Constitution of the United States of America, but also renders said law special and not general, contrary to Section 20, Article 3 of the Constitution of the State of Florida."

VANDERBILT IN CENTRAL NEW YORK—SUB-STATION AT SYRACUSE FOR NIAGARA POWER

The trip of William K. Vanderbilt, Jr., and Attorney Walter N. Kernan, of the Vanderbilt-Andrews syndicate, over the line of the Syracuse & Suburban Railroad on Aug. 3, led to reports that the syndicate was considering the purchase of the property, which consists of a 14-mile road from Syracuse to Edwards Falls, and with a 3-mile spur to Jamesville. Messrs. Vanderbilt and Kernan denied to a representative of the Street Railway Journal that the trip had any such significance. It was stated that the purpose was that Mr. Vanderbilt might familiarize himself with the situation, as the syndicate already owns the Syracuse Rapid Transit system and is about to electrify the West Shore Railroad, a branch of which runs parallel with the Syraeuse & Suburban for some distance. There is a proposition to extend this road to Cazenovia Lake.

At a meeting of the directors of the Syracuse Rapid Transit Railway Company, to be held in New York soon, plans will be decided upon for the large sub-station to be built here in connection with the introduction of Niagara power next year. General Manager E. G. Connette says that the new plant and equipment will cost about $150,000.

PRINCETON AND THE ELECTRIC RAILWAY

Whether or not an electric railway is injurious to a town is no longer a debatable question in Princeton, N. J., where the opposition to the entrance of the trolley was most energetic a few years ago. In 1895, when an electric railway was first talked of between Trenton and Princeton, all kinds of dire things were prophesied, and the opposition was so strong that for five years the line was kept out. The Trenton Street Railway, however, finally came into a remote and inconvenient part of the borough, after a most bitter fight. A year or so later the Trenton, Lawrenceville & Princeton Railroad (New Jersey & Pennsylvania Traction system) came to the borough line, and in 1902 secured a franchise to run up Witherspoon Street within a block of the University campus. The two roads are carrying more than 1,500,000 passengers yearly between Trenton and Princeton. From 1900 to 1905 business failures in Princeton were but a fraction of the number that occurred between 1895 and 1900, or even between 1890 and 1895. From 1890 to 1900 the permanent population increased about 14 per cent, or from 3422 to 3899, while from 1900 to 1905 (according to the State census just completed) the increase was 58 per cent, reaching 6200, or 116 per cent for the decade between 1900 and 1910, assuming that the same rate (and it is increasing) continues; this in spite of the entrance of two electric railways, and without a single manufacturing plant or other inducement to bring new people into the borough. The student population, numbering (counting university, seminary and preparatory schools) nearly 2000, is not included in the figures given.

PORT CHESTER GETS MT. VERNON FRANCHISE—OFFICIAL STATEMENT OF ITS ACHIEVEMENTS

The New York & Port Chester Railroad Company, which plans to build a four-track third-rail electric railway from New York to Port Chester, a distance of 27 miles, succeeded in obtaining from the Common Council of Mount Vernon, at a meeting of the latter on Tuesday evening, the franchise to pass through all streets of that city.

The company has issued a new statement regarding its present financial standing, and reviewing the history of its fight with opposing interests. The statement emphasizes the fact that the New York Railroad & Development Company is financing the Port Chester road, and places at the latter's disposal a capital of $2,000,000 for construction, the buying of real estate, etc. The expending of the money is in the hands of the executive committee of the Port Chester Railroad. The following legal steps which have been taken in compliance with the law by the New York & Port Chester Railroad Company are summarized in the statement, as follows:

(1) Secured the certificate of public convenience and necessity from the Railroad Commission.

(2) Had that certificate twice unanimously sustained by the Court of Appeals.

(3) Secured from the Common Council of Mount Vernon the right to pass through all streets.

(4) Secured from Common Council of New Rochelle right to pass through all streets.

(5) Secured an order from Supreme Court at White Plains to pass through Pelham, Larchmont, Harrison, Mamaroneck, Rye and Port Chester, and to pass over and under every public street and highway in those places.

