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

Of this issue of the Street Railway Journal 8000 copies are printed. Total circulation for 1905 to date, 343,950 copies, an average of 8189 copies per week.

The New York Central-New Haven Situation

In an extended communication which appears elsewhere in this issue, Frank J. Sprague analyzes the conditions which will be brought about by an attempt to utilize a. c.-d. c. locomotives in the present d. c. zone of the New York Central & Hudson River Railroad Company. The situation as outlined by him is a most interesting one, and is discussed from both an electrical and an operating standpoint. Although Mr. Sprague is known to believe very thoroughly that the possibilities of d. c. operation are by no means reached, in his article he does not consider the relative merits of the two systems except in connection with this particular case, but in this instance he makes a most effective argument in favor of the d. c. system. Although expressly disclaiming any intention of speaking for the New York Central Electric Traction Commission, of which he is a member, Mr. Sprague's connection with that Commission has made him familiar with every step taken during the progress of the Central work and

the reasons for their adoption, so that his arguments are based upon a thorough knowledge of the conditions.

These conditions do not necessarily apply to the New Haven road, except so far as the entrance of its trains into New York City is concerned. We understand that the New Haven Company has not yet placed any order for multiple-unit equipments, either a. c. or d. c., although its business from Stamford west is essentially one for multiple-unit operation. From this fact we assume that the company's decision to purchase the single-phase locomotives described by Mr. Scott and to use them on the d. c. zone between Woodlawn and New York, and upon the company's own tracks as far as Stamford, was based upon the desire to acquire further knowledge of the performance of single-phase apparatus under heavy traction conditions before proceeding further with the electrical equipment. This proposal, of course, interferes with the contemplated plans of the New York Central Railroad Company in devoting the lower tier of its Forty-Second Street station to the use of suburban trains and the upper tier to through trains, as explained by Mr. Sprague, and also to the proposed pooling of rolling stock. It is unfortunate that the New Haven road should have waited so long before deciding upon its plans for electrification, but the company now commands excellent electrical talent, and although somewhat late in entering the game, still has eleven months to complete its equipment.

The subject is one which has its popular as well as its technical side. The New York public and others who travel to and from the city by the three lines running into the Forty-Second Street station have been patiently awaiting the conversion of the motive power in the Park Avenue tunnel from steam to electricity, which the Electric Traction Commission expects will be made by September, 1906. Whatever plans for composite working are adopted they should be such as not to delay the date of change or interfere with the convenience, economy or despatch of operating trains out of the new station.

Recent Speed Contests

Some excellent persons worthy of foreign extraction have recently been casting the dust off their wheels at a rate that is enough to make the engineering profession wipe its spectacles. When automobiles on a country road, even a good one, can keep up a pace of over a mile a minute for four or five hours, with the winner averaging 70 miles an hour, and an even faster car only put out of the race by collision near its end, one stops to consider what it all means. The winning car was rated at only 90 hp, and the transmissions of an automobile are far from being in the first rank of efficiency. It would be most interesting and instructive to know what the actual driving horse-power was in this tremendous sprint. We know of no tests which give even an approximate answer to such a question, but it is very evident that the power taken for these high speeds is much less than one would guess at first thought. And what would these engines do on a straight line of rail or even upon a fine, smooth road with minimum grades and curves? Certainly something astonishing.

The practical question that at once suggests itself is the probable effect of such performances on a general demand for

higher speeds of traveling. The time is here when a resident of the suburbs can get into his office more quickly in a motor car than he can on the railway trains he is likely to patronize. He will have to overrun the legal speed limit to do it, but he can get there. Will he thereafter be content to jog along behind a mere locomotive? It would not be surprising if the result were a general tendency to increase speeds all along the line. Even now we hear rumors of new fast trains, of straightening tracks, lowering grades and eliminating all the remaining grade crossings. The hundred mile an hour train has now been on the way a good many years and has not yet arrived. But if there is any sporting blood left in the railway business the hundred mile an hour automobile threat ought to stir it into activity. As for the electric roads we have no fear; when the time comes for high speeds the electric locomotive will be the one to do the work without much doubt. It can concentrate more power in a given dead weight than any other, and it is power that counts. It can also maintain that power more steadily than anything yet devised. All this has been well understood, but the incentive to high speed has been lacking. When, however, the high speed microbe begins to get in its work, slow traveling becomes irksome to the victim, and he will have none of it. Perhaps a motor-car enthusiast could be found who would take a 50-mile an hour train if a 100-mile an hour train were available, but we think his conscience would tweak him at every mile post. A little more of the strenuous education of public opinion will begin to produce an effect. We do not approve of giving the automobiles exclusive rights to speed or exclusive use of the road. If, however, it calls for more speed in its own behalf it brings an influence to bear that may give a new impulse to train records.

A Coming Test

We learn with pleasure that at least one of the huge direct-connected gas engine sets of the California Gas & Electric Company has been shipped so that the time draws near in which the facts as to the practical properties of very large gas engines will be ascertained. Discussion of the subject hitherto has been strongly favored with polemics, since American gas-engine practice has been upon a rather modest scale until within very recent years. Certainly the Californians have thrown down the gage of battle with a resounding clatter, and any steam engineer who is looking for trouble is welcome to pick it up. Our friends of the Coast have done the same sort of thing before, and those who have gone into the lists against their propositions have generally retired in bad order. This time the battle is of great significance, for upon the result of it hinges the question whether the advocates of reciprocating engines and turbines will hereafter have to be largely on the defensive. The load will be largely a railway load, and San Francisco is not a city of smoothly beautiful load curves by any means. Those gas-engine sets will get soundly tested, but if they make good, we see some lively times coming. We earnestly hope that the whole matter can be soon opened to public inspection, for the issue is of very great importance. Probably decisive results one way or the other will quickly leak out, but if the odds are nearly even, it may take a long time to settle matters. At all events, the fun is now about to begin, and we shall try to keep our readers informed of the latest news from the scene of carnage, and to take a hand in the subsequent autopsy on the remains.

Use of Steel in Car-House Construction

The use of steel in "fireproof" structures has always been necessary to a greater or less degree, but experience has shown its presence to be objectionable, owing to its susceptibility to warping or buckling under intense heat. The tendency of the past decade, during which a great deal of study and attention have been given to this line of architecture, has been to substitute, as far as possible, tile and concrete beams, wider span of arches between beams, and other means to reduce as much as possible the amount of steel work in the structure. This revolution, for it may well be so called, has accomplished the long-sought for result of entirely doing away with the vulnerable steel channels in the all-concrete structures now built and building in many of the larger cities.

It seems strange that under these circumstances, architects should specify for car houses, which in case of fire are subject to an intense heat, roofs of expensive open tile and steel detail with long steel trusses under heavy strain. A fire in a single car, should it be so confined, as is seldom the case, could quickly cause enough damage to the members of a truss as to cause heavy damage to a large area of the roof. If it should spread to two or more cars, the chances are that the entire roof will collapse and every car in the car house, or at least in that section, will be destroyed. If a wide roof does not collapse, the labor and material for repairing it are correspondingly more expensive than one of simple construction.

For the reasons outlined above, we have frequently laid stress upon the importance of dividing up the car house into sections, with slow-burning or incombustible roofs and correspondingly protected walls. A recent structure of this kind is considered by its owners a model fireproof house, as it is subdivided by several walls, and each section contains from two to four tracks. Good as was this principle, the walls were built up by using steel columns with exposed flanges and filled in with 8-in. brick walls. To the top of these columns were attached the steel roof trusses, making the building practically a steel building except for the brick filling between columns. It would be interesting to see the result of a severe fire among cars in such a structure. But from the action of steel under far less severe conditions than would be imposed by a conflagration among cars, it may be expected with all reason that the ability of these walls to hold a fire would be small, for the buckling of the trusses and of the beams themselves as exposed in the so-called "fire walls," would cause a quick collapse of the brickwork and spread of the fire to adjoining sections, with a resultant general fire. In this case, and there are many with similar wall construction, the objection was aggravated by the fact that the only means for removing cars from all sections was by a single transfer table, the operation of which would be practically impossible in case of emergency, owing to its proximity to the building and the intensity of the heat at that short distance from a fire.

It would be far more practicable to subdivide the area by substantial 12-in. brick walls corbeled for truss or roof supports with roof of simple construction, such as corrugated iron sheets on light supports with small span. These are easily replaced, if destroyed, with low original cost, and are so light that their collapse in case of fire would not add materially to the damage to contents. One company has large storage yards for cars in active service with concrete walls, unroofed, 14 ft. high, dividing yard into sections containing each from two to three tracks. Others have small storage sheds of all-concrete

construction. Others have "slow-burning" or wooden timbers. Any one of these is far better, from an economical or underwriting standpoint, than expensive roofs which are but little more serviceable than the inexpensive types, and far more susceptible to heavy loss from fire.

The Street Railway Situation in New York

The street railway situation in New York City, as disclosed by the report of the New York City Railway Company in our last issue, is a very interesting one. The net results of surface operation, if considered by themselves, might give rise to a pessimism which is not warranted when the text of the report of President Vreeland and the other conditions which affect transportation in New York are considered. Nominally, the report for the year's operation shows a deficit of over two million dollars after paying dividends on the stock of the Metropolitan Street Railway, Third Avenue and other underlying companies. Actually, the condition is not so unfavorable as this report would seem to indicate.

In the year ending the 30th of last June there were a number of temporary causes which increased the expenses and decreased the net earnings. Principal among the former was the large expense caused by the severe winter, and which was not confined to the increase of \$119,000 for the removal of ice and snow mentioned in the report. As we have taken occasion to remark before, an increase in this item is always followed by an increase in others. This is due not only to the additional power required to move the cars, and to the burn-outs caused by the strain on the electrical apparatus, but also to the weakened condition of the motors, caused by continuous operation on overload; this weakened condition is sometimes not reflected in the repair charges for two or three months, or until the motors become unfit for use. It is not too much to say, therefore, that a cold winter, accompanied by an unusual fall of snow such as we had last winter, will increase the total repair bills from 25 to 50 per cent. With this increase in expenses comes a natural decrease in gross receipts, due to the snow which keeps people at home and reduces transportation. As the statistics published in our issue of March 18 show, the past two winters have been phenomenal in the amount of snow which has fallen in New York City, and by the law of averages it is safe to assume that a similar condition of affairs will not occur for a great many years, if ever.

But it has not been alone on account of a severe winter that the New York surface railways have been handicapped. During the past year there has not only been a large amount of reconstruction and electrification which naturally impeded movement of cars, but during the last nine months the company has experienced the competition of the subway. We have already expressed the opinion that the ultimate effect of the construction of rapid transit lines running longitudinally in New York will be to increase the gross receipts of the surface cars, as it will relieve them of long-distance traffic and will bring to them a large amount of short-distance traffic. During the first nine months of year, however, it is only natural that the factor of competition should be felt more keenly than the causes which will increase the traffic. It should also be remembered that the main effect of the subway in distributing the population within the limits of Greater New York will be to build up the Bronx, which now, outside of the surface lines, has no transportation lines except in a north and south direction. It will be the province of the Bronx surface lines to carry the people living in this borough between

the subway and elevated stations and their homes. At present about 33 per cent of the track controlled by the New York City Railway Company is north of the Harlem River, whereas the per cent of earnings north of the river is only a little over seven. This fact shows the future possibilities in the way of transportation in this section of the city.

Three years ago, when the plan of forming the Metropolitan Securities Company and of leasing the Metropolitan Street Railway Company to the New York City Railway Company was broached, we published an editorial on the comparative merits of issuing "overlying" and "underlying" securities to provide the additional capital required to complete the equipment of the system, and took the occasion to say, "it seems to us that it was a very wise plan to make a lease of this kind by which those among the stockholders who are sanguine as to the future possibilities of the system can invest their money in the stock of the Securities Company with the knowledge that they will have to wait a considerable time for dividends, while those who do not feel warranted in taking a step of this kind can retain their railway stock with a guarantee of 7 per cent." At that time many, if not all, of the conditions which have since developed were foreseen by the management, and their judgment in making the lease, although criticised at the time in some quarters, has been amply justified by subsequent events. The records of the last quarter indicate that the corner has already been turned, and we shall be surprised if the earnings should not now begin that recovery which students of transportation matters in New York consider certain.

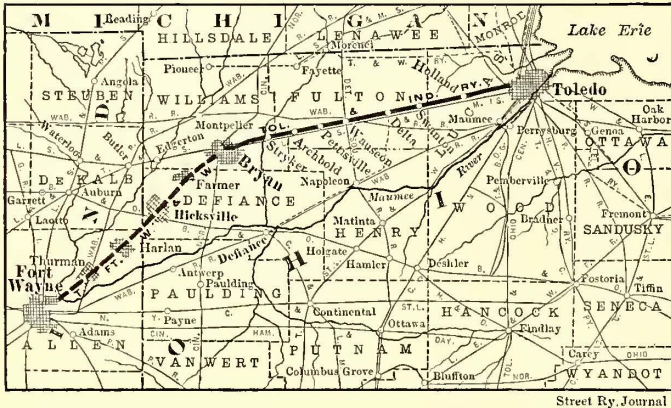
Cost of Oiling Cars

The figures given in the answers to the Question Box of the American Railway Mechanical & Electrical Association on the cost of oiling cars with four-motor equipments, brought out such a wide variation in figures as to call for considerable comment and discussion at the convention. We do not altogether agree with some that the amount of oil required to lubricate a car is independent of the amount of dust and dirt through which the car must operate. Any machine operating where there is dust and dirt must have a liberal margin of safety in its oil supply, and such margin is not necessary upon an elevated road operating on a perfectly clear right of way. Other things being equal, the cost of oiling a motor depends almost entirely on the amount of oil that is wasted. The actual amount of oil that is required for lubrication is very small. It is the oil that is wasted that makes up a large part of the expense. The main question is to reduce this waste. With motors which are designed with oil chambers with the intention of having them oil lubricated entirely, there is not the same chance for waste of oil that there is when the motor has some oil cup arrangement adopted as a substitute for the old fashioned grease lubrication. With the latter devices, the oil after it passes through the bearing is generally wasted and cannot be used a second time. The main thing with them is to get a cup which will feed no more than the necessary amount, and will, as far as possible, stop feeding when the car is standing still. Few, if any, devices will absolutely stop when a car is standing, but all the more successful ones feed much more rapidly when the car is moving than when it is at a stand-still. At any rate, it seemed to be the consensus of opinion at the convention, that even a wasteful oil lubricating scheme is more economical for a company than grease lubrication, on account of the longer life of bearings, fewer hot bearings, and consequently fewer ruined armatures.

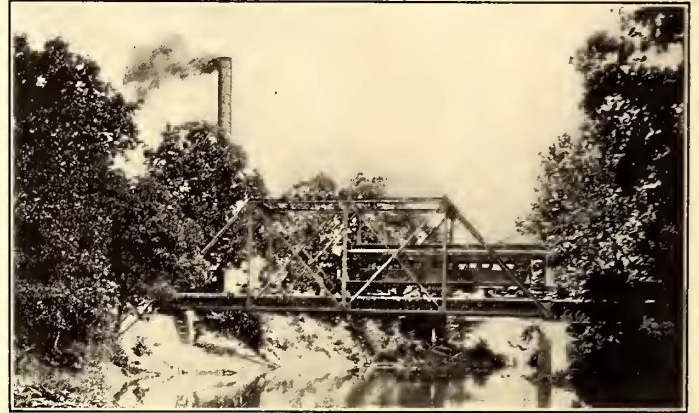
THE TOLEDO & INDIANA RAILWAY

The Toledo & Indiana Railway Company has recently opened an extension from Wauseon to Bryan, 22.4 miles, making the entire line from Toledo to Bryan 55.8 miles in length. With this enlarged field of operation, numerous improvements were necessary, and consequently the entire line was renovated, the rolling stock overhauled, and a power plant, car house and

tract across country to Holland. From this point, and on through the towns of Swanton, Delta, Wauseon, Pettisville, Archbold and Stryker, the line is to the north of, and immediately adjoining, the Lake Shore & Michigan Southern Railway's Air Line division, which is perhaps the finest stretch of track in the country—a perfect tangent for 77 miles. A short distance from Bryan the electric line passes under the Lake Shore by an undergrade crossing and passes into the city south



PROPOSED ROUTE OF THE TOLEDO, FORT WAYNE & WESTERN RAILROAD, BRYAN TO FORT WAYNE



CROSSING THE TIFFIN RIVER BRIDGE—POWER HOUSE IN THE BACKGROUND

repair shops were erected on the east bank of the Tiffin River near Stryker, replacing the former temporary power station and shops at Delta, Ohio. At present a further extension of the road from Bryan to Fort Wayne, Ind., is being pushed through with all possible speed, and surveys and engineers' reports have already been completed. The route of the extension is shown in the accompanying map. This will give a through line from Toledo to Fort Wayne 101 miles long. At

of the railroad, but aside from this, the rights of way of the two lines closely adjoin one another. Much of the way they have ditches in common and with no fence between, so that probably no electric road in the country has as many long tangents. Approaching each town the line swings over to the first parallel street. In every case the main streets of these towns lie north and south, so that the electric line crosses them at right angles. In nearly every town the road has been



ADJOINING RIGHTS OF WAY OF THE LAKE SHORE & MICHIGAN SOUTHERN RAILROAD AND THE TOLEDO & INDIANA RAILWAY



65-FT. THROUGH GIRDER BRIDGE ACROSS BEAVER CREEK, NEAR BRYAN, OHIO, ON THE LINE OF THE TOLEDO & INDIANA RAILWAY

Fort Wayne direct connection will be made for Indianapolis. With limited service it will be possible to compete for time with the steam roads to these points, as the routes are shorter. In addition to the extension mentioned, the same interests have organized the Toledo, Defiance & Southwestern Railroad, and will build a branch line from Delta to Liberty Center, Defiance and Napoleon.

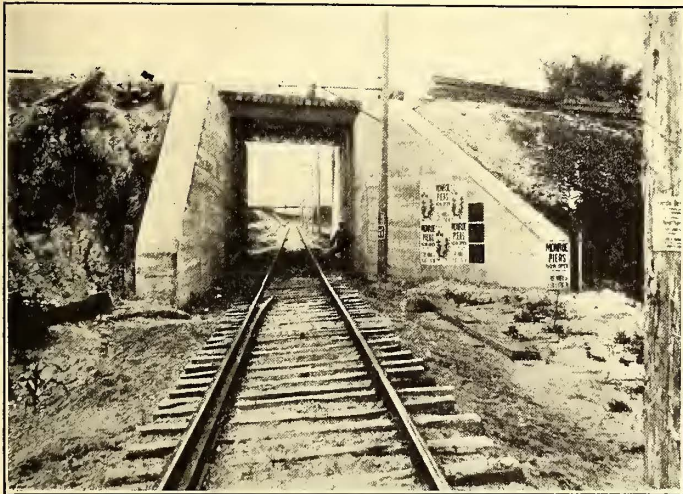
allowed to place a siding in the street, where it is permitted to lay up freight cars if desired, so that all these features tend to make it an ideal high-speed line and at the same time improve its possibilities for handling carload freight, a feature which is to be strongly pushed.

ROAD CONSTRUCTION

From the Toledo interurban station to Calvary Cemetery, a distance of 3.8 miles, the company uses the tracks of the Toledo Railway & Light Company, under a traffic arrangement. This is perhaps the best interurban entrance to the city, as the track is new and the route direct, which is of great benefit to the interurban schedules. From there the line passes over a 50-ft. private right of way through an extensive truck-farming dis-

This district is very level, and there are no grades over 1½ per cent, and few as great as this. A number of good-sized fills and cuts were made, the heaviest fill being about 20,000 yds. The undergrade crossing near Bryan required a fill of 4 or 5 ft., and the track has natural drainage, a peculiar circumstance for a crossing of this kind. The track-bed is 14-ft. face and it is heavily ballasted with A1 grade of gravel from

the famous pits at Tecumseh, Mich. Trains of forty ears or more were hauled the whole length of the road for this work, which gives an idea as to the grades and curves. The track is all 70-lb. rail, bonded with the Ohio Brass Company's soldered bonds and five cross-bonds to the mile. The trolley wire is two No. 000 grooved on the new section and two No. 000 Fig. 8 on the old. The overhead work is of the Ohio Brass Company's heaviest type, flexible suspension bracket construction, 9-ft. arms of 1½-in. tube, supported above and below. Ears are 10-in. e-lineher and soldered. The poles are 35 ft. with 7-in. tops, set 5 ft. in the ground and spaced 100 ft. apart. The



UNDER CROSSING OF LAKE SHORE & MICHIGAN SOUTHERN RAILROAD NEAR BRYAN, OHIO

high-tension system consists of three No. 4 copper wires insulated with 7-in. triple petticoat glass insulators. Garton 500-volt lightning arresters are placed ⅓ of a mile apart. The sidings are all on the north side of the track; they average 2½ miles apart and are 300 to 500 ft long. They have No. 10 frogs and spring switches, and under the operating rules the east end of every switch is locked open, so that every westbound ear takes the siding and eastbound cars the main line. The trolley wire is arranged in the same way, so that it is not necessary to change the trolley at any time. At each siding is a circuit of six 110-volt lamps; two at each switch and two in the telephone booth, and the practice is to allow them to burn all the time. Extra lamps are carried in the telephone booth.

Telephone booths are placed at all sidings and waiting rooms. Conductors take written copies of orders and read them to the motorman before leaving the switch or station. Telephone lines are No. 12 copper, and the 'phones are of the bridging type installed by the W. G. Nagel Electric Company, of Toledo. The dispatcher uses the standard steam train sheet, and in addition to despatching, it is part of his duty to check the time slips with the train sheets. He figures mileage on the



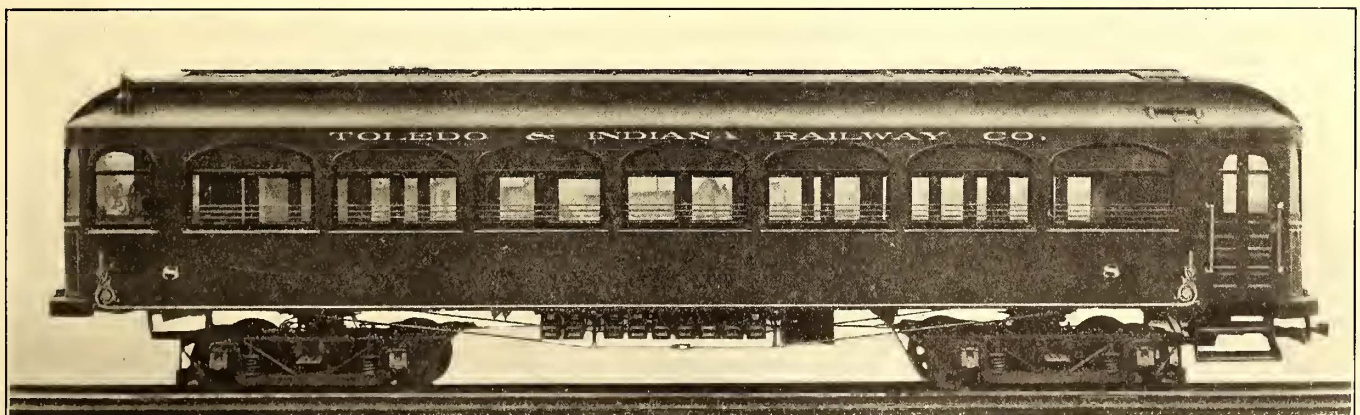
BEAVER CREEK BRIDGE AND UNDER CROSSING OF LAKE SHORE ON THE LEFT

bottom of the train sheets, distributing it into four classes—passenger, special passenger, freight and earload freight.

All bridges are built of concrete and steel in accordance with steam railroad practice, steel girders or spans being used exclusively where pipe and masonry culverts were insufficient. At Stryker, where the road crosses the Tiffin River, the bridge consists of a 90-ft. high truss and two 45½-ft. deck girder spans, and over Beaver Creek near Bryan there is a 65-ft. through girder, these being the largest bridges on the line.

