

# ELECTRIC RAILWAY JOURNAL



PUBLIC LIBRARY  
 CARNEGIE BRAN  
 TEXAS.

## STACKPOLE CARBON BRUSHES



### *The real reason—*

Even motormen notice the improvement in operation, the decrease in commutator troubles and the greater freedom from pull-ins.

What causes it, they ask? The answer is—Stackpole Carbon Brushes.

Grade L-30 is an exceptionally efficient brush, of the utmost uniformity in quality, peculiarly suited to the overloads and heavy duty of traction motors. It is self lubricating, minimizes sparking and affords smooth noiseless commutation.

Prolongs the life of commutators.

**STACKPOLE CARBON COMPANY**  
 ST. MARY'S, PENNA.



## Keeping Pace With a Growing Demand

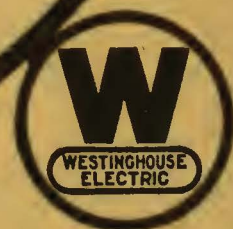
The Los Angeles Railways, faced with materially increased demands for mass transportation, recently purchased 120 additional low-floor cars, which are to be equipped with four Westinghouse Type 514-L, 40-hp. Motors and HL Control, arranged for train operation.

Upon delivery of this equipment there will be 1200 Type 514 motors and more than 300 low-floor HL-controlled cars, arranged for train operation on this property.

Westinghouse Electric & Manufacturing Company  
East Pittsburgh Pennsylvania  
Sales Offices in All Principal Cities of the  
United States and Foreign Countries



HL Switch Group for Low-Floor Cars



# Westinghouse

# ELECTRIC RAILWAY JOURNAL

MORRIS BUCK  
Associate Editor  
C. W. SQUIER  
Associate Editor  
JOHN A. MILLER, Jr.  
Assistant Editor  
O. J. MACMURRAY  
News Editor

CHARLES GORDON  
Western Editor  
Old Colony Bldg., Chicago  
MERRILL B. KNOX  
Editorial Assistant  
Old Colony Bldg., Chicago  
CARL W. STOCKS  
Associate Editor

HENRY W. BLAKE and HARRY L. BROWN, Editors

## CONTENTS

Editorials ..... 643

Progress in Noiseless Substation Design..... 645  
By L. J. TURLEY.  
The Los Angeles Railway has developed substation buildings to harmonize with surroundings in residential districts. Use of automatics has produced satisfactory operating results and substantial economies, which are itemized.

Looping Back Reduces Delays by 28 per Cent..... 651  
The downtown rerouting recently inaugurated by the United Electric Railways of Providence, R. I., has speeded up the car service and reduced congestion. At the same time a change was made in the method of fare collection.

Tractor-Drawn Plow Cuts High Ice..... 653

Signs Tell Strangers How to Reach Their Destinations  
by Railways ..... 653  
By W. H. BOYCE.

New Seating Arrangement to Increase Capacity..... 654  
Seats for three on one side and two on the other side increase capacity of multiple-unit coaches of the New Haven Railroad 38 per cent.

St. Louis Valuation..... 655

The Readers' Forum..... 656

Association News and Discussion..... 658

Badgers View Utility Business Broadly..... 658  
Responsibilities of utility management, speakers' bureau activity and training of women employees for publicity work are considered. Railway section holds lively discussions.

The Commission's View of Platform Men..... 660  
By ANDREW L. McDONALD.

Accounting Practice on the North Shore Line..... 661  
By C. R. MAHAN.

Effect of the Automobile on Passenger Traffic..... 662  
By DUDLEY MONTGOMERY.

The Electric Railway Situation Today..... 663  
By W. H. SAWYER.

I. C. C. Considers Mail Rates..... 664

Maintenance of Equipment..... 666

News of the Industry..... 669

Financial and Corporate..... 675

Personal Notes ..... 678

Manufactures and the Markets..... 679

## It's All in the Family

DURING a visit to a Southern city one of the editors of this paper, in conversation with the president of the local electric railway, expressed a desire to see the company's repair shops. Because the shops were a considerable distance away from the office and the president had another appointment later in the day, he was unable to go out there himself. So he sent for one of the engineers of the railway and instructed that the editor be conducted to the shops.

"Show him all there is out there. Tell him whatever he wants to know. It's all in the family, anyhow."

Of course, we are always pleased to have the doors thrown open, and full information concerning methods of operation and maintenance put at our disposal. But to have it done because the editors of ELECTRIC RAILWAY JOURNAL are considered to be members of the family, is particularly gratifying. It shows appreciation of the fact that the interests of the industry and the interests of the JOURNAL are the same.

Information furnished us by an electric railway is never printed contrary to the wishes of that company. If the time is felt to be inopportune for publication of some particular matter, we are always willing to wait until the company feels that the proper time has come. But the more closely we are in touch with actual conditions—the more the JOURNAL is treated as a member of the family—the better the paper can serve the interests of the industry.

McGraw-Hill Company, Inc., Tenth Ave. at 36th St., New York

JAMES H. MCGRAW, President  
ARTHUR J. BALDWIN, Vice-President  
MALCOLM MUIR, Vice-President  
E. J. MUEBEN, Vice-President  
MASON BRITTON, Vice-President  
JAMES H. MCGRAW, Jr., Vice-Pres. and Treas.  
C. H. THOMPSON, Secretary

WASHINGTON:  
Colorado Building  
CHICAGO:  
Old Colony Building  
PHILADELPHIA:  
Real Estate Trust Building  
CLEVELAND:  
Leader-News Building  
ST. LOUIS:  
Siar Building  
SAN FRANCISCO:  
883 Mission Street  
LONDON:  
6 Bouverie Street, London, E. C. 4



Member Associated Business Papers, Inc.  
Member Audit Bureau of Circulations

The annual subscription rate is \$1 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala and Paraguay. Extra foreign postage to other countries \$3 (total \$7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place. Copyright, 1924, by McGraw-Hill Company, Inc. Published weekly. Entered as second-class matter, June 23, 1908, at the Post Office, at New York, under the Act of March 3, 1879. Printed in U.S.A.

# Varnish Plus



When you buy Westinghouse Insulating Varnishes and Compounds, you get in addition to better materials, the benefit of the great amount of research work done in the Westinghouse laboratories.

You get the same varnishes and compounds used in the manufacture of Westinghouse electrical apparatus.

You get the benefit of the experience of Westinghouse engineers in the use of these materials and, also, their services, if you so desire, to help you conduct tests or solve problems of insulation application.

Our free booklet discussing the proper application of insulating varnishes and compounds will be sent to you on request.

Westinghouse Electric & Manufacturing Company  
East Pittsburgh Pennsylvania  
Sales Offices in All Principal Cities of the  
United States and Foreign Countries



# Westinghouse



# Heat

## When you want it —

Just put in the load, set the thermostat at the temperature you wish to maintain and turn on the power. When the time of baking is up, if you wish to use the oven again right away—well and good. But, if you don't want to use it again for a day, or a week, or even for a month, when the time comes, you will find the Westinghouse Type K electric oven still ready. No time is lost lighting burners, adjusting valves, or waiting for steam. The electric oven is always ready when you want it.

Westinghouse Type K industrial ovens are shipped completely assembled, ready to install. They are made in many sizes, suitable for operating at temperatures up to 700° Fahrenheit.

Westinghouse Electric & Manufacturing Company  
 East Pittsburgh Pennsylvania  
 Sales Offices in All Principal Cities of the  
 United States and Foreign Countries



*Write for Leaflet  
 1815  
 describing  
 these ovens.*

# Westinghouse

# Heed the silent rubber tread

"Ride on rubber" say bus and private motor car—and the public does. Why? Speed, comfort, noiselessness. These same qualities help sell rail transportation too—and nothing helps more than well maintained track. Only on good track can electric railway cars combine speed with safety, comfort and relative noiselessness. Only by consistent grinding at cupped joints, battered special work or corrugated rail can you economically maintain speedy, safe and silent track.

*See the silencers pictured at your right—approved rail grinders and welders that are helping maintenance-of-way men on large and small roads everywhere. All the facts in print are yours for a word.*

## **Railway Trackwork Co.**

3132-48 East Thompson Street, Philadelphia

### AGENTS:

Chester F. Gallor, 30 Church St., New York.  
Chas. N. Wood Co., Boston  
Electrical Engineering & Mfg. Co., Pittsburgh  
Atlas Railway Supply Co., Chicago  
J. H. Doerr, Los Angeles  
Equipment & Engineering Co., London



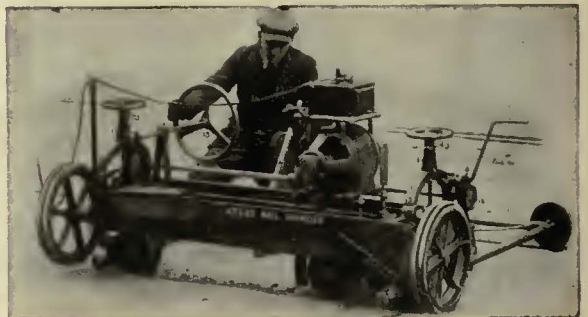
"Reelproating" Track Grinder



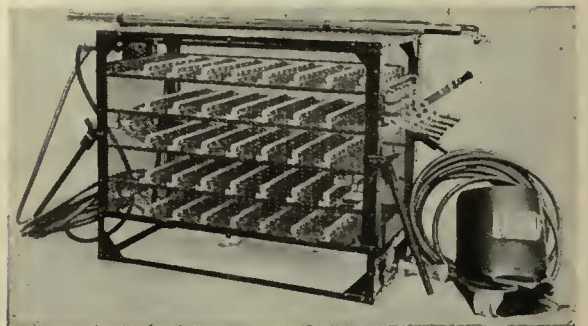
"Universal" Rotary Track Grinder



"Hercules" Swing Frame Rail Grinder



"Atlas" Rail Grinder

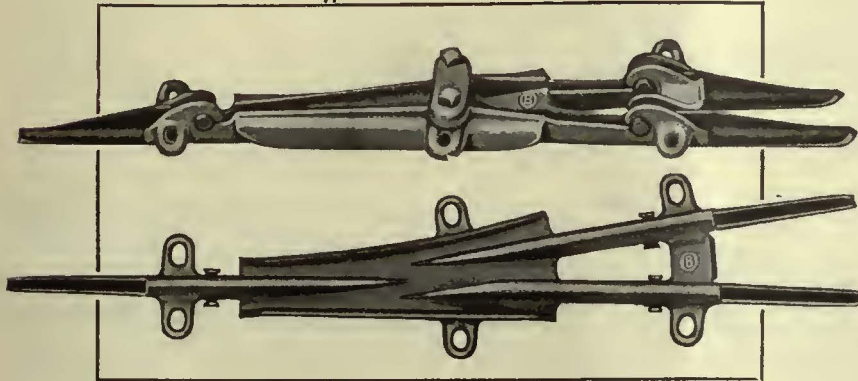


"Ajax" Electric Arc Welder

# Operating Economies in these O-Bs

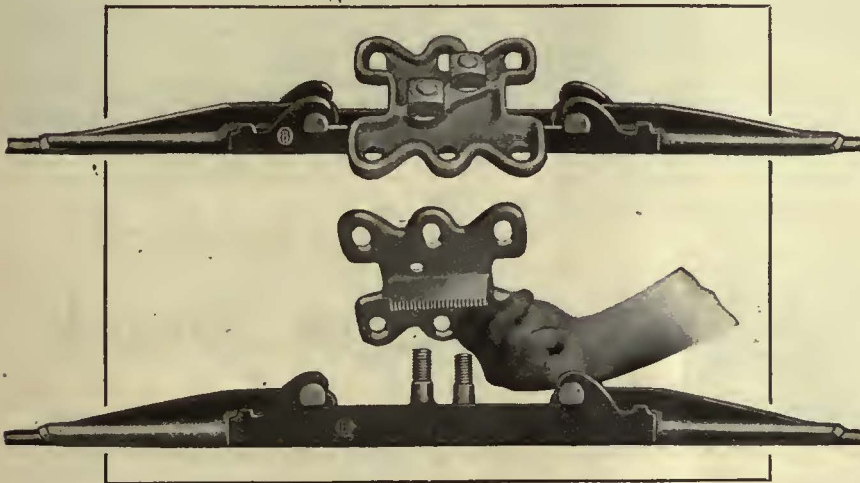
## "B C" Frog

The runners are formed up to the center of the pan casting. The trolley wheel thus travels from end to end of the BC on the groove instead of on the flanges. The BC Frog can be placed farther back towards the switch point, thus reducing the drag, or distance the wheel rides at an angle on the main line wire. The trolley wheel and the frog wire all last longer.



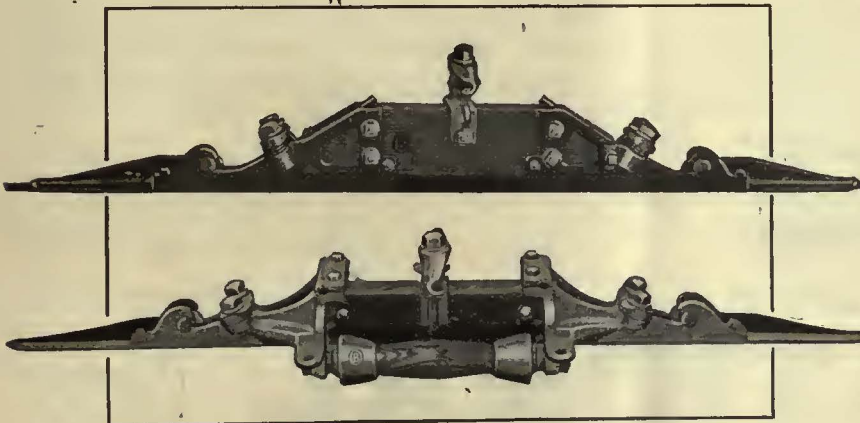
## "C" Strain Plate

A separable strain plate that firmly grips the wire by a serrated clamp casting held in place by two 5/8-inch studs. There is good clearance and a smooth under-run for either trolley wheel or pantograph. Like the other O-B devices shown here the C Strain Plate is provided with renewable bronze cam tips. The runner casting is bronze and the clamp malleable iron.



## "C" Section Insulator

The insulating beam is carefully selected and seasoned second-growth hickory impregnated and varnished. Rocker clamps for trolley ends work on cam principle so that the holding power increases as the tension increases.



## "A-4" Section Insulator

Entire trolley tension is sustained by two O-B wood strain insulators. Runner piece is renewable fibre. Trolley wire is held by rocker clamps like on the Type C.

Renewable Bronze Cam Tips on All These O-B Fittings

**The Ohi O B Brass Co.**  
 Mansfield, Ohio, U.S.A.

TROLLEY MATERIAL — ELECTRIC RAILWAY CAR EQUIPMENT — RAIL BONDS — HIGH TENSION PORCELAIN INSULATORS — THIRD RAIL INSULATORS

NEW YORK — PHILADELPHIA — PITTSBURGH  
 CHICAGO — CHARLESTON, W. VA.  
 LOS ANGELES — SAN FRANCISCO — PARIS, FRANCE

**Western  
Red Cedar**

**Light, Durable and Strong  
Plain or Treated Poles**

**Northern  
White Cedar**



## On the banks of Puget Sound

From this yard, at Everett, Washington, thousands of Western Red Cedar poles, cut in Washington and British Columbia, are handled, sorted, seasoned and prepared for shipment. It is one of the largest and most efficient pole handling yards in the world. The photograph shows only a section of the yard.

National Pole facilities make possible a pole delivery service that is unapproachable in the entire cedar pole industry.

# NATIONAL N P Co POLE COMPANY

## Escanaba, Michigan

*Western Electric Company* Distributors

*Sales Offices in 47 Principal cities*





CLASS OF SERVICE DESIRED	
Telegram	<input checked="" type="checkbox"/>
Day Letter	<input type="checkbox"/>
Night Message	<input type="checkbox"/>
Night Letter	<input type="checkbox"/>

Patrons should mark an X opposite the class of service desired; OTHERWISE THE MESSAGE WILL BE TRANSMITTED AS A FULL-RATE TELEGRAM

# WESTERN UNION TELEGRAM



NEWCOMB CARLTON, PRESIDENT

GEORGE W. E. ATKINS, FIRST VICE-PRESIDENT

Form 1206A

Receiver's No.
Check
Time Filed
10:44 A. M.

Send the following message, subject to the terms on back hereof, which are hereby agreed to

CLEVELAND, OHIO, MARCH 22ND, 1924.

TO ANY GENERAL MANAGER, OR CHIEF ENGINEER,  
WHO HAS PAVED TRACK WITH CONCRETE UNDER TIES TO REPAIR.

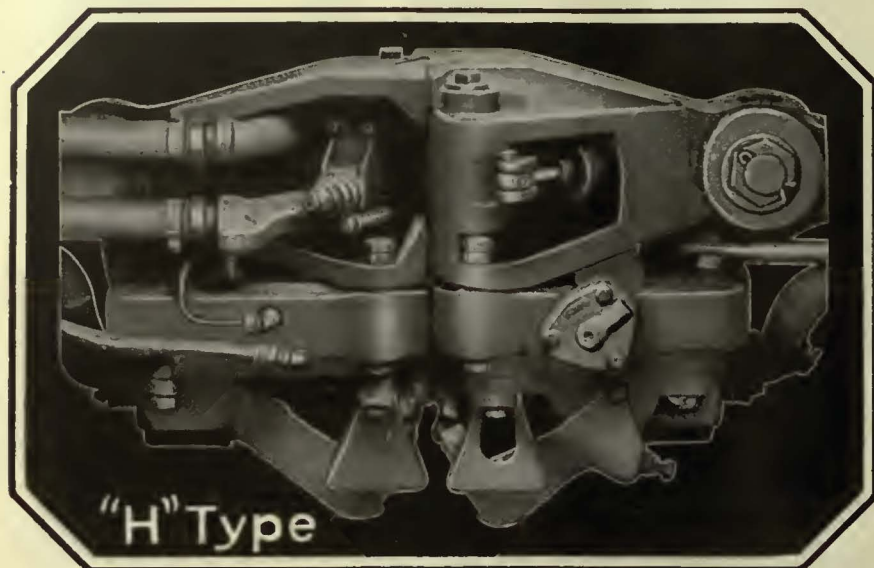
IF YOU HAVE PAVED TRACK WITH CONCRETE UNDER TIES TO REPAIR, OR  
RECONSTRUCT, ALLOW US TO PRESENT COMPLETE METHOD OF SAVING PRESENT  
CONCRETE FOUNDATION. USED IN CLEVELAND, BALTIMORE, AKRON, DES MOINES,  
ASHTABULA AND TOLEDO AT SAVING FROM TWO (2) TO SIX (6) DOLLARS PER FOOT  
TRACK. WIRE ANSWER COLLECT.

THE INTERNATIONAL STEEL TIE COMPANY.

TJL-JLH.

# Steel Twin Tie Track

“Couple your cars automatically”



## The Automatic Coupler For Heavy Service

The “H” type automatic car, air and electric coupler, one of the Westinghouse “Tight-Lock” models, is built especially for heavy service requirements—for subway, elevated and high-speed interurban trains.

### 3 Sizes

Westinghouse Automatic Couplers are furnished in three separate sizes to meet the requirements of all classes of service—the “H” type for heavy, high-speed cars, the “K-1-A” for light and medium-weight cars and the “C-3-A” for light cars in cases where the electric feature is not required.

This coupler embodies all the features which years of experience in automatic coupler design and manufacture have shown to be desirable for dependable, high-class service.

Connections made with all Westinghouse couplers are absolutely rigid—the greater the stress, the tighter they lock.

Westinghouse Traction Brake Company  
General Offices and Works: Wilmerding, Pa.

2123

# WESTINGHOUSE TRACTION BRAKES



### Every car speaks for itself

With the ball parks opening and the crowds once more on the move—

With the beaches about to open for the sweltering city hordes—with the vacationists soon swarming the cars to and from the railroad stations fed by your lines—

With all these fares to go into your coffers are you doing your utmost to see that these people reach their destinations via your lines?

Indistinct car markings won't get them all; they'll patronize the first means of transportation advertising the destination points they want to reach.

Get Hunter-Keystone Illuminated Destination Signs on your cars immediately and they'll do the job of announcing your service in no uncertain language.

A Hunter-Keystone-marked car is its own salesman.

It speaks for itself. Employ this salesman on every car you operate this summer.

*Ask for an introduction. We'll arrange it if you'll write for the data sheets.*

### ELECTRIC SERVICE SUPPLIES CO.

*Manufacturer of Transportation Specialties and Electrical Supplies*

Philadelphia, 17th and Cambria Sts.; New York, 50 Church St.; Chicago, Monadnock Bldg. Branches: Boston, Scranton, Pittsburgh. Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto.



*An effective advertising medium.*



# *International*

## Standard Specification

### TREATED TIES

## The Effect of Known Value

**T**HE growth of any business depends on the satisfaction of its customers, for a company establishes confidence only as it serves; its success depends on how its products endure.

For that reason, *International* offers ties of known value to the railroads—it knows that a company is known by the customers it keeps and that the only customers of value to it are those who are satisfied and will buy again.

*International* knows that its ties will give lasting service and prove satisfactory. To substantiate this belief *International* ties are permanently identified by the *International* dating nails showing the year in which they leave the plants.

*International* ties are sound, full size, plainly marked, well seasoned and effectively treated.

*International* has gained many friends by conducting a great tie business on a quality basis, by producing ties in accordance with the standard A. R. E. A. tie specifications, and by the faithful, experienced and thorough manner in which it has completed its contracts.

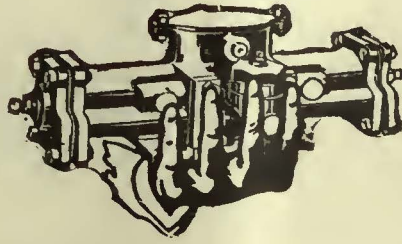
To entrust *International* with your tie contract is to guarantee yourself the value of satisfactory service.

*Send inquiries to our general office*

**International Creosoting & Construction Co.**  
General Office—Galveston, Texas

Plants: Texarkana, Texas    Beaumont, Texas  
Galveston, Texas





## No. F-63008

### Why every engine has a number

**J**UST another example of National Pneumatic foresight and service.

The figure shown above was the serial number of a National Pneumatic Door Engine shipped recently. Five years, hence, or ten years the purchaser may want a blueprint or a spare part for this engine. By referring to its serial number our factory at once identifies it with its original drawing and a complete record of its manufacture, inspection and shop test.

*National Pneumatic Service is Your  
Protection and Guarantee*

### **National Pneumatic Co., Inc.**

*Originators and Manufacturers*

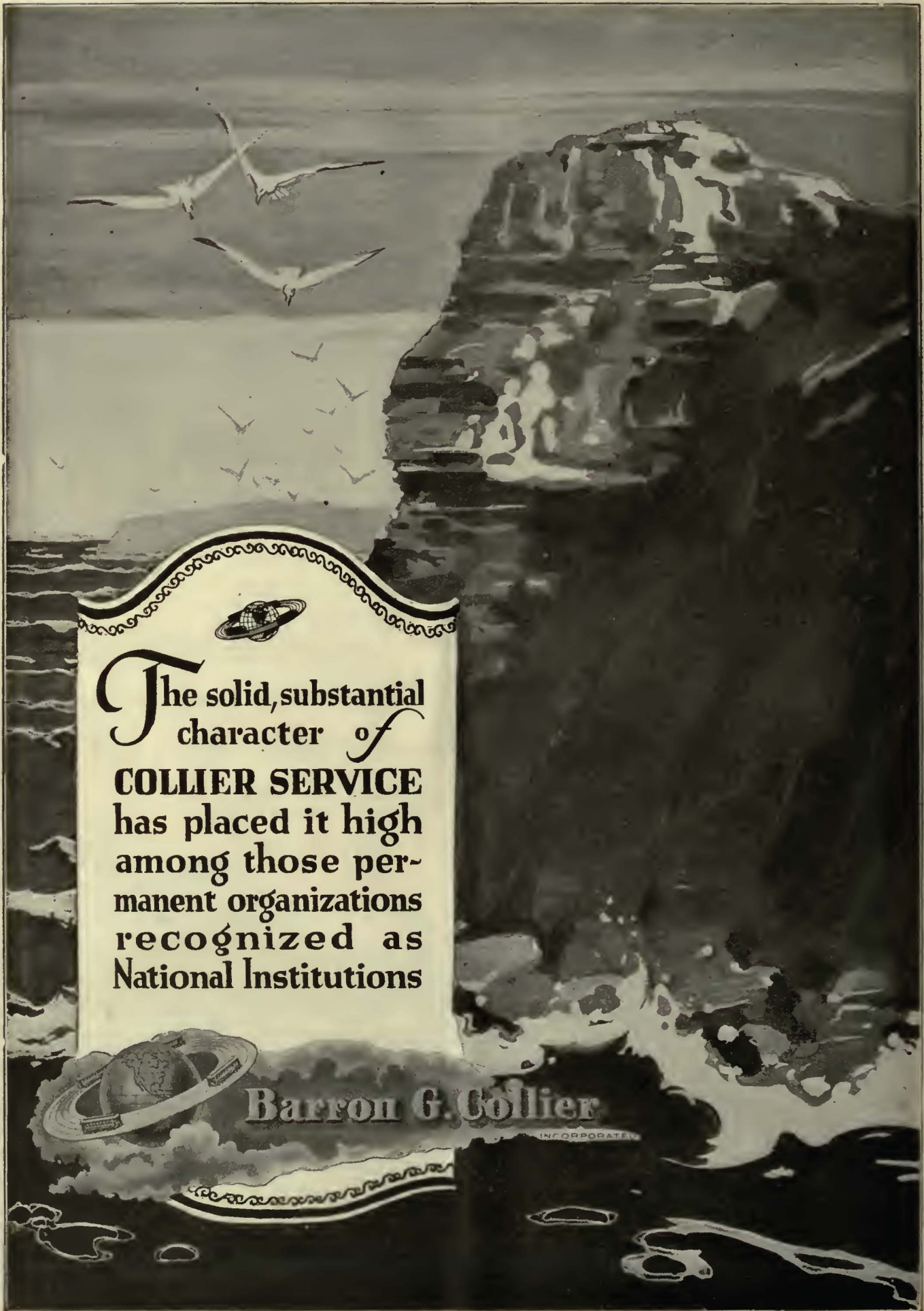
**Principal Office: 50 Church Street, New York**

Philadelphia—Colonial Trust Building      Chicago—McCormick Building

Works—Rahway, New Jersey

*Manufactured in Canada by Dominion Wheel & Foundry Co., Ltd., Toronto, Ont.*





The solid, substantial character of **COLLIER SERVICE** has placed it high among those permanent organizations recognized as National Institutions

**Barron G. Collier**

INCORPORATED



# GALENA

for lubricating efficiency

WHEN you use Galena Oils and Greases you stop waste, add life to your equipment, save money and—benefit by Galena Service which embodies whole-hearted, conscientious co-operation. The purpose is to help you get the most for your money.

Galena Service engineers are lubrication specialists, familiar with every type of equipment. Their recommended practices have never failed to produce results in efficiency and economy.

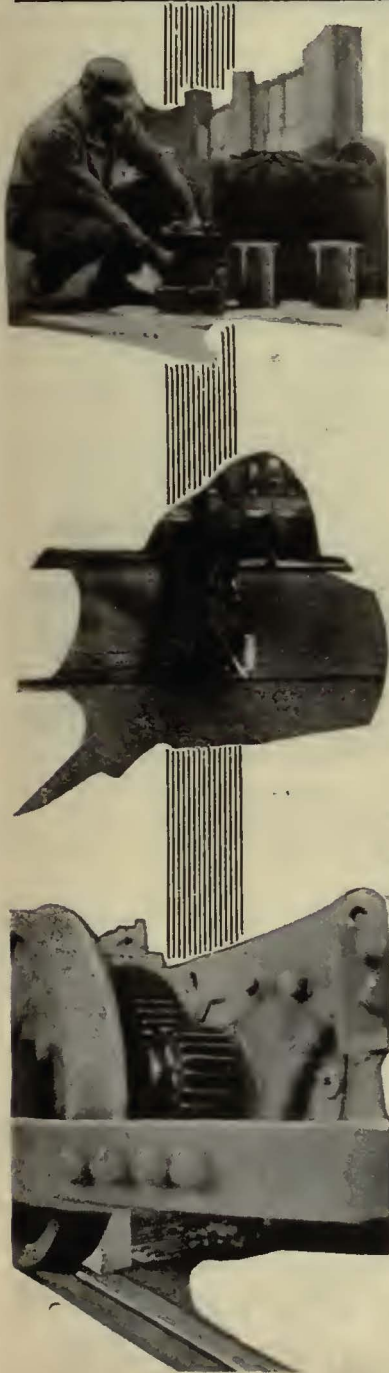
**GALENA-SIGNAL OIL COMPANY**  
Franklin, Pa.

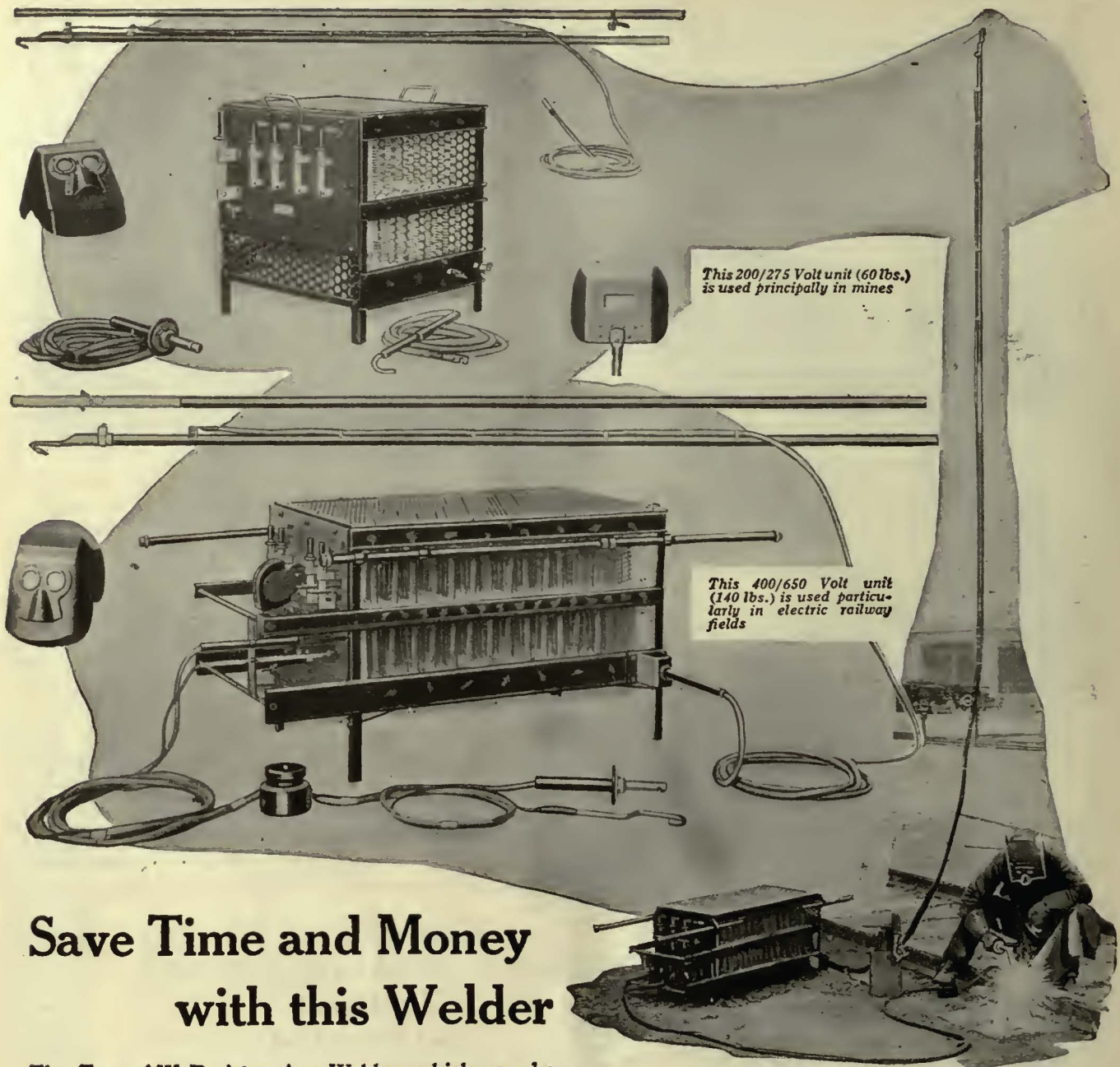
New York

and Principal Cities

Chicago

- Electric Car Oil
- Power House Engine Oil
- Power House Valve Oil
- Turbine Oils
- Dynamo Oils
- Air Compressor Oils
- Track Oil
- Gas Engine Oil
- Commutator Oil
- Electric Generator Oil
- Anti-Friction Triple Valve Oil
- Air Brake Compound
- Gear Greases
- Ball Bearing Grease
- Roller Bearing Grease
- Motor Grease
- Trolley Grease
- Solidified Oil
- Lubricating Grease
- Sponge Grease





*This 200/275 Volt unit (60 lbs.) is used principally in mines*

*This 400/650 Volt unit (140 lbs.) is used particularly in electric railway fields*

## Save Time and Money with this Welder

The Type AW Resistor Arc Welder, which can be carried by hand and operated from a trolley wire, is a "big hit" in electric railway and mine service.

It is light in weight and is easily handled by workmen.

It does a good job in quick time and at minimum cost.

It withstands the wear and weather.

It is specially designed for the welding of rail bonds, fish plates, etc.

Just hook the Type AW to a trolley wire and you get speedy production combined with low cost of operation. The welding current can be varied by approximately 15 ampere steps from 60 to 200 amperes.

*Welding rail bond with the Type AW. Note the foot-operated push button station for making and breaking welding circuit at a remote point. This control is optional and can be supplied if desired*



Ask the G-E Sales Office nearest you for complete information on your electric welding requirements.

**General Electric Company**  
Schenectady, N. Y.

Sales Offices in all Large Cities

# GENERAL ELECTRIC



New York, April 26, 1924

# 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*

Volume 63  
Number 17

## Accurate Schedules

### Demand Accurate Time

WITH steam railroad men accurate timepieces are traditional, and are looked on as a matter of course. Not only are high-grade movements demanded, but the timepieces used in railroad work must be examined periodically by competent inspectors and their accuracy certified.

Some street railway managers are prone to believe that similar accuracy of timepieces is not necessary on their roads. This is on the theory that slight deviations from the schedule are not of prime importance, and that it is the duty of inspectors stationed along the line, along with their other activities, to keep the cars properly spaced and on time.

Headways on a large city system are usually quite close, especially on trunk lines, where a number of routes converge, and it is folly to try to space out the cars on the street if they do not start from their terminals on time. Where the headway is, say, 2 minutes, if a car is 1 minute behind its schedule because the motorman's watch is a minute slow, and the one due next is 1 minute ahead, due to a watch a minute fast, they would run together, and there would be a gap of 3 minutes on either side of them, or 50 per cent above the proper spacing. The car due later might even arrive at the junction first, and so get ahead of its scheduled leader.

A joint headway of 2 minutes is not particularly frequent service, and nearly every American city of any size has at least one such line. The bunching of cars started in this manner is likely to be cumulative. One or two cars off time at the beginning of the rush hour might easily derange the entire service during this period. It is not always unavoidable delays that cause the irregular spacing.

Some roads have a practice, similar to that of the steam railroads, of requiring the men to purchase good watches and have them inspected. While ordinarily street car men do not have a large surplus of funds, a good watch should be considered an essential of the business. Arrangements usually can be made to purchase the watches on the installment plan, and as it is only the quality of movement that matters, the burden is not particularly onerous.

In line with the same policy, standard clocks should be provided at carhouses or other central points, against which the men should be required to check their watches daily, thus synchronizing time on the entire system and preventing any argument as to the correct time. And no alibis should be accepted from trainmen whose watches are inaccurate.

The policy of having the time for a road standardized is just one of the big little things that go to make the difference between good service and indifferent service. As a means of merchandising transportation there is

nothing like dependable service, with the cars always on time. Accurate timepieces are the first and a fundamental requisite in such a program.

## Railway Conventions for Railway Men

OUR conventions have come to be too much of a character designed to get publicity for the railway man's point of view. While this is desirable to a certain extent, it is somewhat of an imposition on a busy man's time to have to listen to papers and addresses directed not to him, but to the general public, he merely helping to make up the scenery and the occasion for putting this message out to the public.

In this suggestion, there is not the least intention to belittle the importance of good publicity, nor the effort to get all the good out of a meeting, in a publicity way, that can be. But there are ways of doing this without turning conventions for railway men into conventions for the general public; for example, by planning greater publicity for talks of railway men before layman type audiences.

## More Outside Point of View Needed

AS ATTENDANTS at numerous railway conventions, the editors of this paper have been impressed with the desirability of bringing in more speakers with an outside point of view. There is a rather natural tendency for railway men to tell each other their problems and consult about them, all from an inside point of view. This is productive of considerable mutual helpfulness, especially with respect to mechanical and operating problems. But on the broader, less tangible problems, such as public relations, they are all attacking them from about the same angle, for their thinking is much along the same lines. They confer, and, agreeing, part without having gained materially.

What would be helpful here, perhaps, would be to have speakers who would present some ideas from the car rider's point of view. Most every layman has ideas on how to run the railway. Some of those ideas, if coming from a man of reputation, might be quite worth the time of a railway man to hear. They might not always make the best publicity—and yet, the railways have nothing to conceal nowadays, and if a condition does exist which would not look well in print, it ought to be corrected anyway, or if it cannot be, then the company doubtless has a reason that will constitute a satisfactory explanation, and the news about the matter would give an opportunity to get that reason before the public.

Would it not be fruitful to invite a prominent news-

paper man to speak to a railway convention now and then, even though he might represent an anti-traction paper? Perhaps he would disclose something of his reasons for antagonism—some motive that had not occurred to the railway men. This would then suggest a way to correct a misimpression on his part, or a fault on the part of the railway.

### House Organs as Mediums for Railway Publicity

ANOTHER good way to get the story of the local electric railway before a part of the public is to prepare short articles for some of the numerous little publications of the "house organ" type. Almost every large organization nowadays has some sort of magazine which is circulated to the employees. These organizations include manufacturing concerns, department stores, the police department; automobile, golf, political and athletic clubs; federated women's clubs, and so on. Such papers are often in need of an article or two on some good, live topic. And they are not troubled with the general publicity that floods every newspaper office. They may not reach a host of readers, but to their limited audiences they have an especial appeal—that associated with company or club interest and backing. Such mediums are numerous, and taken as a whole, they form a very worth-while means of spreading the true story about railway service.

### Giving the Pedestrian a Show Should Benefit the Railway

TRAFFIC problems nowadays are considered principally from the standpoint of the street car and the motor vehicle. The discussion usually comes down to whether the motor car should use the streets to the exclusion of other traffic, or whether the street car should be given precedence over vehicles.

There is, however, a silent sufferer who loses no matter what the decision—the pedestrian. Street congestion is getting so bad in most urban business centers that it is exceedingly difficult for him to make his way across the intersections.

Some cities go farther than to consider the pedestrian a pest. They legislate against him to the extent that he must cross the streets at certain designated points, and then only when the traffic signal is set properly for him. Even so, there are vehicles making right-hand and left-hand turns that interfere with his movement and make it dangerous for him.

A speaker recently pointed out that there is a connection between the street railway and the pedestrian, in that except for the pedestrians on the congested streets there could be no surface car system. Railway managers are importuned to tell the motor car owner to leave his automobile home and ride the street cars. It must not be forgotten that this carries with it a certain obligation to make it safe and convenient for the same person when he leaves or boards the street car, wherever that may be. Certainly if he cannot feel that he is safe afoot, he will prefer to drive his own machine with its attendant risks rather than walk on the streets and take a chance against other vehicle drivers.

With this idea in mind, street railway men can justify time spent in campaigns for public safety, for in so doing they are not only performing a public duty, but they are also working in their own interests. The passage of regulations safeguarding boarding and alight-

ing passengers, the construction of safety zones and loading platforms, elimination of vehicle turns that interfere with pedestrian movement, prohibition of parking at places that make it dangerous for persons going from sidewalk to the car stops, are just a few of the things that can well be sponsored in an effort to popularize service and increase patronage.

If it can be shown, as it repeatedly has been, that the street railway can furnish faster, cheaper and above all safer service than the individual can provide for himself, the ranks of the car riders will be augmented and the coffers of the railway will gain accordingly.

### A Subway by Assessment Approved in New York

THE legality of the New York State act of 1909 permitting rapid transit lines in New York to be built through assessments on the property benefited bids fair to be determined soon. The line concerned is the proposed Sixth Avenue subway in Manhattan, construction of which is being strongly urged by the Manhattan borough president. Under his direction, the owners of a considerable part of the real estate immediately abutting on the route have agreed to pay an assessment of 10 per cent on their property to construct the new line. Sanction to the plan has now been given by the Transit Commission, though it points out that a 10 per cent assessment on all the property directly affected would yield only about half of the sum required. The commissions suggests, therefore, either an assessment increased to 20 per cent or to lay some part of the cost on property from half a block to a block on each side of the proposed route. It refers the choice between these methods to the municipal authorities.

Much can be said in favor of the plan of special assessments for rapid transit lines judiciously planned. But any act of this kind also contains an element of danger, which property owners in New York now will more generally recognize since Mayor Hylan can now appoint a board to construct rapid transit lines to be municipally owned and operated. Hence, as any property holder may object to his assessment, it is safe to say that active construction work on the new Sixth Avenue subway will wait until the courts act on some test case.

