

ELECTRIC RAILWAY JOURNAL



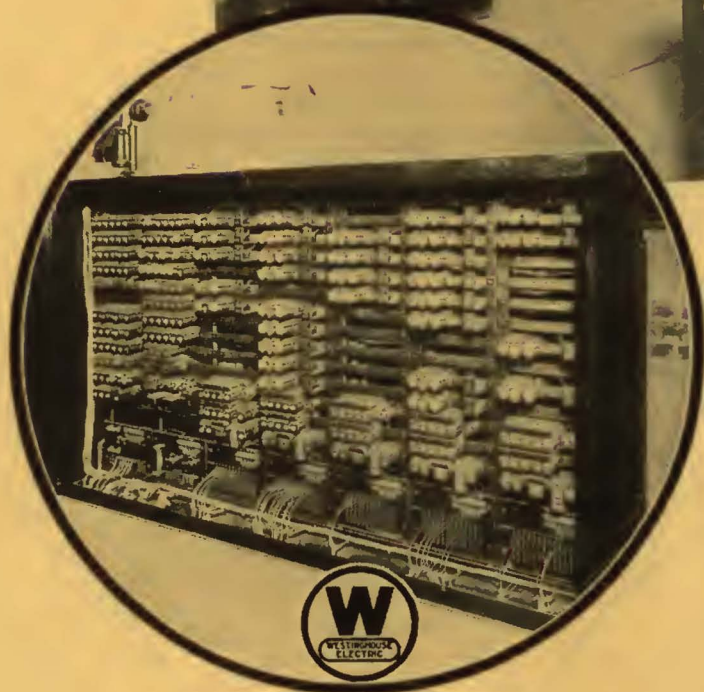
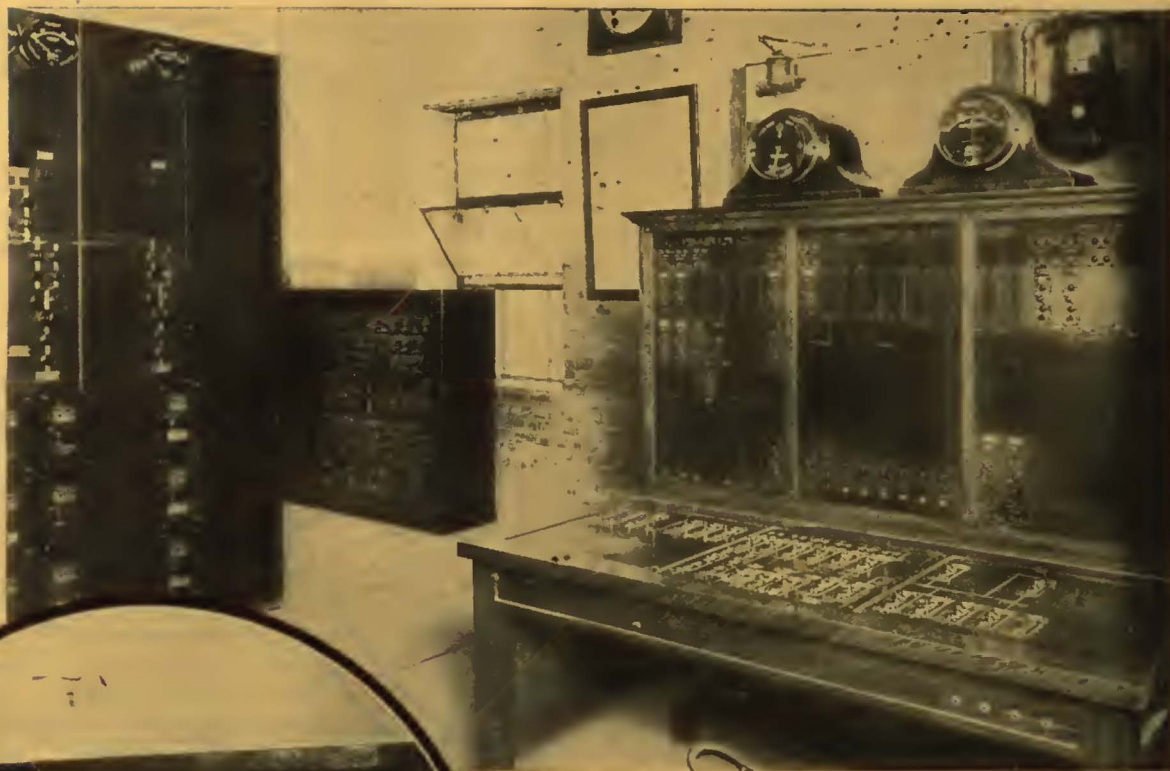
HOUSTON PUBLIC LIBRARY
LYCEUM AND CARNEGIE BRANCH
HOUSTON, TEXAS.

Spoksteel

*the
New Wheel
for Buses
and Trucks
—by*

THE finest material ever possible in metal wheels has been combined with the undeniable advantages of spoked construction. Absolute surety, reduced weight, simple mounting and easy inflation save trouble, tires, and time. Sponsored by the world's largest wheel makers. MOTOR WHEEL CORPORATION, LANSING, MICHIGAN

Motor Wheel



Trustworthy Apparatus

ONLY standard automatic telephone relays are used in Westinghouse Supervisory Control Systems. They are peculiarly adapted to the needs of supervisory control. Years of use on telephone lines have proved their dependability.

That the design of these relays is correct is shown by their operating records. A single unit has made, on test, more than 50,000,000 circuit closings without failure or any appreciable change in contact resistance.

In some large city telephone exchanges, after 15 years of continuous operation, the relay failures are only about 200 a year for 50,000,000 operations. In one large exchange the percentage of failures is but one in 5,000,000. The relays are given only an occasional inspection.

That is reliability.

And this is the kind of apparatus used in Westinghouse Supervisory Control Systems.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

Sales Offices in all Principal Cities of
the United States and Foreign Countries

By means of Westinghouse Supervisory Control the operator at the St. George substation of the Staten Island Rapid Transit Railway System controls the entire system. Under his control are four automatic railway substations, and two high-voltage power switching substations.

Above are shown the dispatcher's control desk at the St. George substation and the Clifton Junction substation relay cabinet.



1926

Westinghouse

MORRIS BUCK
Managing Editor
JOHN A. DEWHURST
Associate Editor
JOHN A. MILLER, JR.
Associate Editor
CLARENCE W. SQUIER
Associate Editor
CARL W. STOCKS
Associate Editor

ELECTRIC RAILWAY JOURNAL

CHARLES GORDON, *Editor*

HENRY W. BLAKE
Senior Editor
GEORGE J. MACMURRAE
News Editor
EDWIN F. THAYER
Assistant Editor
PAUL WOOTON
Washington Correspondent
ALEX McCALLUM
Editorial Representative
London, England

Vol. 68
No. 1

CONTENTS

Pages
1-48

JULY 3, 1926

Editorials	1
Car Purchases Below Normal Rate.....	4
Survey for past six months shows a total of 802 cars of all types ordered. Of these, 740 are passenger cars. Little present indication of improvement during remainder of year. Bus purchases approximate first-of-the-year predictions.	
Greatest Feat in Transportation History.....	7
All records for passenger handling believed to have been broken by the Chicago Surface and Elevated Lines during the Mundelein migration. Vivid account of the extreme length to which the roads went to accommodate prospective passengers.	
Safety Pays in Milwaukee	11
Energetic Campaign for Paving Relief of Wheeling	11
Havana Railway Operation Combines American and Cuban Methods	12
Extremely narrow streets and close spacing of stops create operating difficulties. Fares are low and no standing passengers are carried. Double trolley wire is used, supported by unique overhead construction.	
One Owner's Faith in the Trolley.....	15
In the rehabilitation of the Steubenville, East Liverpool & Beaver Valley Traction System particular attention was paid to the rolling stock. New cars were purchased and old cars rebuilt to give better service.	
Improved Employment Record in Boston Reflects Good Condition	17
Notable Safety Work in Savannah	18
The company was the winner over two competitors in a railway safety contest. An account is given of the methods followed in promoting safety through team contests, maintenance of individual records of trainmen and careful analysis of the causes of casualties.	
Maintenance Notes	21
Association News and Discussions	24
Bluff Point Meeting Well Attended.....	24
Many phases of bus operation discussed at New York Electric Railway Association convention. Railway operators and manufacturer representatives gave ten-minute talks on live topics in their fields.	
The Circulating Load in Passenger Movement.....	27
BY A. FRANK PAUL.	
Tax Problems in New York State.....	28
BY RALPH NORTON.	
Some Legal Phases of Street Railway and Bus Operation	29
BY ALFRED T. DAVISON.	
Traffic Problems	31
BY LEON R. BROWN.	
Motor Vehicle Operation in Rochester.....	33
BY ROY R. HADSELL.	
American Association News	34
News of the Industry	35
Recent Bus Developments	40
Financial and Corporate	41
Legal Notes	43
Personal Mention	44
Manufactures and the Markets	46

Fact or Fancy

EXPLORERS are constantly extending that portion of our globe about which we have definite knowledge. Only recently two parties have made flights over the vast unexplored area near the North Pole. They brought home accurate reports and dissipated many vague rumors concerning that unknown land.

Often returning travelers bring back strange and unlikely tales concerning the transportation systems in foreign countries. Experienced American railway operators usually are skeptical of such stories, but there is little opportunity to discover from the daily press whether they are fact or fancy.

For this reason, ELECTRIC RAILWAY JOURNAL regularly devotes a considerable amount of space to foreign transportation matters. All important developments are covered either as news items or in longer technical articles.

In some cases the foreign practices thus presented may be an improvement on those followed in this country. In other cases, perhaps, they are impracticable under the conditions existing here. However that may be, American operators are kept thoroughly posted concerning the state of the industry throughout the rest of the world. For the readers of the JOURNAL there is no far-away undiscovered land of fanciful transportation development. Definite knowledge has replaced vague rumor.

McGRAW-HILL PUBLISHING COMPANY, INC.

Tenth Avenue at 36th Street, New York, N. Y.

JAMES H. MCGRAW, President
JAMES H. MCGRAW, JR., V.-P. and Treas.
MALCOLM MITCHELL, Vice-President
EDWARD J. MERRILL, Vice-President
MASON BRITTON, Vice-President
EDGAR KOBAK, Vice-President
C. H. THOMPSON, Secretary

Cable Address: "Machinist, N. Y."

Publishers of
Engineering News-Record
American Machinist
Power

Chemical and Metallurgical Engineering

Coal Age

Engineering and Mining Journal

Ingenieria Internacional

Bus Transportation

Electric Railway Journal

Electrical World

Industrial Engineer

Electrical Merchandising

Radio Retailing

Successful Methods

Journal of Electricity

(Published in San Francisco)

American Machinist—European Edition

(Published in London)

WASHINGTON:
Colorado Building

CHICAGO:
7 S. Dearborn Street

PHILADELPHIA:
18th and Parkway

CLEVELAND:
Guardian Building

ST. LOUIS:
Star Building

SAN FRANCISCO:
833 Mission Street

LONDON:
8 Bouverie Street, London, E. C. 4

Member Associated Business Papers, Inc.

Member Audit Bureau of Circulations



The annual subscription rate is \$4 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, Chile 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, 1926, by McGraw-Hill Publishing Company, Inc.
Published weekly. Entered as second-class matter, June 23, 1908, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

 SAVING THE RAIL SAVES THE RAILWAY

Get a merchandising viewpoint into your maintenance budget

It's important. You have only one thing to sell—service. It's an overworked word and an underworked idea. If the service you sell does not please the buyers, they'll stop buying. You can't maintain satisfactory service if you don't maintain your property.

You can sell safe, smooth, swift, silent and satisfactory service only on well-maintained track.

The surest way to maintain track is to maintain the rail. For that purpose the welding and grinding equipment here shown provides the most economical and most effective method.

*Quotations by wire
if you are in a hurry.*

Railway Trackwork Co.

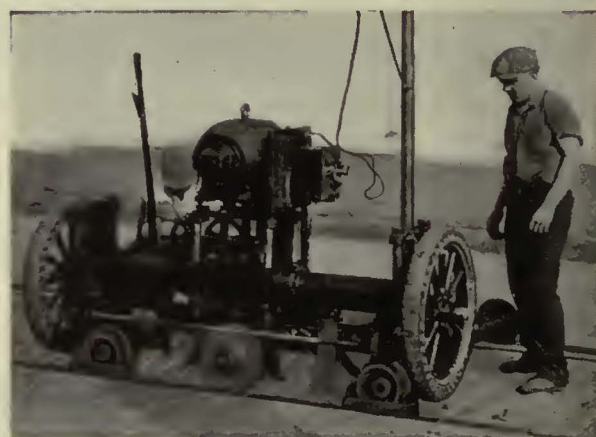
3132-48 East Thompson Street, Philadelphia

AGENTS:

Chester F. Gallor, 30 Church St., New York
Chas. N. Wood Co., Boston
Electrical Engineering & Mfg. Co., Pittsburgh
H. F. McDermott, 208 S. LaSalle St., Chicago
Equipment & Engineering Co., London
P. W. Wood Railway Supply Co., New Orleans, La.
Frazar & Co., Japan



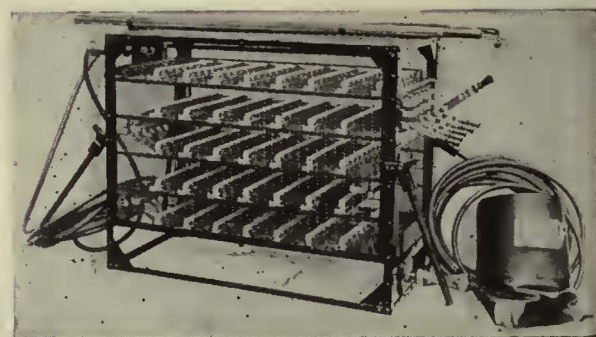
"Improved Atlas" Rail Grinder



"Imperial" Track Grinder



Reciprocating Track Grinder

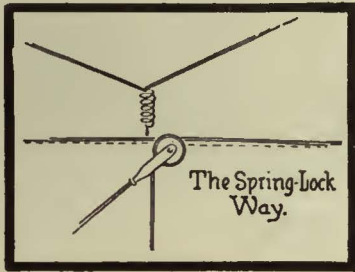
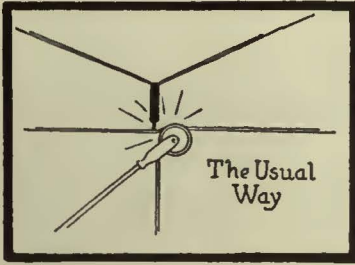


"Ajax" Electric Arc Welder

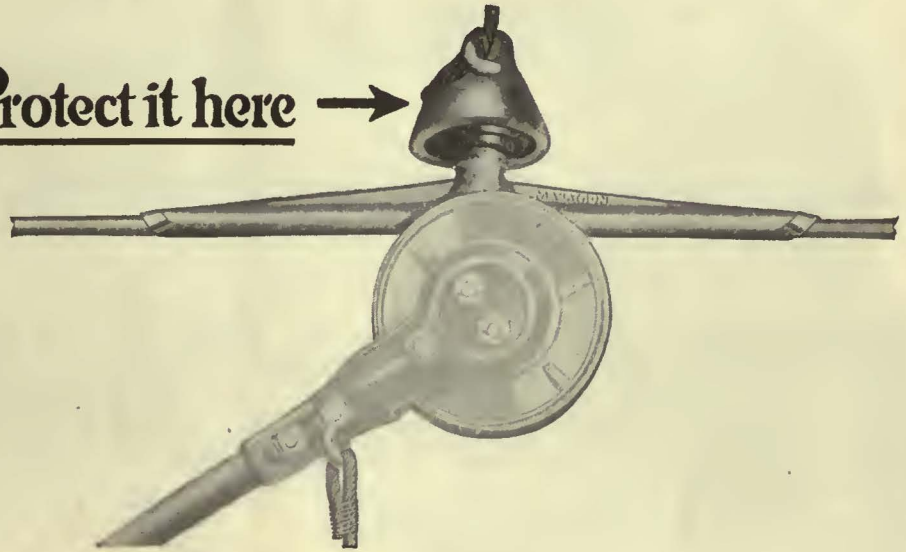
1187

 SAVING THE RAIL SAVES THE RAILWAY

Give Your Overhead a Chance

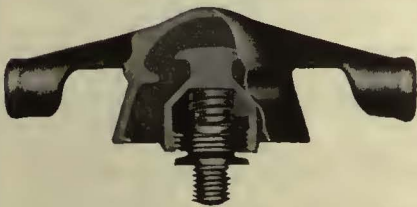


Protect it here →

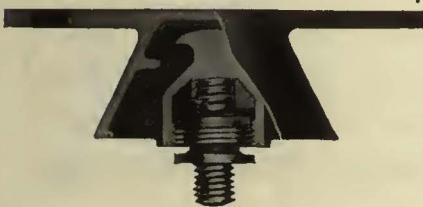


O-B Spring Lock Hangers Are Like Shock Absorbers on the Line

For Span



For Bridge or Barn



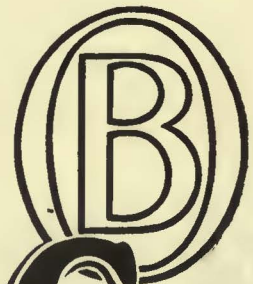
THREE YEARS' USE on many properties has shown that O-B Spring Lock Hangers last longer and prolong the life of both ear and trolley wire by cushioning the hammer blows of the trolley wheel.

Impact is absorbed by a coil spring placed between the stud and hanger body. This spring lasts for years because it is compressed only when the trolley wheel passes directly under the hanger. A fibre grease packing in the spring chamber excludes moisture and prevents rust. The trolley ear threads tightly against the bronze collar on the stud. Turning the ear back into line with the trolley wire does not disturb this tight connection.

O-B Spring Lock Hangers are especially desirable for car houses, underpasses and troughs. But many companies use them for their entire overhead, so marked is the improved smoothness of operation. A notable reduction of the noise within the car is also effected.

Ohio Brass Company, Mansfield, O.
Dominion Insulator & Mfg. Co., Limited,
Niagara Falls, Canada

76B



Ohio Brass Co.

PORCELAIN INSULATORS • LINE MATERIALS • RAIL BONDS • CAR EQUIPMENT • MINING MATERIALS • VALVES



SPEAKING of MODERN CARS

EVERYONE is talking about the "modern car!" At the last American Electric Railway Association Convention, speakers brought out the fact that there are more than 25,000 cars still in service, all over eighteen years of age. They should be replaced.

When considering the modern car, be sure the wheel equipment is modern, too.

Davis "One-Wear" Steel Wheels fulfill modern car requirements. They are lighter than the ordinary wheel. They are much stronger, which aids in noise-reduction through reduction of flats.

Economy, the main idea in the modern car, is attained, because Davis "One-Wear" Steel Wheels require no shopping for contour reconditioning. They last longer, with less maintenance expense.

AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS



EUCLID AVENUE, CLEVELAND



NAZARETH, PA.

Big City or Small Town

THE ready acceptance Twin Ties have in both the large city and small town, make us feel sure we have something to offer both.

The first-cost economy of the Twin Tie design makes the biggest appeal on the small property.

The increased life of track and the renewable design, both based on actual experience and practice, influence the large city properties to use **STEEL TWIN TIES**.

The volume of Steel Twin Tie Track is, of course, laid in the cities because that is where the volume is.

We have analyzed in the table where the work now in progress is being done, to indicate this more clearly.

Analysis of 28 Twin Tie Installations Now in Progress

CITY-POPULATION	Number of Cities or Towns
1,000,000 and over	2
750,000 to 1,000,000	1
500,000 to 750,000	3
200,000 to 500,000	3
100,000 to 200,000	3
50,000 to 100,000	7
Under 50,000	9

May we send Catalog and Quotation?

The International Steel Tie Company
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track . . . Permanent Foundation

Signals

and their Diversified Applications.

Have you more than scratched the surface to uncover available means of protecting and speeding up your traffic, and are you experiencing delays or perhaps accidents which might be eliminated by the use of one or more of the following means?



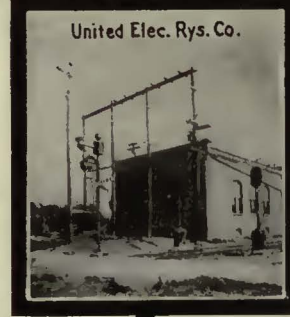
1.—Automatic semaphore or color light block signals, controlled by continuous track circuits.



2.—Electro-pneumatic, electric, electro-mechanical, or purely mechanical interlocking systems at terminals or at grade crossings with other railway lines.



3.—Highway crossing protective devices of flashing color light, wig-wag and audible types or combination of same.



4.—Remotely controlled switches at outlying sidings.



A statement of your problem places you under no obligation and if it appears to our engineers that your conditions can be improved by installation of our materials, we shall be glad to furnish complete details.



Electric Railways which are large users of Union automatic signal and interlocking systems are:

Chicago, Lake Shore & South Bend Ry. Co.
Chicago, South Bend & Northern Indiana Ry.
Kansas City, Clay County & St. Joe Ry. Co.
Washington, Baltimore & Annapolis Elec. R. R.

Interstate Public Service Co.
Pacific Electric Ry. Co.
Illinois Traction System
United Elec. Rys. Co.

Scranton & Binghamton R. R. Co.
United Railways & Elec. Co.
San Francisco-Sacramento R. R.
Northern Texas Traction Co.



Union Switch & Signal Co.

SWISSVALE, PA.





Independence Hall—Philadelphia Floodlighted with Golden-Glow Projectors.

City Hall—Philadelphia Floodlighted—Many Golden Glow Projectors are used.

PHILADELPHIA has invited you to participate in her Sesqui-Centennial Exposition, commemorating one hundred and fifty years of glorious history and uninterrupted progress.

And the Electric Service Supplies Company, for many years one of Philadelphia's leading industrial concerns, welcomes you. A cordial invitation is extended to visit our manufacturing plant at 17th and Cambria Sts.,—North Philadelphia—the home of the famous Keystone line of Railway, Power and Industrial Electrical Equipment.

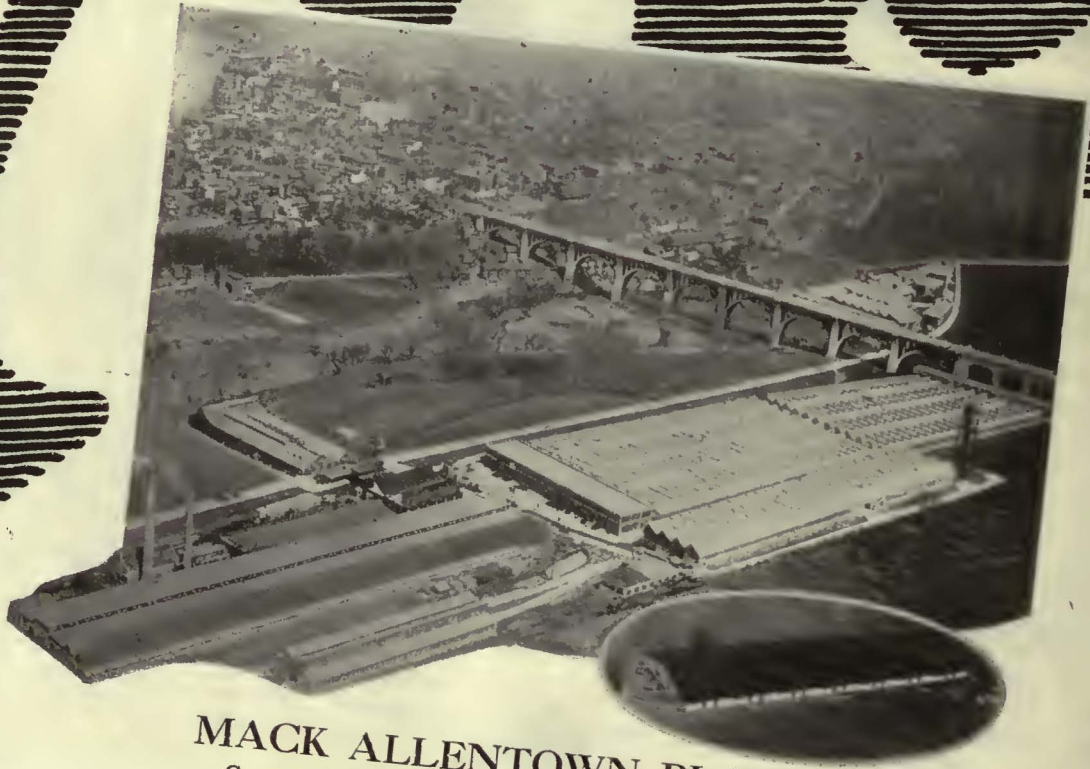


ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.
PITTSBURGH
1123 Bessemer Building

NEW YORK
50 Church St.
BOSTON
88 Broad St.
SCRANTON
316 N. Washington Ave.
Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

CHICAGO
Illinois Merchants' Bank Bldg.
DETROIT
General Motors Bldg.



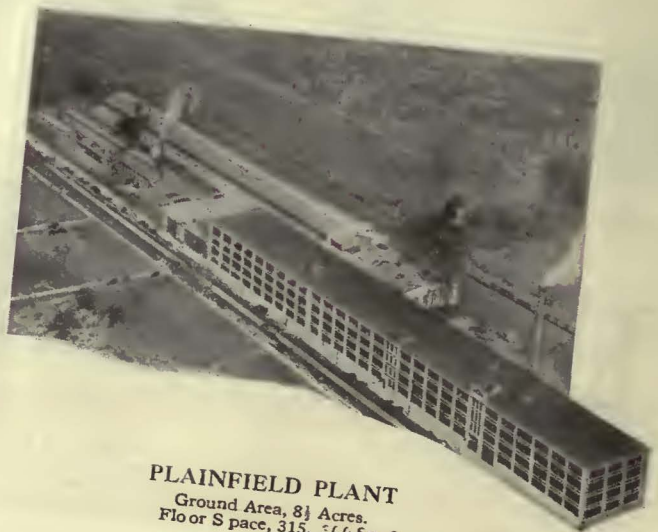
MACK ALLENTOWN PLANT

Ground Area, 132 Acres. Floor Space, 926,463 sq. ft.



NEW BRUNSWICK PLANT

Ground Area, 17 Acres
Floor Space, 486,260 Sq. ft.



PLAINFIELD PLANT

Ground Area, 8 1/2 Acres.
Floor Space, 315, 360 Sq. ft.

Mack-Made Buses

- 25-Passenger City Type
- 29-Passenger City Type
- 25-Passenger Parlor Car
- 25-Passenger Suburban Type
- 29-Passenger Suburban Type
- 25-Passenger Gas-Electric
- 29-Passenger Gas-Electric

What's behind
the Bus you buy?

What an impartial observer saw at Allentown

At Allentown, Pa., the Impartial Observer viewed the third and largest Mack plant where the larger chassis parts are made, the chassis erected, tested, finished and shipped and where Mack bodies are built. His cursory inspection required 5 miles of walking, after which he said:

"No wonder Mack quality is superlative. Here is bus manufacture on a stupendous scale, conducted in enormous buildings, each planned and built for a specific purpose, each shop flooded with daylight and equipped with machines whose fineness and efficiency is worthy of the super-materials used in Macks.

"In the enormous machine shop, the great frame, sheet-metal, wood-working and assembly shops, precision, cleanliness and ceaseless inspection proceed in line with the latest thoughts on straight-line production straight to the long erection floor.

"As with the exhaustive tests of gear parts at New Brunswick and the astonishing double test of engines at Plainfield, the tests at Allentown from rough forgings to finished chassis dynamometers permit nothing to be taken for granted.

"Having seen the ideal conditions under which Mack buses are finished, I no longer marvel at their thoroughgoing and lasting good looks.

"Why, Mack manufacture is a gigantic enterprise. Just one department, the bus body plant, is the largest of its kind in the world. The Mack is truly a completely manufactured, thoroughly standardized product of surpassing quality."

Mack cordially invites you to inspect its great factories and gain first-hand knowledge of how the Mack is built. If you cannot make this inspection, the direct Mack Factory Branch nearest you will gladly show you the finished product.

MACK TRUCKS, INC.

INTERNATIONAL MOTOR COMPANY

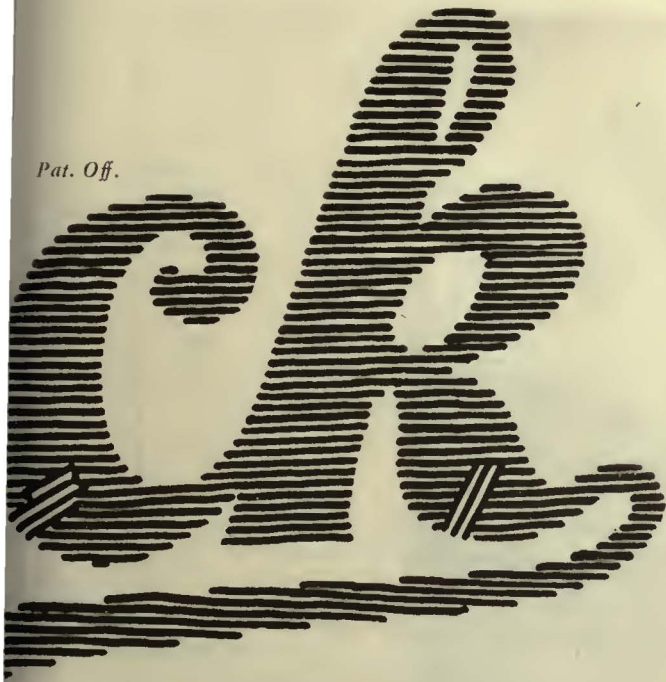
25 Broadway, New York City

One hundred and seven direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."

The **Mack** Bus



Pat. Off.





No. 4—3-conductor Super Service Cable—carrying 7500 volts to the big Marion Shovel, twenty-four hours a day.

No. 10—3-conductor Super Service Cord is used on this churn drill which precedes the shovel in its operations.



After almost a year of 24-hour days they report—"exceptionally good service"

At the Sunlight Coal Co.'s operation, in Indiana, Super Service Cords and Cables have been in service for almost a year.

The cable, carrying power to the big electric shovel, is dragged its full length over rocks and through mud every two or three days.

The cord that supplies the churn drill is hauled about from one position to the next through mud, muck and water.

Both the cord and the cable are exposed

to the weather at all times. Yet, in spite of this, Mr. F. B. Janeway, electrical engineer in charge, reports that Super Service "has given exceptionally good service."

The answer lies in the fact that every foot of Super Service is vulcanized in steel molds under tons of pressure. A patented process that gives perfectly centered conductors and an outside jacket that is water proof and tough enough to withstand the daily abuse of work under the worst conditions.

ROME WIRE COMPANY

Mills and Executive Office: ROME, N. Y.
Diamond Branch: BUFFALO, N. Y.

New York
50 Church Street
Boston
Little Building
Chicago
14 E. Jackson Blvd.
Detroit
25 Parsons Street

SUPER SERVICE

CORDS and CABLES

Cleveland
1200 West 9th Street
Los Angeles
J. G. Pomeroy, Inc.
336 Azusa St.
San Francisco
J. G. Pomeroy, Inc.
51 Federal Street

2567

A ROME WIRE PRODUCT



Independence

NATIONAL Pneumatic Door and Step Equipment makes operation independent of the passengers who otherwise would try to board or to alight when cars are in motion. It frees the car crew who are able to devote their full attention to collection of fares and to car operation. It makes operation of the doors independent of the temper of conductors and frees it from all irritation, noise and slam-bang handling.

NATIONAL PNEUMATIC COMPANY

Executive Office: 50 Church Street, New York

General Works: Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building



American Brown Boveri Mercury-Arc Power Rectifiers

***answer:—**

WIDELY used in Europe for a number of years, Mercury-Arc Power Rectifiers have found their most popular application in the electric railway field. Their ability to effectively handle the fluctuations in load on railway lines without material loss in efficiency, from no-load, to high overload, is proved. There is no inertia of heavy rotating parts to be overcome.

On the accompanying charts are curves showing the comparative efficiencies and the average converting losses of Rotary Converters and Mercury-Arc Rectifiers for 600 Volts D.C. These data refer to an actual load curve of an interurban railroad. Note the great advantage of the Mercury-Arc Rectifier at one-quarter load, an ordinary condition on traction lines in non-rush hours; an idea of which can be gained by comparing the all day converter efficiencies and the converting losses.

Other advantages of the Mercury-Arc Power Rectifier are:— absolutely quiet operation, no moving parts except small auxiliaries, adaptable to full automatic operation, minimum maintenance required.

Further details of the principles, construction and operating features of this equipment will be given in subsequent advertisements.

Brown Boveri engineers have developed the Mercury-Arc Power Rectifier to a high degree of perfection in Europe. We are now in the act of building and installing this type of equipment in America.

**To the question— What points of difference are there between Mercury-Arc Power Rectifiers and other conversion units?*

**American Brown Boveri Electric
Corporation**

165 Broadway, N. Y. C. Camden, N. J.



PRINCIPAL PRODUCTS

*Electric Locomotives
for any system of current, high or
low tensions*

*Complete Equipment
for railway electrification*

*Mercury-Arc Power Rectifiers
(steel enclosed)*

Diesel-Electric Locomotives

Mining Locomotives

Motors (all sizes and types)

Rotary Converters

Motor Generators

Transformers (power or current)

*Switches, Controllers
and all Auxiliary Equipment*

Oil Switches

Condensers and Auxiliaries

*Steam Turbo Generators
for normal or high pressures and
superheats*

Automatic Regulators

Relays

Turbo Compressors and Blowers

Electric Furnaces

Induction Regulators

Ships

Diesel Driven

Turbine Driven

Electrically Driven

Structural Steel Fabrication

AMERICAN

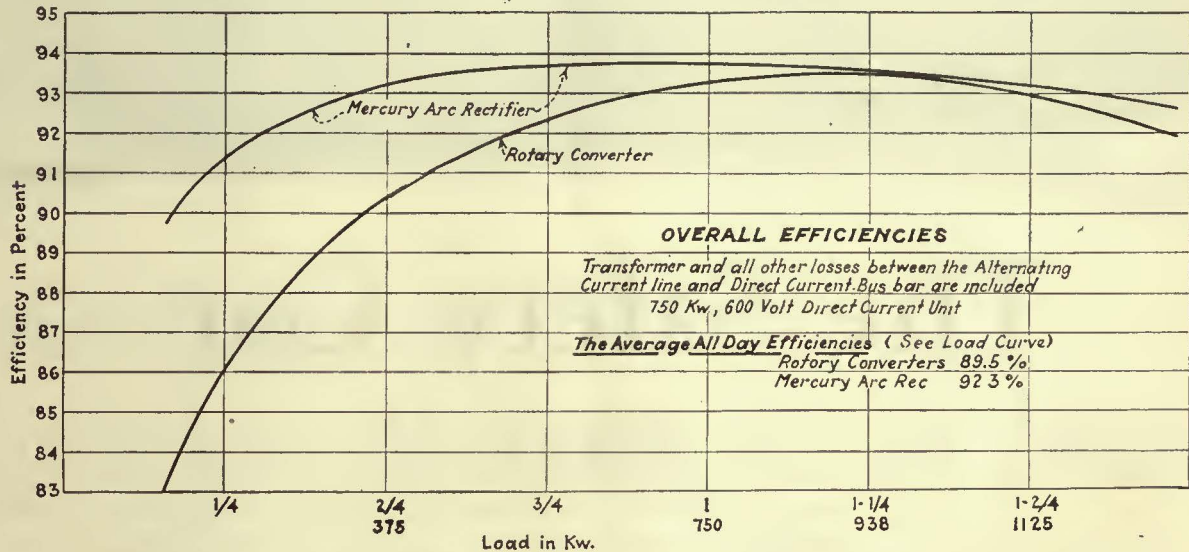
Efficient at all loads

With a BROWN BOVERI MERCURY-ARC RECTIFIER, characterized by unusually high efficiency at partial loads, the Average Converting Losses are, at extremely Low Load Factor, cut down tremendously, even at Rail Voltages as low as 600 V. Below is shown what can be done in an Actual Case by the use of Mercury-Arc Rectifiers. The reference is to an Interurban Railroad in one of the Eastern States. The substation rating is

750-Kw.-H., 600 V. The part of a record roll reproduced on this page shows the usual output over a period of six hours.

The AVERAGE ALL DAY OVERALL EFFICIENCY was found to be:

for Rotary Converters..... 89.5%
for Mercury-Arc Rectifiers..... 92.3%

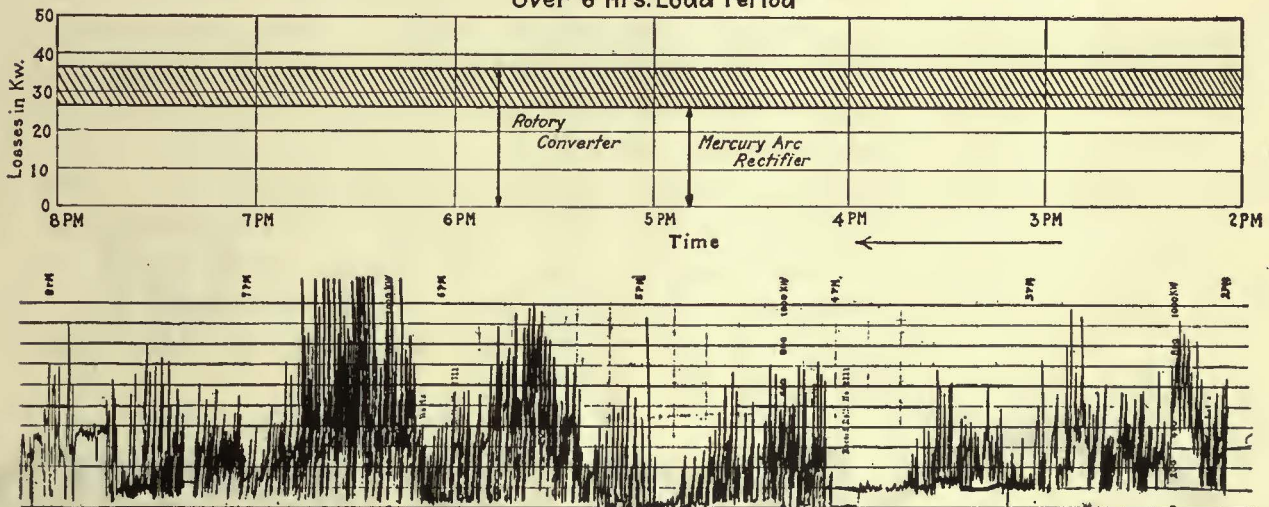


The saving obtained in six hours (represented by the shaded area) when extended over a 20-hr. day, amounts to MORE THAN 200 KW.-H., or, at 1c. per Kw.-H., THE ANNUAL SAVING effected is \$730.00, which is

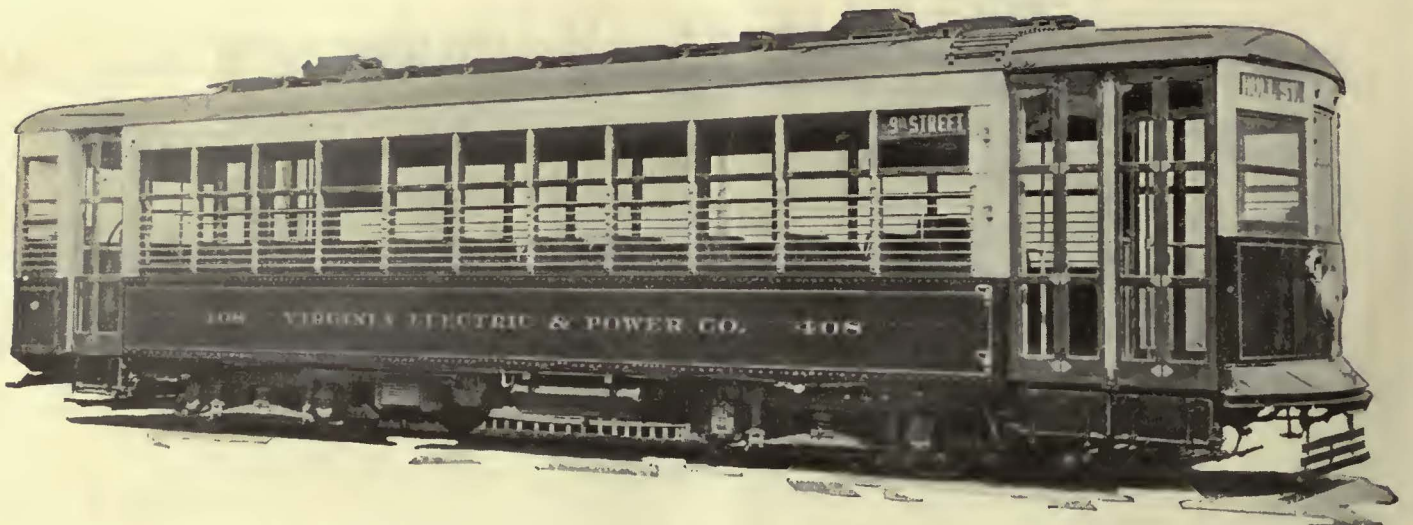
the INTEREST on MORE THAN \$10,000.00.

In addition to the power saving, the maintenance cost will be less than half as much as with rotary converters.

Comparative Average Converting Losses in Kw. Over 6 Hrs. Load Period



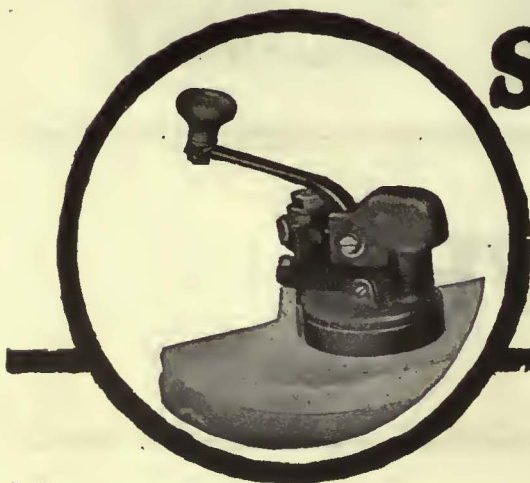
BROWN BOVERI



The Safety Car

—is an exemplification of modern safety and economy in street railway equipment. It bridges the gap between ordinary precaution and positive safety, stimulating public appreciation through the medium of safe, adequate, accelerated service that follows with the obvious economic advantages of Safety Car installation.

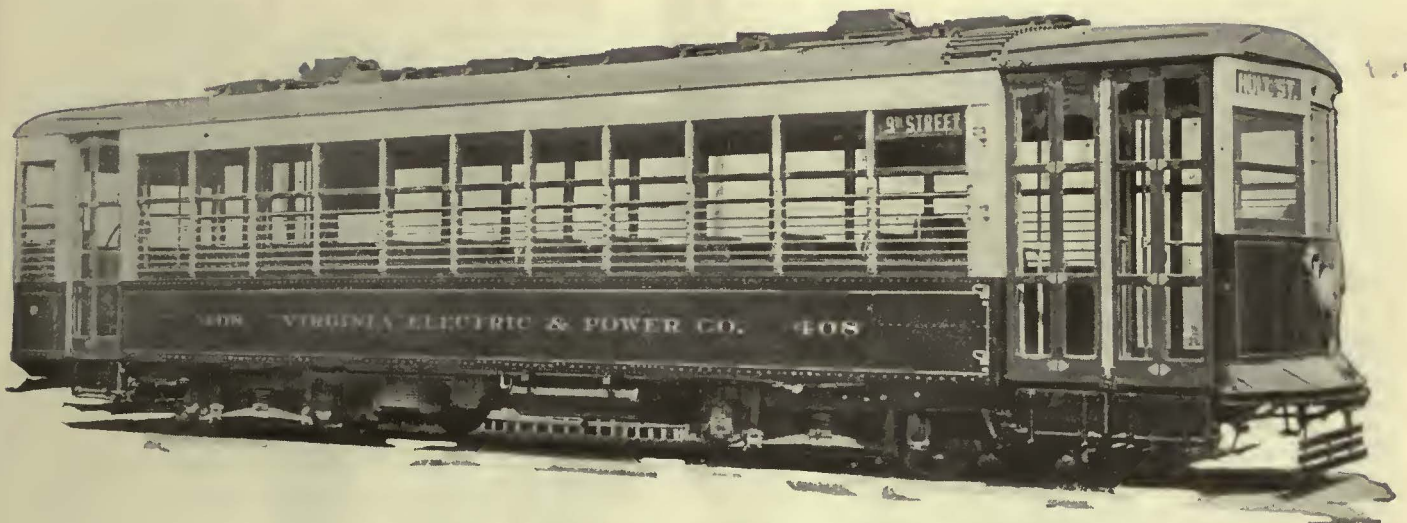
Safety Car Control Equipment interlocks the power, brake and door control functions to combine ease and convenience of operation with positive safety. Greater convenience is realized because both brakes and doors are controlled by the manipulation of a single operating handle, and because selective door control is possible. Greater safety is assured because careless or promiscuous door opening is prevented, the car must be stopped before the doors can be operated, the doors must be closed before the car can be started, and release of the controller handle, through motorman's negligence or disability, cuts off the power and applies the brakes automatically.



SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH



A new user of Variable Load Brakes

The *Virginia Railway and Power Company* has recently put into service 15 new cars equipped with Westinghouse Variable Load Brakes.

This is one of the many traction companies that have recognized the auspicious part that Variable Load Brakes can play in the operation of modern light weight surface cars.

Variable Load Brakes provide for the same effectiveness of retardation throughout the entire range of car loading, thus assuring uniformly short stops which are reflected in greater safety and increased schedule speeds.

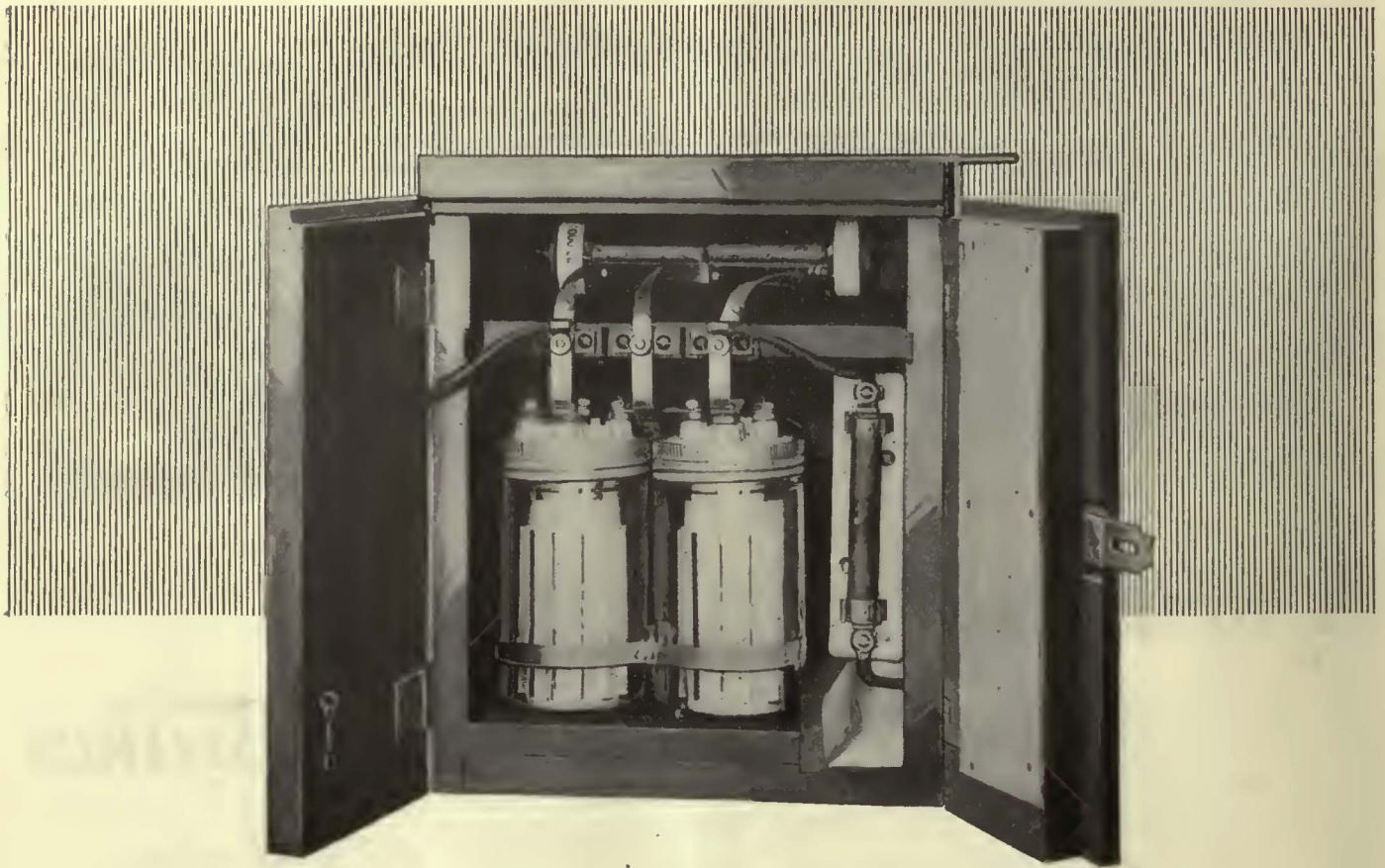


Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office—
Ask for Descriptive Catalogue T-2045.

WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works: WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES



Worthy of modern cars

The installation of D-C. Aluminum Arresters is right in line with the adoption of modern cars to reduce operating costs, because the record of this railway arrester in furnishing lightning protection is a record of cars kept out of the shop.

It is significant that south of the Mason-Dixon Line, where lightning storms are the most numerous, practically every electric railway has its equipment protected with arresters of this type.

The absolute protection afforded by the D-C. Aluminum Arrester is attested by roads where, with hundreds installed, not a single armature failure caused by lightning is experienced for years at a time.

No wonder that the confidence in this arrester is so enduring!



The D-C. Aluminum Arrester built by General Electric has the advantage of the most advanced facilities for research in lightning phenomena. It has the advantage of G-E experience with arresters for all other classes of service. It is the superlative arrester for the protection of car equipment.

