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Of this issue of the Street Railway Journal, 8300 copies are printed. Total circulation for 1906 to date, 418,600 copies, an average of 8208 copies per week.

The Field of the Interurban Railway

An interesting editorial recently appeared in a technical paper outside the street railway field, discussing the sphere of the interurban railway. A number of excellent points were brought out in connection with the danger of building roads either too costly to pay a proper return upon the investment or too cheap to attract traffic, and the tendency to purchase very expensive rolling stock was touched upon. In commenting upon the "needlessness" of interurban lines in

territory already occupied by steam roads we are inclined to think that the subject was viewed with too much discouragement, for the experience of the past few years has demonstrated pretty well that the interurban line really occupies a place peculiarly its own in the transportation scheme of any well-populated section.

The article in question stated that there are two large cities in this country, about 40 miles apart, which are as yet unconnected by an interurban line, though the project has been discussed for some time. The steam railroad service between the two answers the demands quite well, according to the editorial, and it is suggested that capitalists are a little uncertain of the wisdom of building an electric line between these two points. In considering this matter it is a little singular that the closely parallel case of the Boston & Worcester interurban line, not to mention many others of similar character, did not at once convince the writer that there may be an excellent field for an interurban line between two cities 40 miles apart, even though there may be trains over twenty times a day in each direction from one place to the other on the steam line. The growth of traffic on the Boston & Worcester line, for instance, since its opening some three or four years ago, has certainly justified the existence of the road, and it is an open question in Massachusetts if the receipts of the competing steam line have not been increased instead of diminished since the advent of the interurban. It is a common custom for the people of each city to make the journey in one direction by steam and in the other by trolley, and as far as we have been able to ascertain there has been no lack of traffic on each system.

The point of the whole matter is that the interurban line occupies a sort of middle ground between the steam road and the street railway, and it possesses certain features which no steam road enjoys, or is likely to enjoy for a good while to come. For long-distance high-speed travel with sustained running at from 50 to 65 m. p. h. the steam road enjoys a traffic which the interurban line can seldom secure. The facts may as well be acknowledged. But on the other hand, as distances of travel grow shorter, as the need of transfer privileges and stopping places becomes more insistent, as the half or quarter-hourly service at half the steam fare becomes appreciated, with the added comfort of better ventilation in summer and equally good ventilation in winter, with a conspicuous absence of dirt and cinders and the possibility of a flexible express service instead of a tedious local service between intermediate points—then it is plain enough that the interurban electric line fulfils duties quite beyond the scope of its older neighbor, and creates new business where none existed before. The extension of fast freight and express service to interurban lines more generally is likely to give still broader proof of the wisdom of building such roads when the population density and general conditions are favorable.

Wider Interurban Cars

Either because the managements of interurban systems do not fully appreciate the disadvantages of the present narrow interurban cars or because they consider that there are too many drawbacks to a greater width, not as much attention is being given to the question of wider cars as would seem to be warranted. The chief disadvantage of cars measuring about 8 ft. 6 ins. over side sills is the lack of comfort they afford to passengers. For short hauls and as long as the cars are not run in competition with steam road coaches, probably this disadvantage does not cause a reduction in passengers. But when a traveling man has the opportunity either to occupy a roomy seat in a steam coach or else be squeezed in between a window and a neighbor who is trying not to slide off the edge of a seat or to try and stay on the end of the seat himself, and has a very long trip before him, it is safe to say that he will choose the steam coach. As the tendency of interurban systems is more and more to compete with steam roads the question of wider cars is a timely one.

A few years ago any attempt to introduce wider cars no doubt would have met with a vigorous protest from city authorities, but now, largely because it is generally realized that street traffic would not be interfered with by a few inches of extra width on a car, it is probable there would be no objections from municipalities. Many of those who cast votes for and against ordinances are regular patrons of the electric lines and enjoy having a comfortable seat, and they would have influence in silencing any opposition.

But what has been most influential in holding cars down to their present width is the distance between double tracks in cities. A great number of interurban lines operate into terminal cities over double tracks, and proper clearance limits the width to that of present practice. When designing the cars for lines which have no such limiting feature, the managements, realizing that mergers or operating agreements may within a few years be made that will necessitate their cars operating beyond their own line, feel justified in adopting the prevailing width of about 8 ft. 9 ins. over all for their cars. We think that in many instances the importance of a wide clearance between cars has been overestimated. When the windows are well barred on the proper side, there is in fact not much necessity for a wide space between cars traveling in opposite directions on double tracks, as has been proven by experience in Chicago. On some of the double-track lines in that city cars 9 ft. in width over all are operated on tracks with centers 9 ft. 5 ins. wide. In another large city cars are operated with a clearance of only 3 ins. between them. But even with smaller clearances, with the usual devil strip, cars of satisfactory width for interurban service cannot be used.

However, within a few years in all probabilities the question of wider cars will be regarded as of so much importance that instead of building cars to accommodate double tracks, the tracks themselves will be reconstructed to permit of wider cars. One interurban railway company to our knowledge is expecting that this will take place in a short time and is building its cars regardless of the width of double tracks in cities. The new cars are in fact 9 ft. 4 ins. in width over all. This construction permits seats of a comfortable width for two people, and the seats are provided with arm rests. If more companies would take a similar stand no doubt the era of wide interurban cars would be reached within a few years.

The Technical Journal as an Educator

The mail has just brought the printed copy of an interesting address delivered by Prof. Hibbard, of Cornell University, to the Society of Mechanical Engineers of that institution upon the subject of the technical journal as an educator. We do not wish to be accused of blowing our own horn, but Prof. Hibbard's friendly appreciation of technical journals as a class contains so many suggestions as to their value and proper use that his advice should be of assistance not only to the students to whom it was addressed, but to the busy man of affairs as well. We have no claim of omniscience to present in behalf of ourselves or anybody else—it is merely the fact that it is the business of the technical journal to record a particular line of human progress that makes it valuable, and the more thoroughly that is done, the more useful does the paper become to its readers. We have no educational hobby horses to ride or technical axes to grind, but it is our regular task, always strenuous and sometimes wearisome, to find out and record what the world has been doing in the various phases of street railway practice, and week by week to present that information in such form that our subscribers can get at it with the minimum of trouble. And from one year's end to another there is thus collected together a very useful mass of information that can be gathered in no other way than by such specialized effort. Some of it is the record of original research on the part of our contributors, other parts the carefully selected reports of papers published all over the world, but all of it, we believe, of direct applicability to the daily business of somebody in the field in which we are directing our efforts. The wider the field covered by a journal the smaller the proportion of its contents that applies to any highly specialized line of work. For this reason, even in such a comparatively restricted line as the electric railway industry, every article in this paper will probably not appeal to the same extent to every subscriber. Some are written for the financial or legal interests, others for the operating manager, the designing engineer, the track man, the accountant, the claim agent or the repair man. But, as we have said before, the various departments in electric railroading are so interconnected that no person actively engaged in the industry can safely confine his knowledge to any one or two of them, and for the protection of his own future he should know in a general way the progress being made in them all.

It is because the technical paper is the living record of what is being done that Prof. Hibbard earnestly commends its perusal to students. It is not too much to say that it is doubly necessary to the student when he lays off cap and gown and settles down to his life work as employee or employer. As Prof. Hibbard very properly remarks, student life is leisure personified compared with the high-pressure life of the successful engineer or operator. If the habit of keeping a watchful eye on one's professional papers is not formed in one's student days it is hard to fix afterward. And any one who has tried to catch up after even two or three years with a single branch of modern science or engineering knows only too well what a gruelling task it proves to be. The reading habit once formed is likely to stick, and the time required is not so considerable as to be a serious matter. A single hour a week conscientiously spent on the literature of one's business or profession will often be of

very great service—and more time in proportion as it can be spared. Reading an occasional technical book on the same subject is necessary and agreeable, but it is only information a few months or years old that gets into books, from the mere mechanical necessities of the case, even supposing that the author gets to work very busily. The value of technical books lies in their being judicial summaries of progress up to near the date of publication—the interim of progress between books is recorded only in the journals and can be collated so that the ordinary reader can get at it only by painstaking investigation and editing. Street railway literature is simpler than the average, yet it is scattered through a large number of papers in three or four languages, many of them utterly inaccessible to American readers through the libraries, even supposing the reader to be a linguist. Yet the information to be had is often of direct commercial value. Here is a case from our own editorial observation. An engineer detected a new and interesting construction in a brief note in a trade paper. He hunted it down, told a client about it, and the two brought it up to a constructing engineer in whose line it lay. He grasped the opportunity and within a year was doing a large business along the new lines.

Such cases might be greatly multiplied, though this is quite enough to point the moral. The main thing is how to use the technical papers to the best advantage. Desultory glancing over them is not enough. A better plan is to read the paper at some regular time that forms itself into a fixed habit. Still better if practicable is it to gather a little group of co-workers into what the university men call a "Seminar," where each man at the meeting—perhaps an hour once a week—reports briefly what he has found in a particular journal or upon a particular topic. Such journal meetings are immensely helpful in student life, and they have proved equally so in the few cases among street railway companies in which they have been thoroughly tried. Then the question arises, what shall be done with the journal next? How shall its contents be recorded for future reference? All sorts of plans supposed to save time and effort have been tried—scrap books, enlarged indices, and card catalogues. The latter Prof. Hibbard thinks highly of. It is undoubtedly very valuable, especially where a number of papers have to be indexed. Our experience, however, has been that in practical life a card catalogue, unless one has a trained clerk to look after it, usually gets neglected and breaks down in the hour of need because some special phase of the subject outside of its scope has arisen. Every good-sized office should have one man possessed of a methodical devil, in whose charge a card catalogue might be safe, but failing his ministrations, and in the case of most individual readers, other means must answer. The best thing in the case of a wide field is that which some branches of science possess in a yearly volume of very brief and judicious abstracts, usually issued a year or two late. There are also some very meritorious efforts at regular abstracts on engineering subjects which should be more accessible than they generally are. Failing these, and especially in a restricted field covered by one or a few papers at most, the best thing is the well-indexed bound volumes of the periodicals themselves. One learns after a little experience with a particular index, especially where the articles are recorded by subjects, as in the indices issued by this paper, and not by titles, to run down topics readily and promptly in it. The volume indices can also be

supplanted to advantage very often by those issued at longer periods by the publishers of this and some other papers to cover a number of years. Such a comprehensive index will give a pretty good view of the state of current knowledge upon any particular topic. The early volumes of any journal may get sadly out of date in some respects, but they never will lose their whole usefulness in the art, and in emergency cases may suddenly become very important.

Cheap Foremen and Master Mechanics

It is a generally recognized fact in the business world that the best men demand the highest price. Another principle generally conceded is that low-priced men are often the most expensive. The truth of these two principles is not recognized by some electric railway managements. When it comes to hiring a shop foreman or a master mechanic the management at times allows a matter of twenty-five or fifty dollars per month to prevent the appointment of a really capable man. A great many men who are really unfitted to take charge of the maintenance of cars, can hold a job of master mechanic for a year or two, as it takes about that length of time before neglect and poor repair work will cause a general breakdown of the equipment. After a time, when enough cars to operate the road cannot be kept out of the shop, an investigation is usually made and the deficient man loses his berth. In the meantime the operating company has saved a few hundred dollars in foreman's or master mechanic's wages. Against this, however, must be placed many times this amount in extra labor and in supplies and materials for use in the shops. During the interval a few serious accidents due to defective equipment may have occurred and the cost of these should also be charged against the amount saved in foreman's wages. That such conditions exist is evidenced by the fact that frequently when a capable man is finally put in charge, after a few months of general overhauling of the apparatus, the maintenance charge per car-mile takes a sudden drop and remains far below what it was under the low-priced man's regime.

While the less capable men are found out and dismissed in a short time, there are others of a little higher class who plod along and by barely keeping the cars on the road manage to hold their jobs for years. These are even more expensive than the worse ones who are found out and are "fired" in a shorter time. While the proneness of the management to employ cheap help is usually blamed for poor foremen, there are various ways in which the cheap and incapable man gets in charge of the shops. Often the applicant runs a bluff and passes muster. Many were fixtures with the company when horse cars were abandoned. Again many workmen have been advanced to authoritative positions who have afterwards failed to get interested in the work. In most cases by proper treatment men of the latter class could be developed into capable ones. When they are advanced, their wages or salary should be increased sufficiently to make them appreciate the new position and to incite them to give more thought to their work. If such increases were always made, there would be more really capable foremen and fewer mediocres.

In general, we believe the responsibilities of the position of master mechanic should be better appreciated and more vigorous attempts should be made both to put proper men in charge, in the first place, and to follow this up by such an appreciation of their work as to keep up their interest in it.

THE TRACK DEPARTMENT OF THE DETROIT UNITED RAILWAYS

The track department of the Detroit United Railways differs from that of many electric railway systems, in that it is almost a complete organization within itself. Thus, it has its own shops and yards in a section of the city at quite a distance from any other department, its own engineering department, its own cars, which are maintained, with the exception of the heavy repairs, in its own shops, and in practically every respect it is conducted independently of the other departments.

There are, in addition to the roadmasters mentioned, a superintendent of shops, a bridge foreman, a carpenter foreman and a foreman for construction cars in the city. About 1300 men are employed in the department, and it has complete charge of 194 cars used in construction work and in hauling materials. These cars necessitate the employment of about thirty day crews and nineteen night crews for city track work and seven crews on the interurban roadway.

The engineering work of the department is taken care of by three civil engineers and three draftsmen who are stationed at the headquarters on Harper avenue, known as the Harper yards. An area of 10 acres is covered by the yards, and all of this space is well taken up by the offices, the shops for

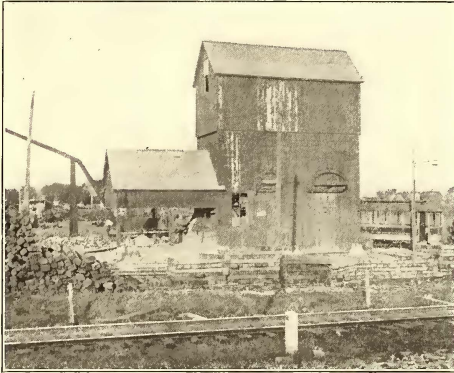


FIG. 1.—STONE CRUSHER USED FOR CRUSHING OLD CONCRETE AND BROKEN BRICK

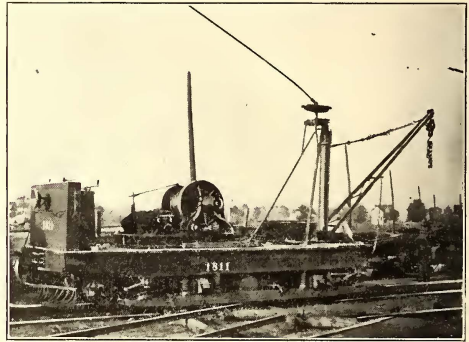


FIG. 3.—DERRICK CAR USED ABOUT THE YARD AND IN TRACK CONSTRUCTION

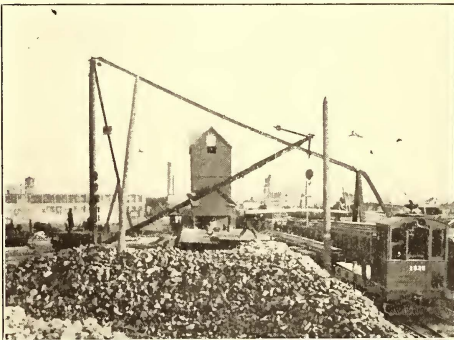


FIG. 2.—DERRICK FOR HANDLING RAILS AND UNLOADING MATERIALS FROM CARS

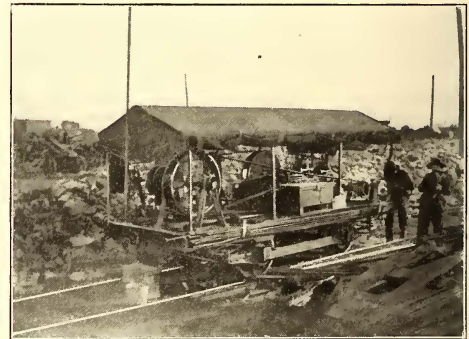


FIG. 4.—ELECTRICALLY DRIVEN AIR COMPRESSOR USED IN DRILLING RAILS

It has charge of all the track work on about 550 miles of line, which include all of the city tracks in Detroit and those of several radiating interurban lines, one of which extends to Port Huron, 70 miles distant. In addition to track work, the construction of all buildings is taken care of by this department, wrecks are cleared, tracks sprinkled and all construction material used by the road is hauled by it. The organization of the department includes a roadmaster for each of the interurban divisions, as well as one for the city; the roadmaster of the city division has under him six division foremen. All of the roadmasters report directly to John Kerwin, who as superintendent of tracks has charge of the track department. It is through the courtesy of Mr. Kerwin that this publication is enabled to present the following notes.

the construction of special work, the repair shops for construction of cars, a store room, a stone crusher, a cement storage building, and switching tracks and storage space for material used in track construction. The shops in which the special work is built are supplied with planers, lathes, shapers, and other tools necessary in the work, all of which are motor driven. In the car repair shops, which contain two tracks provided with pits, only the light repairs are done. When wheels are to be changed, motors repaired, or other similar work is to be carried on, the cars are sent to the general repair shops. A view of the stone-crushing plant, which is used to crush broken brick and old concrete from torn-out tracks, is shown in Fig. 1. After having passed through the crusher, a conveyor carries the crushed material to overhead

bins. A track is built along one side of the structure and chutes leading from the overhead bins permit the material to be loaded into cars with a minimum amount of labor.

City track construction is carried on to such an extent that to guard against delays it is necessary to keep on hand several carloads of cement. A building has been erected specially for storing this cement, and usually eight carloads are kept on hand. The building has been constructed with an idea of reducing as much as possible the labor cost of handling the cement. On one side is an elevated track for the steam cars from which the cement is unloaded. On the opposite side is a depressed track for the electric cars which are to be loaded with the material. Fig. 2 shows the derrick used in handling rail. The stock of rails is kept within range of the boom and car tracks run under it on two sides. A great deal of labor is saved by employing the derrick in loading and unloading rails and other heavy materials.

In use about the yards and in the city track construction are several derrick cars of the type illustrated by Fig. 3. The mast is well braced and the crane is capable of lifting six or eight tons. The crane motor is located near the center of the car and the controller for it is in such a position that the motorman on the car can operate the crane. This type

chief of which is that it is operated entirely by air. The clutches, the throttles of the engines as well as their reversing gears, and the bucket dumping device are all controlled by means of air cylinders and engineer's valves. The main ob-

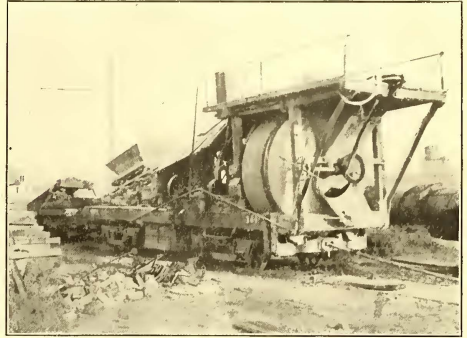


FIG. 5.—CONCRETE MIXER

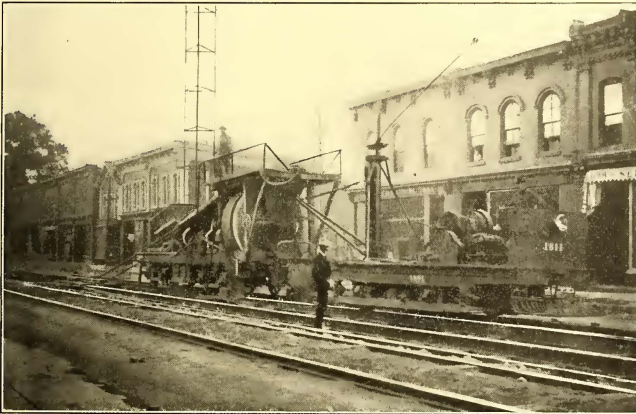


FIG. 6.—MIXER AT WORK IN CITY TRACK CONSTRUCTION

ject of this arrangement is to reduce the labor necessary to operate the shovel. Only one attendant is necessary, as the man usually required at the crowding engine is dispensed with. The engineer's valves, which are of the type used in connection with straight air-brake equipment on electric cars, are mounted together near the base of the crane. The operation of these valves admits air to straight air-brake cylinders and the pistons of these cylinders open the throttles of the engines or operate the clutches. One valve is used for hoisting the shovel, one for operating the brake of the main drum, and another for opening the lid of the dipper. The governor of the main engine is also controlled by the valve operating the clutch on the main drum in such a manner that

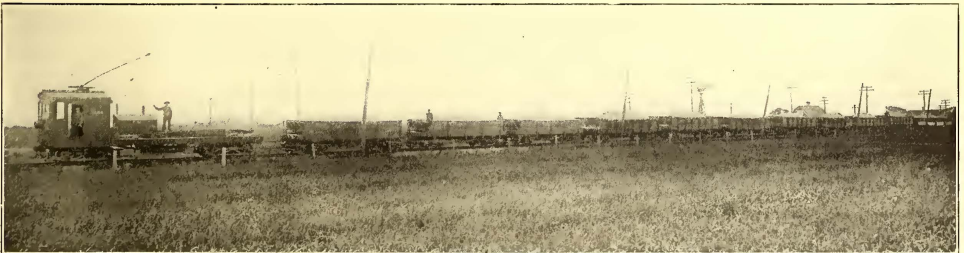


FIG. 7.—A FOURTEEN-CAR TRAIN OF STONE ON THE DETROIT UNITED RAILWAY SYSTEM

of car is found very useful in loading and unloading heavy materials, and it is also used to carry concrete from the concrete mixer in city track construction.