Wisely, the commission's order provides that the present Sixth Avenue elevated railway must remain in place until the new subway is ready to function. In view of the fact that the Sixth and Ninth Avenue lines together now carry over 150,000,000 passengers a year, of which probably at least half use stations exclusively on the Sixth Avenue branch, this was the only decision possible. No new north and south line on Manhattan is under construction, and the present lines certainly could not care for this number of passengers in addition to those now being carried.

The removal of the Sixth Avenue elevated can be seriously considered only after the proposed Sixth Avenue subway has been built, and then only if the north and south traffic on Manhattan does not increase materially during the five years or more required to build and equip the subway. All past experience shows that traffic in New York increases more rapidly than the facilities. In fact, conditions are becoming so bad on trains and in stations during rush hours that the congestion suggests as a possible necessary early measure that those waiting to be carried form queues and be admitted onto the station platforms only as the trains have capacity to carry them.

# Progress in Noiseless Substation Design

The Los Angeles Railway Has Developed Substation Buildings to Harmonize with Surroundings in Residential Districts—Use of Automatics Has Produced Satisfactory Operating Results and Substantial Economies, Which Are Itemized

By L. J. Turley

Electrical Engineer Los Angeles Railway Corporation



These Designs of Noiseless Substations of the Los Angeles Railway Show the Architectural Treatment. Top, Left—West Adams. Top, Right—Melrose. Bottom—Garvanza

WITHIN the last three years the Los Angeles Railway has placed in service five automatic substations, four of these being 1,000-kw. single units, while the fifth is a double 1,000-kw. installation. A contract has just been closed for the sixth equipment, to consist of a 1,500-kw. automatic set.

This is a good example of the gratifying trend toward the recognition of the economic possibilities claimed by the manufacturers for automatic control features, applied to one or two units in stations scattered over a spreading trolley system. This claim is now substantiated by the increased number of successful installations on other systems, where a desired reduction in cost of attendance has been obtained, together with a general improvement in power conditions.

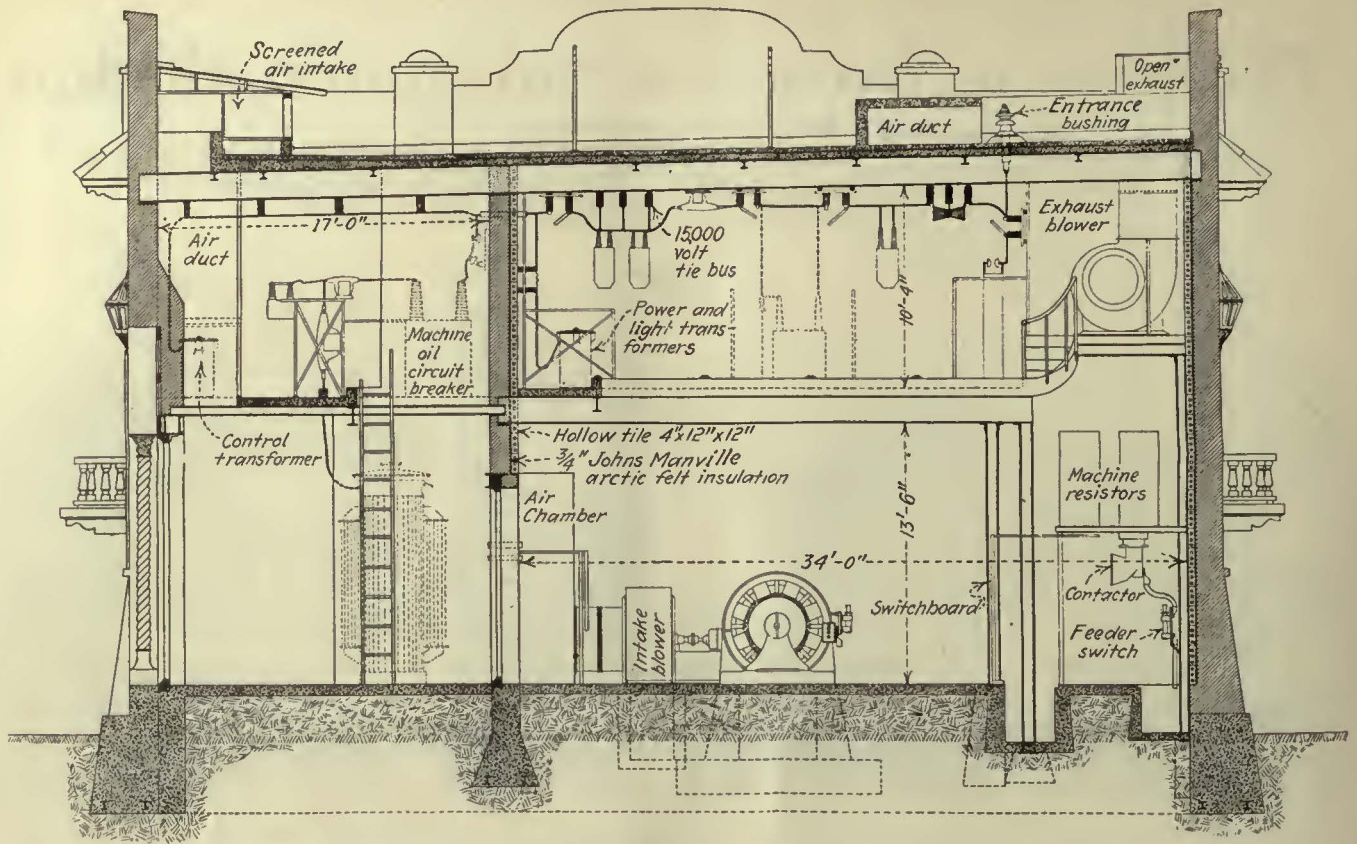
The automatic type of substation has now passed the early development stage into economic use. A general degree of confidence seems to exist in its reliability for city and interurban service, and it is satisfactorily meeting every kind of normal or emergency load demand. Where high line switching formerly required the presence of an operator, the remotely controlled supervisory schemes of today have met this requirement.

Ordinarily an increase of 6,000 kw. over a three-year period on any large city railway system is unworthy of comment, but due to the timely action of establishing five distinct power delivery points to the overtaxed generating and distributing system of the Los Angeles

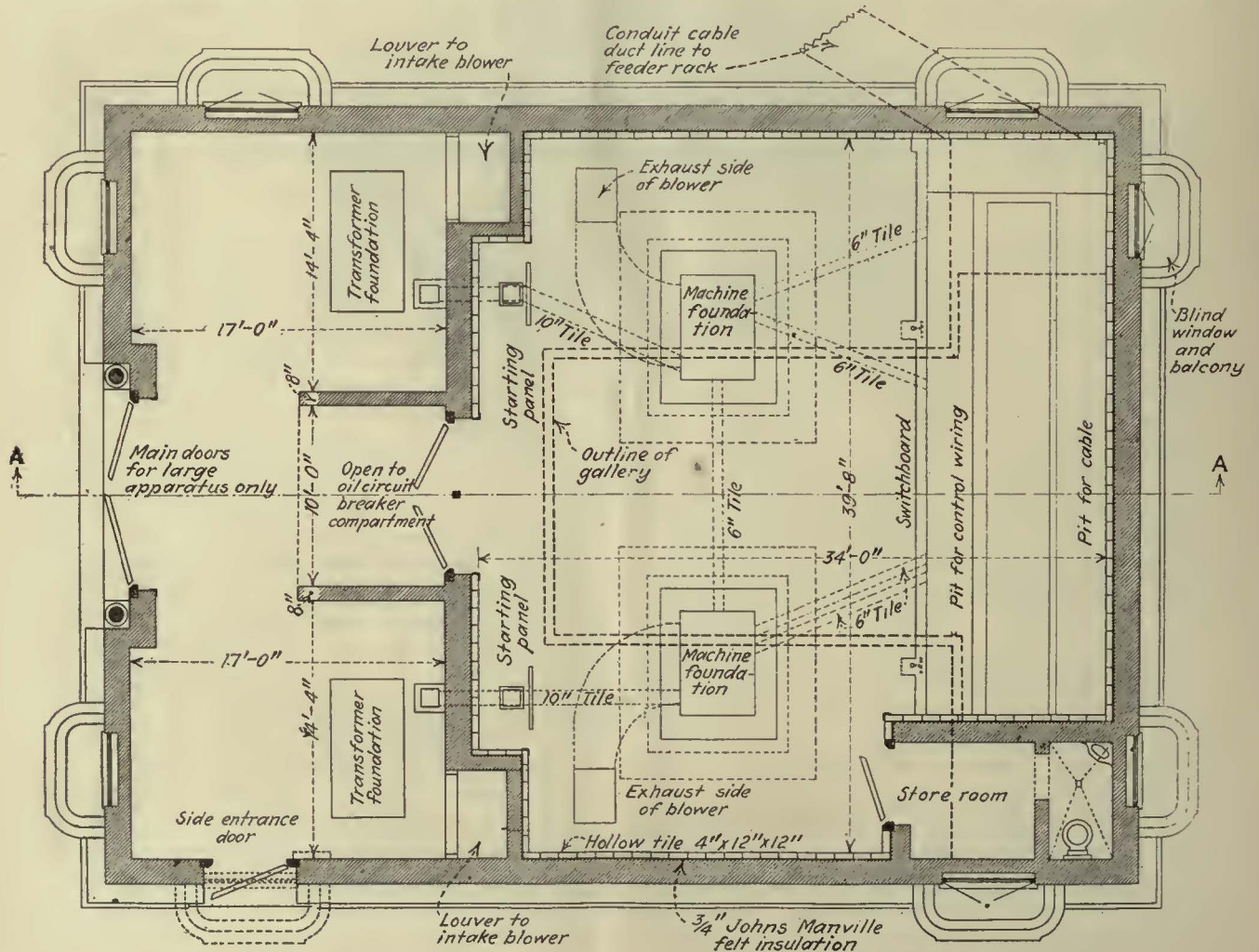
Railway, and to the favorable and satisfactory operation obtained from the very first installation, the writer considers it of sufficient importance to review briefly the situation that led up to the decision to institute a program involving the construction of noiseless automatic substations.

The redistribution program of 1920 called for several substations in the immediate outlying districts of the city. Without defeating the object of economically serving the entire feeding area, it became necessary to plan the station sites approximately near the established load centers. A problem arose on finding that some of them must be located in restricted residential sections. Realizing that former complaints had been lodged against other stations on account of noise and the unsightly appearance of the buildings, and with due regard for rights of property owners in residential sections, the railway company decided that future substations should be of fireproof structure, unusually attractive, beautifully parked, and with the added feature of eliminating the unnecessary noise which characterizes rotating machines and transformers.

There was a limited amount of available information on sound-proofing applied to substations, and the special conditions imposed novel considerations in combining soundproof construction, forced ventilation, and automatic control operation. Naturally this course would make property and building costs unusually high for 1,000-kw. single-unit installations, but it was considered



The Sectional Elevation of the Melrose Station Shows How Switches and Auxiliary Equipment Have Been Placed Overhead



Floor Plan of the Melrose Station, Which Has Two Units and Separate Air Supply for Each Machine

TABLE I—BUILDING DIMENSIONS AND COSTS

	Kw. Capacity	Building Dimension	Square Feet of Building Area	Cable Feet Machine Room	Air Changes Cubic Feet per Minute	Real Estate	Building and Foundations**	Complete with Equipment
Garvanza.....	1,000	43 x 44'	1,892	26,000	9,000	\$953	\$17,915	\$74,806
Melrose.....	2,000	39 x 52	2,128	33,000	30,000	7,398	26,280	109,056
West Adams.....	1,000	35 x 44'	1,540	20,000	15,000	5,019	25,150	74,140
West 54th.....	1,000	35 x 41'	1,435	21,000	15,000	*	21,230	68,255
Central Ave.....	3,000	45 x 54'	2,430	36,000	40,000	*	Under construction.	

\* On division carhouse property.  
\*\* Cost include parking, lighting, cable duct lines.

an asset in public good will, together with the improvements sought in giving better service with a shorter feeding area.

Regardless of the company's good intentions, two districts filed petitions of protest to the City Council, with emphatic objections to granting the railway's application, basing their claim on the ground that the architectural harmony of the district would be marred and property values decreased, noise or no noise. The railway realized the importance of rendering increased car service to the entire district, even in view of the protestants declaring the existing service satisfactory. After a year's delay the city granted the application, having been satisfied with the company's first attempt with the Garvanza substation. The ELECTRIC RAILWAY JOURNAL of July 8, 1922, contains a description of this station. Due to the improvements in arrangements and soundproofing in subsequent substations, it is considered of sufficient importance to present an abstract description of the building construction, together with views and plans, showing the accomplishment.

Each automatic substation is located in a district corresponding to its name: Vernon, Garvanza, Melrose, West Adams, West Fifty-fourth Street, and the proposed Central Avenue station. These are all indicated on the accompanying map, along with the manual substations. All are of soundproof design, except the one in Vernon industrial district. The following description is confined to those of noiseless design.

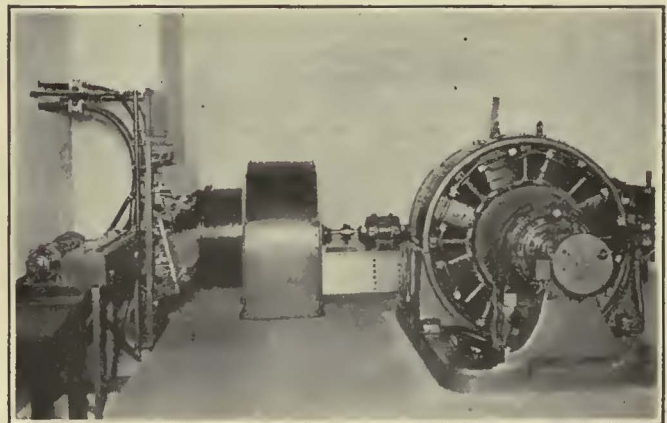
Incidentally, the addition of these substations did not permit any reduction in copper feeder cable, but actually required considerably more. This demonstrates the low voltage existing on the extended lines and the great dependency being placed upon the additional power delivery. Table I gives the general inside dimensions and costs. In addition to the original design of the building, all arrangements of apparatus and installation were made by the engineering department of the Los Angeles Railway.

All substations have fireproof compartments for oil switches and transformers. There are no basements except a 2-ft. x 3-ft. pit located back of the switchboard,



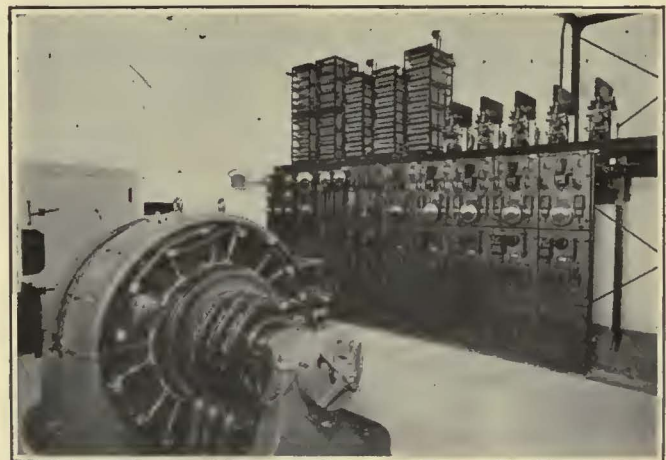
The Machine Room of the Two-Unit Melrose Substation. The Air Outlets Are Above the Grid Resistors

which is used for incoming underground feeder cables to facilitate the control wire connections at the base of the panels. As may be observed from the elevation of Melrose substation, a gallery is mounted over the machines for the indoor lightning arresters and 15,000-volt bus and switches. This plan is used with the two-unit, or high line installations.



Intake Blower of the Melrose Substation

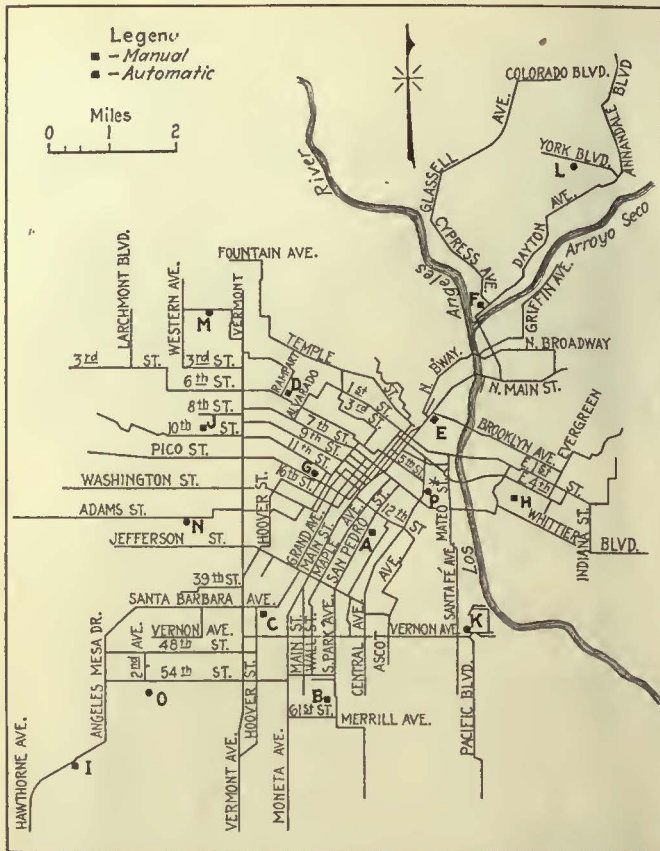
The hydro-electric system of the Southern California Edison Company supplies all the 15,000-volt power used by the Los Angeles Railway. The high-tension lines interconnecting with substations are owned by the railway company, and are three phase 50 cycle, 15 kv. to



The Entrance to the Machine Room of the West Fifty-fourth Street Station Is Through a Refrigerator-Type Double Door

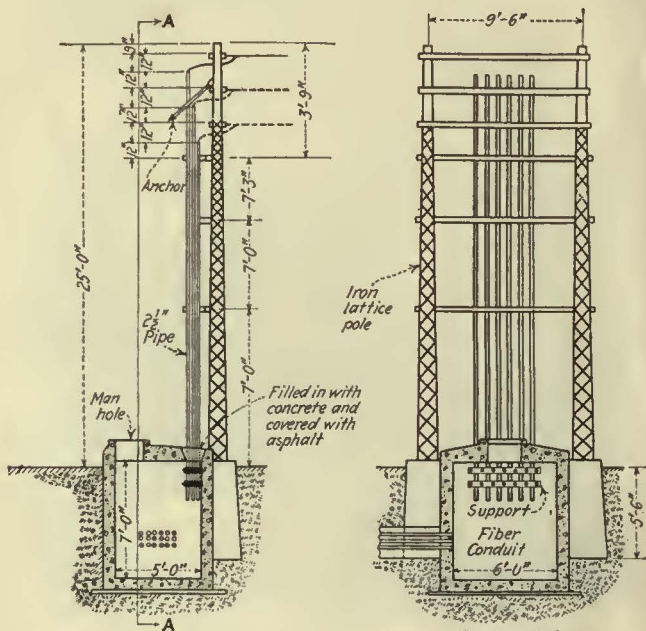
TABLE II—OPERATING CHARGES

Year	Monthly Average per Substation							
	Repairs to Equipment		Lamor of Operators		Supplies		Total	
	Automatic	Manual	Automatic	Manual	Automatic	Manual	Automatic	Manual
1922	\$9.94	\$131.13	\$85.16	\$564.44	\$16.07	\$20.75	\$109.17	\$716.32
1923	1.73	90.01	78.17	563.47	4.91	23.30	84.81	676.78
	Monthly Average per 1,000 Kw. Capacity							
1922	\$9.94	\$52.77	\$85.16	\$227.14	\$16.07	\$8.35	\$109.17	\$288.26
1923	1.73	36.22	78.17	226.75	4.91	9.37	84.81	272.34



The Locations of Both Manual and Automatic Substations Are Shown in the Route Map of the Los Angeles Railway

Symbol	Name	Number of Machines	Capacity
A	Sixteenth Street	4	3,600
B	Slauson	3	1,600
C	University	4	4,200
D	West Lake	3	1,400
E	Plaza	5	6,000
F	Huron	3	1,600
G	Sentous	3	2,600
H	Soto	3	1,800
I	Centinella	3	650
J	Ardmore	2	1,600
K	Vernon	1	1,000
L	Garvanza	1	1,000
M	Melrose	2	2,000
N	West Adams	1	1,000
O	West Fifty-fourth Street	1	1,000
P*	Central Avenue (proposed)	2	3,000



Standard Feeder Rack and Manhole for Los Angeles Automatic Substations

TABLE III—DATA ON OPERATION AND FAILURES

Year	Number of Substations	Substation Days	Average Daily Kw. Hours	Daily Hours Operator Present	Actual Time Station in Service	Average Daily Minutes Lost Due to:				
						Regular Inspection	High D. C. Voltage	Men Working	Equipment Failures	Total
1922	3	425	10,200	3.20	93.1%	39	15	22	4	80
1923	3	1,095	13,900	2.20	97.7%	24	10	7	2	43

Year	A. C. Interruption per Substation	Number of Equipment Failures			No. of Device Giving Trouble		
		Garvanza	Melrose	W. Adams	Garvanza	Melrose	W. Adams
1922	41	8	2	2	21.33	69	133
1923	79	1	6	7	64.69	7.28	66.7

16 kv., aerially constructed with single line to each automatic station for the present. Provision is made at two substations for double high line entry when necessity warrants. Indoor oxide film lightning arresters and choke coils are installed at each station, except at two, which are of the outdoor type. The main-line 35,000-volt oil circuit breakers are automatically and electrically operated and controlled for undervoltage and overload, with sufficient disrupting capacity to care for short circuits.

METHODS OF ELIMINATING NOISE

The soundproofing feature is used in the machine room only. The ordinary brick walls seem sufficient to prevent transmission of the transformer hum to the outside. Around the machine foundation is placed 1/2-in. elastite insulation, separating it from the substation 6-in. cement floor to deaden the vibration of the machine. Without any windows or steel frame work penetrating the walls or ceiling, the absorption of the noise developed within the building is obtained by use of the Johns-Manville 3/4-in. Arctic insulation placed in layers between the ordinary hollow building tile facing and the 21-in. brick wall. The felt and tile are held securely fastened to the brick with large nails. The ceiling is made up of a 4-in. slab of reinforced concrete mixed with Truscon waterproof paste, on top of which is laid one layer of 3/4-in. Arctic insulation, which is covered with an additional 3-in. slab of waterproof concrete.

With all doors 6 in. thick properly constructed with heavy beveled jambs, felt lined and held securely closed to a tight fit by Glockler refrigerator door clamps, the soundproof feature has been such a success that two of the substations were placed in operation and running for some days before any one in the neighborhood was aware of the fact, and then only from seeing the exterior lighting of the building at night and inquiring "when the noise was to start." Although one might detect a slight rumble when in close proximity to the outside wall, yet at 3 ft. distance no noise of machine, transformer or rushing air is noticeable against extraneous disturbances. As with the West Fifty-fourth Street station, a double door is used where entrance is planned from the outside direct into the machine room. Property values are advancing, and many new residences have been constructed since these stations were started.

The exterior view of Melrose shows blind windows with balconies. With a row of 10-watt lamps placed

in a recess back of the amber colored glass, the lighting effect at night is similar to that with a drawn shade, as may be observed in the surrounding dwellings. This class of exterior design, with parking arrangements of shrubbery and automatic sprinkling system for lawn, as shown by the views, may not be necessary in every case. This is true of the West Fifty-fourth Street station, but still the principle of sound absorption used in this type of construction will be found satisfactory where such an installation is considered.

The Central Avenue station will have the added feature of an air washer scheme. This was felt to be necessary, since several failures due to poor contacts of relays have been attributed to dust accumulation, where automatic substations are located in a dusty district. The floors of all the transformer and oil switch compartments are provided with drainage to an outlet for oil in case of explosion or fire. A suitable number of fire extinguishers are conveniently located throughout the building.

**FORCED VENTILATION IS USED**

The ventilating scheme for Melrose, as for the other forced-draft stations, is as follows: The air is drawn into the transformer room from the roof by way of a large duct, with 20 to 30 sq.ft. area. This duct is covered on the roof by a housing screened on the sides to prevent rain and large particles from entering. An attempt is made to filter the air in its passage by use of a removable tray covered with large mesh screen on which is laid one layer of cheese cloth. The air is drawn into the transformer room past all sides of the three-phase transformer, thence through a large fire-proof louver, and forced into the machine pit by a Sturtevant No. 90 silent vane fan, directly connected to a 3-hp., 40-deg., 600-r.p.m. motor. The air in the machine and switchboard room is drawn up by a similar blower located near the ceiling, thence to the roof through an air duct, which extends out on the same plane with the roof, doubling back on itself. This exhaust duct is constructed along acoustic principles by baffling the noise of the machine and rushing air, yet not unnecessarily increasing the static pressure.

The grid resistors used in the station for machine and feeder control are located directly under the exhaust fan, so that hot air rises quickly in case the grids are connected into the circuit. Melrose has about 33,000 cu.ft. in the machine room, and being a double unit the air is changed in this station, with both units in service, approximately every minute. The 2-min. rate of change is about correct for the southern California climate to maintain proper transformer and machine room temperature for the 1,000-kw. installation on a 65 per cent load factor. Unless precautions are taken in locating the feeder resistors, it becomes necessary, as with the West Adams station, to provide an auxiliary exhaust blower of about 8,000 cu.ft. to care for the hot air, and to permit cooling of the feeder grids in the shortest possible time consistent with load conditions.

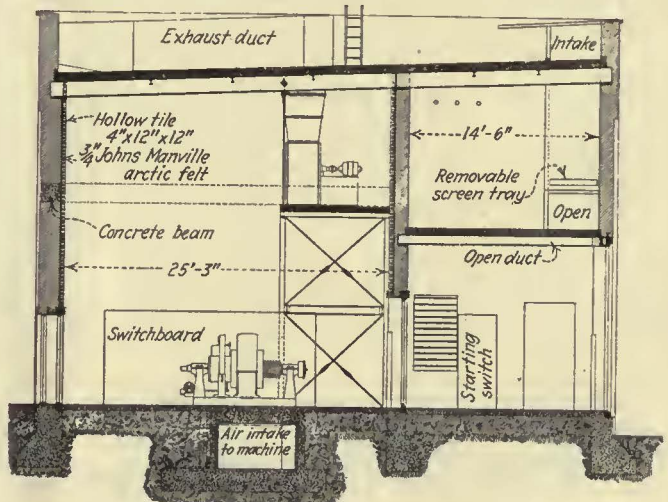
The blower motors are started up and operated with the machine. Provision is made for them to cut out 10 to 15 min. after the machine is shut down. They are equipped with an underspeed relay, which will shut down the machine in case either of the motors fails to come up to speed, or blows the main line fuses. These motors are fed from a three-phase bank of separately connected transformers. A throw-over switch in the



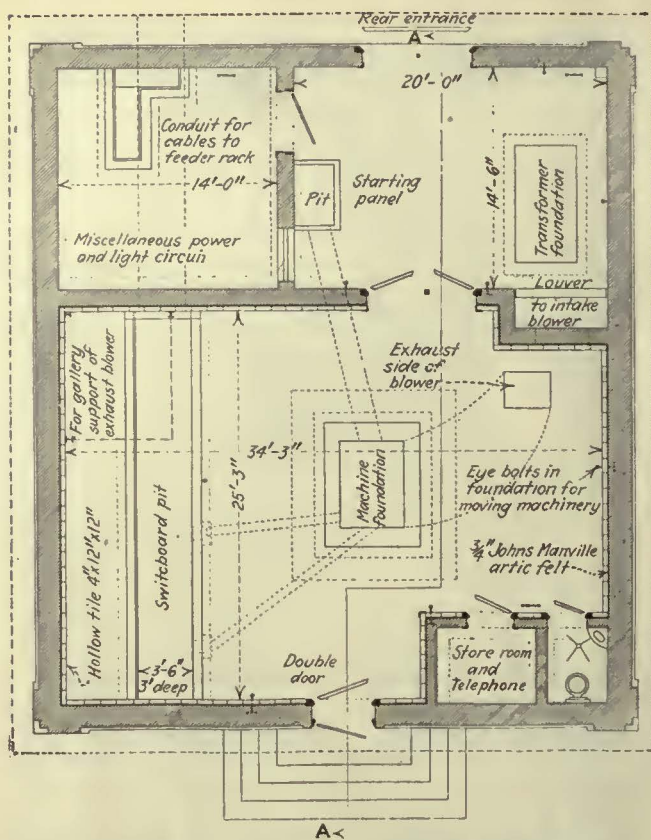
In the Fifty-fourth Street Substation the Exhaust Blower Is Mounted Above the Switchboard

motor circuit permits operation of the converter, independent of the blower motors.

Up to date each of the soundproof substations is equipped with General Electric apparatus. This gives greater interchangeability of parts. The 1,000-kw. synchronous converter has a 200 per cent overload rating for 2 hr. It is flat-compounded, with high reluctance interpoles and without flash barriers on either end. The transformer is three-phase, oil-cooled, with four 2½ per cent taps on the high-tension winding below 16,500 volts. The 1,500-kw. unit on order for Central



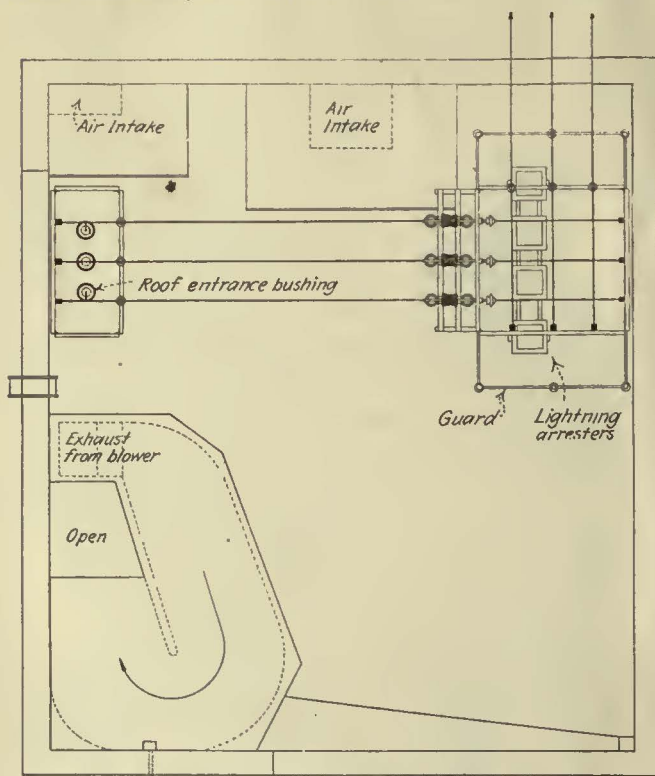
Vertical Section A-A of Fifty-fourth Street Station, Showing Air Intake and Exhaust



The Floor Plan of the West Fifty-fourth Street Substation Shows Arrangement for a Single Unit

Avenue station will have flash barriers on the d.c. end only.

All substations have current-limiting resistors for the machine current, while for the positive feeders resistor control is used in three stations, with the high-speed circuit-breaker type for the latest two construct-



Roof Plan of Fifty-fourth Street Station. Note the Circuitous Route for the Exhaust Air

ed. There are usually four positive 600-volt feeders in each substation, with provision for an ultimate capacity of eight. This number is due to the extensive trolley sectionalizing policy of this company.

All feeder cables leave the switchboard through a pit to underground fiber conduits, which extend from the inside of the substation about 50 ft. to a feeder rack; thence aerially to the overhead trolleys. This is shown in one of the illustrations. The feeder rack was considered a better means to take care of the cables on leaving the building, since it permits the building to be unattached and adds to the outside appearance. There are but two stub-end feeders out of a total of 24, all the rest being tied in with manually operated substations. Each feeder has a d.c. electrolytic lightning arrester without choke coils. The insulated negative feeder scheme is used extensively with these stations for reducing rail potential gradients and minimizing the effects of electrolysis.

The control and protection for all machine and resistor-type feeders follow the standard General Electric methods. The feeder control bus is energized at all times, whether the machine is running or not. However, there are two special means of meeting conditions. One multiple-end feeder is provided with a reverse-current relay, so that it will be disconnected from the station bus in case of reverse feeding. It is automatically reclosed when the outside trolley voltage is lower than the station bus, so that this feeder is usually disconnected from the station during the period when the machine is off the line.

The West Fifty-fourth Street d.c. reclosing feeders are equipped with high-speed circuit breakers. These are provided with the standard General Electric auxiliary feeling out control with the added feature used with the manually-operated stations in handling grounded trolley wires. At the instant of a grounded trolley wire, the high-speed breaker opens the circuit. The auxiliary feeling out detects whether the existence of the grounded wire warrants keeping the feeder open. At the end of a 10-sec. period, if the feeder is cleared of ground, normal service is resumed, but if at the end of 10 sec. the ground still exists, then the feeling out is delayed a predetermined time, usually 10 min., before an attempt is made to detect outside conditions. This process is repeated in the same sequence until normal conditions are established. A considerable amount of trolley wire has been saved from being annealed. There also is the important consideration of the safety of traffic, and trainmen are enabled to clear the wire from ground without fear of hazard.

TIME SWITCHES CONTROL HOURS OF SERVICE

The machine is controlled by a time switch set for about 18½ hr. per day, including Sunday. This switch gives a definite starting and stopping period, and in addition prevents starting up of the machine due to low voltage during the early morning period. Another time switch controls the exterior lights from sundown to midnight. No scheme is included for remote indication telling when the machine is on or off, or any method of remote supervisory control. Some improvement in this matter is contemplated shortly. To provide means of determining the nature of any abnormal conditions, there is being considered for each automatic substation a graphic strip chart meter, showing the total machine ampere load and bus voltage, together with two special



pan attachments to indicate by short movements on each edge of the chart whenever certain contactors in the machine circuit operate. This seems to be about all that is necessary in the way of recording instruments.

Table II shows average operating charges, comparing the automatic and manual stations; while Table III gives operating data. Due to greater familiarity with the control and equipment by the attendants, the duration of failures has been reduced for 1923. The attendant in charge is subject to call at all hours. He is furnished a roadster for inspection or emergency duty and is required to live in the city.

The scheme of inspection is as follows: The machine

is blown out and cleaned twice a week. The a.c. and d.c. brushes are inspected and the commutator slots cleaned once a week. A general substation cleaning of all 15,000-volt insulators, bus and transformers, together with necessary inspection and adjustment of relays, is made once a month. It will take the time of two attendants to care for inspections of six automatic substations, with one helper during the general cleaning up.

With 15 to 24 months operation of these substations, there has been no case of a flash-over on the d.c. or a.c. end of the synchronous converters, although there have been more than 120 a.c. interruptions and many trolley breaks.

## Looping Back Reduces Delays by 28 per Cent

The Downtown Rerouting Recently Inaugurated by the United Electric Railways of Providence, R. I., Has Speeded Up the Car Service and Reduced Congestion—At the Same Time a Change Was Made in the Method of Fare Collection



A Loading Point on Loop No. 1, Exchange Place, Which Is Used by Cars Entering Providence from the North

**B**EGINNING on Sept. 9, 1923, all lines operated through the business district by the United Electric Railways of Providence were discontinued and all cars entering the business district were routed around eight loops. This change reduced from 16 to 3 the number of points where straight railway crossing movements take place in the congested area. Points where left-hand turning movements occur were reduced from 12 to 6, while the number of right-hand turning points remained constant. As a result of these changes there has been a reduction of 28.4 per cent in the number of cars late as compared with the corresponding period the previous year.

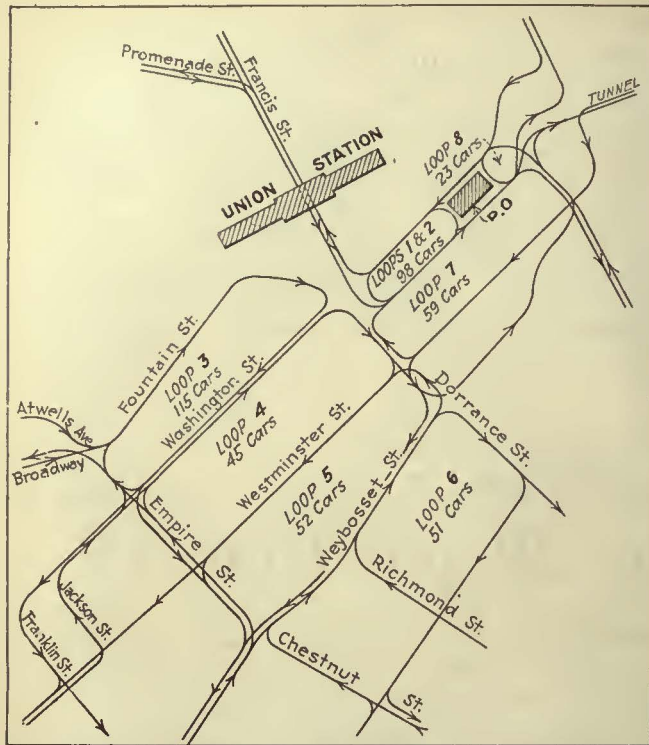
There were formerly 35 car routes in Providence, of which 12 were through routes and 23 terminated in the business district. The first step leading to the change in routing was a comprehensive traffic survey by Ford, Bacon & Davis, Inc., covering a period of three months. This investigation showed that the number of passengers actually riding through the business section was less than 5 per cent of the total railway traffic in Providence.

Many of the streets in the business district are

narrow and winding. Although in the newer sections of the city there are broad straight streets, on approaching the old part of the town these all feed into a few narrow thoroughfares. During the rush hour there was extreme congestion of vehicles and street cars. Formerly the car routes crossed each other at many places, and cars were forced to make turning movements against a heavy flow of traffic in the opposite direction. The result was that the speed of operation was slow and interruptions to service were frequent.

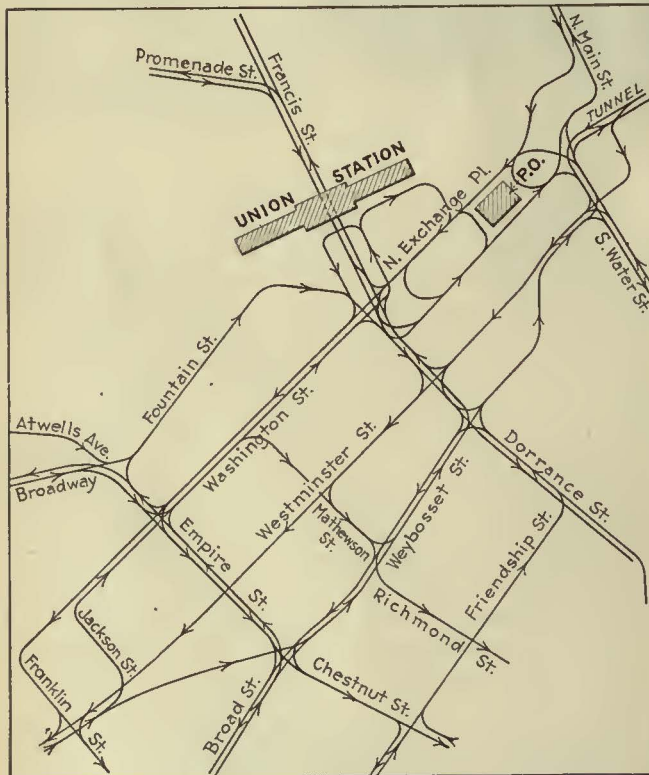
During the severe snowstorms encountered in the winter of 1920, it was necessary for the railway temporarily to split operation on some of the through routes. The resulting improvement in service was so marked that many of its patrons wrote to the company at that time suggesting that the change be made permanent. After careful consideration of all sides of the question and several conferences with municipal authorities, the company decided that loop operation should be substituted for through operation.

Three principal objects were sought. In the first place it was thought that by eliminating the long, slow



**New Routing of Cars Through the Center of Providence Under the Loop System. All Lines Reach Dorrance Street Within a Short Distance of One Another**

crawl through congested traffic in the downtown district it would be possible to give more satisfactory service to the majority of the passengers on each of the individual lines. In the second place, it was hoped to eliminate much waste mileage that was being run because carhouses were located near the outer ends of certain routes. To take care of the afternoon rush hour it was necessary to send a large number of cars out at an early hour. These operated to the center



**Former Routing of Cars Through the Center of Providence. Note the Variety of Turning Movements Along Dorrance Street**

of the city practically empty, and on the return trip, after having done their work, operated empty from the center out to the carhouse. Such wasteful operation was a feature of nearly all of the crosstown lines. In the third place the railway wished to install a system of pay-enter-inbound and pay-leave-outbound fare collection. This was impossible with the through routing, but could be arranged easily under the loop plan.

The city officials approved the proposed change in car routes, and as an additional step to reduce congestion they agreed to regulate automobile parking more strictly. For a week prior to making the change the company published half-page advertisements in all the daily newspapers explaining the reasons why the change was being made and the benefits which it was hoped would result therefrom. Pamphlets were distributed by conductors on the cars explaining in detail the modifications in routes, the new schedules, etc. Special telephone service was given so that it was necessary only to call the company's number and ask for "Traffic Change." This established communication with an offi-



**Passengers Board and Alight in the Congested District at Both Ends of the Car Under the Pay-Enter-Inbound and Pay-Leave-Outbound System of Fare Collection**

cial of the railway who could give any needed information. Beginning on the day that the change became effective several starters in uniform were stationed at central locations to help perplexed patrons.

The general nature of the change is shown by the accompanying drawings of car movements in the center of the city. An outstanding feature of the old routing was the excessive number of turns into and out of Dorrance Street. At the intersection of Dorrance and Weybosset Streets in the rush hour 26 cars made a left-hand turn against 72 cars which continued straight across. At Westminister Street 104 cars southbound had to cross 116 eastbound and westbound cars. In front of the City Hall 41 cars made a left-hand turn across 40 westbound cars. On Washington Street 86 cars had to cross 139. Another bad feature of the old plan was the congestion on the north end of Weybosset Street, where many lines operated along a narrow, crooked thoroughfare.

