

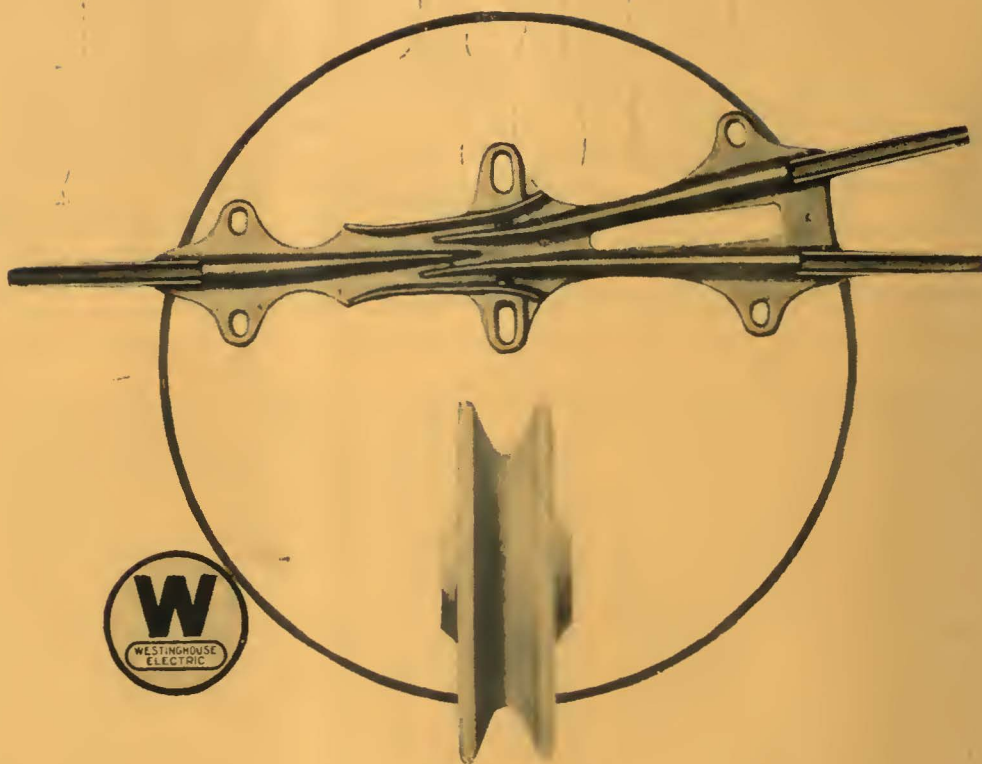
ELECTRIC RAILWAY JOURNAL

ACF
Hall-Scott

ACF

See
Pages 29, 30, 31, 32

—
 Keeping the
 Overhead *Down*
 by
 Keeping it UP
 —



A Perfect Fit



JUST as no shoe can be made to fit all feet, so no frog can be made to fit all trolley wheels. Each of the new Westinghouse frogs was designed to fit wheels of definite sizes. The Westinghouse LW frog fits wheels up to 1½ inches wide; the CG frog fits wheels exceeding 1½ inches in width.

Smother, quieter operation—and longer service—result from the improved fit.

Helping to produce these results are the bayonet type approaches and overlapping runners, features that have given to frogs of previous designs some wonderful service records. In the new designs the runners overlap even more—this is made possible because of the limited application of each frog.

The long service of these new Westinghouse frogs will help to keep your overhead lines UP where they belong, and by so doing keep your overhead expense down.

Westinghouse Electric & Manufacturing Co.
 East Pittsburgh Pennsylvania

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



1927

Westinghouse

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No. 6

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Refreshing the Spring

THERE is a legend of rare beauty among the Arabs which recites that the traveler when drinking at an oasis never consumes all of the precious fluid but pours back some in order to refresh the spring. In these days such a practice would be considered as co-operation to the nth degree, yet one fancies that the followers of Allah practiced it not only in a spirit of co-operation but in a rarer sense—to promote the Brotherhood of Man.

Those who read and those who write would do well to follow the example set by these nomads of the desert. Those who read are the consumers. They must not expect to consume all and not at some time refresh the spring from which other men drink in their search for knowledge.

ELECTRIC RAILWAY JOURNAL for many years has striven to be the well spring of information for the industry. It has always sought the substrata channels of information in order that the well should never go dry. But like the spring in the oasis, it will be ever refreshed if those who read will also write. If they will, in consuming the knowledge of others, not forget to give of their experience and knowledge in order that the Brotherhood of Man may become the vivifying spirit of the industry.

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SAVING THE RAIL SAVES THE RAILWAY

*333 amp.
at 500 v.*

*209 amp.
at 300 v.*

150 lbs.



“AJAX”

ELECTRIC ARC WELDER

Do you realize that the Ajax is in a class by itself judged by combination of high capacity and low weight? Judged by any other standards, “Ajax” also maintains its lead. Its simple wiring scheme with all circuits in sight, the accessibility of all parts, the ample ventilation, the trolley pole making contact on the bright underside of the wire—these are some of the other features which make “Ajax” first choice on so many roads. Finally—price—lower than you’d expect if you didn’t know.

Why not get a quotation?

Railway Trackwork Co.

3132-48 East Thompson Street, Philadelphia

AGENTS:

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SAVING THE RAIL SAVES THE RAILWAY

Setting the Standards For Efficiency and Low Cost



The O-B Trolley Catcher instantly and positively catches and holds a flying pole without danger of "stepping up". Regardless of the rebound of the pole and resultant slack rope, it does not let go. Requires lubrication only at long intervals.



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YOU SEE O-B Trolley Catchers and Retrievers on city and interurban cars the world over. Make a point of investigating their records of service. You will find thousands that have been in use from five to ten years. And by far the greatest percentage have given continuously reliable, efficient service with practically no expense for repairs or replacements.

Simplicity, accuracy, and strength in every detail of design and construction are the reasons for such records of service. Both O-B Catchers and O-B Retrievers are made with the fewest possible parts—the minimum that will insure automatic operation. These parts are accurately machined in jigs and given individual inspections, thus insuring interchangeability. All the materials used are sufficiently sturdy to insure a large factor of safety above the most severe service requirements.

In every emergency, O-B Catchers and Retrievers act positively and promptly, even after years of use and abuse. This fact plus their exceptional economy from the maintenance standpoint certainly makes it worth while to use them as standard on your cars.

May we arrange a demonstration? Address

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
255C

Ohio Brass Co.  **PORCELAIN INSULATORS · LINE MATERIALS · RAIL BONDS · CAR EQUIPMENT · MINING MATERIALS · VALVES**

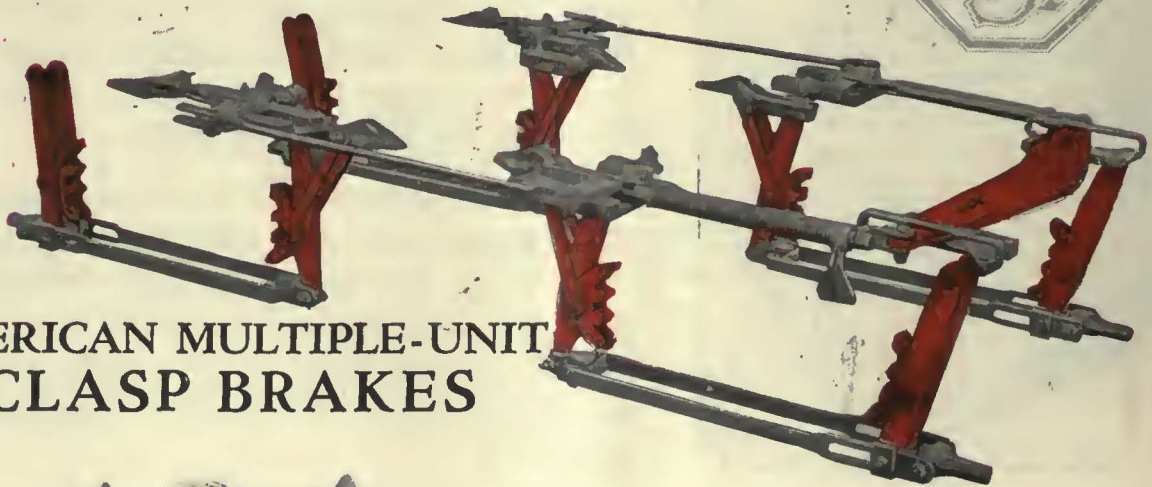
AS LOGICAL AS THE BALANCING OF SCALES



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

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

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



AMERICAN MULTIPLE-UNIT
CLASP BRAKES



AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS

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The International Steel Tie Co., Cleveland, Ohio.

20% more bearing surface

steel [⌈] **||** [⌋] *win* [⌈] **||** [⌋] *tie* [⌋] *track*

Safeguard and Accelerate Traffic

Automatic Signals by providing proper spacing of cars or trains, reduce trip time and enable more cars to be operated with consequent safety.

Interlocking installations at terminals and at grade crossings eliminate unnecessary stops and assure route continuity by means of signal indications.

Highway crossing protective devices of the flashing light, automatic flagman, or audible type, or combination of same, are a dependable insurance which soon pays off the investment.

Power operated remotely controlled switches are being used economically to accelerate Electric Railway traffic.

These Systems are products of the



Union Switch & Signal Co.



SWISSVALE, PA.



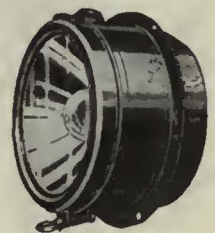


Headlights that *Spotlight!*



For buses

GOLDEN GLOW HEADLIGHTS



For electric railway cars

Though rain, snow and mist are added to the natural darkness of night, operators of cars and buses equipped with Golden Glow Headlights can quickly spot an object along the right-of-way.

The intense light is non-blinding and non-dazzling because the greenish-yellow glass reflector alters the violet portion of the spectrum. This glass reflector will not scratch, tarnish or corrode.

Golden Glow Headlights are made in various styles and sizes for every requirement. Complete particulars on request.



ELECTRIC SERVICE SUPPLIES CO.

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NEW YORK
50 Church St.

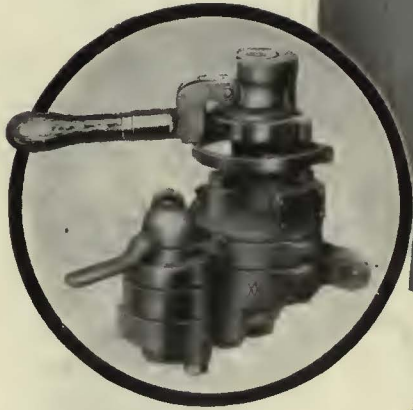
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88 Broad St.
Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Bldg.



Making each passenger his own brakeman!



Confer with our representative regarding the desirability of Westinghouse Variable Load Brakes for your new cars.

Each passenger boarding a car adds more weight to be controlled by the brakes.

If the ordinary air brake equipment is used, this additional weight will result in a longer stopping distance than when the car was empty—particularly if the car is of the modern light weight type. The longer stop reduces the schedule speed and slows up transportation service for the passenger.

If Westinghouse Variable Load Brakes are used, however, the weight added by each passenger entering the car does not remain uncontrolled, but is used to automatically adjust the brake mechanism so that a corresponding increase in retarding force is made to assure the same stopping distance as before his extra weight was added. Each passenger thus unknowingly helps to safeguard and expedite his journey.

This modern brake for modern cars makes for safer and faster transportation, because uniformly short stopping distances are assured by virtue of automatic adjustment of brake cylinder pressure as the passenger load changes.

WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works, WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES

In Lexington Kentucky



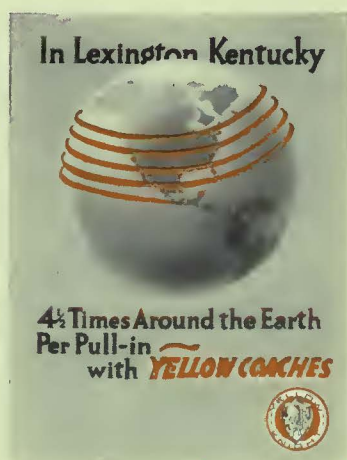
4½ Times Around the Earth
Per Pull-in ~
with *YELLOW COACHES*





For the Kentucky

17 $\frac{1}{2}$ ¢ per bus mile!



The Kentucky Coach Company, a subsidiary of the Kentucky Traction & Terminal Company, operate eleven Yellow Coaches—all of the X-21 type.

During the first eight months of operation, since May 26, 1926, the Yellow fleet has reeled off 352,800 miles at an operating cost of approximately 17 $\frac{1}{2}$ ¢ per bus mile.

It has carried over a million passengers.

It has operated 117,000 miles per pull-in; equiv-

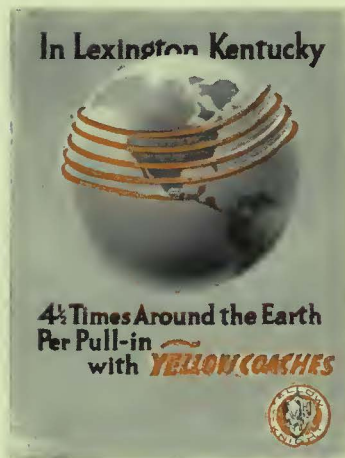
Coach Company ~

alent to encircling the earth four and a half times before a single coach has been hauled off the road.

In Lexington, co-ordination of coach and street car service with universal transfer under one rate of fare heightens the convenience and efficiency of city transportation where Yellow Coaches perform over four city routes, besides building a profitable charter business.

Yellow Coaches, in Lexington, are bringing to patrons a new conception of comfort, speed and convenience. To the operating company they are bringing tremendous mileage before pull-ins. They are successfully shouldering the bulk of service. They are the company's first choice from all standpoints.

Total Operating Expenses of the Kentucky Coach Company—



	Per Bus Mile
Superintendence plant and equipment . . . . .	.0017
Maintenance of Buildings, fixtures and grounds . . . . .	.000127
Maintenance of Bus Bodies . . . . .	.00280
Maintenance of Chassis, Motor, etc. . . . .	.0218
Tires and Tubes . . . . .	.0145
Maintenance Shop and Garage Equipment . . . . .	.00009
Maintenance and Operation of Service Car . . . . .	.00022
Miscellaneous Shop Expenses . . . . .	.00102
Retirement Expense (depreciation) . . . . .	.0274
Fuel for revenue vehicles . . . . .	.0350
Lubricants revenue vehicles . . . . .	.00374
Garage Employees . . . . .	.00815
Garage Supplies and Expenses . . . . .	.00171
Miscellaneous Transportation Expenses . . . . .	.00015
Transportation Expense . . . . .	.041
Traffic Expense . . . . .	.001
General and Miscellaneous . . . . .	.015

17.485

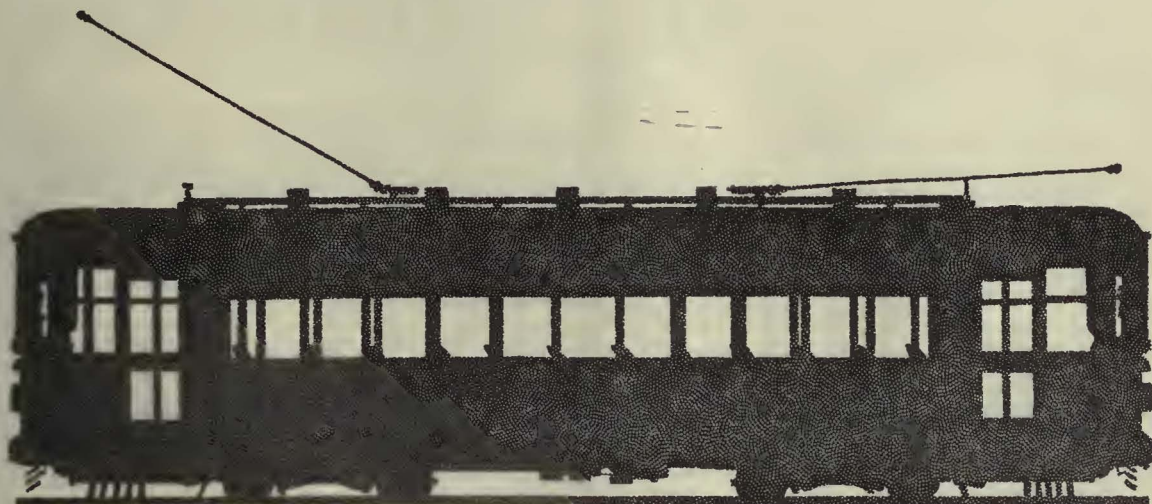
YELLOW COACH *plus* General Motors

stand ready to analyze *your* transportation problems and designate the type of equipment best suitable to your particular requirements.

Transportation experience and research combine with exceptional manufacturing facilities to assure low-cost, profitable miles.

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

THE BACKBONE OF MASS TRANSPORTATION



The street car has amply demonstrated that it will always be the backbone of mass transportation because—

Its ability to handle peak load traffic with less occupation of street space and with general all around efficiency exceeds that of any other passenger vehicle.

Installation of the National Pneumatic Systems makes it possible to handle heavy traffic with the greatest speed, safety and comfort for the passenger and the maximum economy in operation.

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

Thermit— in Brooklyn



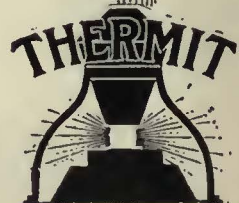
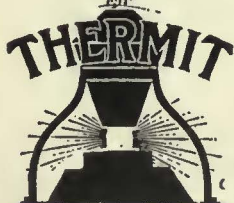
Thermit in Brooklyn, N. Y.

In 1923 the first Thermit Insert Weld went in, on the surface lines of Brooklyn. Since then over 11,000 Thermit Welds have been installed by the Brooklyn Companies which is ample proof of what they think of the results. These welds carry the load of a traffic procession equaled in few other American cities.

Brooklyn now uses Thermit Welds—exclusively!

Why? Because they've found that the first cost is the last cost—and it's far cheaper in the long run.

A quotation and full information costs you nothing. Ask for our figures on the next track-work job.



METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK, N.Y.



Building a new-day transportation system in Alliance, Ohio!

The Stark Electric Railroad has had its troubles during the past three years. Replacing the electric car service with buses proved a failure. The losses were heavy.

Yet the prospects of this road for 1927 are good. Car service has been resumed on improved schedules. Eight new lightweight interurbans, Cincinnati-built in accordance with the principle of **BALANCED DESIGN**, have already won high praise. And on these interurban cars ultra-modern improvements have done much to win back substantial public goodwill.

The photographs show how attractive the interiors of these new cars really are. Smoking compartment and toilet are provided, also such original details as telephones and hat check-boxes. Furthermore the seat coverings in the main compartment are of two-tone gray linen, —removable and washable.

Balanced Design has missed no tricks here.

It has achieved cars of distinct character, coupled with sound operating efficiency under the conditions to be met.

And **BALANCED DESIGN** can do exactly the same thing for you. May we enter into correspondence on the subject?

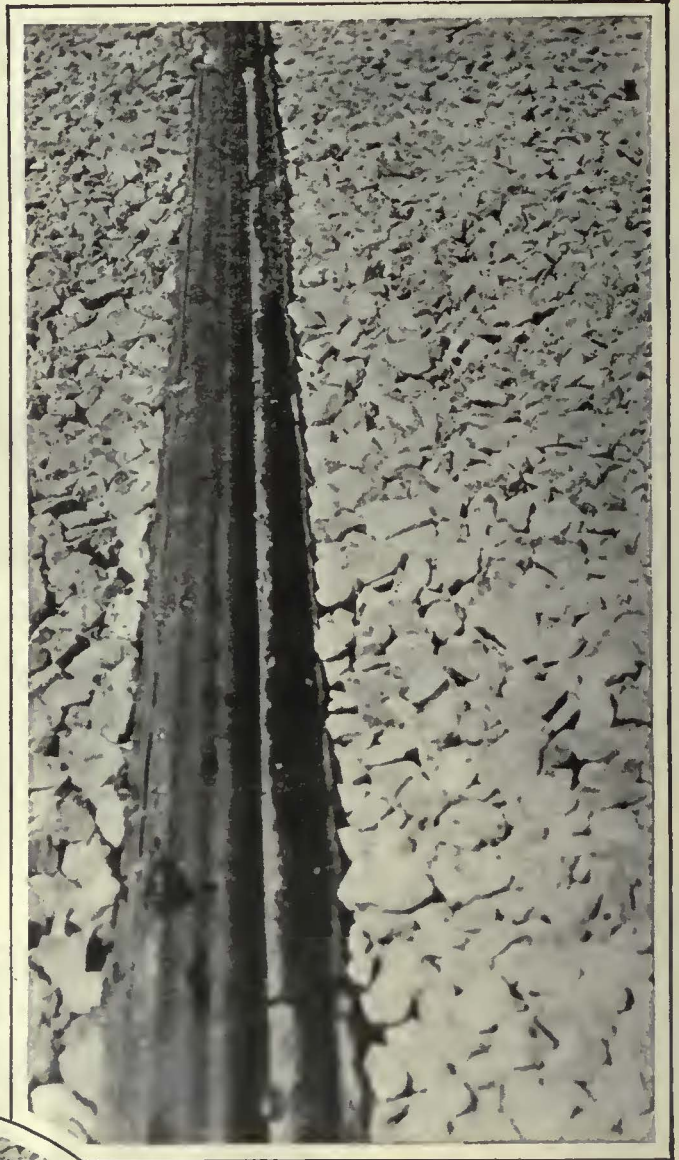


CINCINNATI *New* CARS

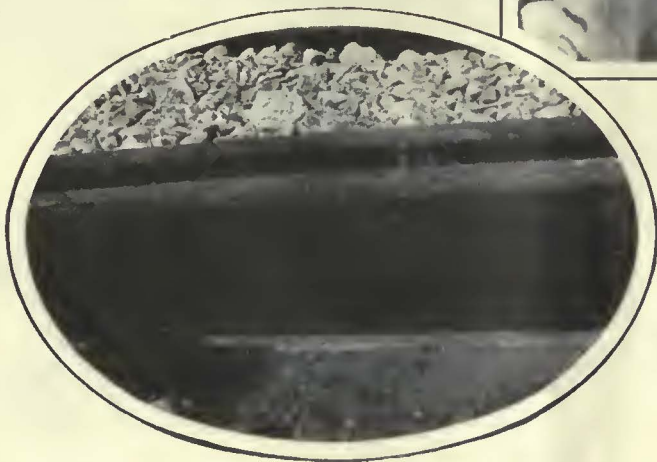
CINCINNATI CAR COMPANY
Cincinnati, Ohio

*A step ahead
of the
modern trend!*

"The street railway



*Section of the track of the Evansville
& Ohio Valley Traction Company,
protected by Carey Elastite System
of Track Insulation.*



can hold its own with the automobile"

"FOR several years we have been hearing that the days of the electric interurban railway are numbered, due to the growth of motor vehicle transportation," said G. R. Millican, General Manager of the Evansville & Ohio Valley Railway Company, Evansville, Indiana. "But now the pendulum is swinging the other way.

"The use of motor vehicles, has, to be sure, enforced changes in electric railway transportation. But if the interurban railway adapts itself to the new situation it can hold its own with the automobile.

"On our lines, we have met the problem by using smaller and more comfortable cars, and by operating on faster schedules. We have discarded the 65,000 pound two-man cars and are using 32,000 pound one-man cars in their places. Since this change our passenger traffic has shown a 15% increase, due in part to our faster schedules. And for the same reason we have been able to handle this increased



G. R. MILLICAN, General Manager of the Evansville & Ohio Valley Traction Company, which serves several towns in the neighborhood of Evansville, Indiana.

traffic with fewer cars than we formerly used. Our maintenance costs are lighter and our operating costs per mile much less. Besides, we have been able to give better service.

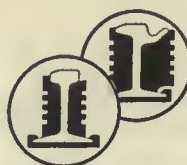
"When we want a first-class piece of track construction, we use an asphaltic rail filler on each side of the rails. In one of the small towns in which we operate we were able to overcome local opposition to needed changes in our tracks, by installing a rail filler job. We find it keeps the pavement in perfect condition."

In carrying out the construction work referred to by Mr. Millican, the Carey Elastite System of Track Insulation was used. This system has been thoroughly tested under actual service conditions and its use is recommended by leading street railway officials throughout the country. It protects the pavement, lessens track corrugation and reduces operating expenses.

THE PHILIP CAREY COMPANY

Lockland, Cincinnati, Ohio

Carey
Elastite
TRADE MARK REGD. U.S. PATENT OFFICE



SYSTEM OF
TRACK INSULATION

HASKELITE

Roofs
helped
make
these
records
possible

41%

Gross return on investment proves that—

New Cars Pay

In 1923 the Pennsylvania-Ohio Electric Co. placed in service on its Youngstown-New Castle Division four (4) new 37,000 lb. cars equipped with 35 h.p. motors, displacing an equal number of 54,000 lb. cars equipped with 90 h.p. motors. From resultant economies obtained thus far indications are that these new cars will pay for themselves in less than three years time.

Actual Operating Costs OLD CARS 1922		Actual Operating Costs NEW CARS 1925	
Per Car Mile	Total	Per Car Mile	Total
Wear and Repairs	1.75c	2.66c	10.65c
Electricity	4.50c	5.46c	20.58c
Maintenance	1.00c	2.66c	10.25c
Oil and Grease	0.75c	0.50c	1.90c
Water	0.25c	0.25c	0.95c
Other	0.25c	0.25c	0.95c
Total	8.50c	39.52c	150.28c

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. — CHICAGO, ILL. — WAGON MACHINERY CO.

	Old Cars	New Cars	Saving
Maintenance of Equipment	6.19c. per car mile	2.66	57%
Power	8.52c. per car mile	5.46	36%
Total Operating Cost	47.40c. per car mile	39.52	16.6%
Gross return on investment			41%

A HASKELITE roof saves more than 100 lbs. in the weight of a street car. This material is equally valuable for use in floors, linings, seats, etc., and its armored companion, PLYMETL, saves approximately 300 lbs. as compared with steel plate for side panels. When HASKELITE and PLYMETL are used for all the logical applications in a modern car, the total saving in weight effected is

over 900 lbs. At the accepted figure of 6c. per lb. per year for operating cost, this means an annual saving of well over \$50 per year for every such light weight car put in service. As indicated above, these savings, combined with others possible in light weight car construction, will pay the cost of such equipment in a short time. Ask for detailed information on HASKELITE and PLYMETL.

Haskelite Manufacturing Corporation
133 West Washington Street, Chicago
Canadian Representatives:
Railway and Power Engineering Corp., Ltd.
Montreal Toronto Winnipeg

PLYMETL, steel faced HASKE-LITE, ideal for side panels still further decreases weight and decreases operating expense.

PLYMETL

Modern Cars are noted for Comfort—

“Money spent for new cars has been a profitable investment in every instance where it has been intelligently applied.” Mr. Willis H. Sawyer’s words refer to improvements in service made possible by using new, modern, *comfortable* cars. Only cars that are attractive and comfortable will successfully compete with other modes of transportation.



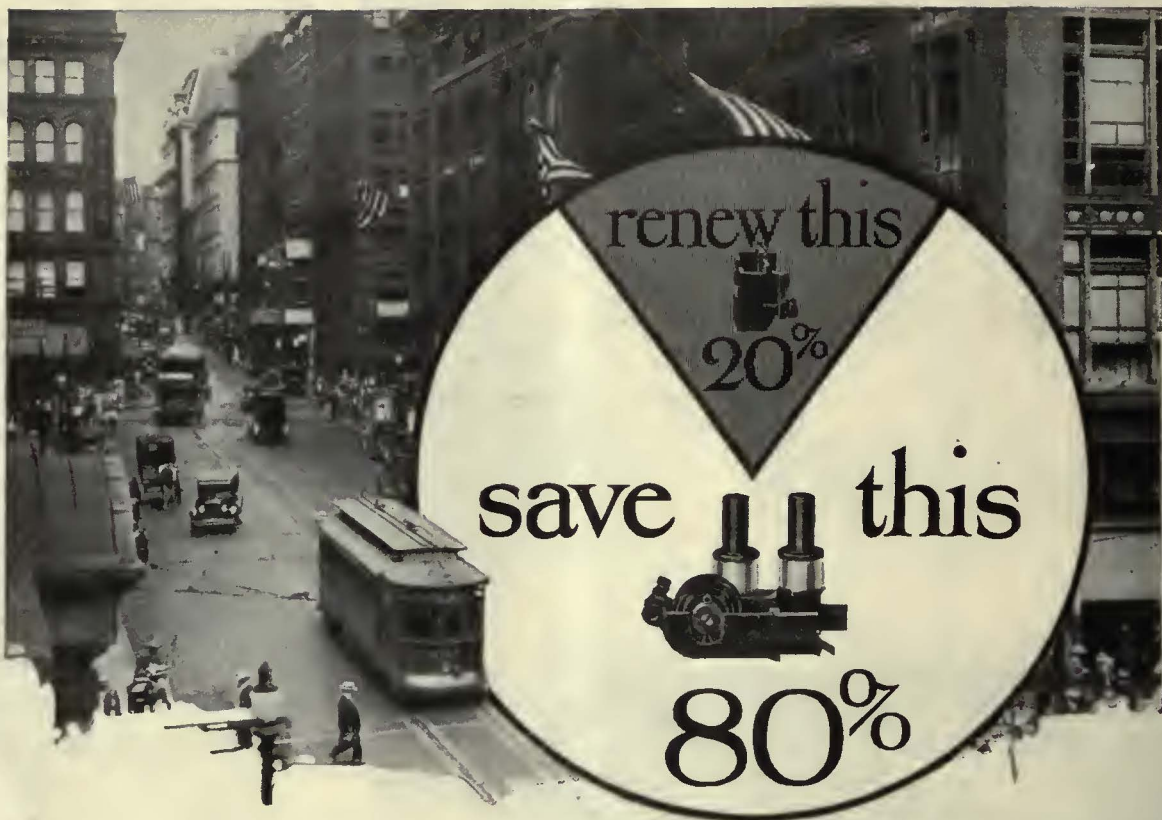
Interior of interurban cars recently built by Cummings Car and Coach Company. Seating arrangement is a feature.

CUMMINGS CAR AND COACH COMPANY

Successors to McGuire-Cummings Mfg. Co.

111 West Monroe Street

CHICAGO



Baltimore is convinced - 3,000 in one order

The United Railways and Electric Company of Baltimore is installing 3000 G-E Renewable Carbonway Brush Holders in order to convert its motors to the renewable carbonway type.

This change will reduce brush holder maintenance, because now only the worn carbonway need be scrapped, while the more expensive part of the holder is preserved for further service.

With an 80% saving possible, can you afford delay in adopting this obvious improvement?



General Electric is continually developing new or improved products for electric railway service. Ask your G-E Railway Specialist to tell you more about this and other maintenance-reducing repair parts.



330-35

GENERAL ELECTRIC

Electric Railway Journal

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

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

Volume 69

New York, Saturday, February 5, 1927

Number 6

Rapid Transit Subways an Economic Solution for Street Traffic

CHICAGO'S billion dollar transit plan improves with rereading. The material and theories presented warrant many readings. Besides being a good transportation plan it is a sound economic treatise on civic traffic relief. The abstract of the report presented in the Jan. 22 issue of this paper could but briefly touch the high spots.

Subways are ordinarily considered as a benefit to their patrons. They are. More than that, they are a benefit to the street surface users. One subway will provide transportation facilities for many thousand people who would otherwise use the overcrowded streets. Widening or double-decking of streets might accomplish the same thing, but with attending difficulties of approaches that are much simpler when accomplished by rail transportation. The cost of rapid transit subways is also materially less.

No one would think of burdening the car riders to pay for a double-decked street; more likely the riders or their company would be reimbursed for what costs might be involved in changing the rail structures to conform with the double-decking. Henry A. Blair, author of the plan, likewise argues that the cost of providing tubes for trains should not be added to the street car fare—neither the principal nor the interest on it. For the benefits derived by transit users—and they are important, indeed—the riders will absorb the cost of scrapping the superseded surface track investment and the construction of the new and costly track structures in the tubes. The company will provide capital for the track and equipment and the riders will pay for the operation of the trains and the use of the private investment.

Mr. Blair's arguments are materially strengthened in this position, since Chicago has already spent millions in providing more street surface for vehicles, at materially greater unit costs. Wacker Drive, for instance, cost \$20,000,000 per mile and Michigan Boulevard \$18,000,000 per linear mile of street gained. Subways are only another way of accomplishing the same thing, except for the important difference that they are materially cheaper. Also, as shown in the McClintock report on street traffic, they will serve more of the populace because 62 per cent of the people who enter the central district use the common carrier vehicles (except steam roads) and only 19 per cent private automobiles. The auto is more in evidence because of the great number of units, but the service it performs for individuals is quite another story. After all, it is the individual who must be benefited, not the vehicle.

Subway proponents should not be blinded to certain obvious disadvantages, both to the public and the operator. Many short-haul riders in the subway areas will unquestionably be lost. People cannot be induced to go down one or two flights of stairs to a car or train

they know must be there but cannot see as they can on the street, only to ride a few blocks and then climb to the surface again. This is a loss the transportation system must bear as a part of the civic improvement and the benefit derived by the long haul and less profitable passengers.

With this thinking, subways as public improvements appear in a different light from that often observed. It is not a question of company welfare, because the users must pay in the end, but one of economics—a fair distribution of costs for the benefits derived.

Hesitating Before the Plunge

IN ALL sections of the country electric railways are repainting or refitting or rebuilding some of their equipment. Unfortunately, in many instances unwise things are being done. Expenditures ranging from \$1,000 to \$7,000 or \$8,000 per car are being made to improve old equipment. With many of the oldest cars, although new paint and new seats and other improvements help materially, the rehabilitated cars are still heavy, clumsy and noisy affairs that fool nobody but those who lacked the wisdom and the courage to get rid of them. These are strong words, but they represent the judgment of a rapidly widening circle of forward looking operators who have given the subject careful thought, and who have made an unbiased analysis of the experience of those properties which have put on modern cars.

New cars are not a panacea. It has been said before that they will not take the place of good management. But they are a part of good management. They make many things possible that are impossible with heavy, clumsy, noisy and run-down equipment. It is easier to make a friend of the man on the sidewalk for the railway which presents the appearance of being progressive and up to date. It is easier to secure the co-operation and interest of employees on spick-and-span, modern cars which make them proud of their jobs than on dilapidated arks that sway and toss and groan and creak. Since the first step toward winning public friendship is to get the public interested in the railway, modern new cars help toward the solution of some of the industry's most pressing and baffling problems.

The general tendency to rebuild old equipment is a favorable sign. It is an indication of the rapidly growing and spreading realization of the need for improving the appearance, comfort and performance of electric railway cars. But in a sense the present situation is like that of the timid swimmer who cautiously tests the water before plunging in. The industry is interested, but it is still timid. There are many years of precedent to be overcome. It takes a high degree of courage and faith to send good money after bad unless there is a preponderance of evidence in support of such action. A new kind of thinking is being advanced. Somehow it is

difficult for the average electric railway man to abandon the idea that a street car should be able to run forever. "It is a perfectly good car," he says. "Maybe it is a little bit heavy, but a coat of paint and some new seats will fix it up good enough to run many more years. These cars are too good to throw away." And so he paints and patches his twenty-year-old cars and then goes home to buy his wife a new automobile to replace the one he purchased three years before.

But the industry is thinking. It is beginning to ask itself pointed questions. It is beginning to realize that times are changed and that we have changed with them. It is standing on the brink of a new idea, but, like the timid swimmer who cautiously tests the water, it still hesitates. A little more testing is required; a little more experience on the part of those properties that have definitely gone ahead. Then we may expect to see the industry courageously striking out to put its equipment into shape to meet the need of modern times and modern demands.

Rule of Thumb Methods Will Not Solve Traffic Problem

CONTROL of street traffic by an extensive system of interconnected signal lights, all giving the same indication at the same instant, has proved extremely inefficient. This is because of the dissimilarity of conditions at different street intersections, where the volume of cross traffic varies greatly. With such a system the time intervals must necessarily be based on the needs of one particular intersection, so that they are entirely unsuited to the needs of other intersections having different characteristics. It is evident, therefore, that no such simple and easy plan will solve the problem of traffic control.

In New York City the Police Commissioner recently asked for \$534,000 to install 800 additional traffic signals, following the same general plan that is now in use on Fifth Avenue and other longitudinal streets. It is proposed to synchronize vehicular movement over considerable distances on many parallel thoroughfares. Like some well-advertised patent medicines, these signals are expected by the municipal authorities to have a variety of beneficial effects, such as speeding up the vehicular movement, preventing accidents and reducing the number of traffic police required.

Curiously enough, one reason cited for extending the system is the tendency of automobile drivers to avoid the streets equipped with synchronized signals. Perhaps this is because the lights have speeded up vehicle movement until careful drivers are afraid to travel on these thoroughfares. One is inclined to doubt this explanation when it is remembered that the average speed of vehicles on Fifth Avenue, New York, excluding buses, is only 7 m.p.h., despite the use of the lights. In fact, engineering investigation indicates that synchronized signals have a definite tendency to slow down traffic.

So far as safety is concerned, the National Safety Council finds that simultaneous control offers no advantage over any other type of control. Thus reduction in the number of traffic police remains as the only desirable result achieved. If that be the object, it should be so stated, and the installation should not be made to masquerade as a means of speeding up traffic.

On the other hand, the "progressive" or "co-ordinated" plan, whereby the signal lights change according

to the requirements of traffic at the particular intersection, rather than all changing simultaneously, has proved to be extremely efficacious in speeding up traffic. The installation on State Street, Chicago, is an outstanding example of the successful application of this principle. The speed of vehicular movement has been increased more than 25 per cent since this system has been in use. Rather than spend huge sums to provide more lights of a simultaneous type, New York and other cities contemplating similar installations would do well to study the methods used elsewhere, and profit by experience already obtained.

A Humanitarian Movement That Pays Large Dividends

FEW are the accomplishments in the street railway industry that can be of more benefit than a reduction in the number and seriousness of accidents. On any property it will result in better service because of lessened delays, in more economical operation because more of the gross revenue is retained as net and, last but not least, a reduction in the amount of human suffering.

Accident prevention, then, must be looked at as one of the most desirable ways of improving the operation of a system. Every company should be interested in the subject, and should do its share in finding ways of minimizing losses of this character. The Claims Association and the Transportation & Traffic Association are both doing excellent work in studying the prevention of accidents rather than in minimizing the loss after one has occurred.

The efforts of these associations are in large measure confined to the industry. Work of a similar character, but on a scale to interest the whole nation, is being carried on by the Electric Railway Section of the National Safety Council. The effectiveness of this work depends in large measure on the size and quality of the membership and the interest taken by the individual representatives. The last convention of the council showed that interest is not in any sense lacking. The subjects were live and the discussions were good.

The membership, on the other hand, is not nearly so large as the importance of the subject justifies. Statistics show that only 128 electric railway companies, or about one-sixth of the total number of active operating companies, have membership in this body.

In view of the vital character of the council and the wonderful possibilities in getting the results that are to be obtained, every company should see if it can afford not to be connected with this movement.