GENERAL ELECTRIC

Electric Railway Journal

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

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, Editor

Volume 68

New York, Saturday, July 3, 1926

Number 1

Drifting Along the Path of Least Resistance

RESULTS just obtained in a survey of car purchases for the first six months of the year and published in this issue demand careful consideration by all electric railway men. A most serious condition is divulged by these figures. To say that some mighty straight thinking is required by the industry is putting the situation mildly. There have been a total of 802 cars purchased for the half year and at present there seems to be little prospect of exceeding this number during the next six months. At this rate there would be a total of 1,600 cars purchased for the year. This is approximately the number purchased during 1925, the lowest for several years.

A moment's consideration shows where this rate of car purchases is leading the industry. Assuming that all cars bought are for replacements and not for additional facilities, it would take at least 45 years to renew the cars now in service. Of these 25,000 are now more than twenty years old. Some are even much older. It requires no prophetic power to anticipate what will happen to the industry long before its cars are permitted to get into any such condition as is indicated by these figures.

What are railway men going to do about it? At present they are permitting the equipment on which they are dependent for attracting patronage rapidly to get into a more and more disreputable condition. Street cars cannot run forever, and any attempt to dodge the facts is suicidal. If the present neglect of car replacement is not corrected the public apathy toward any service which presents a down-at-the-heels appearance will lead not only to complete public indifference to tax, fare and franchise problems, but will ultimately result in active demand for abolition of such service as a nuisance.

What matters it that electric railways continue to be the most economical method of public transportation? The American public will not tolerate any service that seems out of date, regardless of its economy, nor will it listen long to appeals for remedial measures for the preservation of a service that has become unpopular. True, money for new cars is scarce and hard to get, but fortunately, it has been adequately demonstrated that on most properties new equipment literally pays for itself through operating economies alone. Manufacturers stand ready to arrange equipment trusts. Savings that can be made in the cost of new cars, particularly on the smaller properties, by adherence to some uniformity in type and size, would probably more than compensate for the necessary banking discount for such financing.

New cars are not a panacea. They will not take the place of good management, but they are a part of good management. They may be made the basis for bringing about many needed measures for relief from franchise restrictions, inadequate fares and other burdens.

Even a comparatively small number of up-to-date, attractive new cars on a hard-pressed property may be made the means of bringing home to the public the character of improvements that would result from relief measures sought by the railway. Such a procedure may be characterized as "selling" the idea of relief to the public by offering something attractive as an inducement.

The industry is today faced in the wrong direction on this car situation. It is high time to forget the fallacious idea that people will ride in any old vehicle that gets them to their destination. It is a grave mistake to drift along the path of least resistance because improvement is difficult. There is a strong current of progress in transportation, and the agency which drifts is sure to be headed down stream.

Chicago Sets a New World's Record

NEITHER the story nor the pictures presented elsewhere in this issue tell all there is about the transportation feat that was performed at Chicago in handling the Eucharistic Congress crowds. This does not mean that either the story or the pictures are inadequate. It is a stimulating account of accomplishment and the pictures tend to round it out, but like all similar accounts the reader must put something into it if he would get something out of it. The figure of 5,087,481 passengers carried by the Chicago Surface Lines in one day, a number 650,000 in excess of the corresponding day a year ago, reduces the feat to mathematical proportions, but it does not give a real idea of the problems involved. That would be well nigh as insuperable as was the feat itself. Similarly the fact that the North Shore and the Rapid Transit Lines delivered 130,000 at the gates of the seminary six hours after the migration began, stupendous as are the figures, also tells only part of the whole story. Consult the picture of the crowd milling around the Wabash Avenue station! This and the other pictures merely illuminate the subject with flashes that show the problem and the extent to which they went to cope with the situation.

Motor highways were reserved for the use of travelers to Mundelein, but despite this only an inconsequential number relied on their private cars to reach the site of the conclave. That in itself was a great tribute to the consciousness of the ability of the railroads to perform satisfactorily.

Out of the experience at Chicago many lessons will come. Not the least by any means of those already learned is that the rigid ban placed on parking in all streets in the Loop district for three days speeded up traffic to such an extent that a resolution has already been introduced into the Council to make the no-parking rule for the downtown district permanent.

It is a valuable story of measures and men, this one

of handling the Chicago crowds. Either would have been ineffective without the other. If in the account elsewhere in this issue the efforts of the men appear to be submerged, that is only because, after all, their performances were largely personal, individual. A very significant testimonial to them is that there were no man failures, no casualties. All in all, it is a record of a stupendous undertaking successfully completed. Managements and men deserve great credit.

Transit Congestion May Force Stricter Height Limitation in New York

COMPARING the present appearance of Manhattan Island to a railroad baggage room on the day after Labor Day, strewn about with up-ended trunks and boxes, Henry H. Curran, a member of Mayor Walker's recently-formed committee on city planning and survey, urged an immediate ban against skyscrapers. He suggested a building limit of six stories on side streets and ten stories on avenues. Construction of high buildings has outrun the ability to provide adequate rapid transit, he pointed out. The more subways are dug the more skyscrapers are built to utilize the added capacity, and the perennial straphanger remains the symbol of metropolitan transportation conditions.

Gradually the idea is spreading that relief from congestion is not to be had simply by building more and more transit lines. It takes only a simple calculation to show that the ultimate demand for transportation, if the entire business district were built up to the limit allowed by law, would be far in excess of the ultimate capacity of all the rapid transit lines which it would be feasible to construct. The sooner this situation is understood the better it will be. If stricter height limitation must eventually be adopted, this should be done as quickly as possible. By this means a more even development of the entire metropolitan area will be encouraged. Neglected and dilapidated sections of the city will be restored to usefulness. The transportation system will broaden out, and the city will be healthier and better for the change.

Europe Has Faith in the Future of Rail Transportation

CONFIDENCE in the future of electric surface railway transportation is indicated by recent car purchases in foreign countries. In Great Britain the tramways have ordered nearly 700 new cars since the first of last year. Details were given in an article in this paper on June 26. Not long ago the street railways of Berlin, Germany, placed orders for 1,000 new cars. After extensive experimentation the Paris system decided a little more than a year ago to build 475 new tramcars. A long list might be given of other foreign street railways that have recently made substantial additions to rolling stock.

Particular significance attaches to these car purchases because they were made despite vociferous arguments of the bus proponents to the effect that the usefulness of the tramways was over and that buses should be bought rather than new cars. Careful study of conditions, however, convinced the various managements that the tramways were performing an essential service which would not satisfactorily be superseded by bus service.

Reasons given for retaining the tramways rather than substituting buses for them were substantially the

same in the different cities. Primarily, it was evident that transportation service could be rendered much more cheaply by tram than by bus, and, second, it was feared that the large number of buses which would be required to replace the cars would make worse the already serious traffic congestion. The difficulties resulting from the presence of an excessive number of buses in streets of London has given pause to some of the more enthusiastic bus adherents.

Ownership of the transportation system by the municipality itself in nearly all of the cities where new cars recently have been purchased assures the impartiality of the investigation of the relative merits of cars and buses. Questions of franchise rights, protection of security holders, etc., which have sometimes tended to obscure the issue and prevent its determination on the basis of merit alone, were largely absent. Moreover, many of these transportation systems have already undertaken bus operation on an extensive scale, and know from experience its advantages and disadvantages. The decision to continue and expand the tramway service is thoroughly in accord with the ideas of competent transportation men in the United States, and leads to the hope that the confusion which has existed concerning the proper spheres of the street car and bus is gradually being cleared.

Law on Use of Highways Rapidly in the Making

PRACTICALLY all courts, whether with state or federal jurisdiction, are now rapidly making precedents on legal questions relating to the use of the highways. The reason, of course, is the large number of motor vehicles desiring to use the roads, but particularly it is the great increase of trucks and buses, many of which are operated in competition with the older forms of common carriers. During the last few years there has been a great deal of legislation relating to motor carrier operation, and the courts have passed more explicitly than has ever been necessary in the past upon the fundamental rights and duties of all users of the highways.

One of the most interesting recent decisions is that of the United States Supreme Court, early in June, in the case of the Frost, & Frost Trucking Company. Readers of this paper are familiar with the position taken by the California Legislature that it had the power to set the conditions under which the highways of the state can be used for commercial purposes. This position received the approval of the California Supreme Court, which upheld the State Public Service Commission when it refused a carrier under private contract right to operate in the state without first having secured from the commission a certificate of public convenience and necessity.

In one sense this position of the state has been approved in the United States Supreme Court decision just rendered, but in another way it has been upset. In disagreeing with the California view the Supreme Court says there are limits to the conditions which a state can impose on carriers. It cannot, for example, compel a private carrier to assume against his will the duties and burdens of a common carrier. More broadly speaking, it cannot offer to grant him a valuable privilege only if he will relinquish rights guaranteed to him under the federal Constitution. But the Supreme Court was very careful to add that it did not mean

to abate in any degree the power exercised by the state or of its utilities commission over common carriers or over those who to escape utility regulation posed as private carriers. In other words, it was the effort of the California law to change the status of the carrier from what it was to something it was not that came under the ban of the Supreme Court.

Outside of this decision, the most important recent development on the status of highway usage is probably the decision rendered by the Ohio Supreme Court within the last few weeks overruling an order of the State Public Utilities Commission which granted the Buckeye Special Transit Company of Columbus right to operate motor buses promiscuously over irregular routes within the state. Every such route, according to the court, must be advertised in the required way in each county to be traversed and the service must be one which will fulfill a demand for convenience and necessity. Some sixteen existing transportation companies in Ohio carried this case to the Ohio Supreme Court as appealing the decision of the commission.

In some respects this decision is like that of the California case, since in both there was an attempt to bring under the common carrier law a carrier that wanted to do a special business. The difference was that in California the carrier objected, while in Ohio the objection came from the railways and bus companies that would be subject to competition. But both cases show the increasing demand for various kinds of motor carrier service and the necessity in each state for some definite legislative program by which the activities of these carriers will come under proper regulation. This regulation ought to be such as will give the public the benefit of the expanding uses offered by motor buses and trucks without encroaching on what is really the entirely different service given by the established common carriers. Such a program can be begun none too soon.

It is unfortunate for this reason that the effort to provide some sort of adequate regulation for public interstate motor carriers seems destined to failure at the present session of Congress. The bill offered may not be ideal in every respect, yet admittedly some improvement over existing conditions is greatly needed. If nothing should be done at this session, steps should be taken promptly when Congress meets again.

Higher Standards the Real Goal at Which to Shoot

MUCH discussion always follows the suggestion that affiliated bus operations should be similar to rail operations in color of equipment, style of uniform and methods of performance. Equally as many opinions are voiced that it should be distinctive; that care should be taken to differentiate between the service details so that the people may know that here is something different and a step ahead in transportation.

It appears that there are grounds for both of these contentions, but the underlying reasons apparently do not often come to the surface. The basic consideration is that whatever is done should be an improvement in every sense of the word. The quality of transportation should be lifted and no attempt made to drag down the people's desires to the level of antiquated equipment.

If through the adoption of modernization programs in the past the rail system enjoys the support and good will of the public there is reason to have the bus sys-

tem emulate the electric cars in color, finish, method of operation, etc. In this way the bus will assume the rôle of an auxiliary service to be operated on the same high standards that have been previously established.

On the other hand, it may be a stroke of genius to establish an auxiliary bus service in a totally different manner and as far removed as possible from the rails. By doing this the onus of the old is not passed on to hamper the initial effect of the new agent. Further expansion of the bus and perhaps a revamping of the rail lines will thus be encouraged.

A Drive Against the Summer Fool Killer

SOMEHOW the glamor of the summer season is dimmed by accidents, especially week-end accidents. From Saturday noon to Monday morning throughout the summer season, with people pleasure bound and safety barriers let down, the accident record reaches its apogee. Far too often what might have been the culmination of a happy holiday is converted into a catastrophe. Even those who fortunately are not participants in the tragedies suffer the pangs of the ill-fated ones. These survivors no longer philosophize on "accidents will happen," but sorrowfully recount how the accident might have been averted.

Now that this carefree season is nigh again the necessity for practicing safety first measures becomes of paramount importance. Railway companies can well afford to follow the example of the United Railways, Baltimore, which has started a campaign for the reduction of week-end accidents. It will be a drive distinct and different from the continuous safety work carried on by the company, and by its concentration on the proverbial accident period will probably increase the interest in the general subject of safety. By means of car card advertisements and posters the railway is transmitting its purpose to the public, and at the same time soliciting their help. Special cards have been distributed to the company's agents—trainmen and bus operators—warning them of their responsibility in preventing accidents which mar happiness and wreck homes.

With a slogan of "no week-end accidents" the 1926 record of safety on electric railway properties could be even more impressive than that of 1925, a banner year in many cities for safety first. A glance at some recent accident reports is testimony of this. In Scranton, Pa., 30,000,000 people were carried by the railway lines in 1925 without a fatality or serious accident of any kind. The railway department of the Milwaukee Electric Railway & Light Company reports a reduction of 50 per cent in accidents of all kinds during 1925. The United Railways, St. Louis, reports a decrease in accidents of all kinds of 12.5 per cent over 1924. In Buffalo the number of accidents decreased 7.2 per cent in 1925 over 1924. In Los Angeles the Pacific Electric Railway reported a decrease of 16 per cent over the preceding year. In Baltimore the number of accidents decreased 31 per cent compared with 1919, when the safety department was organized. In Rhode Island there was a decrease of 8.38 per cent over the 1924 record. So was progress made during 1925 toward the safe handling of passengers, whether due to safety contests, councils or codes. Further tangible evidences can be expected when the week-end campaign is universally adopted. A drive of this kind would not mean a cessation of regular safety activity. Rather would it serve to intensify general safety enterprise.

Car Purchases Below Normal Rate

Survey for Past Six Months Shows a Total of Only 802 Cars of All Types Ordered—740 of These Are Passenger Cars—Little Present Indication of Improvement During Remainder of Year—Bus Purchases Approximate First-of-the-Year Predictions—Analysis of Car Types Is Included

COMPLETE figures for the first six months of 1926 indicate that 802 cars of all types have been ordered by the electric railway industry. Of these 740 were passenger cars and the remaining 62 were freight and service units. These figures were obtained from a survey of all the car builders in this country, backed up by a review of orders which have been published in this paper.

In an effort to obtain some idea of the number of orders which will be placed during the coming six months, representative electric railways were requested to state their probable purchases of rolling stock, both cars and buses. Replies were received from some 70 properties, comprising nearly all of the larger railways in the country and a number of the smaller ones.

Buses are contemplated in abundance, but there is uncertainty in the matter of street cars to be ordered. The manufacturers are fairly evenly divided, some taking the attitude that the coming months will herald the long-anticipated revival of activity in the acquisition of cars, while others are more conservative and wish to witness a few promising inquiries before committing themselves. One car builder states that a group of four companies is actively contemplating the acquisition of 335 cars within the next 90 days.

The largest prospective order for cars that has been

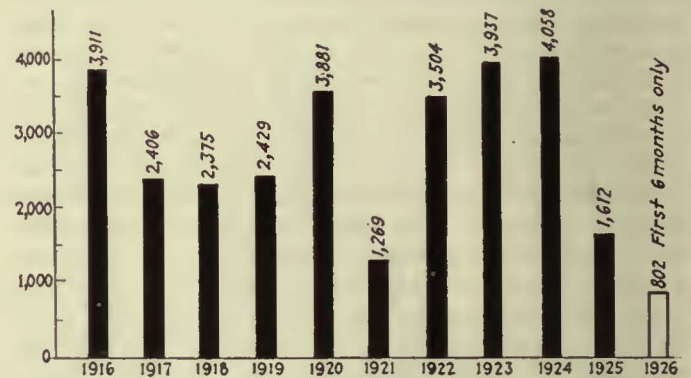
Year	Period	Total	Per Cent
1923	First six months	1,467	46
	Second six months	1,708	54
	Total	3,175	100
1924	First six months	1,731	71
	Second six months	699	29
	Total	2,430	100
1925	First six months	331	25
	Second six months	933	75
	Total	1,314	100
1926	First six months	802	740

announced to date is that of the Seattle Municipal Street Railway, Seattle, Wash. Bids have been requested for 80 cars with a closing date of July 30. Several purchases of additional rolling stock will be contingent on the outcome of public service commission hearings, negotiations with local authorities, etc., now in progress. Practically all cars which are definitely known to be in contemplation are of the double-truck, one-man, two-man type.

That it is difficult to predict the total purchases from the figures for the first six months is seen from Table I, showing a division for the last three years. In 1924 the first six months brought in 71 per cent of the orders, while last year 75 per cent were received the second half of the year. In 1923 the orders were quite evenly divided, 46 per cent being ordered in the first six months.

Two circular diagrams analyze the information con-

tained in Table II to show the types of cars which comprise the 802 ordered during the half year and further to split the city service cars into their various classifications. These diagrams bring out a number of interesting facts concerning trends in car design and the proportions of cars being purchased for city and interurban service. The fact that 75 per cent of the total cars ordered were for city passenger service is



Total Yearly Purchases of All Types of Cars by Electric Railways Since 1915

scarcely a matter for comment. This is about the average for the past six years, and reflects the relative amount of city and interurban business.

Only 35 freight cars were ordered during the six months, these being purchased by two of the companies which participated in the Central Electric Railway Association agreement to standardize freight trailer equipment. It will be remembered that a considerable number of these standard cars were ordered toward the close of 1925 by other members of the C.E.R.A. The further purchase of box and gondola cars is being contemplated by several roads for the current year.

Of the city cars 222, or 36 per cent, were of a type suitable for both one and two-man operation. Most of these were double-end, with double trucks and equipped with four motors. Next in favor were cars for straight two-man operation, these totaling 210, or 34 per cent of the whole. The third largest group was made up of double-truck cars for one-man operation, these also being generally equipped with four motors and of double-end construction.

At the bottom of the list appear the one-man single-truck cars. There were only 45 of these or approximately 7.5 per cent of the total orders. All but eight of these were greater than 28 ft. in length and therefore do not come under the general category of Birney cars. The double-truck car for one-man operation seems to be rapidly attaining the nature of a standard for this type of service, at least in current purchases.

SPECIAL CHARACTERISTICS OF CARS ORDERED

It has been quite noticeable in the cars ordered during the past few months that continually increasing emphasis is being placed on the matters of riding com-

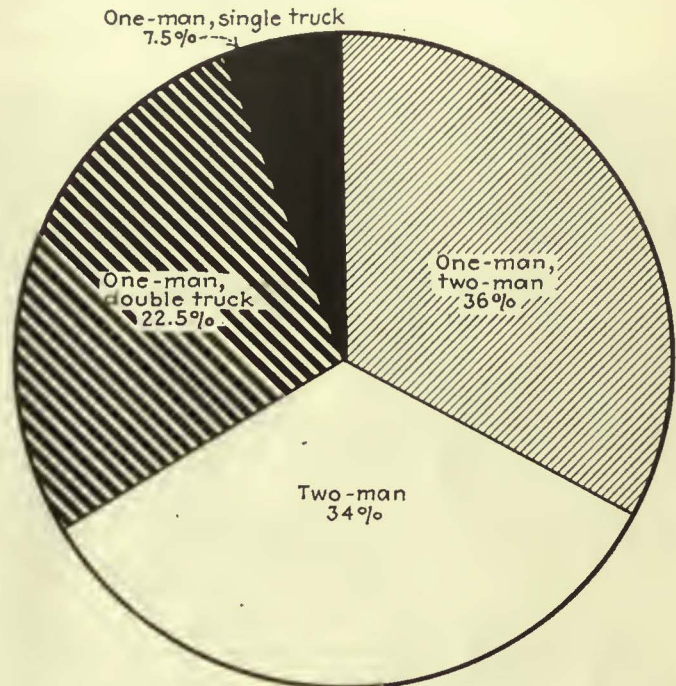
fort and esthetic appearance. Seats are undergoing a metamorphosis and the wood slats are giving way to spring cushions upholstered with plush, rattan and leather. In particular the frequency with which plush and leather are being specified indicates that these materials have met with marked approval from the railways and their customers. Upholsterings of leather and leather substitutes are perhaps somewhat in the lead over plush. Deep springs are much in evidence and there is a distinct tendency to use considerably lower seats than formerly. In fact, there have been several orders placed which called for seats 17 in. high.

Post and seat spacing varies from 28½ in. to 33 in. for city cars, and an average dimension of 29½ in. or 30 in. seems to be fairly common. This is another evidence that the railways are going more than half way in the effective marketing of transportation by catering to the comfort of their patrons.

Special floor coverings have been specified in a number of instances. Inlaid rubber tiling and linoleum are the materials which have principally been used for this purpose. Fewer cars are being built with wood slats on the floors than in past years. Practically all of the cars ordered were equipped with folding doors and steps and in many cases treadle mechanisms have been provided to operate rear or center doors for one-man service. On some interurban cars bucket type seats

Philadelphia Rapid Transit Company, no particularly large orders have been placed. Several roads have made their initial investment in bus equipment to supplement their railway service during the six-month period, and many others have made further additions to existing bus equipment.

More buses were ordered for city service than for



The Various Types of City Service Cars Are Here Graphically Analyzed in the Proportions Ordered

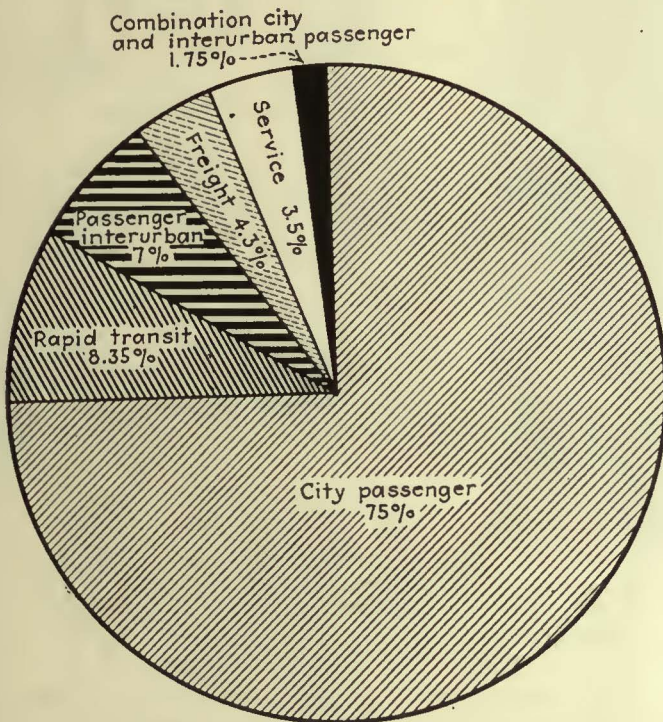


Diagram Showing the Proportion of Various Types of Cars Purchased During the First Half of the Year

have been specified, this being a deliberate bid to emulate the comfort and luxurious atmosphere attained in the modern parlor car bus.

BUS DEVELOPMENTS DURING THE PAST SIX MONTHS

Roughly estimated, the number of buses purchased by electric railways during the first half of the year was 1,000. Detailed purchases by companies have not been obtained, but material in the rolling stock columns of the JOURNAL and in reports received from the leading manufacturers indicate that this is a fairly representative figure.

With the exception of 135 buses bought by the Phila-

interurban routes. The tendency even in the street car type of bus has been to render service as attractive as possible by means of more luxurious equipment, increased knee room and better appearance, both exterior and interior. Practically all interurban and suburban equipment was of the de luxe parlor car type. Of some 175 double-deck buses ordered, 75 went to the Philadelphia Rural Transit Company and 50 to the Department of Street Railways, Detroit, Mich. In the single-deck equipment 25 and 29-passenger capacities predominated, although many railways indicated that for their particular services the 21-passenger bus was more adaptable. The gas-electric type of equipment continues to arouse interest among railway bus operators. The Philadelphia Rural Transit Company, a bus subsidiary of the Philadelphia Rapid Transit Company, has standardized its entire equipment on the gas-electric basis, including the 135 buses it ordered. Two other large orders for gas-electric equipment were those of the Department of Street Railways of Detroit for 50 and the Public Service Company of Newark, N. J., for 54 buses.

For the most part bus manufacturers are decidedly optimistic in their predictions of business during the next six months. Doubling the figure of 1,000 buses for the first half of the year would not equal the 2,200 units purchased by electric railways last year. Plans for more complete co-ordination of bus and trolley service are being rapidly pushed forward by many companies, and the manufacturers appear to be justified in expecting an increase of business for the remainder of the year. At least one company is contemplating the purchase of more than 100 buses, provided that certain features of the local transportation situation are satisfactorily worked out. Numerous inquiries for buses

in lots of from 10 to 25 have been received by several of the manufacturers. The predictions of the manufacturers taken in connection with the purchases estimated by the railways seem to indicate that approxi-

mately 1,500 buses will be ordered by them from July to the end of the year. This will bring the total for the twelve months to approximately 2,500, a considerable advance over 1925.

Table II—Details of Rolling Stock Ordered During First Six Months of 1926

	No.	Class	Service	Motor or Trailer	Single or Double Truck	Length, Ft. In.	Width, Ft. In.	Weight, Lb.	Motors	Seats	One or Two Man	Center or End Entrance
Alabama												
Birmingham Electric Co.	16	Passenger	City	Motor	Double	49— 7	8— 0	35,000	4	62	Both	Center
Mobile Light & Railroad Co.	5	Passenger	City	Motor	Single	29— 9			2	32	One	End
Arkansas												
Arkansas Central Power Co.	30	Passenger	City	Motor	Single	28— 6½			2	33	One	End*
Forth Smith Light & Traction Co.	6	Passenger	City & Int.	Motor	Single	28— ½	8— 0	16,000	2	32	One	End
California												
Key System Transit Co.	6	Dump	Construct	Motor	Double	40— 0						
Key System Transit Co.	4	Dump	Construct	Trailer	Double	40— 0						
Connecticut												
Connecticut Co.	1	Crane	Construct	Motor	Double	42— 0						
District of Columbia												
Washington Railway & Electric Co.	15	Passenger	City	Motor	Double	42— 3				49	One	
Florida												
City of St. Petersburg.	8	Passenger	City	Motor	Double	40— 1			4	44	One	End
Georgia												
Georgia Railway & Power Co.	5	Passenger	Interurban	Motor	Double	45— 6	8— 4	36,245	4	51	One	End*
Georgia Railway & Power Co.	5	Passenger	City	Motor	Double	46— 4	8— 4	37,380	4	48	One	End
Georgia Railway & Power Co.	60	Passenger	City	Motor	Double	46— 4	8— 3	37,000	4	48	One	End
Illinois												
Aurora, Elgin & Fox River Electric Co.	8	Passenger	Interurban	Motor	Single	28— 0	7— 9½	18,050	2	32	One	End
Chicago & Joliet Electric Railway.	10	Passenger	Interurban	Motor	Double	46— 2	8— 10½	38,000	4	52	One	End
Chicago Surface Lines.	34	Passenger	City	Motor	Double	48— 11		41,000	2		Both	
Chicago Surface Lines.	33	Passenger	City	Motor	Double	48— 11		41,000	2		Both	
Chicago Surface Lines.	33	Passenger	City	Motor	Double	48— 11		41,000	2		Both	
Indiana												
Gary Railway.	5	Passenger	City	Motor	Double	45— 0		37,000	4	46	One	End
Southern Indiana Gas & Electric Co.	13	Passenger	City	Motor	Double	37— 6			4		One	End*
Maryland												
Potomac Edison Co.	2	Passenger	City	Motor	Double	40— 0			4	38	Both	
Massachusetts												
Berkshire Street Railway.	10	Passenger	Interurban	Motor	Double	40— 0			4			
Boston Elevated Railway.	6	Work	Construct	Motor	Double	40— 0						
Boston Elevated Railway.	75	Passenger	City	Motor	Double	46— 7½	8— 7½		2	44	Two	
Boston Elevated Railway.	25	Passenger	City	Motor	Double	46— 7½	8— 7½		2	44	Two	
East Taunton Street Railway.	2	Passenger	City	Motor	Double	36— 10	8— 1	27,934	4	44	Both	
Michigan												
Michigan Railroad.	15	Freight	Interurban	Trailer	Double	49— 8	8— 5½					
Minnesota												
Twin City Rapid Transit Co.	1	Crane	Construct	Motor	Double							
New York												
Brooklyn City Railroad.	1	Crane	Construct	Motor	Double	44— 0						
Brooklyn-Manhattan Transit Corp.	67	Passenger	City	Motor	↑						Train	
Jamestown Street Railway.	8	Passenger	City	Motor	Single				2	30	One	
New York State Railways.	1	Dump	Construct	Motor	Double	40— 0						
New York State Railways.	1	Dump	Construct	Trailer	Double	40— 0						
Schenectady Railway.	2	Dump	Construct	Motor	Double	40— 0						
Ohio												
Columbus, Delaware & Marion Electric Co.	2	Parlor	Interurban	Motor	Double	62— 0		102,000	4	35	Two	
Northern Ohio Traction & Light Co.	1	Dump	Construct	Trailer	Double	40— 0						
Penn-Ohio System.	10	Freight	Interurban	Trailer	Double	49— 8	8— 5½					
Portsmouth Public Service Co.	3	Passenger	City	Motor	Double	42— 11	8— 6½	26,800	4	55	Both	
Steuensville, East Liverpool & Beaver Valley Traction Co.	8	Passenger	City & Int.	Motor	Double	48— 0		40,000	4	51	Both	
Stark Electric Railroad.	8	Passenger	Interurban	Motor	Double	47— 0	8— 8½	32,500	4	52	Both	
Toledo Edison Co.	1	Dump	Construct	Trailer	Double	40— 0						
Western Ohio Railway.	10	Freight	Interurban	Trailer	Double	49— 8	8— 5½					
Pennsylvania												
Pennsylvania Railroad.	8	Passenger	Interurban	↑	Double							End
Philadelphia Rapid Transit.	50	Passenger	City	Motor	Double	45— 6	8— 6	36,940	4	48	Two	Center*
Pittsburgh Railways.	50	Passenger	City	Motor	Double				4		Two	Center
Sunbury & Selinsgrove Railway.	3	Passenger	Interurban	Motor	Double	40— 3			4	51	Both	End
West Side Electric Street Railway.	3	Passenger	City	Motor	Double	41— 2	8— 3	35,060	4	46	Both	End
Wilkes-Barre Railway.	10	Passenger	City	Motor	Double	45— 0			4		Two	
Rhode Island												
United Electric Railways.	10	Passenger	City	Motor	Double	41— 0				44	Both	
Tennessee												
Memphis Street Railway.	32	Passenger	City	Motor	Double	46— 0			4		Both	*
Nashville Railway & Light Co.	10	Passenger	City	Motor	Double	40— 0			4		Both	
Nashville Railway & Light Co.	1	Work	Construct	Motor	Double	40— 0					Both	
Tennessee Electric Power Co.	10	Passenger	City	Motor	Double	40— 0			4		One	End
Texas												
Dallas Railway.	2	Dump	Construct	Motor	Double	40— 0						
Dallas Railway.	30	Passenger	City	Motor	Double	45— 8½	8— 5		4		Both	
Vermont												
Springfield Terminal Railway.	2	Pas. & bag.	Interurban	Motor	Double	41— 6				28	Two	End
Virginia												
Roanoke Railway & Electric Co.	6	Passenger	City	Motor	Double	41— 4				44	Both	
Purchaser not specified												
	19	Passenger	City	Motor	Double	42— 0			4	44	One	End*

* Single-end construction.

† Articulated three-car units.

‡ Motor-multiple unit.

Greatest Feat in Transportation History

All Records for Passenger Handling Believed to Have Been Broken by the Chicago Surface and Elevated Lines During the Mundelein Migration—Vivid Account of the Extreme Length to Which the Roads Went to Accommodate Prospective Passengers

IT WILL probably never be known just how many pilgrims journeyed to Chicago from all parts of the world last month to attend the 28th International Eucharistic Congress of the Catholic Church, but that the transportation agencies played a conspicuous part in the success of the elaborate program will never be gainsaid. So efficient was their functioning, in fact, that had it not been for the outdoor services and mammoth pageants, which drew anywhere from 150,000 to 300,000 persons to the downtown district every morning of the four-day conclave, the casual observer would have been wholly unaware that the city's population had suddenly been increased by more than one-third.

At no time during the great religious conference were there fewer than 600,000 delegates in Chicago, and from the time the spectacular ceremonies opened in Grant Park Stadium on June 20 to the celebration of the final mass at Mundelein on June 24, it is estimated that close to 1,000,000 visitors bent on acclaiming the Eucharist had been in the city—the greatest assemblage of people for a single event in the history of the world.

The task of transporting this vast throng from every corner of the city to the various sectional meetings and diurnal services in the downtown stadium taxed every available resource of the combined surface and rapid transit systems. In anticipation of the unprecedented travel, all painting and repair work on the equipment of both lines was suspended, and on the day the congress opened the surface lines and elevated system reported 99.8 per cent and 98 per cent of their respective equipment in service. Monday, June 22, was the biggest day in the history of the Surface Lines, more than 5,087,000 revenue passengers being carried. On the same day the Rapid Transit Company announced that 1,800 cars were in service—the greatest number ever moved at one time in the annals of the elevated organization. Not even during the memorable days of the Columbian Exposition in 1893 or at the time the Armistice was signed could officials recall an occasion when the transportation companies had been called upon to render such a mighty service. Most remarkable of all, however, was the fact that, in spite of the greatly multiplied load, the lines man-



A Typical Crowd Awaiting Its Turn at the North Shore Ticket Booths on Wabash Avenue, Chicago

aged to handle their regular patrons with a minimum of inconvenience and delay. Some retardation of service was, of course, inevitable, but Chicagoans were generally philosophical and little trouble was experienced.

If the problems of local transportation were momentous, still more colossal was the burden imposed on the electric railways when officials of the congress announced that the culminating exercises would be held at Saint Mary's-of-the-Lake Seminary in Mundelein, a tiny village 40 miles to the north of Chicago. To study the situation and perfect plans for the gigantic movement of pilgrims to this shrine, a transportation committee was appointed on which three steam railroads and the Chicago Rapid Transit Company and Chicago, North Shore & Milwaukee Railroad were represented. Many months before the pilgrimage was to take place this committee set about to divide up the city into districts co-extensive with the several church parishes in

which the great host was to be quartered. The expected rail traffic of 300,000 was allocated according to the facilities and accessibility of each railroad. From its downtown terminal, the Chicago & Northwestern Railroad was asked to carry as far as Lake Bluff a total of 60,000 visitors quartered in parishes adjacent to its right-of-way in the northern half of the city. At Lake Bluff the Mundelein branch of the North Shore Line was assigned this load for haulage direct to the seminary grounds. The Chicago, Milwaukee & St. Paul Railroad was charged with the responsibility of hauling another 30,000 passengers from a large area in the northwestern part of Chicago to Libertyville, 2 miles east of Mundelein. Pilgrims billeted in the west and south sides of the city were allotted to the Soo Line terminal at Forest Park on the outskirts of Chicago. It was decided that by pressing every available car into service this last road might transport a possible 15,000 direct to Mundelein. The maximum capacity of the three steam lines was thus placed at 105,000.

In the belief that much of the travel to Mundelein would be by motor nine state highways, with a capacity of 1,000 cars per hour each in one-way traffic, were designated as official routes and barricaded at every intersection to prevent interference with the steady flow of vehicles. Each of these main arteries led directly to a parking space of 100 acres each a short distance away from the seminary grounds. On the basis of four passengers to each car, it was estimated that in eight hours of travel a possible 350,000 might reach Mundelein by automobile. That this number proved to be far in excess of the bare 75,000 or 80,000 who actually motored to the Catholic seat on June 24, however, could in no way be attributed to faulty planning or to precautions neglected. The great mass of pilgrims simply found it easier and more convenient to use rail service.

Because of their matchless facilities, convenience of connection and direct route, by far the heaviest share of the traffic by rail necessarily fell to the Chicago Rapid Transit and the Chicago, North Shore & Milwaukee Railroad. By concentrating all equipment in the movement, it was estimated that the electric roads could jointly carry 175,000 from the south, central and northeast parts of Chicago. In addition, the committee asked accommodations for the 60,000 transfer passengers from the Northwestern steam line at Lake Bluff and for the thousands of others who were expected to be attracted to the Mundelein ceremonies from North Shore suburbs and Wisconsin cities served by the Milwaukee division of the North Shore Line. As a result

of this allotment, the electric lines faced the overwhelming prospect of transporting 250,000 delegates, virtually two and one-half times the aggregate load of the three steam roads and nearly 60 per cent of the total migration. It was probably the greatest problem that has ever confronted any transportation system on earth, exceeding even the task of the steam railroads in Great Britain at the time of the exposition at Wembley.

The Rapid Transit Company was enabled to operate its own cars in local service to the downtown districts, take on passengers there for Mundelein and transport them direct to the seminary over the tracks of the North Shore Line without transfer.

Anticipating the day when its facilities would be put to this severest of tests, the North Shore Line hastened to complete its new Skokie Valley route begun in June, 1925. Without this high-speed air line with its heavy roadbed and minimum of grade crossings the movement of such a large percentage of the traffic to Mundelein would have been seriously hampered, if not altogether prohibited.

But the staggering problem was practically solved long before the influx of churchmen began. Preparations for their travel to Mundelein were on a vast scale. Rapid Transit and North Shore officials offered every assistance possible to Eucharistic representa-

tives to insure the success of the climax day of the congress. No trouble or expense for the comfort and convenience of delegates to the magnificent festival was spared.

Out in the fields which surround the little North Shore Line station of St. Mary's-of-the-Lake six special sidings with a capacity of 52 cars at one time were constructed. Alongside, five loading platforms were built, two of them 335 ft. long and 16 ft. wide and three 420 ft. long by 24 ft. wide. By this arrangement, it was possible for eight trains of six and eight cars each to be loaded or unloaded at the same time. An overhead control bridge, spanning the network of tracks, was also erected to insure speedy and efficient operation of trains in and out of the temporary terminal. At the head of each platform a loading chute with a comfortable capacity of 1,000 persons was built. Entrance into these chutes was from an enormous stockade completely encircled by a high picket fence. It was planned to admit only from eighteen to twenty trainloads, or roughly 9,000 people, into the stockade at one time in order to forestall the chaos which would naturally result if the surging thousands all attempted to "catch the first train back to town."

THE Chicago Surface Lines carried the greatest transportation load in its history on Tuesday and next to the greatest load on Monday, and did it without undue crowding or congestion. The Tuesday load reached a total of 5,087,481 rides on the system, an increase of 665,000 over the corresponding Tuesday of the year before.

Sunday, with 3,443,904 rides, was the biggest Sunday in the company's history. On Monday there were 4,993,000 rides. The rides on Wednesday totaled approximately the same as on Monday.

Practically every car on the system was available for service. Vice-President Richardson said that the millions of street car riders benefited materially from the elimination of parking in the downtown district, and that this, together with the very efficient co-operation on the part of the Police Department, made possible a freer movement of cars than under ordinary conditions. There was no confusion of traffic and there were no accidents during the three days.



One of the Six Loading Chutes at Mundelein Terminal. A Train from Chicago Is Seen Unloading 600 Passengers into Adjacent Chute. Returning Crowds Awaiting Chance to Board Train for Chicago

At Lake Bluff, 8 miles east of Mundelein, where the Chicago & Northwestern Railroad, the Milwaukee division of the North Shore Line and the Mundelein branch of the latter converge, two enormous loading platforms close to 400 ft. in length were installed to provide for the speedy transfer of steam road and shore line passengers to the thirteen eight-car trains of the North Shore Line that were operated in shuttle service at three-minute intervals to Mundelein.

In the shops of the Chicago Rapid Transit Company scores of cars were equipped with trolleys that previously were able to operate only over the third rail divisions of the elevated lines. A large number of trail cars were also equipped with motors.

EVEN DINING FACILITIES WERE PROVIDED

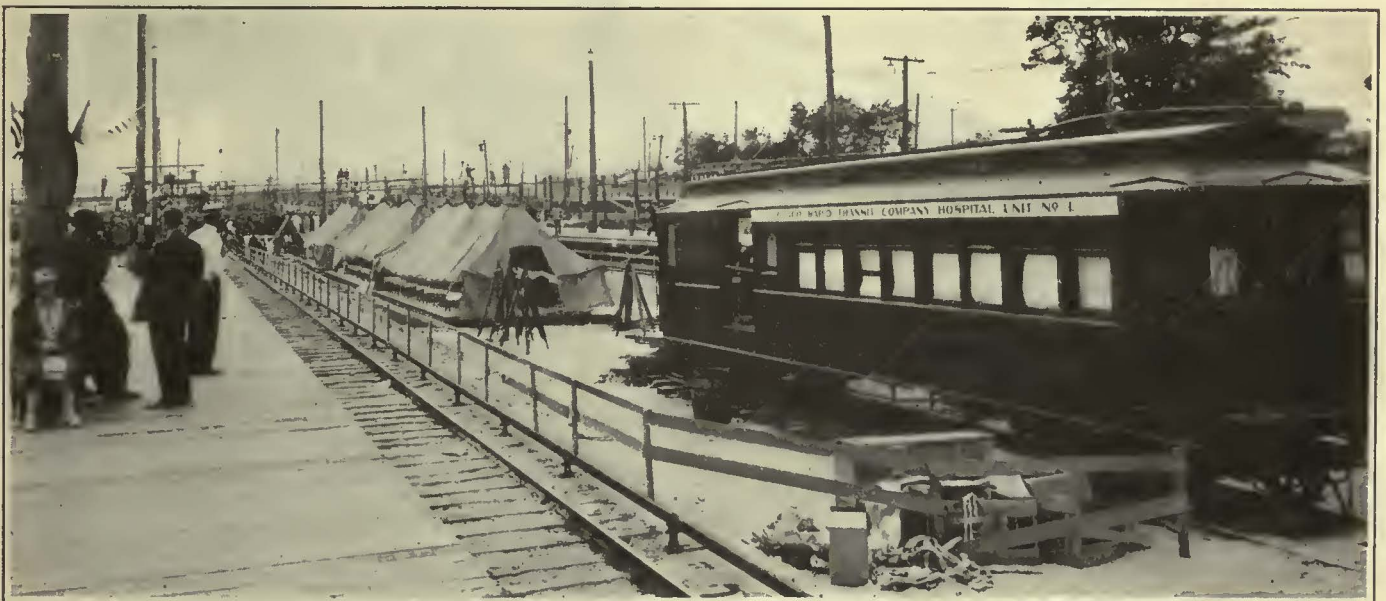
Expanded operating facilities, however, were not the only preparations made. To help feed the army of hungry pilgrims, the North Shore Line invested a large sum in the erection of a lunch stand with some 700 ft. of serving space. The kitchen forces for this concession alone numbered over 300. To remove the possibility of a sudden rush for the trains at the conclusion of the day's program and to facilitate the orderly loading of trains, the company also arranged a series of band concerts and motion pictures. The total cost

to the North Shore and Rapid Transit Lines for this single day's traffic in temporary platforms, tracks and other facilities is believed to have been in excess of \$150,000. Although this section is becoming increasingly popular among suburban home seekers, it will be many years before an actual need for these enlarged facilities will arise and their only value to the company at present is the salvage which can be made of them.

RAILROADS FURNISHED HOSPITAL FACILITIES

Further illustration of the splendid support which was given church officials by the Rapid Transit and North Shore management may be seen in the extensive arrangements made by the two roads for the care of persons requiring medical aid while attending the fête at Mundelein. Two hospital centers, each consisting of a fully equipped hospital car; three hospital tents of 25 beds each, a surgical dressing tent and a motor ambulance were established at the Mundelein terminal and at Lake Bluff by the Rapid Transit Company. Along the route from Chicago to Mundelein eighteen special first aid stations in charge of trained staffs were set up at frequent intervals.

At 3 o'clock on the morning of the appointed day every employee of the two systems, from chief executive down to platform men, was at his post, ready for the



Completely Equipped Rapid Transit Hospital Car at Mundelein Terminal

The first aid tents located between loading platforms had a capacity of 25 beds each. Across the terminal tracks in the background is the control bridge from which railroad officials directed the movement of trains

supreme test. For the day the personnel of the Rapid Transit Company had been increased by 1,500 men, the majority of them employees of other Chicago public service organizations. One man was assigned to every 900 ft. of the right-of-way for the entire distance between Chicago and the terminal at Mundelein, and at the latter point something like 700 additional company representatives were on duty.

First of the endless procession of trains to arrive in Mundelein from Chicago was the magnificently appointed North Shore Line special bearing Cardinal Bonzano and other dignitaries of the church. Appropriately draped in national and papal colors, the train reached the seminary on the eve of the great day.

More than one-half of the entire equipment of the Rapid Transit Lines, or 932 cars, was assigned to the Mundelein service, and at 4 o'clock the next morning trains of six cars each had begun operating out of the Jackson Park and Loomis Street terminals in Chicago at four-minute intervals. From 58th Street, where the two elevated divisions converge, a special train left for Mundelein every two minutes. Responding to the exhortations of railroad officials to start early, excited crowds had gathered at every station long before the hour of departure of the first train. Hundreds of pilgrims, fearing that they might not be able to board the crowded trains, spent the night on elevated station platforms. Down in the Loop district, at the Adams

IN NEARLY ten hours of uninterrupted loading the entire throng of more than 225,000 who had arrived on 372 Rapid Transit and North Shore trains and an additional 50,000 who forsook motor cars and other means of transportation by which they had come, to return by way of the more convenient electric lines, were hauled away from the Mundelein terminal. The three steam railroads, carrying a joint load of only about 75 per cent of the original estimate, were able to handle only 85,000 passengers, or less than one-third of the traffic over the Rapid Transit and North Shore Line. Counting each trip made by a Rapid Transit car, and each one made at least three round trips that day, it was estimated that 15 miles of electric cars were employed in carrying the great mass of pilgrims from and to Chicago. The last train, heavily loaded with company employees and policemen, many of whom had been on duty for upward of 24 hours without relief, left the Mundelein terminal for Chicago at 11:30 p.m.

Street terminal, the lines of waiting pilgrims and clergy frequently extended for blocks. The same surging crowds met the flag-bedecked trains at every stop to Howard Street, where, switching over to the Skokie Valley route of the North Shore Line, the heavily loaded trains continued on to Mundelein without further haltings. Where safety is a prime consideration, as it was in the handling of these 150,000 or more people of all ages who sought transportation from Chicago by electric line, speed was not a factor, and the 40-mile trip to Mundelein, ordinarily requiring an hour, was made on that day in the average time of two hours and a half.

By distributing round-trip tickets to the various parish headquarters several days in advance and advertising their sale at conveniently located booths throughout the city the Rapid Transit Company hoped to eliminate much of the congestion at regular stations on the day of the trek to Mundelein. A definite hour for starting was given to each ticket purchaser. Up until the very eve of the pilgrimage, however, only 60,000 tickets had been sold, and in consequence considerable delay was experienced in boarding trains at many stations on the morning of the 24th.



Flag - Draped North Shore Line Special Train on Which Papal Legate and Nine Visiting Cardinals Were Taken from Chicago to Seminary Grounds in Mundelein

All available equipment of the North Shore Line was consigned to the shuttle service on the Lake-Bluff-Mundelein branch and to the transportation of pilgrims from points north of Chicago on the old lake shore route. Simultaneous with the early morning service from Chicago, five-car trains were operated out of the North Shore terminal in Milwaukee on a fifteen-minute headway. In the course of ten hours an estimated total of 25,000 passengers were transferred from these trains to the shuttle cars at Lake Bluff.

100,000 STORM STOCKADE DURING STORM

By 10 o'clock in the morning—six hours after the migration began—the North Shore and Rapid Transit Lines had delivered 130,000 at the gates of the seminary. Trains carrying anywhere from 600 to 800 passengers were arriving at the Mundelein terminal, discharging their load and started back to Chicago frequently in less than a minute's time. Including the shuttle trains from Lake Bluff, a trainload of pilgrims entered the terminal regularly every 40 seconds for eight consecutive hours. As late as 3 o'clock in the afternoon special trains were still leaving Chicago as fast as they could be loaded. Long before the incoming traffic began to dwindle, however, thousands of the more than 400,000 pilgrims at Mundelein, hopeful of returning to the city before the rush was on, commenced to storm the gates of the stockade. A sudden rainstorm which struck the seminary grounds just as the procession of the blessed sacrament around the shores of the lake was about to start brought a frenzied crowd of fully 100,000 down on the terminal. The situation was acute, and despite the heroic efforts of 600 Chicago policemen and several detachments of state militia and the pleadings of company officials the clamorous mob all but swept aside the walls of the stockade in an effort to reach the trains. Although several persons were injured in the mad dash, it is considered providential that not a single fatality occurred.

40,000 DISPATCHED AN HOUR

From the control bridge B. J. Fallon, vice-president of the Rapid Transit Company, and B. J. Arnold, assistant general manager, surveyed the menacing throngs and by speeding up the movement of trains through the "bottle-neck" entrance to the terminal finally succeeded in loading 40,000 passengers per hour and sending out one train for Chicago every 55 seconds.

The crowd, bedrugged from the rain and exhausted by the long trip and emotional setting of the occasion, was difficult to handle, but when the rain subsided and it could be seen that the railroad was doing everything in its power to expedite the return to Chicago and other points good humor again prevailed and the confusion was abated.

Safety Pays in Milwaukee

FIFTY PER CENT reduction in accidents of all kinds was made by the rolling stock department of the Milwaukee Electric Railway & Light Company during 1925. The department had a smaller number of lost time accidents to employees than ever before, and for the fourth year there was not a fatal accident, according to an article by A. W. Koehler, superintendent of accident prevention, in the May issue of *National Safety News*.

According to the writer, the department comprises

842 employees. Every accident is thoroughly investigated, the primary cause being determined and definite responsibility fixed. The foreman makes the original accident report, which is signed by himself and the safety committee man from his department. It is then passed on for review by the general foreman and the superintendent, who determine the kind and degree of discipline necessary to be administered. When the accident is due to gross negligence on the part of an employee, temporary suspension may follow. Habitual or willful violation of the safety rules is held to be reasonable cause for discharge.

Although every man is considered responsible for any accident in which he may be involved, the foreman is accountable for the general safety of all of the employees in his division. He is expected to be continually on the alert for any unsafe practices or questionable methods which may have been introduced. In each major division of the department there is also a safety committee man, appointed by the superintendent. These men hold office for one year, and memberships then rotate so that the influence of the active safety committee experience was spread through the department.

