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Non-Combustible Cars in Tunnels

According to the published accounts which have reached us of the recent disastrous and deplorable accident on the Metropolitan Underground Railway, of Paris, the loss of life was considerable, and unless steps are taken to assure the public that there is no danger of the repetition of such an occurrence, many people will refrain from patronizing an underground road of this character. This is the first serious accident which has occurred on any of the electric underground roads in Europe, a fact which should be borne in mind in any public discussion of the unfortunate event in Paris this week. Both in London and in Paris this immunity from accidents has been accompanied with a density of traffic exceeded in few places in the world. Nevertheless, the destruction by fire of a train of cars in the subway indicates that the danger from the use of combustible cars is by no means imaginary, and must be reckoned with in every installation of this kind.

Electricity in the transportation service is, in many respects, a much safer servant than steam, and it is, perhaps, the very fact that electrical engineers are so accustomed to the handling of large current that familiarity with electricity has bred in them a sort of contempt for it. That this is not true in all cases, however, was shown last year by the extended discussion on the subject of "combustible vs. non-combustible cars" reproduced in the STREET RAILWAY JOURNAL, in which such authorities on transportation subjects as George Westinghouse and C. T. Yerkes defined very clearly their position in regard to the importance of using fire-proof material in subway car construction.

A conflagration on a surface car is not particularly serious, as passengers can easily leave the car in case of a disaster of this kind. With elevated railways the difficulty of abandoning a train is, perhaps, a little more difficult, but nowhere near so serious as it would be in the case of an underground road. Nevertheless, the Manhattan Railway Company, as has been described in these pages, has paid especial attention to the thorough protection against fire of its cars by the use of a lining of asbestos board under the car floor.

The protection on underground roads should be most complete. In London, up to within recently, the cars on the tube railways were hauled entirely by electric locomotives which were, of course, fireproof. With the introduction of motor cars, however, on the Central London Underground Railway the precaution was taken of constructing the cab of steel with a uralite or asbestos lining, and finishing it throughout so as to be incombustible. Equal, if not greater, care has been taken for protection against fire in the case of the new subway cars for New York City, and the New York public can feel safe against a repetition in that city of the Paris horror, which startled the world last Monday.

The New York Subway Cars

The most conspicuous feature of the new subway cars, which are being built for the New York subway, is the precaution taken by the Interborough Rapid Transit Company to guard against accidents through fire, collision or derailment that might destroy the coaches or endanger the lives of passengers. For this reason the cars were built unusually strong, and were designed especially with the view of withstanding heavy impact. The plans for the electrical features were also made to provide against the possibility of fires from defective wiring, faulty insulation and improper installation of apparatus. A careful examination of the cars which have already been received in New York for operation in the subway confirms the opinion expressed by the company's engineers some time ago that in these particulars, at least, they would represent the highest degree of the car builders' skill. The management has appreciated from the beginning the importance of this feature of the equipment, and is entitled to praise for the attitude it has maintained throughout the investigation conducted by its engineers with a view of determining the best methods, materials and forms of construction for insuring safety to patrons. A careful study of car construction in European cities, especially with reference to tunnel operation, was undertaken at an early stage, and an earnest effort was made to avoid the defects which have been revealed in former installations. The New York subway management has profited by the experience of the London and Paris companies, and those who are best qualified to judge say that such a disaster as the Paris conflagration could not be repeated in this city. Not only has

every effort been made to insure safety by employing fireproof material, including a copper sheathing for the car body, but the tunnel construction and equipment show marked advance. Moreover, the lighting service is entirely independent of the power supply for the operation of the trains.

In this connection it is worthy of note, too, that other companies are constantly striving for a higher standard of car construction, although their operating conditions are much more favorable than the subway company's, and that they have aided materially in solving many vexatious problems. As a result, it must be admitted by every intelligent observer that, in spite of the hubbub raised by calamity howlers every time a fire is discovered in or near an electric car, the art is constantly advancing and that great improvement has been made in the last few years in this important department. Recognition of the needs of the service is much more general, too, and under the circumstances better work and more satisfactory results may be looked for.

Two Memorable Strikes

The labor troubles which have caused the street railway managers of Connecticut so much annoyance and financial loss during the last year are now happily terminated, and it is to be hoped that the experience gained will have a wholesome effect upon employees, and serve to restrain them from engaging too readily hereafter in such disturbances. In the conflict just closed the union has been forced to admit defeat—grudgingly, it is true, and only after the company affected had successfully operated its property several months in spite of the organization—and the workingmen who persisted in standing out for the union terms now find themselves deserted by their leaders, without occupation and with no prospect of employment in railway work.

The formal raising of the "boycott" at Waterbury on Monday marked the ending of a series of strikes in two of the most important manufacturing cities of Connecticut—Bridgeport and Waterbury—in both of which the strikers were worsted.

The Waterbury strike lasted 210 days, and was marked by violence and bloodshed, destruction of property, boycotting and intimidation, culminating in murder. The trouble was precipitated by the discharge of the president of the union for cause, after three warnings had been given him, but later other demands were made by the men, and one condition was insisted upon—recognition of the union, which the company firmly and flatly refused to entertain. An effort was made to call out the employees of the company and allied corporations throughout the State, but this failed utterly, and merely raised a storm of indignation against the perpetrators of this outrage.

The Bridgeport strike was marked by violence from the beginning, but did not last as long. It was noteworthy, also, because of the attitude of Mayor Mulvihill, who openly aided the strikers until his action brought a severe rebuke from other members of the city government, and he was practically forced into the background in spite of his official position. The stand taken by the business interests on this occasion had a wholesome effect, as it showed what could be done by a few resolute men who would insist upon having their legal rights respected and protected.

In this connection the attitude of the management of the properties is deserving of commendation. During the long struggle they maintained the same position, and although at times the pressure brought to bear upon them was almost irresistible, they did not swerve from their purpose for a moment. Their loss, reckoned in dollars and cents, was great, and they were hampered in the development of their property and the execution of plans for improvement in the service, but the result justified the sacrifice. With the defeat of the union they announced their determination to put into effect the concessions which they offered when the strike was threatened, thus showing a disposition to deal fairly, of their own volition, with their employees, which cannot fail to win the respect and confidence of the entire community.

It is fortunate for all concerned that these labor troubles are at an end. The lesson was a hard one, and its application entailed much annoyance, inconvenience, financial loss and hardships. Let us hope that it was not in vain, and that its influence will be felt wherever there may be an inclination to follow blindly the irresponsible agitators who have brought so much suffering and strife into Connecticut during the last year.

Fixing Responsibility for Trolley Accidents

A 5-year-old child, while attempting to cross the Bowery after dark, was run down and killed by an electric car a short time ago. The crowd which quickly gathered at the scene of the tragedy, headed by the victim's father, attempted to wreak vengeance upon the motorman, who was saved from the fury of the mob only by the prompt action of the police. This incident may be taken as a fair example of the attitude of the public in times of excitement. There was nothing in the accident, as reported, to indicate that the motorman was at fault or that he did not exercise reasonable care and watchfulness; no charge is made of reckless operation, but the blame for the deplorable accident was laid upon the motorman by the parents and their sympathizers, although they did not witness the tragedy.

According to the report of the accident there was no sympathy expressed for the motorman, but he was held as responsible for the calamity as if he had run over the child willfully or through gross carelessness. Nevertheless, we know of many cases where an accident of this kind, in which the motorman was entirely blameless, has so affected him that he has abandoned his position entirely, and in nearly every case the result of such an accident on the nerves of a motorman are such that the effect lasts a very long time. Even the possibility of causing serious injury to a child by his car is enough to give a terrible shock to the average man after he has had a narrow escape. The result is that runs past school houses and through the densely crowded streets of the tenement districts of our large cities are disliked by all motormen largely for this reason. Yet the children themselves seem to take great delight in jumping in front and away from a car in mere bravado, to see the motorman put on the brakes and to "give him a scare," while the parents of these children seem to exercise no restraining influence over them.

The prominence given this affair has directed attention to the conditions that obtain in the densely populated sections of large cities, like the lower East Side in New York and the poorer districts of the West Side in Chicago. The streets through which trolley cars pass are used as the playground for the little ones, parents evidently trusting to a kind Providence and a watchful motorman to see that no harm comes to them. Even an occasional fatality does not seem to impress parents with a sense of their own responsibility as the natural and legal guardians of their offspring. In spite of warnings and tragedies the children continue to play in the streets, day and night, and the wonder grows that there are so few serious accidents.

In fixing responsibility it seems that all these circumstances should be taken into consideration. Gross carelessness on the part of parents in failing to keep the little ones out of danger really constitutes contributory criminal negligence, and while undoubtedly it would be hard to fix responsibility upon them under the circumstances, a strict sense of justice would sustain such a decision. All that a motorman can do is to keep a sharp lookout and exercise special care in running through crowded streets, but parents can and ought to do more. They should not permit their children to play unattended in such thoroughfares. If they persist in neglecting such necessary precautions the legal as well as moral responsibility rests upon them.

Some Economic Features of Power Transmission

The increasing complexity of the interurban networks in various parts of the country brings constantly before the engineer the necessity for a careful study of the conditions of economy in power transmission. Glance at a map of the electric roads in any region where they are well developed, and there is at once apparent the great practical difficulty of supplying power. However judiciously the power stations for individual roads may be located, the supply of the network of roads, considered as a unit, will almost always be found to exhibit conditions that do not make for economy. The natural tendency is to go in at once for power transmission and to feed the whole system from one or more well-located stations. But save in the case where hydraulic power can be well utilized, the planning of such a general system of electrical distribution is one of the most puzzling tasks by which the engineer can be confronted. It resolves itself into the following problem: Given a network of electric railway lines covering, say, a thousand square miles, required the number and location of the stations and sub-stations that will give the minimum cost of power per car-mile. As a general problem the data are always insufficient for a complete solution; as a special problem, one can sometimes get a fairly satisfactory result. The natural tendency nowadays is to locate one station as near as may be to the center of load, and transmit the power at high voltage to the sub-stations. As an economic question the first thing here to be considered is the working efficiency of such a system from which to determine the cost of power. It is easy enough to estimate this efficiency as a matter of theory, but data on the performance of complete transmission systems have until very recently been sadly lacking.

At the recent Institute meeting Professor Goldsborough, in connection with a discussion of the storage battery in sub-stations, presented the results of an efficiency test on the complete transmission system of a typical interurban system in which eight sub-stations, at distances of 11 miles to 33 miles from the main generating station, are fed by a 16,000-volt transmission system. The whole plant is modern and represents recent practice as fairly as any single system could. Now, this plant, under continuous test, yielded some highly interesting figures. On a daily load of about 25,000 kw-hours, the net efficiency of the transmission, reckoned from the low-tension bus-bars in the generating station to the direct-current bus-bars of the rotaries, averaged 73.5 per cent. That is, for each kilowatt delivered from the rotaries, 1.36 kw must be generated at the transmission station. Add to this extra amount of power the extra charges for interest, maintenance and depreciation of the transmission plant, and without having the data available for an exact computation, it will probably turn out that the cost of 1 kw-hour, delivered to the line via the sub-stations, is more than double the cost of the kilowatt-hour delivered to the bus-bars of the generating station. In the particular case under consideration the capacity of each of the sub-stations is rather small, and there is a fair chance that the installation pays as against separate generating stations instead of sub-stations, but double the capacity of the whole affair and the chance of recouping the lost power in cheaper generation would be none of the best. We could point out some instances in which it is quite certain, as certain as anything can be without examination of the books, that money is lost on every kilowatt of transmitted power, quite apart from the danger of putting all one's eggs in a single basket.

In cases of transmission like that investigated here the use of the storage battery is almost a necessity. Without it any accident to the main plant may paralyze a hundred miles or more of road, and the battery is more reliable and less of a luxury than it was a few years ago.

Another consideration that should be given great weight in planning such a plant is the gain that may be made in feeder copper by increasing the number of sub-stations. Under certain circumstances this may be large enough to in part offset the heavy expense of the transmission proper. If ever there is worked out any device for obtaining direct from alternating current which does not require attention there will be a revolution in electrical distribution for railway purposes, and the saving in copper can be effected where it is most needed—in the feeder system. At present the transmission lines are all additional expense, replacing no feeders in the ordinary case, but if one could multiply the sub-stations without increasing operating charges for labor, the feeder charges would get down where they belong. Of course, multiplication of stations would somewhat increase the total cost of apparatus, but one could well afford this in view of the saving in labor. Again, the most desirable thing is to increase the voltage on the working conductor, but in the absence of any thoroughly satisfactory way of doing this attention may well be directed to the feeders. And most of all it should be realized that the economy of the system, as regards power, is not so much in the cost of generation as in the cost of power at the motor terminals. There is such a thing, to drop into Yankee vernacular, as "saving at the tap and spilling at the bunghole"—and it is rarely commendable.

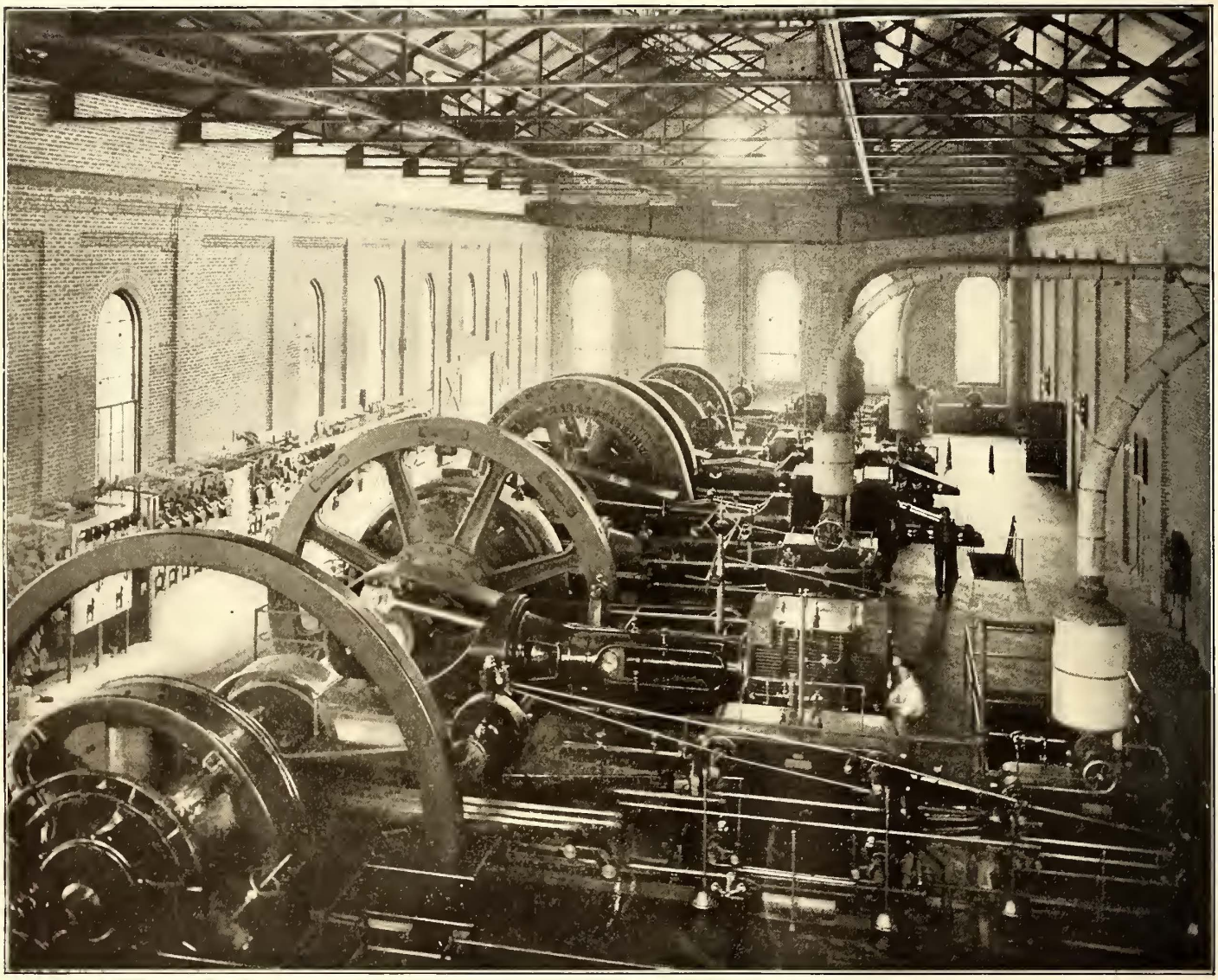
The Standard Form of Report

The adoption by the National Association of Railroad Commissioners at its Portland convention of the standard form of report, presented and adopted at the Detroit Convention of the Street Railway Accountants' Association of America, must prove very gratifying to the members of the latter body as well as to the committee of the Accountants' Association, which presented that report to the Association of Railroad Commissioners. The form was adopted by the Railroad Commissioners without change, but previous to this action had been very carefully gone over at a meeting of a joint committee of the two associations at Boston, at which the form of report was very thoroughly discussed and deemed acceptable. It might be interesting to state in this connection that at the Portland Convention of the National Association of Railroad Commissioners the fact was brought to light that in addition to the States which had previously adopted the standard classification of the Accountants' Association of operating and constructing accounts, the States of Pennsylvania, Virginia and Vermont had also fallen into line. These States now require reports from electric railroads within the State to be filed in accordance with the standard classification. This shows a gratifying improvement in the direction of uniformity.

A COMBINED RAILWAY, LIGHTING AND ICE PLANT AT HAMPTON, VA.

A noteworthy example of a combined railway, lighting and ice-making station is the Hampton (Va.) plant of the Norfolk, Portsmouth & Newport News Company. For some three years the electric railways in Newport News and between that city and Hampton, Old Point Comfort and Buck Roe Beach have been operated from this station, power and lighting have been supplied at all the points along the line, and a very profitable business has been developed in the sale of manufactured ice. The plant is run condensing, and as the condensed steam can well be utilized as the source of supply for water for freezing, and as the fresh water for boiler feeding, except a portion obtainable from driven wells, has to be metered from the town's public water supply, surface condensers are employed. From the standpoint of engineering design there are a number of interesting features. A duplicate set of steam mains has been provided, the feed piping is also practically in duplicate, mechanical stokers are fitted to the boilers, and special apparatus for handling coal and ashes has been installed. The main engines generally are equipped with independent condenser units, and the condensing water intake is the special feature. Architecturally, the building is a massive, dignified structure, in keeping with the character of its contents, and it is a conspicuous addition to the town of Hampton.

The plant was built by the Newport News & Old Point Railway & Electric Company to operate a trolley line from Old Point Comfort to Newport News through Hampton, and to supply electric power and lighting in the region. It is now a part of the property of the Norfolk, Portsmouth & Newport News Company. It is located on low ground on the bank of Herbert's Creek, which flows into Hampton Roads, and rests on piles driven over the entire building site. The power station is 105 ft. x 151 ft. in plan, and stands 155 ft. from the bulkhead line on the creek. It is planned to accommodate 2625 kw in generating machinery and two 40-ton refrigerating machines. The freezing ice is done in an adjacent building, 40 ft. x 86 ft. This building is to be extended 62 ft. when the full refrigerating capacity is installed. Besides these and one or two small buildings the station includes an ice storage, 25 ft. x 70 ft., arranged to be doubled in width when necessary.

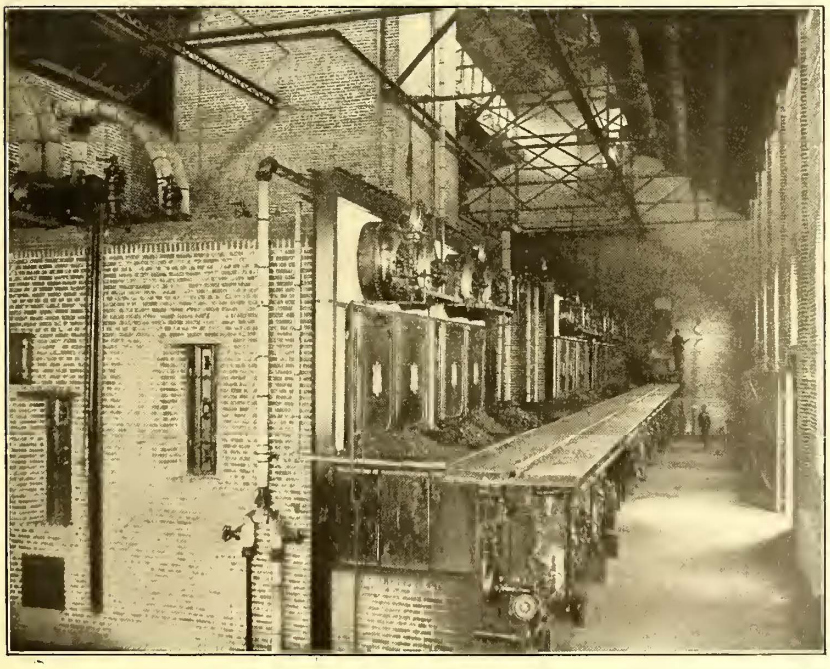


INTERIOR OF POWER STATION AT HAMPTON, VA.

The foundations for the station have been made in an interesting manner. Twenty-foot piles, spaced both longitudinally and transversely on 3½-ft. centers, were driven in the soft earth of the site; they were tied together in the transverse rows by 12-in. x 12-in. timbers tree-nailed on top of them, and a double layer of plank flooring was laid across the timbers. On this pile-supported floor, which is at mean low tide level, so that the piles are always wet, were started the wall and column footings and the brick foundations of the chimney. The entire area of the building was then filled in around the footings with concrete 3½ ft. deep, forming the floor of the engine and boiler room basements. The finished concrete surface is 1½ ins. thick, composed of 1 part Toltec Portland cement and 2½ parts crushed granite, passing a ¼-in. ring, floated and trawled to an

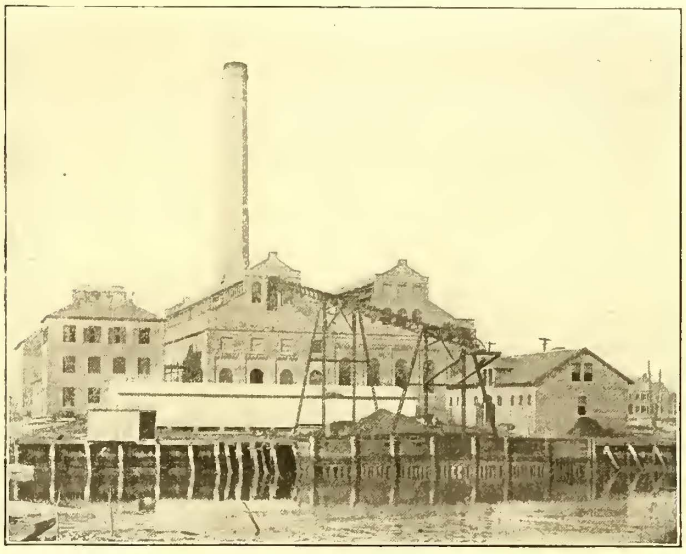
even surface and cut into blocks 4 ft. sq. and finished with a dust coat of 1 part sand and 2 parts cement. The rough concrete underneath is 6 ins. thick, and is composed of 1 part cement, 3 parts sand and 5 parts broken stone, passing a 1½-in. ring.

