

ELECTRIC RAILWAY JOURNAL

GREATER HIGHWAYS ~ GREATER WHITES



The New WHITE Six Cylinder Bus

A new realization of speed, comfort and safety in highway travel.

Advanced Engineering Features

1. 100-H.P. Engine—In the chassis, on the road.
2. Seven-Bearing Crankshaft—3 in. in diameter; main bearings mounted in deep, rigid crankcase.
3. Overhead Valves—All parts automatically and fully lubricated, fully enclosed.
4. Four-Wheel Brakes—Air compressor part of the motor; lubricated by the engine lubricating system.
5. Nine-Inch Balloon Tires—Balloon tires and easy steering; semi-center point steering; straight drsg link; straight tie rod.
6. Double Drop Frame—Security and comfort, carrying the load close to the road; easy entrance and exit.
7. Two Stage Springs—Hotchkiss drive; springs 5 ft. 4 in. long.
8. Superior Performance, Economy and Comfort—A new sensation in bus performance.

THE WHITE COMPANY, Cleveland

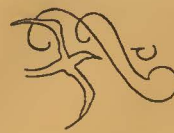


© THE WHITE CO. 1927



WHITE

Busses





In Huntington

Modern Cars Save Fifty Per Cent

AFTER three years' experience with 100 per cent new passenger rolling stock in Huntington, W. Va., the Ohio Valley Electric Railway is maintaining this equipment for half the former cost, according to Mr. W. R. Power, General Manager, in the *Electric Railway Journal*. Not only in equipment maintenance was money saved, but energy cost, discounting

the change from coke to electric heating, shows a saving of 18.75 per cent, and operation reflects the change from two-man to one-man operation in substantial savings.

These savings have been more than returned to the riders in improved service. Headways have been increased on all city lines. Car mileage has been increased 18.4 per cent, and on the interurban line, ten new cars now maintain the same schedule as twelve of the old cars.



Forty new light weight one-man - two-man cars were placed in service in Huntington in January, 1924. These are 47 feet in length and provide seats for 48 passengers. Each is equipped with four 35 hp. Westinghouse 510 motors, allowing high acceleration, and, with the wide Huntington streets, relatively high schedule speeds.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

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



1927

Huntington Cars, too, are
**Westinghouse
Equipped**

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Vol. 69
No. 2

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Hit-or-Miss Reading

STROLL through the reading rooms of a public library and one will be surprised to see how many hit-or-miss readers there are. Particularly is this noticeable in the special reading rooms, where it is a common sight to observe a reader facing a pile of text books and publications, thumbing distractedly first one and then another.

Industry is full of persons whose thirst for knowledge far exceeds their ability to select the proper reading matter. The result is that their minds become lumber rooms cluttered up with useless material.

Perhaps the greatest service one can perform for a co-worker is to place before him one authoritative publication that deals with the problems of his profession—one upon whose accuracy, editorial judgment and vision he can depend at all times.

For 42 years ELECTRIC RAILWAY JOURNAL has endeavored to meet such requirements. Frequently it has succeeded in directing the surefooted as well as the toddling. Its editors at all times have felt the responsibility that the confidence of the reader has placed on their shoulders. And now, as 1927 dawns, they ask no more inspiring task than to increase the paper's usefulness by reducing the proportion of hit-or-miss readers.

McGRAW-HILL PUBLISHING COMPANY, INC.

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

Cable Address: "Machinst, 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
Electrical West
(Published in San Francisco)
American Machinist—European Edition
(Published in London)



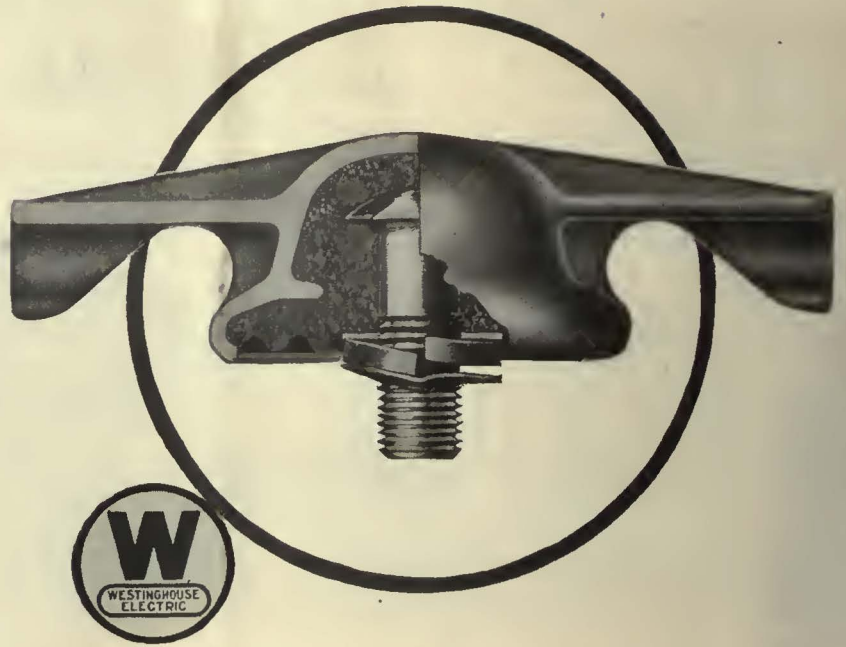
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8 Boulevard Street, London, E. C. 4
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The annual subscription rate is \$4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, 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, 1927, 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.

Keeping the
Overhead *Down*
by
Keeping it UP

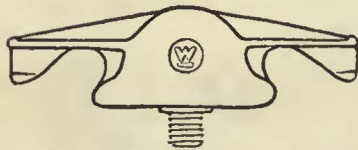


Holds the Ear —Firmly

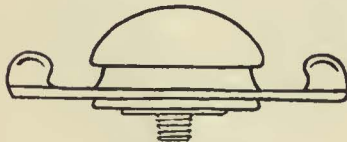
A spring lock washer keeps the ear tight during its last turn. The ear, when aligned, is held firmly on the stud, the stud is imbedded firmly in the molded insulation—no chance for a loose, wobbling connection when you use the Westinghouse round-top suspension shown above.

This patented round-top suspension is a worthy member of the Westinghouse family. All Westinghouse suspensions give that dependable service which keeps the trouble wagon in the garage. Their metal parts are malleable iron, carefully annealed to be break-proof, sherardized to be weather-proof; their insulation is a special Westinghouse hot-molded compound.

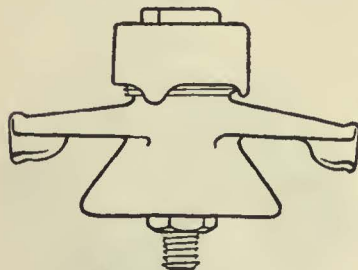
Westinghouse suspensions keep the overhead lines UP and by doing so keep your overhead *down*.



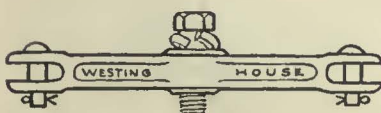
Round Top
Suspensions



Cap and Cone
Suspensions



Insulated Bolt
Suspensions



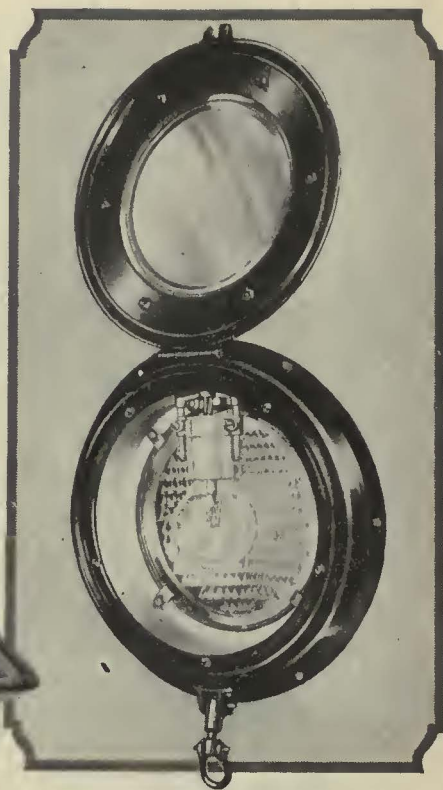
Uninsulated
Suspensions
(For Use With Strain Insulators)

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



1927

Westinghouse



A New Imperial Headlight for City Cars — the ZP Special



LOW first cost and practically no maintenance over a long period of years, are the outstanding advantages of the new ZP Special Imperial Headlight for city service.

Provided with a prismatic reflector that spreads the beam in the horizontal plane only, the ZP Special gives a diffused light that illuminates both sides of the track. In addition it gives ample pick-up distance due to its higher beam candle power. Any type of lamp from 23 to 94-watt may be used—a convenience when concentrated filament lamps are not available.

The casing is of exceptionally heavy Armco Iron, offering maximum resistance to weather. It is made thoroughly dust-proof. Its flush type mounting, a design that conforms to the curvature of the dash, and its theft-proof lock (optional) are other desirable features.

Designed for flush-type mounting with minimum projection both inside and outside of dash.

Detailed specifications gladly sent on request. Address

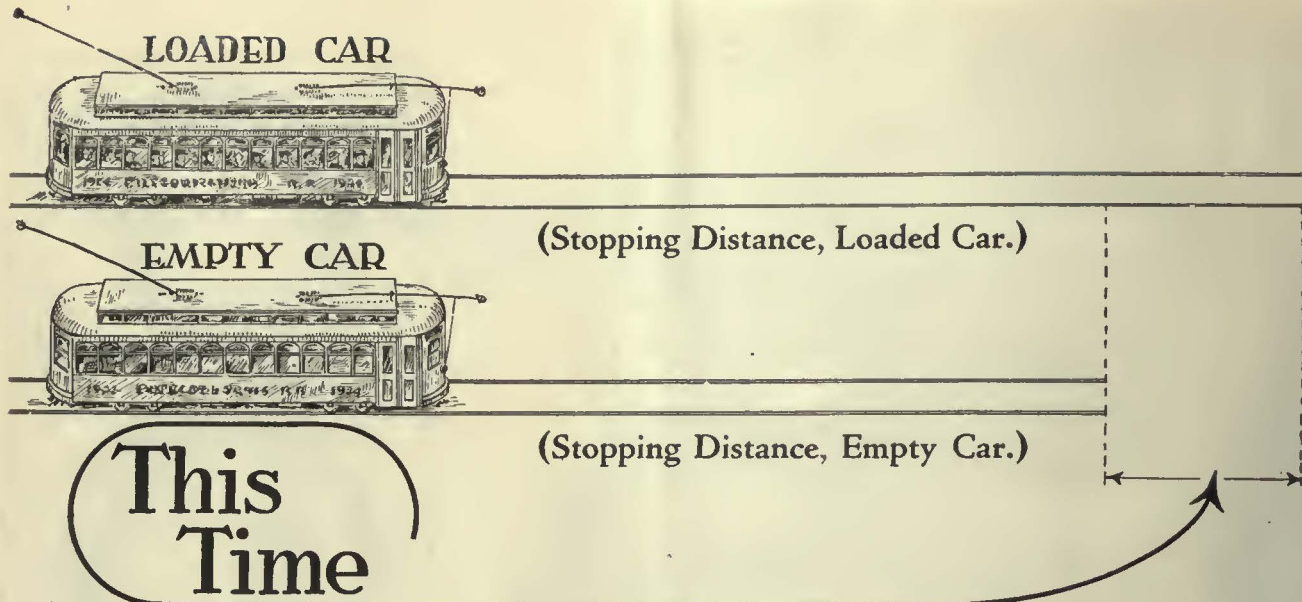
Ohio Brass Company, Mansfield, Ohio
 Dominion Insulator & Mfg. Co., Limited
 Niagara Falls, Canada

171C

Ohio Brass Co.



PORCELAIN
 INSULATORS
 LINE MATERIALS
 RAIL BONDS
 CAR EQUIPMENT
 MINING
 MATERIALS
 VALVES



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

WITH the ordinary form of air brake equipment the maximum retarding force is limited to that which is ample and permissible for an empty car, but which is inadequate to effect the proper degree of control on a loaded car—particularly if it has a high ratio of loaded to empty weight—with the result that the stop is lengthened and more time is consumed.

But this time can be saved!

The Westinghouse Variable Load Brake, adapted specifically for modern light weight surface cars, eliminates the difference in retarding effect on empty and loaded cars—by an automatic adjustment of brake cylinder pressure with the changing load—and insures that stops will be as short under all conditions as would normally be possible only with an empty car.

The saving in time, effected by the uniformly shorter stops, is translated into faster schedule speeds just when time is most valuable—during those periods when there is a demand for quick transportation of large volumes of revenue-producing traffic.

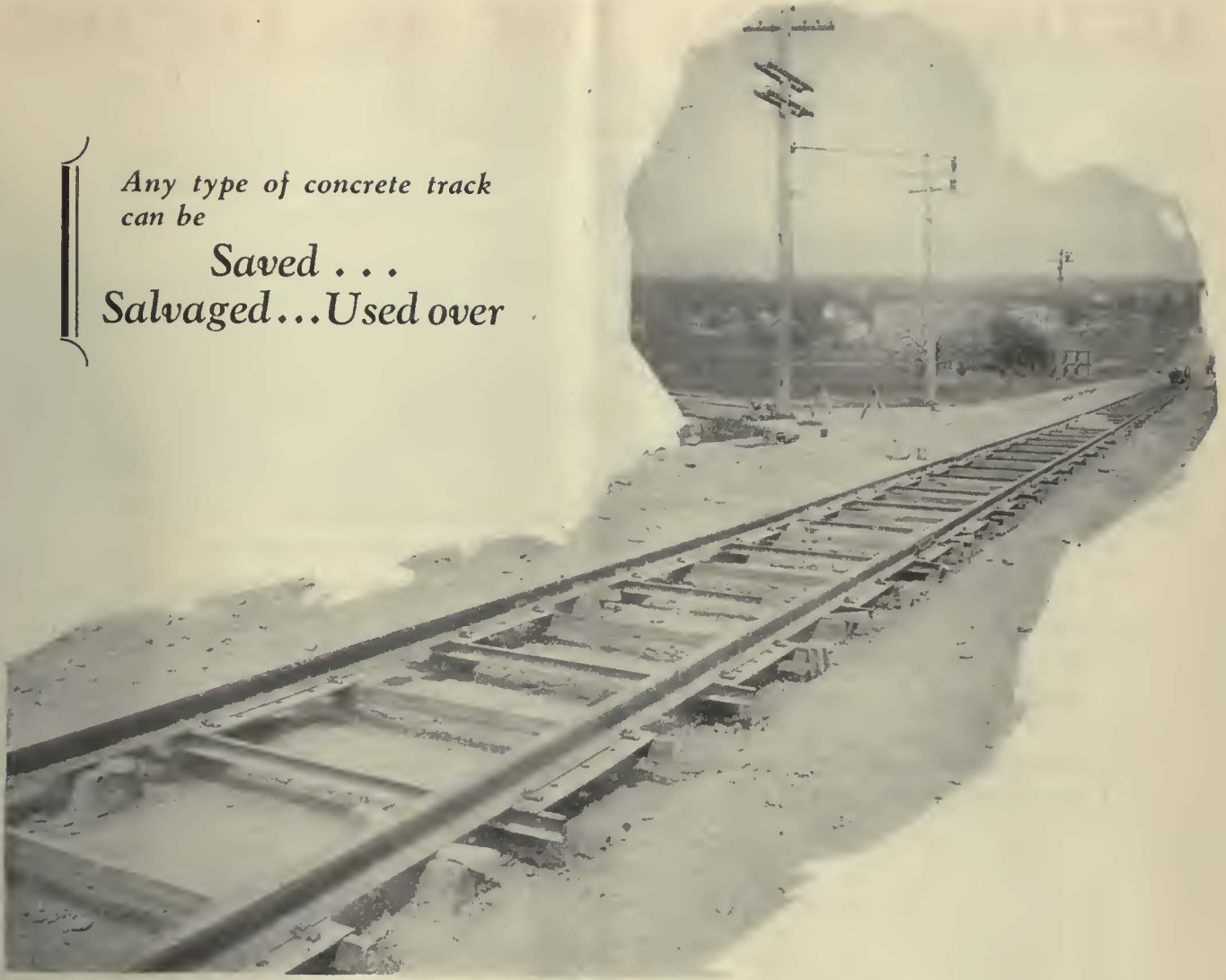
Mass transportation can be accelerated to increase the profit and popularity of your service by the use of this modern brake on your modern cars.

WESTINGHOUSE TRACTION BRAKE CO.
General Office and Works, WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES

Any type of concrete track
can be

Saved . . .
Salvaged . . . Used over



The accepted first step toward lowering track costs

In the first place, the Twin Tie design reduces the construction material 40%. And realizing that concrete and excavation usually make up 82% of the total track cost—you can readily appreciate just how much this 40% savings would mean to you.

Secondly, the experience of the many users of Twin Ties show that track may be laid on Twin Ties with a 50% savings in labor costs.

Actual data on installations and other interesting details are in a booklet that is yours for the asking—Write to The International Steel Tie Co., Cleveland, Ohio.

20% more bearing surface
steel **Twin Tie** track

AS LOGICAL AS THE BALANCING OF SCALES



To obtain the unknown weight of an object, by balancing it with known weights was one of the earliest scientific developments. This principle of equalization of forces has had countless practical applications. It is logical.

In the modern railway clasp brake, equal pressure is applied to opposite sides of each wheel, through standard brake shoes, whereas the ordinary practice is to apply the force to one side only. The clasp brake, or balanced braking system, neutralizes the tendency to one-sided wear on journal bearings, pedestals and other truck parts. It affords smoother braking with less heating of brake shoes, and reduces the number of "slid-flat" wheels.

In short—it is the modern and scientific braking system—which is finding increasing favor for heavy traction, and rapid transit service.



AMERICAN MULTIPLE-UNIT
CLASP BRAKES



AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS



Lighting Fixtures provide a steady, well-diffused light. Manufactured to the Keystone standard of quality, they are both ornamental and durable.



Golden Glow Headlights project powerful, well concentrated beams of light. Made in various styles and sizes to suit every requirement.



Faraday Car Signal Systems fulfill the requirements for convenient reliable passenger signal service.



Hunter-Keystone Destination Signs are an effective way "To tell the public where you're going." Designed to fit any available space.

Keystone Equipment used by P.-O. Electric Company —1926 Coffin Medal Winner

In the process of putting their divisions on a good, sound, paying basis the Pennsylvania-Ohio Electric Company purchased many new cars having the most modern types of equipment.

On their latest cars for the Youngstown Municipal Railway they put great emphasis upon the lighting system—the fixtures for which are the Keystone-Ivanhoe enclosed type.

Keystone Car Equipment also scored with Golden Glow Headlights, Hunter-Keystone Destination Signs, and Faraday Car Signal Systems.

But this is merely typical of the many generous displays of Keystone Car Equipment found on the newest and most up-to-date cars. *Ask for further particulars.*

ELECTRIC SERVICE SUPPLIES Co.

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Illinois Merchants' Bank Bldg.

PITTSBURGH
1123 Bessemer Bldg.

BOSTON
88 Broad St.

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

What Would Happen to Electric Traction If Every Nuttall Gear, Pinion and Trolley Were Suddenly Withdrawn from Service?



Nuttall Helical
Gear Set.

That question brings home to you in a vital way the fact that for over thirty-five years Nuttall has been an indispensable factor in the development of electric traction to its present high standards of efficiency and equipment.

Nuttall Helical Gears, the Nuttall BP Process of Heat Treatment, and the Nuttall "One Step Ahead" trolleys, have solved problems that were always drawbacks and annoyances to the industry.



Nuttall US No. 20A Trolley Base Equipped with
Timken Roller Bearings.

R.D. NUTTALL COMPANY
PITTSBURGH  PENNSYLVANIA



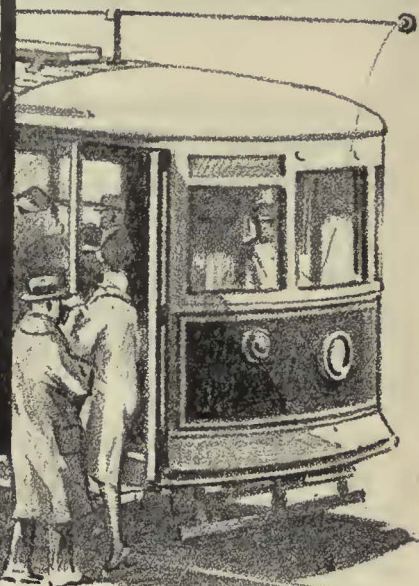
1927

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 Tubs & Supply Co., Ltd., Montreal and Toronto.

Eliminate the "Choke Point" on Your One Man Cars



ONE-WAY traffic has relieved choked thoroughfares. The same principle can be applied to "choking" at the entrance of your one man cars. With the N.P. Automatic Treadle Exit Door, passengers can enter at the front and exit at the rear, moving always in one direction, with free boarding and alighting space and no friction in the aisle. One man can handle passengers that move one way on any size of car.



National Pneumatic Company

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

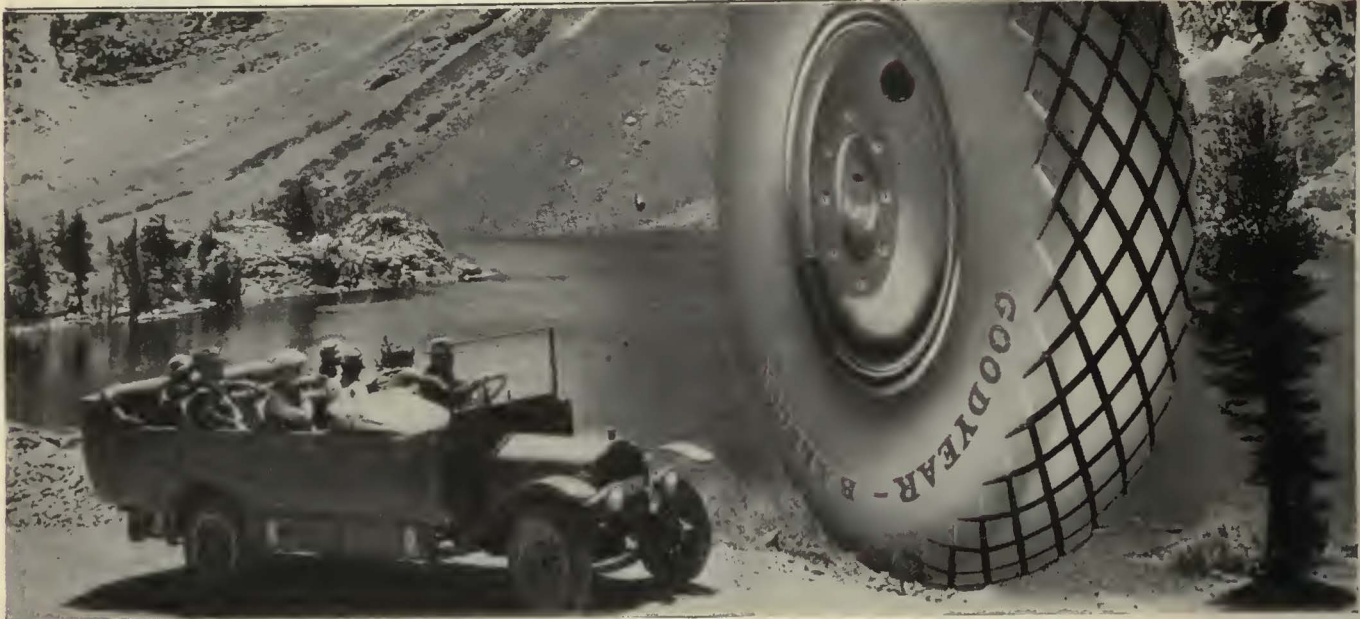
CHICAGO
518 McCormick Building

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

PHILADELPHIA
1010 Colonial Trust Building



What SUPERTWIST Adds to Goodyear Tires



One of the Goodyear-equipped fleet of buses operated by the Yosemite Park and Curry Co.

You know what rugged strength and long life have always been built into Goodyear Pneumatic Bus tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for Goodyear balloon tires, motorbus and heavy duty cord tires.

It far outstretches ordinary cotton cord, and has a maximum flexing power that yields under impact, protecting the tire from rupture, stone bruise and other in-

juries. It thus insures virtually *double* the *carcass* life of the tire.

Other exclusive features of the Goodyear Pneumatic Tire construction for motorbus service are (1) the new Goodyear band-building method; (2) the new Goodyear breaker; (3) the new Goodyear bead—patent applied for, and (4) the famous All-Weather Tread.

These advantages you get only in Goodyear Pneumatic Bus Tires—the only motorbus tires made of SUPERTWIST.

They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort and long, trouble-free mileage at low cost.

Goodyear Means Good Wear

GOODYEAR

PASSENGER APPEAL

Balanced Design has
attacked this problem
from *Six Distinct Angles*

1. THE APPEAL OF APPEARANCE.

Balanced Design has attained an entirely new standard of car appearance by coordinating every factor of trim, line and exterior finish.

2. THE APPEAL OF COMFORT.

Seats, upholstery, flooring, the placement of stanchions and hand-holds, windows and interior trim—each is essentially a part of **BALANCED DESIGN**. From the time a passenger enters a Cincinnati **NEW Car** till he alights at his destination, up-to-date comfort invites his patronage.

3. THE APPEAL OF QUIETNESS.

Cincinnati **NEW Cars** are unusually quiet because body bolsters, framing and flooring, brake rigging and under-body equipment have been drastically insulated against noise.

4. THE APPEAL OF SPEED.

Balanced Design provides for quick pick-up and improved schedules on all type cars. Where high-speed can profitably be used, it gives you "60 m.p.h. with safety."

5. THE APPEAL OF SAFETY.

Modern full safety features are an essential part of **Balanced Design**. On the high-speed types the new Duplex Air and Magnetic brakes decelerate "from 60 m.p.h. to a full stop in less than 800 feet."

6. CONVENIENT VENTILATION

AND LIGHTING. Special care has been taken to assure most convenient placing of windows and lighting relative to seats. Lighting is of most up-to-date type. An entirely novel form of individual ventilation, controllable by passengers, has been developed.

Space forbids further discussion of these advantages in this advertisement. We will gladly go into facts and figures with any interested electric railway executive.

CINCINNATI CAR COMPANY

Cincinnati, Ohio

CINCINNATI
New
CARS

A step ahead of the modern trend

How Cincinnati is solving



1926 view of Spring Grove Ave., Cincinnati, showing use of Carey Elastite System of Track Insulation where the pavement and rails adjoin.



A section of Central Ave., Cincinnati, where Carey Elastite System of Track Insulation is used. Note the perfect condition of the paving where the wood blocks adjoin the rails. Yet this paving and these rails have carried a continual stream of heavy traffic since 1919.



Scene of one of Cincinnati's more recent installations of Carey Elastite System of Track Insulation—Gilbert Ave., laid in 1924.

the problem of Track Reconstruction and Maintenance

DURING the past year The Cincinnati Street Railway Company used 345,000 lineal feet of Carey Elastite System of Track Insulation.

And Cincinnati will use the same system in future years, too, for it is agreed that this system presents a radical improvement over old methods of track construction. It prevents deterioration of street paving within the track area and brings

about a marked reduction in noise. For it forms a lastingly resilient cushion against the stress between rails and paving.

And as in Cincinnati, so in cities all over the country, Carey Elastite System of Track Insulation is greatly prolonging the life of both track and pavements. You can make an excellent investment of a moment's time by having us tell you all about it. Write today for full information.

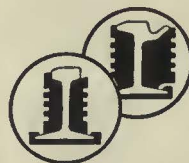


Carey Elastite System of Track Insulation is a preformed asphaltic compound reinforced with asphalt-saturated fibres. It is impervious to moisture, can be installed at any temperature, and forms a resilient cushion between the rail and the pavement. The slabs are made to fit any rail section, and can be fitted snugly in place by a blow with a sledge hammer.

THE PHILIP CAREY COMPANY, *Lockland*, CINCINNATI, OHIO

Carey
Elastite

TRADE MARK REGD. U.S. PATENT OFFICE



SYSTEM OF
TRACK INSULATION



The
Silent
Worm—

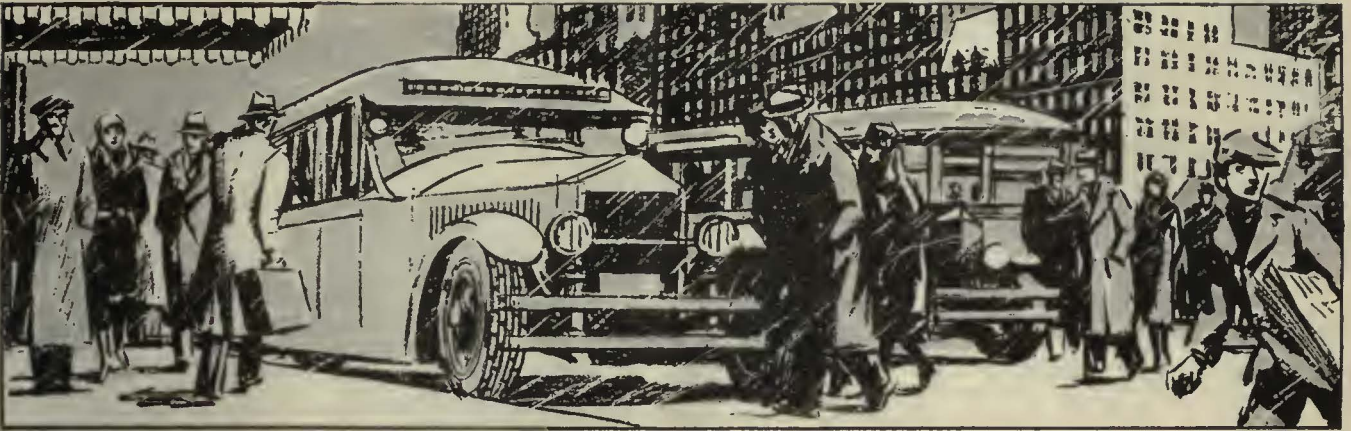
its users look upon it as the ideal final drive; for its rugged simplicity, long-lived economy, and noiseless efficiency.



THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

**TIMKEN
AXLES**

UNITED STATES TIRES ARE GOOD TIRES



Motorcoach Operators—North and South Choose the Royal Cord Motorcoach Tire

CHECK the performance of the United States Royal Cord Motorcoach Tire where you will, you will find it delivering uniformly fine service everywhere.

In building this "Modern Tire for the Modern Motorcoach," United States Tire engineers carefully investigated motorcoach operating conditions in every part of the country.

They saw to it that every element that has a destructive effect on a tire is opposed by a type of material and construction to minimize it.

The result is a tire that gives exceptional mileage on motorcoaches operating under widely varying conditions throughout the United States.

For instance, praise for the Royal Cord Motorcoach Tire comes from such widely separated operators as The United Transportation Co. of Albany, N. Y.; The San Antonio Public Service Co., San Antonio, Texas; The Ohio Transit Co., Columbus, Ohio; The Florida Motor Lines, Tampa, Fla.; The New England Transportation Co., New Haven, Conn.

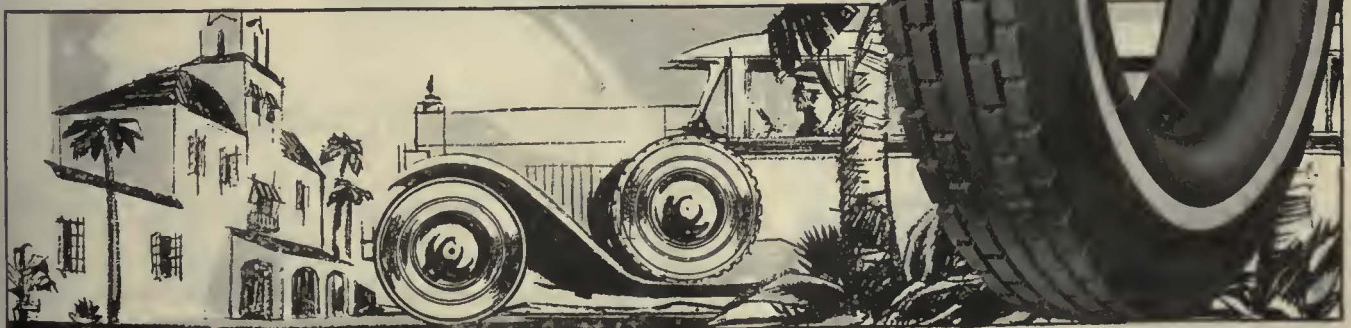
United States  Rubber Company

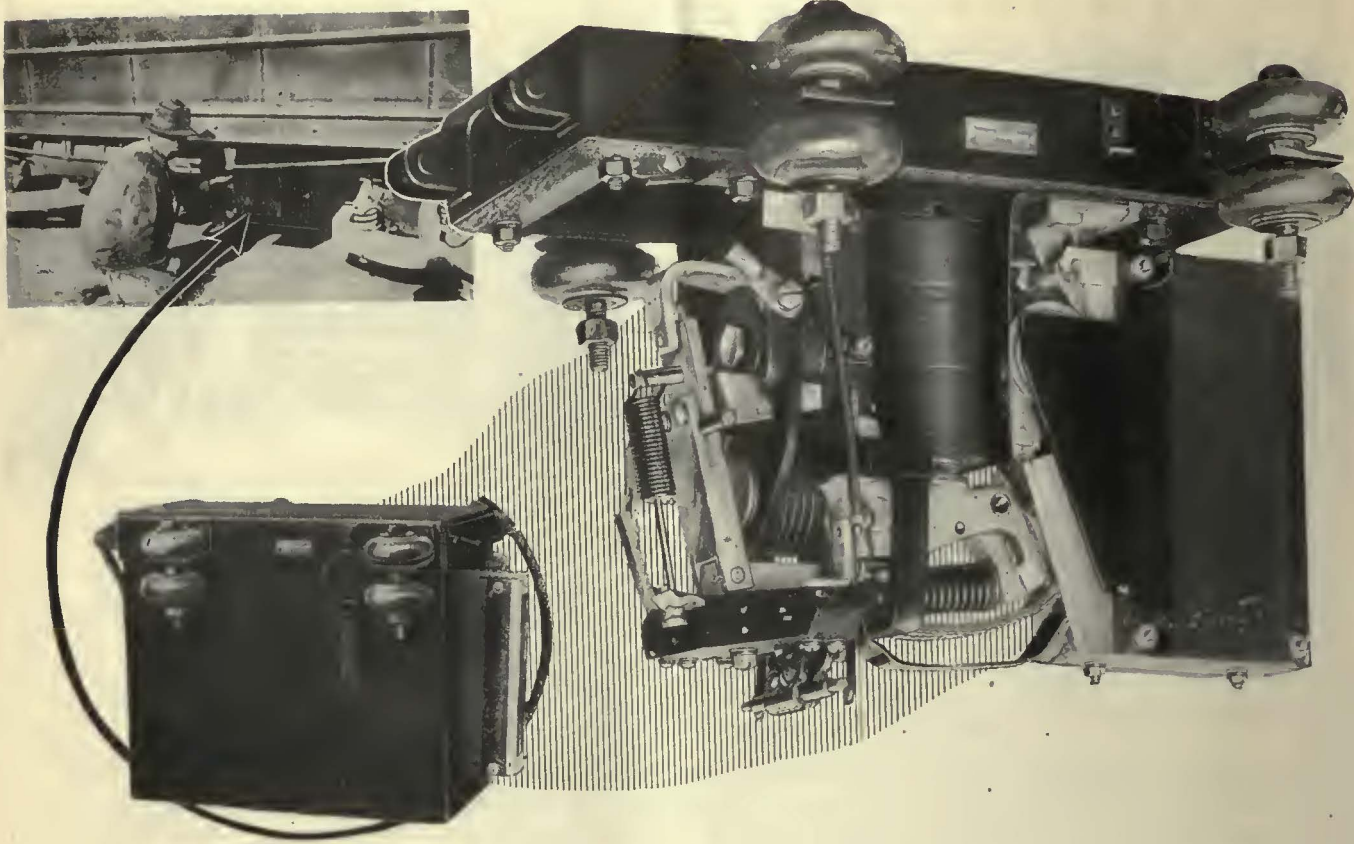
Trade Mark

UNITED STATES
ROYAL CORD
Motorcoach

Built for Lowest Possible Cost Per Tire Mile

The United States Royal Cord Motorcoach Tire is a distinct development in tire building. It is specifically designed for Motorcoach service. Through the use of *Latex-treated Web Cord*, all cross-tie threads are eliminated. This carcass construction affords maximum strength with maximum flexibility. The rugged anti-skid tread is made of *Sprayed Rubber*—tough, uniform, free from smoke, acid or other impurities.