Consent from the city of New York is lacking, and application for this franchise is now before the Board of Estimate and Apportionment.

Terminal property has been purchased in the Bronx, where connection will be made with the Interborough Rapid Transit Company.

IMPORTANT STEP IN THE PROGRESS OF THE NATIONAL BATTERY COMPANY

The annual meeting of the stockholders of the National Battery Company was held Aug. 4 at the general offices of the company in Buffalo. The old board of directors was continued unchanged, and the following officers of the company were elected: John R. H. Richmond, who was formerly treasurer, was elected president of the company; James Macnaughtan, formerly vice-president, was continued in the same office; Ralph Kimberly, formerly secretary, was appointed to fill the offices of both secretary and treasurer, the latter office being the one formerly occupied by Mr. Richmond. Mr. Richmond and several associates have taken a large block of the increased capital stock, which will be used in the further extension of the business.

R. L. Coleman, formerly president of the company, was elected chairman of the board of directors, and he still retains his large interest in the company. James Macnaughtan, under whose management the company has been brought to its present position of strength and activity, was reappointed general manager of the company.

The company has done an excellent business in the sale of storage batteries during the past year, and extensive plans for further development have been made. The field of activity will be broadened, and it is confidently expected that the results for the coming year will more than justify the company in a continuation of the progressive policy that has been inaugurated. The company has an excellent organization. The sales manager is both an electrical and mechanical engineer, with extended commercial experience, and the factory manager is a thoroughly trained technical man, who has been connected with this company from its inception. Other departments of note are the engineering, construction and publicity departments, all of which are managed by men carefully selected for their ability and training in their particular line of work.

INDIANA TRACTION LINES ALMOST DOUBLE IN VALUE DURING LAST YEAR

A notable increase in the property valuation of Indiana electric railways during the past year is shown by the assessments made against these companies by the Indiana State Tax Board at the close of its first session. The total assessed valuation of the lines for 1905 is $26,387,366, as compared with $13,702,394 for 1904. An examination of the schedule shows that while the aggregate assessment is much greater, there is no marked general increase in the individual assessments per mile, the increase being due to the extensions or increased mileage of the old roads and the building of a number of new roads. A slight general increase is also noted in the assessed valuation of steam roads, the total being $178,000,000, as against $165,863,367 last year. This increase is likewise due to new lines and increased mileage in the State. A general increase in the assessment of the express companies doing business in the State is shown by the valuations placed on these companies. The express business has been greatly augmented by the carrying of parcels by the interurban lines. The largest increase was imposed on the Adams Express Company. Its assessment was raised from $425 to $566 a mile. The assessment of the other express companies remains about the same as rated last year.

BELMONT SYNDICATE BUYS LONG ISLAND REAL ESTATE

The Degnan Contracting Company, acting for the New York & Long Island Railroad Company, the Belmont company now building the tunnel under the East River, from Forty-Second Street, New York, to Long Island City, has taken title to five blocks of land in Long Island City, comprising about 250 lots, 25 ft. x 100 ft., at the average price of $800 per lot, or $200,000 for the whole tract. The new purchase is in the line of the extension of Mr. Belmont's proposed tunnel. On the property just purchased there will be a railroad yard abutting on the south side of Thompson Avenue, over which highway and Hoffman Boulevard the Belmont line is to be extended to Jamaica, where it will connect with the New York & Long Island Traction Company, whose lines extend to Belmont Park, Queens and Hempstead.

CURTIS STEAM TURBINES IN JAPAN

Characteristic of the present progressiveness of Japan is the fact that outside of Europe and the United States this small nation is the largest users of steam turbines in the world. On July 29, 1904, the first shipment of steam turbines arrived in Japan via the steamship "Korea" from San Francisco. They were of 500-kw capacity, of the Curtis type, and were for operating the Shigai Railway in Tokio. Four weeks from their arrival they were in full operation. As significant of the success of these first units, there have been ordered by the Japanese from the General Electric Company, of New York, thirty-seven Curtis steam turbines with electric generators, with a total normal capacity of more than 35,000 hp. Of these, eleven units are now installed and in satisfactory operation.