All this has been changed under the new routing. Cars coming into Providence from the north turn back on Loops 1 and 7. Cars coming from the west pass under the Union Station and operate over loops via the north side of Exchange Place, returning via the south side of that street, thence into Francis Street. At first

these cars took a crossover on Francis Street, but because no sheltered waiting station was available there for passengers, and because a somewhat dangerous condition was created by their walking across Exchange Place, this plan was changed in favor of the present method of operation. Approaching the city from the south and southwest cars use Loops 3, 4 and 5. Loop 6 is used by cars coming from the east. There are now forty-one routes in all as compared with the thirty-five formerly operated. The density of traffic on the different loops in the rush hour is shown in the table:

Loop 1.....	62 cars	Loop 5.....	52 cars
Loop 2.....	36 cars	Loop 6.....	51 cars
Loop 3.....	115 cars	Loop 7.....	59 cars
Loop 4.....	45 cars	Loop 8.....	23 cars

Considering the wide scope of the changes made very few complaints have been received. The majority of railway patrons have undoubtedly benefited by the new arrangement and are pleased. Some time after the loop system went into effect a central belt line was established, in order to connect up the different lines. This operated on a 7½-min. headway from the Union Station via Dorrance, Westminster, Mathewson, Weybosset, Market, Canal Streets and the north side of Exchange Place. Free transfers were issued and accepted between this belt line and other lines in the central district. The average number of passengers carried per trip was one. Many trips carried no passengers at all and after a two months' trial this belt line was abandoned. The light riding on the belt line proved that very few people have been inconvenienced by the discontinuance of the crosstown lines.

Practically all lines now enter Dorrance Street and come to within a short distance of each other. Passengers bound to or from the central business district can make the trip without change, and the comparatively small number desiring to go from an outlying district on one side of the city to an outlying district on the other side can do so by changing cars in the center and walking a short distance to reach the other line.

### Tractor-Drawn Plow Cuts High Ice

ANOTHER addition to its snow-fighting equipment made during the past winter by the Boston Elevated Railway was that to remove the crown of high ice which sometimes forms between the rails. This is a Killifer ice breaker drawn by a tractor.



The Projecting Teeth Break Up High Ice Between the Rails

Following the ice breaker is an ordinary road scraper to clear the broken ice away from between the rails. The accompanying illustration shows clearly how the equipment is set for service.

## Signs Tell Strangers How to Reach Their Destinations by Railway

By W. H. BOYCE

Commercial Manager Pittsburgh Railways\*

IN THESE days of competition, modern business methods must be applied. Try to induce people to ride. Don't be ashamed of the product you have to sell, unless it's that kind of a product. Even then, a bold front would help get you more than the "just can't help it" riders.

Did you ever step into another man's town where the taxicabs are always plentiful, the chauffeurs of which are more than willing to separate you from 50 cents or a dollar to take you to a location that could be just as easily and almost as quickly reached by a



Such Signs Are a Real Help to Strangers

street car that two or three minutes later passes the place where you are standing?

Did you, preferring to patronize the street railway company, and wishing to save the difference in fare and not wanting to appear as a stranger in a strange land, stand on the station sidewalk, trying to appear to be looking directly ahead and all unconcerned in an attempt to make "the folks" think that you felt right at home, and did you at the same time roll eyes right, left, up, down, and all around in an attempt to bring within your range of vision some indicator which would show you when, where, how and to what points the street cars operated?

Well, others have been in the same fix. A few of them may slip around the corner of the station, out of sight of the taxicab drivers, and make inquiry of some hanger-on regarding street car operation. The majority of them, wishing to be thought of as world and town wise, hard-boiled travelers, take to the taxi, and of course the railway company loses a passenger.

An item of their merchandising of transportation campaign to help swell their receipts, as well as to guide the stranger in their midst, is the installation of a number of blue and white enameled signs by the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway. These signs, 23½ in. x 27½ in., and 23½ in. x 11½ in., are located at various railway stations and at the nearest points on car lines adjacent thereto, as well as at points of heavy traffic within the business section of the larger towns.

Some of the signs in use are shown in the accompanying illustration. Those headed "Car Stop" are located at car stops, and the others serve as guides to persons leaving the train at the station, which is a short distance from the car track.

In addition to the signs already mentioned, smaller blue and white enameled signs, 16 in. x 8 in., reading "To Street Cars," with arrow indicating the direction, are located at various points, such as the high school football fields, and in front of hotels or other points where strangers are apt to be in need of directing.

\*At the time this article was written Mr. Boyce was general manager Beaver Valley Traction Company.



Two Experimental Arrangements of Seats to Increase the Capacity. Left—Back-to-Back Stationary Seats. Right—Reversible Seats

## New Seating Arrangement to Increase Capacity

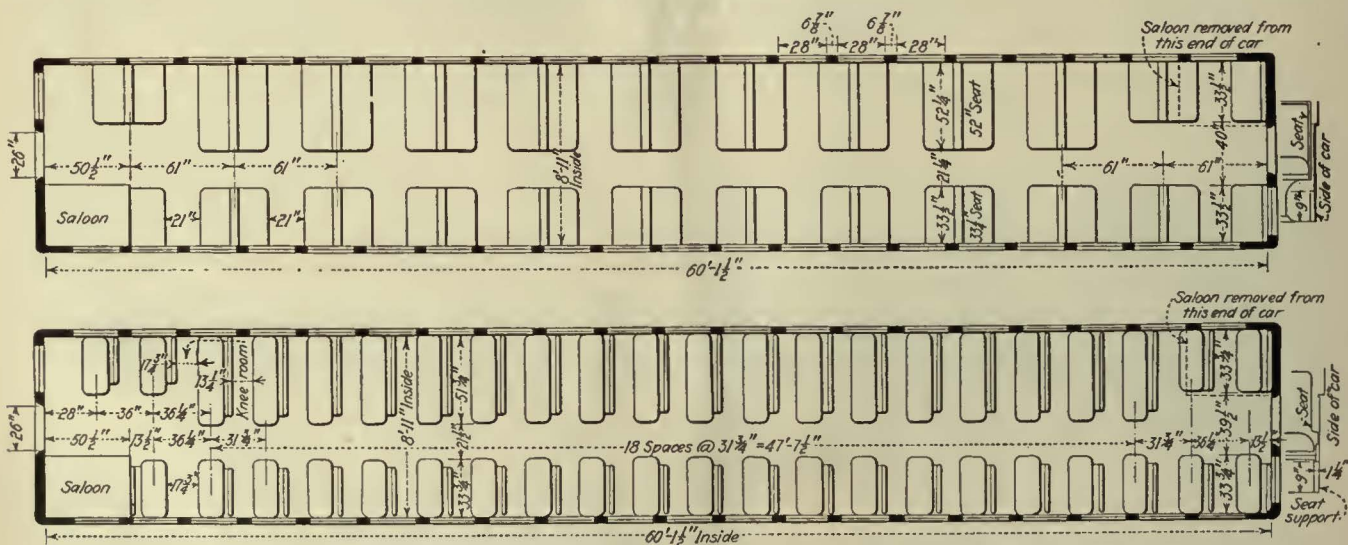
Seats for Three on One Side and Two on the Other Side Increase Capacity of Multiple-Unit Coaches of New Haven Railroad 38 per Cent

**D**URING the last three years the number of trains into and out of the Grand Central Terminal, New York, during commuter hours has approached the station capacity. Yet each day an increase of 3,000 passengers over that of the corresponding day of the preceding year has had to be handled, which has resulted in the New York, New Haven & Hartford seeking a way to increase the seating capacity of its cars, as the number of trains and the number of cars per train has about reached the limit.

Two experimental seating arrangements have been installed in two multiple-unit cars which have been re-equipped for this experiment. Additional seating accommodations have been provided by a closer spacing of seats than formerly and the use of a three-passenger seat on one side of the aisle and a two-passenger seat on the other. A different seating arrangement has been installed in each car, but each has the three-

passenger seat, one in the form of a reversible seat and the other a stationary back to back seat. These two cars are a part of the equipment used in suburban service and have been rearranged at a cost of \$2,000 each. The recent installation in service was accompanied by installation of signs in suburban cars setting forth the reason for the change and inviting the patrons to express their preference between the two types of seats and seating arrangement.

The converted car is 60 ft. long inside and 8 ft. 11 in. wide between the inside linings. In the case of the reversible seat car the seat spacing has been reduced from the previous standard of 34½ in. to 31½ in., and a Pantasote covered low back seat has replaced the high back plush seat. This gives a seating capacity of 104, or an increase of 38 per cent over the old arrangement that accommodated 75. The new seats are without arms, the wide seat measuring 51½ in. and the narrow



Rearrangement of Multiple-Unit Coaches Used in Suburban Service of the New Haven Railroad to Increase Seating Capacity Above—Stationary seats back to back were tried in this car. Below—Another car was equipped with this arrangement of reversible seats

seat 33½ in., leaving an aisle of 21½ in. This width of aisle allows free passage of passengers in both directions because of the low backs which do not extend the full width of the seats. The seat construction is the same as is usually found in rapid transit cars, with full spring cushion and back and a handle located at the aisle end of each back.

In the other car the backs of the stationary seats, covered also with Pantasote, have been spaced 61 in. apart, allowing 21 in. of knee room between facing seats. This arrangement of seats gives a capacity of 108, or an increase of 44 per cent over the former seating arrangement.

The three-passenger seats have not been placed at the extreme ends of the cars. The last two seats are of the two-passenger type, allowing a wider aisle at the body entrance. No change has been made in the platform or vestibule doors. One toilet has been removed from each car, allowing space for seats for four more passengers.

## St. Paul Valuation Before Minnesota Commission

Cost to Reproduce the Property Is Submitted by Consulting Engineer for the Company on Six Different Bases of Unit Costs—Going Concern Value Placed at \$4,000,000

THE Railroad and Warehouse Commission of Minnesota opened hearings on March 31, 1924, to determine the value of the property of the St. Paul City Railway. Upon the valuation fixed by the commission at this hearing will depend the rate of fare to be in effect in St. Paul. The company now has a 6-cent fare, which is lower than that established in many cities of the size of St. Paul, but the city is endeavoring to reduce this rate. The present case was started in 1921 and after a conference of the valuation engineers for the company and the cities of Minneapolis and St. Paul with the commission it was decided to make valuations of the property on six bases.

At the March 31 hearing, Mr. Drum of A. L. Drum & Company, Chicago, on behalf of the company, submitted to the commission valuations of the property on these six bases, which are itemized by classes of property in the accompanying table.

The St. Paul City Railway operates the entire street railway system located within the corporate limits of the city of St. Paul, Minn., and a line to South St. Paul,

consisting of about 8.29 miles of single track outside of the city limits. The inventory and appraisal includes the entire property in the present St. Paul 6-cent fare zone, consisting of the property of the St. Paul City Railway and the property comprising the line on East Seventh Street from Duluth Avenue to city limits of St. Paul and the South St. Paul line extending outside of the city limits of St. Paul. The property consists principally of 176.71 miles of single track; lands; the power distribution system, consisting of overhead trolley, feeder lines, underground conduit and underground wires; car equipment; carhouses; office, shops and miscellaneous buildings; four rotary converter substations, having an aggregate capacity of 20,400 kw., all primary power being furnished by the Minneapolis Street Railway and the St. Anthony Falls Water Power Company; shop machinery; tools; miscellaneous equipment, consisting of office furniture and fixtures.

The valuation of the physical property was made from a complete and detailed field inventory of the property taken as of Jan. 1, 1920, to which have been added the net capital expenditures from then to Jan. 1, 1922, to bring the valuation to the latter date.

The cost to reproduce the physical property now represents the minimum amount of capital that would have been required actually to reproduce the physical property of the company as of Jan. 1, 1922, on the following six different bases of unit costs: (1) Pre-war cost as of Jan. 1, 1920, using average prices for the five-year pre-war period, 1911 to 1915, inclusive; (2) ten-year average cost as of Jan. 1, 1920, using average prices for the ten-year period, 1912 to 1921, inclusive; (3) July 1, 1921, cost as of Jan. 1, 1920, using current prices as of July 1, 1921; (4) present-day cost as of Jan. 1, 1920, using current prices as of April, 1922; (5) Sept. 15, 1923, cost as of Jan. 1, 1920, using current prices as of Sept. 15, 1923; (6) estimated original cost as of Jan. 1, 1920, derived from the books of the company, or estimated, using prices in effect when property was installed or purchased.

The total power supply used by the St. Paul City Railway Company is generated at the steam power station of the Minneapolis Street Railway and at two water power stations operated under a lease from the St. Anthony Falls Water Power Company to the Minneapolis Street Railway, expiring June 1, 1937.

The value of the water power leases to the St. Paul City Railway is based on the saving effected due to the two water power leases, this saving being computed on the basis of the total cost of the electric power pur-

THE COST TO REPRODUCE NEW AND THE ESTIMATED ORIGINAL COST OF THE PHYSICAL PROPERTY OF THE ST. PAUL CITY RAILWAY AND LEASED LINES AS OF JAN. 1, 1922

Division	Pre-War Cost, Average Prices 1911-1915	Ten-Year Average Cost, Average Prices 1912-1921	1921 Cost, Current Prices July 1, 1921	Present-Day Cost, Current Prices April, 1922	Estimated Original Cost	September, 1923, Cost
Land	\$994,613	\$994,613	\$994,613	\$994,613	\$994,613	\$994,613
Track and paving	5,482,794	7,184,175	9,856,108	8,960,410	4,475,782	9,033,012
Bridges, trestles and culverts	114,445	129,284	141,976	138,104	109,633	141,841
Tunnels	400,062	522,167	657,574	651,138	329,679	640,733
Electrical distribution system	1,179,120	1,654,123	1,742,350	1,585,408	1,256,550	1,888,921
Rolling stock	2,818,151	4,390,329	5,838,799	5,257,859	2,599,280	5,932,093
Substation equipment	395,453	527,164	720,114	639,908	456,916	720,322
Shop machinery and shop tools	561,742	782,811	954,754	807,375	564,872	989,141
Buildings and structures	988,416	1,401,241	1,731,750	1,612,750	974,082	1,717,196
Furniture and fixtures	68,530	104,588	140,645	122,622	68,530	148,638
Stores, tools and miscellaneous equipment	578,027	578,027	578,027	578,027	577,795	578,027
Expenditures not apparent in inventory	149,696	149,696	149,695	149,695	89,996	149,696
Engineering and superintendence	686,552	920,910	1,175,320	1,074,896	624,887	1,467,712
Administration, organization and legal expense	671,354	747,138	831,457	817,534	661,628	822,100
Taxes during construction	220,485	312,002	442,835	442,835	220,485	422,143
Interest during construction	1,837,133	2,447,723	3,114,720	2,859,980	1,680,567	3,041,422
Working capital	305,444	305,444	305,444	305,444	305,444	305,444
Cost of financing	872,600	1,157,575	1,468,809	1,349,929	799,536	1,434,602
Grand total	\$18,324,617	\$24,309,080	\$30,844,990	\$28,348,527	\$16,790,275	\$30,126,656

chased under the water power leases and the total cost of manufacture of this if generated at a modern steam power station. The total saving to June 1, 1937, is prorated between the Minneapolis Street Railway, the St. Paul City Railway and the Minneapolis & St. Paul Suburban Railroad on the basis of the total kilowatt-hours used by each. This element of value was included at \$782,229.

The presentation of the claim for "going concern value" was made generally on the basis that the St. Paul City Railway had passed through the following stages of development: (1) Construction period; (2) developmental period of construction; (3) period of development into a successful going concern.

Mr. Drum submitted that the fair going concern value of the property was determined to be not less than \$4,000,000, based on an estimate of the cost of placing the physical property in successful operation.

The basis recited that, in addition to the cost of the component parts of the bare physical property, the cost of placing the physical property in successful operation, that is, the cost of converting the inert railway plant into a successful operating system, is an element of cost that is encountered in creating a street railway

system. In determining the amount of this item of cost the fact was considered that the St. Paul City Railway is in active and successful operation and has passed through the period between the beginning of operation and the time when the business earns not only operating expenses and taxes, but also a return on the investment, so that the cost of bringing the bare physical property into an efficient operating going concern has been encountered and met.

The business of the company has been built up, the service and equipment have been planned and perfected successfully to serve the business, an experienced and successful operating staff has been organized, trained and perfected in its duties, and extensions have been made into unpopulated territory requiring many years of operation before the increase in population (due to the construction of such extensions) can create traffic sufficient to pay the operating expenses and interest on the capital invested in such extensions.

Another element of going concern value submitted was that due to the consolidated operation with the Minneapolis street railway system, which was measured by capitalizing the estimated saving per year to the St. Paul company.

## The Readers' Forum

### *Scheduling Car Leaving Times*

PIQUA, OHIO, March 31, 1924.

To the Editors:

Your editorial entitled "Make Your Headways Sell Your Service" in the issue of March 15 has in it so much with which I find myself in thorough agreement that I hesitate to take exception to some other features of it. Let me rather suggest that we expand the ideas of scheduled leaving times and of so-called "freak headways" a little further.

While I agree that freak headways should not be deliberately set up when they reasonably can be avoided, there are some circumstances and conditions that have a very marked bearing on this question. Likewise in the matter of scheduled leaving times of cars on lines operating on a "regular" headway.

Take, for example, three lines each operating on a 10-minute headway from a central terminal using common track for  $1\frac{1}{2}$  or 2 miles out to the point of divergence. I believe that as a general rule, if cars on routes A, B and C are spaced 3, 3 and 4 minutes apart over each 10-minute period on the common track much better service is provided than if three cars, bunched, went out over this  $1\frac{1}{2}$  or 2 miles every 10 minutes. The advantage of frequent service in the short-haul territory outweighs the possible disadvantage to the patrons of lines B and C whose cars leave the central terminal at 3, 13, 23, etc., and 6, 16, 26, etc., minutes after the hour rather than at 10, 20, 30, etc., minutes after the hour.

On a relatively small system with several lines radiating from a central point and with very little joint track used by cars on different routes, it generally would be desirable for all cars to leave at the same 10, 20 or 30 minutes past the hour, both for ease in remembering the schedule and to facilitate transfers.

But peculiar local conditions might modify any general rule.

Take again the case of suburban and interurban service operated from a terminal station like that of the Pacific Electric Railway in Los Angeles on headways of 20, 30 or 60 minutes, with three, four or five-car trains. Concentration of scheduled leaving times serves to limit the station capacity not only as to tracks but also as to waiting room area, gate, passageway and platform space. Much better service is possible by spreading the leaving times of different lines more evenly over the hour. It also would have a tendency to smooth off the power peaks.

The staggered hour plan is applicable not only to the hours for industrial and other labor for the purpose of smoothing off the traffic peaks, but may be applied to scheduling of cars and trains from concentrated terminals.

Referring now to the freak headways there seem to be two features you have raised for consideration: First, headways in excess of 5 minutes or in excess of 10 minutes, which are not exact multiples of 5 minutes, such as 17 minutes or 28 minutes; second, headways that are unbalanced such as 4 and 6, or 3 and 7, even though the average may be exactly 5 minutes.

I would say that the occasion would be very rare that would justify a 28-minute headway rather than a 30-minute headway, particularly if we were dealing with an individual line not complicated with local service. Very often suburban service is supplied by having certain cars (i.e., every second, third, fourth, fifth or sixth car) in city service run through to the suburban terminal. The traffic demand on the city line determines the basic headway for the city service. The suburban service, particularly in off-peak hours, is not determined by traffic which may be very light, but, let us say, has been determined upon as a matter of policy to be on a headway of approximately 15 minutes.

If the city service is on an 8-minute or 7-minute headway, we could probably stretch a point and use a basic  $7\frac{1}{2}$ -minute city headway and send alternate cars

to the suburban terminal on an even 15-minute headway. But if the city line traffic requires a 6-minute headway shall we take alternate cars and give a 12-minute suburban headway, or take every third car and give an 18-minute headway? I know of conditions that would justify the 12 and others that would justify the 18.

If a 6-minute headway is proper for the city line it would be too much like making the tail wag the dog to say that the city line should be cut to 5 minutes in order to make a nice even 15-minute headway to the suburban terminal. And likewise, if a 6-minute headway is required, a 7½-minute headway would be very inadequate and quite unjustifiable merely to make an even 15-minute suburban headway.

Every third car on a 5-minute headway, or every fifth car on a 3-minute, make up an even 15-minute suburban headway, but if city traffic requires a 3½ or 4-minute headway, the resultant suburban headway would be 14 minutes in the first case and either 12 or 16 minutes in the second case. Conditions may justify arranging the headways in cycles of 4, 4, 4 and 3 minutes, every fourth car being a suburban car on an even 15-minute headway. And let me say that I would put the suburban car, which serves the longest stretch of the line, following the 3-minute headway in the 4, 4, 4 and 3 cycle.

The foregoing discussion assumes double-track operation, at least no obstacles due to different headways on single track. But very often the problem is complicated by single track and again general rules must be altered to suit the local conditions.

Much of what has been said relative to suburban cars operated as integral parts of the city service is applicable to city lines with split or multiple terminals, turn-back service, etc. Typical examples may be found on the Milwaukee system and on the Winnipeg lines. Service demands on the main line should generally fix the main line headways rather than the desirability of making the branch line headways multiples of 5 minutes. I have before me a concrete example of the effect of changing a main-line headway from 6 to 5 minutes with resultant branch line headways changed from 12 to 10 minutes.

The change was made for the off-peak hours in the middle of the day and was not based upon traffic checks, which, by the way, showed a 6-minute headway to be adequate, but for some other reason, perhaps to make the branch line headways 10 instead of 12 minutes. The car mileage was increased about 750 car-miles per day with no appreciable increase in revenue. It simply showed that a 6-minute headway served the frequency factor of adequate service on that particular line as well as a 5-minute headway. I believe 750 car-miles per day is too great a price to pay for the difference between a 12- and a 10-minute branch-line headway.

Moreover, the electric railways in this country are operating on rather narrow margins and, speaking generally, are not in a position to waste service for the sake of headways of exactly 10, 15 or 20 minutes. One or two cars on one line for a few hours does not seem to cost much for one day, but the cost of one or two more cars on each line totals a neat little sum in the course of a year. In many cases the additional expense produces no commensurate return.

With reference to combination headways of 7 and 3 minutes I do not believe many schedule departments

are laboring under any illusions on this point. While the 3 and 7 combination is rather extreme, a 5 and 7, a 4 and 6, a 3 and 5, a 2 and 3 or some other similar combination may be used, not by mistake or through carelessness, but for a very definite purpose.

The use of combination headways is particularly suited to city lines having turn-back or short-line service where all cars do not go to the end of the line, and where there is from 20 to 30 per cent of the total traffic beyond the turn-back point. If the traffic check taken within the zone of maximum loading shows the need for an average 5-minute headway the through cars would be overloaded and the turn-back cars would fail to carry their share of the load if all cars were spaced exactly 5 minutes apart.

A much better balance of the loads is obtained by the combination headway of 4 and 6 minutes with the short line car following the 6-minute interval and the long line car following the 4-minute interval. It is not advisable to put in too much differential, and in this connection it may be noted that a short-line passenger just missing a short-line car can take the next car which will be a through car. But a through passenger unable to get aboard an overloaded through car or just missing it cannot reach his destination on the next car (which is "turning short") but must wait for the next through car. Therefore the through cars should be favored in the time differential even more than the traffic ratio would indicate.

Another occasion for justifying combination headways is where single cars and two-car trains are used on the line at the same time. If traffic comes to the line at such a rate as to justify a 4-minute service with single cars, or an 8-minute service with two-car trains, the schedule for alternate single and double units should not be an even 6-minute headway. The double units would be underloaded and the single units would be overloaded.

Experience indicates that a space interval in front of a two-car train equal to twice the interval in front of a single unit produces an unbalance in the other direction, at least in city service subject to variations encountered in actual surface operation. In the case cited the combination headway would probably work out on a 5 and 7-minute basis rather than on a 4 and 8-minute basis or on a 6 and 6-minute basis.

Thus, in the tendency toward lack of balance in passenger loads due to difference in length of route or territory served or in the size of the successive passenger carrying units, we find ample justification for combination headways made up of unequal intervals.

I realize that in endeavoring to make some points clear I may have made some general statements open to the same criticism that might apply to the editorial. If so it only proves the point that each property has its own peculiar problems which require separate analysis and individual treatment. This leads me to quote the third paragraph of your editorial in pointing the way:

"Undoubtedly great economies in electric railway operation have been accomplished by the scientific scheduling of cars. Careful study by competent men is required to prepare time-tables so that cars will not pull out too early, stay out too long, waste time in excessive layovers, or bunch in the central district. The time and money employed to make accurate traffic checks are well spent."

JOE R. ONG,

Consulting Transportation Engineer.

# Association News & Discussions

## Badgers View Utility Business Broadly

Responsibilities of Utility Management, Speakers' Bureau Activity and Training of Women Employees for Publicity Work Are Considered—Railway Section Holds Lively Discussion on Many Operating Subjects

AT THE meeting of the Wisconsin Public Utilities Association, held at the Hotel Pfister, Milwaukee, on April 17 and 18, a broad conception of the utility business was voiced by the speakers at the general sessions. In the railway sectional meeting, held during the afternoons of the two-day session, papers dealing with detailed technical operating and maintenance problems were given a spirited and enthusiastic discussion. Although the railway men in attendance did not quite accept the invitation of Chairman B. W. Arnold to remove their coats if necessary, the frank and free discussion accorded most of the papers added greatly to the value of these sessions.

The broadminded thinking of the general sessions reached its climax in an address delivered on Friday morning by John F. Gilchrist, vice-president Commonwealth Edison Company, Chicago, who took the responsibilities of utility management as his subject. He said that the management of the present-day public utility property is vested with responsibility to many interests, and unless each is fully considered in the administration of the company's affairs, the utility does not develop its service in the fullest sense of the term. The modern utility management carries a direct responsibility to the people of the district served, to the customers of the utility, to the employees of the company, to commercial and industrial organizations in the community and to the stockholders of the company.

If the utility discharges its obligations to the first four interests in accordance with the fullest conception of real public service, Mr. Gilchrist contended, the interests of the stockholders will be automatically safeguarded. This, he said, is true because failure to earn a fair return to the stockholders immediately reacts to curtail the service which the company can render because such failure limits the ability to meet the needs of a growing community.

Mr. Gilchrist went further in his analysis and said that each management owes an obligation to its brothers in the industry and should take part fully in any activity to further the interests of the industry as a whole.

Since the utility industry can only function properly and efficiently as a monopoly, Mr. Gilchrist said that this in itself imposed several extremely important obligations and responsibilities.

The first of these is the responsibility to maintain both continuity and adequacy of service. Then there is the responsibility of providing new capital to take care of needed extensions as the community develops. Customer ownership of the company's securities has proved to be one means of meeting this later requirement.

A further responsibility is that of assuming a proper place as a leader in the community. Another is the development of young men as future utility leaders and managers. The rapid development of industry in general and the increasing complexity of the problems involved raise a serious question, Mr. Gilchrist said, of the possibility of developing men rapidly enough to keep pace with the continually increasing requirements.

### SATISFACTORY PROGRESS MADE

In his opening address at the general session, President Harold L. Geisse attributed the success of the association to the co-operation of its individual members and also paid a tribute to the assistance rendered by the associate manufacturer members. The activities of the association and its committee on public utility information has produced a noteworthy improvement in public understanding of the utility problems in Wisconsin and surrounding territory. He reported the organization of a speakers' bureau to supplement with the spoken word the work carried on by the committee on public utility information through the newspapers.

### WOMEN EMPLOYEES TO HELP

Another step in the publicity work of the association was marked, Mr. Geisse said, by the organization of a women's public information committee in conformity with the work started by the National Electric Light Association. In their various capacities, he said, women are important contact points with the public and their education and training may be expected to aid materially in presenting authoritative facts to the general public regarding the utility business.

Miss E. M. Westenhaven, chairman of the women's public information committee, outlined the progress already made in organizing this women's work. Of the 575 women employed in utility work, exclusive of telephone companies, in Wisconsin, 528 have been included in the educational work under way. Speaking of the qualifications of women employees, she cited the suc-

cess with which they have engaged in the sale of utility securities to the public as an illustration of their qualifications for assisting.

W. S. Vivian, Middle West Utilities Company, delivered an address on the subject of "Service." He drew a distinction between service and facilities, pointing out that the latter includes the mechanical facilities of the company only, whereas the former also includes the personnel and the personal contact.

General principles which have governed the organization of safety campaigns in various cities were outlined by J. W. Harte, Elliott Service Company of New York.

### HIGH INTEREST IN RAILWAY SECTION MEETINGS

At the opening of the railway section meeting Thursday afternoon, Chairman B. W. Arnold, Chicago, North Shore & Milwaukee Railroad, voiced approval of the combined meetings with other branches of the utility business. He thanked the membership for its co-operation during the two-year period of his chairmanship and stated that the individual members profited from meetings of this kind in direct proportion to the enthusiasm and energy with which they entered the activities and participated in the discussions.

A paper on substitute ties was read by J. C. Jameson, vice-president Dayton Mechanical Tie Company. He said that their use, although now stimulated by the difficulty of securing good grade wood ties and by the constant upward trend of wood tie prices, would likely in a few years be forced upon railways by the government in its effort to conserve the forests. He advocated some means of preventing the transmission of the shock and vibration of rolling stock directly to the concrete in which the ties are imbedded. Concrete, as a track foundation in paved streets, was held by him to be the best construction. Crushed rock or gravel ballast is practical only in open track which permits of periodical tamping. When sealed over by street paving, some shifting of ballast must occur.

In the discussion of Mr. Jameson's paper, A. A. Oldfield, Oshkosh, stated that the high price of substitute ties prevented their wider use. He also said that it sometimes became necessary to use stone ballast when making repairs under track carrying traffic. In regard to noise he reported no more noise with substitute tie construction than is obtained on wood ties, when the traffic consists of light-weight cars.

Dudley Montgomery, Madison, said that his property had tried the use of steel ties and had found considerable difficulty in bringing the track to line and surface in hot weather. He also said that steel ties had been found more noisy than wood ties and believed that the type of pavement was a con-



siderable factor in the selection of the type of tie to be used. He questioned the value of a substitute tie in monolithic construction where the track is imbedded in concrete. He felt that in this form of construction the rail is carried and imbedded in the concrete, and described the use of old wood ties in some recently constructed track in Madison, utilizing wire reinforcing between rails. He stated that this track was expected to give good results for the operation of light-weight cars.

C. E. Warwick stated that no particular difficulty had been encountered in Green Bay in properly lining up the track when using substitute ties. He said that in hot weather the practice of leaving some of the joints open and completing the welding operation at night or in the evening under lower temperatures enabled proper alignment to be made. Mr. Oldfield said that by using 60-ft. rail lengths in Oshkosh, it was possible to weld up approximately five lengths of rail in advance. By keeping the aligning gang at work directly ahead of the concrete machine, no particular difficulty had been experienced.

N. C. Rasmussen, Wausau, reported some difficulty in holding track to line and surface in hot weather but said that his property was able to obtain satisfactory results by avoiding welding too far in advance of the concreting gang.

#### CHILLED IRON WHEELS DISCUSSED

The manufacture, test and maintenance of chilled iron wheels to meet service conditions was the subject of a paper read by Francis J. Fox, Griffin Wheel Company. Mr. Fox listed the essential requirements of a car wheel as follows: (1) Sufficient hardness of the wearing surface to carry concentrated loads without excessive deformation over irregular tracks at high speeds; (2) maximum service on the wearing surface per unit of metal worn away; (3) maximum coefficient of friction between tread and brakeshoe; (4) tread surface should allow maximum durability of shoe; (5) wheel should produce minimum wear on rail.

By means of enlarged charts he described the method of chilling the tread and a portion of the flange of chilled iron wheels, and described the character of the resulting metal. This he said consisted of combinations of carbon and manganese with the iron. At the tread, the carbon is retained in combined form by the sudden chilling and the resulting metal at this point is very hard, containing 3.5 per cent of combined carbon. Mr. Fox then described the condition of the metal at various points in the wheel from the tread to the hub, stating that the combined carbon gradually decreases and the amount of graphite increases, giving the desired physical characteristics for the various parts of the wheel. At a point near the hub, he said, a sample taken from a wheel would show 96.5 per cent iron and 3.5 per cent graphite and would have the characteristics of soft steel.

Mr. Fox further described the methods used in the manufacture, testing and inspection of chilled iron wheels. He also pointed out that the

service results obtained depend to a considerable extent upon the service conditions on each property, and stated that machining, mounting and maintenance practice have an important bearing on the total life of the wheel.

#### CAST AND ROLLED WHEELS COMPARED

Many of the members present engaged in a general discussion of Mr. Fox's paper, which, in general, resolved itself into a comparison of results obtained with rolled-steel and chilled-iron wheels. A considerable part of the discussion related to the subject of flat spots on chilled-iron wheels, resulting from skidding, in comparison with those on rolled-steel wheels. Mr. Montgomery attributed a considerable part of the difficulty with flat spots on chilled-iron wheels to the action of sand when used on slippery rails. He stated that the chilled-iron wheels tend to slide on striking the sand, whereas the steel wheel continues to roll. He reported the results of the practice followed in Madison for a time of washing greasy rail with a sprinkler instead of using sand. Under this condition the difficulty with flat spots on chilled wheels was largely eliminated. But his road was required to go back to the use of sand as a result of a ruling by the Railroad Commission.

In reply to a question, Mr. Fox discussed the variations in the thickness of the chill on the tread of chilled-iron wheels and stated that in the manufacturing process it was possible to control this thickness within comparatively close limits.

#### AIR BRAKE DEVELOPMENTS

A. B. Wood, Westinghouse Air Brake Company, presented an illustrated paper describing the development of air brakes for light-weight cars. The importance of a proper understanding of the function of the air brake on the part of those who operate, supervise and maintain the cars was emphasized. In the proper selection of brake equipment, in supervising and insisting on proper instruction of operators and maintenance men, and in adopting standardized equipment on the various cars of a property, those in executive charge, Mr. Wood said, can do much to further safe and economical practices.

Mr. Wood pointed out the remedy for several recently detected causes of difficulty with safety control equipments. Among other things, the use of a choke fitting in a union close to the air whistle on interurban cars was recommended as a means of overcoming the difficulty from emergency action of the brake when the whistle is blown.

In answer to questions, Mr. Wood also discussed the problem of freeze-ups in air-brake lines and said, as a matter of design, it is almost impossible entirely to avoid this trouble. He also described the construction and operation of an anti-freezing device known as the Air Rectifier, which injects small quantities of alcohol into the system and which was reported by several of those present to have eliminated difficulty from freeze-ups.

The latest developments in automotive brakes were also described and

illustrated by lantern slides. This included a description of the rotary inlet valve type of compressor which has been developed for this brake equipment.

#### CLAIMS WORK DISCUSSED

On Friday afternoon W. T. Bie of Green Bay read a paper showing how the Wisconsin Public Service Corporation has collected more money during the past year than had been paid out in the settlement of claims. The paper will be abstracted in a forthcoming issue. It was discussed by Mr. McQuade of the Chicago, North Shore & Milwaukee Railroad, C. L. Hedges of LaCrosse and N. C. Rasmussen of Wausau. Mr. McQuade said that in a large city it was much more difficult to make the kind of a record cited by Mr. Bie. The North Shore Line, he said, felt that it was accomplishing good results when it held disbursements for claims within 2 per cent of the gross income. The latest figures obtained showed this figure to be approximately 1.6 per cent. He attributed the difference in the conditions of the large city and the small community to the greater difficulty of making and maintaining contact with the residents along the line and with the people of the town who make up juries. In addition he said that the ambulance chaser is always present in the larger city. He advocated the careful and continuous upbuilding of favorable public sentiment, founded on efficient service, as the best method of obtaining permanently improved conditions.

Mr. Rasmussen said that the practice in Wausau was to settle claims whenever possible and avoid lawsuits. Careful training of employees, and co-operation by all operating departments for the prevention of accidents, were held to be the most successful methods of holding the costs of claims to a minimum.

Commissioner A. L. McDonald, in a paper abstracted elsewhere in this issue, held that proper treatment of employees is necessary if they in turn are to be expected to make the proper kind of contact with the public. C. R. Mahan, Chicago, North Shore & Milwaukee Railroad, described several accounting practices of that road in a paper which is also abstracted elsewhere, and Dudley Montgomery of Madison presented a paper giving the result of a study of the growth of automobile and street car traffic with increases in population. From the results of his studies, which are given on another page, Mr. Montgomery expressed an optimistic viewpoint of the future of the industry. In his opinion, there has been no time during the past twenty years when the outlook for the electric railways was as bright as at present. He said that although automotive vehicles offered a type of de luxe service which appealed to certain classes of people, the possibilities of running special service with street cars for certain classes of patrons at increased fares had by no means received the consideration which it merited, and although a railway might be criticised for catering to a preferred class of passengers, such service was comparable with the operation of certain classes of bus service,

and warranted careful consideration by railway operators.

#### ELECTION OF OFFICERS

Acting on the report of a nominating committee, G. C. Neff, Wisconsin Power & Light Company, was elected president of the association; L. L. Tessier, DePere Light & Power Company, was

made vice-president, and H. A. Smith, Southern Counties Power Company, was elected treasurer. In the railways section, Dudley Montgomery, vice-president Madison Railways, was elected chairman, and N. C. Rasmussen, superintendent railway department, Wisconsin Valley Electric Company, Wausau, was made vice-chairman.

to "crowd" forward for any one. This patron was thinking of himself and selfishly had forgotten all about the people standing out in the rain. The conductor bore the loud criticism with patience rather than to retort as most people would be inclined to do. Unquestionably he gained the approval and respect of all fair-minded and right-thinking persons in the car.

It was pointed out by the observer who reported this incident, and I feel deserves repetition here, that in this case the conductor used the term "crowd up forward, please." The word "crowd" is what annoyed the irate gentleman spoken of, and it would perhaps have been better to have used the word "move" forward, please, or "step" forward, please. The word "crowd" did not appeal to that observer as the proper term to use under such circumstances.

Of course, it is impossible for street car companies to expect their employees working for moderate salaries to be perfect Chesterfields in courtesy and manner. I am reminded of a story told of a newly appointed railway manager who was riding one of his own cars to observe the performance of the conductor and motorman. The specific conductor called out the names of the streets in such manner that it was impossible to detect the names by which such streets were christened. After some period of observation on the part of the manager he approached the conductor and chided him for his bungling and inefficient manner in attempting to call the names of the streets. The conductor asked him what business of his it was how he called the streets. With great dignity the manager declared his official capacity and advised the conductor to be more musical and accurate in his future street calling. To this the conductor replied with some heat: "What do you expect of a poor dub getting \$75 a month in calling street names—grand opera?"

Many illustrations could be given to show that an unusual degree of judgment is required by street car operators. Quick thinking is sometimes necessary to avoid serious accidents. Another observer stated that recently an automobile was parked at the curb of a narrow street in a certain city. As a street car was approaching at the average speed another automobile was being driven in the same direction just in front of the car, but not on the track. The driver, in order to pass the standing automobile, suddenly and without warning turned upon the tracks immediately in front of the rapidly moving car. The motorman reversed the power and thus avoided what would otherwise have been a very serious accident, with possible loss of life. In this case no blame could have been attached had the collision occurred, but the motorman, through his training in alertness and quick wit, did what was expected of him. He saved the driver of the automobile from the results of his own folly.

Another observer reported recently seeing a conductor get off his car, lift on board a small child, then get off the car again and assist a crippled man to the car and help him to a seat. He

## The Commission's View of Platform Men\*

Trainmen Cannot Make Up for Defects in Service for Which the Management Is Responsible—They Can Win Public Approval by Their Services Beyond Those Forming an Essential Part of the Job—They Should Never Be Censured in Public

BY ANDREW L. McDONALD  
Member Wisconsin Railroad Commission

THE Railroad Commission receives many forms of criticism from the car-riding public. Sometimes such criticism or complaint is the result of long-standing alleged inefficiency in service. Frequently it comes from people who spontaneously give vent to their attitude and feeling toward real or imagined disregard of the rights of the car-riding public. The motormen and conductors have quite as much to do with the relations between the public and the company as the board of directors or the manager. They are frequently made the target of complaint and possibly abuse for acts and conditions for which they are not at all personally responsible, but which acts reflect inefficiency or inattention of their superiors. Because of their intimate contact with the public, they have to be men of quick action and thought and should be imbued with absolute loyalty to the employing company. They must be, in the very nature of their employment, much more courteous and considerate than are the people who patronize the cars.

From personal observation as a mere patron of street railway and interurban service, as well as from my experience as a commissioner, motormen and conductors do not generally entertain a narrow and provincial view of the scope and character of their duties. They are not only required to load and unload passengers and run the cars so as to avoid danger to pedestrians and vehicles, but in general must be a kind of geographical encyclopedia and a source of wide information to the public. They are constantly bombarded with all kinds of questions, many of them wholly unrelated to the immediate service in which they are engaged. The employees who are building up a mutually helpful relationship between the riders and the company are those who meet these demands, as well as the technical duties they perform, with unflinching courtesy and sympathy.

The commission, of course, can only insist on such operation as will effectively care for the comfort, the safety and efficient transportation of passengers. It is self-evident that the motorman and conductor cannot make up for defects in equipment or service,

for which superintendents and managers are primarily responsible.

The prerequisite importance of amicable and friendly relations between the company and the traveling public is constantly being more fully recognized by the transportation companies. It is not only what is done by employees close to the public that counts, but it is also the manner of doing things that is of vital importance. From my observation the present tendencies of street railway and interurban operation are toward the exercise of a very general spirit of helpfulness and care toward the patrons of the service. In fact, one frequently wonders at the extreme patience which these men exercise. There are, of course, exceptions to this general practice. There is an occasional grouch who does not appreciate or realize the value of courtesy and sympathetic helpfulness. Operators with such a narrow view will not answer the numerous questions that seem nonsensical and often without point. To the patron making such queries, however, the answer may be of vital importance. Even when unable to answer a question, the employees' manner may either give offense or may be such as to retain the friendliness and respect of a passenger.

