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EDITORIAL NOTICE

Street railway news, and all information regarding changes of officers, new equipments, extensions, financial changes and new enterprises will be greatly appreciated for use in these columns.

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Chicago Franchise Extension Ordinance

The Chicago City Railway Company has signified its acceptance in the main of the franchise extension ordinance prepared by the Council sub-committee on franchises, and outlined on another page in this issue. This ordinance will be submitted to the local transportation committee, and later to the whole City Council. The clause specifying the compensation to be paid the city has been left blank, and this feature will be a question for further negotiation. Under the terms of the proposed ordinance the company waives whatever rights it may have under the ninety-nine-year act in exchange for a blanket franchise covering all of its lines for twenty years. This is a very important decision in view of the attitude of the other companies, and the ratification of the agreement containing this provision, it is needless to say, might have an important bearing upon the general question, as it has been assumed all along that the terms of the several grants would be practically identical. Judge Grosscup, it is needless to say, places considerable weight upon the rights of the companies under the ninety-nine-year act, and the question naturally arises whether he will be influenced in effecting a settlement for the North Side and West Side systems by the action of the South Side Company. Whatever may be the final solution, therefore, the first franchise granted will undoubtedly be looked upon by the public as the model upon which the others will be formed.

It is unnecessary and impracticable to review the details of the proposed ordinance here. The subject has been carefully discussed in all its bearings in these columns during the progress of the controversy, and there is little to be added at this time. We must confess a feeling of disappointment over the form of the proposed measure. It is far from satisfactory, and, if adopted, will, we fear, require constant tinkering and interpretation. To begin with it is not a general measure, but is complicated and involved in details which should have no place in such a document. For instance, it specifies in a vague way many things regarding the operation and equipment, which should have been left entirely to the management to deal with according to the advancement in the art; most of the provisions the company would carry out in any event, whether specified in the ordinance or not. At any rate, a franchise ordinance is not the place where such matters should be discussed.

Provision is made for the operation of cars through a subway in the down-town district, if such subway shall be built, and specifies the way in which compensation for the use of subways shall be determined in case there is a disagreement between the city or any company building the subway and the railway company. It is stipulated that at the end of twenty years the city may purchase all the property of the company at its physical value, leaving out of account any values attached to the franchise, or may extend the franchise under a new ordinance, or the city may make the grant to another company, which shall pay to the Chicago City Railway Company the same price that would be paid if the city were purchasing the property. It is the purpose of the city administration to frame matters so that the entire transportation problem may be considered advantageously to the municipality at the expiration of the present term, and pave the way for municipal ownership and operation if such a step should be considered desirable at that time. There are other features of this ordinance which we will reserve for consideration at more opportune times.

St. Louis Transit Shops

The new shops of the St. Louis Transit Company, completed this fall and described in this issue, are in many ways the most important electric railway repair shops ever put in operation. It is common, in discussing work of this kind, to compare it with other recent work of similar character, but it would be difficult to make such a reference in this instance, because in many respects the St. Louis shops are designed to meet operating conditions which are quite different from those on many roads. For example, it is the plan to use them for practically all of the repair and renewal work of the entire system, leaving nothing to be done at the several car houses but the renewals of small parts, which can be accomplished by hand without the aid of machinery for heavy lifting. For this reason a great deal of space has been given to repair tracks, and the facilities for handling parts to and from these tracks are unusually complete. The very multiplicity of repair tracks and the great number of places at which heavy lifting must be

carried on at one time led the management to abandon the favorite modern method of installing large traveling cranes, and to use instead a system of overhead travelers running on I-beams and equipped with air and chain-block hoists. The large traveling crane has become so indispensable in large factories and is finding such increasing use in electric railway repair shops, especially where cars, trucks and motors are very heavy, that its absence in this installation seems strange at first thought, but not at all remarkable after the operating conditions are taken into account. It must be remembered that it is a vastly different proposition to handle motors and trucks on half a dozen tracks from doing the same work on twenty-seven tracks.

It would be hard to conceive of two large repair shops more radically unlike in design than those of the St. Louis Transit Company and the Chicago City Railway Company described several months ago. These two are the best equipped large shops recently completed. When we say this we do not mean to cast any reflection on the excellence of many small shops recently described, which are equally well adapted for the class of work which they do. In the Chicago shops we find the machine shop, coil winding department and several minor departments in a large, high, two-story building, served with a traveling crane in a bay through the middle, by which the heavier material is delivered directly to the large machine tools. The number of repair tracks are comparatively few. The blacksmith shop is in another building. Car building and painting may be left out of the present comparison, as the new St. Louis shops do not include these departments. In the St. Louis shops we have a one-story building with low saw-tooth roof. The heavy material is handled entirely by an overhead traveler system of 6000 lbs. capacity, and this, with the car and pit hoist, is sufficient to do all the lifting and carrying. What makes possible such radical differences in shop design is the difference in the operating methods. At St. Louis everything goes to the repair shop for repairs and renewal of heavy parts, and numerous tracks have to be provided for the occupancy of the many cars that must be taken care of at one time. At Chicago many repairs and renewals are carried on at the several car houses. We will not now discuss the relative merits of these two operating methods, but they explain the necessity for changes in the design of these two shops. A shop like that in Chicago partakes largely of the nature of a manufacturing enterprise, while that in St. Louis is both a car repair house and a manufacturing concern.

Special attention should be called to some of the excellent features to be found in the St. Louis shops, notably the car hoists with which the repair tracks are equipped. These hoists seem to be as absolutely safe as any car hoists yet devised, and have many strong points, including the ability to stay at any point at which they may be left without special precautions for holding them there, combined with quickness and simplicity of operation. The transformer test for short-circuited armature and field coils has been referred to on numerous occasions within the last year in these columns, but on account of its simplicity of operation and consequent great commercial value, we cannot refrain from again calling attention to it. Another practice just being introduced by the St. Louis Transit Company, to which we have called attention before, is that of abandoning pit work as far as possible, and requiring all new motors and trucks to be adapted to repair work without the use of pits, or, in other words, to be handled from above rather than below.

Elevated Platforms in Chicago

The Union Elevated Loop in Chicago recently, after much delay, secured permits to lengthen its platforms at the various stations along the loop. The one thing needed at the present time to relieve the congestion during the rush hours on the Union Loop is the lengthening of the platforms so that two trains can be loaded at once at each station. This was clearly explained in the report on the Chicago transportation problem made last year by Bion J. Arnold, assisted by an eminent staff of transportation engineers. The findings of this report, which were the result of a long, intimate knowledge of Union Loop conditions, were that the ultimate capacity of the loop would be determined by the number of trains which could be passed into and out of the loop at the junction points, but that the present capacity of the loop was limited by the fact that only one train at a time could load at a platform. The lengthening of the platforms was thus shown to be the method which should be at once adopted to relieve the congestion on the loop.

Now, however, that the work has already begun on the extension of these platforms, certain property holders around the loop have joined together to throw obstacles in the way of these extensions. It certainly seems as if these gentlemen were acting from very selfish and short-sighted motives, if they thoroughly understand the situation. Probably many of them do not. At any rate, it is difficult to see why all the elevated transportation facilities of a great city should be crippled during the rush-hour periods by the objections raised by comparatively few property holders against the extension of existing platforms a few feet. It seems to be the opinion of the gentlemen forming this association that they alone are to be consulted in this matter, which, however, affects the happiness, convenience and comfort of the entire community.

English Railroads to Meet Electric Competition

The steam railways of England have awakened to the danger of competition for suburban patronage which is threatened by the extension of the electric street railway systems of the cities into the surrounding country, and of the advantage that would accrue to the older systems if they succeed in pre-empting the field by establishing feeder lines radiating from the principal centers of traffic along their routes. American railroads failed to recognize the importance of the trolley, and made no attempt to control the suburban feeder lines in their respective districts until it was too late, and in many cases this short-sightedness cost the steam lines a profitable business which a great deal of time and money had been spent in developing. The English managers do not propose to be caught napping in this manner, and they have already taken steps to meet the threatened competition. The Great Western Railway, for instance, which already suffers from competition of electric lines, has announced, through its chairman, that steps have been taken to forestall and prevent the building of other electric lines by establishing self-propelled individual passenger cars, running at more frequent intervals than trains were formerly operated, and also by establishing railroad stations and automobile service through country districts as feeders to the steam lines. It was further announced that these cars would run on the company's lines, and that arrangements had been made for stopping not only at existing stations, but at intermediate points, for picking up and setting down passengers. In this way a fairly quick local service would be provided. The management had had under consideration light railways, but it was doubtful as to whether there was sufficient traffic to justify the

construction of such lines. Another plan that was favorably considered was a proposal to feed their railway by running motor cars, and instructions have been given to purchase five, capable of carrying twenty-two persons each. The automobiles would travel at a moderate speed, and would show how much traffic there was in a district. One advantage of motor cars was that if the traffic proved insufficient they could be moved elsewhere, and the outlay involved was not heavy. The result of this experiment will be awaited with considerable interest in this country as well as in England, and if the plan prove feasible it will doubtless be very generally followed by the big steam roads throughout the British isles.

Interurban Information

We have called attention before to the unaccountable lack of information for prospective passengers on some interurban roads, and judging from conditions which have recently come to our attention, there still exists a necessity for several more sermons on the same text. There are, indeed, some notable and commendable examples of how to do it as well as those complained of, and in some of the interurban centers in the Middle West adequate provision has been made for the convenience and information of passengers. At all hotels time-tables are to be found, giving information about the interurban lines radiating from the city; the hotel clerks are as well posted about the arrival and departure of interurban cars as they are about the movements of steam railroad trains, and central waiting rooms are provided where passengers may receive information or wait for cars with the assurance that they will not miss the car they want. This is as it should be, but we regret that such complete arrangements are so unusual as to make them remarkable. At one of the most prominent interurban centers in the Middle West, there appears to be an absolute disregard on the part of the majority of the interurban companies of the fact that there are always many visitors who are unfamiliar with the community and its methods of doing business and who are not posted as to the movements of interurban cars and the routes over which they operate. Nine out of every ten citizens of a town may know that the interurban cars for Blankville leave at 6:05 a. m., and hourly thereafter, and that it takes 1 hour 25 minutes to make the run, but that fact doesn't secure the patronage of a traveling man or tourist who finds himself in the place for the first time. When arriving at one of these centers recently the writer sought information at the leading hotel regarding interurban lines, and found that not only was there not one single interurban time-table of any kind to be found on the premises, although there were about a half dozen interurban roads entering the city, but the clerks seemed woefully deficient in correct information about the arrival and departure of interurban cars, and in one case gave directions that proved to be entirely incorrect and nearly resulted in the missing of one of the hourly cars on a certain line. Some of the daily papers had time-tables showing departures of cars on some of the interurban lines, but these time-tables were not complete, and nowhere were printed time-tables to be found showing how long it would take to make a trip to any neighboring town and what kind of connections could be made. In other words, most of these companies were operating their roads in an excellent manner and adopting many of the features found useful in steam railroad service, but had evidently given no more attention to the information of prospective passengers than if they were operating a street railway.

Now, people do not start on an interurban journey of several hours with cars, perhaps, on 1-hour headway, in the same way

that they will start on a street railway trip of a few minutes with cars on 1 to 10 minutes headway. The interurban trip is a more expensive and time-consuming proposition, and the stranger wants to know more about it before he starts. Nothing will reassure him like a plain statement in printer's ink as to when and where he can go and how long it will take him.

As most people are not mind readers they need something definite and tangible in the way of information as to the movements of interurban cars before they will patronize them. This is especially true of traveling men who furnish a steady volume of business to all railroads. They are eager to learn any new means of transportation, but they are apt to be discouraged in patronizing interurban lines if no information can be obtained around their hotels, as to when and where interurban cars run from a given center.

The time is coming when comprehensive interurban guides will be published. In fact such a movement was begun in Detroit some time ago, and is well carried out there, but, unfortunately, it has not been adopted elsewhere. People who want to make a trip to-day do not care what the time-table is going to be in the future; they want to know what it is now, and they are accustomed to change of time on steam railroads, so that they will not be seriously put out by a change later on.

T-Rail in Paved Streets

One might easily understand how an unthinking person could be considerably misled or confused by the rather conflicting reports which have been reported in these columns recently in the discussions of convention papers and elsewhere on the results of laying T-rail in paved streets. A few words analyzing the situation more closely may not be out of place. On one hand, we have the fact that the T-rail has been used successfully for years in down-town paved streets in such cities as Minneapolis, Denver, Los Angeles, Milwaukee and a score of smaller places. On the other hand, comes the testimony from cities where T-rail has been used in streets on which the team traffic was heavy, that the paving was soon worn into ruts just inside of each rail.

How to account for these discrepancies might seem difficult at first, but the explanation is easy. Where the T-rail has been successfully used it will be found that the streets are sufficiently wide and well paved to afford ample roadbed without tempting teams, as a regular thing, to drive on the tracks, and, moreover, the trucking in these cities is not as heavy and constant as in cities of the first class. Of course, the fact that there is a T-rail instead of a girder rail, which offers a smooth track for vehicles tends to keep the teams off the track as long as there is any other good place to drive in the street. Where the T-rail has been laid and its use abandoned because of the difficulty in maintaining paving, it will be found almost invariably that the streets are comparatively narrow, so as to compel teams to drive along the car tracks, or the street paving is so abominable outside of the car tracks that teamsters have every inducement to keep on the tracks; or, owing to the fact that girder rail has been used exclusively on other construction in the city, it has become a custom to drive along the car tracks, and the habit cannot be put aside when but a small mileage of T-rail is laid, and the girder rail, which invites driving on the tracks, is used everywhere else in the city. Where any of these conditions exist it would seem that T-rail would involve very heavy expense in paving maintenance, while in the class of cities first mentioned T-rail is undoubtedly the most desirable rail from every standpoint.

THE REPAIR SHOPS OF THE ST. LOUIS TRANSIT COMPANY

The new shops of the St. Louis Transit Company, which have recently been completed, contain an unusual number of new features in the way of labor-saving machinery, which are of interest both to large and small electric railway companies.

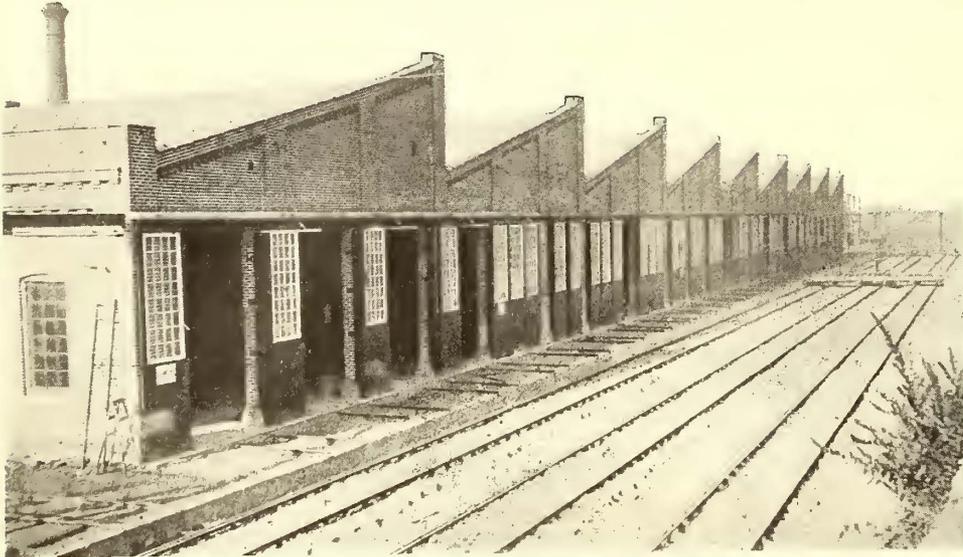


FIG. 1.—GENERAL VIEW OF FRONT OF SHOP AND TRANSFER TABLES, FROM THE SOUTHEAST

The features of most interest to small electric railway companies are the methods of hoisting car bodies and handling trucks and motors, which are applicable to both large and small shops and car houses. The St. Louis Transit Company is also engaged extensively at present in the manufacture of its own trucks, and has introduced labor-saving methods to such an extent that the cost of labor for truck manufacture is a very small proportion of the total cost. These manufacturing

methods, however, will be of interest mainly to very large companies only.

These new shops are located at Park Avenue and Vandeventer Avenue, near the company's general offices and central power station. Ever since the consolidation of the numerous St. Louis street railway companies into the St. Louis Transit Company, the management has been constantly at work centralizing its various departments. It was not until the present shops were completed, however, that it was able to centralize its repair work at one point. The completion of these shops has resulted in the shutting down of nine shops widely scattered over the city, where repair work of various kinds was carried on. In the new shops all the repair work on the rolling stock of the entire system will be done, with the exception of the replacing of small parts, which can be accomplished in the several car houses. Any work calling for the removal of trucks or motors from car bodies is performed at the central repair shop. Formerly the principal machine shop was in one place and the armature-winding department in another. Altogether, as said before, nine shops were maintained, each giving special attention to one particular branch of work for which it was best equipped.

GENERAL ARRANGEMENT

Most of the new shop building is a one-story structure, with saw-tooth roof, having skylights facing north. Fig. 1 is a general view looking down on the front of the building. Two transfer tables afford the means of getting cars into and out of the building. The general floor plan of the shops is

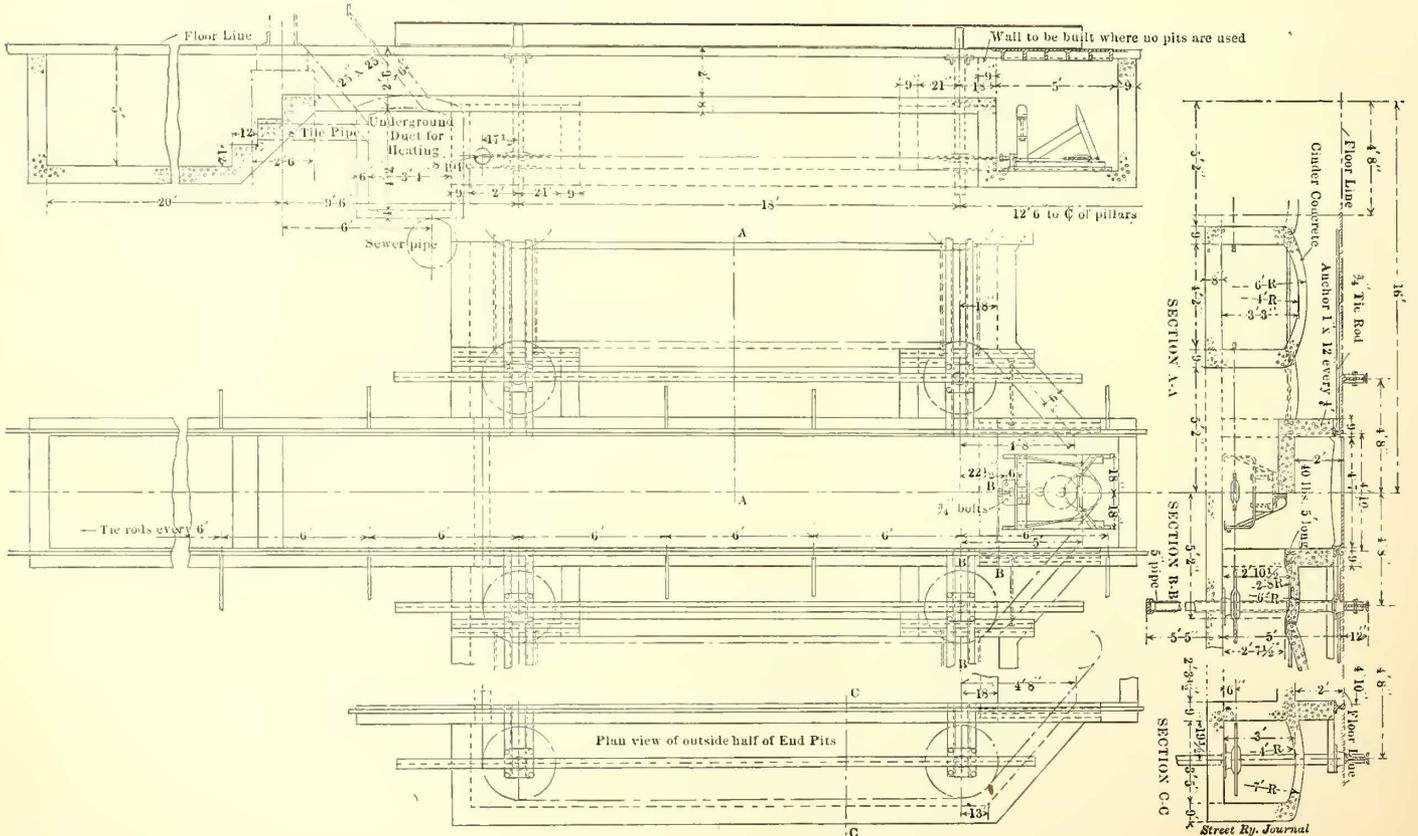


FIG. 3—ASSEMBLY AND PIT FOR ELECTRIC CAR HOIST

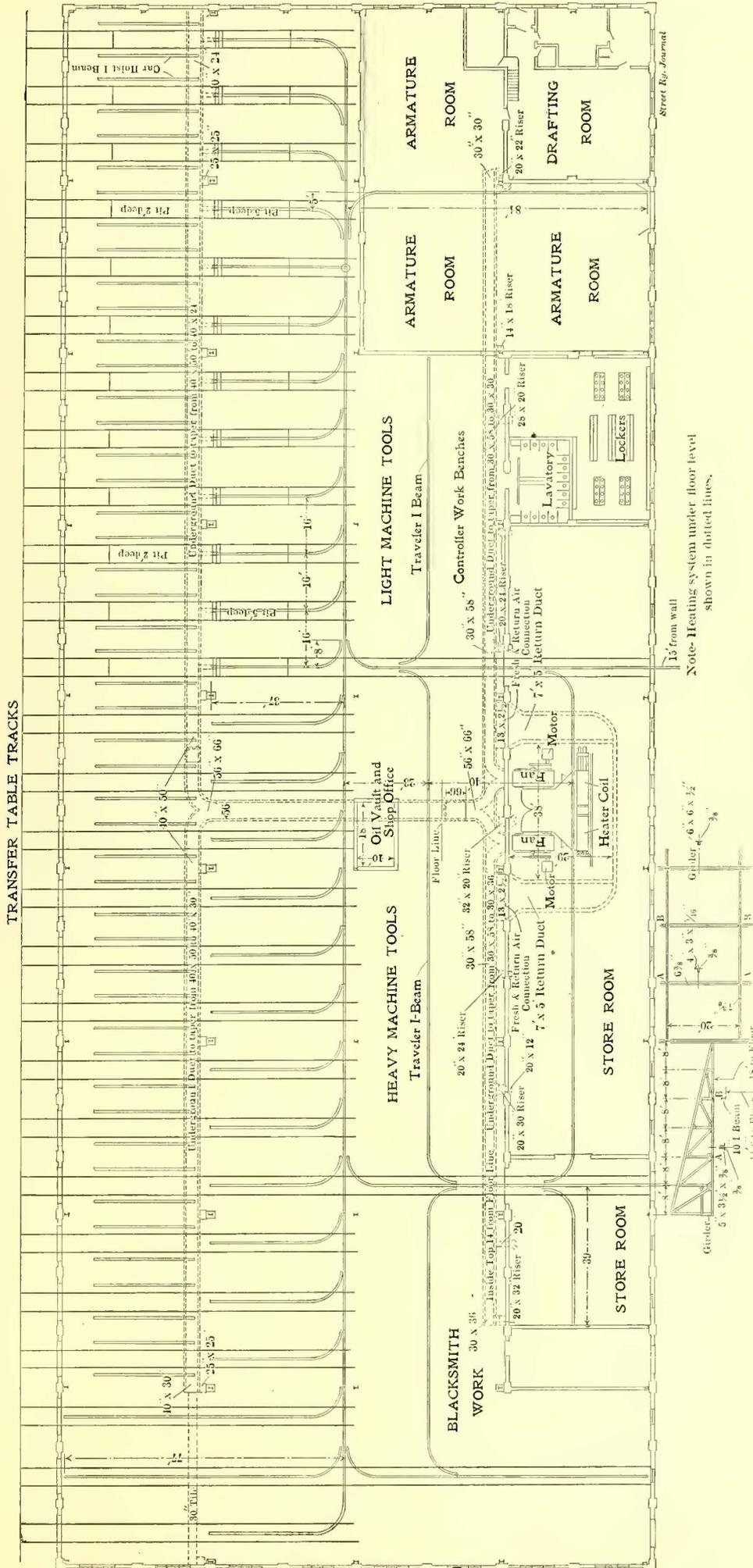


FIG. 2.-PLAN OF REPAIR SHOP

shown in Fig. 2. The eastern half of the building is occupied by twenty-seven repair tracks. The western half of the building has the blacksmith and machine shops, the store room, the armature room, the drafting room, general offices and toilet rooms. The blacksmith and machine shops are not partitioned off from the main part of the building containing the repair tracks. The armature room, store room, toilet rooms and offices, however, are divided from the balance of the building, as can be seen from the plan, Fig. 2. All of the floors are concrete. The total length of the building is 432 ft. The distance between track centers of the repair tracks is 16 ft. The repair tracks are 80 ft. long inside of the building, and the portion of the building now occupied by tracks is 80 ft. wide.

Adjoining the repair shop building on both sides are storage yards. In the rear, or west of the shops, are tracks which afford connection not only with the street railway lines but also with the steam railroads. As the street railway lines are not standard gage, a separate pair of steam tracks, parallel with the street railway tracks, are laid. These tracks are arranged so that unloading from the cars can be done onto platforms that connect with the store room and the shops adjoining. East of the shops, beyond the space occupied by the transfer table, is a storage yard for miscellaneous track material and also a sand drying plant.