The building is a red brick structure and stands at the back of a broad lawn a considerable distance from the street. It is of the usual class with engine and boiler rooms side by side, separated by a partition wall, the roof, which is covered with slate, has two ridges corresponding to the two sets of trusses spanning the two rooms. A view of the station from the creek, reproduced to show also the coal hoist and trestle, is given among the accompanying illustrations. The engine room is 58½ ft. wide, the boiler room, 46 ft., and the engine room runs the full length of the building, 170 ft. From the end of the boiler room, however, a room for the refrigerating machinery has been partitioned off. It extends across the entire boiler room and is 34½ ft. deep. It is 24 ft. in height, and in the space over it a coal bunker has been provided, the transverse partition wall being continued to the roof. It is to this bunker that the coal trestle leads. The boiler and engine floors are on the same level, and the lower chords of the roof trusses are 27 ft. above them. In the basements there is a clear headroom of about 9 ft., and a noteworthy fact in this regard is the well-lighted and clean aspect they present, even after the comparatively long use they have had. This is due to the provision of numerous windows around the exterior sides of the basements, openings in the engine room over the condensing units and a light, smooth cement floor. The floor of the engine room is of pine boards laid diagonally, the walls of both rooms are the unpainted bricks, the underside of the room over the engine room is of wood sheathing on timber purlins, while the slate over the boiler room is fastened to angle-iron purlins. The engine room is served by a 20-ton traveling crane, made by the Reading Crane & Hoist Works, carrying two 10-ton trolley hoists. It runs the entire length of the building on rails supported by the outside wall at one end, and by the 16-in. partition wall at the other, the walls having pilasters on 13-ft. centers, corbelled out at the top to form the base for the rail. The roof carries a monitor over each room the length of the building, with swinging sashes in each side, guarded in turn by louvers on the outside. The partition wall between the engine and the boiler rooms has two doorways in it, one opening into the boiler room and the other into the ice-machine room, the floor of which is 5 ft. below the general floor level.



VIEW OF BOILER ROOM

Coal is delivered to the station ordinarily by boats. It is scooped from the boats by a ½-ton hoisting tub and hauled in the tub up an inclined trestle bridge to the coal bunker, where it is dumped into a weighing hopper on the weighing floor above the bunker, and then chuted into the coal storage space below. The trestle bridge consists of a latticed-box girder, of 3-in. x 3-in. x ⅜-in. angles and 3-in. x ⅜-in. flat members, supported at the wharf by the end wall of the power station and at a mid point. The latter and the support at the wharf are each a bent of four members, two vertical and two inclined, each made up of two 8-in. 11.25-lb. channels latticed together. The end of the bridge projects 19 ft. over the water at a point 20 ft. above dock level, and the bridge has an upward inclination to the power house, a distance of 170 ft., of over 11 degs. The trolley over which the tub is suspended is hauled by two 7-16-in. steel-wire ropes wound around drums direct-connected to a 20-hp railway motor on the weighing platform, and the trolley rails are two 6-in. 10.5-lb. channels fastened to the girder bridge at 5-ft. intervals. The coal handling plant was furnished by the G. L. Stuebner Iron Works, of Long Island City, N. Y.; a branch track of the railway passes underneath the bridge, and coal can thus be readily handled from the company's own cars.

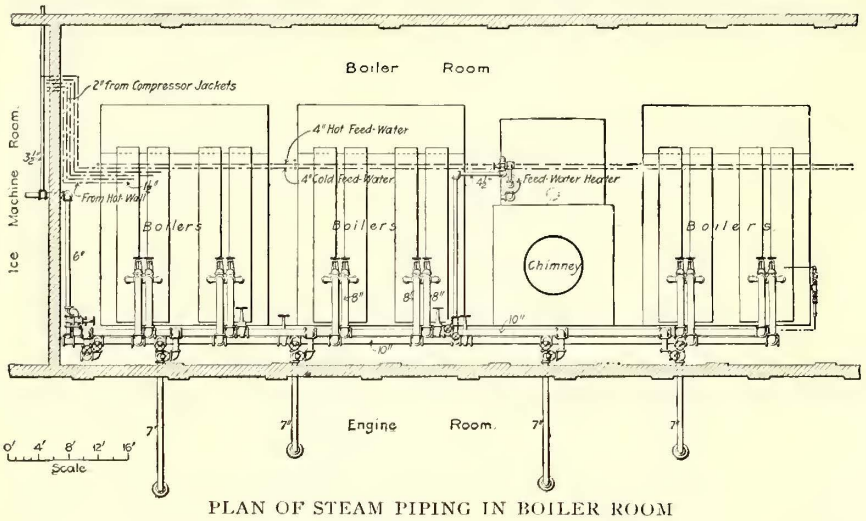


EXTERIOR OF STATION

The coal bunker has a capacity for about 400 tons, and it occupies part of the floor space above the ice-machine room. The floor is level and has a concrete finish, supported by brick arches between 15-in., 42-lb. I-beams on 3-ft. 2-in. centers. The coal passes into the boiler room through a short chute in the transverse partition wall, falling into a hopper car. The chute has a mouth about 3 ft. x 4 ft. in size, and its discharge end is about 5 ins. sq. It makes an angle of 35 degs. with the horizontal.

The boiler room, through the center of which rises the chimney, contains two batteries of two boilers on one side of the stack, one battery of two on the other side and space for a fourth battery. Each boiler is of 250-hp capacity on the basis of 12 sq. ft. of heating surface per horse-power, and are of the water-tube type with two steam drums. They were built by the Aultman & Taylor Machinery Company, and are fitted with Murphy furnaces. These project 6½ ft. in front of the boilers proper, leaving a space of 11 ft. between them and the outer wall. Across their

fronts is laid the tracking for the hopper cars, and the coal loaded into the car from the chute is pushed opposite the furnace whose hopper requires filling. The hopper car is provided with a chute under control of a gate. The ashes from the furnaces fall into an ash hopper immediately below each furnace in the basement, and by means of a double-lever gate in the bottom of the hopper they are dumped as desired into an ash car of 20-cu. ft. capacity, running on tracking which leads to an area at the front of the building, where they are lifted upon construction cars of the railway company.

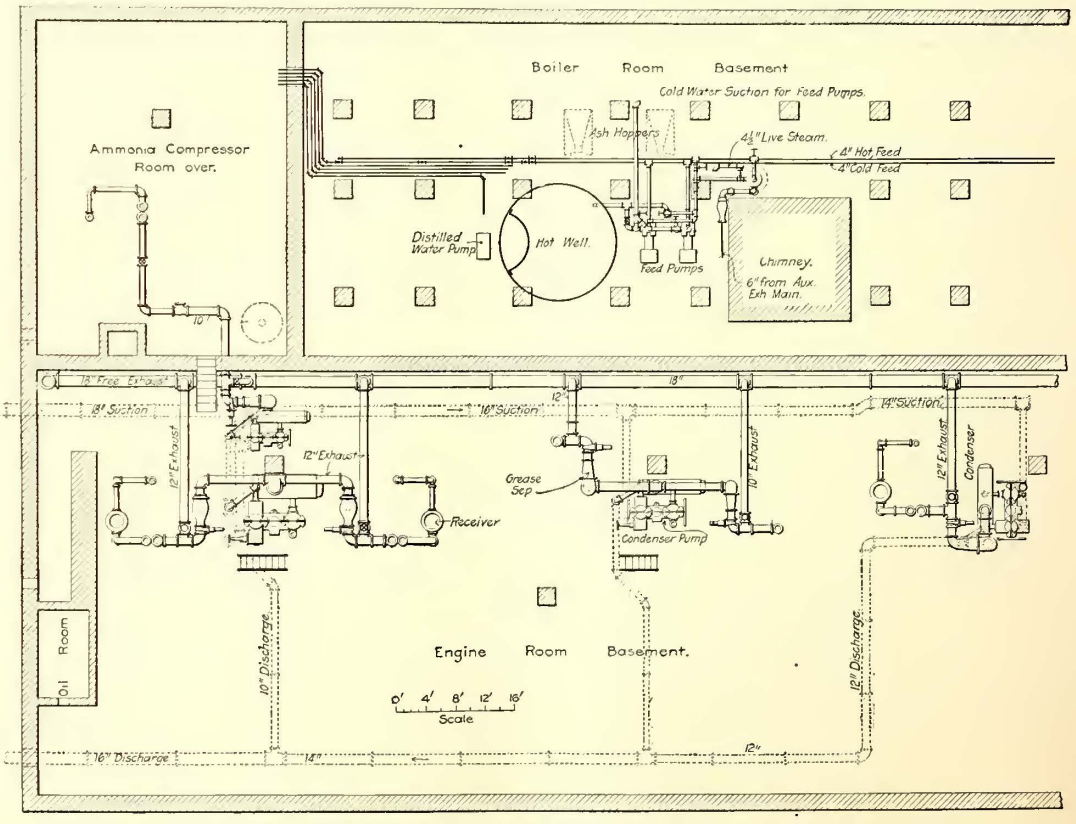


PLAN OF STEAM PIPING IN BOILER ROOM

The smoke from the boilers is conducted in a firebrick-lined brick smoke passage to the chimney, leading in opposite direction from the two groups of boilers. The smoke duct spans the space between the boilers and the partition wall and is 8 ft. above the floor, leaving a passageway behind the boilers the length of the boiler room. It is 5 ft. sq. inside, and the two ducts meeting at the chimney have a total area equivalent to that of the stack. The chimney is of brick, 8 ft. inside diameter and 175 ft. high above the boiler room floor, and 188.5 ft. above the plank foundation flooring. It is square for a short distance above the power house roof and hexagonal above. It has an inner shaft of firebrick, 75-ft. high, above the smoke flue, the lower half 9 ins. thick and the upper half 4½ ins. The outer shaft is hexagonal in section on both outside and inside peripheries, and the walls are 3 ft. 2½ ins. thick at the bottom and 13 ins. at the top. It is offset for a change of thickness every 25 ft. It has a light cast-iron cap in eight sections, riveted together, and the part a short distance below the cap, enlarged for decorative purposes, is reinforced by a ¾-in. x 2½-in. wrought-iron band imbedded in the brickwork.

The steam piping is arranged with duplicate steam headers supported overhead back of the boilers. Each boiler has two leads rising from the top of the cross-connection on the steam drums, passing upward in long sweep bends and dropping into the top of the headers. Each lead has one valve, located close to the boiler outlet. A single supply pipe to each engine is passed through the partition wall, and in the boiler room it has two short curved connections with the top of the two headers, each connection fitted with a valve, which is thus also in the boiler room. The piping is of extra strong wrought-iron, the flanges of the Chapman cast-iron pattern with corrugated copper gaskets. The headers are supported by roller-bearing brackets, and, being above the boilers, all condensation is drained directly back into the boilers. The headers are provided with valves to isolate each battery when necessary. Condensation of high-pressure steam lines is in general returned automatically to the boilers by means of the Holly system.

The engine supply pipes sweep downward in long bends without valves in the engine room to a vertical steam separator in each case, of the De Rycke type, close to the throttle valve. The two valves controlling the flow from the headers in the boiler room to each engine supply are arranged to be handled, by means of extended stems, in the engine room. The exhaust piping is all confined to the engine room basement. It passes from the low-pressure cylinder of each engine first through a horizontal De Rycke grease separator, and then enters the surface condensers, which are operated in connection with a vertical crank and fly-wheel pump, which employs a steam cylinder, driving both the circulation water plunger and the air pump, the steam cylinder being located between the other two. It was built by the Conover Manufacturing Company, of New York. The exhaust steam escapes to the atmosphere when the condensers are out of commission, and the exhaust branches

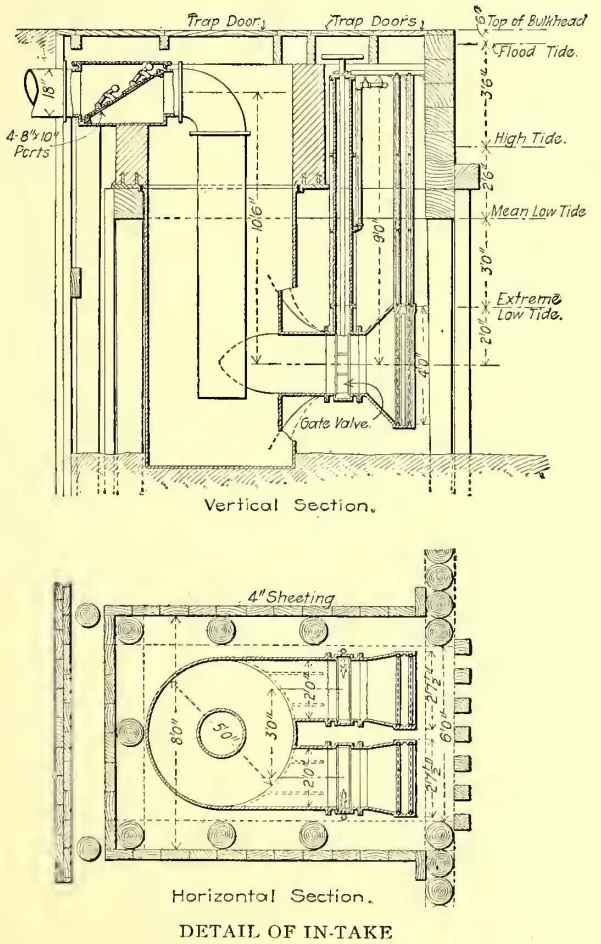


PLAN OF POWER STATION, HAMPTON, VA.

are equipped in the usual way with back-pressure valves to act as relief valves on the failure of any condenser. When it becomes necessary to clean the extractors by draining to a sewer connection, the engine corresponding is run non-condensing. The exhaust main rests on roller bearings on the engine room floor basement, and extends the length of the

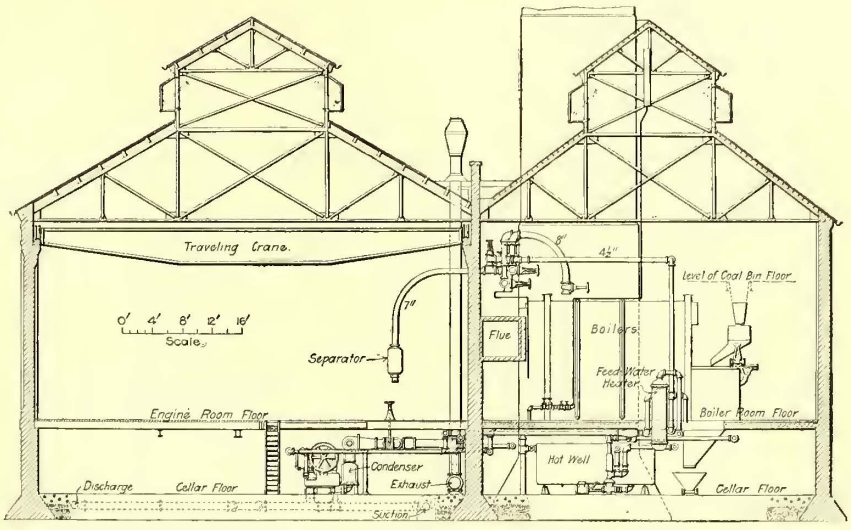
building. At each end it connects with an exhaust riser capped with exhaust head. The exhaust main and risers are of iron-riveted pipe.

The salt water from the creek, which is really an arm of the bay, is used for condensing and is taken from an injection pipe, 18 ins. in diameter, which leads the water from an in-take at the wharf line; it is discharged through a pipe 16 ins. in diameter, which empties into the creek 100 ft. below the in-take. The pipes are of cast-iron and buried in the filling between the foundation flooring and the basement floor. The piping is, of course, reduced in diameter as the various connections to condensing units are made. An accompanying illustration shows the general construction of the condensing water in-take. It consists of a cast-iron chamber provided with screened inlets and a central outflow pipe, the whole enclosed in 4-in. sheathing and protected by a bulkhead of 16-in. piling driven closely together. The cast-iron chamber is a cylinder, 5 ft. in diameter, of ¾ in. thickness of metal, with the top open and two circular inlets, 2 ft. in diameter, projecting from near the bottom. To the front of each of these inlets are bolted, in succession, two castings, one containing a gate, controlling the inflow of water and the other holding wire screens. In front of these the opening in the pile bulkhead is protected with 6-in. x 6-in. vertical timbers spaced 6 ins. apart. There are two screens to each inlet, the first of 3-16-in. wire with a 1½-in. mesh, and the second of No. 12 brass wire with a ¼-in. mesh. The screens



DETAIL OF IN-TAKE

are mounted on small channel-iron frames and slide in iron guides, so as to be removable. The gate valve has an inside screw and may be raised and lowered by means of an extension bonnet. To each valve opening is connected a 1-in. pipe, connected with both the town water supply and the boiler feed pumps, by which the in-take can be flushed when necessary. The gross area of the screens, which are placed below the level of extreme low tide, is nearly three times that of the inlet pipes. The outflow pipe, which starts below the inlet pipes, is 18 ins. in diameter, and its entrance into the horizontal



CROSS SECTION OF POWER STATION

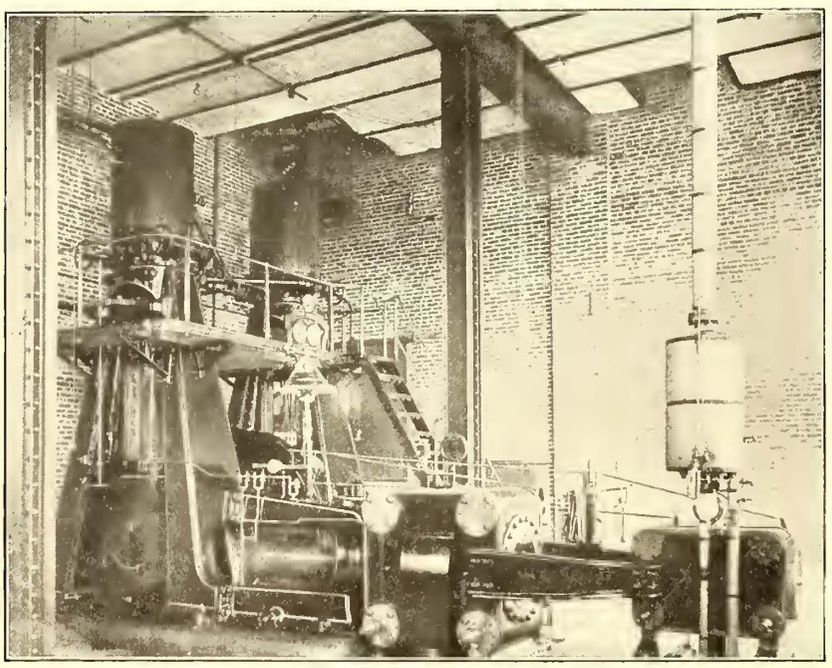
suction pipe to the condensers is controlled by a check valve, preventing a back flow into the in-take. The check valve has four ports, which have a total area of 25 per cent greater than that of the suction pipe. The cast-iron chamber was sunk in place, but is supported in a fixed position by suspension from two cast-iron beams carried on piling.

The water from the air-pump side of each condenser is delivered into a hot-well resting on I-beams on the basement floor under the boiler room. The discharge from each pump, which is 6 ins. in diameter, is connected into a header, also 6 ins. in diameter, parallel with the free exhaust header, and a 6-in. pipe passes from the water header to the hot-well. This is 16 ft. in diameter and 6 ft. deep, and is divided into compartments by a baffle plate, as indicated in the accompanying illustrations. To the smaller compartment the condensed steam is delivered, and such oil and impurities as rise on the surface are drained to waste through an overflow pipe in the larger compartment. From the smaller compartment the water is taken for the freezing cans and from the larger the water for boiler feeding. Besides the condensed steam, water is continually brought to the well from the cooling jackets of the compressor of the ice machine, and also, under the action of a float to maintain a constant water level, cooling water is taken from the town supply for the distilling apparatus in the ice plant.

The boiler-feed pumps, of which there are two 10-in. x 6-in. x 12-in. Blake steam duplex pumps, are connected to draw water either from the hot-well or a fresh supply, two-thirds of the latter coming from two driven wells 300 ft. from the station, and the rest through meters from the town supply. The pumps deliver into either one of two feed headers carried across the boilers, one header for a cold supply to the boilers and the other for a hot supply. For the latter they pass the water through a closed feed-water heater of the Wheeler type, which receives exhaust steam from the various pumps and an engine in the engine room driving an exciter dynamo. The cold water supply to the station is metered, and, with the exception of the feed-pump suction, is conducted through the cold-feed header, which ordinarily acts as a distributing main for all fresh cold water supplies for drinking, fire protection and cooling purposes. The live steam for the auxiliary machinery is taken from the steam headers in the boiler room, brought into the boiler room basement at the auxiliary feed-

water heater and carried along the basement ceiling, the required branches to the condenser pumps and the exciter set passing through the partition wall. The exhaust steam of the auxiliaries is collected in a similar way, and at the feed-water heater is fitted with a grease extractor for cleaning it before reaching the feed-water tubes.

