

# ELECTRIC RAILWAY JOURNAL

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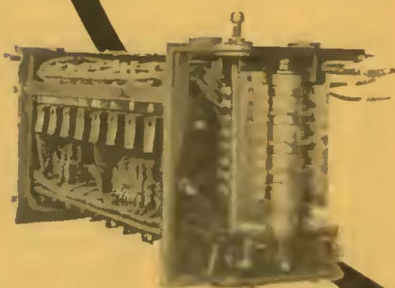
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# ELECTRIC RAILWAY JOURNAL

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## CONTENTS

Editorials .....1031

Three-Door Trailers in Toronto .....1033  
Operated on the pay-as-you-pass plan and have three doors of which one can be changed by the conductor from entrance to exit. Run in conjunction with Peter Witt motor cars.

Co-ordinated Operation of Street Cars and Buses Urged 1035  
By GEORGE H. DAVIS.  
A statistical picture of how the public travels. In 1922 the per capita rides averaged 1,623 passenger-miles in all conveyances. Street railway development has lagged. Opportunity still waits to provide monopoly service.

Subway Construction Costs Have Increased .....1037

Working Off the Rough Edge on Prospective Motormen 1037

Interlocking Traffic Signals Hinder Railway Operation 1038

Liverpool, Glasgow, Edinburgh Compared .....1039  
Statistics on traffic, fares and other phases of tramway and bus operation in these cities are given in report to New York Commission. Liverpool and Glasgow developing rapid transit surface lines.

Carrying Safety to the Public—VII .....1041  
By C. W. PRICE.

New Transfer System for New Orleans .....1043  
Present system involves 12 per cent misuse. Requirements complicated by necessity for second and third transfers and reversal of direction.

Cleveland Trailer Being Changed .....1044

Benefits of Subdividing Operating Expense Accounts .....1045  
By CLIFFORD A. ELLIOTT.  
Experience of eight years with an extensively subdivided series of accounts indicates a number of advantages for it. Through its use specific cost figures for any purpose are always available.

Crossing Protection on High-Speed Railway .....1047

Fare Collection at Providence .....1048

The Readers' Forum .....1049

Association News and Discussions .....1050

American Association News .....1051

Maintenance of Equipment .....1052

News of the Industry .....1055

Financial and Corporate .....1061

Traffic and Transportation .....1064

Personal Mention .....1067

Manufactures and the Markets .....1069

## The Index

### Next Week

NEXT week's issue of ELECTRIC RAILWAY JOURNAL will contain the complete index to Volume 61, covering the first six months of 1923. The index will give references to every article appearing in the JOURNAL during this time, classified by subjects as well as by geographical location. There is a separate author index and a list of personals. Altogether between 3,000 and 4,000 entries or cross references are included.

The publishers of ELECTRIC RAILWAY JOURNAL have for many years followed the same consistent policy of giving such careful attention to the form in which the references are listed that only a minimum of effort is needed to locate a desired subject.

To make it still easier for the reader unfamiliar with the system of indexing, instructions are printed at the beginning of the index explaining not only the method adopted but giving a list of keywords to assist in locating information.

If you want to get the most good from the service the JOURNAL is furnishing be sure to look out for the index next week and then preserve it where it will be readily available when you want information about any electric railway subject. The index is always bound in the front of the last issues of June and December. When having your volumes bound be sure to place the index in the front of the volume, where it is most convenient for use and where it serves also as a title page.

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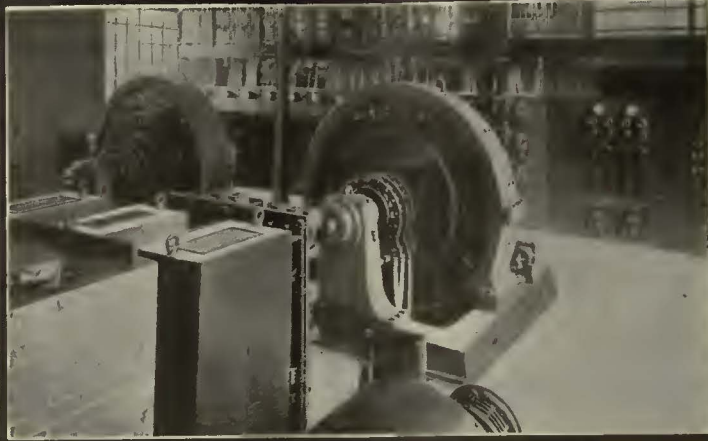
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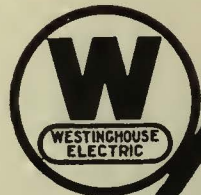
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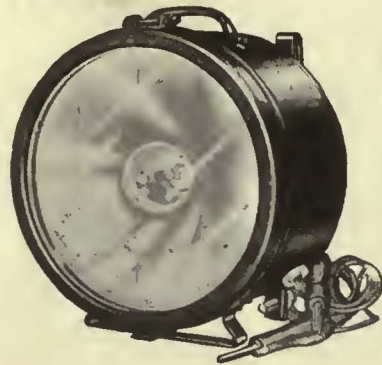
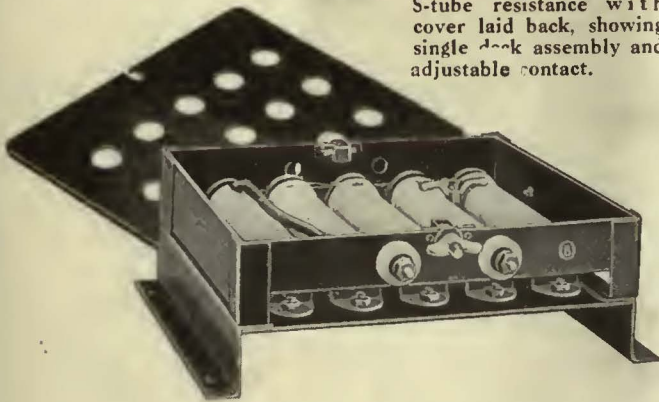
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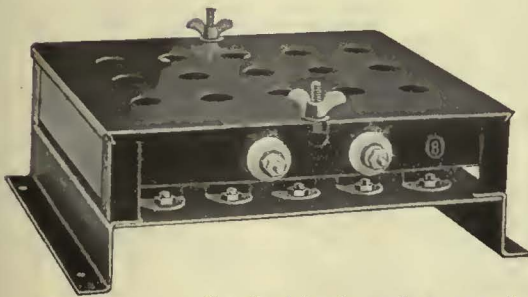
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# Westinghouse

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## Improved Resistances for Imperial Arc or Incandescent Headlights—



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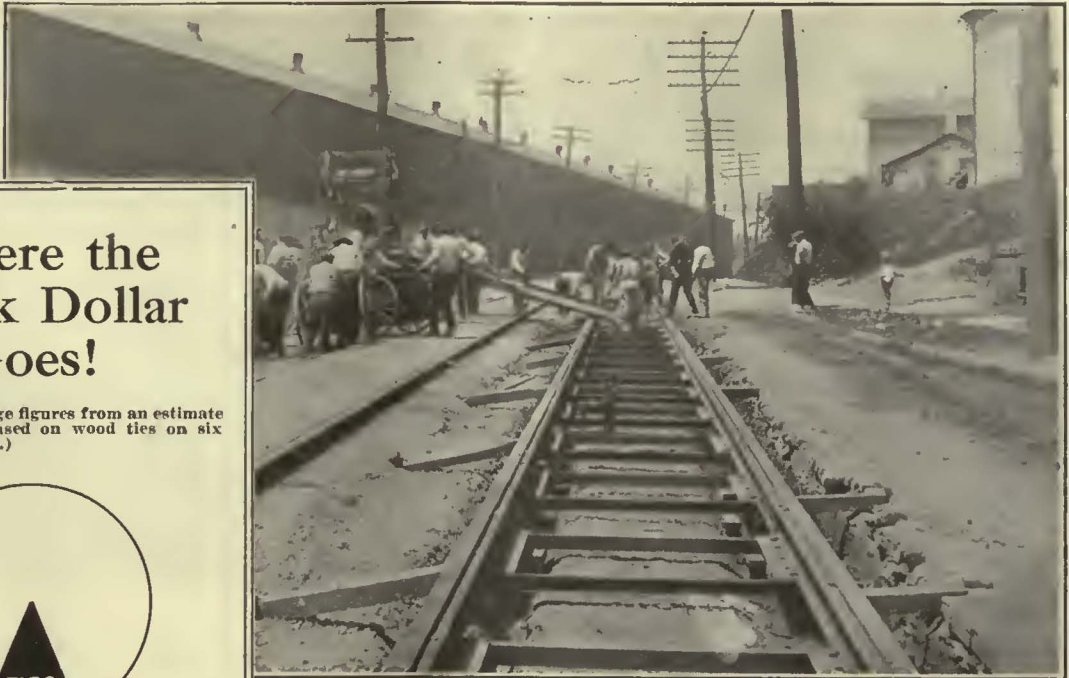
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(Note.—Percentage figures from an estimate to base of rail based on wood ties on six inches of concrete.)



Re-orders are nearly 86% of our 1923 first half business because first orders average smaller than re-orders—for only after trial do we expect, or get, all of our customers track reconstruction program. This pleases us, for it confirms our high opinion of Steel Twin Tie Track.

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THE INTERNATIONAL STEEL TIE CO.  
Cleveland

# Steel Twin Tie Track

# The International Tie of Uniform Quality



*The Stamp of Quality  
The International Dating Nail*

—and Every  
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is a Standard  
Specification Tie

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To substantiate our willingness to assume full responsibility for our ties—every International Tie is permanently marked with the I. C. C. Co. Dating Nail. This identification is particularly important to the tie consumer because the real value of high grade timber and effective penetration of International Treatment can only be realized after many years.

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*Just specify the timber, the grade and the treatment desired—we will ship the ties exactly as you specify them.*

## International Creosoting & Construction Co.

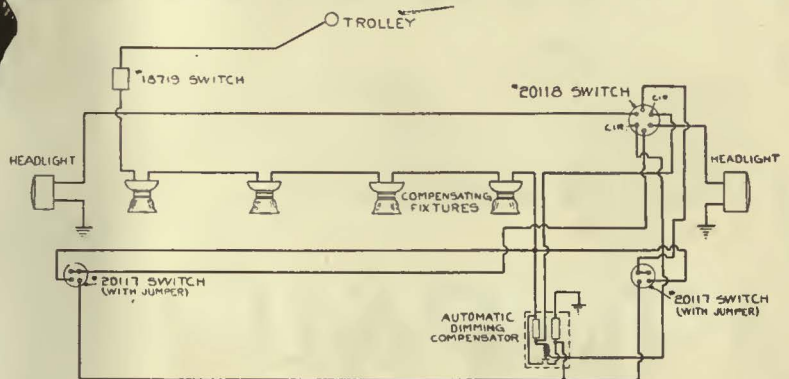
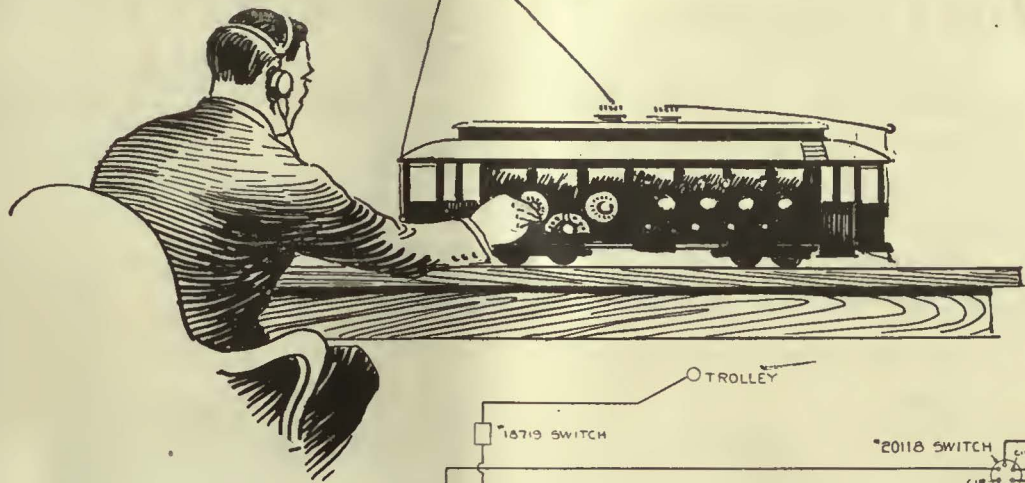
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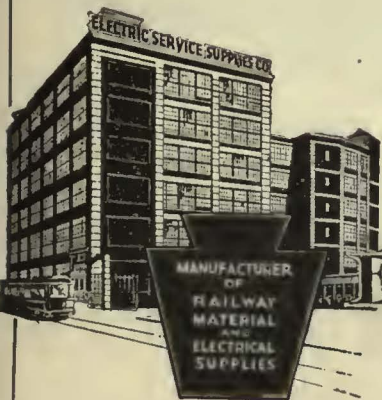
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## List of Keystone Specialties required per car

- 2—Golden Glow headlights
- 1—Automatic compensator dimmer
- 4—Compensator lighting fixture
- 2—"Bright" and "Dim" switches
- 1—DP, DT switches

Diagram shows wiring connections for double end car with two headlights, either headlight operating in series with one circuit of interior car lights, equipped with compensating fixtures including switches for operating opposite headlight and using type USA automatic compensating-dimming resistance.

This makes a single, fully compensated circuit which provides interior car lighting and headlight and permits the dimming of headlight without affecting car light.



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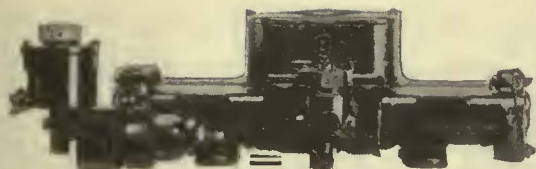
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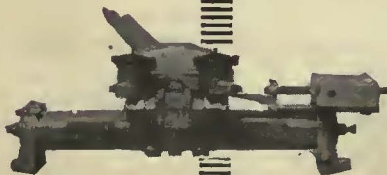
- Door and Step Control
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- Safety Interlocking Door Control
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- Motorman's Signal Lights

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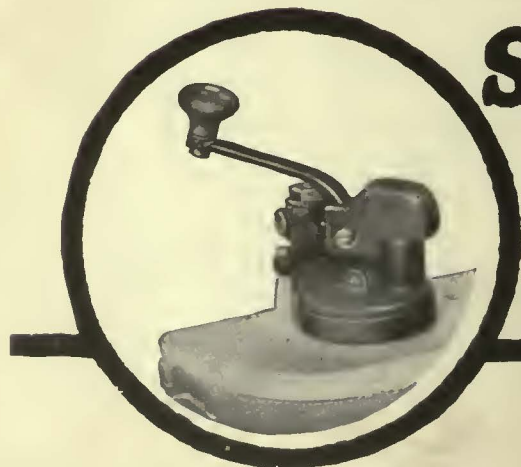
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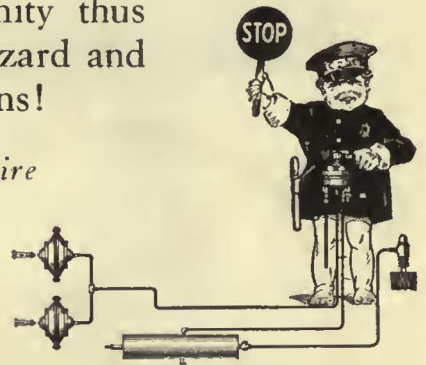
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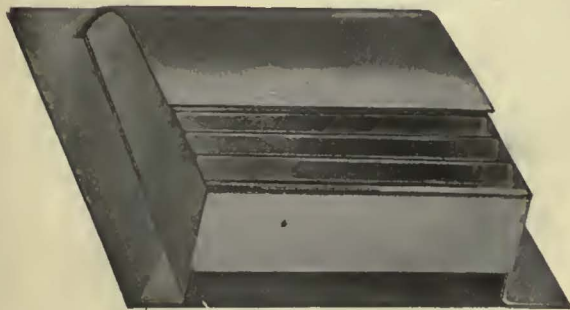
## All Toronto Cars are equipped with N-L Indicating Signals



Every car operated by the Toronto Transportation Commission is equipped with N-L Indicating Signals and, the greater percentage of them, with N-L Ventilators and Sanders.

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N-L Ventilators have been in service for more than ten years on many of the finest cars built.



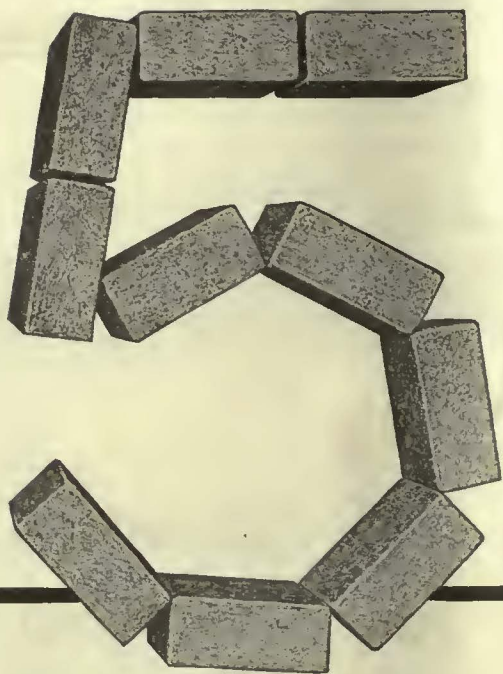
N-L Type "C" Ventilator

N-L Ventilators lie low on roof. Ventilate well. Weatherproof. Neat in appearance. Easy to apply.

There are N-L Sanders for every type of car and special equipment  
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Concrete,  
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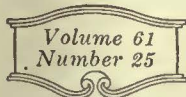
New York, Saturday, June 23, 1923

# Electric Railway Journal

Consolidation of *Street Railway Journal* and *Electric Railway Review*

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*



## Maintenance of Men as Well as Maintenance of Plant to Be Considered

**P**ROBLEMS of maintenance usually are confined to the material features of the railway's equipment; but another element that merits careful consideration was again brought to the attention of the industry in the address of Dr. Alden Coffey before the street and interurban section of the Southwestern Public Service Association, abstracted in this week's issue.

Good maintenance, and in fact good work in any department, requires good health of the individual. It is entirely a personal problem, and each case must be handled on its own merits. The best way to have good health is to educate the employee to pay personal attention to it. But a railway needs to start right by employing only those men who can pass a suitable physical examination. Then periodic examinations will reveal any changes for better or worse in the well-being of each employee.

The writer points out that conservation of health should apply not only to the workman, but to all in the employ of the company from the top down. The value of this is obvious, since a man cannot give the best attention to the problems at hand if he is sick. He is more likely to be hard to do business with, and this reacts on those who must work with him.

Numerous direct financial savings are cited in favor of the plan, such as reduced turnover of labor, since those who are hired have a greater chance of remaining at work. These results also reduced compensation for accidents. Incidental advantages come in better relations between motormen and conductors and the public. When it is remembered that the trainmen are the company's principal salesmen, the importance of having them present the best appearance and greatest show of cheerfulness is evident.

## Stored Cars Constitute Large Fire Hazard

**T**HE greatest fire risk on an electric railway, because representing the greatest aggregation in inflammable material, is usually the carhouse. Several times a year it is demonstrated that a carhouse full of rolling stock furnishes ideal conditions for a conflagration that quickly gets beyond control and consequently wipes out the structure and reduces the contents to a tangled mass of scrap. Many steel cars include considerable inflammable material in their construction. Hence even though isolated, each car itself is a considerable fire hazard. But when a large number of cars are within an inclosure, which confines the flames, and close to other inflammable material, such as wood, oil, paint and waste, a condition is produced which is extremely favorable to the rapid spreading of a fire.

Unfortunately also there are conditions in and around carhouses and shops such as bare 600-volt conductors

that are favorable to the starting of fires. These facts are not mentioned because they are new. But, as a recent article in this paper showed that a number of companies are favoring inside over outside storage for cars, the matter of carhouse fire risk remains a live topic. Though probably more progress has been made in intelligent protection against the fire hazard during the past five years than during any previous decade, more remains to be done.

One of the most disastrous carhouse fires within the last two years was that of the Devon carhouse of the Chicago Surface Lines on Jan. 26, 1922. This case illustrates how rapidly such a fire spreads and how complete is the destruction. Ninety cars were destroyed in this fire, which wiped out one-half of the structure. Although the Devon carhouse fire was spectacular because of the large number of cars lost, it is but one example of many that might be cited to show how rapid is the spread of fire in the average carhouse, which is often the case in spite of what is usually considered adequate fire protection.

Besides the monetary loss from the destruction of cars, which may be covered by insurance, there is another loss which may be nearly as large as the value of the car, but is usually not considered a subject for insurance. This is the loss in revenue because of the lack of cars until those burned have been replaced. This emphasizes the need for the adoption of all practicable safeguards against the fire loss of any considerable number of cars.

## Customer Ownership Is an Excellent Means of Improving Public Relations

**W**E ALL want good service, and most of us are willing to pay what we think a fair price for it; but how many of us know what some of the seemingly minor demands made of the utilities mean in the matter of expense? So long as the other fellow has to foot the bills we do not care, provided the service continues as we normally expect it to. The only time it is realized that there is something wrong is when the service deteriorates and the utility asks for more revenue in order to put the quality back where it should be. Even then the usual thought is that the corporation can find the money somewhere or else cut off some of the always "excessive dividends."

Several speakers at the recent convention of the National Electric Light Association emphasized the value of customer ownership in developing better public relations. The problems involved in providing satisfactory utility service, while at the same time earning a reasonable return on the investment, are then brought home to the customers.

Make the customer an owner of the property, keep him informed constantly through financial statements and other timely material addressed to him as a stock-

holder, and then let him know that the attacks made by demagogues are attacks against *his* business, and are likely to jeopardize *his* investment, and there will not be so much enthusiasm for the corporation baiter, whether it be politician or newspaper.

One phase of the matter must not be overlooked, however. The customer will not stand for poor service just because he may be a stockholder. It is not likely to be a major investment with him, and when the poor service becomes apparent he forgets his partnership and complains as any ordinary customer. Of course, no management should be misled into thinking that poor service ever pays, whether or not the customers participate in the profits. However, it is important to keep quality of service close in mind, for a few instances of notably poor service may undo much of the work of a long and carefully-planned ownership campaign. In other words, make the service such that the partners can be proud of their interest in the enterprise, not ashamed of it, among the circle of friends in which they are going to take the part of the utility.

Furthermore, customer ownership challenges utility executives to be very conservative in the extent of their financing, lest over-capitalization result in failure to earn dividends and the reverse of the expected advantage from customer ownership.

### Benefits of Surface Car Subways Not All for Electric Railways

RECENTLY there was a discussion in this column on the cost of subway construction for surface cars, in which it was pointed out that surface car subways are not an economic advantage to the electric railways using them. What, then, is the argument in favor of this form of construction? Repeatedly it has been urged that the street cars should be taken off the streets to reduce traffic congestion, as though the street cars are the primary cause of the congestion.

While street cars, or any other vehicles in the streets, are a cause of congestion, they do not compare with some other users of the streets. Daniel L. Turner, in his report to the New York Transit Commission abstracted in this paper on June 9, states that touring cars take up in our congested streets nine to thirteen times as much space per passenger carried as the most economical street car. Taxicabs, he says, are still worse. His conclusion is that it is such extravagant users of the streets that cause the difficult traffic conditions.

If the street cars are taken off the streets, instead of providing a true relief of congestion, the result is to give up more space to the less efficient passenger vehicles. The street car rider, who, by virtue of his number, has the logical right to the street space, is inconvenienced by having to walk, sometimes several blocks, to a subway station in order to get his car. If he has been accustomed to take a short ride in the district where the cars have been put underground, the chances are that he will walk the entire distance rather than go to the trouble of walking a good share of the way to a station and then climbing down and up stairs in the bargain.

In return for this inconvenience to the greatest users of the streets, they have the privilege of paying more for their car rides, either in increased fares or increased taxes, while the beneficiaries frequently demand, and sometimes get, added free garage facilities in the form

of additional parking space on portions of the streets vacated by the railway.

It is about time for the public to wake up to this condition. It is no more logical to put the street cars off the streets than to do the same thing with automobiles and taxicabs. One main reason that subways are proposed for the railway rather than for these other vehicles, is that with the latter there is no convenient corporation that can be made the collector of the tax on the public necessary to finance the proposition.

Why not put the matter before the public in this light and then see if the citizens will be so enthusiastic about a public improvement of this character? It is another matter of education.

### Is Enough Thought Given to the Comfort of Passengers?

WHEN street railways were younger and were fighting actively to obtain business a great deal of attention was paid to the little details that distinguish comfort from purely utilitarian purposes. As the demand for local transportation became better established passengers came naturally to the street cars and less attention was paid to methods of inducing people to ride.

When the era of increasing costs arrived many managers considered it advisable, among other economies, to eliminate certain refinements which made for comfort. Cane seats replaced the earlier upholstered seats, and finally in some instances these gave way to wooden slat seats. The spacing between seats has often been reduced so as to take care of more passengers, but the knee room has become uncomfortably small for tall persons. On some roads the once familiar cross seats gave way to the longitudinal type, despite the very clear public disapproval of side seats, for the reason that the railway man saw in this change a means to give the same seating capacity while permitting of a greater standing load in addition. The old-fashioned open car, although an accident breeder and requiring duplicate equipment, was liked by the public on account of the view obtained and the fresh air. This, too, is passing away, no new orders for this type having been placed for several years.

Changes such as these have followed one after another, until in many cities, even apart from the influence of the automobile on the kind of transportation comfort demanded, it scarcely can be said that riding in the street cars is a diversion to be indulged in for the pleasure of it.

In contrast to this, it is interesting to note that recently the London Underground system has been making experiments with various types of car, whose major differences appear to the public to be in the interior decoration and in the quietness. Another indication of the same thought is the use of plush-covered seats in safety cars of the North Shore Line used in Milwaukee. These innovations are made primarily to attract business.

If cars equipped with features of this sort for comfort of the passengers perform in other respects as well as the cars not so arranged, there can be no question but that additional traffic can be attracted. Whether the amount of this business is sufficient to justify the increased expense of maintenance is another matter. These two companies, at least, think the idea is well worth trying.



The Three-Door Arrangement Speeds Up Movement of Passengers

# Three-Door Trailers in Toronto

Operated on the Pay-as-You-Pass Plan and Have Three Doors, of Which One Can Be Changed by the Conductor from Entrance to Exit—Run in Conjunction with Peter Witt Motor Cars—A Fast Schedule Is Made

THE traffic on Yonge Street, Toronto, and on some other streets in that city is very heavy during rush hours, so much so that trailers are used, attached to the Peter Witt motor cars during the busy morning and evening hours. Since it took over the street railway system in September, 1921, the city has added 450 cars to its rolling stock equipment. In 1921-22 it purchased 190 motor cars and 60 trailers and in 1922-23 100 motor cars and 100 trailers were added.

All of the trail cars are center-entrance, but in the last 100 trailers added there are three side doors instead of two, to increase their loading and unloading capacities. With the wide doors of the Peter Witt motor cars it is possible for two streams of passengers to enter and two to leave the car at the same time, and as motor car and trail car have equal carrying capacity it was found desirable to have the entrance and exit capacities of the trailer the same as those of the motor car to prevent a slowing up of running time.

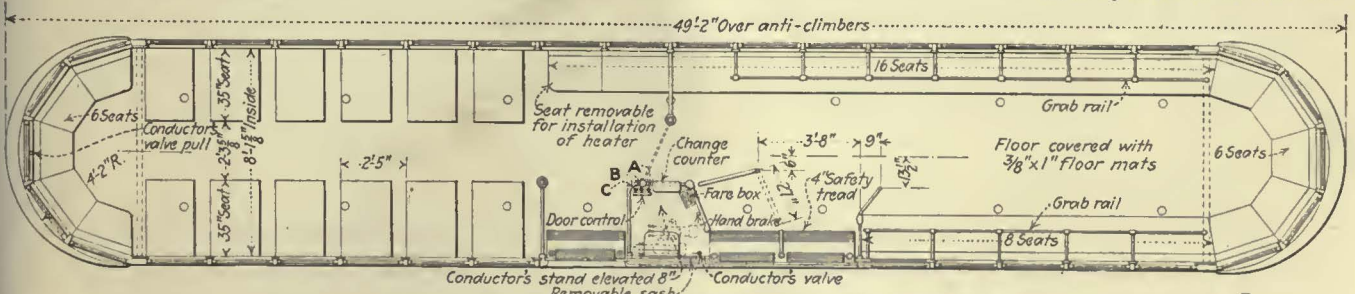
This is accomplished by the three-door arrangement. In this arrange-

ment the door to the rear in the trailer is always used as an exit, while the door nearest to the front is always an entrance. The center door, on the right of the conductor's stand, may be used either as an entrance or as an exit, but not as both at the same time. It is changed from one to the other by the conductor, who alters the position of a movable barrier as the character of the traffic demands.

When the trailer is inbound during the morning rush period the two front doors are used as an entrance and accommodate two streams of passengers, the barrier being set so that passengers turn slightly to the right as they enter at either door. When the trailer reaches the central or unloading zone on its in-bound trip the barrier is altered so that passengers from the forward, or unpaid section of the car, may deposit their fare and leave at the door to the conductor's right without conflicting or causing aisle interference with the passengers leaving from the paid, or rear, section of the car, who use the door to the conductor's left. The movable barrier is operated by a lever at the con-



Center Well, Stanchions and Swinging Barrier, Grab Rail Over Longitudinal Seats, and Slat Seats



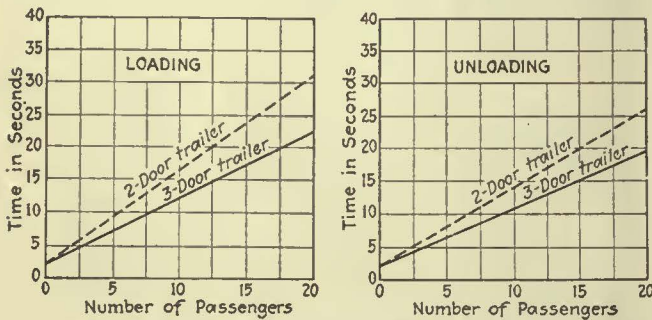
Plan of Three-Door Toronto Trailer, Showing Swinging Barrier for Center Door

ductor's left. The doors are each equipped with a door engine, and the valves controlling the engines are located in the conductor's stand. The three valve handles are placed so that it is as convenient for the conductor to operate one or three, or any two of them, as conditions warrant.

The trailer doors are interlocked with the motor car control, and a light is being installed at the conductor's stand, which will burn when the entrance doors of the motor car are open. It is considered that this signal will assist in speeding up the service.

Since the fall of 1921, the Toronto Transportation Commission has operated sixty trailers which have a single entrance door to the conductor's right and a single exit door to the conductor's left. The first of the 100 new three-door trailers went into service on Feb. 26, 1923, and all are now in operation.

Two charts are published on this page, one showing loading time and the other showing unloading time for the two types of trailers. These charts are based



The Charts Show the Reduction of Time in Loading and Unloading for the Three-Door Trailer

on about 600 observations with each type of trailer, but the data were produced after the three-door type had been in operation only a short time. It is expected that the new equipment will show still further savings in loading and unloading time as passengers and conductors familiarize themselves with it.

The cars are not supplied with hand straps, but the end of the car with longitudinal seats has a grab rail on each side, as shown in the accompanying plan. This grab rail is at the height of the usual strap handle, or about 5 ft. 10 in. The upper window sash in this car is deeper than usual to permit a good view outside to standing passengers. Specifications giving other details of the cars follow:

GENERAL DIMENSIONS OF TRAILERS

Length over vestibule	48 ft.
Length over bumpers	49 ft. 2 in.
Width over side sill angles	8 ft. 4 in.
Width over lower deck eaves	8 ft. 6 in.
Width inside of side lining	8 ft. 1 1/2 in.
Width between stanchions, exit doors	2 ft. 6 in.
Double doors	5 ft.
Height from rail to top of roof	10 ft. 4 1/2 in.
Height from rail to top of ventilator	10 ft. 4 1/2 in.
Height from top of rail to top of floor	2 ft. 4 in.
Center to center of truck	26 ft.
Center to center of side posts	2 ft. 5 in.
Height from top of rail to underside of side sill at sliding doors	10 in.
Step heights	14 1/2 in. and 13 1/2 in.
Diameter of wheels	22 in.
Weight	26,300 lb.
Seating capacity	60

DETAILS OF CONSTRUCTION

The side sills are of angle iron construction and the center sills extend from bumper to bumper. The under-frame is reinforced by diagonal bracings, which are connected to the center sills, side sills and other members. Posts and carlins are of T sections. The side girder plates are 3/8 in. thick, American open hearth cold

rolled and box annealed steel. The letterboard plates are No. 16 gage and the dash panels are No. 13 gage.

For the roof construction white ash carlins are bolted to the steel carlins and are also used midway between the steel carlins. The roof boards are of 1/8-in. poplar, 2 1/2-in. face tongued and grooved, except the hood roof, which is double sheathing 3/4 in. thick. The roof is covered with No. 8 cotton duck and No. 22 gage copper gutters are used over the doors.

The main body floor is double thickness with three-ply waterproof paper laid between the two layers of flooring. The lower floor is laid diagonally and is 3/8 in. thick by 2 1/2-in. face red pine. The upper floor is 3/4 in. thick by 2 1/2-in. face hard maple except at the mat strips, where the floor is 3/4 in. thick and of hard maple. All flooring is tongued and grooved. In the aisles and standing spaces 3/4-in. x 1-in. hard maple mat strips are used. These are spaced 1/2 in. apart and are 1/8 in. high.

The interior of the car is finished in clear birch, all molding being of the plain sanitary type. The headlining is regular quality 1/8-in. Agasote. The forward part of the car has longitudinal sanitary slat seats and the rear part of the car has cross seats, also of slat construction. The cross seats are equipped with Ottawa Car Manufacturing Company's pressed steel pedestals, with hinged cushions and wooden hand rail on the top of the back. The cross-seats are bolted to pressed steel brackets, which are riveted to the side plate girder. All stanchions and rails are of hard drawn aluminum, which contains 1 1/2 per cent manganese. Window guards are attached to the side posts and are made of Clinton electrically welded 2-in. square mesh with 1/2-in iron pipe frames.

The trucks have a 4-ft. 2-in. wheelbase and 22-in. diameter single plate chilled cast iron wheels with 2 1/2-in. tread. The journal bearings are 3 1/4 in. x 7 in. and A.E.R.A. standard E-4 axles are used. The trucks have annealed cast steel side frames and are equipped with roller bearings. The miscellaneous equipment includes:

Air brakes:	Canadian General Electric Company's automatic air brakes with conductor's emergency valve handles located at conductor's stand and at rear of trailer.
Hand brakes	Peacock
Couplers	Tomlinson
Door and step mechanism	Consolidated Car Heating
Buzzers	Consolidated
Signals	Consolidated
Tall lights	Nichols-Lintern
Shades	None
Signs	Hunter
Lighting:	Fifteen 46-watt lamps in Safety Car Heating & Lighting Company's fixtures, with Jefferson Glass Company's shades.
Ventilators	Nichols-Lintern
Heaters	Peter Smith No. 2P
Enamel	Pratt & Lambert

Heaters for Drying Out Generators

THE MOIST climate of Havana requires special precautions in the use of electrical apparatus which has been left idle for any considerable time. In fact, the average humidity is so high that if a generator in the station should not be run for a week or more it is often necessary to give it a drying out run before it is fit to carry full voltage. Various ways of protecting the generators in the power station of the Havana Electric Railway against moisture were tried without much success until electric heaters were installed, just below the stator core. These heaters are run all the time that the generator is idle and keep the temperature of the winding well above that of the air. All of the generators in the power station of the company are now so equipped.