As every user will tell you

Under the car, out of the way, the Line Breaker helps solve the perpetual problem of maintaining equipment economically.

It reduces controller contact wear and prevents improper starting and running practices, all of which contribute to high maintenance expense and shortened life of car equipment. It reduces maintenance by eliminating the causes.

The new G-E Line Breakers are exceptionally quick acting and embody many improvements. Ask your G-E railway engineering specialist about them.



General Electric is constantly producing new equipment as demanded by changing conditions and improvements in the railway industry. The G-E Line Breaker is a typical example of G-E developments produced primarily to protect and save equipment.



For
Modern Equipment Standards

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 69

New York, Saturday, January 8, 1927

Number 2

Design of Standard Freight Car Stimulated Sales

INTERURBAN electric railways are going after freight business with new freight cars. This fact was emphasized by the rolling stock statistics published in the Jan. 1, 1927, issue, which show 198 freight cars ordered during 1926. Of these 147 were ordered by Ohio roads. Nearly all of these cars are the standard design brought out by the Central Electric Railway Master Mechanics' Association in December, 1925. When the group of electric railway equipment men in the Central States got together and agreed on a standard freight trailer, nine companies indicated that their aggregate requirements would be about 150 units. The 1926 statistics show that 13 roads in this district ordered 186 cars. Railways in the Central States were in need of additional freight equipment and by bringing out a standard design sales were stimulated. This certainly is a feather in the cap of standardization, and while passenger cars cannot be standardized so readily, as has been demonstrated already, still the work of passenger car standardization may well be carried much further and many items of equipment standardized with excellent results.

Last Year's Receivership Record the Most Encouraging in Years

MOST encouraging is the record of receiverships in the electric railway industry for the year just completed. As an index of the progress which is being made, it shows clearly the gradual but steady growth of financial stability. The record published in this paper last week shows a material reduction in the number of railways which have been overcome with difficulties and an increase in the number of roads which have been successful in overcoming them.

At the beginning of the year only a few major properties remain under the protection of the courts, and these are rapidly clearing up their difficulties so that it is likely that several of them will emerge from receivership before the end of 1927. Apart from the Chicago Railways, which was thrown into voluntary receivership as a protective measure on account of the political situation, only two roads with 100 miles or more of track went into receivership during 1926. These are the Olean, Bradford & Salamanca Railway and the Utah-Idaho Central Railroad, the latter road having also emerged from receivership in 1926. Both of these are interurbans, as are all but a few of the other defaulting companies. The largest company to come out of receivership and one of the few of its kind still under federal protection was the Kansas City Railways.

True, some companies that never have been in receivership and appear to need the advice most have not made the determined effort that seemed desirable toward

carrying out the recommendations for changes in capital structure made by the committee on finance a year ago last October. In brief, these were for voluntary reorganization in such a way as to reduce fixed charges. These companies cannot hope to escape the onus that attaches to this unwillingness on their part in the event that they come into the market for funds. In fact, it would appear that only in this way are some of them likely to undergo changes that certainly appear to be most desirable.

Manufacturers Are Optimistic for the Coming Year

MANUFACTURERS who rely wholly or in part upon the transportation industry for their market are adopting an optimistic attitude toward the twelve months just ahead, based on the theory of continued prosperity. Many of them feel, and with justice, that the railways are slow in sensing the new order of things; leaning over backward to avoid any hint of too impulsive modernization activity and thus defeating temporarily their own best interests. Yet the equipment men call attention to the increasing momentum of the modernization campaign and look to the immediate future for a widespread acceptance by the public of the indispensability of electric railways.

Some of those who pin their faith on the theory of invariable business cycles are inclined to be skeptical concerning the ability of American industry to prevent the periodic recurrence of serious business depressions. They have overlooked, however, the various checks which have been set up by industry to forestall any such declines. So-called hand-to-mouth buying is coming more and more into general practice, not only by transportation companies but by all classes of business; manufacturers are in much closer touch with their particular markets than formerly and they are now able to control production to suit demand; prices have been maintained at very stable levels, if anything declining slightly in the face of heavy purchasing requirements, thus indicating that production costs are being pared to a satisfactory minimum; foreign markets are being consistently developed by American industry and may prove a valuable stop-gap in the event of a temporary slowing down of consumption here.

Hence it seems reasonable to assume that the electric railway industry, in common with other fields of business, may plan ahead for expenditures needed in equipment replacements and service improvements, having confidence that in the coming year ample revenues will be forthcoming.

Equipment manufacturers are convinced, for the most part, that 1927 will be marked by greatly increased purchasing by the electric railways and are preparing for a degree of production undreamed of during the lean period of the past few years. The railways have

been slow to react to the national prosperity, yet one is reminded of the proverb: "All things come to him who waits."

Stabilization of the Industry Should Stimulate Purchases

STABILITY of electric railway costs was a matter of comment a year ago. The study of fares, operating and construction costs and wages, conducted by Prof. Albert S. Richey, then indicated a remarkable degree of stabilization. This year a similar study by Professor Richey, published last week, indicates that the fluctuations have become even less marked than before.

The charts in his article show remarkable freedom from violent changes in the various index numbers considered. Fares, for instance, had a maximum range between 151.2 and 153.2, or 1.3 per cent. While this is slightly more of a change than the 0.9 per cent variation in 1925, it indicates the remarkable degree of stabilization that has been reached. On the expense side, electric railway operating materials showed a fluctuation between 153.1 and 159.2, or 4 per cent, as compared with 5.7 per cent the year before. Wages have advanced from 223.8 to 226.8 or 2.1 per cent, against 0.9 per cent in 1925. Electric railway construction costs moved between 201.3 and 203.7, or 1.2 per cent, a reduction from the 2.6 per cent of the previous year. As in the earlier year, wholesale prices of all commodities went down, receding from 156.0 to 148.1, or 5.3 per cent, as against 3.6 per cent in 1925 and 7.9 per cent in 1924. The average of these fluctuations for the past year is only about half of the average of a year ago.

Last year's prediction of stabilized costs is thus borne out. All information available points to a further continuation of stability throughout the present year. There is thus every reason why the industry may go forward with confidence and plan for the future on the basis of known conditions. In particular this applies to contemplated purchases. There is every reason for not putting off improvements involving labor or materials because of a possible recession in prices. There is every reason why the alert railway management should go ahead with the knowledge that changes in the prices will be minor, and that there even may be a saving in cost through buying now, as well as getting the advantage of using improved facilities.

Will the Railways Rebuild or Renew Their Cars?

WHILE the JOURNAL'S forecast based on data received from many companies points to an expenditure of \$55,000,000 for equipment in 1927, a close study of the individual returns discloses the interesting point that not all this money will go for new cars. Much of the budget is for capital expenditures on old cars. The 1926 figures of actual accomplishments also bear out this conclusion, because that is exactly what many of the roads did do. How far this tendency will go in the future depends on the appeal of the modern car designs of 1927.

In many cases no brief can be held against this practice of rehabilitation, even though gross mistakes have been made in the past by expenditures on old equipment

unwarranted from the standpoint of value received. Often such a policy is forced by financial conditions as the lesser of two evils. Many managers are thoroughly convinced of the advantage of new as against rebuilt equipment, but are unable to convince their financial backers. The public, too, may not be as thoroughly convinced as might be desired. The points of superiority in the latest type cars have not impressed themselves on the manager so that he can produce an argument strong enough to do a complete selling job to his bankers and often to his public.

Here lies the crux of the new car situation in the industry. As long as the conventional designs of twenty years ago form the background of modern design, bankers as well as patrons, who are once removed from actual contact with the details of operation, may not be convinced readily of the superiority of new over old or rebuilt cars.

What is needed is the grip of some master hand. In the emergency of the late war a group of engineers went into a prolonged conference on airplane motor design and after a period of intensive work emerged with the Liberty engine. Perhaps the same treatment is in order again for the street car. The demands for noise reduction, higher speeds and greater comfort are so intense that fundamental changes may be necessary from the type of construction now so generally adopted. Public favor extended to buses is largely because of their newness and improved seat comfort and reduction of noise.

The extent to which the industry will be persuaded in the future to devote its capital budget to new cars as against rebuilding old ones will be in no small measure determined by the sales appeal of the product offered in the immediate future. The improvements of the bus must be capitalized and added to others possible in rail car construction.

Terminable Permit Law

Recommended by Illinois Committee

STRICTLY in line with the bulk of modern thought on franchise matters is the recommendation of the sub-committee of the Illinois terminable permit commission that the terminable permit is superior to the definite term franchise. It does not see in that form of grant any reason to doubt the ability of the cities adequately to protect themselves, but it does see in that form of grant a stabilizer, particularly so far as the grant carries reasonable assurance of continuity of the enterprise to the investors who make the enterprise possible. In particular the committee was impressed with the soundness of the argument that grants of this type tend to take the utilities out of politics. As a result of its deliberations the committee recommends that appropriate legislation be adopted at this session of the General Assembly to remove the present limitation of twenty years as the maximum term for which franchises may be granted to street railways and authorizing the issuing of the terminable permit.

The suggestion is entirely reasonable that these permits be made only under such terms and conditions as may be deemed wise by the Assembly to insure continuous and efficient operation of the utilities and to protect the public as to service and rates and the rights of the utility to the streets. To this end the suggestions could be followed that are intended by the National

Association of Railroad and Utilities Commissioners to be included in the uniform terminable permit law now under consideration by the National Conference Commission on uniform state laws. That body, be it recalled, regards the principle of the indeterminate permit as economic and sound, and urges the legislatures of the various states which have not yet adopted the principle of the indeterminate permit to enact legislation recognizing and putting such principle into effect.

A previous attempt to make possible a terminable permit failed in the 1925 Legislature through opposition on the part of the city of Chicago and some down-state interests. Following this the legislative commission that has just reported was created to investigate the operation of the terminable permit in other states and its feasibility in Illinois. Legislative bodies are usually deliberate in their actions, so there appears little likelihood that a permit law of this kind will be passed before the expiration of the present Chicago Surface Lines franchises on Feb. 1, but there would seem to be little reason to doubt that the present unfortunate conditions that surround the surface railways in Chicago would have been avoided had the companies there been under some such form of grant.

Railway, Bus and Taxis Under One Head in Twin Cities

NO LITTLE interest should attach in electric railway circles to the announcement made elsewhere in this issue of the purchase of the leading Minneapolis cab company by the Twin City Rapid Transit Company. It is the second largest purchase of the kind reported in this industry. Both the governing principle of co-ordination behind the matter and the extent of the purchase are significant. So far as the former goes the railway in the Twin Cities is said now to control all the interurban passenger bus services and some suburban lines entering the city, a program in which the first move was made several years ago. As to its extent, the purchase just made includes about 500 cabs.

It is too early to say just what plans will eventually be worked out for tying all the services together, but one thing is sure, duplication of the organization and the facilities of the taxi companies has been a source of unnecessary traffic congestion. True, control of the taxicabs in the Twin Cities, together with the ownership of the railway and the bus lines, gives the parent company virtual control of public transportation service, but that service is under the control of the city and the state. Such an arrangement is anything but inimical to the best interests of the traveling public. In fact, under proper regulation and control it is just the reverse. Far too often it is difficult to make the so-called man in the street see that there is no advantage to him in the duplication of transit facilities, but such is a fact nevertheless.

President Lowry rightly believes that the proposed unification will best serve the public interest in that it will be possible to give more efficient and better service. He believes that, given time, the company can clearly demonstrate that the transaction is a sound and logical one. It most certainly is. But there will be need for the exercise of care in working out the details. The suspicion that one form of service may be advanced to the detriment of another—a bugaboo easily conjured in the public mind—should be carefully guarded against.

Co-ordination of railway and bus in the Twin Cities has been effected with such celerity, however, that it may well be presupposed the articulation of still another form of transportation activity with those that already exist will be carried out no less wisely than have other similar moves. As stated before, it is a significant move this, one which managers everywhere may well ponder carefully, whether or not the situations that confront them would seem to make a similar move by them desirable.

Chicago's Survey of Street Traffic a Masterful Report

STREET traffic in Chicago has finally reached that uncomfortable degree of congestion where representative business men are demanding that something be done to correct the situation. To this end the Chicago Association of Commerce, representing the business interests of the city, has made an extensive study and definite recommendations tending to alleviate the serious conditions that exist today.

The report just published by the association was undertaken at the invitation of the City Council, although financed by the association. It has a convincing appeal because of the extensive studies made and the abundance of data collected under the direction of Dr. Miller McClintock, director of the Erskine bureau for street traffic research of Harvard University. The survey forms the basis of the article appearing in this issue of the JOURNAL.

The report keeps close to the subject of traffic on street surfaces. Apparently it was not written to prove any preconceived theories or to favor any one agency. It might almost be said that undue favor was shown the private car operator despite the convincing evidence of his uneconomic use of the public thoroughfares. The inadequacy of curb parking and the resulting congestion is shown, however, and parking in the Loop would be prohibited during the day in favor of the development of extensive "off-street" parking areas and garages.

Of special interest to the railway industry is the story gleaned from many sections of the report of the efficiency of the street car as a transportation agent. The bus, too, makes an efficient showing, but so far has not been developed extensively in Chicago.

Sixty per cent of the people entering or leaving the Loop by street agencies use the cars. This, however, requires only a little more than 8 per cent of the vehicles evident during the day, and according to police records the surface cars and elevated combined are involved in but 5.4 per cent of the accidents. Compare this with the 33 per cent auto riders using 90 per cent of the vehicles and producing directly or indirectly 94 per cent of the street accidents!

More convincing than ever are these facts, coming as they do from unbiased sources. The entire report is perhaps the most extensive study yet made on street traffic, and while its conclusions are far reaching, they are not visionary. At the present conditions merely foreshadow those that will exist in the future. The appeal is made to lay the groundwork for common sense regulation that will help the traffic flow rather than hinder it. Chicago, as well as other great cities, may well face the facts and prepare along sound lines to meet this situation that even now seems almost baffling.

Street Traffic Analyzed in Chicago

Metropolitan Street Traffic Survey Made by Miller McClintock Under Auspices of the Chicago Association of Commerce Contains Many Valuable Data on Conditions as They Exist Today—Recommendations Based on Forecasts of the Future Are of Far-Reaching Importance—Surface Cars Found to Perform Efficient Transportation Service

WITH a full realization that the streets of a city are the most important element in its economic usefulness, the Chicago Association of Commerce undertakes to make basic recommendations for the future use of such arteries that will give the greatest service to all. The recommendations contained in the Metropolitan Street Traffic Survey of the street traffic of Chicago and the 40-mile territory adjacent to it are simple and do not involve enormous expenditures. Segregation of various kinds of traffic, improved regulation tending to produce a more efficient use of the streets and provisions for safety are fundamentals on which the recommendations are based.

A proposed traffic ordinance defining the methods of vehicle operation with suitable rules and regulations is included in the report. Formation of a street traffic commission, twelve members in all, including the Mayor, the commissioner of public works, corporation counsel, superintendent of police, the president of the board of local improvements, chief justice of the Municipal Court, the commissioner of gas and electricity, chairman of the Chicago Plan Commission and one representative from each of the political subdivisions of greater Chicago, is recommended to act as the co-ordinating

body on all matters related to street traffic. In addition, a division of traffic engineering is planned to work as a function of the bureau of streets under the jurisdiction of the Department of Public Works.

Reorganization of the traffic division of the Police Department is deemed necessary in the administration of the proposed traffic ordinance. "Firmer and more sys-

tematic enforcement of traffic law in the courts" is also considered necessary to improve conditions. In this connection the report states that "Traffic laws will be obeyed without compulsion in direct ratio to their reasonableness." While the police responsibilities are many, and the function of arrest of willful or careless violators is minor, the fact that this class of violators is

responsible for so many accidents and loss of life and property should cause it to be systematically followed up and summarily dealt with through the courts.

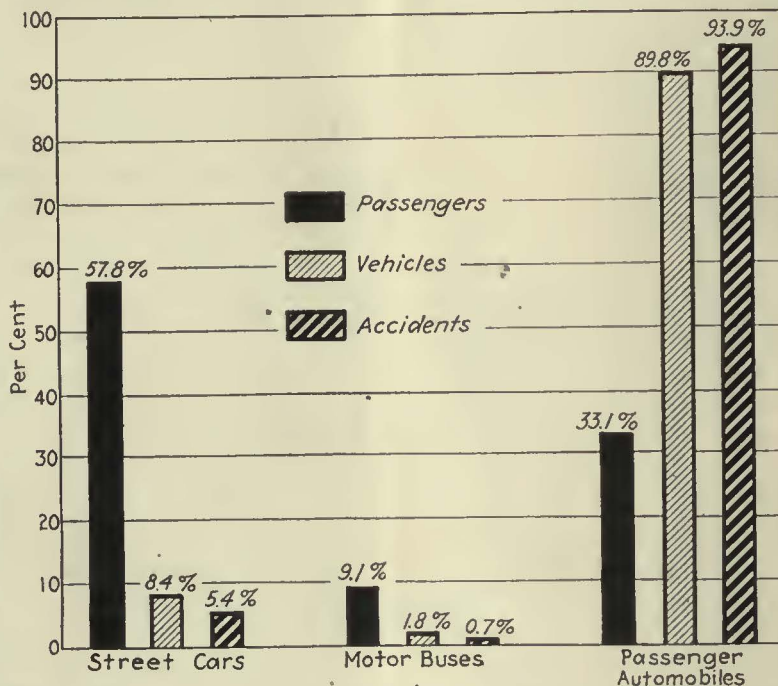
Regulation and not punishment is of perhaps greater importance, and to this end the report deals at length with traffic signs and signals to guide the motorists and to provide greater freedom of movement with a lessened accident hazard.

As told in the ELECTRIC RAILWAY JOURNAL in the issue of Dec. 25 this survey

was made by the Chicago Association of Commerce under the direction of Dr. Miller McClintock, head of the Albert Russel Erskine bureau for street traffic research in Harvard University. The report of the survey was directed to the Mayor and Chicago City Council and signed by William R. Dawes and Elmer T. Stevens, president of the association and chairman of the street traffic committee, respectively. Functioning

with Dr. McClintock and the technical staff was the administrative board of the Chicago Association of Commerce and eleven advisory committees on as many distinctive subjects.

As a basis for the suggestions offered, the survey presents a vast array of traffic statistics that indicate the thoroughness of the work. Space permits the reproduction of only a few of the salient findings, and those



Comparison of Mass Transportation by Street Cars with Mass Traffic by Automobiles

More than 800,000 people using vehicles on the streets enter or leave Chicago's central district each day between 7 a.m. and 7 p.m. Note the efficiency of the street cars and buses as compared to the private automobiles.

Story Gleaned from Chicago's Street Traffic Survey

These data show the utilitarian value of the surface car as a means of handling the masses with a minimum of vehicles and accidents.

	Passengers Carried Per Cent	Vehicles Used Per Cent	Accidents Per Cent
Street cars.....	568,925 57.8	16,901 8.4	212* 5.4
Motor buses.....	89,369 9.1	3,633 1.8	29 0.7
Passenger autos....	325,524 33.1	180,846 89.8	3,705 93.9
Totals.....	983,818 100.0	201,380 100.0	3,946 100.0

* Includes elevated and surface cars, no segregation being given. Number of accidents are for the three months of May, June and July, 1926, and cover the entire city under the jurisdiction of the Police Department.

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Absence of Loading Zones and Adequate Traffic Regulation Delays the Progress of Street Cars and Their Larger Number of Patrons. In This Typical Instance Two Private Automobiles and a Bus Prevented an Electric Car from Approaching the Corner Despite the Fact that the Curb Lane Was Unobstructed

of greatest interest to the electric railway industry have been selected.

It is self-evident from the charts and tables reproduced that surface car performance stands supreme in its utility as a transportation agent. About a million people come into the central business district every day. According to the cordon count of this district made in May, 1926, exactly 1,693,506 persons entered or left this district in the twelve-hour period from 7 a.m. to 7 p.m. on the average weekday. Assuming that all who entered the district left it the same day it would appear that 846,753 persons, or 25 per cent of Chicago's population, went downtown to work or shop every day during these hours alone.

The count indicated that 80.8 per cent of these people

used mass transportation agencies, as shown in an accompanying table, and 19.2 per cent used private automobiles. Likewise, 58.1 per cent used street agencies and 41.9 per cent "off-street" agencies such as steam roads, elevated or electric interurban.

The relative importance of the street car is of particular interest. An accompanying table and chart indicate that the street cars entering the Loop carry 57.8 per cent of all people using street agencies, buses carry 9.1 per cent, and 33.1 per cent ride downtown in automobiles. The disproportionate street occupancy of these different classes supports the street car still further. The 57.8 per cent of car riders required but 8.4 per cent of the vehicles, while the 33.1 per cent of automobile passengers required 89.8 per cent of the vehicles.



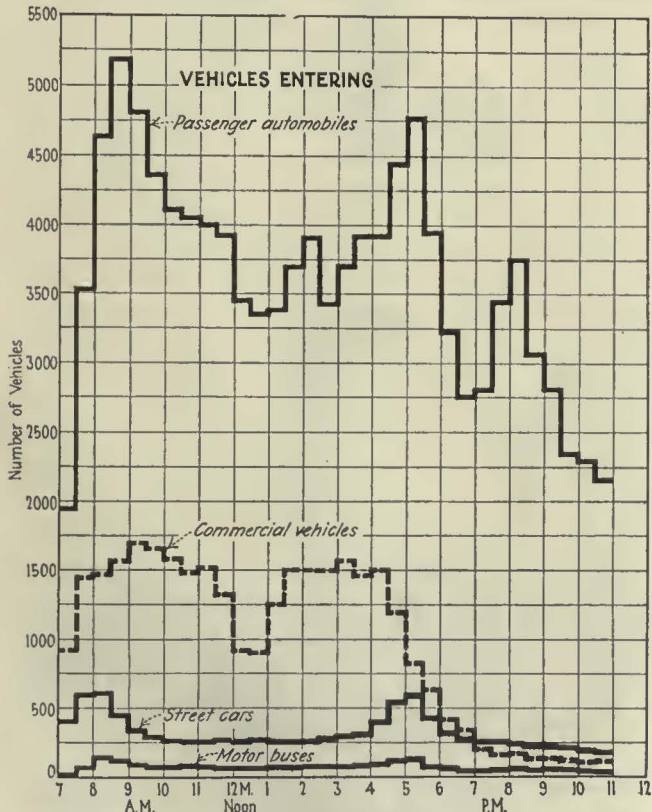
Curb Supports of the Elevated Structure on 63d Street, Chicago, Are an Important Improvement Which Benefits Street Traffic



Sidewalk Obstructions Impede the Progress of Pedestrians at Busy Intersection in Chicago and Should Be Removed, According to the Recommendation of Miller McClintock

From another part of the report it is disclosed that only 5.4 per cent of accidents for the three-month period May to July, 1926, inclusive, reported by the Police Department involved street cars or elevated trains, 0.7 per cent buses and 93.9 per cent private automobiles. No segregation is given as between surface and elevated cars in the accident data.

Despite the less efficient use of public streets, the report distinctly recognizes the economic value of the private automobile, saying in part: "Automotive transportation has wrought a basic modification in man's



Vehicles Entering the Central Business District in Chicago Have Peaks at 9 A.M. and 5 P.M., as Revealed by the Cordon Count of the Chicago Street Traffic Survey

attitude toward time and distance and has had a fundamental effect upon every aspect of urban life. It is inevitable that such a change should necessitate many readjustments in private business and in public administration. The manufacturers of automobiles have gone far in fitting their vehicles for conditions under which they must operate. From now on it is necessary that some more constructive steps should be taken in adjusting operating conditions to the needs of the vehicle."

Further on the report states "that the increasing automotive use in the past quarter of a century is only a forecast of what will take place in the future. All considerations of street traffic conditions, and all plans, both in the way of street design and in traffic control, must take cognizance of the fact that the problem of street congestion and street safety is only beginning, and that the burdens of the future will be much larger than those of the present."

With a population of 3,048,000, the city of Chicago has a motor vehicle registration of 341,468—probably slightly less than the actual number owned and operated in the city. For 1950 the population has been estimated

Industrial Workers Heavy Users of Street Cars

Mode of transport used by 95 per cent of the 37,946 employees of the Hawthorne plant of the Western Electric Company, shown in the Chicago Street Traffic Survey. Most of these employees come to work between 7:30 and 8:30 a.m.

	Per Cent
Surface cars.....	60.2
Elevated.....	13.3
Steam (C., B. & Q.R.R.).....	2.6
Automobiles.....	17.8
Walked.....	3.5
Unidentified.....	3.5
Total.....	100.0

at 4,380,000 and the motor vehicles at 876,000. The loading at present is 8.9 persons per car and in 1950 is estimated at five persons per car. For the metropolitan district, assumed for the report as the territory within a 40-mile circle, the population is estimated in 1950 as 6,408,500 riding in 1,281,700 motor vehicles.

CERTAIN FACTORS HAVE INCREASED STREET TRAFFIC

Freight terminals that form a fringe around the central business district on the north, west and south, with the docks on the east, add the greatest amount of traffic burden to the business streets. During the month of March, 1926, 69,508,959 lb. of freight in 13,806 loads was moved in interterminal transfer alone over the streets of the central district. In addition, dock to freight terminal movements during the same month amounted to 16,283,879 lb. in 1,803 loads. This does not include freight having origin or destination points in the central district, but means transfer shipments via street surface only. It is of interest to note that the Chicago Tunnel Company handles almost an equal poundage in its elaborate system of tunnels under the central district.

Natural barriers such as Lake Michigan and the rivers are cited in the report as greatly complicating the city growth. The lake has caused a semi-circular plan of development and the rivers require adequate bridge facilities. The river traffic often causes serious delays due to open bridges.

Paved streets are considered essential. The report emphasizes that "the most direct physical relief that could be brought to the Chicago traffic problem would be an energetic and comprehensive paving program."

Despite the increase of paved streets the automobiles have increased faster. In 1908 there were only 3.8 automobiles per mile of paved street, whereas in 1925 there were 139. Street design is discussed. High crowns cause discomfort and difficulty in steering, especially of trucks. This results in greater use of the center or top of the crown and seriously affects street capacity and safety.

On traction streets the rails often form the smoothest riding, resulting in an uneconomical street usage and delay to surface cars. Rounded curbs at corners facilitate turning movements of automobiles and reduce the accident hazard of such movements. Elevated pillars also reduce street capacity and the report contains a recommendation for their removal to the curb. Public



When Parked Cars Absorb the Paved Traffic Lane at the Side of Narrow Streets the Moving Vehicles Use the Tracks to the Detriment of the Masses

A Quarter of Chicago's Population Goes to Work or Shop Daily in the Central Business District

The cordon count of the Chicago Street Traffic Survey reveals the utility of the street car as the most important and efficient street agency in use today, as well as the carrier of the largest group of riders.

Mode of Transportation	Number of Passengers	Per Cent
Street car.....	568,925	33.6
Elevated.....	473,736	28.0
Steam railroad (suburban).....	192,909	11.4
Steam railroad (through).....	29,173	1.7
Electric interurban.....	13,870	0.8
Motor bus.....	89,369	5.3
Passenger auto.....	325,524	19.2
Total.....	1,693,506	100.0
Mass transportation.....	1,367,982	80.8
Passenger auto.....	325,524	19.2
Total.....	1,693,506	100.0
Street agencies.....	983,818	58.1
"Off-street" agencies.....	709,688	41.9
Total.....	1,693,506	100.0

Of the motor vehicle fatalities in the United States, numbering 22,500 for 1925, Chicago contributed 2.9 per cent. A study based on May, June and July, 1926, indicated that the frequency of accident occurrence was much greater between the hours of 5 and 6 p.m. and is attributed to the greater fatigue of motorists and pedestrians at this time of day, as well as the increased congestion. A chart on page 74 indicates this situation and another shows the vehicles involved in accidents.

and private encroachment on street and sidewalk space should also be minimized.

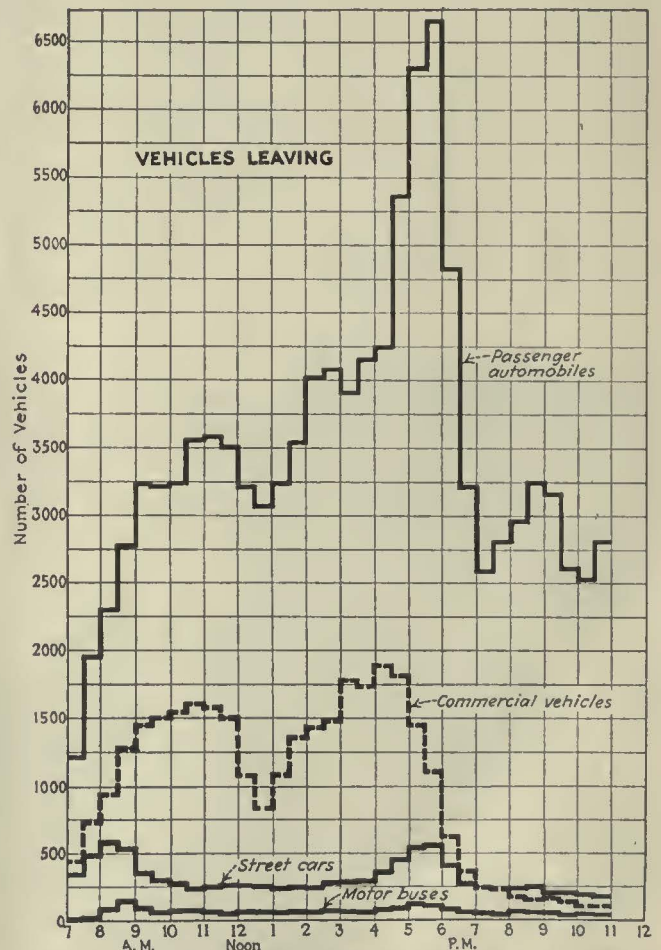
A lack of adequate regulation is responsible for much congestion. Irregular turning movements and unnecessary use of the streets also add to traffic density. Taxicab operation is cited as an indication of dead traffic and a count was taken during a typical business day at State and Madison and also at the Link Bridge. At State and Madison 1,218 cabs, or 26.3 per cent of those observed, were loaded and 3,429, or 73.7 per cent, were empty. At the Link Bridge 2,893, or 49.3 per cent, were loaded and 2,973, or 50.7 per cent, were empty. A total of both points observed indicated that 60.9 per cent of the taxicabs were empty and is an indication of the cruising habits of this class of carrier, although many cabs may have been moving to and from calls.

COST OF CONGESTION AND ACCIDENTS HIGH

Decentralization is the direct product of congestion. In Chicago this is true as in other cities, such as New York, Boston and Los Angeles. Chicago now possesses 75 major and 20 minor neighborhood or package goods districts. Also 173 outlying banks exist with deposits of \$615,000,000. This is cited as the result of a demand for greater accessibility, especially by automobile patronage.

On the assumption that 10 per cent of the unit hours of work could be saved by partially relieved congestion a daily saving could be made of \$75,820, or \$27,215,200 annually.

Accidents, in addition to the above, are estimated to cost \$17,000,000 annually.*



Vehicles Leaving the Central District Form a Higher Peak than When Entering

The greater peak is just before 6 p.m., immediately following a secondary peak of vehicles entering this district, as shown by chart on opposite page.

*If all the automobiles and trucks operating in Chicago were insured for public liability and property damage at the prevailing rates the total premium would approximately equal this sum.

How 96,000 Patrons of Mercantile Establishments Arrived in Downtown Chicago

Based upon this extensive series of interviews covering one day the Chicago Association of Commerce would ban all parking in the central district of Chicago, bounded by Wacker Drive on the north, Michigan Avenue on the east, Harrison Street on the south and Market Street on the west, between the hours of 7 a.m. and 6:30 p.m.