Energetic Campaign for Paving Relief at Wheeling

"STREET CARS do not wear out the paving. Place the expense where it belongs." Such is the slogan used by the Wheeling Traction Company, Wheeling, W. Va., in an energetic campaign to secure relief from paving burdens.

A series of advertisements has been published by the company in the local papers, appearing one week apart. Newspapers in neighboring cities have also been used

WHICH DO YOU PREFER
Paved Streets
or
Better Service?

Every Dollar Spent for Paving
Means a Dollar Less for
Improving
Street Car Service



Place The Expense Where It Belongs

Typical
Advertisement
Used by the
Wheeling Traction
Company
in Its
Campaign
for Relief
from
Paving Burdens

in this campaign. Most of the advertisements have been featured by a drawing which showed the damage done to paving by heavy motor trucks. An accompanying reproduction of one of the advertisements used in the campaign shows this sketch. Mention has been made in the advertisements to the relief secured by electric railways in Massachusetts and Connecticut and in the cities of Indianapolis, Jackson, Seattle, Toledo and Cleveland.

Havana Railway Operation Combines American and Cuban Methods

Extremely Narrow Streets and Close Spacing of Stops Create Operating Difficulties—Fares Are Low and No Standing Passengers Are Carried—Double Trolley Wire Is Used, Supported by Unique Overhead Construction

ELECTRIC railway operation in Havana, Cuba, during the 25 years of its existence has developed somewhat along the same lines as American operation, but it is characterized also by several peculiar local practices. Previous to 1900 local transportation was furnished only by horse cars. The operating company was owned and controlled locally. The present agency supplying transportation, however, the Havana Electric Railway, Light & Power Company, is a subsidiary of the Electric Bond & Share Company of New York. The system embraces some 96 miles of single track, 82 miles of which is in the city and 14 miles interurban. Interurban trackage is operated by a separate company, which in its turn is a subsidiary of the Havana Electric Railway, Light & Power Company.

Despite lively bus competition the railway carries on the average 10,300,000 revenue passengers per month. The fare is 5 cents straight for all persons more than four years old. Tickets are sold, but only to government employees. This is done merely as a matter of accommodation to do away with the necessity of their signing vouchers for each 5-cent fare paid. Transfers are issued free. Revenue per car-mile averages 30.5 cents and operating ratio is about 72 per cent.

During the peak a maximum of 522 cars are in operation. In the middle of the day, however, this number falls to 320. In Havana employees are granted two hours for lunch, usually between 11 a.m. and 1 p.m. This enables them to go home, a privilege of which practically all make use. Thus there are four peaks in the traffic, one early in the morning, one about 11 a.m., another at 1 p.m., and the last and heaviest one about 5 o'clock in the afternoon.

In general the car routes come into the city from the outlying districts and make a loop around several blocks adjoining the harbor, returning by the same streets. A few routes do not come downtown, but connect the different suburbs. During the rush hours a headway of three minutes to five minutes is provided on all lines except those serving the smaller suburbs. In the non-rush hours the headways are sometimes as long as eight minutes to fifteen minutes. Most of the more densely populated suburbs, however, can be reached by more than one car line, so that the service is actually



Small Single-Track Cars and a Double Overhead Trolley Wire System Are Characteristic Features of Electric Railway Operation in Havana

more frequent than would appear. Free transfers facilitate the use of different routes for reaching one destination. During the night 30-minute owl car service is maintained to most of the outlying districts.

Operation of the numerous bus lines has not seriously affected the revenue of the railway company. A majority of the buses are vehicles of inferior quality, having been imported second-hand from the United States and rebuilt. The fare is the same as on the cars and the buses are well patronized, passengers frequently hanging on to the steps or fenders in order to ride. They serve sparsely-settled suburbs lying so far out that up to the present it has not appeared profitable to extend the rail lines. The loss of revenue on the cars has been so slight that the company has not considered it necessary to take steps to combat this competition.

Free transfers are issued at all points where two or more car routes intersect. By the use of transfers it



Railway Operation in Havana Is Hampered by Narrow Streets

At left, when rounding a curve it is frequently necessary to lift up the fender to prevent it striking the curbstone.

At right, U-shaped brackets of iron piping are used on narrow streets to support the overhead wiring.

Below, narrowness of the streets in Havana has necessitated placing of the car tracks on one side to permit passing of a vehicle.



is possible to ride from practically any part of the city to any other part for 5 cents. Inasmuch as the city is rather closely built up and several of the suburbs on the west lying outside the city limits are served by the separate interurban company, the longest ride possible for a single fare is not much more than 5 miles. Many city cars operate over the tracks of this subsidiary, but an additional fare is collected when crossing the city limits.

NARROW STREETS MAKE OPERATION DIFFICULT

The older sections of Havana have many extremely narrow streets and sidewalks. Although traffic is permitted only in one direction on such streets, space must be provided for an automobile or horse-drawn vehicle and a street car to pass. This has necessitated the

placing of the tracks at one side of the street rather than in the center. To provide sufficient radius to enable cars to turn a corner the tracks must be on the outside of the curve. This makes necessary a frequent shifting of the tracks from one side of the street to the other. At corners where two or more lines meet many simple and reverse curves are required.

Another difficulty in turning corners is that the fenders run up on the sidewalk. Great care must be exercised by the motormen when rounding a corner not to upset pedestrians on the sidewalk. In many places the fender will jam against the curb unless the motorman raises it before turning the corner. The switch iron is supplied with a hook at one end for lifting the fender. It is a duty of the conductor to ring the gong almost continuously to warn pedestrians.

Owing to a stipulation in the franchise made at the time when the United States Army was in control of the affairs of the city, the company is not permitted to use its rails for the return electrical circuit but is obliged to use the double overhead wire system. On narrow streets it has been found advantageous to support the trolley wires by inverted U's of 3-in. wrought-iron pipe. The legs of these supports extend into the ground alongside the buildings on each side of the street. The piping fits snugly against the buildings and reduces the obstruction in the street and sidewalk to a minimum. That part of the piping which crosses the street overhead furnishes the necessary lateral strength to permit supporting the trolley wires in the usual manner. On wide streets trolley wires are supported by steel poles and span wires.

All trackage is of standard gage and is constructed of 89-lb. girder rail. The company paves between its tracks and for a distance of about 50 cm. (approximately 20 in.) on each side. As a rule the same material is used for paving the railway area as is used elsewhere on the street, whether granite blocks, asphalt or macadam. On certain streets paved with asphalt, however, granite blocks have been used for the railway area on account of the lower maintenance cost of this type of paving.

NARROW STREETS AND CLOSE STOP SPACING AFFECT CAR DESIGN

Cars stop at every street corner, and as the streets in the older part of the city are very close together the average distance between car stops is not more than 60 or 70 yd. This makes it desirable to operate light-weight cars. Those used are of the single-truck type with inclosed or partly inclosed platforms, weighing from 18,000 to 19,000 lb., and seating 36 passengers. They are built by the company in its own shop, using Brill 21-E trucks. Native hard woods are used in the body construction. Some of the cars are equipped with two 25-hp. motors, while others have two 35-hp. motors. The latter type is gradually replacing the former.

City ordinances permit a maximum speed of operation of 25 km. per hour (approximately 15½ m.p.h.) on wide streets, and 12 km. per hour (7½ m.p.h.) on narrow streets. In spite of the narrow streets and frequent stops the city cars average about 8½ m.p.h., and the suburban cars approximately 11½ m.p.h. There are few heavy grades on the system and those which do exist are short. Cars are equipped only with hand brakes, but these have been found to answer all requirements.

Power is generated in the company's own power plant, both oil and coal being used for fuel. Electricity and gas are furnished also to the general public both for light, power and heat. The company has a contract for illuminating all the streets and public parks of the city, both gas and electricity being used for this purpose.

Full advantage is taken by the company of every opportunity to sell advertising space. The demand for it has been such that not only the usual space along the inside of the car roof is used for this purpose, but also the front bulkheads and the upper half of the window sash. Advertisements are painted on the upper part of the windows, as shown in one of the accompanying illustrations.

To a stranger the first street car ride in Havana is interesting. Regulations require that the passenger

enter the car at the rear and leave at the front. When you hand the conductor your fare he takes out of his pocket a small wrench, made especially for this purpose, and turns a square iron rod running along one side of the top of the car and connecting with the register. By this means he rings up your fare.

SPANISH CUSTOMS GIVE LOCAL COLOR TO OPERATING PRACTICES

There are no push buttons with which to signal the motorman. When you want the car to stop at the next corner you simply say "pst" (the favorite way of calling attention among Spaniards), and when the conductor looks at you, you wave your hand toward the front of the car. The conductor will then pull the bell rope once to signal the motorman. When you want a transfer, you do the same thing, except that instead of waving your hand toward the front of the car you wave it several times in whatever direction you want to proceed on your journey. Children like to give the "pst" sign, just as they like to push the signal button in the United States.

Newsboys and vendors of peanuts, flowers, etc., board cars and, without paying fare, ride a block or so while passing through the car offering their wares for sale. They do this without objection on the part of the conductor, who may even make change for them if they do not have it. They must, however, enter the car from the rear, for it is against the regulations for anyone but policemen and employees of the railway to board a car at the front end.

There are no straphangers in Havana street cars, because there are no straps to hang on. When all the seats in a car are taken, the conductor usually closes the gates of the rear platform and admits no more passengers until some seats become vacant. He will refuse admittance to women especially. Women wanting to board a car and seeing that it is crowded call "Hay asiento?" (Is there a seat?) to the conductor before trying to enter.

During the rush hours, when everybody wants to get home as quickly as possible, people sometimes enter cars the seats in which are all filled and stand on the rear platform. If the person is a woman, the conductor may even permit her to stand in the aisle, a thing he seldom permits men to do. On such occasions it happens only infrequently that a man will get up and offer his seat to the lady who is standing. On the other hand, if a man occupies a seat alone and a woman sits down beside him, he will jump up like a jack-in-the-box, take off his hat, bow to her, and offer her the seat next to the window, that being considered the more pleasant one to occupy.

Scrapped After Twenty-one Years of Service

AUTOMOBILE competition has destined four of the fleet of the Lake Minnetonka passenger steamers of the Twin City Rapid Transit Company, Minneapolis, Minn., to a 70-ft.-deep watery grave. Two were sunk recently and two more are to go, after 21 years of service. These boats for years met the electric trains and carried passengers to points off the line, and also carried sightseeing loads around the lake. Private automobiles and bus lines destroyed the usefulness of the boats.

One Owner's Faith in the Trolley

SECOND ARTICLE

In the Rehabilitation of the Steubenville, East Liverpool & Beaver Valley Traction System Particular Attention Was Paid to the Rolling Stock—New Cars Were Purchased and Old Cars Rebuilt to Give Better Service

WHEN the rehabilitation of the Steubenville, East Liverpool & Beaver Valley Traction Company was decided on by C. A. Smith, it was found necessary to put the rolling stock in such condition that it would be suitable for the projected service.

Purchase of 25 Brill safety cars, the first step toward a program of more service at less cost, was undertaken during 1923. These are of the standard 32-seat capacity with double-end equipment, but differ in several important respects from the Birney model. The body design is of the double-door rather than single-

than they possessed when bought. The trucks, of the Brill diamond-frame type, are being strengthened. To eliminate nosing due to the bolster coil spring becoming lopsided, the spring was replaced by a spring-borne iron block filler.



The "Ceramic," a Car that Is Proving the Public Is Glad to Ride the Electric Line When Speed, Spaciousness, Safety and Comfort Are Combined

The trucks of the "Ceramic" were rebuilt to provide for easy riding.

The circle bar is now mounted inside instead of outside.

Ball center bearings and roller side bearings are used.

The bolster is suspended from gusset plates instead of the transom.

Pillow block suspension of the spring ends is used.

In the "Ceramic" you make your choice of seats. They're all good.



door type. The trucks are J. G. Brill No. 79E-1. Since the principal use of these cars would be on the very hilly local routes in East Liverpool, Chester and Steubenville, they were also higher powered than ordinary Birneys. Two GE-247-A motors with K-63 control, Nuttall helical gears, GE electrolytic arresters and the Safety Car Devices apparatus are the main elements of the propulsion and braking equipment. The motors are geared for a maximum speed of 28 m.p.h. to take care of operation over the better levels of the main line.

There are now passing through the shops fifteen center-entrance cars of Pittsburgh type purchased in 1916. These are not only being converted to one-man, two-man operation, but are also being reconstructed to secure greater strength and more passenger comfort

Standard turnbuckles are being substituted for the dead lever type of brake rigging, and because of this change, a floating center bar is replacing the original rigid bar. The net result is expected to be a truck that will remain square and journal boxes that will not tilt under hard service.

Early in 1925 high upkeep and lack of need for train operation led to the replacement of type M control with type K-35-JJ control and line switch. The four GE-247-A motors, geared for a maximum running speed of 35 m.p.h., remain, except that they will be used with 26-in. diameter instead of 24-in. wheels to secure better clearances and higher speeds.

In altering the car body, the front-exit single-folding door with 29-in. clear opening is being replaced by

double folding doors of 52-in. clearance. This change necessitated cutting back the underframe, but without interfering with the diaphragm. Only a 4-in. channel bar of greater thickness replaced the original pressed-steel channel in the hood to offset the structural weakening caused by lengthening the front platform.

As in the Pittsburgh center-entrance cars, one side is taken up by a longitudinal seat. The original No. 14 gage sheathing on this side is being backed with No. 12 material to strengthen the body, but an air gap of 2½ in. permits better heating also. Car warmth will be further promoted by adding a second floor at right angles to the original single floor. While this work is in progress, the motor openings are reduced from four to two for the sake of noise reduction. Kass safety treads are being added on the steps and landing platforms.

One of the center doors on each side is being paneled, still leaving a clearance of 31½ in. On

Crouse-Hinds headlights of 150-watt capacity replace an older C-H design.

With the operating economies which have been made possible by this reconstruction for normal one-man operation, the management of the company has been able to undertake a program for shorter headways, as will be recounted later in this series of articles.



Upper right, before the change. Above, the front passageway has been changed from a single 29-in. door to a double 52-in. door, while one of the center doors has been changed. Right, the interior before remodeling. Below, rattan upholstery has been replaced by Kemi-Suede; electric heat takes the place of hot air; the center well has been simplified, and the lighting has been improved.



The Side Door Cars of This Type Have Been Converted for One-Man Service

occasions when these cars are used in two-man operation, the conductor will be stationed with his farebox in front of the new panel. The remaining double-leaf door on each side will be manually operated, either by a conductor or by a street inspector, according to whether two-man or one-man operation is in effect. The doors at the front or operator's end are being fitted with individual National Pneumatic engines. When these doors are open, vestibule lamps burn; when they are closed, the lights go out automatically. The line switch is interlocked to prevent the car from starting with doors open. Each of the two doors at the front is independently controlled, but can be operated simultaneously.

VARIOUS FEATURES CATER TO PASSENGER COMFORT

Passenger comfort has been increased by replacing the stove and motor-blower heater with Westinghouse electric heaters and Consolidated thermostats. Removal of the stove gives room for another double cross-seat. The seats are being covered with Kemi-Suede. Another feature for the passenger's comfort is the use of extended flush-type direct lighting fixtures with shades instead of bare lamps. The use of ten 56-watt lamps on two circuits will give more satisfactory illumination than the old-style lamps on three circuits.

To bring its interurban rolling stock up to the standards of speed and luxury demanded by an automotive-trained public, the management has begun the thorough rebuilding and reupholstering of its existing interurban cars, aside from plans for eight entirely new cars.

The first rebuilt car, named "Ceramic," went into service on Jan. 10, 1926, and made such a hit that plans were immediately begun for like work on a second car to be called "Fort Steuben," after a prominent regional name in Steubenville. The following account will show how thoroughly the interurban cars are to be overhauled and modernized to appeal to a discriminating public:

The new "Ceramic" was a 48-ft. wooden car. Its body was reinforced with No. 14 gage steel. Then it was painted in Packard cream on the sides, but with yellow for the dashers for maximum visibility. The striping is uniform with the dashers. The roof is light buff with black striping leading therefrom.

The original seating consisted of eighteen double cross-seats and four double longitudinal corner seats in Pantasote, totaling 44. These seats have been replaced by plush-upholstered seats of four different designs to get an idea of what the public likes best. The central section of the "Ceramic" has ten double cross-seats of standard design but rebuilt and upholstered in plush. Adjacent to these at each end is a pair of swiveling twin-bucket seats, believed to be the first of their kind on an electric railway. Next to each set of these double seats is a pair of individual swiveling bucket chairs, and, finally, fixed twin bucket seats in each corner. The total seating capacity has been cut from 44 to 40. The more important point is that the car as a unit is earning more money.

ROOMINESS OF SEATING ARRANGEMENT GIVES OPPORTUNITY FOR SOCIABILITY

Perhaps the most pleasing feature of the bucket seats is that a party up to ten persons can arrange themselves so as to be almost face to face, whereas in other seat arrangements they could be comfortable only in twos. For sociability, this arrangement is decidedly superior to personal motor cars or to a motor coach with transverse seats. Another advantage is that more convenient spaces are left for the grips and suitcases of the many traveling men who use this railway between Beaver, East Liverpool and Steubenville. These cars were not built with parcel racks, but coat hangers have been added in the "Ceramic."

There are no rods or bars to obstruct the vision or diminish the roominess of the car to the eye, except for a signal cord. The cord hangers are covered with plush to match the seat upholstery.

One of the questions before the management was whether the "Ceramic" and similar de luxe cars should be run during hours when they would be carrying loads of begrimed workmen to and from their jobs. It was decided that the money of these regular riders was certainly as good as that of any casual and that the best was none too good for them. To meet the situation in the right spirit, towels are placed on the backs of the swivel chairs twice a day. These towels, it may be added, were embroidered with "C" or "Ceramic" by the girls at the office because of their pride in this development.

The Taylor high-speed trucks originally under this type of car have been greatly strengthened. While the side frame and journal boxes were retained, M.C.B. standards now apply to the levers, brake beams, center brake bar, swing links, etc., to permit interchange with M.C.B. trucks of Brill and Baldwin make. The new axels are 5½-in. A.E.R.E.A. standard instead of 5 in. as previously used.

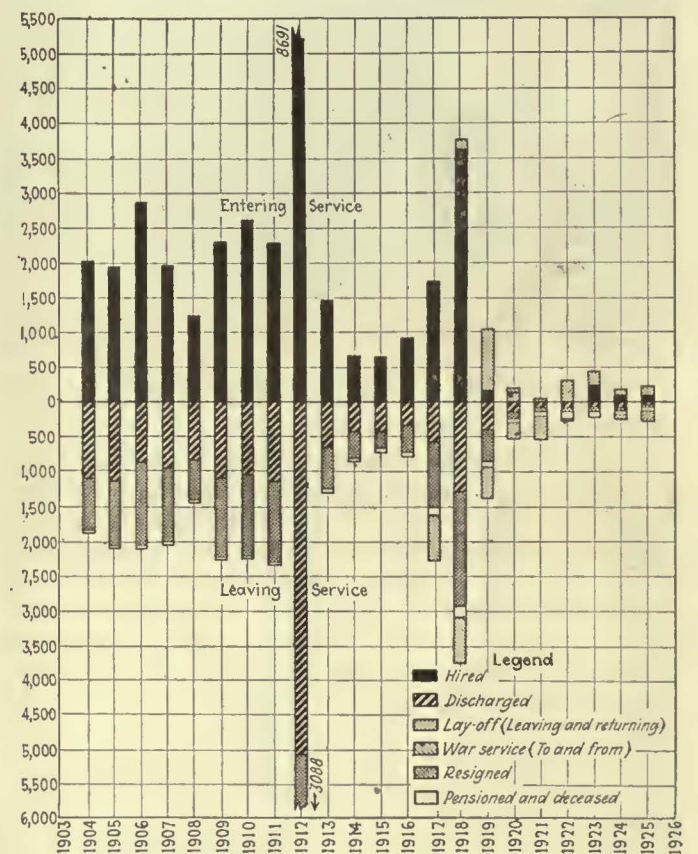
Formerly, the sand supply for the pneumatic sanders was in boxes under the seats, which, of course, was more or less discommoding to passengers. Sand is now carried in narrow, deep (4 in. x 30 in.) compartments built between the end seats and the bulkheads.

As regards the electrical equipment, while the original Westinghouse No. 93-A-2 motors remain, they have

been tuned up in every part. The control has been changed from K-14 to HL. Piping has been made as inconspicuous as possible by being laid neatly against the car paneling. All wiring is concealed. Headlight, lighting and other auxiliary switches are mounted in a vestibule compartment under which is a chamber for the governor, jack and trolley pick-up.

Improved Employment Record in Boston Reflects Good Condition

SIX years of comparative quiet have passed on the Boston Elevated, as far as the turnover of the blue uniformed men is concerned. The accompanying chart shows the marked change that has taken place in this class of employment since 1904. For many years it was quite customary to employ from 1,500 to 2,000 men each year, not for expansion of service, but



Boston Elevated Record for Its Blue Uniformed Employees Shows Marked Improvement During the Last Six Years

to take the place of men who were discharged for cause or who were otherwise laid off or resigned.

For the years 1919, 1920 and 1921 no men were employed. In the year 1923, 237 men were employed. In the year following that, 99, and for the last year only 83 new men were taken on. Likewise the number of men who were discharged has been very greatly reduced.

Many factors contribute to this desirable condition; the increase in wages, provision of an eight-hour day, introduction of one-man operation, and the operation of elevated trains with guards operating two cars each, and last, but of greatest importance, the many efforts of the management to build up the spirit of co-operation on the basis of permanency of employment.

Notable Safety Work in Savannah

The Company Was the Winner Over Two Competitors in a Railway Safety Contest—An Account Is Given of the Methods Followed in Promoting Safety Through Team Contests, Maintenance of Individual Records of Trainmen and Careful Analysis of the Causes of Casualties



In Savannah There Are Many of These Small, Open Grassed Squares in the Main Streets. The Roadway Passes Around Them, but the Electric Track Passes Through Them

ON LAST Easter Sunday all the trainmen of the Savannah Electric & Power Company blossomed out in new straw hats. The reason was that through the care exercised by them the company was winner in a six months accident contest in which Savannah, Jacksonville and Tampa participated. The losers paid for the hats. The final score showed that in the six months ended March 1, 1926, the record of the Savannah company was the large number of 2,946 miles per accident.

The record just quoted is even more notable than might appear at first sight because of the very strict definition used of the term "accident." The accidents recorded are not confined to casualties in which some degree of responsibility attaches to the company. Any occurrence to persons or property, other than ordinary wear and tear to the car and the track, caused by the movement of the car on the street is counted as an accident. Thus, if an automobile should run into the rear of a standing car, it is called an accident.

The fine record of safe operation in Savannah made during this contest was not the result of chance nor mere superficial attention

to the usual safety precautions. For a number of years the company has paid a great deal of consideration not only to developing cordial co-operation by all employees in safe operation but to a study of the causes of accidents. In this way it has been able to learn how and where most of the accidents on its system occur. The adoption of methods to avoid accidents has thus become much more easy.

An essential feature of the means to encourage the employees in safe operation is a continuous contest between selected teams of the trainmen as to low accident records. The layout of the Savannah property is such that all of the cars operate from one depot. Hence, it was not possible to organize these team contests between men in various divisions. Instead, six captains are chosen, and these men select in rotation the men to compose their teams. At the end of each month members of the team having the best record are the guests of the company at a dinner given at one of the local hotels. This event is made the occasion to a considerable extent of talks on safety. If the same team wins three months in succession each of the men on the team receives a motor-



A Considerable Part of the Track in Savannah Is on Reservation or Neutral Ground

man's cap as an extra reward. Up to the present three teams have won this crowning prize.

At the end of each year the men have the privilege of electing new team captains, though three of them have remained as captains since the plan was started.

In these interteam contests each accident counts as two points against the crew of the car involved in it. That is to say, if the car involved is a one-man car, the operator is penalized by two points. If it is a two-man car, the conductor and motorman are penalized by one point each. The company has only two routes on which two-man cars are used, these being suburban lines. All the rest of the operation is with one-man cars. The lines with two-man cars do not constitute a large proportion of the car mileage of the company, as on one line cars run only every half hour and on the other line only every hour.

In a sense, it might be considered unjust to charge against a crew unavoidable casualties, or those in which no negligence by the trainmen has been shown. This plan is followed for two reasons. One is that if an attempt were made to grade responsibility in the penalty attached, a very difficult problem would exist. The second reason is, it is found that with the reduction of all accidents the unavoidable ones also seem to grow less.

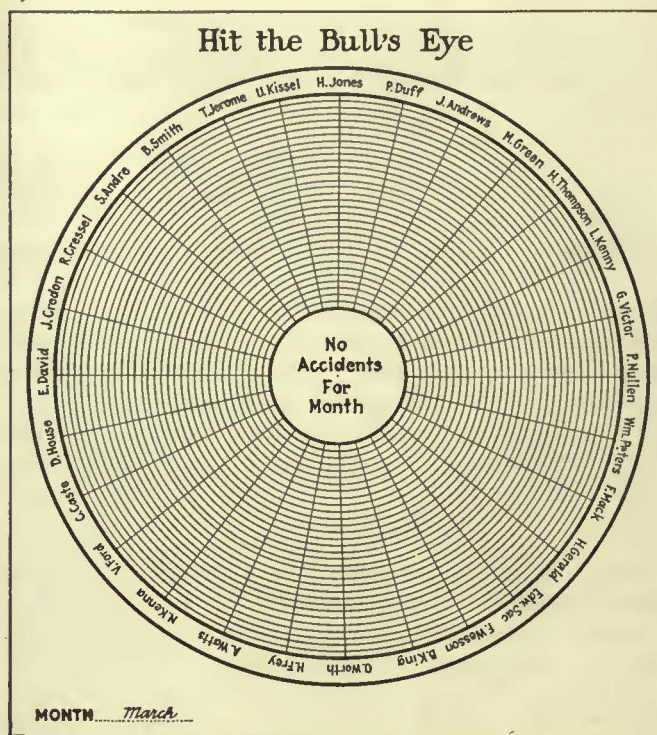
COMPARISON OF RECORDS

This plan means that some comparisons of records must be made daily so that the men may know the number of accidents charged against them. There are two records of this kind, one by teams and the other by individuals. The record by teams is plotted daily in the form of graphs, of which several copies are made. One of these is posted in the main office. Another is posted in the trainmen's waiting room. In the chart in the main office the record of each team in number of points charged against it cumulatively for the month is plotted in lines of different colors to represent the different teams. The one in the trainmen's waiting room also shows the number of accidents by teams cumulatively for each day of the month, but it is on a much larger scale and the lines are shown by strings of different colors rather than by being drawn in ink. The background of the board is black.

The daily records of the men of each team are recorded on what is known as a target. There are six of these, one for each team. The diameter of each target is about 36 in. The targets are mounted in a row in the trainmen's headquarters. Each target has 31 concentric circles to represent the days of the month and as many radii as there are men on the team whose records are being shown by the circles. The radii are marked with the names of the men composing the teams. The advance of each man toward the "no accident" center is indicated by a plug which is moved along his particular radius one circle each day he has no accidents. If a man has two accidents on the same day he is not moved forward one step for two days.

As explained, different colors are used on the charts to distinguish the several teams. These same colors are used for the centers of the several bullseyes.

These targets are painted on beaverboard. At the top of each are the words "Hit the Bullseye." By these targets it is possible for every man to know exactly where he stands and where every member of every



Centering Attention on Safety at Savannah

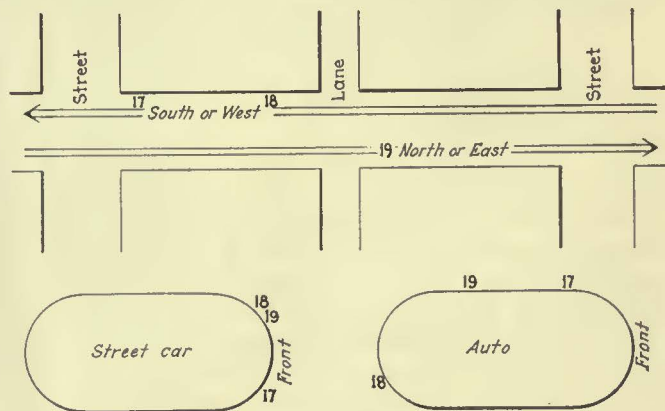
The train force is divided into teams and daily records of the individuals and each train are shown by pegs on a chart like this in the trainmen's headquarters. The object of each trainman is to hit the bullseye on the last day of each month by means of a perfect safety record.

other team stands in the monthly contest. There are about 26 men on each team.

Of course, in a contest of this kind, questions will always arise as to what should be called an "accident," even with the very specific rules which the company has on this point. For this reason there is a standing committee on disputes. It is made up of Fred C. Morton, general superintendent of the company; A. F. Solms, claim agent, and G. A. Webb, superintendent of transportation.

OTHER POSTED RECORDS

Besides the bullseyes or targets, there are a number of other records on safety in the trainmen's headquarters. One is the chart of records by teams, already mentioned. Another is a map of the system showing the location of automobile accidents. The purpose of



Charts Aid in Visualizing Causes of Accidents

Graphical records are kept monthly of the comparative locations on a typical block where automobile accidents occur and of the parts of the electric car and automobile hit. The numbers indicate the kind of accident. In the original charts two colors of ink are used, one to indicate that the car hit the automobile, the other that the automobile hit the car.

this map is to show the men the places where experience indicates this kind of accident is liable to occur. The map shows in red ink the locations of the accidents during the first six months of 1925 and in green ink those during the first part of 1926.

Another map of the same kind, but changed monthly, is kept in the superintendent's room. Adjoining it is a representation of the dial of a clock, but drawn to represent twenty-four hours. On this pins of different colors, each color representing a different kind of accident, are used as markers, so that with this clock and map there is a visual record of the place and time of each accident for the month. At the end of each month the data are transferred for comparative purposes to smaller maps and charts. By this method dangerous street crossings, etc., can be detected and arrangements made to protect them.

RECORDS HELP SAFETY

It is impossible through lack of space to present all of the records and the studies made by the company to determine where and how accidents occur most frequently, but a few of the principal forms will be mentioned.

A monthly record is kept with 20 classifications of kinds of accidents and 23 headings of vertical columns to indicate the part of car hit, type of car, etc. The classifications used follow:

Collision with pedestrians	Alighting from car
Collision at railroad crossings	Injuries on car
Collisions between cars	Injuries by doors
Collision, auto hit car	Ejectments and disturbances
Collision, car hit auto	Broken windows and doors
Collision with other vehicle	Split switches
Collision with animals	Fenders torn off
Derailments	Broken trolley poles
Damage to equipment	Broken trolley wire
Boarding car	Miscellaneous

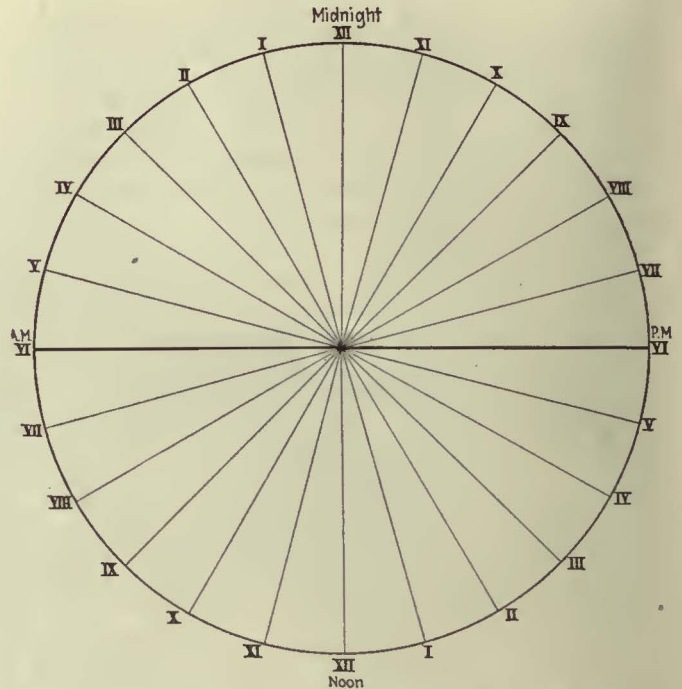
The headings for the vertical columns read as follows:

- Part of car hit: Front, moving
- Part of car hit: Front, stopped
- Part of car hit: Rear, moving
- Part of car hit: Rear, stopped
- Part of car hit: Side, moving
- Part of car hit: Side, stopped
- Type of car, Birney, safety, one-man
- Type of car, reconstructed, d.t. one-man
- Type of car, old type
- Type of auto, passenger car
- Type of auto, truck
- Kind of driver, white man
- Kind of driver, negro
- Kind of driver, woman
- Length of service of operator—Less than six months
- Length of service of operator—Six to twelve months
- Length of service of operator—One to two years
- Length of service of operator—Two to three years
- Length of service of operator—Three years or over
- Responsibility—A
- Responsibility—B
- Responsibility—C
- Responsibility—D

In connection with these final four columns, the company designates as A accidents those in which the operators were entirely responsible; as B accidents those where the responsibility of the operator is open to question; as C accidents those where an employee other than a trainman is responsible, as with bad equipment, and as D accidents those in which outsiders are wholly responsible.

A special record is also kept of all automobile accidents, because in Savannah, as in most cities, they constitute a very large proportion of all of the accidents. In the written records on automobile accidents full

particulars are given of the nature of the accident, place of occurrence, time, cause, line, car number, etc. In addition, a diagrammatic record is kept, by months, of the positions in a typical block of the locations of all automobile accidents as well as the part or place on the car and auto which came into collision. Such charts, much reduced, are shown on the preceding page. In these charts the numbers "17," "18," "19" refer to the classification of these accidents used by the company,



One of Several Charts Used by the Savannah Electric & Power Company in Its Safety Work

A clock dial with space for 24 hours, like that above, and a map of the city are used to plot the place and time of every accident. Pins of various colors, each color representing a different kind of accident, are used as markers. These records are made daily. At the end of each month the data are transferred to maps and charts for comparative purpose. By this method dangerous street crossings, etc., can be detected.

while the positions of these numbers on the chart show the part of the vehicle or place where the accident occurred.

Hearty co-operation in this safety campaign has been received from the Police Department of Savannah, and that department has adopted several of the company's methods of locating hazardous corners and locations. Maps and charts are also kept by the department for the information of the patrolmen and traffic squad. As a result of these studies the police traffic department has installed many safety and boulevard stops, not only at hazardous street railway crossings but at many other blind and hazardous street crossings in the city. These studies have also disclosed points where traffic men should be located for short periods only, both weekdays and Sundays.

This aid to traffic accordingly has been supplied. In fact, it has been possible for the Police Department, through the information thus obtained, to locate its traffic squad properly and to gain far greater use of the men available by limiting their time to the points of greatest need and moving them to hazardous points as traffic conditions change.

With these methods of analyzing accidents it is not surprising that good records in safe operation are being made in Savannah.

Maintenance Notes

Special Tools for Compressor Maintenance

GRINDING in valve seats in an air compressor valve head is no easy job. A special device, however, was developed in the Dallas Railway shops that has almost the touch of the human hand. This device was first mentioned in *ELECTRIC RAILWAY JOURNAL* for Aug. 8, 1925, page 210. The machine has been in continuous use since then, greatly lessening the cost of valve grinding. M. S. Crouch built the machine that does this work automatically. Both the machine and Mr. Crouch are seen in one of the accompanying illustrations. The machine is adjustable and can be swung in any position. It is driven by the small motor shown over a valve opening, the valve is dropped in place with a little grind-

ing compound put around the valve seat. The clamp of the grinding machine is attached to the valve stem and the machine set in motion. The machine makes half a dozen reciprocating motions similar to those of an operator doing the work by hand. Then the valve is lifted slightly, allowing the grinding compound again to cover the valve seat and the reciprocating process is continued for another half dozen or more revolutions.

A new device has been added to



Valve Seat Cutting Tool

The blades are expanded after the tool has been inserted in the valve chamber

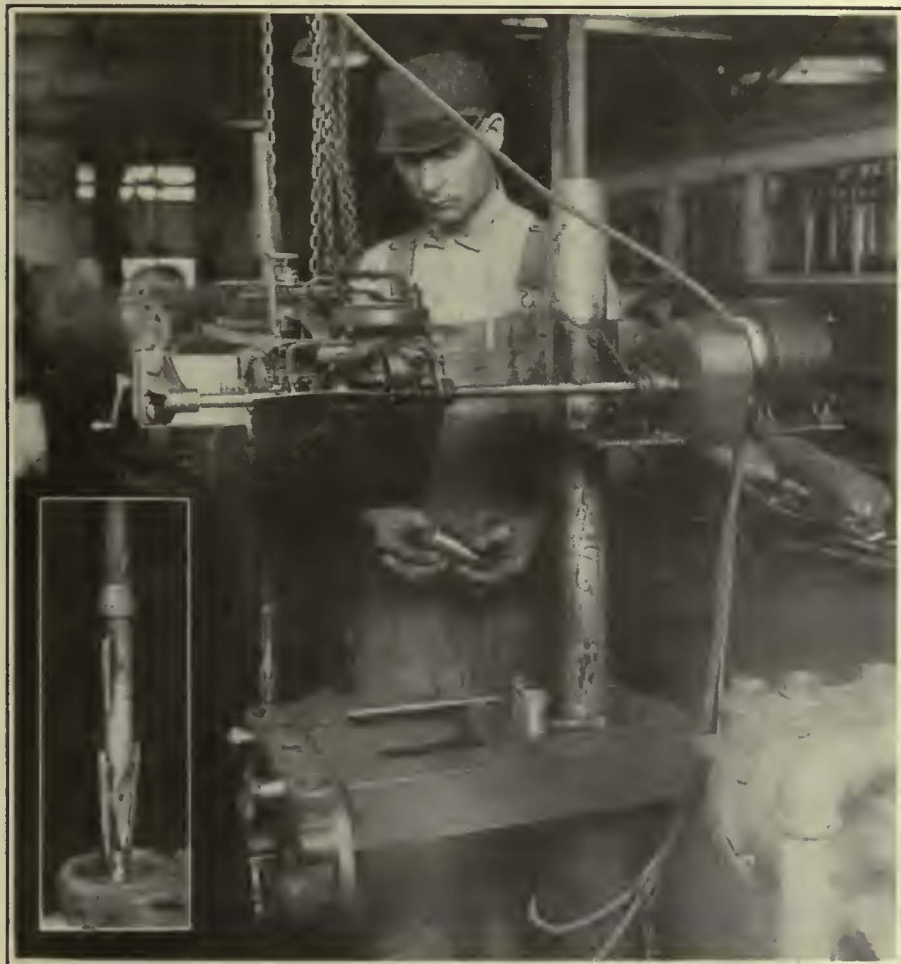
the air valve maintenance equipment of the Dallas Railway through the use of this extremely handy tool. As maintenance men know, the seats of air compressor valves become worn in a grooved or conical shape, and it is then desirable to remachine the valve seat in order to establish the correct taper. The difficulty is to get a machine through the hole, since it is necessary to cut the seat back a distance slightly greater than the upper end of the valve chamber.

To accomplish this Mr. Crouch has built the tool shown in one of the views. The cutting edges of the tool consist of four hardened blades which are set in the stem. Each blade is pivoted around the center, as can be seen in the illustration. One blade was pulled out as far as possible to show the construction while the others are in their normal positions.

This tool can be inserted into the valve chamber with the blades compressed inwardly. When it is inside, the stem at the upper end can be turned from left to right, which screws down a taper that forces out the blades in an even manner. When they have been extended sufficiently, the tool is clamped in a drill press and the valve seat is remachined. The process of unscrewing the stem and closing in the blades is necessary to remove the tool from the valve chamber after the machinery operation is completed.

Metal Cutting with Illuminating Gas

ILLUMINATING gas to replace acetylene, hydrogen and other fuel gases in combination with oxygen for metal cutting has been adopted at the Schenectady plant of the General Electric Company, following a comprehensive study of the economic needs of the various classes of work. A special oxy-illuminating gas torch was developed for the purpose, and is now being used for the cutting of risers in the steel foundry of that plant, varying in thickness from 1 to 20 in. This method is also used on machines in cutting intricate shapes from steel plate.



Mechanism for Automatically Grinding Air Compressor Valve and Seats Used in Dallas. The Cover Over the Glass Has Been Removed to Show the Details of Construction. Inset Shows Detail of Clamp that Engages Valve Stem



Cutting Riser from Large Rotor Casting

As a result of tests, it was found that illuminating gas is cheaper in machine cutting than either hydrogen or acetylene, while the speed of cutting after one starting is approximately equal for all gases. The advantages of the use of illuminating gas were found to be (1) availability; (2) elimination of delays and handling of tanks; (3) low cost; (4) safety, and (5) chemical and physical properties, permitting its use in a torch, equipped with a super heater,

thus effecting marked economies in the amount of oxygen required by the cutting jet.

General Salvage Man Reclaims Much Material

VARIOUS small parts such as screws, nuts, bolts, rods, nails, fuses, lighting sockets, etc., used by electric railways are sorted and reclaimed in the shops of the Department of Street Railways, Detroit, Mich., by a man who devotes his entire attention to the work. This man visits the various departments of the shop and picks up miscellaneous material, also outside shops send in their accumulations for sorting and testing. The salvage man goes over these accumulations of material at his bench, located in one corner of the shop. The various parts are placed in boxes so that uniform sizes are brought together. Poorly threaded screws and nuts are re-threaded or tapped. Fuses are tested and where labels are defaced or missing new labels are supplied. Various other parts are repaired where necessary. Work done in this way has proved of great convenience to other departments as well as being made profitable to the company.



General Salvage Man in the Department of Street Railways, Detroit, Sorting Machine Screws and Placing Them in Proper Boxes

Press Reclaims Slightly Used Trolley Ears

BY JAMES SCOTT
Superintendent of Overhead Cleveland
Railway, Cleveland, Ohio

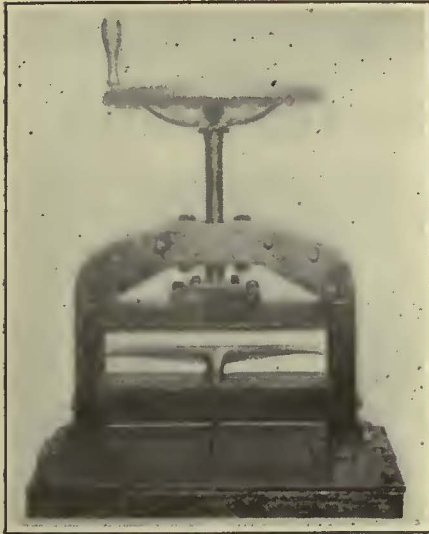
POLE relocation, span rearrangement, and removal of temporary and permanent trolley wires make necessary the removal of a surprisingly large number of trolley ears long before they are worn out on



Ear in Position Previous to Straightening

the lines of the Cleveland Railway. These ears are in good condition except for the half-moon bend which results from removal by the stripping iron. This bend cannot be removed satisfactorily or economically by hand, but the saving possible by reclamation of these ears warranted the construction of a special machine to perform this operation. Such a machine has been developed in our shops and by means of this an ear may be straightened quickly and accurately. The machine used resembles a letter press in appearance. A die is fitted into the base which is shaped to conform with the upper side of a new trolley ear. The movable element of the press consists of a metal block connected on the top by a ball and socket joint to a screw. This screw passes through the upper frame of the press. The lower face of this movable block consists of a metal strip which is shaped to conform to the under side of the groove of the ear.

To straighten the ear it is placed in the press with the boss resting on a coil spring, which extends up through the center of the lower die. The handwheel is then turned so as to close the press and force the ear into the die. A moderate force



Reclaimed Ear Ready for Reuse

so that it can be removed readily. The entire operation can be completed very quickly and an inexperienced operator can do the work so that the labor cost is very low. Ears reclaimed in this manner, with the exception of slightly worn lips, are equal to new ones.

Another feature of this press provides for changing the lower die and straightening and reclaiming switch approaches in a manner similar to that used for the ears.

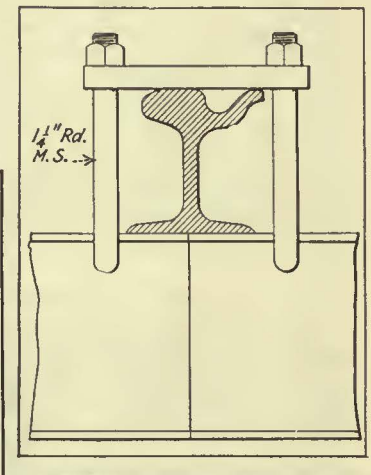
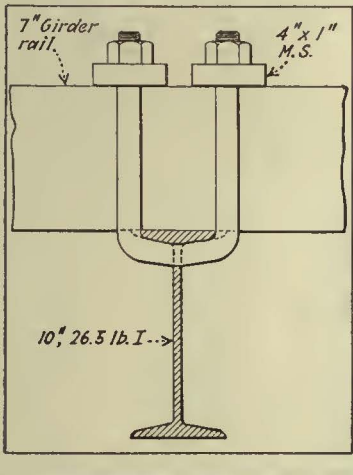
Monorail Installation Reduces Handling Cost

INSTALLATION of a 1½-ton monorail traveling hoist by the Eastern Massachusetts Street Railway in its Chelsea shops has speeded up production and lowered the cost of handling heavy materials between the various departments. Equip-

ment such as axles, wheels and motors were formerly transferred on hand trucks, which was a rather slow and expensive method compared to the present one. The electric hoist is equipped with variable speed control operating by ropes from the floor. It has a full load lifting speed of 26 ft. per minute and a traveling speed of 250 ft. per minute. An automatic limit feature is in use to prevent over-traveling of the hoist hook. This is self-resetting after operation.

The hoist operates on a 10-in., 26½-lb. I-beam track hung on cross rails spaced 15 ft. on centers. Cross members consist of 7-in. girder rail 10 ft. in length and attached to existing uprights by means of forged hangers. The I-beam track is suspended midway between uprights and secured in place with 1¼-in. U bolts as shown in an accompanying sketch.

Electric Hoist and Monorail Arrangement Has Facilitated Handling of Material between Departments in Chelsea Shops of Eastern Massachusetts Street Railway. A 10-In., 26½-Lb. I-Beam Is Used for Monorail Track. Track Is Suspended from 7-In. Girder Rail Cross Members by 1¼-In. Bolts.



applied to the wheel is sufficient to accomplish desired results. Upon opening the press, the spring in the base raises the ear clear of the die

Association News & Discussions

Bluff Point Meeting Well Attended

Many Phases of Bus Operation Discussed at New York Electric Railway Association Convention—Railway Operators and Manufacturer Representatives Gave Ten-Minute Talks on Live Topics in Their Fields

BUS operation occupied a prominent position on the program of the 44th annual convention of the New York Electric Railway Association on June 25 and 26. The meeting was held at the Hotel Champlain, Bluff Point, and was attended by about 350 persons. A feature of the program was a series of ten-minute talks by railway officials on live topics in electric railway operation. The subject in each case was left to the speaker. There was also a series of similar talks by representatives of manufacturing companies on recent developments in their particular fields. Two sessions of the association were held on June 25, and the annual banquet took place on the evening of June 26.

At the opening session on June 25 President W. J. Harvie called the meeting to order at about 9:45 o'clock and reviewed the progress made during the year in an address. An abstract follows:

PRESIDENTIAL ADDRESS

Mr. Harvie first briefly reviewed the work of the legislative committee and the program committee. He then emphasized the need of the companies, in considering new problems, like that of the motor bus, not to relegate to second thought the consideration of the electric car. "We still have it with us," he said, "and will have it for many years as the *pièce de résistance* of the business of transportation. We must, therefore, give it much more of our attention. None of us will deny that difficulties of successful operation do not diminish as the years go by, and that our problems require more alertness and acumen than formerly. Some of our burdens have become so heavy that they require special attention at our hands. Failure to correct them will inevitably result in inability to operate a much-needed service—a calamity due entirely to causes inherent in electric railway operation itself, and not due to the entry of the motor bus into the field of transportation." In conclusion, he said:

"A very considerable responsibility rests upon each of us to put our best thought on the problems that confront us, relieve our industry of unjust burdens, obtain an adequate return for service rendered, adopt new methods if necessary, and render service of quality and sufficiency to please our industry so that it will retain its place as a constantly helpful factor in the prog-

ress of our various communities. Only by so doing may we hope to make our business a profitable one."

COMMITTEE REPORTS

The treasurer's report showed disbursements for the year of \$22,324 and balance now on hand of \$7,428.

The accounting committee reported efforts made to induce the State Tax Commission to accept the reports made by the companies to the Public Service Commission and the Rapid Transit Commission. This would save the labor required to prepare two sets of reports. The committee also spoke of its work in endeavoring to get these two utility commissions to adopt the same classification of accounts.

A nominating committee consisting of the past-presidents present was appointed by President Harvie.

The legislative committee reported through Gen. Charles D. Newton efforts made at the recent session of the State Legislature to reduce the paving burden and the gross receipts tax on electric railway companies. Though both bills introduced failed of passage, the prospects for securing some relief at the next session of the Legislature are good.

Three papers were presented as follows: "Motor-Vehicle Operation" by Roy R. Hadsell, New York State Railways, Rochester; "Legal Phases of Street Railways and Buses" by Alfred T. Davison, Third Avenue Railway, and "Taxation" by Ralph Norton, Interborough Rapid Transit Company. They will be found in abstract elsewhere in this issue.

In answer to an inquiry, Mr. Davison quoted from a decision in a recent case where a car of his company had collided with a bus operating unlawfully on the streets. The court held that gross or willful negligence of the operator of the trolley car would have to be proved before the railway company would be held responsible. In this case the question was one of property damage only, as no passengers were injured. The decision had been appealed by the bus owner.

TEN-MINUTE TALKS ON OPERATION

A feature of the meeting, as explained, was a series of ten-minute talks on operation by transportation men, and on new manufacturing kinks by representatives of manufacturing companies.

R. E. Danforth, formerly general manager Public Service Railway, Newark, N. J., said motor vehicle transportation was not a big element in city service in the near future, but it seemed large to the public because of a popular impression that the electric car was being superseded. Buses should be provided for those who want to ride on rubber, but it is just as important, if not more so, to keep the railway service up to date. Both public and trainmen must be educated, the latter in their duties and in ways to attract traffic. One of these is to wear a smile, as a grouchy operator repels passengers. Publicity also is needed.