The derrick car is only one of the several construction cars built in the shops of the track department. Mr. Kerwin has just completed a power shovel having several novel features,

when the clutch is released the governor is opened. The shovel loads 12 tons of gravel per minute and will handle 1000 yds. at an expense of \$11. The floor framing is of steel and the floor itself is of $\frac{3}{8}$ -in. sheet steel. Practically no wood is used in its construction. It is provided with a 50-hp portable water-tube boiler, to-

gether with a water tank of suitable size. The main engine is of 40-hp and the crowding engine of 20-hp capacity. An 8½-ft. steam operated Westinghouse compound air compressor supplies pressure to storage tanks for operating the air cylinders. The shovel is shown in Figs. 13 and 14. The dipper raises 13 ft. above the rail and will dig gravel 4 ft. below the rail.

Fig. 4 shows an electrically driven air compressor which is mounted on a car, and which is used in track work. On the motor shaft is mounted an emery wheel for grinding track drills and other tools. When the compressor is used for drilling rails it is removed from the track and the lengths of

section of track to the ground and make hose connections with a hydrant. In city track work it is customary to station the machine at one point and to carry the concrete for 1000 ft. or more to the point at which it is to be used by means of the derrick car previously described. A bucket of the same capacity as the drum of the concrete mixer is hung to the crane of the car and the contents of the drum are dumped directly into this, as may be seen in Fig. 6, which is a view of the mixer at work upon the street.

Crushed stone for the concrete used in city track construction is hauled into the city over the company's interurban lines. A fourteen-car train of stone is shown in Fig. 7. Ten

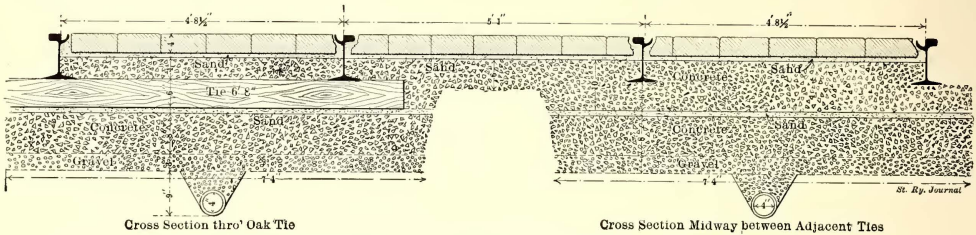


FIG. 8.—TRACK FOUNDATION FOR MICHIGAN AVENUE, WITH 3 IN. GROOVED RAIL

pipe shown in the illustration are coupled up so that air may be obtained for drills 600 ft. distant from the compressor. It is customary to operate six or seven track drills from this one compressor.

Fig. 5 gives a good idea of the main features of another interesting machine built by the department. This is a concrete mixer which has a drum 7 ft. in diameter and which mixes 35 cu. ft. of concrete at one time. The drum is stationary and is emptied by means of a chute inside. When this chute is thrown into the proper position by means of a spoke wheel and bevel gear it catches the concrete as the

of the cars have a capacity of 25 cu. yds. and the remaining four hold 6 cu. yds. each. The motor car is provided with four GE-57 motors with low gears. All of the ballast cars are equipped with straight air brakes. This train makes one trip per day to the city limits. The loaded cars are left at this point in the afternoon and are taken to the point at which work of track construction is being carried on by night crews. The cost of the power for operating the train to the city limits is \$8 per day. This charge includes a haul of 18 miles of the loaded cars and the return of the empty ones. The combined wages of the motorman and the trolley-

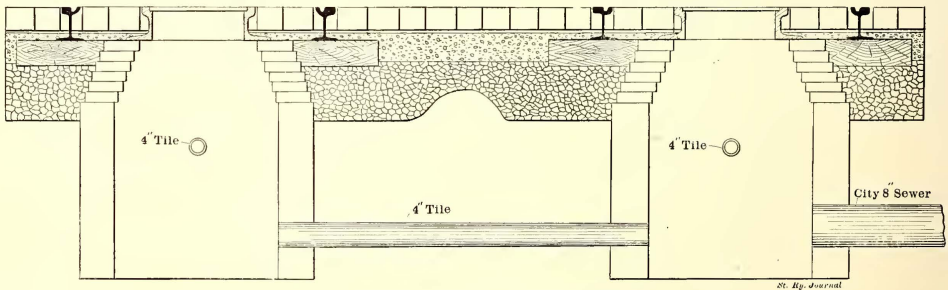


FIG. 9.—CONSTRUCTION OF CATCH-BASINS

latter drops from the top of the drum and conducts it out through a center opening. The material from which the concrete is made is carried to the platform above the drum in a small car which runs on a sloping track. When the machine is being operated this track is run down from the platform and along the ground for quite a distance behind the mixer, and the sand and rock as well as the cement is shoveled from the ground into the car in the proper proportions by laborers. The car is operated by the one attendant stationed on the platform. Water is obtained by attaching a hose to the nearest hydrant, and the proper amount for each batch of material is stored in a barrel on the platform. The mixer can be set up ready for operation in about twelve minutes, as about all that is necessary to do is to lay the sloping

man are \$4.50 per day, and the total cost of the stone delivered at the point at which it is used in the city is \$.58 per cu. yd. The stone that is taken from the quarry one day is laid in the track as concrete the following morning.

The tracks of the interurban systems are being ballasted with 1 ft. of gravel under the ties. The company owns a gravel pit consisting of six acres of gravel 60 ft. deep. Gravel is hauled to the point at which it is placed under the track in much the same manner as stone is handled, and it is delivered at a cost of \$.27 per cu. yd.

CITY TRACK CONSTRUCTION

The company has experimented with many kinds of city track construction, but at the present time that shown in Fig. 8 is being followed wherever possible. The most notable

feature of this construction is the provision for the drainage of the track. Past experience in Detroit as well as in other cities has demonstrated the fact that city track, if not prop-

the scene of the work on construction cars and are unloaded and placed in position by means of the derrick car to which reference has already been made. But a very short time is



FIG. 10.—CONCRETE BED ON GRAVEL, AND TRACKS LAID UPON THIS, IN THE DISTANCE



FIG. 11.—TEMPORARY TRACK ON THE RIGHT, GRAVEL BED READY FOR CONCRETE ON THE LEFT, AND TEMPORARY TRACK OVER CONCRETE ON THE LEFT

erly drained, will not hold up, no matter how well built. In the construction shown in the drawing a 4-in. drain tile is run along the center of the track a few inches below the lower bed of gravel. At the summits and valleys this tile is run into circular catch basins built of brick in the center of the track and provided with cast-iron manholes and covers. The basins, which are drained into city sewers through 8-in. sewer pipe, are large enough to permit a man to enter them in order to flush out the connecting drains should they become choked. Fig. 9 is a drawing of a cross-section of these catch basins. This drawing is reproduced only for the purpose of showing

required to bolt the sections together. As the work progresses after the rear sections have been unbolted they are lifted by the derrick car and carried to the farther end, where they are again bolted in position. After the temporary track



FIG. 12.—CONCRETE MIXER, SHOWING SLOPING TRACK TO THE PLATFORM ABOVE THE DRUM

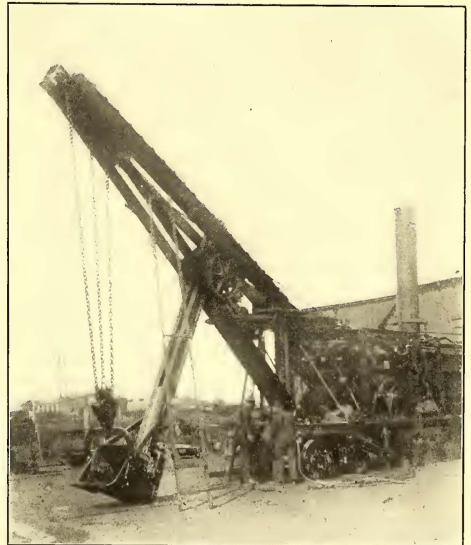


FIG. 13.—BOOM AND BUCKET OF AIR-OPERATED SHOVEL

the construction of the basins, as the track construction illustrated is not at present being followed by the company.

The methods employed in the reconstruction of city track interfere very little with the schedule of the cars. The track is constructed in sections about 1500 ft. long. The old track is not disturbed until a temporary track is laid alongside the double track. This temporary track is made up of sections of two T-rails bolted permanently together by means of 3/4-in. rods on either side of 2 1/2-in. x 6-in. timbers, which are placed at about 7-ft intervals. The sections are originally made up in the yards. When they are to be used they are hauled to

has been gotten ready for service, one of the permanent tracks is torn out and the roadbed is gotten ready for concreting. The concrete mixer is then hauled to the scene of the work and is put in operation. The fact that the concrete mixer blockades one track necessitates its being put into service only between the hours of 11 at night and 5:15 in the morning, during which period the schedule of cars is so light that cars in both directions can be operated over the section

of temporary track. On top of the gravel sub-base is first placed an 8-in. bed of concrete. This is allowed to set fourteen days. During this period temporary track is built over it, as shown in Figs. 10, 11 and 12, and the work of tearing out the second track and concreting it is carried on. After

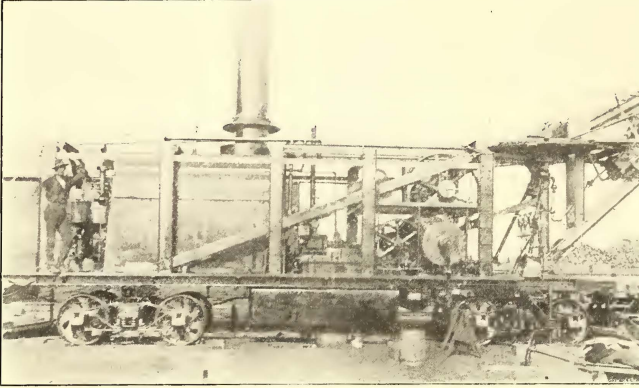


FIG. 14.—AIR-OPERATED SHOVEL, BUILT BY THE TRACK DEPARTMENT OF THE DETROIT UNITED RAILWAY

the concrete has been allowed to set the proper length of time, a 1-in. layer of sand is spread over it and the oak ties and rails are placed in position. The track is then completed with a 10-in. layer of concrete, a 1-in. bed of sand and the paving brick. As the work of concreting is carried on only during that portion of the night when the schedule is light, two tracks are always available for use during the day, so that the regular schedule is not interfered with no matter how heavy it may be. In this connection it is interesting to note the cost of concreting. The concrete laid in the track costs \$2.58 per cu. yd. This cost is made up of 1 bbl. cement, \$1.80; ½ cu. yd. sand, \$.15; 1 cu. yd. crushed stone, \$.58; labor, \$.25. The concrete is mixed in the proportions of 1, 2 and 4. During the short period of the night that work is carried on 120 cu. yds of concrete are mixed by a crew of fourteen men. The fact that there is a minimum amount of manual labor connected with the work from the time the stone is quarried to the time it is lying in the track is largely responsible for the low cost per cubic yard.

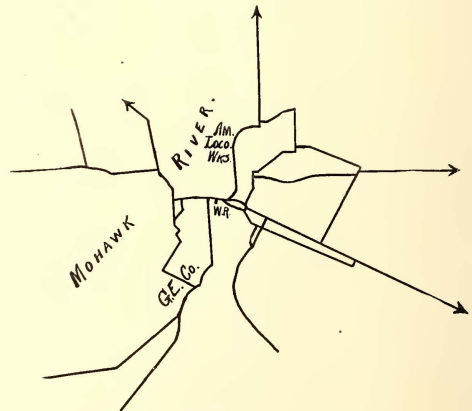
It may be added that it is the aim of the department to carry on its work in a manner that eliminates as much as possible the manual labor necessary. This idea is kept in mind in construction of the special cars as well as in planning the methods of carrying on the work. It is interesting to note that the only time the rock entering the concrete is handled by manual labor is when it is shoveled into the car of the concrete mixer.

Plans have been made by the Long Island Railroad to build a new model station at Jamaica, Long Island, and to do away with all grade crossings in and near the town. Twelve tracks will come into the station, eight tracks for through trains and four "stub ends" for the electric suburban trains from New York. A thoroughfare running directly under the station platforms will be created by the railroad company, and every platform will be reached by steps from below. There is not room for the new station on the site of the present one, so it is planned to build the new structure nearly a mile to the west, where the company owns property.

THE SPEED QUESTION IN SCHENECTADY

The problem of maintenance of car schedules with any degree of regularity is a very difficult one in Schenectady because of the necessarily restricted trackage facilities of the company. A glance at the accompanying map will show that the easterly network of the city is connected with the westerly portion by means of one double-tracked line passing by the waiting room. This is located in the downtown district. Many portions of the streets served have only single tracks. This inability fully to double-track the system and to avoid concentration of traffic upon busy streets is due to the narrowness of some of the streets traversed and also to the very steep bluffs which occur in that part of the city which lies directly between the residence portion and the General Electric Works. The busiest times of the day are early morning and late afternoon, when some twenty thousand people have to be transported to or from the General Electric Company's plant and the American Locomotive works,

in addition to the usual traffic incident to the business section of a city which is by no means light, for the people of Schenectady have the "riding habit" quite firmly fixed. When all of these things are considered, it is easy to see



LOCATION OF TRACKS IN SCHENECTADY

why the railroad company has desired to maintain high speeds.

The city ordinances have undergone revision during the last year, and through an oversight the matter of speeds was not fully discussed. As a consequence, the old-time limit of 8 m. p. h. crept into the new ordinance and was reenacted as a part of the local laws. At the same time, the company was required to allow local passengers to ride upon any interurban cars, except the limited cars, while in the city. These rules obliged the abandonment of a number of express cars which were run to and from the extreme ends of the local lines either in the morning or at noon or night, by reducing their speeds to that of the locals. In fact, none of

the cars could be thrown upon full series running points. General dissatisfaction was the immediate result. It was asserted that no car was allowed to attain the 8-mile speed and, hence, no proper and honest effort was being made to conform to these ordinances.

When conditions had continued till the feeling became rather intense, the railway company proposed to the Common Council that they should witness a test exhibit of car speeds. The invitation was accepted by a committee of the Council. The tests were conducted on the experimental tracks of the General Electric Company, and occupied about two hours. The committee's incredulity soon gave way to the conviction that their ordinance was impracticable, 8 m. p. h. as a maximum being designated as a "useless crawl" and making the average speed in service a negligible quantity.

The car used in these tests was a standard one-truck, 12-ton car, and it was found that upon practically level, straight track the maximum rate was about 22 m. p. h. on full series points. The

REPAIRING BY THERMIT IN MONTREAL

During the past year the Montreal Street Railway Company has welded fifty broken steel motor frames and thirty-two



FIG. 1.—STEEL MOTOR FRAME WELDED

steel truck frames with thermit, and has also used the same material for welding on lugs which have been broken from gear cases. All of the parts welded have been steel castings and the results have been satisfactory. Through the courtesy of Nelson Graburn, mechanical superintendent of the company, the accompanying engravings of a truck and motor welded by this method in the shops of the company are published. Fig. 3 shows a broken motor frame and Fig. 1 shows the same frame welded. Fig. 2 illustrates two welds made on a broken steel truck frame. This truck was welded without dismantling it, as the wheels were so banked with sand that the thermit could not come in contact with them.

The ingredients used for making the molds in which the fluid metal is poured are 1 lb. of flour, 10 lbs. of sand and $\frac{1}{2}$ pint of molasses. After the core is made it is baked in the oven for about six hours. It is then taken by the molder and formed into shape to suit the weld. Before pouring the thermit the two parts to be welded are thoroughly cleaned and holes are chipped through them at different points, so that the thermit can get through and hold them firmly. The parts are then heated to a high temperature, after which the molds are put in place.

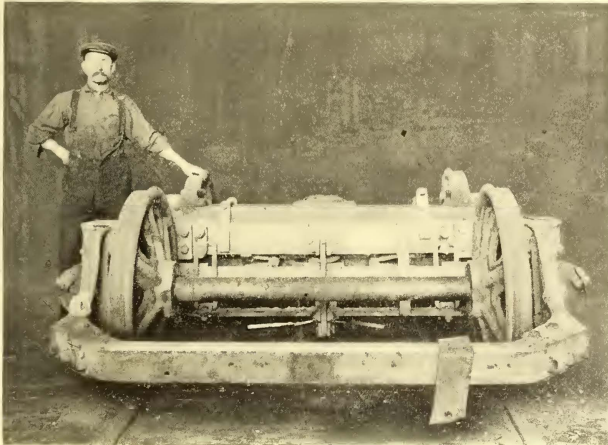


FIG. 2.—WELDED TRUCK FRAME

conclusion was reached that speeds up to 15 m. p. h. would be feasible even in downtown districts, while in outlying portions of town 20 m. p. h. would be permissible.

Arrangements were made whereby, a few days later, a public demonstration was made upon one of the city lines to show just what 8 m. p. h. really means. Those who witnessed any of these trial runs were quite free to express their surprise at the slowness of progress represented by a figure which they had considered reasonable.

The outcome of this investigation was a recent revision of the law which states certain streets bounding an area within which car speeds are limited to 15 m. p. h. Cars upon suburban lines outside of these boundaries are allowed to reach speeds of 20 m. p. h. At corners of 90 degs. or less 3 m. p. h. is permitted.

The final action of the City Council has given general satisfaction.

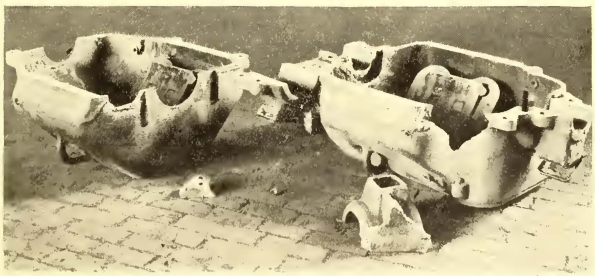


FIG. 3.—BROKEN MOTOR FRAME

The material used in casting is not pure thermit, but 1 lb. of steel turnings are added to every 10 lbs. of thermit.

During the casting process the motor, truck frame or what-

ever is to be welded is held rigidly, with the broken part set in position so that it cannot move. As the metal cast around the brake is only a band which in most cases is about 1 in. wide by 1 in. thick, no difficulty has been experienced from shrinkage, and it has not been found necessary even to anneal the welded part or put it through any similar process. The amount of metal lost in casting is about 50 per cent, that is, the amount of metal in the gates and risers is about the same, in this class of work, as that cast about the defect.

drain cock inserted in the bottom of the tank, and fresh oil may be introduced through the lip in front.

As a precaution against "splitting," or the throwing of a

ELECTRIC SWITCHING INSTALLATION IN JERSEY CITY

A large and novel terminal switching system, electrically controlled from an indicator and operating board, has recently been installed at the Pennsylvania ferry terminal in Jersey City of the Public Service Corporation of New Jersey by the American Automatic Switch Company, of New York. All of the cars entering this terminal approach through York Street, and are switched on to the proper tracks by means of six electric track switches. All of these switches are con-

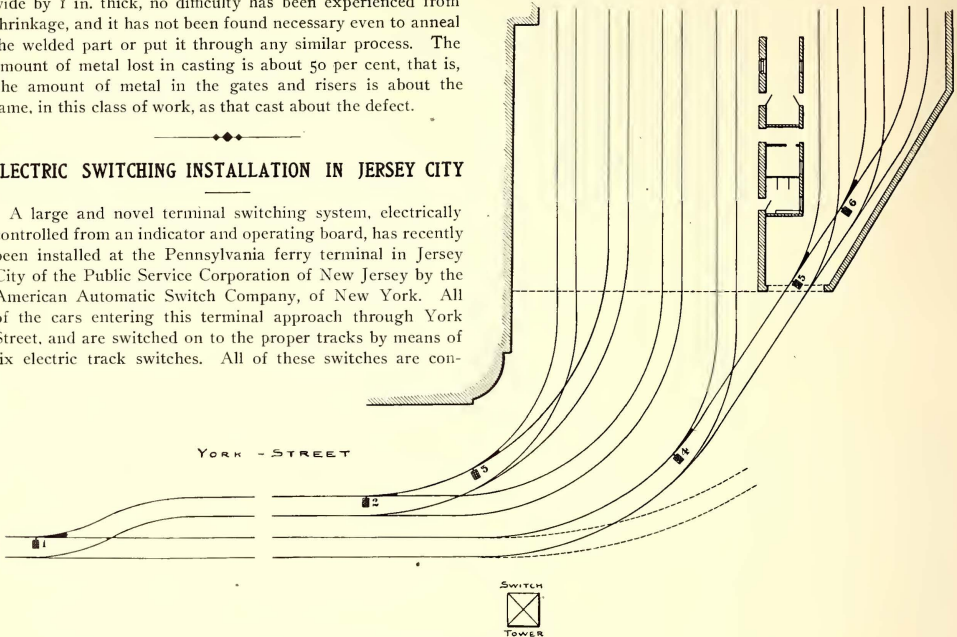


FIG. 1.—DIAGRAM OF TRACKS AT JERSEY CITY TERMINAL, SHOWING SWITCH TOWER

trolled by an operator stationed in a tower back of the terminal. The diagram of the tracks and the location of the tower and the various switches is shown in Fig. 1.

track switch beneath a passing car, the lever controlling that switch is automatically locked by the trolley wheel of the car approaching that switch. This is done by tapping into a contact maker on the trolley wire at a suitable distance from

The mechanism for throwing the switch tongue is substantially the same as that described on page 1065 of the STREET RAILWAY JOURNAL for Dec. 19, 1903, with the exception that a "rebound catch," or lock, has been added. This prevents the tongue from rebounding from the side of the switch bed when the switch is thrown; and, by holding the tongue firmly to the side of the switch bed, does not allow it to be jarred to a dangerous position by the wheels of a car passing over it, or by the wheels of a wagon running in the car track.