A Lot of Shucking, but Mighty Little Gain

"DYAR'S er monst'us mess o' shucking, but er mighty little grain," the quaint philosophic refrain to a negro dialect poem, is pertinent to the present transit problem now before the citizens of Greater New York. In the light of the predatory shucking operations of a certain political group at Albany, it seems safe to predict that if there is any grain it will be in the nature of corns on the feet of millions of citizens now called upon to put up with inadequate and insufferable transportation conditions.

Perhaps the most alarming phase of the problem at present is that of the public paying too much attention

to the bus franchise controversy between Mayor Walker and the Board of Estimate and, as a result, neglecting the main issue, an issue so fundamental that it makes New York's problem a national one. Unbiased experts see no cause for alarm in delaying the franchise awards. Such action will undoubtedly result in good for the traveling public in the matter of safety, adequate seating facilities, lower fares and, more than likely, greater revenue to the city.

They are, however, deeply concerned that the people should neglect the solution of the main issue—more subways—which is threatened with annihilation in the present Legislature by the refusal of a political group to allow the people a voice in the extension of the city's debt limit. By so doing it is patent that a minority can rule, that it can destroy a rock-ribbed political axiom of the republic. In other words, it can shuck for the silk and not the grain. This brings one back to the assertion that New York's problem is a national one, for its roots are in the inertia of the people at the time of expressing their will, *per se*, when the polls are open. The people are, have been and always will be the reformers of the world, and as they sow so shall they reap. If they refuse to vote, or, what is far worse, vote unintelligently and under the spellbinding influence of selfish political promises, they must be prepared to be twiddled around the thumbs of petty politicians.

Talking Trainmen Can Do Railway Much Harm

WOMEN as a sex are usually credited with doing harm by too much talking, but men also are frequent offenders—particularly those railway employees who come into most frequent contact with the public—the trainmen. Sometimes it is just a slight grudge the man has against the company that causes him to grumble in the presence of passengers. In other cases it may be nothing more than natural garrulousness. But no matter what the reason, it always creates a bad impression when an employee tells the world what he believes to be wrong with the company and how much better things would be managed if only he had his way.

Seldom is the management in ignorance of this habit of certain employees to talk too much. Before long it is bound to reach the ears of those in authority. It is not easy, however, to know just how to handle such cases.

No management is perfect, and an experienced and thoughtful employee often is able to see ways in which service can be improved. If he is encouraged to impart his ideas to his superiors, he will be less inclined to unload them on the public. When the adoption of a suggestion is impracticable, the reason should be carefully explained to the man. Should he continue to feel seriously at odds with the policy of the company, his only proper course is to leave its employ. It is indefensible for a man to remain on a payroll who criticizes company methods at every opportunity.

Undoubtedly the best way to forestall such talk is to give employees full information about the affairs of the company. The old conception that the relations of employer and employee were those of master and servant has largely passed away. Progressive railway managements have come to regard their employees as co-partners in a joint enterprise. As such they have a real interest in the company's affairs and deserve to be

given all possible information about its operation. Where this policy has been adopted, as in the case of the Pittsburgh Railways, for example, it is meeting with conspicuous success.

Surely This Kind of Death Is Not a Necessary Evil

“THERE is no class of taxpayers in New York State so heavily burdened by taxation as the street railways.” Had an electric railway man said that it would have been regarded as vicious propaganda. A railway man did not say it, but the last man in the world who would be expected to do so. That man is none other than John J. Merrill, the tax gatherer himself. He is supposed to be impersonal in his point of view, and he is. But his alacrity in office as a member of the New York Tax Commission to gather the uttermost farthing has not blinded him to the inequity of a system that takes away from the electric railways \$2,500,000 in taxes as paving. That in itself is an anachronism. As Mr. Merrill pointed out in a public speech, street railways pay a property tax on all property, 1 cent on every dollar of gross income, and in addition to all that a franchise tax.

The recital is particularly interesting because of the source of the remarks. Perhaps even more important is the picture which Mr. Merrill has drawn of the taxes paid by some others toward the support of state government.

The question is ever recurring. “Taxing the Utility” as discussed by Prof. E. R. A. Seligman before the committee on taxation of the American Electric Railway Association was the subject of an article in the JOURNAL for Jan. 29. Professor Seligman's talk was, of course, more specific than was Mr. Merrill's, but it had a different object. Professor Seligman made a plea that the utilities get behind the gross-net tax and do away with all the absurd things in the laws today, including the special franchise tax. In his opinion, if the utilities did this, and approach the subject fairly and loyally they would be able to help solve both the state and the local tax problem and at the same time achieve something that will ultimately redound not only to their own benefit but to the prosperity of the community as a whole. Talking to different audiences, the methods of approach to the subject by these two men had to differ. Professor Seligman does not lack the power to present facts concisely, but it fell to Mr. Merrill's lot to galvanize the facts into life. No one will deny that he did that.

There are apparently no limitations on the use to which the electric railways may put the facts Mr. Merrill and Mr. Seligman have so concisely stated for them. They have given the railways most valuable ammunition. This paper is glad to print the remarks and call the attention of the industry to them. While it is decidedly unpleasant to the electric railways to be reminded by Mr. Merrill that “electric railroads are being taxed to death,” particularly when these remarks are so close an approximation of the truth, the legitimate use that the industry makes of these statements in its own behalf will bespeak the extent of its courage to battle for the right for itself and, more important still, for its own patrons. One may still agree with Shakespeare's sentiment that death, a necessary evil, will come when it will come, but death by external strangulation is hardly a necessary evil, supinely to be endured.



Arrangements for Handling Car and Bus in Lexington, Ky.

Above is the interior of the main garage, with two of the Yellow 21-passenger buses. At the right is a pit. Since the photograph was taken the pit has been lengthened and an additional inspection pit constructed.

Below is shown the paint shop, where trolleys and buses receive "appearance" treatment. A White-Kuhlman bus is seen in process of refinishing.





Adjacent to the car shops, this 50x90-ft. garage was available and put in order for bus maintenance. The wooden building at the right is an overflow storage shed.

The Five Fundamentals of Co-ordination

Lexington, Ky., Property Evolves Working Definition—Encouraging Growth in Trolley Riding Even During Periods When Number of Buses Is Greatly Increased

By R. E. Plimpton

Associate Editor BUS TRANSPORTATION

“WHAT is co-ordination?” is a question that is being given a practical answer in the city of Lexington, Ky. With less than 50,000 all-year inhabitants, this center of the breeding of blooded stock for horse racing, of the largest burley tobacco warehouses in the world and of at least half a dozen institutions of higher learning has kept up an encouraging growth in trolley riding and revenue. At the same time there is being developed a bus system which while not yet profitable in itself gives every promise of being so as operating experience is gained and practicable buying economies are put into effect.

The Kentucky Traction & Terminal Company and its subsidiary, the Kentucky Coach Company, are now in a position to say that co-ordinated transportation is a fact in the city of Lexington. To secure the present non-competitive operation in local transportation a long process of education has been necessary, but at present the people of the city and its government seem to be convinced that better service can be given under the one management. It is felt also that the traction company has done the fair thing in buying out certain of the small operators who had previously made a hand-to-mouth living, often on routes directly paralleling the trolley line.

With these underlying problems settled, for the time

being at least, the company has gone ahead really to practice co-ordination based on the following five fundamentals:

1. *Organization*—A subsidiary company operates buses on account of certain legal requirements, the bus work being taken over largely by the trolley staff.

2. *Routes*.—The new bus lines dovetail to supply unserved territory, with the exception of one case where parallel routes are necessitated by special conditions.

3. *Schedules*.—Service alternated in the one instance of parallel routes with “loop” layouts adopted for other bus lines. On two of these lines service given on the loop in both directions.

4. *Facilities*.—New garage building put up adjoining trolley car repair shop. Machine tools, blacksmith, woodworking and painting facilities of car shop used for bus work.

5. *Equipment*.—Experimental work to adapt practice in trolley construction to the motor bus and incidentally to develop worth-while automotive ideas in connection with trolley car construction.

NEW DUTIES, OLD ORGANIZATION

The Kentucky Coach Company, formed early in 1925 when bus operation was started, is a subsidiary of the International Utilities Corporation, the holding com-

pany, which also owns and controls the Kentucky Traction & Terminal Company, the Lexington Utilities Company, operating the electric light and power interests in Lexington and the surrounding territory, and the Lexington Ice Company, operating two ice and one cold storage plants in Lexington. Officers are practically the same for the four companies, with J. P. Pope vice-president and general manager of each local company. It was a simple matter for the various administrative and operating departments to take over the new bus work. The superintendent of transportation, H. Bush,

and bus maintenance. One working bus foreman was added this year, when the fleet was practically quadrupled in size by the purchase of new buses. The same force handles the cleaning of the two forms of vehicles, this being simplified because the plush covering for seats, standardized years ago for trolley cars, has been adopted for the bus seats.

ALL BUS ROUTES BUT ONE SERVE NEW TERRITORY

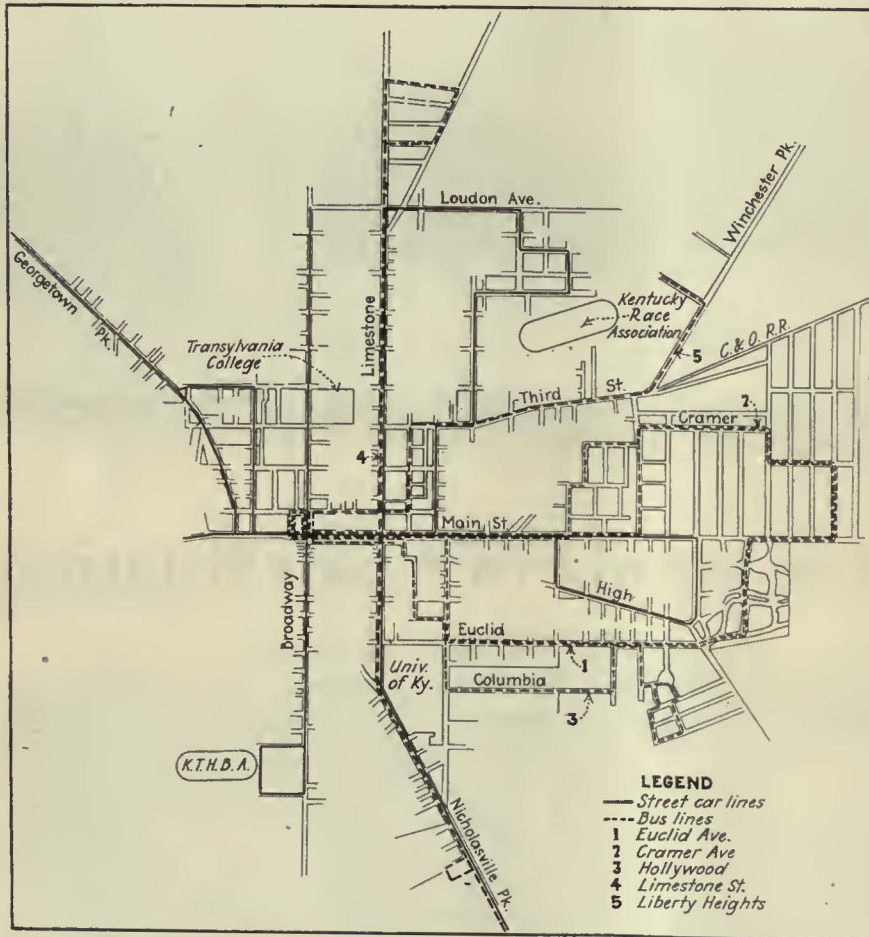
The Euclid-Cramer routes, started in the spring of 1925, pass through one of the finest residential sections of Lexington. While these are shown on the map as one route, buses are operated around the loop in both directions. On the "loop" part the streets followed are a considerable distance from any trolley line, thus serving a territory that entirely lacked public transportation. The Hollywood route, started in January last year, also keeps clear of any trolley line. This is not the case with the service on Limestone Street, an important through artery, where bus and trolley run parallel except for the diverging loops shown near the northeastern border of the city. On this street bus service has been given previously by a small number of independent operators, and for policy reasons and as a contribution to public relations it was deemed best to continue the two forms of transportation.

Approximately seventeen - hour service is given on both bus and trolley. In general the basis is a fifteen-minute service, with a ten-minute service on the peaks. Lexington is a "home to luncheon" city, so that there is a noon as well as morning and evening rush period. Frequent service, so desirable in the smaller cities where competition is often with would-be walkers, is obtained on Limestone Street by alternating bus and trolley. The bus headway is shown in the accompanying table,

but on account of the method of operation on Limestone Street the public gets a six-minute service during off-peak and a five-minute service during peak periods.

Similarly, the Euclid and Cramer lines are staggered so that the headway out of the downtown terminal is 7½ minutes during the off-peak period and five minutes during peak periods, with the same headway at the far end of the loop. As is indicated in the table, on all lines ten buses are required for base service and fourteen for the peak requirements.

To house the buses a 50x90-ft. garage which happened



Practically Every Section of Lexington, Ky., Is Served by the Two Forms of Transportation Operated by the Kentucky Traction & Terminal Company and by Its Subsidiary, the Kentucky Coach Company

has direct charge of bus and railway operation, being assisted by one timekeeper and starter, one road supervisor and one inspector. Each of these officials gives the same attention to both forms of transportation, supplying change for all bus and car operators, putting equipment out on time, instructing operators and riding on the vehicles periodically. In like manner, the motor truck operation of the company furnished the nucleus of mechanical talent, which has been placed under the superintendent of equipment, W. G. Stuck, with a master mechanic as assistant in direct charge of trolley

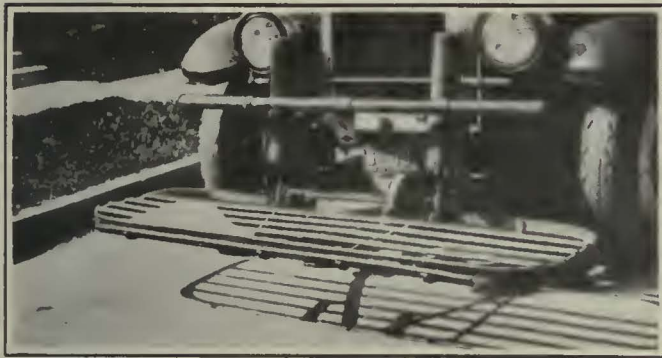
CO-ORDINATED BUS ROUTES, LEXINGTON, KY.

Route No.	Name	Date Started	Round Trip, Miles	Round Trip Running Time, Minutes	Lay over, Minutes	Headway, Minutes		Buses Operated	
						Base	Peak	Base	Peak
1	Euclid	4-6-25	5.2	27	3	15	10	2	3
2	Cramer	4-6-25	5.2	27	3	15	10	2	3
3	Hollywood	1-11-26	5.2	27	3	15	10	2	3
4	Limestone	9-1-26	6.9	38	2	12	10	3	4
5	Liberty Heights	9-18-26	4.2	25	5	30	30	1	1

to be available across the street from the trolley car-house was bought. This was remodeled last year with installation of large doors, skylights and a drainage system, about \$6,000 being spent to put it in good working order. Following the purchase of new equipment last year a small frame structure, which is shown in an accompanying illustration at the right of the main garage, is also being used for storage. Heavy repair equipment already available in the trolley shops is, of course, utilized to the fullest extent. All the machinist work is done in the car shops, where blacksmithing and welding facilities are available. Air from the railway air compressor supplies the garage, and body repairs and repainting are taken care of by the same force and with the same facilities. One of the illustrations shows the paint shop with a one-man trolley car and a 24-passenger bus side by side.

ROLLING STOCK

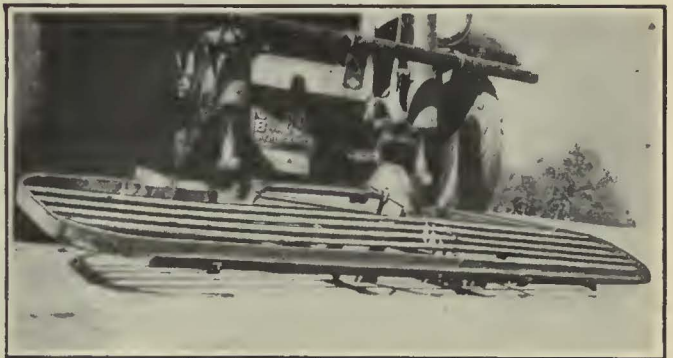
In introducing the new bus equipment many of the details of construction found satisfactory with the trolley have been adopted. For example, all the seats are finished in plush, a material which has proved extremely satisfactory for the local conditions after many years use in city and interurban electric cars. Another



bus equipment includes a total of 444 seats, as compared with a total of 812 on the trolleys, the latter representing 29 one-man cars, each seating 28 passengers. Five makes of buses are used, five 24-passenger Whites, eleven 21-passenger Yellows, five 15-passenger Reos and one 17-passenger Graham.

At present the bus growth is greater than on the trolleys, a recent month showing a 40 per cent increase in riding, as compared with the same month last year, while the trolley riding went up only 10 per cent. This is accounted for by the addition of a number of buses in April of last year. In fact, the number operated has been practically doubled over a year's time. In view of this the trolley showing is very encouraging.

Taking the figures for the last six months of 1926, the traffic was about 175 rides per inhabitant, not at all a bad showing for a city roughly 3 miles and 4 miles across on its main axes. Of these 175 rides per inhabitant, about 60 were taken in the buses. For the first six months of 1926 the bus operation showed a total accumulated loss of close to \$10,000, although the increase in bus business lessened the loss considerably in the second half of the year. As against this the trolley part of the business is practically breaking even. It is expected, however, that when possible buying



Fenders Are Used on the Lexington Buses, Being Controlled by the Driver. The Views Show the Fender In the Up and Down Positions

novel feature is shown in an accompanying illustration. This is the use of a front fender on buses. It is the invention of F. W. Bacon, president of the Kentucky Coach Company and vice-president of the Kentucky Traction & Terminal Company. The fender is arranged so that it is tripped automatically when it strikes an object or the driver can drop it or lift it up by a knob placed at the side of the steering wheel.

The idea of co-ordination is carried out in the fare arrangement, the rate being 7 cents cash, four checks for 25 cents, on either car or bus. A universal transfer system from car to bus and vice versa is in effect. At present about 66 per cent of the passengers on the buses use the checks, as against 57 per cent on the trolleys. This difference is due, it is said, to the fact that whites only are carried on the buses, while the trolleys carry colored people as well as whites.

On this fare basis the business has grown until the buses are carrying around 140,000 passengers a month, as compared with 400,000 on the trolleys. Income from buses during 1926 will be about \$110,000, it is estimated, while the trolleys will bring in nearly \$250,000. Annual mileage covered during 1926 was about 657,000 for the buses and 1,050,000 for the trolleys. Route mileage is 11.3 and 18.6 for the two respectively, these figures being based on half the round trip mileage, which includes the distance covered on the loops. The

economies are put into effect and increased experience is gained in maintenance a much better showing will be made with the buses.

The officers of this company are strong believers in weight reduction and think that the manufacturer should apply a lighter vehicle and therefore one less expensive to operate, without any sacrifice in strength or durability. Another result they are working to obtain is the transportation point of view among their automotive maintenance force. It has been found that the average automotive mechanic is more efficient in replacing parts than in locating and eliminating trouble. Hence, the effort is being made to imbue these men with a new conception of the purpose of inspection.

Capacity of Traffic Lanes

SPEAKING at a meeting of the American Society of Civil Engineers on Jan. 5, Arthur Tuttle, engineer of the Board of Estimate, said that on the proposed marginal highway in New York City there would be six lines of vehicles and that each line would have a capacity of about 1,500 vehicles per hour. He added that there was no street in New York at the present time in which the maximum number of vehicles moving past a given point reached as many as 900 per hour per lane.



An Excellent Restaurant and Lunch Counter Run by the North Shore Line Is Located in the Rear of the Street Floor of the New Station



Looking Toward the Front on the Street Floor of the North Shore Station. Finish Is in Marble and Walnut with Brass Fixtures and Fittings Including the Ticket Office

North Shore Opens New Station

Interurban Line Between Chicago and Milwaukee Has a New Station in the Chicago Loop, Reported to Be the Finest of Its Kind—Serves Trains Operated Over Elevated Tracks and Companies' Bus Operations

SUPERIOR accommodations are afforded to patrons by a new station of the Chicago, North Shore & Milwaukee Railroad in the Chicago Loop district which embodies decorative features that make it one of the finest interurban stations of its kind. It is located at 223 South Wabash Avenue, only a few doors south of the location of the former station.

Passengers enter and leave the main floor directly from the street. Ticket offices, check room and restaurant are on this floor. The interior finish is marble and walnut with brass fixtures, presenting a most pleasing ensemble. Broad stairways lead to the upper or train level and to the men's smoking room in the basement.

The second floor is given over in part to a waiting room. A bridge connects this with the Adams and Wabash "L" station, where patrons board the North Shore trains for Milwaukee and intermediate points. For convenience, additional ticket windows are provided. At the rear of this floor are show windows in which are attractive displays of household furnishings.

Walnut benches are provided on both floors for passengers waiting for trains. In addition, a women's waiting and rest room is equipped with luxurious period furniture.

A feature of the new quarters is a system of electric amplifiers through which train departures are announced so that they may be clearly heard in all parts of the station.

A. U. Gerber, architect, designed the new quarters, completely remodeling the old interior. The station has excellent lighting facilities. Illuminated signs direct customers to all points of service.

The restaurant and lunch counter are operated by the North Shore Line, being installed under the direction of P. F. McCall, manager of commissary. The kitchen is equipped with the most modern cooking appliances. The station will serve as a model in future development of North Shore Line terminal facilities.



New North Shore Station on Wabash Avenue in Chicago Connects Directly with the Adams and Wabash "L" Station



On the Mezzanine Between the First and Second Floors of the New North Shore Station Is a Sumptuous Lounge Room for the Women Patrons

Saginaw Revives a Dead Service

Once Discredited, the Street Car, as a Means of Local Transportation, Has Come Back with a Punch in the Michigan City—Intensive Advertising and Distinctive Painting Important Features of Campaign Waged by Railway



Distinctive Color Schemes Were Combined with the Naming of Cars for Various Local Organizations in Cultivating Public Approval of the Street Car Service

WILL the average rider take a personal interest or pride in the transportation facilities of his city? Will he respond to an appeal for his patronage? Does he actually realize what transportation convenience means to him from a dollar and cents point of view?

The foregoing questions sum up briefly what Charles S. Kressler, president and general manager of the Saginaw Transit Company, Saginaw, Mich., had in mind just before he inaugurated the present scheme of merchandising his electric railway and bus service.

Slowly but surely the progressive policies instituted as a result of these rider psychology questions brought results that proved beyond doubt that a dead service can be revived despite the worst obstacles. In the first place, it was necessary to rekindle interest in street car riding after a lapse of time during which motor buses had completely dominated and then lost public favor through disorganized service. This situation had created the habit of private automobile use for business purposes as well as a public willingness to give free rides to those who desired them.

Secondly, it was necessary to drive out of the average rider's mind the impression that public traction service

was monotonous and impersonal in comparison to the freedom of a private automobile. These features typified the most important sales resistance offered to the street railway property. Its service was of a sound nature, and yet it was thought that the public fancy could not be intrigued by this alone, but through some other merchandising method that would keep the subject of transportation favorably impressed in the minds of the riders and lead to their steady patronage. For this merchandising campaign was enlisted the printed word carried in company advertising placed in a leading newspaper and several other mediums reaching different classes of riders. The message conveyed in each piece of advertising copy brought home forcefully facts of which the average rider was perhaps not cognizant and, in addition, convinced him of the value of the service given.

In a number of the advertisements the theme of the message was designed to prove to the rider that private automobile operation was far more expensive to him than the moderate fare charged on either the street car or the bus. How potent this educational work alone proved is illustrated by the decrease of at least 50

Why is it that you Live on or Near a Car or Bus Line?

ISN'T IT BECAUSE YOU CONSIDER SUCH A
LOCATION ADDS VALUE TO YOUR
PROPERTY?

ISN'T IT BECAUSE A WELL ORGANIZED
TRANSPORTATION SYSTEM (SUCH AS
IS ENJOYED BY YOU) IS ONE OF
THE GREATEST ASSETS A
CITY CAN HAVE?

*Are You Doing Your Part in Riding the Cars and
Busses to Make Your Transportation
System a Success?*

Saginaw Transit Company
"Your Transportation System"

One of the Typical Sales Appeals Made Through the Advertising
Column of a Newspaper

per cent in the number of parked automobiles at one
factory. Formerly this factory yard was overflowing
with cars.

For a long time after the street car system was re-
vived the revenue from school children was consider-
ably below the potential possibilities. The habit of
begging rides continued and served as a bad example
to other classes of riders, such as those going to the

Start the day right, by go-
ing to School on the street
car.

◆◆◆◆◆
**Saginaw Transit
Company**
Your Transportation System

The Importance of School Patronage Was Recognized by Space
Taken in the High School Publications

trade school and the naval reserve training station.
Through steady advertising in the high school paper
and by painting one of the cars in the distinctive yel-
low and black school colors school revenue picked up
immediately.

The same distinctive color plan was worked out on
cars covering the trade school and naval reserve routes.
These appeals to rider pride were soon developed to
encompass the Boy Scouts, Girl Scouts, the American
Legion and the 32d Division.

The plan has also been adopted of identifying the
car operator through the use of a nameplate prominently
displayed in the front vestibule. In abolishing number
identification the company feels that it has made just
one more stride toward implanting the necessary per-
sonal touch in its service. In this case the riders soon
acquire the habit of greeting the operator by name
when boarding the car in the morning or evening and

subconsciously connect the service given them with an
individual rather than with a cold, inanimate public
carrier.

In September, 1925, the company decided on a fare
increase from four rides for 25 cents to three for the
same price. In order to determine what the riding
public thought of the plan, a general vote was taken.
A majority of 60 per cent decided in favor of it. The
decrease in revenue immediately after the fare increase

What Your Car Ticket Does---

It places at your immediate service a \$6,000
to \$8,000 car—a car that in winter is closed
and heated as comfortable as your home.

This car is operated by trained men and you
sit back in comfort while they take you through
traffic safely and quickly. It is always ready
and running whenever you wish to use it. You
do not have to worry about having it stolen, or
damaged by careless drivers; you do not have
to provide it with garage or gasoline.

If you go to the theater at night or shopping
in the day, you have no difficulty getting to the
entrance of store or theater.

The company provides extra cars for extra
crowds, and when you come out of the theater
your car is waiting for you.

Every ticket you buy is helping maintain
Your Transportation System, something that is
most vital to the future success and develop-
ment of your city and your own prosperity.

Remember the street cars and busses have
earned your consideration and deserve your
support.

The Saginaw Transit Company
Your Transportation System

Good Public Relations Established by Presenting Salient Facts
to the Public Concerning Transportation

became effective was small and soon afterward the in-
crease in gross receipts crept up to a little above 20
per cent.

Whether the foregoing increase resulted because of
the color plan cannot be accurately determined, but it
apparently did play an important part, as this plan was
started in October, a month after the fare increase went
into effect. What the company has accomplished since
1923, when it started operating, until January, 1926, is
shown by the traffic statistics. In December, 1923,
14,273 passengers were carried; December, 1924, 20,309
passengers; December, 1925, 23,938 passengers, and in
January, 1926, 26,000.

Trainmen's Timekeeping Simplified in Twin Cities

Half of the Time Clerks Saved—Time and Payroll Based on Schedules and Variations Noted to Get Final Figures

PREVIOUS to the change made recently in the auditing department of the Twin City Rapid Transit Company it required twelve clerks to keep the trainmen's time and make up the payroll. With the old method a clerk was required in each car station to make up a time sheet each day from the trip sheets turned in by the conductors, which also included the motorman's time. These time sheets from the six operating car stations were sent in daily and it required six

women clerks to post the time, check it with the schedule and to transfer each day's total to the payroll sheet.

Upon studying the actual procedure in this work, it was found that 90 to 95 per cent of the daily work performed was exactly according to schedule and that the only variations occasioned by sickness, allowed time off, traffic tie-ups or other unusual procedures amounted to but 5 or 10 per cent of the total entries necessary.

PAYROLLS MADE UP IN ADVANCE

In accordance with the new plan now in effect on the system the daily time sheet is written once with duplicator ink and fifteen or sixteen copies made, sufficient for the two weeks payroll period. One of the sheets reproduced herewith is for the Kenwood-East 25th Street line, operating out of the Lake Street station. There are eleven runs and eight trippers.

Running Record <u>Kenwood-E 25th</u> Line <u>Lake St</u> Station															
Card No. <u>7314</u> Week _____ Day <u>August 16 1926</u>															
Run No.	Running Time From To		Motorman	No.	Platform Time	All'd Time	Time Card Time	Extra Time	Car No.	Conductor	No.	Platform Time	All'd Time	Time Card Time	Extra Time
1	502	118	Lindgren	1737			9 00		1683	Anderson	1730		44	9 00	
2	613	1206	Johnson	2045			9 00		1510	Bergquist	1838		46	9 00	
3	621	1152	Carlson	1935			9 16		1625	MacKugge	2262		37	9 16	
4	206	354					37		1625						
	431	551													
	545	815	Wheeler	2111			7 30	✓	1620	Svenson	2280			9 00	
	1242	618		2003	✓	54	6 30	✓	1548				54		
10	1227	828	Kilgrem	1703			9 00		1603	Norheim	1778		59	9 00	
11	1245	847	DeKolk/Kok	2125			9 00		1599	Berg	1758		58	9 00	
	529	835					3 06		1601					3 06	
	556	943	#4 Grand				3 47		✓					3 47	
	1206	316					3 10		1510					3 10	
	1152	206					2 14		1625					2 14	
	455	617	#27 Snell				1 22		✓					1 22	
	421	728					3 07		1537					3 07	
	435	554					1 19		1150					1 19	
	618	814					1 56		1229					1 56	
					107.57	6.46						107	57	6.46	

Portion of Daily Time Sheet for a Weekday of One Line in Minneapolis

The normal time for the weekday schedule is calculated in advance and sufficient duplicator copies are made to last for a payroll period. As the trip sheets come in,

they are checked against this sheet and variations from the standard time card are noted. Also the car number used in each run is marked on this sheet.

This system has saved half of the time clerks used previously and has been operating successfully for some time in Minneapolis and St. Paul.

FORM 488				FOR HALF MONTH ENDING _____ 192__																
OCCUPATION RATE	NAME	BADGE NO.	1		2		OVERTIME	PULL OUT AND PULL IN TIME	TOTAL TIME	RATE	AMOUNT	BONUS	TOTAL	DEDUCTIONS			BALANCE	TIME CHECKS	CHECK NO.	REMARKS
					TAX	INSURANCE								OTHER						
OVERTIME																				
1	A 55	F. GUST JOHNSON	59	6:21	7:12			120:06		66:25			66:73	25:00	50:00		59:19			696
OVERTIME																				
2	A 55	GEO. E. GRUBER	63	9:25	9:25			138:31		73:43			73:22	3:20			70:72			697
OVERTIME																				
3	B 55	HANS PEIT	67	7:30	9:20			138:45		75:74			75:55	3:20			72:55			698
OVERTIME																				
11	B 55	CHAS. O. DEMARIS	91	9:25	9:25			132:58		73:13	2:00		75:36	3:25			72:11			706
TOTAL OVERTIME				1:45																
TOTAL TIME				98:06																
PULL OUT AND PULL IN																				
Examined by _____			Foreman																	

Facsimile of One Sheet of the Minneapolis Trainmen's Payroll, on Which Are Transferred Daily the Actual Time Plus the Allowed Time that Each Trainman Worked the Day Before

Prior to the payroll period, the names and numbers of the trainmen operating this line are entered, as well as the time for each run and the total time of the run with the "time allowance" permitted. The total time allowed by the time card is included at the bottom.

When the trip sheets for a day come in, these are checked against this daily time sheet. If there are any changes the duplicated figure is crossed out and the new figure written above it. Usually there may be one or two changes on each time card. The difference in time is quickly calculated, subtracted or added to the total and the day's time for that line is completed.

The time for each man is then transferred to the semi-monthly payroll. The condensed facsimile of the form used is shown at the top of this page. The method of filling it in is obvious.

By the use of this method no timekeepers are needed at the station. The trip sheets are examined as they are turned in and then bundled up and sent to the auditor's office. Here they are checked against the standard time sheets. Necessary changes are re-entered on the payroll for the half month. Six girls in the auditor's office now do the work which previously required twelve clerks. Besides this, they have time to spare for other work. In fact, it is stated that five girls could do all of this work during eight hours a day. There are at present 2,200 trainmen, but the same force has done the work for 2,500 trainmen.

Some little difficulty is experienced when the lines are thrown off schedule, as, for instance, in case of a heavy snowstorm, but if every line were thrown completely off schedule due to some such cause, the situation for a day or two would be no worse to handle than the normal day on the old basis. Naturally these days of abnormal conditions are very infrequent.

Three different time cards are in effect on the system, weekday, Saturday and Sunday. Sheets similar to those represented are made up for each kind of time card.

Radio Stunt—A Valuable Advertiser

AN UNUSUAL method of using the radio as a valuable advertising medium has been successfully developed by the Northern Texas Traction Company, Fort Worth, Tex. The first program was so refreshing in its novelty that it brought a total of 2,612 "fan letters," a record for station WBAP. The programs are broadcasted semi-monthly from station WBAP of the Fort Worth *Star-Telegram* and *Record-Telegram*.

This popular stunt consists of a round trip between Fort Worth and Dallas on the "Crimson Limited," the non-stop interurban train of the company. A specially constructed noise-making device reproduces all the sounds made by interurban trains in actual operation, such as the conductor's signal bell, warning gong, click of wheels and whistle. With this realistic obligato the announcer describes the passengers, scenery and incidents of the road with so much enthusiasm that many of the listeners are reported to believe that the program is actually being broadcasted while the train is going over the line. New incidents of the trip are introduced from time to time to give variety to the program.

The advertising advantage of these programs is tremendous and varied. As far as the general public is concerned, the radio not only provides direct contact with the majority of potential patrons but it also offers an opportunity for follow-up advertising in connection with the mass of "bad mail" which is continually coming in. All of these communications are immediately answered by letter, over the signature of the passenger agent, containing a souvenir time-table.

With the radio activities of the company growing popular the company has recently erected its own studio. In addition to the trip on the "Crimson Limited," entertainment is furnished by three orchestras and various vocal artists, many of whom are recruited from the company's own ranks.

Berlin Carries Out Extensive Car Improvement Program

SECOND ARTICLE

Cardan Drive Being Used in Various Combinations and Is Considered Especially Desirable for Trains of Two Motor Cars—For Such Use Two Motors Only Are Required to Drive All the Axles of the Train—Cardan Drive Gearing Shows Practically No Wear After a Run of 58,000 Miles

By Wilhelm Pforr

General Manager Berlin Street Railway System, Inc., Berlin, Germany

This series of two articles is based upon an article by the author entitled "Die Entwicklung des Wagenparks der Berliner Strassenbahn," in the *Zeitschrift des Vereines deutscher Ingenieure* for Nov. 13, 1926, supplemented by other information just received by ELECTRIC RAILWAY JOURNAL from Mr. Pforr.

DEVELOPMENT of car design in Berlin, Germany, up to the present time was discussed in the article published in this paper for Jan. 29, 1927. Some particulars were given of the experimental use of Cardan drive on several recent cars. The general principle of the application of this system of drive is shown in Fig. 15. This particular car has a weight empty of 12.15 metric tons (26,730 lb.) and a gear reduction of $\frac{34 \times 40}{14 \times 16} = 6.1$.

In some motor cars under construction, the installation of Cardan drive is being made with a single motor of double capacity instead of two motors of 35 kw. (47 hp.) capacity. Such a motor will have two sets of gears as shown in Fig. 16. It will be noted that this is a modification of the former Cardan drive and that both axles are connected mechanically together by means of Cardan gearing. The motor is set midway between the two axles and has a capacity of 70 kw. (93 hp.) and a speed of 1,200 r.p.m. With this size of motor, as with the two motor equipment, it is possible for a motor car to haul two trailers.

Figs. 17 and 18 show the appearance of the Cardan gearing in our experimental car after running 54,000 km. (33,750 miles). As will be seen it shows practically no evidences of wear. Since these views were taken the car and gearing have completed 93,000 km. (58,000 miles) in operation, with no more appreciable wear on the gears than that shown in the illustrations. Moreover, the gearing is operating as noiselessly as at first. These results, as well as the high efficiency of the combination, are to be attributed largely to the method of drive employed. In addition, the Cardan drive possesses the following advantages over spur gearing:

ADDITIONAL ADVANTAGES OF CARDAN DRIVE

1. The operation of the gearing is accompanied by very little noise, partly because the operation is in an oil bath and also partly because the elimination of motor axle bearings makes possible permanent precision in the meshing of gears.

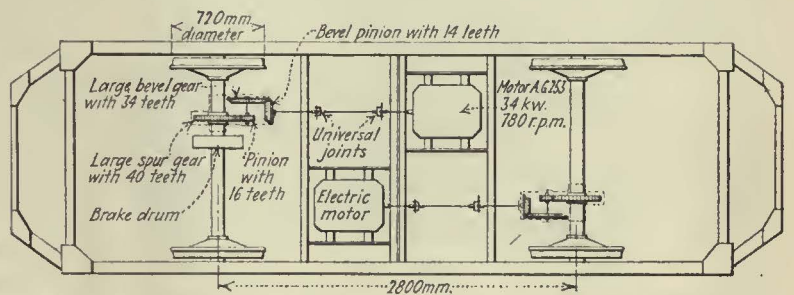


Fig. 15—Plan of Floor Framing of Car with Two Cardan-Drive Motors

2. Wear on the faces of the teeth is very small.
3. Abandonment of the motor axle bearings does away with the necessity of their maintenance.
4. Addition of lubricant to the gear system is necessary only infrequently.
5. Owing to the complete spring support of the motors, the life of the roller bearings, including their housings, is greatly increased.
6. The removal of the motor from the axle greatly reduces the non-spring supported weight of the car.
7. Locating the motors with their armatures at right angles to the axle of the car makes it practicable to drive both car axles with one motor and obtain excellent braking and acceleration. As shown in Figs. 20 and 21, we have adopted this form of construction for our new trains with two motor cars, obtaining traction on all

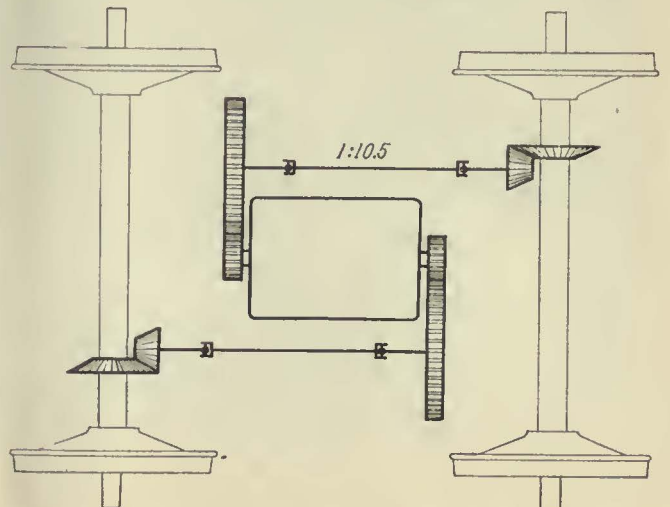


Fig. 16—Method of Driving Two-Axle Car with One Motor



Fig. 17—Cardan-Drive Gearing with Cover Removed, of the type Shown in Fig. 15, Operated in Experimental Service. In This Case the Brake Drum Is on the Gear Shaft and Not on the Axle

eight wheels with but two motors. The result is we have a two-car train carrying 140 passengers and driven with but two motors, which possess good braking and acceleration. It is obvious that both first cost and maintenance cost of two motors is less than if four motors of the same total capacity were used. It appears to us that this arrangement might be of interest to American properties.

