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ELECTRIC RAILWAY JOURNAL

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Vol. 69
No. 4

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JANUARY 22, 1927

Pacing the Industry

THE thoughts of one man are the seeds from which spring the achievements of another. For centuries these seeds were unfruitful because there was no adequate method for sowing them. Then came John Gutenberg with his printing press, and soon the first harvest was reaped. Gradually, man discovered that there were no limitations to the interchange of thought; that a multiplicity of achievements would result from the grouping of ideas. This led him to specialization. Then came the enormous strides of science. Every invention required a medium to exploit its claims and expand its usefulness, and thus arose the necessity for technical publications.

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(Published in London)

1927

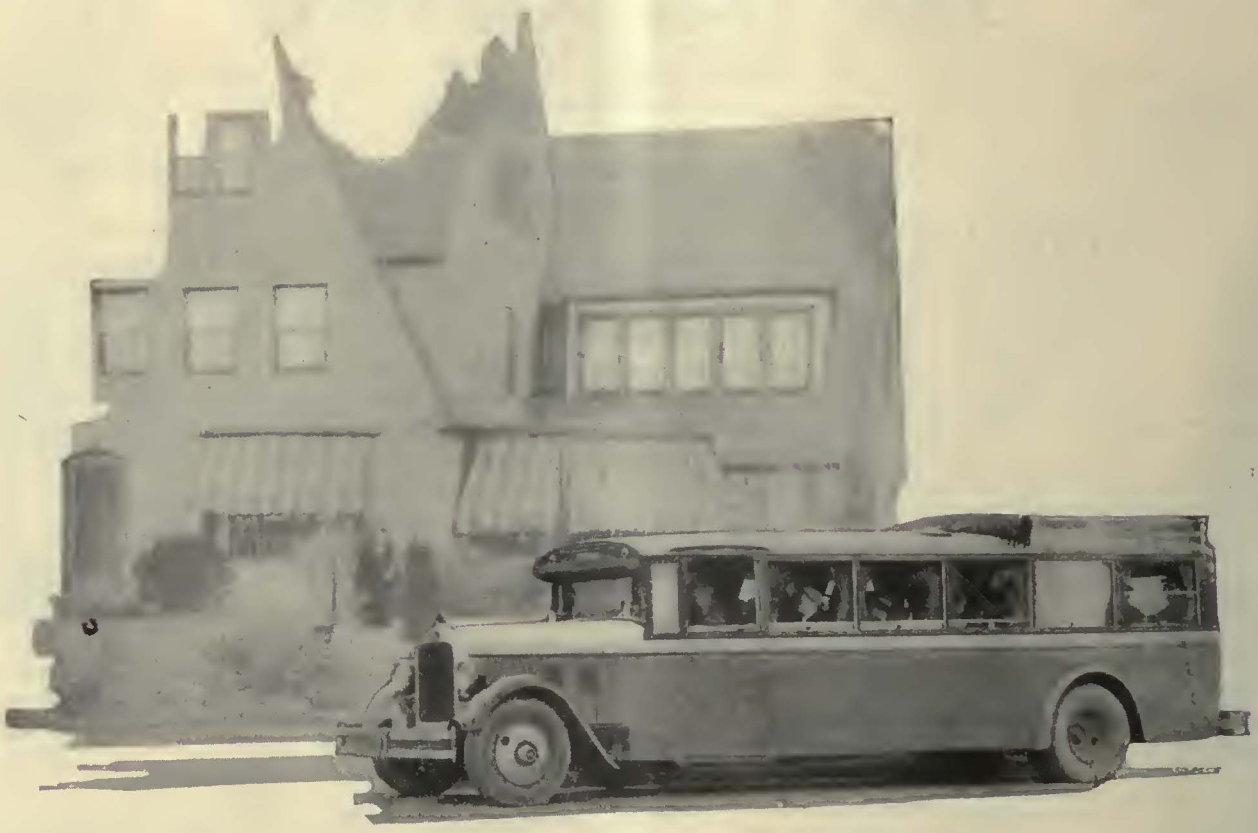
The annual subscription rate is $4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala, Chile and Paraguay. Extra foreign postage to other countries $3 (total $7 or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.

Published weekly. Entered as second-class matter, June 23, 1908, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

Number of Copies Printed, 6,130

Advertising Index—Alphabetical, 36; Classified, 32, 34, 36; Searchlight Section, 31



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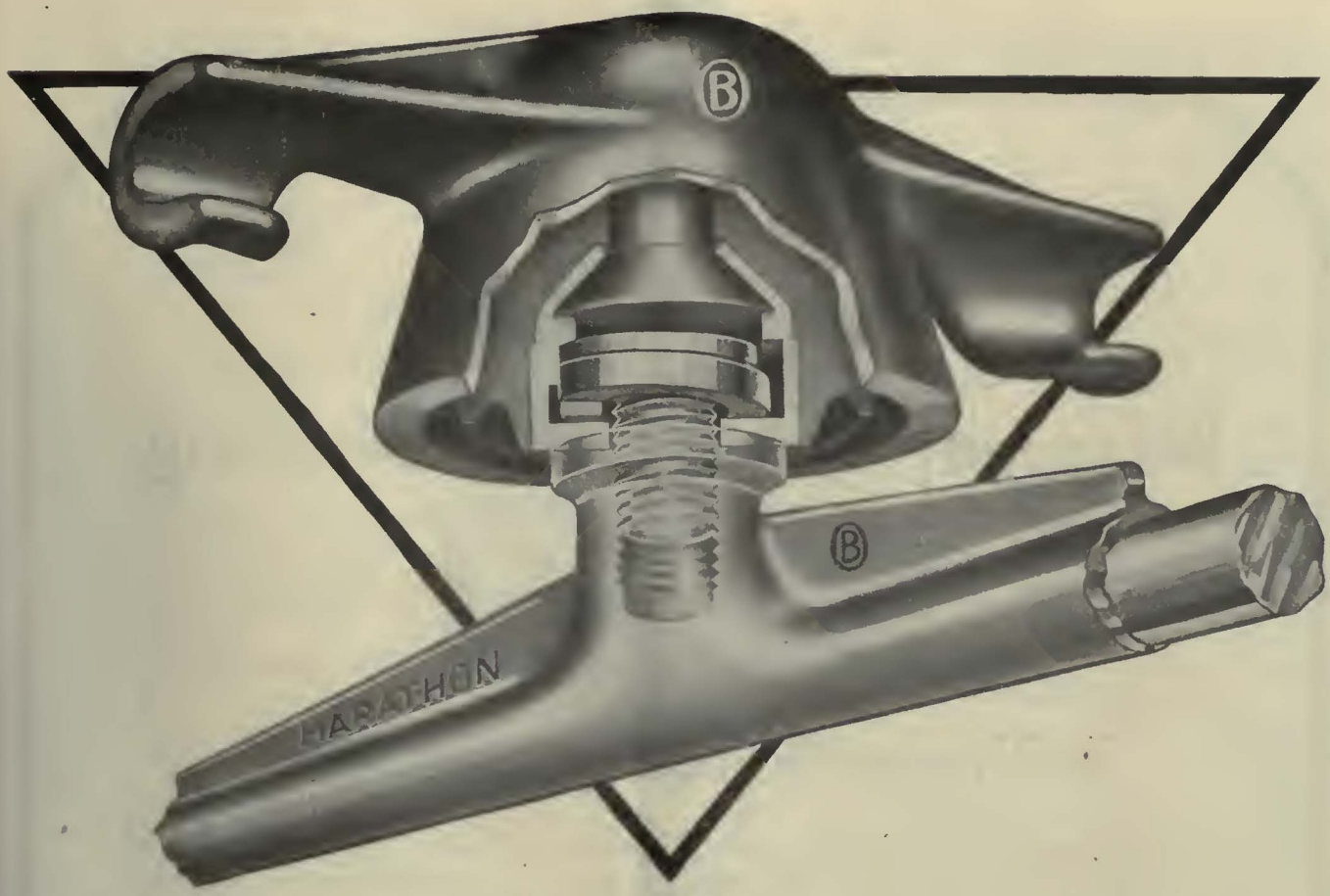

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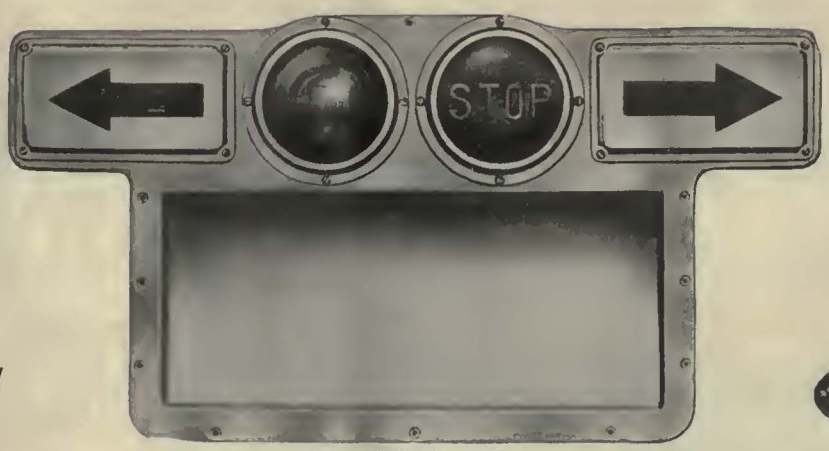

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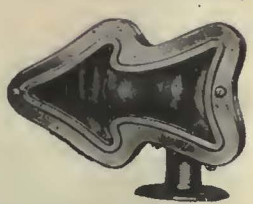

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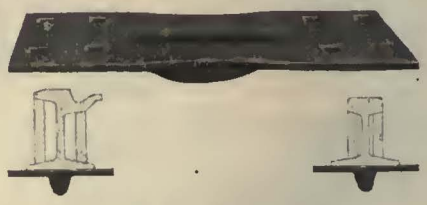

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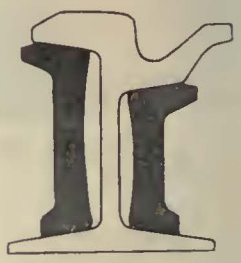

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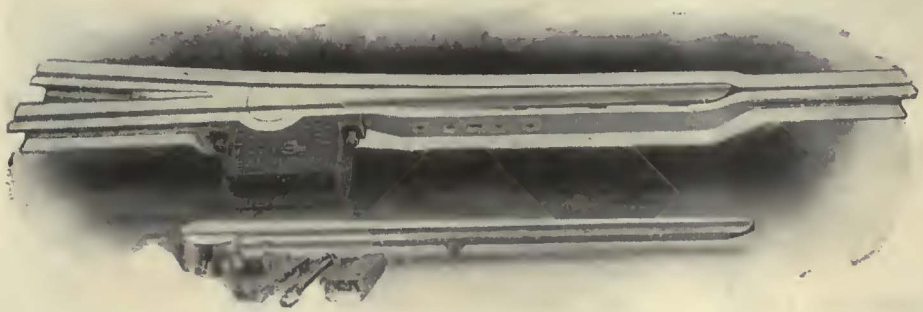

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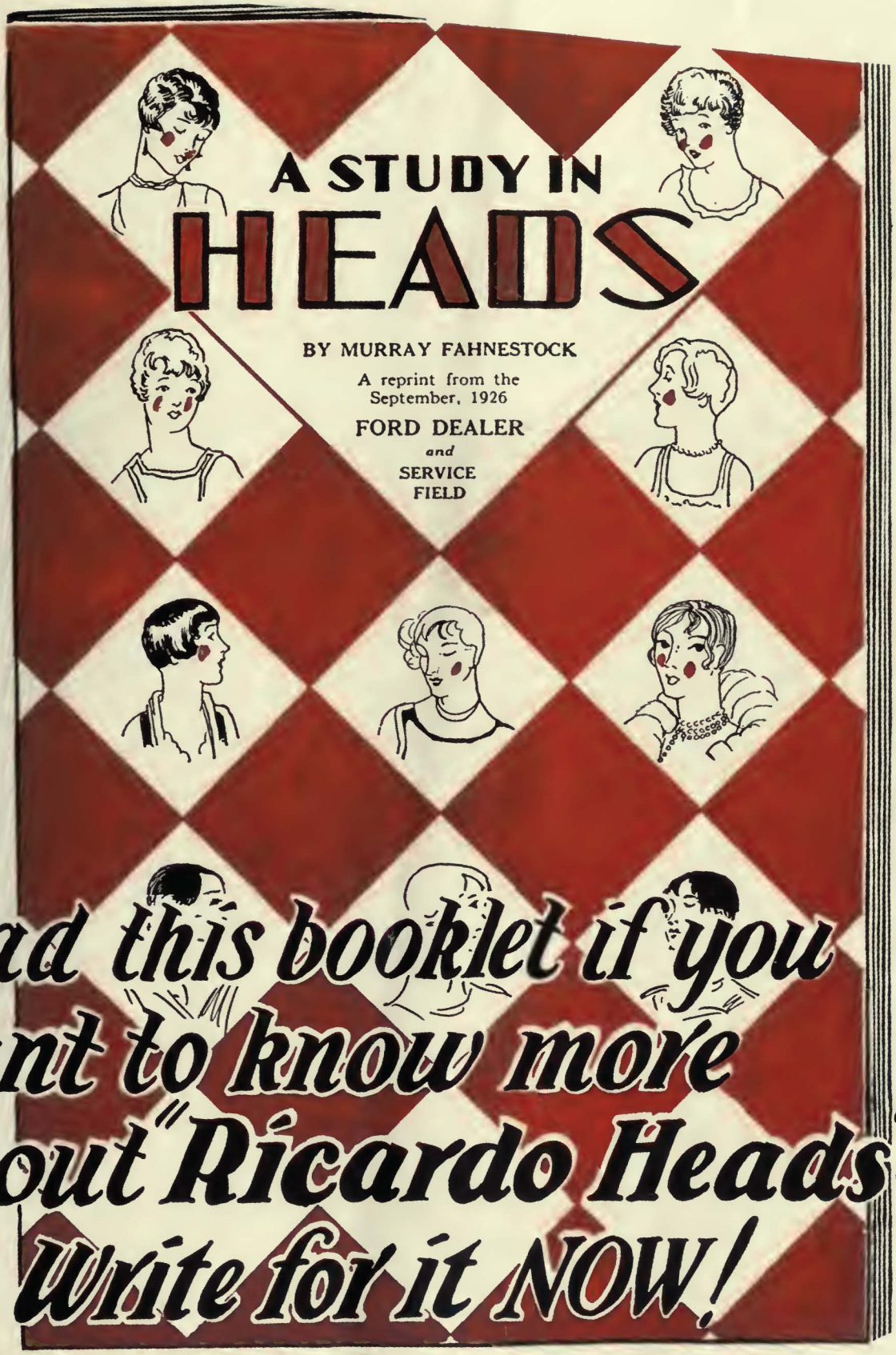