Fig. 4 gives a general view of the controlling mechanism in the tower. The number of levers on the operating board corresponds with the number of track switches to be operated. By the depression of one of these levers a double break, single-pole switch is closed in oil. Current taken from one of the trolley feeders then flows through a rheostat common to all switches contained in the cabinet, through the oil switch, and through the solenoid coil of one of the switch-throwing mechanisms to ground, thus throwing the track switch. By removing the pressure of the hand from the lever, the oil switch automatically opens the circuit and the oil snuffs out the arc, which would otherwise be considerable. The blades and clips of the oil switch are protected by arcing pieces, which are readily replaceable. The amount of the current employed to operate a switch is 15 amps.

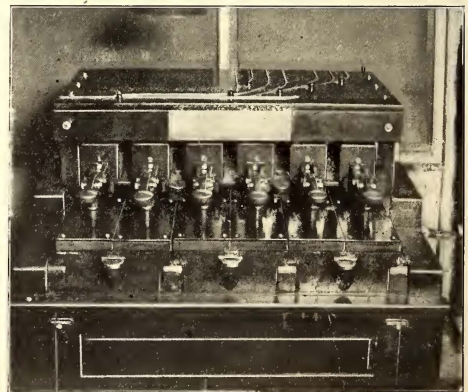


FIG. 2.—TOP OF OPERATING BOARD

Two switches are usually placed in one oil tank, the interior of which is porcelain lined, and either switch can be removed without interfering with the operation of the rest. When necessary to change the oil, it can be drawn off through a

the switchpoint, which closes a shunted circuit passing through one coil of an electric lock, placed behind the hand lever. This coil shoots a bolt over the back end of the lever and locks the lever in position until it is unlocked by the car passing another contact maker on the trolley wire. This sends a

current through a second coil and withdraws the bolt. The locks can be plainly seen in Figs. 2 and 4, and the method of tapping the trolley wire for the shunt circuit in Fig. 6. The

may be seen on the top of the operating board in Fig. 2. Upon this board is a complete diagram of the yard. Each track is represented by a strip of metal, and a miniature

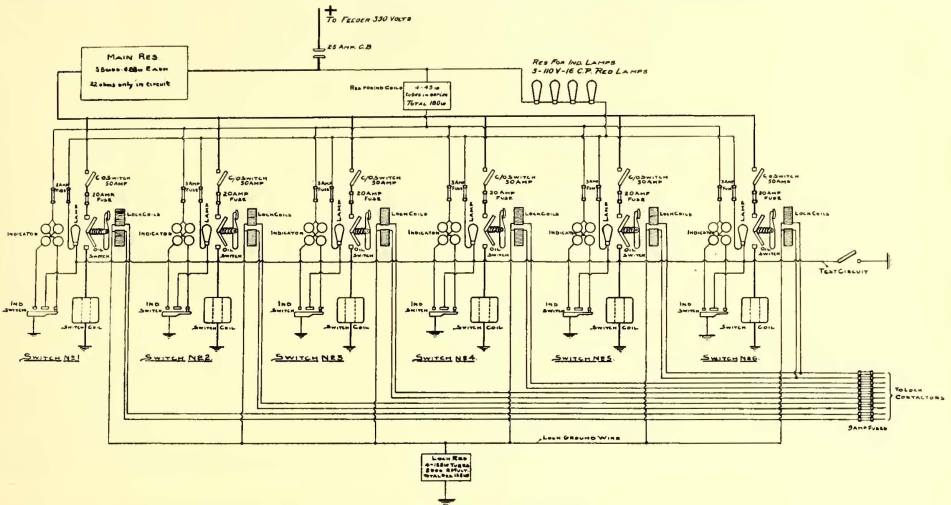


FIG. 3.—DIAGRAM OF CONNECTIONS



FIG. 4.—INTERIOR VIEW OF SWITCH TOWER

switch tongue moves coincidently with the tongue in the yard. The indicating mechanism consists of four small magnet coils and an X-shaped armature. One opposite pair of coils is always in circuit, thus holding the miniature tongue in its proper position.

Within each box containing the track switch-throwing mechanism is a plate containing three contact strips, and

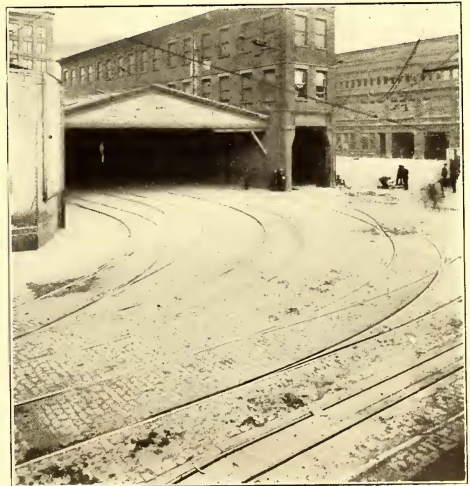


FIG. 5.—ENTRANCE TO TERMINAL SHED

operation of the system as a whole will be readily understood by reference to the diagram of connections, Fig. 3.

In order that the operator may know, at all times, the position of each tongue, an indicator board is provided. This

upon the arm of the rod which moves the switch tongue is a button which forms a ground connection. When the button is on either of the outside contact strips a small current flows through one of the two pairs of indicator coils; but when the

button rests upon the center strip a ground connection is made through a small red lamp placed upon the indicator board beside each miniature tongue. Therefore this lamp will light if the switch tongue is split, or unable to throw owing to a stone or other obstruction being lodged between it and the side of the switch bed, and the operator is notified

INTAKE TUNNEL FOR NEW ORLEANS POWER PLANT

A 370-ft. tunnel, 70 ins. in diameter and extending under two electric railways and seventeen steam railroad tracks, has recently been completed by Sanderson & Porter for the New Orleans Railway & Light Company, and will be used by that corporation as an intake and outlet pipe for its Claiborne power house at Elysian Fields Avenue and North Peters Street. The tunnel consists of a 70-in. steel pipe which starts at a central part of the Claiborne power house and is carried to a concrete intake crib located on the river bank on the outside line of the levee. The first 115 ft. of this construction passes about 20 ft. below the surface and between the rear wall of the power house and the side wall of an adjoining four-story brick building. This portion of the work was carried on by excavating from the surface between two parallel rows of sheet piling.

Commencing at the curb line, the route of the tunnel is under two street railway tracks and seventeen steam road tracks, one 48-in. pressure main and numerous smaller pipes. The necessity for the continuous operation of surface tracks precluded the possibility of securing the right to install an intake pipe by the usual method of excavating from the surface. Had such a right been procurable, the driving of sheet piling and excavating to such a great depth would have been both difficult and expensive.

The center of the tunnel is at grade 18.5, and as the river level ranges from grade 22 to grade 40 the tunnel construction had to be carried on at all times below water level. The character of the soil was such as to permit of work under the Greathead system and a breast shield $7\frac{1}{2}$ ins. inside diameter and 10 ft. long was used. This shield had a nose piece about 4 ft. long with cutting edge and also a clear space of about 6 ft. in which to assemble the permanent pipe. The shield was advanced by means of six hydraulic jacks of 50 tons capacity each.

The permanent construction of the tunnel consists of half-inch wrought steel plate, built up of 5-ft. rings, each ring consisting of four sections. An inside butt strap joint construction was used throughout, one side of the strap being riveted to the sheet and the other side being drilled and counter-

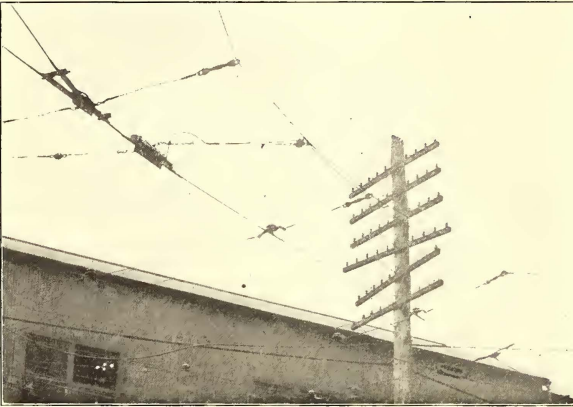
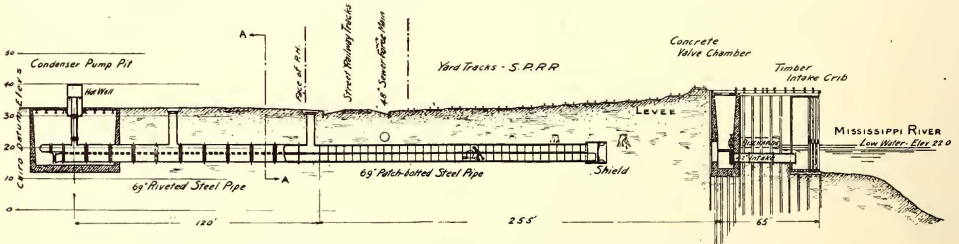


FIG. 6.—CONNECTORS ON TROLLEY WIRE

of danger. At the same time a "stop" signal notifies the motorman entering the yard to proceed with caution. The motorman will then naturally stop his car and remove the cause of the trouble, after which the danger signal will cease to show.

Fig. 5 shows a view of the terminal. The system described has now been in successful operation for three months.

The Columbus, Delaware & Marion Traction Company has entered into a contract with the Wells Fargo Express Company to handle its express matters between Columbus and Marion, and on Wednesday, Dec. 12, the service was started with a special express car. This car arrives in Columbus from Marion and points north in the morning, and departs for Marion and intermediate points late in the after-



VERTICAL SECTION SHOWING PROGRESS OF CONSTRUCTION ON INTAKE TUNNEL

noon daily. In addition to this service, express matter is carried on all of the regular combination cars of the company. The arrangement furnishes service to Columbus to every common point in the United States. As a result of its contract with the Columbus, Delaware & Marion, Wells-Fargo & Company have opened offices in Delaware, Radnor, Prospect and Marion, on the electric railway. The contract in no way, however, conflicts with the freight business on the electric railway.

bored for standard patch bolts. The sections were assembled one at a time within the shield and the patch bolts were all inserted from the inside and screwed tight before forcing the shield ahead to permit placing the next, the whole making a steel plate pipe equivalent to a continuous riveted steel construction.

A peculiar feature was that, although the bottom of the tunnel was always considerably below the river level, no serious trouble was encountered from leakage. The entire

255 ft. of tunnel was built in exactly sixty days from commencement, making a rate of about 4 1/4 ft. per day.

Another feature of the construction is that the pipe is subdivided into two compartments by means of a creosoted wood diaphragm or partition and the water will flow to the power house through the lower half of the pipe and will be discharged back to the river through the upper half of the pipe.

The capacity of the present installation provides for about 12,000 hp.

The above work was carried on continuously day and night from the time of commencement by a working force con-

IMPROVEMENTS UNDER WAY AT NEWBURGH, N. Y.

Since the purchase last September of the Orange County Traction Company, of Newburgh, N. Y., by a syndicate headed by former Governor B. B. Odell, extensive improvements have been begun under General Manager E. C. Boynton. As the new owners have authorized liberal expenditures in every department of the system, the completion of the work under way will result in a model railway service.

A considerable portion of the roadbed has been rebalasted and over 4 miles of the city track furnished with new ties.

THE INDIANA, COLUMBUS & EASTERN TRACTION CO.

1000 MILE BOOK

No.

GOOD FOR BEARER

OR

TWO OR MORE PERSONS TRAVELING TOGETHER OVER THE FOLLOWING LINES:

- 17 The Indiana, Columbus & Eastern Traction Co.
- 17 The Cincinnati Northern Traction Co.
- 16 Indiana Union Traction Co.
- 15 Indiana & Northwestern Traction Co.
- 15 Indianapolis & Nashville Rapid Transit Co.
- 14 Indianapolis East Traction Co.
- 13 Indianapolis & Eastern Railway Co.
- 13 The Indianapolis & Western Railway Co.
- 12 The Lima & Toledo Traction Co.
- 11 Richmond Street & Interurban Railway Co.
- 10 Ft. Wayne & Walpole Valley Traction Co.
- 9 Muncie & Fortland Traction Co.

When officially stamped, and upon the conditions named in the contract attached to and made a part hereof.

VALID ONE YEAR FROM DATE PURCHASED
Valid if more than one date is punched.

D. J. Boynton
Vice President.

Conductors will refuse all books not properly stamped.

CONTRACT

This book is sold at a special contract rate. Coupons attached to this book will be accepted for passage when presented by bearer or party of two or more. In consideration of the reduction, it is subject to the following conditions, which are a part of the contract, and agreed to by the purchaser or holder of same. It will be good for one year from date of sale as shown by stamp and punched limit.

1st. No detachments of less than five (5) miles will be accepted for passage.

2nd. Coupons for either passengers or baggage will not be accepted if detached when presented.

3rd. If book or any part of same is lost or destroyed, no claim for redemption will be allowed.

4th. If book is presented for a party in which there are children, detachments for each child over five years of age, will be made on same basis as for adults.

5th. Agents will detach baggage coupons for any distance to which baggage is checked. If it is represented that more than one person is traveling on the book, detachments of baggage coupons will be made on the same basis as for weight checked, not to exceed 100 lbs. for each person.

NO FREE ALLOWANCE FOR BAGGAGE WILL BE MADE ON THE CINCINNATI NORTHERN, DEERBORN COMPANY AND BAGGAGE COUPONS WILL NOT BE ACCEPTED OR HAVE ANY VALUE ON THAT LINE.

6th. Baggage Agents will not check baggage on baggage coupons unless all preceding coupons for passage have been used.

7th. In detaching mileage for passage, if baggage coupons have not been detached, conductor will collect same in connection with passage coupons.

8th. This book or its coupons are not good for passage to points where trains do not stop regularly.

9th. That baggage checked on this book shall consist of wearing apparel only, and in event of loss or damage to same, no claim will be made in excess of Fifty (\$50.00) dollars.

10th. Our arrangements with other Lines who honor this book for passage are simply that we agree to pay them for each coupon honored on their trains and collected and returned to us, and in using same for passage on other Lines, it is subject to their local rates and regulations.

NOTICE TO CONDUCTORS.

Each numbered horizontal line on enclosed mileage strip represents a distance of one mile, therefore Conductors must detach enough lines, counting from the top, to equal the distance to be traveled.

Make the detachment in the space between the lines, not on a line. The rubber band used to confine the mileage strip must not be removed to make detachments for passage, as the strip can be easily drawn out or back, as a result of the removal of the band. A convenient way to handle the ticket is as follows: Hold the ticket in the left hand, open the front cover towards you, draw out neatly enough of the strip to cover the trip, then close the cover on the portion drawn out, adjust the "straight edge" (on top of front cover) between the lines, evenly, exactly at the place where the detachment is to be made, compress the cover when adjusted, and at the same time carefully draw the strip towards you against the straight edge and it will be torn easily and smoothly.

To avoid errors, Conductors should be certain, before detaching, that the straight edge is adjusted to the proper place.

Enter on the part detached station numbers from the strip to which trip is to be made, and give the date, cancel with punch and turn it in with collections.

Conductors must not honor mileage strips unless attached to cover nor any portion of a strip if already detached when presented.

Conductors must promptly report any attempt at improper use of these tickets.

Conductors will take up and return this cover when the mileage strip is used up.

AGENT STAMP HERE.

COVER AND CONTRACT OF NEW MILEAGE BOOK OF INDIANA, COLUMBUS & EASTERN TRACTION COMPANY

sisting of a day foreman, a night foreman and three shifts of excavators, each of these gangs consisting of three men, in addition to which several mechanics were employed in fitting and assembling the sections prior to taking them into the tunnel.

NEW MILEAGE OVER THE INDIANA, COLUMBUS & EASTERN AND ALLIED LINES

The Indiana, Columbus & Eastern Traction Company and allied lines adopted last month a new form of interchangeable mileage, for which there has been a large demand. It does not do away with the use of the Central Electric Railway Association interchangeable coupons, but is on a mileage basis instead of a 5-cent coupon basis, and so is intended to appeal to those who prefer mileage. The book, which contains 1000 miles, is sold for 1 1/2 cents a mile or a total of \$15. This is \$5 cheaper than the mileage of the Central Passenger Association of steam roads, which sells for \$20. The book is good for the transportation of the bearer or party, and the general conditions covering it are adequately set forth in the accompanying engravings, showing reduced fac-similes of the cover and the contract.

Six steel girder bridges, built by the United Construction Company, of Albany, N. Y., have replaced an equal number of old wooden ones. These bridges are close to the public highway bridges and are single-track, built up on 24-in. I-beams. The ties project on one side to form the support of a foot-path which is only intended for emergencies, as these bridges are only for the railway company's use.

The power facilities are being enlarged by the installation of two 155-hp Abendroth & Root water-tube boilers, a non-condensing engine and a 350-kw, 25-cycle, three-phase high-tension generator. This means an increase of over 50 per cent in power capacity, as the present equipment is only 600 kw. Mr. Boynton has also designed a brick sub-station for the interurban division at East Walden. This building can hold two 300-kw rotaries, but for the present only one 250-kw rotary will be installed. Pending the use of the proposed high-tension generators in the Newburgh power station, current for this rotary will be purchased from the local lighting company and transmitted 10 miles to East Walden at 13,200 volts 3 phase, 60 cycles over the railway company's new transmission line. The same line will be used later for the company's own current, no change being made in the wires.

The rolling stock is receiving a heavy increase in the form of five single-truck cars bought from the Rochester Railway Company, and fourteen Brill semi-convertibles. The Rochester cars are already in service. Two of them are 18 ft. long and three are 21 ft. long. At present each is furnished with two 35-hp motors, which will be supplanted by 40-hp motors,

An order has been placed with the Cincinnati Car Company for the car body for the electric car which is to form a part of the equipment of the new electrical engineering laboratory at Worcester Polytechnic Institute.

as the severe grades in Newburgh cannot well be overcome by the smaller machines. Of the rolling stock from the J. G. Brill Company, the four double-truck cars will be 28 ft. long and the ten single-truck cars 20 ft. 8 ins. long. The larger cars will be equipped with Baldwin trucks, Standard steel wheels, Westinghouse air brakes and four 40-hp motors; the smaller cars will be mounted on Brill trucks with Standard steel wheels and two 40-hp motors. All of the old cars have been overhauled and repainted and interurban cars have been equipped with Root track and snow scrapers.

The company's freight business is an unusually important factor, as Newburgh and its suburbs are built on a steep hill which makes animal teaming difficult. The present freight rolling stock embraces a double-truck motor car, two single-truck box cars with motors, and four flat trailers. Most of the freight business is done on the Walden line, but next year provision will be made for hauling ice, coal, and general merchandise in the city proper. At present most of the freight is brought into Newburgh by Hudson River boats or the West Shore Railroad, which runs along the river level. The Orange County Traction Company, however, is planning eventually to build a half-mile extension for freight haulage from the Erie Railroad, which runs back of Newburgh on a higher level. This extension, of course, will save a great deal of haulage over grades.

The company has added to its line repair department a Trenton tower wagon, and has also adapted an old passenger car for the same purpose by mounting on it the tower of an old repair wagon.

The operating efficiency of the system has also been increased by installing about twenty-five telephones at various points along the city and interurban divisions. The city telephones are in iron boxes mounted on poles, and the interurban telephones in booths. Every employee is furnished with a key for these boxes, which are used for despatching (on the interurban division), notification of accidents and other railway purposes.

The amusement resort operated by this company—Orange Lake Park—has always been a large factor, but in the future even more attention will be devoted to the development of pleasure traffic. A fine theater, capable of seating 1200 people, has just been started, and in addition next season will see a large number of other attractions, such as merry-go-rounds, circle swings, etc. The lake is very popular for its boating, and the ride to the park itself is very attractive on account of the views it affords of Hudson River Highland scenery.

As Newburgh is only three or four hours' sail from New York, there are many excursionists on the Hudson River boats who can be induced to take the pleasant trip to the park or visit some of the historic points in the towns. To encourage this business round-trip tickets will be sold from New York to Orange Lake, Park via the Central Hudson Steamboat Company at a combination fare very little above the regular boat excursion cost.

