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

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THE STREET RAILWAY JOURNAL,  
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## Fresh-Air Seats the Year Round

A prominent street railway man remarked recently that he believed the demand for open-air seats the year round was on the increase, even in climates where the thermometer occasionally reaches the zero point. It has always been noticeable that on the cable grip cars of Chicago and Kansas City, which are open the year round, there are but few days in each year when seats on the open grip car are not in demand. These are the very stormy or extremely cold days. A perfectly satisfactory type of car will probably never be found. Even in California, with its even climate and with the half-open, half-closed cars generally used there, it frequently happens that the open part is crowded at the expense of the closed, and vice versa. The semi-convertible car, in which the transition from open to closed is accomplished by simply raising or lowering windows of ample size, is probably more popular, both with street railway management and public at present, taking the country over, than is any other single type, and yet even this cannot suit those who wish to ride in the open the greater part of the year. The double-deck car has been extensively discussed in many quarters, but unless there is some decided change of sentiment from that existing at present among street railway managers generally, there will be but little attempt in this country to introduce it. A semi-convertible car with two com-

partments, one to be kept open except in very cold or stormy weather, the other to be kept open only during very warm weather, perhaps might suit more people than anything else that could be devised. Street railway cars have been undergoing a continuous evolution in the last ten years. Many freaks in car construction have been tried by some companies, while others have conservatively held to the old types of open and closed cars. Just where the evolution will finally land us no one can safely predict.

## The Broadway Extension of the Underground

It has been announced that the project of building an extension of the present subway from Forty-Second Street through Broadway to Union Square, and thence to the Battery, through University Place, Wooster Street and Church Street, is now under consideration by the Rapid Transit Commission, and that formal authorization may be expected early in the fall. It is generally conceded that this will be a very valuable public improvement, and that the transportation facilities it will afford are even now needed badly, yet the mere mention that such a plan is contemplated has been sufficient to set in motion an opposition movement. Broadway, throughout the retail district, opened up for subway construction, is not a pleasing prospect even to those who have no material interest in the beauty or prosperity of that section of the city, but to those whose business is centered there such a project means very serious financial loss. The line of the proposed tunnel penetrates the most important retail shopping district of the city. There, too, are located the principal hotels, restaurants, theaters and apartment houses; it is visited daily by hundreds of thousands, and represents an enormous investment in buildings whose value depends largely upon the unobstructed use of the street by shoppers, pleasure seekers and sightseers. A moment's reflection will satisfy anyone familiar with local conditions that the property owners, merchants, hotel men, restaurant keepers and theatrical managers are confronted with a serious problem, for the improvement is badly needed; in fact, it is absolutely essential to the continued prosperity of the city, and yet its execution after the method employed on the original subway, it is feared, would mean great financial loss to the business interests already mentioned.

It has been suggested that a deep tunnel be bored through Broadway and that all further extensions of the underground system adopt this plan instead of the open ditch construction. The chief engineer of the Rapid Transit Commission says that plans have not yet been drawn for the Broadway extension, and, judging from the expressions of public opinion that have already been directed to the Commission, that body will doubtless give the subject careful consideration. It has been suggested that a route through Seventh Avenue might be adopted, but this does not secure any encouragement whatever, and the Commission will be called upon to decide merely whether the same system of subway construction shall be adhered to or a deep tunnel plan substituted. The contractors for the original subway line declare that extensions can be completed much earlier if no radical change of methods is made at this time, and they contend that their experience will enable them to proceed

with the work without causing so much inconvenience and obstruction to traffic as in the original line. But the property owners and business interests of Broadway are jealous of the supremacy of that great artery and they do not intend to take any chances in letting trade get away from them even temporarily. It looks now as if the whole subway controversy would be reopened, and in any event an early decision on the Broadway extension can hardly be expected.

### The School of the Motorman

There has been recently a series of electric car collisions that impels us to make comment. Fatalities have, most fortunately, been few, but even minor accidents are distressing, and when preventable cannot lightly be passed over. It is somewhat difficult to generalize as to causes, but the impression is strong upon us that the most fruitful source of collisions is an inadequate understanding of what it means to keep a car under control. Most modern cars for interurban service are equipped with power brakes which are quite capable of doing good work if given adequate chance, and we think that such brakes are usually kept in good working order. That such equipment is not enough to prevent accidents is painfully evident, and it looks as though a better understanding of the brake question were badly needed. To stop a car, particularly a heavy car at high speed, a very large amount of energy must be absorbed, and this takes time even with the very best appliances. It is perfectly possible to have two interurban cars meet in a head-end collision even when each clearly sees the other at a distance apparently great enough to insure safety. It would be a good thing if every superintendent would inaugurate a series of braking tests on his equipment under various conditions as to track, not to see whether his brakes are working properly, but to see how long it takes first-class brakes, well applied, to really bring a heavy and fast car to a stop. Power brakes are better than hand brakes, but neither is good enough unless it has the requisite amount of space on the track ahead. To keep a car under control means considerably more than confining one's self to the legal rate of speed—it means having enough leeway in speed or in space to insure safe stopping. This space may be 50 ft. or it may be 200 ft. or more, and the higher the speed the longer the danger space.

Every road has its own idiosyncrasies, curves, grades, switches and turnouts, where possible obstructions may be met, and it is the business of an intelligent motorman to know for the whole line over which he runs all the possible danger spots and at what speed they can be approached, while yet leaving ample time for stopping if a sudden stop is needed. This is precisely the knowledge which a locomotive engineer must acquire and generally has at his finger tips. To be sure, the engineer works under a carefully carried out system of regulations, of itself generally sufficient to insure safety, but he knows his train and his run besides, and this knowledge is sometimes invaluable. A motorman on an interurban line operates of necessity on a much more flexible schedule, and he has a far less complicated machine to operate, but his mind must be just as alert, and his knowledge of his line just as precise if he is to be rated as skilful. A course in braking and in the fitness of running his schedule is necessary for his complete education, and it is time well spent.

We cannot help citing in this connection the unusual care spent in training the motormen of the Boston Elevated system just prior to the opening of the elevated line proper. To be sure, that line is equipped with a remarkably efficient block system, but a sort of school of the motorman was instituted,

and before a man was trusted with a train he was pretty thoroughly drilled in the peculiarities of his train and of the road. It is just this sort of education that would be particularly valuable in fast interurban work, the more so as a motorman has to exercise far more independent discretion than if working in conjunction with a block system of the nature of that used on the Boston elevated.

In more ways than one it pays to train motormen with particular thoroughness. In the mere matter of power consumed, it is a well-known fact that a skilful man can save for the company a material percentage on his daily pay. The experiment of putting on the cars ammeters, or better, wattmeters, has often been tried, and uniformly with the result of showing a very considerable saving in power, due to the intelligent care that could then be given. It has generally been considered that on ordinary street cars, which have to run under all sorts of difficult conditions, the gain hardly pays for the instruments, and such may be the case; but surely in the case of fast interurban lines, where the energy required per train-mile is far greater than on tramways there is a greatly improved chance for gain. We would like at least to see the experiment tried oftener than it is, and feel confident that it would save money. If it does not seem desirable to equip all the cars, a few cars can be equipped and the motormen given turns in running them. While their service can be checked up only while using the cars so equipped, they will be trained in the economical use of current. Moreover, a little healthy rivalry between motormen in the line of saving power for the company would be an excellent thing to cultivate, and we are disposed to think that a percentage on the value of the power saved might prove a powerful incentive to care and economy. For one thing, such a plan would discourage reckless running, such as is sometimes noted on late evening trips, and would be a sort of general education in the fine points of operation.

Many companies find it sound policy to take a lively interest in the welfare of their men, and do much in the way of providing comforts and recreation. This is highly commendable, but after all one can do nothing better for a man than to train him to skill and a keen appreciation of the value of expert knowledge in his calling. A man trained, not to be governed solely by rules and regulations, but by friendly interest to do his best and to cultivate alertness of body and mind, is a man won to a higher plane of intelligence and usefulness. We think that nothing can do more to prevent accidents and to improve the details of railway operation than persistent schooling of the men in every department of the system.

### Interurban Railways and Property Valuations in Indiana

An interesting statement, which bears upon the effect of interurban railway transportation on land valuations, is reported from Indiana, in which the State Board of Tax Commissioners will add more than \$100,000,000 to the State tax duplicate. This increase is not due entirely to the electric railway construction which has occurred in Indiana during the last year or two. The development of new oil and coal lands have had their effect on the increase in property values, but the vast network of interurban lines has been the greatest factor in the increase. During April all of the land in the State was reappraised for taxation, and the reports show an average increase in the value of suburban property and farm lands served by the electric lines, but this increase is not apparent in localities destitute of electric transit facilities. The appraisers took into consideration the advantages of quick and cheap transportation for the products of the land as well as the social and moral effects in

the way of bringing communities close together and increasing the convenience and multiplying the comforts of life.

Real estate values in Indianapolis, the center of the great interurban system, as well as every other city and town connected with it by interurban lines, have been built up so substantially that indications point toward still greater advance in values. A notable exception is in property in College Avenue, which has been made a trunk line for the entrance of interurban cars from the northeast. A 20 per cent reduction was made in the tax value of property on this street because of the congested condition caused by the heavy cars. This, however, is a residential street, and the very opposite effect is shown in Illinois Street, where the terminal station and office building is being erected. The effect of the terminal station being located on Illinois Street on the value of real estate has already caused a marked advance in values, and it is freely predicted that the locality will become the very business center of the city. Rents for business rooms opposite the site of the new terminal building have advanced more than 50 per cent, and this has been conducive to the enlargement and improvement of business rooms for many blocks in Illinois Street. There has also been a large demand for building sites on the outskirts of the city and for country homes, and this has also been due to the interurban lines that radiate in nearly every direction. During the year ending June 30, 1903, the gross earnings of the thirty-four electric lines operating in Indiana is estimated at upwards of \$7,000,000, and their operating expenses at nearly \$4,000,000.

#### Getting the Vacation Traffic

In these active days in the life of the steam railway general passenger agent—when all the craftsmen, from "Everybody's Uncle George" down, are expatiating eloquently in prose, rhyme and photograph on the luxuries and comforts to be had for a consideration, via their respective lines, our thoughts turn to the electric railway manager in the belief that if he will he, too, may reap a harvest in nickels and dimes culled from the vacationist's bulging pocket.

Comments upon the growth of the vacation habit are superfluous—it is with us to stay, as far as we can tell, and both holiday seeker and transportation agent are at one in their desire to get as much out of it as possible. Long excursions at reduced rates, round trips to distant points at little more than the one-way fare, stop-over privileges and other tempting offers fill the air of the ticket offices and the columns of the press. The resulting traffic is evident to the most casual observer.

We well know that summer business pays the bills and creates the profits on many an electric road which has to get along on pretty lean fare in the winter time. Managers are growing more and more acute in stimulating the growth of purely local traffic by park attractions, band concerts, baseball matches, canoe races, etc., but thus far the field of through vacation traffic has received much less attention than it deserves. Analysis of most networks of electric railways shows certain routes which constitute geographical trunk lines between important points in the system of connecting roads. Thus, in Eastern Massachusetts, the new Boston & Worcester Street Railway stands out as a distinctly trunk line in the network of the State, and its through business is bound to be a most important factor in operation. The management of such a road is concerned with far more than local problems. Similarly, through traffic demands attention and offers golden opportunity on many smaller lines the country over, and its neglect is exceedingly hurtful to such roads, and even, to a certain extent, to the advancement of electric railway practice in general.

Several times we have paid our respects to the present inadequate facilities offered by electric roads in the way of through travel. It is certain that radical improvements must be brought about if the full benefit of this kind of business is to be enjoyed. Before vacation traffic can be drawn to roads to stay permanently with them, the service and equipment must be brought up to the best modern standards. Travelers are often capricious in choosing routes to pass over, and it must be recognized at the outset that close attention will have to be paid to details if the summer traffic is to be more and more diverted to electric routes. Comfortable, roomy cars, kept clean and well painted, are the first essential, unless we except well-laid roadbed and track. If a company cannot afford to spend money on its entire system the least it should do is to bring the standard of the trunk lines which it operates up to a high state of efficiency. Attractive rolling stock is a great drawing card. High speed is far less an object with the vacationist than comfort and reliability. Courtesy in employees and willingness to answer reasonable questions is a large factor in the traveler's enjoyment.

Cars should be run on schedule time if human intelligence and skill can accomplish it. There is little incentive for a traveler to perform part of his journey by trolley if he cannot be safe in expecting to make his connections as advertised. A time-table which is not followed is worse than useless; it is a snare and a delusion, as many of us who have attempted cross-country trips know to our sorrow. Unfortunately, many electric roads publish no useful time-table whatever, and the through traveler is practically at the mercy of chance, as far as connecting systems are concerned. Little can be accomplished if the officers of adjacent roads do not get together now and then and see to it that their respective cars meet at the ends of routes to take care of through business. While it is true that it often falls to the traveler's lot to wait for connecting cars in places so favored by nature that time slips away unheeded, there is a seamy side to the question, which anyone knows who has spent half an hour on a July day, with the mercury at 90 degs., in the condensed and ripened atmosphere of a combined Italian fruit store and street railway waiting room, located on a dusty corner between a brewery and a glue factory.

When the service has been made good enough to call public attention to it the enterprising manager can take a leaf from his steam railway brother's book and advertise. Special features of historic or scenic interest along the line can be described in attractive booklets with a few good illustrations to liven up the text, and the many reasons why it is to the tourist's advantage to forsake the hot path of the steam locomotive for the wooded route of the through trolley car may be ably set forth. In fact, a delightful and inexpensive vacation may be taken now in many parts of the country by electric highways and by-ways. It certainly should not be a very difficult matter for some one with the gift of popular writing to publish a sketchy little brochure illustrating the kind of vacation here mentioned, to the lasting benefit of electric railways in the territory described. We do not believe that all the fishing worth trying for is inaccessible to trolley lines, and we know from experience that the most ardent photographer can find plenty of material for his camera on some of the electric roads not a thousand miles from New York. There is no room to doubt that with good service and equipment, judicious advertising and attention to the details of through traffic, the summer business of many electric railways can be greatly increased, to the satisfaction of the manager, stockholders and the traveling public.

### NOTES ON THE DENVER CITY TRAMWAY SYSTEM

An emergency line car used by the Denver City Tramway Company, and illustrated in the accompanying half-tone views and drawings, possesses some excellent distinguishing features. It was arranged under the supervision of W. G. Matthews, line

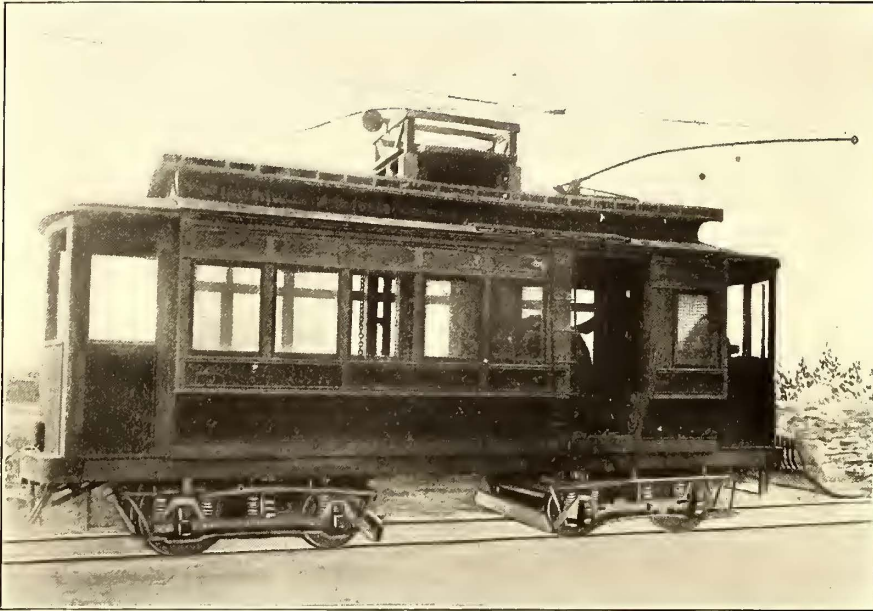


FIG. 1.—EMERGENCY CAR STRINGING LIVE TROLLEY WIRE

superintendent of the company, for use in stringing live trolley wire, and also as a general repair and construction car on overhead work. As shown in Fig. 1 the equipment consists of an old single-truck car body, which was remounted on double trucks with heavy motor equipment, in order to secure greater stability and prevent rocking, which could not readily be eliminated as long as a single truck was used. The seats were removed and replaced on one side by a row of bins for line material. Heavy wire screens were placed on the inside of the windows and doors. These screens not only serve as a protection to the glass but also form a very convenient support for tools and hooks on which coils of wire, rope and miscellaneous material may be hung and still be out of the way of the workmen. By leaving the windows of the car in place the interior of the car is very light, which is not always the case in a construction car.

In the center of the car, as shown in Figs. 2 and 3, was built an elevating tower or platform with gearing, so that it can be quickly and easily raised to the desired height from the inside of the car. The hoisting gear is indicated in Fig. 3, and the chain belt connecting the crank pinion with the large pulley of the gear may be seen at the right of the tower in Fig. 2. There is a clear space of  $27\frac{5}{8}$  ins. between the vertical racks of the tower, and when the tower is lowered a tight fit is made with the roof. Access is had to the roof by means of an iron ladder placed on one side of the car, as shown in Fig. 1. An extra latticed roof was placed on top of the car so the men could walk upon it without damage.

The car has the usual number of doors except that on the right side near the front end is one which slides, and when open leaves a clear space 3 ft. wide and 5 ft. 10 ins. high. When the car is not in use this, together with the rear door of the car, is fastened from within, while the front door of the car and that in the front vestibule are locked. The rear vestibule has no doors, but beneath its central window is a panel, arranged to slide up and allow trolley poles to be run part way into the car, and still not projecting far enough to be objectional. A roller on the floor at the foot of this panel facilitates the handling of the poles. By this means two or three poles can be quickly

loaded onto the car and carried to the scene of an accident. In the front vestibule is placed a 10-in. x 30-in. sand-box.

When it is desired to string new trolley wire the car is run to the company's store room, where a gangway is provided to connect with the side-door so that a spool of wire can be easily rolled into the car through the door from a platform. The spool is then turned and mounted on a detachable spool frame, as shown in Fig. 2 and in the elevation and plan in Fig. 3. This frame is rigid when placed in position and allows the spool to revolve on an iron axle that turns in babbited bearings, and is secured to the spool by means of square iron plates which fit square holes in the sides of the spool. When not in use the frame can be quickly taken to pieces and stored away, leaving the center of the car clear for other work.

On one end of the axle that supports the spool is an iron wheel about 2 ft. in diameter, upon which is mounted a band-brake that is controlled by a brake lever taken from an old cable grip car. The brake arrangement is clearly shown in Figs. 2 and 3.

When it is desired to string new trolley, if the track is in position, as is usually the case, this car is run to the end of the line and the new wire spliced to the old trolley as shown in Fig. 1. The wire is run off the spool in the direction shown by the broken line in Fig. 3. It runs over a pulley mounted in the roof at the opposite end of the car, and is then carried over a wheel on the tower platform to the trolley arm which is

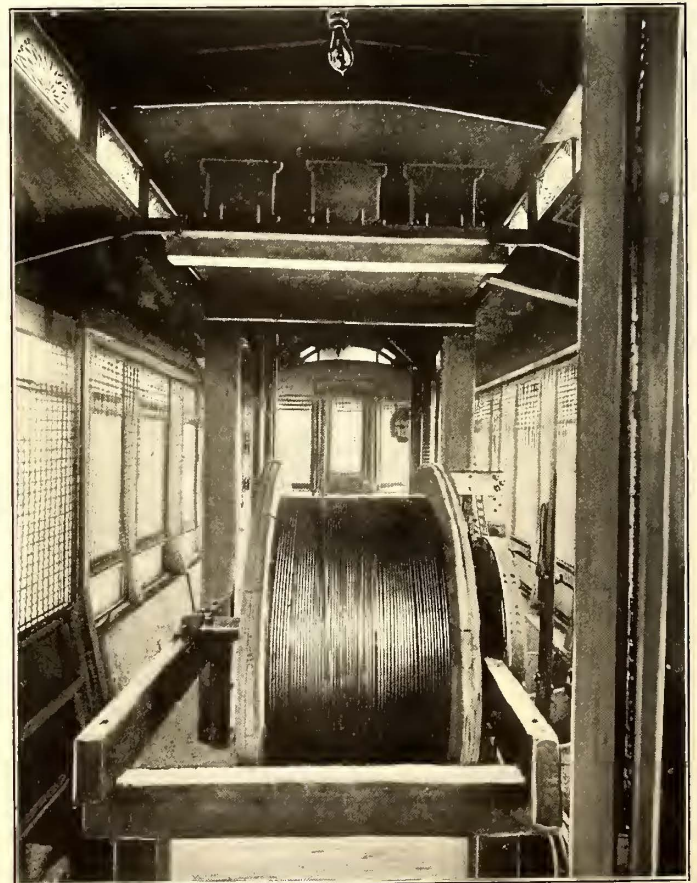


FIG. 2.—INTERIOR EMERGENCY CAR, SHOWING SPOOL OF TROLLEY WIRE READY FOR PAYING OUT THROUGH ROOF

mounted on the front end of the car. The wheel on the tower is supported at one end of a bar that is held by clips to the tower rail, as shown in Fig. 1. When not in use this bar and wheel

can be removed and carried inside, thus leaving the tower free for other work.

When the wire is connected the car is run backward and the new trolley is paid out, the car motors receiving their cur-

STORE YARD

Fig. 5 is a view of the company's store yard, looking south from the entrance, and shows a stock of rails, stone, special track work and miscellaneous supplies. A view of the yard from the opposite end, looking north, Fig. 6, shows a large



FIGS. 5 AND 6.—TWO VIEWS OF STORE YARD

rent through the new wire itself. With one man to propel the car, another controlling the band-brake on the spool and two men on the platform making temporary connections with span wires, Mr. Matthews says that a mile of live trolley wire can be strung in 40 minutes.

The company places all its new trolley by means of this car. Although the company keeps two or three repair and wreck wagons in constant readiness at the down-town loop, this line car is very frequently called into service to make repairs in case of trouble on the line, as it can be quickly sent to any part of the system.

Here is an interesting example of an emergency car that can be easily and quickly arranged for service by adapting a discarded single-truck car, such as can be found in the yards of almost every large city system. But very little new material is needed and all the work can be done at only a small outlay in the company's own shops.