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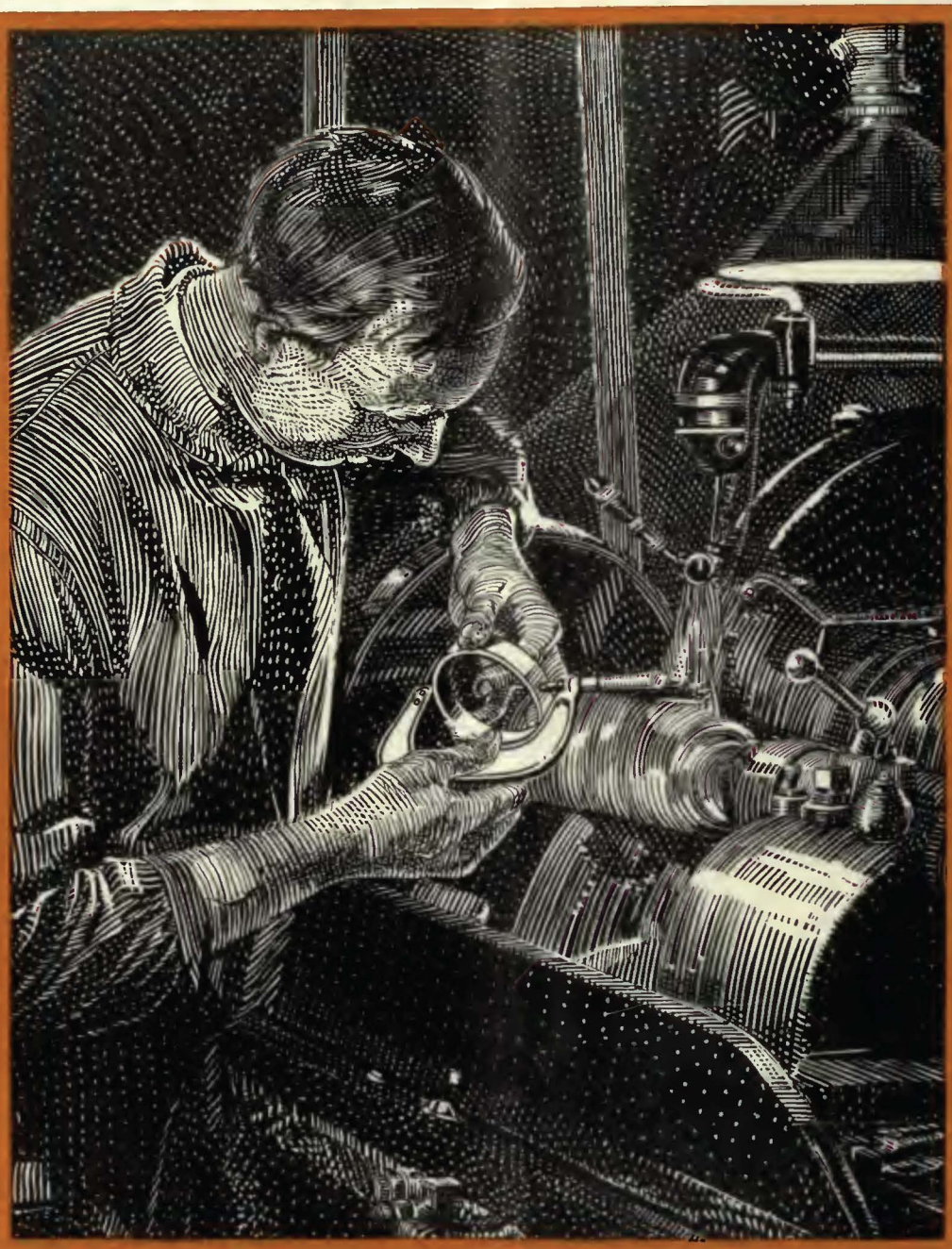

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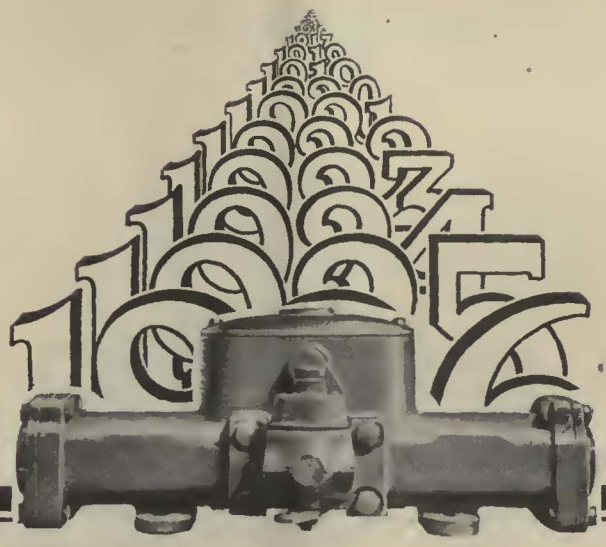

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

Volume 69 New York, Saturday, January 22, 1927 *Number* 4

Mid-West Association Sets a Mark for Sectional Meetings

THE value of sectional association meetings for getting department heads and their assistants off the job and giving them a fresh and broadened viewpoint of their work was stressed by F. G. Buffe, vice-president in charge of operation Kansas City Public Service Company, at the recent meeting of the Midwest Electric Railway Association in Tulsa. Mr. Buffe maintained that the programs of such meetings should be built with a primary view to making them conferences on the improvement of service, building business and the analysis of methods developed by properties which have succeeded in improving their earnings.

Unquestionably this is a sound basis for sectional association work. In such meetings there is an opportunity for a much more intimate and general discussion of business building topics than can take place in a large national meeting. In these smaller meetings there is time for the department heads and their assistants to take an active part and to acquire direct contact with the most progressive thinking in their territory. They are led thus to look on the problems of their company as a whole, and to visualize the part which their individual departments play in the general success or failure. This makes for greater teamwork within the respective company organizations. In teamwork plus imagination lies the industry's salvation.

As Mr. Buffe pointed out, the discussion of detailed questions of technical practice have limited value in such a meeting. Little definite information is conveyed in the average convention paper on construction or maintenance practice. By reading of the practices of other properties in the technical press, where specific illustrations and figures are made available, much more ground can be covered in a given time and at vastly decreased expense than in a convention meeting. Where this does not suffice, personal visits to neighboring properties for first-hand inspection of new practices will yield far more actual information than can be gleaned from listening to the monotonous reading of a convention paper couched in generalities.

Those who attended the Tulsa meeting listened to a recital and discussion of operating practices which have improved the service, increased business, raised the employee morale and reduced costs on properties which have made definite and outstanding progress. Department heads and their assistants joined with general executives in questioning speakers and in discussing the subjects presented. The net result was a distinct inspiration to every man present. The program helped to take each man out of his individual job and to give him a better picture of the tendencies and opportunities in the industry of which he is a part. President Sawyer of the American Association commented on the excellence of the Midwest program, but pointed out that there were not enough railway men present from the territory covered by the association. It was noticeable that some of those properties which seem to be in greatest difficulty were conspicuous by the absence of their men. This very fact illustrates the value of such meetings and indicates the source of trouble on some properties. Their personnel needs to get out of the rut.

Truths Not Likely to Fail of Their Purpose

TWO addresses more stimulating than those of President Sawyer and Mr. Graham, made before the Midwest Association, have seldom been heard by audiences of electric railway men. Some may be inclined to judge Mr. Sawyer's remarks in the light of exhortation. Granting even that, they were not more so than the occasion demanded. As a concomitant to them was the record of accomplishment outlined by Mr. Graham. After all, it is the will to do that is important. But greater even than this is the preachment, pronunciamento, or whatever one cares to call it, that kindles the will to do where signs are not lacking that it is dormant or perhaps nearly dead.

As Mr. Sawyer indicated, commiseration seldom accomplishes much. The psychologists know this. On the other hand, the physiologists know that where there is not a malignant growth the patient is often assisted most by being helped to regain his sense of proportion. Pathologically speaking, there have been few tumors on the brain in this industry, but in far too many cases there has been ingrowing inhibition. Carrying the idea to the extreme, perhaps, Mr. Sawyer said that the fact that we have always done a thing in a given way is good reason for questioning the wisdom of that practice. It certainly is. But there is nothing to be gained merely from change for the sake of change. It is necessary to apply the criterion of fine discrimination.

Take the case of the question of the use of new cars. Mr. Sawyer says that the money spent for new cars and new facilities has been a profitable investment in every instance where it has been intelligently applied. The preponderance of the evidence is on his side. There has been far too much parsimony in this industry in the past. Its practice has become almost a fetish. Economy is one thing, but parsimony is something quite different. Unfortunately, the two had been allowed to become confused in the minds of many railway men. Too often have they thought they were practicing the one when in reality they had become the victims of the other. If Edmund Burke were the diagnostician of the industry's ills he would say that the railway operators have been more inclined to saving than to selection; that their so-called economy required no providence, no sagacity and no judgment, but a mere instinct, and one not of the noblest kind. Mr. Burke's definition of economy and parsimony has perhaps never been surpassed. Real economy, in his opinion, has larger views. It de-

mands a discriminating judgment and a firm, sagacious mind.

Does all this seem elementary? The answer is "yes." But it is the distinction between the two that Mr. Sawyer and Mr. Graham have sought to bring home by being specific. That is the nub of the whole matter. The public must have public transportation service. As for the electric railway industry, it is trying to learn how to do a better job than it has been doing, and the man who misses this point in a convention is missing the very reason for his attendance at a meeting of this kind.

Certainly these two addresses by Messrs. Sawyer and Graham take high rank among the outstanding papers of their kind presented at utility conventions in recent years. It is well to recall that Guizot, the great French historian and economist, said: "Truth has already trouble enough in penetrating to the council of kings; let us not send it there pale and feeble; let it be no more possible to mistake it than to doubt the loyalty of our sentiments." And he would, indeed, be a doubter who questioned for a moment the loyalty of the sentiments of either Mr. Sawyer or Mr. Graham. They did not send truth out pale and feeble. As they handled truth it should not fail of its purpose.

Blair Plan for Chicago Transit Development Extends Over 22 Years

WITH but a few days remaining before the termination of the franchise, bonds and operating agreement of the Chicago Surface Lines the Council of that city is still talking about plans. This week the billion-dollar plan of Henry A. Blair, president of the Chicago Surface Lines, was presented to the Council committee on local transportation and underwent the first fire of criticism. The plan was not entirely new, as an outline was submitted to the Council in 1924 by Mr. Blair.

This plan, however, has been developed and augmented during recent weeks, largely in conference with other transportation representatives, so that at present it is said to meet with the tentative approval of other transportation authorities in Chicago.

A study of this plan, abstracted elsewhere in this issue, has the ring of genuineness. In it Mr. Blair fearlessly faces Chicago's civic needs and forecasts resulting transportation requirements up to 1950. The plan contemplates progressive development in three periods extending over 22 years, by which time the population of Chicago will have reached 5,000,000, according to conservative estimates. Even at this juncture the investment would be only $145 per capita, far below what it is in New York today, with essentially the same population as that estimated for Chicago in 1950, and even though much of New York's subway construction was accomplished in an era of lower costs.

From the initial total investment of slightly more than a quarter billion of private capital, the subways, rapid transit extensions, plus the surface lines extensions, and the addition of 60 miles of bus routes would equal $1,000,000,000 by 1950, approximately 56 per cent of which would be company investment and 44 per cent would be obtained from public funds.

Considering the merits of this plan from the standpoint of Chicago's economic development, which after all is the important factor, the program stands out in sharp contrast to the $50,000,000 or $100,000,000 contemplated in the Lisman proposal. If this larger plan is necessary to provide for Chicago's growth, and there seems to be agreement among the present leaders who are providing transportation today that it is, then it appears more impossible than ever that such a program can be contemplated on a 20 or even a 30 or 40-year basis. The present dilemma is evidence enough that an extensive development could never be consummated if progress must be halted periodically and the invested capital held in jeopardy while a new deal is made.

How Paris Approaches Rush-Hour and Other Operating Problems

ELECTRIC railway transportation problems in Europe are very much like those in this country and are being approached largely in the same way. This is clearly indicated by the article in this issue on "Increasing Car Speeds and Rush-Hour Carrying Capacity" by Paul Mariage, commercial manager of the Paris tramway and bus system. It shows, for example, that equal importance is laid in Europe as in this country upon the need of increasing car schedule speeds. It also shows that in Europe the answer to this question is felt to lie largely in a type of car designed especially to speed up the rate of passenger interchange and simplify the collection and registration of fares. Mr. Mariage's article also indicates that a great deal of care and thought are being given in Paris to means for increasing the rush-hour capacities of the company's system without unduly increasing the total number of cars and buses owned.

In these efforts, Paris tramway managers labor under some handicaps which to American managers would appear to be rather serious. One of these is the narrowness of the cars, made necessary because of the narrow streets through which they run. A second is the need, felt at least in Paris, for providing for two classes of passengers on every electric motor car and on the 36 and 48-passenger buses. Only on the trail cars and on the 25-passenger express type of buses are the passengers all of one class. A third handicap to rapid operation in Paris is the large variety of fares which have to be collected. Their number makes prepayment fare collection hardly possible.

Nevertheless, the Paris authorities have a number of accomplishments to their credit. They have produced a car the height of whose floor above the street is practically the same as the diameter of the wheels used, the car being boarded by a 14.4-in. and an 8-in. step, there then being a 10-in. riser to the main car body. With smaller diameter wheels than those used, it would seem as if these heights could be reduced materially. Paris also has a spacing between stops of about 820 ft. in the central portions of the city and 1,150 ft. in the outskirts, with good records for shortness in length of time of car stop. One reason for the latter condition is undoubtedly the very clear marking of stopping points, as mentioned in the article.

Problems of rush-hour capacity and provision of rush-hour crews are similar to those here. Among the solutions considered for the former (adopted elsewhere in Europe but not yet in Paris) may be mentioned that of folding seats which are turned up in rush hours to increase the carrying capacity of the cars. The principal solution for the rush-hour crew problem in Paris is the employment on the cars for short periods each

day of employees in other departments than the transportation department. Thus, shopmen are being used as motormen, and members of other departments do miscellaneous transportation duties during the rush hours.

Philadelphia May Show the Way to Relief of Traffic Congestion

COMMENDABLE spirit has been shown by the various merchants' organizations in Philadelphia. Faced with a deal of strife and recrimination over the rigid anti-parking ban which was proposed by Director of Public Safety Elliott, nearly all of the groups agreed to accept a 30-day trial period for the measure. Evidently the director is gifted with a very persuasive tongue, for it was only after he had met with the Market Street Merchants Association at a luncheon held on the day scheduled for the final Council hearing on the bill that the organized opposition began to fade. He showed beyond peradventure that some radical steps were inevitable if complete traffic stagnation on the alley-wide streets of the city were not to result, and suggested that a trial be given to the parking ordinance over a limited period of time and with a reasonable program of enforcing the measure progressively over the downtown streets.

When the bill came before the City Council for its final hearing it was passed unanimously and later signed by Mayor Kendrick. Much local interest had been aroused because of the sweeping restrictions placed by the new ordinance. It forbids parking for periods longer than are required to load and unload passengers or to discharge merchandise in practically the entire downtown section of Philadelphia between the hours of 7 a.m. and 7 p.m.; it forbids parking at any time on streets less than 20 ft. in width and specifically names certain streets falling in this category; finally, it forbids any parking on the city streets between the hours of 3 a.m. and 6 a.m.

A peculiar situation had existed in Philadelphia prior to the passage of the bill. While the firms on some of the major thoroughfares were emphatically opposed to any suggestions that parking be prohibited in the vicinity of their establishments, the side street merchants were crying vigorously for relief from the abuse of parking rules. They claimed that they frequently were unable to receive shipments of merchandise, since the delivery trucks were unable to pierce the mazes of traffic or to find unloading space in front of the entrances. Hence some of the strongest advocates of the parking legislation came from the class which has generally shown the greatest opposition to any such proposals.

As is usual with such drastic regulation, a number of points remain to be worked out. Physicians feel that the plan will work a hardship on them and their patients. Ministers of downtown churches are fearful that serious inroads will be made on the attendance. Director Elliott has expressed a willingness to effect modifications in the present ordinance that may be found essential at the end of the trial period.

Similar plans have been tried in other cities with more or less success. Transportation men will watch Philadelphia with much interest, as the enforcement of a satisfactory ordinance there will show that traffic relief through the elimination of parking is feasible. This one thing will go a long way toward solving the congestion problem.

Work of Insurance Committee Demands Fullest Co-operation

EXPERIENCE of electric railway companies in connection with the purchase of fire insurance indicates that much can be done to clarify the situation. The rates vary widely, as was indicated in an editorial in this paper for Nov. 27. Furthermore, the record for 1925 shows that of $2,140,000 paid out in premiums only $607,000 was returned in fire losses, indicating an excessive rate. Improved practices in the construction of cars and structures are constantly tending to make the fire hazard less and less.