ROLLING STOCK

The rolling stock was increased at the time of the opening of the Bryan extension by three passenger and two express cars



STANDARD PASSENGER CAR OF THE TOLEDO & INDIANA RAILWAY COMPANY

Near Wauseon the line crosses the Wabash and the Detroit, Toledo & Ironton steam railroads. Both of these crossings are protected by interlocking systems, which also protect the Lake Shore & Michigan Southern crossings, one towerman taking care of three lines in each case; one of these crossings is illustrated. Near Toledo, there are two other crossings protected by derailleurs, which are thrown by the conductor.

built by the Jewett Car Company. The passenger cars are 52 ft. over all, 40-ft. body and standard width, with vestibule at each end. The bottom framing is extra strong, reinforced with I-beams. The interior finish is mahogany with marqueterie inlay, and the ceiling is of the semi-empire type. The front end has a smoking compartment seating sixteen people, while the main compartment seats thirty-eight people. The

seats are of the walkover type upholstered in green Pantasote. Windows are of polished plate glass ornamented in gothics, and have Pantasote curtains with Keeler fixtures. Every car

Tiffin River, on whose bank it is located, is the largest stream on the line, so that in every way it is an ideal location. The building is of substantial and pleasing design. The boiler room

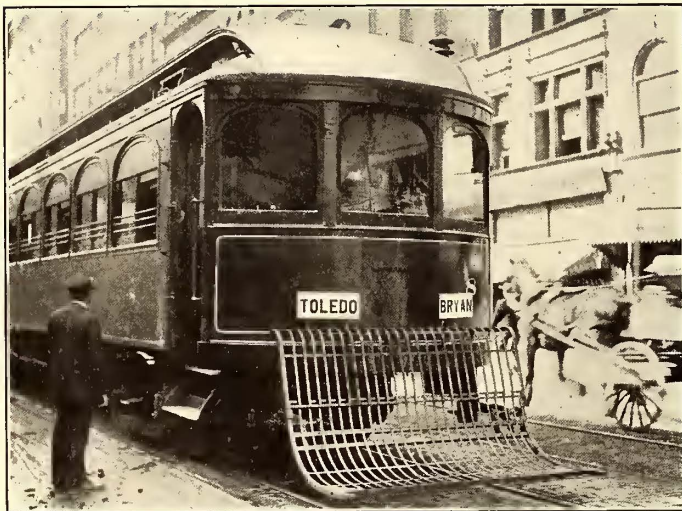
is 90 ft. x 44 ft., with a clear height under roof trusses of 32 ft. The engine room is the same length and 56 ft. wide; the engine room floor is 8 ft. above the boiler room floor, leaving a height to the trusses of 24 ft. On the north side at the west end there is a bay 14 ft. x 45 ft. divided into two stories for the reception of the switchboard apparatus. The basement under the engine room is on the same level as the boiler room, excepting that between the engine foundations there is a pit for the condensing machinery 14 ft. below



STANDARD EXPRESS CAR USED ON THE TOLEDO & INDIANA RAILWAY

has continuous parcel racks, VanDorn coupler on rear end, Smith heater and Sterling-Meaker register. The trucks are Peckham M. C. B. 36-A extra heavy type, on which are

the engine room floor. The roof trusses are of steel, and the roof is 1½-in. matched sheeting laid on nailing strips fastened



VIEW SHOWING STYLE OF FENDER USED ON THE CARS OF THE TOLEDO & INDIANA RAILWAY



INTERIOR OF STANDARD CAR, SHOWING THE TYPES OF SEATS AND WINDOWS, LIGHTING ARRANGEMENT, ETC.

mounted four Westinghouse No. 57 motors with K-14 controllers and National Electric Company's AAI air equipment. The passenger cars are geared for 60 miles per hour.

to the steel purlines, covered with a prepared roofing. There are two ventilating monitors over the engine room provided with pivoted windows actuated by mechanism controlled from

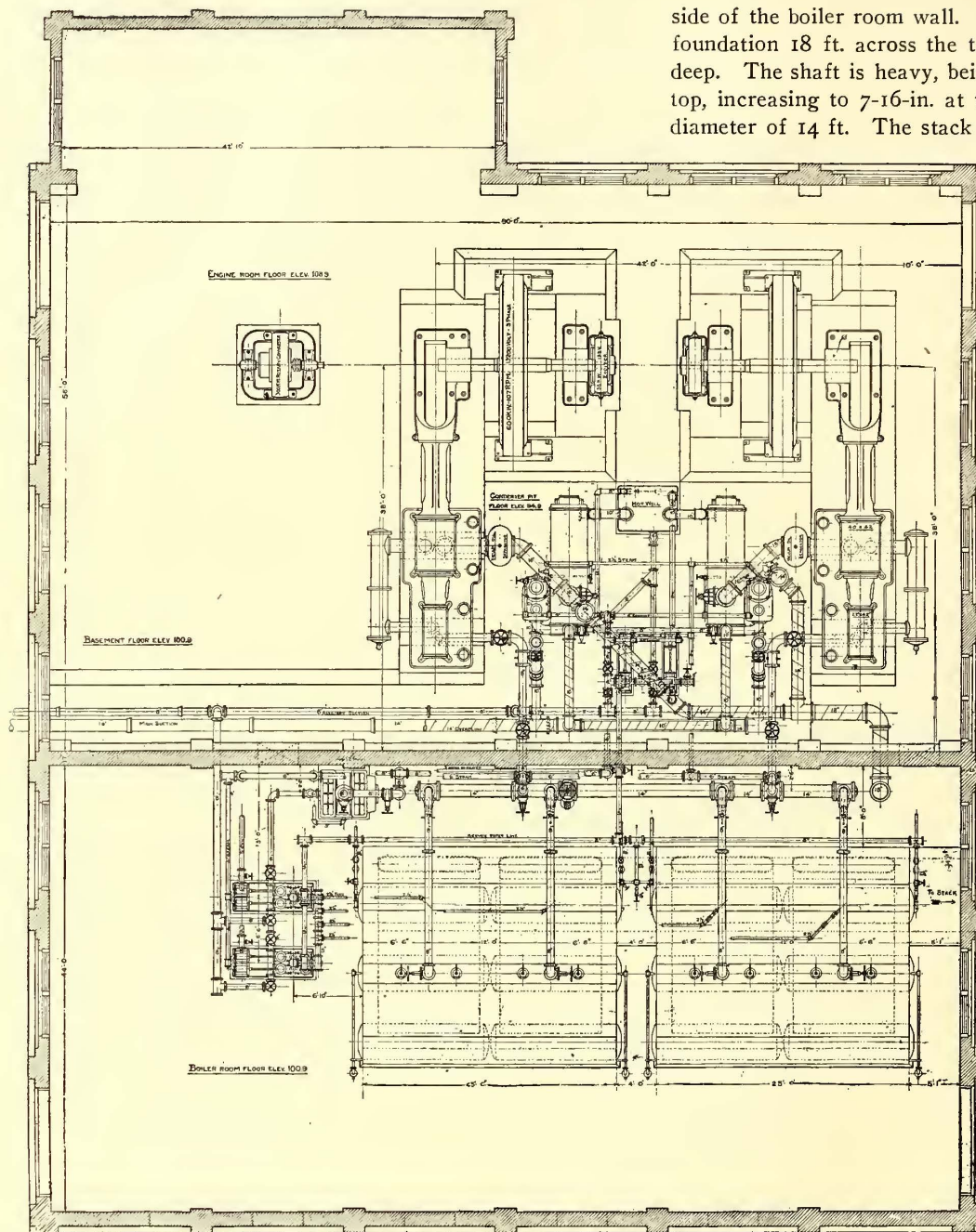
The express cars are 44 ft. long, equipped with four 75-hp No. 112 Westinghouse motors with L-4 controllers and Christensen air brakes. These cars are geared for slower speed than the passenger cars, and the heavier equipment will enable them to haul a number of freight cars. The company had six Stephenson passenger cars and an express car, which have been repainted a uniform orange and brought up to the standard of the new cars. In addition, the company has seven gondolas, two flat cars, three standard box cars and three center-dump ballast cars. These are equipped with air brakes and M. B. C. couplers. A 40-ton electric locomotive is being built; it is to be equipped with very heavy trucks and four Westinghouse No. 76 motors.

POWER STATION

The power station at Stryker is at exactly the center of the system, considering the proposed extension to Fort Wayne, and it is designed to take care of the entire line. The



INTERLOCK AT WAUSEON, OHIO, PROTECTING TRACKS OF THREE ROADS—LAKE SHORE, DETROIT SOUTHERN AND THE TOLEDO & INDIANA RAILWAY

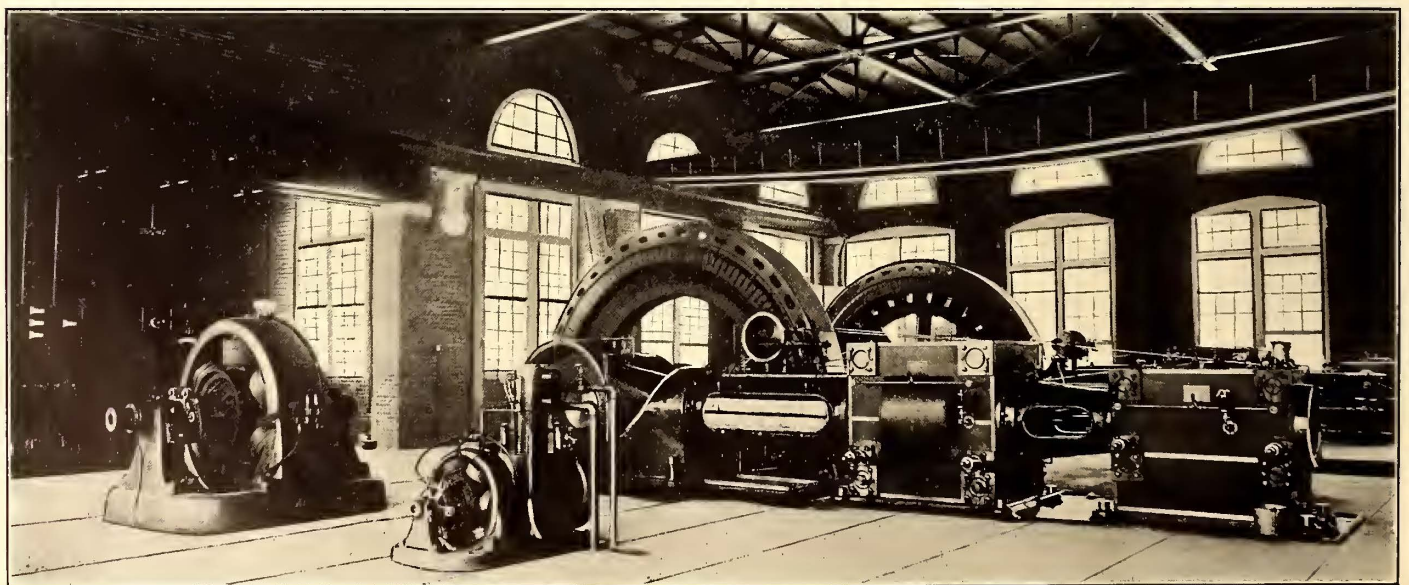


PLAN OF MAIN PIPING LAYOUT IN THE POWER STATION OF THE TOLEDO & INDIANA RAILWAY

side of the boiler room wall. The stack rests on an octagonal foundation 18 ft. across the top, 22 ft. at the base and 20 ft. deep. The shaft is heavy, being formed of $\frac{3}{4}$ -in. plates at the top, increasing to 7-16-in. at the bottom, which is flared to a diameter of 14 ft. The stack is heavily bolted to the foundations and no guys are used. A lining of brick 8 ins. thick extends to a height of 50 ft. from the foundation.

ENGINES

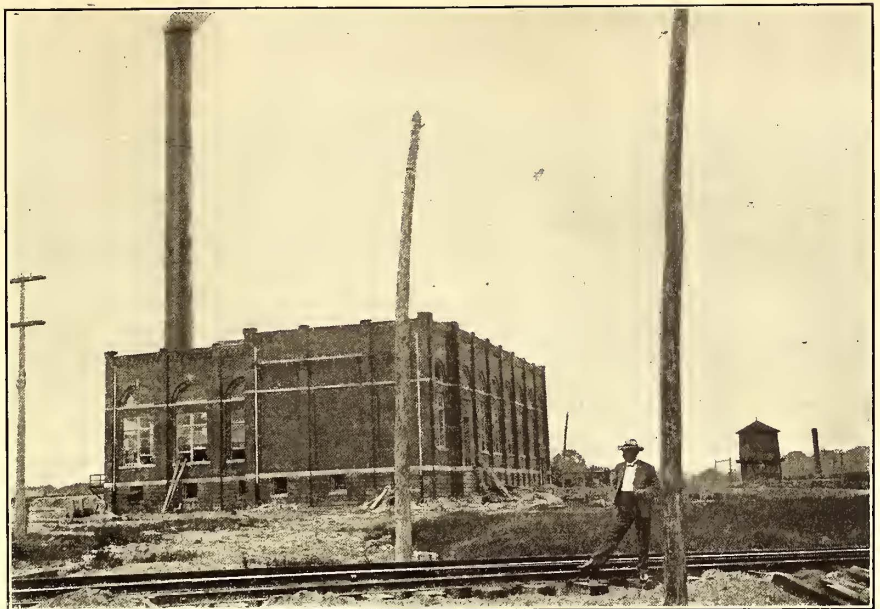
There are two tandem compound Corliss type engines, built by the C. & G. Cooper Company. The cylinders are 22-in. and 40-in. x 42-in. stroke. They operate at 107 r. p. m. and are rated at 900-hp each. Steam is taken from beneath the floor, and in addition to the throttle valve, a butterfly valve is placed in the steam line, operated by an automatic tripping device from the governor, which positively shuts off the steam where the speed increases beyond a prearranged point. Each engine is direct connected to a 600-kw General Electric generator placed between the bearings, and a 35-kw exciter is on the extended shaft overhanging the outer bearing. On account of the design of the generators, no fly-wheels are used, the revolving fields having the necessary momentum to permit parallel operation of the units. The cylinders are mounted on heavy cast-iron foundation plates and are lubricated by means of multiple force-feed oil pumps. Machine oil



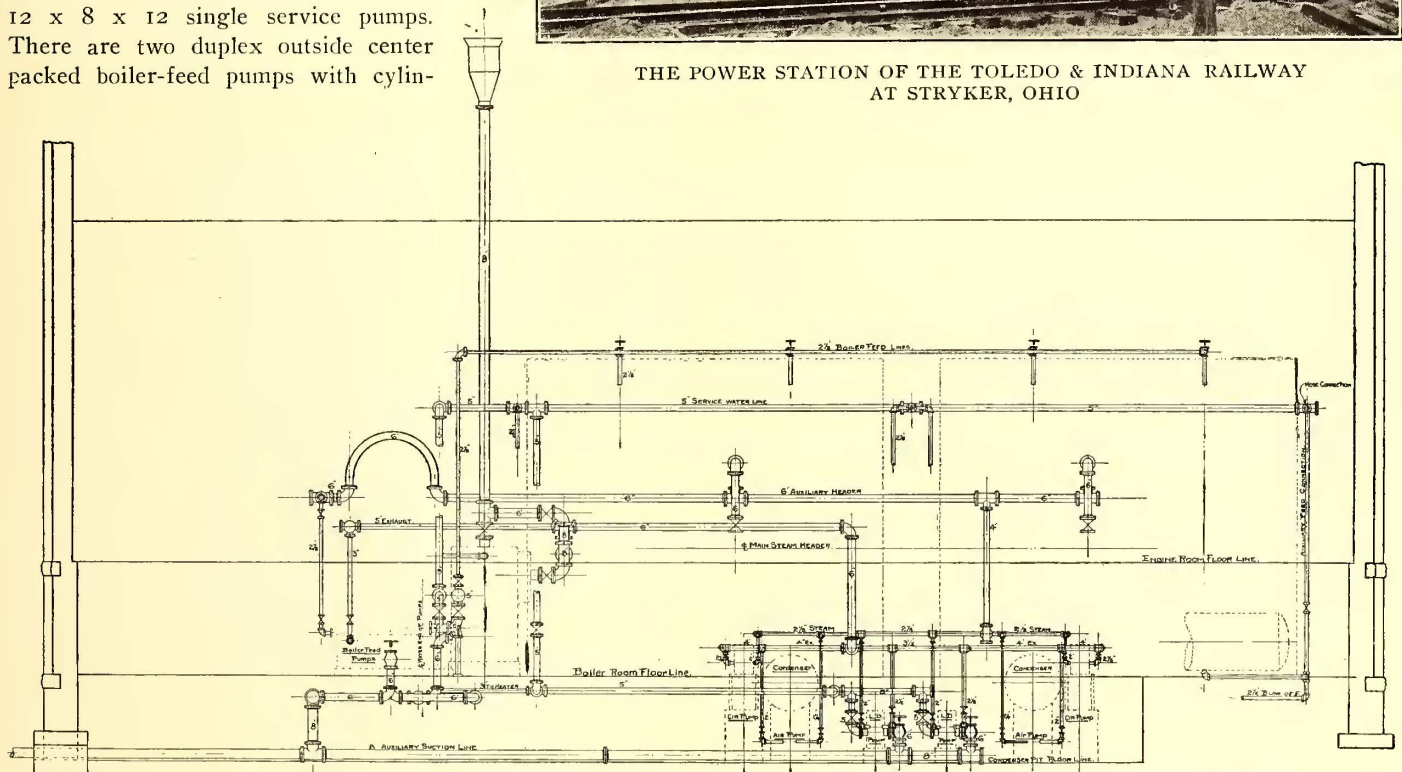
VIEW OF ENGINE ROOM IN THE STRYKER POWER HOUSE OF THE TOLEDO & INDIANA RAILWAY

is supplied from a gravity oiling system in connection with a Cross filter and pump in the basement. The main and outer bearings are water jacketed. Besides the main units, there is installed an 8-in. x 6-in., 400 r. p. m., vertical marine type engine for an auxiliary exciting unit.

In the pit formed in the space between the engine foundations are two surface condensers, each containing 2300 sq. ft. of cooling surface. The shells are cylindrical and are made of cast iron in two sections. The tube heads are of composition metal, and the tubes are 3/4-in. seamless brass, tinned inside and out. The condenser shells are mounted over 10 x 18 x 18 single air pumps, brass fitted, while the circulating water is supplied by two 12 x 22 x 15 vertical single type double-acting pumps. In the condenser pit is also located a steel hot well and two 12 x 8 x 12 single service pumps. There are two duplex outside center packed boiler-feed pumps with cylin-



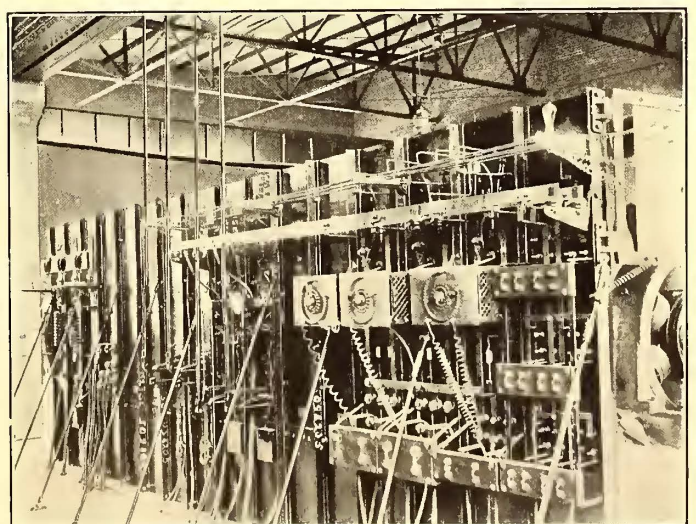
THE POWER STATION OF THE TOLEDO & INDIANA RAILWAY AT STRYKER, OHIO



LONGITUDINAL ELEVATION OF PIPING, AS VIEWED FROM BOILER ROOM WITH PARTITION WALL REMOVED



OIL SWITCH ROOM IN GALLERY OF BAY WINDOW

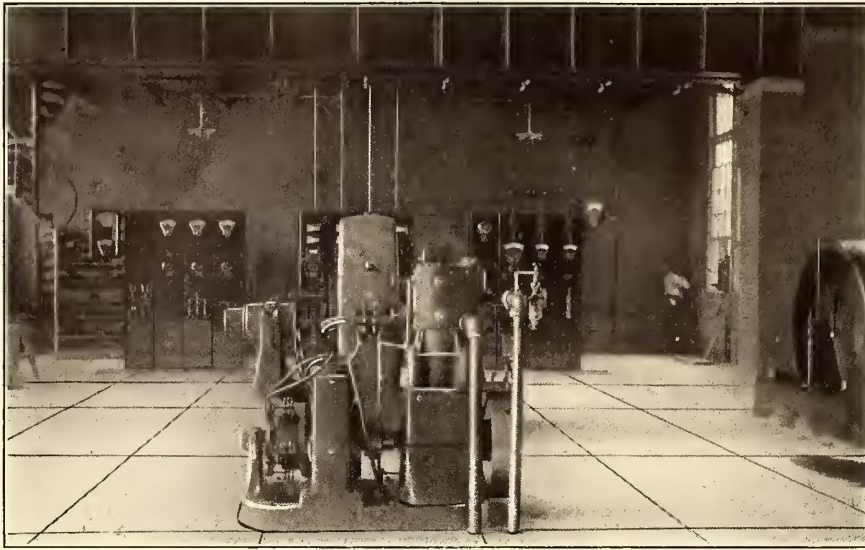


REAR VIEW OF SWITCHBOARD

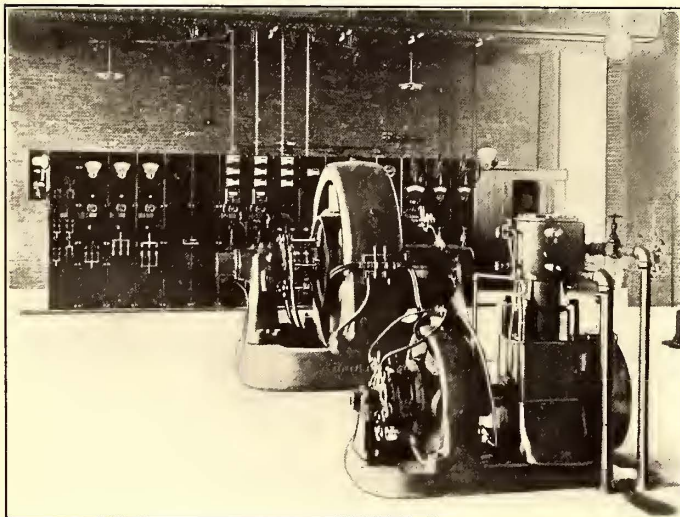
ders 12 x 7 x 10 placed in the boiler room at the side of the battery of boilers. All of the pumps have lagged steam cylinders and cast-iron bed-plates to catch drips. In addition to

ning along the division wall supplying boiler-feed pumps, condenser equipment and low-service pumps. The auxiliary header can take steam from either side of the valve in the main line, thus allowing either of the latter to be cut out of service. The 16-in. exhaust line from each engine contains a vacuum oil separator, made by the Austin Separator Company, Detroit. Gate valves control the passage of the steam into the condensers, and automatic relief valves are provided for atmospheric exhaust. The lines from the relief valves combine into one 18-in. atmospheric line which passes through the division walls and thence through the roof. The exhaust lines from the small exciter engines and the pumping machinery combine into one 8-in. line, connecting to the feed-water heater with a by-pass, extending above the boiler room roof into a Lyman exhaust head.

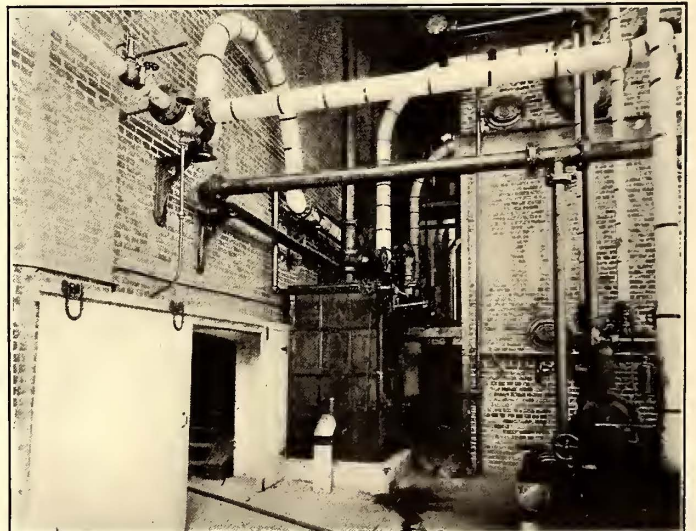
About 150 ft. west of the power house on the banks of the river is located a cold well 15 ft. in diameter, in which are located foot valves for the main and auxiliary suction lines. These lines are formed of 14-in. cast



VIEW OF SWITCHBOARD EXCITER AND ROTARY IN POWER STATION



SWITCHBOARD EXCITER AND ROTARY IN POWER HOUSE AT STRYKER, OHIO

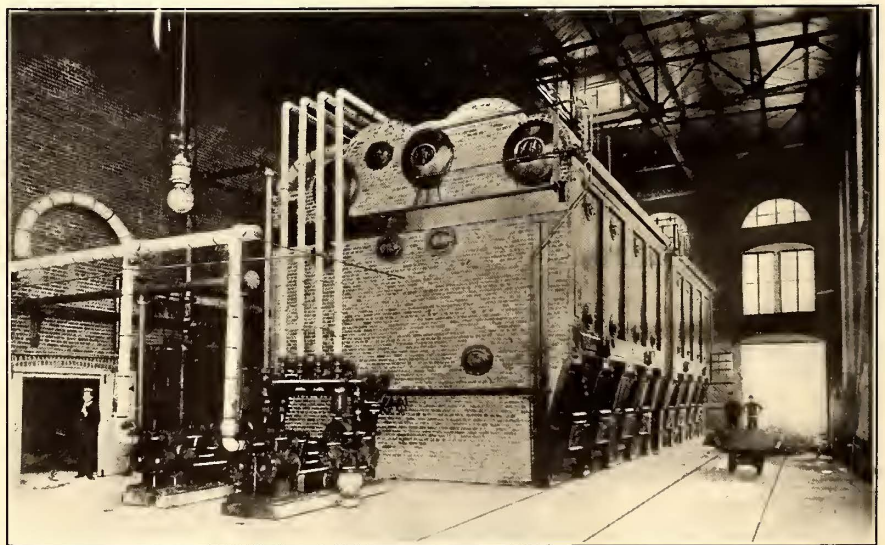


STEAM HEATERS BEHIND THE BOILERS IN THE STRYKER POWER HOUSE

the above, there are two small single vacuum pumps used to drain the vacuum oil separators, and a steam-driven oil pump to elevate the engine oil from the filter and tanks to the elevated supply tanks. The entire pumping and condensing equipment is of the Dean make. Near the boiler-feed pumps in the boiler room, is a 1500-hp open feed-water heater of the standard Cochrane design.

The arrangement of the piping is made on the unit system, so as to permit of extension of the power plant without any rearrangement. The main steam header is supported between the boilers and division wall on steel beams and rollers, and is 14-in. pipe with extra heavy valves and fittings. On each boiler nozzle is located an automatic stop and check valve, and in addition there is a gate valve in each boiler lead at the header, and a stop valve in the line to each engine. Steam is taken for the engines at the bottom of the header, passing through large receiver separators, which act as a constant drain to the header. There is a 6-in. auxiliary steam line taking steam from the top of the main line and run-

ning along the division wall supplying boiler-feed pumps, condenser equipment and low-service pumps. The auxiliary header can take steam from either side of the valve in the main line, thus allowing either of the latter to be cut out of service. The 16-in. exhaust line from each engine contains a vacuum oil separator, made by the Austin Separator Company, Detroit. Gate valves control the passage of the steam into the condensers, and automatic relief valves are provided for atmospheric exhaust. The lines from the relief valves combine into one 18-in. atmospheric line which passes through the division walls and thence through the roof. The exhaust lines from the small exciter engines and the pumping machinery combine into one 8-in. line, connecting to the feed-water heater with a by-pass, extending above the boiler room roof into a Lyman exhaust head.