The generating equipment in the engine room comprises three alternating-current machines, aggregating 1300 kw, and two railway units with space for a third, giving a total of 1325 kw. The smaller of the two railway sets consists of a tandem-compound Rice & Sargent engine, built by the Providence Engineering Works, with 14-in. and 28-in. cylinders and 48-in. stroke, and a direct-connected 325-kw, 550-volt continuous-current dynamo, run at 100 r. p. m. The second railway unit employs a 22-in. and 38-in. x 48-in. cross-compound Corliss engine, made by the St. Louis Iron & Machine Works, and a 500-kw, 550-volt Westinghouse generator, driven at 90 r. p. m. The third railway generator, yet to be installed, is to be of the vertical type, of 500-kw capacity. A steam pressure of 135 lbs.



ICE MACHINE

to 140 lbs. is carried at the boilers, and a vacuum of 27 ins. of mercury in the exhaust pipes.

Three alternating-current General Electric, 60-cycle generators furnish current at 3450 volts. One unit of 700 kw is direct connected to a horizontal McIntosh & Seymour cross-compound engine, of 23-in. and 46-in. x 42-in. cylinders, operating at 120 r. p. m., and the two others, of 300-kw capacity, are driven by tandem-compound Rice & Sargent engines of 14-in. and 28-in. x 36-in. cylinders, running at 150 revolutions. For furnishing exciting current there are three General Electric 125-volt continuous-current sets, one steam driven and two motor driven. The steam unit consists of an 8-in. x 6-in. marine engine, coupled to a 15-kw dynamo. One of the motor sets has a 60-hp induction motor connected to an Edison bipolar machine, and the other a 20-hp induction motor coupled to a four-pole dynamo.

The switchboard was furnished by the General Electric Company. There are two railway generator panels and a third for the unit, to be installed, the panel equipment, including indicating lamps, an indicating ammeter and a circuit breaker; there is a totalizing railway panel, having a recording wattmeter and indicating ammeter and voltmeter, and there are five railway feeder panels, each with a single-pole, single-throw switch, an ammeter and a circuit breaker. The exciters are all controlled from one panel, having three three-pole switches, three rheostat wheels, three ammeters and one voltmeter. The three alternating-current generator panels and four feeder panels for the general alternating-current supply are all provided with oil-break switches. There is also a totalizing panel, located between the groups of the generator and the feeder panels, this carrying in addition to a recording wattmeter a ground detector and an indicating ammeter and an indicating voltmeter.

The company also furnished a considerable number of arc lamps, and for this purpose has adopted the series-alternating constant-current system. There are four feeders for this service, all controlled from the one panel, and in addition there is a panel with a recording wattmeter for the lighting load. In connection with the arc lighting system there are four transformers, wound for a primary pressure of 3120 volts, and a secondary of 6.6, and each of twenty-five lights capacity with 6.6-amp. constant current. For general power distribution over distance two 250-kw transformers are used, with a third as a spare, each having a transforming ratio of 3 to 1, so that the transmission pressure is about 10,000 volts. The high-voltage line is carried into Newport News for local distribution there at 3120 volts, and it was designed to carry 600 kw with a line loss of 5 per cent. It is 5 miles long, and comprises two No. 1 conductors and one No. 4. Power and lighting are furnished at Buck Roe Beach and at Old Point, 200 kw to the latter, which is 5 miles distant from the station, at a pressure of 3120 volts. The railway system, including that of Newport News, is supplied directly from the Hampton station. One feeder of 500,000-circ. mil cross-section is carried into the city, and at three intermediate points three 0000 feeders are connected into the trolley line. In the other direction for the lines to Old Point and Buck Roe Beach three 0000 feeders leave the station.

The ice plant is operated by a 40-ton compressor machine in the ice-machine room. It was built by the Frick Company, of Waynesboro, Pa., and consists of a 100-hp horizontal tandem-compound engine, with cylinders 14 ins. and 28 ins. in diameter and 28-in. stroke, and a double-cylinder vertical ammonia compressor. As already stated, space is reserved in this room for a duplicate unit. It is operated condensing, its condenser being located in the engine room basement. The ammonia piping, together with auxiliary steam and water piping, is carried across a space about 16 ft. wide to the ice plant, which is a detached brick building with a frame roof. It consists of a single-story portion, 61 ft. long, containing the freezing tank, and a three-story portion, 28 ft. x 42 ft. in plan, containing the distilling apparatus and incidental machinery. The ammonia condenser is located on the top story, and is of the coil-pipe type, cooled by salt water drawn from the creek. For this purpose there is an M. T. Davidson simplex pump, 7 ins. x 7 ins. x 10 ins. in size, in the basement. In the third story is also the distilling apparatus. The condensed steam in the hot-well in the boiler room basement is lifted to this point by means of a Gould triplex pump alongside the well, direct-connected to a 1-hp, 110-volt General Electric motor. The water is skimmed and reboiled by steam in the usual way. The reboiled water is cooled in pipe coils in the second story of the ice plant, and for this purpose fresh water from the town supply is used, the drain from this going, as needed, to maintain a supply in the hot-well. The distilled water is then passed in succession through seven charcoal filters in the first story, each filter 3 ft. in diameter and 5 ft. high, and then through an International cloth filter. It is stored in a tank, from which the cans are filled, and is cooled by the ammonia gas returning from the

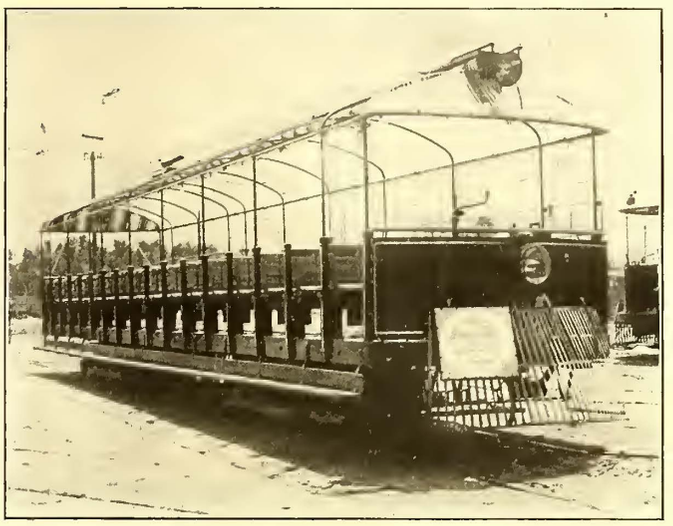
freezing tank after its expansion, the gas passing through a submerged coil in the tank. The liquid ammonia receiver is also located in the first story. The plant has a capacity of 40 tons of ice daily, and is operated during ten months of the year. It is an important branch of the business, and the company has built box cars for hauling the ice to distant points, chiefly to Old Point Comfort. In a separate building there is 1000 tons ice storage, so that sudden demands, as happens when some ship requires a supply, can be readily met, and the plant can be run steadily meanwhile at best economy.

On the basis of some records made some time ago it was found that 3.31 lbs. of coal were burned per kilowatt-hour. The cost of the electrical output on the bus-bars was 7 mills per kilowatt-hour, as follows: Labor, $.0017; coal, $.0044; water, $.00033; repairs, $.00016; supplies, $.00045; total, $.00704. For a period of ten months the average horse-power developed was 527,666 ecp per month; the auxiliary apparatus, 98,550 hp; ice plant, 102,000 hp; total, 728,217 hp. This gives an average of 994 hp per hour.

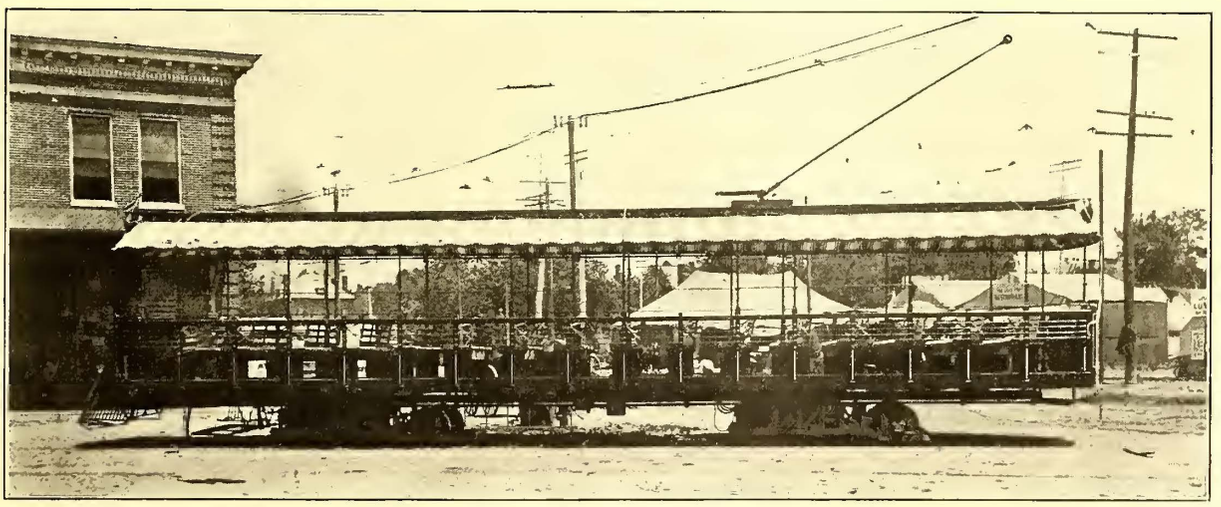
R. Lancaster Williams, of Richmond, Va., is president of the Norfolk, Portsmouth & Newport News Company, and William J. Payne, formerly president of the Newport News & Old Point Railway & Electric Company, is first vice-president. The general manager of the system is E. C. Hathaway, of Norfolk, Va., and the general superintendent of the division supplied by the power station is H. H. Carr. The plant was designed by Samuel B. Thompson for James F. Heyward, railway expert, of New York, who had charge of improvements made at the time the plant was built, and the architect was Henry Brauns, of Baltimore. E. W. Norris is chief engineer in charge of the station.

A NOVEL CAR FOR PLEASURE TRAFFIC AT ST. LOUIS

The St. Louis Transit Company has recently built in its own shops a number of open cars which are proving extremely popular for summer travel to Croeve Coeur Lake. This car seats ninety-six people on its sixteen benches, and is 47 ft. over all. The novel feature about the car is that it has no roof. During the daytime an awning of canvas is used, as seen in the accompanying illustration. In the evening this awning is rolled up next to a center-board, which carries the trolley base, so that the car is entirely open. The car is equipped with two



END VIEW OF PLEASURE CAR



SIDE VIEW OF OPEN CAR FOR PLEASURE TRAFFIC

an expensive car to build and can be turned out of the shops very rapidly. In fact, some of these have been turned out in as short a time as three weeks. Being purely a summer travel car and having so little work about the roof, there is not the necessity for time and care in building that there would be with a more elaborate car for continuous service. The popularity of the car is due, of course, to the fact that it is entirely open. The management of the company likes it because of its large carrying capacity and low cost. In providing for the extra heavy travel that occurs during a few days of the year to Croeve Coeur Lake the matter of idle investment in rolling stock is important, and this type of car provides for this extra heavy travel with about as low an investment as possible.

The scheme of collecting "through" fares which has been adopted by the Hartford & Springfield Street Railway Company, operating between Hartford, Conn., and Springfield, Mass., might well be adopted by other interurban lines in New England and other parts of the country. In Hartford the company operates over the lines of the Hartford Street Railway Company, and in Springfield it operates over the lines of the Springfield Street Railway Company. Two 5-cent fares are collected while the cars are in Hartford, and one 5-cent fare is collected in Springfield by the Springfield Street Railway. Between Hartford and Springfield three 5-cent fares are collected. To save passengers the annoyance incident to the collection of so many fares the Hartford & Springfield Company collects all their fares at once if a passenger is going through from one city to the other, issuing a destination ticket such as steam railroads use.

No. 34 Lorain motors on maximum traction trucks. It is not

INTERURBAN RAILWAY DEVELOPMENT IN GREAT BRITAIN—II

BY HON. ROBERT P. PORTER

In my last article I referred to the legislation in Great Britain covering tramway and interurban electric railway construction, and quoted one or two examples of the difficulties in the way of carrying on new work.

The problem of reconstructing and welding several isolated tramway systems into a group of interurban lines is attended with, perhaps, greater difficulties than the promotion of an extensive system of lines, in what might be called, from a tramway point of view, a virgin district. Nevertheless, the obstructiveness of local authorities and of railway companies has in both cases to be dealt with; and the same qualities of diplomacy and enterprise have to be displayed in both instances. The main advantages of promoting tramways in a new district are a certain freedom in the choice of route and an opportunity of developing the system gradually with the growth of traffic and population, stimulated by the constructed lines. Against these advantages there is the disadvantage that virgin districts of a profitable nature in England are few and far between. Most parts of the country which do not possess tramways of some sort are equally lacking in people to make use of them.

LONDON SUBURBAN TRAMWAYS

One conspicuous exception to this latter rule is the suburban or semi-rural district around London. The prominence given to the promotion of "tubes" in London itself has rather obscured the significance of the extensive tramway systems which are growing up in the outlying districts, partly as feeders to the tubes themselves. The London United Tramways System, however, radiating westward from Shepherd's Bush and Hammersmith, is now well known; and over the wide extent of northern London a system similar in nature and extent promoted by the British Electric Traction Company is on the eve of actual development. Whatever may or may not be done about locomotion within the administrative area of London, and whether the County Council decides to take over the operation of all the tramways or not, these two systems must remain an important factor in London transportation. Extending, as they do, into areas outside the county of London, and dealing, as they do, with other local authorities—many of them unwilling to come under the authority of the London County Council—contracts have been brought about which will practically keep these systems intact for twenty-five years, and in some cases for a longer period. If, therefore, good business judgment continues to be shown in handling these properties—and both enterprises are just now in most capable hands—we may reasonably expect two of the largest tramway systems in the world, probably each carrying in the neighborhood of 500,000,000 passengers annually. It may be advisable to examine the reason for this belief. First take the London United Tramways, Ltd., and we find the following mileage:

	Miles	Feet	Inches
Authorized lines	40	0	0.00
Extension, session of 1901	14	7	3.40
Proposed extension	21	6	9.74
Proposed extension — Hammersmith Bridge, Barnes, Mortlake, Richmond.	3	5	1.00
Total route length	80	3	4.14

This well-planned system of tramways, on its present 16 miles of operated route, carries 40,000,000 passengers annually. The estimate is 300,000,000 when the entire system has been completed, an estimate, in my opinion, far below the realization when a quick, cheap and up-to-date electric traction railway has been installed.

NORTH LONDON TRAMWAY SYSTEM

Of far more interest for the present article is the North London Tramway System promoted, as I have said, by the British Electric Traction Company. This latter system, of which a map was published last week, is interesting as being the first example of an interurban system promoted by a company in association with a County Council. Here, we have a total route mileage, as now planned, of about 120 miles, 56 miles of which are being worked. The system, as planned, will comprise both tramways and light railways, so-called and constructed, I suppose, because of the advantages of organizing under the Light Railway Act, but all will ultimately be operated as electric traction. The operating lines of this company now carry annually 165,000,000 passengers, a number of which will be easily doubled when their entire system is completed and electric equipment substituted for horse-power.

As the conditions of this association have many attractive features, and are likely to become to some extent a precedent, they may be briefly reviewed. It is clear, in the first place, that a County Council, by having certain powers of supervision over a very large area, is able to take a much more comprehensive view of the traction question than a local authority. When, as in the case of the Middlesex County, the County Council is the road authority, it is natural that it should want to retain direct control over the use and maintenance of the roads. At the same time, the County Council is not a body fitted by its constitution to undertake the development of a speculative trading enterprise such as interurban tramway or light railway promotion.

Therefore the Middlesex County Council, in deciding to promote a large system of electric road lines in the county, decided at the same time to leave the working of them, with the associated commercial risks, in the hands of a company. Procedure under the Light Railways Act (referred to hereafter) was followed in each case, and powers were obtained for about 50 miles of line, as shown on the map.

The agreement between the County Council and the company runs as follows. It may be mentioned that the neighboring County Council of Hertford is also a part to the agreement:

"The cost of constructing these lines, including the necessary road widenings and the acquisition of sites for power stations and depots, is borne by the County Councils, who have agreed to grant leases of the system to a company known as the Metropolitan Electric Tramways, Ltd., for terms of thirty and forty-two years, respectively, the cost of the machinery, equipment, plant and rolling stock being borne by the lessee company. The conditions of these leases provide that, after payment of a moderate rate of interest to the Councils and to the company on their respective expenditure, the net profits shall be divided, in the case of Middlesex, in the proportions of 45 per cent to the Council and 55 per cent to the company, and in the case of Hertford in the proportion of 40 per cent and 60 per cent to the company. The leases also provide that the company's expenditure is to be limited to material which becomes purchasable by the Councils at the expiration of the respective terms at a price which will represent their value as part of a going concern."

By this last clause the company avoids the expenditure of a large amount of money on permanent way and improvements, for which a comparatively small return would probably be obtained at the termination of the leases. It will be observed that the tenure of the leases is much longer than the average (which is twenty-one years). This longer tenure, together with the equitable financial arrangements, will enable the company to conduct its operations in a spirit of liberal enterprise, free from the narrow restrictions which are so common in the arrangements with local authorities. To the County Council the agreement means complete control of the public roads and a sound security that the public money expended will receive its due interest and thus not prove a burden on the rate payers.

LEASING FROM THE LONDON COUNTY COUNCIL

From the map of the Middlesex system, shown last week, it will be noticed at three points the projected lines connect with the existing horse tramway lines of the North Metropolitan Tramways Company. This juxtaposition brings them in touch with a more complicated problem than that of making arrangements with the Middlesex County Council for a system of new lines. Part of the North Metropolitan lines lie within the Middlesex County and the remainder (constituting much the larger portion) within the County of London. The latter part now belongs to the London County Council, being leased to the North Metropolitan Tramways Company until 1910. The former part belongs to the North Metropolitan Company, as well as being worked by it.

The bulk of the North Metropolitan shares have now been acquired by the Metropolitan Electric Tramways, Ltd., which is an associated company of the British Electric Traction Company. This amalgamation will enable the Metropolitan Electric Tramways, Ltd., to electrify the existing lines in Middlesex, and to work them in conjunction with the lines which are about to be constructed. An extensive system of lines would thus be formed, reaching from the borders of the densely populated area of London proper, through suburban areas to what is almost open country. The public usefulness of this system would plainly be much increased were it to be worked in harmony with the lines within the London County area. But the lease of these lines expires in 1910; the conversion from horse to electric traction is thus impracticable; and the policy of the London County Council as regards the fate of these lines is as yet unknown. For these reasons it is impossible to say whether inter-communication between the neighboring systems will be effected when both are electrically worked. The public interest, of course, points emphatically to the unification as regards working arrangements of all the lines shown in the map. As regards the traffic itself they are practically one system.

The actual negotiations with the Middlesex County Council extended over several years, and were not unattended with the difficulties natural to complicated arrangements pledging the policy of a public body for many years to come. But it may be said that the Middlesex County Council displayed a very clear appreciation of the public advantage of interurban lines under a single enterprising control, and was much more amenable to the conditions of a business arrangement than the average local authority. If all public bodies had given the evidence of the same statesmanlike intelligence and public spirit, there would be less complaint of the stunted growth of tramways in England.

DIFFICULTIES OF COMBINING

The history of such undertakings as the Black Country system illustrate the difficulties involved in arranging inter-communication facilities between neighboring systems owned respectively by companies and local authorities. The municipal systems occupy for the most part the areas of densely populated towns, and their owners have naturally a tendency to regard them as self-contained, and, therefore, superior to connections with outlying systems. From the present state of municipal opinion with regard to private enterprise it seems utopian to expect the initiative of better things from local authorities themselves. The necessity for free inter-communication between neighboring tramway systems is already a truism among electric traction companies; but local authorities, not being business organizations, do not treat the question on the same broad commercial lines. There seems every reason to anticipate that the local authorties will not, save in rare cases, be readily induced to arrange running powers with tramway undertakings touching their borders. The public interest, nevertheless, demands it, and points to the necessity of altering the state of the law in order to achieve it. When two neighboring railway companies do not agree to running powers for which there is a clear public necessity, Parliament can enforce mutual working arrangements. Now that extensive tramway systems of a nature similar in character to railway systems are being built up, common sense requires Parliament or the Board of Trade should have the same power to force inter-communication where various tramway systems are contiguous. For such action, moreover, there is already a precedent in the tramway world, apart altogether from the example afforded by railway legislation. I refer to the case of Bournemouth. At the present time an interurban system of tramways is under construction in and around that fashionable health resort. That system is the outcome (partly indirect) of the endeavors of the Poole & District Electric Traction Company to obtain powers for certain lines of tramways within the boundary of Bournemouth itself, with a continuation westward to the harbor of Poole, and eastward to the small town of Christchurch. No fewer than three times did the Corporation of Bournemouth appear in successful opposition to the company's applications. The ground of opposition was that Bournemouth being a quiet home for invalids did not want electric tramways. However, the repeated efforts of the company gradually influenced the views of the corporation, and they followed up their appearances as opponents by themselves promoting the previously unwanted lines. Meanwhile the company had obtained powers for the Christchurch and the Poole lines. Following the usual course, Parliament approved the application of the Corporation in preference to that of the company, as far as the lines in Bournemouth were concerned.

If no running powers had been arranged between company and corporation, the condition of things would have resulted in two lines being worked, shuttle fashion, up to the boundary of Bournemouth, while the Bournemouth system itself would, as it were, revolve on its own axis. The need of free interconnection was too obvious to be overlooked, and the Corporation obtained its order on the express condition that the company should have running powers over certain lines necessary to the inter-connection. Similar powers were granted to the Corporation in respect of the lines of the company.

Such a case should go far to facilitate the Board of Trade in its efforts to form junctions between the network of tramways under the two kinds of control. But any movement in that direction must come from public opinion, awakened to the advantages of interurban systems when working in harmony with each other. The awakening will probably be slow, as in most cases public opinion, even when thoroughly wide-awake and in earnest, is not very rapid in its action. But it appears to be impossible that local authorities can continue for an indefinite period to shut the gates against companies which may justly claim to be in a position to offer important benefits to their citizens.