Conditions such as these have prompted the committee on insurance of the American Electric Railway Association to go into the matter this year even more thoroughly than it has done in the past. A questionnaire has been prepared and is being mailed out from headquarters requesting every company in the industry to give its insurance history and should reach every railway system within a week. It is of vital importance to the success of the committee's work that it receive an answer from each and every company, whether a member of the association or not. Only with experience of all the companies represented in its collective data can the committee speak authoritatively for the industry or properly represent it.

Nothing but good can come to any individual company by supplying full information. Managements owe it to the owners of their properties to see that the proper officers furnish everything asked for and cooperate with the insurance committee in every way possible.

Keeping Up with the New South

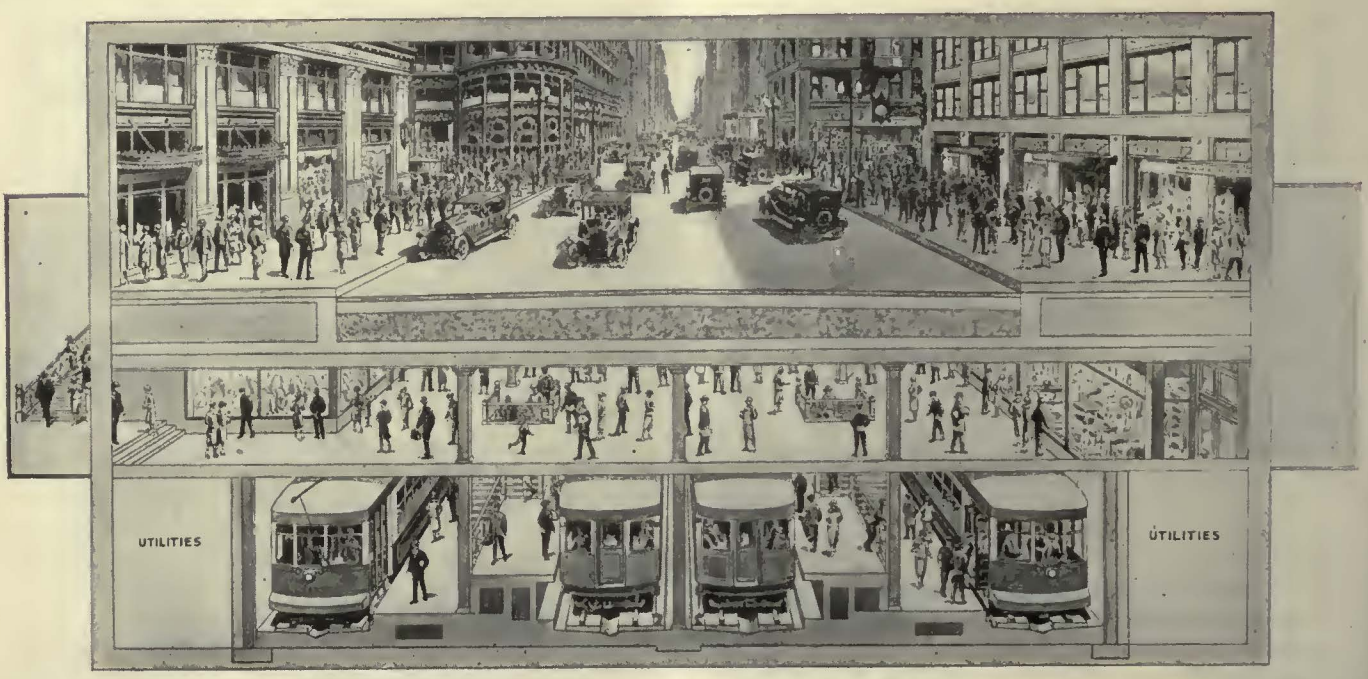
ONE of the builders of the new South was the late James B. Duke. Among his many undertakings was the construction of the Piedmont & Northern Railroad. It was one of the first, if not actually the first, line of its kind in the South, and it has done very well financially. Mr. Duke was ambitious for the road. The line as originally built was to be only the beginning of a much bigger system to be tied in with the gigantic plans he had for power development in the district. It was proposed to connect practically all of the cities of North and South Carolina, running from Greenwood to Durham probably after leaving Charlotte, east by way of Concord, Salisbury, High Point, Greensboro, Burlington into Durham.

The existing links in this system were built in 1912-13-14. Then came the war. Mr. Duke, like many others, had to put aside his personal plans in the interest of the general good. But he never put aside the idea. He harbored it all the while, but before he could perfect the necessary arrangment to carry out the plan he died. Now his associates propose to take up the task where he left off.

The estimated cost of the present undertaking is $15,000,000. By itself this sum bulks large. It is big, but it is only a small part of the vast sums that men of the Duke type have been pouring into the new South in a prodigious stream. It is small wonder that great interest attaches to this latest proposal to build an electric railway of 150 miles to traverse the great industrial belt of Piedmont along the line of what has been called "the workshop of the South."

Billion-Dollar Plan for Chicago Transit

Henry A. Blair, President Chicago Surface Lines, Presents a Plan to Develop the Three Present Systems of Surface Cars, Elevated and Buses—Unified Company Proposed with Terminable Permit Franchise—Report Contains Estimated Budget of Expenditures in Three Steps Extending to 1950 and Presents Estimated Earnings at an Average Fare of 7.35 Cents



State Street, Chicago, Shown in Cross-Section as It Would Appear with the Pedestrian Mezzanine and the Four-Track Subway for Rapid Transit and Surface Cars in Accordance with Plan Proposed by Henry A. Blair, President Chicago Surface Lines

DEVELOPMENT of the three general groups of transportation utilities in Chicago, consisting of surface car lines, elevated railroads and buses, into a billion-dollar system by 1950 is the construction program of a plan of progressive action presented by Henry A. Blair, president of the Chicago Surface Lines. The report containing this enormous program has been developed in recent months through conferences with the major interests involved and is said to have the general approval of these parties.

Subways with sub-level pedestrian concourses, extension to rapid transit lines, ultimate removal of the elevated loop, surface car line terminals and extensions with the buses used as feeders and for light line operation are all included in the plan. The report is worked out on the basis of three periods, 1928 to 1935, then 1935 to 1940, and the final period 1940 to 1950. Investments at the beginning of the period, standing at $273,000,000, will swell to $1,003,626,000 by 1950. The final total would be divided $563,274,000 as company investment and $440,352,000 as city investment in the permanent structures of the subway and elevated lines.

Table III, on page 156, shows the estimated investments detailed by periods for city and company considered necessary by Mr. Blair to accomplish the plan and to provide adequate transportation for the 5,000,000 citizens conservatively estimated for 1950.

The first necessary step is to obtain the passage of enabling legislation by the Illinois General Assembly to permit the granting of a terminable permit type of franchise. Legislation is also necessary to authorize the consolidation of the surface line companies, chartered under the street railway act, with the elevated lines, chartered under the railroad act; to extend the powers of the city relative to special assessments, and to remove the 20-year limitation on the right of the city to lease city-owned railways.

Following this legislation the second step would be to effect the consolidation of the present companies into one, and the third step to grant a terminable franchise to the one recognized corporation, to remain in effect during good behavior or until the city should exercise its option to purchase.

It is estimated that such unified operation could be accomplished on an average fare of 7.35 cents, with free transfers between the lines of each basic type of system

TABLE I—CONSTRUCTION PROGRAM FOR CHICAGO DIVIDED INTO THREE PERIODS USED IN THE BLAIR REPORT

For the period 1928 to 1935	Structure Miles
Elevated	16.71
Joint occupancy in subways	5.86
Rapid transit subway	3.43
Surface car subway	4.45
For the period 1935 to 1940	
Subways	9.92
Elevated	21.45
For the period 1940 to 1950	
Subways	7.76
Elevated	56.74

and eventually between all services. On the schedule outlined a maximum fare of 7.71 cents will be reached in 1933 and the minimum fare of 7.06 cents in 1950.

The Physical Plan

Pending the construction of subways 1,000 new cars of a larger type would be purchased for the elevated system and 600 for the surface lines.

Immediate construction of four units of subways and elevated lines would be started. This would include a four-track subway in State Street from North Avenue to 23d Street, a four-track subway under Washington from Ogden to Michigan, with a two-track extension to a loop under Grant Park and another two-track extension under the park just east of Michigan Avenue to connect with a two-track subway under Adams Street. The Adams Street two-track subway would extend west to Halsted Street. The fourth unit would be a two-track elevated line extending from the present structure at Harrison Street east of State, along Harrison and Wells to Wells and Van Buren, where it would connect with tracks on Wells Street at separate levels. This unit would serve until such time as funds would be available for a subway along the west side of the central district.

These units are classed as the most urgent and should be provided immediately. The State Street subway would be used for both rapid transit and surface cars. This step will relieve part of the present elevated structure and give two rapid transit entrances into the city from the north and the south. The street surfaces would be relieved by the removal of many surface cars.

TABLE 11—ESTIMATED USE OF THE PROPOSED TRANSPORTATION UNITS BY YEARS

	Passengers Using Surface Cars or Buses for All or Most of the Ride	Passengers Using Rapid Transit for All or Most of the Ride	Passengers Using Both Types of Transportation for the Ride
1926	870,000,000	224,500,000	.....
1935*	955,000,000	390,000,000	140,000,000
1940*	1,073,000,000	475,000,000	194,000,000
1950*	1,200,000,000	800,000,000	400,000,000

*Fares collected would not be divided as these columns show when under the consolidated plan.

The west side would be helped in thus having more use of the elevated structure and the full use of the surface car subway in Adams Street.

One of the important features of the State Street subway is the pedestrian mezzanine extending from building line to building line with direct entrances to stores and buildings facing State Street. The three kinds of traffic will thus be essentially separated on State Street, the vehicles on the street surface, pedestrians on a level below and rapid transit and surface lines below that. This is well illustrated by the cross-section view.

Future Construction

Following the immediate subway units, other tubes should be started on Lake, Wabash, Van Buren and a cut-off along Milwaukee from Paulina to Lake. When completed these units will permit the removal of the present elevated loop. The table on page 154 shows the miles of structures to be built in each period.

The report points out that not all of the development would be confined to the central district. In the first three years there should be 40 miles of track extensions

Subway Development by 1950 in the Central District of Chicago as Proposed in the Blair Report

Table III—Estimated Investments by the Company and the City for the Three Periods from 1928 to 1950

	Company Investment		City Investment		Cumulative Total Investment
	Period	Total	Period	Total	
Company's original investment	$273,000,000	$273,000,000	.....	.....	$273,000,000
First period—1928 to 1935	113,902,000	386,902,000	$172,920,000	$172,920,000	559,822,000
Second period—1936 to 1940	62,520,000	449,422,000	110,034,000	282,954,000	732,376,000
Third period—1941 to 1950	113,852,000	563,274,000	157,398,000	440,352,000	1,003,626,000

and 60 miles of streets supplied with bus transportation. During the same period 600 old surface cars should be replaced, at the rate of 200 per year. Other cars will be altered during this period as to the arrangement of doors, platforms, etc., to make them more convenient. Other improvements cited are loop terminals at turn-back points, feeders, substations, new carhouses, additional shops and equipment and additional service equipment.

Improvements to elevated lines involve the purchase of 1,000 large and modern cars, the installation of a complete track signal system with automatic control and the rearrangement of routes and station layouts to provide better accommodations for the traveling public.

Financial Features of the Plan

The assumed base capital of $273,000,000 at the beginning of 1928 is the certified capital of the Surface Lines group and the Chicago Rapid Transit plus the additions to the capital account of $8,000,000 that will be made before the plan becomes effective. Some $5,000,000 of this additional capital will be allocated to a stabilizing fund.

The city will provide the funds for the subways and elevated structures from special assessments or otherwise and the consolidated company will provide the funds for equipment, consisting of tracks, cars, electrical facilities, ventilating apparatus, drainage systems, station equipment, substations, shops, yards, carhouses and other miscellaneous property used in operation.

Amortization of part of the company's capital has been provided for at the rate of 1 per cent of the capital account annually from 1933 to 1937, 1½ per cent from 1938 to 1942 and 2 per cent thereafter to 1950. The yield is to be applied to the retirement of mortgage bonds. By 1950 a total of $134,237,000 will have been accumulated and the retirement of bonds thus made possible will reduce the fixed charges and also the purchase price should the city decide to exercise its option.

Operation will be essentially on a service-at-cost basis and therefore public benefits such as the 55 per cent of surface lines net earnings, paving, street cleaning and sprinkling and similar indirect taxes have not been included, since these are considered unfair burdens on the riders. Likewise no return has been contemplated on the city investment, since the building of rapid transit facilities is considered in the same category as additional streets or analogous to street-widening projects.

While many courts have established 8 per cent as a fair return on invested capital, 7½ per cent is suggested in this report.

By 1950 the total investment in rapid transit will be $145 per capita, which is not considered excessive.

Chicago Rapid Transit Takes Leading Part in First-Aid Campaign

THE first-aid training school conducted by the Chicago Rapid Transit Company, Chicago, Ill., under the direction of Dr. Hart E. Fisher, head of the medical department, graduated nearly 300 student-employees during 1926. Regularly constituted members of the board of examining physicians of the American Red Cross are in charge of the final test to which each employee is submitted before he becomes eligible for a first-aid certificate. All classes of Rapid Transit employees, trained for any emergency, any time or at any place, passed the rigid Red Cross examinations. With more than 100 other employees already enrolled in first-aid courses, this year promises to establish an even higher mark than that set in the record-breaking year just closed.

Included in the courses offered for study by the Red Cross through the Chicago Rapid Transit Company school are the Schaefer prone-pressure method of resuscitation; treatment of fracture and the application of splints; rescue from contact with electric current, and treatment; stopping blood flow and application of roller and head bandages; restoration from fainting, and the transportation of injured.

Not only have first-aid educational activities been centered on employees of the Rapid Transit Lines but considerable effort has been expended toward education of the public. During the year 1926 a first-aid team of picked experts gave 184 demonstrations before public gatherings aggregating 87,000 persons. The Rapid Transit Lines also have the distinction of having won the Chicago city championship in first aid for two of the last three years. Interest taken by employees in the work has caused the school to set a "100 per cent" mark in first-aid training on the Rapid Transit Lines.

TABLE IV—ABSTRACTED EARNINGS STATEMENT ESTIMATED FOR CHICAGO'S CONSOLIDATED TRANSIT

Calendar Year	Revenue Passengers	Operating Expenses, Taxes and Renewals	7½ Per Cent Return on Average Net Company Capital	Amortization on Average Capital*	Total Columns 3, 4 and 5	Less Miscellaneous Earnings	Required Passenger Revenue	Average Fare, Cents
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1927	1,115,400,000	$64,268,000	$20,475,000	.....	$84,743,000	$1,924,000	$82,819,000	7.42
1930	1,190,000,000	67,977,000	22,083,000	.....	90,060,000	2,053,000	88,007,000	7.39
1935	1,345,000,000	71,650,000	27,952,000	$3,819,000	103,421,000	2,320,000	101,101,000	7.52
1940	1,548,000,000	80,661,000	30,621,000	6,651,000	117,933,000	2,670,000	115,263,000	7.45
1945	1,767,500,000	90,744,000	31,313,000	9,875,000	131,932,000	3,036,000	128,896,000	7.30
1950	2,000,000,000	101,382,000	32,110,000	11,136,000	144,628,000	3,450,000	141,178,000	7.06
							Average fare	7.35

* The amortization fund starting in 1933 will total $134,237,000 by 1950.