CAR HOISTS AND TRAVELER SYSTEM

The feature that probably attracts the most attention on the part of the average street railway man is the new form of car hoist employed. It is similar in its general principles to a number of hoists installed in the Louisville Railway shops in 1896 by the gentlemen who now have charge of the St. Louis Transit Company's shops. While it is, therefore, not entirely new it has several improvements as compared with the Louisville hoists. This form of hoist is certainly worthy of greater prominence than has heretofore been given it.

The hoisting is done by means of four screw jacks, operated simultaneously by a sprocket chain driven by an electric motor. Fig. 3 shows a plan, end and side view of the arrangement. Figs. 4, 5 and 6 are views of the repair tracks,

both with and without pits, showing the application of this car-hoisting apparatus. On each side of the track, referring to the foregoing illustrations, is a 12-in. I-beam resting on

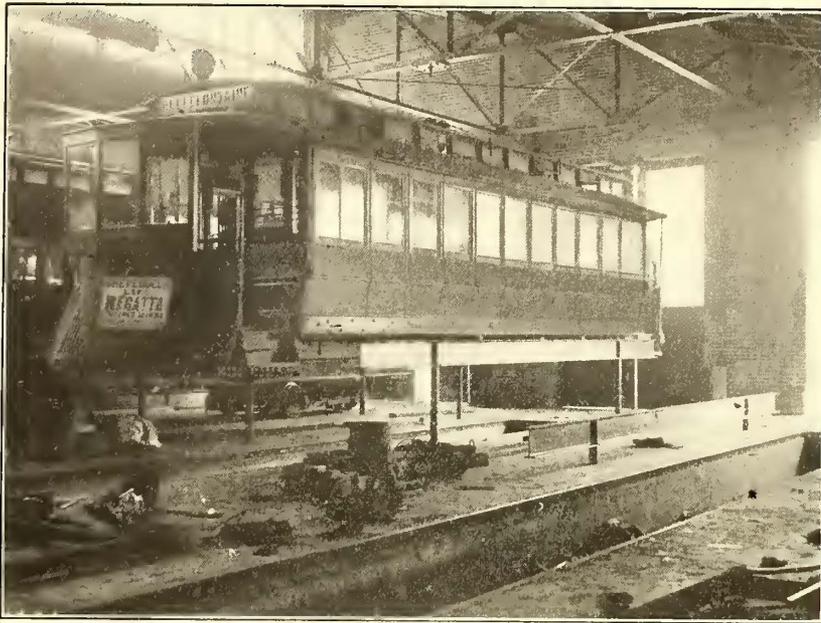


FIG. 4.—CAR ON HOIST OVER PIT TRACK

two pillars of 5-in. solid round steel. The lower end of these pillars is threaded to form the screw of the jack. The nut of the jack, which, when revolved, raises and lowers these pillars, is in the form of a sprocket wheel on which the sprocket chain runs, as shown in Fig. 3. To take the downward thrust of this nut a ball bearing is provided, since the four nuts of the hoist, when lifting the car body, must together support and turn under the full weight of the car body. The 5-in. bars or columns slide up and down in 5-in. pipe. They are slotted at the top, and the 12-in. I-beams rest in these slots, as seen in the cuts, Figs. 3, 4 and 6. The bottom flange of the I-beam is cut away for 5 ins., so that the web of the I-beam slides directly into the slot in the end of the bar. As the sprocket chain drives all four of the nuts simultaneously the I-beams on both of the tracks rise together. After hoisting a car it is necessary only to place an old rail or I-beam under each end of the car, resting upon the I-beams of the hoist, and to start the motor driving the hoist.

The motor used is an old Sprague railway motor with the double reduction gears just as they were used under the cars. It is placed with its shaft vertical, as shown in Fig. 7. It is in

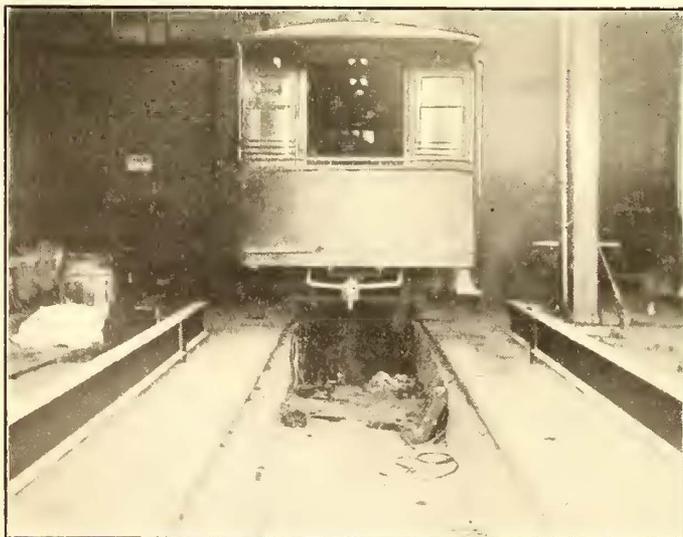


FIG. 6.—REPAIR TRACK, SHOWING HOIST AND DEEP AND SHALLOW PITS

use very little, and it was not thought necessary to provide any special thrust bearing on the armature shaft, as the usual collar on the armature shaft was sufficient to sustain its thrust.

The motor is mounted upon a frame, which can be slid along to tighten up the sprocket chain.

As shown in the general plan of the shops, Fig. 1, twenty-four of the repair tracks have car hoists and twelve have pits. The remaining fifteen tracks have no pits. The motors, sprocket chains and jacks are entirely below the level of the concrete floor. The motor in each case is placed between the tracks in a pit, which is covered over with plank, as shown at the far end of the pit, Fig. 8. Between tracks is a narrow tunnel, which accommodates the sprocket chains of the hoists of the two adjoining tracks. The dimensions and details of construction are all fully given on the drawings, Fig. 3, so that further explanation of them is not necessary.

One of the first questions which would naturally be asked in connection with this new form of hoist is as to its cost as compared with hydraulic jacks for performing the same work. In selecting this type of hoist, however, the management of the St. Louis Transit Company did not consider this feature a controlling one, because it believed this

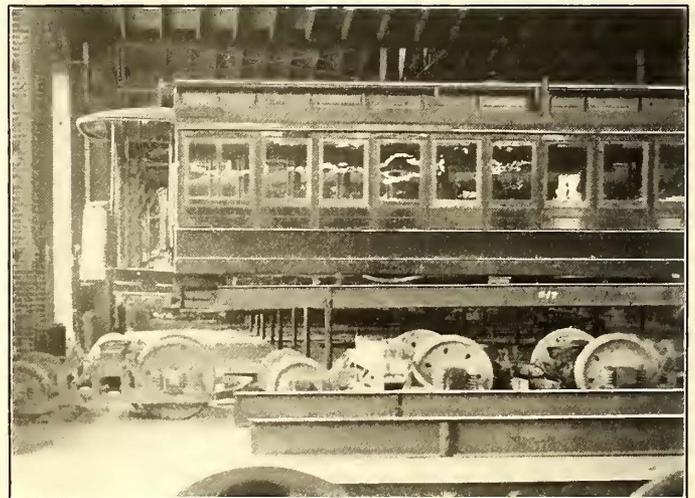


FIG. 5.—CAR ON HOIST, SHOWING LOCATION OF HOIST CONTROLLERS

form of hoist to be so much superior to hydraulic jacks or chain-block hoists in point of safety as to make the latter out of the question. Some personal experience with the breaking of chain blocks when used as hoists for car bodies led the management to give very earnest consideration to the question of safety. It is believed that this screw-jack hoist is as nearly absolutely safe as any hoist can be made. In fact, the liability of accident with it is practically nil. The car body when hoisted is supported on four solid columns of 5-in. round steel. These columns are supported at the floor surface and at the nut 5 ft. below the floor when the car is hoisted. The car body could not fall without bending at least two of these 5-in. columns. Another strong point in connection with this hoist is that while it is fully as rapid as the hydraulic or pneumatic hoist, there is no possibility that the car body will be wrenched through the hoisting of one corner higher than another, as the four jacks must necessarily act in unison, as they are driven from the same sprocket chain. Each hoisting motor is controlled by a type-K controller, located between the entrance doors adjoining the repair track under which the motor is located. The location of these controllers can be seen in Fig. 5.

shop has a comparatively low roof, as it was unnecessary to provide a great deal of head room.

It is interesting to compare the method of conveying material which has been adopted in this shop with that used in some

not be taken any great distance from their home track, because of their air-hose connection with the compressed air system. For conveying material any considerable distance on the main line track, chain block hoists are used; but it is not necessary in most cases to do any hoisting with these chain blocks, as the load can be transferred to or from them by a pneumatic hoist, so that all the raising and lowering can be done by the pneumatic hoist on the siding at which the material is to be handled. The overhead traveler system is designed to carry a load of 6000 lbs. at any point.

TRANSFER TABLES

Next after the interior arrangements for hoisting and conveying, the transfer tables which operate along the tracks in front of the building are of interest. These

transfer tables are shown in Figs. 1 and 15. Instead of having the trolley wire which furnishes power to operate the transfer table underneath the table, as has frequently been done, the table derives its power from an overhead trolley wire which runs parallel with the front of the building. This wire is supported on the ends of channel-irons, Fig. 16. These channel-irons are used instead of trolley wires for supplying current for the cars as they are run into the building. The channel-irons are of sufficient width to serve as a trough for the trolley wheels. The trolley wires which serve the transfer table are supported on the ends of these channel-iron troughs. Two trolley wheels, mounted on the overhead framework of the transfer table, ride on top of this trolley wire, as seen in Fig. 15. These trolley wheels supply current not only for the operation of the transfer table but for moving the cars when they are on the transfer table. By having the channel-iron troughs instead of trolley wire, where the cars leave the transfer table, there is but little danger from trolleys leaving the conductor, as they are guided by a frog into the end of the channel-iron trough. The channel-

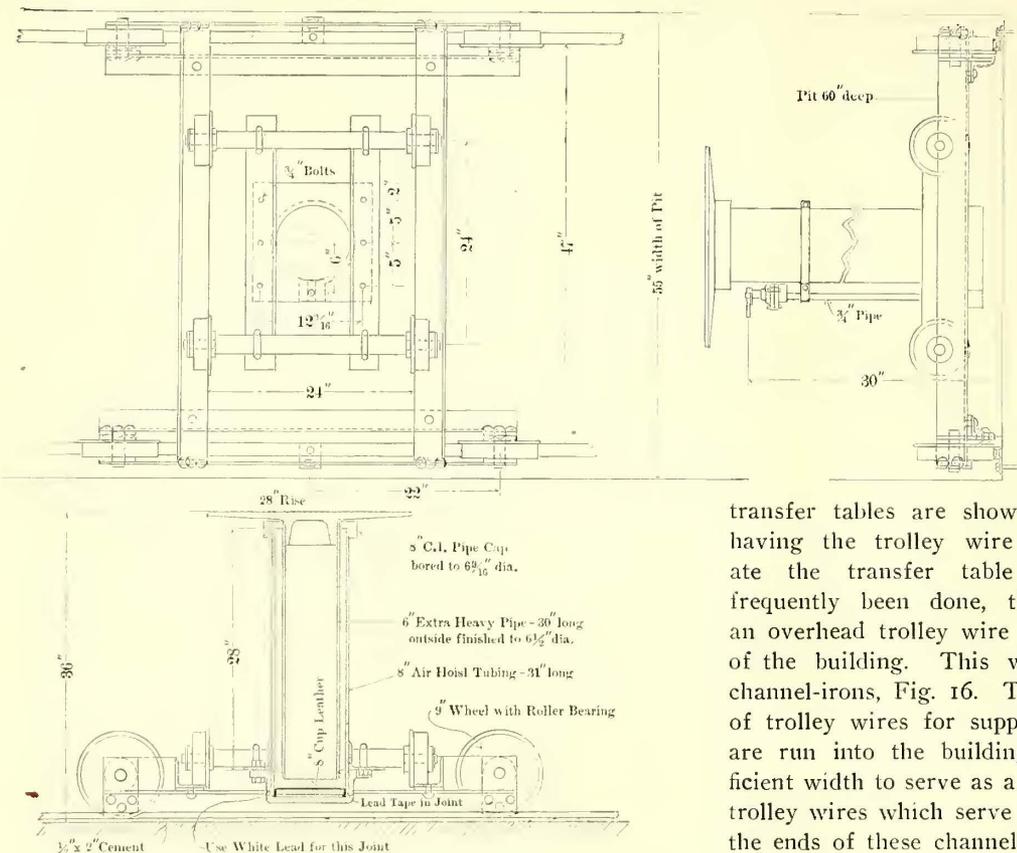


FIG. 9.—ASSEMBLY OF AIR-PIT HOIST

others, of having a large overhead traveling crane spanning that portion of the shop in which the heavy material is to be handled. If a system of overhead traveling cranes had been installed in this shop it would, of course, have called for an entirely different plan of building. Such a system was not considered, however, because the management did not think it would be feasible with it to handle as many pieces of heavy apparatus at one time as is sometimes necessary in such a large shop having so many repair tracks. With the traveler system which has been installed men can be handling and hoisting motors, wheels and armatures in many different places at one time without waiting for the services of one or two large traveling cranes. All the overhead travelers located on the sidings which serve the repair tracks are equipped with pneumatic hoists, as can be seen from Figs. 10, 11 and 12, and the same is true of the travelers in the vicinity of the machine tools. Of course, these pneumatic travelers can-

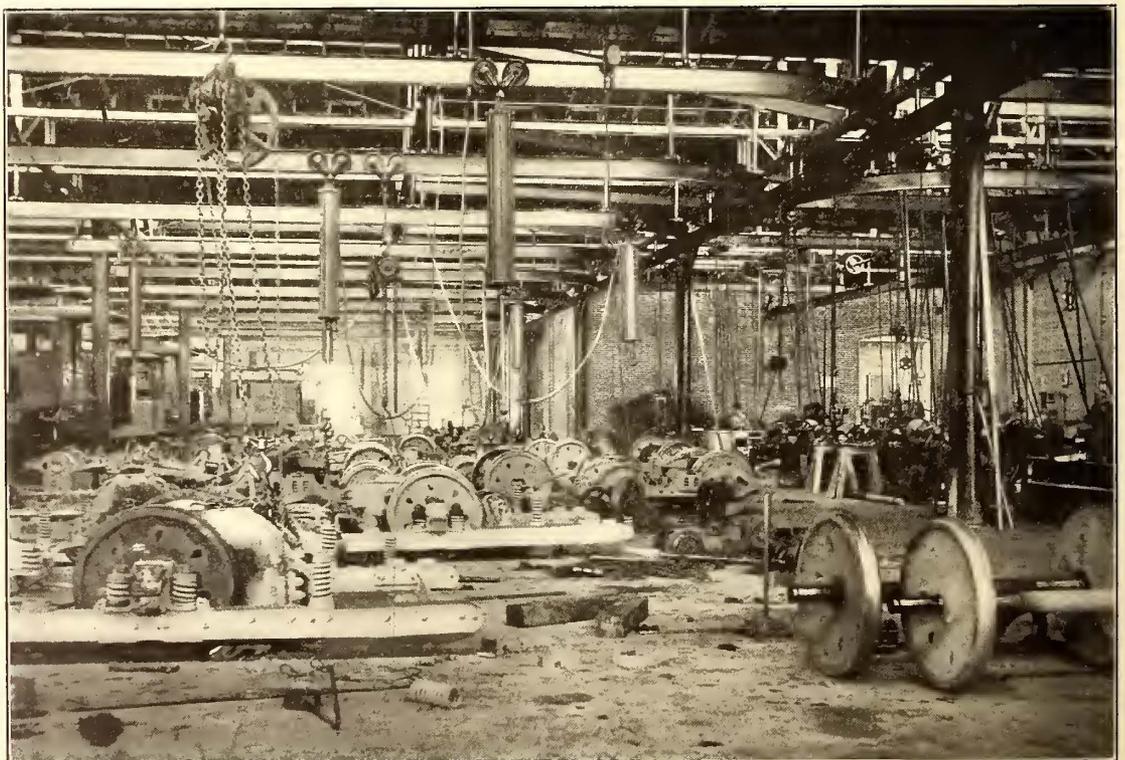


FIG. 10.—OVERHEAD TRAVELER SYSTEM, SHOWING GENERAL ARRANGEMENT OF SHOP

iron trough extends a short distance inside of the building, and is there connected to the regular trolley wire, which extends part of the length of the repair tracks. Two transfer tables are used to serve the twenty-seven repair tracks. The cars can be run onto the transfer tables from entrance yards at either end of the repair shop.

ARMATURE WINDING AND TESTING

The St. Louis Transit Company has for several years maintained an unusually well-equipped winding department. Special machinery and forms for winding were developed several years ago. This machinery was fully described and illustrated in the *STREET RAILWAY JOURNAL* of July 6, 1901. The princi-

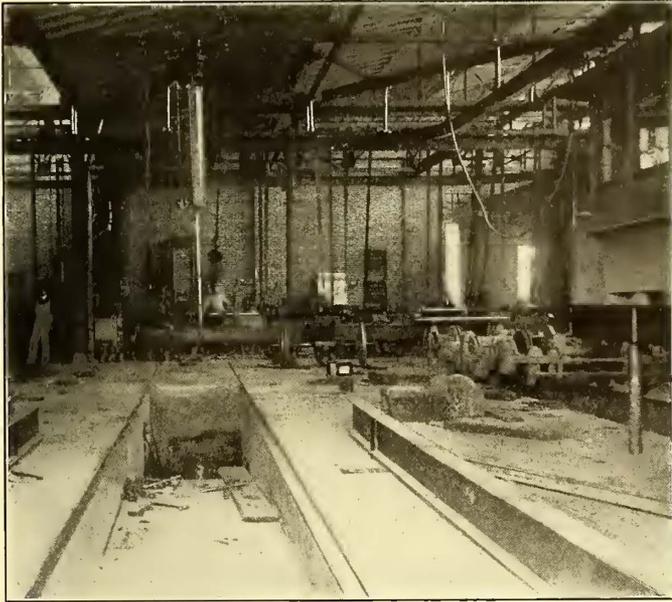


FIG. 11.—AIR HOIST ON TRAVELER OVER REPAIR TRACK

pal change in coil winding introduced since that article has been the placing of some of the armature coil forms in a machine more easily manipulated. Some of these machines are illustrated in Fig. 17. The forms are mounted on a spindle, about the level of the operator's shoulders, and are revolved

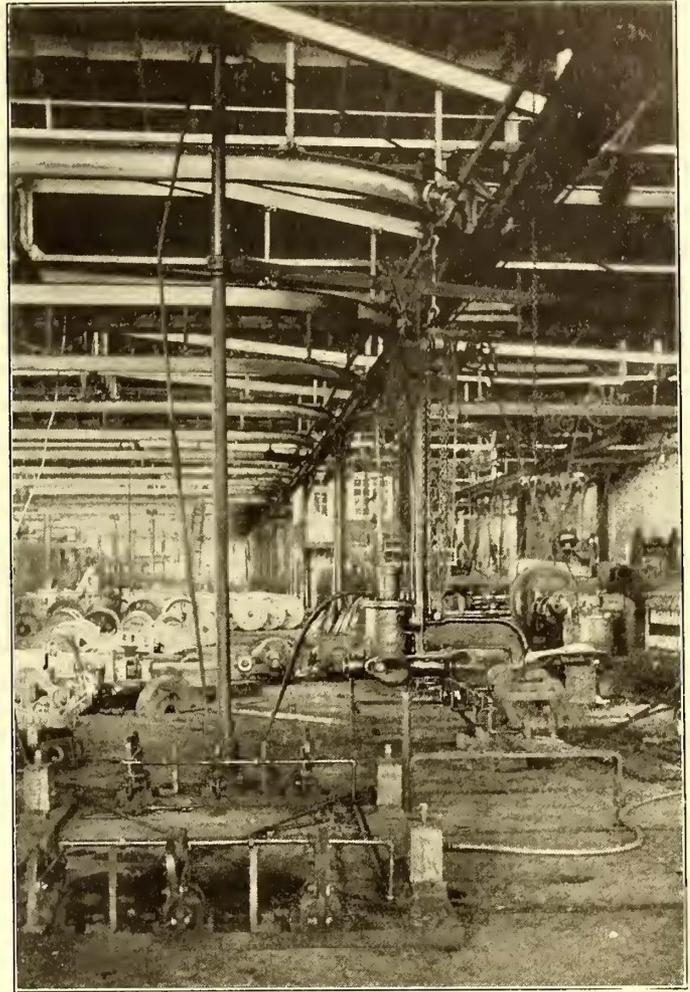


FIG. 13.—TRAVELER SYSTEM, PNEUMATIC RIVETER AND ASSEMBLER

by power from a line shaft which is controlled by a foot lever. After coils are wound they are hung in rows on long sticks to dry, and after a time are taken to drying ovens located along one side of the armature room, where they are hung on racks, as in Fig. 18. These ovens are heated by electricity. They are adapted to receive

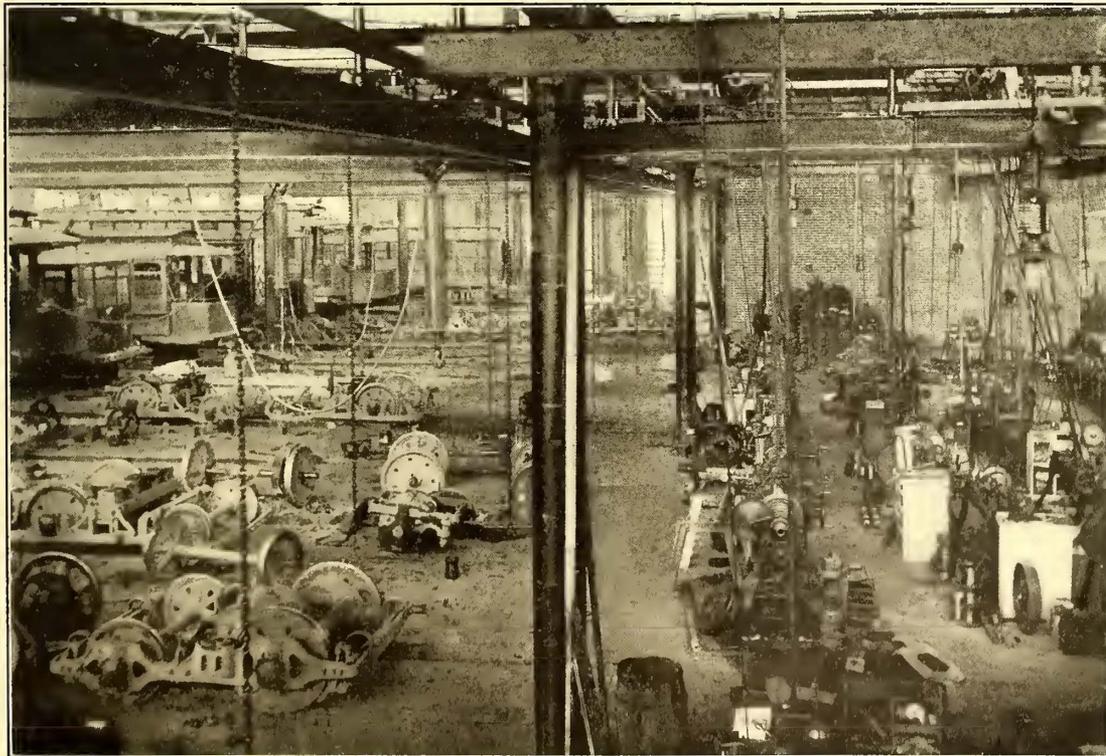


FIG. 12.—GENERAL VIEW OF MACHINE SHOP AND REPAIR TRACKS

either racks containing individual coils or completed armatures. The hooks in the top of the oven from which coils or armatures are hung are mounted on rollers, so that they can be pulled out from the oven, as shown in Fig. 18. As mentioned before, a crane of 2000 lbs. capacity spans that part of the armature room devoted to armature winding and testing. For moving the armatures about the shop two kinds of armature trucks are used. One is a derrick mounted upon a four-wheel truck, seen in Fig. 19, and the other is a smaller truck upon which the armature rests in bearings, and

illustrated in Fig. 20. There is a large number of these smaller trucks. As an armature is free to turn on the bearings when carried on such a truck, the transformer test can be easily



FIG. 14.—BLACKSMITH SHOP

applied to it without removing it from this truck, and, in fact, the armature can be turned over for any kind of inspection

The transformer test is used for locating short-circuited armature and field coils. In Fig. 20 is shown an armature undergoing the transformer test for defective coils. This armature is mounted on one of the small shop trucks previously mentioned. The small transformer coil and core which is used in making the tests can be raised or lowered at will. When a test is to be made the armature is run under the transformer, and the transformer, which is hung on a pulley, is lowered so that its poles bear directly on the surface of the armature. The switch controlling the alternating-current supply to the transformer coil is within easy reach of the tester. When alternating current is turned into the transformer coil and there is a short-circuited coil on that portion of the armature

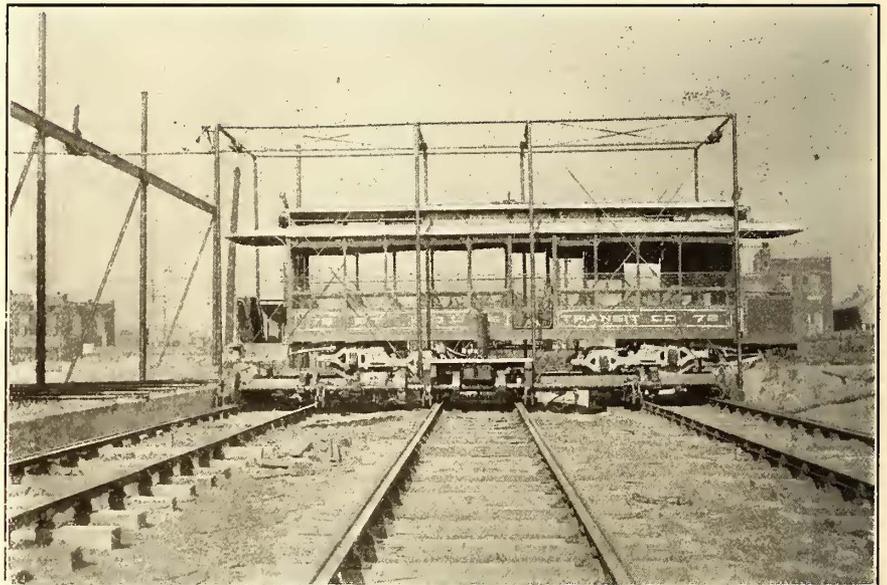


FIG. 15.—TRANSFER TABLE, WITH OVERHEAD TROLLEY

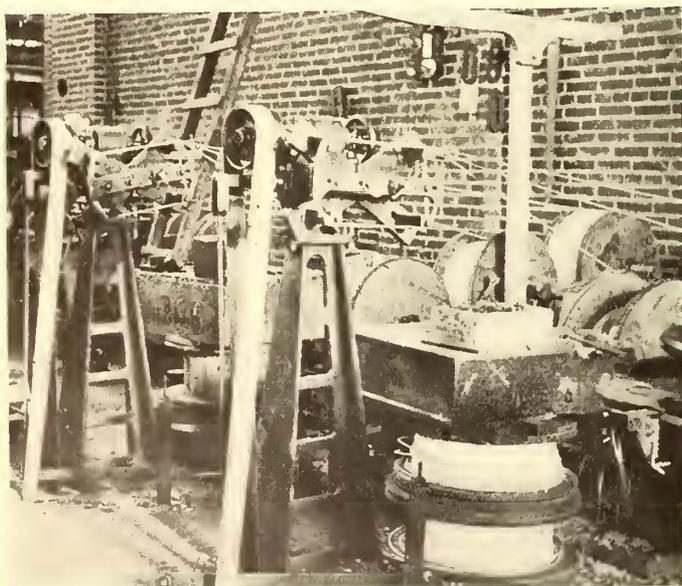


FIG. 17.—ARMATURE-COIL WINDING MACHINES

enclosed between the pole pieces of the transformer, its presence will be made known by the vibration which it will cause in a piece of light sheet-iron held in the hand of the tester 90 degs. from that portion of the short-circuited coil which is between the poles of the testing transformer. The tester turns on current and "feels" for short circuits with his piece of sheet-iron, as shown in Fig. 20. After he has "felt" of the coils which come under the pole pieces with one setting of the transformer, current is turned off and another section of the armature brought under the transformer for test. The short-circuited coils, of course, act as closed circuit secondaries of the transformer, and in time their presence would be made known by their heating under test, but the vibration test with the piece of sheet-iron has been found sufficiently reliable, and is, of course, much quicker. The principles upon which this transformer test depends, and another form of testing transformers, were described on page 743 of the *STREET RAILWAY JOURNAL* of Nov. 1, 1902. The present method of coil testing, as used at the Baltimore shops, was described briefly in the *STREET RAILWAY JOURNAL* of April 4, 1903, and later in the paper by H. H. Adams, of Baltimore, read before the American Railway Mechanical and Electrical Association, printed in the Sept. 5 issue of this paper.