# Co-ordinated Operation of Street Cars and Buses Urged

A Statistical Picture of How the Public Travels—1,623 Passenger-Miles per Capita in 1922 in All Conveyances—Street Railway Development Has Lagged—Opportunity Still Waits to Provide Monopoly Service

By George H. Davis

Ford, Bacon & Davis, Inc., New York, N. Y.

POSSIBLY there have been fewer advances in the business of city street railway passenger transportation during the past twenty years than in almost any of our other basic modern industries. While it was hardly to be expected that the rate of progress of the decade from 1890 to 1900 could be maintained, yet during the last ten years, at least, the industry has permitted other types of transportation to make marked inroads upon its business. That there have been real obstacles to progress in the electric railway industry all will admit, but a comparison of the type of electric street cars in use in 1902, which was the product of more than ten years of development, with that in use today, and of the passenger automobiles in use on those respective dates, is significant.

We are inveterate travelers. In fact, we almost live in conveyances. This is confirmed by a study of transportation records, largely obtained from government sources, which give the surprising information that the passenger-miles traveled per capita per annum by the population of the continental United States in all conveyances, including steam railroads, street railways, automobiles and miscellaneous conveyances, were approximately as follows: For 1902, 620; for 1907, 766; for 1912, 851; for 1917, 1,149, and for 1922 as much as 1,623. It will be noted in Tables I and II and in the diagram that the increase in total miles per capita in the period 1902-1907 is 24 per cent; 1907-1912, 11 per cent; 1912-1917, 35 per cent; 1917-1922, 41 per cent, and for the entire period 1902-1922, 162 per cent.

For street railways, the increase in passenger-miles per capita in the period 1902-1907 is 48 per cent; 1907-1912, 16 per cent; 1912-1917, 11 per cent; 1917-1922, 4 per cent, and over the twenty-year period it has been 98 per cent, while for their principal competitor, the passenger automobile, this increase has been from 1902-1907, 267 per cent; 1907-1912, 573 per cent; 1912-1917, 357 per cent; 1917-1922, 133 per cent, and for the twenty-year period the extraordinary amount represented by 26,100 per cent.

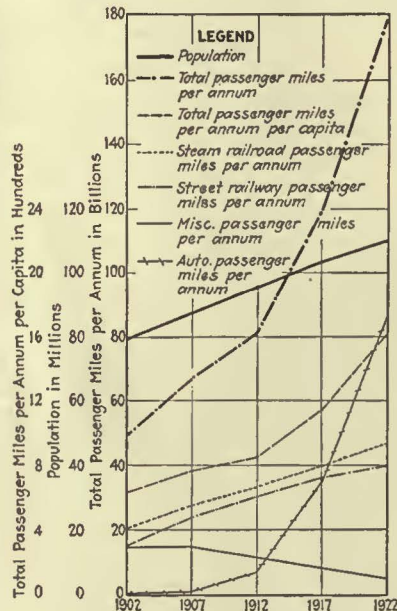
The transportation industry as a whole, over the

period in question, has been aggressively and profitably conducted. The departments of transportation, however, that relatively have lagged behind in rate of increase have been the steam railroads, the street railways and animal power conveyances.

The enormous potential profit in the means and use of transportation has been thoroughly realized by the manufacturers of passenger automobiles, and as a whole the automotive industry has catered most completely to the pleasure and convenience of the traveling public. The volume of this business indicates its importance. The wholesale value of passenger automobiles and parts manufactured in the United States in 1921 was about \$1,666,140,189. It is now probably the second industry in the country in value of products. Slaughtering is the first industry, its products amounting to \$2,200,942,000.

The present financial condition of the street railway industry is due largely to the lack of progress on the part of the companies in that they did not provide the kind of service demanded by the public, especially in the way of quiet, safe, convenient, flexible, comfortable and rapid transportation. In making this statement I am not unmindful of the vicissitudes through which the industry has passed during the past ten years. But

year. These figures have been checked in various ways and are believed to be reasonably close to the actual values.



Graphic Statistics of Passenger Travel in the United States

TABLE I—POPULATION AND PASSENGER-MILES PER ANNUM AND PER CAPITA, CONTINENTAL UNITED STATES—ALL CONVEYANCES

Year	Population Continental United States	Passenger-Miles				Total	Per Capita
		Steam Railroads	Street Railways	Automobiles	Miscellaneous		
1902	79,000,000	20,000,000,000	14,580,000,000	201,000,000	14,200,000,000	48,981,000,000	620
1907	87,320,000	27,719,000,000	23,800,000,000	995,000,000	14,400,000,000	66,914,000,000	766
1912	95,410,000	33,132,000,000	30,040,000,000	7,070,000,000	11,000,000,000	81,242,000,000	851
1917	103,500,000	39,740,000,000	36,200,000,000	35,000,000,000	8,000,000,000	118,940,000,000	1,149
1922	110,000,000	47,000,000,000	40,000,000,000	86,500,000,000	5,000,000,000	178,500,000,000	1,623

Note: The amounts in the various columns are based upon United States Census reports of 1902, 1907, 1912, 1917, various Interstate Commerce Commission reports, various reports by the National Automobile Chamber of Commerce, miscellaneous

sources, and estimates. The passenger-miles for the street railways were calculated on the basis of an average ride per passenger of 2½ miles, and for the automobiles on the basis of 1.75 passengers per automobile-mile and 4,000 miles per automobile per

TABLE II—PASSENGER-MILES PER CAPITA PER ANNUM AND RATES OF INCREASE, CONTINENTAL UNITED STATES—ALL CONVEYANCES

Year	Steam Railroad	Percentage Increase Five Years	Street Railways	Percentage Increase Five Years	Passenger Automobiles	Percentage Increase Five Years	Miscellaneous	Percentage Increase Five Years	Total	Percentage Increase Five Years
1902	253		184		3		180		620	
1907	318	26	272	48	11	267	165	-8	766	24
1912	347	9	315	16	74	573	115	-30	851	11
1917	384	11	350	11	338	357	77	-33	1,149	35
1922	427	11	364	4	786	133	46	-40	1,623	41
Period				Percentage Increase	by Decades	and for	Twenty-Year	Period		
1912-1902	37	..	71	..	2,367	..	-36	..	37	..
1922-1912	23	..	16	..	962	..	-60	..	91	..
1922-1902	69	..	98	..	26,100	..	-74	..	162	..

Note: The basis for the figures in this table is given in the note under Table I.

the popularity, in our largest cities, of motor buses which have comfortable seats and de luxe furnishings and make convenient delivery shows that people are willing to pay for this kind of service. They have without doubt come to stay.

#### ADVANTAGES AND POSSIBILITIES OF ELECTRIC RAILWAYS

The distinct operating advantages of street railways are:

1. A steel roadway, which is far superior in smoothness and durability to any other road surface ever devised.

2. Practicable express train, high-speed operation, with few, long-spaced stops, through effective traffic regulation in congested areas, and

3. Relatively low operating costs with high density. Street railways may largely retrieve their former financial status by:

1. The inauguration of a supplemental local bus operation, co-ordinated with the operation of the various lines of an express service.

2. The remodeling or supplementing of their roadways and equipment for express service.

3. The development of public sentiment in cities so that vehicular traffic on street railway tracks will be lessened and limited through effective traffic regulations, particularly in congested areas, enabling reasonably high speeds by the street railway cars for the proper accommodation of the public.

4. The reorganization of their plans of operation.

This combination may save the situation for both types of service, which are at present, under independent operation, often failing to earn a reasonable return on the respective investments.

#### PLAN AND FEATURES OF COMBINED OPERATION

Street railways generally occupy the middle of the street, while vehicle traffic occupies the entire roadway up to the curbs. In a combined street railway and bus operation, safety island stations might be established at distances ranging from six to eight blocks apart for the use of a railway express service, analogous to that of the subways of various cities, while the buses would furnish the local service, stopping for passengers at the curb at all street crossings. A transfer between bus and car would give passengers the advantages of both.

The public generally accepts the street railway as a public necessity and realizes that it can prosper and render adequate service only with a sufficient fare rate. The response which the public has made to recent fare increases on the street railway and the charges of the bus lines confirm this view. Through joint ownership and operation of the street railways and bus lines, with a scale of charges in accord with the service rendered, increased revenues to the street railways should be possible.

A transportation company should furnish all the types

of service the public needs. There is at present a distinct place in street transportation for both the street car and the motor bus.

Street railway companies should follow the practice of industrials and maintain development departments so that the requirements of those served will be anticipated and satisfied. This policy means the discontinuance of the use of antiquated equipment and plans of operation, and the substitution of such facilities as will enable the companies fully to meet the public's natural and stimulated demands.

The time is ripe for a long step forward in diversified means of street transportation. The twenty-year period in which the industry has gained but slowly should be followed by a period of greatly increased earnings. In general, the companies already have the organization and often the franchises for conducting such supplementary bus service as may be required. They should now give the question of street transportation by all the various means a broad, exhaustive study, covering especially the necessities, pleasures, sentiments and practices of people desiring transportation. Such a study should include:

1. A review of types and modifications of street cars and street car service, and the manufacture of street railway equipment.

2. A thorough understanding of motor bus design, construction and manufacture, and the uses and possibilities of buses for co-ordinated or supplemental service in street transportation.

It is reported that at least 7,500 automotive engineers and designers are now constantly engaged in the development and manufacture of various types of autos, and that more than 100 individual companies are manufacturing motor vehicles, while the number of designers of street cars and street railway construction and equipment is limited to not more than one-tenth of this force. The number of street cars manufactured and put into service each year is almost insignificant compared with the number of automobiles manufactured yearly.

The original purpose of the organization of street railway companies was not to engage in a part only of the street transportation business but to carry practically all passengers seeking public conveyances. They should now, through new and old means of street transportation, regain their former position.

The present year marks the fortieth anniversary of the opening of the first hydro-electric tramway in the world. According to the *London Engineer* this was at the Giant's Causeway in 1883 by Earl Spencer, then Lord Lieutenant of Ireland. Credit for this venture must be given William A. Traill, the originator, and also the engineer and constructor of this line, which was 8 miles long with heavy gradients. Power was obtained from a waterfall on the River Bush. Originally current was collected from a side conductor or third rail, later replaced by an overhead trolley.



## Subway Construction Costs Have Increased

Expense Has Been as High as \$2,500,000 a Mile in Lower Manhattan—Present Costs Probably Double Those Prior to War

SOME interesting figures on the cost of rapid transit construction in New York and other features of that city's subway and elevated systems were given in a talk before the Providence Engineering Society, Providence, R. I., on May 15, by Robert Ridgway, chief engineer Transit Commission, State of New York. Referring to the construction cost of the existing subways in New York, Mr. Ridgway said that it varied from \$700,000 per track-mile in an outlying portion of Brooklyn to \$2,500,000 per track-mile in a very congested section of lower New York. This cost included track, stations, maintenance and underpinning of abutting buildings, and maintenance and restoration of surface, subsurface and overhead structures, but did not include the installation of third rail, signals, light and other railroad equipment. At pre-war prices the cost of a steel elevated railroad, also including track, stations and other appurtenant work, ranged from \$235,000 to \$275,000 per track-mile, depending on whether a three-track or a two-track structure was built. Under present market conditions, the speaker thought these costs would probably be doubled.

He declared that there are but few cities in the world where a direct profit can be expected from the investment necessary to construct and equip an extensive system of subways. It requires many huge office and commercial buildings, large and intensively patronized shopping and amusement districts, and the concentration of a population in many large apartment house districts.

The adoption in New York of the shallow type of subway instead of the deep subway, like those in London, has been justified, in the speaker's opinion, by experience, but the art of subway construction has advanced since 1900, and experience has shown the necessity of longer stations, provisions for ventilation, emergency exits between stations and other improvements. New York is believed to be the only city in the world that operates both express and local service in subways. The subways in other cities generally contain only two tracks. Excluding the privately-owned rapid transit lines constructed prior to 1913, but including the city-owned subways and extensions built prior to that date, there has been expended for construction of the dual rapid transit system in New York City nearly \$400,000,000. This is in addition to about \$190,000,000 which has been expended by the companies in equipping all of the new lines and in improving their old lines. New York has been called a subway city, and rightly so, because it has more miles of rapid transit subway than all of the other cities of the world combined.

Much of the rapid transit system in New York in the outlying sections is elevated, and elevated lines are still to be considered for use in such sections because their cost per mile is but one-fourth or one-fifth that of subways of the same track capacity. In such locations something can be done to make the appearance of the structure less objectionable. For example, at stations at parkway crossings in New York the steel members have been incased in concrete, the surfaces of which are tooled and decorated with colored tile with pleasing

results. On a boulevard 200 ft. wide, in the Borough of Queens, a reinforced concrete viaduct was substituted for the standard steel structure, and its surfaces were also treated in the manner described. While such a massive structure is in keeping with its setting in that location, it would be out of place in the ordinary city street because it would cut off light, and its columns would offer greater obstructions to traffic than do steel columns.

The open-cut method of construction for rapid transit lines is also worthy of consideration where property values are low enough to permit the taking of private rights-of-way for this purpose. Some of the old steam rights-of-way controlled by the Brooklyn Rapid Transit Company have been improved by depressing the tracks in this manner.

## Working Off the Rough Edge on Prospective Motormen

BY J. G. JEFFERY

Director of Public Relations Los Angeles Railway

THE Los Angeles Railway, Los Angeles, Calif., has equipped a special car known as the "rough edge" car for instruction purposes. When a new man is accepted for service as a motorman, he is given only a short talk on the fundamentals of his job before he is put on a car, but it is the "rough edge" car and not a passenger car to which he is assigned.

The "rough edge" car is built practically the same as



Los Angeles Test Car Used to Work Off the Rough Edges of New Motormen

a passenger car except that the seats in the open end sections are placed longitudinally, as this gives more space for student trainmen to observe the work of the men at the controller than if cross-seats like those on regular passenger cars were used. The step at the right rear of the car is removed so that passengers will not mistake it for a regular car and attempt to board.

A class of not more than four new motormen is taken from the instruction department by an instructor and put on the "rough edge" car. The instructor runs the car until a district of light travel is reached. During the first part of the run he calls attention to the various signs on the overhead wire, the method of operating at electric switches, and the necessity for throwing off the power while passing special overhead work. He points out the traffic officers at intersections, the sema-

phore "go" and "stop" signals, and other features of traffic with which the new man must become acquainted.

When a district of light travel is reached, usually at a terminal, the power is switched off and the new men in turn sit at the controller and are taught how to feed it. After each man has learned the "feel" of the motorman's position, the students begin operating the car up and down the track where they will not be bothered by other traffic.

On the first day they learn to aim at definite stop points and get practice with late conductor's signal bells given by the instructor. On the second and third days, the new men operate the "rough edge" car through semi-congested territory and finally through the downtown streets. They are taught about the mechanical features of the car and learn how to locate trouble.

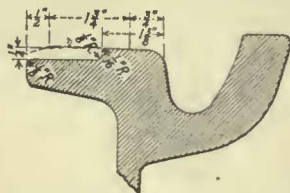
In the opinion of the instruction department, the important feature of this plan is that a new motorman is capable of handling a car under various conditions and understands the mechanical features before he is placed on a regular passenger car in service. The new man's remaining instruction is given by a regular motorman to whom he is assigned. Having learned the fundamentals of operation on the "rough edge" car, the line instructor can devote his attention to teaching the new man matters peculiar to the line on which he is running, the proper attitude toward passengers, etc.

### Barbey Rail Has Reduced Noise

AS A result of numerous complaints from residents of the neighborhood about the "unearthly noises" made by cars taking the curve at Washington Avenue and Marion Street, Scranton, Pa., the railway installed in 1915 a "frictionless" rail for the inside rail of the curve. The rail is made under the Barbey patent and is the ordinary Lorain section 132, with part of the head machined down  $\frac{1}{4}$  in. as shown in the accompanying illustration. The theory of the curve is that the narrower the rail head the less the friction and noise.

At this point the service is a seven and one-half-minute headway and during the eight years since the rail was laid the head on the rail has worn nearly flush with the planed surface. Practically no complaints about squealing have been received since the installation of the Barbey rail.

No change has been made in foundation, ties or pav-



Head of Rail Is Machined Down  $\frac{1}{4}$  In. for Curves

ing where this rail is used. The practice of greasing curves is the same as for other rail.

More recently the Barbey rail has been used by the Scranton Railway at various other intersections and has given very satisfactory results, not only reducing noise to a marked extent, but also giving longer wear than the ordinary type. A curve installed in November, 1921, at the intersection of Lackawanna and Wyoming Avenues, where the headway is three and one-half minutes, shows practically no wear after sixteen months service.

### Interlocking Traffic Signals Hinder Railway Operation

AT ERIE, PA., the problem of placing traffic signals on streets with railway tracks has been solved in a way quite different from that in effect in Scranton, Pa., and described in the JOURNAL for May 12. A system has recently been installed for the control of both cars and vehicles on, and crossing, a section of State Street. Regulation is effected by colored electric lights suspended from the span wires of the Buffalo & Lake Erie Traction Company.

In the center of each intersection from Sixth Street to Thirteenth Street inclusive is hung a signal box containing three lights and twelve lenses, three on each side of the box, as shown in the accompanying illustration. The lenses are of red, green and white, and are



One of Eight Interlocked Signals at Successive Crossings

arranged in reverse order on alternate sides, so that the illumination of a single lamp gives simultaneously a "proceed" indication on State Street and a "stop" indication on the cross street, and vice versa. All of the signals are on a single circuit, which is controlled by a traffic policeman in a tower at the curb at Twelfth and State Streets.

This method of suspending the boxes from span wires is admirable in that there are no columns or towers in the street to obstruct traffic. Moreover it places the signal well up in the air where it can readily be seen by the drivers of all vehicles.

A serious objection exists, however, to the method of controlling all signals from a single point. The trolleys, unlike other traffic, are not able to continue block after block without interruption so long as the signal remains clear, but must ordinarily stop at each corner for passengers. Thus they are unable always to take advantage of the privilege of going ahead, but they are always forced to heed the red light.

For this reason the installation of the interlocking traffic signal system has been rather a handicap to the railway. It has been of some benefit to other vehicles perhaps, but has meant no economy to the city as police officers are stationed at most of the intersections anyway. On the whole, observation of the operation of this plan at Erie indicates that on trolley streets individually controlled signals are better than interlocked signals.

# Liverpool, Glasgow, Edinburgh Compared

Statistics on Traffic, Fares and Other Phases of Tramway and Bus Operation in These Cities Are Given in Report to New York Commission—Liverpool and Glasgow Shown to Be Developing Rapid Transit Surface Lines

**D**ANIEL L. TURNER, consulting engineer New York Transit Commission, submitted to that commission on May 9 a report discussing car and bus design in relation to street area occupied, and also observations on city traffic in Liverpool, Glasgow and Edinburgh. An abstract of his comments on the first subject appeared in the June 9 issue of this paper. In his report on transportation conditions in Liverpool, Glasgow and Edinburgh, Mr. Turner expresses his great appreciation of the courtesies extended to him by the tramway managements in the cities visited.

An abstract follows of the technical portions of the report on these three cities:

## LIVERPOOL

Liverpool, which has an area of about 33 square miles, is approximately a semicircular city located on the north side of the Mersey. In 1922 its population, within the city limits, was about 803,000 people. The Metropolitan District centering around Liverpool within 12 or 15 miles has an aggregate population of 1,250,000 people.

Liverpool has all kinds of municipal transit facilities: A subway line, an elevated line, trolley lines and buses, but the most important transit facilities are the trolley or tramway lines. The subway is a deep level line traversing Liverpool for a short distance and then crossing under the Mersey by tunnel and traversing the territory on the south side of the Mersey for a short distance. There are only seven stations on the line, two in Liverpool and the five others on the opposite side of the river. It was originally constructed for steam railroad service but was subsequently electrified.

The elevated line runs along the waterfront for a distance of about 6½ miles and has two tracks. There are sixteen stations on the line, the average distance between them being about four-tenths of a mile. The line was originally built to relieve the congestion existing on the waterfront street and to facilitate the trucking traffic. Neither the elevated nor subway line transfers to the surface lines. Traffic figures of the elevated and subway lines are not available.

During the calendar year ended Dec. 31, 1921, the surface line traffic in Liverpool was divided about as follows:

On the tramways.....	169,800,000 passengers—98.6 per cent
On the buses.....	2,430,000 passengers— 1.4 per cent
Total.....	172,230,000 passengers—100 per cent

This was a reduction in total traffic compared with 1920 of about 48,000,000 passengers. The riding habit is only approximately obtainable, because the amount of traffic originating outside the municipal limits is not known. But the outside traffic is relatively small, so if all of the traffic is assumed as originating within the city limits, and the population is taken at 803,000, the riding habit amounted to 214 rides per capita per year, on the tramway lines and buses combined.

During 1921 ten bus routes were operated, but four of them were dropped at different times so that only six routes were continued in operation throughout the year. The bus service was introduced largely during the period of the war when it was impossible to make adequate renewals to the tramcars. In other words, the bus service was largely an emergency service. Now the buses are used chiefly as feeders to the tramway lines.

All the tramway cars in Liverpool are double-deck cars, top inclosed. The most modern type provides for twenty-two longitudinal seats on the lower deck, and forty-two cross seats on the upper deck, or a total seating capacity of sixty-four, and eighteen passengers are permitted to stand, nine on each deck. These cars are 16 ft. 1½ in. high, 7 ft. 4 in. wide over all and 30 ft. 2 in. long over all.

On some of the lines first-class cars were operated on intervals of ten or fifteen minutes. The lower decks of these cars have upholstered seats and they charge approximately a double fare, the upper deck charging the regular fare. The other cars charge one fare for both upper and lower decks.

The Pier Head on the Mersey is where the most intense operation occurs. This is really the neck of the bottle of the Liverpool tramway system. About 160 cars per hour are operated over the several routes located at this point, the maximum operation on any single track being about a three-quarter-minute headway. At another terminal, at Haymarket Junction, about sixty cars per hour were operated on eight or nine routes. At this point, to facilitate the loading of the cars, the passengers were confined in queues inclosed by pipe railings erected on the sidewalk at the curb lines.

Zone fares prevail. The fares on both the tramways and buses during 1921 varied from 1d. by half pennies to 4d. and over. The average fare was 2.128d. About 66 per cent of the total traffic was carried on the 2d. fare. For 2d. a passenger can ride from the center to the limits of old Liverpool, or just outside of the 2-mile circle. To reach the outer limits of new Liverpool, or within the 6-mile circle, an additional 2d. fare is charged if it is a broken ride, but through fares may be obtained from the center to the limits of the present city for about 3d. There are no free transfers.

Liverpool owns and operates its tramway lines. The operation is controlled by a committee of the Council. The equipment and operation of the properties is under the direction of the general manager of the Liverpool Corporation Tramways, who reports directly to the Council Committee, but the construction and maintenance of the tramway tracks is under the charge of the chief engineer of the city of Liverpool, who also reports directly to the Liverpool Council Committee. The general manager and the chief engineer are independent of each other, but, of course, there is full and

complete co-operation between the departments. There did not appear to be any serious difficulties arising from this condition of affairs, but it was unusual, and the desirability of such an arrangement seems doubtful.

The most interesting thing in the Liverpool transit situation was the system of high-speed surface lines proposed by Mr. Brodie, chief engineer of the city. This type of line has been developed to provide relatively rapid transit in the place of subway or elevated lines. The tramway line is proposed to be located in the center of an arterial highway, 120 ft. wide. The width of the highway is made up as follows:

Two paved sidewalks .....	8 ft. wide
Two sidewalk grass and tree plots .....	10 ft. 6 in. wide
Two curbs and gutters .....	2 ft. wide
Two vehicular roadways .....	25 ft. wide
One centrally located grassed area occupied by the tramway line .....	29 ft. wide

making a total width of 120 ft. It is proposed to fence in the tramway right-of-way on either side to keep off pedestrians, dogs, etc. Only a low fence would probably be required. The transverse roads are only permitted to cross the tracks at about every one-quarter of a mile, at which points station stops will be provided. The highway crossings at these quarter-mile points will be made at grade. Average speeds, including stops, of 20 m.p.h. can be obtained on such a line. This speed is better than the speed now reached on the local train services on the elevated and subway lines in New York. The New York subway express train service is scheduled at only 25 m.p.h. The cost of building such a line would be very much less than a subway or elevated line, for its additional cost over an ordinary surface line would be only the cost of the extra street width. Mr. Brodie has proposed a number of such lines for Liverpool, and a number of old roads are being widened to conform to the dimensions of such high-speed arterial ways. Such a system of providing rapid transit in smaller cities is capable of being developed to the very great advantage of the community.

#### GLASGOW

Glasgow is approximately a circular city of about 20 square miles area. The outline of its boundary is irregular, but the city can be almost completely circumscribed by a circle of 3 miles radius. The River Clyde runs through Glasgow. No up-to-date population figures for the city itself are available. In its tramway report the corporation gives the population of Glasgow and the suburban area served by the tramway lines as about 1,339,000. It is believed that the city itself has a population approximating 1,200,000 now.

Glasgow is now served by two types of transit facilities—tramway lines and a single subway line. There are no bus lines.

The subway is a deep tube line, operating in a circular route about  $6\frac{1}{2}$  miles long. About half of it is located north of the Clyde and the other half south of it. The tubes are about 11 ft. in diameter inside and the railroad is operated by a cable. Until recently it was owned by an independent company, which had to suspend service because of the inability of the line to support itself. Recently, however, the city acquired possession and is now operating it. My understanding is that it ultimately expects to electrify the line. As an independent line its usefulness was limited, but as a loop line, connecting with all of the surface tramway lines, it can serve a useful function in distributing the traffic around the central business area of the city on both sides of the Clyde.

During the year ended May 31, 1922, the tramways carried about 431,372,000 passengers, or about two and one-half times as much traffic as the Liverpool system, although Liverpool has about 50 per cent more area than Glasgow. The riding habit in Glasgow is about 322 rides per capita per year. In New York the rides per capita for 1922 were about 435, or about 35 per cent greater than in Glasgow.

During 1922 the Glasgow system operated about 100 route-miles, equivalent to approximately 200 miles of single track. The longest route now operated is the tramway from Paisley on one side of the city to Baillieston on the other side. The length of this line is approximately 13 miles. The route is being extended at both ends, and when these extensions are completed the two termini of the route will be about 25 miles apart. The ride from Paisley to Baillieston now costs 8½d., or a little more than 15 cents. No fare has yet been fixed for the 25-mile ride.

The tramway cars in Glasgow are practically of the same type—double-deck cars with the body and upper deck inclosed except for the portion of the upper deck over the platform. The cars have a body length of about 17 ft. with 6-ft. platforms and are 7 ft. 2 in. wide. The over-all height is 16 ft. 1 in. They are mounted on single-truck cars and weigh empty about 25,280 lb. Inside of the car below there are twenty-four longitudinal seats and above there are twenty-eight cross-seats inside and 10 seats outside. During the rush hours six passengers are permitted to stand inside below. As a matter of fact, oftentimes more than this number stand, but the policy is to keep down the standing passengers to six as nearly as possible. The company constructs and equips all of its own cars.

The car crews are trained both as conductors and as motormen. A man is first taken into the service as a conductor. After about eighteen months of service he is required to take the training as motorman, whether he is to serve afterward as a motorman or not. This method of training men places the company in a very strong position in case of any labor troubles or on occasions when an extraordinary demand is made for service, as it is relatively easy to break in men to serve as conductors temporarily, whereas to train motormen is another matter.

Zone fares prevail. The ordinary fares range from 1d. to 9d. by ½d. grades. There is also a minimum token fare of ¾d. The minimum fare distance is about 1.15 miles, that is, for the ¾d. token fare, or the minimum ordinary fare of 1d. The maximum ride is 15.27 miles for 9d. Only a few of the long rides have fares of 6½d. and over. The average fare paid by a passenger is 1.306d. The distance paid for on the average by this passenger is for a ride of 1.96 miles. Fifty-seven per cent of the passengers paid a penny or a ¾d. token for their fare, and approximately 40 per cent of the total revenue of the company was derived from these fares.

Just as Liverpool has done and is doing, Glasgow is preparing for high-speed surface tramway lines. In the outlying sections the roadways are being widened for such lines. The same general plan is being followed as in Liverpool.

The Glasgow tramways are owned and operated by the municipality, under the direction of a committee of the Council. The municipality took the lines over in 1894. In 1917 the whole indebtedness of the tramways was cleared off. At present, the only indebtedness is that which has accumulated since 1917 for the improve-

ment and extension of the system. This does not amount to a very large sum.

**EDINBURGH**

Edinburgh and Leith together have an area of approximately 19 square miles. Leith is the port of Edinburgh and is practically surrounded by it. The combined cities approximately form a circular city of about 3 miles radius. The population served by the joint transit facilities in 1922 was about 420,000. In 1920 Edinburgh was enlarged to include Leith and several adjoining towns, giving an area aggregating about 51 square miles, but the transit facilities have not yet been extended to include all this area.

The tramway system in Edinburgh is in process of transformation from a cable system to an electric system. Although the cable conduits were available, the city has adopted the overhead system because of its relative cheapness in cost as compared with the underground trolley system. Approximate statistics for the year ended May 15, 1922, follow:

**STATISTICS OF TRAMWAY SYSTEM**

	Single Track	Mileage	Passengers Carried	Per Cent of Total
	Length in Miles	Per Cent of Total		
Cable.....	49	43	67,986,000	67
Buses.....	47	41	20,408,000	20
Electric.....	18	16	12,633,000	13
Total.....	114	100	101,207,000	100

Note: The bus mileage referred to above means the mileage operated over by the buses in both directions of travel, or means the length of the streets traversed by the buses, doubled.

Based on the population served, as estimated by the tramways department, the total traffic amounts to about 241 rides per capita, as compared with 214 for Liverpool and 322 for Glasgow.

The corporation looks upon the bus operation as only suitable as feeders. Buses have also been used as substitutes for cable routes during the time of transition from cable to electric operation. I was informed that

the electric lines is of the same general type as that used in Glasgow—that is, double-deck closed-top cars with about the same seating arrangements as in the Glasgow cars. The motor buses in use are single-deck, seating about thirty-one.

Zone fares prevail, as in Liverpool and Glasgow, and range from 1d. to 8d. The average fare per passenger on the cable lines was 1.949d.; on the buses 2.024d., and on the electric lines 1.476d. As in Liverpool and Glasgow also, the Edinburgh system is municipally owned and operated. The responsibility for the ownership and operation rests with a committee of the Council, which directs the operation through a general manager. The general manager is responsible, as in Glasgow, for the construction and equipment as well as operation. There is no divided responsibility such as obtains in Liverpool.

**Carrying Safety to the Public—VII\***

**Public Safety May Be Promoted in the Industries Through Organized Instructional Work—A School for Foremen Is the Means of Reaching a Large Group of Workers**

BY C. W. PRICE

Vice-President in Charge of Public Safety, Elliott Service Company, New York City

A FEW years ago the average railway executive and industrial manager thought of industrial safety and public safety as two separate and distinct fields of activity. Now they have learned from experience that these two fields merge and overlap; that each has a vital bearing on the other. They are more and more coming to see that safety is a habit, an attitude of mind, not a technique; that a workman in a factory who has become thoroughly imbued with the safety



Part of the Class of 1,500 Foremen Enrolled for the Safety Instruction in Milwaukee

idea as the transition from cable to electric traction takes place the latter will be substituted for a number, if not all, of the bus routes also, as rapidly as it can be effected economically.

The car equipment on the cable lines is of an old type of double-deck car. The car equipment utilized on

idea and has learned to operate his machine with safety is pretty apt to carry that habit, that attitude of mind, in favor of safety, from his work out to the street as well as into his own home.

The Carnegie Steel Company, for instance, in the

\*Seventh of a series of ten articles.

Pittsburgh district is not only interested in stimulating community safety in the towns in which its plants are located, but is including safety on the street and in the home as a part of the daily instruction program for its workmen.

Therefore, it is quite proper in this series of articles on public safety that we give a place to industrial safety and point out how, in an organized community effort, safety in the industries may contribute directly to safety of the public. In 1917 a safety school for foremen was organized in Pittsburgh, and so successful did it prove that since that time in some thirty cities in which local safety councils have been organized similar schools for the instruction of foremen have been conducted each year.

Industrial managers have come to see that the attitude of workmen toward safety depends on the attitude of their foreman. He must not only know how to organize safety in his department, but what is more important, he must believe in it just as he believes in any other feature of his work which has to do with efficiency. He must get back of the movement for safety, and stay back of it so unmistakably that not a workman will doubt for a moment what he proposes to do to safeguard their lives—and what he expects them to do. Possibly the greatest service which the school for foremen renders is to convince these men of the value of safety and imbue them with the safety spirit and enthusiasm.

In the cities where schools for foremen have been conducted, the superintendent, foremen and subforemen in charge of railway construction work and repair shops have attended the classes and have received valuable help.

The course of study in the school should include ten lessons—each lesson covering some important phase of safety. The material to be treated is of the nature suggested by the following subjects: "Safety and Industrial Efficiency," "The Foreman the Determining Factor," "Workmen's Safety Committee," "Mechanical Guards," "Visualizing Safety on the Bulletin Board," "Inspection," "First Aid," "Shop Sanitation," and "Reaching the Workmen Through Community Safety."

Each lesson should be presented by some man who has had practical experience in his own plant. Half of the lesson should be given up to a round-table discussion, and the foremen should be encouraged to ask questions, to express their views, and if possible to suggest new topics.

The success of the school will depend largely on the ability of the chairman who presides at each session, and on the character and ability of the speakers. The chairman must be thoroughly familiar with safety, must know how to stimulate enthusiasm in the meeting, and must be able to draw out discussion. The speakers should not only know their subjects but should present them in a convincing manner.

In many schools the session is opened with singing and a motion picture film is shown at the close.

When the course of ten lessons is finished it is customary to give a graduation banquet at which diplomas are presented and inspiring addresses are delivered by two or three prominent citizens.

The value of a school for foremen will not be confined merely to the instruction of a number of individuals. The foremen of plants in which safety has not been organized may quickly, say within a period of ten weeks, familiarize themselves with the experience of

plants in which successful work has been done. They then will go out of the school convinced, because they have received first-hand information from men of experience, and because they have heard the testimony of foremen from other plants, speaking out of their own experience.

Through the influence of the foremen who carry the message back to their managers many plants will be stimulated to organize safety. In St. Louis, for instance, in 1917 there were 110 industrial workmen killed by accident, and in 1922 only fifteen; in Milwaukee, substantial reductions were made in industrial accidents since 1920; and in Louisville, accidental deaths were reduced from thirteen to five in two years. The schools for foremen in each city played an important part.

The school for foremen offers an exceptional opportunity to introduce into the industries of a community this new and larger conception of safety, and to broaden the scope of the safety instruction to include safety in the home and on the street, and then to furnish a new appeal to the workmen.