Increasing Car Speeds and Rush-Hour Carrying Capacity*

A Discussion of Various Factors Which Enter Into These Two Matters, with Particular Reference to Electric Railway and Bus Operation in Paris

By Paul Mariage

Commercial Manager Société des Transports en Commun de la Region Parisienne, Paris, France

RARELY does the average citizen who finds the use of the bus and tramway car necessary in his daily life realize the extent of the organization required to provide proper service. If he did, he would make greater effort to approve and promote legislation by which the acuteness of the conditions under which local service is given would be lessened. Two problems which vitally concern the economy of electric railway and bus operation are schedule speeds and rush-hour carrying capacity. As increases in each without too great expense are generally sought, particulars of the way in which the problem has been approached in Paris should be of interest. Incidentally, it might be said that the S.T.C.R.P., which operates all the tramway and bus lines in Paris, has 32,000 employees, 128 tramway lines and 75 omnibus lines.

Distance Between Stops

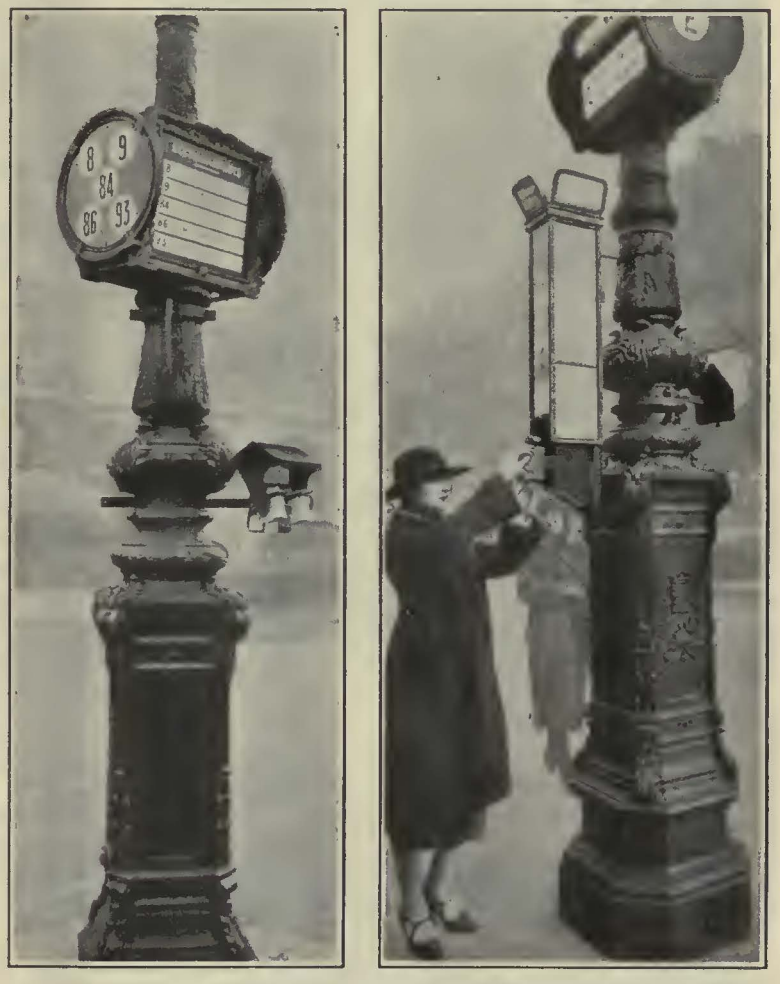
In cities with heavy traffic streets the principal factor in causing reduced speed is street congestion. In Paris the schedule speed of the street cars varies from 6.8 m.p.h. to 10.7 m.p.h. and of the buses from 7.3 to 9.4 m.p.h.

In other cities where there is great street congestion, as in Marseilles, London, Brussels and Barcelona, schedule speeds of cars do not differ greatly from these figures.

A second factor which has an effect on schedule speed is the number and extent of the grades and curves on the line. The speed of a car is not only automatically checked as it ascends grades but limits have to be put on the rate of descent. Thus in Paris, buses and cars are not allowed to descend grades at more than 5 m.p.h. when the grade is more than 4 per cent. In Geneva the longest grade is about a mile with an average of 3.35 per cent and the steepest part has an incline of 7.43 per cent for about 250 ft. The car speed permitted, both ascending and descending, is 5 m.p.h. As will be seen, this about corresponds with Paris practice.

Schedule speed is also a factor of the time of passenger interchange, and this time, in turn, is affected by the number and sizes of car doors, height of car platforms above the street and other features of car design. It was owing to delays in loading that led to the adoption as the standard in Paris of a center-entrance car with two large doors, low steps and a large passenger entrance reservoir.

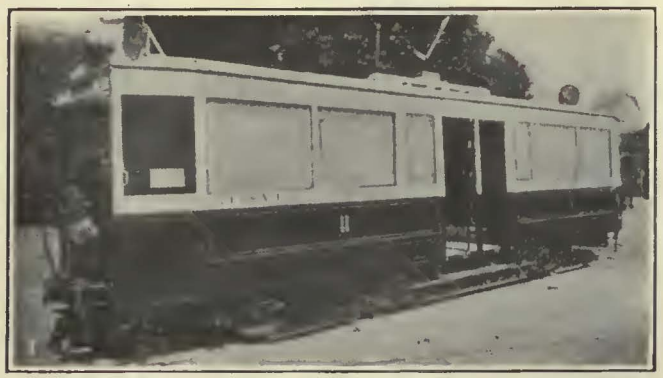
The effect of the use of more than one class of compartment on car speeds is open to question. On the other hand, the use of trailers with the same type of entrances as the motor car is thought in Paris not to increase the length of station stops.

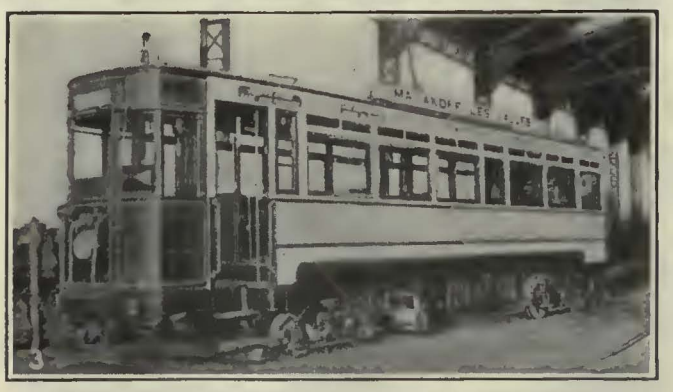


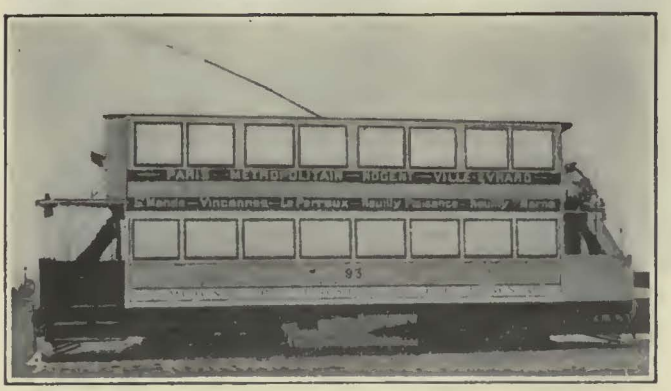
Methods of Issuing Queue Tickets in Paris

The illustration at the left shows the long-familiar method used in Paris for determining order in queues of waiting passengers. When a person intending to board a car reaches a stopping point he tears the uppermost number from one of the packages of numbers shown in the illustration, one package being for movement in one direction and one in the other. The numbers are called in order when a car arrives. This plan saves the passenger from taking his place in a waiting queue. The other illustration shows an improved form of number-issuing machine now being tried in Paris. Both illustrations also show the method of marking car stops. The route numbers of cars passing this point are indicated at the ends of the cylindrical looking car stop sign mounted on the lighting pole. The panel at the side gives further details by route numbers of the several routes which pass this particular stopping point.

*Abstract of paper presented at the biennial meeting of Union Internationale de Tramways, de Chemins de Fer d'Intérêt Local et de Transports Publics Automobiles, Barcelona, Spain, Oct. 10-16, 1926.







Types of Motor Cars Used in Paris

The present standards of cars on the Paris Tramway System are the type G car shown in Fig. 1 and the type L car shown in Fig. 2. An extended article about the type L car was published in the issue of this paper for Sept. 11, 1926. Both type G and type L cars have a wheelbase of practically 11 ft. and over-all length of 37 ft. 4 in. Owing to the narrowness of these cars only three people can be seated across a car instead of four as in an American car. Cross seats are used, but the seats are placed back to back. This arrangement is standard in all of the cars except in the double-deckers. The latter have longitudinal seats on both decks. The car shown in the first illustration weighs, empty, 14,850 kg. (32,670 lb.) and that shown in the second 12,800 kg. or 28,160 lb. Both have a capacity of 30 seated and nineteen standing passengers, though in each case there is capacity for four more standing passengers when the car is used as the second car in a train. The car shown in Fig. 3 has a capacity of 32 seated and nineteen standing passengers, and the double-decker in Fig. 4 of 70 seated and four standing passengers. The double-deck types are used only on a few routes in the outskirts of the city, except on special occasions, such as Sundays and holidays in summer.

The method of fare collection undoubtedly is another factor. The fare most rapidly collected is that which can be paid by a single coin. On properties where this fare can be used prepayment with a fare box is the logical method. Unfortunately, railways with zone systems cannot usually follow this plan. In Paris fares are not collected at the entrance, but by the conductor after the passenger takes his seat or standing position. The conductor passes continually from one end of the car to the other calling out "Fares, please." As passengers pay their fares they receive from him fare receipts torn from a pad and punched to indicate the amount of fare paid and the point to which the passenger is entitled to ride. This fare receipt must be held by the passenger during his trip and must be produced at any time when called for by inspectors who board the cars frequently. It is upon this inspection that the company depends for checking over-riding and riding without payment of fare. During rush hours fare receipts are sold by employees of the company to passengers on the street about to board the cars.

Still further to speed the service, the company is considering requiring all passengers to buy tickets before boarding the car. The conductor would then cancel each ticket by a machine which would stamp on the ticket the number of zones for which it was valid. At the same time the machine would automatically register the number of passengers carried by class and by amounts of fare paid.

Means for Increasing Schedule Speeds

In several cities limits are placed by law on the maximum speeds permitted. Thus in Paris the highest speed allowed is 30 km. (18¾ miles) per hour on through streets and 20 km. (12½ miles) per hour on cross streets. This speed has to be reduced to 8 km. (5 miles) an hour on descending grades of 4 per cent or more, at crossings and turnouts, while crossing switches, when passing points at which stops are usually made, when the tracks cross from one side of the street to the other, when the cars enter congested streets and when they are passing points considered dangerous.

The speed permitted buses varies to some extent with the type of bus used. The maximum of 35 km. (21¾ miles) per hour is allowed to the smaller and lighter buses, i.e., those with capacities of from 25 to 38 passengers and weighing from 10,500 lb. to 17,600 lb., but at various points all speeds must be reduced, as well as during fogs, over bridges, etc.

Schedule speeds can be increased by shortening the time of passenger interchange and by varying the schedule speed according to the conditions of place and time.

The rate of passenger interchange is speeded up in Paris on the public streets by three means, namely, by the use of safety areas, methods for forming loading queues and special island platforms. The plan of safety areas is followed on a number of properties. The method of forming loading queues in Paris is somewhat peculiar to that city and its value is questionable. Persons waiting to take a car are required to supply themselves at the corner at which they are waiting with numbers which indicate the order in which they are permitted to board the car, provided the latter has spare carrying capacity. Two bundles of these numbers are attached to a post near the stopping point, as shown in an accompanying illustration. Recently, however, an automatic number-issuing machine, also

shown herewith, has been put into experimental use, though it has not been in use long enough to determine its value. It has a capacity of 6,000 tickets, as compared with 1,000 in the ordinary distributor. It not only effects an economy of 6 per cent in tickets issued but there is a saving in the time of calling the tickets, since fewer are lost. This cuts down the length of station stops.

In cars which are not of the pay-as-you-enter type the principal features in car design affecting length of station stop are width of doors and height of steps. On the two latest types of street cars built for the Paris system the width of each of the two doors is 34 in. and on the trail cars the width of each of the two doors is 29½ in. The height of the steps is shown in inches in the accompanying table.

TABLE OF HEIGHTS IN INCHES OF PARIS CAR STEPS
(LATEST DESIGNS)

	Type G Motor Car	Type L Motor Car	Type A Traller
First step.....	10.8	8.0	9.5
Second step..	14.6	14.4	14.9

On the buses the width of the entrance is 24.8 in. and the height of the first step above the pavement is approximately 14½ in. in a loaded bus and from 17 to 19 in. in an empty bus. In addition to this step, there is a second to the platform and a riser between the platform and the car floor. In the very latest type of bus an effort has been made successfully to provide easier access. By means of a low hung frame the height of the platform has been brought to only about 10 in. above the pavement and between the platform and the car floor in this type of bus there is only a riser.

The second method mentioned above of increasing average schedule speed is by changes in schedule running time according to conditions. In Paris schedule speeds vary with the time of day and parts of the line.

Effects of Increased Schedule Speed

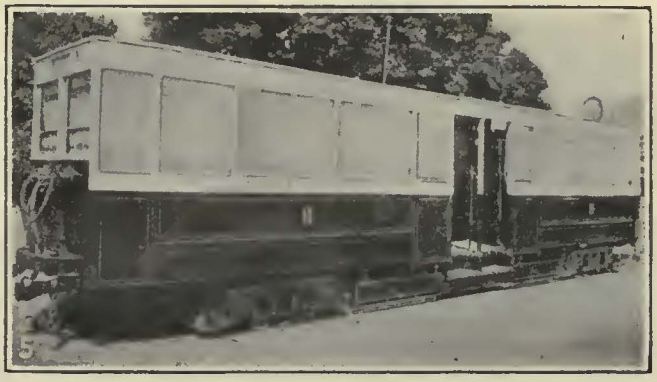
Increases in schedule speed will now be considered as to their effect (1) on traffic, (2) on economy in the use of equipment, and (3) on accidents.

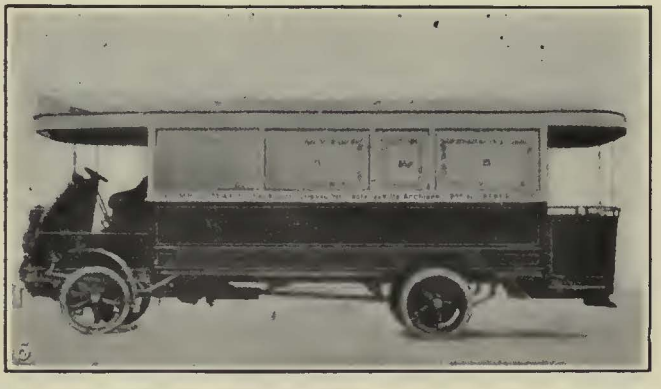
It is very difficult to give any rule as to the effect of schedule speed on volume of traffic because the extent of riding depends on so many causes. Nevertheless, it is only fair to assume that an increase in schedule speed will be accompanied by an increase in patronage, especially of long-distance passengers. Experience indicates that between comfort and speed in travel most passengers would choose speed.

There is also a distinct gain in economy of the use of equipment when the car-miles or bus-miles are increased in relation to the car-hours or bus-hours. Thus a smaller number of cars at high speeds can serve a line at the same headways than a larger number of cars at low speed, with consequent saving in equipment and personnel. On the other hand, higher speeds tend to increase the number of accidents. Comparison of two lines in Paris in which operating conditions were practically the same is shown in the table on page 160.

Distances Between Stops

The principle followed in determining the distances between car stops on the Paris system is that the distance should vary inversely to some extent with the density of traffic, although, practically, other factors





Double-Truck Trailer and Standard Buses, Paris

Fig. 5 shows the Paris double-truck center-entrance car usually used as a trailer and known as type A. It weighs empty 8,800 kg., or 17,600 lb., and when used as the second car in a train has a capacity of 34 seated and 24 standing passengers. It is designed to carry only second class passengers, whereas the cars shown in Figs. 1 to 4 have accommodations for both second and first class passengers.