Two of the 1000-kw turbines mentioned above are intended for the Miike Coal Mines on the Island of Kyushu. The Osaka Electric Light Company, which furnishes electricity to the city of Osaka, which has a population of over 800,000, has six of these turbines. The capital of this company is $2,400,0000, and with its progressive methods it will soon rival some of our modern American illuminating companies.

One of the largest electrical interests in Japan which has ordered some of the machinery referred to above is the Tokio Street Railway Company, which furnishes transportation facilities for the city of Tokio, which has a population of 1,440,000. Its Japanese name is Tokio Shigai Tedsudo. Its franchise runs until 1952, and its capital stock is 15,000,000 yen, divided into 300,000 shares. This company's power station includes five 2000-hp Curtis turbo-generator units.

AFFAIRS IN CHICAGO

Reports in Chicago are to the effect that representatives of the controlling financial interests in the various local street car companies will meet in New York within a couple of days for the purpose of considering the plans for a merger of the various lines upon one city, one company, one system and one fare basis, and also to go over the legal and rehabilitation propositions which the representatives of the various companies of Chicago have had under discussion. John J. Mitchell, of Chicago, who is one of the controlling men in the traction syndicate, has gone to New York, and it is announced that he will there meet the other controlling financial men who are expected to furnish the money necessary for the rehabilitation of the lines.

STREET RAILWAY PATENTS

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

UNITED STATES PATENTS ISSUED JULY 25, 1905

795,261. Car Truck Bolster; John M. Ames, New Brighton, N. Y. App. filed April 12, 1905. Comprises a box-like structure for a center bearing, said structure extending above the body of the bolster, and longitudinal flanges extending from the upper portion of the box to the end portions of the bolster and affording seats for side bearings.

795,262. Car Truck Bolster; John M. Ames, New Brighton, N. Y. App. filed April 12, 1905. An integral hollow cast bolster, comprising a lower body part and an upper narrower part and having at its center a box-like formation extending to the top of the upper part and affording the center bearing and sleeve for the bing-bolt.

795,282. Car Bolster; Clarence H. Howard, St. Louis, Mo. App. filed May 1, 1905. Comprises two opposite side beams transversely fixed to the longitudinal car sills, a cross-beam intermediate to the side beams and having the body center plate integral therewith, the end portions of the cross-beam extending beneath and adapted to bear against the under side of the middle portions of the side beams and means for separably fixing the cross-beam to the side beams.

795,285. Switch; William S. Jackson, Hoboken, N. J. App. filed Aug. 27, 1904. A longitudinally-swinging contact bar depends from a portion of the trolley wire, and when moved in one direction or the other by the trolley wheel opens suitable circuits to actuate a desired switch or switches.

795,316. Brake Mechanism for Trucks; Burton R. Stare, Kingston, N. Y. App. filed Nov. 16, 1901. Means whereby the braking pressure may be properly proportioned so that the wheels which carry the greater part of the load may receive the greater braking pressure, and consists in combination with the usual brake-shoes and brake beams, of a lever pivotally mounted upon one of the beams, a lever connected to actuate the other beam and also connected to the first lever, and a member connected to the first lever between its center and point of attachment of the second lever, which member is adapted to be actuated from the brake rod.

795,348. Brake Rigging and Operating Device Therefor; George L. Fowler, New York, N. Y. App. filed May 26, 1905. A system of levers by which the braking pressure is compounded.

795,363. Brake Shaft Holding and Releasing Device; John F. O'Connor, Chicago, Ill. App. filed April 6, 1905. A friction wheel of disc on the brake shaft and a stationary friction-shoe with which the friction wheel is held in frictional engagement by the tension of the brake chain.

795,419. Friction Brake; Aldo E. Reynolds, Peoria, Ill. App. filed Dec. 27, 1904. A cup-cone revoluble with the wheel and axle, a cone carried on the axle but independent thereof, the axle turning therein, a brake beam for each pair of wheels, connection between each brake beam and the cone, and a pair of beveled-faced plates carried on the axle adjacent to the cone for shifting the latter along the shaft into engagement with the cup-cone to impart a partial rotary movement to the cone to draw the brake beam against the wheels and means at each end of the car for moving the beveled plates.

