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ELECTRIC RAILWAY JOURNAL

HOUSTON PUBLIC LI
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HOUSTON, TEX

"With RAIL FILLER, maintenance costs will be decreased"

"Two years ago, in a paper read before the Wisconsin Utilities Association in Milwaukee," says Alf A. Oldfield, a leading street railway engineer, "I made the statement that it seemed likely that we would have to avoid the use of concrete in city track zones. But since that time we have made great strides in the development of resilient track, and consequently my idea does not hold.

"About the time that we changed from flexible types of pavement to concrete, we also began the use of ties of steel construction.

"Finally the welded joint and mechanical tie were developed. We used a mechanical tie having asphaltic filler which provides the necessary resiliency. While this was a great advancement, we found it desirable to keep the rail from having direct contact with the concrete between ties. And for this purpose we have adopted Carey Elastite Rail Filler. Our decision was reached after a six months' test on two stretches of track, one with and one without rail filler.

"Personally, I am convinced that concrete pavement in city track zones with rail filler will be found much more satisfactory, and that maintenance costs will be considerably decreased."

Alf A. Oldfield, Engineer of Maintenance of Way, Wisconsin Power & Light Co., Fond du Lac, Wis. Mr. Oldfield is numbered among the best known railway engineers in the country.

* * * * * * * * * *

Carey Elastite Rail Filler is a mastic compound of asphalt and fiber. It comes in ready-formed slabs shaped to fit any type of rail. A tap with a mallet puts the strip into place. It forms a resilient cushion for the rail, which absorbs traffic impact and reduces noise. Unaffected by moisture or changes in temperature. The very small amount it adds to construction costs is insignificant compared with the saving in maintenance costs which results. Write for full details.

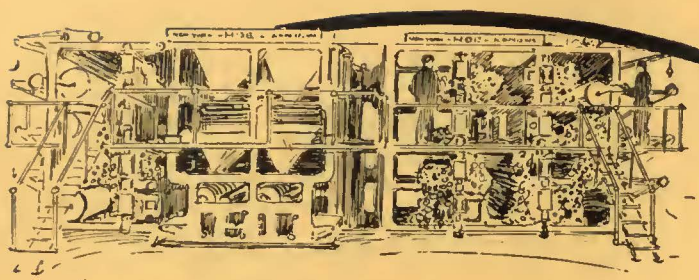
THE PHILIP CAREY COMPANY, *Lockland*, CINCINNATI, OHIO

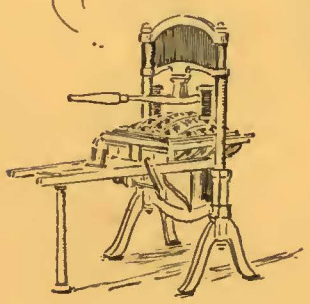
A view of the track system of the Wisconsin Power & Light Co. at Sheboygan, Wis. This shows the type of track construction together with the use of Carey Elastite Rail Filler which was being set in place when the photograph was taken.

Carey Elastite

REG. U.S. PAT. OFF.

SYSTEM OF TRACK INSULATION





Economic Retirement of Obsolete Cars

The printing industry owes its present position to its consistent acceptance of every proven advancement in the art of printing, even when such action necessitated the extensive scrapping of obsolete equipment.

And, as in the printing industry,—

engineering studies on a number of electric railway properties, conducted during the year 1925, show conclusively that—

it pays handsomely to retire obsolete equipment.

One of the great leaders of the industry says:—

Progress

"I do not believe that men in the electric railway business as a whole can claim to have been anything like as progressive as the men controlling and directing some of the great industrial enterprises in this country. When methods, processes or tools in these industries come in time to be obsolete or on the road to obsolescence these men . . . rip them out and replace them with the most modern and up-to-date processes or tools".

J. W. SHANNAHAN,
President, A. E. R. A.

From page 466, September 26, 1925, Electric Railway Journal.

How many of the 28,000 obsolete cars have you?

Modern street cars attract patronage

MEMBER A E R A 1926

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

Westinghouse

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February 13, 1926

CONTENTS

He Found It in the "Journal"

FAILING to obtain necessary information relative to the skip-stop plan from individual railway companies, William P. Capes turned to ELECTRIC RAILWAY JOURNAL and secured the data for which he was searching. Such was the statement of the director of the New York State Bureau of Municipal Research in a talk given at the midwinter meeting of the New York Electric Railway Association.

Besides the leadership the JOURNAL has earned through its editorial pages, its files are the log book of the industry. For more than 41 years it has accurately recorded and interpreted the events and progress of the utility that serves three out of every four people who travel daily between home and work.

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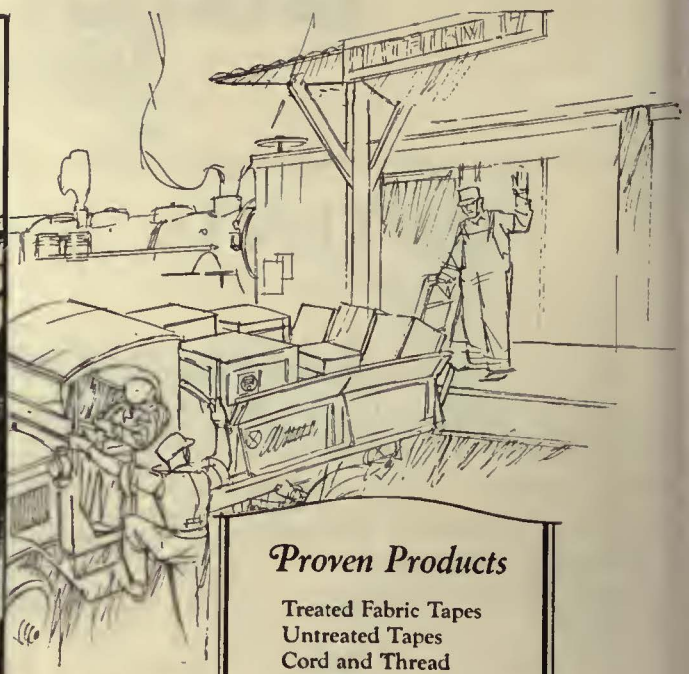


"Like Owning a Million Dollar Testing Laboratory"

"SAY, Bert," called the superintendent, swinging around in his chair, "better add some Westinghouse soldering flux to that requisition I gave you the other day."

"Too late, Bob," regretted the P. A., "The order went right through. The goods will be here shortly. Those Westinghouse people surely ship promptly."

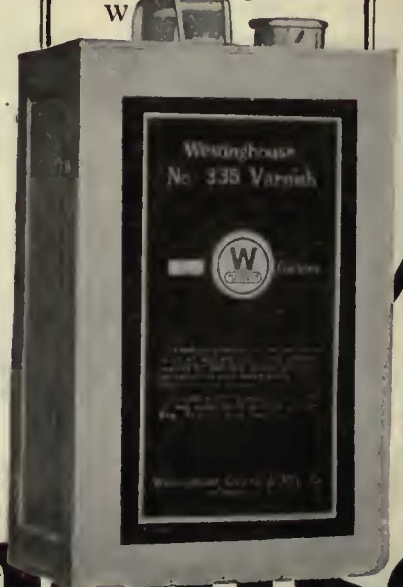
"You like those Westinghouse materials, don't you?" he added.

"You bet I do," Bob responded heartily, "It's just like owning a million dollar testing laboratory when we buy our insulating materials from Westinghouse. The things we buy, they have already tested for their own use. You can't beat Westinghouse insulating materials."

"That's true," agreed the other. "It's convenient for me, too. When ordering supplies, I just send Westinghouse all orders for insulating materials. It saves work and I am sure we are getting the best."

Proven Products

Treated Fabric Tapes
Untreated Tapes
Cord and Thread
Sleeving
Treated Papers
Treated Fabrics
Untreated Papers
Untreated Fabrics
Asbestos
Fullerboard
Micarta Sheets
Micarta Tubes
Micarta Formed Shapes
Mica Sheets
Mica Tubes
Varnishes
Paints
Japans
Enamels
Insulating Compounds
Insulating Glue
Soldering Flux
Transformer Oil
Switch Oil
HL Lubricating Oil
W



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

WESTINGHOUSE ELECTRIC

MEMBER AERA 1926

Westinghouse

X84572

"He Will Get Across!"

"Will he get across?" is the question that too often, and needlessly, flashes to mind when one sees a car start over a grade crossing—especially if a locomotive is approaching.

"Will he get across?" implies the hazard that always goes with the unprotected crossing.

It gives way to a feeling of "He *will* get across," when crossings are protected with

National Trolley Guard

When National Guard is on duty the chance of stalled cars due to trolley jumping is eliminated. The guard forms a trough over the wire, catches the wheel if it jumps and furnishes the power necessary to carry car and passengers to safety.

National Trolley Guard is cheap and reliable protection against crossing accidents.

National Trolley Guard is an inverted trough of galvanized iron or phono-electric wire mesh—light in weight, easily installed and cheaply maintained.

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

Ohio Brass Co.

14-B

PORCELAIN INSULATORS LINE MATERIALS RAIL BONDS CAR EQUIPMENT MINING MATERIALS VALVES

The WHITE COMPANY adopts Westinghouse Air Brakes!

Westinghouse Air Brakes

—develop a retarding force sufficiently powerful for stopping even the heaviest bus quickly to increase safety and permit faster schedules.

—provide automatic equalization to minimize skidding and lengthen life of brake linings.

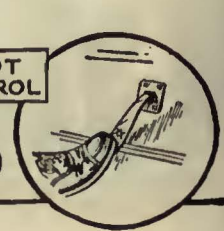
—relieve the driver of braking fatigue to increase safety and utility.

—and permit use of metal brake linings to provide still greater safety and economy.

AFTER thorough trial, both in rigid tests on demonstration cars and in actual service, The White Company has given the stamp of approval to Westinghouse Air Brakes by adopting them, together with metal shoes, as standard factory equipment for the Model 50-B Bus—thus assuring for all users a degree of operating safety and utility not otherwise obtainable.

WESTINGHOUSE TRACTION BRAKE CO.
Automotive Division, Wilmerding, Pa.

WESTINGHOUSE *Automotive* AIR BRAKES



Twin Ties Being Installed Under Traffic in Kansas City

Under traffic if you must

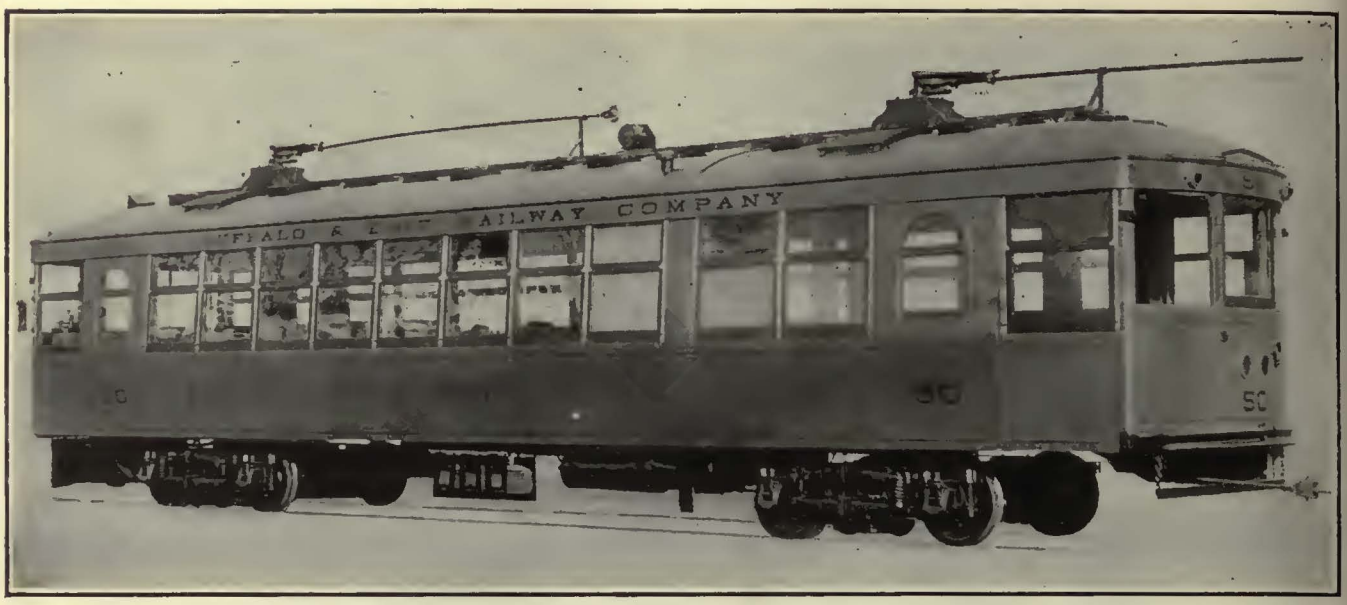
Various methods of installing Twin Tie track under traffic have been worked out during the past three years.

They are the subject of a special bulletin which we will be pleased to send to interested engineers and managers.

The International Steel Tie Co.
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track—Permanent Foundation



Safety Car Control Equipment used by this progressive road

The Buffalo and Erie Railway, an interurban line running between these two cities, recently replaced their two-man cars with modern light-weight equipment designed to provide more attractive transportation for patrons at less cost to the operator.

Among the several factors by which decided economies have been effected is this—the new cars are operated by one man whose duties are safeguarded and simplified by complete protective and labor-saving devices—The Safety Car Control Equipment.

Undoubtedly there are other properties which have the potentiality for better and more profitable service if they were thus modernized.

It is a Safety Car if equipped with our standard Safety Car Control Devices

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

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

(3092)

13,000 Cars now have our complete Safety Car Control Equipment

Esprit de corps!

To improve the esprit de corps of your men let their personal equipment be of a type to inspire pride in their appearance and workmanship.

Well-made uniform caps, with legible, neatly lettered enamel badges enhance the men's appearance. Buttons, too, are an important part of the uniform. This reflects to the credit of the company.

As another instance, change carriers enable the men to make change more quickly and more accurately, as well as speeding up service—especially on one-man cars.

Full descriptions of other Keystone Specialties for employees, which are equally important in raising morale, can be found in the *Essco Catalog No. 7.*

ELECTRIC SERVICE SUPPLIES CO.

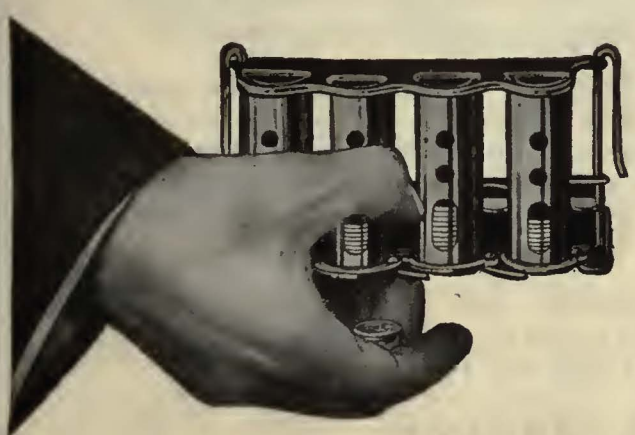
PHILADELPHIA 17th and Cambria Sts. | NEW YORK 50 Church St. | CHICAGO Illinois Merchants' Bank Bldg.

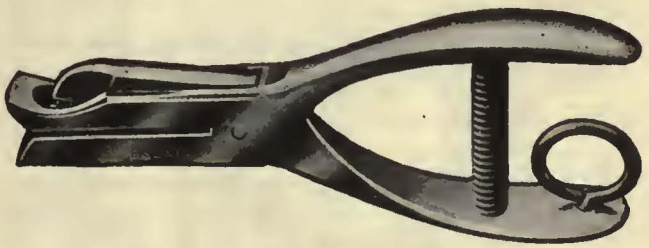
PITTSBURGH 839 Oliver Building | BOSTON 86 Broad St. | SCRANTON 316 N. Washington Ave.

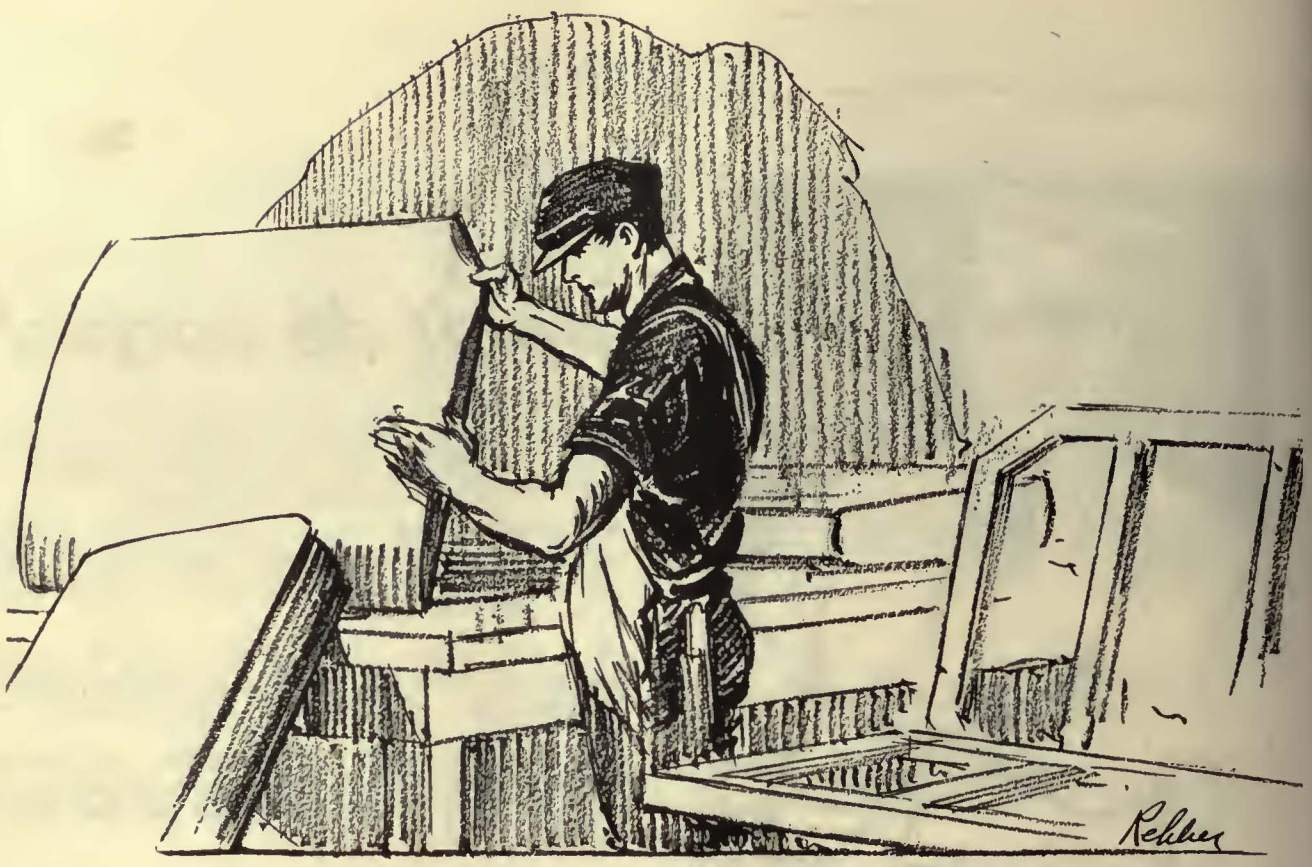
DETROIT General Motors Building

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

KEYSTONE EQUIPMENT FOR EMPLOYEES







Pantasote and Agasote

The universally approved standard of practice

For more than 25 years, the steam railroads, the Pullman companies and the great majority of electric railways throughout the World have consistently specified Pantasote for seats and curtains; Agasote for roofs headlinings and interior trim.

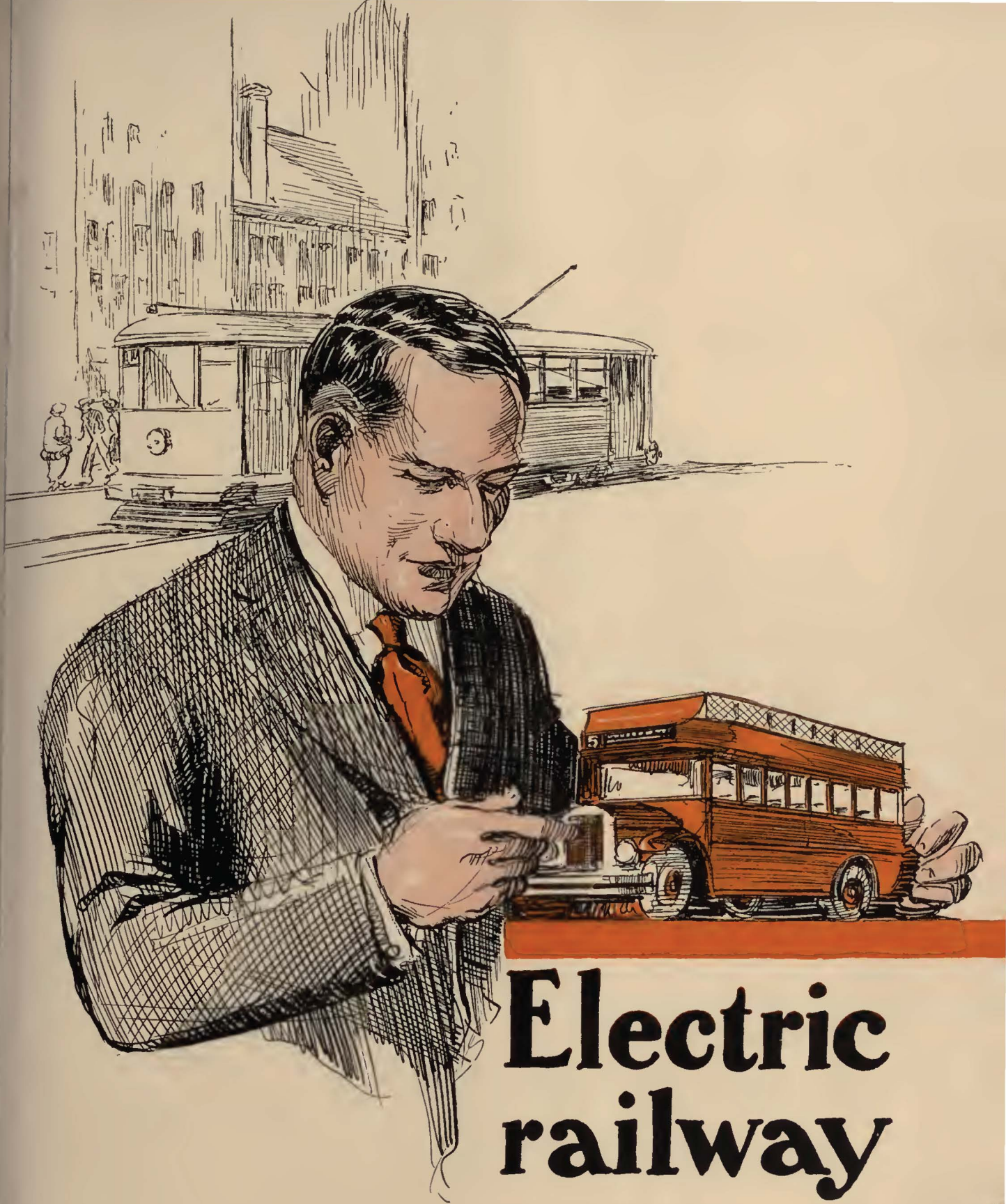
The surface coating of Pantasote is a secret preparation free from either rubber or pyroxylin. It is absolutely impervious to sunlight, water or grease, permanently fade-proof, and very easy to clean.

The process employed in its manufacture makes it practically homogeneous with the fabric base, eliminating all possibility of peeling. It will not harden, crack or flake off under any climatic conditions or in any natural temperature. Furthermore, it is not inflammable; even a lighted match dropped on a seat will not burn a hole.

Agasote is an absolutely homogeneous fibre board, made especially for use where accurately curved surfaces are required.

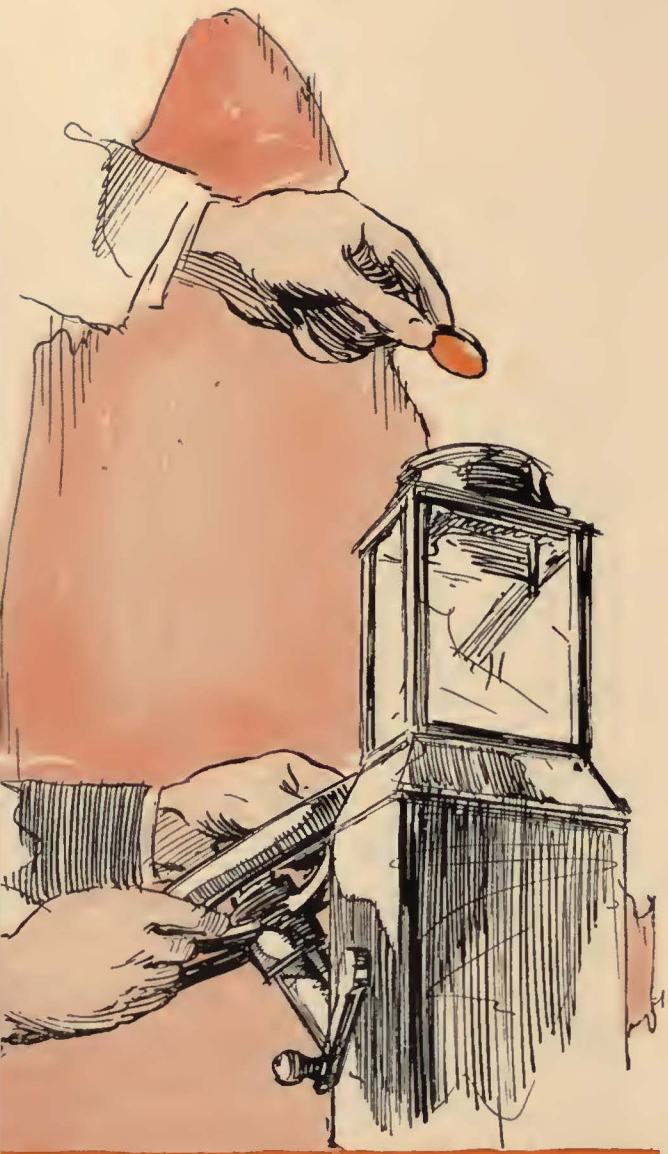
There are no points of possible separation, no grain as in wood, and no laminations as in built-up ply-woods and veneers. Hence, splitting, warping, or peeling is impossible, no matter what the conditions of service and exposure may be.

Specify and insist upon Pantasote and Agasote for new cars and for rehabilitation. *In the end it always pays!*



Electric railway men

YELLOW KNIGHT



uild and perate Yellow Coaches

YELLOW KNIGHT

IN offering to electric railways the benefi of hundreds of years of accumulate executive experience in motor coach con struction and operation, Yellow Coach through the personal railway experienc

of its leading execu tives, is particularly close to the railwa problem. Primarily an organization sell ing economical an reliable transporta tion as a business in which the moto coach plays its proper part in secur ing *low-cost, profitable miles,* our personne of management is built around men wh have faced operating problems for years in branches of operating, traffic an maintenance. And to this personnel the

electric railway in dustry has contrib uted liberally.

Electric railway management is not interested in motor coaches merely as vehicles that run. Such management *is* interested, however, in motor coaches as vehicles that *earn,* when fitted correctly into an existing transportation system.

It is on the basis of securing *low-cost,*

YELLOW

profitable mileage that we offer our cooperation, the best of our thinking and the operating experiences that originate in our vast laboratory where motor coaches built and operated by members of the Yellow Coach organization pile up a grand monthly total of 2½ million miles on the streets of New York, Chicago and St. Louis. And these same motor coaches carry 150,000,000 passengers every year, in comfort and safety.

The service we offer to railways is therefore *bigger* than the motor coach itself. It is expressed in the following terms—

Economical and reliable transportation, which means:

1. The proper sort of accommodation to the public: guaranteed comfort, reliability and safety—

2. With profit to the operator.

Yellow Coach engineers will be glad to cooperate in making any transportation survey. Such work will be undertaken with an intimate appreciation of the railway problem. You will find that we talk your language.

Write for catalogs, blue prints and other interesting data.

COACHES

Every department is influenced by Yellow Coach management

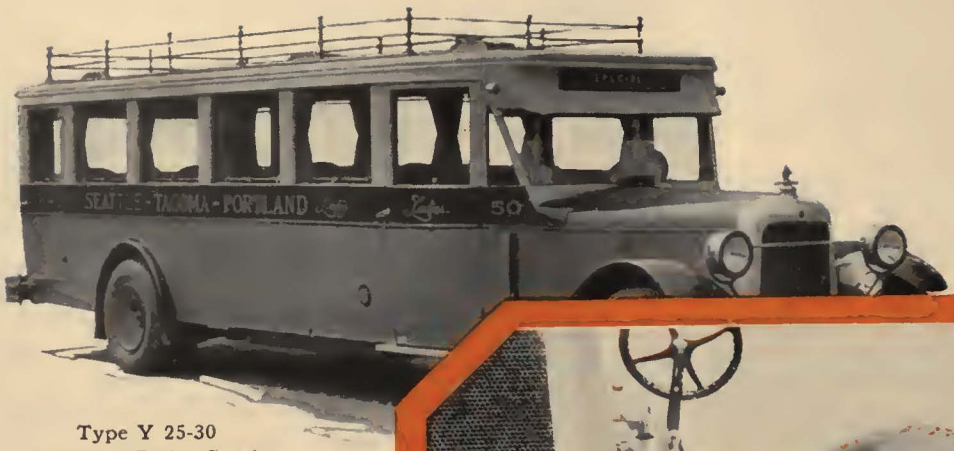
IN THIS space we are listing the experience records of various executives found in the Yellow Coach organization. These men, deeply-rooted in all phases of transportation, are typical of the personnel that influences the work of every department. Drawn from the great motor coach operating centers of the world, their experience sets the standard for securing *low-cost, profitable miles.*

GEORGE A. GREEN, *Vice-President,* is typical of the class of men who make up the personnel of Yellow Coach management. His experience record clearly indicates his influence as a pioneer in the field of passenger transportation by motor coach, and he is largely responsible for the development of this form of service to its present well-established position of public usefulness. Extensive knowledge of operation and manufacture abroad was acquired by many years' association with European manufacturers, including the London General Omnibus Company, with which organization he served as Works Manager and Assistant Engineer. This knowledge was supplemented by ten years' activity as Vice-President, General Manager and Chief Engineer of the Fifth Avenue Coach Company, of New York City. With this vast background of successful experience, Mr. Green came to the Yellow Coach Manufacturing Company as Vice-President and General Manager in 1922. He is also Vice-President of the Chicago Motor Coach Company and the Yellow Sleeve Valve Engine Works, Inc., in the management of which he takes a very active part.

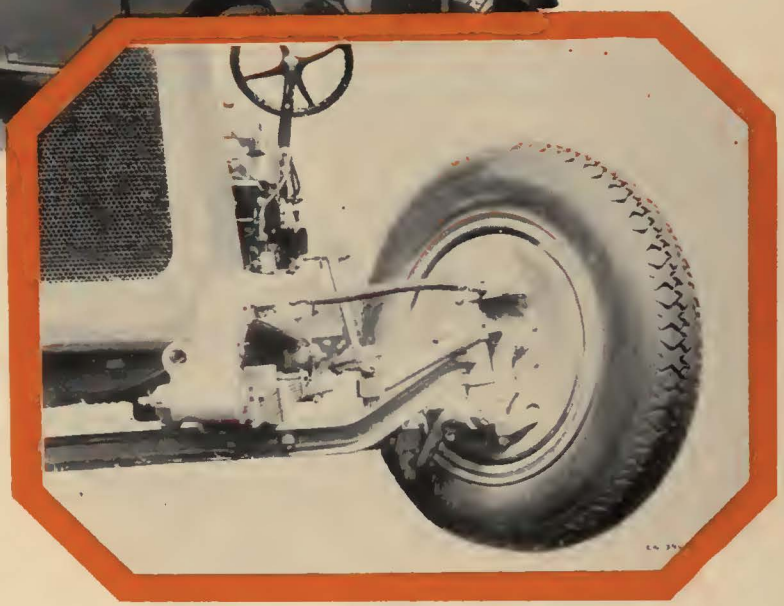
Men of this calibre are at your service to work out *your* transportation problems.

YELLOW KNIGHT

There is no substitute for experience



Type Y 25-30
Passenger Parlor Coach
operated by the
Portland-Seattle Stage
Company, Olympia, Wash.



Model Y chassis-view
giving idea as to
turning radius

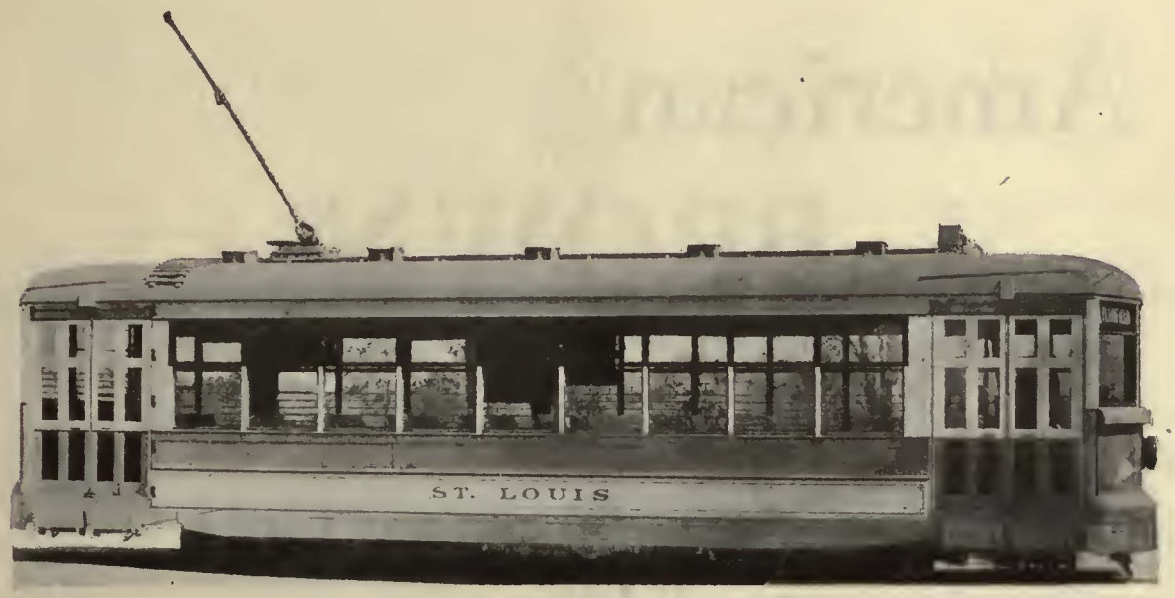
Transportation experience expressed in the *turning radius*!

TURNING radius is an important factor in motor coach operation, especially under conditions of congested traffic.

In the design of Yellow Coaches, operating experience has provided for a turning circle that is exceptional and approaches that of the average automobile. The turning radius of "Y" Type Yellow Coaches, for example, is only 31 ft. 2 in. Front wheels may be set at an angle of 43 degrees, and this lock is obtained without the use of the customary bent drag link.

It is features like these, directly affecting operation on the road, that distinguish Yellow Coaches and help build their reputation for securing *low-cost, profitable miles.*

YELLOW TRUCK & COACH MANUFACTURING COMPANY
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.



NP

Grand Rapids Chooses

Readers of this advertisement may remember noting the quick, convenient and efficient operation of the National Pneumatic Door Operating Equipment on the St. Louis Car Company's "Grand Rapids" Car, exhibited at Atlantic City.

The sample has now proved itself in service and 27 of these cars have been ordered equipped with National Pneumatic Door Engines and Door Shafts, Folding Step Devices, Automatic Treadle Exit Doors, Controls and Signal Lights.

Details on request.

NATIONAL PNEUMATIC COMPANY

***Executive Office*, 50 Church Street, New York**

***General Works*, Rahway, New Jersey**

CHICAGO
518 McCormick Building

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

PHILADELPHIA
1010 Colonial Trust Building

American BROWN BOVERI

Power Rectifiers

Efficient in Sub-Station Service under extreme load variation

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

On the accompanying chart are curves showing the comparative efficiencies of the three classes of conversion equipment—Rectifiers, Rotaries and Motor-Generators, This data was developed from actual tests. Note the great advantage of the mercury-arc rectifier at one-quarter load, an ordinary condition on traction lines in non-rush hours.

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

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

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

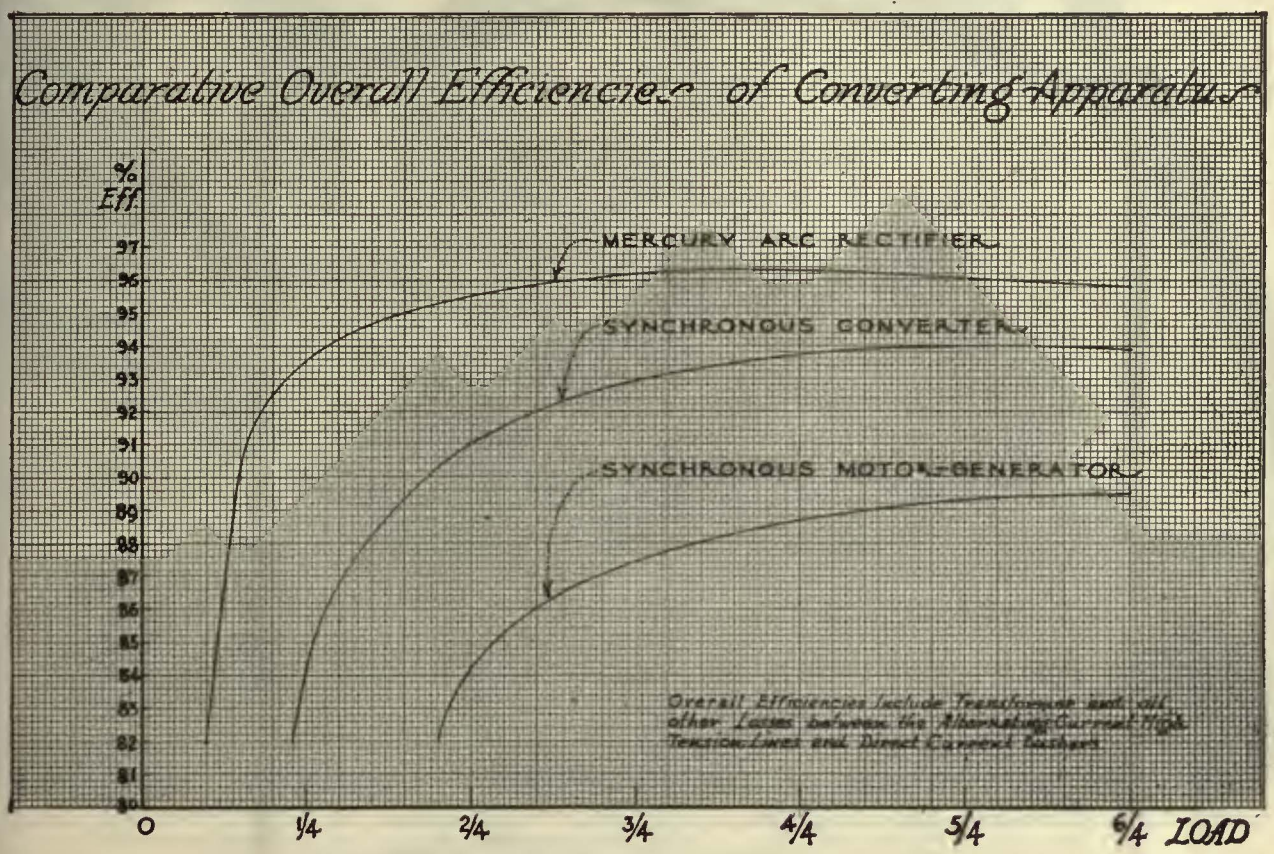
Products of American Brown Boveri Electric Corporation

Electric Locomotives
for any system of current, high or low tensions
Complete Equipment
for railway electrification
Mercury-Arc Power Rectifiers
(steel enclosed)
Diesel-Electric Locomotives
Mining Locomotives
Motors (all sizes and types)
Rotary Converters
Motor Generators
Transformers (power or current)
Switches, Controllers
and all Auxiliary Equipment
Oil Switches
Condensers and Auxiliaries
Steam Turbo Generators
for normal or high pressures and superheats
Automatic Regulators
Relays
Turbo Compressors and Blowers
Electric Furnaces
Induction Regulators

Recommends

Mercury Arc—Steel Enclosed Power Rectifiers

for Sub Station Service



Graphic Comparative Efficiency with Rotative Equipment

Mercury-Arc Power Rectifiers pay for themselves quickly where D.C. load factor is variable or low.

In addition to their recognized position in the railway field, they can advantageously replace rotating equipment in Central Station distribution and industrial application, not only because of their great efficiency, but because they are noiseless in operation, cause no vibration, do not require special foundation and occupy a minimum of space.