W. E. Thompson, vice-president Third Avenue Railway, said that two of a transportation man's most difficult problems are how he can cut down the losses on lines that do not pay operating expenses and how he can take care of the peak loads on heavy lines. Experience with the bus during the last few years shows that in newly developed or sparsely settled territory, where the travel offering would not justify the construction and operation of an electric railway line, the bus can be used to advantage. Where a line has been operated for years at a loss and requires considerable rehabilitation is often another place where the trolley can be abandoned and service in the territory given with buses. In small towns, where the peak loads are not a factor, buses are also found useful. But for carrying large numbers of persons in and through congested centers, the use of the bus adds to the traffic congestion, gives slower movement and requires a higher fare.

An observation made in New York City in May of this year shows that on Fifth Avenue during the peak of the rush in the afternoon between Fourteenth Street and 57th Street, a distance of 2.1 miles, the average running time for a bus was 47 minutes or 2.7 m.p.h. The buses served an average of 75 passengers per unit and at nearly all of the stops prospective passengers were left standing on the corner. On the same days and at the same time on Third Avenue the average running time for an electric car was 18.2 minutes or 6.9 m.p.h. The average number of passengers served per unit was 118 and the electric car was taking care of all of the travel that offered. Fifth Avenue has a rapidly moving light traffic with good police regulation, while the traffic on Third Avenue is largely of trucks.

Mr. Thompson also referred to a national survey just completed by the American Electric Railway Association, showing that the cities where the trolley has been abandoned are small and in many instances are in places

where street car service would never have been attempted if buses had been available when the rails were laid. On the other hand there are now in daily operation 2,658 more closed electric cars in regular service than there were in 1919.

Continuing, he said that the dependability of service by the street car in all kinds of weather should be enough to convince anyone of its advantage over the bus, if there was no other reason. This was notably so in New York City last winter, where, during a heavy sleet storm, in a good many localities bus operation was completely suspended but the trolley cars were kept in operation.

On the more economical use of the streets by the car, Mr. Thompson said that at Broad and Market Streets, Newark, N. J., a recent two-hour traffic count showed that of the 44,000 persons transported 3,500 passenger automobiles carried 6,000, 826 buses carried 17,000 and 670 street cars carried 21,000 passengers. In other words, of the 44,000 passengers, four out of five were riding in street cars and buses, the street cars leading by a wide margin. In Chicago, according to a recent report, nearly 75 per cent of the passenger traffic in the central business district is carried by surface cars, which are only 10 per cent of the vehicles using the streets. In Atlanta, a check showed that 75.8 per cent of the people are carried by street cars, which form less than 9 per cent of the traffic in the street.

In conclusion, Mr. Thompson said recent railway reports from Philadelphia, Kansas City and the Public Service system in New Jersey show that their bus services were being conducted at a loss.

H. B. Weatherwax, vice-president United Traction Company, Albany, said that company now has 30 buses (including four trackless trolleys), is adding 25 buses now and may add 25 more before the end of the summer. The bus lines on this system are not profitable, but in general have been put where trolley lines would not be or had not been profitable. Buses have proved especially popular with women passengers and have increased the off-peak riding. Elderly people also like their ability to make stops at the curb. The speed is usually higher than that of the trolley line replaced, and the gross receipts per vehicle-mile are often higher.

T. C. Cherry, vice-president and general manager Rochester & Syracuse Railroad, urged the need of giving good service but at a remunerative fare. He thought, in general, the city bus fare should be 10 cents, and the interurban bus fare should be 5 cents a mile.

J. F. Hamilton, president New York State Railways, Rochester, which operates a number of bus lines, said these lines were paying operating expenses including a fair rate of depreciation. He does not contemplate at present any material bus extensions. Bus operation is financially not a great asset, but it is very helpful in improving public relations. Mr. Hamilton then spoke of the good results following three years'

COMING MEETINGS OF *Electric Railway and Allied Associations*

July 8-10—Midwest Electric Railway Association, annual convention, Brown Palace Hotel, Denver, Col.

July 8-10—Texas-Southwest Railway Claim Agents Association, convention, Arlington Hotel, Hot Springs, Ark.

July 22—New England Street Railway Club, annual outing, Portland, Me.

July 23-24—Central Electric Railway Accountants' Association, meeting, Drake Hotel, Chicago, Ill.

Aug. 12-13—Wisconsin Public Utility Association, Railway Section, La Crosse, Wis.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

Oct. 10-15—Congress International Tramway, Local Railway and Motorbus Association, Barcelona, Spain.

Oct. 25-29—Annual Congress and Exhibit, National Safety Council, Detroit, Michigan.

Nov. 16-18—Society of Automotive Engineers, National Transportation and Service Meeting, Boston, Mass.

work in safety on his property. Safety competitions are being held between different divisions of the trainmen. They have been of great value.

George MacLeod, vice-president and general manager Buffalo & Erie Railway, spoke of the novel features of the interurban cars on that property. These cars have been described in issues of this paper. He also spoke of their noiseless features, including rope suspension for trolley bases and air compressors. Within the last two or three months, 28-in. wheels have been installed instead of 26-in. wheels to secure greater speed. The company is also experimenting with a magnetic track brake operated from the trolley circuit. It functions with the air brake and reduces the distance and time required to stop cars by at least 25 per cent. He believes the public ready to support with their patronage cars which operate on a fast schedule and are comfortable.

In conclusion, Mr. MacLeod gave some interesting figures on economies gained with the light one-man cars on the Buffalo & Erie Railway, as compared with two-man operation. The saving in total operating expenses in 1925 over 1924 was approximately 20.2 per cent, despite the fact that the car-miles were increased 16.7 per cent. By the use of one man instead of two a reduction of 60 cents an hour was obtained. Another saving was in power. The total power cost in 1925 was 3.3 cents per car-mile and the power consumption, excluding heating, was 2.02 kw.-hr. at the car. The

equipment maintenance was 1.1 cents per car-mile. On the Lexington property of the same company, after five years use of light-weight cars, this charge is still less than 1.8 cents. Finally, track construction and maintenance costs have been reduced by a wider spacing of ties, made possible by the lighter cars. In Lexington, where no freight trains are run, the spacing is 3½ ft. except at joint ties, as against the old spacing of 2 ft. On the Buffalo & Erie Railway, where a freight service is run, the spacing used is 3 ft. as against the 2½-ft. spacing previously employed.

C. E. Morgan, vice-president and general manager Brooklyn City Railroad, said the initials of the words Electric Railway Operation also stand for Education Responsibility is Ours. He thought it especially the duty of railway managements to explain to city officials and the public the public need for good street railway service. Merchants also should be shown that most of their patrons come by electric car and not in private autos and taxis. A recent check on this subject was made at a large department store in Brooklyn. Between 8 a.m. and 6 p.m. 33,000 patrons visited this store. Of this number 4.8 per cent walked there, 8 per cent came in private automobiles or taxicabs, 2.2 per cent came from the station of the Long Island Railroad, 31.3 per cent came from the subway, 20.3 per cent were delivered by elevated railway and 33.4 per cent by surface railway. Mr. Morgan spoke of a Pittsburgh merchant who thought most of his patrons came in private autos and taxicabs. To prove to him that he was wrong the railway company early each morning for three days parked autos around his store and left them there all day. The sales increased. Mr. Morgan also quoted figures from a recent study made by the B.-M.T. Corporation on the comparative use of the streets by private automobiles and street cars.

The series of ten-minute talks on "New Kinks," by manufacturers' representatives, was initiated by Bertram Berry, Heywood Brothers & Wakefield Company, New York. Mr. Berry said, in part:

IMPROVEMENTS IN SEAT DESIGN

One of the more recent demands in passenger transportation is for greater comfort. Some years ago, with the advent of the single-truck safety car, many of the electric railways adopted wood slat seats for their city service because they weighed less and were more economical in first cost and maintenance than upholstered seats. As the cars ran on rails, a not uncomfortable ride was had, providing the roadbed was kept in proper condition.

When motor buses started to haul passengers, the old style of seating was found to be inadequate. Uneven street paving and the sudden starts and stops of the vehicle brought a call for deep, soft cushions and high-yielding backs. Electric railway managers, noting that the riding public appreciated and was attracted by comfortable seats, are giving the subject careful consideration. The seat manufacturers, in turn, have

been studying how to meet the new demand and have developed reversible seats with deep, well-upholstered cushions and thick backs with light springs.

Seats with sub-spring cushions and spring air cushion top pads with form-fitting backs, either revolving or stationary, have been designed. They can be provided with frames of wood, steel, reed or fiber. Usually an arm rest or panel is used at aisle end only. If the width of the car will permit, seats with an arm should be 37 or 38 in. over all. In buses, chairs with arms are frequently made only 35 in. long due to restrictions in the width of the bodies.

Single revolving wood and reed parlor car chairs with double springs can now be secured. Genuine leather is generally used in upholstering the deep cushion seats, although mohair plush is favored for parlor cars.

The appearance of the interior of a car depends largely on the seats. Recently the Eastern Massachusetts Street Railway, desiring to improve the appearance of some of its cars with the expenditure of little money, had the slat seats covered with an embossed imitation leather. Hair felt was used under the imitation leather. The effect was excellent, some of the regular patrons believing the management had provided new cars. Money invested in attractive furnishings and in adding to the comfort of electric cars will bring returns in the form of good will and increased patronage.

A. Frank Paul, National Pneumatic Company, Philadelphia, discussed progress in the development of circulation in passenger movement. An abstract appears elsewhere in this issue.

GIVES RECENT CAR STATISTICS

George Frey, the J. G. Brill Company, Philadelphia, referred to the report on cars recently compiled by the American Electric Railway Association and published in abstract in last week's issue of this paper. He urged all to read and study it. In commenting on it he said that records had recently been compiled showing cars ordered by electric railways from Jan. 1, 1926, to date, indicating a total number of 33 orders and 873 cars. Of this total 49 were single-truck city cars, 443 double-truck city cars, 80 heavy electric coaches and 301 for elevated and subway service. Of the 33 orders for cars mentioned, 21 orders, representing 289 cars, required new drawings. A further analysis of the 443 double-truck city cars ordered showed that 200 were in orders of 50 or more, and of the 243 remaining cars, 46 were represented by two orders. This left 197 cars on 21 orders, and these could have been uniform in all essential respects but were not. The speaker emphasized the desirability from the economic standpoint for companies ordering cars, especially the smaller companies placing small orders, of keeping to uniform dimensions.

Other statistics given by Mr. Frey relating to the city cars were as follows:

49 had 25-hp. motors
375 had 35-hp. motors
10 had 40-hp. motors

8 had 50-hp. motors
50 had 60-hp. motors

85 had plush seats
66 had leather seats
170 had cane seats
168 had wood seats

79 had rubber floor covering
49 had linoleum floor covering
367 had plain wood floor covering

12 had pressed steel trucks
74 had arch bar trucks
18 had built-up trucks
391 had solid trucks and of this number 191 car sets were maximum traction trucks

John F. Craig, Westinghouse Air Brake Company, New York, gave particulars of that company's latest type of variable load brake for surface cars. He pointed out its advantages in increasing the braking rate of loaded cars and in reducing the number of flat wheels.

This portion of the program concluded with a discussion by R. Krienberg, Electric Service Supplies Company, New York, who referred to the effect on car design and equipment of changes which added to the comfort of passengers. This is being evinced by more comfortable seats, better illumination, more attractive decoration, better destination and route signs, more efficient headlights, etc. Modern tendencies in car equipment, he said, are decidedly in this direction.

During the morning session, at the request of President Harvie, the delegates stood for a half-minute in silence in memory of J. E. Duffy, whose death occurred recently. Mr. Duffy was general superintendent of the New York State Railways, Syracuse.

A MESSAGE FROM THE WEST

The second session of the association was held in the evening of June 25 to permit the display of slides and moving pictures with two papers.

Mr. Harvie called the meeting to order about 9 p.m. and said that Myles Lambert, Westinghouse Electric & Manufacturing Company, had a "message from the West" to present.

Mr. Lambert said he had spent considerable time recently in the Central West and had received many inquiries there about the electric railway situation in New York, particularly in New York City. The New York papers had published statements that the substitution of buses for a number of important electric railway lines was being seriously considered in New York City. These rumors were having a very disturbing effect throughout the country. He urged the electric railway interests of New York State to see that the facts in the case should be made public through a bureau of public information and in other ways. He particularly urged co-operation in this matter with the interests in New York representing the security holders of properties elsewhere in the country.

Papers by Leon R. Brown, safety engineer New York State Railways, Rochester, on "Traffic Problems in Rochester," and by H. L. Andrews, General Electric Company, on "Electric Drive for Gasoline Buses" were presented. Both were illustrated by moving pictures. Abstracts of these

papers will be found in this and a subsequent issue. The views shown by Mr. Brown had been taken with the approval of the Commissioner of Public Safety, Chief of Police and captain of the Traffic Squad in Rochester and depict congested street conditions in Rochester, proper methods of making right and left-hand turns, violations of traffic rules, etc. They had been shown at a meeting for automobile drivers in Rochester under the auspices of the traffic committee of the Rochester Engineering Society. Later they will be exhibited at the theaters in that city.

ELECTION OF OFFICERS

The concluding portion of the session was devoted to the election of officers. The report of the nominating committee for officers for the ensuing year, presented by R. E. Danforth, was unanimously adopted. It was as follows:

President, William W. Foster, Rochester.

First vice-president, William G. Gove, Brooklyn.

Second vice-president, William E. Thompson, New York.

Third vice-president, Ernest Murphy, Albany.

Secretary-treasurer, William F. Stanton, Rochester.

Executive committee, the officers and Frank Hedley, New York; Harry B. Weatherwax, Albany; James F. Hamilton, Rochester, and Slaughter W. Huff, New York.

At the conclusion of the election, Mr. Foster and the other newly-elected officers who were at the meeting were installed in office.

LARGE ATTENDANCE AT BANQUET

The annual banquet was held Saturday evening. This gave opportunity to those in attendance to participate in golf and other outdoor sports on Saturday. A number of sightseeing trips by buses were also provided and were enjoyed by those who participated.

There were many ladies at the convention, as is usual at Bluff Point meetings, and special sightseeing trips, bridge parties, etc., were arranged for them while the delegates were in session. They also attended the banquet, which was one of the most enjoyable ever held by the association. Mr. Harvie acted as toastmaster. The two speeches scheduled were of high grade and were well received. Hon. T. W. Wilson, Congressman from Mississippi, spoke of ideals in life and showed that the modern conception of aristocracy in this country is the aristocracy of service. Rev. John L. Davis was the other speaker and won great applause by his humor.

Importance of Truthful Advertising by Public Utilities

POINTING out that public utility advertising should be at all times based upon unassailable facts, Louis Wiley, business manager of the New York Times, delivered a most illuminating talk on "Newspapers and Public Utilities" before the Public Utilities Advertising Association, at the conven-

tion of Associated Advertising Clubs of the World, held in Philadelphia, Pa., on Tuesday, June 22. He declared it to be one of the greatest problems of the public utilities to cultivate and maintain community good will toward their activities. Emphasizing the important part which the newspapers in the community may play in improving this good will through judicious advertising Mr. Wiley was emphatic in stating that it is better not to advertise at all than to advertise unintelligently. He went on to say:

Poorly conceived advertising will fail to bring you results and will hurt the reputation of this powerful business influence among you. Until you are convinced of what advertising will do for you; until you are ready to understand that what you say in your copy must be only the truthful reflection of your company's character and that advertising cannot conceal or atone for mistaken policies of management; until you have a definite goal to be achieved by taking space, I would advise you not to advertise.

Mr. Wiley took the attitude that proper advertising will have a very beneficial effect upon the attitude of public utility employees. The public utilities may learn something in this direction from the great department stores. In such stores the employees are required to know what the company has advertised in the daily papers,

both merchandising and institutional copy. The managers find that the employees take the keenest interest in the public advertising of the stores' policies and goods. Mr. Wiley believes that public utility advertising in the newspapers should be carefully prepared to have the right effect upon the employees as well as upon the public. He also pointed out the necessity for proper discrimination in the use of copy. Public utilities as well as merchandising institutions must deal with widely differing classes of patrons and the taste and characteristics of these various types must be carefully analyzed before a successful advertising program may be carried out.

Mr. Wiley looks for the greatest advance in public utility advertising in the future in the institutional form of copy. He said:

See to it that your institutional advertising is scrupulously honest with the public; and if it is not backed up by performance it will be in vain. The most pious protestations in advertising in the world may be just as untruthful as the cheap copy which intelligent persons can tell at a glance is false. I cannot think of anything so vital to a public utility, whose prosperity must be bound up with the persons in the community it serves, as public confidence. Advertising alone will not begot this confidence, but truth in advertising will.

now pass to a consideration of the subject in this relation.

In a one-man car everything possible must be done to help the operator and to increase car mileage. The safety devices equipment was designed especially to facilitate the work of the one-man car operator. This was comparatively simple on the original Birney car, which had only one passageway for loading and unloading. But as larger cars came into use in one-man operation, on lines of heavier traffic, the duties of the operator increased proportionately. It then became evident that some additional facilities were necessary, so the longer platform car having a separate entrance and exit door, side by side at the front right-hand corner, was introduced and found of decided advantage. Simultaneous loading and unloading resulted.

With the front-entrance front-exit type of car the difficulties of aisle friction (passenger movement in opposite directions in the aisle), congestion at the pay point (passengers unwilling to move away from close proximity to the exit doors) and street friction (passengers massed at the entrance on the street, delaying the egress of passengers) immediately were evident and offset largely the advantage gained by the two doorways.

Perhaps the next step in the development was the turnstile type of circulating load car, in which the passengers board at the rear and leave at the front. This car has been operating very successfully in a number of cities. In others the turnstiles have been abandoned, the cars being operated as front-entrance rear-exit without turnstiles. A number of cities operate cars in which the passengers either enter at the rear and leave at the front, or vice versa. Among them are Albany, Scranton, Altoona, Knoxville, Fairmont, Springfield (Ohio) and Dayton. While this type of car is an advantage over the other types mentioned, it is not all that could be desired. The treadle rear exit supplies the need.

With a front-entrance rear-exit treadle type of car all of the difficulties in the movement of the passengers are eliminated. There is no street friction, no aisle friction, no congestion around the pay point, no hesitation on the part of the passengers to move away from the entrance door, as they are naturally anxious to move toward the exit door so as to alight more quickly at their destination. There is no street friction, because the passengers getting out do not encounter any of the boarding passengers. A description of the operation of this car will illustrate the advantages.

In the operation of a one-man car the car operator is both the motorman and the conductor, but these two duties are entirely separate and distinct. While the car is in motion the operator is a motorman, looking ahead and having his hands on the controller and brake. Coming to a stop where there are passengers to board, he applies his brakes and opens the front door. He is then finished as a motorman and assumes the duties of conductor. He collects all fares, makes change, issues transfers, answers questions, assists passengers

The Circulating Load in Passenger Movement*

Though Not New in Idea, This Principle Has Received Great Impetus Recently Through the Use of Large One-Man Cars— Possibilities Along This Line

By A. FRANK PAUL

National Pneumatic Company, Philadelphia

THIS is not a new system in car operation, but the phrase sounds new to us in that it has been recently popularized through the extension of one-man car operation, on larger car units, such as the turnstile car, the treadle car and the double-truck one-man car, where the passengers enter at the front and leave at the rear or vice versa. So many of us have come to think of it as a new scheme of operation. Nevertheless, the original "pay-as-you-enter" and "pay-within" types of car were fundamentally circulating load cars. When the "pay-within" car was introduced we endeavored to persuade the railway operators to insist that the public follow this method, but were unable to do so, because the officials felt that such a hard and fast rule would create more unpopular feeling and dissension than it would do good. The "pay-within" car had a chain across the rear exit, which the conductors were instructed to unfasten only in extreme cases, when the car was crowded during rush hours. Otherwise, there would be a delay if passengers had to force their way through crowded aisles to exit at the front. Another type of circulating load car is the Peter Witt "pay as you pass."

There is certainly much to be gained

by an orderly systematized method of passenger movement, in comparison with the haphazard plan which results in a tangled knot of people trying to get through a small aperture at one time, and in many cases obstructing the flow of another group of people coming in the opposite direction.

In England, at all heavy loading points, the passengers are arranged in systems of queues. There are two lines to the queue as the platforms of the car have two passageways, one to the upper deck and one to the lower deck. In this way cars holding 74 to 76 passengers are loaded in an astonishingly short time. One car which we timed with a stop watch loaded in 45 seconds, and the average of a number of cars was 55 seconds. American managers say that the American public will not stand for this scheme. However, it was used to a considerable extent during the war, and is still in operation in some places. Personally, I believe that this system could be applied to the elevated and subways of our large cities to great advantage, especially where there are railings on the platforms to control the passenger movement, and the cars are stopped with the doors in front of the openings in these railings.

As stated, the phrase "circulating load in passenger movement" is thought of in connection with the more recent double-truck one-man cars. We shall

*Abstract of paper at annual meeting of New York Electric Railway Association, Bluff Point, N. Y., June 25, 1926.

and does the complete work of a conductor. When this is finished, he turns to the brake and controller, having in the meantime had no thought or consideration for the passengers who may have been exiting from the car. These are leaving through the automatic treadle door at the rear. Having resumed the duties of motorman, he looks in the signal light to see whether the automatic conductor on the rear has closed the rear door, as he would do on a two-man car. As soon as he gets the signal light that the rear door is closed he releases his brakes and proceeds.

The great advantage of this system is that the two functions of the man can be so clearly and completely defined and his mind is so entirely relieved of anxiety and concern for what may be going on at the rear of the car. The rear treadle is interlocked with the brakes, so that should the motorman become careless or neglectful, he could not start the car when any one was on the treadle or the step. Further, he could not close the door on a passenger who was alighting at the rear.

There are at the present time 1,165 treadle cars in operation, with 225 additional on order. The city of Toronto has been operating for the past year 10,000 car-miles per day, at an average

speed of slightly more than 10 m.p.h., with large double-truck treadle cars. These cars have such a capacity that frequently during rush hours from 100 to 120 passengers are on the car. Further, these cars are running on the same track through the down-town congested district with "pay-within" type two-man cars and Peter Witt two-man cars. They are able to keep their place in the schedule without holding up or delaying the two-man cars. Stop watch tests have shown that the treadle car in Toronto is the fastest unloading car in the city, it being faster than the Peter Witt two-man car. It is not quite as fast in loading, but the gain in unloading has offset this and enables it to make a schedule speed of slightly better than 10 m.p.h.

In every case where the treadle car has been thoroughly tried out it has been proved beyond doubt that larger loads can be carried and faster time maintained than with any other type of one-man car. Lines are being operated by the treadle car which previously were considered too heavy for one-man operation.

Illustrating the extent to which the treadle car has gained favor, to date this year 498 city service cars have been purchased. Of these 278, or 56 per cent, are treadle cars.

accepted a franchise for an extension through an old but unpaved street in Queens County connecting with one of its lines in Brooklyn. As a condition of the franchise the company paved the railroad area. That street has since become one of the main through thoroughfares, particularly for trucks, but the space outside the railroad area is still unpaved. In consequence, the movement of trolley cars is impeded at times by the public's use of the facility which the railroad company has provided. The pavement is of no benefit to the company; rather the reverse, but it paid the bill. Another case is that of a company which also operated in Queens County, but now has gone out of business, where the paving bills rendered by the city authorities for one year were in excess of 60 per cent of the entire year's gross receipts. Still a third case is that of another company, also operating in Queens County and now in receivership, where operation is continued solely as the result of a tacit agreement by the present administration not to press for payment paving bills amounting to more than \$200,000.

In many instances local authorities will direct the substitution of new and more costly pavements for an existing one not in need of general repair. Where that occurs in a street occupied by a double-track street surface railway it generally means that a large part of the cost, sometimes as much as two-thirds of the total, must be paid by the company and the remainder borne by the municipality at large as a part of its general tax levy. Thus, the street railway company must pay not only the bills directly rendered to it for paving the street railway area but also its share of the general charge as a real estate owner and taxpayer.

With the ever-growing increase in vehicular traffic on the streets, there is no reason why the street railway, which is responsible for less wear and tear on the street pavement than other users, should be singled out for a continuance of the old horse car time obligation. Theoretically, a special tax is premised only upon a special benefit or privilege. Destroy or remove the benefit and the tax should fall. Certainly, in any comprehensive readjustment of the tax burdens and imposts throughout the state, provision should be made for the entire elimination or amelioration of the existing paving obligation.

IMPROVEMENT SLOW

With accumulation of state and local taxes upon these public utilities—gross earnings taxes, excess dividend taxes, corporate franchise taxes, special franchise taxes, real estate taxes, percentage payments and car license fees—and with the insufferable paving burden on top of them all, naturally the question arises: What can be done about it? The somewhat indefinite program of the Legislature's committee four years ago contemplated a constitutional amendment as a necessary preliminary to getting rid of the special franchise tax. As yet, not a single constructive step for the correction of the outrageous tax conditions affecting public utilities generally, and this industry in

Tax Problems in New York State*

Injustice of Many Existing Burdens Admitted—Progress Toward Their Removal

BY RALPH NORTON

Of Counsel to Interborough Rapid Transit Company

"THE present taxes on public utilities are a complicated hodge-podge which are the despair of the taxpayer and an occasion for amazement and scorn of students of taxation generally. For a long time it has been generally appreciated that the taxes on public utilities were arbitrary, uncertain and complicated, but it has been assumed that the law did achieve a reasonable degree of equity in the distribution of the tax burden. Our statistical investigation shows conclusively that the net result of all the effort which we now put forth in assessing these intricate taxes is scandalous inequality and disgraceful discrimination."

These are not my words. They constitute the indictment found by the Davenport joint legislative committee in 1922 against the statutory provisions under which different classes of public utility corporations are taxed for the support of municipal and state governments. The statistical tables accompanying the committee report furnish ample justification for the conclusion that gross inequality and discrimination prevail. The committee found that public utilities as a group pay a larger percentage of their net income in taxes than any other class of corporations doing business in the state, and that within the public utility group the

street railway industry had to bear a burden nearly 100 per cent greater than other members of the group.

For a ten-year period, from 1911 to 1920, inclusive, the Davenport committee found that telephone and telegraph companies paid 16 per cent of their net income in taxes, gas and electric companies 23 per cent, steam railroads 27 per cent and electric railways 44 per cent. The comparison is all the more unfavorable to the street railroads because of the fact that the other public utilities have been able to raise their rates to meet their increased expenses. Undoubtedly, if the period under examination had been extended to later years the discrepancy would have been even greater. If any consideration had been given in the report to the paving obligation and its effect upon street railway finances the resulting discrimination and inequity would have been much more striking.

PAVING OBLIGATION UNJUST

The paving burden had its beginning in the horse car times, but under present-day conditions the obligation is as obsolete as the horse car itself, and it has been distorted by municipal authorities to cover requirements which, while they may come within the technical language of some particular franchise, were never within the contemplation of the parties at the time the contract was made.

In one case, the B.-M. T. system

*Abstract of paper at annual meeting of New York Electric Railway Association, Bluff Point, N. Y., June 25, 1926.

particular, has been taken. Committee bills have been introduced from time to time since the 1922 report, notably those paving the way for the constitutional amendment incidental to the effort to get rid of the special franchise tax, but they get nowhere. Only this year the special joint committee on taxation and retrenchment reaffirmed its 1922 recommendation "that the taxation of public utilities be completely revised." But nothing is done.

If anything in the way for betterment is to be accomplished it must be germinated, nourished and brought to full and vigorous fruitage by the untiring efforts of those most vitally concerned. That means us.

For a number of years this association, functioning through its executive committee, has been making every effort to secure from successive legislatures the passage of a remedial measure which would substantially reduce the paving bills of street railroad companies by limiting the area to which the obligation would attach, and by clearly defining the proposition that the obligation is one to repair and not to repave, as the changing desires of the people or city administration might dictate. A measure of this character, cutting down the obligation rather than one seeking to remove it entirely, was considered wiser from a practical point of view because of the solidified opposition of the cities throughout the state which a bill entirely eliminating the obligation would be sure to bring forth. The wisdom of that course seems to have been amply justified by the progress which the Stevens-Thayer bill made at the 1926 session of the Legislature, drafted by and introduced at the request of this association's executive committee.

This bill proposed to amend Section 178 of the railroad law, which creates the paving obligation, so as to limit the street railroad area to what might be called ribbons of the street surface 16 in. in width with a rail in the center of each ribbon, and also by clearly specifying the street railway company's obligation to be one of maintenance and of restoration to the former condition of any part of the pavement of such street which should become in need of repair in consequence of the existence or use of the track. This bill was favorably reported in both houses and seemingly encountered little real objection. It probably would have passed if it had not been caught in the jam of the concluding days of the recently ended legislative session.

The successful culmination of such an effort would bring New York in line with Massachusetts, Connecticut, California and Montana, where similar drastic paving requirements to those now on our statute books have been modified. In addition, in many cities, scattered through 24 states, individual relief has been granted to different railway companies, varying between complete exemption from original paving, repaving and maintenance costs, requirement of only part of the cost of original paving and agreements stipulating annual flat amounts to take the place of all paving requirements.

In some cases the relief granted is of a temporary nature, in others agreement for a specific number of years, and in many others it is permanent. It will thus be seen that a measure such as that which this association has sponsored, and which it will again present and urge for passage, is in line with a widespread attitude of fair treatment of this subject by different sovereign states and by many municipalities.

FRANCHISE TAXES

This year the executive committee of the association determined for the first time to seek some other form of legislative relief from existing tax burdens in addition to the paving bill. After mature consideration, it was felt that the objective most likely to be obtained would be found in some amendment of the statutory provisions under which the corporate franchise taxes payable to the state are assessed. Accordingly, the committee caused to be introduced, in the 1926 Legislature, a bill attempting to do away with some of the discrimination which had been found to exist between different members of the public utility group. That bill, known as the Smith-Mastick bill, proposed to reduce the percentage of the gross earnings which operating street railroads are required to pay to the state as an annual franchise tax from 1 per cent to one-half of 1 per cent, and thereby place the street railways on a parity with steam railroads and certain other public utilities. To remove objections of the State Tax Department, the bill was changed so that the franchise tax would be a varying percentage of the capital stock of the company affected according to its degree of prosperity, as evidenced by dividends paid. With this amendment passage of the bill seemed assured until the closing

days of the session, when it ran into the same situation which prevented the passage of the paving bill, although there was an additional consideration about the make-up of the state's financial budget, which would have been slightly affected had this bill become a law.

I feel sure that the amounts which the companies would be required to pay to the state under the law as it is proposed to be amended would be a smaller proportion of their gross receipts than they are now paying.

WHAT CAN THE ASSOCIATION DO?

What can the association do, and what can its members do? They can see to it that their representatives in the Senate and Assembly are acquainted in a general way with the injustice and discrimination affecting street railroads under the existing law. They can call to the attention of those representatives the fact that bills to correct some of those inequalities and discriminations were introduced at the last session of the Legislature, and that similar bills undoubtedly will be introduced early in the 1927 session. They can enlist the support of such representatives to those measures when introduced.

In this respect ours should be a campaign of education, because we cannot close our eyes to the fact that measures such as these have no popular appeal and that their successful passage can be accomplished only by obtaining the intelligent interest of the members of the Legislature. That means being sure that the legislators learn what the bills are all about. That job is ours, and we should bend every effort to see to it that between now and Jan. 1, 1927, the necessary knowledge is imparted.

Some Legal Phases of Street Railway and Bus Operation*

Conditions Under Which Railways May Undertake Bus Service—Methods of Combating Installation of Competing Bus Lines—Control of Interstate Lines

BY ALFRED T. DAVISON

General Counsel Third Avenue Railway, New York City

MOST of the bus operation which has been initiated during the last five years in the city of New York and the territory immediately adjacent thereto is illegal and the buses involved in such operation are legal nuisances on the street. Probably the same situation to a lesser extent exists in other localities throughout the state.

Formerly the Public Service Commission, then as now empowered by statute to invoke the most summary processes known to the law—injunction and mandamus—was zealous in preventing the carrying on of a transportation business as common carriers by persons and corporations not legally empowered so to do. During the last few years the

Public Service Commission and the Transit Commission, because of the increase of their own pressing duties and business and the prevalence of this illegal operation, have been unable to take the necessary steps to stop such illegal operation. If, therefore, this illegal operation is to be stopped the institution of legal proceedings to that end will largely, if not entirely, devolve upon street railways. Moreover, many street railways are finding it to their advantage to engage in bus operation in co-ordination with or as an auxiliary to their street car lines.

Within the limitations of the time which can now be given to this subject I shall discuss: (1) Requirements for the legal operation of buses; (2) legal proceedings and methods by which the establishment of legal bus operation may be opposed and defeated; (3) ille-

*Abstract of a paper presented before the New York State Electric Railway Association, Hotel Champlain, Bluff Point, N. Y., June 25, 1926.

gal bus operation and its effects and prevention; (4) interstate bus operation.

REQUIREMENTS FOR THE LEGAL OPERATION OF BUSES

Here we find that street railways are in a class by themselves. By Chapter 840 of the Laws of 1926 a new section known as Section 50-a was added to the public service commission law whereby the commission may authorize the substitution of buses or motor vehicles in place of cars or trains upon tracks on any portion of a street railway route, provided the municipal authorities of the city, village or town consent.

Assuming such consent the following are some of the legal corollaries or deductions resulting:

Compliance with the new section 50-a is the only method by which a street railway may directly operate buses. A street railway company can of course operate buses indirectly through the organization and stock ownership of an operating bus company or companies with the consent of the commission.

The order of the commission and the consent of the municipality for the substitution of buses for street cars can be so drawn as to authorize the use of buses for a limited period, with the privilege of resuming operation by street cars at the option of the street railway. Likewise the order and consent can be so drawn as to make it possible to operate street cars during part of the day and buses during the balance.

So long as the tracks remain in the street the paving obligations of the street railway will not be changed, but if the tracks are removed, then the street railway will be relieved of its paving obligation. This is true both under the paving obligation imposed by the railroad law and under the usual paving obligation sometimes embodied in franchise contracts. Our experience has been that unless the Public Service Commission requires as a condition of the abandonment an agreement on the part of the railway to remove the tracks and restore the pavement, the tracks can be removed at the same time the city repaves the street.

The obligation of snow removal is contained in the railroad law and is also sometimes embodied in franchise contracts. It is doubtful whether the following clause contained in Section 178 of the railroad law,

and such authorities may make such reasonable regulations and ordinances as to the rate of speed, mode and use of tracks and removal of ice and snow as the necessity or convenience of the public may require,

is authority for the adoption of an ordinance requiring a street railway company which no longer has any tracks in the street and operates buses still to keep a given area free from ice and snow.

The street railway will still be required to pay the per cent of gross receipts called for by its franchise. If the tracks are removed the company is to that extent relieved from paying special franchise taxes.

We come now to the operation of buses by persons and corporations other

than street railways. As stated above, a street railway can indirectly carry on bus operation by stock ownership of separate corporations. Buses can be operated by an individual or by a corporation, but if by the latter such corporation must, if formed after April, 1921, be incorporated under the transportation corporations law.

In villages and towns which have not accepted the provisions of Section 26 of the transportation corporations law buses may be operated without any franchise and without any certificate of convenience and necessity. One advantage of the operation by a corporation in towns and villages which have not made Section 26 of the railroad law applicable is that if after bus operation is commenced by a corporation organized under the transportation corporations law such village or town adopts a resolution making Section 26 applicable, nevertheless the corporation already operating buses has, I believe, a franchise right which is not affected by the subsequent adoption of such resolution. Until the adoption of such a resolution no bus operation in such villages and towns can be prevented, nor is any such bus operation subject to the jurisdiction of the Public Service Commission.

In all cities and in those towns and villages which have adopted the provisions of Section 26 no bus operation can legally be carried on unless (1) the consent of the local authorities of such city, village or town and (2) the certificate of convenience and necessity from the Public Service Commission have been obtained. The above requirements follow from Sections 24, 25 and 26 of the transportation corporations law. They must be met for all buses irrespective of the rate of fare charged and whether or not passengers are taken on or discharged between termini.

The transportation corporations law was amended generally by Chapter 762 of the Laws of 1926. The changes on the above provisions are with respect to numbering of sections only.

There is no distinction between a consent under Section 26 of the transportation corporations law and a franchise. A franchise, broadly speaking, is the privilege to do something which the public is generally not permitted to do. The right to operate a street railway is always referred to as a franchise and yet the railroad law requires "the consent of the local authorities having control of that portion of a street or highway upon which it is proposed to build or operate such railroad." In other words, "consent" and "franchise" are synonymous.

When a franchise is granted by a city, the charter provisions of that particular city as well as provisions of the general city law and the second class cities law, in so far as applicable thereto, must be complied with.

In cities of the second class every franchise, and this includes a bus franchise, must be sold at public auction. The general city law, which relates to all cities not of the first or second class, also contains a provision requiring the

sale of franchises at public auction, but this limitation only relates to those cities where the only power to grant the franchise comes from the general city law.

The procedure for the granting of certificates of convenience and necessity is familiar and no attempt will be made to outline the general principles except to say that in some states public utility commissions have preferred the operation of buses by existing transportation companies rather than by new transportation operators.

OPPOSING THE ESTABLISHMENT OF COMPETING BUS OPERATION

Assuming that a franchise has been granted, then the only method of preventing bus operation is the successful contesting of the granting of the certificate of convenience and necessity by the Public Service Commission or the Transit Commission. Obviously if the bus operation competes with an existing street railway operation the certificate of convenience and necessity should not be granted, nor should it be if the financial ability of the grantee of the franchise is not sufficient to insure the proper institution of bus operation. Therefore, in opposing the granting of the certificate of convenience and necessity, all facts which come under any of these heads should be fully brought out in the hearings before the Public Service Commission. One thing is certain, our commission, and in fact all public utility commissions, have repeatedly held that they will not permit a duplication of, or competition in, public utilities. The right of the state to regulate public utility companies is based upon the proposition that a public utility is a monopoly and must be protected. The basic theory upon which a certificate of convenience and necessity is required is that there shall not be competition or duplication of transportation facilities. We so often hear public officials thoughtlessly advocating competition in transportation facilities that no effort should be spared to show to the public and to official bodies not only the impossibility of competition but that competition of public utilities is diametrically opposed to regulation and control.

Assuming, however, that the Public Service Commission grants a certificate of convenience and necessity, then the only remaining step which can be taken in opposing such bus operation is by a *certiorari* proceeding in the Supreme Court. Such *certiorari* proceedings are in the nature of an appeal from the Public Service Commission and the determination thereof is based entirely upon the record before that body. While the court will not arbitrarily substitute its own judgment for the judgment of a commission, nevertheless it will set aside the granting of a certificate where it is clearly shown by a preponderance of evidence that its granting was not justified.

From this it will be seen that it is most important that in the proceedings before the Public Service Commission the case be most carefully prepared and that the record contain evidence of all facts which in any way tend to show

that a certificate should not be granted.

The Public Service Commission is given power to invoke the summary process of the court by injunction and mandamus to prevent any illegal transportation operation. In the last few years, however, it has been very definitely established by the courts that illegal bus operation may be enjoined by street surface railroads.

There never has been any question concerning the right or power of a street railroad corporation to enjoin illegal bus operation, which competes with street railroad operation, and naturally the street surface railroad company is in a better position to show competition with its existing transportation lines than even the Public Service Commission would be. Personally, I believe that every additional means of transportation competes with all existing means of transportation, irrespective of the fares charged.

We have found in the prosecution of these injunction actions against illegal bus operation that the claim has been made, on behalf of the illegal bus operators, and even by municipalities, that the street railway had no standing to invoke the protection of a Court of Equity by means of injunction for the reason that the railway could not actually show that it was in any way damaged by such illegal bus operation.

The Appellate Division, Second Department, in *Huff vs. City of New York*, 202 App. Div., 425, has squarely held that:

The action may be maintained by a common carrier of passengers with whom the bus lines come in competition, or by a taxpayer for injunction to restrain an illegal official act, and to obtain a judgment for loss to the city occasioned by such an illegal act of the officials, or by any citizen and resident of the city to secure the abandonment of a nuisance in the public streets.

Inasmuch as it has been held that a street railroad is a resident and citizen of every municipality in which it operates, it follows that a street railroad company can bring an action for injunction as a resident and citizen.

In a recent case by the Westchester Electric Railroad vs. Mount Vernon Sight-Seeing Company, Inc., Mr. Justice Taylor sustained the right of the railroad company to enjoin illegal bus operation without passing upon the question as to whether the illegal bus operation was in competition with the street surface railroad.

In the last few years we have brought upward of fifteen actions to enjoin illegal bus operations and have secured the injunction in each and every case. There is, therefore, little excuse for a street railroad permitting illegal bus operation in its territory.

Apart from the question of competition, street railways are very materially affected by illegal bus operation in that bus operation adds to the vehicular congestion of the street and, therefore, increases the danger of collisions with such vehicles.

INTERSTATE BUS OPERATION

The operation of buses from one state to another is increasing rapidly and presents an interesting question under the interstate commerce clause of the Constitution of the United States. The

courts have not yet definitely passed upon the right of an interstate bus to operate in a state without securing a franchise required by the laws of that state for bus operation in its public streets, but the recent decision of the United States Supreme Court in the *Buck* case should be considered. The court decided that an injunction should issue enjoining any state official from prohibiting such interstate operation. This decision, however, was made on the ground that the primary purpose of the Washington statute requiring a certificate of convenience and necessity was not regulation with a view to safety or the conservation of the highways, but was for the purpose of the prohibition of competition. In that case the statutes of Washington did not require, as do the statutes in New York, that operators of motor buses as common carriers must obtain a franchise from an agent of the state, namely, a municipality.

Until Congress passes a law assert-

ing its authority to regulate interstate commerce of buses it seems certain that a state may conserve its highways, even against interstate buses, by requiring, as a condition precedent to such operation, a franchise grant for such use of its streets.

Congress has been considering the passage of a law with reference to interstate bus operation, and hearings on interstate bus and truck operation are to be held during the coming summer before the Interstate Commerce Commission. I believe it is important that both the municipalities and the street railway industry of this and other states should be represented at those hearings and endeavor to have incorporated in that law a provision whereby no interstate bus operation can be carried on in those states which require franchises for intrastate bus operation unless franchises are also obtained for interstate bus operation. Such a provision will certainly settle any question which now exists on that point.

Traffic Problems*

Street Congestion Is Becoming Constantly More Serious—Suggestions Made for Its Relief and for Reducing Parking

BY LEON R. BROWN

Safety Engineer New York State Railways, Rochester

THE public should be told of the importance of the street car; that today cars carry the bulk of the traffic on the streets; that the street car is the safest means of transportation on our streets today; that they occupy less area of the streets per passenger than any other transportation agency, and that no other means of transportation can approach the street car in the matter of low cost. Consequently the street car is here to stay for a great many years. We of the industry know that it cannot be replaced for mass transportation by the bus and that the sooner we convince the public of this fact the better it will be for every one.

When we tell the exact figures to the public they are astounded. In Rochester we made surveys during the rush hours and found that on Main Street 85 per cent of the riders were on street cars. The other 15 per cent riding in autos included the drivers. Similar percentages have been found to obtain in other cities. But none know it but ourselves.

The Safety Council in Rochester has about 100 bulletins on the streets containing safety slogans for autoists which they change each month. I asked the council recently if it would consider some slogans that would benefit car riders. I received little encouragement until I mentioned the fact that 85 per cent of the riders on our streets were street car riders. It was these people, while trying to get on and off cars, who were struck by autoists violating city ordinances, and this made up a sizable percentage of the killed and injured. As a result, the council at a recent meeting voted to use these slogans.

*Abstract of a paper at the annual meeting of the New York Electric Railway Association, Bluff Point, N. Y., June 25, 1926.

We should also educate the public regarding the traffic laws affecting the operation of automobiles in respect to street cars. Our police officials say that most of our traffic violations are due to the ignorance of drivers. These violations by motorists cause our accident lists to mount and slow up our service, thus discouraging our patrons and reducing our revenues. The motorist should be told that the street car has the right of way on the street or between cross streets (if that is the case in the city where you operate); that he must respect the rights of pedestrians about to board or alight from street cars; that he must not park opposite car stops, etc. Also, we can help shape the traffic laws in our cities, especially as pertains to the movement of funerals and parades.

HELP SOLVE TRAFFIC PROBLEMS

Traffic problems every day are becoming more acute. City officials and police, in most cities, are groping for possible solutions. We should help them to see clearly the relative importance of the various kinds of traffic and aid them in the solutions of their problems, thereby helping to solve our own problems.

We are fast approaching a point where there must be a restriction of traffic. In a recent issue of the *Industrial Digest* the results were given of a nationwide prize essay contest. The judges in this contest were all men high up in national highway safety affairs, such as general manager of the American Automobile Association, vice-president of the National Safety Council and a chairman of one of the national committees on Street and Highway Safety. It is worthy of note that both first and second prizes in this contest were awarded to contributors who pre-

sented practically the same general ideas—that of the restriction of vehicles permitted to enter the most congested traffic areas. For the benefit of those who have not read the prize-winning essay and to give you an idea as to what the thinking public is thinking I want to read to you a portion of this essay. This plaint for the relief of traffic congestion is based on the following underlying principles by Howard Williams:

1. Public highways are for the use of all people, on which they have the right to travel freely.

2. They were designed primarily for the use of pedestrians and for the conveyance of goods.

3. That while private vehicles have the right to move on the streets, that right is subject to the superior right of pedestrians and public vehicles.

4. That when traffic becomes too congested and the public welfare thus diminished, the use of private vehicles ceases to be a right and becomes a privilege which must yield to the superior right.

If traffic congestion in large cities must be relieved, without resort to major surgical operations, such as the widening of existing streets and the demolition of buildings to make new avenues, it logically follows that traffic itself must be reduced and controlled in a way that will work out to the best public advantage. This can be done only by:

(a) The selective elimination of privileged vehicles from congested areas during certain hours.

(b) The rigid control of necessary vehicles operating in those areas.

Private passenger conveyances and certain classes of commercial vehicles certainly belong in the privileged category. For private exclusive advantage they occupy traffic space which is now desperately needed for more general public use and thus infringe on public right to a free flow of traffic. Public conveyances—trolley cars, buses and taxicabs—just as surely belong in the category of necessary vehicles. They offer varied types of conveyance—traffic available to all people and to the exclusion of none. It is therefore proposed that:

1. All private passenger conveyances be excluded from defined congested areas during designated hours.

2. All commercial vehicles be classified and their operation in the restricted areas be regulated to meet the need and conditions of their particular classification.

3. All public passenger conveyances shall have free access to the restricted areas at all times, but shall be under rigid control, especially as it relates to the cruising and parking of taxicabs.

The advantages are obvious and many:

(a) Elimination of private cars reduces congestion immediately and flow of traffic is consequently accelerated.

(b) Freedom from parked automobiles leaves the curb lanes open for quick discharge of bus and taxi passengers.

(c) There is more space in side streets, both for traffic and for taxicab stations, where waiting cars would be instantly available.

(d) Owners of private cars, whose present progress in traffic is tedious and inconvenient, would find the loss of their privileges outweighed by increased speed, release from parking worries and accident responsibility.

(e) Retail stores, instead of losing so-called "carriage trade," would find business stimulated by the greater ease and celerity of vehicular travel.

(f) The constant demand for taxicabs and the rapid turnover resulting in that business would lead to finer cabs and to lower fares. Increased use of taxis does not necessarily mean a great increase in their number.

(g) Routes connecting important city divisions and leading to bridges, ferries and tunnels would still be open to through traffic on avenues outside the restricted area.

(h) The regulation and partial exclusion of commercial trucks would also reduce the danger factor during hours of busiest traffic.

(i) The advantage to the pedestrian in great comfort and safety are too apparent to need elaboration.

If such an experiment were tried and proved successful it could be applied to other selected areas with acceptable modifications.

There are no physical reasons why such a plan could not be put into immediate ef-

fect. Existing traffic regulations can be easily altered to fit the new conditions if necessary. Present plans for the extension of traffic towers will not be affected. It involves no changes in curbs or road surface.

EFFICIENCY OF THE STREET CAR

If it comes to a question of the selective restriction of vehicles, the street car can easily be proved to be the most efficient means of transportation, in so far as street area used per passenger is concerned. Taxicabs are the least efficient of any vehicle. Investigations made at various locations in New York City indicate that there are only 0.83 of a passenger in each cab. Nearly half the cabs were cruising without passengers. It is estimated that a taxicab occupied about 64 ft. of street area, so that the amount of space required for each taxicab passenger is 80 sq.ft.

Surveys made in many cities of the United States and involving a total of nearly a million private automobiles indicate that the average number of passengers in each automobile, including the driver, is 1.75. This means that the private automobile requires about 30 sq.ft. of street area for each passenger.

The average bus will accommodate about 25 people. Assuming that they carry half a load at all times, this would mean about 20 sq.ft. of street area required for each passenger as compared to 30 used by the private automobile. If used to replace the private automobile entirely, they would greatly increase the passenger carrying capacity of our streets.

Surveys made of the relative efficiency of the various modes of transportation place the street car far in advance of the others. Figures show that with a full load it requires less than 4 sq.ft. of space per passenger. Thus it is twenty times more efficient than the taxicab, eight times more efficient than the private automobile and five times more efficient than the bus. We should tell the public about this.

Our traffic problem and our parking problem have done one thing beneficial to the railways, and that is, called attention to the unjust paving charges which the railway companies have to pay. Parking and congestion force traffic onto the car tracks. If vehicular traffic won't keep off the pavement which the railway company pays for and maintains, then they should pay their share of the expense, which is really the entire cost, because the street cars do not use the pavement at all, but operate on their own rails.

PERCENTAGE OF AUTOS USING LEGAL WIDTH

Actual counts taken on various width streets in Rochester where there are car tracks showed the following results:

On one street where the width between curbs was 40 ft., out of a total of 4,579 vehicles using the street from 6 a.m. to 6 p.m. 4,259, or 93 per cent, had one or more wheels on the railway company's legal width. On another street, which was 60 ft. between curbs, 38 per cent had one or more wheels on the legal width. This check was made in 1922.

Another check made on the same 60-ft. width strip—the check made on June 4 of this year—showed 93 vehicles out of 100 using the legal width. This was because the pavement in the car tracks was much better than the pavement outside the car tracks. As an experiment, the following day we had the police place a white strip defining a clearance line about 2 ft. from the rail from one safety loading zone to another. This reversed the ratio of autos using the legal width, only eight out of 100 going on the car tracks.