Alternating current is derived from a small motor generator set which supplies 125-cycle, 360-volt alternating current to a

static transformer, which reduces the voltage to one that is safe to handle for general testing purposes.

The transformer for testing field coils is shown in Fig. 21. By this transformer even a single convolution on a short-circuited coil is instantly made known, not only by the sound the transformer makes, which is considerably deadened, but by the reduced voltage across the terminals of the coil that is being tested. In practice this variation is indicated by the lighting of an incandescent lamp. It is intended, however, to put an ammeter near the transformer in the transformer circuit, so that the presence of short-circuited coils or of higher resistance, short circuits will be detected by the ammeter.

After armatures are wound they are tested by actually running in motor frames with a load imposed by a Prony brake. Testing frames are shown in Fig. 19. There is one frame with motor case and fields for each of the principal motors used by the company. Extensive use has been made of a plan of re-insulating the field coils of Westinghouse No. 56 motors, as described in the article on the Baltimore shops in the *STREET RAILWAY JOURNAL* of April 4, 1903, and also in the paper by H. H. Adams, of the United Railways & Electric Company, of

Baltimore, which was read before the last convention of the American Railway, Mechanical and Electrical Association. This method was adopted by the St. Louis Transit Company

TRUCK MANUFACTURE

The company is now making 900 swivel trucks of the Dupont type, to go under 450 new cars. The shop methods in the



FIG. 16.—TROLLEY WIRE AND CHANNEL-IRON CONDUCTORS AT FRONT OF SHOP



FIG. 20.—TESTING FOR SHORT-CIRCUITED COILS WITH TRANSFORMER

immediately after its appearance in the STREET RAILWAY JOURNAL, and it has been in use ever since. The field coils of this motor are of very heavy wire, and are curved in a form, so that it would be very difficult to repair them by any of the well-known processes of reinsulating and rewinding wire. The Baltimore plan is to separate slightly the convolutions of the

manufacture of this truck have been carried to a high degree of perfection. As many trucks of one kind were to be made, the shop management could afford to give a great deal of study to labor-saving methods. The Dupont truck is a comparatively simple one to manufacture, as can be seen from Fig. 22, which shows a sample of the Dupont trucks the company is now able to turn out at the rate of ten a day. The frame of this truck consists of four pieces of bar steel, bent to the proper shape, and riveted together at the ends. These bars composing the truck frame are first cut to the proper length, and the rivet holes are then punched according to a templet. The templet used was described on page 843 of the STREET RAILWAY JOURNAL of June 6, 1903. Its peculiarity consists in having beveled holes for the punch to enter. That is, the top of the

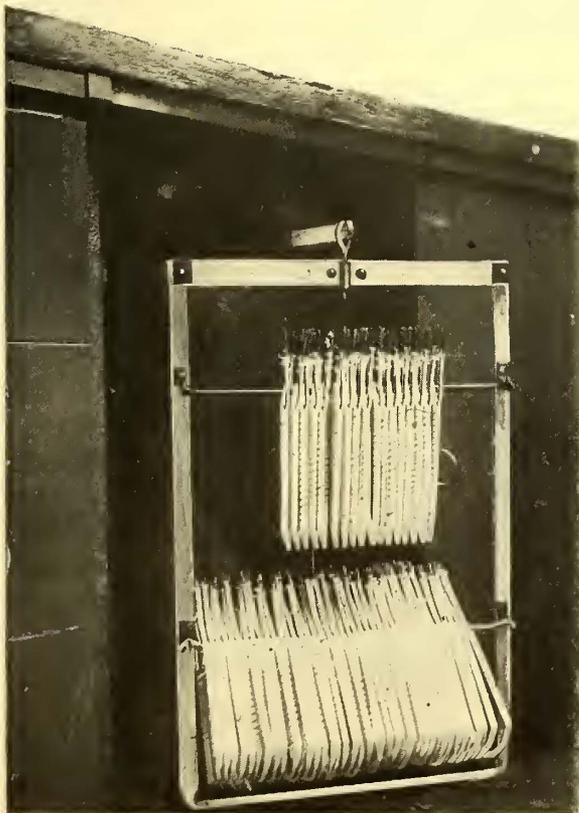


FIG. 18.—COILS ON RACK IN FRONT OF OVEN

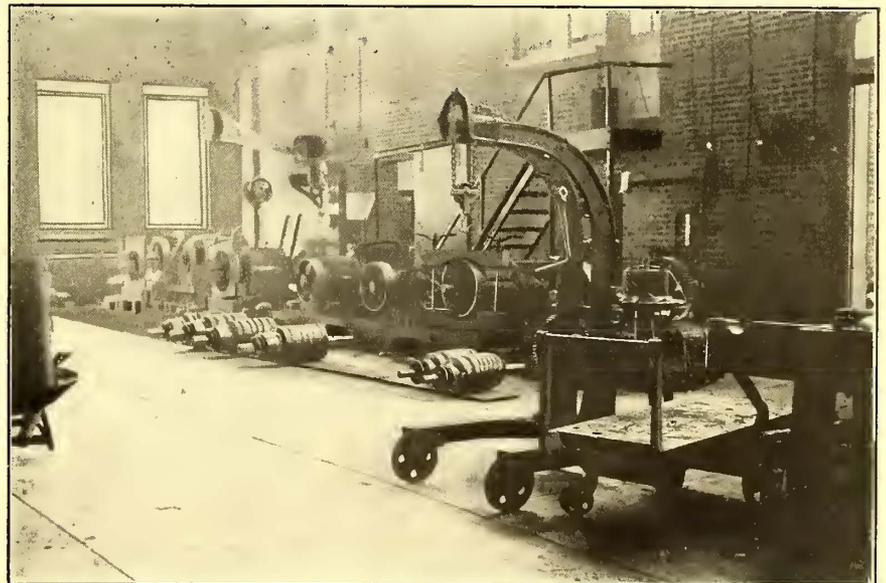


FIG. 19.—MOTOR-TESTING RACKS AND ARMATURE DERRICK TRUCK

coil, keeping them hung on a long rack. Cheap labor is employed to scrape off the burned insulation, and tape is wrapped on by hand without disturbing the general form of the convolutions, which are later bunched together in their original shape.

hole in the templet where the punch enters is considerably larger than the bottom, so that the punch of itself finds the proper position. It would, of course, be next to impossible to do rapid punching with a templet having holes the same size as the punch, the entire thickness of the templet, as it would

be necessary to get the templet exactly under the punch before making a stroke. As it is, the punching can be done very rapidly and accurately, and is much cheaper than drilling.

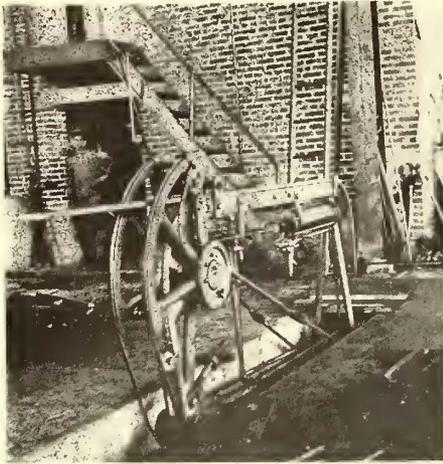


FIG. 23.—PNEUMATIC BENDING MACHINE FOR TRUCK FRAMES

After these bars for the frame are punched they are bent to the proper shape. This bending is done cold, in a special pneumatic bending machine, shown in Fig. 23, where one of the bars is shown in the machine ready to be bent.

An air cylinder in the base of the machine, operating through wire cables, draws a roller down over the proper segment of a circle to accomplish the proper bending of the bar. As there is a slight difference in the elasticity of different bars the exact amount of deflection of the end of the bar can be adjusted by a screw, and if the bar does not bend to the proper angle at first trial, the angle can be increased at a second or third trial. The cylinder seen in Fig. 23 is for making the return stroke after bending. The bending proper takes only one or two seconds, as the compressed air cylinder draws the bar down very promptly. The principal time is taken in putting bars in and out of the machine.

Before being bent these bars are straightened, and the fins taken off from the punch holes by a large steam hammer



FIG. 21.—TRANSFORMER FOR TESTING FIELD COILS

driven by compressed air. This straightening and general truing up of the bars is an operation which probably consumes more time in proportion to the visible results accomplished

than any other in connection with truck manufacture as this company carries it on. Most of the small parts, fillers and other fittings of the truck, are of cast-steel. There are a few parts, however, such as motor suspension rods and bolster fastenings, which are made up from bar-steel on a bulldozer. Every piece bent on the bulldozer which goes into the truck is, however, bent in one operation. Some very ingenious templets have been devised to do this. In connection with cast-steel fittings it is to be noted that cast-steel brake beams are being used on these new trucks, and it is stated that cast-steel beams weighing 71 lbs. are stronger than 115-lb. wrought-iron beams previously used, and, everything considered, cheaper. After all the truck parts are ready for assembly the truck is riveted together with hot rivets by means of a pneumatic riveter, as shown in Figs. 13, 24 and 25. This pneumatic riveter is not a hammer, as many would suppose from its name, but is simply a pneumatic

press capable of exerting sufficient pressure on a hot rivet to upset the end of the rivet and compress the whole rivet so that there is no possible chance for a loose fit. This riveter is swung

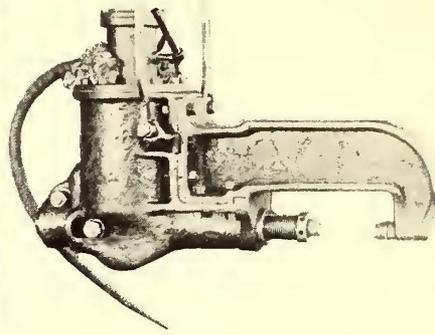


FIG. 24.—PNEUMATIC RIVETER

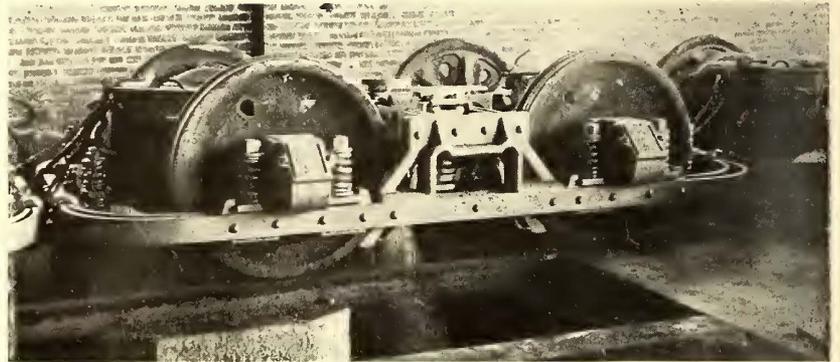


FIG. 22.—DUPONT TRUCK

on a small derrick with a vertical shaft, as seen in Fig. 13, so that it can be placed anywhere desired within the radius of the derrick.

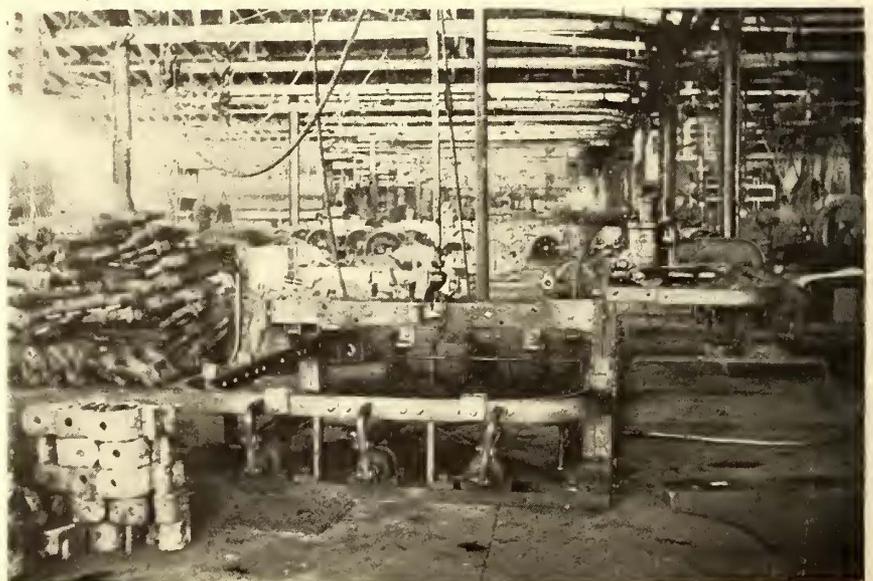


FIG. 25.—PNEUMATIC ASSEMBLERS AND RIVETER

In assembling the truck frames a pneumatic assembler is used to hold together the parts of the truck frame during riveting. This assembler is shown in Figs. 13 and 25, and it con-

sists of a number of pneumatic cylinders operating clamps, which can be quickly set to clamp the truck frame at a number of points while it is being riveted. The advantage of the pneumatic clamp is, of course, the rapidity of operation, as it would require many times as long to tighten up the screw clamps as it does to set the pneumatic clamps. Two sets of clamps or assemblers are used in riveting together a truck frame. Figs. 22 and 25 are views of truck frames and parts in various stages of construction. The extensive scale on which this company has gone into truck manufacture and the number of special templets and machines required to do this work cheaply might seem at first to call for rather large investment; but it was considered that if this special apparatus for making various parts was not built this year it would have to be built later to supply and repair parts, and that it would be amply justified now, not only on account of the reduction that it would effect in the first cost of trucks, but because of its use in later

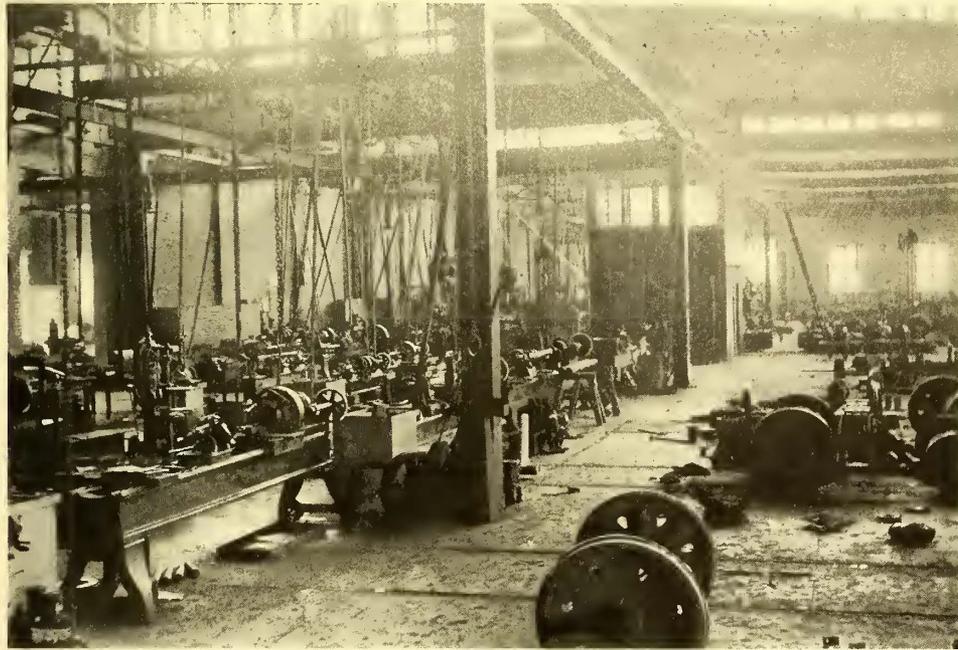


FIG. 26.—MACHINE SHOP, OIL VAULT AND SHOP OFFICE

years. The bulldozers, punches, shears, cutters, milling machine and steam hammer would be necessary for a complete shop equipment in any event. The principal special investment has been in the way of templets and the pneumatic machine for the cold bending of truck frames, so that, after all, it is not high considering the saving.

GENERAL SHOP METHODS

The company makes its own bolts and nuts from the bar stock, as it figures that it can make them cheaper than it can buy them.

No brass foundry is maintained, as a very satisfactory contract has been made with a local brass foundry, whereby the brass foundry supplies the company with all of its brass castings, taking payment in scrap brass and copper. The price of the new brass castings and the price of the scrap brass and copper are fixed by contract, and it is, therefore, immaterial to both parties to the contract what the market fluctuations in the metals may be, and the foundry can figure on a definite margin for its work. In this way, probably a more advantageous contract is obtained than could be obtained from a brass foundry which must figure on fluctuations in the price of metals. The street railway company, of course, always has sufficient scrap copper and brass to pay for what new brass it requires.

Most of the smaller machine tools are driven from line shafting. A few of the larger machines are driven by individual motors, through the medium of silent chain. Both the

Renold and the Morse silent chains have been used with satisfaction.

In the main it has been found most satisfactory to teach new men how to perform certain operations and keep them steadily at that work, than to hire general machinists, who know a little of everything and not much of any one thing.

HEATING SYSTEM

In a vault underneath the store room is a large bank of steam coils supplied from the power house across the street. The air is forced from these steam coils to the various parts of the shop by motor-driven fans. The hot-air ducts are all in tunnels under the concrete floor, indicated in the plan, Fig. 2, as it was desirable to leave the room overhead clear of hot-air pipes, because of light and the presence of the traveler system in all parts of the shop. The hot-air tunnels come to surface near pillars, and galvanized iron piping alongside of the pillars carry hot-air up a short distance and discharge it downward at an angle of about 45 degs.

TOILET ROOMS

In the toilet rooms enameled wash bowls on light iron supports, with open plumbing, are located in the center of the room, and expanded metal lockers for the workmen are ranged around the walls.

OIL VAULT AND SHOP OFFICE

In the center of the shop, as seen in Fig. 26, is a vault for the storage of oil. On top of this vault is an office overlooking the entire shop.

THE SUBWAY HABIT

Even the staid "New York Times" occasionally wanders into the realms of contemplation so aptly described by Prior. And when it does, no matter what the theme, some pert remarks are always sure to be made. Peering into

the future the "Times" seems to see looming up what it terms "the subway habit." It says that within a few weeks, when the first section of New York's great underground system is opened for traffic, the habit will be contracted of regularly using the subway to the exclusion of other means of transportation. Commenting on the possibilities of the habit becoming chronic, the "Times" expresses the belief that the daily flight of the citizen from his office in the extreme southern end of the city to his home in Harlem or the Bronx, will eventually result in an unfamiliarity with the intervening territory as gross as the ignorance of "the most typical Reuben, who come to town at infrequent intervals to see the sights and give substantial encouragement to the gold-brick industry." As a corrective of this tendency the suggestion is offered that the citizen occasionally deny himself the privilege of rapid transit underground between walls of concrete, and take the time needed to traverse the city by elevated and surface lines. It is also suggested to the citizen that when there is a holiday the time be employed in familiarizing himself with the city, instead of rushing to the country.

The first report of the Underground Electric Railways Company shows that the company received up to June 30 cash £6,519,672, spent £5,600,222, leaving a balance of £919,450 cash in the bank and in call loans. The company has sold £6,999,931 of profit-sharing notes. Chairman Yerkes says that the total amount of capital required to complete the work is assured.

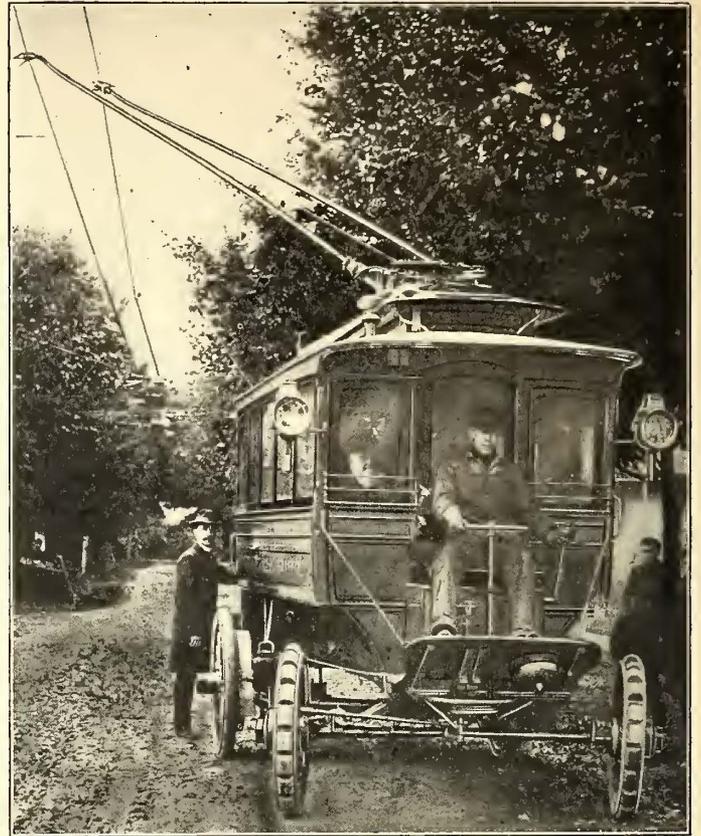
TRACKLESS TROLLEY IN SCRANTON

Active interest in trackless trolleys has been revived by the demonstrations on an experimental line recently constructed at Scranton, Pa., where a large number of interested spectators witnessed the operation of the road on Monday, Nov. 2.