DEPARTMENTS AND ORGANIZATION

Upon the retirement of Rodney Curtis as president and general manager of the Denver City Tramway Company, on account of poor health, there took place an entire rearrangement of the organization of the company. This has been largely necessary on account of the election of John A. Beeler to the vice-presidency of the company. Mr. Beeler also assumed the duties of general manager and chief engineer. W. G. Evans, president of the company, has many other business interests, so the details of management are largely left in the hands of the vice-president. The accompanying organization chart, Fig. 4, shows the arrangement of the several departments as they are at present.

supply of ties, paving stone and poles. The company believes in keeping constantly on hand a large stock of all materials used in track, overhead and shop work, as Denver is located some distance from the source of supply, and materials could not be obtained, even on rush orders, inside of several days.

The yard is situated a short distance from the company's main shops on South Broadway, and conveniently near the main tracks of two or three steam railroads. Two trolley tracks enter and extend the entire length of the yard, and as

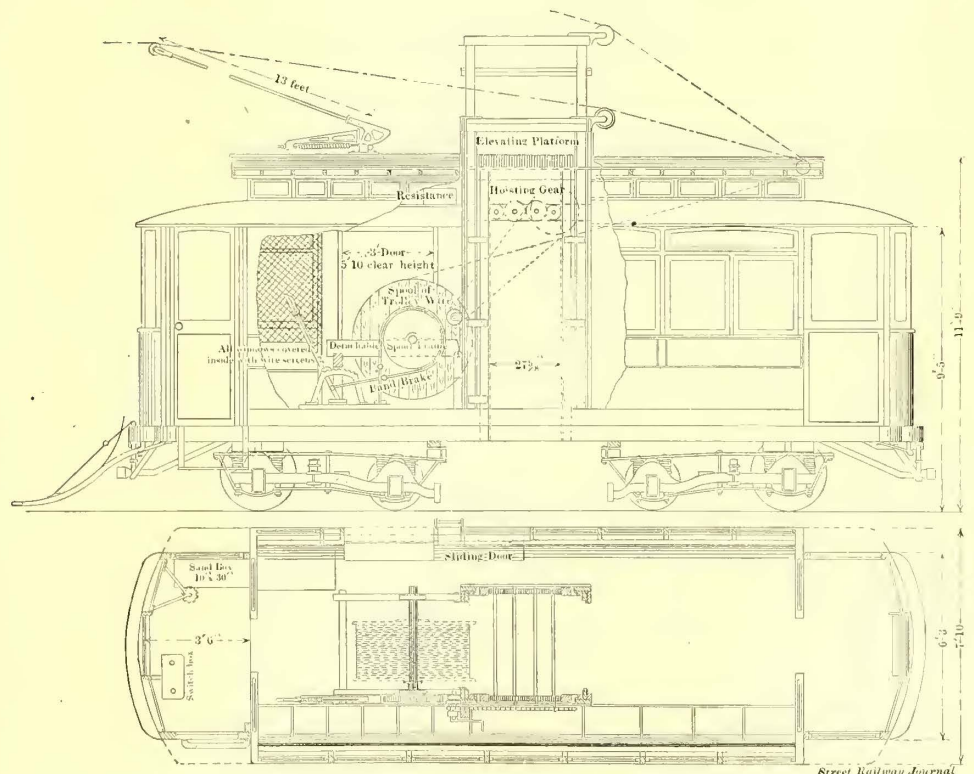


FIG. 3.—PLAN AND ELEVATION OF EMERGENCY CAR

the traction system has the narrow gage of 3 ft. 6 ins., a third rail is laid for use in switching the standard-gage freight cars from the steam railroad tracks. It will be noticed from both illustrations that the trolley wire over the two tracks are sup-

ported by long-span wires from poles placed at the edges of the yard, so as not to take up any of the room in the yard.

At the time the photographs were taken there were stored in the yard 70,000 Texas heart-pine ties, 150,000 basalt paving blocks, 1000 tons of 72-lb. and 65-lb. rails, 1200 30-ft. to 45-ft. cedar poles, 10,000 ft. of 3-in. rough lumber used in track work, and a large quantity of old rails and miscellaneous material. The company's last semi-annual inventory showed that there was stored in this yard and in the store rooms at the shops

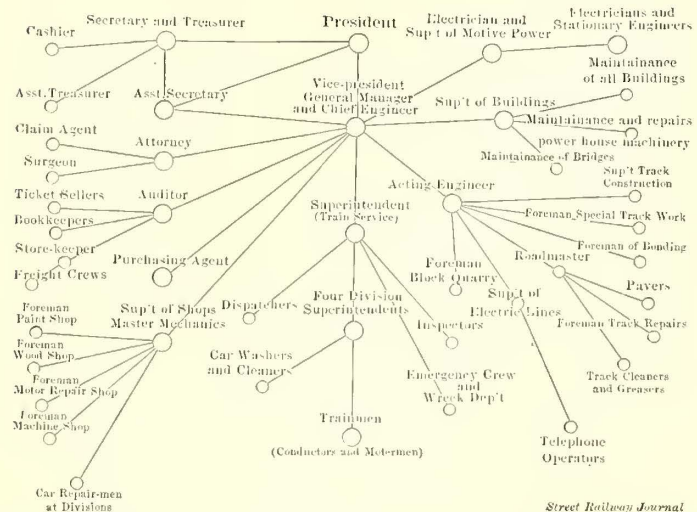


FIG. 4.—ORGANIZATION CHART OF DENVER CITY TRAMWAY COMPANY.

stock valued at over \$132,000. It is interesting to add in this connection that the inventoried value came within \$50 of the figures carried on the company's books, a very small difference when the great variety and the nature of the stock are considered. W. H. McAloney is superintendent of shops and master mechanic of the company and has supervision of the store yard.

BASALT PAVING BLOCKS

Under the city ordinances the tramway company is required to pave the space between its tracks and for 24 ins. outside with stone paving blocks. As it was found expensive to let the city contractors do this paving the company decided to do the work itself. Accordingly, a lease for twenty years was entered into for a quarry of basalt rock at Golden, about 15 miles west of Denver. A royalty of 5 cents per yard is paid for all stone quarried. Three men are kept constantly employed cutting this stone and shipping it to Denver, where it is stored in the yard, as shown in Fig. 6.

The specifications for the stone require that the blocks be from 4 1/4 ins. to 4 3/4 ins. in depth, 3 1/2 ins. to 6 ins. in width, and 7 ins. to 12 ins. in length.

This rock is very hard and has good lasting qualities. It is put down on concrete made of Dykerhauff Portland cement, mixed in proportions of three cement to one of sand for the interstices. This construction is costing the company \$2.65 a square yard complete. If the city should do the work it would cost over \$4 a yard, and the work would not be as good. Besides there would be an extra expense for inspection and for extra track work. An example of the expensiveness of the city work is shown by some paving that was done some years ago for the company by the city at a cost of \$6 a square yard. This pavement was gone in five years and had to be replaced, whereas, the company's own construction shows every indication of lasting for ten years to twenty years. The company has been using its own stone for two years, and during that time has saved enough to pay for the cost of its equipment at the quarry, \$1,500, and besides has a large quantity of blocks on hand.

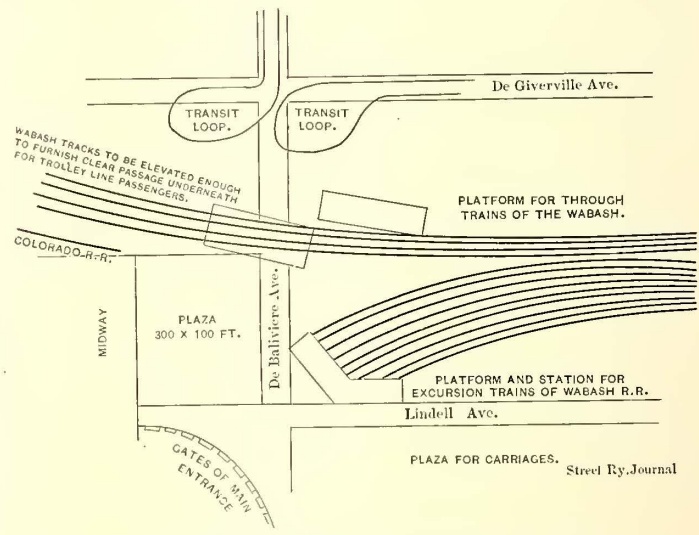
LOCATION OF ST. LOUIS EXPOSITION TRACK TERMINAL FIXED

At a recent joint conference between the World's Fair management, the Wabash Railroad, the St. Louis Transit Company and the Colorado Railroad, terminal track arrangements for the handling of traffic during the World's Fair were finally determined.

The accompanying diagram shows how the tracks will be arranged by the Wabash Railroad Company for steam traffic and by the St. Louis Transit Company for street railway traffic, likewise the plaza arrangement in front of the main gates to the exposition grounds. The street car terminals will be located north of the railroad tracks, and the crowds arriving by the electric railways will pass under the Wabash main tracks to the plaza in front of the main entrance. The Wabash main tracks will be elevated for a short distance for that purpose, as the general scheme is to avoid surface crossing of tracks in any direction.

The St. Louis Transit Company, during the World's Fair season, will abandon its loop at the pavilion in Forest Park south of De Baliviere Avenue, and will establish two World's Fair terminal loops for its cars arriving via Baliviere Avenue and De Giverville Avenue. These loops will be located north of the Wabash main tracks, as already stated, and the street railway passengers will walk through the subway to the plaza in front of the main entrance.

The Wabash will construct arrival and departure platforms for the accommodation of the main or through line traffic, and south of its main tracks the Wabash will locate its World's Fair terminus proper for excursion trains, etc. This will be a "pocket" depot, with ten or more parallel tracks, and the pas-



TERMINAL PLANS FOR THE ST. LOUIS EXPOSITION

sengers will walk across the plaza direct to the main entrance of the exposition grounds. The carriage and automobile approach to the main gate will be immediately south of the Wabash depot. The Wabash will make arrangements to handle local as well as excursion and through traffic during the World's Fair season, and the local trains will be operated on the shuttle plan adopted by the Illinois Central in caring for the Chicago World's Fair business in 1893.

The details of the plan shown in the diagram have not yet been worked out, but the conference finally disposed of the main question—the location of the terminals for the steam and the electric lines and the plaza arrangements in front of the main entrance, to provide ample space for egress and ingress at the Fair.

**INTERURBAN RAILWAY DEVELOPMENT IN GREAT BRITAIN—I**

BY HON. ROBERT P. PORTER

Electrical traction is undoubtedly making headway in the United Kingdom, especially during the last five years, and this statement also holds good when applied to electrical undertakings generally. Since 1896 the capital invested, including debentures and loans, has increased considerably more than five hundred millions of dollars, and in 1901-1902 aggregated \$830,000,000. It is extremely doubtful if the United States can show greater increase during the same period. Of course, this includes the capital invested in telegraphs, which has only increased in the period about \$10,000,000; in telephones, which has increased about \$20,000,000; in electrical supplies, which has increased \$150,000,000; in manufacturing, which has increased \$130,000,000, and in electrical traction, which has increased \$205,000,000, making a rough total of \$515,000,000 added to these allied industries in six years. The great actual increase, as will be noted, is shown in electrical traction, and it is of this electrical traction that the present article will treat. According to the figures of Garcke's Manual of Electrical Undertakings for 1901-1902 I find the increase to have been as follows:

NUMBER AND INVESTMENT IN TRAMWAY ENTERPRISES IN UNITED KINGDOM

Year	Number of Companies and Investment		Number of Municipalities and Investment	
	No.	Investment	No.	Investment
1896 .....	17	\$30,423,360	..	.....
1897 .....	30	42,765,965	..	.....
1898-9 .....	31	72,030,700	..	.....
1899-0 .....	66	98,152,650	11	\$5,847,100
1900-1 .....	75	130,748,295	18	13,744,365
1901-2 .....	125	197,610,915	47	52,597,715

The mileage of electrical tramways and light railways in the United Kingdom in 1901-1902 may be noted in the following table:

TRAMWAYS AND LIGHT RAILWAYS IN UNITED KINGDOM

	Route Mileage	Track Mileage	Number of Cars
Constructed.....	777	1,252	3,854
Under construction .....	533	846	777
Authorized and about to be constructed.	927	1,348	.....
<b>Total.....</b>	<b>2,237</b>	<b>3,446</b>	<b>4 611</b>

TUBE ELECTRIC RAILWAYS IN LONDON

	Route Mileage	Track Mileage
In operation.....	15 3/4	30 1/2
Authorized and under construction..	36 1/2	72 3/4
Suspended in 1901 session and partially passed on last session .....	57 1/2	114
<b>Total .....</b>	<b>109 3/4</b>	<b>217 1/4</b>

The above tables give an approximate idea of the progress and present condition of electric traction in the United Kingdom. Private enterprise, speaking roundly, still seems to represent the largest aggregate capital; namely, about \$200,000,000, but the municipalities, if not stopped by the campaigns now so vigorously conducted against municipal trading, will continue to gain on private companies. The municipalities now represent a total expenditure of about \$52,500,000, or a trifle more than one-quarter of the capital of private enterprise. It must be remembered, however, that private companies had nearly \$100,000,000 in electrical traction in the United King-

dom before the municipalities took much interest in such enterprises. While private companies have about doubled the investment since then (1899-1900) municipalities have increased their capital investment eight-fold. With the exception of the London County Council, which is inaugurating electric tramways, private companies have ascendancy in and around London, and the session just ended witnessed a capital exceeding \$250,000,000 knocking at the door of Parliament anxious to embark in electrical tubular railway schemes. The fifty million dollars or more of municipal money has been largely invested in tramway schemes in the provinces, and it is of these and interurban tramways that I now propose to speak.

INTERURBAN TRAMWAYS IN ENGLAND

For a decade or more the immense possibilities underlying the development of interurban electric tramways in England have been fully recognized by electrical engineers and others. Various conditions, however, have combined to retard the realization of these possibilities, and such advance as has so far been achieved in this department of traction enterprise must be regarded as a victory over unusual difficulties. Fortunately, enough has been done to show that the formation of a network of electric tramways over practically the whole of the country is a foregone conclusion. The end is only a matter of time now that the advantages of comprehensive systems of secondary lines are becoming evident to the public. It is, therefore, of practical interest to consider the conditions under which such lines are promoted, constructed, and worked, together with the prospect of more speedy progress in the near (or comparatively near) future.

Speaking generally, the engineering aspects of interurban electric railways are the same in England as in other countries. There are differences, of course, but they are not vital. The conditions which distinguish England in this matter from the rest of the world are at once deeper and more external than those concerned with the actual construction and working of electric tramways. They are partly legislative and partly social; and to discover their true significance it is necessary to trace the history of tramway legislation in England from its commencement.

Previous to 1870 only a few tramways had been built, and these had been promoted under the costly and cumbersome method of submitting a "private bill" to Parliament. To obviate unnecessary trouble, waste of time, and expense, a bill was passed which enabled tramway promoters to apply directly to the Board of Trade for what is called a tramway "provisional order." Such an order is practically a franchise and is provisional only in the sense that it has to be formally confirmed by Parliament before it can be acted upon. This arrangement was embodied in the Tramways Act of 1870, and so far as it simplified and cheapened procedure, the act was fully welcome. In other respects, however, the act was not so well advised, since it established precedents which have hampered electrical enterprise to a degree not fully recognized by those who have not been engaged in the effort of carrying out tramway schemes in England.

When the Tramways Act was drafted the government was in a most zealous reforming mood. The inspiration of this enthusiasm lay in the misdeeds of certain gas and water monopolies, which had taken a short-sighted advantage of the too liberal powers granted to them in former years. There was a strong demand that the public should be protected from similar abuses of power, and as tramways were in essence a monopoly, Parliament was naturally inclined to include protective measures in the act.

This it did in two ways:

(1) By giving each local authority the right of vetoing any tramway scheme within its district, and

(2) By imposing a tenure of only twenty-one years on tramway concessions, and giving each local authority the power of

purchasing the undertaking at scrap value (otherwise called "old iron" or "marine store" prices) when the period of tenure was at an end.

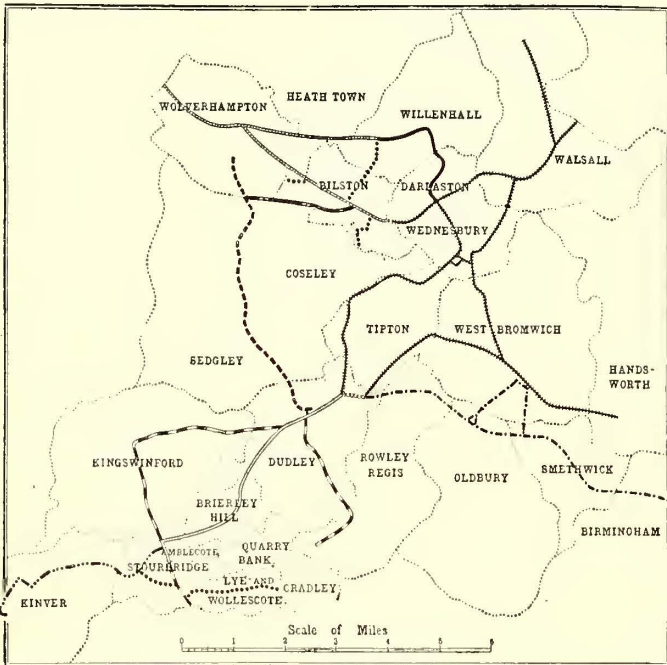
It is safe to say that the government had no anticipation of the actual effect which these provisions would have on the future of the tramway industry; and it is equally safe to say that the government of the present day has made but slow efforts to improve matters now that the unfortunate incidence of the veto and the conditions of tenure have been felt over and over again. The attempt to regulate the powers of tramway companies in the public interest led to restrictions which were excessive, and so defeated its own intention by retarding the development of an important public service.

HOW TRAMWAYS WERE STRANGLING

In justice to the government it must, nevertheless, be admitted that the full strangling influence of the Tramways Act

the question, and the efforts of the managers were naturally concentrated on reducing expenses and husbanding revenue so as to meet, as far as possible, the inevitable capital loss through the sale of the undertaking at old-iron prices. The unhappy effect of the limited tenure arrangement was to force tramway undertakings into a premature condition of senile decay. No money (except what was absolutely necessary) was spent on the renewal or rolling stock or permanent way; the cars were even grinded fresh coats of paint, and the conductors their new uniforms and new sets of the brass buttons so dear to the heart of the public. The service of cars was limited as far as possible; extensions were not to be thought of; and, in short, enterprise as it is generally understood would have been a business absurdity.

The last years of a tramway company were, therefore, years of insufficient and inefficient service. The public grumbled, and called upon the tramway companies to electrify their systems—a vain demand when there was no promise of renewal of tenure for even another twenty-one years. As the undertakings would soon fall into the hands of local authorities it

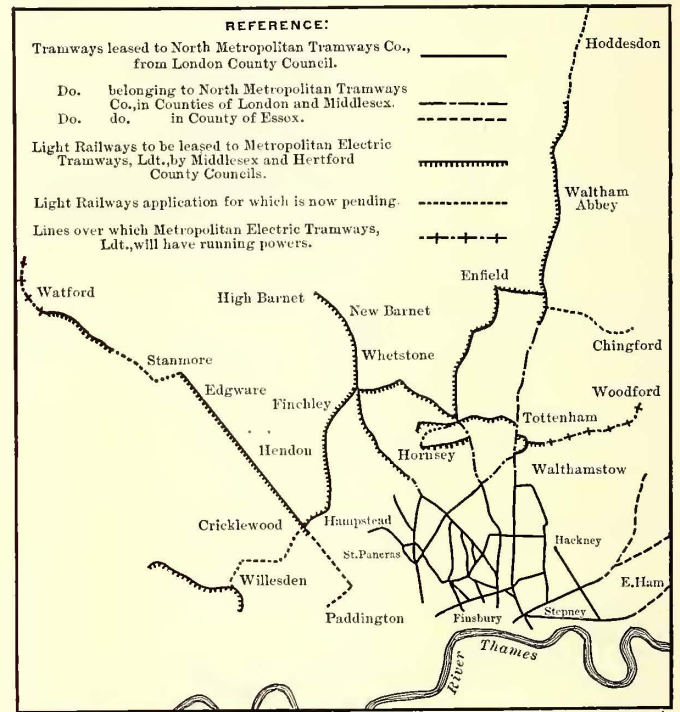


South Staffordshire Light Railways.....	—————
Wolverhampton Tramways.....	—————
South Staffordshire Tramways.....	—————
Dudley & Wolverhampton Tramways.....	—————
Dudley & Stourbridge Electric Tramways.....	—————
Dudley & District Light Railways.....	—————
Kinver Light Railways.....	—————
Birmingham & Midland Tramways.....	—————
Proposed Extensions.....	.....
Running Powers.....	.....

THE EXISTING TRAMWAY SYSTEMS IN SOUTH STAFFORDSHIRE AND ADJACENT COUNTIES

was not felt until many years after 1870; indeed, not until the dawn of electric traction as a commercial possibility. That was about 1890—twenty years after the passing of the act—and close upon the time when numerous tramway orders were expiring. At the same period, moreover, the important movement of municipal bodies in the direction of trading enterprises had already begun and was making steady strides in popular favor. In the coincidence of these three things—one legislative, one industrial and the third social—one finds the causes of the present condition of electrical traction in England.

To understand how this trinity of causes co-operated to produce a single result in putting back the tramway clock in England for several years, all that is necessary is to consider the position of a tramway undertaking which, in or around the years from 1890 onwards, was approaching the end of its period of tenure. Confronted with the fate of expropriation in a few years time at its "then market value" with no allowance for good will or compensation for compulsory purchase, anything like fresh capital expenditure on the undertaking was out of



SYSTEM OF THE NORTH METROPOLITAN TRAMWAYS CO., LONDON

was natural that public opinion should turn to them for the reforms which were apparently unreasonably refused by the private companies.

This appeal of public opinion was not made in vain, and it has placed the development of interurban electric traction in a difficult position from which it will probably not emerge for a considerable period. One municipality after another took over its local tramway system when the period of tenure was concluded; and one municipality after another decided to adopt electric instead of animal traction. This latter change was not, however, carried out with anything like rapidity. Even the most progressive of municipalities and those most enamored of trading projects (such as Glasgow) dilly-dallied over the problem of conversion for a quite unnecessary period; and in the hands of the local authorities the progress of electric traction has been extremely slow. Although their new-found sphere of municipal trading was very attractive, they were at that time extremely cautious about embarking public money in speculative enterprises. When the bold few made the plunge the others followed gradually, according to the fashion of municipalities. There was for the time being no inclination to run even the most elementary of risks, and hence the local



authorities did not altogether redeem the electric traction industry of England from the reproach of backwardness.