American Brown Boveri Electric Corporation

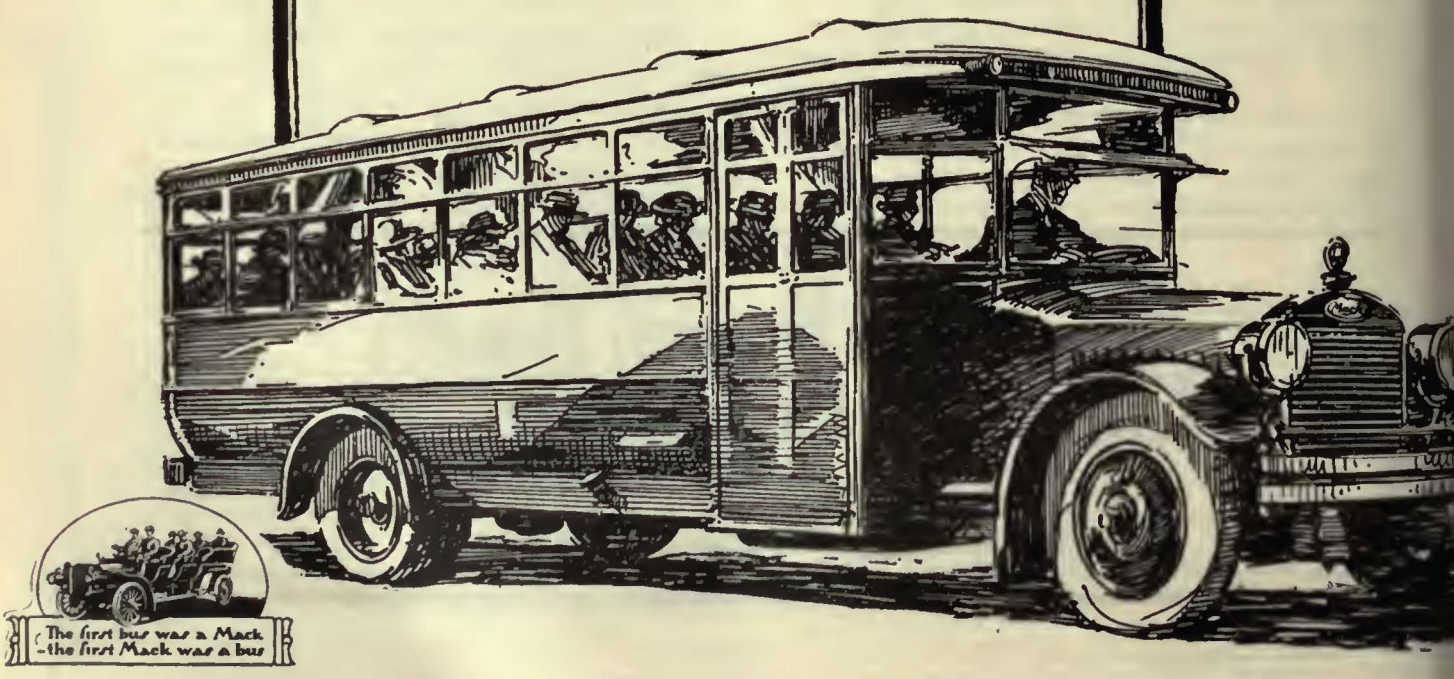
Plants at Camden, New Jersey

***Main Office:* 165 Broadway, New York**

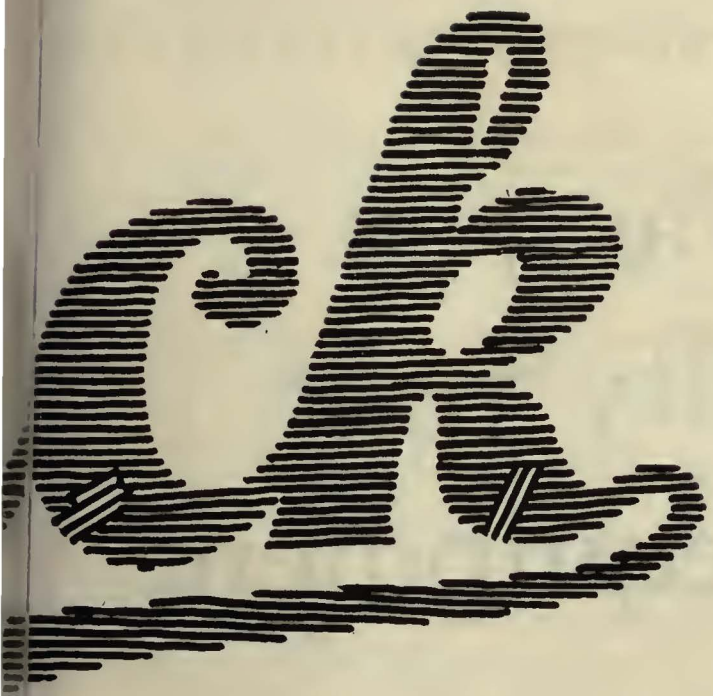
The Operator's Check

Partial List of Electric Railways Now Operating Mack Buses

Municipal Tramways Trust, Adelaide, S. Australia
Illinois Power & Light Corp., Chicago, Ill.
The Connecticut Co., New Haven, Conn.
Chicago, West Towns & Northern Railroad, Chicago, Ill.
Lehigh Traction Co., Hazleton, Pa.
United Electric Railway Co., Providence, R. I.
Columbus Railway, Power & Light Co., Columbus, Ga.
Boston Elevated Railway, Boston, Mass.
Waterloo, Cedar Falls & Northern Railroad, Waterloo, Iowa
Northern Ohio Traction & Light Co., Akron, Ohio
Illinois Power Co., Springfield, Ill.
Boston & Worcester Street Railway Co., Framingham, Mass.
Mississippi Valley Electric Co., Iowa City, Iowa
New Orleans Public Service Co., New Orleans, La.
Tampa Electric Co., Tampa, Fla.
Chicago, South Bend & Northern Railroad, Chicago, Ill.
Chicago & Joliet Electric Railway Co., Chicago, Ill.
Key West Electric Co., Key West, Fla.
Iowa Southern Utilities Co., Inc., Des Moines, Iowa
Holyoke Street Railway Co., Holyoke, Mass.
Durham Public Service Co., Durham, N. C.
Coast Counties Gas & Electric Co., San Francisco, Cal.
Hartford & Springfield Street Railway Co., Hartford, Conn.
Worcester Consolidated Street Railway, Worcester, Mass.
Youngstown Municipal Railway, Youngstown, Ohio
Binghamton Railway Co., Binghamton, N. Y.
Wisconsin Power & Light Co., Madison, Wis.
Kansas City Railways, Kansas City, Mo.
Iowa Railway & Light Co., Des Moines, Iowa
Omaha & Lincoln Railway & Light Co., Omaha, Neb.
Arkansas Central Power Co., Little Rock, Ark.
City of Ashtabula, Ashtabula, Ohio
Twin City Rapid Transit Co., St. Paul, Minn.
Wilkes-Barre Railway Co., Wilkes-Barre, Pa.
Phillipsburg Traction Co., Phillipsburg, N. J.
Wilmington & Philadelphia Traction Co., Wilmington, Del.
Nashua Street Railway Co., Nashua, N. H.
Union Street Railway Co., New Bedford, Mass.
Baton Rouge Electric Co., Baton Rouge, La.
Lordship Railway Co., Bridgeport, Ct.
Municipal Railway, Eureka, Calif.
Trenton & Mercer County Traction Corp., Trenton, N. J.
Illinois Power & Light Corp., Decatur, Ill.
Wichita Ry. & Light Corp., Wichita, Kans.
Topeka Railway Co., Topeka, Kans.
Illinois Power & Light Corp., Bloomington, Ill.
Duluth Street Railway Co., Duluth, Minn.
Mesabe Railway Co., Virginia, Minn.
Kansas City, Leavenworth & Western Ry., Kansas City, Mo.
Oklahoma Union Railway Co., Tulsa, Okla.
Virginia Ry. & Power Co., Norfolk, Va.
Syracuse Co-ordinated Bus Line, Inc., Syracuse, N. Y.
Utica Co-ordinated Bus Line, Inc., Utica, N. Y.
Third Ave. Ry., New York City
Camden & Suburban Ry., Camden, N. J.
Dubuque Electric Co., Dubuque, Ia.
East St. Louis Ry. Co., East St. Louis, Ill.
Los Angeles Ry., Los Angeles, Cal.
Hudson Transit Corp., Newburgh, N. Y.
Newburgh Public Service Corp., Newburgh, N. Y.
Pittsburgh Ry. Co., Pittsburgh, Pa.
Savannah Electric & Power Co., Savannah, Ga.
Tacoma Railway & Power Co., Tacoma, Wash.
Yakima Valley Trans. Co., Yakima, Wash.
Westside Electric St. Ry. Co., Charlerol, Pa.
White Stage Lines, Tampa, Fla.
Lehigh Valley Transit Co., Allentown, Pa.
Wellington City Council, Wellington, New Zealand.



The first bus was a Mack
—the first Mack was a bus



Mack—the universal word used by Street Railways

Street railway companies have adopted another word for performance.

That word is *Mack*. It is used broadcast for new and re-orders.

"Give us Macks," said the Boston and Worcester Street Railway Company.

They said it first in June, 1925, when five city types were bought and placed in operation. They said it again in December when two more city type Macks were added.

Every day their sturdy Mack buses stand the gaff of heavy peak loads over a $7\frac{1}{2}$ mile loop, feeding to the main trolley line.

At times, from 60 to 65 passengers crowd in, but the Mack stands the strain and the fleet yields a good profit.

Nothing unusual in this! It is all part of the day's work for the Mack bus, *wherever* it is operated. And as days of economical service lengthen into years, it is easy to understand why Mack and *performance* mean the same thing.

MACK TRUCKS, INC.

INTERNATIONAL MOTOR COMPANY

25 Broadway, New York City

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

The Mack Bus

GAS-ELECTRIC DRIVE MEANS

Just as you specify your car equipment

—specify General Electric drive for buses also and be assured of motive power that you know from actual experience to be reliable. General Electric is the pioneer in the building of

Gas-Electric Drive

(for buses and trucks)

Consult the General Electric Company before you buy buses to be sure proper electrical equipment is applied. Best results are obtained only when service and grade conditions have been considered.

GENERAL

GENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK

LOWER COST FOR BETTER TRANSPORTATION

IT'S easy enough to specify buses complete with mechanical drive, *but* experience has shown that such buses are not the best suited for satisfactory transportation service, nor the best in point of long, useful life.

When you buy new cars you choose the motors, the control, brakes and trucks. Nearly all the major items are specified in accordance with your knowledge of the different types and your confidence in the manufacturer.

You can exercise the same studied judgment in selecting motor bus equipment.

Gas-Electric Drive is a much-needed improvement, which means easier operation, smoother running, faster acceleration, less vibration, less maintenance and longer life. It is available for practically any standard make of bus chassis—and it's General Electric.

Maintenance Advantages

Inspection and testing of engine are simplified, made systematic and conclusive.

Engine cannot be raced or stalled and average engine speed is lower—prolonging life of bearings, pistons, cams and all other moving parts.

Clutch, gears and differential—all subject to high maintenance—are eliminated.

Without the shock of gear changing, the life of engine, chassis and body is longer.

Uniform torque of electric drive means less tire wear.

Engine lubrication is materially less.

Operating Advantages

Greater riding comfort—no vibration or jerks during starting, and smooth acceleration.

Increased safety—control entirely in foot pedal relieves operator's hands for steering—skidding is minimized by individual drive on rear wheels—engine cannot stall on dangerous crossings.

Higher schedule speeds—through more rapid acceleration and reduction of driver fatigue—affording lower costs and higher receipts.

ELECTRIC

SALES OFFICES IN ALL LARGE CITIES

Why do they use G-E Carbon Brushes on the "Milwaukee"

—and other leading roads?

Because G-E research made them and maintains their quality. Because G-E motor-building experience is back of them. Because there is a *right* G-E Brush for each commutation requirement. Because nothing but the best will do.

54C-1

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Co., Inc.

MORRIS BUCK, *Managing Editor*

Volume 67 New York, Saturday, February 13, 1926 *Number* 7

Personality a Great Asset to Electric Railway Officials

DETERMINATION of whether or not a certain man possesses the requisite qualities to become a good electric railway executive cannot be made according to any general rule. Neither experience nor education alone, nor a combination of the two, is a guarantee of fitness. In the past the importance of qualifications other than experience has not always received the attention which it deserves. Nowadays it is receiving more consideration.

It is not enough for an executive in the utility business to know his own job thoroughly. That, of course, is an essential. But to be really successful he must be more than a good engineer or a good operating man. He must have a personality that encourages friendliness and creates confidence.

Wars are caused by lack of understanding. Specific conditions may be the immediate reason for their outbreak, but failure to understand the point of view and the thinking of the other side in the controversy is the underlying difficulty. This is just as true of conflicts between the public and the utility company as it is of conflicts between nations, and nothing can be more unprofitable for a utility than a war with the public it serves.

The man who can do the most for an electric railway company is often the man who can go before the people and tell them what his company is trying to accomplish, how it is trying to serve them, and the difficulties with which its operation is beset. A successful utility executive need not necessarily be a talented public speaker, but he should at least be able to tell the story of his company in simple, straightforward language that every one can understand. When a selection is to be made of a man to fill some executive position, length of service should not be the determining factor, but rather his ability to operate successfully and inspire a feeling of general confidence that things are being properly managed.

Did the Eastern Massachusetts Trustees Do the Job Too Well?

AN EXTRAORDINARY job was done in rehabilitating the Eastern Massachusetts Street Railway. That is history. It has all been made plain before. Now the question arises about the proper place of the investor. That is a legal point for the courts to settle. A special master, reporting to the courts, has reviewed the affairs of the company at length. His findings make interesting reading. As indicated in ELECTRIC RAILWAY JOURNAL for Feb. 6 the master's report sets forth the financial policy of the trustees and the present condition of the company. His was a fact-finding inquiry. The problem before the court is to construe the intention of the statute under which the road is run. Earnings have been put back into the property liberally, too liberally apparently to suit some.

There is no need here to do more than animadvert to the facts established by the special master. The issues involved are of course of primary interest to the investor, but those who followed the vicissitudes of the company in the early days and studied the work of the trustees in re-establishing the company have an economic interest in the case. The thought that occurs is that if the trustees had done less than they did, there probably would not be anything upon which to raise the question now propounded. The thoroughness of their job is shown by the statement that even in the face of decreases in gross earnings the net operating revenue has been stabilized by economies and maintained without great variation since 1921 even under reductions in fares. Surely this is an extraordinary record. The trustees took the position that their right to apply income to rehabilitate the road was not limited to the depreciation accruing after the new company was incorporated, but included depreciation which accrued before that time. As the special master points out, the company has been honestly managed, its assets prudently conserved and the capital values enhanced by the earnings put back into the property. There would be little doubt about the propriety of this procedure under private operation. In this case, however, under the provisions of the special act settlement of the question that has been raised may depend on different principles.

There Is Only One Danger in the Daily Dozen

STUBBORN, indeed, would be the condition in the electric railway industry that did not yield under the persistent application of the code which Mr. Storrs prescribed at Indianapolis. Note the word persistent. That is important. It is a daily dozen, not an occasional dozen. Necessarily, Mr. Storrs had to generalize. He was not dealing with any particular case. There was no real need for him to be specific. Indeed, his method of treatment did not permit of it. Instances of the beneficial results of the practice by electric railways of all the homely virtues prescribed by Mr. Storrs are not far to seek. In fact, the very meeting at which he spoke furnished one of the best examples of this. It was a coincidence that the paper by Mr. Budd was presented at Indianapolis. Was ever more striking evidence furnished than by Mr. Budd to show that the exercises were not only well suggested but that their diligent practice pays?

Measure the Budd speech and the known accomplishments of many other roads in terms of the Storrs suggestions! It is great mental exercise. Mr. Storrs said: "Let us not say that a thing cannot be done." That, in-

deed, is dangerous in the light of accomplishments on the Insull properties, on the roads that have won the Coffin award, on the roads that have competed for that award and on those that have been resuscitated financially but for one reason or another have not been competitors for that award, to say nothing of many others. One who does hold either to the thought that it cannot be done or who says it cannot be done may be awakened from his attitude of negation by the proof that it has been done. Instance upon instance is on record of accomplishment in this industry if one will only put into practice the first of Mr. Storrs' principles of conduct, the one that advises exercise of the eyesight.

Pains were not spared by ELECTRIC RAILWAY JOURNAL to place before the industry both the Storrs speech and that of Mr. Budd. There is no intention here to attempt to recapitulate them. There is, however, just one more thought. As Mr. Budd so aptly said, problems are not peculiar to the electric railways. Every business has its troubles. Self-commiseration is a calamity for those who practice it. There are men in the electric railway industry capable of grasping the vast transportation opportunities. Any other conclusion is untenable. The facts belie it. There is one danger and only one in the daily dozen—it may not be practiced by some to the extent that it deserves.

The Sting Was the Sting of the Wasp

TACOMA has a Mayor who is a perpetual candidate for that office. He has been in and out of the post ever since 1896. He is one of those anomalies peculiar to American politics that are difficult, indeed, to explain. The perpetual candidate of Tacoma is A. V. Fawcett. He has been against the street railway first, last and all the time. To him change in ownership of the property has made no difference. In 1922 he was elected to serve until 1926 on a platform of 5-cent street car fares. He will undoubtedly run for re-election in the spring. It is the probable outcome of that election which is agitating the city.

Tacoma's street railway management is progressive. The operators are among the ablest in the industry. At the incoming of the Mayor for his present term the railway put into effect the $1 weekly pass. This $1 pass was kept in force until Sept. 15, 1924. During the 26 months the pass was sold at $1 it proved extremely popular. More than 60 per cent of the riding was on the pass at an average fare of 3¾ cents. Riding increased, but extra service had to be given at a lower average fare. Beginning on Jan. 1, 1924, the company conducted a campaign for relief from burdensome franchise restrictions so that the $1 rate might be continued. This movement, backed by the federation of local improvement clubs, was successfully blocked by the Mayor. As a result the price of the pass had to be raised to $1.25. These facts are related so that the picture may be reasonably complete.

As the Mayor pretended to see it, 100 palaces on wheels, as he refers to buses, run at a 5-cent fare would drive the street cars out of business and make a lot of money for their operators. It is just here that theory and fact have been shown to part company. For some time 22 jitneys have been run over routes paralleling the street car lines, but the jitney company on which the Mayor has pinned his hopes is growing restive. One of its officers has openly accused the Mayor of sacrificing the stockholders to further his own political interests. The jitney company has thrown open its books to show that not in a single month of its eighteen-month period of operation has there been a profit. Anybody who knows anything about the transportation business could have foretold this result. The voice of the railway would, however, have been a voice in the wilderness. Mayor Fawcett is not the first public official of his kind. It is one thing to have a bee in the bonnet, but it is quite another to be stung by a wasp.

Blocking of Public Transportation in Snowstorms Demands Vigorous Methods

NOT so many years ago a snowstorm was hailed with delight by the street railway manager, as it would bring in extra revenue that would far more than balance the cost of cleaning the tracks and making incidental repairs to the equipment. The recent heavy snowstorms along the Atlantic coast, however, have shown that there is danger of complete paralysis of public transportation under such conditions unless more stringent limitations are put on the operation of private automobiles and motor trucks.

Particularly in Boston and New York have conditions been bad. The surface railways have done their part and more in cleaning snow off their tracks and keeping the lines open. But no sooner has the way been cleared than a procession of miscellaneous motor vehicles has crowded in on the tracks and made it virtually impossible to move traffic of any kind at more than a snail's pace. Worse than that, in not a few instances vehicles have become stalled in such positions that they blocked the tracks and then have been abandoned. Reports from Boston indicate that in numerous cases this happened. Complete cessation of rail service ensued until the obstruction could be cleared away. On the other hand the buses operated by the Boston Elevated Railway did not fare so badly. They were able to detour through streets used less by general traffic and so were able to maintain some sort of service.

Public policy dictates that conditions of this sort should not continue. Traffic congestion is at all times an increasingly serious problem. But when a public utility with an excellent organization fights the elements to open the way for the general public, its customers, there is no excuse for the occasional individual, in order to save a little personal discomfort or for the sake of a slight private gain, to discommode the thousands who are looking to the railway to transport them. The city of Boston was scored heavily for failure to anticipate the storm and make provision in advance for clearing away the snow, as did the railway. In New York the very complete equipment of the street cleaning department was used to clear the roadways on streets without trolley tracks, leaving the railways to do the best they could alone, despite the motor vehicular traffic that followed in the wake of the plows.

Managements of transportation systems in all parts of the country where snow blockades are at all common should act to bring city governments to the realization that co-operation in respect to keeping street car tracks and bus routes free from interference in such emergencies is a duty. Whatever ordinances are needed should be passed. But this is not enough. It must be seen to that they are enforced.

Give the Exact Fare to Conductor— Put the Bill on the Plate

WHEN the railway emerged from the dark ages of the "public-be-damned" policy to the halcyon era of the "public-be-pleased" attitude co-operation replaced conflict, but it was more the wisdom of giving a helping hand than the feeling for it that prompted the idea of service plus. This wisdom brought with it the knowledge that co-operation was a business, a scientific one, too, and that like philanthropy, its ally, it needed astute direction if it were to be a success.

Of course, such management did not carry with it the stigma attached to the philanthropy of Jesse James, who succumbed to the entreaties of the old woman to spare her rent for the expected landowner and then in ambush waited for the return of the enriched rent collector. Nor was it comparable with the altruistic impulse of the woman who, upon beholding a bread line on the street, straightway went to the bank to deposit the $500 her husband had given her to buy a fur coat. No, the administration of co-operation as understood by the railways was on a higher plane. They believed implicitly in the principle that co-operation should bless the one who gives as well as the one who takes, although fundamentally the alpha and omega of the doctrine was that charity can start with advantage at home.

Saving one's own soul is intrinsically not a bad belief, but with the advance in time the solid rock upon which such a code was built gradually crumbled and moldered into the newer ethics which stressed the salvation of one's neighbor. A striking example of this is noted in a recent advertisement by a railway in a local paper. Here it is in part:

"Sunday morning seems to be the worst morning that our trainmen have for making change. Patrons seem to depend upon the street car conductors to 'break' bills so there will be change for the church collections. Why not give the correct amount to the conductor, and put the bills in the collection?"

A mighty swing of the pendulum and the clock has struck for a new co-operation cult obliterating its more sordid parallels. At least one railway is prepared for the change. It has found more gratification in giving than in receiving and has learned that it is more salutary to feel co-operation than to know how to define it. Just as "sorrow does not spring out of the ground," so the causes of co-operation have been imbedded in a well-founded if occult philosophy.

Public Relations Are After All Human Relations

STREET railway men often take themselves too seriously in their dealings with the public. This may be seen frequently in the dignified but stiff appeals found so often in their newspaper advertising. Judging from present trends, the public wants amusement far more than instruction. This is the day of the movie, the radio and the tabloid newspaper. People are headline readers and simply will not take time to read through long statements in small type. In a measure the same principle applies to other forms of publicity as well.

But take a serious campaign, take out the non-essentials and dress up the vital part in attractive form. Lo and behold! The reader has been reached and his confidence gained. Of course, success in winning public good will depends on intangible factors, such as doing the right thing at the right time.

The three main factors are relations with newspapers, relations with city officials and relations with the car-riding public, according to L. J. DeLamarter. His paper before the Central Electric Railway Association midwinter meeting, published in this paper last week, is an excellent analysis of methods that can be used to reach these various elements. That Mr. DeLamarter has been successful in this work is testified to by the good public sentiment in Grand Rapids and favorable action in connection with franchise and other matters. Careful perusal of this article should show others not only how one railway has succeeded, but it should suggest methods other operators can turn to good account on their properties.

Personalized Service Might Be Tried on Car Lines as Well as on Bus Lines

LUCIUS S. STORRS, in his recent paper before the Central Electric Railway Association at Indianapolis, said the electric railways were not doing all that they might to attract new business. The trend of passengers carried, varying upward or downward, followed closely the composite curve of the business trend throughout the country.

"By not doing all that they might" has at least two meanings. The operators might do more to attract riding on the old-established rail lines by improved cars and improved facilities in general, and they might do more by improved types of service such as exemplified in the Chevy Chase de luxe line of the Capital Traction Company in Washington, D. C., described in this issue. J. H. Hanna, vice-president of that company, nearly a year ago conceived the idea that there would be an opportunity for a high-grade suburban service, and against the opinion of many railway operators and some bus operators started the 8-mile line.

Naturally an operation of this kind will be an experiment for many months until normal operating costs and normal traffic can be established. Indications are, however, that it will be more than self-sustaining. For the initial period of 2½ months there was an operating deficit, but December and January showed a comfortable net. The important point established, however, is that there is a demand for a superior service. Transportation, like articles of food and dress, must appeal to a wide variety of tastes. Service that is merely a means of transportation from one point to another will be patronized only by the people to whom it is a necessity. Others will find means of transportation more to their liking—and will be willing to pay for it.

To meet this modern demand electric railways in general have only begun. In some cases, as was intimated by Mr. Storrs, they have gone backward. To be sure, there have been signal advances in an ever-growing number of cases. But it is a sad commentary that advances in transportation methods have often been made only when a new type of vehicle such as a de luxe bus has been introduced, and along with it a progressive management has pointed the way to a new standard of service. The electric car, the backbone of the industry, is too often allowed to roll along with the service standards of 20 and sometimes 30 years ago.

Mr. Storrs has stated the case mildly. Why not give more special treatment to the electric car? Why not personalize this service, not alone by publicity but by new equipment, new standards and modernized methods?

The Capital Traction De Luxe Coach Runs Between Chevy Chase and Downtown Washington

De Luxe Coach Service Pays in Washington

Five Months Experience of the Capital Traction Company with the Chevy Chase 25-Cent Coach Line Shows Substantial Net Revenue—The Parallel Street Car Line Has Not Been Affected Materially—Several Factors Have Contributed to the Success of the Service

DE LUXE coach service has now been given by the Capital Traction Company, Washington, D. C., for practically five months with gratifying results. The route, which is 8 miles long, connects Chevy Chase, a widely known high-class suburb lying to the northwest of the city, with the downtown business district, including the Union Station and the Capitol. The fare charged is 25 cents, children under five being carried free. Initially the service consisted of a 20-minute headway in each direction from 7:30 a.m. until midnight, requiring four buses with two in reserve. Shortly after the service was started a fifth coach was used during the morning and evening rush hours, with one in reserve. Patronage developed rapidly and before the end of the year two more coaches were ordered. The headway in certain parts of the day, morning and evening, was cut to ten minutes and seven buses are now necessary to take care of the peak crowds.

The coaches are type Y parlor cars manufactured by the Yellow Truck & Coach Manufacturing Company of Chicago. They seat 21 passengers in individual leather upholstered seats. They are well lighted and attractively finished inside and out and appointments are used that add elegance and comfort. There is a separate smoking compartment, and baggage racks are provided. Each smoking compartment is equipped with four nickel-plated ash trays. Paper matches are supplied by hotels and others desiring the excellent advertising accruing from such practice. The coaches are cleaned thoroughly inside and out nightly, not just swept out.

Operators are carefully selected and instructed in the art of giving personalized service. They are clad in a special olive green whipchord uniform of military design, differing not only from the uniform of the platform men, but from operators of the regular buses of the company. Woven on the coats and the caps of the uniform is the company's monogram in red. Black leather puttees, black shoes, white collars and black ties complete the operator's distinctive uniform.

Comfortable Individual Seats in This Chevy Chase Parlor Coach Operated by the Capital Traction Company, Washington, D. C., Accommodate 21 Passengers. A Smoking Compartment Can Be Seen in the Rear

The company adheres strictly to the no standee pledge made when this service was started. This keeps the service up to a high standard that appeals to nearly all the patrons. Occasionally, of course, it causes disappointment to persons who are unable to board a bus. Drivers are instructed to stop and explain in such cases that standing in the bus is not allowed. This practice is appreciated, as is evidenced by comments made to operating officials. "Good morning" from the operator helps greatly to

start the morning's transaction pleasantly. Each coach has the operator's name on a brass stencil nameplate mounted on the instrument panel so that the passengers soon know the operators by name. This makes the operator feel that he is a part of the company and helps to make possible the personalized service so greatly desired.

Fares are collected by means of the Rooke system, using a standard register mounted in a special holder.

From the beginning of the service on Sept. 15 there has been a steady growth in the business. The first 2½ months showed operating deficits, but in December the gross business done increased so greatly that it produced a surplus of $767. January, even without the holiday business, produced practically the same revenue, although expenses were somewhat greater. The operating statement follows:

OPERATING RECEIPTS AND EXPENSES, CHEVY CHASE DE LUXE COACH SERVICE

	Sept., 1925*	Oct., 1925	Nov., 1925	Dec., 1925	Jan., 1926
Revenues	$1,644	$4,377	$5,150	$6,769	$6,746
Expenses	2,550	5,630	5,669	6,002	6,272
Net revenue	.....	.....	.....	$767	$474
Operating deficit	$906	$1,253	$519	.....	.....

*Sixteen days only.

In the above table operating expenses include depreciation and taxes, but not interest on the investment.

A study of the appeal that such a service has to the community shows that its greatest attractiveness is to men and women who otherwise might use their private automobiles. The parking problem, severe in Washington as in every other city, is a constantly growing deterrent to the use of private automobiles. In a large sense it creates a demand for just such a service as was started by the Capital Traction Company. While a study of the traffic indicates that the service is used to a great extent by men and women shoppers, it is also used extensively by business people, as is evidenced by the more extensive traffic during the rush hours.

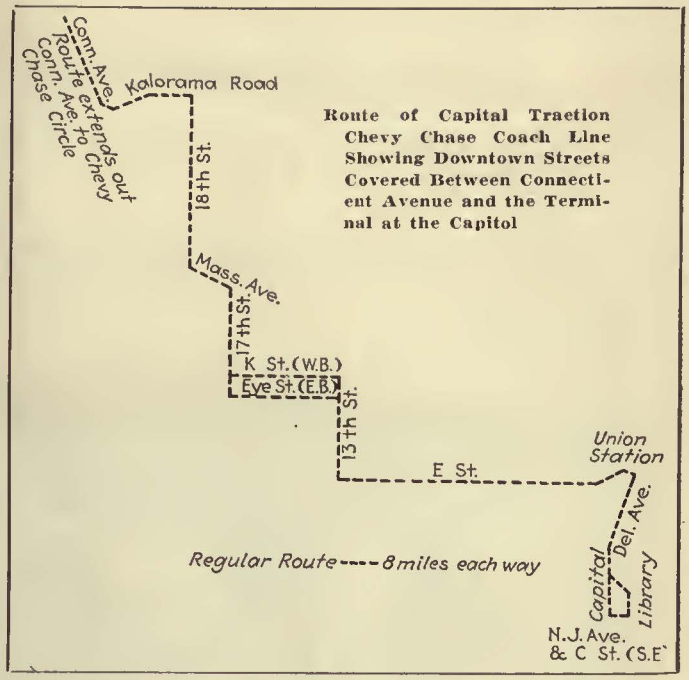
Out of the experience of the coach operators, many incidents have been collected which tell volumes as to the reactions of the passengers and show their appreciation of the service. A few of these instances are cited here:

One parent brings a small child to the coach each morning and the operator lets him off in front of the school.

A lady boarded a coach with two children and paid fare for all three. She told the operator she would gladly take them both in her lap if the coach became crowded. She uncomplainingly did this a little later to avoid having passengers passed by.

At another time a man alighted from a coach two squares from his destination so that a lady might get aboard, as the seats had all been occupied.

Many senators and representatives are patrons of the service. One morning a senator who is a regular rider between his home in Chevy Chase and the Capitol stopped an outbound coach on its way to Chevy Chase and asked the operator to watch out for him on his way down, as he wanted to walk a little of the way. When the coach reached the senator it had a seated load and the operator stopped to inform him and express his sorrow at not being able to carry him. The senator said, "Sanders, you know I must be at the Capitol at 9 o'clock. Give me 2 cents to buy a paper and I will sit on the baggage rack." Operator Sanders gave the senator the necessary 2 cents and the coach proceeded on its way with the senator riding on the baggage rack.



Route of Capital Traction Chevy Chase Coach Line Showing Downtown Streets Covered Between Connecticut Avenue and the Terminal at the Capitol

On one occasion a man was unable to board the coach downtown on its way out to Chevy Chase because it was already loaded. So he took a taxi and followed until some one got off, whereupon he left the taxi and boarded the coach.

In another case a man missed a coach at the Union Station and followed in a taxi until he caught up with it after a drive of about five miles. He then left the taxi and boarded the coach, telling the operator he was still saving a dollar.

One complaint recently registered by a lady said that the coaches were too quiet and that it was dangerous to have them running around when one could not hear them.

To aid passengers unique stop signs painted in Capital Traction green with white lettering have been erected at important points. One of these is shown in an accompanying view. Each sign is specially lettered to indicate the exact time the bus is due to pass. The coaches will stop anywhere on signal for passengers, but of course do not stop at the designated points unless signaled.

Bus Stop Sign

This stop sign is a ride-selling feature. It gives the actual time the bus can be expected.

From the Chevy Chase terminal to Thirteenth and F Streets, in the principal shopping district, the running time is 24 minutes and to Union Station 31 minutes. This schedule is slightly in excess of 15 miles per hour for the eight-mile run. It is of course considerably higher than is possible on the street car line.

Inauguration of this service was made by J. H. Hanna, vice-president in charge of operations of the Capital Traction Company, by sending out about 1,200 individual typewritten letters. A reproduction of one of these appears elsewhere. To the same list booklets

THE CAPITAL TRACTION COMPANY
General Offices, 36th and M Streets
Washington, D. C.

September 12, 1925.

Mr. John Doe,
1234 Connecticut Avenue,
Washington, D. C.

Dear Sir:

We wish to call to your attention the fact that this company will begin operating on September 15th a special parlor-car coach line between Chevy Chase Circle, the shopping, theater and business districts, the Union Station and the Capitol. The line is to be called the Chevy Chase Coach Line.

We have purchased 6 of the latest type motor coaches for use on the Coach Line. They are unequalled, we believe, in riding comfort, luxuriousness of appointment, attractiveness and, of course, safety and mechanical detail. They have individual seats—there will be no standees on the Coach Line, at any hour—smoking compartments, baggage racks, and will be operated by men chosen specially, who are instructed to pay the greatest attention to the comfort and convenience of passengers.

We feel there is a demand for this form of public transportation, more luxurious and speedier than may be given by a street car, but furnished at a price far below that of the taxi-cab or the cost of private automobile operation. Coaches will run every 20 minutes throughout the day, from a little after seven a. m., until midnight.

The route: South from Chevy Chase Circle over Connecticut Avenue to Kalorama Road; east to 18th Street, south to Massachusetts Avenue; east to 17th; south to Eye; east to 13th; south to E; east to Union Station Plaza; east over Delaware Avenue and through the Capitol grounds, to New Jersey Avenue and C Street, Southeast.

On the return trip coaches will go east and north around the House Office Building, past the Library of Congress, before entering the Capitol grounds. At 13th Street, where they turn north, they will continue to K before turning west. Otherwise the west and north route follows the same streets as the south and east.

We recommend this new service to your consideration. It offers a $1 ride for 25 cents.

Very truly yours,

J. H. HANNA,
Vice-President.

Introducing the Parlor Car Coaches, Vice-President Hanna Sent Out Some 1,200 Letters to Prospective Passengers Along the Eight-Mile Route

and cards advertising the service and giving the schedule on which the coaches would operate were sent at several later times. A young society girl was employed for a few weeks to send out personal letters to her friends on special stationery. Since the start of the coach service much additional literature has been distributed by the operators.

For about half of the distance between Chevy Chase and downtown Washington the coach line parallels the Chevy Chase electric car route of the Capital Traction and of course for the whole distance parallels it in effect. No apparent reduction in traffic has been noted on the car lines; in fact, there was a slight tendency upward following the general local trend in this community, so that it appears that the traffic attracted by this de luxe service is new business or at least business the company had years ago and which was lost during the rapid growth in use of the private automobile.

New Magazine Issued by Utility Organization

THE demand for closer contact among the departments of the operating division of the Byllesby Engineering & Management Corporation has been met with the publication of *Byllesby Management*, an executives' magazine. Halford Erickson, vice-president in charge of operation, planned the paper.

The magazine will collect and publish information relating to the operation and management of public utilities, with special reference to those operating under the supervision of the Byllesby Engineering & Management Corporation. The range of topics will be wide, including engineering, construction, financing, sales of service, merchandising of appliances, rate making, valuation, customer ownership and many other subjects in the respective fields of electric, gas and railway operations. Important subjects will be dealt with editorially from the viewpoint of the man inside the organization.

Enlarged Scenic Photographs Make Fine Posters

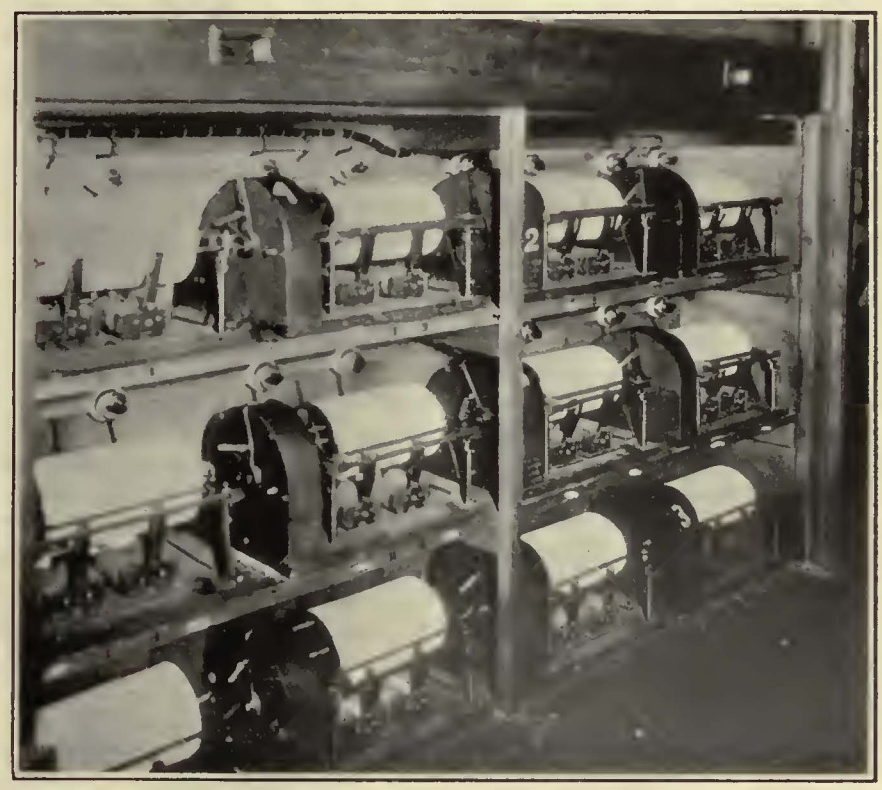
REAL ingenuity marks the plan used by the Metropolitan Division of the Hydro-Electric Railways of Ontario to advertise pleasant places along its lines. These localities deserve colored posters, but the size of the division would not justify the cost. On the other hand, halftone reproductions on the paper ordinarily used for placards would not do justice to the scene pictured. Therefore the management evolved the plan of making up placards out of enlarged photographs with block letters for text. The ensemble is so attractive that in some cases the stores which help to display the cards are loath to discard them when new subjects come along. The usual edition does not exceed fifty and the cost averages about 50 cents per placard. In addition to the display in stores, these placards are, of course, placed in Hydro stations and cars. Reductions of the same photographs are made for use in the folders that are sent to social organizations in soliciting pleasure traffic both summer and winter.

Some Recent Placards Advertising Pleasure Resorts on the Metropolitan Division of the Hydro-Electric Railways

Centralized Installation of Headway Recorders Saves Time

Information Is Obtained More Quickly and the Machines Give a Better Performance Under This Arrangement—Only Inbound Cars Are Checked

EARLY in 1920 the Milwaukee Electric Railway & Light Company installed seven Nachod automatic headway recorders on its local lines in Racine. The results obtained from this installation were considered of sufficient value to warrant a trial in Milwaukee. Accordingly in 1922 recorders were installed on three lines from which a considerable number of complaints in regard to service had been received. Good results were obtained from these installations, but it was found very difficult to keep the clock mechanism properly regulated when being cared for by the line supervisors. On the other hand, to have a man from the general office change the records and care for the clocks entailed a great waste of time in traveling from one location to the other. The idea was then conceived of having the recorder mechanism placed in the main office and connected electrically with the distant contact pan. One instrument was accordingly connected in this manner and gave such excellent results that in 1924 the management approved a plan for covering all 24 lines in Milwaukee with recorders and having the instruments centrally located in the main office. This installation was completed late in 1924 and the recorders have now been in operation for more than a year.



Battery of Nachod Headway Recorders Assembled in Main Office of the Milwaukee Electric Railway & Light Company

Inbound Cars Only Checked

In making this centralized installation it was decided that from the viewpoint of the passenger it was more important to check inbound cars, or those going toward the business section, and of considerably less importance to check outbound cars. Contact pans were accordingly placed over the inbound tracks only and with their centralized arrangement one recorder instrument is made to cover two locations, so that only twelve machines are required to cover the full 24 lines in the city.

The scheme of operation is as follows: The contact pan is placed at a selected point along the line where only cars of that line pass and so located as to avoid as many pull-out or pull-in cars as possible. On the nearest convenient pole is placed a relay, which, receiving the impulse at 600 volts, closes a 52-volt circuit through a telephone cable to the main office, terminating in a telecode relay. This relay closes a 220-volt circuit which operates the recorder. The twelve recorder instruments are placed on shelves in a dustproof cabinet which has a sliding glass front counter-balanced so that it may easily be raised to get to the recorders. The recorder half sheets are numbered consecutively from 1 to 24, corresponding to the 24 locations controlled. Each location is connected through its own snap-switch so that any individual location can be cut out. An accompanying illustration shows the cabinet with the glass door raised.

After trying several different methods of working up the data the one described below was evolved as giving the most and easiest read information for the amount of labor involved. On the first of each month a sheet of millimeter cross-section paper is prepared for each line. This sheet is labeled with the name of the line, month, number and location of recorder pan, all the sheets for any one month being bound at the top in book form. This sheet is divided vertically into two parts, the first half covering from 6 a.m. to 3 p.m. and the second half from 3 p.m. to midnight. In the first column is marked time, each small division representing one minute. In the second column is marked the run number and in the third a horizontal mark indicates the time when that run is scheduled to pass under the recorder pan. The succeeding columns are marked with the dates of the month, Saturdays, Sundays and holi-

days being excluded, as on those days the schedules are different.