PAROCHIAL SPIRIT MANIFESTED

The parochial spirit of municipalities has been evinced in their dealings with each other, perhaps more strongly in their relations with companies. Next-door neighbors are not always the best of friends; and municipalities are in this respect very human. The natural pride of each of them in their municipal achievements has an obverse in a natural jealousy of the achievements of others. There is no necessity to dwell on this well-known aspect of municipal life, but it must, at least, be referred to in order to explain why municipalities have not done much to develop isolated tramway systems into interurban networks. The old familiar difficulties of getting several local authorities to work harmoniously together in a drainage or water scheme are experienced again in connection with tramways. They are, indeed, exaggerated beyond their usual intensity, because questions of profit on municipal outlay are involved in mutual traction and enterprise. In this matter also, local authorities are conspicuously human.

One of the most striking examples of the failure of munici-

palities to come readily to a working tramway agreement was afforded by Salford and Manchester. These two towns—numbering about 700,000 souls together—are really a single town; the boundary line is purely artificial, and it is a common saying that you cannot walk two steps in Manchester without treading on Salford. In such a situation it would be the height of folly to have two isolated tramway systems. The Corporations were in this case the tramway owners, and they readily enough admitted that free inter-communication was an immediate practical necessity. Time after time, however, they vainly endeavored to arrange the terms of running powers. Manchester's proposals were objected to by Salford as inequitable; Salford's proposals were objected to by Manchester on similar grounds. Committees were formed by each Corporation, reports were drawn up, discussed, submitted to the neighboring Corporation and rejected. The press took the matter up, and for more than two years the Corporations discussed the matter without coming to any settlement. In the end Manchester decided to apply to Parliament for the necessary running powers.

The Corporation of Glasgow is experiencing considerable difficulty in making the necessary arrangements for the extension of its municipal system of tramways to the neighboring shipbuilding center at Clydebank. Leeds and Bradford, which are only 8 miles apart, are debarred from inter-communication because they could not agree to adopt the same gage for their municipal tramways. Leeds chose 4 ft. 8 ins. and Bradford 4 ft. These cases show how difficult it is for municipal bodies, whose sympathies are inevitably directed to a single special area, to carry on enterprises which, to be properly conducted, must ignore local boundaries and spread freely in all directions. They show, also, how little in the way of interurban tramway development may be expected to arise out of the initiative of the local authorities.

In addition to this criticism "by results" there are many objections to be urged on the grounds of inexpediency and of principle, to any local authority carrying trading operations in the areas of neighboring authorities—as must be done if municipalities are to become promoters of comprehensive systems of electric lines. Whether the rate payers of A should be taxed to provide tramways of B, and whether the pennies paid by the public to B should be applied to relieve the rates of A—such are the questions that are opened up as soon as a local authority trades beyond its border. And all the arguments against municipal speculation within the limits of each area become emphasized when the area is overstepped.

Experience seems to indicate very clearly that in the majority of cases the municipal control of a tramway system implies an obstacle to the development of that system to become part of an extensive interurban system.

OTHER RESTRICTING INFLUENCES

Although municipal obstruction (both direct and indirect) has been a powerful deterrent to the growth of large tramway systems, it is not the only restrictive influence. In England, as in America, the steam railways have done their best to crush all projects for tramways running parallel for any material distance with their lines. The opportunity for effective opposition was placed in their hands by the Light Railways Act of 1896. This act has in other respects proved a good friend of the electrical traction industry, although it has not realized all the hopes which were entertained on its first appearance. As no definition was given in the act of a light railway, the simple and rapid procedure under the act was largely taken advantage of by tramway promoters in seeking powers for interurban lines. Its provisions were more favorable to free enterprise than those of the Tramways Act of 1870, but as the old act was not definitely repealed, the Light Railway Commissioners felt obliged to interpret the new act in the spirit of the old. Hence, the power of the municipal veto remained active under the Light Railways Act, although that act did not specially grant the power of veto; and the principle of limited tenure remained, although the act contained no definite instructions on that point.

The situation was so anomalous, and was productive of such frequent disappointment in the case of thoroughly sound schemes, that the revision of the Light Railways Act has become almost imperative. At the present moment the government possesses a new Light Railway Act, which will be put before Parliament for consideration "at the earliest opportunity." That may be this year, but more probably it will be next year. As the provisions of this new act are still private, it is impossible to guess how far they will assist the progress of electrical traction. Nevertheless, the president of the Board of Trade has publicly stated that the proposed act contains an acceptable compromise on the crucial question of the absolute veto hitherto possessed by the local authorities. That is at least one step in the right direction, and as such is something for which to be grateful. But unless a more radical reform than that is effected by the bill, it may prove ultimately to be a stumbling block by containing just sufficient progressive qualities to give the appearance of improvement, yet not sufficient to make it anything like permanently useful in the cause of progress.

THE LIGHT RAILWAYS ACT

The particular clause in the Light Railways Act which gives the railway companies a lever for opposition reads as follows:

"If the Board of Trade, on such consideration, are of opinion that by reason of the magnitude of the proposed undertaking or of the effect thereof on the undertaking of any railway company existing at the time, or for any other special reason relating to the undertaking, the proposals of the promoters ought to be submitted to Parliament, they shall not confirm the order."

"Submitted to Parliament" means that the scheme shall be embodied in a private bill passed through all the expensive process of Parliamentary treatment. The railway opposition is then considered "on its merits" in theory only, since the natural tendency of Parliamentary committees is to protect the vested interests of the railway companies. In actual practice, scheme after scheme has been rejected by the Light Railway Commissioners on the ground of railway opposition. Only in certain cases was the procedure by private bill either feasible or successful; and for a time it seemed as if the attitude of the railway companies to tramway competition was about to prove as serious a stumbling block to the construction of electric traction systems as the obstacles interposed by reactionary municipalities.

Fortunately, there are signs of change in the attitude of the railway companies. From their first natural feeling of uncompromising opposition they are apparently passing to a better comprehension of the true functions of the tramway in relation to the railway. How long a time will elapse before they fully realize that the interurban tramway is complementary to, much more than competitive with, the heavy steam railway, I do not hazard a prophecy. But the course of recent events undoubtedly shows that the hostility of railway companies to the tramway innovation is sensibly weakening. In many instances it has become modified to the level of toleration, and in two significant cases it has been transformed to active co-operation. As these cases may prove to be the turning point in the career of interurban tramways as regards their association with railways, it is interesting to state their main features.

One of the cases refers to the London & North-Western Railway Company, and the other to the Midland Railway Company—the two most important railway companies in England. The former company has made arrangements with the Dudley, Stourbridge & District Electric Traction Company, Ltd., whereby the tramway company runs special cars to Dudley station in connection with the railway excursions from Birmingham. This is a direct recognition of the value of a

tramway system as a feeder to a railway, even in a district which is already well provided, in the ordinary sense, with railway facilities. Negotiations are also in progress for the association of the tramway and the railway in goods and parcels traffic; and if the working details of that matter can be settled, we shall have an example of a large tramway system co-operating in every department of traffic with a railway undertaking of the first magnitude.

The case of the Midland Railway is even more striking. Some time ago a group of private interests promoted a system of light railways in the neighborhood of Burton-on-Trent, which is in the territory of the Midland Railway Company. That company appeared before the Light Railway Commissioners and successfully opposed the light railway scheme on the ground that the proposed lines would compete directly with the "Midland traffic proper," as the chairman of the Midland expressed it. The commissioners, in rejecting the proposal, stated that they did so with regret, as they felt that the lines, if constructed, would prove of real public benefit.

On the strength of that opinion, the promoters of the light railway afterwards approached the directors of the Midland Railway Company, with the result that at the last half-yearly meeting of that company the shareholders were asked to sanction the promotion of the light railway system which their company had previously opposed on the ground of competition.

It is intended to work the light railways so that they will not interfere with the steam railway traffic—which means that the Midland Railway Company has duly recognized the electric tramway as an ally, even though it should traverse the same ground as an existing railway. It is, of course, possible that these instances of co-operation may prove to be exceptions to the general rule of antagonism, but they more probably indicate that the railway companies will in time regard the progress of interurban electric tramways with equanimity if not with pleasure. The contention of the tramway interests is, of course, that the character of the traffic catered for by the tramway, with its frequent service of single cars with numerous stops along the road, is essentially distinct from the railway traffic proper, where large trains of cars are run at comparatively infrequent intervals with comparatively few stops. The one, in short, is short-distance traffic in which frequency of service is the main thing, and the other long-distance traffic in which speed is the main thing.

The influence of tramways in developing surburban and rural districts, moreover, can no longer be overlooked by the railway companies. The chairman of the Wirral Railway Company recently gave expression to an opinion on this subject which may be regarded as another sign of the times. He said that although their line certainly suffered to some extent from tramway competition, he fully expected that it would ultimately benefit from the increased population brought into the district by the tramways.

All these things tend to the reduction of the violence of the railway opposition which has appeared as an additional serious menace to the development of interurban electric tramways. They show, in addition, that English railway companies are more amenable to the influence of innovations than they are generally understood to be.

THE ENGINEERING POINT OF VIEW

From the engineering point of view, interurban tramways differ in some respects from Continental and American lines of the same character. As I have already said, these differences are not vital. Nevertheless, they do affect the prosperity of the English tramways to a certain degree. They are mainly due to the narrowness of the roads, which involves expensive road widenings and the use of single lines with loops. The necessity of single lines, in conjunction with the comparatively congested nature of the vehicular traffic on narrow town roads, prevents the adoption of a very frequent service at high speed over many portions of the tramways. For that reason many of the calculations based on the results attained by Continental or American street railways were not borne out by the results actually obtained on English roads. The carrying capacity per route mile was naturally less than with a continuous double line on an open road.

To some extent this drawback may be averted in future by building light railways on tracks of their own through open fields. But at present the legislative conditions governing the purchase of land for such purposes are not by any means favorable. They are practically the same as those relating to the case of railways, but the proportion of capital expenditure involved is apt to be too large in proportion for a tramway company. What is wanted is power to compulsorily purchase a strip of land of the necessary width. If that were possible, the change might facilitate the construction of interurban lines in many districts where the difficulties arising from the congestion of the street traffic are considerable.

Double-decked cars are peculiar to England, and their use has arisen partly from the necessity of combining a large carrying capacity with a comparatively short wheel base (so as to prevent cars blocking the street traffic by their length) and partly from the persistent popularity of the double-decked car with the English public. Small single-deckers have been tried on English tramways, but have not proved a success.

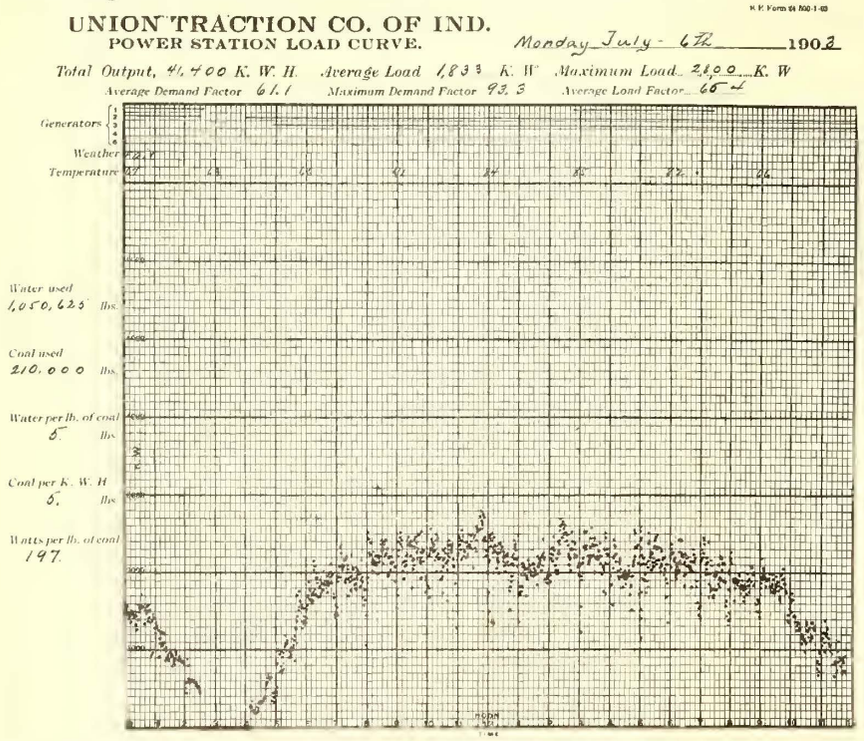
According to the latest available figures the number of route miles of electric tramways and light railways constructed and under construction in the United Kingdom is 1720, while 1396 miles in addition are fully authorized to be built or converted. These figures, however, convey only a faint impression of the actual condition of electric traction enterprise in this country. Every town of any great size already possesses, or is on the point of possessing, its electric tramways, and from each of these centers we may confidently expect new lines to radiate along the highways of traffic until they link themselves up with neighboring centers. For reasons already stated, this process of growth will be slower under municipal control than where the enterprise is in the hands of joint stock companies. But under any circumstances it is inevitable, and it is not likely to cease until every town and village in the kingdom is placed in direct communication by this means with its neighbors.

ST. LOUIS TRANSIT COMPANY TO RENT POWER

The plans of the St. Louis Transit Company, previously mentioned in these columns, for the erection of a large steam turbine generating station in East St. Louis before the opening of the World's Fair have been abandoned and a contract entered into with the Union Electric Light & Power Company, of St. Louis, for the rental of power to the amount of about 9000 kw, to carry the heavy load during the World's Fair next summer. The St. Louis Transit Company's power houses are capable of supplying about 29,000 kw at present. The Union Electric Light & Power Company is building a large station at Levee Street and Ashby Street, which is on the St. Louis river front, a few blocks north of the Eads Bridge. In assuming this contract the Union Electric Light & Power Company purchased the two 5000-kw Curtis steam turbine units, with 6600-volt three-phase generators ordered from the General Electric Company by the St. Louis Transit Company, and also the twenty-four Stirling boilers of 500 hp each that had been ordered. This relieves the St. Louis Transit Company from the necessity of building a station for several years at least. Owing to the high price of labor and material at St. Louis just now, previous to the World's Fair, and the necessity of great haste in the building of a new power station, it would have been expensive work the coming six months, and it is felt that the decision to rent power is a wise one.

POWER STATION LOG OF THE INDIANA UNION TRACTION COMPANY

The Indiana Union Traction Company has adopted a power station log sheet which is of unusual form, as it contains the original record of the power station load made by a recording wattmeter, and has information regarding the daily operation of the plant in condensed form. Several sheets of this log are reproduced herewith. The log sheet is cross-ruled for the plotting of the load curves of the station. The sheet is put in a new form of recording instrument designed by employees of the company, and the load in kilowatts is recorded by a dot once each minute, as the log sheet passes through the instrument. The sheet, therefore, contains a much more accurate record of the power station output than is usually obtained by readings taken by switchboard attendants. The log sheet is printed upon tracing paper, so that after the other data regarding the performance of the station for the day are entered with the pen, blue prints can be made and sent to the various officers of the road.

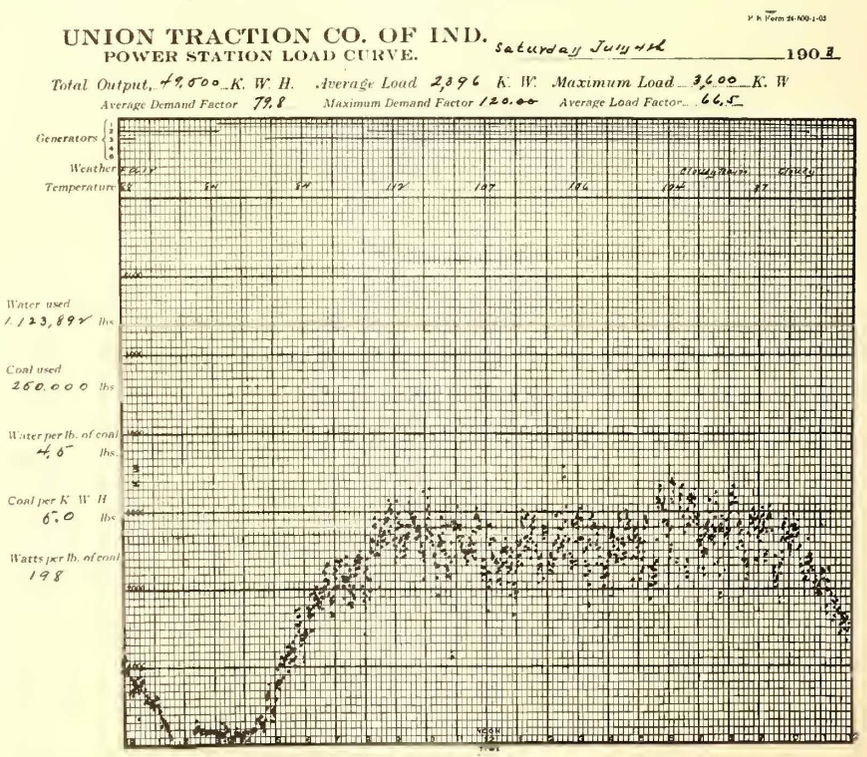


The log sheets reproduced here are of interest, not only for their form, but as showing the regular daily performance of the Indiana Union Traction Company's large station at Anderson. As will be seen the log sheet gives the total output in kilowatt-hours, the average and maximum loads in kilowatts, the average demand factor, which is the relation of the average load to the capacity of the generators operated; the maximum demand factor, which is the relation of the maximum load to the capacity of the generators operated, and the average load factor, which is the relation of the average load to the maximum load. On Saturday, July 4, for example, the average load was 79.8 per cent of the rated capacities of the three 1000-kw generators which were in operation. The maximum demand was 120 per cent of the capacity of these generators, the average load was 66.5 per cent of the maximum load. The number of generators in operation and the hours they are in operation are indicated at the top of the log sheet, opposite the numbers of the respective generators, by straight lines drawn between the hours that the respective generators are operated. The temperature is noted every three hours, and also the weather, from hour to hour, if there are any changes. At the side of the sheet is given the water used, coal used, coal per kilowatt-hour and watts per pound of coal. Coal used cannot be determined exactly from day to day, although total coal for a period of time would be known accurately.

The character of the load on this company's power house on different days is well shown by the sample log sheets reproduced. Thus, Saturday, July 4, is a holiday, upon which the load was naturally larger than usual. The company operates from this station over 100 miles of interurban line, and 50 miles of local city line in several cities.

The reason for the high and low loads on the even hours is due to the fact that it happened that a number of cars are at terminal points and sidings on the even hours, and are either standing still or starting just about that time. Indeed, the load record on these power station logs, to the experienced eye, tells whether cars were operated on time or not, or whether the schedule in some was broken up so that terminal points were not made on the even hour.

We are enabled to reproduce these log sheets through the courtesy of Albert S. Richey, electrical engineer of the Indiana Union Traction Company.

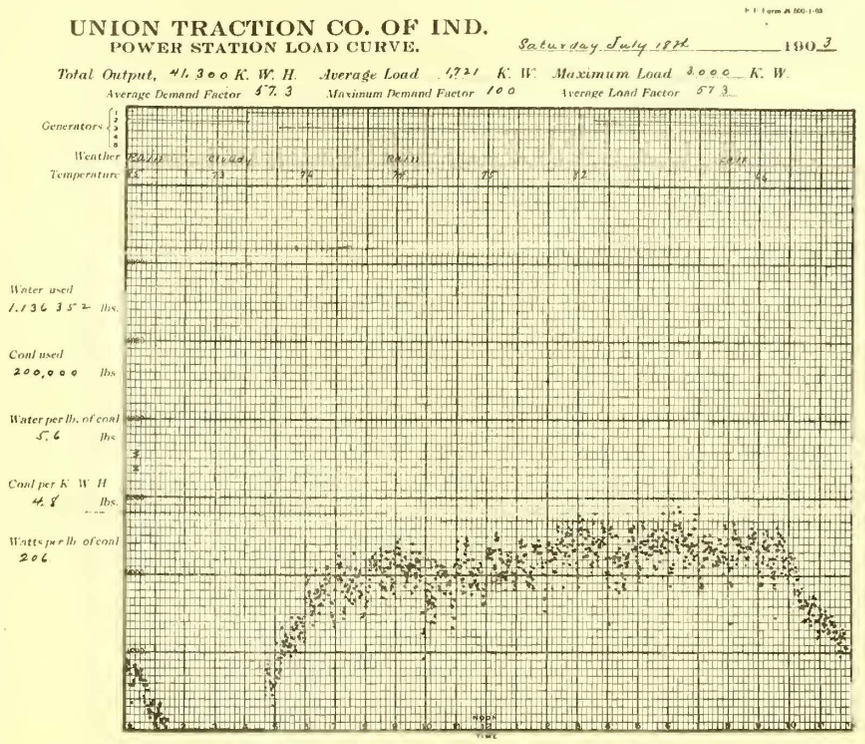


The Cleveland Electric Railway Company, of Cleveland, Ohio, has placed in operation an observation car which will be operated over all parts of the city system, affording patrons an opportunity of seeing all places of interest. The starting point is at the Public Square, at 9 a. m. Regularly thereafter until 7 p. m. cars leave at intervals of two hours. Each trip will be over a different route. A charge of 25 cents per trip is made, and it is part of the duties of the conductor in charge to announce all points of interest as they are passed. Thus far the experiment has proved exceedingly profitable and the car has been filled on nearly every trip.