#### COMMISSION OBSERVERS GIVE EXAMPLES, GOOD AND BAD

In this connection general criticisms and deductions perhaps are of much less value than concrete illustrations. Pursuant to this thought I called together those of our staff whose duty it is to check up men in the operating branch of the service in question and asked them to tell me some of the things that had come to their attention within the last year in the different cities in the state, and a recital of some of these may be helpful to those charged with the immediate duties of operating the railway properties.

One of them said that recently during rainy weather a car in a certain city was very much crowded and those standing in the rear might easily have moved forward so as to permit several to board the car who were standing out in the rain. The conductor requested the passengers to move forward but was met by a noisy protest from a prominent man who shouted defiance to the effect that he did not propose

\*Abstract of paper presented before Wisconsin Utilities Association in Milwaukee, April 17 and 18, 1924.

later managed to find a seat in a very crowded car for a lady carrying a small child. Perhaps these acts might be interpreted as beyond the conductor's duties but they represent what the public receives in the way of service, purely from the humanitarian impulse which no doubt prompted the conductor in these instances. The public was better served because these acts saved time and allowed the car to proceed more quickly and to reach its destination sooner.

Many other incidents of like nature might be cited. Those given are a fair sample of the courtesy extended to both deserving and undeserving patrons of street and interurban cars every day.

Supervisors and other operating men have their part in the scheme of public service, and they too will often be called upon to exercise judgment and discretion, which can hardly be said strictly to be included in their duties. In dealing with the men who are operating or maintaining the cars they should not fail to realize that these men are in a position often most trying and nerve-racking.

To illustrate, a short time ago a motorman was seen driving a car along one of the principal streets of a certain city when a little child suddenly darted squarely down the track in front of the car. Quick action brought the car to a stop within 2 ft. of the child. Do you think the motorman's nerves were such that he could at that time have endured any kind of criticism from a superior?

The same observer recently noticed a superintendent standing at a timing point in a certain city when a car approached with its signs improperly set, the two destination signs being in conflict. A bystander who was talking to the superintendent called attention to this. The superintendent stepped into the car and severely reprimanded the conductor in front of a carload of passengers. In the interest of service to the public and in common justice to the employee, this is one mistake on the part of supervising officers that the commission cannot condemn too strongly, and I might add too that it is not so very unusual. While it is true this conductor had made a mistake, and also true that his attention should have been called to it, it could have and should have been done simply by calling his attention to it at that time and later, if it was deemed necessary, talking to him about it at the barn.

To you supervising officers I would say: Don't forget that your employees are just as human as you are, and sometimes perhaps just a little more so, and don't publicly criticize and censure them and then expect them to deal politely and civilly with the public. Don't forget you are their superior officers and that such criticism from you, especially if unmerited and unjust, irritates and angers them even though they are not in position to express their feelings to you. It is just natural that for some time after such public rebuke has been made it will be pretty hard for that particular conductor or motorman to deal civilly and courteously with the public. Don't forget that this conductor or motorman is your

representative with the public and that his attitude and treatment of your patrons either adds to or takes away from the patronage of your company.

#### RULES AT TIME OF ACCIDENT MUST BE FOLLOWED WITH JUDGMENT

Another little thing has come to our attention. There is a rule in force by practically all companies forbidding employees to give any information to the public in case of an accident. The rule may be well meant, but unless carried out with judgment, its workings may lead to absurdities.

To illustrate, some time ago a slight accident occurred in a certain city shortly after noon when many were going home to lunch. The car was disabled and could not be moved for a long time, a fact known by the car crew. Questions asked by passengers brought no replies from the trainmen, and after waiting for a long time many were compelled to go back to their work without being able to get home for lunch.

Within two or three blocks was another car line that would have delivered

these people very near their desired destination. What harm could have resulted if the operators had been permitted to advise the passengers of the facts, which could not possibly have had any bearing on any damage claim that might later be made against the company? The men in charge of that car, or any other car, if properly instructed, can be trusted to exercise reasonable judgment in such cases, and a friendly feeling toward the company is sure to be engendered when people know that their interests are receiving as much consideration as the company's interest in a damage claim.

In conclusion, from my acquaintance with the average railroad man, I would say this: Make all possible effort to have your men properly instructed in their duties, pay them a wage that will keep poverty and want out of their thoughts, treat them as you would be treated yourself if your positions were reversed, and you will find they will respond and that such treatment will bring a splendid return in the way of public interest in your railroad and patronage of it.

## Accounting Practice on the North Shore Line\*

BY C. R. MAHAN

Auditor Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

WE HAVE in practice three methods of accounting that differ somewhat from those in general use on other properties: First, cost department accounting for the engineers; second, centralized merchandise dispatch accounting; third, accounting for tickets issued by cash register machines.

There never was a time in the history of our industry that called for closer co-operation between the engineers and accountants than the present. Today it is very necessary that the accountants exercise the utmost care in correctly stating the cost of maintenance and also the outlay applicable to investment. The very nature of the work performed by the maintenance of way department is so diversified and so widely spread over the entire system of the carrier that constant and careful attention is required to differentiate between the expenditures properly chargeable to income and those which are chargeable to capital.

Carriers working under a budgetary control system endeavor to regulate their expenditures for upkeep and additions and betterments within the amount specified by the budget. In order that the engineers may successfully carry out their part of the program, it is essential that the accountants furnish them with accurate detail unit costs during the progress of the work. Should the engineers be compelled to wait until the work is completed before they are furnished with unit costs, they would have little chance to correct faulty organization; to detect inefficient labor, or to correct

imperfect construction or maintenance methods. With these points in view and with the assistance and co-operation of our chief engineer, we organized a cost department under the supervision of the accounting department.

#### IN CHARGE OF ENGINEER AUDITOR

This cost department is in charge of an engineer auditor, who has had considerable experience in handling cost work and is thoroughly familiar with the requirements of the engineering department as well as those of the accounting department. The personnel of this department was recruited from the engineering and accounting departments, and by this co-ordination of employees developed a combination of forces that had a concrete understanding of the requirements of each department and resulted in the installation of a system of accounting that by one continuous operation provides the engineers with a sectional unit cost report which shows the description of each account, account number, man-hours, money, unit and unit cost, and also summarizes the final result for the accounting department labor distribution entry.

It is our intention, in the near future, to extend the scope of this department so that it will also furnish all other departments with such unit costs as they may find desirable.

*Centralized Merchandise Dispatch Accounting.* The centralized system of merchandise dispatch accounting is in charge of the merchandise dispatch station accountant under the supervision of the auditor of merchandise dispatch accounts, who in turn reports to the auditor. The purpose of creating

\*Abstract of a paper before the Electric Railway Section, Wisconsin Utilities Association, Milwaukee, Wis., April 17-18, 1924.

this department, in so far as practical, was to separate the accounting from the physical operation of the station.

The receipt of the original waybills for inbound traffic, the revision thereof, the issuing of merchandise dispatch (expense) bills with their, component parts, mailing statements to credit patrons and collections and remittance of all charges, remain part of the agent's duties. The methods used were described in *ELECTRIC RAILWAY JOURNAL* for Sept. 1, 1923, page 329.

The merchandise dispatch accountant's office abstracts by tabulating machines all outbound and inbound waybills and miscellaneous items, furnishing the station agents with their copy and the traffic department with a copy of forwarded abstracts. Station accounts are kept in balance and reports furnished the station daily. The station agent sends in the daily cash sheet which is posted to the abstracts. Uncollected reports are drawn off by stations each month and the station furnished with a copy. All correction notices are sent out and all adjustments are made by this department as well as all refunds. The draft covering, however, is forwarded to the agent who makes the delivery, the agent taking up the paid expense bill.

This method of accounting results in uniformity and accuracy in abstracting and in keeping the station accounts in balance. The accountant's office is in possession at all times of the amount of uncollected charges, which results in an enforcement control over the agents to collect the charges within the time limit prescribed by the Interstate Commerce Commission, and also results in considerable saving of the traveling auditor's time in the actual checking of the stations, as the verification of the uncollected accounts prior to the current month is handled by mail in the accountant's office.

*Tickets Issued by Cash Register Machines.* We have now in operation 22 cash register machines issuing tickets sold by agents, and it is our intention to install additional machines in the stations not now equipped just as rapidly as the volume of business justifies the expenditure. These were described in *ELECTRIC RAILWAY JOURNAL* for Nov. 11, 1922, page 773.

The accounting for machine ticket sales is very simple, as it is not necessary to check a ticket case containing a

stock of one-way tickets for each agent. The machines automatically list and total all tickets sold. The agent sends in the machine tape with his ticket report to the auditor of passenger accounts. The tapes indicate the destination point by symbols opposite the amount received for each ticket. These tapes are then tabulated on an analyzing machine that gives the total sales by stations for tickets sold from one station to every other station. This ticket analysis, previous to the machine installation, required the time equivalent to two and one-half employees. One operator now does the work, and in addition is distributing the various classes of accounts for the storehouse

and summarizing our daily mileage reports for the month in accordance with our prescribed classification.

We have found by actual test that tickets can be issued more rapidly by machines than card tickets can be issued, and in addition the passenger gets a receipt. There is less opportunity for ticket manipulation as the ticket is automatically canceled when the hat check is lifted by the conductor and placed in the hat check holder. The machines have cut down our investment in printed one-way stock considerably. Ticket paper costs approximately 30 cents per thousand, while card tickets run all the way from 80 cents to \$1.25 per thousand.

## Effect of the Automobile on Passenger Traffic

BY DUDLEY MONTGOMERY  
Vice-President Madison Railways,  
Madison, Wis.

THE past fifteen years have been the most trying in the history of the street railway business. Together with the trials of war and much adverse legislation and criticism, the industry has had to meet the competition of the automobile.

In 1910 we were all worried about the possible diminution of street railway traffic due to automobile traffic, and yet at that time no one conceived of the ultimate growth of the automobile industry. The accompanying charts give the facts from 1910 to 1923, both inclusive, and represent what is considered to be conservative judgment from 1923 to 1930.

The chart for the State of Wisconsin shows the present trend of population and automobile ownership. Assuming that the population between 1920 and 1930 will increase by the same proportion that it did during the previous ten years, and that by 1930 there will be five inhabitants per automobile, we can expect a total of 600,000 automobiles in the state at that time. The chart for the city of Madison shows the probable increase in population, the number of passengers being carried and

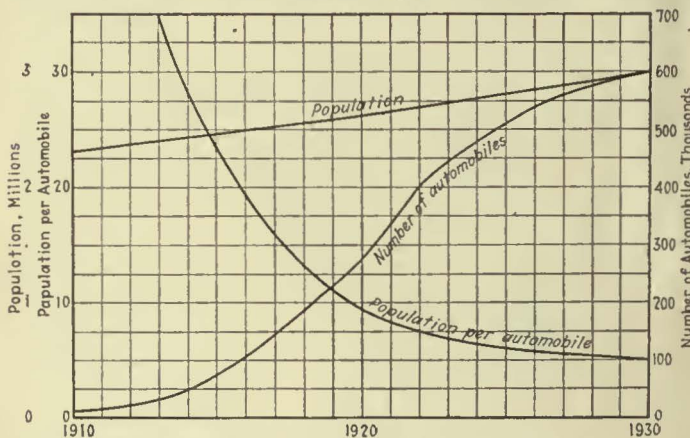
those that probably will be carried by the electric railway in 1930.

The many predictions of how many automobiles the country could support and the time when the enormous annual increase of production would slacken to a point commensurate with the normal growth of population have usually fallen short of the facts. I would call attention to only one comparison, which seems to provide some measure of future development; that is, that there are now more automobiles in the United States than there are telephones. I believe that an expansion much beyond this point will not prove to be the permanent saturation point.

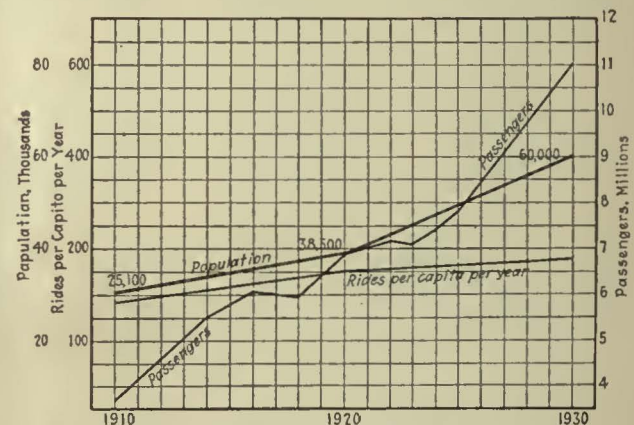
The number of persons who at present own automobiles but are using them less and less for daily service is increasing steadily. They find that the expense is greater than they care to assume, that the difficulty of finding space to park their cars is an annoyance, that the wear and tear on the automobile standing in the weather is another expense and that the time saved, if any, is of no great moment to them. The result is that they are using their automobiles mostly for pleasure riding.

The country is going through much the same kind of experience with the

\*Abstract of a paper before the Electric Railway Section, Wisconsin Utilities Association, Milwaukee, April 17-18, 1924.



Relation Between Population Growth and Automobiles, State of Wisconsin



Relation Between Population and Street Car Riding Habit, City of Madison

automobile that it did with the bicycle, and a part of the novelty of automobile driving is wearing off. This is especially true where traffic congestion is serious enough to hamper and irritate the driver.

For some time we have been collecting data and making observations to determine the amount of traffic which the automobile takes from the street car, and two of the best illustrations which we have are comparisons between the month of March, 1923, and that of April, 1923, and between December, 1923, and January, 1924.

	March, 1923	April, 1923	December, 1923	January, 1924
Passengers	718,400*	630,400	615,100	754,700
Aver. per day	23,950	20,600	19,800	24,300
Difference	3,350	.....	.....	4,500

\*One day no service.

Each of these two combinations of months were comparable in Madison except that the weather in April and December was mild and beautiful, whereas March and January were cold and stormy. If we assume that the automobile travel during March and January was of a nature which used to be carried by horse or was new busi-

ness peculiar to the automobile, we find that 14 per cent in the first instance, and 18½ per cent in the second, of the total possible traffic was accommodated by the automobile, and from 81½ per cent to 86 per cent by street cars.

From this and other information we find that the street cars are carrying, on the average, 80 per cent, or four-fifths, of the city traffic, and we believe that they will continue to hold this proportion. It must be remembered that the largest part of the automobile riding is new business developed by the automobile and cannot be considered as a loss to the street railways.

In coming to these conclusions, we are not forgetting the possibilities of urban bus operation. Such transportation is more likely to appeal to those now riding in their privately owned automobiles than to street car patrons, and we believe that we can compete with the bus in attractiveness of service. There is no doubt that the street car is still the service of lowest cost, and there is every reason to believe that, as the people settle down to a steadier existence, the street railways can look forward to a normal increase in their business based on increase in population and riding habit.

generation of electric railway executives and operators is more efficient than ever before. We have too big a job before us today to grow pessimistic over the possibilities of what may happen in the next generation. If, however, we continue to have regulation, and the customer is protected from paying more than the cost of the car ride, including, of course, a fair return on a fair value, it is essential that careful thought be given by all to see to it that the investor is given a fair return on a fair value. Otherwise there will be no investors, and then there will be no electric railways—but that to me is unthinkable. Electric railways must continue and investors must, therefore, continue to be willing to invest in electric railway securities, and the people must, therefore, continue to be willing to allow the investor a fair return.

Another new phase which has come about due to the general adoption of this service-at-cost idea is the desire on the part not only of the electric railway companies, but of their customers also, to have eliminated those items of expense which are not part of the cost of the car ride. Years ago when conditions were different, when there was no regulation, when there was a flat rate of fare, every concession forced out of the company was considered a benefit to the civic community. Under today's condition expense saddled by the community on the car company is paid by the car rider. The company and the customers both want to see the lowest practicable fare for good service. The company and the customers both want to see all unfair expense eliminated from the cost of the car ride.

One of the best illustrations of an unfair expense charged against the cost of a car ride today is the paving tax. In communities working under old-time franchises the car rider still pays for the paving between the car tracks, although this paving is not needed by the car rider, is not worn out by the car rider, and does not even deteriorate due to the electric cars. It is in keeping with the spirit of changed conditions that new franchises are eliminating this paving tax, and rightfully so. The car rider should not pay for paving worn out by vehicle owners.

Upon examining some figures a while ago I noticed that the Kansas City Railway had invested in pavements and viaducts more than \$5,000,000. It seems unthinkable that a company with gross earnings of only about \$10,000,000 should have to invest more than \$5,000,000 in pavements and viaducts, and maintain and keep in repair such pavements and viaducts. Interest, depreciation and taxes should certainly be taken as high as 10 per cent on this \$5,000,000. This means \$500,000 a year to be paid by the car rider for fixed charges on pavement and viaducts. To maintain this paving alone would cost on the average approximately \$200,000 a year.

I am not well enough acquainted with the local situation to hazard an approximation as to the cost of maintenance of viaducts, but there is no

## The Electric Railway Situation Today\*

Securities Strengthened by Public Appreciation that Railway Is a Necessity and by Earnest Endeavor of Operators to Give Best Possible Service Under More Efficient Methods

BY W. H. SAWYER

President East St. Louis & Suburban Railway, East St. Louis, Ill.

THE greatest advancement which has been made in the position of the electric railways has been the appreciation on the part of the public that electric railways, being a national and civic necessity, are entitled without question to make a fair return on a fair value. This has strengthened electric railway securities so that the buying public today has more faith in them as investments. This is especially true of the city electric railways, which today, speaking nationally, are in a fairly healthy condition and merit recognition from the investors. In fact, it is probably true that in the past year's market, which in general has possibly been somewhat inflated, electric railway securities have not come fully into their own.

One reason why electric railway securities are better investments today than before is the appreciation on the part of the investing public of the underlying necessity of electric railways. Another is the increased efficiency in mechanical production shown by the operators. A really fundamental reason is that the 1924 electric railway executive and operator has a more keen appreciation of the fact that it is his duty to give the very best service practicable for the rate of fare charged, and further, that it is his duty to give service in such a way that

it will satisfy, in so far as it is humanly possible, the customers and the potential customers of his electric railway.

I care not where you go, there is a different attitude today on the part of the electric railway executive and operator. He wants to satisfy his public. We executives and operators who went through the horrible nightmare during war times learned our lesson and were brought to an appreciation of the fact that part of our troubles were of our own making.

Times and conditions have changed. The old flat franchise fare is gone, never nationally to return. Our customers today in different localities call it by different names, but in the last analysis street car fares today are in most cases based on the cost of the service. In no place does the customer pay more than the cost of the service.

There has for some time been a question in my mind whether regulation practically eliminating profits and practically restricting return on investment to the cost of money would not work out detrimentally in the end, but at the present time the theory of regulation on the basis of a fair return on a fair value and no more is, I am frank to say, giving very general satisfaction. There has also been a question in my mind whether the electric railway operator would be as efficient if all the efficiency went to the benefit of the car rider, but today this

\*Abstract of paper presented before Missouri Public Utilities Association at Kansas City, Mo., April 9, 1924.

question but that the street car riders in Kansas City pay, exclusive of regular state, county and city taxes, upward of \$800,000 a year for indirect taxes which no other business is called upon to pay. There is no question but that the Kansas City car rider has to pay considerably more than  $\frac{1}{2}$  cent of his car fare for these inequitable indirect taxes. It is therefore not to be wondered at that where new franchises are being granted the car riders are asking for the elimination of these indirect taxes and imposts.

In some instances the street car company is asking for the elimination and it is being opposed by the elected representatives of the community. This is, I believe, due to the fact that there is not yet a full appreciation of the fact that the car rider must eventually pay for the cost of the car ride—and no more. Once this fact is appreciated and understood, mayors, city councils or city commissioners will not ask that the burden of these indirect taxes be put upon the car riders, who are mostly the working class of people, for the benefit of the community at large.

#### RAILWAY MEN STUDYING THE BUS

No electric railway man gets to his feet today to talk without touching upon what we call the bus situation. It was only a few years ago that electric railway men shuddered at the mere mention of the word "buses." They had in mind the jitneys, which for a long period almost sapped the lifeblood of many companies, including the local company here in Kansas City. The average electric railway man is not disturbed today when you mention buses. It is one of the problems which he is studying—studying from an analytical, unprejudiced standpoint. Buses are going to be used more and more as time goes along by electric railway men in fulfilling their transportation duties to their communities. In many cities the electric railway man is today rightfully using a considerable number of buses to supplement and round out his transportation service.

There are objections to buses, especially in some localities, and especially on some streets in some localities. The bus as a vehicle does not carry as many people as the street car does as a vehicle, and from the status of the art today it is impracticable for it to do so, and to transport the same number of people therefore requires more buses than street cars. Bus transportation costs more per passenger carried than does street car transportation. Buses add materially to the downtown congestion, which is one of the biggest problems electric railway men and civic communities have to solve. I do not believe that bus operation should be independent of the street and interurban car facilities, but I do believe that every electric car man should give serious thought as to whether buses operated by the railway company are not necessary to round out and complete the transportation needs of his community. But buses should not be allowed to compete in such a

way as to take away the cream of the traffic from the electric cars in which the people now have their money invested, and upon which the people finally must depend for service.

A short time ago while in Chicago at a convention similar to this I listened to a well-meaning man talk about educating the public by the use of publicity. I took the ground that the man meant right but that he was wrong in his phraseology. The public does not need to be educated, but we need to be educated, we electric railway execu-

tives and operators. I think the facts are that none of us are yet fully educated either as to the proper quantity or quality of publicity or advertising, but we are on our way, we are on the right path, in that we are today conducting our business as other successful men conduct their businesses, giving full service for value received, giving efficient service, and acquainting our customers through the newspapers with all the facts surrounding our business, which in the final analysis is really their business.

## I. C. C. Considers Mail Rates

### Association Committee Presents Extended Report on Proper Basis for Determining Charges to Be Paid for Electric Railway Mail Service

THE question of the proper charges to be paid by the Post Office Department to the electric railways for the haulage of mail is now before the Interstate Commerce Commission. For years the electric railways have believed that they were underpaid for the services which they render in the haulage of mail matter, and under the direction of a committee of the American Electric Railway Association they have been endeavoring to secure an increase. The last rate schedule established by the Interstate Commerce Commission went into effect Dec. 1, 1920, but has been found inadequate in a number of particulars. Since that time both the association and the department have been compiling data on the subject and these data have been presented as exhibits to the commission. The final step in the effort to secure a fairer rate for mail service took place April 10, when W. H. Maltbie, as counsel for the association, filed with the commission a brief discussing the evidence so far submitted. This brief occupies a pamphlet of about 116 pages. The following is a summary of the principal points made in it:

#### THE PRESENT RATES

Briefly, the present rates are:

Class I. R.P.O. service.—In this service the railway furnishes and transports either a full car or a compartment for the exclusive use of mail, but all the work in connection with the handling of the mail is done by the regular employees of the department. The rate is based per car mile on the linear length of the car, or compartment, as follows: For each linear foot of car length up to 20 ft.,  $1\frac{1}{4}$  cents per mile; for each foot of length over 20 ft.,  $\frac{3}{4}$  cent per mile.

Class II. Independent cars.—This class covers those cases where the car or compartment, at least during the time when it carries the mail, is used exclusively for the post office department, but the mail is handled by the employees of the transportation company. The present rates allow for the additional service of handling and responsibility for the mail an additional charge of  $\frac{1}{4}$  cent per mile for each foot of car or compartment length up to but not exceeding 20 ft.

Class III. Closed pouch service in baggage or express cars or compartments.—In this form of service the mail is carried, with other express or baggage, in a baggage or express car or compartment. It is handled entirely by the employees of the transportation company and is given preferential treatment in that space must be provided for any quantity tendered, and as the space occupied must be carried after the mail is discharged to the end of the run, an additional allowance is warranted. The rate which has been paid for this service is 1 cent per mile per foot of car length used for mail, plus a surcharge of 2 cents per car mile to cover handling, preferential treatment, excess haul and responsibility, but applicable only to the first unit of each shipment. In other words, this surcharge is 2 cents per shipment-mile.

Class IV. Closed pouch service in passenger cars or compartment.—This comprises cases where the mail is carried in passenger cars or passenger compartments, all handling being done by the company. As there is even greater responsibility in protecting the mail against loss and damage than in Class III, the rate is slightly higher, i.e., the base rate is the same as Class III, but the surcharge per shipment-mile is 3 cents instead of 2 cents as in Class III.

#### BASIS OF THE PRESENT CASE

After an experience of about two years, the railway companies requested the reopening of the case on the ground that the rates were inadequate. To determine what were fair rates, a questionnaire was prepared by co-operation between the representatives of the post office department and those of the American Electric Railway Association, designed to secure the information desired by both parties. Many valuable data were secured. These data have been accepted by both parties. Some testimony was also presented during the hearings through witnesses, particularly by A. S. Richey and Thomas Conway, Jr. Some of the points in which it was found that the department and the companies differed will be mentioned.

The method of determining the revenue length of car, particularly the

extent to which the platform should be considered as part of the length of car, was one point of difference. In an effort made to determine the actual cost to the company of the service, there were differences in opinion as to the proper method of apportioning some of the expenses, whether the Federal income tax should be treated in the accounts as an operating expense and the proper "fair return" to allow, the department proposing 5½ per cent and the carriers asking for 8 per cent of the fair value. There was also a disagreement as to the space to be considered as "occupied," particularly in Class IV service.

CARRIERS PROPOSE RATES

The position of the carriers before the Interstate Commerce Commission was that the rates should be based on the cost of service, plus a fair return, but that as the cost varies with each city, it is more practicable to take the average cost of all electric railway transportation as a base rate. In the absence of operating figures for the entire country, the average figure of the 151 railway companies from which data were obtained in this study of mail rates is taken. Then the cost per car foot mile may be obtained by dividing the total operating expenses and other costs of the railway systems by the total revenue car foot mileage. The "fair value" of the properties, for the purpose of this determination, may then be taken as 4.35 times the total annual operating expenses, and on the value thus obtained, the fair return should be figured at 8 per cent.

In developing the reasonable rate on the basis of this cost, the carriers' brief said that in general mail service is divided into three classes: (A) Full car service, (B) full compartment service, and (C) fractional service. Classes A and B are subdivided according to whether mail is handled by the post office employees or by the railway employees, and Class C is subdivided according as the fractional service makes use of freight, express or passenger equipment.

The brief then says that the proper basis for rate making is the cost per car mile or the cost per car foot mile, plus a fair return, with proper discount from the car mile rate for short length cars and proper surcharges for: (a) Special service not demanded in passenger traffic, (b) fractional or l.c.l. service, (c) necessary excess run, due to demand for service between points other than termini of existing car runs and (d) the fact that the mail service is an ordered service.

The brief then points out that the revenue length of the car should be taken to include one-half of all platforms. The rates per car foot mile would then be shown in the tabulation at the top of the next column.

THE BRIEF SUGGESTS TWO METHODS

In applying the rate thus obtained to the full car R.P.O. rate, the brief suggests two methods. One is that the full car mile cost of 51.49 cents be subject to a discount of 25 per cent for cars less than 28 ft. The other is that there should be a base rate of 65 per cent of the total car mile cost of 51.49

COMPUTATION OF CAR FOOT RATES

1. Total number of cars covered by study.....	26,502
2. Total number of car miles.....	574,892,000
3. Car-foot miles (Post Office Department's estimate).....	20,742,000,000
4. Increase in item 3, due to addition of one-half of platform length in freight, express, mail and express-mail cars, and one-fourth of platform length in passenger—express and passenger—mail cars.....	0.251 per cent
5. Corrected total car foot miles (1 + 0.251) multiplied by.....	20,793,000,000
6. Operating expenses.....	\$204,084,942
7. Taxes, other than federal income tax.....	\$15,852,192
8. Federal income tax.....	\$1,080,191
9. Miscellaneous debits.....	50,557
10. Lease of road (net balance).....	5,376,206
11. Total cost, exclusive of fair return.....	\$226,444,088
12. Total cost per car mile in 1921, exclusive of fair return (item 11 divided by item 2).....	39.38 cents
13. Total cost per car mile, October, 1923, exclusive of fair return (97 per cent of item 12).....	38.20 cents
14. Total cost per car foot mile in 1921, exclusive of fair return (item 11 divided by item 5).....	1.089 cents
15. Total cost per car foot mile, October, 1923, exclusive of fair return (97 per cent of item 14).....	1.056 cents
16. Fair return expressed as a percentage of fair value.....	8 per cent
17. Ratio of fair value to total operating expenses.....	4.35
18. Fair return expressed as a percentage of operating expenses (item 16 multiplied by item 17).....	34.8 per cent
19. Car mile cost plus fair return, October, 1923 (1.348 times item 13).....	51.49 cents
20. Car foot mile cost, plus fair return, October, 1923 (1.348 times item 15).....	1.42 cents

cents, or 33.46 cents, to which there should be added for each foot of car, 35 per cent of the car foot rate of 1.42 cents, or 0.50 cent per mile.

Where the railway company pays the labor costs for handling, an additional charge of 1.5 cents per linear foot per mile is recommended, pending a more accurate determination of the cost, with a reduction to 0.75 cent per linear foot per mile for full car or full compartment service. For R.P.O. apartment service, the rate recommended is the base rate of 1.42 cents per linear foot of apartment, plus the present short length surcharge of 25 per cent for the first 20 ft. and 25 per cent discount for any portion of the apartment over 20 ft. in length.

The suggested rates for closed pouch or express car or compartment service are based on a unit of 30 cu.ft. This figure is obtained on the assumption that 30 cu.ft. are equivalent to 1 linear ft. of an 8-ft. car, in which mail is piled to a height of 5 ft., with a 2-ft. aisle. The rates recommended are:

CLOSED POUCH BAGGAGE OR EXPRESS CAR OR COMPARTMENT RATE

(For Units of 30 Cu.Ft.)	
	Cents per Mile
First unit.....	4.5
Second unit.....	4
Third unit.....	3.5
Fourth unit.....	3
Additional units.....	2.75

CLOSED POUCH PASSENGER CAR OR COMPARTMENT RATE

	Cents per Mile
First unit (10 bags).....	7
Second unit (sufficient volume to make total for first and second units 60 cu.ft.).....	6
Third unit.....	5
Fourth unit.....	4
Additional units.....	3.5

The brief explains at length the basis for these figures, and includes, in the data given, interesting figures on the average load factors on cars on different railway systems. The load factor, in this connection, is defined as the revenue passengers per car mile, multiplied by the average length of ride in miles, and divided by the average seats per car. Recent figures for various properties were declared to be:

	Per Cent
Easton (Pa.) Transit Company.....	37.43
Nashville Street Railway.....	39
Public Service Railway of New Jersey.....	39.72
Springfield (Mass.) Street Railway.....	46.8

Recent figures on average length of rides in different cities were also quoted. They are given in the following table:

	Miles
Cleveland, Ohio.....	3.11
Chicago, Ill. (surface lines).....	4.16
Detroit, Mich.....	4.06
Milwaukee, Wis.....	2.93
Nashville, Tenn.....	2.5
Philadelphia (surface lines).....	2.71
San Francisco, Cal.....	2.4
Springfield, Mass.....	2.88
Worcester, Mass.....	2.5

In connection with the proposed rates, the carriers declare that there should also be a minimum charge for a mail route, but as it is difficult to determine with any degree of accuracy what it should be, they suggest a minimum charge not less than 1.42 times the one at present in force. This will make the new minimum charge approximately \$250.

New Reports Available

SPECIAL reports and compilations on the following subjects prepared by the association staff during the past month are now available to member companies upon request.

*Working Conditions of Trainmen:* A new edition of the association's regular bulletin based on up-to-date information covering hours of labor, length and types of runs, layover time, overtime rates, extra compensation allowed for special types of work, number of trainmen, labor turnover, etc.

*The Problem of Traffic Congestion:* Extracts from reports of traffic surveys and leading articles on the traffic problem in city streets giving a general survey of traffic conditions and brief specific surveys of some of the leading cities, including descriptions of methods adopted to relieve congestion in certain cities, the results obtained and also some theoretical solutions of traffic problems which have not actually been tried out. Discussion of the comparative efficiency in the use of the streets by passenger automobiles, buses and street cars is also included.

*Trend of Trainmen's Wages in 1914 to 1923:* Shows for a large group of companies the maximum wage rate and the number of years of service necessary to reach it for the years 1914 to 1923, inclusive.

In addition to the above, supplements to the Wage Bulletin, Fare Bulletin and Cost of Living Studies have been prepared, bringing them down to date.

# Maintenance of Equipment

## Closing Ends of Turnbuckles for Rethreading

WHEN the threaded ends of turnbuckles become worn, it is desirable to rethread them. This requires that the hole be closed in sufficiently to permit the tap to cut a thread of standard size. This work is carried on very efficiently in the shops of the Philadelphia & Western Railway, Norristown, Pa., by use of swages of the particular shape necessary for the hexagonal ends of the turnbuckles. In closing in the ends, the turnbuckle is heated in a forge, and the end is placed in the bottom swage which is placed in the hardy hole of an anvil. The top swage has a handle. When this is held in position on top of the turn-



Turnbuckle in Position for Closing in Ends

buckle a couple of blows from a sledge will close in the end and retain the proper exterior shape. After the turnbuckles have been cooled they are again threaded in a bolt threading machine.

Threads on the brake rods also become worn. If there is sufficient stock remaining the rods are upset and rethreaded. Otherwise they are cut off at an angle, and a new end is welded on. This is then rethreaded to proper dimensions.

## Protect Passengers Against Drafts

SEVERE climatic conditions prevailing in Manitoba have influenced the design followed in the reconstruction of four double-truck double-end cars by the Winnipeg Electric Railway. These have been converted into one-man safety cars for service on suburban lines. Swinging doors separate the interior of the car from the vestibule in order to protect the passengers against drafts.

The platforms are flush with the car floor, but there are two steps between the platform and the ground. The lower step is of the folding type and is connected with the door operating mechanism. A second step is in the form of a well inside the doors. This arrangement prevents

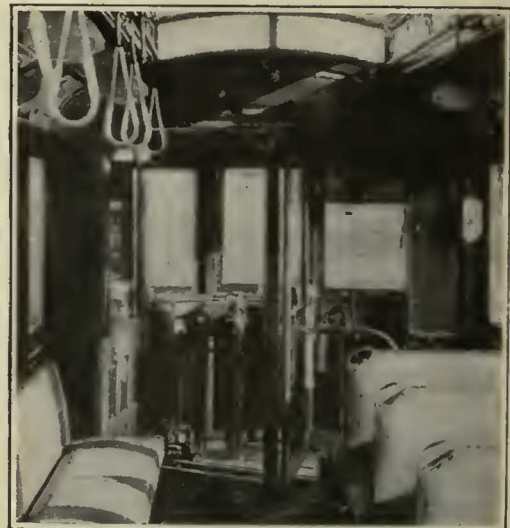
drafts entering the car through a crack under the doors. Entrance and exit doors are operated individually by means of a selective mechanism manufactured by the Safety Car Devices Company. The cold air coming in the car interior is thus reduced to a minimum. A Peter Smith heater is located in the center of the car in order to distribute the heat evenly.



Double Doors, Separately Controlled, and Step Arrangement on Rebuilt Winnipeg Cars

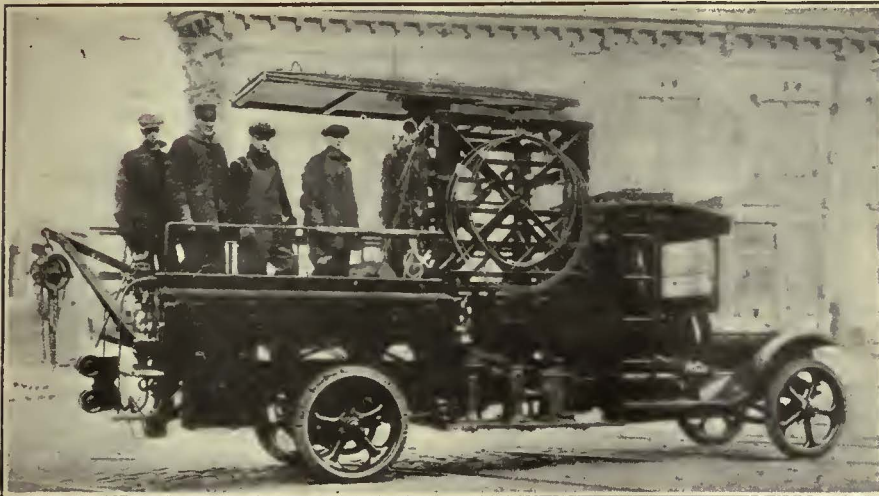


Four Cars of This Type Have Been Converted by the Winnipeg Electric Railway for One-Man Operation on Suburban Lines



Swinging Doors Separate the Vestibule from the Car Interior in Order to Prevent Drafts





Combination Truck for Line Maintenance and Emergency Car Work

### Combination Line-Emergency Truck

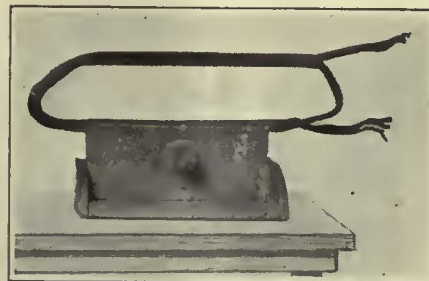
A NEW truck which can be used for overhead maintenance as a line truck and as an emergency truck for rolling stock has recently been placed in service by the New York & Queens County Railway, New York, N. Y. The chassis is a White 2½-ton model with a McCardell three-section tower mounted on it. Special running boards are provided on the sides and three jacks are carried on either side and a stone jack on the rear step, making a total of seven jacks carried by the truck. A four-wheeled buggy for moving vehicles with broken axles is also carried on the rear. Provision is made for a portable hoisting arm, which may be attached to the rear end and used for hoisting an automobile that has been disabled on the track. This hoisting arm functions the same as the hoist on an ordinary garage wrecker and when not in use it is slid into a compartment located under the truck flooring. A full set of materials and tools for maintaining overhead lines is carried on the truck as well as the wrecking tools.

In addition to this tower truck, the company has also placed in service a Ford 1-ton truck, and through the addition of these two is able to retire a stable of five horses, two horse-drawn tower trucks and two horse-drawn freight trucks and to eliminate one line crew. By the use of the new trucks for car emergency

calls a wrecking car previously used by the company has almost been eliminated.

### Vise Holds Armature Coils

A HAND VISE constructed of wood of the type shown in the accompanying illustration has been found a great convenience in the armature room of the Eighth Avenue Railroad, New York. The hand vise is made entirely of wood with two upright jaws mounted on a wooden base. The front jaw is moved back and forth through the use of a hand screw in the center. The armature coil to be taped can be placed in the vise and quickly fastened. In taping coils it is most convenient to provide so that they can be swung around at various angles during the taping process. The particular ad-



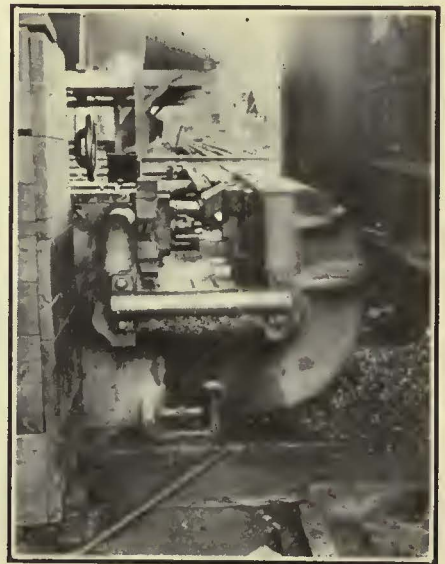
Convenient Form of Hand Vise for Taping Armature Coils

vantage in using a hand vise of the type shown is that this can be fastened to the bench by a "C" clamp and can then be shifted to a position most convenient for the winder.

### Rail Saw, Punch and Bender

RAILWAY systems which are a long distance from the producer have to install more shop and yard equipment than if they were closer to the source of supply. Among the appliances owned by the Spokane United Railways, Spokane, Wash., is the extensive installation for cutting, punching and bending rails shown in the accompanying line illustrations.

The plan shows the track on which flat cars, loaded with rails to be cut and punched, are brought into these yards. From these cars the rails

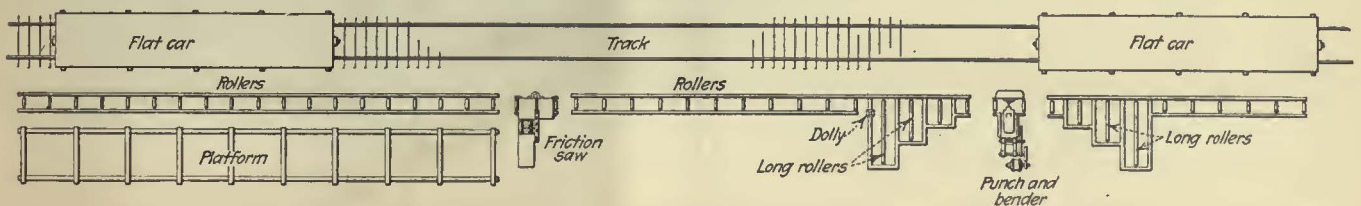


This Machine Punches and Bends Rails

are skidded to an adjoining platform and are then placed on rollers which carry them to the friction saw. Here the worn ends are cut off. They are then run down another set of rollers to the punch and bender, where the ends are punched or the rails are bent.

It will be noticed that the rollers on each side of this bender are of various lengths. These are to permit the 60-ft. rails, while being bent to a short radius curve, to lie work-wise on the rollers.