Each day when the records are taken from the machines the actual passing times of the cars are indicated on this sheet by means of short horizontal marks. In this way the operation of any particular run can be followed through from day to day. After the data from the original sheet have been transcribed to this monthly record, any large gaps in service are noted and reported on the form shown, a copy being given to the supervisor in charge of that line, who looks up the cause for the delay and notes it on the form, which is then returned to the superintendent's office.

To handle the records from these 24 locations requires the time of two clerks for a half day. One clerk reads the time as indicated on the original record, while the other records it on the monthly sheet.

Advantages of Centralized Installation

Some of the principal advantages realized from this centralized installation are:

1. The clock mechanism, being in a room at uniform temperature, gives much better regulation than could be had if installed out of doors.

2. All the records can be changed in about a half hour, whereas an unreasonable length of time would be required to visit the pan locations.

3. If anything does get out of order a spare machine can be substituted in about five minutes, whereas formerly the tower truck had to be sent out to change it.

4. In case of minor trouble, such as a torn ribbon, it is discovered immediately, while formerly it was not discovered until the next day, thus losing the entire day's record.

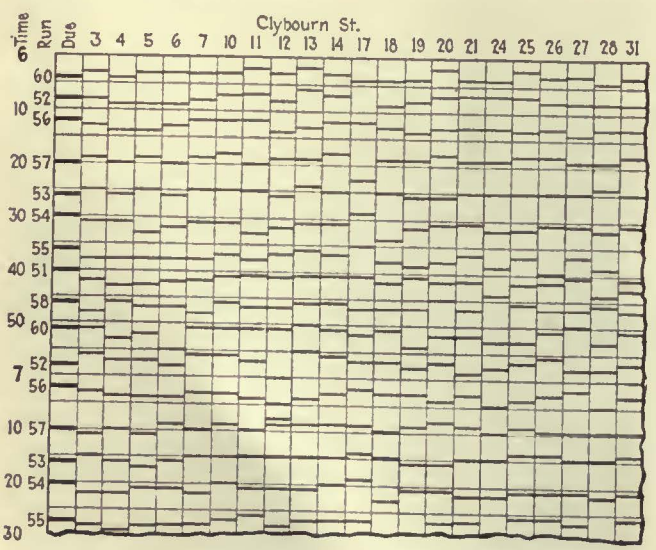
5. In case of severe snowstorm (not uncommon in Milwaukee) when the machine could not be reached, damage was done by jamming. This does not happen now.

6. In cases of complaint in regard to long waits the matter can be checked up immediately. Formerly it was necessary to wait until the following day to see the record.

7. Two locations can be recorded on one machine.

8. The records are never damaged due to being changed in a rain or snow storm.

The records have been used to good advantage in



Information Is Compiled Showing the Performance of Each Car Day by Day. August, 1925, Chart Is Shown

REPORT OF IRREGULARITIES IN SERVICE

Line Clybourn Date 8-19-25

Records indicate that no car passed

N.H.R. Location No. 16

From	To	Cause
3:21 P	3:34	Load of iron stuck at 5th and Sycamore

Investigated By

Reports Are Made on This Form of All Serious Interruptions and Sent to Line Supervisor

hearings before the Wisconsin Railroad Commission involving frequency and regularity of service. Complaints alleging excessively long waits for cars fell flat when mechanically made records of service were produced. By tabulating a month's record on one sheet, a picture of operation can be obtained that cannot be realized by studying each day's records individually. The supervisor by studying these sheets can obtain quite interesting information concerning the men under his charge. For instance, certain runs are found to be persistently ahead of time, others are generally late, while another may operate spasmodically. This monthly tabulation will also indicate whether or not a schedule is too fast, too slow or just right.

The company is now working out the details of a plan whereby at the end of each month the delays will be summarized for each line and expressed in terms of minutes delayed per 100,000 car-miles or per cent of total cars off schedule. These summaries will then be posted in the carhouses and an attempt made to stimulate a friendly rivalry between the supervisors and trainmen of the various lines to see which line can make the best record of cars being on schedule.

Diner on Fast California Train

SERVICE on the San Francisco & Sacramento Railroad and the Sacramento Northern Railroad has been augmented by the addition of a new combination observation and dining car. Passengers traveling from Oakland and San Francisco to Sacramento will be particularly benefited. The car is attached to the limited train that leaves San Francisco daily at 7:40 a.m. and Oakland at 8:15. This train arrives in Sacramento at 10:40, continues its journey north and reaches Chico at 1:40 p.m. Passengers for Sacramento from the bay cities may breakfast while they ride, and northbound passengers will have the opportunity to eat their midday meal while en route. The dining section of the car will accommodate sixteen persons.

On the return trip Sacramento passengers from Chico, whence the train leaves at 1:50 p.m., may have their luncheon on board. Sacramento passengers, southbound, find the dining service a convenience, leaving, as they do, at 4:40 p.m. and arriving at Oakland at 7:40 and San Francisco at 8:15 p.m.

Ten-Year Statistics Show Gain in Electric Railway Conditions

In Decade, Electric Railways in Large and Small Cities Have Had Increases in Revenue and Traffic per Inhabitant and Show More Economical Use of Cars

By Albert S. Richey
Electric Railway Engineer, Worcester, Mass.

HAVING had occasion to make comparison of some general operating statistics of the electric railways of the United States in 1914 and in 1924, and to segregate these figures as between the companies serving cities of a population of 500,000 or more and the remainder of the country, it is thought that some of the figures resulting from this study might be of interest to the readers of the ELECTRIC RAILWAY JOURNAL.

The general statistics which apply to the country as a whole are given in Table I. In general, they are similar to those presented by John A. Beeler in the paper on "The Electric Railway Car," which he presented at the Atlantic City convention last October. The figures for population, however, have been revised to exclude that part of the population which the Census Bureau classifies as "rural."

TABLE I—POPULATION, EXCEPT RURAL, IN UNITED STATES. ELECTRIC RAILWAY REVENUE, PASSENGERS AND CARS

United States	1914	1924	Per Cent Increase
Population (except rural)	57,000,000	67,000,000	18
Operating revenue	$625,000,000	$1,027,000,000	64
Revenue passengers	10,250,000,000	13,100,000,000	28
Passenger cars	76,000	77,000	1

In the above table the operating revenue and revenue passengers for 1914 have been determined by interpolation between the 1912 and 1917 figures of the U. S. Census Bureau. The corresponding figures for 1924 were obtained by applying to the Census Bureau figures for 1922 the percentages of change between 1922 and 1924 as shown by the statistics of the American Electric Railway Association. The numbers of passenger cars in use in 1914 and in 1924 were taken directly from Mr. Beeler's paper; it is understood that they were derived partly from the census figures and partly from ELECTRIC RAILWAY JOURNAL data.

GAIN SHOWN IN REVENUE AND PASSENGERS PER INHABITANT

Similar statistics were obtained directly from the electric railways operating in the thirteen cities of the United States which have a population of 500,000 or more. These cities are New York, Chicago, Philadelphia, Boston, Detroit, Cleveland, St. Louis, Baltimore, Los Angeles, Pittsburgh, San Francisco, Buffalo and Milwaukee. By deducting the figures which apply to these thirteen cities from those shown in Table I the statistics shown in Table II were obtained. These apply to the electric railways in the United States outside of the thirteen cities with a population of 500,000 or more.

The increase in revenue passengers shown in Table II, especially for the smaller cities, is some higher than actual comparative figures would warrant, as there was some zoning in fare limits during the period considered, and passengers who are now paying two fares for a ride which was bought for one fare ten years ago tend to increase the 1924 passenger figures unduly for comparative purposes. This caution applies also to the derived figures shown later, but it is believed that the effect of such zoning as has occurred is not great enough to affect adversely the general conclusions which may be drawn from these figures, especially if this effect be borne in mind.

BOTH SMALL AND LARGE CITIES SHOW INCREASES

It is interesting to note that the railways in the thirteen cities, which serve 28 per cent of the urban population of the country, operate 36 per cent of the cars, carry 53 per cent of the passengers and receive 43 per cent of the total operating revenue. The population of these thirteen cities has increased 22 per cent in ten years, as compared with only 16 per cent increase in the remaining urban population. The number of revenue passengers in the thirteen cities has increased 38 per cent, while in the remainder of the country the increase has been not more than 18 per cent. The operating revenue has increased 76 per cent in the large cities and 57 per cent in the remainder of the country. The larger increases in revenue passengers and operating revenue in the thirteen large cities is accounted for, of course, by the greater amount of necessity riding and the relatively smaller influence of the bus and privately owned automobile. In spite of these latter adverse factors, it is gratifying to note the quite substantial increases in both number of passengers and operating revenue in the country outside of the thirteen large cities.

That the rolling stock equipment is being used much more efficiently at present than ten years ago is indicated by the fact that the largely increased number of revenue passengers is being handled by a decreased number of cars in the larger cities and by a number of cars only slightly increased in the smaller communities.

Based on the figures shown in the three tables pre-

TABLE II—DIVISION OF STATISTICS IN TABLE I BETWEEN DATA FROM THIRTEEN LARGE CITIES AND URBAN POPULATION IN THE UNITED STATES OUTSIDE THOSE CITIES

Thirteen Cities	1914	1924	Per Cent Increase	1924 Per Cent of Total
Population	15,450,000	18,800,000	22	28*
Operating revenue	$251,500,000	$441,300,000	76	43
Revenue passengers	5,060,000,000	7,000,000,000	38	53
Passenger cars	28,000	27,650	1†	36
U.S. Outside Thirteen Cities				
Population (except rural)	41,550,000	48,200,000	16	72*
Operating revenue	$373,500,000	$585,700,000	57	57
Revenue passengers	5,190,000,000	6,100,000,000	18	47
Passenger cars	48,000	49,350	3	64

*Per cent of population (except rural) of United States. †Decrease.

sented above, the derived statistics shown in Table III were obtained.

TABLE III—PASSENGERS AND REVENUE PER INHABITANT AND OTHER STATISTICS FOR THIRTEEN SELECTED CITIES AND OTHER URBAN POPULATION

	1914	1924	Per Cent Increase
Passengers per Inhabitant per Annum			
United States	179.8	195.5	9
Thirteen cities	327.5	372.3	14
U.S. outside thirteen cities	124.9	126.6	1
Revenue per Inhabitant per Annum			
United States	$10.96	$15.33	40
Thirteen cities	16.28	23.47	44
U.S. outside thirteen cities	8.99	12.15	35
Average Revenue per Passenger	Cents	Cents	
United States	6.10	7.84	29
Thirteen cities	4.97	6.30	27
U.S. outside thirteen cities	7.20	9.60	33
Passengers per Car per Annum			
United States	135,000	170,000	26
Thirteen cities	180,700	253,200	40
U. S. outside thirteen cities	108,000	123,600	14

It is not surprising to note that the annual number of rides per person is three times as great in the large cities as in the remainder of the country. In the large cities the rate of increase in passengers per inhabitant per annum (14 per cent) is two-thirds as great as the increase in population in the same cities (22 per cent). It will be remembered that before the advent of the automobile it was generally assumed that the passengers per inhabitant would increase at practically the same rate as the population. There is some satisfaction also in the figures showing that the passengers per inhabitant for the United States outside the thirteen large cities has about held its own, indicating that the electric railway is at least as important a factor in the life of this public as it was ten years ago, and that its business has not been reduced seriously by the automobile. Evidently the latter, including both bus and privately owned car, is caring for such increased movement of passengers as has been occasioned by the increase in population.

Average Fare Increased More in Smaller Cities

The average revenue per passenger as shown above is obtained by dividing the total operating revenue by the number of revenue passengers. It therefore includes revenue from sources other than passenger fares, such as freight and other miscellaneous revenue, and is still further increased by the inclusion of interurban fares, so that the figures as shown do not represent average fares. The percentages of increase, however, between 1914 and 1924 correspond as closely as might be expected with the increases in fares over that period. The indication is that the average fare has been increased more in the smaller cities than in the thirteen large ones. Inasmuch as the traffic in the smaller cities is much less dense, and as compared with the larger cities has shown a lesser increase in the ten-year period, the greater relative increase in unit fares was, of course, quite necessary.

The figures giving the amount of revenue per inhabitant per annum evidently are dependent on the number of rides per inhabitant and the average revenue per ride, and show, as may have been expected from a consideration of the former figures, that the increase is greater in the larger cities than in the smaller. It is interesting to note, however, that even outside of the thirteen large cities the average person was paying about $9 a year for electric railway transportation in 1914 and more than $12 at present.

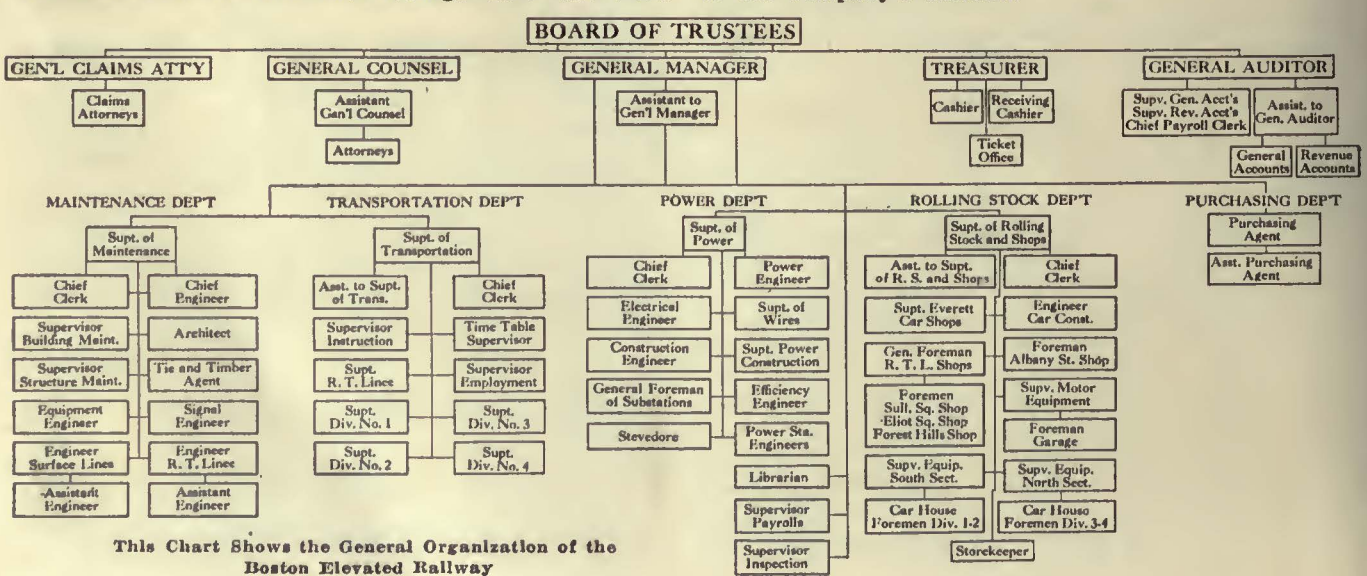
Better Use Being Made of Rolling Stock

The last of the derived figures shown above indicates a very considerable betterment in the efficiency of the use of rolling stock. Each active passenger car in the thirteen large cities is at present carrying 40 per cent more passengers than it did ten years ago, and even in the smaller communities, despite the much-talked-of destructive competition of the automobile, each car is carrying 14 per cent more passengers than it did ten years ago. This increased efficiency is all the more noticeable since at present there are in use in the country some 6,000 28-ft. one-man cars, all of which are of much smaller passenger carrying capacity than the two-man cars which they replaced.

Departmental Organization of Boston Elevated Railway

FIVE departments, each reporting to the Board of Trustees, constitute the organization of the Boston Elevated Railway. The largest department, of course, is the operating organization under the general manager. This department is again divided into five departments as follows: (1) Maintenance department; (2) transportation department; (3) power department; (4) rolling stock department; (5) purchasing department. In addition, the librarian, the supervisor of payrolls and the supervisor of inspection report directly to the general manager and assistant general manager.

The organization chart reproduced was used in one of the lectures in the educational course on the Boston Elevated Railway and a copy appears in the last issue of the company's bulletin.



This Chart Shows the General Organization of the Boston Elevated Railway

The Wide Double Stream Doorway Provides Free Movement for Ingoing and Outgoing Passengers

More New Cars for Miami

Light in Design but Constructed of Copper-Bearing Steel Plates Because of Climatic Conditions, Fifteen New Cars Embody Many Features Which Make Them Attractive and Comfortable

FORMING the latest addition to the rolling stock of the city of Miami, Fla., fifteen double-end, double-door, one-man single-truck cars were shipped by the J. G. Brill Company recently. The original plan of the city included an appropriation for systematic additions to its transit equipment. The continued increase of electric rolling stock indicates the importance which local officials attach to an efficient transportation system to provide for the rapid development of this Southern city.

The ordinary warm temperature of Florida, while delightful to its inhabitants, has a harmful effect on the usual types of rolling stock. In order to prevent rapid oxidation of the metal the new cars utilize copper-bearing steel plates extensively and all wood has been treated with preservatives in order to provide for long life and guard against destruction by insects. Bronze screws have been used throughout for fastening the wood members.

A full vision vestibule, which was first employed in the construction of some cars for the Boston Elevated Railway, has been made a feature of the Miami cars. By this means, the operator is given a maximum range of vision through the use of light steel tee-posts. Special attention was paid to the window construction.

In order to try out various methods and finishes in painting, three different systems have been used on the fifteen cars. Ten were finished with the standard enameling system, three have a Duco finish and two are painted with the Miroloid system. The exteriors are green with aluminum lettering and the interiors are finished in mahogany. Pipe railings and stanchions are enameled to match the interior trim.

Ten cross seats of wooden slat construction are provided in the car body and the platforms are provided with the Davis book type seat, which first made its appearance on cars in Brooklyn.

At Left—The Interior Finish Is of Mahogany. Ten Reversible Seats Are of Wood Slat Construction. At Right—A Book Type Folding Seat Provides Additional Seating on the Rear Platform

T. T. C. Operates Supplementary Bus Service

Sightseeing and Feeder Routes Have Been Established —Modern Equipment Bought—Automobile Riders Attracted

IN THESE days of rapid developments in matters pertaining to urban transportation attention has been attracted by the progressive program of the Toronto Transportation Commission, Toronto, Ont., which controls for the city practically all public transportation services operated within the city, and also operates, under special agreements, the railway services of adjoining communities.

During the unification, extension, complete rehabilitation and rerouting of the lines which served the city prior to September, 1921, the transportation commission also started bus and trolley-bus routes to serve several residential districts and to operate as feeders to the street cars, with twenty single and double-deck buses and four trolley buses.

These supplementary services, with free transfers issued between buses and street cars, have been continued successfully, with the exception of the trolley bus routes. After a trial extending over three years, the trolley buses were found unsatisfactory and were replaced by an extension of one of the street car routes.

Modern Equipment Bought

Alert to the development of the bus, the commission early this year added to its rolling stock a fleet of the most modern and luxurious motor coaches. These include 24 Yellow Coach "Y" type chassis, equipped with pneumatic tires and six-cylinder sleeve-valve engines. Built in the commission's own shops, the bodies are finished in a rich Pyramid gray exterior, while the interior mahogany woodwork, leather upholstered semi-divided seats, beveled mirrors, dome lights and other equipment provide for passengers the luxurious comfort of the finest inclosed private automobile.

The commission's first venture with the coaches was in the sightseeing tour services, for which six of the bodies were especially designed to provide clear view of interesting sights of the city.

During its first months in the sightseeing tour business, the commission had one competitor, the Dominion Coach & Livery Company, which had been operating for a number of years with a fleet of old style, solid-tired buses with bench seats. Acting solely on compassionate motives, the commission bought the assets of its outrivaled competitor and retired the obsolete buses from sightseeing service. This clarified the local situation and left the sightseeing business to be served exclusively by the commission's modern coaches.

The volume of sightseeing business handled during the first summer of operation was greater by a very pleasing margin than the commission had estimated. A modified schedule of tours is being operated during the winter, and present indications are that visitors appreciate the opportunity to see Toronto's landmarks and beauty spots in their winter settings.

Having supplied the transportation needs of the visiting public, the commission directed its efforts to regain and retain for its public transportation services the traffic that was inclined toward the privately owned automobile.

Early in September, after exhaustive study of various districts that might be served to advantage with motor coaches, the commission started a regularly scheduled motor coach route between the "Hill" residential districts and the downtown business area, passing en route the Provincial Parliament buildings, the large group of buildings of the University of Toronto (with a student registration of more than 5,000) and many apartments and clubs from which traffic for the coaches might be expected to originate.

The "Hill" route coach service is operated on a straight 10-cent fare. No transfers are issued to or from the street car and motor bus routes. The normal headway is five minutes.

Automobile Riders Attracted

Confirming the commission's estimates, traffic on this route has shown a steady increase each week. Many prominent citizens have taken the trouble to write to the commission to express their appreciation of the service provided by the coach route. Invariably these communications contain the information that the writer and his family had formerly used his automobile for their travels to and from business, shopping, theaters, etc., but the carefree comfort and convenience of the motor coach has resulted in their using the coach service for all these trips.

Incidentally, it is obvious that downtown traffic congestion and parking have been relieved by the absence of many private automobiles which were formerly brought downtown and parked in the congested streets while owners were in offices, stores, theaters, etc.

For the slack periods of traffic on the "Hill" route and sightseeing tours the commission has developed a profitable business by chartering of coaches for special tours, theater parties, lodge visits, excursions and other outings. One organization of women chartered 32 coaches for an excursion from Toronto to Niagara Falls, a round trip of 166 miles.

All motor coach drivers and sightseeing tour lecturers are men carefully selected from the commission's permanent organization and especially instructed in the safe, courteous and efficient performance of their duties. The men are neatly uniformed in dark gray, their smart caps and neat leather leggings giving them an appearance quite in keeping with the splendid appearance of the coaches.

The Toronto Transportation Commission is affiliated with the Association of Gray Line Owners and with its total fleet of 53 motor coaches and buses is the largest operator of automotive public transportation in Canada. Its unique position of exclusive control of public transportation services and its progressive plans to supply the service required are well worthy of attention.

Soft Seats Increase Riding Comfort of London Tramcars

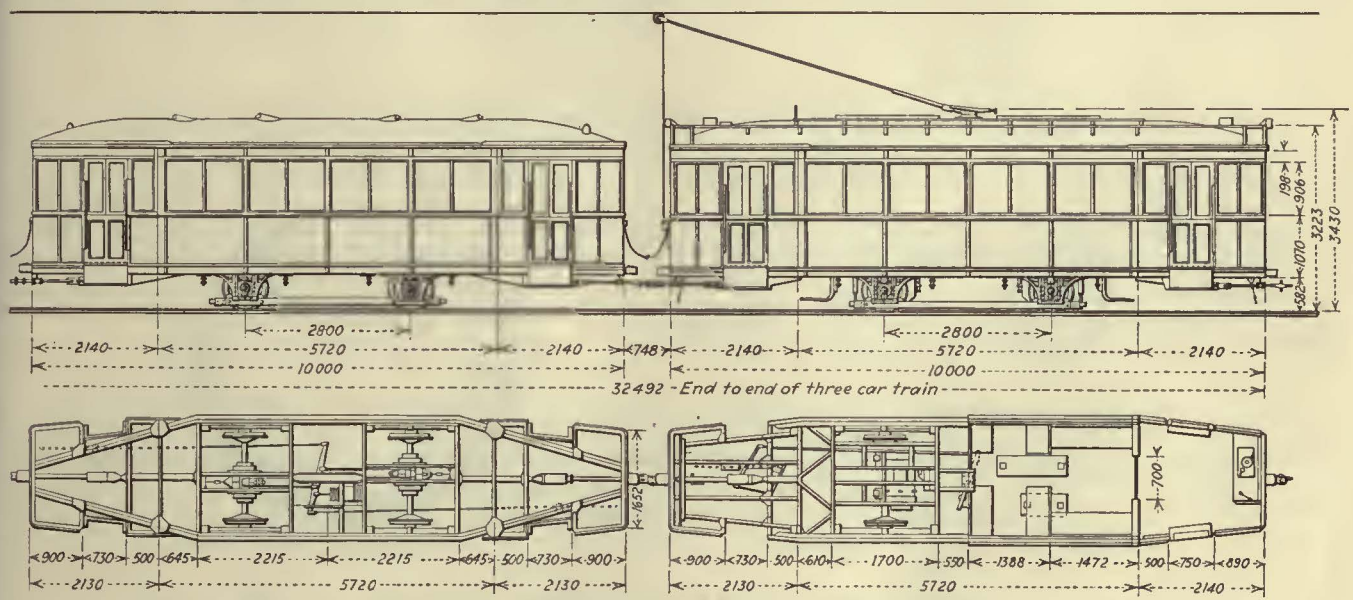
CUSHIONED seats are to be fitted on 120 of the older type tramcars of the London County Council, London, England. This type seat is known as the pad cushion, and the cost including installation is estimated at £2,580. Up to this time the Council has adhered to the bare wooden slat seat as being the most sanitary and easily kept clean. On account of bus competition, however, the cushioned seats were decided upon to increase riding comfort and attract new passengers.

Light Weight Motor Cars and Trailers for the Berlin Surface Lines

Wheels Are Mounted Directly on Car Body Without Use of a Truck, and Cars Are Equipped with Band or Disk Brakes Which Are Mounted on Armature Shafts of Motor Cars and on Axles of Trail Cars—There Are No Brakeshoes

By E. Kindler
Engineer of Equipment Berlin Street Railway System, Berlin, Germany

DURING 1925 the Berlin Street Railway System put in service 500 new motor cars and 500 new trailers. Both types differ radically in outward appearance and in design from those previously used in Berlin. Instead of a monitor roof an arch roof was chosen, by which 600 kg. (1,320 lb.) in weight was saved. Two roof ventilators are used on the motor cars and four on the trailers. These ventilators, with adjustable louvers (1,400 x 140 mm. or 55 x 5.5 in.) over the side windows, insure a plentiful exchange of air without causing any draft on the occupants of the car.



The Berlin Surface Lines Have Recently Put in Service Three-Car Trains Consisting of a Motor Car and Two Trailers
Only the motor car and one trailer are shown in this plan and elevation. Novel features are the absence of trucks and substitution of disk and band brakes for brakes which operate on the wheels

The exterior of the car has been so finished and painted as to show a streamline effect. This is gained by windows of uniform size and butt joints between side girders and window sashes, and by painting the car body above and below the windows yellow and the side posts white.

The windows are held in brass sash with rubber strips. The glass sash are 4 mm. ($\frac{5}{32}$ in.) thick. On the hood, at each end of each motor car, are two square illuminated markers for showing the route number. Between these markers is the route sign. The same type of route markers used on the motor cars is employed on the trailers as well.

All cars carry the usual wooden guard directly in front of the wheels. In addition, the motor cars also have an automatic fender under the platform with trip in front. The car journal boxes are fitted with special projections to which lifting jacks can be readily applied in case of accident.

All structural steel parts for the car framework are of standard shapes and are joined with standard gusset plates so as to make every part readily replaceable. All steel parts were sand-blasted after being cut and immediately thereafter dipped in varnish so as to prevent even the slightest trace of rust.

The cars have no separate truck, but the side sills of the car rest directly upon long-leaf springs which rest on the car journal boxes. On the motor car these springs have ten leaves, 1,600 mm. long and 100 mm. wide (63 in. x 4 in.). On the trailer there are ten leaves 1,400 mm. long and 75 mm. wide (55 in. x 3 in.). At each end of these leaf springs are placed small supplementary spiral springs to take up light shocks when the cars are no more than one-quarter occupied. For a larger number of passengers these spiral springs are completely compressed.

The steel framework of the car is built up on Z-shaped side sills the lower flanges of which point outward and support the four V-shaped corner posts. The upper flange of the Z-shaped side sill is turned to the inside of the car and supports the car floor. On these side sills also are bolted the cast-steel pedestals, in which the journals have a play of 1 mm. (0.04 in.) in each

direction. Through the use of these Z side sills and small high-speed motors, it was possible to keep the floor of the car at the same level as the front and rear platforms and to have both only 770 mm. (30 in.) above the top of the rail.

In the trailers a somewhat different form of floor framing is followed. Here the side sills are 10.5 m. (34 ft. 5 in.) long and extend under each platform from buffer to buffer. At their ends under each platform these side girders are bent inward toward the draft rigging, so that the shocks from the coupler are transmitted directly to these girders. On the motor cars the side sills end at the corner posts and the platforms are carried on four straight U-beams which can readily be replaced if the platform should get damaged.

The floor framing of the car is supported on steel channels with liberally dimensioned gusset plates, the thickness of the flooring being 25 mm. (1 in.). The car framing is so designed that the roof, which is stiffened with carlins and is covered with "triolin," can be put in place separately and is independent of the rest of the framework. On account of the frequent sidewiping damage of the Berlin street cars, the side panels had to be made very easily replaceable. These are of 1.5-mm. (1/16-in.) sheet steel and are fastened to the side posts with wood screws. They are not used to stiffen the framework of the car. The vestibule hoods are of four-ply and are readily replaceable in case of damage.

Interior Design and Finish

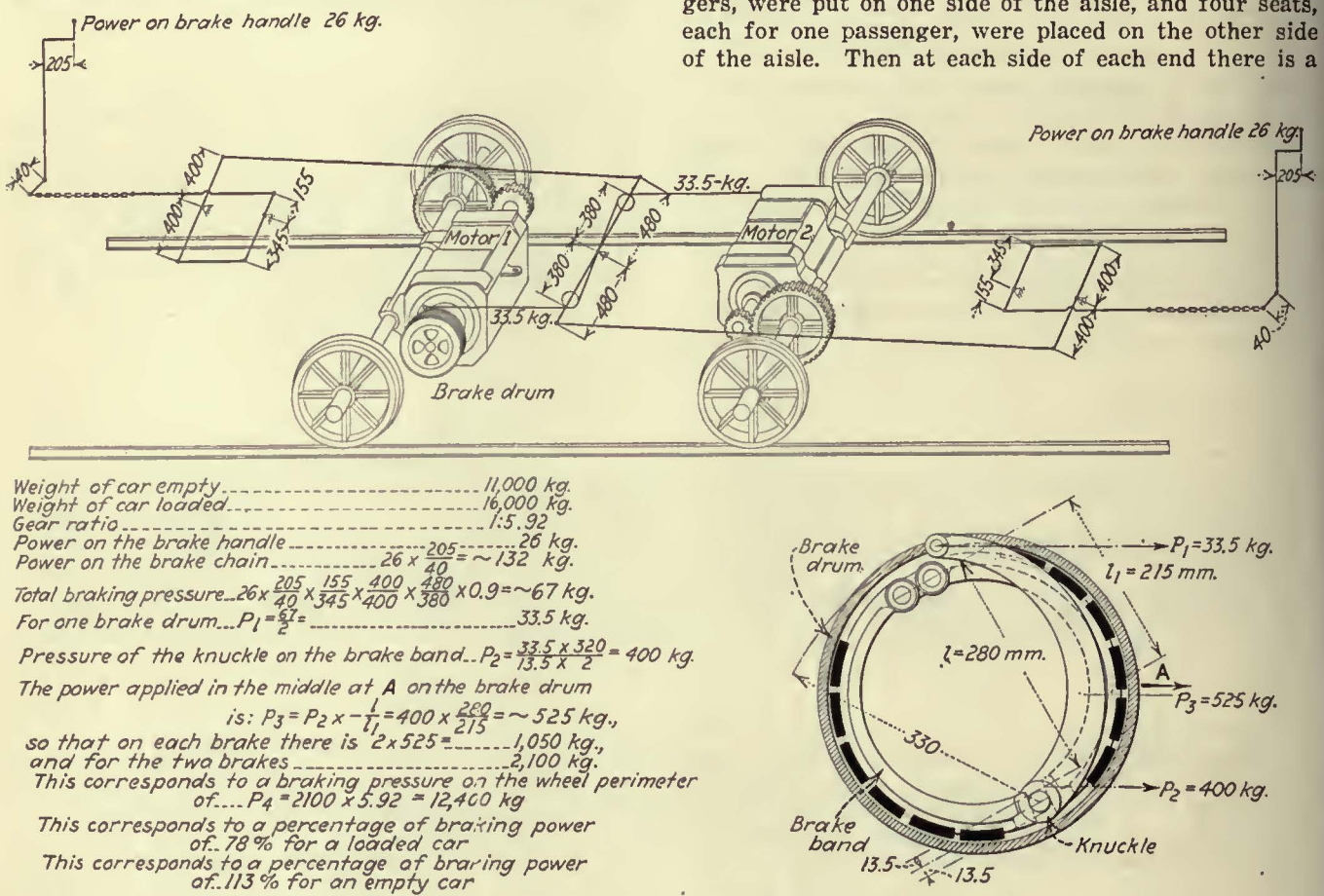
Inside of the car, as well as inside of the entrance vestibules, all steel surfaces have been covered with oak veneer, which has been fumed for 48 hours in ammonia vapors, and subsequently coated with "mattin" lacquer. In this way the appearance of a steel car has been entirely avoided. As a matter of fact, the brown hue of the fumed oak, the simple white ceiling, the dark red artificial leather covering the steel spring upholstered seats, the paneled car sides and the narrow brass fittings give the interior of the car a very homelike appearance, such as was intended by the designer of the interior, Prof. Bruno Paul.

The over-all width of the car is 2,200 mm. (7 ft. 2½ in.) and the width of the aisle is 553 mm. (21¾ in.). In consequence, four cross-seats, each for two passengers, were put on one side of the aisle, and four seats, each for one passenger, were placed on the other side of the aisle. Then at each side of each end there is a longitudinal seat to hold three passengers. This gives a seating capacity of 24 passengers per car.

The ventilating openings above the windows, already mentioned, are equipped on the inside with frames, which serve as advertising racks. The method of fastening used prevents any bulging out of the printed matter in times of wet weather.

A considerable departure from conventional design is represented by the arrangement of the body sash. In these cars the two center sash on each side of the body slide sideways, thus avoiding the need of pockets for drop sash or facilities for permitting them to raise. These movable sash are provided with weather stripping to keep out the drafts in winter.

The car is lighted with 25-cp. lamps, mounted on the sideposts above the cross-seats and so dimensioned that reading matter in the hands of a seated passenger will receive about 30 lux luminosity. Shadows of passengers standing in the aisle do not fall upon the paper of the reading passenger.



Armature Band Brake on Motor Car with Braking Diagram

TABLE SHOWING WEIGHT OF BERLIN CARS IN TEST

Empty motor car (11 tons) + ballast (5½ tons)	16.5 metric tons or	36,300 lb.
Two empty trailers (7.22 tons each) + ballast (5¼ tons each)	24.94 metric tons or	54,868 lb.
Eight passengers and instruments	0.56 metric tons or	1,232 lb.
Total	42.00 metric tons or	92,400 lb.

By means of a switch within the car or by another one on the platform an emergency circuit of lamps can be thrown in in case of trouble with the lamps used for regular service.

Heat is supplied by electric heaters placed under the cross-seats and wired so they can receive either current from the overhead line or that generated by the motors when they are used as generators to brake the car. The heaters are designed so that the inside temperature of the car can be raised about 10 deg. C.

Each trailer is similarly equipped with heaters which are supplied with current from the motor car through a jumper cable.

WHEELS, JOURNALS AND BEARINGS

The car wheels have tread diameter of 720 mm. (28⅜ in.). All axles are made of nickel-manganese steel, containing 1 per cent nickel and 1½ per cent manganese. The wheel tires are of chromium steel and the wheel centers of cast steel.

The car journals are equipped with a double row of S.K.F. roller bearings, filled with a special grease lubricant which is claimed to give satisfactory service for one year without any attendance to the bearing. These bearings can be taken off readily when the wheels have to be taken out of the car when the tires are turned down. The roller races which remain on the journal are then temporarily inclosed to prevent injury.

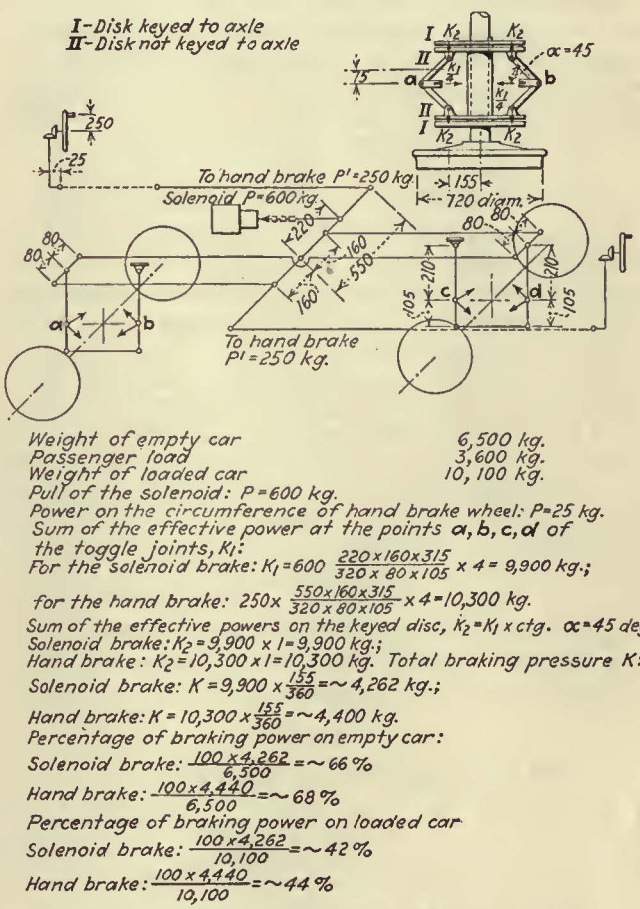
BAND AND DISK BRAKES

Perhaps the most novel feature is the mechanical brake with which both motor cars and trailers are equipped. This is entirely different from any brake hitherto used in Berlin and was necessary because, with the method of car body support adopted, the brakeshoes would have moved too far away from the wheels on a fully loaded car to function properly. It was therefore decided to design a brake rigging which would be independent of any movement of the wheels.

On the motor car this brake consists of a band operating on a drum attached to the armature shaft of the motor which has been extended on the commutator side to hold this drum. The drum, in turn, has been equipped with an inside band brake not greatly different in design from that used on automobiles. The brake-band lining is made chiefly of asbestos.

On the trailers the mechanical brake takes the form of a double disk brake in which a toggle joint on each axle presses two 10-mm. thick asbestos-lined plates against two circular steel disks with polished surfaces attached to the axle. This brake operates noiselessly and is very elastic, and the asbestos surfaces have been found to have a very long life. These brakes on the trailer are operated from the motor car by a solenoid mounted on the trailer and having a 600-kg. (1,320-lb.) pull and 90-mm. (3½-in.) stroke, or can be operated by hand.

These two brake systems have the great advantage over the commonly used brake that both braking and braked surfaces are away from the zone of street dirt and moisture, so that the friction coefficient is practically constant. They have the further advantage that they do not involve the use of pressures against one side of the journals and journal bearings and that by a simple arrangement of effective levers a very slight amount of power exerted by the motorman effects a very large braking action. In this way the brakes respond exceedingly quickly. Other advantages are the exact brake pressure equalization possible and a great saving in wear of wheel tires.



Double Disk Brake on Trailer with Braking Diagram

In addition to the mechanical brake described, the motor car is arranged for electric braking through the use of the motors as generators. When trailers are hauled, a part of the regenerated current from the car motors can be sent through resistances on the trailer or trailers for heating purposes, as already described. If trailers are not being hauled the brake circuit is automatically completed on the motor car.

Five hundred of the electric motors required for these 500 cars were supplied by the A.E.G. and 500 by the Siemens-Schuckert Works. The light-weight motors made by both of these companies are essentially alike, particularly in those parts which are subjected to wear, such as brushes, gears, axle bearings, gear casings and armature brake. This co-operation in design is considered a very essential step toward motor standardization. The motors have an hourly rating of

34 kw. at 500 volts, 70 amp. and 770 r.p.m. Their continuous output is 24.7 kw. at 900 r.p.m. The weight of one motor is 780 kg. (1,716 lb.) alone, and 830 kg. (1,826 lb.) complete with accessories. The armature brake weighs 65 kg. (143 lb.), the armature 175 kg. (385 lb.), and the gear case 25 kg. (55 lb.).

All motors have roller bearings and commutating poles and are self-ventilating. With the introduction of high-speed motors, large savings were made in weight, cost and size. The use of these motors has made it possible to find room under the car for the new type of armature brake and permitted the use of small diameter wheels. The reduced weight of the wheels in turn reduced the upsprung weight on the rails and tends to reduce their maintenance cost.

All the light wires are installed in small wooden ducts above the window ventilators and are very easily accessible. The grounding cables are connected to both motor housings and thence to the axle to prevent the operating or braking current from finding its way across the roller bearings.

Tests on Speed and Current Consumption

Tests on speed and current consumption have been made with trains of one motor and two trailers in regular scheduled service. The cars were loaded with ballast equivalent to a full load of passengers as shown in the accompanying table.

The ballast used corresponds to a weight of about 75 passengers per car. The time taken for a run over the 14.679-km. (9.1-mile) long track was 52 minutes, including twelve-second stops at each stopping point. The current consumption was an average of 45 watt-hours per ton-kilometer (64 watt-hours per ton-mile). The moving resistance as measured by "run-out" tests was an average of 6.5 to 7 kg. per metric ton (13 to 14 lb. per ton of 2,000 lb.). The highest speed of the train weighing 42 metric tons was 32 km. (20 miles) per hour on the level, and for the empty motor car alone 41 to 42 km. (25½ to 26 miles) per hour.

Wheeling Wives Win Passes

ADDRESSES by A. C. Spurr, general manager of the Wheeling Traction Company, and Prosecuting Attorney A. C. Schiffler and the acceptance of eleven new members into the Veterans' Association featured the entertainment and dance given recently by the veteran employees of the Wheeling Traction Company, Wheeling, W. Va. The entertainment was one of a series that is staged by members of the Veterans' Association, made up of men in the transportation department who have been in the service of the company for twenty years or more. Following the program dancing was enjoyed by the several hundred couples present until midnight.

In his address Mr. Spurr declared that the transportation business was a partnership with employees, traction officials and the public served. He also spoke highly of the wives of veteran trainmen, to whom he referred as "silent partners," and said that it is his intention to present them with passes on all lines of the Wheeling Traction Company as an expression of appreciation for their efforts. He announced that passes would be mailed on Jan. 1 to the wives of all trainmen who have been in the service of the company for twenty years or more.