795,475. Switch; Harvey J. Barton and Harvey J. Barton, Jr., Philadelphia, Pa. App. filed Dec. 7, 1904. A rotating head having a gravitating detent mounted thereon and pendent therefrom and a stationary ratchet, with either member of which said detent is adapted to engage.

795,501. Car Seat; Francis K. Fassett, St. Louis, Mo. App. filed Jan. 11, 1904. Two levers connected at their upper ends to the back and pivotally mounted at their lower ends one above the other upon the frame, both the levers being prolonged beyond said pivotal points, the prolongations engaging each other to assure synchronous movement.

795,580. Cable Grip; Sebern A. Cooney, New York, N. Y. App. filed March 28, 1905. Comprises a fixed and a movable jaw, an operating toggle connecting the jaws and a single nut acting to adjust the toggle to take up wear in all the bearings.

795,596. Car Seat; Francis K. Fassett, St. Louis, Mo. App. filed July 20, 1903. Details of construction of a "walk-over" car seat.

795,616. Switch and Signal Track Trip; Charles M. Hurst, Rawlins, Wyoming. App. filed Nov. 25, 1904. A pair of bell cranks so arranged at the side of the track that one arm of each bell crank is upwardly inclined, and may be frictionally engaged by the passing car to swing it on its pivot and actuate the switch.

795,683. Wheel for Railway, Tramway and Other Vehicles, etc.; Samuel G. Board, Manchester, England. App. filed May 24, 1904. A wheel comprising in its construction a prepared material of sawdust magnesium oxid and a binding material forced and compressed while still in a soft, plastic, moist condition around the hub and into the space between it and the tire, and maintained therein under a dead hydraulic pressure equal over its entire area until set.

795,690. Wheel; John A. Casey, Jacksonville, Fla. App. filed April 12, 1905. A wheel having a tread provided with intersecting grooves producing projecting engaging portions.

UNITED STATES PATENTS ISSUED AUG. 1, 1905

795,945. Railway Track Structure; Frederic F. Stockwell, Jr., Somerville, and Henry R. Luther, Newton Center, Mass. App. filed Nov. 11, 1903. A process by which the short lengths of rails usually included in frogs, switches, etc., are so connected and united with the central body of the structure as to remain integral therewith in spite of repeated and severe shocks.

796,146. Power Brake; Louis Pfingst, Boston, Mass. App. filed Oct. 24, 1904. A brake lever is located at the base of the usual controller and is actuated to throw a friction clutch which engages the brake-applying means to a power connection from the electric motor.

796,196. Switch Operating Mechanism; Henry Dickinson, Flushing, N. Y. App. filed Dec. 19, 1904. A pair of jaws embracing the track rail and adapted to be thrown in one direction or the other by wedge-shaped shoes carried by the car, said jaws having suitable connections to the switch point whereby the latter may be thrown.

796,203. Sand Distributing Machine; Giuseppe Gioiosa, East Boston, Mass. App. filed Jan. 14, 1905. A heating coil around the sand box and an agitator therein.

796,287. Electrically Controlled Shifting System for Track Switches; Thomas Bovey, Chicago, Ill. App. filed July 11, 1904. The switch is provided with a pair of separate electro-magnets, the circuits of which are alternately completed by the motions of the switch point. For either position of the switch point that magnet is energized which tends to move the point to the opposite position, so that the switch point moved alternately.

796,295. Combined Brake and Take-Up Mechanism for Trolleys; Henry B. Clarke, Chicago, Ill. App. filed July 9, 1904. A sudden jerk on the trolley cord actuates an air valve which con-

trols a band brake around the winding drum, and at the same time a signal is given to the conductor that the trolley has left the wire.