NEW WORK IN OMAHA

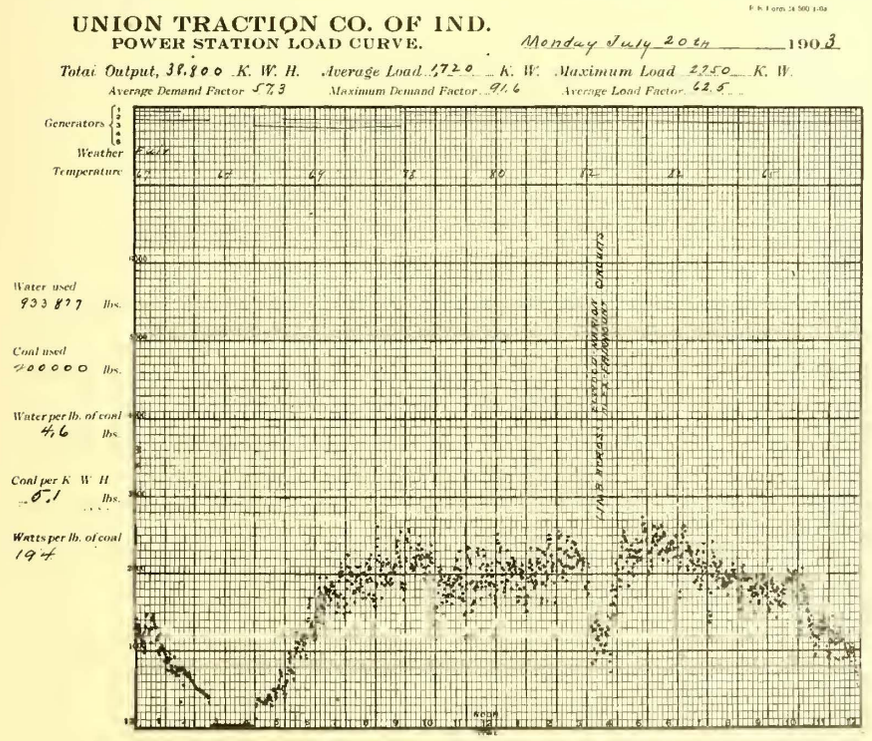
All the street railway properties in the city of Omaha, Neb., are now owned by the Omaha & Council Bluffs Street Railway Company, which, on Dec. 22, 1902, purchased the Omaha Street Railway Company and the Metropolitan Cable Railway Company. In addition the Omaha & Council Bluffs Street Railway Company has leased for a period of ninety-nine years the properties of the Council Bluffs Street Railway Company, the Omaha, Council Bluffs Railway & Bridge Company and the Omaha, Council Bluffs & Suburban Railway Company. The latter three properties are situated in the city and suburbs of Council Bluffs, It. It is thus seen that the new company operates all the street railways in Omaha and South Omaha, Neb., and Council Bluffs, Ia. The company owns 90 miles of track and leases 32 miles.

The company is now operating an old power station at Twentieth Street and Nicholas Street, in Omaha, and also a station in Council Bluffs. In order to handle the entire system from one plant the company has designed and is now building a new power plant at the foot of Jones Street, on the Missouri River front. This site is three-fourths of a mile from the center of the city of Omaha, which is approximately at Sixteenth Street and Farnam Street. The new station is designed for a total capacity of 6000 hp, and it is hoped that it will be completed by April 1, 1904.



The initial order for generating equipment consists of three 1000-kw General Electric railway generators, direct-connected to 1500-hp, horizontal cross-compound condensing engines, made by the Fulton Iron Works, of St. Louis. These engines will have cylinders 26 ins. x 54 ins. in diameter by 60-in. stroke, and a speed of 80 r. p. m. The generators are 525-575-volt, 1730-amp. machines, and have a guaranteed overload capacity of 50 per cent at 575 volts for 2 hours and 100 per cent momentary overload. In addition to this new generating equipment there will be moved to the new plant an 850-kw railway generator, driven by a cross-compound Allis engine, that is now operating in the old station. The General Electric Company will also supply the switchboard, which will consist of four generator panels, two blank panels and twenty feeder panels.

In the boiler room there will be installed six Babcock & Wilcox water-tube boilers in three batteries. These boilers will generate steam at 150 lbs. pressure, and have superheating coils designed to superheat at 80 degs. The boilers have a total capacity of 3145 hp. They will be equipped with Green traveling-link grate stokers, 11 ft. 9 ins. long, with 106 sq. ft. of grate surface to 500-hp of boiler capacity. Space will be provided for an additional installation of two similar boilers.



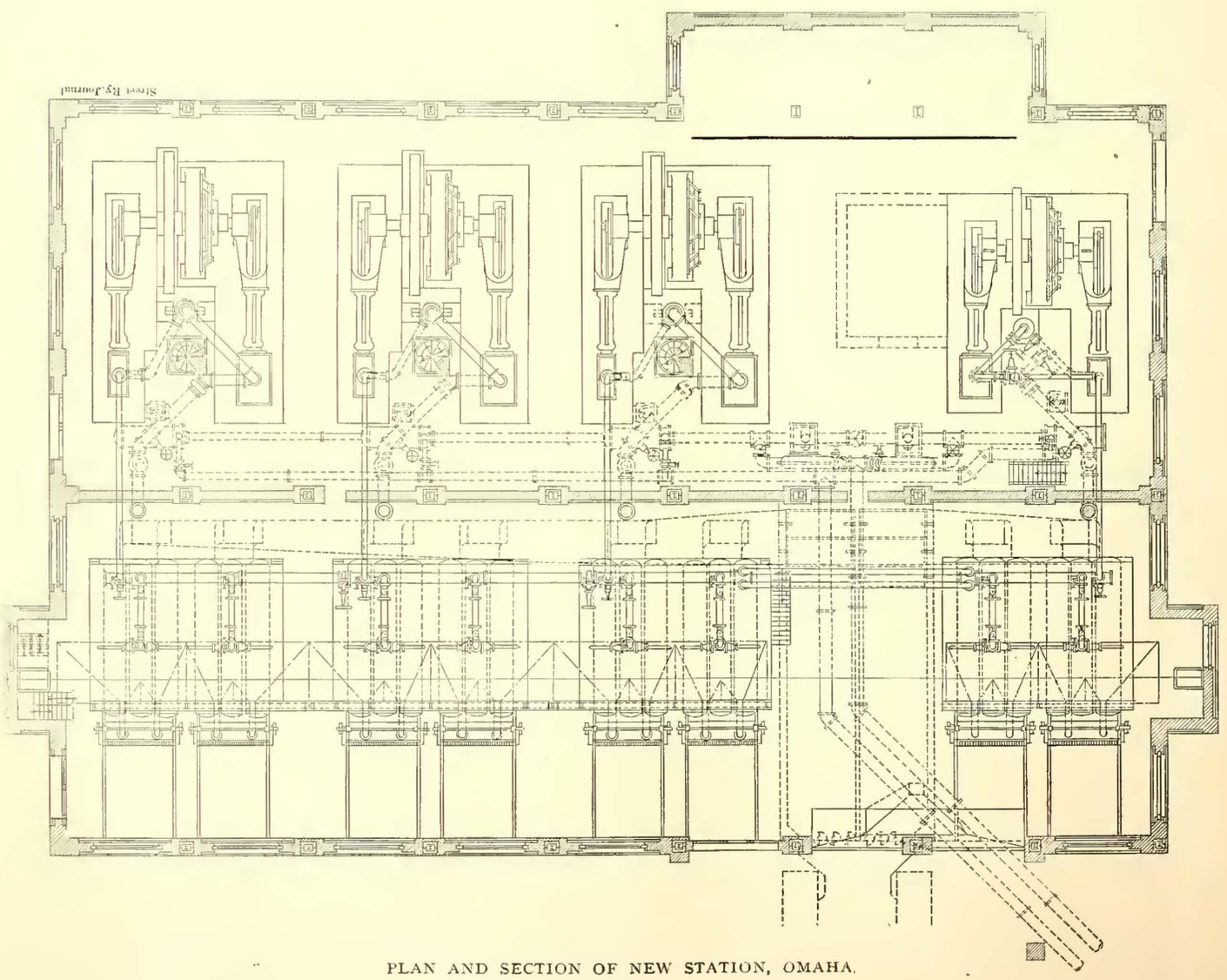
A coal and ash conveyor of the McCaslin overlapping gravity type, manufactured by John A. Mead & Company, will be placed in the boiler room. The conveyor will be electrically driven, and will have a speed of 35 lin. ft. to 40 lin. ft. per minute. There will also be placed a coal crushing mechanism and a cross conveyor to carry the coal to the main conveyor.

Although a coal conveyor has been provided it will be seen from inspection of the plans that this coal conveyor is not absolutely necessary to the operation of the plant. If the conveyor was not in operation coal could be shoveled by hand directly from the cars to the place in front of the boilers instead of passing down the chute to the coal crushers.

The building is on a wedge-shaped piece of property, located between the Union Pacific and the Burlington tracks. There is room in this space for forty cars of coal, which can be kept as a reserve.

The Green Fuel Economizer Company will install a fuel economizer of fifty-two sections, each of fourteen tubes, the total heating surface being 9464 sq. ft. The same company will install two induced-draft fans with stack and connections. The fan will be of the steel-plate type, with blast wheel 18 ft. in diameter and 5 ft. wide, the inlet diameter being 122½ ins., and the outlet being 104 ins. by 64 ins. The steel stack will be 45 ft. high, and have a diameter of 10 ft.

The general dimensions of the power station will be 189 ft. long by 115 ft. wide. A longitudinal wall will divide the building into an engine room 60 ft. wide and a boiler room 55



PLAN AND SECTION OF NEW STATION, OMAHA.

ft. in width. An addition to the boiler room, 58 ft. x 36 ft. in size, will contain the induced-fan equipment. An electric traveling crane will span the engine room. The plans for the new power station have been prepared by Lichter & Jens, of St. Louis, the consulting engineers for the company, and the work is being supervised by W. A. Smith, treasurer and general manager, and R. A. Lerssler, secretary of the company.

Upon the completion of the new power house the old generating station in Omaha will be shut down and used as a general repair shop, the other shops of the company then being centralized there.

During the last winter the company has placed in service twenty single-truck closed 20-ft. Jones cars, equipped with General Electric 57-motors, mounted on Peckham trucks. Twenty new single-truck open Jones cars, 30 ft. over all, with similar equipment, are now being placed in service. During this month (June) the company expects to receive ten double-truck interurban cars, made by the American Car Company. These cars will have 34-ft. bodies, and will seat forty-eight passengers each. They will be equipped with Peckham trucks, Christensen air brakes and arc headlights. Each truck will be provided with a General Electric 67-motor.

The company has just opened a new interurban line to the village of Florence, where the city waterworks of Omaha are located. This line is a 3½-mile extension from the terminus of the North Twenty-Fourth Street line. It is built with 60-lb. T-rail, single track with turnout. During the present summer the company will probably extend its Thirteenth Street line to South Omaha, the new work consisting of 3700 ft. of double track. About 8000 ft. of double track will also be built on South Twenty-Fourth Street, giving the company still another route into South Omaha.

A general policy in reconstructing track has been followed by the company during the last few months in order to get a perfect roadbed. On paved streets a 73-lb. girder rail is used, and on unpaved streets a 60-lb. T-rail. Ohio Brass bonds are used throughout. About 30 per cent of the system still consists of old track. On most of the overhead system No. 0 trolley is used, there being some No. 00. The company is now putting up 6½ miles of 500,000-circ. mil stranded weather-proof, triple braid copper feed wire, to connect the Council Bluffs power station with the Omaha feeder system.

The people of Brooklyn, or at least some noisy, disgruntled individuals, are again crying out against the 10-cent fare charged by the Brooklyn Rapid Transit Company for a ride from Manhattan or Brooklyn to Coney Island. The courts have already decided that the company has the right to charge 10 cents, but the kickers are still pressing their demands for a single fare. In an exceedingly sane editorial utterance the "Brooklyn Times" upholds the company's refusal to accede to the demand, and expresses indignation at the annoyance that has resulted to the company from the crusade. The "Brooklyn Eagle" also has tried to point out the fallacy of asking a 12-mile ride for 5 cents. In an editorial defending the company, and in which it calls attention to the sound utterances of the "Times" on the subject, the "Eagle" says: "But we are prepared to go further than the 'Times,' and to say that a 10-cent fare to Coney Island is not only legal but is just; that it cannot only be legally exacted, but that it ought to be exacted as a fair price for what it secures. When the public is wrong, it is very wrong. When it is unjust, it is very unjust. In such case, the duty of newspapers to withstand the public until the public gets right is plain. And it is not one to be avoided. * * * A railroad, with the law on its side, can rightly charge the worth of what it gives. The Brooklyn Rapid Transit Company gives really more than 10 cents worth of travel to Coney Island, and is justified in charging and getting the dime which it obtains."

THE CRITICAL SPEED OF STEAM TURBINES

Berlin, Germany, July 24, 1903.

EDITORS STREET RAILWAY JOURNAL:

In one of your recent numbers you referred to the great difficulties which the dynamo builder encounters when designing generators for use in connection with steam turbines. These difficulties occur in arranging the generators for the peripheral speeds (1500 r. p. m. to 3000 r. p. m. and higher) which must be used in turbine construction for the sake of steam economy, and the necessity for direct-coupling the generator to the turbine shaft. The latter difficulty can hardly be avoided in large units, as all methods of speed reduction at high speeds are either impractical at all or give too low an efficiency.

On account of the necessity for high speeds of the rotating parts of the generator, centrifugal forces enter of a hitherto unknown magnitude. By using material of sufficient strength, however, a reasonable degree of safety may be obtained even at these high speeds, but there is another difficulty which must be overcome.

It will seldom or never be possible to locate the center of gravity of the rotating part in the center of the shaft with mathematical exactness even with the most careful balancing. On account of this eccentricity of the revolving masses the resulting centrifugal force tends to bend the shaft. This bending increases with the speed of rotation and the eccentricity of the center of gravity. In general, this condition may be met by using a sufficiently strong shaft, and it does not become dangerous until the so-called "critical speed" is reached. As the flexure of the shaft increases with the centrifugal forces impressed upon it, and as the centrifugal force increases with the flexure, the bending tends to increase toward infinity, that is, until the shaft is broken.

The following is a simple formula for finding the required number of revolutions (n) for breaking or infinite speed:

$$n_{\infty} = 300 \sqrt{\frac{1}{d}}$$

in which d stands for the flexure of the shaft (expressed in cm.), caused by the weight of the rotor.

To attain sufficient safety the dynamo constructor must only use one-half of the value given, that is, the actual speeds must be $< 0.5\ n_{\infty}$ and $> 1.5\ n_{\infty}$.

From this the great importance will be seen of a method of quickly finding the critical speed value up to a certain degree. This method consists in the exact balancing of the rotors, and this latter is a point which is often not given enough care.

The following requirements for balancing will be found satisfactory:

1. That the complete mounted rotor should be supported at the journal bearings and not at any other points when being balanced.

2. That the rotor be supported at the bearings on cylindrical surfaces, which are cut with absolute exactness in order that there shall be no unevenness of surfaces which would introduce errors when testing.

3. That the shaft be revolved between stationary points.

4. That the rails for the support of the testing apparatus be placed throughout their entire length on foundations which are free from vibration.

By following these requirements it is possible to reduce the radius of gyration to 1/300 mm. There is, however, a certain element of danger in the armatures of dynamos. Assuming that the apparatus is mounted correctly, yet owing to the great centrifugal force the shifting of a winding now and then can hardly be avoided. This, of course, will shift the center of gravity, which shifting may easily have important effects on the armature. As a matter of fact in spite of the most careful selection of the proper running speed in comparison with the critical speed, nearly all wire-wound armatures will give

trouble. This is particularly true with direct-current machines, which, in addition to an armature, also have a commutator as a rotating element.

The following methods are suggested for safely running high-speed turbogenerators:

1. Secure greatest possible difference between the actual running speed and the critical speed.

2. Use alternators in preference to direct-current machines whenever possible, or better still—

3. Use non-synchronous generators.

This latter machine possesses the advantage of having an armature carrying absolutely no wire. In fact, this form permits the use of speeds up to 3000 r. p. m. and 4000 r. p. m. In the Moabite central station of the Berlin Electricity Works there has been running for several months a non-synchronous 1800-hp turbogenerator using wattless current, and it has given no trouble in the direction mentioned.

Franz zur Nedden.

FENDERS IN LIVERPOOL AND BERLIN

Boston, Mass., Aug. 10, 1903.

Editors Street Railway Journal:

One of the most practical devices found by the writer in a recent examination of European street railways was the plow life guard used by the Liverpool Corporation, a fender whose perfect record might have seemed incredible but for an examination of official reports and careful inquiry elsewhere. The general manager in his annual report for 1901 states that "its principal features are that it is dissociated from the spring movement of the car, which insures its running with a fixed minimum clearance from the road surface. It is of the plow shape, and is so designed to shear a body clear of the car wheels. Three cases have occurred in Liverpool, and numerous ones throughout the country, in which persons have got under the type of guard designed to pick up, and have become entangled with the under carriage of the car in such a way as to render it necessary to raise the car before the body could be removed. Such a result is rendered practically impossible with the new guard." In his report for 1902 the manager reports "that although since its introduction twenty-one persons have been actually under cars fitted with this guard, all have been pushed out of danger without anything approaching serious injury, medical assistance not being required in any of the cases." To illustrate the value of the improved fender, this spring a bicyclist was knocked down by a car, but both he and his wheel were pushed off the track uninjured and he rode away. Last December a bicyclist ran into and was knocked down by a car equipped with an old fender, and was killed, going under the car, the life guard failing. Of the persons knocked down in Liverpool a large proportion have been children.

It will be seen from the illustrations that the plow guard consists of boards entirely surrounding the wheels, making it effective on curves, where many other kinds of fenders fail or are worse than useless. To prevent the collection of snow inside at the rear, each nose is hinged so that it can be lifted by a chain on the rear platform and allow the snow to escape through the opening left. Rubber hose forms a blunt point to the plow, and belting around the entire bottom of the boards projects to within 2 ins. of the track. The principle of the guard is not new, of course. It would be interesting to know if it has been perfected in other cities besides Liverpool so as to be absolutely unfailing. The illustrations show the guard as applied to single-truck cars; when the writer left Liverpool it was about to be fitted to the double-truck cars. In view of the constant fatalities in American cities, especially of children, a trial of the guard in this country would seem very desirable. There is nothing patented about it to hinder its use. The average and maximum speeds of cars in Liverpool seem quite as high as in many large cities in this country.

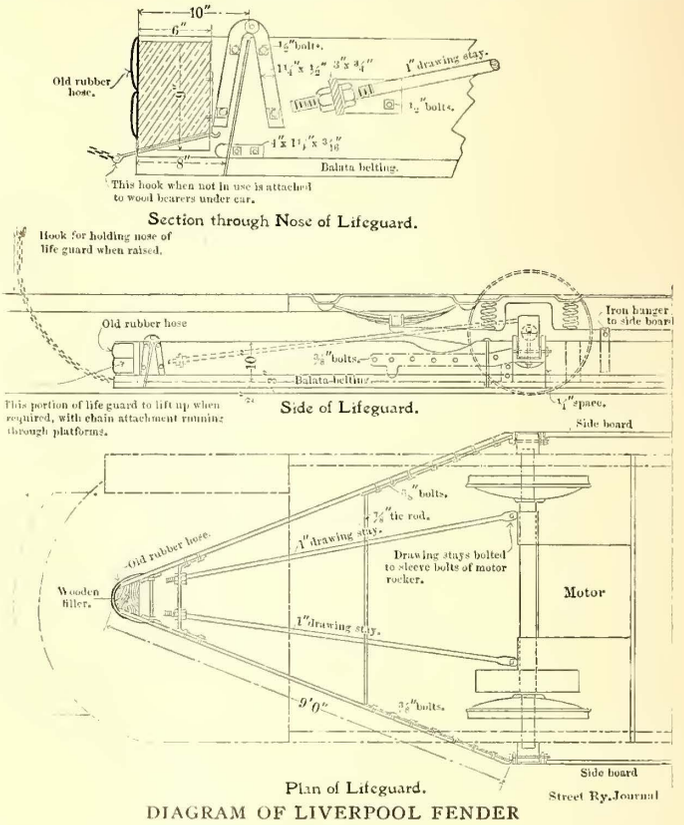
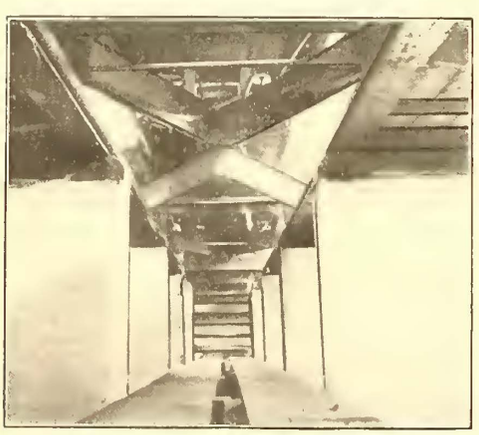
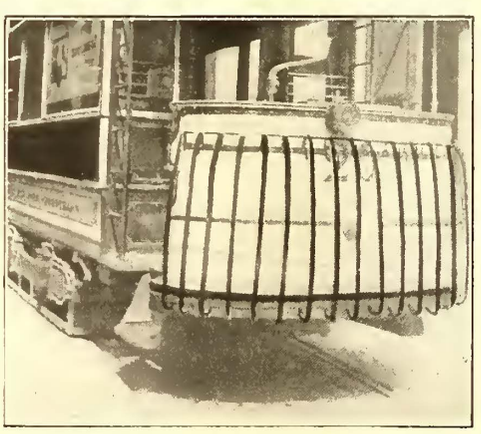


DIAGRAM OF LIVERPOOL FENDER



VIEW OF LIVERPOOL CARS FROM PIT SHOWING FENDER



LATE TYPE OF BERLIN FENDER

It is important, of course, that a person lying on the track should not be struck by anything projecting down from the car before being pushed aside by the plow guard, so the Liverpool brake shaft is short, and there is no coupling under the platform. The front end of metal steps is also filled in with wood with rounded corners to reduce the chance of injuring any person struck by it. This last is also done in Berlin, where the wheels of both single and double trucks are also surrounded with boards with a 2-in. clearance only above the track and pavement, or even less at times. Some of the Berlin cars have had rods around the dashers for persons struck to get hold of. This construction is not now in great favor, and steel ribs are being tried on the dashers in various ways, extending down over the bumpers in order to break the force of a blow against

any one hit by a car, as shown in one of the illustrations herewith. In addition a straight pilot board is used in front of the wheels. Every car also carries a jack, a saw to use on the wheel guard, crowbar and wooden blocks.

JOHN P. FOX.

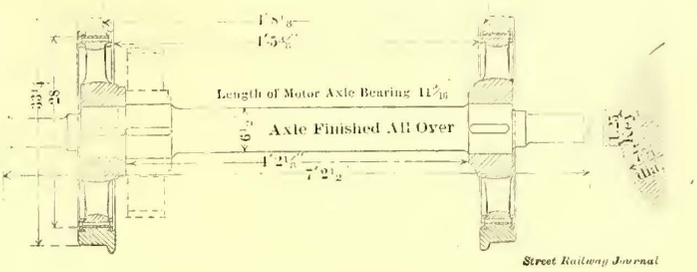
MOTOR TRUCKS FOR THE NEW YORK SUBWAY

The design of the motor trucks for the subway equipment of the Interborough Rapid Transit Company has been decided upon, and all the details of construction have been worked out. The plans, which were recently approved by the engineering department, are here presented for the first time. It will be noticed that these trucks differ materially from the Manhattan type, and also in many respects from those of other electric railway lines. This is due to the character of service in which they will be employed, as the requirements of high speed, quick braking and rapid acceleration for the heavy trains it is intended to operate will be much more exacting and of an entirely different character from the experience thus far obtained on established electric roads.