Bureau of Public Roads Issues Bus Statistics from Eight States

RECENTLY the United States Bureau of Public Roads, which is a part of the United States Department of Agriculture, made public an analysis of bus operation in eight states. It was compiled by H. R. Trumbower, economist of the bureau, and appears in the official publication of the department, entitled "Public Roads." The data from three of the states, Connecticut, Maryland and New Hampshire, were obtained from the records of the Public Service Commissions of those states. For the other states, West Virginia, Kentucky, Arizona, Oregon and Washington, the material was obtained from summaries published by the American Electric Railway Association.

FARES CHARGED BY INTERURBAN AND SUBURBAN BUS LINES IN CONNECTICUT, NEW HAMPSHIRE AND MARYLAND

Rate of Fare per Mile (Cents)	Connecticut Routes		New Hampshire Routes		Maryland Routes	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
2 to 3	2	4.2	1	3.1	1	3.1
3 to 4	7	14.9	4	12.5	6	18.8
4 to 5	21	44.7	3	9.4	11	34.4
5 to 6	11	23.4	7	21.9	13	40.6
6 to 7	3	6.4	2	6.3	1	3.1
7 to 8	3	6.4	1	3.1	..	....
8 to 9	..	....	1	3.1	..	....
9 to 10	..	....	4	12.5	..	....
10 to 11	..	....	2	6.3	..	....
12 to 13	..	....	5	15.6	..	....
15 to 16	..	....	1	3.1	..	....
18 to 19	..	....	1	3.1	..	....
Total	47	100.0	32	100.0	32	100.0

In these eight states there are 705 bus routes, which have a total length of 18,196 miles and an average length of 25.8 miles. Sixteen of these routes are 100 miles or more in length, but more than half of them are less than 20 miles in length. Of this route mileage, 41 per cent was directly competitive with the steam railroads, 28 per cent indirectly competitive and 31 per cent non-competitive. The author declares that motor bus and truck competition had very little or nothing to do with the recently announced policy of the Boston & Maine Railroad to abandon 1,000 miles of track and that this competition has been very limited.

Almost invariably the rates per mile charged by the bus operators are higher than the mileage rates of the competing railroads, indicating, in the opinion of the compiler, that the bus lines must have some superiority in service, such as a more direct route or more frequent service. Examples of both are given. A table of the capacities of the buses being used shows that 35.5 per cent have a capacity of from one to seven passengers, 25.3 a capacity of from eight to fourteen passengers, 34.2 per cent a capacity of from sixteen to 24 passengers and 5 per cent a capacity of 25 passengers or over. Two tables, one showing fares charged in three of the states and the other the motor bus fees and taxes in all eight states, are reproduced.

MOTOR BUS LICENSE FEES AND TAXES IN EIGHT STATES

State	Annual License Fee	Gasoline Tax	Total	Personal-Property Tax in Addition
Connecticut	$82.50	$71.42	$153.92	Yes
New Hampshire	276.00	142.84	418.84	Yes
West Virginia	666.67	249.97	916.64	Yes
Kentucky	270.00	214.26	484.26	Yes
Arizona	25.00	214.26	239.26	No data
Oregon	177.00	214.26	391.26	No
Washington	250.00	142.84	392.84	Yes
Maryland	1,428.57	142.84	1,571.41	Yes
Average	$396.96	$174.09	$571.05	.....

The Readers' Forum

Manufacturers of Cars Can Be More Aggressive

WHEELING TRACTION COMPANY
WHEELING, W. VA., Feb. 5, 1926.

To the Editor:

You probably have been in a "crossroads" town and noticed the way the windows of the general store are dressed—the glass opaque, the articles antiques, the whole aspect unattractive—and they do business only with those who must trade with them.

In many parts of the country the street railways are still dressing their show windows (their cars) in the crossroads manner.

You have been calling attention to this forcibly and I believe that the street railway business as a whole echoes your point of view. Too many striking illustrations of modernizing have been called to our attention to permit us long to forget the fact that "To the quickest belongs the spoils."

If we were in the bus game entirely, our situation would be better. The motor vehicle salesman would be calling our attention to the need for new equipment, the possibilities of different types of equipment, new fields for our service, new types of service, and then offer to assist us in financing the venture. They seem to have realized that obsolescence deflects earnings and that modernization makes money.

Perhaps there are reasons for the optimism of the bus manufacturer, but with the possibilities that exist for the street railway business, some optimism should be reflected in its future by retiring the faithful carrier of the early days.

A. C. SPURR,
General Manager.

Great Possibilities for Improving Service Through Noise Reduction

AKRON, OHIO, Feb. 4, 1926.

To the Editor:

In the Jan. 23 issue of ELECTRIC RAILWAY JOURNAL there was a letter by "Master Mechanic" in which he feels that the work of the equipment committee toward improving the noise condition and general comfort of cars is a case of "Love's Labor Lost." It would seem from the tone of this letter that the work of maintaining the equipment and keeping expenses down to the limit had very much reduced his vision. It is a pity for any man running a railroad not to have a broad enough vision to see the possibilities of improving the service and keeping it up to the highest possible standards. It is true with all of us that we do not find the money growing on trees, but if the managements of most properties find that certain expenditures will produce results and profit, these managements usually will authorize the necessary expenditures..

It is true that there was no discussion of the very complete report of the sub-committee on noise reduction at the last A.E.R.E.A. convention, but I do not think that this indicated any lack of interest. This report was the last one to be read and the hour was so late that it was thought advisable not to start any discussion.

PIERRE V. C. SEE,
Chairman Equipment Committee.

An Opportunity for "Master Mechanic"

TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY
INDIANAPOLIS, IND., Feb. 3, 1926.

To the Editor:

In your issues of Jan. 16, Jan. 23 and Jan. 30 I note some correspondence between the chairman of the committee on noise reduction and "Master Mechanic." I think "Master Mechanic" overlooks the function of various committees of the American Electric Railway Engineering Association. Certainly they are taking into consideration the greatest good for the greatest number and pursue their work along lines which will be of greatest benefit to the individual and the companies, and are not attempting to advise any one way how various properties may increase their revenues.

I believe also "Master Mechanic" overlooks the trend of thought and demand on the part of the public toward more luxury and comfort in the public conveyances which are used on our streets. The tremendous increase in the number of rubber-tired vehicles has more or less instilled the idea in car riders' minds that there is no real necessity for noise. This is the very problem the committee on noise prevention is trying to solve. It will point the way to master mechanics, truck departments and others. Certainly the committee is not attempting to advise in any individual case what should or should not be done, that being up to individuals to determine as the revenues of their properties may indicate. There is no question, however, that the investigation which the committee is pursuing in a practical, not a theoretical way, will tend, in the end, to do the two things regarding which "Master Mechanic" complains; that is, increase his revenue and decrease his maintenance expense. In addition, it will certainly increase the feeling of friendliness toward his company or his patrons, the car riders.

Should the entire membership of the association take the attitude toward the work of the committee which apparently is assumed by "Master Mechanic" there would most certainly be very little accomplished as to constructive progress in the industry. If "Master Mechanic" will make himself known, I, as a member of the executive committee of the A.E.R.E.A. and of many years' experience in committee work, would be glad to use my efforts to have him become a member of some of the committees in order that he might ascertain what is back of all their hard work and investigation. Such membership might be of material benefit to him.

It occurs to the writer that if "Master Mechanic" had not been so prone to the use of "Aladdin's Lamp" instead of putting forth individual effort his property might be in condition to adopt progressive recommendations.

WILLARD F. GRAVES,
Member Executive Committee A.E.R.E.A.

Anti-Glare Glass on Sheffield Cars

SO SUCCESSFUL has been an experiment with anti-glare glass fitted in front of some of the Sheffield, England, tramcars that it is to be adopted for all the cars in the city. The device consists of a sheet of blue glass fitted on a level with the motorman and a little to the right. Its purpose is to prevent the driver from being dazzled by powerful headlights on approaching vehicles.

Association News & Discussions

Self-Propelled Cars and Locomotives

A. H. Candee Analyzes the Characteristics of Oil-Electric and Gas-Electric Driven Units—Advantages and Disadvantages of This Type of Equipment Stressed—Present Field Is Outlined

DISCUSSIONS by various manufacturers of the pros and cons of gas-electric and oil-electric operation of rail cars and locomotives have occurred quite frequently during the past month. Generally, however, it has not been possible to get a complete picture of the entire field. A broad analysis of the subject was made by A. H. Candee, general engineer of the Westinghouse Electric & Manufacturing Company, in an address before the Iowa Engineering Society at Mason City, Iowa, on Jan. 28. While optimistic for the future of the self-propelled motor car, Mr. Candee does not even suggest that it has approximated its ultimate state of development as yet. He rather shows that the gas-electric and oil-electric rail cars and the oil-electric locomotive have proved particularly efficacious in meeting certain localized conditions in railway operation.

One thing which has been very noticeable in development of the rail cars is the shrinking market for the smaller cars as the larger cars are brought out. Attempts have been made to determine the economical limit in engine size for this type of car, which seems to have been reached for the gasoline engine at about 250 to 275 hp. Larger engines will have some field, but will undoubtedly have to be built on an uneconomical production basis, as the Diesel engine will soon enter the field in the larger capacity.

According to the speaker the difficulties which arise in providing mechanical transmission in gear shifting of the larger gasoline-driven rail cars are no small problem and it has been demonstrated that electrical transmission is the only satisfactory system for the transmission of real power. Its advantages are:

1. Railway motors mounted on the trucks require only cable connections to the car body.
2. Gearing of motors to the axles is simple.
3. Power plant may be located at the most convenient place on the car.
4. Engine speed is independent of the car speed. This means that maximum engine power is available at all times for acceleration and for high-speed running, yet when the power required to maintain a given speed is lower than the maximum the engine speed may be lowered correspondingly. This increases engine life.
5. Simplicity of control.
6. Long life and low maintenance of the transmission as a whole.

For the propulsion of rail vehicles in recent years there has been a rather consistent effort on the part of Diesel engine designers to produce an engine to meet the requirements. The most noteworthy of these is the four-stroke cycle, solid injection engine, built by William Beardmore & Company, Ltd., of Glasgow, Scotland, and of which there are nine in successful operation on rail cars of the Canadian National Railways. This engine compares very favorably in size and weight with the modern gasoline engine and it weighs but 16 lb. per brake horsepower.

In considering the economies of the rail car for light passenger traffic or branch line service, Mr. Candee said, available data indicate that the comparative figures for rail cars using gasoline engines are from 25 cents to 45 cents, while Diesel engine cars will operate at figures approximately 25 to 35 per cent lower. Time will be required to verify this estimate, although there is every reason to believe that the maintenance of a Diesel engine in railway service should be lower than that of the gasoline engine.

Next the subject of the use of gasoline and Diesel electric engines for locomotives should be taken up. As in the rail car, the weight and space requirements of the Diesel engine have limited its use to sizes where real blocks of power have been required. Gasoline engines have been available for the smaller weights of locomotives and have been used rather extensively in industrial work. In continuous heavy duty, however, the fuel costs have been a severe handicap.

Both gasoline and Diesel engines have recently been used for switching locomotives. The available horsepower per ton on drivers has been much lower than in steam locomotives. These machines are more in the nature of experiments, or rather a step in development of the ultimate. Thus, the Ingersoll-Rand Diesel 60-ton locomotive has 5 hp. per ton and the 100-ton has 6 hp. per ton. The Brill-Westinghouse 75-ton switcher, using 500 hp. in gasoline engines, has 6.66 hp. per ton. Designs are now under way for locomotives having 8 to 14 hp. per ton weight on drivers. An electric locomotive can easily develop 25 to 35 hp. per ton. Steam locomotives can develop from 18 to 23 or 24 hp.

In service the low-power Diesel units with electrical transmission can develop more than enough tractive effort to slip the wheels and thus can haul immense trains, but the speed will be held to a very low value on account of the limited horsepower. To increase the speed it is necessary to reduce the tractive effort on account of the limited power available. Thus the time required to switch a given tonnage is relatively high as compared with steam switching.

One of the big problems of the self-propelled car or locomotive is that of providing power for the auxiliaries, such as radiator fans, air compressors, battery-charging apparatus, and engine starting. Direct connection of fans and compressors to the engine is not often desirable or feasible. With the electrical system of power transmission, electrical energy is available for the auxiliaries, but even then the problems are not all solved. The solution of the problem of varying voltage on the main generators has been solved in the case of the locomotives by the provision of an auxiliary generator having constant voltage characteristics, but with the rail car the use of an additional rotating machine is undesirable.

In concluding, Mr. Candee said, "I do

COMING MEETINGS OF *Electric Railway and Allied Associations*

Feb. 18 — A. S. C. E., A. S. M. E., A.I.E.E. and A.I.M.M.E., joint meeting, Engineering Societies Building, New York, N. Y., 8.15 p.m.

Feb. 24-26—Electric Railway Association of Equipment Men, Southern Properties, Mobile, Ala.

March 5 — Metropolitan Section, A.E.R.A., 29 West 39th Street, New York, N. Y.

March 8-11—National Railway Appliance Association, annual exhibition, Coliseum and Annex, Chicago, Ill.

March 9-11 — Oklahoma Utilities Association, annual convention, Mayo Hotel, Tulsa, Okla.

March 12 — Pennsylvania Street Railway Association, annual meeting, William Penn Hotel, Pittsburgh, Pa.

March 17-18—Illinois Electric Railways Association, Illinois State Electric Association and Illinois Gas Association, annual joint convention, Springfield, Ill.

March 23-25—National Conference on Street and Highway Safety, Washington, D. C.

April 13-16—Southwestern Public Service Association, Galveston, Tex.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

Oct. 4-8—American Electric Railway Association, annual convention, location not yet determined.

not wish to leave you with the idea that the gasoline or Diesel rail car and the Diesel locomotive are going to supplant the steam locomotive in the immediate future. Undoubtedly the rail car is developed sufficiently at this time to become the economical substitute for the steam locomotive in several classes of service. Locomotives equipped with internal combustion engines, however, have proved their desirability in but one class of service — that of light switching duty. As the ratio of cost between the Diesel locomotive and the steam locomotive is now quite considerable, the railroads will require conclusive demonstrations of the economies of a new form of motive power before they buy in quantities, and it will be many years before the intensively interesting and spectacular steam locomotive vanishes from our sight."

Canadian Convention Goes to Quebec

QUEBEC has been chosen for the 22d annual meeting of the Canadian Electric Railway Association. It will be held on June 2 to 4, inclusive. As in the last two years, the Canadian Electrical Association will hold its convention at the same time and at the same place.

While the exhibits and the majority of the entertainment features will be in common, the business sessions of the two associations will be entirely separate.

The following convention committees have been appointed:

Exhibits—O. C. Rehfuss, Canadian Car & Foundry Company, Montreal, chairman; C. H. Clancy, Toronto; J. A. Fletcher, Montreal; H. T. Gibbs, Toronto; W. J. Lynch, Quebec; Hugh Millar, Montreal, and C. F. R. Jones, Montreal.

Entertainment—R. B. McDunnough, chief engineer Quebec Railway, Light, Heat & Power Company, chairman; T. O. Burnside, Quebec; W. W. Horwood, Montreal; C. W. McMillan, Quebec; Norman Richards, Montreal, and H. E. Weyman, Levis.

From present indications there will be a fairly large exhibit, particularly of buses.

American Association News

Convention Location Not Decided

WHILE two meetings of sub-committees of the committee on location of the A. E. R. A. were held last month to investigate the possibilities of selecting Cleveland or Atlantic City for the annual convention it was not possible to get the full committee together at Indianapolis on Jan. 29, the date when the meeting was called. Accordingly no final report was made to the executive committee. Chairman C. E. Morgan, who was delayed en route, arrived in Indianapolis in time to make a short oral report, but without a recommendation as to the location of the convention. The statement in the calendar of *Bus Transportation* for February that the convention will be held in Cleveland was in error.

It is planned to hold a meeting of the committee on location during the coming week to take definite action. Since the executive committee finds it impossible to hold a special meeting for the purpose of approving a recommendation, a special committee with Mr. Morgan as chairman was appointed at Indianapolis with power to act. The complete personnel of this committee was published in the report of that meeting in the Feb. 6 issue.

Special Reports Available

SPECIAL reports have been prepared by the Bureau of Information and Service of the American Electric Railway Association and are available to member companies upon request.

Bulletin No. 64—Trend of Electric Railway Operations.—A month by month record of the revenues, expenses, taxes, car-miles, revenue passengers, operating ratio, etc., of a group of 154 companies for the months of January to November, 1925, compared with the same period of 1924. The combined figures for the group are followed by separate statements for each of the geographical divisions of the country. In addition the month by month record of operations of the group of 80 companies started in January, 1920, and published in bulletin form from time to time has also been brought through the month of November, 1925.

Bulletin No. 65—Motor Bus Legislation in 1925.—Contains complete copies of all motor bus regulatory legislation passed during the year 1925, with a carefully prepared analytical index, permitting easy reference to any section of laws. This bulletin supplements Bulletin No. 17, "State Regulation of Motor Bus Common Carriers," issued April 1, 1925.

Bulletin No. 66 — Trend of Trainmen's Wages.—Shows for a large group of companies the maximum wage rate, the number of years of service necessary to reach this maximum and the number of trainmen employed for the years 1914 to 1925 and as of Feb. 1, 1926.

Bulletin No. 67—Electric Railway Fares in 1917 to 1925.—Shows the fares in effect in 319 cities having a population of 25,000 or more, 1917 to Dec. 31, 1925. In addition it shows the average cash rate of fares in 272 cities in these same years and the number of cities in which each rate of fare was in effect in each of the years.

In addition to the above, supplements to the Wage Bulletin, Fare Bulletin and Cost of Living Studies (Bulletin No. 68) have been prepared, bringing them down to date.

Metropolitan Section, A.E.R.A., Issues Attractive Leaflet

IN AN attractive two-fold leaflet, a direct appeal for new members has been issued by the membership committee of the Metropolitan Section to operating men in New York City and vicinity.

"You should belong" is answered by seven reasons: First, to learn how other companies handle their shop, car and street problems; second, to tell others how to solve problems, lending a helping hand, exchanging ideas for the mutual benefit of all; third, to learn of new practices constantly being developed by manufacturers and operators; fourth, promote your own welfare and the welfare of your company, to which you owe your best efforts; fifth, to receive the inspiration of frequent contacts with others in electric railway fraternities, both operators and manufacturers; sixth, to build a sound foundation for your own progress in the industry; seventh, to meet foremen, general foremen, dispatchers, motor instructors, superintendents, vice-presidents, general managers and presidents of other transportation companies.

President J. W. Hulme of the Metropolitan Section and R. F. Carbutt, chairman of the membership committee, are responsible for the leaflet. It was accompanied by a strong letter of appeal for membership.

In the first year of this section's activities 1,000 members were enrolled. This year a bogey has been set for 1,500, and from the enthusiasm exhibited and the quality of the meetings held the bogey should be exceeded.

Individual and Company Membership Increasing

NINE company members and ninety individuals were elected to membership in the American Electric Railway Association at the meeting of the executive committee held at Indianapolis, Jan. 29. The new company members include one operating railway, one associate and seven manufacturers. The names are given below:

Operating Company

Saginaw Transit Company, Saginaw, Mich.

Associate

J. K. Moore, consulting engineer, Chicago, Ill.

Manufacturer Companies

Braender Rubber & Tire Company, Inc., Rutherford, N. J.
Century Rubber Works, Cicero, Ill.
Cummings Car & Coach Company, Chicago, Ill.
Egyptian Lacquer Manufacturing Company, Inc., New York, N. Y.
Elliott-Fisher Company, New York, N. Y.
Selden Truck Corporation, Rochester, N. Y.
Ternstedt Manufacturing Company, Detroit, Mich.

The 90 individual memberships are divided as follows:

	Operating	Associate	Manufacturer	Total
Affiliated with member company:				
Accountants	4	..	..	4
American	14	3	25	42
Claims	2	1	..	3
Engineering	8	1	9	18
T. & T.	8	..	2	10
	36	5	36	77
Not affiliated with member companies:				
Accountants	1	1	..	2
American	..	..	2	2
Engineering	1	..	4	5
T. & T.	4	..	..	4
	6	1	6	13

The Truth About Local Transportation

UNDER this title a small eight-page folder has recently been issued by the publication department of the American Electric Railway Association. It contains interesting and helpful facts about the industry written by Mr. Storrs, the managing director of the association.

Maintenance of Equipment

Chemical Mixture Removes Paint Quickly

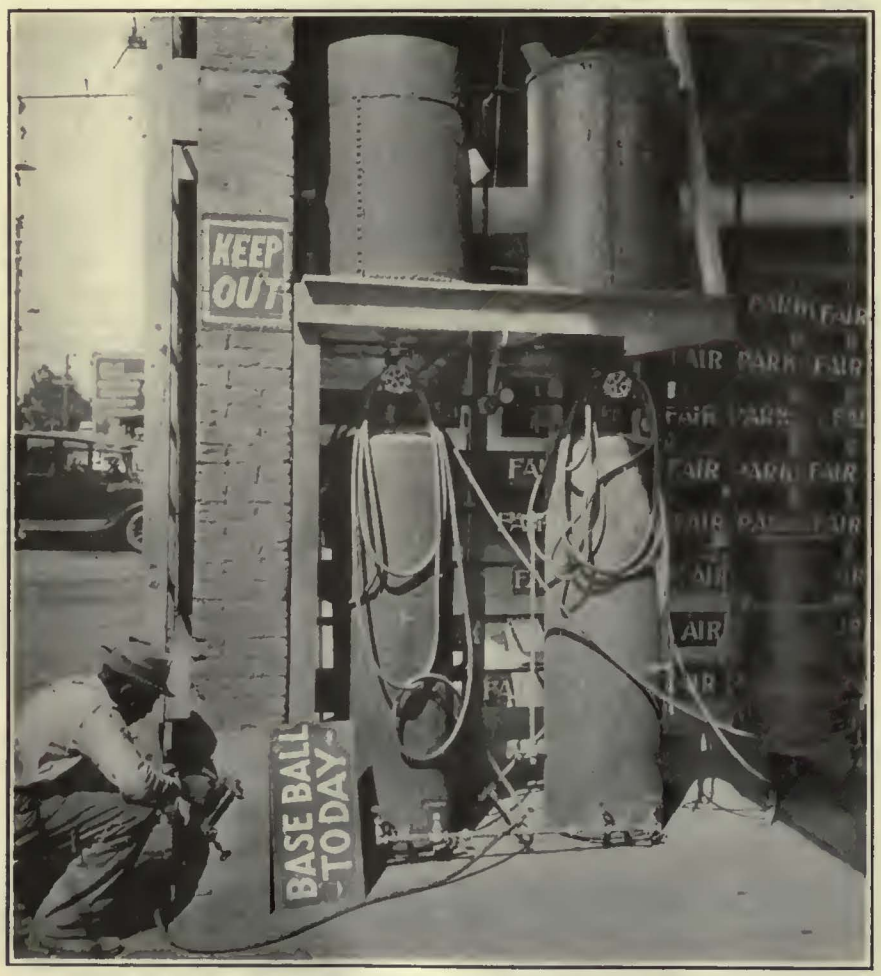
BY J. L. BROWN
Master Mechanic Dallas Railway

ECONOMY in removing paint from the exteriors and interiors of cars has been accomplished by the Dallas Railway by means of a special chemical mixture applied hot. Both the mixture itself and the apparatus used in its preparation were perfected by Dr. L. C. Moore, former city chemist of Dallas. Altogether there are four tanks, two above and two below. The bottom tanks are connected to a Pittsburgh heater, as shown in an accompanying illustration. The tanks on the left are used for mixing the paint remover, while those on the right are used in the preparation of a car-cleaning solution. An air compressor, not shown in the picture, is part of the equipment.

Eighteen pounds of a substance called Mooreite and 60 gal. of water are mixed in the left-hand upper tank and then allowed to flow into the left-hand lower tank. The mixture is forced from the lower tank by air pressure through the coils in the Pittsburgh heater to attain a temperature of about 175 deg. F. A small hose is connected to the outlet of the heater, and on the end of the hose is a small nozzle with a thumb valve. This arrangement permits the operator to handle conveniently the solution to be applied to the painted surface. A small stream is played upon the paint to be removed until it becomes soft and falls away from the surface. After the paint has been removed the entire surface is given a bath of clear water, which neutralizes the paint remover and prevents rusting of the metal.

The cost of removing paint from a double-truck car 45 ft. in length which has been painted every two years for the last eighteen years without removing the paint was $18.24. The cost for this same job using a paint remover for the steel and burning the paint off the wood with a blowtorch was $33.80. Thus, a saving of $15.56 was effected. The job included removal of the paint from the body inside and outside as well as from the wood seats.

To renovate and clean a painted surface without injury to the paint 2½ lb. of Westolite is mixed with 60 gal. of water. The same procedure of operation is employed as the paint-removing scheme. The old method of cleaning inside the car with hand brush and soap costs $2.94, as compared with $1.35 with the new method.



Apparatus Used by Dallas Railway for Cleaning and Paint Removing
Solutions are mixed in the upper tanks and allowed to flow into the lower tanks. From there they are forced by air pressure through the heater and then through the hose and nozzle.

Manganese Special Work Successfully Welded*

ONE of the major items of track maintenance on the lines of the Denver Tramway, Denver, Col., is the maintenance of special work. This has been reduced materially through the installation of solid cast manganese flange bearing special work, the use of hard center special work, and carbon steel flange bearing work hardened by a special process. The life of manganese special work has been prolonged in many cases through the use of surface welding. This welding has been made a success by chilling the weld very frequently. This is done by the application of water before cooling takes place.

While hard center special work is not considered as satisfactory as solid cast manganese, the company has some installed which requires

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

maintaining. This work consists of melting the old metal or babbitt with an acetylene torch with special scraper. Air from a portable air compressor is used for cleaning the center and the opening. An air pressure of 120 lb. per square inch is used to blow out foreign material. The center is removed and cleaned thoroughly and the pocket is dried by heating with a gasoline torch to prevent an explosion from steam formation while pouring in the new metal. In replacing the center, it is adjusted to the proper level by thin metal shims which are left in place. Antimonial lead has been found to give best results for resetting the centers on account of its characteristic of expanding as it solidifies and thus holding the center under pressure. A special sheet steel portable stove is used to melt the babbitt.

Journal Box Covers Clamped in Position

CLAMPS for holding journal box covers in the proper position are used in truck maintenance work by the Union Street Railway, New Bedford, Mass. Formerly the journal box covers often became loose and were sometimes lost. To overcome this difficulty, G. H. Bonner, shop foreman, devised a method to lock these covers securely in their proper places. It consists of a piece of ⅜-in. steel that is bent U-shaped and placed over the outside center of the journal box cover. This U-shaped piece is held in position by a ½-in. through bolt which passes from side to side through the

Strap Clamp Used by Union Street Railway to Hold Journal Box Covers In Place

journal box. Lock nuts hold this clamp firmly in position. Not only has this simple device eliminated lost journal box covers but it has held them so firmly in place that little dirt has found its way into the journal box and little oil has leaked out of the packings.

New Equipment Available

Novelties Incorporated in Design of Bus Bodies

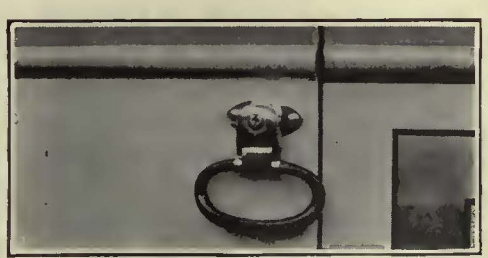
SEVERAL new features have been incorporated in the design of bus bodies recently built by the Lang Body Company. These will be mounted on International Harvester chassis and will be used in Florida. Particular attention has been paid to details affecting the width.

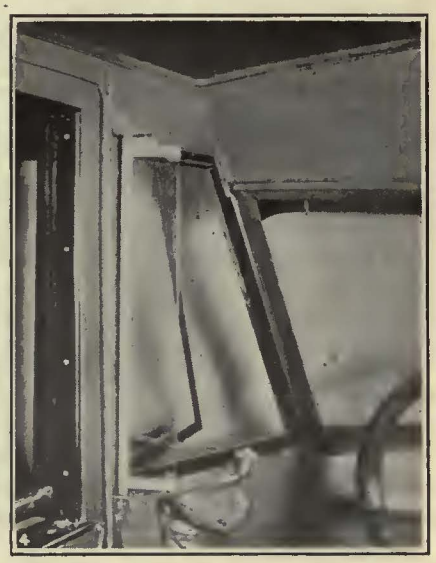
As anything which overhangs or projects from the side of the bus body adds to the effective width, the Lang company has designed a door handle which springs back flush with the side of the bus when not in use. When the handle is used it is raised and turned in the ordinary manner, but when released it immediately springs back close to the body. This handle is shown in one of the accompanying illustrations.

A grab handle has been placed conveniently alongside the entrance door, as shown in another of the accompanying illustrations. Its presence is a convenience for boarding and alighting passengers, and its location inside the body removes any temptation for the passenger to try to hold on while the bus is in motion. Placing the handle inside also tends to keep down the width.

An intermediate step between the ground and the floor of the bus is aranged in a well. This well is deeply rounded, allowing plenty of space for the step. A step light has been placed at one side and is operated automatically. The entrance door is made airtight by the use of rubber hose. This acts as a yielding washer when the door is shut.

Another new feature of this design is a wind deflector, which has been developed as the result of an idea secured from a bus driver. This driver was in the habit of sticking a piece of cardboard about 4 or 5 in. wide in the crack of the door at his left, bending the cardboard to such a position that when the wind blew in through the open front window it hit the cardboard and was deflected toward him. In warm weather this was a great relief. The wind deflector which has been installed on





Novel Features Incorporated in Recently Built Lang Bus Bodies

1. Conveniently located grab handle is mounted beside the entrance door.
2. Folding handle which springs back against the side of the bus to reduce the over-all width.
3. Rounded step well and rubber hose, which makes the door airtight.
4. Air deflector which throws the wind on to or off the bus driver.

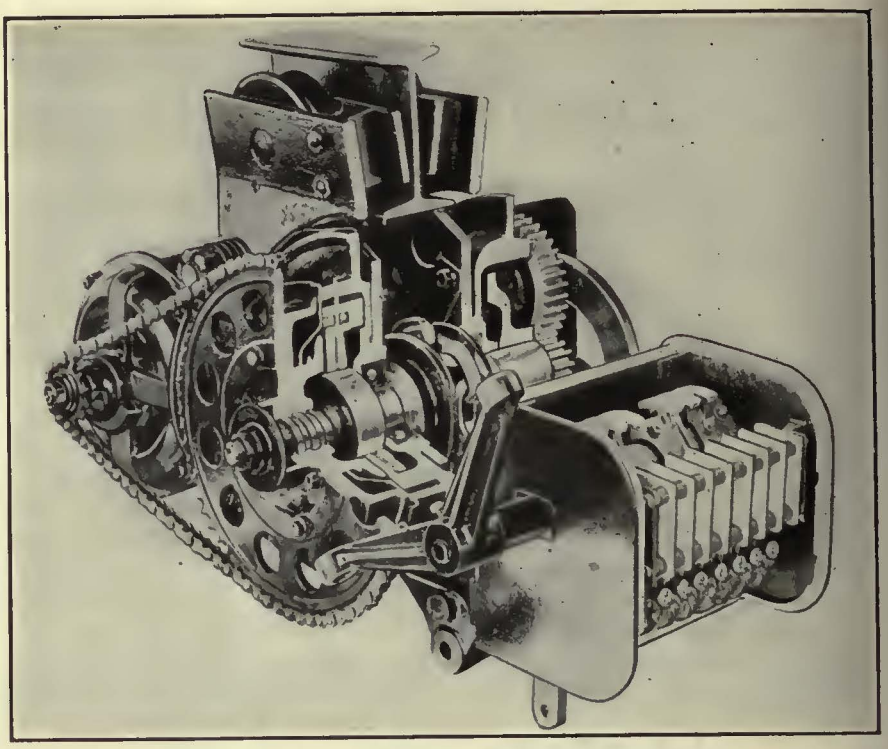
this body is of heavy plate glass, securely set in a polished nickel frame. The frame is attached to the side of the body at the driver's left, as shown in an accompanying illustration. It swings to any angle right or left, so that the driver may adjust it to derive the full effects of the breeze coming in at the front of the vehicle.

Ball Bearing Chain Hoist

LARGE chrome-vanadium steel ball bearings surrounding a massive steel load sheave reduce friction and give increased life to the Yale Model 20 B electric chain hoist just placed on the market by the Yale & Towne Manufacturing Company, Stamford, Conn. The heavy steel one-piece load sheave is ground on an arbor to give perfect concentricity for the ball races. It is bronze bushed for the driving pinion and is provided with splash lubrication to give a continuous flow of oil over the gears, pinions and bearings.

The driving pinion that passes through the load sheave is machined from a single drop forging, then heat-treated. The motor brake mechanism is provided with a large braking area, combined with heavy springs and strong supports to prevent over-travel in hoisting or lowering. The brake is operated positively by the controller handle. When the current is on the brake arms are lifted clear of the drum, so that there is no dragging or friction during the hoisting operation. When current is shut off the brake arms clamp tightly around the hoisting drum and produce a powerful braking action.

The load brake consists of a combination roller ratchet and the Yale-Weston friction disk mechanism. The roller ratchet resembles a huge roller bearing. The inner steel ratchet wheel is hardened and ground and carries six hardened and ground steel rollers, surrounded by an outer hardened and ground steel race. The load is held by the advancement of the steel rollers along the inclined wedge-shaped spaces. Small steel plungers force the rollers into a locking position the moment the hoist comes to rest. As these rollers are applied simultaneously around the entire circumference of the wheel they prevent any backward slipping of the load. The entire mechanism is continuously lubricated within an inclosed compartment.



Yale Model 20 B Ball Bearing Electric Chain Hoist

The design of the central steel suspension frame provides for rapid and easy change from trolley type to hook type hoist. The steel tie plates of the trolley are secured to the hoist suspension plates by two through bolts. These trolley side plates can be adjusted to fit I-beams of various sizes. When the hook type hoist is desired the trolley bolts and plates are removed and the hook and crosshead secured in central slots without the necessity of disassembling the hoist. When rigid suspension is desired both hook and trolley can be omitted and the suspension plate holes utilized in various ways for attachment to overhead construction.

A balance drive planetary transmission is furnished. With this type of gear system the tendency to thrust and wear the bearings apart is neutralized by the counteracting pressure due to the mesh of the intermediate gears with the internal gear. The gear housing is designed to provide a satisfactory splash oiling system.

Upper and lower limit safety stops are provided. These are mechanically connected with the controller and operate the drum brake when the load hook has traveled its limit in either direction. The current is cut off and the brakes are applied the moment the limit of travel is reached. The upper limit stop does not in itself provide maximum safety of operation, but when combined with the lower limit stop the protection is complete.

Malleable Iron Galvanized Without Embrittlement

OHIO BRASS COMPANY, Mansfield, Ohio, has developed a new metal which it has called "Flecto" iron. This is a type of malleable iron which, by virtue of a heat-treating process, is said to be freed from all tendency toward embrittlement when hot-dip galvanized. While retaining all of the desirable characteristics of malleable iron, the Flecto process so improves the metal with added valuable properties that it is considered to be practically a new metal. All malleable iron castings produced by this manufacturer during the past two years have been treated by this process.

Hot-dip galvanizing has long since been recognized as the best method of rust-proofing castings. However, ordinary malleable castings are frequently embrittled by galvanizing, and as a result, many substitute methods of rust proofing have been resorted to. Experience, however, has shown the great desirability of hot-dip galvanizing if the bad effect upon the iron can be overcome. This is said to have been accomplished in this new iron, whose main characteristic is that it always retains its malleable properties.

The News of the Industry

New One-Man Cars for Milwaukee Demonstrated

Realizing that practical demonstrations are more potent than words, the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., recently invited officers, merchants and the Councilman representing the territory to be served by one-man cars on the Walnut Street line to attend a demonstration trip, under typical operating conditions. The first of a number of new one-man cars which are to be introduced on this line were run on the trial under the direction of railway heads of the company. As a result one-man cars probably will be placed in service for six months, after which the case before the Railroad Commission in which opposition was raised to the use of the cars may be reopened.

The company plans to install 22 of the new one-man cars on this line, where seventeen are now operated. The adoption of a new shade of color embodying a deep shade of orange with ivory trimming will make it possible easily to distinguish them from the two-man cars, painted yellow. The cars will be equipped with suède seats instead of cane seats.

In explaining the extension of the use of the one-man car at the hearing in Milwaukee on Feb. 4, President S. B. Way declared that only through the economy afforded by one-man car operation can the present standard of service be maintained and that 300,000 fewer passengers were carried on the Walnut Street line in 1925 than in 1924. The purpose of the company was to disprove the city's contention that growth of the district served does not necessarily mean increased patronage and business for the company. In spite of increase in population railway earnings in Milwaukee during 1925 were $100,000 less than in 1924.

At the close of the hearing the commission announced that it reserved decision on the question of reopening the case.

Greater Differential in Fares Sought in Louisville

The Louisville Railway, Louisville, Ky., which on Feb. 1 put into effect a straight 7-cent fare, instead of a 7-cent cash fare with a 6-cent ticket fare, is now asking a cash fare of 10 cents, with tickets at fifteen for $1, or slightly under 7 cents, for a trial period of two years. It is contended that Louisville's rapid growth demands extensions of service which cannot be taken care of without an income sufficient to enable the company to market securities with which to secure funds for improvement of service. The new industrial district along the riverfront in the western section of the city has no street car connections and no prospects, unless funds can be secured to take care of the necessary installations. In the last few years there has been a rapid growth of the city toward the southeastern section, or Highlands, which has only one car line, while there is also need of new lines in the eastern section.

A tentative memorandum has been presented to the city by Churchill Humphrey, counsel for the company, and tentative ordinance terms have been given to the press by Mr. Humphrey and President Barnes, with the consent of the Mayor. The plan is to abrogate the old ordinance and create a new one, if the Council should favor the proposal.

A census completed in December by officials of the federal bureau showed a 77,000 gain in Louisville for five years, bringing the total up to more than 305,000 inhabitants, with great gains in the suburbs.

It is urged that the variance between cash and ticket fares is in favor of regular riders, who will profit by a low fare, whereas the transient and casual patrons would pay more. The working man or woman would pay less than at present, but those who contribute to the company's income only in an emergency would be penalized under the new proposal.

Franchise Question in Kansas City, Kan.

Pledges Sought from Reorganized Company Regarding Proposed Railway and Bus Services—Adequate and Better Service Promised to City Commissioners

PRESIDENT NESSELRODE of the Kansas City (Kan.) Chamber of Commerce in the first week of February appointed a committee to keep in touch with matters pertaining to the proposed franchise for the Kansas City Public Service Company, which bought the properties of the Kansas City Railways at foreclosure early last month. If the sale is approved, the new company will succeed the Kansas City Railways in the operation of the property.

The committee has recommended that the application for a franchise to operate street cars and buses in Kansas City, Kan., should be heard by city officials before a separate franchise for the operation of an independent bus system is awarded to private interests. The committee has further indorsed Frank J. Ryan, Secretary of State, in holding that the Kansas City Public Service Company should make known its intentions for the improvement of transportation facilities in this city before a state charter is granted to the company.

The services of the committee have been offered to Mayor Gordon and to William G. Woolfolk of the service company. It is stated that the committee is interested only in procuring for the city service to which its residents are believed to be entitled.

Although the sale of the railway property has not yet been approved by Judge Kimbrough Stone, referee, the Kansas City Public Service Company applied some time ago for a charter to operate in the state of Kansas. The company was refused a charter by the board on Jan. 21, on the grounds that the company had failed to specify the sort of service Kansas City, Kan., would be given. At the time of the hearing, officials of that city appeared before the board in Topeka and fought the issuance of such a charter. A hearing has been called for Feb. 17 at Topeka, when a new application for a charter will be considered.

Confirmation of the sale at auction of the Kansas City Railways by Judge Stone is expected some time in March. If and when the sale has been approved by Judge Stone, the control of the properties will immediately pass from the present receivers to the Kansas City Public Service Company, which represents the first mortgage bond holders of the old company organized to bid in the property at foreclosure.

Under the receivership, the railways company has been operating without a franchise in Kansas City, Kan., but it was explained that, were a private company to operate under similar circumstances, every member of that company would be liable for damages resulting from accident and other suits.

During the meeting at Kansas City, Kan., on Feb. 5, it is understood that Mr. Woolfolk gave Mr. Ryan and the city commissioners no definite promise as to the sort of service that city may expect in the event the sale of the properties is approved.

He is said, however, to have stated that service on the whole will be quite adequate and better than that rendered in the past.

Mr. Woolfolk expressed the probability, if a charter is granted, that the new company will place two bus lines in operation on the Kansas side. One line is tentatively planned to run from City Park and the other from State Avenue, both from Kansas City, Kan., to Kansas City, Mo. It was also promised tentatively by Woolfolk that service over the Twelfth Street viaduct, between Kansas City, Mo., and the Argentine district of Kansas City, Kan., would be resumed.

Street cars can reach the Argentine district only over that viaduct. The railway now operates a bus line over the Goddard Avenue viaduct, but passengers who do not wish to pay a 10-cent fare are forced to walk across the bridge to the other side, where they must board another street car and must transfer a second time in order to reach the business district of Kansas City, Kan.

C. D. Darnall, water and light commissioner, told Mr. Woolfolk that bus lines are not desired by residents of the Argentine district. Mr. Woolfolk promised to make a personal study of the situation in that district at an early date.

TALK OF COMPETITIVE BUSES

W. D. Pratt, local financier, a few months ago offered to establish a bus system in Kansas City, Kan., and submitted a tentative list of lines to be operated to the city commissioners, requesting a franchise. He did not ask that street cars be excluded from that city. The commissioners have delayed any definite action on his proposal until a final decision is reached by the Kansas charter board in connection with the charter for the Kansas City Public Service Company.