Figs. 6, 7 and 8 show the standard motor buses in Paris. Fig. 6 has cross seats back to back and a capacity for 28 seated and ten standing passengers. Fig. 7 has a similar arrangement of seats and capacity for 40 seated and eight standing passengers. The two buses shown in Figs. 6 and 7 have rear platforms and rear entrances. Fig. 8 is the express type of bus with seats for 25 passengers. It has a front entrance and pneumatic tires.

The body of the bus shown in Fig. 6 has a weight of 1,800 kg. (3,960 lb.). The chassis weighs from 5,150 kg. to 5,350 kg. (11,330 lb. to 11,770 lb.), depending upon the type used. The total weight of the six-wheel bus, shown in Fig. 7, empty, is 7,340 kg. (16,148 lb.). The 25-passenger bus shown in Fig. 8, has a weight empty of 5,385 kg. (11,847 lb.).

RELATION OF SPEED AND ACCIDENTS, PARIS

Line A	Schedule Speed In m.p.h.	Number of Accidents Per 1,000 Car-Kilometers
Ordinary service	7⅛	0.428
Express service	10⅜	0.493
Line B		
Ordinary service	7¼	0.384
Express service	11¼	0.776

have also been considered. Thus, in general, stops must be located at all important street intersections and other like points.

Car stops may be divided into two classes, namely, those where a car would naturally stop and those established by the management as convenient points to receive and discharge passengers. In the first class are important loading points, places on the line considered dangerous for a car to enter without a stop, and zone limits. On the average line in Paris the proportion of these obligatory stops to the whole number is about 30 per cent. Optional stops are then located at logical points between obligatory stops, based on the observed movements of passengers. The spacing used between stopping points is about 250 m. (820 ft.) in the central portions of Paris and 350 m. (1,150 ft.) in the outskirts of the city or where the streets are not congested.

The average length of obligatory stops is fifteen seconds when the speed is less than 12½ m.p.h., twenty seconds when it is more than 12½ m.p.h., twenty-five seconds at carhouses where there is a change of crew and thirty seconds where a change has to be made from conduit to overhead trolley operation, or vice versa. At the optional stops five seconds is the average time allowed where the speed is less than 12½ m.p.h. and ten seconds where it is more than this rate.

In Paris all stops are marked by enameled sheet iron disks attached to the street lighting poles and colored red if the stop is obligatory and green if it is optional. All lighting posts carrying these disks are furnished with green shades over the lamps so that they are distinguishable at night. The latest type of stopping sign is shown in the same illustrations that show the method of issuing tickets to waiting passengers. There are two disks on the lamp pole separated by panels. the disks show the route numbers of the cars which pass that point. The panels contain information by route numbers of the principal streets covered by the cars on each route.

On the bus lines a special stopping rule is in force after 9 p.m., when the traffic on the street is less than during the day. Under this rule any bus will stop on signal to discharge a passenger at any point which is farther away than 50 m. (165 ft.) from a regular stopping point.

Conspicuous marking of car stops has two distinct advantages from an operating point of view. The first is that it collects waiting passengers definitely at one point so that the time of loading is reduced to a minimum. The other is that it makes easier any desired change in the number or position of car stops. Thus, in Paris a study is now being conducted to determine the possibility of reducing the number of stops by about 20 per cent.

Increasing Rush-Hour Carrying Capacity

The means for increasing rush-hour carrying capacity which appear to be most important are as follows: (1) Increase in the number of cars and the employment of cars of larger capacity, (2) increase in schedule speed, (3) short routing of cars, (4) use of cars with folding seats, (5) establishment of express or direct service.

The first method, increase in number of cars or use of larger capacity cars, is followed on the Paris system by the employment of trail cars. On a great many lines single trailers are used and on a number of lines operating outside the city trains of three or four cars are employed. The company has a number of double-deck cars with from 74 to 83 seats each, but they require the use of two conductors, and their use is limited to a few routes in the outskirts of the city except on special occasions, such as on Sundays and holidays during the summer season.

Daily car inspection is arranged with the idea of having at least 83 per cent of the rolling stock available at the beginning of the day, 90 per cent at 11 a.m., 94 per cent at 1 p.m., 95 per cent at 2 p.m. and the entire equipment by 4 p.m.

Adjustment of the rush-hour schedule is complicated by the agreement which the company has with its motorman and conductors. This agreement provides:

	Hours
Average working time per week	48
Maximum working time per day	9½
Maximum spread of work	13½

Meal relief times are also specified, and for the morning shift cannot be before 10:30 a.m. or after 1:30 p.m. and for the afternoon shift cannot be before 4:30 p.m. or after 8:30 p.m. A spread of 13½ hours must not be exceeded in any case.

It will be seen that these rigid regulations make economic arrangement of schedules very difficult, since the heavy traffic period continues for about fifteen hours or from 5:30 a.m. to 8:30 p.m. To help the situation the company has had recourse to the following:

Women are employed as conductors during four hours of the day; some shopmen work as motormen during part of the day; some employees in other departments do miscellaneous transportation work on part of their time; on Sundays and holidays it is quite common to transfer men from one division to another according to the extent of the traffic; men are not permitted time off on days of heavy traffic; some overtime is paid to volunteers, etc.

Of the second and third methods of coping with rush-hour traffic, listed above, means of increasing schedule speed has already been considered in this article, and short routing of cars is used to a considerable extent.

The fourth method of increasing rush-hour capacity, mentioned above, is by the use of folding seats. Several companies in Europe are using successfully seats arranged to fold and swing out of the way during the rush hours to increase the standing room and hence the carrying capacities of the cars during this period. Up to the present this plan has not been followed on the Paris system, but it offers a means of coping with the rush-hour situation. The plan seems especially adapted to prepayment lines.

The introduction of express service or direct lines was the final method suggested above for increasing rush-hour capacity. A test of this plan was made with buses in Paris recently. The buses made only a few of the stops made by the regular lines, but the experiment did not prove very satisfactory and was aban-

doned. One trouble was that the loads were carried in one direction only. Another was that in congested streets it was difficult for the express buses to make much better time than the local buses. The experiment showed, however, that there is a field during the peak hours for an express bus service at higher rates over the same general routes followed by the ordinary buses, provided the express buses can make considerably better time.

The Lyons Tramway & Omnibus Company has been operating some express buses of this kind at higher fares with success. It has found that on the streets where this service of buses and tramcars operates together the express bus service has speeded up all the traffic on the street and so helped the tramcars to make better time.

An Added Source of Revenue

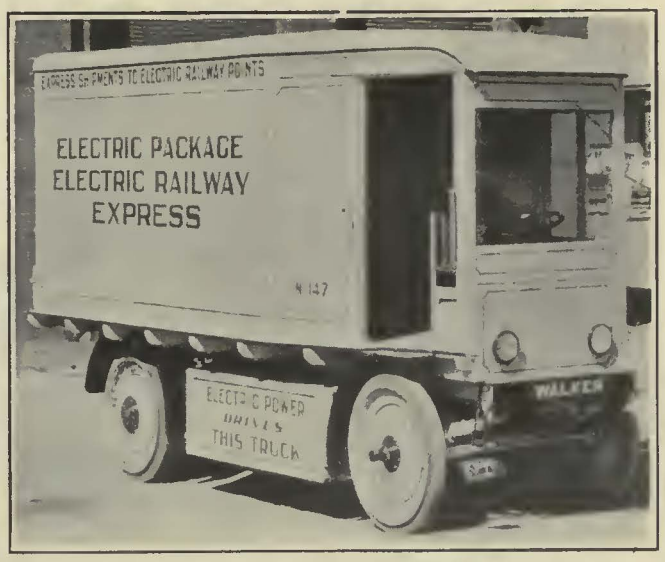
Electric Railways May Provide an Attractive Express Service in Conjunction with Their Normal Freight Movements

By F. W. Brown

Manager Electric Package Agency, Cleveland, Ohio

METHODS of obtaining additional revenues for electric railways, as well as for increasing the capacity to serve, are of importance at any time, and at this time when store-door delivery is being given consideration, the subject of express shipments on electric lines naturally comes to mind. It may not be generally known that in the main express shipments are in a class by themselves and that there is no conflict between such shipments and freight. That is, shipments that are intended to move by express will so move, and as electric railways do not, except in a few instances, provide such express service, the business goes to the old line express company.

The features of express service that make it differ from freight are essentially such as to make it a preferred service, for which the shipper or consignee seems willing to pay. The pick-up and delivery does not by any means constitute the entire difference. Cash-on-delivery service, insurance for valuable merchandise, as well as less packing restrictions, all are identified with express shipments. In these days of rapid movement of freight by electric railways, the "Order Bill of Lading" is too slow and the merchandise is at its destination long before the bill of lading is at the bank. This causes confusion and dissatisfaction; while with the c.o.d. express shipment, delivery is immediate and the payment at that time closes the transaction, so far as the consignee is concerned, all at once.



A New Electric Truck that Has Just Been Added to the Electric Package Agency Fleet in Akron, Ohio

As stated earlier, there is enough difference in the class of shipments moving by express and by freight so that there is no conflict between the two. Shippers not providing their own trucks find but little, if any, difference in the cost by express and by freight plus drayage, with the advantage of expediting movement by express.

The Electric Package Agency, acting as agent for the Lake Shore Electric Railway, the Cleveland-Southwestern Rail & Light Company and the Northern Ohio Power & Light Company, performs an express service between all stations located on these lines and to Detroit via the Detroit United Lines and to Youngstown via the Pennsylvania-Ohio System. All the features of the express service are furnished by the Electric Package Agency, and the rates charged are the same as by the old line express company. Soliciting, advertising, auditing, filing of tariffs and investigating of claims are matters taken care of by the Electric Package Agency, as well as provision and maintenance of all street equipment and the pick-up and delivery service. The rail lines furnish the transportation between terminals in the same manner and in the same cars as they transport interline and local freight shipments. It has been found that the regular freight car movements are frequent enough so that with but one exception additional service is unnecessary.

Street Equipment Used in Cleveland, Ohio, in Making Door-to-Door Pick-Ups and Deliveries

Giving Credit for Service

IT IS the purpose of the *Buyer's Guide* to boost home business by telling people why Massillon dealers serve them best.

Sometimes, however, we overlook the fact that every merchant is not selling tangible merchandise. Sometimes he is selling service only, but he is really a merchant just the same. And when you buy service and get good service, you are getting more than your money's worth.

The illustration we have in mind is one which occurred right here in the Guide office last week. We were looking for a shipment of paper over the Electric Package Company's lines. It was an important shipment, and every minute's delay meant real money.

Meeting Paul Englehardt, 1434 Sixth Street, driver for the Electric Package, we asked him to watch for the shipment and snap it to us. Englehardt probably gets lots of rush calls, and knowing this we expected we would get our paper "when it came."

But next morning early in walks "Pauly," with his eternal beaming grin, saying, "Here's your stuff. Just came in." That little extra service on Englehardt's part saved us dollars and kept in good humor an exacting customer to whom we, in turn, were trying to give service.

That is what we mean when we say that whether a man sells merchandise, service, or both, it is a pleasure to know that "Massillon serves you best," and if Englehardt reads this, he'll know we appreciate the kind of service he sells.

—*Buyer's Guide*, Massillon, Ohio.

Quality of Service Rendered in Massillon, Ohio, by the Electric Package Agency Is Commended by the Local "Buyer's Guide"

The express shipments are loaded last in the same car with the freight or, where the volume for any one point is sufficient, the entire car is used, but such is handled in the same train with freight cars. It will be seen that this additional tonnage which cannot be secured except by furnishing the express features of the service is added at an attractive rate with little or no additional expense.

Express rates are usually three times greater than first-class freight rates. The expense of performing the pick-up and delivery and other features of the express service is approximately one-half of the gross revenue from this source, thus leaving to carriers a rate per ton well above the first-class freight rate, or double the average rate received for freight shipments handled at the same time. The volume obtainable, however, is much smaller.

Such a service would not be profitable if performed separately; it should be in addition to service now operating. Nor can individual lines establish such a service locally; it would necessarily have to be operated separately and to include all connecting lines now operating through cars in interline freight service, its scope being to provide on electric lines the same service now provided on steam lines by the American Railway Express Company. The Electric Package Agency has performed such a service for a number of years for the lines it represents. While the territory it covers is limited, yet the gross earnings received from this source are such as to make it interesting, especially as there is but little additional cost to the carriers because of its operation.

Old Passenger Cars Rebuilt for Freight Trailers

SEVERAL old wood passenger cars have recently been converted into freight trailers by the Indiana, Columbus & Eastern Traction Company at the Springfield, Ohio, shops. The views show the method of accomplishing this conversion. After the windows, seats and interior fittings have been removed the ends and sides are covered with tongued-and-grooved side sheathing, which is then painted the Pullman green used on the passenger cars of the company.

Motors, gears and control are also removed and the air brake equipment arranged for operation in train service. The hand brakes are changed as shown in the accompanying illustration of the completed car. Standard freight car door openings are cut in each side and inside hung doors mounted.

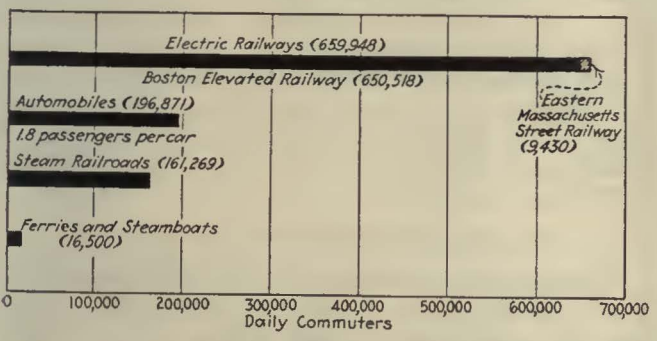
The two cars shown were completed during the summer and fall months at an average cost of $835 each. They will be put in service on the company's lines to care for its growing carload freight business.

Reconstructing an Old Type Passenger Coach for Use as a Freight Trailer in the Springfield Shops of the Indiana, Columbus & Eastern Traction Company

One of the Freight Trailers Just Rebuilt from a Passenger Car. A Few Years ago the I., C. & E. Purchased Several New Light-Weight Passenger Cars to Replace Old Heavy-Weight Wooden Ones

Boston "L" Issues New Guide Book

INFORMATION concerning car and train service of the Boston Elevated Railway, maps of the system and pictures of interesting and historic spots in and around Boston are given in a revised book just issued. The cover is a colored representation of the Park Street station and surroundings, showing Boston Common and the State House. Colored maps show the surface car lines, rapid transit lines, bus lines and foreign connecting lines. Under the head "The Elevated Carries the Commuters" a striking diagram is presented showing clearly the fundamental character of the co-ordinated transportation system in metropolitan Boston. The relation of the riding habits to transportation service is convincingly brought out. Figures are presented to show that traffic congestion can be reduced by increasing use of the Elevated lines. The booklet is compiled and distributed jointly by the Elevated and the Boston Chamber of Commerce.



Figures Show that the Boston Elevated Carries Nearly 70 Per Cent More Commuters than All Other Means of Transportation Combined

High-Speed Articulated Cars for W., B. & A.

Ten Two-Car-Body Units, Each Mounted on Three Trucks, Will Supply Limited Service Between Washington and Baltimore—Easy Riding Qualities and Superior Appointments

ORDERS for ten articulated cars have recently been placed by the Washington, Baltimore & Annapolis Electric Railroad with the J. G. Brill Company. When completed these cars will supply the half-hourly service on the 40-mile double-track main line between Baltimore and Washington. The double-car units will be mounted on three trucks and except for the rigid connection between the front and rear bodies through the agency of the articulated mounting on the middle truck the unit will be operated as one car, having, however, the passenger carrying capacity of two cars. Four motors per unit will be used, mounted two on each end truck in the standard manner. One set of control and air brake equipment will be used per unit. The cars are arranged for double-end operation, a motorman's cab being built in the right-hand section of each front vestibule.