8. Suspension of the motors from the car body permits greater latitude in the height of the car floor, and step heights can be made less than with spur gearing.

9. The motor and gear drive can be constructed together as a unit.

10. It is possible to use higher speed motors than with spur gearing.

11. It is also possible to build motors with a greater armature length, as this length is not limited by the wheel gage, as with spur gearing.

12. The entrance of gear grease into the motors, which sometimes occurs, especially with motors of the ventilated type when spur gearing is used, is impossible.

APPLICATION TO TWO-CAR TRAINS

Use of motor cars along with trail cars presents some operating difficulties since considerable switching has to be done at the ends of lines unless there are loops. This indicates the desirability of making up each two-car unit not of a motor car and trail car, but of two motor cars and having in each motor car a motor of sufficient capacity to operate it independently. This for Berlin conditions was decided to mean a motor of 35 kw. (47 hp.) capacity and the system of drive shown in Fig. 19. As will be seen from the diagram and gear ratio, this meant a motor speed of about 800 r.p.m. with a single bevel gear drive for each axle. Instead of the bevel gear drive, a worm drive can be used, if desired, and it will have the advantage that it will permit a gear ratio of 1 to 9 and allow the use of a higher speed motor. One car with worm drive is being built for the Berlin Street Railway and will be put in operation within a short time. As to the results to be achieved it is impossible now to say.

Two coupled motor cars with the method of drive

illustrated in Fig. 19 have been fitted up and are shown in elevation in Figs. 20 and 21. This method of drive has been applied to two cars exactly alike and designed always to be coupled together, and this articulated unit will shortly be put in service. Ten other cars of this kind are now under construction. They are of the center entrance type. The wheels are of 650 mm. (25½ in.) diameter and the wheelbase is 3.2 m. (10 ft. 6 in.). The body length outside of posts is 11 m. (36 ft. 1 in.) and the running gear is of the Peckham type with pendulum action so as to permit some axial displacement. Thereby the effect of blows to the car body due to bad track and at entrance to curves is reduced. At the same time the side thrust of the axle on the roller bearings is reduced, and this should have a material effect on their life.

The use of small diameter wheels and center entrance and the fact that the motors are attached to the body of the car allows the car floor to be about 130 mm. (5½ in.) lower than on the other recent type of cars of the company, as shown in Fig. 11 (see previous article). This facilitates the boarding and alighting of passengers. Moreover, since it is possible with the center entrance car to combine the space formerly taken by the two end platforms in one large center platform, it is practicable to install two separate doors of ample width to permit a passenger to enter and another to leave the car at the same time. A gain is also made of four seats, and passengers no longer interfere with the motorman in boarding or leaving as with end platforms. Lastly, the conductor has better control over entrances and exits than when one door is at one end of the car and one at the other.

DOUBLE-DECK CARS NOT DESIRABLE

In addition to these advantages of the center-entrance car, the two-car train has the further advantage that the cars do not have to be uncoupled at the ends of the line. All axles of the two-car train are driven, permitting rapid acceleration and better braking. There has been some agitation in the daily press that the Berlin Street Railway should put on double-deck cars to increase the seating capacity. Such a policy is not desirable, especially since Berlin has a number of points on its streets where there is little clearance under the

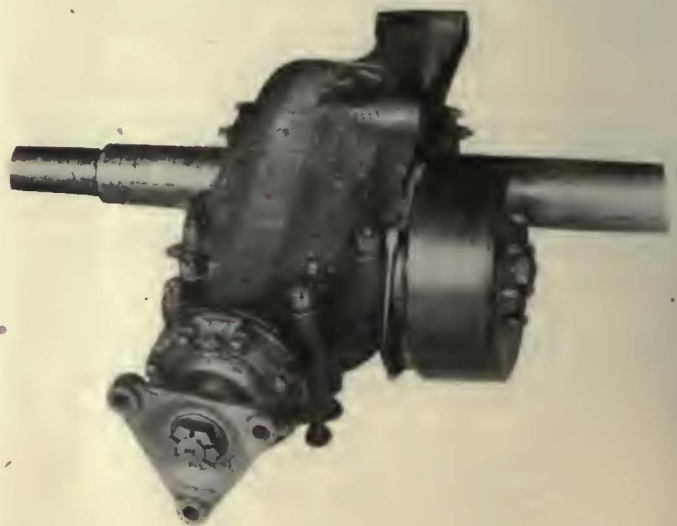


Fig. 18—Cardan-Drive Gearing Shown in Fig. 17, but with Cover in Place

Interesting Construction on Cleveland Car Station

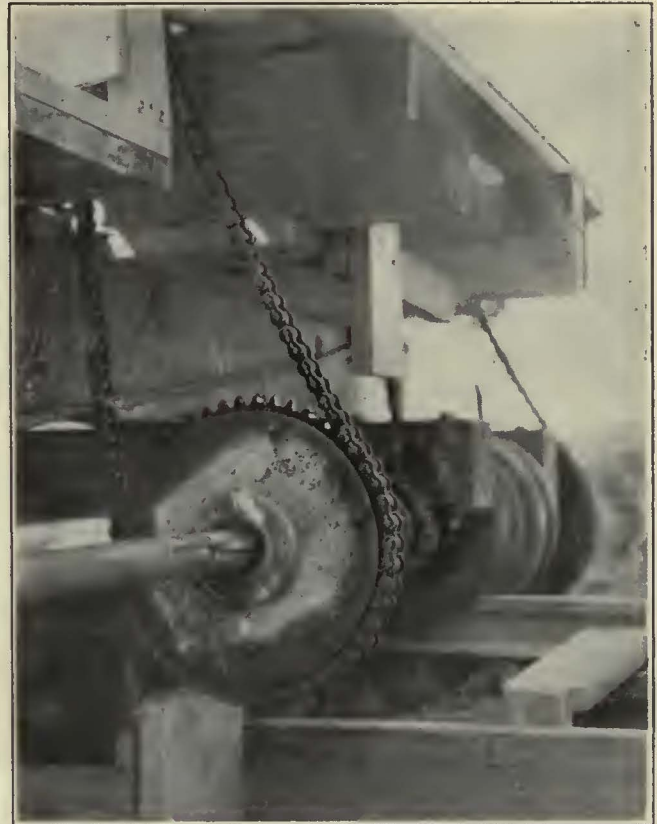
Preparatory to Constructing a New Car Station on West 117th Street, It Was Necessary to Build Drainage Culvert—Method Used to Construct This Culvert Illustrated

PROPERTY on which the new car station of the Cleveland Railway at West 117th Street and Linnet Avenue was to be built had a stream running through it in a deep ditch. This necessitated the construction of a culvert. Because of the broad curve of this open ditch and stream certain problems were presented that were solved by the use of a traveling bridge designed to carry batches of concrete from the mixer located at one end of the property abutting the street.

This bridge, shown in several of the views, has a span of 36 ft. from rail to rail on which it runs. For a short distance the 36-ft. gage track is tangent and then swings onto a long curve having an inside rail radius of 197.26 ft. and an outside rail radius of 233.07 ft. The problem was naturally to construct the bridge and track so that the bridge would swing around the curve, even though the outer wheel must travel a longer distance. This was accomplished by using a larger diameter wheel on the outer end of the bridge that came into play on an offset rail just at the point of tangency with the curve.

CURVE RAIL OFFSET TO ACCOMMODATE LARGE WHEEL

The wheels used on the tangent sections are of the same diameter on each end of the axles, namely, 12 in. The two larger wheels on the outer end of the bridge are of 14½ in. diameter and are mounted adjacent to the smaller ones. The size was calculated previously to give the proper swing to the outer end of the bridge when traveling around the curve. To accommodate the outer or larger wheel the rail on the curve



The Traveling Bridge Used on Cleveland Railway Culvert Construction Is Driven by a Ford Automobile with Sprockets Substituted for Wheels and Connected to the Two 36-Ft. Axles by Sprocket Chains, as Illustrated in This View

is offset as shown in the views, leaving an overlap to provide easy rolling from one rail to the other.

A Ford automobile has been rigged up on one end of the bridge to furnish the propulsion power. Rear wheels have been removed and sprockets substituted that drive, by means of chains, both axles of the bridge.



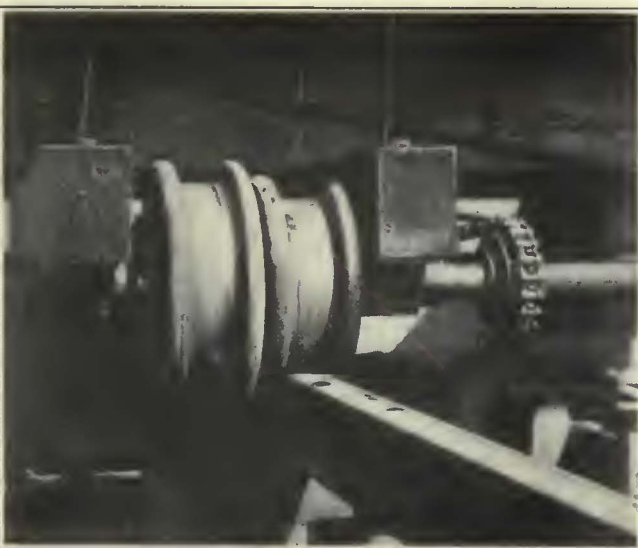
Mixing Plant at One End of the 400-Ft. Culvert Being Constructed Prior to the Erection of the New Car Station of Cleveland Railway on West 117th Street. A Ford-Driven 36-Ft. Bridge Carries the Mix and Other Materials to Any Point on the Job, Part of Which Extends Around a Curve



At the Point of Tangency on the 400-Ft. Runway Over the Culvert a Second Rail Is Used to Accommodate a Larger Wheel, Allowing Bridge to Swing Around Curve in Perfect Alignment

Some little difficulty was experienced at first in the relative forward and reverse speeds. The outbound speed with the load was rapid, but in the reverse direction it was too slow. To overcome this the sprockets were changed to give the same outbound speed as originally planned but with the engine in second speed. Since the reverse speed of a Ford drive has nearly the same speed as second, this difficulty was overcome and the operation of the bridge made practically the same in each direction.

Two culverts of reinforced concrete were built in this manner by the Bituminous Construction Company for the Cleveland Railway. Each is 10 ft. high by 12 ft. 6 in. wide. When complete the culverts will be covered over and the car station and tracks constructed on top of this structure.



The Tangent Running Wheels Are 12 In. Diameter. To the Left Is One of the 141-In. Wheels that Engages a Rail in that Position, Allowing the 36-Ft. Bridge to Travel Around the Curve in Proper Alignment

Des Moines Pass Riders Increase

MORE than 10,000 Des Moines citizens are now users of the weekly pass recently started by the Des Moines City Railway, Des Moines, Iowa. The pass idea started with the Sunday pass for 25 cents, which materially increased riding on these otherwise light traffic days.

Some of the suggestions for pass use offered by the company are as follows:

Ride to lunch at home or favorite restaurant or club.
Go to lodge meeting, prayer meeting, entertainment at night.

Loan your pass to the wife, so that she can shop before dinner.

Loan your pass to one of the youngsters for the evening.

Ride as short a distance as you please, to escape rain or snow, or to let the car carry your parcels.

A message to the automobile user is contained in an estimate of operating costs totaling 9 cents a mile, made up of the following items:

	Cents
Cost of car.....	3.0
Repairs	0.5
Gasoline and oil	2.5
Tires	1.5
Storage, taxes, insurance	1.5
Total	9.0

You can ride in a closed car with driver on a weekly pass for 1 cent a mile. Think what you could buy with the difference!

Another stunt used to increase interest in pass usage is a lucky number contest, by which five lucky numbers are chosen each week, entitling the winners to a prize of a \$1.25 pass plus a ticket to a local theater.

On Nov. 20, 1926, a new contest was announced and \$25 was distributed to the seven best writers of letters on the use of the pass. The letters were judged by a committee of Des Moines business men and the prize winners were announced in a December issue of the company leaflet distributed on the cars.

Modern Equipment Described for Passengers

THE Pennsylvania Railroad is distributing a fourteen-page pamphlet in which modern cars and locomotives of the various types and classes now in use on the system are pictured and described. In addition to 30 pictures of the leading types of locomotives and cars now in service on the Pennsylvania, the pamphlet includes a short preface, seven pictures of cars and locomotives used in the early days of railroading in America, and eight views of the Altoona works, the principal shops of the Pennsylvania Railroad and the largest railroad shops in the world.

The illustrations of modern locomotives and cars include ten pictures of steam locomotives, four electric locomotives, electric passenger locomotive, electric switching locomotive, electric passenger and freight locomotive, electric passenger coach, gasoline-electric rail motor car, standard passenger coach, combination passenger and baggage car, dining car, mail car, combination baggage-mail car, baggage car, box car, automobile box car, refrigerator box car, stock car, flat car, low-side gondola car, high-side gondola car and hopper car.

Each type of locomotive and car is accompanied by a brief description giving the salient facts in regard to weight, length, capacity and tractive power.

The Readers' Forum

Attractive Cars Increase Riding

CUMBERLAND COUNTY POWER & LIGHT COMPANY

PORTLAND, ME., Jan. 19, 1927.

To the Editor:

I am in hearty co-operation with the idea expressed in the article on attractive car appearance which appeared in the Jan. 15 issue of *ELECTRIC RAILWAY JOURNAL*. The best reason for the use of modern and well-maintained cars is to attract more passengers and give a lasting impression of comfort, regularity of service and safety. They will induce more people to use the cars regularly since people will ride in the conveyances that they find give them the most comfortable and dependable service.

The general appearance of rolling stock as viewed from the street is one of the best advertisements of the class of service given by a railway. Good maintenance is by far the cheapest. Special attention should be paid to cleanliness, heating, lighting, seats, ventilation, reduction of noise, proper destination signs and riding qualities of both cars and tracks.

Motormen and conductors should be well trained in salesmanship, neatness and high-operating ability so as to make the ride pleasant and safe. When this is done the number of riders will increase.

R. T. CHILES,
Master Mechanic.

Attractive Cars and Frequent Service Solved Fort Wayne Problem

INDIANA SERVICE CORPORATION

FORT WAYNE, IND., Jan. 26, 1927.

To the Editor:

Some years ago the Indiana Service Corporation began buying cars. As a result, all of the cars now in regular operation are of very short average age, the oldest dating from 1918. In the evening rush hour we use some trippers that go to the factories and pick up employees who are carried to the various lines without transfer. These cars date back to 1911, but they are the very oldest cars we own. However, the 1911 cars are only used for one trip in the evening rush and all other cars are 1918 or more recent still.

At the time the first modern cars were bought, that is to say about 1918, this company went into the proposition of using a distinctive color. Fort Wayne has narrow streets and some of them have heavy traffic for a city of this size. It was thought necessary to have a very bright, attractive color for the cars because of the street congestion and also because of the fact that such a bright color acts as a good sales argument in advising the public that a car is approaching. The color selected was a bright lemon yellow. It has been adhered to ever since. The results obtained with this color were all that could have been desired. The cars are very easily picked out from other traffic on the street.

We attempt to keep them well painted and well cleaned, because our street cars are our show window

and we want them kept in the most attractive form possible.

We operate a large number of car-miles because we believe that frequency of service is a very important factor with the public. All cars in Fort Wayne are one-man operated. The public apparently is pleased with the service, and while we do receive complaints occasionally, these are decidedly infrequent.

Of course, in connection with the cars, we have also put forth every effort to keep the track in good condition, because a good car operating over a rough track will not give a smooth ride and the public insists on having the smoothest ride possible.

HENRY BUCHER,
Manager Railway Department.

Safe, Clean and Comfortable Cars a First Need

SHREVEPORT RAILWAYS

SHREVEPORT, LA., Jan. 25, 1927.

To the Editor:

The providing of greater comfort, safety and convenience for the traveling public is indeed an important subject and requires constant thought and study. The first duty of a street car company is to provide cars that are sound, safe, clean and as comfortable as possible. The service must be frequent and dependable. The speed should be as fast as safety will permit. The employees on cars must be courteous and obliging to the traveling public at all times. After these things we begin to think of the refinements that will attract new business, and we should go as far in that direction as the earnings will permit.

When purchasing new cars, we have tried to get the latest features in design, that will increase the safety and riding qualities. To improve the lighting, we replaced the green ceiling with white, and replaced the cluster lights in the center of the ceiling by distributing the lamps on each side. These changes have brought out very complimentary remarks from the patrons of our line.

We replaced the monitor roofs with arch roofs. This also improved the appearance and made the car lighter. To improve the riding qualities, we are revamping all of the older type trucks with the latest Brill system of spring suspension and brakes.

To eliminate noise we are replacing the split spur gears with solid helical gears and pinions. We have adhered to the Pullman green color for the outside of our cars. This we find durable and in harmony with the buildings and surroundings along our tracks. Our sash, doors and inside trim are of cherry.

We have not departed from the use of slat seats, about which we have never had any complaints from our patrons. For short rides we do not believe seat upholstering is justified, under the low rate of fare fixed by the government authorities. We have never had any complaint about the riding qualities of our double-truck cars, but the single-truck cars are not satisfactory except on very smooth tracks. We have determined never to buy or build any more single-truck cars, because it is almost impossible to keep the track smooth enough for these cars to give satisfactory riding.

H. B. HEARN,
President.

"Nix on the nicks," while winding armatures, Will minimize your broken lead failures.

Atlanta moved up from fifth place to fourth, and Little Rock from ninth to fifth. In all, eight railways made a better showing in 1926 than in 1925, while four reported smaller mileage per pull-in.

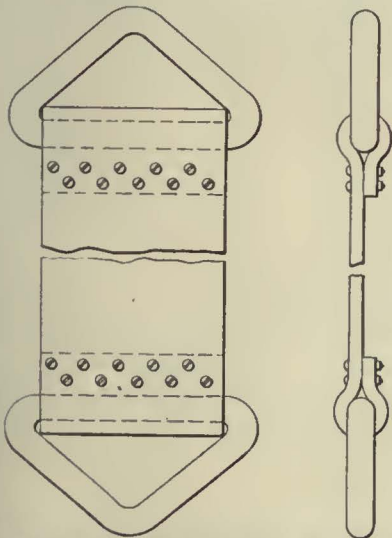
An accompanying table shows the number of pull-ins for each company listed under 64 classifications.

The principal classes of defects which have caused most detentions are: Armatures, fields, brushes and holders, controllers, air brakes, and brake rigging. This table also serves to give a very definite idea as to the classification of defects that is used.

Sling for Lifting and Carrying Armatures

LIFTING or carrying armatures by means of hooks, chain or rope slings offers the danger of mechanical injury at the bearing fit, and bells, commutator or end connections. To eliminate this possibility entirely a flat sling has proved satisfactory in the Interborough Rapid Transit Company shops in New York.

This sling is made of five-ply Balata belting 12 in. wide and on each end is installed a closed lifting tri-



Sling Made of Balata Belting Prevents Armature Injuries During Shop Handling

angle made of 3/4-in. round iron. The belting is lapped over one side of each triangle and made secure by numerous 1/4-in. stove bolts. In lifting an armature the sling is placed around the core at the center of gravity and both triangles hooked on the lifting device.

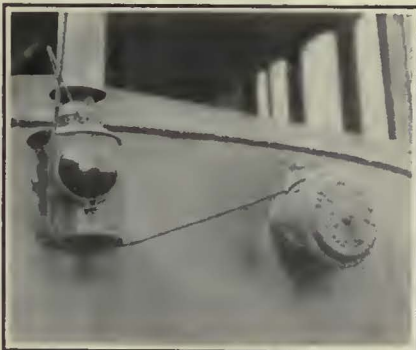


New Style Tail Light Bracket with Spring Bolt Holds the Light in Position Securely

Spring Plunger Locks Tail Light in Place

ON CARS equipped with trolley catchers trouble was experienced by the Grand Rapids Railway, Grand Rapids, Mich., from the trolley rope catching underneath the tail light and lifting it out of its socket. Also, jars at crossovers frequently caused tail lights to become detached from

trations show the method by which tail lights are now installed and are held in position by the plunger and also a tail light with the trolley rope caught underneath in a position to lift it out of the socket.



The Catching of a Trolley Rope Underneath a Tail Light Frequently Pulls the Tail Light out of Its Socket

the supporting brackets. In order to overcome this difficulty the bracket was fitted with a spring plunger. To install a tail light the plunger is pulled out against the tension of the spring. With the tail light installed in its bracket the plunger, when released, hooks over the bar of the tail light arm and so holds it down firmly. This has effectively overcome the difficulty. Accompanying illus-

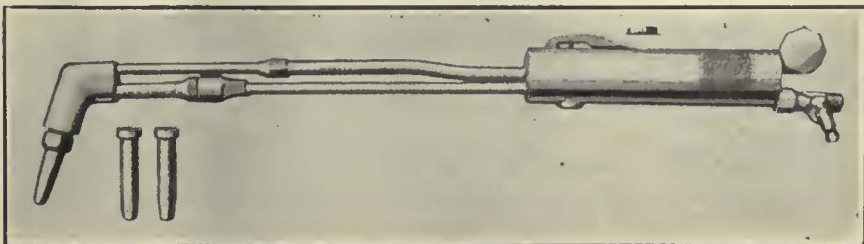


Torch Uses Oxy-Illuminating Gas

CUTTING of heavy plates, risers, gates, billets, etc., using either city gas, natural gas or by-product (coke oven) gas has been made possible by the development of a new oxy-illuminating gas cutting torch, manufactured by the Alexander Milburn Company, Baltimore, Md.

An interesting achievement of this type LPG torch is that it can be used with by-product (coke oven) gas. It is not necessary to have this gas scrubbed; it can be used just as it comes from the coke ovens. A recent test with this particular by-product gas with a low B.t.u. content showed a speed averaging 1 ft. per minute on 3-in. plate using 40 lb. oxygen pressure with the gas at ordinary line pressure without being boosted.

The cuts showed a sharp, clean edge, devoid of slag on the under-



Cutting Torch for Use with Illuminating Gas and Oxygen

side, a narrow kerf and very smooth surfaces. A very important feature is the absence of case-hardening of the surfaces, which makes for easier machining. The torch is made of bronze forgings and special seamless tubing, constructed to withstand constant and severe service. It is evenly balanced and ruggedly built. The high pressure cutting oxygen is controlled by a thumb valve.

The torch is supplied with a range of tips to accommodate all thicknesses of metal. The tips are made of solid copper, designed rapidly to preheat the gases, giving better penetration and quicker cutting.

Welder Built on a Unit Basis

NCESSITY for having all the elements of a welder in one block has been eliminated and a reduction in voltage stress on insulators and resistance wires has been made possible by the adoption of a sectionalized plan of construction for a

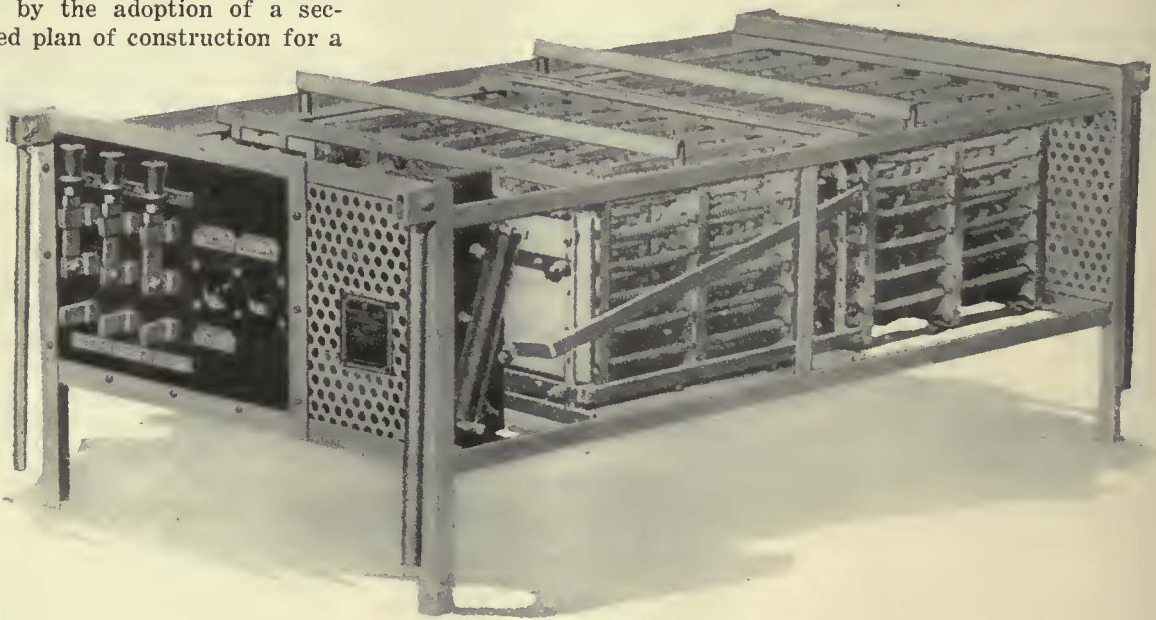
locked. Retaining lugs on the frame are so spaced that should any of the insulators become cracked or broken as the result of unusual handling they will remain in position and the resistance coils cannot short or ground.

Each individual resistance element unit is a rigid and sturdy steel frame structure. Its design provides maximum protection both to the insulators and resistance coils and affords rapid heat dissipation. The spirally wound resistance wire is of a super-nickel-chromium resistance alloy made for continuous duty at temperatures approximately 50 per cent higher than those generally obtained in actual service. The wire resists oxidation and is non-corrosive. Undue stretching or sagging of the resistance coils is prevented by the close spacing used between the supports.

each other and from the main frame by mica tubes and washers. Voltage stress on any one resistance unit is thus reduced and possible short circuit is minimized. Any one of the individual resistance units in either block may be removed for inspection without disturbing the other units.

A heavy-duty shunt-type contactor provided with a magnetic blow-out is connected in series with the welding circuit. It completes or breaks the circuit as the electrode touches or is withdrawn from the work. Control of the machine is provided by a push button on the electrode cable adjacent to the electrode holder. This gives complete voltage protection to the operator when changing electrodes by enabling him to control the welding circuit at a remote point instead of at the machine.

The welder operates on any volt-



Portable Resistance Type Arc Welder Built on a Sectionalized Plan

new type portable resistance welder put on the market by the Ohio Brass Company, Mansfield, Ohio. Insulators used for supporting the resistance coils are made of an especially developed heat-resisting porcelain. Absence of holes or sharp corners on these insulators prevents excessive breakage under rapid changes in temperature. The surfaces which support the resistance coils are convex in shape to provide a point contact between coils and porcelain.

Pressed steel upright supporting frames hold the insulators and resistance coils securely in position and at the same time provide clearance for the resistance wires. When assembled the insulators are inter-

The main frame is a one-piece unit made of 1-in. x 1-in. angle steel braced rigidly and arc welded. The cover is made of hot-dipped rust-treated galvanized iron perforated to give rapid heat dissipation. The complete unit is light and is easily carried by two men. It is equipped with handles which drop down out of the way when the machine is in operation. The legs of the welder are drilled and tapped for attaching clamping studs, axles and wheels, which are furnished on special order.

The fourteen individual resistance units are arranged in two element blocks of seven units each instead of in one complete element block. The element blocks are insulated from

age from 400 to 600 in current ranges of from 30 to 210 amp. The current is regulated in steps of 20 to 30 amp., depending on the line voltage, by three single-pole, double-throw switches. These permit the operator to adjust the current to the requirements of the work. The welder operates on 400 to 500 volts when the switches are in the lower position and on 500 to 600 volts when the switches are in the upper position. Marker plates opposite the switch controls indicate the position of knife switches for a given voltage. Current ratings of individual switches are shown by marker plates located above and below the switch contacts.

Association News & Discussions

Active Interest Shown at Southern Equipment Meeting

Annual Pull-In and Maintenance Cost Reports of Member Companies for the Year 1926 Show Improvement Over 1925—Major Part of Meeting Devoted to Discussion of Maintenance Practices

RAPID-FIRE questioning of the author of each paper by other members brought out constructive information at the Memphis meeting of the Electric Railway Association of Equipment Men, Southern Properties, held Jan. 26 to 28. A preliminary report of the meeting was published in this paper last week. Letters were read from W. H. Sawyer, president American Electric Railway Association, and J. W. Welsh, executive secretary, expressing regret at their inability to attend.

E. W. Ford, vice-president Memphis Street Railway, addressed the convention and complimented the association for its progress and the valuable contributions made to the industry since it was organized.

In his opening address A. D. McWhorter, general superintendent Memphis Street Railway, president of the association, said that the Southern properties continued to show lower and more uniform maintenance costs than in the past. These compare favorably with maintenance costs in other sections of the country. Good public relations are obtainable only through good service and good service is dependent on properly maintained, clean, well-painted and attractive cars. He called attention to the progress made by the industry in establishing bus service and extending one-man operation. Electric railways are rendering a most important service to the public at less cost than any other industry in the country. "We have made progress," he said, "but we must stay one jump ahead of the game or we are falling short in our duty to ourselves, our communities, and our companies."

C. J. Axtell, special railway engineer General Electric Company, read a paper on "Car Equipment Apparatus." He spoke in detail about the changes which had been made in the manufacture of standard apparatus in order to minimize failures, facilitate inspection and decrease maintenance costs, and pointed out that manufacturers found it necessary to design equipment to suit the new and varied designs of light safety cars that are in operation today. An abstract of this paper appears elsewhere.

Following a lively discussion of Mr. Axtell's paper, R. S. Frehse, National Pneumatic Company, explained in a clear and concise manner how a circulating load is handled by means of a

treadle-operated door. His paper is published in abstract elsewhere in this issue. T. R. Bristol, assistant superintendent of equipment Georgia Railway & Power Company, told of experience with 40 pneumatic treadle door equipments and 60 electro-pneumatic treadle door equipments. This paper explained in detail the troubles which had been experienced and how they were corrected.

E. L. Ray, employment agent Memphis Street Railway, presented a paper on the methods employed by his company in developing operators for the one-man cars. Requiring the motor-men and the conductors to exchange positions for a few days under the guidance of an instructor soon provides skillful operators.

"Essential Features of Modern Cars" was the subject of a paper read by E. A. Palmer, special railway engineer Westinghouse Electric & Manufacturing Company. This paper will appear in abstract in a further issue of the JOURNAL.

In a paper on "Department Co-operation" J. L. Brown, master mechanic Dallas Railway & Terminal Company, emphasized that without full co-operation of all departments maintenance costs cannot be kept at a minimum.

MAINTENANCE DATA PRESENTED
On the second day the program

COMING MEETINGS OF *Electric Railway and Allied Associations*

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

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

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

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

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

AVERAGE MILES PER PULL-IN FOR THE YEAR 1926, SOUTHERN PROPERTIES

	Total	Chargeable to Equipment
New Orleans.....	100,833	261,084
Nashville	45,000	118,724
Knoxville	32,524	54,046
Atlanta	25,991	41,340
Little Rock	15,848	23,389
Birmingham	13,964	17,531
Texas Electric	12,058	15,829
Memphis	9,889	14,337
Mobile	8,633	13,029
Dallas	6,954	10,416
Covington	5,686	16,707
Montgomery	2,865	3,211
Chattanooga	1,920	2,750

COMPARATIVE MAINTENANCE COST OF EQUIPMENT PER 1,000 CAR-MILES FOR YEAR 1925, AND FIRST ELEVEN MONTHS OF 1926

	1925	1926
Memphis	\$17.94	\$16.16
Little Rock	18.90	16.32
Covington	19.32	18.75
Atlanta	21.54	20.24
New Orleans	19.78	20.37
Knoxville	22.28	20.56
Texas Electric	23.41	20.86
Mobile	27.80	24.80
Birmingham	25.42	25.25
Dallas	31.43	29.74
Chattanooga	30.37	33.08

started with a paper by J. H. Squires, machine shop foreman Georgia Railway & Power Company, on "Shop Practices on Wheels and Axles." This aroused unusual interest and created considerable discussion concerning methods of machining and assembling wheels and axles. A. J. Naquin, engineer rolling stock and shops New Orleans Public Service, Inc., read a paper on "Advantages of Overhauling Equipment on a 40,000-Mile Basis." Abstracts of these papers are given on another page.

C. B. Tutwiler, general foreman Memphis Street Railway, spoke on "Car Cleaning." He told how the cars are washed outside every three days with a Holcomb 4-in. bristle brush and clear water. At the same time the windows are cleaned inside and the dust removed from the lamps and interior woodwork with a soft cloth. After each car has finished its daily run, the interior is disinfected and the floor swept. Accumulation of dust is removed from the seats by means of a feather duster.

A. Taurman, superintendent of equipment, way and structures Birmingham Electric Company, Birmingham, Ala., spoke on "Good Housekeeping." He stated that with the shops and car-houses properly cleaned and maintained it is much easier to require better work from the men and to furnish the public with clean and serviceable cars.

The afternoon session was devoted to discussion of 36 questions prepared by member companies pertaining to equipment maintenance. Charts were distributed at the meeting showing the average miles per pull-in and maintenance cost per 1,000 car-miles for the

year of 1926. These figures are given in accompanying tables. In the evening the delegates attended a banquet in the Louis XVI dining room of the Peabody Hotel.

The report of the nominating committee, election of officers, appointment of committees, and an inspection of the Memphis Street Railway and Memphis Power & Light Company's properties occupied the morning of Jan. 28.

New officers of the association elected for 1927 are as follows:

President, W. H. McAloney, superintendent of equipment Georgia Railway & Power Company, Atlanta, Ga.

Vice-president, R. M. O'Brien, superintendent of equipment New Orleans Public Service, Inc., New Orleans, La.

Secretary, A. Taurman, superintendent of equipment way and structures Birmingham Electric Company, Birmingham, Ala.

It was decided to hold the twelfth semi-annual meeting of the association in Atlanta, July 27-29.

Improvements Made in Car Equipment Apparatus*

BY C. J. AXTELL

Special Railway Engineer
General Electric Company

CAR equipment apparatus is a comprehensive subject, and the most interesting phase is that dealing with recent improvements. Changes made in the K-35 controller are typical of the improvements in other controllers of this class. The back casting has been changed to include a vertical trough up the back on each side to provide sufficient room to install the largest size of motor cables. This shortens the time necessary to change a controller. The cable terminals are a flat flag type in which the cables are permanently soldered, and fastened to the finger bases by a cap screw.

Contacts of the cutout switch have been reinforced by heavy flat springs, increasing the capacity of the switch and eliminating troubles due to poor contact and overheated switches. Where the insulated hexagonal shaft is used, the insulation is molded on. It is now molded in hexagonal tubes which accurately fit the standard shaft and can be easily renewed, by dismantling the cylinder castings and replacing the damaged insulation with a new piece. Reverse fingers, having a flat phosphor bronze spring and a heavy copper contact tip, insure decreased burning at the segments.

All modern K controllers with individual finger blowouts are now provided with arc suppressor plates inserted in the arc chute between the deflectors. This plate consists of a specially molded part of arc resisting compound which partially closes up the arcing space and directs the arc through two narrow slots. The older lock type burning tips are replaced with a lap type or one in which the segment screw passes through a hole

in both the segment and the burning tip so that it cannot loosen up and drop off the segment as might be possible with the old style.

Cap plates are now made with provision for mounting the LB control device without any machining operations. K-35 controllers furnished with cast aluminum alloy back and cap plates reduce the weight of the controller 19 per cent.

A new type of line breaker known as the DB-986 and DB-987, consisting of a very efficient arc rupturing contactor, magnetically operated and an overload relay inclosed in a box for under car mounting has been developed. This operates to break the motor circuit when normally turning off the controller as well as rupturing overloads and short circuits.

Among the recent improvements is the arrangement for removing the complete arc chute without the use of tools, simply by raising it up to unhook the top and withdrawing the chute, when the entire mechanism and the contact tips are exposed for inspection. The overload relay also has the novel feature of not only opening up the control circuit of the contactor, but also of mechanically opening the contact tips.

The early use of the line breaker provided for the breaking of the arc when the controller was turned to the off position. The ratchet switch improved this operation by requiring that the controller be turned backward but one step in order to open the line breaker. However, to improve further this operation the line breaker control device was developed. It is mounted on top of the cap plate. This permits the addition of this handle to any of the recently manufactured controllers, without the necessity of taking out the cylinder, changing the bearings or mounting any apparatus on the shaft. This breaker has the great advantage of opening up the control circuit of the line breaker on a slight backward movement of the controller handle and before the main cylinder has started to turn off.

With the advent of the new light-weight car, a new controller was needed which controller should be small, light weight and low in height. The K-75 controller was designed to fulfill this need. It has a capacity for operating four 50-hp., 600-volt motors. The contact tip is renewable by removing one cap screw. The arc chute is hinged to swing to the right instead of to the left, thus exposing for inspection all the fingers, blow-out coils and main cable connections when the arc chute is opened. Resistors used are in four sections, assembled in one group instead of with two groups as with the K-35 controller. The controller has five points in series and three points in parallel. A single motor cutout switch provides for cutting out two of the motors and permits operating the remaining pair in series-parallel relation instead of in series only.

For some classes of service a remote control is desirable. For this purpose a new type of magnetically operated control, known as the "Light Weight type M" has been produced. It is

intended principally for the city or light interurban service as it has a capacity for four 60-hp., 600-volt motors. The motor controller, which handles all of the main motor connections except the reversing of the motor fields, consists of a contactor box with eight contactors, one of which functions as a line breaker.

A split cover on this box when removed permits the controller inspector to have ready access to all contacts, main terminals and control connections. The reverser has a cylinder similar to a standard K controller. This control has a hand acceleration, viz., it is governed by the movement of the master controller, for its five steps series and four steps parallel. But nine train wires are required for operation. Due to the modern designs incorporated the control current has been reduced to less than one ampere.

The US-20-A trolley base, like its predecessor the US-13, has four tension springs adjusted by a single screw and provides for fastening the pole by means of a clamp held by two bolts. The bottom of the base is flat, eliminating the necessity of recessing any projection in the wood platform. Instead of a series of long small rollers, this base has two sets of short tapered rollers, set in accurately machined raceways which are provided with very liberal grease reservoirs. Two pipe plugs afford easy means of filling oil to taper roller bearings and to pole socket axle pin reservoirs. A trigger lock can be actuated to secure the trolley poles socket in a lowered position for changing poles.

Stepping on It*

BY RAY S. FREHSE

Sales Engineer National Pneumatic Company

UNQUESTIONABLY the electric railways are "stepping on it." They are traveling at accelerated speed along lines of modern progress. In fact, within the last few years they have done more to attract car riders and provide an improved service than during any other time in railway history. The trend is as apparent in the South as in any other section of the country. It is a trend which clearly points toward the use of modern cars. By modern cars, I do not merely mean new cars. New cars are not necessarily modern.