Establishments	Total Patrons	Suburban Trains	Per Cent	Elevated Trains	Per Cent	Street Cars	Per Cent	Motor Coach	Per Cent	Taxi-cabs	Per Cent	Automobiles			
												Totals	Per Cent	Park at Curb	Per Cent
Department stores.....	68,621	12,875	18.5	23,176	33.3	19,370	27.8	8,881	12.7	709	1.0	4,610	6.70	1,013	1.47
Office building.....	9,432	2,334	24.7	3,404	36.0	1,906	20.2	505	5.5	85	0.9	1,198	12.70	167	1.77
Banks.....	8,421	1,900	22.6	2,884	34.3	2,308	27.4	405	5.3	79	0.9	800	9.50	144	1.71
Musical instrument stores.....	2,649	499	18.8	1,016	38.4	567	21.4	315	11.9	42	1.6	210	7.90	61	2.29
Furniture stores.....	2,378	449	18.8	855	36.0	498	21.0	291	12.3	22	0.9	263	11.0	45	1.88
Shoe stores.....	1,064	158	14.9	311	29.2	169	15.8	211	19.8	33	3.1	182	17.2	32	3.02
Restaurants.....	2,405	507	21.0	748	31.1	343	14.3	307	12.8	122	5.1	378	15.70	41	1.69
Book stores.....	112	20	17.2	25	21.6	30	25.8	20	17.2	.....	.....	21	18.20	2	1.74
Grand total.....	96,082	18,742	19.5	32,419	33.8	25,191	26.2	10,980	11.4	1,092	1.1	7,662	8.00	1,505	1.57

A reduction of 23 per cent of personal injury automobile accidents has been noted in the five months following the installation of the co-ordinated traffic signals in the Loop, in addition to reducing materially street car and vehicular running time in this district.

TRAFFIC MUST BE CONTROLLED

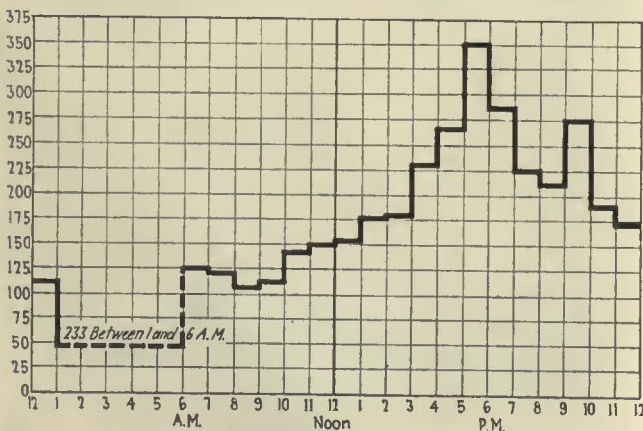
One chapter is devoted to the control of traffic. Street cars should be given the right of way by requiring vehicular traffic to avoid blocking tracks when cars are approaching. Street car stops should be provided with clearly defined safety zones and vehicle drivers must not be allowed to drive through such zones, whether occupied or not.

Surface cars should minimize loading time in the central district by using street loaders and change makers where possible. Motor coaches should be provided with clearly marked loading points arranged not to interfere with surface car loading zones. Recessed curbs the width of the bus could be provided in certain streets. Buses should never be allowed to load while standing in the second lane from the curb.

The valuable results obtained by prohibiting left turns in the central district have been somewhat impaired by permitting left turns in the middle of the block. Observations made indicate that 78.8 per cent of such turns caused delays that when reduced to a man-minute basis averaged 6.84 minutes per turn.

THE PEDESTRIAN NEEDS PROTECTION

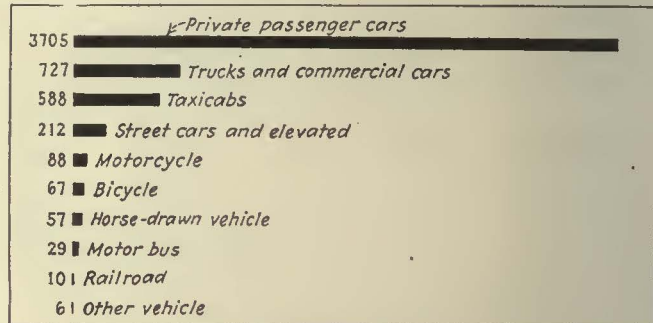
Checks show that pedestrian speeds average 3.16 m.p.h. on typical streets in the central district, which is reduced to 2.81 m.p.h. with the congestion of the late afternoon hours. An observation on a Saturday in May, 1926, showed that 195,930 people entered the intersection at State and Madison in five afternoon hours.



Fatigue and peak traffic combine to produce the greatest number of accidents between 5 and 6 p.m.

The peak hour showed 49,250 persons and the peak quarter hour 13,190.

From these and other observations the conclusion is drawn that pedestrian traffic on sidewalks as well as at street intersections must be regulated. Sidewalk obstructions must be removed, stopping midstream must cease and all possible causes of congregations must be eliminated. Pedestrian subways under Michigan Ave-



What Causes Accidents?

The chart here shows the type of vehicle involved in all motor vehicle accidents in Chicago for months of May, June, July, 1926. Most of the accidents involve private passenger cars. Surface cars and elevated trains, although providing the background of passenger transportation, have very few accidents.

due to the Illinois Central station have proved practical and checks show their use is in excess of the original estimates. The report carries the recommendation that pedestrian subways be used at other places, but not in congested streets because of the difficulty of providing approaches.

THE PARKING PROBLEM

The parked cars of the few must give way to transportation of the many. Parking checks were made in five square blocks of the central district which had a possible parking capacity of 300 cars. Observations revealed the fact that the average number parked between 7 a.m. and 7 p.m. was 170, or 57 per cent of the maximum possible. The hour from 2 to 3 p.m. is the peak, during which time 231, or 77 per cent of the maximum number, were parked. The present regulation calls for a half-hour parking limit, but the check revealed the fact that 1½ hours is the average duration of parking time.

Surveys in outlying business districts indicate that three hours is the average parking time and the peak hours are at night.

Within the area bounded by the elevated loop there is a curb footage available for parking sufficient to accommodate 1,157 vehicles at one time. If the half-hour parking limit was rigidly adhered to 27,768 vehicles could be parked in a twelve-hour day. This would ac-

commodate but 15 per cent of the demand placed upon the streets of this district. The primary effect on street capacity of this small accommodation is a reduction of 30 to 50 per cent. The secondary effect is that little or no space is available for the actual loading and unloading of passengers and merchandise.

Basic reasons for traffic regulation are greater safety and improved business. The first is obvious. To determine the latter some 96,000 patrons of different firms were interviewed. Of these 90.9 per cent arrived by common carriers, 1.1 per cent by taxicabs and 8 per cent by automobile. Of the latter only 1.57 per cent parked their cars at the curb. This complete check is shown in tabular form on page 74 and is one of the most important features of the report.

Based upon the extensive series of interviews which tends to blast the mistaken idea of the value of parking facilities to merchants on congested streets, the Association of Commerce recommends that parking for longer periods than necessary actually to load or unload passengers or merchandise be entirely prohibited in the central district between the hours of 7 a.m. and 6:30 p.m. The construction of garages and off-street parking areas is urged, as is also the further development of Grant Park, now accommodating hundreds of machines.

Outlying business districts should also be limited by empowering the commissioner of public works to erect signs, and the Police Department to enforce a two-hour parking limit between 7 a.m. and 6:30 p.m.

MORE TRAFFIC SIGNS AND SIGNALS NECESSARY

"Stop and go signals should rarely, if ever, be installed for purely safety purposes. The primary pur-



With the Abolition of Left Turns in the Chicago Loop, Midstreet Turns Are Permitted, but with Inevitable Delays, as Illustrated

pose of the signal is to start and stop traffic to facilitate movement." Boulevard stops and other warning and guiding signs are recommended to help the motorists in rapid although safe movement. Installation of automatic "stop" and "go" signals at points where traffic conditions do not warrant such regulation invites a violation of such signals and thus creates a dangerous habit. It would be one of the duties of the proposed engineering division to avoid impracticable signals.

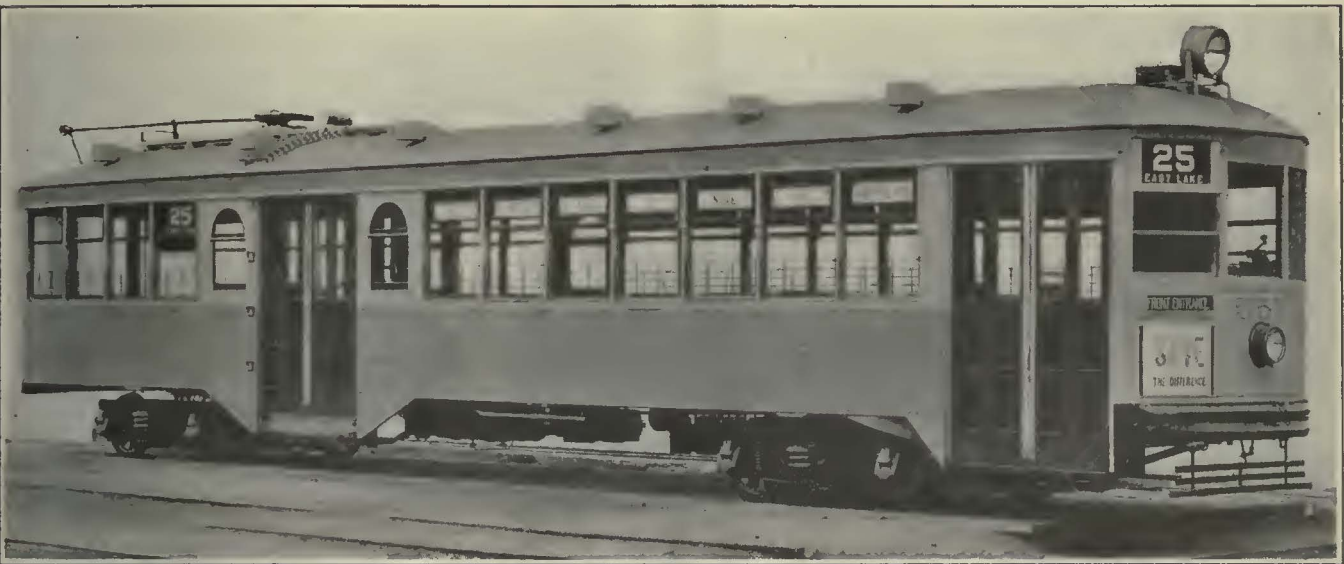
The co-ordinated system in the Loop has proved so successful that its extension to other districts is recommended. Much space is used in the discussion of the amber light. The report favors relatively a longer



Angle Parking on Narrow Chicago Streets Leaves Only the Track Area Free for Moving Vehicles

Birmingham Pleased with Its New Cars

Careful Attention to Local Requirements Was Given in Designing the Sixteen Units Recently Delivered—
The Cars Are Truly "All Dressed Up," but They Do Not Lack for a Place to Go—Noise
Reduction and Interior Decoration Are Important Features



One of the Sixteen New Cars Which the Birmingham Company Has Purchased to Improve Further the Quality of Its Transportation Service

WITH a desire to eliminate noise to as great an extent as possible in the sixteen new cars recently delivered to the Birmingham Electric Company, Birmingham, Ala., all trapdoors have been omitted from the floor and oiling and inspection will be done from underneath. As a further step in attaining the desired end helical gears have been used and the bolsters are filled with ground cork and cement. Where they connect at the side with the framing of the cars the bolsters are insulated with $\frac{1}{4}$ -in. linoleum, securely fastened between the end of the bolster and the side sill.

Making it imperative for oiling and inspection to be carried on from without serves a further purpose than simply reducing the amount of truck noise which reaches the passengers. It effectively keeps the inspectors from entering the cars and soiling the plush seats and other features of the interior fittings through contact with their clothing and persons.

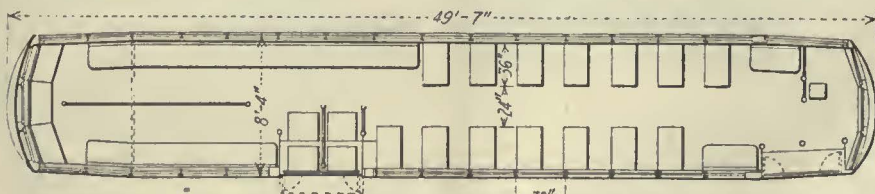
The sixteen cars just delivered are similar in general design and over-all dimensions to the standard single-end, double-truck, center-exit units which have been in service in Birmingham heretofore. They possess, however, a number of refinements in detail and in various features of appearance and comfort which will recommend them to the attention of railway men. Built by the Cincinnati Car Company, no effort has been spared in incorporating into the design all prac-

ticable ideas which will enhance the selling appeal of the transportation units.

For example, there is the matter of the partition which has been erected at the front of the car just in the rear of the motorman's seat. It was desired to eliminate the unsightly appearance which it was felt the motorman's stool and curtain generally give. But on the other hand the designers wished to avoid having a plain and unadorned steel partition to confront the passengers, so a 24-in. x 26-in. beveled plate mirror was installed.

The seating arrangement consists of fourteen cross seats and additional longitudinal seats at the rear of the car. These latter, together with the row of seats extending across the extreme rear, will accommodate 32 passengers, making the total seating capacity 60. Before these new cars were placed in service fixed partitions had been used to separate the colored passengers from the white. In these units, however, this arrangement has been modified so that the amount of space set aside for colored passengers may be varied at will. This eliminates the necessity for white passengers having to stand while seats remain unoccupied in the colored section.

The new plan embodies the use of aluminum pipe stanchions and rails which may be adjusted as desired. Much pleasure has been evinced by patrons of the company due to the adoption of this



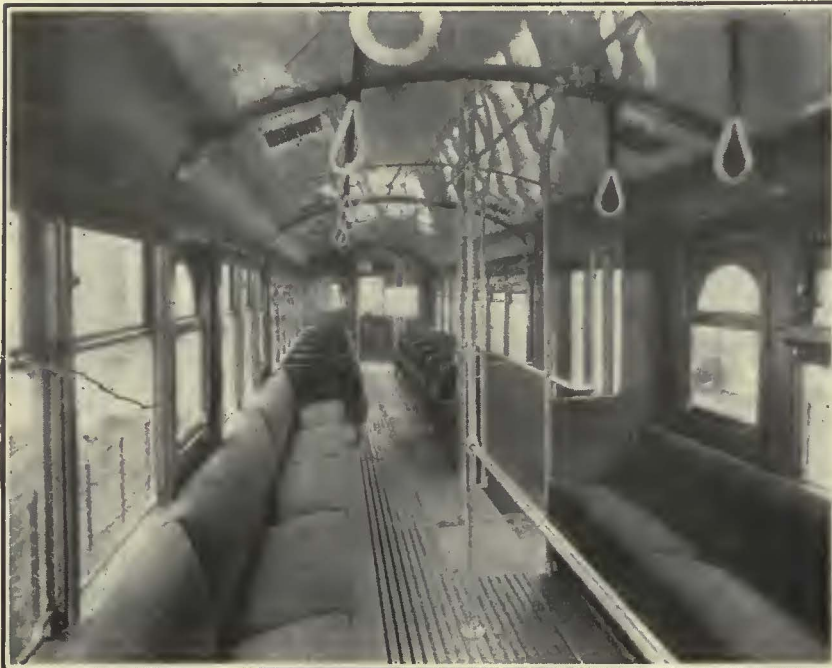
Seating Plan of the Birmingham Cars, Showing the Arrangement of Longitudinal and Cross Seats Which Will Accommodate 60 Passengers

more flexible arrangement. At the center of the side exit door there is another pipe stanchion which carries a lever for operating the center doors when two-man operation of the car is in effect.

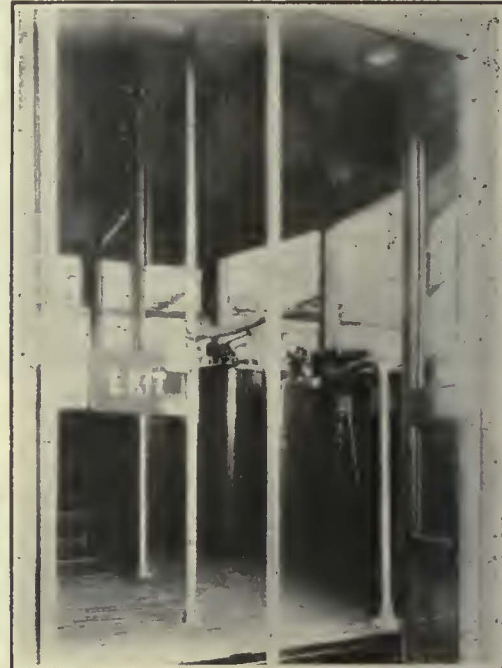
A harmonious interior appearance has been effected through the use of first quality, green, unclipped Pullman plush in upholstering the seats along with silk window shades which match them in color. Cherry finish has been used throughout, with the steel stippled to match where exposed to view. Brass sash have been used to provide a pleasing contrast with the window shades and interior trim, as well as to facilitate the raising and lowering of the windows. The seats throughout are of the deep spring type, and a further element in passenger comfort was effected in increasing the seat spacing from 29 in. to 32 in. The floor under

the upper wood sash and doors. The side panels and letterboard are finished in delft blue, while the side posts, front dash and posts are painted in cream. The top sash and doors are finished in cherry and varnished. All lettering and striping are in gold.

One-man operation is entirely feasible with these cars. With a single operator the side exit doors are treadle operated, or, as stated before, they may be manually controlled by the conductor when two men constitute the crew. Complete safety car devices are used, the brakes and line breaker being interlocked with the doors so that the car cannot start with the door open. Both front doors are connected with a selective valve under the control of the motorman. The electrical equipment of the car consists of four 35-hp. motors, a K-35 KK controller and a line breaker.



In the Foreground Is the Aluminum Rail Which May Be Adjusted to Vary the Amount of Space Reserved for Colored Passengers



Directly Behind Exit Sign May Be Seen Steel Partition Which Shuts Off Motorman's Compartment from Passenger View

the seats is covered with 1/4-in. rubber tile, while the aisles and platforms are covered with 1 1/2-in. oak mat strips fitted with brass channels between. The edges of the rubber tiling at the aisles are finished with brass angles. Interior lighting is accomplished with flush porcelain sockets set into the headlining, using 46-watt frosted lamps.

The exterior finish of the cars is Duco, except for

Placing these new units in city service in Birmingham has marked another step in the avowed program of the local company to raise its transportation service to the highest possible plane consistent with earning capacity. That the townspeople appreciate the efforts of the railway is clearly indicated in the quantities of written and verbal praise and congratulations which have been received.

SOME OF THE PRINCIPAL SPECIFICATIONS FOR BIRMINGHAM'S NEW CARS

Seating capacity	60	Compressors	Westinghouse DH-16	Registers.....	International No. 5
Weight:		Conduits and junction boxes..	Flexible duct	Safety devices..	Safety Car Devices Company
Car body	17,330 lb.	Control	GE K-35-KK	Sanders.....	O. B. with No. 10038 traps
Trucks	9,300 lb.	Curtain fixtures..	Curtain Supply Company	Sash fixtures	Dayton Manufacturing Company
Equipment	8,340 lb.		No. 90	Seats	Hale-Kilburn No. 203
Total	35,020 lb.	Curtain material	Pantasote	Seating material	Chase Company
Bolster centers, length.....	29 ft. 3 1/2 in.	Destination signs, Hunter illuminated	129 LR	"Friezette"	
Length over all	49 ft. 7 in.	Door-operating mechanism	National	Slack adjuster....	Cincinnati Car Company
Truck wheelbase	5 ft. 4 in.		Pneumatic	turnbuckle type	
Width over all	8 ft. 4 in.	Fenders.....	H-B life guards	Springs	Union Spring & Manufacturing Company
Height, rail to trolley base.....	10 ft. 8 1/2 in.	Finish	Duco	Step treads	Feralun
Body	Semi-steel	Gears and pinions	GE ratio 69-14	Trolley catchers.....	O. B. No. 13141
Interior trim	Cherry finish	Hand brakes....	Cincinnati 16-in. vertical	Trolley base	U. S. 20-A
Headlining	4-in. Agasote	Heater equipment..	Consolidated Car Heating	Trucks.....	Cincinnati Car Co. arch bar
Roof	Arch	Headlights.....	Electric Service Supply	Ventilators..	Railway Utility exhaust, Cincinnati Car Company hatch type intake
Air brakes	Westinghouse	Journal bearings.....	"Golden Glow"	Wheels....	Southern Wheel Company 26 in., chilled iron
Armature bearings	Sleeve	Journal boxes	Cincinnati Car Company	Special devices, etc....	Triple step treadle doors at both center doors
Axles	Pollak Steel Company	Lightning arresters.....	GE aluminum cell		
Bumpers	Cincinnati, pressed steel	Motors ..	Four GE 265-A, 35 hp. inside hung		
Car signal system.....	Faraday buzzer				
Car trimmings.....	Dayton Manufacturing Company				
Center and slide bearings.....	Cincinnati				



Storage Battery Locomotive Hauling Train at Wilson Terminal, Prague

Electric Railways of Czechoslovakia

The Largest City System Is at Prague, Where 500 Motor Cars and 450 Trail Cars Form the Equipment—There Are Also Interurban Lines in Czechoslovakia and Considerable Heavy Electrification Is Under Way

By Dr. F. Niethammer

Prague, Czechoslovakia

CZECHOSLOVAKIA has 256 km. (160 miles) of routes of city electric railways and 173 km. (109 miles) of interurban electric railway lines, according to recent statistics compiled by Ministerialrat Juranek. The largest system is at Prague, the capital of the country and a city of about 730,000 inhabitants. The track mileage in Prague amounts to 186 km. (116 miles), most of the routes being double track, and there are more than 500 motor cars and about 450 trail cars.

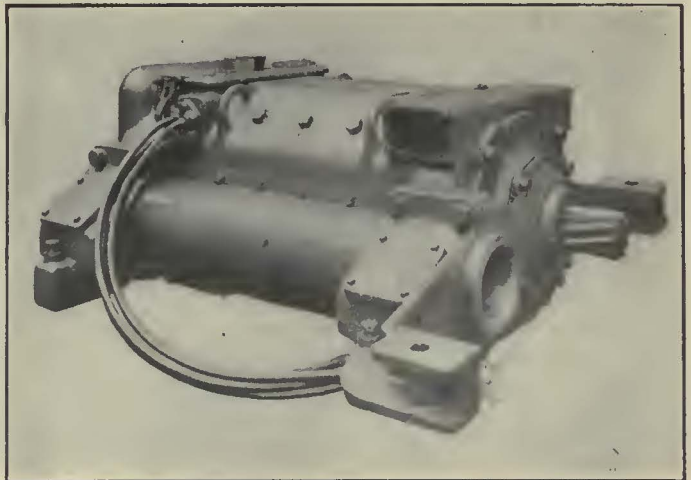
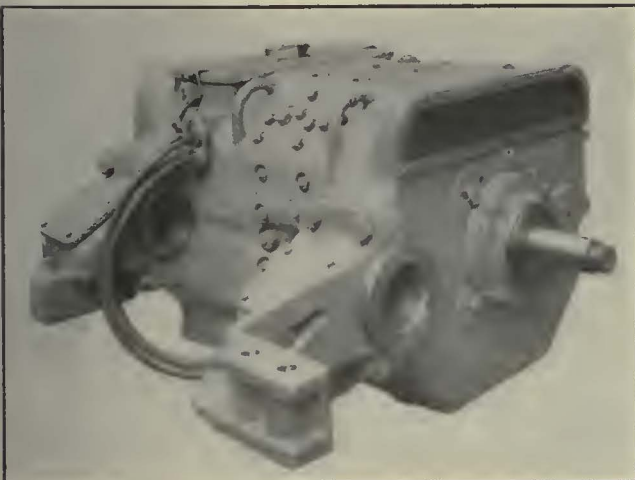
There are also a number of motor bus lines which are operated in supplementary service with the electric railways.

In 1925 the Prague Street Railway carried 173,400,000 passengers and operated more than 20,300,000 motor car kilometers and 11,100,000 trail car kilometers (12,700,000 motor-car miles and 6,937,500 trail-car miles). The receipts amounted to about \$4,600,000, of which the operating expenses consumed 91 per cent. Power

is taken from the municipal lighting and power system.

Although the lines in Prague have many curves and steep grades, some very good traffic records have been made. Thus, during the recent gymnastic festival, July 3 to July 6, 1926, more than 1,000,000 passengers were carried on the day of greatest traffic. The usual average on the Prague system is about 440,000. For this special festival 100 new motor cars and 100 new trail cars were purchased, some additional track was built and special schedules and routes were adopted to facilitate the transportation of people to and from the Stadium, or place where the gymnastic exercises were held.

At this point trains containing 200 passengers or more were dispatched at intervals of from sixteen to nineteen seconds, although the grades at this point are as high as 6 per cent. The number of night tickets sold on one of the days was 40,000, although night



At Left, Standard 40-Kw. Motor of Prague Street Railways. At Right, Standard 25-Kw. Motor of Brlnn Street Railways

tickets command an extra rate in Prague and the usual number of such tickets issued daily is only 5,000. The daily energy consumption during this period reached a maximum of 140,000 kw.-hr.

The motors used on the cars in Prague, as well as in Brünn, the next largest city in Czechoslovakia and the capital of Moravia, were supplied by the Skoda Works at Pilsen. In the accompanying illustrations views are shown of the latest motors as well as of the latest form of controller, which is of the camshaft type with mechanically operated contactors. The overhead construction is of the usual form for trolley wheel use and not for the bow type of trolley, as in many cities in central Europe.

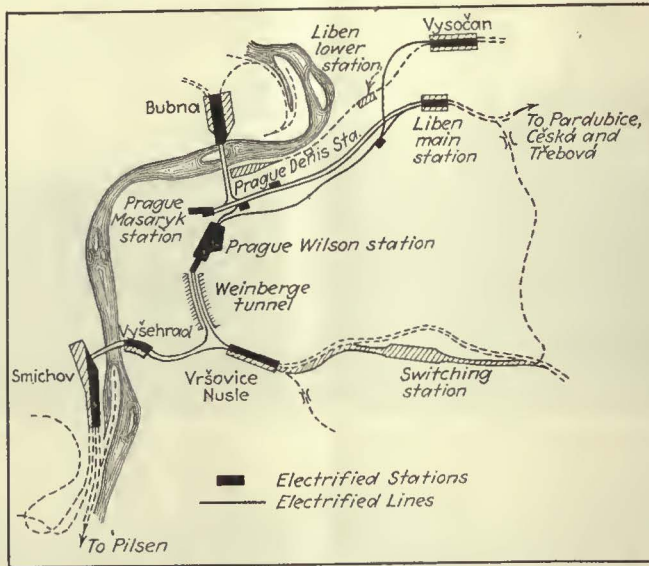
Other cities in Czechoslovakia besides Prague and Brünn, which have standard gage street railways, are Kaschau, Olmütz and Pilsen. There are narrow gage street railway lines in Oderberg, Pressburg, Budweis, Gablonz, Iglan, Richenberg, Marienbad, Brůx, Troppau, Teplitz and Aussig.

INTERURBAN LINES

The three largest interurban electric railways in Czechoslovakia are as follows:

1. Tabor-Bechyne, 31 km. (20 miles) in length, in Bohemia. Tabor is on the direct railway line between Prague and Vienna.
2. The Tatra interurban system, 36 km. (23 miles) in length, in northern Slovakia.
3. Zartlesdorf-Lippen Railway, 28 km. (17 miles) in length, in south Bohemia.

The first mentioned, a standard-gage line, was built by the Krizik Electric Company of Prague and has been in operation since 1903. An interesting feature is the system of power distribution, which is of a modified three-wire type. There are two overhead contact wires, one carrying 700 volts positive and the other 700 volts



Map Showing Terminal Electrification at Prague

negative, with the rails as the neutral conductor. Each car is equipped with four 30-hp. motors permanently connected in two groups of two motors in series each, the middle point in each series group being grounded to the rail. The generators at the power station are wound to have an auxiliary set of brushes connected to the rail-ground, and in parallel with the generators is a storage battery also divided into two groups of cells with the connection between them joined to the neutral. Incidentally, it might be said, in 1905-06 the Krizik company built a 3,000-volt direct-current

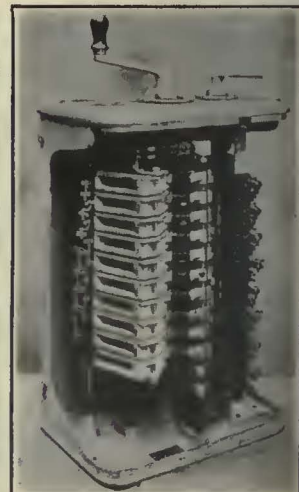
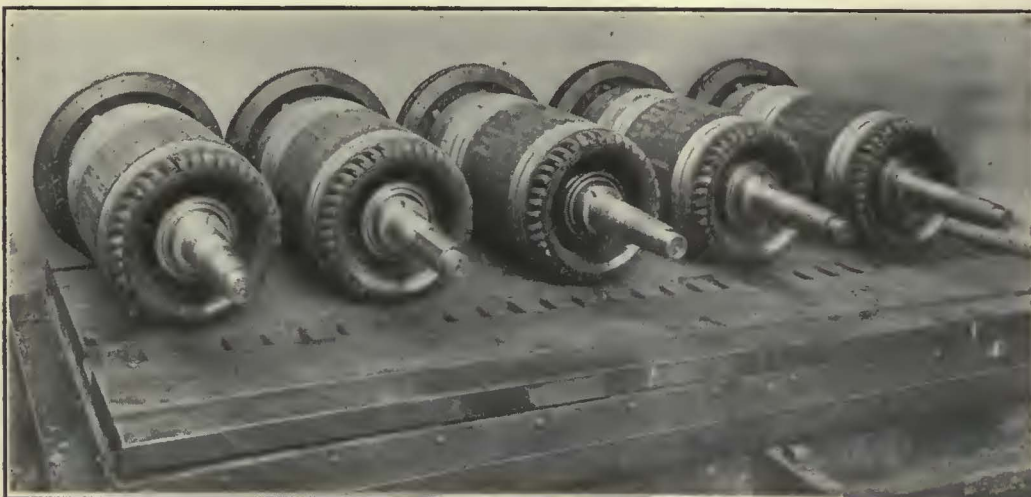
locomotive for Vienna on the same system; that is to say, with a difference of potential of 1,500 volts between each trolley wire and the ground. Each of the two driving axles of this locomotive was equipped with two 130-hp., 1,500-volt motors in series and connected to the driving axle by gearing.

The second interurban railway mentioned, the Tatra line, was built by the Siemens-Schuckert Works of Pressburg and the Ganz Company of Budapest. It operates through a region of splendid mountain scenery, with grades of more than 6 per cent. This line has the same system of distribution as that just described; that is to say, there are two overhead direct-current conductors, each with a difference of potential of 825 volts from the rails and of 1,650 volts difference between each other.

On one freight locomotive the motors are wound directly for 1,650 volts, but the motors on all of the other cars are wound for 825 volts.

The Zartlesdorf railway operates at 1,200 volts d.c. It was equipped by the Siemens-Schuckert Works in Vienna and has only four electric motor cars and a freight locomotive.

Of the three lines mentioned, the first is standard gage, the two others are narrow gage. There are several other smaller narrow gage lines in Czechoslovakia.



At Left, Row of Railway Motor Armatures. At Right, Camshaft Type of Controller. This Equipment Is Used in Prague

This list of interurban lines does not include the important Pressburg-Vienna electric railway as only a very short portion of it is in Czechoslovakia. The remainder of the trackage is in Austria.

MOUNTAIN RAILWAYS

In the Alpine sections, aerial cable lines for passenger service are beginning to replace rack railways and cable incline railways, as the aerial lines are much cheaper in first cost. Several of these aerial cable lines have been in operation for a long time near Bozen and Meran in

employees, 900 motor cars and 700 trail cars. One-man cars are used on six of the smaller lines. Ten railways use track brakes.

RAILWAY ELECTRIFICATION

All main line railways in Czechoslovakia are the property of the government and since 1924 all electrified lines receive energy from the general three-phase, 50-cycle power transmission system in the country. In consequence of this standard, the high-voltage direct-current system has been adopted, most of the lines so far being built for 1,500 volts.

The most important electrification started is that at the Wilson terminal in Prague. This station is in the very heart of the city and with steam operation the emission of smoke from the locomotives was a great nuisance. In addition, the trains entering this station from the south had to pass through a long tunnel, so that the elimination of smoke-producing locomotives was very desirable.

The electrification of this new terminal was begun by the purchase of six storage battery locomotives to haul trains to and from the station through the tunnel and for a short distance beyond. One of these storage battery locomotives has been in regular service since May, 1926. It is the most powerful storage battery locomotive in Europe. It was built by the Krizik Electric Company and is illustrated in accompanying engravings. All principal data and details about it are given in the table. It operates from ten to twelve hours a day, hauling all important express and passenger trains in and out of the terminal and during this time uses only 300 kw.-hr. measured on the three-phase side of the motor charging set. It needs no boosting during its service time and is charged during three hours late at night. Its maximum energy consumption is 450 amp. at 450 volts.

There is one central cab for the locomotive engineer, who is the only operator required. A feature of the equipment is the drum controller with finger contacts which can be operated by either one of two hand wheels on a horizontal shaft, so that the driver can operate the controller from either side of the cab. Inside the control wheel is the handle of the starting switch for the electric pump of the vacuum brake. The main overload switch, the reversing switch, the battery changeover switch and the motor disconnecting switch are interlocked.

The battery equipment consists of 238 Tudor cells with an hourly rating of 392 amp.-hr. The four motors are 50 kw. each at 440 volts and 330 r.p.m. and have roller bearings, and motor braking is possible. The gear ratio is 1 to 5.118. The maximum motor efficiency, including gearing, is 88 per cent. The radius of action is 290 km. On a grade of 1.1 per cent and on a curve of 284 meters radius the locomotive has hauled a train of 400 metric tons at a speed of 5.5 km. per hour.