As far as interurban electric lines were concerned, the part which the local authorities played was for many years practically nil. Each local authority thought only of its own district, as it was naturally inclined to do. Not until the example of other countries was afforded, combined with the successful exploitation of some interurban systems by private enterprise in England itself, did the local authorities begin to realize that

sisted by the operation of the Light Railways Act of 1896, a measure about which I shall presently say more, as it introduced a new element of opposition to the extension of interurban systems.

A TYPICAL EXAMPLE

A typical example of the first method of procedure is afforded by the development of interurban tramways in what is known as the Black Country. This region lies to the north and west of Birmingham, and is practically a congeries of towns occupying a total area of about 100 square miles, and containing a population in round numbers of about one million and a half. The population of most of the towns is between 10,000 and 60,000; in the more densely populated parts the adjacent centers of congested population are so close that a stranger cannot easily distinguish where one town ends and another begins, but in the majority of cases a distance of one to several miles separates the densely populated parts. The district is, therefore, one in which the needs of easy, frequent and rapid communication are strongly felt.

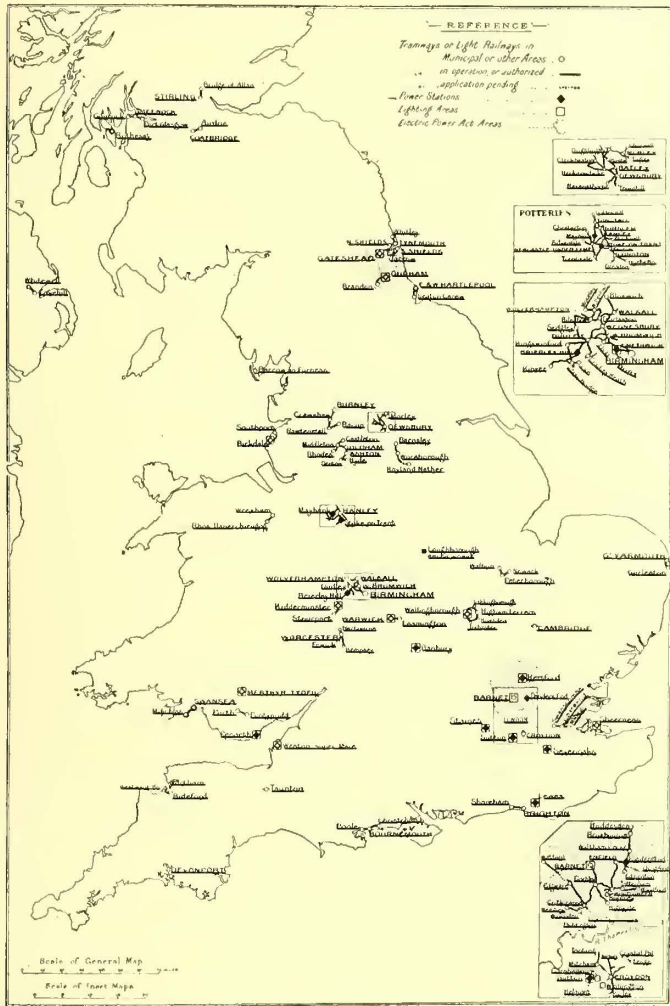
Previous to the advent of electric traction these needs were most inadequately met by steam railways and by tramways which were worked in some cases by horse traction, and in others by steam traction. The work which the British Electric Traction Company undertook when it began operations in this district was two-fold. The existing tramway systems were acquired, either outright or to the extent of a controlling interest. As already indicated, their period of tenure was drawing to a close, and it was therefore essential to obtain a renewal of tenure in order to justify the capital expenditure on conversion to electric traction. Consequently, the second operation was to obtain the consents of the local authorities to the granting of leases or other powers to the various companies.

The policy of the company was, when these necessary powers were obtained, to electrify the various isolated systems and weld them together into a single comprehensive system of interurban lines with a uniform gage and under a single control.

Separate agreements had to be arrived at with about a score of local authorities—a circumstance which outwardly gives only a faint impression of the magnitude and difficulty of the negotiations which the British Electric Traction Company has, with almost uniform success, been conducting in this district for the last six years. The word success, however, is applicable only in a relative sense. Delay is inseparable from all negotiations with local authorities; and the realization of the company's clearly defined aim has been deferred for this reason long past the time required from the merely engineering point of view. Some examples of the agreements actually arrived at will illustrate the complicated nature of the financial and other operations which had to be undertaken.

The lines of the South Staffordshire Tramways Company form the nucleus of the Black Country system. They are about 23 miles in length, and traverse the populous districts of Walsall, Wednesbury, Darlaston, West Bromwich and Tipton. The British Electric Traction Company acquired the majority of the debentures of the South Staffordshire Company, but as the latter was a "Statutory" company, working under definite Parliamentary powers, it was unable to go beyond its prescribed sphere and adopt electric traction or to make new agreements with local authorities, or even to sell its undertakings, except to local authorities under the provisions of the Tramway Act. An act of Parliament was, therefore, promoted to grant power to the South Staffordshire Tramways Company to lease its lines to a new company called the South Staffordshire Tramways (lessee) Company, Ltd., formed for that purpose, and also for the purpose of forming a link with the British Electric Traction Company. The lessee company then undertook the labor of making fresh arrangements with the local authorities concerned.

These arrangements are fairly typical of those made when a



MAP SHOWING UNDERTAKINGS OF BRITISH ELECTRIC TRACTION COMPANY AND ASSOCIATED COMPANIES IN THE BRITISH ISLES.

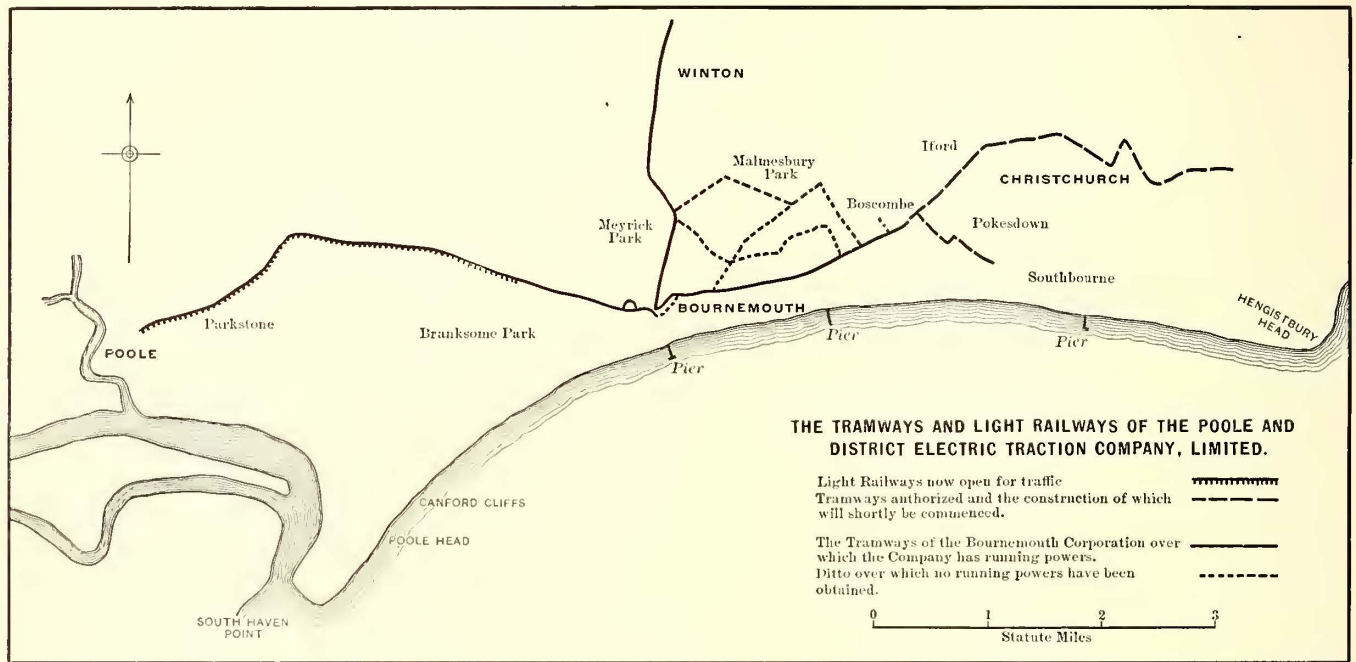
the conversion of tramways to electric traction did not merely enlarge the carrying capacity of the old systems, but greatly enlarged the area over which the tramways systems should, in the public interest, extend. With horse traction the limits of each local authority were roughly the limits of economical working. With electric traction the parish became a mere item in a comprehensive system, which might extend over a whole county.

It remained, therefore, for private enterprise, in the face of discouraging legislative conditions and the opposing trading ambitions of municipalities, to demonstrate to the public the value of those extensive interurban systems which electric traction had rendered possible.

The efforts of private capital toward this end were directed through two channels. In the first place, old tramway undertakings (those approaching the end of their tenure) were acquired in the hope or the promise that the local authorities concerned would defer purchase until the end of a certain period, or grant a lease to the company. In the second place extensions are promoted as links in a comprehensive system. In both these operations private enterprise was materially as-

local authority adopts the role of tramway owner and a company obtains a lease. The agreement with the Corporation of Walsall binds the corporations to purchase the lines and equipment within the burgh boundary from the South Staffordshire Tramways Company, and to lease the same to the lessee company. An act of Parliament had to be obtained to confirm this arrangement. The West Bromwich Corporation undertook to purchase the tramways within the West Bromwich area, to reconstruct and equip them with electric traction, and thereupon lease them to the South Staffordshire Lessee Company for a period of twenty-one years. Under the agreement with the Darlaston local authority, that body agreed to defer the exercise of its power of compulsory purchase for a period of seven years,

efforts was to obtain sufficient security of tenure to justify the conversion to electric traction of the whole network of lines. Obviously, from the nature of this welding process, any physical break in the continuity of the arrangements would prevent its proper realization. The only hiatus of this kind with which the company has been confronted was caused by the deliberate isolation of the Wolverhampton Corporation. That body has never betrayed any adequate appreciation of the benefits of mutual intercommunication between neighboring tramway systems; and besides refusing to adopt the policy which neighboring local authorities found most consistent with the public interest, that body has placed a physical barrier in the way of intercommunication by adopting a surface-contact system in



Street Ry. Journal

and to lease the Darlaston lines to the lessee company upon the expiration of that period.

#### THE BIRMINGHAM SYSTEM

Another system which was acquired for reconstruction to electric traction in a somewhat similar way was that of the Birmingham & Midland Tramways, Ltd., whose lines connect Birmingham in a fairly direct route with Dudley. The British Electric Traction Company purchased the majority of the shares of this company, which held two tramway orders dated, respectively, 1881 and 1883. Several local authorities were concerned in this system; and with two of them—Smethwick and West Bromwich—similar leasing arrangements to those mentioned were concluded. With the local authorities of Rowley Regis and Oldbury it was arranged that they should defer to exercise their powers of purchase for a period of twenty-one years from Aug. 11, 1902.

The South Staffordshire and Birmingham & Midland systems converge at Dudley, from which point continuity is maintained by the Dudley, Stourbridge & District Electric Traction Company's system. The British Electric Traction Company purchased the majority of issued shares of the Dudley Company, converted its lines from steam to electric traction, and undertook the necessary negotiations with the local authorities. Several of these bodies agreed to defer purchase until 1921, and the Dudley Corporation retained the right of purchase in 1902, undertaking thereafter to lease the purchased lines to the company.

In addition to reconstructing old steam lines in this part of the county, the British Electric Traction Company undertook certain extensions with a view to increasing the area of operation of the comprehensive system. The general object of its

place of the overhead system adopted on all other lines in the Black Country network. Three of the network lines converge toward the Wolverhampton boundary, but further than that line they are unable to carry their passengers, who must change cars at a merely artificial division line, undergoing an inconvenience which has no compensating benefits. But not even the experience of this comparative isolation has induced the Wolverhampton Corporation to take a business-like view of the situation. It seems to have committed itself at one and the same time to the surface-contact system and the policy of absolute exclusion.

This rough outline of the methods adopted in the Black Country to organize a large system of interurban tramways does not convey an adequate notion of the difficulties—mainly of a diplomatic character—which have to be overcome. Each local authority had to be separately considered, its opinions, its prejudices, and its ambitions, carefully studied. Each of the local authorities, it should be remembered, had the absolute power to veto any scheme of the tramways company for the renewal of tenure, and each of them had to be separately persuaded not to use this power. Could these detailed negotiations have been avoided, I repeat, the uniform electrical operation of this whole system would now be an accomplished fact. The necessity of these negotiations has delayed progress to such an extent that part of the system is still worked by steam, while other portions are only now passing through the reconstruction period.

(To be Continued.)

The last reminder of Boston's old street car system was taken away a few days ago when the long-unused horse car tracks on the Back Bay end of Dartmouth Street were removed.

**A COMPARISON OF STEAM AND ELECTRIC RAILWAY RETURNS**

BY H. D. EMERSON

To all who are interested, either in the financial results from or the operations of electric railroads, the United States Census Office bulletin, giving the income account of the street and electric railways of the United States for the fiscal year ended June 30, 1902, is of particular interest. This is the first complete tabulated statement of the doings and the earnings of the electric railroad systems of the United States. The development of the business of transporting passengers on railroads whose power is distributed by electricity, has occurred practically within the past decade; and while it has been demonstrated in innumerable cases that at present rates charged the business is exceedingly profitable, no complete summary of the situation, demonstrating conclusively the financial soundness and the certainty of profitable income, has been given us before this report.

The bulletin just issued gives certain extremely interesting and valuable figures and statistics, although the most interesting and valuable figures which it could give are accentuated by conspicuous absence. We refer, of course, to the income account of the individual corporations. If this had been included it would enable us at once to pick out the profitable properties, and eliminate those which are, or will continue to be, unprofitable either through bad location, bad management or bad financing.

The total of the income account of all the companies is given, and it is given in such form that for the purpose of discussion it may be considered as is a report of a single corporation, for example, the Pennsylvania Railroad. The following table gives the comparative items as given in the report, for all the electric railroads of the United States, a total of 817 companies, operating 16,651 miles of line, or 22,589 miles of track, condensed and rearranged and compared with the report of the Pennsylvania Railroad System for the year ending Dec. 31, 1902. Measured as "track" the mileage does not differ greatly:

	Pennsylvania System	Electric Railroads of United States
Miles of line (not track) operated...	10,783	16,651
Gross earnings .....	\$219,849,864	\$247,553,999
Operating expenses .....	*152,220,271	142,312,797
Net earnings .....	\$67,629,592	\$105,241,402
Other income .....	16,254,710	2,950,628
Gross income .....	\$83,884,302	\$108,192,030
Charges .....	39,323,180	*77,595,053
Surplus .....	\$44,561,122	\$30,596,977

\* Includes taxes.

Two important items are made conspicuous by this comparison, the first being the less proportionate cost of operation of the electric roads, and the second the greater proportion of gross income required to pay fixed charges.

Further, the arrangement of the various items as given in the above table tends materially to deceive the actual situation.

	Pennsylvania	Electric Railways
Gross earnings .....	\$219,849,864	\$247,553,999
Operating expenses and taxes.....	152,220,271	155,391,496
Net earnings .....	\$67,629,592	\$92,162,503
Other income .....	16,254,710	2,950,628
Gross income .....	\$83,884,302	\$95,113,131
Charges .....	39,323,180	64,516,154
Surplus .....	\$44,561,122	\$30,596,977

The Pennsylvania report includes taxes with operating expenses, but the electric railroad report includes taxes with charges. Without entering into the question as to which is the proper place to put this item we can arrange them both on the same basis, as shown in the second table.

The disproportion in the cost of operation is reduced under this arrangement of figures, although the percentages of cost of operating expenses to the gross receipts still remains in favor of the electric railroads.

The question of operating expense and the proportion of operating expense to gross earnings, is one which has agitated the minds of the students of railway operations for a number of years past, almost to the exclusion of the consideration of other equally important questions. For a time it was a fad, especially in New York, for financial writers to make final determinations as to the efficiency of the management of a corporation by comparing the operating ratio and the operating ratio alone. But at the present time it is admitted that every railroad property, owing to its location, its construction, the physical and geological conditions of the country through which it passes, and the climatic conditions which must be contended with, has its own particular, economic ratio. And that it is extremely dangerous, and oft-times leads to error to laud one management and condemn another because of apparent discrepancies in operating ratio. In the case in hand, it is a notorious fact that the Pennsylvania Railroad is over-operated; that is, betterments which are properly chargeable to capital account are included in operating expense, which naturally reduces the earnings or profits proportionately. And in the same way it must be admitted that the cost of operation, as shown by the electric lines, is undoubtedly lighter than a conservative audit would show. Unquestionably there are many trolley companies which include in their expense accounts only such charges as are absolutely necessary for the actual operation of the property, and as plant and equipment is all comparatively new, depreciation, or its equivalent, proper natural up-keep, is omitted. If to the total operating expense, as shown in the electric railroad column, be added the proper percentage for depreciation and renewals and repairs of power stations and rolling stock, such amounts as will have to be expended annually in a few years, undoubtedly the operating expense of the electric railroads would be materially increased, so the disproportion in these two items will be materially lessened.

Other income has no particular bearing on the question either way, except as it indicates the financial strength of the corporations. Illustrating this proposition, we can deduct income from the fixed charges, which would leave us approximately \$23,000,000 for the Pennsylvania and \$75,000,000 for the electric railroads. This latter item, the item of fixed charges, is the all important question in the proposition. The financing of any corporation should be along such lines as will make the securities of unquestioned merit, and to meet this demand the income of the properties underlying the bonds must be sufficient to prove that, given the minimum probable gross earnings and the maximum possible operating expense, the net earnings will be more than sufficient to meet the fixed charges. In the case of the Pennsylvania there is no question as to its ability to earn, even after a material decrease of gross receipts, its charges and have a surplus left for its stock. In the case of the electric railroads the proposition is not as clear or as positive. In making up the table above the figures have been used as given in the income account for the year ending June 30, 1902. But in another table the census report gives the interest charges on the outstanding indebtedness as \$43,500,000, as against \$38,000,000, as included in the table above. This would make an increase in the total charges per annum of \$7,500,000, and would reduce the surplus after charges to \$23,000,000. Of course, in figuring this way it must not be for-

gotten that the Pennsylvania Railroad is the product of the ablest engineers and the ablest financiers working in harmony for a matter of fifty years, and that undoubtedly mistakes have been discovered and errors have been rectified. On the other hand, our electric railroads are really developments of the last decade, and it may be said without animus that a majority have been built by inexperienced engineers and financed by amateurs, and some are undoubtedly over-capitalized.

And this brings up the question of capitalization. The capitalization, as reported for the electric railroads, amounts to \$2,300,000,000; divided \$1,315,000,000 stock and \$992,000,000 funded debt. The Pennsylvania Railroad Company has at the

TICKETS AND TRANSFERS USED IN DENVER

The Denver street railway system uses a large number of tickets and several distinct transfer slips. Each ticket is of special design and also has a distinct color so that it may be easily recognized. Several styles of tickets used on these lines are represented in the accompanying illustrations. They may be classified and described as follows:

(1) Half-fare ticket, sold at 2½ cents each in books of ten and twenty, for children under 12 years of age; good on all lines and at all hours.

(2) Straight 5-cent fare ticket, sold in books of fifty and one

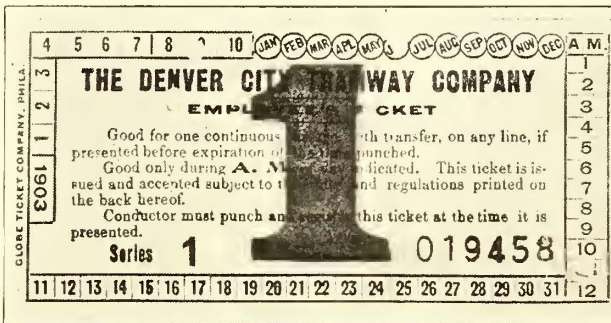


FIG. 11.—EMPLOYEE'S TICKET

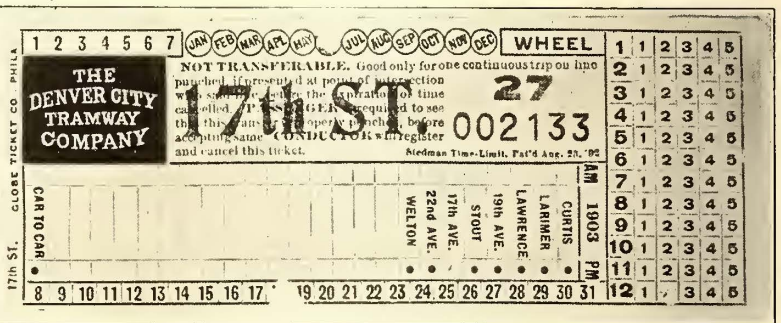


FIG. 12.—TRANSFER ON DENVER SYSTEM

present time \$300,000,000 stock and \$140,000,000 bonds, but to this latter should be added at least an equal amount representing the indebtedness and outstanding securities of subsidiary corporations. The total amount of capital issued against all of the various Pennsylvania Railroad subsidiary companies is, of course, much larger than these figures would indicate, and undoubtedly approximates somewhere near the billion-dollar mark, but for the purposes of comparison they should be eliminated, because held by the Pennsylvania Railroad Company or its subsidiary companies, or as in the case of guaranteed rentals of leased lines or guaranteed stocks are represented by the charges included in the table above. As far as the public is concerned the Pennsylvania Railroad Company, in effect, could distribute to its stockholders at least three-fourths of the surplus income shown above, or, say, a dividend of 10 per cent on its present outstanding capital stock of \$300,000,000, and still have a surplus left. On the other hand, the electric railroads last year could have paid out \$30,000,000, which is a little over 2 per cent on the outstanding stock. But if we deduct the fixed charges, as shown in the report, as indicated for the present year, the surplus earnings applicable to stock account is equal to 1.8 per cent thereon. This showing, however, of 1.8 per cent for all of the stock issued against the trolley lines of the United States, after deducting all of the charges, is most excellent, when comparing an industry of under ten years growth with a corporation which has been over half a century in building.