The street cars, while not actually using the pavement, occupy some of the area. Just what space they did take up I figured out for Main Street, Rochester, over which most of the car lines run. During the rush hour there is a car every few seconds. But computations show that during that time in a half mile of its most congested section the street cars occupy only 5 per cent of the paved area, while they pay for and maintain about 35 per cent of the pavement. On many of the streets the railway pays for more than 50 per cent of the pavement.

THE PARKING EVILS

The use of our streets for private garages affects the street railway in many ways. It narrows the effective width of the street, forcing other autos onto the car tracks, delaying traffic. Slow car service means more autos and still more congestion, because people want to get where they are going quickly. Parked autos increase the dangers of traffic. They make blind corners everywhere. A large percentage of our street accidents, especially collisions with pedestrians, are caused by the partially obscured vision due to parked autos. Now parking is of no benefit to any one.

As mentioned earlier, 90 per cent of the shoppers travel by street car. Anything to facilitate street car traffic helps the merchant. Where there is ten-minute, thirty-minute or one-hour parking in front of a store auto users cannot find a place to alight, and consequently get the habit of shopping at their neighborhood stores. This has been proved in Pittsburgh and elsewhere, where prohibition of parking in the congested districts aided business rather than injured it. This same prohibition of parking in the congested districts of Pittsburgh decreased the running time of all street cars—some as much as five minutes.

A prominent merchant of a large Eastern city recently said: "If merchants do not do something to relieve the present traffic situation within fifteen years there will be no down-town shopping districts of any importance." This fact is being recognized everywhere, and if brought about will mean a further falling off of street railway revenues.

The street railway and the merchants are in the same boat, so to speak, on this proposition and they should get together in remedying the situation. That the merchants have given little thought to the problem is shown by the fact that in a reply to a questionnaire sent out by the United States Department of Commerce to merchants throughout the United States

3 per cent of the merchants gave the street car as one of the causes of traffic congestion, whereas we know that the street car in transporting people uses a minimum amount of street area, and it therefore remains the chief solution to our traffic congestion problems.

Automobilists deceive themselves if they think they are saving money by parking in the street. Just the cost of a paint job is equivalent to a year's car fare, and a new coat of paint would certainly be needed on a car parked in the street all day for a few months. Simply the purchase of a new mudguard or two crumpled by a parking neighbor who failed to leave his card would pay a year's car fare or the rental of garage space.

The autoist himself would save money and I believe time by riding the street cars. Evidence gathered all over the country and pertaining to various makes of cars indicate that the average person cannot hope to operate a car for less than 10 cents a mile, or about \$500 a year. If the people knew the facts our traffic congestion would disappear. A recent ad in a Rochester paper read like this: "Save your car fare by buying one of our cars. Yearly car fare saved \$50. Lunches saved \$150. Total \$200. You can buy many of our cars for this amount." The fallacy is apparent. A person would save little if anything on lunches; they cost about the same at home as they do downtown. A \$200 car will have left in it only a one-year life. It will cost the user more than \$300 a year for gas, oil and repairs, so that he would have to pay the \$50 saved from car fare and \$450 more a year for the privilege of riding in a rattletrap which shattered his nerves and congested traffic.

I believe, all things considered, a man can save time by riding to and from his work in the street car. When he drives his machine there is the time and trouble getting started in the morning. There are the traffic jams and delays on the way and the possible accident, and then, at the end, the parking problem. The man wasn't far from wrong who said that he often passed his own house on the way to the office after finding a parking place. A man who rides the street car is not wasting his time. He can read his paper, cultivate acquaintances or plan his work. If the public could only be educated to this fact traffic congestion would be reduced, parking problems would be over and street cars still further speeded up.

WE SETTLE TOO MANY UNJUST CLAIMS

With each new automobile manufactured the traffic congestion is made worse and the possibility for street car accidents is increased. It is only through organized accident prevention work that they can be kept down. But hospital rates, doctors' fees and wages have increased so that our claim departments pay higher amounts for the same class of injury or damage than they formerly did. So even with less accidents it is barely possible to hold our own financially in accident prevention work. But there are several companies in the United States that are doing a wonderful work along accident prevention lines and greatly reducing the number of accidents.

A year's experience in accident prevention work has convinced me most accidents involve contributory negligence on the part of the other party, but railway companies settle because it is cheaper than a court action and they are afraid of a jury verdict. In this way the public has come to expect settlements. At the National Safety convention last year one electric railway reported it had collected more in claims than it had paid out. It had established a policy of paying nothing unless it was clearly at fault, and of suing to collect damages in every case where it was not at fault. The public there had come to learn that it would cost more to collect an unjust claim from the railway than it was worth, and that it was cheaper to settle a damage suit than to fight. Apparently no ill will was developed. The people respect the railway for ascertaining its rights. I wish every railway in New York State would do the same thing.

The best remedy to cure the ills that have been enumerated is publicity. When people know and understand the facts they are going to demand that the

electric railway industry gets justice.

If the railways want the traffic laws enforced they should help enforce them by co-operating with the police. In Rochester each motorman and conductor is equipped with a traffic report blank. When they see a traffic violation by an autoist, such as passing on the left hand side of a street car or passing a standing street car while it is loading or discharging passengers, they fill in the blanks on the card showing location, time, license, number, etc.

This card comes to the Safety Director and is given by him to the police. There it receives the same attention as if it had been sent in by a police officer. The autoist is called in and then he is called down. If he admits his guilt his operator's license is given a police punch. Three such punches and the motor vehicle bureau will refuse to renew his license. If he denies the report, but the police think he is guilty, they have the option of having a warrant sworn out for his arrest and then the traffic violator has to tell his tale in court. This is one way in which the railways can help enforce traffic laws.

Motor Vehicle Operation in Rochester*

City and Interurban Buses Give a Variety of Services—Express and Freight Services Also Discussed

BY ROY R. HADSELL

General Superintendent of Transportation New York State Railways, Rochester

OUR principal reason for operating buses in Rochester is to serve the public and protect our investments against competitors. As we have operated the old-established system of transportation we feel that we are better qualified to handle this new mode of service, together with all forms of public transportation. We have 50 motor vehicles and we give a headway averaging from five minutes on city crosstown lines to three trips per day on some of the interurban lines.

On our co-ordinated lines we use drivers taken from the trainmen in the trolley service and on our interurban lines experienced independent drivers. Many of the latter were employed on the lines before we acquired them and they are well qualified for their work.

Our method of fare collection on crosstown city lines is the same as on trolley cars; that is, fare box with p.a.y.e. operation, issuing transfers to city car lines.

On the lines operating into the suburban districts city fares are charged to the city line and zone fares to the line terminals. On our interurban lines our fare is prepayment, the operator issuing a duplex. The passenger holds this duplex as a receipt and the operator turns in the stub to the auditing department as a record of his passengers carried.

OTHER SOURCES OF MOTOR VEHICLE REVENUE

The development of express revenue presents many problems, principally

*Abstract of paper at annual meeting of New York Electric Railway Association, Bluff Point, N. Y., June 25, 1926, because anybody can establish a trucking line to do express business, whether

in direct competition with an interurban railway or not. The result in many cases has been that the interurban railway express business has been ruined. In a certain case the railway company proposed to carry express and freight matter at a lower rate than the independent operator, but this policy was changed. A fair rate was established and the best service possible installed. The independent operator soon discontinued and the railway company found itself in possession of an auxiliary express business far larger than the sum lost by its interurban express line. This was because the trucks could give a direct collection and delivery service which formerly had to be performed by the individual industries. It is not at all difficult to secure a revenue of 75 cents a mile from this type of operation, most of which is business which the railway company never had before.

Most transfer freight between steam railroad stations is done by trail trucks. The truck backs up to a railroad station, the freight is loaded by the steam railroad, the truck is sealed and the transfer company hauls it to the other station, at which place the freight is handled by the steam railroad. There is no labor charge for handling the freight and it is not necessary for the transfer agent to assume the responsibility to bill it. It can, therefore, be done at a very low rate. As a rule, this transfer takes only two to three hours during the day, after which the truck can be used for whatever other express business the company may have. As there is a large volume of this business in the state and as it can be performed at a low rate and still give a good profit, it would seem to be

a source of auxiliary revenue which street railways should endeavor to get.

Another very profitable source of additional revenue is through chartered bus operation. The company with which I am connected has been unable to take care of all of this business which exists. In my opinion it is one of the most promising sources of auxiliary revenue for buses, as frequently it can be performed for short distances between the rush-hour periods. This tends to give a much better use curve of bus equipment.

Mail and package revenue, while not large in volume, is almost clear profit.

DETAILS OF PASSENGER SERVICE

In conclusion I will give a few details of our passenger operation.

The Rochester bus system consists of fifteen lines, totaling 238 miles in length. The longest is 70 miles and the shortest 2.7 miles. An average of 3,800 miles is operated daily, giving five types of passenger service:

1. A crosstown city service, providing means of transfer between twelve trolley lines.

2. A suburban service from the present trolley line terminals into the sparsely settled suburban districts.

3. A de luxe service from certain sections in the city to the down-town district. The fare charged is 15 cents or more without a transfer privilege.

4. Interurban service from outlying cities and villages into the city, providing a service similar to that on the electric interurban lines.

5. Service during the summer season to various lake or summer resorts from the city or car line terminals.

In one instance two lines give service to a section along the lake shore where the Rochester & Manitou Beach Railway was previously operated but was abandoned in 1924.

During 1925 we carried 3,500,000 on the bus lines mentioned.

In addition to the regular service, we have given a chartered or special service which to date has proved very successful. During the past year we made 190 of these trips, operating to Atlantic City, Philadelphia, Baltimore and Washington, as well as to nearer cities.

report of the committee on carhouses and car wiring of the A.E.R.A.

Mr. Schoen will have the committee compare relative standards to be discussed further.

Arc Welding Processes

WELDING wire was the subject of a meeting of special committee No. 6, arc welding processes for repairs to rails, of the way and structures committee of the Engineering Association. The meeting was held at Hotel Champlain, Bluff Point, N. Y., on June 26. Members present were C. F. Gailor, chairman; H. E. Bean, R. B. Fehr and A. L. Donnelly. Replies received to a questionnaire sent out on this subject with the purpose of determining the possibility of preparing specifications for welding rods were discussed. It was concluded that it would not be well to draft specifications of this kind during the present year, as the experience data available are not sufficient. It was decided to submit a brief report telling the aims of the committee and recommending that the work be continued by next year's committee.

Special Bulletins Available

FOLLOWING is a list of special reports that have been prepared by the bureau of information and service of the American Electric Railway Association and are available to member companies upon request:

Bulletin No. 87. Operating Costs of Motor Bus Operations of Electric Railways.—1925. A study of the average operating costs of 92 electric railway bus undertakings in 1925 and a comparative study of the operating costs of 44 bus operations in 1925 and 1924. For each group, the operations have been classified as city, interurban, or combination city and interurban service. The depreciation methods adopted by each company are presented in tabular form and all of the data are illustrated by graphic charts.

Bulletin No. 88. Zone-Fare Systems on Electric Railways in the United States. Gives list of companies that have adopted the zone system; detailed description of how the zones were laid out, including maps; methods of fare collection; how the public was educated to the new plan; attitude of various public utility commissions toward the zone system; and results of operations compared with the previous flat-fare system.

Bulletin No. 89. Accident Statistics of Electric Railways—1925. A comparative summary and analysis of statistical data on accidents reported by 184 electric railways for the years 1925 and 1924. Some of the items shown are as follows: Total number of accidents; number of accidents involving motor vehicles; number of car collisions; number of persons injured; number of fatalities; total cost of claims; ratio of total cost to gross earnings; number of car-miles and number of passengers carried per accident, etc.

Bulletin No. 90. Trend of Material Prices. A new edition of the association's compilation, bringing down to date the trend of prices of material used by electric railways and furnished by the manufacturers of those materials.

Bulletin No. 91. Traffic Ratios—1925—Part 2—Interurban Lines. A tabulation of data for interurban lines similar to that given in Bulletin No. 82 for city lines. For interurban lines the data include the average speed, revenue passenger per car-mile, per mile of track, per car operated, operating revenues, revenue per mile of track, and operating income per mile of track.

In addition to the above, the following supplements have been prepared, bringing the information they cover down to July 1, 1926:

Supplement No. 4 to Trainmen's Wage Bulletin No. 69.

Supplement No. 4 to Busmen's Wage Bulletin No. 70.

Supplement No. 10 to City and Interurban Fare Bulletins Nos. 40 and 41.

Cost of Living Studies (Bulletin No. 92).

American Association News

Brady Safety Award Resumed

RESUMPTION of the Anthony N. Brady Safety Award has been announced by Arthur Williams, president of the American Museum of Safety, at the request of the American Electric Railway Association. This award was established in 1914, but was discontinued during the war. The award, consisting of a gold medal, was won in 1914 by the Boston Elevated Railway, in 1915 by the Union Traction Company of Indiana and in 1916 by the Connecticut Company. Included with the award is a silver replica conferred upon the officer or department head who has contributed most to the successful record of the company and a bronze replica to the employee whose services have been of signal value in the promotion of safety and health.

The resumption of the award has been made possible by the generosity of Nicholas F. Brady. It is distinctly an award of merit which is offered each year to the electric railway company making the best record in the safeguarding of the life and health of its patrons and employees.

The value of this competition in initiating a friendly rivalry among electric railway companies for the establishment of the best record in the conservation of human life cannot be overestimated. It focuses the attention of each company on the need for an intensive and continuous campaign among its employees and the public in safety matters. It tends to establish a very much higher *esprit de corps* among the employees of the various companies and it is of inestimable value to all competitors as an instrument for securing public good will, whether they win the award or not.

The announcement of the reestablishment of the award came too late to

open the contest during the present association year. Plans are being made, however, to review the conditions of the contest immediately to ascertain if any modifications are necessary to meet changed operating conditions of today. At the beginning of the 1926-27 association year the conditions of the competition will be publicly announced and all companies will be invited to enter the contest.

Fire Protection Discussed

MR. SCHOEN, Atlanta, Ga., chairman of the committee on carhouses of the National Fire Protection Association, presided at a meeting of those interested in carhouse and garage fire protection held at the office of the American Electric Railway Association on June 30. Several people connected with the insurance profession attended, also a number of railway operators who run buses, among them Charles Rufus Harte of the Connecticut Company, Adrian Hughes, Jr., of the United Railways & Electric Company, Baltimore, Md., and Alexander Shapiro, Washington Rapid Transit Company.

The meeting was devoted largely to outlining points to be taken under advisement by garage operators when considering the question of fire protection. Among the topics discussed were the maximum number of buses which should be stored in any one space, bearing in mind the number of entrances and the accessibility to the street; the question of building construction; whether there should be pits; whether tanking should be done inside or outside; the effectiveness of sprinkler protection; extent to which smoking should be permitted; fire-fighting apparatus, and a number of other matters made the subject of reference in the 1925

The News of the Industry

Talk of Settlement in Toledo Soon

Steps will be taken at once to draft a new franchise ordinance for Toledo, Ohio, embodying the principles recommended by Prof. H. E. Riggs of the University of Michigan following his survey of a year ago.

This action is prompted by receipt of a telegram from Henry L. Doherty from Mexico City by Mayor Fred J. Mery in which the traction head declares he is favorable to working out a new proposal. Mr. Doherty said:

I am desirous of co-operating with you in working out the city's transportation problem, using as a basis the principles set forth in the reports of Professor Riggs. I suggest that you have an ordinance drafted which will provide for carrying out those principles and then send the ordinance to me at New York. I will examine the ordinance and will promptly advise you of any suggestions I may have.

Professor Riggs has conferred with the Mayor and law department officials several times recently. Dewey C. Bailey, counsel for the Doherty interests, is also in the city, looking after legal matters. It is probable those interested in the ordinance will have a tentative draft ready soon.

The Riggs report suggests maintaining the general service-at-cost plan of the Milner ordinance, providing funds for improvements, inaugurating a city-controlled monopoly of bus and street railway operation by the Community Traction Company, maintenance of present 10-cent cash and three-for-25-cent ticket rates of fare, relief for the company from paving obligations and a change in financial sections of the ordinance so as to divert the present sinking fund-city purchase funds into a rehabilitation fund.

Under the financial plan the company would have 4 per cent depreciation reserve annually available for renewals and betterments.

It is estimated that nearly \$2,860,000 would be required in new money to secure the necessary economies and bus equipment to operate under the Riggs recommendations.

Concessions in power rates are also a part of the agreement reached in the supplementary report between Riggs and Doherty engineers.

Rensselaer Sticks to the Trolley

The Common Council of Rensselaer, N. Y., has defeated the ordinance permitting the Capitol District Transportation Company, a subsidiary of the United Traction Company, which operates in both Albany and Rensselaer, to supersede trolley service with bus service. Sentiment expressed by a rising vote in a public hearing was opposed to the bus project. Despite this the Albany News regards the action as regrettable. That paper said:

The trend now is against laying any more trolley tracks in city streets and few trolley

companies anywhere are extending their lines. There may have been a feeling in Rensselaer against the company for service that residents felt was not satisfactory. Yet service would have been improved through bus lines and this attitude hardly improves the situation in Rensselaer.

It is probable that Rensselaer will see this attitude was shortsighted and that eventually bus service will be permitted. Rensselaer is bound to grow and develop with the port. It will need better transportation.

Wage Agreement Ratified in Boston

An agreement has been reached by the board of trustees of the Boston Elevated Railway, Boston, Mass., with the carmen's union over wages and working conditions for another year, beginning July 1. This is the first time

for some years that the matter has not gone to arbitration.

There is no change in the basic rate of pay to the uniformed carmen, except the motormen of the subway trains, who will receive 76 cents an hour, an increase of 1½ cents. The carhouse repair men, of whom there are about 1,000 in the employ of the company, receive an increase of 4½ cents an hour, making their pay 80 cents, but their week is reduced from seven to six days. The uniformed carmen receive no more pay, but each one will receive a uniform free.

Edward Dana, general manager, says that both sides made concessions.

The agreement has been ratified by a special meeting of the union.

New St. Louis Franchise Made Public

Mayor Sees the Transportation Problem One of Great Concern and Importance—Wants General Discussion of Measure—Several Vital Points Left Open—Summary of Grant's Provisions

MAYOR VICTOR J. MILLER of St. Louis, Mo., on June 25 made public the official text of the proposed service-at-cost franchise ordinance under which the St. Louis Public Service Company will operate when it takes over the properties of the United Railways.

The Mayor proposes that there shall be a general public discussion of the measure prior to its passage by the Board of Aldermen or through a vote of the people. With this end in view several vital points were left open in order that the public might express its desires for the guidance of the city officials.

In general the tentative draft guarantees the company a fair return on its investment, through a sliding scale of fares, based on the cost of service, in return for the surrender to the city of control of its service and provisions in its contract which will make possible co-ordination of the street car lines with any existing transportation lines (including buses) or any future rapid transit system, with the possibility of universal transfers and the right of purchase by the city.

Mayor Miller also gave out a personal statement in which he tentatively approves the measure, but points out that before the ordinance as finally drafted can become effective it must be approved by the Board of Aldermen or the voters at an election, then approved by the Missouri Public Service Commission and accepted by the company.

The important points left open in the bill for the present are: The rate of return to which the company shall be entitled, the question of official recognition of labor unions, rules governing use of one-man cars and the preference

to be given in payment of special taxes.

These special taxes are fixed at 3½ per cent of the company's gross revenue and take the place of the present mill tax. The bill also provides that the back mill taxes now due, \$2,396,321, unpaid since Jan. 13, 1919, shall be met in six annual payments with interest.

A summary of the provisions of the service-at-cost franchise follows:

Fares—To be automatically fixed on a basis of a fair return upon valuation, after deducting cost of operation.

Valuation—To be agreed upon by city and company and approved by the Public Service Commission. With a rate of return commonly allowed by the Public Service Commission and under present operating conditions it is probable the rate of fare will be 7½ cents. The present rate is 7 cents, but Receiver Rolla Wells recently applied for an 8-cent fare with two tokens for 15 cents.

Service—The city to designate how many cars shall be run, how often and upon what routes. It may have any quality of service it is willing to pay for.

Extensions—City may order extensions to serve new districts, with the restriction only that they be self-supporting to a degree that the company may have an adequate return from the entire system.

Method of Control—Through a transit commissioner appointed by the Mayor but paid by the company, who shall have full authority to exercise all of the rights of the city.

Buses—The company is not required to operate buses, but may do so.

Life of Franchise—Thirty years if passed by the Board of Aldermen or 50 years if approved by a vote of the people.

Taxes—Company agreed to pay back mill tax judgment of \$2,396,000 out of earnings in six annual installments, with interest. Mill tax and other present franchise taxes are abolished and replaced by a flat tax of 3½ per cent of gross revenues. This is in addition to regular property tax of state and city.

Disputes—All disputes to be settled by arbitration. If city and company agree, Missouri Public Service Commission shall be the arbiter. If either declines to accept that office, the city shall select one or two and the company one or two arbiters and the odd arbiter will be designated by the senior Judge of the St. Louis Court of Appeals.



It Was a Good Fire and Raged Savagely

Grand Rapids Has a Bonfire

50,000 Rejoice at the Sight as Flames Relegate to the Realm of Limbo Antiquated Equipment Which Has Been Replaced by 27 Coaches that Are the Last Word in Sumptuousness

ALL OF its old, rickety, rattletrap street cars were consigned to the flames by the Grand Rapids Railway, Grand Rapids, Mich., in a huge bonfire at the West Michigan fair grounds Thursday night, June 24, while cheering throngs welcomed the advent of the modernized electric rail coach service and the passing of the antiquated equipment that had outlived its usefulness. The event was one of the biggest jollifications and night celebrations ever held in the history of the city. It was attended by nearly 50,000 people.

The bonfire, first of its kind ever held in the United States and the largest ever held in Michigan, and probably the entire country, because of its novelty and also because of its importance to Grand Rapids, proved a wonderful magnet in drawing a record attendance.

Advance advertising by the railway announced the affair as a jollification—and it was. The vast crowd seemed happy that the cars, some of which were nearly 30 years old, were to pass out of existence and be replaced by equipment as fine as that possessed by any other railway.

Mayor Elvin Swarthout had the honor of touching off the great bonfire. Surrounded by other city officials and prominent citizens, the Mayor applied the torch at one end of the long string of cars, while Louis J. DeLamarter, general manager of the railway, in the presence of visiting street railway officials, distinguished visitors and invited guests, simultaneously touched off the other end.

When the crowd saw the flames begin to lick their way through the cars a great cheer went up and continued

for several minutes. As the lurid glare from the oil and grease soaked cars grew brighter, illuminating the grounds so that a newspaper might easily be read anywhere, the people showed their happiness in many noise-making ways, auto horns predominating.

Primed with plenty of straw, grease, oil and parts of broken up cars, the fire was quite different from the one two years ago which made the use of these rickety and antiquated cars necessary. No fire engines responded to this blaze.

Within five minutes after the torch had been applied to the ends of the long line of cars, which stood in a semi-circle within the paddock in front of the grand stand, great jagged tongues of flame were shooting 100 ft. into the air. The flames were visible for miles around, while the lurid glare on the



Some of the Cars that Replace Those Destroyed

clouds could be seen from many surrounding towns.

Spectators loudly cheered for the new coaches as the flames rapidly devoured the old equipment.

Pathé Weekly and Universal and local movie men cranked their cameras as Mayor Swarthout and Mr. DeLamarter started the great fire and continued their cranking at intervals until it was nearly over. It did seem peculiar, but car No. 198, so old that railway officials were fearful of hazarding a correct guess as to its age, was the last car to cease burning. This veteran car was rebuilt in 1902.

Long before 8 o'clock the big grand stand was filled to capacity. By 8:30 every available parking space on the

"There'll Be a Hot Time in the Old Town Tonight."

Promptly at 8:30 Mr. DeLamarter gave the signal and three giant aerial bombs soared skyward, exploded with war-like detonations and the big jollification was on.

When Miss Ruth St. Clair gave the word "Let 'er go!" her big balloon started skyward and things began to happen. She carried with her a large supply of fireworks and fuses which burned brightly as she sailed into the air. She landed in the Grand River, swam ashore and returned to the grounds, to be roundly applauded.

The ascension was followed by one of the most gorgeous pyrotechnic displays seen in western Michigan. Great

The railway had put extra cars on the line serving the fair grounds and at 10:30 the last passenger had left for home and was being rapidly carried back to town, while the autoists fumed and fretted.

Jupiter Pluvius sprang a surprise with a severe downpour 30 minutes after the jollification was concluded. The storm passed as quickly as it came.

Mr. DeLamarter was congratulated by city officials, business men and prominent citizens in the successful culmination of his aim to give to Grand Rapids and its residents the most modern type of electric rail coach and a railway service that would bring credit not only to himself and his company but to the entire railway industry.



Old Cars Lined Up on the Afternoon Before the Fire



Mayor Swarthout Touching Off the Fire with a Torch

grounds was taken. The crowd lined the paddock fence and each side of the stand. Autoists, caught in the jam on the highways leading to the fair grounds, parked their cars as far as 2 miles from the grounds and walked to the bonfire.

While the crowd was assembling and until the program started, there was an enjoyable concert by the Grand Rapids Commercial Drivers Safety Club Band, of 100 pieces, which donated its services for the event to show its appreciation to the railway of the new coaches and improved service. The band played a funeral dirge when the cars were set on fire, a few moments later swinging into the appropriate notes of

aerial torpedoes carried the story of the event to the thousands in the grounds, while the reverberating echoes wafted the message to nearby towns. The fireworks were climaxed by big and special set pieces directly in front of the grand stand. When the company's well known slogan, "Don't Worry! Relax! Ride the Street Car. The Safest Place in Town," was emblazoned in letters of living fire, the colored words were greeted by an expression of public good will in long and continuing cheering and applause.

Then came the bonfire, the big event of the evening. Mayor Swarthout, torch in hand, was ready officially to start the conflagration. Turning to city officials and prominent citizens, he said that the honor gave him great pleasure because it marked the passing of the old-time railway service, ushered in the new and more modernized and blazed the way for a forward movement for the local railway and the industry as a whole. Dedicating the new cars to the people of Grand Rapids, he touched the fuse and history was in the making.

Jammed in every conceivable position, the thousands of autoists were unable at the conclusion of the ceremonies to extricate their cars from the maze for more than two hours. They sat and waited for an opening in the traffic within the grounds while idling motors burned up thousands of gallons of gasoline.

The day preceding the jollification representatives of several other railways were guests of Mr. DeLamarter in an inspection of the new coaches in service. Among the visiting officials were R. S. Bull, superintendent of the shops of the Pittsburgh Railways, and T. E. Allerdice, superintendent of the Homewood shops of the same company; J. P. W. Brown, vice-president of the Nashville Railway & Light Company, Nashville, Tenn.; E. D. Reed, manager of the Chattanooga Railway, and J. J. Geringer of Evansville, Ind., general superintendent of the Southern Indiana Gas & Electric Company.

"Service that Is Service"

Within the covers of an eight-page booklet issued by the Northern Ohio Traction & Light Company is told the story of 670 lb. of forgings which went from Alliance, Ohio, to Detroit, Mich., in less than five hours. It is the story of the fastest freight service on record. The company asks consideration of this service when shipments in small or carload lots are made. In another booklet even smaller the company tells the story of a casting—which journeyed from Peoria, Ill., to Alliance. One shipment will convince you, the company advises, of what this service supplied by the traffic department will do for you.

New Jersey Board Approves Higher Fare

Just and reasonable are the increased rates of fare proposed to be put into effect by the Morris County Traction Company, Morristown, N. J., operating more than 50 miles of interurban line and running in Newark over the tracks of the Public Service Railway. The Board of Public Utility Commissioners of the state has so declared. In consequence, effective July 1, the rates will be 10 cents per zone for regular riders, and 5 cents per zone for school children. The old rates were 7 cents and 3 cents.

In the petition filed by the receivers of the company it was set forth that \$180,250 was required to carry out improvement work deemed necessary. It appeared, further, that no interest had been paid on the bonds of the company by the receivers and that \$101,893 was due for unpaid taxes prior to 1925. In addition \$9,212 is due on taxes for 1925.

Revenue for 1925 was \$541,109, and after deducting operating costs, taxes and rentals there remained a net revenue of \$55,142 for 1925. The increase in fare is desired to provide additional principal for the improvements required. The petitioners estimate that the revenue obtained under the new rate, will be 15 per cent less than if the same number of passengers carried in 1925 at 7 cents and on a weekly pass is carried at 10 cents, and provided also that the same number of 3-cent riders carried in 1925 is carried at 5 cents. This would return gross operating revenue of \$630,275, compared with \$541,109 for 1925 under the present rate, an amount sufficient to carry out the improvements required.

Analysis of data submitted indicated that there was a general and material increase in the various items entering into the cost of operation and maintenance of the property from 1911 up to date including taxes; the cost per car-mile was less during 1924 and 1925 than the average of a large number of companies operating under similar conditions. The financial statement indicated that the net income during the past eleven years had varied from \$18,452 in 1923 to \$86,262 in 1916, the net income for 1925 being \$55,002. These figures, however, do not include allowance for depreciation and taxes.

The board held that the company was now confronted with increased expenditures for improving its roadbed, and while it might be doubtful whether the increased fares would produce sufficient revenue for this purpose, the board believed the plan should be put in effect. The question of a reasonable return on the value of the company's property did not arise. The problem was one of earning operating expenses and raising funds for necessary improvements.

Only a few of the municipalities through which the company operates objected to the increased fare.

Wages Advanced in Duluth

An upward revision in wages of employees has been made by the Duluth Street Railways, Duluth, Minn., effective July 1. For motormen and conductors, the first year of service, the new scale is 46 cents an hour, 48 cents the second year, 50 cents the third year,

52 cents the fourth year and after. This compares with 50 cents now paid under the last wage change in 1922. One-man car operators will receive the above scale, plus 5 cents an hour. Mechanical department employees, permanent engineering and roadway department employees and all other employees paid on the hourly basis will receive a wage increase of approximately 5 per cent.

Hearings on Milwaukee Service

An ex-Alderman, Henry Bulder by name, a former opponent of the one-man car, appeared before the Railroad Commission of Wisconsin recently to make a public retraction of his statements concerning the use of one-man cars in Milwaukee. He said the trial period now in progress on the Walnut Street line had convinced him and the people he represented that the one-man cars were giving the section in which he lived better service than they had before—that there were more seats and that the wait for cars had been cut down.

About four months ago the commission conducted a public hearing on the application of the Milwaukee Electric Railway & Light Company for the introduction of one-man cars on the Walnut Street line as a measure of economy. The ex-Alderman was among a number of politicians who denounced the commission. He said at that time: "If the commission grants the request of the company each member of it should be hanged. A movement by the citizens will be started that will threaten violence."

During the week ended June 26, when the commission was conducting a public hearing on some general recommendations of its engineers, requiring the company to add 70 more cars, the ex-Alderman asked to be heard and made the statements quoted previously.

At the hearing on the general survey conducted by the Railroad Commission's engineers, the company introduced evidence to show that if the commission's rail extension and additional rolling stock recommendations were put in the form of an order it would cost the company \$1,971,000 and would reduce the net income to 3.6 per cent. The company acknowledged that the commission's engineer's survey disclosed a number of discrepancies and that the company would remedy them.

The commission's engineer stated that he believed the company had taken the wrong attitude in refusing to make rail extensions into rapidly growing sections of the city now unserved. He said that if the company made the extensions more riding would result.

S. B. Way, president of the company, took direct issue with the engineer on the usefulness of the articulated trains. The commission's engineer stated the articulated trains distorted schedules on many of the lines on which they are used. Mr. Way contended that the articulated trains had proved themselves indispensable, particularly at rush-hour periods.

Mr. Way informed the commission that the company had made a proposal to the city for a complete traffic survey. The company, he said, would finance the expense up to \$50,000.

25 per Cent Wage Increase Asked in New Jersey

Trainmen and affiliated workers of the Public Service Railway, Newark, N. J., have approved the proposed wage increase demand to be made Aug. 1. The demands will include a 25 per cent wage increase and various changes in present working conditions. At the time the rates now in effect were agreed upon the bus operators and their affiliated maintenance and construction groups did not have to be taken into consideration, as the buses were practically all controlled by independents.

In a lengthy statement which he made early in June, Mathew R. Boylan, vice-president in charge of railway operation for the Public Service Corporation of New Jersey, made plain the position of the company at the present time. His remarks were reviewed in the *ELECTRIC RAILWAY JOURNAL* for June 5, page 986. He said at the time that company officials felt the transportation situation can be corrected by complete co-ordination of street car and bus facilities and relief from paving obligations, combined with "a return to the rate of wages in effect prior to Aug. 1, 1923, and still greater co-operation from employees."

The agreement expires by limitation on Oct. 1.

Old Toledo Rate Renewed

Employees of the Community Traction Company, Toledo, Ohio, have approved a renewal of the wage and working agreement at the old rates of wages for a year from June 1, 1926. The men asked a flat increase of 10 cents an hour. The company submitted an offer of an increase of 2 cents an hour with elimination of payment for lapse time, meal relief and layover periods. This offer was rejected by the men by a vote of more than five to one. In a final offer the company withdrew the offer of an increase in wages and stated the last offer would be on the basis of the old agreement. This plan was accepted by a close vote. Under the new contract the company will provide \$15, or about half the cost of each uniform in case the men are asked to change the style of uniforms this year.

Mayor Refuses to Rush Bus Franchises

Until he has determined what course is for the best interest of the city of New York, N. Y., Mayor Walker will not grant any bus franchises. This and more emphatic statements from him were his reaction to a large delegation from the Bronx Citizens' Bus Committee who went to City Hall on June 30 to urge speedy action on bus installation for that borough. The Mayor scored the threats made upon him in this matter of granting bus franchises and the false rumors to "rig" the stock market. Within the coming month he believed the Board of Estimate, which body has been considering 200 applications, would be prepared to bestow the franchises after having given thorough scientific study to the matter. He said he knew the Bronx needed buses, but he was working for the entire city of New York.

Union Request at Chicago Opposed

Demands of motormen and conductors of the Chicago Surface Lines for a blanket raise of 5 cents an hour in wages, a \$1,000 insurance policy and a \$20 a week sick benefit for each employee, which followed the expiration of their contract on June 1, are not likely to be granted. According to authentic reports, officials of the railway have refused to consider the signing of any agreement that extends beyond Feb. 1, 1927, the date on which the present franchises terminate. Heretofore, wage scales have been adopted for periods of one, two or three years. Union leaders say that negotiations will not be begun until August.

Traffic Experts for Newark Hired

Engineers of the firm of Parsons, Klapp, Brinckerhoff & Douglas, New York, will begin work immediately on a survey of traffic and transportation of Newark, N. J. This announcement was made recently by Chief Engineer Costello of the Department of Public Affairs, representing Mayor Raymond. Mr. Costello said the work of the engineers would consist of a survey of the needs of the transportation system, both trolley and bus, including interstate and intrastate bus lines, a study of the co-ordination of trolleys and buses, recommendations for the correction of weaknesses and a study of the general traffic situation. Henry M. Brinckerhoff will be the directing engineer of the survey.

Atlanta's Suburban Cars Welcomed

Patrons of the Stone Mountain and Marietta electric lines of the Georgia Railway & Power Company, Atlanta, Ga., welcomed with fitting ceremonies recently the arrival of the first four of the new series of luxurious cars which went into service on the two lines on July 1. The new cars were presented formally to their patrons and accepted by city officials and civic leaders of the communities in ceremonies held in Marietta, at the court house square and in Stone Mountain near the railroad station.

The two cars, identical in construction and appearance with the others to be delivered shortly, were opened for inspection and an informal "house warming" by the patrons immediately following the presentation exercises in both places. Instead of numbers, the cars will bear the names of distinguished citizens whose public service in a former generation laid the foundation for the present prosperity and greatness of the sections they serve.

Cumberland Lines

The Cumberland Traction Company, Bridgeton, N. J., has taken over the lines of the Millville & Vineland Traction Company and the lines of the Maurice River Transportation Company. A new company will be formed, to be known as the Cumberland Lines, according to Clayton McPherson, general manager of the company.

The Millville & Vineland Traction Company has been operating the railway line between those two cities for a number of years. About a year ago negotiations were made with Mr. McPherson for the purchase of the line. However, the final steps in the deal were not taken until a few days ago. It is the plan of the Cumberland Lines to put new and modern cars on this route and to reorganize the system.

The Maurice River Transportation, another recently acquired property, has been operating a bus line from Vineland, Millville and Port Norris. New bus equipment will be placed in service on this route also. This company has sold its interest outright to the Bridgeton concern, while in the case of the trolley line the lease has been purchased for the remainder of the franchise time, which is 70 years.

The Cumberland Lines, the new operating company, will take charge on Aug. 1. The railway line of Bridgeton and the bus line running from Bridgeton to Philadelphia, which was recently started by Mr. McPherson, both come under the Cumberland Lines.

Newspapers Praise Late John E. Duffy

Opinion was general in Syracuse and vicinity that few men in electric railway work were superior to the late John E. Duffy, general superintendent of the New York State Railways, from the point of ability. Newspaper comment since his death has elaborated on his loyalty, his attention to duty and his ardent zeal. The character of the man, who long helped to direct the affairs of the New York State Railways in Syracuse, was summed up by one commentator as follows:

He knew the business thoroughly from long association with it; he had the confidence of those who had their money in the enterprise and equally of the men on the cars; he was always courteous and cordial with his public; he was on the square.

New Tunnel Plan Advocated at Kansas City

At a meeting held in Kansas City, Mo., on June 22, the board of directors of the Business District League adopted a resolution indorsing the proposal of a new or enlarged Eighth Street tunnel, and favoring the proposal to permit the Eighth Street Viaduct to remain as it now stands.

Heretofore the Central Industrial District group has advocated an enlarged tunnel and a wider viaduct for Eighth Street. The Main Street body some time ago voted to urge the removal of the viaduct from Eighth Street. The resolution also urges the early resumption of through service by the Kansas City Railways over the Eighth Street lines through Greater Kansas City. On the following day a similar resolution was approved by the Club President's Round Table.

The questions arising out of the alleged unfit condition of the viaduct and the tunnel on Eighth Street have been the foundation of much contention. The approval of the sale of the Kansas City Railways' property under foreclosure has served to bring these problems before the public eye again.

Newspaper Indorses Proposed Louisville Grant

The *Courier-Journal* of Louisville, Ky., has gone on record as approving the new franchise grant for the Louisville Railway mentioned frequently in the *ELECTRIC RAILWAY JOURNAL*. That paper believes that in order to supply an urgent public need which could not otherwise be supplied public interest demands the passage of a new ordinance similar to the one submitted to the Mayor and the City Council of Louisville. That paper says in part:

In briefest terms, Louisville needs more transportation facilities. The railway must borrow the money to supply these facilities. It cannot borrow this money under the present ordinance. It can borrow the money if the ordinance submitted should be adopted by the city authorities. Should the ordinance be adopted the people of Louisville will be protected against excessive rates both by their representatives in the City Council and the Mayor's office, and by the courts, in the same fashion and to the same degree that the company will be protected against rates so low as to be confiscatory. In the construction of the new lines now so urgently needed the city will have to rely, to an extent, upon the good faith of the owners and managers of the railway company, but the *Courier-Journal* believes that the city takes no undue risk in relying upon the good faith of the railway officials, and, moreover, that they should be credited with the ordinary common sense which would impel them to carry out these improvements with intelligence and with reasonable rapidity, since their own interest is primarily involved in doing so.

Every Day Episode Depicted in Unusual Movie

A convincing argument showing that it is cheaper, safer and far more convenient to use street cars for trips to and from the business section than it is to drive motor cars is made in a moving picture contributed to the Clarksburg, W. Va., Police Department pension fund by the Monongahela-West Penn Public Service Company. The screen flashes the trials of Mrs. Penn and her two children, who urged her to take them to the theater on a Friday afternoon. They are shown leaving their home in the mother's coupe and getting caught in a traffic jam in the theater district. Mama ignores a traffic signal and, ordered to "back up," becomes the cynosure of laughing crowds on the sidewalk. Best clothes are soiled through alighting over the fenders. When finally the party arrives at the box office the matinee has been in progress many minutes. The disheartened group then decides to return home. The next trial is finding the car tagged for parking too long and an order to report to the police court. Disgusted, mother and daughters return home, resolved never again to use the automobile, but to use the old reliable street car, ready and anxious on the screen and street, too, for its patrons.

Wage Scale Continued.—The Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., has concluded an agreement with its trainmen of the rapid transit lines, continuing for another year the existing wage scale. It was stated that present negotiations with other groups of employees indicated similar agreements for continuing the present wage for another year.

Recent Bus Developments

Cities' Approval Necessary for Operation in Wisconsin

A decision of far-reaching significance with reference to the intricacy of bus lines in Wisconsin by electric railways as well as independent bus operations was handed down by the Railroad Commission at a special hearing in Eau Claire on June 23. Under this ruling any company wishing to operate a bus line in a Wisconsin city hereafter must first have the city's approval of the route its buses will follow within the city before the commission will issue a permit. This new decision by the commission erases all doubts which prevail under the existing laws concerning the authority of a city to regulate buses within its own corporate limits.

The case involved was the application of the Motor Bus Company of Chippewa Falls for a renewal of its license, which expired on July 1, covering the use of the streets in Eau Claire by its Eau Claire-Chippewa Falls inter-city line. The city opposed the application and based its fight on the ground that the buses as now routed in Eau Claire had added seriously to an already congested traffic condition in the business district. Last April the city attempted to regulate the bus routes in the city by an ordinance which was passed, and in the battle which followed the validity of the ordinance was set aside by a lower court. In this case the court held that the bus company received its permit from the commission and the city, therefore, had no authority to alter its route.

As a result of the commission's decision, which carried with it a flat denial of the new application for a license, the company finally agreed to operate hereafter in accordance with the routes and stops designated in the ordinance passed by the City Council last year. The decision apparently does not apply to existing lines which already have a license from the commission, but will be applied to companies seeking a renewal of their yearly license as well as prospective bus line operators.

Cities hereafter will be notified by the commission whenever an application for a bus line permit is made so that the community concerned may have an opportunity to object to or approve the route selected by bus lines.

White Rock Bus Line Opened in Dallas

The White Rock bus line, to be operated by the Dallas Railway, Dallas, Tex., will be started at once. The buses are of the coach type, seating 21 persons. They will run on a 30-minute schedule, connecting with the terminus of the Mount Auburn railway line at Lindsley and Monte Vista Avenues. From this spot the buses will traverse Blair Boulevard, Ash Lane Avenue, West Shore Drive, Warwick Avenue, Lake Shore Avenue and thence along a

country road to the Garland road and then to a point opposite the White Rock Dam and return over the same route. The fare from the terminus of the car line to White Rock will be 4 cents, making the total fare from any spot in the city to the lake 10 cents for tokens or 11 cents for one cash fare.

Parade Celebrates Peekskill's Change from Trolley to Bus

With a celebration that anticipated the Fourth, Peekskill, N. Y., on July 1 ushered in its new bus system. At the same time, it said good-bye to its electric railway. Many of the 16,000 inhabitants turned out to witness a parade of the old trolley cars and the new buses through the village. The Peekskill Lighting & Railroad Company tuned up three of its oldest cars especially for the occasion to lead the parade. They were followed by the nine new White buses which will take over the transportation service in the village. Fireworks and a band livened the procession.

The trolley system in and around Peekskill has been going by degrees. In 1924 a 3.5-mile line to Mohegan was abandoned. The 5-mile line to Oregon followed in 1925. Other bus operators took over these routes. Now the 7 miles of line which the company still operated has given way to buses to be operated by a subsidiary, the Peekskill Motor Bus Company.

Peekskill extends north and south, but its trolley tracks extend east and west. By substituting buses it made it possible to serve populous sections not reached by the railway. Instead of 500 car-miles operated daily the buses are traversing 1,300 miles. Instead of two railway routes aggregating 7 miles there are four bus routes totaling 14 miles. More buses to bring the total to fifteen will be added if necessary.

Stricter Motor Carrier Insurance Rules in Oklahoma

The Oklahoma Corporation Commission has called a hearing at the State Capitol on July 8 to determine what further rules and regulations should be made governing the issuance of insurance policies for the protection of the public and patrons of bus carriers. In Journal Entry 1471 the commission sets out several proposed amendments to Order No. 2219, which contains rules and regulations governing motor carriers. These amendments propose stricter regulation of the issuance of insurance policies. The regulations propose, in substance, that policies should provide that they cannot be canceled except upon 30 days notice to the commission; that they should not contain any clause stating that "delinquency in payment is a ground for non-liability" or any similar statement. Policies should contain a provision for the protection of personal property and

hand baggage. It is proposed to eliminate from policies provision that they may be voided because of carelessness on the part of the driver. Policies should cover liability to patrons in any motor vehicle owned by the licensee.

The commission may refuse to accept any policy wherein it appears that the patrons of the motor carrier are not protected. The commission will consider whether or not the amount of liability insurance should be increased and in proportion to the number of persons carried. The commission proposes to grant only policies which show on their face that they are paid up for a period of at least one year, and will not receive so-called "binders" or other evidences of contract for insurance. Policies covering patrons of motor carriers should be continuous, and policies issued to licensees covering the period succeeding the current year should be filed with the commission at least fifteen days prior to the expiration of the policy now on file with the commission.

Peace the Objective in Tacoma

Officials of the Puget Transportation Company have acknowledged that the City Council of Tacoma, Wash., is within its rights in revoking the permits issued to it for the operation of buses on the Point Defiance line. This action has removed the possibility of friction from the attempts to settle the transportation problem. The bus operators declared, in short, that they had no desire to embarrass the city officials. The Mayor then wrote into the record the provision that if no settlement is reached with the Tacoma Railway & Power Company the Puget Transportation Company will have precedence in any restoration of bus service on the Point Defiance line. The loss of independent bus rights was referred to previously in ELECTRIC RAILWAY JOURNAL.

Extension of Service in Buffalo

The Delaware Avenue double-deck bus line of the International Bus Corporation, subsidiary of the International Railway, Buffalo, N. Y., has been extended from the Buffalo city line to the north village line of Kenmore, where it connects with a new single-deck bus line to the city of Tonawanda. Franchises for the operation of buses in the village of Kenmore, the town of Tonawanda and the city of Tonawanda were granted by the local boards and application for consents is pending before the commission.

Under the franchise with the village of Kenmore, the Delaware Avenue buses will charge a 5-cent fare within the village or commutation tickets will be sold in strips of ten round trips from Kenmore to any point in Buffalo for \$2.50, making the single round trip fare 25 cents. An extra 5-cent fare will be charged from Kenmore to the city of Tonawanda. Passengers boarding the Delaware Avenue buses in Kenmore are permitted to transfer to Buffalo cars at the Buffalo city line upon payment of a 10-cent fare, which makes the bus fare in Kenmore 2 cents. The local fares in Buffalo are 8 cents or four tokens for 30 cents.

Financial and Corporate

City and Suburban Traffic in Atlanta Grows

The gross revenue from railway lines of the Georgia Railway & Power Company, Atlanta, Ga., for the year ended Dec. 31, 1925, was \$5,436,441, or 35.8 per cent of the total earnings. Extensions, improvements and betterments to the property completed during the year, or in the course of completion as of Dec. 31, 1925, involved total expenditures for the railway department of \$1,442,120. During the year the company purchased 60 electric railway cars of the most modern type, including 40 one-man safety cars. The Atlanta Coach Company, all of the stock of which is owned by the Georgia Railway & Power Company, purchased and placed in operation during the latter half of the year fifteen double-deck gas-electric drive coaches, which are being used in supplementing the service furnished by the railway in Atlanta.

	1925	1924	1923	1922	1921
City and suburban system.....	94,636,746	92,029,437	95,357,117	92,172,664	91,358,379
Stone Mountain line.....	657,500	640,634	634,014	557,274	672,741
Atlanta Northern.....	962,496	1,202,985	1,218,697	1,131,278	1,178,852

The number of passengers carried on the city and suburban system, on the Stone Mountain line and on the Atlanta Northern Railway, which is the inter-urban line between Atlanta and Marietta, for each of the last five years is shown in the accompanying table.

The annual report to the stockholders does not segregate the railway earnings.

Fewer Passengers in Des Moines

Seventy-three thousand fewer revenue passengers were carried by the Des Moines City Railway, Des Moines, Iowa, during the month of May than in April, and total operating revenue for the last month was \$191,705, compared with \$198,690 for April. The gross revenue, less operating expenses and taxes of \$153,314 and fixed charges amounting to \$37,990, left \$99.52 for the stabilizing fund, compared to the balance of \$4,176 shown in the April statement. The stabilizing fund now stands at \$12,957. Revenue passengers carried during the month totaled 1,958,463.

\$200,759 Value Placed on Jamaica Central

The hearings before the New York Transit Commission pertaining to approval of the securities to be issued by the Jamaica Central Railways, Inc., were concluded on June 15. The commission reserved its decision. Aside from bringing out the story of the inception of this railway, referred to in ELECTRIC RAILWAY JOURNAL of June 19, 1926, page 1078, the principal feature of the hearings was the testimony of Ira W. Fisk of Fisk & Roberts, New

York, consulting engineers for the company, relative to depreciation, working capital required and the value of the physical property.

Mr. Fisk testified that the present-day value of the property other than real estate and buildings was \$200,759, based on the appraisal made by his firm. He advised that the company should set aside a tentative depreciation fund on the basis of 3.25 cents reserved per car-mile operated. Requirements for working capital were put at \$20,000.

Surplus in Terre Haute

For the year ended Dec. 31, 1925, the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., reports a surplus of \$167,733. After the consideration of sinking fund the company finished the year with a deficit of \$59,780. Gross earnings for 1925 decreased \$143,247 over 1924 due to the constantly increasing use of privately

owned automobiles as well as bus and motor truck competition. Operating expenses increased \$87,062 due to power plant equipment. The freight earnings for 1925 were \$561,680, compared with \$609,460 in 1924. These facts were brought out in the annual report to the stockholders, submitted on June 9.

There was expended and charged to capital account an amount of \$123,453, which represents the grand total on owned and leased lines. On the Terre Haute division a single-track loop was constructed around the court house at Terre Haute, power lines were extended and ten buses purchased to meet the bus competition.