In the winter of 1925-26 sixteen electric locomotives for express, passenger, freight and switching service with overhead current distribution at 1,350-1,500 volts were ordered. Details about these locomotives are given in the accompanying table, together with those of the

Data of Electric Locomotives of the Czechoslovakian State Railways

Locomotive Contractors for Mechanical Electrical	Type	Number Ordered	Sketch of Locomotive	Number of Motors	Type of Motor	Gearing	Gear Ratio	One Hour Rating per Wheel in Hp.	Weight in Kg.		Control	Total Length over Buffers in mm.	Speed in Km-Hr. Normal Maximum
									Adhesion on Drivers	Total			
Breitfeld Daněk Křižík - B.C.	1+AAAA+1	2		4	Interpoles, size pole	Buchli gearing	33.205	1460	60,000	84,000	Electropneumatic B B C camshaft controller	14,760	50 90
Passenger and Express Škoda Works	1+AAAA+1	3		4x2	Interpoles and compensating winding	Quill Drive	13.68	1600	64,000	84,000	Electric driven camshaft controller	14,500	50 90
Freight Zesmarovská-Kolben Zesmarovská-Kolben	AA+AA	4		4	Interpoles, field shunting	Tramway suspension, Flexible axle wheel	20/59	1300	64,000	64,000	Electropneumatic Wamsdorf controller	11,870	50 90 30 60
Passenger and Express Škoda Works	B+B	2		2x2	Interpoles and compensating winding	Quill Drive	16.066	800	53,000	53,000	Electropneumatic	10,200	50 50
Switching Adamshill Works Vickers (England)	AA+AA	2		4	Interpoles	Tramway suspension	14.06	920	50,000	50,000	Electropneumatic Wamsdorf controller	11,400	30 50
Switching Breitfeld Daněk Siemens & Co	AA+AA	2		4	Interpoles	Tramway suspension	14.42	736	54,000	54,000	Electropneumatic camshaft controller	11,300	30 50
Switching Breitfeld Daněk Křižík El. Co.	AA+AA Storage Battery	1		4	Interpoles, field shunting	Tramway suspension	18.78	260	66,000	66,000	Mechanical drum controller	12,200	12 40
Switching Křižík El. Co.	A+A	1	Two Axles Two Motors per Axle	4	Interpoles	Tramway suspension	1	460	32,000	32,000	Mechanical drum controller	7844	30 -

the Southern Tyrol, and there are others in the Swiss and Austrian Alps. Two lines of this kind will soon be built in Czechoslovakia, one at Reichtenberg, the other at Johannesbad. The driving sheaves of these lines are operated by three-phase slip-ring motors, or by d.c. motors with Leonard control, and recuperation takes place when the down load is greater than the up load. Separate carrying and driving cables are used.

INVESTMENT AND TRAFFIC STATISTICS

The total investment in the electric street and interurban lines in Czechoslovakia is estimated to be about \$50,000,000 and the passenger traffic amounts to about 325,000,000 passengers yearly. There are about 7,000

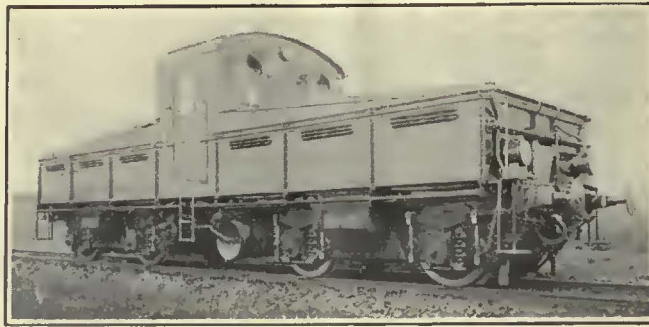
old Krizik locomotive from Vienna already mentioned, as this locomotive has now been adapted for Czechoslovakian service.

Individual axle drive is used exclusively, the motor suspension being usually of the tramway type, one exception being the switching locomotive of the Skoda Works (No. 4 in the table) which has two twin motors with gearing, crank and a horizontal connecting rod.

Most of the locomotives are mounted on double trucks with all axles motor driven. An exception is the first given in the table, which is of the solid frame type with pilot wheels. The second locomotive given in the table also has pilot wheels, so that all of the passenger locomotives are so equipped, but it is planned in the future to do without them and to use type C + C or B + B + B for the larger units which are built for speeds up to 110 km. per hour.

The maximum output per driving axle for the locomotive with tramway type of suspension for the motors is 400 hp., but for the quill or Buchli method of connection the output is as high as 1,000 hp. per driving axle.

In connection with the list of manufacturers, it should be said that the Krizik Electric Company has business relations with the Brown-Boveri Works at Baden and for stationary machinery with the Bergmann Works at Berlin, the Cesko-Moravska-Kolben has connections with the Westinghouse Electric & Manufacturing Company and the Skoda Works with Schneider Creusot of France, the Adamsthal Works near Brünn is in collaboration with the English Vickers Company and Siemens & Company are in close relation with the Siemens-Schuckert Company of Vienna and Berlin. It should also be stated that the AEG-Union Electric Company, which co-operates with the Allgemeine Elektrizitäts Gesellschaft of Berlin and the General Electric Company



Storage Battery Locomotive in Terminal Service in Prague

of Schenectady, received an order for the line equipment of the Wilson terminus.

It will be noted that some of the engines have twin motors and some motors have a compensating winding to neutralize the armature cross field and reduce the voltage between commutator bars. The field is weakened not only by shunting the field winding through

a resistance, but also by changing the field turns in circuit. All the motor ratings given in the table are for the lowest trolley voltage of 1,350. All of the motors in the locomotives are of the ventilated type. The cushion or elastic type of gear is used on some of the locomotives.

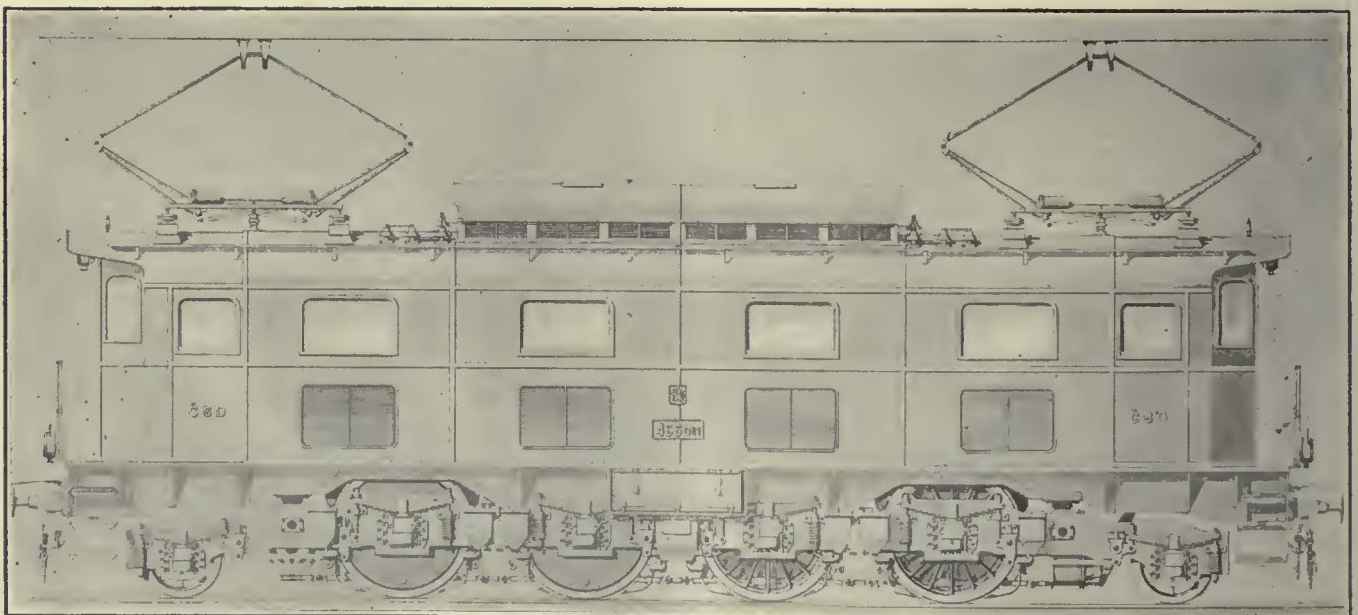
Contact switches are employed on all the locomotives in connection with the control system but are not operated electromagnetically. They are equipped for operation either electropneumatically with single cylinders for each switch or by a camshaft, and this shaft is operated either electro-pneumatically or by an electric motor or by hand, as stated in one of the columns in the table.

LIGHT, HEAT AND BRAKE EQUIPMENT

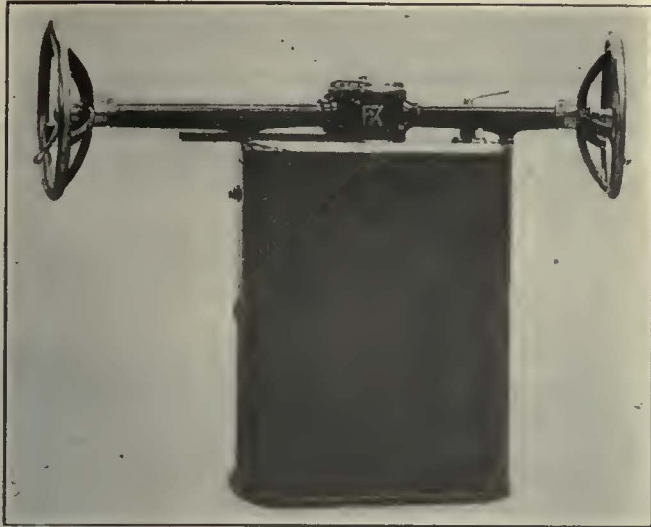
The light and control circuits are fed from a storage battery of two 24-volt units, but the heaters and all auxiliary motors for fans, compressors, etc., are supplied from the 1,500-volt trolley circuit. The cabs are heated electrically, but passenger cars are heated from a special steam boiler car. The whistle and sanders are operated pneumatically.

All locomotives are equipped with both air brakes and hand brakes, and the passenger and freight locomotives also have vacuum brakes. Every passenger and freight locomotive has two Westinghouse air operated pantograph collectors with two bows per collector. The contact pressure used is from 10 to 12 kg. (22 to 26 lb.).

Catenary overhead construction is used, and in some



One of the Passenger Electric Locomotives Being Built for the Prague Electrification. It Has Four Twin Type Motor Sets, one for Each Driving Axle



Controller for Storage Battery Locomotive

sections there are counterbalances to keep the trolley wire taut. The distance between the supporting poles is from 50 to 90 m. (165 to 275 ft.). Over each track there are two contact wires of 100 sq.mm. area (about 200,000 circ.mils). The messenger cable is just half the size and is of bronze in the tunnels and steel elsewhere. The rail bonds are soldered and welded.

POWER DISTRIBUTION

The single substation for the electrified zones in Prague is near the terminal and contains one double rotary of 2,000 kw. and one of 1,000 kw., built to supply two circuits of 750 volts in series. The rotaries have only shunt excitation, and a quick-acting circuit breaker is inserted in both direct-current lines. Future substations will be equipped with rotaries producing directly 1,500 volts in single machines and with mercury arc rectifiers. Power is received at the substation at 22,000 volts, three phase, from the local central station.

FUTURE PROGRAM

It is expected that complete electric service at the Wilson Station will begin in 1927. Later plans include the electrification of several suburban lines with motor cars, which will use the main line tracks for their suburban runs and the street railway tracks for city distribution in Prague. It is expected also to extend the trunk line electrification from Prague to Pilsen on the west and Trebova on the east.

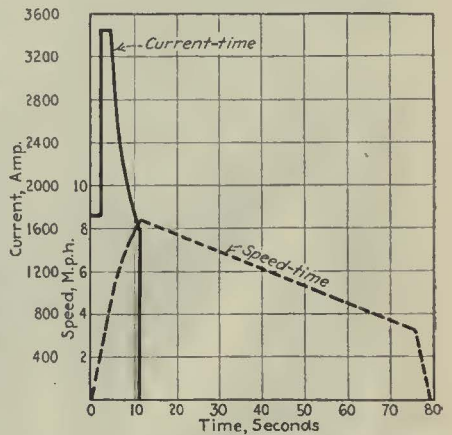
Largest Storage Battery Locomotive Demonstrated

Before Many Witnesses the New 118-Ton Unit, Designed as an Intermediate Step in Electrification, Performs Switching Service in Competition with 127-Ton M-1 Steam Locomotive

WITNESSED by 100 representatives of railroads and manufacturers, the new storage-battery locomotive built for the Chicago & Northwestern Railway demonstrated in a satisfactory manner its ability to perform in competition with the M-1 type of steam switcher. The electric engine was designed to replace the M-1 type and several tests were made on Nov. 18 to demonstrate the relative operating characteristics of each.

The first test was to determine the time required to move a given train

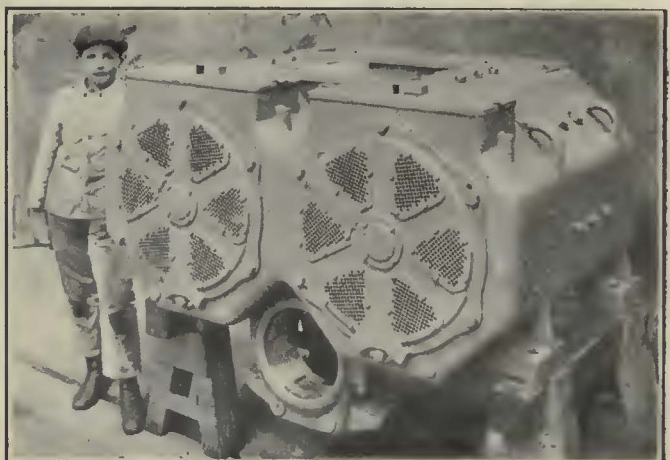
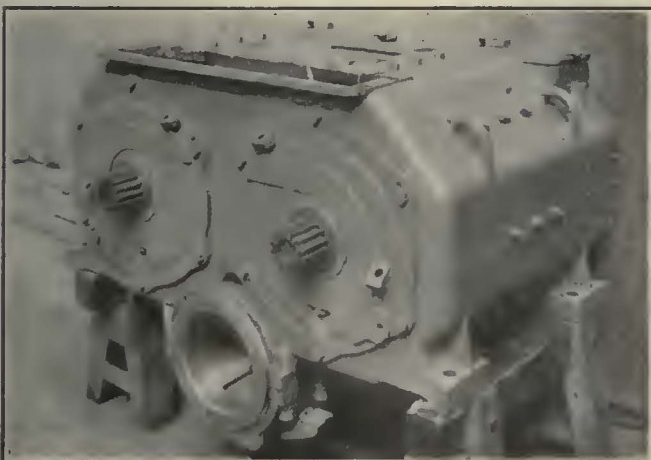
100 ft. from a standing start on a level tangent track with no slack in the train. The M-1 type of steam engine could not start the 1,700-ton test train assembled for this purpose without taking slack. The storage battery engine required 37.8 seconds to cover this distance under the conditions prescribed. Later the new unit demonstrated its ability to "kick off" fifteen cars, or 1,160 tons, over the hump and into the lead in 14.5 minutes. No comparative test of the steam engine was made.



Speed Time Curve for New Chicago & Northwestern Storage Battery Locomotive, Performing an Average Switching Movement as Determined by the Chicago Smoke Abatement Report. Trailing Train Weighs 306 Tons, Average Speed 5.4 M.P.H., Average Run 0.119 Mile, Per Cent of Time in Motion 60.1.

Of spectacular interest was the "tug of war" between the M-1 and the storage-battery engine, in which the latter won in both of the two trials made.

This new type of engine is dependent primarily on central station power for charging and hence was of direct interest to light and power officials. The tests



At Left Pinion End and at Right Commutator End of 425-Hp., 1,500-Volt Locomotive Twin Motor

were run coincident with a meeting in Chicago of the electrification committee of the National Electric Light Association, of which Britton I. Budd is chairman. Mr. Budd and many other members of this committee were present.

In all, seventeen railroads were represented by one or more delegates, as well as several associations. Many individuals interested in electric transportation were present, including Dr. Herman Bundeson, commissioner of health city of Chicago, who is most interested in this step toward electrification from the smoke abate-

able for driving the motor-generator. In this way the gas-electric set could be eliminated.

The M-1 weighs 126.83 tons complete with 60 tons on drivers, while the electric weighs 118.5 tons with all weight on drivers. The electric is 52 ft. long over couplers, 10 ft. 3 in. wide over rail guards and 14 ft. 6½ in. high. Two trucks are used with four GE-287 motors wound to operate at 225 volts each. Gear ratio is 66/13 on 39-in. wheels. The locomotive was constructed by the General Electric Company at the Erie works and made the trip from Erie to Chicago under its own power.



Railroad Officials Watching the Largest Storage Battery Locomotive Start a 1,700-Ton Train Without Taking Slack and Move 100 Ft. in 37.8 Seconds. The M-1 Type Steam Switcher Which This New Unit Is Designed to Replace Could Not Start the Same Train. This Unit Is Now Performing Switching Service in Chicago for the Chicago & Northwestern Railway

ment standpoint. Representing the Chicago & Northwestern were H. T. Bentley, general superintendent; S. W. Hand, assistant to the president, and H. M. Eicholtz, assistant general manager.

Primarily, this type of locomotive is only a step toward full electrification. It is intended to perform switching service in big cities in which smoke, gases and noise have become a serious detriment to surrounding residences and business establishments. The present unit has a 200-hp. gasoline-electric "kicker" to give the battery a partial charge when the required full day's performance would exceed the battery charge. Under severe service the normal battery charge can be used up in a few hours, or under light switching service it will last sixteen hours. Normally the engine should be out of service eight hours a day for complete charging.

A second logical step toward electrification would be to erect a short stretch of trolley over the track most frequently used and by means of a pantograph and a high-speed motor-generator on the locomotive the battery could receive frequent short charges. The trolley would be permanently connected to a power source suit-

A stop was made at Cleveland, where the engine was placed on exhibit during the last A.E.R.A. convention.

Electric Storage Battery Company's type FL-31 Iron-clad, 120-cell battery is used. It weighs approximately 78,960 lb. and has a 2,700-amp.-hour discharge capacity at the six-hour rate. The maximum discharge rate is 6,500 amp.

The locomotive will haul a 2,000-ton train, including the locomotive, on level tangent track at a maximum speed of 12.7 m.p.h. and will haul this train 15.8 miles on one complete discharge of the battery.

When hauling a 333-ton train (total weight) at 20 m.p.h. the cost of energy per mile, using the battery alone, is 7.5 cents, assuming an "off-peak" charging schedule of 1 cent per kilowatt-hour.

The smoke abatement report of Chicago shows that the average switching duty for the engines in all Chicago yards requires a speed of 5.4 m.p.h., a total distance traveled per eight-hour day of 26 miles, requiring a coal consumption of 0.37 tons per hour. The average weight of switching train is 425 tons and the average length of run 628 ft. It is for this service that the storage-battery locomotive was designed.

Increased Demand for Automotive Service Equipment

Purchases in 1926 Were the Largest of Any Year of Record—Many Trucks for Miscellaneous Haulage Purposes Were Ordered

FLEXIBILITY of automotive service equipment is proving popular with electric railways. Automotive vehicles are replacing many of the electric cars previously used for carrying material from place to place. It has a particular advantage in that it can reach distant points by direct route, and does not have to follow the track. For wreckage purposes, its flexibility enables it to reach the point of trouble quickly and without waiting for the clearing of long lines of stalled electric cars.

In an accompanying table the automotive service equipment which was ordered by electric railways during the year 1926 is listed. An interesting feature of

these figures is the large number of automotive trucks purchased for miscellaneous uses such as for removal of snow and transportation of freight and express. Many railways are finding these trucks of particular convenience in following up electrically equipped sweepers and snow plows which clean the track area. By the use of automotive equipment areas adjacent to the track are cleared quickly and congestion of traffic on the tracks is prevented. A number of railways also have contracts with city governments for the removal of snow adjacent to the car tracks and for this work the automotive equipment is found of particular value.

A general summary of the various types of equipment which are shown in the table, together with the comparisons of equipment ordered in previous years, appeared in the Jan. 1 issue of this paper. Lack of space prevented the publication of this table in that issue. The list includes 52 railway companies which ordered a total of 347 automotive service vehicles during the year just ended. This is an increase of approximately 25 per cent over purchases made in the preceding year.

Automotive Service Equipment Ordered by Railways During 1926

Name of Railway	No.	Type	Capacity, Tons	Make	Name of Railway	No.	Type	Capacity, Tons	Make
Connecticut									
Connecticut Co.	2	Frt. & Exp. Truck	1½	Reo		6	Service Trucks	3½	White-C.S.L.
	1	Frt. & Exp. Truck	3½	White		1	Service Truck	2½	Mack-Press Sons
	2	Service Truck	2½	Mack		1	Service Truck	3	Auto Car
	1	Tower Truck	2½	White	Indiana				
	1	Dump Truck	1½	Ford	So. Indiana Gas & Elec. Co.	1	Service Truck	1	Graham
	1	Snow Plow	1	Reo Signal	Iowa				
	1	Snow Plow	1½	Reo Tower	Sioux City Service Co.	1	Truck	1	Ford
	2	Snow Plow	½	Ford Service	Kentucky				
	3	Snow Plow	....	Good Roads Mach.	Louisville Ry.	3	Service Truck	3	Ford
Massachusetts						1	Service Truck	1½	Graham
Boston Elevated Ry.	77	Truck and Tractor	....	....	Michigan				
	18	Truck and Tractor	....	....	Dept. of St. Rys., Detroit..	5	Service Truck	....	Ford
Eastern Mass. St. Ry.	7	Tractor	5	....		1	Truck	....	Cummings
Middlesex & Boston St. Ry.	1	Truck	1	Graham		6	Truck	....	Walter
Union Street Ry.	1	Tower Truck	2½	Auto Car-U. S. Ry.	Minnesota				
Worcester Cons. St. Ry.	1	Truck	1	Federal	Twin City Rapid Trans. Co.	2	Truck	1	Ford
Maryland					Missouri				
Cumberland & Westernport Electric Ry.	1	Frt. & Exp. Truck	3½	White	United Rys. of St. Louis..	2	Tractors	....	Fordson
New Jersey						1	Truck	1	Ford
Morris County Traction Co.	1	Snow Plow	....	Walter		1	Truck	2	White
New York						2	Tower Truck	2½	White-U.R.
Brooklyn City R.R.	21	Various	½-5	White & Ford	Ohio				
Brooklyn-Manhattan Transit Corp.	20	Truck	Var.	G. M. C.	Community Traction Co.	1	Tower Truck	1	Inter.-McArdle
Buffalo & Erie Ry.	4	Frt. & Exp. Truck	14½	White-Niagara	Peensylvania-Ohio El. Co.	1	Truck	2½	White
Newburgh Pub. Serv. Corp.	6	Trailers	5	....		1	Truck	2½	Mack
New York State Rys.	1	.....	5	.....	Toledo, Bowling Green & Southern Traction Co.	2	Truck	1	Ford
(Rochester)	1	Express Truck	1½	Graham-N.Y.S. Rys.	Alabama				
	1	Line Truck	1	Reo-N.Y.S. Rys.	Birmingham Electric Co.	3	Truck	5½	White-B.E. Co.
	1	Service Car	1	Studebaker-N.Y.S. Rys.		1	Truck	5½	Ford
	1	Money Wagon	1	Brockway-N.Y.S. Rys.	Florida				
N. Y. State Rys. (Syracuse)	1	Express Truck	3	Sanford-N.Y.S. Rys.	Miami Beach Ry.	1	Truck	½	Graham
	1	Tractor	5	G. M. C.	Georgia				
	2	Trailers	2½	Wolverine	Macou Ry. & Light Co.	1	Tower Truck	2	White-McCardle
	1	Service Truck	1	Reo-N.Y.S. Rys.	California				
N. Y. State Rys. (Utica)	2	Express Truck	5	White-N.Y.S. Rys.	Key System Transit Co.	18	Trucks	....	Various Kinds
	1	Express Truck	1½	Brockway-N.Y.S. Rys.	Market Street Ry.	1	Frt. & Exp. Truck	3½	Fageol
	1	Express Truck	1½	G.M.C.-N.Y.S. Rys.	Municipal Ry. of San Francisco	1	Dump Truck	5	White
	1	Service Car	1	Reo N.Y.S. Rys.	Pacific Electric Ry.	1	Service Truck	1	Graham
Richmond Light & R.R. Co.	1	Tower Truck	....	Auto Truck	Nebraska				
Third Avenue Ry.	1	Truck	....	Reo	Omaha & Council Bluffs Street Ry.	1	Truck	1	Ford
United Traction Co.	2	Tank Trucks	5	Mack-Sharpsville	Texas				
	2	Snow Plows	2½	Walter	Dallas Ry. & Terminal Co.	1	Truck	....	Chevrolet
	1	Service Truck	1	Ford		1	Truck	....	Ford
Pennsylvania						1	Truck	1	Ford-E. P. E. Co.
Altoona & Logan Valley Electric Ry.	1	Truck	2½	Mack	Washington				
Erie Rys.	2	Dump Trucks	1½	....	Puget Sound Pwr. & Lt. Co.	2	Truck	1	Graham
Lewistown & Reedsville Electric Ry.	1	Truck	2½	Yellow		1	Truck	1½	G.M.C.-P.S.P. & L. Co
Philadelphia & West Chester Traction Co.	1	Service Truck	½	Dodge		1	Truck	1½	Garford-P.S.P. & L. Co
	1	Snow Plow	7	Walter		1	Money Truck	1	Graham
West Penn Rys.	1	Tower Truck	2½	White	Canada				
Illinois					British Columbia Elec. Co.	2	Frt. & Exp. Truck	3	Federal-B. C. E. Co.
Aurora, Elgin & Fox River Electric Co.	1	Truck	1	Reo		3	Frt. & Exp. Truck	2	Federal-B.C.E. Co.
Chicago & Joliet Elec. Ry.	2	Truck	2½	Garford		2	Frt. & Exp. Trailer	4	Dominion-B.C.E. Co.
Chicago, North Shore & Milwaukee R.R.	22	Trailers	8	Mobile-Cincinnati		3	Truck	2	Federal-B.C.E. Co.
Chicago Rapid Transit Co.	1	Truck	½	Ford		6	Service Car	½	Ford-B.C.E. Co.
Chicago Surface Lines	1	Frt. & Exp. Truck	....	Ford-DeKalbe		1	Truck	....	Ford
	2	Frt. & Exp. Truck	3½	White-Wayman & Murphy	Hydro Electric Rys.	6	Dump Truck	1	Ford-Hughes Keenan
					Montreal Tramways	2	Express Truck	2½	Federal
						1	Express Truck	3	Leyland
						1	Tower Truck	2½	Federal
					Toronto Transp. Com.	15	Truck	....	Ford
					Total	347			

The Readers' Forum

Traffic Congestion Editorial Approved

NEW YORK, N. Y., Dec. 24, 1926.

To the Editor:

I wish to compliment the writer of the editorial on page 1079 of the Dec. 18 issue of *ELECTRIC RAILWAY JOURNAL* on the subject of "Traffic Congestion in New York City."

I should like to see some set-up effected by interested parties whereby this character of information would get a wider circulation and be placed in the hands of the riding public.

T. R. LANGAN,

President Metropolitan Section A.E.R.A.

Foreman Conferences Can Help

BOSTON ELEVATED RAILWAY

BOSTON, Jan. 1, 1927.

To the Editor:

The editorials on educational activities in the steam and electric railway fields which appeared in recent issues of the *ELECTRIC RAILWAY JOURNAL* are timely and sound in their reasoning. Our experience has shown that men in supervisory positions; that is, foremen in a broad sense, are eager to discuss the principles of foremanship, and their interest increases after they see the possibilities of such discussion. Your statement regarding the continued enthusiasm of foremen in the steam-railroad field could be duplicated with respect to our own field and that of manufacturing.

It is probable that the average foreman has never had an opportunity to think of his duties in a broad way. He has come up from the ranks and presumably has been a skilled workman, using that term to cover all kinds of electric railway work. He has had difficulty in detaching himself from the point of view of the workman. When he has pointed out to him the possibilities of his supervisory work in seeing that what is supposed to be done is done right, in considering the element of cost, in insuring that each job under him is being done in the best possible way, in looking out for the welfare of his working force, in co-operating with the working force, his fellow foremen and the management, etc., he is amazed, delighted and stimulated to make the most of his opportunities. This explains, to my mind, the widespread interest in foreman conferences, and it is to be deplored that more executives do not appreciate the fallow field which lies right at their door.

You touch upon the subject of apprenticeship, which is more difficult to deal with. The old-fashioned apprenticeship system has largely died out and there is nothing yet to take its place. The manufacturing industries are possibly getting hold of this situation, but not on the old basis. The steam railroads seem to be making some progress too. The subject is one which ought to be discussed freely in our industry. I hope that your correspondents will take it up. In the meantime, little discussion is needed on foreman conference plans. The foremen everywhere will welcome these conferences. All that is needed is for some one on each property to give the matter careful study. The American Electric Railway Association committee on education, under the leadership of Edward Dana, through its

series of "How-to-do-it" booklets has made its recommendations very definite. The demonstrations under the auspices of the committee, which you indorsed in your editorials, have shown how uniformly foremen from different properties, previously unacquainted with each other and with the foreman conference plan, react to these conferences.

H. H. NORRIS,
Educational Adviser.

Long Electric Trains Not Unusual

NEW YORK, NEW HAVEN & HARTFORD RAILROAD

NEW HAVEN, CONN., Dec. 11, 1926.

To the Editor:

I noted with interest your account as published on page 568 of the *JOURNAL* for Oct. 2 of the test of the New York Central locomotive between Harmon and New York City, in which it was stated that the train of 108 freight cars was "the longest ever seen in New York City." I beg leave to call to your attention the fact that on the New Haven Railroad there are freight trains (electrically operated) relatively frequently of more than 100 cars and in numerous instances of more than 108 cars, these trains being hauled along the Harlem River branch to the Harlem River or Oak Point terminals.

SIDNEY WITHINGTON,
Electrical Engineer.

Buses Extend and Augment Rail Lines

THIS advertisement of the Pennsylvania Coach Lines in recent issues of the *Official Cleveland Guide* shows not only the progressive leadership of this subsidiary of the Pennsylvania Ohio Electric Company but the wide

Travel Service DeLuxe

To Warren, Youngstown,
New Castle and Sharon

By The

P. O. COACH LINES

—Every Hour on the Hour—

Coaches Leave Union Bus Terminal
2133 E. 9th St. Phone Sup. 2450

Limiteds		Locals	
7:00, 9:00, 11:00 A. M.	5:00 A. M. Hourly to 5:00		
1:00, 3:00, 5:00 P. M.	5:30, 7:00 P. M., 8:00 P. M.		
11:15 P. M. COACH SAT., SUN., HOLIDAYS			

THE EARLY BIRD SPECIAL
Particularly for Traveling Men
Leaves Cleveland at 6 A. M.

extent of the service supplied. A few years ago the parent company operated only rail service to Youngstown and Warren, Sharon, Newcastle and intermediate points, with connections as shown.

Maintenance Notes

Pneumatic-Tired Truck for Moving Fenders

HANDLING and transporting fenders in and about the shop of the York Railways, York, Pa., was always a troublesome and expensive job until E. L. Greene, master mechanic, designed and constructed a pneumatic-tired hand truck to facilitate this work. This truck has a pair of Ford automobile wheels mounted

*Railway operator's "three R's"—
Requisition, Reliable, Renewals.*

to the end of a pole and is long enough to permit of being hooked over the trolley wire, or, better still, over an ear, because of the lessened liability of the wire being damaged by an arc.

The usual place for the fuse in such a circuit is at the motor, the idea being to protect the machinery.

However, on the lines of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., after having had the trolley wire burned down on several occasions due to the insulation of the jumper wire becoming worn off and the wire grounding on the track, a fuse has been installed in the wire on the pole, where it is so close to the trolley wire that there is no chance for a ground occurring inside of its protection. This location is most satisfactory.



Fender Loaded on Pneumatic-Tired Truck Ready for Transportation

on an axle to which is attached a 6-ft. by 3-ft. underslung rectangular oak frame of rugged construction. This is fitted with suitable saddles and rests to permit the safe, steady carrying of fenders in a vertical position.

Fenders are very unwieldy pieces of apparatus to handle and to transport them to and from various sections of the shop formerly required the services of two men and was necessarily rather slow. Since this truck has been placed in service one man has been able to load and transport fenders around the shop. This results in a reduction in fender labor maintenance and a tremendous increase in shop transportation speed.

Location of the Jumper Fuse

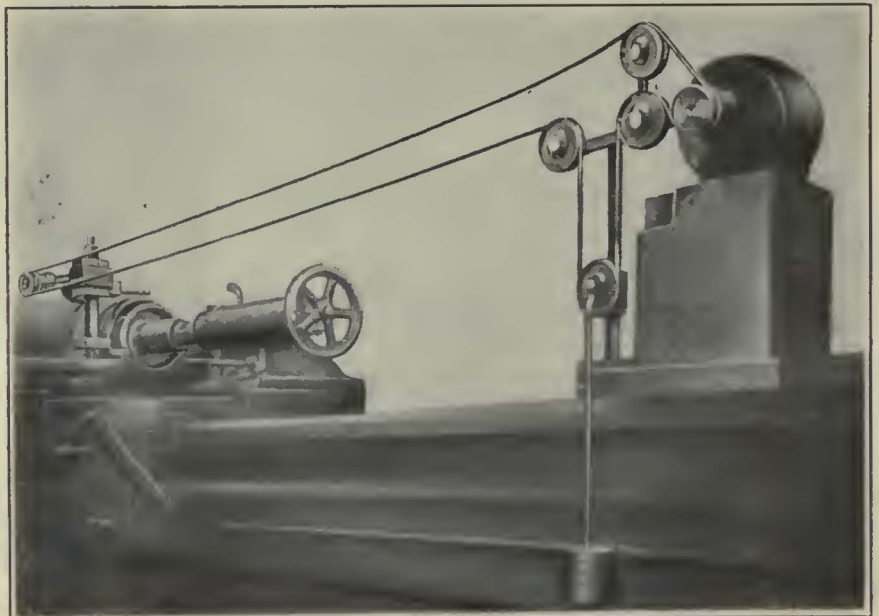
WHEN a piece of apparatus driven by an electric motor is used out on the line the power is generally taken from the trolley wire through a wire jumper with a hook on its end. The hook is attached

Commutator Slotter on Lathe Tool Stand

FULLY appreciating the value of commutator slotting, and not being financially able to purchase a manufacturer's product, the Williamsport Passenger Railway, Williamsport, Pa., designed and built a slotting device in its shop. The equipment is designed to be used in connection with a lathe. It is of the semi-portable type, since the slotter proper can be set up readily on the lathe tool stand or removed at will. The motor, with a group of pulleys, is installed on a wood pedestal and is clamped and mounted permanently on the extreme right-hand end of the lathe rails.