In communities where local councils have been organized it is customary each year to arrange for two or three luncheon conferences of factory managers. These conferences offer a splendid opportunity to acquaint the managers with the more important developments of community safety and its value to the industries.

The magnitude of the instructional work in the foremen's school is shown by the photograph of the class in session at Milwaukee. This is one of the largest groups ever gathered for the purpose, more than 1,500 men being enrolled in the course. The picture was obtained through the courtesy of C. M. Anderson, manager of the Milwaukee Association of Commerce Safety Council.

### Concrete Ditch Barrier at Entrance to Tunnel Stops Automobiles



A Practical Device to Keep Automobiles Out of Tunnel

A CONCRETE ditch has been built across the east entrance to the Twin Peaks tunnel in San Francisco for the purpose of keeping motorists from trying to drive through the tunnel. Before this ditch was built a motorist drove his car part way through the tunnel. He met a street car and was forced to back his car out. The ditch is about 3 ft. across and if an auto should be driven across it, the front wheels would drop in and the further progress of the vehicle would be arrested.

# New Transfer System for New Orleans

Present System Involves 12 per Cent Misuse—Requirements Complicated by Necessity for Second and Third Transfers and Reversal of Direction—New Form Would Require Conductor to Punch Time, Line and Direction at Time of Issue

**S**ECTION V of the report by John A. Beeler on local transit conditions in New Orleans deals with the order of installation of the various changes in track layout, routing, etc., which have been discussed in previous issues of the JOURNAL. This was worked out to give the most practical plan, taking into account the convenience of patrons, the immediate transportation needs of the city, the official paving program, the minimum number of temporary changes, and the most economical expenditure of time and money.

Section VI of Mr. Beeler's report takes up the question of transfers and deals with the present practice and recommends a new transfer which it is believed will regain for the company some \$134,000 a year of the amount now lost through misuse. The report points out that the present system of transfers is not a universal one. It was not founded upon any particular method, but is an outgrowth from the regulations adopted haphazardly by the individual companies years ago. The operation of belt lines, with other lines doing combination trunk and crosstown service, presents a complicated situation. To establish a universal transfer under these conditions would be extremely difficult, if not impracticable.

Since 1908 on the New Orleans system the proportion of passengers using transfers has been steadily increasing. In that year, transfer passengers numbering 15,492,363 were 20 per cent of the revenue passengers, which numbered 77,459,499. This percentage has increased steadily each year until in 1922 it was 30.21 per cent, the actual figures being 31,934,874 transfer passengers and 105,712,503 revenue passengers.

It is pointed out that the total revenue passengers have increased 50 per cent, while the transfer passengers have increased more than 100 per cent. The enlarged use is undoubtedly due to one or more of the following reasons: Changes in routing, changes in location of the population, or abuse of the privilege. The first item is considered almost negligible, as few changes in routing have been made. Changes in population account for some of the increase, as many sections, especially those in outside districts, are growing rapidly. The abuse factor also contributes largely to the growth. The engineer states that the looseness of the present system, combined with the lack of systematic checking, has invited and encouraged abuse. He comments that there will always be more or less loss in connection with the transfer, and that the problem is how best to reduce this to a minimum. From observations made and from information furnished by the railway, it is estimated that the misuse of the transfer privilege is at present not less than 12 or 15 per cent of the total collected. On a basis of the lesser figure, if a system can be devised that will reduce the abuse by one-half, the revenue will be increased \$134,000 annually.

## PROPOSED TRANSFER SYSTEM

It is stated in the report that a universal transfer system can be adopted under the proposed routing plan. It should be based on the principle that any rider, upon

This coupon, WHEN NOT DETACHED, entitles the holder to another transfer, issued in accordance with transfer regulations of the Issuing Line.  
New Orleans Public Service Co., Inc.

**RIVER BOUND  
NAPOLEON - BROAD**

<b>AT</b>	<b>TO</b>		1	2	3	4	5
	UP WOODS	DOWN RIVER	2	1	2	3	4
ESPLANADE	Esplanade		3	1	2	3	4
URSULINES	City Park		4	1	2	3	4
DUMAINE			5	1	2	3	4
ST. PETER	St. Peter		6	1	2	3	4
			7	1	2	3	4
			8	1	2	3	4
			9	1	2	3	4
			10	1	2	3	4
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			47	1	2	3	4
			48	1	2	3	4
			49	1	2	3	4
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			56	1	2	3	4
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			67	1	2	3	4
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			71	1	2	3	4
			72	1	2	3	4
			73	1	2	3	4
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			75	1	2	3	4
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			82	1	2	3	4
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			89	1	2	3	4
			90	1	2	3	4
			91	1	2	3	4
			92	1	2	3	4
			93	1	2	3	4
			94	1	2	3	4
			95	1	2	3	4
			96	1	2	3	4
			97	1	2	3	4
			98	1	2	3	4
			99	1	2	3	4
			100	1	2	3	4

**TRANSFER TICKET**  
Issued, subject to the conditions printed on the back of this ticket.  
New Orleans Public Service Co., Inc.

VOID  
- IF -  
DETACHED

NOT TRANSFERABLE

This transfer is issued subject to the rules of this company. Good only on the line punched, in the direction indicated, if presented at the place indicated, before the time punched. Its transfer or intentional use after proper date and time is a misdemeanor.

Passengers MUST see that transfers are properly punched before accepting same. By accepting this transfer the passenger agrees to use it only in accordance with the rules and regulations of this company.

New Orleans Public Service Co., Inc.

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Cancelled by Conductor \*  
and refused on account of

Point	Time	Line	Direction

Proposed Form of Transfer for Use in New Orleans

payment of a fare, is entitled to one continuous trip from any point on the system to any other point by the shortest practicable route. Provision must be made for use of more than two lines to reach the desired destination and the transfer form must be simple and readily understandable.

A form of transfer that will admirably fit itself to the requirements in New Orleans, according to the engineer, is reproduced herewith. It is recommended that it should be printed on four different colored papers, one for each direction of travel. Its face contains the following information:

1. Day of the month in large red numerals.
2. Name of the issuing line.
3. Direction of the trip of issuing line.
4. Line to which transfer is issued.
5. Point at which transfer must be used.
6. Time limit after which transfer becomes void.

The points requiring punching by the conductor when issuing are three: Time, line and direction. In making the latter punch, conductor will indicate whether it is the first, second, or third transfer, by locating it under 1, 2 or 3, as the case may be, in the line which indicates the actual direction of travel. Conductors when issuing

## TRANSFER CHART FOR THE NAPOLEON-BROAD LINE Woods Bound

**Note—Abbreviations**  
 U = Up  
 D = Down  
 R = River  
 W = Woods

TRANSFER POINT	TO LINE	DIRECTION OF TRANSFER	FURTHER TRANSFER	FIRST CONTINUING TRANSFER				SECOND CONTINUING TRANSFER			
				TRANSFER POINT	TO LINE	DIRECTION	FURTHER TRANSFER	TRANSFER POINT	TO LINE	DIRECTION	FURTHER TRANSFER
Annunciation	Laurel	U		Peters Ave	Dryades	D	None	Elysian Fields	Elysian Fields	W	N
				Louisiana Ave	Louisiana	W	None		Lafayette Ave	Desire	
Laurel	Laurel	D		Jackson Ave	Jackson Lines	R or W	None	St Claude Ave	Tulane-St Claude	D	
				Canal St	Canal	W			None		
				Walnut St	North Claiborne	D					
Magazine St	Magazine	U		Peters Ave	Dryades	D	None				
		D		Louisiana Ave	Louisiana	R or W					
Prytania St	Prytania	U	None	Peters Ave	Dryades	D	None				
		U	None	Louisiana Ave	Louisiana	R or W					
		D	None	Jackson Ave	Jackson	U or D					
		U	None	Broadway	Broadway	R or W					
St Charles Ave	St Charles	D		Carrollton Ave	Tulane-St Claude	D	None	Shuttle	S. Claiborne Ave	W	None
				Louisiana Ave	Louisiana	W					
				Jackson Ave	Jackson Lines	W					
				Canal St	Canal	W					
				Canal St	Shrewsbury	W					
				West End	West End	D					
				North Claiborne	North Claiborne	D					
				Desire	Desire	D					
				City Park	City Park	W	None				

Portion of Transfer Chart Showing Transfer Conditions in One Direction for the Napoleon-Broad Line, New Orleans

the last transfer necessary for the patron to reach his destination will give him a transfer without the upper coupon. Usually this will be the first one.

Direction of travel is designated by the words "Up," "Down," "River," "Woods." Aside from the normal transferring in the same general direction, it is necessary that the patrons have the privilege of reversing their direction of travel at certain points on the system. This transfer is designed to permit this, and at the same time guard against its abuse, but in order to allow this privilege it is necessary to designate certain lines in both up and down town districts, as "change of direction lines." The report then lists eight uptown lines and seven downtown lines that come under this category.

The rules that will govern transfer issuance and acceptance are as follows:

Transfers will be issued for a continuous-trip upon request at the time the fare is paid. They will be accepted only at the designated point on the line and in the direction indicated, if presented within the time limit shown. A transfer will be issued good only in the same general direction except on "change of direction lines." On such lines if the conductor takes up a transfer with the coupon attached, he can issue a transfer good for travel in a direction opposite to the direction shown in the first transfer. Shuttle lines should collect fares and accept transfers. They should issue a "ride-ticket" in lieu of a transfer, which will entitle a holder to all the transfer privileges of a cash fare.

The report recommends that a method of careful inspection and checking should be adopted. Where a line is served by safety cars, the use of transfer machines is recommended. Each conductor should be supplied with a complete set of rules governing the issue of transfers, and this should be made up in looseleaf form to permit easy revision.

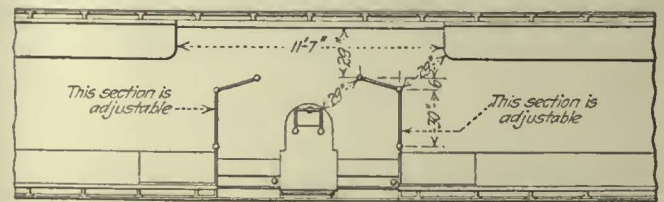
A portion of a transfer chart for one of the most intricate lines proposed, so far as transfer conditions are concerned, is reproduced with this article. A similar

chart for the opposite direction of travel for the same line was included in the report, the pair serving as an example of the manner in which the transfer privileges of each line should be tabulated.

## Cleveland Trailer Being Changed

### Adjustable Railing Installed to Improve Pay-Enter and Pay-Leave Conditions—Results to Date Have Proved Satisfactory

A NUMBER of electric railway properties are using a design for trailers known as the Cleveland trailer design. Hence added interest attaches to the fact that the Cleveland Railway is experimenting with some changes in the floor plan. These changes are in the form of a railing and are such as better to fit the car for the Cleveland system of fare collection, which is pay-enter on the inbound trip and pay-leave on the out-



Adjustable Railings Quickly Change This Center-Entrance Trailer from Pay-Enter to Pay-Leave

bound trip. The new form of railing is shown in the accompanying diagram, which represents the center of the car. In this railing the two sections transverse to the car can be raised or lowered, but the shorter sections, which are set at an acute angle to the center line of the car, are permanent. The operation of the railing is then as follows:

When the car is going down town, or pay-enter, the adjustable railing toward the rear of the car is lifted and the one toward the head of the car is lowered. Then,



as the passengers enter individually by the front door, they pass by the fare box, and those who expect to leave the car by the exit or rear door before it reaches the terminal gather in the rear of the car, while the others gather in the front of the car. At the final point of unloading both bars are lifted and passengers leave by either door. When the car is going out in the evening the conditions are reversed. On that trip the car is operated pay-leave, and at the principal downtown loading point or points both bars are lifted. Then the rear one is lowered. This makes passengers who leave the car file by the fare box.

The new arrangement of railings meant that some seats opposite the fare box had to be removed. This cuts down the seating capacity of the car by four seats,

but not the total carrying capacity. As, however, trailers in Cleveland are used only during the rush hours, this was not considered a great disadvantage. It has been found that the method adds slightly to the time of loading, but it has not been necessary to reduce the scheduled speed of the runs, and fewer fares are missed. The effect of the railing also is to keep passengers away from the fare box.

In a few special cases, as at ball grounds, the usual plan is reversed. Thus, when attendants at a ball ground are being taken away after the game the car is run pay-leave, although it may be going down town in the pay-enter direction.

The company has equipped four cars in this way, and the results so far have been very satisfactory.

## Benefits of Subdividing Operating Expense Accounts

Experience of Eight Years with an Extensively Subdivided Series  
of Accounts Indicates a Number of Advantages for It—Through Its  
Use Specific Cost Figures for Any Purpose Are Always Available

*By Clifford A. Elliott*

Cost Engineer Pacific Electric Railway

THE instructions contained in the uniform system of accounts for electric railways prescribed by the Interstate Commerce Commission, effective July 1, 1914, say that any carrier or any receiver or operating trustee of any such carrier, in addition to the accounts prescribed by the commission, may, unless otherwise ordered, keep any temporary or experimental accounts the purpose of which is to develop the efficiency of operation, provided that such temporary or experimental accounts shall not impair the integrity of any primary account prescribed.

Possible subdivision of the primary accounts is indicated to some extent by the definitions in the I. C. C. classification, but it is left to each company to work out such details, if it desires to do so. To some persons any advantage in such a subdivision of the operating expense accounts may not be apparent, but the writer's familiarity with such a system, covering a period of eight years, shows that it has been desirable from the standpoint of all concerned.

Before this accounting system was adopted, considerable study and planning, as well as co-operation of all concerned, were required. All departments were called upon to submit a tentative schedule of what should be the proper number and titles of the proposed subdivisional accounts. Judgment in this respect rested in a majority of instances on experience as to what particular subheads were required under each account. In the way and structures accounts the department was thoroughly familiar with the most important subheads required.

The final draft of the schedule was the result of an elimination process, and the impression was general that too many subhead accounts would defeat the

benefits to be derived from the system. If carried too far the division would entail a tedious volume of book-keeping upon the auditor, as well as burden each department in determining the proper accounts for charges in documents prior to their transmittal to the accounting department for auditing.

The schedule herewith shows the subdivision of the operating expense accounts in Way and Structures for a Class "A" company with which the writer is familiar. The system is such as to benefit all departments concerned. This particular exhibit takes the reader only through the way and structures operating expense accounts, but the same efficient subdivision is likewise followed throughout the equipment, power, conducting transportation, traffic, etc., accounts.

The writer will now endeavor to point out some of the great advantages of this plan.

### ADVANTAGES OF THE SUBDIVISION

Of what benefit is a grand total statement of operating expenses to an operating official, month after month? The change in the total as between one month and another may be as much as \$10,000, but if the official wants to know the reason for this variation, he must have a subdivision of the accounts. Take, for instance, the way and structures accounts. There is provided under each account a subdivision for municipal and legal requirements, and by adding up the total of each subdivisional account with this title the official may determine that at least 65 per cent of the way and structures expenses were attributed to this one cause. In other words, franchise requirements, which are an uncontrollable expense, caused the increase. Also, take into consideration the subdivision

of accounts for flood control. Large unforeseen expenditures may be incurred on this account.

Not only does this statement of the accounts, so subdivided, give the operating official a well analyzed lineup on his expenses, but it gives the engineer or superintendent of way and structures a system of figures whereby he may budget his way and structure expenses for subsequent months. Take, for instance, the subdivision account 8-g, "Removing grass and weeds." If the current month's expenses have exceeded the previous month to such extent that it has virtually robbed his department of allowances for more important maintenance work, the way engineer knows that in the subsequent months he can limit the amount of labor for weed extermination. The same principle applies to the various other labor accounts. Labor is the vital issue. Many times it will run 65 per cent of the expense.

The writer has also found this system of accounts of great help at the end of the fiscal year in summing up

the expenses for a given class of maintenance work, such as the upkeep of road crossings, annual cost of flood control work, maintenance of automatic flagmen, block signals, pavement, switch lamps and targets, repairing of tools, etc. Take, for instance, the subdivision of accounts No. 16, "warning signals," or automatic flagmen. This subdivision is even carried out as between material and labor. As the number of these devices in operation is known, it is easy to find the average cost for both labor and material of their maintenance.

On all street railway properties also there is a large number of items of operating expense that are uncontrollable such as paving, maintaining road crossings, exterminating rodents, cutting grass and weeds by orders of municipalities, etc. This subdivision of accounts enables one to work out by percentages just what portion of the operating expenses are attributable to these sources.

## Detailed Classification of Way and Structures Accounts

### I. Track, Roadway and Buildings

1. Superintendence:
  - (a) Salaries, maintenance engineer and clerks.
  - (b) Salaries, supervising engineers.
  - (c) Salaries, field engineering forces.
  - (d) Salaries, draftsman.
  - (e) Salaries, roadmasters and supervisors.
  - (f) Miscellaneous supplies and expenses.
 Total superintendence.
2. Ballast:
  - (a) Ordinary.
  - (b) Municipal and legal requirements and property retired.
 Total ballast.
3. Ties:
  - (a) Ordinary.
  - (b) Municipal and legal requirements and property retired.
 Total ties.
4. Rails:
  - (a) Ordinary.
  - (b) Municipal and legal requirements and property retired.
 Total rails.
5. Rail fastenings and joints.
  - (a) Ordinary.
  - (b) Municipal and legal requirements and property retired.
 Total rail fastenings and joints.
6. Special work.
  - (a) Crossings.
  - (b) Other special work.
  - (c) Municipal and legal requirements and property retired.
 Total special work.
7. Underground construction.
8. Track and roadway labor.
  - (a) Surfacing and aligning track.
  - (b) Unloading and laying ballast.
  - (c) Unloading and laying ties.
  - (d) Unloading and laying rail and rail fastenings.
  - (e) Unloading and laying special work.
  - (f) Inspecting and repairing switches.
  - (g) Removing grass and weeds.
  - (h) Cleaning tracks.
  - (i) Patrolling, inspecting and watching tracks.
  - (j) Repairing tools.
  - (k) Rent of teams.
  - (l) Wages trainmen — work train service.
  - (m) Flood control.
  - (n) Municipal and legal requirements and property retired.
  - (o) Removing drift sand from tracks.
  - (p) Miscellaneous track and roadway labor.
 Total track and roadway labor.
9. Miscellaneous track and roadway expenses.
  - (a) Renewal roadway tools and material used in repairing tools.
  - (b) Material and supplies for weed burner.
  - (c) Miscellaneous material and supplies — flood control.
  - (d) Section house and camp expenses.
  - (e) Material used in repairing retaining walls, rip rap, etc.
  - (f) Power and sundry expenses — work train.
  - (g) Operation and maintenance of motor velocipedes and cars.
  - (h) Miscellaneous material and expenses.
  - (i) Municipal and legal requirements and property retired.
 Total miscellaneous track and roadway expenses.
10. Paving.
  - (a) Payroll labor — asphalt and concrete paving.
  - (b) Material — asphalt and concrete paving.
  - (c) Payments to contractors — asphalt and concrete paving.
  - (d) Payroll labor — oil macadam paving.
  - (e) Material — oil macadam paving.
  - (f) Payments to contractors — oil macadam paving.
  - (g) Hire of teams and trucks.
  - (h) Wages of trainmen, power, sundry expenses — work trains.
  - (i) Paving tools.
  - (j) Municipal and legal requirements and property retired.
 Total paving.
11. Cleaning and sanding track.
  - (a) Oiling roadway.
  - (b) Cleaning, greasing and sanding tracks.
  - (c) Municipal and legal requirements and property retired.
 Total cleaning and sanding track.
12. Removal of snow and ice.
13. Tunnels and subways.
14. Elevated structures and foundations.
15. Bridges, trestles and culverts.
  - (a) Bridges and trestles — labor.
  - (b) Bridges and trestles — material.
  - (c) Culverts.
  - (d) Cleaning culverts and bridge channels.
  - (e) Wages trainmen, power, etc., for work trains.
  - (f) Repairs account floods.
  - (g) Bridge tools.
  - (h) Municipal and legal requirements and property retired.
 Total bridges, trestles and culverts.

16. Crossings, fences and signs.
  - (a) Crossings—repairs and renewals.
  - (b) Crossings—paving repairs and renewals.
  - (c) Fences.
  - (d) Warning signals—labor.
  - (e) Warning signals — material and supplies.
  - (f) Roadway signs.
  - (g) Municipal and legal requirements and property retired.
 Total crossings, fences and signs.
17. Signal and interlocking apparatus.
  - (a) Signal and interlocking buildings.
  - (b) Tower operated-signal and interlocking apparatus — labor.
  - (c) Tower operated-signal and interlocking apparatus—material.
  - (d) Automatic block signal system—labor.
  - (e) Automatic block signal system—material.
  - (f) Signal light circuits.
  - (g) Switch lamp and targets.
  - (h) Municipal and legal requirements and property retired.
18. Telephone and telegraph lines.
  - (a) Labor.
  - (b) Material.
  - (c) Wages of trainmen, power and sundry expenses of work trains and line cars.
  - (d) Municipal and legal requirements and property retired.
 Total telephone and telegraph lines.
19. Miscellaneous way expenses.
  - (a) Ordinary.
  - (b) Municipal and legal requirements and property retired.
 Total miscellaneous way expenses.
20. Poles and fixtures.
  - (a) Labor.
  - (b) Material.
  - (c) Wages of trainmen, power etc., work trains and line cars.
  - (d) Municipal and legal requirements and property retired.
 Total poles and fixtures.
21. Underground conduits.
  - (a) Ordinary.
  - (b) Municipal and legal requirements and property retired.
 Total underground conduits.
22. Distribution system (bonding).
  - (h) Bonding—labor.
  - (i) Bonding material.
  - (j) Testing for defective bonds.
  - (k) Wages trainmen, power, supplies, etc., bonding cars.
  - (l) Municipal and legal requirements and property retired.
 Total bonding.
23. Miscellaneous electric line expenses.
  - (a) Expenses light and power department.
  - (b) Miscellaneous.
 Total miscellaneous electric line expenses.
24. Buildings, fixtures and grounds.
  - (a) Carhouses and shops.
  - (b) General offices.
  - (c) Station buildings and signs.
  - (d) Landings and platforms.
  - (e) Docks and wharves.
  - (f) Moorings.
  - (g) Grounds.
  - (h) Section buildings.
  - (i) Municipal and legal requirements and property retired.
  - (j) Miscellaneous.
 Total buildings, fixtures and grounds.
25. Equalization — way and structures.
  - (a) Ordinary.
  - (b) Municipal and legal requirements and property retired.
 Total way and structures — track roadway and buildings.

### II. Electric Line

1. Superintendence.
  - (g) Salaries electrical superintendent, assistants and clerks (proportion).
  - (h) Salaries draftsmen (proportion).
 Total superintendence — electric line.
2. Telephone and telegraph lines.
  - (a) Labor.
  - (b) Material.
  - (c) Wages of trainmen, power and sundry expenses of work trains and line cars.
  - (d) Municipal and legal requirements and property retired.
 Total telephone and telegraph lines.
3. Poles and fixtures.
  - (a) Labor.
  - (b) Material.
  - (c) Wages of trainmen, power etc., work trains and line cars.
  - (d) Municipal and legal requirements and property retired.
 Total poles and fixtures.
4. Underground conduits.
  - (a) Ordinary.
  - (b) Municipal and legal requirements and property retired.
 Total underground conduits.
5. Distribution system.
  - (a) Overhead feeders—labor.
  - (b) Overhead feeders—material.
  - (c) Wages of trainmen, power, etc., work trains and line cars—feeders.
  - (d) Overhead trolley labor.
  - (e) Overhead trolley—material.
  - (f) Wages of trainmen, power, etc., work trains and line cars—overhead.
  - (g) Municipal and legal requirements and property retired.
 Total distribution system (except bonding).
6. Miscellaneous electric line expenses.
  - (a) Expenses light and power department.
  - (b) Miscellaneous.
 Total miscellaneous electric line expenses.
7. Total way and structures — electric line.
  - (a) Ordinary.
  - (b) Municipal and legal requirements and property retired.
 Total way and structures (excluding depreciation).

## Crossing Protection on High-Speed Railway

**Interurban Railway Connecting Indianapolis and Louisville Uses Flashing Lights Behind Hooded Lenses in Combination with Trembling Bell at Thirteen Intersections with Highway**

THE Interstate Public Service Company operates high-speed interurban service between Indianapolis, Ind., and Louisville, Ky., over a 600-volt d.c. line, with overhead trolley. Speeds up to 70 m.p.h. are reached. Both trolley wheels and Miller shoes are employed as contact devices.

For the protection of the public, the company has installed at thirteen of its grade crossings with highways a type of signal comprising a 12-in. trembling bell in circuit with which are four 25-watt Mazda lamps that flash with the current fluctuations caused by the operation of the bell. Each lamp is placed at the focus of an 8-in. hooded lens, so that it is visible night and day. The signal is operated from the trolley wire.

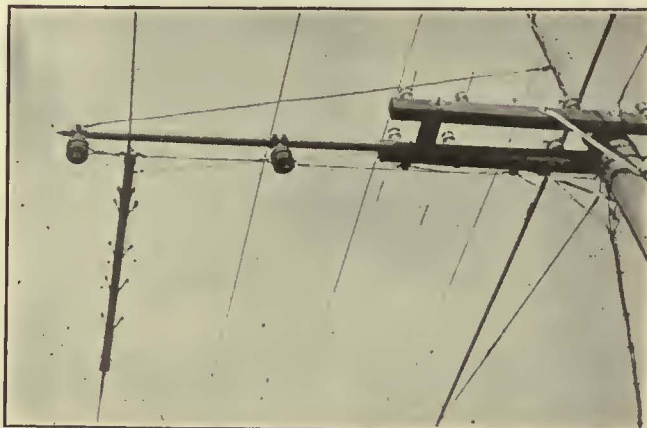
The bell, group of hooded lamps and case containing the operating relays are mounted on a steel pole or standard, which in some cases has been painted in yellow and black stripes, as an experiment, in the hope of making the warning more impressive.

The halves of the light case containing the lenses are separately pivoted, so that one-half may be pointed or "focused" in one direction along the highway and the other in another direction which may be at any angle from the first. While the lamps in these cases are connected in series with the bell, a shunt is provided so that the burning out of a lamp does not open the operating circuit or stop the ringing of the bell, which will

on a pole and "focused" so that the motorman will see it as he passes the contactor. The blinking of the light indicates that the bell is ringing.

The signal at Marshfield, shown in one of the illustrations, is one of those equipped with "overlapped stopping control." In this a unidirectional stopping contactor is located in the overhead a short distance each side of the crossing, the contactor on the far side operating to cut out the bell for each direction. Thus, when the car is held by an accident near the crossing, the bell will continue to ring.

The starting contactors are also unidirectional and



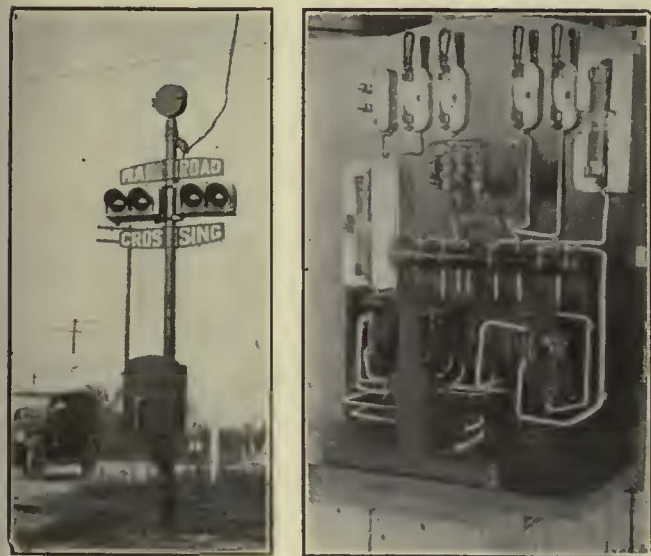
Spine Type of Overhead Trolley Contactor on Bracket Suspension at Memphis, Ind.

are located about 1,500 ft. on each side of the crossing. They operate to start the signal when the car is approaching the crossing, but are inoperative in the other direction.

One form of contactor used is known as the "spine" type, illustrated as installed at Memphis, Ind. This consists of two steel contact strips, supported on an insulating frame, so as to be wiped by the trolley wheel. Each strip has a phosphor-bronze spring forcing it against limit stops at four points along its length. The two strips are connected in multiple and insulated from the trolley wire. The lead runs off the binding post from these strips to the relay to be operated, and thence to ground. A car passing under the contactor diverts a transient current to operate the relay due to its trolley wheel bridging the wire with the strips. The strips are insulated at the middle, so as to give a sense of direction by the order in which the contact is made.

The impulse of current from the trolley contactor is received on a "last-position" relay. This is mounted in an iron relay box at a height convenient for inspection and maintenance. The door of the box is gasketed and padlocked. An accompanying illustration shows the relay board for single-track control and the form of last-position relay used. This is of the quick-acting type, with double-break contacts. The directional relay is mounted above it in the case. The incoming leads pass through disconnecting switches and fuses, so that the maintainer can work safely on the relay. Resistors and terminals are also mounted on the relay board, which is removable as a unit.

Of the crossings protected by the signals, twelve are single-track crossings and one is a double-track crossing. A number of the signals have been in operation for two years or more and have proved to be entirely reliable. They are Nachod automatic highway crossing signals of the BL type.



At Left, Crossing Signal at Marshfield, Ind., with Pivoted Light Cases and Off-Set Relay Box. At Right, Relay Board Complete for Single-Track Control, Removed from Relay Box

continue to give its warning even if all of the lamps are burned out.

A valuable feature of the Interstate Public Service installation is the motorman's indicator, which is installed three or four spans beyond the starting contactor. The indicator is one of the series of flashing lights. It is housed in a hooded light signal, mounted



The "Box-Portable" in Action on United Electric Railway's Safety Car

## Fare Collection at Providence

New Form of Portable Register Proves Well Adapted to Conditions on United Electric Railway's Property—Provision Is Made for Registering Both Cash and Token Fares

THE United Electric Railways, Providence, R. I., has for a number of years used the standard Rooke register in fare collection. This until recently has been a one-coin machine, so that when the fare of 6 cents was collected the passenger inserted a nickel in the register and handed the conductor the extra cent.

On Jan. 1, 1923, the railway put a reduced fare in operation by selling ten tokens for 50 cents, the cash fare remaining as before. This necessitated a new form of register, and the company adopted the type, made by the Rooke Automatic Register Company, which has been used on a number of other properties during the past eighteen months. This is a modification of the previously standard Rooke register by means of which it is practicable to register nickels, dimes and tokens (or quarters). These are inserted in the same slot and registered on separate dials. The same principle can be applied to as high as four or more coins or combinations of coins and metal tickets properly registering on several totalizing counters.

R. R. Anderson, superintendent of transportation United Electric Railways, states that the use of these registers results in a uniform collection system and a uniform accounting system. This is highly desirable on account of the varied equipment operated by the company. The same register is used on cars operated one-man and two-man, the cars being of a number of types. There are pay-within, pay-enter, pay-leave and open-bench cars. In addition the company operates both city and suburban buses, on which the registers also are used. Another feature is the use of these registers for street collections.

On the suburban buses the tokens are not accepted, but the registers take quarters instead. The conductor's turn-in is based on a return of 5 cents for each point on the nickel dial and 25 cents for each point on the other.

For use on the one-man cars in Providence the Rooke people developed a simple "box-portable" which consists

of a steel cash box mounted on a pipe standard and containing an inspection plate. An aperture in the side of the box receives the hand register, which, inserted in the aperture, is operated by a pedal. After registration the coins can be readily removed by the operator.

Among the railway properties besides the Providence company which are using the multiple-coin register are the Union Street Railway, New Bedford, Mass.; the Lehigh Traction Company, Hazleton, Pa., and more than a dozen others.

## Livestock Transportation by Electric Railways

AN INTERESTING statement showing the growth of business in the handling of livestock by traction lines entering the Indianapolis Union Stockyards is included in a report by the traffic manager of the company. The statement covers January and February of this year and permits a comparison with previous traffic. In January this year 905 carloads of livestock were brought to the stockyards here by the traction companies compared to 511 for January a year ago. In February this year 773 carloads were handled compared to 364 carloads in February, 1921. Bert Henley, financial editor of the Indianapolis *Star*, writing on the growth of this feature of the traction freight business at Indianapolis, says:

Statistics compiled by the Belt Railroad & Stock Yards Company reveal that the total amount of livestock handled by the interurbans in January and February of 1919 was 206 cars; in 1920, 267 cars; 799 in 1921; 875 in 1922, and 1,678 in 1923.

These figures cover a period of the year when a seasonable falling off in receipts of livestock is to be expected, and can be taken as fairly representative of the year's traffic. Within the last year or eighteen months, all four of the large interurban companies have made many improvements and changes in order to develop the livestock line of their freight traffic. More changes are to be made during the present year, including purchase of rolling stock and equipment, the remodeling of old rolling stock; the construction of receiving pens at way stations.

In order to facilitate prompt unloading and marketing of stock transported by electric interurbans the Belt Railroad & Stock Yards Company has provided greater switching facilities and extended the unloading platform and receiving pens.

## Changes in Cost of Living Figures

THE U. S. Department of Labor, through the Bureau of Labor Statistics, has completed the compilations showing changes in the retail cost of food in twenty-two of the fifty-one cities included in the bureau's report.

From April 15, 1923, to May 15, 1923, fifteen of the twenty-two cities showed increases as follows: Philadelphia, 4 per cent; Baltimore, Bridgeport, Butte, Cleveland, Louisville, Norfolk, and San Francisco, 1 per cent. The following cities increased less than five-tenths of 1 per cent; Indianapolis, Little Rock, New Haven, Omaha, Pittsburgh, Portland, Me., and Providence. There was a decrease in five cities, i.e., Memphis and Newark, 1 per cent, and Buffalo, Fall River, and Manchester less than five-tenths of 1 per cent. Boston and Richmond remained the same. For the year, May 15, 1922, to May 15, 1923, twenty-one of the twenty-two cities showed increases. Bridgeport was the highest with 8 per cent. Richmond was the only one which decreased, its reduction being less than five-tenths of 1 per cent.

## Track Notes from Detroit

**Special Trackwork Is Laid on Wood Ties for Ease in Replacement—Cause of Corrugation Is Being Investigated**

THE standard system of track construction in Detroit was described in the issue of this paper for July 23, 1921. Briefly, it consists of 100 lb. A. R. A. plain girder rail on International steel ties laid in concrete, which is carried up over the ties and about 1 in. up on the rail. After this concrete bed has set, the remainder of the trench up to the level of the rails is filled with crushed granite, which is crowned between the rails. This is rolled and then filled with rich cement grout and rolled again.

For special trackwork, wooden ties are used instead of the monolithic construction so that parts can be more easily replaced. Broken stone is used under and between the ties, and granite, tarvia and other materials have been used for paving. The bolts for the angle plates and tie rods are spot welded. At present manganese insert special trackwork is being employed, but the tendency is to work toward solid special trackwork of manganese steel or other alloy.