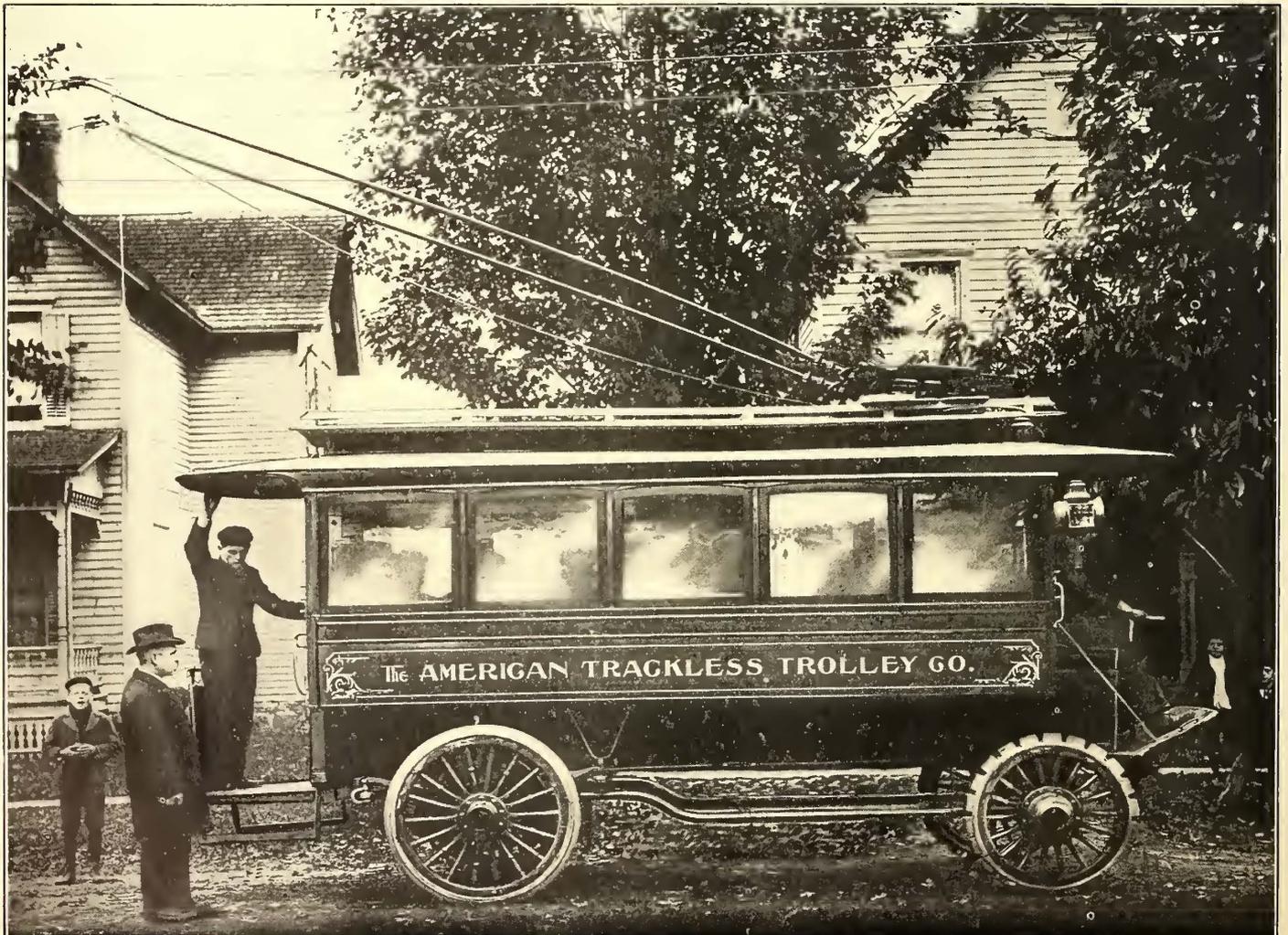
The line, 800 ft. in length, was run over private property, and the ground traversed by the coach was neither smooth nor hard, but exhibited conditions such as would be met with on many country roads. Nevertheless, the progress of the coach, ease of manipulation and comfort in riding were all that could be desired.

In outward appearance, as indicated by the engravings on this page, which are reproductions of photographs of the present equipment, the trolley coach resembles an omnibus, having a trolley-car platform, with step on either side, at the rear, and a seat for the motorman in the front. The steering gear, current controller, brake mechanism, motors and driving gear with which the coach is at present equipped, are similar to those in use on automobiles, but inasmuch as they are to be replaced by electrical railway apparatus of standard make they will not be described here.

Briefly stated, the object sought is to provide means whereby passenger coaches might be propelled through the streets, without the use of tracks, by means of electric current furnished from a main generating station, and continuously supplied to the motors on the coach truck through feed and return wires run above the coach. The trolley is designed to permit the coach to turn out a distance of 15 ft. to either side of the road, and thus to avoid interfering with either light or heavy traffic. At the same time it will enable the motorman to thread



FRONT VIEW OF TRACKLESS TROLLEY 'BUS, SHOWING STEERING GEAR



TRACKLESS TROLLEY OMNIBUS

his way through congested thoroughfares crowded with all kinds of vehicles as readily as could be done with any other type of ordinary conveyance.

The mechanical design and construction features of the system are illustrated in detail in the accompanying drawings. The essential feature of the system lies in the use of a double

The trolley wheels are prevented from slipping off the wires while the coach is in motion by the guides or guards (d), whose shape is clearly indicated by Fig. 3, which also illustrates how the guards serve to guide the trolley wheel of the coach traveling in an opposite direction. One of the guards in such a contingency, it will be noticed, serves as a curved track

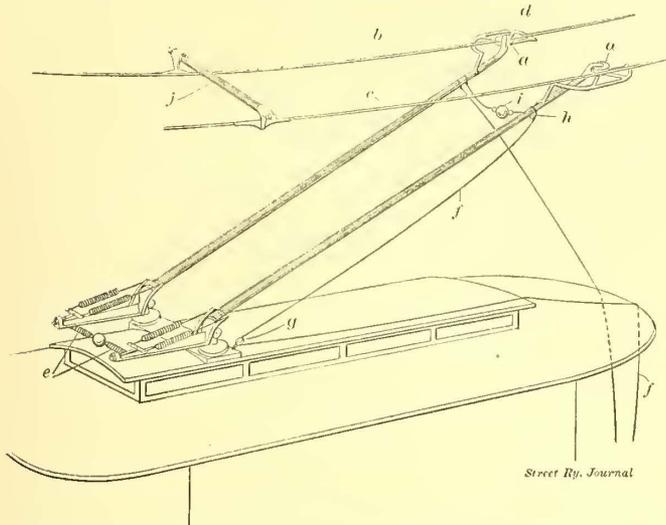


FIG. 1.—PERSPECTIVE OF TROLLEY POLES, SHOWING ARRANGEMENTS FOR HOLDING WHEELS IN CONTACT WITH FEED WIRES, SPREADING THE LATTER, AND TROLLEY WHEEL DISENGAGING DEVICE

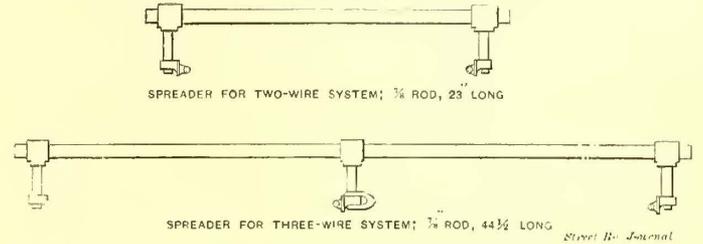
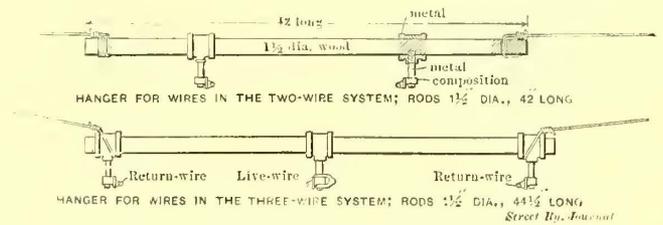


FIG. 4.—OVERHEAD FIXTURES



FIGS. 4-a AND 4-b.—TWO STYLES OF HANGERS

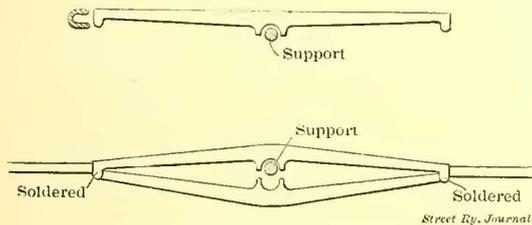
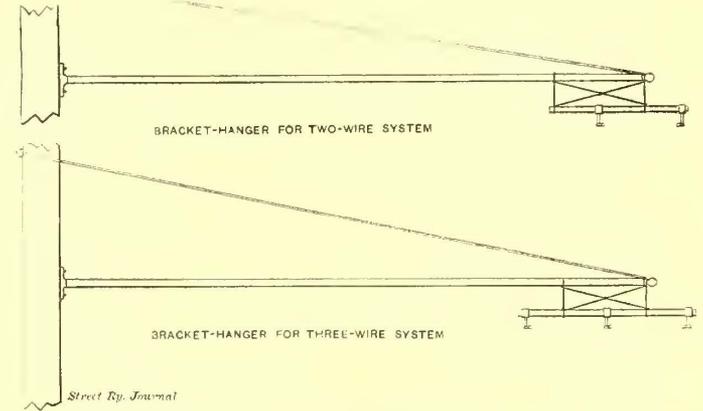


FIG. 5.—HANGER SUPPORT



FIGS. 4-c AND 4-d.—BRACKET HANGERS

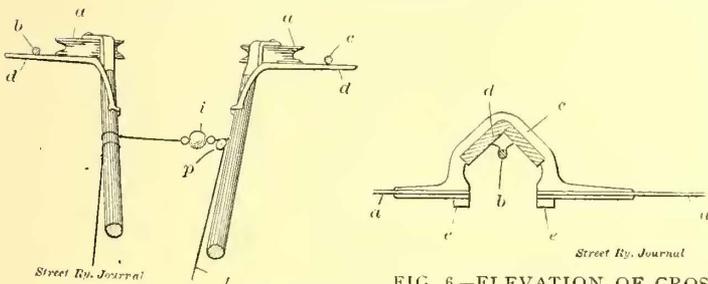


FIG. 2.—PERSPECTIVE ELEVATION OF TROLLEY WHEELS AND ATTACHED GUIDES

FIG. 6.—ELEVATION OF CROSS OVER BRACKET

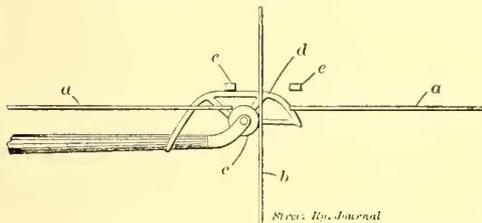


FIG. 7.—BRIDGING GAPS AT CROSS-OVERS FOR UNDER-RUNNING TROLLEY LINES

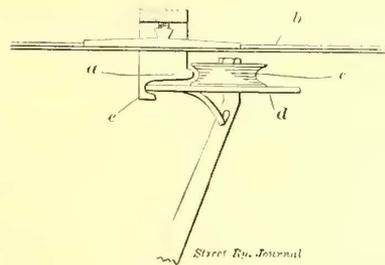


FIG. 8.—GUIDING TROLLEY WHEEL ACROSS GAPS

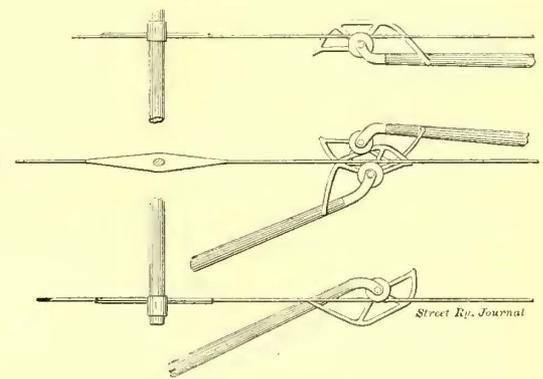


FIG. 3.—PLAN OF THREE-WIRE SYSTEM

trolley having two horizontally disposed trolley wheels (a a), as shown diagrammatically in Figs. 1 and 2, that are held in contact with the feed and return trolley wires (b c) by the lateral separating pull exerted by the insulated spring (e) attached to the trolley pole bases. The trolley poles are pivotally mounted to permit the coach to move freely from one side of the street to the other, and they also have a vertical swing of from 18 ins. to 24 ins., to provide for any unevenness in the contour of the road.

over which the wheel of the other trolley passes to the wire without jumping off. Both guides are beneath the wire, even though both trolley wheels might not be in contact with the wire at the moment of passing.

Engagement of the trolley wheels with the feed wires, or withdrawal therefrom, is effected by means of the rope (f), Fig. 1, by which the trolley poles may be drawn toward each other. The rope is passed through two pulley blocks (g and h), Fig. 1, to a ball insulator (i), and thence to the other trolley pole.

The ball insulator serves the double purpose of preventing a short circuit and of limiting the distance between the trolley wheels when drawn toward each other by the rope. The degree of limitation is relatively shown in Fig. 2. The trolley wheels take a position only a short distance away from the wheel flanges, with the guards under the wires. By drawing the trolley poles toward each other and then swinging them by means of the rope to the proper position beneath the trolley wires, and allowing them to rise until the guards come in

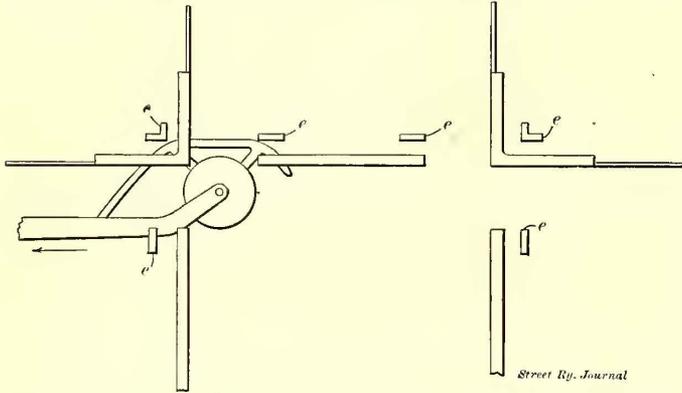


FIG. 9.—ARRANGEMENT OF GAPS FOR WIRES OF TWO SIDE-RUNNING TROLLEYS

contact with the wires, as in Fig. 2, the wheels, on releasing the rope, instantly spring apart into contact with the feed wires.

For the purpose of keeping the two trolley wires the same distance apart throughout their length, side engagement spreaders (j), Fig. 1, are used. These consist of composition metal side hangers insulated by the circular paraffined wooden bars or rods, to which they are attached.

Coaches traveling in opposite directions may pass each other without removing the trolleys when the three-wire system, illustrated by Fig. 3, is used. In this arrangement the central or third wire serves as a common feed wire, the two outer wires being for the return current.

The spreader and hanger used with the three-wire system are shown in Fig. 4a and Fig. 4b, respectively. The hangers for the outer wires are of the side engagement type, as with the two-wire system illustrated by Fig. 4b, but the hanger for the center wire is made somewhat like a dart, as indicated in Fig. 3, in order to prevent the trolley wheel flange from coming in contact with the hanger support. As indicated by Fig. 5,

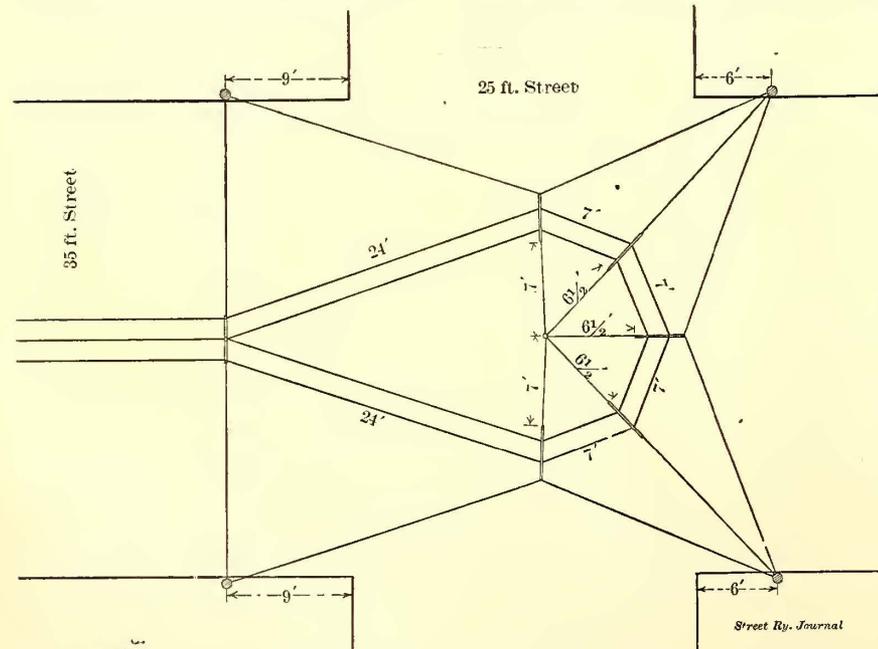


FIG. 11.—OVERHEAD LINE AT TERMINAL LOOP

the trolley wire lies in a groove along the inner side of the hanger, which is made up of two composition metal elements, bent in the manner shown, the strip along the inner side of which the wire runs is made somewhat straighter than the other, so as to lessen the tension and thereby obviate danger of the wire pulling away from the hanger at the ends.

Bracket hangers for both systems may be of any desirable pattern, those illustrated in Fig. 4c and Fig. 4d being considered satisfactory types for this service.

Provision for passing an under-running trolley line at right angles is made by placing the wires for the trackless system slightly below the wire of the other system, as shown in Fig. 6. Then by running the former within 2 ins. of the other wire at either side, a gap will be provided for the passage of the under-running trolley wheel. The trackless trolley wires (a) are

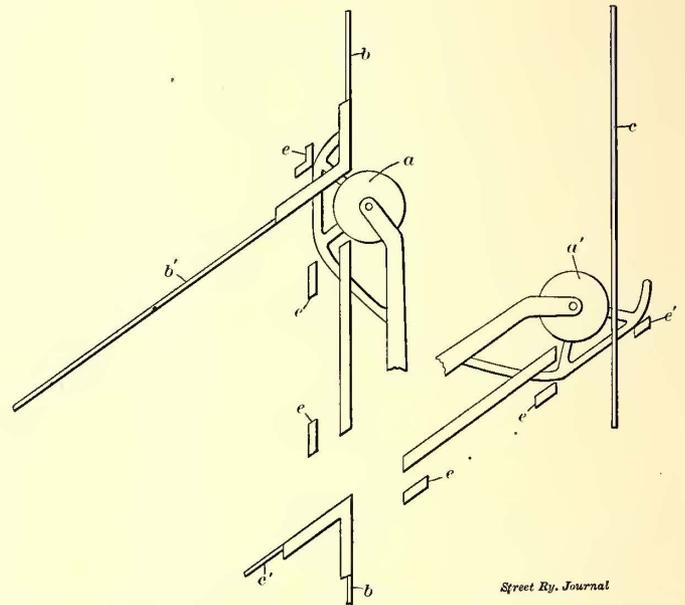


FIG. 10.—SWITCHING SIDE-RUNNING TROLLEY FROM ONE WIRE TO ANOTHER

held in position at the gap by a rigid metallic arch that also serves to hold in place the under-running trolley wire (b), which is supported by and insulated from the arch. An insulating trough protects the latter in case the under-running trolley wheel should slip off its wire. To prevent the side-running trolley wheels from being pressed into the gaps in passing them, a grooved track or guide for the trolley wheel guard (d), Fig. 7, is formed in the lower portion of the arch at the points (e), Fig. 6, so that the guard, being of greater radius than the trolley wheel, bridges the gap and delivers the wheel to the wire on the other side smoothly and with certainty. Fig. 7 is a plan view, showing the method of bridging the gaps at the cross-overs, while Fig. 8 is an elevation showing the relation of grooved guide or track to the guard, trolley wheel and wire of the under-running trolley line.

Where two side-running trolley wires pass each other at right angles, all the wires being in the same horizontal plane, the gaps in the wires are arranged as indicated in Fig. 9, permitting the proper wheels to slip through, while the track blocks (e) prevent the wheels from flying through the wrong gap to the cross wires.

The same arrangement permits the side-running trolley to be switched from one line to another, as shown in Fig. 10, wherein the trolley wheel (a) is shown passing the gap opposite

the wire (b'). In order that the trolley wheel may leave one wire (b) and pass to another (b') the motorman turns the coach to one side in the direction of the latter wire (b') before the trolley wheels reach the switch. Therefore, when the wheels actually reach the latter they will be lying in the direction of the switch line and will pass through the gaps to the proper wires (b' and c').

With the three-wire system no switches are necessary at the line terminals, where loops are arranged, as indicated in Fig. 11; but with the two-wire system a switch, such as is shown in Fig. 12, is arranged at the entrance of the loop at each end of the line. The feed wire is carried around the loop to the point (c), where a wooden track serves to insulate it from the return wire (b). When the trolley wheels reach the wooden switch piece (d) it is thrown over to the wire (a), returning to its original position under the influence of the spring (e).

Since the trackless trolley system obviates the use of running rails it is especially adapted for asphalt pavements in residential localities where permission to tear up the streets could not possibly be obtained; also, in small cities and large towns and villages, whose residents refuse a franchise for laying tracks, and for temporary service to summer resorts and other places of amusement. Another field of usefulness is in joining villages whose traffic is not sufficient to warrant the expense of the installation of track lines or for meeting the requirements

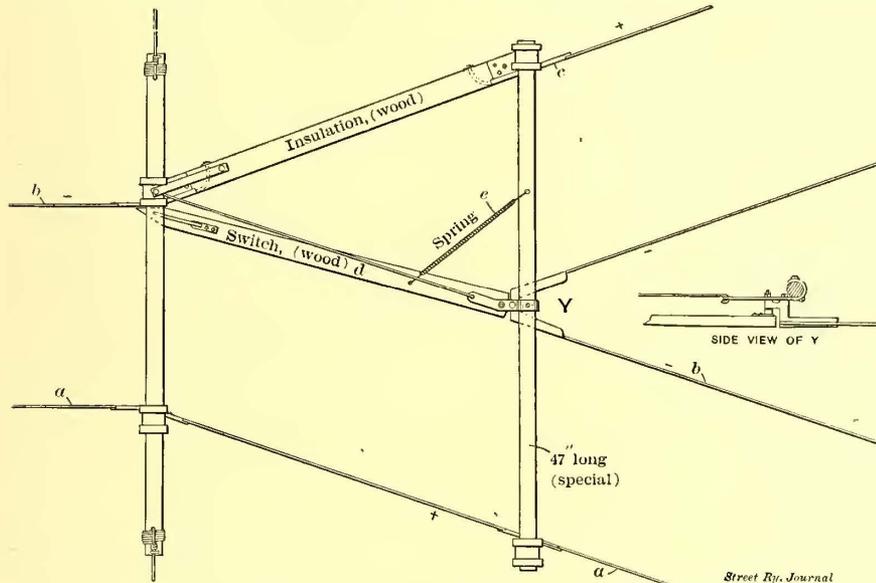


FIG. 12.—LOOP ARRANGEMENT FOR TWO-WIRE SYSTEM

of outlying districts where feeders to main-track lines would be desirable. Moreover, the system permits the operation of combination passenger and freight lines, the trolleys of the slow freight cars merely being pulled off the wires at any point to allow the faster passenger coaches to pass. Furthermore, by means of a removable line extension the freight cars may be run off 100 ft. or more from the trolley line to distant stores or warehouses.

When operated in localities where there is a considerable fall of snow in winter, it is suggested that instead of piling up the snow on the sides of the road, a snow roller may be used for packing down the snow, and thus insuring good sleighing.

No data as to the cost of operation in comparison with street car lines can as yet be given. The cost of installation of the trolley wires and supports is about \$1,600 per mile, while the cost of coaches, having a capacity of twenty passengers seated and fifteen standing, with motors and trolleys complete, is about \$2,600 each.

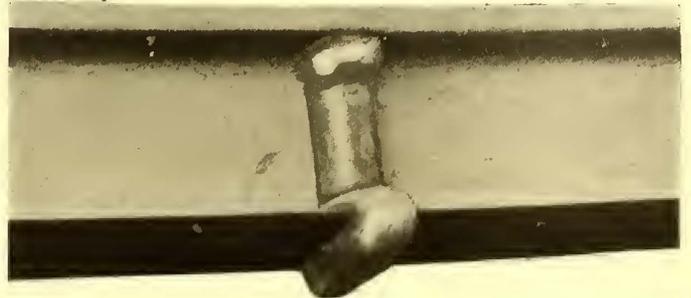
The inventor of the system here described is A. B. Upham, president of the American Trackless Trolley Company, of Boston. The installation at Scranton was made under the personal supervision of Fred. G. Tilton, of that company.

ALUMINO-THERMICS AND RAIL WELDING*

BY DR. HANS GOLDSCHMIDT

The large field of welding processes with the aid of thermit—which is at present the most important application of aluminothermics—has been considerably broadened in recent years.

The most important of these welding processes is the one by which a continuous rail—a necessity of modern trolley road

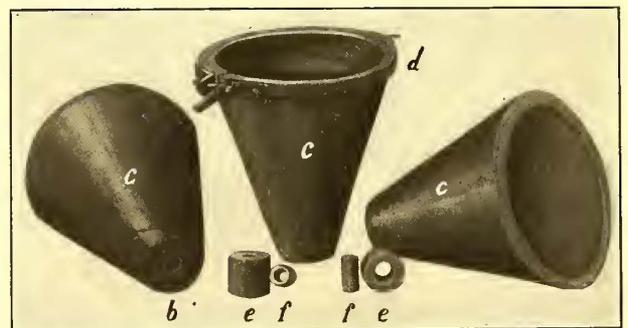


SIDE OF RAIL, SHOWING WELD

construction—is simply, cheaply and effectively obtained. Engineers in this country, in which no less than 25,000 miles of single track are in existence, are watching the good results obtained in Europe with this system.