Included in the total of the 800 odd companies are many which are not at the present time earning their fixed charges, and their obligations included in the general summary undoubtedly materially reduce the surplus applicable to the profitable corporations. It is inevitable that reorganization, either by means of foreclosure or amicable adjustment of capital stock, will cut down the total bonded indebtedness of the electric railroads and diminish the outstanding securities. When, in the course of the next two or three years, these necessary financial readjustments and the new scientific expert management which is being acquired by many corporations increases profits, trolley line and electric railroad securities should take a place second only to the securities of the great trunk lines of the United States, which are the best managed, strongest, most profitable and most stable corporations in the world.

hundred; used as convenience and also purchased to some extent by residents who make presents of the books to their friends and visitors.

(3) United States Army tickets, purchased by quartermaster's department, at Fort Logan, at full rate, and given to soldiers.

(4) Special ticket for various uses.

(5) Policeman's ticket, issued to chief of police.

(6) Special limited ticket, good between 6 a. m. and 7 p. m. on week days; purchased at full rate by employers and presented to their employees.

(7) Complimentary ticket, issued in books of 100; books not renewed oftener than once a month.

(8) Commutation tickets, purchased at 5 cents, and good for transferring to and from the Cherrelyn car line, south of Denver (known as the line where the horse rides down hill on the car).

(9) Trainmen's wives' tickets, issued gratis every month, in books of sixty tickets, to each motorman and conductor who has wife or housekeeper dependent on him; month and year punched before issuing; can be used any time during the month.

(10) Employees' tickets, issued in books of sixty-two, for two rides each day of month; used principally by shop men.

(11) Employees' Tickets.—There are several classes of these tickets, and they are issued in blocks to foremen and superintendents, who punch the day and hour and issue them to their men for transportation between their work and their homes. White tickets are good only in the morning, and pink tickets only in the afternoon. A heavy red numeral, printed on each ticket, indicates the department (track, line, etc.) to which the men belong. The company found that the use of passes or badges was abused by such employees and record was kept of the traffic. By the use of these tickets an accurate record is kept of the traffic, and as they are issued with a limit of time necessary for the employee to reach home, or to leave home and reach his work, the men are not so apt to loiter or spend time at saloons before going home.

(12) New Form of Transfers.—Formerly the transfers were punched so that they were good for 30 minutes after time of punching. Now the conductors punch the maximum time limit, allowing not more than 20 minutes from the time the car is due at the transfer point. The name of the car line is printed on the ticket in red ink, and all the lines to which transfers are

given are arranged in alphabetical order for the convenience of the conductor in punching the transfer line. Blocks of these transfers are issued each morning to the conductors at the barns, the month and day being stamped beforehand. The conductor punches the transfer line in the a. m. or p. m. column and the minutes after the correct hour. These transfers have proved very popular and quite satisfactory. At first on the back of the ticket was printed instructions and advice to the passenger, but the company has now sold the privilege of using the back of the transfers to the "Seeing Denver" concern,

The elimination of losses in units of time, fuel, brain energy—in short, every possible leak in operation, is thus a problem of tremendous importance. Success or failure in its solution appears in the declaration or passing of dividends at semi-annual and even quarterly times of coupon shearing. The opportunities of watchfulness in this direction are so extensive that time and space permit only suggestions of what may be done with one instrumental method, that of the card system in street railway work.

Reference has been made before in these pages as to the



SPECIMENS OF TICKETS USED ON DENVER TROLLEY LINES

which is distinct from the tramway company. Under the new arrangement the net cost to the tramway company of printing the transfers is but one-third what it was formerly.

THE CARD INDEX IN ELECTRIC RAILWAY WORK

The reduction of operating expenses by the employment of labor-saving methods and devices is to-day receiving attention in every industrial field which can rightly claim to be progressively worked. The results of such improvements in business machinery are well exhibited in those spheres of activity which are carried on by transactions in small units, and which are susceptible to detailed analysis in quantities not too large for the imagination readily to grasp. Especially is this true in manufacturing industries.

Broadly considered, an electric railway system is but a vast machine for the manufacture of transportation, capable of turning out an enormous product in passengers carried per week, and operated by the concentrated energy of many individual units. Its revenues are to a great extent functions of the 5-cent piece, and its expenses, when properly dissected, resolve themselves into even fractions of a cent per unit output or per car-mile.

value of the card catalogue in indexing engineering literature. By extending the idea to small and large envelopes, classified alphabetically or decimally, clippings and notes can be found when needed, almost in the space of a dozen seconds. A vast amount of information strays into and out of a manager's office each week. Much of it is worth keeping. When information is wanted in street railway work it is usually needed at once, and if the particular item required is hidden away in a non-indexed bunch of papers or overlooked note book, many minutes are usually the price of forthcoming, if, indeed, it is found at all. Thus, at ten minutes before six some evening the manager calls for an editorial which appeared a few weeks back in the leading morning paper, in regard to an extension which he is to discuss at seventy-thirty before the City Council, it is in his hands inside of a half-minute if it was filed in proper season in an indexed envelope covering that extension; but if it was not so filed, a weary quarter or half-hour is in store for the manager's secretary, who finally locates it, securely tucked away in a box marked "miscellaneous."

A former employee of the company is arrested for forgery in another city. Certain facts regarding his habits are requested from the general manager by long-distance telephone. In less time than it takes to write it the superintendent of transportation has the man's record card upon his desk, and is

dictating a letter to confirm his quickly-furnished information.

The coal bill of one of the outlying power stations suddenly begins to increase. Immediately the question of output and previous coal consumption, both in total and per kilowatt-hour, arises. The superintendent of motive power turns to his card cabinet drawer and the history of that station for months back is at his finger tips. No nerve-wearing efforts to remember just where the particular items sought are hidden away, no loss of clerk's time in hunting for the elusive figures, no loss in keeping the station records while the record book is being consulted—all these time and energy-wasting methods are relics of the past.

The purchasing department receives a dozen quotations on thirty barrels of oil. Before the contract is awarded the price per barrel, delivery and terms of payment of each bidder in a proposition made by him three months before are wanted. The card index immediately locates the awarded previous contract, and specifies the numbered compartment in the filing case which contains the original proposals.

A damage suit is instituted against the company by persons claiming to have been injured on one of its cars in a collision with an express wagon three weeks before. The claim department at once requires full information as to the number of passengers carried on the trip when the accident happened, the addresses of witnesses, weather, speed of the car—in brief, every possible fact bearing upon the event. The reports of the various motormen, conductors, inspectors, police officers who saw the accident, and even photographs of the street where the casualty occurred, may be invaluable to the company's defense, and their speedy collection is but a matter of seconds, if they are properly filed and indexed on the card system. Not many years ago a Boston car ran away on a moderate grade, dashing into a market, and more damage suits were instituted against the company, it is said, than the register showed passengers on the car. The importance of having detailed records in accessible files could be instanced in hundreds of cases where the opportunity to mulct the company has been thought too good to be lost by the not always over-scrupulous general public.

Another instance of the usefulness of the card system appears in the filing of photographs and lantern slides. During periods of new or reconstruction it is always desirable to make liberal use of the camera when possible, and the proper putting away of plates and prints is an important consideration if they are to be promptly found when wanted. It is easy to forget just what phases of the work have been photographed as well. On large roads it is sometimes the practice of prominent officials to give illustrated lectures, when requested, at various gatherings of church organizations and other social bodies, and the same treatment in indexing may as readily be given to lantern slides as to plates.

The cost of new work, especially in the engineering department, is often an uncertain quantity when details are considered. The comparison of original estimates with actual construction cost is so instructive that every means of analysis which can throw light upon how the details worked out on the ground is extremely valuable. In a large company the field of usefulness in this direction is well nigh inexhaustible. The causes of change from original design and the resulting effect on expenses in construction, the amounts paid for labor and material, the times which each part of the work required for completion and any unusual circumstances present are all amenable to the best methods of filing data by which the card system can effect economy in time, work and expense.

On many roads it is necessary to keep track of the length of service of the uniformed employees, in order to correctly award the increased pay and uniform service stripes which mark the length of the different periods of employment by the company. The task can be done with the utmost ease by providing a card for each employee concerned, which gives the date of his enlist-

ment in the ranks, and by its color indicates either the year in which he was employed or the year in which his next period expires. The use of cards alphabetically arranged has been in considerable use for some time in the employment offices of different street railway companies, and experience has demonstrated the advantages of being immediately able to examine applicants' records when new men are under consideration.

The application of the card system to the operation of electric railway car and machine shops is bound to grow in favor as the all-around usefulness and wide scope of the method become recognized. Records of painting and car repairs, renewals of wheels, lamps, brake-shoes, tire turnings, mileage, carpentry and blacksmith work may be kept absolutely up to date and constantly at hand for immediate consultation. In the electrical department breakdowns of car equipments, generators, feeder and transmission system, the insulation of underground cables, special tests and investigation, may all be usefully and conveniently classified in this way.

In the traffic department there is scarcely any limit to the flexibility of indexing records, which may, if care is not used, become in detail minute to a burdensome degree.

It is upon this possibility of flexibility that the danger of overdoing the applications of the card system depends. It is difficult to know just where to draw the line, but a sound, general principle is to make the fact which is filed as far as possible its own index, as it is usually a waste of time to copy data once properly classified. The danger does not lie so much in widely applying the index as in carrying each card catalogue too far in one particular direction. It is safe to say that no single method of classifying can apply to all kinds of data, and that note-books have their proper place, but even these should preferably be made up of removable leaves alphabetically or decimally arranged. Nor should a company, whose cards are printed to satisfy its own operating conditions, feel that improvements in the cards are not constantly in question.

If the possibilities of excessive indexing are kept in mind the three great advantages of card systems are irrefutable. The fact that in every department information may be kept up to date at all times, coupled to the remarkable certainty and speed with which the requisite data may be obtained at low or reasonable cost, render the card system one of the most efficient mechanisms of modern industrial life, and its extended applications to electric railway work are only questions of time and appreciation. In shop, drafting room and office it is bound to become, in some form or other, an indispensable piece of furniture.

#### THE PROJECTED LINE BETWEEN ITHACA AND AUBURN, N. Y.

The plans for building the proposed interurban electric railway between Ithaca and Auburn, N. Y., have progressed to the point of taking out a charter for the road under the title of the Ithaca & Auburn Electric Railway Company, capitalized at \$1,000,000. The preliminary work has been going on for months, and it is said that even the system of power distribution has been worked out. Unofficially, it is said that the main generating station will be located at Lake Ridge, and that sub-stations will be built at Auburn and Ithaca. A company, to be known as the Ithaca & Auburn Construction Company, is to be organized to build the road, and the work of construction will be under the direct supervision of A. P. Colegrove, of Philadelphia. The road will enter Auburn at Genesee Street, making connections with the local lines. Entrance to Ithaca will be made by way of Tioga Street.

The officers of the company are: Isaac P. Hazard, of Poplar Ridge, president; Dexter Wheeler, of Poplar Ridge, vice-president; Edwin B. Mosher, treasurer; Sherman Collins, of Ithaca, secretary. An executive committee consists of Sherman Collins, chairman; Isaac P. Hazard and Edwin B. Mosher.

**MINOR CAR REPAIRS**

BY A. O. CARPENTER

In car repairs there are usually several right ways of performing the work. They may be all equally good, judging from the mechanical standpoint, in strength and cost, but vary only in the question of the time. Where other reasons have equal weight the decision between two methods ought to be governed by the time in which the work can be performed.

The following notes in regard to the practice on the old "West End" shop will be of interest in this connection:

A large portion of the injuries to car bodies are caused by blows upon the ends or corners of the vestibules, due to collisions, and naturally the guard rail suffers. In its repair there

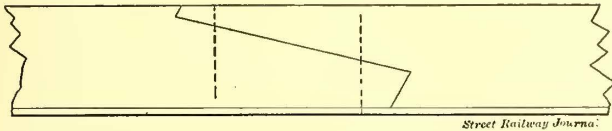


FIG. 1.—BOSTON METHOD OF REPAIRING GUARD RAILS

is a slight deviation in Boston from what is usually considered standard practice.

A long scarf joint, while very neat, is lacking in longitudinal strength. If the belt rail is to be repaired a ship splice is used, but, as shown in Fig. 1, one of the parts is made much wider than the other so as to give as much end to end contact as possible. Repaired in this way the new piece is almost as well able to resist an endwise blow as the original rail. Of course, this is not as neat as the standard scarf joint, but neatness cannot well be urged as against strength and durability.

In Boston dashers suffer severely. The narrow streets and short curves make it impossible to use projecting buffer beams. Hence, dents and dimples are constantly on the list of repairs. It has been found, however, that by using jack screws or hydraulic jacks these can be taken out without removing the dashers from the car, and usually without any necessity for repainting beyond a simple touching up. When a dasher is straightened by heating several days are required for repainting even when the work is hurried. The time and cost of removal and the cost of painting is saved by the use of the jack, and the delay to a car amounts to hours instead of days. The saving in money is considerable on a large road, and on smaller roads with a limited number of cars the advantage is often greater.

On some of the roads now forming a part of the Boston elevated system there are many cars which were built without diagonal bracing. They belong to a time when the need for diagonal strength was not greatly felt, but new conditions have brought out the need for this strength. All the cars are now being fitted with vestibules. When these are in place a slight blow, for example, from a loaded truck breaks or takes a splinter from a vestibule corner post. The repair is, of course, simple and quickly and easily made. The car is apparently uninjured, and upon inspection it is usually found that the windows and end doors work perfectly, that is, all except the outside door diagonally opposite the injured post on the other end of the car. This, perhaps, refuses to be shut by three-sixteenth of an inch, and it has to be taken off from the stile.

This is almost a daily occurrence, and shows, of course, that the car body is "out of square" to that extent. No one would have suspected any damage to the frame as there was no other sign of injury, and such slight distortions passed unnoticed until the introduction of vestibules.

The lesson is one that should be studied by those who are building large, heavy cars, depending upon the cross-framing alone to hold them square. Blows upon corners which do not seem to be of any great force will cause trouble at vestibule

doors. Probably, when the frame is once distorted and the joints broken it will yield to the next blow much more easily.

One of the important principles upon which all work is conducted in the Bartlett Street shops is to "save the use of the rolling stock." Every car is needed and every car, as far as possible, should be earning money. The cars are kept in the shop the shortest possible time, and in making repairs that method is selected which will produce the strongest and most durable job in the least time.

In building new vestibules which are to be applied to all old cars standard lengths cannot be exceeded. Buffers cannot have a greater projection than heretofore, nor is it possible to move the dasher forward so as to have a straight front. The upper part of the vestibule then projects because the dasher cannot be moved sufficient to accommodate the brake handle, and on top of it a wide bottom board or shelf is used to form a base for the vestibule. Blows from the overhanging loads of trucks and market wagons frequently split this board. Usually lag screws can be so placed as to hold the parts together and save the renewal of an expensive piece of timber. Of course, no one likes a lag screw or would recommend its use; yet a lag screw, properly driven home in a hole of the right size, makes one of the best known connections for wood. The "rub" comes in getting the hole to fit the "wire" of the screw and in giving the screw just the right number of turns. One or two turns too much and a wire nail is about as good as a lag screw.

Much of the original designing for the old West End Company, and a great deal of that for the Boston Elevated, has

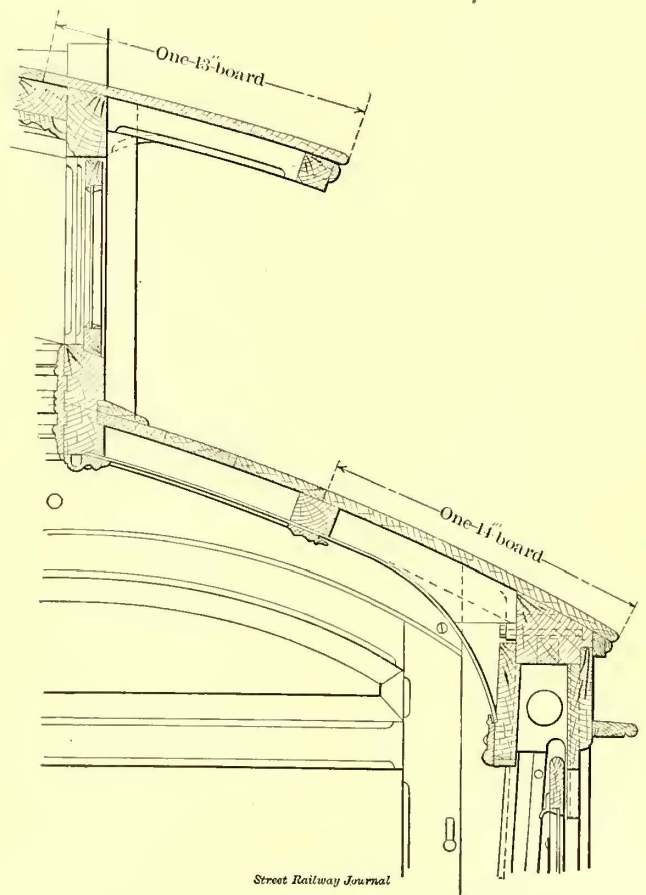


FIG. 2.—CROSS SECTION SHOWING ROOF BOARDS

been made with a view to making repairs easy and economical. Some of the peculiar details are simply the result of long experience. Those who have built cars for this system will remember the stress that is always laid upon the finish at the edges of both the upper and lower deck. The roof board, in such cases, projects, and the half-round moulding covering the canvas is placed under it instead of on its edge, see Fig. 2.

This engraving shows a cross-section of the raised roof as well as a section of the lower deck and the plate.

In many of the common systems of finish the roof board is flush and the half-round covers it, forming a finish at the edge of the roof. This looks neat, but there is a vertical joint exposed to the water, and if the external paint is cracked the water finds its way into the bare canvas, and so on to the wood of the frame. In the case of the main or lower deck the water gets an easy passage to the heads of the post. A little decay at this point soon ruins the whole structure.

By adopting the arrangement shown in Fig. 2 the roof board projects, and the edge of the canvas is held under it by the half-round moulding. A drip is formed and nearly all the water drops clear without passing under the joint. From the same engraving it will be seen that the water table is formed with an edge so moulded as to give a drip and prevent the water from following the under side. The value of these details is shown by the complete freedom which the cars have from decay in and about the head of the post.

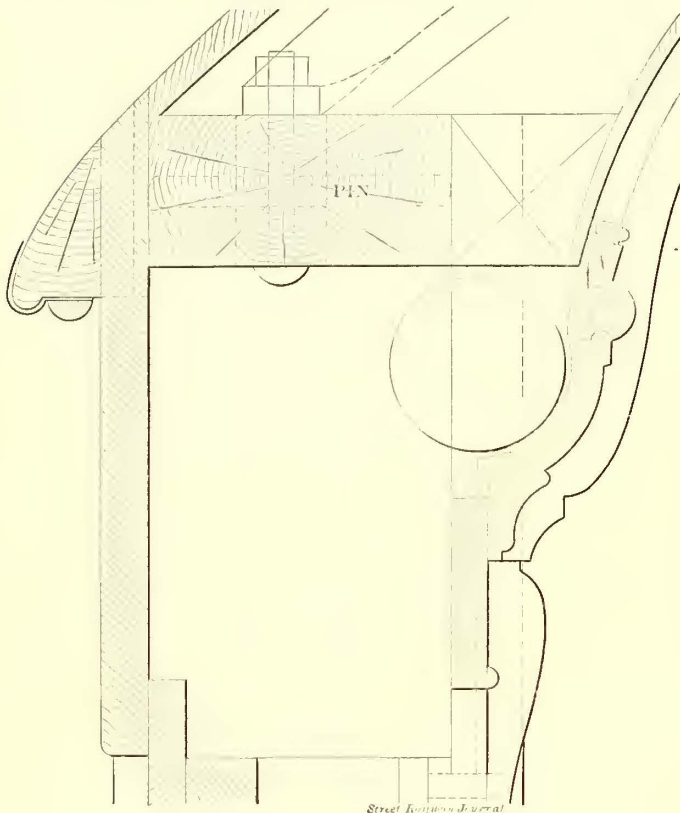


FIG. 3.—COMMON FORM OF DRIP.

In Fig. 3 we have another form of drip which has been extensively used and has some good features. As long as the canvas is intact the water is carried away so as to drip outside the joint. Its defective feature is that the roof board does not come down to the drip without a joint.

One of the common troubles with electric cars is the entrance of the water at the end vestibule sash in the roof. It was a serious matter with the old horse car, but is worse with electric cars on account of the higher speed. When water goes through the inside finish at this point it reaches the whole end frame, including the corner post. Making the end sash on each side in the roof stationary would be an effective remedy. On surface cars of the Boston Elevated the hood is given an unusual cross projection so that the opening is 14 ins. back from the edge of the upper deck. Another notable departure from common practice followed in Boston is the use of wide boards at the edges of the roof. This is properly a precautionary measure by which water is kept away from the framing if the canvas should become damaged.

Another notable feature of these cars is shown in Fig. 4. It is the absence of corner plates. Although much advocated

by some builders they are not always an unmixed blessing. When badly bedded moisture enters behind them and the whole corner of the ear is destroyed beyond repair. Not only is the post spoiled, but the plates and headpiece become spongy. For this reason a plain bracket has proved safer than the more elaborate plate with its numerous pockets for water.

To argue against brass or bronze for the trim of both open and closed cars puts one in the "way back class." He who advocates malleable iron is set down as penurious or old fogy.

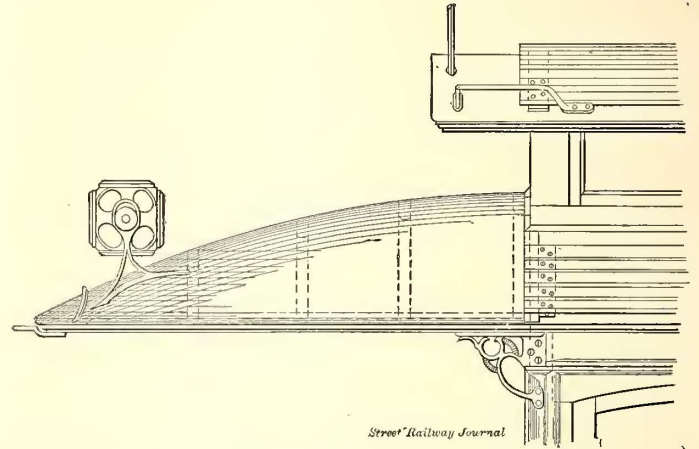


FIG. 4.—ELIMINATION OF CORNER PLATES.