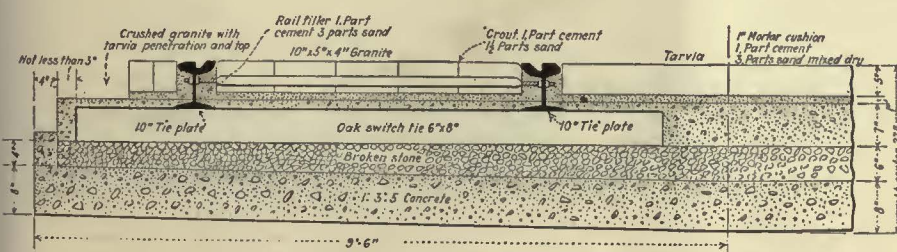
The accompanying engraving shows a typical cross-section of track for special work with sloped base, used by the Department of Street Railways, Detroit.

Very much attention has been given to the study of corrugation, as considerable of this trouble has developed in the 100-lb. A. R. A. rail, which the company has laid. Formerly corrugation had been noticed particularly on sections of the track where the cars are braked to a stop and on down grades, but on the new 100-lb. rail it is quite continuous.

An interesting experiment was tried to determine whether the cause was in the rail or in the type of foundation. Detroit has a short section of open tangent track laid on oak ties with stone ballast and the joints not welded. The 80-lb. rail used in this track has not shown corrugation. Four lengths of it were taken up and the same lengths of the 100-lb. rail were put in, and they developed corrugation as rapidly as in the monolithic construction.

Corrugation rarely develops in two-way track, but it seems always to develop in one-way track, and the theory now held by P. A. Kerwin, superintendent of tracks, is that it is a movement of the metal in the head of the rail produced by the same forces which cause steam railroad rails to creep. As the street railway rail is held so tightly that it cannot creep, the movement has to take place in the metal in the head of the rail.

One peculiar feature of all of the corrugations found in the recently laid 100-lb. rail is that they are about 2 in. in length. In some cases where corrugations have developed in older rails, they have been 4 in. and sometimes 6 in. in length.



Section of Roadbed with Sloped Base for Special Trackwork in Detroit

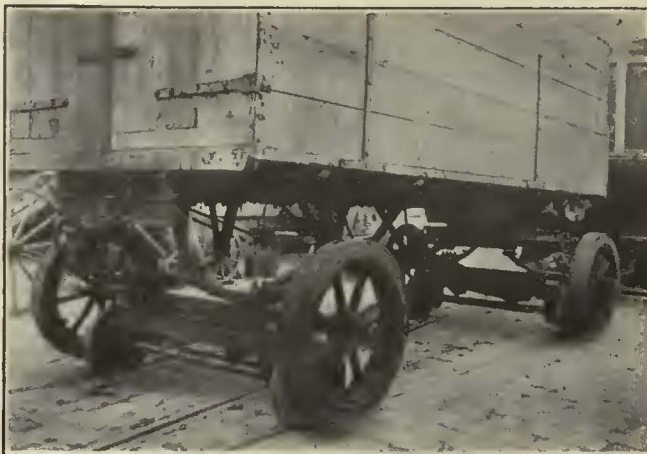
## The Readers' Forum

### A Wagon with Auxiliary Flanged Wheels

VIENNA, AUSTRIA, May 10, 1923.

To the Editors:

I have noted with interest the article in the Jan. 6 issue of the ELECTRIC RAILWAY JOURNAL, page 49, entitled "Hauling Wagons with Electric Cars." The device described in this article was first used in Düsseldorf, Germany. A similar device has been constructed and tried out by the city electric railway in Vienna, as



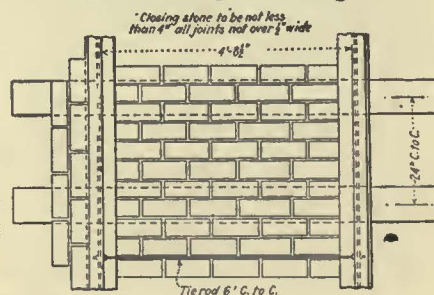
Postal Trail Car Mounted on Auxiliary Trucks to Permit Use on Electric Railway Tracks

shown in the accompanying illustration. Trail trips made with this car have proved satisfactory, but no decision has been reached as to its general introduction.

The illustrations show a trail car of about 11,000 lb. weight, constructed in accordance with the Büssing system. When the trailer is to be run on the railway tracks, a small, single-axle truck is slipped under each trailer axle. Unlike the four-axle auxiliary truck used and illustrated in the ELECTRIC RAILWAY JOURNAL article, this one does not need to be carried around with the trailer, but can easily be removed and set aside.

In the use of the newer auxiliary truck, the car needs to be lifted only a short distance onto the truck, just enough to provide clearance between the rubber-tired wheels and the paving. The trailer is lifted a sufficient distance to admit the auxiliary truck by running the rubber-tired wheels up a pair of light wooden inclines placed outside the rails. The auxiliary trucks are held in place by means of pins by which they are attached to an angle iron mounted under the body. This requires but a few minutes. One of the auxiliary trucks weighs about 670 lb., and a pair will carry about 17,500 lb.

FRANZ SCHREY, Consulting Civil Engineer.



# Association News & Discussions

## Human Maintenance in Industry\*

BY ALDEN COFFEY, M.D.  
Fort Worth, Tex.

THE value of human maintenance to any industry is just as great as the maintenance of machinery, for an expensive machine would not be used night and day without periodically inspecting it to repair damaged parts before it is injured, and the employee should be given the same character of inspection.

The benefits and influences of a thorough human maintenance department are so great that it is impossible to estimate its value. The cost of such can be ascertained exactly, but the monetary returns cannot be determined. How could one estimate the financial gain due to the increased efficiency of an employee who has for years been below par because of some chronic ailment which was discovered by periodical examinations and removed, thereby restoring the man to his full producing capacity?

The work covered by a human maintenance department should consist of the following:

1. Examination of applicants for employment.
2. A periodical examination of employees.
3. Treating the sick and injured.
4. Preventive medicine.
5. Emergency service to the injured.

The examination of applicants for employment is most important. The only proper time for such an examination is before the beginning of employment. It assists materially in the proper placing of applicants. It should be able to show the class and character of the work for which the applicant is best suited. It determines the ability of the individual to meet the public and to get along peacefully with his fellow workmen.

Periodical examination should be made of all the employees at least once a year, extending from the manager to the lowest employee. It should consist of taking blood pressure, examination of urine and a thorough physical examination. This will enable the medical department to render better service, and often will disclose the cause of many accidents.

Treating the employees in the time of sickness and injury enables them to have medical service when in a great many instances they otherwise would hesitate to call a physician on account

of the expense, and they and the company would lose in the time away from their work.

Preventive medicine is the duty of the medical department. In the prevention of diseases it would be necessary to look after the sanitation and general working conditions of the shops and use proper preventive measures for the spread of infectious diseases. Look into the environments of the home life and teach the employees the proper care of the body.

Many injuries which seem to be of minor importance, unless properly treated at the time of occurrence, may later become infected, in some instances producing a great loss of time, or possibly permanent disability. Prompt attention relieves a great deal of suffering and sometimes saves lives.

The advantage of a health maintenance department to the employer are as follows:

1. Increases output by having a steadier working force.
2. Decreases cost of training new employees.
3. Increases efficiency of the employer's service to the public.
4. Secures the good will of the employees.
5. Increases the proportion of old employees, with their gradually increasing value.
6. Reduces compensation for accidents resulting in deformity and death.

The advantages of a health maintenance department to the employee are as follows:

1. Properly places employees according to physical ability and condition.
2. Furnishes better medical and surgical service.
3. Prevents accidents to himself or fellow workman.
4. Reduces permanent disability.
5. Protects from infections or contagious diseases.
6. Prevents loss by finding focal infections.
7. Discovers diseases early.

The health maintenance department increases the output of the man by keeping him well, so that he can work, say, from 75 to 90 per cent of his time, as compared with 25 to 50 per cent of his time when his health is poor. This is a great advantage both to the company and to the man himself. The cost of training new employees is decreased, since with better health there are fewer changes. The loss in the time it takes

to develop a new employee is greater than can possibly be the health maintenance of several men.

The efficiency of the company's service to the public is increased, because the employees are better able to handle the public by meeting them in a pleasant attitude, which they could not do if they were ailing or were suffering from hidden diseases. The spread of infectious diseases among employees and from them to the public is prevented.

By properly placing each employee according to his physical ability to serve, he is enabled to work without being handicapped by some infirmity that would prevent his advancement. Likewise the proportion of older employees will be increased, and their value to the company and to themselves will be gradually growing greater. By properly protecting the employees' health his expectancy of age will be increased materially, making it possible to increase his years of service.

Proper care of those injured should result in quicker recovery, reducing the amount of compensation very materially, due both to the decreased time required for healing and to the reduction in the number of deformities and permanent disabilities that usually follow injuries. Death cases can be reduced to a minimum in many instances, provided the injury is handled properly and with the least delay after its occurrence.

### City Officials Hear About Railways' Paving Problems

SPEAKING before the engineers' section of the conference of Mayors and city officials held at Buffalo on June 13, H. H. George, engineer maintenance of way Public Service Railway, drew attention to the impracticability of preparing a definite specification for street railway track construction which would be suitable for all conditions.

He spoke also on the need of closer co-operation between municipal and utility engineers in relation to the location of surface and underground work. Sewers, water, electricity, gas, telephone, steam mains and sometimes mail tubes occupy space and require frequent service connections to the adjacent structures along the street. Some streets also carry exceedingly large trunk sewers and water mains which are frequently independent of the regular local mains. Practically all of these utilities have manholes and valve boxes which extend to the surface at frequent intervals and these often form quite a collection at street intersections. Instances have been noted of

\*Abstract of an address before the street and interurban railway section of the Southwestern Public Service Association, Fort Worth, Tex., May 16.

as many as eleven manhole covers at one location within the confines of two 50-ft. intersecting streets. When there are many manhole heads in the vicinity of the car track, curves and special trackwork it becomes a nice problem to design tracks to dodge them, and their presence usually causes great difficulty in properly constructing and maintaining the tracks and track pavement.

Concerning the paving obligations of street railways, Mr. George said that the only justifiable basis for the imposition of the paving impost disappeared with the horse cars; the companies today pave and maintain a right-of-way merely because, when the change was made from the horse-drawn vehicles to electrical propulsion, no consideration was given to changed conditions as far as the resultant wear on pavement was concerned. The question of relief from the paving burden is a vital one to the street railway industry. Relief has been granted in a certain relatively small number of cases through special legislation. A good beginning has been made and the sentiment for complete relief is gaining ground among thoughtful people. It would appear to be high time that laws making burdensome paving requirements on the street railway companies should be repealed and the justice of the street railway's claim for relief from the responsibility for paving expense recognized and this burden placed where it properly belongs.

## American Association News

### Heavy Traction

**T**HE heavy traction committee met at New York on June 13. The members present were: A. H. Armstrong, J. M. Bosenbury, H. W. Cope, J. C. Davidson, Mr. Chase (representing J. V. B. Duer), N. Litchfield, L. B. Wells and Sidney Withington, chairman.

The draft of the proposed annual report was carefully reviewed and discussed in detail. The committee members were requested to make suggestions of men who may discuss it at the annual meeting. Suggestions were also requested for activities of the committee for the coming year.

Collection of data which has not yet been completed includes information on electric locomotives below 80 tons weight for industrial purposes and which conform to the M. C. B. standard.

It is understood that a committee of the Association of Railway Electrical Engineers is to study self-propelled car operation. To avoid duplication of effort it was the consensus of opinion that the data collected on this subject be sent to the A.R.E.E. committee of the association interested, with the understanding that the American Electric Railway Association will receive

the benefit of any information which may be collected by the A.R.E.E.

A letter from H. A. Johnson, sponsor, was read in connection with the presentation to the American Engineering Standards Committee of subjects for national standardization. Since these standards primarily concern steam railroads it was held that any presentation to the A.E.S.C. would come more appropriately from the A.R.A. rather than from this association.

### Preparing for Atlantic City Exhibit

**A**T THE time this paper went to press there were applications for more space for exhibits at the annual convention than at the corresponding period in 1919, 1920 or 1922. There was no exhibit in 1921. The application blanks went out to manufacturer members the first part of the month. They called for the usual particulars of space required, dimensions of the largest piece to be shipped, weight of the heaviest pieces, total weight of exhibit, needs in the way of steam, electric power, compressed air, etc., with the regulations adopted by the exhibit committee to govern exhibits at the convention. The chairman of the exhibit committee this year is L. W. Shugg of the General Electric Company, and Fred C. J. Dell is director of exhibits, with headquarters at the association office, 8 West Fortieth Street.

It is the intention of the exhibit committee to allot space shortly after July 1 on all applications received up to that date. To all applications received after July 1 space will be allotted in the order in which they are received.

### Wood Preservation

**A**STEP toward the eventual establishment of uniform specifications for methods of wood preservation was taken at a meeting of the special committee on wood preservation of the Engineering Association in New York on June 15. A report on specifications for brush treatment of poles was submitted. Discussion was held as to the maximum temperature at which the oil should be applied for unseasoned timber and a suggestion was made that the temperature be raised to about 250 deg. F. It was brought out in the discussion that the bristles in the brushes used would not stand up at such a high temperature.

The extent to which non-seasoned timbers, and seasoned timber which has been made wet by rain, would respond to preservative treatment was also discussed. It was brought out that some wood case-hardens on seasoning and will take treatment better if moistened slightly before the application of a preservative. A. P. Way raised a question as to the desirability of recommending the use of grade 1 coal tar creosote oil for the brush treatment of timber. The committee was of the opinion, however, that this grade of oil was not suitable for brush treatment, but thought it would be desirable to

recommend that next year's committee prepare specifications for a type of oil for brush treatments.

Specifications for open tank treatment of poles was the subject of a report submitted by E. F. Hartmann. There was a discussion concerning the result obtained by treating unseasoned or green poles by the open-tank method. A report on specifications for pressure treatment for pine poles was submitted by C. A. Smith. It was thought that these specifications should include the use of grade 2, as well as grade 1, coal tar creosote oil for this purpose, and that the range of temperature of the oil should agree with the existing specifications for treatment of ties and dimension timber.

Because specifications for pressure treatment of poles have not yet been adopted as standard by the American Wood Preservers' Association, the report of this committee was accepted for information only. It was thought that the existing specifications for the purpose of treating crossarms were entirely suitable, and nothing further was done along this line. The perforation process for timber treatment was discussed. A historical sketch, consisting of a review of existing specifications, was presented.

Those present at the meeting were H. H. George, chairman; A. P. Way, M. J. Curtin, W. H. Fulweiler, E. F. Hartmann, E. L. Morier and C. A. Smith.

### Joint Committee on Engineering Accounting

**A**MEETING of the joint committee of the Accounting and Engineering Associations to study the subject of engineering accounting was held at association headquarters on June 15. Those in attendance representing the Accountants' Association were G. F. Dineen, Holyoke, and J. E. Heberle, Washington, while L. R. Brown, Rochester, and E. D. Dreyfus, Pittsburgh, represented the engineering members of the committee.

The study of the committee this year will be the drafting of a suggested classification of detailed accounts in the standard classification for the benefit of those companies which, on account of their size, find it convenient to divide their accounts to a greater extent than is called for in the standard classification. Under the rules of the Interstate Commerce Commission, companies are permitted to do this providing they make no change in the accounts called for in the classification.

It was found that a number of companies have been subdividing the I. C. C. accounts to a considerable extent, and it is hoped that through the work of the committee a more scientific method of following this practice will be available for those companies that wish to adopt it.

The work of the committee last week was devoted largely to reviewing suggested subdivisions of the way and structures capital account, or accounts 501 to 550, inclusive.

# Maintenance of Equipment

## Convenient Commutator Slotter

A COMMUTATOR slotter that provides for both vertical and horizontal adjustment of the armature has been constructed in the shops of the Lehigh Valley Transit Company, Allentown, Pa. It is mounted on a bedwork frame and has a wooden framework at the operating end, for supporting the operating mechanism, and a strap-iron mounting at the pinion end, constructed of 4-in. x 1-in. iron. The slotting saw is driven by



Home-Made Commutator Slotter

a belt from a 1-hp., 110-volt, 60-cycle motor, which is mounted on the bed-plate. The framework for the shaft which carries the slotting saw slides on two 1-in. rods and is moved back and forth to cut the slot by a lever at the outside end. Two vertical rods threaded at the upper ends provide for adjustment of the saw in a vertical direction so as to accommodate commutators of different size.

The armature shaft fits into wooden saddles, which can be raised and lowered by means of screws. Sidewise adjustment of one end of the armature is provided by moving the supports, which are clamped in position by bolts. Thus, commutators which are somewhat out of alignment can be set so as to cut an accurate slot and not leave any mica on the side, or cut away an excessive amount of the copper. A 1-in. pipe

supports a lamp for the convenience of the operator and a hose connection is provided for blowing away the particles of copper dust. A jib crane mounted on an adjacent post is used for handling armatures into and out of the slotting machine.

## Table of Bushing and Pin Data Helps Repairmen

IN ORDER that the shopmen may know exactly the dimensions of parts required in making repairs, the San Antonio Public Service Company has prepared a table which shows the sizes of bushings and pins used on its various equipment of railway cars.

Each type of car is classified separately by the builder's name and series numbers. The apparatus in which pins and bushings are used is listed, and on the same line are given the dimensions of the several parts, and the stock names. This table, which is posted where it will be always available to shopmen, is convenient in making out storeroom requisitions.

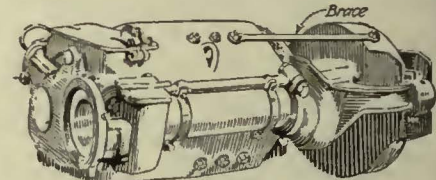
The left-hand columns of the table show the sizes of bushings and pins in stock, and at the right are given the number required per car. It enables the workman to get the correct size from the stock room the first time and insures the use of bushings and pins of the right size.

SIZE OF BUSHING STOCK				ST LOUIS CARS 285-299				
Inside Diam.	Length In.	Outside Diam.	Name	Number per Car	Number Cars	Total	Pin Diom.	Pin Length
1 9/64	3/4	1 3/8	M Air cylinder ram	2	15	30		
1 9/64	1	1 3/8	O Floating lever at ram end	6	15	90	1 1/8	3
1 9/64	3/4	1 3/8	M Tie between dead and floating levers at cylinder	4	15	60	1 1/8	3
1 9/64	3/4	1 3/8	M Air pull rod clevis cylinder end	4	15	60	1 1/8	3
1 1/64	1	1 1/4	I Vertical floating lever	12	15	180	1	2 5/8
1 1/64	5/8	1 1/4	F Connecting link between vertical floating lever and brakebeam bushed in vertical lever only	16	15	240	1	2 5/8
1 1/64	1	1 1/4	I Brakebeam bushed on each end	6	15	90	1	2 23/64
1 1/64	1/2	1 1/4	E Fulcrum pin support of vertical lever	8	15	120	1	2 5/8
1 1/64	5/8	1 1/4	F Adjusting clevis or jaw	16	15	240	1	2 5/8
1 1/64	1	1 1/4	I Adjusting eyebolt	4	15	60	1	2 5/8
1 1/64	5/8	1 1/4	F Breakshoe head (lower hole)	8	15	120	1	2 3/8
5 7/64	3/4	1 1/8	C Breakshoe head (upper hole)	8	15	120	7/8	3
5 7/64	3/4	1 1/8	C Brake hanger links	8	15	120	7/8	3
5 7/64	3/4	1 1/8	C Supporting casting engaging brake hanger links	8	15	120	7/8	3
AMERICAN CARS 270-284								
1 9/64	1	1 3/8	O Floating lever at cylinder stock	3	15	45	1 1/8	3
1 9/64	3/4	1 3/8	M Ram in air cylinder	2	15	30	1 1/8	3
1 9/64	5/8	1 3/8	L Tie rod between floating and dead levers not bushed on dead lever ends	2	15	30	1 1/8	2 1/4-2 3/4
1 9/64	7/8	1 3/8	N Air pulls rod on air cylinder end	2	15	30	1 1/8	4 3/4

This Table of Bushing and Pin Data Aids San Antonio Shopmen

## Brace Holds Gear Case in Alignment

A DIFFICULTY frequently experienced, especially with older types of railway motors, is tilting of the gear case away from the perpendicular. This is because the case is not anchored to the motor frame with sufficient rigidity. Continuous vibration loosens the bolts, after which the finished surfaces rub and wear, so that a tight fit is impossible. The gear case then tilts until the



The Brace Prevents Vibration of the Gear Case

side clearance from the gear is gone, and the gear cuts through the thin metal, making a hole in the side.

To prevent this difficulty the West Penn Railways, Connellsville, Pa., has designed a brace that connects the top of the gear case to the motor frame. This consists of a 1-in. round bar, upset on the ends to provide bosses. One end is fastened beneath one of the pole-piece bolts, and the other to the top of the gear case. The brace entirely prevents the trouble, since vibration cannot move the gear to produce rubbing.



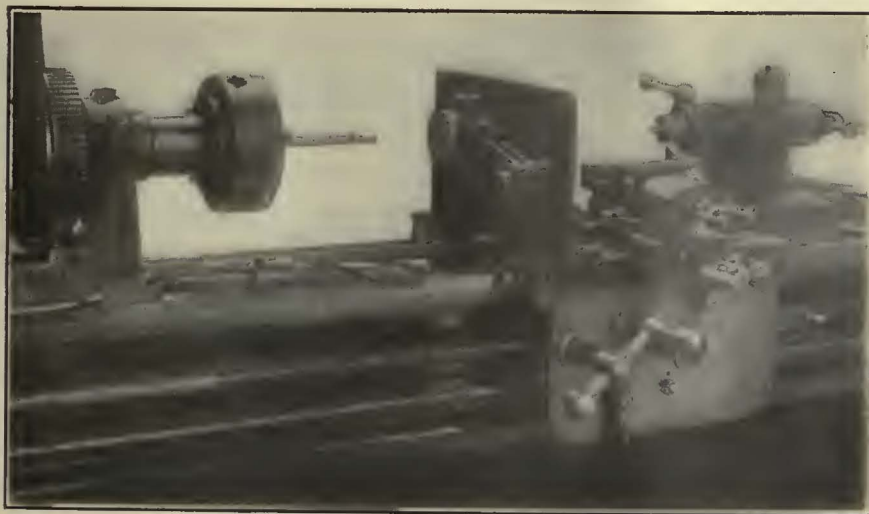
### Trimming Springs with Acetylene Torch

WHEN leaf springs are made in the ordinary forge shop to replace broken springs, or when broken springs are welded, it is necessary to bend the ends exactly to size to give the correct length and to fit the suspension hanger pins. Since on repair work it is not always possible to determine beforehand the exact amount of material needed, there is usually a small surplus which must be trimmed off to make a correct fit. This is frequently done with a hot cutter on the anvil.

The West Penn Railways, Connellsville, Pa., has adopted a practice which is simple and effective. The spring is made exact to size in a jig and the ends bent over to form the link. The surplus metal is then cut off by means of the acetylene torch. This is done while the spring is still in the forge shop, and since there is no hammering, there is no chance for the spring to get out of shape. The metal is cut off cleanly, and the entire operation takes only from two to five minutes.

### Finishing Connecting Rods in Small Lathe

THE accompanying illustration shows the fixtures used for finishing connecting rods for compressors in a small lathe at the Fairview shops of the Lehigh Valley Transit Company. The usual plan would be for such a piece to be held in the headstock of the lathe and rotated, but the lathe used in this case is not large enough to swing the connecting rod, so this is held stationary on a jig bolted to the carriage of the lathe and the cutting tool is rotated.



Finishing Connecting Rods for Compressors in a Small Lathe

The accompanying illustration shows a connecting rod in position for finishing. It is fastened to the face of a jig of L section by means of clamps with two bolts on either side of the rod. A pin projects from the jig to receive the finished part of the rod. The plate used has a base 2 in. wide to provide for fastening

securely to the carriage of the lathe. It is 11 in. high at the base and 1/2 in. thick. After the connecting rods have been babbitted, the bearing surface is first drilled out and finished with a boring bar. The outside portions of the rod are finished with a tool rotating with the spindle of the lathe.

## New Equipment Available

### Hydraulic Pinion Puller

THE accompanying illustration shows the Peerless hydraulic pinion puller, a new specialty being marketed by the Electric Service Supplies Company, Philadelphia. This device is designed to remove pinions from railway armature shafts quickly. It is of light weight so that it readily can be carried to the arma-



Portable Hydraulic Pinion Puller

ture or motor from which the pinion is to be removed. It clamps over the end of the pinion, and since it pulls in a straight line it can be applied to the shaft without removing the armature from the motor.

The action is hydraulic, oil being used as the medium for producing the pressure. This is pumped up by means of a hand lever at the end of the pinion puller. Six sizes of jaws furnish a means of fitting pinions ranging from a minimum diameter of 2 1/4 in. up to a maximum of

9 in. The jaws consist of two heavy steel castings, held together by quick-action clamps. The inside face is machined so as to take care of variations between new and badly worn pinions. The device complete weighs approximately 50 lb., and is supplied with a handle for convenience in carrying.

### Lights Only Indication in New Signal

A SIGNAL in which the indications are given only by colored lights has been developed by the Chapman Electric Railway Signal Company. The separation of the indicating lenses from the operating mechanism is a feature of the apparatus. This permits each to be placed in any desirable location. The case containing the operating mechanism can be placed low on the pole, where it may be inspected and worked on by any one standing on the ground, and the case containing the colored lenses and lamps in a position most easily seen by the motorman.



The Lenses Are Separate from the Operating Mechanism in This Signal

The indicating cases are each fitted with two 6 3/8-in. diameter lenses, one of which, when the lamp back of it is lighted, will show red and the other, when its lamp is lighted, will show green. The lenses are so fitted that they will not give the appearance of being lighted when the sun shines on them. Behind each lens there are two 50-watt lamps, each on a different circuit, so that the failure of one lamp does

not put out the other. All lamps are on circuits separate from the magnets of the operating mechanism.

The operation of the signal is as follows: When a car approaches the signal and the motorman finds it unlighted, he will understand that there is no car in the block. The car thereupon proceeds and as it passes the contactor a green light appears at the near end of the block and a red light at the remote end.

The motorman of a car approaching a signal which is displaying a green light will understand that another car, moving in the same direction, has preceded it into the block. As it proceeds under the contactor, the green light will momentarily disappear, the red light will momentarily be lighted and disappear, and the green come back permanently. The car may then pass the signal. Unless this series of operations, which shows that the car has counted itself into the block, takes place, the car should not proceed. When all cars that have entered the block have passed the clearing contactors at the leaving end, signals will return to their normal, non-lighted condition.

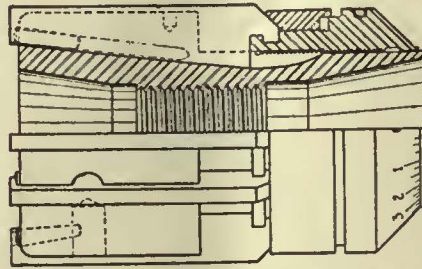
### Roller Bearings Applied to Turntables

APROPOS of the interest in roller bearings in connection with electric and steam railway rolling stock, the recent construction of a turntable for the Canadian National Railways by the Dominion Bridge Company of Montreal is of particular interest.

This is an 85-ft. twin span turntable, equipped with Stafford roller bearings, 5 in. x 9 in. in size. Each bearing is subjected to 48,000 lb. impact load when a locomotive of the maximum weight for which the turntable is designed comes upon the table. The rollers are arranged in two races, staggered, eliminating the continual raising of the load as each roller approaches the crown of the bearing. The turntable is equipped with a 15-hp. motor, whereas, it is said, a 30-hp. motor would be required for operation with friction journal bearings. In addition to their low friction, the roller bearings have the advantage that they require no more power in winter than in summer, as the lubrication resistance is done away with.

### New Line of Expansion Reamers

THE Davis Boring Tool Company, St. Louis, Mo., is placing on the market a new line of expansion reamers. Provision is made for rapid adjustment without the necessity of circular grinding, and individual blade screws are eliminated for holding the reamer blades in the body. The blades are firmly held in the reamer by means



Shell Type Expansion Reamer with Micrometer Dial

of hard taper pins, whose holding power is many times greater than the type of screws ordinarily used. The entire length of the hard taper pin is in contact with the notch in the blade, thus holding it rigidly in the bottom of the slot without interfering with the free movement of the blades for adjustment. The only time that it is necessary to release the taper pin is for replacement of the blade.

In replacing blades, the taper pins are driven out by means of a special drift inserted in "knock-out" holes. When the blades reach their limit of utility in one reamer, they are interchangeable in smaller sizes.

So as to meet various conditions, the expansion reamers are furnished in three types. Group 1 reamers are of superior quality and the methods of expanding and contracting the blades on the taper is by means of a positive micrometer dial graduated in one-quarter thousands. All threads are covered and protected. The taper drive and the internal thread hold the pilot or driving arbor in true alignment.

Group 2 reamers include those designed for shops where a moderate price tool is desired. It employs the forward movement of blades on a taper with the blades advanced and securely held with hardened taper pins. Rigid locking is obtained with a hardened locknut reinforced by a hardened jam nut. The driving arrangement is simple and requires

only an ordinary arbor which can be purchased with the reamer if desired at a very low cost. Group 3 reamers are simple in construction and inexpensive, and are designed for withstanding hard usage. They can be used to advantage in boring as well as reaming. The expansion is by blades held by taper pins in the same manner as for Groups 1 and 2.

### Automatic Window Cleaner

THE Folberth Auto Specialty Company, Cleveland, Ohio, announces the installation of its automatic windshield cleaners on the cars of the Cleveland and Louisville railways. This cleaner consists of a long wiper arm to which is affixed a rubber cleaning blade. The arm is caused to oscillate back and forth by a piston in an air cylinder fastened to the top of the window. The air cylinder is connected directly to the air line on the car, a small reducing valve being located between the cylinder and the air line connection. The cleaner can be operated



Window Cleaner Installed on Cleveland Car

on from 4 to 200 lb. air pressure and can be adjusted to any uniform speed desired.

The Folberth automatic windshield cleaner has been used quite extensively on automobiles, and its new use in electric railway service requires but few changes. A longer and heavier wiper arm with rubber cleaner blade is used and a heavier boss for supporting the driving shaft. Some changes in the interior mechanism have also been made, in order to adapt the piston head and valves for working on air pressure instead of on vacuum as developed by the suction of the automobile motor.

# The News of the Industry

## No Service in Frankfort

Capital of Kentucky Loses Railway Service Because of Unwillingness to Approve Franchise Renewal

Frankfort, the state capital of Kentucky, has been without trolley service since June 5, on which date the franchise of the Kentucky Traction & Terminal Company expired. The question of the renewal of the contract had previously been taken up with the local Chamber of Commerce to see if a franchise could be worked out that would be worth while submitting to the City Council. Three open meetings were held at which several city officials were present. The company's operating statements showed that operations at a 5-cent fare had caused \$12,000 to \$15,000 annual loss. The 6-cent fare allowed during the war period was disallowed fifteen months ago.

### CAN NOT OPERATE AT A LOSS

The company told the citizens that operations would be continued if it could be done without loss. It was willing to waive any claim to a profit. It also agreed to operate under a franchise which the city might draw up, if the company was relieved of paving cost and maintenance of track excepting rails, ties, joints, etc., making up the track structure proper. The desire was for a twenty-year contract subject to discontinuance of operation on thirty days notice from either party. It was to be understood that, under this franchise, the company would assume the obligation of repairing all paving injured through carrying on its own construction work.

At the last meeting of the City Council in May the company proposed an ordinance to continue service thirty days under the terms just mentioned and at a 7-cent fare. The Council proposed an ordinance authorizing continuation of service for thirty days under the old terms of a 5-cent fare and the usual paving obligation. The company refused.

The same night the Council introduced a resolution calling for paving of certain streets in the city. Under the resolution property owners were to pay for paving from curb to track, the city to pave the street intersection and in and between the tracks. The city was to pay for all paving cost of the track, but not for rails, ties, joints, etc. The idea of this resolution was to bring a test case to determine whether the statutes of the State of Kentucky can relieve a company of the paving obligation in making a new franchise con-

tract. No such paving case has heretofore come up for settlement. Whatever procedure is adopted by a city must continue for ten years, and the state law provides that a city must reserve the right to cause the traction company to pave between and 18 in. outside the tracks.

It is the exact interpretation of what a city "may" do under this law that remains to be settled. Where an agreement already covers obligations regarding the track paving the Railroad Commission cannot relieve the company of obligations under the agreement. As the Court of Appeals has not yet passed on the law the whole matter is in the air.

Only two out of 257 people approached refused to sign a petition asking the company to restore service.

The Frankfort Bus & Truck Line Company, with two regular buses and one spare, has been trying to serve Frankfort's population of 10,000. It started operation on June 11 with a 5-cent fare, but after five days went to 10 cents, with four tickets for 25 cents.

## Chicago Wage Arbitration Hearings to Begin June 25

Arbitration of the wage dispute between the Chicago Surface Lines and the Chicago Elevated Railroads and their employees will begin on June 25. Hearings before the arbitration boards probably will be held in the City Council chambers in the city hall and will be open to the public.

The arbitrators chosen at a joint conference of the interested parties and Mayor Dever in his office in the city hall are:

For the public, Francis X. Busch, corporation counsel of the city of Chicago. He was named by Mayor Dever as the umpire or "third man" on the boards and his selection was approved by both sides.

For the unions, Maclay Hoyne, former state's attorney. He served on the arbitration board that settled the wage controversy after the strike of 1915.

For the surface lines, James M. Sheehan, attorney. He likewise served as a member of the board in 1915.

For the elevated railroads, William A. Morrow, attorney.

The cases of the surface and elevated employees will be heard separately. Corporation Counsel Busch, as "umpire," will sit on both boards and Mr. Hoyne, representing the union men, will also serve on both boards.

Both sides signed an agreement to abide by the awards of the arbiters. The wage scale fixed will run for two years from June 1.

## Home Rule Campaign Fails

Despite Governor's Urging Legislators of Tennessee Reject Proposal to Restore Local Control

The effort in Tennessee to abolish the Public Utilities Commission is quiescent for a time, but is by no means dead. This is the opinion of observers of the recent attack on the utilities law in the sixty-third Legislature.

The move to abolish the commission and to return to home rule was urged by Governor Alf Taylor, the Republican incumbent, before the session of the Legislature two years ago and became one of his principal campaign points in offering himself for re-election. On the eve of the November election of 1922, Governor Taylor was most pronounced in declaring he would force the repeal of the act. He accused his Democratic opponent, Austin Peay, Clarksville, of evading the issue. The Governor's boast was that he would restore to the municipalities their right to enter into contract.

Governor Taylor went down to defeat as did also one of Governor Taylor's appointees to the commission, W. N. Beasley, Halls, who during the election campaign promised to lower all the utility rates in the state to pre-war levels.

### COMMISSION ISSUE RAISED AGAIN

With Governor Taylor's defeat and the inauguration of Governor Peay, the public utilities act became a renewed issue when the new Governor in his inaugural speech repeated his pledge to restore the right to contract to the municipalities of the State.

While bills looking toward this end were introduced in both houses of the Legislature in the first week of the session, no action was taken on the floor of either house until after the recess. As the Tennessee Legislature convenes for only seventy-five days, all discussion of public utility matters came in the closing days of the session.