The service between these two cities, based on studies extending over several years, is such that a two-car capacity is always required. Nearly all of the traffic handled between Washington and Baltimore is through business, since the intervening territory is sparsely settled. What local service does exist is handled on a two-hour headway by individual cars. In addition to this, the Baltimore to Annapolis trains operated via the Naval Academy Junction supply local service for the northern section of the main line.

For the through business between Washington and Baltimore, this company is in competition with the Pennsylvania and the Baltimore & Ohio Railroads and the Washington Motor Coach Company. Thus speed and comfort are essential factors. In these trains it is expected that greater riding comfort will be obtained due to the articulation, since the rigid connection reduces the tendency to side sway or to nose.

New Rolling Stock Needed to Increase Passenger Riding

Immediately following the cessation of the World War and the gradual curtailment of governmental activities there was a very pronounced falling off in Baltimore-Washington traffic. On the other hand the business on the company's two other lines between Baltimore and Annapolis held up to a greater extent despite the increasing use of automobiles. This new equipment will be directed, therefore, at the division showing the greatest relative losses. The company has for many years enjoyed more than half of the Baltimore-Washington traffic, so that these new cars will not only tend to check losses but they will also provide an agency whereby a greater share of this very desirable business can be obtained.

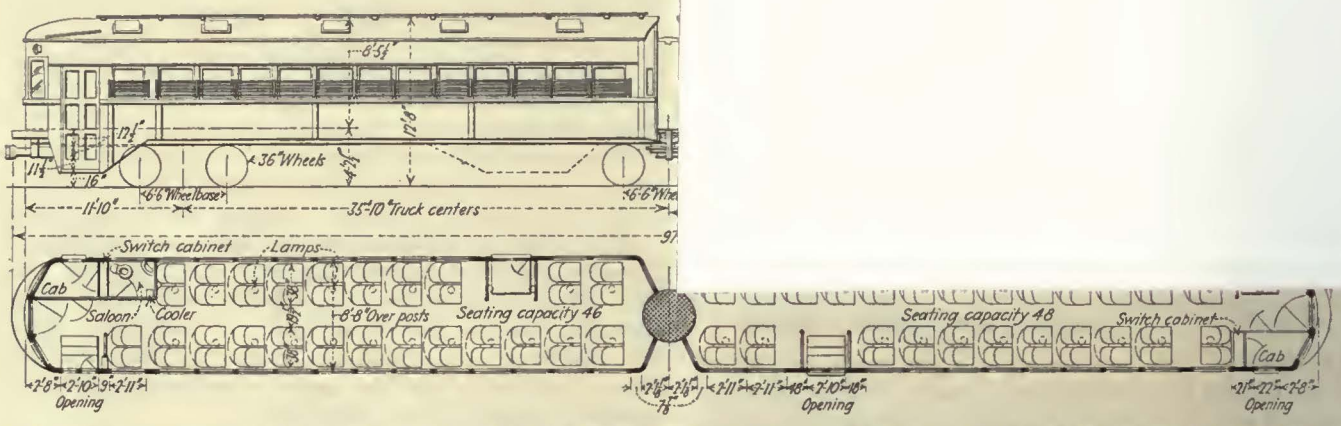
At present the company operates between excellent terminals near the center of each city, and while the running time from terminal to terminal is 85 minutes, because of relatively slow operation over city streets, this differential over the steam road schedules of one hour is not so obvious when the time and money

element of a taxicab or street car ride necessary to reach the steam road terminals is taken into consideration.

By this change in equipment not only modern steel equipment of more attractive design will be available but a more economical unit will thus be created. The weight saving alone, unit per unit, is nearly 30 per cent, or over 23 tons. Four motors instead of eight, one set of electrical and air brake control as against two, three trucks as against four, will all reflect savings in operating and maintenance costs.

One Door Used for Entrance and Exit

The passenger carrying capacity is the same as two cars, since two car bodies are used. Due, however, to the permanent connection and the easy access between units of the articulated train, it is planned to use one door for entrance and egress to the articulated car, and the conductor will control all passenger movement from one position and handle the fare collection



Side View and Floor Plan of One of Ten Articulated Cars Being Constructed for the Washington, Baltimore & Annapolis Electric Railroad
These cars will supply limited service over the 40-mile double-track line between Washington and Baltimore, operating on a 30-minute headway. The present wood cars, in constant service since 1910, weigh approximately 80 tons per train. The new articulated units are estimated to weigh 59½ tons.

of the complete car. In addition to the 34-in. door openings near the middle end of each car body an end door of the same width is available for use at terminals. All doors will be pneumatically operated.

Each car body will have a length of 47 ft. 8 in. and when mounted the articulated unit will have a total length over all of 97 ft. 4 in. The seating capacity of each half unit is nominally 48, except that space for one double seat is used for the installation of the saloon at one end of the car bodies. A flush lavatory and basin will be supplied in each saloon.

The seats will be double-rotating chairs of Hale-Kilburn manufacture. The backs will be curved, as illustrated in the diagram, and heavily padded. Seats will be constructed with individual spring cushion pads and individual arm rests at the end. Frieze plush will be used for the outer covering. Ample knee room will be available, since the seats are to be mounted on 35-in. centers, and they will thus conform to the side window spacing.

Double wood flooring will be used, the bottom to be laid lengthwise and the upper crosswise. The top floor is to be covered with a standard type of cut-out Pullman rubber tile.

Supported on steel carlins, the arch type roof will be constructed of tongued-and-grooved sheathing covered by canvas in the conventional manner.

per unit with double-end HL type control, arranged for operation on either 600 or 1,200 volts. Propulsion current is obtained from an overhead 1,200-volt trolley in the city of Baltimore as well as on its private right-of-way from that city to the District Line, then overhead 600-volt trolley to Fifteenth and H Streets, Washington, after which the cars are operated over the 600-volt underground conduit system of the Washington Railway & Electric Company.

Braking Pressure Regulated by Load

Westinghouse automatic and straight air brake equipment will be used. It will be designed to apply pressure to the wheels of all three trucks in proportion to the relative weight on each.

Special attention is being given to all of the interior details, such as lighting, heating and ventilating. It has been decided to use 22 double coil truss plank heaters controlled by a thermostat in each section. Both the heaters and the ventilators, ten of which will be used in each section, will be manufactured by the Railway Utility Company. The company has adopted a deep letterboard in lieu of the Gothic glass which this company had previously used and which is in keeping with the modern interurban cars. Plate glass is used in the windows and will give a pleasing outlook to the passengers.

Cab-Controlled Couplers Speed Up San Diego Service

High-Speed Multiple-Unit Trains at San Diego Demonstrate Merits of Combination Air and Electric Car Coupler in Heavy Interurban Service, Where Speed in Coupling and Uncoupling Is Essential

By R. G. Averill
Commercial Engineer Ohio Brass Company

COMPLICATED coupler problems were involved in the equipment of 50 cars purchased by the San Diego Electric Railway early in 1923 from the American Car Company of St. Louis. These cars were intended primarily for train operation and had full motor equipment with multiple-unit control, but they were also designed so that they could be operated individually, as either one-man or two-man units.

On the Interurban Line as Many as Six Cars Are Used in a Train

The train operation in which these cars are being used is on the Mission Beach and La Jolla line and on the Ocean Beach branch line. The traffic on these routes is highly fluctuating and has a pronounced seasonal variation as it is largely tourist and amusement park traffic. It was necessary, therefore, to provide peculiarly elastic trains and trains which could be coupled or uncoupled quickly en route, as these trains generally comprise a three-element unit which uncouples at two points on the outward journey and is again reassembled in a reverse manner at these same two junction points. A train of from three to six cars leaves the plaza at San Diego and runs as a unit under the control of a single motorman through the city streets, northwestward around the harbor and across the base of the Point Loma Peninsula to Ocean Beach Junction, a total distance of 6 miles, in a scheduled running time of eighteen minutes. Here the rear one-third of the train is detached, practically with no delay, to turn south to Ocean Beach, while the front section proceeds north 1 mile to the Mission Beach amusement center. Normally the leading car of the train is detached at Mission Beach and proceeds 6 miles further north to La Jolla. The total running time from San Diego to Mission Beach is 21 minutes, while to La Jolla it is 35 minutes. The return trip, of course, is simply a reversal of the evolutions described for the outward journey and all cars are again collected into a single unit for operating over the city streets. This minimizes congestion of traffic in the business center and has proved a popular as well as efficient method. From the description of this operating system it will be evident that speed in coupling and uncoupling cars, while loaded and in regular service, is an essential factor in maintaining a satisfactory schedule. These coupling and uncoupling operations not only must be done quickly but they must be casual incidents, entailing no annoyance or discomfort to passengers. At first thought these

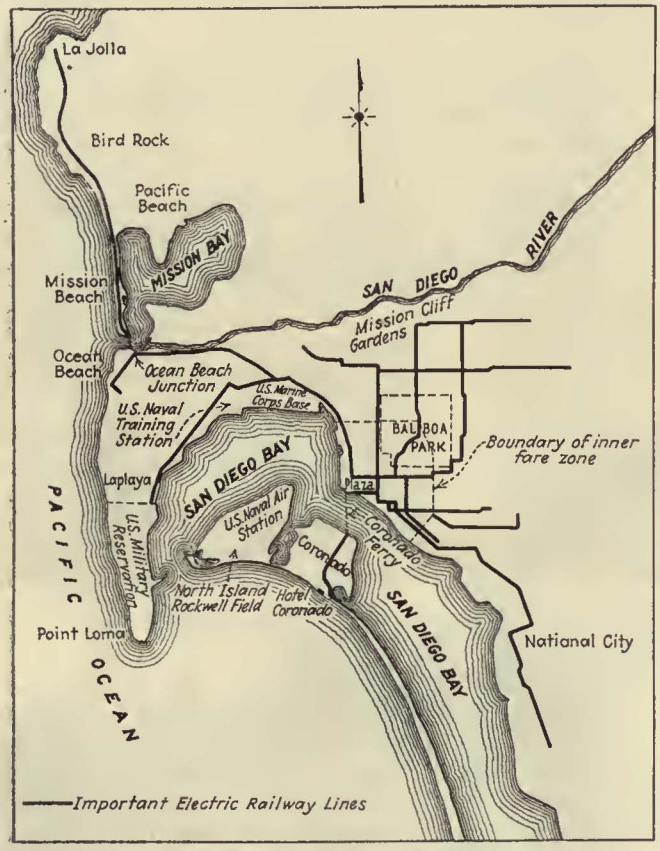
A Passenger Train at the Plaza in the Central Business District of San Diego

may not seem remarkable requirements, but such a conclusion is due to a failure to appreciate all the necessary operations involved in making a complete coupling between modern multiple-unit motor cars. Perhaps a tabulation of some of these requirements will prove interesting and may win for the lowly coupler some measure of the respect which its humble performance of vital functions merits:

1. Automatic mechanical coupling upon impact. The

physical connection which must withstand all tensile and compressive stresses incident to train haulage and coupling shocks. The coupler face at the ends of a car or train must be in condition (without requiring preliminary adjustment) to engage a counterpart coupler quickly and securely when the two are brought together. The coupler must be anchored securely yet flexibly to the platform underframing to provide for car haulage and still permit the necessary horizontal, vertical and torsional movements required of coupler bars on coupled cars when traversing curves and abrupt grades.

2. Manually controlled uncoupling means, whereby a trainman on either adjacent platform can quickly and



This Map Shows the Principal Lines of the San Diego Electric Railway

safely effect an unlocking of the couplers and separation of the cars.

3. Automatic coupling of two air brake pipe lines upon impact.

4. Manual control equipment on each platform for positively opening valves in both air brake lines after the couplers have been engaged and for closing these valves (during the uncoupling operation) before the coupler heads can be disengaged. The movements of the valves on both platforms must be subject to the control of an operator in either car.

5. Automatic electric coupling, involving the closing upon impact of sixteen independent train line and control circuits and of a separate power bus line circuit.

6. Manual control equipment on each platform for operating, pneumatically, special drum type switches on coupled ends of cars, each switch serving to close the several circuits leading to the electric couplers subsequent to coupling, and to open them prior to uncoupling. The movements of the switches on both platforms to be subject to the control of an operator in either car.

7. The provision of a positive mechanical interlock between the electric coupler disconnecting switch and the air brake pipe valves on each platform. This prevents the switch being closed when the valves are closed, or the switch being open when the valves are open, a safety feature which insures that no "live" contact parts will be exposed on the uncoupled ends of a car or train. No car can be operated with the air valves open because such a condition automatically applies the brakes. It also safeguards train operation by insuring the necessary opening of air line valves between cars (for proper braking conditions), as otherwise no power can be supplied the cars back of the platforms where switches are open and valves closed.

8. A pneumatic interlock between the disconnecting switch engine and the uncoupling cylinder. This prevents couplers being separated until after switches have opened all electric coupler circuits and consequently prohibits any possibility of arcing at the electric coupler faces during uncoupling.

9. The provision of an electric interlock which insures the interruption of all train control and bus line current between cars upon initial movement of the uncoupling button at any station where uncoupling may be required. This is a safeguard for the disconnecting switches as otherwise they might be required to break heavy bus line currents, should uncoupling be made while the train is moving and with power on the motors.

10. A special arrangement of the circuits involved in the coupling up operations which renders them ineffective until mechanical coupling between cars has been completed. This is an important safety feature which prevents any possible opening of the air brake valves on the uncoupled ends of a car or train, more particularly while in motion. Emergency brake applications are thus prevented even should "coupling" button be pushed.

11. The provision of a concealed interlock button in the coupler control, push button box which must first be pushed in before the main coupling or uncoupling buttons can be operated. This, of course, is merely an added safeguard to prevent an inquisitive child or other unauthorized person causing an uncoupling by pushing an uncoupling button at some unoccupied cab station.

12. The provision of a coupler equipment having a practical and safe system of control which permits uncoupling of cars or train sections at full schedule speed, if desired.

Not one of these requirements is unessential to an acceptable operation of these trains. All have been achieved by simple means, without complication, and without addition to the duties of the train crew. As a matter of fact, the coupling and uncoupling operations have been greatly simplified and the attendant labor reduced. Entering between cars is no longer necessary to complete the mechanical coupling, to couple up the air hoses or to insert the end plugs of the train line and the bus line jumpers in their sockets. A motorman simply approaches the car to which he is to couple, engages the couplers, and then, without leaving his station, presses the coupling button. This energizes electro-pneumatic valves under each platform, admitting air to the disconnecting switch engines, which completes the coupling operations by closing the switches and simultaneously opening the valves in the air brake pipes. There need be no delay in service due to coupling, as cars equipped with this form of remotely controlled

coupler apparatus have been coupled on the fly while running at 20 m.p.h. It is the difficulty of correctly estimating car speeds which renders this procedure hazardous, not any limitations imposed by the couplers.

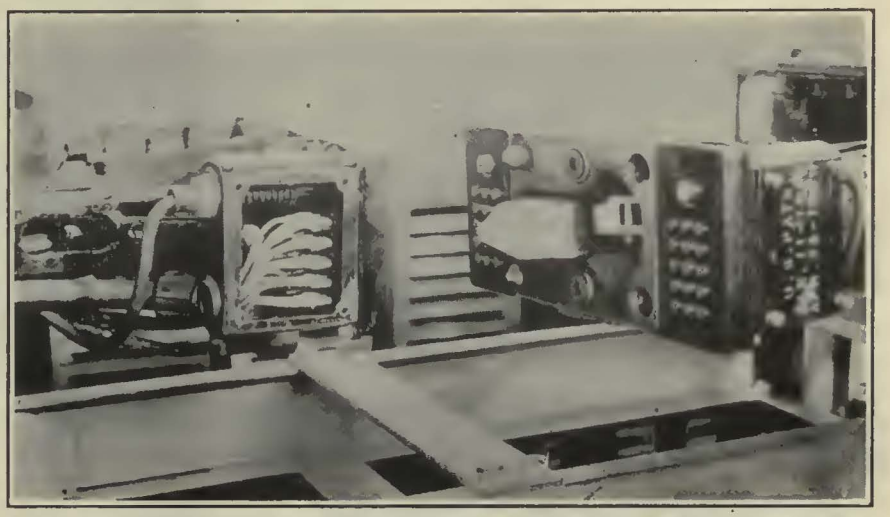
Uncoupling is equally simple and it is entirely safe, as well as possible, to uncouple while running at full speed. At the desired point, the conductor on the rear end of the forward section presses the uncoupling button, which energizes another set of magnet valves and operates the disconnecting switches on both platforms to the open position. After air valves are closed and switches are open, further travel of the switch engine piston admits air to the uncoupling cylinders and the coupler hooks disengage, allowing the cars to separate.