When a large number of cars is to be kept in order brass or bronze is, in more than one way, expensive. In the Dudley Street shops the preference is decidedly in favor of malleable iron, and with the best of reasons. At the end of the season, when open cars go into the shops for repairs, the bronze trim looks not better, if not worse, than the painted iron; often it is very much worse. Most of the trim must come off and go to the brass shop for refinishing. To get each piece back upon its own car, in its original place, is out of the question. Screws do not fit, and those portions secured by wood screws are not nearly as firm as when they were first set. These seat braces are especially apt to work loose. Each time the pieces come off larger sizes of screws are needed, but the holes in the metal put an end to larger screws after a few changes.

Painted malleable iron trimming does not need to be disturbed. When painted it is as neat as bronze and very much cleaner. Since it is never removed the car is, in the end, much stronger. The cost of putting the malleable trim in shape at the end of a season is a small item compared with that of refinishing bronze, and, as there is a considerable advantage in first cost and a less liability of theft, it must be confessed that the arguments in favor of iron are strong and appeal with special force to roads having many cars.

#### EXPANSION OF THE INDIANA UNION TRACTION COMPANY

From the press reports received from various points in Northern Indiana and Chicago, it is evident President George F. McCulloch, of the Indiana Union Traction Company, is carrying on negotiations which mean an extensive addition to that company's large network of interurban lines and an ultimate entrance of that network to Chicago. Indeed, many who are in a position to know believe that in the course of a few years the Indiana Union Traction Company will operate the greater part of the Interurban mileage in a territory between Indianapolis on the south and Chicago on the north. There are several roads by which the Indiana interurban network might enter Chicago. Two of these, the Calumet and the Chicago Electric Traction, are in receivers' hands, and it is understood that several offers have been made for the purchase of them recently.



**TRACK-LAYING MACHINE**

An interesting scene along the route of the Denver & Northwestern Railway is shown in the accompanying illustration, reproduced through the courtesy of "The Rocky Mountain News," of Denver. In the foreground is seen a Roberts track-laying machine in operation on the new Moffat Short Line. Back of the machine stands the Denver City Tramway Company's new private or chartered car, illustrated in the STREET RAILWAY JOURNAL, of June 20, 1903. A party of Denver out-of-town guests, at the invitation of W. G. Evans, president of the tramway company, made a trip over the Northwestern line and stopped at the track-laying scene, a short distance beyond Arvada, to inspect the operations. The machine had been in operation only two or three days, but was proceeding at a speed of between 1 mile and 1½ miles a day. Later it is expected the speed of the machine will exceed 2 miles a day.

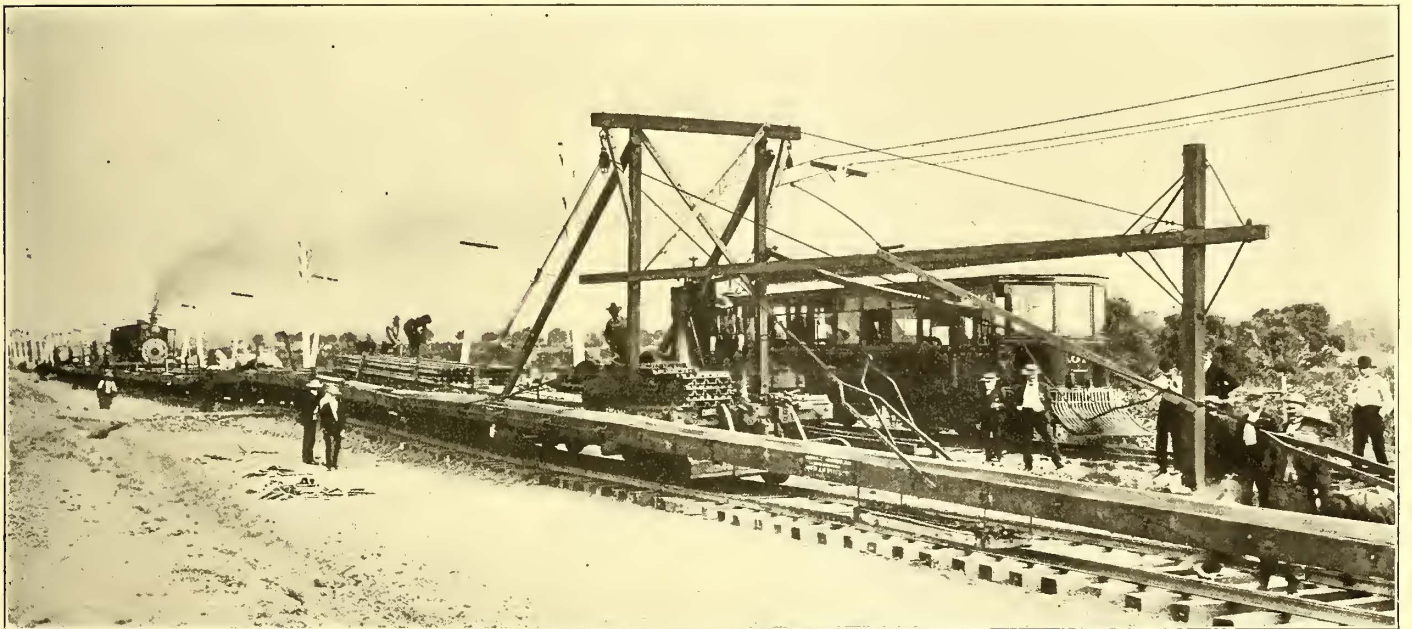
In laying a mile of track over 300 tons of material is handled by the machine, and placed directly at the point where it is needed and where it will require the minimum amount of handling by laborers.

Among those in the party were S. M. Perry, president of the Denver & Northwestern Railway; John A. Beeler, vice-presi-

dent's paper, is quite interesting, as the division of the items is more comprehensive than most tables of similar character:

Total cost per kw-hour for generating energy:\*

<i>Total Charges for Fuel:</i>		Cost in pence.
Capital charges on cost of land for siding.....	0.003	
Capital charges on cost of bunkers and siding.....	0.010	
Capital charges on cost of automatic weighing.....	0.006	
Capital charges on cost of machine and stokers....	0.006	
Annual charges for maintenance and repair of above.	0.002	
Cost of fuel used.....	0.140	
Labor and energy handling coal trains, and cost of terminal charges.....	0.008	
Labor and energy for stoking.....	0.018	
Labor and energy for disposing of ashes.....	0.007	0.194
<i>Total Charges for Steam Plant:</i>		
Capital charges on cost of boilers.....	0.017	
Capital charges on cost of feed arrangements....	0.007	
Capital charges on cost of superheaters and economizers .....	0.003	
Annual charges for maintenance and repair of above .....	0.011	
Labor and material for cleaning boilers and flues.	0.007	
Cost of feed-water used.....	0.010	0.055
<i>Total Charges for Electric Plant:</i>		
Capital charges on cost of engine and dynamo plant .....	0.068	



TRACK-LAYING MACHINE EMPLOYED AT DENVER

dent and general manager of the Denver City Tramway Company; Charles J. Hughes, Jr., attorney of the Denver City Tramway Company; United States Senator Henry M. Teller; Edgar G. Cross, of Philadelphia; Mr. Nicholson, of the Nicholson File Company, Providence, R. I.; Charles D. Kinney, an Ohio traction man, and several officials of the Moffat Short Line and the Colorado-Utah Construction Company, which is building the railroad. The party rode the length of the electric line and inspected the coal mines at Leyden.

**COST OF POWER AT NEWCASTLE-ON-TYNE**

At the eighth annual convention of the Incorporated Municipal Electrical Association of Great Britain, A. E. L. Rossignol presented a paper regarding the cost of power. Mr. Rossignol is the general manager and engineer of the Newcastle Corporation Tramways, and the data given was obtained in connection with the erection and operation of the Corporation's power station.

The table given below, which was embodied in Mr. Rossig-

Capital charges on cost of switchboard and connections .....	0.007	
Capital charges on cost of battery and booster.....	0.031	
Annual charges for maintenance and repair of above .....	0.021	
Labor running engines.....	0.035	
Oil waste and stores.....	0.020	
Storekeeper and clerking work.....	0.006	0.188
<i>Total Charges for Condensing Water:</i>		
Capital charges on cost of surface condensers.....	0.007	
Capital charges on cost of pumping station and pipes .....	0.024	
Annual charges for maintenance and repair of above .....	0.006	
Labor running pumping station.....	0.009	
Energy for running pumping station.....	0.010	0.056
<i>General Charges on Undertaking:</i>		
Capital charges on cost of land for power station..	0.034	
Capital charges on cost of foundations for power station .....	0.027	
Capital charges on cost of buildings for power station .....	0.089	

\* This estimate of cost is based on an output of 7,000,000 kw-hours per annum.

Labor charges on cleaning and maintenance of above .....	0.007	
Engineering superintendence of plant.....	0.040	
Management and office expenses, if run as a separate concern .....	0.035	
Rates, taxes and other charges.....	0.069	0.301
<hr/>		
Total charges of all kinds.....	0.794	0.794
Depreciation and reserve fund.....	0.086	0.086
<hr/>		
Total cost per kw-hour.....	0.880	0.880

**DISTRIBUTION SYSTEM FOR SWITCHING YARDS**

One of the most serious problems in the electrical equipment of a suburban division of a trunk line steam railroad is that of the supply of current to the motor car or locomotive in the switching yards. The third rail is generally recognized as the ideal method of current distribution on straight track, but the danger of a complicated third-rail system in a switching yard, such as would be required if this method of distribution was employed in such places, has made most engineers loath to recommend it. On the other hand, an overhead system has, perhaps, as serious objections. An electric locomotive to accomplish the work required of a switching engine would need

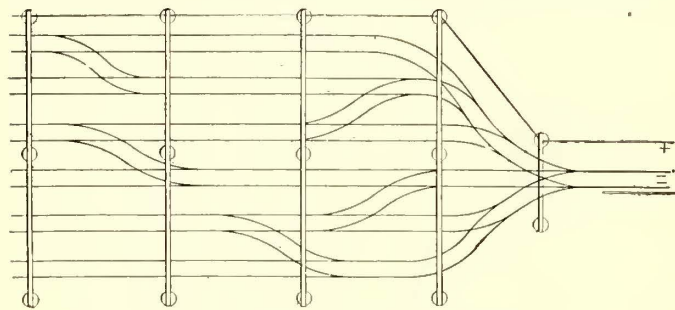


FIG. 1.—BOYNTON TRACK CIRCUITS.

from 1500 amps. to 2000 amps., at from 500 volts to 700 volts, and the size of the conductors required for this current would necessitate a very heavy overhead superstructure, which would probably have to be little if any lighter than if they formed girders for a roof covering the entire yard.

To overcome these two objections the system illustrated in the accompanying engravings has recently been made the subject of a patent by Edward C. Boynton, formerly assistant chief electrical engineer of the New York, New Haven & Hartford Railroad Company. Mr. Boynton, it will be remembered, took a very active part in third-rail construction work at Nantucket, Hartford and New Britain, and his solution of the switching

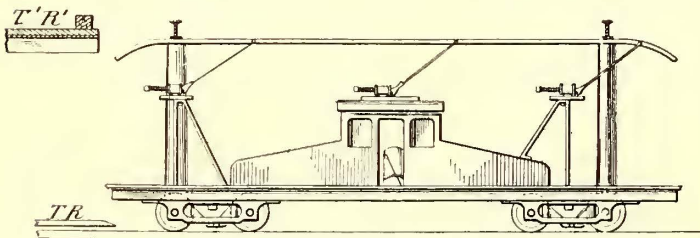


FIG. 2.—CURRENT COLLECTOR ON LOCOMOTIVE

problem is certainly interesting. He recommends the erection throughout the switching yard of posts which will carry transverse girders or I-beams at right angles to the main direction of the tracks, and which will be parallel and distant from each other about 70 ft., as shown in Fig. 1. The I-beam, or the lower girder in case a truss is used, as described, is the contact surface from which the current is taken into the locomotive. The current collector is an elongated skate supported at two or three points from the frame work of the locomotive, as illustrated in Fig. 2. The height of the I-beams over the track in a

switching yard or terminal which is not used for freight cars would be about 16 ft. or 17 ft., which would be ample to clear the highest passenger car. If freight cars are used the height would have to be about 21 ft., which would clear a man standing on a freight car. The contact or rubbing surface between the skate and the I-beams as arranged would be about 40 sq. ins. to 50 sq. ins., as the skate is made long enough to stretch between two overhead conductors.

The system as outlined and as illustrated involves the use of an electric locomotive of considerably greater length than that heretofore employed. This length could, of course, be reduced by placing the overhead conductor supports nearer together, but Mr. Boynton believes in using the supports about 70 ft. apart, and this spacing would not require the locomotive to be of greater length than an ordinary Pullman car. Except in cases where two electric locomotives are coupled together, there is no serious objection to having the skate longer than the distance between the locomotive buffers.

When the locomotive passes from the switching yard to the straight track the overhead skate can be hauled down and current taken from the third rail, or, if preferred, current can still be taken by the skate from an overhead trough, as shown in T<sup>1</sup> R<sup>1</sup> in Fig. 2.

**PROGRAMME OF THE ACCOUNTANTS' CONVENTION**

The following programme has been adopted for the convention of the Street Railway Accountants' Association of America for the Saratoga meeting:

WEDNESDAY, SEPT. 2, 1903.—In Convention Hall, Grand Union Hotel. 10 A. M., sharp.

- Annual address of the president.
- Annual report of the executive committee.
- Annual report of the secretary-treasurer.
- Paper: "Freight and Express Accounts," by Irwin Fullerton, General Auditor, Detroit United Railway, Detroit, Mich.
- Appointment of convention committee on nominations.
- Appointment of convention committee on resolutions.
- Replies to questions.

THURSDAY, SEPT. 3, 1903.—10 A. M. sharp.

- Paper: "Car Maintenance Records," by S. C. Stivers, New Jersey & Hudson River Railway, Edgewater, N. J.
- Paper or address by a representative of the United States Census Bureau.
- Report of the committee on a standard form of report for electric railways. Chairman, William F. Ham, Comptroller Washington Railway & Electric Company, Washington, D. C.
- Replies to questions.

FRIDAY, SEPT. 4, 1903.—10 A. M. sharp.

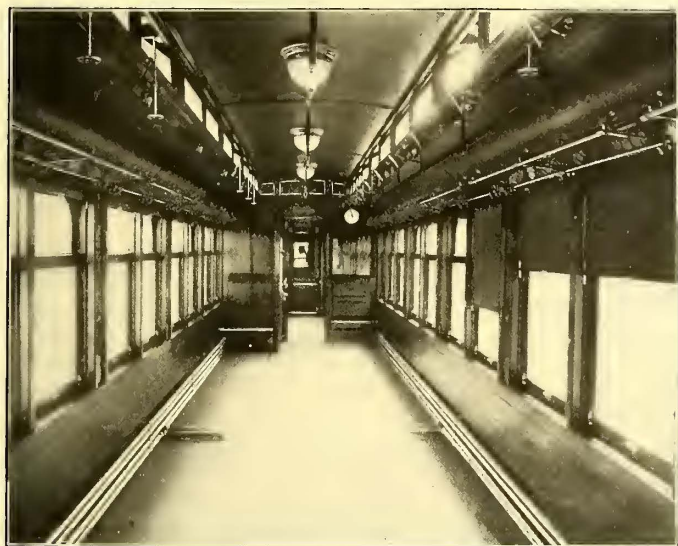
- Paper: "Advantages and Disadvantages of Bag or Envelope Receiver System of Conductors' Deposits," by F. R. Henry, Auditor St. Louis Transit Company, St. Louis, Mo.
- "Comparison of the Municipal Tramways Association of Great Britain, Proposed Standard Classification and Form of Report with the American Standard," by C. N. Duffy, Secretary Chicago City Railway, Chicago, Ill., Chairman committee on standard classification.
- Report of committee on resolutions.
- Report of committee on nominations.
- Election and installations of officers.
- Adjournment.

The association has adopted a rule that members desiring replies to special questions may either ask them verbally or give them to the secretary. This is an opportunity for members not personally present to obtain replies to questions, and will be found of great convenience.

The extent to which the people who have undertaken to solve the traction problem, and who have not solved it, are responsible for the discomforts and accidents suffered by street railway patrons is a matter which will probably demand attention from an intelligent public after a while.—Chicago Inter-Ocean.

**SUBURBAN CARS FOR INDIANA**

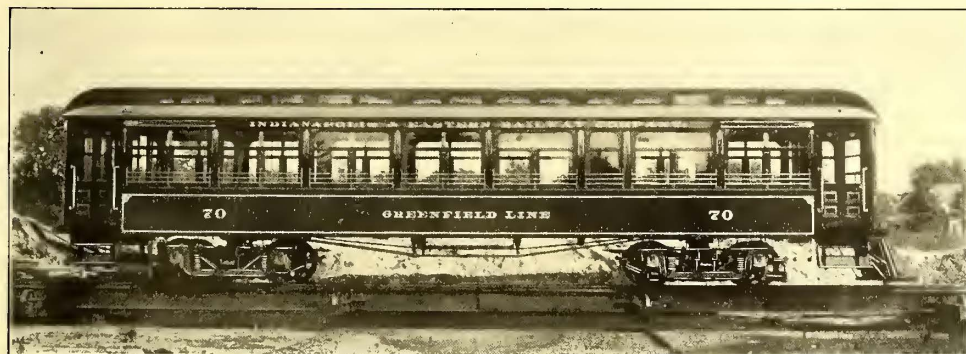
The accompanying cuts illustrate the exterior and interior of a car built for suburban service by the G. C. Kuhlman Car Company. The Indianapolis & Eastern Railway Company, which controls an electric railway over 34 miles long, has re-



INTERIOR SUBURBAN CAR

cently placed a number of these cars in service on its Greenfield division.

The total length of these cars is 53 ft., and the width over all



COMBINATION CAR FOR SUBURBAN SERVICE.

8 ft. 8½ ins. The car bodies have "V" ceilings extending to the bottom edge of side sills, and roofs of "Monitor" type with steam coach ends extending over vestibules. Full width vestibules are at both ends, and the car sides have 7½ sets of double Pullman windows.

The forward end of the car is used as a smoking room, and is divided from the regular passenger compartment by a glass and wood partition running across the fourth window post, leaving seats for sixteen passengers. The seats in the smoking room are of rattan and those in the passenger room of frieze plush. The latter compartment seats forty-two passengers.

The general finish of all sash, doors, panel work, mouldings, etc., is of Mexican mahogany, with narrow marquetry inlaid work on pier window posts and ventilator rails. The body doors are also relieved with marquetry work. The headlinings are of three-ply veneered wood, painted in light green and relieved with gold and silver decorations. Trimmings are of heavy bronze of modern design. The interior finish of these cars is of the new design used only by the Kuhlman Car Company, there being no shop moulding

to collect dust or dirt. Eight large holophane glass globes admit light to each car. The cars are heated with Peter Smith hot-water heaters, the heater proper being placed in the front vestibule.

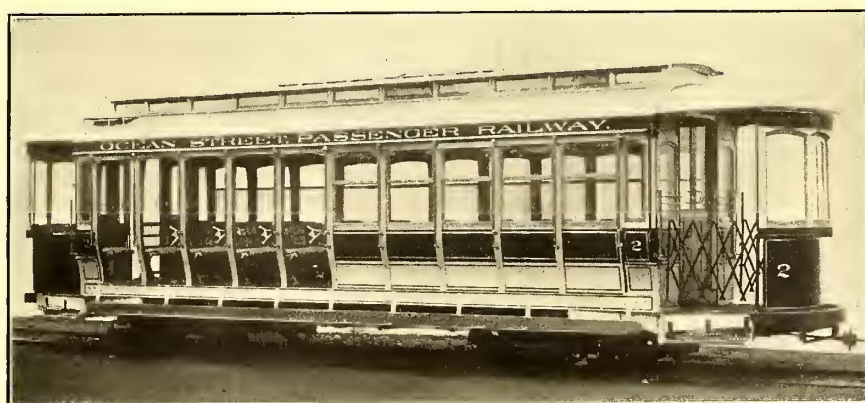
**CONVERTIBLE CAR AT CAPE MAY**

The J. G. Brill Company lately sent the handsome convertible car shown in the accompanying illustration to the Ocean Street Passenger Railway, of Cape May, N. J. Last year a car of this type was placed in commission by this company, and has given such satisfactory service as to warrant a second order. The cars run along the beach from Cape May Point to Sewell's Point, and, as Cape May is a winter as well as summer resort, the cars are used all year.

The car illustrated is shown partly open and partly closed. Only a few minutes are required to convert the entire car. The operation of sliding the windows and panels into roof pockets is well known and need not be described. Attention may be called, however, to a slight change in the window system. Instead of the sashes being connected with a toggle joint, as has been the practice heretofore, the system of the builders' semi-convertible car is used, which is simply that the lower sash is raised alone till the top is abreast of the top of the upper sash, when they automatically connect, the upper sash riding on the lower into the pocket.

The cars have a bright, attractive interior, finished in natural ash, with ceilings of decorated birch. The spring cane seats have reversible backs, of spindle construction, and afford seating accommodation for forty passengers. Portable vestibules of the builders' make are furnished at either end, and are well adapted for use with this type of car. Other furnishings of the same make are angle-iron bumpers, radial draw-bars, brake handles and "Dedenda" gongs.