A 1-in. steel tube is fastened to a steel plate on one end and to the saw shaft bearing casting on the other. Passing through tube, steel plate and bearing casting is a $\frac{1}{2}$ -in. bolt used for fastening the machine to the tool stand. The saw shaft passes through suitable bearings. On its end is a 3-in. grooved pulley.

A $\frac{1}{4}$ -hp., 110-volt universal motor drives the slotting machine by means of a $\frac{3}{8}$ -in. round belt guided and supported by 3-in. grooved pulleys, all of which are stationary except the counterweight wheel. The depth of the slot is controlled by the diameter of the saw being used, whereas the lateral motion is ob-



Slotting Equipment Installed in Position and Ready for Use

tained by means of tool stand movement. The lengthening or shortening of the belt due to the tool stand travel is taken up by means of a counterweight attached to a 3-in. grooved pulley suspended over the lower part of the belt, held in place and guided in its oscillating vertical movement by a 1-in. T-iron bracket fastened to the motor foundation

"Keep up" with your schedules by systematic equipment "up keep."

block. The other pulleys are rigidly supported and act as directional belt deflectors. This equipment has been giving satisfactory service for about two years.

Derrick for Lifting Motors and Trucks

NCESSITY, as the mother of invention, has been very clearly demonstrated by the shop organization of the Valley Railways, Lemoyne, Pa. Due to limited shop space and track facilities, it was found impracticable to take care of painting, damaged car repairs and motor or truck overhauling at the same time. This interfered greatly with the usual maintenance procedures. Lifting facilities in the shop often were obstructed by work in

progress. In order to reduce such interruptions a derrick was erected outside the shop building on an adjacent track. This derrick consists of an 8-in. iron pipe mast inserted in a concrete foundation, and a boom made of 65-lb. T-rail, reinforced by a T-rail diagonal brace and a 1-in. x 4-in. vertical brace of steel strap, all being bolted together rigidly. The upper end of the boom framing is provided with a guide ring and the lower end with a thrust ring,

thus permitting a free circular movement and providing a substantial construction for the carrying of the load.

The thrust ring rests and revolves upon a heavy circular band welded to the mast, which when lubricated, enables the operator to change its position without any great physical effort. Lifting is accomplished by means of a chain hoist suspended from a strong movable link attached to the boom. This derrick has proved very satisfactory and has been a means of obtaining a non-interrupted motor and truck overhauling schedule.

Pick-Up and Delivery Service for Storeroom

PICK-UP and delivery service is given by the storeroom in the South Park shop of the Los Angeles Railway to all departments included in the shop area. This system replaces the former method of delivering goods on requisition and has resulted in saving a substantial amount of money. Instead of 200 shop men per day calling at the storeroom for materials needed, four delivery clerks make regular calls on the several departments of the shop five times per day. They collect requisitions for material from pick-up boxes and make delivery of material to the proper departments. In some cases one department will requisition material to be delivered to another department for use by its men while doing special work there.

Requisitions are made out in duplicate, the original being given to the storeroom boy and the carbon retained by the department foreman for allocation of charges on the job. When the errand boy is making delivery, which often requires the use of a truck or cart, he collects salvage and scrap materials, which are returned to the storeroom for reclaiming or other disposal.

This system has eliminated the long line of men waiting 20 to 30 minutes at the storeroom counter for service. With 200 men calling at the storeroom, this amounted to a considerable loss in labor time. It has been calculated that the new system has resulted in a saving of \$15,000 a year.

Besides the saving in productive time, the entire department is speeded up because the materials needed are constantly available.



Truck Frame Suspended on Outdoor Derrick Chain Hoist

During the month of November 5,088 deliveries were made at an average of 4½ minutes per delivery.

When material is delivered, the original requisition, which is returned with it, is signed by the foreman. It is returned and placed in a box in the storeroom as a receipt for the delivery, also serving to check material on hand in the stockroom and indicating the department

Cover hints for ventilated motors—Porous knits or B.V.D.'s for summer, and red flannels when the snow flies.

to which general charge can be made. The foreman makes the detailed distribution of charges on his copy of the requisition.

mer is controlled by a trigger on the side of the handle. Current supply to the tamper is regulated through a small portable control box.

The alternating current required for operation of the apparatus is derived from a portable power plant consisting of a four-cylinder, 15-hp. Le Roi water-cooled gasoline engine direct connected to a 6-kva., 110-volt generator. Energy for the simultaneous operation of four tampers is supplied. The power plant weighs only 750 lb. and can be moved easily from place to place either by carrying or on dolly wheels.

Chief among the advantages claimed for this outfit are the rugged character of the tamper because it has only one moving part and the portability of the power plant because of its light weight.

New Equipment Available

Electric Tie Tamper Has Only One Moving Part

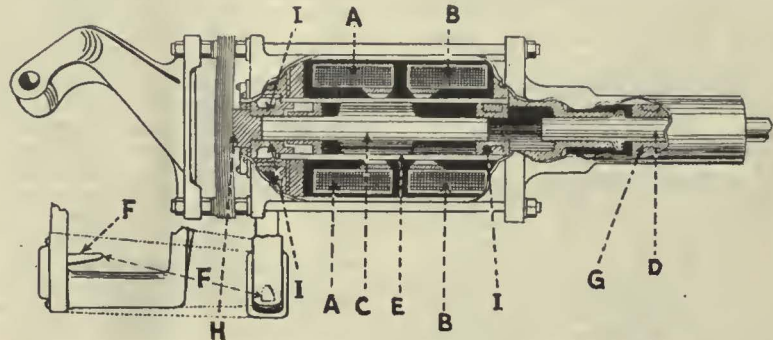
BY AN unusual application of magnets energized by alternating current, an electric tie tamper recently put on the market by the Syntron Company, Pittsburgh, Pa., is able to strike 1,200 blows per minute. It is claimed that this apparatus quadruples the amount of tamping that a track laborer can do in a day. During a test made by the Monongahela Railroad a 198-ft. section of track was electrically tamped in seven man-hours, while it required 26½ hours to tamp a section of the same length by hand. The cost of electric tamping was 1.5 cents per foot of track, as compared with 5.3 cents per foot for hand tamping. Detailed figures for this and another similar test are given in an accompanying table.

The Syntron electric tie tamper has only one moving part—the piston. Four powerful electromagnets are located in a cylindrical housing around the upper end of the piston. Energizing the magnets by alternating current gives the piston a reciprocating motion in synchronism with the supply voltage.

The tamping tool is held by a bushing so that it receives the full force of the blow as the piston reaches its maximum speed. On the backward stroke the piston impacts against a shock-absorbing device which takes up the kinetic energy of the movement and utilizes it to add force to the downward stroke.

An accompanying sketch shows the arrangement of the various parts of the apparatus. The total weight is 56 lb.

Starting and stopping of the ham-



Simplicity Is a Feature of the Syntron Electric Tie Tamper
 A and B—Magnets.
 C—Steel piston.
 D—Tamping tool.
 E—Cylindrical housing.
 F—Control trigger.
 G—Bushings.
 H—Shock absorber.
 I—Bushings.



The Power Plant of the Syntron Electric Tie Tamper Weighs so Little that It Can Be Carried by Hand from Place to Place.
A Battery of Four Electric Tampers at Work

TEST OF ELECTRIC TAMPING VERSUS HAND TAMPING CONDUCTED ON MONONGAHELA RAILROAD AT POINT MARION, PA.

		June 30, 1926														
	Rails	Ties	Feet	Lift, Inches	Men	Hours Work	Hours Tamp	Total Hours Tamp	Total Cost Tamp	Gas and Oil	Total Opp. Cost	Cost Per Rail	Cost Per Tie	Cost Per Foot	Cost Per Mile	
Hand tamp.	..	56	95	8	8	9	1½	14	\$5.60	....	\$5.60	....	\$0.10	\$0.059	\$311.52
Syntron tamp.	..	95	175	2	6	9	1½	10½	4.20	0.25	4.45	....	0.046	0.025	132.00
		July 2, 1926														
Hand tamp.	6	120	198	2	15	1½	1½	26½	\$10.50	....	\$10.50	\$1.75	\$0.08½	\$0.053	\$279.40
Syntron tamp.	6	120	198	2	6	1½	1½	7	2.80	0.20	3.00	0.50	0.02½	0.015	79.20	

Association News and Discussions

Midwestern Association Meets in Tulsa

MODERNIZATION of the interurban railway, public relations, improvement of transportation and the advantages of new equipment occupied the first day of the two-day session of the Midwest Electric Railway Association which was in session as this issue of the JOURNAL went to press.

After a cordial welcome to the city by Mayor H. F. Newblock of Tulsa, J. M. Bosenbury discussed in detail the methods by which the Illinois Traction System had succeeded in stopping a downward curve of passenger earnings and in building up a substantial increase in freight revenue. To improved equipment, increased speed and intense merchandising effort on the part of both the management and employees of the company was attributed the success accomplished.

The subject of public relations was handled from the angle of the public's own viewpoint by E. F. McKay, manager Oklahoma Utilities Association. Demonstrated sincerity of purpose was held by Mr. McKay to be the first principle in the establishment of a sound public relations policy. The speaker characterized the sense of his thought by pointing out that the establishment of good public relations, like good statesmanship, is dependent on successful diplomacy and that good diplomacy is merely good faith.

M. W. Welsh, manager Waterloo, Cedar Falls & Northern Railroad, representing the Iowa Electric Railway Association, addressed the meeting on the invitation of President Reynolds. He described the tendency of recent years for electric railways to adopt a defensive attitude instead of one of positive aggression. He maintained that the railways had not been given fair consideration, in some cases by their own managements, in comparing their performance with that of buses. "People like success," said Mr. Welsh, "and it is up to all of us to drop our tendency to whine about our troubles and concentrate on so improving our service as to win public interest and support."

In a paper which was declared by several of those in attendance to be one of the best ever delivered before a sectional association meeting R. N. Graham, manager railways Penn-Ohio Electric Company, Youngstown, Ohio, outlined the principles on which his company had so improved its condition as to win the Coffin Award for 1926. Mr. Graham's paper will be published in next week's issue.

A general survey of the industry, indicating that the railways of the country are expending in excess operating costs for obsolete equipment a sum sufficient to purchase 12,000 new cars per year at \$15,000 each, was the basis

for an address by Charles Gordon, indicating that the industry cannot afford longer to continue the operation of heavy and out-of-date cars. A further report of the meeting will be published next week.

Important Tentative American Standards Completed

WORK of the sectional committee of the American Engineering Standards Committee on tooth form of spur gears, which has been in progress for several years, has been completed and has been submitted for the formal approval of the A.E.S.C. as a tentative American standard. Several parts of the comprehensive work on bolt, nut and rivet proportions are now nearly completed, and the same is true of several sections of the work on pipe flanges and fittings. It is expected that the first of these to be issued will be that on high-pressure steel flanges, which, although not yet officially completed, is already practically the sole basis of industrial practice in recent advances in high-pressure steam practice.

The work on mechanical standards now in the course of development under A.E.S.C. procedure is so extensive that plans are under way for the organization of a representative advisory committee to keep the various parts of the work properly co-ordinated.

During the year 1926 specifications satisfactory to both the steam railways and electric railways have been agreed upon for the first time. It is an interesting illustration of the manifold inter-relationships of modern industry that eleven national organizations were officially represented on the sectional committee through which this unification of specifications has been accomplished. Specifications for tubular steel poles and for girder rails have also been unified and approved as tentative American standards.

Twenty of the 50 codes on the national safety code program have now been approved by the A.E.S.C. Among those receiving approval during 1926 were a group of codes for the prevention of dust explosions and new editions of the codes for abrasive wheels and punch presses.

A particularly important development has been the revision of the "National Electrical Code," which is the industry's bible for wiring devices. This included a settlement, by almost unanimous action, of a controversy of three years standing over the admission as approved material of non-metallic sheathed cable. This new material was approved for limited uses.

In connection with the safety code program, and upon the initiative of the

COMING MEETINGS OF Electric Railway and Allied Associations

Jan. 10-11—National Automobile Chamber of Commerce, third world motor transport congress, Hotel Roosevelt, New York City.

Jan. 10-14—American Road Builders' Association, convention and road show, Coliseum, Chicago, Ill.

Jan. 18—American Society of Safety Engineers, annual meeting, Cafe Boulevard, New York City, 6:30 p.m.

Jan. 19-20—Central Electric Traffic Association, Fort Wayne, Ind.

Jan. 21-22—Central Electric Railway Accountants' Association, Fort Wayne, Ind.

Jan. 25—New York Electric Railway Association, winter meeting, Hotel Commodore, New York City.

Jan. 26-28—Association of Equipment Men—Southern Properties, Peabody Hotel, Memphis, Tenn.

Feb. 3-4—Central Electric Railway Association, winter meeting, Toledo, O., Commodore Perry Hotel.

Feb. 4—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

Feb. 7-10—American Institute of Electrical Engineers, annual convention, Engineering Societies Building, New York City.

Feb. 10—Central Electric Railway Master Mechanics' Association, Toledo, Ohio.

Feb. 18-19—Kentucky Association of Public Utilities, annual convention, Brown Hotel, Louisville, Ky.

April 26-29—Southwestern Public Service Association, convention, New Orleans, La.

Oct. 3-7, 1927—American Electric Railway Association, annual convention, Public Auditorium, Cleveland, Ohio.

state industrial commissions, arrangements have been made for a revision of the standard plan of reporting and compiling accident statistics under the procedure of the American Engineering Standards Committee. This plan forms the general basis of the accident statistics of the various state governments and of the casualty insurance companies.

Third World Motor Congress

NATIONAL Automobile Chamber of Commerce will hold its third world motor congress Jan. 10 and 11 at the Hotel Roosevelt, New York City. Discussions of international development of motor transport, highways, trade practices, public relations and automotive finance will fill the major part of the program. Delegates will visit the National Automobile Show at the Grand Central Palace, Jan. 12, and will then go to Detroit and other Western cities to inspect factories of the industry.

The News of the Industry

Further Economies by Seattle Municipal Line

Economies which were to be put into effect on Jan. 3, including rerouting of cars, were expected to cut 40 men from the payroll of the Seattle Municipal Railway, Seattle, Wash., and reduce operating expenses an additional \$146,420 annually. D. W. Henderson, superintendent, so declared in a statement to Mayor Bertha K. Landes. The rerouting is part of the proposed economy program of the railway. It will decrease the week-day car-hours 308 hours and twelve minutes a day and the Sunday car-hours 404 hours and 45 minutes. This, Mr. Henderson says, will result in a saving of \$146,420 a year in platform time.

Meantime, the City Council has voted, eight to one, to repeal the ordinance enacted recently when the Seattle Clearing House Association refused to cash December payroll warrants of the railway, which provided for an increase from 2 to 2½ per cent interest on city funds. The banks refused to permit the advance and have refused city money at the new rate. The city's contracts with the banks expired on Dec. 31 and it was necessary to repeal the ordinance so that the city would not be faced with more than \$5,000,000 of money on hand and no place to bank it.

Street railway employees, through their union leaders, have informed Mayor Bertha K. Landes that they will fight any attempt by the city to lay off street railway employees on the efficiency rating basis. They declare that if lay-offs be made, they must be according to seniority. The city charter provides that lay-offs be based on the efficiency rating schedules, which the union men state violates the union principle that men employed the shortest time be the first to be discharged.

Meantime, Mayor Landes will begin a series of conferences immediately after Jan. 1 with officials of the Puget Sound Power & Light Company in an effort to extend the time for payment of the Municipal Street Railway debt. In the opinion of city officials, one of the most pressing of the department's financial problems will be ironed out if an extended payment plan can be put into effect.

Final Hearing on Utica and Syracuse Fares

Chairman Prendergast held the final hearing in Albany on Jan. 5 on the petition of the New York State Railways to the Public Service Commission for permission to increase railway fares on its Syracuse lines.

Evidence was submitted by Charles Hansel as to reproduction cost and value of the property of the railway. Mr. Bean, the chief engineer of the company, and B. E. Tilton, vice-presi-

dent and general manager of the Utica and Syracuse lines, were cross-examined by the attorney for the city. Mr. Tilton presented statements showing the result of operations on the Utica lines from Aug. 22 to Dec. 31 in the years 1925 and 1926, giving a comparison of the earnings in these two years, the effect of increased fares and the use of commutation tickets. He stated that the averages show that 27 per cent of the passengers are paying cash fares and 73 per cent buying tickets.

The engineers of the commission were cross-examined as to such inspections and their valuation of the property and equipment of the railway.

H. Duance Bruce, assistant corporation counsel, and Milo R. Maltbie, former Public Service Commissioner, represented the city of Syracuse. Willis H. Mitchell and W. G. Gannon of Gannon, Spencer, Mitchell & Riley, attorneys, represented the railway.

Counsel were given two weeks in which to file briefs. Mr. Prendergast stated that he would like to have the decision expedited as much as possible.

Inquiry Into Proposed Fare Changes in Newark

Proposed changes in eleven fare zones in northern New Jersey which the Public Service Railway and the Public Service Transportation Company, Newark, N. J., sought to make effective on Jan. 1 were suspended on Dec. 24 by the Board of Public Utility Commissioners of New Jersey for three months pending the outcome of a hearing called for Jan. 19 at Newark to inquire into the new schedule. The proposed readjustment was referred to at length in the *ELECTRIC RAILWAY JOURNAL* for Dec. 18, page 1111.

A Close Shave for Memphis

NOT a male member of the staff of the Memphis Street Railway, Memphis, Tenn., was overlooked in the distribution at Christmas of neatly bound holly boxes each containing a safety razor with strop. A total of 850 gifts was made to the company by A. D. McWhorter, general superintendent. An order for the razors was placed some weeks ago, and the plush lined boxes in which the razors were contained bore a special message with the imprint "Compliments of the Memphis Street Railway." Even President T. H. Tutwiler is expected to shave himself during the new year. The annual practice of distributing suitable presents to the employees' children was continued.

Downtown Dips Disapproved for Detroit

The Rapid Transit Commission of Detroit, Mich., in a report made public on Dec. 30, states that it believes the city is ready and can finance a complete rapid transit system, and that, in its opinion, construction of the "dips" would be "unwise and would set a bad precedent for the financing and construction of the remainder of the system."

Rather than build subway dips in the downtown section, the commission believes it advisable to begin subway construction on a smaller scale than that recommended in its original report, which embraced a complete unified system to all four sections of the city. It recommends that construction be started on the lesser scale only in event that the plan outlined is not put to the voters "on account of political, psychological or other reasons."

In the event that the city does not accept the plan recommended by the commission then that body recommended several alternatives, fifth among which is the subway dip plan suggested by Mayor Smith. This plan would entail construction of those portions of the Woodward, Grand River and Gratiot lines operating through the mile circle, in which the downtown section is located. Subway dips would compel the city to alter the financing plan already approved by the voters and "would fail to give train operated rapid transit and with it the special benefit to adjacent property accruing from real rapid transit."

A system of this kind could not be considered as anything but a street railway facility, the commission says.

The original recommendations of the Rapid Transit Commission called for the construction of 46.6 miles of subways at a cost of \$189,000,000. This plan is listed in the latest report as No. 1. The second alternative embraces the construction of 30.75 miles of tubes; No. 3, the Woodward, Grand River and Gratiot lines, 21.1 miles. The Woodward Avenue line, 7½ miles in length, comprises No. 4. Any one of these plans can be adopted and added to in the future, if the people desire to accomplish rapid transit in that form, the commission adds, although it urged against piecemeal construction.

The Rapid Transit Commission is a body created by the charter. Members are appointed by the Mayor. The report made public on Dec. 30 was submitted to the Mayor's finance committee Dec. 10, but was not made public at once at the request of the Rapid Transit Commission. Mayor Smith announced his approval of a "dip" plan at a meeting with the police in charge of the new traffic survey and the City Council on Dec. 29.

Chicago Franchise Question to Be Aired Again

With less than four weeks remaining for settlement of Chicago's traction difficulties before the existing franchises expire, Henry A. Blair, John J. Mitchell and Frederick H. Rawson, receivers for the Chicago Railways, and Leonard A. Busby, president of the Chicago City Railway, are to be given a final opportunity to explain their attitude on the question of an extension of their present twenty-year franchises, or to bring forward any other plan for the permanent solution of the problem, when they appear before the local transportation committee on Jan. 7.

Francis X. Busch, counsel for the city, is also expected to have ready at that time the tentative draft of the proposed new unified ordinances for the surface and elevated lines.

The delay in presenting this new ordinance has been caused by a deadlock on the question of regulation. While both sides agree that a commission of three or five members shall regulate the lines, they are widely apart on the question of who shall appoint the commission. Mr. Busch insists that the appointing power be vested in the Mayor, while the companies demand that they be permitted to appoint one member, the city the other, the third to be selected by agreement between the two others.

On Monday, Jan. 10, the revised draft of the ordinance proposed by the F. J. Lisman interests of New York will be resubmitted to the City Council. Further hearings on the Chicago Motor Coach Company's city-wide bus plan are likewise scheduled for next week.

Awaiting the appearance of the traction officials and bankers, members of the local transportation committee were inclined to lay the blame for the long delay in settlement on the companies themselves. The matter has been lying dormant, they declare, since Oct. 22, when the companies promised to sit in with them for the purpose of framing a new ordinance. Many of them are openly opposed to a franchise extension for the surface lines.

At a meeting on Jan. 3, Corporation Counsel Busch warned the Aldermen that the city must enter into some kind of agreement or contract before Feb. 1 if it is to protect its rights under the 1907 ordinance. "Any first mortgage bondholder can go into the federal court after Feb. 1 and protest the further payment of the city's 55 per cent of the net earnings while the bonds are in default," he pointed out.

In the case of the Chicago Railways, said Mr. Busch, any extension of the franchise would have to be accepted by the court, in spite of repeated assurances of the receivers.

Mr. Busch also suggested to the Aldermen that it would be more advisable to pass an ordinance providing for a "day-to-day" extension because there was some question as to whether the court would permit the Chicago Railways to accept an extension for a definite length of time.

Because the filing of an intervening petition in the Chicago Railways receivership with the federal district court would be equivalent to recognition of

the propriety of receivership procedure, Mr. Busch announced that he would not file the petition as he previously intended. [This petition was referred to in ELECTRIC RAILWAY JOURNAL for Jan. 1, 1927.] "The prudent thing to do," Mr. Brush said, "is to keep out as long as the city's rights are respected."

Terminable Permit Favored

Commission Recommends Passage of Legislation to Remove the Present Limitation

Elimination of the present twenty-year limitation on electric railway franchises in Illinois has been recommended by the state terminable permit commission. Announcement to this effect was made on Jan. 4 by a sub-committee. The commission went on record as favoring the right to terminate the permit, for cause or by purchase, and as believing in the soundness of the policy of regulation of public utilities by some governmental agency in matters of rates, service and financing, protecting the utility, the local municipality and the customers in their respective rights.

The report was submitted to the commission by a sub-committee of which Senator Richard Barr, Joliet, is chairman. Other members are Thurlow G. Essington, Streator, and Harold Kessinger, Aurora. The report follows:

It is the conclusion of this commission, and the practical working under the laws of other states shows, that the terminable permit has been the occasion of continuity of operation, not restricted by misunderstandings and bickerings incidental to the termination of an old franchise and the securing of a new one; that it has permitted wise and cheap financing, which, in turn, has permitted continuous growth, expansion and extensions required for the service of the inhabitants of the different communities served; that public utility questions have, to a large measure, been removed from politics; and that, as a result of all of these things, a higher standard and character of service has been attained, rates have been reduced, confidence of the investors on the one hand and of the utility patrons on the other hand has been established; and the entire public utility situation has been enormously improved.

This commission found that in the laws of the various states there are differences as to what body or authority shall issue the terminable permits, what body or authority shall have the right to revoke such permits, and what body or authority shall regulate the utility companies during the existence of the permits; but, so far as the terminable permit itself is concerned, there was practically unanimity of opinion in its favor and in its superiority to the definite term franchise.

The commission is further of the opinion that, in the issuance of terminable permits, the rights of the municipality to make reasonable requirements regarding the use of its streets and public places shall be maintained; and that the right to terminate the permit for cause or by purchase shall be provided. The commission further states unqualifiedly its belief in the soundness of the policy of regulation of public utilities by some governmental agency in matters of rates, service and financing, protecting the utility, the local municipality and the customers in their respective rights, but where this power of regulation should be placed is a matter upon which the commission was not authorized by the act of its creation to investigate or report.

This commission therefore recommends that appropriate legislation be adopted at this session of the General Assembly removing the present limitation of twenty years as the maximum term for which franchises may be granted to street railways; and authorizing the issuance of terminable permits to public utilities operating within this state, under such terms and conditions as may be deemed wise by this General Assembly to insure continuous and efficient operation of the utilities and to protect the public as to service and rates and its rights in and to streets and public places.

Final Briefs in Denver Franchise Case

Final arguments in the case involving the franchise of the Denver Tramway, Denver, Col., will be heard by the Supreme Court of the United States on about Jan. 15. At that time the court will be asked to decide whether the tramway has a perpetual franchise or whether it is bound by a twenty-year franchise, granted in 1906 and calling for a 5-cent fare. The contention of the city is that the company is bound to carry passengers in Denver for a 5-cent fare, in accordance with the 1906 franchise. The company argues that the 1906 franchise is a regulatory statute that became invalid when it was established that a 5-cent fare would not yield a reasonable return on the money invested.

In the District Court in Denver, Judge Lewis decided that the Denver Tramway has a perpetual franchise granted by ordinances of 1883 and 1886. He also held that the company is entitled to a return of 7½ per cent on a valuation of \$23,000,000, and that it is confiscatory for the city to seek to impose a fare that does not provide the proper return.

Attorneys for the city will argue that granting of perpetual charters is forbidden by the state constitution of Colorado, and that the State Supreme Court has so ruled on three occasions.

Parking Banned in Rush Hours

In accordance with a new traffic regulation recently promulgated by the police department, parking is forbidden on Broad Street, Newark, N. J., in the district between the Lackawanna Railroad station and Clinton Avenue, and on Market Street from the Pennsylvania Railroad station to the court house, between 8 and 9 a.m. and 4:30 and 6 p.m. The new rule became effective on Jan. 3, after extended investigations made by the city's engineers, Parsons, Klapp, Brinckerhoff & Douglas, had demonstrated the serious interference to traffic caused by automobiles parked in solid rows along these streets, sometimes two or three abreast. The new regulation will be tried for a month. Checks are now being made to determine the effect on speed of traffic movement, particularly that of street cars and buses. Reduced congestion and increased speed are expected to result.

Wages Being Discussed in Milwaukee

Negotiations are under way for a new supplementary wage agreement for the next six months beginning Jan. 1 between trainmen and officials of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis. A demand for a wage boost of 5 cents an hour has been drafted for the trainmen in Milwaukee, Racine and Kenosha, and on all interurban lines operated by the company. A 5-cent increase was requested six months ago, but was turned down. The increase, if granted, will apply to one-man car operators, who are receiving a maximum of 66 cents an hour now, and two-man car trainmen, who are now receiving 61 cents an hour.

A 2½-Cent Fare for Short Pittsburgh Line

The Pittsburgh Railways, Pittsburgh, Pa., established a round-trip fare of 5 cents on Jan. 1 on what is known as the Library Shuttle Route No. 525. This route, located in the Borough of Braddock, is only about 0.2 mile long, operating from Library and Braddock Avenues to Bell and Jones Streets. It serves as a transfer link with two other routes and also affords a connection between the business district of Braddock and the residential district near Bell and Jones Streets. The distance is short, but the territory is rather hilly. However, it was apparent that very few persons were willing to pay 8½ cents merely for a ride over this section. Inasmuch as the single car used on this route always had plenty of room it was decided to give the local public the opportunity to use the service at the lowest feasible price. This led to the establishment of a round-trip non-transfer rate of 5 cents, much to the satisfaction of the Braddock merchants, who believe this will stimulate trade.

Transit Survey in Philadelphia

An investigation into the transportation facilities in Philadelphia, Pa., which will be followed by public hearings and action on future transit needs, is to be undertaken shortly in Philadelphia by the Pennsylvania Public Service Commission.

In furtherance of this plan, Charles C. McChord, former chairman of the Interstate Commerce Commission, has been engaged by the commission to make a comprehensive survey of the city's transit problems. His engineering and legal aids will make an exhaustive study of the city-P.R.T. contract of 1907 and the entire structure of the company's underlying companies preliminary to submitting the report to the Pennsylvania Public Service Commission. The McChord survey will also take in the Broad Street subway, the Chestnut Street tube and the Frankford elevated system. The final argument on the latter lease agreement had been scheduled for Feb. 7. However, it was indicated that final decision on the Frankford elevated and Chestnut Street subway leases would be withheld by the commission pending the outcome of the inquiry now authorized.

Simultaneously with the transit study the commission will begin its probe of the car riders' complaints about alleged curtailment of the Philadelphia Rapid Transit Company's service.

Franchise Draft Ready in Kansas City

The proposed new franchise for the Kansas City Public Service Company, Kansas City, Mo., recently drafted by the franchise committee of the City Council failed to touch upon two important considerations which will have to be taken up when work on the actual franchise is started. These are buses and extensions. Just what provision will be made with regard to a new grant for buses is a point upon which

the special franchise committee is undecided. The question of extensions is bound up to some extent with the question of buses. The old franchise required specific extensions, and new trackage each year. However, with the increased interest in motor transportation such provisions are deemed impracticable. For them will probably be substituted a requirement of extension when necessary. Councilman A. N. Gossett, chairman of the special franchise committee, says that a draft of the final franchise will probably be ready for submission to the Council by Feb. 1.

San Francisco Trainmen Receive Pay Increase

Nine hundred trainmen of the San Francisco Municipal Railway, San Francisco, Cal., received an increase in pay of 20 cents a day, effective Jan. 1. Under the new scale platform men will receive \$6 a day instead of the former \$5.80. The increase makes a total of 60 cents a day during the past six months, an increase of 40 cents a day having been granted platform men last summer. The increase ends a long deadlock with the Board of Supervisors, the Mayor and the Board of Works, during which time it was charged that if further increases were granted a deficit would be created in the operating revenue of the road.

Supervisor James B. McSheehy, chairman of the finance committee of the board, was among those who doubted that receipts of the Municipal Railway would take care of the additional wages. He is reported to have said:

The finances of the Municipal Railway were drained to the last drop to handle the 40-cents-a-day raise to platform men last April. There is nothing else they can use. Not a nickel is available to cover the 20-cent increase granted to other workers of the road last week.

The business of the railroad, according to Superintendent Boeken, has shown no increase over last year's receipts for the past six or seven months. He explained the lack of funds as follows:

When the raise was granted last April, and for a month or two thereafter, the road was running along with an average normal growth in receipts amounting to approximately 3½ per cent annually. We had every reason to anticipate a continuance of that growth, but the falling off of the last six months has been a serious disappointment.

I believe the condition is only temporary. I attribute it to the industrial unrest in part, the strike that has slowed up construction and other unlooked for local conditions that may be removed at any time.

Mr. Boeken explained that the increase in receipts has amounted to only \$25,000 for the six months period, instead of the \$125,000 expected on the basis of the normal 3½ per cent annual growth. He suggested several alternatives in case no rally occurs to bring the increase in receipts back to normal. He is quoted as follows:

The \$200,000 bond redemption may be put up to the taxpayers in June; the road may be refinanced; fares may be increased; our \$20,000 monthly depreciation fund may be drawn against; the city may repay \$83,000 it still owes on the railroad's loan for the tunnels; or the city might even pay the railroad interest on funds on deposit for the past fifteen years, aggregating approximately \$500,000.

The railroad is paying off \$200,000 annually on its funded debt.

Drastic Parking Ordinance in Philadelphia

A bill to ban parking in Philadelphia, Pa., was reported favorably in the City Council by the public safety committee on Dec. 30. If the measure becomes a law it will abolish parking of cars between 6:30 a.m. and 7 p.m. in the large area within the boundaries of Spring Garden and South Streets and the Schuylkill and Delaware Rivers. Besides, it will bar parking during any hours of the day or night on streets less than 20 ft. wide in any part of the city and particularly specified Fifth, Sixth, Eleventh, Twelfth, Thirteenth, Broad, Fifteenth and Sixteenth Streets in the 24-hour ban. It also provides that no cars may be parked in any street in the city between 3 a.m. and sunrise.

A second ordinance provided for the establishment of a "pound" where cars violating the no-parking laws may be taken by the police. This measure was returned by the committee to City Solicitor Gaffney for a ruling on its legality. One of the disputed points in the measure was the extent of the city's liability in case impounded cars were damaged.

Director Elliott asserted at a hearing on Dec. 30 that the new measures would be enforced to the full capacity in his department or else he would bring the law back and tell the people why it failed. His plea came at the end of the three-hour session of the committee, during which representatives of various organizations and business establishments appeared to present their arguments. It was stated that business firms located on streets in the center of the city were oppressed by drivers who lined the streets with parked automobiles.

J. Barton Weeks, president of the Keystone Automobile Club, issued a statement opposing the no-parking ordinance and charging that existing parking measures had never been enforced and were at present dead letters.

Kane J. Green, president of the Automobile Club of Philadelphia, declared that that organization was heartily in favor of the ordinance. He said that if there were room for proper movement of traffic and also for parking space it was all right to have both, but when parking interfered with movement as it did in Philadelphia, then it was logical that parking should be prohibited.