Apparently no agreement was reached during this latest meeting and, after setting the date for the later hearing in Topeka, Mr. Ryan returned to the capital soon after the close of the meeting.

Contract for Mozart Hill Line in Wheeling

Prospects of having the Wheeling Traction Company, Wheeling, W. Va., assume charge of the Mozart Hill line, a subsidiary of the Wheeling Public Service Company, loomed when the City Council of Wheeling adopted on Feb. 3 a contract to be presented to officials of the traction company. The contract as drafted makes many concessions as to the present franchise of the Wheeling Traction Company. The various franchises will be consolidated and unified if the contract is found favorable.

The proposition is that the Mozart Park Traction Company will be formed to serve in the capacity of a subsidiary. In exchange, the city of Wheeling, which has been operating the line since it was abandoned several months ago, will turn over all equipment for the consideration of $1. The Mozart Park company will be permitted to operate the line for a period of 75 days, and in that time, if it is found that the operation is unprofitable, the line may be again turned back to the city. The same fare as is in effect at present will be compulsory and the street cars will run between Twelfth Street and Mozart Hill, as was formerly the custom when the system was in charge of the Wheeling Public Service Company. The line will also come under the jurisdiction of the State Public Service Commission.

In connection with the operation of what was formerly a part of the City Railway system, City Manager Harvey L. Kirk in a monthly report to Council announced that during the past two months net earnings by the road had been $1,140.

City Approves Seven-Cent Cash Fare for Dallas

Increased fares for the Dallas Railway, recommended to the Council by J. W. Everman, supervisor of public utilities for the city, have been approved by the City Commission. It is his idea that the cash fare should be 7 cents with five tickets for 30 cents, with half fare and half tickets for children and school students and free universal transfer. As Mr. Everman sees it, this plan will not work hardship upon the regular riders, citizens of Dallas, as, by purchase of tickets or tokens, they will ride at the same rate as now in effect. Up to Feb. 6 the railway had not indicated its intention regarding the matter, but it was believed the company would accept the proposal. Mr. Everman says:

The 7-cent cash fare will bring increased earnings from those car riders who, of their own choice, pay the cash fare rather than purchase tickets. The 6-cent ticket fare, purchased in lots of five tickets for 30 cents, will not add to the living costs of the Dallas citizens and will be an encouragement to regular riders to purchase the tickets, thereby benefiting the company in the way of cash advanced ahead of service, more rapid movement of street cars (inasmuch as the majority of passengers will be provided with tokens or tickets), saving time making change, etc.

Mr. Everman says that for the increased fare and other considerations the Dallas Railway should be required to secure and expend new money to the amount of $1,000,000, and also to expend from the reserves for replacements the sum of about $450,000.

Mr. Everman says the Dallas Railway should agree to place an order immediately for 30 Peter Witt cars. He also says that the company, upon its acceptance of the terms and conditions of the plan, should exercise diligence in carrying out the work, promptly authorizing the City Commission to instruct paving contractors to proceed with the work of paving streets which have been, or are to be, ordered paved, as set forth in the plan, the expense of which pavement is to be partly paid by the Dallas Railway. He wants all orders for all material required for extensions placed promptly.

Mr. Everman said:

In my negotiations with the Dallas Railway the officers have expressed their desire, both now and for the future, to co-operate with your honorable body in every possible way leading up to the furnishing of a first-class transportation service for the city of Dallas, and to this end to furnish $1,000,000 new money and approximately $450,000 from reserves and to extend same to improve the property as outlined in this plan, pushing the work with all dispatch consistent with economical business methods, completing the entire plan promptly so as to give the Dallas car riders the improved service with as little delay as possible, and further to work in close harmony with the City Commission to take care of the future street car needs.

He wants this plan with the increased fare made effective immediately.

$55,000,000 Construction Budget in New Jersey

Approval of the 1926 construction budgets of public service operating companies, including Public Service Electric & Gas Company, Public Service Railway and Public Service Transportation Company, brings the total amount now authorized to be expended on the improvement of electric, gas and transportation facilities in the territory served by these utilities up to approximately $55,000,000. New authorizations for 1926 total more than $18,000,000. Construction projects already approved and to which the companies are committed make up the rest.

The completion of the great Kearny electric generation station and the Harrison gas works are the biggest single items in the program of the Electric & Gas Company, while for the railway, an order for 333 gas-electric buses, said to be the largest single order for buses ever placed at one time, heads the list.

More than half of the construction budget of the railway will be used for track reconstruction. In addition to the 333 gas-electric buses, previously provided for, the company appropriations cover new garage facilities at Camden, Hackensack and Elizabeth.

Electrification of Railroads Must Go On

Samuel Insull, president of the Commonwealth Edison Company, Chicago, in addressing the Boston Chamber of Commerce, said:

One branch of electrification must go on —that is, the electrification of the steam railroads. Only about 1 per cent of the steam railroads of the United States are electrified today. Of the 250,000 miles of steam railroad, I do not think there are more than 2,500 miles electrified. Steam railroads consume somewhere between 150,000,000 tons and 180,000,000 tons of coal a year in their operations. The figures of what they would require if electrified are so small and the saving is so great that I almost hesitate to quote them. These savings vary from about 100,000,000 tons of coal a year to 140,000,000 tons of coal a year, depending somewhat upon the conservatism of the statistician who does the figuring.

I do not mean to suggest for one moment that all the 250,000 miles of railroads in the United States can be electrified, but certainly, where there is great density of population, great density of manufacturing, and consequently great density of tonnage, they should be electrified. From the experience of electrification of the New Haven road, there should not be a steam locomotive running between Boston and New York today.

F. I. Fuller Praised by Portland Papers

Franklin Ide Fuller, first vice-president of the Portland Electric Power Company, Portland, Ore., who died on Dec. 16, was a real, constructive force in the affairs of that city. Account of this fact was taken by the Portland papers, particularly the Portland *Telegram.* That paper said editorially:

To the moral and physical growth of Portland, F. I. Fuller contributed his share. Coming here about the time Portland was discarding swaddling clothes, he grew up with the city and from the year of his arrival took an active part in its growth. Modest and unassuming in his personal and public actions, Mr. Fuller never attracted the attention many of lesser worth received, but no man with a record of 40 years of clean, upright living in a community, where tangible evidence of his moral and physical accomplishments is ever present, can entirely hide his light under a bushel.

For this reason his passing will be mourned and regretted, not only by those who worked with him in the building of the young commonwealth, but by thousands who now and in years to come will enjoy the benefits of a better Portland which Mr. Fuller helped to make.

As noted in the ELECTRIC RAILWAY JOURNAL for Dec. 19, he had been identified with the Portland Company and its predecessors since 1892.

8-Mile Road in 16,000 Town Attracts Attention

The right kind of spirit, co-operation and good fellowship was manifested recently, said the Berlin *Reporter*, Berlin, N. H., of Jan. 21 when the management of the Berlin Street Railway gave a banquet to its employees at Georges.

The interior of the room was decorated to suit the occasion, namely, to represent a street car. As one approached this room or car he was confronted with a metal blue sign that said "Car stops here," and near at hand was another, "Parking 30 minutes only." Inside was a regular carfare register, and bells completely installed, together with other street car signs, made it look like a real street car and was very appropriate. The people inside did not show much respect for the "No smoking" signs, but thought the refreshments were very satisfactory.

After the train order was run through and the fuel and ballast were put away and the headlights were shining brightly the men expressed their appreciation for the kindness shown them by the Berlin Street Railway.

Later a reporter visited the manager. He stated that the Berlin Street Railway feels that it is most fortunate in the high type of men in its service, in their devotion to public service and in the good relations that exist between the management and men.

The company is a strong believer in the principle that the public is reasonable, and even generous, when it is truly acquainted with the conditions and problems of the street railway.

The *Reporter* said:

> We wish to congratulate the officers of the Berlin Street Railway in their get-together banquet. This is a very good policy and leads to good results. A few years ago complaints in regard to the Berlin Street Railway were numerous, both in this newspaper and on the street. With their record of service as given to the public at the present time, they should be receiving at least 25 compliments to one of an adverse nature.

Jacksonville Votes on Railway Issue April 13

Voters of Jacksonville, Fla., will decide on April 13 whether they desire to own the Jacksonville Traction Company. This date was set by the City Council on Jan. 11 for the special election at which a $4,000,000 improvement program will be submitted to the people for approval. The election will determine whether the city shall acquire the railway by purchase. No mention will be made on the ballot of the price to be paid by the city.

Situation in Shreveport Acute

The Shreveport Railways, Shreveport, La., continues to face a crisis of inadequate revenues on account of a low rate of fare. The rate for adults is less than 6 cents. The company has asked the Public Service Commission for permission to increase its fares slightly to net sufficient to cover operating expenses and leave a small margin of profit. This petition is now pending. In addition to that precarious position, a jitney ordinance adopted by the City Council of Shreveport has resulted in only diminishing the number of jitneys. The Shreveport Railways system last year carried more than 11,000,000 passengers, counting adult fares, school children and transfers.

Chautauqua Institution Refuses to Finance Line

The executive board of Chautauqua Institution, at a meeting at Albany on Jan. 30, expressed the opinion that the institution would not be warranted in investing its funds in aid of the Chautauqua Traction Company with a view to continued operation of the line beyond the 60-day period arranged by the school authorities. The executive board approved the action of officers in agreeing that Chautauqua Institution pay to the school board of the Chautauqua school district No. 3 one-half of such deficit as may arise in the emergency and modified operation of the trolley line, in accordance with the guarantee agreement of the school board with the Chautauqua Traction Company, provided this sum does not exceed $1,500 over the 60-day period from Jan. 11, 1926. The officers of the institution and the trustees did not anticipate that the abandonment of the railway would have a serious effect upon the attendance at the institution or upon the convenience of its summer patrons. The institution stated that arrangements would be completed as soon as possible for readjusting the passenger, baggage and freight facilities for the changed conditions. The agreement to continue the line for 60 days has been referred to previously.

Would Make Tax Value Basis for Rates

A bill in relation to fixing rates, fares and charges to be exacted by public utility corporations has been introduced in the Senate and Assembly by Minority Leaders Downing and Bloch.

The bill adds a new section, 24-A, to the public service commission law and provides that the commission shall consider the assessed valuation of the properties of the company upon which their income, franchise, corporation and other taxes are based as such information is filed with the State Tax Commission in fixing any rate, fare or charge. It also provides that the commission may go back to all decisions rendered since Jan. 1, 1921, and reopen the same, and may give consideration to the assessed valuation of the properties of the corporations. The Tax Commission is required under the provisions of the bill to furnish all information in its possession to the commission, such information now being confidential and not available to the rate-making body.

News Notes

Rehearing on Track Work Denied.—The Public Service Commission denied on Feb. 8 the petition of the International Railway, Buffalo, N. Y., for a rehearing on its recent order directing certain track reconstruction work to be done in Buffalo.

Hearing Set on Utica Increase.—A hearing will be held before Chairman William A. Prendergast of the Public Service Commission at Albany on Feb. 17 on the petition of the New York State Railways for permission to charge an increased fare in Utica and vicinity. The company now is charging 7 cents. The petition asks permission to charge 10 cents cash or ten tickets for 75 cents.

Thrift Ideas to Be Rewarded.—The Southern Public Utilities Company, Charlotte, N. C., will offer three prizes of $5, $3 and $2 respectively to its employees for the best thrift letters to be published in the February number of the Southern Public Utilities Company's magazine. The letters should relate to a practical thrift problem.

Offices Moved.—Executive offices of the International Railway, Buffalo, N. Y., are to be moved from the Littell Building at Franklin and West Huron Streets. The main executive offices will be taken to the D. S. Morgan Building, but the claims department will be shifted to the Virginia Street carhouse in Main Street. The new locations will save the International Railway a large sum of money in rentals each month over those now paid.

Fare Increase Sought in Ironwood.—The Lake Superior District Power Company has asked the City Commission of Ironwood, Mich., to join with it in submitting a proposal to the Public Utilities Commission for adjusted street car rates in Ironwood. The City Commission will take action after giving Walter Hodgkins, general manager of the company, a hearing. According to an audit, submitted by the company, the net deficiency for the year just ended was $48,928 when consideration is given to interest on investment at 4 per cent, operating expenses and depreciation on property of 3 per cent. The company, about two years ago, rehabilitated the system in Ironwood at an expenditure of $221,465 and during 1925 was $19,749 short of meeting its operating expenses. It is now operating with a 5-cent fare in Ironwood and a 6-cent fare in Hurley, Wis., just across the state boundary.

Remodeled Cars Given Trial.—The first of 24 street cars of the Indianapolis Street Railway, Indianapolis, Ind., being rebuilt and equipped with devices so the cars may be operated by one man has been given a trial run. The cars will be equipped with stop lights in addition to other features. Passengers enter from the front but leave by the rear. When the rush hours come it will be possible for a conductor to stand at the door, collect the fares quickly and then alight and let the car proceed as a one-man car.

To Pay with Check in Louisville.—As a protection to the paymaster and the employees themselves, the Louisville Railway, Louisville, Ky., will hereafter pay its trainmen by check instead of cash. The notice announcing the change refers to the risk from highwaymen as well as the likelihood of losing the money.

Sunday Pass for Allegheny Valley.—The Allegheny Valley Street Railway, a subsidiary of the West Penn Railways system, was to install an unlimited-ride transferable Sunday pass for 50 cents effective Feb. 7. The pass will be available for any and all of the eight zones between Aspinwall (Greater Pittsburgh) and Natrona. Operation of this railway, however, is divided into a six-zone division between Aspinwall and New Kensington and a two-zone division between New Kensington and Natrona. The standard fares are 8 cents cash and 6¼-cent tickets per zone, but there is also a variety of commutation rates.

Opening of New Systems into Yonkers.—The first train was run into Yonkers, N. Y., on Feb. 7 on the recently electrified Yonkers branch of the Putnam Division of the New York Central Lines. A committee headed by Mayor William A. Walsh met the trains.

Fifth Traffic Plan Submitted in Baltimore.—The Baltimore, Md., Traffic Survey Commission held its final public hearing on Feb. 3 for the discussion of plans to reroute some of the lines of the United Railways & Electric Company. The four plans submitted by Kelker, De Leuw & Company, Chicago experts, were considered and a fifth plan was submitted to the committee. The new plan was prepared by the Retail Merchants' Bureau of the Baltimore Association of Commerce and several of the various trade organizations in the downtown section of the city. This plan was drawn with the view of eliminating some of the objections which were voiced at previous hearings and is to be considered by the commission in preparing its final draft.

Aid of Merchants Enlisted.—The question of transportation and traffic in Jamestown, N. Y., and vicinity was discussed at a dinner given by officials of the Jamestown, Westfield & Northwestern Railroad for 250 manufacturers and merchants of Jamestown on Jan. 25. Robert H. Jackson, one of the three administrators of the estate of the late Sheldon B. Broadhead, set forth in detail the serious financial situation which confronts the Jamestown, Westfield & Northwestern. He made a plea for increased passenger business and suggested that merchants divert to it a share of their freight business under the through freight rates established by the Jamestown, Westfield & Northwestern in connection with the New York Central Lines, the Pennsylvania Railroad and the Nickel Plate Road. Some few years ago the Jamestown, Westfield & Northwestern Railroad suffered a decline in its interurban passenger business and in the hope of recouping its losses in 1923 started a through system of freight handling. The plan was outlined in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 21, 1925, page 924.

Recent Bus Developments

Another Bus Report in New York City

With a recommendation that the Board of Estimate and Apportionment first determine a policy of awarding omnibus franchises on a basis of either city-wide, borough-wide or system operation, on the best possible terms for the city and satisfactory service to the traveling public, the Board of Transportation of New York City has filed with the Board of Estimate its fifth report on pending applications for bus grants.

The board makes no recommendation as to which of the petitioners should be granted a franchise, as it was not directed to do so by the Board of Estimate, but it is prepared, the report states, to make such recommendations, without delay, if the board so desires.

The report restates a summary of facts as to previous applications and as to nine new or amended applications for franchises to operate bus lines. It again points out the necessity for securing satisfactory service at a 5-cent fare as far as possible.

The report favors a franchise grant borough-wide in area or by systems made up of contiguous territory, where most of the travel is in one community, or between areas that are developing as communities.

New Haven Operates Buses Over 777 Miles of Road

President Pearson of the New York, New Haven & Hartford Railroad announces that the railroad is now operating buses over 777 miles of road and in addition to this is operating gasoline rail cars on 567 miles of rail. He says that in the development of modern transportation, automobile operation over the public highways has become a factor. At the beginning there was some doubt in the minds of the railroad officials whether the New Haven Railroad could afford, in view of its limited financial condition, to invest in this new transportation facility. As time went on it became apparent the company must be in a position to protect itself from further diminution of revenue through the taking away of passengers by automobiles. In many instances, he says, the beginning of highway operation by the railroad means better transportation service for communities than they ever had before. Until Mr. Pearson made this statement there was little realization on the part of the public of the extent to which the railroad had gone in its plans for coordinating steam, electric railway and bus transportation.

Date Set for Hearing on Buffalo Buses

Tameling, Keene & Company, New York, who are said to have completed plans for financing the 5-cent bus service in Buffalo for which Ernest M. Howe, Detroit, has secured a franchise from the municipal authorities, have informed the New York State Public Service Commission that all details of the plan will be outlined to the commission on Feb. 15. The state utilities board previously had granted two adjournments to Mr. Howe and his associates so the financing plans could be worked out.

Opposition to the Howe lines will be entered by the Buffalo Chamber of Commerce, the Buffalo Federation of Business Men's Associations and the International Railway, which is operating three bus routes in Buffalo under a subsidiary, the International Bus Corporation. The opposition contends that the 5-cent buses to be run over thirteen routes covering 71.5 miles of operation will have a very serious effect upon the local railway, which operates on an 8-cent fare or two tokens for 15 cents. The proposed bus routes would parallel many of the existing car lines.

Missouri Commission Cannot Rule on Bus Fares

The Missouri Public Service Commission ruled on Feb. 2 that it had no jurisdiction over bus lines operated in the state and under the public service law was without power to regulate such utilities. The decision was on the application of the Springfield Traction Company, Springfield, Mo., which had sought permission to increase bus fares from 5 to 7 cents to conform to the fare charged by its street cars. The application was filed on Dec. 16, last. The petition pointed out that the buses were operated at a loss of $49,003 during the period Sept. 1, 1924, to Sept. 30, last.

The application was the first of its kind ever received by the Missouri Public Service Commission. It was thought that the commission might have jurisdiction because the buses are being operated in conjunction with the railway system. The Springfield Traction Company has exclusive bus rights in Springfield under a city ordinance.

Many Applications for Bus Rights in Brooklyn

Applications of fourteen companies for franchises to operate bus lines in Brooklyn were submitted on Feb. 1 to the Board of Estimate of New York City by its division of franchises and considered by the board in committee of the whole. Action was deferred until the committee meeting on Feb. 15 to give the members time for consideration. The question of bus operation is closely allied with the general transit problem and will be considered by Mayor Walker in his conferences with the members of the Transit Commission and the Board of Transportation. So far as is known none of the companies is affiliated with any of the railways operating in the territory to be covered by the routes of the applicants.

Twin City Company Expands in Bus Field

The Twin City Rapid Transit Company, Minneapolis, Minn., through its subsidiary corporation, the Twin City Motor Bus Company, now owns all the bus lines carrying passengers between Minneapolis and St. Paul, in addition to some suburban routes. This has been accomplished by the purchase of the third and last interurban bus line, the Minneapolis & St. Paul Bus Line, Inc., operating twelve buses. With the Twin City Motor Bus Company line and the American Auto Transit Company line, previously acquired, the railway now operates buses between the Twin Cities on three major traffic routes.

The Twin City Motor Bus Company is putting seven new buses in service on interurban lines. The bodies, built at the Eckland Body Company shops, are on Mack (International) chassis. The railway company now has 84 buses.

Net revenues on the buses over the 7½ per cent return allowed on the railway investment will be turned over to the street car companies. Thus the railway has taken over bus lines that were eating into the revenues of the electric companies and may get additional revenue from the bus lines.

Indiana Decisions Apparently in Conflict

The Superior Court at Terre Haute, Ind., has handed down a decision upholding the state law enacted by the last Legislature providing that buses operating in cities must secure certificates of necessity and convenience from the Indiana Public Service Commission. The ruling came on the hearing of a petition of the Terre Haute, Indianapolis & Eastern Traction Company for an injunction against nineteen bus operators. Counsel for the bus men argued that a license issued by the City Council was a contract which took precedence over the state law, but the court ignored this construction of the statute. The railway also asked for an accounting from the operators and a judgment for the sums that were received by them for carrying passengers since the passage of the new law.

At about the same time came another decision from Hammond, Ind., in the Lake County Superior Court of a somewhat different nature. The court ruled that certificates of the Public Service Commission permitting operation of buses within cities cannot supersede city ordinances. The opinion denied the petition of the Gary Street Railway to enjoin the city from enforcing an ordinance prohibiting such transportation. The court held that cities have an inherent right to regulate transportation facilities within their own limits.

Permission Sought for New Line.—The Philadelphia Rapid Transit Company, Philadelphia, Pa., recently applied to the Public Service Commission for permission to remove its tracks from Race and Vine Streets between Second and 23d Streets, Philadelphia, to make room for an authorized bus route. Commissioner Benn, who heard the application, said he would recommend approval. The commission rejected a similar application several months ago because of a clause in the councilmanic ordinance covering the city and the P. R. T. agreement which would have given the railway the exclusive right to operate over these streets. That clause was eliminated in the application presented on Feb. 4. The company also applied for permission to establish a bus route to serve East Germantown and Logan.

Boston Bus Line Extended. — The Boston Elevated Railway, Boston, Mass., has extended its bus line being operated between Kendall Square and Bowdoin Square to Lafayette Square. This change in routing became effective on Feb. 1.

Line Discontinued—Would Run Buses.—The Grand View Railroad, a 6-mile line in Kirkwood, near St. Louis, Mo., has been discontinued. The St. Louis Bus Company, a subsidiary of the United Railways, has asked the St. Louis Board of Public Service to substitute buses for the cars. The route the bus company would operate is 2 miles. The buses would connect with the Broadway and Bellefontaine Street car lines.

Petitions for Bus Substitution.—The Menominee & Marinette Light & Traction Company has petitioned the Marinette, Wis., Common Council to replace its Hall and Pierce Avenue street cars with buses. In presenting the company's case before the Council, A. J. Goedjen, general manager, stated that traffic on this line was only about 75 per cent of the figures established three years ago and that the line had shown no profit in 1925.

Bus Line Serves Useful Purpose.—The Portland Electric Power Company, Portland, Ore., is putting on transfer buses to serve the Eastmoreland district and Reed College, joining the Error Heights car line and others. The run is about 2 miles. The bus line eliminates the railway traffic on a one-way viaduct.

New Line in Northwest St. Louis.—The St. Louis Board of Public Service on Feb. 2 voted unanimously to grant a permit to operate a bus line in Northwest St. Louis to the St. Louis Bus Company, a subsidiary of the United Railways. The bus line will use Natural Bridge, Marcus, Kingshighway Northeast and Florissant Avenues, and will provide transportation for a new territory that has not adequate street car facilities. A 10-cent fare will be charged with transfers to connecting street car lines. S. W. Greenland, representing the reorganization committee of the United Railways, presented to the board a petition signed by 900 residents of the district asking for the service. About fifty home owners were on hand to support the application.

Bus Expansion by East St. Louis Line.—The Red Line Motor Bus Company, an auxiliary of the East St. Louis & Suburban Railway, is now operating two buses each way daily between Greenville, Ill., and St. Louis, Mo., via the Eads Bridge. In addition, two other buses will run from Greenville to Collinsville each way, making connection with the suburban street cars in Collinsville.

Cross-town Line in Fond Du Lac.—Permission to operate a cross-town bus line, has been sought of the City Commission of Fond Du Lac, Wis., by the Wisconsin Power & Light Company. This proposed city bus system would work in harmony with the company's railway with interchangeable transfers. If operating conditions justify the service will be extended to other parts of the city which do not now enjoy transportation service. To obtain the sentiment of residents living in the districts on routes and schedules the company is conducting a city-wide house-to-house survey. Equipment which the company proposes to use would comprise buses of the street car type.

New Service Started. — The Los Angeles Motor Bus Company, a subsidiary of the Pacific Electric Railway and the Los Angeles Railway, started the operation of buses on Riverside Drive, Los Angeles, Cal., on Feb. 1. The line extends from Dayton Avenue and San Fernando Boulevard along Riverside Drive to Whitmore Avenue and Alessandro Street. A connection will be made with certain Los Angeles Railway and Pacific Electric cars. The line will skirt the bottom of the Elysian Park Hill. The fare is 10 cents with transfer privilege to and from the railway cars.

International Application Held Up.—Plans of the International Bus Corporation, a subsidiary of the International Railway, Buffalo, to start a bus line in Richmond Avenue on a similar basis as the other three local bus lines are being held up. The delay is due to the hearing by the Public Service Commission on the application of Ernest M. Howe, Detroit, for permission to operate thirteen bus lines over 71.5 miles of streets at a 5-cent fare under the franchise obtained from the City Council last fall. The International also plans the extension of its Delaware Avenue bus line from the Buffalo-Kenmore city line to the north village line of Kenmore at an additional 5-cent fare or the sale of round-trip tickets for 25 cents. The fare inside the city is now 10 cents.

Opposes Bus Routes.—The Hartford & Springfield Street Railway, through Harrison B. Freeman, receiver, appeared recently in opposition to the petitions of the New England Transportation Company to operate bus routes between Hartford and Broad Brook, Conn., and between Hartford and Suffield, Conn. The New England Transportation Company, however, was authorized to operate and started its service on Jan. 17. Mr. Freeman declared the lines might prove an entering wedge toward direct competition for his company.

Bus Stock Increased. — The Public Service Transportation Company, a bus subsidiary of the Public Service Railway, Newark, N. J., filed an amendment to its certificate of incorporation with the Secretary of State on Jan. 28 increasing its authorized capital stock from 1,000,000 to 1,500,000 shares of no par value. The increase was authorized at a directors' meeting Jan. 12 and ratified at a subsequent stockholders' meeting.

Financial and Corporate

Reappraisal Suit at Rochester to Be Heard in March

Trial of the reappraisal suit brought by the city of Rochester, N. Y., to determine the valuation of the Rochester lines of the New York State Railways is scheduled for the equity term of Supreme Court, Justice Stephens presiding, on March 3.

Clarence M. Platt, corporation counsel for the city, and the law firm of Harris, Beach, Harris & Matson, for the railways, already are marshaling their arguments in this long-standing legal controversy.

The Common Council rejected the compromise offer of the traction company to lop off $1,400,000 from the base valuation of $19,216,000 as originally fixed in the service-at-cost contract under which the railway operates in the city.

The city's position is that war time prices prevailed in the appraisal and that the valuation as fixed then is excessive. The decision of the Appellate Division, Third Department, in the certiorari proceeding to review the rates charged by the Peoples Gas Company of Oswego is being studied as bearing on the Rochester case.

In this decision the court held that the Public Service Commission was in error in not allowing value as a going enterprise and in not considering the good will of the properties. These points were not considered in the Rochester appraisal.

James F. Hamilton, president of the New York State Railways, contends that the proceeding will result in establishing a higher valuation for the Rochester properties. He declared that the company's offer of settlement was solely to avoid litigation costly to all parties concerned.

Mr. Fitkin Comments on Newport News Purchase

According to A. E. Fitkin, president of the National Public Service Corporation, 80 per cent of the preferred and common stocks of the Newport News & Hampton Railway, Gas & Electric Company has been acquired. The price paid for these stocks is understood to have been $110 a share. As indicated previously in the ELECTRIC RAILWAY JOURNAL the properties just taken over will be combined with the Virginia-Western Power Company, Virginia-Northern Power Company and other Virginia holdings of the Fitkin interests in a Virginia operating company which will be a subsidiary of the National Public Service Corporation.

Acquisition of the Newport News & Hampton Railway, Gas & Electric Company will add more than $2,000,000 to yearly gross revenues of the National Public Service Corporation. The Newport News company serves without competition a population of about 60,000 over a territory of 14 miles, extending from Old Point Comfort on the eastern end of the peninsula through the towns of Phoebus and Hampton to Newport News. The territory is almost entirely industrial, the largest single industry being the Newport News Shipbuilding & Dry Dock Company.

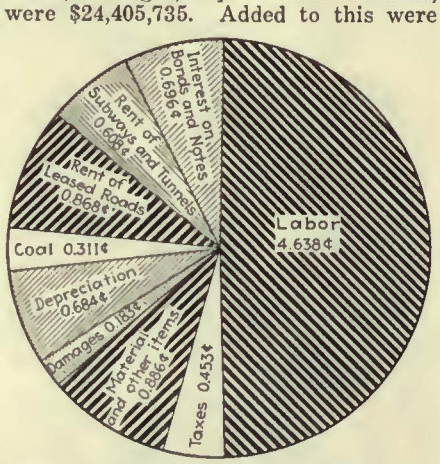
In commenting on this purchase, Mr. Fitkin said:

> Our engineers consider the Newport News & Hampton Railway, Gas & Electric Company one of the finest properties from the standpoint of physical efficiency they have examined in a long while, and we believe the territory served has recovered from the after effects of the war and is launched upon a great era of expansion and prosperity. The property has been ably managed, public relations are excellent and the company will form an important link in our Virginia operations. The company will be under management of the General Engineering & Management Corporation.

$502,195 Net for Boston Elevated

Seventh Annual Report of Public Trustees Makes a Remarkable Showing —Bus Business Growing—Statistics of Operation Deserve Careful Study—Gratifying Increase in Riding

THE Boston Elevated Railway, Boston, Mass., which is operated by public trustees, has just presented its annual report to the Massachusetts Legislature. The period covered is the year 1925. The trustees show $502,195 as the balance of receipts above cost of service. In 1924 there was a deficit of $636,696. The total receipts for the year were $34,547,379. This is the largest amount during the five years that are compared in the report. The operating expenses, such as wages, material, damages, depreciation and fuel, were $24,405,735. Added to this were taxes, rents, interest and miscellaneous items to the amount of $34,045,185. The number of revenue passengers carried in 1925 was 365,036,286, a reduction of 17,852,562 from last year.



Average Receipts per Revenue Passenger, 9.461 Cents. Cost of Service, 9.327 Cents per Revenue Passenger

The report shows that of the loan assessment of 1919 it paid back to the contributing cities and towns only $20,581 last year, as against $1,114,557 in 1924. On this loan the sum of $2,327,816 is due to the cities and towns of Boston, Cambridge, Somerville, Brookline, Medford, Malden, Everett, Watertown, Arlington, Chelsea, Newton and Belmont. In the reserve fund there is $637,797, compared with $176,868 one year ago.

Close supervision of expenditures was necessary to reach this result. Basic wage rates of 72½ cents an hour for surface motormen and conductors, established by the 1924 arbitration award, were continued unchanged by the arbitration board of 1925, but the board increased the differential for one-man car and bus operators from 8 cents to 10 cents an hour above the basic rate.

In order to meet the situation created by the 1924 award the repair shops were operated throughout the greater part of the year on a five-day week, track reconstruction was reduced somewhat below the average amount necessary, car mileage operated was reduced 500,000, one-man car operation was considerably increased and many lesser economies were put into effect.

Reduction in cost of power and cost of accidents, together with an increase of $386,716 in operating revenues, materially assisted in reaching the favorable result shown.

The increase in bus transportation is shown by the following table of miles operated:

1922	63,937
1923	465,382
1924	890,901
1925	2,472,456

At the present time there are 25 routes in operation employing 157 buses. In connection with this business the chartering of special buses in place of special cars and supplementary to special car service is being developed. Last year the revenue from this special bus service was $15,130.

On the subject of buses the trustees say in part:

"It was early decided that the public would best be served by seeking to discover where bus service would be desirable and then supplying it in conjunction with rapid transit and surface electric lines. In large metropolitan centers better and more economical transportation can in general be supplied by electric cars, but upon lines where traffic is not sufficient to warrant the heavy investment in track and electric system or where streets are so narrow or congested by vehicular traffic that the electric car is continuously blocked and delayed in its passage the bus fills an important place.

"If competing bus lines were established within the area served by the railway system operated by this board in behalf of the commonwealth the revenue of passengers so diverted would constitute a direct loss to the

COMPARATIVE DIVISION OF RECEIPTS AND EXPENDITURES OF THE BOSTON ELEVATED RAILWAY FOR YEAR ENDED DEC. 31

	1925	1924	1923	1922	1921
Total receipts	$34,547,379	$34,175,319	$34,096,813	$32,699,176	$33,277,025
Operating expenses:					
Wages	16,931,549	17,358,670	16,224,275	14,772,340	15,563,255
Material and other items	3,175,981	3,203,378	3,236,805	2,903,650	3,093,934
Injuries and damages	666,488	740,025	822,775	555,355	518,249
Depreciation	2,496,000	2,496,000	2,004,000	2,004,000	2,004,000
Fuel	1,135,715	1,424,058	1,842,396	1,853,111	1,663,617
Total operating expenses	$24,405,735	$25,222,133	$24,130,253	$22,088,458	$22,843,056
Taxes	1,652,517	1,623,995	1,688,139	1,587,186	1,546,758
Rent of leased roads (including dividend rental under chapter 159, Acts of 1918)	3,169,448	3,175,566	3,185,577	3,646,595	4,203,061
Subway and tunnel rents	2,217,470	2,125,593	2,026,936	2,008,414	1,963,737
Interest on bonds and notes	2,540,909	2,602,891	2,316,026	1,891,315	1,494,258
Miscellaneous items	59,104	61,835	70,247	65,016	54,707
Total cost of service	$34,045,185	$34,812,016	$33,417,181	$31,286,987	$32,105,580
Loss for year	.....	$636,696	.....	.....	.....
Gain for year	$502,193	.....	$679,631	$1,412,189	$1,171,444

Profit and loss items not included in above.

commonwealth, to which accrues all receipts after payment of expenses. In addition to that loss the service furnished to the public would be impaired. Consequently, this board has consistently taken the position that no competing bus lines should be permitted within the territory served by this system and has adopted the policy of standing ready to furnish bus service within that general territory wherever it appeared in the public interest that bus service should be given. By this method better transportation is supplied, since with street cars and buses under one management the service given by each can be co-ordinated and used to improve instead of to injure the service given by the other. Free transfer from car to bus and vice versa is possible under such a unified system."

During the year new garages accommodating 56 buses each were constructed at the Arborway near Forest Hills and on Salem Street, Medford, and the first unit of the Lotus Place car repair house has been practically completed.

A prepayment station has been constructed at Egleston Square and an area provided at Kendall Square for interchange between Cambridge subway trains and buses operating from this point.

During the year actual construction of the Dorchester tunnel extension was begun by the Transit Department of the city of Boston. The first section of the work has been completed and substantial progress made upon the second section.

More than 13 miles of track and special work have been rebuilt and 2.31 miles extensively repaired.

All-night service of cars in the Boylston Street subway has been started and a system of stopping cars at particular berths has been put into effect in subway stations.

In order to encourage parking of automobiles outside of the congested centers and inducing such riders to make their journey into the city by rapid transit, land located near the Everett Terminal was leased for storage purposes. Direct connection of a large garage adjacent to this land with the Kendall Square station of the Cambridge subway awaits action by the Legislature authorizing the Department of Public Utilities to act for the commonwealth in giving necessary permission.

On the subject of rolling stock the trustees say:

"It is interesting to note that of the 82,450 cars in the United States 34 per cent are more than twenty years of age, while on the Boston Elevated only 12.7 per cent of the passenger cars now in service are more than twenty years old."

Sixty cars of the Cambridge subway type have been ordered to provide for operating the Dorchester Rapid Transit extension when completed. Ninety new No. 5 type cars of an order of 100 placed in July, 1925, have been received and placed in service.

For several years past the board in its annual reports and before committees of the General Court has called attention to existing limitations upon the raising of new capital for essential improvements of the railway. The board still believes the General Court should provide means for raising new

ALLOCATION OF ASSESSMENT ON CITIES AND TOWNS OF BOSTON ELEVATED DEFICIT YEAR ENDED JUNE 30, 1919

History of the 1919 Loan Assessment on Cities and Towns (Chapter 159, Special Acts 1918)

Cities and Towns	Passengers	Per Cent	Amount	Distribution of July, 1922, Repayment	Distribution of July, 1923, Repayment	Distribution of July, 1925, Repayment	Balance Due
Boston	2,100,423	71.9330	$2,863,042	$372,034	$790,029	$14,902	$1,686,075
Cambridge	283,475	9.7081	386,397	50,209	106,622	2,011	227,553
Somerville	122,583	4.1981	167,090	21,712	46,106	869	98,402
Brookline	74,553	2.5532	101,621	13,205	28,040	528	59,846
Medford	59,754	2.0464	81,449	10,583	22,475	423	47,966
Malden	55,838	1.9123	76,112	9,890	21,002	396	44,823
Everett	54,823	1.8775	74,727	9,710	20,619	388	44,008
Watertown	41,198	1.4109	56,155	7,297	15,496	292	33,070
Arlington	32,477	1.1122	44,267	5,752	12,215	230	26,069
Chelsea	29,659	1.0157	40,426	5,253	11,154	210	23,807
Newton	27,201	0.9316	37,079	4,818	10,231	193	21,836
Belmont	18,746	0.6420	25,552	3,320	7,051	133	15,047
Quincy (Comm. of Mass.)	15,569	0.5332	21,222	2,757	18,464	.....	.....
Stoneham (Comm. of Mass.)	3,674	0.1258	5,007	650	4,356	.....	.....
*Commonwealth of Mass.	.....	.....	.....	.....	690	.....	†690
Totals	2,919,973	100.00	$3,980,151	$517,196	$1,114,557	$20,581	$2,327,816

Based on traffic counts made July 24, 25, 26, 27, 1919, in accordance with the provisions of Section 14, Chapter 159, Special Acts 1918.

* From the July, 1923, repayment, the commonwealth of Massachusetts deducted $690.24 to reimburse itself for the difference between 126 days interest at 4.28 per cent on $4,000,000 (Note issued July 17, 1919, due Nov. 20, 1919) and $3,980,151.67, the amount paid to the B. E. Ry. Co. $297

And interest from July 17, 1919, to July 19, 1923, on amount the state deducted to pay assessment of Quincy and Stoneham 392

Amount of expense to state to be assessed to towns and cities pro rata to their original contribution $690

† Credit.

STATEMENT OF REVENUE PASSENGERS CARRIED BY BOSTON ELEVATED RAILWAY

	5c. Fares	6c. Fares	7c. Fares	8c. Fares	10c. Fares	Pupils' Tickets 5c.	Special Car and Special Bus Passengers (*See Note*)	Total Revenue Passengers	Present Yearly Increase
1917—Year ending Dec. 31	380,819,242	.....	.....	.....	.....	.....	198,096	381,017,338	1.99
1918—Year ending Dec. 31	217,203,899	.....	102,619,954	28,739,858	.....	.....	100,989	348,664,700	*8.49*
1919—Year ending Dec. 31	886,034	.....	.....	173,808,769	146,162,131	3,803,815	97,936	324,758,685	*6.86*
1920—Year ending Dec. 31	3,846,989	.....	.....	.....	326,496,184	5,105,588	77,800	335,526,561	3.32
1921—Year ending Dec. 31	23,915,742	.....	.....	.....	307,624,243	5,606,105	105,990	337,252,080	0.51
1922—Year ending Dec. 31	71,425,347	.....	.....	.....	279,851,313	5,213,664	103,618	356,593,942	5.73
1923—Year ending Dec. 31	94,170,518	.....	.....	.....	283,660,762	4,214,132	104,285	382,149,697	7.17
1924—Year ending Dec. 31	85,218,867	9,549,775	.....	.....	283,569,003	4,443,228	107,975	382,888,848	0.19
1925—Year ending Dec. 31	3,853,807	55,937,785	.....	.....	299,107,782	6,003,917	132,995	365,036,286	*4.66**

5-cent fare previous to Aug. 1, 1918.
7-cent fare Aug. 1, 1918.
8-cent fare Dec. 1, 1918.
Pupils' tickets (5-cent) Jan. 1, 1919.
10-cent fare July 10, 1919.

First 5-cent fare line (without transfer) Aug. 23, 1919.
First 5-cent local fare line March 26, 1921.
5-cent fare for children under fourteen years (not including children under five years) June 14, 1922—discontinued Nov. 5, 1924.
6-cent local fare Nov. 5, 1924.

Note—Previous to 1908 special car passengers included with 5-cent fares.

*During the years 1922, 1923 and 1924, one passenger making a single journey for which he might pay two 5-cent fares was counted as two revenue passengers. The substitution in November, 1924, of 6-cent tickets for 5-cent cash fares has often resulted in the payment of a 10-cent fare by such a passenger with a consequent reduction in the company's figures of total revenue passengers carried, though the gross passenger revenue for the year 1925, which increased $371,269, would indicate substantially the same number of passengers carried by the railway in 1925 and 1924.

Italics denote decreases.

capital. That matter has been recently considered by a special recess commission in a report now before the state law-making body. The trustees say that pending consideration of that report by the court the board feels that it should confine itself to operating the railway at the highest efficiency possible with existing facilities and such property as can be purchased from time to time from the allowance to offset the annual exhaustion of the depreciable property.

The average pounds of coal consumed per kilowatt-hour direct-current at the cars was 1,973 in 1925 compared with 2,068 last year. This is the lowest of any year in the history of the railway. The average cost of coal per ton during 1925 was $5.22, compared with $5.921 last year, and is also the lowest since 1917. There was a reduction of 23,078 tons of coal burned as compared with 1924.

An improvement has been made during this year in the accident record. Operating charges on this account were reduced from $914,043 in 1924 to $846,235 in 1925.

ACCIDENTS PER MILLION CAR-MILES

	1925	1924
One-man cars	204	205
Two-man cars	245	249

The seventh full year of public operation closed on June 30, 1925, with a balance of receipts over cost of service of $20,581. This amount was repaid to the cities and towns served by the railway.