Never, prior to this San Diego installation, had cab-controlled coupler equipment (including bus line electric couplers) been used on a commercial scale in regular daily service. The novel character of the equipment, and more particularly its control, it was thought, justified this rather detailed description. To the more practically inclined, the convincing record of 2½ years of daily operation may prove even more interesting.

The coupler proper is of the well-known Tomlinson type, attached to the car by means of an oil-lubricated ball anchorage and supported in a special spring carrier to permit trains to travel over the abrupt Broadway grades. The electric couplers bolt to the sides of the coupler heads and thus afford maximum clearance underneath, which is important on low cars used in city service. The bus line cables (two parallel branches from the electric couplers combined into a single car cable), which terminate in the large contacts in the upper portions of the electric coupler faces, pass back through the terminal chamber entirely inclosed in insulating sleeves. Thus double current capacity is provided at the bus contacts as well as complete protection for the train line and auxiliary circuits which occupy the terminal chambers. The disconnecting switch comprises three switch boxes and a pneumatic driving engine, all coupled together as an operating unit on a common bed plate which also serves as a mounting means for attaching the switch unit to the car underframing. The two electro-pneumatic valves are mounted on a bracket under the platform near the corner of the step where they can be reached (in emergency) for manual operation of the valve stems. The push button box or operating station is located above the center window of the vestibule where it can be conveniently reached and yet where it will not attract attention or be accessible to children.

The cars equipped with these couplers are large, double-truck, double-end, city cars of arch,-roof, drop-platform design. They are 47 ft. 5 in. in length over buffers with 23-ft. truck centers and weigh 48,740 lb. fully equipped. They will seat 57 passengers and have a total estimated capacity of 90. One, two and three-car trains employ one trolley pole on the front car for current collection. When more than three cars are operated as a train trolley poles are used on the first and last cars to reduce the amount of current drawn from a single trolley wheel, and also to reduce the current passing from car to car through the bus line. Heavily loaded six-car trains have been observed, however, running with only one pole up. This is good proof that generous overload capacity is afforded by the bus line couplers.

The San Diego Electric Railway uses 70 cars during the morning rush hour, 60 during the middle of the day and 92 for the evening peak from 4:20 to 5:40. Eighty-five thousand passengers per day is not an uncommon load in one of the peak tourist seasons. One of these peak seasons is in the winter, when the city has a large temporary population of Eastern visitors. The other is during summer months, when it regularly entertains a considerable number of people from Arizona and the interior valleys of southern California. During other parts of the year, however, there is a large and constantly growing traffic, because San Diego is the metropolitan center of a vast surrounding region.



A Combination Coupler Head that Is Giving Good Service Under Arduous Conditions

It should also be remembered that the city is the home port and supply base for the destroyer division of the Pacific fleet; that the chief army and navy aviation base for the Pacific Coast is at Rockwell Field, on North Island, in the harbor; that the Marine Corps base for the Pacific is here, and that the U. S. Naval Training Station as well as the U. S. Naval Hospital are permanent institutions at this port. The considerable population of these several military bases supplies an interesting and important contribution of car riders which is particularly desirable as it usually constitutes an off-peak load.

Railways in Indiana Operate 278 Buses

TRACTION companies in Indiana operate 278 buses, with a total passenger capacity of 6,447 people. These buses operate over routes traversing 1,093 miles. Of this mileage, only 62.6 is over city streets as auxiliary service to the street car lines. The rest of the mileage is over country roads between cities. The fares are fairly well standardized, ranging between 7 and 10 cents, excepting in two cases where rides are sold for 5 cents, and intercity charges averaging from 3 to 4 cents a mile. Six of the companies accept passengers willing to stand if all seats are occupied, but two others accept passengers only up to the seating capacity.

Bucket Seats Prove Popular

Public Service Railway Has Converted Latest City Car to Semi-de Luxe Type—New Exterior Color Scheme Permits Easy Identification

IMMEDIATE popular approval marked the introduction of a semi-de luxe car on the Bloomfield line of the Public Service Railway, Newark, N. J. For this service one of the latest city cars was completely renovated and repainted. Leather-covered individual bucket seats have replaced the old longitudinal cane-upholstered seats and the floor has been covered with linoleum.

Reconstruction was planned with the idea that the man who now drives his own automobile can be induced to ride the street cars if he is assured of the same degree of comfort as that to which he is accustomed. It is the hope of the operating officials of the railway that the remodeled car will prove sufficiently attractive in comfort and appearance to popularize the service and thus attract many new patrons who heretofore have used their own private transportation.

On each side are ten double bucket seats. A well about 12 ft. long is created at the front of the car by side seats holding six passengers each. The total seating capacity is 52. Spring hand straps of the type frequently found in rapid transit cars are provided on both sides of the car.

Side walls from the floor to the windows are paneled, the upper part being painted in imitation of hard wood. Iron and wood work in the car and on the front and rear platforms is painted a mottled brown and tan. The roof is painted white.

Outside the cars are easily distinguishable from the ordinary cars by the color scheme. Public Service yellow on the body has given way to a dark maroon, which rises to the window sills. Above that line a cream color is used. Gold lettering on the maroon side gives a pleasing effect. The new car is being operated in regular service at the usual fare. In addition to the one car already completed, ten others are being rebuilt in the same way.

The New Color Scheme Adopted by Public Service Railway to Distinguish Its Semi-de Luxe Cars Is Maroon and Cream

Double Bucket Seats Upholstered in Leather Have Replaced Longitudinal Cane-Upholstered Seats in This Car, with Which the Public Service Railway Is Trying to Attract Traffic from the Private Automobiles

Decreasing Congestion Losses

Dr. McClintock in Survey of Street Traffic in Chicago Discloses Many Interesting Facts—Improvements Are Suggested in Traffic Survey

A YEARLY saving of $27,000,000 can be made by a reduction of only 10 per cent in the delays affecting various types of traffic in Chicago. This is the extent of the economic burden that follows in the wake of traffic regulation, it is pointed out in one phase of the Albert Russel Erskine bureau's findings in that city alone. Experience with certain types of regulation in Chicago and other cities has demonstrated, the bureau points out, that where proper methods of control are applied the speed and volume of traffic flow can be increased from 25 to as much as 50 per cent.

The Erskine bureau, established in Harvard University for engineering research in street traffic, has completed in Chicago a twelve months survey that is one of the first scientific approaches to the solution of traffic problems confronting every American city. Undertaken at the request of the Chicago Association of Commerce and the City Council, the survey was in charge of Dr. Miller McClintock, director of the Erskine bureau, in co-operation with a committee of 80 prominent business men and city executives. An abstract of the Chicago survey appeared in the Jan. 8, 1927, issue of the JOURNAL.

"From the standpoint of movement of vehicles it is

not an exaggeration to say that there are few cities in the United States that use even the most congested streets to more than 75 per cent of their capacity," declares Dr. McClintock. "The system of traffic control put into effect in Los Angeles increased the volume of traffic flow on the congested arteries more than 50 per cent and reduced expense and fatalities by more than 30 per cent. I know that by one move in Chicago it will be possible to reduce the number of trucks used in the delivery of merchandise and freight in the central part of the city by approximately 35 per cent."

Studies made by the Erskine bureau have brought out the fact that street transport plays a substantial part in the cost of living in every large city. Taking oranges, coal and potatoes as three staple commodities, it was found that drayage costs in the city, borne by retailer and consumer, ran from 25 to 50 per cent of the total freight rate from the original point of shipment.

Chicago's principal coal supply is in Illinois fields. Freight rates to Chicago are from $1.25 to $1.95 per ton. The consumer pays approximately 90 cents a ton in addition to the freight rate to cover the cost of trucking the coal from freight car to his coal bin.

Street accidents and fatalities add $600,000,000 to the national economic loss that can be reduced by modern traffic control, according to estimates of the National Conference on Street and Highway Safety.

Street congestion exacts a heavy toll from retail business establishments as well as adding to the cost of retail distribution, the Chicago survey has disclosed. Studies made in outlying business districts as well as in the central Loop area warrant the conclusion that where congestion occurs and interference results the volume of business has been reduced from 1 per cent to 20 per cent below that which would have been transacted with the automobile as a "business bringer" minus the factor of congestion.

Reports from other cities, supplementing the survey, indicate that a high percentage of all retail establishments in outlying shopping districts find that traffic congestion interferes in varying degrees with their volume of business. Information gathered by the Domestic Commerce Division of the United States Department of Commerce shows that in cities of more than 200,000 population 61 per cent of the retail establishments are affected by street congestion, 53.6 per cent in cities between 50,000 and 200,000 population, 46.5 per cent in cities between 10,000 and 50,000 and 32.9 per cent in cities from 2,500 to 10,000 population.

"From the standpoint of efficiency, and hence lower business cost, the problem of street use is the joint problem of merchandisers in the central district, merchandisers in the outlying districts and the purchasing public," declares Dr. McClintock.

Open Secrets of Operation in St. Louis

SOME of the many interesting activities going on continually behind the scenes in the operation of the United Railways, St. Louis, Mo., have been told in a 32-page pamphlet called "When St. Louis Moves." By means of interesting text and appealing illustrations, the peruser of this book sees St. Louis in the days of its cable cars and crinoline and follows its history up to the Twentieth Century de luxe cars and buses. Letting the patrons in on the daily and hourly doings of the railway system was decided upon as an antidote for the taking-for-granted attitude of many of the wonders of our daily life. The pamphlet was issued also as an invitation to the public to visit the shops and yards and note the operation of the various departments. Readers are assured that experienced members of "the army that never parades" will direct the curious ones.

The Readers' Forum

Further Comment on Chicago Bus Proposal

CHICAGO SURFACE LINES
CHICAGO, Jan. 12, 1927.

To the Editor:

The ELECTRIC RAILWAY JOURNAL deserves the highest commendation for the clarity and intelligence with which, in its issue of Jan. 1, it discusses editorially the bus proposal in Chicago.

As you so forcefully point out in this editorial, every authority on local transportation in the United States recognizes that the bus has an important function in supplementing electric railways, but when bus interests attempt to mislead the public into believing that satisfactory service in large cities can be given by buses alone they are injuring their own cause.

In consistently advocating co-ordination of rapid transit, surface and bus service the JOURNAL voices the best judgment and experience of the industry. Proposals to substitute buses for street cars in city-wide operation becloud the issue with false propaganda and are certain to be harmful to all concerned. G. A. RICHARDSON,
Vice-President.

MILLER-SCHORN RAPID TRANSIT SYSTEM
DETROIT, MICH., Jan. 11, 1927.

To the Editor:

We note the space which you have given Mr. Ritchie's views on the use of the motor bus in your issue of Jan. 1. The motor bus has a place in transportation, but it has certainly not yet been developed to a point where it can handle passengers as economically of space as do trolley cars.

While the per passenger street space of a double-deck bus may be calculated as less than that of a street car, the fact that it is not on a fixed right-of-way inclines the driver to pass from lane to lane in the street with a consequent greater actual use of the surface than does the trolley car and, moreover, this same facility makes it increasingly difficult for the other traffic on the street to gage their relative positions.

The bus has been advancing greatly in the past two or three years as to design and comfort, but in our opinion the most economical plan for handling and expediting mass transportation is the use of the trolley car for express purposes and the motor coach operating along the curb for local transportation on main arteries. The flexibility of the bus also makes it a very desirable vehicle for use in newer territory, the exact development of which is undetermined, and where transportation facilities, even at a higher base fare, are required.

We feel that your editorial has a common-sense ring that will strike a high average accord.

NICH. J. SCHORN.

Maintenance Notes

Commutator Slotting Saw Operated by Air Drill

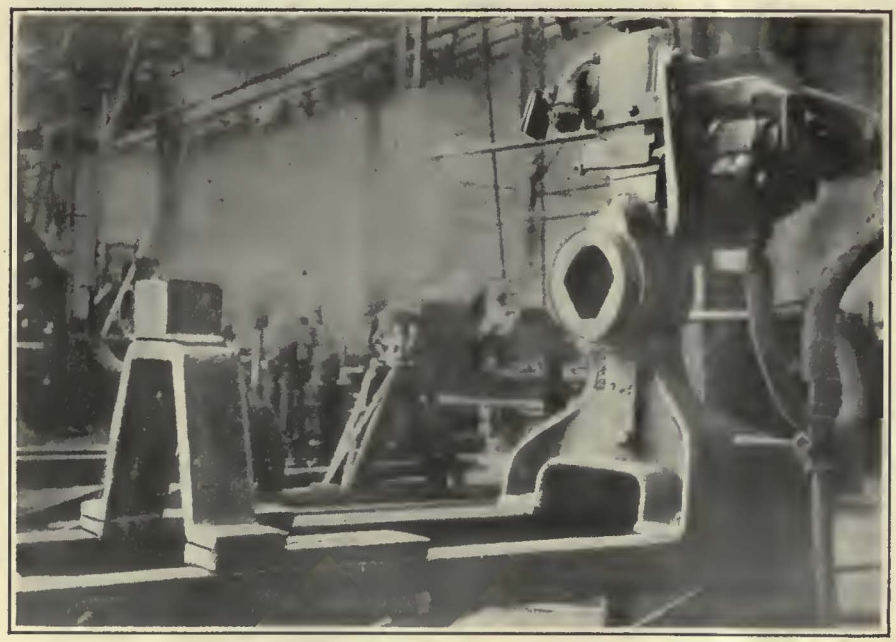
AN IMPROVISED commutator slotting machine for emergency use has been made up from an air-operated hand drill in the Interborough Rapid Transit Company's shop.

This slotting machine consists of a sturdy base upon which are mounted a stationary and a movable bearing for the support and the rotation of the armature. On top of the stationary bearing is mounted the slotting mechanism, consisting of a sliding base for horizontal motion, a slide for vertical motion and a hand air drilling machine with extended shaft and saw.

The air machine is securely fastened to the vertical slide and the saw shaft kept in alignment by a suitable bearing. A fiber shield is installed between the air machine and the saw to prevent the exhaust air from scattering the copper and mica dust. Directly over the saw is a suction hose to carry away copper and mica dust as it is developed during the slotting process.

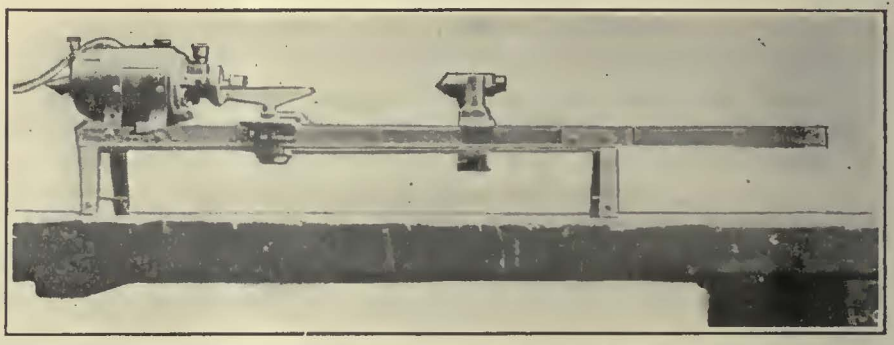
The depth of the slot is governed by the vertical slide, which is controlled by the hand wheel at the top. The movement of the saw through the slot is controlled by the horizontal sliding base hand lever shown in the illustration directly under the suction hose.