Further Suspension of International Railway Schedule

The Public Service Commission on Jan. 4 further suspended to and including April 12 increases in rates filed by the International Railway, proposed as effective on Oct. 16 last, on its Buffalo-Niagara Falls high-speed line, the Buffalo-Lockport-Olcott division and in the city of Lockport. The schedules are to remain under suspension until April 12 unless otherwise ordered by the commission. The commission suspended the proposed increase in rates on Oct. 6 to and including Jan. 12 pending a showing of necessity by the railway for the proposed increase. The order of Jan. 4 continues the suspension until April 12.

News Notes

Fare Raised.—The Lake Superior District Power Company was recently authorized by the Michigan Public Utilities Commission to charge an 8-cent cash fare in Ironwood, Mich. The old fare was 5 cents.

Tokens in Indianapolis.—Metal tokens supplanted tickets on the cars of the Indianapolis Street Railway, Indianapolis, Ind., on Jan. 1. Conductors, however, continued to receive outstanding tickets. Fare boxes have been installed on the cars and passengers will deposit the cash fare of 7 cents or a token, which may be purchased four for a quarter. The cost of installation was about \$30,000 and the company issued pamphlets telling of the reasons for the installation.

\$106,000 Bonus in Los Angeles.—The Los Angeles Railway, Los Angeles, Cal., distributed \$106,000 as 1926 bonuses to 2,147 trainmen in its service. All men receiving the special awards were presented with their checks by the superintendent of their particular division. It was mentioned recently in the *ELECTRIC RAILWAY JOURNAL* that the special award plan on the Los Angeles property had been changed for 1927 so that every trainman in the company could participate regardless of his division affiliations.

Another Skip-Stop Hearing in Baltimore.—The Maryland Public Service Commission has set Jan. 17 as the date to resume hearings on the skip-stop system that has been placed in operation during the morning and evening rush hours by the United Railways & Electric Company, Baltimore. The first hearing was held a few weeks ago.

New Line Planned.—A plan of action is to be formulated shortly looking toward construction by the Pacific Electric Railway, Los Angeles, Cal., of a line through Santa Ana Canyon between Stern and Corona. Charles A. Bland, manager of the industrial and transportation bureaus of the Pacific Electric Railway, has stated that the committee of fifteen, to which was referred the plan for a short line from the northeast to Long Beach Harbor, has been authorized to work out the details which will give a wide section of that country quick ingress to the harbor. The distance between Stern, at which the Pacific Electric Railway line now ends at the western mouth of the canyon, and Corona, at the other end, is about 14 miles. With that stretch of line built, the committee believes that the road will see its way clear to connect with Marlboro and Anaheim with another 5-mile stretch.

Greetings from Washington.—A token inscribed with the names of the Washington Railway & Electric Company and the Capital Traction Company and melted onto a white beveled edge 6 x 4 card carries the Christmas and New Year's greeting of C. Melville Sharpe, executive assistant of the Washington Railway & Electric Company, Washington, D. C. The card reads as fol-

lows: "C. Melville Sharpe sends a token for Christmas and wishes you kilowatts of joy during the New Year."

Trolleys Meet Emergency.—The Boston & Worcester Street Railway, Framingham, Mass., which operates a bus line between Hudson and Fayville, Mass., via Marlboro and Southboro, was forced recently to return to trolley operation to provide service to the public. A treacherous ice storm made the hills impassable for buses. The trolleys were returned to service for safety sake.

Temporary Fare Agreement Extended.—At a special session of the City Council of London, Ont., on Dec. 28 the temporary agreement between the city and the London Street Railway was extended for three months. Under this agreement the rate of fare is 5 cents, instead of 7 with nine tickets for 25 cents, as specified in the by-law. The Council proposes to go into the matter fully and will submit to the electors some plan of definite settlement of a lengthy controversy. At the municipal election the people turned down a proposal for renewal of franchise and also a by-law for purchase of the lines. The question of granting licenses to independent buses operating in opposition to the London Street Railway was discussed briefly.

Olive Street Not Wide Enough.—Seven members of the St. Louis, Mo., Board of Aldermen, who visited New Orleans to inspect thoroughfares with parkways for trolley cars, returned to St. Louis convinced that the plan was not practical for Olive Street. Parkways for cars of the St. Louis Public Service Company have been proposed for Olive Street when that street is widened from 60 to 100 ft. between Twelfth Boulevard and Channing Avenue. Several of the Aldermen said that their observations in New Orleans, where many streets, both wide and narrow, include such parkways, convinced them that Olive Street would not be wide enough to make a curb-off trolley right-of-way economical.

Volunteers to Reduce Fares.—David P. Strickler, president of the Colorado Springs & Interurban Railway, Colorado Springs, Col., recently proposed to the City Council to reduce fares, both on the company's tramcars and buses. The reduction, if granted, would do away with the two rides for 15 cents, substituting the sale of fourteen rides (checks) for \$1. This is equivalent to a reduction of one-fourth of 1 cent per ride. The Council asked Mr. Strickler to make an offer on a 50-cent lot. This will likely be submitted and the whole approved.

More Safety in Altoona.—A safety campaign to extend throughout 1927 was launched by the employees of the Altoona & Logan Valley Electric Railway and its subsidiary, the Logan Valley Bus Company, Altoona, Pa. Two teams are being organized, one including men on the roster designated by even numbers, the other team designated by odd numbers. The contest will continue from week to week with an award made to the teams monthly. A map 30 ft. square, showing the entire holdings, is to be used to mark the "accident centers."

Foreign News

South African Trams Lose Revenue from Bus Competition

Municipal tramways in South African cities are finding it increasingly difficult to meet the competition of the bus lines, according to a report made to the Department of Commerce. As an illustration of the seriousness of the position from the standpoint of the tramways, the report points out that in 1925 the trams carried 2,500,000 fewer passengers than they did in 1924 with a loss of revenue of more than £30,000.

Among the remedies suggested, one that is receiving serious consideration is the setting up of a transport commission by either the union government or the various provinces, to regulate routes, fares and general working conditions. The big problem is to find the proper economic fields for both trams and buses, the question being aggravated by the fact that the trams are largely municipal ventures and the buses private enterprises.

Swiss-Argentine Railway Capitalized at \$6,000,000

"La Société d'Electricité pour l'Amérique du Sud" is the name of the new \$6,000,000 company which has recently been formed in the city of Zurich to take over control of the following companies: The Great Southern Railway in Buenos Aires; the tramway system and the electricity and gas works in Bahia Blanca, and the Compania Americana de Luz at Asuncion. This new company, according to reports which are being circulated, is said to be financed by a group of English, Swiss and Italian financiers.

Hull Corporation Tramways Reinstates Strikers.—Strikers of the Hull Corporation Tramways who walked out in the general tramway strike last May are gradually being absorbed into service again by means of a plan adopted by the tramways committee. A new arrangement of a five-day working week makes it possible to reinstate the strikers and at the same time retain the services of the volunteers who have been filling the other men's places for the last seven months. The plan is also being aided by increasing the bus service.

Transformer Station for Midi of France Railway.—In connection with the electrification of the railroad between Bedous and the Spanish frontier the Midi of France Railway has lately placed a contract with the Société Alsacienne de Constructions Mécaniques of Belfort for the equipment of a 60,000-volt outdoor transformer station. The order includes three large transformers to convert three-phase 50-cycle current and eighteen 575-kw six-phase converters to give continuous current at 1,570 volts.

Recent Bus Developments

Twin City in Taxi Field

Announcement Made of Cab Purchase at Minneapolis as Further Co-ordination Move

The Twin City Rapid Transit Company, Minneapolis, Minn., has acquired a majority of the stock and control of the Yellow Cab Corporation of Minnesota. The deal was announced on Dec. 31. It was negotiated through Lane, Piper & Jaffray, Inc., Minneapolis, brokers, and is reported to have involved slightly more than \$500,000.

This transaction followed in three days announcement of the formation of the Delaware corporation to merge the Yellow Cab and the Red Top taxi service in the Twin Cities, the Yellow Cab taxi service in Duluth, Minn., the Town Taxi and Drive Yourself services in Minneapolis and Rochester, Minn., which involved about \$1,000,000, it was reported at the time.

CO-ORDINATION PLAN ACHIEVED

With the consummation of this deal the Twin City Rapid Transit Company now controls the electric railway service in the Twin Cities area, the interurban bus service and the majority of the taxi service, there being still some independent companies operating. Horace Lowry, president of the company, said:

The purchase of the control of the taxicab fleet is sound and logical from every standpoint. When we learned that the five companies were consolidated we decided that the next progressive step toward the unification of transportation in the Twin Cities should be taken by us if we were to serve the interests of the public.

We therefore purchased the stock control of the merged companies. Duplication of the organizations and the facilities of the taxi companies has been a source of unnecessary traffic congestion and has not been conducive to the best interests of the public. We are going to do away with this duplication and bind the taxicab business into one sound operating unit, and the Twin Cities may be assured of our utmost efforts toward an improved service which will not be excelled in this country.

While control of the taxicabs in the Twin Cities, together with the ownership of the railway and the bus lines, gives the parent company virtual control of public transportation service, that service is under supervision either by the state or the city. I believe that this unification will best serve the public interest in that it gives more efficient and better service, and I believe further that, given time, we can demonstrate clearly that the transaction is a sound and logical one, and is the ultimate solution of modern transportation difficulties.

CITY IN FRONT RANK

Robert F. Pack, chairman of the board of the newly formed Yellow Cab Corporation, who as head of the Northern States Power Company is familiar with public service operation, said:

There is no reason why the taxicab business, offering a necessary public service, should not be run on the same high plane with other transportation facilities. The new system established in Minneapolis by this deal puts the city in the front rank of a new transportation development.

Formation of the Yellow Cab Corporation of Minnesota was first reported by way of Chicago on Dec. 13, but was not confirmed in Minneapolis until Dec. 28. P. W. Loudon was announced as president and J. H. Colman as secre-

tary-treasurer. The company has 330 Yellow Cabs and Red Tops, 50 Hertz sedans, 52 Chevrolets, Chryslers and Fords, with 20 new Red Tops ordered.

The new bus corporation already had advanced the taxicab rate 5 cents a mile from 35 cents minimum and 10 cents for each additional half mile with no charge for extra passengers, and was to give the drivers from \$2.50 to \$4 more wages a week on a commission basis, and had ordered that all of the taxicabs should be completely inclosed.

Massachusetts Bus Law Upheld by Supreme Court

Statute Found Not to Be Arbitrary or Unreasonable in Its Requirements
—Bus Company, Competing with Electric Railway,
Cannot Evade Massachusetts Law by Mingling
Interstate with Intrastate Passengers

IN A DECISION handed down by Justice Butler the United States Supreme Court on Jan. 3 upheld the validity of the Massachusetts motor vehicle law as applied to buses. The decision affirmed the action of the lower courts in dismissing the suit of the Interstate Buses Corporation against the Holyoke Street Railway and various municipal, county, district and state officials of Massachusetts. The Supreme Court decision, in brief, held that the bus company could not evade the Massachusetts law by mingling interstate with intrastate passengers and that the law is not arbitrary or unreasonable in its requirements.

LOCAL LICENSES REQUIRED

The Massachusetts law requires that buses apply for a license and provides penalties for failure to do so and for operation over routes not approved. The Interstate Buses Corporation runs on regular schedule between Hartford, Conn., and Greenfield, Mass., passing through various Massachusetts towns and cities. Its route for some distance parallels the tracks of the Holyoke Street Railway, the lines of which serve several communities in Massachusetts.

The bus company did not take out a license and a number of its chauffeurs were arrested. The company brought suit to restrain such arrests and to test the Massachusetts law. It relied on the fact that its buses follow an interstate route, claiming that because of this they were not subject to the Massachusetts law. The lower court found that the company did an intrastate passenger business as well as an interstate business, carrying both classes of passengers in the same bus.

The suit was brought to restrain the enforcement of a state statute relating to common carriers of passengers by motor vehicles as in conflict with the commerce clause of the Constitution of the United States and with the

The merged lines will be reorganized in the near future. In the formation of the new corporation gross earnings of the merged systems for 1925 were given at \$1,667,750 and for the twelve months ended June 30, 1926, at \$1,632,652. Eight thousand shares of Class A common stock of the new corporation were reported sold at a price of \$22.50 and accrued dividend.

It will be recalled that the motor bus subsidiary of the Twin City Rapid Transit Company acquired the Twin City Motor Bus Company line between the Twin Cities in July 1924, the Brown bus line in November, 1925, and the Green bus line in January, 1926, comprising all the interurban passenger bus service and some suburban lines operated out of the city.

due process clause of the Fourteenth Amendment. The case was heard before a court of three judges on an agreed statement of facts, and a final decree dismissing the complaint was entered.

Sections 45, 48 A and 49 of c. 159, General Laws, as amended by c. 280, Acts of 1925, contain the provisions attacked:

No person shall operate a motor vehicle upon a public way in any city or town for the carriage of passengers for hire so as to afford a means of transportation similar to that afforded by a railway by indiscriminately receiving and discharging passengers along the route on which the vehicle is operated, or as a business between fixed and regular termini, without first obtaining a license. The licensing authority in a city is its council, in a town is its selectmen; and, as to public ways under its control, is the metropolitan district commission.

ELECTRIC RAILWAY OBJECTS

No person shall operate a motor vehicle under such license unless he has also obtained from the Department of Public Utilities a certificate that public convenience and necessity require such operation. Any one operating under a license from local authority and a certificate from the department is declared to be a common carrier and subject to regulation as such. Violations of Secs. 45-48 or of any order, rule or regulation made under them are punishable by fine or imprisonment or both. And the act gives to the Supreme Judicial and Superior Courts jurisdiction in equity to restrain any violation upon petition of the department, any licensing authority, ten citizens of a city or town affected by the violation, or any interested party. Neither license nor certificate is required in respect of such carriage as may be exclusively interstate.

For many years the appellee, the

Holyoke Street Railway, has been a common carrier of passengers by railway in Massachusetts through Holyoke, South Hadley, Granby, Amherst and into Sunderland. Appellant is engaged in the business of transporting passengers for hire by motor vehicle and operates buses between Hartford, Conn., and Greenfield, Mass. It has run its buses between Hartford and Springfield since Dec. 1, 1924, and north of Springfield to Greenfield since about Dec. 15, 1925. Its route in Massachusetts passes through Springfield, West Springfield, Holyoke, Granby, Amherst, Sunderland, Deerfield and Greenfield. With certain exceptions, all its buses run the whole distance between Hartford and Greenfield.

It transports persons from one state into the other, and also those whose journeys begin and end in Massachusetts. Both classes of passengers, intrastate and interstate, are carried in the same vehicles. Intrastate passengers constitute a very substantial part of the whole number carried in Massachusetts. The appellant maintains an office and garage at Springfield and advertises its route and rates.

The buses are operated between fixed terminals in Massachusetts. They run regularly on public ways parallel to and alongside the tracks of the railway and afford transportation similar to that furnished by that company. They stop regularly and also on signal to receive and discharge passengers.

RAILWAY EARNINGS HURT

The operation of the buses in competition with the railway has resulted in substantial loss to the latter. It was established that the appellant has not obtained a license from any of the cities or towns served by the railway, which caused plaintiff's employees to be arrested and prosecuted.

After receiving the facts as just set down the Supreme Court concluded its opinion as follows:

The statutory provisions in question have been sustained by the highest court of Massachusetts. *New York, N. H. & H. Railroad vs. Deister*, 253 Mass. 178; *Barrows vs. Farnum's Stage Lines*, — Mass. —; *Boston & M. R.R. vs. Cate*, — Mass. —; *Boston & M. R.R. vs. Hart*, — Mass. —; *Commonwealth vs. Potter*, — Mass. —. And these decisions were followed by the district court in this case.

Appellant's principal contention is that the act contravenes the commerce clause. If as applied it directly interferes with or burdens appellant's interstate commerce, it cannot be sustained regardless of the purpose for which it was passed. See *Shaffer vs. Farmers Grain Co.*, 268 U. S. 189, 199; *Real Silk Mills vs. Portland*, 268 U. S. 325, 336; *Colorado vs. United States*, 271 U. S. 153, 163; *Di Santo vs. Pennsylvania*, — U. S. —. The act existed in some form before interstate transportation of passengers for hire by motor vehicle was undertaken. Its purpose is to regulate local and intrastate affairs. *Barrows vs. Farnum's Stage Lines*, supra. No licenses from local authorities or certificate of public convenience and necessity is required in respect of transportation that is exclusively intrastate. Cf. *Buck vs. Kuykendall*, 267 U. S. 307; *Bush Co. vs. Maloy*, 267 U. S. 317. The burden is upon appellant to show that enforcement of the act operates to prejudice interstate carriage of passengers. The stipulated facts do not so indicate. The threatened enforcement is to prevent appellant from carrying intrastate passengers without license over that part of its route which is parallel to the street railway. Its right to use the highways between Springfield and Hartford is not in

controversy. While it appears that in Massachusetts both classes of passengers are carried in the same vehicles, it is not shown what part of the total number are intrastate or interstate. The record contains no information as to the number of persons, if any, traveling in interstate commerce on appellant's buses over the part of the route competing with the street railway. It is not shown that the two classes of business are so commingled that the separation of one from the other is not reasonably practicable or that appellant's interstate passengers may not be carried efficiently and economically in buses used exclusively for that purpose or that appellant's interstate business is dependent in any degree upon the local business in question. Appellant may not evade the act by the mere linking of its intrastate transportation to its interstate or by the unnecessary transportation of both classes by means of the same instrumentalities and employees. The appellant relies on *Western Union Tel. Co. vs. Kansas*, 216 U. S. 1, and *Pullman Co. vs. Kansas*, 216 U. S. 56. But there the state was using its authority as a means to accomplish a result beyond its constitutional power.

ACT IS NOT CONFISCATORY

There is no support for the contention that the enforcement of the act deprives it of its property without due process of law. Undoubtedly, the state has power in the public interest reasonably to control and regulate the use of its highways so long as it does not directly burden or interfere with interstate commerce. *Packard vs. Banton*, 242 U. S. 140, 144; *Kane vs. New Jersey*, 242 U. S. 160; *Hendrick vs. Maryland*, 235 U. S. 610. Cf. *Opinion of the Justices*, 251 Mass. 594, 596. The terms of the act are not arbitrary or unreasonable. Appellant has not applied for and does not show that it is entitled to have a license from the local authorities or a certificate of public necessity and convenience from the department. Plainly, it has no standing to attack the validity of the statute as a violation of the due process clause.

Four More Rochester Routes Sought

The Rochester Railways Co-Ordinated Bus Lines, Inc., Rochester, N. Y., filed with the Public Service Commission on Jan. 4 a petition for a certificate for the operation of bus lines in the city of Rochester, the village of Hilton and the towns of Parme and Greece, Monroe County. Four routes are proposed in this petition, known as the Grand View Beach line, the Island Cottage Bus Line, the Ridge Road Bus Line and the Manitou Beach line, also known as the Long Pond Route. The Ridge Road Passenger Lines, Inc., which formerly operated the Ridge Road bus line, has been merged with the petitioner. A public hearing will be held on this application.

Extension of Bus Service Permitted.

—A certificate has been granted by the Railroad Commission to the Pacific Electric Railway to operate a coach service for the transportation of passengers between Beverly Hills and Los Angeles, Cal., and intermediate points along the line.

Service Discontinued.—Permission to discontinue the operation of regular bus service between Salt Lake City and Ogden, Utah, effective on Dec. 25, was granted the Bamberger Transportation Company by the Public Utilities Commission of Utah. Application for permission to discontinue such service was filed with the commission by Julian Bamberger, president and general manager of the bus subsidiary of the Bamberger Electric Railroad, on the ground that the public did not seem to require this service at this season of the year.

Attention is called in the application to the fact that from Dec. 15 to 21, both inclusive, only 134 passengers were carried by the buses. The total cost of operating the buses during that period was \$536, while the total revenue was only \$135.

Bus Agreement Lost.—The track removal agreement for Filbert Street, Philadelphia, Pa., with the Philadelphia Rapid Transit Company and its subsidiaries was halted recently. The pact was lost en route to Mayor Kendrick and no explanation has been offered. The agreement carries a ten-year bus franchise on the Pennsylvania Boulevard, which is to take the place of Filbert Street. The project to be carried out under the agreement by the city and the Pennsylvania Railroad, at a cost of \$53,000,000, includes a tunnel from the West Philadelphia Station to Broad Street Station, improvements to both terminals, widening of Twentieth Street, a Schuylkill driveway and other highway projects.

Seeks to Run Line in Western Utica.—The Public Service Commission held a public hearing on Dec. 30 on the petition of the Utica Railway Co-Ordinated Bus Lines, Inc., for a certificate for the operation of a bus line in the western part of the city of Utica. C. N. Phillips, attorney, representing Kernan & Kernan, counsel for the company, appeared for the petitioners. The city of Utica was not represented, but the commission was advised by Clarence E. Williams, Corporation Counsel, that the city is agreeable to granting the franchise. The proposed route will, it is shown, give transportation service to a section of the city which is rapidly developing. Rates of fare are to be the same as those charged by the parent company, the New York State Railways, with transfer privileges to and from such lines.

Bus Service to Be Furnished.—The Eastern New York Utilities Corporation applied to the Public Service Commission on Dec. 29 for approval of a declaration of abandonment of two parts of its line in Hudson. The company alleged that by reason of changes in conditions, development of the city and economic conditions affecting the properties of the company the petition was advanced for the discontinuance with the approval of the city of Hudson. The Eastern New York Transportation Corporation, a subsidiary, proposes to furnish bus service and exchange transfers from its main line to Hudson and in the town of Greenport, where the bus service will be provided.

Buses Supplying Service.—The strike of the street railway employees of the Danbury Power & Transportation Company, Danbury, Conn., is gradually abating. The company was granted temporary certificates to operate buses over any and all of its routes two weeks ago by the Public Utilities Commission. Ten buses are now in use and recently the company placed an order with the Yellow Truck & Coach Manufacturing Company, Chicago, Ill., for four more of the latest type coaches. This step is in line with the plan to motorize its franchise holdings in Danbury and Bethel.

Financial and Corporate

Patronage Gains on Chicago Surface Lines

For the first eleven months of 1926, ended Nov. 30, 1,433,929,014 passengers were carried by the Chicago Surface Lines, Chicago, Ill., against 1,382,623,114 in the corresponding period of 1925. A more accurate picture of the heavy amount of traffic handled over the corresponding months of last year is noted in the following tabulation:

	1926	1925
January.....	129,604,602	127,666,571
February.....	121,282,868	115,830,619
March.....	131,839,632	128,009,030
April.....	131,452,890	126,052,447
May.....	132,939,381	127,542,240
June.....	132,980,301	125,684,909
July.....	130,235,208	124,566,209
August.....	129,214,055	125,002,113
September.....	127,149,619	122,964,778
October.....	135,878,579	132,515,318
November.....	131,351,870	126,788,880
December.....		132,949,576

Divisible receipts for November amounted to \$628,628 after taxes, renewals and return on purchase price, against \$716,111 in October and \$422,172 in November, 1925.

The income account for November, 1926, compared with that of the corresponding month in 1925 is as follows:

	1926	1925
Gross earnings.....	\$5,151,860	\$4,939,131
Operating expenses and taxes.....	3,813,294	3,834,735
Residue receipts.....	1,338,566	1,104,396
Joint account expense.....	37,725	10,000
5 per cent interest on purchase	672,212	672,224
Divisible receipts.....	628,628	422,172
City's 55 per cent.....	345,746	232,194
Company's 45 per cent.....	283,883	189,977

Certificates and Coupons Burn in St. Louis

Almost \$5,000,000 of canceled obligations of Receiver Rolla Wells of the United Railways, St. Louis, Mo., were burned in the fireplace of the office of James J. O'Connor, clerk of the United States Court for the Eastern District of Missouri in the Federal Building, St. Louis, on Dec. 27. The proceeding marked another step toward the final reorganization of the railway properties. Series B of certificates issued by Receiver Wells totaling \$4,200,000 and \$630,000 in interest coupons were fed to the flames after they had been redeemed. The certificates were issued by Receiver Wells in 1923 to take up other securities of the railways.

Negotiations for a new blanket franchise from the city of St. Louis is the next and probably the final step in the reorganization program.

Reorganization Plans of Indiana Property Going Forward

Reorganization of the Fort Wayne, Van Wert & Lima Traction Company, operating more than 65 mi's of trackage between Lima, Ohio, and Fort Wayne, Ind., is being perfected, and articles of incorporation for the new corporations controlling the line have been filed with the Secretaries of State in both Indiana and Ohio. The incor-

porators for the Indiana corporation are Henry C. Paul, Frank M. Cutshall, James M. Barrett, Jr., R. Earl Peters and Leigh Hunt, all of Fort Wayne, while Paul C. Martin, Homer C. Corry, C. I. Gallagher, H. M. Lacey and S. A. Titer, all of Springfield, Ohio, appear on record in the incorporation of the Ohio organization. The traction line serves the intermediate towns of New Haven and Monroeville in Indiana and Dixon Convoy, Middlepoint, Delphos, Scott's Crossing and Elida in Ohio.

The property comes into possession of the new company through its purchase last October by Edward Hopkinson, Philadelphia, representative of the bondholders. The purchase price was \$150,000, the property being offered for sale by Mr. Paul, receiver, who had charge of the line since 1921 on an order of the United States federal court. The operation of buses and sale of electric current also are provided for in the articles of incorporation.

\$1,137,700 of Winnipeg Stock Subscribed in Forty-eight Hours

The second customer-ownership campaign of the Winnipeg Electric Company, Winnipeg, Man., proved a remarkable success. The sale of 2,500 shares of the company's 7 per cent cumulative preference stock opened on Dec. 13 and was advertised to continue for ten days, but so great was the demand for the shares that the sale closed within 48 hours with 11,377 shares (\$1,137,700) applied for by 2,222 customers.

The shares were offered through company employees at par, \$100 a share, under a customer-ownership plan. The success of the campaign was due to the energetic efforts of the company and the extensive internal organization, together with a well-planned publicity program conducted by the company. The Customer Ownership Company of Canada, Ltd., co-operated with the company in organizing and directing the campaign. While a limit of 50 shares to any one customer was set, it is interesting to note that the number of shares applied for averaged five shares to each customer.

The first 2,500 shares offered by the company form part of an issue of \$3,000,000, par value, of preferred stock put on the market a few years ago, and authorization for new preferred stock to take care of the oversubscription will be sought from the shareholders at a meeting to be held on Jan. 20.

The first customer-ownership campaign undertaken by the Winnipeg Electric was conducted in March, 1925, and 2,645 shares were sold to 1,280 purchasers. As a result of the two campaigns the Winnipeg Electric Company will have nearly 3,500 local preferred shareholders.

The sale just concluded marks one of the most outstanding customer-ownership campaigns undertaken by any public utility in the Dominion.

Another Dividend on Common Stock.—The Springfield Railway, Springfield, Mass., recently declared a dividend of \$1.15 a share on the common stock and the regular semi-annual preferred dividend of \$2 a share, both payable Jan. 3 to stockholders of record of Dec. 20. Six months ago \$1.60 was paid on the common stock.

Capital Increased.—The British Columbia Railway, Vancouver, B. C., decided at its annual meeting in London, held on Dec. 16, to increase its capital to \$5,320,000 by the issuance of 320,000 new shares of stock at \$1 each. Successful operation of the company during the past year was evidenced in the address made to the shareholders at that meeting by George Kidd, the president, who has been in charge of its affairs for 12 years. He told how the railway had carried more than 72,500,000 passengers and 417,000 tons of freight, and also that motor coaches and lorries had been added to the equipment as feeders to the railway system.

Abandonment Record Closed.—The Public Service Commission of New York on Jan. 5 granted the petition of the United Traction Company for approval of a declaration of abandonment of its South Ferry Street line in the city of Albany. There has been no operation on this 3-mile route for ten years and in 1925, when the street was repaved, it was agreed with the city to remove the tracks, which was done. The application just granted was made to close the records of the company.

Power Property Sold to Traction President.—The sale of the Clyde River Power Company, Richford, Vt., is reported to have been made to John J. Flynn, president of the Burlington Traction Company, Burlington, Vt., for a sum said to be \$500,000. The property that passes to Mr. Flynn includes a water power at Richford and a 50-mile power line. The Clyde River Company has been in the hands of a receiver for some time.

Charleston Deal Approved.—The stockholders of the Charleston Consolidated Railway & Lighting Company, the Charleston Consolidated Railway, Gas & Electric Company, the Charleston-Edison Light & Power Company and the Charleston Gas Light Company have approved the consolidation of these properties into the South Carolina Power Company. This last-named company acquires all the rights and powers of the aforesaid four companies, the stock of which, by agreement, is to be exchanged for stock in the new company. It is part of the plan for control of the South Carolina Power Company to pass to the Southeastern Power & Light Company in accordance with plans announced previously in the ELECTRIC RAILWAY JOURNAL.

Abandonment Hearing Continued.—Hearing on the petition of the receiver of the Detroit United Railway, Detroit, Mich., to discontinue service between Romeo and Imlay City, Mich., has been continued until Feb. 14 by William S. Sayers, Jr., standing master in chancery. A. L. Drum, representing the railway, declared on Dec. 30 the 20-mile line is being operated at an annual loss of \$30,000. The plan was opposed by some of the residents affected.

Book Reviews

Mainsprings of Men

By Whiting Williams. New York: Charles Scribner's Sons. 313 pages. \$1.50.

Whiting Williams knows his subject. He got much of his material at first hand. Then starting with a bond of sympathy for the worker, he has written a volume that is mighty stimulating. Many of us think we know what we want, but even after we have attained our ambition, few of us know then what to do. As the author points out, we are appreciating as never before the vastness of our human powers and the delicacy of their control. As never before, accordingly, men are searching for the springs of action within themselves and within their fellows—evidently in the belief that the value of a life is measured by its influence upon the thoughts and actions of others.

It is certainly true, on the whole, that teachers and students, statesmen and voters, editors and readers, captains of industry and lieutenants of labor, all are to-day in earnest search of a better understanding of the deeper sources of men's daily doings; between dawn and dusk all these wielders of influence stand or fall according as they secure and direct the physical or the spiritual energies of their fellows. The author saw in the wide-spread urgency of this search the chief warrant of the book's effort to furnish to such seekers a few suggestions capable of daily application. In order to facilitate this practical purpose free use was made of the "case" or "problem" method; wherever possible, a fact or principle is set forth by showing how, in a particular section of human experience, it appeared to operate.

The introduction to the book is confined to a statement of "The Why and the How." The rest of the book is divided into three parts: I. What the worker wants. II. What all of us want. III. Finding what we want in our work. There is the bare outline. It is impossible even to begin to go into the matter of the scope of the contents. To all employers of labor sincere in their desire for a more thorough understanding of this whole problem the book contains many points that should be helpful and much thought-provoking material. It is not merely "just another book on the labor problem," not by any means.

Metropolitan Street Traffic Survey (Chicago)

By Miller McClintock. The Chicago Association of Commerce. 292 pages. \$5.

Street traffic studies from the metropolitan standpoint form the basis of Dr. Miller McClintock's report on street traffic survey in Chicago. The report is based on a year's study of actual conditions. It is replete with data, charts and findings made by the corps of investigators. The report contains fifteen chapters divided into two parts, the first presenting the survey data and the second the recommendations in-dorsed by the Chicago Association of

Commerce, under whose auspices the report was made. The report forms the basis for an article which appears elsewhere in this issue of the JOURNAL.

Personenbahnhöfe (Passenger Railway Stations)

By W. Cauer. Berlin: Julius Springer. 306 pages, 142 illustrations. Cloth. 22.50 marks.

This is the second edition of a book first published in 1913. While the contents relate primarily to steam railroad passenger stations, electric railway managers with large terminal or through waiting stations could obtain many suggestions on station layout, arrangement of track, etc. There are a few references to railroad stations in the United States, but the practice described is primarily that of Europe.

American Railway Accounting

Compiled by Elizabeth Cullen, reference librarian Bureau of Railway Economics, Washington, D. C. Railway Accounting Officers Association, Washington, D. C. 52 pages.

This pamphlet is a continuation of bibliography in railway accounting procedure, 1926 edition, and reprinted from "Railway Accounting Procedure," 1927 edition. Part I includes historical matter issued 1925-1926; Part II is a compilation and use of railroad statistics, and Part III concerns depreciation with additional references. The books, documents and periodical articles listed are to be found in public libraries, especially those maintaining special collections on economics and statistics.

The Tired Trolley Car

By Beth A. Retner. Garden City, New York, N. Y.: Doubleday, Page & Company. 1926. 158 pages. Net, \$2.

Minnie was weary of working hard and handling over the nickels to Jimmy Jingle. She was tired of Rockaby Street with its bumps and hills, its red-brick houses, graveyard and second-hand animal store. She longed for shops and lights and adventure. Main Street would be the panacea for all her ills. But disillusionment followed close upon the glorious experience. No gentlefolk inhabited Main Street; automobiles "honked," "honked" at her scornfully; none of the shiny-badged policemen seemed glad to see her and a huge moving van came along and bumped her. "Sirrocco, Mirrocco, if I were only back on Rockaby Street."

Minnie is a tired trolley car who longs for thrills and gets them. She is only one of the many whimsical characters in Mr. Retner's latest contribution to juvenile readers. The others include the Wax Lady in love with the Window Dresser; Lucy Dancing Leg; Billy Tick, the fish, and Adam Applepie.

Boys and girls of the fairy-tale age will undoubtedly have genuine sympathy for Minnie, who longs for patent leather shoes and moon balloons, who is enchanted with the superficial

grandeur of the Main Street cars and intrigued by their accounts of theaters, department stores and carrousel. But Mr. Retner would have boys and girls also imbibe some of the wisdom Minnie took on after her escapade. There was happiness in every ride on Rockaby Street. The children actually cheered when they passed the graveyard and when they approached the second-hand animal store, that always bought everything and never sold anything—why, there were goldfish to be had for the buying. And what if the curfew sounded at 8 o'clock, something done "had earned a night's repose."

On first reading the title of this book, "The Tired Trolley Car," it appeared to the reviewer that Mr. Retner, well-known humorist, was joining the unattenuated ranks of transit experts. It seemed as though his thesis were a plea for a new form of transportation, since the electric became jaded. But a book cannot be judged by its title. To the average reader of the ELECTRIC RAILWAY JOURNAL the allegory presented by the author of "That's That" may not be especially informative, but it will serve as another reminder that no planning is sufficiently constructive which does not consider the problems of Rockaby Street as well as those of Main Street.