Immediately on the recommendation of the Legislature, Governor Peay summoned the city officials of the nine larger cities of the State to learn their views on the present utility act, and he formulated his program accordingly. There was, of course, a conflict of opinion among the municipal officers as to what would be best or how state authority could be asserted over the utilities in event the act was repealed. On the adjournment of this conference Governor Peay announced that there had been a unanimous declaration for the repeal of the act, and that a committee had been delegated to draw up a

measure to this end. When Governor Peay reassembled the city officials, however, more than a score of cities protested against the repeal of the act, saying that they had found the Public Utilities Commission of the greatest benefit and help in regulating their utility affairs.

Despite this Governor Peay, on March 20, sent to the Legislature an urgent message, and the only special message of the session, advocating the immediate repeal of the act. The House by a majority of seventy-four to thirteen had already voted to repeal, and the Governor's action was expected to coerce the Senate to similar action. This focused the entire fight on the Senate, where the bill was tabled by a vote of eighteen to eleven, thus practically killing the effort to repeal the measure.

Little sentiment was displayed for the repeal previous to the Governor's message, and at the hearing before the public utilities committee of the Senate few representatives of the cities appeared to urge favorable action.

The Mayor and the city attorneys of both Memphis and Chattanooga advocated repeal, while the officials of both Nashville and Knoxville, the two other larger cities, took an opposite view.

#### MAYORS ADVOCATED REPEAL

A committee for the city attorneys conducting a rate case against the Cumberland Telephone & Telegraph Company were unanimous in defending commission rule, and the bill to repeal was reported for rejection.

On the tabling of the measure, a new bill was offered by Senators A. B. Anderson and W. H. Washington, suggesting an amendment to the present law, increasing the personnel of the commission to five and adding a special lawyer to serve as counsel for cities and consumers wishing to protest against utilities. This passed the Senate, but in the press of the final days of the session it was not brought up for consideration by the House.

Several evasive bills were offered to take the larger cities from the commission's control, but these, too, met defeat.

#### Trial of Striking Employees July 10

Col. William J. Donovan, United States Attorney for the western district of New York, announces that a special session of the Federal court will be convened in Buffalo beginning July 10, with Judge John R. Hazel presiding. The special term was called to hear the trial of State Senator Robert C. Lacey and striking employees of the International Railway, Buffalo, charged with conspiracy in connection with the dynamiting of the Buffalo-Niagara Falls high-speed electric train last summer, in which many persons were injured. Two of the prisoners are also charged with perjury in connection with the case. The men will be defended by attorneys representing the Amalgamated Association.

#### \$5,500,000 Electrification Project at Boston

It is estimated that it will cost the city of Boston \$4,500,000 to carry out the provisions of the so-called Dorchester transit bill, the passage of which was referred to briefly in the *ELECTRIC RAILWAY JOURNAL* for June 9. This does not include expense for equipment totaling another \$1,000,000.

The Dorchester transit bill is calculated to give the people of Dorchester rapid transit on Boston Elevated trains as far as Fields Corner, with surface car connections from that point as far as Welles Avenue, over what is at present the Shawmut branch of the New Haven road.

The bill provides that the city of Boston shall finance the entire project, paying the cost of extending the tunnel beyond Andrew Square, changing the railroad tracks on the Boston division and procuring this right-of-way for the Elevated; defraying the cost of land taking and damages and new track equipment, and purchasing the Shawmut branch outright from the New Haven and Old Colony roads at a price not to exceed \$1,000,000. (The Interstate Commerce Commission has estimated the physical valuation of the Shawmut branch as \$1,050,000).

The bill states that after the city has acquired the property it shall be leased to the Boston Elevated at a rental rate of 4½ per cent a year, "upon the fair and reasonable cost, as determined by the Public Utilities Department of the premises and equipment." But it is stipulated that, though the rental shall be not less than 4½ per cent, it shall in any event be one-half of 1 per cent more than the rate of interest the city has to pay on its bonds. The one-half of 1 per cent profit a year accruing to the city is intended to go into a sinking fund, which, in the end, it is anticipated, will amortize the principal. Mr. Ufford has estimated that the city can discharge the entire cost in 40 years.

The method of financing is the same followed in the acquisition of subways by the city and rental to the Elevated.

Apparently the only direct expense to be borne by the Elevated will be the purchase of new cars. At the company offices, it is estimated that 40 new tunnel cars will have to be provided at a probable expense of \$20,000 each, totaling \$800,000. As additional surface cars may have to be furnished for the run beyond Fields Corner, the total expense to the Elevated might reach \$1,000,000.

The principal physical changes decreed in the bill are:

1—Extension of the Dorchester tunnel from its present terminus a few hundred feet beyond Andrew Square so that tunnel trains will come to the surface to the west of the tracks of the Boston division of the New Haven road. This is to bring the tracks under Boston and Power Street and Dorchester Avenue, thus avoiding grade crossings.

2—Use by the Elevated of the railroad right-of-way on the Boston division of the New Haven road from Dorchester Avenue to Harrison Square where the Shawmut branch begins. The railroad tracks are to be moved over toward Dorchester Bay, and

the Elevated trains will run over the present location of the New Haven tracks. Shelters or stations for Elevated passengers must be provided at Columbia Road and Savin Hill Avenue and at such other points as may be agreed upon between the Elevated and the Public Utilities Department.

3—Erection of a terminal at Fields Corner, where the Dorchester tunnel trains will be looped or run dead in, for the return trip to Harvard Square.

4—Use by the Elevated of the Shawmut branch from Fields Corner to Welles Avenue or beyond to serve Milton for single car service connecting with the new rapid transit line.

#### Commission Rules on Deferred Maintenance and Property Appraisal

The Public Utilities Commission of the state of Tennessee recently handed down a decision involving three technical points in the application of the Nashville Railway & Light Company for increased rates.

The first question presented was whether the commission's order of Dec. 31, 1920, should be construed as allowing the company to compute the return on its property from April 1, 1920, or from Dec. 31, 1920. The commission said the latter date was the one intended.

The second question referred to the method of handling the expenditures for deferred maintenance under the order of Dec. 31, 1920. The commission ruled that the proper method was to credit the sum monthly, beginning April 1, 1920, with an amount equal to the excess of the actual expenditures of the company for maintenance during each month over and above an amount equal to 10 per cent of the operating revenue for each month. This sum is not to include charges to maintenance accruals to renewals and replacement reserve, with monthly payments on the deferred maintenance account to be deducted from the earnings of the company under the rate of return prescribed by the previous order. This account must be wiped out by April 1, 1924, the commission held, regardless of the net earnings of the company over 6½ per cent.

The third question settled was whether the expense of the appraisal of the property of the company made in 1920 and the cost of the traffic survey completed in 1921 should be amortized over a period of years. The commission held that the cost should be spread out over a period sufficiently long to allow the company to pay it at the rate of \$1,000 per month, beginning April 1, 1920, and the cost of the traffic survey at the rate of \$500 per month, beginning Jan. 1, 1921.

#### Wages Under Discussion

A new wage agreement on the Berkshire Street Railway, Pittsfield, Mass., is under discussion, the yearly contract having expired June 1. The union has presented its case, but the terms desired have not as yet been made public. It is stated, however, that the request is for a substantial increase over the present scale.

### Electric Service Restored Quickly After Philadelphia Fire

Fire which started under the track floor of the Broad Street station trainshed of the Pennsylvania Railroad at Philadelphia just before midnight on Sunday, June 10, wrecked the entire track floor and the huge trainshed and destroyed a large amount of baggage and railway property in the story below the track floor, including the power plant, which supplied heat and power to the station building. The terminal

the west end of the station to permit electric traffic to be resumed at the earliest moment, using the platform extensions and sheds outside the main shed. By Tuesday morning, thirty hours after the outbreak of the fire, work was actively in progress building new platforms on the wrecked steelwork of the trainshed floor, and as the views herewith show, by the following morning several of these platforms were in service. Before this, stairs had been built for direct access from the

ice being made complete by midnight. By Thursday, June 14, normal steam-train service on two branches was resumed from Broad Street station, and bridge train service was resumed, terminating at West Philadelphia. Within seventy-two hours after the discovery of the fire, 246 trains, or nearly half the total, had been restored and nine of the sixteen tracks were available.

### Pamphlet Will Inform Public

The Omaha & Council Bluffs Street Railway, Omaha, will keep its patrons informed through *Street Car Topics*, a small four-page publication which will be distributed twice a month. The first issue already has been circulated. Copies are placed in tin boxes which have been fastened within easy reach of passengers. In a foreword of the first issue the company states that the aim will be to place before those who ride in street cars facts bearing on various phases of street car operation and service. Further, the foreword says that to attain maximum service at minimum cost harmony and co-operation are necessary with a utility, its patrons, and the public officials charged with the duty of regulating the utility.

### Service Being Improved in Schenectady

The Schenectady strike situation remains practically unchanged. The Schenectady Railway has extended its service to nearly all city lines and is now going ahead with the work of gradually building up a permanent force. While service is being maintained, there is little riding on the cars. Cars are being operated until midnight with no further disorders.

The interurban service is being maintained with a fair degree of patronage, the cars being manned by the old employees.

The State Industrial Commission adjourned its inquiry during the week ended June 23 subject to the call of the chairman. It is expected the members of the commission will render a report of their findings as to the cause of the strike in a week or ten days.



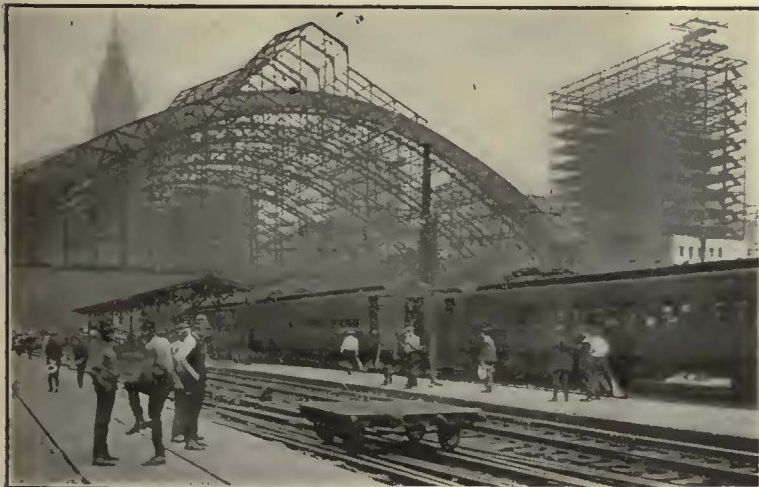
View Showing General Havoc Wrought by Flames

and office building lying east of the trainshed, was not injured. The size and rapid spread of the fire resulted from the antiquated construction of the station, built partly in 1881 and partly in 1893.

With the central point of the Pennsylvania System out of service through the fire, work to restore traffic was taken in hand immediately and with admirable energy. New signaling and dispatching wire lines were run outside the trainshed even while the fire was still in progress, the West Philadelphia and North Philadelphia stations were made terminal points, and crews started to repair overhead conductor wires at

street level to the surviving platform extensions west of the shed, and these went into service even on Monday.

At 11:45 p.m., June 10, when the fire was discovered, the entire station traffic of 529 trains daily was paralyzed. By 5 a.m., Monday, arrangements had been made for trains to terminate at North Philadelphia, West Philadelphia, Thirty-first and Chestnut Streets, and (for the Atlantic City trains) Camden, abandoning bridge train service from the coast. Conductor-wire reconstruction was so rapid that before four o'clock Monday afternoon electric service was resumed from the west end of the station shed to Paoli and Chestnut Hill, this serv-



Electric Trains Being Dispatched from Point Outside of Train Shed



Crew of Tower Car Repairing Overhead Wires

### Arbitration on Detroit Municipal Wages

The request of the employees of the Detroit Department of Street Railways for a 20 per cent wage increase and several changes in the existing working conditions will be arbitrated. The city will name an arbitrator, who will sit with Judge Edward J. Jefferies, the representative of the men, and they will appoint the third member of the board.

The present pay for platform men is \$5 for an eight-hour day. The re-adjustment of schedules is to eliminate inequalities in runs and to bring the employees nearer to the average eight-hour day asked.

A somewhat similar action was taken by employees of the Detroit United Railway in asking for a 20 per cent increase in pay and the uniform readjustment of wages and working conditions on the Flint, Mount Clemens, Monroe and Ann Arbor divisions. At the first meeting between company officials and representatives of the employees methods were planned looking toward an agreement.

### More Action on Dallas-Denton Interurban

The second attempt by legal action to prevent the laying of the line of the Dallas-Denton interurban on Fairmount Street in Dallas, Tex., has been begun by property owners on this street. In former litigation, recently decided by the State Supreme Court adversely to the property owners, an injunction was obtained in the District Court of Dallas County restraining the city from passing an ordinance giving the Texas Interurban Railway authority to lay its tracks on Fairmount Street. This was carried through the Appellate Courts to the Supreme Court, and there the court decided adversely to the property owners. Upon this decision the city passed the ordinance granting the Texas Interurban Railway the right to lay its tracks on Fairmount Street, and work was about to begin when the new action developed. The litigation is holding up the electrification of the Missouri-Kansas-Texas road from Dallas to Denton.

### The Engineer in Public Affairs

Developing participation by engineers in public affairs was strongly evident at a meeting held in St. Paul, June 8-9, of the executive board of the American Engineering Council of the Federated American Engineering Societies. General round-table discussion revealed that local groups in many sections of the country are taking a constructive part in solving community problems. This local effort embraces traffic, smoke abatement, water supply, city planning, state and municipal legislation relating to engineering matters and related subjects. The committee on transportation is considering ways and means whereby the Federated American Engineering Societies may be of constructive

service in relation to the transportation problem of the nation. The committee on storage of coal reported that its plans had been perfected and that the survey was well under way. Sub-committees are being formed in some eighty centers and each member society has been requested to designate a member on each sub-committee.

### Mayor Will Approve Fare Ordinance in Seattle

Salary warrants of the railway employees of the Seattle Municipal Railway, which were due on June 11 and held up for two days, on account of the refusal of the Seattle banks to cash them, are to be paid by the transfer, as a loan, of \$125,000 from the city light fund, provided for in an emergency ordinance which was passed by the City Council.

The increase in fare to the rate of 8½ cents three weeks earlier than expected will in all likelihood result in greatly aiding the Council in meeting the next railway pay warrants on June 25, and will also make easier the way for negotiations with the trustee of the railway bondholders for a modification of the purchase contract.

The immediate increase of the fare is also expected by city officials to influence the attitude of the bankers in future emergencies. Chairman Blaine of the finance committee states that the present difficulties of the railway and the fact that the system will be approximately \$800,000 behind by Dec. 31 are largely due to the four months' experiment with the 5-cent fare.

### Request of Minneapolis Men Refused

Horace Lowry, president of the Twin City Rapid Transit Company, Minneapolis, Minn., has refused the request of trainmen through their organization for a restoration of the wage schedule to 60 cents an hour from 53 cents, the rate which has prevailed since Jan. 1, 1922.

The employees based their request on increased cost of living, increase in pay by other railways, obligation of the company to maintain the 60-cent rate as long as the fare is 6 cents and the better financial condition of the company as evidenced by the recent declaration of a dividend at the rate of 6 per cent per annum as opposed to the 4 per cent rate which has been in effect for some time.

The company replied that living costs were greatly reduced from 1920 to 1922, but that the maximum rate of pay was continued to Jan. 1, 1922. The drop in living costs from 1920 was 19.5 per cent, while the pay reduction was only 11.6 per cent. Only ten of the fifty railways comparable to the Twin City Lines have increased wages. The company said that it had been necessary to cut common dividends for the last five years below a fair return on capital.

### Provision of Kansas Law Fixing Wages Declared Unconstitutional

The Kansas Industrial Court Act has been held unconstitutional by the United States Supreme Court in so far as it permits fixing of wages.

The court held, in a suit brought by the Charles Wolf Packing Company, that the drastic regulation attempted by the Kansas act on the principle that certain industries are affected with the public interest, is clearly invalid under the Fourteenth Amendment to the Constitution.

Under this guise of "public interest" employers and labor have been required to submit differences to the Industrial Court for compulsory arbitration. Thus the court has fixed wages.

The state has also used the Industrial Court to keep prices of essentials—food, clothing and fuel, chiefly—at reasonable levels. The court's action was based chiefly on that section of the Kansas law which forbids workmen the right to strike.

Chief Justice Taft delivered the court's opinion, which was unanimous. Mr. Taft concluded:

We think the Industrial Court act, in so far as it permits the fixing of wages, is in conflict with the Fourteenth Amendment and deprives the plaintiff of its property and liberty of contract without due process of law.

### Arbitrary Deflation Would Be Unwise

It is the general consensus of opinion of the research committee of the National Monetary Association, as announced at its recent meeting, that the economic and monetary affairs of the world are in such a disturbed state that the formulation of any specific plan for stabilization at the present time is extremely difficult, especially in view of the wholly anomalous distribution of the world's monetary stock of gold.

There was general agreement that any arbitrary attempt toward deflation or a return to any fixed pre-war standard was at the present time unwise and likely to bring about far more disturbance of business and industrial conditions than could compensate for any possible gain.

### Union to Erect Building in St. Louis

The local division of the Amalgamated Association for St. Louis, Mo., has purchased the entire frontage on the west side of Grand Boulevard between Bell Avenue and Windsor Place for a modern office building. The purchase price of the ground alone is said to have been \$100,000.

The proposed building will contain stores on the ground floor with offices and meeting halls for various local unions in the upper stories. A feature will be a large auditorium. Unions now housed in other structures are expecting to seek quarters in the new building of the carmen.

## News Notes

**Wage Agreement Being Negotiated by Interborough.**—Preliminary discussions have begun between officials of Interborough Rapid Transit Company, New York, and representatives of employees with a view to extending or modifying the existing wage agreement which expires June 30. Present wage schedules were accepted by the employees in July, 1921, to be effective for one year. The period of the agreement was extended in July, 1922, for twelve months to June 30, 1923.

**Receives Policies as Gifts.**—Three hundred employees of the Tri-City Railway, Rock Island, Ill., received as a gift from the company insurance policies in the Traveler's Life Insurance Company effective for the current year. They were in amounts corresponding to the length of service. To qualify for a policy one must have been in the employ of the company six months. The policies contain a disability clause ineffective after the policy holder reaches the age of sixty years. Those who have been employees of the company for ten years received policies in the sum of \$1,500.

**Wage Increase Sought.**—The Cincinnati street car men's union has sent a formal notice to the Cincinnati Traction Company seeking an increase in wages for the 1,700 employees. The increase sought averages 17 cents an hour. The present pay of motormen and conductors is 43, 45 and 48 cents an hour. The present agreement expires on July 1. If no agreement is reached the matter will be settled by arbitration as provided for in the contract between the traction company and its employees.

**Men Adopt Real Slogan.**—"He who does only what he is paid for is paid for only what he does." This motto has been posted in the carhouse of the Springfield (Mo.) Traction Company. At various times the men adopt mottoes to be posted in the shops to encourage them to do their work. Usually the signs pertain to methods of "safety first." For the year 1923 the motto will be placed in conspicuous places in the carhouse and shops to remind the men of their true value to the company and their duty toward themselves.

**Seeks Franchise Approval.**—Application was filed with the Public Service Commission on June 8 by the New York State Railways asking for the approval of a franchise granted to the company by the city of Utica to operate an extension of its present street railroad lines along James Street in the city of Utica. The proposed extension will start from the present track on James Street and extend in an easterly direction to St. Vincent Street, connecting with a loop upon private property. A franchise was granted by the city on May 7, 1923.

**Paving Obligation Will Be Argued.**—Judge E. S. Morris has taken exception to the ruling of Judge N. B. Hunt, who recently passed judgment for the Henderson Traction Company to the effect that the company was not liable for street paving between the rails and 12 in. on each side of them and an immediate appeal was granted to the Court of Appeals. Judge Morris will go to Frankfort to hear and argue the case when the higher court sets a date for same. The City Commissioners are anxious to get a final hearing as early as possible so they will know how to proceed in awarding contracts for street paving this summer.

**"All Aboard" Appears.**—*All Aboard* is the clearing house through which all news of the various departments of the United Electric Railways, Providence, R. I., will pass. This monthly pamphlet made its debut on June 1 and will appear each month in the interests of the employees. In the first issue A. E. Potter, president and general manager, tells what he thinks a company publication should do and urges all to send in contributions and suggestions for betterment of service, etc. Six years ago the employees of this company had their own paper, which was known as *The Trolley*.

**Discharge of Employee to Be Arbitrated.**—The employees of the Middlesex & Boston Street Railway, Newtonville, Mass., will not strike because of the discharge of William Rowse, a motorman, whose car was in collision with another. Judge Pierce of the Supreme Court, after a lengthy hearing on June 15, denied a preliminary injunction asked for by the company, and said that he agreed with James H. Vahey, counsel for the union, that a disputable question was involved that should be settled by arbitration. Pitt F. Drew, who represented the railway, announced that he would abide by the decision of Judge Pierce, and that the company would arbitrate.

**Home Rule Urged for Wisconsin.**—Home rule or the local regulation of the rates and services of electric light and power, railway, gas, telephone and other public utility properties by the cities in which they operate instead of by the Railroad Commission was recommended in an address by Arthur A. Bentley, Mayor of LaCrosse and president of the League of Wisconsin Municipalities, at its twenty-fifth annual convention of that organization in this city. Mr. Bentley said that the control of utilities by the Railroad Commission was to a degree right in principle, but in actual practice many cities of the state have found that it sometimes works a grave injustice to the small taxpayer.

**Transit Conferences Started.**—Conferences between the New York Transit Commission and a committee named by the Board of Estimate have begun and will continue until the difficulties in the way of the construction of new subways

have been removed or until it is evident that there is no hope of agreement between the two bodies. No conclusions were reached but the six men went over the maps and routes of the lines proposed by the Mayor and by the Transit Commission. Routes on which there is little disagreement include the Brooklyn Crosstown and Washington Heights lines, and hope was expressed that an agreement might be reached to start construction.

**Saving Power in Dallas.**—The power-saving campaign conducted by the Dallas Railway continues and gratifying results are shown, according to Richard Meriwether, vice-president and general manager. C. J. Crampton, in charge of employment and safety, is authority for the declaration that one motorman became so enthusiastic over the power-saving drive that on a long coasting trip he called back to his conductor, "Pull down the trolley, Ed, and save the wheel." George I. Plummer, superintendent of traffic, told the men that, regarding the power-saving campaign, another source of power loss is stopping, or rather starting, in a curve. He advised trying to coast around all curves and make stops clear of same.

**Grants Temporary Injunction.**—Federal Judge John R. Hazel in Buffalo has issued a temporary injunction upon application of counsel for the International Railway restraining the Collector of Customs at Niagara Falls from forcing the traction company to suspend service over the upper steel arch bridge at Niagara Falls Sundays, holidays and between sundown and sunrise. The temporary restraining order is effective until June 25, when arguments will be heard by the court to make the injunction permanent. The reason advanced by the government is that the International has failed to obtain a special permit required under the 1922 tariff law. Such a permit would enable the company to unload passengers and merchandise at the American end of the two bridges at the prohibited hours.

**Proposed Vote on Trolley Rehabilitation.**—The new board of Aldermen of Goldsboro, N. C., in their first regular session, ordered an election to see whether the city should spend \$35,000 to equip and put the Goldsboro Street Railway in operation. This is the second time within a year that the same resolution was passed, the old board several months ago ordering such an election, which was never called. The rehabilitation of the Goldsboro property has been referred to previously in the *ELECTRIC RAILWAY JOURNAL*. It was announced early in the year that the people would vote in about six weeks to decide whether the city would put the car system in operation again. At that time it was stated that the city had about \$35,000, which was realized from the sale of the old power plant, and that the city was holding the money as a sort of trust fund. Later, it was said that the amount of money to be used for the rehabilitation of the property had been increased to \$40,000.

## Foreign News

### One-Man Car Experiments in England

The working of an experimental one-man car on the London United Tramways for the past year has proved so successful that the tramway companies are engaged in the conversion of several ordinary cars to the one-man type. St. Helens Town Council is about to try a car of the same design. It is a single-deck car, seats thirty-four passengers and is divided into two compartments, one of which is for smokers.

### Cost of Road Surface Maintenance

For many years tramway authorities in Great Britain have agitated against the injustice of the law, which is set forth in the tramways act of 1870, which imposes on them the work and the cost of maintaining the street paving between the rails and tracks. When the law was passed horse cars were of course the rule, so that there was a justification for the arrangement. But electric cars do not wear out the road surface at all, and since the advent of the auto tramway authorities are bearing the ever-increasing burden of repairing surfaces which are smashed up by heavy motor lorries and buses.

The latest effort to obtain relief has also resulted in failure. The London County Council recently applied to the Ministry of Transport for a grant from the national road fund (which is derived from the taxes on automobiles) for road surface maintenance. The reply is that the Ministry has no power to give financial assistance from the road fund for such a purpose. It was of course never intended that the road fund should help tramway authorities; its disbursements go to general road maintenance. That, however, does not lessen the growing hardship from which the tramways are suffering.

### London Underground Railway Improvements

While the work of construction for extensions and improvements on the London Underground Electric Railways is going on merrily, and while the bills in Parliament to authorize further extensions are having a smooth passage, detailed improvements are being put in hand almost from day to day. One of the latest announcements is that a contract has been placed with John Mowlent & Company for £67,784 for escalators at Tottenham Court Road station. There are now two separate stations at Tottenham Court Road, one for the Central London line on the street level and one for the Hampstead line which is below the road surface. The former station is to be abandoned (with the consequent loss of the existing lift facilities) and the Hampstead line booking

hall made common for the passengers of both lines.

Considerable improvements will be made here by way of enlarging this common booking hall to accommodate the traffic which will result. The Hampstead line lifts will also be abandoned and will be superseded by escalators which will convey passengers direct to the platforms of both Central London and Hampstead line stations. Passimeters will be installed in place of the existing booking office. The scheme of reconstruction also provides for a stairway connection from the site of the existing Central London booking hall to the new improved booking hall and circulating area beneath the roadway.

The merging of these two stations into one and the provision of escalators will enable passengers to reach the platforms in a much shorter time than at present. The fact that the escalators will take passengers right to the platform levels will also be welcomed as it entirely eliminates the traversing of long corridors after leaving the lifts.

### Subway and Tramway Purchases Approved

A Parliamentary Commission sitting in Glasgow on April 10 granted an order to the Glasgow Corporation conferring powers on the corporation to purchase the Paisley tramway undertaking and the Glasgow Subway undertaking. Both of these formerly belonged to and were worked by private companies. They will now be worked as parts of the Glasgow tramway system. As already announced, the corporation had come to agreements for the acquisition of both the Paisley tramways and the subway, but it was only recently that legislative sanction was obtained. There was one point of much more than local interest before the Parliamentary commission. This was in reference to the subway, which is an underground railway forming a circle and worked by cable haulage. The corporation proposes to electrify it. On behalf of the municipality it was stated that the Ministry of Transport maintained that the subway was a railway and that it ought to be dealt with as such by the corporation. The latter's reply was that it was merely an underground tramway, and the suggestion that it should be managed as a railway was viewed with apprehension by the corporation, having regard to the fact that a railway was subject to an elaborate code of regulations involving a great many obligations imposed appropriately on a railway but entirely out of place in the case of a small undertaking like the subway. For working the subway the corporation would use its own

tramway staff, but if it was made a railway the enterprise would require a separate staff and the corporation would become to all intents and purposes a railway company. It was also pointed out that the tramways were part of the common good of Glasgow, and the proposal was that the subway should be purchased on the security of the common good. Unlike municipal tramways in other towns, there was no power to fall back on the local rates to make good deficiencies, and if the subway was treated as a separate unit it was not possible to see how to deal with either a deficit or a surplus. The commissioners decided that the subway should be taken over on the footing of a tramway and not as a railway. The commission also refused an application by the Ministry of Transport for power of control of tramway fares. Certain tramway extensions sought by the corporation were approved.

### \$5,000,000 for Escalators

It is estimated that the cost of providing escalators or moving stairs now arranged for at numerous London tube railway stations will amount to nearly £1,000,000. The escalators will take the place of lifts and have the double advantage of greater carrying capacity and the saving of passengers' time. Two new contracts for the installation of these contrivances relate one to Moongate Street Station, where the foundation company will put them in at a cost of £42,574, and the other to Shepherd's Bush Station, where Messrs. J. Cochrane & Sons will install the moving stairs at a cost of £21,709. Moongate Street is a dense city station, while Shepherd's Bush is suburban.

### Ticket Selling Machine a Success

The London underground railway companies are so satisfied with the new automatic ticket-issuing machines at Victoria Station that they propose to introduce a similar arrangement at Waterloo Station. A device has been fitted which enables a warning bell to be rung in the station booking office when the stock of tickets in the machines is running low. All the machines are electrically operated and a clever arrangement permits of their refusing money if the machine is out of order or the stock of tickets is exhausted.

### Central Office Under Construction

Rapid progress is being made with the construction of new central offices at St. James' Park Station for the London underground electric railway companies. The new offices, which have an area of about 45,000 sq.ft., are being constructed immediately over the tracks of the Metropolitan District Railway and are built upon massive girders weighing, altogether, 400 tons. There will be six stories and when complete the building will accommodate a staff of approximately 400. The work will be completed during 1923.



## Financial and Corporate

### St. Louis Company Does Better

United Railways Reports Surplus of \$513,091 for 1922, Compared with \$303,045 for 1921

Rolla Wells, receiver of the United Railways, St. Louis, Mo., reports net income of \$513,091 for the year ended Dec. 31, 1922, as compared with \$303,045 for the year 1921. The statement of earnings of the company is as follows:

or extended was 491.41 miles for the nineteen years, or more than the grand total of mileage of the company at present.

It is impossible here to do more than touch upon some of the high spots of the report. Among other improvements four automatic substations were installed during the year. Mr. Wells says that the year 1922 was one of great activity in the shops of the company. The number of passenger cars owned at the end of 1922 was 1,579, of which 1,400 were motor cars and 179 trailers.

UNITED RAILWAYS, ST. LOUIS			
CONSOLIDATED INCOME AND EXPENSE STATEMENT FOR THE YEARS ENDED DEC. 31			
	1922	1921	
Operating Revenue			
Revenue from transportation:			
Passenger revenue.....	\$19,701,598		
Special car revenue.....	29,694		
Express revenue.....	8,826		
		\$19,740,118	\$19,498,946
Revenue from other railway operations:			
Station and car privileges.....	\$176,705		
Rent of equipment.....	1,908		
Rent of buildings and other property.....	16,334		
Sale of power.....	28,490	223,437	159,604
		\$19,963,555	\$19,658,551
Gross operating revenue.....			
Operating expense and charges			
Current operating expense:			
Way and structures.....	\$1,268,788		
Equipment.....	1,505,824		
Power.....	2,099,256		
Transportation expense.....	6,535,401		
Traffic expense.....	23,630		
Injuries and damage reserve.....	1,197,813		
General and miscellaneous.....	764,796		
Depreciation reserve.....	1,500,000		
	\$14,895,508		
Taxes.....	1,845,723		
		16,741,231	16,768,915
Total operating expense, depreciation and taxes.....			
		\$3,222,324	\$2,889,635
Income from operation.....			
Non-operating income			
Rents—Less: Taxes and expenses.....	\$8,796		
Interest on deposits.....	13,540		
Interest from investments.....	180,282		
Miscellaneous.....	213	202,831	216,349
Gross Income.....		\$3,425,155	\$3,105,985
Other Deductions			
Interest on funded debt.....	\$2,339,807		
Interest on receiver's certificates.....	294,000		
Interest on mill tax judgment.....	143,779		
Interest on notes payable.....	109		
Amortization of discount and expenses on receiver's certificates and extended funded debt.....	108,229		
Income tax on bond coupons.....	23,414		
Bank services—payment of bond coupons, etc.....	2,725	2,912,063	2,802,939
Net income for the year.....		\$513,092	\$303,046

Mr. Wells, in his comments, has gone into the work of the company for the year at considerable length. A statement by him of the capital expenditures made during the year shows that the total additions amounted to \$1,065,939. This sum was divided among the several grand divisions as follows: Way and structures, \$366,779; equipment, \$564,352; power, \$134,804. Against this were total deductions of \$107,104, as follows: Way and structures, \$69,349; equipment, \$107,104. This left the net additions for the year at \$958,832.

The total mileage of the system (in single track) on Dec. 31, 1922, was 460.93. In 1922 the company reconstructed 23.54 miles. A table contained in the report shows that since 1904 the amount of track reconstructed, renewed

Fifty new cars of the so-called 777 type were completed during the year, making a total of 101 cars of this type completed and in service. In this connection it is interesting to note that ten of these cars were provided with independent air compressors, replacing the old storage air equipment. An analysis of the work order made in connection with the construction of these cars in the company's own shops showed that more than 1,100 different items of material were used in the manufacture of this type of car.

The receiver says that 665 cars were equipped with Economy meters. They were installed on all cars operating from the Park, Jefferson and Geyer and the De Baliviere and Neustead stations. He explains that it was expected that

the installation would be completed early in 1923 on cars operating from all stations. In discussing the installation of the meters the receiver said:

Total investment for installing meters and other necessary equipment was estimated at \$105,800, operating cost of instruction and clerical force for first year \$15,100, making a total expenditure for the first year of \$120,900. Based on results already shown, and on average energy cost for years 1921 and 1922, annual gross saving in power cost would be \$189,900, or a net saving of some \$69,000 at end of first year of complete equipment. Besides the tangible saving in power, indications are that cars are being operated more safely and that greater care is taken on the equipment, which should make a further saving in maintenance of electrical equipment and in brake-shoe and wheel wear.

Reference is made by the receiver to the status of the valuation case before the Missouri Public Service Commission. He said in this connection that a tentative valuation would be handed down before mid-summer. As noted in the ELECTRIC RAILWAY JOURNAL for June 9, this has since been done. The valuation is of course tied in with the matter of rates. In discussing the rate adjustments the receiver said:

On June 30, 1922, the Missouri Public Service Commission issued an order extending the present 7-cent fare to Aug. 1, 1922; on Aug. 24 a supplemental order was issued extending said fare to Dec. 31, 1922; on Dec. 26, 1922, an order was issued extending the 7-cent rate of fare until such time as the commission should issue its order in the valuation case.

The accompanying statement shows the principal traffic statistics of the company for the years 1922 and 1921.

	1922	1921
Revenue passengers.....	286,076,475	282,447,190
Transfer passengers.....	152,261,868	150,562,354
Total passengers.....	438,338,343	433,009,544
Percentage of revenue passengers using transfers.....	53.22	53.31
Average fare per passenger (including transfers).....	4.49c	4.49c
Average fare per revenue passenger.....	6.89c	6.89c
Passenger car-miles.....	44,229,300	44,229,210
Revenue passengers per car-mile.....	6.47	6.39
Total passengers per car-mile.....	9.91	9.79

The necessity of analyzing work orders and accounts more in detail had been realized for some time, the receiver says, and in devising the new system, considerable thought was given to the problem of working out an accounting scheme that would not only take care of the stock records but would supply information for the general books and for detail analysis of work orders. Mr. Wells says that these ends have been accomplished, without duplication of work, by the aid of Powers accounting machines, consisting of a punch machine, sorter and printer tabulator. A card which contains all data required is punched for each charge and for each credit. These punched cards are sorted mechanically by catalog number, account number, work order number, etc., depending on the class of information desired, and are then run through the printer tabulator, which furnishes printed lists, with totals, which lists are used as a posting medium for general books and subsidiary records. Mr. Wells says that this

system, at a very reasonable expense, has enabled the company to insure accuracy in work order costs and to get much desirable information which would have been very expensive and difficult to obtain otherwise.