An accompanying illustration shows the bender and punch used as a punch. In the background will be seen the rail saw and roll-way. It will be noticed that both rail punch and rail saw are housed to protect them from the weather.

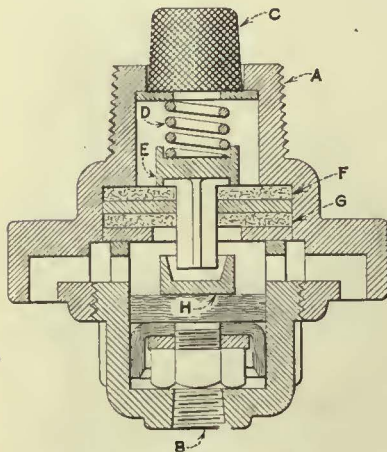


Plan of Installation for Cutting, Punching and Bending Rails in Spokane

## New Equipment Available

### Automatic Drain Valve for Car Reservoirs

A NEW type of automatic drain valve for car air reservoirs is being placed on the market by the Columbia Machine Works, Brooklyn, N. Y. The action is somewhat similar to the air-operated slack adjuster for brakes, in that each application of the air causes the discharge of the water accumulated in the reservoir since the last brake application.



Automatic Non-Cumulative Drain Valve

In this way the water is removed practically as fast as it is condensed, and does not have a chance to freeze and prevent proper action of the brakes.

The manner in which the device operates may be seen from the following description:

Referring to the accompanying diagram showing the construction details, the threaded part, marked A, is arranged to screw into the main reservoir. There is a pipe connection at the bottom from the opening B to connect with the brake cylinder of the car. With each application of the brakes air is admitted from the brake cylinders through the opening B to the drain valve.

With the valve in position in the main reservoir, any water which may accumulate passes through the strainer C and into the valve chamber D. A small valve, E, is held on its seat at F by the main reservoir air pressure and also by a spring which seats on the top of the valve.

With each application of the brakes, brake cylinder pressure is admitted at B, which raises the valve H and also valve E. This produces

an opening from the chamber D to atmosphere, so that any moisture which accumulates in this chamber is blown out as the valve is lifted from its seat. When the valve H reaches its upper position it seats against the rubber gasket G, and thus closes the opening to atmosphere. With the release of the brakes the valves again take their normal position and in so doing there is again a short blow of air from the chamber D to atmosphere, which carries any moisture out of the chamber D.

This type of valve has been installed upon a number of electric cars, and is giving satisfactory results. It is made entirely of brass, and is arranged to screw into the main reservoir in place of the usual drain cock.

### Removable Top for Double-Deck Bus

A DOUBLE-DECK bus seating 64, with a top designed to make the upper deck comfortable every day in the year, has been placed in service by the Fifth Avenue Coach Company, New York. To make the 38 seats on the upper deck available in cold and inclement weather and at the same time have the upper deck attractive for open-air riding on pleasant days a removable semi-glass inclosed top

equipped with drop curtains and a roll cover roof of light waterproof material has been provided.

The top is bolted to the rail of the upper deck and is inclosed both front and rear with glass and a permanent section of roof. There is also a permanent roof over the aisle. On each side of the aisle roof is a roll cover, which, when lowered, forms the roof from the aisle to the top of the windows. These two roll sections can be lowered in a few minutes by the conductor.

The lower half of each upper deck window is covered with a fixed 10-in. glass panel, while the upper portion may be closed with a roll shade. This, when lowered, overlaps the upper edge of the glass panel, so that rain, snow or sleet cannot get in. With the overhead covers and side curtains down there still is plenty of light entering the inclosure through the front, rear and side sash. Electric lights mounted just above the windows illuminate the interior at night.

In general appearance the bus shown in the accompanying illustration resembles No. 601, a 60-passenger double-decker, which was exhibited at Atlantic City last October. The additional seats in No. 602 have been provided by extending the upper deck beyond the driver's vestibule. This also affords additional safety when driving, as the overhang forms a visor to the windshield, protecting it from rain or snow.

The new bus was manufactured by the New York Transportation Company.



Sixty-four-Passenger Bus with Removable Top Equipped with Roll Roof and Side Curtains. This Arrangement Is Designed to Make the "Open Deck" Usable All Year

# The News of the Industry

## Subway to Replace "L"

**A Four-Track Trunk Line to Be Built on Sixth Avenue, New York City, Within Five Years, Maybe**

A subway under Sixth Avenue, New York City, extending from Trinity Place to Fifty-ninth Street was recently approved by the Transit Commission. Later the commission suggested the subway be extended under Central Park and then east to Queens. It will be a four-track trunk line and as approved is an adaptation of the proposal first advocated by Julius Miller, Borough President of Manhattan, for tearing down the Sixth Avenue elevated and constructing a subway in its place, provided the property owners along Sixth Avenue pay the cost of the change through assessments. A large number of them have consented to a 10 per cent assessment, believing this would cover the cost as outlined below. But the commission points out that the cost will require a 20 per cent assessment. The elevated structure is not to be removed until after the completion of the underground system.

### COST ESTIMATED AT \$60,000,000

The commission points out that the estimated costs are affected by the existence of the Hudson & Manhattan structure in Sixth Avenue from Ninth Street to Thirty-third Street. Of the four new tracks, two used for express purposes will have to be built beneath the existing Hudson and Manhattan tracks, and of the two used for local purposes one must be built on either side of the existing tracks and at a depth sufficient to avoid interference with the Hudson & Manhattan stations. Other engineering difficulties will be met in dipping the new line under the Pennsylvania Railroad tubes at this point. These engineering difficulties will add about \$7,000,000 to the cost of the subway.

The engineers estimate that the mere destruction and removal of the Sixth Avenue Elevated line would cost \$500,000, less whatever sum might be realized through the sale of the scrapped material. Further, that the amount of the award the courts in a condemnation proceeding would allow the railroad for its property is entirely conjectural. But in allowing \$49,000,000 as the cost of the subway, the commission assumes that the total cost of acquiring and destroying the old line and of building the new would be not far from \$60,000,000. It also says that during the year ended Dec. 31, 1923, 153,409,605 passengers were carried in both directions by the two lines, the Sixth and Ninth Avenue branches, from Rector Street station to the terminus of the joint line at Anderson and Jerome Avenues in the Bronx.

Traffic checks indicate that 60 per cent of this total, or 94,000,000, were carried either to or from stations on the Sixth Avenue branch, and approximately 59,000,000 to or from stations on the Ninth Avenue branch below Fifty-third Street.

## Details of Detroit Trackless Trolley Plan

The Detroit Department of Street Railways plans to use trackless trolleys as feeders to the East Warren extension. Announcement to this effect has been made to the City Council by Ross Schram, assistant general manager of the municipal system. Extensions of the tracks for about 1½ miles are planned and if the trackless trolleys are found available they will probably be run from ½ mile to 1 mile beyond the terminus of the proposed track extensions.

The costs of laying tracks and providing overhead lines is estimated at \$100,000 per mile, while for trackless trolleys the cost of the overhead equipment is placed at \$10,000 a mile, with cars costing about \$9,000 each.

The municipal officials plan on putting a number of trackless trolleys in service in the outlying districts where the population does not warrant the laying of expensive tracks, provided the cars sent for examination and experiment prove satisfactory, as the city was authorized by a charter amendment passed two years ago, to purchase and operate trackless trolleys.

Announcement has been made that the D.S.R. officials expect to pay up within five years the \$5,000,000 bond issue voted last spring by the aid of monthly sums set aside from the earnings. The monthly sums will take care of the interest on these bonds and part of the principal. The new cars purchased are to be paid for without depleting the bond issue or financing by so-called car trust certificates. As the cars are delivered, it is planned to have the controller obtain the necessary money on notes, charging the payments to the fund for additions and betterments.

The notes are to be taken up with a fund established by the setting aside of a definite monthly sum. It is anticipated that all of the notes will be written off in a maximum of five years, \$4,000,000 having been spent for rolling stock.

The \$1,000,000 available this year from bonds, it is estimated, will take care of all reasonable demands for extensions and will be sufficient to build 10 miles of track. While petitions have been received asking for the construction of from 30 to 50 miles of track, only 20 to 25 miles of track are necessary now, according to Mr. Schram.

## City Would Buy Lines

**Purchase Negotiations Under Way in Chicago—Proposal First Step in Plan to Co-ordinate Service**

Negotiations between representatives of the city of Chicago and officials and representatives of security holders of the Chicago Surface Lines and Chicago Rapid Transit Company on the subject of municipalization of Chicago transportation systems are being carried on in a series of meetings held in Mayor Dever's office. These meetings, which are being held at the invitation of the Mayor, have for their purpose the formulation of a plan whereby the city may purchase the transportation properties by the issuance of so-called "Schwartz certificates."

Preliminary negotiations on the subject of the proposed purchase have been under way for some time between legal representatives of the city and of the security holders. In addition to the question of the legality of the proposed Schwartz certificates, which must be definitely determined in order to assure their marketability, the price to be paid for the railway properties and the organization and control of the proposed board of control which would operate the combined properties must be settled before further progress can be made.

### COMPANIES IN RECEPTIVE MOOD

The Mayor's proposal to purchase the existing transportation properties is the first step in his general plan for the co-ordination of the service of the elevated and surface lines, to be followed by expansion of the existing systems, and the construction of subways.

At a meeting held in the Mayor's office on April 22 there were present Samuel Insull and Attorney Patrick J. Lucey for the Chicago Rapid Transit Company, Henry A. Blair and Leonard A. Busby for the Chicago Surface Lines, together with Frank O. Wetmore, president of the First National Bank; A. W. Harris of the Harris Trust & Savings Bank, and M. A. Traylor of the Illinois Merchants Bank. As representatives of the city there were present Mayor Dever, Corporation Counsel Francis X. Busch and Alderman U. S. Schwartz, chairman of the local transportation committee. Another meeting of the conferees was set for April 24.

Mr. Busby had previously indicated that the management intends to do everything possible to reach an agreement with the city on a basis which will recognize and adequately protect the rights of the owners of the property and accomplish the city's desired purpose of bringing about a unified transportation system, with adequate provisions for extensions and improvements to meet present and future transportation needs.

## More One-Man Cars

### Buffalo Company Changing Over to One-Man Equipment Except on Main Lines

One-man cars are being placed in service on a majority of the local lines in Buffalo by the International Railway as part of an economy campaign. Herbert G. Tulley, president of the company, explained the International sustained a deficit of \$1,000,000 last year and it is essential that every operating economy known to electric railway practice be used in Buffalo.

Trainmen operating one-man cars on the local lines of the International receive 5 cents an hour more than the regular scale. It is said that none of the present trainmen will lose his position because of the operation of cars with only one man, but that the company will stop hiring new men for a short time.

The one-man system of car operation is being adopted on all the lesser traveled lines in the city. One-man cars now are being operated on the William, Abbott Road, Elk, Hoyt, Connecticut, Clinton and Chicago Street lines. They will soon be placed in service on the Jefferson line and on May 18 the new system will go into effect on the Sycamore Street line. Other lines will be added to the list as rapidly as the cars can be changed over in the company's shops.

#### HEADWAYS REDUCED

On the Sycamore Street line, where the new system will go into effect on May 18, the headway will be reduced from ten and a half minutes to seven and a half minutes at midday and during the rush hours from three minutes to two and a half minutes. A similar plan will be followed on other lines where one-man cars are being placed in operation.

Mr. Tulley says that an investigation covering a period of a year on lines where one-man cars have been in operation shows that accidents during loading and unloading have been reduced to a minimum. He said that on lines operating cars with two trainmen there has been an increased number of accidents during loading and unloading.

The one-man cars will not be placed in service on the more heavily patronized through lines in the city where speed in starting and stopping in congested areas is essential in order to keep to schedules.

The City Attorney has advised the City Council that there is nothing in the franchise or in the city ordinances which would force the company to operate cars with crews of two men. This opinion by the city law department has kept the Council from seeking the aid of the courts to require the company to man cars with two men.

### Buses and Trucks Supplementing Service in Utica and Rome

Motor buses and express trucks are supplementing the electric service of the New York State Railways on the Utica, Rome and interurban lines. Beginning April 28, a large passenger

bus will operate between the American Corner and railroad station in Rome, in addition to the 20-minute trolley car service. The bus body was constructed in the railway shops at Utica and has a seating capacity of 25 persons. It is mounted on a Brockway chassis.

Utica has a passenger bus of the same type which is used mostly for sight-seeing purposes. The route is over the city's beautiful boulevard. This bus is equipped with a body built by the Kuhlman Car Company and has a Brockway chassis. Early in June the company will inaugurate a commercial trucking service between Rome, Utica and Little Falls and intermediate points. Four White automobile chassis have been purchased and bodies are now under construction at the company shops. The express line will be operated under the name of the Utica Railway Co-ordinated Bus Lines Inc. The trucks will be of 2½ and 3½ ton capacities.

### Seven and Three-Quarter Cents Needed in Baltimore

Hearing on a petition filed by the United Railways Company, Baltimore, to be permitted to put into effect a new schedule of rates and charges was started by the Maryland Public Service Commission on April 22 and is attracting great public attention. The hearing is expected to continue for several days. The original petition as filed by the railway company did not fix a specific figure to which it desired to increase the fare from the present 7-cent rate. On the first day of the hearing it was said by the counsel of the United that in order to accomplish what it desires he believes the company should have a rate of about 7½ cents.

The original petition asked that the company be permitted to maintain rates which would yield an annual net income of \$1,500,000. This figure was cited because in 1920 the Public Service Commission set \$1,000,000 as the minimum annual net income and the company pointed out that at the same time the commission had decided that \$1,500,000 was "reasonable, necessary and in the public interest" and placed upon the company the burden of increasing the net income to that figure by exercising economy and efficiency.

The figures placed before the commission at the opening of the hearing were submitted by William H. Maltbie, counsel for the United. Joseph C. France, also representing the company, addressed the commission on the need of additional revenue on the part of the railway. In its petition as filed recently the company said that in 1923 only \$976,266 was earned and in the four years from Jan. 1, 1920, to Dec. 31, 1923, the total net surplus was \$3,454,365, which is \$2,545,635 below what should have been made under the annual rate of \$1,500,000. In the opening arguments for the company it was declared that the \$500,000 had been saved by economy and efficiency in operation, but this saving had been eaten up by other circumstances. The saving was made, it was declared, but the company cannot control the riding habits of the public and the demands for extra service.

## Non-Parking Rule Helpful

### Traffic Is Speeded Up in Downtown St. Louis by Enforcement of Recent Ordinance

Marked improvement in traffic conditions in downtown St. Louis has resulted from the strict enforcement by the police of a city ordinance abolishing the parking of automobiles and other vehicles on Olive Street between Third and Twelfth Boulevard.

So successfully has the new plan worked out that the Traffic Council, which has been placed in control of vehicular traffic in the city through the recently enacted traffic code, has decided to extend the no-parking rule to Washington Avenue. Parking will be abolished on Washington Avenue from Fourth Street to Eighteenth Street during the morning and evening rush periods. This will provide a free line of traffic by which the morning and evening peak can flow freely into and out of the congested district.

The maximum time now required for a street car to make the trip from Twelfth Boulevard and Olive Street east to Fourth, north to Locust, west to Broadway, south to Olive and thence west to Twelfth Boulevard is ten minutes less than before the new law went into effect. The clocking was done on April 7 and April 9, during the peak of the rush hours. A survey made by the research department of the United Railways on Oct. 23, 1923, showed that this trip required a maximum of thirty-three minutes. The recent survey showed a maximum of twenty-three minutes.

#### EXTENSION OF PLAN PROPOSED

The elimination of parking on Washington Avenue is expected to be even more beneficial. That street is the gateway for East St. Louis and other East Side cities into St. Louis and is used by the four bus lines now operating in St. Louis, the Page, Park and Compton divisions of the United Railways and hundreds of service cars. With cars parked along the curb this throws most of the heavy traffic onto the railway tracks and street cars and buses lose most of their time in the territory east of Eighteenth Street.

Experts for the United Railways have found that motorists now use Olive Street for a speedy exit from the congested districts. Instead of trailing the street cars and running continuously on the tracks, these machines are able to pass between the tracks and the curb. On other streets where parking is permitted from ten to twelve machines line up in back of every street car and very frequently a street car or bus loaded and ready to go is held up by a minor mishap to an auto.

Elimination of parking on crosstown streets will greatly speed up traffic on both Washington and Olive Streets, experts of the railway say. The survey conducted by the railway in October, 1923, and circulated under the title "Rush-Hour Car Movement in the Congested District" is regarded as having played an important part in the action of the Traffic Council in forbidding parking on Olive Street and the decision to curb parking on Washington Avenue.

## East Boston Tunnel Changed Over to Train Operation

By joining forces with the Boston Transit Commission, so as to muster a working crew of about 800 men, the Boston Elevated Railway changed over the service in the East Boston Tunnel between 8 o'clock on the evening of April 18 and 5 o'clock on the morning of April 21 from surface cars to the operation of four-car trains. It was a stupendous job. The tunnel was closed to the public during the fifty-seven hours. Then the crossovers were broken, the guard rails taken down, the third rail installed for a distance of 2 miles and platforms erected at the several stations. This was work which could not be done until the surface cars ceased running. Its completion was accomplished in record time, however, as everything was ready for the work the minute the cars were out of the tunnel. All the platforms had been built in small sections which fitted together like a picture puzzle. The third rail had been welded together in lengths of 400 ft., all ready to set in place.

Forty new steel cars have been purchased by the Elevated for this service, the trains to run between Maverick Square in East Boston and Bowdoin Square in Boston, meeting surface cars at both ends. The new work cost about \$2,500,000. It makes the total cost of the East Boston Tunnel approximately \$9,000,000. The Elevated pays the rental on this sum to the city of Boston.

## Question of Confiscation Involved in Florida Suit

The United States Supreme Court granted a writ of certiorari on April 21 by which it will review the decision of the Florida State Supreme Court in a suit brought by the city of Palatka against the Southern Utilities Company. The company had a franchise secured from the city in 1914. Owing to the increase in costs due to the war, the company later gave notice of an increase in rates of gas. The city sought an injunction on the ground that the rate named in the franchise was a contract obligation. The city was sustained by the trial court and by the State Supreme Court. The company alleges that the rate is confiscatory and that there is no rate-making power delegated by the Legislature of Florida to the municipality.

## Puget Sound Property and City of Seattle Must Pay Taxes

Under a ruling of the United States Supreme Court, the city of Seattle and the Puget Sound Power & Light Company will be compelled to pay taxes totaling \$401,000, on railway property for the period from September, 1918, to March, 1919. The case was the outcome of the railway purchase by the city, which was contracted in the fall of 1918, but was not consummated until March, 1919. Under the contract, the city was to pay three-fourths and the company one-fourth of the taxes due for this period. When the company started suit to prevent collection of its

one-fourth the city joined. The city contended that if the company were to be exempted from the county taxes, the city should also be exempted. The Supreme Court of the United States, in refusing to grant a rehearing of the case, upheld the Supreme Court of the State of Washington.

## Will Investigate Cincinnati Property's Books

Carl H. Nau, head of the firm of Nau, Rusk & Swearingen, certified public accountants of Cleveland, Ohio, was sworn in as Master Commissioner to examine the books, papers and records of the Cincinnati Traction Company by Judge Robert S. Marx, in the Hamilton County Superior Court on April 7. Appointment of the master commissioner is the result of a suit filed by Attorney Robert Alcorn, as a taxpayer, against the traction company to compel the payment of franchise tax deficiencies amounting to \$1,050,000. Hearing of the suit started on April 1. Judge Marx decided to have an expert accountant go over the traction company's books and obtain data desired, so as to get at the bottom of the case. Attorney Alcorn objected to the procedure. W. Kesley Schoepf, president of the traction company, then offered to provide \$5,000 out of his own pocket to finance the accounting of Mr. Nau. The hearing on the matter has been postponed until Mr. Nau completes his investigation.

In defining the details of the work of the investigators the court assumed the validity of the service-at-cost franchise under which the traction company is now operating.

## City to Co-operate with P. R. T. on Refund

Approval has been given by the committee on transportation and public utilities of the City Council of Philadelphia to an ordinance authorizing the city to join with the Philadelphia Rapid Transit Company in an effort to secure a \$5,000,000 income and excess profits tax refund from the government. Provision is also made in the measure that the money refunded or saved through an exemption of the company from similar taxes in the future shall be used only for additions, extensions and betterments of the city's street railway transportation. The railway's appeal for a refund was turned down.

**Forty-four per Cent in Wages.**—The Philadelphia Rapid Transit Company's employees received in wages 44 per cent of the fares collected in 1923. In *Service Talks*, the official publication of the company, the story of what happened to each 6½-cent fare last year is shown in graphic form. Four per cent provided the dividend on the \$30,000,000 of paid-in capital. Twenty-four per cent was used to pay other operating expenses, including cost of power and maintaining equipment, with 22 per cent paying interest on bonds and rentals. This left 6 per cent going to the city, state and federal governments in taxes.

## Municipal Ownership Advocated

A recommendation that the city of St. Louis pass a bond issue of \$51,000,000 for the purchase of the United Railways was made by L. R. Bowen, chief engineer of the division of bridges and buildings, Department of the President, Board of Public Service, in an exhaustive report submitted on April 18 to E. R. Kinsey, president of the board.

Mr. Bowen details a plan whereby he contends the city can take over the railway and provide for needed extensions without additional cost to the citizens and with no increase in the present fare of 7 cents with universal transfer. He states that the trend is toward municipal ownership, pointing out that of all the cities that have embarked upon this venture none had the opportunity of taking over a transportation system under the auspicious circumstances St. Louis enjoys.

The presentation of the report caused quite a stir in administration circles. Mayor Kiel and Mr. Kinsey disclaimed the report. The Mayor expressed surprise that Mr. Bowen had submitted the report, stating that the first he knew of it was when he read a synopsis of the report in a St. Louis morning newspaper. Mr. Kinsey, too, declared that he was unaware that Mr. Bowen was to submit a report on his studies of transportation methods in other American cities, and that he certainly did not order it or authorize such a report to be made.

## CITY'S EXPERT DISAGREES

Rolla Wells, receiver of the United Railways, declared that the price of \$51,000,000 would wipe out the holders of the common and preferred stock in the company. Mr. Wells said:

I ran for Mayor of St. Louis years ago on an anti-municipal ownership platform. I was opposed to public ownership then, and I have no reason to change my stand now. Mr. Bowen's proposal goes back directly to the utility of municipal ownership. As receiver for the United Railways, I am not in a position to comment directly on the report. I have no authority to sell the property, being simply its custodian for the federal court.

Mr. Watts, chairman of the reorganization committee, pointed out that the \$51,000,000 valuation was merely set for rate-making purposes, and that that valuation had no relation to the price which the buyers might pay for it.

C. E. Smith, the city's expert on public utility matters, said that while he was in accord with the principal of municipal control of public utilities he was not ready to say that this could best be accomplished by municipal ownership. He said that St. Louis is not in the same relative position as Detroit to force a low purchase price. In St. Louis the company's principal franchises do not expire until 1929. Other rights do not expire until 1942 and still others not until 1948. Mr. Smith said that after studying the experiences of American cities with their street railways, he was convinced that better results could be obtained through municipal control such as is exercised by the city of Cleveland under private ownership and municipal supervision than under municipal ownership and operation.

## Wage Demands in Pittsburgh Cannot Be Met

The demands of the 3,200 trainmen of the Pittsburgh Railways, Pittsburgh, Pa., cannot be met at the present time, A. W. Thompson, president of the Philadelphia Company, announced in a letter to President Winters of the City Council, without creating a deficit in the revenues of the company. He stated that the increased wages would create a loss which would have to be offset by increased fares. He invited suggestions from the Council on the matter of the increased wage demand.

In a memorandum accompanying the letter and signed by Thomas Fitzgerald, general manager of the railway, it was brought out that all available income was necessary now to meet operating expenses of the system. Mr. Fitzgerald also reported that the meeting on April 21 with the men was largely a repetition of former meetings. He said that no new arguments were being presented by either side.

The conductors and motormen have asked for an increase from 68 cents an hour to 75 and 77 cents for the first and second years respectively. The present wage scale expires May 1.

## Buffalo Company Wins First Damage Suit in Dynamite Case

The International Railway, Buffalo, N. Y., has won the first suit brought against it for damages as the result of injuries alleged to have been sustained by a passenger on the Buffalo-Niagara Falls high-speed line interurban train which was wrecked at Ellwood Station in August, 1922, by dynamite claimed to have been placed by strikers. The suit was the first of a series of such actions for \$40,000 damages. The case was heard in the United States Court for the Western District of New York. The jury was out two hours and returned a verdict of no cause of action. Counsel for the International argued the company was not responsible for injuries sustained by Mrs. Anna Hanna, Philadelphia, one of the wreck victims. He suggested that the suit should be brought against the Buffalo local of the Amalgamated Association, members of which, he charged, dynamited the track and caused the wreck. The company introduced testimony to show that everything possible was done by the company to protect its passengers.

## Texas Interurban Planning to Build

With the completion of organization of the Texas Rapid Transit Company, announcement is made that the construction of an electric interurban line linking Austin and San Antonio, Tex., is assured. The line as contemplated would pass through the towns of Lockhart, Seguin, San Marcos, New Braunfels, Gonzales, Cuero and Yoakum.

The company has taken over all rights held by the Seguin & Guadalupe Valley Railway, organized in 1914, before the World War, by W. B. Dunlap, Beaumont, and Dr. E. W. Brown, Orange. This company has secured much of the right-of-way for its pro-

posed line between San Antonio and Seguin and grading had commenced when operations were halted by the war. The first unit of the proposed Austin-San Antonio electric line will be built between San Antonio and Seguin.

The proposed electric line will be approximately 100 miles long. It is estimated that its completion will require an investment of more than \$7,500,000. E. G. Potter, San Antonio, is president of the company.

## Settlement of Los Angeles Damage Suit Shown

When the case of Mrs. Julia H. J. Henderson against one of the local Los Angeles railways, was called for argument recently in Judge Fleming's court it was stricken from the calendar. This indicates that a settlement has been effected out of court. The case was considered an important one from a legal standpoint, as it involved the question of whether a traction company can be held liable for damages by permitting more passengers to enter a car than can be accommodated with seats.

Mrs. Henderson sued the railway for \$10,150 damages for injuries she asserted she received June 9, 1923, when a car in which she was a passenger, lurched suddenly, hurling her against a rear section. She contended the company was negligent in permitting the car to become overcrowded and with failing properly to provide passengers with seats. In an answer to the suit, the company stated that if the plaintiff became a passenger when the car was overcrowded she did so voluntarily and therefore assumed the risk of possible injury with her own knowledge. The defendant contended that probable injury was to be anticipated at the time Mrs. Henderson boarded the car.

## Arkansas City Councils Pass Ordinances

The City Councils of Little Rock and North Little Rock, Ark., have passed the ordinances necessary to permit the Inter-City Terminal Railway of North Little Rock to cross the new Main Street bridge connecting the two cities. Under the plan agreed to the company will charge a 6-cent fare for the privilege of crossing the bridge from any part of either city, but should a passenger desire to proceed beyond the bridge line he must pay an additional 2-cent fare for a transfer.

Officials of the Inter-City company have announced their intention of speeding up the laying of the double track on the bridge so that the service can be put into effect about May 1. The company, which has been granted a twenty-six year franchise for the use of the bridge, will pay Little Rock \$25,000 cash and \$35,000 in partial payments and also will receive credit for \$40,000 for laying the new tracks for the new franchise. The franchise ordinance provides that future interurban lines shall be permitted to use the new bridge on equitable terms, and in the event the railways cannot agree on that point the city shall decide it.

## Terminal Plan in Trenton Abandoned

The plan to build a large central terminal in the heart of Trenton, N. J., for the suburban lines of the Trenton & Mercer County Traction Corporation, New Jersey & Pennsylvania Traction Company and the Public Service Railway has been abandoned. The three companies announced that the costs would be prohibitive. The site selected for the proposed terminal has been purchased by the Trenton & Mercer County Traction Corporation and a terminal for that company alone will be built.

The idea of creating such terminal was conceived by Mayor Donnelly of Trenton, and indorsed by the other members of the commission. The plan contemplated by Mayor Donnelly provided for the acquisition of all property along the north side of Perry Street, between North Broad and North Warren Streets, and to whatever depth might be required for the purposes in view. Preliminary surveys made by City Engineer Swan indicated that this location would be well suited to the proposed establishment of a terminal. Fulfillment of the project, it developed, would cost in the neighborhood of \$1,500,000 and none of the companies, it was understood some time ago, would agree to enter upon such expensive undertaking.

## Free Transportation a Menace in New Orleans

At the request of Commissioner Paul H. Maloney, of the Department of Public Utilities at New Orleans, President Flowers of the New Orleans Public Service, Inc., has sent the commissioner a list of the free trippers for the month of February. The list shows that the holders were given 167,646 rides during the month. At 7½ cents a ride this represents \$11,735 for the month. This is a decrease of 2,680 rides from the number of passes issued in January.

Accompanying the list was a communication from Mr. Flowers in which he outlined the policy of the company in regard to granting free transportation to employees of the Public Service, Inc., stating additionally that it is the usual rule of practice with all companies regarding whose practice he has knowledge to give its employees unlimited passes, while New Orleans occupies a unique position in this that the practice is curtailed. He said:

We give transportation to those of our employees who are required to ride on the cars, or to make visits in the interest of the development of our business. In addition, the contract with the union requires free transportation to employees in uniform and also to all other members covered by the contract. Policemen, firemen, and female members of religious orders in their garb ride without passes.

Mr. Maloney regards every free ride as a factor in preventing the lowering of fare. He has announced his intention of having an auditor check the books of the company for the purpose of determining whether the railway division of the company is being credited with service furnished the other departments.

### Eighty Cents Sought in Detroit

Although the new wage demands adopted April 19 by the motormen and conductors on the Detroit Department of Street Railways have not yet been officially presented to the Street Railway Commission, platform men, according to Herbert Meeker, president of Division No. 26, are asking a wage for two-men car operators of 72 cents an hour for men in their first six months of service, instead of 62 cents as at present; 76 cents an hour for men in their second six months of service, instead of 66 cents, and 80 cents an hour instead of 70 cents after one year of service. For overtime (more than eight hours) time-and-a-half is asked, instead of 75 cents an hour now given; for owl cars the request is 90 cents, instead of the 80 cents now prevailing, and for crews placed in charge of snow plows \$1 an hour.

The union also asks that 25 per cent of the runs be straight day runs, 25 per cent straight night runs, 30 per cent of the runs to be completed in eleven consecutive hours, while the remaining 20 per cent must be completed in twelve and one-half consecutive hours. A shift of more than six hours would be considered a full day under the new plan.

Operating expenses of the system would be increased \$1,025,000 for the year if the increase asked were granted. This would wipe out the estimated net earnings of \$960,000 for the year and probably make it necessary to abandon the program of rehabilitation or increase fares.

In case the formal demands of the men are not met, arbitration will probably be asked of the Street Railway Commission. The city has never recognized a union among its employees on the ground that the charter forbids it.

### Washington Railway Men Get Two Cents Increase

At a meeting of the directors on April 19 it was decided to increase the pay of the motormen and conductors of the Washington Railway & Electric Company, Washington, D. C., 2 cents an hour, following a similar increase to Capital Traction employees, which was referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of April 19. The new scale is 52 cents for the first three months, 56 cents for the next nine months and 58 cents thereafter. Operators of one-man cars will receive 63 cents an hour. In making the increase, the Washington Railway & Electric Company announced that it would abandon the quarterly cash prizes heretofore awarded for safety-first work.

### Ordinance Introduced for P. R. T. Bus Line

An ordinance granting the Philadelphia Rural Transit Company, a subsidiary of the Philadelphia Rapid Transit Company, a franchise for operating a motorbus line between Mount Airy Avenue and Germantown Avenue was introduced recently in Council by Councilman Smith and was referred to the committee on transportation and public utilities.

The ordinance provides that the fran-

chise shall not be regarded as an exclusive privilege that would prevent the city any time hereafter operating buses of its own on any of the streets. The fare, subject to the approval of the Public Service Commission, is 10 cents for a one-way trip, with the 3-cent exchange tickets to surface or elevated connecting lines of the P. R. T. Another provision is that the earnings of the Philadelphia Rural Transit Company accruing directly or indirectly to the P. R. T. shall be applicable to the payment to be made to the city under the provisions for the retaking of profits contained in the agreement of 1907.

### Oklahoma Union Authorized to Charge Higher Fare

The Oklahoma Union Railway has been authorized by the Corporation Commission to put into effect the same rates of fare that are now effective over the lines of the Tulsa Street Railway between all points in Tulsa and West Tulsa within the city limits. The company has been operating for several years on a 5-cent fare within the city limits and contended that it had been losing money on this fare basis since 1919. On Jan. 15, 1924, it filed an application with the commission seeking an increase in its city fare from 5 cents to 7 cents, or four tickets for 25 cents, the latter rate being the charge that the Tulsa Street Railway had been receiving for city passenger fares. The Corporation Commission finds that for the year ended Dec. 31, 1923, the net revenue of the Oklahoma Union Railway for both city and interurban fares was \$17,481. Further, that this amount was not sufficient to pay the interest on outstanding bonds of the company.

The Oklahoma Union Railway is primarily an interurban railway. It also operates about 4 miles of line in Tulsa and handles approximately 1,500,000 passengers a year in that city. The commission also approved an agreement between the Oklahoma Union Railway and the Tulsa Street Railway for transfer exchange at specified points.

### Twenty per Cent Increase Asked in Toledo

In a new contract submitted to the officials of the Community Traction Company, Toledo, the employees have asked for a 20 per cent wage increase and changes in working conditions estimated to cost the company an additional \$400,000 annually. The men now receive 50, 52 and 55 cents an hour. They demand 60, 63 and 65 cents an hour. The present contract will expire on May 21.

In addition to the direct wage boost the men want two weeks' vacation with pay, closed shop on the entire property, and many changes in working conditions.

Company officials have intimated that they will submit the demands to Street Railway Commissioner Cann and the city officials before they undertake negotiations which might lead to a drastic increase in fares.

Last year's wage increase cost \$15,000 a month and resulted eventually in a fare increase.

### Fares Advanced in Indianapolis

Seven-cent cash fares with four tickets for 25 cents, double transfers and a 1-cent transfer charge will become effective on the lines of the Indianapolis Street Railway, Indianapolis, Ind., on May 20, under an order issued by the Indiana Public Service Commission on April 18. The company is ordered to extend its service to Broad Ripple by Sept. 1, this year, under penalty of having the increased fare revoked if it does not make the extension by that time. Ten-cent owl fares remain as at present. The commission did not grant the request of Indianapolis city officials for seventeen tickets for \$1. The order declares rerouting of the lines is essential both to the railway and its patrons. A decision on new routes is deferred for a supplemental order after the commission obtains suggestions from city officials and other sources. Nothing in the order indicates the period for which it will be enforced.

The present rate in Indianapolis is 5 cents with a 2-cent transfer charge. It was the contention of the company that this rate could not provide sufficient revenue to enable it to rebuild its property. The matter of the need for an increase in the fare of the company has been under discussion for three months under a renewed plea asking relief.

### Trial with Reduced Fare in Hornell

Raymond E. Page, new receiver of the Hornell Traction Company, Hornell, N. Y., has asked the Public Service Commission for authority to permit a trial of reduced fares for a period of ninety days. The company is said to have considered the advisability of abandoning operations, but hopes that a reduced rate will stimulate travel and increase revenues. The filing of the formal application with the commission is really a step in the previously announced program to cut rates.

Traffic on the Hornell line has been decreasing. Robert W. Bull, former receiver, resigned on April 3, 1924, and Mr. Page was appointed to succeed him. Mr. Page said:

I have taken the office of receiver for the purpose of revising the plan of operations, lowering expenses and reducing fares in an effort to continue operations. I believe a reduction of fares will increase the traffic. My desire is to make the effort and ascertain the results. It is of great importance that this be done at once, as delay is injurious in the present situation and the financial condition of the company.

The railroad now operates in two zones with an 8-cent fare in each. A 7-cent fare is to be substituted for the ninety-day trial.

Twenty metal tickets for \$1 will be sold by conductors and ten metal tickets for 50 cents at certain places in Hornell and Canisteo. A twenty-ticket book will be sold for \$1.40 good in either direction between Hornell and Cook's Switch and between Canisteo and Crittenden. These tickets are good only on Canisteo cars except from passengers boarding local cars at the Erie shops or other industrial establishments and transferring to Canisteo. No commutation tickets will be sold. Transfers will be issued in zone 1.

## News Notes

**Seeks Dissolution of Bus Line.**—The Washington-Virginia Railway has filed with the State Corporation Commission a petition asking that the certificate of the Alexandria Motor Bus Line, Inc., be revoked. It is claimed by the railway that continued competition of the bus line will make it impossible for the railway to render profitable service.

**Difficulties in Wichita.**—In order to operate the Wichita Railroad & Light Company, Wichita, Kan., profitably fares will have to be increased or competing buses eliminated. This opinion was recently expressed by A. M. Patten, general manager of the property, before members of the City Commission. He said that net earnings for 1923 showed a marked decrease compared with previous years.

**Course for Electric Metermen.**—The University of Colorado, Boulder, Col., during the week of March 17 to 22, held its Second Annual Metermen's Short Course. This course is given through the extension division and is in direct charge of Professor C. M. McCormick of the electrical engineering department, who also has charge of the electrical standardizing laboratory. The course was not given for electric railway motormen, as was stated in the *ELECTRIC RAILWAY JOURNAL*, issue of March 29, but for electric metermen of public utilities and others who wished to attend.

**Wages Advanced.**—The Morris County Traction Company, Morristown, N. J., has granted a wage increase of 5 cents an hour to all the platform men. The company is now operating all cars with one operator. None of the employees has been laid off. As passengers enter the car the operator hands them identification tickets, which indicate the zone in which passengers boarded the trolley.

**Offers Old Car Bodies for Sale.**—The Brooklyn-Manhattan Transit Company, Brooklyn, N. Y., is offering for sale to its employees the bodies of single-truck cars that have been withdrawn from service on the surface lines. The bodies may be purchased by employees for \$25 each and will be delivered to the purchasers at any of the B. M. T. surface line depots or terminals. The bodies can be converted into livable bungalows or camping quarters.

**Expropriation Methods to Get Property.**—Ninety-three pieces of property involved in the North Rampart-St. Claude Street cut-off of the New Orleans Public Service, Inc., from Esplanade Street, recommended to be acquired in the Beeler traffic report, will be effected by an ordinance adopted by the Commission Council. The city of New Orleans and the company are jointly to bear the expense of obtaining these sites, to carry out the Beeler recommendations. The Commission Council found, after many efforts were made to reach an amicable settlement of the matter, that expropriation methods would have to be used to compel the realty owners to be

more reasonable in their demands. The new route will provide a wide thoroughfare from the upper to the lower section of the city.

**Disposes of Jamestown Buses.**—The Jamestown Street Railway, Jamestown, N. Y., recently announced that the company was selling six of its thirteen buses to Case & Kane, Middletown, N. Y. Five buses will be kept for use on the west side line in Jamestown and two more will be disposed of at once. A. N. Broadhead, president of the railway, recently withdrew an application for a blanket bus franchise in Jamestown after the City Council and railway officials had failed to agree on a rate of fare for the buses or an adjusted flat rate for both trolleys and buses.

**Freight Line to Be Electrified.**—The Long Island Railroad improvement plans, referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of April 5, include the electrification of the freight line from Bay Ridge, Brooklyn, to Fresh Pond, where connection is made with the New York Connecting (Hell Gate route) Railroad. Over this route standard freight cars are interchanged daily between the Pennsylvania and New Haven Railroads. At present steam locomotives handle this traffic.

**Fare Tariffs Suspended.**—The Public Service Commission, in an order recently issued, suspended the proposed new tariffs filed by the Southern Pacific Railway for its Salem and Eugene railway lines, providing for an increase in fares from 6 to 7 cents. The suspension order will remain in effect until Sept. 22, unless investigations of the proposed tariff are completed before that time. Under the tariff filed by the Salem property conductors would be allowed to sell strips of four tickets for 25 cents and tickets in books of fifty could be purchased at \$3.10. The present price of the fifty-ticket book is \$3. The proposed Eugene schedule is practically the same as that of Salem.

**Maine Road Asks Fare Increase.**—The Androscoggin Electric Company Lewiston, Me., has filed a petition with the Public Utilities Commission asking for an increase in its through rate of fare from Portland to Lewiston from 93 cents to \$1. The petition asks that the new rate become effective May 14.

**Advertisements to Tell the Public.**—In furtherance of its plan to solve the traffic problem in the downtown sections of Milwaukee and to awaken public opinion to the need of maintaining open spaces for the loading and unloading of buses in each block of the congested district, the Milwaukee Electric Railway & Light Company and subsidiary, the Wisconsin Motor Bus Lines, are running a series of advertisements in the current Milwaukee daily papers. One advertisement, called "Test of Special Bus Loading Zones Is Working Well," promised a report on various experiments which are being tried out in many cities to bring about traffic relief. Another advertisement described what was being done by traffic experts and other city planners in helping to solve the problem at least cost to the taxpayers. A third advertisement described the parking rules in effect in St. Louis, Detroit and San Francisco

and another told what the Milwaukee Safety Commission was doing in this matter for the benefit of all concerned. Incidentally, another purpose of the ads. is to help the movement looking toward procuring a solution of the parking problem.

**Complains of Bus Grants.**—The Cincinnati Traction Company, Cincinnati, Ohio, has appealed to the State Public Utilities Commission for relief from bus competition in its territory. It filed protests against the granting of certificates to the Valley Bus Company and the Anderson's Ferry Transit Line. Petitions also were filed asking for a rehearing of the cases in which the commission granted certificates to the Red Star Transportation Line and the Wilmington & Norwood Bus Company. Protests also were filed against the granting of the certificates on a rehearing. The traction company contends that it is furnishing adequate service over much of the territory covered or proposed to be covered by the bus companies and that the operation of buses would be detrimental to its service.