To encourage the use of Orange Lake Park as an all-year resort, the new boat house is being enclosed with glass so that it can be steam heated, and thus be made convenient for ice skating parties, who will find here all means for refreshment. Both the boat house and lake will be brilliantly illuminated.

The biennial report of the Secretary of the Commonwealth of Pennsylvania for the two years ending Nov. 30, 1906, shows 3032 charters issued to manufacturing corporations within that period; 176 to street railways and 78 to steam railroads.

THE FINANCIAL PROMOTION OF ELECTRIC RAILWAYS

BY GEO. U. G. HOLMAN

The misuse of the word promoter brings to mind unsavory thoughts, but there is no one word in the English language that so truly expresses the vocation of one who is honestly trying to produce and to do things of benefit to mankind by interesting capital. The promotion of new electric railway projects has been and is an essential part of the important industry which is represented by the *STREET RAILWAY JOURNAL*. Much greater credit is due the promoter of an original project for its successful completion than the mere making of money. For the community in general is benefited, values are created, and the promoter has accomplished a good to the world by bringing capital and labor together.

THE PROMOTER

We will regard the promoter of electric railway projects as belonging to two widely different classes: First, what we may term the "home promoter" is one who is conscientiously desirous of seeing his project take the form of real rails and cars, as well as of increasing his personal bank balance; and, second, the "promoter" who, though called such, is really a "broker," ready to lend his services to the home promoter in the latter's efforts in seeking capital. This "broker" is one who can, or claims he can, secure capital from others to float the proposed enterprise. It is the former, or the home promoter, whom this article will consider.

What the home promoter of an electric railway proposition ought to know and what he does know are oft-times widely separated. Usually he is ignorant of the simplest way of putting his proposition in readiness to begin to reach out for the capital to finance his road, although he feels quite sure in his own mind that it would be a paying investment. He may have thought of the project for months, and it may be the current opinion of the town that such a railway should exist, but that is as far as he goes. In many cases he probably does not feel capable of taking hold of the tiller and steering the bark into the wind's eye.

The original promoter of a project deserves much more consideration than he gets as a rule. He often risks his small amount of money, his time, his health and the good opinion of his intimate friends. He must live during the time necessary to place his plans in tangible and profitable shape, and the world never seems to allow in its mind a place for the promoter. He is not even legally protected as he is in England, where "founder's shares" to the amount of 10 per cent are by law reserved for the promoter.

Recognizing the necessity of the promoter in modern business methods, it is the purpose of the writer to outline some directions which should make his path smoother and bring to him a greater proportion of financial gain from his undertaking than he sometimes secures.

CHARTER AND FRANCHISES

These are the first desiderata, and where a promoter is known as a substantial citizen or as an energetic man with financial backing, the necessary franchises from municipal and township authorities can be obtained with patience, forbearance and time. Next comes the charter or authority of the State. This is usually readily obtained under a general statute, and certain State officers issue the certificate of incorporation. Early in the promoter's career let him tie himself to a worthy legal counselor. Even if the latter knows little of the railway law in the beginning, by the time the home promoter may need his services in order to retain a just participation in the profits of promoting an enterprise, the coun-

selor will usually have been so educated that he will be of real service.

WHAT TO SECURE IN A FRANCHISE

A franchise should be for a duration of not less than twenty years, the longer the better. It should include as little street or road paving as possible. The car headway—that is, time between one car and the next car following—if specified at all should be not less than twice the time the promoter deems necessary; that is, if a ten-minute schedule is considered desirable, the minimum schedule specified should not be less than twenty minutes. The reason for this is that this extra allowance gives latitude in car operation that may finally be necessary to make the maximum amount of net earnings with the least number of car-miles. The gross receipts may be less in consequence, but the operating expenses will be much less. Let the promoter guard especially against onerous street paving. Snow removal should either be ignored or if mentioned the company should secure the right to remove the snow from its tracks with "the wings of its plows or otherwise." There are so many obvious don'ts in securing a franchise as to make it advisable for the promoter in this part of his work to seek advice from some one who has had actual experience with the franchise question.

PRELIMINARY MONEY

The promoter should be sure of sufficient money to pay the cost of preliminary engineering and expenses. He should in the first place be sure that the road will absolutely earn at least 10 per cent interest per annum on the actual estimated cost of construction. This is for his own subsequent peace of mind.

We will assume, however, that the proper charter, rights and franchises have been secured and have been assigned to the railway corporation and have been approved by counsel. It is then necessary that all real estate and right of way should either be under option in writing or that actual title be secured. Now there is nothing in the way but lack of funds.

WHAT A PROMOTER MUST DO ON THE GROUND

Before starting on his quest for money the promoter must know the cost of the proposed construction and equipment. Consequently, whether he is one man or a group of men, some preliminary money must be spent for engineering and expert information upon which estimates of the cost of the proposition and the probable net income from operation exclusive of fixed charges, such as interest on bonds or preferred stock are obtained.

A map of the territory to be served by the railway should also be prepared, showing the population within a few miles on either side of the proposed line. This line should be indicated prominently on the map. The tributary population to the line should be platted on the map by cross-hatching with figures adjacent thereto. A drawing prepared in this way readily shows the business man and banker the distribution and extent of population. A profile should accompany the map. The grades are thus graphically shown.

From the plan and profile the power required and the possible car service can be worked out by the engineer in the employ of the promoter, and intelligent data can be derived therefrom upon which the cost of construction of roadbed and track, of equipment, of power house and car storage sheds can be obtained. The population of to-day should be also compared with that of five and of ten years ago to show the past and the prospective growth of the communities served. This should be done in tabulated form so as to appeal to the eye at a glance.

The raising of the preliminary money and the weeks and

months required to ascertain whether the proposition is worth while, and in preparing the statistics to convince others of this fact, are what make the promoter of a railway a "laborer worthy of his hire."

After finding out what the road will cost and that it will be an interest-earning venture, he may proceed to the financing of his scheme.

FINANCING IN THE EARLY DAYS

In the first days of public utility propositions the promoter appeared in many cases as a self-sacrificing sort of individual. In fact he was a philanthropist. He was not so particular about being right in the opinion of others that the investment would return interest and maintain itself in splendid condition as he was to see the railway actually possess rails and moving cars and be an operating road. To obtain his object he expended much time and labor in interviewing his neighbors who might be benefited by the proposed project and so succeeded in securing subscriptions to a stock company. When the company was finally formed he would often be left with but a very small, if any, interest, and probably would not even be graciously considered in the election of honorary officers of the corporation. The road would be built from the very funds he so arduously got together and finally be passed on perhaps to even other hands at a receiver's sale. And the promoter-philanthropist found himself sacrificed.

The next group of promoters issued to themselves a small portion of the stock for services, and were contented with having but a small voice in the management.

Then came the time when the promoter conceived the construction company and issued all the non-voting bonds or preferred stock and the common stock to the construction company in payment for its contract to build the road. In this way a bright mind saw a way to reserve for the promoter the ownership of the equity in a property, and, what was of greater value to him, the future profit to be gained by the possession of the common stock. This entitled him to all the profits from operation after the payment of operating expenses, maintenance, and the interest on the money raising mortgage bonds or preferred stock. In most States this method is perfectly legal.

After a while this original promoter found many imitators. Finally the local banks or capitalists seeing that it was, after all, their money loaned on a first mortgage of the property, by which the road was built, insisted on a participation in the ownership of the equity which necessarily carried with it the possible future profits that sometimes developed beyond anticipation.

EQUAL PROFIT FOR THE PROMOTER AND THE CAPITALIST

It is but right that the capitalist and the promoter should divide that future profit, but what shall that proportion be? Every day conditions in other lines of business cause equal profit for the silent and the active partner. The present day home promoter has many difficulties before him. His desire is often as much to see his energy and time result in an actual operating railway as it is to make money. It takes months and sometimes years of his time to secure suitable franchises from the body politic. It often takes all his own money, and more often all he can borrow from friends, to carry on his work; and with those friends he must share whatever profit he may make. To-day such a promoter succeeds more easily if he is a specialist; i. e., an engineer with commercial instinct and experience; and, as his fee is contingent upon success, this fee necessarily should be a large one. Obviously half the profits are none too much for himself and friends, and the other half for those who finance the construction. How this works out under varying conditions we shall see.

WHAT IS A WORTHY PROPOSITION

After determining the prospective cost and gross earnings, it is essential to fix upon the financial plan. Where a proposition works out as capable of earning gross receipts of from 20 per cent to 25 per cent of the probable cost of construction, it will be safe to conclude it will earn net twice the amount of interest on the bond issue which is to finance that cost.

IMPORTANCE OF FINANCIAL PLAN

Many home promoters have the idea that once the amount of bond issue is decided upon and the mortgage to secure the bonds duly executed and filed in the office of the County Court, that the financial path is easy—that is, they think so until the rude awakening. Our advice is to defer the execution of the mortgage as one of the last acts before actual construction. For ten to one the buyer of the bond issue, or the lender on the bonds, may wish a provision, or provisions, changed to suit his ideas or the ideas of his attorneys.

In order to obtain capital it is necessary for the promoter to have the proposition worked out in complete detail, and when he meets the financial interests to have, if possible, his engineer with him, or at least a report from an engineer of standing, upon the feasibility of his project.

There are well defined rules regarding the territory, population, mileage and cost per mile, which will not be discussed here, so that an enthusiastic report derived from very favorable and readily substantiated data by the engineer will often be sufficient. But a proposition of doubtful merit, requiring close figuring by experienced engineers, is aided materially by being endorsed by engineers of good repute and favor in the financial world.

The financial plan is important. The company which has presumably been incorporated under the laws of the State in which it is to operate and under the guidance of proper counsel should be, of course, authorized to issue the securities both in kind and amount to suit the contemplated conditions. It has often been expedient in changing owners of, or leasing, existing railways to incorporate the new railway company under the laws of another State of the Union. In most States, however, it is necessary to secure the incorporation of the company in the State in which it is to operate.

In the old days, to which reference has been made, a simple joint stock company was formed where every dollar represented a dollar paid into the treasury in cash. At the present day most companies are formed, where the laws of the State permit, with the minimum amount of stock subscribed and on that stock the least amount of cash is paid into the treasury of the company that the statutes allow. Then an additional amount of stock and an amount of bonds already authorized by the State certificate of incorporation are issued when required, making the total issue of stock in dollars equal, as a rule, to the par value of the bonds. Incorporating with the least capital generally saves the promoter considerable bonus tax to the Commonwealth. The proportion of first mortgage bonds to the company's stock occasionally varies from this ratio to suit certain contingencies and a ratio of one to two has at times been used.

In some States, as in Massachusetts, the common stock can be only issued for cash actually paid into the treasury of the company, or for actual and not book assets. In Massachusetts also the actual amount of stock so issued is under the supervision of the State Board of Railroad Commissioners, which employs engineers and accountants to verify the returns of any corporation. In such cases the amount of bonds issued per mile of track is, other things being equal, lower than where the bonds issued alone cover the cost of construction.

AMOUNT OF BONDS PER MILE

The amount of bonds per mile of single track of an electric railway is never pre-determined by any hard-and-fast rule. Off hand, the average banker looks for about \$20,000 of bonds per mile of single track and an equal amount of common stock. If the amount is less than \$20,000 per mile, he is naturally attracted to the project on presentation. Bankers are skeptical of the ordinary "trolley" proposition where the bond issue per mile of track is greater than \$20,000, and will overlook some lack in other details of presentation if the bond issue is \$15,000 per mile or less. But there are coming to be more and more exceptions to the \$20,000 bonds-per-mile idea, the tendency to-day being to construct a more solid roadbed and track and to use heavier railway equipments than was thought possible a few years ago.

What the first purchasers of first mortgage bonds look for is a low amount per mile of track in a construction proposition. After the construction stage the amount that the net earnings from operation exceed the interest on bonds issued is the criterion. For this reason it should be the desire of every original promoter of a proposition to have his engineer work out a class of construction that will cost, not the least amount of money (because his interests lie in the future of the property), but the amount necessary for a resulting saving in a maintenance charge of less than the interest on the difference between the good and the cheap construction.

PREFERRED STOCK

The project will certainly be more readily taken up and financed by outside capitalists if there be money invested in it aside from that to be derived from the proceeds of the bonds, particularly if that first money be supplied by people living in the locality wherein the proposed railway is to be constructed. This means faith in the project at home and instills confidence in the mind of the outsider, besides resulting in an minimum issue of bonds. It is, then, quite desirable to work out a financial plan embodying preferred stock to the amount of 25 to 50 per cent of the bond issue if this stock can be sold to the people at home. This will also permit the promoter and his friends interested with him financially to be reimbursed for cash expended in preliminary engineering, for rights of way, organization expenses, etc. Another advantage is that the proceeds from a loan on the bond issue are seldom knowingly permitted by the leader to be in any way devoted to this really fair and legitimate purpose.

The preferred stock should be made preferred to the common or general stock, both in respect to assets and as to dividends. It also should have a voting right. Whether it is made redeemable or not depends upon the conditions of its issue, but if made redeemable at a premium of, say, 10 per cent, the feature is valuable to the holder of the control of the common stock. Stock of this description is really a second mortgage and a further increase in its issue should be safeguarded by a two-thirds or three-quarters vote of the outstanding preferred shares with, of course, the necessary consent of a majority of the common shares. The adoption of a cumulative feature depends upon the interests that are to be served by the issue of preferred stock. If it is possible to sell this stock without the cumulative feature, it should be done if the interests of the common shareholders are to be served.

FORMATION OF THE CONSTRUCTION COMPANY

The first step to take after incorporating the railway company is the formation of the construction company, which is the vehicle used in the bond-and-watered-stock method of creating the common stock a full-paid stock. This is done by the railway company voting the issue of stock and the issue

of bonds as full payment to the construction company for the completion of the contract for building and equipping the railway under certain specifications and a contract that shall meet the approval of the parties interested, as well as the approval of the engineers of the purchaser or underwriter of the bond issue. All the stock and a small portion of the bonds are technically paid over to the construction company on the execution of the bonds.

The way is then clear to negotiate for the cash necessary to pay for actual construction, the balance of the bonds being generally left in the hands of the trustee and released by it as voted by the directors of the railway company.

FINANCING

First-mortgage bonds of a proposition in the stage preceding construction are not sought after by the general public. The owners and promoters of the project up to this point have, therefore, to seek an underwriter or a purchaser for their bonds.

The first thought is to sell the bonds to a banker in some large city. In this case the large city nearest the proposed railway is the logical place and if the amount of bonds to be negotiated is less than a million dollars the nearest city possesses the better chance of success.

For presentation to a banker it is absolutely necessary to preserve the whole issue, that is, not to have sold any portion. The reason is that the successful sale of securities by a banker hinges to a considerable extent on the condition that no one bond shall be sold for a less price than that at which he might wish to put out the whole issue. Even if a few bonds have been sold at a premium, it will usually be considered a detriment by the banker as offering a likelihood or chance that during the many months before the completion of the project and the issue offered to the public, for one reason or another, the original holders of a few bonds might be forced for personal reasons to sell their bonds below the price that was paid by them. This would always stand in the way of marketing the balance by destroying the bankers' market price.

But bankers, unless the proposition is one of unusual merit and backed by prominent men, or is strongly recommended by well-known electric railway experts, rarely buy a bond issue in the construction stage unless the home promoter virtually hands over the proposition for the sake of seeing it built, and retains merely a small percentage of stock, or hardly enough to reimburse him for the money and labor expended.

UNDERWRITING—TRUST COMPANY—BANKER AND BROKER

A much wiser plan is to secure the underwriting of the issue at, say, 85 per cent or 90 per cent among men of means in the locality near the road, or among capitalists in the nearer cities. The usual bonus of common stock for the underwriter is anywhere from 10 to 50 per cent. The underwriting is usually a two-year period and is often extended another year. A shorter time is unwise, for the aim should be to show the results of a year's operation on the completed road before selling the issue to a bond house for a price equal to or slightly exceeding the loan figure and presenting 10 to 25 per cent of the stock with the bonds. Thus the underwriters are left with a small cash present profit and a future profit from their bonus stock. Then on the financial strength of the acquired underwriting names, and with the bonds as collateral, a trust company can be secured without great difficulty, which will advance the money for a two-year time. The interest on the loan will be from 6 per cent to 8 per cent per annum, depending on the section of the country.

A commission to the advancing institution of from 2 per cent to 5 per cent in cash for making the loan is the rule rather than the exception. Invariably a percentage of the bonus or common stock is handed over as well. This percentage runs from 10 per cent to 25 per cent, depending upon the way the proposition is presented, the personality of the promoters and of the bank officials, and the pressing need there may be on the part of the promoters to part with their bonus stock.

Where there is no nearby institution able to furnish the funds, it is vitally important to procure the services of a financial go-between or "promoter" (really a broker), of good reputation, who will know where there are available funds in the city which the home promoter has selected for his search for capital. This broker should know where such a loan may be effected and the kind of broker to be selected is one who is well recommended to the home promoter and one who has made such deals before. The 1 per cent to 2½ per cent in cash to which this local broker or "promoter" is entitled, is well worth being paid by the owner of the proposition as it is made solely contingent upon the successful raising of the funds. Here is where the home promoter is often bested and he should be sure by personal, thorough investigation, easily carried out, that the local broker is worthy. Once being satisfied of his honesty the visiting home promoter should not hesitate to take him into his confidence. There are local financial brokers in every city who are acquainted with the financial paths of their own community and know who should be, and, what is more valuable, who should not be approached. There are also in every large city many unworthy financial brokers or "promoters." Some of them carry their offices in their hats; others, on the contrary, have splendid stage settings in the way of gorgeous offices in their business of "grafting" advance money, but if the man from a distance will but take the trouble to do so, it is easy to learn all about the man or men through whom success is expected, but more often failure results. This agent naturally must have for a week, at least, an exclusive option on the proposition. He cannot act without it. And the home promoter, who hesitates to grant this time, should overcome his scruples.

Some trust companies will advance 75 per cent in cash on a bond issue without underwriters. But in this case they invariably require that the other 25 per cent in cash shall be deposited with them. The trust company does not want to see the preliminary money spent in effecting organization, or securing rights and right of way from the bond proceeds, and it also must be convinced from a reputable engineer of the merits of the enterprise. Last, but not least, one must reckon on handing over a common stock bonus of from 25 per cent to 60 per cent.

In case the bonds are underwritten by capitalists, whether of the home town or from nearby or distant cities, it is a help in negotiating for a loan on the bonds to interest the local financial institution as a lender to even a small extent, say 10 per cent of the entire issue. The fact that the home institution stands ready to back the enterprise to the extent of its capability, may be of material aid in securing loans from one or more distant institutions. In cases where the underwriting and even a loan is shared by two or more concerns, the fact that the home bank or trust company is ready to share in the enterprise is a great help and may finally end in limiting the underwriting or the loan to the distant institutions. Banks and trust companies, like men, desire what others want, and this is the reason for possible success in the line of procedure just outlined. Let the home promoter be backed by substantial men of his town, and it is astonishing what weight this has with the distant financier. The

latter does not then expect, nor ask for, as much bonus from their representative, the home promoter.

All the way through, the fact that the home promoter, in the majority of cases, is hard-up financially, and that the "other fellow" is always in the attitude of expecting a bonus from the promoter, tells severely against the latter.

If the banker buys the bonds direct from the company which is yet under the control of the home promoter, he invariably obtains more than 50 per cent of the voting stock—this gives him the control of the company. The banker then underwrites the bonds himself, if he is confident that he can market them on a fair first year's showing. As the banker cannot afford to lock up his capital in any great amount, he merely turns the bonds and stock of the company over as collateral to his financial friends, the trust companies or banks, and gives his demand or time note and the proceeds are credited to the banker's account.

WHAT THE HOME PROMOTER SHOULD EARLY RECOGNIZE

It saves much time and bitter disappointment if the financially weak home promoter will recognize the fact at once that he must give up the "control" of his company.

The home promoter always has a natural desire to retain control of the voting stock, but unless he has money of his own, or has been able to create a syndicate of friends, who by a fair cash interest in the property, show sufficient financial strength to be considered in the division of profits, he will be compelled to be satisfied with a minority stock interest. There is always some bonus stock which is reserved to be used for the good of the enterprise, and this, of course, comes out of the promoter's share. For this reason the home promoter rarely received his just profit.

Undoubtedly the safest plan is for the home promoter to go immediately to a reputable engineering and constructing firm known to be a builder of railways. It is certain also that if such a concern should view the project with favor, it will propose to take the road off the promoter's hands by the payment of an amount in cash or by a participation in the bonus stock which will appear ludicrously small to the promoter. But nine times out of ten the deal would be more profitable to him if it is consummated then and there.

The commission dealer in stock exchange securities is the last place to go with any expectation of financing a proposition. It is not the kind of banking in which commission houses deal. Should the home promoter have a letter of introduction to such a concern, it might be able to give him information of a broker who would be useful in finding the banker, and any commission involved in such an introduction would cause the broker to care for it himself.

Of all things let the home promoter beware of the type "promoter" who has a very attractive advertisement in the daily newspapers. As a rule he is a type of grafter with whom the home promoter will lose time, if not money.

PROSPECTUS

The form that a prospectus should take for use in the presentation of a proposition is important. Usually the home promoter puts in too much detail. It should always have a good map of the locality and should contain facts about the following: Organization and history, location, franchises, legality, management, construction, probable earnings, local industries, population, security and officers.