796,296. Trolley Retrieving Device; Henry B. Clarke, Chicago, Ill. App. filed Oct. 31, 1904. A spring-drum for retrieving the trolley is held inactive by means of a band brake around the drum which is controlled by a magnet energized through the trolley circuit. When the trolley leaves the wire, the magnet is de-energized and the spring-drum allowed to operate to pull down the trolley.

796,316. Car Wheel; Perry J. Garrison, Three Rivers, Mich. App. filed May 1, 1905. Comprises an outer disk having a tread and flange thereon, and an inner disk with a circumferential flange of a width equal to the width of the tread and extending in a direction toward the outer disk and abutting directly against the tread to reinforce the same, the two disks being oppositely concave and separated the width of the tread and gradually coming together in a direction toward the center of the wheel where the disks abut against each other and a hub to which the abutting ends or edges of the disks are secured.

796,319. Sand Distributing Machine; Giuseppe Gioiosa, East Boston, Mass. App. filed March 20, 1905. A receptacle for sand having a conical bottom with an aperture therein, a conical agitator comprising in its construction a plurality of radio-conical arms journaled to rotate in the receptacle and mechanism to impart a rocking motion to the agitator.

PERSONAL MENTION

MR. DAVID WEBSTER has resigned as superintendent of the Sedalia Transit Company, of Sedalia, Mo.

MR. W. C. PHILLIPS has been appointed superintendent of the interurban line of the Northern Texas Traction Company between Fort Worth and Dallas.

MR. C. A. WALKER has resigned from the Public Service Corporation of New Jersey to accept the position of master mechanic of the Schuylkill Traction Company, of Girardville, Pa. Mr. Walker is well fitted by previous training for the position to which he has just been appointed.

MR. C. M. CORY has been promoted from chief clerk to the position of treasurer and auditor of the Birmingham Railway, Light & Power Company. Mr. Cory takes the position formerly occupied by Mr. C. O. Simpson, who has resigned from the Birmingham company to become general manager of one of the other Newman properties.

MR. FRANK ROSS, assistant general superintendent of the Sacramento Electric, Gas & Railway Company, of Sacramento, Cal., who has accepted the position of superintendent of the Northern Electric Railroad, which will soon be in operation between Chico and Oroville, Cal., has been succeeded at Sacramento by Mr. F. E. Fitzgerald, of Alameda.

IN THE STATEMENT OF CHANGES in the Toronto Railway Company, published in the Street Railway Journal for June 17, an error was made in referring to the resignation of Mr. W. H. Moore as manager of the York Radial Railway. Mr. Moore has not resigned from the company. Neither has he severed his connection with the Toronto Railway, for which he acts as assistant to President W. MacKenzie.

MR. J. BRODIE SMITH, general manager of the Manchester Traction, Light & Power Company, of Manchester, N. H., has been elected to the position of vice-president of the company to succeed the late Mr. George Byron Chandler. Mr. Smith's first work along electrical lines was as superintendent of the fire alarm telegraph in Manchester, a position which he held for two years. Then followed his appointment to the position of superintendent of the Franklin Electric Company. Next he became superintendent of the Manchester Electric Light Company. In 1896 Tucker, Anthony & Company entered the field in Manchester and Mr. Smith became general manager of the concern's interests.

MR. ELY M. KINNEY, of the construction department of the General Electric Company at Schenectady, was married at Saratoga on Saturday, to Miss Helen B. Cunningham, of Carthage, Mo. The bride was attended by Miss Mary Kellogg and Miss Verna Brinkley, both of Missouri. The best man was Harry K. Crandall, of Athens, Pa. The guests of honor at the wedding were Mr. Warren Tubbs, of Buffalo, and Mr. Albert V. Thompson, of the General Electric Company. The wedding supper was served at the Grand Union Hotel, Saratoga, after which Mr. and Mrs. Kinney took an evening train for New London, Conn., where Mr. Kinney has charge of the installation of an electric railway system.