The modern car is the car equipped with every essential and modern device for increasing safety, speed and comfort. It is the car constructed with luxurious seats and finely finished interiors. It is equipped with motors which assure fast acceleration and high running speeds. It is provided with modern air brakes, assuring quick stops and the safety of the riding public.

It must also be a car equipped with the most modern loading and unloading apparatus. If safety, speed and comfort are established as essential, there is surely no consideration more important than the problem of passen-

*Abstract of a paper presented at a meeting of the Electric Railway Association of Equipment Men, Southern Properties, held at Memphis, Tenn., Jan. 26-28.

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ger interchange. If this problem is overlooked—if proper door and step control equipment is not provided—all other advantages of modern equipment may be easily offset.

No matter how quickly a car accelerates or decelerates, no matter at what rate of speed it travels between stops, the gain in schedule speed is largely wiped out if excessive standing time is required to load or unload passengers at every stop.

Since the first inclosure of car platforms, there has been a decrease of 8.7 per cent in boarding and alighting accidents. This is based on the reports of 175 operating companies.

The eyes of the industry today are turned toward the operation of one-man cars. The automatic treadle door is an exit door operated by a pneumatic engine and controlled by a treadle plate set flush with the car platform. This system of controlling exit doors—by permitting passengers themselves to step on a treadle plate—has proved a boon to one-man operation. It has solved the loading and unloading difficulties encountered in the original type of one-man car.

While the first small type of one-man car made a decided cut in operating expense, it somewhat slowed up scheduled speeds due to the small door at the front of the car through which boarding and alighting passengers must pass. This caused considerable congestion at the door as well as unnecessary friction in the aisle and on the street. With such an arrangement, moreover, it was impossible to operate one-man cars in the cities below the Mason-Dixon line where a special law calls for separate exits for white and colored people. To eliminate this unsatisfactory condition a few properties provided two doors at the front of the car—one for an entrance and the other for an exit. While this helped to relieve the congestion of boarding and alighting passengers passing through one door, it did not eliminate the aisle friction nor keep the short-haul rider from standing near the front door, causing an unevenly distributed load.

The next step, however, was one in the right direction. It started the circulating load method of operation in one-man service. One or two properties installed at the rear of their one-man cars, a pneumatically operated door controlled by the operator on the front platform. The objection to this method of operation was that the door was open much longer than required for passengers to get off. It thereby invited the non-paying rider to use this door for his entrance. In cold weather, moreover, a considerable amount of heat was wasted. The greatest objection, however, was the fact that it was possible for the operator to close the door at the wrong time, catching the outgoing passenger in the door and thus leading to accident claims and delays in service.

The development of the automatic treadle door makes it possible to use the circulating load in one-man operation with these objections entirely avoided. Both the center-exit type car and the car with platforms front and rear lend themselves to this method of controlling passengers in one-

man service. The front entrance and center-exit type car is usually arranged with double front doors for rapid loading, while both center doors are equipped with treadles for rapid unloading. Where cars of this type are run through congested areas and where the loading is apt to be heavy at certain corners during peak periods, a street fare taker's valve is provided for one of the exit doors so that passengers can be loaded at both the front and center doors.

The car with end platforms can be arranged in several ways, depending entirely upon conditions. The small single-truck car, for instance, which is generally used on lines having light traffic, is most frequently equipped with a single entrance door at the front and a single exit door of the automatic treadle type at the rear. If conditions warrant it a fare taker's valve can be provided for rear loading.

On the larger double-truck cars it has been found that an entrance and an exit on the front platform are desirable in addition to the exit at the rear. It has also been found that a treadle for the front exit has the same advantages as the treadle used at the rear.

In some cases where the cars are used to handle extremely heavy traffic, it has been found necessary to have two doors on the rear platform. One is the treadle exit door, and the other is an entrance door controlled from the street fare taker's valve on the outside of the car. If, at times, it is thought desirable to use this same car in two-man service, a conductor's valve is provided so that the door can be controlled by him from the inside of the car. This latter arrangement provides for either one-man or two-man operation and, as it can be used with equal facility in either type of service, it constitutes a highly flexible unit.

In fact, more than 4,500 of these treadles are now in use on cars operated in some half a hundred cities. These cars are traveling nearly 9,000,000 car-miles every 30 days.

Considerable thought and attention should be given to the construction of the car in and around the doors so that the best possible condition for installation of the door-operating mechanism is obtained. Faulty car construction at the doors will cause poor door operation, high maintenance, excessive wear and frequent adjustments. If the equipment is installed so it is accessible for inspection it is often found that employees will not trouble to keep the equipment in first-class condition.

Wheel and Axle Maintenance at Atlanta*

By J. H. SQUIRES

Machine Shop Foreman Georgia Railway & Power Company, Atlanta, Ga.

WHEN ordering axles we specify a tensile strength of 85,000 lb., and a chemical analysis as per A.E.R.A. standard, E-5-24. Axles are ordered rough turned, of constant diameter, specifying the rough diameter $\frac{1}{8}$ in.

*Abstract of a paper presented at a meeting of the Electric Railway Association of Equipment Men, Southern Properties, held at Memphis, Tenn., Jan. 26-28.

over the finished diameter. We also specify the finished dimensions as a further check on correctness. The axle is finished all over. In finishing axles we turn to 0.008 oversize at axle bearing and journal bearing seats and roll bearing to correct diameter. We date all axles on end, but no mileage record is kept.

On our modern cars we are using the same axle in three different types of trucks, a total of 170 four-motor cars. This axle is A.E.R.A. standard, $3\frac{1}{2} \times 7$ journal. We have about three types of axle thrust collars; the one we like best in split and held together with four bolts. An adjustable screw is provided to engage against the wheel hub.

We use the standard of 10 tons to the inch diameter in pressing on wheels. The allowance for pressing on cast wheels depends upon the character of the metal. The machine operator sizes this up from experience while boring. This usually runs from 0.003 in. to 0.005 in. There is a difference in allowance for pressing on steel wheels as compared to cast chilled wheels, 0.002 to 0.004 in. being maximum allowance necessary to get tonnage required on steel wheels. White lead is used in pressing on.

Wheels are centered by measurements from the end of the axle to the wheel hub. We press wheels to wheel gage 4 ft. 8 $\frac{1}{2}$ in., and then press until the gage is loose. This checks tight on high spots on the flange. Track gage being 4 ft. 8 $\frac{1}{2}$ in., this gives $\frac{1}{4}$ in. lateral tolerance. It is assumed, of course, that the wheel-gage line is $\frac{1}{4}$ in. up on the flange fillet.

The wheel gage is applied at three locations on the wheels to check for warped wheels or spring axle. We find we will need some new wheel gages before long and probably will make them to 4 ft. 8 $\frac{1}{8}$ in. as recommended in the 1926 Proceedings, and our wheel gage, allowing a tolerance of $\frac{1}{8}$ in. under, will be as a minimum 4 ft. 8 $\frac{1}{2}$ in.

Cast wheels and a few rolled steel wheels are used on city cars. Our cast wheels are 2 $\frac{1}{2}$ in. tread, $3 \times 1\frac{1}{8}$ -in. flange. On our cast wheels we aim to get about 31,000 miles on 26-in. wheels and 40,000 miles on 33-in. wheels. We find, however, that on an average we do not quite reach this.

Discarding of wheels is first determined by the judgment of the carhouse foreman, and verified by the general foreman and machine shop foreman. The criterion for removing wheels is soft iron spots appearing through the chill. For city work on cast chilled wheels we do not have a flange limit gage.

As stated before, we do not attempt to keep a mileage record on axles, and discard them only on limitation of wear. Interurban car axles are removed from that service after seven years and placed in city service. The hammer test is given to all axles each time a car comes in for wheels. Limitations of wear gages are then used, which are $\frac{1}{8}$ in. undersize on the axle bearing seat, and $\frac{1}{4}$ in. undersize on the journal bearing seat. Axles are not built up except worn buttons on the ends. When the axle becomes undersize it is turned to the next smaller size.

We have a number of maximum trac-

tion trucks, and a few trailers. When an axle becomes too small to use as a motor axle it is turned down to a trailer axle or an idler axle for maximum traction trucks. When an axle is of sufficient diameter for this purpose, but is not long enough, we make two axles out of three; cutting two pieces to sufficient length, a hole is bored in the end of each one and a piece of 1-in. round cold-rolled steel is inserted. Axles are then put together, chamfered, and electric welded. The weld comes about 36 in. from end of axles. We have been following this practice for about three years and have not had a failure.

Overhauling on a 40,000-Mile Basis*

BY A. J. NAQUIN

Engineer Rolling Stock and Shops
New Orleans Public Service, Inc.

BRIEFLY, this inspection system consists of removing motors, line breaker, circuit breakers, and air compressor from a car that has operated approximately 40,000 miles since its purchase or last inspection; replacing them with units that have previously been put in A-1 condition, and at the same time checking over all car wiring, air piping, brake rigging, door mechanism, trucks, and minor units (such as trolley poles, harps and wheels); replacing or rebuilding everything that is needed to place the car in as good a condition as the day it was first placed in service. A car is held out of service only a fraction of the time that would be required to repair and replace original equipment.

Inspection is carried on under the supervision of a shop foreman and a field engineer. The latter makes all electrical tests, such as resistance measurements, "hi-potting," and motor "running-in" tests. The dipping and baking of armatures and field coils is under his supervision, and all assembled motors must bear his stamp of approval before being placed on a truck under a car.

Resistance measurements are made with a Kelvin bridge ohmmeter. "Hi-pot" tests are made with portable Westinghouse variable voltage transformers which have been built into a convenient testing set. A testing set has been constructed for calibrating line and circuit breakers. Another testing set has been built for the "running-in" of all assembled motors. A complete load testing set is under the process of construction. An air-brake testing outfit is also provided for the testing of air compressors, governors, etc. Babbitt and "half and half" solder temperatures are thermostatically controlled by means of Leeds & Northrup potentiometers. Baking oven temperatures are controlled by Taylor Instrument Company's apparatus in conjunction with a Westinghouse switchboard layout. A small tank filled with hot Oakite solution is used for cleaning motor bearings. All truck parts and other units are thoroughly cleaned before any

squaring and tightening up is attempted.

Advantages of such an inspection system are shown by the record of re-wound armatures. In 1923 and 1924 there were 201 and 148 wound respectively, as compared with 55 and 36 in 1925 and 1926. That is, a total of 349 against 91. The total number of motors in service is 1,100. New fields used during 1923 and 1924 totaled 473, compared with 123 in 1925 and 1926.

A reduction in personnel in the assembly room was effected when the system was first put into operation. During 1923, six armature and field winders were used. This number was reduced to four in 1924, and further reduced to three in 1925, at which figure it was maintained during the past year. Four armature and field winder's helpers were employed in 1923. Three were used in 1924, two in 1925, and this past year only one helper and one apprentice were needed. This reduction in labor has been partly accomplished by efficient assembly room management. Efficient tools and equipment account for a further allowable reduction, and the quality of the work done since the system was started has permitted this reduced force to maintain its schedule of operation.

A steady reduction in the number of pull-ins chargeable to equipment is being made. This is due to the inspection system having raised all equipment to a more reliable operating condition. Maintenance cost has been reduced to a figure that compares favorably with like costs throughout the country. For the past year our cost was \$20.39 per thousand car-miles. It is desirable to have maintenance charges low, but improved service should always be given consideration even at slightly increased cost.

Minority Only Benefits by Parking †

BY JOHN A. MILLER, JR.

Associate Editor ELECTRIC RAILWAY JOURNAL

ELIMINATION of parking on Fifth Avenue, New York City, during the recent subway strike resulted in an increase of more than 50 per cent in the speed of vehicular movement between 32d and 52d Streets. On June 17 the writer found by careful investigation that the average speed of northbound private automobiles in this area between 3 p.m. and 6 p.m. was about 4.3 m.p.h. On July 28 with anti-parking regulations in effect a second check showed an average speed of approximately 7.2 m.p.h. Other conditions on these two dates were so similar that the elimination of parking must receive the major part of the credit for the improvement.

It has been stated that the capacity of streets is determined by the intersections. That theory is only partly true. The elimination of all crossing movements at grade, of course, would increase greatly the capacity of any street. But such elimination is a dream of the future. For the present

American Engineering Council Meets in Washington

PRESENTATION and adoption of a definite legislative program covering public works was one of the chief events of the two-day annual meeting of the American Engineering Council held in Washington on Jan. 13 and 14 of this year. The council indorsed the public works measure to be introduced in the House by Representative Adam M. Wyant of Pennsylvania. This bill embodies the essential features of the report of the council's special committee, adopted a year ago, providing for the reorganization and the more effective co-ordination of the public works function of federal government.

A safety and production study made by a committee of the council is nearing completion. While the conclusions have not all been formulated, members of the committee announced one of the important findings: "In practically every industry studied, an upward tendency in productivity is accompanied by a downward tendency in accident frequency." A. W. Berresford, Detroit, is chairman of this committee.

Another report is rapidly being completed by the council's committee on street signs, signals and marking, W. B. Powell of Buffalo, chairman. Co-operation of numerous national agencies has been obtained. The aim of this investigation is to prepare a standard code of street and highway markings that will appeal to various communities.

The meeting terminated with a banquet, at which Charles M. Schwab, president American Society of Mechanical Engineers, and Secretary Herbert Hoover of the Department of Commerce were guests of honor. Both Mr. Schwab and Mr. Hoover delivered notable addresses.

we must permit cross movements, and the problem is to move the greatest possible amount of traffic during the period that the intersection is open.

If vehicles move across an intersection in six lines instead of four, the number crossing in a given time is increased 50 per cent. That was what happened on Fifth Avenue when parking was eliminated. On the day when the second of the two checks already referred to was made northbound vehicles crossed the 42d Street intersection in three lines, while on the first day they crossed in only two lines. The same space was available at the intersection on both occasions, but on the earlier date automobiles parked along the curb between 42d and 43d Streets created a bottleneck on the far side of the crossing.

Undoubtedly much can be done to improve traffic conditions at street intersections. The full width of the roadway should be available for moving traffic. Left-hand turns prevent the most efficient utilization of space at an intersection and should be prohibited at heavy traffic points. Cutting

*Abstract of a paper presented at a meeting of the Electric Railway Association of Equipment Men, Southern Properties, held at Memphis, Tenn., Jan. 26-28.

†Abstract of discussion published in February Proceedings, American Society of Civil Engineers, page 270.

back the corners to permit vehicles to turn on a longer radius while yet hugging the curb might prove advantageous in many places. Better control of pedestrian movement certainly would help. All this, however, will do little good if the roadway space between intersections is not used to the best advantage—a condition that does not now exist.

The argument has been advanced that elimination of parking will not create an additional traffic lane because a certain number of vehicles will always be stopping along the curb to pick up or discharge passengers. This argument assumes that these vehicles are now drawing up close to the curb, but such is not the case. Often a solid line of parked automobiles renders the curb inaccessible. Consequently vehicles picking up or discharging passengers stop in a second line in the middle of the roadway. Thus the elimination of parking will actually create an additional lane for moving traffic despite the necessary stopping of occasional vehicles.

It cannot be denied that there is some curtailment of the rights of the individual when parking is restricted, but restriction of individual rights for the common good has been practiced since the beginning of civilization. The no-parking rule is only a new example of a well-established principle. Most cities have forbidden sidewalk obstructions. Today's protest becomes absurd tomorrow. If more people benefit by regulation than suffer thereby, it is clearly justified. Of this the public and not the individual must be the judge.

From all available evidence it appears that the beneficiaries of parking restriction would far outnumber the sufferers. A careless assumption often is made that nearly every one has an automobile and wants to park. The fact is that only a small fraction of the users of the public streets ride in private automobiles. Investigations made by the writer concerning traffic conditions on Fifth Avenue, New York, showed six times as many passengers riding in public transportation vehicles as rode in private automobiles. Traffic checks made elsewhere show similar conditions. Even in Detroit, the greatest automobile manufacturing center in the world, more than three-quarters of the users of the streets ride in public transportation vehicles. Figures from a few typical cities are given below:

MEANS OF TRANSPORTATION USED BY STORE CUSTOMERS, PEDESTRIANS NOT INCLUDED

City	Number of Stores	Public Transportation Vehicles	Private Automobile	Per Cent by Private Automobile
New York, N. Y.	13	34,439	813	2.3
Chicago, Ill.	4	13,549	1,680	11.0*
Detroit, Mich.	27	158,801	36,272	19.1
Cleveland, Ohio	22	69,419	20,313	22.7
Baltimore, Md.	3	38,433	1,712	4.3
Brooklyn, N. Y.	1	28,800	2,640	8.4
Los Angeles, Cal.	1	17,759	2,058	10.4
	71	361,200	65,488	15.3

*Customers questioned in this investigation were specially selected as being of a type likely to have come by automobile.

Not all of the users of private automobiles are parkers. Many are en route and do not wish to stop. Possibly this is why the store counts show a smaller percentage of automobilists than do the street counts. Many others leave their automobiles in garages. It is difficult to tell exactly what proportion of the users of private automobiles actually are parkers. Figures on this phase developed by the four Chicago department stores mentioned in the preceding table show 452 automobiles parked free in public streets as com-

pared with 369 using paid storage space. It is safe to say that not one person in ten really profits by the parking privilege.

No one has suggested that elimination of automobile parking on important streets offers a complete solution of the problem of traffic congestion. But experience has shown conclusively it does afford relief. It can be done at once. The cost is practically nothing. A large majority of the public will benefit by the greater amount of roadway space available for moving traffic.

American Association News

Engineering Executive

BUSINESS of importance was transacted at the second meeting of the executive committee of the Engineering Association held at association headquarters, New York, on Jan. 26. Members present were President Daniel Durie, R. H. Dalglish, F. H. Miller, W. F. Graves, W. W. Wyssor, L. D. Bale, C. H. Jones, P. V. C. See and G. C. Hecker representing J. W. Welsh.

The secretary announced that the finance committee of the American Association approved appropriations for the committees on noise reduction and rail corrugation. It was voted to request the finance committee to approve an appropriation for use in the trolley wire tests being conducted by the committee on power transmission and distribution.

An affirmative vote was cast by the executive committee on the proposal to charge individual members \$1 for copies of the annual proceedings, it

was voted to make changes suggested in Manual section W108-23 to bring it into conformity with the American Railway Engineering Association specification for plain bolted special trackwork. In future, it was agreed that wherever a drawing or specification of some other national organization is referred to in the Manual but not included, copies of such drawings or specifications may be obtained at nominal price on request to the executive secretary. It was voted that the proposal to publish the Manual in sections corresponding to the various engineering departments be held in abeyance.

It was voted to make suggested changes in sections W106, W107, W108 and W109-23 be made in the 1926 Manual provided the Manual committee approves. It was voted to combine way and structures special committees Nos. 2 and 5 into special committee No. 2—special trackwork, the personnel to consist of the present membership of the two committees.

For the Manual committee Mr. Dalglish reported that copy for the 1926 Manual had been approved and sent to the printer. The secretary suggested the printing of 1,000 copies, of which 500 would be bound, the remainder being held for stock and for making paper-bound sections. This action was approved.

Mr. Miller stated that the subjects committee had no report to make. It was proposed to send out letters to all committee chairmen in the near future requesting them to circularize their members for suggestions regarding new subjects. For the rules committee, he reported that the existing rules had been studied, after which a meeting was held on Jan. 24 and 25 at which a draft of the proposed regulations was unanimously agreed upon. He submitted the

PASSENGERS CARRIED BY PUBLIC AND PRIVATE VEHICLES

	Public Transportation Vehicles	Private Auto	Per Cent by Private Auto
Fifth Avenue, New York City	19,224	3,220	13.9
Broad and Market Streets, Newark	38,000	6,000	13.6
Business district, Detroit	57,150	18,281	24.1
Business district, Baltimore	58,859	12,509	18.1
Business district, St. Louis	69,768	17,601	20.1
	243,001	57,611	19.2

An even smaller proportion of private automobilists is shown by investigation made to determine the means of transportation used by customers to reach retail stores. Of 426,688 customers checked at 71 stores in various cities only 153 per cent came by private automobile. Results of these counts are shown in the following table:

was announced. Another ballot of the executive committee unanimously approved the formation of two special rolling stock committees, one to review the association's standard journal boxes and the other to establish limits of wear on car equipment.

Several proposals of the way and structures committee were acted on. It

report of the committee, containing recommendations in favor of a unit method of voting on standards and a letter ballot instead of the oral vote on the convention floor. The proposals were carefully reviewed and unananimously approved by the executive committee as corrected and amended. It was voted that the president be instructed to report to the American executive committee the action taken. If approved the Engineering Association will appoint a committee to make a careful study of plans which might be used for a unit method of voting.

President Durie presented a suggestion that the engineering committees might incorporate in their reports each year a tabulation of improvements and new devices needed by the industry which have not been developed, and that such information be compiled in a pamphlet for distribution among the manufacturers. The suggestion was favorably received and Mr. Durie was asked to see if the proposal could be put in more definite form.

Mr. Dalgleish, chairman of the special committee to co-operate with the United States Department of Commerce, reported on a number of projects along the lines of simplified practice. The recommendation on carbon brushes and brush shunts was approved.

A.E.S.C. PROJECTS

Several American Engineering Standards Committee projects were reported by the secretary, and a number of appointments were announced. J. M. Hipple represented the association at a conference on standardization of electric motors, and stated that a sectional committee on this subject was authorized. W. E. Brown was appointed on the sectional committee on wood poles, vice Leslie E. Delf, resigned, with H. E. Brauning as alternate.

F. L. Aime was appointed on the committee on terminal markings vice C. A. Greenidge, resigned. Announcement was made of the formation of a sectional committee on standards for graphical presentation. H. W. Coddling was named as the association's representative. A sectional committee on methods of test of road materials was organized. Proposed federal specifications for chrome yellow and for Portland cement were referred to A. T. Clark and H. H. George, respectively.

The executive committee was advised that the specification for tubular steel poles prepared under the sponsorship of the A.E.R.A. had been approved and printed in the standard form for the A.E.S.C. Copies are available at association headquarters at a nominal price.

A.S.T.M. SPECIFICATIONS

The secretary announced that an attempt was being made to have the American Railway Engineering Association bring its specifications for the manufacture of open hearth girder rails of plain, grooved and guard types into complete conformity with those of the A.S.T.M. and the A.E.R.E.A. so that at the proper time a specification might be presented to the A.E.S.C. Only a few minor changes are needed to do this.

Announcement was made that Mr. Hecker and Mr. Bale as representatives of the association had attended a meeting of the power house committee of the N.F.P.A. at which a start was made in the formulation of rules for protection of electric power houses. A conference committee on electric railway car houses and cars has been organized to consider in particular regulations for hot water and hot air heaters, composed of H. H. Adams, chairman; J. H. Lucas and H. S. Williams.

A joint meeting of the conference committee on bus garages and garage hazards was attended by Mr. Hecker, at which a proposed set of regulations for bus garages was drawn up for further consideration.

A. J. Scaife and L. H. Palmer of the Society of Automotive Engineers have accepted appointment as representatives of that society on rolling stock committee No. 2, motor coach design.

L. D. Bale, W. E. Bryan and H. W. Coddling of the A.E.R.E.A. have been suggested to the American Institute of Electrical Engineers for membership on the committee on switchboards for power and light.

The secretary announced the resignation of M. B. Rosevear from the A.E.S.C. sectional committee for the revision of the National Electrical Safety Code, parts 2 and 4. His resignation was accepted with regret and the president was authorized to appoint a successor.

The need for revision of the constitution and by-laws was discussed. Changes may have become necessary on account of the new organization and procedure. The president was authorized to appoint a sub-committee to investigate the need for such revision.

Claims Executives

PLANS for the October meeting of the Claims Association were made by its executive committee at a meeting held in the offices of the Memphis Street Railway on Jan. 28. Those present were: President C. B. Proctor, Memphis; W. F. Weh, Cleveland; B. F. Boynton, Portland, Ore.; W. R. Robinson, Cincinnati; G. T. Hellmuth, Chicago; S. J. Herrell, Knoxville; L. F. Wynne, Atlanta, Ga.; H. V. Drown, Newark, N. J.

It was proposed to include in the program for the annual meeting a number of papers showing the actual accomplishments of electric railways in accident prevention work. Medical and surgical work are also to be given a place on the program, and a joint session is planned with the Transportation and Traffic Association, as has been customary with this group in recent years.

Mr. Proctor exemplified his Southern hospitality by entertaining the early arrivals with drives around the city of Memphis. He was also host at a dinner given the executive committee at which officers of the Memphis Street Railway were present.

Further details of the program will be taken up at a later meeting of the executive committee of the Claims Association.

Heavy Electric Traction

ORGANIZATION of the heavy electric traction committee of the Engineering Association was completed at a meeting held at association headquarters in New York on Jan. 27. Those present were H. F. Brown, New Haven, Conn., chairman; J. M. Bosenbury, Springfield, Ill., vice-chairman; A. H. Armstrong, Schenectady, N. Y.; Morris Buck, New York City; H. W. Cope, Pittsburgh, Pa.; A. H. Daus, Chicago, Ill.; J. C. Davidson, Schenectady, N. Y.; E. P. Chase representing J. V. B. Duer, Altoona, Pa.; M. W. Manz, Mansfield, Ohio; G. C. Hecker representing J. W. Welsh, New York City, and F. H. Miller, Louisville, Ky., sponsor.

Assignment of subjects to the various sub-committees was the principal business of the meeting. In addition to the subjects assigned by the association, it was decided to continue the collection of data on electrified steam railroad mileage and electric locomotives.

It is planned to hold the next meeting of the committee in New York City during April.

Special Reports Available

SPECIAL reports are being prepared by the Bureau of Information and Service of the American Electric Railway Association and will be available to member companies upon request, as follows:

Bulletin No. 124. Motor Bus and Truck Rules and Regulations Prescribed by Public Utility Commissions.—A collection of all the orders issued by the regulatory commissions of the various states, prescribing rules and regulations for the operation of buses and trucks in common carrier service, with an analytical index permitting ready reference to subjects covered by the orders. The orders cover such subjects as size and weight restrictions on buses and trucks, standard equipment prescribed, liability bonds and insurance requirements, rules for making applications for certificates of convenience and necessity, requirements for drivers, etc.

Bulletin No. 125. Relief from Paving Burdens.—An up-to-date review of the developments in the movement to obtain relief from state and municipal requirements to pave, repave or maintain the pavement along the electric railway's tracks, with accounts of leading cases in which relief has been obtained. All of the data contained in the previous bulletins on this subject have been brought together in this bulletin, and a careful index has been prepared covering all cases of paving relief.

Bulletin No. 126. Trend of Trainmen's Wages, 1927.—Shows for a large group of companies the maximum wage rate paid trainmen, the number of years of service necessary to reach this maximum, and the number of trainmen employed for each of the years from 1914 to 1926, inclusive, and also the rates paid as of February 1, 1927.

Bulletin No. 127. Trend of Electric Railway Fares, 1927.—Shows the rate of fare in effect in all cities having a population of 25,000 or more for each year from 1917 to 1926, inclusive. In addition, it shows the average cash rate of fare in 272 cities during the same years, and also the number of cities in which each rate of fare was in effect in each of these years.

In addition to the above the following supplements have been prepared, bringing the information they cover down to February 1, 1927.

Supplement No. 17 to City and Inter-urban Fare Bulletins Nos. 41 and 42.

Supplement No. 4 to Bulletin No. 108, Wages of Trainmen.

Supplement No. 4 to Bulletin No. 109, Wages of Bus Men. Cost of Living Studies (Bulletin No. 128).

The News of the Industry

New St. Louis Fare Schedule Suspended

The Missouri Public Service Commission on Feb. 3 suspended until June 7 the fare schedule of the United Railways, St. Louis, Mo., under which the company proposed to raise its fare from 7 cents to 8 cents or two tokens for 15 cents, effective on Feb. 6. T. E. Francis, counsel for receiver Rolla Wells, states that the federal court will be asked for an order setting aside the commission action and permitting the proposed rate to go into effect. An appeal will be based on grounds that the present fare schedule is confiscatory and in violation of the constitution.

Seattle Warrants to Be Cashed Without Discount

Upon showing by the City Council of Seattle, Wash., that the salary warrants of the employees of the Seattle Municipal Railway will be cashed without discount, Judge Calvin S. Hall in the Superior Court has continued argument of J. G. Von Herberg's application for a restraining order in his suit against the city until Feb. 7. Mr. Von Herberg is asking for an order restraining the city from making further payments on the railway purchase until operation costs are paid. The court stipulated that while he granted the city's request for non-interference at this time, the money now in the bond redemption and interest fund must remain in the jurisdiction of the court. Meanwhile, the \$118,000 payroll warrants paid to employees on Dec. 26 have been cashed, either at the banks or department stores of the city, without discount.

Mayor Bertha K. Landes presented to the court an affidavit setting forth efforts made to obtain a revision of the purchase contract with the Puget Sound Power & Light Company, and submitted a telegram from A. W. Leonard, president of the company, who is en route West from a meeting of the Stone & Webster directors, with a proposition to present to the city in regard to the railway contract.

Corporation Counsel T. J. L. Kennedy pleaded for a policy of non-interference, pointing out that the railway will be off the warrant basis by May 20, a period of five months and four days. He accused Mr. Von Herberg of being an enemy to "both laborers and taxpayers."

Attorney for Mr. Von Herberg told the court the action was brought in good faith and questioned the authority of the city to issue interest-bearing warrants when there is no money in the warrant fund. He called attention again to the statute which says labor must be paid first. He declared the power company is not interested and

not properly a party to the suit, as it has assigned its bonds. He also criticized the payment of damage claims of the railway out of the general fund, saying they should come from the railway fund.

Seattle's "Fourteen Taxpayers," who in 1922 protected the city's general fund from invasion by the Municipal

Railway, came back into the situation when Judge Hall granted them permission to appear as "friends of the court" in the Von Herberg suit. It is declared that the taxpayers have resolved to back the Von Herberg suit on the ground that labor and operating expenses, under the law, must be superior to bond redemption.

Chicago Grants Expire; \$171,188,000 Bonds Defaulted

Situation Affecting Chicago Surface Lines Reviewed as Matters Stood on Day of Expiration of Old Franchises—Slow Progress of New Negotiations—Coach Company Renews Its Bid

FRANCHISES granted twenty years ago to the four companies which comprise the Chicago Surface Lines expired at midnight on Jan. 31. Simultaneously the six months extension ordinance voted by the City Council on Jan. 26 became effective, thus assuring continuance of unified operation with the same rate of fare, universal transfers and the same compensation to the city.

While the change does not affect street car riders, holders of the companies' securities are denied the principal now due them. Interest on all of these securities was paid this week, but payment of the principal will have to await agreement on a new franchise. The aggregate default of the railways' securities—probably the largest in the history of the industry—will be \$171,188,475, approximately \$102,000,000 of which represents Chicago Railways obligations. This default has been anticipated ever since it was known there would be a delay in agreeing upon a new franchise for the companies.

About 50 per cent of the Chicago first mortgage bondholders are reported to have placed their securities in the hands of a protective committee.

Actual demand for the payment of \$55,655,000 first mortgage gold bonds was made within ten hours of the expiration of the franchise period upon the Chicago Railways by the Harris Trust & Savings Bank, acting as trustee. In announcing the default, the company replied that it was in the hands of receivers. Holders of \$40,000,000 worth of junior bonds of the company, consisting of consolidated mortgage bonds, series A and B, purchase money mortgage bonds and adjustment income bonds, which also fell due Feb. 1, met the same answer when payment was demanded the following day.

The receivers for the company have declared their intention of joining with the Harris Trust & Savings Bank and the first mortgage bondholders' protective committee in asking the federal

court that the first mortgage on the property be foreclosed. It is expected that the protective committee, headed by Albert W. Harris, president of the aforementioned bank, will subsequently institute proceedings for a sale of the property. The Chicago Railways has a valuation of \$94,000,000. This will open the way for a reorganization over which the bondholders will exercise strong control. As a reorganization without the franchise power to operate would be of very limited value, the bondholders are also expected to exert a powerful influence in the traction negotiations which were resumed by the local transportation committee of the City Council on Feb. 3.

Holders of the \$68,270,000 first mortgage bonds of the Chicago City Railway and the Calumet & South Chicago Railway are apparently satisfied with the situation and no move has been made to apply for a receivership. While there is no money in the treasuries of these companies to meet the demand for the principal sum, interest on the bonds is available and will be paid promptly, according to Leonard A. Busby, president of both companies. The \$20,616,000 principal of collateral trust bonds of the Chicago City & Connecting Railways, the third member of the south side group, was defaulted on Jan. 1.

ORDINANCE NEGOTIATIONS DEFERRED

Further consideration of the new consolidation ordinance was postponed on Jan. 29, awaiting action of the Chicago Railways receivers appearing in the federal court to default on their mortgage bonds. In the event of the filing of a bill for the foreclosure of the first mortgage this week, the bondholders will be directly injected into the negotiations and the issue between the city and companies may become more clearly defined. At the instance of President Busby, the Aldermen agreed to defer discussion of the clause in the draft providing for the naming of the local

regulatory commission. A commission of five members, all named by the Mayor subject to approval by the City Council, appears to be favored by the members of the committee, while company representatives insist that at least two commissioners should be named by the company and another selected jointly. A bill authorizing Chicago to appoint a commission to regulate, supervise and control its own transit affairs was introduced into the lower house of the state Legislature on Jan. 27 by Representative Michael R. Durso.

The committee tentatively agreed at its meeting on Jan. 29 to relieve the new company of certain non-transportation expenses, including the cleaning of its right-of-way and part of the burden of paving between the tracks.

SUBWAY QUESTION REVIVED

Chairman Joseph B. McDonough announced at the meeting that he would soon ask the committee to order working specifications made preparatory to building subways by special assessment. Steps in this program, according to Mr. McDonough, will be, first, a decision on the kind and size of a supervisory staff; second, a rough estimate of the cost of plans; third, hearing of property owners and other citizens, and fourth, approval of the program by the City Council as a whole. An estimate of six months was placed on the length of time which will probably be required to prepare plans for the subways.

Questions of valuations of the various properties and rates of return, over which a deadlock seems to have been reached, were briefly discussed. Cyrus H. Adams, attorney for the Chicago Rapid Transit Company, said he would be able to offer a valuation of the elevated lines at an early date.

Growing indifference on the part of members of the local transportation committee is regarded as endangering the hope that the consolidation ordinance, many vital clauses of which are still undecided, will be completed and approved by the City Council in time for submission to the voters at the April mayoralty election. With many of the Aldermen coming up for re-election on Feb. 22 it is considered unlikely that much attention will be given to traction matters in the intervening weeks. It has been estimated by Corporation Counsel Francis X. Busch that three solid weeks will be required before the proposed ordinance is ready for presentation to the City Council.

MOTOR COACH HEARINGS RESUMED

The Chicago Motor Coach Company on Jan. 27 renewed its bid for a term franchise to operate comprehensive city-wide bus service. The bus company's proposal has been in the hands of the Council sub-committee since it was first presented to the city on Dec. 9. The Aldermen have been assured that so long as a reasonable return is guaranteed to the company the terms of the ordinance can practically be dictated by the city.

At the hearing during the week ended Feb. 5, called to receive further details of the proposition, James A. Emory, vice-president of Ford, Bacon & Davis, presented the results of

elaborate engineering studies together with supporting data, maps and charts showing how the plan would be carried out.

The federal court on Feb. 3 ordered foreclosure proceedings on Feb. 9 against the Chicago Railways, on petition of the Harris Trust & Savings Bank. Friendly action was not contested. The court reappointed the three receivers named last month and ordered the lines operated as required under the city contract. Similar action by the junior bondholders is expected soon. The company has twenty days to reply. A formal hearing will be held in the meantime. The consolidation ordinance hearing has been postponed indefinitely.

Railways Robbed by Tax Collector

Economic retrenchment in New York State should begin in the public school system and the tax burden should be equalized by distributing the levies to protect the electric railways, which "are being robbed." These are the views of John J. Merrill, expressed by him at the National Republican Club in an address on Jan. 26. Mr. Merrill spoke impromptu at New York. Later he talked with the correspondent of the ELECTRIC RAILWAY JOURNAL at Albany on the same subject. The subjoined comment is believed to represent his views correctly:

Street railroads are taxed to death. They pay a property tax on all properties; they then pay to the state of New York 1 cent on every dollar of gross income they take in; they then pay a special franchise tax for the privilege of occupying public places. They are also paying paving taxes. The average amount taken away from the street railways for paving the streets of municipalities has been in excess of \$2,500,000 a year. This is, of course, a relic of the old days when the horse cars actually did some damage to pavement, but that is not so now.

It is true the street railways should pay any expense occasioned by heavier construction needed to carry their rails and for whatever repairs are made necessary by their operation upon them. Today, subject to all these taxes, they are thrown into competition with bus lines which are practically paying nothing, so to speak, toward the support of government; at least it is so slight it is nearly negligible. Of course, incorporated bus lines are supposed to pay a gross earnings tax, but they do not pay any special franchise tax and they have little if any property which gets onto the tax rolls. There is no class of taxpayers in the state so heavily burdened by taxation as the street railways.

Mr. Merrill is regarded as one of the foremost experts in the state of New York on the practical working of the corporation tax law. He has been connected with the tax system of the state since 1894. In November, 1917, he was appointed a tax commissioner by Gov. Charles S. Whitman to fill an unexpired term, and in February, 1918, he was reappointed for a full term. On Jan. 26, 1925, Mr. Merrill was reappointed by Governor Smith for a term ending Dec. 31, 1926, and in January of this year he was again reappointed by Governor Smith as a member of the tax commission for a term of six years.

Mr. Merrill was born at Potter Hill, R. I., on Nov. 14, 1861. He was educated in the public schools, Hopkinton Academy and Alfred University, from which institution he was graduated in the philosophical course in 1884. He received the degree of master of philosophy in 1887.

Wage Petition in Indianapolis to Be Considered

A petition of three employees of the Indianapolis Street Railway, Indianapolis, Ind., asking for an increase in wages, changes in the procedure of future requests for wage adjustments and the reinstatement of employees who went on strike last July 4, is being considered by James P. Tretton, superintendent. He indicated there probably would not be immediate action on the matter and officials of the company declared the financial condition of the company would not permit of pay increases.

A wage scale of 60 cents an hour for those employed less than six months; 63 cents for those from six months to a year, and 65 cents for those with the company more than a year, was requested. The present scale is 37 to 42 cents over a five-year period. In addition to the regular wage increase asked, operators of one-man cars would receive 7 cents additional under the petition. A minimum monthly wage of \$100 is asked.

Ten-Cent Cash Fare in Syracuse

The Public Service Commission on Feb. 4 authorized the New York State Railways, effective on Feb. 10, to establish a 10-cent cash fare with ten tickets for 75 cents on its Syracuse lines.

The new rate was determined upon a tentative rate base of \$9,426,739 as of Sept. 30, 1925. Based upon revenue passengers carried for the year ended Sept. 30, 1925, and under the new fare rates authorized, estimating a 2 per cent decrease in travel, 70 per cent of riders using tickets and 30 per cent paying cash fares, the increased revenue, on the tentative valuation above, will give an estimated return of 7.58 per cent upon such value of the property used in giving service on the Syracuse lines.