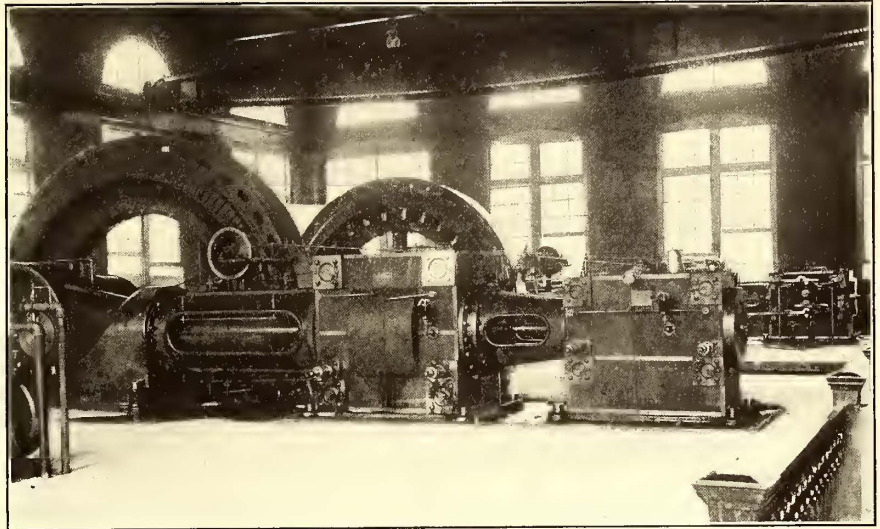
VIEW IN THE BOILER ROOM OF THE TOLEDO & INDIANA RAILWAY

and each branch contains a large air chamber. The auxiliary suction line is connected to the low service pumps in the basement, also to the boiler-feed pumps. Suction connections are also made from the hot well to the service pumps, and from the feed-water heater to the boiler-feed pumps.

There are two 10-in. lines running from the discharge connections of the condenser, combining into one 14-in. outflow line running outside of the power house to a sink, into which also lead all drip and blow-off lines from the station. This sink is drained by a vitrified sewer-pipe line to the river below the intake of the cold well. In the overflow line from each condenser is located a T, the side outlet of which has a valved 5-in. connection, the two lines combining into a line running into the hot well. In the hot well this line terminates in an automatic float valve. This valve preserves the level of the water in the hot well, and in case the water discharged by the condenser air pump is not sufficient to supply that taken out by the service pumps, the automatic valve provides the make-up water.

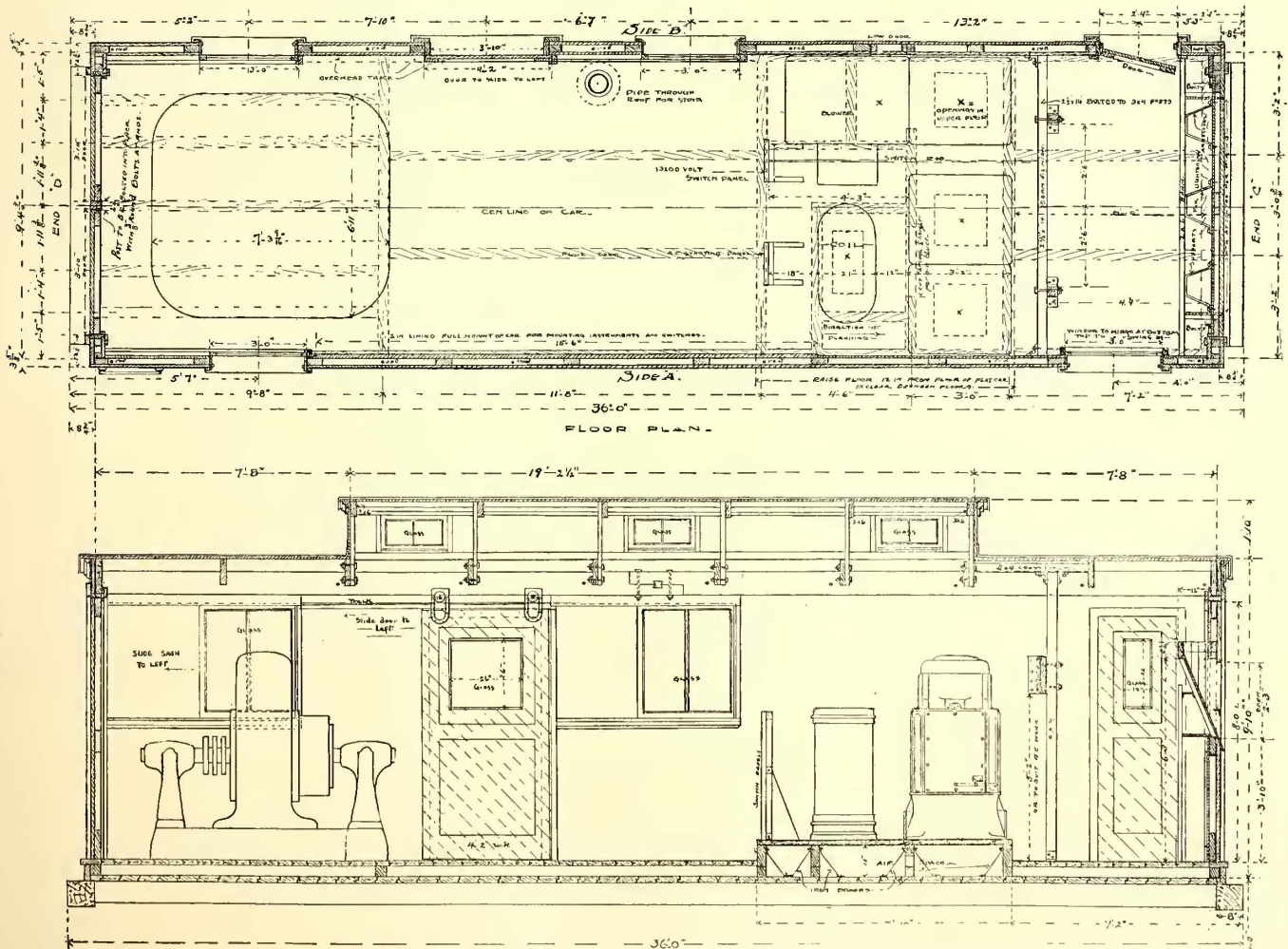
A boiler-feed manifold is provided, being supported at the end of the boiler-feed pumps, having a valved branch for each boiler; either pump can supply this manifold. There is also provided a connection from each pump to the service line which is supported on the back wall of the boiler setting. The discharge lines from the low-duty pumps are connected into one line which connects to the service line and also the feed-

water heater. This line is so valved that the service pumps can supply the feed-water heater while one of the pumps is supplying the service line for boiler cleaning, etc. There is also a connection from the service line to the blow-off line on each boiler, so that in case the main feed line of any boiler is



THE MAIN DIRECT-CONNECTED GENERATING SETS IN THE STRYKER STATION

disabled it can be fed temporarily from the service line or from the boiler blow-off. The high-pressure steam drips are all combined into one manifold located in the condenser pit, this manifold being drained by a Sorge registering drainer, dis-
 plete gravity oiling system is installed, two 60-gal. tanks being charging the condensation into the feed-water heater. A com-



PLAN AND LONGITUDINAL SECTION OF SUB-STATION CAR, SHOWING CONSTRUCTION DETAILS AND LOCATION OF APPARATUS

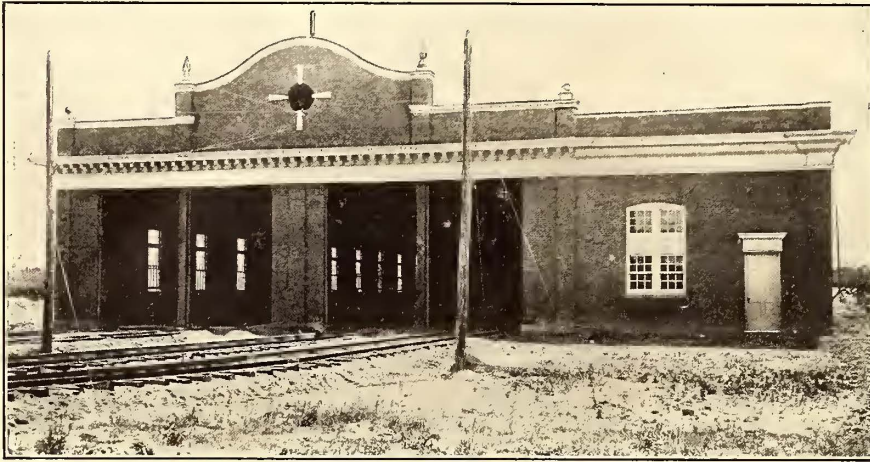
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located on an elevated platform in the boiler room from which the oil is piped to the sight feed valves on the engine bearings. The drips are collected and run through a large Cross oil filter in the engine room basement, and, after being purified, it is

dividual compartment. A view of this room is shown. All lighting wires in the building are run in conduits.

SUB-STATIONS

The sub-stations are located at Holland, Delta and Pettisville, an average distance of 12 miles apart. Each of the stations has installed one 360-kw rotary converter, three 110-kw transformers, one 45-kw reactance coil motor-blower set, three 15,000-volt, 200-amps., single-pole automatic oil switches, three-phase 15,000-volt G.E. lightning arresters, together with the necessary instruments and switches. Due to the greatly increased flexibility, two of these equipments are installed in portable cars, which were built and designed by the Hirsch Company. A monitor extending the full length of the car furnishes good ventilation, while one end, that near which the rotary is placed, is composed of two doors, which allow ample room for the removal of the rotary. The method of entering the car with the high-tension wires is the same as used by the General

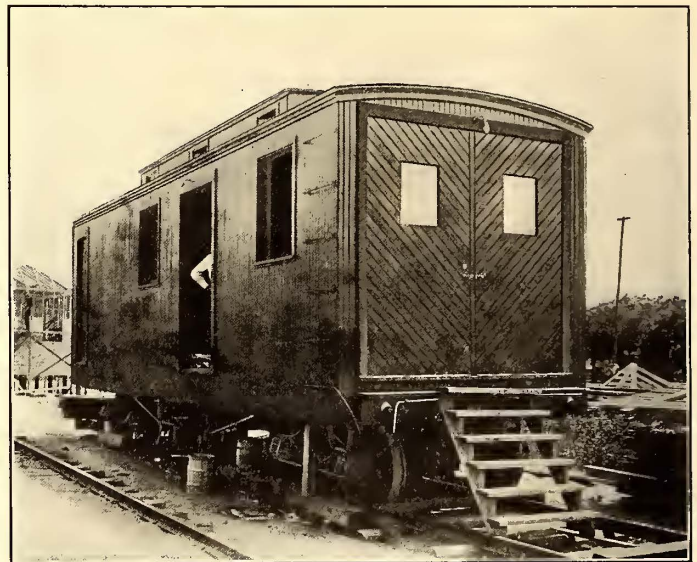


CAR HOUSE OF THE TOLEDO & INDIANA RAILWAY AT STRYKER, OHIO

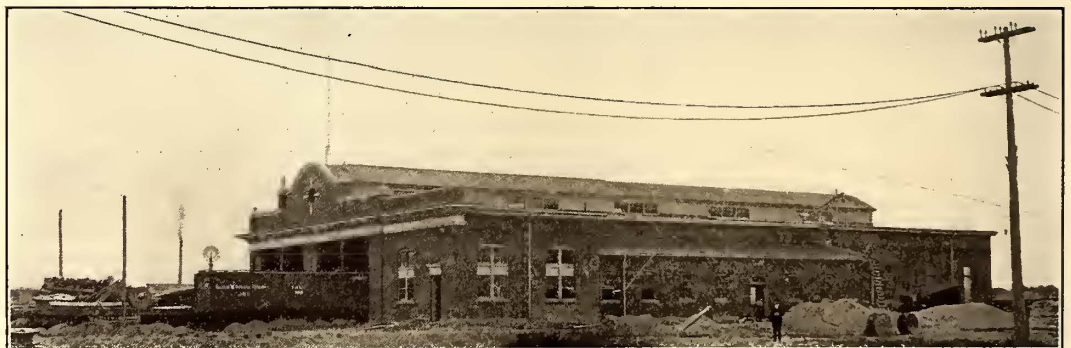
pumped into the storage tanks. All of the live steam and hot-water piping is covered by 85 per cent magnesia covering.

ELECTRICAL EQUIPMENT

The electrical equipment consists of two ATB 28-pole, 600-kw, 107 r. p. m., 13,200-volt, three-phase revolving field, fly-wheel type generators, direct connected to the Cooper-Corliss engines. Each unit has direct connected to the end of its shaft one 35-kw, 125-volt exciter. In addition to this, there is one 15-kw, 400 r. p. m., 125-volt exciter, direct connected to a standard G.E. vertical single cylinder engine. The lighting of the station as well as that of the adjoining car house is taken from the exciter bus. This unit was installed for lighting the station and power house after the large units are shut down, and for the further purpose of an auxiliary exciter. The converter equipment in the main station consists of the following: one 6-pole, 360-kw, 500 r. p. m., 600-volt, 25-cycle, standard three-phase rotary converter, with speed limiting and end play device; three 25-cycle, 110-kw, 13,200-370-volt single-phase air blast step-down transformers; one 45-kw air blast reactive coil; one blower set, consisting of a 40-in. Buffalo fan, direct-driven by a 4-pole, 2-hp, 250 r. p. m., 350-volt induction motor. The transformers are each provided with four taps in the primary winding, giving a total variation in voltage of 10 per cent. A tap in the middle of the secondary winding is used in starting the rotary. The station switchboard consists of three exciter panels, one lighting feeder panel, two high-tension generator panels, one high-tension out-going line panel, one 360-kw, 13,200-



PORTABLE SUB-STATION CAR USED BY THE TOLEDO & INDIANA RAILWAY



CAR HOUSE AND SHOPS OF THE TOLEDO & INDIANA RAILWAY

volt rotary panel, one 600-volt d. c. rotary converter panel, and two 600-volt d. c. feeder panels. Panels are black enameled slate; instruments of dull-black finish. A novel feature of the arrangement of the electrical apparatus is that in place of arranging the switchboard, transformers, etc., in the main engine room, these are placed in the bay. On the second floor of the bay are installed the high-tension lightning arresters, instrument transformers and the high-tension oil switches, each of which is enclosed in an in-

Electric Company, with the exception that the entire end can be removed in case the transformers have to be taken out. The entire electrical equipment, outside of car motors, was furnished by the General Electric Company.

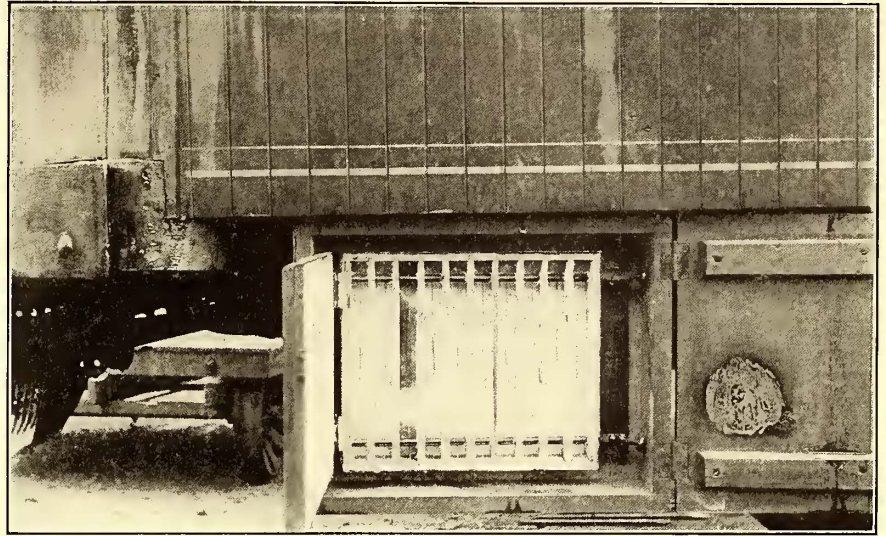
The car house, which is 100 ft. wide and 180 ft. long, is built of brick and steel, and contains four storage tracks, two concrete pits sufficient to accommodate four cars, store-rooms, armature room and machine shop. The last named is equipped with a 160-ton wheel press, one 36-in. and one 24-in.

lathe, drill press, emery wheels, etc. Cranes are installed for handling motors, trucks and armatures. The company does more of its own repair work than is usual for a road of this size. It rewinds all its own armatures, makes its own coils and does the commutator work. Wood gear cases are made from 1-in. matched and grooved material, tops as well as sides, so that grease will not work through. The gear face is 5 ins. and the case is made with a clearance of but $\frac{1}{8}$ in. on either side, so that broken bolts cannot work up and get into the teeth. The cases are made very strong with iron straps formed in the company's shop.

The company has a special trolley wheel for which remarkable mileage is claimed. Wheels are made from its own formula and cost 88 cents each in the rough at a neighboring brass foundry. Bushings cost about 12 cents each, and the work of turning and assembling is about 10 cents, making the finished wheel cost \$1.10. The wheel has a 3-in. oil reservoir and a very thick shoulder. The groove is $1\frac{1}{8}$ ins. wide and $\frac{3}{4}$ in. deep, the idea being to have it shallow enough so that when it becomes worn down it will not knock off hangers. The pins are of cold rolled steel and the bushings are the standard Star Brass Company's, except that two additional holes are bored in them to give free flow for lubrication. The oil reservoir is packed with a mixture of motor cup grease, cylinder oil, machine oil and Mexican graphite, and it is claimed that it is never necessary to touch either bushings or wheels until they are worn down to the spokes. It is claimed they run 10,000 to 12,000 miles, and Master Mechanic L. R. Gaw says that the "trolley wheel problem" is the least of his troubles.

Car lightning arresters are home-made, after the type used in Detroit. One of these arresters as installed on the car is shown in the illustration on this page. The fuses are made

with a new fender, built by the Automatic Fender Company, of Wyandotte, Mich., which is illustrated on page 764. There is a cable stretched across the front of the fender, and anything striking it with a force of 8 lbs. to 10 lbs., causes the fender to trip. The cable has connected to its ends a turn-buckle, by means of which it is always kept tight. All



INSTALLATION OF LIGHTNING ARRESTER UNDER CAR

supporting castings on the fender are malleable and wrought iron. The entire construction is strong and heavy, and the device is designed for interurban service.

Oil lubrication is used for journals and armatures, and the company has adopted the automatic feed oil cups and lubricants furnished by W. A. Wood, of Boston. Rochester steel wheels are used and solid gears are being adopted.

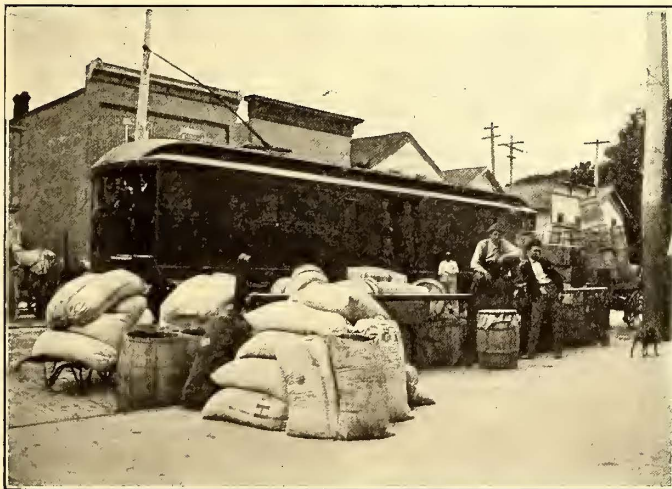
Cars are swept out by the crew at the end of each run, there being a 30-minute layover in Bryan. The men clean the cars thoroughly each morning before taking them out; cuspidors are washed out daily. Windows are washed three times a week and cars are thoroughly scrubbed out twice a week. The master mechanic has arranged a system for keeping accurate mileage on all parts such as trolley wheels, bearings, armatures, gears, etc., and reports of these are made monthly to the manager.

RATES AND SCHEDULES

Before the opening of the new power station, the schedule to Wauseon, 32 miles, was 1 hour 45 minutes, but this has now been reduced to 1 hour 28 minutes, while the schedule from Toledo to Bryan, 56 miles, is 2 hours 15 minutes, which equals the speed of limited cars on a number of interurban roads. Rates are based on 2 cents a mile in multiples of 5 cents, and where there is a fraction the company takes it. The steam road has recently announced competitive commutation rates between points on the electric line and Toledo, but as the steam road has only two accommodation trains a day which stop at all towns, and as the time to the center of Toledo is no faster than that offered by the electric, it is not believed that the business will be affected.

EMPLOYEES' CLUB

The employees have an organization known as the Lavenberg Club, named in honor of General Manager D. H. Lavenberg, and practically every employee from president to section man is a member. The company exercises no jurisdiction over the organization and it is not allied with any union. Members pay 50 cents a month, and the company furnishes a clubroom, where there are facilities for reading and amusement. In case of sickness or disability, the employee draws \$6 per week. It is the intention to increase the dues somewhat and provide a



TRANSPORTING A LOAD OF FREIGHT ON THE TOLEDO & INDIANA RAILWAY

from No. 29 magnet wire, cut in two and braided in the center with a Western Union connection. One end is bare and is tied around the positive bar, and the other end, which is covered, is tied to the negative bar, the bars being made from No. 000 grooved trolley wire. The box and partitions are covered with asbestos and shellac.

Formerly the company made its own stop, crossing, and signing signs from wood, but it is now using galvanized Bessemer steel signs furnished by the Bond Steel Post Company, of Adrian, Mich., as they are cheaper and more durable than wood signs. Express and passenger cars are being equipped

fund so that it will be possible to pay almost full wages for disability.

FREIGHT BUSINESS

The freight business is developing in a manner really surprising, considering the facts that the line closely parallels a great steam road and its rates are practically the same. All of the towns touched are good manufacturing and agricultural centers, and the electric line has an advantage in that its cars traverse the streets and can unload goods in front of stores and manufacturing establishments. It has laid sidings into a number of factories, and is getting carload business in direct competition with the steam road. As has been pointed out, the absence of grades and curves makes it possible to haul a number of cars at a time. At present it has two package freight runs a day, the cars running to the Toledo terminal station, and it is claimed that its business at the station is heavier than any of the roads entering Toledo. Like the Toledo & Western Railway, whose freight business was referred to in the *STREET RAILWAY JOURNAL* of Sept. 2, the company has an arrangement with the Toledo Terminal & Belt Company whereby its standard freight cars are hauled to the center of the city or delivered to other roads, the Belt making a switching charge for its service. Through the same intermediary it has received foreign cars from distant points, and it receives a switching charge for delivering them. A great deal of crushed stone has been handled in connection with the Toledo, Angola & Western, a small steam road with which it makes connection by means of the Belt. Last year it handled several millions of brick, besides other material used in rebuilding the town of Delta, whose business section had been destroyed by fire. The ability to deliver the material on the spot where it was to be used, gave it the advantage over the steam road. At present all freight cars are handled by the package express cars, but, as stated, electric locomotives are being built, and then it will institute regular freight train service. The market-gardening district near Toledo is furnishing a large bulk of business, and teaming has almost been dispensed with. In a number of instances the farmers have put up cash for laying a siding into their yard, the company paying for it in freight. The company has passenger and freight stations in each town, and in all the larger towns it employs two men, going on the principle that a station man cannot work eighteen hours a day and give efficient service.

ORGANIZATION

The Toledo & Indiana Railway Company has a capital stock authorized and issued of \$2,500,000, and a bonded debt of \$1,650,000. The officers of the company are: S. C. Schenck, president; T. H. Clauss, vice-president; M. G. Briggs, treasurer, and C. H. Masters, secretary. The above, with Patrick Hirsch, M. Donnelly, H. C. Stahl, Frank Yesbera, George G. Metzger, C. H. Webster, L. E. Flory and J. M. Longnecker, are directors of the company. D. H. Lavenberg is general manager; Robert Dittenhaver, general passenger and freight agent, and E. B. Kleinhaus, auditor.

The extension to Bryan was financed and the contract for the entire work was taken by the Patrick Hirsch Company, of which the officers are: Patrick Hirsch, president; H. C. Stahl, first vice-president; M. I. Wilcox, second vice-president; J. H. Clauss, secretary-treasurer; C. E. Van Bibber, chief engineer; D. A. Proctor, resident engineer, and F. H. Froehlich, electrical engineer. The grading, track and overhead construction was sublet to the Fidelity Construction Company, of Detroit, while the contract for boilers, engines and piping was given to the Arbuckle-Ryan Company, of Toledo, which installed that portion of the work. This journal is indebted to General Manager Lavenberg, of the railway company, and to Mr. Froehlich, of the Patrick Hirsch Company, for much of the information presented herewith.

AN UNPRECEDENTED RAILWAY SITUATION

BY FRANK J. SPRAGUE

"After a most thorough investigation on the part of the New York, New Haven & Hartford Railroad's electrical commission"—certainly a most astonishing preamble in more ways than one, yet so reads the trade notice which announces the placing of an order for twenty-five a. c. locomotives, under conditions not stated, for operating both the through and suburban passenger service on the New York and Stamford division.

Speaking in my individual capacity as an engineer, and also from a railroad equipment and operating standpoint, I venture to assert that under the existing circumstances, and in view of certain special limiting conditions, this decision is an error of more than ordinary magnitude—one which no engineer knowing the facts should have urged, and one which, instead of advancing the application of electricity to trunk line service, may very easily seriously interfere with it.

A discordant note this, I know, in that chorus of praise with which the technical press is resounding because of the "brilliant and progressive action" of the New Haven road, and yet I am led to this conviction after full consideration of all the factors of the problem, and without, I trust, shutting my eyes to any advantages which may accrue from all-round successful a. c. operation. Such as are my conclusions, however, it seems but proper to state them with the same candor which I have always observed in speaking of engineering problems, for, unless the wisdom of this action by the New Haven Company is promptly challenged, it is likely that erroneous conclusions affecting trunk line operation may become temporarily settled convictions.

In what I have to say I disclaim any intent to speak for the electrical commission of the New York Central & Hudson River Railroad, of which I have been and am an active member, for whatever their individual opinions, and whatever may be that body's present or future official action on the subject, it will undoubtedly be confined to problems affecting joint operation of the roads, and embody only those ideas to which all of its members can subscribe. Even less do I assume to speak for the railroad company in matters affecting its relations with another company operating over its tracks, but the public announcements made from time to time concerning developments on both the Central and New Haven roads afford ample basis for my comments.