The burden of taxation which the company bears is strikingly illustrated in a detailed statement of the amount set up on this account during 1922. In addition to direct taxes of \$1,808,692, the company expended \$477,992 for street paving, and furnished free transportation for the police and the firemen of St. Louis. The total of taxes and street paving costs for the year 1922, was \$2,355,061, or 0.823 cents per revenue passenger, as compared with 0.791 cents per revenue passenger in 1921.

During the year 1922 the average distribution of power on a kilowatt-hour basis was as follows:

	Per Cent
Purchased water power.....	55.9
Purchased steam power.....	27.4
United Railways' plants.....	16.7

The prolonged coal strike of 1922 made it necessary for the company to supplement the use of coal in the receiver's power plants with some other form of fuel. After careful investigation it was decided to install fuel-oil burning equipment, and ten boilers at the Central power station and ten boilers at the Northern power station were equipped with oil burners and the necessary auxiliary apparatus, such as storage tanks and pumps. For a period of thirty days the majority of the power supplied by the receiver's plants was generated by oil. The oil burning equipment is being held for future emergencies.

### International Seeks to Establish \$96,539,185 Value

Additional evidence was heard during the week ended June 16 by the Public Service Commission in the rate proceeding pending before the commission in an attempt on the part of the city to have the 5-cent fare re-established on the local lines of the International Railway, Buffalo. Three witnesses

were sworn by Coleman J. Joyce, counsel for Mitten Management, Inc., which operates the local and interurban lines of the International. The company is seeking to establish its valuation at \$96,539,185 for the entire system.

The witnesses included Charles Hansel, consulting engineer for the Pennsylvania and the Reading Railroads; William K. Myers, vice-president of finance of the Philadelphia (Pa.) Rapid Transit Company; George W. Fuller, consulting engineer of Summit, N. J., former member of the Pennsylvania Public Service Commission. These men constitute the valuation committee of the International. They estimated the cost of engineering and superintendence at \$2,225,195; preliminary promotion costs prior to construction, \$885,295; administration and legal expenses, \$2,065,688; taxes during construction, \$515,000; working capital, materials and supplies, \$1,457,544.

### Ford Gets \$2,000,000 Detroit City Issue

Short-term notes for \$2,000,000 have been issued by the Detroit City Comptroller to Henry Ford and Edsel B. Ford to finance extensions to the municipal railway and to finance city expenditures for equipment. The notes bear interest at 4 per cent and will provide funds until city tax money begins to come in on July 15.

According to a statement of Clarence E. Wilcox, Corporation Counsel, the legislative act increasing the bonding limit of the city of Detroit did not change conditions so far as the prospects go for financing the city with funds obtained in New York. The New York buyers are not disposed to purchase bonds unless the municipality issuing the bonds has a net bonded indebtedness well within a fixed percentage of the assessed valuation.

The Michigan Legislature has increased the bonding limit of the city of Detroit so as to enable the expenditure of \$80,000,000 for subways. In view of the fact that Detroit is now close to the 7 per cent limit, any further large bond issues will probably be sold only to private capitalists.

### HOLDERS OF ILLINOIS TRACTION Preferred to Receive Extra 1 per Cent

The regular quarterly dividend of 1 1/2 per cent, at the rate of 6 per cent per annum, will be paid on the preferred stock of the Illinois Traction Company on July 2. An additional amount sufficient to make the combined payment equivalent to 7 per cent per annum for the quarterly period ending July 1, 1923, will be paid to shareholders who exchange their Illinois Traction preferred stock for the preferred stock of the Illinois Power & Light Corporation.

Payment in adjustment of such amount will accompany the certificates of 7 per cent cumulative preferred stock of the Illinois Power & Light Corporation issued in exchange. The certificates will be dated July 2, 1923, or thereafter for exchanges subsequent thereto. It is contemplated that dividends on the 7 per cent cumulative preferred stock of the Illinois Power & Light Corporation will be declared regularly at the quarterly periods payable Oct. 1, Jan. 1, April 1 and July 1 of each year. This stock will have full voting power, a privilege which the holder of the Illinois Traction preferred did not enjoy.

The Illinois Power & Light Corporation has issued a thirty-two-page booklet descriptive of the company and illustrative of its properties.

### Plan of Key System Transit Announced

The financial plan of the Key System Transit Company which will take the place of the present San Francisco-Oakland Terminal Railways, will be as follows: common stock, \$3,300,000; 7 per cent preferred, \$6,100,000; 7 per cent prior preferred, \$8,350,000; Oakland Railway notes, \$2,500,000; general and refunding 6 per cent mortgage bonds, \$1,121,000; general and refunding 5 per cent mortgage bonds, \$6,417,000; first mortgage bonds, \$2,500,000; divisional 6 per cent bonds, \$465,000.

The East Oakland Railway, a subsidiary of the Key System Transit Company, will issue \$250,000 in bonds in exchange for underlying issues outstanding.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares* 1913 = 4.84	June 1923 6.92	May 1923 6.88	June 1922 7.04	May 1921 7.24	May 1923 6.88
Street Railway Materials* 1913 = 100	May 1923 173	Apr. 1923 175	May 1922 166	Sept. 1920 247	Sept. 1921 156
Street Railway Wages* 1913 = 100	June 1923 210	May 1923 208	June 1922 211	Sept. 1920 232	Apr. 1923 207
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	May 31 1923 6.98	Apr 30 1923 7.29	May 31 1922 5.25	July 31 1920 11.12	Feb. 28 1922 4.14
U.S. Bank Clearings Outside N. Y. City (Billions)	May 1923 15.58	Apr. 1923 15.00	May 1922 13.08	Mar. 1920 18.54	Feb. 1922 10.65
Business Failures Number	May 1923 1,467	Apr. 1923 1,638	May 1922 1,775	Jan. 1922 2,722	May 1922 1,467
Liabilities (millions)	31.77	51.66	48.21	105.7	31.77

**Conspectus of Indexes**  
for  
**June, 1923**  
Compiled for Publication in this Paper by  
**Albert S. Richey**  
Electric Railway Engineer  
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Eng. News-Record Construction costs 1913 = 100	June 1923 220.7	May 1923 216.7	June 1922 166.6	June 1920 273.8	Mar. 1922 162.0
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	May 1923 156	Apr. 1923 159	May 1922 148	May 1920 247	Jan. 1922 138
Bradstreet's Wholesale Commodities 1913 = 9.21	June 1923 13.38	May 1923 13.67	June 1922 11.90	Feb. 1920 20.87	June 1921 10.62
Dun's—Wholesale Commodities 1913 = 120.9	June 1923 191.4	May 1923 192.9	June 1922 170.0	May 1920 263.3	July 1921 159.8
U.S. Bur. Lab. Stat. Retail food 1913 = 100	May 1923 143	Apr. 1923 143	May 1922 139	June 1920 219	Mar. 1922 139
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	May 1923 160.3	Apr. 1923 159.1	May 1922 154.9	July 1920 204.5	Aug. 1922 154.5

\*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials Index is relative average price of

materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motor-men and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

**Number of Passengers on Sacramento Lines Increase**

The accompanying table from the annual report of the Pacific Gas & Electric Company for the year ended Dec. 31, 1922, shows the progress made by the Sacramento Street Railway in the matter of total passengers carried and gross revenue. It is stated that largely as a result of the installation of a number of one-man cars the company was enabled to conduct its railway operations without loss of efficiency upon a somewhat more profitable basis than for some years past.

purchase price was \$135,000 for the right, title and interest of the company's franchise, etc. Cars and second and third mortgage bonds were sold in various groups for from 25 cents to \$1 each.

**Change in Name Made.**—Shareholders of the Public Service Corporation of Quebec, a subsidiary of Shawinigan Power, have ratified by-laws providing for changing the name to the Quebec Power Company and increasing the capital from \$3,000,000 to \$10,000,000. Of this \$4,000,000 will be preferred. This company is expected to absorb the

Seventh Avenue Railroad, New York, N. Y., have voted to issue 11,000 shares of no par common to take the place of the present common stock. It is proposed to exchange the new stock for old \$100 par common on the basis of one share of new no par common for each share of outstanding common, and provision was made to exchange the outstanding \$100 par preferred stock for new common on the basis of one and three-quarter shares of new common for each share of preferred stock outstanding. The directors have likewise been empowered to issue two shares of the new no par common for each \$100 face value of the notes of the company outstanding.

COMPARATIVE STATISTICS OF SACRAMENTO STREET RAILWAY FOR LAST DECADE

Year	Miles of Street Railway Track	Cars Owned	Total Passengers Carried	Car-Mileage	Car-Hours	Average Passengers per Day	Gross Revenue
1912	40.0	62	11,926,098	2,301,342	276,438	32,674	\$547,187
1913	42.0	60	12,508,744	2,469,745	301,930	34,270	572,913
1914	42.9	60	12,256,142	2,481,968	303,263	33,578	556,908
1915	43.1	66	9,485,490	2,684,508	294,739	25,988	425,338
1916	43.9	66	10,044,428	2,919,041	299,873	27,519	442,303
1917	43.9	66	10,616,953	3,069,408	313,040	29,088	491,021
1918	43.9	70	11,331,864	3,067,599	312,439	31,046	534,068
1919	43.9	70	14,079,372	3,228,306	331,704	38,574	671,105
1920	44.1	76	15,770,295	3,210,112	332,895	43,206	753,028
1921	44.2	76	16,021,805	3,380,119	349,840	43,895	779,639
1922	44.1	76	16,075,231	3,171,580	329,737	44,042	799,192

**Auction Sales in New York.**—At the public auction rooms in New York there were no sales of electric railway securities this week.

**Fight Against Remaining in Receivership Lost.**—The Eighth Avenue Railroad and the Ninth Avenue Railroad, New York, have lost their fight before the United States Supreme Court against remaining in the hands of Job E. Hedges, receiver of the New York Railways, by decision of the highest court.

**Dividends Declared.**—The Duluth Superior Traction Company has declared two dividends of 1 per cent each on the 4 per cent cumulative preferred stock for the quarters ending March 31, 1923, and June 30, 1923, both payable July 2 to holders of record on June 15. In April of this year two dividends of 1 per cent each were paid.

**Common Stock Dividend Increased.**—The Eastern Texas Electric Company, Beaumont, Tex., has declared a quarterly dividend of \$2.25 a share on the common stock and the regular semi-annual dividend of \$3 a share on the preferred, both payable July 2 to holders of record June 20. Previously \$2 a share quarterly was distributed on the common stock.

**Service to Grove City Stopped.**—Service on the Orient-Grove City branch line of the Indiana, Columbus & Eastern Traction Company stopped at midnight on June 16 in accordance with orders of the Federal District Court and the Ohio Public Utilities Commission. Application to halt service was due to loss in revenue attributed by the company to "unregulated bus competition."

**Property Sold for \$135,000.**—The Slate Belt Transit Company's property, operating at Nazareth, Bangor and Allentown, Pa., has been sold at receiver's sale to Joseph T. Hambleton, representing the reorganization group. The

Quebec Railway, Light, Heat & Power Company which it now controls.

**Loss of \$1,232 for Three Months.**—The United Traction Company, Albany, N. Y., for the first quarter of 1923, reports railway operating revenues amounting to \$905,674 and operating expenses \$738,240. From the gross income of \$180,540 there were total deductions, including rent for leased roads, interest on funded debt, other deductions, etc., of \$181,773. This leaves the company with a net corporate loss for the period ended March 31 of \$1,232. The corporate deficit at the end of the period amounts to \$3,419,475.

**Ratified Stock Increase Proposal.**—The stockholders of the Louisville Railway have ratified a proposal to increase the authorized capital stock from \$20,000,000 to \$35,000,000. Amended articles of incorporation to this effect were filed by the company on June 1. The increase in the authorized stock is to make it possible for the company to hold stock of affiliated transportation companies, including its new \$200,000 bus division. It may also hold some stock in certain rail or water transportation companies from which it receives freight tonnage.

**Bridge Line Passes Dividend.**—The stockholders of the Manhattan Bridge Three-Cent Line, Brooklyn, N. Y., have been informed by letter that the dividend payment due at this time will not be paid. There is \$450,000 common stock outstanding on which 5 per cent annually has been paid since 1919. The passing of the dividend was decided upon as a measure for conserving the cash position of the company until such time as disposition has been made of the claims likely to arise out of the accident on the line on May 1, referred to in the ELECTRIC RAILWAY JOURNAL for June 9, page 978.

**Stockholders Authorize Exchange.**—The stockholders of the Broadway &

**Preferred Stock Offered.**—Spencer Trask & Company are offering at 93½ and accrued dividend to yield about 7.50 per cent, \$1,500,000 of Consolidated Power & Light Company's 7 per cent cumulative preferred stock. The Consolidated Power & Light Company directly and through its subsidiaries owns and operates without competition, the entire electric power and light and electric railway business in Huntington, W. Va., Roanoke and Lynchburg, Va., and surrounding communities, as well as the gas business in Ironton, Ohio, Ashland and Catlettsburg, Ky., and the intermediate territory. The proceeds of this issue are to be used in part to provide funds for the purchase and installation of a new 20,000-hp. unit at the Kenova generating station necessary to meet the demands for electric power and service from the manufacturing industries in and about Huntington.

**Shareholders at Montreal Reported Restive.**—Pointed suggestions to shareholders of Montreal Tramways & Power Company are being distributed anonymously in Montreal and are believed to be a step toward breaking the long endured silence as to the exact position of the company. This has been a sealed book to the public for years. The circular is an open letter to the president and directors giving notice that an extraordinary general meeting of the company should be called. The letter in outlining the objects to be considered, deals with the points that everyone would like answered, profit and loss account, balance sheet, also appointment of a shareholders committee to inquire into the affairs of the company. According to the *Financial Post* the fight is against E. A. Robert, president, whose genius conceived the arrangement under which control of fares and earnings rests with a commission under the city while management remains with the private ownership. No one is disposed, says the *Post*, to deny Mr. Robert credit for this work, but he is considered as rather apt to disregard the rights of minority stockholders. Stockholders of the Montreal Tramways & Power Company have felt that he has failed to treat them properly during the past few years. He has given them no information that would enable them to judge of the value of their holdings.

## Traffic and Transportation

### Stops a Problem

#### Detroit Department of Street Railways Concerned Over Growing Menace of Accidents

A construction program and stop plan have been suggested by Ross Schram, assistant general manager of the Detroit Department of Street Railways, to reduce traffic accidents and speed up automobile and railway traffic. The plan includes the construction of 500 traffic safety zones annually with loading points for street cars three blocks apart instead of one and two blocks apart as at present.

Most drivers are content to average 20 m.p.h., which is a reasonably safe rate, but as traffic is constantly held up the tendency is to speed to make time. The license bureau for three months has been issuing drivers' licenses at the rate of more than 300 a day. Therefore, if steps are not taken to assure a fair average speed for vehicles, accidents would appear bound to grow in number. The stopping of street cars does more to prevent a sustained average speed for motor vehicles than any one other factor.

#### SKIP STOP PLAN DESIRABLE

The D. S. R. is prepared to adopt at once a three-block stop plan on its entire system; that is, it will make stops spaced at an interval of three average length blocks. In addition to this the department would be willing, in its own interest and that of the public, to co-operate with the Department of Public Works to the extent of financing and building not less than 500 safety zones each year.

It is the plan that these safety zones will not be of the raised concrete type, but rather on the order of the post and chain type now being tried at Woodward Avenue and Kitherell Street. Plans for an improved type of zone of this kind have been made.

It is stated by Mr. Schram that the proposed stop plan would reduce the running time on the railway lines from two to five minutes and add only one-half block to the distance to be walked by pedestrians to reach a car stop. Moreover, adoption of the new plan would result in a saving of approximately \$100,000 a year in the cost of operating the street cars.

### Six-Cent Fare in East Cleveland

East Cleveland, a suburb of Cleveland, with a population of 30,000, ceased to have a 5-cent fare on June 19, although Cleveland riders continue to pay only a nickel. For the next five years East Cleveland car riders will pay a cash fare of 6 cents. Tickets will, however, be sold at the rate of nine for 50 cents, with a penny charge

for a transfer ticket without any rebate.

Unlike Cleveland, East Cleveland does not have a service-at-cost franchise arrangement with the Cleveland Railway. Instead it operates on a five-year price agreement with an ordinance that specifies minimum service and calls for arbitration in the event that the city and company cannot agree upon an equitable fare rate for a five-year period. Almost a year ago the Cleveland Railway insisted upon a 6-cent fare for East Cleveland riders and a board of arbitration granted this rate, to become effective on June 19, the day of the expiration of the first five-year franchise period.

### Litigation Ends in Salt Lake City Over One-Man Cars

The operation of one-man cars in Salt Lake City by the Utah Light & Traction Company has become a reality. The company's employees have withdrawn their objections to them, and the city ordinance prohibiting the use of such cars has been repealed. Beginning June 3 one-man cars were placed in operation on six of the company's routes, and additional ones will be operated in the near future. Ultimately, it is stated, about 50 per cent of the cars in operation will be converted to the new system. An increase in wages of 5 cents an hour has been granted by the company to the operators of these cars. The service on the lines on which they are operated will be increased from 33 to 50 per cent.

For some time past the Utah Light & Traction Company has had several of these cars in operation. However, each car has been in charge of two men, pending the outcome of an action brought by Salt Lake City against the traction company to test the validity of the city ordinance requiring each car to be operated by two men. This action has now been dismissed and the ordinance repealed. The case started last November with the arrest of one of the company's employees for operating a car with only one man. Complaint was filed in the City Court, the company was found guilty and fined \$25 by stipulation of both parties. The company appealed the case to the Third District Court in order to test the jurisdiction of the city in this case. The demurrer of the company set forth that there was no public offense and that the court had no jurisdiction, but only the Public Utilities Commission had power to rule in this case.

The repeal of the ordinance was by unanimous vote of the city commissioners, all opposition to the one-man cars having been withdrawn on the part of the company's employees, and those of the public who opposed them having failed to continue their objections.

### Shriners Ride Electric Way

#### Pass and Solicitation Under Busmen's Noses Got 90 per Cent of Shriners' Rides for Electric Railway

Like hawks espying their prey from afar, a group of New York "rubber-neck" busmen descended upon the Shriners' convention at Washington in the week of June 4 fully resolved to snatch all possible business away from the Washington-Virginia Railway, in whose territory many of the gatherings were held. So confident were they that they came down with some twenty to thirty vehicles and posted barkers at the entrance to Shrine Park to din the delegates with the news that they could ride into Washington for 50 cents and get a return trip to their Pullman car hotels for \$1.

Had the innocent Shriners known that the busmen had no authorized or definite stands in Washington, the invaders would have carried practically no traffic at any time. At first, they did have a little success because they stationed themselves at the park entrance, which was just out of sight of the Washington-Virginia tracks. Their triumph proved of short and profitless duration. A couple of leather-tongued railway men supplied with batches of weekly passes soon drove them from the field. When these electric ride salesmen began to explain that unlimited, transferable riding could be obtained between Alexandria and Washington for \$1.60 a week the message got under the fez at once, with the result that some 1,500 passes were sold.

#### PASSES A SALES LEADER

Nor is that all of the story. The passes really served as a sales leader because the dashing tactics of the railway management got everybody to talking about the electric railway service and its general superiority. Thus the 1,500 passholders proved to be a nucleus around which gathered a much larger sale of cash fares at 24 cents and round-trip fares at 40 cents. In fact, the company estimates that it got 90 per cent of the business.

As for the invaders, by the second day the leader of the busmen had become so obnoxious in his desperate effort to get business that he was disposed of by the simple method of having him arrested as a public nuisance. From that time on his cohorts retreated from the field to pick up a little sight-seeing travel before scuttling back to Harlem.

### Discuss Railway Discontinuance

The Colorado Utilities Commission and the Trinidad Electric, Transmission, Railway & Gas Company are discussing the question as to whether or not the company may discontinue its electrically propelled street cars. The company is not running its street cars, and motor buses are taking care of the traffic. The company maintains that it has been unable to make receipts meet operating expenses for several years and that last year it lost \$24,000.

## Passenger Service Details Under Public Relations Head

All matters pertaining to passenger service, including sale of tickets, has been taken over by the department of public relations of the Indiana, Columbus & Eastern Traction Company, according to an announcement from headquarters in Springfield, Ohio. This change will permit W. S. Whitney, former general passenger and freight agent, to devote his entire attention to the freight business of the company. Ticket sales, advertising and publicity will be handled directly henceforth by the public relations department. A statement says:

The department of public relations will, through publicity, seek to better our relations with the traveling and shipping public; through advertising create a demand for passenger service, and through the sale of tickets, close the contract. From then on it will be up to the transportation department "to deliver the goods."

Under this co-ordinated plan, officials pointed out, the department can direct its publicity and advertising to fit in with the sale of tickets, so that a campaign may be conducted more efficiently than if the separate departments handled the work as heretofore. Arthur V. Bland is in charge of the department.

## Fewer Car Riders in Buffalo

Jitney competition in Buffalo is responsible for a big falling off in passenger revenues on the local lines of the International Railway for the first quarter of 1923. Figures filed by the company with the Public Service Commission show passenger revenues and car riders for the three months ended March 31 as follows:

Quarter Ended	Passenger Revenues	Passenger Fares
March 31, 1920	\$2,339,079	43,768,267
March 31, 1921	2,575,664	40,057,144
March 31, 1922	2,505,683	38,536,723
March 31, 1923	2,111,520	32,324,064

The claim is made by the municipal authorities in the rate proceeding pending before Commissioner Pooley of the Public Service Commission that unpopularity of the management of the International, growing out of the strike last July, is responsible for the falling off in the number of car riders and passenger revenue.

**Extra Charge if You Ride Late.**—The Indianapolis Street Railway, after June 30 next, will charge a fare of 10 cents a passenger for its owl cars. The commission granted the company an increase of 5 cents on its plea that the old rate was unprofitable.

**Prohibits Jitney Soliciting.**—The City Council of Columbia, S. C., recently passed an ordinance prohibiting jitneys from running through the principal business streets soliciting passengers. The fare on the jitneys is 10 cents and on the cars of the Columbia Railway, Gas & Electric Company 7 cents.

**Seven-Cent Fare Likely.**—Des Moines is to have a 7-cent fare by July 1 if the stabilizing account is increased by \$20,000. The sum of \$22,270 was added

during April, it was announced. The fund now is in excess of \$130,000 and the franchise granted the company calls for \$150,000. When that sum is reached the company must reduce the fare from 8 to 7 cents per passenger.

**Will Seek Six-Cent Fare Continuation.**—The Dallas Railway, Dallas, Tex., does not expect nor want the 5-cent fare restored in Dallas when the one-year extension of the 6-cent fare privilege expires on June 27. The company has already notified the City Commission that it will ask for a continuance of the 6-cent fare after June 27, and it is expected that the grant will be made by the city for another year. In return for the grant of increased fares for another year, the company will be asked by the city to make improvements and betterments in its service.

**One-Man Cars Operate.**—Six one-man cars are now in operation on the lines of the Columbia Railway, Gas & Electric Company, Columbia, S. C. Two-man cars are also being operated. The new cars are light and are equipped with various safety devices; they are being well patronized and are easy riding and do not make so much noise as the larger and heavier vehicles. Before putting them in operation the company published in the local daily papers large advertisements calling on the public to patronize the street cars and "bank the difference."

**Will Try Pass Plan.**—The Sacramento Northern Railroad was granted authority on June 9 by the State Railroad Commission to adopt the weekly unlimited pass system of fares. The plan already is in effect in several southern California communities. The Sacramento Northern Railway will apply the plan in Sacramento, Chico, Veeino, Barber, Chapmantown, Mulberry, Marysville, Yuba City and between Marysville and Yuba City, where it operates local car lines. It will not be effective on the Sacramento-Swanston line. The plan, it is specified, is experimental and is to be tried during the period beginning immediately and ending Nov. 25.

**Wants Seven Cents.**—E. W. Oliver, general superintendent of the Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., has sent an ultimatum to the town of Merriton declaring that he will recommend to the executive of the federal-owned road the surrendering of the existing franchise unless the company is granted a 7-cent fare on the local line and is guaranteed protection against buses and jitneys. The franchise in question will not expire for six years. Mr. Oliver protests that the franchise is burdensome, imposing very stringent conditions as to fares and paving. He proposes a new franchise for the railway company under which rehabilitation is promised, the company to pay for everything in excess of what it would cost the town if the tracks were not there.

**Allows Fare Increase.**—The application of the Fishkill Electric Railway to

increase its fare was granted by the Public Service Commission on May 28. The old rate of fare had been 6 cents in the city of Beacon and extending to a zone limit in the hamlet of Glenham, with two 5-cent zones extending from there to Fishkill Village. The through rate for these two zones was 8 cents. The new rate combines these last two zones into a single 7-cent zone and changes the rate in the city of Beacon to the zone limit in Glenham to a 7-cent fare. There was no public opposition to these changes. The Public Service Commission, however, made a careful study of the conditions before granting approval.

**Subject to City Regulation.**—The Texas Legislature has passed a bill known as Senate Bill No. 45, which has for its purpose the regulation of motor trucks and jitney lines operating for hire on public roads and authorized streets. Suburban and interurban railroads to operate motor trucks or jitney lines for transportation of passengers in incorporated cities and towns are subject to regulation by said cities and towns and within 5 miles thereof under regulation by commissioners' courts of the county. The law amounts practically to an extension within a 5-mile zone adjacent to municipalities of franchise rights held by transportation companies within said cities and towns.

**Securing Names for Petition.**—Jitney owners and operators are securing names to a petition asking for a referendum vote on the agreement, in the nature of a city ordinance, with the Birmingham Railway, Light & Power Company which goes into effect on July 1, and which puts the jitneys off Birmingham's downtown streets. Heads of the jitney men's organization claim they have 6,000 names signed to the petition, and that they will get the required number. Under the law 15,000 names of legal voters must be signed to the petition before a referendum vote can be called. As the agreement, or ordinance, goes into effect July 1, city officials are of the opinion the jitney men will not be able to secure the required number of names in time to call the election.

**One Stop in Safety Zone.**—On the recommendation of Captain James McDowell of the Police Traffic Department, each car of the Los Angeles Railway will make only one stop for loading and unloading passengers in the safety zone. When a car is standing at the front of the safety zone, waiting for the traffic signal to proceed, and two following cars stop behind in second and third position, they will load and unload passengers. The second and third position cars will cross the intersection without a second stop. This is considered an important step in speeding up service in the downtown district. This group movement of street cars at downtown intersections became effective on June 12. The plan under which it is being operated was described in a recent publication of the railway.

## Legal Notes

**FEDERAL COURTS—Ordinance Held Not to Fix Maximum Fares Beyond Power to Change.**

An ordinance granting a street car franchise was passed in 1919 and fixed the fare for the first twelve months at 6 cents. It was provided, however, that at the end of that and each succeeding twelve months period the company should submit a statement of its receipts and expenditures and should return to the city any excess over expenses and a reasonable return on the investment. The fare should then be reduced to only that necessary to provide a reasonable return, and that the valuation of the company's property may be appraised in a manner prescribed in the franchise. It was held that this franchise does not show a contract binding on the company to accept the rate of fare prescribed for the first year as a maximum fare for the life of the franchise, that the company retained its right after the first year to a reasonable return on the value of its property used in the public service and that it was not prevented from attacking an ordinance fixing the same fare for subsequent years. [City of Paducah, et al., vs. Paducah Railway, 43 Sup. Ct. Rep., 335.]

**CALIFORNIA—Doctrine of "Last Clear Chance" Defined. Duty at Stops.**

To make a defendant liable, under the last clear chance doctrine, it must appear that the defendant was not only aware of the danger in time to have avoided the injury, but must have known that the plaintiff was oblivious of his danger and unable to avoid it, and further that the defendant failed to exercise ordinary care to avoid the injury.

An instruction that it was the duty of the motorman and conductor to make sure, by looking to see, that plaintiff had alighted from the steps of the car, and if the jury found that either or both of them neglected to perform such duty, and in consequence plaintiff was injured, etc., verdict should be for plaintiff, was not erroneous, as assuming that the car had come to a stop and was again started before plaintiff had alighted, especially where other instructions clearly submitted such issue to the jury. [Gainer vs. United Railroads of San Francisco, 208 Pacific Rep. 1013.]

**GEORGIA—What Are Tracks?**

"The word 'tracks' means the space included between the outside edges of the outside rails of each line," according to the Supreme Court of Georgia, "and is not dependent upon the length of the cross ties." This case came up in a paving suit brought by an abutting property owner against

the City Council of Augusta. [Rowland vs. City Council of City of Augusta, 113 Southeastern Rep., 2.]

**INDIANA—Contract Requiring Company Constructing Crossing Over Railroad to Pay Expenses of Repairs Held Void.**

A contract between a railroad company and a traction company, whereby the railroad company granted permission to cross its tracks at a street intersection in consideration of the traction company's agreement to pay all expenses incurred by the railroad company in repairing and renewing the crossing after its construction by the traction company, held void as against public policy and without consideration, since the traction company had the right to cross the railroad, and it was the absolute duty of each company to keep its own track in repair. [Terre Haute, I. & E. Traction Co. vs. Ross, 138 Northeast. Rep. 90.]

**IOWA—Street Railway Not Obligated to Maintain Safe Landing Place.**

The duty which the law imposes upon an ordinary railroad to provide and maintain a safe place for landing its passengers has no application to a street railway, its duty in such case being limited to the selection of a reasonably safe place for passengers to alight. The relation of passenger and carrier terminates the moment the passenger descends from the street car to the street. [Morris vs. Omaha & C. B. St. Ry., 187 Southwest. Rep., 510.]

**MINNESOTA—Mandamus Requiring Street Railway Company to Permit Examination of Books Cannot Be Avoided on Grounds Specified—City Can Also Examine Books of Holding Company.**

After the entry of judgment for the issuance of a writ of mandamus requiring a street railway company to permit the representatives of a city to inspect the books and papers of the company in connection with a valuation and the establishment of rates of fare, compliance with the command of the writ cannot be avoided on any of the following grounds: (1) That application for the inspection should have been made to the Commission instead of to the court; (2) that such an application had been made to and denied by the Commission; (3) that the proposed inspection was not relevant to the inquiry before the Commission; (4) that the city had an adequate remedy in the ordinary course of law; or (5) that the judgment and writ went beyond the findings. The city representatives should also be permitted to inspect the stock books of the holding company, as facts tending to throw

light on the ultimate questions to be determined by the Commission are relevant. [State vs. Minneapolis Street Railway, 191 Northwest. Rep. 1004.]

**MISSOURI—In Collision Between Car and Delivery Wagon, Railway Held Liable for Injury to Helper on Wagon, Though Driver Was Negligent.**

In this case the driver of the delivery wagon and his helper were seated on the front seat when the delivery wagon was crossing the track, and the helper (the plaintiff) warned the driver of danger but was assured that everything was all right. Negligence was charged against both the chauffeur and the motorman, but the court held that the plaintiff had fulfilled his duty by warning the chauffeur. The owner of the delivery wagon, a bakery concern, was held not liable because the driver and the helper were fellow servants. [Rowe vs. United Railways of St. Louis, 247 Southwest Rep. 443.]

**NEW YORK—City Cannot Provide for Establishment and Operation of Bus Lines on Established Routes, Except in Compliance with Statute.**

Where there was no lack of adequate transportation facilities on a bus line as established, except for a short distance, and there was no demand or necessity for a line, and no possibility of maintaining one, there was no emergency; but, even if there was an emergency, the city of New York was not authorized to provide for the installation and operation of buses on established routes by private individuals, without compliance with the law relative to grants of franchises, consents of property owners, etc. [Kingsbridge Railway vs. City of New York, 198 New York Sup. 135.]

**NEW YORK—Franchise with Privilege of "Renewal" on Revaluation Held to Give Absolute Right to Renew.**

Where a franchise to a street railway company was granted for ten years, with a privilege of renewal for an additional period of fifteen years on a fair revaluation of the franchise, the original grant gave an absolute right to the additional period, and proceedings for the determination of the revaluation for the additional period were not governed by Greater New York Charter, Secs. 72, 73, 74, as section 74, providing that this act applies to renewals or extensions, refers to renewals or extensions beyond the terms of the original grant.

Where such a contract provided for the appointment of appraisers, and stated that, if the annual rate was not fixed within the specified time, the company shall pay the old rate until the new rate is determined, that company could prevent, by appropriate proceeding, the city from unduly delaying the appointment of the city's appraiser. [Manhattan Bridge Three-Cent Line vs. City of New York, 198 New York Sup. 49.]

## Personal Items

### Messrs. Dahl and Menden Head Brooklyn Company

Financier and Lawyer Heads Executive Committee of Successor to  
B. R. T. as Chairman—Engineer Long with Road Has Been Made  
President in Charge of Operation

Gerhard M. Dahl, a leading figure in the reorganization of the Brooklyn Rapid Transit Company, was elected on June 14 chairman of the executive committee of the board of directors of the successor company, the Brooklyn-Manhattan Transit Corporation. At the same time William S. Menden, who had been general manager for Receiver Lindley M. Garrison, was elected presi-

This in short summarizes the attitude of the new head of the company to the problem of public relations. It is a statement of policy, but it represents the personal attitude of the head of the system toward matters of this kind in every instance in which he has had to do heretofore. In it is bound up the creed which attracted attention to Mr. Dahl in his post some years back as railway commissioner of Cleveland, when affairs there under the service-at-cost plan were largely in the making, and again brought him to public attention in connection with the handling of the affairs of the New Orleans Railway & Light Company. He it was who went to New Orleans, secured the co-operation of local banking interests and then set about the work of rehabilitation which culminated in the successful reorganization of the company as the New Orleans Public Service, Inc.

To say Mr. Dahl did the lion's share of the work in connection with the New Orleans reorganization does not mean much to those unfamiliar with that situation unless something is said about the extent of the chaos out of which the company there was lifted. At one time in the affairs of the New Orleans Railway & Light Company it appeared that the property had fallen heir to all of the ills that could possibly come to any utility. The public was disgruntled with the company, the city officials were at loggerheads with the management, the employees were restive and self-assertive, and the physical property was nothing if not at low ebb. Out of this tangle Mr. Dahl and those associated with him in arranging the reorganization were able to save something for the security holders and to put through an arrangement for operation in the future that would seem to preclude any possibility of the company ever again falling into disrepute.

In the handling of this work and also in the work which he has done in connection with the reorganization of the Brooklyn Rapid Transit Company Mr. Dahl has been able to bring to the problems confronting him long experience in the law and in the handling of public utility problems as operator, banker, and public official. He was born on June 8, 1876, at Fort Howard, Wis. He was educated in the public schools at Stoughton, Wis., and at the University of Wisconsin and was graduated with the degree of LL.B. in 1896. After being out of college one year he

returned to the university in the fall of 1897 and took elective work until the spring of 1899. He then practiced law at Waupaca, Wis., from August, 1898, to September, 1901. He was city attorney of Waupaca later and then practiced law at Stevens Point, Wis., from September, 1901, to November, 1906. He was also district attorney of Portage County, Wis., from 1902 to 1906.