The city of Leeds, in England, after careful investigation by a commission of experts, is using this process over the whole of its track, and an American expert, who had occasion to see it employed there, recommended it for a very important contract at Singapore, where, in consequence, it is now being used over a track of 27 miles. Last year 3000 joints were welded, and this year no less than 20,000 joints have been delivered. A marked advantage enjoyed by this system is the absence of any bulky equipment. All that is required is a crucible, a mould box, and, in some instances, where a complete butt-weld of the head of the rail is desired, a rail clamp. All these materials, including the necessary quantity of thermit, can easily be moved on a hand truck. Each weld, according to section, requires from 15 lbs. to 20 lbs. of thermit. Even where a

rail clamp is used the time employed is less than that necessary for fixing fish-plates and copper bonds.



CONICAL CRUCIBLES LINED WITH MAGNESIA

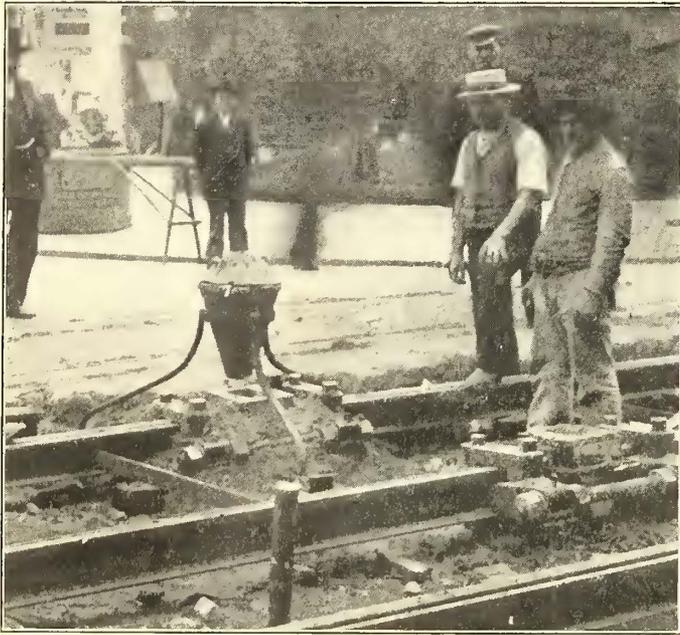
The mould is made according to a model designed especially for each section. Its two parts, one on each side, firmly enclose and exactly fit the rail. Certain channels are provided in the

* Abstract of lecture before the Columbia University Chemical Society, Nov. 13, 1903.

mould parts for the thermit iron to run through. The size of these channels, which are open towards the rail, has been accurately determined by experiments. It varies according to whether slag or iron is to fill the mould and also in accordance with the requirements of each section. The thermit iron running out of the crucible flows round the web and foot of the rail, and, melting them, forms one mass with them. The

The use of the rail clamps is, however, by no means obligatory. Without them the work is still further simplified, as the time necessary for adjusting the heavy clamps and for chiselling off the up-set is saved. By practical experience it has been found that the weld without clamps is quite sufficient. Of late the clamps are being used less and less.

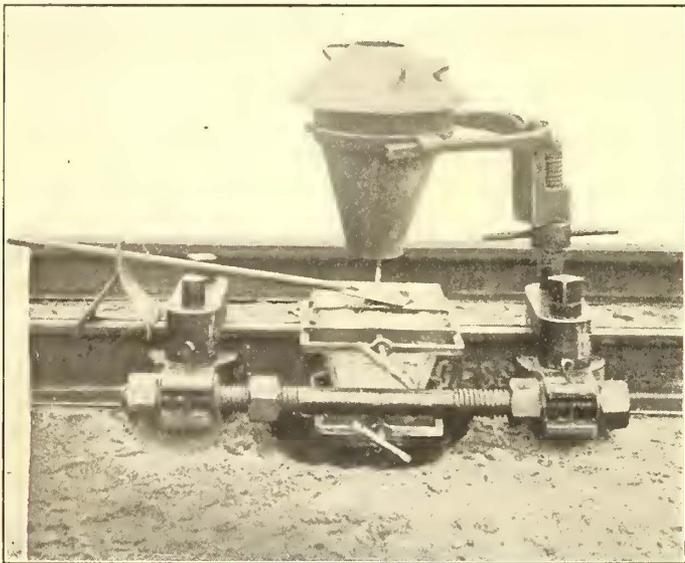
The first to weld without clamps was the town of Brunswick,



MOULD READY FOR CASTING

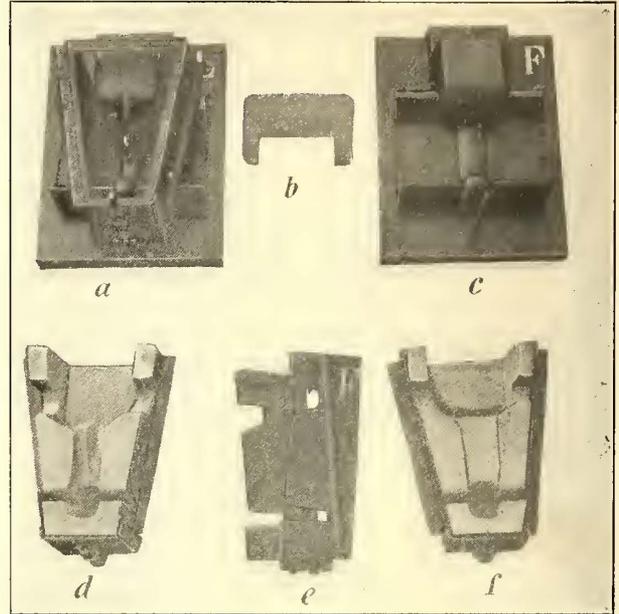
liquid slag which follows the metal is diverted to the top of the rail and brings the latter to welding heat. The whole section is thus heated equally and the rail ends will not buckle.

The weld can be made with or without rail clamps. In the former case the rail ends are butted together by tightening the screw two minutes or three minutes after the run. A slight and very short upset will be produced at the joint, which can easily



COMPLETE OUTFIT

be removed. The simplest way has been found to chisel it off, as a grinder will not answer the purpose as well. One man can take care of twenty-five joints a day in this manner. By using the rail clamps a perfect butt-weld, without even the smallest gap between the ends, is obtained. The rigidity of the joint is particularly great, and when tested under hydraulic pressure the break occurs outside the welded zone, for with the iron shoe welded onto the section the joint is really stronger than the rail.



FORMS AND MOULDS

a Model for the lip side with mould shell. *b* Appliance used when ramming the sand in. *c* Model for tread side. *d* Finished half of mould for lip side. *e* Half of mould shell for tread side. *f* Finished half of mould for tread side.

Germany, more than two years ago; it has continued to follow this plan ever since. Nearly all the work done in France, such as at Rouen, Havre and Paris was without clamps, and the joints have now been in the ground for more than a year. Italy also, particularly the cities of Genoa and Milan, preferred to work without clamps. Altogether this modification has been tried in several thousand joints and given entire satisfaction.



WELDING TRACK AT DRESDEN

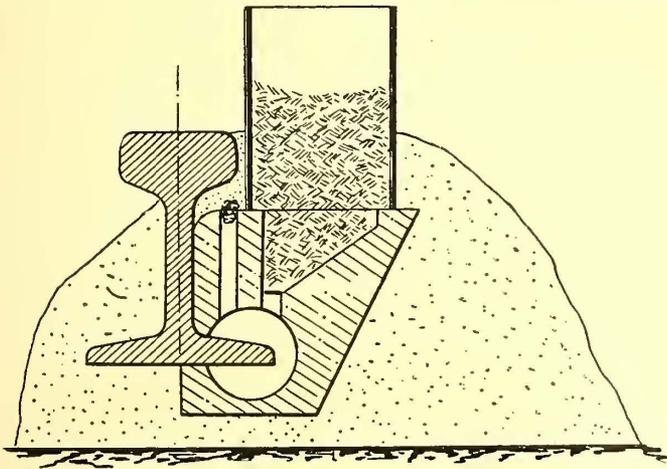
The use of clamps is based chiefly on theoretical considerations. Even a butt weld can be obtained without clamps, particularly with rails already embedded. At Barmen, Germany, this was done very successfully about a year and a half ago. The old fish-plates were taken off, the ends of the rails were raised slightly by means of a crowbar, and a shim was firmly wedged in between; in this case the shim is welded into the head of the rail.

When welding new rails not yet embedded the use of rail

clamps can be obviated by firmly wedging up the rail from the next succeeding joint.

When working without clamps the time consumed per joint equals three-quarters of an hour for one man; trained squads of four men, including foremen, did not use nearly so much time. At \$1.50 per day the wages item of cost is 10 cents per joint. The use of the clamps doubles this amount. All other labor connected with welding remains the same whether clamps are used or not.

As stated the moulds are in two parts. They can either be made on a large scale by manufacturers of refractory earthenware, or, according to the requirements of the trolley lines, in the repair shops. In the latter case they are made by ramming a simple mixture of sand and loam into a sheet-iron case, which



WELDING THIRD RAIL

afterward has to be dried during a couple of hours at a temperature of some 100 C. The cost is, therefore, only a few cents.

The mould is dry and porous, and is screwed onto the rail, and the rims are carefully smeared with clay where they touch the rail. Prior to this, however, the rail ends are cleaned of dirt and rust with a wire brush, and are slightly warmed. A sand blast is superfluous.

In case the tops of the rails are to be butt-welded the section has to be filed. This is all that is required in the way of preparatory work. A true alignment of the rail is, of course, an indispensable precaution. The rails require no bolt holes, as no provisional fish-plates are necessary. In wet weather the protection of a few planks is desirable to prevent the mould and thermit getting wet. None of this work demands special training, and can easily be done by inexperienced labor.

The next and only appliance remaining necessary for thermit welding is the crucible. This consists of a sheet-iron mantle lined with magnesia. It is of simple construction, the lining being introduced by ramming it round a cone which is suspended in the middle of the mantle. The bottom is formed by a hard magnesia stone provided with an exchangeable outlet, which will stand from nine runs to 10 runs. The crucible, with the cone in it, is placed in a furnace for two hours until it is brought to a glow heat, when it is ready for use. Crucibles will stand about twenty-five reactions, and the wear and tear will, therefore, amount to only a few cents per joint. Every section, according to its weight and according to its different dimensions, requires different quantities of thermit, the composition of which has also to be regulated for each separate case. Although sections generally in use in this country are higher than the average European standard, the less width counterbalances in a certain degree the increased height, and the quantity of thermit required will average about the same in both countries. Thermit is supplied in small bags, containing the exact weight which is needed to effect the weld. These are called welding portions. The trolley companies may make their own crucibles

and moulds, and they will, therefore, have to pay freight only on the welding portions. As these weigh about 20 lbs. gross the freight is, of course, considerably less than that on fish-plates and bolts. The Essen Works have a plant to supply over 500 welding portions daily. The illustrations which accompany this article show clearly the methods and apparatus employed, both in track welding and for contact rails.

The strength of the weld is about 80 per cent of the strength of the original material. The shoe welded onto the foot of the rail not only makes up for the remaining 20 per cent but materially strengthens the rail at the joint. The head does not get softer although it is brought to welding heat, the reason being that the operation takes place without the air having access to it. Test rods, cut out of rails, brought to welding heat with thermit, have proved this contention. Tensile strength and elasticity have not suffered. Three years practical experience in over forty towns in Europe confirms these conclusions.

TABLE OF TESTS

From tests made June 23, 1903, by F. S. MacGregor, permanent way engineer of the Leeds City Tramways, on the strength of thermit joint, the following figures are taken:

Rail supported 5 ft. center to center, test made with 10-in. ram, 2-in. bearing on head of rail.

Up to 28 tons, no deflection and no set, and then 1-64 in.

Up to 30 tons, 1-32 in.

Up to 40 tons, 1-32 in.

Up to 45 tons, 1-64 in.

Up to 50 tons, 3-32 in.

Up to 55 tons, 3-32 in.

Up to 60 tons, 1/8 in.

Test was then stopped, and it was found that there was no permanent set whatever.

Pressure brought on again to 65 tons, still only 1/8 in. deflection; at 68 tons, rail still sound, and at 70 tons, rail broke, but not through the weld.

Hydraulic test, July 7, 1903. Dead load, 5-ft. bearings, 10-in. ram, 2-in. bar on head of rail:

Eighty-five tons, 3-16 in. set.

Ninety tons, 1/4 in. set.

Ninety-five tons, 1/2 in. and slight fracture.

Thermit welded joint tested to dead load as above:

Up to 60 tons no permanent deflection.

Safe dead load at 68 tons.

Seventy tons fractured at side of the weld, the welded portion remaining intact.

Fish and sole-plate joint. Fish-plates, 62 lbs. per pair, 2 ft long, six 1-in. bolts; sole-plate, 46 lbs., 2 ft. x 8 ins. x 3/4 in 12 7/8-in. bolts.

Permanent set at 85 tons, 3/4 in.

Permanent set at 90 tons, 7/8 in.

Fractured at 102 tons.

The so-called third rail is also welded by this means. The skin resistance of copper bonds increases with time, and frequent repairs are necessitated thereby, but welding obviates these repairs. It can be done in two ways. The first is identical with the one described before (but without the use of clamps), and is now in operation on 20 miles of road at Paris, France, where a short track gave satisfaction after a year's trial. The second consists in welding a small bridge of thermit iron between the feet on one side of the rail. Both are in use on a large scale. On the Suburban Road from Berlin to Grosslichterfelde, the Union Elektrizitäts-Gesellschaft of Berlin has welded 13 1/2 miles of track. In this case the crucible is superfluous. The welding portion, of about 3 lbs., is placed directly into the upper part of the mold, which is prolonged by a piece of gas pipe.

The accompanying cut shows the third rail and the mould at the right hand. A tube is placed above the mould and filled with thermit iron. At the bottom the thermit iron mixture rests on a thin iron plate. When the thermit mixture is ignited this plate melts, and the molten mass flows into the mould and the weld is made. The ignition is made by placing about a thimbleful of ignition power in the crucible and setting fire to it with an ordinary match.

"L" ROAD PATRONAGE AFFECTED BY ESCALATOR SERVICE

The charts published herewith, although compiled primarily to show graphically the falling off of revenue at the Twenty-Third Street station of the Sixth Avenue Elevated Railroad, New York, while the escalator was shut down, are also inter-

the receipts at Twenty-Third Street and Eighteenth Street for 1903, and here it will be noted that the ratio between the two is practically the same as in 1902 up to March 26 of this year, when the escalator was stopped. It was necessary to keep it out of commission while a number of electrical changes were being made to secure better speed regulation of the driving motor. From the date on which the escalator was stopped the ratio curve took a sudden drop and the ratio of the receipts at the two stations, from March 26 to July 18, averaged 1.22, as compared with 1.33 for 1902. On July 18 of this year the escalator again resumed regular operation, and the chart shows that from that time on the ratio again began to rise until it became practically the same as in 1902. From these facts it is assumed that, had the escalator remained in operation, the ratio of receipts of the two stations would have remained practically the same in 1903 as in 1902.

In Fig. 2 are plotted curves showing the actual number of fares per day during the season of 1903, as compiled from the books of the Interborough Company. The lower curve represents the actual number of fares at the Eighteenth Street station. The solid curve above it represents the actual receipts at the Twenty-Third Street station. If the same ratio between the receipts at the two stations which obtained in 1902 had held during 1903, it is computed, the receipts at Twenty-Third Street would have been those shown by the upper dotted curve. From the foregoing analysis it is concluded that the only reason for a reduction of the ratio was the fact that the same facilities were not offered the public at Twenty-Third Street as in 1902; that is, the escalator was shut down during the period under discussion, and in support of this line of reasoning is cited the fact that within less than four weeks after the escalator had resumed operation (a period which necessarily elapsed before the traveling public became fully aware that the service had been resumed) the corrected curve of receipts merged with the curve of the actual receipts. As is obvious, the area between the corrected curve and the actual curve represents the fares which were lost during the shut down. A calculation of this area shows that the loss was 64,645 fares, or \$3,232. The loss would have been much greater had the shut-down not been, for the most part, during the summer months, when traffic is the lightest.

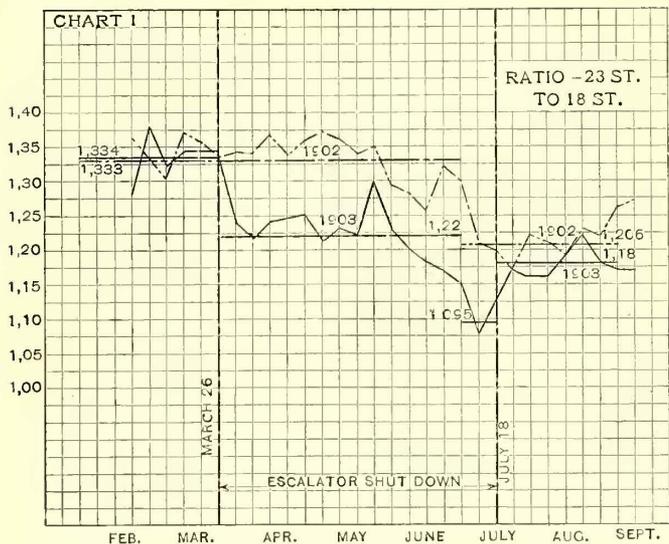


FIG. 1.—RATIO BETWEEN TRAFFIC AT TWENTY-THIRD STREET AND EIGHTEENTH STREET STATIONS

esting because of their presentation of other phases of the fluctuations of traffic.

In Fig. 1 the upper curve shows the ratio between the traffic at the Twenty-Third Street and the Eighteenth Street uptown stations in 1902, when the escalator was operating. It is of

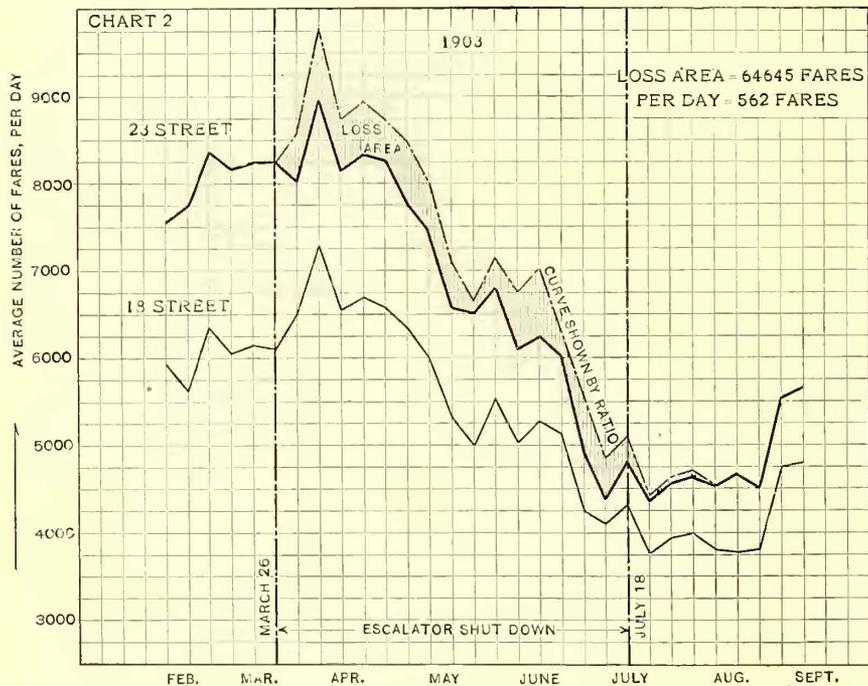


FIG. 2.—DAILY RECEIPTS

interest to note, in passing, that the curve begins to fall about the middle of May, when the spring shopping terminates, indicating that the Twenty-Third Street receipts fall off at a greater rate in summer than the Eighteenth Street receipts, as indeed might be expected from the difference in the character of these shopping districts.

The lower curve in the same chart shows the ratio between

WORLD'S FAIR EXTENSIONS PLANNED BY THE SUBURBAN COMPANY

Extensions for handling World's Fair traffic have been planned by the St. Louis & Suburban Railroad Company which will give it terminals near the two principal entrances to the Exposition. The improvements include two loops, one at a point just east of the main entrance at De Baliviere Avenue and Lindell Boulevard, and the other at Skinker Road and the Colorado tracks at the northwest corner of the Pike.

The plan is to run through cars during the World's Fair out over the main road to Union Avenue and thence south to a point south of De Giverville Avenue. The line will then run westward over a right of way through Catlin tract to a point about 200 ft. east of De Baliviere Avenue and Lindell Boulevard, terminating there in a loop. The Suburban tracks crossing those of the Wabash and the Colorado will be either depressed or elevated. A station will probably be erected at the loop.

The route of the western branch of the line to the Fair Grounds will be as at present until the curve on the Brentwood division, 600 ft. south of Delmar Avenue, is reached. At this

point the extension tracks will run eastward over a right of way leased from the Parkview Realty Company. These tracks will terminate in a loop at Skinker Road and the Colorado tracks, west of the road and north of the tracks. A station will also probably be erected here. All of the extension lines will be double tracked. While negotiations have been almost completed for the lease on the necessary land the leases have not yet been closed.

“ELECTRIC MULE” ON ERIE CANAL

Recent tests were made on the Erie Canal, at Schenectady, for the purpose of determining the practicability of an electric towing system designed by Stephen W. Wood. The experimental track is about 2700 ft. in length, with a sharp curve, and furnishing a good average section of the 7-ft. prism. Along the bank are erected every 25 ft. short posts set in concrete and supporting, on each side of the post, about 3 ft. apart, continuous plate 18-in. girder, the girder farthest away from the canal being raised above the inner one, as in a tier of seats. The girders are cross braced so as to stiffen the structure, and of a most substantial character. The edges of each girder are faced with light 3-in. rail for track. Over the two girder tracks extend a series of ordinary trolley brackets carried on poles set at the outer edge of the canal bank and carrying a trolley wire readily accessible to a trolley reaching up from either track.

The “electric mule” is a vehicle closely resembling a “hog-

upper or lower track. Obviously, two wires, one for each track, could be strung if desired.

From the body of the motor mule extends downward a heavy



“ELECTRIC MULE,” SHOWING GEARING ON EXPOSED SIDE

arm, which carries springs pulling upwards two grooved wheels so as to exert a gripping effect on the under rail. This tension spring can be loosened or tightened at will, and the arrange-



CONSTRUCTION OF TRACK AND POLE LINE

back” mule locomotive, and is 10 ft. long by 2 ft. wide, and 3 ft. high from the rail. It is iron-clad for better protection from the weather, but all the parts are accessible. At each end is a 40-hp motor of street car, narrow-gage type; but, owing to the low speed required, geared down by double reduction in the ratio of about 40 to 1. Both sets of gear are shown in one of the views, on the exposed side, the first reduction from the motor armature axle to the first gear being seen in front, while the second reduction set of the rear motor is seen at the rear. Each motor drives a grooved wheel about 22 ins. diameter, which travels upon the upper rail; and, by reversing, the motor runs promptly backward and forward. At the rear end is a series-parallel controller and a resistance box. The mule has two large hooks for the tow-ropes, and has also a running board and guard hand rail, so that the driver can go around the machine without dismounting. Reaching upward from the center of the top shell of the motor is a stout, short mine trolley, which can be pulled down so as to let another mule pass on the

ment serves to keep the tractor steady, besides affording additional adhesion. The amount of power consumed varies, of course, with the speed, the weight hauled, the condition of the track and other factors. Direct current is furnished from the General Electric plant to the motors at 475-500 volts.

As to the tests themselves, they included the hauling of two boats each loaded with over 200 tons, at a speed up to $4\frac{1}{4}$ m. p. h., as recorded by tachometer in the observation car keeping abreast over the run. These two boats would represent a total weight of probably 600 tons. Other tests included the haulage of four loaded barges at varying speeds up to the same figure. In every instance the slight wave motion in the canal, or absence of wash, was most noticeable, the disturbance dying out in a mere ripple as it reached either bank. This would appear due to the steadiness of the breast pull and the abolition of the churning action consequent upon the use of a screw propeller. Some of the tests were conducted in a heavy snow-storm, but little, if any, difference was observed in the results.

During the tests one or two mule tows passed in the opposite direction, making barely a mile an hour on the wet towpath. The contrast between the two systems was most striking, while it was not to be forgotten that both the old and the new methods were operating at the same time without interference.

The cost of equipping the Erie Canal, 352 miles, with the Wood system, is estimated by the International Towing & Power Company, of New York, at \$7,040,000, provision being made for 300 equipments, of 80-hp capacity each.

The gross earnings from the operation of the system, estimated at 50 cents a ton for 10,800,000 tons, which is the capacity of a barge canal, would be \$5,400,000. The operating expenses would be: Four per cent on equipment, \$281,600; cost of 24,000 hp, seven months' use at \$35 per hp per annum, \$490,000; wages, motormen for 300 motors (three men each) 8-hour shifts, \$378,000; trackmen, \$11,340; repairs, salaries, etc., \$150,000; total, \$1,310,940, making the net earnings \$4,089,060.

The General Electric Company, while in no way associated with the enterprise, built the motors and furnished current for operation in order to encourage the effort. Carl W. Larsen, of the mining department, and W. B. Potter and A. P. Jenks, of the railway department, have devoted considerable attention to this experimental work.

PROPOSED SUSPENDED RAILWAY FOR HAMBURG, GERMANY

The following is an abstract of a paper read by Richard Petersen, chief engineer of the Continentale Gesellschaft for Elektrische Unternehmungén, Nürnberg, before the Architects & Engineers Verein of Hamburg, concerning the plans for the proposed suspended railway which his company has prepared for the consideration of the Hamburg municipal authorities. The system offered is based on that now in service at Barmen-Vohwinkel, to which reference was made in the STREET RAILWAY JOURNAL of June 7, 1902.