Furthermore, my criticisms are not dictated by any spirit of antagonism, practical or theoretical, to a. c. development, concerning the possibilities of which I have well-defined notions, and the bearing of which upon railroad equipment I can, I hope, judge perhaps as clearly as most engineers. I regret, however, that so seemingly bold a step has been taken where alternating-current operation must necessarily be handicapped by various physical, engineering and operative conditions over which neither the New Haven road nor the contracting company can have any control, which the nature of things makes it impossible to change, and which will surely interfere with the full fruition of the hopes of those who have committed themselves to this proposition; and further, that it should be supported by some assertions concerning d. c. operation which will not bear inspection.

Generally speaking, I assume that a trunk line railroad's chief concern is how best it can meet conditions which are from time to time forced upon it, both from a financial and an operative standpoint, improve and lower the cost of its service and benefit its stockholders; and that it is not directly concerned in experimental development for the benefit of other companies, whether railroad or manufacturing. In fact, because of the necessity of maintaining effective and safe opera-

tion it should be slow to commit itself to any radical departures save for the gravest of reasons.

The first queries which naturally arise are: Why has the New York & New Haven Railroad decided to adopt electricity at all, and what has determined the limitation, of the particular zone selected?

Is it because the company has suddenly become convinced that the economy of electric locomotive operation is such as to warrant it in embarking at great expense in a more or less experimental venture, or is it so certain of it that it intends ultimately to adopt electricity throughout its main line, and meanwhile is willing to try it on its own as well as some one else's dog first, even at some possible great inconvenience?

I venture to assert that neither assumption is tenable, for not only is the latter most improbable, but even the first is not a strong enough motive to lead to the present action by the New Haven Company. The simple truth is that the New York Central & Hudson River Railroad was, primarily because of a grave disaster in the Harlem tunnel, quickened into a more serious consideration of plans already under advisement, and being compelled by legislative act to locally abandon steam, had for practical operative reasons to further consider whether an extension of its proposed operation by electricity was not only feasible but necessary. The electrical zone thus determined necessarily included not only the yards, tunnel and viaduct in New York City, but, so far as relates to the operation of the New Haven trains, the section of the Harlem road to Woodlawn, at which point the trains of that company deflect to its own tracks. Hence for that dozen miles it became necessary that provision should be made for the operation of all trains by electricity, no matter what the New Haven Company might otherwise have wished to do, and Woodlawn being impracticable as a point of change of motive power, the operation had to be carried to some natural terminal division of suburban traffic, either New Rochelle, Port Chester, or Stamford, where change could be conveniently made on trains intended for more remote destinations, just as the Central had decided for North White Plains and Croton.

The limited zone of present operation having been evident for over two years, what would have been the ordinary procedure? Naturally, one would say, through executive and technical representatives, to promptly enter fully into the investigation, and if possible determination of plans which would affect joint operation, and which might further be acceptable for individual operation.

The Central took up this problem in a manner which I think has commended itself to the common sense of the community, and ought to the engineering and railroad world, by bringing together in a commission outside independent technical advice and its own constructive and operative officers, and reinforcing them with all that was necessary for effective work. In spite of the criticism which those who have not this responsibility upon their shoulders are lightly given to express, I, for one, save in one particular, where the better decision had to be subordinated to external conditions, am satisfied with the results, whether measured by first costs of installation, determination of engineering facts and possibilities, or practical railroad operation. And, if I mistake not, the example thus made by the Central will not only help raise the standard of electrical engineering, but establish a precedent for the safe and economical determination of problems of vital concern reaching every operative department of a railroad.

No sooner had this commission undertaken its responsibilities than it generalized a harmonious plan, making use of every advance which had been made or seemed reasonably sure of fruition in electrical equipment and operation, and planned for a reliable and economical service to satisfy alike the public and the railroad company. The broad question of

whether alternating or direct current should be used on motor equipments had at the time to be settled in favor of direct current, not only because of the unpreparedness of the manufacturing companies to reliably undertake the solution of problems of paramount importance by a. c. methods, but also because of special engineering and other limitations. In my own mind there has not been a shadow of doubt of the wisdom of this decision, and that the results will be fully equal to those anticipated, in spite of any claims based upon what is hoped to be accomplished by other means, now some three years later. And now, what of this problem of the New Haven road, and how is it going to affect plans already formulated and being actively carried out?

Let us briefly consider the character of its service, and to what extent it meets with that favored condition advanced quite forcefully, although sometimes on mistaken premises, as specially adapted for demonstrating the advantages of a. c. operation, namely, a long line with relatively infrequent units.

Operating in one direction there are in the twenty-four hours of a week day a total of sixty-seven trains run on passenger schedule, of which the runs of five end at New Rochelle, eight at Port Chester and nine at Stamford, leaving forty-five for points beyond this division. Thirteen of the latter are scheduled not to stop at Stamford, and thirty-two of the sixty-seven are essentially local trains making frequent stops.

On the Mount Vernon-Stamford section the schedule of these locals varies from 23 to 27 miles an hour, and the station distances average 1.65 miles apart, while intervals between train stops vary from 4 to 6 minutes, quite comparable to the conditions on the express service of the Interborough system.

Woodlawn, the point of departure of the New Haven from the Harlem tracks, is a flag stop for four trains only, and Mount Vernon, 1.6 miles farther on—or 13.63 miles from the Grand Central Station—is practically the first suburban station on the New Haven road.

As further illustrating the character of this service, it may be noted that in addition to the starts at Forty-Second Street Station, these sixty-seven trains make only 23 starts below Mount Vernon, but 289 in the 19.85 miles beyond, excluding, on the one hand, possible stops at the drawbridge over the Harlem, and on the other, movement of trains in the yards at New Rochelle and Port Chester.

The train movement is variable, intervals at stations in one direction varying from seven minutes to nearly three hours. But considering traffic in both directions, while at times there are no trains in motion on the Mount Vernon-Stamford division, and for a period of about three and one-half hours when there is but one train at any moment, for the remaining time there is an average of a train every ten minutes, and sometimes as many as eight trains in the section. Any freight movement is, of course, an addition. The road, therefore, can hardly be classed as a long rural road with infrequent service.

Four months ago the New Haven road's expressed determination was to limit its electrical movement of trains over the equipped tracks of the Central; three weeks ago, after a period of three years of vacillation, during which time there was but a single attendance of any representative of the road at the meetings of the Central's electrical commission, a second attendance is accompanied by the announcement of the adoption of alternating-current locomotives, the intention to extend operation from Woodlawn to Stamford, the abandonment of multiple-unit suburban train operation, the handling of all trains by electric locomotives, and a possible call for electric power not alone on the direct-current third-rail section, but for a single-phase a. c. supply to an overhead trolley on the balance of the division.

In eleven months the Central hopes to begin electric operation. It has taken that company two years to have developed by two great manufacturing companies an electric locomotive

which can perform such part of its service as must be so operated, and months must elapse before any number are ready for use, despite the fact that they are built for a single purpose, and are to be operated on a single plan. The development of this locomotive has been accompanied by a running test of nearly 25,000 miles under every conceivable load and operative condition, on a track specially set apart day and night for this purpose.

Now, by some wizard performance, the development of a new locomotive on other plans, designed to be operated both by alternating and direct currents, to have a double system of contacts, and control both for single and multiple-unit locomotive operation, is promised in time to meet the already established conditions. Just here, and to have at first hand an authoritative expression as to proposed methods, I will quote from a paper presented at the recent meeting of the Philadelphia convention of the American Street Railway Association by Charles F. Scott, as follows:

"While single-phase cars can be arranged to operate from a direct-current trolley wire, it handicaps in some measure the single-phase equipment. The addition of resistance to the car equipment, and the extra switches and the like for enabling the change to be made in the current supply are obviously objectionable. It is best, therefore, to keep single-phase equipments free from operation on direct current if it be practicable to do so. When it is found necessary for them to operate from an existing direct-current trolley wire, the motors are connected two in series for 500 volts, and if there be four motors, the two pairs may be connected first in series and then in parallel as in ordinary series-parallel control. The transformer is cut out, and the control apparatus and motors operate substantially the same way as those on an ordinary car."

"Current may be taken from one phase of a two-phase or a three-phase generator. Current from the several phases of a polyphase generator may be used for operating different divisions of the railway."

"A polyphase motor taking power equally from each phase of the high-frequency circuit may drive an alternator, either single-phase or polyphase, for furnishing current to the single-phase railway."

"Trolley voltage [on d. c. operation], however, has been limited to approximately 500 volts on account of the limitation of the direct-current motor."

The pertinence of these remarks will be apparent later.

Assuming, for the sake of argument, that an a. c. locomotive of sufficient capacity to handle the New Haven trains can in the time required be developed, how will the introduction of a. c. operation affect the elaborated plans of the Central?

That road is actively engaged in carrying out plans involving an expenditure of nearly sixty millions of dollars, much of it made possible by the advances in electrical development, and over ten millions are being invested in electrical equipment alone. Increase of capacity, however defined and elaborated, has been the keynote of its plans, and anything which threatens to impair or in any way interfere with the full measure of its accomplishment must be subjected to rigid scrutiny, and if the threat becomes a fact should meet with prompt and emphatic rejection.

In what particular, then, does the proposed introduction of a. c. locomotive operation into this territory promise to better or even equal that already provided?

The plans of the Grand Central Station show a terminal designed to obtain the maximum despatch and economy in handling train service and passengers, and the minimum dead movement of all equipment. To accomplish this, a double-track level is being provided, the upper for trains drawn by locomotives originating from points outside of the electric zone, and the lower to accommodate the movement and storage of suburban trains operated on the multiple-unit plan, this lower level

being provided with a loop, storage tracks and the necessary cross-overs, and also for a possible, though improbable, connection with the Interborough system.

This loop is of 135 ft. radius, even less than that at the City Hall station of the Interborough, and on which it is manifestly impracticable to effectively operate any locomotive handling a ten or twelve-car train. This method of operation, designed for the New York Central trains, should without argument govern the operation of all trains which come into this terminal, and yet the proposal to use alternating-current locomotives means the abandonment of multiple-unit train operation, at least on this section, by the New Haven road.

Assume that on second thought it recognizes the necessity of altering its conclusions so as to meet the imperative demands of terminal station movement and the traffic requirements of the public, what are the technical facts?

Simply that not only every locomotive, but every motor car—and in a suburban train of any length there must be several if not all motor cars where high schedule is attempted—must according to present plans be equipped with bow collectors for overhead trolley contact 22 ft. above the traffic rails, and third-rail as well as overhead collectors for operation on the d. c. zone, must pass through a tunnel of only 15 ft. in height and over special switch work in terminal yards, and must be provided with means for throwing one or other of these sets of collectors into operation and two distinctive systems of control, one for a. c. and the other for d. c. operation.

When considering the difficulties which must be inevitably experienced in the change over from one system to another, and especially if the attempt is made to operate the suburban trains on the multiple-unit system, one wonders why, instead of adding to them by an overhead trolley from Woodlawn to Stamford, a properly constructed and protected third rail operated at a moderate potential was not adopted for at least this experimental equipment.

To say nothing of the increased weights, and the liability of trouble and delay because of the extra apparatus and complications, and even assuming that these can, despite Mr. Scott's inference, be ignored, what will be the result in the matter of economy when operating in the d. c. zone, and what bearing will it have upon the capacity of conductors and supply at the Central's sub-station nearest Forty-Second Street?

The a. c. motors proposed are designed to work at a maximum of about 250 volts when at full speed, and when in the d. c. zone they must be coupled in series in pairs because of the higher potential. Locomotives, although equipped with four motors, can then be operated only with the two groups in series and parallel relation, and motor cars if equipped with only two machines must be operated with fixed relation of motors. The result will be that for locomotive operation there will not be the advantage of the d. c. four-motor series control provided on the Central's locomotives, and no corresponding two-series control for motor cars. Locomotives will therefore require an increase of over 100 per cent in current up to about 12 miles an hour, which constitutes a considerable part of the yard movement, and there will be a similar increase of d. c. current requirements for two-motor suburban motor cars up to speeds of 20 or 25 miles an hour. In fact, the conditions will be worse than indicated, because if the motors are designed for 250 volts individual operation, two in series will not be sufficient for the d. c. zone, where the regular potential will range from 600 to 650 volts.

No wonder, then, that in spite of local requirements, and the fact that the multiple unit has become an accepted tenet of such character as to preclude the possibility of successful criticism, the New Haven road commits itself to the abandonment of that method of train operation, one of the strongest reasons and most legitimate excuses for the use of electricity.

Even its locomotives, be they ever so successful, would in-

roduce an additional cause for trouble and complaint on account of the extra number and yard space required, and because of the inability to pool the equipment.

Furthermore, should there be delay in providing them, it will mean a like inevitable delay in commencing electrical operation by the Central, because of the inadvisability of joint electrical and steam operation in the tunnels, a condition to which a long-suffering public will register an emphatic and justifiable protest.

In the matter of current supply, what shall it be, especially in view of the limited time remaining before electric operation should begin at Forty-Second Street? Either there must be a single supply from the power houses of the Central for both a. c. and d. c. operation, or d. c. supply for 12.05 miles by the Central's power house, and single-phase a. c. supply for 19.85 miles from an independent station. In the latter case it is manifestly impossible to get the highest economy because of the great variation of load, and because only one part of the work, and that the more severe, will be performed by the independent station. Joint supply of the d. c. division is simply out of the question, because in order to meet the necessary conditions it would have to be through independent sub-stations, practically similarly equipped, and supplied by independent high-tension lines from the New Haven plant, which duplication, because of physical conditions, is impracticable.

The proper determination of the relative amounts of energy used by the equipments of the two companies under the complicated conditions of train operation, with supply from three main power stations and the necessary duplicate sub-stations feeding a common working conductor, would be most difficult. Nor could there be under such conditions of supply from independent corporations that effective control of current supply vital in times of emergency.

It must be remembered that the New York Central, while providing space for future increases of equipment, has established two power houses considerably removed from each other, one at Port Morris and the other at Glenwood, near Yonkers; that these two stations generate polyphase currents which are transmitted to eight sub-stations, where they are converted into continuous current at 650 volts pressure which is delivered to the working rail; that at these sub-stations storage batteries of great capacity are to be installed; and in order to insure reliable operation of the rotaries under the extreme variations of load due to the heavy train demands, extraordinary care has been taken to maintain a practical minimum of voltage variation and freedom from sharply fluctuating loads at the main stations.

Furthermore, these two main stations are tied together, and the sub-stations are supplied by a system of high-tension conductors of minimum number, so that either joint or independent operation of stations can be effected with the least delay and the greatest freedom from confusion and trouble.

While normally, at least during times of heavier traffic, both stations will be maintained in operation, the reduction of fluctuations and the reserve capacity afforded by the batteries is such that in an emergency one station could just about take care of the Central's service, and in case of a total temporary breakdown of the high-tension lines the batteries will have reserve capacity enough to carry the entire load for a short period. It will be seen, therefore, that a fundamental idea of the Central's equipment is that of insurance because of the great volume of traffic and the vital necessity of maintaining continuity of operation. If called upon to supply three times as much power as originally contemplated outside of its own necessities, there would, unless the capacity of both stations is increased, and also the number or capacity of certain of the high-tension feeders, be imposed upon it a demand which it will not be prepared to meet. The fact that two-thirds of this special demand would be of a sharply varying character, without any relief

whatever from storage battery equalization, would certainly tend to interfere with the attainment of results which have been considered fundamental.

But assuming that a. c. supply is made from the Central's main station, how can it be done? There are several theoretical possibilities:

Single-phase, all from one section of the machines to step-down transformers which in turn supply the trolley wire or single-phase from all windings to independent transformers, from each of which a section of the road will be supplied. Neither of these plans is permissible, because in view of the size of the train units there would be serious unbalancing of the phases, with consequent irregularities and unreliability in operation of the rotaries, especially when accompanied with material drops of potential, to say nothing of the possible overloading and burning out of some part of the windings, or the necessity of operating an excess amount of machinery.

An alternate plan, supply by all phases to transformers connected upon the three-phase two-phase plan, the two phases supplying different sections of the road, is likewise objectionable for the same reasons.

An independent supply from machines specifically set apart for the New Haven's service cannot without great cost be made effective because of the existing system of distribution and switchboard arrangements. Only a limited supply of this sort could in any case be possible from the station equipments now being provided.

A remaining possibility is by all phases to polyphase motors, which in turn drive single-phase generators to supply the trolley wire, so as at all times to make equal use of all phases. This seems to be the only practical method when rotaries are also to be operated from the same source, and when train units of the size under consideration are to be operated. This, of course, means the introduction into the sub-stations of that moving machinery so much deprecated by critics of d. c. operation.

Every specific condition surrounding this proposed equipment seems, therefore, to militate against that directness and simplicity of equipment essential to the claim of a. c. operation, and which under more favorable auspices would have a fair chance of being demonstrated.

What, then, is to be gained, and by whom? The New Haven Company must make a serious expenditure, lessened possibly by utilizing current from another company in the d. c. zone, but this necessarily rendering less efficient the supply from its own station, if it has one for the a. c. division, and it turns over its tracks and equipment, as well as operation, to an experiment in the hope of demonstrating such economy in electric locomotive operation alone as will warrant the enormous expenditure necessary for any serious extension of electric service on its main line.

The passengers seem to have been lost sight of, for there is no promise of a single additional train, or higher schedule, or any improvement in the service, save abolition of smoke, which nuisance seems to have assumed gigantic proportions.

The Central, when it fully comprehends the meaning of the proposed equipment, may find sufficient warrant to view with equanimity the entire disarrangement of its plans, and the prostitution of its service to what may be fairly termed a craze for experimental development applied without regard to consequences, but I doubt it.

On the general subject of a. c. and d. c. operation, I beg to add a word. Affecting, as it vitally does, conductor capacity and sub-station distances, it is unfortunate that Mr. Scott should make a statement to the effect that 500 volts has become the standard, and by inference must necessarily be the limit for d. c. operation, for the Central's rail supply will be at 650 volts, its d. c. motors are guaranteed for 750, the Berlin Elevated and the Zweisimmen-Montreux roads are built for 800

to 850, reliable companies in Europe are supplying d. c. motors wound for 1000 volts, and it may be safely assumed that in spite of apparent difficulties turbine operation of comparatively high d. c. current dynamos is not an impossibility.

By all means let us have the utmost which can be gotten by either system, let every improvement and advance possible be attained. Every engineer stands ready to welcome accomplished facts, and help in the progress of the art, but for the best interest of that progress it is vital to avoid not only unwarranted claims but adverse statements which will not bear critical analysis.

THE INTERNATIONAL STREET RAILWAY CONVENTION OF 1906

At a meeting of the officers and the executive committee of the International Tramways & Light Railways Association (Union Internationale de Tramways et de Chemins de fer d'Intérêt local) held at Liège, Belgium, recently, it was decided to hold the next biennial convention of the association at Milan, Italy. The date for the convention has been set for September, 1906. One reason for the choice of Milan was that, during the summer of 1906, an international exposition will be held in that city for the purpose of celebrating the opening of the new Simplon Tunnel through the Alps, and that an important feature of the exposition will be the exhibition of transportation apparatus. Some particulars of this exposition were published on page 125 of the issue of July 15, 1905. The programme for the convention has not yet been decided upon, but will be issued shortly from the office of the general secretary, at Brussels, together with an announcement of the exact date of the meeting.

EFFECTIVE METHOD FOR ATTRACTING PARK TRAFFIC

A unique idea was carried out with success by the Boston & Northern and the Old Colony Street Railways on Saturday afternoons, Sept. 23 and 30, which were given up wholly to pleasure for the children in the form of "hunts" held in the various parks maintained by the companies. The hunt of Sept. 23 was an exciting chase in which the children secured real live animals and took them home for pets. The fortunate child to secure the first prize received a goat and a goat-cart. Others who were successful received as prizes live guinea pigs, doves, canaries, rabbits, etc. On Sept. 30 the presents were dolls, watches, games, balls, Indian clubs and many other toys. In each case, tags bearing the names of the various articles were hidden away, and on being unearthed the holder was presented with the article named on the tag. Both hunts were open only to primary and grammar school scholars. While considerable money was spent in carrying out the plans, the company was well repaid, as more than 40,000 children and their parents were carried to and from the parks at which the hunts were held.

Edward D. Adams, the well-known financier of New York and representative of the Deutsche Bank, has been presented by the Siemens & Halske Company, of Germany, with a superb model of their high-speed car with which such brilliant demonstrations were made on the Zossen military road some time ago, using three-phase current. The model is exact in every detail of outward construction, and a great many of the working parts are also reproduced with closest exactitude. The scale is 1:20. The model was made by the apprentice force, which was sent into the field to make its measurements from the actual car itself as it stood on the track, without the working drawings. It is particularly interesting, in this model, to study the bow contacts for the three overhead wires, these having proved very successful in the final operative tests.

MEETING OF INDIANA ELECTRIC RAILWAY ASSOCIATION

The first regular monthly meeting of the Indiana Electric Railway Association after the summer vacation was held in the palm room of the Claypool Hotel, Indianapolis, Oct. 12. The occasion brought out a good attendance of traction men from all over the State. The meeting was called to order by C. L. Henry, president of the association, who very felicitously congratulated the members of the association over their healthy and vigorous appearance following their summer vacation, and also congratulated the association on the auspicious opening of the first monthly meeting. Mr. Henry said he had selected C. L. Morgan to act as secretary in the absence of Mr. White, the regular secretary, if there were no objection. The unanimous vote by which the selection was ratified indicated that no better choice could have been made.

President Henry called the members' attention to the death of John W. Chipman, vice-president of the association, and spoke very feelingly of his worth as a friend and helpful counselor. A committee composed of C. C. Reynolds, of Lebanon; C. G. Pohlman, of South Bend, and C. E. Morgan, of Indianapolis, was appointed to draft suitable resolutions, and the following resolutions presented by Mr. Reynolds were adopted by a rising vote:

Resolved, That in the death of John W. Chipman, which occurred at Boston, Mass., on the 12th ult., this association has lost a valuable member, an energetic worker and a wise counselor, and a friend whose exemplary habits in his public and private life are worthy of emulation by all.

Resolved, further, That we, as an association, extend to the family of our deceased friend and associate our heartfelt sympathy in their great loss.

A copy of these resolutions was ordered spread upon the minutes of the association and the secretary directed to furnish a copy thereof to the family of the deceased member.

President Henry announced that it had been suggested that a question box be established. This suggestion brought out a hearty discussion relative to the purpose and management, and when explained, the question box was unanimously indorsed. The question box will be in charge of a committee, of which B. L. Kelsey, of the Indiana Union Traction Company, of Anderson, is chairman. Members are requested to forward questions for the box and the committee will assign the questions to certain members of the association to answer; however, questions will be received up to the hour of opening the box, and the members present will be given an opportunity to discuss them. The question box is expected to prove a popular and interesting feature of future meetings.

The supply men present asked for the privilege of making an exhibit before the association once a year, and this was heartily agreed to. The May, 1906, meeting was selected as the time, and the supply men the wide-world over are invited to make exhibits.

The only topic on the programme for discussion was "Claims and Their Adjustment." The discussion was opened by the presentation of a very interesting and instructive paper by E. C. Carpenter, claim adjuster of the Indiana Union Traction Company. Mr. Carpenter said:

Claim departments were created and exist by reason of the misfortune of others; but so long as motormen will run their cars into each other in broad daylight and women persist in getting off cars backwards, the necessity for the departments will remain and they must be maintained, although I feel certain that even claim adjusters would welcome the day if the causes could be removed so that the claim departments could be disbanded. What we shall say in this paper will be said in the light of what our experience and observation has taught us, yet realizing that we have not attained perfection.

Every claim department should be furnished with certain blank forms for reporting accidents, the forms being prepared

to cover local conditions. It is not possible to have a blank form of report that will cover all accidents and not be confusing, but a blank form of report should cover such important features that experience has shown are most likely to occur in the more frequent accidents.

We are now using a form of accident statement (our form No. 401) that we prepared about a year ago. It has proved very satisfactory, and answers our purpose where accidents are occurring on city as well as interurban lines. This blank is placed in the hands of our agents and reports are to be made out by the agent, the information being given to him by the train crew reporting the accident. We find we get clearer information in reports where one person at each terminal has been instructed regarding taking reports, and he gets the details from the train crew and fills out the report, but reports are always signed by the train crew.

We are also using a form of report for employees (form No. 416) which is intended to cover accidents to employees in the departments of roadmaster, electrical, shops, power house and construction. This blank is especially prepared with a view of ascertaining the familiarity of the injured party with the duties which are being performed, the condition of tools, staging, etc., at the time of the accident. The report of accidents of this character are to be made out by the foreman in direct charge of the work at the time of the accident.

In case of serious or fatal accident, immediate notice should be given the claim department, either direct or through the train despatcher. For this purpose we are using a telephone accident report (form 417) which is intended to cover only important facts that can be gathered quickly. This report is given to the despatcher by the train crew out along the line, and is sent in immediately by the despatcher to the claim department. We are also using a short form of report (form C. D. 403) that conductors must carry with them to report all trouble occurring on the cars, such as ejections, controversy over tickets, etc. Conductors are also required to carry small printed tabs so they can quickly have passengers write down their names and addresses when collecting this information in case of accident.

Our agents are provided with blank reports for delayed baggage. The first part of report is made out when the complaint is made; the second part, or receipt, is taken when the baggage is delivered. The agent fills out the "Agent's Report" as soon as baggage is delivered and forwards his report with baggage check attached to the claim department. We also have for the use of section men a form of report for stock killed or injured.

The above covers all the blank forms that are essential in securing reports of accidents, but we have in addition to the above our release blanks for use in making settlement with injured parties, and a special form for releases by employees. It is, I believe, a correct policy to require all employees injured in any manner to execute a release to the company before being permitted to return to work. It is then left to the judgment of the claim department as to whether or not any consideration should be paid in settlement other than re-employment. Inasmuch as a large percentage of accidents to employees occur by reason of their own negligence, and are settled upon the basis of re-employment, we use in connection with this form a blank addressed to the head of the department where the employee was injured, showing that the injured employee has executed a release. Upon this blank the foreman must endorse the date upon which the man returned to work, and must send this information to the claim department for permanent filing. This makes a complete record of each case and shows the fulfillment of the contract by each party.

When a report of an accident is received by the claim department, we immediately note the date and the hour of its receipt, and index in a book for that purpose, under the name,

if given, showing date, location and kind of accident; a space is left for entry of settlement when made. The report should then be placed before the head of the claim department and he can order inquiries mailed to witnesses or assign the case for personal investigation, after which reports are filed alphabetically according to date in special files for the purpose.