MR. G. L. GROVER, vice-president and general manager of the Eastern Wisconsin Railway & Light Company, operating the local street railway in Fond du Lac, Wis., the Fond du Lac interurban line, and the Fond du Lac electric and gas plant, has handed in his resignation, to take effect Oct. 1. Mr. Grover has been identified with the Fond du Lac company for nine years, going to that city in 1896 from Milwaukee, where he was superintendent of the Milwaukee & Wauwatosa Electric Company. In 1903, when the Eastern Wisconsin Railway & Light Company was organized, Mr. Grover was elected general manager.

MR. W. J. HAYLOW, who was for a number of years superintendent of transportation of the Atlantic Coast Line, has been appointed general superintendent of the railway department of the Savannah Electric Company, a position just created. Mr. Haylow will have entire charge of all matters connected with the railway business of the company, as distinguished from the lighting department. With the announcement of the appointment of Mr. Haylow, it is also announced that the position of superintendent of transportation, from which Mr. N. B. Rhoads has resigned, will be abolished.

MR. ALLEN B. WELLS has resigned his position in the auditor's office of the Brooklyn Rapid Transit Company to become division superintendent of the Tranvias Limitado de Mexicano Electrico (Mexican Electric Tramways, Ltd.), in the City of Mexico, Mex. Mr. Wells has had an extended experience in the detail of railway operation in Brooklyn, entering the employ of the company ten years ago in the timekeeper's office. Shortly after he became general timekeeper, which position he held with success for eight years. He was then promoted to the chief clerkship in the office of the engineer of way and structures, and six months later to a similar position in the office of the vice-president and general manager, Mr. J. F. Calderwood. For the six months prior to his resignation he was engaged in special work in the office of the comptroller. Mr. Wells is a Southerner by birth and will be eminently adapted to his new duties in Mexico, where he will be associated with Mr. W. W. Wheatly and Mr. James A. Pierce, both of whom were formerly connected with the Brooklyn Rapid Transit Company.

MR. E. C. FOLSOM, who recently resigned as superintendent of transportation of the Fort Wayne & Wabash Valley Traction Company, of Fort Wayne, Ind., began his street railway career in Cleveland fifteen years ago on the Johnson lines. Later he was engaged in construction work on the Nassau Railroad in Brooklyn. For two years after this he was chief inspector at Detroit. About two years ago he became superintendent of the city lines at Logansport, Ind., in charge of the reconstruction and widening of the gage of these lines, which were later consolidated with the interurban lines of the Wabash Valley, now operating under the name of the Fort Wayne & Wabash Valley Traction Company. When the preliminary consolidation took place he was superintendent of the interurban and city lines, and when the deal was effected which resulted in the present company he became superintendent of transportation of the whole road, including the city lines of Fort Wayne, Wabash and Logansport and the intervening interurban lines. Mr. Folsom is interested in a new automatic block signal which has been in successful use on a busy piece of interurban track near Logansport.

MR. ELMER M. WHITE, cashier and auditor of the Hartford Street Railway Company, of Hartford, Conn., and secretary of the Street Railway Accountants' Association of America, has resigned from the Hartford company to accept the position of assistant secretary and assistant treasurer of the Birmingham Railway, Light & Power Company, of Birmingham, Ala. Mr. White will leave Hartford Aug. 16 for the South, and will assume his new duties Aug. 24. Mr. White is very well known in the street railway field, has served on the executive committee of the Accountants' Association, and has been its secretary since the first of the year. He was born at Northbridge, Mass., Sept. 14, 1857. Three years later his parents moved to Hartford, where Mr. White was educated. Leaving the High School in 1872, he engaged in bookkeeping until 1877, when he became a traveling salesman. In 1883 he took up estate accounting, and in 1885 began the service with the street railways of Hartford which has just ended, in the receiving department of the Hartford & Wethersfield Horse Railroad Company, now the Hartford Street Railway. In 1890 Mr. White was appointed cashier of the company. Since then the additional duties of auditor have been added to his position. At the Saratoga convention of the Accountants' Association, Mr. White was appointed a committee of one to make a new collection of blanks and forms used in street railway accounting work. This collection was exhibited at the St. Louis convention, and the care and skill displayed by Mr. White in connection with this work received many favorable commendations from the delegates present.