WHERE TO GO FOR MONEY

The promoter will find in the large cities, which contain financial interests able to participate in the financing of railway propositions, a diversity of opinion. We are in an era of railway construction never before equaled, and in the im-

mediate past some of the banking institutions of the country have had left on their hands the securities of really good operating companies, which they have not been able to sell to the public at a profit. This, naturally, causes a financial institution to be conservative with regard to present and future undertakings. Boston, particularly, has vividly in its memory a multitude of railways built in Massachusetts which, as outlined in the preceding portion of this article, were taken by financial houses with zeal on account of the low issue of bonds per mile of track. There was no reason for many such roads, as they did not contain the population along the line to support the enterprises, consequently many are to-day in the hands of receivers or have undergone reorganization at the hands of bondholders. It will therefore be more difficult to-day in Boston than in many other cities to secure capital for electric railway construction. Nevertheless, Boston would be interested in a good proposition of a smaller capitalization than such a city as New York.

New York houses, with few exceptions, are only interested in propositions of over one million dollars. The reason of this is obvious. There is just as much physical labor entailed in the legal and engineering examinations necessary, nearly as great expense and quite as much time required by the financier for the smaller as for a large project. And there is no dearth of larger projects opening up in swift recurring intervals to fully take the time of those willing to investigate. New York City institutions, however, are more willing to take a proposition on its merits and without the financial support of the home capitalist than any other city in the country. On the other hand, there must be more "give up" on the part of the promoter.

Philadelphia houses undertake propositions in the State of Pennsylvania rather than from other sections of the country, but in general require an underwriting of considerable strength before loaning on the securities. In general, Philadelphia houses are satisfied with a smaller bonus from the promoter. New York and Boston are more interested in Western and Southern propositions than any other of the Atlantic Coast cities.

The financial institutions of the Middle West have been filled full of undertakings from their own sections of the country, yet have found time to take on propositions from the farther West and from the East. St. Louis and Cleveland, especially, have been very active in financing roads away from their own territory.

New projects on the Pacific Coast have been handled by Philadelphia, Pittsburg and New York capitalists largely through the medium of well-known constructing engineers, who have been more and more enlarging their banking facilities until one might say each has a banking department of its own. It might be made an axiom that enterprises should seek capital in the large cities nearest to the location of the proposition.

There are a few bankers in every large city who are dealers in investment securities and who make a specialty of public utility bonds. These bankers and bond houses rarely finance the construction proposition brought to them by a home promoter. It is more in their line to buy the entire issue of bonds after the road has demonstrated earning power, although they sometimes do take up construction projects when brought to them by high-class engineering firms. In such cases the original promoter gets back, perhaps, the money he has spent, but takes the most of his profit in experience.

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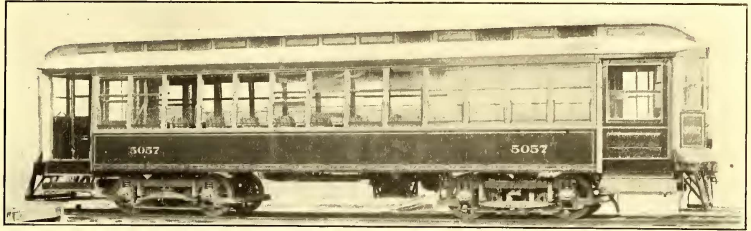
Negotiations by the Blair interests to take up the elevated railway merger in Chicago have recommenced.

NEW STEEL UNDERFRAME CARS FOR BOSTON

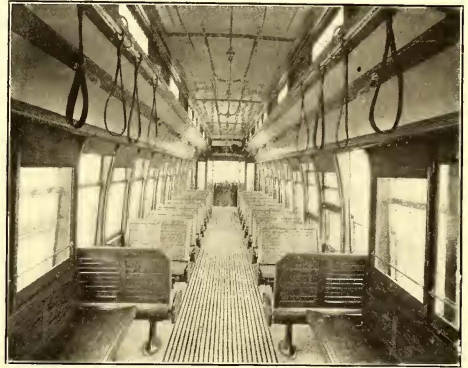
The Boston Elevated Railway Company has recently secured from the J. G. Brill Company, of Philadelphia, fifty semi-convertible easy-access cars for surface line use. Of these cars thirty-seven are equipped with steel underframing and thirteen with wooden underframing. Each of these cars is 44 ft. 10 ins. over all, 8 ft. 6 ins. in maximum width and 12 ft. high from the track to the trolley board. Each car is to be equipped with Brill No. 27-E-1 trucks and 33-in. wheels. The side sills are composed of 18-in. x 3/8-in. plate having riveted to the lower edge a 3 1/2-in. x 3 1/2-in. x 1/2-in. angle-iron. The stringers are composed of 3-in. I-beams; crossings are of 5-in. channel iron, as are the end sills.

Each car is to have thirteen windows on each side and doors at each end 3 ft. 10 ins. long and 1 1/2 ins. thick, operated by compressed air. The flooring of each car is to be composed of corrugated galvanized iron laid with the corrugations running transversely, and imbedded in these corrugations the full length of the aisle will be 18-in. "nailing strips" of wood 2 ins. wide at the base and 1 3/4 ins. wide at the top, around which Karbolith flooring is to be applied, thus dovetailing the surface into the flooring. To this hardwood surface is to be screwed the corrugated wooden flooring in the aisle, with corrugations running longitudinally. The side flooring beneath the seats is to be flush with the top of the corrugated maple flooring, filled in at the bottom with Karbolith fireproof material. The platforms will be flush

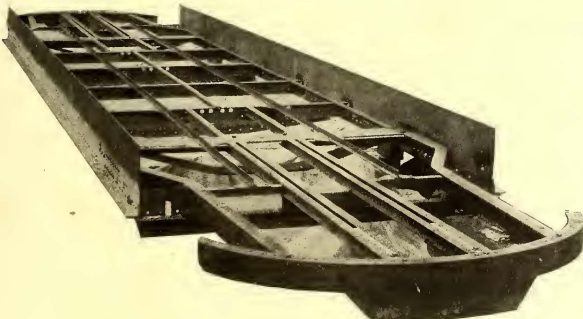
with the car floor. Corner posts are to be 3 3/4 ins. thick and side posts 3 1/4 ins. thick, both corner and side posts being wood covered with 1-16 in. of sheet metal on the outside. The side sheathing is to be of poplar tongued and grooved



SIDE VIEW OF NEW SEMI-CONVERTIBLE CAR FOR BOSTON



INTERIOR OF BOSTON CAR

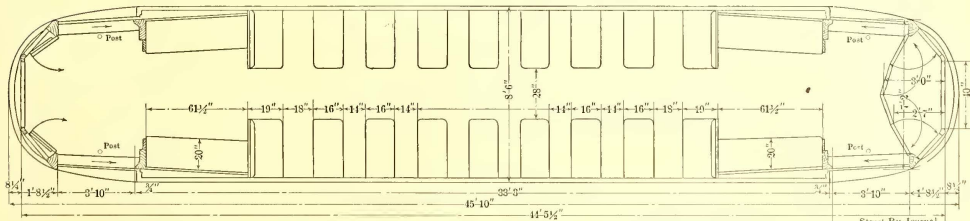


STEEL UNDERFRAME OF BOSTON CAR

boards and covered with 1-32-in. of sheet metal up to the height of the belt rail. The inside finish is to be of cherry, and the ventilator sashes are to be made of wired glass. All woodwork is to be coated with fireproof paint.

Each steel car underframe is to be equipped with two GE-73 motors, and the estimated weight of the empty car body complete, including electrical and air-brake equipment, is 34,000 lbs. The wooden underframe cars are estimated at 28,000 lbs., body and equipment. The principal track dimensions are:

- Diameter of wheels, 33 ins.
- Diameter of motor axles, 5 1/2 ins.
- Diameter of trailer axles, M. C. B., 5 ins.
- Diameter of all journals, 4 1/4 ins.
- Length of all journal bearings, 8 ins.



Track Base 25' 0" Wheel Base 6' 1" Wheel 33"

PLAN OF CAR FOR TUNNEL SERVICE, BOSTON

Minimum distance of track below lowest point of truck, not including brake-shoes, with weight of car-body on same, 4 ins.

Distance from top of rail to top of truck bolster, with empty car, 27¾ ins.

Distance from top of rail to top of center plates, with empty car, 30¾ ins.

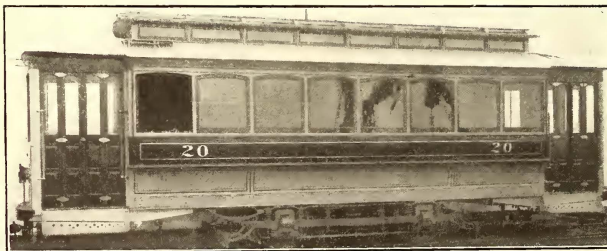
The trucks are to be fitted with inside-hung brakes, and provision will be made to compensate for a radial tire wear of 1¾ ins. The total wheel width is to be 3¾ ins. and the tread 2¼ ins., the maximum weight of brake-shoes exclusive of head being 35 lbs. each.

The steel underframe cars are to be used mainly in the East Boston Tunnel. The lower engraving on page 1159 shows a plan of one of the present cars used in the tunnel, and is practically the same in dimensions and seating arrangement as that illustrated in the half-tone engravings.

CLOSED CARS FOR THE TERRE HAUTE TRACTION & LIGHT COMPANY'S SYSTEM

The ten closed cars recently ordered by the Terre Haute Traction & Light Company, of Terre Haute, Ind., from the American Car Company have now been running on the lines in the city proper since last October, and have greatly relieved the traffic. Much will be done later on toward developing the company's four interurban lines which enter Terre Haute, and it is planned to extend the St. Mary's line, now only 5 miles in length, to Paris, Ill.

The new cars are of the standard closed type, and the feature about them is the unusually handsome appearance of the interiors, which are finished in quartered oak. Panels of the same material are placed intermittently beside the electric heaters under the longitudinal seats. The lighting arrangement is a departure from the usual clusters employed, the lamps being individually placed along the center of the dome and in almost a vertical position against the upper portion of the headlining; the bulbs are of frosted glass. The position of the bulbs enables passengers to read their newspapers even when the car is carrying a number of standing passengers who would otherwise obstruct the light. The type of truck is the familiar No. 21-E with a wheel base of 8 ft. The chief car dimensions are as follows: Length over the end

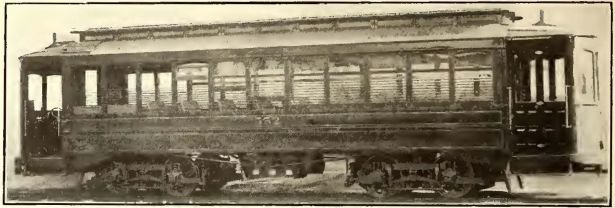


THE NEW TYPE OF CLOSED CAR AT TERRE HAUTE

panels, 22 ft.; over the vestibules, 30 ft. 8 ins.; width over the sills, including plates, 6 ft. 3 ins.; width over the posts at belt, 7 ft. 5½ ins. The side sills measure 3¾ ins. x 7 ins.; center crossings, 3¾ ins. x 6 ins.; end sills, 5 ins. x 7 ins., and the sill plates ½ in. x 7 ins.

MORE SEMI-CONVERTIBLE CARS FOR MEMPHIS

The city of Memphis is undergoing a period of very rapid growth, having doubled its population in the last eight years,



ONE OF THE NEW SEMI-CONVERTIBLE CARS FOR MEMPHIS

and it is therefore not surprising to hear that the Memphis Street Railway Company has lately received from the J. G. Brill Company another big consignment of semi-convertible cars, these following closely on, and similar to, cars of the same type, thirty-five in number, shipped by the John Stephenson Company. The semi-convertible type of car has proved very acceptable in handling the crowds which frequent East End Park and Overton Park, the patrons of the lines leading to these resorts being quick to appreciate a car that will instantly respond to the varying climatic conditions.

Like their predecessors, the new cars are handsomely finished in mahogany with bird's-eye maple headlinings; seats are of the push-over type upholstered in cane; eight-bar bronze window guards effectually prevent passengers from putting their arms out of the window or otherwise exposing themselves to danger. The general dimensions are as follows: Length over the end panels, 30 ft. 6 ins.; over the vestibules, 40 ft. 6 ins.; width over the sills, including the panels, 7 ft. 8½ ins.; over the posts at the belt, 7 ft. 11½ ins.; height from the floor to the ceiling, 7 ft. 9 ins. The truck employed is the No. 27-GE1. The bottom framing is the substantial form generally found with this type of car, and in addition to 12-in. x ¾-in. sill plates, the inside of the sills have under trusses with queen posts. The outside platform knees are reinforced with angle-iron and the center knees are composed of angle-irons offset for the purpose.

ST. LOUIS CARS FOR CALIFORNIA

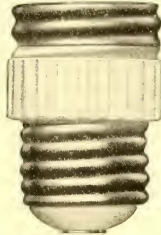
The St. Louis Car Company has recently completed a shipment of 100 double-truck cars to the Los Angeles Railway Company. These cars were duplicates of those built for the Los Angeles Railway Company on several previous orders. They are of the combination open and closed type, having the closed portion built between two open sections. The length of the cars over all is 39 ft. 1½ ins. The closed compartment is 14 ft. 8½ ins. long, and has a width of 8 ft. 2 ins. The cars seat forty-two passengers each. They are mounted on the standard double trucks of the Los Angeles Railway Company, manufactured by the car builder.

The car company is also building fifty-two cars for the Pacific Electric Company, of Los Angeles. These cars are similar to cars furnished on previous orders.

The Commissioners have approved the location of the Niagara, St. Catharine & Toronto at Lundy's Lane.

A NEW INDICATING PLUG FUSE

In electric lighting installations where wires are exposed to view, it is obvious that the fittings used should be as neat and compact in appearance as possible. Believing that the Edison plug cut-out represents the ideal design for this class of work up to 30 amps., the D. & W. Fuse Company, of Providence, R. I., has recently devised a plug fuse embodying all the merits of its cartridge fuse, including its well-known Bull's-Eye Indicator. This indicating feature is said to be a new one with 250-volt plug fuses, and with this new type the blown fuse is detected at a glance, as the indicator is visible at all times, thus eliminating the present practice of testing for trouble. The general appearance of the plug is shown in the accompanying engraving. The blowing of the fuse is indicated by the appearance of the black spot within the circle on the face of the fuse. Another important factor in the construction of this fuse is that it can be readily renewed by returning to the factory, thereby reducing the cost of maintenance. The fuse meets all of the rigid requirements called for by the National Board of Underwriters, by whom it has been listed among their approved electrical fittings of October, 1906.



FULL-SIZE VIEW OF
PLUG FUSE

A LONG LIFE GEAR

On Nov. 1, 1905, the Interborough Rapid Transit Company of New York placed two different gears in service on car No. 385 of the Manhattan Elevated division, one of which was of the "Titan" ground-tooth type supplied by the Atha Steel Casting Company, of Newark, N. J., and the other of the ordinary cut-tooth design. When both gears were removed on April 6, 1906, after making 20,000 miles, it was found that the cut-tooth gear had stripped its teeth and had to be scraped, while the "Titan" showed no perceptible wear. In fact the opinion was expressed by a representative of the railway company that the latter gear was capable of giving 300,000 to 500,000 miles more. This successful test led the Interborough Company to make Atha gears standard on its Manhattan Elevated division, and several are also being installed on the Subway division. An interesting feature of the Interborough test was that the forged-steel pinion running with the ground-tooth gear did not wear so fast as the pinion running with the other gear, from which it seems that a better gear lengthens the life of the pinion too.

Another comparison covering a trial on a surface car is given by the Public Service Corporation of New Jersey. Gears of both styles were placed on car No. 1024 on July 24, 1905. These were run without gear cases and were removed on Nov. 13, 1905. The cut-tooth gear was entirely worn out, the teeth having sharp edges, while the other gear showed no wear.

The "Titan" gear is so hard that it cannot be machined like tool steel, but each tooth must be ground to templet, thus securing a much more accurate tooth than is possible with

cut teeth. Although so hard, the material is tough enough to be bent 180 degs. without a sign of fracture. The gear hub is of gray iron or soft steel, and is inserted under 35 to 40-ton pressure. This soft hub enables the users of the gear to bore it easily to fit their standard axle diameters.

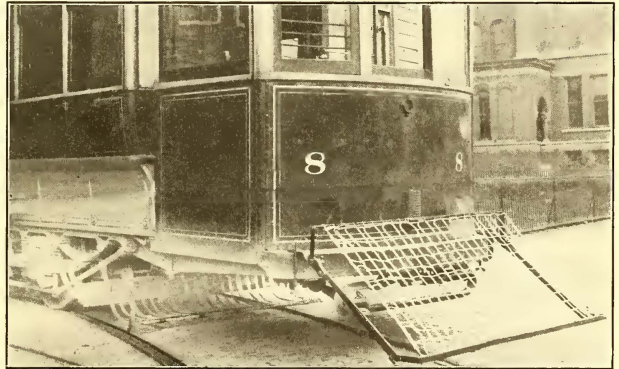
The gear is now operated on all classes of electric railways, such as the Rhode Island Company, the Public Service Corporation of New Jersey, the Rochester Railway Company, the United Railways & Electric Company, of Baltimore, New York City Railway, Washington Railway & Electric Company, and the Boston & Northern Street Railway Company.

NEW HAVEN GETS TROLLEY RIGHTS IN CONNECTICUT

Permission has been granted by the New Rochelle Common Council and the Village Trustees of Larchmont to the New York, New Haven & Hartford Railroad to widen its roadbed to accommodate eight tracks and to operate a trolley line between these points, completing the company's trolley circuit from the Harlem River to Boston. The railroad made its application Dec. 18, and permission was granted Dec. 19. According to the officials of the road, the company has already purchased the necessary right of way from the property owners, and work upon the new road will commence immediately.

A NEW FENDER AND WHEEL GUARD

A fender exhibited at the Columbus Convention which attracted considerable attention was the Clark automatic, manufactured by Ira P. Clark, of Hagerstown, Ill. This fender is made of rope instead of wire or hoop steel, and in case of collision can readily be restored if injured. As a person is picked up with it the front flies up at right angles with



HOOP STEEL AND ROPE FENDER AND WHEEL GUARD

the side of the frame and is locked, forming a basket out of which it is impossible for the person to fall. The view herewith of fender and wheel guard shows that the slat or grid-iron style is used instead of the wire netting. This allows the snow to pass through. The device consists essentially of four parts—a steel spring arm, the cast-iron socket or guide that is bolted to the lifeguard or pilot board of the trucks and into which the shank of the spring arm is placed, the pinion wheel, which when placed in position engages the rack by means of a rod, and the rod, which when turned raises or lowers the arms.

FINANCIAL INTELLIGENCE

WALL STREET, DEC. 19, 1906.

The Money Market

The expected relaxation in rates for money resulting from the relief measures put into effect by Secretary of the Treasury Shaw failed to materialize during the past week. On the contrary, the market displayed decided strength, rates for practically all classes of accommodation ruling fully as high as those heretofore prevailing. The active demand for money in connection with the enormous volume of business in all branches of trade continues, which together with the low bank reserves has served to increase the tension which has characterized the local market for some time past. The demand for money from stock houses also was somewhat larger despite the liquidation in stocks, and at this time there is nothing in the situation to warrant the expectation of materially easier rates until after the turn of the year. General conditions have improved somewhat during the week, as a result of the prepayments of interest on Government bonds, and the deposits of public moneys in depository banks throughout the country. For the week ending Dec. 15, the local banks scored a substantial gain in cash, and since that time they have gained \$2,250,000, which compares with a loss of \$3,500,000 in the corresponding period of last week, but against this must be reckoned the heavy Jan. 1 interest and dividend disbursements, which promise to break all previous records, and for which preparations must soon be made, and the flotation of new stock issues by some of the large railroad systems announced during the week. Money on call ranged between 25 per cent and 6 per cent, while the asking rates for fixed periods were fractionally higher all around. Sixty-day money at times commanded 8½ per cent, with practically nothing obtainable under 9 per cent. Ninety-day money was available at 8½ per cent, four months at 7 per cent and six months money at 6½ per cent. A feature of the week has been the further decline in rates of sterling exchange, which under ordinary conditions would result in the importation of gold from Europe. The situation abroad, however, is such as to prevent the shipments of the yellow metal to this side at the present time. Money throughout Europe is in urgent demand and rates at all of the principal European centers are very firm. This is emphasized by the action of the Imperial Bank of Germany in advancing its discount rate to 7 per cent. It is generally believed, however, that this advance is only temporary. At London conditions ruled somewhat easier at the beginning of the week, but towards the close the market began to harden as a result of the shipments of considerable gold to Argentina and Brazil, and the prospects of further shipments to those points in the near future may compel the managers of the Bank of England to again raise the discount rate. The bank statement published on last Saturday was rather favorable. Loans decreased more than \$17,000,000, as a result of the liquidation in the stock market. Cash increased \$1,224,100. The reserve required was \$3,779,025 less than in the previous week, which, together with the increase in cash resulted in an increase in reserves of \$5,003,125. This increase reduced the deficit to \$1,669,050, which compares with a surplus in the corresponding week of 1905 of \$3,961,075; \$14,546,625 in 1904, \$14,025,500 in 1903, \$8,093,600 in 1902, \$5,785,325 in 1901, and \$6,325,375 in 1900.