For effective work thorough organization is essential, and every department of the service should co-operate with the claim department.

The prompt report of accidents means much, for if the information regarding accidents is slow in reaching the claim department, many times important information may be missed and much time and expense is required in looking it up, when, if a prompt report had been made, the matter could have been determined and proper action taken. Information in full regarding accidents cannot reach the claim department too soon. It is necessary in many instances, in cases of serious accidents, to have the employees report to the claim department in person as soon after an accident occurs as possible. In case of fatal accident this rule should always be observed, not only so that full details may be reported to the company, but that the main facts may be prepared in the form of an affidavit ready for the signatures of the train crew so that the affidavits may be taken to the coroner and sworn to before him. By following this plan important details can be kept from the coroner's records and the public that an over-inquisitive officer might bring out and be troublesome in court.

One of the most important features relating to accidents, and which is so often looked upon lightly by the transportation department, is the prompt securing of full names and addresses of witnesses to accidents or persons near the scene of an accident. It is difficult to make men in charge of cars realize the importance of doing this and securing this information, and how to get them to do it is worthy of our best thought. When a serious accident occurs, such as a collision where possibly 100 to 200 persons may be more or less injured, I know of no more important service a train crew can render the company, even if the entire system should be stopped for half an hour, than to secure the name and address of every individual on the car. In every accident of this kind you will find some designing person who will gladly welcome an opportunity to filch money from the company upon some real or imaginary injury, and we have known cases where claims have been made by persons who were not on the cars at the time of the accident, but who claimed they were, thinking it would not be possible to detect them.

There are two ways of keeping this matter before the men. One is by general rules governing this question and printed in the train schedules. The other is by explaining to the men in meetings arranged for the purpose, the importance of this as well as other matters pertaining to the claim department. These meetings should be held at least twice a year, so as to include all new employees and keep them informed regarding these matters. No man, however, should be placed on a car in the capacity of motorman or conductor unless in his preliminary examination he is able to answer intelligently a few pertinent questions as to what should be done in case of an accident.

When the car men understand these matters and place the main facts, with the witnesses, promptly before the claim department, the matter of ascertaining from disinterested persons their version of the accidents should be promptly done by expert investigators. We find that young married men are best for this work. They should be of good address, pleasant and courteous, with judgment as to when to get down to business and touch vital matters.

Written statements signed by parties are best, and a shrewd investigator can weave into a general conversation about an accident the vital points and get what he wants. He should always

want facts and bring them out as clearly as he can get them, and never mislead a witness into an intentionally wrong statement. If a written statement is prepared along the line of the conversation, using as nearly as possible the language or peculiar expressions of the witness, it is seldom that he will refuse to sign and afterwards, if necessary, testify in court as to the occurrence in a way corresponding with his statement after he has been permitted to see the signed statement and refresh his memory.

In an investigation of accidents, the question as to the negligence of either or both parties to an accident should be borne in mind, and the circumstances surrounding accidents should be reported as accurately as possible. To cite an illustration: suppose a car collided with a wagon at a crossing, which is of frequent occurrence. The essential facts which should be fully and carefully given are: the distance the wagon was from the car track as well as from the car when the motorman first saw the wagon, the speed of car, condition of car on track, and whether or not the party driving looked, how he was driving, speed, kind of wagon, etc., etc.

It takes a person of more than ordinary ability to obtain in the best way, written statements from witnesses and at the same time to couch the statements in such language as to make a plausible account of an occurrence and omit conflicting or derogatory statements, so that, if necessary to use the statements in court, they will have a good effect with a jury. With this in view, the statements should always be read over to witnesses and asked if correct before signing.

It is necessary for a successful investigator to be somewhat familiar with every department of the service in order to make intelligent inquiry as to the running of cars, condition of shops or machinery, power plant, or whatever may be involved in an accident. A cheap man is an abomination, for he will make more blunders than two good ones can correct.

Good, active, intelligent men, capable of understanding the requirements, only should be used in this work. They should be assigned and required to do a liberal amount of work and to do it thoroughly and should be well compensated for it.

If the work of the investigator is well done, and reliable information is placed before the adjuster, it can soon be rightly determined whether or not a claim should be settled or contested.

In dealing with the question of the adjustment of claims, claim adjusters must, of course, be governed by the policy of their company. Some companies adopt the policy of fighting everything. This is wrong. It not only makes enemies of the claimants, but an atmosphere of antagonism is created that pervades every community through which a line passes and affects travel, as the public would travel with you only when really necessary.

Then there is the very liberal policy of settling practically everything out of court and abhorring a lawsuit and paying liberally to escape having a suit filed against your company. This, too, is wrong. The public in general, and lawyers in particular, soon learn of this, and take undue advantage of you, and you have many claims filed and unreasonable demands made. There is, to my mind, but one right policy, and that is this: permit every case to stand upon its own merits. If the company is liable for an injury done, pay what is reasonable. If not liable, or unjust demands are made, stand upon the rights the law affords. The only exception to this should be in the case of fatal accident, where parties appreciate there is no liability. Then settlement should be made upon the basis of a reasonable allowance for funeral expenses where the surviving parties are too poor to stand the expense. You may rest assured that this is not money thrown away, but really brings better returns (although indirectly) than settlements made in most any other form. For instance: a man is killed; his family is in meagre circumstances; the company is not liable; you pay

\$50 or \$100 and take a release. That family has its friends who know of this allowance; you are afterwards engaged in a lawsuit; a friend of this family sits as a juror when the case is determined; don't you believe the friendly feeling of this juror will mean dollars saved to the company? I do most assuredly.

The question of making adjustment of claims is one for which there can be no fixed rule, and a company must depend largely upon the ability of its adjuster to negotiate settlements upon the most advantageous terms, considering the question as to the liability or non-liability of the company, the nature and extent of injuries, the temperament, position and station in life of the claimant, as well as the surroundings in which he finds his claimant. All these, as well as many other minor matters, a well-informed adjuster will be quick to note and use in the proper way.

The matter of dealing with persons injured is something one cannot well describe. No two persons are alike, and you must judge your individual when you see him. A successful adjuster must almost be a "jack of all trades, and master of them, too," for it is often necessary to discuss with the lawyer the legal phases of a proposition upon which a claim is based. He must be able to talk intelligently with the physician about the physical condition of his patient so as to obtain as favorable a report as possible on a claimant. He should be a farmer, if farming interests his man; a merchant, if this is what gets his attention; a mechanic, or what not; in fact, anything that will interest the person with whom he is dealing, even to the extent of flattering the ladies where the necessity exists.

Mr. Carpenter's paper was well received, and in the general discussion that followed his plan and suggestions were endorsed. Mr. Spillman, of the Indianapolis & Northwestern, said he knew of a company that at first contested every claim, but subsequently adopted the plan of paying where there was a possible liability. The company soon had friends along the line. A new attorney was appointed, and he started in by paying a small amount and getting a release. This plan failed to stand the test in the Supreme Court, the latter deciding that a release based on an inadequate consideration was no bar to recovery. He thought it a good policy to pay damages actually sustained, even when there is no liability. He related numerous instances where there is no liability, but a gift from the company or settlement made friends for the road. He thought it a good plan to keep in friendly touch with the public by being liberal with those unfortunate enough to get injured or damaged. The road may ask for concessions, right of way, or a jury in a meritorious case, and these friends can then be relied upon.

President Henry asked for the plan adopted by companies in case of injured employees. Mr. Reynolds, general manager of the Indianapolis & Northwestern Traction Company, said his company had assisted in the organization of a mutual aid association among the employees and encouraged entertainments given, whereby a sufficient sum is kept in the treasury to pay weekly benefits to the injured and the sick employees. This plan, he believed, had almost wholly destroyed the disposition upon the part of employees to bring suit.

Mr. Nichol, of the Indiana Union Traction Company, was asked to divulge the plan in vogue with his company. Mr. Nichol very graciously referred the inquiry to Mr. Carpenter, who said his company invariably allowed a faithful employee his wages in case of injury or sickness. Continued employment or re-employment after injury had much to do toward lessening the number of damage suits, he thought.

Mr. Henry said the claim department is one we always have with us. The real difficulty is to determine whether it is more advisable to settle or stand suit. He thought a lawsuit a good

thing at times, as they give the public to understand that electric railroads stand on their legal rights. Mr. Henry advocated the appointment of a medical staff; that good physicians should be employed along the line to give immediate medical services to the injured. This plan, he said, was proving advisable on his line, and was far less expensive than to pay for the medical services rendered by other physicians.

The November meeting of the association will be held at Rushville, as the guests of President Henry, where the members will be given an opportunity to examine the power plant and sub-stations of the famous single-phase line of the Indianapolis & Cincinnati Traction Company.

6-in. angle, and with two center knees. The vestibules consist of five sash; center sash arranged so as to be raised and fasten to hood.

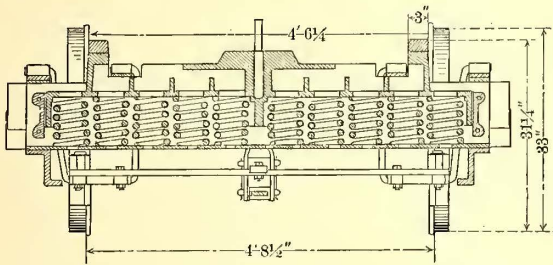
Cherry, with bird's-eye maple ceiling, constitutes the interior



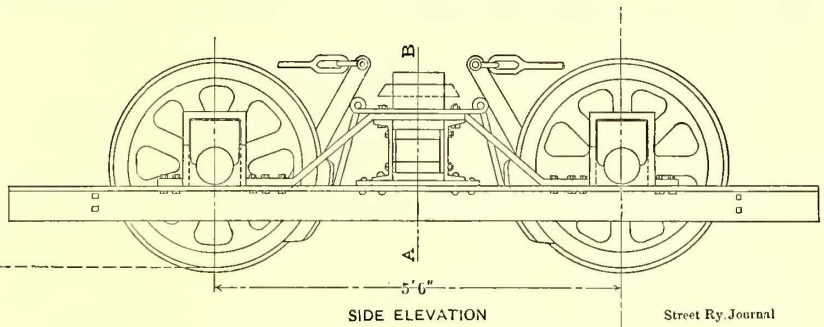
INTERIOR VIEW OF ATLANTA CAR, SHOWING THE SEATING ARRANGEMENT

DOUBLE-TRUCK CAR BUILT BY THE GEORGIA RAILWAY AND ELECTRIC COMPANY

The Georgia Railway & Electric Company, of Atlanta, Ga., has recently placed in service a number of fine interurban cars designed by A. M. Moore, the company's master mechanic. This car is of the double-truck, double-vestibuled type, and, as shown in the illustration, is furnished with large windows, which are arranged to slide upward. It measures 35 ft. 7 ins. over corner posts, 46 ft. 7 ins. over all, and is 8 ft. 2 ins. wide over all. The bottom framing consists of 5-in. x 8-in. side sills, with a 3/4-in. x 8-in. steel plate running the full length of the car body. The center sills are 4 3/4 ins. x 7 ins., and the



SECTION THROUGH A-B.



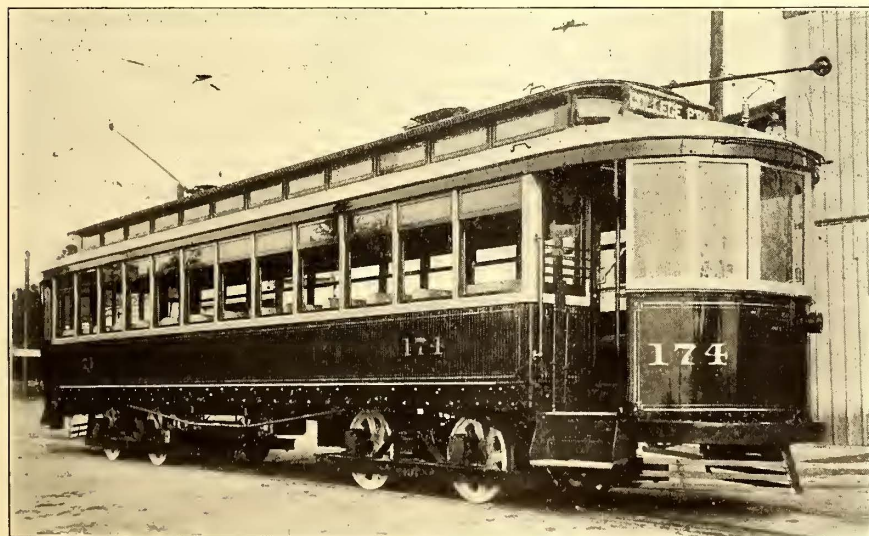
SIDE ELEVATION

Street Ry. Journal

ASSEMBLING OF STANDARD Z-BAR TRUCK USED BY THE GEORGIA RAILWAY AND ELECTRIC COMPANY

end sills, 5 ins. x 8 ins. All of the cross timbers are 4 ins. x 6 ins.; the side posts are 2 1/2 ins. x 3 ins., and the corner posts,

finish of the car. The seats are of the Wheeler No. 52 rattan type with grab handles, and are transversely placed, with the exception of the four longitudinal seats at the corners of the car. There are thirteen seats to the side.



DOUBLE-TRUCK INTERURBAN CAR BUILT BY THE GEORGIA RAILWAY & ELECTRIC COMPANY

5 ins. x 5 ins. The car has straight sides and is sealed with 3/4-in. x 6-in. ash longitudinal; gaged in all posts, 1/4 in.; 5/8-in. V-ceiling, glued and nailed to the longitudinal ceiling. The platforms are made of one continuous piece, 1/2-in. x 4-in. x

The electrical equipment consists of four GE 67 40-hp motors, mounted on trucks also built and designed by the company. Owing to the length of the car, two trolley poles are used. Every car is furnished with the National Electric Company's air brakes, AA-1 type air compressor. The cars are also equipped with Consolidated Car Heating Company's heaters and the J. G. Brill Company's gravity platform gates.

The trucks are made of 4-in. x 4-in. Z-bar; bolster construction, 1/2-in. x 10-in. channels, with 3/4-in. plate riveted to same. The journals are of cast iron, babbitted for 3 3/4-in. x 9 1/4-in. journals. These trucks have a 4-in. axle, 5-ft. wheel base and 33-in. wheels, with outside hung motors. The approximate weight of the car body and equipments is 42,000 lbs.

The company has also built quite a number of this type of car with 20-ft. 8-in. bodies for the city lines. The neat appearance of this type is well shown in the half-tone illustration of the exterior of the double-truck, double-vestibule car.

SOLICITING TRAFFIC BY LETTERS

The Public Service Corporation of New Jersey has given a great deal of attention to the development of business in its railway, electric lighting and gas departments. Some of the methods are quite novel, while others, like the issue of a bulletin on electric lighting and power, and a bird's-eye map, have been followed successfully by other companies. This work is in charge of C. W. Lee, of the advertising department, and of J. N. Akarman, traffic superintendent. Among the novel methods followed is the transmission at occasional intervals of manifolded letters, addressed to persons within the territory served by the company, and suggesting special reasons for patronizing the cars of the company. Thus, last spring the following two letters were sent out to stimulate the special car business of the company. The first was sent to a large number of school teachers; the second to the secretaries of various fraternal and other organizations:

PUBLIC SERVICE CORPORATION OF NEW JERSEY
Office of Traffic Superintendent

NEWARK, N. J., June 1, 1905.

Miss Jennie Smith, 234 Main Avenue, Orange, N. J.

DEAR MADAM.—Have you ever considered the two excellent natural educational advantages which New Jersey possesses? I refer to its resources for the study of botany and American history.

North of an imaginary line running from Perth Amboy, at the Raritan River, to Belvidere on the Delaware, the flora of the State consists of northern species. About one-third of this wild vegetation is also native of Europe, while a large share of the remainder is found in the northern part of this country.

Armed with a penknife, dissecting needles and a good lens, a day in the woods would give to your pupils and yourself a fresh inspiration for the closing weeks of this trying part of the school year.

There is no better method of impressing either our national or natural history upon youthful minds than by visiting famous places or studying direct from Nature.

Even a jolly picnic party becomes more interesting when the lunch is spread on historic ground. New Jersey as one of the principal battle fields of the Revolution, teems with such associations.

The enclosed folder may be of service to you in planning such an excursion. We make a special arrangement for large parties and should be pleased to give you any information on this subject.

Yours truly,

JNO. N. AKARMAN,
Traffic Superintendent.

PUBLIC SERVICE CORPORATION OF NEW JERSEY
Office of Traffic Superintendent

NEWARK, N. J., June 7, 1905.

Mr. John Jones, Secretary, 85 Clinton Street, Newark, N. J.

DEAR SIR.—Intersected as New Jersey is by trolley lines, it offers exceptional facilities for trolley parties.

These may be given either as all-day picnics, afternoon rides or evening jollifications. The variety of fun they offer recommends them particularly for club organization outings.

New Jersey also teems with historical points of interests, of which many are accessible by trolley. They make interesting places for pleasure seekers.

A society as a body needs an outing in the summer just as much as its individual members. There can be no pleasanter or more expeditious way of taking it than by trolley.

Our special car facilities are excellent and we will be pleased to give you any information on the subject.

Yours truly,

JNO. N. AKARMAN,
Traffic Superintendent.

These letters were the means of increasing the company's special car business at least 50 per cent over that of last year. They were followed this fall by another letter which was addressed to the school teachers in New York City and New Jersey, and which read as follows:

PUBLIC SERVICE CORPORATION OF NEW JERSEY
Office of Traffic Superintendent

NEWARK, N. J., Oct. 2, 1905.

Miss Fannie M. Williams, Tallmans, N. J.

DEAR MADAM.—After the first hurried weeks of school are over,

and yet before the weather grows cold, is a delightful time to take your pupils for a day's or a half day's outing.

This season of the year, when Mother Nature is gaily garbed in her most brilliant garments, was made particularly for the children. The woods are full of secrets, and the nut trees are dropping their treasure on the ground. It is a time rife for sipping at the cup of botanical knowledge.

Such an outing, which is easily possible on the cars of Public Service, will quicken one's powers of observation. To this end it could be aptly used in language or rhetoric classes.

It might also be utilized to gather large quantities of the most perfect autumn leaves, which could be pressed and made to beautify and brighten the school rooms, during the long winter months.

New Jersey teems with wild and beautiful spots, good objective points for such a trip. The enclosed folder may offer you some suggestions, and if I can be of any assistance to you, kindly advise me.

Yours very truly,

JNO. N. AKARMAN,
Traffic Superintendent.

The letters are neatly printed in imitation typewriter type and mailed in a sealed envelope so that they bear every appearance of a personal communication on the part of the traffic superintendent, and hence receive attention.

OPENING OF JAPAN'S FIRST ELECTRIC INTERURBAN RAILWAY

The Hanshin Electric Railway, between Kobé and Osaka, the first line constructed in that country to connect two large cities, has been placed in operation. It is operated by the electric overhead trolley system, and covers a little more than 19 miles. There are in use at present eighteen cars, which were made by the Nippon Sharyo Seizo Kaisha, of Nagoya, Japan, from a sample car imported from the United States. The rails were imported from Pittsburg, and the electric motors were imported from Schenectady. The line is divided into four sections, the fare on each section being 2½ cents, these being subdivided into 1½-cent journeys. All told there are thirty authorized stopping places between the termini, stops being made only when passengers wish to get on or off cars. On the opening day several cars passed eight or nine stations without stopping, and the trip of nearly 20 miles was made in 1 hour and 20 minutes. The average time, however, is about an hour and a half—half as long again as the time occupied by the steam cars. There has been much speculation as to whether the new competing service will not greatly affect the traffic between Kobé and Osaka, on the Imperial Government Railway. Besides the difference of fare, which is 10 cents on the tram and 17 cents third-class and 50 cents first-class on the steam cars, the electric cars run every twelve minutes against every hour on the steam railway, and have thirty stopping places as against 3. On the whole, however, it is more than probable that the new line of cars will cause a very considerable diminution in the receipts of the government railway between these two cities.

ELECTRICITY FOR PARA, BRAZIL

J. G. White & Company, Ltd., of London, England, are to equip with electricity the existing mule and steam lines operated by the Companhia de Estrada de Ferro Paraense, in Para, Brazil. The present transportation systems have about 40 miles of track. Later on the various lines will be extended to the different suburbs of Para. The track will be relaid with heavy rails. At first a 3000-hp plant will be built. The rolling stock will consist of about 100 double-truck motor cars. The value of the contract is about \$2,000,000. It is the intention of White & Company to handle this enterprise much in the same way as was done with the Manila Electric Railway & Light Company, that is, the old tram lines will be consolidated, rehabilitated and operated as a modern, up-to-date system.

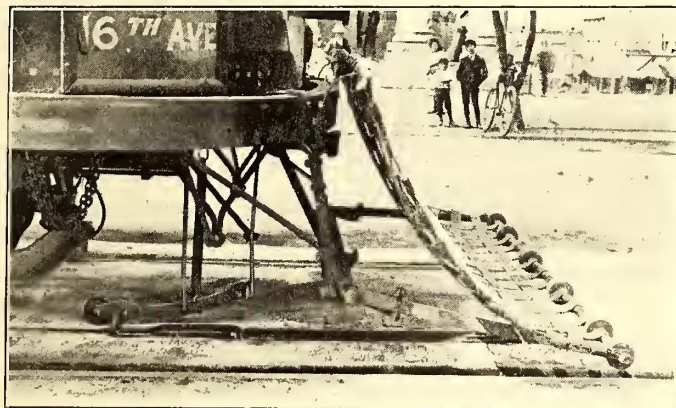
AUTOMOTONEERS IN NEW YORK

The rapid strides in popularity that the automotoneer is making, both on city and interurban electric railways, is shown by the fact that the New York City Railway Company has ordered all of the cars on the Eighth Avenue line to be equipped with this current controller, which is made by the Garton-Daniels Company, of Keokuk, Ia. The company's standard automotoneer is so adjusted that full power cannot reach the motors until the expiration of twelve to fourteen seconds. In this instance, however, the controllers are arranged to permit the full travel to be made in five and one-half to six seconds. This change is due to the fact that the congested thoroughfares covered by the Eighth Avenue line make relatively fast feeding a necessity in order that the cars may keep within their schedule.

SWITCHING DEVICE USED ON THE BRITISH COLUMBIA ELECTRIC RAILWAY

The British Columbia Electric Railway Company has been using successfully for the last two years a new automatic switch throwing device on its lines in Vancouver, Victoria, New Westminster and various interurban divisions.

This switch thrower obviates all necessity of turning switch points by hand and is operated while cars are in motion. It is



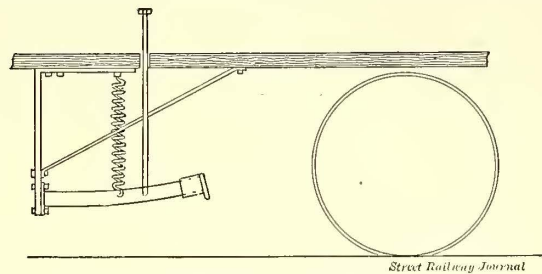
SWITCH BEING THROWN BY MOTORMAN ON CAR

of simple construction, inexpensive and unfailing if operated with but ordinary care. The company has operated and thoroughly tested this device under all conditions of service and weather on streets where there is heavy traffic, since June, 1903, and it has met every requirement.

simplicity of device; and cost of maintenance and repairs so low as to be a consideration of no importance. The company has spent 90 cents on the first switch installed, the same having been in continual use since installation.

The switching device consists of two parts, the switch throwing lever attached to the car body and the device installed on the street railway track between the rails.

To install, the tongue switch first is drilled about 22 ins. back



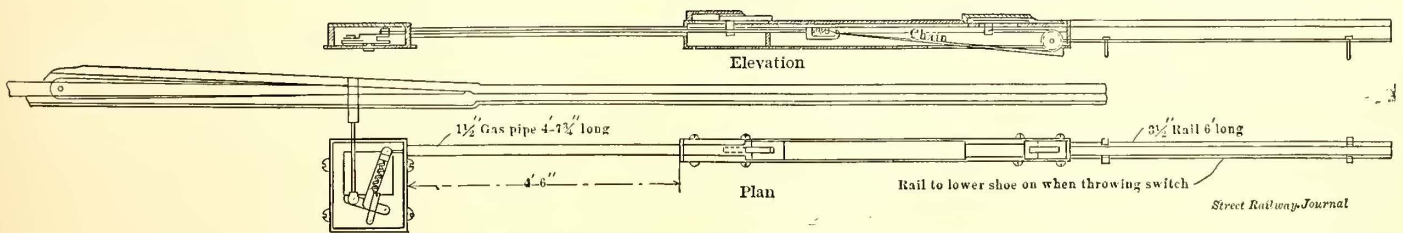
CAR EQUIPMENT FOR SWITCHING DEVICE

from the tongue, making a rectangular hole 1½ ins. x 1⅛ ins., as per separate detail; the dog is fitted to the tongue and connected to the lever in cast-iron box by the connecting rod provided. Then the 1½-in. wrought-iron pipe that serves as a



CAR APPROACHING A SWITCH

cover for the long connecting rod is placed in position, fitting one end in the square box and the other end in the long casting, driving the pipe into place to the mark on the pipe. The levers and the chain are then connected up to the two triggers, making sure that all parts are in line and work easily before spik-



TRACK ARRANGEMENT REQUIRED FOR AUTOMATIC SWITCH

The company gives the following as some of this switch thrower's points of value: Saving of time; switch is operated from any distance without stopping car; motorman or conductor do not leave their positions on car to operate it; conductor is free to attend to passengers, and motorman to his duties on the car, therefore there is less liability of accident; motorman can see switch point move over before car enters switch; less danger of collisions at switch points or crossings; services of switchmen not required; inexpensiveness and sim-

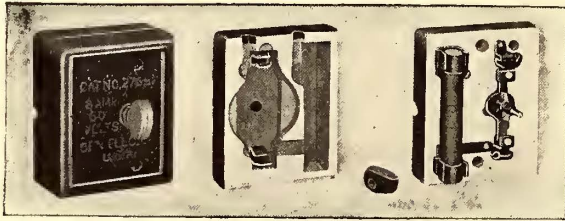
ing down. A short length of rail, about 6 ft. long, is spiked down for the shoe on the switch thrower to run on.