Campaign to Restore Michigan Suburban Line Continues

Another meeting of the residents in the villages and communities served by the Grand Rapids, Holland & Chicago Railway who are seeking to finance the operation of the proposed United Suburban Railway was held on Feb. 2. A large crowd packed the schoolhouse at Grandville.

H. T. Slaght, banker and chairman of the movement to rejuvenate the road, said that nearly 25 per cent of the \$70,000 needed to finance the proposed new company and the operation of the contemplated line between Grand Rapids and Jenison has been raised.

The campaign for stock subscriptions will be continued for one more week. Final report on the subscriptions will be made at another meeting to be held in Grandville during the week ended Feb. 12.

The railway committee is distributing a circular among residents of the suburban communities that answers many questions asked by prospective subscribers and is expected to simplify the work during the last week of the drive to obtain the \$50,000 still necessary to assure the project's success.

\$2,050,000 to Be Spent in Cleveland

The expenditure of \$2,050,000 is contemplated in the program of the Cleveland Railway, Cleveland, Ohio. This would include at least 100 new cars, 25 additional buses and terminals and power units. The completion of the West 117th Street car yards and switching terminals, the completion of the new terminal on Kinsman Road, near Lee Road, and two new power substations, one on the west side and one on the east side, are included. The company may even experiment with three-car train operation.

Abandonment of the present Windermere carhouse on Euclid Avenue, East Cleveland and sale of valuable frontage and rebuilding of terminals on a much larger tract of land which the company has in that vicinity also are planned.

It is proposed to place company stock on the market for this purpose. This would be the first time in nearly ten years that stock has been sold to finance a similar program of improvements.

The annual reports show the company in the best financial condition for some time. The interest fund deficit has disappeared and been replaced by a balance of \$212,000.

While some bus lines are understood not to be profitable, the entire operation is regarded as a valuable supplement to rail service.

Higher Fare Sought by Syracuse & Eastern

The Syracuse & Eastern Railroad applied to the Public Service Commission on Jan. 26 for authority to increase its fare in Syracuse, N. Y., by establishing two fare zones, with a fixed rate in each zone at 10 cents. Fare rates on the lines within Syracuse vary from 7 to 14 cents cash.

The petition alleges that the value of the company's property used in giving service in Syracuse is more than \$350,000 and that the gross operating income from the entire road, including the 11 miles of line in Syracuse and under existing fare rates, was \$1,068 in 1926. The return, the company alleges, did not exceed 2 per cent in 1924 or 1 per cent in 1925 and 1926.

There will be a hearing in Syracuse on Feb. 4 on a complaint by Mayor Hanna of Syracuse against the railroad for alleged violation of law in charging two fares within the city following recent annexation by the city of the Genesee Manor section.

Los Angeles Fare Hearing Adjourned

Hearing on the application of the Los Angeles Railway, Los Angeles, Cal., for an increase in fares has been adjourned until May 17 so that the city's attorneys as well as the railway's attorneys may have time to prepare more evidence. At a hearing on Jan. 13, before State Railroad Commissioner Louttit, Jess Stephens, city attorney, and engineers of the Board of Public Utilities led the opposition to the proposed rate increase from 5 cents to 7 cents and a ticket fare of

6½ cents. An important point raised by Attorney Stephens was the matter of interchange of transfers between the Los Angeles Railway and the Pacific Electric Railway. Attorney Haskins for the railway agreed to confer with the Pacific Electric Railway officials to discover on what basis such a contract could be made. It was the contention of the witnesses that the present 5-cent fare was too low to yield just compensation for the use of the property involved over and above the amount necessary to pay taxes and operating expenses.

The hearing of the Los Angeles Railway application came on the heels of the Pacific Electric Railway's petition for a 7-cent and a 12-cent local fare and an increase on its interurban lines, as outlined in the JOURNAL for Jan. 22. The City Council in both cases opposed the move.

Jacksonville Property Offered to City

The property of the Jacksonville Traction Company, Jacksonville, Fla., has been offered for sale to the city by J. P. Ingle, manager of the company, but the City Council tabled a motion that a legislative bill be prepared to authorize the city to make the purchase.

In reading a letter offering the railway for sale, Mr. Ingle did not set a price, and in his motion Councilman Barrs asked that the company manager set a figure on the value of the property. Councilman Edward S. Hemphill, proposing the motion to table the matter, declared that the bone of contention was the valuation of the company.

Among other things Mr. Ingle said:

Five months has now passed since the franchise ordinance was first introduced and to date nothing has actually been accomplished toward drawing up a franchise. I think also I can accurately state that the citizens' committee is more interested in delaying action on a franchise than they are in drawing up one, and the laws and rules committee seems perfectly willing for the citizens' committee to pursue their course of postponement and delay. Whether this policy of postponement and delay will continue indefinitely, I of course cannot say, but at this time I can see no reason to suspect any change unless it be for the citizens' committee to propose such a franchise as will be impossible for us to accept. This will in its effect mean delay and postponement of a settlement of this franchise question.

As the Council knows, before the city could purchase and operate the railway, it would be necessary to obtain special authority to do so from the Legislature. The Legislature meets in April, and there should be no trouble in obtaining the passage of a special act authorizing the city to purchase and operate the railway. We would be glad to join the city in asking the Legislature to pass such an act if the Council desired our assent or assistance.

Action looking to the possible purchase of the railway by the city, furthermore, need not in any way interfere with the drawing up and passage of a franchise by the Council, as such a franchise could contain a provision requiring the company to sell its property to the city at any time within a stated period, if the city decided to purchase.

In coming before your honorable body and again bringing this matter to your attention, I do so largely in the interest of the tens of thousands of citizens who daily use our street cars as a necessary means of transportation. Their interests should certainly receive your earnest attention. Unless and until your honorable body takes some constructive steps toward either putting us in a position where we can supply additional service, or by purchase of the property, giving this additional service yourselves, the car rider is not going to get the service to which he rightfully feels he is entitled.

Arranging for San Francisco's Municipal Railway Bond Issue

By Feb. 1 all of the preliminary details for a bond issue election to finance proposed extensions to the San Francisco Municipal Railway, San Francisco, Cal., will probably be completed. Announcement to this effect was made on Jan. 20 by Supervisor Shannon, chairman of the public utilities committee of the Council.

The committee now has under consideration the extension program of City Engineer O'Shaughnessy, covering five major projects and costing about \$3,500,000. To this program others have been suggested by citizens and improvement clubs, the total of which is approximately \$2,000,000.

Many proponents of extensions were before the committee on Jan. 20, which was the last day that public hearings on extensions will be held. Among the districts that were heard were Bayview and Quintara Street.

Relief from Paving Charge Up in Detroit

The Street Railway Commission at Detroit, Mich., is considering the question of whether to renew efforts to relieve the department of street railways of the cost of paving between the tracks, as proposed by Del A. Smith, acting general manager of the department. In recommending that the City Council be asked to pass an ordinance embodying the idea, Mr. Smith said the change would save the system \$500,000 a year, and that in recent years 46 street railways in the country have been freed of such paving requirements.

City Council of Boston Opposes Public Control

In the pending discussion over the proposed extension of public control of the Boston Elevated Railway, Boston, Mass., the City Council of Boston assumes an adverse attitude. It has voted to oppose further extension of such control, but has taken under consideration Representative Luke D. Mullen's plan for state purchase of the property and the construction of a subway in Charlestown and Roxbury in place of the present elevated structure.

Campaign to Protect Public.—D. W. Henderson, superintendent of the Seattle Municipal Railway, Seattle, Wash., has started an intensive safety campaign to protect the public. Street railway patrons will be warned by conductors and motormen of the traffic dangers. Meetings will be held at the carhouses at which means of lessening dangers in traffic will be discussed.

Accident Record Compiled for Moral Effect.—General Manager Smith of the Beaver Valley Traction Company, New Brighton, Pa., has notified his employees that if they want their accident record for 1926 they may have it compiled by name, years in service, and even by date, time and place. Mr. Smith believes that if an employee knows his record he will be most cautious and learn to do his job in the efficient way,

without accidents. Each morning a chart is brought to his desk showing the comparison with the year, month and day previous. Then there follows a report of each accident by name of operator, kind of accident and place.

Interurban Men Receive Increase.—As a result of negotiations between the trainmen's labor adjustment committee and officials of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., interurban trainmen have been granted an increase of 5 cents a hour. The increase is retroactive to Jan. 1 and with renewal of present working conditions extends to June 30. The wage agreement for city and suburban trainmen has been extended without change.

Favor Railway Service.—Residents along the South Mason Street line of the Wisconsin Traction, Light, Heat & Power Company, in Appleton, Wis., attending the last meeting of the Council voted in favor of continuing the present railway service instead of abandoning it in favor of bus service. The issue grew out of the company's refusal to move its tracks to the center of the street. The dispute ended suddenly, however, when the company promised to put its tracks in shape, providing no great additional expense would be involved.

Resolution Scores Commission Supervision.—The City Council of East St. Louis, Ill., on Jan. 24 passed a resolution presented by Mayor M. M. Stephens asking members of the Illinois Legislature from the 49th District to vote in favor of a bill providing for city supervision of public utilities instead of supervision by the Illinois Commerce Commission. The resolution is in keeping with the legislative program of the Illinois Municipal League, which would abolish the Illinois Commerce Commission.

City and Tramway Disagree on Fare Change.—The City Council of Colorado Springs, Col., recently denied the Colorado Springs & Interurban Railway a change of fare methods. The company is charging 8 cents cash with two tickets for 15 cents. It asked that it be allowed to make the fare fourteen tickets for \$1, or 10 cents for a single cash fare. The Council in denying the change feels that few people would care to invest \$1, therefore the change would practically mean a 10-cent fare.

New Attack Affecting One-Man Operation.—The city of Buffalo, N. Y., has attacked the International Railway under a new city ordinance adopted some time ago including certain regulations for the operation of one-man cars. The ordinance, aimed to curb the operation of one-man cars on congested streets, provides that operators of these cars cannot engage in other duties when the car is in motion. One motorman has been arrested in a test case. He is accused of making change and issuing transfers while the car was in motion on a congested street. The penalty for each violation is a fine of not less than \$25 nor more than \$50. The railway says it will question the validity of the ordinance and that it is prepared to carry the case to higher courts if there should be a conviction.

Recent Bus Developments

Temporary Injunction in Louisville

Court Restrains Competitor of Louisville Railway—Contention of Counsel for Company Reviewed—Briefs to Be Filed at Once—Issue of Great Importance

IN THE suit of the Louisville Railway against the People's Transit Company, Louisville, Ky., asking an injunction to prevent the latter company from operating buses on local streets on which there are railway lines and within a reasonable distance to either side of such streets, Judge William H. Field of the Jefferson Circuit Court on Jan. 28 granted a temporary injunction. The railway at once deposited a bond of \$25,000 to indemnify the bus company against loss, in event the suit should be decided against the railway in the Court of Appeals.

As a result of the injunction the People's Transit Company withdrew its buses from Broadway at 4.30 o'clock on Jan. 28 and carried the case to the Court of Appeals, where it was brought up on Jan. 29 at 9 o'clock. The upper court refused a decision in the appeal until briefs were filed and more light cast on what the upper court referred to as an "important case." Attorneys for the railway had until Feb. 1 to file briefs, and those for the bus company an additional day.

Attorneys for the bus company contended that city and state licenses were all that were necessary to operate the line. Those for the railway contend that the bus operators have no franchise and are interfering with a franchise held by the railway.

BUSES MUST HAVE FRANCHISE

The Louisville Railway has a franchise giving it the railway privilege on Broadway. Attorneys for the bus line contend that if the company's position is sustained a taxicab company or any one carrying passengers for hire would have to have a franchise and, perhaps, stay off of certain streets. It was contended that this would also stop all jitneys. It was also contended that if the lower court is upheld, the Louisville Railway would have to secure franchises for operation of its Kentucky Carriers Company chain of buses, operated as feeders to the Louisville Railway in suburban territory.

Judge Field held that buses can be operated on local streets only under franchise, and that a company operating buses without a franchise would be doing so illegally.

The People's Transit Company on Jan. 17 started its Broadway line with six buses. It has been telling about plans for several other lines to be started shortly.

Arguments on the motion for a temporary injunction were made by Mr. Dodd, representing the bus owners, and Churchill Humphrey, general counsel for the railway. Four points were involved in the litigation, Mr. Humphrey

pointed out in his argument. The court sustained him on each point.

The principles involved were cited as follows:

1. The use of the highway by a bus operating as a common carrier of passengers for hire, over a regular route, according to a fixed schedule and between fixed terminals is a special or privileged use as distinguished from an ordinary or general use.
2. There can lawfully be no special or privileged use of the streets of a Kentucky municipality except under franchise rights.
3. A citizen and taxpayer may complain of an unlawful street user.
4. A franchise holder whose rights are infringed by the unlawful highway user of a competitor may complain of such unlawful highway user.

In arguing the first point Mr. Humphrey contended that the use of the highway by a bus operating as a common carrier of passengers for hire, over a regular route, according to a fixed schedule and between fixed terminals is a special or privileged use as distinguished from an ordinary or general use. In support of this contention Mr. Humphrey cited Section 164 of the Kentucky constitution, which provides that such use can only be secured by franchise, and that before granting such franchise or privilege the city or municipality must offer the franchise for sale to the highest and best bidder.

COUNSEL FOR COMPANY QUOTED

Mr. Humphrey is reported to have said:

"The contention of the plaintiff is that the defendant's use of the highway is not a natural or ordinary use, but is an extraordinary or privileged use. If this use of the highway be an extraordinary or privileged use, then, obviously, it requires a franchise. Let us inquire, then, as to the use defendant bus company is making of the highway.

The defendant is operating on Broadway from the west end to the east end. It is running buses as a common carrier of passengers for hire, according to fixed schedules, along the Broadway route, between fixed terminals. It is, of course, using the city street, a public highway, for this purpose. Is this use of the city street an ordinary use, or is it a privileged use?

It would be difficult to find any point in our jurisprudence upon which there is such a wealth of authority and such unanimity of opinion. We do not wish to burden the court with a discussion of precedent, but it is necessary to point out how universal is the rule that the use of the public highway by a common carrier is not the ordinary use of the highway, but is a special or privileged use. In other words, an individual or corporation has a natural right to the ordinary use of the highway, but has no right to the privileged use of the highway, except under sovereign grant.

In summing up the facts on point one, Mr. Humphrey declared:

The use of a highway by a common carrier of passengers for hire, operating between fixed terminals, over designated route, and according to a fixed schedule, is an extraordinary or privileged use of the highway. The Court of Appeals of Kentucky has said so. The Supreme Court of the United States has so decided, as have

also the highest courts of the following jurisdictions: Alabama, Colorado, Delaware, Georgia, Idaho, Indiana, Iowa, Kansas, Louisiana, Massachusetts, Michigan, Mississippi, Montana, New Jersey, Ohio, Oklahoma, Oregon, Texas, Utah, Vermont, Virginia, Washington and West Virginia.

It cannot be necessary to amplify this argument. It would take more vanity than the writer of this brief can muster to think that he could add anything to the careful and reasoned discussions of the 25 jurisdictions which have gone so thoroughly into the question.

In support of point 2, Mr. Humphrey contended there can be no special or privileged use of the streets of a Kentucky municipality except under franchise rights. There is probably no point better settled in Kentucky, he said, than this one, pointing out a long list of precedents to this effect developed by the Court of Appeals.

GENERAL COUNCIL MUST PASS ON MATTER

In summarizing point 2, Mr. Humphrey said that in order to acquire the privileged use of the streets of Louisville a franchise authorizing such privileged use must be created by the General Council, which must be sold at public auction and the person or corporation claiming the right must buy at such sale. None of these conditions has been complied with, he said, in the case involved.

In discussing the other two points raised by the railway, Mr. Humphrey said, in referring to point 3, any citizen or taxpayer may complain of an unlawful street user. It has been held in Kentucky, he said, that a citizen and taxpayer may complain of the unlawful use of the city streets by a concern operating without franchise rights.

On point 4 he indicated that a franchise holder whose rights are infringed by the unlawful use of a highway by a competitor may complain of such unlawful highway user, and cited the case of the Reo Bus line against the Big Four Bus line to support his contention that a franchise is necessary to operate on the public highways. Again he was quoted:

The case at bar presents a curious state of facts. The Louisville Railway is one of the largest taxpayers to the city of Louisville. Not only has it acquired franchise rights and assumed franchise obligations, but also it has constructed and maintains its own track and roadbed and, in addition, it is paying, by taxes and as a direct obligation, for the surfacing of the city streets over which its competitor, with no obligation, or even idea, of general service, is attempting to raid its only profitable lines to the breakdown of the general transportation system in Louisville. Where we have a constitution providing that operating obligations must accompany operating rights, it hardly seems to us that a situation will be allowed to continue whereby the established, responsible, obligated company must pay taxes to construct and maintain streets upon which its unestablished, irresponsible and unobligated competitor can destroy it.

BUS COUNSEL'S CONTENTION

In his argument against the injunction, Mr. Dodd contended that buses are different from street cars, and that their use of the streets or highways is not a special or privileged use, as contended by the railway and that they therefore do not require a franchise before they can operate. Buses are not required to secure a franchise, he contended, any more than the jitneys or taxicabs, which have undisputed use of the streets day and night.

Consent Sought for Independent Operation in Buffalo

The Buffalo Motor Coach Company, Inc., which has obtained franchises from the City Council of Buffalo, N. Y., for the operation of three bus lines in the city, has applied to the Public Service Commission for a certificate of convenience and necessity so that the lines can be put in operation as soon as possible.

Ernest M. Howe, Detroit, president of the company, says eighteen buses will be used at the start on routes 1 and 2 and seven buses will be used on route 3. The buses will be of the single-deck, one-man, pay-as-you-enter type with seating capacity for 29 passengers.

An 8-cent cash fare will be charged with free transfers to connecting bus lines of the company.

Several of the routes will serve territory now reached with local lines of the International Bus Corporation, a subsidiary of the International Railway, which is opposing the new corporation before the Public Service Commission. The commission has not yet fixed a date for a hearing on the proposed right to operate in Buffalo.

Bill Would Tax Bus Companies

Bus companies operating in St. Louis, Mo., would be required to pay a 5 per cent tax on their gross receipts if a bill presented to the Board of Aldermen by Alderman Schwartz of the Twentieth Ward is passed and signed by Mayor Victor J. Miller. The measure was introduced at the request of Comptroller Louis Nolte and Director of Streets and Sewers Robert B. Brooks. They contend that the present tax of 3 per cent of gross receipts is inadequate to repair the damage caused to streets by the buses. Companies operating only part of their lines in the city would pay in proportion to the mileage in the city and on their entire system.

W. H. Vanderbilt Acquires Bus Company in Connecticut

The controlling interest in the Connecticut Motor Transportation Company has been acquired by William H. Vanderbilt, purchase being made through the Automotive Transportation Company, Inc., which was organized in 1925 by Mr. Vanderbilt and associates. The new acquisition controls the Gary Transportation Company, operating in the northeastern section of Connecticut; the Conlin Bus Lines, Inc., plying between Springfield and Worcester, and the Newport-Providence Street Railway.

Mr. Vanderbilt, who is president of the Automotive Transportation Company, Inc., and chairman of the board of directors of the corporation, said that no immediate radical changes were contemplated. He has been interested in motor transportation since 1925, when he invested in the Newport & Providence Street Railway. This company operated railway cars from Newport to Bristol Ferry, but with the adoption of buses the service was continued to Providence. During the past few years

Mr. Vanderbilt has been buying into Massachusetts and Connecticut bus companies.

Would Run Buses.—The Illinois Power & Light Company has applied to the Illinois Commerce Commission for permission to discontinue railway service in Hillsboro, Ill., running from the Big Four depot to the Court House and from Hillsboro to Taylor Springs, and substitute buses for the cars.

Bus Lines Bought.—The Worcester Consolidated Street Railway, Worcester, Mass., has purchased the Lake Bus Lines, Inc., from Henry R. Carter. The deal includes seven buses. The Worcester company plans to continue the line, which operates between Salem Square and the north and south ends of Lake Quinsigamond.

Increases Coach Service.—The Wisconsin Power & Light Company has added two more coaches to its fleet of buses supplying city service in Sheboygan. The coaches are of 22-passenger capacity and will be used during the light traffic hours in place of the heavier 29-passenger buses. During peak loads both types of buses will be used. The company now has nine coaches in city service.

Bus Permit Granted in Oakland.—A certificate of public convenience and necessity has been granted by the California Railroad Commission to the Key System Transit Company to operate buses on Telegraph Avenue, in Oakland, between a terminus at Eleventh Street and Broadway and a terminus at Alcatraz Avenue and Dama Street and intermediate points as an extension and in connection with its present street railway system. The company intends to co-ordinate railway and bus service on Telegraph Avenue, using 29-passenger buses of safety type, charging a 7-cent fare with transfers.

Substitution Not Approved.—The proposed amendment of a Peoria, Ill., ordinance to permit the Peoria Railway to substitute buses on its Sixth and Second Avenues car lines has been referred to a committee of the Council for further investigation. It was announced, although not a part of the official proceedings, that the railway proposed to have a bus line in operation by March 1 across the bluff district and down Western Avenue. This line was suggested recently by members of the Council.

Seeks Reconsideration.—The Interstate Buses Corporation, Hartford, Conn., has asked the Supreme Court of the United States to reconsider its recent decision which upheld the state of Massachusetts. The Interstate Buses Corporation sought to have an injunction lifted which prevented the operation of a bus line between Springfield and Greenfield, Mass., without first obtaining licenses from the towns through which the line passed. The injunction was imposed on a complaint by the Holyoke Street Railway. The corporation asserted that the case had been decided by the Supreme Court on the ground that the regulations complained of did not prejudice interstate carriage of passengers, a question not considered in the lower court.

Financial and Corporate

Boston "L" Does Well

Earnings Satisfactory Under Very Trying Conditions—Increase in Number of Passengers Carried

During 1926 the cost of service on the Boston Elevated Railway, Boston, Mass., was \$482,749 in excess of receipts. This is disclosed in the annual report which the board of public trustees has submitted to the Massachusetts Legislature. In 1925 the company earned \$502,194 in excess of cost.

Total receipts in 1926 were \$35,481,313 as against \$34,547,380 in 1925, but wages had gone up from \$16,931,550 in 1925 to \$17,697,378 in 1926; total operating expenses went up from \$24,405,736 to \$26,076,268 and taxes went up from \$1,652,518 to \$1,910,765.

The number of revenue passengers increased to 371,218,401 from 365,036,286 in 1925.

Motor bus mileage of the Boston Elevated in 1926 compares with four previous years as follows: 1926, 4,717,900; 1925, 2,472,456; 1924, 890,901; 1923, 465,382; 1922, 63,937.

On Dec. 31, 1926, the road was operating 150 owned buses, as compared with 69 on Dec. 31, 1925. In addition, on Dec. 31, 1926, the road was operating 80 leased buses, against 80 in 1925.

In discussing phases of operation the trustees say in their report that while there has been a reduction in some types of accidents, vehicle collisions have increased and there has been an increase in total expense for injuries and damages of \$261,000 over the preceding year.

The annual charge for depreciation is \$346,000 more than for the previous year due to increases in investment in depreciable property. By far the greater portion of this increase arises from the expansion of bus service and consequent increase in number of buses owned. The life of a bus is relatively short as compared with nearly all other elements of the properties and consequently necessitates the annual accrual of a high percentage of the cost in order to provide for replacement at the proper time.

Added revenue arising from greater number of passengers carried and from larger payments from advertising and station privilege contracts has offset some of these increased costs but the net result is as stated above. Effort has been made during the year adequately to meet proper maintenance

charges, which had been curtailed somewhat during the previous year. The trustees say:

For some time test installations of automatic passimeters similar to those commonly in use in New York subways have been made with apparent success. Sixty of these have been ordered and when placed in use will result in operating economy.

In conjunction with the transit department of the city of Boston a very considerable amount of work has been performed on the Dorchester Tunnel Extension. It is

anticipated that the portion to Fields Corner will be placed in operation during the current year. Sixty additional cars of the type now in use in the Cambridge-Dorchester Tunnel service have been ordered and will be received by the time this portion of the extension is ready for operation.

The Somerville garage was placed in operation on Dec. 6, 1926, with a present capacity of 112 buses. This made possible the surrender of some leased garage space and avoided the necessity of leasing additional quarters.

Replacement of the last wooden elevated cars, 100 in number, has been undertaken by an order for a similar number of modern steel cars. Eighty-one buses have been added during the year to cover the line on which bus operation has been started.

Snow-fighting equipment to meet the exigencies of snowstorms under present-day traffic conditions has been added at a cost of \$28,000, so that at the present time there is more than \$600,000 invested in snow-fighting equipment.

System of Accounting for Depreciation

Interstate Commerce Commission Announces Hearing to Be Held on Plan to Be Prescribed for Electric Railways Submitted for Its Consideration

THE Interstate Commerce Commission announced on Jan. 27 that the depreciation section of its bureau of accounts proposes to enter an order prescribing a system of depreciation accounting for electric railways substantially the same as that entered recently with respect to depreciation charges of steam railroad companies. Before considering the proposed order, the commission will hold a hearing on Feb. 28, at Washington, D. C., before Examiner Bunten, at which those concerned will be given opportunity to testify. The text of the notice follows:

By paragraph 5 of Section 20 of the Interstate Commerce act, as amended by the transportation act, 1920, the Interstate Commerce Commission is directed, as soon as practicable, to "prescribe for carriers subject to this act, the classes of property for which depreciation charges may properly be included under operating expenses, and the percentages of depreciation which shall be charged with respect to each of such classes of property, classifying the carriers as it may deem proper for this purpose."

In carrying out this provision of the act the commission upon its own motion instituted a general investigation of depreciation charges of all classes of common carriers subject thereto and has held hearings and heard argument concerning depreciation charges of steam railroads and of telephone companies. Following this the commission's report, Telephone and Railroad Depreciation Charges, 118 I.C.C. 295, in which a general discussion of the subject appears, together with appropriate orders in the matter, was made public.

As the fundamental principles which are controlling in the application of depreciation accounting for the property of steam railroad companies and telephone companies appear to be controlling also with respect to the application of depreciation accounting for other classes of common carriers, the depreciation section of the bureau of accounts which conducted the various preliminary investigations now proposes:

1. That the commission enter an order concerning depreciation charges of electric railways substantially the same as that

entered with respect to depreciation charges of steam railroad companies.

2. That the classes of property of electric railways for which depreciation charges may properly be included under operating expenses are the classes of property includible in the following accounts:

WAY AND STRUCTURES

- | No. | Name |
|------|--|
| 505. | Ballast. |
| 506. | Tie. |
| 507. | Rails, rail fastenings and joints. |
| 508. | Special work. |
| 509. | Underground construction. |
| 511. | Paving. |
| 512. | Roadway machinery and tools. |
| 513. | Tunnels and subways. |
| 514. | Elevated structures and foundations. |
| 515. | Bridges, trestles and culverts. |
| 516. | Crossings, fences and signs. |
| 517. | Signals and interlocking apparatus. |
| 518. | Telephone and telegraph lines. |
| 519. | Poles and fixtures. |
| 520. | Underground conduits. |
| 521. | Distribution system. |
| 522. | General office buildings. |
| 523. | Shops and carhouses. |
| 524. | Stations, miscellaneous buildings, and structures. |
| 525. | Wharves and docks. |
| 526. | Park and resort property. |

EQUIPMENT

- | | |
|------|---------------------------------|
| 530. | Passenger and combination cars. |
| 531. | Freight, express and mail cars. |
| 532. | Service equipment. |
| 533. | Electric equipment of cars. |
| 534. | Locomotives. |
| 535. | Floating equipment. |
| 536. | Shop equipment. |
| 537. | Furniture. |
| 538. | Miscellaneous equipment. |

POWER

- | | |
|------|-------------------------------|
| 539. | Power plant buildings. |
| 540. | Substation buildings. |
| 541. | Dams, canals, and pipe lines. |
| 542. | Power plant equipment. |
| 543. | Substantial equipment. |
| 544. | Transmission system. |

FINDING IS REVISED

3. That in the place of finding (8) in No. 15100 regarding the assignment of specific amounts to the primary accounts under road and equipment the following findings shall be made:

That each electric railway which has not yet assigned appropriate amounts to the primary road and equipment accounts covering property for which depreciation accounting is herein prescribed shall do so not later than Jan. 1, 1928; that such companies as have already made an assignment of investment to the primary accounts, shall redistribute the same; that such distribution or redistribution shall be made as indicated below; and that the remainder of the amount in the books representing the carrier's investment in road and equipment shall be carried in sub-accounts which will be provided for later in the commission's classifications, for inclusion of the carrier's unassigned investment in road and equipment;

(a) Where the property has been constructed by or for the accounting company, the amount to be assigned to the primary accounts covering depreciable property

TRAFFIC STATISTICS OF THE BOSTON ELEVATED RAILWAY

	1926	1925	1924
Round trips operated.....	7,526,260	7,185,587	6,994,749
Passenger revenues.....	\$34,393,954	\$33,790,442	\$33,419,172
Passenger revenue per car-mile.....	59.41c	60.93c	59.69c
Passenger revenue per car-hour.....	\$5.75	\$5.86	\$5.67
Passenger revenue miles.....	†57,895,881	†55,461,094	†55,988,679
Passenger revenue car-hours.....	5,980,267	5,767,957	5,894,115
Revenue passengers carried.....	371,218,401	365,036,286	382,888,848
Revenue passengers carried per car-mile.....	6.412	6.582	6.838
Revenue passengers carried per car-hour.....	62.07	63.28	64.96

†Including motor bus mileage.

shall be based upon the actual cost of construction if such information is available, and if the actual cost is not available the amount to be assigned to the primary accounts covering depreciable property shall be upon basis of the estimated cost of construction as of the date the property became available for operation.

(b) Where the investment account of the carrier includes the cost of property not constructed by or for the accounting company which was purchased at a cost in excess of its depreciated structural value as of the date purchased, such structural value, less an allowance for that portion of the purchase price includible in accounts not classed as covering depreciable property, shall be apportioned to the primary accounts covering the depreciable property.

(c) Where the investment account of a carrier includes the cost of property not constructed by or for the accounting company which was purchased at a price equal to or below its depreciated structural value as of the date purchased, the apportionment of the cost to the accounting company to the primary accounts covering the depreciable property shall be upon a basis which will permit the assignment to other primary road and equipment accounts of an appropriate proportion of the same.

\$1,900,000 Equipment Trust for Philadelphia Rapid Transit

A new issue of \$1,900,000 of 5 per cent equipment trust certificates, series K, of the Philadelphia Rapid Transit Company, Philadelphia, Pa., is being offered by Dillon, Read & Company, New York. The proceeds will be used in part payment for new gas-electric motor bus equipment. The certificates are issued under the Philadelphia plan and will mature from Dec. 1, 1927, to 1936. They are priced to yield from 4.75 to 5.30 per cent.

Reference to the 218 buses to be covered by the equipment trust is made elsewhere in this issue.

Passenger, Fare and Wage Figures Compared

The electric railways close the year 1926 with a substantial increase in their traffic for the month of December, and the result for the whole twelve months of 1926 was an increase over the year 1925.

The number of revenue passengers, including bus passengers, reported to the American Electric Railway Association by 213 companies for December, 1926, compared with December, 1925, is as follows:

December, 1926.....	867,763,895
December, 1925.....	852,109,119
Increase, per cent.....	1.84

For the calendar year 1926, a group of 217 companies, with only a few companies missing for the last few months of the year, reported the following number of revenue passengers, including bus passengers, carried:

Calendar year 1926.....	9,655,400,529
Calendar year 1925.....	9,534,870,690

The average cash fare in cities of 25,000 population and over follows:

Jan. 1, 1927.....	Cents 7.7570
Dec. 1, 1926.....	7.7423
Jan. 1, 1926.....	7.6213

Average maximum hourly rates paid motormen and conductors in two-man service by companies operating 100 or more miles of single track follow:

Average Hourly Rate, Cents	Index Number 1913=100%
Jan. 1, 1927.....56.88	208.73
Dec. 1, 1926.....56.88	208.73
Jan. 1, 1926.....56.31	206.64

Toronto Deal Completed

Transportation Commission, Now Operating City Lines, Takes Over Control of Radials

Dawn of a new day at the beginning of a new year seems to have been the time appropriately designed for the transmittal of authority over Toronto's radials from one commission to another. At midnight on Jan. 12 in the North Toronto radial station on Yonge Street, the city's boundary line, Mayor Foster acted as intermediary in passing over the official agreement of operation from the hands of W. R. Robertson, general superintendent of the Ontario Hydro Radials, to the hands of P. W. Ellis, chairman of the Toronto Transportation Commission. But the ceremony of a few minutes was the amen to the battle between the "powers that be" of the two commissions and the city, which has raged for more than a year and a half. The agreement was approved unanimously by all members of the City Council present on Dec. 17—with the exception of the Mayor, who refrained from voting, and Alderman Wright, who was absent from the meeting. It should, perhaps, here be explained that the radials have a financial structure entirely independent of the city system.

Seldom has a city staged so dramatic a performance of its civic affairs as did Toronto on this occasion. But the new addition of railways has brought the system out of its local territorial interest to that of a broader scope in that it now constitutes the second largest electric railway system in North America under public ownership, Detroit having first place. Festivities lasted from 7 o'clock one eve-

MILEAGE NOW UNDER TORONTO TRANSPORTATION COMMISSION

	Single-Track Miles
City street railways.....	227
Buses (included in city fare).....	18
Coach route in city.....	8
Township and Weston lines..	16
York radials.....	97
	<hr/> 366

ning until nearly 3 o'clock the next morning. The Mayor acted as leading dramatist in the rôle of conductor of the first car, gayly draped in flags with huge letters T.T.C. emblazoned on its sides, which was run from the city under the new management.

For many years, according to the Toronto press—which also played its part in most effective co-operation—it was the dream of the late Sir Adam Beck, the founder of Hydro, to see high-speed radials meet in the heart of the city under unified control. But it was a vision of a very huge transaction, involving more than \$3,000,000, with \$1,088,000 actually being paid in cash and \$2,375,000 assumed by the city in bonds which represent the McKenzie interests of 90 miles of road. Operation cannot be begun in the downtown section, however, until winter is over, because the gage of the metropolitan and Mimico divisions will have to be changed. Meantime, a temporary connection will be made between the West Hill line and the city system.

In all 366 miles of lines have been acquired by the city for municipal operation.

According to D. W. Harvey, general manager of the Transportation Commission, this does not mean that other municipalities will not be taken into partnership agreements. When asked the question by a newspaper reporter, he answered in the affirmative.

Quotations from the agreement provide that:

Clause I.—“all the powers, rights, authorities and privileges of the city as to control, management and or operation of the railways and future extensions or additions to such railways, or any transportation service to be operated in connection with such railways shall be exercised by the commission and not by the Council of the city.

Clause IIIa.—The city will from time to time furnish to the commission on demand such moneys as it may require to carry out its powers and duties hereinunder including such sum in excess of operating revenues as may be required to meet the full cost of maintenance and operation, which cost shall include such maintenance, renewals, depreciation and debt charges as the commission shall think proper; notwithstanding anything in the foregoing, any moneys requested by the commission for new capital expenditure shall only be furnished if when approved by the Council of the city.

Clause IV deals with the powers and duties, namely, that the commission will have power to extend the railways by lines of railways; motor bus routes or any other means of transportation, and to control, maintain, operate and manage such additions. That it will fix fares and tolls so that as far as possible transport will be self-sustaining after providing for maintenance, renewals, depreciation, etc.

Clause VI provides that the commission will keep separate books of accounts of receipts and expenditures of the new divisions provided in the agreement and Clause VII that all moneys will be kept separate for this purpose also. Other provisions follow:

Clause IX.—Immediately after the close of each calendar year the commission shall submit to the Council of the city a completely audited balance sheet and certified financial statement of the affairs entrusted to it by this agreement, including a revenue and expense account, and profit and loss statement of each division of the railways and said statement shall be accompanied by a general report of the operations of the commission under this agreement during the year.

Clause XII.—The commission will, if it deems advisable after providing for maintenance, repair and operation and such maintenance renewals, depreciation and debt charges as it shall think proper pay to the city any surplus of revenue over expenditures remaining in its hands at the end of any year in respect of the railways and transportation services entrusted to its management by this agreement.

Groton & Stonington Reorganizes

New directors of the Groton & Stonington Traction Company, Mystic, Conn., are Clarence E. Thompson, Jr., New Haven, and Lucius E. Whiton, New London. The new financial structure contemplates an issue of \$250,000 first mortgage income bonds. Each holder of a \$1,000 of first mortgage bond of the Groton & Stonington Street Railway will receive a new \$500 bond of the Groton & Stonington Traction Company, together with ten shares of stock, par value \$100. The Winthrop Trust Company, New London, is trustee under the indenture securing the first mortgage bonds.

Change in Fairmount Park Capital Structure

At the annual meeting of the Fairmount Park Transit Company, Philadelphia, Pa., to be held on Feb. 21, stockholders will vote upon a change of capital stock of the company to provide for the authorization of 150,000 shares of common stock without par value in lieu of the present authorized common stock of 40,000 shares; par \$10, and to provide for the authorization of the issuance of three shares of common without par value about to be authorized by the State of Delaware in exchange for each share of the common stock now issued and outstanding.

Combined operating account of the Fairmount Park Transit Company and the Woodside Real Estate Company for the year ended Dec. 31 shows revenue from all sources of \$565,700, compared with \$449,661 in 1925. After operating expenses, interest, depreciation, but before deduction for federal taxes, there was a combined profit of \$114,286, compared with \$57,215 in 1925.

Auction Sale of Washington- Virginia Line

The Washington-Virginia Railway, Washington, D. C., is to be sold at auction some time in April next. An announcement to this effect was made recently by Attorney Gardner L. Boothe, division counsel of the company. The Circuit Court has named John S. Barbour, Judge J. K. M. Norton and Gardner L. Boothe with Edward Hopkinson of Philadelphia as commissioners of sale.

The road, which consists of 40 miles of track connecting Alexandria, Va., Washington, Mount Vernon and Fairfax, was placed in the hands of a receiver on Nov. 23, 1923. At one time the road was virtually the only means of transportation to Mount Vernon and to Alexandria, but bus lines have hurt it recently.

It is said that the total bonded indebtedness of the road is \$3,500,000, of which amount \$2,500,000 is on the Mount Vernon division and \$1,000,000 is on the Falls Church division. No interest has been paid on the bonds for several years.

6,000 Shares Sold to Residents of Dallas

The initial offering of Dallas Railway & Terminal Company, Dallas, Tex., 7 per cent cumulative preferred stock placed on sale on Nov. 4, 1926, has met strong public demand and more than 6,000 shares have been sold.