In planning the system the company's engineers were chiefly guided by the present need for rapid transit between Hamburg and its suburbs, but they have also provided for taking care of the probable traffic increase for several decades to come. The present plans call for one main line through the middle of Hamburg, with numerous branches to the outlying towns.

The main line will begin in the eastern portion of Hamburg, known as the Deichtor, pass through the center of the city to a point near the Rathshaus, thence southerly to Baumwall and along the River Elbe to St. Paul's Landing Bridges. After running along the boundary between St. Paul and Altona, it will turn to the north, cross above the Hamburg-Altona State Railroad, run northeast to Schlump and then northwest to Schlangkreye, which will be the western terminus. One track is to be used for express service between Deichtor and Schlangkreye. Total length of main line about 5 miles (6.5 km).

Of the four branches contemplated, that between Deichtor, St. George, Borgfelde, Hohenfelde, Uhlenhort and Barmbeck will be the longest (about 5 miles), running northeasterly to the northern limit of Barmbeck. At Uhlenhorst provision is to be made for future extensions to Mühlenkamp and Winterhude.

The second eastern branch is to run to St. George-South and Billwärder-Ausschlag, crossing several canals. The present plans contemplate building about 2 miles, terminating at the Billhorn Canal. It is intended, however, to extend this line to Hammerbrook later.

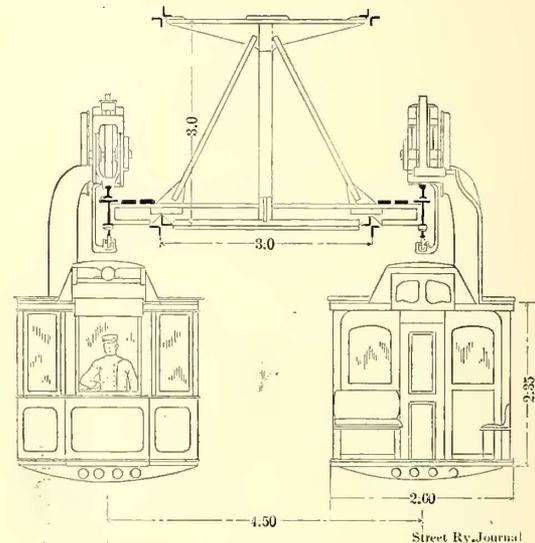
Two branch lines are planned to begin at the Schlangkreye terminus of the main line—one running north to Eppendorf-Winterhude, and the other west to Langenfelde, via Eimsbüttel. The Eppendorf-Winterhude line is to be connected

later with the Uhlenhorst-Winterhude branch, thus forming a belt line around the Alster Basin.

The construction of the railway will not be of uniform character but varied to suit the conditions, the supports being designed, wherever possible, in harmony with the surroundings. Along promenades and narrow streets they will form inverted capital U's. Where there is ample room, however, the supporting posts will be placed in the center of the road with cross-beams attached. Owing to the poor quality of the soil it is planned to imbed the supports in cement to a depth of 10 m, and have them rest on granite foundations.

The rails and adjacent longitudinal sections of the upper structure are to be inflexibly combined in solid sections, varying from 200 m to 400 m in length, by screws. It is expected that this method will prevent the serious disturbance formerly caused by the rails becoming loosened from the rest of the structure. A cross section of the upper portion of the proposed line is shown in the accompanying illustration.

Each car is to have double trucks, two motors and complete air brake equipment. It is expected to run the cars singly at first and in trains of two or three later on, each car seating



CROSS-SECTION OF SUSPENDED RAILWAY

All dimensions shown are in meters.

eighty-five passengers. All station and switching plans are, however, based on the ultimate use of six-car trains. Every car will have a double center door on each side for entering and leaving, and end doors for use in extraordinary cases only. Elaborate plans have been drawn up covering the switching and signaling arrangements.

If the system is adopted the company intends to run single cars on a five-minute headway on the main line and ten-minute headway on the branch line, but cutting these headways in half during the rush hours. It is estimated that with three-car trains on a two-minute headway the hourly capacity of the system would be 15,000 passengers.

Mr. Petersen's paper has been published in book form, with many fine maps and other illustrations. Whether the suspended railway is adopted or not there is no doubt that the Continentale Gesellschaft, of Nürnberg, has made an earnest effort to solve Hamburg's traction problem.

A company is being organized by Dayton (Ohio) inter-urban interests for the purpose of erecting a terminal station for the electric roads centering in that city. The plan is to erect a fine station between Main Street and Ludlow Street, near the steam railroad station. Dr. J. E. Lowes, V. J. A. Obenauer, W. J. Ferguson, Stanley Krohn and C. H. Bosler are the promoters. The company will be capitalized at \$120,000.

FIRST "WORLD'S FAIR" CARS RECEIVED BY THE ST. LOUIS TRANSIT COMPANY

The St. Louis Transit Company has received the first of 450 new cars which are being built for it by the St. Louis Car Company. The new cars are about the same size as those now in use on the Olive Street line, 33 ft. 4¾ ins. long, 9 ft. wide and 8 ins. over all, but severely plain in general appearance, being entirely devoid of ornamentation. The body of the car is shaped like a railroad coach, and the car is constructed throughout with a view to economy of space. While the length of the car is about the same as the present ones, the seating capacity is increased to fifty persons. The maximum carrying capacity is about 120 persons. A portion of the space heretofore given to platforms is given to the body of the new car, and space saved by straightening the sides of the car is added to the aisle, which is 12 ins. wider than in the old cars.

The front platform is reduced to a narrow cab, with barely room enough for the motorman, and the rear platform, which is of the double type, is not so large as the platform now in use on the long cars. The front door of the car is to the right of the center, and is smaller than the rear door, which opens in the center. The interior finish is done in mahogany, with white wood ceiling. The seats are of the latest pattern and upholstered in split cane.

The cars are mounted upon solid steel trucks and equipped with four 75-hp motors, improved air brakes and controllers, and are to be heated by electricity. The lighting arrangement will be the same as that now in vogue. The cost of each car is approximately \$5,000.

By the middle of November the Transit Company is to receive an additional assignment of fifty cars, which will be at once placed in service on the Laclede Avenue division. All of the entire 450 cars are to be completed before the opening of the World's Fair.

The plan for running observation cars during the period of the Fair has not yet been decided upon. Superintendent Grant says that if the crowds are not as large as expected the company may decide to run observation coaches.

CONDENSING WATER FROM A BIG SEWER

The South Side Elevated Railroad Company, of Chicago, has secured the permission of the Drainage Board of Chicago to use water from the Thirty-Ninth Street intercepting sewer or conduit for condensing purposes in its new power house. The company is to pay the sanitary district \$1 per rated horse-power per year as compensation. This sewer is one of the intercepting sewers or conduits which the sanitary district of Chicago has been constructing as a part of the plan to divert all sewage from the lake into the new drainage canal. It takes water from the lake and discharges into the south branch of the Chicago River near the Stock Yards. The South Side Elevated Railroad Company has heretofore used cooling towers for artificially cooling its condensing water, but as the plant grew, land on which to locate these cooling towers has become scarce, and it has been necessary to operate part of the plant non-condensing at times.

In order to avoid confusion, due to similarity of the names of the Interurban and Interborough Railway Companies, the Interurban Street Railway Company, of New York, will change its name to the New York City Street Railway Company.

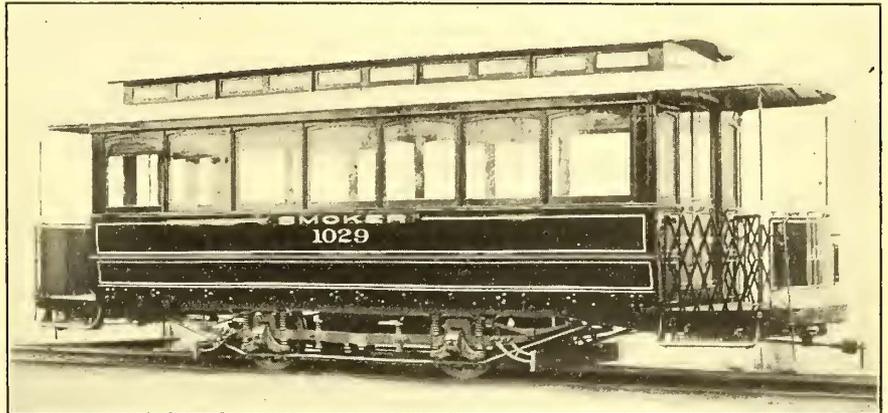
NEW BUFFALO CARS

Fifty closed cars, embodying several deviations from common city practice, have been recently built for the International Railway Company, of Buffalo, N. Y., by the J. G. Brill Company. One of these cars, as it appears when used as a trailer, is shown in the accompanying illustration. All are arranged, however, to be readily converted into motor cars, as trap-doors are provided in the floors and the trucks prepared to take motors at any time.

To prevent passengers from indulging in the dangerous habit of standing on the car bumpers, the latter are roofed with sheet metal covers placed at such an angle as to make it impossible to get a footing. It will also be noticed that the car shown is marked "Smoker," indicating that it is for the special convenience of tobacco users, who will no doubt appreciate the railway company's courtesy. When used for regular passenger service this sign is changed.

The car is equipped with Brill folding gates, which are attached to the dash posts and provided with a cover in the form of a clasp when folded. The windows are arranged to drop into pockets. The seats are longitudinal, are upholstered in spring cane, and accommodate about twenty-six passengers. The car interior is finished in plain cherry.

The construction throughout is extra strong; besides the



NEW CAR FOR BUFFALO

½-in. x 6-in. sill plates on the outside of 5-in. x 7-in. sills, high trusses of ¾-in. x 2½-in. iron are supported on the posts 4 ins. below the sash rails by iron struts. The end sills are 5 ins. x 7¾ ins.; platform timbers, 5 ins. x 5¾ ins., plated with ¾-in. x 5-in. steel; platform knees are 2¾ ins. x 7½ ins., plated with ¾-in. x 3-in. x 4-in. angle-iron. Two cross-sills, 3¾ ins. x 5 ins., are faced with ¼-in. x 5-in. steel. The intermediate sills are 4¾ ins. x 5 ins.; corner posts are 3¾ ins. x 7¾ ins.; side posts are 2¾ ins. thick. Each car has four steel rafters sandwiched between the wooden rafters.

The general dimensions of the cars are as follows: Length of body, 22 ft. 10¾ ins.; length over crown pieces, 30 ft. 10¾ ins.; length over bumpers, 31 ft. 10¾ ins.; width over sill plates, 7 ft. 2 ins.; over posts, 7 ft. 9 ins., and over all 8 ft. The cars are mounted on 21-E trucks, which have an unusual feature, in that the ears at either sides of the journal boxes are extended to bring the coil springs immediately under the coil springs which are seated on the frames. This, the builder believes, is a correct principle of construction, inasmuch as the load upon the frame is brought directly over the points where the frames themselves are supported—it also extends the base of the coil springs and increases the stability of the truck. The trucks have a wheel base of 8 ft., diameter of axle, 4½ ins., and of wheels 33 ins. They are arranged for 50-hp motors.

FINANCIAL INTELLIGENCE

WALL STREET, NOV. 11, 1903.

The Money Market

Two very striking changes have occurred in the money situation during the last fortnight. Responding at length to the extremely heavy drain of currency to the West and South, money rates have advanced sharply, so that call loans are quoted now between $4\frac{1}{2}$ and 6 per cent, and time money is not obtainable for any period below 6 per cent. The contraction in local bank reserves which has produced this advance, has been one of the most violent ever witnessed in Wall Street. Although nothing more than the usual interior money requirements have been present, it seems to be a fact that the movement westward was delayed altogether too long, and that interior bank correspondents, if they had read the situation correctly, would not have had to make such hasty withdrawals from their New York balances. The other and even more striking incident of the fortnight has been the heavy drop in sterling exchange, which is partly due to the rise in money rates here, but more largely is the result of the enormous outrush of cotton from the seaports, and the purchases of some very large blocks of our railway bonds by European investors. It has been the extraordinarily heavy cotton exports which have chiefly demoralized the exchange market. When it is pointed out that the cotton movement has increased five or six times over, as compared with September, and when the high prices at which the staple is being sold are also taken into consideration, some idea may be formed of the rapid making of exchange, which has lately been in progress. Foreign subscriptions to some of our new bond issues have also contributed to increase the supply of exchange bills pressing for sale. We have dwelt on these conditions at some length, because the foreign exchange position is evidently the key to the whole domestic money market for the immediate future. Surplus bank reserves are down to nearly \$5,000,000. The crop-moving demands for money are likely to continue for several weeks longer. We should clearly enough reach the position very soon where, in order to replenish or protect the surplus reserve, it would be necessary to call loans from home borrowers. But as it is, this disagreeable means of relief will probably not be necessary now. Europe is placing impediments in the way of our drawing gold; we have been able to import so far less than \$2,000,000, although sterling rates are down well below the usual import point. But the natural factors in the exchange situation, as they have just been described, are so exceedingly strong that there can be no doubt of our getting what gold we need this autumn, providing our money rates are maintained.

The Stock Market

Discussion of the stock market of the last two weeks should be devoted about three parts to the United States Steel stocks and one part to other issues. The Steel stocks have held the center of the stage from first to last, and their decline has been a greater influence than anything else that the market has had to encounter. Two conclusions can safely be drawn from the recent dealings. One is that the market is in a very much stronger position than it has been at any time previous this season, else it would have never been able to withstand, with so little decline, such an enormous weight of selling as that which has forced down the prices of the Steel shares. Second, it is clear that whatever reasons investment capital has had for fighting shy of the Steel stocks have not affected the investment attitude toward other securities. It is still a question whether the break in the Steel group has not exaggerated the importance of the unfavorable trade conditions which seem to have produced it. The theory generally entertained among Wall Street speculators is that not only will the remaining dividend on the common stock be passed altogether at the next meeting, but that there is some probability of a reduction being made in the preferred stock dividend also. This apprehension is founded entirely on the idea that the recent cut in prices of steel products will enormously reduce the profits of the Steel Corporation. There will be some decrease in earnings without any question, but analysis of the earnings of the past year shows that profits might be cut to a third of what they were and still leave enough margin for the payment of the full 7 per cent on the preferred stock. Nobody conversant with the iron trade, we imagine, is prepared to believe that any such slump as this is now in prospect. The general market has stood up well under the tremendous strain of the Steel

liquidation. The adverse money conditions have, of course, greatly aggravated the test. Only one inference is possible from this, and that is that liquidation in the standard securities has for the time being run its course. Whether it will break out again later on seems to depend very largely upon the effect which a general decline in business will have upon railroad earnings during the next few months.

The local traction stocks have been the strongest features of the past week in the general market movement. Manhattan Elevated has been the leader of the group in point of advance, but the rise in Metropolitan and Brooklyn Rapid Transit has been scarcely less noteworthy. All three stocks show the effect of some very heavy accumulation which has been going on quietly and unobtrusively at the recent low prices, and which has made it possible for a strong clique of professional operators to mark them up with comparative ease. The fact is appreciated that properties situated as these are, depending for their earnings upon the growing traffic of a great city, are not likely to be seriously affected by whatever depression may be in store for the business of the country at large. This is the simple explanation why the traction shares should be selected above others for bull operations at this time.

Philadelphia

Prices have moved with considerable irregularity on a small volume of trading in the market for Philadelphia traction stocks. The speculative issues have been inclined toward weakness, while the securities which have a positive investment merit have been disposed to show considerable strength. This differentiation between the two groups is the natural result of investment capital having reentered the market to a moderate extent, but keeping close to the safest opportunities. Thus, shares of the Philadelphia Company have been rather depressed, the common stock selling down from 37 to $35\frac{3}{4}$, and the preferred from $43\frac{3}{4}$ to 42, while at the same time Philadelphia Traction has advanced from 94 to $95\frac{1}{2}$ and Union Traction has held firm around 44, which is its recent high figure. Dealings in all these stocks have at times been quite active, but in other directions the trading has been generally light and unimportant. American Railways is up a point to 43, and scattering sales have occurred in Philadelphia Rapid Transit at 12, Pittsburg Traction preferred at 49, and Consolidated Traction of New Jersey at 60. As a further evidence of the increasing investment activity in the market, a much better inquiry is reported for such standard bond issues as Philadelphia Company 5s, Electric People's Traction 4s and People's Passenger 4s.

Chicago

Something of a flurry was occasioned in Chicago street railway circles by the announcement ten days ago of the incorporation of a new company, called the Chicago Railways Company. It is said that the new concern aims to absorb eventually every street railroad and elevated railroad in Chicago or Cook County, together with any desirable line in the neighboring counties. According to the gossip the new company stands ready to appropriate \$5,000,000 to assume the indebtedness of the North and West Chicago lines and to guarantee a dividend of 4 per cent on Union Traction preferred, together with something possibly on the common. The scheme will not be unfolded in all its details until the franchise controversy is settled, but the fact that J. Pierpont Morgan and other prominent financiers are behind it, is sufficient assurance that the project will be worked out to a satisfactory conclusion. Strange to say, the market for the various traction specialties has shown no enthusiasm over this new and startling development. On the contrary Union Traction preferred is down from 32 to 30, North Chicago is selling at 100, and West Chicago has broken from $56\frac{1}{4}$ to 50, which is a new low record for the stock. City Railway, after selling at 170, fell to 166, on fears of a strike among the employees of the road. The elevated securities have fared no better. Metropolitan common has sold as low as 18, which is pretty close to the poorest figure of the season. South Side dropped from 94 to 92, while 4 is the highest price recorded for Lake Street. The reorganization plan of the latter company has at length been given out. The underwriting syndicate will pledge itself to raise \$1,400,000 cash, in return for which it will receive \$2,000,000 preferred stock, \$2,000,000 common stock, and \$500,000 first mortgage bonds. The cash raised in this way will suffice to clear off the floating debt and put the company on its feet again.

Other Traction Securities

With the exception of Boston Elevated, which sold as high as 141 a week ago, all the Boston Traction specialties have been rather depressed in the recent dealings. Massachusetts Electric common dropped from 19½ to 18, and the preferred from 77½ to 76, both of these representing the low prices of the year. General market conditions, rather than any special considerations, are responsible for this decline. West End common has changed hands between 90 and 91, and the preferred between 109 and 109½. In Baltimore the trading, so far as the traction securities are concerned, has been rather more active with a particularly good demand for the standard bond issues. Sales are reported in Atlanta Consolidated 5s at 104 and 104¼, Lexington Street Railway 5s at 100, North Baltimore Traction 5s at 118, Knoxville Traction 5s at 101, and Anacostia 5s at 89¾. The United Railways' 4 per cent bonds have kept firm around 91, but the income bonds, and the stock have shown no rallying power, the former, after rising to 59½, falling back to 58¾, while the latter has continued heavy at 8¾. Transactions for the last ten days on the New York curb include the following sales of traction issues: Interborough Rapid Transit from 87½ up to 90, Brooklyn City Railroad at 232, Brooklyn Union Elevated at 16, St. Louis Transit at 14, and Brooklyn Rapid Transit 4s at 77½ and 75.

Cincinnati Street Railway lead in the selling at Cincinnati last week, but sales numbered only about 450 shares at the steady price of 127½ to 128. Detroit United sold to the extent of 327 shares, with a range of from 66 to 67½, which is several points higher than the stock has been selling during the past few weeks. Toledo Railways & Light also showed improvement, and about 300 shares sold at from 21½ to 23½, the latter an advance of four points over recent sales. A block of Cincinnati, Dayton & Toledo 5s sold at 80, a drop of 2½ points from recent sales.

The sweeping victory of Mark Hanna and the Republican party in Cleveland had a tendency to strengthen the demand for Cleveland Electric, which is controlled by Hanna and his friends, and after several sales the price advanced to 66¾, but after unfavorable reports from New York markets, it dropped back to the old price of 65. Aurora, Elgin & Chicago common became quite active during the week, after an inactivity of several weeks. Two lots sold at 16 and then it fell to 15 for another 100 shares. Northern Ohio Traction & Light declined to the lowest figure it has yet reached, 13⅞, with other sales at 14 and 14½. A small lot of Northern Texas Traction sold at 30; the stock is in good demand at that figure, but offerings are few. A block of Northern Ohio Consolidated 5s sold at 95½, a decline of two points from last sale.

Security Quotations.

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

	Closing Bid	
	Oct. 27	Nov. 10
American Railways	41¾	42
Aurora, Elgin & Chicago	12	—
Boston Elevated	140	140
Brooklyn Rapid Transit	347½	37
Chicago City	169	165
Chicago Union Traction (common).....	7¼	5½
Chicago Union Traction (preferred).....	32	28
Cleveland Electric	64	65
Consolidated Traction of New Jersey.....	60	60
Consolidated Traction of New Jersey 5s.....	104½	105
Detroit United	60¼	64
Elgin, Aurora & Southern	a56	a56
Lake Shore Electric	—	—
Lake Street Elevated	3½	3
Manhattan Railway	134¾	138¾
Massachusetts Electric Cos. (common).....	19	18
Massachusetts Electric Cos. (preferred).....	77½	76
Metropolitan Elevated, Chicago (common).....	17	17
Metropolitan Elevated, Chicago (preferred).....	55	55
Metropolitan Street	110	111½
New Orleans Railways (common).....	7¼	7½
New Orleans Railways (preferred)	a28½	28
North American	75	70½
Northern Ohio Traction & Light.....	15	12½
Philadelphia Rapid Transit	12½	11½
Philadelphia Traction	94	95
St. Louis Transit (common).....	14	13½
South Side Elevated (Chicago).....	92	90¼
Third Avenue	105	108

	Closing Bid	
	Oct. 27	Nov. 10
Twin City, Minneapolis (common).....	86	86½
Union Traction (Philadelphia).....	44¼	43⅞
United Railways, St. Louis (preferred).....	61	59

a Asked.

Iron and Steel

The principal incident in the iron market during the last two weeks has been the cut announced by the steel billet pool from \$27 to \$23 a ton. No action has yet been taken in the matter of lowering the quotation for steel rails, but it is expected that a cut cannot much longer be delayed in the price of this product, in view of the general decline in steel and iron schedules elsewhere. These reductions in prices conform to the knowledge which has been common property long before this, that business in the steel trade has been falling off very heavily during the last few months, and that whether the reaction goes further or not a readjustment of market quotations was necessary in order to meet the altered conditions. While the finished branches of the trade are thus preparing for a period of diminished consumption, the producers of pig iron have decided to continue their agreement to curtail output for another month at least. Probably when the new time-limit expires it will be found advisable to continue the agreement indefinitely. Quotations are as follows: Bessemer pig iron \$15.85, steel billets \$23, and steel rails \$28.

Metals

Quotations for the leading metals are as follows: Copper 13½ cents, tin 25½ cents, lead 4½ cents, and spelter 6⅞ cents.

REORGANIZATION OF LAKE STREET ELEVATED RAILROAD, CHICAGO

A compromise has apparently been reached by several factions in the Lake Street Elevated Railroad Company, of Chicago, whereby a reorganization will be effected. Those agreeing upon this compromise are the directors of the company, the protective committees of the income bond and stockholders, the representatives of Blair & Company, bankers, of New York, and the Northwestern Elevated Railroad Company. The following plan was evolved in a series of conferences lasting over a week, the plan being in the form of a compromise. The plan provides for the incorporation of a new company which is to take over the assets of the Lake Street Elevated Railroad Company. This new company will have a lower capitalization than the present company, having \$6,000,000 in common stock as against \$10,000,000 of the present company; \$3,200,000 of preferred stock as against none in the present company; \$5,000,000 of first mortgage bonds as against \$5,860,000 in the present company, and no income bonds as against \$1,023,550. The present outstanding issue 5 per cent first mortgage bond issue is to be called in and stamped redeemable at 105 on any interest date and returned to the holders. Later, when there is an opportune market, this issue will be refunded and reissued in 4 per cent bonds. The \$3,200,000 of new 5 per cent preferred stock is to be issued thus: \$2,000,000 to the underwriting syndicate which will furnish new money; \$800,000 to the holders of the present income bonds and \$400,000 to the present holders of the common stock. The common stock is to be issued as follows: \$4,000,000 to the present holders of common stock who will give in return for it their present \$10,000,000 of common stock and \$200,000 in new cash; \$2,000,000 of the common stock to go to the underwriters syndicate. This will amount to an assessment of \$2 per share on present common stock. Under this plan the first mortgage bondholders will receive dollar for dollar on their holdings in the shape of new securities. The holders of the income bond will receive \$800,000 in preferred stock in exchange for \$1,000,000 of income bonds, or 80 per cent of the face value of these bonds. The common stock holders will receive \$2 preferred stock for each \$1 assessment paid and will get two shares of new common stock for each five turned in. The underwriting syndicate, which, supposedly, will be headed by Blair & Company, will pledge itself to raise \$1,400,000 of cash. It will receive for this \$2,000,000 of preferred stock and \$2,000,000 common stock and \$5,000,000 of first mortgage bonds. The Northwestern Elevated has agreed to accept a note for \$350,000 due in five years at 2 per cent interest as payment for its claims against the road, which amount to over \$700,000. It is agreed by all parties that the receivership is to be dissolved.