In equipping a car with the switch thrower, care must be taken to see that the latter is the same distance from the gage line of the rail as the triggers on the track, and to see that the shoe and lever has not too much side play. The operating rod in the floor of the vestibule can be offset to bring it into the best location for the motorman's use. This position will naturally vary with the different types of vestibules.

To throw the switch for the main line, it is required to press the pin just as the first trigger in the long casting rod disappears under the fender, holding the shoe steadily until the switch is thrown. To throw for a branch line, the pin is pressed at the second trigger just as the one nearest the switch disappears under the fender. When operating switch thrower, the car must be slowed down to 2 m.p.h., and the foot released from the pin as soon as the switch is thrown.

COMBINED SWITCH AND ENCLOSED FUSE CUT-OUT FOR CAR LIGHTING

Large cars are constantly coming into more general use in both city and suburban railway service, and heavier duty is being imposed upon the lighting switches and cut-outs, owing to the use of several lighting circuits in multiple. The switch



COMBINED SWITCH AND ENCLOSED FUSE CUT-OUT

and cut-out illustrated herewith has been designed by the General Electric Company with a view to these conditions, and also to convenience in installation and operation. The switch movement is positive and rapid, and will invariably break at its rated load. The fuse is of the enclosed type and will open a dead short circuit on any line with a voltage up to 650. It is held in position by spring clips, no binding screws being used, and can thus be quickly snapped into place. The cover is also held by substantial clips and does not carry any part of the circuit. The contacts and binding screws for wiring, mounted on the surface of the flat base, are all easily accessible, and the back of the base is recessed so that the device may be used in connection with either cleat or concealed wiring.

A LARGE CONCRETE STEEL CHIMNEY FOR THE PORTLAND GENERAL ELECTRIC COMPANY

The Portland General Electric Company has recently replaced its induced draft plant with a concrete steel chimney,

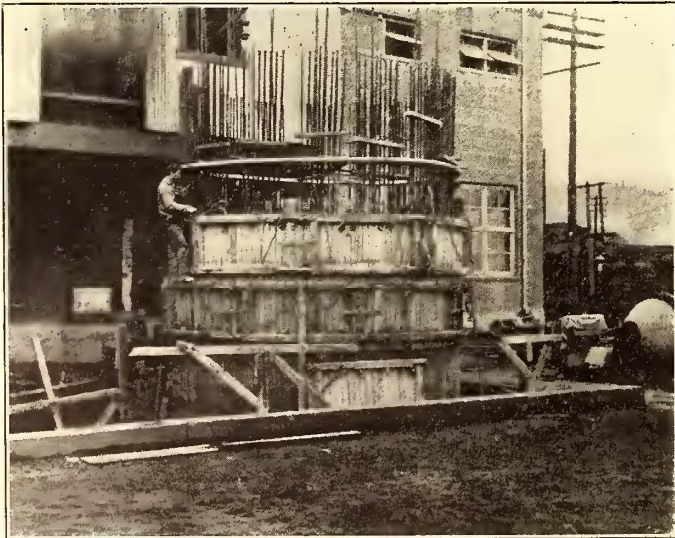


FIG. 1.—VIEW OF CONCRETE CHIMNEY IN COURSE OF CONSTRUCTION

erected by the Weber Steel Concrete Chimney Company, of Chicago. Fig. 1 shows the chimney during construction, and

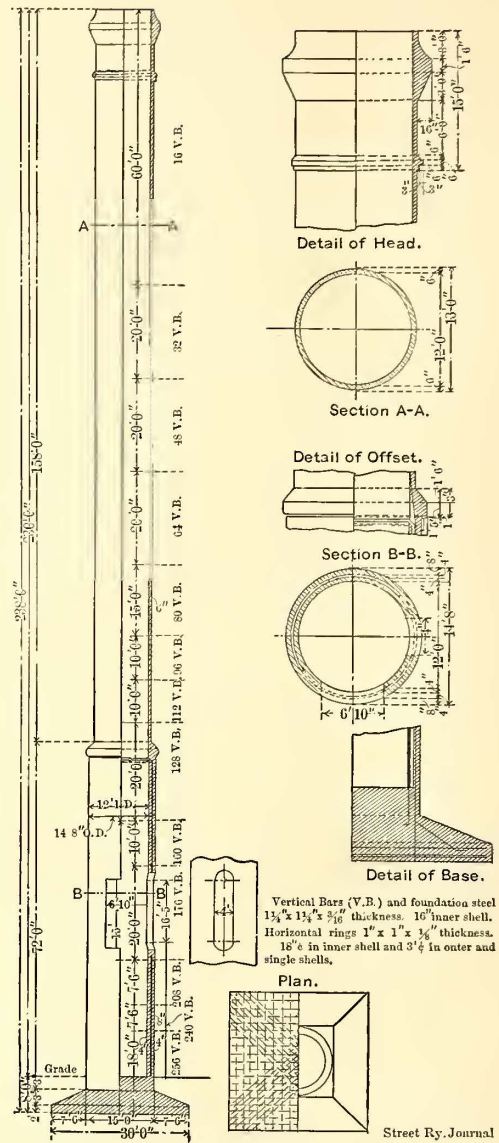


FIG. 3.—SHOWING PLAN, ELEVATION, SECTIONS AND OTHER DETAILS OF CONCRETE CHIMNEY

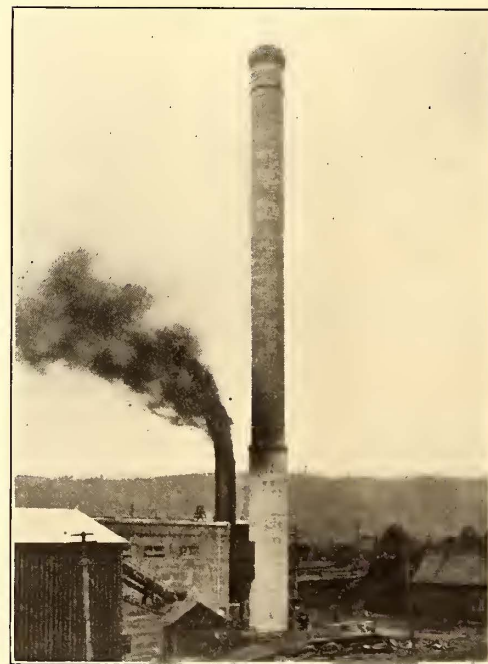


FIG. 2.—COMPLETED CONCRETE CHIMNEY

Fig. 2 shows the completed work. Fig. 3 is a drawing giving the dimensions and showing some of the details of construc-

tion. The chimney is 230 ft. high with a 12-ft. flue. Work was commenced March 18, 1905, and completed March 12, 1905, or in fifty-eight working days. Steel T-bars are used for reinforcing the concrete. These are of 1¼-in. x 1¼-in. x 3-16-in. section, with a sectional area of .45 sq. ins., weighing 1.7 lbs. per lineal foot. The steel is the best low carbon Bessemer. The cement used in this chimney is German Portland, Alsen brand, made in Hamburg. The sand used was bank sand of excellent quality, mixed in a proportion of one cement to three of sand. No gravel or crushed stone was used except in the square part of the foundation below the ground. All the mixing and hoisting of material was done in a special combination mixing and hoisting machine built specially for the purpose. The material was used medium dry and tamped into the forms placed around the steel bars. Fig. 1 gives a good idea of these forms, which consist of two inner and two outer rings, each 3 ft. high. These rings are divided into several sections, held together by latches. As soon as the upper form is filled, the latches of the lower form are released and its sections set upon the upper form one at a time. Two sections, or 6 ft., were made each day, except for a few days, in the lower part, where the chimney consisted of a double shell, as shown in Fig. 3. All work and hoisting was done inside the chimney, so that no outside scaffolding was needed. The platform supporting the workmen was fastened direct to the inner molds, and only a light stage was used inside to support the ladder, which reaches to the working platform. In Fig. 1 a wooden ring is seen above the forms. This ring is for the purpose of holding the steel bars in place before tamping in the concrete. It is kept always about 6 ft. above the upper forms. The bars are used in mill lengths of 20 ft. to 30 ft. Where bars join lengthwise, they are overlapped about 3 ft. The overlappings are so distributed that they are at irregular intervals, and never more than four bars overlap at the same height. No special finish is applied to the outside of the chimney, the outer surface being left the way the forms mold it, but very smooth forms are used and extra care taken in setting them. The company has now erected about sixty steel concrete chimneys in the United States and Canada, the highest being one of 350 ft. in Butte, Mont.

A NEW INDUCTION MOTOR

The National Electric Company, builder of direct and alternating-current machinery and the Christensen air brake, so

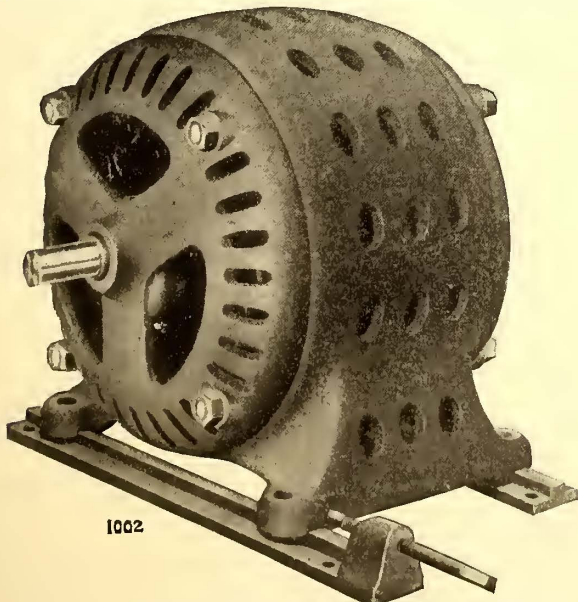


FIG. 1.—INDUCTION MOTOR READY FOR SERVICE

well known in the street railway field, has just brought out a new line of induction motors. These machines are of extremely

heavy and substantial construction, and they may be operated from floor, side wall or ceiling by changing brackets which carry the bearings. Owing to the high speeds at which these machines operate and the small space between stator and

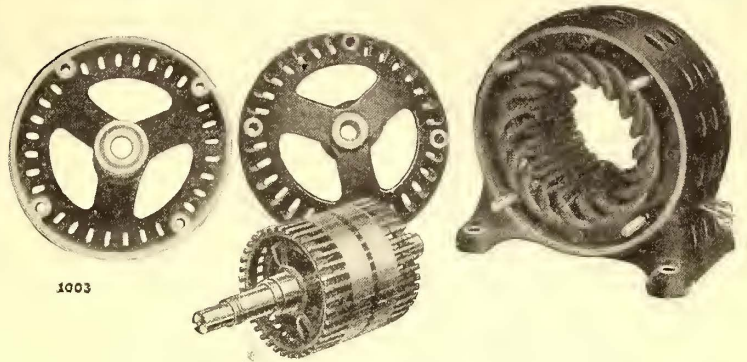


FIG. 2.—PARTS OF MOTOR READY FOR ASSEMBLING

rotor, an extremely heavy shaft is used, while the bearings are of large area, eliminating as much as possible any variation in the air gap.

The frame is made of cast iron, into which is assembled the laminations. The windings are all form wound by automatic machinery, and between each coil air space is provided to take care of the heating. The ventilation has also been given careful consideration, there being numerous openings provided in the frame, and also ventilating spaces between the laminations.

The rotor is of the squirrel-cage type, with copper rods inserted in the slots. This is built up of laminations of mild steel assembled on a spider and held firmly in position by end plates. Bearings are self-oiling and have wearing surfaces of ample proportions. An auto-starter is furnished with the squirrel-cage type, consisting of transformers connected across the line with voltage taps suitable for starting the motor under different conditions of load. A switch of suitable construction is provided for throwing the motor from one voltage to another. All of this apparatus is immersed in a tank of oil, which makes it sufficiently reliable to operate at high voltages, and which takes care of any heating due to starting under heavy torque.

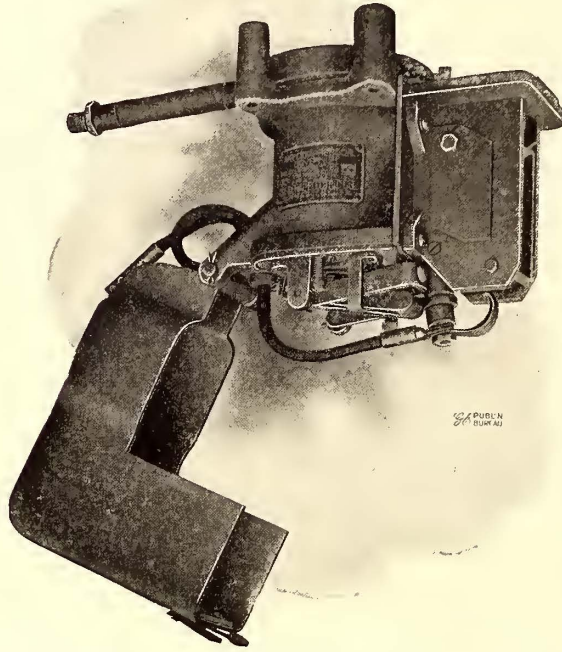
A NEW GOVERNOR FOR ELECTRICALLY-DRIVEN AIR COMPRESSORS

The modern electric car equipment, including as it does the independent motor-driven air compressor for the braking system, requires for successful operation an automatic regulator or governor to control the air pressure. The function of the governor is to stop the compressor motor when the desired pressure has been reached, and to start it whenever the pressure falls below the predetermined minimum. The reliability of the governor is the most important factor in insuring continuity of service and a ready and positive operation of the air-brake system at all times. The General Electric Company, of Schenectady, N. Y., has developed the type MC governor with these conditions clearly in view. The governor is light, compact and simple in operation, and embodies details of construction which are the result of long experience with apparatus of this class.

The limiting pressures at which the governor acts are usually such that a fall of 10 lbs. in the operating pressure will start the compressor motor, which will run until a rise of 10 lbs. pressure is obtained. The varying pressure of the air against a diaphragm actuates a set of operating levers, one of which carries the contact finger by means of which the motor compressor circuit is made and broken. The form of contact, arc chute, and magnetic blow-out is similar to that employed in the standard railway contactor, this construction having

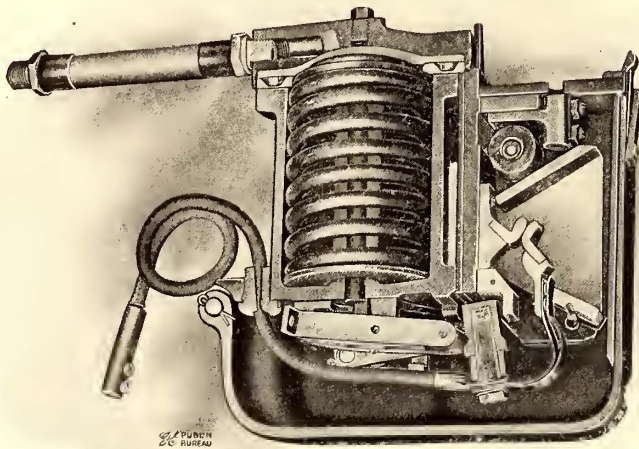
been found to be superior to any other form of current-interrupting device.

Friction and leakage, usually experienced from pistons and packing rings, are entirely eliminated by the substitution of a



AIR COMPRESSOR GOVERNOR WITH COVER SWUNG DOWN

thick diaphragm of pure rubber in their stead. This forms an hermetic seal and prevents any leakage or flow of air through the governor, thus obviating all difficulties due to condensation and freezing of moisture which accompany the flow of air through a governing mechanism. This construction, together



SECTION OF AIR-COMPRESSOR GOVERNOR

with the absence of valves of any sort, insures the utmost reliability of operation.

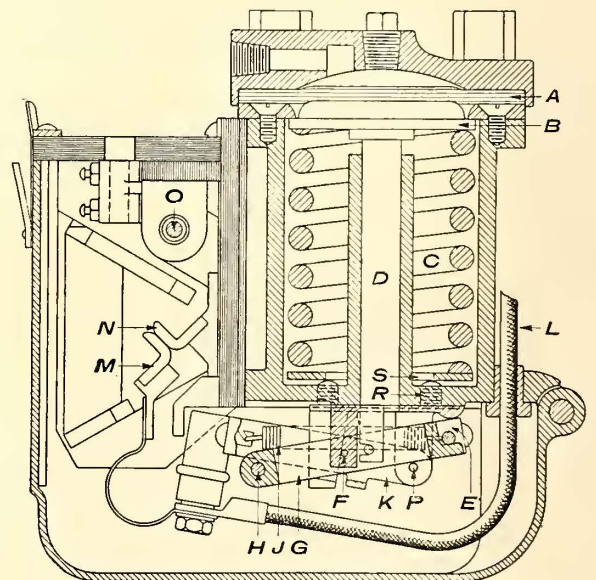
The compact arrangement of the governor permits its installation in small space directly on the bottom of the car. It is 5 3/4 ins. wide, 9 7/8 ins. long and 10 3-16 ins. deep. If installed for stationary use, it may be placed in any desired position. A tightly fitting cover protects the operating parts, contacts and adjustments from dust, dirt and mechanical injury. This cover also serves to exclude snow, brake-shoe dust and wheel wash, permitting the use of the governor without any enclosing box. Adjusting screws are provided for accurate

adjustment for various maximum pressures within the range of the governor. These maximum pressures may be selected over a wider range than is obtainable for the opening and closing limits, and vary from 40 lbs. to 60 lbs., or from 100 lbs. to 140 lbs., according to the particular range desired.

These ranges are predetermined in each governor by the strength of its operating spring, any desired pressure being provided for by the use of the proper spring. The difference of 10 lbs. between the opening and closing pressures for which all standard governors are set, is not readily varied without a change in the operating mechanism. Governors of this type can, however, be furnished to meet any special requirements.

From the lettered sectional view shown herewith, it will be seen that the cylinder head is provided with a tapered hole for the insulated pipe, which affords connection between the governor and the compressor reservoir. This cylinder head is so constructed that this connection may be placed at the back or either side of the governor, as desired. It is bolted to the frame Z and holds the rubber diaphragm A against the retaining ring Y. This ring serves as an abutment for the piston B, against the upper surface of which the diaphragm A is pressed. The lower side of the piston is acted upon by the operating spring C, the pressure of which is adjusted by means of the screws RR bearing against the washer S. Attached rigidly to the piston B is the rod D, the lower end of which is connected to one of the operating levers. The largest of these levers is provided with a recess, into which a mica-insulated stud is forced by hydraulic pressure. Attached to the stud is the cable terminal and the spring carrying the contact finger. The finger tip through which the circuit is completed and broken is so made as to be readily renewable when worn.

This finger completes the circuit through the stationary contact, the tip of which is also renewable. Enclosing these contact members is the arc chute W, composed of a special molded insulating compound, and is provided with renewable



DETAILS OF COMPRESSOR GOVERNOR

plates of a highly refractory material. This material has the property of resisting the action of the electric arc to a greater degree than any other similar compound. In series with this circuit is the blow-out coil O, which produces the magnetic field which extinguishes the arc when the circuit is broken. This coil is made of enameled copper ribbon, wound edgewise. Connected with this coil is the terminal Q, which is provided with two set-screws for clamping the wire. The protecting cover is hinged at the back of the frame and is held in the closed position by the spring catch. On the inside of this cover, adjacent to the arc chute, is a plate of insulating mate-

rial which prevents the possibility of the arc striking the metal.

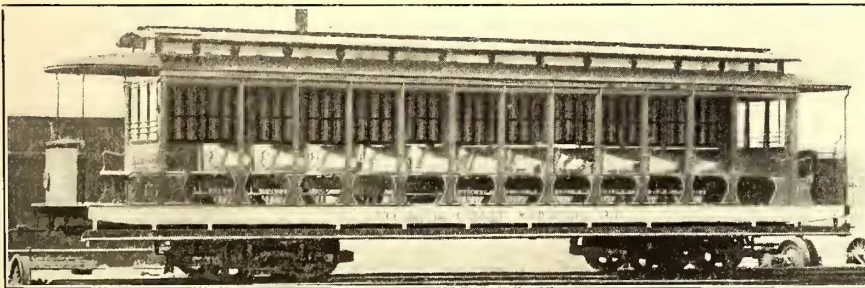
The action of this governor in opening and closing the motor circuit of the compressor is as follows: As the compressor continues to operate and the pressure of air in the reservoir is thereby increased, the pressure in the chamber above the diaphragm A rises; the piston rod D is thereby forced downward against the action of the operating spring C, turning the lever E around its fulcrum. This brings the pivot H above the center line of the tension springs J, which connect the intermediate lever G with contact-carrying lever K. The action of these springs then pulls the back end of the intermediate lever downward; this movement quickly carries the center line of the springs past the pivot P, thus reversing the action of these springs on the contact-carrying lever K, which causes the free end of this lever to be drawn downward, separating the contacts M and N with a quick snap.

The object of this double system of levers is to maintain a constant pressure between the contacts until the tripping point is reached, thus preventing the liability of burning at the contacts, which would otherwise occur.

As the pressure in the reservoir is reduced, the piston rod D raises the back end of the lever E, a projection on which engages the intermediate lever G. This carries the center line of the tension springs J above the pivot of the contact-carrying lever K, and thereby pulls the contact finger upward, quickly closing the circuit.

LARGE OPEN CARS FOR ASBURY PARK, N. J.

A number of fifteen-bench open cars has lately been delivered to the Atlantic Coast Railroad Company, of Asbury Park, N. J., by the John Stephenson Company. These cars are duplicates of a lot built for the railway company in 1903. The lines of the company connect Long Branch, Elberon, Deal, Allenhurst, Asbury Park, Bradley Beach, Neptune City, Avon, Belmar and Spring Lake, and about eighty cars are operated.



ONE OF THE LATEST FIFTEEN-BENCH OPEN CARS DELIVERED TO THE ATLANTIC COAST ELECTRIC RAILROAD

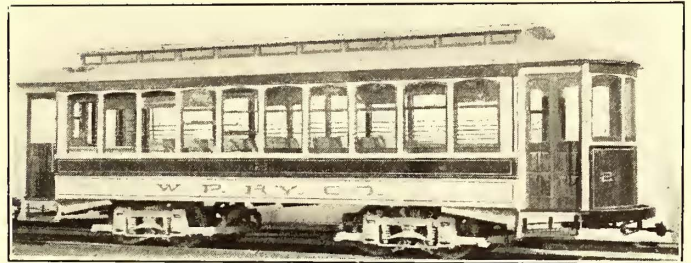
The attractive amusement resort, Pleasure Bay Park, is also owned by the railway company.

The new cars measure 33 ft. 4 ins. over the end panels and are seated for seventy-five passengers. The seats are reversible and are composed of ash slats. Ash, with ceilings of bird's-eye maple, constitutes the interior finish of the cars. The sashes in the bulkheads are arranged to drop into pockets between the seats. The curtains may be pulled down to the floor, the Brill round-corner seat-end panels which are used being so arranged in connection with the grooves in the posts as to permit the curtains to come down over the post outside of the panels, a continuation of the grooves of the posts being formed in the exterior surface of the panel.

The width over the sills is 6 ft. 6 $\frac{5}{8}$ ins., and over the posts, 7 ft. 3 ins. The distance between the centers of the posts is 2 ft. 7 ins. The side sills are 4 $\frac{3}{4}$ ins. x 7 $\frac{3}{4}$ ins., and the end sills are 2 $\frac{1}{4}$ ins. x 6 $\frac{5}{8}$ ins. The sill plates are 10 ins. x $\frac{5}{8}$ in.

SEMI-CONVERTIBLE CARS FOR WILLIAMSPORT, PA.

The J. G. Brill Company has delivered to the Williamsport (Pa.) Passenger Railway Company four of its semi-convertible cars. These are mounted on the Brill No. 27-G short-base double trucks, and will be used in the city and suburbs of Williamsport, where the company operates about thirty cars. Forty passengers may be comfortably seated in the new cars, the seats being of spring cane. All the seats are transversely placed except four longitudinal seats at the corners. The seats are 36 ins. long and the aisles are 22 ins. wide. The illustration shows the windows raised at different heights, and gives an idea of the appearance of the car when open for summer service. The low window sills, the height being 24 $\frac{5}{8}$ ins. from floor to top of sill, are considered to be a decided advantage in a car of this type. Since the sills are too low to be



DOUBLE-TRUCK VESTIBULED CAR FOR THE WILLIAMSPORT PASSENGER RAILWAY COMPANY

reached comfortably by an adult person, neat armrests are attached. The lower sash measures 26 $\frac{1}{2}$ ins. over the frame and the upper 17 $\frac{1}{4}$ ins., and both together weigh 17 lbs. As there are ten windows to a side, there is a 170-lb. weight of sashes when raised in each side roof, three-quarters of which bears vertically on the tops of the posts. This excess of weight, though small, is amply compensated by the extra-strong construction, including a heavier letter board than usual. The interior of the cars are finished in cherry, with ceilings of birch.

The general dimensions of the cars are: Length over the end panels, 28 ft., and over the crown pieces and the vestibules, 37 ft. 5 ins.; panel over the crown piece and vestibule, 4 ft. 8 $\frac{1}{2}$ ins.; width over the sills, 7 ft. 10 $\frac{1}{2}$ ins., and over the posts at the belt, 8 ft. 2 ins.; the sweep of the posts is 1 $\frac{3}{4}$ ins. The distance between the centers of the posts is 2 ft. 8 ins. The side sills are 4 ins. x 7 $\frac{3}{4}$ ins., and the end sills are 5 $\frac{1}{4}$ ins. x 6 $\frac{7}{8}$ ins. The sill plates are 12 ins. x $\frac{3}{8}$ in. The thickness of the corner posts, 5 $\frac{5}{8}$ ins., and of the side posts, 3 $\frac{1}{4}$ ins. The Brill No. 27-G trucks have a wheel base of 4 ft. and 33-in. wheels.

A system of close scrutiny of clothes, such as is in vogue in the police departments in cities, will hereafter be a feature of the management of the Chicago & Oak Park Elevated, of Chicago, and prizes will be awarded based upon personal appearance. Well-pressed clothes, shiny shoes, immaculate collars and neatly combed hair will all count. Hereafter trainmen's uniforms must be pressed once a month. Half the expense of this will be borne by the company, the employees contributing the other 25 cents. The office of the company in Austin Avenue has been equipped with whisk brooms, combs, brushes and shoe-shining outfits, so that those employees who report without having complied with the new orders may have a chance to remedy the fault before taking out their trains.