As J. W. Carpenter, president of the company, sees it, the excellent financial condition of Dallas people is reflected in the sale of the stock. At the time the stock was placed on sale there was much talk about the depressing effect of low cotton prices on general business conditions in Dallas. The sale of the stock is limited exclusively to Dallas residents. The fact that more than 96 per cent of all sales have been for cash shows there is money available for sound investments. Since the purpose

of selling the stock to the public is frankly to obtain more active and widespread interest in the company by its patrons, the officers of the company are especially pleased with the wide distribution of stock in small lots to investors who take a personal interest in the company.

Mr. Carpenter said:

The loyalty of our employees is shown by the fact that more than 98 per cent have bought stock for themselves and a large number have been active in selling to the public. Keen competition by employees in the sale of this stock has made it necessary for them to become better acquainted with company policies and the educational effect of the campaign is reflected in the improved personal service that has come from it. Since our employees are now financially interested in the company and realize that many of their patrons are company stockholders, there is increased incentive to render high-class service.

Receivership of Oklahoma Railway May End Soon

The receivership of the Oklahoma Railway, Oklahoma City, Okla., may be ended at the close of 1927 provided there is no slump in business conditions, according to Gabriel T. Lackey, joint receiver with George A. Henshaw and president of the company. The company had approximate net earnings of \$60,000 during 1926, which was its most successful year of two years of receivership. The company made many improvements in 1926. Perhaps the outstanding achievement was establishment of a system of 26 buses which are self-supporting.

New Director Elected.—W. G. Murrin, vice-president of the British Columbia Electric Railway, Vancouver, B. C., Canada, was elected a director of the company at the annual meeting of shareholders in London, England, on Dec. 15.

Pittsburgh Pays Its Notes.—It was announced recently that the \$500,000 of 6 per cent notes of the Pittsburgh Railways, Pittsburgh, Pa., due on Feb. 1, 1927, would be paid off at maturity at the office of the Union Trust Company, Pittsburgh.

New Bill Would Double Tax Rate.—A bill has been introduced before the Wisconsin Legislature providing for the taxation of light and power companies operating electric railways according to the local rate of the community in which they operate, to replace the general tax rate method now in force. If the bill is enacted the general tax rate of 2.01 now levied against these companies would be practically doubled.

Ordered to File Objections.—Carl F. Morrow, judge of the Circuit Court at Anderson, Ind., has ordered creditors of the Union Traction Company of Indiana, now in receivership, to file their objections, if any, by April 2, to a report filed July 30, 1926, by Arthur W. Brady, receiver of the Union Traction Company.

Will Vote on New Financial Plan.—In accordance with recommendations made by the board of directors of the Wisconsin Public Service Corporation, Green Bay, Wis., stockholders were to vote on Feb. 3 on a new financing program which provides for increasing the

amount of preferred stock from \$5,500,000, par value, to \$12,500,000, increasing the authorized common from \$3,000,000 to \$7,500,000 and dividing up the present \$100, par value, common shares into \$10 par value common stock. In explaining this change in the financial structure, Clement C. Smith, chairman of the board, asserted that business has been growing very rapidly and additional capital was needed for development.

New Directors Elected.—Henry Scandrett, vice-president of the Union Pacific Railroad, and Emmet Tinley, were recently elected directors of the Omaha & Council Bluffs Street Railway, Omaha, Neb. Their affiliation with the board of directors of that company increases the number to eleven members.

Exchange of Securities at Evansville.—The Evansville & Ohio Valley Railway, operating from Evansville, Ind., to Mount Vernon, Ind.; Grandview, Ind., and Henderson, Ky., has been granted permission by the Indiana Public Service Commission to issue \$235,100 in first and refunding 7 per cent bonds in exchange for \$235,000 of 7 per cent preferred stock of the Evansville, Henderson & Owensboro Railway.

Residents Favor City Purchase.—Residents of the Rainier Valley, an urban district of Seattle, Wash., are working to mold public opinion prior to the March elections to the end that the lines of the Seattle & Rainier Valley Railway be purchased by the city for \$1,200,000 and made a part of the municipal railway system. The City Council has approved the purchase. The matter is now up to the voters at the March election. It is pointed out that the city can save \$160,000 a year in transportation costs by operating over the tracks on Fourth Avenue now owned by the Rainier Valley system and used exclusively by it, at which rate, it is estimated, the lines would be paid for in 7½ years.

New Mexico Loses Railway.—The Las Vegas Transit Company, Las Vegas, N. M., has been authorized by the City Council to abandon railway service. The company has had a losing struggle with automobile competition and fares are not enough to offset this loss. The line was 3 miles long. It was operated between Las Vegas and East Las Vegas.

Harp on Colorado Abandonment.—Attorneys, citizens and various business bodies of the cities of Louisville and Boulder, Col., are after the Colorado Public Utilities Commission to force Receiver William H. Edmunds of the Denver & Interurban Railroad to restore the operation of trains on the road, regardless of the fact that the federal District Court at Denver instructed the receiver to discontinue operation because the road was unable to pay its debts; that it should sell the properties and turn the money over to its creditors. Some lawyers claim that should the commission take any such action, it would be in contempt of the federal court. No electric trains are being operated despite the speculation. The trains were discontinued on Dec. 15.

Legal Notes

FEDERAL CIRCUIT COURT OF APPEALS.— *Division of Cost of Maintaining Railroad Gates at Crossing.*

A steam railroad and an electric railway made a contract for the maintenance of a crossing by which the larger part of the cost of maintaining the crossing was placed upon the electric railway company. Later, the latter sued the railroad company to recover up to half the cost of maintenance of the crossing on the ground that the contract was void for want of consideration. It was held, however, that the obligation of the steam road to maintain gates at the crossing was sufficient consideration to support the contract. [Erie Railroad vs. Cleveland Railway, 15 Federal Rep. (second), 374.]

FEDERAL CIRCUIT COURT OF APPEALS— *Judgment for Seller of Street Rail- way Against City Which Acquired Railway Through Action of Council Held Not Chargeable Against General Funds of City.*

Laws of the state of Washington prescribe two methods by which a municipality may acquire a street railway or other utility. The first method is where a general indebtedness is to be incurred. With this method, the plan and cost thereof must be approved by the voters. The second method is where the charter of the city, adopted by vote of the people, authorizes the authorities to acquire the property, but its cost and expense of operation is to be paid exclusively from its own revenues. In this case the city council may act alone. In an agreement to purchase a railway, made according to the second method, the city agreed to pay a certain proportion of the taxes on the property for the year of purchase as part of the consideration, but the Circuit Court of Appeals for the Ninth Circuit held that this amount was not collectible from the general funds of the city. [City of Seattle vs. Puget Sound P. & L. Co., 15 Federal Rep. (second), 794.]

FEDERAL SUPREME COURT — *Statute Specifying Price of Gas Held In- valid.*

In an act approved June 2, 1923, the New York State Legislature directed that thereafter in New York City not more than \$1 per 1,000 feet should be demanded for gas of 650 B.t.u. The statute was declared invalid because confiscatory. [Ottinger vs. Consolidated Gas Co., New York, 47 Supreme Court Rep., 198. Also two similar cases on page 199.]

FEDERAL SUPREME COURT—*Valuation of Utility Based on Present Prices and Price Trends. Seven Per Cent Return Sustained.*

"In determining present value, consideration must be given to prices and wages prevailing at the time of the investigation; and, in the light of all circumstances, there must be an honest and intelligent forecast as to probable

price and wage levels during a reasonable period in the immediate future.

The testimony of competent valuation engineers who examined the property and made estimates in respect of its condition is to be preferred to mere calculations based on averages and assumed probabilities. The evidence is more than sufficient to sustain the rate of 7 per cent found by the commission, and recent decisions support a higher rate of return." [This decision was reviewed editorially on page 1034 of the issue of this paper for Dec. 11, 1926.] [McCardle vs. Indianapolis Water Co., 47 Supreme Court Rep., 144.]

ILLINOIS—*Duty to Repave Held to In- clude Reconstruction after Water Mains Are Laid.*

According to the 1907 ordinance, the Chicago City Railway Company was obliged, at its own expense, to fill, grade, pave and repair that portion of the street occupied by it as specifically provided in an accompanying exhibit. This duty was held to include that of repairing its portion of the street when such repair became necessary for any reason, as when the city had removed the paving for the introduction of water and sewer pipes. The railway company's track foundations, for this purpose, were held to be a part of the "street," so that track foundations removed by the city in its work of laying the water and sewer pipes had to be renewed at the expense of the company. [Chicago City Ry. vs. City of Chicago, 154 Northeast. Rep., 112.]

MASSACHUSETTS—*Motorman Not Neg- ligent When Car Hits Person Stooping on Track.*

A person occupying a house adjoining an electric railway exposed track attempted to drain some water from his basement with a hose, and while on the track stooping over to adjust this hose was struck by a car. He was not in a place where a motorman might reasonably anticipate someone would be on the track, and as he was in a stooping position, he could not readily be seen by the motorman, although it was not dark. The company was held not responsible. [Chatterton vs. E. M. Street Railway, 154 Northeast. Rep., 259.]

MISSOURI — *Duty Under "Vigilant Watch" Ordinance.*

Under the St. Louis Vigilant Watch Ordinance, it is the motorman's duty to be on the lookout for persons or vehicles on or approaching the track and to stop his car in the shortest space and time possible. This duty is continuous and failure of the motorman to see an approaching automobile in time to avoid collision with it from a point where he could have seen it in the exercise of the care prescribed by the ordinance constituted negligence. [Riggle vs. Wells, 287 Southwest. Rep., 803.]

NEW YORK—*Injury to Finger in Slid- ing Door.*

A passenger to preserve his equilibrium in boarding a subway car placed his hand on the edge of a sliding door operated pneumatically in multiple with other doors. The door moved forward, then slid back into its casing, bruising and contusing one of the fingers of the plaintiff. Judgment for the defendant was affirmed on the ground that the accident was not caused by any negligent act of the defendant's servants. [Siegel vs. Interborough R.T. Co., 214 N. Y. Supp., 71.]

NORTH CAROLINA. — *Reckless Driving Even If Not Followed by Colli- sion Constitutes Negligence.*

Where a person was struck by a bus which turned off the road to avoid being struck by a bus with a different owner, the relative liability of the owners of each bus was held for the jury. [Shipp vs. United Stage Lines, 135 Southeast. Rep., 339.]

OHIO.—*Responsibility to Provide Safe Lighting Place for Passengers.*

A passenger, alighting from one car to transfer to another, tripped over a rail which was from two to four inches above the general level of the ground. While the passenger might have seen the rail if he had looked for it, his failure to do so was not held to be negligence. The stressing by the plaintiff's counsel of the fact that subsequent to the accident, there had been a substantial reconstruction by the company which reduced the height of the projecting rails—a fact not brought in issue by the defendant's evidence—was held reversible error. [Cleveland Railway vs. Halterman, 153 Northeast. Rep., 922.]

OREGON.—*Automobile Driver Making Left-Hand Turn in Front of Ap- proaching Car Held Negligent.*

An automobile driver who, while closely following a street car, attempted to make a left-hand turn at a street intersection and was struck by a street car coming from the opposite direction, was held to be contributorily negligent as a matter of law for recklessly attempting to pass in front of a fast moving car. [Grasle vs. Portland R. L. & P. Co., 250 Pacific Rep., 379.]

TEXAS — *Railway Responsible for Prompt Removal of Injured Per- son to Hospital.*

A woman passenger fell while on a car and then was taken by the employees on a long trip to the company's office, then transported to a hospital, and then to her home. The entire trip lasted between two and two-and-a-half hours. Even though the company's negligence did not cause the original fall, it was liable for damages resulting from her detention on the car. [San Antonio P. S. Co. vs. Wellman et al., 288 Southwest. Rep., 582.]

WASHINGTON. — *Injury to Pedestrians at Street Intersection.*

Pedestrians at a street intersection who looked but failed to see the approaching car which struck them were held not contributorily negligent as a matter of law, as the approaching trolley car was obscured by intervening vehicles. [McLeod vs. the City of Seattle, 249 Pacific Rep., 1059.]

Personal Items

New Assistant Manager at Toronto

H. W. Tate Appointed Assistant Manager of Municipal Railway to Succeed A. T. Spencer

H. W. Tate has been appointed assistant manager of the Toronto Transportation Commission, Toronto, Ont., because of a vacancy created when A. T. Spencer, formerly assistant to the general manager, received an appointment as general superintendent of construction and maintenance in the way and structures department of the Montreal Tramways, Montreal, Que.

Mr. Tate was the first engineer to join the commission's staff, in 1920, and was engaged in the formation of the



H. W. Tate

commission's rehabilitation and extension plans prior to the summer and fall of 1921, when the completed organization was formed and rehabilitation of the old lines of the Toronto Railway by the city commenced. He was appointed field engineer of the way department on Sept. 1, 1921, and was associated with the commission in this capacity during the rehabilitation of the unified transportation system in Toronto. Later, in May, 1924, Mr. Tate became engineer of way and was in charge of the way department until Jan. 25, 1927, when his appointment to the position of assistant manager was announced.

The new assistant manager is a graduate of the University of Toronto, having concluded a brilliant academic course when he led the graduating class of 1910 in civil engineering and received the degree of B.Sc. The wide range of his practical experience also has been a factor in qualifying Mr. Tate for his advancement. In 1905 and 1906 he was with the Canadian Pacific Railway on irrigation and maintenance of way. For three years, 1907-08-09, he was associated with mining engineering in the Cobalt camp. During the five years 1910 to 1914 he was

engaged in land surveying and municipal engineering.

The World War interrupted Mr. Tate's career in civil life, but his enlistment in the Canadian Expeditionary Force with the Second Pioneer Battalion early in 1915 opened opportunities for wider engineering experience. During his four years of active service, three of which were spent in France, he attained the rank of major and was second in command of the Ninth Battalion Canadian Engineers. For three months, during which occurred the Canal du Nord attack of October, 1918, Major Tate, in the absence of his colonel, was in command of the battalion. He was twice mentioned in despatches by Sir Douglas Haig for gallant and distinguished conduct in the field.

Returning from overseas in 1920, Major Tate joined the staff of the Toronto Transportation Commission. He is an Ontario land surveyor, a Dominion land surveyor, an associate member of the Engineering Institute of Canada and a member of the Professional Engineers of Ontario.

W. H. McAloney Honored at Equipment Meeting

W. H. McAloney, superintendent of equipment of the Georgia Railway & Power Company, Atlanta, Ga., was elected president of the Southern section of the Electric Railway Association of Equipment Men at the closing session of a three-day convention held recently in Memphis. In his post as president he succeeds A. D. McWhorter, superintendent of the Memphis Street Railway, who has been president for five years, and who declined a sixth nomination.

Mr. McAloney is considered one of the leading equipment men. He took full charge of shops, carhouses and garage and assumed jurisdiction over the maintenance of all street cars and automobile equipment of the Georgia Railway & Power Company, Atlanta, Ga., about six years ago, when he filled the vacancy caused by the death of Mr. Moore. Sixteen years of his railway experience had been spent as superintendent of rolling stock of the Denver Tramways. While in Denver he was actively connected with the welfare association of the Denver Tramways. The latter city claims him as its own more than Atlanta because Mr. McAloney began work there for the Denver Tramways as a conductor in 1891, and after a few months of this work entered the office of E. W. Olds, at that time master mechanic. Later he was appointed division superintendent of the east division and still later to the shops as storekeeper. In 1902 he became superintendent of rolling stock, which position he held at the time of his resignation in 1918. It was in that year that Mr. McAloney was appointed superintendent of rolling stock of the Winnipeg Electric Railway. He remained in Winnipeg for two years, when he be-

came associated with John A. Beeler, consulting engineer.

Articles by Mr. McAloney have appeared in the JOURNAL from time to time, dealing particularly with his experience and suggestions regarding various phases of railway equipment.

New Superintendent of Equipment at New Brighton

Henry J. Meyer, for the past 26 years master mechanic of the Beaver Valley Traction Company, New Brighton, Pa., has been promoted to superintendent of equipment for the Beaver Valley Traction Company, the Pittsburgh-Beaver Street Railway and the Beaver Valley Motor Coach Company, all with headquarters at New Brighton, Pa. Mr. Meyer is a member of the 25-Year Service Club, recently organized on the property, and in his years of experience has seen the advancement of the industry from the early days of electric cars to the present modern de luxe cars.

The new incumbent first provided



H. J. Meyer

money for his existence by working in a cigar factory at the age of 12. When asked why he selected transportation as his work, Mr. Meyer replied "because it is a good field of endeavor." In the general manager's bulletin issued as a weekly feature some complimentary remarks were made of Mr. Meyer's career. Service to the public and welfare of his company had been his constant thought.

South Shore Line Appoints New Freight Representatives

Important changes in the personnel of the freight traffic department of the Chicago, South Shore & South Bend Railroad, Michigan City, Ind., were announced recently by F. W. Shappert, assistant to vice-president Bernard J. Fallon. A. W. Oberfell, formerly a commercial agent of the South Shore Line, was made general freight agent, and C. L. Binger, also a former commercial agent, was made assistant general freight agent. Mr. Oberfell's office will remain in South Bend, Ind., and Mr. Binger's headquarters will be in Chicago.

Mr. Oberfell has been associated with the traffic department of the South

Shore Line for more than a year, having previously been traveling freight agent of the Canadian Pacific with headquarters at Minneapolis.

Mr. Binger has served the South Shore Line since it came under its present management, having been associated previously with the Chicago, North Shore & Milwaukee Railroad.

Four "off-line" agencies were established in Minneapolis, Pittsburgh, Detroit and Kansas City, Mo. They are the first of their kind to be established by the South Shore Line and are a result of the rapid strides in the freight business of the road.

Personnel Changes on the Interstate Property

Changes in the personnel of the Interstate Public Service Company, Indianapolis, Ind., to become effective at the annual meeting of the company to be held on March 7, are as follows: President, Ernest Van Arsdel; vice-president in charge of gas, electric and water operation, I. L. Oppenheimer; vice-president in charge of railway operation, L. M. Brown; vice-president and treasurer, in charge of the financial department, W. Marshall Dale; vice-president and auditor, in charge of accounting and stores, A. D. Jones.

G. J. Oglebay, now district manager of the Bedford district, will go to the Indianapolis organization as assistant to the vice-president in charge of the gas, electric and water operation.

J. E. Albert in Charleston

J. E. Albert, recently affiliated with the Public Service Railway, Newark, N. J., is now serving in the capacity of assistant to Arthur M. Hill, vice-president and general manager of the Charleston Interurban Railroad, Charleston, W. Va., and president of the Midland Trail Transit Company and New River Transit Company. The latter two companies are purely intercity bus companies, while the Charleston Interurban Railroad operates several city bus lines. All of the companies are under the same management and control.

Early in 1926 Mr. Albert joined the ranks of the Public Service Railway as traffic engineer. For two years prior to that he had been assistant general manager of the Wheeling Traction Company, Wheeling, W. Va. Mr. Albert began his railway career with the West Penn Railways in 1916 while a student at the University of Pittsburgh. At that time he was engaged in valuation work. During the summer of the following year he again engaged in work for the West Penn.

Following his return to civil life after the war, he entered the special engineering department of the West Penn Railways, dealing with rates and valuation and the appraisal of electric and other properties prior to absorption by that company. He was also engaged on special reports covering arbitration of wages and similar subjects. He remained on this work until 1922. In that year Mr. Albert was transferred to the office of Vice-President C. P. Billings as assistant to that official. Two years later he was appointed to

the position of assistant general manager at Wheeling.

As assistant to Mr. Hill, who has the entire responsibility of operating the railway and bus companies at Charleston, Mr. Albert is collaborating in working out important plans for that property.

W. A. MacRae Promoted in Toronto

W. A. MacRae has been appointed engineer in charge of the Toronto Transportation Commission, Toronto, Ont., succeeding H. W. Tate, who has been promoted to the position of assistant manager. Mr. MacRae has been superintendent of construction in the way department since the summer of 1921, when the commission commenced its reconstruction and extension program, following the purchase of the property of the Toronto Railway. Prior to joining the Toronto Transportation Commission staff and since graduating from McGill University in civil engineering in 1913, he was engaged in general construction work.

New Commissioners Named in Pennsylvania

Emerson Collins and Samuel Walker have replaced Richard J. Beamish and Chris Golden as members of the Pennsylvania Public Service Commission following the rejection of the latter names on Feb. 1 and the submission of the two former by Governor Fisher. Both Mr. Beamish and Mr. Golden were appointees of Governor Pinchot. When the Senate finance committee met on Feb. 1 it decided to report negatively on the Pinchot men.

Emerson Collins, one of the new incumbents, is a resident of Lycoming County and was former deputy attorney-general. He taught school for a time, but left that work for the law, being admitted to the bar in 1887. He has since practiced in Williamsport.

Samuel Walker was admitted to the bar in Butler County in July, 1899. He is a graduate of the University of Pennsylvania law school. Mr. Walker resides in Butler, Pa.

The controversy provoked by the naming of Messrs. Beamish and Golden was the subject of comment in the JOURNAL at the time they were appointed.

Changes on Lake Shore Property

John Heim, Sandusky has been appointed superintendent of the city lines of the Lake Shore Electric Railway, Cleveland, Ohio, by Martin Ackerman, general manager. Mr. Heim succeeds Charles Coon, Lorain, who with P. M. Trueman, superintendent of the Toledo division, and Warren Gregg, superintendent of the Cleveland division, retired recently. Irving Robinson, Beach Park, was named to succeed Mr. Gregg and Sherman Gibson, Fremont, to succeed Mr. Trueman.

The three new incumbents have all been in the employ of the company many years. Mr. Heim's headquarters will be at Lorain, Mr. Robinson's at Cleveland, and Mr. Gibson's at Fremont.

Obituary

T. M. Jenkins

Thomas M. Jenkins, former railway official, died on Jan. 23 in St. Louis, Mo. Mr. Jenkins started his railway career as a driver of a horse-drawn car in Albany, N. Y., and worked himself up to the position of superintendent. For a while he was general superintendent of the Cincinnati, Newport & Covington Traction Company. He went to St. Louis, Mo., in 1900 as general manager for the St. Louis & Suburban Railway, then operated independently, but now part of the system of the United Railways, with which it was merged in 1906. Mr. Jenkins left the St. Louis & Suburban to enter the coal business as president of the St. Louis & O'Fallon Coal Company, St. Louis, owned by the Busch interests. In more recent years he headed the Regal Coal Company. Mr. Jenkins was born in Albany, N. Y., in 1862. As a youth he served as a page in the New York Legislature.

Col. H. G. Prout

Col. Henry G. Prout, internationally known engineer and editor, died on Jan. 26 at his home in Summit, N. J. His name was well known as a Civil War veteran, colonel in the Khedive's service in Egypt and as editor of *Railroad Gazette*, now the *Railway Age*. Colonel Prout succeeded General Gordon when that commander went down to Khartoum as Governor-General of the Sudan. Mr. Gordon's opinion of him is shown by the fact that he had Colonel Prout promoted twice and at the end suggested him for the rank of Pasha and offered him the governorship of either of two provinces if he would stay in the service. When Colonel Prout returned to America in June, 1878, he entered the service of the Toucey & Buchanan Interlocking Switch Company, Harrisburg, Pa., which later became one of the constituents of the present Union Switch & Signal Company. After a year or so of this work, Colonel Prout entered the printing business with the firm of Atkins & Prout, which printed the *Railroad Gazette* for several years before Colonel Prout became editor of that paper in March, 1887.

During the next sixteen years, as editor of *Railroad Gazette*, Colonel Prout took an active part in railroad activities throughout the entire country. So great was the respect in which his judgment on engineering problems was held that an editorial written by him and read on the floor of the United States Senate influenced the selection of Panama instead of Nicaragua as the route of the Isthmian canal.

In 1903 Colonel Prout resigned, editor of *Railroad Gazette* and as director of the corporation to become first vice-president and general manager of the Union Switch & Signal Company. In July, 1914, Colonel Prout, then president of the company, resigned, and in November of the same year became president of the Hall Switch & Signal Company, a position he held until his resignation and retirement the following year.

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

Rockford & Interurban Spends \$100,000 for New Cars

Rockford & Interurban Railway, Rockford, Ill., has ordered ten interurban cars of the latest design from the American Car Company of St. Louis, at an estimated expenditure of \$100,000. These cars will be operated out of Rockford on lines radiating to Beloit, Janesville, Freeport and Belvedere. They are designed for a speed of 60 m.p.h., and are expected to reduce the running time between these cities. The new rolling stock will be placed in operation in about six months, at which time will be instituted a door-to-door freight service through the medium of transferrable bodies, a service already successful on the North Shore line. Thirty of these bodies of 6-ton capacity are now being constructed in the company's shop.

\$654,900 Budget in Minneapolis Includes 25 Cars

More than \$600,000 will be spent by the Minneapolis Street Railway, Minneapolis, Minn., in 1927. The budget of the railway for 1927 having been approved on Jan. 28 by the City Council, materials will be bought and work will begin simultaneously on the various projects in the spring. Probably the most popular work is the new crosstown line on 50th Street from Xerxes Avenue to Bryant Avenue South, connecting the Oak-Xerxes and Bryant-Johnson lines, the first crosstown line south of Lake Street. This will necessitate double track from Xerxes to Penn Avenue South, terminus of the Oak-Harriet line, an extension of the Xerxes line, eight blocks, and a new double-track line from Penn to Bryant, fourteen blocks. A single track is to be laid on Penn from 50th to 54th Street. Other projects include double tracks from 46th Avenue and 46th Street to and across the new Ford bridge over the Mississippi River, doubling the single track on 41st Street from 42d to 46th Avenue South, and on 46th Avenue from 41st to 46th Street, and on the Lyndale-Bryant Avenue North line

from 42d Avenue to the city limits. Six other projects include new rails and paving between tracks and 25 new type noiseless cars. The total budget is \$654,900.

Fifteen De Luxe Cars Ordered by Chicago, Aurora & Elgin Railroad

What is said to be a new type of de luxe passenger car will be introduced by the Chicago, Aurora & Elgin Railroad as a result of an order placed with the Cincinnati Car Company for fifteen motor-equipped passenger coaches to cost a total of \$585,000 or \$39,000 each. Delivery of these cars is expected about July 1.

The new rolling stock will be of all-steel construction, equipped with a combination straight and automatic air-brake system. Additional features will be triple-tier truck springs, 52 bucket-style seats upholstered in Byzantine plush, separate smoking compartment accommodating twelve persons, an elaborate toilet section, maroon exterior and mahogany interior finish. The cars, weighing 102,000 lb. each, are designed for high-speed operation and will carry four 150-hp. motors. Although the coaches will approximate in convenience and comfort the ordinary railroad parlor cars, there will be no extra fare charged.

According to a recent statement by Col. Edward J. Blair, general manager of the company, "these luxurious cars will give our customers transportation on rails which equals that of the appointments of the most luxurious private automobiles, in addition to the advantages which they now have of speed and highly skilled drivers.

"It is our desire," said Colonel Blair, "to give the western suburbs and Fox River Valley the best transportation to be found anywhere in the country, and this very large expenditure is in keeping with that. These cars will give the Chicago, Aurora & Elgin Railroad a considerable additional capacity to serve the public. We believe this distinct innovation in transportation will be pleasing to our customers, just as have been the other very large exten-

sions and improvements which this high-speed, electrically operated railroad has made since the present management took charge more than ten months ago."

Party Lines Waived on Wooden Car Elimination

From latest reports Republican and Democratic legislators of New York City will make a determined effort during the present session of the Legislature to eliminate all wooden cars on subways and elevated lines in Greater New York. Senator Kleinfeld on Jan. 24 introduced a measure compelling the withdrawal of all wooden rolling stock within one year. Assemblyman Hofstadter announced that he was drafting a measure calling for the elimination of the cars, but had not decided to place a time limit on their withdrawal.

\$2,720,000 Bus Order Placed by Philadelphia Rapid Transit

The Philadelphia Rapid Transit System has placed an order for 201 gas-electric buses with the Yellow Truck & Coach Company of Chicago at a total expenditure of \$2,720,000. According to an announcement made public on Feb. 1, work has already been started on the new equipment, which will consist of 100 single-deck, 50 double-deck and 51 parlor car buses. The order also includes seventeen smaller gas-electric motor service units. With this new order delivered the Philadelphia company will have a total of 575 buses in operation. Delivery is expected in May and the buses, it is understood, will be used in developing new lines in and around Philadelphia.

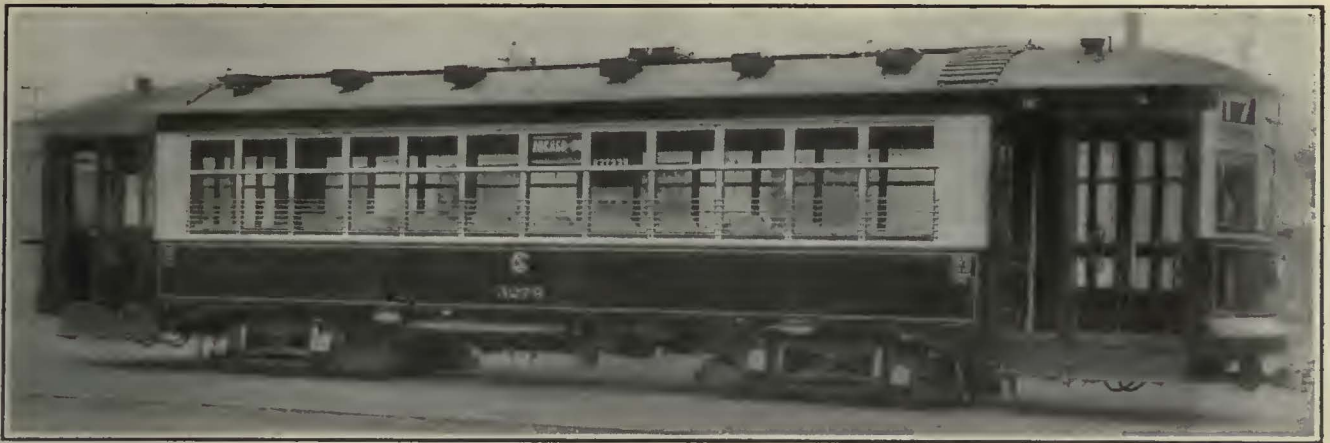
In connection with the purchase of this new equipment the company has sold to Dillon, Read & Company a new issue of \$1,900,000 equipment trust 5 per cent certificates which will be offered to the public shortly.

Electric Locomotive Shipments

December shipments of electric locomotives from principal manufacturing plants based on reports received by the Department of Commerce totaled 28 locomotives, as compared with 16 in November and 22 in December, 1925. Shipments for 1926 totaled 234 locomotives, as compared with 184 in 1925. The following table gives the shipments and unfilled orders of electric locomotives for each month since January, 1925:

ELECTRIC LOCOMOTIVES SHIPPED FROM PRINCIPAL MANUFACTURING PLANTS, 1925 AND 1926

Year and Month	Shipments			Unfilled Orders End of Month			Year and Month	Shipments			Unfilled Orders End of Month		
	Domestic	Foreign	Total	Domestic	Foreign	Total		Domestic	Foreign	Total	Domestic	Foreign	Total
1925							1926						
January	12	2	14	44	15	59	January	11	0	11	53	42	95
February	7	3	10	51	12	63	February	22	2	24	60	40	100
March	13	2	15	51	15	66	March	11	1	12	50	41	91
April	14	0	14	41	29	60	April	12	16	28	44	29	73
May	9	2	11	48	31	79	May	14	9	23	46	23	69
June	8	6	14	47	25	72	June	11	3	14	53	20	73
July	12	4	16	39	23	62	July	20	0	20	36	23	59
August	6	8	14	48	15	63	August	16	7	23	26	16	42
September	16	8	24	41	7	48	September	13	7	20	24	11	35
October	21	1	22	40	12	52	October	15	..	15	20	13	33
November	8	0	8	46	40	86	November	15	1	16	27	15	42
December	18	4	22	54	41	95	December	17	11	28	14	8	22
Total (year)	144	40	184	..	..	..	Total (year)	177	57	234	..	..	..



Chicago Surface Lines Now Operating 100 Cars of This Type Built by Three Manufacturers

Brill Completes Delivery of 33 Surface Cars to Chicago

Information has just been received from the J. G. Brill Company of Philadelphia that it has delivered the 33 cars which were ordered by the Chicago Surface Lines last May. These cars were part of an order for 100 which was divided between the Cummings Car & Coach Company of Paris, Ill., the Brill Company and the St. Louis Car Company, St. Louis. They are practically the same design throughout as the 100 cars purchased in 1924, and described in the *ELECTRIC RAILWAY JOURNAL*, issue of Nov. 15, 1924, page 837, and in the issue of May 27, 1926, page 908. The new cars are designed for multiple-unit operation, giving them the maximum flexibility between service of single two-man or one-man operation. Although general specifications for the entire order were carried in the *ELECTRIC RAILWAY JOURNAL* of May 22, 1926, specifications of the Brill order are appended as they differ to some extent from the original set as recorded in that issue:

Number of cars ordered.....	33
Date order was placed.....	May 13, 1926
Date of delivery.....	October 20, 1926
Builder of car body.....	J. G. Brill Co.
Type of car.....	Closed, 32 ft. 9 in.
Seating capacity.....	51
Weights:	
Car body.....	21,640 lb.
Trucks.....	11,470 lb.
Equipment.....	8,590 lb.
Total.....	41,700 lb.
Bolster centers, length.....	22 ft. 0 in.
Length over all.....	48 ft. 11 in.
Truck wheelbase.....	4 ft. 10 in.
Width over all.....	8 ft. 6 in.
Height, rail to trolley base.....	11 ft. 6 in.
Body.....	Steel and wood
Interior trim.....	Statuary bronze
Headlining.....	Agasote
Roof.....	Arch
Air brakes.....	General Electric
Axles.....	Carnegie
Bearings.....	Brill center, Stucki side
Bumpers.....	Channel
Car signal system.....	Consolidated
Car trimmings.....	Brill
Control.....	General Electric C-169
Couplers.....	Tomlinson
Curtain fixtures.....	Railway Supply & Curtains Co.
Curtain material.....	Fabrikoid
Designation signs.....	Electric Service Supplies Co.
Door mechanism.....	National Pneumatic
Wheelguards.....	H-B
Hand brakes.....	Dayton No. 35, drop handle
Heater equipment.....	Consolidated Car Heating Co.
Headlights.....	Trolley Supply Co.
Journal boxes.....	Brill
Lightning arresters.....	General Electric
Motors.....	Westinghouse 535A and GE-275-FI, outside hung
Paint.....	Chicago Varnish Co.
Registers.....	International R-10

Sanders.....	Electric Service Supplies Co.
Sash fixtures.....	Edwards
Seats.....	St. Louis
Seating material.....	Cane
Springs.....	Brill
Step treads.....	Kass
Trolley catchers.....	Ideal
Trolley base.....	U. S. No. 14
Trolley wheels or shoes.....	General Electric
Trucks.....	Brill 39-E
Ventilators.....	Railway Utility
Wheels (type and size).....	28 in. and 22 in. Rolled steel

Oil Output Increases 3,415 Barrels a Day

Crude oil production again showed an increase last week, the daily average output rising to 2,364,204 bbl., an advance of 3,415 bbl. from the preceding week, it was announced this week by the *Oil and Gas Journal*. This total compared with a daily average of \$1,915,960 in the corresponding week last year.

The jump is accounted for by increases in Oklahoma and California, production in the former state rising to 607,820 bbl. daily, compared with 597,825 last week and 443,540 in the corresponding week a year ago. California output rose to 653,500 bbl. from 648,500 last week and 611,000 a year ago.

The Texas Panhandle continued to recede and reductions were reported from many other fields.

The detailed production figures compare as follows:

	Jan. 29, 1927	Jan. 22, 1927	Jan. 30, 1926
Oklahoma.....	607,820	597,825	443,540
Kansas.....	115,815	117,710	98,985
North, Central, West Texas.....	236,443	232,065	162,080
Texas Panhandle.....	127,498	131,185	.....
East Central Texas.....	44,366	45,261	62,510
N. Louisiana.....	53,370	53,630	43,410
Arkansas.....	128,950	130,830	159,500
Gulf Coast.....	160,950	171,613	98,820
Southwest Texas.....	39,337	39,830	39,025
Rocky Mountain area.....	89,155	85,090	97,460
Eastern.....	107,000	107,250	99,600
California.....	653,500	648,500	611,000
Total.....	2,364,204	2,360,789	1,915,960

Kansas City Citizens Petition Council for Track Extensions

A petition signed by 600 citizens was filed with the City Council of Kansas City, Mo., asking that the Kansas City Public Service Company be permitted to extend its Jackson Avenue car line from 24th Street South to 39th Street. A provision of the railway franchise provides for this extension, and it is thought that the petition will be given

consideration by a special committee now conducting negotiations for the new franchise.

New Booklet Contains Valuable Track Data

Paved-track data are presented in an attractive manner in a looseleaf book just issued by the International Steel Tie Company of Cleveland, Ohio. The book is prefaced by excellent color reproductions of oil paintings depicting the manufacture of steel in Cleveland's industrial center.

Some historical facts are presented leading up to the greater use of steel ties in trackwork and the modern conception of their economy in the paved track of today. Many pages are devoted to the details of the twin tie featured by this company, and drawings are reproduced showing not only many typical track sections, but special construction and features relative to the product and uses to which it is placed.

Cost data collected from many actual jobs is detailed and presented on a unit foot basis. Interspersed with engineering and cost facts are many photographs and excerpts from technical magazines showing work in progress and opinions or descriptions of men prominent in the railway industry.

An interesting feature of the track notebook is the report of an investigation made by D. D. Ewing, consulting engineer and professor of electrical engineering, Purdue University, on the noise produced by cars operated over various types of track. Tests were made by Professor Ewing in Cleveland, Ohio, Schenectady, N. Y., and Harrisburg, Pa., in which noise and also vibration were measured by means of an inverted radio receiving set.

Conclusions of Professor Ewing based on the tests made in these three cities are that the type of tie has no appreciable effect on the noise incident to car operation, and also that noise is a function of car speed. Data and charts measuring the noise in the several tests are reproduced.

The book closes with several tables of standard and special handbook data. The looseleaf feature allows of the continuing growth of the book as additional sheets are sent out by the company or by the addition of individual notes.

Haskelite Products Standard for Cars, Says Fitzpatrick

Writing in *Industrial Marketing* for January, 1927, James R. Fitzpatrick, secretary and director of sales of the Haskelite Corporation of Chicago, gives a graphic account of how his company was forced to seek other fields when ten days after the armistice orders on its books for airplane equipment amounting to \$1,080,000 were canceled. Of particular interest is Mr. Fitzpatrick's outline of the reasons which led the company to invade the electric railway field. "It is generally accepted as true by practical street railway operators," he writes, "that it costs 6 cents a pound per annum to operate a street car, exclusive of passenger load. For a number of years the engineers of this field had been endeavoring to procure a light-weight street car. We decided this was our field.

"The result of our tests and efforts is that Haskelite products are today accepted as the standard in street car construction. A 3/4-in. Haskelite roof replaces a 3/4-in. or 1/2-in. lumber roof; a 1/8-in. or 1/4-in. Haskelite panel replaces a 3/4-in. composition board headlining; a 1/2-in. Haskelite panel replaces solid lumber for interior trimmings; a 3/4-in. Haskelite plywood floor replaces the 1 1/2-in. solid lumber floor; a 1/8-in. plymetl replaces 12 to 16-gage steel for outside panels."