The Stock Market

The stock market was feverish and unsettled during the week and price changes were very irregular, but on the whole the tone was weak, and the sharp upward spurts were regarded as more the result of manipulation rather than of any really good buying. The advance which followed the announcement that the Treasury would release \$32,000,000 through anticipation of interest payments and by deposit of public funds in National banks was followed by a reactionary movement in security prices, due to selling on the theory that the relief to the money market would not be sufficient to offset the calling of loans during the second half of the month, in connection with the heavy Jan. 1 interest and dividend payments. Operators for the decline were influenced to sell on the ground that the proposed issue of \$60,000,000 of new stock by the Great Northern, and expectation of similar action by the Northern Pacific, will entail a heavy drain upon the money market at a time

when the supply of funds is inadequate to meet the requirements of even a moderate speculation. Although the sales of stocks average over 1,000,000 shares a day, a large part of this represents nothing more than a "swapping of contracts" between the professional traders. The volume of commission business is small and the public evidently finds general business too active and profitable to give any consideration to the speculative possibilities of the stock market. The large decline in the so-called Hill stocks following the announcement by the Attorney General of Minnesota that he would bring suit to enjoin the proposed issue of new stock adversely affected general sentiment and the opinion prevailed in some quarters that the action of the above companies will be followed by others, owing to the necessity of providing money for improvements and additions to equipment. Rights to stockholders are usually attractive, but present and prospective monetary conditions are a decided offset to such rights, and new issues of stocks may prove a more serious menace to the money market than any of the conditions heretofore operative. The large advance in St. Paul was one of the prominent features of the week. No new development accounted for this movement, and it doubtless represents further accumulation of the stock by the dominant interests. Near the close of the week, however, the stock reacted 13¼ points on the announcement of a new issue of \$66,327,100 preferred stock, and \$33,183,740 common stock which will be offered at par to stockholders of record Dec. 19. The new stock will not be issued until after final payment is made for the same on March 1, 1906. The subscribers in the meantime will receive 5 per cent interest on the instalments paid.

The copper stocks were strong on buying in anticipation of increased dividends on both Anaconda and Amalgamated and on rumors of plans for control of other large producing companies by the Amalgamated interests. The heavy trading in Mexican Central at advancing prices was due to reports that control of the property is about to change hands and that the Mexican Government has secured a large amount of the stock. The break in Virginia Iron & Coal represented speculative liquidation in a narrow market for the stock. It is now, and likely to be for some time, a specialty market, and the general price movement will be governed by the ups and downs of a few of the leading shares.

Nothing of any importance has developed in connection with the local traction situation. There appears to be good buying of Brooklyn Rapid Transit on all soft spots based on the increased facilities and prospective larger earnings of the company. On the other hand the Interborough shares and Third Avenue have shown some weakness due to the latest attacks upon the merger and the statements regarding the alleged excessive cost of the installation of electric power on the surface lines.

Philadelphia

Considerable activity developed in the local traction shares during the past week and prices for practically all of the active issues displayed a declining tendency. Philadelphia Rapid Transit led the group in point of activity, about 8500 shares changing hands from 26¼ to 22½, from which it rallied to 23. Union Traction ruled firmer during the early part of the week at prices ranging from 60½ to 61¼, but at the close the price yielded sharply on rather heavy offerings and closed at 58. Philadelphia Traction were more active than of late, several hundred shares changing hands at 97 to 96½. Other sales included American Railways at 51¼ and 51; Consolidated Traction of New Jersey at 76; Philadelphia Company common at 48 and 48½, preferred at 48; Railways General at 7, and United Traction of Pittsburg preferred at 49.

Baltimore

United Railway issues constituted the chief feature of the Baltimore market. The 4 per cent bonds held steady, with sales at 88½ and 88¾, but the incomes and the refunding 5s were lower, the first named declining from 59½ to 58½, on sales of about \$105,000, while the refunding 5s receded from 87½ to 86¾, on transactions aggregating \$25,000. The common stock sold at 14¼ and the certificates representing stock deposited brought 14. Other transactions included Atlanta Street Railway 5s at 106½, Lexington Street Railway 5s at 100, City & Suburban 5s at 108¾, and Knoxville Traction 5s at 106.

Other Traction Securities

The settlement of the local traction controversy was reflected in a more active and stronger market for the Chicago Street Railway issues during the past week. Chicago Union Traction advanced from 5 to 6, while the preferred moved up from 18 to 20½. North Chicago sold at 40 and West Chicago changed hands at 30. In the bond department West Division Railway 4½s sold at 87; West Chicago debenture 6s at 72½; West Chicago consolidated 5s from 62½ to 75, and West Chicago first mortgage bonds from 90 to 95. The elevated railroad issues were also stronger in sympathy with the stocks of the surface lines. Metropolitan "L" common sold at 27 and the preferred at 72. South Side Elevated brought 90 for about 500 shares. There was renewed talk that after the surface situation had been cleared up, the matter of consolidating the surface lines with the elevated roads would be taken up. In the Boston market, Boston Elevated was quiet but firm, sales of odd lots taking place at 152 and 153. Boston & Worcester common has continued the upward movement, the price advancing from 29½ to 30½, on purchases of about 1000 shares. The preferred sold at 78. Massachusetts Electric common, after selling at 20, declined to 19¼, while the preferred declined from 70 to 69½. West End common sold at 93, the preferred at 100 and Boston & Suburban common at 13.

Holiday business is probably affecting the stock exchange in Cleveland to some extent, as trading has not shown as great activity as might be expected. Quite a little business has been done in Washington, Baltimore & Annapolis pool certificates from 12¼ to 13¼, and some small blocks of Northern Ohio Traction & Light, Aurora, Elgin & Chicago have changed hands. Only one or two very small lots of Cleveland Electric have been sold within the past week and they went at 66. Forest City still remains around 91, notwithstanding the probability of an adverse decision regarding its franchises.

Security Quotations

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

	Dec. 12	Dec. 19
American Railways	51	51
Boston Elevated	152½	151
Brooklyn Rapid Transit	80%	79%
Chicago City	160	150
Chicago Union Traction (common)	4%	5
Chicago Union Traction (preferred)	16	18%
Cleveland Electric	63½	62
Consolidated Traction of New Jersey	77	76
Detroit United	80	79
Interborough-Metropolitan	36½	36
Interborough-Metropolitan (preferred)	74½	73
International Traction (common)	—	62
International Traction (preferred), 4s.	—	85½
Manhattan Railway	143	141
Massachusetts Electric Cos. (common)	19	19
Massachusetts Electric Cos. (preferred)	69½	68½
Metropolitan Elevated, Chicago (common)	26%	26½
Metropolitan Elevated, Chicago (preferred)	70%	69½
Metropolitan Street	106	106½
North American	99	87½
North Jersey Street Railway	40	—
Philadelphia Company (common)	48	48½
Philadelphia Rapid Transit	126¼	22%
Philadelphia Traction	97	96¼
Public Service Corporation certificates	65½	67
Public Service Corporation 5 per cent notes	95½	96
South Side Elevated (Chicago)	89%	89
Third Avenue	121	121½
Twin City, Minneapolis (common)	105½	106
Union Traction (Philadelphia)	60%	58

* Ex-div. † \$30 paid.

Metals

The "Iron Age" says activity has centered during the past two weeks in the Eastern pig-iron markets, where buyers have taken hold of covering-requirements for the third quarter. In some cases these have extended throughout the last quarter, and in others the second quarter is included. Southern markets have advanced their prices for the third quarter to \$17.50 and \$18 for No. 2 foundry, Birmingham. The situation in the South is growing more serious, through inadequate transportation facilities and scarcity of labor. Rail makers have been booking some additional good orders. Eastern plate makers have been forced again

to put up their prices \$2 per ton, making the third of a like amount during the current month.

Copper metal continues in regular demand, especially electrolytic, and prices continue to advance. Lake Copper is quoted at 23¼ to 23½; electrolytic at 22¾ to 23¼, and castings at 22½ to 22¾.

KALAMAZOO, GULL LAKE & NORTHERN ORGANIZES

The organization of the Kalamazoo, Gull Lake & Northern Railway Company has been completed. The officers elected are: J. T. Upjohn, Kalamazoo, president; Martin P. Huyck, Chicago, treasurer; Edward D. Hosmer, Chicago, vice-president and secretary. The company has already made a large outlay, looking toward the development of the Gull Lake section and the country between the lake and Kalamazoo. It is understood that the financing of the company has all been taken care of. Col. W. V. Jacobs, the promoter of the road, has made all the preliminary arrangements and the necessary capital is said to be all in hand.

COMMITTEES ANNOUNCED FOR CENTRAL ELECTRIC RAILWAY ASSOCIATION MEETING

Announcement has been made of the following committees to act at the annual meeting of the Central Electric Railway Association to be held at the Claypool Hotel, Indianapolis, Jan. 24: Honorary Reception Committee—Hugh J. McGowan, president of the Indianapolis Traction & Terminal Company, chairman; E. B. Peck and R. I. Todd, first vice-president and general manager, respectively, of this company; Joseph I. Irwin, president of the Indianapolis, Columbus & Southern Traction Company; H. P. Wasson, George J. Marott and Admiral George Brown. Reception Committee—W. F. Mitholland, secretary-treasurer of the C. E. R. Association; Frank D. Norviel, general passenger and freight agent of the so-called merger lines, of Indiana; Fletcher M. Durbin, assistant superintendent of the Indianapolis Traction & Terminal Company; L. J. Drake and William Bloss. Transportation Committee—J. J. Mahoney, superintendent of the Indianapolis Traction & Terminal Company. Committee on Hotel Accommodations—H. A. Nicholl, general manager of the Indiana Union Traction Company, and E. C. Spring, president of the C. E. R. Association. These gentlemen will also have charge of the banquet proper. Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company, will act as toastmaster.

THE PLANS OF THE CHICAGO, LAKE SHORE & SOUTH BEND RAILWAY COMPANY

The Chicago, Lake Shore & South Bend Railway will be built over private right of way outside of cities and towns, and through all of the latter has ordinances by which it will be in control of its trackage from one end to the other. The road connects at Kensington, within the city of Chicago, with the Illinois Central Railroad, with which it has a traffic contract. The overhead work will be constructed with center poles, cross-tied and set in concrete, with single catenary construction. The power house will be located at Michigan City, Indiana, on the river, and be constructed of cement blocks. It is probable, also, that the shops and car house will be located at Michigan City. At present the company has all of its franchises, and about 85 per cent of its entire right of way purchased. Contracts have been made for grading between South Bend and 12 miles west of Michigan City; also between Gary, Ind., and Indiana Harbor. The work of grading will be pushed all winter and the road completed in twelve months from date. A private right of way 66 ft. wide has been granted through the new steel town at Gary. The company has 10½ miles of 70-lb. steel rail on the ground ready to be laid, and expected to have an engine and seven cars start track-laying on Dec. 17. All of the steel has been contracted for, deliveries beginning in January and finishing in May. Nothing but standard ties will be used in the construction. The road, which will be operated by the single-phase system, runs from its connection with the Illinois Central, at Kensington Station, in the city of Chicago, through Hammond, Indiana Harbor, East Chicago, Gary, Michigan City, New Carlisle to South Bend, Ind., a distance of about 80 miles. The officers of the company are: J. B. Hanna, Cleveland, president; M. H. Wilson, Cleveland, secretary and treasurer; Edwin Hanna, South Bend, Ind., superintendent; John W. S. Reagle, South Bend, Ind., chief engineer Cleveland Construction Company, Cleveland, Ohio., engineer power station.

CHICAGO VALUATIONS—AGREEMENTS TO TERMS BY COMPANIES

The complete pamphlet report of the values of the tangible and intangible properties of the Chicago City Railway Company and the Chicago Union Traction Company submitted to the committee on local transportation of the Chicago City Council by Bion J. Arnold, Mortimer E. Cooley and A. B. du Pont, the traction valuation commission, shows these detail figures:

COMPARATIVE VALUATIONS OF THE PHYSICAL PROPERTY OF THE CHICAGO CITY RAILWAY AND UNION TRACTION COMPANIES, JUNE 30, 1906.

	CHICAGO CITY RAILWAY COMPANY.		
	Commissioners' Estimate.		Company's Estimate of Present Value.
	Cost to Reproduce.	Present Value.	
1. Track.....	\$6,455,462	\$4,568,062	\$6,401,837
2. Electric power distribution system.....	1,750,478	1,448,259	1,735,639
3. Cars and car equipment.....	5,784,875	4,556,137	4,489,842
4. Power plants.....	2,329,282	1,009,469	2,315,643
5. Tools, implements and machinery.....	247,407	198,183	197,452
6. Office furniture and fixtures.....	46,150	46,180	46,180
7. Horses, wagons and miscellaneous.....	29,110	29,110	38,740
8. Buildings and miscellaneous structures.....	1,309,704	1,149,205	1,583,226
9. Real estate (land).....	1,095,396	1,095,396	1,446,395
10. Patent rights.....	41,268	41,268	41,268
Totals of items 1 to 10, inclusive.....	\$19,119,432	\$14,735,239	\$18,390,122
11. Stores, supplies and floating tools.....	521,258	521,258	505,000
Totals of items 1 to 11, inclusive.....	\$19,640,690	\$15,256,497	\$18,895,122
12. Legal expenses, carrying charges, brokerage and contingencies at 10%.....	1,964,069	1,525,650	
Totals of items 1 to 12, inclusive.....	\$21,604,759	\$16,782,147	\$18,895,122
13. Add paving.....	2,283,826	1,833,558	2,091,280
Totals.....	\$23,888,585	\$18,614,705	\$20,986,402

	CHICAGO UNION TRACTION COMPANY.		
	Commissioners' Estimate.		Company's Estimate.
	Cost to Reproduce.	Present Value.	
1. Track.....	\$8,947,783	\$5,747,806	\$10,184,008
2. Electric power distribution system.....	1,763,046	1,407,043	2,019,207
3. Cars and car equipment.....	5,225,907	3,988,706	3,794,291
4. Power plants.....	3,234,872	2,027,437	3,078,308
5. Tools, implements and machinery.....	100,798	100,798	215,499
6. Office furniture and fixtures.....	32,650	32,650	32,650
7. Horses, wagons and miscellaneous.....	29,593	29,593	42,708
8. Buildings and miscellaneous structures.....	3,781,046	2,845,262	3,717,890
9. Real estate (land).....	2,866,178	2,866,178	3,479,374
10. Patent rights.....	14,925	14,925	14,925
Totals of items 1 to 10, inclusive.....	\$25,995,658	\$18,469,888	\$26,578,260
11. Stores, supplies and floating tools.....	487,630	487,630	545,314
Totals of items 1 to 11, inclusive.....	\$26,483,288	\$18,957,518	\$27,123,574
12. Legal expenses, carrying charges, brokerage and contingencies at 10%.....	2,648,328	1,895,571	2,712,357
Totals of items 1 to 12, inclusive.....	\$29,131,616	\$20,853,269	\$29,835,931
13. Add paving.....	3,201,492	2,509,477	3,027,752
Totals.....	\$32,333,018	\$23,362,746	\$32,873,683

Comparative valuations of the physical properties as shown in the tables, indicate specifically the present variance in the figures of the city's experts and those of the companies. The feature of this part of the report, which attracted the attention of the Aldermen at the meeting on Monday, Dec. 10, was that, while the City Railway Company is only about \$2,000,000 higher than the estimate of the city's engineers, the Union Traction Company's valuation of its properties is more than \$9,000,000 greater.

Based on the assumption that the cable lines of the two companies, with a few exceptions, are still operating systems, the city engineers declared the present value of the City Railway properties is \$18,614,705, and of the Union Traction Company, \$23,362,746. The City Railway Company submitted a statement whereby its totals were made \$20,896,402, or only \$2,281,687 more than the municipal experts returned.

The Union Traction Company places a valuation of \$32,873,683 on its possessions, the city's valuation being \$23,362,746, or a difference of \$9,510,937. The total variance of the two companies and the city, therefore, is \$11,702,624. W. W. Gurley, general counsel of the Union Traction Company, announced, however, that he considered it but fair for the city also to allow something for expenditure on bridges and viaducts, and to look upon the

old North Chicago Company cables as "going concerns." If these concessions were made, the Union Traction Company's price would be even higher.

Compared with the Arnold valuations in 1902, the present estimates are several millions larger. The commission of engineers explained the difference by reminding the Aldermen that cost of material and labor is higher now than then, and that new construction, equipment, and related expenses also are relatively far greater. In 1902, for instance, Engineer Arnold valued the City Railway properties, including paving of streets, at \$11,747,818, and to-day the Arnold commission's estimate (on the basis, however, of the cable lines being considered a part of the electric system) is \$16,254,492, the increase in four years being \$4,506,674.

In 1902 Mr. Arnold adjudged the Union Traction properties worth \$14,937,089, and his commission this year puts the price at \$20,882,706 (on the basis of an entire electric system), or a difference of \$5,945,617. In every respect, excepting value of tracks and buildings, the City Railway Company's property is vastly more valuable to-day than in 1902; the exceptions in the case of the Union Traction Company lie in the lower value of track and of tools and machinery. The value of the electric power distributing system, cars and car equipment, power plants, real estate, office fixtures, horses, wagons and miscellaneous items has gone up markedly.

ENGINEERS' ESTIMATES OF THE PROBABLE INCREASE IN TANGIBLE AND INTANGIBLE TRACTION VALUES IN NEXT FEW YEARS.

	CHICAGO CITY RAILWAY COMPANY.			
	Value of Physical Property.	Value of Intangible Property.	Total without Paving.	*Total with Paving.
12 months.....	\$16,782,147	\$3,056,813	\$19,838,960	\$21,671,518
18 months.....	16,782,147	3,754,303	20,536,510	22,369,068
24 months.....	16,782,147	4,434,273	21,216,420	23,048,978
36 months.....	16,782,147	5,848,355	22,630,482	24,468,040

*Value of paving, \$1,832,558.

	CHICAGO UNION TRACTION COMPANY.			
	Value of Physical Property.	Value of Intangible Property.	Total without Paving.	*Total with Paving.
12 months.....	\$20,853,629	\$4,293,144	\$25,146,773	\$27,656,250
18 months.....	20,853,629	5,262,608	26,116,237	28,625,714
24 months.....	20,853,629	6,218,682	27,072,311	29,581,788
36 months.....	20,853,629	8,161,015	29,014,644	31,524,121

*Value of paving, \$2,509,477.

The tables of franchise valuations contain estimates of valuations at different stages or periods—twelve, eighteen, twenty-four and thirty-six months hence, or the time within which it is generally believed the city would take over the lines, should the present negotiations fail and should the Supreme Court sustain the statute under which the city would necessarily act. The contract plan for controlling the roads probably might be used in such an instance, and the value of the franchises would be a big item in the bill the city would have to pay.

The Arnold commission set the following valuations upon Chicago City Railway franchises for the periods indicated:

Twelve months.....	\$3,056,813
Eighteen months.....	3,754,303
Twenty-four months.....	4,434,273
Thirty-six months.....	5,848,355

On Union Traction the intangible values set were:

Twelve months.....	\$4,293,144
Eighteen months.....	5,262,608
Twenty-four months.....	6,218,682
Thirty-six months.....	8,161,015

Following the classification of franchises are discussed the subject of the method of valuing franchises, determination of operating expense and the final franchise values. These are all most interesting, but the following abstract has been made of them, which contains all that is essential:

"The method of valuing the franchises which was finally adopted is based on the assumption that the gross earnings are in proportion to the car mileage on the different parts of the system.

"In the matter of transfers the conditions are somewhat complicated. On the Chicago City Railway the number of transfers reported is equal to 40.62 per cent of the total number of passengers carried; and the percentage for the Union Traction Com-

pany is 37.72. The principle followed in giving transfers is to enable a passenger to go from one point in the city to any other point, on the same system, using as many transfers as may be necessary, the journey to be made in the same general direction.

"It has, therefore, been assumed that for every passenger going in one direction paying a fare and receiving transfers there is a corresponding fare and transfers received from a passenger going in the opposite direction. In other words it has been assumed that the transfers honored cancel each other in the different directions and may be disregarded in the problem."

The report of the experts, besides the valuations and explanatory matter, contained an appendix which included the various legal opinions of counsel for the companies on the valuation question, John P. Wilson and W. W. Gurley writing the opinions for the Chicago City Railway and Union Traction companies respectively. The report also contained tables showing when ordinances expire, there being an apparent divergence of views on this knotty matter just as of old.