FINANCIAL INTELLIGENCE

WALL STREET, Oct. 18, 1905.

The Money Market

The money market developed a rather easier tendency this week, but rates for all maturities ruled practically unchanged from those recently quoted. The opening was firm, with lenders generally demanding full asking rates, but subsequently there was some shading of quotations on the stronger position of the local institutions, as revealed by the statement of the associated banks, published on last Saturday. Other factors operating in favor of an easier market were the extremely light demand for funds, as a result of a restricted stock speculation, and a less urgent demand for money for crop-movement purposes at interior points. For the week ending Oct. 12 the local banks gained substantially from the interior, this being the first gain in the currency movement reported since the beginning of August. The gain, however, was more than lost by the banks in their operations with the sub-treasury. On Monday of the present week, the final instalment on the Japanese loan was paid, amounting to about \$17,000,000, but the money was at once made available for market purposes, and the reoffering of a considerable part of it was largely responsible for the easier conditions noted. A noteworthy feature of the market has been the decided strength in sterling exchange, rates for prime demand bills advancing nearly a cent on the pound sterling, despite the prevailing rates for money in the local market. The advance in sterling was due largely to the advancing discounts abroad, and to the heavy buying to cover maturing bills and to purchases by the short interests. The supply of commercial bills continued extremely light for this season of the year, owing largely to the action taken by cotton growers to hold the staple for higher prices. There were no further engagements of gold for import, the movement being arrested, at least for the present, by the high rates of exchange. The arrivals of gold to date amount to \$8,780,000, leaving a comparatively small amount yet to arrive. The foreign markets have ruled firm, discount at all the principal European centers, and especially at London, showing an advancing tendency, and at this time there is some talk of a possible advance in the Bank of England rate in the near future to 5 per cent. The bank statement, published at the close of last week, was extremely favorable. Loans decreased \$29,456,600, due partly to liquidation in the stock market and partly to shifting of loans from the banks to the trust companies. The decrease in cash amounted to \$2,350,800, and was considerably larger than expected. Deposits were smaller by \$33,104,100, due in part to the withdrawals of balances by out-of-town institutions, to be loaned in the local market. The reserve required was \$8,276,025 smaller than in the previous week, resulting in an increase in the surplus reserve of \$5,925,235. The surplus is now \$10,121,400, as against \$15,957,875 in the corresponding week of last year, \$17,433,250 in 1903, \$5,608,250 in 1902, \$15,465,775 in 1901, and \$2,947,700 in 1900. At the close the opinion prevails in banking circles that the market will hold at near the present level for some weeks to come. Money on call loaned at 6 and 3 per cent, the average rate for the week being about 5 per cent. On time $5\frac{1}{4}$ per cent was asked for sixty-day funds, 5 per cent for three to five months, and $4\frac{3}{4}$ bid offered at 5 per cent for six months maturities. Specialists in commercial paper reported an extremely light supply of prime material, and all offerings are readily absorbed at 5 per cent, the minimum rate. For other good names the rates range from $5\frac{1}{4}$ to 6 per cent.

The Stock Market

The depression in the stock market, primarily caused by the "note of warning" sounded by one of the vice-presidents of a leading bank of this city, in an address at Washington, proved to be of only temporary duration, and while there has been no evidence of any pronounced upward tendency in the general run of stocks, the range of value at the close is somewhat higher than it was following the spasm of weakness resulting from the speech alluded to. Withal, however, a conservative feeling permeates the general share speculation, a fact due to existing monetary conditions more than to anything else. Throughout the week, money on call at the stock exchange has ruled firm, though the average rate was somewhat lower than that of the previous week. This, together with the expectation that money rates during the balance of the year will rule at least fairly firm, served as a deterrent to bullish opera-

tion in the stock market, and by some was used as an excuse for selling in a moderate way. These counter currents caused a rather irregular movement to prices, but, as before noted, the tendency for the most part was upward, the unexpectedly favorable showing of the bank statement on Saturday last having had considerable to do with this condition of affairs. A sharp upward turn in the shares of the anthracite coal properties, notably in Delaware & Lackawanna, which sold near 500, the unexampled prosperity in the iron and steel industry, the continued bright outlook for the crops, and the generally satisfactory reports of railroad earnings to hand, all tended to inspire confidence in the future of security values, but, as previously stated, present and prospective monetary conditions held speculation for the bull account in check, and in consequence of this dealings, as a rule, were in somewhat restricted volume. Aside from the anthracite coalers there were comparatively few noteworthy features to the speculative, although Amalgamated Copper attracted considerable attention and was strong, partly on account of the continued strength of the copper metal market and partly in anticipation of the stock being placed upon a 6 per cent dividend basis this week.

The local traction stocks have followed the same general course as practically all other stocks, and there have been no particular developments having a bearing upon any of their properties. The selling wave that appeared in Metropolitan Street Railway shares on the publication of the company's annual report abated, and in its place has come a quiet purchasing movement, based upon the knowledge that the causes which operated to make that showing so unfavorable were only temporary and do not now exist.

Philadelphia

Extreme dullness characterized the market for local traction issues during the past week. Comparatively few issues figured in the transactions, and the individual totals were considerably below those of the preceding week. Prices, however, remained steady. Philadelphia Company common was the interesting feature, upwards of 12,000 shares changing hands at prices ranging from 49 to 48 $\frac{5}{8}$. The preferred stock sold to the extent of about 200 shares at 49 to 48 $\frac{1}{2}$, and 300 rights brought 28. Philadelphia Traction ruled firm, 300 shares selling at 100 to 100 $\frac{1}{8}$. Philadelphia Rapid Transit was dealt in at 28 to 27 $\frac{3}{4}$, for about 600 shares. Union Traction moved up a small fraction, 300 shares selling at from 62 $\frac{7}{8}$ to 63 $\frac{1}{4}$. American Railways brought 52 $\frac{1}{2}$ for several hundred shares, and 200 Railways General brought 4. Other sales included Fairmount Park Transportation at 17 $\frac{1}{2}$ to 17, United Companies of New Jersey at 269 $\frac{1}{2}$ to 269, United Traction of Pittsburgh at 50, and United Railway & Investment at 92.

Baltimore

Little interest was manifest in the traction issues at Baltimore. United Railway issues, which have furnished the principal feature of the trading for several weeks past, ruled extremely quiet, and prices showed very little change from those prevailing at the close of a week ago. The income bonds were dealt in to the extent of only \$72,000, at from 65 $\frac{3}{8}$ to 65 $\frac{7}{8}$, while \$18,000 of the 4s brought 93 $\frac{1}{8}$ and 93. The stock and the deposited incomes were practically neglected. The investment issues ruled generally quiet but firm. A somewhat better demand existed for the Virginia Railway & Development 5s, \$11,000 of them selling at 100. City & Suburban 5s sold at 114 $\frac{3}{4}$ for \$5,000, and \$3,000 Lexington Street Railway 5s brought 106. Other transactions were: \$1,000 Augusta Street Railway 5s at 104 $\frac{1}{2}$, \$2,000 Macon Railway & Light 5s at 99 $\frac{3}{4}$, \$1,000 Baltimore Traction 5s at 118 $\frac{3}{8}$, \$2,000 United Railway incomes certificates at 65 $\frac{1}{4}$, 100 United Railway stock certificate of deposit at 16, 20 Norfolk Railway & Light stock at 13, and \$10,000 of the 5s at 97.

Other Traction Securities

Trading in the Boston market was dull and absolutely featureless. Boston Elevated rose from 153 to 154 on the purchase of about 300 shares. Massachusetts Electric sold at 14 $\frac{1}{4}$ for 100 shares, and 130 shares of the preferred brought 57. West End common sold at 99 $\frac{1}{4}$, and the preferred brought 113 $\frac{3}{4}$ and 114. Boston & Worcester common sold at 27 $\frac{1}{2}$ and 27 for odd lots. The feature of the Chicago market was the strength in Northwestern Elevated common and preferred. The first named sold at 24 early in the week and later rose to 25 $\frac{1}{2}$, while the preferred jumped from 65 to 68. Chicago & Oak Park common sold at $5\frac{1}{4}$, and the pre-

ferred, after selling at 20¼, dropped to 18¾. Metropolitan Elevated common sold at 26½ and the preferred at 72 and 70¾. West Chicago Street Railway brought 62 and 61, and 300 Chicago Union Traction changed hands at 12. North Chicago held firm, 100 shares selling at 85. In the New York curb market Interborough Rapid Transit ruled fairly active and firm. From 212¼, the low price of the week, there was an advance to 215½, but later the price ran off to 214¾. Upwards of 4500 shares were dealt in. Other sales included 600 New Orleans Railway common at 36½ and 36, 900 preferred at 79 and 79½; \$54,000 New Orleans Railway 4½s at 88½ and 90, \$4,000 Washington Railway 4s at 91, \$3,000 International Traction, of Buffalo, 4s at 83 and interest, \$10,000 Jersey City, Hoboken & Paterson 4s at 74¾ and interest, and \$10,000 Public Service Corporation certificates at 65½.

Another very active week in Cleveland with advancing prices for nearly all traction issues. Western Ohio, which has been inactive for a long time, opened the week at 15 and made gains until the early part of this week it sold at 19½, about 2000 shares changing hands. This was due largely to the reports of probable lease to the so-called Widener-Elkins syndicate. The bonds advanced in sympathy from 84 to 86½. Northern Ohio Traction was very active and made a slight advance from 24½ to 25½. The 4 per cent bonds advanced to 73¾, and the 5s to 87. Aurora, Elgin & Chicago shared in the bull movement to the extent of over 2000 shares and made another advance, from 31½ to 33½. The preferred moved up from 88 to 91½ on sales of a few hundred shares, while the bonds advanced to 98½. Cleveland & Southwestern had another strenuous week and it moved up from 14 to 17¼. The preferred sold at 60. Lake Shore Electric advanced in sympathy from 13¾ to 17¾. The old preferred sold at 60¼ and the bonds at 85½. Muncie, Hartford & Ft. Wayne sold at 43¾. Cleveland Electric was active with an advance from 82½ to 85.

Security Quotations

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

	Oct. 11	Oct. 18
American Railways	52½	52
Boston Elevated	152	153
Brooklyn Rapid Transit	71½	72¼
Chicago City	199	199
Chicago Union Traction (common).....	12½	11¾
Chicago Union Traction (preferred).....	—	—
Cleveland Electric	75	75
Consolidated Traction of New Jersey.....	82½	82
Consolidated Traction of New Jersey 5s.....	109	108½
Detroit United	93¼	92
Interborough Rapid Transit	212½	214
International Traction (common).....	39	39
International Traction (preferred) 4s.....	74½	73
Manhattan Railway	167	166
Massachusetts Electric Cos. (common).....	14	13¾
Massachusetts Electric Cos. (preferred).....	57	56
Metropolitan Elevated, Chicago (common).....	25	25½
Metropolitan Elevated, Chicago (preferred).....	71¾	70½
Metropolitan Street	127	125½
Metropolitan Securities	81½	80¾
New Orleans Railways (common), W. I.....	36	36
New Orleans Railways (preferred), W. I.....	79	79¾
New Orleans Railways, 4½s.....	89	89½
North American	98	97
North Jersey Street Railway	28	28
Philadelphia Company (common).....	48¾	48½
Philadelphia Rapid Transit	27¾	28¾
Philadelphia Traction	100	100
Public Service Corporation 5 per cent notes.....	97	96
Public Service Corporation certificates.....	69	64½
South Side Elevated (Chicago).....	97	96
Third Avenue	127	124½
Twin City, Minneapolis (common).....	117¼	116
Union Traction (Philadelphia).....	62	62½
West End (common).....	98½	99
West End (preferred)	113	114

W. I., when issued.

Iron and Steel

The "Iron Age" says that leading interests in the steel industry are more and more emphatically taking a position adverse to any violent upward prime movement. They are endeavoring to keep not alone values of raw material in bounds, but are holding down prices for finished iron and steel. The market for pig iron has stiffened. This week it is the East and the Central West which have marked up quotations. Some of the large Southern interests have withdrawn from the market entirely, but there is still some,

though little, iron available on the basis of \$12.50 for No. 2 at Birmingham. The news of greatest interest in the Central West is that the Steel Corporation has purchased 20,000 tons of iron for October delivery at \$15.50, and 20,000 tons for November delivery at \$18, thus establishing an advance. In the Eastern market, No. 2 foundry has advanced to \$16.75 at furnace. A number of moderate-sized lots of steel billets have been contracted for during the last week. The pressure upon car builders and locomotive shops is enormous. Reports from the lighter lines are very encouraging.

RAILROAD OFFICIALS AND ENGINEERS INSPECT LONG ISLAND COMPANY'S ELECTRIC LINES

A party of railroad men and engineers inspected the Atlantic Avenue and Rockaway divisions of the Long Island Railroad, now equipped with electricity, on Saturday Oct. 14. The party first ran out to Belmont Park, about 15 miles, and then returning to Woodhaven, they ran across Jamaica Bay to Rockaway Beach, inspecting the protected third-rail system, the sub-stations, car shops and other features of the system. The following persons were members of the party:

W. K. Vanderbilt, Jr., E. W. Winter and J. F. Calderwood, of the Brooklyn Rapid Transit Railway; Oren Root, of the New York City Company; Frank Hedley, of the Interborough; F. D. Underwood, J. M. Graham and J. C. Stuart, of the Erie; W. J. Wilgus and A. T. Hardin, of the New York Central; F. L. Shepard and M. Trump, of the Pennsylvania; President Ralph Peters, Superintendent C. L. Addison, George Gibbs, head of electrical department, and J. R. Savage, chief engineer, all of the Long Island Railroad; George and H. H. Westinghouse.

TUCKER-ANTHONY PROPERTIES

The recent sale by Tucker, Anthony & Company, of Boston, of several street railway properties in Ohio, also the sale by them of the Peoria & Pekin Traction & Terminal to the Chicago & Alton Railway, all of which has been mentioned in the STREET RAILWAY JOURNAL, call forcibly to attention the operations of the company in the building and management of this class of properties. The firm have successfully organized, or financed, built and managed twenty-eight different street railway, electric light and power companies in the past ten to twelve years. Of these twenty-eight properties, they have sold all but twelve, and it is a remarkable record that in every case the properties have been sold at a profit to the underwriters and the stockholders.

The following is a list of the various properties organized by this firm and later sold:

Properties	To Whom Sold
Macon Consolidated St. Ry....	Southern capitalists.
Worcester & Marlboro.....	Worcester Rys. & Inv. Co.
Fram., Southboro & Marlboro....	
Marlboro Street Ry. Co.....	
Brock., Bridgewater & Taun....	Massachusetts Electric Cos.
Prov. & Taunton St. Ry.....	
Hingham Street Railway.....	
Newport & Fall River.....	New Haven Railroad.
New London St. Ry. Co.....	
Montville Street Ry. Co.....	
Norwich Street Ry. Co.....	United Gas Imp. interests.
Indianapolis & Northwestern Street Railway	
Indiap. & Western St. Ry.....	Chicago & Alton interests.
Col., Buckeye Lake & Newark..	
Col., Newark & Zanesville.....	
Peoria & Pekin Term. Co.....	

The following are the properties and capitalization of the companies still managed by Tucker, Anthony & Company:

Properties	Bonds	Stock
Manchester St. Ry. Co.....	\$2,000,000	\$2,050,000
Manchester Electric Co.....		
Garvins Falls Elec. Power Co..		
Un. Elec. Co., all consol. into Manchester Tr., Lt. & P. Co..	925,000	700,000
Hartford & Springfield.....		
Somers & Endfield Co.....		
Broad Brook Company, all consolidated into the Hartford & Springfield St. Ry. Co.....	2,000,000	2,000,000
Canton-Akron St. Ry. Co.....		
Canton-New Philadelphia Co.		
Tuscarawas Traction Co., Ohio.	600,000	1,500,000
Binghampton Lt., H. & Pow. Co.	200,000	200,000
Gt. Nor. Power Co. and Northwestern Pow. Co., Duluth, Wis.	400,000	650,000
	4,000,000	10,000,000

THE CHICAGO UNION COMPANY'S OFFER

The franchise ordinance of the Chicago Union Traction Company has reached the City Council. As previously stated in the *STREET RAILWAY JOURNAL*, it is substantially the same as that presented by the Chicago City Company, of which an abstract was published in the last issue of this paper. The first difference between the Chicago City and the North and West Chicago ordinances appears in the first section, where the grants to the three companies for the joint use of tracks in any street are made to expire concurrently, regardless of the actual date of their passage and acceptance. Section 3 provides that the North and West Side companies shall install the underground trolley system in that portion of the south division of the city lying north of Van Buren Street in the event that the underground trolley installed by the Chicago City Company proves to be practicable and satisfactory after two years of operation and other tests. Through routes are provided for on Halsted Street and on Western Avenue. Provision is also made for two through routes from each division of the city to each of the other two divisions through the business district east of Halsted Street, south of Chicago Avenue and north of Twelfth Street. Transfers within this district are to be discontinued. Passengers on the through cars are to be entitled to the same facilities as to transfers at the ends of the routes as if they paid cash fares. W. W. Gurley, general counsel of the company, says, if the companies operate through cars within the district described they should not be required to give transfers within the district. He says the present complaint his companies had to make is the tremendous abuse of transfers in the downtown district. In section 26, the provision for the city's purchase of the lines binds all the companies to grant the city the right at such time as it may elect after the completion of the reconstruction period required under the terms of the ordinance to purchase all the property, real and personal, then comprising the going street railway systems of the companies. The conditions of the purchase are:

The price to be paid therefor to be the then fair cash value of said real and personal property (exclusive of earning power and any franchise value) for continuous use in the city for street railway purposes, plus the then fair cash value of all of the then unexpired rights of said companies, and each of them, in the streets of the city of Chicago, existing at and prior to the date of the passage of this ordinance.

Section 30 provides for the construction of tunnels at Van Buren, Washington and La Salle Streets. The tunnels are made parts of the street railway systems, and provision is made for their appraisal with the other properties when the city elects to purchase. Until the tunnels are lowered or rebuilt the companies are to be allowed to use the river bridges.

The Supreme Court has advanced the hearing of the Chicago Traction cases to Jan. 2. The cases come to the Supreme Court from the Circuit Court of the United States for the northern district of Illinois.

CONTRACT LET FOR LINE FROM DETROIT TO BAY CITY

The Detroit-Bay City Traction Company has filed a trust mortgage for \$3,000,000 to cover a bond issue of that amount and has let a contract for the construction of the road, which will extend from Detroit to Bay City, to Ross Construction Company, of Chicago. A subsidiary company known as the Wayne Construction Company, of Detroit, has been organized to carry on the work in Michigan. The contract calls for the completion of the road by Oct. 1, 1906. Construction work will begin at Bay City, run east to Akron and thence south to Cairo. The entire length of the road will be 112 miles. The power house will probably be located at Lapeer, and sub-stations at Pontiac and Cairo.

Several years ago the project was known as the Detroit, Pontiac, Lapeer & Northern Railway, and the best known of its promoters was O. J. Price. Also interested in the project at that time were John H. Christian and L. H. Rothwell, of Detroit, and E. H. Whitcomb, of Davenport, Ia. Then the company became involved in financial troubles through the machinations of one of those interested. About a year ago Messrs. Whitcomb, Rothwell and Christian decided to go ahead with the project on an entirely new basis. They abandoned the old survey and surveyed a new right of way. They also secured control of about \$800,000 of the old bond issue, and settled with O. J. Price all claims which he had in the project. Bankers in Chicago, Davenport and New York will underwrite the bonds of the new company, and the Union Trust Company, of Detroit, will be trustee of the mortgage. The officers of the company are: E. H. Whitcomb, of Davenport, Ia., president; L. A. Rockwell, of Detroit, secretary; C. H. Christian, of Detroit, treasurer.

THE RIGHT OF CITY COUNCIL TO COMPEL THE ADOPTION OF CERTAIN FENDER

An important decision has just been rendered by the Supreme Court of Indiana as to the right of a municipality arbitrarily to dictate the style of the fender that shall be adopted for use on cars operated within the corporate limits. It seems that the City Council of Elkhart passed an ordinance providing that it shall be unlawful to run any street car within the city limits without attaching thereto a certain form of automatic fender made by a certain company, or some fender equally as good, to be approved by the Council. The court holds that the ordinance is void because it vests in certain public officers an arbitrary discretion in determining what fender shall be used.

MISSOURI COMPANY ABOUT TO LET CONTRACTS

The St. Louis, Hillsboro & Southern Railroad Company, Mechanics' Bank Building, St. Louis, is about to take bids for the equipment, etc., as well as the construction of the line, which will run through the foot hills of the Ozark Mountains from South St. Louis to Hillsboro, the county seat of Jefferson County, Mo., about 40 miles. The company is incorporated for \$1,200,000. The bond issue is \$1,600,000. Henry Bowen, formerly with H. M. Byllesby & Company, of Chicago, is the general manager of the company. The financing of the road is all arranged. It is the intention to extend this line 168 miles further south than the present terminus, through rich lead, zinc, coal and timber country.

OTHER TROLLEY DEVELOPMENTS IN NEW JERSEY IN CONNECTION WITH TUNNELS TO NEW YORK

Another project for the development of electric railway lines in New Jersey to operate in conjunction with tunnels building to New York and with the underground roads already in operation in that city is under way. On Monday there were filed with the county clerk of Hudson County, New Jersey, articles of incorporation of the Hudson Street Railroad Company, capitalized at \$3,000,000 "for the purpose of increasing and improving the local transportation facilities throughout the principal cities and towns of Hudson County, with a view to operating these lines in connection with the tunnels now being built under the Hudson River." The new lines are so planned as to tap the tunnels at points back from the water front, so that fast time can be made through the congested business districts in Jersey City and Hoboken, and this, coupled with the fact that the new lines will have superior track construction and most modern equipments, will result in reducing the time between the residential and business districts of New York and New Jersey to practically one-half of that now required to get across the river.

The incorporators of the company are Pliny Fisk, Rye, N. Y.; Walter G. Oakman, Roslyn, N. Y.; W. C. Fisk, New York City; Andrew Freedman, New York City; David C. Young, Newark, N. J., and William G. McAdoo, Yonkers, N. Y. The incorporators constitute the board of directors, with the exception of W. C. Fisk, whose firm of Harvey, Fisk & Sons, bankers, will be doubly represented on the board by William M. Barnum and Pliny Fisk. Walter G. Oakman is president of the Hudson Companies in New York, W. G. McAdoo is president of the Hudson & Manhattan Railroad Company, Andrew Freedman is a director of the Interborough Rapid Transit Company, and David Young was, until their absorption by the Public Service Corporation, the vice-president and general manager of the North Jersey Street Railway Company and president of the Jersey City, Hoboken & Paterson Street Railway Company. The officers chosen are William G. McAdoo, president; Andrew Freedman, vice-president; K. B. Conger, secretary, and William C. Kinney, treasurer.

To be specific, the new company plans to connect with the tunnels being constructed by the Pennsylvania Railroad Company at the foot of Exchange Place, Jersey City, and with the branch tunnel at Hoboken of the McAdoo Company. The rival corporation contemplates running lines through Jersey City, Hoboken, Bayonne and the other municipalities in Hudson County, and extend out through the State.

The Pennsylvania Railroad has formally signified its intention of equipping with electricity one of its lines from Philadelphia to Atlantic City. Passenger service over this line is acknowledged to be the best in the world. It is the line over which many records for speed are made.

VESTIBULING BROOKLYN CARS

The first shipment of the new vestibules with which the Brooklyn Rapid Transit Company will equip one-third of its surface cars for the coming winter are due to arrive in Brooklyn soon, and the month of November will be devoted to placing the vestibules on the cars. As there are several different types of surface cars in use on the Brooklyn Rapid Transit system the adjustment of the vestibules to fit the various measurements, will be no small task. Two sample vestibules are now being fitted to cars at the Fifty-Second Street shops. The mere adjusting of the vestibules will be but a portion of the work, as the old fenders which protrude over the dash rail will be of no use on the cars fitted with the new vestibule, as they could not be properly operated. The old fenders will, therefore, be added to the cars remaining without vestibules, thereby giving those cars a double allotment of fenders, which will be of advantage to the general equipment, making two fenders to each of these cars.

Several of the new semi-convertible cars have already been equipped with vestibules and are in regular operation, but the regular rolling stock will not be equipped ready for operation before Dec. 1. On account of it being impracticable to utilize the old fenders on cars to be vestibuled, 1200 new fenders for this purpose have been ordered. According to the Thonet law, one-third of the cars are to be vestibuled for the coming winter, an additional third next winter, and the balance the third winter.

A CALIFORNIA PROPERTY SOLD

The Santa Clara Interurban Railway Company—with all of its franchises, rights of way and other interests—has passed into the possession of Lewis E. Hanchett, who has been elected president of the company. All of the stock of the Interurban Company has been placed in Mr. Hanchett's name, and the deal is said to have been accompanied by a simultaneous transfer of \$500,000 to the retiring owners, represented by A. T. de Forest, Pacific Coast manager of the American Steel & Wire Company, and Attorney J. C. Campbell. Mr. Hanchett will not say who his associates and backers in the railroad enterprise are, but the impression has gone forth that the interests behind the deal are the Western Pacific or Gould interests.

The Santa Clara Interurban Railway Company was brought into existence some time ago for the purpose of building an electric railway from San Jose to San Mateo, and from the personnel of its board of directors and for other reasons it has been pretty generally understood that the American Steel & Wire Company, or the United States Steel Corporation, of which the former is an important asset, was behind the enterprise. The interurban company obtained franchises for its proposed road through all of the intermediate towns between San Mateo and San Jose, and purchased a private right of way connecting up its various franchises, so that the operation of its trains would not be restricted as to speed. In San Jose it obtained a franchise that permits it to enter the city over a street parallel to the Alameda, and to run over certain city streets to connect with suburban lines to Berryessa, Alum Rock and Alviso.