According to Mr. Fitzpatrick, the Chicago Surface Lines, Pittsburgh Railways, Detroit United Lines, Los Angeles Railways, Chicago & North Shore, Market Street Railway of San Francisco and Grand Rapids Railway are some of the large operators who make free use of Haskelite plymetl in the manufacture of their cars. Mr. Fitzpatrick also states that the company's products are standard in the manufacture of buses by the American Car & Foundry Company, Yellow Coach, Mack International, Garford Motor Company, the Six Wheel Company and others.

Rolling Stock

Reading Rapid Transit Company, Reading, Pa., has recently turned out another steel-framed car of the "800" type from its shops. Another car of this type is at present under construction and will be ready for service within a few weeks.

Cleveland Railway, Cleveland, Ohio, has approved a program of expenditures totaling \$2,050,000. Among the items included are new cars and buses to the probable extent of 100 cars and 25 buses.

Key System Transit Company, Oakland, Cal., spent upward of \$400,000 in trackwork in Oakland, Cal., during 1926, according to the company's report, just released. Forty new cars of the 900 type were added to the rolling stock and this type is now standard for the system. Twenty-seven new buses also were purchased at a cost of \$238,997. The total expenditures for improvements during 1926 are set at nearly \$4,500,000.

Milwaukee Electric Railway & Light Company will shortly commence the construction of de luxe coaches for its new Burlington-East Troy service. They will be built in the company's shops and along the same lines as those now in use on the Milwaukee-Waukesha-Watertown rapid transit line.

Shops and Buildings

Portland Electric Power Company, Portland, Ore., has completed improvements of its Jefferson substation which was started in 1925. The work involved an expenditure of about \$250,000 and consisted of a 34x100 ft. extension which was erected while the plant was in constant operation. Provision has been made for housing 15,000 kw. in primary distribution transformers, 3,000 kw. in railway rotary converter transformers, switching equipment, distribution feed regulators, and a water cooling system for the transformers, etc. The station supplies some of the west side overhead feeders and also current for the underground feeders in the downtown district.

Illinois Traction System, Peoria, Ill., has sold to the Union Electric Light & Power Company, subsidiary of the North American Company, its Venice, Ill., power plant. Under the terms of the sale contract the Illinois Traction Company will purchase power from the Union Electric for a period of twenty years. The Illinois Traction Company is affiliated with the Illinois Power & Light Company, which operated the Venice plant. The Venice power plant is at the east end of the McKinley Bridge over the Mississippi River. It was built about twenty years ago, but within the past two years it has been modernized.

Trade Notes

Armco Culvert Association is the new name for the Armco Culvert & Flume Manufacturers' Association, effective Jan. 1.

Oil Jack Company, Inc., New York City, manufacturer of the Pederson "oiljack," is now located at 15 Park Row, having formerly had general offices in 110 West 40th Street.

Metal, Coal and Material Prices

Metals—New York		Feb. 1, 1927
Copper, electrolytic, cents per lb.	.....	12.75
Copper wire, cents per lb.	.....	15.125
Lead, cents per lb.	.....	7.40
Zinc, cents per lb.	.....	6.92
Tin, Straits, cents per lb.	.....	66.50
Bituminous coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	.....	\$5.075
Somerset mine run, Boston, net tons	.....	2.525
Pittsburgh mine run, Pittsburgh, net tons	.....	1.95
Franklin, Ill., screenings, Chicago, net tons	.....	1.875
Central, Ill., screenings, Chicago, net tons	.....	1.425
Kansas screenings, Kansas City, net tons	.....	2.35
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	.....	\$5.50
Weatherproof wire base, N. Y., cents per lb.	.....	17.00
Cement, Chicago net prices, without bags	.....	2.10
Linsed oil (5-bbl. lots), N. Y., cents per lb.	.....	10.9
White lead in oil (100-lb. keg), N. Y., cents per lb.	.....	14.50
Turpentine (bbl. lots), N. Y., per gal.	.....	\$0.82

Chicago & Northwestern Railroad has just ordered 120 Hyatt roller-bearing equipped cars. This, it is understood, is the largest order for roller bearings on record from the railroad field. The Hyatt company also reports that the Rock Island Railroad recently started an extensive test program on fifteen cars, specifying Hyatt roller bearings in connection with the experiments.

Relay Motors Corporation, recently incorporated to take over all assets of the Commerce Motor Truck Company of Ypsilanti, Mich., and Service Motors, Inc., Wabash, Ind., has announced the following officers for the amalgamated company: W. R. Bassick, chairman of the board of directors; G. L. Gillam, president; M. A. Holmes, vice-president; A. K. Cabel, secretary and treasurer; E. W. Bassick, director of policies. The new company will still manufacture the relay drive for trucks, which it considers one of the leading developments in the truck and bus fields.

A. B. Foster Company has recently opened its Chicago office at 231 La Salle Street, in charge of R. A. Foster, vice-president of the company.

Elliott-Fisher Company has acquired the business of the Sundstrand Corporation, manufacturer of Sundstrand adding, bookkeeping and calculating machines, with factories and general offices at Rockford, Ill. The Elliott-Fisher Company manufactures accounting-writing machines and has factories at Harrisburg, Pa., and general offices in New York. The latter company desired to supplement its line with equipment for the adding-bookkeeping field, and for that reason acquired the Sundstrand organization. The products of the two constituent organizations will be marketed by the General Office Equipment Corporation, a subsidiary of the Elliott-Fisher Company. The same officers of the General Office Equipment Corporation continue in the management of the organization, with executive and general sales offices at 342 Madison Avenue, New York.

The White Company, Cleveland, Ohio, announces a new sales district organization for its motor truck and buses with headquarters at 1045 Atlantic Avenue, Brooklyn, N. Y., as the result of separating the Brooklyn territory from the New York district. William McDaniels, formerly Brooklyn division manager, has been appointed district manager, and F. H. Laning, formerly of the home office in Cleveland, assistant district manager.

H. T. Heath, who is well known in the electric railway and automotive field of the Middle West, is now with the Illinois Motive Equipment Company, Chicago, Ill. Mr. Heath will handle sales and service of Johnson fare boxes in the Middle West. He was formerly connected with the Electric Devices Company, Hageman-Castle Corporation, Westinghouse Electric & Manufacturing Company and the Detroit Railway Supply Company.

Arthur F. Connally, formerly connected with the Goodrich Tire Company, has accepted the vice-presidency of the Millisco Advertising Agency, with headquarters in 1 Park Avenue, New York City.



Interior of Modern Cars of Chicago & Joliet Electric Railway

Modern Car Platforms Require—

“Peacock” Staffless Brakes!

Reg. U. S. Pat. Off.

That is one of the many reasons why they are included in the specifications of nearly all modern cars!

Note in the above illustration the small platform space occupied by the Peacock Staffless at the left of the motorman's seat.

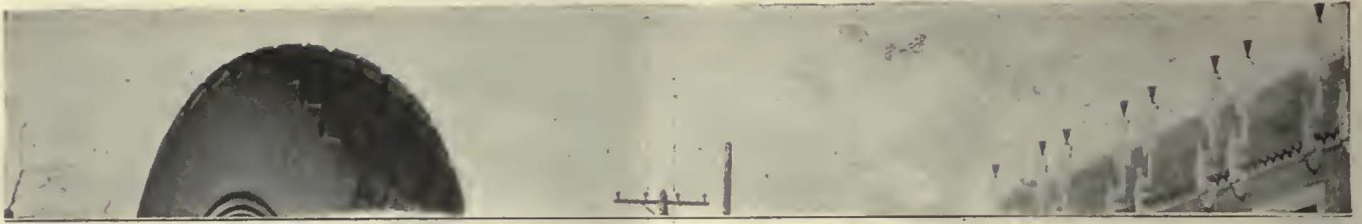


They have three times the braking capacity of ordinary hand brakes,—almost unlimited chain winding capacity—144 inches if necessary—low installation and maintenance cost, simplicity of operation and are preferred by motormen.

There are many other factors that especially adapt Peacock Staffless Brakes to the most modern cars. May we tell you about them?

NATIONAL BRAKE CO., Inc.

Buffalo, N. Y.



What SUPERTWIST Adds to Goodyear Tires



One of the 100% Goodyear-equipped motorbus fleet of Chicago and West Towns Railway Company

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

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

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

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

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

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

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

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

Goodyear Means Good Wear

GOODYEAR



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“It is the easiest job to drive I have ever handled”

W. L. PLATTER, of Platter & Baldwin, Rockville, Indiana, owners of the Indianapolis-Rockville-Clinton Bus Line *knows* busses and the value of proper equipment. Daily observation of various types of busses entering and leaving the great Indianapolis terminal enables him to determine the relative value of motor busses.

Because of this, his following statements concerning his Studebaker busses are well worth regarding.

“On the run between Indianapolis and Clinton, a distance of 81 miles, road conditions in some seasons are none too good. Mud, snow, steep hills and sharp curves all exert certain handicaps but the easy driving qualities and ample power of the Studebaker motor enables us to maintain our schedules without excessive driver fatigue.

“This line is showing a good profit even at seasons when travel is naturally light and this is because our Studebaker busses are most economical to operate and their fine appearance plus their easy riding qualities attract and hold our patronage.”

These remarks are typical of the many reports received from every section of the country where Studebaker busses, operating independently or as feeders to traction lines, are popular, profit producing units.

Most Powerful Bus Chassis of Its Size and Weight

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

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

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

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

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

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

*Includes dual rear wheels

THE STUDEBAKER CORPORATION OF AMERICA
Dept. B, South Bend, Ind.
Send me full information on Studebaker Busses without obligation

Name.....
Address.....
City..... State.....
We have..... busses at present.
Check below the Studebaker Bus about which you desire information.
Type: Sedan..... Parlor Car..... Street-Car Type.....
Capacity:..... Passengers.



New York KNOWS—

WINTER snows bring the peak-load in metropolitan street-cleaning; with interrupted food distribution, increased fire risk, hampering of business. It is no time for uncertainties in equipment. New York City *knows*.

Timken Axles were an important factor in New York's recent selection and purchase of 189 GMC Trucks—7-ton and 5-ton—equipped with Timken Axles, front and rear.

Experienced truck and coach operators know that Timken Axles are good assurance of uninterrupted service, mechanical reliability, low upkeep.



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

TIMKEN AXLES



The Coffin Award, made to the Penn-Ohio System, Youngstown, Ohio, "for distinguished contribution to the development of electric transportation for the convenience of the public and the benefit of the industry."



Recognition

NOT one single excellence—but many excellences—bring that coveted thing: recognition. How is recognition achieved? In the public utilities field, it's a question of *choice*—choice of those elements which go into the making and operation of street railway equipment which stand for the best, each element the best in its field of usefulness.

The Penn-Ohio System, for the street railway cars illustrated, chose Duco as the material with which their cars were to be finished. Duco was one—of the many—excellences that made for the *excellence of the complete unit*—Duco helped in achieving that recognition!



There is only ONE Duco
—DU PONT Duco

Duco is the correct finishing material for railway equipment. For information write to the E. I. du Pont de Nemours & Co., Inc., Chemical Products Division, Parlin, N. J., Chicago, or San Francisco.



Why bus owners are turning to Kelly-Springfields

OF course we don't claim that every Kelly Heavy-Duty Cord will give such remarkable service, but we do know—and letters like these prove it—that Kellys have unusual mileage built into them. Bus owners are finding that Kellys give them less trouble and more mileage than other bus tires they have used. Kellys on your busses will lower tire costs and make tire changing much less frequent.

Acme Coach Line

Cadillac, Michigan

June 3rd, 1926.

Kelly-Springfield Tire Co.,
5900 Cass Ave.,
Detroit, Mich.

ATTENTION Mr. C. D. Cole

Gentlemen:-

I noticed your ad in the June issue of Bus Transportation in which you featured our Acme Coach showing front Kelly-Springfield tires, which had run over 48,995 miles.

Wish to state that both of these tires went well over 50,000 miles, one going 51,700 miles and the other 59,665 miles. This certainly is exceptional mileage over gravel roads which often times are badly rutted from thawing and freezing and no time too smooth.

Believing your Company will continue to make the same high class tires that they have in the past. I am,

Very truly yours,

L. B. Donnelly

73

BUS TRANSPORTATION

June, 1926

Look good for another 10,000 after running almost 50,000 miles

Acme Coach Line
Cadillac, Michigan Feb. 18th, 1926.

Kelly-Springfield Tire Co.,
5900 Cass Ave.,
Detroit, Mich.

Gentlemen:-

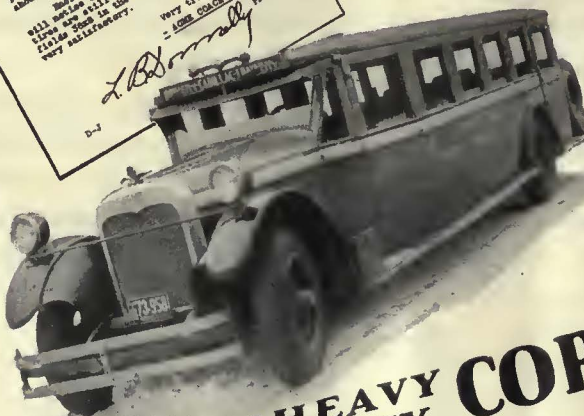
Our Acme bus has been driven 48,995 miles over heavy duty rough gravel roads and has front Kelly-Springfield tires on it and has run over 50,000 miles since, and has never had the air out of it.

These tires look like they are good for 10,000 miles more and I wish to purchase my company an additional set of Kelly-Springfield tires which are made in the U.S.A. and made for average road wear. I have about 20 miles per year.

Believe me please, in what you will advise the bus line, I will adapt the Kelly-Springfield tires and they are proving very satisfactory.

Very truly yours,
L. B. Donnelly
- ACME COACH LINE -

Kelly-Springfield Tire Co.
250 West 57th Street, New York, N. Y.



KELLY HEAVY DUTY CORD

Once a bus owner has tried Kelly Heavy - Duty Cords after using other makes, he usually standardizes on Kellys as exclusive equipment. Such letters as the one printed above tell their own story and need no comment from us.

KELLY - SPRINGFIELD TIRE COMPANY
250 WEST 57th STREET
NEW YORK, N. Y.

a.c.f.
Hall-Scott



60
horsepower
90
horsepower



90

Horsepower

Both are Hall-Scott Sixes

ALL the genius which originated the low-swung parlor car type of coach is now also available in a coach of more moderate size. It means that today every operator of full-fledged buses may have the benefit of Q. C. F. responsibility and Q. C. F. universal mass transportation experience, bringing many definite extra measures of value.

Q. C. F. resources and high standing guarantee a degree of responsibility which protects each coach through every mile, and throughout all the years that it will serve you.

All Q. C. F. engineering facilities have been intensively applied to still higher development of the coach which started the era of automotive mass transportation. As a result Q. C. F. coaches are capable of lowest-cost car miles, and their attractiveness to the public is also an assurance of the most passenger miles per car.

The Right Foundation

The reasons for Q. C. F. maintenance economy and high total mileage are nowhere more apparent than in the chassis frames themselves. Extreme low suspension, achieved on a practical basis, contributed largely to the early sensational success of the safety coaches now manufactured by American Car and Foundry Motors Company. Today these frames represent doubtless the most exhaustive engineering in bus history.

The power plant, drive and body are entirely free from the effects of frame distortion. Operators are permanently protected from risk and cost in connection with frames.

Q. C. F. Hall-Scott Power

Conceded to be one of the finest power plants ever developed, the 90 h. p. Q. C. F. Hall-Scott engine has long been standard for the larger Q. C. F. coach of 230-inch wheelbase. Specialized coach engineering and extreme economy are apparent in countless points of Hall-Scott design. The entire valve mechanism, including the camshaft, is carried by the cylinder head. All valve work is bench work; a spare head carried on hand prevents lay-ups for valve work. Cylinder block design is so simplified, that instead of laying up a vehicle for regrinding, it is often more economical to install a spare block.

The hardest alloy steel crankshaft manufactured for gas engines is employed, and the bearings are fitted by an automatic method—with usual care 50,000 miles or even 100,000 miles of faultless operation may be expected from Hall-Scott motors before they require anything but routine attention.

A New Hall-Scott Creation

Carburetion, combustion and lubrication also benefit by Hall-Scott science,

60 Horsepower

— and both are by Q.C.F.

which has now been applied to a smaller engine—the 60 h. p. Q. C. F. Hall-Scott motor, for the new Q. C. F. coach of 198-inch wheelbase. With a displacement of 332 cubic inches, the latest Hall-Scott achievement makes possible more than 60 horsepower at only 1800 r.p.m. Long life and economy are apparent. Yet there is all the power and agility to enable Q. C. F. coaches to get under way with “flashy” cars, and hold a pace which permits unequaled daily schedules.

Hall-Scott power in buses of moderate size is truly an opportunity for operators. Types of vehicles which have been “converted” or “adapted” from other automotive fields need be acceptable no longer. For the first time a smaller chassis assures all the comprehensive, specialized, creative engineering which first brought about high-speed, long-distance luxury travel by motor.

Chassis Equally Advanced

Vibration, dilution and other possibilities of wear and trouble are literally *designed out* and permanently kept out of Q. C. F. Hall-Scott engines. Rubber mounting and similar devices to keep vibration merely from being felt are unnecessary. Just so, all the elements of safety, comfort, endurance and economy are inherent throughout the design.

The long, wide, flat springs, made to work far under the critical limits, provide highest protection for passengers, body and chassis. Specially developed 4-wheel brakes, automatic chassis lubrication, carefully worked out driving control, and a host of other betterments typify the advancements to be expected in latest Q. C. F. models.

16-Passenger Parlor Car

21-Passenger Street Car

Joined to the value of Q. C. F. mechanical excellence there is always the fact that appearance, comfort and reputation have earned public preference for these coaches. That is why Q. C. F. coaches have often replaced others and produced extra revenue which previously did not seem to exist in those particular territories!

If you have thought Q. C. F. success associated only with larger coaches, investigate the smaller chassis in the 16-passenger parlor car type and 21-passenger street car body. These buses command consideration before any equipment order is placed.



AMERICAN CAR AND FOUNDRY
MOTORS COMPANY

30 CHURCH STREET, NEW YORK

FACTORIES: DETROIT, MICHIGAN
and BERKELEY, CALIFORNIA



A.C.f. Mechanical Drive

The chassis of 230-inch wheelbase is available with 29-Passenger and 31-Passenger Street Car bodies; with 26-Passenger Parlor Car body and with 60-Passenger Fully-Enclosed Double-Deck body.

The chassis of 198-inch wheelbase is available with 21-Passenger Street Car body and 16-Passenger Parlor Car body.



A.C.f. Gas-Electric Drive

The Gas-Electric chassis of 230-inch wheelbase is available with 29-Passenger and 31-Passenger Street Car bodies; and with 60-Passenger Fully-Enclosed Double-Deck body.

Write for complete specifications. Upon request the A. C. f. Transportation Staff will serve you broadly in connection with any coach transportation problem.



AMERICAN CAR AND FOUNDRY MOTORS COMPANY
30 CHURCH STREET, NEW YORK

FACTORIES: DETROIT, MICHIGAN *and* BERKELEY, CALIFORNIA



Long Products - Automotive Clutches and Radiators



Accurately engineered and proven in its worth, the Long Clutch makes for the utmost in smooth, silent clutch operation.

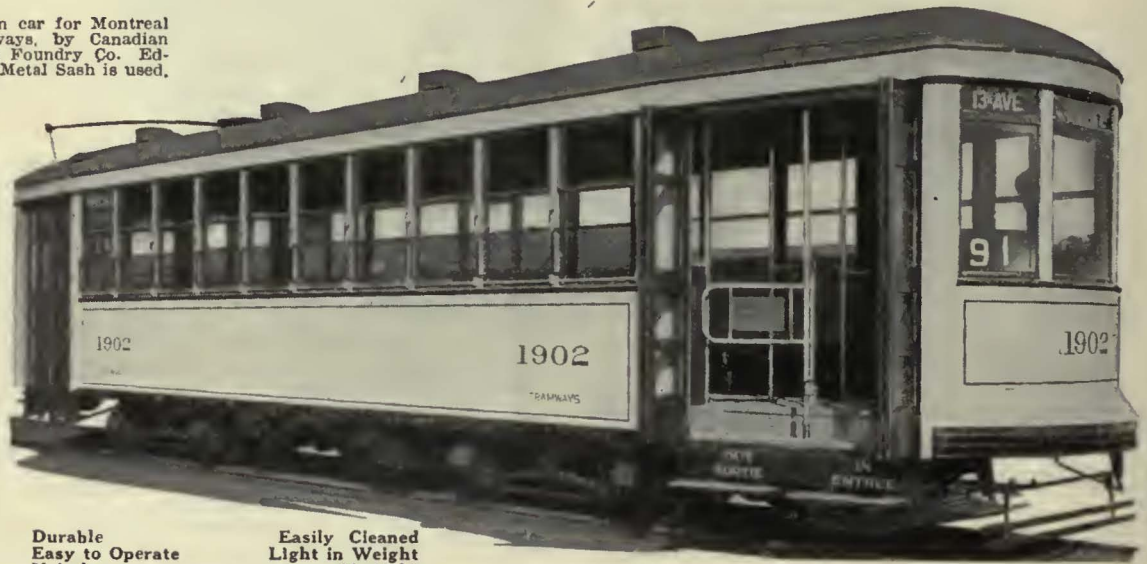
We are offering you this service.

THE LONG MANUFACTURING COMPANY
DETROIT MICHIGAN

LONG

DO MAKE A DIFFERENCE in *winning* good will

Modern car for Montreal Tramways, by Canadian Car & Foundry Co. Edwards Metal Sash is used.



Durable
Easy to Operate
Noiseless

Easily Cleaned
Light in Weight
Air-tight



YOU can measure the future of your operations by the extent to which you modernize your equipment.

Edwards Metal Sash wins good will because it meets the modern trend in car design.

Old-fashioned, noisy, drafty, heavy, fist-defying windows are replaced in Edwards construction with modern, silent, air-tight, smooth-sliding metal sash that gives a maximum of clear vision.

Car builders can furnish Edwards Metal Sash in a type to fit your needs. Specify it on your next order, and ask us to send you your copy of our Catalog S which describes all types of Edwards Metal Sash.

O. M. EDWARDS COMPANY
SYRACUSE, N. Y.

New York

Chicago

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

Edwards Metal Sash

101 YEARS OF MANUFACTURING EXPERIENCE

Snow sweeper rat-tan and cane webbing may be ordered through any H-W sales office.



HEYWOOD-WAKEFIELD SEATS
CHOSEN AFTER PRACTICAL
TEST

TO offset the inroads made by busses, a mid-western Electric Railway Company (name on request) determined to increase the attractiveness and comfort of its cars. Sample cars, equipped by three seat manufacturers, were operated in a six months' practical service test.

The above installation of our seat No. 55-P, without arm rest and with attractive grip rail, was selected by the public and the company as the most handsome, comfortable and practical.

Our car seating experts will be glad to help in selecting the seats best suited to your needs. This service is free, without any obligation on your part, through any Heywood-Wakefield sales office.

If you have not received a copy of our new Bus Seat Catalogue, write for it.



Heywood-Wakefield
REG. U.S. PAT. OFF.

Heywood-Wakefield Co., Wakefield, Mass.
 Heywood-Wakefield Co., 516 West 34th St., New York, N. Y.
 Heywood-Wakefield Co., 439 Railway Exchange Bldg., Chicago, Ill.
 Frank N. Grigg, 630 Louisiana Ave., Washington, D. C.
 Herbert G. Cook, Hobart Bldg., San Francisco, Calif.
 The G. F. Cotter Supply Co., Houston, Texas
 The Railway and Power Engineering Corporation,
 133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada



Get All Your Money from Fares Sold

For Use On—

- Electric Railways
 - Steam Railways
 - Motor Coaches
 - Ferries
 - Excursion Boats
 - Steamships
 - Toll Bridges
 - Ticket Offices
- Wherever fare protection is needed.



- ## 10

Big Features

 1. Prints and issues complete ticket.
 2. Prints untamperable duplicate record of each ticket inside the register.
 3. Eliminates preprinted tickets.
 4. Enforces proper accounting of every ticket sold.
 5. Removes temptation.
 6. Stops carelessness.
 7. Protects passengers.
 8. Makes inspection easier.
 9. Eliminates detail work in auditor's office.
 10. Compact, light weight, portable, low cost

Ohmer Fare Reg. Co. Dayton, Ohio	THE PEOPLES TRANSP. CO. GOOD ONLY FOR ONE CONTINUOUS PASSAGE BETWEEN STATIONS AS INDICATED BY ARROW FROM TO DATE: 1 1 1 1 FARE CLASS NUMBER	PLEASE RETURN TO OPERATOR UNFOLDED ON ARRIVAL AT DESTINATION Reg. No. 217
NOV 10 28	3 N 15 \$0.55	HF 9 9 3 3

2
RECORDS
ALIKE

IDENTIFICATION	AMOUNT	CLASS	CONSECUTIVE	REGISTER NO.
MONTH	DAY	YEAR	FROM	TO
2 NOV	10 28	5 N 8	\$0.15	SCH 9 9 3 5 217
2 NOV	10 28	4 N 10	\$0.55	9 9 3 4 217
2 NOV	10 28	3 N 15	\$0.55	HE 9 9 3 3 217
2 NOV	10 28	3 N 15	\$0.00	RT. 9 9 3 2 217
2 NOV	10 28	2 N 12	\$0.00	TIC 9 9 3 1 217
2 NOV	10 28	2 N 10	\$0.80	9 9 3 0 217
2 NOV	10 28	1 N 99	\$3.75	9 9 2 9 217
2 NOV	10 28	1 N 0	\$0.00	9 9 2 8 217
17 NOV	10 28	0 N 0	\$0.00	9 9 2 7 217

- Use this NEW Ticket-Printing Fare-Protecting Register!

THE New Ohmer Ticket-Printing Register, Type 79, absolutely enforces a correct accounting of every fare sold. It instantly stops the leaks and losses that cost transportation companies enormous sums. Where this new fare-protecting register is used, mistakes, carelessness, and dishonesty are practically eliminated. If any exist, they are immediately detected and responsibility fixed. You know at the end of each trip just how much money you should receive. And you will get that much money or know the reason why.

The Ohmer Ticket-Printing Register, Type 79, prints and issues tickets as sold. A duplicate untamperable record of each of these tickets is printed and locked up inside the register. This record is automatically and instantly made as the ticket is issued—a record that safeguards your interests from the time the ticket is sold until the money is turned in to the cashier.

OTHER OHMER PRODUCTS

- Fare Registers
- Fare Boxes
- Printing Taximeters
- Atco Taximeters
- Odometers
- Hub Odometers
- Recordographs

Regardless of the kind of transportation you are selling, the use of this register will result in a tremendous saving for you. Let us send you the proof. Let us show you how it will eliminate detail work, stop losses, and

increase profits—all at a cost that is surprisingly low. A letter or wire will bring you complete information without obligation of any kind.

OHMER

REG. U.S. PAT. OFF.

Transportation Recording Devices

OHMER FARE REGISTER COMPANY
Dept. Y DAYTON, OHIO, U. S. A.

PUT TRANSPORTATION ON A BUSINESS BASIS



Standardize on comfort —for both car and bus seats

Though the type of service on both car and bus varies—from urban to suburban to interurban—comfort can tie them all together, can give them a common basis on which to attract the riding public.

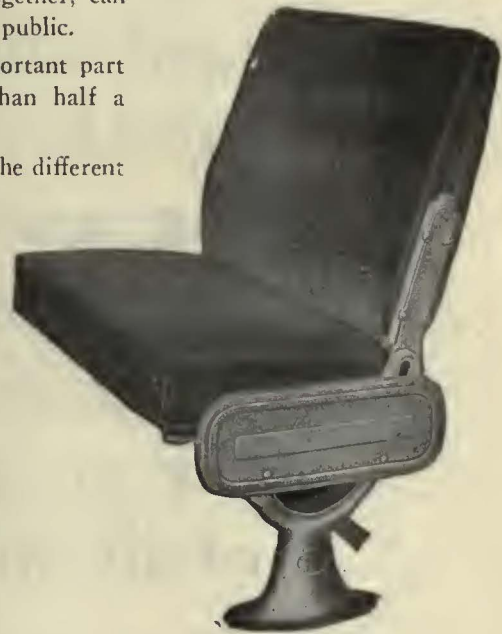
In this connection Hale-Kilburn Seats play an all-important part—for their luxurious comfort is the result of more than half a century's seat-making experience.

Ask for our catalogs to get complete information about the different types.



**Bus Seat
Type 208**

Designed with divided back and spring cushion and air cushion pads, this is an exceptionally graceful and comfortable double chair for DeLuxe service.



**Car Seat
Type 199-F**

Built with plush upholstered spring edge cushion and detachable back, this inexpensive but comfortable seat is well adapted for suburban and light-weight interurban cars.

HALE-KILBURN COMPANY

General Offices and Works: 1800 Lehigh Avenue, Philadelphia

SALES OFFICES:

Hale-Kilburn Co., 30 Church St., New York
Hale-Kilburn Co., McCormick Bldg., Chicago
K. A. Thornwell, Candler Bldg., Atlanta

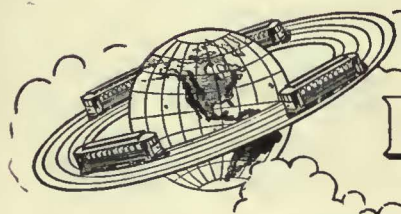
Frank F. Bodler, 903 Monadnock Bldg.,
San Francisco
Chris Eccles, 329 S. San Pedro St., Los Angeles
T. C. Coleman & Son, Starks Bldg., Louisville

W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
W. D. Jenkins, Carter Bldg., Houston, Texas
H. M. Euler, 46 Front St., Portland, Oregon



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

Creating and protecting our mutual interest is a costly item.



Barron G. Collier

INCORPORATED
CANDLER BLDG. NEW YORK



THIS de luxe car of the Columbus, Delaware & Marion Electric Company is equipped with "STANDARD" Rolled Steel Wheels.



Rolled Steel Wheels

Quenched and Tempered Carbon Steel Axles

Armature Shafts]

Coil and [Elliptic Springs

STANDARD STEEL

WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

Chicago
St. Louis
New York

Portland, Ore.
Richmond, Va.
San Francisco

St. Paul, Minn.
Pittsburgh, Pa.
Houston, Texas

WORKS: BURNHAM, PA.



Lubricate and Protect Gears and Pinions with TEXACO CRATER COMPOUND

Texaco Crater Compound has the faculty of clinging to gear teeth despite speed and pressure so that constant effective lubrication is secured at all times.

This lubricant stands up well under temperature conditions and due to its length of life it insures economical lubrication.

It prevents wear, thus increasing the life of the gears and pinions.

It has the same high quality that is daily increasing the demand for the rest of the Texaco Lubricants for electric street railways.

We shall be glad to make a complete survey of your line and make specific recommendations. No obligation is involved. We are glad of the opportunity to demonstrate our ability to assist you.

There is a Texaco Lubricant for Every Purpose



THE TEXAS COMPANY
DEPT. R-J · 17 BATTERY PLACE · NEW YORK CITY
HOUSTON · CHICAGO · NEW YORK
OFFICES IN PRINCIPAL CITIES





“BOYERIZE to ECONOMIZE”

Improved practice pays! Boyerized Car Parts represent improved and modern practice! They cut operating expenses, (even though they cost a trifle more) because they outlast ordinary steel parts three to four times.

The real saving comes when frequent replacements are eliminated, costly labor minimized, break-downs reduced and accidents prevented.

Equip one of your cars with Boyerized Parts. Try them under any conditions and note their ability to stand up under the most severe service strains.

Pick the items you need from the following list. Then send for quotations.

Brake Pins	Side Bearings
Brake Hangers	Chafing Plates
Brake Levers	Manganese Brake Heads
Bushings	Manganese Truck Parts
Center Bearings	McArthur Turnbuckles

Bemis Car Truck Company

Electric Railway Supplies
Springfield, Mass.

Representatives:

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

Where Safety is Paramount and Appearance is Appreciated

"NATIONAL"

Electric Line POLES

are generally used because

First:

Their great strength and the ductile quality of the steel offer maximum protection both to the company and the public.

Second:

They do not detract from the appearance of the finest street; they present a neat appearance and are unobtrusive in the most beautiful surroundings.

Third:

They economize space, which is always desirable and often quite necessary.

Fourth:

Experience of street railways with their overhead construction points to less interruption, lower up-keep, greater reliability and longer life for these poles.

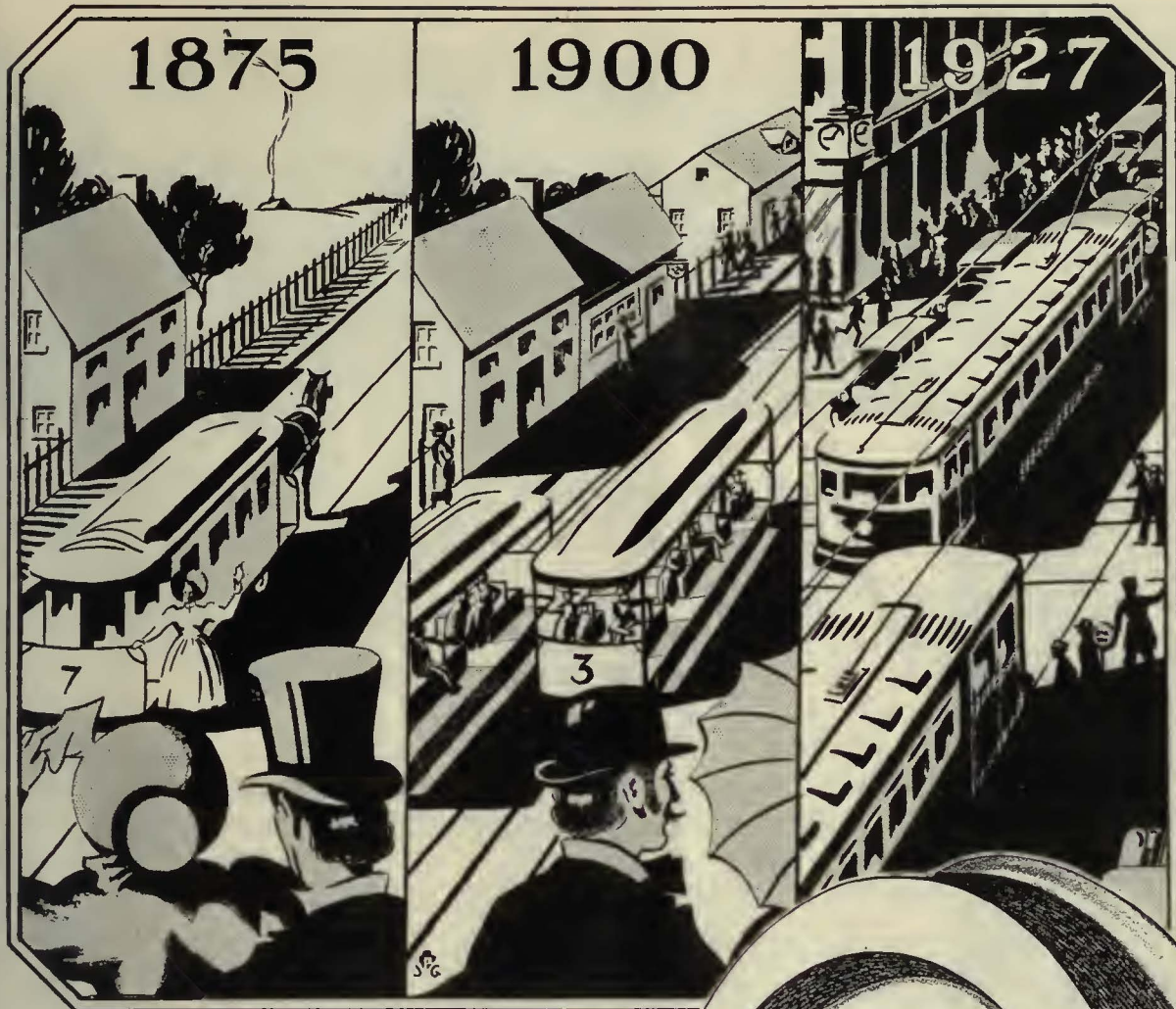
Specify "NATIONAL" Poles, made by the largest manufacturer of Tubular Products in the world, with facilities for meeting a wide range of specifications in pole construction.

NATIONAL TUBE COMPANY

Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES IN THE LARGER CITIES





*Growing . . . Growing . . .
Growing*

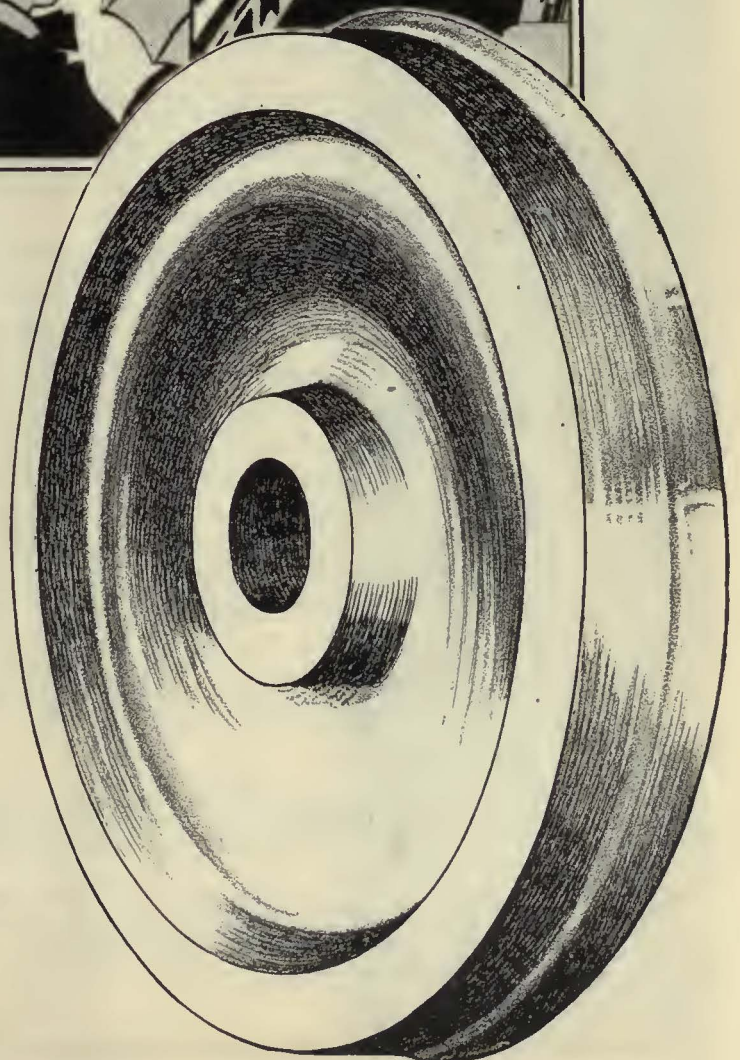
Year by year metropolitan population grows larger, more active, more congested. . . . Year by year, as a result, greater and still greater demands are made upon transportation.