The general dimensions are as follows: Length over end panels, 28 ft. 4 ins.; over crown pieces, 37 ft. 4 ins.; from end panels of over crown pieces, 4 ft. 6 ins.; width over sills, 7 ft. 2¾ ins.; over posts at belt, 8 ft. ¾ in.; centers of posts, 2 ft. 7 ins.; sweep of posts, 5 ins.; lower sash, 23 ins. x 28¾ ins.; upper sash, 16 3-16 ins. x 28¾ ins.; side sills, 4¾ ins. x 7 ins.; with steel plates on outside, 5/8 ins. x 7 ins. The cars are mounted on "Eureka" maximum traction trucks,



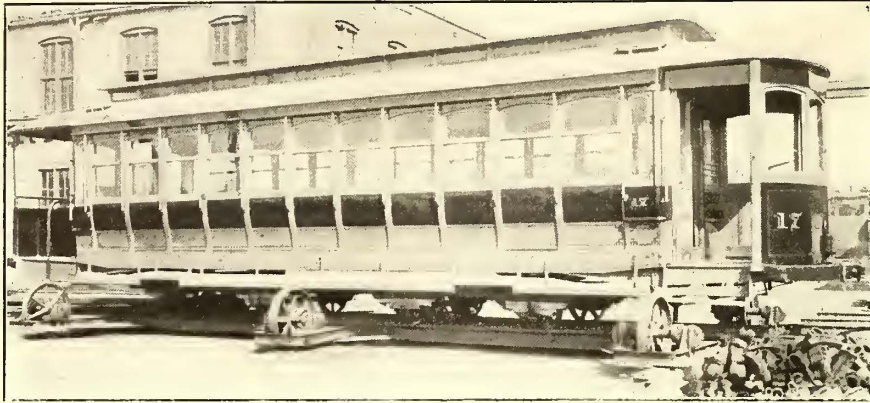
CONVERTIBLE CAR FOR CAPE MAY.

wheels, 33 ins. and 20 ins.; wheel base of 4 ft., and 4-in. axles. Each truck is equipped with a 30-hp motor. Total weight of car, trucks and motor, 25,360 lbs. This type of car has been found particularly serviceable for all the year resorts.

**CONVERTIBLE CARS FOR BAY CITY, MICH.**

The American Car Company, of St. Louis, lately completed ten convertible cars of the Brill patented type for the Bay

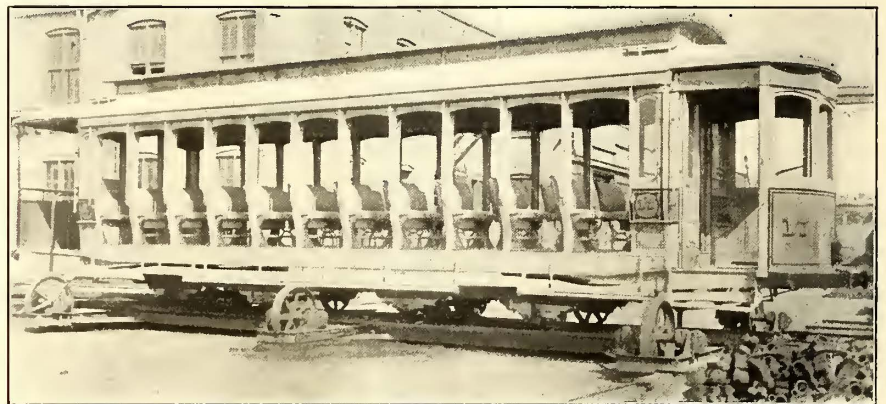
sills, 4¾ ins. x 7 ins. The interiors are handsomely finished in natural ash with birds'-eye maple ceiling, giving a bright, attractive appearance. Each car is furnished with sand-boxes, alarm gongs, brake handles, draw-bars, etc., of Brill patented make. The trucks are the "Eureka" maximum traction, with 33-in. drivers and 20-in. pony wheels. They are equipped with 45-hp motors.



CONVERTIBLE CAR—ENCLOSED

Cities Consolidated Railway. Situated on the south shore of Saginaw Bay, in Northeastern Michigan, Bay City and Bay Cities, north, south and west, are exposed in winter to severe storms and low temperature, which will put these cars to a thorough test as to heat retaining qualities. However, cars of this type have been in use for several winters at Benton Harbor, not far distant, and it is, therefore, known that they are quite as capable of keeping warm as cars of solid side construction. Bay City has a population of nearly 30,000, and is at the center of a group of good-sized towns. It is an important railway point, a busy manufacturing place, and an excellent field for electric railway operations.

These cars are powerfully constructed and fully equal to the double service which is re-



CONVERTIBLE CAR—OPEN



INTERIOR CONVERTIBLE CAR

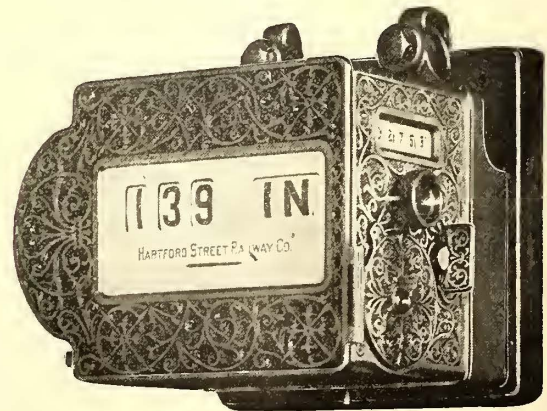
quired of them. The builders claim that the firmness of the upper structure is proved by the fact that the windows and panels do not stick nor bind, and always retain their original easy movement. The double corner posts, the strong setting of the side posts and the assistance of the Brill patented round-corner seat-end panels give a firm support to roof. The length over end panels is 30 ft. 8 ins., and over the vestibules, 42 ft. 4½ ins.; from panels over vestibules is 4 ft. 8½ ins. Width over sills and sill plates is 7 ft. 5½ ins., and over posts at belt, 8 ft. 1 in. From center to center of posts, 2 ft. 7 ins.; sweep of posts, 3½ ins. Thickness of corner posts is 3¾ ins., and of side posts, 3¾ ins. The side sills are 4¾ ins. x 7 ins., plated with 5/8-in. x 8-in. steel, End

ford, Conn., and has been found so successful on that line that all of the cars of that system have been equipped with the device.

Externally the register is very similar to the ordinary fare register except that the totalizer shows to the right. Internally, however, and in its mechanism the register differs entirely from the ordinary fare register. It carries a cylinder on which is

**A NEW RECORDING FARE REGISTER**

The accompanying illustration shows a register which has just been put on the market by the Recording Fare Register Company, of New Haven, Conn., a company which has recently been organized, principally to exploit this machine. The register, however, is not a new one, although it has not been manufactured for general sale before. It has been in constant service for the last six years on the line of the Hartford Street Railway, of Hart-



RECORDING FARE REGISTER.

wound a strip of paper on which the register records its own trip sheet, giving a complete record of all fares collected on each half-trip, the number of the register and the direction of each half trip. One of these cylinders is shown underneath the

register in the accompanying cut. No extra work is required of the conductor in securing this record, as the numbers and direction marks are stamped automatically on the cylinder when the face numerals are returned to zero in the usual way. The record is removed at the end of the car-day by the inspector and forwarded to the auditor, and the aggregate totals of each half trip on this record must agree, of course, with the totalizer or permanent continuous statement in the register.

In addition to the recording register the Recording Fare Register Company also handles a full line of electric railway supplies.

**OVERHEAD MATERIAL OF THE ST. LOUIS TRANSIT COMPANY**

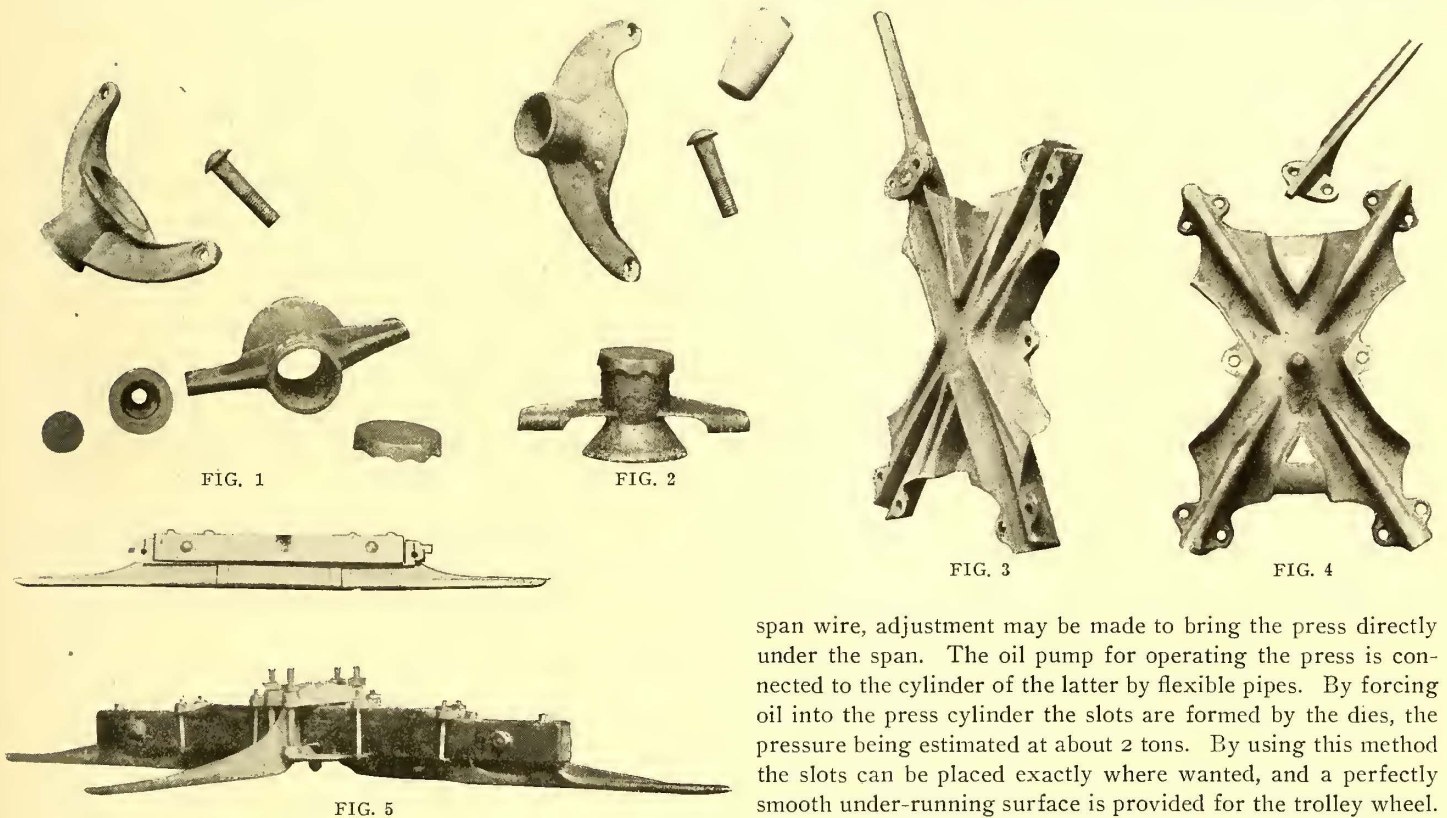
The St. Louis Transit Company employs considerable overhead material of its own manufacture which has several fea-

**METHOD OF SUPPORTING TROLLEY WIRE**

St. Louis, July 25, 1903.

EDITORS STREET RAILWAY JOURNAL:

It may be of interest to some of your readers to learn of the method of supporting No. 0 round trolley wire that is in practice by the overhead department of a prominent city traction system. Slots or grooves, 4½ ins. long, are made on both sides of the wire just above the horizontal diameter. These slots are made deep enough on a No. 0 round trolley so that a No. 3064 Detroit trolley clamp can be used the same as if the trolley was a regular grooved or figure 8 wire. For making the slots the overhead department has adopted a machine originally designed for splicing 500,000-circ. mil aluminum cable. Special dies were prepared for forming the slots. When it is desired to put up some new trolley wire this machine, which operates by oil pressure, is mounted on top of the emergency or line car. It is supported on slides so that after the car is stopped under the



OVERHEAD MATERIAL ADOPTED BY ST. LOUIS TRANSIT COMPANY

tures which will no doubt be of interest to other companies. The trolley wire insulating hangers employ wood for insulation. Various parts of the straight line and curved hangers are shown in Figs. 1 and 2.

The wood is locust, and soaked in warm linseed oil. The wooden insulating bolt consists of a cone-shaped piece of locust bored out and countersunk to receive a common bolt, and having a wooden plug fitting into the countersink over the head of the bolt. This is slipped down into the brass hanger shell, and a brass cap put on the top of the hanger to hold the bolt in. This brass cap is not threaded, but simply has its sides bent in, and there is a lip on the hanger which prevents the cap coming off after this operation. Views of the parts from various angles are shown which will give a good idea of the general construction. Front and back views of the solid crossing are shown in Figs. 3 and 4. This crossing has detachable approaches, so that the wire does not have to be cut or taken out of the ear if the crossing is renewed. Each approach is fastened to the crossing by two bolts. In Fig. 5 is shown the section insulator and insulated crossing which this company uses. These are also furnished with detachable approaches.

span wire, adjustment may be made to bring the press directly under the span. The oil pump for operating the press is connected to the cylinder of the latter by flexible pipes. By forcing oil into the press cylinder the slots are formed by the dies, the pressure being estimated at about 2 tons. By using this method the slots can be placed exactly where wanted, and a perfectly smooth under-running surface is provided for the trolley wheel. Two city lines have been equipped as here described, and after several months' use show no signs of failure or tearing out at the ends of the slots. This method may appeal to traction companies who can use considerable No. 0 round trolley, as it has the advantage of employing standard and comparatively inexpensive trolley clamps. ENGINEER.

Big increases over last year's business have been made by the St. Louis & Suburban and the St. Louis Transit Companies, according to figures filed with the City Register. For the quarter ending June 30 the Suburban Company made 74,465 trips and carried 4,451,164 passengers, while for the corresponding quarter last year 65,074½ trips were made, with a total of 4,022,909 passengers carried. The report of the Transit Company shows that it made 1,367,454 trips, in which 38,421,172 passengers were carried during the period which ended June 30, while for the same period last year 1,296,544 trips were made, with a total of 33,269,842 passengers carried.

The Pacific Electric Railway Company has put on sale a new mileage book of 500 miles that will permit holders to ride on interurban lines of the Huntington-Hellman syndicate on a basis of 1¼ cents per mile.

## IMPROVEMENTS OF ST. LOUIS & SUBURBAN RAILWAY

The St. Louis & Suburban Railway Company is rapidly pushing to completion a series of improvements that will enable it to furnish better service to the public, and to reduce the running time on many of its lines. These improvements extend to all departments of the service, from power distribution to new cars, and will aggregate an expenditure of \$1,250,000.

In order to care for increased traffic the capacity of the Hodiament Avenue power house will be increased. New storage batteries are to be installed, the capacity of the boiler room is to be increased and new engines are to be put in. The storage batteries are now on the ground ready to be installed, and some of the other apparatus has already been received. The output of the plant will be increased to 8000 hp when these improvements are completed. The sub-stations, too, are to receive attention. The Brentwood station, on the Meramec Highlands line, will be remodeled and a rotary converter installed, and it is possible that a sub-station will be built to serve the Florissant line, which runs from Wellston Park to Florissant, a distance of 11 miles.

The improvements that are being made to the track extend to nearly all lines, and include the relaying of entire lines, partial reconstruction in some cases, and the elimination of curves and grades wherever possible. The last of the track work on the main line, which runs from Fourth Street and Elm Street to Suburban Park, is now under way. Nine-inch rails have been laid on Locust Street. The track from Vandeventer Avenue to the suburban right of way, a distance of 50 yds., has yet to be laid, and then the relaying of the main line will be complete.

The Meramec Highlands line is being improved from Sarah Street to King's Highway, on Manchester Avenue, with 9-in. rails, but as it is necessary to grade the streets from building line to building line, the work is progressing slowly. None of the new steel has been laid. The south side of the street has already been cut down and the old south track replaced. Another improvement will be made in the Meramec Highlands line by eliminating the double curve on Sarah Street, a short distance north of the Wabash tracks. This curve is dangerous, and it is so sharp that two long cars cannot pass there. For this reason the company has been unable to operate the large cars on the Meramec Highlands line. With the improvements to this line the company will be able to run cars on schedule time, which cannot always be done at present. The schedule time for making the run from Meramec Highlands to the intersection of Fourth Street and Elm Street is 96 minutes. Larger cars will also be run on this line.

The company also expects to make improvements that will eliminate the loss of time in rounding the curves on Thirteenth Street and Fourteenth Street, but what those improvements will be has not been announced.

The St. Louis Car Company is building fifty new cars, each with a seating capacity of fifty-two, for the company, and in order to have shed space for them the car houses at Hodiament Avenue, which were burned down last spring, will be rebuilt. The car house on Manchester Avenue will also be reconstructed. A steam heating plant and an air plant for the purpose of cleaning cars will be added to the Manchester Avenue and the Hodiament Avenue car houses.

It is expected that by Nov. 1 the work now under way will be finished, and then the company will turn its attention to the question of terminal facilities at the Exposition. Just what arrangements the company will make to get to the World's Fair has not been decided.

A new line of cars has been opened in Boston between Jamaica Plain and Park Street Subway, via Center Street and Huntington Avenue.

## CONVENTION ANNOUNCEMENTS

The latest bulletin regarding the twenty-second annual meeting of the American Street Railway Association, issued Aug. 1, announces the following list of papers to be presented at the Saratoga Convention:

Steam Turbines.

Electric Welded Joints.

The Evils of Maintenance and Champerty in Personal Injury Cases.

Train Orders and Train Signals on Interurban Roads.

Freight and Express on Electric Railways.

The Manufacture and Distribution of Alternating Currents for City Systems.

Comparative Merits of Single and Double-Truck Cars for City Service.

The Right of Way.

There seems to be a general impression that all of the space available for exhibits at the Saratoga Convention of the American Street Railway Association has been assigned, and that those exhibitors who have not yet secured room there cannot be accommodated. Frank M. Cozzens, chairman committee of exhibits, Saratoga Springs, N. Y., states, however, in a recent letter that owing to the large amount of exhibit space available at the Grand Union Hotel, it is still possible to accommodate manufacturers who have not yet secured space, if they make prompt application.

## MORE NOISELESS CROSSINGS FOR ST. LOUIS

The St. Louis Transit Company is making a practical experiment at Fourteenth Street and Olive Street with Chief Engineer C. A. Moreno's patent noiseless crossing. For several days General Track Foreman P. J. Conolly and a large force of workmen have been engaged in putting in a new frog equipped with the noiseless surface blocks of wood at the intersection of each cross track. This double crossing was described and illustrated in the *STREET RAILWAY JOURNAL* May 9. At Eighth Street and Carr Street a single set of these blocks has been in use for several months, and this preliminary experiment has increased the Transit Company's confidence in Mr. Moreno's invention. As traffic is very heavy over the lines passing Fourteenth Street and Olive Street, the company is confident that the crossing will stand the strain of any ordinary service.

A peculiar dispute between a street railway company and a town has just been settled at North Andover, Mass. It seems that the Boston & Northern Street Railway Company completed a line through North Andover late last fall, and soon after it was open for traffic the North Andover Selectmen had a conference with the road officials, at which the claim was made that the street railway company had not lived up to the terms of the franchise regarding the care of the streets. The railway officials claimed that the franchise had been lived up to. After much controversy the Selectmen revoked the company's franchise and the town brought suit against the Boston & Northern to recover the bond of \$500 given by the company as a guarantee that the conditions of the franchise would be lived up to. Meanwhile the street railway company applied to the Supreme Court for an injunction restraining the town maintaining barriers in the company's tracks. Judge Braley declined to issue the injunction and referred the case to a master. James C. Gillis, of Salem, was appointed, and the road consented to a settlement of the case whereby the town is to grant a new franchise, the master to adjust the whole matter. It is probable that it will be at least two months before the line is in operation again.

## FINANCIAL INTELLIGENCE

WALL STREET, August 5, 1903.

**The Money Market**

As was generally expected the money market developed a decidedly lame tone this week. This was only natural in view of the developments, all of which were favorable, and while rates for time contracts show no material changes the supply of lendable funds has been increased considerably, and lenders find it extremely difficult to place their funds except at liberal concessions. The principal influence was the payment of notes by the Pennsylvania Railroad amounting to about \$40,000,000, of which \$35,000,000 were held in this city. In addition, the influx of currency from the interior continued on a large scale, the net gains by the local banks for the week being in excess of \$6,000,000, not including the \$3,371,400 new gold from the Klondike and Australia. The large gains in cash were reflected in an exceptionally good bank statement, which showed the local institution to be in a much stronger position than for some time past. Some stress was laid upon the failure to reduce the loan account, but on the other hand the reserve on all deposits increased \$5,144,675, bringing the total surplus reserve up to about \$10,000,000 larger than it was in the corresponding period of last year. Deposits were over \$1,000,000 in excess of loans, and during the past three weeks the banks have increased their cash holdings by over \$20,000,000.

Money on call has been in an abundant supply at rates ranging from  $2\frac{1}{2}$  to 1 per cent, but the character of the stock market has been such as to warrant only a limited demand. In time loans there was practically no demand for funds except for the long dates, and even at a reduction of  $2\frac{1}{4}$  per cent in the rate to  $5\frac{1}{4}$  per cent the inquiry was extremely light. A good demand existed at 5 per cent for over the year funds, and while lenders were not disposed to do business on that basis, the indications are that further concessions will be made before the close of the present week. In some instances loans have been made at 5 per cent, but the collateral offered consisted of high grade stocks.

There have been no important changes in money rates at the leading European centres. At London call money continues to rule around  $1\frac{1}{2}$  per cent, while the discount rate remains unchanged at  $2\frac{3}{8}$  per cent. Discounts at Paris and Berlin are unchanged at  $2\frac{1}{4}$  and  $3\frac{1}{4}$  per cent respectively.

**The Stock Market**

In marked contrast with the great excitement that attended the dealing on the Stock Exchange during the greater part of last week, business in the forepart of the current week dwindled to insignificant proportions, and it became evident from this fact, as well as from the gradual improvement in values, that urgent liquidation had run its course. The Street, however, was somewhat disappointed by last Saturday's bank statement, showing an approximate increase in loans of \$1,000,000, whereas all indications pointed to a large decrease, and operations for the bull account were materially restricted on that account, even though crop accounts were generally favorable. Railroad earnings continued highly satisfactory and both monetary and foreign exchange conditions were as auspicious as could be desired. Toward the close of the week fresh liquidation in some of the specialties, like Virginia Carolina Chemical and United States Realty, which eventuated in two more failures of Stock Exchange houses, unsettled the entire market, and accompanied by a pronounced increase in the volume of trading, prices weakened decidedly, so much so in fact that many stocks not only reached the bottom figures of the present year, but the lowest on record also. An incident of the week that contributed to the late unsettled condition of the general share speculation was the announcement made by the Consolidated Gas Company of its intention to issue \$6,500,000 new stock.