**Will Provide Bus Service.**—The Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis., has obtained an option on the bus line operated by Krautkramer Brothers between Appleton and Kaukauna, paralleling the interurban line. The company plans to extend its bus service from Kaukauna to Sheboygan, connecting with the parlor car electric trains of the Milwaukee Northern Railway running to Milwaukee.

**Wants to Increase Rates.**—The Waterville, Fairfield & Oakland Railway, Waterville, Me., has petitioned the Public Utilities Commission to increase its zone fare from 7 to 8 cents, with an increase in its strip ticket fare from 70 cents to 80 cents and an increase in its commutation books of fifty coupons from \$3.50 to \$4. The rate of pupil's tickets in books of forty coupons is increased from \$1.40 to \$1.60. The proposed schedule would become effective May 12. An increase in the zone fare on this line from 5 to 7 cents was granted by the Public Utilities Commission in the fall of 1918.

**Seeks Permission to Increase Fares.**—The Honolulu Rapid Transit Company, Honolulu, Hawaii, has petitioned the Territorial Public Utilities Commission for permission to increase fares in Honolulu from 5 cents to 6½ cents, or four tokens for 25 cents. The report of operations of the company for 1923 was reviewed in the issue of the *ELECTRIC RAILWAY JOURNAL* for April 19, page 636.

**Bus Permitted Provisionally.**—The Public Service Commission recently granted a permit to operate buses between Tonawanda and the plant of the Dunlop Tire & Rubber Co., Inc., but provision is made for the cancellation of the franchise in the event that the International Railway, Buffalo, extends its River Road line to serve the Dunlop plant. Mr. Wooley had two buses in operation on River Road in 1920 until he was stopped by the commission after the International secured an injunction restraining him from further operation of the route in competition with its railway.



## Financial and Corporate

### Delaware & Hudson Reports

Electric Lines Under the Albany System Show Both Increase and Decrease in Operating Revenues

The report of the Delaware & Hudson Company, Albany, N. Y., for the year ended Dec. 31, 1923, contains summaries of the earnings of the company's allied electric railway lines, including the United Traction Company, Hudson Valley Railway, Plattsburgh Traction Company and the Troy & New England Railway.

#### DETAILS OF ALBANY OPERATION

Operating revenues of the United Traction Company from all sources during 1923 were \$3,234,149, operating expenses \$2,839,937 and taxes \$244,500. Operating income was \$149,712, compared with \$273,366 in 1922, a decrease of \$123,654. Operating revenues increased \$148,858, or 5 per cent over the preceding year; operating expenses increased \$261,712, or 10 per cent, and taxes increased \$10,800, or 5 per cent.

Of the gain in operating revenues, \$75,521 was principally due to an increase of 1,033,000 in passengers carried and \$74,894 to power sold to other companies. Operating revenues would have been greater except for losses of approximately \$51,000 from the strike on the Schenectady Railway and \$10,000 from a strike of short duration, in June, 1923, on the lines of the company.

Among the increases in items of operating expenses are: Paving, \$102,500; removal of snow and ice, \$24,000; equipment retired, \$74,146; power purchased, \$102,500; increased wages, effective June 1, 1923, \$84,000; injuries and damages, \$33,000, and these are partly offset by the following decreases: Track and roadway labor, \$23,000; track and roadway material, \$18,000; maintenance of structures, \$21,000; miscellaneous equipment expenses, \$5,000; maintenance of plant, buildings and equipment, \$13,000; power plant supplies, \$5,000; superintendence of transportation, \$4,500; miscellaneous transportation expenses, \$40,000; general office expenses, \$26,000.

#### PAVING PROVES EXPENSIVE

Extensive street paving programs of the municipalities in which the electric railway lines are located forced premature reconstruction of tracks by the company at a cost of \$347,208, involving charges to operating expenses of \$134,694. The company's proportion of the cost of new pavement laid in 1923 approximated \$204,578, of which \$50,203 was charged to operating expenses and the balance to capital account. More than \$1,000,000 has been spent in paving and repairing Capitol District streets and highways within the last ten years. The company regards the paving charges as needlessly burdensome.

Operating revenues of the Hudson Valley Railway during 1923 were

\$961,108, operating expenses \$878,282, and taxes \$67,000. Operating income for the year was \$15,826, compared with \$82,339 in 1922, a decrease of \$66,513. Operating revenues decreased \$62,511, or 6 per cent from the preceding year; operating expenses decreased \$3,877, or less than 1 per cent, and taxes increased \$7,879, or 13 per cent. Extensive use of privately owned automobiles is assigned as the principal factor in the decrease in operating revenues. One-man car operation was established on all lines in Glens Falls and on the interurban lines between Glens Falls, Hudson Falls and Fort Edward. In 1923 the municipality of Glens Falls engaged in a street paving program. The cost of its part of this work to the company was \$41,515, of which \$6,650 was charged to operating expenses and \$34,865 to capital.

Operating revenues of the Plattsburgh Traction Company were \$33,244, operating expenses \$31,039, and taxes \$2,107. Operating income for the year was \$98, compared with \$1,492 in 1922, a decrease of \$1,394. Operating revenues decreased \$2,728, or 8 per cent from the preceding year; operating expenses decreased \$1,595, or 5 per cent, and taxes went up \$262, or 14 per cent.

Operating revenues of the Troy & New England Railway were \$30,073, operating expenses \$20,990 and taxes \$2,001. Operating income for the year was \$7,082, compared with \$534 in 1922, an increase of \$6,548. Operating revenues increased \$4,848, or 19 per cent over the preceding year; operating expenses decreased \$2,113, or 9 per cent, and taxes increased \$412, or 26 per cent.

### \$3,000,000 Equipment Issue at Pittsburgh

A total of \$3,000,000 of Pittsburgh Railways 6 per cent car trust gold bonds was offered for subscription on April 24 by the Union Trust Company, Pittsburgh. The bonds mature serially, \$200,000 on Feb. 1, 1925; \$200,000 on Feb. 1, 1926, and \$200,000 Feb. 1, 1927 to 1939, inclusive, the offering prices being respectively 100.50 yielding 5.22 per cent, 100.75 yielding about 5.50 per cent and 100 yielding 6 per cent.

It is explained that the car trust bonds are to be issued in part payment for sixty single-end, center-entrance, semi-convertible, double-truck, semi-steel passenger cars; 160 semi-steel passenger cars of the multiple-unit type, and sixty-five semi-steel passenger cars of the one-man, two-man type. The cost of this new equipment is estimated at \$3,600,000.

The statement of the offering house reviews the new operating agreement with the city and says that this arrangement practically assures adequate revenues. The balance after the payment of fixed charges, including rents of leased properties, is reported at \$670,276 for 1921, \$555,509 for 1922 and \$1,128,750 for 1923.

### \$3,200,000 Grand Rapids Issue Offered at 7 per Cent Yield

Dillon, Read & Company, Federal Securities Corporation and Spencer Trask & Company, New York, offered for subscription on April 23 \$3,200,000 of first mortgage 7 per cent sinking fund gold bonds dated May 1, 1924, and due May 1, 1939. The price was 99½ and interest, to yield slightly more than 7 per cent. The bonds are in the denomination of \$1,000 and \$500. The proceeds of the sale of the bonds are to be used in refunding bonded debt of the company due June 1, 1924.

The Grand Rapids Railway owns and operates the entire electric railway system in the city of Grand Rapids, serving a population of more than 145,000. It is explained that the bonds are to be secured by a direct first mortgage lien on 69 miles of railway and 193 cars now owned by the company, and on all its tracks, equipment, real estate and other physical property, together with power contracts and franchises.

The bankers point out that the City Commission of Grand Rapids has placed a valuation of \$5,500,000 on the properties for purposes of rate making, as of Jan. 1, 1922, and that with additions to property since that date, the rate making base now amounts to more than \$5,800,000. Net income after taxes, available for interest and depreciation reserves for the year ended Dec. 31, 1923, was \$560,457. This amount is two-and-a-half times the annual interest charge of \$224,000 on the \$3,200,000 new first mortgage 7 per cent bonds. A sinking fund of 2½ per cent per annum payable semi-annually will be used to retire bonds by purchase up to the current redemption prices or, if not so obtainable, by call at those prices.

The gross earnings of the company in 1916 were \$1,297,586. That year bond interest was \$143,012. In 1923 the gross earnings were \$1,817,606. That year bond interest was \$220,000. The net earnings available for interest and depreciation increased from \$469,561 in 1916 to \$560,457 in 1923.

### Approves Security Issues in Birmingham Reorganization

Transfer of all properties of the Birmingham Railway, Light & Power Company, Birmingham, Ala., and of the Tidewater line to the newly organized Birmingham Electric Company was approved by the Alabama Public Service Commission and formal orders were issued following a hearing in Montgomery on April 16. Authority was also granted to the Birmingham Electric Company to issue \$8,000,000 of refunding mortgage gold bonds bearing 6 per cent interest and maturing in 1954, 19,990 shares of no par value cumulative preferred stock and 799,990 shares of no par value common stock.

The railway properties to be transferred include the Norwood Street Railway and the Edgewood Street Railway, in addition to the Birmingham Railway, Light & Power and Tidewater lines. The petitions were amended at the hearing to include the Tidewater lines and the other properties.

### Initial Dividend on B.-M.T. Preferred Stock

The directors of the Brooklyn-Manhattan Transit Corporation on April 21 declared an initial dividend of \$1.50 a share on preferred stock for the quarter ended March 31, 1924, payable on May 15 to stockholders of record on May 1. The dividends on this stock do not become cumulative until July 1, 1926.

Gerhard M. Dahl, chairman of the executive committee, says that this dividend is to be considered in the nature of interest on money contributed by stockholders at the time of the reorganization, nine months ago, and is not to be taken as an indication that the company is earning a fair return on its actual investment or on a fair valuation of its property.

Mr. Dahl declared that the city by reason of its failure to build subways called for by the dual subway contracts was responsible for the present overcrowding of the rapid transit lines and had handicapped the company seriously. He asserted that the city had also defaulted in its obligation to supply the company with yards and shops and added that it was the policy of the present management of the company to give the best service possible under existing conditions.

Mr. Dahl said in part:

Before the directors, however, had taken any action in recognition of their obligation to the preferred stockholders, they did everything within their present power to provide adequate transit facilities for the public. Since the organization last June, for example, the directors have appropriated approximately \$4,000,000 for new cars and equipment for rapid transit lines alone, despite the fact that the net income from the operation of the rapid transit lines would not justify so large an investment in improvements. Furthermore, on its surface lines this company is continuously making changes and adding improvements which seek to better the service.

The B.-M. T. is ready now, as it has been at all times in the past, to increase its rapid transit service and to decrease the necessity for the present dangerous and unhealthful congestion but it is powerless to do anything more so long as the city of New York defaults under its contract with this company and refuses to carry out contract No. 4, which provides for the completion of the Fourteenth Street eastern line, the Nassau-Broad Street extension and the construction of new shops and yards.

The city and the company together have invested in our rapid transit lines the sum of \$295,000,000. On this amount for the

first nine months of operations the earnings were 2.4 per cent.

For eleven years taxpayers and investors have combined to pour money into rapid transit lines and equipment, and this huge investment is earning less than 3 per cent without allowing any return on the \$60,000,000 worth of elevated lines.

### Kansas Lines Participate in Terminal Line Purchase

The Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., has been authorized to acquire control of the Kansas & Missouri Railway & Terminal Company through the purchase of 8,000 shares of stock without nominal or par value, issued or to be issued by the Terminal company under authority granted by the Interstate Commerce Commission's order of Feb. 16, 1924.

The commission dismissed that part of the application of the Kansas City, Kaw Valley & Western seeking to acquire first mortgage bonds of the Terminal company and the application of the Kansas City Southern to acquire one-half of said bonds, the principal amount of which is \$379,000.

The Kaw Valley operates an electric passenger and freight road between Kansas City and Lawrence, Kan., and connects at Kansas City with a line formerly owned by the Kansas City, Outer Belt & Electric Railway, and through an arrangement with the receiver of the Outer Belt Road, the Kaw Valley is able to interchange freight with other carriers, including the Kansas City Southern. The Outer Belt also owns a partly constructed line, extending from a connection with the Kaw Valley to a point near the mouth of the Kansas River, which line the Terminal company was instructed to complete and operate, together with the lines formerly owned by the Outer Belt. The lines of the Terminal company will be operated by electricity, with some of the equipment, power and employees of the Kaw Valley.

The cost of the Terminal company's securities to the Kaw Valley and the Kansas City Southern, which participated in the purchase, is \$388,636. The cost of rehabilitation and construction of the Terminal company's lines is placed at \$421,000, or a total estimated cost of the lines when completed of \$809,636.

### Largest Balance for Dividends in Holding Company

Standard Gas & Electric Company, Chicago, reports for 1923 the largest balance available for dividends in the history of the company. The payment of dividends on the common stock at the rate of \$2.50 per share per annum was started for the quarter beginning April 1, 1923. Common dividends were increased to the rate of \$3 per share per annum for the quarter beginning Jan. 1, 1924.

Net revenue of the company for 1923 was \$5,103,425, compared with \$4,652,126 in 1922. The company includes in its earnings only amounts actually received or in process of collection. The balance before preferred dividends in 1923 was \$2,940,829 compared with \$2,811,422 in 1922.

Gross earnings of the operated public utility companies for 1923 were \$46,165,533 and net earnings were \$18,711,033. These figures represent an increase in gross earnings of 9.72 per cent and an increase in net earnings of 16.4 per cent over 1922.

The interests of the stockholders have been substantially improved, according to President H. M. Byllesby, by certain changes in the capital structure, authorized at a special meeting of the stockholders on March 19, 1924, at which the recommendations of the directors for an authorized issue of 7 per cent cumulative prior preference shares and 6 per cent non-cumulative stock were approved. This action enables changes in the outstanding capitalization which, together with the conversion of debentures into common stock, will result in reducing the proportion of funded debt to the total capitalization. Upon completion of this financing the company will have no secured funded debt.

The construction budgets for 1924 are estimated at \$32,672,000, representing additions and extensions. New construction in 1923 required an expenditure of \$31,471,106.

The Standard Gas & Electric Company operates the electric railways in Fargo, N. D., and Fort Smith, Ark. During the year it took over the Wisconsin-Minnesota Light & Power Company, operating about 25 miles of city and interurban railway.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares*	Apr. 1924 6.94	Mar. 1924 6.93	Apr. 1923 6.83	May 1921 7.24	May 1923 6.88
Street Railway Materials*	Mar. 1924 164	Feb. 1924 163	Mar. 1923 174	Sept. 1920 247	Sept. 1921 156
Street Railway Wages*	Apr. 1924 219	Mar. 1924 219	Apr. 1923 207	Sept. 1920 232	Apr. 1923 207
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Mar. 31 1924 4.78	Feb. 29 1924 4.91	Mar. 31 1923 7.40	July 31 1920 11.12	Feb. 28 1922 4.14
U.S. Bank Clearings Outside N. Y. City (Billions)	Mar. 1924 15.12	Feb. 1924 14.71	Mar. 1923 16.36	Mar. 1920 18.54	Feb. 1922 10.65
Business Failures Number	Mar. 1924 1,652	Mar. 1924 1,578	Mar. 1923 1,577	Jan. 1924 2,258	Sept. 1923 1,280
Liabilities (millions)	Mar. 1924 61.33	Mar. 1924 73.75	Mar. 1923 60.62	Jan. 1924 109.1	Sept. 1923 27.50

**Conspectus of Indexes**  
for  
**April, 1924**  
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	Apr. 1924 221.6	Mar. 1924 221.7	Apr. 1923 213.5	June 1920 273.8	Mar. 1922 162.0
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Mar. 1924 150	Feb. 1924 152	Mar. 1923 159	May 1920 247	Jan. 1922 138
Bradstreet's Wholesale Commodities 1913 = 9.21	Apr. 1 1924 12.66	Mar. 1 1924 12.90	Apr. 1 1923 13.93	Feb. 1 1920 20.87	June 1 1921 10.62
Dun's Wholesale Commodities 1913 = 120.9	Apr. 1 1924 186.8	Mar. 1 1924 190.7	Apr. 1 1923 193.1	May 1 1920 263.3	July 1 1921 159.8
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Mar. 1924 144	Feb. 1924 147	Mar. 1923 142	June 1920 219	Mar. 1922 139
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Mar. 1924 153.2	Feb. 1924 163.9	Mar. 1923 159.2	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.

**Power Rights Acquired.**—Thomas S. Wheelwright, president, has announced the purchase by the Virginia Railway & Power Company of the property of the Roanoke Rapids Power Company, Roanoke Rapids, N. C., owner of valuable water rights, some of them undeveloped, north of Weldon, N. C. Instead of adding to its steam power equipment the Virginia Railway & Power Company plans to build a high-tension line connecting with the Virginia cities.

**Interurban Involved in Purchase.**—An option on the controlling interest in the common stock of the Toledo & Indiana Traction Company, Toledo, has been taken by the Lake Shore Power Company, a new holding corporation, organized here with Charles T. DeHore of the General Electric Company as president and L. V. Van Ness, president of the Maumee Valley Lines, and other local capitalists associated with them. The Toledo & Indiana operates from Toledo west to Bryan, a distance of about 50 miles. It has \$1,040,000 of common stock and \$400,000 of bonds outstanding. The railway does a power and lighting business.

**Net Earnings of Porto Rico Company Lower.**—Net earnings of the Porto Rico Railways, Ltd., Ponce, Porto Rico, for 1923 were \$433,353, compared with \$516,638 for 1922, due to heavier operating expenses. Disbursements included \$119,020 interest on first mortgage bonds, \$64,483 interest on refunding mortgage bonds, \$70,000 dividend on preferred stock, \$100,000 reserve for depreciation. Including balance of \$557,405 at credit of profit and loss, there was carried forward \$651,221. Current assets decreased from \$503,081 to \$453,627, and current liabilities from \$355,625 to \$242,183, an improvement of \$63,987 in liquid position.

**Hearing Set in Reorganization Contest.**—Action in a contest to set aside the reorganization of the San Francisco-Oakland Terminal Railways, Oakland, Cal., as the Key System Transit Company, was taken on April 15 when Superior Judge John D. Murphey set April 25 as the date for hearing of several motions and demurrers to the suit brought against the company by Frederick Olschewski. One of the charges is that the committee in charge of the reorganization conspired to wipe out the interest in the company which were represented by the ownership evidenced in the issue of common stock outstanding.

**Confirmation of Sale Before Judge.**—The sale of the Electric Short Line, which runs westward from Minneapolis, Minn., by the mastery in chancery for \$275,000 has been placed before Judge W. F. Booth of the Federal court for confirmation. The line was sold at public auction by Master Howard S. Abbott to the bondholders represented by W. H. Thorp, chairman of the reorganization committee. The line has cost more than \$2,000,000 and prospective extensions have not yet been completed. A foreclosure decree was entered in January. Willard J. Hield and Erle D. Luce are receivers for the property. The purpose in reorganiza-

tion has been to reduce the bonded indebtedness to such a ratio to assets as to make it possible for the Interstate Commerce Commission to give authority for a bond issue to finance extension of the line of the company, to points west of Lake Lillian, the present terminus.

**Cannot Delay Tax Payments.**—The United States Court of Appeals at St. Louis reaffirmed its former ruling that the Denver Tramway, Denver, Colo., now in receiver's hands, cannot list taxes owed to the city of Denver as "an ordinary debt to take its turn with other debts." The company owes the city \$220,000. It ceased paying right after the 1920 strike.

**Suburban Railway Discontinued.**—In his annual report to the shareholders of the Dominion Power & Transmission Company, Hamilton, Ont., President J. R. Moodie states that with the exception of the railway department a steady advance was enjoyed in 1923. During the year just ended the board decided that it was necessary to discontinue operating the Hamilton & Dundas Railway and on Sept. 5, 1923, this decision became effective. Nothing is known yet as to the disposition of the property. The statement says that bonds to the amount of \$231,000 have been redeemed. According to the report the total of the reserves and profit and loss accounts have been increased by the sum of \$283,559, bringing this total to the amount of \$3,900,021.

**Equipment Trust Certificates Offered.**—Mention is made in an offering of \$17,640,000 of Southern Pacific Company 5 per cent equipment trust certificates, Series G, of the fact that five electric locomotives, fifty steel center-entrance electric street cars, twelve steel one-man, two-man electric street cars, and six steel electric motor coaches are included in the equipment covered by the deed of trust. The offering was made by Kuhn, Loeb & Company, New York, on April 24. The certificates are being offered at 99½ and accrued dividends to yield an average of 5.08 per cent. They mature in equal annual instalments from May 1, 1925 to May 1, 1939 both inclusive. There is vested in the trustee title to equipment costing not less than \$22,050,000.

**Railway Service to End.**—After a controversy of many weeks the Chicago, Burlington & Quincy Railroad, Deadwood, S. D., has given notice that trolley service between Deadwood and Lead will be discontinued and that a bus line will be substituted to operate between the two cities, which are about 4 miles apart. David Keffeler, Lead, S. D., will run the bus line between the two cities for a period of three years, which is the unexpired term of the franchise with the city.

**South Carolina Company Reported Under Option.**—Stone & Webster, Inc., Boston, are reported to have an option on the Columbia Railway, Gas & Electric Company and associated utility properties in and near Columbia, S. C., with a view to possible purchase of these properties and the development of additional power for central South Carolina. It is further said that a proposition has been made to the Co-

lumbia Canal Commission to pay the state \$200,000 for settlement of the pending litigation over proposed completion of the canal. The offer is said to have been made by George J. Baldwin, Savannah, Southern associate of Stone & Webster and Benet, Shand & McGowan, Columbia, and T. Frank Watkins, Anderson, counsel for the company.

**Seeks Line Discontinuance.**—The Illinois Power & Light Corporation, Chicago, Ill., has applied to the Illinois Commerce Commission for permission to discontinue service on its line between Galesburg and Knoxville in Knox County.

**Service Suspended.**—The York Utilities Company, Sanford, Me., recently suspended service between Kennebunk and Wells. This suspension was in accordance with the announcement made a few weeks ago by the company. So far as is known no efforts are being made to resume service.

**Purchase of Long Island Branch Recommended.**—The New York Transit Commission has revived negotiations for the purchase for the city of the Whitestone division of the Long Island Railroad from Whitestone Landing to Flushing, L. I. The commission proposes to make the line an integral part of the city's rapid transit system, connecting it with the extension of the Corona elevated-subway line at Flushing. Vice-President LeBoutillier, acting head of the Long Island Railroad, is said to look with favor upon the proposal if suitable terms can be arranged. The city's Corona line now is nearing completion into Flushing. The extension would be connected physically with the Whitestone line, forming continuous trackage to the Borough of Manhattan.

**J. C. Easley New Director at Richmond.**—John C. Easley Richmond, was the only new director elected on April 16 at the annual meeting of the Virginia Railway & Power Company Richmond. He replaced P. M. Chandler, Philadelphia, resigned.

**Merger of Subsidiaries Approved.**—The Wisconsin Railroad Commission has approved the merger of six Wisconsin electric companies into the Eastern Wisconsin Electric Company, operating both city and interurban railroads. The Eastern Wisconsin Company has controlled the six companies and in the petition to the Railroad Commission asking permission to merge the company declared that it was seeking more economical and uniform operation of all the companies and with the merging it would be in a position to improve service and carry out financing through one corporation instead of seven. The companies merged with the Eastern Wisconsin are the Wisconsin Light, Heat & Power Company, Madison; Janesville Electric Company, Mineral Point Electric Company, Badger Electric Company, Wisconsin Utilities Company and Middle Wisconsin Power Company. The Railroad Commission has authorized the Eastern Wisconsin Company to issue \$2,115,900 of bonds for the purpose of retiring bonds of the companies taken over.

## Personal Items

### R. E. Danforth Consultant

Former New Jersey Official, After Complete Rest, Will Engage in Traction Work as Expert

Richard E. Danforth, who on April 1, 1924, retired from the vice-presidency and the general managership of the Public Service Railway, Newark, N. J., will retain a permanent consulting relation with the Public Service. He will make his headquarters for the present at Skaneateles, N. Y., but will visit Newark as may be necessary in the interests of the railway. Mr. Danforth has actually been away from his office for five months and does not intend to engage in any work for the remainder of the year other than such service as he may be called upon to perform for the Public Service. At the end of that time, however, he plans to establish himself as consultant, not only for the Public Service, but for banking and bond houses, and for other railways.

For this work Mr. Danforth has had remarkable experience as railway manager, engineer, and consultant, covering thirty-two years. After he was graduated from Cornell University in 1891, Mr. Danforth was for a year an apprentice with the Buffalo Railway; then for five years superintendent of the Buffalo, Bellevue & Lancaster Railway. With this preparation he became superintendent and purchasing agent of the Buffalo Railway, remaining as superintendent of the Buffalo lines of the International Railway after the formation of that company in 1899. In 1901 he designed the railway terminal for the Pan-American Exposition, a kind of work which he especially enjoyed. He left in that year, however, to become general manager of the Lake Shore Electric Railway. This property was handicapped by lack of funds and when it went into receivership, early in 1902, Mr. Danforth went to Rochester, N. Y., where he spent five years, first as assistant general manager, then as vice-president and general manager of the Rochester Railway.

#### SEVENTEEN YEARS SERVICE IN NEW JERSEY

Beginning in 1907 he was for exactly seventeen years general manager of the Public Service Railway, and for a considerable part of this period vice-president as well. As manager in New Jersey he succeeded Albert H. Stanley, now Lord Ashfield, who on April 1, 1907, sailed to assume the management of the Underground Railways of London. The Public Service property is enormous, but neither this nor the intricacy of the detail problems which were presented daunted Mr. Danforth. It is obvious that behind the remarkable career of the man there must be a strong personality. There is. Slight of frame, Mr. Danforth is characterized by keenness of mind, alertness of manner and great driving power. A strict disciplinarian, he has always tempered discipline with the kindest of dis-

positions. One of his greatest satisfactions has been the affection with which his associates, including the rank and file of his employees, have regarded him. He has always been an approachable chief, and has been quick to give to department heads credit for their share in the results achieved by his department. His well known interest in vocational education is a natural corollary to his interest in men.

Mr. Danforth has always insisted on the best of accounting practice, stores accounting and operating detail records, and has been quick to avail himself of such records as a means to economical operation. These records were of great value to him in the activities of the past few years. He spent the better part of 1918 to 1922, inclusive, as an expert before courts and the Public Utility Commission or in the preparation for this work and in assisting attorneys in cross-examining opposing witnesses. At the same time he kept a close rein on the affairs of the Public Service Railway, carefully watching revenues and expenses. A tribute to his work in this connection is the reports of appraisers of the property who found it in 100 per cent operating condition in 1916, 1919 and 1921-22, in spite of strenuous cuts in the expenses made necessary by rising costs and limited rate of fare.

In accepting Mr. Danforth's resignation, President McCarter and the other directors of the Public Service expressed appreciation of the value of his efforts to keep the property safe and intact during the trying years of the war, and the almost equally trying years that have followed during the period of readjustment.

### Dr. Ambrose Swasey Awarded John Fritz Medal

Dr. Ambrose Swasey, Cleveland, inventor, manufacturer, philanthropist and dean of the American engineering profession, has been presented with the John Fritz gold medal, one of the highest distinctions in world engineering. The ceremonies took place on the evening of April 23 in the Engineering Societies Building, New York, in the presence of distinguished engineers, scientists and educators from all over the country.

The award was made in recognition of Dr. Swasey's achievements "as a designer and manufacturer of instruments and machines of precision, a builder of great telescopes, a benefactor of education and the founder of Engineering Foundation."

The medal was originally established by these four national engineering societies in honor of a great American metallurgical engineer, John Fritz of Bethlehem, Pa. It has since become an international institution, and is now regarded as the highest engineering honor in America. This is the first time in four years that the medal has been awarded to an American.

J. W. Delaney has been appointed assistant to the master mechanic of the Market Street Railway, San Francisco, Cal. The master mechanic is J. M. Yount.

Frank P. Flinn has become master mechanic of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute division. The new appointee will relieve M. M. Nash, superintendent of the city lines, of all duties in connection with the maintenance of car equipment, giving him the opportunity of devoting all of his time to the traffic department. Mr. Flinn has been superintendent of the American Car & Foundry Company plant at Terre Haute for some time. Previous to coming to Terre Haute he was connected with the Westinghouse Machine Company and the Heyl & Patterson Engineering Company of Pittsburgh, Pa.

J. R. Abercrombie, secretary-treasurer of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has been made secretary-treasurer of the Capital Gas & Electric Company, Topeka, Kan., formerly known as the Consumers Light, Heat & Power Company. Mr. Abercrombie was associated with the St. Joseph property for twenty-two years.

Eugene E. Stringer, who has been connected with the La Crosse, Wis., office of the Northern States Power Company as commercial manager, has been appointed acting manager of the company at Chippewa Falls to assume the duties of Albert Smith, formerly in charge of the electric railway, electric and gas departments.

Oscar B. Smith of Knox, Ind., has been appointed by Gov. Warren T. McCray of Indiana as a member of the Indiana Public Service Commission to succeed Oscar Ratts of Paoli. The appointment is effective May 1, with the expiration of the term of Mr. Ratts. Mr. Smith is one of the leading attorneys of northern Indiana. He is a former member of the State Senate, where he represented his own and another county. He has been Republican chairman of his county for six years.

N. S. Cumming, superintendent of the Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., has been transferred to Toronto to superintend the Toronto Suburban Railway. He became superintendent of the St. Catharines property more than four years ago, succeeding W. R. Robertson, who resigned to accept a position with the Ontario Hydro-Electric Power Commission. Mr. Cumming before this appointment was chief clerk of the railway department of the Dominion Power & Transmission Company, in Hamilton. A farewell to him was attended by his many employee friends in the railway business, who presented to him a gold watch and chain. In commenting on Mr. Cumming's success as a railroad operator, E. W. Oliver, general manager of the Canadian National Electric Lines, stressed the many difficulties which Mr. Cumming had surmounted while in charge of the property. He said that he had arranged for his transfer so that the Toronto Suburban Railway might have the benefit of his services.

## Obituary

### Arthur Warren

Arthur Warren, representative of the committee on public relations on the memorable tour of the country taken by members of the executive committee of the American Electric Railway Association in 1912, died in Bermuda on April 16. As it turned out, Mr. Warren and the members of that committee became the precursors of the more modern movement to place the case for the electric railways directly before the public. For the part that he took in this work Mr. Warren was particularly well qualified. He was London correspondent of the Boston *Herald* from 1887 to 1897, editorial and special writer for the same paper from 1897 to 1907, associate editor from 1907 to 1909 and dramatic critic of the New York *Tribune* from 1909 to 1912. He was also for many years associated in a confidential capacity with George Westinghouse, and had a great deal to do with formulating the publicity policy of the Westinghouse company in the early days. Mr. Warren was born in 1860, and besides his journalistic work was the author of a book, entitled "London Days," in which he described his British impressions.

Col. Robert Kirkup, ninety-two years old, pioneer brass foundryman and president of Robert Kirkup & Company, Cincinnati, one of the oldest manufacturers of brass castings in the Middle West, died at his home in Avondale, a suburb of Cincinnati, on April 12. Mr. Kirkup's death was due to injuries and shock suffered when he fell down stairs in his brass foundry in February. Mr. Kirkup was colonel of the Fifth Ohio Volunteer Infantry during the Civil War. He was born in Scotland and came to this country when he was twenty-eight years old.

Arthur Field, sales manager of the Standard Motor Truck Company, Pittsburgh, Pa., is dead.

Miss Sarah R. Harvey, auditor for the Trenton & Mercer County Traction Corporation, Trenton, N. J., died on April 18. Miss Harvey had been connected with the company for thirty years. She was a member of the Professional and Business Women's Club and the First Presbyterian Church, Trenton.

George W. McNulty, a builder of subways and conduit street railways, died recently in New York City at the age of seventy-three years. He was a civil engineer of note. After assisting in the construction of the Brooklyn Bridge he went into business for himself as a contractor. Then he became chief engineer of the Metropolitan Street Railway in New York and supervised the installation of the cable system on Broadway. Later he helped to build the subway from Times Square to Columbus Circle and was engineer for the Sunnyside Yard for the Pennsylvania Railroad. Still later he served with the Holbrook contracting firm in the building of many sections of the New York subways. He was one of the oldest members of the Engineers' Club.

## 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

### Code of Business Ethics Formulated

Principles that Will Avert Restrictions Set Forth by U. S. Chamber of Commerce

A committee of the Chamber of Commerce of the United States has worked out a code of business ethics based on the "material needs of mankind" and the necessity of "increasing the wealth of the world and the value of happiness of life." The code will be submitted to the convention of the chamber at Cleveland on May 6. It follows:

The foundation of business is confidence, which springs from integrity, fair dealing, efficient service and mutual benefit.

The reward of business for service rendered is a fair profit plus a safe reserve, commensurate with risks involved and foresight exercised.

Equitable consideration is due in business alike to capital, management, employees and the public.

Knowledge—thorough and specific—and unceasing study of the facts and forces affecting a business enterprise are essential to a lasting individual success and to efficient service to the public.

Permanency and continuity of service are basic aims of business, that knowledge gained may be fully utilized, confidence established and efficiency increased.

Obligations to itself and society prompt business unceasingly to strive toward continuity of operation, bettering conditions of employment and increasing the efficiency and opportunities of individual employees.

Contracts and undertakings, written or oral, are to be performed in letter and in spirit. Changed conditions do not justify their cancellation without mutual consent.

Representation of goods and services should be truthfully made and unscrupulously fulfilled.

Waste in any form—of capital, labor, services, materials or natural resources—is intolerable, and constant effort will be made toward its elimination.

Excesses of every nature—the inflation of credit, overexpansion, overbuying, overstimulation of sales—which create artificial conditions and produce crises and depressions are condemned.

Unfair competition, embracing all acts characterized by bad faith, deception, fraud or oppression, including commercial bribery, is wasteful, despicable and a public wrong. Business will rely for its success on the excellence of its own service.

Controversy will, where possible, be adjusted by voluntary agreement or impartial arbitration.

Corporate forms do not absolve or alter the moral obligations of individuals. Responsibilities will be as courageously and conscientiously discharged by those acting in representative capacities as when acting for themselves.

Lawful co-operation among business men and useful business organizations in support of these principles of business conduct are commended.

Business should render restrictive legislation unnecessary through so conducting itself as to deserve and inspire public confidence.

The report was prepared by Judge Edwin B. Parker, umpire of the German-American Mixed Claims Commission of Washington; Paul W. Brown, editor of *America at Work*, St. Louis; William Butterworth, president of Deere & Company, Moline, Ill.; Henry S. Dennison, president of the Dennison Manufacturing Company, Framingham, Mass.; Noble Foster Hoggson, president of Hoggson Brothers, New York; James R. MacColl, president of the Lorraine

Manufacturing Company, Pawtucket, R. I.; Henry T. Noyes, Rochester, N. Y., and George Rublee, Washington.

### Trade Association Activities

Three Proposals to Define Right of Such Bodies Will Be Discussed at Commerce Meeting

Much still remains to be done to fix the exact status of the trade association with respect to its right to collect and disseminate information. Some precedents have been established and the correspondence of the National Lumber Manufacturers' Association, made public in February last, has helped the situation. In fact, one of the letters in the correspondence of that association was accepted as constituting the first public statement on behalf of a national association in interpretation of the requested informal opinion on the subject given to Secretary of Commerce Hoover by Attorney-General Daugherty. But that did not dispose of the situation. So in their own behalf members of the Chamber of Commerce of the United States have decided that trade associations and their activities shall go on the program for the Cleveland meeting, May 6 to 8.

In this connection three separate proposals concerning trade associations have been submitted by member organizations of the national chamber for consideration at the convention. Thus the Memphis Chamber of Commerce proposes that the national chamber should advocate creation of a commission which would define the rights of trade associations and their members in all respects, including their rights to discuss operating expense, sources of supplies for materials, prices, trade competition, etc. A study of anti-trust laws and of the Federal Trade Commission's powers and activities would be included. The purpose would be to establish recognized principles which would remove handicaps under which trade associations now operate, through fear that they may violate some law, rule or regulation and be called before a commission or the courts upon a criminal or civil charge the existence of which, regardless of the merits, is detrimental.

### New Quarters for Westinghouse Interests in New York

The Westinghouse Electric & Manufacturing Company has moved its New York executive offices from 165 Broadway to 150 Broadway. The new building is known as the Westinghouse, and all departments of the company will hereafter conduct business from there. The Westinghouse Electric International Company and the Westinghouse Lamp Company will move into the new

building next week-end. The Westinghouse interests will utilize the upper twelve stories of the twenty-three-story structure, the total space amounting to approximately 100,000 sq.ft.

### New Metal for Car Building Promised

W. W. Atterbury, vice-president in charge of operation of the Pennsylvania Railroad, appeared before the Senate agricultural committee on April 19 in behalf of the Hooker-White-Atterbury offer for the government plant in opposition to that of Henry Ford. Mr. Atterbury promised the manufacture at Muscle Shoals of a new metal "that will revolutionize transportation." The scheme advocated by Mr. Atterbury looks to the manufacture of freight and passenger cars from a new metal that he discovered abroad during the war.

Mr. Atterbury said the new metal would be lighter than steel and almost as strong, and could be manufactured with waterpower much cheaper. He declared it could be used in the construction of both freight and passenger cars and he predicted that these would take the place gradually of those now in existence. Mr. Atterbury added that the new cars would cost less than those used today.

Almost at the same time that Mr. Atterbury was making his remarks discovery of a new alloy metal to take the place of steel in the near future was predicted by Dr. Arthur A. Hamerschlag, president of the Research Corporation. Dr. Hamerschlag said:

We are on the threshold of an era of changes in the great field of metallurgy. Steel has ruled king of industry. Its position is being threatened by those who have been pioneering in the fields of the alloys. The inventor who can produce a new metal with the strength of steel, non-corrosive, lighter in weight, already is on the horizon.

### Metal, Coal and Material Prices

Metals—New York	April 22, 1924
Copper, electrolytic, cents per lb.	13.437
Copper wire base, cents per lb.	15.875
Lead, cents per lb.	8.075
Zinc, cents per lb.	6.487
Tin, Straits, cents per lb.	49.625

#### Bituminous Coal, f.o.b. Mines

Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	\$4.20
Somerset mine run, Boston, net tons	2.175
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	2.175
Central, Ill., screenings, Chicago, net tons	1.90
Kansas screenings, Kansas City, net tons	2.50

#### Materials

Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	\$6.65
Weatherproof wire base, N. Y., cents per lb.	17.50
Cement, Chicago net prices, without bags	\$2.20
Linseed oil (5-bbl. lots) N. Y., per gal.	\$0.93
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	12.25
Turpentine, (bbl. lots), N. Y., per gal.	\$0.99

### Rolling Stock

Salamanca, Olean & Bradford Railway, Salamanca, N. Y., has applied to the Public Service Commission for permission to place a bond issue to finance the purchase of three one-man safety cars.

Cincinnati, Georgetown & Portsmouth Railroad, Cincinnati, Ohio, has asked the authority of the State Public

Utilities Commission to issue \$17,000 of equipment trust certificates for the purpose of purchasing two interurban cars.

New Orleans Public Service, Inc., New Orleans, La., has contracted with the Perley Thomas Car Company, High Point, N. C., for fifty-five modern cars at an approximate cost of \$700,000. The cars will be delivered this fall. The contract for the motor equipment and the air brakes was split between the Westinghouse Electric Company and the General Electric Company. The New Orleans property has also placed an order for four additional buses with the Yellow Coach Manufacturing Company, Chicago, Ill.

### Track and Line

Madison Railways, Madison, Wis., will soon begin the double tracking of its line on University Avenue and Breeze Terrace.

Savannah Electric & Power Company, Savannah, Ga., is replacing the old track around the city market with new 114-lb. rail. The job when completed will cost approximately \$5,000, of which \$1,500 will be for repaving between the track and 2 ft. on each side. More than \$250,000 will be spent on improvements during 1924. To complete the 1923 construction program it will cost \$41,863, while the new work for the year which has just been approved is estimated to cost \$275,111.

Trenton & Mercer County Traction Corporation, Trenton, N. J., will install steel ties in the Borough of Pennington.

Tri-City Railway, Davenport, Iowa, has completed approximately 4,000 ft. of new track. The proposed project consists of 2,675 ft. of double track and 1,300 ft. of single track. The company also reports progress on the Rockingham Road project, where new track is being laid preparatory to the paving of the street.

North Carolina Public Service Company, Greensboro, N. C., is improving its track between Spencer and Salisbury by lowering the rails almost on a level with the surface of the street.

Department of Street Railways, Detroit, Mich., will start track extensions on May 1, which will be carried to conclusion during the month of May. The extensions include laying of tracks on Livernois Avenue from Fenkell Avenue to Six Mile Road, as an extension of the Trumbull Avenue line. This has been referred to as the most important project recently announced. Three extensions are proposed for construction beginning May 1, and still another program of extensions and improvements of service is to be made public for June 1, it was announced. The East Warren line will be extended from St. Jean Avenue at least 1 mile farther east if the Department of Public Works proceeds with the grading and paving. Construction between Toledo Avenue and Michigan Avenue on the Scotten Avenue line will begin on May 1, and the Scotten line extended between Fort Street and Michigan Avenue. This line was commenced last year and construction work carried on between Fort Street and

Toledo Avenue. When completed this will form a link in the loop for the Clairmount and Grand Belt cars.

United Railways, St. Louis, Mo., has been granted a permit by the St. Louis Board of Public Service to lay some 3 miles of T-rails to replace existing track in various parts of the city.