Political and Industrial Democracy—1776-1926

By W. Jett Lauck. New York: Funk & Wagnalls Company. 374 pages. \$2.

Political democracy without corresponding industrial freedom is an anachronism, according to W. Jett Lauck, who traces, in his most recent book, the growth of employee ownership and representation in this country. It is worthy of note that of the very few cases cited by Mr. Lauck as being truly democratic in nature he places the plan of Thomas E. Mitten, head of the Philadelphia Rapid Transit Company, pre-eminently in the vanguard. According to the author, this "men and management" organization represents the most comprehensive plan yet set up to provide for the immediate company enfranchisement of labor and the gradual conversion of labor into capital through acquiring common stock.

Mr. Lauck has in this present work made a thorough investigation into the sundry practical plans adopted by various manufacturing companies, railways, etc., to insure continued harmony between capital and labor. The principles and standards essential to the realization of industrial democracy are applied as measures of these plans; present tendencies are analyzed and future developments forecasted.

The book summarizes the principal features of various outstanding plans and thus provides a deal of actual working information which should make valuable reference material. Mr. Lauck's tone is optimistic throughout. He believes that the experiences of the present have shown very conclusively that industrial warfare is unnecessary to the satisfactory working out of labor's interests. Railway men will find particular interest in the fact that the author credits the most comprehensive and satisfactory of existing plans to an electric railway.

Personal Items

"Taking a Year Off"

After Forty Years of Aggressive Activity H. M. Atkinson, Atlanta Chairman, Plans to Boost Georgia

After 40 years of activity, in which he has devoted himself to building one of Georgia's greatest industrial enterprises, Harry M. Atkinson, chairman of the board of the Georgia Railway & Power Company, is getting out of harness, so far as attention to business details go.

Beginning Jan. 1, 1927, Mr. Atkinson is "taking a year off." This does not mean that Mr. Atkinson is going to drop out of things. It means that Georgia, as a state, is going to benefit or be benefited, for so long as he lives Mr. Atkinson will always be a builder. His conclusion to forego business details means that he will give more of his time to aiding in a great constructive work in the state. Recently Mr. Atkinson was induced to take the chairmanship of the advisory committee of the Georgia Association, in the hope that he can help President Hastings along practical lines with the association's work. This is not a new interest with him by any means, for Mr. Atkinson has been doing these things a number of years. He and his business associates quite a little while ago took an active interest in improvement of agricultural education in the state, and for some time Mr. Atkinson has been close to the efforts made at the state college.

To those who know him well no surprise was occasioned by this latest announcement by the chairman of the board of the Georgia Railway & Power Company. He is an unobtrusive worker, but the value of his contributions to the community has received public recognition before. Just about a year ago he was selected as having contributed in the twelve months then recently ended more of inspired, effective and unselfish work for the betterment of the community of Atlanta, Ga., than any other citizen. To him was awarded the silver loving cup given annually by the *Georgian and Sunday American* for playing the rôle of Atlanta's most valuable citizen in 1925. The committee's selection, according to the announcement, was based on Mr. Atkinson's activities in industrial development of the North Georgia region, of which Atlanta is the center, through great water-power plans, two of which were completed in 1925 and another projected. His efforts to improve transportation facilities in and around Atlanta and his general record of service for the communities and region development were also cited by the committee.

Mr. Atkinson has been identified with nearly all the important electrical projects that have been put through at Atlanta for more than 25 years and has contributed much to the city's growth and prosperity. He was instru-

mental in consolidating the railways and lighting companies of Atlanta into the Georgia Railway & Electric Company. He also organized the Georgia Railway & Power Company, which began operating in 1912, and became chairman of the board of directors of that company at the time of its organization. This position he has held up to the present time. In addition to electrical enterprises, he organized, built and was the first president of the Atlanta, Birmingham & Atlantic Railroad, a steam property, which has contributed to the development and pros-



H. M. Atkinson

perity of those sections of Georgia and Alabama served by it. Mr. Atkinson has also found time to take an active interest in the cultural and social life of the community.

E. F. Thayer Joins P.R.T. Staff

Edwin F. Thayer has resigned as assistant editor of the *ELECTRIC RAILWAY JOURNAL* to enter public relations work with the Philadelphia Rapid Transit Company, Philadelphia, Pa. In this work he will be associated with J. M. Shaw, who as editor of *P.R.T. Service Talks* directs the public relations activities of the company.

During his connection with the *JOURNAL*, Mr. Thayer has contributed to all departments of the paper, but he engaged more particularly in the preparation of material for the department Manufactures and the Markets. To this work he brought an unusual combination of talents, a combination which, reinforced by his recent contact with the electric railway industry in its various phases, should be very valuable in his new work.

Mr. Thayer is by profession an engineer, but the urge toward journalism and public relations work has long been strong in him. Thus he served with the *Pasadena Star-News* for three years and the *Los Angeles Examiner* for two years. He was graduated from the California Institute of Technology at Pasadena, where he took a five-year

course, receiving the degree of B.S. He had more than a year's experience in street contracting work, but turned from engineering as such to become an engineer-editor, activity that contemplated the exercise of his acquired talent as expressed in his engineering studies and his natural talent manifested in the urge to write.

J. H. Hustis Heads Schenectady Railway

The Delaware & Hudson Company and the New York Central Railroad have announced the election of James H. Hustis, formerly chairman of the Boston & Maine Railroad, as president of the Schenectady Railway, which is jointly owned by them.

Mr. Hustis for several years was identified with the New York Central and later became president of the Boston & Maine, from which post he was elevated to the chairmanship which he lately resigned. He succeeds the late E. M. Walker at Schenectady.

R. B. Stearns and K. S. May Members of Banking Firm

Two former railway men have become members of an investment banking house. They are Russell B. Stearns and Kenneth S. May, who on Jan. 1, 1927, were admitted to general partnership in the firm of Arthur Perry & Company, Boston, Mass.

After Russell B. Stearns was graduated from the University of Michigan, class of 1916, he assumed the duties of assistant to the president of the North American Company, New York. He served overseas during the war and then entered the investment banking business in Boston and became associated with the firm of Arthur Perry & Company in November, 1920. He is vice-president and a director of the Municipal Gas Company of Texas. Mr. Stearns will continue to be located in Boston.

Mr. May was in the class of 1909 at the Massachusetts Institute of Technology, taking the electrical engineering course. After leaving college he was successively connected with the Boston & Worcester Street Railway, the Boston Elevated Railway and for some six years with Stone & Webster in the department which conducted examinations of public utility properties for investment bankers. In May, 1916, Mr. May became associated with Arthur Perry & Company, with headquarters in Boston. He is now located in Philadelphia.

L. P. Miles a Publisher

Lovick P. Miles, attorney for the Memphis Street Railway, Memphis, Tenn., was elected president of the Commercial Publishing Company, publishers of the *Commercial Appeal* and the *Evening Appeal*, at a meeting of the directors on Dec. 8. Mr. Miles was the unanimous choice of the board. He has announced his immediate acceptance and retirement from law practice on March 1, 1927, in order to devote his entire time to the duties of his new

office. Mr. Miles is one of the most prominent lawyers in the South. He has had newspaper experience and training. He was engaged at one time

as assistant attorney of the Missouri Pacific Railway System and later was general attorney for the same system for western Arkansas and Oklahoma.

New Public Service Transportation Unit Heads

Messrs. Warner and Schreiber, Long in Service of New Jersey Company, Are in Charge of Traffic and Plant Respectively—L. P. Baurhenn Director of Personnel—Messrs. Rothery and Sell Promoted

CHANGES in the operating personnel of the Public Service Railway and the Public Service Transportation Company, Newark, N. J., were announced recently by Matthew R. Boylan, vice-president in charge of

George A. Rothery, chief clerk, Camden, succeeds Mr. Schreiber as Southern Division manager and Claude L. Sell, superintendent of employment, Camden, becomes assistant manager.

Mr. Warner was graduated from Lafayette College on June 22, 1910, as an electrical engineer and five days later entered the employ of Public Service Railway as a cadet engineer. He was put to work in the pits at the Newark car shops, and later had experience in other departments of the company. At the end of the two-year course, in 1912, he was assigned to take charge of the traffic department, which was formed at that time. Later he became traffic investigator. He was made traffic engineer on Jan. 1, 1916. He became assistant to Matthew R. Boylan when Mr. Boylan was made acting general manager on Dec. 1, 1923, and continued as his assistant when Mr. Boylan was made vice-president in charge of operation in April, 1924. Mr. Warner is president of the Public Service Section of the American Electric Railway Association and holds important committee places in that organization.

For sixteen years Mr. Schreiber had charge of the designing and construction of a large number of improvements for Public Service, including carhouses, bridges, ferry slips and ferry houses, sand-drying and stone-crushing plants and commercial buildings. He had charge of the construction of the Public Service Terminal Building in Newark.

After several years of railway experience in New Orleans. Mr. Baurhenn came to New Jersey in 1900 and took a position with the Bergen County Traction Company at Edgewater as general shop foreman in charge of transportation. When the New Jersey & Hudson River Railway & Ferry Company took over the Bergen County Traction Company Mr. Baurhenn became superintendent and purchasing agent of the new company, remaining



A. T. Warner



Martin Schreiber

operation. As indicated previously in the ELECTRIC RAILWAY JOURNAL the purpose is to increase the efficiency of the organization.

Arthur T. Warner becomes general manager in charge of traffic. Mr. Warner has been assistant to Vice-President Boylan.

Upon graduating from Ohio State University with the degrees of mechanical and electrical engineer, Mr. Schreiber entered the employ of the Cleveland Electric Railway as an electrician and had risen to the position of engineer in charge of drafting rooms when he resigned in 1903 to become

in that position until 1911. When Public Service took over that company in 1911 Mr. Baurhenn was made division superintendent of Bergen. He was transferred to the Hudson Division as division superintendent in 1915 and two years later went to Essex Division in a similar capacity. In August, 1918, he was made assistant general super-



L. P. Baurhenn



G. A. Rothery



C. L. Sell

Martin Schreiber becomes general manager in charge of plant. Mr. Schreiber has been manager of the Southern Division.

Louis P. Baurhenn becomes director of personnel. Mr. Baurhenn has been general superintendent.

connected with the Public Service as assistant engineer of the railway. Three years later he was made engineer of maintenance of way and later chief engineer for the Public Service Railway and was appointed manager of the Southern Division on Sept. 1, 1920.

intendant and on Dec. 1, 1923, general superintendent.

For the last fourteen years Mr. Rothery has been employed by the Public Service Railway. He started in the inspection department, then went to the general superintendent's office, was

chief clerk of Essex Division, and later he was active in special traffic and standardization of carhouse practices, with headquarters at Newark. Since 1920 he has been chief clerk to the manager of Southern Division.

Mr. Sell became connected with the Public Service Railway in 1912 as a motorman. He since has run the gamut of the operating department and has had much to do with the operation and maintenance of buses. Besides, he has been starter, inspector, chief instructor, supervisor of instruction and superintendent of employment.

Obituary

Edwin M. Walker

President of Schenectady Railway a
Victim of Monoxide Gas Poisoning
—Man of Sterling Qualities

Another name was added to the long list of fatalities attributed to monoxide gas poisoning in the death on Dec. 30 of Edwin M. Walker, president of the Schenectady Railway, Schenectady, N. Y. Apparently he had started to adjust his car, but with the garage doors closed on account of the cold. So it was that the deadly, odorless gas overcame him within a few feet of his unknowing family.

Even the brief mention that the ELECTRIC RAILWAY JOURNAL was able to print at the moment of going to press with the Jan. 1 issue sufficed to prove that Edwin M. Walker had made a host of friends in the industry which he had helped so much to lead to higher ideals. It seemed incredible to them that one still in the flush of his powers and the bounding health of a clean-living man should have been taken away so suddenly.

Those who know the rough and tumble through which many a public utility man has to pass never ceased to admire the scholarly refinement that was always a part of Edwin M. Walker. Whether he was dealing with the employees or the most unreasonable agents of the public, a coarse word never passed his lips. His unmistakable sincerity and faithful performance of any promise made were the weapons that brought him victory without lowering his personality.

Indeed, Edwin M. Walker had inherited from his forebears the finest qualities of the cultured Englishman. His life was the embodiment of Polonius' advice: "Be thou familiar, but by no means vulgar." His charm and tact were felt by men of every degree of education.

These qualities stood him in good stead, for he was ever in the forefront of the struggle for modernizing the electric railway industry. Pioneers have exceptional need of an amiable disposition to make the bitterness of a new idea palatable. Edwin M. Walker had just the right combination of brains, patience and kindness.

Mr. Walker is best known through his splendid work with the safety car at Terre Haute at a time when the safety car was anathema to most of

the field. It was his doctrine that the street railway must take advantage of all technical improvements to give a higher standard of service to a more exacting public. Starting in 1918 with his first safety cars, he soon wiped out most of the jitneys with a railway service much better than they offered and at a fare no higher than 5 cents. Mr. Walker left Terre Haute in 1923, but the fare there remains unchanged, largely because of the extent to which the service has been merchandised.

It is less widely known that he was also a pioneer with the bus. As long ago as September, 1914, when he was manager of what is now the Dubuque Electric Company, Dubuque, Iowa, he installed some improvised Ford buses and later used Edison-cell buses for a



E. M. Walker

bridge operation to East Dubuque. During his stay at Schenectady Mr. Walker also applied for certain bus franchises. From the vantage point of ten years' clear-sighted study, he refused to be swept away by propaganda or hysteria on the matter of car versus bus. For him there was no "versus"; only an "and" to care for conditions where trackways were impracticable or where there was no market for real mass transportation.

When he went to Schenectady, late in 1923, it was to accept a most difficult task. A strike had left the company impoverished. Maintenance had been deferred. Much of the rolling stock was antiquated or too heavy. Finally the directors of the two steam railroads which were equal owners of the property assumed a somewhat "defeatist" attitude about electric railways; in other words, they were not sure.

The man who had been chosen to assume the post at Schenectady was equal to the task. Month after month saw an improvement in the reliability of the equipment, and with that improvement came increases in riding and decreases in expenses per car-mile.

It was in this connection that Edwin M. Walker showed his flair for the right kind of publicity. The winter before his advent had seen a complete breakdown of the service in a snow-storm. So his first thought was to guard against any possible repetition of the kind. However, it was not enough only for his men to know that they

would be prepared. He wanted the public to know it, too. No space was bought to advertise "We're ready to clean up Old Boreas." Instead, the completely rehabilitated and enlarged snow-fighting equipment was lined up alongside the shops where the thousands of General Electric workers could see for themselves that this time it would be safe to jack up their autos for the winter.

Although Mr. Walker succeeded in securing funds for only part of the new rolling stock he considered essential the new vehicles amply justified their purchase. Shortly before his death, however, he had made recommendations for a modernization program which he firmly believed would make the property at Schenectady one of the finest and most profitable of its size in the country.

Mr. Walker was born at Worksop, England, in 1875. At the age of twelve he came to the United States with his parents. Following a technical education, ever broadened by his love for good literature, he entered the public utility field. After holding positions in gas and electric work at Lockport, Boston and elsewhere, he took charge of the railway and electric property at Dubuque. Next he spent six years to 1923 at Terre Haute, following which he accepted the presidency of the Schenectady Railway.

Hardly the least of Edwin M. Walker's fine qualities was his willingness to give freely of his experience to fellow-craftsmen. He was a hard worker in his territorial bodies and the American Electric Railway Association, a faithful correspondent and a painstaking host. The electric railway industry can never have too many men of his stamp.

F. Harrison Warner, general agent at Greenfield, Ind., for the Terre Haute, Indianapolis & Eastern Traction Company, died recently. He was 60 years old.

Charles Page, Sand Springs, Okla., builder of electric railways and promoter of other utility enterprises, died on Dec. 28.

William T. Fitch, for many years superintendent of the maintenance of way department of the Philadelphia Rapid Transit Company, Philadelphia, Pa., is dead.

Samuel M. Clement, former public service commissioner of Pennsylvania, died in Philadelphia on Dec. 21 of injuries received in a recent taxicab accident. Mr. Clement was president of the Quaker City Cab Company and a director of several local trust and insurance companies. He was 53 years old.

Charles Elmer Gossard, superintendent of the Lewistown & Reedsville Electric Railway, Lewistown, Pa., for 24 years, died on Dec. 28. Mr. Gossard was born at State Line, Franklin County, Pennsylvania. The early years of his life he spent at Altoona. He went to Lewistown 26 years ago and entered electric street railway service there. The late superintendent was 57 years old.

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

General Electric Adopts Relief and Loan Plan

A relief and loan plan whereby employees of the General Electric Company who are temporarily idle, working part time or in need of relief because of illness in the family or other emergencies in the home can borrow up to \$200, without interest, and repay it by deduction in installments of 10 per cent of weekly pay when back on full time again has been inaugurated at the Schenectady, N. Y., works of the company.

This plan originated among the employees and was presented to the company through the works council some time ago. The employees were told then that if a majority in the employ of the company for one year or more wanted the plan it would not only be

who leave the employ of the company after one year's membership will be refunded the amount deducted from wages less the amount contributed toward the supplementary relief fund.

All loans and disbursements will be administered by a committee composed of an equal representation of employees elected by the contributors and appointed by the works management.

Lehigh Valley Orders Four Double-Unit Gas-Electric Cars

A recent order for additional motive power placed by the Lehigh Valley Railroad includes four Brill-Westinghouse double-unit gas-electric cars for operation on the stiff grades from Elmira to Canastota and between Wilkes-Barre and Towanda. On these lines grades of 1 and 1.5 per cent are com-

switch type, arranged for single-end operation. Two motor-driven air compressors, each having a displacement of 25 cu.ft. at the rated voltage, are to operate the brakes and controls, and two fans rated at 1,500 r.p.m. have been specified as part of the cooling equipment. The power plants are to be mounted longitudinally and spaced 4 ft. 5 in. center to center, which will permit free access to either side of either unit, as well as providing ample room for an aisle. The cars will replace six regular trains.

Jobber's Status Discussed

Head of Electric Hose & Rubber Company Makes an Exhaustive Survey of Situation as It Affects Industry

Feeling that the jobber's present status in industry needs a thorough discussion, C. D. Garretson, president of the Electric Hose & Rubber Company, Wilmington, Del., has just prepared a frank and comprehensive study of the subject, which is published in a handsome brochure, entitled "Thinking Thru."

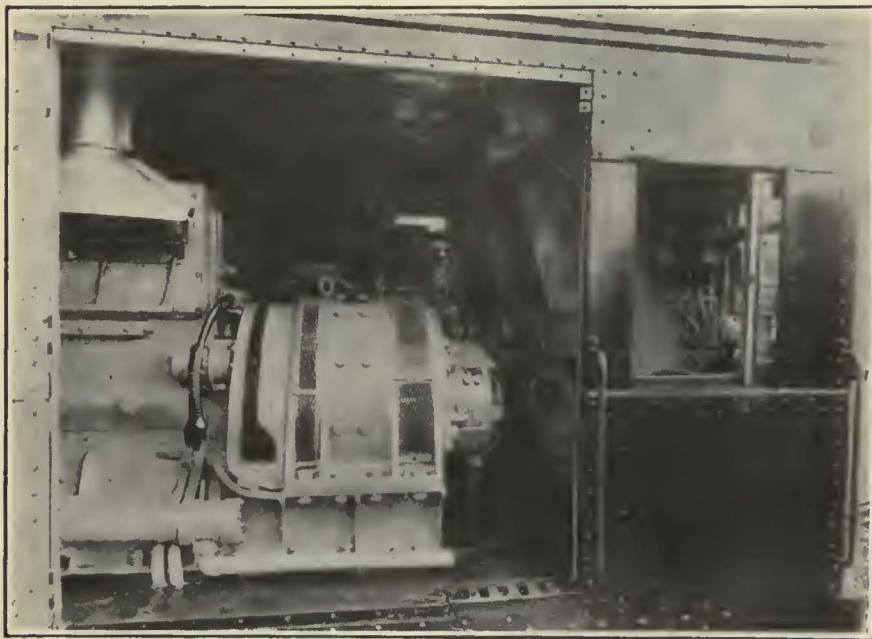
While Mr. Garretson is far from predicting that the position of the jobber is without hope, he likens him to "a weathervane in a cyclone." "He is," continues the author, "grabbing at any line to sell on which he can make money. His full line is a regular hodgepodge, from steel bullets to tooth-brushes and from radios to rubber bands. If he looks this condition right square in the face and thinks about it, he will realize that it is not an economical position for him to be in, because of the fact that he is carrying a lot more inventory than he should for the amount of his sales, and, more still, he cannot give the attention to each individual item that it deserves.

"Wouldn't it be better to bring his line down to the number of items to which a jobber can give adequate representation, get his business on a stable basis and make room for other jobbers in the line which he discards?" asks Mr. Garretson. "This intensive competition does not make any more business. It is simply changing the channels in which business should economically flow. A jobber who really adds on lines with the thought that he is going to get more business cannot help but spread his efforts thinner, and eventually he pays the price for this greed."

"Thinking Thru" not only contains such arguments as these but is the medium for presenting the business policies of the Electric Hose & Rubber Company in a very human manner. The booklet is now being distributed to the trade.

Brown Boveri Has Good Year.

Laurence R. Wilder, president of the American Brown Boveri Electric Corporation, reports a successful year for his corporation. Gross business of the company and its subsidiaries in 1926 is estimated by him at approximately \$25,000,000. For 1927 Mr. Wilder predicts a gross of some \$35,000,000, this estimate being based on business done and in sight.



Engine-Room Layout of New Gas-Electric Cars for Lehigh Valley Railroad.
View Is of Right Side of Car, Showing Generator, Blower Motors,
Instrument Boards and Controls

adopted but that for every dollar put into the relief and loan fund treasury by the employees the company would put in an additional dollar.

Any employee with the company more than one year is eligible for membership. Fifty cents a month is deducted from each member's pay, 5 cents going into a relief fund and 45 cents to be used as an unemployment loan fund.

The General Electric Company will act as custodian of the fund and will allow 5 per cent interest thereon. Employee members retired either on a pension or disability relief will be paid the full amount deducted from their wages plus interest at 5 per cent per annum for the average time. Members

mon, while the most severe one is 2.4 per cent for 3.6 miles.

While the floor plans of the cars differ, the exterior dimensions and general characteristics will be the same. Each car will be 70 ft. 6 in. over all and will weigh between 130,000 and 135,000 lb., depending upon the interior arrangement. A compartment 13 ft. 10 in. long at the front of the car will house the power plant, fans, control apparatus and operator's cab. Each of the two power plants will consist of a 250-hp. Brill-Westinghouse engine, driving a 160-kw. Westinghouse generator through a flexible coupling. There will be four 140-hp. type 557-D-8 motors to each car, two fed from each generator. Controls will be of the unit

Careful Attention Paid to Interior Appearance of Williamsport Cars

Emphasizing the elements of lightness in weight and flexibility of operation five one-man, two-man cars were recently delivered to the Williamsport Passenger Railway of Williamsport, Pa., by the J. G. Brill Company of Philadelphia, Pa. The interior appear-



Roomy Interior of Williamsport Passenger Railway's New Cars

ance of these cars is particularly pleasing, Brill seats with brown leather upholstery being standard equipment, while the motorman's operating equipment is inclosed by wood paneling. A large full-vision hinged type of windshield has been installed at either end.

Principal specifications of the new units are appended here:

Date order was placed.....	July 8, 1926
Date of delivery.....	November, 1926
Seating capacity.....	44
Weight:	
Car body.....	19,460 lb.
Trucks.....	9,600 lb.
Equipment.....	9,820 lb.
Total.....	38,880 lb.
Bolster centers, length.....	19 ft. 8 in.
Length over all.....	42 ft. 2 in.
Truck wheelbase.....	5 ft. 4 in.
Width over all.....	8 ft. 8 in.
Height, rail to trolley base.....	10 ft. 10 1/2 in.
Body.....	Semi-steel
Interior trim.....	Statuary bronze
Headlining.....	Agasote
Roof.....	Arch
Air brakes.....	Westinghouse
Axles.....	To A. S. T. M. specification
Bumpers.....	Hedley anti-climber (four-ribbed)

Car signal system.....	Faraday
Car trimmings.....	Statuary bronze
Center and side bearings.....	4 ft. 3 1/2 in.
Conduits and junction boxes.....	Brill
Control.....	K-35
Destination signs.....	Electric Service Supply
Door operating mechanism.....	National 129LR
Fare boxes.....	Pneumatic Johnson type DM-2
Finish.....	R. F. Johnson's "Krakno"
Gears and pinions.....	Tool Steel Gear & Pinion Co.
Hand brakes.....	National Staffless
Heater equipment.....	Railway Utility Co. cross seat type, 750-watt
Headlights.....	"Golden Glow" type RRc-96
Journal boxes.....	MCB 3 1/2 x 7 in.
Motors.....	Four Westinghouse No. 510-A, inside hung
Sanders.....	Keystone
Sash fixtures.....	Brill
Seats.....	Brill No. 201-B
Seating material.....	Genuine leather
Slack adjuster.....	National Brake Co. type E
Springs.....	Brill
Step tread.....	Kass, 5 in.
Trolley catchers.....	Earl
Trolley base.....	Nuttall No. 20-A
Trolley wheels.....	VK-6
Trucks.....	Brill No. 177-E-1
Ventilators.....	Railway Utility Co.
Wheels.....	26 in. diameter

Rubber Exchange Announces New Rule

A new rule providing that trading in the current months shall stop at noon of the last trading day upon which transferable notes may be issued for delivery went into operation on the Rubber Exchange of New York Dec. 27. Explaining the new ruling, Secretary Walter Dutton has issued the following statement:

"Transferable notes may be issued up to 12:15 p.m. of the last trading day. This extension of time applies to notices issued against open conditions with the clearing house and also provides for issuing notices against sales made on the last trading day of the current day for delivery on the last day of that month.

"In the latter instance, clearing members may issue transferable notices for such deliveries before 12:15 p.m. on the last trading day, which notices should be issued direct to the clearing members, clearing the purchase, instead of to the clearing house. Such transferable notes must be passed on within a half hour and circulate until the interest in such month is liquidated, not later than 7 p.m. on the date of issue."

25 Noiseless Cars for Twin Cities

Included in the budget of the Twin City Rapid Transit Company, Minneapolis, Minn., is \$155,000 for 25 of the new type noiseless cars to be built in 1927. In addition \$82,000 is set aside for repair and renewal of old cars. These plans are before the Councils of the two cities of St. Paul and Minneapolis, Minn.

Each of the new cars will weigh about 1,000 lb. more than the original type put into operation four years ago on Nicollet Avenue in Minneapolis, but 11,000 lb. less than the old type of cars in use many years. The proposed cars are similar to those in use for a year on the Bryant and Johnson line in rush hours and tried out on the Nicollet Avenue and the Fourth Avenue routes.

Approval of the plan means 60 per cent will be charged to Minneapolis and 40 per cent to St. Paul operation. For instance, \$93,000 would be part of the \$680,000 budget for the Minneapolis Street Railway for 1927 improvements.

Extensive Improvement Work in Altoona in 1926

The sum of \$726,000 has been expended by the Altoona & Logan Valley Electric Railway and its subsidiary, the Logan Valley Bus Company, Altoona, Pa., during the past year, according to a financial statement submitted by C. A. Brooks, supervisor of railways for the General Engineering & Management Corporation, operating the local lines.

Replacing trackage in the city and on suburban lines cost a total of \$311,455. Thirteen new cars were purchased at a cost of \$221,714. Equipping cars with safety devices cost \$37,000. Buses and bus equipment cost \$53,000. Repairs and building construction cost \$85,337. The company spent \$45,000 for rearranging the power feeders and turning over the power contract to the Penn Central Company, Altoona. Since the Fitkin interests assumed charge of the Altoona lines in March, 1925, practically every route has been rebuilt with heavier rails.

Westinghouse Subsidiaries Merged Into Parent Company

Westinghouse Electric & Manufacturing Company announces the discontinuance of the corporate form of two subsidiaries by consolidation into the parent company. These concerns are the Westinghouse Electric & Products Company of Mansfield, Ohio, and the George Cutter Company of South Bend, Ind. In future they will be designated as the Mansfield works and the street lighting department, respectively, of the Westinghouse Electric & Manufacturing Company. The latter includes the South Bend works, which is one of the largest in the country devoted to the manufacture of street lighting equipment, with branches for the manufacture of poles located in Milwaukee, St. Louis, and Valdosta, Ga.



Visiting Inspection Committee from Williamsport Ready to View New Equipment at Brill Plant

Long Island Railroad Opens New Double-Track Line

Officials of the Long Island Railroad announced the completion on Jan. 5 of double track on the Long Beach Division between East Rockaway and Wreck Lead, a distance of 3.37 miles. The work involved laying a complete single track and, in addition, 150-lb. third rail. The project cost approximately \$500,000. Power for the line is being supplied from the existing substations at Wreck Lead and Lynbrook. Service was commenced immediately following the announcement.

General Electric Recalls G. E. Emmons

At a recent meeting of the board of directors of the General Electric Company, G. E. Emmons, for many years in charge of the manufacturing organization and since 1924 retired, was elected acting vice-president, due to the illness of F. C. Pratt. In addition to being in charge of the manufacturing organization, Mr. Emmons was for years Schenectady works manager. At the same meeting E. W. Allen, formerly manager of engineering, was elected vice-president in charge of that activity. The promotions were effected as of Jan. 1.

Rolling Stock

Hamilton Street Railway, Hamilton, Ont., Canada, expects delivery in May, 1927, of 24 single-end, semi-convertible street cars, ordered Nov. 12 from the National Steel Car Corporation, Ltd., also of Hamilton. The units will be of semi-steel construction, steel frames and steel girder plates for the inside side finish being specified, while the outside sheathing below the windows will be of 1/2-in. Plymetl. Seats for 48 passengers will be provided, these to be upholstered in genuine Spanish leather. Following are the principal specifications:

Weights:	
Car body	19,000 lb.
Trucks	8,000 lb.
Equipment	7,000 lb.
Total	34,000 lb.
Bolster centers, length	18 ft. 2 in.
Length over all	40 ft. 11 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 3 1/2 in.
Height, rail to trolley base	10 ft. 9 1/2 in.
Body	Semi-steel
Interior trim	Cherry
Headlining	Haskellite
Roof	Arch
Air brakes	Westinghouse
Axles	4-in. steel
Bumpers	Anti-climber
Car signal system	Consolidated Car Heating Co.
Center and side bearings	Perry-Hartman ball bearings
Compressors	Westinghouse
Control	K-35
Couplers	Emergency
Destination signs	Hunter
Door-operating mechanism	National Pneumatic Co.
Fare boxes	Cleveland
Fenders	H-B life guard
Gears and pinions	Helical
Hand brakes	Peacock Staffless
Heater equipment	Consolidated Car Heating Co.
Headlights	Golden Glow
Journal bearings	Friction
Journal boxes	MCE
Lightning arresters	Westinghouse
Motors	510-A-2 Westinghouse interpole, inside hung

Paint	Duco
Sanders	O. W. Meissner's
Sash fixtures	O. M. Edwards
Seats	Ottawa Car Company
Seating material	Spanish leather
Slack adjuster	Westinghouse
Springs	Coil and elliptic
Step treads	Irving Subway
Trolley catcher	Ohio Brass
Trolley base	U. S. No. 13
Trucks	National Steel Car
Ventilators	Nichols-Lintern
Wheels	26-in. rolled steel
Special devices, etc.	Westinghouse treadle step, automatic air control

Philadelphia, Pa. — Westinghouse Electric & Manufacturing Company was recently awarded two contracts for electrical equipment for the Broad Street subway cars, aggregating \$1,182,148. Twenty of the 312 car motors included in the contract must be delivered by April 30 and all must be turned over to the J. G. Brill Company by Sept. 15. Incidentally, Director Ehlers of City Transit expects that the subway will be officially opened by Mayor Kendrick early in November.

Indianapolis, Ind.—Arthur W. Brady, president of the Union Traction Company, recently outlined before the Public Service Commission plans for the purchase of new rolling stock to be used in the company's freight business. Mr. Brady sought the commission's approval of a proposed issue of \$62,235 in notes to buy twenty new freight cars. The purchase is to be made on the basis of a \$6,000 payment and the balance in monthly installments of \$1,035.27.

New York City.—The New York Railways is planning the rehabilitation of 115 cars. They will be rebuilt along the lines of the trial cars concerning which articles have already appeared in the JOURNAL.

Union Traction Company of Indiana, Anderson, Ind., according to reports, has requested permission from the Public Service Commission for the issuance of notes to buy twenty new trail freight cars for \$68,235. Terms of the proposed purchase are said to be \$6,000 cash and the balance in 60 monthly installments.

Trade Notes

Elisha Walker, president and chairman of the board of Blair & Company, New York City, has been elected a director of the American Brown Boveri

Metal, Coal and Material Prices

Metals—New York		Jan. 4, 1927
Copper, electrolytic, cents per lb.		12.90
Copper wire, cents per lb.		15.25
Lead, cents per lb.		7.725
Zinc, cents per lb.		7.25
Tin, Straits, cents per lb.		66.75
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Md		
Roads, gross tons		\$5.125
Somerset mine run, Boston, net tons		2.45
Pittsburgh mine run, Pittsburgh, net tons		2.125
Franklin, Ill., screenings, Chicago, net tons		1.875
Central Ill., screenings, Chicago, net tons		1.425
Kansas screenings, Kansas City, net tons		2.35
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.		\$6.00
Weatherproof wire base, N. Y., cents per lb.		17.50
Cement, Chicago net prices, without bags		2.10
Linseed oil :5-bbl. lots, N. Y., cents per lb.		10.8
White lead in oil :100-lb. keg, N. Y., cents per lb.		14.50
Turpentine :bbl. lots, N. Y., per gal.		\$0.89

Electric Corporation, to fill a vacancy, and Henry Lockhart, Jr., vice-president of the same company, has been elected to succeed Felix Jenkins, resigned.