EARNINGS AND OPERATING EXPENSES OF THE TERRE HAUTE, INDIANAPOLIS & EASTERN

	1925	1924
Gross earnings.....	\$4,852,170	\$4,995,417
Operating expenses.....	3,847,397	3,760,335
Net from operation.....	\$1,004,773	\$1,235,082
Taxes.....	153,225	244,167
Maintenance expenditures:		
Maintenance of way and structure.....	\$613,022	\$706,601
Maintenance of equipment.....	358,573	304,558
Maintenance of power plant buildings and equipment....	154,780	135,032
Total railway maintenance.	\$1,126,375	\$1,146,091
Maintenance of light and power.....	203,694	235,165
Total maintenance.....	\$1,330,070	\$1,381,257

MISCELLANEOUS STATISTICS OF THE TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY FOR YEAR ENDED DEC. 31, 1925

Passengers carried—interurban lines.....	4,917,719
Passengers carried—city lines.....	19,137,310
Total passengers carried.....	24,055,029
Car-miles operated—interurban lines.....	6,572,607
Car-miles operated—city lines.....	3,650,567

Partial Abandonment in Joplin Announced

Abandonment of its Main Street lines in Joplin and all city transportation service is suggested by the Southwest Missouri Railway in a letter sent to Mayor J. F. Osborne and the City Commission.

The railroad contemplates rerouting its main line cars over West Fourth Street to McKinley Avenue and then south to its present main line in Joplin Heights, and would remove its present double tracks on Main and West Twentieth Streets.

Accompanying the letter was a proposed ordinance that would give the concern permission to build tracks across Seventh, Thirteenth and Twentieth Streets at points approximately where McKinley Avenue, were it extended, would intercept those streets. Application will be made to the Missouri Public Service Commission to make the change.

The letter states that the change of line and rerouting are contemplated "largely on account of the inability of the transportation company to pay a proportionate part of the repaving of Main Street in Joplin, an improvement which will become imperative within the near future and which, on account of the financial condition of the railway, cannot be assumed."

Augusta-Aiken Deal Approved

Stockholders of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., have voted the issuance of \$2,000,000 in bonds, \$1,500,000 of which will be sold immediately. A deal involving the purchase of the common stock of the Georgia-Carolina Electric Company by the Georgia-Carolina Power Company, a subsidiary of the Augusta-Aiken Railway & Electric Corporation, has also been consummated. Purchase by the Georgia-Carolina Power Company of the Carolina Light & Power Company of Aiken, S. C., was also confirmed. Transmission lines and distribution systems in Georgia, including part of the transmission lines constructed by the Georgia Railway & Power Company, were also purchased. These lines extend from Stevens Creek to Broad River, on the line from Stevens Creek to Toccoa, and involve an expenditure of approximately \$380,000.

The bonds offered for sale are to be handled by Redmond & Company and J. G. White & Company, both of New York City. Of the \$2,000,000 bond issue authorized only \$1,500,000 will be sold now, leaving \$500,000 in abeyance. The money acquired by the sale will be used in purchasing the properties outlined.

Traffic in Winnipeg Improves in 1925

A. W. McLimont, president of the Winnipeg Electric Company, Winnipeg, Man., in the 33d annual report to the stockholders, states that the hope that the added commercial and industrial activity noticeable in 1924 would assist the railway utility to register improvement in 1925 had materialized, and that as a result the decreases in traffic which

had been experienced yearly since 1920 were checked. The street railway department carried 55,096,000 revenue passengers in 1925, which is a slight increase over 1924. Operating expenses of the railway were reduced largely as the result of extending one-man operation to a number of city lines. This was accomplished by slight alterations to a number of street cars and equipping them with special apparatus.

INCOME ACCOUNT OF THE WINNIPEG ELECTRIC COMPANY FOR THE YEAR ENDED DEC. 31, 1925

Gross earnings from operation.....	\$5,211,665
Operating expenses before charging depreciation.....	3,301,903
Net operating income.....	\$1,909,761
Miscellaneous income.....	157,604
(Includes \$54,000 interest charged subsidiaries in excess of earned fixed charges for the year 1925.)	
Gross income.....	\$2,067,365
Deduct:	
Interest charges on mortgage stock, bonds and bank loans....	\$872,914
Extinguishment of discount on securities.....	26,764
City percentages and car license..	154,237
Taxes.....	163,965
Miscellaneous non-operating taxes.....	3,031
Other income deductions.....	24,847
	1,245,761
Net income before charging depreciation	\$821,604
Deduct:	
Depreciation.....	201,050
Net income transferred to surplus.....	\$620,554
Surplus brought forward from 1924 as adjusted.....	594,788
Net income transferred.....	\$620,554
Additional depreciation.....	173,000
	447,554
	\$1,042,343
Dividends on 7 per cent cumulative preferred stock.....	\$210,000
Dividends on common stock....	220,000
	430,000
	\$612,343
Deduct appropriations:	
Sinking fund reserve.....	\$73,100
Deferred and undistributed charges such as stock discount and expenses.....	158,955
	232,055
Surplus carried forward.....	\$380,287

The company made substantial additions and improvements to its property in 1925, including new car tracks between Winnipeg and St. Boniface, permitting cars to make use of the fine Provencher bridge, and seven new buses. The alterations to street cars making them adaptable for one-man operation were also important.

Marion Company Gets Another Property

Agreement has been reached for the sale of the property of the Richwood Light, Heat & Power Company to the Columbus, Delaware & Marion Electric Company, Marion, Ohio. This action has brought a sudden end to a suit of the Richwood company against the Columbus, Delaware & Marion which had been won in the lower courts by the defendant company and appealed by the Richwood company.

The suit came up for hearing in the Court of Appeals at Marion during the week ended June 26, but before it was opened attorneys representing the companies, including the Ohio Edison, agreed to terms for the sale of the Richwood plant to the Columbus, Dela-

ware & Marion. The terms of the agreement were not made public. The Columbus, Delaware & Marion Electric Company is a combined light and railway property.

Readjustment of Public Service Railway Finances Impends

Readjustment of the financial structure of the Public Service Railway of New Jersey and affiliated companies, which comprise the transportation system of the Public Service Corporation, is under discussion by a special committee.

According to the *Wall Street Journal* one of the main purposes of the proposed readjustment is financial unification of the entire transportation system, similar to that effected a few years ago when the electric and gas systems were consolidated into one company, the Public Service Electric & Gas Company. Any plan that is finally decided upon is likely to provide for the formation of a new company and exchange of the latter's securities for those of various operating subsidiaries and affiliated companies in the transportation division. About \$75,000,000 bonds, all told, and about \$73,000,000 stocks now outstanding would be involved.

Railway and bus earnings have improved each month this year over 1925 in that net losses have steadily been reduced; but the transportation system as a whole has shown deficits for a number of years.

Bonds Issued.—Authority to issue \$235,100, par value, of first and refunding bonds bearing 5 per cent interest has been granted the Evansville & Ohio Valley Railway, Evansville, Ind., by the Indiana State Public Commission. It was announced that the bonds are to be exchanged at par for \$235,100 in 7 per cent preferred stock of the company, which is now outstanding.

Presents Plea for Revaluation.—The Duluth Street Railway, Duluth, Minn., at a recent hearing before the Minnesota Railroad and Warehouse Commission in Duluth presented arguments on its petition for a revaluation of the company's properties for the purpose of obtaining an increase in fare. A. L. Drum, the company's engineer, and Herbert Warren, vice-president, presented statistics showing that the company was not making a proper return on the invested capital. The company is seeking an 8-cent fare.

Financial Status in Spokane Not Improved.—Deficits of \$20,484 in April and \$16,050 in May are reported in statements of the Spokane United Railways, Spokane, Wash. Because of increased competition from private automobiles the United Railways has not experienced the improvement that was expected with the increase in fares effective last February. The number of passengers carried dropped 215,019 in April and 227,953 in May, compared with similar months a year ago. April cash fares of 10 cents were about 10 per cent of the 7-cent ticket fares. In May the cash fares numbered 140,478, compared with 1,299,772 7-cent ticket fares.

Hears Discontinuance Petition.—A hearing was held before the Public Service Commission on June 29 on the application of the Fonda, Johnstown & Gloversville Railroad for permission to discontinue about 2.08 miles of its line in the city of Amsterdam, N. Y. The proof on the part of the company was to the effect that the operation of this portion of its line was not profitable and that this condition had continued for several years. Objection to the abandonment was advanced by the city of Amsterdam. A further hearing on the matter will be held on July 9.

Surplus in 1925.—The Bakersfield & Kern Electric Railway reports to the California Railroad Commission its 1925 operating revenue at \$106,772, compared with \$97,821 for 1924. The operating expenses, excluding taxes, for 1925 are reported at \$99,268, and for 1924 at \$96,108, leaving net operating revenue of \$7,504 for 1925 and \$1,713 for 1924. During 1925 taxes charged to operation amounted to \$7,164 and for 1924 to \$7,740. Deducting the taxes leaves operating income of \$340 for 1925 and \$6,026.81 (deficit) for 1924. Adding to the operating income the non-operating income of the company results in a gross corporate income available for surplus of \$340 for 1925 and a deficit of \$5,976 for 1924.

Heavy Loss on New Hampshire Line.—The Manchester & Derry Street Railway, owned by the Manchester Traction, Light & Power Company, Manchester, N. H., is seeking to abandon its 8 miles of line in Manchester on which \$141,869 has been lost in recent years.

No Action on Worcester Dividend.—The Worcester Consolidated Street Railway, Worcester, Mass., at a recent meeting of the directors took no action on the payment of the usual semi-annual dividend. It is likely the payment will be passed at this time. Extraordinary expenditures for maintenance have cut greatly the net earnings of the road.

Net Income Lower.—The passenger revenue on the Brooklyn City Railroad, Brooklyn, N. Y., for the eleven months period ended May 31, 1926, was \$10,430,556, against \$10,402,860 for a similar period in 1925. The operating expenses and taxes fell off from \$8,929,151 to \$8,892,381 for the eleven months period ended May 31, 1926. After the consideration of income deductions the net corporate income was \$1,321,424 for this year's period, against \$1,388,163 for a similar period ended May 31, 1925.

Earnings Off in Akron During Strike Period.—In its report of earnings for May, 1926, the Northern Ohio Power Company, Akron, Ohio, attributes the decrease during that month as compared with May, 1925, to the walk-out on May 1 of some of the railway employees who returned to work on May 22. Gross earnings decreased from \$941,541 in May, 1925, to \$875,714 in 1926. Net income available for retirement reserve and corporate purposes in May, 1925, was \$61,837, while in May, 1926, there was a deficit of \$50,153. It is estimated that the decrease in passenger and freight receipts during May attributable to the strike amounted to \$156,908.

Legal Notes

ALABAMA—Duty to Person Driving Automobile on Parkway

A person driving an automobile along the track laid in a parkway or reservation was struck by a trolley car. There was a mist at the time. The driver was held to be a trespasser and that the company owed him no duty except the exercise of due care upon discovering his peril. As the motor-man was under no duty to be on the lookout for a trespasser, no presumption could arise that he was looking ahead. The fact that the roadway on each side of the reservation was torn up for repaving was no legal excuse for the use of the track by the automobilist. [Snyder vs. Mobile L. & R. Co., 107 Southern Rep., 451.]

IDAHO—Constitutionality of Auto Bus Law Upheld

Idaho has a law requiring auto transportation operators to take out surety bonds for amounts depending on the capacity of the vehicle operated, to pay 5 per cent of their gross earnings to the state to be used for the maintenance of the highways and other provisions. School buses, motor cars or engines on steam or electric railroads, and companies operating exclusively within the corporate limits of cities are not included within the law. The constitutionality of this act was upheld by the Supreme Court. [Smallwood vs. Jetter, 244 Pacific Rep., 149.]

KENTUCKY—Duty to Passenger Boarding Car at Terminal Station

A carrier operating a terminal station to which passengers are admitted through turnstiles where they pay their fare before entering owes the same duty to passengers as a carrier operating a similar elevated or subway station. The highest degree of care should be taken to protect him when he is about to board the car from injury caused by pushing crowds. This is especially true at those times when the company should know from experience that large, boisterous and jostling crowds are to be expected. [South Covington & C. Street Railway vs. Vanice, 277 Southwest. Rep., 116.]

MAINE—Relief from High Local Tax Assessments.

A taxpayer whose property is taxed at 100 per cent of its true value while that of others is taxed at a lower percentage is entitled to have his assessment reduced to the percentage of value at which other property owners are taxed, but his claim of discrimination must be supported by "something which in effect amounts to an intentional violation of the essential principle of practical uniformity." [Cumberland County P. & L. Co. vs. Inhabitants of Hiram, 131 Atlantic Rep., 594.]

MASSACHUSETTS—Evidence in Action for Malicious Prosecution.

A railway company instituted criminal proceedings against a one-man car operator, accusing him of larceny by

retaining fares received by him, but he was acquitted. He then sued the company on the ground that it had acted maliciously and without probable cause for believing him guilty, and he received judgment. In this trial, the railway company took certain exceptions, one being to the exclusion of testimony of the division manager that on days when the plaintiff was laid off the receipts from the car were considerably greater than those turned in on the corresponding days when he was working and to the exclusion of the testimony of the assistant general manager that he had given this fact consideration in deciding whether to authorize the prosecution. The Supreme Judicial Court held that the exclusion of the testimony of the assistant general manager was wrong, whether the reports were false or not, as they influenced his judgment in deciding he had probable cause to believe the plaintiff guilty. The exceptions were therefore sustained. [Clark vs. Eastern Mass. St. Ry., 150 Northeast Rep., 184.]

MICHIGAN—Passenger Injured by Tort of Fellow-Passenger

Where a passenger was injured by the tort of a fellow passenger, the carrier can be charged only with the neglect by the conductor of some duty owed to the passenger arising from facts known to the conductor, or which in the discharge of his duties he ought to have known. Where a passenger tried to open the door between a compartment of a car at a place other than the regular stopping place, was assaulted by a fellow-passenger, fell against the glass in the door and cut his wrist, a verdict for the defendant was properly directed. [Takacs vs. Detroit United Railway, 207 Northwest. Rep., 907.]

MISSOURI—Excessive Speed of Car Is Negligence

An intending passenger crossed a street in front of a car thinking it would stop at an earlier corner before it reached the one at which he intended to board the car, but it did not so stop, and he was injured. The car's speed exceeded the 15 m.p.h. permitted under the city ordinance. It was held that this fact would entitle the plaintiff to recover damages, if it was the proximate cause of the injury. [Unterlacher vs. Wells, 278 Southwest. Rep., 79.]

NEW JERSEY—Land Owned by Railroad Next to Right-of-Way and Rented Held Subject to Jurisdiction of Public Utility Commission

A steam railroad owned property adjoining its right-of-way and rented it to a coal and lumber company. Later, an electric railway received permission from the Public Service Commission to make a physical connection with the steam railroad across this leased property. The Court of Errors and Ap-

peals upheld this order on the ground that the steam railroad could not contract away its liability to perform a public duty. The electric railway must bear any reasonable expense called for by this connection. [C. & M. County Traction Co. et al. vs. Board of Public Utility Commissioners et al., 132 Atlantic Rep., 118.]

NEW YORK—Plaintiff Can Examine Motorman

It was held that a plaintiff in a personal injury case is entitled to examine the particular employee of the defendant who is most familiar with the condition of the alleged effective appliance, where an important feature of the case was the question of the condition of the brakes and appliances. [West vs. Coney Island & B. R. Co., 114 N. Y. Sup., 475.]

OHIO—Requirements on Bus Franchises Upheld

An Ohio statute says that motor transportation companies "may" file applications with the Public Utilities Commission for changing, extending or shortening their routes, increasing or decreasing the number of vehicles, etc. The word "may" in this statute was declared by the court to be equivalent to "must." The statute also required the company to secure permission from the commission for the issue of capital obligations. Where this was not done, the court held that it might be overlooked at the discretion of the commission. [Cincinnati Traction Co. vs. Public Utilities Commission of Ohio, 150 Northeast Rep., 308.]

OHIO—Issue of Bus Certificate by Commission Voided

If the Public Utilities Commission should grant a certificate on the convenience and necessity of a new bus route without due notice and hearing, as provided by the code, the grant is void. [Columbus R. P. & L. Co. vs. Public Utilities Commission of Ohio, 150 Northeast. Rep., 237.]

PENNSYLVANIA—Terms of Rider in Accident Policy Covering Buses Held Not Controlling

A transportation company took out insurance on six buses with an oral agreement that it would receive credit for periods exceeding ten days in which any of the buses was not in use. At first the insured notified the insurer after the bus had been out of use for the period mentioned and would receive a credit memorandum therefor. Later, at the request of the insurance company, a form was used in which the number of the bus not in use was mentioned, and it was stated that the policy ceased as regards that bus. The transportation company understood the use of this memorandum to be for book record only and that all buses in operation were covered. Later, an accident occurred to a bus which the insurer had been notified had been withdrawn from service, but through an oversight on the part of the bus company, no notice was sent to the insurer that this bus had been replaced in service. The insurance company was held liable for the insurance under the policy. [Schuylkill Transportation Co. vs. London G. & A. Co., 131 Atlantic Rep., 701.]

Personal Items

John W. Carpenter Heads Dallas Railway

Review of Changes Made Recently in Personnel of Texas Road—

C. W. Hobson Returns to Commercial Pursuits—

Richard Meriwether Vice-President

OF GREATER interest than the brief mention made of them in the *ELECTRIC RAILWAY JOURNAL* for June 19, page 1079, are the changes in personnel of the Dallas Railway, Dallas, Tex., the most important of which resulted in the withdrawal of C. W. Hobson as chairman of the board, the elevation of John W. Carpenter to the post of president, a position vacant for some time, and the continuation of Richard Meriwether, long general manager of the company, in that post and as vice-president.

both companies to operate under new franchises.

Mr. Hobson was requested by the General Electric Company to head the railway. In the negotiation of the franchises there were numerous contracts, commitments and promises made—some definite, others informal. So Mr. Hobson set about the task he did so well. For about eight years he functioned as head of the railway. Then on Dec. 31, 1924, the General Electric Company disposed of all of its interest in Dallas Railway and, all of its promises,

business in Corsicana in 1900. He later was made general superintendent of the power and light and street railway company there and worked for some of the large electric companies in New York and Ohio, for a time with the Northern Ohio Traction Company. Later Mr. Carpenter returned to Corsicana and was made president and general manager of the Corsicana Light & Power Company.

The late Col. J. F. Strickland, pioneer in the electric power and light business in Texas, made Mr. Carpenter vice-president and general manager of the Dallas Power & Light Company in 1918. He occupied this position until 1919, when he became vice-president and general manager of the Texas Power & Light Company.

Mr. Carpenter is a member of the board of regents of the Texas Technological College at Lubbock. He is also a member of the board of directors of the East Texas Chamber of Commerce and vice-president of the Cotton Palace at Waco. Mr. Carpenter has been active in the movement for the in-



J. W. Carpenter



C. H. Hobson



Richard Meriwether

A lot of water has gone over the dam in Dallas since Mr. Hobson in 1916 was induced to try to avert the disaster that threatened the electric railways there. But men are part and parcel of the times in which they move. So the need arises to recount in part how it was that Mr. Hobson, who probably had little natural desire for the job, was in a sense commandeered as the one local man qualified to make the Dallas utilities local institutions and to restore the local transportation system to public confidence.

In 1916 the General Electric Company, though a subsidiary, owned a substantial but minority interest in the Dallas Electric Company of Maine, which controlled the Dallas Electric Light Company, three street railways operating in Dallas east of the Trinity River, and the Interurban Terminal property. The Oak Cliff lines were controlled by other interests.

The Mayor of Dallas requested the General Electric Company to acquire control of the Dallas Electric Company and the Oak Cliff street railway line, organize two separate Texas companies, one to operate the light and power property and the other all electric railway facilities in the city limits of Dallas—

contracts and commitments having been fully complied with, Mr. Hobson felt that it was no longer necessary or desirable that he, as Southwestern manager of the General Electric Company, should continue as an officer in the railway. In consequence he tendered his resignation as a director and chairman of the board of directors of the railway.

Mr. Hobson, besides being the Southwestern manager of the General Electric Company, is a director in the Texas Electric Railway and the Texas Interurban Railway. He is chairman of the board of directors of the Southwest General Electric Company.

A native of Savannah, Mo., after coming to Texas he founded the Hobson Electric Company of Dallas and Houston and became its president and general manager. As early as 1888 he was identified with electric railway work at St. Joseph, Mo., as treasurer of the railway there. He is an active member of several civic and social organizations. He has held the office of vice-president and director of the Dallas Chamber of Commerce.

Mr. Carpenter was born on a farm in Navarro County. He started his career in the electric light and power

development of Texas through the upbuilding of the textile industry of the State.

Mr. Meriwether, in addition to directing the street railway operations in Dallas, is vice-president and general manager of the Texas Interurban Railway. He went to Dallas in 1911 as superintendent of a local holding of the Stone & Webster corporation. Upon the merger of the railways in Dallas in 1917, Mr. Meriwether became general manager of the new concern, which continues as the Dallas Railway.

J. C. Madigan Retires at Grand Rapids

John C. Madigan, veteran superintendent, whose span of service with the Grand Rapids Railway, Grand Rapids, Mich., and its predecessors has covered every type of railway vehicle from horse cars, cable cars and trolley cars to the present de luxe electric rail coaches, has tendered his resignation to L. J. DeLamar, general manager. He will retire on Aug. 1.

Mr. Madigan has spent 38 years in the employ of the Grand Rapids Rail-

way. He will now devote his time to his big stock farm on the Rouge River, near Rockford, Mich., and to his other interests. His successor has not been appointed.

Mr. Madigan entered the service of the Valley City Street & Cable Company in May, 1888, at the time the cable company began operations. Two years later, on Aug. 1, he was made division superintendent and continued in executive capacities with that corporation and its successors, the Consolidated Street Railway and the Grand Rapids Railway. In 1900 he was made superintendent of transportation and six years later was promoted to general superintendent, a position which he held for two decades.

John G. Baukat Appointed to New Work

John G. Baukat, well known in the electric railway field, has been appointed vice-president and sales manager of the Woonsocket Manufacturing Company, Providence, R. I. Mr. Baukat's office will be located in the Grand Central Terminal Building, New York City.

Since early in the present year Mr. Baukat has served in the capacity of consulting engineer for the New York Railways. In fact, for the past few years he has been occupied in general consulting engineering work, principally in designing and superintending the building of trolley car equipment. He was affiliated for two years with the Batavia Car Works, which he organized and operated. In his very active career Mr. Baukat has been affiliated with several manufacturing concerns, among them the General Electric Company and the National Steel Car Company, Hamilton, Ont. In the operating end many companies have had his services. They include the Hydro-Electric Power Commission, the Lehigh Valley Transit Company and the Schenectady Railway. Some years ago he was connected with Day & Zimmermann, Philadelphia, public utility operators.

R. P. Stacy, formerly of Pittsburgh, has been made vice-president and general manager of the West Virginia Utilities Company, Morgantown, succeeding Joseph K. Buchanan, resigned. Mr. Stacy, accompanied by C. C. Gillette, another official of the company, arrived in Morgantown late in June and immediately entered upon the discharge of his duties. Mr. Stacy is a graduate of North Carolina State College. For a number of years he was with the Westinghouse interests and later became associated with the Duquesne Light Company, Pittsburgh, Pa.

S. Gordon Gale, Ottawa, Ont., vice-president and general manager of the Hull Electric Company, has been appointed to the position of general manager of the Gatineau Power Company, a subsidiary of the Canadian International Paper Company. Mr. Gale's appointment will not affect his position with the Hull Electric Company, which is a subsidiary of the Canadian International Paper Company. Mr. Gale is an outstanding figure in electric railway and power circles in Canada and the

United States. He is a former president of the Canadian Electric Railway Association. The Gatineau Power Company was organized to control the power developed by the Canadian International Paper Company on the Gatineau River.

W. W. Foster Heads New York Association

W. W. Foster, secretary-treasurer and general manager of the Rochester, Lockport & Buffalo Railroad, Rochester, N. Y., was elected president of the New York Electric Railway Association at the annual meeting at the Hotel Champlain, Bluff Point, N. Y., on June 25. Mr. Foster is very well known in New York State, not only for his association with electric railway activities but also for his banking and business affiliations.

At the age of sixteen he entered the employ of the First National Bank of Syracuse as a clerk. Two years later he entered the service of Holden & Sons, wholesale coal dealers, as an ac-



W. W. Foster

countant and cashier. In 1905 he became identified with electric railway interests when he went with the Beebe Syndicate as general auditor and assistant treasurer. This syndicate operated five interurban electric railways, including the Buffalo, Lockport & Rochester Railway, which was taken over in 1911. In the railway field Mr. Foster seemed to have found his chief interest. In June, 1915, the Buffalo, Lockport & Rochester Railway was segregated from the Beebe Syndicate and at that time he became auditor, secretary and treasurer, moving his offices to Rochester, N. Y. A little more than two years later he was appointed general manager of the company, but still retained the position of secretary-treasurer. In April, 1919, the company was reorganized and the name changed to the Rochester, Lockport & Buffalo Railroad Corporation. Then it was that he was elected a director and appointed to the positions of secretary-treasurer and general manager. These positions he still holds.

In addition to his railway work Mr. Foster has retained his banking affiliations and is a director of the Union Trust Company, Rochester. He was born in Syracuse on Jan. 1, 1873.

Obituary

Bert Weedon

Bert Weedon, a director of the Interstate Public Service Company, Indianapolis, and traffic manager for the company, which operates interurban and light and power utilities in Indiana, died recently in an Indianapolis hospital. He had been in ill health for some time. Funeral services were held June 28, with the Knights Templars in charge. Burial was in Indianapolis.

Mr. Weedon was widely known in public utility circles of Indiana. Practically all his life, since early boyhood, was devoted to public service corporation work. He joined the staff of the Interstate company as traffic manager in May, 1913. Prior to that time he was in the service of the New York Central Railroad at Terre Haute, Ind. That company sent him to the University of Michigan, where he completed his education.

Harry Reid, president of the Interstate, said:

Mr. Weedon was one of the most loyal and valuable members of the staff. We were close friends and his duties as a director of the company and traffic manager brought us in close contact. His death is a loss of an efficient and valuable officer and associate.

Mr. Weedon had unbounded faith in the interurban electric railway. He went after business intensively and he understood the value of good public relations. The road with which he was associated was one of the most intensively developed of its kind in the United States, doing an immense freight business and being distinguished for the quantity and the quality of its passenger services, which included parlor, dining and sleeper car accommodations. For this development there was sufficient reward to go around, and the officers of the company were not either slow or loath to acknowledge the part that Mr. Weedon played in advancing ideas for successful application in connection with the development of this service—a service of singularly outstanding merit.

In 1924 Mr. Weedon was a member of the committee on the development of new business of the American Electric Railway Transportation & Traffic Association, and in 1925 of the committee on selling transportation of that body.

Mr. Weedon was born at Murfreesboro, Tenn., 44 years ago. His parents died when he was a child and he went to live with an uncle in Logansport. He is survived by his wife and three children.

W. S. Hamilton

William S. Hamilton, superintendent of stores for the New York State Railways, and brother of James F. Hamilton, president of the company, died at Syracuse after an illness of ten weeks.

Mr. Hamilton entered the employ of the railway at an early age, and served in many capacities. At one time he was president of the Schenectady Railway. He has lived in Utica, Schenectady, Syracuse and Rochester, while serving in the railway companies.

Mr. Hamilton was on a business trip to Rochester when stricken with apoplexy.

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

Bids Asked for 100 Buses for Buffalo

Mayor Frank X. Schwab of Buffalo, as commissioner of public safety, has asked for bids to be submitted on or before July 6 for 100 single-deck buses in lots of 25, 50 or 100, of 26 to 30 passenger capacity with one or two-man control or both; also for 100 double-deck buses in lots of 25, 50 or 100 of 50 to 56 passenger capacity with one or two-man control. Bidders must submit their own specifications. Where possible, bidders are requested to furnish five or ten buses for operation and demonstration purposes, when required. No proposal will be considered unless accompanied by a certified check drawn for 10 per cent of the amount bid, or, in lieu of such check, by a bond conforming to law, such bond to be equal to 50 per cent of the sum named in the proposal. Proposals should be marked, "Proposals for Motor Buses."

This request for bids marks a step by the city to start municipal bus operation in opposition to the service now being given by the International Bus Corporation, a subsidiary of the International Railway. The legality of the

plan of the City Council is questioned by the city law department, but Mayor Frank X. Schwab says a transportation emergency exists. He is anxious to have the plan to establish municipal bus routes placed before the courts, if necessary.

Plant to Reconstruct Railway Track Equipment Is Planned

Within a few days work will be started on the erection of a modern steel and concrete factory building at Indianapolis by the Morrison & Risman Company, Inc., of Buffalo, N. Y., for the reconstruction of railway track equipment, it was announced by R. L. Morrison, vice-president and treasurer of the corporation. The new plant will house machinery of the latest pattern for the reconstruction of frogs, switches and similar track equipment. F. C. Cullen, who will be the manager of the plant, accompanied Mr. Morrison to the city and assisted him in making arrangements for the erection of the building. The site on which the plant will be erected is 650 ft. long and 105 ft. wide. Recently the company, which has been in business in Buffalo for 38

years, placed a second plant in Chicago, due largely to the expansion of the business in the Middle West. The new plant was so successful that after six months of business it was decided that another new plant and branch office in Indianapolis was needed.

Noiseless Car Is Exhibited

As a means of increasing public interest in transportation affairs, the Twin City Rapid Transit Company, Minneapolis, Minn., recently entered one of the noiseless street cars which it plans to put in service in the Twin Cities in the St. Paul Products Show, recently held at one of the St. Paul department stores. This show inaugurated the home products display and sales plan being conducted in the Minnesota city. The car that was exhibited weighs approximately 25,000 lb., is equipped with noiseless roller bearings and brake bands, as well as an improved type of spring to insure a maximum of easy and quiet riding.

Applicants Rush to Exhibit at Cleveland

American Electric Railway Association
Reports About 101,302 Sq.Ft. of
Space Sought on July 1

Space for the monster exhibit to be held at the meeting of the American Electric Railway Association in Cleveland, Ohio, starting on Oct. 4, will be assigned by the exhibit committee of that body at a meeting called for July 8. Up to the close of business July 1, applications had been received from 190 member companies for about 101,302 sq.ft. of space. There were also nine applications asking for 670 lin.ft. of track space.

Transportation experts from all parts of the world will attend the meeting and examine the display because they look upon the exhibit as reflecting the latest developments in both rail and non-rail vehicular transportation. Records established in Atlantic City for the exhibition of the latest types of electric railway cars are expected to be broken. Special track has been provided adjoining the exhibition hall on which to show this equipment. Applications have already been received for the display of typical passenger cars and for showing dump cars, crane cars, concrete breakers, freight cars and even refrigerator cars. It will be a live exhibit, in that the cars will be served with current to permit the operation of all the automatic devices with which they are equipped.

No phase of up-to-date operation is likely to be neglected. Although they are machines not easy to handle over a temporary track, it is expected that both oil-electric locomotives and gas-

Many Electric Locomotives Under Construction at Erie, Pa.



A RECENT view of the locomotive assembly shop of the Erie, Pa., works of General Electric Company, showing fifteen electric locomotives of various types in the process of being assembled. In front is an 80-ton switching locomotive. Next are four halves of the two freight locomotives for the New York

Central Railroad, and beyond these are five of the ten gearless passenger locomotives for the same railroad. Next in line are two New York, New Haven & Hartford switching locomotives, and in the far end of the long building are three of the new motor-generator type of locomotive for the same railroad.

	Booths	Total Sq.Ft.
Section A—Arena floor...	53	23,838
Section B—Exhibition hall 103		19,627
Section C—Auditorium's west wing...	148	62,077
Section D—Open air exhibition space	8	6,360
Section E—1,500 lin.ft. exhibition space.		
Total number of exhibition booths in Sections A, B, C, D, and E, 312.		
Total number of square feet available 111,902, exclusive of track space.		

electric rail cars will be shown. Reference was made in the ELECTRIC RAILWAY JOURNAL previously to some of the plans that had been developed for exhibiting the railway equipment.

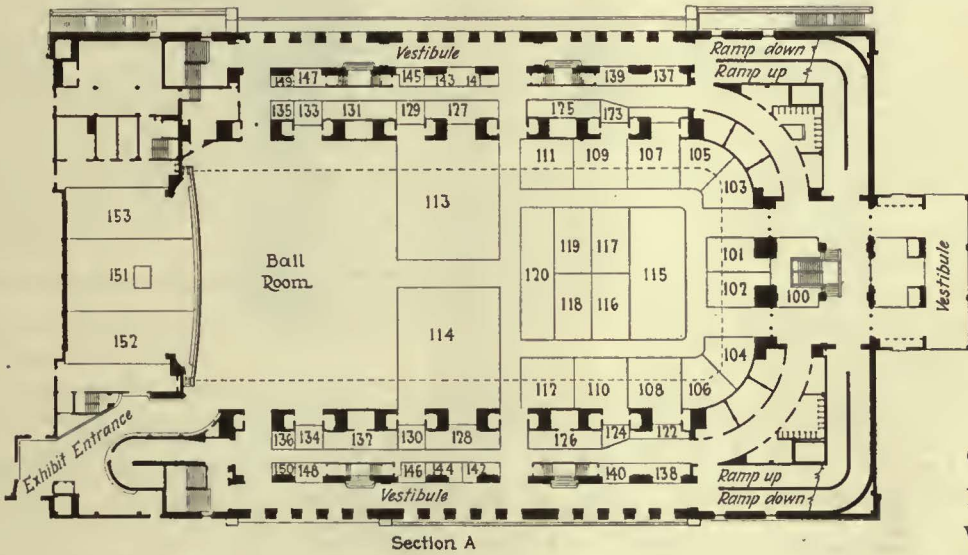
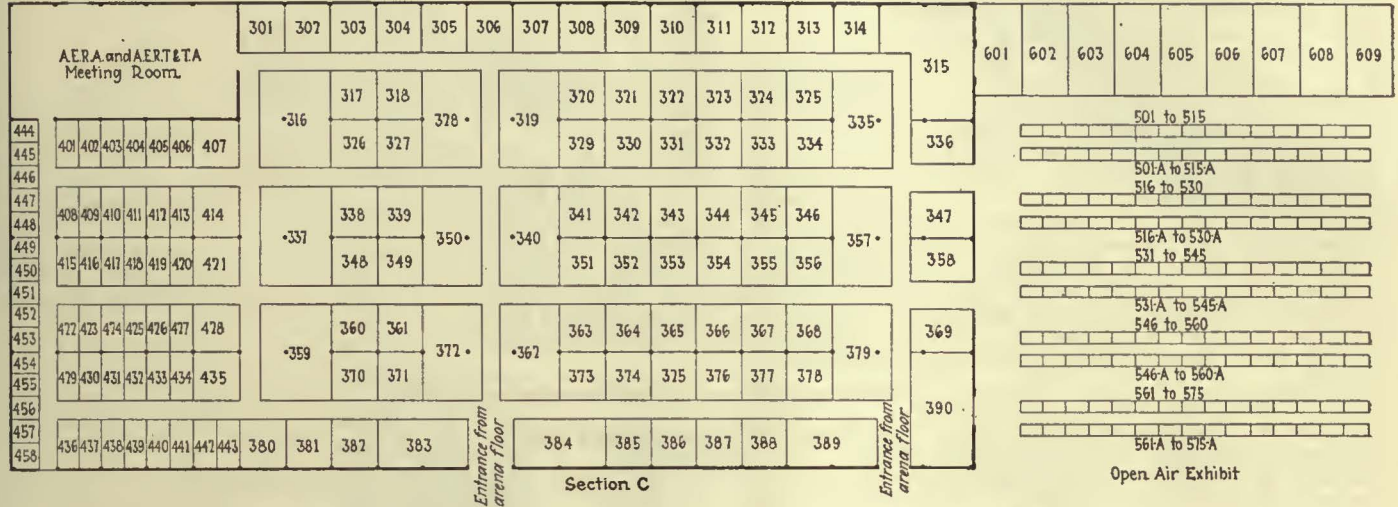
So far as the show of buses is concerned it is expected that the vehicles which will be displayed will outnumber and outrank in their variety similar

vehicles shown in previous years. The feeling prevails that the motor bus men this year should do more in the way of showing trucks and tractors than they have in the past. The suggestion has also been made that the automobile makers display taxicabs.

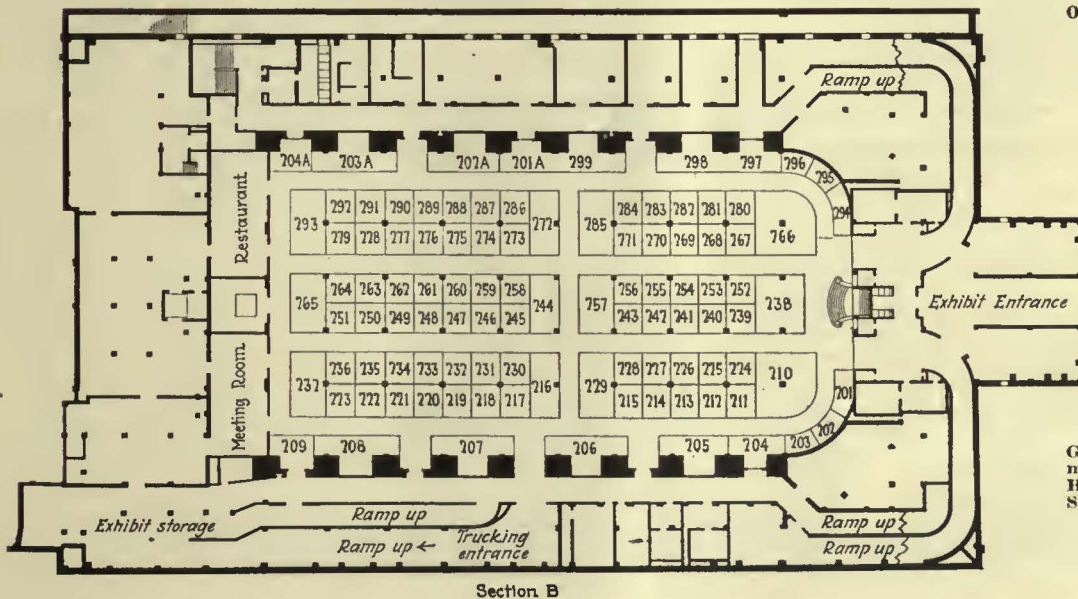
Nothing definite has been said about it, but it would not be surprising if

some planes were shown. At least one electric railway is now operating planes in regular service.

A recapitulation of the space available, with the total number of booths, and the number of square feet and an illustration showing the meeting hall and exhibition layout accompany this account.



On July 1
190 Applicants
Were Seeking
101,302 Sq.Ft.
of Space



General Arrangement
of Meeting
Hall and Exhibit
Space at Cleveland

Some Recent Timken Company Changes

Phenomenal growth of sales of Timken bearings for industrial uses has brought about the promotion of G. W. Curtis from industrial equipment engineer of the Timken Roller Bearing Company, Canton, Ohio, to district manager of sales, industrial division, for the Milwaukee territory. Mr. Curtis will work with R. W. Ballentine, who previously has handled this territory. S. M. Weckstein succeeds Mr. Curtis as industrial equipment engineer. Mr. Weckstein has been notably successful in developing Timken bearing applications for precision work in machine tools and high-speed applications. G. W. Richards and A. R. Spicacci are appointed assistant industrial equipment engineers to assist Mr. Weckstein.

Other changes have recently been announced. H. E. Gilmore will become manager of the St. Louis branch of the Timken Roller Bearing Service & Sales Company.

The Omaha branch office of the Timken Roller Bearing Service & Sales Company, formerly located at 2524 Farnum Street, now occupies larger quarters at 2240 Douglas Street. Complete service stocks for authorized distributors will be maintained as in the past. The management will continue under the direction of A. D. Hackim.

The new home of the Los Angeles Branch of the Timken Roller Bearing Service & Sales Company will be at 1361 South Figueroa Street, moving to this location from 1241 South Hope Street.

Track and Line

Connecticut Company, New Haven, Conn., is planning to construct an additional track over Blue Hills Avenue from Westbourne Parkway to the turnout track north of Holcomb Street, Hartford. The street board and railways committee of the Common Council will, it is expected, grant the required permission.

Los Angeles Railway, Los Angeles, Cal., has started work at the Temple Block which will unite two of the oldest car lines in the city. The south layout of the special work on Main Street at the Temple Block will be relocated and new double tracks constructed west

therefrom to connect with the present terminal of the Temple Street tracks in front of the Federal Building. This work will necessitate the relocation also of the center line of tracks with respect to Main Street from this special work to a point about 125 ft. north. All other special work and curves at this location will be removed. The safety island in the center of the street will be completely reconstructed and the large island in front of the Federal Building will be removed. A new island will be built along the east side of the tracks on Main street, north from the new curves to Temple Street.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., is busy now with two paving jobs. There are 3,700 ft. of paving to be laid on King Hill Avenue. About 1,150 ft. of the concrete work has been completed and all the steel laid on the east track. The Francis Street project totals 1,800 ft. of paving.

Power Houses, Shops and Buildings

Georgia Railway & Power Company, Atlanta, Ga., has purchased a tract of land containing many acres, part of which, it is said, will be used as a site for a carhouse. The property is located near Atlanta adjacent to the West Point belt line.

Birmingham Electric Company, Birmingham, Ala., will start work shortly on the construction of a two-story and basement building to be used as a warehouse and offices for linemen, construction crews and other employees. The new building will cost approximately \$350,000.

Rockford City Traction Company, Rockford, Ill., through Receiver Adam Gschwindt, was authorized by Judge E. D. Shurtleff, in the Circuit Court, to expend \$72,000. Of this amount \$50,000 is for the completion of Seventh Street paving and track laying and \$7,000 is for North Second Street track laying.

Trade Notes

American Engineering Company, Philadelphia, announces the appointment of H. Kempner as sales manager of its "Lo-Hed" electric hoist division. Mr. Kempner has been in charge of sales promotion work for the American Engineering Company, including the handling of its advertising and publicity, for the last three years. He studied electrical engineering at Harvard University and for four years was an instructor in physics at Pratt Institute, Brooklyn, N. Y. He formerly was connected with the engineering department of the Western Electric Company in New York. From 1919 to 1923 Mr. Kempner was in the service of the McGraw-Hill Publishing Company, Inc., handling accounts in a number of papers published by this company, including *American Machinist*, *Electrical World* and *Power*. In 1920 he was sent

to Washington to organize and take charge of the disposal of surplus war property for the government. He was overseas from 1917 to 1919, participating in the Oise-Aisne and Argonne-Meuse offensives.

Monitor Controller Company, Baltimore, Md., manufacturer of automatic controllers and electrical resistors, has opened a branch office at Room 417, 136 Federal Street, Boston, Mass., with Nelson A. McCoy in charge. For the past eight months Mr. McCoy has been located at the main office of the company. Previous to joining the Monitor organization he was with the Wagner Electric Corporation for fifteen years. After completing this company's student course he was made foreman of its motor tests. In 1913 he was transferred to Wagner's Philadelphia sales and service organization and in 1921 was sent abroad, covering Hawaii, Australia and New Zealand.

John R. Lee has been appointed general sales manager of Dodge Bros., Inc., Detroit, Mich. Mr. Lee has been assistant general sales manager since last December, and prior to that served for several years as assistant to the president. Three new assistant general sales managers have been appointed to serve with Mr. Lee. They are: H. J. New, formerly director of distribution; W. M. Curves, former division sales manager, and F. R. Valpey, former director of the commercial car and truck division. Mr. New's duties will embrace agreements and distribution; Mr. Curves will be in charge of districts and field operations, and Mr. Valpey will concentrate on Dodge Brothers commercial car and Graham Brothers truck and bus sales.

New Advertising Literature

Nichols-Lintern Company, Cleveland, Ohio, has issued a booklet giving prices and specifications on various types of Nichols-Lintern Universal lanterns.

General Electric Company, Schenectady, N. Y., has issued bulletin GEA-380, describing Helicoil sheath wire units. This is a form of heating unit with protective casing. Nickel chromium wire is used as a conductor and it is surrounded by a compacted insulating powder so as to insulate it from the casing. The unit is flexible and can be bent into various shapes.

Ohmer Fare Register Company, Dayton, Ohio, has reprinted another early address by John F. Ohmer. It is entitled "Transfers, Their Use and Abuse," and was delivered before the Iowa Street Railway Association on April 16, 1906. It outlines the principal problems connected with the issue, collection and accounting for of transfers and then explains how these difficulties are overcome by the Ohmergraph, a transfer printing and issuing machine. A paragraph dated June 9, 1926, at the end of the paper, explains that the Ohmergraph referred to in this address was the first step in the evolution of the present Ohmer transfer machine, which prints all the required data on plain paper supplied to the machine in rolls, no punching or prepared transfer being necessary.

Metal, Coal and Material Prices

Metals—New York		June 29, 1926
Copper, electrolytic, cents per lb.		13.875
Copper wire, cents per lb.		16.00
Lead, cents per lb.		8.275
Zinc, cents per lb.		7.52
Tin, Straits, cents per lb.		61.75
Bituminous Coal f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons		\$4.425
Somerset mine run, Boston, net tons		1.925
Pittsburgh mine run, Pittsburgh, net tons		1.75
Franklin, Ill., screenings, Chicago, net tons		1.70
Central, Ill., screenings, Chicago, net tons		1.45
Kansas screenings, Kansas City, net tons		2.425
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.		\$6.25
Weatherproof wire base, N. Y., cents per lb		18.00
Cement, Chicago net prices, without bags		2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.		11.70
White lead in oil (100-lb. keg), N. Y., cents per lb.		15.00
Turpentine (bbl. lots), N. Y., per gal.		\$0.89

Study the "modern car" specifications—

Peacock Staffless Brakes are almost *always* there



Miami Beach Railway, Miami, Fla., recently received twelve new cars. The specifications follow:

Bullder of car body . . .	Perley A. Thomas Car Works
Type of car . . .	Light-weight, double-truck, one-man safety
Seating capacity . . .	48
Total weight . . .	36,000 lb.
Bolster centers, length . . .	20 ft. 0 in.
Length over all . . .	45 ft. 9 in.
Width over all . . .	8 ft. 4 1/2 in.
Height, rail to trolley base . . .	10 ft. 11 in.
Body . . .	All steel
Interior trim . . .	Cherry
Headlining . . .	1/4-in. Agasote
Roof . . .	Arch
Air brakes . . .	General Electric
Bumpers . . .	Channel
Car signal system . . .	Electric Service Supplies Company
Compressors . . .	General Electric
Control . . .	K-35
Curtain fixtures . . .	Curtain Supply Company
Destination signs . . .	Hunter
Door-operating mechanism . . .	National Pneumatic
Fenders . . .	Consolidated
Finish . . .	Varnish
Gears and pinions . . .	General Electric
Hand brakes . . .	National Brake Company
Headlights . . .	General Electric
Lightning arresters . . .	General Electric
Motors . . .	Four GE-265, 35 hp.
Registers . . .	International
Sanders . . .	Ohio Brass
Sash fixtures . . .	O. M. Edwards
Seats . . .	Hale & Kilburn
Seating material . . .	Wood slat
Slack adjuster . . .	American Brake Company
Step treads . . .	American Abrasive Company
Trolley retrievers . . .	Chas. I. Earl
Trolley base . . .	Ohio Brass, Form 4
Trucks . . .	Brill, 76-E-1
Ventilators . . .	Railway Utility Company
Wheels . . .	Pollak Steel Company 26-in.



The Peacock Staffless

In progressive cities, it is only natural that the specifications call for modern hand brakes. And of course they mean Peacock Staffless Brakes!

They have a demonstrated capacity for winding in 144 inches of chain—so that even though chains are slack and brake shoes worn, adequate braking power is assured at all times.

Both installation and maintenance costs are very low—as proved by actual figures, gladly sent on request.

Let us quote on your requirements
for any class of rolling stock

NATIONAL BRAKE COMPANY, Inc.

890 Ellicott Square, Buffalo, N. Y.—Canadian Representative, Lyman Tube & Supply Co., Ltd., Montreal

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

THE BEELER ORGANIZATION

ENGINEERS AND CONSULTANTS

Traction - Traffic - Equipment - Power Investigations

TRANSPORTATION, TRAFFIC, AND OPERATING SURVEYS

COORDINATING SERVICE—FINANCIAL REPORTS

APPRAISALS—MANAGEMENT

52 Vanderbilt Ave.

New York

SANDERSON & PORTER ENGINEERS

PUBLIC UTILITIES & INDUSTRIALS

Design Construction Management
Examinations Reports Valuations

CHICAGO

NEW YORK

SAN FRANCISCO

J. ROWLAND BIBBINS

Engineer—2301 Connecticut Ave., N.W., Washington, D. C.

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

ENGELHARDT W. HOLST

Consulting Engineer

Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation

Reorganization Operation Management

683 Atlantic Ave., BOSTON, MASS.

JAMES E. ALLISON & CO. Consulting Engineers

Specializing in Utility Rate Cases and
Reports to Bankers and Investors

1017 Olive St., St. Louis, Mo.

DAY & ZIMMERMANN, INC. ENGINEERS

DESIGN - CONSTRUCTION - REPORTS

VALUATIONS - MANAGEMENT

NEW YORK

PHILADELPHIA

CHICAGO

STEVENS & WOOD

INCORPORATED

ENGINEERS AND CONSTRUCTORS

120 BROADWAY, NEW YORK

ENGINEERING
CONSTRUCTION

YOUNGSTOWN, O.

FINANCING
MANAGEMENT

WALTER JACKSON

Consultant on Fares and Motor Buses

The Weekly and Sunday Pass—Differential
Fares—Ride Selling

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

HEMPHILL & WELLS

CONSULTING ENGINEERS

Gardner F. Wells Albert W. Hemphill

APPRAISALS

INVESTIGATIONS COVERING

Reorganization Management Operation Construction

43 Cedar Street, New York City

KELKER, DELEUW & CO.