### Shops and Buildings

Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, suffered a loss of \$8,000 when flames threatened its carhouse. Four cars were damaged.

### Trade Notes

American Steel Foundries, Chicago, Ill., has moved from the McCormick Building to the Wrigley Building, 410 North Michigan Avenue.

K. D. Hequemour, at one time director of exhibits and vice-president of the American Electric Railway Manufacturers' Association, has been appointed state commissioner of Missouri for the National Association of Builders' Exchanges. His duties will consist of acting as state representative of the national association, looking after state and local affairs. He will have the power to organize local associations. He has lately been executive secretary of the Builders' Exchange of St. Joseph, Mo.

Buda Company, Harvey, Ill., is extending its railway switch plant.

Economy Electric Devices Company, Chicago, Ill., has received an order from the Key System Transit Company, Oakland, Cal., for the equipment of all of the motor cars on that property with Economy meters. This order will call for about 450 meters.

J. M. Pneuman, Berea, Ohio, has been appointed sales agent for the Transit Equipment Company, New York.

Union Switch & Signal Company will move its New York office from its present location in the Benenson Building, 165 Broadway, to the new Westinghouse Building, 150 Broadway, on May 1. The new quarters occupy the greater part of the twenty-second floor of the Westinghouse Building. They are larger and better arranged and can be reached more conveniently.

William Lintern, president of the Nichols-Lintern Company, Cleveland, Ohio, manufacturer of railway, vehicle and mill supplies, sails for Europe May 8 for an extended business trip.

### New Advertising Literature

Heine Boiler Company, St. Louis, Mo., has issued Bulletin 54, an illustrated pamphlet on the bent-tube boiler V-type.

Tide Water Oil Sales Corporation, New York, N. Y., has issued "An Unusual History of Petroleum." The book is a reprint of twelve mailing pieces which were used during the past year in a direct advertising campaign among users of lubricating oils and greases.

## The School burned down— but not a child was lost!

Such news items occasionally *do* appear. When we read the details we invariably learn the children were saved because they had been drilled repeatedly for just such an emergency. They marched out calmly—to safety.

### *Practice does it!*

That's why we're always urging hand brake practice. At least one stop every trip should be made with the emergency brake equipment. Then the motorman will know what to do if circumstances suddenly demand it.

### **But the equipment must be adequate, too!**

All the fire drills in the world won't avail if stairways are too narrow or fire escapes are insufficient. And all the hand brake practice will be wasted unless the car actually can be stopped.

Where Peacock Staffless Brakes are used—the results are assured. Motormen trust their powerful grip—motormen are confident of their absolute control.

Peacock Staffless Brakes have a braking power limited only by the locking of the wheels. Their full braking power can be applied with almost instantaneous speed. And there is ample capacity to wind almost any length of chain.

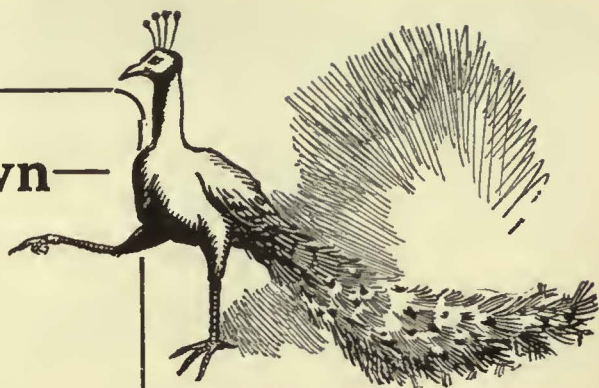
*Doesn't it pay to have equipment like this—  
and to use it?*

## National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

*Canadian Representative:*

Lyman Tube & Supply Company, Limited, Montreal, Canada



**PEACOCK  
STAFFLESS  
BRAKES**



# Bankers and Engineers

## Ford, Bacon & Davis Incorporated Engineers

115 Broadway, New York  
PHILADELPHIA CHICAGO SAN FRANCISCO

## The J. G. White Engineering Corporation

Engineers—Constructors

Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission  
Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.

43 Exchange Place

New York

## STONE & WEBSTER

Incorporated

EXAMINATIONS      REPORTS      APPRAISALS  
ON  
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES

NEW YORK

BOSTON

CHICAGO

## JOHN A. BEELER

Operating, Traction and Traffic Investigations  
Routing Surveys—Valuations—Operation  
Management

52 Vanderbilt Ave., NEW YORK

## SANDERSON & PORTER ENGINEERS

REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT  
HYDRO-ELECTRIC DEVELOPMENTS

RAILWAY, LIGHT and POWER PROPERTIES

CHICAGO

NEW YORK

SAN FRANCISCO

## ENGELHARDT W. HOLST

Consulting Engineer

Appraisals, Reports, Rates, Service Investigation,  
Studies on Financial and Physical Rehabilitation  
Reorganization, Operation, Management

683 Atlantic Ave., Boston, Mass.

## THE ARNOLD COMPANY

ENGINEERS—CONSTRUCTORS  
ELECTRICAL—CIVIL—MECHANICAL  
105 South La Salle Street  
CHICAGO

## J. ROWLAND BIBBINS

Engineer—927 Fifteenth St., WASHINGTON

TRANSPORTATION SURVEYS

Organized Traffic Relief and Transit Development  
Co-ordinating Motor Transport, Railroad and City  
Plans, Service, Routing, Valuation, Economic Studies

EXPERIENCE IN 20 CITIES

## ALBERT S. RICHEY ELECTRIC RAILWAY ENGINEER

WORCESTER, MASSACHUSETTS

REPORTS—APPRAISALS—RATES—OPERATION—SERVICE

## JOE R. ONG

Consulting Transportation Engineer

Specializing in Traffic Problems and in Methods to  
Improve Service and Increase  
Efficiency of Operation

PIQUA, OHIO

## STEVENS & WOOD, INC.

Design and Construction of Power Stations  
Railroad Electrification, Industrial Plants

REPORTS AND APPRAISALS

Management and Financing of Utilities and Industrials

Youngstown

New York

## Parsons, Klapp, Brinckerhoff & Douglas

W. M. BARCLAY PARSONS  
EUGENE KLAPP

H. M. BRINCKERHOFF  
W. J. DOUGLAS

Engineers—Constructors—Managers

Hydro-electric      Railway      Light and Industrial Plants  
Appraisals and Reports

CLEVELAND  
1570 Hanna Bldg.

NEW YORK  
84 Pine St.

## HEMPHILL & WELLS

CONSULTING ENGINEERS

Gardner F. Wells

Albert W. Hemphill

APPRAISALS  
INVESTIGATIONS COVERING

Reorganization      Management      Operation      Construction  
43 Cedar Street, New York City

## DAY & ZIMMERMANN, INC.

ENGINEERS

Design, Construction  
Reports, Valuations, Management

NEW YORK      PHILADELPHIA      CHICAGO

## WALTER JACKSON

Consultant on Fares, Buses, Motor Trucks

Originator of unlimited ride, transferable weekly  
pass. Campaigns handled to make it a success.

143 Crary Ave., Mt. Vernon, N. Y.

## KELLY, COOKE & COMPANY

Engineers

149 BROADWAY  
NEW YORK

424 CHESTNUT STREET  
PHILADELPHIA



**EDWIN WORTHAM, E.E.**  
*Consulting Engineer*  
 Valuations of Electric Railways and  
 Utilities of All Kinds  
 Traffic and Operating Studies  
 Allison Bldg. Richmond, Va.  
 Established Feb. 1913.

C. B. BUCHANAN President      W. H. PRICE, JR. Sec'y-Treas.      JOHN F. LAYNG Vice-President  
**BUCHANAN & LAYNG CORPORATION**  
*Engineering and Management, Construction,  
 Financial Reports, Traffic Surveys  
 and Equipment Maintenance*  
 BALTIMORE 825 Equitable Bldg.      Phone: Hanover 2142      NEW YORK 49 Wall Street

**JAMES E. ALLISON & CO.**  
*Consulting Engineers*  
 Specializing in Utility Rate Cases and  
 Reports to Bankers and Investors  
 1017 Olive St., St. Louis, Mo.

Transmission Line and Special Crossing  
 Structures, Catenary Bridges  
 WRITE FOR OUR NEW DESCRIPTIVE CATALOG  
**ARCHBOLD-BRADY CO.**  
 Engineers and Contractors      SYRACUSE, N. Y.

**HUMAN ENGINEERING**  
*Railway Audit and Inspection Company, Inc.*  
 Fourth and Chestnut Sts., Philadelphia  
 Boston New Orleans } BRANCHES { Baltimore Atlanta  
 New Orleans Pittsburgh }      Chicago St. Louis

**Dwight P. Robinson & Company**  
 Incorporated  
 Design and Construction of  
*Electric Railways, Shops, Power Stations*  
 125 East 46th Street, New York  
 Chicago Youngstown Atlanta Philadelphia  
 Los Angeles Montreal Rio de Janeiro

The Most Successful Men in the Electric Railway  
 Industry read the  
**ELECTRIC RAILWAY JOURNAL**  
 Every Week

**THE P. EDWARD WISH SERVICE**  
 50 Church St. NEW YORK      Street Railway Inspection DETECTIVES      131 State St. BOSTON

When writing the advertiser for information or  
 prices, a mention of the Electric Railway  
 Journal would be appreciated.

# WHEN RAILWAY MEN

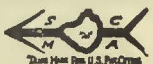
in general, study the question of *wood durability* for other purposes, as carefully as *Railway Signal* men have studied it for *Trunking* and *Capping*, there will be a lot more

## “ALL-HEART” “TIDEWATER” **CYPRESS** “THE WOOD ETERNAL”

used for *Fencing, Ties, Car Material, Station Construction* and similar railroad requirements, *to the very great economy of the companies using it.*


The long service which “All-Heart” *Tidewater Cypress* gives, **SAVES LABOR COSTS FOR RENEWALS AND REPLACEMENTS**

—big items in themselves. “All-Heart” *Tidewater Cypress* comes nearer being decay proof than any other wood.

This mark  on every timber, board and bundle of *Tidewater Cypress* is your insurance of true replacement economy.

The data in support of these facts will be promptly furnished upon request.

### SOUTHERN CYPRESS MFRS.' ASSN

1265 Poydras Building, New Orleans La., or  
 1265 Graham Building, Jacksonville, Fla. 

# Saves Labor



**DAYTON**

# *in the Car Barn!* **As Well as on the Track**

Dayton Resilient Track saves labor in the car barn by cutting down repairs to rolling stock. The resilient feature prolongs the life of all rolling stock by cushioning the shocks and jars.

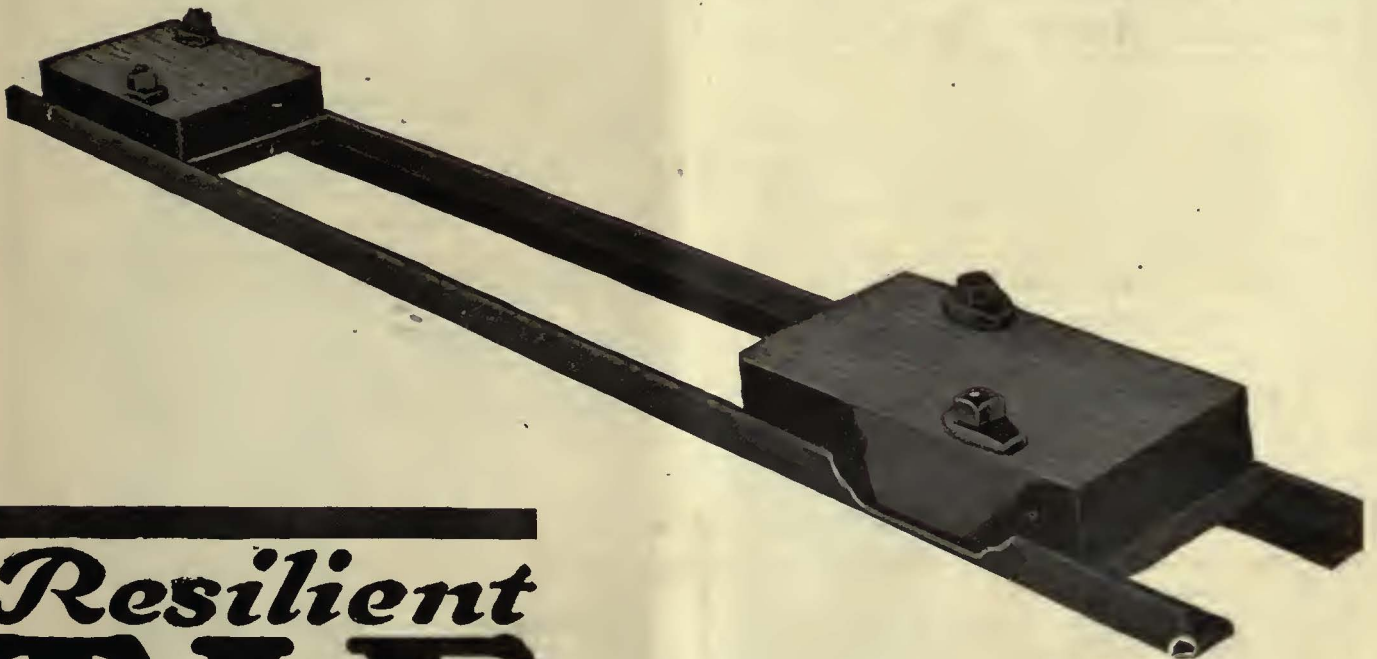
Resiliency protects the concrete foundation from disintegrating shocks and reduces track and paving repairs.

Dayton Resilient Track saves labor in new track work because it can be easily installed by ordinary track laborers. By actual test, eight men have laid 500 feet in a day.

Thus does the Dayton Resilient Track make possible even a three-fold labor economy—in the car barn, in track and paving repairs and in laying new track. There are other signal advantages. Investigate!

THE DAYTON MECHANICAL TIE CO.

707 Commercial Building  
DAYTON, OHIO



**Resilient**  
**TIE**



**THE NEW YORK-NEW JERSEY VEHICULAR TUNNEL**  
Two Tubes Under the Hudson River.  
Total length 9,250 feet.  
Outside diameter of tubes 29 ft. 6 in.  
Width of roadway in each tube 20 ft.  
Estimated annual traffic, 5,610,000 vehicles.  
Estimated cost \$30,000,000.00.

### Compounds are used everywhere!

In the "Vehicular Tunnel" pipe openings and joints in the shields are sealed with "Leverite"—Leverite was selected because it withstands air and water pressure, shock and high temperature; Oilproof Compound is used in the transformers; extensive use is also found for Damp-proofing Compounds, Insulating Paint, etc.

## MITCHELL-RAND MAKES MANY MIXTURES

—practically every kind of Commercial Compound—Insulating Waxes for wire, Brake Lining Compounds, Electrotypers' Wax, Belt Dressing, Soldering Paste, Rubber Softeners and Fillers, etc., etc.—an almost endless variety.

Factory representatives and distributors: tapes, mica, fibre, varnished materials, papers, etc.

"Everything in Insulation"

Write for our 160-page handbook.

**MITCHELL-RAND MFG.  
COMPANY**

18 Vesey St., New York, N. Y.



## Indoda

The Kaffirs have a strange ceremony to mark the transition from boy to man (indoda).

Kids are placed opposite each other and given stout switches with which they beat-up one another until their skins are swollen and bleeding.

At the cry of "halt" the judge looks into each one's eyes and if the slightest trace of tears appears—back he goes to boyhood.

The dry eyes pass into manhood.

Ability to stand punishment used to be the standard in judging a man's qualifications to run electrical machines—before Morganite brushes made that job easy.

Since operators have learned that commutation can be secured through Morganite prescription, they feel that they really have a gentleman's job.

# Morganite Brush Co., Inc.

Main Office and Factory:

519 West 38th St., New York

DISTRICT ENGINEERS AND AGENTS:

Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn Ave.

Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.

Cleveland, Electrical Engineering & Mfg. Co., 422 Union Building.

Philadelphia, Electric Power Equipment Corp., 412 North 18th St.

Baltimore, O. T. Hall, Sales Engineer, 1926 Edmondson Ave.

Revere, Mass., J. F. Drummy, 75 Pleasant Street.

Los Angeles, Special Service Sales Co., 502 Delta Building.

San Francisco, Special Service Sales Co., 202 Russ Building.

Toronto, Can., Railway & Power Engineering Corp., Ltd., 131 Eastern Ave.

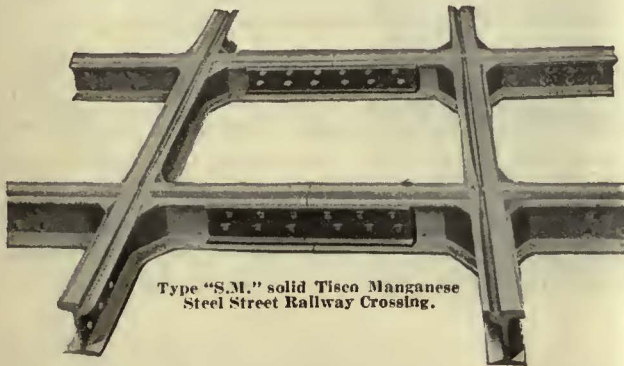
**TAYLOR-WHARTON IRON & STEEL CO.**

**TIOGA STEEL & IRON CO.**

**W<sup>m</sup> WHARTON Jr. & CO. Inc.**

**PHILADELPHIA ROLL & MACH<sup>e</sup>**

**Solid TISCO Manganese Steel Street Railway Crossing**



Type "S.M." solid Tisco Manganese Steel Street Railway Crossing.

This crossing is cast in two pieces; the ends are shaped to suit any section of rolled rail, and fishplate bearings are ground true to take standard plain joints. This is but one of many types of work furnished by this Company to the electric railway industry.

Covering a long period of years, the engineering staff of Wm. Wharton Jr. & Co., Inc., has collaborated with many of the foremost railway engineers of this country and abroad in designing and fabricating some of the most successful trackwork in operation.

For standard and special trackwork this Company has unusual facilities.

**WM. WHARTON JR. & CO., INC.**  
EASTON, PA.

Taylor-Wharton Iron & Steel Co.  
Plant at High Bridge, N. J.  
Manganese Steel  
Wearing Parts

Wm. Wharton Jr. & Co.  
Plant at Easton, Pa.  
Special Trackwork  
Cylinders for Gases

Tioga Steel & Iron Co.  
Plant at Philadelphia, Pa.  
Forgings  
Hammered and Pressed

Phila. Roll & Machine Co.  
Plant at Philadelphia, Pa.  
Rolls and Rolling  
Mill Machinery



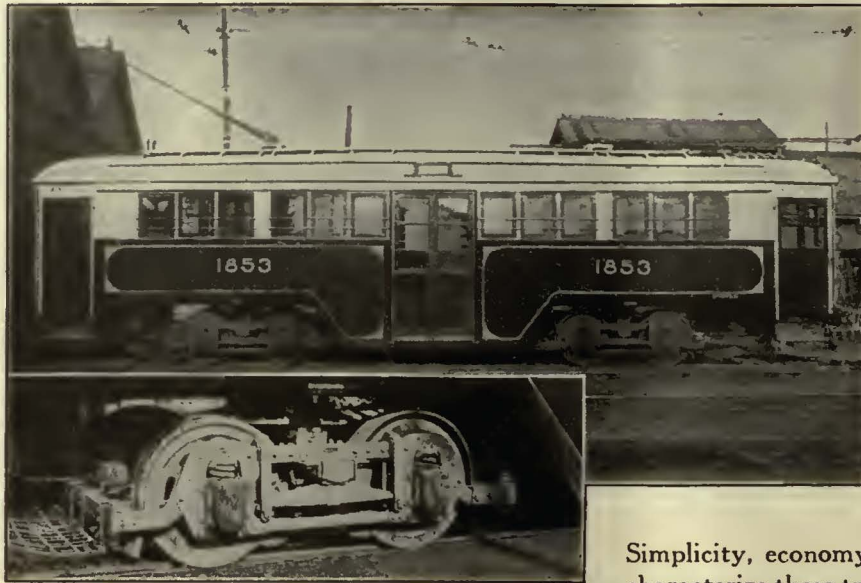
**N**O OTHER gear at any price assures you as good value for your money as the Nuttall BP Helical Gear. It saves your equipment, it saves 70% in gear cost and it lasts four times as long as any untreated gear.

*Can you afford not to have BP Helicals on your equipment*

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

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

## Baldwin Class "L" Trucks on Tokyo Municipal Electric Railway Cars



Type "L" Trucks on Tokyo Municipal Railway Cars

Where the clearance under the car body permits wheels of equal size, Baldwin Class "L" trucks give absolute satisfaction in city service. The side frames are of bar steel, arranged with the greater sectional dimension vertical to give maximum strength. The end frames are of angle iron. The motors are outside hung, permitting a short wheel base to be used.

Simplicity, economy and low cost of maintenance characterize these trucks. Full details upon request

### THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA, U. S. A.

Cable Address, "Baldwin, Philadelphia"

1241



## In a Language They Can Understand!

One kind of language is all your Directors understand and appreciate. That's the language of the black—not red—figures at the lower right hand corner of the monthly statements.

Here is the equipment to make those red figures black, and make the black ones larger.

St. Louis Quality double truck one-man safety cars are the latest development for efficient passenger transportation. Larger capacity, lower operating cost,—these mean greatly increased *net earnings*.

*Write for Full Details*

**St. Louis Car Company**  
 St. Louis, Mo.  
*"The Birthplace of the Safety Car"*



## Don't Overlook Opportunities

Men who regularly keep in touch with the market through other channels often overlook the many opportunities that are to be found in the

### SEARCHLIGHT SECTION

For Every Business Want  
 "Think SEARCHLIGHT First"  
 0156

### Hubbard Trolley Pole Bands



Split

Made of Open Hearth Steel. Galvanized by the Double-Dip process. Your best insurance for long service and durability.

Ask Your Jobber

HUBBARD & COMPANY

Pittsburgh



Solid

Chicago

### AUTOMATIC SIGNALS

Highway Crossing Bells  
 Headway Recorders

NACHOD SIGNAL COMPANY, INC.  
 LOUISVILLE, KENTUCKY.



### Shaw Lightning Arresters

Standard in the Electric Industries  
 for 35 years

Henry M. Shaw

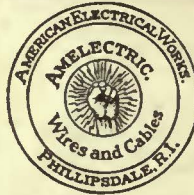
150 Coit St., Irvington, Newark, N. J.

ROEBLING

WELDING CABLE

ELECTRICAL WIRES and CABLES

John A. Roebling's Sons Company, Trenton, N. J.



### AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE  
 TROLLEY WIRE  
 WEATHERPROOF WIRE AND CABLE  
 PAPER INSULATED UNDERGROUND CABLE  
 MAGNET WIRE

Reg. U. S. Pat. Office

Incandescent Lamp Cord

AMERICAN ELECTRICAL WORKS  
 PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams;  
 Cincinnati, Traction Bldg.; New York, 100 E. 42nd St.

### ELRECO TUBULAR POLES



THE WIRE LOCK / THE CHAMFERED JOINT

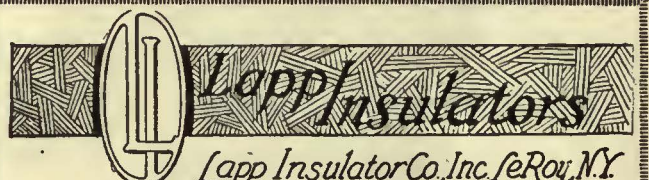
COMBINE

Lowest Cost                      Lightest Weight  
 Least Maintenance          Greatest Adaptability

Catalog complete with engineering data sent on request

ELECTRIC RAILWAY EQUIPMENT CO.  
 CINCINNATI, OHIO

New York City, 30 Church Street



Lapp Insulator Co., Inc. Le Roy, N.Y.

Trade Mark

### ANACONDA TROLLEY WIRE

ANACONDA COPPER MINING COMPANY  
 Conway Building, Chicago, Ill.



THE AMERICAN BRASS COMPANY  
 General Offices: Waterbury, Conn.

# STANDARD

Wires, Cables, Cable Accessories  
 Superior quality, economical prices  
 Standard Underground Cable Co.  
 Boston Philadelphia Pittsburgh Detroit  
 New York Washington Chicago St. Louis  
 San Francisco

### Chapman Automatic Signals

Charles N. Wood Co., Boston



# American Rail Bonds

CROWN  
UNITED STATES  
TWIN TERMINAL  
SOLDER  
TRIPLEX

Arc Weld and Flame Weld

*Send for new  
Rail Bond Book*

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

## Lorain Special Trackwork Girder Rails

*Electrically Welded Joints*

**THE LORAIN STEEL COMPANY**

Johnstown, Pa.

*Sales Offices:*

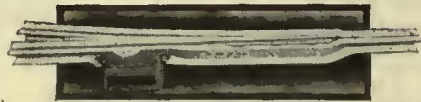
Atlanta	Chicago	Cleveland	New York
	Philadelphia	Pittsburgh	
	<i>Pacific Coast Representative:</i>		
	United States Steel Products Company		
Los Angeles	Portland	San Francisco	Seattle
	<i>Export Representative:</i>		
	United States Steel Products Company, New York, N. Y.		

## High-Grade Track Work

SWITCHES—MATES—FROGS—CROSSINGS  
COMPLETE LAYOUTS  
IMPROVED ANTI-KICK BIG-HEEL SWITCHES  
HARD CENTER AND MANGANESE  
CONSTRUCTION

**New York Switch & Crossing Co.**  
Hoboken, N. J.

## Bethlehem Products for Electric Railways



Solid Manganese Tongue Switch, Design 905

Frogs, Switches, Special Trackwork, Rails, Car Wheels, Gear Blanks, Axles, Armature Shafts, Splice Bars, Bolts, Spikes, and Track Accessories.

**BETHLEHEM STEEL COMPANY**

General Offices: Bethlehem, Pa.

Sales Offices in the Following Cities:

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh  
Buffalo Cleveland Cincinnati Detroit Chicago St. Louis San Francisco

## BARBOUR-STOCKWELL CO.

205 Broadway, Cambridgeport, Mass.  
Established 1858

Manufacturers of

**Special Work for Street Railways**  
Frogs, Crossings, Switches and Mates  
Turnouts and Cross Connections  
Kerwin Portable Crossovers  
Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

## SPECIALISTS

in the

**Design and Manufacture  
of**

**Standard—Insulated—and  
Compromise Rail Joints**

**The Rail Joint Company**  
61 Broadway, New York City



Special Track Equipment and Layouts  
of all kinds

**THE BUDA COMPANY**  
Harvey (Suburb Chicago) Illinois



# THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

**Builders since 1868 of  
Water Tube Boilers  
of continuing reliability**

**BRANCH OFFICES**

BOSTON, 49 Federal Street  
PHILADELPHIA, North American Building  
PITTSBURGH, Farmers Deposit Bank Building  
CLEVELAND, Guardian Building  
CHICAGO, Marquette Building  
CINCINNATI, Traction Building  
ATLANTA, Candler Building  
TUCSON, ARIZ., 21 So. Stone Avenue  
DALLAS, TEX., 2001 Magnolia Building  
HONOLULU, H. T., Castle & Cooke Building  
PORTLAND, ORE., 805 Gasco Building



**WORKS**

Bayonne, N. J.  
Barberton, Ohio

**Makers of Steam Superheaters  
since 1898 and of Chain Grate  
Stokers since 1893**

**BRANCH OFFICES**

DETROIT, Ford Building  
NEW ORLEANS, 521-5 Baronne Street  
HOUSTON, TEXAS, Southern Pacific Building  
DENVER, 435 Seventeenth Street  
SALT LAKE CITY, 705-6 Kearns Building  
SAN FRANCISCO, Sheldon Building  
LOS ANGELES, 404-6 Central Building  
SEATTLE, L. C. Smith Building  
HAVANA, CUBA, Calle de Aguiar 104  
SAN JUAN, PORTO RICO, Royal Bank Building

## AETNA INSULATION LINE MATERIAL

Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches



Albert & J. M. Anderson Mfg. Co.  
289-93 A Street Boston, Mass.  
Established 1877  
Branches—New York, 135 B'way  
Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St.  
London, 12 Moor Lane, E. C. 2



## DUNDEE "A" AND "B" FRICTION TAPES



Great Adhesive  
Strength  
High Quality  
Long Life  
Price Right



Write for Samples and Circulars

### THE OKONITE Co., Passaic, N. J.

Incorporated 1884  
Sales Offices: New York—Atlanta—Pittsburgh—San Francisco  
Agents: Central Electric Co., Chicago, Ill. Pettingell-Andrews Co., Boston, Mass.; The F. D. Lawrence Electric Co., Cincinnati, Ohio; Novelty Electric Co., Philadelphia, Pa.  
Canadian Representatives: Engineering Materials Limited, Montreal.



## METAL SAFETY CROSS TIES

Eliminate from track assemblage all Spikes, plates, anchors, braces, lugs, bolts, etc.

### REVOLUTIONIZES ROADBEDS

Write for descriptive folder and quotation.

### METAL SAFETY RAILWAY TIE CO.

522 North American Bldg., PHILADELPHIA, PA.

## GODWIN STEEL PAVING GUARDS

Adapted to all types of rails and paving.

W. S. GODWIN CO., Inc.



Proven by service to economically prevent seepage and disintegration of street railway paving.  
Write for Illustrated Catalog No. 20.  
Race & McComas Sts., Baltimore, Md.

## RAMAPO AJAX CORPORATION

Ramapo Automatic Return Switch Stands for Passing Sidings



RACOR Tee Rail Special Work. Manganese Construction

GENERAL OFFICES: HILLBURN, NEW YORK  
Chicago New York Superior, Wis. Niagara Falls, N. Y.  
Canadian Ramapo Iron Works, Ltd., Niagara Falls, Ont.

# ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

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

## NEW and RELAYING RAILS

1 TON OR 1000

TRACK EQUIPMENT

**L. B. FOSTER CO.**

PITTSBURGH - PENNSYLVANIA

RAIL ACCESSORIES

NEW YORK - JERSEY CITY - PHILADELPHIA - HAMILTON, O.



THE ELECTRIC RAILWAY IMPROVEMENT CO.  
CLEVELAND, OHIO

## A Single Segment or a Complete Commutator

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.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

## ECONOMIZERS

reduce fuel costs by making use of waste exhaust gases to preheat the boiler feed. Patented construction proven by 20 years of service.

# FOSTER

## SUPERHEATERS

improve engine, turbine and boiler economy by enabling a given amount of steam to do more work. Over 10,000 installations in stationary power plants.

POWER SPECIALTY CO., Boston, Philadelphia, Pittsburgh, Detroit, Kansas City, Chicago, San Francisco, Dallas, London, Eng. 111 Broadway, NEW YORK

**Beckwith-Chandler  
VARNISHES and COLORS**

for  
Brush or Spray Application  
Flat Color and Varnish Systems  
Enamel Systems  
Color Varnish Systems

Developed through years of experience in varnish and color manufacture, especially to meet transportation needs. Easily worked, quick drying—essentially durable.

Full Details on Request

**BECKWITH-CHANDLER COMPANY,**  
193-211 Emmett St., Newark, N. J.  
320 Fifth Ave., New York



**SCREECH!!!\*\*!  
HOWL!!!\*\*  
GRIND!!**

All eliminated  
by  
**MEXICAN  
GRAPHITE CURVE GREASE**

Unaffected by rain, heat or cold.  
Cars won't scrape it off.  
Adheres to the guard of the rail.

Write today for particulars.

**THE UNITED STATES GRAPHITE CO.**  
SAGINAW, MICHIGAN

**THE WORLD'S STANDARD  
"IRVINGTON"**

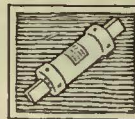
Black and Yellow  
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing  
Insulating Varnishes and Compounds

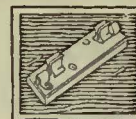
**Irvington Varnish & Insulator Co.**  
Irvington, N. J.

Sales Representatives in the Principal Cities

**J-P Products of interest to Electric Railways**



NOARK Fuses



NOARK Fuse Clips  
CUTOUT BASES



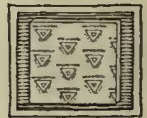
NOARK Service and  
Underground Boxes



Railway and Mine  
hangers and insulators



J-P Molding Service  
(Contract Basis)



VULCABESTON  
Sheet and Rope Taching

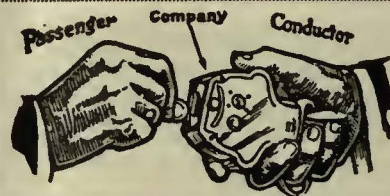
**JOHNS-PRATT CO. HARTFORD, CONN.**

**Heywood-Wakefield  
CAR SEATS**

of pressed Steel for all Classes of Passenger Service. Rattan for covering seats and for snow sweepers.

**HEYWOOD-WAKEFIELD CO.**  
Factory at Wakefield, Mass.

Offices at New York, Chicago, San Francisco



**Direct  
Automatic  
Registration  
By the  
Passengers  
Rooke Automatic  
Register Co.  
Providence, R. I.**



**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**  
6209 Hamilton Ave., Detroit, Mich.

The Most Successful Men in the Electric Railway Industry read the

**ELECTRIC RAILWAY JOURNAL**

Every Week



## OHMER FARE REGISTERS

They indicate and record the exact amount of each transaction. They place the sale of transportation on a strictly business basis.

We manufacture Indicating and Recording Fare Registers, Receipt Issuing Taximeters, and Fare Boxes.

**OHMER FARE REGISTER CO.**  
Dayton, Ohio

## Hale - Kilburn Seats

Suitable types for any kind of railway car or motor bus.

Neat  
Light  
Strong  
Simple



*Steel Seat  
Light  
Weight*

It will pay you to consider Hale-Kilburn Seats for your new cars on the basis of (1) Passenger comfort, (2) Attractive appearance, (3) Lower maintenance.

*Let us submit quotations*

**Hale-Kilburn Corporation**  
PHILADELPHIA

NEW YORK  
30 Church St.

RICHMOND  
Mutual Bldg.

CHICAGO  
McCormick Bldg.

ATLANTA  
Candler Bldg.

LOS ANGELES  
447 E. 3d St.

SAN FRANCISCO  
71 First St.



**Cleveland Fare Boxes**

plus  
**SUPERVISION** *of their use*  
equals

**100% Fare Collection**

Let Us Put the Box Before You and  
Quote Prices

**The Cleveland Fare Box Co.**  
Cleveland, Ohio

CANADIAN CLEVELAND FARE BOX CO. LTD.  
Preston, Ontario



Type R-10

**International  
Registers**

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.

**The International Register Co.**

15 South Throop Street, Chicago, Illinois



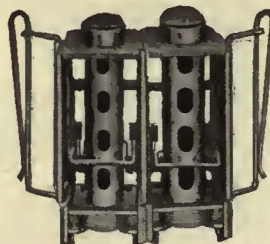
## JOHNSON Universal Changer

**Adjustable**

The best changer on the market. Can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

**Flexible**

Each barrel a separate unit, permitting the conductor to interchange the barrels to suit his personal requirements, and to facilitate the addition of extra barrels.



**JOHNSON FARE BOX COMPANY**  
Ravenswood, Chicago, Ill.

75% of the electric railways

use

**B-V Punches**

Send for Catalog

BONNEY-VEHSLAGE TOOL CO., Newark, N. J.



*You're having brush trouble*

**CORRECT IT  
USE LE CARBONE CARBON BRUSHES**

*They talk for themselves*

**COST MORE PER BRUSH  
COST LESS PER CAR MILE**

**W. J. Jeandron**  
345 Madison Avenue, New York  
Pittsburgh Office: 634 Wabash Bldg.  
Chicago Office: 1657 Monadnock Block  
San Francisco Office: 525 Market Street  
Canadian Distributors: Lyman Tube & Supply Co., Ltd.,  
Montreal and Toronto

Since  
1907

Other Ry. Motor Gear Mfgs.  
have brought out a total of  
22 grades of gearing  
each one "as good as Tool Steel"

**BUT**

Cincinnati "Tool Steel" is still  
the Standard of Quality

**Tool Steel Quality**

The Tool Steel  
Gear and Pinion Co.

CINCINNATI, O.

B. A. HEGEMAN, Jr., President  
H. A. HEGEMAN, Vice-Pres. and Treas.  
W. C. LINCOLN, Manager Sales and Engineering

C. C. CASTLE, First Vice-President  
F. T. SARGENT, Secretary

**National Railway Appliance Co.**

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York

**BRANCH OFFICES:**

Munsey Bldg., Washington, D. C., 100 Boylston St., Boston, Mass.  
Hegeman-Castle Corporation, Railway Exchange Bldg., Chicago, Ill.

Tool Steel Gears and Pinions  
Pittsburgh Forge & Iron Com-  
pany's Products  
Anglo-American Varnish Co.,  
Varnishes, Enamels, Etc.  
National Hand Holds  
Drew Line Material and Railway  
Specialties  
Genesco Paint Oils  
Turnstile Car Corporation—  
Turnstiles  
Dunham Hopper Door Device

Anderson Slack Adjusters  
Economy Electric Devices Co.,  
Power Saving and Inspection  
Meters  
Ft. Pitt Spring & Mfg. Co.  
Springs  
C.-H. Electric Heaters  
Garland Ventilators  
E-Z Car Control Safety Devices  
Lind Aluminum Field Coils  
Flaxilnum Insulation  
Yellow Coach Mfg. Co., Buses

**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 Fall Lengths*

**SILVER LAKE COMPANY**  
Manufacturers of bell, signal and other cords.  
Newtonville, Massachusetts

**PROVIDENCE  
FENDERS**

**H-B  
LIFE GUARDS**

The Consolidated Car Fender Co., Providence, R. I.  
Wendell & MacDuffie Co., 110 E. 42nd St., New York  
General Sales Agents



*Gets Every Fare*  
**PEREY TURNSTILES  
or PASSIMETERS**

Use them in your Prepayment Areas and  
Street Cars

**Perey Manufacturing Co., Inc.**  
30 Church Street, New York City

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



No.  
**478E**

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

**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.

# SEARCHLIGHT SECTION

## USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

**UNDISPLAYED—RATE PER WORD:**

*Positions Wanted*, 4 cents a word, minimum 75 cents an insertion, payable in advance.  
*Positions Vacant* and all other classifications, 8 cents a word, minimum charge \$2.00.  
*Proposals*, 40 cents a line an insertion.

**INFORMATION:**

*Box Numbers* in care of any of our offices count 10 words additional in undisplayed ads.  
 Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

**DISPLAYED—RATE PER INCH:**

1 to 3 inches.....\$4.50 an inch  
 4 to 7 inches..... 4.38 an inch  
 8 to 14 inches..... 4.10 an inch  
 Rates for larger spaces, or yearly rates, on request.  
 An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

E. F. J.

**POSITIONS VACANT**

**A GENERAL** track foreman wanted to have charge of four or five gangs on construction and general track maintenance work in Connecticut. State qualifications and give references. P-671, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

**WANTED—A-1** car wire and controller repairman, must understand the old type as well as the new. State wages expected in first letter. Apply Mr. H. T. Royal, Master Mechanic, Coast Cities Railway Co., Asbury Park, New Jersey.

**POSITIONS WANTED**

**AS CHIEF** inspector or instructor by a man who knows how to handle men and impart instruction; successful in one-man operation. PW-689, Electric Railway Journal, 10th Ave. at 36th St., New York.

**AS MASTER** mechanic; twenty years' experience in all departments, also type M. & H. L. control; can handle labor; A-1 references from past and present employers. PW-690, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

**AUDITOR**, with thorough experience large railway, electric and gas properties, seeks engagement. PW-677, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

**GRADUATE** engineer desires permanent position in larger field. Fifteen years' successful experience. Five in charge maintenance city and suburban system. Rehabilitation, design, special work, welding. PW-682, Electric Railway Journal, Real Estate Trust Bldg., Phila., Pa.

**MASTER** mechanic or engineer of equipment, technical education and five years' experience in manufacturing and maintenance of equipment. PW-681, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

**SCHEDULES.** Traffic manager and schedule maker, thoroughly experienced in city operation, wants whole or part time employment. PW-685, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

**STEADY** position wanted by young married man as armature winder or controller man; six years' experience in railway work; will work anywhere. B. Roiler, 1600 19th Ave., Gulfport, Miss.

**POSITIONS WANTED**

**SUPERINTENDENT** or assistant general manager on city or interurban road. Twelve years' successful experience with first-class record and references. Salary \$3,000.00 to start. PW-687, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

**SUPERINTENDENT** or general superintendent. Twelve years connection with one of the largest and most successful steam railways in America. Five years operator, agent and yardmaster; four years general yardmaster large terminal; three years superintendent in charge all departments electrified subsidiary lines, operating high speed interurban trains and handling heavy carload freight traffic. Desire connection with large electrified property. Have record for establishing new low operating ratios and rendering more effective service. Can secure spontaneous co-operation from employees and meet the public. Reason for leaving present position, electric railway field limited. Prefer situation requiring initiative and executive ability. Age 38. PW-686, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

**FOR SALE**

### Motors and Electric Locomotives

- 16—G. E. 203 A7 Motors.
- 4—Wh. 307 Motors.
- 1—26-ton Electric Locomotive.

Trucks, wide and standard gauge, bodies, air equipment, etc.

**G. T. ABEL**

700 97th St., Woodhaven, N. Y.

### Relaying Rails

NEW RAILS - ACCESSORIES

Buy Guaranteed Relaying Rails and Save 30% to 50%

1 Ton or 1000

**LBFOSTER**

PITTSBURGH, PA. NEW YORK CITY  
 JERSEY CITY - PHILADELPHIA - HAMILTON, N. J.

**FOR SALE**

### FARE BOXES

70—Second-hand Johnson, Model D.  
 FS-688, Electric Railway Journal, Tenth Ave., at 36th St., New York City

### New Motor Repair Parts

IMMEDIATE SHIPMENT

We have in stock virtually every part necessary to complete all of the types of non-interpole motors. They are new and were manufactured by either the Westinghouse Company or the General Electric Company. They may be purchased at 20 per cent less than the manufacturers' present prices.