In the latter year he moved to Cleveland, Ohio, where he practiced law from Nov. 1, 1906, until January, 1910, when he was appointed street railway commissioner to represent the city of Cleveland. He continued to act in this capacity until Jan. 1, 1912, when he moved to New York to become vice-president of the Electric Bond & Share Company, which position he resigned on Jan. 1, 1917, to become vice-president of the Chase National Bank. He continued with the Chase National Bank until Jan. 1 of the present year, when he entered the investment and banking house of Hayden, Stone & Company.



G. M. Dahl



W. S. Menden

dent of the company. Mr. Dahl, because of his position, will be the executive head of the system, but Mr. Menden will deal with all the problems of operation. He will consult with Mr. Dahl on the larger questions of policy, and everything affecting the company that is to come up to Mr. Dahl will do so through Mr. Menden.

It is Mr. Dahl's desire to operate the system in a way that the public will be satisfied or as nearly satisfied as is humanly possible. This is a mighty big job and Mr. Dahl realizes it. He also knows that no system in the world can handle the peak loads of rush-hour crowds comfortably. As a point of contact for carrying out his program of keeping in touch with the public Mr. Dahl will have the advice and help of the three representatives of the public elected to the board of directors under the plan for the reorganization of the company as approved by the New York Transit Commission. So far as the attitude of the company toward the city is concerned, Mr. Dahl has said publicly that he assumes the city officials will endeavor to co-operate with the officers of the company.

Aside from the positions which Mr. Dahl holds with the Brooklyn-Manhattan Transit Corporation and the New Orleans Public Service, Inc., he is a director of the Alabama Power Company, the Alabama Traction, Light & Power Company, the Chase National Bank, the Lehigh Power Securities Corporation, the Duquesne Light Company, the Philadelphia Company, the Pittsburgh Utilities Corporation and others.

Mr. Menden, the president of the new company succeeding the Brooklyn Rapid Transit Company, has at last rightfully come into his own. It is indeed difficult adequately to describe Mr. Menden. He is the quiet, unassuming type of executive. The first impression of him is that he is inclined to be distant. This is only partly true. He is candid but not condescending. He had to submit to being photographed for the newspapers in connection with the announcement of his election as president, but he did it as a duty and not as a desire. This doesn't mean that there is anything of the fatalist about the man. Neither does it mean that he is indifferent to the interests of the public. It merely means, as Mr. Menden sees

it, that the interest of the public is in the accomplishments of the organization of which he is a part rather than in the man himself.

#### ENGINEER IN CHARGE OF SUBWAY WORK

The statement handed out to the newspapers reviewing Mr. Menden's career was doubtless prepared by Mr. Menden himself, for it contained merely the barest outline of the work of the man. Mr. Menden's service with the companies in Brooklyn dates back to 1905. Edwin W. Winter had recently taken charge of the work of rehabilitation after the passing of the Rossiter régime. Mr. Menden had made a name for himself as chief engineer of the Metropolitan West Side Elevated Railroad, Chicago, and he was selected to become chief engineer of the B. R. T., as principal engineering assistant to Mr. Winter. It soon became evident that Mr. Menden combined the rare qualities of both the engineer and the executive, and so in 1907 in addition to his duties as chief engineer he was appointed to the position of general superintendent, and the following year was made assistant general manager.

After the dual subway contracts were signed, in 1913, Mr. Menden was appointed chief engineer of the New York Municipal Railway Corporation, and as such directed for the company the work of constructing and equipping the rapid transit lines provided for in the contract with the city. In October, 1918, he was made chief engineer and assistant to the president of the Brooklyn Rapid Transit Company. Early in 1919 Mr. Menden was appointed assistant general manager for the receiver of the Brooklyn Rapid Transit Company and since October, 1919, he has held the position of general manager for the receiver.

Mr. Menden has, of course, been happiest when engaged in the important work of planning for and carrying out the extension and improvement of the system with which he has been identified. This has been almost a continuous performance since his connection commenced with the company, but the work has varied from time to time in its intensity. The great bulk of the rapid transit construction had been carried to completion previous to the appointment of the receivers for the company in 1918, but the receiver on his own account spent approximately \$26,000,000 on the lines for new construction and the purchase of equipment during his incumbency. At the same time approximately \$1,600,000 was expended on the surface lines for track reconstruction, car reconstruction, and new cars. Furthermore, the receiver spent out of earnings upward of \$3,700,000 on the construction of the Williamsburg power plant.

#### PRESIDENT'S RECORD RECOGNIZED

All of this vast engineering and construction work was carried out under the direction of Mr. Menden and his election to the presidency is a mark of appreciation on the part of the new

financial interests in the company of his very competent handling of both the engineering and management problems of a system of more than 700 miles of track, on which the revenue passengers on the rapid transit lines alone have increased in number from 280,295,291 in 1918 to 459,049,609 in 1922, and on the surface lines from 320,370,316 in 1918 to 465,865,137 in 1922. This is only a very small part of the whole story, but it is sufficient to indicate that Mr. Menden has long been the real "power behind the throne" in Brooklyn. That fact has now been recognized publicly.

#### RECEIVER PRAISED MR. MENDEN

In the report of the receiver to the court Mr. Garrison paid tribute to Mr. Menden with these words:

I desire to take this occasion to acknowledge the help I have received from the services of the general manager, William S. Menden, and the able heads of the different departments. At every stage of the practical operation of the properties I have found them wise, competent and able. Under their operation of the property during the entire receivership period upward of 3,500,000 passengers have been carried by the system without serious accidents, and upward of \$31,000,000 has been spent in new construction and betterments.

Mr. Menden was born in 1868 at Evansville, Ind. He was graduated from the Rose Polytechnic Institute, Terre Haute, Ind., in 1891 with the degree of civil engineer. He started work in the railway business in 1892 as rodman in the engineering department of the Metropolitan West Side Elevated Railway at Chicago, Ill. He remained with the Chicago Elevated Lines until 1905, serving in various capacities and finally as chief engineer of the system. As stated previously Mr. Menden resigned his connection at Chicago in 1905 to accept the position of chief engineer with the Brooklyn Rapid Transit System.

#### Mr. Feiker Joins Society for Electrical Development

F. M. Feiker, formerly vice-president of the McGraw-Hill Company, Inc., publisher of the *ELECTRIC RAILWAY JOURNAL* and more recently on leave of absence as special agent to the Department of Commerce at Washington, will after his return from Washington be associated with the staff of the Society for Electrical Development, 522 Fifth Avenue, New York City. As a result of the appointment of Mr. Feiker the various branches of the electrical industry served by the society will secure the benefit of his broad experience and background, for he will be available to act as a special counselor to engineers, manufacturers, central stations, jobbers, contractor-dealers and publishers, and his special training and wide knowledge in the engineering, publishing and public relations fields of many industries qualify him eminently for such consulting work. Mr. Feiker will retain a consulting relation to the McGraw-Hill Company, Inc., and he will continue in a similar capacity his relation to the problems of personnel and organization of the Department of Commerce at Washington.

#### New Commission Appointments in Missouri

Gov. Arthur M. Hyde of Missouri has appointed two more lawyers to the Missouri Public Service Commission. The new appointees are Thomas J. Brown, Republican, of Charleston, Mo., and R. M. Musser, Democrat, Plattsburgh, Mo. Mr. Brown's term expires on April 15, 1929, while Mr. Musser is to fill out the unexpired term of Hugh McIndoe, Joplin, who died several weeks ago. The term of office under this appointment expires on April 15, 1925.

J. P. Holt, former road master of the abandoned line of the Interurban Railway & Terminal Company, Cincinnati, Ohio, is now engineer of maintenance of the Cincinnati, Georgetown & Portsmouth Railway. He succeeded E. J. Jones, who has accepted a position in the maintenance department of the Cincinnati Traction Company.

## Obituary

### C. C. Baldwin

Chauncey C. Baldwin, for more than twenty years connected with the Standard Underground Cable Company at Perth Amboy, N. J., died on June 7, 1923, aged fifty-seven, after a brief illness. He had been one of the outstanding figures in the copper rolling and wire drawing industry for many years. His connection with the Standard Underground Cable Company dated from 1902 as superintendent and manager of its metal departments at Perth Amboy, including its copper melting furnaces and equipment for the production of copper and brass rods and wire, tubes, weatherproof and magnet wire products. In 1916 he was elected a vice-president of that company, which position he held at the time of his death.

### John A. Kurtz

John A. Kurtz, chairman of the Missouri Public Service Commission, died suddenly on June 17 at the Jefferson City Country Club, where he had been playing golf with Attorney-General Barrett, Noah W. Simpson, until recently a member of the commission, and R. Perry Spencer, general counsel of the commission.

Mr. Kurtz succeeded William G. Busby as chairman of the commission on April 15, 1921. He was appointed by Governor Hyde for the full term of six years.

On May 28 Hugh McIndoe, a member of the commission, was stricken with internal hemorrhages and died within an hour.

During Mr. Kurtz's connection with the commission many important rate cases were decided, notably the recent decision as to the rate-making valuation of the property of the United Railways, St. Louis.



## Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions  
A Department Open to Railways and Manufacturers  
for Discussion of Manufacturing and Sales Matters

### Union Scale of Wages of Labor

A bulletin relating to the union scale of wages of labor throughout the United States as of May 15, 1922, and showing comparison with preceding years has just been issued by the Department of Labor. The bulletin embraces returns from sixty-six leading industrial cities and states the scale in twelve groups of industries embracing ninety-one trades and occupations, which reported an aggregate membership of 861,893. In the average for all trades taken collectively the hourly wage rate on May 15, 1922, was 6 per cent lower than on May 15, 1921; 69 per cent higher than in 1917, 93 per cent higher than in 1913, 104 per cent higher than in 1910 and 115 per cent higher than in 1907.

The average rates of wages per hour as of May 15, 1922, for the country as a whole for a few typical occupations were: Bakers 89.1 cents; bricklayers, \$1.164; building laborers, 71.4 cents; carpenters, 97.3 cents; inside wiremen, \$1.042; painters, \$1.009; plasterers, \$1.173; plumbers, \$1.043; freight handlers, 65.1 cents; blacksmiths, 84.5 cents; machinists, 76.7 cents; iron molders, 74.6 cents; compositors, newspaper, day work, \$1.004.

The average rate per hour May 15, 1922, for all building trades combined was 96.3 cents; for chauffeurs, teamsters, and drivers, 55.7 cents; for granite and stone cutters, \$1.062; metal trades, 74.6 cents; printing trades in book and job offices, 89.2 cents; newspaper offices, \$1.036, and for all trades covered by the report, 85.8 cents.

As compared with May 15, 1913, the rates per hour on May 15, 1922, showed an increase of 167 per cent for bakers, 68 per cent for bricklayers, 114 per cent for building laborers, 83 per cent for carpenters, 90 per cent for inside wiremen, 99 per cent for painters, 74 per cent for plasterers, 68 per cent for plumbers, 96 per cent for freight handlers, 98 per cent for blacksmiths, 93 per cent for machinists, 92 per cent for iron molders, and 76 per cent for compositors, newspaper, day work.

### Swiss Electrification May Be Completed in 1928

The general management of the Swiss Federal Railways has submitted a report to the board of directors, which has been approved by the latter, regarding the electrification of these lines.

A report to the Department of Commerce at Washington states that if the Federal Assembly will approve the program of acceleration for this work

and vote a subsidy of about \$12,000,000 to assist in defraying the expense involved all the principal lines of these railways will be electrified at the end of 1928—in all, 950 miles. There are 250 miles already electrified, and electrification work is in progress on 240 miles additional. The cost of this work will be about \$150,000,000, of which approximately \$60,000,000 was spent from 1907 to the end of 1922.

It is estimated that as soon as the traffic density shall have attained that of 1923 the electrical operation of these lines will not be any more expensive than steam operation with coal at \$12 a ton. Should the traffic density surpass that of 1913 the cost of electrical operation will relatively decrease and will equal steam operation at a cost price of coal of only \$9 a ton.

### Destructive Fire at Plant of Columbia Machine & Malleable Iron Company

A serious fire occurred in the shops of the Columbia Machine & Malleable Iron Company, 169 Chestnut Street, Brooklyn, Thursday afternoon, June 21. The one-story structure on Chestnut Street was badly damaged and several of the small frame buildings adjacent were destroyed.

When a representative of the ELECTRIC RAILWAY JOURNAL talked with the officials of the company Friday morning they were unable to give any accurate estimate as to the extent of the loss. They stated, however, that reconstruction would begin immediately and that they hoped to have the greater part of the plant in operation within a week or ten days. Special effort will be made by the officials of the company to give deliveries on rush orders as soon as possible.

### Fifty New Cars to Be Purchased for Brooklyn

The expenditure of more than \$1,750,000 on new equipment and improvements for the new Brooklyn-Manhattan Transit Corporation, the successor to the Brooklyn Rapid Transit Company, was voted by the directors at their first meeting on June 18. Of this amount \$1,250,000 will be for the purchase of fifty new cars. About \$580,000 will be expended for cables and substations. The new cars will be ordered at once for delivery during the coming fall. They are to be of the type now in use.

Under the plans for reorganizing the B. R. T. \$5,000,000 was provided for improvements, and this is the first expenditure from that sum. No other

expenditures for improvement are to be made until a careful plan has been worked out.

The expenditure for cables, equipment and substations was explained in a statement that read in part:

On account of the increase in service on certain lines of the company, particularly in South Brooklyn, it is necessary to provide additional substation equipment, including an additional substation building and equipment on the Sea Beach line at Avenue T.

Other improvements included feeder cables, new rotary converters in power houses and additions and alterations to the King's Highway substation.

### Retail Food Price Goes Up

The retail food index issued by the Department of Labor through the Bureau of Labor Statistics shows that there was an increase of two-tenths of 1 per cent in the retail cost of food to the average family in May, 1923, as compared with April, 1923. In May, 1923, the index number was the same as in April, 1923, 143.

### Shares Offered to Westinghouse Employees

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has announced a plan whereby all employees may participate in the purchase of a new issue of 20,000 shares of common stock to be paid for on the deferred plan at \$53 a share (par value \$50). Each employee may subscribe for one to twenty shares of stock and pay for it in ten consecutive monthly installments. No interest will be charged on the deferred subscription payments. When the final payment on each stock subscription becomes due, dividends at the rate declared and paid on the company's common stock after Aug. 1, 1923, when the plan goes into effect, will be credited to the account of each subscriber.

This plan will in no way interfere with the insurance saving fund now in force. In the latter plan the employee by depositing 2 per cent of his salary in a 4½ per cent interest-bearing savings fund obtains additional insurance up to \$1,500 over the \$500 given by the company after six months' service. Subscription rights are for the benefit of the employee and are not transferable.

### Metal, Coal and Material Prices

Metals—New York		June 19
Copper, electrolytic, cents per lb.	15.075	
Copper wire base, cents per lb.	18.00	
Lead, cents per lb.	7.25	
Zinc, cents per lb.	6.25	
Tin, Straits, cents per lb.	40.75	
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	\$5.875	
Somerset mine run, Boston, net tons	2.75	
Pittsburgh mine run, Pittsburgh, net tons	2.05	
Franklin, Ill., screenings, Chicago, net tons	1.80	
Central, Ill., screenings, Chicago, net tons	1.625	
Kansas screenings, Kansas City, net tons	2.625	
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	\$7.75	
Weatherproof wire base, N. Y., cents per lb.	19.00	
Cement, Chicago net prices, without bags	\$2.20	
Lined oil (5-bbl. lots), N. Y., per gal.	\$1.15	
White lead, in oil (100-lb. keg), N. Y., cents per lb.	13.125	
Turpentine, (bbl. lots), N. Y., per gal.	\$1.05	

### Rolling Stock

Abilene Street Railway has purchased a new one-man all-steel car, which has already been put in operation.

Eureka, Calif.—The contract for furnishing the Eureka Street Railway with 20 tons of car wheels has been awarded to the Griffin Wheel Company. The amount is \$67 a ton.

Brooklyn-Manhattan Transit Corporation, successor to the Brooklyn Rapid Transit Company, has included in a program of improvements just announced the purchase of fifty new cars for use in rapid transit service.

Lima & Defiance Railroad, Lima, Ohio, will place an order about July 1 for three passenger and two baggage cars. These cars are to be gasoline propelled. The seating capacity of the passenger cars will be forty-four.

Northwestern Ohio Railway & Power Company, Oak Harbor, Ohio, has purchased four new steel passenger cars, costing \$16,000 each. They will be received some time this month to be used between Toledo and Bay Point.

Philadelphia Rapid Transit Company, Philadelphia, Pa., ordered on June 1 nine trackless trolleys. The builder is the J. G. Brill Company. Electrical equipment will be furnished by the General Electric Company. Specifications follow:

Seating capacity .....	30
Style of seats .....	5 longitudinal, 4 cross
Type of control .....	K
Type of motors .....	G. E.-258
Length of route .....	5.8 miles
Length of body over vestibules ..	23 ft. 2 1/2 in.
Width over all .....	7 ft. 6 in.
Type of tires .....	Overman

Durham Public Service Company has placed an order for four cars to be delivered on Sept. 1. The specifications of these cars are as follows:

Builder of car body .....	P. A. Thomas
Type of car .....	Passenger, four motor
Seating capacity .....	52
Total weight .....	27,000 lb.
Bolster centers .....	17 ft.
Length over all .....	39 ft. 1 1/2 in.
Truck wheelbase .....	5 ft. 2 in.
Width over all .....	8 ft. 2 1/2 in.
Height, rail to trolley base ..	10 ft. 5 1/2 in.
Body .....	Steel
Interior trim .....	Birch
Roof .....	Arch
Air brakes ..	Westinghouse Traction Brake
Car signal system .....	Faraday
Control .....	Westinghouse K-35
Curtain fixtures .....	Rex
Curtain material .....	Pantasote
Fare boxes .....	Johnson
Wheelguards .....	H. B. life guard
Gears and pinions .....	Nuttall, helical
Lightning arresters .....	Westinghouse
Motors ..	Four Westinghouse No. 510, 35 hp.
Seats .....	Hale & Kilburn
Seating material .....	Birch
Slack adjuster .....	None
Trolley base .....	Ohio Brass Company
Trucks .....	Taylor, R. H. Double truck
Ventilators .....	Railway Utility Company double exhaust
Wheels .....	26 in., C. I.

### Track and Roadway

Los Angeles Railway has completed the double tracking of Temple Street to Willowbrook Avenue. The line is now in operation. Work started recently on the Olive Street track between

Fifth and Sixth. New ties, ballast and rail will be installed.

Brantford, Ont.—The City Council has authorized electric railway repairs and improvements costing \$40,000.

Hutchinson Interurban Railway, Hutchinson, Kan., expects to pave Washington Street from Fourth Avenue to Fifth Avenue.

San Francisco-Oakland Terminal Railway will spend a total of \$240,000 on track reconstruction along Telegraph Avenue. Work on the track in Oakland, between Fifty-fourth Street and the Berkeley line, will cost \$140,000. An additional \$100,000 will be required to reconstruct the track in Berkeley as soon as the city completes its paving work on the avenue.

El Paso & Juarez Traction Company, El Paso, Tex., will extend its railway system in Juarez. An amended concession has just been granted this company by the Mexican Government, under the provisions of which the company has obligated itself to build a new steel and concrete bridge across the Rio Grande, connecting Juarez with El Paso. The proposed structure will cost about \$200,000.

San Antonio, Tex.—Construction of the proposed interurban electric railway between San Antonio and some point in the Lower Rio Grande Valley will be started as soon as the survey which is now being made is finished and the right-of-way obtained, according to V. H. Williams, Dallas, who is largely interested in financing the project. The road will be about 225 miles long. Mr. Williams and associates have purchased a large bed of lignite in McMullin County, close to the route of the proposed road, and will build an electric power plant there, using the lignite for fuel.

### Power Houses, Shops and Buildings

Illinois Power & Light Company, Peoria, Ill., in view of the rapidly increasing demand in the field of electric power and light, will install approximately 100,000 hp. in or near existing stations and will later construct one or more super-power houses.

New Orleans Public Service, Inc., has awarded a contract to the Phoenix Utility Company, New York, with branch offices at New Orleans, for the construction of several projects involving an expenditure of approximately \$600,000. The contract was on the cost plus basis. The work includes construction of a reinforced concrete building 63 ft. x 151 ft., substation at Polymnia and Baronne Streets, estimated at \$300,000; remodeling and extending the boiler house at Market and South Peters Streets, estimated to cost \$100,000; construction of three oil storage tanks at cost of \$50,000 each and remodeling and extending several substations.

### Trade Notes

Osgood Bradley Car Company, Worcester, Mass., has begun work on a contract for thirty trolley cars for the Boston Elevated Railway, which when completed will represent an outlay of approximately \$500,000. They are double-truck safety type surface cars.

A. R. McLean announces the opening in Norfolk, at the Board of Trade Building, of his own business, engaging in general secret service work for steam and electric railways as well as for other corporations. The business will be known as the McLean Secret Service Bureau. On June 1 Mr. McLean resigned as general manager of the Corporation Service Bureau, Cleveland.

Uehling Instrument Company, Paterson, N. J., manufacturers of CO<sub>2</sub> recorders and draft and vacuum gages, has just made two important agency appointments, namely, Amsler-Morton Company, Fulton Building, Pittsburgh, for western Pennsylvania, and John A. MacDowell, 2039 Railway Exchange Building, St. Louis, for eastern Missouri and southern Illinois. H. R. N. Johnson, who formerly represented the Uehling Instrument Company in Minnesota and the Dakotas, has joined the W. P. Nevins Company, 120 South Ninth Street, Minneapolis. This company is now the official Uehling representative in the territory mentioned.

### New Advertising Literature

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has just issued Vol. III, No. 3 of its electrification data series, dealing with the Chilean State Railway electrification. The booklet, which contains twenty pages and is amply illustrated with photographs and drawings, explains the problem that the Chilean Railway officials had to solve.

Detroit Underfeed Stoker Company's level fuel bed multiple retort underfeed stoker is illustrated and described in detail in the new bulletin "Built on Advanced Engineering Principles," just published by the manufacturer. Among other subjects it covers the practical application of principles of combustion in the design and construction of a high-duty machine to meet modern requirements.

Graver Corporation, Chicago, has just issued a booklet on its Zeolite and hot process methods of water softening. Analyses of raw water and water softened by both processes are given and points of comparison between the two methods are included. Attention is also called to a number of bulletins descriptive of Graver water softening and purification equipment. These include such topics as water supply for horizontal and vertical pressure-type filters; hot process, continuous, Zeolite, and intermittent water softeners.



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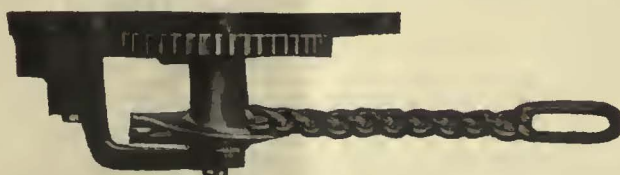
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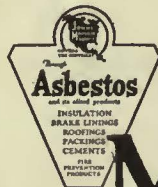
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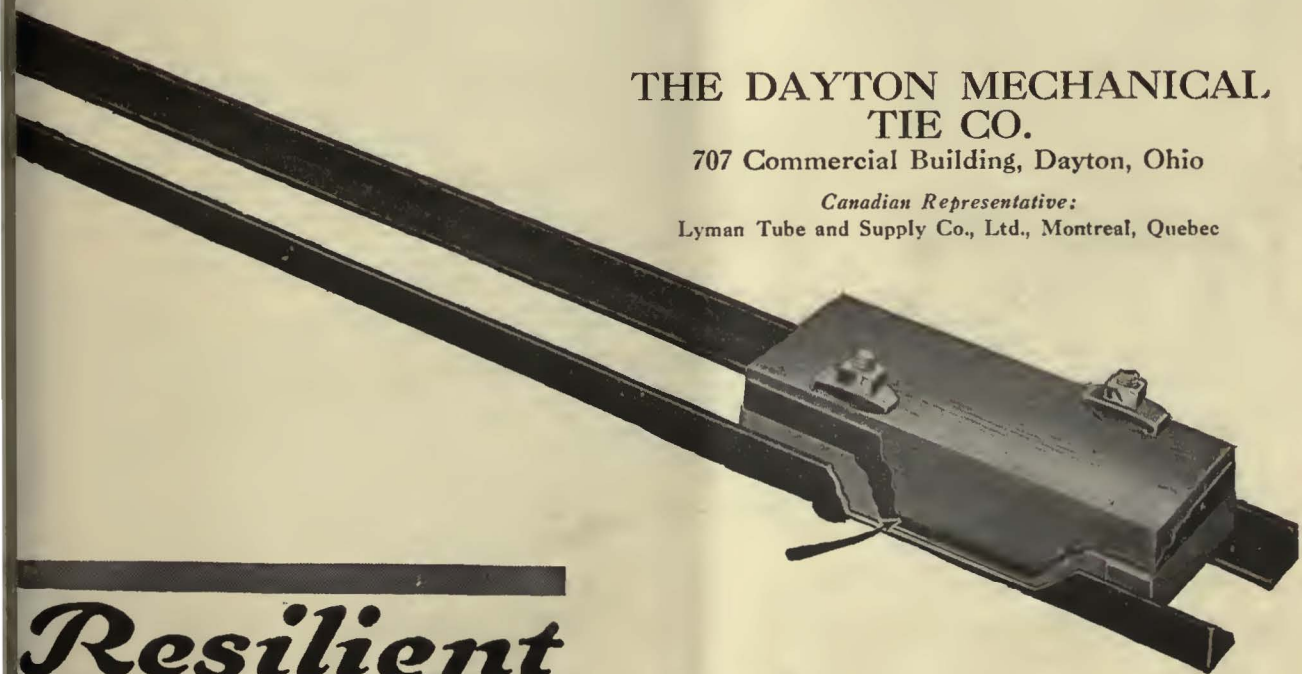
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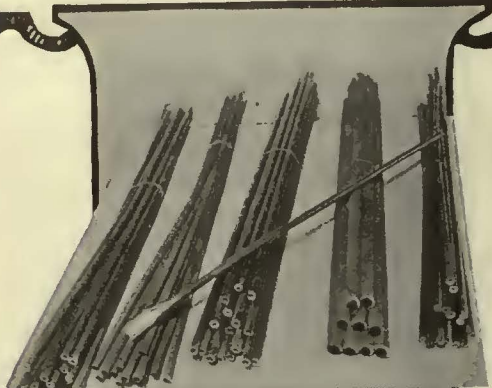
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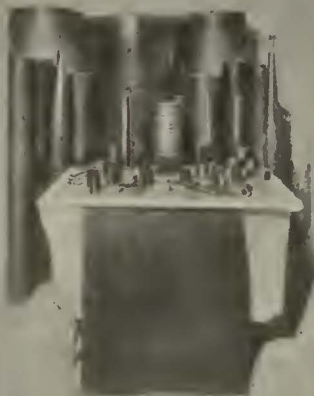
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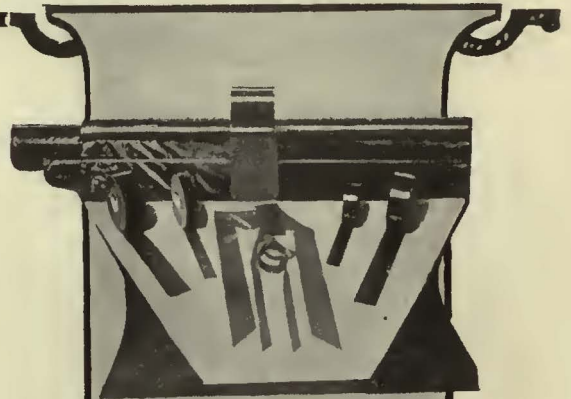
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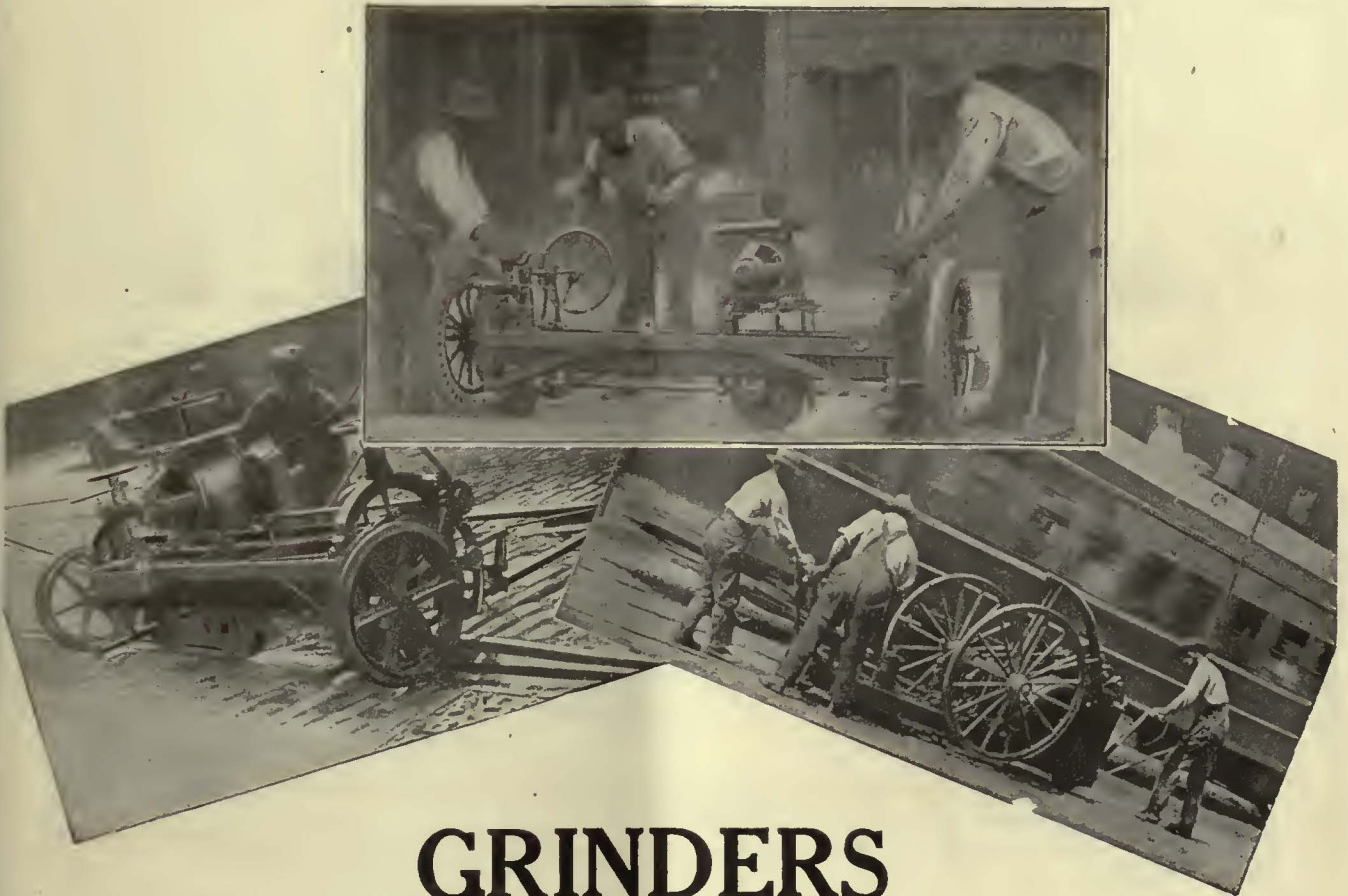
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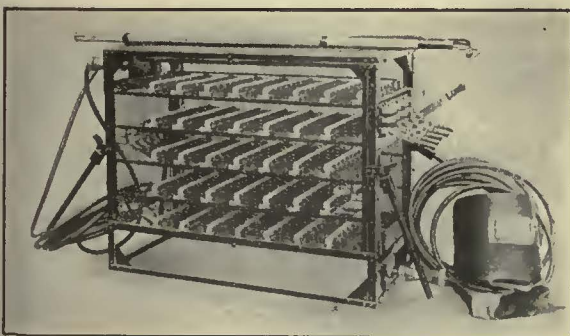
Even the smallest road needs and can afford this machine. It is fast and efficient, in following up welding operations. Smooths off surplus metal after “building-up” joints and special work. Its very reasonable cost is insignificant in comparison with its economy of operation and the results produced.

As its name implies, this machine possesses the widest possible range of usefulness. It costs a trifle more, but its tilting grinding wheel and other special features permit an unusual variety and quality of work. It reaches every part of the rail—in grooves and along gauge lines. Trims frog and switch points. Large rubber-tired derail wheels, and correct balance, make it instantly and easily removable to permit cars to pass.

### “Reciprocating”

For the removal of corrugations, the Reciprocating Track Grinder is without equal, either in speed or in effectiveness. Easily operated by unskilled labor. It removes the minimum amount of metal, just enough to bring the rail head to a smooth surface finish, with its original shape.

and to complete this line of “track-work” equipment  
**AJAX ELECTRIC ARC WELDER**



This is the kind of apparatus which actually lightens the burden of track maintenance costs, *first*, because it is light and easily handled by two men—weighs only 155 lbs.—*second*, because its own maintenance cost is

little or nothing, and *third*, because it *does a job which lasts*. The high amperage of the Ajax, even where voltage is poor, makes a deep, strong permanent weld, a weld which endures.

*Write for further details.*

**3132-48 E. Thompson St., Philadelphia, Pa.**

**30 Church St., New York**

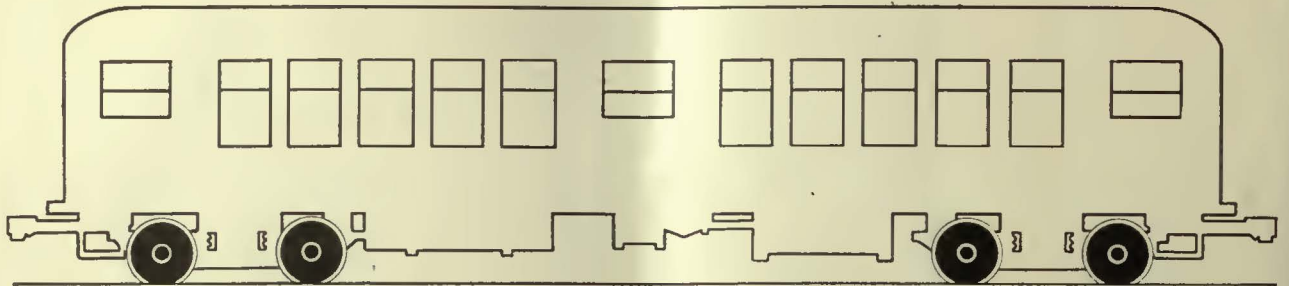
**3132-48 E. Thompson St., Philadelphia, Pa.**

AGENTS:

Chas. N. Wood Co.  
 Boston  
 Atlas Railway Supply Co.  
 Chicago

New Orleans  
 P. N. Wood

Electrical Engineering & Mfg. Co.  
 Pittsburgh  
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 London

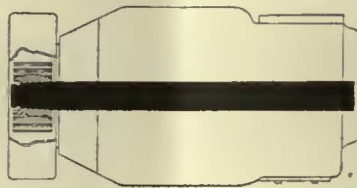


TYPE OF CAR USED BY THE  
CHICAGO ELEVATED RAILWAYS



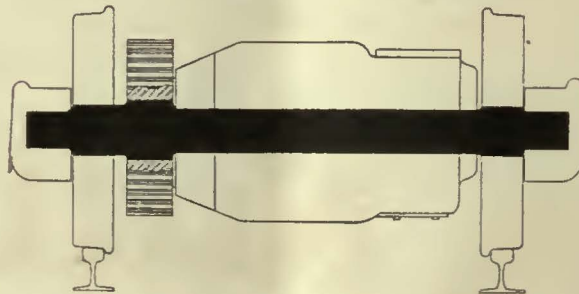
### The WHEELS

are of rolled steel, produced by the Standard Steel Works Company in their plant at Burnham, Pennsylvania.