On Saturday, Dec. 15, at a conference held between the Council Committee on Local Transportation and Messrs. Gurley and Mitten, representing the Union Traction Company of Chicago and the Chicago City Railway Company, respectively, an agreement was reached regarding the settlement of the traction situation. The value of the existing street car properties and unexpired franchises, as finally decided upon by the two interests, was fixed at \$50,000,000, which the city, if it should undertake municipal ownership, must pay the companies in addition to what has been expended for rehabilitation. Of this amount the Union Traction Company will receive \$20,000,000 and the City Railway Company \$20,000,000. As stated in the STREET RAILWAY JOURNAL of Dec. 15, the two companies originally demanded \$74,000,000 for their present properties. The price allowed the Union Traction Company is about \$400,000 more than the highest estimate, inclusive of paving, which the city experts placed on the property. For the City Railway the allowance is about \$1,300,000 less than the city experts' maximum figures. A significant provision of the new ordinance is the division of the net receipts. The understanding is that the city will get 55 per cent, and the companies 45 per cent. Estimates place the return to the city under this plan between \$2,000,000 and \$4,000,000. It is announced that the companies will proceed at once to a thorough re-equipment of the street car service, the features of which will be new cars, new rails, the subway, through routes, universal transfers and minor measures for the improvement of transportation facilities. The work of rehabilitation and operation will be supervised by a general board of three engineers, one of whom the Aldermen and representatives of the companies agreed should be Bion J. Arnold, who has acted as advisory engineer to the city throughout the entire negotiations. Of the other members beside Mr. Arnold, one will be appointed by the city and the other by the companies. Both Mr. Gurley and Mr. Mitten said that they wished to submit the terms of settlement to the interests which they represent, but they intimated that an acceptance will be forthcoming. They told the committee that as soon as the ordinance is put in final shape to be submitted to the Council they will state finally whether they will accept the terms.

CONSIDERING CHANGES IN SAN FRANCISCO

At a recent conference of various interests, called together by President Duffey, of the Board of Public Works, to consider how best to regrade, resewer and repave Market Street with as little impediment to travel and traffic as possible, it was decided that the north half of the street should be rebuilt first; that while this was being done the United Railroads should use a temporary track, which General Manager Chapman agreed to lay immediately south of the present tracks, for the westbound cars; and that vehicles should be allowed to move toward the ferry along the space left between this temporary track and the sidewalk on the southern side of the street.

In response to a question, General Manager Chapman stated that the railroads' intention was permanently to construct the four double tracks down lower Market Street, as before the fire. The railroad may, and probably will, have little permanent use for the outer tracks, the headway of the cars on the main tracks being sufficient, and more embarrassment to travel would likely be caused by attempting to run two lines of cars closely parallel, headed in the same direction, and stopping at every block.

In place of a temporary track on the north side, the railroad will use its secondary permanent track on the north side for its

westbound cars, while the south half of the street is being rebuilt. Mr. Chapman stated that it was the present intention to relay the tracks with 11 ft. ½ inch between centers, the space now existing between the centers of the two inside tracks for most of the distance to the ferry.

City Engineer Woodward asked if it were not the understanding that the United Railroads should erect a central line of ornamental poles instead of two lines along the sidewalks as at present. It was stated that the people would not tolerate the double sidewalk lines as a permanent feature of rebuilt Market Street. Mr. Chapman replied that the railroad had agreed to erect either a single or a double line of poles as required, but the authorities had not yet signified their will in the matter. Mr. Chapman agreed that if a line of central poles were used the space between the centers of the two inner tracks would have to be widened a foot to prevent danger to passengers.

DEVELOPMENTS IN CLEVELAND

Apparently with the idea of protecting the investments that have been made in the property of the Forest City Railway Company, the Low Fare Railway Company was incorporated a few days ago with a capital stock of \$250,000. The names of W. B. Colver, secretary of the Municipal Traction Company; W. H. Greenlund, I. D. George, J. E. Creed and J. G. Harding appear upon the incorporation papers. The general opinion is that the new company will succeed the Forest City, and that all future grants will be made to it. The fact that W. B. Colver was granted a franchise for a short strip on East Seventy-First Street would strengthen this opinion. Mr. Colver, however, states that the new corporation has no connection with the Forest City Railway Company or the Municipal Traction Company, and will not lease its franchises to either. He states that it is to be entirely independent of any other company, and that the members of no other company are interested in it, aside from himself.

Another company incorporated at the same time is the Municipal Construction Company, with a capital stock of \$10,000, with W. S. Hadley, Glen W. Hadley, W. H. Brown, Charles Dauell and Charles Dempsey as incorporators. None of the men interested in the new companies seemed to know anything about it, although its name would indicate that it is related to the movement in some way.

The village Council of Newburg Heights has accepted the bids of J. J. Stanley, on Harvard Street, and C. F. Emery, on Marcelline Avenue, at a fare of 2 cents in the village with transfers to the Cleveland Electric on a 5-cent fare. The gentlemen said they did not make the bids as a company, because the difference in fare might complicate the street railway troubles in the city.

Bids of J. J. Stanley and C. F. Emery for Wellington Avenue, Superior Hill, Summit Avenue and Carnegie Avenue have been accepted by resolution of the City Council. All of these routes were bid in at a fare of 2 cents by the gentlemen, who put up \$10,000 on each one to guarantee that it would be built.

The case of the Cleveland Electric Railway Company against the Forest City Railway Company was called in Judge Phillips' court Monday morning, but on motion of the attorneys of the former was continued until Jan. 7. Some of the attorneys could not be present and it is understood that City Solicitor Baker had another case that would keep him busy most of the week.

City Solicitor Baker filed an answer to the petition of the Cleveland Electric the latter part of last week, in which it is denied that the city had any knowledge of the arrangement between Mayor Johnson and E. W. Scripps by which the obligation of the Forest City would be guaranteed. It was also denied that the Mayor is financially or otherwise interested in the company. Further, it is asserted, that the Cleveland Electric had no right to bring suit, as the time allowed by law had passed before any action was taken.

The Lynchburg Traction & Light Company's proposed office building will be separate and distinct from the car house and shops, although it is being erected on the same lot. The company laid in Lynchburg the past summer about 1500 tons of standard A. S. C. E. 70-lb. rail, and built an extension to one of its lines of about 2 miles, to the Fair and Baseball Grounds. This gives the company two lines to the Fair Grounds, and while they are both of single track, with the necessary switches, in rush times the company operates this as one line, making a complete belt.

IMPROVEMENTS IN DENVER

The Denver City Tramway Company has announced its intention to spend during the coming year \$3,500,000 in improvements and extensions. This work includes 40 miles of new road, and provides for lines to Boulder, Ft. Collins, Greeley, Longmont and other nearby suburban towns in addition to extensions within the city. The first line to be built will extend from Sixteenth and Arapahoe Streets to Globeville, and loop in the business district. After this work will come the suburban extensions in an order yet to be announced. An official announcement has also been made of an agreement with the Colorado & Southern Railroad by which the passengers on the new electric line of the latter company running northward will be carried to the heart of Denver over the tramway system. This means the bringing into direct communication with Denver that rich belt of country included in Boulder, Larimer and Weld Counties, a territory that is advancing very rapidly. The business of this new section, added to the other communities that are to be brought into direct business dealing with the city, means a still greater Denver. The electric road to the north is under way and will be completed by the time that the Tramway Company is ready to accept the passengers and convey them over the new line running from Globeville via Twenty-Third Street to Arapahoe and Sixteenth Streets.

BIDS FOR NEW YORK'S NEW SUBWAYS TO BE ADVERTISED IN TWO FORMS

At the meeting of the Rapid Transit Commission, Thursday, Dec. 13, a communication was received from the Board of Estimate recommending that in advertising bids for subways they be advertised in two ways, one calling for construction alone and the other calling for construction, equipment and operation. It was resolved to follow this suggestion in the future. On the recommendation of the chief engineer, it was resolved to construct the Lexington Avenue subway on the double-decked plan. In this way the local tracks would be near the street surface and the express tracks directly underneath them. This plan is necessary owing to the narrowness of Lexington Avenue. The express tracks will be about 35 ft. below the surface, and all the express stations will be provided with escalators. The board approved the plans of the Cortlandt Street terminal submitted by the Hudson & Manhattan Railroad Company.

IMPROVEMENTS AT ROANOKE

The Roanoke Railway & Electric Company has under way a number of improvements extending to all branches of the service. It has just installed a new 500-kw G. E. railway unit, direct connected to Corliss engine, and a 500-kw, three-phase A. C. generator, direct connected to McIntosh & Seymour vertical compound condensing engine, and is now putting in a Babcock & Wilcox 400-hp boiler, equipped with the Parsons system of draft. This will increase the boiler capacity to 2000 hp. The engine and generator capacity has been increased to 2500 hp, including the above units. The company has practically relaid all of its outside lines with standard A. S. C. E. 60-lb. rails, and is double-tracking all of its main lines in the city with 60-lb. 7-in. T. It is also renewing all special work with the Lorain Company's standard construction. An especially interesting piece of T-rail special work has recently been installed by the company's own track force at Campbell Avenue and Jefferson Street, the busiest part of the city. The company also expect to enlarge its car house next year, and will erect its own office building.

TOLEDO & WESTERN SALE CONFIRMED

On Saturday, Dec. 15, the sale of the Toledo & Western to a syndicate represented by J. R. Nutt, of Cleveland, was confirmed by the United States Court. Exceptions were noted, and attorneys for the minority stockholders threaten to carry the matter up. They say they asked for a modification of the sale in such a way that any reduction in the claims would be for the benefit of the stockholders instead of the purchasers. The court, it seems, did not see fit to make this modification. It is claimed that the majority stockholders filed exceptions to the claims of the Allen estate, Mr. Seagrave, Fugé Stone and others within the time allowed after the order of sale was made, but that later on they asked a modification of the exceptions that would make the amounts of the reductions only a few thousand dollars.

The Toledo & Indiana Railroad Company has been incorporated to own and operate the road. The nominal capital stock is placed at \$10,000, and George Cook, L. J. Milin, F. B. Williams, M. S. McAletman and J. C. Rexforth are the incorporators. The articles of incorporation provide for the extension of the road from Pioneer to the Ohio and Indiana State line.

MR. HUNTINGTON REPLIES TO LOS ANGELES CHAMBER OF COMMERCE RECOMMENDATIONS

H. E. Huntington, president of the Los Angeles Railway and the Los Angeles Interurban Railway Company, has replied at considerable length to suggestions made by the Chamber of Commerce committee for certain changes in the operation of the companies' systems. Mr. Huntington has met the issue squarely from all sides. Where recommendations have been made that are at all possible of adoption he has signified his willingness to comply so far as it is possible to do so. Where recommendations have been made imposing conditions too hard he has emphatically given reasons why the recommendations can not be met, pointing out how they would result in disorder or in some cases unreasonable expense.

In regard to the filing of accident data within 48 hours of the occurrence, Mr. Huntington says he cannot see what the effect of this would be on the minimizing of accidents, but that he would even comply with the request were details not wanted that would require the organization of a special force to care for the work.

The point that Mr. Huntington makes in regard to the relation of speed to the number of accidents is very interesting. He says that after a careful study of accidents he is convinced that more than 90 per cent of the accidents on his lines would have occurred whether the cars were running 8 or 16 miles an hour.

In regard to the recommendation that cars stop on the near side of the street, Mr. Huntington says this has been a mooted question among street railway men for years, but that he is prepared to give the system a thorough trial. He suggests that the adoption of this rule be accompanied by the passage of an ordinance, as recommended by the Commission, compelling teamsters to give the right of way to cars. As Mr. Huntington says, one of the greatest objections to this heretofore has been that teamsters, knowing that the car would stop on the near side of the street, have had no hesitancy about driving on to the intersection and choking traffic in such manner as to make it almost impossible to operate in congested portions of the city. He says signs should be posted on all street corners calling the attention of the public to the point where cars will stop to receive and discharge passengers, and the police department of the city should be required to give its attention and assistance in directing the public to the proper stopping and starting points.

The recommendations of the Commission, numbered from VIII. to XX., inclusive, have been referred by Mr. Huntington to the proper heads of departments and will receive attention. His observation on the Commission's recommendations for trainmen are very pertinent, especially those covering the subjects of relative responsibility of motorman and conductor. He says:

The Commission seems, I believe through error, to have drawn a distinction as to the responsibility between motormen and conductors. They have, I believe, fallen into this error through the fact that such distinction is made in steam railway operation, and to have lost sight of the fact that in the operation of an electric car the responsibility of the conductor is perhaps as great as that of the motorman.

I will illustrate by calling your attention to the two most deplorable accidents our roads have ever experienced, viz.: The accident at Onoonta Park in which the Southern Pacific train struck one of our cars, and the accident on the Redondo line in August when two of our Redondo line cars collided. In both of these accidents, if there was any responsibility on the part of our platform men, it was with conductors rather than the motormen, and I say, therefore, that in the operation of electric railway cars, the responsibility is so evenly divided, the results of years of experience has taught electric railway men that the scale of wages for platform men—as conductors and motormen are called in street railway service—should be the same.

I wish to suggest, however, at this point, that a scale of wages for electric cars operated in cities, or in suburban service, such as is paid trainmen on steam railroads, would be absolutely prohibitive. The engineer driving a locomotive on a steam railroad is handling a train of cars weighing many hundreds of tons, having a carrying and earning capacity of anywhere from ten to forty times as much as the one electric car. Our platform men are among the best paid in the United States. They are, I believe, the best satisfied and highest class men in their line of work of any in the world. * * * A careful personal investigation has satisfied me that no platform man upon the electric railway system, in which I am interested in Southern California, has ever been required to work so long as to unfit him in any way from properly performing the duties assigned to him.

PLANS ANNOUNCED FOR IMPORTANT LOS ANGELES-PACIFIC IMPROVEMENT, WHICH INCLUDE A TERMINAL STATION

E. H. Harriman has completed plans for extensions and improvements for the Los Angeles-Pacific Railroad that will make Los Angeles one of the most important electric railway centers in America. The plans include three concrete subways, 5 miles in length, to carry the new express trains of the Los Angeles-Pacific through the heart of the northern and western hills of Los Angeles, and a new \$1,000,000 office building to be erected in the center of the city. The estimated cost of the new subway is \$5,000,000. The main subways will number two. One will parallel West Fourth Street from Hill Street to Vermont Avenue; the other will pierce the Temple Street highlands, joining North Hill Street to Sunset Boulevard. More than \$1,500,000 has already been expended securing rights of way for the subways. About \$350,000 has been spent procuring on South Hill Street, between Fourth and Fifth Streets, a site for the new Hariman Building.

Outside the city limits the company will build new lines that will reduce the time between Los Angeles and Ocean Park to 20 minutes, while Hollywood and adjacent territory will be only 10 minutes away, and the western city limits only 5 minutes from the city's heart. All these lines, like the main project, are to be standard gage. To do all this work will require at least three years and the ultimate expenditure of upwards of \$8,000,000.

The subway from Fourth and Hill Streets to Vermont Avenue will be almost 4 miles in length. It will parallel West Fourth Street all the way. Its down-town entrance will be from a magnificent ten-story office building and depot located on the present site of the Masonic Temple on South Hill Street. This building will be of steel, granite and reinforced concrete, the largest of its kind in the West. The plans contemplate 1100 office rooms, which will give accommodations for more than 3000 people. The floor space will comprise nearly 16 acres. Nine stories in height, besides a basement, the building will have a frontage of 240 ft. on Hill Street, and a depth of 330 ft. The floor area will be, exactly, 669,000 sq. ft. The first and second stories will be faced with granite, the upper seven stories with terra cotta. Eight passenger elevators and two freight elevators will be installed. On the first floor of the new building will be waiting rooms, a large ladies' parlor, restaurants, ticket offices, an information bureau and three store rooms. From the subway into the depot will run eight tracks and from Hill Street two tracks. Outgoing and incoming trains will be handled through separate entrances. The accommodations and facilities are to be such that ten trains can arrive and depart every 5 minutes.

All new cars will be equipped with multiple-unit control and the overhead trolley system will be used. In the concrete subway will be four tracks. The train service will consist of express trains of five or six cars each. From the western entrance to the Fourth Street subway air lines will be built direct on Ocean Park, Santa Monica and Hollywood. The main line will extend across private right of way from Fourth Street and Vermont Avenue to Wilshire Boulevard. There it will enter a second subway, 3000 ft. in length, running through the famous Nadeau vineyard, and finally connecting with the present lines at the junction of the line to the Soldiers' Home, and then to Ocean Park. A second line will extend from Fourth Street and Vermont Avenue to Sherman Junction, a distance of 5½ miles, making a short line for Santa Monica and the Westgate line. Midway between Vermont Avenue and Sherman Junction a third road will run through Hollywood by way of Highland Avenue.

PITTSBURG RAILWAYS COMPANY DISPOSES OF ITS AMUSEMENT ENTERPRISES

James D. Callery, president of the Pittsburg Railways Company, announced last week that the company had leased Duquesne Garden, Kennywood and Southern Parks, for a term of years, to A. S. McSwigan, A. F. Megahan and F. W. Henninger, all experienced amusement purveyors, thus taking the company out of the amusement park business. Calhoun and Oakwood Parks, which the company also operated in the past, will not be reopened, but will be sold for building purposes. Mr. McSwigan has had charge of all the company's amusements and advertising since the company began business five years ago. He will still be identified with the company. Mr. Megahan is an old street railway man,

and was formerly manager of Kennywood Park and West View Park. Mr. Henninger was one of the organizers of the West View Park Company, of which he is still secretary and treasurer and a director.

The new company will begin about Feb. 1 improving Kennywood and Southern. The latter will practically be rebuilt. A new \$10,000 carrousal will take the place of the present one, a \$12,000 coaster will be erected and a brilliantly illuminated tower effect entrance built. The dancing pavilion will be enlarged or torn down and a new one built. At Kennywood the improvements will include another mammoth dancing pavilion, near the entrance. The park will then have two pavilions—one for picnics and the other for private dances. The scenic railway will be extended, the old mill rebuilt and the roller skating rink enlarged. In the Wonderland building a number of new free laugh-making devices will be installed. The lessees will continue Duquesne Garden, which is a stone and brick building, 140 ft. x 450 ft., as a high-class resort, with ice skating from November to April. During the remainder of the year exhibitions, receptions, etc., will be held.

SIXTY-FIVE MILE INTERURBAN LINE IN TEXAS

Details have been announced of the contracts let by the Texas Traction Company for the equipment of a 65-mile electric railway between Dallas and Sherman, Tex., which were briefly noted in the STREET RAILWAY JOURNAL of Dec. 8. The new line will parallel the existing steam road between the two cities, and will be one of the longest electric roads in the State. While the apparatus is standard direct current throughout, the equipment, in some respects, presents several features of interest.

The country through which the new line is laid out, is flat and rolling, there being no grades exceeding 1 per cent and a maximum curvature of but 3 degs. In order to have a clear headway for operating cars, a private right of way has been established by the company, so that the run between Dallas and Sherman will be made in 2 hours and 30 minutes. This schedule includes a 15-minute run within the city limits of Dallas, where the cars must necessarily be operated at lower speeds. While the main traffic will be of an express nature, stops have been provided about every 2 miles to take care of the local travel.

Fifteen car equipments will be provided to maintain the initiative schedule. These will be of the standard interurban type, each 50 ft. long, and equipped with four GE-73 (75 hp) standard direct-current motors, equipped with the Sprague-General Electric type M system of multiple-unit control. Each car will be further provided with General Electric air brakes and compressors.

Power for the new road will be generated by steam at McKinney, a town located about midway between Dallas and Sherman. The main power station equipment will include two 1000-kw Curtis steam turbo-generators, working under a steam pressure of 150 lbs. at the throttle with 125 degs. superheat. The turbines will operate condensing. Current will be generated at 2200 volts and 25 cycles, and stepped up for transmission to 10,100 volts. For exciting the fields, two 35-kw generator sets will be provided.

The three-phase current from each of the turbo-generators will be transformed in a set of three 330-kw air blast transformers. One transformer of the same capacity will be installed as a reserve. To supply air for cooling, duplicate blower sets will be furnished, one set being driven by an induction motor, the other by a direct-current motor. Each blower will have a capacity of 10,000 cu. ft.

One of the special features of interest in the new road lies in the rotary converter equipment. Six sub-stations will be provided, including one at the main station and a portable equipment. This last mentioned sub-station comprises a special car containing a 300-kw rotary converter air blast transformers, and suitable switching apparatus for cutting into the transmission system wherever necessary.

Regular sub-station equipments are to be provided at the main station, and at four points distributed along the railroad. Each of these sub-stations will be equipped with a 300-kw, 600-volt rotary converter with the necessary switchboards, oil-cooled transformers and lightning arresters. The sub-stations will be interconnected by high-tension transmission lines, operated initially at 19,100 volts. Eventually, however, a transmission potential of 33,000 volts will probably be used, and for this purpose taps will be provided for Y connection of the transformers.

RAILROAD OFFICIALS SAY ELECTRIC OPERATION INTO WASHINGTON IS IMPOSSIBLE.

Formal announcement has been made by officials of both the Pennsylvania and the Baltimore & Ohio Railroads that they cannot grant the request of the District Commissioners to have the various railroad companies which will use the new union station substitute electric motors for steam locomotives within the District, as a means of eliminating smoke and gases. The communication from the Pennsylvania Railroad was written by the president of that company, and that from the Baltimore & Ohio by the third vice-president. The two railroad officials reported that it is impossible for them to make the substitution in the method of motive power from the time of the beginning of the use of the union station, and stated that it is unlikely that they will substitute the electric motors at any time in the future.

The letter of President Cassatt, of the Pennsylvania Railroad, says:

I beg to say that we expect to open the station next spring or early next summer, and it would be quite impossible to install an electrical plant by that time, even if it were reasonably practicable to do so at any time.