STATEMENT OF RESERVE FUND OF BOSTON ELEVATED RAILWAY ON DEC. 31, 1925

Balance Jan. 1, 1925		$176,868
Excess of receipts over cost of service:		
January	$269,649	
February	118,183	
March	211,955	
April	130,636	
May	139,081	
October	117,703	
November	45,265	
December	289,343	
	$1,321,820	
Excess of cost of service over receipts:		
June	$25,792	
July	249,477	
August	367,593	
September	176,763	
	$819,628	
Excess for the year of receipts over cost of service		502,191
		$679,060
Amount refunded to commonwealth of Massachusetts, July 1, 1925		20,581
		$658,478
Profit and loss items, Dr		20,680
Balance—Dec. 31, 1925		$637,797

STATEMENT OF SPECIAL TRUST FUND OF BOSTON ELEVATED RAILWAY, DEC. 31, 1925

Principal of trust fund as established			$1,500,000
Accretions and accumulations to Dec. 31, 1925			633,495
Total special trust fund			$2,133,495
Income from June 10, 1922, to Dec. 31, 1925		$330,694	
Less amount paid on account of retirement of second preferred stock, as follows:			
718½ shares purchased July, 1923	$72,193		
919 shares purchased July, 1924	90,319		
1,116 shares purchased July, 1925	111,685	$274,198	
			56,496
Investments			2,126,840
Cash on deposit			$63,151

TRAFFIC STATISTICS OF BOSTON ELEVATED RAILWAY FOR YEAR ENDED DEC. 31

	1925	1924	1923	1922
Round trips operated	7,185,587	6,994,749	6,488,082	6,059,531
Passenger revenue	$33,790,441	$33,419,172	$33,297,951	$31,834,022
Passenger revenue per car-mile (cents)	60.93	59.69	61.61	62.94
Passenger revenue per car-hour	$5.86	$5.67	*$5.71	$7.09
Passenger revenue mileage	†55,461,094	†55,988,679	†54,049,665	†50,575,088
Passenger revenue car-hours	5,767,957	5,894,115	*5,826,993	4,487,400
Revenue passengers carried	365,036,286	382,888,848	382,149,697	356,593,942
Revenue passengers carried per car-mile	6.582	6.838	7.070	7.051
Revenue passengers carried per car-hour	63.28	64.96	*65.58	79.47

*Car-hours, American Electric Railway Association Standard, adopted Feb. 1, 1923.
†Including motor bus mileage....1922, 63,937 1923, 465,382 1924, 890,901 1925, 2,472,456

COMPARATIVE POWER STATION STATISTICS OF THE BOSTON ELEVATED RAILWAY

	1925	1924	1923	1922	1921	1920	1919
Tons of coal burned	217,414	240,493	260,032	273,441	215,870	258,087	287,670
Pounds of coal per kilowatt-hour	1.973	2.068	2.264	2.553	2.174	2.353	2.835
Average price of coal per ton	$5.22	$5.921	$7.085	$6.777	$7.71	$10.07	$5.91
Net cost of power for car service per kilowatt-hour (cents)	1.021	1.093	1.227	1.414	1.172	1.921	1.307
Net cost of power per total revenue car-mile (cents)	4.428	4.833	5.468	6.153	4.815	8.538	5.439
Direct current annual output (kw.)	246,835,300	260,401,225	257,270,357	239,905,874	222,461,060	245,676,503	239,892,118
Direct current maximum hour output (kw.)	85,660	86,245	82,965	78,755	75,905	72,295	71,760

COMPARATIVE PASSENGER STATISTICS OF BOSTON ELEVATED RAILWAY—REVENUE PASSENGERS CARRIED

Year	Week Day Average	Saturday Average	Sunday Average	Holiday Average	Total for Year
1925	1,066,317	1,172,871	577,200	650,007	*365,036,286
1924	1,109,861	1,216,132	630,755	727,191	*382,888,848
1923	1,109,274	1,196,301	652,404	758,915	*382,149,597
1922	1,030,303	1,144,320	617,148	691,890	*356,593,942
1921	975,745	1,060,295	578,860	696,691	337,252,080
1920	960,737	1,072,319	591,063	703,634	335,526,561
1919	934,916	1,078,635	596,182	706,429	324,758,685
1918	985,384	1,147,809	638,902	775,634	348,664,700
1917	1,073,943	1,249,588	728,847	857,902	381,017,338
1916	1,050,038	1,218,749	718,804	832,962	373,577,908
1915	992,283	1,140,046	685,726	846,860	352,469,586

*Note—During the years 1922, 1923 and 1924 one passenger making a single journey for which he might pay two 5-cent fares was counted as two revenue passengers. The substitution in November, 1924, of 6-cent tickets for 5-cent cash fares has often resulted in the payment of a 10-cent fare by such a passenger, with a consequent reduction in the company's figures of total revenue passengers carried, though the gross passenger revenue for the year 1925, which increased $371,269.51, would indicate substantially the same number of passengers carried in 1925 and 1924.

A gratifying increase in riding and revenue during the latter part of 1925 and early 1926 has permitted the resumption of full time work in the shops and a substantial increase in the number of car-trips and car-miles operated.

Net Earnings at Springfield Improve

The Springfield Street Railway, Springfield, Mass., has announced a 5 per cent dividend on 1925 business, compared with a 2 per cent dividend for 1924. Net income for 1925 was $239,135, compared with $133,846 in 1924, a gain of $105,289. There was a loss of more than 4,000,000 revenue passengers for the year. An increase of fares to the 10-cent basis and the extension of the use of the one-man cars account for the improved showing in net income.

Bus operations of the company showed a 50 per cent increase of mileage in 1925. Two new suburban lines were added and the number of buses increased to 25. Passengers carried by bus totaled 1,356,316, out of a grand total of 39,602,870. Total passenger revenue for the year increased $55,040 over the previous year. Comparative statistics for the two years follow:

STATEMENT OF EARNINGS OF SPRINGFIELD STREET RAILWAY

	1924	1925
Gross revenue	$3,173,616	$3,228,746
Operating expenses	2,760,564	2,697,362
Taxes, rentals, interest and other fixed charges	279,205	292,247
Net income	133,846	239,135
Dividends	*93,094	†232,735
Surplus	40,752	6,400

* 1924, 2 per cent. † 1925, 5 per cent.

Income Higher in 1925 Period.—The gross income for the last six months of 1925 for the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., was $22,463,954, against $21,448,951, in 1924. The net income after charges was $2,994,524, against $2,598,524 for the six months period ended December, 1924.

More Passengers in St. Louis.—Operating on the average 33 cars a day fewer during the last quarter of 1925 than were used in the corresponding period of 1924, the United Railways, St. Louis, Mo., carried 654,429 more passengers. A total of 66,998,669 revenue passengers was carried against 66,344,240 from October through December of 1924. The cars of the company made a total of 1,459,036 trips, or 41,018 fewer than in the last quarter of 1924. Miles traveled by the cars the last quarter totaled 9,501,723, against 9,789,677 in a similar period of 1924. The quarter ended Dec. 31, 1925, showed an increase of 4,246,379 passengers compared with the quarter ended Sept. 30, 1925.

Purchase Rumors at Portland Denied.—Persistent reports that the American Power & Light Company interests had opened negotiations for purchase of the control of the Portland Electric Power Company, Portland, Ore., have been denied by Franklin T. Griffith, president of the company.

New Director Elected.—Ed Crawford has been added to the board of directors of the Shreveport Railways, Shreveport, La.

Small Balance for Transportation Area.—The Athol & Orange Transportation Area for 1925 reports passenger revenue of $41,908 and total revenue of $43,392. Expenditures were $41,768, leaving a balance of $1,624. Only $31 was paid out for damage claims during the year. The present system of operation under special permissive legislation from the State of Massachusetts has been in force 21 months.

Bond Issue Authorized.—The Key System Transit Company, Oakland, Cal., has been authorized by the Railroad Commission to issue and sell $2,500,000 of series "C" first mortgage 5½ per cent bonds, due July 1, 1938, at not less than 94 per cent of face value, plus accrued interest. The proceeds are to be used to pay indebtedness, reimburse its treasury and for additions and betterments.

Book Reviews

Proceedings of Fifteenth Annual Convention, Pacific Claim Agents Association

This 32-page pamphlet contains the papers and a brief reference to discussions at the annual meeting of the association, held at Los Angeles July 22-24, 1925. The report of this convention was published in the issue of ELECTRIC RAILWAY JOURNAL for Aug. 8, 1925.

Second Technical Conference of the State Utility Commission Engineers

Published by the Department of Commerce, Bureau of Standards. 98 pages.

This is a report of the meeting held March 6, 1924, at the Bureau of Standards, Washington. Discussion of the subject of utility valuations and rates occupied the first day. The second day the discussion was more diversified. Perhaps the principal topic, however, was rural extensions and rural electric service.

Labor Laws of the United States

The Bureau of Labor Statistics of the United States Department of Labor has been obliged again to revise its publication of labor legislation of the United States, being the sixth compilation of this character published by this office. By summarization and abridgment, the contents of the two volumes of Bulletin 148, published in 1914, and nine succeeding annual bulletins, including also the legislation of the years 1923 and 1924, have been condensed into a single volume (Bulletin No. 370). The result is a volume of convenient size containing the substance, and in many instances the full text, of all existing labor legislation except that relating to workmen's compensation, which is incorporated in a separate series of bulletins.

Few new subjects appear, the current tendency in labor legislation being rather to elaborate the laws regarding safety, sanitation, wage payments, the right of contract, the employment of women and children, etc., than to undertake any new departures. Administrative provisions have received attention by legislatures, and the concentration of law enforcement into the hands of a single agency is a tendency that is apparent. The court decisions have been expanded in some measure, and some classes of laws have received sufficient discussion to indicate the status of the type of legislation under consideration. Thus, in the matter of state laws affecting interstate commerce by railroad, the power of Congress is shown to be exclusive where it has entered the field. Opinion seems to be divided as to the right of municipalities to engage in the ice business, the operation of fuel yards, etc., but the courts are practically of one mind as to laws forbidding the discharge of union workers on account of organization membership.

The volume affords the answer to many questions submitted almost daily to the bureau. It is an essential handbook to any one interested in industrial and economic law.

Planning Problems of Town, City and Region

Published for the International City and Regional Planning Conference by the Norman Remington Company, Baltimore, Md. 530 pages. Illustrated.

These are the proceedings of the conference held in New York, April 20 to 25, under the auspices of the International Federation of Town and Country Planning and Garden Cities and the National Conference on City Planning, reported briefly in the issue of this paper for April 25. City planning engineers and street railway engineers are realizing more than ever before that their problems are largely identical, and this view was emphasized in a number of the papers presented at the meeting in New York last April. It was also expressed in the resolutions adopted at the traffic and transportation round table of the conference which declared that the problem of traffic congestion and the development of adequate transportation must include all transportation agencies and that every city should adopt a traffic policy to encourage greater efficiency and organization in traffic and transportation.

A Century of Progress

Published by the Delaware & Hudson Railroad for private circulation. 755 pages. Illustrated.

In April, 1923, celebrations were held in New York City and in Scranton, Pa., of the 100th anniversary of the founding of the Delaware & Hudson Company. It was indeed an important historic occasion, for in this country corporations which have had a continuous existence of a century are very rare. Originally, the Delaware & Hudson Company was organized to mine anthracite and transport it to the city of New York and elsewhere in the state of New York. The coal was carried first by canal and afterward by railroad. The volume under review is an account of the activities of this historic company, which, in later years, has added a number of electric railways in the eastern part of New York State to its transportation system. A very interesting chapter in the book is that describing the results of federal control of the railroad during the years from 1918 to 1920. Those who advocate government operation of railroads can well obtain an object lesson of its results from the information given in this chapter.

Underground General Associated Tramways American Tour, 1924

This is a 46-page illustrated pamphlet containing papers read at a meeting of the directors, officers and assistants of the Underground General Associated Tramways on March 2, 1925, at Hotel Victoria, Northumberland Avenue, London, England. The book is for private circulation only.

They gave up "larffing" and the world "laffed" with them on that American Tour in 1924. So it would appear from reading the papers of Clive Leese, H. S. F. Lansdown of the London General Omnibus Company and H. C. Davy and A. W. Green of the Underground, who were chosen to take the trip to America in 1924 in search of knowledge and experience. Here is a diary replete with interesting experiences that these British railway magnates had on this side of the Atlantic. The illustrations alone throw special light on what the tourists were anxious to find out and also what made a big impression on them. Mr. Leese's paper stressed the types of buses in America with the problems of the American bus designers and operators. Mr. Lansdown gave a résumé of traffic conditions in America generally. In addition he discussed labor conditions in America. Mr. Davy referred to banking of traffic receipts and wages and Mr. Green made a comparative study of the country and its people and discussed control of receipts and expenditures on the railways. He prophesied future development of transport industry with America tackling the bus question. On this point he said: "We are pre-eminent in the motor bus world today, but if we are going to retain that pre-eminence it seems to me that we shall have to fight very hard."

An interesting feature of the pamphlet is a double-page spread showing in statistical form a comparative study of the London General Omnibus Company, the United Railways of St. Louis, Fifth Avenue Coach Company, the Chicago Motor Bus Company, the Connecticut Company and the Cleveland Railway. The questions answered in the table are on hours of duty, meal reliefs, guarantee, rates of pay, reporting allowance, traveling allowance, rest days and other points that are applicable to bus operation.

The tourists referred to the meeting of the American Electric Railway Association at Atlantic City and all joined in thanking the chairman and directors for the opportunity which was afforded them of visiting America.

Personal Items

J. N. Shannahan Still in the Industry

Sale of Property at Hampton Not to Change His Railway Status—Laudatory Newspaper Comment

Plans of John N. Shannahan for the future are somewhat uncertain, but his talents will not be lost to the industry. It will be recalled that the former president of the American Electric Railway Association and head of the Newport News & Hampton Railway, Gas & Electric Company recently concluded a deal in which control of that property passed to the Fitkin interests. In the industry interest naturally centered in the question: "What is Jack Shannahan going to do?" So far as he has made any plans it is known that Mr. Shannahan will spend the next few months and possibly longer in developing large real estate holdings of the Old Dominion Land Company in and about Newport News which he purchased recently from Henry E. Huntington. He expects to remain head of Peck - Shannahan - Cherry, Inc., which firm has long operated a number of electric railways, several of which center at Syracuse, N. Y.

Jack Shannahan's record is too well known to those in the industry to need reiteration. He represents the best there is and practices what he preaches. No amount of mere biographical facts, however complete in themselves, written from within the industry would tell half so well the story of his achievements as an operating official as do the expressions of appreciation contained in the local papers at Hampton. Daily newspapers are not given to saying nice things about men and their work, particularly public utility men, unless the men and the work they do deserve it. They have other fish to fry. Most of them would rather use vitriol than varnish.

It is no more possible to cite all the expressions of appreciation by his handling of the properties than it would be to quote from them at length. Extracts from two editorials, each nearly a column in length, suffice to indicate the tenor of the comments and emphasize the fact that the value of good public relations is a real, tangible thing. The Newport News *Times-Herald* said:

The Newport News & Hampton Railway, Gas & Electric Company has sold not only a valuable property but a good name. By square dealing, honest and efficient service, respect for the rights of the public and by identifying itself with the interests of the community it served, the company has gained the respect, the confidence and the good will of the people of the Lower Peninsula, which is a most valuable asset. The company has never attempted to dicker with the municipal bodies of this section. To the contrary, it has treated those bodies with consideration, has kept no secrets from them, has laid its case in frankness and confidence before them whenever any emergency in its affairs has arisen and has consulted them before applying to the State Corporation Commission for any increase in rates; and has never gone before the commission with such a petition without having first gained the consent and co-operation of the municipal bodies concerned. In short, the company has made itself part and parcel of the community and has heartily co-operated with the people in all movements and enterprises for the common good. It has been a good and helpful partner and has rendered service in many directions, outside of its immediate sphere of activities. The company also has been considerate of its employees, and has gained their good will, as well as that of its patrons and the general public.

We should be less than frank did we not say that the retirement of President Shannahan from the company is a matter of regret to the community. He has the full confidence and the friendly regard of this people. He has proved himself to be not only an able and honest operator of the public utilities, but a loyal, progressive, public-spirited and very valuable citizen, and his administration has given the people a sense of security. But this regret is largely alleviated by the fact that Mr. Shannahan will continue to reside here, and that he will devote his abilities and activities to the development of the Old Dominion Land Company. The *Times-Herald* is well pleased to learn that.

J. N. Shannahan

The Newport News *Press* said:

The company has given an efficient service and has dealt honestly and considerately with the entire community; with its employees as well as with its patrons, and it has gained the good will of all.

It is not in disparagement of the other officers to say that this is due, primarily, to the integrity and the fidelity of President Shannahan. He is an upright man and he is a loyal citizen. He has dealt with the community not in selfishness, but in the spirit of fairness and generosity. He has contributed liberally of his private means and the means of his company toward all public enterprises, and he has made the public utilities a strong agency in community progress. His indorsement of any enterprise is sufficient to inspire the confidence of investors. It is with keen regret, therefore, that the people see Mr. Shannahan retire from the presidency of the company, but it is gratifying to know that the sale of his holdings in the company does not involve his removal to another place of residence.

The manager of Fitkin Utilities, Inc., informs the *Daily Press* that fer the present, at least, there will be no change of policy or in the personnel of the local management. That is a pleasing announcement, and the *Daily Press* hopes that the status quo may continue indefinitely. We are a very neighborly people, gentlemen, and we have a friendly spirit. We are also hospitable and kindly disposed to all genteel persons who may cast their lot with us. We are prepared to give you a warm Virginia welcome, and you may count upon fair treatment from the authorities and from the general public, and also upon our friendly co-operation, so long as you deal with us in the same spirit that characterized the old company.

Certainly there is comment indicating in no unmistakable terms that the praise bestowed upon Mr. Shannahan was well deserved!

Personnel Changes in Cincinnati

F. J. Venning, superintendent of shops, equipment and overhead of the Cincinnati Street Railway, Cincinnati, Ohio, has been appointed superintendent of power. His former assistant, E. J. Jones, has been named superintendent of equipment.

Mr. Venning will have charge of the operation and maintenance of the power houses, substations, overhead transmission and distribution system and inclined planes. Mr. Jones will have jurisdiction over the maintenance of cars, the operation of the Chester Park shops and all carhouses.

W. H. Lines in Charge of Railway Operations at Portland

W. H. Lines, assistant to the president of the Portland Electric Power Company, Portland, Ore., for the past year, was placed in charge of all railway departments and operations of the company on Feb. 1. He retains his former title. This new responsibility covers part of the executive duties of the late Franklin I. Fuller. President Griffith states, however, that it may be a month or more before a successor to Mr. Fuller is named.

Mr. Lines is an engineer of wide experience. He has been with the Portland Electric Power Company in various capacities for the last fourteen years.

F. W. Coen Leaves Lake Shore Electric Railway

After many years of service with the Lake Shore Electric Railway, F. W. Coen, Cleveland, resigned as vice-president and general manager, effective on Jan. 30. Under Mr. Coen's direction the property was developed into one of the largest passenger, freight and express carriers in the Central West. In addition to the transportation industry there has also been developed a large and rapidly growing light and power business. Mr. Coen has been active in the affairs of the American Electric Railway Association and of the Central Electric Railway Association, of which he is a past-president.

He has not decided whether he will again engage in the electric utility field or become identified with industry in some other line.

P. H. Gadsden Heads Philadelphia Chamber of Commerce

Philip H. Gadsden, vice-president United Gas Improvement Company and former president American Electric Railway Association, is the new president of the Philadelphia Chamber of Commerce. In his initial address to the members of that organization Mr Gadsden expressed the hope that it might be possible during the coming

year to bring about "closer co-operation among all the commercial and business organizations of Philadelphia." As the Philadelphia *Ledger* sees it, unity of effort among the city's business organizations is the goal worth striving for. The *Ledger* says: "If it can be attained under the inspiration and tactful generalship of Mr. Gadsden, he will have performed a public service of inestimable value."

C. L. Bartlett Massachusetts Northeastern Manager

Clifton Lewis Bartlett has been appointed general manager of the Massachusetts Northeastern Street Railway, with headquarters at Haverhill. He succeeds the late Ralph D. Hood. Mr. Bartlett was born in Haverhill in 1890. He entered the employ of the Haverhill & Southern New Hampshire Street Railway, the Northeastern company's predecessor road, in 1907 as a checker of conductors' returns. In 1925 he was made chief clerk and claim agent. He has been acting as general manager since Dec. 30.

S. L. Nicholson Made Westinghouse Vice-President

At a recent meeting of the executive committee of the Westinghouse Electric & Manufacturing Company S. L. Nicholson was elected acting vice-president. This honor follows an association of more than 27 years with the Westinghouse company and is in recognition of the noteworthy services which Mr. Nicholson has rendered to the electrical industry. He became sales manager of the Westinghouse company in 1909 and held that position until 1917, when he was made assistant to the vice-president.

Mr. Nicholson assisted in the formation of the American Association of Electrical Motor Manufacturers, which is now known as the Electric Power Club, and was its first president. He also assisted in the formation of the American Gear Manufacturers Association and the Stoker Manufacturers Association. He was chairman of the Electrical Manufacturers Council, which is the co-ordinating committee of the Power Club, Electric Manufacturers Club, and the Association of American Manufacturers of Electrical Supplies.

In 1921 he was chairman of the tariff committee of the council and represented the electrical industry on its National Industry Conference Board. Mr. Nicholson is also a member of the Electrical Safety Conference, the American Statistical Association, and the Bureau of Personnel Research of the Carnegie Institute of Technology. He is a native of Philadelphia and began his electrical career in 1887, serving various companies from that date until 1898, when he joined the Westinghouse company.

G. T. Lackey, vice-president and agent for the receivers of the Oklahoma Railway, Oklahoma City, Okla., has been made general superintendent of all the departments of the company, working under the direction of the two receivers. Mr. Lackey has been with the company seven years.

W. H. Woodin, Brill Chairman

Head of American Car & Foundry Now Interested in Companies Supplying All Forms of Transportation Equipment—Reared in Atmosphere of Cars and Car Construction

W. H. WOODIN, elected chairman of the board of directors of the Brill Corporation, newly organized to control the J. G. Brill Company and the American Car & Foundry Motors Company, has back of him a groundwork of experience in the railway equipment field which dates back to 1890. He was reared in an atmosphere of car design and cars. The name of Woodin has been associated with railway car building since the inception of that industry in this country. Mr. Woodin's grandfather was one of the organizers of the Jackson & Woodin Manufacturing Company, founded in 1842 and taken over by the American

W. H. Woodin

Car & Foundry Company at the time of its organization in 1899.

Mr. Woodin is not only president of the American Car & Foundry Company, but last December was elected a president of the American Locomotive Company, succeeding Andrew Fletcher, deceased. Before that he had been a director and a member of the executive committee of the American Locomotive Company for many years. This affiliation is really more than that of one individual with several companies. The American Car & Foundry Company has large holdings of American Locomotive Company stock and Mr. Woodin himself is a large shareholder of the company.

The election of Mr. Woodin to the Locomotive company was in recognition of his executive ability, supplemented by his extended familiarity with the supply field in general and with the operations of the American Locomotive Company in particular. Similar considerations governed his election as chairman of the board of the new Brill corporation, control of which is lodged with the American Car & Foundry Company. Through the Brill corporation and its subsidiary, the American Car & Foundry Motors Company, the Hall-Scott Motor Car Company and the Fageol Motor Company of Ohio are owned. Thus Mr. Woodin's help and advice will be available in shaping the policies of companies supplying equipment for all forms of common carrier transportation.

The extent of the operations of these companies is shown by the fact that the American Car & Foundry Company operates four passenger car building plants, sixteen freight car building plants, six wheel foundries, eight gray iron foundries and several other plants, while the American Locomotive Company operates eight plants. The facilities of the companies just brought into the new Brill organization need no reiteration.

Director of Many Corporations

Mr. Woodin has many other business affiliations. He is chairman of the board of the Canadian Car & Foundry Company and a director of the American Exchange Security Corporation, the American Beet Sugar Company, the Westinghouse Electric & Manufacturing Company, the Montreal Locomotive Works, the Westinghouse Electric International Company, the General Motors Corporation, the Cuba Company, Cuba Railroad, the Compañia Cubana and the American Ship & Commerce Corporation. Like many other big business men, he has a hobby and rides it hard. He is a coin collector. With Edgar H. Adams he is the author of a standard book on American coins. He is a member of the American Numismatic Association and the New York Numismatic Club. During the war he served the public as fuel administrator for the State of New York.

Mr. Woodin was born in Berwick, Pa., on May 27, 1868. He received his technical education at Columbia University in the School of Mines, class of 1890. He served in the shops of the Jackson & Woodin Manufacturing Company at Berwick and in 1892 was made general superintendent of that plant. In 1895 he was elected vice-president and in 1899 president. When the company was taken over by the American Car & Foundry Company in 1899 he was made district manager of the Berwick plant. He later became assistant to the first vice-president of the new company and in 1902 was made a director and assistant to the president, with general direction of the company's affairs, under President Frederick H. Eaton. On Feb. 1, 1916, he succeeded to the presidency.

Changes at Fond du Lac

M. H. Frank, formerly manager of the railways of the Wisconsin Power & Light Company at Fond du Lac, has been promoted to general manager.

F. S. Whitely has been selected manager of the company's properties at Fond du Lac, succeeding M. H. Frank.

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

Large Expenditures Looked For in Ohio During 1926

Electric railways in Ohio are planning large expenditures for the purpose of bettering service during 1926. Material increases to present rolling stock are contemplated, as well as the expenditure of considerable sums for track renewals, general maintenance and improvement work on roadbeds. Figures already revealed by the budget of some of the companies total more than $6,500,000 for these types of work.

The largest figure thus far indicated is that of the Cleveland Railway, which estimates its new capital expenditure for the year as $4,500,000. Of this amount, it is estimated $2,300,000 will be spent for way and structures, $1,250,000 for modernizing existing street cars and purchasing new units, $450,000 for bus equipment and $500,000 for power. The Cincinnati Street Railway will undertake a $350,000 program in improving its bus service, including provision of structures to be used for storage and repair, and estimates the amount necessary for track reconstruction at $50,000.

Purchase of new buses, remodeling cars to the one-man type and installing new track and special work will mean an expenditure of $317,353 by the Community Traction Company, Toledo. The People's Railway, Dayton, plans to spend $181,895 for track renewals, $50,894 for new work cars, $2,525 for installment of electric switches and $2,712 for miscellaneous equipment. New interurban cars which will be ordered by the Steubenville, East Liverpool & Beaver Valley Traction Company will cost approximately $150,000.

The Cleveland Southwestern Railway & Light Company will spend $80,000. Of this amount, $30,000 will be spent in its railway department and $50,000 in its light department. The Northern Ohio Traction & Light Company will spend approximately $1,000,000 in its transportation division and $1,500,000 on its light and power department. The former total includes $350,000 for additions to the South Akron substation, $225,000 for new buses, $100,000 for a new freight house and $100,000 for new freight cars. Various sums will be spent for extending its underground system, for the purchase of new transformers and equipment and for rural line extensions and the rebuilding of lines in Akron.

Other companies expecting to make material expenditures during the current year, but which have not yet indicated how extensive these will be, are the Columbus Railway, Power & Light Company, the Lake Shore Electric Railway, the Southern Ohio Public Service Company, the Cincinnati & Dayton Traction Company, the Indiana, Columbus & Eastern Traction Company, the Pennsylvania-Ohio Electric Company and several others.

Last year electric railways in Ohio were authorized by the Ohio Public Utilities Commission to issue a total of $9,002,320 of new securities. Of this amount, $7,586,620 was authorized in bonds and $1,415,700 in common and preferred stock. Indications are that the expenditures for the present year will equal if not surpass the totals for 1925.

Manufacturers to Be Aided by Publicity Campaign

Plans are rapidly going forward in connection with the intensive publicity campaign which is contemplated by the special committee on co-operation with manufacturers of the A. E. R. A. As outlined in the issue of the JOURNAL for Feb. 6 the program, which is to impress upon the public the fact that some 500,000 workers are employed in the production of electric railway supplies in the United States, will embrace a complete layout of posters for bulletin boards, stickers for letters and packages, outdoor signs, etc. The posters, labels and stickers will be supplied by E. F. Wickwire, chairman of the committee, in any quantity desired free of charge. Outdoor signs may be obtained from George H. Tontrup.

Cost-per-Mile Basis Opposed

Manufacturers Unite Against Practice of Selling Tires to Bus Operators Under a Mileage Plan—Claim Outright Purchase Is Cheaper for Consumers

"BOTH tire manufacturers and operators of buses lose under any kind of a cost-per-mile contract per tire purchased," stated an official of one of the larger tire manufacturing companies in a recent interview with a representative of ELECTRIC RAILWAY JOURNAL. On an advancing market for crude rubber prices the operator may have a slight temporary advantage, while on a falling market the odds are all with the manufacturers. In general, the manufacturers have come to the conclusion that the purchase of tires on a mileage basis is an economic fallacy resulting in inevitable rate wars among the producers, and making it necessary for the manufacturers to establish service stations throughout the country to care for all tires sold under such an arrangement.

So much interest has been evidenced in this question by traction companies operating a co-ordinated bus and railway service that it was considered of value to obtain a general statement of the manufacturers' policies and of the conditions which have led to the adoption of those policies. Accordingly, several of the principal tire producers were questioned as to their attitude toward cost-per-mile contracts and were asked whether or not they were disposed to allow any such contracts in the future. Without an exception the answers received agreed most heartily on practically every phase of the question.

The mileage purchase plan has been tried out and has been found wanting in the estimation of the larger companies. It is true that some of the smaller producers are continuing to accept contracts on this basis. One official characterized this practice as "playing with fire." He declared that an abrupt and unexpected rise in crude rubber prices would bring many smaller companies operating on limited capital to grief with quickness and dispatch. Nor has crude rubber of late exhibited any marked tendency toward stability.

Since street cars, buses, trucks and other equipment are all purchased on an outright basis, tire manufacturers see no reason why their products should not also be considered in the same light. Of course, bus operators seized upon the cost-per-mile contract as a means of "passing the buck" on at least one item of their general maintenance work. They figured that as long as the tire manufacturers were willing to undertake the servicing of tires and to give them an attractive price for this service, there was no reason why they should not relieve themselves of this particular worry. On the other hand, the manufacturers soon discovered that selling tires is one thing and selling service quite another. Furthermore, the bus operators were not long in discovering that most exasperating delays frequently resulted under this plan, since instead of taking steps to repair a flat tire themselves they were forced to await the pleasure of the manufacturer's representative.

The most reasonable argument advanced by the tire manufacturers against the mileage purchase plan, however, was simply that the actual net cost per mile to the operator in the long run is considerably less when he buys a strictly quality tire and pays for it outright. This is demonstrated as follows: A certain company manufactures a tire the quality of which insures a life of 20,000 miles. A cost-per-mile contract would therefore be figured on this mileage. Since all of the tires not actually defective may be expected to attain this mileage, it is obvious that many of them will considerably exceed it. On the cost-per-mile basis the operating companies do not profit by this excess mileage, while on the outright purchase plan it might be said to be, in common parlance, "gravy" for them. It is thus possible for the manufacturers to demonstrate on the hard bedrock of common sense that both parties to the agreement will benefit under the outright purchase plan.

A representative of one company states:

We believe that outright purchase is preferable because for him who takes care of his tires, extra mileage, lower tire cost and fewer interruptions are his reward. And for him who is indifferent toward his tire service, low mileage, high tire cost and frequent interruptions are the penalty. To our minds, this works out fairly for everyone and such a policy should merit favor as against the plan that works a disadvantage to one or another of the parties involved. Practically all electric railway operators are buying on an outright purchase basis and we believe that they will continue to do so. Of course, outright purchase favors the quality tires as against the others because they will prove to be more trouble free and longer lived, and tires will therefore be judged more strictly on their merits.

When the cost-per-mile plan was first adopted the manufacturers had no reliable information as to tire cost on various types of buses, mileage records for equipment operating over different types of roadway and all of the countless other factors which of necessity enter into the problem. The rates given were, therefore, absurdly low in many cases, at least one contract having been awarded on a cent-per-mile basis. Naturally the producing companies lost a great deal of money in this way, and as more data became available on the aforementioned factors, the rates were materially increased. As opposed to this tendency, however, there was the equally strong inclination to cut prices in order to meet competition and to get desirable business away from rival concerns. The whole situation was therefore one of storm and strife and finally the larger manufacturers singly and as groups agreed that the end did not justify the means and declared themselves against any further sales on this basis.

One of the manufacturers stated:

Only 20 per cent of the companies operating buses in the United States are of a size which would justify our making such a contract with them in any case. Of this 20 per cent, a large number have become convinced that the mileage purchase plan is not the solution of their problem and they are now buying their tires on an outright purchase plan. We, therefore, feel that it scarcely behooves us to violate the dictates of common sense in a wild scramble for what is after all only a comparatively small percentage of the available business in the country. How much better for us to concentrate our efforts on a sane marketing of quality tires on the tried and proved outright purchase plan!

A few manufacturers still offer the cost-per-mile contract to the large operator and some of the largest fleets of buses in this country continue to be equipped under such agreements. Of course, there are two sides to every story and certain operators may have found after a thorough trial of the cost-per-mile plan that it meets their particular requirements in a satisfactory manner. No effort has been made in assembling the opinions contained in this article to get the operator's viewpoint on the question. The manufacturers alone have been consulted. However, it seems significant that the larger producers have deliberately turned their backs on a marketing plan which may be presented in an attractive light to the operating companies.

Manufacturers who still favor this plan necessarily have confidence in the quality of their product, since they can only profit as their tires attain to good mileage figures.

Business Forecasts Optimistic

Authorities See Good Outlook Immediately Ahead, but Are Loath to Attempt Distant Predictions

General business conditions in the United States continue prosperous and there is an encouraging stability in the trend of prices. However, the note of caution which was heard at the beginning of the year is still sounding on the pitch-pipes of commerce. Unprecedented as was last year's record in practically every line of industry, it cannot be safely taken as a guarantee for a continuance of this state of affairs indefinitely. This is the opinion of observers known for their more sober judgment.

The New York *Times* states:

Tangible evidence of prosperity sometimes points to past, not future, conditions. The basic influence of the 1924 grain harvests was not duplicated in 1925. Our railway traffic and industrial profits depend in large measure on unknown future conditions, notably the crops. In directions where the public's purchasing power has been extraordinary (notably the motor car industry) we have still to discover whether there may not be a saturation point. The capacity and incidental hazards of the country-wide "installment buying" have not yet been tested. As for easy money, such year-end indications as the Reserve Bank rates, the rate on Treasury short-time notes and the 6 per cent for Stock Exchange demand loans (over the year end) suggest that at least the money markets' general trend may have altered.

Broadly speaking, the trend of Stock Exchange prices during January was downward, with several notable exceptions. These were not sufficiently numerous to affect the general averages, however. There does not seem to be any reason to accept this movement as presaging anything more serious than a technical reaction, following advances in many directions which had proceeded too far. This is the opinion of the *Industrial Digest*. As the *Commercial and Financial Chronicle* points out:

Fundamentally the country is prosperous and there are ample funds for all legitimate purposes. If any such thing (as a long-continued downfall) shall come in the future it will be because of definite causes and not because of the mere advance in prices.

None of the accepted authorities, however, seems willing to make definite predictions for more than the first half of the current year. It appears certain that the very momentum of industry which has been built up during past months will carry things forward at a satisfactory rate during the coming spring and early summer. What will happen beyond that point is apparently a matter for mere conjecture, although very definite occurrences would have to manifest themselves in order to make serious inroads into the nation's industrial health this year.

Metal, Coal and Material Prices

Metals—New York	Feb. 9, 1926
Copper, electrolytic, cents per lb	14.275
Copper, wire base, cents per lb	16.00
Lead, cents per lb	9.20
Zinc, cents per lb	8.25
Tin, Straits, cents per lb	63.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.875
Somerset mine run, Boston, net tons	2.175
Pittsburgh mine run, Pittsburgh, net tons	2.05
Franklin, Ill., screenings, Chicago, net tons	1.575
Central, Ill., screenings, Chicago, net tons	1.125
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$7.00
Weatherproof wire base, N.Y., cents per lb.	17.75
Cement, Chicago, net prices, without bags	2.10
Linseed oil (5-bbl. lots), N.Y., cents per lb.	11.30
White lead in oil (100-lb. keg), N. Y., cents per lb	15.50
Turpentine (bbl. lots), N. Y., per gal	$1.02

Babbitt Metal Consumption in December

Total apparent consumption of Babbitt metal in December, based on reports received from 27 firms, was announced by the Department of Commerce to be 5,726,703 lb. as compared with 4,954,683 in November. This consumption is calculated from sales by manufacturers and consumption by those firms (among them several important railroad systems) who consume their own production. In the accompanying table the sales of Babbitt metal are shown separately from the consumption in the producing plants:

1925	Total Apparent Consumption, Lb.	Sales, (By Manufacturers) Lb.	Consumption, (By Producers) Lb.
Jan.	5,683,183	4,620,815	1,062,368
Feb.	5,164,619	4,103,340	1,061,279
March	5,644,288	4,395,901	1,248,387
April	5,126,416	3,928,136	1,198,280
May	5,081,668	4,189,558	892,110
June	5,074,966	4,085,125	989,841
July	5,184,196	3,694,386	1,489,810
Aug.	5,441,823	4,068,706	1,373,117
Sept.	4,621,033	3,579,780	1,041,253
Oct.	5,550,247	4,169,870	1,380,377
Nov.	4,954,683	3,534,026	1,420,657
Dec.	5,726,703	4,758,057	968,646
Total	63,253,825	49,127,700	14,126,125

$9,101,909 Sales by Brill in 1925—Business Holds Up Well

For the year 1925 the combined output of the four plants of the J. G. Brill Company amounted in sales value to $9,101,909.

The combined output for each of the past seven years follows:

1919	$14,210,622
1920	17,537,293
1921	7,647,898
1922	10,177,582
1923	18,167,486
1924	8,721,726
1925	9,101,909

After deducting $560,938 from earnings for all cost of operations, including maintenance and repairs and depreciation, and after setting aside $82,791 out of earnings reserve for federal income taxes, not yet due, there was a net profit of $571,269 for the year.

The amount of work on hand on Feb. 1, 1926, was approximately $4,500,000 compared with $4,521,000 at this time last year.

In his report covering the year, presented to the stockholders at the annual meeting on Feb. 10, Samuel M. Curwen, president of the company, said that during the past year the company continued the active development of various sizes of gasoline and gas-electric self-propelled cars for steam railroads. The development cost of this new product during the year ended Dec. 31, 1925, was approximately $350,000, all of which has been charged against the profits for the year. This new branch

of the company's business is increasing. More than fifty-five steam railroads have these cars in operation or on order.

Mr. Curwen on Jan. 8 mailed a letter to all of the stockholders of the company outlining the plan and proposal for the reorganization of the company. On Jan. 13 a sufficient amount of stock had been deposited to make the plan operative and, accordingly, the Brill Corporation has been incorporated under the laws of Delaware.

At a meeting of the board of directors of the J. G. Brill Company held on Jan. 29, W. H. Woodin, president of the American Car & Foundry Company, was elected a director of the J. G. Brill Company to fill the unexpired term of W. H. Heulings, Jr., deceased.

At the meeting of the company on Feb. 10, W. M. Hagar, William Clarke Mason and C. S. Sale were elected directors to serve for three years and W. C. Dickerman was elected a director to serve for one year.

The consolidated profit and loss and earned surplus accounts of the J. G. Brill Company for the year 1925 follows:

Total net sales billed	$9,101,909
Cost of sales, including operating, selling, administration and general expenses, and depreciation for the year, less miscellaneous income	8,447,849
Operating profit	$654,060
Less estimated federal and state income taxes for 1925	82,791
Net profit to earned surplus	$571,269
Earned surplus at Dec. 31, 1924	$4,905,308
Add adjustments (credit)	1,200
	$4,906,509
Add profits as above	571,269
	$5,477,778
Less dividends paid:	
Preferred $320,600.00	
Common 240,510.00	561,110
Earned surplus at Dec. 31, 1925	$4,916,668

Fifty New Cars for P.R.T.

Arrangements have been made by the Philadelphia Rapid Transit Company for the purchase of 50 new street cars from the J. G. Brill Company, Philadelphia. Delivery of this equipment will begin in April and end early in June. The cost of the cars will be approximately $650,000. They are to be of the single-end, center-exit type, many of which are now in service on P.R.T. lines. These cars, together with the 135 buses which have just been ordered by the company, will help to meet the transportation demand which the Sesqui-Centennial Exposition will place upon the transit system.

$687,560 Expenditures in Minneapolis

Expenditures by the Minneapolis Street Railway, Minneapolis, Minn., totaling $687,560 in 1926 as recommended by the street railway and bus committee of the City Council and now approved by the Aldermen means that the company will have to finance the difference between that amount and the budget, which was $568,000 to be taken from earnings. Expenditures will be: For the bus lines, power and mechanical improvements, $267,000; nine re-rail and paving projects, $309,500; special work, $63,000; bridge work, including some paving, $11,000; miscellaneous, $20,000.

As soon as permission has been granted by the Railroad and Warehouse Commission the company will install crosstown bus lines on Lowry Avenue North and 38th Street South and will extend the Bryn Mawr trolley line. Only one long new line is to be built, or extension of the tracks on 42d Street. One of the large paving contracts will be on Nicollet Avenue.

Rolling Stock

Dallas Railway, Dallas, Tex., if the Council approves the suggestion of the city's supervisor of utilities with respect to fares, will put through a program calling for the expenditure of about $1,000,000, an important item of which will be an appropriation for the purchase of 30 Peter Witt cars.

Pennsylvania Railroad System is building eight all-steel multiple-unit cars for suburban service on its various lines. The cars are under construction at the company's Altoona works.