### The ARMATURE SHAFTS

are made of open hearth hammered steel by the Standard Steel Works Company in their plant at Burnham, Pennsylvania.



### The MOTOR AXLES

are also made of open hearth hammered steel in the Burnham plant of the Standard Steel Works Company.

*"Not only to make better products but to make them better understood—not only to sell but to serve, assisting those who buy to choose as well as use their purchases—this is the privilege if not the practice of all modern manufacturers."—Vauclain.*

# STANDARD STEEL WORKS COMPANY

PHILADELPHIA, PA.

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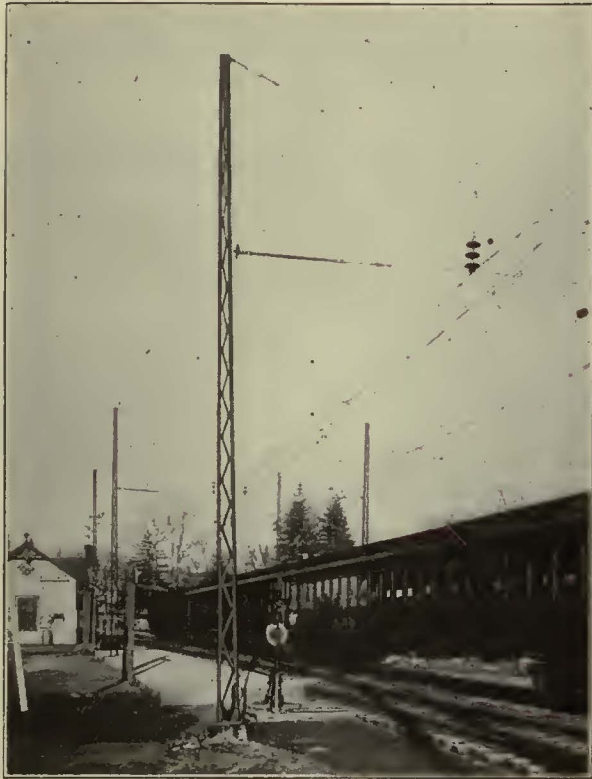
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WORKS: BURNHAM, PA.



# Bates Steel Pole Strength

The stability of installations built with Bates Poles as the *backbone* of the construction reflects the progressive trend of the organization using them.

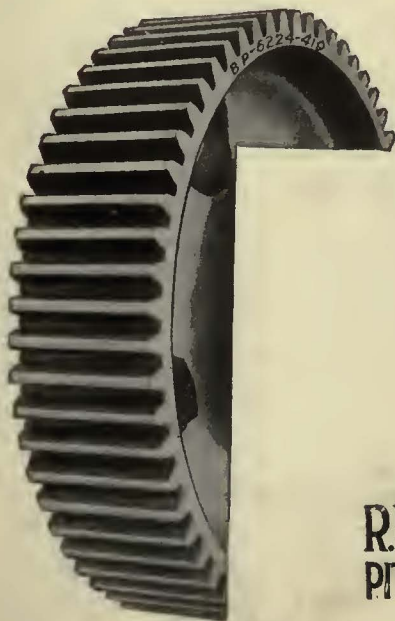
Use Bates Poles—Poles of a character consistent with the high standards you demand and specify for the rest of your equipment. Bear in mind Bates prices compare favorably with the cheapest substitutes.

**B**ates **E**xpanded **S**teel **T**russ **C**o.

Illinois Merchants Bank Bldg.,  
CHICAGO, ILLINOIS, U. S. A.

*Bates Engineers will gladly co-operate with you in your planning.*

**BATES** ONE PIECE **EXPANDED** **POLES**  
STEEL



# Nuttall

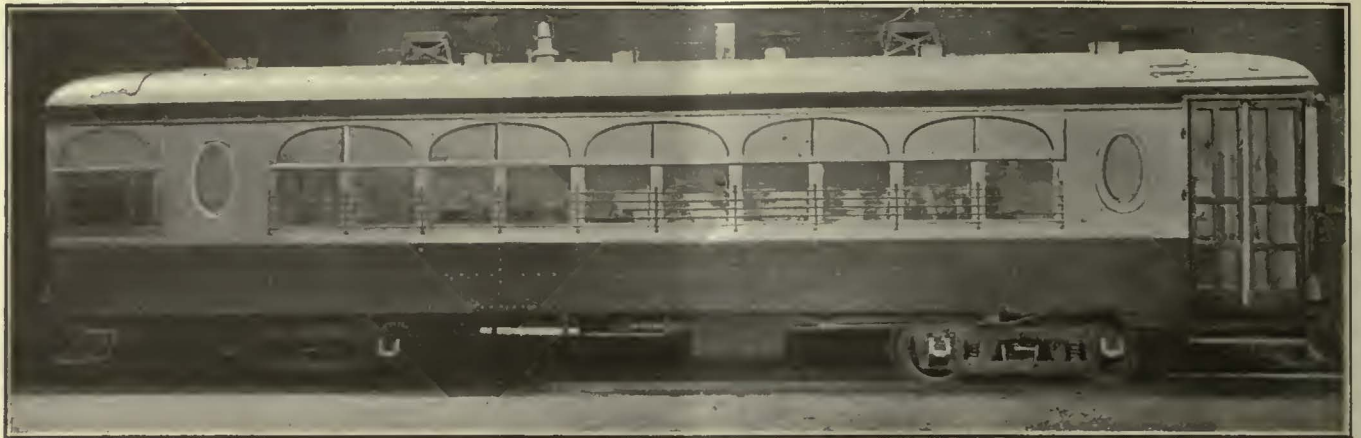
**N**UTTALL has every possible facility for making the best gears and pinions that can be produced, beginning with experienced designer and ending with critical inspectors and careful shippers. It would be pretty hard for any other plant to duplicate a Nuttall gear, as we have been over thirty years gaining our experience, methods and equipment.

**R.D. NUTTALL COMPANY**  
**PITTSBURGH**  **PENNSYLVANIA**



All Westinghouse Electric and Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tubs & Supply Co., Ltd., Montreal and Toronto.

# St. Louis Quality Cars



New Lightweight Interurban Cars for Eastern Wisconsin Electric Co.

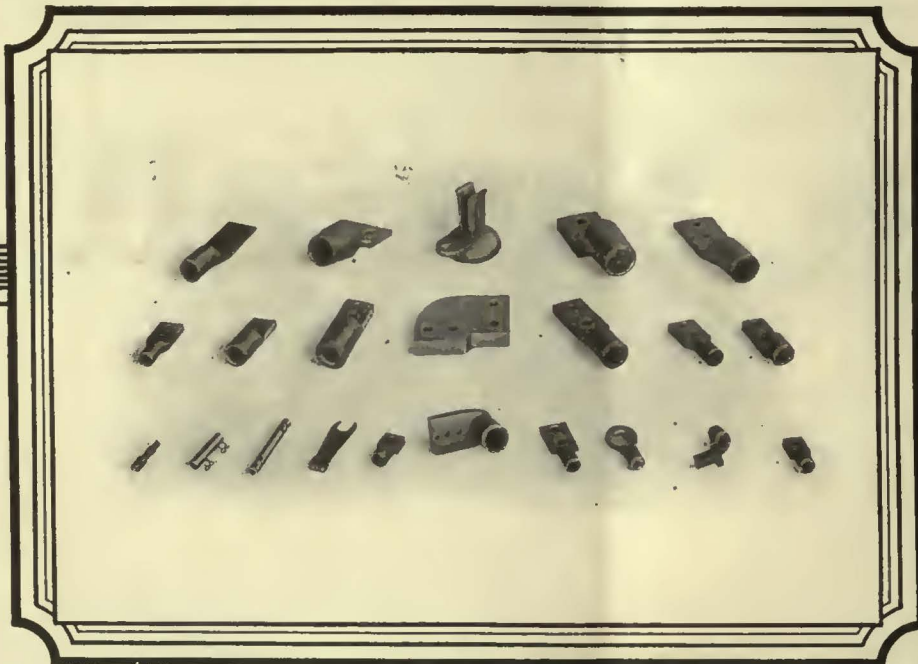
These double-end, double-truck cars of the "Safety" type, 43 feet long over all, arranged with a smoking compartment have a seating capacity of 44 passengers. They are mounted on St. Louis trucks CM-69, equipped with four 35 H.P. motors.

## St. Louis Car Company

St. Louis, Mo.

*"The Birthplace of the Safety Car"*

*Further particulars sent upon request*



Types of COLUMBIA Terminals

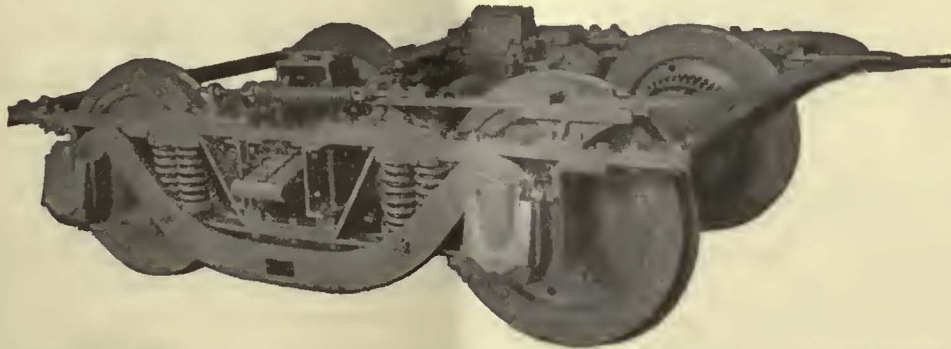
—that insure desired conductivity, strength and other elements.



3313 Atlantic Ave., Brooklyn,

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# Baldwin Improved Motor Trucks for Electric Interurban and Street Railway Service



Baldwin Typa "A" Truck used on the Osaka Electric Railway and also on the Osaka Tetsudo Railway of Japan. Similar Trucks are used on many American and Foreign Electric Railways.

**B**ALDWIN electric motor trucks are designed and built with the same engineering skill and excellence of workmanship as are Baldwin Locomotives.

We built trucks to meet the most severe conditions of high speed electric interurban and street railways; for use under motor cars on electrified

sections of steam lines; for double truck electric locomotives used in switching and local freight service; for the requirements of city and interurban electric freight and express service.

For simplicity, strength, low cost of maintenance and perfect riding qualities, Baldwin Trucks cannot be excelled.

*Baldwin representatives in all principal countries of the world.  
Detailed information upon request.*

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Cable Address, "Baldwin, Philadelphia"

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How far in advance do you collect fares?

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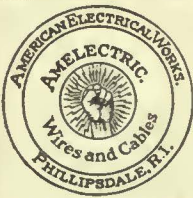
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*"Tool Steel"  
safety car pinions  
Endure  
and  
Endure  
and  
Endure  
and just keep on enduring.*

The Tool Steel  
Gear & Pinion Co.  
CINCINNATI, O.



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**BARE COPPER WIRE AND CABLE**  
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**BARE AND INSULATED**

**Rome Merit Wins Customers**  
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**Lowest Cost**                      **Lightest Weight**  
**Least Maintenance**          **Greatest Adaptability**

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**Varnished Cambric Wires and Cables**

are built to meet the most exacting requirements.

When using *quality* Wires and Cables use *quality* Tapes.  
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Your best insurance against insulator breakage

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for single track block signal protection

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Branches—New York, 135 B'way

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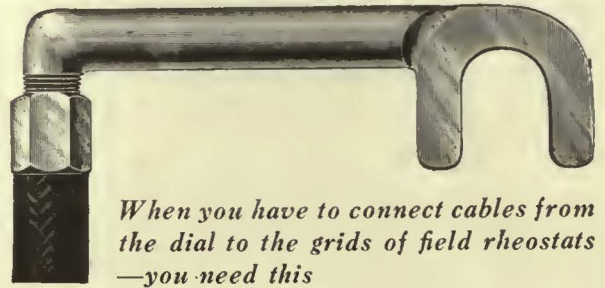
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*Send for new  
Rail Bond Book*

**American Steel & Wire  
Company**  
CHICAGO  
NEW YORK



*When you have to connect cables from  
the dial to the grids of field rheostats  
—you need this*

## DOSSERT Rheostat Terminal

The elongated shank holds the cable in a straight line—the contact disc being slotted to fit over the grid—while the Dossert tapered sleeve and compression nut gives solderless connection to the cable.

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Established 1858

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**Special Work for Street Railways**

Frogs, Crossings, Switches and Mates  
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SWITCHES—MATES—FROGS—CROSSINGS  
COMPLETE LAYOUTS

IMPROVED ANTI-KICK BIG-HEEL SWITCHES  
HARD CENTER AND MANGANESE  
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Wires, Cables, Cable Accessories  
Superior quality, economical prices  
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ESTABLISHED  
1881

Special Track Equipment and Layouts  
of all kinds

**THE BUDA COMPANY**  
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*Electrically Welded Joints*

**THE LORAIN STEEL COMPANY**

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*Sales Offices:*

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**Brazed Bonds**

Type ET | head  
 Type EA | of rail  
 Type EC, web of rail

**Arc Weld Bonds**

Type AT-F | head  
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 Type AU |  
 Type A, base of rail

**The Electric Railway Improvement Co.**  
Cleveland, Ohio

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An up-to-date and most economical process for the Aluminothermic welding of rail joints. Makes the joint stronger than the rail itself.



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Special advantages — (1) Rail ends are butted together and easily aligned, no inserts needed to fill in or adjust. (2) Smaller portions of material used. (3) Grinding reduced to the min-

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The Feralite Rail Welding Process eliminates rail joints at a lower cost than any other process. Write for full details.

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**Special Trackwork**

*For Street and Steam Railways*

**Steel Castings**

**Gas Cylinders**

ORIGINATORS OF

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A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

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Adapted to all types  
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W. S. GODWIN CO., Inc.



Proven by  
service to  
economically pre-  
vent seepage and  
disintegration of  
street railway paving.

Write for Illustrated  
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## RAMAPO AJAX CORPORATION

Ramapo Automatic  
Return Switch  
Stands  
for Passing  
Sidings

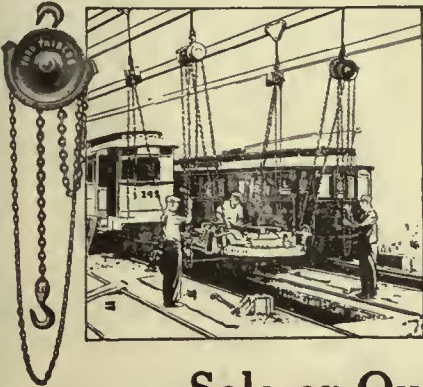
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Special Work.



Manganese  
Construction

GENERAL OFFICES: HILLBURN, NEW YORK  
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## Solo or Quartet

USED individually, there are Triblocs to manage any load to 40 Tons; used in batteries of two, three, or four, they take care of loads up to 80, 120 and 160 Tons respectively.

Write for information on any type or capacity to 40 tons  
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**FORD CHAIN BLOCK CO.**  
2ND & DIAMOND STREETS PHILADELPHIA, PA.

OVER-SEAS REPRESENTATIVE

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PARIS BRUSSELS TURIN BARCELONA RIO DE JANEIRO

# Car Seat and Snow Sweeper Rattan

For 60 years we have been the largest importers of rattan from the Far East. It is therefore to be expected that when Rattan is thought of our name, "Heywood-Wakefield," instantly comes to mind.

Follow that impulse and write us when in the market for:

High Grade close woven Rattan Car Seat Webbing, canvas lined and unlined, in widths from 12 in. to 48 in.

High Grade Snow Sweeper Rattan in Natural and Cut Lengths.

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Factory: Wakefield, Mass.

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High-grade R. R. Track and Car Jacks

The Buckeye Jack Mfg. Co.

Alliance, Ohio

## MOORE RAPID ELECTROMELT FURNACES



MAKE YOUR OWN STEEL AND IRON CASTINGS WHEN AND AS YOU NEED THEM

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Largest Maker of Arc Furnaces in the World  
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*"Make it of Vul-Cot Fibre"*

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MILWAUKEE, WIS. U. S. A.

Electrical Machinery, Steam Turbines, Steam Engines, Condensers, Gas and Oil Engines, Air Compressors, Air Brakes



We make a specialty of

## ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

**The Universal Lubricating Co.**  
Cleveland, Ohio

75% of the electric railways use

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Send for Catalog

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is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

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**Waterproofed Trolley Cord**



Is the finest cord that science and skill can produce. Its wearing qualities are unsurpassed.

**FOR POSITIVE SATISFACTION ORDER SILVER LAKE**

If you are not familiar with the quality you will be surprised at its **ENDURANCE** and **ECONOMY**.

*Sold by Net Weights and Full Lengths*

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Manufacturers of bell, signal and other cords.  
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Type R-10

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Made in various types and sizes to meet the requirements of service on street and city system. Complete line of registers, counters and car fittings.

Exclusive selling agents for **HEEREN ENAMEL BADGES.**

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**SHOCKS**

*have little effect on*

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*because these plates are made from Ajax Perfecto Bronze*

*The strongest and toughest metal on the market. They will bend before they will break and give longest possible service.*

**The Ajax Metal Company**

Established 1880

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**RAILWAY UTILITY COMPANY**

Sole Manufacturers

"HONEYCOMB" AND "ROUND JET" VENTILATORS for Monitor and Arch Roof Cars, and all classes of buildings; also **ELECTRIC THERMOMETER CONTROL** of Car Temperatures.

141-151 West 22d St. Chicago, Ill.

Write for Catalogue

1328 Broadway New York, N. Y.

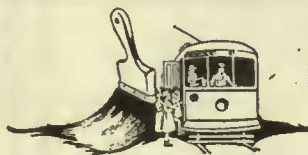
**SAMSON SPOT WATERPROOFED TROLLEY CORD**



Trade Mark Reg. U. S. Pat. Off.

Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws. Samples and information gladly sent.

**SAMSON CORDAGE WORKS, BOSTON, MASS.**



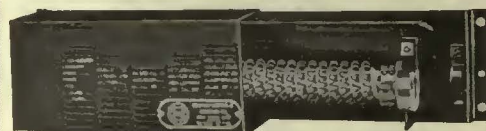
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**Sells Transportation**

Let our experts on railway car finishing demonstrate Beckwith Chandler paints and varnishes. Write for details.

Beckwith-Chandler Co., 203 Emmett St., Newark, N. J.

**THE BEST TRUSS PLANK ELECTRIC HEATER EVER PRODUCED**



No. **478E**

GOLD CAR HEATING & LIGHTING CO., BROOKLYN, N. Y.

**STEEL 'CARNEGIE'**

*When you think of Steel—think of Carnegie*

**Fare Boxes**

**Change Carriers**

**COIN COUNTERS SORTERS WRAPPERS**

**THE CLEVELAND FARE BOX CO.**

CLEVELAND, OHIO

Canadian Branch, Preston, Ontario.

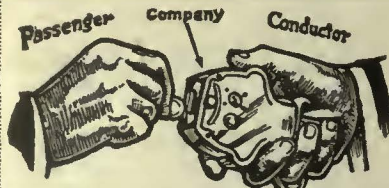


**Car Heating and Ventilation**

are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

**The Peter Smith Heater Company**

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**Direct Automatic Registration**  
 By the **Passengers**

**Rooke Automatic Register Co.**  
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E. R. J.

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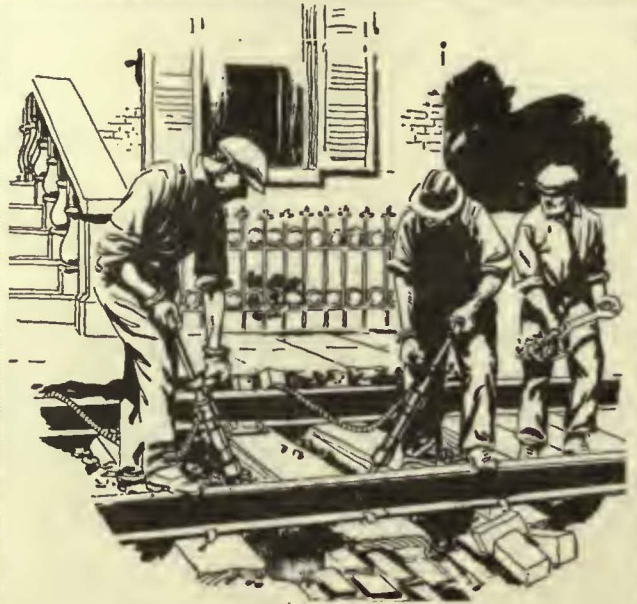
- Advertising, Street Car  
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Ramapo Ajax Corp.
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Special Work)
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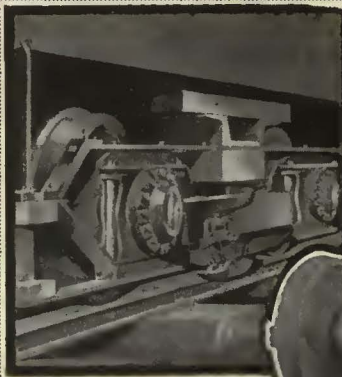


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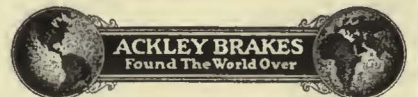
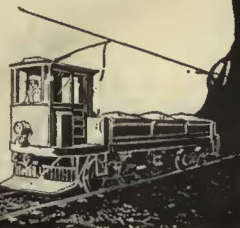
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**Meters (See Instruments)**  
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 (See Buses, Motor)  
**Motor Leads and Co.**  
**Motormen's Seats**  
 Brill Co., The J. G.  
 Electric Service Sup. Co.  
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**Paving Guards, Steel**  
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**Paving Material**  
 Amer. Br. Shoe & Fdry. Co.  
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 Electric Service Sup. Co.  
 Ohio Brass Co.  
**Pinion Pullers**  
 Columbia M. W. & M. I. Co.  
 Electric Service Sup. Co.  
 General Electric Co.  
 Wood Co., Chas. N.  
**Pinions (See Gears)**  
**Pins, Case Hardened, Wood and Iron**  
 Bemis Car Truck Co.  
 Electric Service Sup. Co.  
 Ohio Brass Co.  
**Pine Fittings**  
 Power Specialty Co.  
 Standard Steel Works Co.  
 Westinghouse Tr. Br. Co.  
**Planers (See Machine Tools)**  
**Plates for Tee Rail Switches**  
 Ramapo Ajax Corp.  
**Pliers—Rubber Insulated**  
 Electric Service Sup. Co.  
**Pole Reinforcing**  
 Hubbard & Co.  
**Pole Line Hardware**  
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**Poles, Metal Street**  
 Bates Exp. Steel Truss Co.  
 Electric Ry. Equip. Co.  
 Hubbard & Co.  
**Poles, Trolley**  
 Anderson Mfg. Co., A. & J. M.  
 Columbia M. W. & M. I. Co.  
 Electric Service Sup. Co.  
 Nuttall Co., R. D.  
**Poles, Tubular Steel**  
 Electric Ry. Equip. Co.  
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**Poles and Ties, Treated**  
 Bell Lumber Co.  
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**Power Saving Devices**  
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 Ohio Brass Co.  
 Westinghouse E. & M. Co.  
**Pumps**  
 Allis-Chalmers Mfg. Co.  
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**Punches, Ticket**  
 Bonney-Vehslage Tool Co.  
**International Reg. Co., The**  
 Wood Co., Chas. N.  
**Rail Braces and Fastenings**  
 Ramapo Ajax Corp.  
**Rail Grinders (See Grinders)**  
**Rail Joints**  
 Carnegie Steel Co.  
**Rail Joints, Welded**  
 Metal & Thermit Co.  
**Rails, Steel**  
 Carnegie Steel Co.  
**Railway Material**  
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**Railway Pavine Guards, Steel**  
 Godwin Co., Inc., W. S.  
**Railway Safety Switches**  
 Consolidated Car-Heating Co.  
 Westinghouse E. & M. Co.  
**Rail Welding**  
 Metal & Thermit Corp.  
 Railway Track-Work Co.  
**Rattan**  
 Brill Co., The J. G.  
 Electric Service Sup. Co.  
 Hale & Kilburn  
 St. Louis Car Co.  
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 Electric Service Sup. Co.  
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 Ohmer Fare Register Co.  
 Rooke Automatic Reg. Co.  
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 Electric Service Sup. Co.  
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 Westinghouse E. & M. Co.  
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 Consolidated Car-Heating Co.  
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**Rheostats**  
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 Westinghouse E. & M. Co.  
**Roofing Asbestos**  
 Johns-Manville Inc.  
**Roller Bearings**  
 Stafford Roller Bearing Car Truck Corp.  
**Sanders, Track**  
 Brill Co., The J. G.  
 Columbia M. W. & M. I. Co.  
 Electric Service Sup. Co.  
 Nichols-Lintern Co.  
 Ohio Brass Co.  
**Sash Fixtures, Car**  
 Brill Co., The J. G.  
**Sash, Metal Car Window**  
 Hale & Kilburn  
**Scrapers, Track (See Cleaners and Scrapers, Track)**  
**Screw Drivers, Rubber Insulated**  
 Electric Service Sup. Co.  
**Sealing Materials**  
 Brill Co., The J. G.  
**Seats, Bus**  
 St. Louis Car Co.  
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 Brill Co., The J. G.  
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 Allis-Chalmers Mfg. Co.  
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**Slide Bearings (See Bearings, Center and Slide)**  
**Signals, Car Starting**  
 Con. Car Heating Co.  
 Electric Service Sup. Co.  
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**Signals, Indicating**  
 Nichols-Lintern Co.  
**Signal Systems, Block**  
 Electric Service Sup. Co.  
 Nachod Signal Co., Inc.  
 U. S. Electric Signal Co.  
 Wood Co., Chas. N.  
**Signal Systems, Highway Crossing**  
 Nachod Signal Co., Inc.  
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**Slack Adjusters**  
 (See Brake Adjusters)  
**Slag**  
 Carnegie Steel Co.  
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 Allis-Chalmers Mfg. Co.  
 Anderson Mfg. Co., A. & J. M.  
 Electric Service Sup. Co.  
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**Switches, Tee Rail**  
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 Anderson Mfg. Co., A. & J. M.  
 Electric Service Sup. Co.  
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 Brill Co., The J. G.  
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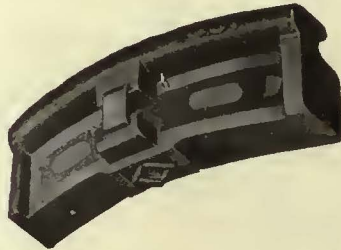
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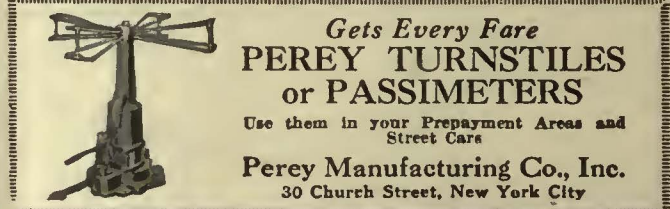
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**Woodworking Machines**  
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## ALPHABETICAL INDEX TO ADVERTISEMENTS

	Page		Page		Page
Ackley Brake & Supply Corp.	39	Day & Zimmerman Co., Inc.	20	Kuhlman Car Co.	43
Ajax Metal Co.	38	Dayton Mechanical Tic Co.	22-23	Lapp, Insulator Co., Inc.	33
Allis-Chalmers Mfg. Co.	35	Differential Steel Co.	39	Le Carbone Co.	41
Allison & Co., J. E.	20	Dossert & Co.	33	Lorain Steel Co.	34
Alumino-Thermic Corp.	34	Electric Railway Equipment Co.	32	Marsh & McLennan	6
Amer. Brake Shoe & Fdy. Co.	41	Electric Railway Improvement Co.	32	Metal & Thermit	26
American Car Co.	43	Electric Service Supplies Co.	9	Morton Mfg. Co.	42
American Electrical Works	32	Ford, Bacon & Davia.	20	Nachod Signal Co., Inc.	32
American Steel & Wire Co.	33	Ford Chain Block Co.	35	National Brake Co.	19
Anaconda Copper Mining Co.	32	"For Sale" Ads.	37	National Paving Brick Mfrs. Assn.	16
Anderson Mfg. Co., A. & J. M.	32	Galena-Signal Oil Co.	17	National Pneumatic Co., Inc.	11
Archbold-Brady Co.	21	General Electric Co., 18, Back Cover	39	National Railway Appliance Co.	36
Arnold Co., The.	20	Gilbert & Sons, B. F. Co.	31	National Vulcanized Fibre Co.	35
Babeck & Wilcox Co.	34	Globe Ticket Co.	31	New York Switch & Crossing Co.	33
Baker Wood Preserving Co.	21	Godwin Co., W. S.	34	Nichols Lintern Co.	15
Baldwin Docomotive Works	31	Gold Car Heating & Ltg. Co.	36	Nuttall Co., R. D.	29
Barbour-Stockwell Co.	33	Hale & Kilburn	11	Ohio Brass Co.	5
Bates Expanded Steel Truss Co.	29	"Help Wanted" Ads.	37	Ohmer Fare Register Co.	41
Beckwith-Chandler Co.	36	Hempbill Wells	20	Okonite Co.	32
Beeler, John A.	20	Heywood-Wakefield Co.	35	Ong, Joe R.	20
Bell Lumber Co.	42	Holst Englehard, W.	20	Page & Hill Co.	10
Bemis Car Truck Co.	42	Hubbard & Co.	32	Parsons, Klapp, Brinckerhoff & Douglas	20
Bibbins, J. Rowland.	20	Ingersoll-Rand Co.	39	Perey Mfg. Co., Inc.	42
Bonney-Vehslage Tool Co.	35	International Creosoting & Construction Co.	8	Pittsburgh Elec. Furnace Corp.	35
Brill Co., J. G.	43	International Register Co., The	36	Positions Wanted and Vacant	37
Buckeye Jack Mfg. Co.	35	International Steel Tie Co.	7	Power Specialty Co.	34
Buda Co.	33	Irrington Varnish & Insulator Co.	24-25	Railway Track-work Co.	27
Cameron Electric Mfg. Co.	35	Jackson, Walter	20	Railway Utility Co.	36
Carnegie Steel Co.	36	Jeandron, W. J.	41	Ramapo Ajax Corp.	34
Chillingworth Mfg. Co.	42	Johns-Manville, Inc.	21	Richey, Albert S.	20
Cleveland Fare Box Co.	36			Robinson & Co., Dwight P.	20
Collier, Inc., Barron Co. Front Cover	40			Roebling's Sons Co., John A.	32
Columbia M. W. & M. I. Co.	32			Rome Wire Co.	32
Consolidated Car Fender Co.	40			Rooke Automatic Register Co.	36
Consolidated Car Heating Co.	42			Safety Car Devices Co.	12
				St. Louis Car Co.	30
				Samsom Cordage Works	36
				Sanderson & Porter	20
				Searchlight Section	37
				Shaw, Henry M.	32
				Silver Lake Co.	36
				Smith Heater Co., Peter	36
				Stafford Roller Bearing Car Truck Corp'n	39
				Standard Steel Works Co.	28
				Standard Underground Cable Co.	33
				Star Brass Works	39
				Stevens & Wood, Inc.	21
				Stonz & Webster	20
				Stucki & Co., A.	42
				Thornton Trolley Wheel Co.	39
				Tot Steel Gear & Pinion Co.	31
				Transit Equipment Co.	37
				U. S. Electric Signal Co.	32
				U. S. Graphite Co.	41
				Universal Lubricating Co.	35
				"Want" Ads	37
				Wason Mfg. Co.	43
				Westinghouse Elec. & Mfg. Co.	2-4
				Westinghouse Traction Brake Co.	13
				Wharton, Jr. & Co., Wm.	34
				White Engineering Corp., The	20
				J. G.	20
				Wish Service, The P. Edw.	21
				Wood Co., Chas. N.	32
				Wortham, Edwin	21

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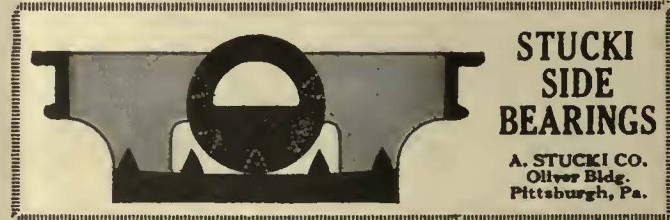
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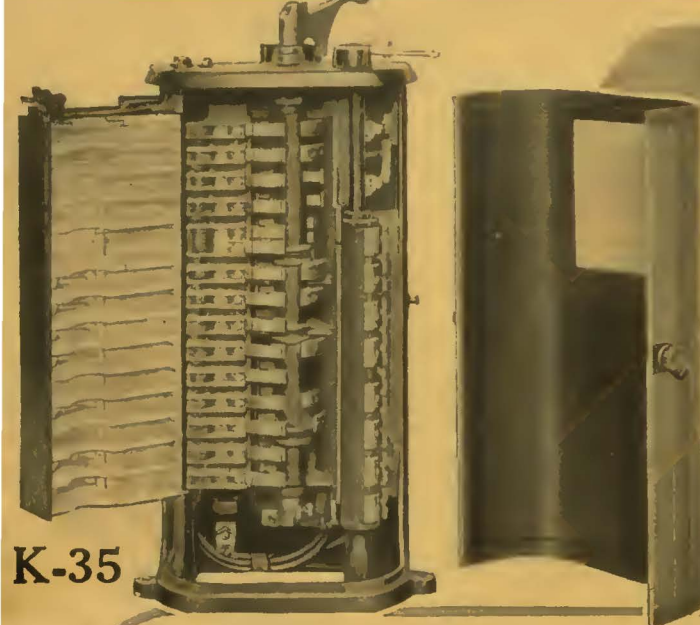
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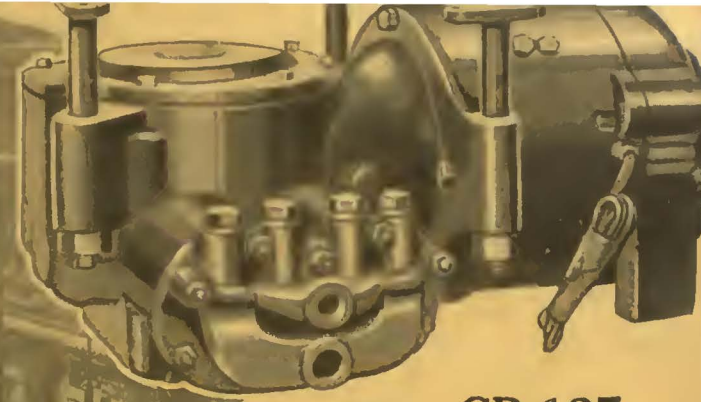
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