Subsequently the company obtained an option on the properties of the San Jose & Santa Clara Street Railway Company and paid \$50,000 on account of the purchase price. The latter company owns and operates electric lines that run through the town of Santa Clara, along the Alameda to San Jose, through San Jose and out to Alum Rock, with extensive feeders reaching in various directions. The closing of this deal was involved in the negotiations for the acquirement of the interurban company. Several meetings were held recently, as a result of which, it is said, the properties of San Jose & Santa Clara Railway Company, which were owned by the Centers, of San Jose, as well as those of the Santa Clara Interurban Company, have passed into the possession of the new owners.

Thus far the Interurban company has constructed very little track. It has built a mile and a half of line in Palo Alto. Construction work was temporarily abandoned some little time ago, but was resumed quite recently, and the Palo Alto line, it is announced, will be ready for operation very shortly. The track at Palo Alto is of standard gage and is laid with heavy steel similar to that on the main line of the Southern Pacific, so that the road could be used as a steam road without the necessity of any reconstruction. The entire line up the peninsula, it is understood, will be of similar construction.

GREAT FALLS & OLD DOMINION NEARING COMPLETION

The Georgetown-Great Falls line of the Great Falls & Old Dominion Railway Company is nearing completion. The track has been laid and the poles for the wires which will furnish the current are in place for a distance of 10 miles, and work on the power house and the car house is being pushed with vigor. The Georgetown end of the line is at Thirty-Sixth and M Streets northwest, at the Washington end of the Aqueduct Bridge. The track across the bridge is complete, and all the track is nearly ready for the cars, within 4 miles of Great Falls. The grading for the line was made for a double track, but at present only a single track has been laid.

The power house, which is being built of concrete reinforced by steel, is located just across the Aqueduct Bridge, in Rosslyn, about 200 yds. from the bridge on the banks of the Potomac. It is nearly square in shape, its dimensions being 84 ft. x 90 ft. Its height will be 42 ft. The smokestack will be 125 ft. high, and will be 8 ft. in diameter. The Westinghouse Company is equipping the plant. A feature of the installation will be the use of 500-kw Westinghouse-Parsons turbines. A sub-station will be built about 10 miles up the road.

The car house, which will be completed in about two weeks, is situated about 200 yds. to the right of the Virginia end of the Aqueduct Bridge. It is 150 ft. long and about 45 ft. wide. The height at either end will be 16 ft. and at the peak 25 ft. The car house will be of wood frame, covered with galvanized iron. Three car tracks will be laid in the shed.

There are some six or seven bridges on the road, crossing wagon roads and creeks, etc., and the one over Difficult Run, Fairfax County, is about 600 ft. long and 100 ft. high.

When the road is completed, it will open up to Washingtonians one of the prettiest parts of Virginia, the scenery along the line of the road being very attractive. An elevation of 465 ft., the highest point around Washington, will be reached within a few minutes' ride.

It is expected that the road will be opened to traffic this fall, but the exact date is as yet uncertain.

ACCIDENT FAKIRS RUN DOWN IN NEW YORK

The New York City Railway Company caused the arrest on Sunday, Oct. 15, of Albert Woods and Mrs. Mae Woods, a middle-aged couple, on the charge of having attempted to defraud the company out of \$2,000 on an accident claim. The technical charge against them is perjury. The alleged accident upon which the charge is based dates back to June 27, 1904. On that date a Mrs. Herbert was alleged to have fallen from a surface car at Fifty-Third Street and Columbus Avenue. Woods was the conductor of that car. He had worked on that line nine days when the accident occurred, although, it is said, he had worked on another division of the road under another name prior to that time.

Woods is accused of having written a report to the company's headquarters describing the accident to Mrs. Herbert. According to the company's officials, Woods practically claimed liability on the part of the company because he admitted in his report that he was fixing the fare register when the accident occurred, and had given a signal to the motorman to go ahead, not noticing that a woman was standing on the running board of the car. Woods then further stated, according to the counsel of the company, that he heard the woman scream and that he saw Mrs. Herbert fall. Woods at that time gave his name as Walter Gardner and said that he lived at 211 West Forty-Sixth Street.

The trial of Mrs. Herbert's suit to recover \$2,000 from the company came up in White Plains before Judge Platt and a jury on Nov. 2, 1904. At that trial two physicians certified that Mrs. Herbert had received a fracture of the lower part of the spinal column. Her counsel at that time is said to have been Alpheus Frank and Harry Hardenbrook. The suit was decided in favor of the company. It came out then, the detectives say, that Mrs. Herbert really was Mrs. Woods.

The company decided to take up the matter again about two months ago and put detectives on the case. They traced Woods to the New England States, but he jumped so quickly from one State to another that they failed to catch him. Recently, however, they learned that he was living at 213 West Thirty-eighth Street. As soon as this was discovered by the company's detectives warrants were issued in White Plains for the arrest of the couple, and they were taken into custody. It is declared that a swindle similar to that charged against the Woodses was recently attempted in Baltimore, and the police are investigating the case there.

CLEVELANDERS TO FINANCE KANSAS CITY-ST. JOSEPH LINE

Announcement has been made of the plans for financing the Missouri Valley Electric Railway, which is being promoted by Cleveland capital. A committee has been appointed to manage the affairs of the company during the construction. It consists of L. W. Prior, of Denison, Prior & Company, and Warren Bicknell, president of the Lake Shore Electric Railway, representing financiers associated with the Citizens' Savings & Trust Company. The line will run from Kansas City to St. Joseph, Mo., with connections into Leavenworth and Atchison, 66 miles. The tract from Kansas City to Leavenworth will be double-tracked, giving total track of 95 miles. The line will be built on the Missouri side of the Missouri River, crossing the river at Kansas City, bringing the line virtually into the heart of the business district. Connection will be made into Leavenworth and Atchison by spur lines. The interests in this project are the strongest and best known in Cleveland, and there is little doubt that the line will be pushed to completion. The company will be capitalized at \$7,500,000, of which \$5,000,000 will be issued, and will authorize \$7,500,000 5 per cent bonds, of which \$5,000,000 will be issued.

A NEW WIRE AND FIBRE COMPANY

The Ryder Wire & Fibre Manufacturing Company, of New York, was recently incorporated with a capital stock of \$200,000 to manufacture all kinds of wire and fibrous fabrics, iron, steel and copper-wire rope and insulated wire. The president and treasurer of the company is G. F. Valentine, who was formerly president and treasurer of the Magnet Wire Company. The fabrics will be manufactured under the patents covering products and machines of H. Ryder, who is vice-president of the company and who was formerly manager of the Ryder Belt & Cordage Company, Buffalo, N. Y. The wire rope the company purposes to produce will be made by a new process by which the torsion is entirely eliminated, and it is claimed that by this method the strength and lasting qualities of the rope are increased about 10 per cent. The rope the company will manufacture will be made of fine wire, about which fibre is spun. When these fine strands are woven into either a rope or a covering for any material which undergoes high pressure or hard usage, the strength and durability qualities are greatly increased. Among the specialties of this material will be air-brake coupling hose, fire hose, automobile tires, etc. For automobile tires the material is especially valuable, as it makes the tire puncture proof; will stand a very high air pressure, and, on account of its rough surface, will overcome skidding.

LONGEST THROUGH TROLLEY LINE IN NEW ENGLAND

The longest through trolley line in New England, from Boston to Fall River, a distance of 35 miles, was inaugurated by the Old Colony Street Railway Company on Monday, Oct. 9. This line has been considered for some time, in order to connect with the New York boats in Fall River, and its installation is being favorably received. The initial trip was made in 3 hours and 20 minutes.

This trip to New York by trolley and boat reduces the rate 45 cents each way over the steam roads, and if one take the "New Line" of boats between Fall River and New York, the entire cost from Boston is only \$1.75.

Although the schedule has been in force only for a few days, it fully demonstrates that it will become very popular, especially in the fall and during the spring and summer months. The route lies through Mattapan and the famous Blue Hill Reservation, one of the finest parks in the country, then through Randolph with its beautiful trees, and continues on to Brockton, noted the world over for its shoe industry. From Brockton to Taunton the route follows the Old Turnpike and goes through a portion of Easton and Raynham. Taunton Green, where the first flag bearing the device "Union and Liberty" was unfurled, is passed. Then for some distance the trip lies along the banks of the beautiful Taunton River, through Dighton, at one time the center of the shipping industry. Somerset, with its long avenue of giant elms and fine old houses built in the seventeenth century, is another town visited before reaching Fall River. At the latter place the car takes one within a minute's walk of the boat landing.

NEW STEEL ELEVATED AND NEW SURFACE CARS FOR BROOKLYN

The first shipment of the new steel elevated cars for the Brooklyn Rapid Transit system arrived in Brooklyn Monday, Oct. 16, and as soon as they have passed through the company's shops they will be placed in service. This is the new type of elevated car, of which 100 were ordered last summer. In the new cars the old style seats, running along the sides, have been done away with. Practice has shown that the majority of persons on entering an elevated car immediately select to occupy the cross seats, in the center of the car, as these seats permit less crowding, and more prefer to ride facing forward than facing sideways. In addition to that, the cross seats are more comfortable. The new cars have a steel body and steel underframing and are of the convertible type. They seat sixty-two persons, as against fifty-two for the old type.

The Brooklyn company has also just placed orders for 150 additional surface cars. The John Stephenson Company received an order for 100, and the Laconia Car Company will build the remaining 50. The cars to be built are similar in design to the semi-convertible type described at some length in the STREET RAILWAY JOURNAL for March 11, 1905. During the past season 200 of these have been in service on the company's lines in Brooklyn and the vicinity. The new cars will be provided with closed vestibules.

PRETENTIOUS PUGET SOUND PROJECT

F. R. Brown, of Philadelphia, representative of the capitalists who control the Portland Consolidated Railway Company, of Portland, Ore., has been making investigations preparatory to beginning active work of construction on an electric railway projected to connect Portland and Puget Sound cities. Under the direction of Mr. Brown investigations have been carried forward, and compilations made upon which are based calculations as to the possible tonnage that such a road could expect to originate. Engineers have also gone into the physical features of the route, and have reported that low gradients and easy curvatures can be had for the entire route to a connection with suburban lines from Portland along the Columbia, or by a route through Clark County, Wash., connecting with the ferry at Vancouver, which, before the end of the present year, will land at a new terminal on the Oregon side, located on Shaw's Island. It is stated that negotiations have been entered into with business men of Seattle, Tacoma, Olympia, Portland and of the principal points that it is intended to serve between Puget Sound and Portland, to determine what traffic now handled by the steam roads may be diverted to the electric railway, and that within a short time several corps of locating engineers will be placed in the field to complete the engineering work for the road.

OHIO MERGER IN WHICH BUFFALONIANS ARE INTERESTED IS EFFECTED

The East Liverpool Light & Traction Company, which is the result of the merger of the East Liverpool Railway Company, the United Power Company and the East Liverpool & Rock Springs Railway, has elected the following officers: Van Horn Ely, of Buffalo, president; C. A. Smith, of East Liverpool, secretary, and Edward McDonnell, treasurer. These, with M. K. McGraw, G. H. A. Hunt, N. B. Billingsly and U. C. DeFord are directors. The Ohio Valley Finance Company of which W. Caryl Ely, of Buffalo, is president, is financing the proposition. Edward McDonnell, formerly superintendent of the International Company, at Buffalo, has been appointed general manager of the property. The company will immediately rebuild and double track the line between East Liverpool and Wellsville. Louis A. Watres, former lieutenant governor of Pennsylvania; Wm. F. Hallstead, former general manager of the Delaware, Lackawanna & Western Railroad, both of Scranton, and Chas. A. Smith, of Pittsburg, former owners of the constituent properties, it is understood, retain large interests in the new company, of which Col. Watres and Mr. Smith are directors.

The East Liverpool & Youngstown Railway Company has been incorporated by U. C. DeFord, M. E. Johnson, N. B. Billingsley, C. B. Kenty and others interested in the East Liverpool Light & Traction Company. The company proposes to build from East Liverpool to Lisbon, and possibly to Youngstown. The company owns franchises which were secured some time ago. Both the Youngstown & Ohio River Railway Company, promoted by Cleveland people, and the Youngstown & Southern, which is partially in operation, propose to build over this route.

WINTER WORK OF THE BROOKLYN RAPID TRANSIT EMPLOYEES ASSOCIATION

The plans are all laid by the Brooklyn Rapid Transit Employees Benefit Association for the winter's work. As heretofore, there will be special educational and amusement features in addition to that freedom of the main clubhouse at East New York and the several branches at the depots which is enjoyed by members of the association all time.

The educational committee of the association has arranged with Harry Netzer, instructor of last season's physical culture class, to conduct a similar class during the winter at the East New York clubhouse on Tuesday evenings. The class is open to all employees desiring to join, instruction being free to all. It is, however, required that each pupil wear, during class sessions, the regulation class uniform consisting of shirt, trunks and slippers, the price of which is \$2.

The bowling tournament for the season of 1905-06 will commence on Monday, Nov. 13, and will be effective on Mondays, Wednesdays and Fridays thereafter on the association's alleys at Cross-town, Ridgewood and East New York. Similar to previous years the tournament will be open to teams of employees from all departments. Each team is to consist of five men and not more than five substitutes; the captain to be selected by the team. Heads of departments, division superintendents, shop foremen, etc., have been requested to supervise the selection of teams from their several departments and approve the applications before sending them to the secretary's office. The prizes this season will be similar in number and value to those of last season. The team prize will be a silver loving cup. Four individual prizes will be awarded, a gold watch, gold chain, gold filled watch, diamond scarf pin. For the highest number of strikes a gold watch will be given, while for the highest number of spares, diamond cuff buttons will be awarded. The three high single-score prizes will be a gold ring, gun metal watch, pearl scarf pin.

The band of the association gained a splendid triumph at its first public appearance in the recent Mardi Gras parades at Coney Island. This organization is composed entirely of employees of the Brooklyn Rapid Transit Company and is the outgrowth of one of the departments of free instruction given to the members of the association. The band now numbers sixty pieces, and its members are composed of every branch of the railroad life, including electricians, despatchers, foremen of shops, locomotive engineers, motormen, conductors, guards and track and line department employees. It is little more than a year old. Last September it was decided to engage the services of W. S. Mygrant, band master of the Thirteenth Regiment, as instructor, and under his guidance the organization has made remarkable progress. The association has expended for instruments, uniforms, instructor, etc., a sum of nearly \$3000. Rehearsals are held every Monday and Thursday evening in the clubhouse on Jamaica Avenue. Monday evening is for the students, and Thursday for the playing members. Prof. Mygrant is in charge of both classes. As the instruments are owned by the association the men share equally in the benefits of the instruction.

The report of the association for the month ended Sept. 30, shows as follows:

Receipts for September	
Balance Sept. 1, 1905.....	\$9,775
Dues for September collected in August.....	2,372
Initiations	282
Cash left in cars.....	391
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Total receipts for September.....	\$12,820
Less September expense.....	1,998
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Balance Oct. 1, 1905.....	\$10,822
Expenses for September	
Sick benefits	\$1,018
Death benefits	150
Medical service	305
Salaries	194
Printing and stationery	76
Miscellaneous	135
Postage and petty cash	30
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September expense (total).....	\$1,998
Cash on Hand Oct. 1, 1905	
Balance B. R. T. E. B. A. Fund, Oct. 1, 1905.....	\$10,822
Dues and initiations for October collected in September..	2,485
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Total cash Oct. 1, 1905.....	\$13,307
Cash on hand, secretary's office (emergency).....	250
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Total cash available Oct. 1, 1905.....	13,557

THE CASULTY RECORD OF THE NEW YORK ELEVATED

Since the opening of the elevated railroads in New York more than a quarter of a century ago these lines have established an unparalleled record for the safety with which they have handled their tremendous volume of traffic. Until recently no passenger had ever been killed while on the company's cars, so that even in the light of the recent disaster on the Interborough system the record for safety still probably stands unmatched. To show how infinitesimal is the death record of elevated passengers to the total number carried, the "Wall Street Journal" recently printed the following figures of passengers handled since 1890:

Year	Passengers
1891	201,202,518
1892	213,692,745
1893	221,407,197
1894	202,751,532
1895	187,614,985
1896	184,703,636
1897	182,964,851
1898	183,360,846
1899	174,389,917
1900	184,234,000
1901	190,045,741
1902	215,259,345
1903	246,587,022
1904	280,207,620
1905	283,753,680
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Total	3,152,174,835
Average per annum.....	210,144,989

In fifteen years, therefore, there have been carried more than 3,000,000,000 passengers, an average of more than 210,144,989 per year, and of this total less than twenty persons have been killed while on the cars. Going back to the commencement of operations will increase the total of passengers very largely without adding to the number killed.

A NEW COMPANY TO BUILD FROM ROCHESTER TO BUFFALO

Directors of the recently dissolved Buffalo & Rochester Railway Company are organizing a new company to operate between Buffalo and Rochester, to be known as the Buffalo & Rochester Traction Company. The company is capitalized at \$3,500,000, and the same Philadelphia and Buffalo capitalists interested in the dissolved company are interested in the new one. There are no Rochester names in the list. The old company was incorporated Nov. 23, 1904, but in June of this year was denied the right to build because the road ran along public highways. Last month a court writ was obtained permitting the company to dissolve on Dec. 18. The new company will build on a private right of way. The western terminus will be at Depew, and the company's cars will enter Rochester over the Genesee Street tracks. The intermediate points to be touched at are Looneyville, Crittenden, Grimesville, Wende, Pembroke, Alden, Corfu, Batavia, Stafford, Le Roy, Caledonia, Mumford, Wheatland and Chili. The directors of the company are: Henry H. Kingston, J. Andrew Harris, Jr., John J. Collier, Horatio A. Foster, T. Henry Dixon and Samuel Welch, all of Philadelphia, and William B. Cutter, George A. Ricker and Herbert P. Bissel, all of Buffalo.

ROCK ISLAND DISCONTINUES IOWA INTERURBAN SERVICE

Orders have been received by the local officials of the Rock Island Railroad, in Des Moines, Ia., to discontinue the interurban service established between Indianola and Des Moines and Colfax and Des Moines. The order came as a surprise, as the Iowa officials are said to have been well pleased with the result of the experiment, the passenger traffic having increased between the places mentioned to a point where it was paying, even with the added expense of three extra trains each way daily. Reasons for the discontinuance have not been announced, but it is presumed that it was done on the advice of the legal department and was due to the laws of the State, which practically provide that the same proportionate rate shall be charged over all the line as is maintained between any two points. The company had been selling commutation tickets at reduced rates, and this is probably what caused the trouble. It is also stated that the interurban service on the line of the company between Cedar Rapids and Iowa City, which was established to compete with the interurban line connecting those two cities, will be discontinued in the near future.

STREET RAILWAY PATENTS

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

UNITED STATES PATENTS ISSUED OCT. 10, 1905

801,203. Brake Beam; Carl E. Bauer, Hammond, Ind. App. filed Sept. 23, 1903. A brake beam composed of two channel bars placed with flat sides together in substantially the same plane.

801,335. Trolley; Eugene J. Parker, Providence, R. I. App. filed Dec. 23, 1904. A bracket for supporting the trolley harp is mounted upon the trolley pole in such a way that the end of the pole will deflect guy wires and obstructions and prevent their engagement with the wheel and harp.

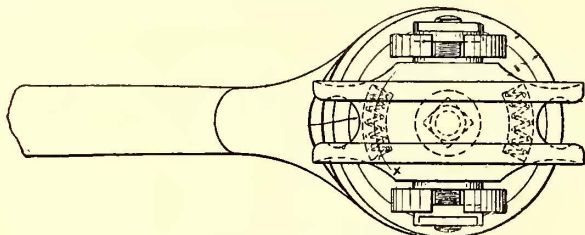
801,433. Brake Beam for Railway Cars; John McE. Ames, New Brighton, N. Y. App. filed April 12, 1905. Comprises two corresponding securing members adapted to fit upon and embrace the flange of the beam, and a jaw having a head loosely confined within a chamber formed within the members, whereby the jaw is rendered axially adjustable and adaptable for either a right of a left-hand fulcrum.

801,441. Electric Switch-Throwing Device; Louis H. Coxe, Philadelphia, Pa. App. filed Nov. 12, 1904. Relates to that class of switch operated by electric current derived from the motive power, in which the switch is actuated by cutting the current off or on when moving over insulated sections in the track.

801,516. Railway Crossing; Edward B. Entwisle, Johnstown, Pa. App. filed March 10, 1904. The intersection plate, against which the ends of the running rails abut, have arms extending between the running rails and guard rails and secured thereto.

801,508. Car; Ezra S. Bucknam, Philadelphia, Pa. App. filed Jan. 19, 1905. Relates to means for stowing sashes, panels, etc., in a semi-convertible car.

801,532. Device for Increasing the Adhesion Between Wheels and Rails; Robert C. Lowry, Seattle, Wash. App. filed Dec. 5, 1904. A bar mounted between the car wheels is electromagnetically wound and provided with a shoe adjacent the rail, which exerts a magnetic pull when the coils are energized.



PATENT NO. 801,335

801,541. Car Construction; Richard J. McHale and Peter Haberle, Philadelphia, Pa. App. filed Oct. 26, 1904. In an open car a hollow metal stanchion provided with a longitudinal slot and a seat panel, secured to the stanchion and straddled thereby.

801,554. Side Bearing for Railway Cars; Warren M. Smith, Moore, Pa. App. filed Jan. 28, 1904. Comprises a rub-plate having blocks thereon and adjusting blocks mounted on said first blocks and means for adjustably connecting the rub-plate and blocks together.

801,675. Car Brake Rigging; Dennis McCarty, Chicago, Ill. App. filed June 6, 1904. A chain runs through sheaves mounted at the ends of rods leading from the two brake levers and a spring is interposed in the chain and acts to draw the brake levers together when tension is put upon the chain.

801,718. Trolley Harp; Charles L. Hooper, Rochester, N. Y. App. filed Dec. 27, 1904. Spring blades between the harp and wheel to improve the contact.

PERSONAL MENTION

MR. H. M. BRINCKERHOFF has resigned as general manager of the Metropolitan West Side Elevated Railroad Company, of Chicago. He will leave for Europe soon upon an extended trip.

MR. M. J. MANDELBAUM, a prominent Cleveland banker, active in the Pomeroy-Mandelbaum syndicate, was married on Tuesday, Oct. 10, to Mrs. Florence Levy. Mr. and Mrs. Mandelbaum left immediately on a bridal trip to Europe.

MR. JOHN J. MURPHY has resigned as division superintendent of the Boston & Northern Street Railway. Mr. Murphy became superintendent of the Lynn division, March 14, 1903, after having served the Lynn & Boston and the Boston & Northern twenty-two years.

MR. ALBERT RICHEY, who recently resigned as chief engineer of the Indiana Union Traction Company to become head of the course in electric railway engineering in Worcester Polytechnic Institute, Worcester, Mass., has been presented with a handsome watch by his former associates in the Indiana Company.

MR. GEORGE C. TOWLE, who has been acting as general manager of the Syracuse & South Bay Railway Company, of Syracuse, N. Y., has been permanently appointed to that position. Mr. Towle formerly was connected with Stone & Webster, of Boston, Mass., for whom he acted in an engineering capacity in the installation of several systems.

MR. T. K. WELLS has been appointed superintendent of transportation for the Manila Electric Railway & Lighting Company, Manila, P. I., which is controlled and operated by J. G. White & Company, of New York. Mr. Wells was with the Wabash Railroad and the St. Louis, Iron Mountain & Southern Railroad for fourteen years, following which he spent eight years with the Syracuse Rapid Transit Company.

MR. C. F. BAKER, superintendent of motive power and machinery of Boston Elevated Railway Company, will become connected with the Brooklyn Rapid Transit Company Nov. 1, as engineer in charge of all power stations. Mr. R. C. Taylor, mechanical engineer of the company, who at present has charge of the power stations, will, upon the arrival of Mr. Baker, devote all of his time to the car equipment. Mr. Baker has been connected with the Boston Elevated Railway Company for more than ten years. He has always been prominently identified with the American Railway Mechanical & Electrical Association and was the president of that association last year.

MR. WILLIAM MARSH has been appointed chief engineer and general manager of the Brighton Corporation Tramways, of Brighton, England. He was appointed assistant engineer and manager in the autumn of 1904; acting engineer and manager in February, 1905, and attained his present promotion in July, 1905. Mr. Marsh went to Brighton in 1900 as assistant engineer and helped in the design and laying-out of the whole of the original system, together with two separate extensions since. Before coming to Brighton, Mr. Marsh served with several engineering firms in Scotland, and also for nearly two years with the Glasgow Corporation Tramways, as assistant electrical engineer, during the reconstruction of nearly the whole system for electric traction.

MR. R. F. HAYWARD, who has recently accepted the position of general manager of the Mexican Light & Power Company, City of Mexico, has occupied a leading position in hydro-electric power transmission engineering in the West for a number of years. Graduating in 1885 from University College, London, England. Mr. Hayward entered the works of the Crompton Company, Ltd., at Chelmsford, England, where he served an apprenticeship of three years. Afterward he was appointed works superintendent, holding that position until 1894, when he became general manager of the Salt Lake & Ogden Gas & Electric Light Company, of Salt Lake City, Utah. In November, 1897, he was appointed electrical engineer for the Union Light & Power Company, and in January, 1900, accepted a similar position with the Utah Light & Power Company, its successor. Four years later this company was consolidated with the Consolidated Railway & Power Company, of Salt Lake City as the Utah Light & Railway Company. Mr. Hayward accepted the appointment of electrical engineer and retained this position until September last, when he resigned to take the management of the Mexican Light & Power Company. During Mr. Hayward's connection with the power companies in Salt Lake City, several hydro-electric and steam power stations were brought into the same general transmission system, and the circuits harmonized so as to give efficient and economical service. For a time Mr. Hayward maintained a separate office as consulting engineer in Salt Lake City, and during this period, his firm, Hayward & Grey, designed and erected the Bear River power plant for the Utah Sugar Company. He was also consulting electrical engineer for the Pioneer Electric Power Company, of Ogden, and was frequently consulted in connection with many of the large hydro-electric power projects in the Rock Mountain States. In his new position as general manager of the Mexican Light & Power Company, Mr. Hayward will have direct supervision of nine power stations, the transmission lines and large distributing system. About 100,000 hp is at present utilized or being developed from water-power and steam plants, including the large Necaxa station. The power is used for lighting and general power purposes, for the operation of the street railways in the City of Mexico, for pumping the city water, and for mining, while an increasing quantity is being used for heating and cooking service.