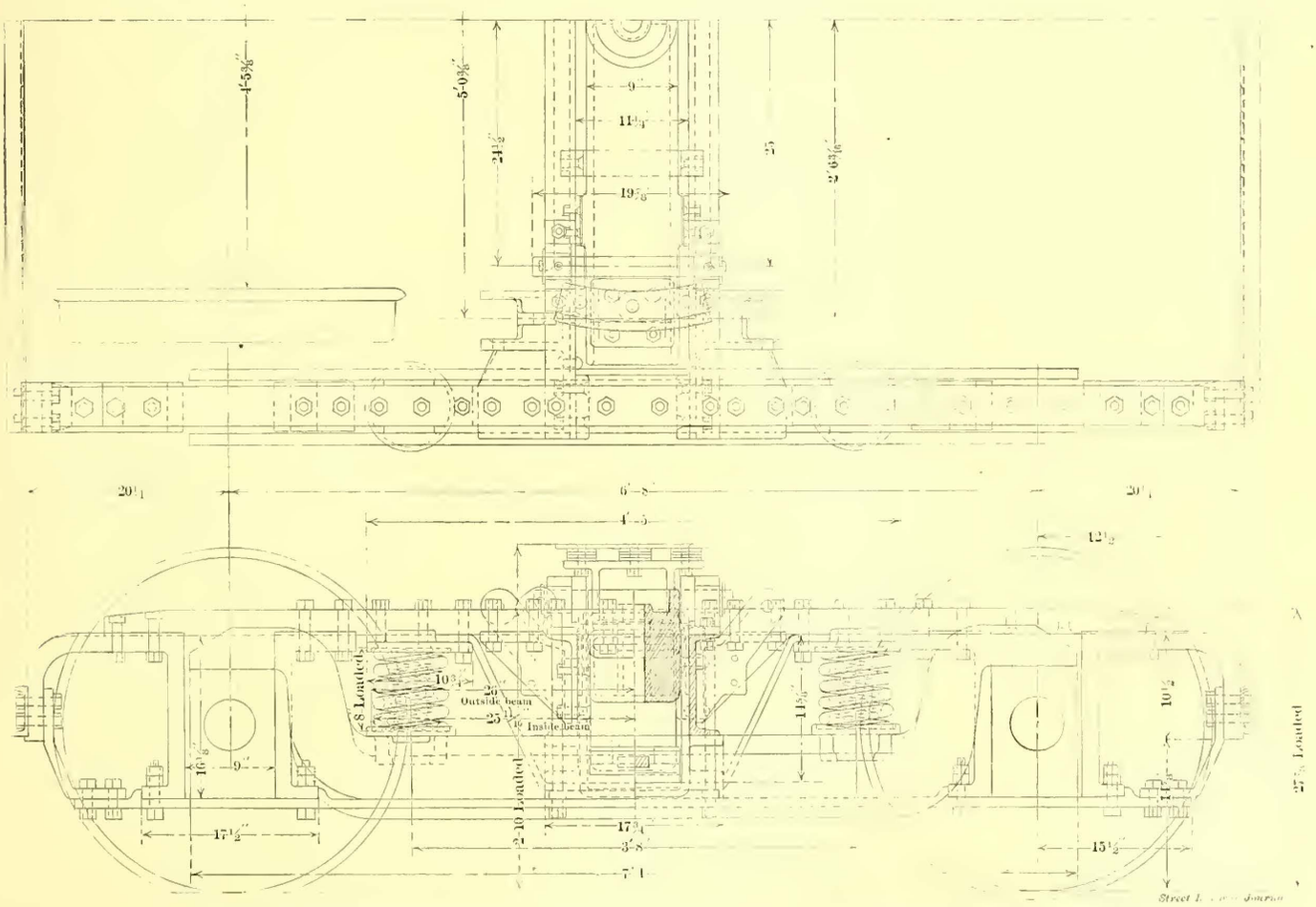
The first order calls for 350 motor trucks, which are now being built at the Baldwin Locomotive Works. Half of these trucks will carry Westinghouse No. 86 railway motors, and the other half General Electric No. 69 railway motors, the rating of which is 200 hp. Nose suspension will be employed in all cases, but the general arrangement will be different, according to the type of motor to be employed. Both styles of motor suspension are illustrated in the accompanying cut, making a detailed description of this feature unnecessary.

The principal dimensions of the trucks and other data here appended are taken from the specifications, which are very complete. The trucks used have a wheel base of 6 ft. 8 ins., and will be built for standard gage track, the distance between backs of wheel flanges being 4 ft. 5⅜ ins. The height of the truck center plate above the rail is to be 30 ins. when the car body is loaded with 15,000 lbs., and 32 ins. without passengers. The weight of the trucks complete, without motors, will be about 11,500 lbs., and the estimated weight to be carried on the center plate is 25,000 lbs. The weight of each motor is 6500 lbs., and the extra weight, due to the torque of one motor on the truck transom, is 3000 lbs.

In the construction of these trucks the side frames will be of wrought-iron machined on four sides, 2½ ins. x 4 ins., and the side truss will also be of wrought-iron. The end frames are of steel channels securely bolted to an extension on the pedestals. The pedestals are of wrought-iron forged, machined on faces and sides for journal boxes, on bottom and edges for pedestal caps and on top where joined to side frames. The pedestals are lipped over the sides of the side frames, as shown, and securely bolted to the frames. Pedestal caps are to be wrought-iron, each made in one piece, forged as shown, and fitted to the pedestals. They are to be securely bolted to all pedestals and to the center brace. The transom is to be of rolled steel channels resting in side frame castings and securely bolted. Equalizing bars are to be of wrought iron, 1¼ ins x 6½ ins., made in one piece and without welding. They will be machined on top edges for spring seats, and formed with bearings on

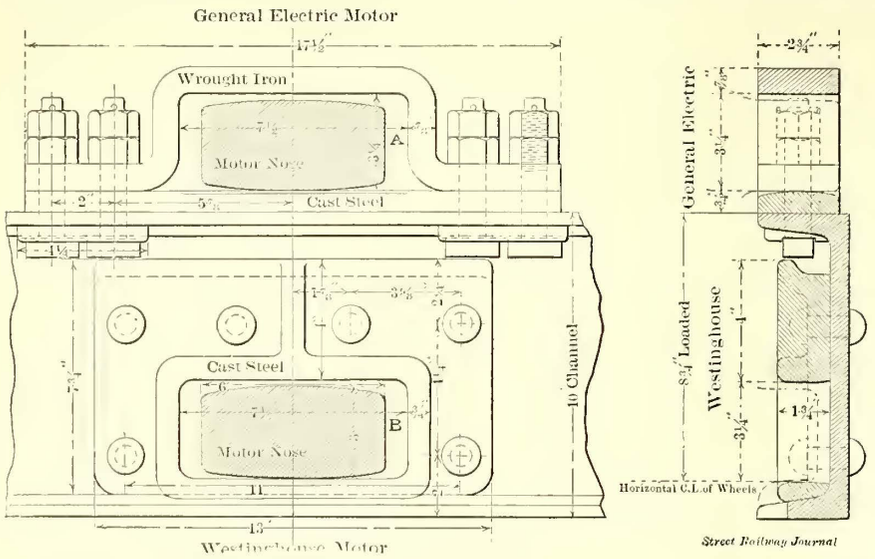


HUB AND AXLE



GENERAL PLAN AND ELEVATION OF TRACK ADOPTED FOR RAPID TRANSIT SYSTEM, NEW YORK

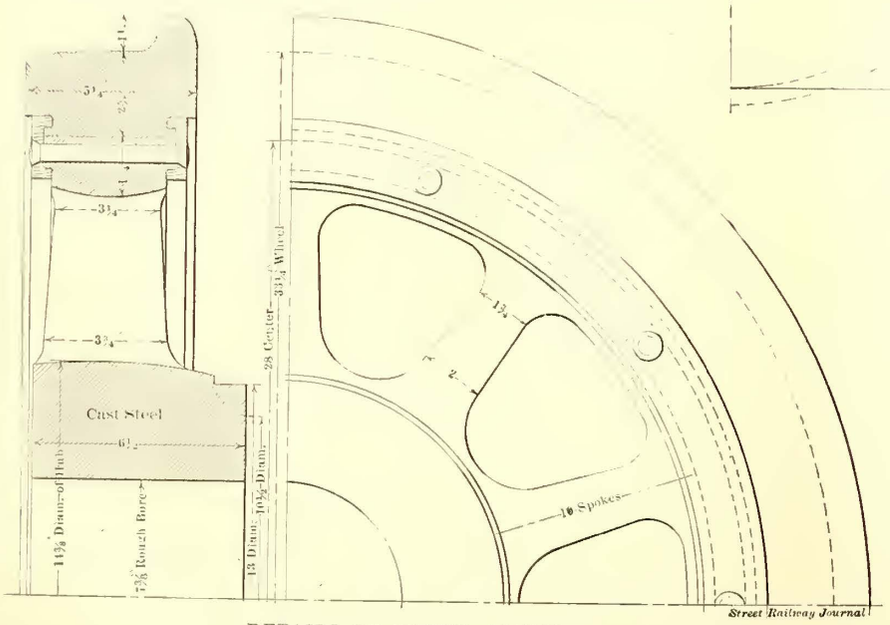
boxes. The bolster is to be of cast-steel with center plate, elliptic spring cap and chafing surface cast as part of bolster casting, all of which will be machined, while the side bearing



SECTIONS OF MOTOR SUSPENSION

castings will be cast separately, machined and provided with adjustable cap plates. The spring seats are to be securely bolted to the tie-strap, and the bolster spring seat bearing machined to fit the swing hanger. Duplicate elliptic bolster springs, 30 ins. long, with nine leaves, of crucible steel and bands of wrought-iron, will be used, while the equalizing springs are to be of open-hearth steel of the double-coil helical pattern, resting in cast-spring seats on equalizers and in caps on side frames.

The general arrangement of the brake rigging is shown in the accompanying illustration. Brake hangers, levers, rods, equalizing beam and all the other parts are to be forged of iron. The brake head is to be of the M. C. B. standard pattern of cast-steel, attached to hangers and levers with turned case-hardened iron pins. The brake-shoe adopted is the "Diamond S" type, made by the American Brake-Shoe & Foundry Company. The equalizing brake lever guides are to be of cast-steel, machined to fit the end frame channel and securely bolted to it.

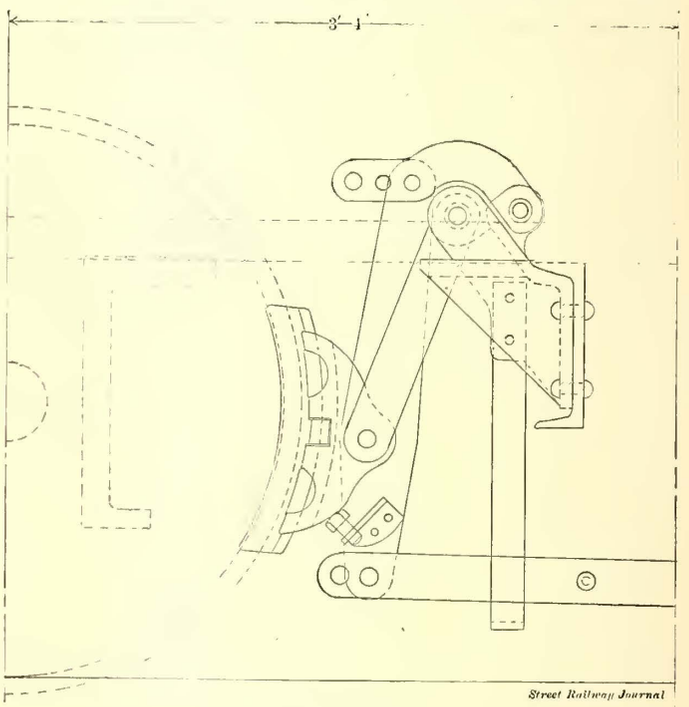


DETAILS OF WHEEL CONSTRUCTION

Single-coil helical brake release springs are to be employed.

The wheels and axles for the trucks are made by the Standard Steel Works. The wheels are to be of cast-steel, 33¼ ins. in diameter, steel tired and of M. C. B. standard tread, 2⅝ ins. x 5¼ ins. All wheels are to be pressed on axles and provided with key. Details of construction of wheels and axles are clearly illustrated in the accompanying cuts. The diameter of the axle at center is 6½ ins., at gear seat 7 13-16 ins., and at wheel seat 7¾ ins. Provision is made that axles are to be turned on collars, journals, dust guard bearings, wheel seats, gear seat, motor bearings and axle centers, and that key seats are to be milled in wheel seats and gear seats. The gears, which are of cast-steel in one piece, are to be forced on before the wheel and provided with key.

The specifications provide that the journal bearings shall be of Damascus bronze. They will have ¼-in. freedom between collars and journal, and are provided with M. C. B. slides, which are rounded on the top to insure that the brass does not tip. Provision is made in fitting the boxes to the pedestals so that there will be a perfectly free movement of the boxes in the pedestals. The wearing parts of the brake rigging (levers, pins, etc.) are all case



BRAKE RIGGING

hardened, and so fitted that the brake parts will not rattle when brakes are applied.

This truck was designed by George Gibbs, consulting engineer, and W. T. Thompson, master mechanic, of the Interborough Rapid Transit Company.

OBSERVATION CARS ON MONTREAL STREETS

The "Seeing Montreal" service of observation cars, which has been arranged for the present tourists' season, has begun operations. Some months ago A. W. Batchelder, general manager of the observation car services which operate in Boston, Washington and other American cities, came to Montreal and made a contract with the Montreal Street Railway, by which the latter will furnish the necessary cars. These cars, as many as necessary, will leave from opposite Dominion Square, at 10 o'clock every morning and 2 o'clock every afternoon, proceeding through the city 2 hours,

CONVENTION ANNOUNCEMENTS A. S. R. A.

The provisional programme for the Saratoga meeting of the American Street Railway Association has been prepared by Secretary Penington, and is as follows:

Wednesday, Sept. 2, A. M.
2:00 P. M. Registration.
First Session.
Address of welcome, by Mayor Knapp.
President's address.
Report of the Executive Committee.
Report of the Secretary-Treasurer.
Presentation of papers.
8:00 P. M. Excursion to Saratoga Casino upon invitation of the Hudson Valley Railroad Company.

Thursday, Sept. 3.
10:00 A. M. Session.
Presentation and discussion of papers.
1:00 P. M. Excursion to the works of the General Electric Company at Schenectady, upon invitation of the General Electric Company.

Friday, Sept. 4.
10:00 A. M. Session.
Election of officers and any unfinished business.
1:00 P. M. Excursion to Lake George on train drawn by electric locomotive, upon invitation of the Hudson Valley Railroad Company.
8:00 P. M. Banquet in the Ball Room of the Grand Union Hotel.

The titles of the papers to be presented were published last week, but the authors were not given. They have since been announced as follows:

The Right of Way, by Herbert H. Vreeland, of New York.

Comparative Merits of Single and Double Track Cars for City Service, by John I. Beggs, of Milwaukee.

The Manufacture and Distribution of Alternating Currents for City Systems, by Richard McCulloch, of Chicago.

Freight and Express on Electric Railways, by J. B. McClary, of Birmingham.

Train Orders and Train Signals on Interurban Roads, by T. E. Mitten, of Buffalo.

The Evils of Maintenance and Champerty in Personal Injury Cases, by Michael Brennan of Detroit.

Electrically Welded Joints, by William Pestell, formerly of Worcester and now of J. G. White & Co.

Steam Turbines, by W. L. R. Emmett.

The Saratoga committees are as follows:

LOCAL COMMITTEES.

ENTERTAINMENT COMMITTEE.

Hon. A. B. Colvin, Chairman—President Hudson Valley Railway Company, and Vice-President Niagara, St. Catharines & Toronto Railway Company, Glenn Falls, New York.
Hon. John W. Herbert, President Niagara, St. Catharines & Toronto Railway Company and Vice-President Hudson Valley Railway Company, New York.
Edgar S. Fassett, General Superintendent United Traction Company, Albany, New York.
W. M. McFarland, Acting Vice-President Westinghouse Electric & Manufacturing Company, Pittsburg, Pennsylvania.
G. Tracy Rogers, President Binghamton Railway Company, Binghamton, New York.
Hon. George E. Green, Vice-President Binghamton Railway Company, Binghamton, New York.
Hon. J. Ledlie Hees, President Fonda, Johnstown & Gloversville Railway, Fonda, New York.
Herbert H. Vreeland, President Interurban Street Railway Company, New York, N. Y.
Edward G. Connette, Vice-President Syracuse Rapid Transit Railway Company, Syracuse, New York.
T. J. Nicholl, Vice-President Rochester Railway Company, Rochester, New York.
James O. Carr, Secretary Schenectady Railway Company, Schenectady, New York.
Thomas R. Kneil, Superintendent of Schools, Saratoga Springs, New York.

RECEPTION COMMITTEE.

Hon. A. P. Knapp, President Village of Saratoga Springs.
Hon. Edgar T. Brackett, State Senator.
W. M. Probasco, Westinghouse Electric Company.
J. R. Lovejoy, General Electric Company.
C. B. Thomas, President Business Men's Association.
Carleton H. Lewis, Police Commissioner.
H. L. Waterbury, Chairman Board of Directors Business Men's Association.
Jonathan Marshall Colcord.

LADIES' RECEPTION COMMITTEE.

Mrs. A. P. Knapp, Chairman	Mrs. C. B. Thomas,
Mrs. A. B. Colvin,	Mrs. F. A. Burd,
Mrs. W. M. Probasco,	Mrs. T. R. Kneil,
Mrs. J. R. Lovejoy,	Mrs. J. M. Colcord,
Mrs. D. M. McFarland,	Mrs. H. F. Thomas.
Mrs. D. C. Moriarta,	

EXHIBITS COMMITTEE.

F. M. Cozzens, Chairman.	W. B. Eddy,
M. E. Varney,	Elmer E. Durkee.
W. S. Robertson,	

INFORMATION COMMITTEE.

F. M. Waterbury, Chairman.	F. J. Resseguie,
W. L. Thompson,	E. A. Burd.

OLD HOME WEEK BY TROLLEY

Old Home Week is a festival quite peculiar to New England towns. During that period former residents return to visit relatives and friends, and every one endeavors to have as pleasant a time as possible. This year the Concord, Maynard & Hudson Street Railway Company, of Maynard, Mass., took a prominent part in the festivities by introducing

DECORATED CAR USED IN CONCORD

a novelty which added greatly to the success of the celebration. This novelty took the form of a trolley trip by night on special cars through the towns operated by the company. The attractively decorated float, shown in the accompanying illustration, was one of the principal features of the trip through the specially illuminated towns and villages, and attracted much attention. The company used for this purpose one of its ordinary flat construction cars, decorated by its superintendent, John W. Ogden. The result of a little work brought the company many extra dollars during the celebration. It was acknowledged by the festival committee and citizens that with the aid of the electric railway Old Home Week was a success that it could not have otherwise been.

During July, on Tuesday afternoons, the East St. Louis & Suburban Railway Company charges half-fares for all trips on its suburban extensions to arouse interest in the country in the neighborhood of East St. Louis. The cheap rates benefit persons who have many children and to whom the question of car fare is a big item. The scheme of "free rides" was evolved by General Manager L. C. Haynes. The rule took effect July 7. On all rides out of East St. Louis the conductor gives the passengers a ticket for every fare collected on the outgoing trip. On the return trip the tickets are good for fares. General Manager Haynes thinks that the reduced rate will cause many people to take the ride along the scenic electric road between East St. Louis and Edwardsville.

PLANS OF THE HOLLAND SLEEPING CAR

The Holland Palace Car Company, of Indianapolis, which has been organized for the purpose of conducting a sleeping car business on electric interurban lines, now has nearing completion, at Wilmington, Del., at the shops of the Harlan & Hollingsworth Company, two sleeping cars intended for service on the electric interurban lines of Ohio and Indiana. These sleeping cars differ radically from the Pullman sleeping cars used on steam roads, but are arranged to serve as parlor cars during the day and as compartment sleeping cars at night. The accompanying engravings, Figs. 1 to 4, show a sample section of the Holland sleeping car as built in the rough at the car shops, for the purpose of determining the appearance of a section built according to these designs and to determine certain matters of detail before building the regular cars. It will, of course, be understood that the section is somewhat crude in many respects, and does not have the finish or the attention to details which would be seen in a regular car.

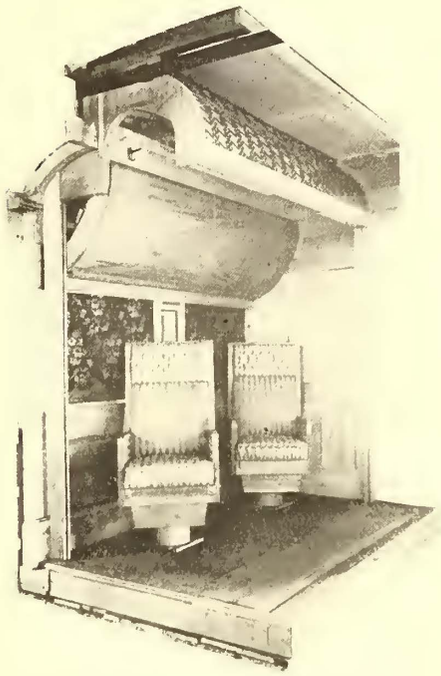


FIG. 1.—READY FOR DAY USE

FIG. 2.—READY FOR NIGHT USE

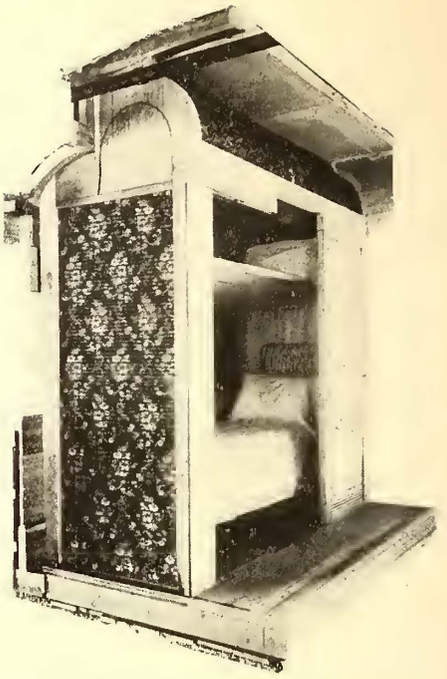


FIG. 3.—PARTITION REMOVED TO SHOW BERTHS

Fig. 1 is of the section made up as a parlor car for day use. There are two revolving chairs. The upper berth is folded up as in an ordinary sleeping car. Fig. 2 shows a section made up for sleeping. Fig. 3 shows the section made up, with the exception that one of the partitions has been lowered to show the berths. Fig. 4 was taken to illustrate the amount of dressing room between the berth and the sliding partition which forms the compartment.