Send your orders to us and deduct 20 per cent from the current quotations.

What have you for sale?

**TRANSIT EQUIPMENT CO.**

Cars—Motors

501 Fifth Avenue, New York.

HAVE JUST PURCHASED

**500 TONS 80 LB. ASCE**

STRICTLY FIRST CLASS

**RELAYING RAILS**

Wire for Prices.

**ZELNICKER IN ST. LOUIS**

## “SEARCHLIGHT”

### Opportunity Advertising

—to help you get what you want.

—to help you sell what you no longer need.

Take advantage of it — For Every Business Want

“Think SEARCHLIGHT First”

0165

## MOTORS For SALE

50 Westinghouse No. 101-B

40 Westinghouse No. 307

60 General Electric No. 80

Immediate Shipment Low Price

**Electric Equipment Co.**

Cars—Motors

601 Commonwealth Bldg., Phila., Pa.

# WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with  
Names of Manufacturers and Distributors Advertising in this Issue

- Advertising, Street Car  
Collier, Inc., Barron G.
- Air Receivers & Aftercoolers  
Ingersoll-Rand Co.
- Anchors, Gny  
Elec. Service Supplies Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.
- Armature Shop Tools  
Elec. Service Supplies Co.
- Automatic Return Switch  
Stands  
Ramapo Ajax Corp.
- Automatic Safety Switch  
Stands  
Ramapo Ajax Corp.
- Axles  
Bemis Car Truck Co.  
Bethlehem Steel Co.  
Brill Co., The J. G.  
Craegie Steel Co.  
Johnson & Co., J. R.  
St. Louis Car Co.  
Westinghouse E. & M. Co.
- Babbitt Metal  
Ajax Metal Co.
- Badges and Buttons  
Elec. Service Supplies Co.  
International Register Co.,  
The
- Bearings and Bearing Metals  
Ajax Metal Co.  
Bemis Car Truck Co.  
Brill Co., J. G., The  
General Electric Co.  
Gilbert & Sons B. F. Co., A.  
More-Jones Brass & Metal  
Co.  
St. Louis Car Co.  
Westinghouse E. & M. Co.
- Bearings, Center and Roller  
Side  
Baldwin Locomotive Works  
Stucki Co., A.
- Bells and Gongs  
Brill Co., The J. G.  
Consolidated Car Heat'g Co.  
Elec. Service Supplies Co.  
St. Louis Car Co.
- Bollers  
Babcock & Wilcox Co.
- Bonding Apparatus  
Amer. Steel & Wire Co.  
Elec. Ry. Improvement Co.  
Elec. Service Supplies Co.  
Ohio Brass Co.  
Railway Track-work Co.
- Bonds, Rail  
Amer. Steel & Wire Co.  
Elec. Ry. Improvement Co.  
Elec. Service Supplies Co.  
Ohio Brass Co.  
Railway Track-work Co.  
Westinghouse E. & M. Co.
- Boxes, Switch  
Johns-Pratt Co.
- Brackets and Cross Arms  
(See also Poles, Ties,  
Posts, Etc.)  
Elec. Ry. Equipment Co.  
Elec. Service Supplies Co.  
Hubbard & Co.  
Ohio Brass Co.
- Brake Adjusters  
Brill Co., The J. G.  
National Ry. Appliance Co.  
Westinghouse Tr. Br. Co.
- Brake Shoes  
Amer. Br. Shoe & Fdy. Co.  
Barbour-Stockwell Co.  
Bemis Car Truck Co.  
Brill Co., The J. G.  
St. Louis Car Co.
- Brakes, Brake Systems and  
Brake Parts  
Allis-Chalmers Mfg. Co.  
Bemis Car Truck Co.  
Brill Co., The J. G.  
General Electric Co.  
National Ry. Appliance Co.  
St. Louis Car Co.  
Westinghouse Tr. Br. Co.
- Brushes, Carbon  
General Electric Co.  
Jeandron, W. J.  
LeCarbons Co.  
Morganite Brush Co., Inc.  
Stackpole Carbon Co.  
U. S. Graphite Co.  
Westinghouse E. & M. Co.
- Brushes, Graphite  
U. S. Graphite Co.
- Brush Holders  
Anderson Mfg. Co., A. &  
J. M.
- Brushes, Wire, Pneumatic  
Ingersoll-Rand Co.
- Buses, Motor  
Brill Co., The J. G.  
St. Louis Car Co.
- Bushings, Case Hardened and  
Manganese  
Bemis Car Truck Co.  
Brill Co., The J. G.  
St. Louis Car Co.
- Cables. (See Wires and  
Cables.)
- Cambric Tapes, Yellow and  
Black Varnish  
Irvington Varnish & Ins. Co.
- Carbon Brushes (See Brushes,  
Carbon)
- Cars, Dump  
Brill Co., J. G., The  
Differential Steel Car Co.  
St. Louis Car Co.
- Car Lighting Fixtures  
Elec. Service Supplies Co.
- Car Panel Safety Switches  
Consolidated Car Heat'g Co.  
Westinghouse E. & M. Co.
- Cars, Passenger, Freight, Ex-  
press, etc.  
Amer. Car Co.  
Brill Co., The J. G.  
Kuhlman Car Co., G. C.  
McGuire-Cummings Mfg. Co.  
National Ry. Appliance Co.  
St. Louis Car Co.  
Wason Mfg. Co.
- Cars, Gas, Rail  
Brill Co., J. G., The  
St. Louis Car Co.
- Cars, Second Hand  
Electric Equipment Co.  
Transit Equipment Co.
- Cars, Self-Propelled  
Brill Co., J. G., The  
General Electric Co.
- Car Wheels, Rolled Steel  
Bethlehem Steel Co.
- Castings, Brass, Composition  
or Copper  
Ajax Metal Co.  
Anderson Mfg. Co., A. &  
J. M.  
More-Jones Brass & Metal  
Co.
- Castings, Gray Iron and Steel  
Bemis Car Truck Co.  
St. Louis Car Co.
- Castings, Malleable and Brass  
Amer. Br. Shoe & Fdy. Co.  
Bemis Car Truck Co.  
St. Louis Car Co.
- Catchers and Retrievers,  
Trolley  
Elec. Service Supplies Co.  
Ohio Brass Co.  
Wood Co., Chas. N.
- Catenary Construction  
Archbold-Brady Co.
- Celling Car  
The Pantasote Co., Inc.
- Change Carriers  
Cleveland Fare Box Co.
- Circuit-Breakers  
General Electric Co.  
Westinghouse E. & M. Co.
- Clamps and Connectors for  
Wires and Cables  
Anderson Mfg. Co., A. &  
J. M.  
Elec. Ry. Equipment Co.  
Elec. Ry. Improvement Co.  
Elec. Service Supplies Co.  
General Electric Co.  
Hubbard & Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.
- Cleaners and Scrapers Track  
(See also Snow-Plows,  
Sweepers and Brooms)  
Brill Co., The J. G.  
St. Louis Car Co.
- Clusters and Sockets  
General Electric Co.
- Coal and Ash Handling (See  
Conveying and Hoisting  
Machinery)
- Coll Banding and Winding  
Machines  
Elec. Service Supplies Co.
- Colls Armature and Field  
General Electric Co.  
Westinghouse E. & M. Co.
- Colls, Choke and Kicking  
Elec. Service Supplies Co.  
General Electric Co.  
Westinghouse E. & M. Co.
- Coin Counting Machines  
Cleveland Fare Box Co.
- Coin Wrappers  
Cleveland Fare Box Co.
- Commutator Slotters  
Elec. Service Supplies Co.  
General Electric Co.  
Westinghouse E. & M. Co.
- Commutator Truing Devices  
General Electric Co.
- Commutators or Parts  
Cameron Elec'l Mfg. Co.  
General Electric Co.  
Westinghouse E. & M. Co.
- Compressors, Air  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Ingersoll-Rand Co.  
Westinghouse Tr. Br. Co.
- Compressors, Air Portable  
Ingersoll-Rand Co.
- Condenser Papers  
Irvington Varnish & Ins. Co.
- Condensers  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Ingersoll-Rand Co.  
Westinghouse E. & M. Co.
- Connectors, Solderless  
Westinghouse E. & M. Co.
- Connectors, Traller Car  
Consolidated Car Heat. Co.  
Elec. Service Supplies Co.  
Ohio Brass Co.
- Controllers or Parts  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Westinghouse E. & M. Co.
- Controller Regulators  
Elec. Service Supplies Co.
- Controlling Systems  
General Electric Co.  
Westinghouse E. & M. Co.
- Converters, Rotary  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Westinghouse E. & M. Co.
- Copper Wire  
Anaconda Copper Mining Co.
- Cord, Bul, Trolley, Register  
Brill Co., The J. G.  
Elec. Service Supplies Co.  
Internat'l Register Co., The  
Roebbling's Sons Co., John A.  
St. Louis Car Co.  
Samson Cordage Works  
Silver Lake Co.
- Cord Connectors and Couplers  
Elec. Service Supplies Co.  
Samson Cordage Works  
Wood Co., Chas. N.
- Couplers, Car  
Brill Co., The J. G.  
Ohio Brass Co.  
St. Louis Car Co.  
Westinghouse Tr. Br. Co.
- Crane  
American Engineering Wks.
- Cross Arms (See Brackets)
- Crossing Foundations  
International Steel Tie Co.
- Crossing, Frog & Switch  
Ramapo Ajax Corp.  
Wharton, Jr. & Co., Wm.
- Crossing, Manganese  
Bethlehem Steel Co.  
Ramapo Ajax Corp.
- Crossings  
Ramapo Ajax Corp.
- Crossings, Track (See Track,  
Special Work)
- Crossings, Trolley  
Ohio Brass Co.
- Curtains & Curtain Fixtures  
Brill Co., The J. G.  
Elec. Service Supplies Co.  
Morton Mfg. Co.  
The Pantasote Co., Inc.  
St. Louis Car Co.
- Dealer's Machinery  
Elec. Equipment Co.  
Transit Equipment Co.
- Derailing Devices (See also  
Track Work)
- Derailing Switches  
Ramapo Ajax Corp.
- Destination Signs  
Elec. Service Supplies Co.
- Detective Service  
Wish-Service, P. Edward
- Door Operating Devices  
Brill Co., The J. G.  
Consolidated Car Heat'g Co.  
General Electric Co.  
Hale-Kilburn Co.  
Nat'l Pneumatic Co., Inc.  
St. Louis Car Co.
- Doors & Door Fixtures  
Brill Co., The J. G.  
Consolidated Car Heat'g Co.  
General Electric Co.  
Hale-Kilburn Co.  
Morton Mfg. Co.
- Doors, Folding Vestibule  
Nat'l Pneumatic Co., Inc.
- Safety Car Devices Co.
- Drills, Rock  
Ingersoll-Rand Co.
- Drills, Track  
Amer. Steel & Wire Co.  
Elec. Service Supplies Co.  
Ingersoll-Rand Co.  
Ohio Brass Co.
- Dryers, Sand  
Elec. Service Supplies Co.
- Ears  
Ohio Brass Co.
- Electrical Wires and Cables  
Amer. Electrical Works  
Amer. Steel & Wire Co.  
Roebbling's Sons & Co., J. A.
- Electric Grinders  
Railway Track-work Co.
- Electrodes, Carbon  
Railway Track-work Co.
- Electrodes, Steel  
Railway Track-work Co.
- Enamels  
Beckwith-Chandler Co.
- Engineers, Consulting, Con-  
tracting and Operating  
Allison & Co., J. S.  
Archbold-Brady Co.  
Arnold Co., The  
Beeler, John A.  
Bibbins, J. Rowland  
Buchanan & Lay Corp.  
Day & Zimmermann, Inc.  
Drum & Co., A. L.  
Ford, Bacon & Davis  
Hemphill & Wells  
Holst, Engelhardt W.  
Jackson, Walter  
Kelly-Cooks & Co.  
Ong, Jos. R.  
Parsons, Klapp, Brinkerhoff  
& Douglas  
Railway Audit & Inspection  
Co.  
Riehey, Albert S.  
Robinson & Co., Dwight P.  
Sanderson & Porter  
Stevens & Wood  
Stone & Webster  
White Eng. Corp., The J. G.  
Wortham, Edwin
- Engines, Gas, Oil or Steam  
Allis-Chalmers Mfg. Co.  
Ingersoll-Rand Co.  
Westinghouse E. & M. Co.
- Fare Boxes  
Cleveland Fare Box Co.  
Johnson Fare Box Co.  
Nat'l Ry. Appliance Co.
- Fare Registers  
Ohmer Fare Register Co.
- Fences, Woven Wire and  
Fence Posts  
Amer. Steel & Wire Co.
- Fenders and Wheel Guards  
Brill Co., The J. G.  
Consolidated Car Fender Co.  
Elec. Service Supplies Co.  
St. Louis Car Co.
- Fibre and Fibre Tubing  
Westinghouse E. & M. Co.
- Field Colls (See Colls)
- Flange-way Guards, Steel  
Gowdin Co., Inc., W. S.
- Floodlights  
Elec. Service Supplies Co.
- Forgings  
Brill Co., J. G., The
- Frogs & Crossings, Tree Rail  
Bethlehem Steel Co.  
Ramapo Ajax Corp.
- Frogs, Track (See Track  
Work)
- Frogs, Trolley  
Ohio Brass Co.  
Fannell Castings  
Wharton, Jr. & Co., Wm.
- Fuses and Fuse Boxes  
Consolidated Car Heat'g Co.  
General Electric Co.  
Westinghouse E. & M. Co.
- Fuses, Cartridge, Non-Refill-  
able & High Voltage  
Johns-Pratt Co.
- Fuses, Refillable  
General Electric Co.  
Johns-Manville, Inc.  
Johns-Pratt Co.  
Power Specialty Co.
- Oaskets  
Westinghouse Tr. Br. Co.
- Gas Producers  
Westinghouse E. & M. Co.
- Gas-Electric Cars  
General Elec. Co.  
Westinghouse E. & M. Co.
- Oates, Car  
Brill Co., The J. G.  
St. Louis Car Co.
- Gear Blanks  
Bethlehem Steel Co.  
Brill Co., J. G., The
- Gear Cases  
Chillingworth Mfg. Co.  
Elec. Service Supplies Co.  
Westinghouse E. & M. Co.
- Gears and Pinions  
Bemis Car Truck Co.  
Bethlehem Steel Co.  
Elec. Service Supplies Co.  
General Electric Co.  
Nat'l Ry. Appliance Co.  
Nuttall Co., R. D.  
Tool Steel Gear & Pinion  
Co.
- Generating Sets, Gas-Electric  
General Electric Co.
- Generators  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Westinghouse E. & M. Co.
- Glider Rails  
Bethlehem Steel Co.  
Lorain Steel Co.
- Gong (See Bells and Gongs)
- Graphite  
Morganite Brush Co., Inc.
- Greases (See Lubricants)
- Grinders and Grind. Supplies  
Railway Track-work Co.
- Grinders, Portable  
Railway Track-work Co.
- Grinders, Portable Electric  
Railway Track-work Co.
- Grinding Bricks and Wheels  
Railway Track-work Co.
- Guard Rail Clamps  
Ramapo Ajax Corp.
- Guard Rails, Tee Rail &  
Manganese  
Ramapo Ajax Corp.
- Guards, Trolley  
Elec. Service Supplies Co.  
Ohio Brass Co.
- Hammers, Pneumatic  
Ingersoll-Rand Co.
- Harps, Trolley  
Anderson Mfg. Co., A. & J. M.  
Elec. Service Supplies Co.  
More-Jones Brass Metal Co.  
Nuttall Co., R. D.  
Star Brass Works  
Thornton Trolley Wheel Co.
- Headlights  
Elec. Service Supplies Co.  
General Electric Co.  
Ohio Brass Co.  
St. Louis Car Co.
- Headlining  
The Pantasote Co., Inc.
- Heaters, Car (Electric)  
Consolidated Car Heat'g Co.  
Gold Car Heat. & Lig. Co.  
Nat'l Ry. Appliance Co.  
Smith Heater Co., Peter  
Heaters, Car, Hot Air and  
Water  
Elec. Service Supplies Co.  
Smith Heater Co., Peter
- Helmet-Awelding  
Railway Track-work Co.
- Holsts, Portable  
Ingersoll-Rand Co.
- Hydraulic Machinery  
Allis-Chalmers Mfg. Co.
- Indicating Signals  
Oskel Equipment Co.
- Instruments Measuring, Test-  
ing and Recording  
Elec. Service Supplies Co.  
General Electric Co.  
Johns-Pratt Co.  
Westinghouse E. & M. Co.
- Insulating Cloth, Paper and  
Tape  
General Electric Co.  
Irvington Varnish & Ins. Co.  
Mitchell-Rand Mfg. Co.  
Okonite Co.  
Stand. Underground Cable  
Co.  
Westinghouse E. & M. Co.
- Insulating, Silk & Varnish  
Irvington Varnish & Ins. Co.
- Insulation (See also Paints)  
Anderson Mfg. Co., A. & J.  
M.  
Electric Ry. Equipment Co.  
Elec. Service Supplies Co.  
General Electric Co.  
Irvington Varnish & Ins. Co.  
Mitchell-Rand Mfg. Co.  
Okonite Co.  
Westinghouse E. & M. Co.
- Insulation Slots  
Irvington Varnish & Ins. Co.
- Insulators (See also Line  
Material)  
Anderson Mfg. Co., A. & J.  
M.  
Elec. Ry. Equipment Co.  
Elec. Service Supplies Co.

# Brake Shoes A.E.R.A. Standards

Diamond "S" Steel Back is the Best Type



Standard  
Patterns  
for

**SAFETY  
CAR**



D-67 for Narrow Treads  
D-87 for Wide Treads

**American Brake Shoe and Foundry Co.**  
30 Church Street, New York

332 So. Michigan Ave., Chicago    Chattanooga, Tenn.



## Ingersoll-Rand Pneumatic Tie Tampers

Reduce track tamping  
and maintenance costs.

Ask for Bulletin 9123

**INGERSOLL-RAND COMPANY**  
11 Broadway, New York

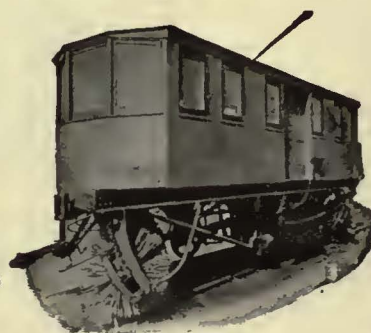
170-TT

## McGuire-Cummings Manufacturing Co.

General Offices:  
111 W. Monroe St., Chicago, Ill.



Street Cars  
Trucks  
Snow Sweepers



We make a specialty of  
**ELECTRIC RAILWAY  
LUBRICATION**

We solicit a test of TULC  
on your equipment

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

Tulc, Inc., Eastern Representative,  
1617 Gotham National Bank Bldg., New York City



**MORE-JONES  
"TIGER" BRONZE  
AXLE & ARMATURE  
BEARINGS**

Strong - tough - durable  
anti-frictional  
economical

**MORE-JONES BRASS & METAL CO**

ST LOUIS

MISSOURI

- General Electric Co.  
Irvington Varnish & Ins. Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.
- Insulator Pins**  
Elec. Service Supplies Co.  
Hubbard & Co.
- Insulators, High Voltage**  
Lapp Insulator Co., Inc.
- Jacks** (See also Cranes, Hoists and Lifts)  
Buda Co.  
Elec. Service Supplies Co.
- Joints, Rail**  
(See Rail Joints)
- Journal Boxes**  
Bemis Car Truck Co.  
Brill Co., J. G.  
St. Louis Car Co.
- Junction Boxes**  
Std. Underground Cable Co.
- Lamps, Guards and Fixtures**  
Anderson Mfg. Co., A. & J. M.  
Elec. Service Supplies Co.  
General Electric Co.  
Westinghouse E. & M. Co.
- Lamps, Arc and Incandescent** (See also Headlights)  
Anderson Mfg. Co., A. & J. M.  
General Electric Co.  
Westinghouse E. & M. Co.
- Lamps, Signal and Marker**  
Nichols-Lintern Co.  
Ohio Brass Co.
- Lanterns, Classification**  
Nichols-Lintern Co.
- Lightning Protection**  
Anderson Mfg. Co., A. & J. M.  
Elec. Service Sup. Co.  
General Electric Co.  
Ohio Brass Co.  
Shaw, Henry M.  
Westinghouse E. & M. Co.
- Line Material** (See also Brackets, Insulators, Wires, etc.)  
Anderson Mfg. Co., A. & J. M.  
Archbold-Brady Co.  
Electric Ry. Equipment Co.  
Elec. Service Sup. Co.  
General Electric Co.  
Hubbard & Co.  
More-Jones Brass & Metal Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.
- Locking Spring Boxes**  
Wharton, Jr. & Co., Wm.
- Locomotives, Electric**  
Baldwin Locomotive Works  
General Electric Co.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.  
Westinghouse E. & M. Co.
- Lubricating Engineers**  
Galena Signal Oil Co.  
Universal Lubricating Co.
- Lubricants, Oil and Grease**  
Galena Signal Co.  
Universal Lubricating Co.
- Manganese Parts**  
Bemis Car Truck Co.
- Manganese Steel Castings**  
Wharton, Jr. & Co., Wm.
- Manganese Steel Guard Rails**  
Ramapo Ajax Corp.
- Manganese Steel, Special Track Work**  
Bethlehem Steel Co.  
Wharton, Jr. & Co., Wm.
- Manganese Steel Switches**  
Frogs & Crossings  
Bethlehem Steel Co.  
Ramapo Ajax Corp.
- Meters** (See Instruments)
- Molding, Metal**  
Allis-Chalmers Mfg. Co.  
Motor Buses (See Buses, Motor)
- Motors, Electric**  
Allis-Chalmers Mfg. Co.  
Westinghouse E. & M. Co.
- Motors and Generators, Sets**  
Allis-Chalmers Mfg. Co.  
General Electric Co.
- Motor Men's Seats**  
Brill Co., J. G.  
Elec. Service Sup. Co.  
Heywood-Wakefield Co.  
St. Louis Car Co.  
Wood Co., Chas. N.
- Nuts and Bolts**  
Barbour-Stockwell Co.  
Bemis Car Truck Co.  
Bethlehem Steel Co.  
Hubbard & Co.
- Oils** (See Lubricants),  
Omnibuses (See Buses, Motor)
- Oxy-Acetylene** (See Cutting Apparatus, Oxy-Acetylene)
- Packings**  
Elec. Service Supplies Co.  
Power Specialty Co.  
Westinghouse E. & M. Co.
- Paints and Varnishes** (Insulating)  
Irvington Varnish & Ins. Co.  
Mitchell-Rand Mfg. Co.
- Paints, Varnishes, Preservatives**  
Beckwith-Chandler Co.
- Paints and Varnishes for Woodwork**  
Beckwith-Chandler Co.  
National Ry. Appliance Co.
- Pavement Breakers**  
Ingersoll-Rand Co.
- Paving Guards, Steel**  
Godwin Co., Inc., W. S.
- Paving Material**  
Amer. Br. Shoe & Fdy. Co.
- Pickups, Trolley Wire**  
Elec. Service Supplies Co.  
Ohio Brass Co.
- Pinion Pullers**  
Elec. Service Supplies Co.  
General Electric Co.  
Wood Co., Chas. N.
- Pinions** (See Gears)
- Pins, Case Hardened, Wood and Iron**  
Bemis Car Truck Co.  
Elec. Service Sup. Co.  
Ohio Brass Co.  
Westinghouse Tr. Brake Co.
- Pipe Fittings**  
Power Specialty Co.  
Westinghouse Tr. Brake Co.
- Planers** (See Machine Tools)
- Plates for Tee Rail Switches**  
Ramapo Ajax Corp.
- Pliers, Rubber Insulated**  
Elec. Service Sup. Co.
- Pneumatic Tools**  
Ingersoll-Rand Co.
- Pole Line Hardware**  
Bethlehem Steel Co.  
Ohio Brass Co.
- Poles, Metal Street**  
Elec. Ry. Equipment Co.  
Hubbard & Co.
- Pole Reinforcing**  
Hubbard & Co.
- Poles & Ties Treated**  
Bell Lumber Co.  
International Creosoting & Construction Co.  
National Pole Co.
- Poles, Ties, Posts, Piling & Lumber**  
Bell Lumber Co.  
International Creosoting & Construction Co.  
National Pole Co.  
Southern Cypress Mfr's Ass'n
- Poles, Trolley**  
Bell Lumber Co.  
Elec. Service Supplies Co.  
Nuttall Co., R. D.
- Poles, Tubular Steel**  
Elec. Ry. Equipment Co.  
Elec. Service Sup. Co.
- Porcelain Special High Voltage**  
Lapp Insulator Co., Inc.
- Portable Grinders**  
Buda Co.
- Pathways**  
Okonite Co.
- Power Saving Devices**  
National Ry. Appliance Co.
- Pressure Regulators**  
General Electric Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.
- Pumps**  
Allis-Chalmers Mfg. Co.  
Ingersoll-Rand Co.
- Pumps, Vacuum**  
Ingersoll-Rand Co.
- Punches, Ticket**  
Bonney-Vehsalge Tool Co.
- Intern'l Register Co., The**  
Wood Co., Chas. N.
- Rail Braces & Fastenings**  
Ramapo Ajax Corp.
- Rail Grinders** (See Grinders)
- Rail Joints**  
Carnegie Steel Co.  
Rail Joint Co., The  
Rail Joints—Welded  
Lorain Steel Co.
- Rails, Relaying**  
Foster Co., L. B.
- Rails, Steel**  
Bethlehem Steel Co.  
Carnegie Steel Co.  
Foster Co., L. B.
- Railway Paving Guards, Steel**  
Godwin Co., Inc., W. S.
- Railway Safety Switches**  
Consolidated Car Heat Co.  
Westinghouse E. & M. Co.
- Rail Welding**  
Railway Track-work Co.
- Rattan**  
Brill Co., The J. G.  
Elec. Service Supplies Co.  
Hale-Kilburn Co.  
Heywood-Wakefield Co.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.
- Registers and Fittings**  
Brill Co., The J. G.  
Elec. Service Supplies Co.  
Intern'l Register Co., The  
Ohmer Fare Register Co.  
Rooke Automatic Rg. Co.  
St. Louis Car Co.
- Reinforcement, Concrete**  
Amer. Steel & Wire Co.
- Repair Shop Appliances** (See also Coil Banding and Winding Machines)  
Elec. Service Supplies Co.
- Repair Work** (See also Collis)  
General Electric Co.  
Westinghouse E. & M. Co.
- Replacers, Car**  
Elec. Service Sup. Co.
- Resistances**  
Consolidated Car Heat Co.
- Resistance, Wire and Tube**  
General Electric Co.  
Westinghouse E. & M. Co.
- Retrievers, Trolley** (See Catchers and Retrievers, Trolley)
- Rheostats**  
General Electric Co.  
Westinghouse E. & M. Co.
- Roofing, Car**  
The Pantasote Co., Inc.
- Sanders, Track**  
Brill Co., The J. G.  
Elec. Service Sup. Co.  
Nichols-Lintern Co.  
Ohio Brass Co.  
St. Louis Car Co.
- Sash Fixtures, Car**  
Brill Co., The J. G.  
St. Louis Car Co.
- Sash, Metal, Car Window**  
Hale-Kilburn Co.
- Scrapers, Track** (See Cleaners and Scrapers, Track)
- Screw Drivers, Rubber Insulated**  
Elec. Service Sup. Co.
- Seats, Bus**  
Brill Co., J. G., The  
Hale-Kilburn Co.  
Heywood-Wakefield Co.  
St. Louis Car Co.
- Seats, Car** (See also Rattan)  
Brill Co., The J. G.  
Hale-Kilburn Co.  
Heywood-Wakefield Co.  
St. Louis Car Co.
- Seating Materials**  
Brill Co., J. G.  
Heywood-Wakefield Co.  
The Pantasote Co., Inc.  
St. Louis Car Co.
- Second Hand Equipment**  
Electric Equipment Co.  
Transit Equipment Co.
- Shades, Vestibule**  
Brill Co., The J. G.
- Shovels**  
Brill Co., The J. G.  
Hubbard & Co.
- Side Bearings** (See Bearings, Center and Side)
- Signals, Car Starting**  
Consolidated Car Heat Co.  
Elec. Service Sup. Co.  
Nat'l Pneumatic Co., Inc.
- Signals, Indicating**  
Nichols-Lintern Co.  
Oakel Equipment Co.
- Signal Systems, Highway Crossing**  
Nachod Signal Co., Inc.  
Wood Co., Chas. N.
- Signal Systems, Block**  
Elec. Service Sup. Co.  
Nachod Signal Co., Inc.
- Slack Adjusters** (See Brake Adjusters)
- Steel Wheels and Cutters**  
Anderson Mfg. Co., A. & J. M.  
Elec. Ry. Equipment Co.  
Elec. Ry. Improvement Co.  
Elec. Service Supplies Co.  
More-Jones Metal & Brass Co.  
Nuttall Co., R. D.
- Smokestacks, Car**  
Nichols-Lintern Co.
- Snow Sweepers, Rattan**  
Heywood-Wakefield Co.
- Snow-Plows, Sweepers and Brooms**  
Brill Co., The J. G.  
Consolidated Car Fender Co.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.
- Soldering and Brazing Apparatus** (See Welding Processes and Apparatus)  
Irvington Varnish & Ins. Co.
- Special Adhesive Papers**  
Irvington Varnish & Ins. Co.
- Special Trackwork**  
Bethlehem Steel Co.  
Lorain Steel Co.
- Spikes**  
Amer. Steel & Wire Co.
- Spilling Compounds**  
Westinghouse E. & M. Co.
- Splicing Sleeves** (See Clamps and Connectors)
- Springs, Car and Truck**  
Amer. Steel & Wire Co.
- Bemis Car Truck Co.**  
Brill Co., The J. G.  
St. Louis Car Co.
- Sprinklers, Track and Road**  
Brill Co., The J. G.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.
- Steel and Steel Products**  
Carnegie Steel Co.
- Steel Castings**  
Wharton, Jr. & Co., Wm.
- Steps, Car**  
Brill Co., J. G., The  
Morton Mfg. Co.
- Stokers, Mechanical**  
Babcock & Wilcox Co.  
Westinghouse E. & M. Co.
- Stop Signals**  
Oakel Equipment Co.
- Storage Batteries** (See Batteries, Storage)
- Strain Insulators**  
Ohio Brass Co.
- Strand**  
Roebling's Sons Co., J. A.
- Subway Boxes**  
Johna-Pratt Co.
- Superheaters**  
Babcock & Wilcox Co.  
Power Specialty Co.
- Sweepers, Snow** (See Snow Plows, Sweepers and Brooms)
- Switches, Safety**  
Johna-Pratt Co.
- Switches, Selector**  
Nichols-Lintern Co.
- Switches, Tee Rail**  
Ramapo Ajax Corp.
- Switches, Track** (See Track Special Work)
- Switches and Switchboards**  
Anderson Mfg. Co., A. & J. M.  
Elec. Service Supplies Co.  
General Electric Co.  
Westinghouse E. & M. Co.
- Tamper Tie**  
Ingersoll-Rand Co.  
Railway Track-work Co.
- Tapes and Cloths** (See Insulating Cloth, Paper and Tape)
- Tee Rail Special Track Work**  
Bethlehem Steel Co.  
Ramapo Ajax Corp.
- Telephones and Parts**  
Elec. Service Supplies Co.
- Terminals, Cable**  
Std. Underground Cable Co.
- Testing Instruments** (See Instruments, Electrical Measuring, Testing, etc.)
- Thermostats**  
Consolidated Car Heat Co.  
Gold Car Heat. & Ltg. Co.  
Railway Utility Co.  
Smith Heater Co., Peter
- Ticket Choppers & Destroyers**  
Elec. Service Supplies Co.
- Ties, All-Metal**  
Metal Safety R. R. Tie Co.
- Ties, Mechanical**  
Dayton Mechanical Tie Co.
- Ties and Tie Rods, Steel**  
Barbour-Stockwell Co.  
Carnegie Steel Co.  
International Steel Tie Co.
- Tool Steel**  
Bethlehem Steel Co.
- Ties, Wound Cross** (See Poles, Ties, Posts, etc.)
- Tools, Truck & Miscellaneous**  
Amer. Steel & Wire Co.  
Elec. Service Supplies Co.  
Hubbard & Co.  
Railway Track-work Co.
- Tongue Switches**  
Wharton, Jr. & Co., Wm.
- Towers and Transmission Structures**  
Archbold-Brady Co.  
Westinghouse E. & M. Co.
- Track Expansion Joints**  
Wharton, Jr. & Co., Wm.
- Track Grinders**  
Railway Track-work Co.
- Trackless Trolley Cars**  
Brill Co., J. G., The  
St. Louis Car Co.
- Track, Special Work**  
Barbour-Stockwell Co.  
Bethlehem Steel Co.  
Buda Co.  
New York Switch and Crossing Co.  
Ramapo Ajax Corp.  
Wharton, Jr. & Co., Wm.
- Transfer** (See Tickets)
- Transfer Issuing Machines**  
Ohmer Fare Register Co.
- Transfer Tables**  
American Bridge Co.  
Transformers
- Allis-Chalmers Mfg. Co.**  
General Electric Co.  
Westinghouse E. & M. Co.
- Treads, Safety, Stair, Car Step**  
Morton Mfg. Co.
- Trolley Bases**  
Anderson Mfg. Co., A. & J. M.  
Elec. Service Supplies Co.  
General Electric Co.  
More-Jones Brass & Metal Co.  
Nuttall Co., R. D.  
Ohio Brass Co.
- Trolley Bases, Retrieving**  
Elec. Service Supplies Co.  
Nuttall Co., R. D.  
Ohio Brass Co.
- Trolley Buses**  
Brill Co., The J. G.  
General Electric Co.  
Westinghouse E. & M. Co.
- Trolley Material, Overhead**  
Elec. Service Supplies Co.  
More-Jones Brass & Metal Co.  
Ohio Brass Co.
- Trolley Wheel Bushings**  
More-Jones Brass & Metal Co.
- Trolley Wheels & Harps**  
More-Jones Brass & Metal Co.  
Thornton Trolley Wheel Co.
- Trolley Wheels** (See Wheels, Trolley)
- Trolley Wire**  
Amer. Electrical Works  
Amer. Steel & Wire Co.  
Anacanda Copper Min. Co.  
Roebling's Sons Co., J. A.
- Trucks, Car**  
Baldwin Locomotive Works  
Bemis Car Truck Co.  
Brill Co., The J. G.  
McGuire-Cummings Mfg. Co.  
St. Louis Car Co.
- Tubing, Yellow & Black**  
Flexible Varnish  
Irvington Varnish & Ins. Co.
- Turbines, Steam**  
Allis-Chalmers Mfg. Co.  
General Electric Co.  
Westinghouse E. & M. Co.
- Turbines, Water**  
Allis-Chalmers Mfg. Co.
- Turnstiles**  
Elec. Service Supplies Co.  
Percy Mfg. Co., Inc.
- Valves**  
Ohio Brass Co.  
Westinghouse Tr. Br. Co.
- Varnished Papers & Silks**  
Irvington Varnish & Ins. Co.
- Ventilators, Car**  
Brill Co., The J. G.  
Nat'l Ry. Appliance Co.  
Nichols-Lintern Co.  
Railway Utility Co.  
St. Louis Car Co.
- Welded Rail Joints**  
Alumino-Thermic Corp.  
Elec. Ry. Improvement Co.  
Ohio Brass Co.  
Railway Track-work Co.
- Welders, Portable Electric**  
Elec. Ry. Improvement Co.  
Ohio Brass Co.  
Railway Track-work Co.
- Welding Processes and Apparatus**  
Alumino-Thermic Corp.  
Elec. Ry. Improvement Co.  
General Electric Co.  
International Oxygen Co.  
Ohio Brass Co.  
Railway Track-work Co.  
Westinghouse E. & M. Co.
- Welding Steel**  
Elec. Ry. Improvement Co.  
Railway Track-work Co.
- Wheel Guards** (See Fenders and Wheel Guards)
- Wheel Presses** (See Machine Tools)
- Wheels, Car, Cast Iron**  
Bemis Car Truck Co.  
Carnegie Steel Co.
- Wheels, Wrought Steel**  
Carnegie Steel Co.
- Wheels, Trolley**  
Anderson Mfg. Co., A. & J. M.  
Elec. Ry. Equipment Co.  
Elec. Service Supplies Co.  
General Electric Co.  
More-Jones Brass & Metal Co.  
Nuttall Co., R. D.  
Star Brass Works
- Whistles, Air**  
General Electric Co.  
Ohio Brass Co.  
Westinghouse E. & M. Co.
- Wire Rope**  
Roebling's Sons Co., J. A.
- Wires and Cables**  
Amer. Electrical Works  
Amer. Steel & Wire Co.  
Anacanda Copper Min. Co.  
General Electric Co.  
Okonite Co.  
Roebling's Sons Co., J. A.  
Std. Underground Cable Co.  
Westinghouse E. & M. Co.



## The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.



**THE STAR BRASS WORKS**  
KALAMAZOO, MICH., U. S. A.



**'CARNEGIE'**  
*for*  
**WHEELS**  
**AXLES**  
**RAILS**  
**CROSS TIES**



**Carnegie Steel Company**  
PITTSBURGH, PENNA.

## Tests Prove That Fewer Inspections Are Required



This fact about the Thornton Side Bearing Trolley Wheel is due to the method of lubrication and the extremely long life of the bearings. The construction insures a perfectly balanced wheel and freedom from vibration and noise. Users are getting over 50,000 miles from the side bearings. Write for Bulletin.

**Thornton Trolley Wheel Co.**  
Incorporated  
Ashland, Kentucky

## The Differential Car

An automatic dump car, an electric locomotive, a snow plow, and a freight car—all in one. Big savings shown in track construction and maintenance, paving work, coal hauling, ash disposal, snow removal, and freight transportation.

**The Differential Steel Car Co.**  
Findlay, Ohio



## IN THE REPAIR SHOPS

There are many cars not equipped with



**AJAX**  
**CAR BRASSES**

The cars that are equipped with Ajax Brasses keep on the road, day after day

**The Ajax Metal Company**

Established 1880

Philadelphia, Pa.

NEW YORK

CHICAGO

BOSTON

CLEVELAND

## N-L STOP SIGNAL

Simple in Operation, Installation and Maintenance

Canadian Representative:  
Railway & Power Eng. Corp.,  
Toronto, Ontario

The Nichols-Lintern Co.  
7960 Lorain Ave., Cleveland, Ohio

## "Boyerized" Products Reduce Maintenance

Bemls Trucks Manganese Brake Heads  
Case Hardened Brake Pins Manganese Transom Plates  
Case Hardened Bushings Manganese Body Bushings  
Case Hardened Nuts and Bolts Bronze Axle Bearings

Bemls Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

Bemis Car Truck Co., Springfield, Mass.



## "OSKELITE"

The Stop Light for street cars. Operates from brake system. Details on request.

**The Oskel Equipment Co.**  
940 McCormick Bldg., Chicago, Ill.



## CHILLINGWORTH

One-Piece Gear Cases

Seamless—Rivetless—Light Weight  
Best for Service—Durability and Economy. Write Us.

**Chillingworth Mfg. Co.**  
Jersey City, N. J.

ALPHABETICAL INDEX TO ADVERTISEMENTS

Table listing advertisements in alphabetical order by page. Columns include letter (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, R, S, T, U, W), page number, and company name.

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. Sample and information gladly sent.
SAMSON CORDAGE WORKS, BOSTON, MASS.

100 New Users in the Last Nine Months
KASS SAFETY TREADS
HIGH in efficiency and lasting qualities
LOW in weight, initial and upkeep costs
Morton Manufacturing Co., Chicago

Northern CEDAR POLES Western
We guarantee all grades of poles; also any butt-treating specifications
BELL LUMBER COMPANY
Minneapolis, Minn.

"Axle Specialists Since 1866"
Address all Mail to Post Office Box 515, Richmond, Va.
CAR AXLES
J. R. JOHNSON AND CO., INC.
FORGED STEEL AXLES
For Locomotives, Passenger, Freight and Electric Cars
Smooth Forged or Rough Turned—Carbon or Alloy Steel—Plain or Heat Treated, Forged and Turned Piston Rods, Crank Pins, Large Shafts, Round Bars, etc.

STUCKI SIDE BEARINGS
A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

ALUMINO-THERMIC JOINTS
New and independent process. No inserts needed. Up-to-date and economical.
Alumino-Thermic Corp.
Roselle Park, N. J.



## Brill "Winner" Seats in Chicago

Brill "Winner" seats are continually specified because they give satisfaction in service, to the public because they are designed for maximum comfort and to the operating company because they are light in weight yet sturdily built to meet the service requirements.

Pedestals, aisle and wall plates and seat rockers are of pressed steel while cushions and backs are upholstered in twill-woven rattan or as desired.

Chicago's latest double-truck cars were equipped with Brill "Winner" Seats.

**THE J. G. BRILL COMPANY.**  
 PHILADELPHIA, PA.

AMERICAN CAR CO. — ST. LOUIS MO. — G. C. KUHLMAN CAR CO. — CLEVELAND, OHIO — WASON MANFG CO. — SPRINGFIELD MASS.





*Brill trolley bus with  
GE-258 Motors and  
foot-operated M control.*

## Philadelphia also Believes in Buses

**9** TROLLEY BUSES of this design, G-E equipped, are in regular operation on the Oregon Avenue Line of the Philadelphia Rapid Transit Company.

As an auxiliary to present service, the trolley bus offers an opportunity. Have you considered it?



General Electric Company  
Schenectady, N. Y.  
Sales Offices in all Large Cities

# GENERAL ELECTRIC