For a time the local traction shares, including Brooklyn Rapid Transit, Manhattan and Metropolitan Street Railway, were firm and in better demand, the basis for which was contained in reports of current large earnings, it being maintained that the Brooklyn Rapid Transit is earning at the rate of 4 per cent on its stock, and that those of Manhattan are increasing at the rate of \$4,000 per day. The Metropolitan Street Railway submitted the statement of gross earnings for July, showing a total of \$1,858,501, an

increase of \$116,187, or 6 $\frac{1}{2}$  per cent, over the corresponding period of last year. However, these stocks were subsequently affected by the more or less demoralized condition of affairs of the general market and closed weak and depressed.

**Philadelphia**

The market showed fair strength until a week ago, but on July 29, under pressure of considerable liquidation, particularly in Rapid Transit and U. S. Steel, prices fell off. There was considerable talk of inside selling in the former stock, but it developed on Tuesday that the sales were for the account of Talbot J. Taylor & Co., which firm had 4000 shares of Rapid Transit. Altogether about 8000 to 9000 shares of this stock were dealt in on the local Exchange during the week ending August 4 at a loss of from  $13\frac{1}{2}$  on July 29 to  $11\frac{1}{2}$  on August 4. The other transit properties showed only slight losses during the week. Union Traction was forced down 1 point to 43, while Philadelphia Traction remained practically steady at  $94\frac{1}{2}$ . The other tractions have maintained their respective positions during the week. American Railways closed at 44, United Gas Improvement at  $83\frac{1}{4}$ , and Railways Company General at 3.

**Chicago**

The Chicago market has been very dull during the past week, the principal exceptions being Chicago City, which dropped in price from 175 to 165, Metropolitan Elevated preferred, which fell from  $55\frac{1}{4}$  to 51, and Metropolitan Elevated common, whose quotations changed from 18 to  $16\frac{1}{2}$ . There have been no new developments in Chicago City, and the liquidation in that stock was attributed to holders who were tired of the delays by the city authorities in the renewal of the franchise grants. Metropolitan Elevated was affected by the announcement made right after the directors' meeting on Monday that the dividend on the preferred stock would be passed. After this announcement the stock went off 3 points from 53 to 50, but recovered later to 51. Chicago Union Traction common and preferred and the other elevateds were very quiet, and remained at about the same figures throughout the week.

**Other Traction Securities**

The Boston market was quiet during the week, but reflected the general market tendency to lower prices, a tendency which was stimulated to a considerable extent by the enormous liquidation in coppers, in which Boston investors are largely interested. The Elevated lost 3 points during the week, dropping from 139 to 136. Massachusetts Electric common fell from 22 to 21, and the preferred from 79 to  $78\frac{1}{2}$ . West End remained stationary at 90, with very few transactions recorded. The Baltimore market has been very quiet, with the exception of transaction of about 2000 shares in United Railways & Electric on July 29. The price has continued stationary at  $103\frac{1}{4}$ , and the income bonds have remained from  $62\frac{3}{8}$  to  $62\frac{3}{4}$ , and the 4's at  $92\frac{7}{8}$  to  $92\frac{3}{4}$  during the week. Other transactions reported are City & Suburban first 5's at 112, City Passenger 5's at 106, and Knoxville Traction 5's at 101. Off the New York curb there have been sales of Interborough at  $98\frac{1}{2}$ , Syracuse preferred at 76, and New Orleans Railway 4's at  $82\frac{1}{2}$  to  $82\frac{3}{8}$ . Among the other traction securities quoted on the New York curb are New Orleans common at  $10\frac{1}{8}$ , New Orleans preferred at 36, and United Railways at St. Louis preferred at  $64\frac{1}{2}$ . North American was pressed for sale, as one of the firms whose failures were announced in New York during the past week was long of the stock and the price has fallen to 73. There was comparatively little trading in Cincinnati last week. Detroit United was the most active issue, about 700 shares selling at between  $71\frac{1}{2}$  and  $69\frac{1}{2}$ , the former the closing figure. Toledo Railways & Light Company ranged from 23 to 24 on sales of 465 shares. Cincinnati Street Railway was quiet at  $132\frac{1}{2}$ . There was some little trading in bonds; Toledo, Bowling Green & Southern 5's brought 98; Mansfield Railway & Light 5's, 101; Northern Ohio Traction 4's, 60, and Cincinnati, Dayton & Toledo 5's,  $84\frac{1}{2}$ . Stock of the Northern Texas Traction Company was listed in Cleveland last week and caused some little interest, owing to the remarkable showing of the road. It had been in operation only nine months and already is paying a dividend besides piling up a surplus for depreciation. Several small lots of this stock brought  $28\frac{1}{4}$ . Cleveland Electric was firm at 74 on sales of 300 shares. Syracuse Rapid Transit preferred sold at 75 for a small lot. Syracuse Rapid Transit 5's brought 90, and Northern Ohio Traction 5's 60. There are plenty of offerings at low prices, but very few buyers.

**Security Quotations**

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

	Closing	
	July 21	Aug. 4
American Railways .....	44½	44
Aurora Egin & Chicago .....	17½	17½
Boston Elevated .....	138	136
Brooklyn Rapid Transit .....	46½	42¾
Chicago City .....	180	165
Chicago Union Traction (common).....	4	3½
Chicago Union Traction (preferred).....	30	30
Cleveland Electric .....	74	67½
Columbus (common) .....	101	85
Columbus (preferred) .....	103	100
Consolidated Traction of New Jersey.....	65	a67
Consolidated Traction of New Jersey 5s.....	104	104
Detroit United .....	69¾	b65
Elgin, Aurora & Southern.....	b52	b52
Lake Shore Electric .....	b10½	b10½
Lake Street Elevated .....	6¼	5¾
Manhattan Railway .....	131½	132
Massachusetts Electric Cos. (common).....	22	21
Massachusetts Electric Cos. (preferred).....	81¾	78½
Metropolitan Elevated, Chicago (common).....	20	16½
Metropolitan Elevated, Chicago (preferred).....	63	51
Metropolitan Street .....	116½	117
New Orleans (common).....	11¾	10½
New Orleans Railways (preferred) .....	39½	36
North American .....	82	73
Northern Ohio Traction & Light.....	18	18
Northwestern Elevated, Chicago (common).....	20½	—
Philadelphia Rapid Transit .....	15	11¾
Philadelphia Traction .....	95	94½
St. Louis Transit (common).....	19½	18
South Side Elevated (Chicago) .....	97	96½
Syracuse Rapid Transit .....	b29½	b29½
Syracuse Rapid Transit (preferred) .....	b75	b75
Third Avenue .....	111½	113
Toledo Railway & Light .....	20	23
Twin City, Minneapolis (common) .....	95½	93
Union Traction (Philadelphia) .....	44	43
United Railways, St. Louis (preferred) .....	69½	64½

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

**Iron and Steel**

The weak feeling in the iron market, to which reference was made in the issue of July 25, seems to have passed, and, although not reflected to any great extent in prices, there is a better tone. There is less pressure on the part of the foundries to sell and many believe that the bottom of the market has been touched, although it is probably too soon to look for any thing like a rapid recovery. Quotations are as follows: Bessemer pig, \$18.75 to \$19; Bessemer steel, \$27 to \$27.50; steel rails, \$28; girder rails, \$33 to \$33.50.

**Metals**

Quotations of the leading metals follow: Copper, 13 to 13¾ cents; tin, 28¼ cents; lead, 4½ cents; spelter, 5¾ cents.

**DEAL IN LONG ISLAND TROLLEY LINES**

Control of the New York & Queens County Railway Company, of Long Island City, which owns the New York & North Shore Railway, and the Long Island Electric Railway, and operates from Long Island City to Astoria, Steinway, North Beach, Dutch Kills, Flushing, Jamaica, Far Rockaway, Queens and other villages in Queens County, has passed into the hands of the United States Mortgage & Trust Company, which is known to be acting for outside interests. In some quarters it is stated that the Belmonts are behind the purchase, while other advices say that the Pennsylvania Railroad is behind the deal. From the diversity of the interests connected with the Mortgage & Trust Company it is impossible to form anything like a definite idea as to the identity of the purchasers. It is expected that formal announcement of the deal will be made soon, and it is thought that with this announcement will be made public plans for the development of the system on extensive lines, including the construction of new lines for which the company now holds franchises, and the construction of a tunnel, or tunnels, to connect Long Island City with New York.

**TOLEDO COMPANY SEEKING AN EXTENSION OF ITS FRANCHISES**

The Toledo Railways & Light Company, of Toledo, Ohio, has presented to the Council of that city an ordinance requesting the extension of its franchises for an average period of eighteen years. In return for the grant the company agrees to give six tickets for a quarter and universal transfers. The ordinance also carries with it the right to handle baggage, express and mail matter. The best paying lines of the company are covered by franchises which expire in seven years. The longest running franchise is twelve years, and the average life of all grants is about eight years. At present a portion of the system is operated under the old Robinson grants, which provide six tickets for a quarter, and in consequence no transfers are given to these lines. The general sentiment is that the company should make a more liberal proposition. Mayor Sam Jones, of Toledo, is a disciple of Tom L. Johnson's three-cent fare heresy, and maintains that the people should take nothing less than three-cent fares and universal transfers.

**PROPOSED Y. M. C. A. STREET RAILWAY WORK IN TENNESSEE**

The organization of Y. M. C. A. street railway branches in Tennessee has been taken in hand by the Tennessee State Committee of the Young Men's Christian Association. S. W. McGill, State secretary of the Y. M. C. A., has taken the first step in this project by writing to Percy Warner, president and manager of the Nashville Railway & Light Company, and to the Memphis Street Railway Company, laying before them what has been accomplished along similar lines in other parts of the country, and suggesting that they establish like organizations among their employees.

The State Committee has proposed to Mr. Warner that the Nashville Railway & Light Company secure rooms near or in the company's transfer station, stating that for about \$5,000, to be furnished by the company, such rooms can be adapted to the purposes of the organization contemplated. It is estimated that the annual running expenses will be about \$1,500. The railway company will be asked to furnish the money to suitably equip the rooms and to contribute \$50 monthly. The fee for membership will be only \$3. In addition to these payments, the Association will solicit funds from outside sources.

In the quarters to be furnished by the company there will be reading and recreation rooms, educational classes, including business courses, and the office of the proposed benefit society. A savings bank for the use of the company's employees is also being considered.

Should the Young Men's Christian Association be successful in Nashville and Memphis it will endeavor to form branches later on in other cities, such as Knoxville, Chattanooga and Jackson.

**MONEY PAID FOR LOS ANGELES TRACTION**

It is reported that the Los Angeles Traction Company has been purchased by Southern Pacific interests, and that E. H. Harriman has an arrangement with H. E. Huntington whereby the latter will control all the street railways in Los Angeles. Whether or not the purchaser is the Southern Pacific, it is positively known now that on July 13 checks and drafts amounting to \$1,515,000 were placed to the credit of the Hook interests, in the Merchants' National Bank, of Los Angeles, and that several days later deeds were recorded transferring all of the traction company's property to the Union Bank of Savings, of San Francisco. The amount of money just passed is in final payment of the purchase price of \$1,750,000.

It will be remembered that Senator W. A. Clark, of Montana, was reported at one time to have bought the traction company, but his option no sooner expired than his real backers in the venture stepped in and saved his equity. In connection with this purchase, it is now stated that Harriman has agreed to turn the traction property over to Huntington in return for a large block of stock in the Pacific Electric Railway Company, or in a holding company that may soon be organized. Under the terms of this arrangement, it is understood that Huntington thus acquires control of the famous Sixth Street franchise, which cost somebody \$110,000 (for 2 miles), as well as the traction franchise to Pasadena, and the interurban line of the California-Pacific Railway Company, now in operation to San Pedro. Until all details of the purchase have been arranged the Hooks will continue to operate as heretofore.



**THE INTERNATIONAL ELECTRICAL CONGRESS OF 1904 AT ST. LOUIS**

Arrangement have been made for holding an international electrical congress at St. Louis next year, in connection with the Universal Exposition. The date selected is the second week of September, 12-17. The advantage of that period is that it offers the most convenient compromise between hot weather, on the one hand, and the terminating limits of fall vacations, on the other. If the date were set earlier, the weather at St. Louis might be found uncomfortably warm. If the date were postponed, it might be difficult for electrical workers on vacation to meet their fall engagements. Moreover, the week selected immediately precedes the great scientific congress appointed by the St. Louis Exposition, which convenes during the third week in September. Since many distinguished visitors and guests will attend the scientific congress, it is the more probable that a good attendance can be secured for the electrical congress immediately preceding.

The international electrical congress will, according to the present plan, comprise three distinct features: namely, first, a chamber of delegates appointed by governments; second, the main body of the congress divided into sections; third, conventions simultaneously held by various electrical organizations in the United States. The last international electrical congress was held at Paris in 1900. The next preceding was Chicago in 1893. The representatives in the chamber of delegates are nominated by the various foreign governments and by the United States. The chamber of delegates considers and votes upon such international questions as units and standards. There are various questions involving units and standards which might properly occupy the attention of a chamber of delegates next year.

The sections which have been proposed for the main body of the congress are:

- |                          |   |                                    |
|--------------------------|---|------------------------------------|
| General Theory—Section A | } | Mathematical.                      |
|                          |   | Experimental.                      |
| Applications             | } | B General Applications.            |
|                          |   | C Electrochemistry.                |
|                          |   | D Electric Power Transmission.     |
|                          |   | E Electric Light and Distribution. |
|                          |   | F Electric Transportation.         |
|                          |   | G Electric Communication.          |
|                          |   | H Electrotherapeutics.             |

It is expected that prominent electrical men in various parts of the world will be invited to contribute special papers on subjects in the various sections and their sub-divisions.

Several of the prominent electrical organizations of the country have already taken steps to hold their conventions in St. Louis during the electrical congress week, and it is understood that the subject will be brought up at the Saratoga meeting of the American Street Railway Association. It is hoped by those interested in the Congress that the Association will make arrangements for holding its 1904 meeting at St. Louis coincidentally with the Congress on Electric Transportation. It is also expected that the following bodies will complete arrangements to this effect: The American Institute of Electrical Engineers, the Electrochemical Society, the National Electric Light Association, the Association of Edison Illuminating Companies, the Pacific Coast Electrical Transmission Association, the American Electrotherapeutic Association. Some plan is expected to be made whereby a joint meeting or meetings may be held between each section of the congress and the particular national organization interested in that subject. In this manner, mutual advantages in membership, discussion and publication ought to be secured.

The transactions of the congress should form a very attractive and important publication, not only as associated with the St. Louis Exposition, but also indicative of the world's progress in electro-magnetism and its applications. The congress arrangements are in the hands of a committee of organization consisting of thirty-three members, all active representatives of American electrical progress. Prof. Elihu Thomson has been elected president. No other man in the country is so well fitted for the post, since he has united for many years the support of scientific, industrial and inventive electrical interests.

The vice-presidents include Prof. H. S. Carhart, of the University of Michigan, whose work is so well known in connection with electrical standards of e. m. f.; Mr. C. F. Scott, the retiring president of the American Institute of Electrical Engineers; Mr. B. J. Arnold, the incoming president of the same organization; Prof. W. E. Goldsborough, the active director of the Department of Electricity at the St. Louis Exposition, and Dr. W. S. Stratton, the director of the National Bureau of Standards.

Meetings of the executive committee and of the advisory committee have already been held. The work of preparing for the congress is already in progress. The general secretary of the congress

is Dr. A. E. Kennelly, Harvard University, Cambridge, Mass., to whom all correspondence should be directed.

**THE DELAY ON THE NEW YORK SUBWAY**

Chief Engineer Parsons and Contractor McDonald, of the New York rapid transit subway, have publicly announced that the subway will not be ready for the operation of trains before April 1, 1904. The persistency with which the work was rushed before the recent labor troubles led to the belief that the road would be ready by Jan. 1, 1904, but the continued delays, owing to strikes among the men, have seriously handicapped the contractor. The work of excavating is not so far behind that it could not be rushed to completion by the first of the year, but the stations and the power house are far behind the schedule of completion originally set for them. The men at work on the power house went out in March, and a month later the men on the stations went out. A short strike would not seriously have retarded the work, but a cessation of activities for five months is more than the contractors could possibly overcome in the short time that remains this year. The work of laying the rails is progressing satisfactorily, and it is expected that by Jan. 1 the track will be laid complete between the Postoffice and Harlem Bridge, on the East Side, and to the Washington Bridge, on the West Side.

**THE ACCIDENT ON THE BOSTON & WORCESTER ROAD**

The investigation as to the responsibility for the accident on the Boston & Worcester Street Railway, which occurred Saturday, July 25, at Shrewsbury, Mass., so far as it has been made public, has brought out nothing to show that the management of the company was in any way to blame. Leon B. Downs, the motorman, and Daniel F. Daly, conductor of the car which was on the track over which another car had the right of way, were arrested a few days after the accident by direction of Assistant District Attorney George S. Taft, of Worcester County, and were held for examination in \$1,000 each. They are charged with manslaughter.

The Railroad Commission started out to investigate the cause of the accident at once. It sent one of its inspectors to get evidence and gave a hearing in Boston Friday, July 31. The hearing was continued to August 2. General Superintendent Arthur C. Ralph, of the Boston & Worcester Company; the assistant general superintendent, Edward H. Richards, and George C. Rappleyea, motorman of one of the cars in the collision, were the only witnesses examined. The crew that are under arrest were represented by counsel and Chairman James F. Jackson announced that the commission would be glad to get a statement from them.

It developed at the hearing that the main purpose of the inquiry is to learn the entire method of operation of the cars on this line with particular reference to the methods employed to insure safety of operation. President William M. Butler told the commission that his road has the most perfect system for safe operation of any road built and he will introduce evidence at the continued hearing to bear out his statements. The commission appears to rely upon its own inspector's report, together with a report of the evidence submitted at the inquest on the death of the one passenger who was killed, which it gets from the county, for the most of its information as to the responsibility for the accident.

The investigation by the State police, who arrested Daly and Downs, shows that the crew ran by a regularly scheduled meeting point without getting instructions to do so from the dispatcher. Telephones are provided at the turn-outs for communication with the dispatcher's office and the printed rules of the road forbid a crew to go by a scheduled meeting point without getting instructions. The crew, who had relieved another crew but a mile away from the accident, stated that they had seen a car go by while they were waiting for their own car to come, and they supposed it was the one they were to meet. On the day of the accident the cars were off the schedule on account of trouble with the power, but the officials state that the crew knew that the scheduled meeting places were the same. There is a single track line with long turn-outs between Worcester and South Framingham, and double tracks the rest of the way.

The accident has caused much comment throughout Massachusetts, because the Boston & Worcester line is the most advanced example of street railway construction in the State, being longer and running at a higher speed than any other line. It has caused an outbreak of agitation against fast time on trolley lines. Suits for amount aggregating many thousand dollars have been brought against the company because of the accident, although many of the claims for injuries have been settled. The payment of \$1,000 in one case where the patient did not go to a hospital is reported.

## CLEVELAND COMPANY TO APPLY FOR FRANCHISE RENEWALS

The Cleveland Electric Railway Company has started an active campaign in its fight to prevent the building of three-cent fare lines in Cleveland. The company is preparing to ask the Council for extensions to its street railway lines on the following streets: Doan Street, from Superior to Quincy Street, 3 miles; Seneca Street, from Scranton Avenue to Jefferson Street, one mile; Rhodes Avenue, from Detroit Street to Denison Avenue, 3 miles; Denison Avenue, from Pearl Street to Lorain Street, 3 miles. On all of these streets the company already has lines, hence the asking for extensions. The Seneca Street, the Rhodes Avenue and the Denison Avenue routes are the same that Mayor Johnson has planned for three-cent fare routes, and for which bids were opened two weeks ago. The new lines would cross existing lines at numerous points, and would provide new short routes to and from different portions of the city. These advantages the railway company proposes to offer at the existing conditions, six tickets for a quarter and universal transfers. The company is now securing consents of property owners for the new lines. The advantage that the old company has over the new aspirants for the franchise is that by it people will be carried to all portions of the city for practically four cents, whereas the three-cent fare companies can offer the reduced rates only over certain short routes, and a passenger going to another portion of the city would have to pay an additional four cents; or seven cents for an unlimited ride, as against four cents to the old company. Another point in favor of the old company is that the courts have recently decided that consents of property owners can be bought and sold, and can be withdrawn when given. To protect its system, the present company can afford to bid higher for consents than can the bidders for three-cent fare routes. Altogether there is every indication that the old company is preparing to make a stronger fight than ever against the threatened encroachments of the three-cent fare people.

## CONTRACT FOR BONDS ON THE NEW YORK SUBWAY

The Interborough Rapid Transit Company has recently awarded the contract for the rail-bonds required for the contact-rail in the subway to the Mayer & Englund Company, of Philadelphia, for its Protected rail-bonds, which company also received the contract to supply the rail-bonds for the traffic rails. Four bonds will be used at each joint, two under the joint plates and two under the base of the rail. An interesting feature in connection with the application of the two bonds to the base of the rail is the special hydraulic tools that will be supplied by the rail bond maker for this work. The holes for the bond studs will be cut through the rail base by a 100-ton hydraulic punch, designed expressly for this purpose. The bond terminals will then be placed in these holes and compressed by a hydraulic compressor of 35 tons indicated power. As the cutting punch produces a tapered hole, with the large diameter at the top, and the copper in the bond terminals is compressed into the holes against the small end, the contact obtained under the 35 tons pressure exerted is stated to be unusually good and entirely moisture proof.

## STREET RAILWAY PATENTS

UNITED STATES PATENTS ISSUED JULY 21, 1903.

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

734,010. Rocker Side Bearing; Frederick B. Townsend, Chicago, Ill. App. filed May 11, 1903. The combination with a bottom plate of a reciprocating top plate, a pair of interposed rockers and a longitudinally arranged spring and followers mounted in and carried by the reciprocating top plate, the bottom plate having stops to engage the followers.

734,098. Electric Switch; John J. Ruddick, Newton, Mass. App. filed Oct. 15, 1900. A box applied to a trolley wire and containing switch mechanism from which a tappet projects into position to be struck by the wheel to throw the switch.

734,113. Car Wheel; Herbert Bacon, Boston, Mass. App. filed Oct. 30, 1902. A car wheel presenting at its face spaces or pockets and having connected therewith non-metallic retaining plates, and fibrous material packed in said spaces or pockets behind the plates to thereby lessen the noise of cars running on elevated structures.