The use of electric locomotives by the New York Central Road for the movement of its passenger trains to and from its station in New York was necessitated by the impossibility of properly ventilating the tunnels forming the approach to the station. For the same reason the Pennsylvania Railroad Company will have to use electric power for the movement of its trains through its tunnels under the North and East Rivers. One railroad entering Paris has resorted to the use of electric power for the same reason, but these are the only instances that I know of where electric power is used for this character of service.

The use of electric motors at terminals is therefore only in the experimental stage, but it is very certain that the shifting and making up of trains cannot be done as expeditiously by this method.

The public would also be inconvenienced by the necessity of an extra stop to change from electric to steam locomotives at the border of the District, which would be seriously objectionable in view of the high-speed service which we propose to establish between Washington and the North. As the tracks leading to the Union Station both from the North and South do not run through important residential sections of the city, we hope that the Commissioners will at least wait to see whether the use of steam locomotives burning semi-bituminous coal shall be seriously objectionable before proceeding in this matter, and I hope that I may be allowed to add that we think the Commissioners and the public should give us credit for providing this magnificent station for the capital of the nation at a cost far greater than we would have been justified in incurring if we had dealt with the matter from a purely business standpoint, and that they will not seek to impose any further burdens than have already been voluntarily assumed for the credit of the country by the railroads concerned.

The reply of the Baltimore & Ohio Railroad showing its reasons for not taking kindly to the request of the Commissioners for the substitution is as follows:

The suggestion that electric motors be substituted for steam locomotives within the District of Columbia was made before the House committee during the last session of Congress, and this company at that time examined carefully into the practicability of the question. The officers of the company were convinced by the investigation then made that, under the conditions existing in the District of Columbia, especially in the Union Station and the facilities connected therewith, the substitution of electric motors for steam locomotives would be entirely impracticable in the present state of development of electric traction, and would also be unsafe. The officers of the company are still of the same opinion, and cannot, therefore, undertake to comply with the request of the Commissioners of the District of Columbia contained in yours of the 16th inst.

THE ANNUAL REPORT OF THE INTERNATIONAL EMPLOYEES' ASSOCIATION

The trustees have submitted the sixth annual report of the International Railway Employees' Association, of Buffalo, giving a brief review of the past year. At last year's annual meeting they announced with regret that the year had been a record breaker for sickness, and came very near the record for deaths in any one year. This year the sick benefits paid amounted to only \$4,541, being \$1,842.30 less than last year, while the membership is greater than ever before. There were four deaths this year, as against six in 1905, four in 1904, and nine in 1903, which is also a gratifying showing. The membership at the end of the fiscal year, October, 1904, was 1354; at the end of the fiscal year of 1905 was 1414, and at the end of the fiscal year of 1906 was 1459. While these increases are not large, the fact is explained

because the field is limited to the employees of the International Railway Company, and after all of the eligible employees are enrolled, the increase in membership must necessarily be small.

The members in Class "R" (that is the regular class) paid during the year, for initiations and dues, the sum of \$9,114.50, and received in sick and death benefits and in medical attendance the sum of \$7,210.84. The resulting surplus of \$1,903.66 was further increased by the proceeds of the annual ball, the sale of lost articles and the interest on investments, so that the net increase to surplus during the year amounts to \$4,082.06, making the total surplus at present \$11,220.33. This satisfactory result of six years' operation is due to the fact that the railway company pays for all salaries, heat, light, repairs, laundry and periodicals, and furnishes free of charge the rooms occupied by the association.

The members in Class "H" (the honorary class composed of employees who could not pass the medical examination) paid in \$78 and drew out of their own fund \$103. The apparent deficit of \$25 in this class is not at all alarming, as the company has pledged itself to make good any necessary sum after the fund is exhausted. The association still holds in its possession \$49.50 of Class "H" funds, and when that is used the company will pay all deficits. Following is a comparative statement of membership:

	1904	1905
Total increase during year.....	851	994
Dropped from roll.....	791	949
Net gain for year.....	60	45
Previous membership.....	1,354	1,414
Membership at end of year.....	1,414	1,459

The treasurer's comparative report for the year ending Oct. 31, 1905, and the year ending Oct. 31, 1906, shows as follows:

INCOME ACCOUNT, CLASS "R"

Receipts	Year Ending Oct. 31, 1905	Year Ending Oct. 31, 1906
Initiations, class "R".....	\$767.50	\$865.00
Dues, class "R".....	7,929.75	8,248.50
Toilet supply.....	118.00	97.20
Interest receivable.....	161.74	296.20
Sale of lost articles.....	130.49	105.50
Net proceeds of ball.....	1,260.38	1,679.40
	\$10,367.86	\$11,293.80
Disbursements		
Sick benefit, class "R".....	\$6,383.30	\$4,541.00
Death benefit, class "R".....	851.00	650.00
Medical attendance—		
East Side.....	849.96	849.96
West Side.....	849.96	849.96
South Side.....	74.97	99.96
Niagara Falls, N. Y.....	120.00	120.00
Niagara Galls, Ont.....	30.00	.....
Lockport.....	99.96	99.96
	9,239.15	7,210.84
Net surplus for 1905.....	\$1,128.71	.....
Net surplus for 1906.....	.....	\$4,082.96

POFIT AND LOSS ACCOUNT

	1905	1906
Credit		
Net surplus, Oct. 31, 1904.....	\$4,006.66	.....
Net surplus, Oct. 31, 1905.....	.....	\$7,137.37
Surplus in income account for the year.....	1,128.71	4,082.96
Donation from International Railway Company.....	2,000.00	.....
Profit and loss surplus, Oct. 31, 1905.....	\$7,137.37	.....
Profit and loss surplus, Oct. 31, 1906.....	.....	\$11,220.33

GENERAL BALANCE SHEET

	1905		1906	
	Assets	Liabilities	Assets	Liabilities
International Traction Company 4 per cent bonds (par value for 1905, \$3,000, and for 1906, \$10,000).....	\$2,255.00	.....	\$7,937.50	.....
Reserve fund (Buffalo Railway Company 6 per cent debenture bond).....	500.00	.....	500.00	.....
Cash with treasurer and on deposit.....	4,497.87	.....	2,873.33	.....
Deposit for locker keys.....	\$41.00	.....	\$41.00	.....
Honorary members' fund.....	74.50	.....	49.50	.....
Profit and loss (surplus).....	7,137.37	.....	11,220.33	.....
	\$7,252.87	\$7,252.87	\$11,310.83	\$11,310.83

FREIGHT RIGHTS TO BE UTILIZED IN NEW JERSEY

After a year of inactivity several electric railways are making efforts to take advantage of the so-called "trolley freight bill" passed by the New Jersey Legislature last winter. The Camden & Trenton Railway has a number of applications pending in the various municipalities between Riverton and Trenton, and the Trenton Street Railway expects soon to make application in Trenton. The Camden & Trenton, if the desired franchises are secured, will make a specialty of packages and milk, it is understood, as business cannot well be interchanged with the steam railroad owing to the difference in gage of the lines. The Trenton Street Railway will use the old car stables on Princeton Avenue for a receiving and delivering station in Trenton, it is said, and will look after the package and milk business likewise. Both the Trenton & New Brunswick and the Trenton, Lawrenceville & Princeton Railroads make a specialty of this particular branch, although the former has never worked it up at the terminals. Both these roads have steam charters and do not need franchise permission to haul freight. The Trenton Street Railway Company (gage 5 ft. 2½ ins.) will doubtless enter into competition with the Trenton, Lawrenceville & Princeton Railroad in the package and milk business, having the advantage of running along the public highway in front of the houses and farms, while the latter is located quite a distance from the main highway. In the matter of through carlots, though, there can be no competition with the Trenton, Lawrenceville & Princeton Railroad, as that company's line is standard gage, and direct connections are had with the Reading Railway tracks in North Trenton.

NORTHERN ELECTRIC COMPANY RAILWAY IN CALIFORNIA

As a result of a recent conference in Chico, Cal., between ex-Mayor James D. Phelan, of San Francisco, and President H. A. Butters, of the Northern Electric Company, the route of the Northern Electric Railway from Chico to Hamilton City was determined. It is generally understood that the exact route of the electric railway will be as follows: From the foot of Fifth Street, at the Southern Pacific depot in Chico, directly west on the river road for about ½ mile to a point where the Morehead property, under lease to the Chico Nursery Company, touches that thoroughfare. From this point the line will be built in as straight a line as possible through the Phelan land to the site of the old bridge across the Sacramento River, and thence in a straight line to Hamilton City. It is now stated that as a result of the success of the conference between H. A. Butters and James D. Phelan, the later will sub-divide all of his property immediately adjacent to the railroad into small tracts, and in addition to this will plant 1000 acres to beets. It is also stated that an avenue and driveway will extend through the Phelan property along the railroad, and will be planted with shade trees, furnishing a delightful drive from Chico to the river for pleasure parties.

The condemnation suit between the Northern Electric Company and W. H. Basler has been settled, and now the railway will have an easy entry to Sacramento. Until the right of way was secured the Northern Electric was practically blocked from entry to the city. While it has very much work to do yet on the west side of the American River, the Basler litigation no little impeded progress, which the company desires to be as speedy as is possible, that it may get footing within the city to reach the property it has already here acquired.

The franchise demanded by the company in Sacramento for a track on Fifteenth Street to I, and down I to Seventh has been granted by the City Board of Trustees after a long and somewhat bitter fight. All reference to underground wires was stricken out, but other concessions by the company were agreed to. On the final vote the franchise was granted unanimously.

The interurban line of the Northern Electric Company began service at Marysville on Dec. 3, running eight trains daily each way between Marysville, Chico and Orville. Service on the local lines will be inaugurated within a few weeks.

STREET RAILWAY PATENTS

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

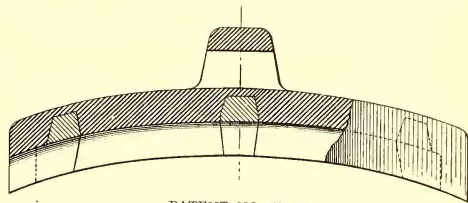
UNITED STATES PATENTS ISSUED DEC. 4, 1906

837,312. Point Mechanism for Tramways and the Like; Edwin Lawrence, Leicester, England. App. filed Nov. 23, 1905. The

switch is operated by means of levers which project into the grooves of the rails.

837,330. Signal; Thomas R. Nicholas, Carthage, Mo. App. filed May 10, 1906. A semaphore signal having a weighted arm which is normally held in elevated position by a magnet and which falls to impinge against a detent so as to release the semaphore arm.

837,356. Brake-Shoe; Alfred L. Streeter, Chicago, Ill. App. filed Nov. 22, 1905. A hard metal insert adapted to trim or dress the flange of the wheel as the tread of the latter wears away.



837,369. Electropneumatic Brake; Edward A. Wright, Edgewood Park, and Walter V. Turner, Wilkinsburg, Pa. App. filed March 20, 1905. Comprises in addition to the usual standard automatic air-brake equipment, an electrically-operated valve for also controlling the supply of air to the brake cylinder and a double check valve located between the electrically-operated valve and the triple valve and the brake cylinder.

837,396. Electric Controlling System; Urias J. Fry, Milwaukee, Wis. App. filed April 9, 1906. Relates to an electric switch and signal controlling mechanism in which the switches and signals are made electrically interlocking by the use of special relays and connections.

837,416. Air Brake; Hugh M. Marsh, Chicago, Ill. App. filed July 16, 1906. In an air-brake cylinder, in combination, a cylinder, a piston movable therein, an induction port, and an eduction port operable by the movement of the piston upon a reduction of pressure within the cylinder.

837,434. Rail Joint; Charles T. Taylor, Woodston, Kan. App. filed March 6, 1906. Consists of lapped tongues integral with the adjoining ends of the rails, the latter having grooves to receive the respective tongues, a key for engaging key seats in the under portions of said tongues and a shoe having longitudinal flanges to overlap the base flanges of the rail and retain the key in place.

837,454. Steel Rail; William J. Devers, Scranton, Pa. App. filed June 13, 1906. The base of the rail has an upwardly extending fin and the tread has a downwardly extending fin, the two fins being secured together by fish-plates and a U-shaped clamping member extending through the fish-plates and fins.

UNITED STATES PATENTS ISSUED DEC. 11, 1906

837,930. Operating Mechanism for Derailers, etc.; Stanley W. Hayes, Geneva, N. Y. App. filed Aug. 29, 1904. A flat base plate in the same plane as the rails and a bracket rising therefrom, a vertical target shaft journaled in said bracket and plate, and a horizontal bell-crank fast on said shaft between the bracket and plate, one arm of the bell-crank being extended away from the rails and serving as an operating lever.

837,943. Brake Mechanism; Albert O. Mitchell, Bethlehem, Conn. App. filed July 6, 1906. A loose pulley on the axle winds up the brake chain when a friction plug, which is fixed on the shaft through the medium of other elements, is forced against the loose pulley or idler.

837,965. Fluid Pressure Brake; William H. Sauvage, New York, N. Y. App. filed Dec. 26, 1905. Comprises an apparatus whereby a second or auxiliary cylinder may operate its piston to reinforce or increase the brake pressure after the main cylinder has operated its piston to take up the slack and set the brake-shoes against the wheels with an initial pressure of less degree.

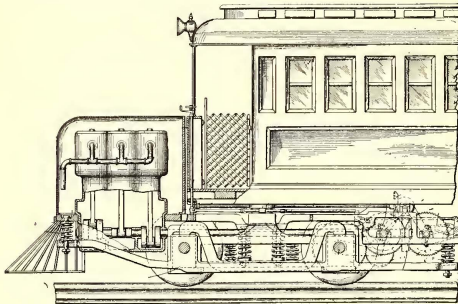
837,980. Retarding Valve Mechanism for Fluid Pressure Railway Brakes; Walter V. Turner, Topeka, Kan., and David M. Lewis, of Raton, New Mexico. App. filed Jan. 29, 1903. Provides an improved retarding-valve mechanism for brake-cylinder release, the action of which shall be controlled by and dependent upon the variations in pressure in the train line from the head to the rear end of trains.

838,033. Switch-Operating Device; Lewis M. Knowles, Augusta, Me. App. filed March 12, 1906. The switch is operated by

means of a depressible lever in the roadbed, which has a flexible connection with the switch point.

838,083. Derailer for Railways; William R. Cochran, Jr., Delphos, Ohio. App. filed May 9, 1906. The derailer is movable on its support, independent of the rail and is so constructed that a car passing in one direction moves the derailer to one side, but a car moving in the opposite direction is derailed.

838,112. Motor Vehicle; Walter D. Hark, Chicago, Ill. App.



PATENT NO. 838,112

filed Jan. 20, 1906. Relates to a self-propelled car and has special reference to the mounting of a gas engine on the trucks.

838,151. Continuous Rail-Joint for Railways; Francis H. Whomes, Los Angeles, Cal. App. filed Feb. 12, 1906. At the abutting ends of the rails a plate is inserted having a shape corresponding to the tread of the rails and having arms seated in grooves in the tread of the rails and also having arms at its base, which extend through the fish-plates on both sides.

838,160. Compound Brake for Cars; William D. Baldwin, New York, and August Sundh, Yonkers, N. Y. App. filed March 7, 1905. Magnetic clutches on the car axles are directly connected to operate the brakes, and additional connections lead to the usual hand levers so that the brake is separately operable thereby. There is also a solenoid magnet for applying the brakes.

838,177. Electrical Contact Shoe; Thomas Fildes, Richmond Hill, N. Y. App. filed Feb. 20, 1906. The sides of the shoe converge toward one end, said sides being provided with an opening extending entirely through the same and beveled in the direction of their height. Constitutes a scraper to remove ice and snow from the rail.

838,175. Controller for the Trolley Poles of Electric Cars; Alfred J. Edwards, Auckland, N. Z. App. filed Aug. 22, 1906. A weight is contained in a casing, which is normally held in raised position by latches or detents. In case the trolley pole leaves the wire, the detents are released and the weight falls to retrieve the pole.

838,222. Brake-Shoe; James S. Thompson, Chicago, Ill. App. filed April 3, 1906. The brake-shoe is formed with a bolt-opening in the body thereof and having a rod located at or adjacent to the back thereof, said rod being bent at one end to form an attaching hook and at its opposite end to reinforce the metal surrounding said bolt-opening.

838,283. Electrically Propelled Vehicle; Russel Thayer and Joseph Ledwinka, Philadelphia, Pa. App. filed May 24, 1906. The vehicle takes current from a trolley wire and has depending rollers engaging track rails to complete the circuit. When the track is not available the rollers are raised and the vehicle proceeds on storage batteries.

838,295. Railway Rail; John C. Allendorph, Kansas City, Mo. App. filed Oct. 23, 1905. Embodies a two-piece rail consisting of a main rail, which is hollow throughout its entire length, and a supplemental rail which fits into and supports the hollow rail and extends throughout the length of the main rail.

838,288. Rail-Joint; Cecil Tyym, St. Louis, Mo. App. filed April 21, 1906. Portions of the tread are removed and the fish-plate is so constructed as to take the place of said cutaway portions.

838,316. Brake-Shoe and Method of Making Same; Henry K. Gilbert, Chicago, Ill. App. filed Dec. 19, 1905. A brake-shoe blank of malleable metal comprising a central section shaped to receive a holding key, and extended end sections formed by flattening the end projections of the central section.

838,404. Relay; Max R. Hanna, Schenectady, N. Y. App.

filed May 26, 1906. An alternating-current railway signal system, comprising means for supplying alternating current to the rails of the blocks, a relay comprising a conducting member, a winding supplied with current from the track circuit arranged to produce a flux threading said member, and a winding supplied with alternating current of the same frequency and different phase, independently of the track circuit and arranged to produce two fluxes threading said member on opposite sides of the first flux, and a signal controlled by the movement of said member.

PERSONAL MENTION

MR. GRIFFIN B. COLEMAN, superintendent of repairs of the District of Columbia and formerly secretary and manager of the Metropolitan Street Railway Company, of Washington, is dead.

MR. A. L. LINDNER, general manager of the Citizens Railway & Light Company, of Muscatine, Ia., has resigned his position with that company, taking effect Jan. 1, 1907. Mr. Lindner has been in control of the property for three years, and in that time the business of the company has more than doubled.

MR. J. B. INGERSOLL has been appointed general manager and chief electrical engineer of the Spokane & Inland Railway, to succeed Mr. F. A. Blackwell, to whom he has acted as assistant. Mr. Blackwell resigns the offices so as to devote more time to his other interests. He will, however, continue with the company as chairman of the board of directors.

MR. L. SPANGLER, manager of the Vienna street railway system, has been appointed chairman of the electric railway committee of the Austrian Interurban Railway Association (Localbahner Verein). This association has heretofore been made up principally of steam railroad companies, but has decided to extend its scope and take up the study of electric railway topics.

GEN. JOHN M. HOOD, president of the United Railway & Electric Company, of Baltimore, Md., and for many years president of the Western Maryland Railroad, prior to its sale to the Gould interests, died Monday, Dec. 17, after a short illness following nervous break-down. Gen. Hood was born in Howard County, Maryland, in 1843. He served in the Confederate Army during the Civil War, and was several times wounded. After Appomattox he took up railroad work, and in 1874 was elected president of the Western Maryland, then a road with only 90 miles of tracks.

COL. J. W. HARTZELL, promoter of the Vallejo & Napa Electric Railway and the San Francisco, Vallejo & Vacaville Valley Railroad & Steamship Company, died at Vallejo, Cal., on Dec. 8. For more than twenty years Col. Hartzell has been identified with many large enterprises in California. He was the projector and builder of the pioneer electric road of San Francisco, from that city to San Mateo, built over twenty years ago. Before coming to California he built several electric roads in Topeka, Kan., and a large park in that city is named after him. Col. Hartzell had large interests in Northern California. He was born at Rock Island, Ill., and was 67 years of age last October.

MR. FENWICK E. LOWE has been appointed superintendent of the St. Paul division of the Twin City Rapid Transit Company, to succeed Mr. C. C. Burdick, resigned. Mr. Lowe is a native of St. Paul. Immediately after graduation from the high school he entered the employ of the Pullman Car Company, and was afterwards appointed storekeeper. Later, however, he was promoted to the general managership of the Minneapolis office of the Pullman Car Company. Last April he took the position of chief clerk to the general manager of the Rapid Transit Company. During the summer, Mr. Lowe had charge of traffic at Excelsior, handling the boats and cars during the Grand Army Republic encampment, and on other occasions when patronage was heavy.

MR. LUDGER TRUDEAU, superintendent of the Montreal Street Railway system, died on Dec. 12, at his home in Quebec. Mr. Trudeau had been in the employ of the Montreal Street Railway for twenty-four years, having entered the service as a conductor. He became an inspector when the motive power of the lines was changed to electricity. When Mr. Duncan McDonald, the present manager of the system, went to France to assume charge of the electric systems centered at Paris, Mr. Trudeau accompanied him, and was placed in charge of the system of Bordeaux. Afterwards, Mr. Trudeau went to Alexandria, Egypt, and became manager of the trolley system there. After being three years in Alexandria he returned to Montreal. In January, 1904, he was appointed superintendent of the system, replacing Mr. Luke Robinson, who had resigned, owing to ill-health.