Service Motors, Inc., Wabash, Ind., will be amalgamated with the Commerce Motor Truck Company of Ypsilanti, Mich., for the purpose of manufacturing buses and trucks to be equipped with the new type of final drive known as the relay axle drive. E. W. Bassick of Bridgeport, Conn., with several associates, has been active in effecting the amalgamation. G. L. Gillam, president of Service Motors, Inc., will be an officer of the new corporation and have active charge of the operation of the business. W. R. Bassick, president of the Commerce Truck Company, will be an officer and director of the corporation and will be actively interested in the new business. M. A. Holmes, for a number of years sales manager of the Republic Truck Company and now sales manager of the Commerce Truck Company, will be in charge of sales. The headquarters of the new corporation will be at the service plant at Wabash, which is one of the best designed truck manufacturing plants in the country.

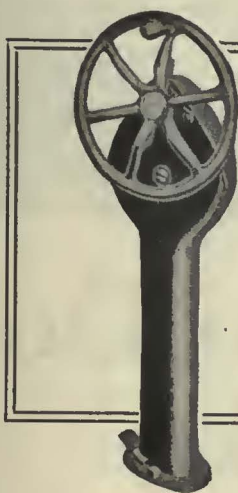
Samuel M. Vauclain, president of the Baldwin Locomotive Works, looks for modest business in 1927, with operations running to 50 per cent of capacity. He expects all departments will be moved to Eddystone, Pa., by the end of 1927 and again denies the report that negotiations are under way for the sale of the Philadelphia property. Gross sales of 1926 are estimated at \$47,000,000, against \$27,876,064 in 1925.

New Advertising Literature

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued folder 4474, describing the babbitting of bearings and explaining the use of the Westinghouse automatic electric babbitting pots. The folder describes also the lead base babbitt, alloy No. 25, a product of the Westinghouse company.

Ohio Brass Company, Mansfield, Ohio, in a recent circular announces a new welding device, designated as the O-B portable resistance welder. The device is of unit type construction and specially designed to operate at high temperatures, with repeated heating and cooling, and without any injurious effects.

Armco Culvert & Flume Manufacturers' Association, Middletown, Ohio, has published a bulletin entitled "Applying Culvert Simplicity to Highway and Railway Bridge Problems." This booklet discusses various angles of culvert and bridge construction and points out the simplicity with which installations of large diameter Armco culverts to the crossing of small streams may be made. Various types of stream crossings and drainage problems are discussed and a table is included to assist in determining the size of culvert required in any given case. Copies of the booklet may be obtained from the Armco association.



Peacock Staffless Brakes

The Peacock Staffless Brake is at least three times as powerful as any ordinary type hand brake and provides ample space to wind up all the chain without jamming or binding. Excess of slack cannot put it out of commission.

The Peacock Staffless Brake is designed to occupy minimum platform space as it projects only six inches into the vestibule from the dash. Motormen like the Peacock Staffless because it is easy to understand, simple to operate and always dependable.

Most leading roads are now demanding the Peacock Staffless on both single and double truck safeties.

Write for full details

National Brake Co., Inc.

890 Ellicott Square, Buffalo, N. Y.

Canadian Representative

Lyman Tube & Supply Company, Limited, Montreal, Canada



Engineered To Do Your Work

Gripping securely on slippery pavements—running on schedule even under adverse weather conditions—cushioning the chassis, engine and passengers over rough places—such performances all have a place in the every day work of Firestone Gum-Dipped Tires.

Traction and flexibility are scientifically

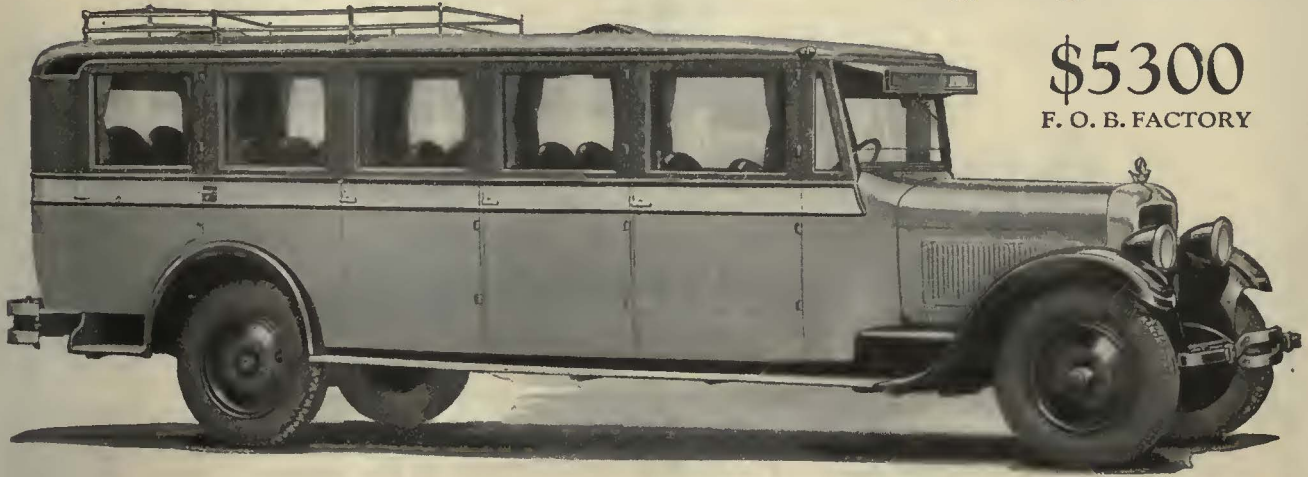
engineered into these tires, just as long mileage is assured by the extra Gum-Dipping process.

You can depend upon the Firestone Dealer—not only for the “Better Service” which goes with these better tires, but for the economy, safety and comfort that only Gum-Dipped Tires can give.

MOST MILES PER DOLLAR
Firestone
GUM-DIPPED TIRES

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER *Harvey E. Firestone*

Bus Patrons Demand Luxurious Equipment



\$5300

F. O. B. FACTORY

Comfort, Beauty, Luxury and Power are found in this Studebaker Side Entrance Parlor Car for Eighteen Passengers

FACTS prove that Studebaker busses are best adapted to profitable city or interurban service.

First, is the low initial cost proved by the fact that two Studebaker busses can be bought for the price of one heavy truck type bus.

Second, is the lower operating cost which is seven to nine cents a mile less for a Studebaker bus than for heavy truck type bus.

Third, is the marked preference shown by bus patrons for vehicles possessing easy-riding qualities and attractive appearance. Passengers gravitate toward Studebaker busses because of the luxurious seats, generous leg room, wide vision windows and because Studebaker busses have a reputation for maintaining their schedules.

The superlative riding qualities of Studebaker busses is the best assurance of continued patronage which means continued profits for the operator.

With the most powerful bus chassis of its size and weight, Studebaker busses glide quietly along the highway, taking long steep grades in high, with a smoothness attainable only by an accurately balanced six-cylinder power plant in which vibration is practically eliminated. The long, resilient springs and the oversize tires cushion every road shock. The smooth acting four-wheel hydraulic brakes enable the driver to thread heavy traffic or, on the open road, to travel at permitted speeds with reassuring safety.

**Six Body Designs, 12 to 21 Passengers
\$3935 to \$6150**

Prices f. o. b. factory, covering body and chassis, complete. Purchase can be arranged on a liberal Budget Payment Plan—Small down payment and balance in convenient monthly installments.

- 12-Pass. (including driver) cross-seat Sedan-Type.....\$3935
- 15-Pass. (including driver) cross-seat Sedan-Type.....\$4295
- 18-Pass. (including driver) side-entrance Parlor Car.....\$5300
- 19-Pass. (including driver) cross-seat Sedan-Type.....\$5050
- 20-Pass. (including driver) Parlor-Car De Luxe*.....\$6150
- 21-Pass. Pay-As-You-Enter Street-Car Type*.....\$5125

*Includes dual rear wheels

Completely Equipped

There is nothing to buy that will add to the driving comfort or facilitate the operation of this bus. The equipment is complete and includes: stop signal system; illuminated destination sign (above windshield); automatic windshield cleaner; rear-view mirror; front and rear bumpers; motometer; extra wheel with tire, tube and cover, mounted on left front; 8-day clock and gasoline gauge, plus the usual instruments, mounted in an oval group under glass; inspection lamp with 10-foot cord. Lights are controlled by a steering wheel switch.

Most Powerful Bus Chassis of Its Size and Weight

Based on the rating of the Society of Automotive Engineers, the Studebaker bus chassis is the most powerful of its size and weight in the world. There are 66 bus chassis on the market with more weight per horsepower than the Studebaker chassis.

The chassis is sturdily built, with surplus strength. It is not a heavy truck-type chassis—nor a passenger car chassis which has been lengthened and therefore weakened by splicing. Extra safety factors include: staunch frame braced by eight stout cross-members; large rear axle shaft; oversize propeller shaft; sturdy, resilient springs; special disc bus wheels and four-wheel hydraulic brakes.

As proved by nearly 300 Studebaker busses with records of more than 100,000 miles, this chassis gives literally scores of thousands of miles of thoroughly dependable service at exceptionally low operating cost—and minimum depreciation.

L
—first cost
—operating cost
—maintenance cost
—depreciation cost
Lower

THE STUDEBAKER CORPORATION OF AMERICA
Dept. B, South Bend, Ind.

Send me full information on Studebaker Busses without obligation

Name.....

Address.....

City..... State.....

We have.....busses at present.

Check below the Studebaker Bus about which you desire information.

Type: Sedan.....Parlor Car.....Street-Car Type.....

Capacity:.....Passengers.



Appraising Versus Engineering

Engineering, the design, construction and operation of property, deals with physical units and mechanical forces. Appraising treats of property in relation to its utility and value. These are dissimilar activities, requiring different experience, personnel, resources and methods.

The American Appraisal Company does not design, build, manage, operate, finance, buy or sell property.

For thirty years it has specialized exclusively in studying property in relation to its utility and value. We believe that this specialization has resulted in a more perfect appraisal service than had we dissipated our energies over a wider range of endeavor.

We know that as in engineering there can be no compromise with the inexorable laws of stress and strain, in appraising there can be no compromise with the basic principles of valuation.

This singleness of purpose and focusing of energy upon the making of appraisals account, we believe, to a large extent for the recognition everywhere accorded American Appraisals.

The American Appraisal Company

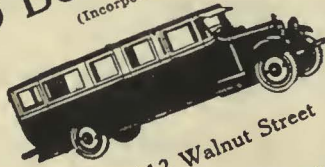
MILWAUKEE

PUBLIC UTILITIES • INDUSTRIALS • REAL ESTATE PROPERTIES • NATURAL RESOURCES

A NATIONAL ORGANIZATION

Tread still good after 29,000 miles

REO BUS LINES CO.
(Incorporated)



114-112 Walnut Street

LEXINGTON, KY.
March 29, 1926.

Kelly-Springfield Tire Co.
212 East Eighth Street
Cincinnati, Ohio

Gentlemen:

Last November we equipped Bus #32 with 6-32x6 Kelly Springfield Heavy Duty Cords, operating on the Lexington-Richmond run.

The distance is twenty-eight miles, four miles being rough, rocky road, with long winding hills and steep grades.

The accompanying photo indicates the condition of the tires after 29,000 miles of continuous service, not one of the six casings being worn smooth as yet.

Yours truly

REO BUS LINES COMPANY

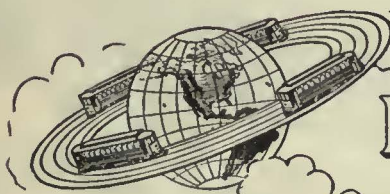
E. R. Webb, Pres



KELLY HEAVY DUTY CORD

An increasingly large portion of the actual income derived from car card advertising service must be devoted to building and maintaining the prestige of car card advertising in the face of the active competition of all other media.

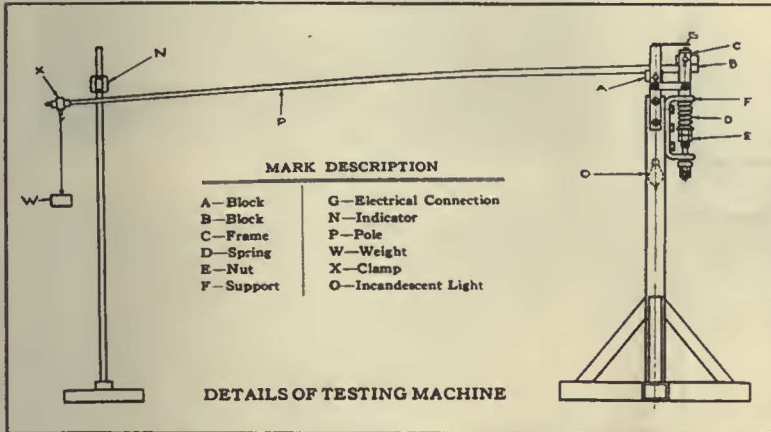
Creating and protecting our mutual interest is a costly item.



Barron G. Collier

INCORPORATED
CANDLER BLDG. NEW YORK

SERVICE TESTED— TROLLEY POLES



A TEST, approximating service conditions, is applied to every standard "NATIONAL-SHELBY" Trolley Pole before it leaves the mill. This test is made on an improved testing machine which infallibly indicates the presence of a permanent "set" in the pole, or any imperfections which would impair its usefulness.

The base of the pole is set horizontally in the machine, after which a deflection gage is set, corresponding to the height, from the floor line, of the free end of the pole under no load.

The proper weight for the pole being tested is then hung on the free end of the pole, and an electrical contact is set so that when the pole is loaded it will close the current of an electric light.

After this adjustment is made, the weight is removed and the return of the pole is checked with the deflection gage. Any pole that does not return to its original position is rejected. A booklet, giving other facts about "NATIONAL-SHELBY" Trolley Poles, sent on request.

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Frick Building, Pittsburgh, Pa.

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Whatever your requirements

specify
**Le Carbone Carbon
 Brushes**

They talk for themselves

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MORE than sixty years of experience in the manufacture of axles, coupled with every facility for correct heat treatment and accurate testing, insure the meeting of the specification in the finished product.

Prompt deliveries of Car and Tender Axles, Engine Truck and Driving Axles, Electric Motor and Street Car Axles, Miscellaneous Forgings.

CARNEGIE STEEL COMPANY
 General Offices • Carnegie Building • 434 Fifth Avenue
 PITTSBURGH PENNSYLVANIA



1835

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 REFRIGERATION
 FOR CARS

Automatic
 —reliable



A Phoenix Electric Refrigerator Car goes on a trip with no attendant in the machinery room and with the door of this room locked. The refrigerating unit needs no attention from the train crew whatever. Controlled entirely by the thermostat inside the refrigerating room, it keeps the interior of the car within narrow limits of any predetermined temperature.

Many other advantages are afforded by Phoenix Electric Refrigerator Cars. Write for particulars.



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PANTASOTE

Trade Mark

Seat and Curtain Materials
There is no substitute for Pantasote

AGASOTE

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Roofing—Headlining—Wainscoting
The only homogeneous panel board

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for electric railway cars
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 At 46th - 250 Park Avenue - Street
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 for Both
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You can save Garage Space!

Get the maximum use of garage and car house floor space. No new buildings or additions to old ones necessary. This can be done by the installation of

EASTON TURNTABLES



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Communipaw Terminal,
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EASTON CAR & CONSTRUCTION CO.
Easton, Pa.

Their installation is advantageous in many places—in saving valuable floor space—in saving time and labor—in expediting garage and shop servicing facilities—as a combined turntable and bus washing platform—and many others. They are easily turned by one man. Their installation cost is low and maintenance practically nil—at most a few cents for lubrication.

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Makers of Steam Superheaters
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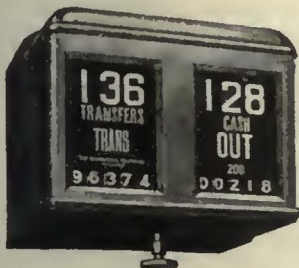
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International Registers

Made in single and double
types to meet requirements
of service. For hand or foot,
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Counters, car fittings,
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LIFTING JACKS
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STRENGTH, SAFETY
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The Duff Manufacturing Co.
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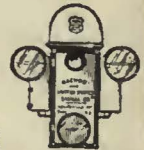


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Wharton trackwork, in which the famous Tisco Manganese Steel has been used, will be found on the leading railways of the country.

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Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

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Special Track Work of every
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We solicit a test of TULC
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The Universal Lubricating Co.
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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.



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**SAVE 30% TO 50% ON
RAILS-LOCOMOTIVES-CARS**

**Economy—Service
Quality—Reliability**

**HYMAN-MICHAELS
COMPANY**

Peoples Gas Bldg., Chicago

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FOR SALE

1—Snow Sweeper

Built by McGuire
Fine condition. Low price.
Immediate Delivery

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Phila., Pa.

**10 Modern All Steel
DOUBLE TRUCK CARS**

Weight, fully equipped, 37,000 lb.
Particulars and prices on application.

IRVING S. VAN LOAN CORPORATION
1750 Broadway, New York City
Specialists in street cars or any part of a street car.

Illustrated bulletin supplied on request.

POSITIONS VACANT

EXPERIENCED track foreman. Energetic man wanted on city work. Give references and experience in detail. P-958, Electric Railway Journal, Tenth Ave. at 36th St., New York.

POSITIONS WANTED

SUPERINTENDENT of rolling stock, 24 years' experience, open for position. PW-960, Electric Railway Journal, Tenth Ave. at 36th St., New York.

TRANSPORTATION official available. Broad experience, successful record, city and interurban properties, recognized ability, progressive, efficient, successful in handling labor. Public relations, traffic problem, selling transportation, increasing revenue. Fine references. PW-961, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

WANTED position as master mechanic, 16 years' experience with two large interurban companies. Can furnish best of references from past and present employers. Very good reasons for making change. PW-959, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

Somewhere—

there's a buyer for the Equipment you no longer need. Reach him thru an advertisement in the SEARCHLIGHT SECTION.

Searchlight Results:

Positions Vacant:

"The strongest proof that your Searchlight Department finds its way to many readers is shown by the numerous letters we have received in answer to our recent advertisement."

Secretary—A Connecticut Railway Co.

"You gave us one good man as a result of a similar advertisement in the Electrical Railway Journal some time ago. Please give us another."

Proprietor of Steel Sales Agency.

Positions Wanted:

"The result of advertising in the Searchlight Section of your Electric Railway Journal I have secured a position with The ——— Traction Co. of W. Va."

"I received 8 replies and accepted a position with the ——— Railway Co. with over 30% increase in salary."

Business Opportunity:

Advertisement for investment to develop or acquire Traction Light & Fr. "The results from the advertisement in Electric Railway Journal have been satisfactory."

New York City Attorney.

Equipment For Sale:

"Our advertisement in the Electric Railway Journal located a buyer, and I have disposed of the car in question."

President—Buffalo Industrial Plant.

"We have disposed of all of our Glrder Rails advertised in your paper. We are frank to tell you that the material went to three different traction lines and represents three separate and distinct new accounts. Our idea is that when it comes to bringing something to buyers in the traction field, there is but one sheet, and that is yours."

Dealer—New York City.

"There is no necessity for the continuation of this advertising, for the reason that we could have sold this equipment five times over from the advertisement that was run one time."

Superintendent—A Pennsylvania Railway Co.

Equipment Wanted:

"The two insertions of this advertisement which you displayed in admirable manner were sufficient to obtain for us the exact equipment that we desired."

Superintendent—A New England Railway Co.

For Every Business Want: "Think Searchlight First"

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
Westinghouse Air Braks Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Appraisals
American Appraisal Co.

Armature Shop Tools
Columbia Machine Works
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.
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse E. & M. Co.

Axles (Front & Rear), Motor Truck & Passenger Car
Timken-Detroit Axle Co.

Axles, Steel
Carnegie Steel Co.
Ludlum Steel Co.

Axles, Trailer & Motor Bus
Timken-Detroit Axle Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Columbia Machine Works
Stuckl Co., A.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Brill Co., The J. G.

Body Material, Haskellite and Plymetl
Haskellite Mfg. Corp.

Rollers
Babcock & Wilcox Co.

Boller, Tubes
National Tube Co.

Bond Trsters
American Steel & Wire Co.
Elec. Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
Columbia Machine Works
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
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
LeCarbone Co.
Westinghouse E. & M. Co.

Brushholders
Columbia Machine Works

Bulkheads
Haskellite Mfg. Corp.

Bus Wheels, Steel
Heywood-Wakefield Co.

Buses
Brill Co., The J. G.

Buses, Motor
Studebaker Corp. of America
White Co., The

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia Machine Works

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.

Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Cars, Gas, Rail
Brill Co., The J. G.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car 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, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.

Castings, Malleable & Brass
Bemis Car Truck Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Celling Car
Haskellite Mfg. Corp.
Pantaso Co., Inc.

Ceilings, Plywood, Panels
Haskellite Mfg. Corp.

Change Carriers
Cleveland Fare Box Co.
Elec. Service Supplies Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.

Claufers and Sockets
General Electric Co.

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Colls, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Colls, Choke and Kieking
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
Columbia Machine Works
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 Electrical Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condenser Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

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
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
American Brass Co.
Amer. Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Amer. Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebing's Sons Co., John A.
Samsom Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samsom Cordage Works
Wood Co., Chas. N.

Conplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes, Holata & Lifts
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations.
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Pantaso Co., Inc.

Dealer's Machinery & Second Hand Equipment
Electric Equipment Co.
Hyman-Michaels Co.
Van Loan Corp., Irving S.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heating Co.
National Pneumatic Co.

Doors & Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.

Doors, Folding Vestibule
National Pneumatic Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Trackwork Co.

Electric Refrigerator Cars
Phoenix Ice Machine Co.

Electrical Wires and Cables
Amer. Electrical Works.
Amer. Steel & Wire Co.
John A. Roebing's Sons Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Engineers, Consulting, Contracting and Operating
Archbold-Brady Co.
Beeler, John A.
Buchanan & Layng Corp.
Bylesby Co., H. M.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McClellan & Junkersfeld
Michey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co.

Exterior Side Panels
Haskellite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Nat'l Ry. Appliance 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.
Cincinnati Car Co.
Consolidated Car Fender Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.
Field Colls (See Colls)

Flangeway Guards, Steel
Godwin Co., Inc., W. S.

Flaxlum Insulators
National Railway Appliance Co.

Floodlights
Elec. Service Supplies Co.

Flmor, Sub
Haskellite Mfg. Corp.

Floors
Haskellite Mfg. Corp.

Forgings
Brill Co., The J. G.
Duff Mfg. Co.

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.

Fuses and Fuse Boxes
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas Producers
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.

Gauges, Oil and Water
Ohio Brass Co.

Gear Blanks
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General Electric Co.
Nat'l Ry. Appliance Co.
R. D. Nuttall Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric Co.
Westinghouse E. & M. Co.

Girdle Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

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Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

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Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
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Elec. Service Supplies Co.
Ohio Brass Co.

Haps, Trolley
Columbia Machine Works
Elec. Service Supplies Co.
R. D. Nuttall Co.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Headlining
Haskellite Mfg. Corp.
Pantaso Co., Inc.

Heaters, Car (Electric)
Consolidated Car Heating 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

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Railway Trackwork Co.
Una Welding & Bonding Co.

Hoop, Bridges
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Lowest Cost
Least Maintenance

Lightest Weight
Greatest Adaptability

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Center Bearings	Bushings
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	McArthur Turnbuckles

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W. F. McManney,
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J. H. Denton,
1328 Broadway, New York City, N. Y.
A. W. Arlin,
772 Pacific Electric Bldg., Los Angeles, Cal.

Bemis Car Truck Company
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AND CABLE

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UNDERGROUND CABLE

MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 26-32 West Randolph Street;
Cincinnati, Trenton Bldg.; New York, 100 E. 42nd St.

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Westinghouse Traction Brake Co.

Instruments, Measuring, Testing and Recording
Amer. Steel & Wire Co.
General Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.

Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars)

Jacks (See also Cranes, Hoists and Lifts)
Buda Co.
Duff Mfg. Co.
Elec. Service Supplies Co.
National Ry. Appliance Co.

Joints, Rail (See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.

Lamp Guards and Fixtures
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Arc and Incandescent (See also Handlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Ohio Brass Co.

Letter Boards
Haskelite Mfg. Corp.

Lighting Protection
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
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Ohio Brass Co.
Westinghouse E. & M. Co.

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Wm. Wharton, Jr. & Co.

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General Electric Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Meters (See Instruments)

Motor and Generator Sets
General Electric Co.

Motor Bases (See Buses, Motor)

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Motorman's Seats
Brill Co., The J. G.
Elec. Service Supplies Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
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Omnibuses (See Buses, Motor)

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Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.

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National Ry. Appliance Co.

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Haskelite Mfg. Corp.

Paving Guards, Steel
Godwin Co., Inc., W. S.

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Elec. Service Supplies Co.
Ohio Brass Co.

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Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipes
National Tube Co.

Pipe Fittings
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Supplies Co.
Nat'l Ry. Appliance Co.

Plywood, Roofs, Handlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pole Line Hardware
Bethlehem Steel Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Elec. Ry. Equipment Co.
Hubbard & Co.

Poles and Ties Treated
Bell Lumber Co.

Poles, Ties, Posts, Piling & Lumber
Naugle Pole & Tie Co.

Poles, Trolley
Elec. Service Supplies Co.
National Tube Co.
R. D. Nuttall Co.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
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Portable, Grinders
Buda Co.

Potholes
Okonite Co.
Okonite-Callender Cable Co., Inc.

Power Saving Devices
National Ry. Appliance Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail, Filler
Philip Carey Co., The

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Ludlum Steel Co.

Rail Joints, Welded
Lorain Steel Co.

Rail Welding
Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.

Rails, Steel
Carnegie Steel Co.
Ludlum Steel Co.

Railway Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Rattian
Brill Co., The J. G.
Elec. Service Supplies Co.
Hale-Kilburn Co.

Refrigerator, Cars
Phoenix Ice Machine Co.

Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.

Reinforcement, Concrete
American Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
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Repair Work (See also Collis)
General Electric Co.
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Replacers, Car
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Resistances
Consolidated Car Heating Co.

Resistance, Wire and Tube
General Electric Co.
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Retrievers, Trolley (See Catchers and Retrievers Trolley)

Rheostats
General Electric Co.
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Roofing, Car
Haskelite Mfg. Corp.
Pantastote Co., Inc.

Roofs, Car and Bus
Haskelite Mfg. Corp.

Sanders, Track
Brill Co., The J. G.
Elec. Service Supplies Co.
Ohio Brass Co.

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Brill Co., The J. G.

Sash, Metal Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

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Elec. Service Supplies Co.

Seating Materials
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Haskelite Mfg. Corp.
Pantastote Co., Inc.

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Hale-Kilburn Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Hale-Kilburn Co.

Second Hand Equipment
Electric Equipment Co.
Hyman-Michaels Co.
Van Loan Corp., Irving S.

Shades, Vestibule
Brill Co., The J. G.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Slide Bearings (See Bearings Center and Slide)

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National Pneumatic Co.

Signal Systems, Block
Elec. Service Supplies Co.

Nachod and United States
Electric Signal Co.
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Signal Systems, Highway Crossing
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Electric Signal Co.
Wood Co., Chas. N.

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Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
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Consolidated Car Fender Co.
Snow Sweeper Rattian J. G. Brill Co.

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Lorain Steel Co.
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Westinghouse E. & M. Co.

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Brill Co., The J. G.

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Brill Co., The J. G.

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American Steel & Wire Co.
Carnegie Steel Co.

Steps, Car
Brill Co., The J. G.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Storage Batteries (See Batteries, Storage)

Storage Tanks
S. F. Dowser Co.

Strain Insulators
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Street Cars (See Cars, Passenger, Freight, Express)

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Booms)

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Ramapo-Ajax Corp.

Switches and Switchboards
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Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Switches, Tee Rail
Ramapo-Ajax Corp.

Switches, Track (See Track Special Work)

Tampers, Tie
Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Ramapo-Ajax Corp.

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Railway Utility Co.
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Godwin Co., Inc., W. N.
International Steel Tie Co.
Ludlum Steel Co.

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Kelly-Springfield Tire Co.
U. S. Tire & Rubber Co.
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Okonite Co.
Okonite-Callender Cable Co.

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National Railway Appliance Co.
R. D. Nuttall Co.
Ohio Brass Co.

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Westinghouse E. & M. Co.

Trolley Wheel Bushings
Star Brass Works

Trolley Wheels (See Wheels Trolley)

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White Co., The

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Easton Car & Construction Co.
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Cincinnati Car Co.
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Railway Trackwork Co.
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Welders, Rail Joint
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Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
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General Electric Co.
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Railway Trackwork Co.

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Wheel Presses (See Machine Tools)

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Carnegie Steel Co.

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Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
R. D. Nuttall Co.
Star Brass Works

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Ludlum Steel Co.

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General Electric Co.
Ohio Brass Co.
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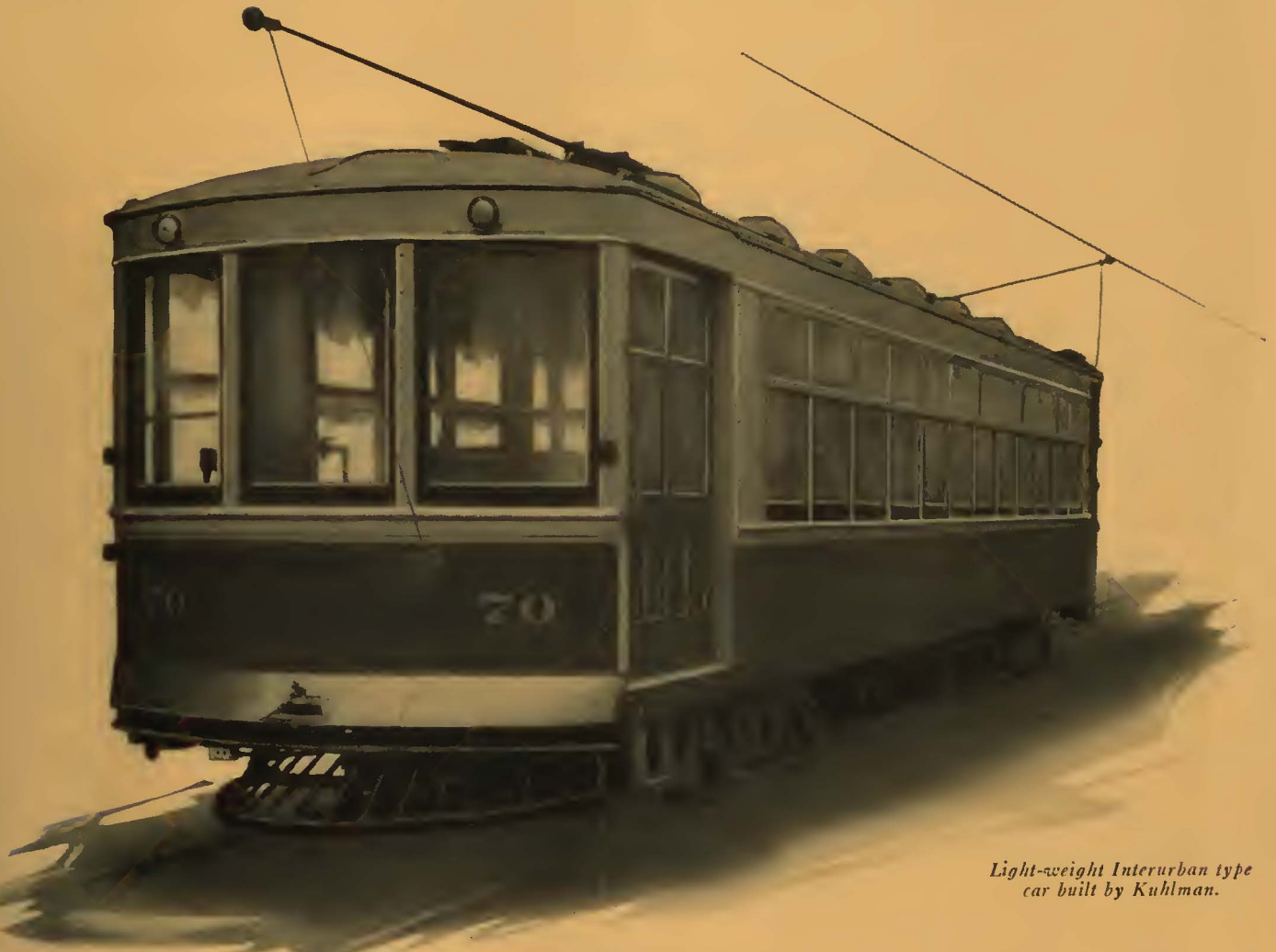
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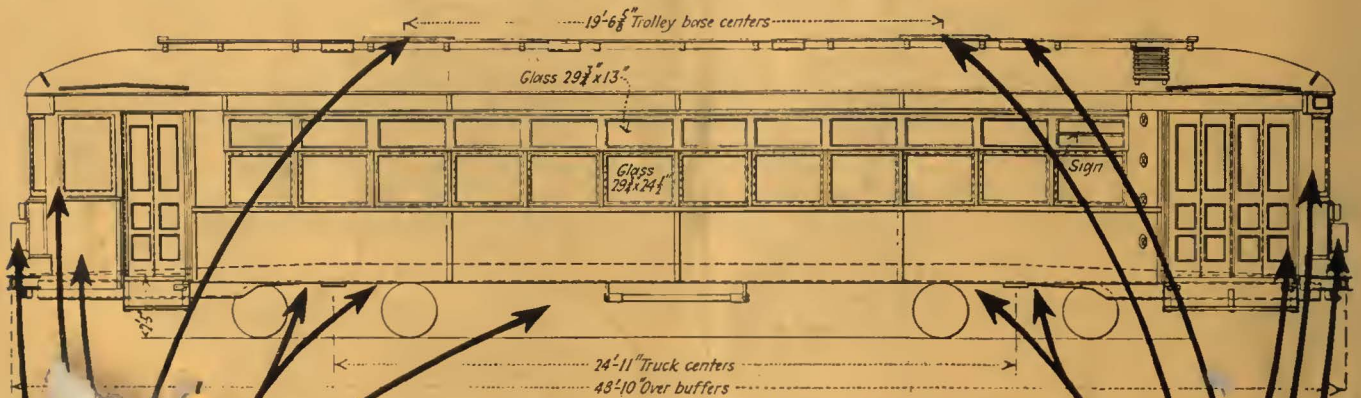
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	Old Cars	New Cars
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