All of the partitions which go to make up a compartment are made on the same principle as the roll top of a roller top desk. These partitions all slide down between the double floors in the day time. The car has a second or false floor built on top of the regular floor, as seen by Figs. 1 to 4. Entrance to the berths is through an opening guarded by a portiere. The berths are 27 ins. wide, which is the width of an ordinary steamer berth. This allows 15 ins. between the berth and the partition of the compartment. Partitions when down are flush with the floor. The plans have been modified somewhat since the sample section was built in order to get better ventilation. In the two cars which are being built there will be an opening of several inches next to the floor when the berths are made up. Cushions for the lower berth are obtained from the bottoms and backs of the revolving chairs. Taken all together, it is a decided innovation in sleeping car construction, and no doubt will attract much interest.

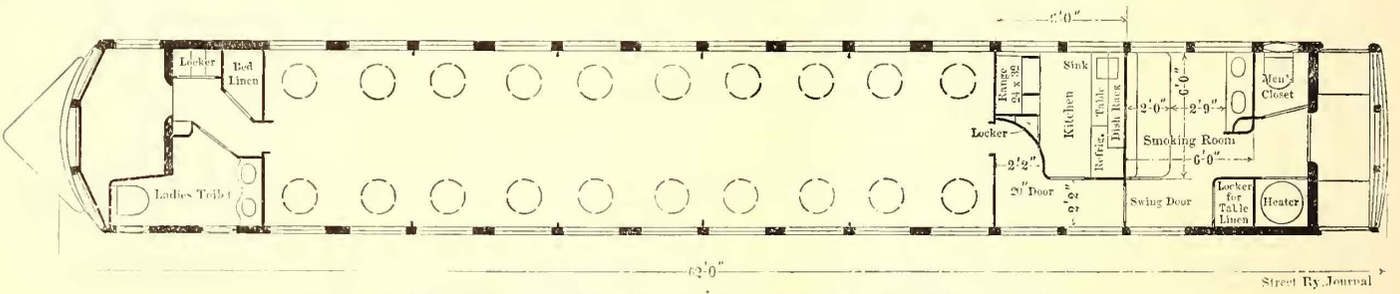


FIG. 5.—PLAN WHEN CONVERTED TO DAY USE OF CAR WITH KITCHEN

Fig. 6 shows plans with dimensions of the two cars now being constructed, which it is expected will be placed in operation soon.

Fig. 5 is the plan of a somewhat longer car, containing a kitchen in addition to the sleeping compartments. It is expected to build this car as soon as the first two cars have been given a trial.

The cars are mounted on M. C. B. trucks, and will be equipped with four 150-hp Westinghouse motors for each car. This is an enormously heavy equipment, and the company intends to provide for the most severe requirements at the start. If advisable, the motors can be omitted from one pair of trucks.

Among the small comforts provided will be electrically-heated curling irons in the ladies' toilet and electric cigar lighter in the smoking room, and electric fans in the main compartment of the car.

It is expected to charge $2 per night for berth and $3 for a compartment. Just where the first two cars will be put into

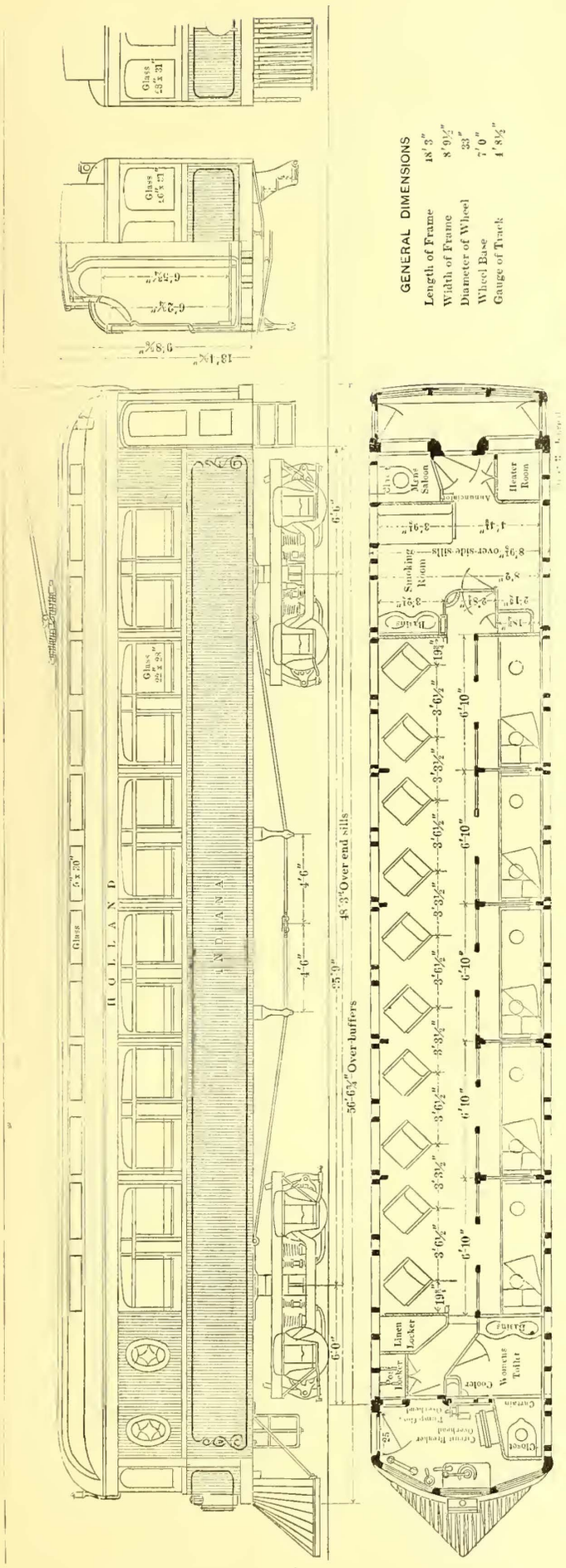


FIG. 6.—SIDE AND END ELEVATIONS AND PLAN OF OHIO SLEEPING CAR, WITH GENERAL DIMENSIONS

service is somewhat doubtful. It was expected at first that they would be operated between Columbus, Ohio, and Indianapolis, Ind., over the tracks of the Columbus, London & Springfield, Dayton & Western, Richmond Street & Interurban, and the Indianapolis & Eastern Railways. Owing to the limited capacity of a subway on this route, however, which will not allow the passage of a full-sized interurban car until the subway is changed, some other route may have the honor of operating the first sleeping car. There seems to be little doubt but that some of the lines of the Appleyard syndicate of Ohio can make use of these cars as soon as they are ready.

FIG. 4.—PARTITION DOOR OPEN, SHOWING ROOM ALLOWED FOR DRESSING

The Holland Palace Car Company expects to conduct the sleeping car business on very much the same lines as the Pullman Company conducts it on steam railroads. Owing to the number of different lines that must be operated over in the majority of cases where it is desirable to have a sleeping car route, a company independent of any one railroad for operating the sleeping cars would have many points in its favor. The Holland Palace Car Company has offices in the Lombard Building, Indianapolis. The officials are: Harris F. Holland, president; Amos K. Hollowell, vice-president; Joseph W. Selvage, secretary and treasurer; A. L. Wheeler, assistant secretary and treasurer; James E. McCullough, general counsel.

AGREEMENTS MADE IN TORONTO FOR THE OPERATION OF FREIGHT CARS AND THE ENTRANCE OF CARS OF SUBURBAN LINES

The city of Toronto has recently entered into an agreement with the Toronto Electric Railway for the entry of the various radial railways into the city over the Toronto Company's tracks. The agreement provides for the carrying of passengers, package freight and express in the cars of suburban lines run over the Toronto system to points in the city to be designated by the city engineer, the necessary permission to be given for connecting the tracks of the city with suburban lines. This new agreement is of special importance because the street railway system is operated by the company under a thirty-year franchise grant, which provides that the property can be taken over by the city at the expiration of the grant at an appraised value. A summary of the conditions under which the company operates was published in the STREET RAILWAY JOURNAL of May 2, 1903.

Under the terms of the new agreement the city engineer is, from time to time, to recommend to the Council the route or routes to be taken by cars carrying light or package freight and express traffic, and every such route is to be subject to the approval of the City Council. Cars are not to be run upon any other route or routes than those approved by the city engineer and adopted by the City Council. Provisions and regulations for the service, which, among other things, shall define the kind,

character, capacity and state of repair of the cars, and the nature, character and quantity of the light or package freight and express traffic to be carried, and the hours of operation, together with the speed, are to be recommended by the city engineer and adopted by the City Council. In order to secure the company against the whims of changing administrations the City Council may only vary the kind, character and capacity of the cars every five years. Even then the variations must not unreasonably affect the cars in use.

For the purposes of both passenger and freight traffic the company is given permission to connect its tracks with the tracks of any suburban electric railway at the limits of the city, and to receive cars on their arrival at the city limits, and operate them over the route so designated to the St. Lawrence Market, and to such other points as the City Council may deem necessary and designate. The suburban cars are, of course, to be operated within the city limits by the Toronto Company, and the company's usual fares are to be collected from passengers. All fares collected within the city are to be entered on the company's books, and the percentage provided for in the agreement governing the city and the company is to be paid to the city. The company is also to charge for freight and express traffic a rate at least proportionate to the mileage the freight is carried. All receipts from freight are to be added to the gross receipts of the company, and the city is to be entitled to a percentage thereon, as provided for percentages upon passenger receipts under the agreement governing the city and the company.

The company may, with the consent of the City Council, acquire station grounds within the limits and connect its tracks therewith. The location of all new tracks and works upon the streets, however, is to be subject to the direction and supervision, and is to be done to the satisfaction, of the city engineer. Provision is made that work not meeting the requirement of the engineer may be done over by him and charged to the company.

The city agrees to assist the company to secure any steam railroad crossings that may be necessary, but the company is to be responsible for damages or court actions that arise.

If at any times it be necessary, in the opinion of the city engineer, to purchase or expropriate any private rights of way for the purpose of the freight traffic, the City Council may, if it approve thereof by by-law, purpose or expropriate such rights of way, and the company is to construct and operate its lines thereon as part of its system. All such construction and operation is to be subject to the terms of the agreement governing the city and the company, and such right of way is to remain vested in the city.

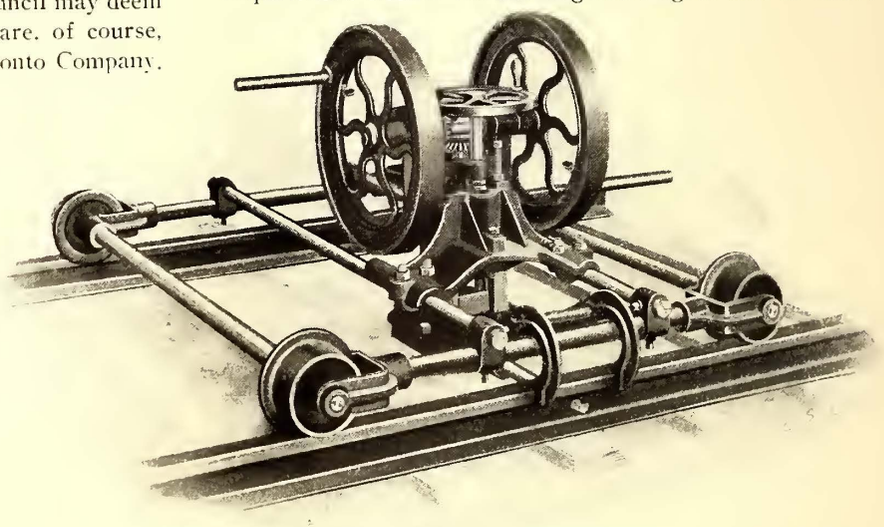
Further, the company agrees to arrange for bringing into the city the cars of any new lines that may be built, the existing terms to apply in any such cases. In the event of connection being made by the company with the Metropolitan Railway, which operates the only independent line in the city, an agreement is to be entered into providing that no fare greater than that charged within the present or any future limits of the city shall be charged between any point in the city and Mount Pleasant Cemetery.

All disputes and differences that arise under the new agreement are to be referred, under the Arbitration Act, to a judge of the County Court of the County of York, to be agreed upon by the parties hereto, and in default of such agreement to a judge of the High Court, to be appointed by the Chief Justice of Ontario. Appeal from the award may be made to Court of Appeal for Ontario, the decision of which court shall be final.

It is further provided that the arbitrator or the Court of Appeal may direct the manner and time in which default or neglect of contract shall be remedied. If the arbitrator of the Court of Appeal will not make such a direction, or will not order specific performances of the agreement, the arbitrator or the court is to determine and set forth the rights of the parties and the manner and time in which default or neglect shall or ought to be remedied. If default or neglect be not remedied in the manner or time so directed or determined, all rights under the agreement shall, at the option of the city, wholly cease.

TRACK DRILLING MACHINE

Experienced electric railway engineers agree that to insure good contact it is best to put in the rail-bonds immediately after drilling the rails. To quickly and neatly accomplish this work the Ludlow Supply Company, of Cleveland, Ohio, has recently brought out the hand-power machine illustrated in the accompanying cut. The manufacturer states that many of these machines are now in use, giving very good service.



HAND TRACK DRILL.

PERSUASIVE METHOD ADOPTED IN CINCINNATI

The Cincinnati Traction Company has abolished the practice of suspending employees for violations of the rules. At a recent meeting of the Traction Employees' Mutual Protective Association Superintendent Robert E. Lee, of the company, announced that after Aug. 1 all employees would be placed on their honor for strict observance of rules and the maintenance of discipline. It is the purpose of the company to lift its employees to a higher standard. As pointed out by those who advocate the merit system of discipline, the management at Cincinnati holds that the suspension of a man is unduly severe because of the indirect suffering it sometimes inflicts on an entire family. Then, too, enforced idleness often results in bad associations, for "an idle man is the devil's workshop." Hereafter any employee violating a rule will be called before the superintendent. A moral sermon will be delivered to the man, and if he persists in disobeying the rules he will be dismissed from the service with no hope of re-employment by the company. It is the intention to make the employees feel that they have more than a passing interest in the welfare of the company. Hereafter promotion to inspectors and division superintendents will be made by advancements from the ranks. By this plan the company hopes to make the men feel that there are prospects of advancement, and that with attention to duty and ability to fill more responsible positions advancement is certain to come.

FINANCIAL INTELLIGENCE

WALL STREET, Aug. 12, 1903.

The Money Market

The feature of the money market this week has been the decided strength which prevailed in the time-loan department. Short-time funds which, a week ago, were practically unlendable at 3½ and 4 per cent, now command 4½ and 5 per cent, while the rate for over-the-year money has risen from 5¼ to 6 per cent, with only moderate amounts obtainable at the high figure. The strength is due largely to the preparations making by the local institutions to meet the demands soon to be made upon them for crop-moving purposes. For this reason the banks are not offering time loans in large amounts, preferring to put their surplus funds out on call at the present comparatively low rates, namely, 1½ and 2 per cent. The demand from stock commission houses is not large, but the inquiry from mercantile sources is reflected in a further advance in the rate for prime names to 5¾ and 6 per cent. Another important factor is the material falling off in the receipts of currency from out of town, indicating the growing demand for funds at the leading interior cities. For the week ending August 10, the receipts were the smallest for any week since April 11, while the shipments from New York were the largest recorded in several months. A very important factor, and one which, in all probability, will exert a great influence in the money market in the near future, is the declining market for sterling exchange. Europe has been a heavy purchaser of stocks in the local market, and the heavy offerings of bills against these purchasers has already brought the demand rate down to 485.15 or about 40 points away from the gold importing rates, and it appears now as if the regular autumn movement of gold will begin earlier than usual. The discount rate at London remains firm at 2¾ per cent. At Paris the rate is unchanged at 2⅛ per cent, but at Berlin the rate is slightly higher at 3¼.

The Stock Market

It now looks as though the long-expected and much-desired change for the better in the stock market has at last come about. Confidence in the stability of security values, which has long been absent, is slowly but surely returning, and while this has not yet been made manifest by any wholesale buying of stocks, it has become evident in purchases by "bargain hunters" and large financial institutions, who have found too tempting the handsome returns on the investment which many stocks now yield. The absence of further "troubles" in the financial world, which the speculative and investing public were made to fear by reason of the recent failures on the Stock Exchange and the alarming rumors that have until very lately been in circulation in Wall Street, has been one of the chief causes for the growing optimism; still there are other considerations that have served to bring about the more cheerful feeling. Chief among these are the promises of a plentiful harvest, particularly as applies to corn, the declining tendency of foreign exchange, which has brought the rates to within striking distance of the point at which gold could be imported from Europe at a profit; the general ease of the local money market; continued excellent railway earnings, and the more tranquil conditions prevailing in the field of labor. All these have led to an improvement in share values, following the severe slumps that took place in consequence of last Saturday's disappointing showing of the loan account of the New York City banks, and as, at this writing, it is expected that the forthcoming exhibit of the Clearing House institutions will be much more favorable than the last, especially in view of the larger disbursements now being made by the Government on pension and other accounts, the prospects are that the improvement, which has already carried prices well above their extreme low level of the recent depression, will go further. The so-called "big" people, who have, for a considerable time, maintained an almost stolid indifference to the course of stocks generally, now appears to be aggressively arrayed on the bull side, and this fact is likely to be made apparent before long in a pronounced upward movement in prices.

This feeling of optimism has been communicated in no small degree to the local traction group, and such stocks as Manhattan, Metropolitan Street Railway, and Brooklyn Rapid Transit seem destined to play no insignificant part in the rally which now appears practically certain to be continued indefinitely. All these companies are now loaning more money than ever before, and the permanency of the rates of dividend now being paid by most of them is beyond question. Some interesting developments in connection with the recent change of ownership of the Queens County Electric Company are expected in the not distant future, many usually well-informed people believing that it will ultimately transpire that the Pennsylvania Railroad has secured control of the property. It is also surmised that the same interest has been a large buyer of the shares of the Brooklyn Rapid Transit Company at the prevailing low figures, and that sooner or later it may likewise turn up in control of that system.

Philadelphia

The Philadelphia Traction market during the latter part of the week ending August 8 was characterized by liquidation and falling prices. The United Gas broke to 80, Philadelphia Company to 37¾, Union Traction to 42½, Philadelphia Traction to 94¼ and Rapid Transit to 11. The transactions were, however, on a narrow scale, and the weakness seemed to be due more to neglect than to liquidation. With a relief in the pressure at New York, the market responded to the advance and the United Gas rose to 83 and the Philadelphia Company 38. According to reports, the Philadelphia Company has increased its gross earnings during the first six months of 1903 $878,000, and its surplus available for dividends on the common stock $128,295. The preferred on an odd lot sold as low as 43¾ during the week. The Philadelphia traction stocks followed the general course of the market. Rapid Transit was well supported on Aug. 11 at 11¾, Union Traction closed at 42⅜ and Philadelphia Traction at 94. An estimate of the Philadelphia Rapid Transit earnings over operating expenses for its first year of operation is $7,867,780, which, after payment of taxes, licenses and fixed charges will have a surplus of about $250,000 for the year. American Railways closed at 43, in spite of the fact that its gross earnings for July show an increase of about 15 per cent over those of July, 1902.

Chicago

The Chicago market has been quiet during the week with little net changes since the last issue of this paper. Chicago City has remained stationary at 165, Union Traction common at 3½ and the preferred at 30. Every indication points to a favorable outcome of the meeting of the Union Traction stockholders on Aug. 18, at which the new plan for the reorganization of the company is to be acted upon. It is stated that enough proxies approving the plan proposed have been received to assure the success of the whole scheme. Metropolitan Elevated has shown an advance of from 16½ to 18 in the case of the common and 51 to 55 in the case of the preferred, in spite of the passing of the dividend on the preferred stock. It is known that the expenses during the first part of the year were very high and the delay in completing the down-town terminal has prevented as good a showing as would otherwise have been made. With this structural work completed, the company should be in a position to show much better earnings Lake Street Elevated shows a fall of a point from 5¾ to 4¾ as the result of the week, while the South Side Elevated closed at 97 instead of 96½ a week ago.

Other Traction Securities

The Boston stocks have moved within very narrow limits during the past week, the elevated going down to 134 on Aug. 4, but closing at 135½. Massachusetts Electric common closed at 21 and Massachusetts Electric preferred at 80. Baltimore United Railways & Electric has remained stationary at 10½, while incomes have varied between 61½ and 62½ and the 4's between 92½ and 93. Other sales on the Baltimore Exchange include City and Suburban of Washington 5's at 112, City Passenger 5's at 106 and small lots of Charlestown Railway 5's at 104¼ and Baltimore Traction 5's at 112. On the New York curb, the most important changes have been in Interborough Rapid Transit, which sold down to 90 on Aug. 11, as compared with 98½ a week ago. The stock closed offered at 94. New Orleans common closed at 9 as compared with 10⅛ last week, and New Orleans preferred closed at 30. The final sale of Twin City, on Aug. 11, was 91 instead of 93 on Aug. 4. Trading in Cincinnati last week amounted to almost nothing; less than 500 shares of traction stock changing hands. Toledo Railways & Light led in the selling, three lots going at from 22 to 23½, the former the closing figure. Detroit United had a range

of from 67½ to 70¾, closing at 68. Cincinnati Street Railway sold at 131 to 132 on small lots. Miami & Erie Canal dropped to 5 for one small lot. Columbus, Delaware & Marion, Zanesville Railway, Light & Power and Mansfield Railway, Light & Power bonds all sold at 101 for amounts aggregating $28,000. There were slight declines all along the line in Cleveland. A block of 100 Detroit United came out at 67½ a price 2½ points higher than the extreme low figure recorded in the local market some months ago. Lake Shore Electric preferred, a 6 per cent cumulative issue, sold at 45, a decline of 4⅛ from last previous. Northern Ohio Traction & Light broke to 18, a new low point. Northen Texas Traction was the single exception to the rule of falling prices. It sold at 29½ and 30 compared with 28, the price of last week. Cleveland & Southwestern preferred sold at 64½. Cleveland Electric gave away two points, selling at 72.