CONSULTING ENGINEERS

REPORTS ON

Operating Problems

Rates

Traffic Surveys

111 W. Washington Street, Chicago, Ill.

A. L. DRUM & COMPANY

Consulting and Constructing Engineers

VALUATION AND FINANCIAL REPORTS
RATE STUDIES FOR PRESENTATION TO PUBLIC SERVICE
COMMISSIONS

CONSTRUCTION AND MANAGEMENT OF
ELECTRIC RAILWAYS

230 South Clark Street
Chicago, Ill.

215 South Broad Street
Philadelphia, Pa.

MCCLELLAN & JUNKERSFELD

Incorporated

ENGINEERING AND CONSTRUCTION

Examinations—Reports—Valuations

Transportation Problems—Power Developments

68 Trinity Place, New York

CHICAGO

ST. LOUIS

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

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 1804 Citizens National Bank Bldg. Phone: Hanover: 2142 NEW YORK 49 Wall Street


KELLY, COOKE & COMPANY
 ENGINEERS
 Operation and Management
 Traffic and Transportation Surveys
 424 CHESTNUT STREET PHILADELPHIA

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.

INDUSTRIAL GASES
 OXYGEN ACETYLENE **IOG SYSTEM** HYDROGEN NITROGEN
 Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.
 International Oxygen Co., Main Offices: Newark, N. J.
 Branches: New York Pittsburgh Toledo

A Single Segment or a Complete Commutator
 is turned out with equal care in our shops. The orders we all 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 built. That's why so many electric railway men rely absolutely on our name.
Cameron Electrical Mfg. Co., Ansonia, Connecticut


Gets Every Fare
PEREY TURNSTILES or PASSIMETERS
 Use them in your Prepayment Areas and Street Cars
Perey Manufacturing Co., Inc.
 101 Park Avenue, New York City

UNA RAIL BONDS·RAIL JOINTS DYNAMOTORS WELDING ROD
UNA Welding & Bonding Co.
 Cleveland, Ohio.



Type ATF-2

for bonding the ball of the rail. Other types shown in Circular No. 13.

It certainly does matter how good your bonding is!

The troubles due to poor bonding are many, indeed, tho how poor bonding produces them is not always so apparent. It is a fact, however, that poor bonding spells poor power, and cars behind schedule. Burned out armatures, flickering lights, and electrolysis troubles are also traceable to poor bonding.



Arc Weld Rail Bonds

Will give you a permanently good return circuit and relieve your operating force from many of these troublesome worries. Not only will your service to your patrons improve, but your power and maintenance cost will be lower too.

Good bonding is not a cure-all, but it's a big factor in paying operation. The surprising part is how little good bonding, ERICO bonding, really costs.

Let us know to whom to send our Circulars Nos. 10 and 13 showing ERICO Arc Weld Bonds and Equipment. They point the way to more profitable operation.

The Electric Railway Improvement Co.
 2070 East 61st Place, Cleveland, Ohio



True-to-Schedule Tire Service

Daily, in all weathers on all roads, Firestone Bus Pneumatics are giving reliable "true-to-schedule" service.

Gum-Dipping is largely accountable for this performance. This exclusive Firestone process insulates every fiber of every cord with rubber; minimizing friction and heat and building greater strength and flexibility which mean extra comfort for passengers and added prestige and patronage for the operator. The broad tread of this tire, with its great volume of rubber, affords deep cushioning—added protection to chassis and body.

Firestone Engineers are specialists in suiting the right tire to the truck or motorbus it must carry. Their advice, added to your dealer's knowledge of local conditions, insures you the equipment, which under all circumstances, will give most efficient service with the economy of—

MOST MILES PER DOLLAR



Firestone

TRUCK AND BUS PNEUMATICS

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER . . . *Harvey Firestone*

Light on the Bus Braking Question

The A B C's of Bus Brakes and Braking Systems

Curing the Skid

Skidding when brakes are applied can easily be cured. It is due, primarily, to the application of unequal braking pressures. One wheel absorbs most of the braking effect, becomes locked, and the vehicle pivots, with consequent loss of control, abrasion of tires, and strain on the chassis; if indeed nothing more serious in the form of an accident occurs.

While skidding may never be entirely eliminated, the most dangerous source of skids can be removed by using a braking system that automatically applies equal braking power to wheels on the same axle regardless of band wear, or any other such variable factor.

It is plain that such a system must transmit its power by a fluid—air, oil or a similar agent. It must apply its power directly, without the complication of levers, pull-rods, shafts, knuckles and cams. The greater the simplicity, the easier to maintain equal pressures.

In a brake system that uses fluid for power transmission, the pressures applied to the brake actuating mechanisms on the same

axle *have* to be equal. It is impossible that they be anything else. With the simplest possible brake operating mechanism,—without a lever, pull-rod, cam system—the ideal of a perfectly equalized braking pressure that automatically maintains its equalization is attained. IN NO OTHER WAY IS IT POSSIBLE.

Furthermore, perfect self-equalization of braking pressure makes possible employing the safe use of brakes on ALL wheels; distributing the braking load and making locked wheels far less likely.

Skidding when brakes are applied can be practically done away with, if truck owners select their brakes with an eye to what has been written above.

This is the fourth of an informative series on Bus Brakes. The series consists of:

- A—What Brakes Must Do.
- B—How many wheels should brakes go on?
- C—Self-equalization and brake adjustments.
- D—Curing the Skid.
- E—Metal to Metal or Moulded Linings—which?
- F—Braking Power.
- G—Compressor Mountings and Drives.
- H—Compressor Cooling.
- I—The Control Valve.
- J—Maintenance on Different Types.

The other topics will appear in the above order. Address any comments, suggestions, or requests for advance information to—

The Christensen Air Brake Co.
6513 Cedar Ave., Cleveland, Ohio

Christensen

Budd-Michelin Dual Wheels put a bigger share of every fare into the profit column

VETERAN bus owners know from experience that Budd-Michelin Dual Wheels lengthen the profit column.

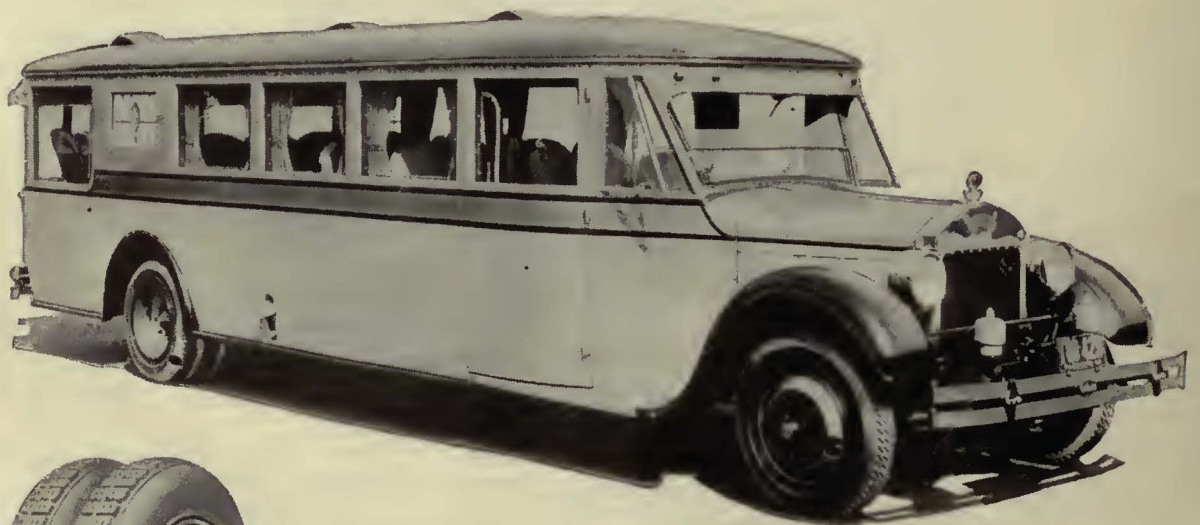
They know that a fleet with one-size wheels, one-size tires—all interchangeable—costs less to service.

And they know that Budd-Michelin Dual Wheels make it possible to get from 15,000 to 20,000 miles from a set of pneumatic tires—this has been the experience of more than 40,000 heavy buses.

Budd-Michelin Dual Wheels have grown up with the bus industry. They made it possible for heavy buses to ride on pneumatics. They brought low-body suspension without interfering with seating capacity—made the heavy bus attractive to look at, comfortable to ride in.

Budd-Michelin means service economy, profitable tire-mileage, passenger-attracting comfort—and these factors are vital to any bus owner, whether he's buying his first bus or his hundredth.

BUDD WHEEL COMPANY Detroit



The Budd-Michelin equipment—two Budd-Michelin single wheels in front, two Budd-Michelin Dual Wheels in the rear (pairs of single wheels acting together as units). All wheels completely interchangeable either as units or as halves of Duals. One spare.

GRAHAM BROTHERS MOTOR COACHES

More Frequent Service

A more frequent service can be furnished without excessive investment in equipment by selecting Graham Brothers Motor Coaches. Their low initial cost is made possible by large production.

Low operating costs result from the absence of excess weight, the economy of the Dodge Brothers engine and the rugged chassis and body construction. Moreover, the dependable performance of Graham Brothers Motor Coaches assures regularity of schedule.

21 Passenger
Street Car Type
Motor Coach
Complete,

\$3815

f. o. b. Detroit

GRAHAM BROTHERS

Evansville — DETROIT — Stockton
A DIVISION OF DODGE BROTHERS, INC.
GRAHAM BROTHERS (CANADA) LIMITED — TORONTO, ONTARIO





A 25-passenger bus equipped with the Baker-Raulang Luggage Loft carries 30 paying passengers, with no increase in wheel-base.

35 Square Feet of Expense or Thirty Five Square Feet of Revenue



Luggage has always been the necessary evil of bus operation. Now that's settled to the complete satisfaction of operator and passenger alike by the Baker-Raulang Luggage Loft.

THERE are actual, provable, money-in-the-bank advantages to the operator in new Baker-Raulang Bus Body design. For one—35 square feet of your bus floor is changed from expensive luggage-carrying space into profitable passenger-carrying space, by the exclusive Baker-Raulang Luggage Loft.

Above each passenger is a roomy compartment where suit-cases, bags, hat boxes can be carried, out of the way. Floor space formerly required for baggage is used for revenue-paying seats, and in addition the bus operator is relieved of all time and liability in caring for passengers' baggage, and passengers have their parcels easily available at any time on the journey.

The Luggage Loft allows ample room for inside storage yet leaves the aisle clear.

The convenient guide rail increases the comfort of passengers going to and from seats, and making possible the carrying of standees where regulations permit.

The Luggage Loft is only one of many Baker-Raulang improvements in bus body design—improvements that make good our promise to the industry—to promote public popularity. The new features are the result of long and careful study of the needs of the industry on the part of this veteran organization which for 73 years has been designing and building fine closed bodies for carriages, for the first closed automobiles, and now for buses.

We will gladly explain Baker-Raulang advantages to interested buyers, and apply our experience, study and facilities to the solution of your engineering and operating problems.

Bus Body Division, THE BAKER-RAULANG COMPANY, Cleveland, Ohio, U. S. A.

**Baker
Raulang**
BUS
BODIES

TRADE MARK



No. 7 of Inter Cities Coach Co. fleet, Dayton, Ohio

INTERNATIONAL HARVESTER MOTOR COACHES

*Are the Product of Tremendous Resources
and of 22 Years' Automotive Experience*

Manufacturers for nearly a century, motor truck builders for over twenty years, the International Harvester Company pioneered also in the designing of motor coaches. The earliest of its 6-cylinder conveyances are in highly profitable operation after six-figure mileage records, and the perfected chassis coming from the factories today are equipped in every detail to render utmost satisfaction to coach owners and drivers and—more important—to discriminating passengers. Mechanical excellence, beauty of line, and de luxe

appointments catering to the rider's comfort, have built a consistent high reputation for International Motor Coaches. The various bodies supplied for the 6-cylinder chassis carry 24 to 33 passengers. Regular equipment includes air brakes on all four wheels and every appointment detail known to highest-grade manufacture. The International SL 4-cylinder coach [12 to 14 passengers] offers advantages of flexibility and economy, either as main units or as auxiliaries to larger operating units.

Detail information on International Coaches—or trucks and industrial tractors—will be mailed on request

INTERNATIONAL HARVESTER COMPANY

606 So. Michigan Ave. of America
(Incorporated)

Chicago, Illinois

International Motor Trucks

A full line ranging from the ¾-ton "Special Delivery" and 1-ton and 1½-ton Speed Trucks to the 5-ton Heavy-Duty Truck.

McCormick-Deering Industrial Tractors

Compact, flexible power units, ideal for many trailer-hauling jobs and for work around yards, plants, etc. Disk wheels, rubber tires, spring-mounted front axle, and 2, 4, and 10 m. p. h. forward speeds.

International Harvester offers you unparalleled automotive service, rendered through the world's largest Company-owned truck and coach service organization. Company-owned branches are now located at 120 points in the United States and 17 in Canada, and they are supplemented by the service of International automotive dealers.



Hollywood Subway ~

OHMER Equipped

REG. U. S. PAT. OFF.

Ten thousand fares are collected here daily and the amount of each fare is indicated and recorded on Ohmer Fare Registers. This is another demonstration of the flexibility of the Ohmer System of handling transportation sales, a method proved absolutely correct in principle and in practice by the most successful electric railway and motor bus companies.

It was natural that the Hollywood Subway should be equipped with Ohmer Fare Registers. It is a part of the great Pacific Electric Railway system which serves Southern California and its cities with the highest type of electric transportation and uses hundreds of Ohmer Fare Registers on its various divisions.

For more than a quarter of a century the Ohmer Fare Register Company has been serving the transportation industries with ever increasing effectiveness and with devices constantly improved to meet the most exacting requirements.

Ohmer Fare Register Company
DAYTON, OHIO, U. S. A.



Trademark Registered in United States and Canada
Applied for in foreign countries

Gibraltars of Bus Transportation



GIBRALTAR Bodies are universally recognized because each step in design and construction has been taken in strict conformity to the ethics of correct engineering, masterly workmanship and good taste, combined with quantity production.

It is with pride that the builders of Gibraltar bodies have found rewards for their efforts in the steadily increasing demand from leading chassis builders and operators in the bus industry.

Today - the Gibraltar of the Bus Body Industry

THE AUTO BODY COMPANY

LANSING, MICHIGAN



Designers and Manufacturers of Motor Coach and Bus Bodies  Open and Enclosed Automobile Bodies



COLD DRAWN— TROLLEY POLES



“NATIONAL-SHELBY” Seamless Steel Trolley Poles are cold drawn from a selected grade of basic Open Hearth steel low in phosphorus and sulphur.

“NATIONAL-SHELBY” Poles are manufactured by the seamless process—from a solid billet—with no weld or brazed joint to weaken its strength.

“NATIONAL-SHELBY” Poles are finished to size and taper desired by cold drawing.

Prior to the last cold drawing operation, they are given a special heat treatment which leaves the grain of the steel in the finest condition.

The result is a pole of maximum strength and elasticity with minimum weight.

Details regarding manufacture and tests are given in a booklet, entitled: Seamless Cold Drawn Steel Trolley Poles.

NATIONAL TUBE COMPANY

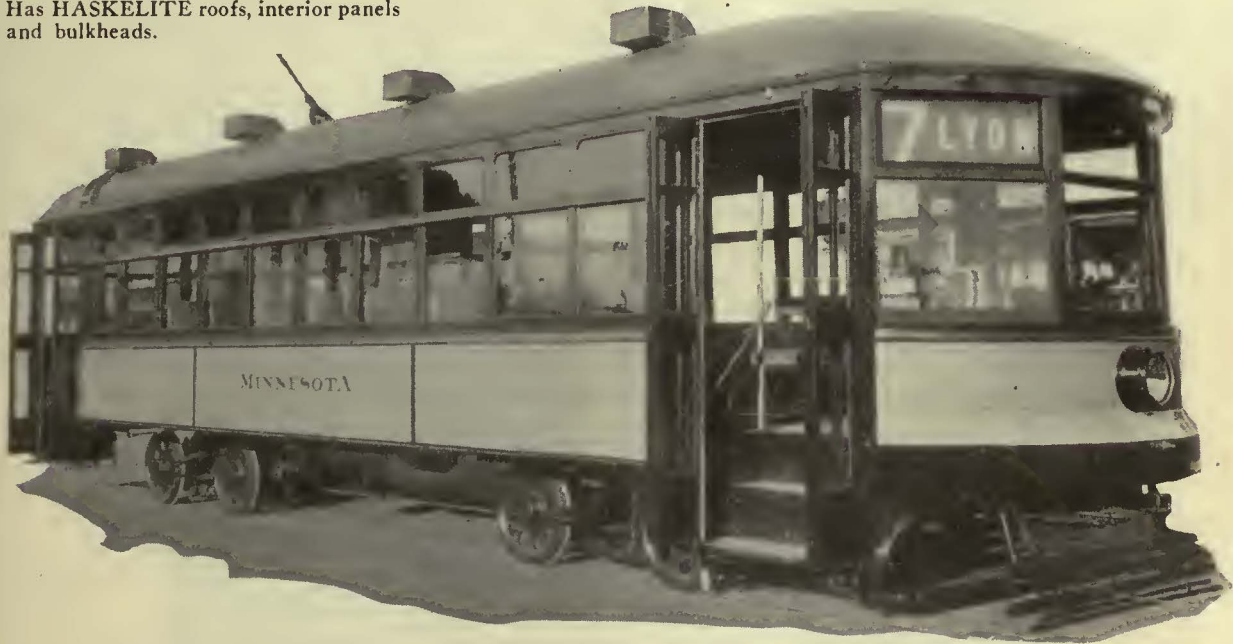
Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES IN THE LARGER CITIES

HASKELITE

HASKELITE
the engineering plywood. Specified on recent Lightweight Noiseless orders from the Tennessee Electric Power Company, The Nashville Railway & Light Company, The Southern Indiana Gas & Electric Company, etc.

Light Weight Noiseless car built for Grand Rapids Railway, of same type as recent orders mentioned herein. Has HASKELITE roofs, interior panels and bulkheads.



Lightening the Weight of the Light Weight Car

THE demand for lower operating costs has forced car designers and railway officers to develop modern types of street cars which are materially lighter than standards of even a decade ago.

But there is another factor in cutting out useless dead weight. That is the selection of materials best adapted to the modern type of construction. When you buy new light weight cars or remodel old ones, why not take advantage of the progress made in producing light weight materials for this purpose. HASKELITE and PLYMETL have no equal in this respect. In addition to their light weight these materials are strong, will take a fine finish, require little maintenance, provide desirable insulation, etc.

A list of the prominent users and a blueprint booklet showing detailed applications to street cars and buses will be gladly sent on request.

Haskelite Manufacturing Corporation
133 W. Washington Street, Chicago, Illinois

PLYMETL

steel faced plywood. Specified on recent Lightweight Noiseless orders from the Tennessee Electric Power Company, The Nashville Railway & Light Company, The Southern Indiana Gas & Electric Company, etc.

PLYMETL



Representative Properties Adopt Bates Poles

The wide general acceptance of Bates poles and supporting structures by leading transportation companies, both in this country and abroad, is significant of the superiority of this form of overhead support. Bates Poles possess unique advantages over other types, and are now available at remarkably low first cost. Their qualities of strength and durability affect substantial economies over long periods of time. Secure a Bates estimate on your projected construction.

INTERNATIONAL
STANDARD ELECTRIC CORP.
General Export Distributors
SAMUEL BROWN, LTD., *New Zealand*
JOST ENGINEERING CO., LTD., *India*

*Specify
Bates*

B E S T
Bates Expanded Steel Truss Co.

Sales, Engineering and Executive Offices
EAST CHICAGO, INDIANA



More Revenue?

Ans.—Modern Cars!

Profits depend largely upon revenue—and modern, attractive cars have proved themselves a productive source of increased revenue. The car that offers comfortable, quick and convenient service will always successfully compete with other modes of transportation.

Will you give us the opportunity of assisting you in the development of new, attractive and profit-earning cars?

Cummings Car and Coach Company

Successor to McGuire Cummings Mfg. Co.

111 W. MONROE ST., CHICAGO, ILL.

Light Weight City and
Interurban Cars
Single and Double Trucks

and—the Cummings Gas-Electric Motor Coach

PIN TERMINAL RAIL BONDS



View of 20th Century rounding bend at Marblehead. The New York Central is always among the leaders in modern equipment. Insert shows our type CPO1 Bond used on all main line tracks

BECAUSE of the ease of installation, Pin Terminal Rail Bonds are used on many of the larger railway systems. They are accessible for inspection, show low maintenance cost, insure strong contact and low resistance.

The American Steel and Wire Company has a rail bond for every requirement. Our engineers will be glad to assist you in selecting the best bond for your needs.



American Steel & Wire Company

Sales Offices:

CHICAGO, NEW YORK, BOSTON, CLEVELAND, WORCESTER, PHILADELPHIA, PITTSBURGH, BUFFALO, DETROIT, CINCINNATI, BALTIMORE, WILKES-BARRE, ST. LOUIS, KANSAS CITY, ST. PAUL, OKLAHOMA CITY, BIRMINGHAM, MEMPHIS, DALLAS, ATLANTA, DENVER, SALT LAKE CITY.

EXPORT REPRESENTATIVE: U. S. STEEL PRODUCTS CO., NEW YORK
PACIFIC COAST REPRESENTATIVE: U. S. STEEL PRODUCTS COMPANY, SAN FRANCISCO, LOS ANGELES, PORTLAND, SEATTLE.



Strength

... an outstanding characteristic of Durable Douglas Fir

THE strength and stiffness of Douglas Fir long ago established this unusual wood as standard material for dredge spuds from the Great Lakes to the Gulf.

Douglas Fir is strong, durable and dependable. Available to the engineer in any size and grade, Douglas Fir structural timbers can be depended upon to give unusual service.

"As a structural timber Douglas Fir is not surpassed" so states the U. S. Forest Service in Bulletin No. 88.

Douglas Fir is strong and stiff, under either static or impact loading. In Technical Note No. 119, the U. S. Forest Service concludes that insofar as strength properties are concerned, the choice between any two lots of Douglas Fir and its closest rival will depend upon the grade and density of the timber composing each lot.

Strength, great stiffness and unusual durability, combined with the large dimensions that are available, place Douglas Fir at the head of the list.

And Douglas Fir is always durable. The U. S. Forest Service in Technical Note No. 173 asserts that Douglas Fir is only a little less durable than White Oak, and rates select material of Douglas Fir on a parity with the King of Hardwoods.

- | | |
|---------------------------|-----------------------------|
| 1. Piling and poles | 16. Foundation material |
| 2. Cross arms | 17. Flumes |
| 3. Railway ties | 18. Bridges and trestles |
| 4. Car material | 19. Paving blocks |
| 5. Construction timbers | 20. Airplanes |
| 6. Spars and spuds | 21. Form work |
| 7. Derrick masts | 22. Towers |
| 8. Wood-stave pipe | 23. Mill construction |
| 9. Underground conduit | 24. Shoring material |
| 10. Shipbuilding material | 25. Pontoons |
| 11. Gridiron timbers | 26. Mine timbers |
| 12. Sheet piling | 27. Roof trusses |
| 13. Oil derricks | 28. Retaining walls |
| 14. Water tanks | 29. Coal and gravel pockets |
| 15. Crib dams | 30. House construction |

—and for every engineering purpose where wood is the best material

An illustrated booklet, "Durable Douglas Fir—America's Permanent Lumber Supply," sent on request. This hand book contains valuable information for you. Use the coupon or mail a postcard.

Durable Douglas Fir

AMERICA'S PERMANENT LUMBER SUPPLY

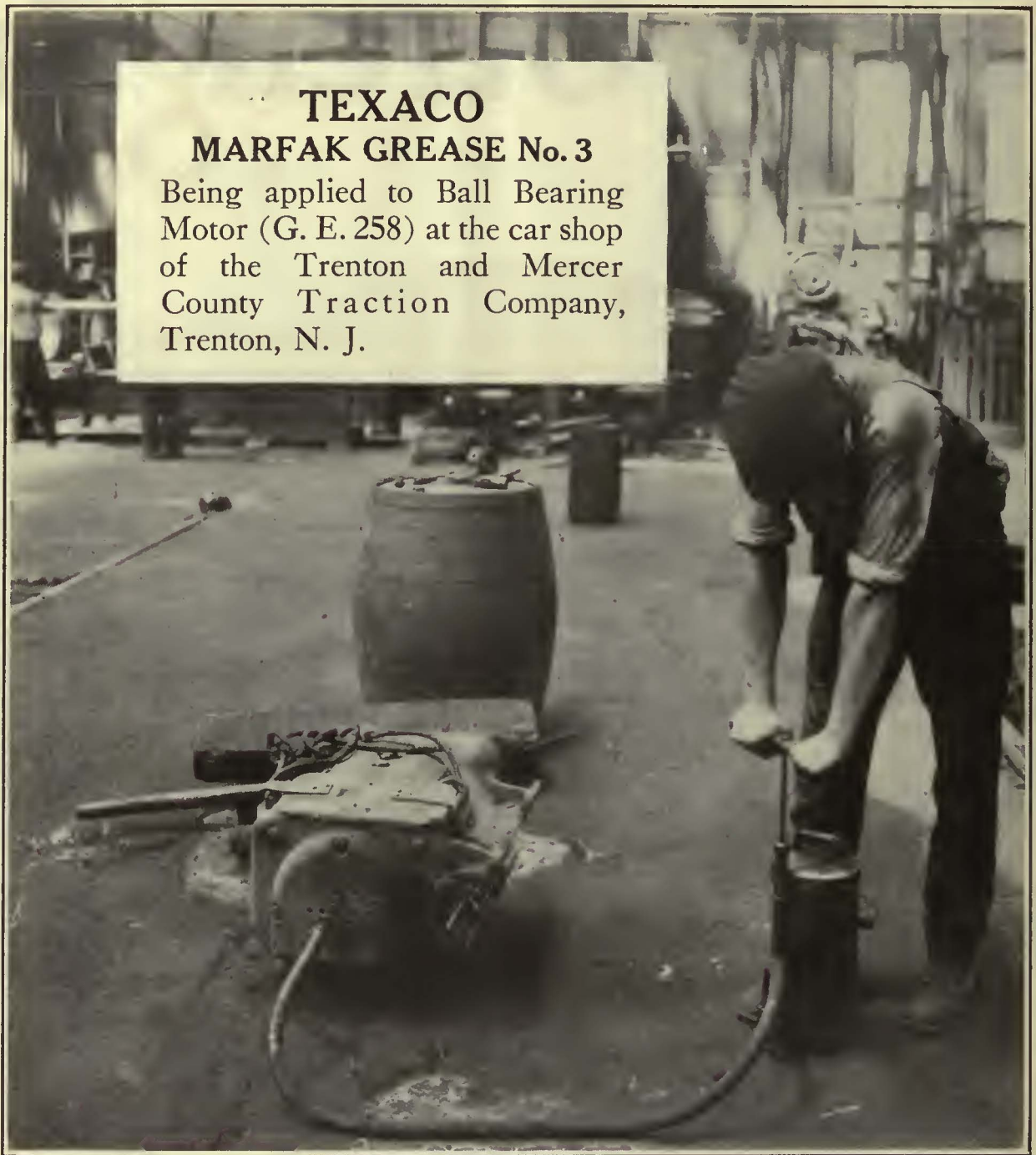
WEST COAST LUMBER BUREAU, 5562-T STUART BUILDING, SEATTLE, WASHINGTON R-41

Gentlemen: Please send me a copy of your free booklet, "Durable Douglas Fir—America's Permanent Lumber Supply."

Name _____

Street _____

Place _____



TEXACO



The Chosen Lubricant
of **ELECTRIC RAILWAYS**



The Texas Company, U. S. A., 17 Battery Place, New York City
OFFICES IN PRINCIPAL CITIES

Cambria Rolled Steel Wheels and Forged Steel Axles for Electric Railway Service

Other Bethlehem Products for Electric Railways include Armature Shafts, Crossings, Frogs, Switches, Switch Stands, Guard Rails, Rails, Spikes, Splice Bars, Bolts, Tie Plates, Gage Rods, Tie Rods, Gear Blanks, Pole Line Materials, Special Layouts and Trackwork.



BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

District Offices:

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

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM



As impregnable as Gibraltar—

Gibraltar, that famous old fortress on the Mediterranean, is equipped to withstand a sustained attack for years—far longer than any ordinary fort.

Boyerized Parts have the same ability to withstand the most determined attacks of their ancient enemies—the “wear-and-tears”. For the Boyerizing process gives them an armor-plate surface that enables them to outwear ordinary case hardened steel three to four times.

Boyerized Parts are the Gibaltars of car equipment. Take your pick from the following list:



The
McArthur
Turnbuckle

- | | |
|----------------------|-----------------------|
| Brake Pins | Spring Posts |
| Brake Hangers | Bolster and Transom |
| Brake Levers | Chafing Plates |
| Pedestal Gibs | Bronze Bearings |
| Brake Fulcrum | McArthur Turnbuckles |
| Center Bearings | Manganese Brake Heads |
| Side Bearings | Manganese Truck Parts |
| Spring Post Bushings | Bushings |

Bemis Car Truck Company

Electric Railway Supplies
Springfield, Mass.

Representatives:

- Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
- F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
- W. F. McKenney, 54 First Street, Portland, Ore.
- J. H. Denton, 1328 Broadway, New York City, N. Y.
- A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.





The Pacific Electric car illustrated is one of many others on this property equipped with "STANDARD" Rolled Steel Wheels.



Rolled Steel Wheels
 Quenched and Tempered
 Carbon Steel Axles
 Coil and Elliptic Springs

STANDARD STEEL

WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
 ST. LOUIS
 NEW YORK
 HOUSTON, TEXAS

PORTLAND, ORE.
 RICHMOND, VA.
 SAN FRANCISCO
 BOSTON

ST. PAUL, MINN.
 PITTSBURGH, PA.
 LOS ANGELES, CAL.
 MEXICO CITY, MEX.

WORKS: BURNHAM, PA.

Newport News still a satisfied user
of "Tool Steel" gears & pinions!

1908

**JPS—THE UNSAFE AND NEGLIGENT WAY OF
SUSPENDING FIRE PAILS**

schedule could be maintained even if the maximum speed was cut to 28 m.p.h. The standard ratio is now 17:67. The saving in energy consumption has not been calculated, but there has been a very perceptible decrease in the number of baked armatures and fields. The company has also changed from bolted gears to the Cincinnati Tool Steel Gear & Pinion Company's solid gear.

MAINTENANCE RECORDS

Until the property was taken over in January, 1912, by Allen & Peck, Inc., with J. N. Shannahan as general

←
*"Economical
management"*

The above is an extract from an article in Electric Railway Journal, July 10, 1915, describing features in the "Economical Management and Good Housekeeping" at the Hampton shops of

Newport News and Hampton Railway, Hampton, Va.

*They have tested "Tool Steel" gears and pinions
since August 1908.
They ought to know.*

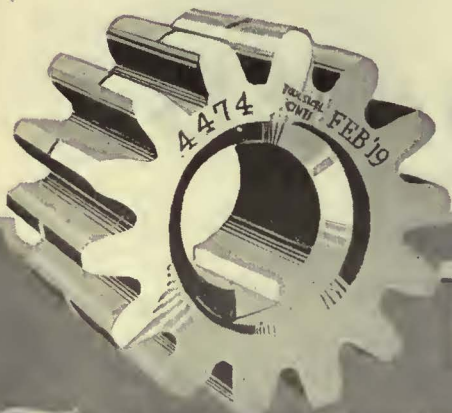
**THE TOOL STEEL GEAR AND PINION CO.
CINCINNATI, OHIO**

1926

Eighteen years ago they tested their first "Tool Steel" gear installation. By 1925 they had standardized on them. The above advertisement published by us in 1915 told the story then, and is just as suitable today.

This road is but one of many long-satisfied customers—a condition which indicates that "Tool Steel" Gears *do give the service.*

The Tool Steel Gear & Pinion Company
Cincinnati, Ohio



The Standard of Quality

TOOL-STEEL QUALITY GEARS AND PINIONS



Some municipalities, as a safety measure, are making heavy trucks and buses prove by actual tests their ability to stop within prescribed limits.

This has been occasioned by the many accidents due to the fact that the weight and speed of trucks and buses throw an *overburden* on the brakes.

The fault is not with the lining, as is more commonly thought, but with the brake drum. Recent investigation has proved that a high carbon drum, irrespective of lining, gives better results than a low carbon drum with the best lining obtainable.

Carnegie Steel Company manufactures brake drum blanks for trucks and buses with carbon content of .45 to .60 by a process insuring full content on the surface of the finished drum. Expensive heat treatment is unnecessary. NOTE: Carnegie Blanks are not furnished in finished form. Some slight machining must be done by the manufacturer.

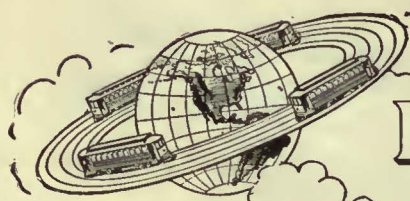
By insisting on brake drums machined from Carnegie Blanks on your new equipment, you are insisting on the maximum of safety.

CARNEGIE STEEL COMPANY
 General Offices • Carnegie Building • 434 Fifth Avenue

PITTSBURGH PENNSYLVANIA



The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.

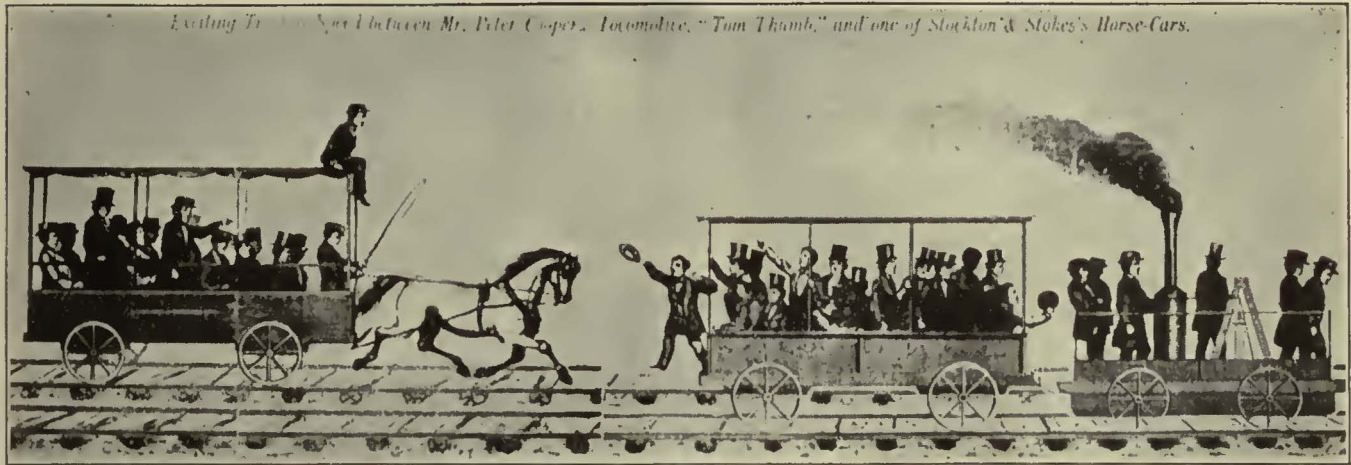


Barron G. Collier

INCORPORATED
CANDLER BLDG. NEW YORK

Who Invented the Wheel?

It is generally agreed by students of the history of civilization that that man did more for material progress than any other man could possibly have done. The wheel is the fundamental element in every vehicle of transportation.



Exciting Trial Run Between Mr. Peter Cooper's Locomotive, "Tom Thumb," and one of Stockton & Stokes's Horse-Cars.

A Race of 1830 on the Baltimore & Ohio

COST LESS
PER
TON MILE

THEY CARRY
A SERVICE
GUARANTEE

THE HARD
TREAD
AND
FLANGE
HAS A
MAXIMUM
WEARING
VALUE



CHILLED IRON WHEELS

HAVE KEPT PACE WITH
THE DEVELOPMENT OF
RAILROAD EQUIPMENT

The
Standard
Wheel
for
74
Years

A.R.A. Standards

- 650 lb. Wheel for 30 Ton Cars
- 700 lb. Wheel for 40 Ton Cars
- 750 lb. Wheel for 50 Ton Cars
- 850 lb. Wheel for 70 Ton Cars

ASSOCIATION OF MANUFACTURERS
OF CHILLED CAR WHEELS
1847 McCormick Building
CHICAGO

50 Plants—Daily Capacities 20,000 Wheels

THE PHILADELPHIA STAFF
OF THE
MCGRAW-HILL PUBLISHING COMPANY, INC.

*announces the opening
of its new
and larger quarters*

INSURANCE COMPANY OF NORTH AMERICA BUILDING

SIXTEENTH STREET AND PARKWAY
PHILADELPHIA



L. D. WALDRON
General Manager, Eastern District

W. K. BEARD	M. A. WILLIAMSON
N. O. WYNKOOP	W. R. VAN KLEECK
R. F. BEARD	J. F. CLEARY
J. M. GESNER	D. N. PIERCE

The new telephone numbers are
RITTENHOUSE 3109, 3110 AND 3111

RAILS



1 ton or 1000

NEW RAILS AND ACCESSORIES

A Service Complete from Spike to Rail — with an absolute Guarantee.

Buy All from One Source — with exceptional price advantages.

Many of the Largest Railroads buy regularly from us — with complete satisfaction.

A quotation convinces — "1 ton to 1000"

L·B·FOSTER COMPANY
PITTSBURGH · CHICAGO · NEW-YORK



Cold Dinners for your passengers?

Not if you use

AJAX
BABBITT for ARMATURES

keeps the rolling stock rolling



The Ajax Metal Company

Established 1880

PHILADELPHIA

NEW YORK

CHICAGO

BOSTON

CLEVELAND

M-J Armature Babbitt



No less than twenty-five different grades of Babbitt have been successfully perfected in the More-Jones line, designed for various services and at varying prices. "Armature" for electric railways is the recognized standard. *Let us quote you.*

More-Jones Brass & Metal Co.
St. Louis, Mo.

MORE-JONES
QUALITY PRODUCTS

DIXON'S ALUMINUM-GRAPHITE PAINT

Prepared primarily to meet the requirements of gas, oil and industrial companies and particularly recommended wherever a light colored paint is desired.

Back of this new product stands our century-old reputation, as well as 65 years' experience in paint manufacturing.

Dixon's Aluminum Graphite Paint is composed of aluminum and flake silica-graphite as a pigment and boiled linseed oil as a vehicle. The aluminum is of flake formation and thus easily combines with the flake graphite, lapping over like fish scales and providing a covering of unusual elasticity and durability.

The value of flake-graphite as a pigment has been thoroughly proven and is generally accepted. The combination of aluminum and graphite results in a paint that is not affected by gases, fumes, and which resists sunlight, air and moisture. Reflecting light and heat, it will keep the temperature of tanks, etc., considerably lower than is possible with darker paints.

Ask for Circular 180-AB.

Additional information and prices will be sent upon request.

Joseph Dixon Crucible Company

Established 1827



Jersey City, N. J.

Griffin Wheel Company

410 North Michigan Ave.
Chicago, Ill.

GRIFFIN
F. C. S.
WHEELS

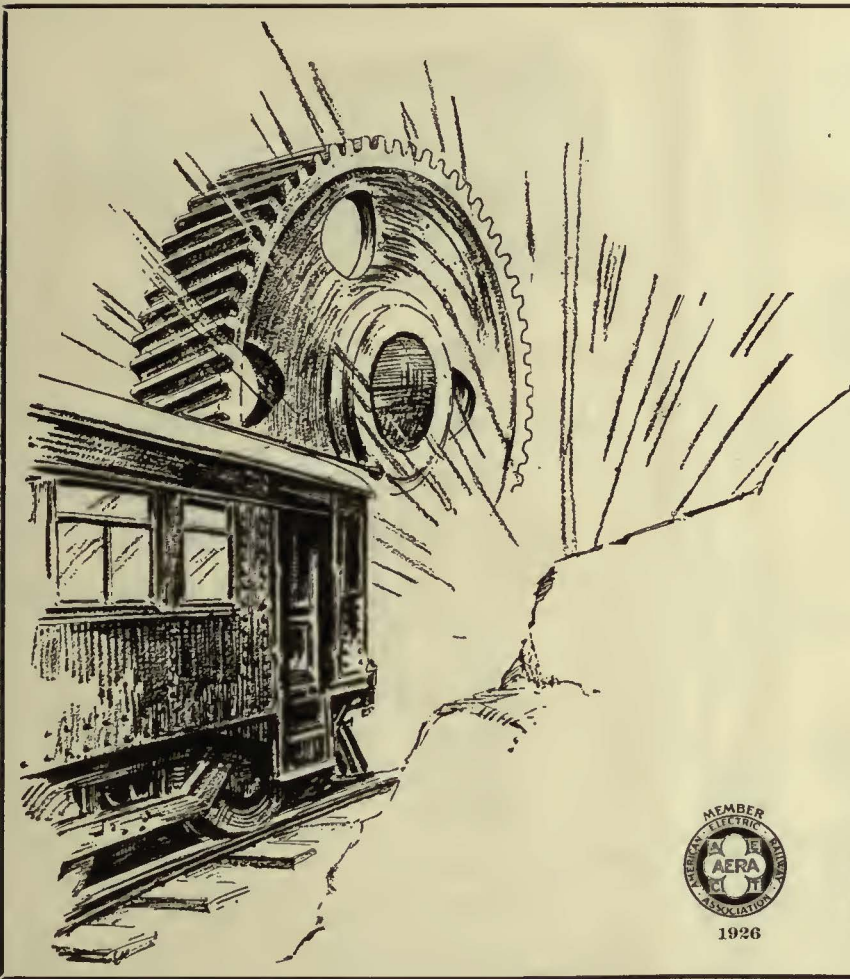
**For Street and Interurban
Railways**

FOUNDRIES:

Chicago
Detroit
Denver

Boston
Kansas City
Council Bluffs

St. Paul
Los Angeles
Tacoma



Nearly $\frac{3}{4}$ of a Million Miles and apparently good for a million

ONE of the first Nuttall Heat Treated Helical Gears ever installed is still running, and is apparently good for an indefinite life.

DO YOU get that sort of service from the gears you buy?

Nuttall BP Helical Gears are saving most of their cost on many properties, just due to minimizing vibration.

Write for Bulletins giving full details

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.

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

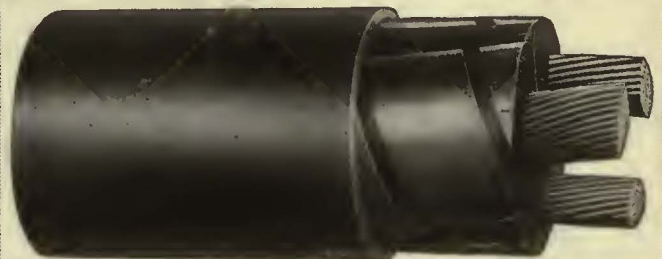
Hoboken Factory Terminal,
 Building F, Fifteenth Street, Hoboken, N. J.

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



STANDARD 35,000-Volt, Type H Cable

BY means of a thin metallic tape or coating over the insulation of each conductor and grounded to the lead sheath, all the electrical stresses in the insulation are perpendicular to the layers of paper (which is the strongest direction), and furthermore, the filler spaces and inevitable voids therein, which are the weakest part of the cable, are screened from all stress.

The result is a cable of longer life and greater dependability, or a cable of approximately the same dependability as the usual type but with a smaller overall diameter.

If you are interested in a cable with these characteristics write our nearest office.

Standard Underground Cable Co.

- | | | | |
|--------------|------------|---------------|-------------|
| Boston | Washington | Chicago | Kansas City |
| New York | Atlanta | Detroit | Seattle |
| Philadelphia | Pittsburgh | St. Louis | Los Angeles |
| | | San Francisco | |

For Canada: Standard Underground Cable Co. of Canada, Limited, Hamilton, Ont.

PANTASOTE

Trade Mark

Seat and Curtain Materials
There is no substitute for Pantasote

AGASOTE

Trade Mark

Roofing—Headlining—Wainscoting
The only homogeneous panel board

*standard
for electric railway cars
and motor buses*

The PANTASOTE COMPANY Inc.
At 46th, 250 Park Avenue Street
NEW YORK



Pantasote Products
for Both
ELECTRIC RAILWAYS
AND
BUSES



R 11 Double Register

Both our latest single and double registers are now equipped for electric as well as mechanical hand or foot operation.

Full Electric Operation of Fare Registers

A completely satisfactory fare registration system is one that has the confidence of the public, the conductor and the accounting department. The simplicity and accuracy of International Registers maintained for more than thirty years, is combined in the later types with the extra speed and convenience of electric operation.

The International Register Co.
15 South Throop St., Chicago



FARE BOXES for BUSES

Let us tell you of this especially designed box for this class of service.

The Cleveland Fare Box Co.
4900 Lexington Ave., Cleveland, O.
Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

COIN COUNTING And Sorting Machines CHANGES CARRIERS Tokens

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

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

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 Building, Chicago, Ill.

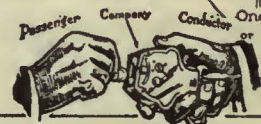
RAILWAY SUPPLIES

- | | |
|---|--|
| Tool Steel Gears and Pinions | Ft. Pitt Spring & Mfg. Co.,
Springs |
| Anglo-American Varnish Co.,
Varnishes, Enamels, etc. | Flaxlinum Insulation |
| National Hand Holds | Anderson Slack Adjusters |
| Genesco Paint Oils | Economy Electric Devices Co.,
Power Saving and Inspection
Meters |
| Dunham Hopper Door Device | Yellow Coach Mfg. Company—
Single and Double-deck Buses |
| Garland Ventilators | |
| Walter Tractor Snow Plows | |

Instantaneous Registration by the Passenger

ROOKE of fare collection SYSTEM

Meets every condition for all types of cars and buses. The stand device, as shown, adapts it to one-man uses—making register portable or stationary, at option. Handles nickels, dimes, quarters, or metal tickets, in any combination, FLEXIBILITY with CERTAINTY.



Roke Automatic Register Company Providence, R. I.

PERFECT MICANITE INSULATOR

Reg. U. S. Pat. Off.

ELECTRICAL INSULATION

Micanite armature and commutator insulation, commutator segments and rings, plate, tubes, etc., Empire oiled insulating materials; Linotape; Kablak; Mico; and other products—for the electrical insulating requirements of the railway.

Catalogs will gladly be furnished

MICA INSULATOR COMPANY

Sole Manufacturers of Micanite

Established 1893

68 Church St., New York 542 So. Dearborn St., Chicago
Works: Schenectady, N. Y.

8-F



Complete satisfaction

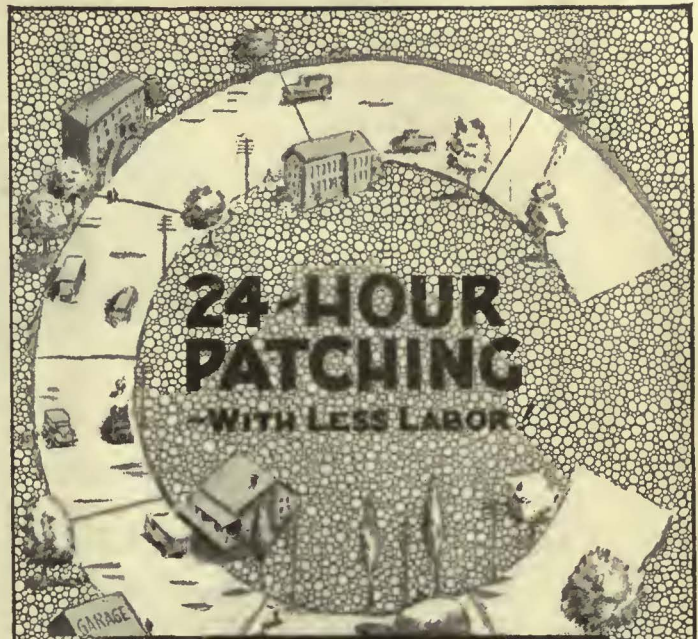
Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

- No-wear Check Pawl
- Free-Winding Tension Spring
- Ratchet Wind
- Emergency Release
- Perfect Automatic Lubrication

Earll Catchers and Retrievers

C. I. EARLL, York, Pa.

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.



Even CAL, with its remarkable accelerative properties, cannot open a whole street to full traffic under 60 hours.

But for a patch, running up to 250 sq. ft. where a very dry mix can be tamped into place CAL can do it in 24 hours.

Then, by painting the surface with a slurry of CAL and water, the patch becomes "self-curing". This saves water, as well as the expense and inconvenience of keeping a man on the job for sprinkling.

As CAL is a white powder, added dry, its very color is insurance against untreated mixes - - and as it can easily be measured by volume, the average foreman can be trusted to make his mixtures correct, to give 24-hour curing.

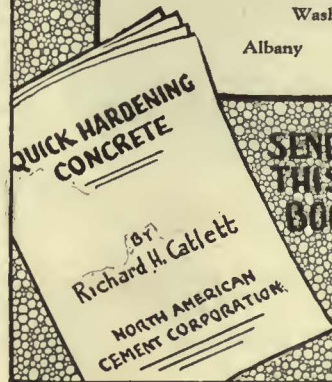
Try CAL on your next patching job.

North American Cement Corporation

Hagerstown, Md.

Washington

Albany Baltimore



SEND FOR THIS FREE BOOKLET!



THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

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



BRANCH OFFICES
BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

BRANCH OFFICES
DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 405-6 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

The DIFFERENTIAL CAR



Standard on
60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

*There is a
Peirce Specialty for
every Distribution
requirement*



Hubbard and COMPANY

PITTSBURGH / OAKLAND, CAL. / CHICAGO

WM. WHARTON JR. & INC. CO.
TISCO MANGANESE STEEL TRACKWORK.

Wharton trackwork, in which the famous Tisco Manganese Steel has been used, will be found on the leading railways of the country.

Plant: Easton, Pa.

SPECIALISTS

in the

Design and Manufacture
of

*Standard—Insulated—and
Compromise Rail Joints*

The Rail Joint Company
165 Broadway, New York City



Special Track Work of every
description

THE BUDA COMPANY
Harvey (Suburb Chicago) Illinois

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.

Sales Offices:
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas
Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representative:
United States Steel Products Company, 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 to 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..... 4.30 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 R J

Why Save It?

Equipment you have replaced, or for which you have no further use can probably be sold at a good price now. Later it may not be worth as much.