CONTRACTS LET HERE FOR JAPANESE ROAD

Some important contracts have just been let in the American market for rails, bridge material, trucks, motors and power house equipment for the Hanshin Railway, which is to be a high-speed road operating between Kobe and Osaka, Japan. The system will be about 20 miles long. Japanese capital is exclusively interested in the undertaking. Four thousand tons of 60-lb. steel rails have been ordered from the Carnegie Steel Company's branch of the United States Steel Corporation. About 600 tons of bridge material have also been contracted for through the same source. Nineteen Brill trucks—double ones—have been requisitioned for. The motors will be of Westinghouse build, No. 68. There will be four 400-kw generators, direct-connected by McIntosh-Seymour horizontal cross-compound engines of 600-hp capacity each. The contract for the generators has been placed with the General Electric Company.

SAN FRANCISCO ARBITRATION BOARD DECIDES IN FAVOR OF EMPLOYEES

The terms of the decision reached on Tuesday, Nov. 3, by the arbitration committee which for several months has been hearing testimony in regard to the labor dispute between the Amalgamated Association of Street Railway Employees and the United Railroads, of San Francisco, have just been made public by Oscar S. Straus, the third commissioner, chosen by Col. Patrick Calhoun and W. D. Mahon, who represented respectively the street railway companies and the employees.

In the introductory passages of the announcement of its findings the committee considers standards of wages and of the cost of living on the Pacific Coast, as compared with other parts of the country. It points out that of 345 street railways from which statistics were obtainable, only four pay a higher rate than those of San Francisco, and finds that during the last year the rent of the rooms or apartments such as the employees in that city would live in has advanced about 10 per cent.

The four clauses of the actual award are as follows:

First—That the United Railroads of San Francisco pay to such of the members of Division No. 205, Amalgamated Association of Street Railway Employees of America, who are now and have been in their employ for a period under two years prior to April 1, 1903, an increase of 5 per cent above 25 cents an hour, and to such of said employees who are now and have been prior to April 1, 1903, in their employ two years and over, an increase of 10 per cent above 25 cents an hour, and that for overtime the like percentages of increase above the present rate be paid.

Second—That the United Railroads of San Francisco pay to such of its employees who are members of Division 205, Amalgamated Association of Street Railway Employees of America, who work by the day, and who are now and have been in their employ for a period of under two years prior to April 1, 1903, an increase of 5 per cent above the daily rate of wage they are now receiving, and to such of said employees who are now and have been prior to April 1, 1903, in their employ two years and over, an increase of 10 per cent above the rate of wage they are now receiving.

Third—That the same hours and schedules that now obtain be continued. It is always within the province of the railroad on the one side and the employees on the other to amend their schedules by mutual agreement. We therefore decline to disturb the present schedule.

Fourth—In accordance with the agreement under which this arbitration was entered upon, the wage rate adjudged and awarded shall be deemed to go into effect as of the 1st of May, 1903, and continue until the 1st of May, 1904.

The award is made by Messrs. Straus and Mahon, Col. Calhoun, representing the street railway company, declining to concur in it.

ANNUAL REPORT OF THE MONTREAL STREET RAILWAY COMPANY

The annual report of the Montreal Street Railway Company for the year ending Sept. 30, 1903, was submitted to the stockholders of the company at their forty-third annual meeting, held on Wednesday, Nov. 4. The report shows gross earnings for the year of \$2,222,787 as compared with \$2,046,208 for 1902. The operating expenses for 1903 were \$1,316,848, as against \$1,135,176 for 1902. The net earnings decreased, the amount for 1903 being \$905,939, as against \$911,032 for 1902. After providing for the percentage of earnings accrued to the city and the interest on bonds and loans, four quarterly dividends amounting to \$600,000 were paid. During the year the company placed to the credit of the fire insurance fund an additional sum of \$25,000, which increased the total amount to \$239,377. As \$50,000 was placed to the credit of the contingent account, a surplus of \$9,907 was left. This was transferred to the general surplus account of the company. The increase in the percentage of operating expenses to gross earnings was due to the heavy increased rate of wages paid

in all departments, the increased amount spent on the maintenance of the company's property and the increased percentage paid to the city on gross earnings. Several new and important extensions were made to the company's system, and such increases were made in the equipment as to meet the requirements of the traffic. During the year \$1,000,000 of new stock was issued to provide for extensions of the company's lines and additions to its rolling stock and equipment. This stock was offered to and subscribed for at par by the stockholders on record on Oct. 14. In order to improve the condition of its employees, the company has assisted in the establishment of a mutual benefit association to provide life insurance, relief in case of sickness and accident, and to pension those who have served faithfully for a stated period. James Ross, vice-president, resigned during the year, and F. L. Wanklyn was elected in his place. During the year the company paid to the city \$121,299, covering all taxes, and \$47,168 on account of snow clearing, making a total sum of \$168,467. The general statistical statement follows:

	1903	1902
Gross receipts.....	\$2,222,787	\$2,046,208
Increase 1903 over 1902 8.63%.....	176,579
Operating expenses.....	1,316,848	1,135,176
Increase 1903 over 1902 16%.....	181,672
Operating expenses—		
Per cent of car earnings.....	60.20	56.39
Net earnings.....	905,939	911,032
Decrease 1903 over 1902.....	5,093
Net income per cent of capital.....	11.41	11.68
Passengers carried.....	54,592,014	49,947,467
Increase 1903 over 1902 9.30%.....	4,644,547
Transfers.....	16,774,595	15,077,511

The profit and loss account shows:

	1903	1902
City percentage on earnings.....	\$107,183	\$95,115
Interest on bonds and loans.....	113,848	114,951
Dividends (payable quarterly).....	600,000	600,000
Transferred to fire insurance fund.....	25,000	100,000
Transferred to contingent account.....	50,000
Transferred to surplus.....	9,908	966
	\$905,939	\$911,032
Net earnings from operation.....	\$905,939	\$911,032

The balance sheets follow:

	ASSETS	
	1903	1902
Year ending Sept. 30		
Cost of road and equipment:		
Construction, etc.....	\$3,650,222	\$3,539,823
Equipment, etc.....	3,287,161	3,063,068
Real estate and buildings.....	1,627,009	1,616,925
M. P. & I. Ry. Co's. stock and bonds....	1,160,105	1,159,297
Stores.....	159,531	76,086
Accounts receivable.....	113,596	57,277
M. P. & I. Ry. Co.....	169,166	122,501
Cash in bank and in hand.....	32,931	95,383
Cash on deposit with City of Montreal..	25,000
Fire insurance fund investments.....	206,000	100,000
	\$10,405,721	\$9,855,360
	LIABILITIES	
	1903	1902
Capital stock.....	\$6,000,000	\$6,000,000
Bonds:		
5 per cent payable March, 1908.....	292,000	292,000
4½ per cent payable August, 1922....	681,333	681,333
4½ per cent payable November, 1922..	1,500,000	1,500,000
Mortgages.....	6,035	6,034
Bank of Montreal loan.....	407,456
Accounts and wages payable.....	109,020	100,808
Accrued interest on bonds.....	33,350	33,275
Accrued tax on earnings.....	114,035	101,748
Employees securities.....	10,302	8,490
Unclaimed dividends.....	1,957	1,957
Unredeemed tickets.....	22,966	20,401
Suspense account.....	139,511	62,490
Dividend payable Nov. 1, 1903.....	150,000	150,000
Fire insurance fund.....	239,377	204,222
Contingent account.....	179,636	183,766
Surplus.....	518,743	508,836
	\$10,405,721	\$9,855,360

CHICAGO CITY RAILWAY FRANCHISE EXTENSION ORDINANCE

The proposed franchise extension ordinance of the Chicago City Railway Company prepared by the franchise sub-committee of the local transportation committee of the Chicago City Council and representatives of the Chicago City Railway Company has been completed and is now before the transportation committee for consideration. The document goes into details of construction, equipment and operation to a much greater extent than is generally done in ordinances of this character. It is divided into thirty-two sections, contains several exhibits and tables, specifications for the improvements contemplated and statistics prepared by transportation experts supplementary to the principal document itself. It is expected that whatever ordinance may be passed for the Chicago City Railway Company will be taken as a model for similar grants to the North Side and West Side systems, so that they may permit of harmonious operation and the adoption of universal transfers. The only feature of the problem that still remains unsettled, as far as the city's representatives are concerned, is the question of compensation. This section of the ordinance has been prepared, but the amount of compensation and the percentage have been left blank.

During the discussion of the franchise problem the principal features of the proposed ordinance have been discussed in these columns, and it is only necessary at this time to enumerate the more important points covered.

Preliminary to the terms of the ordinance itself is presented a declaration on the part of the city denying the validity of the claims of the company under the "ninety-nine-year act" and requiring the company to waive all rights under this act in consideration of the granting of the present franchise extension. The several ordinances under which the company is now operating expire at different times, and it is contended by the city that in order to obtain the best results and to furnish the South Side with proper transportation service it will be necessary to reorganize the entire system and reconstruct a considerable portion of it, and that this can only be done properly if the franchise privileges of all the lines extend over a common period. But of even greater importance in the view of the city is the fact that this plan provides for the termination of all ordinances at the same time, thus enabling the city to deal with the transportation problem as a whole when the rights now conferred shall expire. In case the city shall decide to purchase the property of the company at the end of twenty years, or grant a franchise to another corporation which shall take over the plant of the present owners, the valuations shall be fixed by a board of appraisers, but it is distinctly specified that in fixing the price to be paid for the property the earning power or franchise valuations shall not be considered.

The privileges, powers and obligations covered by this ordinance may be concisely enumerated as follows:

Section 1 designates the term of the life of the franchise as twenty years.

Section 2 directs the immediate construction of a new power plant, the introduction of an underground conduit system in certain parts of the city, and the reconstruction of such portions of the overhead line, track and roadbed as may be deemed necessary to put the entire plant and equipment in first-class condition.

Section 3 provides for electric operation throughout. The company is directed to install on Clark Street, north of Twelfth Street, Wabash Avenue, and State Street, north of Eighteenth Street, and on all downtown loops, an underground conduit system.

Section 4 authorizes the use of the overhead trolley on all other lines excepting those designated in Section 3 for underground conduits.

Section 5 reserves to the city the right to use the poles of the company to carry signal, telephone, telegraph and electric light wires and lamps for city service.

Section 6 permits the company to lease its poles to other companies for carrying electric conductors.

Section 7 empowers the company to construct a system of conduits for carrying its transmission wires and feeders within that portion of the city lying east of Halstead Street, north of Sixty-Third Street and south of the Chicago River.

Section 8 directs the city electrician to supervise the construction of all lines, and makes his approval of such work necessary for its acceptance.

Section 9 relates to track construction and specifies the methods and materials to be employed. Trilby rail weighing not less than 100 lbs. per yard is named as the standard, but certain exceptions are made, where girder rails may be used, and the conditions governing such cases are specified.

Section 10 requires the company to fill, grade, pave, keep in

repair, sweep, sprinkle and keep clean 8 ft. in width of all streets and public ways occupied by a single-track railway, and 16 ft. in width of all streets in which double tracks are laid. Provisions for the removal of snow and ice are also made. Specifications for the repair of roadways are included in this section.

Section 11 and Section 12 relate to the operation of cars. Only passenger and mail cars can be operated under this ordinance, and each service is to be kept distinct and separate. Passenger cars shall not be used for any other purpose, and mail cars are to be devoted exclusively to the service of the United States Post Office Department. Many features of design, construction and equipment of the passenger cars are described, such, for instance, as the vestibuling of closed cars, provision for heating them in cold weather and the seating arrangement. Power brakes as well as hand brakes are required for all double-truck cars, and the present practice of running trains of two or more cars is forbidden, single cars being the rule hereafter.

Section 13 authorizes the city to make an arrangement with the company for the sprinkling of the entire roadway, wherever possible, and also for the removal of street sweepings, garbage, or other refuse at night wherever practicable, the rate of compensation to be agreed upon in advance of the performance of this service. The company shall also have the right to carry materials for its own use or for the use of the city over its lines during the night.

Section 14 gives cars the right of way over tracks, and requires all other vehicles to make way for them so as not to impede the movement of the cars.

Section 15 prohibits the issuing of passes or free tickets by the company, except to its own employees and city detectives presenting written requests for them signed by the chief of police of the city. Policemen and firemen in full uniform shall be permitted to ride free.

Section 16 requires the company to remove all tracks not in use.

Section 17 and Section 18 are devoted to the subject of fares and transfers and embody features already discussed.

Section 19 relates to the establishment of a surface loop system and also the common use of tracks by the North Side and West Side Companies as well as the South Side Company within the district specified.

Section 20 deals with the matter of compensation, but, as already mentioned, the rate is not specified.

Section 21 forbids the company removing its offices beyond the limits of the city during the term of the franchise, and also prohibits the sale or transfer of rights in the ordinance except by way of mortgage to secure funds for necessary improvements to its tangible property, and the company is further prohibited from entering into any consolidation or combination except after having first secured the approval and consent of the City Council. The company is specifically forbidden to mortgage its street railway property and such rights as it enjoys under this ordinance for indebtedness maturing later than the date of the expiration of the franchise, as such action might prevent it from conveying to the city or to any licensee of the city, all of its property clear of encumbrance at that time.

Section 22 contains provision for the indemnification of the city against damages.

Section 23 directs the company to make a detailed report not later than Jan. 15 each year covering its operations during the previous year, and authorizes the comptroller of the city to inspect the books of the company at any time.

Section 24 authorizes the city to declare the privileges conferred by this ordinance forfeited in case the company fails to observe the terms of the agreement.

Section 25 empowers the city to intervene in suits affecting the work here authorized where it is believed such actions might be instituted with the connivance of the company for the purpose of delaying these improvements or otherwise jeopardizing the interests of the community.

Section 26 enumerates the terms under which the company shall use the subways which it is proposed to build through the downtown business district, provided they are completed and ready for the operation of cars through them before the expiration of the franchise.

Section 27 vests authority in the Council to require the extension of lines in any street where the service is needed and the patronage will be sufficient to warrant the improvement.

Section 28 confers on the city the right to buy the railway property at the expiration of the grant, and outlines the method of procedure for determining the valuation and fixing the terms of the purchase.

Section 29 indicates the alternative in case the city is not prepared to buy the property at the expiration of the franchise. The city may grant a franchise to another company or make a new

grant to the present company upon new terms to be agreed upon.

Section 30 provides for the ninety-nine-year waiver.

Section 31 reserves to the city the right to make such additional regulations as may be necessary to secure the highest degree of efficiency in the service for the community.

Section 32 directs that the ordinance shall take effect upon its acceptance by the company, but, in case of failure to comply with the requirements, including the filing of the bond and the formal assent to the terms and conditions within sixty days, all rights and privileges are nullified.

Accompanying the ordinance and comprising a part of it are several exhibits. These include a list of the routes at present occupied by the company, and those over which it is proposed to extend the lines of the system, also an outline of the work to be done, including the establishment of a new power system and the construction of an underground conduit system in the downtown business district.

UNION LOOP CONTROVERSY

A movement has been started in Chicago by business men along the route of the Union Elevated Loop for the purpose of securing certain concessions from the management. The new organization will be known as the Loop Protective Association, and its object, as stated at the initial meeting, is to prevent any further encroachment over the streets, such as the extension of platforms, to secure the removal of all advertising signs on platforms and in cars, the removal of disused stairways along the route and the lessening of the noise along the loop. The association has retained an attorney to look after its interests. The members declare that the loop has injured their business by darkening the street and creating the nuisance of constant noise. They were from the first strenuous advocates of the removal of the signboards at the stations because of their darkening effect, and now the association is engaged in drawing up an ordinance compelling the loop company to take measures for abating the noise caused by the running of trains. The City Council will be asked to pass this ordinance.

CHICAGO UNION TRACTION CERTIFICATES OF DEPOSIT TO BE EXCHANGED

Announcement has been made to stockholders of the North Chicago Street Railroad Company, the West Chicago Street Railroad Company, and the Chicago Union Traction Company, the three transportation companies whose stock interests here have been in the hands of a protective committee for reorganization purposes, that certificates of deposit may now be exchanged again for the original stock certificates through the Guaranty Trust Company. The protective committee has secured relief of the Chicago Union Traction Company from the financial burdens it was under by reducing the lease rentals on the North Chicago Street Railroad Company and the West Chicago Street Railroad Company from 12 per cent to 6 per cent, and from 8 per cent to 4 per cent respectively, on an arrangement whereby the amounts withheld are made cumulative for five years. This will enable the reorganized company to devote a large part of its income to development of its property, and will, it is thought, make it possible to come out with a clean sheet when the five years are up.

JURISDICTION OVER CHICAGO UNION TRACTION MATTERS

Henry R. Platt and Horace K. Tenney, attorneys, in contempt of Judge Grosscup's injunction, filed bills in Judge Tuley's court Oct. 31, attacking the Union Traction reorganization plan, which was approved by Judge Grosscup last August. Judge Grosscup is of the Federal Court and has charge of the Union Traction receivership. The court in which the attack on the reorganization plan was filed is a State court. Judge Grosscup issued warrants Nov. 1, summoning the attorneys mentioned to appear before him for contempt of court Nov. 2. This involves a question as to the relative jurisdiction of the two courts.

The temporary restraining orders issued Sunday by Judge Grosscup caused Attorneys Henry R. Platt and Horace K. Tenney to abandon for a week their attempt to secure from Judge Tuley an injunction against the officers of the North and West Chicago Street Railroad Companies. These two attorneys were summoned by Judge Grosscup, of the Federal Court, to appear Nov. 9 and show cause why the restraining orders issued by Judge Grosscup should not be made permanent. The attorneys appeared before Judge Tuley Nov. 2 and stated that the move made

by Judge Grosscup prevented for the present any prosecution of the case in the State Court of Judge Tuley. The attorneys, therefore, asked that the hearing of the motion for injunction presented at Judge Tuley's Court to prevent payment of interest under the reorganization plan be postponed until Nov. 10. Judge Tuley, believing that this was the proper course to pursue, entered an order for this postponement.

Judge Grosscup took up the defense of the jurisdiction of the United States Circuit Court and its exclusive and paramount rule over all questions affecting the Chicago Union Traction Company, the West Chicago and North Chicago Street Railway companies, and answered the arguments made before him by Henry R. Platt and Horace K. Tenney in the question of enjoining the suit brought in the Circuit Court of Cook County, Illinois, before Judge Tuley by them in behalf of Jacob Miller or Meller, a subject of Germany. In the arguments submitted, Attorney Platt took up the question of jurisdiction and insisted that his client had the right to go before Judge Tuley. Judge Grosscup defined his position very clearly in the following statement:

"The Federal Court, in my judgment, has charge of all the assets of the Chicago Union Traction Company, the West Chicago and North Chicago Street Railway companies, for the proper administration of their affairs. This includes the charge of all leases, contracts, franchises and extension of franchises. The modifying of the old leases were absolutely essential to the administration of the properties of these companies. It is a question of business judgment. The law is as elastic as business judgment to fit the necessities. The leases are an important factor, if not practically the entire assets of these companies.

"In the legal relations of these companies, the presence of the new leases as a substitute for the old ones was an absolute essential to prevent the companies from bleeding to death for the proper equipment of the properties in charge of this court and its dealings with the city. This court must be in a position to have power and control over the entire interests, and it must have exclusive control. Without this power and control the companies would not be in shape to negotiate with the city for a renewal of the franchises. This question of a renewal of the franchises is a valuable asset. The administration of the affairs of this company must not be passive, but must be actual.

"I think the law is clear on the point, that when a court, State or Federal, has taken possession of a thing to administer it, all controversies that affect the possession must be settled in the court having charge of the property.

"Interference now might have the result that after the administration of the property by this court had been adjusted and regulated and the receivership discharged the companies might be forced into another receivership by demands upon the old leases, based upon the judgments in the State courts now sought."

CHICAGO UNION TRACTION PROTECTIVE COMMITTEE DISBANDED

On Nov. 4 the protective committee of the Chicago Union Traction Company, formed last winter to prepare plans for reorganization and to conduct franchise negotiations, was formally abolished. This committee voted itself out of existence because conditions have changed, so that there is nothing for it to do. In an address to the stockholders, the committee says: "In view of the pending negotiations with the city by the receivers of the Chicago Union Traction Company and the formation of a new corporation to provide for the obligations of your company and lease its property, your committee deems it unwise for it to undertake independent action in the premises." The new corporation spoken of is the Chicago Railways Company, recently incorporated.

POSITIVE TRACK SANDER

In the description of the new sand-box of the Positive Railway Sander Company, of Lancaster, Pa., published in the last issue, the reader might infer that the vibrations of the truck were transmitted to the sand-box. This is not so, as the box is mounted on the car floor and is consequently spring supported. The vibratory motion of the truck is confined to the hose connection between the outlet of the box and the track, and the constant jar prevents any sand from collecting in this pipe during freezing or damp weather. The flow of sand from the hopper is regulated by the movement of a foot or hand lever which, by the movement of a corrugated plate gives a vibratory motion to the hopper, shaking out sand only when required.

MUNICIPAL OWNERSHIP IN CHICAGO

The Chicago "Record-Herald" recently editorialized very much to the point regarding the efforts of certain organizations in Chicago to secure immediate municipal ownership of the street railway lines. Under the head "The Council Acts Wisely," the "Herald" says:

"The jealous watch that is kept upon the local transportation committee of the Council is probably due to the best of motives, but we can think of no plea for open hearings at the preliminary traction negotiations which would be convincing. On the other hand, it is manifest that the so-called secret hearings are favorable not only to the expediting of business but to a thorough thrashing out of the various questions involved. The many irrelevant matters that would be brought up at a town meeting, and that would tend only to confusion, are eliminated, while the businesslike character of the conferences leads to a freedom in dicker-ing that would be simply impossible in any large public gathering. Propositions and counter-propositions will follow each other rapidly, there will be changes of confidences, tentative concessions which may or may not be withdrawn, and ultimately a pretty clear exposition of the limits to which each party is prepared to go. The method is the common method of all business transac-tions, and experience shows that it is absolutely necessary to bring about effective and satisfactory results.

"If, however, the people's rights should be sacrificed, it must be remembered that all this work is merely an introduction to the more definite work of the Council, acting as a representative body in open session, and also that if a sufficient number of persons are dissatisfied with both committee and Council there is the possibility of a final resort to the referendum. Obviously the protection is ample if any wrong should be committed under the programme which has been adopted and affirmed.

"It is clear also that suggestions for immediate municipal own-ership are not at all helpful at the present time, but utterly im-practical. The people who make them are misinformed or have not reflected upon the situation as they should. What will they do with the numerous grants that are now running for varying terms? Can they stop them all instanter and so devise a municip-alized system? What will they do with the ninety-nine-year act and its promise of interminable litigation? Have they absolute power over the law and the courts; can they waive aside suits and injunctions? Evidently they fail to recognize a series of complications of the most puzzling description. Yet these com-plexions exist, and they cannot be undone at a single stroke of a magical wand labeled municipal ownership. The process will be a slow one by agreement and contract so made as to enable the city to venture upon municipal ownership when the times are propitious for the experiment.

"In view of all the facts in the case and of the reasoning that is suggested by them it is plain that the Council acted wisely when it decided to let the transportation committee proceed with its work in its own way."

FIRST MEETING OF THE COLORADO ELECTRIC RAILWAY LIGHT & POWER ASSOCIATION

The Colorado Electric Railway, Light & Power Association held its first meeting Oct. 28 and 29, in the demonstration hall of the Denver Gas & Electric Company, in Denver. The first ses-sion was called at 10 a. m. Oct. 28. J. F. Vail, general manager of the Pueblo & Suburban Traction & Light Company, was in the chair, and the room was well filled with delegates, over fifty being in attendance. President Vail recited among other things the fact that the association was organized Aug. 12, 1903, and that this was the initial meeting. There was no reading of papers in the forenoon, that part of the programme being skipped to take up general business and reports of the several committees which were appointed to get the new association under way. In the afternoon L. C. Stockton discussed "A Few Advertising Hints," and C. W. Humphrey presented a paper on "Meters." A question box was opened.

When the association met for the second day's session, W. A. Layman, of the Wagner Electric Manufacturing Company, of St. Louis, read a paper on "Single-Phase Motors as a Means of In-creasing Central Station Earnings." Then L. L. Summers, one of the engineers of the Denver Gas & Electric Company, read a paper on "Steam Economics." The delegates then went into exe-cutive session to elect officers. The selections resulted as fol-lows:

J. F. Vail, of Pueblo, re-elected president, which office he has held since the organization of the association; William Mayhu, of Greeley, re-elected vice-president; George B. Tripp,

of Colorado Springs, re-elected secretary and treasurer. The members of the finance committee chosen were F. F. Webber, Charles Beeley and L. J. Kelin. The membership committee con-sisted of C. W. Badgley, C. E. Doolittle and C. H. Peters. Then J. E. Lundstrum and J. A. Beeler were added to the executive committee and the executive session was closed.

In the afternoon the members went on a trolley ride to the coal mines of the Denver & Northwestern Company, at Leyden. They rode in the private car of General Manager J. A. Beeler, of the Denver City Tramway Company.

Among the twenty-two active State corporations with repre-sentatives at the meeting were: Durango Light & Power Com-pany, Larimer Light & Power Company, Las Animas Electric Light Company, Colorado Springs Electric Company, Leadville Gas & Electric Company, Boulder Electric Light & Power Com-pany, Pueblo & Suburban Traction & Light Company, Las Ani-mas Light, Power & Manufacturing Company, of Trinidad, Ar-kansas Valley Electric Company, Gilpin County Light, Heat & Power Company, of Black Hawk, Denver Gas & Electric Com-pany, Denver City Tramway Company, La Junta Electric Com-pany, Greeley Electric Light Company, Crested Butte Water & Power Company, Roaring Fork Electric Light & Power Com-pany, of Aspen, Loveland Light, Heat & Power Company, Lamar Electric Company, La Belle Mill, Water & Power Company, of Goldfield, Colorado Electric Power Company, of Canon City, Colorado Springs & Interurban Railway Company, and Pagosa Springs Electric Light & Power Company.