Security Quotations

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

	Closing Bid	
	Aug. 4	Aug. 11
American Railways	44	43
Aurora, Elgin & Chicago	17½	b17½
Boston Elevated	136	135½
Brooklyn Rapid Transit	42⅞	41
Chicago City	165	165
Chicago Union Traction (common)	3½	3½
Chicago Union Traction (preferred)	30	30
Cleveland Electric	b73	72
Columbus (common)	85	—
Columbus (preferred)	100	102
Consolidated Traction of New Jersey	a67	64
Consolidated Traction of New Jersey 5s	104	103½
Detroit United	b65	65½
Elgin, Aurora & Southern	b52	b52
Lake Shore Electric	b10½	b10½
Lake Street Elevated	5¾	4¾
Manhattan Railway	132	130⅞
Massachusetts Elrectric Cos. (common)	21	21
Massachusetts Electric Cos. (preferred)	78½	80
Metropolitan Elevated, Chicago (common)	16½	18
Metropolitan Elevated, Chicago (preferred)	51	55
Metropolitan Street	117	111
New Orleans (common)	10⅛	9
New Orleans Railways (preferred)	36	30
North American	73	71¾
Northern Ohio Traction & Light	18	18
Philadelphia Rapid Transit	113⅝	113¾
Philadelphia Traction	94½	94
St. Louis Transit (common)	18	17
South Side Elevated (Chicago)	96½	97
Syracuse Rapid Transit	b29½	25
Syracuse Rapid Transit (preferred)	b75	72
Third Avenue	113	111½
Toledo Railway & Light	23	21
Twin City, Minneapolis (common)	93	91
Union Traction (Philadelphia)	43	42⅜
United Railways, St. Louis (preferred)	64½	64½

a Asked. b Last sale. * Ex-dividend. † $10 paid.

Iron and Steel

The pig iron market continues unsettled, and although the steel manufacturers will need a large tonnage to replenish their now depleted supply, do not seem to indicate any great tendency to buy. Consumers of iron and steel are influenced largely by the course of the stock market, and until this improves it is thought by many that the present condition in the iron market will prevail. Quotations are as follows: Bessemer pig, $18.75 to $19; Bessemer steel, $27 to $27.50; steel rails, $28.00; girder rails, $33 to $33.50.

Metals

Quotations of the leading metals follow: Copper, 13 to 13⅛ cents; tin, 28.6 cents; lead, 4⅛ cents; spelter, 5⅜ to 5⅞ cents.

WATERBURY STRIKE SETTLED

The strike of the employees of the Connecticut Railway & Lighting Company at Waterbury and its suburbs, which was begun Sunday, Jan. 11, 1903, was settled Sunday, Aug. 9, the company agreeing to take back part of the strikers at once at the old wages, to give employment to the others as soon as practicable, and to treat with a committee from the men regarding future grievances. The official conditions under which the settlement was made are not available, but from the published statement of Manager Sewall, of the company, no concessions beyond those made months ago were offered by the company. From unofficial sources, it is said that the company agreed to take back sixteen of the old men at the old wages at once, and to give the remainder employment as soon as places can be found for them. The ex-president of the union and nine strikers who were acquitted of the charge of being implicated in an assault on a non-union conductor and a motorman are not to be reinstated, however.

From the very first day of the strike there were many exciting conflicts between the union and non-union men and between the strikers, the police, and later the militia. For days the Waterbury police were utterly unable to cope with the situation, which by Feb. 1 had become so serious that Governor Chamberlain called out sixteen companies of the State militia, under command of Brigadier General Russell Frost, to maintain order.

When the troops arrived at Waterbury they were greeted with yells and hisses by a great crowd of strikers and their sympathizers, and from then until they were recalled the troops had the most strenuous kinds of duty to perform. Four days after the militia arrived order was established to a certain extent, and the following day, through the efforts of Mayor Kilduff and others, a conference between the representatives of the strikers and the company was held in the Aldermanic Chamber. The conference was without result.

On that day the troops left the city, and after that the strike dragged along until Feb. 27, when the most exciting incident of the strike, the killing of a policeman, accurred. At the same time a non-union motorman was beaten into insensibility, but did not succumb to his injuries. The killing of the policeman created the most intense feeling, and rewards aggregating $19,400 were offered for the apprehension of his murderer or murderers.

March 14 Judge Emery, in the Superior Court, granted an injunction forbidding the unions from interfering with the business or the railroads.

ARE INTERURBAN ROADS IN INDIANA TO BE CLASSED WITH STEAM LINES?

The suit for an injunction and damages brought against the Indiana Union Traction Company by the property owners in College Avenue, Indianapolis, is assuming far greater importance than was anticipated by the aggrieved citizens, or at first by the defendant company. Already the citizens of other Indiana cities and towns using interurban roads are manifesting great interest in the action to determine the status of the electric roads, and it is quite evident that if the status is declared, by the courts of last resort, to be commercial, the interurban electric railway will, perhaps, receive a serious setback.

The Indiana courts have repeatedly held that a commercial railroad is an additional burden on the streets, though a street railroad is not. The question to be decided in this case is whether an interurban, carrying freight and passengers, running heavy cars and trailers, and connecting widely separated towns, is a commercial road in the light of previous decisions concerning steam railroads. As to the matter of damages it would seem that the character of the motive power would make no difference. That College Avenue property has been seriously injured in its sale and rental value by reason of making it a thoroughfare for heavy interurban cars is recognized by the tax authorities in reducing the assessment thereon 20 per cent. If the interurban can be made to compensate for this damage in rendering streets undesirable for residence purposes, or can be compelled to provide for themselves avenues of entry such as steam roads are compelled to provide, the decision would be sufficiently sweeping to revolutionize present admirable arrangements so far as the public is concerned. It is given out, fearing the issue, that the Union Traction Company will compromise with the complaining citizens by settling with them out of court and agreeing that the Indianapolis & Northern cars will not be brought in over College Avenue. Traction men, however, do not all take the view that a compromise will be advisable. They say the issue will be raised sooner or later, and it may as well come now as several years hence. It is certainly an important question, touching as it does the rights of the interurban and the convenience of the people.

A carload of horses was shipped over the interurban railway between Montpelier and Indianapolis, Ind., a few days ago. The sender, a well-known breeder of race horses, expressed himself as pleased with the handling of the horses, and said that hereafter, whenever possible, he would ship his horses on the interurbans in preference to the steam roads.

RICHMOND STRIKE DYING OUT

The strike of the employees of the Richmond Passenger & Power Company, which has been the cause of much disorder and bloodshed in Richmond and Manchester, is now on its last legs. The financial assistance received by the strikers from other labor organizations has been very slight, and many of the men are now begging for reinstatement. All of the company's lines are in operation, giving regular service. With the exception of the labor boycott, which, however, is gradually decreasing, traffic is back to normal conditions.

A few rocks are thrown at cars occasionally, but no other disorder is reported. The company has offered a large reward for the conviction of the dynamiters, which seems to have put a stop to this nefarious practice.

MEETING OF THE AMERICAN RAILWAY AND MECHANICAL ASSOCIATION

Members of this Association should remember that the convention commences one day earlier than that of the American Street Railway Association. The first meeting of the Railway and Mechanical Association will be held on Tuesday, Sept. 1, 10:30 a. m. An invitation was extended to Hon. Edgar T. Brackett, State Senator of New York State, to deliver the address of welcome to the Association and the invitation has been accepted.

The meetings on Sept. 2, 3 and 4 will be called to order at 10:00 a. m. The papers to be read are as follows:

Shop Kinks, by H. H. Adams, of Baltimore.

Type M Control, by W. O. Mundy, of St. Louis.

Improvements in Street Car Motors, by E. W. Olds, of Milwaukee.

Care and Maintenance of Car Bodies, by C. F. Baker, of Boston.

Shop Practice, by Alfred Green, of Rochester.

The Use and Abuse of Controlling Mechanism, by D. F. Carver, of Jersey City.

NOVELTIES IN EXPOSITION BOOTHS

In marked contrast to the old-time sheds and shelters under which, for a generation, those who exhibit at fairs, conventions and expositions have entertained visitors and descanted on the merits of their inventions and appliances, are the novel and convenient creations of the professional booth builder and decorator. He must have above all, imagination; and if he lack boldness, originality, and, withal, a sense of harmony, he cannot succeed in these days of strenuous competition in the arts as well as the crafts.

The Allen-Baker Company, which makes a specialty of just this class of work, has made arrangements this year to construct a number of the principal booths for exhibitors at the Saratoga Convention, and its services will be found very convenient for those who have not the time to undertake the work themselves, or who wish especially attractive headquarters. The company's headquarters for this class of contracts is at 10 North Market Street, Boston, where Mr. Allen, the president of the company, personally superintends all exposition work. The company will have a staff of artists and workmen at Saratoga Springs next week; but it is better to write the company at Boston.

STRIKE IN LONG ISLAND CITY

About one-third of the employees of the New York & Queens County Railway Company, of Long Island City, went on strike Sunday, Aug. 9. The extra schedule which is in force on Sundays and holidays, to care for the immense excursion traffic, was seriously interfered with, but in no other way did the company suffer. In fact, the strike petered out so quickly that by Monday it had been declared off, and the fomentors of the trouble, in the shape of three extra men, were seeking reinstatement. It seems that the three men just referred to called upon General Manager Fuller, of the company, early Sunday morning, and asked for recognition of "the union." Mr. Fuller told them that Sunday was not the proper time to make demands, and that on Monday he would willingly give hearings to all who had grievances. They returned to the car houses, and after a conference with the other extra men, it was decided not to take the cars out. A few of the regular men, it seems, threw their lot in with the "extras," but the majority remained faithful to the company. The police prepared at once for disorder, but not an act of violence was reported.

CONVENTION OF THE INCORPORATED MUNICIPAL ELECTRICAL ASSOCIATION OF GREAT BRITAIN

The eighth annual convention of the Incorporated Municipal Electrical Association of Great Britain was successfully held this year, the meetings being divided between Sunderland, Newcastle-on-Tyne, and Middlesbrough. The first meeting took place in Sunderland, Mr. J. F. C. Snell, president of this year, occupying the chair. An official welcome was extended to the association by the Mayor and Aldermen, who stated that in Sunderland they have invested something like a half million of money for the electrical equipment of tramways and power. Mr. Snell then read his presidential address, after which the following papers were read and discussed:

1. Statistics of Electrical Supply, by Alderman J. P. Smith, J. P. (member of Council), ex-Mayor and chairman of the electricity committee, Barrow-in-Furness.

2. The Possibilities of Future Economies in Electrical Illumination, by Mr. W. A. Chamen (past president), chief electrical engineer, Glasgow.

A substantial luncheon was then provided by the Mayor and Corporation of Sunderland in the Town Hall, after which special cars took the delegates to various stations and sub-stations in the city and vicinity. After these had been inspected the delegates proceeded to the new harbor now being constructed by the River Weir Commission, where tea was served by the Corporation. On Thursday, July 16, the association met at Newcastle, where the delegates were welcomed by the Right Worshipful the Mayor of Newcastle-on-Tyne, Sir William Stephenson, who, in a very interesting speech, remarked that he thought it was rather an anomaly that he should be chosen to welcome the delegates of the Municipal Electrical Association when he himself was the chairman of the Newcastle & Gateshead Gas Company. He believed, however, that there was plenty of room for both electricity and gas, and all they wanted was a fair fight. Papers were then submitted by the following and freely discussed:

1. The Sphere of Utility of a Power Company, by Alderman G. Pearson, J. P. (honorable solicitor), chairman of the Bristol electricity committee.

2. Electrical Traction as Applied to the Newcastle Tramways, by Mr. A. E. Le Rossignol, chief electrical engineer and general manager, Newcastle Corporation tramways. This paper contained a table of costs of operation of the Newcastle tramways which was published in the last issue.

3. The Management and Working of Boilers, by Mr. Horace Root, chief electrical engineer, Tunbridge Wells.

In the afternoon a visit was made to the corporation tramways power house, and visits were also arranged to the works of Messrs. Parsons at Heaton, Messrs. Holmes & Co., Messrs. Scott & Mountain, Messrs. Clarke, Chapman & Co., and the North Eastern Marine Works and other places. In the evening the association smoking concert, in conjunction with the local section of the Institution of Electrical Engineers, was held, which was well patronized and fully enjoyed by the members, though perhaps the musical portion of the entertainment was not given as much attention as would be desired by the artistes. On the following day the meeting was convened at Middlesbrough at the Council Chamber, Town Hall. The following papers were read and elicited interesting discussion:

1. Methods of Stimulating Demands, by Councillor J. E. Panton, M. D., member of council, chairman of the Bolton electricity committee.

2. The Financial Improvement of Electricity Supply Works, by J. A. Jeckell, chief electrical engineer, Coventry.

Luncheon was served to the delegates in the crypt of the Town Hall by invitation of the Mayor and Corporation of Middlesbrough. After luncheon, brakes were largely taken advantage of to drive to the following list of works, which were visited: Messrs. Bolckow, Vaughn & Co., Ltd.; Messrs. Dorman & Long, Ltd.; Messrs. The North-Eastern Steel Co., Ltd.; Messrs. Sir B. Samuelson & Co., Ltd., and N. E. Railway Company's dock installation. On the return from these visits special cars were provided for Stockton in order to visit the Imperial Tramways Company's 3-phase power house and the Stockton Corporation Electricity works, which concluded the ordinary meetings of the convention. The annual general business meetings of the association was held on Saturday. the following officials were elected for the ensuing year:

PNEUMATIC SLIPPER BRAKE

In the STREET RAILWAY JOURNAL of Aug. 1, a detailed description was presented of the Hewitt & Rhodes pneumatic brake. Through an oversight omission was made of the fact that the manufacturers of this brake are Estler Brothers, of London, Eng., who state that this brake is being used with much success.

STREET RAILWAY PATENTS

UNITED STATES PATENTS ISSUED AUGUST 4, 1903.

735,083. Switch Operating Device; G. E. Fry, Allegheny, Pa. App. filed Aug. 28, 1902. The switch point is moved by the car wheel which strikes a lever first set into position by an electric magnet.

735,237. Trolley Wheel; R. and R. W. Fox, Parkersburg, W. Va. App. filed May 20, 1903. The boxes of the axle have curved surfaces, which slide in the cheeks of the harp, permitting the wheel to tilt.

735,246. Car Brake; S. H. Graden, Parkville, Mo. App. filed Dec. 19, 1902. A triangular block is thrust under the wheel and bears against both the wheel and the rail.

735,340. Surface Contact Electric Railway System; W. M. Brown, Johnstown, Pa. App. filed Dec. 18, 1902. The magnet carried by the car sometimes picks up iron objects from the roadway; these are removed by a stronger magnet in the roadbed, located just ahead of a crossing, or siding rail, to thus prevent short circuiting due to such iron pieces coming in contact with the rail.

735,416. Electric Signaling Apparatus; H. W. Souder, Tamaqua, Pa. App. filed March 25, 1902. A system capable of being operated by a number of cars following one another in the same direction, and affording information to each motorman of the fact that one or more cars are ahead of him.

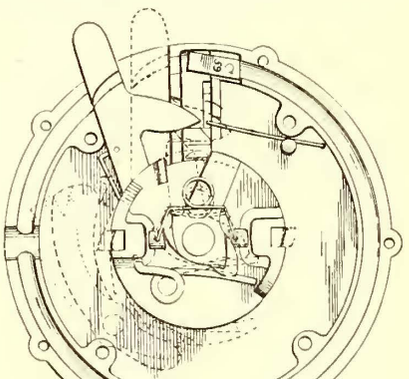
735,417. Electric Signaling Apparatus; H. W. Souder, Tamaqua, Pa. App. filed Aug. 30, 1902. When the circuit closer is operated on the entrance of a car to a block, the distant signal is first actuated, whereupon if that signal be in good working order, the home signal is set; thus the motorman knows on entering the block that the distant signal is properly set.

735,419. Trolley Contact. H. W. Souder, Tamaqua, Pa. App. filed Sept. 25, 1902. A bar having teeth is arranged each side of the wire in a position to be struck by the trolley wheel to close a circuit.

735,426. Brake Shoe; J. S. Thompson, Chicago Heights, Ill. App. filed April 14, 1903. A brake shoe having a backing composed of two rods, diagonally arranged, and attached to an insert in the face of the shoe.

735,534. Derailer; M. P. Layton and J. W. VanDoren, Minonk, Ill. App. filed Sept. 16, 1902. The derailer can be placed on a siding or switch, and as cars are admitted into the siding it will not interfere with their movement, but in case the cars are started in the opposite direction, they will be derailed.

735,535. Car Fender; R. C. Layton, New York, N. Y. App. filed Jan. 5, 1903. A rectangular frame across which a net is stretched, one side being hinged to the dash and collapsible braces supporting it from above and below.



PATENT NO. 735,672

735,576. Railway Switch; J. M. Payne, Spokane, Wash. App. filed Jan. 9, 1903. A projection from a car platform will throw the switch point.

735,584. Surface Contact Railway System; W. B. Potter, Schenectady, N. Y. App. filed April 23, 1902. Positive and negative feeders lead from the power station, the latter being grounded at a single point located at the end most distant from the station.

735,612. Single Link Strain; L. Steinberger, New York, N. Y. App. filed Jan. 29, 1903. The single link has an eye through which a tube passes, the two parts being insulated from each other, and surrounded by a sphere of insulation.

735,613. Suspension Fixture; L. Steinberger, New York, N. Y. App. filed Feb. 2, 1903. A fixture adapted to serve either as a turn-buckle, a strain, or a hanger for a span-wire clip.

735,626. Radial Swing Truck; B. R. Van Kirk, Philadelphia, Pa. App. filed April 13, 1903. The object is to arrange the pivot of the equalizing beam, so that it can swing freely.

735,639. Axle Locking Device for Trolley Harps; A. J. Wiggin, Kennebunk, Me. App. filed Feb. 7, 1902. A spring place on the fork embraces the square end of the axle.

735,672. Trolley Retriever; A. W. Knutson, Canton, Ohio. App. filed Jan. 17, 1903. Details of construction of a spring drum and pawl and ratchet mechanism.

PERSONAL MENTION

MR. T. R. GABLE has been appointed general traffic manager of the freight and passenger departments of the Los Angeles-Pacific Railroad Company, of Los Angeles, Cal., with headquarters in Los Angeles.

MR. H. F. TATE, Western manager of the National Conduit & Cable Company, had a sad bereavement lately in the death of his 12-year-old daughter, Beatrice, who was killed at Williamsport, Pa., by a train.

MR. GEORGE S. PRATT has resigned his position as general sales agent of the Niles Car & Manufacturing Company, and is spending a short vacation at Westport Harbor. It is understood that Mr. Pratt will re-enter the railway field again in a few weeks.

MR. B. HASKELL, formerly superintendent of motive power of the Pere Marquette Railroad, has been appointed general manager of the Franklin Mill & Foundry Company, of Franklin, Pa. This is the company which is making the Tripartite steel pole for overhead electric railway construction.

MR. JAMES R. ATCHISON, for five years superintendent of the power department of the Los Angeles Railway Company, of Los Angeles, Cal., has resigned to take up more remunerative power work in San Francisco. On August 1, Mr. William Jennings was appointed acting superintendent.

MR. JOHN DUNN, for a number of years superintendent of electrical construction for the Cleveland City Railway Company, of Cleveland, Ohio, has been appointed city electrician of Cleveland by Mayor Tom L. Johnson. Mr. Dunn resigned from the Cleveland City Company at the time of the consolidation of that company with the Cleveland Electric Railway Company.

MR. ERNEST GONZENBACH has been appointed electrical engineer for the Youngstown & Southern Railway, which is to be a third-rail road, extending from Youngstown to East Liverpool, Ohio. Mr. Gonzenbach is well known as the electrical engineer who laid out the Albany & Hudson Railway, and later as electrical engineer for the Aurora, Elgin & Chicago Railway. He has already assumed his duties. The Youngstown & Southern will be designed for heavy service.

MR. WILLIAM PESTELL has resigned as superintendent of motive power of the Worcester Consolidated Street Railway Company, of Worcester, Mass., to become connected with J. G. White & Company, of New York. Mr. Pestell's experience in the railway field dates from the pioneer days. In turn since 1890 he has at different times been connected with the Sprague Company, Naumkeag Street Railway, the Lynn & Boston Company and the Massachusetts Electric Companies.

MR. H. H. VREELAND, president of the Metropolitan Street Railway Company of New York, has just returned from a two months' trip to Europe, where he visited Great Britain, France and Belgium. Much of Mr. Vreeland's time, however, was spent in London, where he looked over the rapid transit problem in that city, and incidentally had several long conferences with the Parliamentary committee that is engaged in trying to work out the solution of the transit problem in that city. Mr. Vreeland has arranged to have a commission of the Royal Commission on London Street Traffic, which is to start for the United States Sept. 18, to make a special study of conditions in New York, and he will make arrangements for entertaining the members.

MR. FRED D. SAMPSON, manager of the Electric Railway, Light & Power Department of the Charlotte Electric Railway, Light & Power Company, Charlotte, N. C., sails on the Kaiser Wilhelm II. for a short visit to his old home in England, Aug. 25. Mr. Sampson has been connected with the Charlotte company since 1895, and prior to that time was connected with the General Electric Company, the Lake Roland Elevated of Baltimore, the Brooklyn Heights, and the Twin City Rapid Transit companies as electrical engineer. Under Mr. Sampson's supervision the Charlotte property has been entirely remodelled and rebuilt. The company now operates twelve miles of track and twenty cars, besides controlling the lighting, power and gas interests of the city.