Seattle, Wash.—The City Council recently passed unanimously an ordinance providing for the purchase of fourteen buses, ten to be used in the North End and the others in relief work on lines already established. The ordinance authorizes the issuance of $100,000 in railway department warrants to pay for the new buses.

Track and Line

Trenton & Mercer County Traction Corporation, Trenton, N. J., will install double-track corners at Princeton and Paul Avenues and Princeton and East Paul Avenues.

Northern Ohio Traction & Light Company, Akron, Ohio, did a considerable amount of track construction work during 1925. Right of way was secured from the Wheeling & Lake Erie Railroad for approximately 5 miles and new track was constructed. In Ravenna approximately 1,000 ft. of open track was replaced with heavy T-rail. In Barberton the single track on High Street for a distance of approximately 5,200 ft. has been replaced with double track. In New Philadelphia it was necessary, due to city repaving, to renew approximately 3,000 ft. of single track. In addition to much new construction the company had a very extensive maintenance program. In Bedford repairs were made to the paving on Broadway and approximately 35,000 ties were renewed. Worn-out rails on various curves were renewed. In Akron and Canton especially considerable trackwork was accomplished.

Los Angeles Railway, Los Angeles, Cal., has started the construction of a car track through the North Broadway tunnel. The job was made necessary by the construction of the city hall and civic center in the North Spring Street district. The Broadway tunnel job was authorized recently by the city. It will cost $70,000.

Trade Notes

Griscom-Russell Company, New York, N. Y., announces the removal of its general offices from 90 West Street, New York, N. Y., to the new Murray Hill Building, 285 Madison Avenue.

Universal Metal Box & Products Company, Inc., Newark, N. J., manufacturer of externally operated switches, safety switches, metal cut-out boxes, fuse boxes, electric signs, stair tread lights, etc., has announced the appointment of the Fred Rowell Company, Inc., New York City, as its sales agent in the metropolitan district, including northern New Jersey.

Timken Roller Bearing Company has promoted R. C. Brower to the position of assistant to H. J. Porter, vice-president in charge of sales. Mr. Brower became associated with the Timken Company in 1916, as district manager of the Bearings Service Company, with offices in Detroit. At the dissolution of this company, in 1922, the Timken Roller Bearing Service & Sales Company was organized. He then went to Canton, the headquarters of the new company, as assistant general manager. This position he held until his present promotion. The present offices will be maintained at Canton.

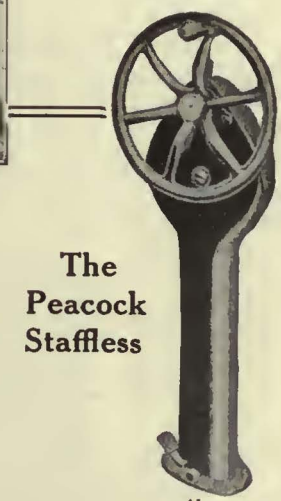
G. L. Hulben has been added to the sales force of the Chicago branch of the Ludlum Steel Company, Watervliet, N. Y. For years Mr. Hulben has been connected with the Chicago sales division of a large tool steel manufacturer.

Southern Wheel Company, Pittsburgh, Pa., has opened a new office in Washington, D. C., at 818-819 Munsey Building. This office will be in charge of F. C. Watkins, special representative, who has been moved from Atlanta, Ga. The Atlanta office, at 1413 Candler Building, will be in charge of C. C. Cox.

Advertising Literature

Westinghouse Electric & Manufacturing Company has issued a 112-page publication, describing the proper switching equipment for alternating-current power stations. This special publication, 1541-C, deals with the fundamentals to be borne in mind when laying out a switchboard, and describes in detail the various types of switching equipment. It is illustrated with diagrams and halftones.

Sullivan Machinery Company, Chicago, Ill., has issued bulletin 81-I, featuring two new types of Sullivan concrete breakers. These are DW-221, a 75-lb. heavy-duty buster, and DP-221, a 48-lb. light buster for concrete breaking in street openings, demolition work of many kinds, etc. The term "buster" has just been registered as a trademark to designate this type of tool. "Speed Up with Air" is the title of another bulletin of sixteen pages, which illustrates Sullivan portable air compressors and shows many applications of Sullivan rotators, hammer drills, clay spaders, concrete breakers, portable hoists, etc. Tables of capacities and specifications are given.



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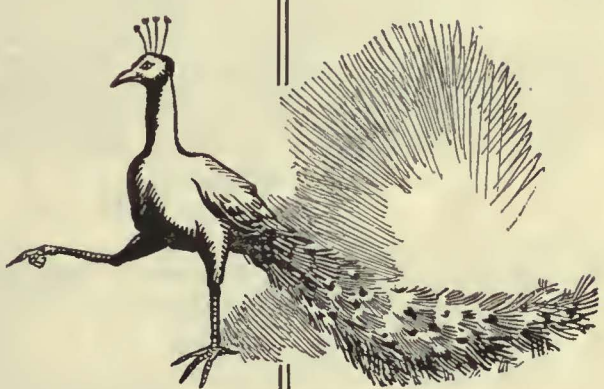

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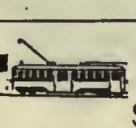

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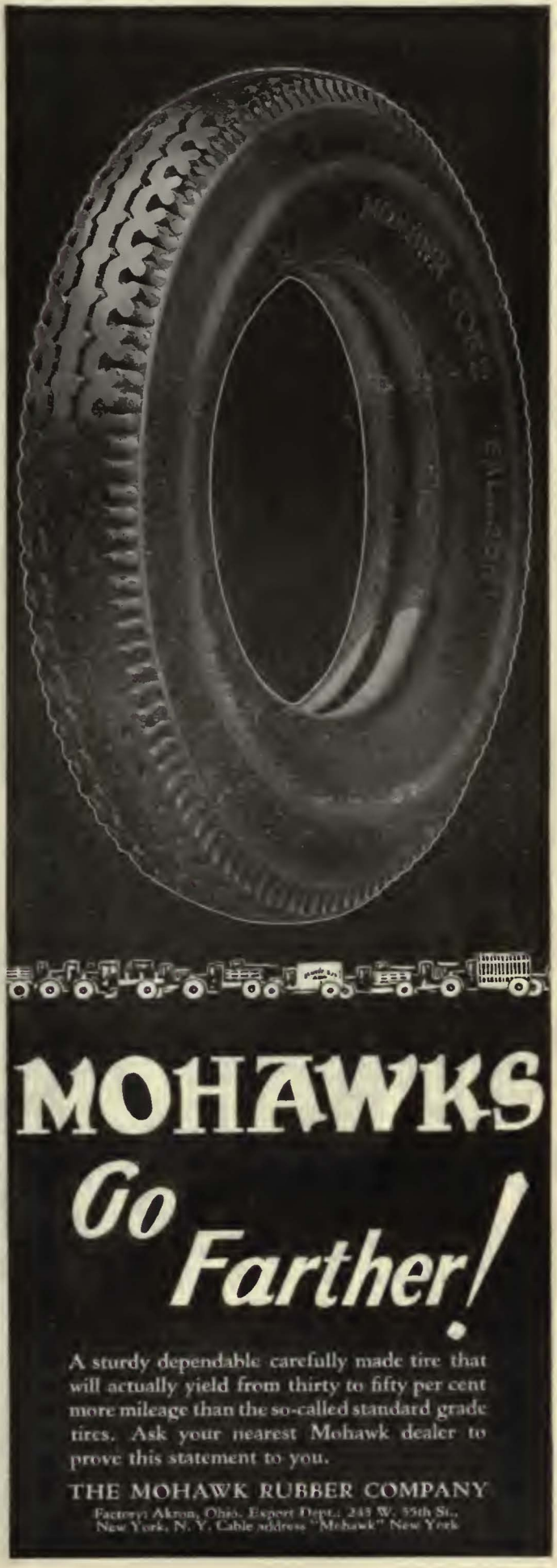
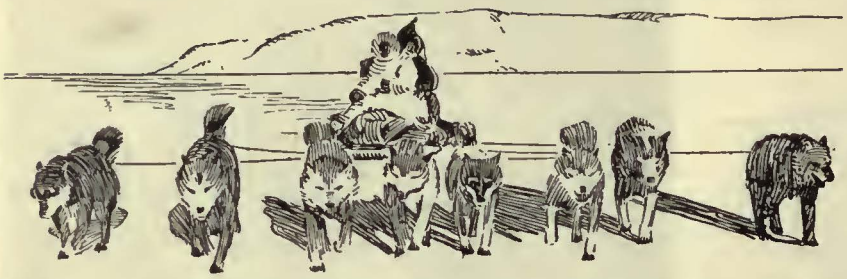
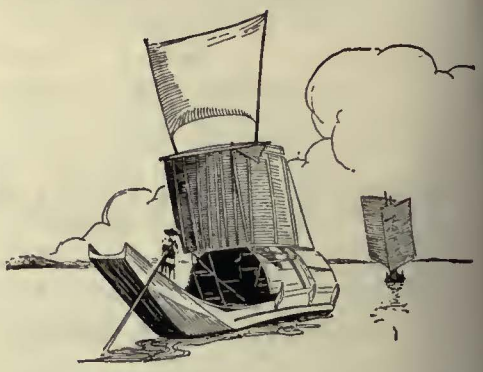


Transportation—The Whole World Around

FOURTH SERIES

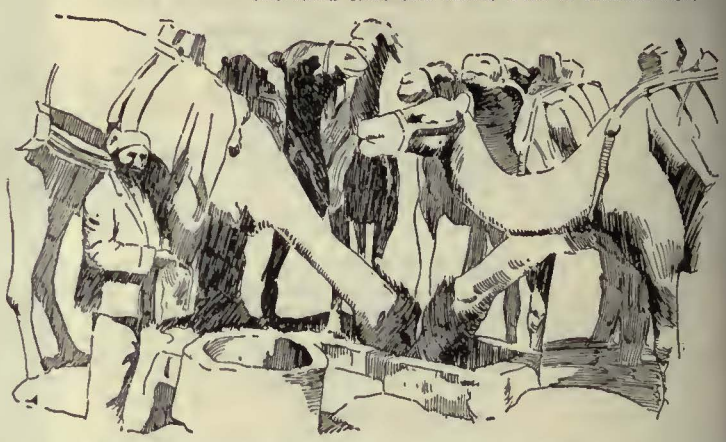


From "Greenland's Icy Mountains to India's Coral Strands" is a famous line in an old hymn; but this outfit coming South—"dog-tired" from Etah—may never have the aid of India Tires. We do well among American Truck and Bus operators, but our exports to Greenland aren't much.

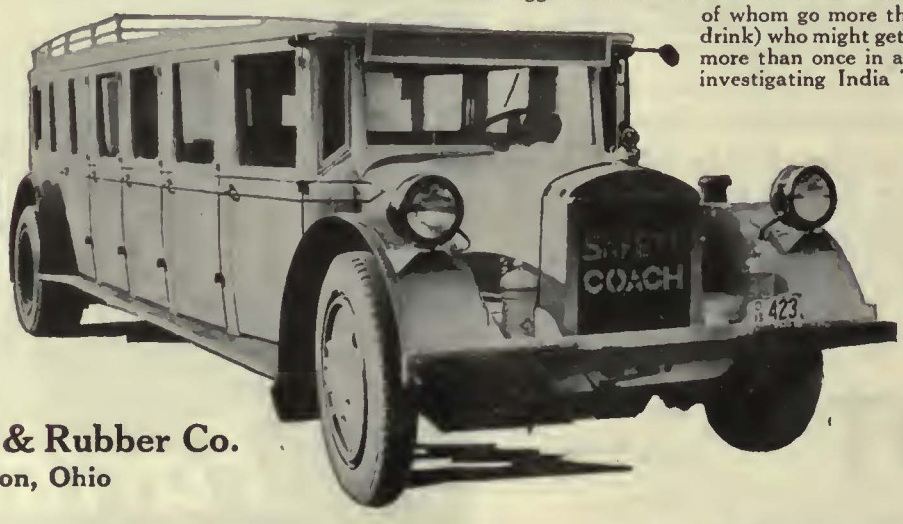


Barrel-Sails of Matting manage to make a speedy proposition out of this awkward and cumbersome looking boat on the Chinese river "Han"—but to speed up the trucks and busses of America it takes uninterrupted tire service, the kind that the India Tire is famous for.

Rapid Transit at Luxor—with the aid of a crutch. Like this "luxurious" limousine by the Nile, some American truck owners are using crutches but don't know it—for tires that fail to meet India's road performance are just as unsatisfactory as crutches.



The Camels of Nazareth get a "hump on themselves"—but only once in a lifetime. Without wishing to seem impertinent, we'd like to suggest that there are some business men in this country (some of whom go more than eight days without a drink) who might get a "hump on themselves" more than once in a lifetime. Why put off investigating India Tires? Do it today!



INDIA

India Tire & Rubber Co.
Akron, Ohio

INDIA TIRES

With the Gum-Weld Cushion

Ruggedly built, yet handsome in appearance, embodying the latest development in motive power with the best elements of body construction resulting from twenty-five years of street car building—The Cummings Gas-Electric Motor Coach.

Features of the Cummings Gas-Electric Coach:

Inviting appearance—low entrance step, broad aisle, leather seats, narrow metal sash, wide windows, abundant lighting, ample head room, smooth, comfortable riding.

Gas-Electric Features:

Smooth, rapid acceleration.
Start to full speed with foot control.
Higher schedule speeds—more trips.
Absence of vibration.
No clutch or shifting gears with accompanying shocks.
Greater riding comfort.
No driver fatigue.
Greater safety.
Minimum depreciation.
Minimum maintenance.

Cummings Car and Coach Co.

Successors to McGuire-Cummings Mfg. Co.

111 West Monroe St., Chicago, Ill.

Lightweight City and Interurban Cars and Trucks

Speeding up service

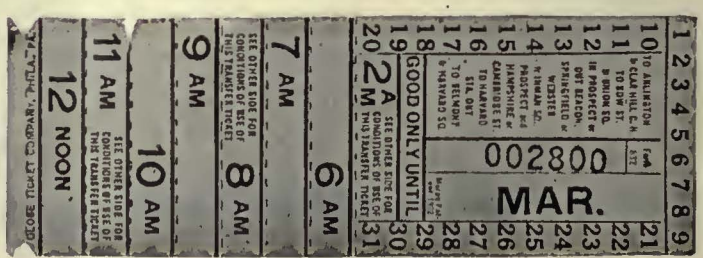
To Speed up service—and yet maintain accuracy of collections—is a problem well solved by the use of

GLOBE

Tickets--Transfers--Passes

Designed by specialists for all standard and special requirements. Ask for further particulars and samples of our work.

GLOBE TICKET COMPANY
116 N. 12th Street, Philadelphia, Pa.
Los Angeles New York San Francisco



Moran Patent Transfer

Low Operating Cost *Plus* High Loading Factor

Equals Profitable Operation

Transportation experts now generally agree that the 21-passenger Motor Coach is the most profitable unit for co-ordination with street car service. This well balanced, attractive unit reduces the percentage of unoccupied seats to the minimum.

Graham Brothers Motor Coaches are proving remarkably economical in operating cost. Skillful design and generous use of alloy steels eliminate excess dead weight and result in a rugged and thoroughly dependable transportation medium.

Street Car Type Motor Coach, Complete,

$3815

F. O. B. Detroit

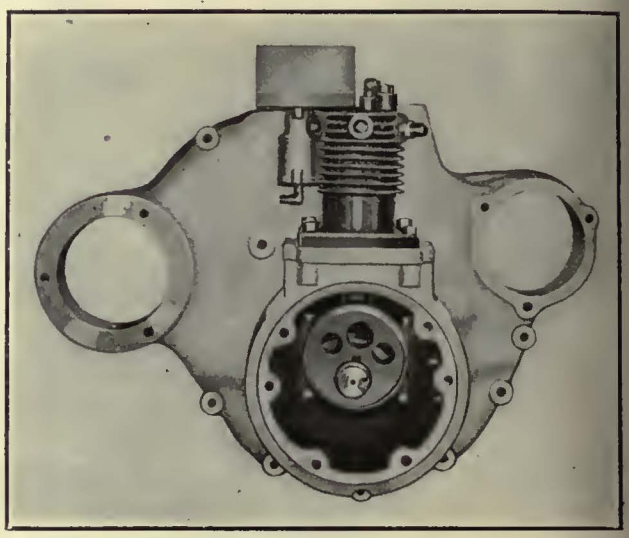
GRAHAM BROTHERS
Evansville – DETROIT – Stockton
A DIVISION OF DODGE BROTHERS INC
GRAHAM BROTHERS (CANADA) LIMITED – TORONTO, ONTARIO

GRAHAM BROTHERS MOTOR COACHES

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

Front-end mounted Christensen compressor as applied to the engines used in White Models 50A and 50B busses.

This unit can be mounted upon your present White busses or obtained on new equipment upon specification.



Front-end mounting developed by Christensen (patents pending)

Specify Christensen because---

———the Christensen compressor is mounted on the front-end cover plate and driven directly from the main engine crankshaft.

———gears, driving chains, auxiliary shafts, and universal joints are eliminated.

———it has less than half the parts of any two-cylinder compressor.

———maintenance is low.

———300 pounds pressure can be delivered in regular service, a tremendous excess over operating requirements.

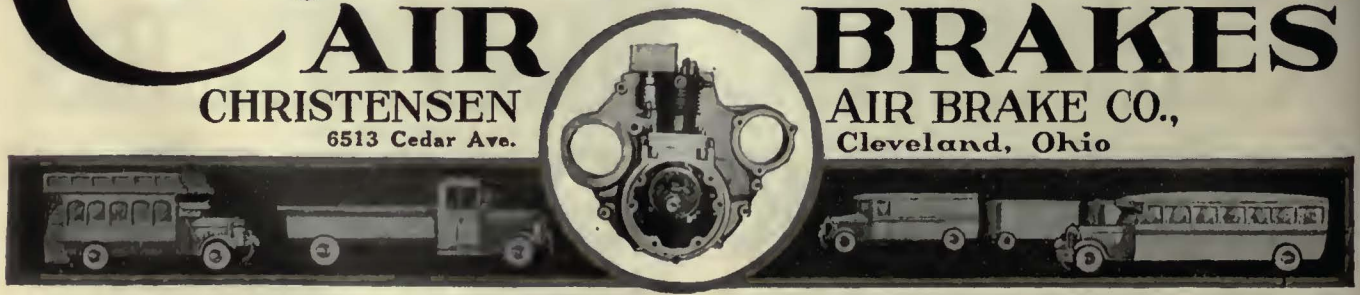
———the automatic governor, controlling maximum and minimum pressures, relieves the compressor from working against pressure except when needed.

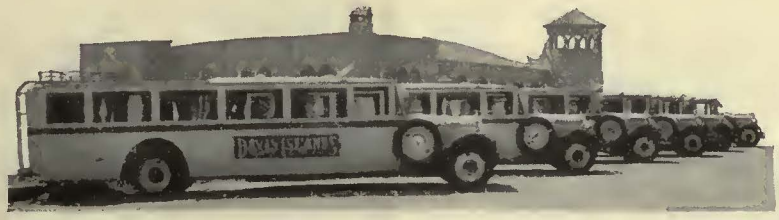
———air and oil cooling absolutely prevents overheating.

If you operate busses, or contemplate their operation, you should be thoroughly familiar with the details of design and construction that make possible the above results. Send for the booklet "The Christensen Compressor for Automotive Air Brakes."

Christensen AIR BRAKES

CHRISTENSEN AIR BRAKE CO.,
6513 Cedar Ave. Cleveland, Ohio





International Harvester

COACHES, AT DAVIS ISLANDS, TAMPA

At Davis Islands, $30,000,000 development de luxe which has risen out of the waters of Tampa Bay, a fleet of 6-cylinder Internationals has for many months been displaying the qualities that distinguish International Motor Coaches everywhere.

In mechanical design; in comfort and safety; in beauty of line and perfection of appointments, these conveyances merit your close attention.

SERVICE is of equal value here. International service is delivered to International automotive customers through 112 branch houses — largest Company-owned truck and coach service organization in the world.

Complete information on request.

INTERNATIONAL HARVESTER COMPANY
606 S. Michigan Ave. of America (*Incorporated*) Chicago, Ill.

Illustrations above and below—Davis Islands' 33-passenger, 6-cylinder Internationals. International also provides sturdy, economical 4-cylinder coaches on underslung chassis. Very popular for school use, golf clubs, suburban routes, station service, as auxiliaries to bigger coaches, and for a variety of other passenger transport requirements.

30 minutes after a coat of DUCO has been sprayed on a car it is ready for the next coat. This is only one of the reasons why DUCO doubles the output of a finishing shop.

Du Pont finishing engineers will be glad to furnish further information about DUCO, and estimate the annual savings you can accomplish by using it.

E. I. du Pont de Nemours & Co., Inc., Chemical Products Division, Parlin, N. J., Chicago, San Francisco . . . Canadian Distributors: Flint Paint and Varnish Limited, Toronto, Canada.

DU PONT

DUCO

REG. U.S. PAT. OFF.

There is only ONE Duco — DU PONT Duco

White Bus Chassis Model 50-B

THE White Bus Chassis Model 50-B is introduced to meet the changing conditions of passenger transportation.

Embodied in the Model 50-B Bus Chassis are a number of improvements and refinements including—

Westinghouse Air Brakes—

The installation of this type of air brake on rear axle makes it possible to use metal to metal friction surfaces which is the most effective way of dissipating the heat which accompanies severe braking. Insures effective brake control under all conditions and long life for brake liners.

An Improved Motor—

Various mechanical refinements have been made in the engine improving flexibility and smoothness of operation.

Improved Oiling System—

Oil pump capacity is increased to insure plentiful supply of oil to all parts of engine. Large area of fine mesh wire screen removes all dirt particles providing clean oil supply at all times.

Larger Tires—

Tire equipment consists of 34 x 7 pneumatic tires, duals in rear.

Improved Rear Axle—

Double bearings of taper roller type at wheel ends of spindles, with other refinements, designed to meet the most severe conditions of operation.

Stronger Frame—

The 10 inch frame with gusseted cross members provides ample strength and rigidity under all operating conditions.

Improved Radiator—

Heavy cast aluminum shell with removable core. Supported by new design of spherical seat and retained by springs in neat housings above radiator brackets.

Easier Steering—

New and sturdy design of steering gear makes easy steering.

Transmission—

Speed ratios specially adapted to bus operation.

The White Model 50-B Bus Chassis is built with the optional wheelbases of 198 or 230 inches to accommodate bodies seating from 25 to 29 passengers.

Write for full specifications and a booklet of facts about actual White Bus operations. We shall be glad to send them free.

THE WHITE COMPANY, *Cleveland*

WHITE BUSSES

MADE RIGHT — SOLD RIGHT — KEPT RIGHT

Cincinnati Georgetown & Portsmouth R.R. Near Coney Island Race Track — Cincinnati, O.
International Poles

2¢6

Pine is the Strongest of Pole Woods

WE have said it before and we say it again. We say this with full knowledge of the facts based on comparative tests and on Government figures. We say also that the greatest permanent line strength is assured by the use of ***International*** Creosoted Pine Poles—because the great natural strength of pine is made permanent by the uniform and deep penetration of high grade creosote oil.

Lower cost per year—lower maintenance cost—and greatest protection against storm damage result from the use of these poles.

INTERNATIONAL CREOSOTING & CONSTRUCTION CO.
Galveston—Texarkana—Beaumont

International

PRESSURE CREOSOTED
YELLOW PINE POLES

Consider the Graybar Year Book on two counts.
1. As a quick means of locating anything electrical.
2. As an assurance of quality-reputation on over 60,000 items.

Dozens of catalogs in one

—for your convenience

How many catalogs do you use in a year for ordering electrical material? Here are dozens of them in one—the Graybar Year Book.

It lists everything electrical. It is indexed for quick reference to any desired article. It covers over 60,000 items.

Start 1926 right with the new Graybar Year Book—just out. For your immediate convenience—here's a memo.

Send for it

"TODAY"
Please send me Graybar Year Book
_____
_____
_____
J

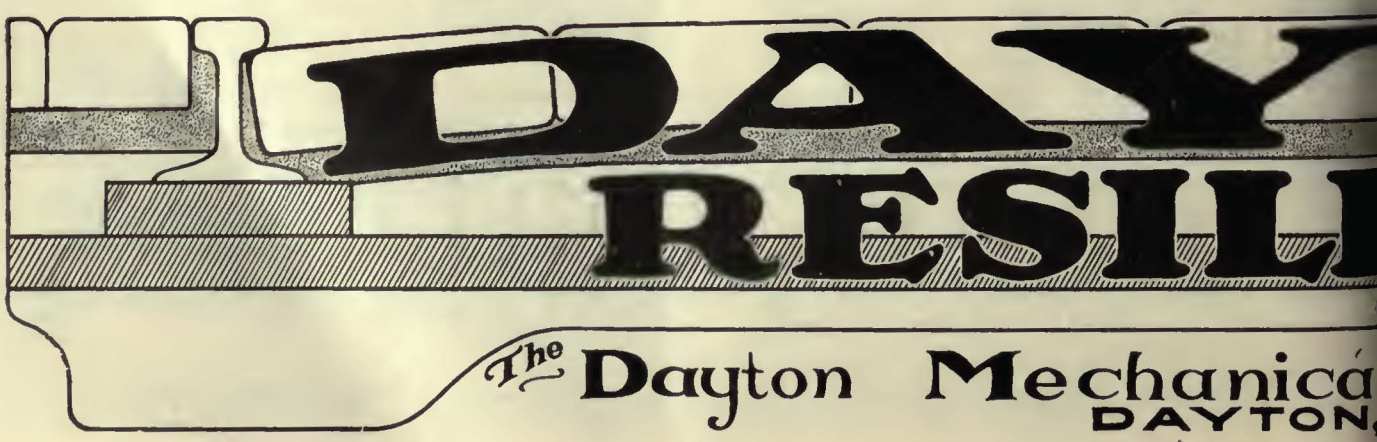
GraybaR ELECTRIC

OFFICES IN 55 PRINCIPAL CITIES
Address nearest office or 100 E. 42nd St., New York

SUCCESSOR TO SUPPLY DEPARTMENT Western Electric

Tracks of the People's Railway Company, on North Jefferson Street, Dayton, Ohio. Dayton Resilient Ties were installed in 1917. The photograph was taken in 1924. Note particularly the absence of any signs of joint repair.

The Dayton Mechanical Tie Co.
Dayton, Ohio



SEVEN YEARS

The track and joints are as smooth and solid as when new

The photograph bears testimony to the lasting qualities of track laid on Dayton Resilient Ties.

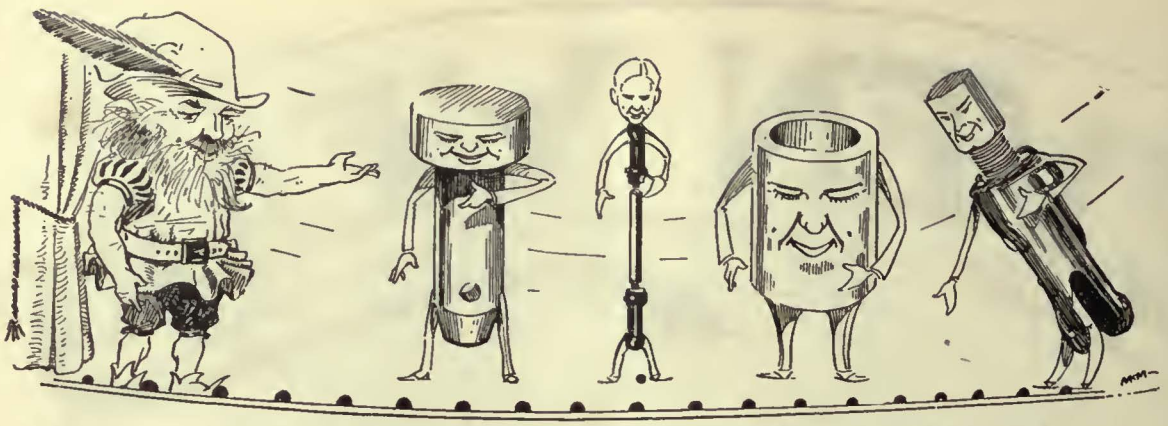
The wood block and asphalt cushion construction of the Dayton Tie has demonstrated its ability to absorb the vibrations and blows of traffic throughout many years and protect the track foundation.

Although the surface of the paving is beginning to show the years of wear, the track itself and the foundation are still smooth and quiet, even at the joints.

As usual Dayton Tie track has proven the most profitable track investment.

Construction details and cost data will be furnished upon request.

Tie Company
OHIO



Taking the "steenth" encore

When an act is called out time after time for encores, you can bet your bottom dollar the show is a success. In fact many managers rate their acts according to the amount of applause received.

In the same way constant repeat orders are visible evidence that the product is "making good." On this basis Boyerized Parts stand "ace high" in railway service. For these companies find that the special Boyerizing treatment gives car parts three to four times the life of ordinary untreated steel parts.

Pick out the parts you need — then send for quotations.

The McArthur Turnbuckle

Brake Pins	Spring Post Bushings
Brake Hangers	Spring Posts
Brake Levers	Bolster and Transom Chafing Plates
Pedestal Gibs	Manganese Brake Heads
Brake Fulcrums	Manganese Truck Parts
Center Bearings	Bushings
Side Bearings	Bronze Bearings

Bemis Car Truck Company

Electric Railway Supplies

Springfield, Mass.

Representatives:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Ore.
L. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.

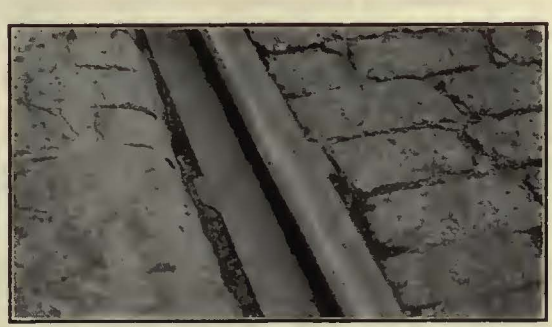
Increase the speed

~but remember that joint damage increases with the velocity

SOME people say it increases as the square of the velocity! In any case, we all know that running a car over bad joints at high speed, accelerates the destruction of the joint, and soon ruins the car itself. The slightest irregularity at the joint is quickly magnified.

Yet every ideal of modern and improved transportation calls for speed, and still more speed. The swift automobile is a spur to the railway which cannot be ignored.

Thermit-welding eliminates the joints, so that rails form one smooth, continuous track, without a break or bump.



A Thermit Rail Weld made over 6 years ago in Grand Street, Jersey City, N. J.

Look at this illustration! A car wheel at any speed, cannot bump or pound where there is no joint. The joints in this track disappeared for good five years ago—when they were Thermit-welded.

THERMIT

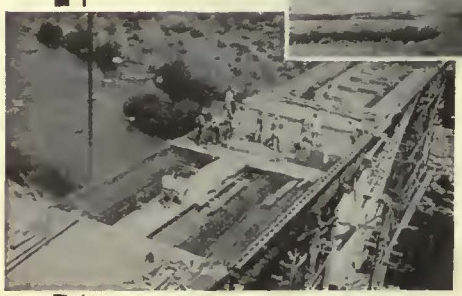
THERMIT

METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

Humboldt County
Van Duzen River Bridge
View looking North.



Construction Work—Bridge across Truckee River and S.P.R.R. track located in Nevada County, near Polaris.

Bridge over North Fork Pacheco Creek.
Located in Santa Clara County.

News from California about Concrete

Field control of concrete quality is now standard practice of the California State Highway Department.

During the last year and a half fifty bridges in various parts of the state have been built strictly in accordance with this practice.

Recognition has been given the principle that the most important factor in obtaining concrete of uniform strength is *control of the water ratio.*

In designing the proper mix for this control, aggregates have been graded by sieve analysis; proportions have been accurately determined by fineness modulus.

Then as a check on the consistency of the concrete, slump tests were made at regular intervals.

Finally, strengths on all jobs were verified by testing field cylinders made of concrete as it came from the mixer.

Results of these tests prove—as similar tests have proved on many other jobs throughout the country—that field control insures uniformly better concrete.

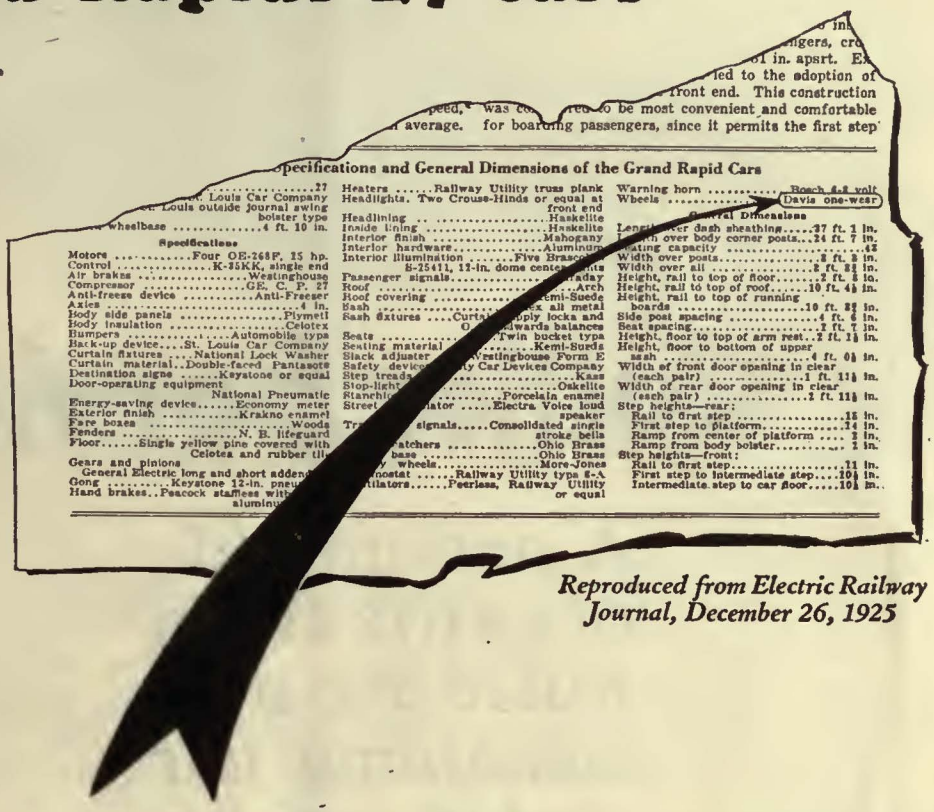
Write today for a copy of "Design and Control of Concrete Mixtures." Address the nearest office listed below. There is no obligation.

PORTLAND CEMENT ASSOCIATION

A National Organization to Improve and Extend the Uses of Concrete

ATLANTA	DALLAS	KANSAS CITY	NEW YORK	SALT LAKE CITY
BIRMINGHAM	DENVER	LOS ANGELES	OKLAHOMA CITY	SAN FRANCISCO
BOSTON	DES MOINES	MILWAUKEE	PARKERSBURG	SEATTLE
CHARLOTTE, N.C.	DETROIT	MINNEAPOLIS	PHILADELPHIA	ST. LOUIS
CHICAGO	INDIANAPOLIS	NASHVILLE	PITTSBURGH	VANCOUVER, B. C.
COLUMBUS	JACKSONVILLE	NEW ORLEANS	PORTLAND, ORE.	WASHINGTON, D. C.

Grand Rapids 27 cars-



...gers, cr... ...61 in. apart. Ex... ...led to the adoption of ... front end. This construction ...peed, ... was co... ...ed to be most convenient and comfortable ... average. for boarding passengers, since it permits the first step

Specifications and General Dimensions of the Grand Rapid Cars

...27	Heaters ...Railway Utility truss plank	Warning horn ...Bosch 4-8 volt
...Louis Car Company	Headlights. Two Crouse-Hinds or equal at front end	Wheels ...Davis one-wear
...Louis outside journal swing bolster type	Headlining ...Haskelite	General Dimensions
Wheelbase ...4 ft. 10 in.	Inside lining ...Haskelite	Length over dash sheathing...37 ft. 1 in.
Specifications	Interior finish ...Mahogany	Length over body corner posts...24 ft. 7 in.
Motors ...Four OE-268F, 15 hp.	Interior hardware...Aluminum	Seating capacity ...62
Control ...K-35KK, single end	Interior illumination ...Five Brasco H-25411, 12-in. domes center lights	Width over posts...8 ft. 3 in.
Air brakes ...Westinghouse	Passenger signals...Holiday	Width over all ...8 ft. 8½ in.
Compressor ...GE. C. P. 27	Roof ...Arch	Height, rail to top of floor...2 ft. 8 in.
Anti-freeze device ...Anti-Freezer	Roof covering ...Semi-Suede	Height, rail to top of roof...10 ft. 4½ in.
Axles ...4 in.	Sash ...Pantasote all metal	Height, rail to top of running boards ...10 ft. 2½ in.
Body side panels ...Plymetl	Sash fixtures ...Curtain supply locks and Edwards balances	Side post spacing ...4 ft. 6 in.
Body insulation ...Celotex	Seats ...Twin bucket type	Seat spacing...1 ft. 7 in.
Bumpers ...Automobile type	Seating material ...Kemi-Suede	Height, floor to top of arm rest..2 ft. 11 in.
Back-up device...St. Louis Car Company	Slack adjuster ...Westinghouse Form E	Height, floor to bottom of upper sash ...4 ft. 0½ in.
Curtain fixtures ...National Lock Washer	Safety device...ty Car Levices Company	Width of front door opening in clear (each pair) ...1 ft. 11½ in.
Curtain material..Double-faced Pantasote	Step treads ...Kass	Width of rear door opening in clear (each pair) ...2 ft. 11½ in.
Destination signs ...Keystone or equal	Stop-light ...Oskelite	Step heights—rear:
Door-operating equipment	Stanchions ...Porcelain enamel	Rail to first step ...15 in.
National Pneumatic	Street ...ator ...Electra Voice loud speaker	First step to platform...14 in.
Energy-saving device...Economy meter	Tr... signals...Consolidated single stroke bells	Ramp from center of platform ... 2 in.
Exterior finish ...Krakno enamel	...tchers ...Ohio Brass	Ramp from body bolster ...1 in.
Fare boxes ...Woods	...base ...Ohio Brass	Step heights—front:
Fenders ...N. B. lifeguard	...wheels...More-Jones	Rail to first step...13 in.
Floor...Single yellow pine covered with Celotex and rubber tile	...nostat ...Railway Utility type E-A	First step to intermediate step...10½ in.
Gears and pinions General Electric long and short addendum	...tilators...Peerless, Railway Utility or equal	Intermediate step to car floor...10½ in.
Gong ...Keystone 12-in. pneu...		
Hand brakes...Peacock staffless with aluminu...		

Reproduced from Electric Railway Journal, December 26, 1925

DAVIS "One-Wear" WHEELS

Grand Rapids has chosen — and the entire railway field notes with interest the outcome of the unique experiments with modern electric railway equipment.

The unchallenged economy, and the sound principles of design embodied in Davis One-Wear Steel Wheels have led to their choice as part of the modern car.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

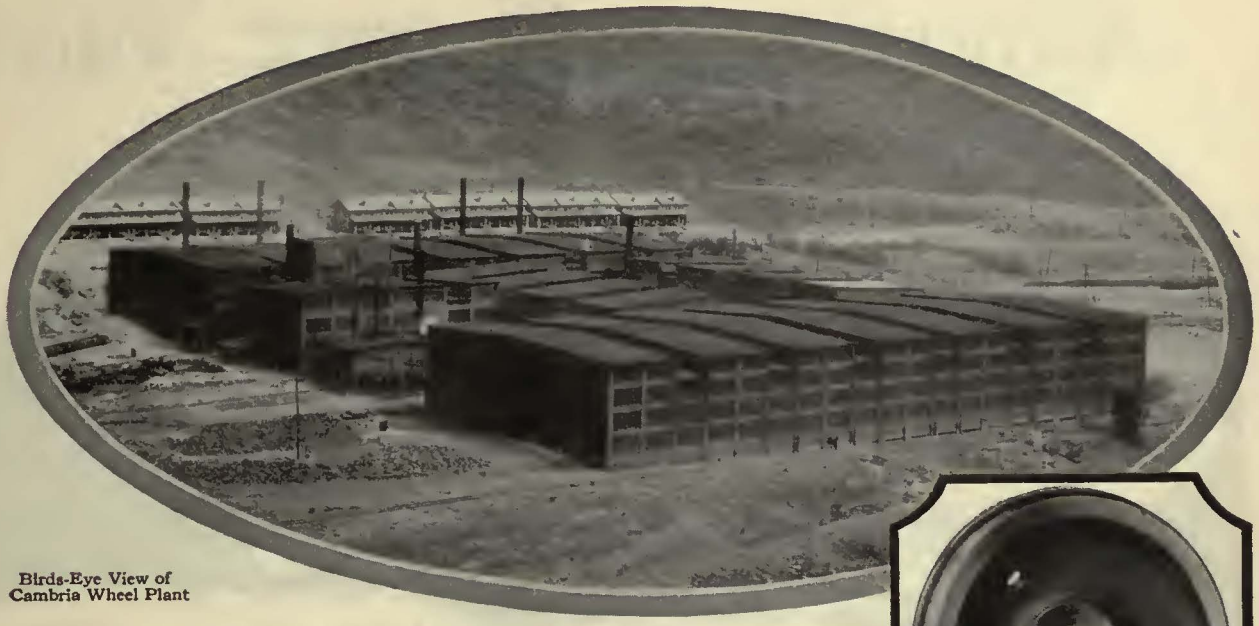
Collier Service

A nation-wide organization building and sustaining car cardadvertising space values

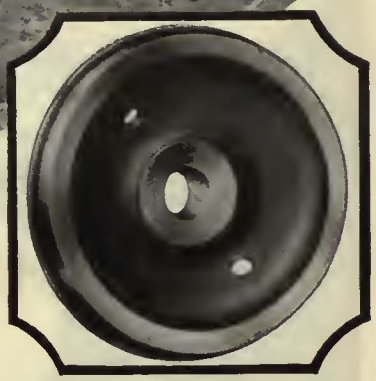
Barron G. Collier, Inc.