Among the eighteen associate members represented were: Albert Sechrist Company, of Denver; E. C. Means, of Denver, agent Adams-Bagnall Company; Phelps Company, of Detroit; Western Electric Supply Company, of St. Louis; National Carbon Company, of Cleveland; Mutual Oil Tank Line, of Omaha; W. A. Layman, of the Wagner Electric Company, of St. Louis; Westinghouse Electric & Manufacturing Company, of Pittsburg; Gilbert W. Kes & Company, of Denver; Allis-Chalmers Com-pany, of Chicago; American Steel Wire Company and B. K. Sweeney, of Denver; B. F. Vreeland, of Denver; W. L. Otis, of Denver, and George A. Woollet, of Denver.

ANNUAL REPORT OF THE MANHATTAN ELEVATED RAILWAY

The annual meeting of the Manhattan Elevated Railway Com-pany, of New York, was held on Wednesday, Nov. 11. Attention was called by President Gould to the lease of the company on April 1, 1903, to the Interborough Rapid Transit Company, also to the fact that since the last annual meeting the electrical equip-ment of the lines has been completed. The official operating report gives separate figures of the Manhattan and Interborough companies, but compiled figures for the twelve months ended Sept. 30, 1903, show:

	1903	1902
Gross receipts.....	\$12,651,977	\$11,067,746
Operating expenses.....	5,429,474	5,545,395
Net earnings.....	\$7,222,503	\$5,522,351
Other income.....	345,859	515,800
Total increase.....	\$7,568,362	\$6,038,151
Interest and taxes.....	2,844,564	2,712,089
Surplus	\$4,723,798	\$3,326,062
Dividends	3,894,000	1,920,000
Surplus	\$829,798	\$1,406,062

The surplus after charges of \$4,723,798 is equal to 8.55 per cent earned on the \$55,200,000 capital stock.

The officers and directors were re-elected.

BRILL CARS AND TRUCKS FOR FOREIGN COUNTRIES

The J. G. Brill Company, of Philadelphia, has various British, Portuguese, South American and New Zealand contracts in hand. Sixteen center-pivotal trucks, 27-G type, and seventy trucks, 21-E type, for four-wheeled cars, are to be shipped to the Electric Tramway & Carriage Works, Ltd., Preston, which concern is largely controlled by the British engineering and contracting firm of Dick, Kerr & Company, Ltd. The Compania Carris de Ferro de Porto Lisboa, of Lisbon, Portugal, has ordered twelve trucks, 21-E type, for four-wheeled cars. Fifty cars have been requisitioned for shipment to Buenos Ayres tramways. A Brill con-vertible car is to be exported to New Zealand for experimental use on the electric traction system now under construction at

Wellington by the British electrical engineering and contracting firm of Macartney, McElroy & Company, Ltd. As previously mentioned in these columns the Brill Company is to build the trucks for the same road.

CONTRACTS PENDING FOR TOKIO STREET RAILWAY

The Tokio-Shigai Railway (Tokio Street Railway), which has at present in operation a short street railway system in the Japanese capital, and is building 20 odd miles of double track, has decided to erect a power plant for the purpose of operating the system. At present power is taken from the Tokio Electric Light Company's plant, the General Electric Company having received the contract for the converters—five machines of 120-kw capacity each. The capacity of the new plant will be about 5000-hp. The specifications call for four 800-kw alternating-current railway-type generators, direct-connected to 1200-hp horizontal compound-condensing engines. Last summer contracts were placed with European companies for 100 trucks and double motor equipments. Dick, Kerr & Company, of London, secured the contract for the trucks. Recently 100 trucks were ordered in Germany. The double motors for these will be manufactured by the General Electric Company.

REPORT OF RAILROAD COMMISSIONERS ON POWER SITUATION IN NEW YORK CITY

The Board of Railroad Commissioners of the State of New York, under date of Nov. 5, issued a report in regard to transportation conditions in Greater New York. The report gives by months the number of passengers, transfers, car mileage, greatest number of passengers carried per day, number of employees and cars in service during June, July and August for all of the street railway companies in the city.

Regarding the power situation, the commissioners state that the Brooklyn Heights, the Coney Island & Brooklyn, the New York & Queens County, the New York & North Shore, and the Manhattan Elevated Railway companies have not sufficient power of their own fully to supply and operate their lines, and recommend in the case of several of these companies an increase in power station capacity. The Interurban Street Railway Company and the Union Railway Company have ample power to operate more than the maximum number of cars now in use. Statistics are also given of the power station capacity of the different systems and the provisions being made for their increase.

MORE SOUTH AMERICAN RAILROAD PROJECTS

The construction of a number of electric railways is projected in the Argentine Republic and Brazil. Advices from Buenos Ayres state that a considerable portion of the Tramway Rural, which is a cable system owned by Frederick Lacroze e Hijo, in the Argentine Republic capital, is to be operated by electricity. The road is more than 22 miles in length.

The Public Works Department of the Buenos Ayres Municipal Council has reported favorably on a proposal made by Doll & Galazar for the construction and operation of an electric traction system to run between Plazo Constitucion and the Liniers slaughter houses, passing through Flores and Vélez Sarsfield. This line will be about 5 miles long.

Eugenio de Andrade has secured a concession to construct a road between Rio de Janeiro and Petropolis, not less than meter gage, passing by the parishes of Santa Anna, San Christovao, Inhauma and Iraja, of the Brazilian capital, and by those of Merity, Pilar and Estrella, located in the State of Rio de Janeiro. The length of the road will be about 60 miles. The franchise permits of the concessionaire carrying on the undertaking without subsidy for a period of seventy years, after which time the road is to revert to the Brazilian Government.

REPORT OF THE SARATOGA CONVENTION

The verbatim report of the twenty-second annual convention of the American Street Railway Association, held at Saratoga Springs last September, has just been published by the secretary. It is an attractive looking pamphlet, larger than usual on account of the extent of the papers, and contains an excellent steel-engraving of President Hutchins, a list of the members of the association, attendants at Saratoga, etc. In the power station discussion some diagrams of the new 50,000-kw station of the Philadelphia Rapid Transit Company, furnished by W. S. Twining, chief engineer of the company, have been included. This station will

contain ten Westinghouse 5000-kw turbo-generators which will generate 25-cycle current at 13,200 volts. The value of the papers presented at Saratoga has already been referred to, and this year's report will prove a valuable addition to the Transactions.

CHICAGO RAILWAY STRIKE

The employees of the Chicago City Railway Company voted by a large majority at a ballot held on Nov. 5 and 6 to insist on the demands for higher wages, the employment of none but union men and many other minor demands, published in the STREET RAILWAY JOURNAL of Oct. 17, 1903. These demands had been presented to the management twice and had been refused with full statement of the reasons for refusal. It was generally understood by the employees that the vote to stand by their demands meant to strike in case the management would not reconsider its action, unless a compromise could be effected in some way.

The "strike" order went into effect Thursday morning, but at this writing the outcome is uncertain. The company is prepared to operate its cars, and the mayor claims that provision has been made for protecting life and property; but the men have taken measures to cripple the service and a clash is feared. A special detail of police has been placed under an "assistant chief," an office created to meet the present emergency, and this would indicate that serious trouble is anticipated by the city government.

BRILLIUM AS FUEL

Since the demonstration made of the value of Brillium as fuel by Harold P. Brown under the boilers of the Grand Union Hotel during the Saratoga convention, Mr. Brown has received reports on a number of other tests of the fuel, which indicate a very marked reduction in the cost of coal when this material is used. Some figures from tests conducted at Station B, of the New York Steam Company, last month are presented below:

NEW YORK STEAM COMPANY. BOILER TESTS, STATION B		
Oct. 15, 1903 With Brillium		Oct. 16, 1903 No Brillium
6	Hours duration	6 hours
93	Pressure	93
155	Temperature of water	155
5,625	Pounds of coal burned	6,575
1,875	Pounds of coke dust	None
1,364	Pounds of ash	668
	.182 Per cent of ash	10
55,302	Total water, lbs.	50,062
9.85	Water per lb. of coal, actual	7.61
10.81	Water per lb. of coal 212°	8.35
7.37	Water per lb. of fuel, actual	7.61
8.09	Water per lb. of fuel 212°	8.35
307 to 333	Boiler H. P. (30°)	278
Barley 75%	Kind of coal	Barley coal only
25% & Brillium	Coke breeze	None
344	Temperature of flue gases	348
7/8"	Average forced draft	7/8"

During the second hour and fifth hour of this test the boiler developed 333½ H. P.

Another concern which is using this material is the Marine Engine & Machine Company. F. A. Scheffler, general manager of the company and who is known in street railway work through his connection with the Walker, Stirling Boiler and other manufacturing companies, reports as a result of the week's run on all coal a reduction of 25 per cent from the cost of coal when Brillium is used. At the Saratoga Grand Union Hotel test the saving was considerably more.

A few words in regard to the theory and nature of the new material may be of interest in this connection. Brillium is supplied in the form of a powder, which is not itself combustible but will dissolve in five or more times its weight of water. Fifty pounds of the material are usually mixed with 250 lbs. of water and the mixture is then spread over a ton of coal and cinders. Where the cinders are high in carbon good results are obtained by using a large proportion of cinders, say 70 per cent, otherwise equal parts of coal and cinders are used. Where the coal is in large sizes, no particular advantage is gained from the use of the Brillium, as the material remains on the outside of the coal and does not mix thoroughly with the combustible; excellent results, however, have been obtained with smaller sizes and with coal dust. The effect of the heat of the fire is to decompose a portion of the water in the Brillium, the hydrogen burning and the oxygen uniting with the carbon in the cinders and the coal. Mr. Brown's attention was attracted to the material as the result of a study of the waste products from acetylene gas manufacture, consisting largely of slacked lime. His experiments with this mixture showed that there was a means of producing calcium from slaked lime by the use of several active reagents to give the results secured by the material now on the market.

MORE LOW FARE LINES IN CLEVELAND

A proposition to build and equip four street railways to be operated at straight two-cent fares was received by the city clerk of Cleveland last week, when proposals were opened for new low-fare lines. The proposition was made by Will Christy, a prominent electric railway operator, through his attorney, C. W. Collister, and was a great surprise to the members of the present city administration. Mr. Christy's proposal calls for a two-cent cash fare, thirteen tickets for 25 cents, twenty-six tickets for 50 cents and thirty-two tickets for \$1. The streets on which he would like to build are: Denison Avenue, Rhodes Avenue, Summit Street and Doan Street. One other bid was received. This was from the Forest City Street Railway Company, organized a few weeks ago, it is understood, for the purpose of relieving the People's Street Railway Company of its franchises. The proposal of this company covered Summit Street, from Erie Street to Seneca Street, a distance of half a mile. The bid was for a three-cent fare, five tickets for 15 cents, seventeen tickets for 50 cents and thirty-four tickets for \$1. Each bid was accompanied by a forfeit of \$5,000, the total of \$25,000 being handed to the city clerk in cash.

Mr. Christy's proposal created the biggest sensation that has occurred in Cleveland street railway circles in years. Mr. Christy is vice-president of the Northern Ohio Traction & Light Company. He has been prominently identified with many of the projects of both the Everett-Moore and the Pomeroy-Mandelbaum syndicates, and is regarded as one of the largest traction operators in Cleveland. He is president of the Cleveland Construction Company, of Akron, and has built a number of prominent roads. Neither Mr. Christy nor his attorneys will say anything regarding their plans.

By some people it is believed that the proposal is a starter for a city system formed for the purpose of bringing the interurban roads into the city over their own tracks. The present traffic arrangement with the city company gives the interurbans two cents per car mile for the use of their cars while on the city tracks, and the interurbans turn over the whole amount collected in city fares. Whether a two-cent fare would be a more profitable arrangement for the interurbans, in view of the investment and cost of power, is a question that is being debated by well-informed people. As opposed to this view of the situation is the fact that only two of the streets, Denison Avenue and Rhodes Avenue, would be available for bringing an interurban line into the city, and this line is the Cleveland & Southwestern Railway, whereas the supposition is that Mr. Christy would first be interested in assisting the Northern Ohio Traction & Light Company into the city, since this line is handicapped more than any of the others by the necessity of long city hauls and slow city schedules. Another confusing point is that Denison Avenue is already held by the People's Street Railway Company, which has constructed about two miles of track for its proposed three-cent fare line. However, this route is free territory, and another company could get into the center of the city by paying its share of the cost of building and operating the line.

Mayor Tom L. Johnson, the supposed backer of the three-cent fare lines, has voiced the opinion that Mr. Christy is backed by the Cleveland Electric Railway, and is endeavoring to work some sort of a scheme to block the three-cent fare company. The officials of the Cleveland Electric Railway affirm that the company is in no way connected with Mr. Christy's project.

STREET RAILWAY PATENTS

[This department is conducted by W. A. Rosenbaum, patent attorney, Room No. 1203-7 Nassau-Beekman Building, New York.]

UNITED STATES PATENTS ISSUED OCT. 27, 1903.

742,154. Car Replacer; Alexander Bouvier, Concord, Mass. App. filed March 10, 1903. Details.

742,157. Car Mover; Norman E. Bunting, Marion, Ia. App. filed June 29, 1903. A bar having a curled heel with a laterally level surface and a shoe adapted to slide forward on the rail to act as a fulcrum.

742,236. Grip for Aerial Wire Rope Tramways; Byron C. Riblet, Spokane, Wash. App. filed March 4, 1903. Details of a cable friction grip.

742,310. Electric Car Heater; Edward E. Gold, New York, N. Y. App. filed Feb. 26, 1903. A plate overlying the heaters and adapted to deflect the heat from under the car seat outwardly and laterally.

742,311. Trolley Finder; Fred A. Graham, Ferdinand F. Carmiencke and John R. Neely, Muncie, Ind. App. filed Jan. 30, 1903. The trolley wheel is provided on each side with rotary

spiral tracks adapted to convey the displaced wire to the wheel.

742,331. Casing for Trolley Wheels; Thomas Kelch, Newport, Ky. App. filed Feb. 2, 1903. One side of the casing is hinged to allow the trolley wheel to be removed and replaced.

742,378. Trolley Contact Device; Wallace L. Baker, Painesville, Ohio. App. filed Dec. 29, 1902. Springs are arranged in the harp to hold the wheel in a normal position, but permit it to tilt when necessary.

742,786. Means for Lubricating the Rails of Street Cars; Elisha K. Green, Los Angeles, Cal. App. filed March 4, 1903. The depression of a lever on the car platform opens a valve in a pipe leading from an oil-supply tank to the rails.

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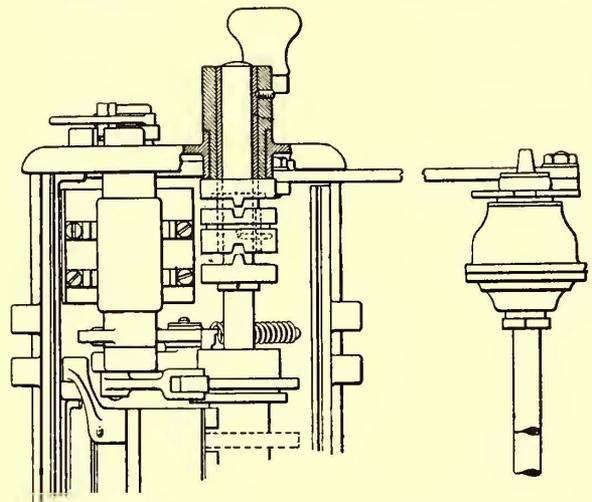
742,933. Electric Motor Controller; Walter N. Vance, Chicago, Ill. App. filed July 2, 1902. A railway controller in which the object is to insure safety in operation, the various parts being interconnected and interlocked to prevent a change of circuit unless the conditions for the change are first made right.

742,967. Combined Motor Controller and Engineer's Valve; Frederick W. Caldwell, Schenectady, N. Y. App. filed May 28, 1903. The motor controlling switch and air brake engineer's valve are so connected as to be operated by a single handle.

742,996. Apparatus for Opening or Closing Railroad Switches; Jonathan S. Jones, Westbend, and Arthur W. McFarland, Sioux City, Ia. App. filed Feb. 3, 1903. Details of automatic switch-throwing mechanism.

743,101. Railway Bond; Henry E. Procunier, Oakpark, Ill. App. filed Sept. 22, 1902. Relates to the formation of the terminal of the bond which is driven into a hole in the rail.

743,153. Trolley Mechanism; Charles I. Earll, New York, N. Y. App. filed Sept. 20, 1901. The trolley cord passes from a spring drum mounted at the base of the pole through the tubular pole and over a sheave at the upper end of the pole.



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743,198. Convertible Car; Hermann Romunder, Newark, N. J. App. filed April 11, 1902. Details of the construction of this car were given in the STREET RAILWAY JOURNAL of Nov. 7, 1903.

743,210. Car Seat; Hubert Witte, St. Louis, Mo. App. filed April 6, 1903. The cushion overhangs the end castings, the brackets secured to the back being bent to pass around the ends of the cushion and having heads seated in recesses formed in the end castings to which they are bolted and having offset ears fitting in openings formed in the end castings.

743,272. Safety Trolley Alarm; William M. Gruner and William C. Fink, Springdale, Pa. App. filed Sept. 14, 1903. A second trolley wheel of wide tread mounted below and to the rear of the main trolley wheel on a sub-trolley arm branching from the main pole, is adapted to engage with the wire when the main wheel leaves it and sound an alarm.

743,291. Convertible Passenger Car; Andrew Kimble, Zanesville, Ohio. App. filed Aug. 14, 1903. Details.

743,331. Means for Removing Sleet, etc., from Electrical Conductors; Elias E. Ries, New York, N. Y. App. filed Sept. 4, 1903. The power rail is made a part of a second circuit carrying a current of large heating capacity.

743,378. Automatic Self-Dropping Trolley Pole; John Deland, Terra Haute, Ind. App. filed March 23, 1903. When the trolley pole rises above the wire a trip is actuated allowing the pole to fall to the roof of the car, the last part of the movement being retarded.

PERSONAL MENTION

MR. DON R. ALMY has resigned as assistant to the solicitor for the Interurban Street Railway Company, of New York, and has opened an office for the general practice of law at 76 William Street, New York. Mr. Almy will be associated in his legal practice with Mr. J. Arthur Hilton.

MR. THOMAS ELLIOTT, formerly general manager of the Pittsburg, McKeesport & Connellsville Railway Company, of Pittsburg, has been appointed chief engineer of the Cincinnati Traction Company, of Cincinnati. The office of chief engineer is a new one with this company, and Mr. Elliott will have charge of all power houses as well as all construction work.

MR. IRA A. McCORMACK, who was formerly connected with the Syracuse and Cleveland street railway properties, was on Nov. 1 appointed manager of the Grand Central Depot and of the Harlem line from Fifty-Second Street to the Mott Haven Yard of the New York Central & Hudson River Railroad Company.

MR. CHARLES T. YERKES arrived in New York on Tuesday, Nov. 10, on the Kaiser Wilhelm II. from London. This is Mr. Yerkes' annual visit to this country, and he had little to say. About the tunnel lines he is building in London he said they were well under way, and that the line from Baker Street to Waterloo will be finished in about a year. He expects to see the entire system completed in five years.

COL. MYRON T. HERRICK, of Cleveland, who overwhelmingly defeated Mayor Tom L. Johnson, of Cleveland, in the race for the Governorship of Ohio, is prominently identified with electric railway enterprises in addition to being president of the largest savings bank in Ohio. He is one of the chief owners of the Pennsylvania & Mahoning Valley Railway Company, of Youngstown, a large stockholder and director of the Cleveland Electric Railway Company, and was one of the members of the bankers' committee that took charge of the affairs of the Everett-Moore syndicate at the time of its embarrassment.

MR. THOMAS M. JENKINS has resigned as general manager of the St. Louis & Suburban Railway Company, of St. Louis, Mo. Mr. Jenkins has been manager of the company for five years, coming to St. Louis from Covington, Ky. Under his management many improvements in service and equipment have been introduced and the system is now regarded as one of the best in the country. Mr. Jenkins has not outlined his plans for the future, but it is understood that he will remain in St. Louis. At present he is a member of the State board of mediation and arbitration, to which he was appointed by Governor Dockery last year.

MR. JOHN C. DANIELS, president of the Garton-Daniels Company, of Keokuk, Ia., died Oct. 25, at his former home at Eau Claire, Wis., where he had gone in the hope of restoring his health. Mr. Daniels was born in New York State in 1840, and was therefore sixty-three years old at the time of his death. He was formerly the owner of a fleet of raft boats operating on the Mississippi River, but in 1892 engaged in the business of the Garton-Daniels Company. He was a man of sterling character, and while his acquaintance among the street railway fraternity was not large, there will be many that will be pained to learn of his death.

PRESIDENT H. S. PRITCHETT, of the Massachusetts Institute of Technology, on Oct. 31 rode in both the Siemens and the Allgemeine cars used in the high-speed experiments on the Berlin-Zossen road, in Germany. As weather conditions were unfavorable, a speed of 100 m. p. h. was not permitted to be exceeded. Mr. Pritchett is the first foreigner to ride in the cars. He expressed emphatically his belief in the commercial success of a speed of 100 m. p. h., and his opinion is that this speed on roads between cities like New York and Washington, with low grades, few curves and heavy ballast, would be exceedingly profitable.

MR. LEWIS R. McCLYMONDS, a director of the Syracuse Rapid Transit Company and largely interested in the Wheeling Traction Company, of Wheeling, W. Va., died at South Orange, N. J., Saturday, Nov. 7, from apoplexy. He was born in Ohio fifty-three years ago. He began business in Cleveland in the Ohio National Bank. Later he became interested in the manufacture of rubber goods, and was in control of the Cleveland Rubber Company, which, under his management, was enlarged until it became one of the leading industries of its class in the West. Mr. McClymonds organized and established the Chicago Rubber Works, and in 1892 identified himself with the New York Belting

& Packing Company in the capacity of president and general manager. In 1902 he retired.

MR. JOHN MAHONEY has been appointed general superintendent of the St. Louis & Suburban Railway Company, of St. Louis, Mo. The announcement of his appointment was made after it had become known that General Manager Thomas M. Jenkins had resigned from the company. Mr. Mahoney is a practical street railway man of nearly thirty years' experience. Since last July he has been connected with the Suburban Company as auditor and purchasing agent. He came to St. Louis in 1874 from Hartford, Conn., and worked his way up from a subordinate place on the old Union Line to foreman of the People's Company, now the Fourth Street line. Later he became superintendent of the Citizen's Railway, now known as the Easton Avenue line, and when this road was sold in 1890 to the syndicate he went back to the People's Company. On the organization of the Transit Company in 1899, when all lines except the Suburban were taken in, he was made division superintendent for the Transit Company. At the instance of President Walsh he resigned from the Transit Company and became connected with the Suburban Railway. In his new duties, Mr. Mahoney will have complete charge of the operation of the lines and of the accounting, while the more important executive duties of former General Manager Jenkins will devolve upon Mr. Julius S. Walsh, Jr., son of President Walsh, who has been vice-president of the company since last January.

MR. MATTHEW C. BRUSH has accepted the position of assistant to Adams D. Clafin, president of the Boston Suburban Electric Companies, assuming the duties of his position on Nov.



MATTHEW C. BRUSH

1. The companies represented in the corporation include the Commonwealth Avenue Street Railway Company, Lexington & Boston Street Railway Company, Newton Street Railway Company, Newton & Boston Street Railway Company, Wellesley & Boston Street Railway Company, and the Waltham Gas Light Company. Mr. Brush, who will relieve President Clafin of the details of the management of the system, is but twenty-five years of age, and has had no special advantages that any man of pluck and determination to succeed may not command, yet he has attained a position many young men would consider a high degree of success at any period of life. At twenty he was clerk of the passenger steamer "Northwest," and at twenty-two was purser of the "North Land," of the Northern Steamship Company, sailing on the great lakes. For five years he was clerk or purser on one or the other of that company's steamers. After his graduation from the Massachusetts Institute of Technology, about two years ago, Mr. Brush became roundhouse foreman for the Union Pacific Railroad at Omaha, later was general foreman of shops and roundhouses of the Rock Island Railroad in western Kansas, resigning to accept his present position with the Boston Suburban Electric Companies, with offices at Newton.

MR. WILLIAM L. ELKINS, the traction magnate and financier, died at his summer home, at Ashbourne, near Philadelphia, Saturday, Nov. 7, from a complication of diseases. Mr. Elkins was born near Wheeling, W. Va., of Quaker parentage, on May 2, 1832. The family went to Philadelphia in 1840, where Mr. Elkins was educated in the public schools. At the age of fifteen he entered the business world, and engaged in different ventures with varying success until the discovery of petroleum in Pennsylvania, in 1862. He then made large investments in oil company shares, and, disposing of his other investments, went to western Pennsylvania and made a thorough investigation of the oil regions. He soon had control of the entire local industry of oil refining. He afterward became largely interested in the manufacture of gas. In 1875 he became a partner of the Standard Oil Company and six years later disposed of his interest to the company, retaining some of its stock, but giving up all active connection with the oil business. Mr. Elkins then turned his attention to street railways. With his associate, Mr. P. A. B. Widener, he was the principal owner of the Philadelphia Rapid Transit Company and was also interested in the Interurban Street Railway Company, of New York, the surface systems of Chicago, Pittsburg, Cincinnati and other cities. He was buried from Ashbourne on Tuesday, Nov. 10. At the moment when the funeral services were begun the entire street railway system throughout the city and suburbs suspended operation, and every car remained stationary for one minute as a tribute to his memory.