Weed out equipment and let a

"Searchlight" Ad

help you sell it promptly

G-9

POSITIONS WANTED

SUPERINTENDENT transportation. With a wide experience and successful record on city and interurban properties also co-ordination of rail and bus service, successful in handling labor, public relations, etc. Recognized as a transportation official of exceptional ability fully capable of getting results on any property. At present engaged. Personal reasons for desiring change. Best of references. Correspondence invited. Address PW-915, Electric Railway Journal, Guardian Building, Cleveland, Ohio.

FOR SALE

14 BIRNEY SAFETY CARS

Brill Built

West, 508 or G.E. 264 Motors
Cars Complete—Low Price—Fine Condition
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

SACRIFICE SALE

7 Birney Safety Cars

Perfect shape. Now in use. Can be sold under Equipment Trust Plan for balance due.

WALTER W. DAVIS
43 Emerald St., Medford, Mass.

Waterproofed Trolley Cord



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

FOR POSITIVE SATISFACTION ORDER
SILVER LAKE

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

Sold by Net Weights and Full Lengths

SILVER LAKE COMPANY

Manufacturers of bell, signal and other cords.
Newtonville, Massachusetts

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

"Axle Specialist Since 1860"

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.

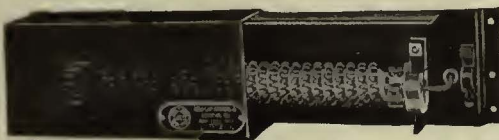


Car Heating and Ventilation

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 BEST TRUSS PLANK ELECTRIC HEATER EVER PRODUCED



No.

478E

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

H B LIFE GUARDS

PROVIDENCE FENDERS

Manufactured by

CONSOLIDATED CAR FENDER CO., PROVIDENCE, R. I.

General Sales Agents

WENDELL & MacDUFFIE CO., 110 E. 42nd St., N. Y. O.

Get Your Wants into the Searchlight

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 Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Air Receivers & Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy
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.
Carnegie Steel Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
Standard Steel Works
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Johnson & Co., J. R.

Babbitt Metal
Ajax Metal Co.
Johnson & Co., J. R.
More-Jones Brass & Metal Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
More-Jones Brass & Metal Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Stueck Co., A.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.

Benders, Rail
Railway Track-work Co.

Bodies, Bns
Auto Body Co., The
Baker-Raulang Co., The
Cummings Car & Coach Co.

Bodies, Passenger Car
Baker-Raulang Co., The

Body Material, Haskelite and Plymet
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Electric Railway Improvement Co.

Bonds, Rail
Amer. Steel & Wire Co.
Electric Railway Improvement Co.

Bonds, Steel
Amer. Steel & Wire Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Brackets and Cross Arms
(See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
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
Bemis Car Truck Co.
Brill Co., The J. G.
Wheel Truing Brake Shoes Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbons Co.
Westinghouse E. & M. Co.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Bulkheads
Haskelite Mfg. Corp.

Bus Seats
Hale-Kilburn Co.

Buses, Motor
Auto Body Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Graham Brothers
International Harvester Co.
International Motor Co.
Mack Trucks, Inc.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Cables
(See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Cambric Yellow and Black Varnish
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co., Inc.

Cars, Gas, Rail
Brill Co., The J. G.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.

Castings, Brass Composition or Copper
Ajax Metal Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
Standard Steel Works
Wm. Wharton, Jr. & Co.

Castings, Malleable and Brass
Bemis Car Truck Co.

Catchers and Retriever, Trolley
Earl, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Celling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Cellings, Plywood, Panels
Haskelite Mfg. Corp.

Cement
N. Amer. Cement Corp.

Cement Accelerator
N. Amer. Cement Corp.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
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-Flows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass 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.
Westinghouse Elec. & M. 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.
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.

Compressors, Air, Portable
Ingersoll-Rand Co.

Condensers
General Electric Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Condenser Papers
Irvington Varnish & Ins. Co.

Conduits, Underground
Std. Underground Cable Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers
American Brown Boveri Elec. Corp.
Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.
Rome Wire Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co., The
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register, etc.
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes, Electric, Industrial, Truck-Mounted
Baker-Raulang Co., The

Cranes, Hoists & Lifts
Buda Co., The
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Foundations
International Steel Tie Co.

Crossings, Frog and Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Signals, (See Signal Systems, Highway Crossing)

Crossings, Track (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.
Pantasote Co., Inc.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.
Sachsenmaier Co., George

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish Service, Edward P., Inc.

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heat. Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Doors & Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.
Morton Mfg. Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Ears
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Track-work Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
John A. Roebling's Sons Co.
Rome Wire Co.

Electrodes, Carbon
Railway Track-work Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Track-work Co.
Una Welding & Bonding Co.

Engineer Inspecting & Chemists
Pittsburgh Testing Laboratory

Engineers, Consulting, Contracting and Operating
Allison & Co., J. E.
Archbold-Brady Co.
Beeler, John A.
Bibbins, J. Rowland
Buchanan & Layng Corp.
Day & Zimmermann, Inc.
Drum & Co., A. L.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLuw
Kelly Cooke & Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
Whits Eng. Corp., The J. G.

Engines, Gas, Oil and Steam
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Engines, Gasoline
Continental Motors Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Nat'l Ry. Appliance Co.
Ohmer Fare Register Co.
Percy Mfg. Co.

Fare Registers
Elec. Service Supplies Co.
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.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Fleed Colls (See Colls)

Flaxlinham Insulators
National Railway Appliance Co.

Floodlights
Elec. Service Supplies Co.
Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Formings
Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works
Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Funcll Castings
Wm. Wharton, Jr. & Co., Inc.

Furnaces, Electric
American Brown Boveri Elec. Corp.

Fuses and Fuse Boxes
Consolidated Car Heat. Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.
Westinghouse E. & M. Co.

Gas Producers
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.

Gauges, Oil and Water
Ohio Brass Co.

Gear Blanks
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works

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
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Gilder Rails
Bethlehem Steel Co.
Loran Steel Co.

Gongs (See Bells and Gongs)

Greses (See Lubricants)

Grinders & Grinding Supplies
Metal & Thermo Corp.
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.
Wm. Wharton, Jr. & Co.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Hammers, Pneumatic
Ingersoll-Rand Co.

Harps, Trolley
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.

Nuttall Co., R. D.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Headlining
Haskelite Mfg. Corp.
Pantasote Co., Inc.

(Continued on page 54)

I-R Portable Air Power Units



Pavement breaking at a fraction of the cost of hand work

Records of many jobs on different roads show that Ingersoll-Rand Paving Breakers operated from an I-R Portable Compressor have reduced the cost of concrete breaking by at least one half, as compared to hand methods.

A combination of Ingersoll-Rand tools and compressor proves a great labor-saver for railway companies. The compressor can be used to operate not only concrete breakers, but I-R pneumatic tie tampers, rail drills, rock drills, sand blast, paint spray, riveters, etc.—all important labor and time savers.

INGERSOLL-RAND COMPANY—11 BROADWAY, NEW YORK CITY.

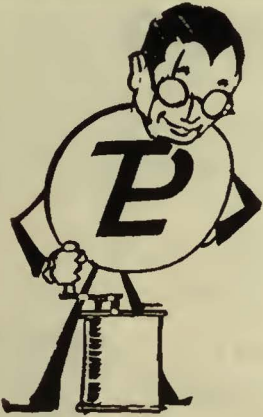
Offices in principal cities the world over

FOR CANADA REFER—CANADIAN INGERSOLL-RAND CO. LIMITED, 260 ST. JAMES STREET, MONTREAL, QUEBEC.

Ingersoll-Rand

73-PC

- Heaters, Car (Electric)**
 Consolidated Car Heat. Co.
 Gold Car Heat. & Ltg. Co.
 Nat'l Ry. Appliance Co.
 Smith Heater Co., Peter
- Heaters, Car, Hot Air and Water**
 Smith Heater Co., Peter
- Heaters, Car, Stove**
 Smith Heater Co., Peter
- Helmets, Welding**
 Railway Track-work Co.
 Una Welding & Bonding Co.
- Hoists, Portable**
 Ingersoll-Rand Co.
- Hose, Bridges**
 Ohio Brass Co.
- Hose, Pneumatic**
 Westinghouse Trac. Br. Co.
- Industrial Tractors**
 International Harvester Co.
- Inspecting Engineers and Chemists**
 Pittsburgh Testing Laboratory
- Instruments, Measuring, Testing and Recording**
 American Steel & Wire Co.
 General Electric Co.
 Westinghouse E. & M. Co.
- Insulating Cloth, Paper and Tape**
 Anchor Webbing Co.
 General Electric Co.
 Irvington Varnish & Ins. Co.
 Mica Insulator Co.
 Okonite Co.
 Okonite-Callender Cable Co. Inc.
 Stand. Underground Cable Co.
 Westinghouse E. & M. Co.
- Insulating Machinery**
 Amer. Ins. Machinery Co.
- Insulating Silk**
 Irvington Varnish & Ins. Co.
- Insulating Varnishes**
 Irvington Varnish and Insulating Co.
- Insulation (See also Paints)**
 Electric Ry. Equipment Co.
 Elec. Service Supplies Co.
 General Electric Co.
 Irvington Varnish & Ins. Co.
 Mica Insulator Co.
 Okonite Co.
 Okonite-Callender Cable Co. Inc.
 Westinghouse E. & M. Co.
- Insulation Slot**
 Irvington Varnish & Ins. Co.
- Insulator Pins**
 Elec. Service Supplies Co.
 Hubbard & Co.
- Insulators (See also Line Materials)**
 Electric Ry. Equipment Co.
 Elec. Service Supplies Co.
 General Electric Co.
 Irvington Varnish & Ins. Co.
 Ohio Brass Co.
 Westinghouse E. & M. Co.
- Interior Side Lintels**
 Haskelite Mfg. Corp.
- Interurban Cars**
 (See Cars, Passenger, Freight, Express, etc.)
- Jacks (See also Hoists and Lifts)**
 Buda Co., The
 Elec. Service Supplies Co.
 National Ry. Appliance Co.
- Journal Boxes**
 Bemis Car Truck Co.
 Brill Co., The J. G.
- Junction Boxes**
 Standard Underground Cable Co.
- Lamps, Guards and Fixtures**
 Elec. Service Supplies Co.
 General Electric Co.
 Westinghouse E. & M. Co.
- Lamps, Arc and Incandescent (See also Headlights)**
 General Electric Co.
 Westinghouse E. & M. Co.
- Lamps, Signal and Marker**
 Elec. Service Supplies Co.
 Nichols-Lintern Co.
 Ohio Brass Co.
- Lanterns, Classification**
 Nichols-Lintern Co.
- Letter Boards**
 Haskelite Mfg. Corp.
- Lightning Protection**
 Elec. Service Supplies Co.
 General Electric Co.
- Line Material (See also Brackets, Insulators, Wires, etc.)**
 Archbold-Brady Co.
 Electric Ry. Equipment Co.
 Elec. Service Supplies Co.
 General Electric Co.
 Hubbard & Co.
 More-Jones Brass & Metal Co.
 Ohio Brass Co.
 Westinghouse E. & M. Co.
- Locking Spring Boxes**
 Wm. Wharton, Jr. & Co.
- Locomotives, Electric**
 American Brown Boveri Elec. Corp.
- Cummings Car & Coach Co.**
 General Electric Co.
 Westinghouse E. & M. Co.
- Locomotives, Oil Engine, Electric Driven**
 Ingersoll-Rand Co.
- Lubricating Engineers**
 Texas Company
- Lubricants, Oil and Grease**
 Texas Company
- Universal Lubricating Co.**
 Lumber (See Poles, Ties, etc.)
- Machinery, Insulating**
 American Insulating Machinery Co.
- Manganese Paris**
 Bemis Car Truck Co.
- Manganese Steel Castings**
 Wm. Wharton, Jr. & Co.
- Manganese Steel Guard Rails**
 Ramapo Ajax Corp.
- Manganese Steel, Special**
 Wm. Wharton, Jr. & Co.
- Track Work**
 Bethlehem Steel Co.
 Wm. Wharton, Jr. & Co.
- Manganese Steel Switches, Frogs & Crossings**
 Bethlehem Steel Co.
 Ramapo Ajax Corp.
 Wm. Wharton, Jr. & Co.
- Mica**
 Mica Insulator Co.
- Motor Generators**
 American Brown Boveri Elec. Corp.
- Motor and Generator Sets**
 General Electric Co.
- Motor Buses (See Buses, Motor)**
 International Harvester Co.
- Motor Trucks**
 International Harvester Co.
- Motorman's Seats**
 Brill Co., The J. G.
- Electric Service Supplies Co.**
 Wood Co., Chas. N.
- Motors, Electric**
 American Brown Boveri Elec. Corp.
 General Electric Co.
 Westinghouse E. & M. Co.
- Nuts and Bolts**
 Bemis Car Truck Co.
 Bethlehem Steel Co.
 Hubbard & Co.
- Oils (See Lubricants)**
 Oxygen
 International Oxygen Co.
- Packing**
 Westinghouse Tr. Brake Co.
- Paints and Varnishes (Insulating)**
 Electric Service Supplies Co.
 Irvington Varnish & Ins. Co.
- Paints and Varnishes, Preservative**
 Joseph Dixon Crucible Co.
- Paints and Varnishes for Woodwork**
 National Ry. Appliance Co.
- Panels, Outside, Inside**
 Haskelite Mfg. Corp.
- Pavement Breakers**
 Ingersoll-Rand Co.
- Pleknps, 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)**
 Plus, Case Hardened, Wood and Iron
 Bemis Car Truck Co.
 Ohio Brass Co.
 Westinghouse Tr. Brake Co.
- Pipe**
 National Tube Co.
- Pipe Fittings**
 Standard Steel Works
 Westinghouse Tr. Brake Co.
- Planers (See Machine Tools)**
 Plates for Tee Rail Switches
 Ramapo Ajax Corp.
- Pliers, Rubber Insulated**
 Elec. Service Sup. Co.
 Nat'l Ry. Appliance Co.
- Plywood, Roofs, Headlights, Floors, Interior Panels, Bulkheads, Truss Planks**
 Haskelite Mfg. Corp.
- Pneumatic Tools**
 Ingersoll-Rand Co.
- Pole Line Hardware**
 Bethlehem Steel Co.
 Elec. Service Supplies Co.
 Ohio Brass Co.
- Pole Reinforcing**
 Hubbard & Co.
- Poles and Ties Treated**
 Bell Lumber Co.
- Poles, Metal Street**
 Bates Expanded Steel Truss Co.
 Elec. Ry. Equipment Co.
 Hubbard & Co.
- Poles, Ties, Posts, Piling & Lumber**
 Bell Lumber Co.
 Naugle Pole & Tie Co.
- Poles, Trolley**
 Bell Lumber Co.
 Elec. Service Supplies Co.
 National Tube Co.
- Pressure Regulators**
 General Electric Co.
 Ohio Brass Co.
- Westinghouse E. & M. Co.**
 Westinghouse Tr. Brake Co.
- Pumps**
 A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
 Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks.)
- Pumps, Vacuum**
 A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
 Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks.)
- Punches, Ticket**
 International Register Co.
 Wood Co., Chas. N.
- Rail Braces & Fastenings**
 Ramapo Ajax Corp.
- Rail Grinders (See Grinders)**
Rail Joints
 Carnegie Steel Co.
 Rail Joint Co., The
 Lorain Steel Co.
- Rail Welding**
 Metal & Thermit Corp.
 Railway Track-work Co.
 Una Welding & Bonding Co.
- Rails, Relaying**
 Foster & Co., L. B.
- Rails, Steel**
 Bethlehem Steel Co.
 Carnegie Steel Co.
 Electric Equipment Co.
 Foster & Co., L. B.
- Railway Safety Switches**
 Consolidated Car Heat. Co.
 Westinghouse E. & M. Co.
- Railway Welding (See Welding Processes)**
Rattan
 Brill Co., The J. G.
 Cummings Car & Coach Co.
 Elec. Service Supplies Co.
 Hale-Kilburn Co.
 St. Louis Car Co.
- Reefers, Mercury**
 American Brown Boveri Elec. Corp.
- Registers and Fittings**
 Brill Co., The J. G.
 Elec. Service Supplies Co.
 International Register Co.
- Ohmer Fare Register Co.**
 Rooke Automatic Register Co.
- St. Louis Car Co.**
Reinforcement, Concrete
 Amer. Steel & Wire Co.
 Bethlehem Steel Co.
 Carnegie Steel Co.
- Repair Shop Appliances (See also Coil Banding and Winding Machines)**
 Elec. Service Supplies Co.
- Repair Work (See also Colls)**
 General Electric Co.
 Westinghouse E. & M. Co.
- Replacers, Car**
 Elec. Service Sup. Co.
- Resistance, Wire and Tube**
 American Steel & Wire Co.
 General Electric Co.
 Westinghouse E. & M. Co.
- Resistances**
 Consolidated Car Heat. Co.
- Retrievers, Trolley (See Catchers and Retrievers, Trolley)**
Rheostats
 General Electric Co.
 Westinghouse E. & M. Co.
- Roofing, Car**
 Haskelite Mfg. Corp.
 Pantasote Co., Inc.
- Roofs, Car and Bus**
 Haskelite Mfg. Corp.
- Safety Control Devices**
 Safety Car Devices Co.
- Sanders, Track**
 Brill Co., The J. G.
 Elec. Service Supplies Co.
 Nichols-Lintern Co.
 Ohio Brass Co.
- St. Louis Car Co.**
Sash Fixtures, Car
 Brill Co., The J. G.
- Sash Metal Car Window**
 Hale-Kilburn Co.
- Scrapers, Track (See Cleaners and Scrapers, Track)**
Screw Drivers, Rubber Insulated
 Elec. Service Supplies Co.
- Seating Materials**
 Brill Co., The J. G.
- Haskelite Mfg. Corp.**
Pantasote Co., Inc., The
Seats, Bus
 Brill Co., The J. G.
 Hale-Kilburn Co.
- Seats, Car (See also Rattan)**
 Brill Co., The J. G.
 Hale-Kilburn Co.
- Second Hand Equipment**
 Electric Equipment Co.
 Sachsenmaier Co., George
- Shades, Vestibule**
 Brill Co., The J. G.
- Shovels**
 Brill Co., The J. G.
 Hubbard & Co.
- Shovels, Power**
 Brill Co., The J. G.
- Signals, Car Starting**
 Consolidated Car Heating Co.
 Elec. Service Supplies Co.
 Nat'l Pneumatic Co., Inc.
- Signals, Indicating**
 Nichols-Lintern Co.
- Signal Systems, Block**
 Elec. Service Supplies Co.
 Nachod Signal Co., Inc.
 Union Switch & Signal Co.
 Wood Co., Chas. N.
- Signal Systems, Highway Crossing**
 Nachod Signal Co., Inc.
 Wood Co., Chas. N.
- Slack Adjusters (See Brake Adjusters)**
Slag
 Carnegie Steel Co.
- Steel Wheels and Cutters**
 Elec. Ry. Equipment Co.
 Elec. Ry. Improvement Co.
 Elec. Service Supplies Co.
 More-Jones Brass & Metal Co.
- Nuttall Co., R. D.**
Smokestacks, Car
 Nichols-Lintern Co.
- Snow-Plows, Sweepers and Brooms**
 Brill Co., The J. G.
 Consolidated Car Fender Co.
 Cummings Car & Coach Co.
- Soldering and Brazing (See Welding Processes and Apparatus)**
Special Adhesive Papers
 Irvington Varnish & Ins. Co.
- Special Trackwork**
 Bethlehem Steel Co.
 Lorain Steel Co., The
 Wm. Wharton, Jr. & Co.
- Spikes**
 Amer. Steel & Wire Co.
- Splicing Compounds**
 Westinghouse E. & M. Co.
- Splicing Sleeves (See Clamps and Connectors)**
Springs, Car and Truck
 American Steel Foundries
 American Steel & Wire Co.
 Bemis Car & Truck Co.
 Brill Co., The J. G.
- Standard Steel Works**
Sprinklers, Track and Road
 Brill Co., The J. G.
 Cummings Car & Coach Co.
- Steel and Steel Products**
 Carnegie Steel Co.
 Morton Mfg. Co.
- Steel Car Doors**
 Morton Mfg. Co.
- Steel Flooring**
 Morton Mfg. Co.
- Steps, Car**
 Brill Co., The J. G.
 Morton Mfg. Co.
- Stokers, Mechanical**
 Babcock & Wilcox Co.
 Westinghouse E. & M. Co.
- Stop Signals**
 Nichols-Lintern Co.
- Storage Batteries (See Batteries, Storage)**
Strain, Insulators
 Electric Service Supplies Co.
 Ohio Brass Co.
 Westinghouse E. & M. Co.
- Strand**
 American Steel & Wire Co.
 Roebling's Sons Co., J. A.
- Street Cars, Passenger (See Cars, Passenger, Freight, Express, etc.)**
Superheaters
 Babcock & Wilcox Co.
- Sweepers, Snow (See Snow Plows, Sweepers and Brooms)**
Switch Stands and Fixtures
 Ramapo-Ajax Corp.
- Switches and Switchboards**
 American Brown Boveri Elec. Corp.
- Consolidated Car Heating Co.**
 Elec. Service Supplies Co.
 General Electric Co.
 Westinghouse E. & M. Co.
- Switches, Selector**
 Nichols-Lintern Co.
- Switches, Tee Rail**
 Ramapo Ajax Corp.
- Switches, Track (See Track Special Work)**
Tampers, 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.
 Wm. Wharton, Jr. & Co.
- Telephones and Parts**
 Elec. Service Supplies Co.
- Terminals, Cable**
 Std. Underground Cable Co.
- Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)**
Thermostats
 Consolidated Car Heating Co.
 Gold Car Heat. & Ltg. Co.
 Railway Utility Co.
 Smith Heater Co., Peter
- Ticket Choppers and Destroyers**
 Elec. Service Supplies Co.
- Ties and Tie Rods, Steel**
 Carnegie Steel Co.
 International Steel Tie Co.
- Ties, Wood Cross (See Poles, Ties, Posts, etc.)**
Tires
 Firestone Tire & Rubber Co.
- Tongue Switches**
 Wm. Wharton, Jr. & Co.
- Tool Steel**
 Bethlehem Steel Co.
 Carnegie Steel Co.
- Tools, Track & Miscellaneous**
 Amer. Steel & Wire Co.
 Elec. Service Supplies Co.
 Hubbard & Co.
- Railway Track-work Co.**
Towers and Transmission Structures
 Archbold-Brady Co.
 Bates Expanded Steel Truss Co.
 Westinghouse E. & M. Co.
- Track Expansion Joints**
 Wm. Wharton, Jr. & Co.
- Track Grinders**
 Metal & Thermit Corp.
 Railway Track-work Co.
- Ramapo Ajax Corp.**
Track, Special Work
 Bethlehem Steel Co.
 Buda Co., The
 Ramapo Ajax Corp.
 Wm. Wharton, Jr. & Co.
- Trackless Trailers**
 Brill Co., The J. G.
- Tractors, Industrial Electric**
 Baker-Raulag Co., The
- The Transfer Issuing Machines**
 Ohmer Fare Register Co.
- Transformers**
 American Brown Boveri Elec. Corp.
 General Electric Co.
 Westinghouse E. & M. Co.
- Treads, Safety, Stair, Car Step**
 Morton Mfg. Co.
- Trolley Bases**
 General Electric Co.
 More-Jones Brass & Metal Co.
- National Ry. Appliance Co.
 Nuttall Co., R. D.
 Ohio Brass Co.
- Trolley Bases, Retrieving**
 General Electric Co.
 Nat'l Ry. Appliance 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.
 Westinghouse E. & M. Co.
- Trolley Wheels (See Wheels, Trolley)**
Trolley Wheel Bushings
 More-Jones Brass & Metal Co.
- Star Brass Works**
Trolley Wheels & Harps
 Elec. Service Supplies Co.
 More-Jones Brass & Metal Co.
- Star Brass Works**
Tralley Wire
 Amer. Electrical Works
 Amer. Steel & Wire Co.
 American Brass Co.
 Anaconda Copper Min. Co.
 Roebling's Sons Co., J. A.
 Rome Wire Co.
- Trucks, Car**
 Bemis Car & Truck Co.
 Brill Co., The J. G.
 Cummings Car & Coach Co.
- Trucks, Motor**
 International Motor Co.
 Mack Trucks, Inc.
- Trucks, Industrial, Electric**
 Baker-Raulag Co., The
- Truss Planks**
 Haskelite Mfg. Corp.
- Tubing, Steel**
 National Tube Co.
- Tubing, Yellow & Black**
 Flexible Varnishes
 Irvington Varnish & Ins. Co.



There's more to a car than the Controller

Every part that goes into the assembly of your electric cars should be carefully inspected and tested to make sure they function properly and meet your exacting specifications. P. T. L. Inspectors, located in the large industrial centers, are thoroughly familiar with your service requirements and guarantee a rigid inspection and test of every item entering into the manufacture and assembly of your purchases.

Bulletin No. 28 tells how we do it in detail. Write to-day.

PITTSBURGH TESTING LABORATORY
 PITTSBURGH Inspecting Engineers and Chemists PENNA.
 Branch Offices in the Principal Cities



AIMco Electric Railway Automatic Signals
REG. U.S. PAT. OFF.

for Accessibility and Reliability

EST. 1855 **AIMco** INC. 1915
"American"
INSULATING
MACHINERY
COMPANY
REG. U.S. PAT. OFF.

Philadelphia, New York, Paris, England

Sales Agents:
 Electric Service Supplies Co.
 Philadelphia New York Chicago



We make a specialty of
ELECTRIC RAILWAY LUBRICATION
 We solicit a test of TULC on your equipment
The Universal Lubricating Co.
 Cleveland, Ohio
 Chicago Representatives: Jameson-Ross Company, Straus Bldg.

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
 KALAMAZOO, MICH., U. S. A.



DON'T REMOVE WORN WHEELS

This shoe does the work while your car is in service.

SAVES TIME—SAVES LABOR—SAVES MONEY

WHEEL TRUING BRAKE SHOE CO.
 Detroit, Mich.



Use only Awebco Tape on your Armatures
 Field Coils have better protection when wound with "AWEBCO Tape." Send for samples.

ANCHOR WEBBING COMPANY
 300 Brook Street, Pawtucket, Rhode Island



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, 20-32 West Randolph Street;
 Cincinnati, Traction Bldg.; New York, 100 E. 42nd St.

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J.

PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta
Birmingham San Francisco Los Angeles Seattle

Pettingell-Andrews Co., Boston, Mass.

F. D. Lawrence Electric Co., Cincinnati, O.

Novelty Electric Co., Phila., Pa.

Con. Rep.: Engineering Materials Limited, Montreal.

Cuban Rep.: Victor G. Mendoza Co., Havana.



ANACONDA TROLLEY WIRE

ANACONDA COPPER MINING COMPANY
THE AMERICAN BRASS COMPANY

Rods, Wire, Cable Products

NEW YORK CHICAGO

NACHOD & UNITED STATES SIGNAL CO., INC.

LOUISVILLE, KY.

BLOCK SIGNALS
FOR
ELECTRIC RAILWAYS
HIGHWAY CROSSING SIGNALS

Chapman Automatic Signals

Charles N. Wood Co., Boston



NAUGLE POLES

WESTERN & NORTHERN CEDAR

NAUGLE POLE & TIE CO.

59 E. MADISON ST. CHICAGO ILL.

New York • Columbus • Kansas City • Spokane • Vancouver • Boston

Northern **CEDAR POLES** Western

We guarantee
all grades of poles; also any butt-treating specifications

BELL LUMBER COMPANY

Minneapolis, Minn.

ROEBLING

WELDING CABLE
ELECTRICAL WIRES and CABLES

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

SAMSON SPOT WATERPROOFED TROLLEY CORD

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

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

SAMSON CORDAGE WORKS, BOSTON, MASS.

Ramapo Ajax Corporation

SEVEN WORKS
RAMAPO, AJAX, ELIJAH

HILLBURN, NEW YORK
NIAGARA FALLS, N.Y.
CHICAGO, ILLINOIS
EAST ST. LOUIS, ILL.
FUEFLO, COLORADO
SUPERIOR, WISCONSIN
NIAGARA FALLS, ONT.
S.A.S.A.

RAMAPO AUTOMATIC
RETURN SWITCH STANDS
FOR PASSING SIDINGS

TEE RAIL SPECIAL WORK

MANGANESE CONSTRUCTION

SALES OFFICES AT ALL WORKS
Main Office, HILLBURN, N.Y.

RAILWAY UTILITY COMPANY

CAR COMFORT WITH **UTILITY** HEATERS
REGULATORS
VENTILATORS

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

Write for
Catalogue

1328 Broadway
New York, N. Y.

ACME Window Curtain Fixtures

Noiseless — direct acting — enlarged friction
surface — less parts — stronger — more easily
and finely adjusted.

MORTON MANUFACTURING COMPANY

Chicago

Eliminate rail joints by THERMIT-WELDING

METAL & THERMIT CORPORATION
120 Broadway, New York City, N.Y.

CHILLINGWORTH

One-Piece Gear Cases

Seamless — Rivetless — Light Weight
Best for Service — Durability and
Economy. Write Us.

Chillingworth Mfg. Co.
Jersey City, N. J.

STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

ELECTRIC CAR HEATERS THERMOSTATS BUZZERS PNEUMATIC DOOR OPERATORS

CONSOLIDATED CAR HEATING CO.

NEW YORK ALBANY, N.Y. CHICAGO

ALPHABETICAL INDEX TO ADVERTISEMENTS

A	Page	E	Page	K	Page	L	Page	M	Page	N	Page	O	Page	P	Page	Q	Page	R	Page	S	Page	T	Page	U	Page	V	Page	W	Page										
Ajax Metal Co., The.....	46	Dixon Crucible Co., Joseph.....	46	Kelker, DeLeuw & Co.....	20	Le Carbone Co.....	47	Mack Trucks, Inc.....	10, 11	Nachod and United States Signal Co., Inc.....	56	Ohio Brass Co.....	5	Pantasote Co., Inc.....	48	Okonite Co., The.....	56	Rail Joint Co., The.....	50	Sachsenmaier Co., Geo.....	51	Una Welding & Bonding Co....	21	Wheel Truing Brake Shoe Co..	55	Varnishes (See Paints, etc)		White Eng. Corp., The J. G....	20	Wheels, Car, Steel & Steel Tire		White Eng. Corp., The P. Edw....	21	Wheels, Motor		Wood Co., Chas. N.....	56		
Allison Co., J. E.....	20	Drum & Co., A. L.....	20	Kelly, Cooke & Co.....	21	Lorain Steel Co.....	50	McClellan & Junkersfeld	20	Co., Inc.....	19	Ohmer Fare Register Co.....	28	Perey Mfg. Co., Inc.....	21	Okonite-Callender Cable Co., Inc.,	56	Railway Track-work Co.....	4	Ramapo Ajax Co.....	56	Universal Lubricating Co.....	55	Wagon Mfg. Co.....	59	Welding Steel		Wires and Cables		West Coast Lumber Trade		Wharton, Wm., Jr. & Co., Inc.	50	Wheels, Trolley		Whistles, Air			
American Brass Co., The.....	56			Kuhlmsn Car Co.....	59			McClellan & Junkersfeld	20	National Brake Co.....	19	Okonite Co., The.....	56	Pittsburgh Testing Laboratory.	55	Positions Wanted and Vacant..	51	Railway Utility Co.....	56	Rome Wire Co.....	12	Westinghouse Elec. & Mfg. Co.	2	Welding Wire and Rods		Wires, Wrought Steel		Wheat		Wholesale		Wholesale		Wholesale		Wholesale			
American Brown Boveri Elec. Corp.....	14, 15							Metal & Thermit Corp.....	50	National Pneumatic Co., Inc....	13	Okonite Co., The.....	56	Pittsburgh Testing Laboratory.	55	Positions Wanted and Vacant..	51	Railway Utility Co.....	56	Rome Wire Co.....	12	Westinghouse Elec. & Mfg. Co.	2	Welding Wire and Rods		Wires, Wrought Steel		Wheat		Wholesale		Wholesale		Wholesale		Wholesale			
American Car Co.....	50							Mica Insulator Co.....	49	National Ry. Appliance Co....	48	Okonite Co., The.....	56	Pittsburgh Testing Laboratory.	55	Positions Wanted and Vacant..	51	Railway Utility Co.....	56	Rome Wire Co.....	12	Westinghouse Elec. & Mfg. Co.	2	Welding Wire and Rods		Wires, Wrought Steel		Wheat		Wholesale		Wholesale		Wholesale		Wholesale			
American Electrical Works.....	55							More-Jones Brass & Metal Co..	46	National Tube Co.....	30	Okonite Co., The.....	56	Pittsburgh Testing Laboratory.	55	Positions Wanted and Vacant..	51	Railway Utility Co.....	56	Rome Wire Co.....	12	Westinghouse Elec. & Mfg. Co.	2	Welding Wire and Rods		Wires, Wrought Steel		Wheat		Wholesale		Wholesale		Wholesale		Wholesale			
American Insulating Machinery Co.....	55							Morton Mfg. Co.....	56	Naugle Pole & Tie Co.....	56	Okonite Co., The.....	56	Pittsburgh Testing Laboratory.	55	Positions Wanted and Vacant..	51	Railway Utility Co.....	56	Rome Wire Co.....	12	Westinghouse Elec. & Mfg. Co.	2	Welding Wire and Rods		Wires, Wrought Steel		Wheat		Wholesale		Wholesale		Wholesale		Wholesale			
American Steel & Wire Co....	34							Motor Wheel Corp.....	Front Cover	Nichols-Lintern Co., The.....	57	Okonite Co., The.....	56	Pittsburgh Testing Laboratory.	55	Positions Wanted and Vacant..	51	Railway Utility Co.....	56	Rome Wire Co.....	12	Westinghouse Elec. & Mfg. Co.	2	Welding Wire and Rods		Wires, Wrought Steel		Wheat		Wholesale		Wholesale		Wholesale		Wholesale			
American Steel Foundries	6									North American Cement Corp..	49	Okonite Co., The.....	56	Pittsburgh Testing Laboratory.	55	Positions Wanted and Vacant..	51	Railway Utility Co.....	56	Rome Wire Co.....	12	Westinghouse Elec. & Mfg. Co.	2	Welding Wire and Rods		Wires, Wrought Steel		Wheat		Wholesale		Wholesale		Wholesale		Wholesale		Wholesale	
Anaconda Copper Mining Co....	56									Nuttall Co., R. D.....	47	Okonite Co., The.....	56	Pittsburgh Testing Laboratory.	55	Positions Wanted and Vacant..	51	Railway Utility Co.....	56	Rome Wire Co.....	12	Westinghouse Elec. & Mfg. Co.	2	Welding Wire and Rods		Wires, Wrought Steel		Wheat		Wholesale		Wholesale		Wholesale		Wholesale		Wholesale	
Anchor Webbing Co.....	55											Okonite Co., The.....	56	Pittsburgh Testing Laboratory.	55	Positions Wanted and Vacant..	51	Railway Utility Co.....	56	Rome Wire Co.....	12	Westinghouse Elec. & Mfg. Co.	2	Welding Wire and Rods		Wires, Wrought Steel		Wheat		Wholesale		Wholesale		Wholesale		Wholesale		Wholesale	
Archbold-Brady Co.....	21											Okonite Co., The.....	56	Pittsburgh Testing Laboratory.	55	Positions Wanted and Vacant..	51	Railway Utility Co.....	56	Rome Wire Co.....	12	Westinghouse Elec. & Mfg. Co.	2	Welding Wire and Rods		Wires, Wrought Steel		Wheat		Wholesale		Wholesale		Wholesale		Wholesale		Wholesale	
Aeso. of Mfrs. of Chilled Car Wheels	43											Okonite Co., The.....	56	Pittsburgh Testing Laboratory.	55	Positions Wanted and Vacant..	51	Railway Utility Co.....	56	Rome Wire Co.....	12	Westinghouse Elec. & Mfg. Co.	2	Welding Wire and Rods		Wires, Wrought Steel		Wheat		Wholesale		Wholesale		Wholesale		Wholesale		Wholesale	
Auto Body Co., The.....	29											Okonite Co., The.....	56	Pittsburgh Testing Laboratory.	55	Positions Wanted and Vacant..	51	Railway Utility Co.....	56	Rome Wire Co.....	12	Westinghouse Elec. & Mfg. Co.	2	Welding Wire and Rods		Wires, Wrought Steel		Wheat		Wholesale		Wholesale		Wholesale		Wholesale		Wholesale	

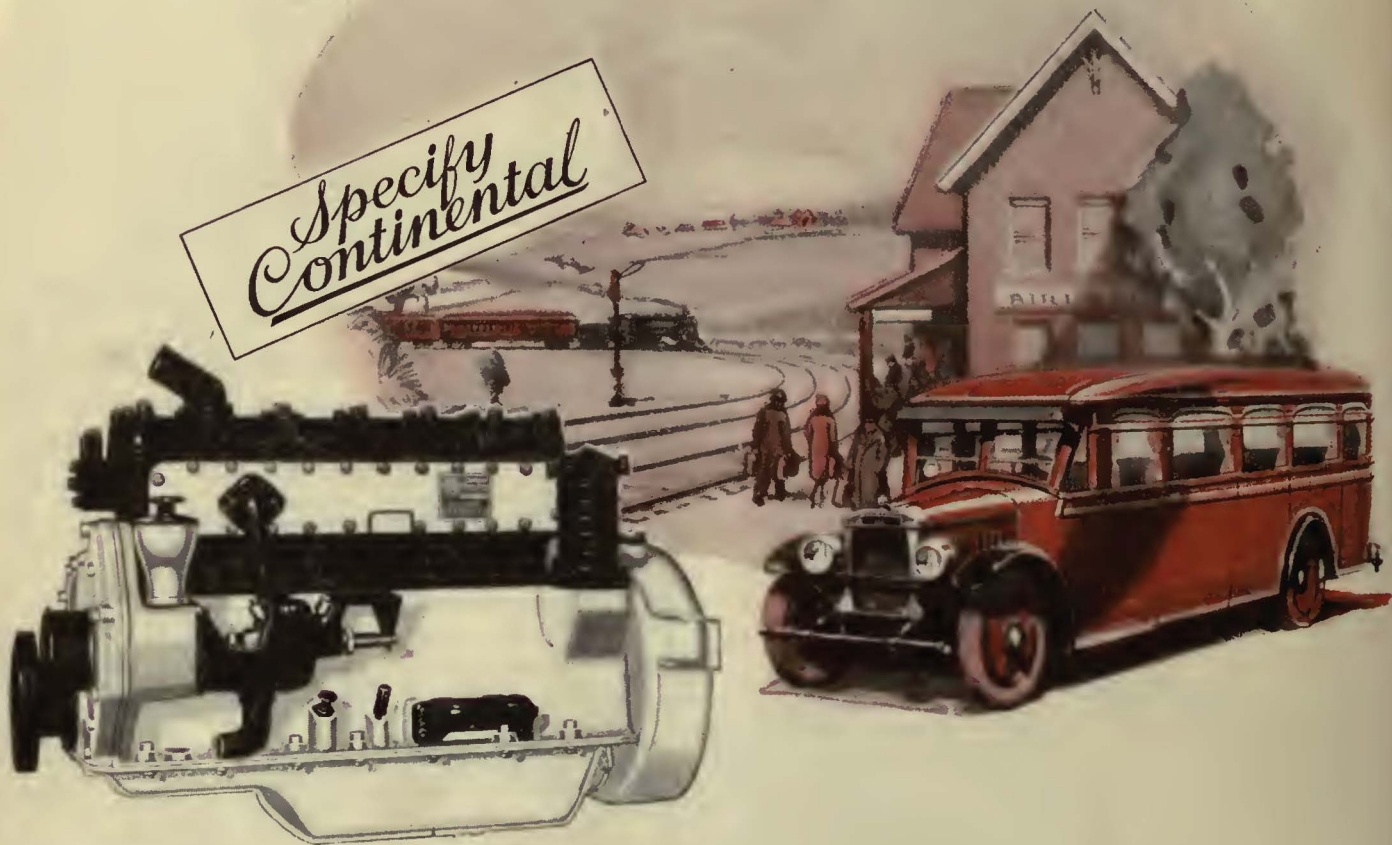
WHAT AND WHERE TO BUY

Continued from page 56

<p>Turbines, Steam General Electric Co. Westinghouse E. & M. Co.</p> <p>Turnstiles Elec. Service Supplies Co. Ohio Brass Co. Perey Mfg. Co., Inc.</p> <p>Turntables Elec. Service Supplies Co.</p> <p>Valves Ohio Brass Co. Westinghouse Tr. Br. Co.</p> <p>Varnished Papers & Silks Irvington Varnish & Ins. Co.</p> <p>Varnishes (See Paints, etc)</p> <p>Ventilator, Car Brill Co., The J. G. Consolidated Car Heating Co. Nat'l Ry. Appliance Co. Nichols-Lintern Co. Railway Utility Co.</p> <p>Vestibule Linings Haskelite Mfg. Corp.</p>	<p>Weatherproofing Morton Mfg. Co.</p> <p>Welded Rail Joints Electric Railway Improvement Co. Lorain Steel Co. Metal & Thermit Corp. Ohio Brass Co. Railway Track-work Co. Una Welding & Bonding Co.</p> <p>Welders, Portable Electric Electric Railway Improvement Co. Ohio Brass Co. Railway Track-work Co. Una Welding & Bonding Co. Westinghouse E. & M. Co.</p> <p>Welders, Rail Joint Ohio Brass Co. Railway Track-work Co.</p> <p>Welding & Cutting Tools International Oxygen Co.</p> <p>Welding Processes and Apparatus Electric Railway Improvement Co.</p>	<p>General Electric Co. Metal & Thermit Corp. Nat'l Ry. Appliance Co. Ohio Brass Co. Railway Track-work Co. Una Welding & Bonding Co. Westinghouse E. & M. Co.</p> <p>Welding Steel Electric Railway Improvement Co. Railway Track-work Co. Una Welding & Bonding Co.</p> <p>Welding Wire American Steel & Wire Co. General Electric Co. Railway Track-work Co. Roebling's Sons Co., J. A.</p> <p>Welding Wire and Rods Railway Track-work Co.</p> <p>Wheels, Car, Cast Iron Association of Mfrs. of Chilled Car Wheels Bemis Car Truck Co. Griffin Wheel Co.</p>	<p>Wheels, Car, Steel & Steel Tire American Steel Foundries Carnegie Steel Co. Standard Steel Works</p> <p>Wheels, Steel Discs Budd Wheel Co.</p> <p>Wheel Guards (See Fenders and Wheel Guards)</p> <p>Wheel Grinders Wheel Truing Brake Shoe Co.</p> <p>Wheel Presses (See Machine Tools)</p> <p>Wheels, Motor Motor Wheel Corp.</p> <p>Wheels, Trolley Elec. Ry. Equipment Co. Elec. Service Supplies Co. General Electric Co. More-Jones Brass and Metal Co. Nuttall Co., R. D. Star Brass Works</p> <p>Wheels, Wrought Steel Carnegie Steel Co.</p>	<p>Whistles, Air General Electric Co. Ohio Brass Co. Westinghouse E. & M. Co. Westinghouse Traction Brake Co.</p> <p>Window Sash, Locks and Racks Morton Mfg. Co.</p> <p>Wire Rope American Steel & Wire Co. Roebling's Sons Co., J. A.</p> <p>Wires and Cables American Brass Co., The Amer. Electrical Works Amer. Steel & Wire Co. Anaconda Copper Min. Co. General Electric Co. Okonite Co. Okonite-Callender Cable Co., Inc. Roebling's Sons Co., J. A. Rome Wire Co. Std. Underground Cable Co. Westinghouse E. & M. Co.</p>
---	---	--	--	--

MAINTAINING SCHEDULES

~ at a Profit



To retain the continued patronage of the traveling public the bus must operate on time—day in and day out.

In order to maintain schedules at a profit the bus must be powered with a motor that can be depended upon always—that stands up under the exacting requirements of modern travel.

Red Seal Continental Motors are the choice of leading bus operators because with them they secure a flexible, easily controlled power, maximum passenger comfort and a dependability which insures against expensive repair delays.



CONTINENTAL MOTORS CORPORATION

Offices: Detroit, Mich., U. S. A. Factories: Detroit and Muskegon
The Largest Exclusive Motor Manufacturer in the World

Continental Motors



Thirty "1926" Safety Cars—

Another electric railway, with utmost confidence in its future, has just placed in service 30 new single-truck safety cars equipped in 1926 style and built by the American Car Company.

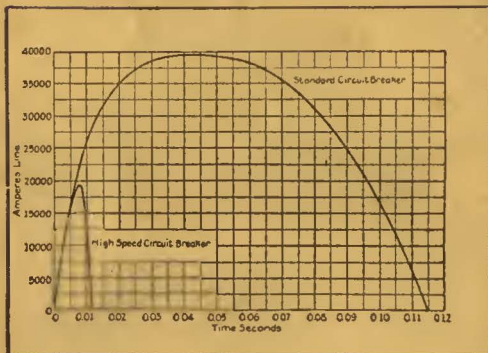
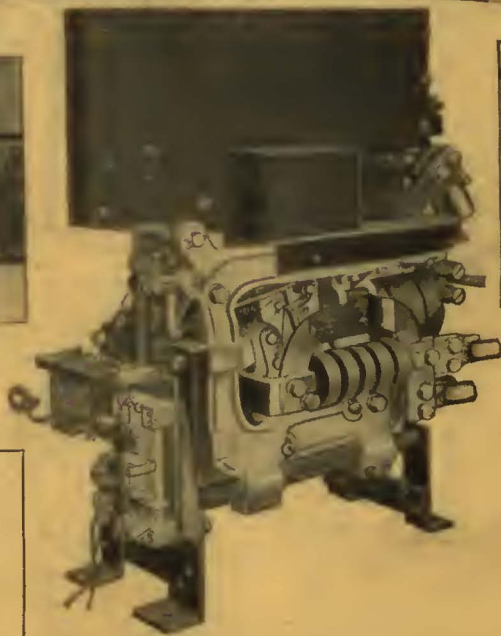
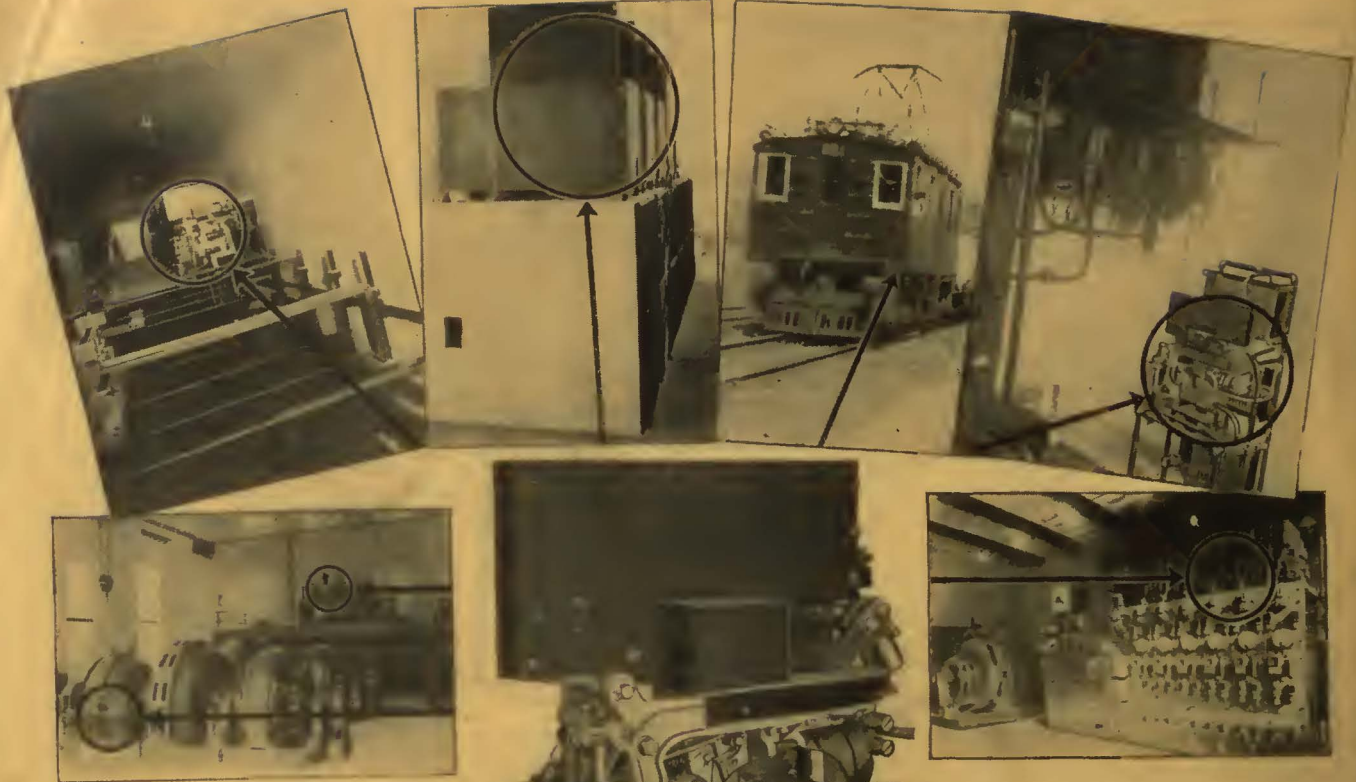
Plush upholstered Brill No.

105-B type non-reversible seats with divided backs, dome lights, control equipment and piping encased, and rubber tile floor covering, are included among the principal innovations. Numerous slogans are painted on the sides of the cars.



Attractively finished and equipped for comfort to stimulate car-riding

 **THE J. G. BRILL COMPANY** 
PHILADELPHIA, PA.
AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MANFG CO.
ST. LOUIS, MO. CLEVELAND, OHIO. SPRINGFIELD, MASS.



The measure of the added protection

Put it where convenient —it's self-contained

—and the accompanying curves plainly show the ideal character of protection which the G-E High-Speed Circuit Breaker provides. It protects synchronous converters, generators, motor-generators, rectifiers, motors, and feeders from overloads and short circuits. It can be installed to protect old or new machines without any change in their design or arrangement.



Bulletin 44742.1 describes the G-E High-Speed Breaker. Your G-E office has copies.

Backed by 9 years of experience
—and by 900 in use

GENERAL ELECTRIC