Candler Bldg.

New York



Birds-Eye View of Cambria Wheel Plant



Forged *then* Rolled —*to Give Longer Life*

Cambria Wheels are made by a combined forging and rolling process which gives them great durability and an exceptionally long life.

The forging process gives strength, toughness and density to the metal, while the rolling establishes a grained structure which prevents breakage and crystallization.

Long experience in the manufacture of wheels and control over materials assure you of a product of the highest quality and finest workmanship.

Cambria Forged Car Axles

Cambria Car Axles are made of the same fine quality as Cambria Wheels and can be furnished smooth forged or rough turned all over; solid or hollow bored; rough turned on journals and wheel seats; heat treated or untreated.

A Few Bethlehem Railway Products

for Electric Railways include Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

DISTRICT OFFICES

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

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM

CAMBRIA CAR WHEELS AND AXLES

Annual Maintenance Numbe

Railways Plan to Spend $296,000,000 for Plant and Material in 1926

Purchasing Power of the Industry Shows Healthy Progress—An Increase of 11.66 per Cent Over Last Year's Figures Is Promised—Large Track Construction Program Is Included in Forecast Submitted by the 57 Operating Companies Furnishing Information

, 1926 ELECTRIC RAILWAY JOURNAL

34 per Cent of Passenger Cars Are Over Twenty Years Old

Less than Half of All Cars Now in Electric Railway Service Were Purchased in the Last Fifteen Years—Greater Number of New Cars Are Needed to Modernize Industry than Was Anticipated —Nationwide Survey More than Confirms Previous Estimates

more

Track Extensions Show Substantial Gain Over Previous Years

Electric Railway Mileage Added During Past Twelve Months Is Larger than in Any Other Year Since 1918—Extensions to City and Interurban Trackage Show Increases Over 1924 — More than Twice as Much Steam Railroad Mileage Was Electrified

ELECTRIC RAILWAY JOURNAL

Bus Operation by Electric Railways Broke All Records in 1925

More Companies Inaugurated Bus Service During the Past Twelvemonth than in Any Previous Year—The Number of Buses Operated More than Doubled—Purchases of New Passenger and Service Equipment Were Greater than Ever Before

Costs and Electrible in 1

Occurred in Major In Trends Indicates Only n Method of Comp Duri Com S. Richey gineer, Worcester, Mas

ELECTRI

ership

Few in Receivers e Over That re on the

--to be dated March 20, 1926

From the Industry's Headlines—learn a lesson!

A REMARKABLE opportunity for the manufacturers of railway equipment and supplies is revealed by the data published in the January 2nd Statistical Issue of ELECTRIC RAILWAY JOURNAL. A few of the strikingly suggestive facts are indicated in the headlines reproduced here.

The definitely-indicated movement toward modernization of rolling stock, brings with it the problems of modernizing maintenance, to the end that riders, attracted by new cars, may be retained as permanent patrons. Only by keeping cars, track and line in the pink of condition can a present-day public be kept "sold" on the electric railway as a means of transportation.

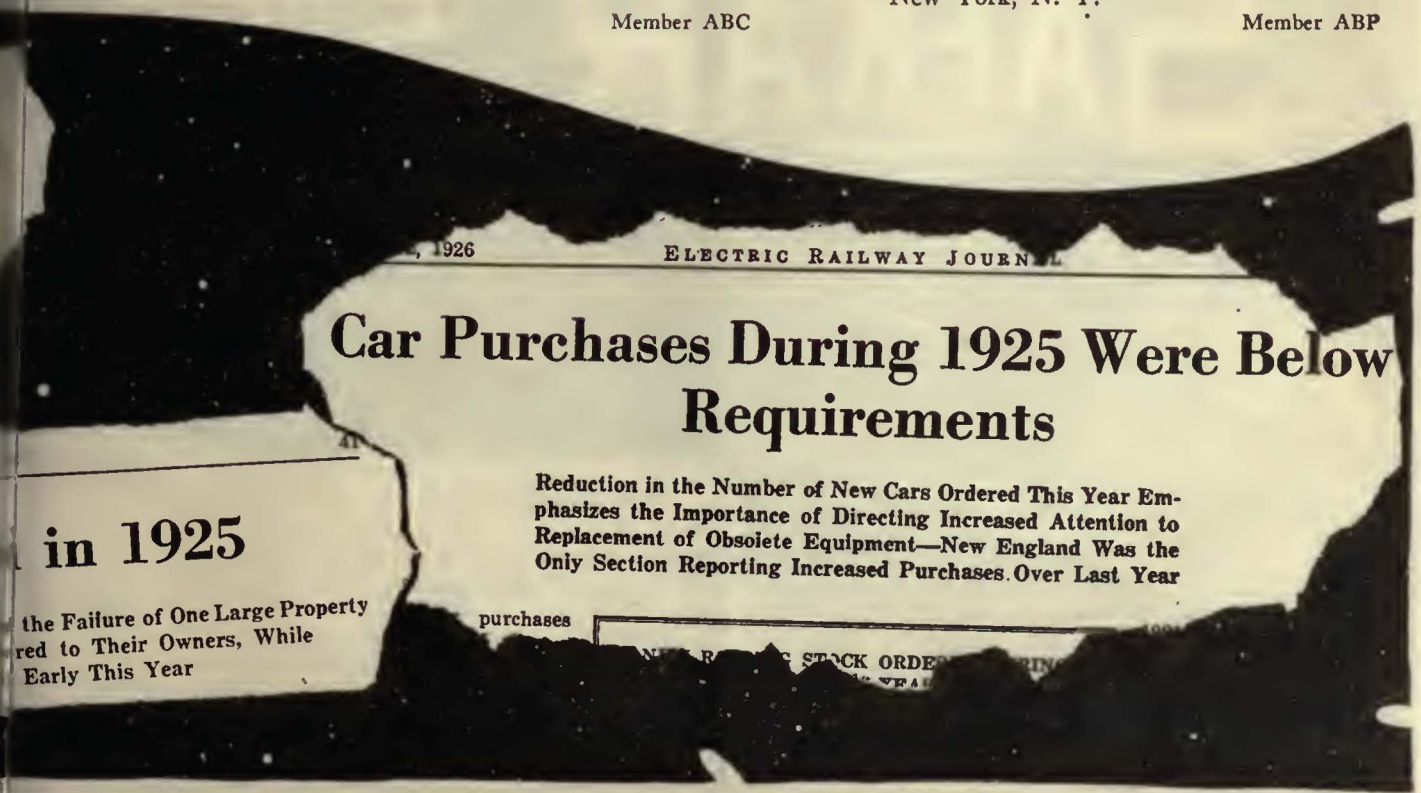
It is to the further exposition of this timely subject, that the big Annual Maintenance Number of ELECTRIC RAILWAY JOURNAL will be dedicated. The producer and distributor of electric railway equipment, supplies, maintenance materials and shop machinery, represented in this issue will derive enhanced value from ample advertising space, due to this tie-in with a timely and appropriate editorial program.

ELECTRIC RAILWAY JOURNAL

(*A McGraw-Hill Publication*)

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

Member ABC Member ABP



, 1926 ELECTRIC RAILWAY JOURN

Car Purchases During 1925 Were Below Requirements

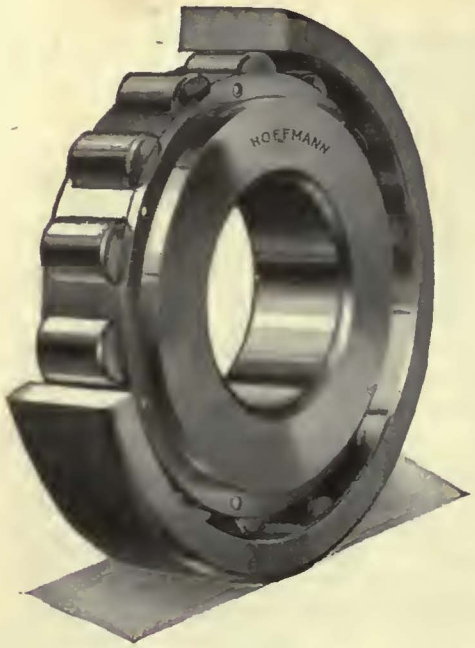
Reduction in the Number of New Cars Ordered This Year Emphasizes the Importance of Directing Increased Attention to Replacement of Obsolete Equipment—New England Was the Only Section Reporting Increased Purchases Over Last Year

in 1925

the Failure of One Large Property red to Their Owners, While Early This Year

purchases

RUGGED SIMPLICITY



Cylindrical rollers, cylindrical races, full-line contact of each roller on races, always—a sturdy balanced cage—this is the utter simplicity of the **"Hoffmann"** Precision Roller Bearing. Initial precision indefinitely maintained under hardest service, makes "adjustability" unnecessary. Hardened and heat-treated alloy steels make wear negligible.

On heavy-duty bearing problems, let our engineers work with you. And send for Catalog 904.

NORMA-HOFFMANN BEARINGS CORPORATION
Stamford — Connecticut
PRECISION BALL, ROLLER AND THRUST BEARINGS

"HOFFMANN"

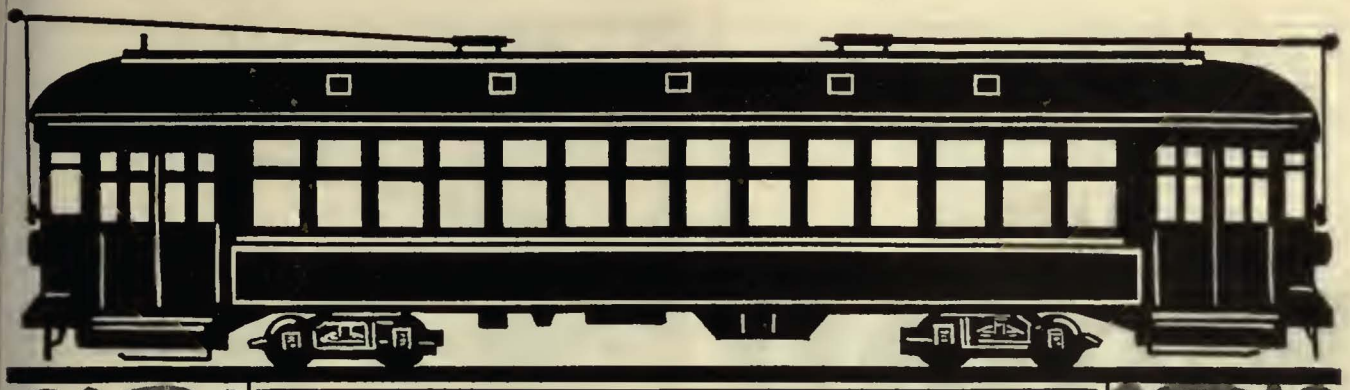
IRVING
SAFKAR STEP
TRADE MARK

DAMAGES paid for one car step accident may cost you more than a complete equipment of permanently non-slipping "SAFKAR" Car Steps for every car on your system. They're lighter in weight than other steps, too—a big saving in dead load. And maintenance costs upon them are negligible.

Write for Catalog 4A28.

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y. U.S.A.

P-83



Service represents one of the reasons why electric railways in steadily increasing numbers are using Gary Wrought Steel Wheels. Central plant location assures prompt delivery after shipment. Long association with railroad requirements guarantees intelligent and painstaking handling of orders.

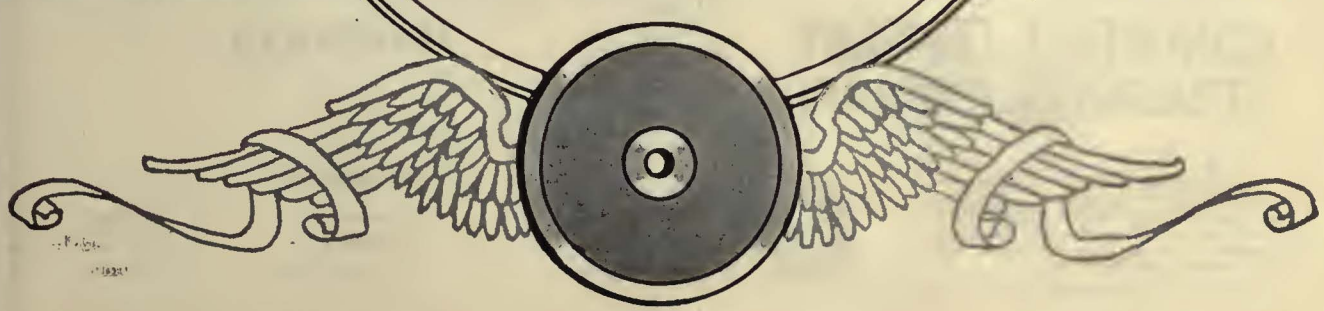
Of themselves, these considerations would be insufficient, perhaps, to be of deciding influence. Added, however, to the manner in which the quality of Gary Steel Wheels is guarded from ore mine to finished product, they help to explain the favor that Gary Wheels enjoy.

Illinois Steel Company

General Offices: 208 So. La Salle St.
Chicago, Illinois

GARY

WROUGHT STEEL WHEELS



Save the motors use Nuttall

Standard Helical Gears

That shock of acceleration that is inevitable with spur gearing. Springs bolts, strains bearings, loosens insulation, cuts gear life and motor life, and piles up maintenance.

The motors suffer; body work suffers and soon begins to creak.

Nuttall BP Helical Gears will stop this profit leak. The meshing of the teeth is like the turning of a screw — smooth, vibrationless, noiseless, shockless. There is no grinding and no chattering.

We'll be glad to cooperate in *proving* their economy on your cars. Consult us.

Write for our Helical Gear Book

R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

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

MEMBER A.E.R.A.

You're having brush trouble

CORRECT IT
USE LE CARBONE CARBON BRUSHES

They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street

Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal and Toronto

Griffin Wheel Company

410 North Michigan Ave.
Chicago, Ill.

GRIFFIN F. C. S. WHEELS

For Street and Interurban Railways

FOUNDRIES:

Chicago	Boston	St. Paul
Detroit	Kansas City	Los Angeles
Denver	Council Bluffs	Tacoma

KUBEE

It is hard for the long-skirted fundamentalist to understand that modesty can exist where clothes do not.

Yet the South Sea Islander, backed by records, will tell you that clothes are the cause rather than the result of a sense of modesty.

Far be it from us to enter the controversy. Judging from what is going on (or off) in the matter of dress in our own cities — we hope it's so.

We have authority to speak only in the matter of carbon brushes (Morganite brushes to be specific) and in that line we consider it perfectly modest to strip brush selling of all its frills and furbelows and get right down to the naked truth, and to talk very frankly and openly about it.

Just mention this matter to any of the men in the list below — they like to talk this way.

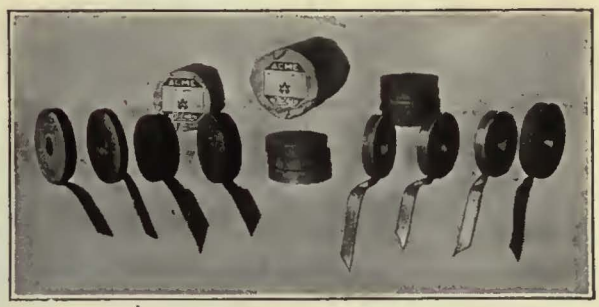
Morganite Brush Co., Inc.

Main Office and Factory
519 West 39th St., New York

DISTRICT ENGINEERS AND AGENTS

Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn. Ave.
Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.
Cleveland, Electrical Engineering & Mfg. Co., 422 Union Building.
Baltimore, O. T. Hall, Sales Engineer, 437-A Equitable Building.
Revere, Mass., J. F. Drummey, 75 Pleasant Street.
Los Angeles, Special Service Sales Co., 502 Delta Building.
San Francisco, Special Service Sales Co., 202 Russ Building.
Toronto, Can., Railway & Power Engineering Corp., Ltd., 133 Eastern Ave.
Montreal, Can., Railway & Power Engineering Corp., Ltd., 326 Craig St., West.
Winnipeg, Can., Railway & Power Engineering Corp., Ltd., P. O. Box 325.

ACME WIRE PRODUCTS



BIAS CAMBRIC TAPES FOR SHOP USE

The man in the shop is the best judge of tapes. We make them to suit him. In the Sewed Bias Tape, the stitching is finer and the butted seam thinner. We need only 48 seams in a 72-yard roll. Some tapes have as many as 55!

The Acme sewed seams are so thin they do not need to be cut out. Acme Seamless Bias Tape comes in any width and in thicknesses from .007 in. to .015 in.; rolls of 72 yards all one piece of cloth, or special length rolls where required.

Acme Varnished Cambric Tapes are made in either yellow or black, and with dry, tacky or greasy finish.

Ask for Catalog 3J

It contains tables and complete data on Varnished Insulations.

THE ACME WIRE CO.
Main Office and Plant
NEW HAVEN, CONN.

New York
52 Vanderbilt Ave.

Chicago
427 West Erie St.

Boston
80 Federal Street

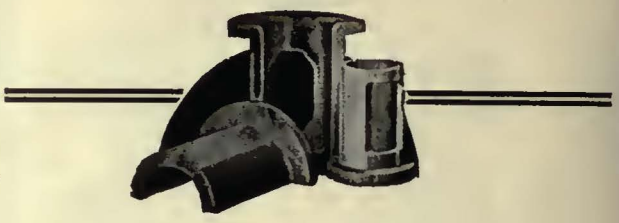
Cleveland
Guardian Bldg.

"Tool Steel"
helical gears
are
Quiet on the start
and
Continue Quiet
because
They dont wear.

BUY THE BEST

The Tool Steel Gear and Pinion Co.
CINCINNATI, OHIO

Greater Service Per Dollar Invested



"Tiger" Bronze Axle and Armature Bearings

More-Jones "Tiger" Bronze castings for axle and armature-bearing service was one of our early achievements. This is probably the most widely known bronze on the market. It has stood the test of time. There is nothing better for long, efficient and most economical results. Let us quote you.

More-Jones Brass & Metal Co.
St. Louis, Mo.

MORE-JONES QUALITY PRODUCTS

Cold Dinners

for *your* passengers?

Not if you use

AJAX

BABBITT *for* ARMATURES

keeps the rolling stock rolling

The Ajax Metal Company
Established 1880
PHILADELPHIA
NEW YORK CHICAGO BOSTON CLEVELAND

The DIFFERENTIAL CAR

Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

SPECIALISTS

in the

Design and Manufacture

of

Standard—Insulated—and Compromise Rail Joints

The Rail Joint Company
61 Broadway, New York City

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

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

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 521-5 Baronne Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

Chicago — Boston — Pittsburgh
New York — Cleveland — Denver
U. S. Steel Products Co.
San Francisco — Los Angeles — Portland — Seattle

BUDA
ESTABLISHED 1881

Special Track Work of every description

THE BUDA COMPANY

Harvey (Suburb Chicago) Illinois

B. A. HEGEMAN, Jr., President — C. C. CASTLE, First Vice-President
H. A. HEGEMAN, Vice-Pres. and Treas. — F. T. SARGENT, Secretary
W. C. PETERS, Manager Sales and Engineering

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York
Munsey Bldg., Washington, D. C. — 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Bell Locked Fare Box and Change Maker
The Aluminum Field Coils
Walter Tractor Snow Plows
Cutler-Hammer Electric Heaters
Genesco Paint Oils
Garland Ventilators
Flaxlinum Insulation
Yellow Coach Mfg. Co.'s Single and Double Deck Busses.
B. G. Spark Plugs
Economy Electric Devices Co.'s Power Saving and Inspection Meters
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Ft. Pitt Spring & Mfg. Co., Springs
Anderson Sleck Adjusters
Feasible Drop Brake Staffs
Dunham Hopper Door Devices

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:

Atlanta — Chicago — Cleveland — New York
Philadelphia — Pittsburgh

Pacific Coast Representative:
United States Steel Products Company
Los Angeles — Portland — San Francisco — Seattle

Export Representative:
United States Steel Products Company, New York, N. Y.

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

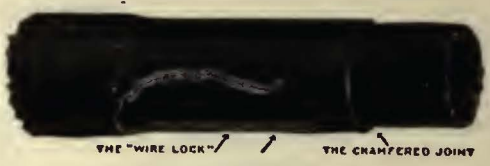
Factories, PASSAIC, N. J. PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta Birmingham San Francisco Los Angeles Seattle

Pettingell-Andrews Co., Boston, Mass.
F. D. Lawrence Electric Co., Cincinnati, O.
Novelty Electric Co., Phila., Pa.

Can. Rep.: Engineering Materials Limited, Montreal.
Cuban Rep.: Victor G. Mendoza Co., Havana.

ELRECO TUBULAR POLES



COMBINE

Lowest Cost **Lightest Weight**
Least Maintenance **Greatest Adaptability**

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street

Waterproofed Trolley Cord

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

FOR POSITIVE SATISFACTION ORDER SILVER LAKE

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

Sold by Net Weights and Full Lengths

SILVER LAKE COMPANY

Manufacturers of bell, signal and other cords.

Newtonville, Massachusetts

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.

Irvington, N. J.

Sales Representatives in the Principal Cities

AMERICAN ELECTRICAL WORKS — AMELECTRIC — Wires and Cables — PHILLIPSDALE, R.I.

Reg. U. S. Pat. Office

Incandescent Lamp Cord

AMELECTRIC PRODUCTS

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

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams;
Cincinnati, Traction Bldg.; New York, 166 E. 42nd St.

STANDARD

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

Chapman Automatic Signals

Charles N. Wood Co., Boston

ANACONDA TROLLEY WIRE

ANACONDA COPPER MINING COMPANY
THE AMERICAN BRASS COMPANY
Rods, Wire, Cable Products
NEW YORK CHICAGO

ROEBLING

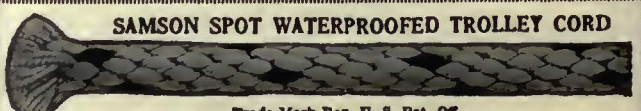
WELDING CABLE
ELECTRICAL WIRES and CABLES
John A. Roebling's Sons Company, Trenton, N. J.

AUTOMATIC SIGNALS

Highway Crossing Bells
Headway Recorders
Flasher Relays

NACHOD SIGNAL COMPANY, INC.
LOUISVILLE, KENTUCKY.

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws. Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 5 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers, in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

POSITIONS WANTED

AS supervisor of welding, grinding and bonding. Nine years' experience both as traveling demonstrator, and in supervising joint and surface welding, grinding, bonding, shop-welding and apparatus repairs on both city and interurban properties. Can guarantee to get highest results in economy and performance. Location immaterial. Available about April 15. PW-883, Electric Railway Journal, Tenth Ave. at 36th St., New York.

ELECTRIC traction master mechanic, 36 years old, with 11 years' experience on city, interurban, and bus lines. Employed at present but desire change. Will go anywhere, but Texas preferred. Best of references. PW-882, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

ENGINEER, 24 years' experience in electric railway rolling stock maintenance and transportation supervision, open for position. PW-879, Electric Railway Journal, Tenth Ave. at 36th St., New York.

BOOKS AND PERIODICALS

For Sale

25 years' unbound copies Electric Railway Journal, $50. B&P-880, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

Rails WeBuy and Sell entire equipment of Electric Railways, including Rails, Cars, Wiring, Conduits, Etc.

Get Our Bids or Ask for Prices

Hyman-Michaels Company
People's Gas Bldg., Chicago
New York St. Louis Pittsburgh
San Francisco Dallas (77)

TO HELP YOU
LOCATE BUSINESS OPPORTUNITIES
"Searchlight" Advertising
G-6

4 High Grade, High Speed, 46 PASSENGER CARS with COMBINATION (Smoking and Baggage) SECTIONS

Exceptionally good for Interurban Service

Every car in first-class operating condition. Built by Cincinnati Car Company. Length over all, 47 ft. 0 in. Height over trolley board, 13 ft. 6½ in. Height over all, 13 ft. 1½ in. Number of seats, 15 across, 4 long. Type of motors, four G.E.-204. Make of trucks, Standard. Wheel base, 6 ft. 6 in. Controller K-34-D. Toilet, 29 in.x34 in. Air Compressor, WH-D-2. These cars good for one or two man operation.

See our advertisement in the Jan. 30th issue of this publication for illustration of these cars. Write for further particulars.

We also have some 56-passenger cars of this type, as offered in our advertisement of January 2nd.

J. W. GERKE, *Railway Equipment*
303 Fifth Ave., New York City

FOR SALE
30 Birney Safety Cars
Brill Built
West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

If there is anything you want—

or something you don't want that *other* readers of this paper can supply—or use—advertise in the

SEARCHLIGHT SECTION

Somebody is always looking for something to meet certain business needs. Some men in charge of plant operations may be in the market for good used equipment—others may have just what they want, to sell. Some may require a man of unusual qualifications for a particular position—that man may be another reader of this paper!

Put the Searchlight Section to work for you under any of the following classifications—to fill your business needs.

Agencies Wanted	Contracts Wanted	Miscellaneous Wants	Positions Wanted
Agents Wanted	Educational Courses	New Industries Wanted	Property For Sale
Auction Notices	Employment Agencies	Partners Wanted	Receivers' Sales
Buildings For Sale	Exchanges	Patents For Sale	Representatives Wanted
Business Opportunities	For Rent Items	Patent Attorneys	Salesmen Wanted
Civil Service Opportunities	Franchises	Plants For Sale	Work Wanted
Contracts To Be Let	Industrial Sites	Positions Vacant	Etc., Etc., Etc.

"Searchlight" is the "Opportunity"

advertising of this industry.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brake Co.

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

Armature Shop Tools
Elec. Service Supplies Co.

Asphalt Paint
Amer. Asphalt Paint Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Illinois Steel Co.
Johnson & Co., J. R.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson, J. R.

Axles, Car Wheel
Bethlehem Steel Co.

Axles, Steel
Carnegie Steel Co.
Johnson, J. R.

Babbit Metal
More Jones Brass & Metal Co.

Badges and Buttons
Elec. Service Supplies Co.

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

Bearings, Center and Roller Side
Stucki Co., A.

Bearings, Roller & Ball
Norma Hoffman Bearing .Co

Bells and Gongs
Brill Co., The J. G.
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Graybar Electric Co.

Bodies, Bus
Auto Body Co.
Cummings Car & Coach Co.
Graham Bros.

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Bolts & Nuts Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Graybar Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

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

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Graybar Electric Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Bemis Car Truck Co.
Brill Co., The J. G.

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

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co.

Bulkheads
Haskelite Mfg. Corp.

Bus Seats
Bender Body Co.
Hale-Kilburn Co.
S. Karpen & Bros.

Buses, Motor
Brill Co., The J. G.
Cummings Car & Coach Co.
Graham Brothers
International Harvester Co.
International Motor Co.
Mack Trucks, Inc.
White Company
Yellow Coach Co.

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

Cables. (See Wires and Cables)

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

Carbon Brushes (See Brushes, Carbon)

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

Car Lighting Fixtures
Elec. Service Supplies Co.

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

Car Steps, Safety
Irving Iron Works

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

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

Cars, Second Hand
Electric Equipment Co.
Transit Equipment Co.

Cars, Self-Propelled
Brill Co., J. G., The
General Electric Co.

Castings, Brass Composition or Copper
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
Bemis Car Truck Co.
Wm. Wharton, Jr. & Co.

Castings, Malleable and Brass
Bemis Car Truck Co.
Horne & Ebling Corp.

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

Catenary Construction
Archbold-Brady Co.
Graybar Electric Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Co.

Cements Products
Portland Cement Asso.

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

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

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

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Root Spring Scraper Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Elec. Service Supplies Co.

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

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compounds (Insulating and Splicing)
Johns-Manville, Inc.

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

Concrete Flooring Surface
Irving Iron Works

Condensor Papers
Irvington Varnish & Ins. Co.

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

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers
Amer. Brown Boveri Elec. Corp.

Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

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

Converters, Rotary
Amer. Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
Anaconda Copper Mining Co.

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

Cord, Bell, Trolley, Register
Brill Co., The J. G.
Elec. Service Supplies Co.
Roebling's Sons Co., John A.
Samson Cordage Works
Silver Lake Co.

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

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing, Frog & Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

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

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

Crossing, Track (See Track, Special Work)

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

Curtains & Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.
Pantasote Co., Inc.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.
Gerke, J. W.
Hyman-Michaels

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heat. Co.
General Electric Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.
St. Louis Car Co

Doors & Door Fixtures
Brill Co., The J. G.
Consolidated Car Heat. Co.
Hale-Kilburn Co.
General Electric Co.
Morton Mfg. Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

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

Dryers, Sand
Elec. Service Supplies Co.

Ears
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
Graybar Electric Co.

Electric Grinders
Railway Track-work Co.
Western Electric Co.

Electrodes, Carbon
Railway Track-work Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Track-work Co.
Una Welding & Bonding Co.

Enamel
Duco E. I. Du Pont De Nemours & Co.
Lucas & Co., John

Engineers, Consulting, Contracting and Operating
Allison & Co., J. S.
Archbold-Brady Co.
Beeler, John A.
Bibbins, Rowland J.
Buchanan & Layng Corp.
Bureau of Commercial Economics, Inc.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Kelly Cooke & Co.
McClellan & Junkersfeld
Ong, Joe R.
Railway Audit & Inspection Co.
Richey, 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
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Perey Mfg. Co.
Nat'l Ry. Appliance Co.

Fare Registers
Electric Service Supplies Co.
Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts
Acme Wire Co.
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co.
Root Spring Scraper Co.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

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

Floodlights
Elec. Service Supplies Co.

Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Flooring, Fireproof
Irving Iron Works

Flooring, Non-Slipping
Irving Iron Works

Flooring, Open Steel
Irving Iron Works

Flooring, Steel, Subway
Irving Iron Works

Flooring, Ventilating
Irving Iron Works

Forgings
Brill Co., J. G., The

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co
Ohio Brass Co.
Westinghouse E. & M. Co.

Funnell Castings
Wm. Wharton, Jr. & Co., Inc.

Furnaces, Electric
Amer. Brown Boveri Elec. Corp.

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

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas Producers
Westinghouse E. & M. Co.

Gas-Electric Cars
General Elec. Co.
Westinghouse E. & M. Co.

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

Gear Blanks
Bethlehem Steel Co.
Brill Co., J. G., The

Gear Cases
Chillingworth Mfg. Co.
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Bethlehem Steel Co.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
Amer. Brown Boveri Elec. Corp.
General Electric Co.
Graybar Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gong (See Bells and Gongs)

Grating, Steel Subway
Irving Iron Works

Greases (See Lubricants)

Grinders & Grinding Supplies
Metal & Thermit Corp.
Railway Track-work Co.

Grinders, Portable
Railway Track-work Co.

Grinders, Portable Electric
Railway Track-work Co.

Grinding Bricks and Wheels
Railway Track-work Co.

Guard Rail Clamps
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Elec. Service Supplies Co
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

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

Headlining
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Heaters, Car (Electric)
Consolidated Car Heat. Co.
Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Helmets, Welding
Railway Track-work Co.
Una Welding & Bonding Co.

Instruments Measuring, Testing and Recording
General Electric Co.
Graybar Electric Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Stand. Underground Cable Co.
Westinghouse E. & M. Co.

Insulating, Silk & Varnish
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.

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

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

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Interior Side Linings
Haskelite Mfg. Corp.

Jacks (See also Cranes, Hoists and Lifts)
Buda Co.
Elec. Service Supplies Co.

Joints, Rail
(See Rail Joints)

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

Junction Boxes
Standard Underground Cable Co.

Lacquer
Duco E. I. Du Pont De Nemours & Co.

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

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

Lamps, Signal and Marker
Electric Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Haskelite Mfg. Corp.

Lightning Protection
Elec. Service Sup. 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 Sup. Co.
General Electric Co.
Graybar Electric Co.
Hubbard & Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co., Inc.

Locomotives, Electric
Amer. Brown Boveri Elec. Corp.
Cummings Car & Coach Co.
General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Castings
Wm. Wharton, Jr. & Co., Inc.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co., Inc.

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

Meters (See Instruments)

Motor Buses (See Buses, Motor)

Motors, Electric
Amer. Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Motors and Generators, Set
Allis-Chalmers Mfg. Co
Amer. Brown Boveri Elec. Corp.
General Electric Co.

Motormen's Seats
Brill Co., J. G.
Elec. Service Sup. Co.
Heywood-Wakefield Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
Bethlehem Steel Co.
Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses, Motor)

Oxy-Acetylene (See Cutting Apparatus, Oxy-Acetylene)

Oxygen
International Oxygen Co.

Packing
Westinghouse E. & M. Co.

Paint
Amer. Asphalt Paint Co.
Duco E. I. Du Pont De Nemours & Co.

Paints and Varnishes (Insulating
Electric Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Paving Guards, Steel
Consolidated Car Heat. Co.
W. S. Godwin Co., Inc.

Pickup, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Ohio Brass Co.
Westinghouse Tr. Brake Co.

Pipe Fittings
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Sup. Co.

Plywood, Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pole Line Hardware
Bethlehem Steel Co.
Electric Service Supplies Co.
Ohio Brass Co.

Poles, Metal Street
Elec. Ry. Equipment Co.
Hubbard & Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Graybar Electric Co.

Poles & Ties Treated
Bell Lumber Co.
International Creosoting & Construction Co.

Poles, Ties, Posts, Piling & Lumber
Bell Lumber Co.
International Creosoting & Construction Co.
Naugle Pole & Tie Co.

Poles, Trolley
Bell Lumber Co.
Elec. Service Supplies Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Elec. Ry. Equipment Co.

Portable Grinders
Buda Co.

Potheads
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.

Punches, Ticket
Wood Co., Chas. N.

Pyroxylin
Duco E. I. Du Pont De Nemours & Co.

Rail Braces & Fastenings
Ramapo Ajax Corp.

Rail Filler
Philip Carey Co.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Illinois Steel Co.
Rail Joint Co.

Rail Joints—Welded
Lorain Steel Co.
Metal & Thermit Corp.

Rail Welding
Metal & Thermit Corp.
Railway Track-work Co.
Una Welding & Bonding Co.

Rails, Relaying
Hyman-Michaels

Rails, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Illinois Steel Co.

Railway Paving Guards, Steel
Godwin Co., Inc., W. S.

Railway Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Elec. Service Supplies Co.
Hale-Kilburn Co.

Rectifiers, Mercury
Amer. Brown Boveri Elec. Corp.

Registers and Fittings
Brill Co., The J. G.
Elec. Service Supplies Co.
Ohmer Fare Register Co.
Rooke Automatic Register Co.

Reinforcement, Concrete
Amer. Steel & Wire Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
General Electric Co.
Westinghouse E. & M. Co.

Replacers, Car
Elec. Service Sup. Co.

Resistances
Consolidated Car Heat. Co.

Resistance, Wire and Tube
American Steel & Wire Co.
General Electric Co.
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

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

Roofing Asbestos (Car)
Johns-Manville, Inc.

Roofing, Car
Haskelite Mfg. Co.
Pantasote Co., Inc.

Roofs, Car and Bus
Haskelite Mfg. Corp.

Roller Bearings
Norma Hoffman Bearing Co.

Sanders, Track
Brill Co., The J. G.
Elec. Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.

Sash Fixtures, Car
Brill Co., The J. G.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Sup. Co.

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.

Seats, Car (See also Rattan)
Brill Co. The J. G.
Hale-Kilburn Co.

Seating Materials
Brill Co., J. G.
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Second Hand Equipment
Electric Equipment Co.
Gerke, J. W.
Hyman-Michaels

Shades, Vestibule
Brill Co., The J. G.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Side Bearings (See Bearings, Center and Side)

Signals, Car Starting
Consolidated Car Heat. Co.
Elec. Service Sup. Co.
Nat'l Pneumatic Co., Inc.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
Wood Co., Chas. N.

Signal Systems, Block
Elec. Service Sup. Co.
Nachod Signal Co., Inc.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Smokestacks, Car
Nichols-Lintern Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Consolidated Car Fender Co.
Cummings Car & Coach Co.
Root Spring Scraper Co.

Sockets & Receptacles
Johns-Manville, Inc.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)
Irvington Varnish & Ins. Co.

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.
Wm. Wharton, Jr. & Co.

Spikes
Amer. Steel & Wire Co.
Illinois Steel Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
Amer. Steel & Wire Co.
Bemis Car & Truck Co.
Brill Co., The J. G.

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.

Stair Steps, Safety
Irving Iron Works

Steel and Steel Products
Carnegie Steel Co.
Illinois Steel Co.

Steps, Car
Brill Co., The J. G.
Irving Iron Works
Morton Mfg. Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Storage Batteries (See Batteries, Storage)

Strain Insulators
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switches, Selector
Nichols-Lintern Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Switches and Switchboards
Amer. Brown Boveri Elec. Corp.
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Tampers, Tie
Railway Track-work Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Telephones and Parts
Elec. Service Supplies Co.
Graybar Electric Co.

Terminals, Cable
Std. Underground Cable Co.

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heat. Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Elec. Service Supplies Co.

Tickets & Transfer
Globe Ticket Co.

Tie Plates
Illinois Steel Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
Carnegie Steel Co.
Godwin Co., Inc., W. S.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tires
India Tire & Rubber Co.
Mohawk Rubber Co.

Tongue Switches
Wm. Wharton, Jr. & Co., Inc.

Tools, Track & Miscellaneous
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Hubbard & Co.
Railway Track-work Co.

Tool Steel
Bethlehem Steel Co.

Torches, Acetylene (See Cutting Apparatus)

Towers and Transmission Structures
Archbold-Brady Co.
Westinghouse E. & M. Co.

Track Expansion Joints
Wm. Wharton, Jr. & Co., Inc.

Track Grinders
Metal & Thermit Corp.
Railway Track-work Co.

Track, Special Work
Barbour-Stockwell Co.
Bethlehem Steel Co.
Buda Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Trackless Trolley Cars
Brill Co., The J. G.

Transfer (See Tickets)

Transfer Issuing Machines
Ohmer Fare Register Co.

Transfer Tables
American Bridge Co.

Transformers
Amer. Brown Boveri Elec. Corp.
General Electric Co.
Graybar Electric Co.
Westinghouse E. & M. Co.

Transportation Publication
Blake & Jackson's Electric Railway Transportation

Treads, Safety, Stair, Car Step
Irving Iron Works
Morton Mfg. Co.

Trolley Bases
General Electric Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Bases, Retrieving
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Buses
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Trolley Material, Overhead
Elec. Service Supplies Co
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Wheel Bushings
More-Jones Brass & Metal Co.

Trolley Wheels & Harps
Electric Service Supplies Co
More-Jones Brass & Metal Co.

Trolley Wheels (See Wheels, Trolley)

Trolley Wire
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Graybar Electric Co.
Roebling's Sons Co., J. A.

Trucks, Car
Bemis Car & Truck Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Lightweight Noiseless Electric Street Car Co.

Trucks, Motor
Graham Bros.
International Motor Co.
Mack Trucks, Inc.
White Co.

Truss Planks
Haskelite Mfg. Corp.

Tubing, Yellow & Black Flexible Varnish
Irvington Varnish & Ins. Co.

Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co.

Turnstiles
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Varnished Papers & Silks
Irvington Varnish & Ins. Co.

Ventilators, Car
Brill Co., The J. G.
Nat'l Ry. Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

Vestibule Linings
Haskelite Mfg. Corp.

Welded Rail Joints
Metal & Thermit Corp.
Ohio Brass Co.
Una Welding & Bonding Co.

Welders, Portable Electric
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
Railway Track-work Co.

Welding & Cutting Tools
International Oxygen Co.

Welding Processes and Apparatus
General Electric Co.
Metal & Thermit Corp.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welding Steel
Railway Track-work Co.
Una Welding & Bonding Co.

Welding Wire
American Steel & Wire Co.
General Electric Co.
Railway Track-work Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Track-work Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron
Bemis Car Truck Co.
Griffin Wheel Co.

Wheels, Car, Steel & Steel Tire
Illinois Steel Co.

Wheels, Trolley
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Nuttall Co., R. D.
Star Brass Works

Wheels, Wrought Steel
Carnegie Steel Co.
Illinois Steel Co.

Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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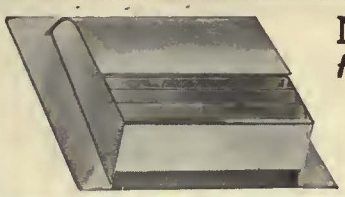

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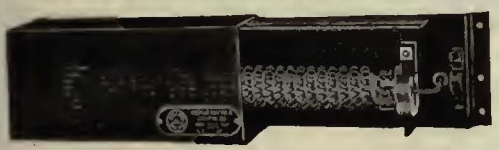

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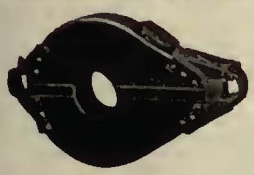

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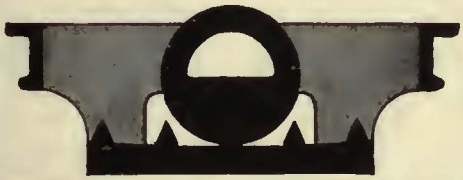

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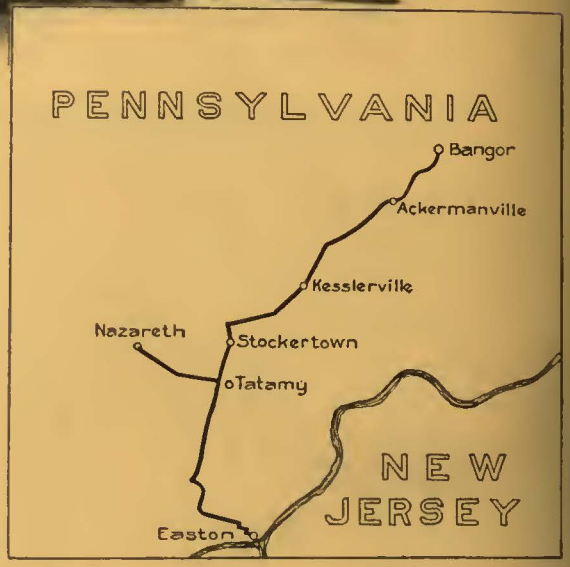

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