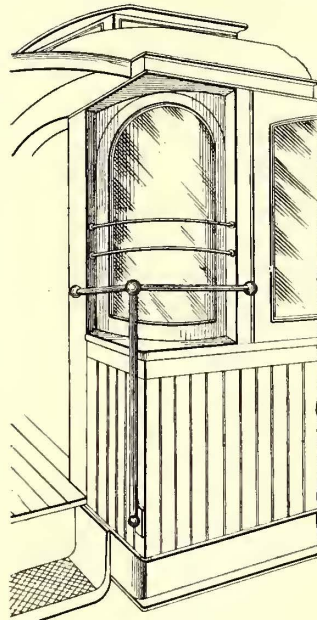
734,181. Car Fender; Frederick R. Keith, Randolph, Mass. App. filed March 25, 1903. Details.

724,200. Device for Decreasing the Noise upon Railroads or Other Rolling Machinery; George W. Stevens, Boston, Mass.

App. filed Oct. 31, 1902. Soft tread wheels running in contact with the car wheels and the railway track.

734,253. Street Car; John A. Brill, Philadelphia, Pa. App. filed April 23, 1902. An open car provided with two steps, one of which is situated below the flooring and within the body of the car.

734,259. Switch Actuating Mechanism; John H. Fitch, Ludington, Mich. App. filed Feb. 16, 1903. Relates to means for moving the switch from the platform of a moving car.



PAT. NO. 734,409

734,362. Car Fender; John D. Price, Cleveland, O. App. filed Aug. 4, 1902. The construction is such that should an obstruction be lying on the track in a position too low to be caught by the forward member, a rear part will be automatically thrown down into position to catch it.

734,409. Car Construction; Antoine B. Du Pont and George J. Kobusch, St. Louis, Mo. App. filed April 6, 1903. A window located in and forming part of the corner of the car.

734,411. Car Fender; Hans P. Eskelsen, Port Clinton, Ohio. App. filed May 16, 1903. A car fender formed of a plurality of spring members, is normally held above the roadbed by the retractile tendency of the springs, and when required for use may be readily depressed by the motormen by means of a foot lever.

734,435. Cable Grip or Clutch Device; Ludwig Schuler and Joseph Ericson, Telluride, Col. App.

filed March 26, 1903. Details of construction.

734,442. Trolley; Harry Spurrier, Montreal, Canada. App. filed Oct. 2, 1900. Comprises means for automatically causing the trolley wheel to turn and meet the curves of the trolley wire simultaneously with the turning of curves in the rails by the car.

UNITED STATES PATENTS ISSUED JULY 28, 1903.

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

734,556. Shoe Brake; Charles W. Hoch, Brooklyn, N. Y. App. filed April 22, 1903. A sudden stopping and derailing device operated by means of a lever from the car platform.

734,560. Car Seat; John S. Johnson, New York, N. Y. App. filed Feb. 2, 1901. Details of construction of a reversible car seat.

734,566. Brake Shoe; John J. Kinzer, Pittsburg, Pa. App. filed Feb. 27, 1903. Consists of an inclosing casing of sheet metal bent into integral back, side and end walls, a sheet-metal lug fixed to the back of the casing, and a filling of frictional material.

734,567. Brake Shoe; John J. Kinzer, Pittsburg, Pa. App. filed Feb. 27, 1903. A modification of the preceding patent.

734,568. Brake Head; John J. Kinzer, Pittsburg, Pa. App. filed Feb. 27, 1903. A brake head having a curved body and face presenting a bearing for a brake shoe, which is substantially continuous throughout the length of the body to thereby strengthen an attached brake shoe.

734,587. Car Fender; Americus Miesse, Lima, O. App. filed Jan. 5, 1903. Fenders provided at each end of a car are so mounted that in whichever direction the car is moved a fender is projected in front while the fender in the rear is retracted; means are also provided to prevent the retraction of the fender at the forward end when the car is moved backward a short distance.

734,609. Wheel; Henry H. Porter, Jr., Chicago, Ill. App. filed Dec. 24, 1901. The wheel is provided with a movable flange disk which is concentrically mounted upon a shaft, and means for moving said disk about its shaft to protrude it outside the edge of the tread of the wheel whereby the wheel may run upon railway tracks as well as on smooth surfaces.

734,611. Car Replacer; William H. Pritchard, Indianapolis, Ind. App. filed Jan. 22, 1903. A car replacer having a longitudinal central depression or channel, wings arched longitudinally, and each having a diagonal offset, the wings having a downward lateral slope from said offset to the channel.

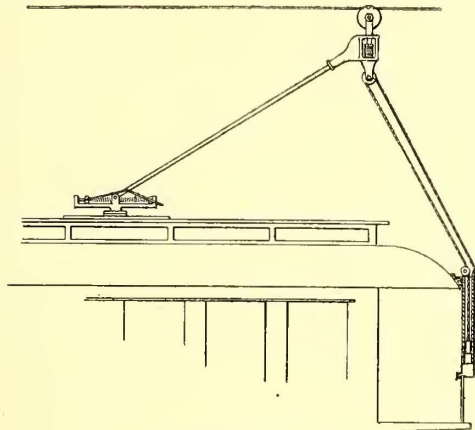
734,723. Switch Lock; Herman H. Louis, Newburg Hamlet, O. App. filed Feb. 13, 1902. Details.

734,745. Brake Shoe; James B. Perry, Buffalo, N. Y. App. filed Dec. 29, 1902. A brake shoe provided with a filling capable

of producing high friction, retaining walls engaging the sides and ends of the filling, and retaining lugs upon the floor of the cavity, embedded in the filling and beveled so as to retain the same in place.

734,830. Car Fender; Delos B. Dibble, Detroit, Mich. App. filed Dec. 8, 1902. In combination with a car fender, a dropping fender hinged to the front edge thereof, means upon the car platform for operating the dropping fender and a rigid hinged connection between the dropping fender and the means for operating it, whereby the dropping fender may be positively operated in both directions.

734,920. Trolley Catch; George W. Maxwell, Los Angeles, Cal. App. filed Mar. 25, 1903. The trolley cord is attached to



PAT. NO. 734,920

the dash board at one end and runs over a pulley near the top of the pole, thence downward to a suspended weight in a casing attached to the dash board, thereby permitting the pole to rise and fall with the irregularities in the wire. When the trolley wheel leaves the wire the dog is released which grips the cord, thus preventing it from running and thereby holding the pole stationary.

### PERSONAL MENTION

MR. THOMAS FARMER has resigned as superintendent of motive power of the Detroit United Railway Company, of Detroit, Mich.

MR. MANSFORD J. FRENCH, who has been acting as the construction engineer for the Oneida Railway Company, of Oneida, N. Y., has resigned from the company to accept a position with the Cleveland Electric Company, of Cleveland, Ohio.

MR. WARREN H. BICKNELL, formerly general manager of the Aurora, Elgin & Chicago Railway, has assumed charge as president of the Lake Shore Electric Railway, of Cleveland. Mr. Bicknell will also become director in the company.

MR. ROBERT A. BYRNES, formerly New York representative of the Ohio Brass Company, has accepted the New York agency of the Northern Engineering Works, of Detroit, Mich., the large manufacturers of hand and electric cranes for power stations and other purposes. Mr. Byrnes will have headquarters at 120 Liberty Street.

MR. F. L. DAME, for the last two years general manager of the Union Electric Company, Dubuque, Ia., has accepted the position of engineer of the local company's committee of the General Electric Company. It is expected that Mr. Dame will assume his new duties with headquarters at Schenectady, N. Y., about the middle of August.

PRIVY COUNCILLOR RATHENAU, one of Germany's leaders in the electrical industry and managing director of the Allgemeine Elektrizitaets Company, of Berlin, is coming to the United States to study electrical progress here. It is also reported that he will resume the negotiations with the General Electric Company, relative to a closer business connection, which were recently conducted in Berlin and were broken off without a result being reached.

MR. C. A. DENMAN, a well-known electric railway operator of Toledo, Ohio, has been appointed superintendent of the Richmond Street & Interurban Railway Company, of Richmond, Ind. For nine years Mr. Denman was connected with the Consolidated Railway Company, of Toledo. Subsequently became general manager of the Toledo, Bowling Green & Southern Railway, and later of the Toledo & Maumee Valley.

MR. HENRY A. EVERETT has taken summer quarters on the Detroit River, a short distance above Detroit. In addition to giving his personal attention to the management of the Toledo

Railways & Light Company, of which he is president, Mr. Everett is temporarily managing the affairs of the Detroit United Railway. Mr. J. C. Hutchins, president of that company, was married a short time ago, and is now in Europe on a wedding trip.

MR. J. A. EMERY has been elected general manager of the properties of the Birmingham Railway, Light & Power Company, of Birmingham, Ala., to succeed Mr. D. A. Belden, who resigned some weeks ago to become president of the New Hampshire Traction Company. Mr. Emery has been with Ford, Bacon & Davis, who are rebuilding the Birmingham system, for five years. He is a technical man and well posted on the work required. He has been in Birmingham for a year and is very popular.

LORD RIBBLESDALE, George Gibb, general manager of the Northeastern Railway; Sir David Barbour, Sir J. Dickson Poynder, and Sir Francis Hopwood, comprising the sub-committee of the Royal Commission on London Street Traffic which was appointed last month to study American street railway systems, will sail for New York September 18. On their arrival at New York, President Vreeland, of the Metropolitan Street Railway system of New York, whom the Commissioners have already met in London, will give them the benefit of his experience. The Commissioners will visit Boston, Chicago, and elsewhere with a view to the adoption in London of any of the valuable features of the street railroads in these cities.

MR. HORATIO BIGELOW, who was recently appointed general superintendent of the Montville Street Railway Company and the Norwich Street Railway Company, of Norwich, Conn., has had several years of practical experience in developing the traction and light properties of Stone & Webster. In 1902 he was appointed assistant to the chief engineer of the Seattle-Tacoma Interurban Railway, after spending several years in the engineering department of the Seattle Electric Company. Later on Mr. Bigelow was sent to Porto Rico to act as manager of the Ponce Railway & Lighting Company. He resigned from Stone & Webster's employ last June to accept the present position which his extensive experience well qualifies him to fill.

MR. DAVID YOUNG, expert street railway adviser with Brown Brothers & Company, of New York, and formerly general manager of the North Jersey Street Railway Company, expects soon to sail for England to make a general inspection of the London tramways in which Brown, Shipley & Company, the London branch of Brown Brothers, are interested. Mr. Young has recently been in San Francisco and Chicago in the interest of his employers. In San Francisco he made a critical examination of the Union Railroads and acted as a member of the board of arbitration chosen to adjust the questions of an operating agreement with the men and of an increase in salary. In Chicago Mr. Young made a thorough inspection of the properties in which Messrs. Brown Brothers are interested.

COLONEL N. H. HEFT, who for several years has been the head of the electrical department of the New York, New Haven & Hartford Railroad Company, severed all connections with that company July 27, when he resigned as president of the Stamford Street Railroad Company. Colonel Heft, according to report, intends to spend a few months resting in Europe. Colonel Heft will continue his interest in the Stamford & New York Railroad Company, of which he is president and which has recently completed a line from Stamford to Portchester. This line, unlike the Stamford and Meriden systems, of which Colonel Heft has also been president, is not controlled by the New York, New Haven & Hartford Railroad Company, but by Colonel Heft and associates.

MR. NEWTON W. BOLEN, the retiring superintendent of the Central and Flatbush Division of the Brooklyn Rapid Transit Company, of Brooklyn, N. Y., was tendered a complimentary dinner Monday, July 28, by his associates in the company in token of their appreciation of him as a man and as one of the executive heads of the company. Handsomely engrossed resolutions and a floral horseshoe were presented to Mr. Bolen after the menu. On the top of the horseshoe was inscribed in red letters upon a pure white background "With Success." Mr. Bolen has been in the employ of the Brooklyn Rapid Transit Company since its formation, and this term of service added to his former connection with companies now a part of the Brooklyn Rapid Transit system, makes twenty-four years' of street railway service in Brooklyn. Mr. Bolen leaves the Brooklyn company to become superintendent of the first district of the railway department of the Public Service Corporation, which controls all of the electric light and street railway companies in Jersey City, Newark and vicinity. The Central and Flatbush division of the Brooklyn company has been divided since Mr. Bolen's resignation. The Flatbush part has been placed in charge of Mr. Kennedy, who is superintendent of the Greenwood division, and the central division has been placed in charge of Mr. Seibert, who now has charge of the Ridgewood division.

## NEWS OF THE WEEK

### CONSTRUCTION NOTES

**BIRMINGHAM, ALA.**—The Birmingham Railway, Light & Power Company has been granted a franchise to lay tracks on Nineteenth Street from its line on Avenue B to the power station to the right of way of the Alabama Great Southern Railroad.

**BIRMINGHAM, ALA.**—It is reported that the Birmingham Railway, Light & Power Company is figuring on the construction of several new lines, one of which is to reach Boyles, the suburb where the Louisville & Nashville Railroad is building new shops. Another is to come via North Birmingham to Thomas, giving a through ride from the city to Boyles, and from Thomas to the same place. The company is also figuring on a 2-mile extension from Bessemer to Jonesville.

**MOBILE, ALA.**—Herbert C. Wright and associates are petitioning the General Council for a franchise for an electric street railway over certain streets in Mobile. The parties are strangers here, and nothing is yet known as to their financial responsibility. The issue of the franchise is uncertain.

**MONTGOMERY, ALA.**—The declaration of incorporation of the Hayneville Railroad Company has been filed. The company is capitalized at \$75,000. The incorporators of the company are: W. P. Russell, W. L. Haigler, E. H. Pritchett, T. R. Meriwether, G. M. Williams, W. B. Brigham, C. W. Garrett, W. Brewer and W. T. Houghton.

**HOT SPRINGS, ARK.**—The Interurban Railway & Power Company is anxious to interest capital in a scheme it has for developing water-power and operating an electric railway and lighting system. The company has secured a 50-year charter in Arkansas, with rights of eminent domain for the lake and a right of way for a car line. The Suachita River is to be dammed four miles from the city limits. W. L. Stebbins gives an estimate of 20,000 hp at ordinary flow, yet says it is safe to figure on a delivery in the power house of not less than 6000 hp at low water. All surveys, maps, etc., have been made.

**LOS ANGELES, CAL.**—The Pacific Electric Railway Company has begun extending its line along the coast from Devil's Gate to Alamitos Bay, a distance of about a mile.

**LOS ANGELES, CAL.**—The Supervisors have granted to J. D. Burkhart a franchise for an electric railway on Santa Fe Avenue from the south city boundary to Slauson Avenue. Burkhart has been running a dummy line along Santa Fe Avenue to the Coursing Park for years.

**LOS ANGELES, CAL.**—Grading has begun on the Brand line to be built between this city and Glendale by the Los Angeles & Glendale Electric Light Railway Company. Ten miles of double track will be laid. Outside the city limits the road will occupy the center of a 100-ft. boulevard, which is being built by L. C. Brand and other property owners of Tropic and Glendale.

**LOS ANGELES, CAL.**—It is stated that the Whittier branch of the Pacific Electric Railway Company, now under construction, will be extended through the La Habra Valley to Riverside, where Mr. Huntington has recently acquired heavy interests in street railway systems. From the valley to Riverside is about 30 miles, and the proposed route runs 3 miles north of Fullerton, 1½ miles north of Placentia and a little south of the Fullerton oil wells.

**LOS ANGELES, CAL.**—Pending the settlement of a suit between the Los Angeles Railway Company and the city of Los Angeles involving the right of the company to construct and operate a street railway on San Pedro Street south of Thirtieth Street and on South Park Avenue from Jefferson Street to the city limits, the City Council has granted the company permission to run its cars over the disputed right of way, provided it will give a \$10,000 bond to remove the tracks if it loses the law suit.

**LOS ANGELES, CAL.**—The Scheller franchise in the First Ward has been sold by the City Council to the Los Angeles Railway Company for \$10,000. The route of the franchise covers Avenue 20, from Pasadena Avenue to Dayton Avenue, thence to Marmion Way to a point about 1225 ft. north of Avenue 45; also beginning at Marmion Way and Avenue 45 and following Avenue 45 southward to Pasadena Avenue, thence eastward to Avenue 50, to Monte Vista Street, to Avenue 61, thence over Piedmont Avenue to Pasadena Avenue; also beginning at the intersection of Dayton Avenue and Avenue 26, and running northwest on Avenue 26 to Huron Street, and on Huron Street to a point about 475 ft. distant.

**MADERA, CAL.**—Articles of incorporation of the Madera Railway Company have been filed. The company has a capital stock of \$50,000 divided into 5000 shares at \$10 each. The directors are: J. C. Campbell, R. W. Campbell, A. C. Towne, J. H. Tate and F. C. Drew. The purpose of the company is to build, equip and construct a railway from the Gowan Station to Knowles Spur, a distance of 2 miles. The principal place of business is San Francisco.

**POMONA, CAL.**—The Pacific Electric Railway Company has purchased a franchise for a street railway in this city. A bond for \$10,000 has been executed to insure the faithful performance of the contract.

**REDLANDS, CAL.**—The San Bernardino Valley Traction Company reports that it hopes to begin work at once on a proposed extension on Olive Avenue.

**HARTFORD, CONN.**—The Railroad Commissioners have approved plans of the Hartford Street Railway Company for extension of lines on Capitol and Huyshope Avenues, and of the Stamford Street Railway Company for an extension from Stamford to Springdale. The requirements are that trolley wires shall be suspended at least 18 ft. above the surface of the street; that the poles shall be 5 ft. from the nearest rail, and that double-truck cars shall be equipped with an effective system of power brakes.

**NEW HAVEN, CONN.**—Newspaper advices say that the New York, New Haven & Hartford Railroad has contracted for a dam at Borden, Conn., to hold 30,000,000 gallons of water, to furnish power for the electric roads in the vicinity of New Haven.

**STAMFORD, CONN.**—A decision of Judge Elmer in the Superior Court, just handed down, granting a charter to build an electric railway from Montowese, a small town a few miles north of New Haven, to Wallingford, 5 miles further north, closes the last gap in the electric railway line from New York to Boston.

**ATLANTA, GA.**—The Georgia Railway & Electric Company has begun work on its proposed line between Atlanta and Marietta. A new bridge will be erected over the Chattahoochie River.

**WALLACE, IDAHO.**—The electric railway for which Herman J. Rossi obtained a franchise is in process of organization. It is contemplated to build the line from Wallace to Gem, Blackbear, Mace and Burke on one branch, being seven miles long; also to build from Wallace to Osburn, Kellogg and Wardner, being a branch thirteen miles long; also to build from Wallace to Mullan, a distance of seven miles. At present it is intended to build the Burke branch this fall and commence on the balance as early as possible in the spring. The capitalization will probably be \$300,000, divided into 30,000 shares of the value of \$100 each.

**JOLIET, ILL.**—F. E. Fisher, general manager of the Fisher Construction Company, which is building the Joliet, Plainfield & Aurora Railroad, says that grading for the first ten miles of this road, between Joliet and Plainfield, has been finished, and that the culverts and bridges are practically all in. Most of the ties are distributed and five miles of the rail laid and the balance of the rails necessary to complete the next ten miles have been shipped from the mills. Gravel for ballasting will be obtained from the Elgin, Joliet & Eastern Railroad, with which a track connection has been made. Mr. Fisher says that the first ten miles between Joliet and Plainfield will be in operation by Sept. 1. Grading between Plainfield and Aurora is about to be begun. Construction work on this road has been very rapid.

**MOLINE, ILL.**—At a recent meeting of the Dixon, Rock Falls & Southwestern Electric Railway Company G. T. Shaw, of Dixon, president of the DeKalb & Southwestern Electric Railway, formerly known as the Northern Illinois Electric Railway, was elected president. The other officers were elected as follows: A. C. Stanley, vice-president; R. L. Leitsch, secretary; O. E. Maxson, treasurer, and H. L. Sheldon, attorney, all prominent business men of Rock Falls. A surveying party under A. M. Shaw has been sent out near Geneseo, and the work of surveying and securing the right of way is being pushed along rapidly.

**MONMOUTH, ILL.**—The Western Illinois Traction Company has commenced work on the Galesburg line. The officers and promoters of this company are: W. B. Young, president; G. W. Gale and W. W. McCullough, vice-presidents; W. H. Woods, treasurer, all of Monmouth, except Mr. Gale, who is from Galesburg. The company was incorporated June 4, capital stock \$500,000. The total cost of the road will be about \$400,000. A \$50,000 guarantee bond assures that cars will be running to Galesburg by January, 1904, also 1½ miles street car line in this city. The power house and main offices will be in Monmouth.

**MT. VERNON, ILL.**—The certificate of incorporation of the Southern Illinois Electric Railway Company has been filed in the County Recorder's office at Belleville. The company is capitalized at \$50,000. The company will build from East St. Louis through St. Clair, Clinton, Washington, Marion, Jefferson, Hamilton and White counties to a point at or near Maumee, on the Wabash River. The incorporators are: John R. Piercy, George F. Ward, Samuel Casey, Louis G. Pavey, Samuel T. Maxey and Albert N. Johnson, of Mt. Vernon.

**BLUFFTON, IND.**—There are both rumors and indications that the Muncie, Hartford City & Ft. Wayne Railway will not be built into Ft. Wayne, but that it will have its terminus in this city, where it will connect with the Kokomo, Marion & Western Railway, which is building from Kokomo through Bluffton and Decatur to Lima, Ohio. Ft. Wayne will be reached by way of Decatur and by an interurban road that is building from Dayton to Ft. Wayne. This change is due to the fact of the purchase of the line by the Union Traction Company.

**CHESTERTON, IND.**—The Town Trustees have granted a fifty-year franchise to the Chicago, Indiana & Michigan Traction Company. The franchise permits the construction of electric lines on any street in the town.

**DANVILLE, IND.**—The Town Board has granted an amended franchise to the Indianapolis-Danville-Rockville Electric Railway which calls for the use of three streets, provides that work shall begin Aug. 1 and be completed and in operation in one year. The power house and car house are to be erected within half a mile of the city. A bond of \$5,000 has been filed to insure compliance with the terms of the franchise.

**ELWOOD, IND.**—The Union Traction officials are planning for the new car houses and shops which will be located in North Anderson. Architect Jeckel is making the plans for the new buildings. The company will probably be ready to receive bids in a very few days.

**INDIANAPOLIS, IND.**—A novelty in interurban railway construction in Indiana will be introduced by the Indianapolis & Martinsville Railway on its extension from Martinsville to Bloomington by the building of a tunnel through the hills in the northern part of Monroe County. This range of hills in Monroe County is over 200 ft. in height, and the tunnel will be about 1,500 ft. in length. It will be constructed through solid sandstone, and will necessitate an expenditure of between \$75,000 and \$100,000.