How the electric railway industry has met these demands is best indicated by the rapid evolution from the horse car and cable car era to the era of the big comfortable cars of today.

While it is the coach of the electric car that carries the passengers, it is the *wheels* that carry the coach, . . . Gary Wrought Steel Wheels are especially designed to meet the strenuous demands of present day traffic conditions.

Illinois Steel Company

General Offices:
208 South La Salle Street
Chicago, Illinois





America's Permanent Lumber Supply

Forever...

*a permanent lumber supply
for electric railways*

WEST of the Rocky Mountains is more timber that will make lumber than *all* of the lumber that has been manufactured in the states of Maine, New Hampshire, Vermont, Massachusetts, New York, Pennsylvania, Michigan, Wisconsin and Minnesota since the Revolutionary War. The greater portion of this enormous forest wealth is concentrated in the Douglas Fir forests of the Pacific Northwest—where prolific natural reforestation assures a continuous lumber supply.

Now and forever the Douglas Fir forests of the West Coast will answer the call of America's railways for lumber and big timbers that are strong, stiff and durable; that resist warping and checking; that are light in weight.

Every electric railway structural grade, together with special sizes and lengths, always can and always will be furnished *on grade* promptly.

Douglas Fir is a superior material for car floors, furring, roofs and trolley boards, because of its strength, stiffness and durability and the large clear sizes (all heartwood if necessary) in which it can be obtained. Ties, trestles, waiting shelters, stations, poles, cross-arms, etc., in fact any structure or equipment of wood is stronger and more resistant to weather when of Douglas Fir.

Specific information in support of these statements will be furnished on request. *Address*, West Coast Lumber Bureau, 5562T Stuart Building, Seattle, Washington.

*Typical forest monarchs
of the Pacific Northwest
Photos by Cress, Seattle*

Durable
Douglas Fir
*America's Permanent
Lumber Supply*

Important West Coast Woods

Douglas Fir - West Coast (Sitka) Spruce - West Coast Hemlock - Western Red Cedar

W110R



What Wrought Steel means to wheel users

Carnegie Wheels are made of wrought steel—homogeneous structure obtained after the steel has been thoroughly rolled, hydraulically forged under 10,000 ton presses and then rolled again. There is no possibility of sand spots, blow holes or any irregularity that might cause fracture. In the steam railroad field, Wrought Steel Wheels are specified under passenger cars and pullmans—where safety is essential. Under street cars they will give that same safety.

Carnegie Wrought Steel Wheels are "multiple-wear" wheels—meaning that when ordinary wheels are ready for the scrap pile, multiple-wear wheels are getting their second wind. The cost of turning or contour conditioning is trifling compared to the cost of a new wheel.

"Carnegie" stamped on a wheel is a synonym for economical wheel service.

Booklet on Request.

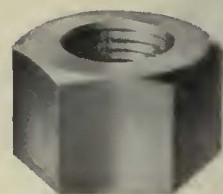
CARNEGIE STEEL COMPANY

General Offices • Carnegie Building • 434 Fifth Avenue

PITTSBURGH PENNSYLVANIA

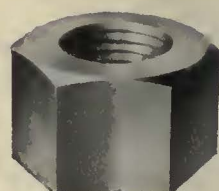
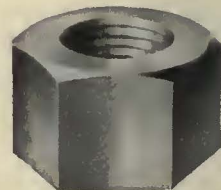


EMPIRE BOLTS & NUTS



THEN AND NOW

All things change with time. The transportation methods of our childhood days look hopelessly primitive now, yet they were the last word at the time. And Empire bolts and nuts were used to hold them together just as they are on the highly efficient models of today. Empire bolts and nuts have kept pace with the changes in transportation methods. Your shop men should know them by name. *Send for samples.*



RUSSELL, BURDSALL & WARD

BOLT & NUT COMPANY

PORT CHESTER, N.Y.

Branch Office:
Straus Building
CHICAGO

Branch Office:
General Motors Bldg.
DETROIT

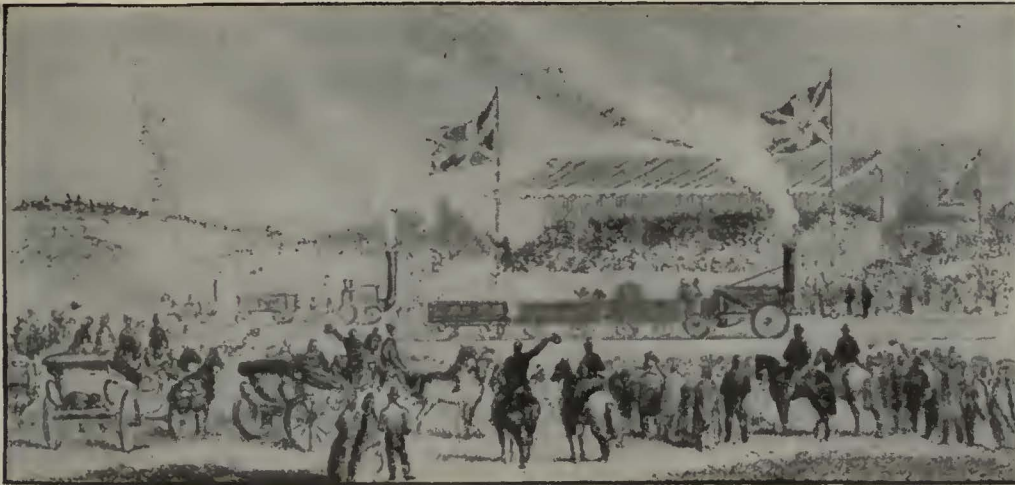
Branch
Factory:
ROCK FALLS, Ills.

Strimple & Gillette
169 Jackson Street
SEATTLE

Maydwell & Hartzell, Inc.
158-168 Eleventh Street
SAN FRANCISCO

Makers of Bolts, Nuts and Rivets Since 1845

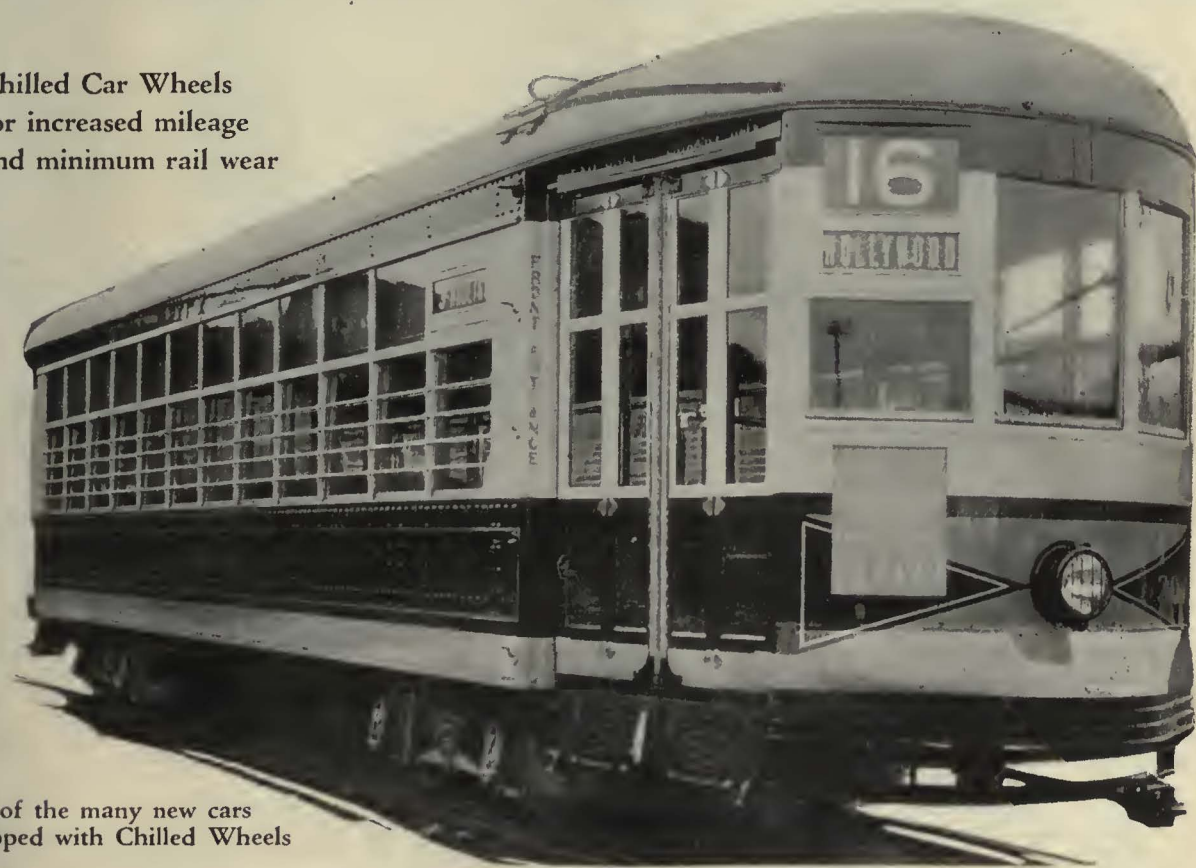
50 Plants—Daily Capacities 20,000 Wheels



Locomotive
Competition
at Ranhill,
England,
1829

Chilled Car Wheels

Chilled Car Wheels
for increased mileage
and minimum rail wear



One of the many new cars
equipped with Chilled Wheels

A. R. A. Standards

650 lb. Wheel for 30 Ton Cars 750 lb. Wheel for 50 Ton Cars
700 lb. Wheel for 40 Ton Cars 850 lb. Wheel for 70 Ton Cars

**ASSOCIATION OF MANUFACTURERS OF
CHILLED CAR WHEELS**

1847 McCORMICK BUILDING, CHICAGO



Jamestown saves
valuable barn space !

with

EASTON Turntables!

Through the use of turntables the Jamestown Street Railway Company, Jamestown, N. Y., is enabled to turn its single end one-man Birney Cars in their own length—and *without the construction of costly special track-work*. Thus at a large saving in initial expense they also eliminate the danger of "backing out." And the maintenance of the turntable is practically nil—at most a few cents for lubrication. And the ease with which one man turns the table surprised them!

There are many places where an Easton Turntable can be used to economic advantage—for turning cars, buses, rail-cars, etc.—for use in shops and garages—in saving valuable floor space—in saving time and labor—in expediting servicing and shop facilities—as a combined turntable and bus washing platform—and many others.

Investigate the many money-saving features of this equipment today!

NEW YORK
KANSAS CITY
PHILADELPHIA

EASTON CAR & CONSTRUCTION CO.
Easton, Pa.

PITTSBURGH
CHICAGO
SAN FRANCISCO



Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

**No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication**

Earll Catchers and Retrievers

C. I. EARLL, York, Pa.

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.



COLUMBIA

Railway Supplies and Equipment

Machine and
Sheet Metal Work

Forgings
Special Machinery
and Patterns

Grey Iron and
Brass Castings

Armature and
Field Coils.

The
Columbia Machine Works
and M. I. Co.

265 Chestnut St., corner Atlantic Ave.,
Brooklyn, N. Y.



Mauran, Russell & Crowell, Architects; Herbert H. Morrison, Consulting Engineer

ANNOUNCEMENT

To more conveniently and more efficiently serve central-southern and south-western manufacturers and their advertising agents, the McGraw-Hill Publications have opened new and larger quarters in St. Louis. The new location is:

1556 Southwestern Bell Telephone Building,
St. Louis

Phone: Main 1060

This change permits of increased facilities for serving the rapidly developing central-south and south-west territory. Manufacturers and advertising agents are cordially invited to make use of this conveniently located office.

McGraw-Hill Publishing Company, Inc.

New York

Chicago

Philadelphia

St. Louis

San Francisco

London

-- and study his interest in HELPFUL ADVERTISING

Change places with the INDUSTRIAL BUYER—for a while



McGraw-Hill Publications



Report of Recent Purchases (Equipment, Materials or Supplies)
Initiated by advertising appearing in *Power*

Name of Purchaser: *Light Heat Power*
Address: *[Redacted]*
Date: *1/24/27*
Equipment, materials and supplies purchased: *[Redacted]*
Representative reporting purchase: *[Redacted]*
Quantity: *one*

Subscriber's Advertising Report
Mr. M. Broese van Groenou
Subscriber to *C. M. I.*
Name: *Chas. J. Mack*
Title: *Comm. Ch. Eng.*
Company: *[Redacted]*
City: *[Redacted]*

Reads advertising section
1. No
2. Occasionally
3. Regularly, as source of information on developments and improvements

Suggestions to improve advertising section (new equipment that should be advertised, kind of information desired in advertising, etc.):
Study page of ad. each week. Recommend advertised equipment to the client.

Stacks of records, like the above, represent a census of the Industrial Buyer's interest in the advertising pages of certain industrial publications . . . those published by McGraw-Hill. Field investigations such as this also record actual purchases resulting from this interest. These records substantiate both the observation made by Mr. Broese van Groenou and the previous basic survey made for McGraw-Hill.

Last month McGraw-Hill invited the Industrial Buyer to sit in the chair of the typical Industrial Buyer to study the sources of information he regularly depends upon and why. That advertisement gave only part of the story—his dependence upon publications of established editorial integrity. He uses more than the editorial helpfulness of such publications—and that is the other part of the story discussed here.

WHAT is the attitude of the Industrial Buyer toward the advertising that aims to make him a customer?
What kind of advertising interests and influences him . . . and why?

. . . Vital questions, these, in this day and age of highly specialized selling!

The well-known investigation of industrial buying practices made for McGraw-Hill a few years ago showed that industry's buyers look to Industrial Publications as the best means of keeping their industries up-to-date on methods, machinery and materials.

Why do the advertising pages of Industrial Publications command this confidence and interest?

The answer is given by Mr. A. J. Broese van Groenou, President, Mack Trucks, Inc., who speaks authoritatively as a subscriber to Industrial Publications and as an advertiser in Industrial Publications. Mr. Broese van Groenou stated before a recent gathering of business paper editors that:

"The publication which is doing a leadership job editorially is transferring to the publication's advertising pages the prestige which it creates among its readers."

Advertising, surrounded by constructive, confidence-building editorial matter, reaches the Industrial Buyer under the most favorable circumstances.

Another reason for the Industrial Buyer's favorable viewpoint toward the advertising pages of Industrial Publications is the special help business he finds in the advertisements themselves. They reflect an understanding of the peculiar operating and producing problems of industry that gains and holds the Industrial Buyer's interest and respect.

Advertising conceived from this standpoint knuckles down to the business of selling in industry's own manner and language.

These are the reasons behind the Industrial Buyer's interest in the advertising pages of McGraw-Hill Publications. Is your advertising the kind that meets his specifications?

How to use industrial advertising to advantage . . . how to coordinate it with your selling job to be done . . . these are the subjects stipulated in the McGraw-Hill Field Study of Industrial Selling which, briefly:

1. Determination of their buying habits
2. Analysis of their buying habits
3. Determination of direct channel approach.
4. Study of effective sales appeals

The help and data of the McGraw-Hill Field Study are fully and freely available to manufacturers and their advertising agencies at the nearest McGraw-Hill office.

McGraw-Hill PUBLICATIONS

McGraw-Hill Publishing Company, Inc., New York, Chicago, Philadelphia, Cleveland, St. Louis, San Francisco, London, Publishers of

INDUSTRIAL MACHINIST
INDUSTRIAL ENGINEER
INDUSTRIAL ELECTRICAL ENGINEER
MINING ENGINEERING & MINING JOURNAL
COAL AGE
OVERSEAS
INTERNACIONAL

3,000 ADVERTISING PAGES USED ANNUALLY BY 3,000 MANUFACTURERS TO HELP INDUSTRY BUY MORE EFFECTIVELY

CATALOG
ELECTRIC
ELECTRICAL
RADIO
KEYSTONE COAL MINING
KEYSTONE COAL BUYING
CENTRAL
ELECTRIC
COAL
ANALYSIS OF
COAL

THIS ADVERTISEMENT REPORTS TO YOU

The main purpose in reproducing in this McGraw-Hill Publication the advertisement on the opposite page is to point out another step in our effort to make the advertising pages of your publication more helpful to you. It discusses investigations made among our subscribers at different times. Perhaps you contributed information to the cause.

The fact is, if the advertiser recognizes that he must square his advertising with the problems of operation and production with which you are concerned, he helps both you and himself.

In regularly reviewing the advertising pages of this and other McGraw-Hill Publications you have undoubtedly observed that much progress has been made toward our goal. While this thought is fresh in mind go through the advertising pages of this issue again and notice how many advertisers recognize this new spirit of advertising.

The advertisement on the opposite page was prepared by the advertiser. It is reproduced in this publication as a service to our subscribers. It is not the property of McGraw-Hill Publications. It is the property of the advertiser. It is not the property of McGraw-Hill Publications. It is the property of the advertiser. It is not the property of McGraw-Hill Publications. It is the property of the advertiser.

McGraw-Hill Publishing Company, Inc.
1221 Avenue of the Americas
New York

Whatever your requirements

specify

Le Carbone Carbon
Brushes

They talk for themselves

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

ELECTRICAL INSULATION

MICANITE and **EMPIRE**
INSULATOR
REG. U. S. PAT. OFF.

Micanite and Super-Micanite
Sheets, Commutator Segments,
and Commutator Rings

Micanite Tubes and Washers

Linotape, Seamless or Sewn Bias
(Yellow or Black Varnished Tapes)

Empire Oiled Cloths and Papers
(Yellow or Black)

Compounds, Varnishes, Etc.

Send for catalog and helpful booklet on Commutator
Insulation and Assembly

MICA INSULATOR COMPANY

Largest manufacturers in the world of mica insulation.

Established 1893

New York: 68 Church St. Chicago: 542 So. Dearborn St.

Cleveland

Pittsburgh

Cincinnati

San Francisco

Los Angeles

Seattle

Works: Schenectady, New York; Victoriaville, Canada; London, England

This Paper is a "Member of the A.B.P."

To you, this is a fact of especial significance, for it means that this publication is part of a concerted movement to raise the level of publishing practice, to assure better service to both subscribers and advertisers.

The "A.B.P." is built upon and revolves around the following set of standards—

STANDARDS of PRACTICE

THE publisher of a business paper should dedicate his best efforts to the cause of Business and Social Service, and to this end should pledge himself—

1. To consider, first, the interests of the subscriber.
2. To subscribe to and work for truth and honesty in all departments.
3. To eliminate, in so far as possible, his personal opinions from his news columns, but to be a leader of thought in his editorial columns, and to make his criticisms constructive.
4. To refuse to publish "puffs," free reading notices or paid "write-ups"; to keep his reading columns independent of advertising considerations, and to measure all news by this standard: "Is it real news?"
5. To decline any advertisement which has a tendency to mislead or which does not conform to business integrity.
6. To solicit subscriptions and advertising solely upon the merits of the publication.
7. To supply advertisers with full information regarding character and extent of circulation statements, subjects to proper and authentic verification.
8. To co-operate with all organizations and individuals engaged in creative advertising work.
9. To avoid unfair competition.
10. To determine what is the highest and largest function of the field which he serves, and then to strive in every legitimate way to promote that function.

Publications which have subscribed to these standards have earned the preferred consideration accorded them.

THE ASSOCIATED
BUSINESS PAPERS, INC.

52 Vanderbilt Ave., New York

What will 1927 mean to YOU?

Next year you will be a year older. Will you be a year advanced? Will your job be a year better? Will your pay be a year bigger? You can take care of this for yourself—you can make 1927 your best year yet—with the

American Electricians' Library

Six Volumes—over 2000 pages—fully illustrated
Special durable library binding
\$2.00 in ten days and \$2.00 monthly for 7 months

This pay-raising Croft Library will help you to make yourself expert in solving the problems of repair and installation of electrical equipment in dozens of different big-pay electrical fields. The six volumes are:

- | | |
|---|---|
| Volume I—Conduit Wiring. | Volume IV—Lighting Circuits and Switches. |
| Volume II—A. C. Armature Winding. | Volume V—Circuit Troubles and Testing. |
| Volume III—Electrical Machinery and Control Diagrams. | Volume VI—Electrical Machinery Erection. |

Big-pay information. It will pay you well to get it. It will mean big things for you in 1927. No investment can mean more to you.

Send no money—See the books free

Mail the coupon below. See the books free. Keep them if you want them. Send them back if you don't. Do this for yourself now! Mail the coupon today!



FREE
—if you act now

Braymer and Roe's REWINDING SMALL MOTORS free if you start with this pay-raising set now!

McGraw-Hill FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York.

Gentlemen:—Please send me the CROFT AMERICAN ELECTRICIANS' LIBRARY (shipping charges prepaid), for 10 days' free examination. If satisfactory, I will send \$2.00 in ten days and \$2.00 a month until the special price of \$16.00 has been paid. If not wanted I will write you for return shipping instructions. When my first payment of \$2.00 is received you are to send me my free copy of Braymer and Roe's REWINDING SMALL MOTORS.

Name

Home Address

City State

Position

Name of Company E 2-5-27

Nuttall

Standard Helical Gears



The contact between a gear tooth and a pinion tooth is a combination of sliding and rolling, and the sliding contact is the cause of wear.

In Nuttall Helical Gears this sliding contact is at least 50% less than in spur gears, so the wear is materially reduced, and is uniformly distributed over the entire contact surface. As a consequence the teeth retain their correct involute form until worn to a sharp edge.

This results in longer wear, longer life, less maintenance cost, less renewal cost, and it is perfectly true to say that while Nuttall BP Helical Gearing is the longest-lived in the world, it is the cheapest.

Do you want to see actual operating cost data to prove this?

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 Railways and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Nuttall

Bankers and Engineers

Ford, Bacon & Davis Incorporated Engineers

115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation

Engineers—Constructors

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

43 Exchange Place

New York

STONE & WEBSTER

Incorporated

EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES

New York

Boston

Chicago

THE BEELER ORGANIZATION

ENGINEERS AND CONSULTANTS

Traction-Traffic-Equipment-Power Investigations

TRANSPORTATION, TRAFFIC, AND OPERATING SURVEYS

COORDINATING SERVICE—FINANCIAL REPORTS

APPRAISALS—MANAGEMENT

52 Vanderbilt Ave.

New York

SANDERSON & PORTER ENGINEERS

PUBLIC UTILITIES & INDUSTRIALS

Design Examinations Construction Reports Management Valuations

CHICAGO

NEW YORK

SAN FRANCISCO

Byllesby Engineering & Management Corporation

231 S. La Salle Street, Chicago

New York

San Francisco

ALBERT S. RICHEY ELECTRIC RAILWAY ENGINEER

WORCESTER, MASSACHUSETTS

REPORTS • APPRAISALS • RATES • OPERATION • SERVICE

ENGELHARDT W. HOLST

Consulting Engineer

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

683 Atlantic Ave., BOSTON, MASS.

A. L. DRUM & COMPANY

Consulting and Constructing Engineers

VALUATION AND FINANCIAL REPORTS
RATE STUDIES FOR PRESENTATION TO PUBLIC SERVICE
COMMISSIONS
CONSTRUCTION AND MANAGEMENT OF
ELECTRIC RAILWAYS

230 South Clark Street, Chicago, Ill.

DAY & ZIMMERMANN, INC. ENGINEERS

DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT

NEW YORK

PHILADELPHIA

CHICAGO

STEVENS & WOOD

INCORPORATED

ENGINEERS AND CONSTRUCTORS

120 BROADWAY, NEW YORK

ENGINEERING CONSTRUCTION FINANCING MANAGEMENT
YOUNGSTOWN, O.

WALTER JACKSON

Consultant on Fares and Motor Buses

The Weekly and Sunday Pass—Differential
Fares—Ride Selling

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

HEMPHILL & WELLS

CONSULTING ENGINEERS

Gardner F. Wells Albert W. Hemphill

APPRAISALS

INVESTIGATIONS COVERING

Reorganization Management Operation Construction

43 Cedar Street, New York City

KELKER, DELEUW & CO.

CONSULTING ENGINEERS

REPORTS ON

Operating Problems Valuations Traffic Surveys

111 W. Washington Street, Chicago, Ill.

BUCHANAN & LAYNG CORPORATION

C. B. BUCHANAN W. H. PRICE, JR. JOHN F. LAYNG
President Sec'y-Trans. Vice-President

Engineering and Management, Construction,
Financial Reports, Traffic Surveys
and Equipment Maintenance

BALTIMORE
1904 Citizens National
Bank Bldg.

Phone:
Hanover: 2142

NEW YORK
49 Wall Street

MCCLELLAN & JUNKERSFELD

Incorporated

ENGINEERING AND CONSTRUCTION

Examinations—Reports—Valuations

Transportation Problems—Power Developments

68 Trinity Place, New York

Chicago

St. Louis

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

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



BRANCH OFFICES

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

WORKS
Bayonne, N. J.
Barberton, Ohio

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 444 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 Aguilar 104
SAN JUAN, Porto Rico, Royal Bank Building



We make a specialty of
**ELECTRIC RAILWAY
LUBRICATION**

We solicit a test of TULC
on your equipment

The Universal Lubricating Co.
Cleveland, Ohio

Chicago Representatives: Jamison-Ross Company,
Straus Bldg

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:

Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas

Pacific Coast Representative:

United States Steel Products Company
Los Angeles Portland San Francisco Seattle

Export Representative:

United States Steel Products Company, New York, N. Y.

THE P. EDWARD WISH SERVICE

50 Church St.
NEW YORK

Street Railway Inspection
DETECTIVES

131 State St.
BOSTON

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

Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

ARCHBOLD-BRADY CO.

Engineers and Contractors

SYRACUSE, N. Y.



Gets Every Fare PEREY TURNSTILES or PASSIMETERS

Use them in your Prepayment Areas and
Street Cars

Perey Manufacturing Co., Inc.
101 Park Avenue, New York City

ILLINOIS MOTIVE EQUIPMENT COMPANY

J. D. Elsom, President

RAILWAY AND AUTOMOTIVE SUPPLIES
35 EAST WACKER DRIVE, CHICAGO

WESTERN REPRESENTATIVES:

JOHNSON FARE BOXES

METAL TICKETS

COIN CHANGERS

DUFF JACKS

TRADE MARK

IT'S LIGHT ON DUFF JACKS
Genuine Barrett Jacks for every purpose
Duff Pinion Puller
Safe—Quick—Positive

The Duff Manufacturing Co.
Est. 1883
PITTSBURGH, PA.

BRANCH OFFICES: ATLANTA - CHICAGO - HOUSTON - NEW YORK - ST. LOUIS - SAN FRANCISCO



RAILWAY UTILITY COMPANY

CAR COMFORT WITH HEATERS
UTILITY REGULATORS
VENTILATORS

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

Write for
Catalogue

1328 Broadway
New York, N. Y.

PANTASOTE

Trade Mark

Seat and Curtain Materials
There is no substitute for Pantasote

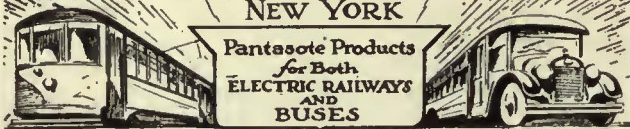
AGASOTE

Trade Mark

Roofing—Headlining—Wainscoting
The only homogeneous panel board

standard
for electric railway cars
and motor buses

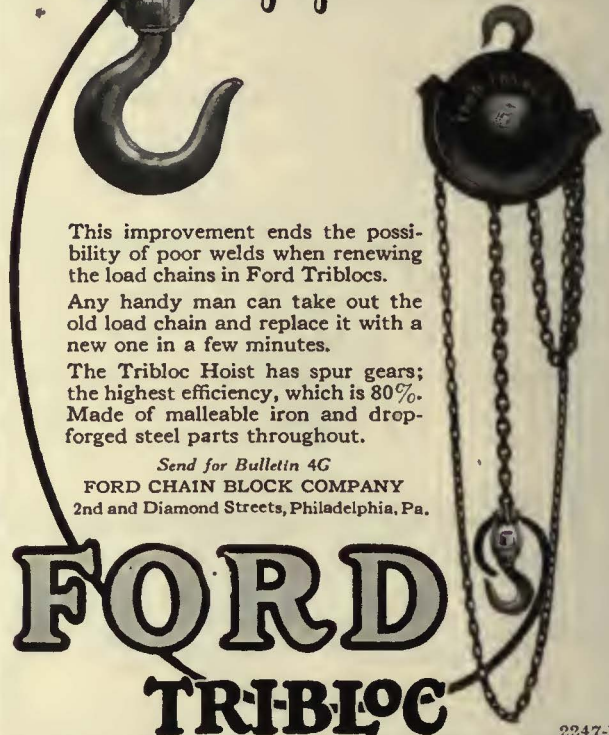
The PANTASOTE COMPANY Inc.
At 46th, 250 Park Avenue Street
NEW YORK



People's Gas Bldg., Chicago, Ill.

Pantasote Products
for Both
ELECTRIC RAILWAYS
AND
BUSES

Tribloc Chain Hoists equipped with our "Ezejoin" Shackle



This improvement ends the possibility of poor welds when renewing the load chains in Ford Triblocs. Any handy man can take out the old load chain and replace it with a new one in a few minutes. The Tribloc Hoist has spur gears; the highest efficiency, which is 80%. Made of malleable iron and drop-forged steel parts throughout.

Send for Bulletin 4G
FORD CHAIN BLOCK COMPANY
2nd and Diamond Streets, Philadelphia, Pa.

FORD TRIBLOC

2247-D



R 11 Double Register

Both our latest single and double registers are now equipped for electric as well as mechanical hand or foot operation.

Full Electric Operation of Fare Registers

A completely satisfactory fare registration system is one that has the confidence of the public, the conductor and the accounting department. The simplicity and accuracy of International Registers maintained for more than thirty years, is combined in the later types with the extra speed and convenience of electric operation.

The International Register Co.
15 South Throop St., Chicago

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slott Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives in the Principal Cities

ELRECO TUBULAR POLES



THE "WIRE LOCK" THE CHAMFERED JOINT

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

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.
Positions Vacant and all other classifications, 8 cents a word, minimum charge \$2.00.
Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.
Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....\$4.50 an inch
4 to 7 inches..... 4.30 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

ADVERTISING and public relations specialist, extensive experience in electric railways, will make preliminary survey if desired. PW-966, Electric Railway Journal, 1600 Arch St., Phila., Pa.

OPERATING man; capable of taking charge of transportation department of electric railway. Practical experience in each of its branches. Highest references. PW-944, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

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

FOR SALE

BIRNEY CARS

In First-Class Condition

WH-508 and GE-264 Equipment

Inspection Invited

Apply to

Eastern Mass. St. Ry. Co.

1 Beacon Street, Boston, Mass.

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

**Economy—Service
Quality—Reliability**

HYMAN-MICHAELS COMPANY

Peoples Gas Bldg., Chicago
ST. LOUIS — DALLAS — LOS ANGELES
SAN FRANCISCO — PORTLAND — SEATTLE

FOR SALE

15 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.

12 miles 70-lb. ASCE Relayers.

10 miles 60-lb. ASCE Relayers.

practically as good as new. Also 12 miles
4/0 figure 8" Copper Wire practically new.

M. K. FRANK

Park Row Bldg. Union Trust Bldg.
New York City Pittsburg, Penna.

AIR COMPRESSORS

12 General Electric CP-27.
6 General Electric CP-28.
16 Westinghouse DH-16.

IRVING S. VAN LOAN CORPORATION
1750 Broadway, New York City

Specialists in street cars or any part of a
street car.

Illustrated bulletin supplied on request.

Today's Prices Are Highest

The quicker idle equipment is sold, the higher the selling price it can demand—today's prices are always highest because—

Equipment permitted to remain unused depreciates rapidly and occupies valuable space. Every day of idleness brings down the possible selling price.

Let
"Searchlight"
Help
You

"Searchlight" Locates Quick Buyers

The wise owner of idle equipment promptly informs the field of his desire to sell through an advertisement in the Searchlight Section, where he knows that those who might need what he has will be most likely to look first.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry
with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Westinghouse Air Brake Co.

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

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automobile Return Switch
Stands
Ramapo Ajax Corp.

Automobile Safety Switch
Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Co.
General Electric Co.
National Ry. Appliance Co.
Standard Steel Works Co.
Westinghouse E. & M. Co.

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

Axles, Steel
Carnegie Steel Co.

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

Babbitting Devices
Columbia Machine Works

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

Barges, Steel
American Bridge Co.

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

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

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
Elec. Service Supplies Co.

Benders, Rail
Railway Track-work Co.

Bodies, Bus
Brill Co., The J. G.
Cummings Car & Coach Co.

Body Material, Haskellite and Plymet
Haskellite Mfg. Corp.

Bolters
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bolts, Nuts, Rivets
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Haskellite Mfg. Corp.
Heywood-Wakefield Co.
Pantaso Co., Inc., The

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Brill Co., The J. G.
Hale-Kilburn Co.
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Seats, Car (See also Rattan)
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Cincinnati Car Co.
Hale-Kilburn Co.
Heywood-Wakefield Co.

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Electric Equipment Co.
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Hyman Michaels Co.
Van Loan Corp., Irving S.

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Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Signals, Car Starting
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Elec. Service Supplies Co.
National Pneumatic Co.

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Union Switch & Signal Co.
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Sleet Wheels and Cutters
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Columbia Machine Works
Elec. Ry. Equipment Co.
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Columbia Machine Works
Consolidated Car Fender Co.
Cummings Car & Coach Co.

Snow Sweeper, Rattan
Heywood-Wakefield Co.

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Duff Mfg. Co.

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Irvington Varnish & Ins. Co.

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American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
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Standard Steel Works Co.

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Cummings Car & Coach Co.

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Carnegie Steel Co.
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Brill Co., The J. G.
Cincinnati Car Co.

Stokers, Mechanical
Babcock & Wilcox Co.
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Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebbling's Sons Co., J. A.

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Cummings Car & Coach Co.

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

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Switches and Switchboards
Consolidated Car Heating Co.
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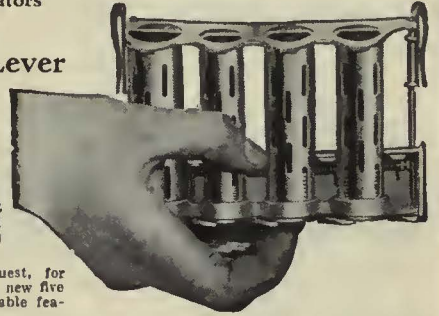


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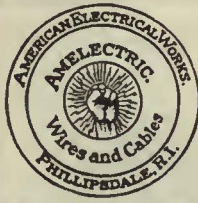


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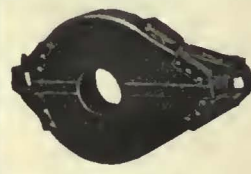
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ALPHABETICAL INDEX TO ADVERTISEMENTS

Table with 4 columns: Letter, Page, Letter, Page, Letter, Page, Letter, Page. Lists companies and their corresponding page numbers under various letters (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, R, S, T, U, V, W, Y).

WHAT AND WHERE TO BUY—Continued from page 60

Table with 4 columns: Item Name, Supplier/Company Name, Item Name, Supplier/Company Name, Item Name, Supplier/Company Name, Item Name, Supplier/Company Name. Lists various electrical and mechanical parts and their suppliers.



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Schedules are made to be met. Business transportation, social obligations, pleasure trips, hinge on the question of time. Keeping to the schedule is of dollars and cents value to the bus operator.

The bus equipped with a Red Seal Continental Motor has the stamina to keep running continuously through fair weather and foul. Continental Motors built for bus service give that economy of operation so essential to profitable service.

26 years experience as specialists in motor building plus a rigid policy of quality workmanship insures the type of power plant best fitted for bus service. As a result the user of Continental motors secures that daily satisfaction which results from satisfied customers and mounting profits.

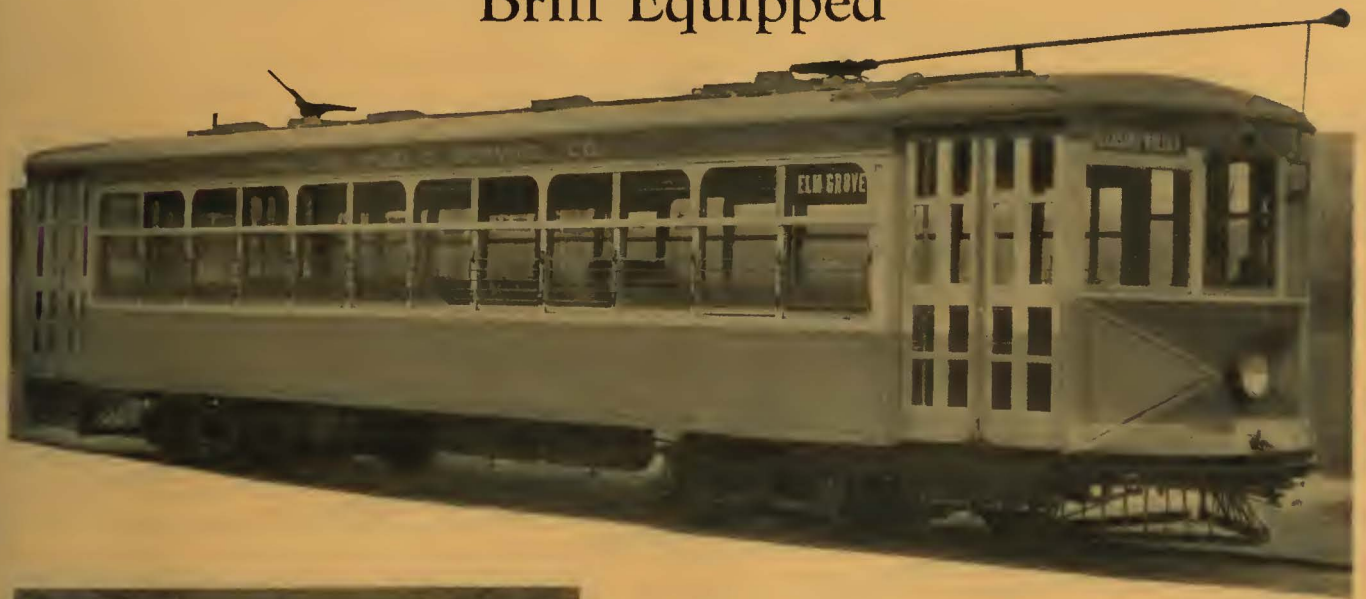
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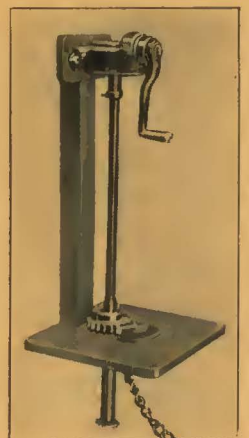


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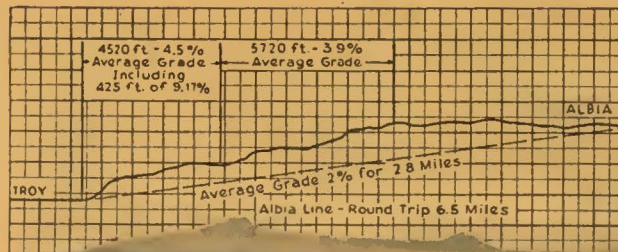
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