This machine has proved satisfactory for emergency use when for any reason the regular belt-driven slotters become inoperative.



Commutator Slotter Rigged Up from an Air-Operated Hand Drill for Emergency Use in Interborough Shop

Portable Lathe Efficient for Small Work



Portable Lathe Using Electric Drilling Machine as Source of Power

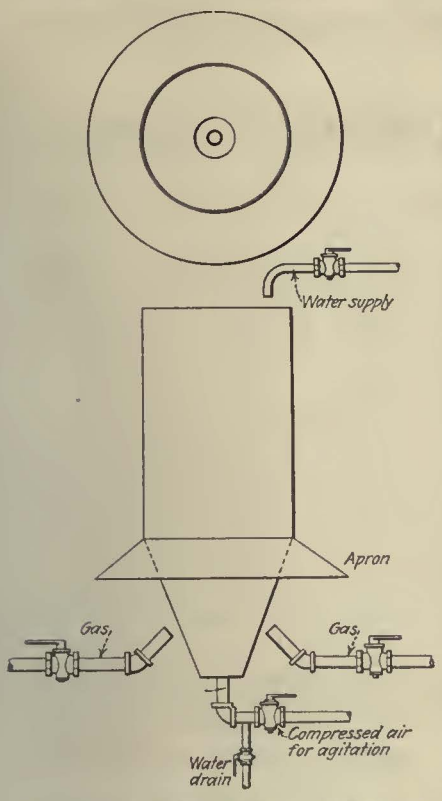
SMALL and light turning, grinding and polishing work is being done by the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., on a portable lathe developed in the shop. This lathe consists of an electric drilling machine mounted on a 1¼-in. T-iron framework, together with an adjustable centering stand and tool rest. The drilling machine is provided with suitable chucks and centers for both steel and wood work and is rigidly bolted to the T-iron frame. The centering stand and tool rest move on top of the T-iron and are held rigid when desired by means of ½-in. machine bolts and wing nuts.

Due to its portability this small lathe has been found very useful throughout various parts of the shop and has eliminated the necessity of interfering with the production of larger lathes.

Rags and Waste Reclaimed for Shop Use

RAGS and waste used for hand cleaning purposes were always a rather large item in the annual shop budget of the Reading Transit Company, Reading, Pa., until H. E. Aldrich, master mechanic, devised a simple machine for reclaiming them. This material, heretofore refuse, is now deposited in an 18-in. x 18-in. x 36-in. galvanized iron tank, where it is boiled thoroughly in an Oakite solution. The cloths are then dried and returned to the stockroom for further use. This tank is located conveniently in the shop and is provided with gas and water supply, compressed air connection for agitation purposes and a suitable apron for

One of the "Follies of 1927" in railway manipulation,
Operation without full co-operation of your organization.



Cleaning Tank and Relative Location of Auxiliary Apparatus

confining the heat from the gas flame.

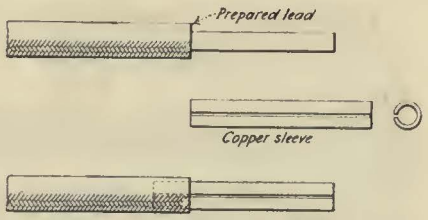
Since this shop-manufactured washing machine was put in operation the depositing of oil-soaked and greasy hand-wiping material in various nooks and corners has ceased, with the result that the floors and pits present a very neat and clean appearance at all times.

Preventing Breakage of Leads at Ends of Sleeves

WHERE copper sleeves are installed over stranded leads the most frequent place of breakage is at the inside end of the sleeve where this adjoins the insulation of the cable. To overcome this trouble it is the practice of the Brooklyn-Manhattan Transit Corporation to shove the inside end of the sleeve back under the rubber insulation of the conductor so that sharp bending at the end of the sleeve will not occur. This has effectively reduced trouble from breakage of leads at the end of the sleeve.

An accompanying illustration shows the method used. In the top illustration a motor lead is shown ready to receive a soft copper sleeve. The center illustration shows the type of sleeve used and the bottom illustration shows the sleeve as applied to the cable. The sleeve is shoved back under the rubber insulation so as to bring the end of the sleeve flush with the end of the conductor. This requires a sleeve length somewhat longer than the bared end of the cable.

The sleeves are tinned by dipping them into a resin-alcohol solution and then into hot solder. They are then slipped onto the conductor and the end of the lead insulation is wet with water to prevent its catching fire when the sleeve lead is held in the hot solder. While the solder is working through the sleeve and strands of the conductor the rubber lining of the insulation is being softened by the heat. As soon as the rubber is soft enough the gloved hands of the workman can press the end of the sleeve against the side of the work table and so push the sleeve back under the rubber into position. Cooling then holds the sleeve firmly in position.



Method of Installing a Copper Sleeve Under Insulation, as a Protective Feature Against Breaking of Leads

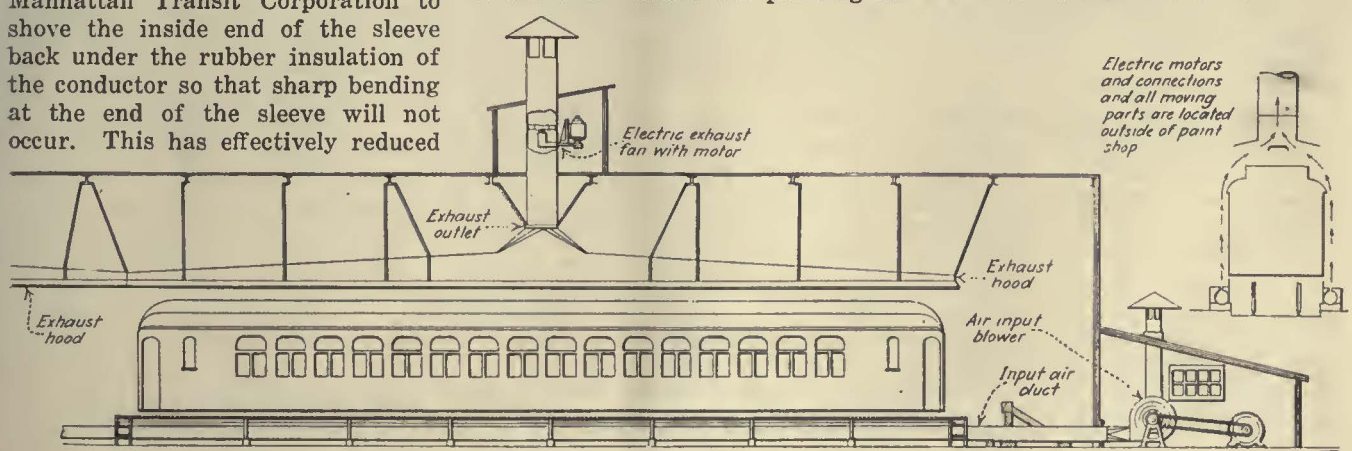
New Equipment Available

Exhaust System for Spray Painting

PROVISION for complete and safe removal of vapors due to spray painting without creating a draft in the shop or lowering the temperature is the salient feature of a special exhaust system for electric car and bus painting introduced by the DeVilbiss Company, Toledo, Ohio. With this system installed, it is claimed that lacquers and other spray materials can be used on any class of work with safety and satisfaction, and that the problem of gases is solved.

The accompanying illustration shows how the system is installed. It can be adapted to varying shop arrangements, according to conditions. Air ducts are included on either side of the track where car painting is done and a large exhaust hood is placed overhead. Air is supplied to the input duct from a blower, and a current of air rises alongside the car by passing from openings in the duct to the exhaust outlet overhead. The circulation of air is accelerated by having an exhaust fan in the outlet.

In operation the air current moving upward alongside the car carries off all gases and vapors without danger of their spreading throughout the shop. The upward current of air does not produce any serious deflection of the vapor from the spray gun, but removes the vapors completely and carries them up and out of the building. With this arrangement only the air which comes from the input air duct is removed from the room and no dust is brought in from outside. Electric motor fans and connections are installed outside the room.



Special Car Painting Exhaust System

Axle Brakes and Heaters in Latest Berlin Cars

Meet your schedules by better maintenance and keep your patrons from contracting the "hoof and mouth" disease.

DURING the fall of 1926 the Berlin Street Railway put into operation 300 new trailers almost identical in exterior appearance to the 500 trailers of the 1924 series. In the new cars, however, a modification has been made in the brake, which now operates by pressure on each side of a disk on the axle by "plier" action, instead of on the inside of two disks by toggle action.

The chart indicates that the braking arrangement is very similar to that of the toggle joint and double disk arrangement, shown in the article in this paper for Feb. 13, 1926, except that pressure is applied on both sides of the disk and the area of contact distances is much less. Experience with the earlier brake showed that the wear on the brake blocks was much less than when wheel brakes were used, and one of the accompanying illustrations shows a year's consumption in the new type of brake blocks and in the wheel brake shoes formerly employed. This means, of course, a saving not only in material consumed but in time of changing brake shoes.

The car framing is of steel in standard structural Z, T and U shapes, riveted together with gusset plates. To avoid rust, all steel parts before being joined are thoroughly cleaned with a sand blast and are immediately dipped thereafter in a rust-protective liquid, like Subox. After completion of the car assembly the steel structures are once more painted, and where two steel surfaces lie against each other they receive a thick coating of white lead to fill out all crevices and keep out dampness. The finished car has a pleasing effect, being finished with stream lines.

Those parts which are liable to frequent damage, such as car posts, side posts and side panels, are constructed so they can easily be replaced. Sections of the roof also can be replaced.

Silumin, a light metal alloy, is used for the seat frames. Light metal is also used for the step and door frame.

The roof is covered with Triolin. The same material is used within the car where the parts are liable to be kicked by the shoes of passengers, and as a floor covering instead of the customary wooden slats because it permits more thorough and easier cleaning. During rainy and snowy weather sawdust is scattered on the floor to absorb the moisture.

The car journals have roller bearings, as with the last lot of 1,000 cars purchased.

Motor cars on the railway system are heated, in part, by the current from the motors used in electrical braking and by the current which would otherwise be wasted in the starting resistances. The starting resistances in Berlin are carried on the car roof, and a set of electrical heaters within the car is arranged in parallel with a portion of these starting resistances so that either circuit can be thrown in and out by a changeover switch, without changing the ohmic resistance of the starting circuit. The position of this switch on the car is set at the power house by the engineering department and the transportation employees on the car are not allowed to move it.

All car heaters are made of helical coils of resistance wire supported on porcelain cores, and the iron casings in which they are contained are lined with asbestos and grounded.

The number of heaters required per car is empirically determined so that an average temperature of about 10 deg. C. (18 deg. F.) over the outside temperature will be maintained.

Trail cars are not heated by this method but from the overhead system. In the trail car heater circuits a 220-volt lamp is put in shunt with part of the heaters, but only so that about 170 volts are on the lamp. This lamp acts as a visual signal to show whether the heaters are in circuit.

MAIN DIMENSIONS 1925 MODEL, BERLIN TRAIL CARS

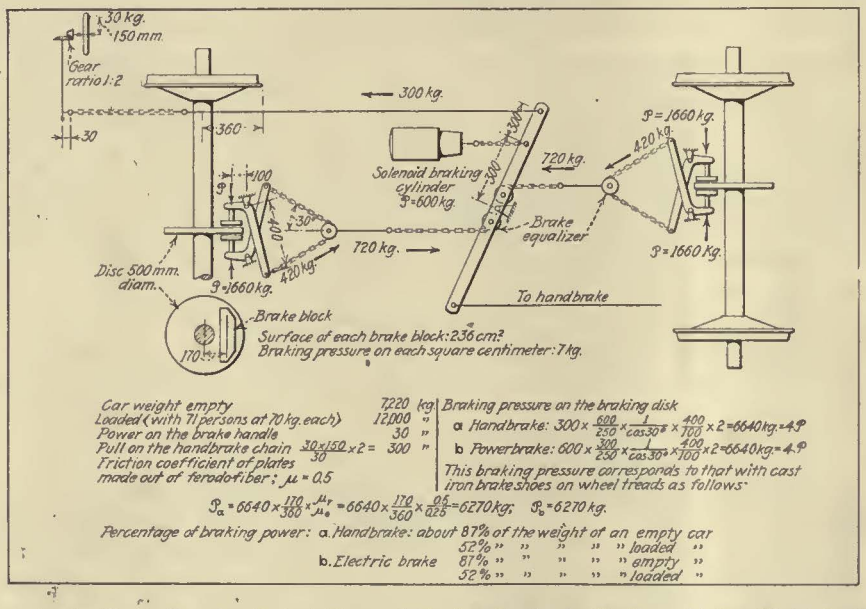
Length of car over buffers	10.46 m. or 34 ft. 4 in.
Length of car body	6.12 m. or 20 ft. 11 in.
Length of each platform	1.94 m. or 6 ft. 4 in.
Total height	3.22 m. or 10 ft. 6 in.
Wheelbase	3.20 m. or 10 ft. 5 ft.
Wheel diameter	720 mm. or 28 in.
Height of floor above pavement	775 mm. or 30½ in.
Number of steps	3 or 3
Weight of car empty	7.9 t. or 17,380 lb.
Weight of car loaded	12.8 t. or 28,160 lb.
Weight of each axle without journal boxes	0.5 t. or 1,100 lb.
Width of end exit door	800 mm. or 31½ in.
Width of end entrance	720 mm. or 28 in.

CAPACITY IN PASSENGERS

Seats	24
Standing room within car	17
Standing room on front platform	15
Standing room on rear platform	14
Total carrying capacity	70

DIMENSIONS OF CROSS SEATS

Width of each seat	492 mm. or 19¼ in.
Depth of each seat	450 mm. or 17¾ in.
Spacing of seats	518 mm. or 20½ in.
Height of seat above floor	480 mm. or 19 in.



At Left, Chart Showing Latest Type of Trailer Brake in Berlin. At the Right Is Shown the Difference in Brake Shoe Consumption, Per Car Per Year, with the Ferodo-Asbestos Shoes Used with the Disk Brake and Iron Shoes Used with a Wheel Brake

Association News & Discussions

Popularizing Electric Railway Service in Pittsburgh*

By J. B. DONLEY
Director of Public Relations
Pittsburgh Railways, Pittsburgh, Pa.

WHEN the properties constituting the Pittsburgh Railways were returned to the owners following a receivership that had lasted from 1918 to 1924, it was realized that the public would expect greater service in schedules, comforts and convenience at once. To fulfill this expectancy the management acted to the limit of its capacity. By constantly improving the comfort of the cars, increasing transfer privileges and bettering the schedules, the company might eventually have reached success, but this alone would have taken such a long time as to be disastrous to the company. It was necessary to "sell" the company to the public at once. To accomplish this it was decided to resort to an experiment that was considered as daring as it was novel. We called it "broadcasting our accomplishments." It was not empty ballyhoo, for the company did have accomplishments to broadcast.

Orders were immediately placed for 225 new cars, this number being later increased to 378, the total expenditure being more than $3,000,000. Additional privileges that liberalized transfer use were affixed. Fares on fourteen of the shorter routes were dropped from three rides for a quarter to 5 cents. Nine district administration buildings were constructed and furnished at a cost of more than $70,000 each. These buildings contain assembly halls which may be used for entertainment and dancing. They are free to employees, civic organizations, and to the public generally. Since 1924, nearly 100 miles of track has been reconstructed, costing about $4,000,000.

Our outlets to give publicity to these improvements were many, although the medium of the newspapers was probably used most. On small signs, larger signs and large posters hundreds of messages have been put before the riding public since 1924. Subjects treated include car service, car equipment, information regarding places to visit, and Pittsburgh's great industrial activities. Announcements notified passengers that heat or lights would be turned on when requested, indicated where lost articles might be inquired for, and gave other information that indicated the company's interest in the public welfare.

Booklets have been published for out-of-town visitors regarding the various routes and their destinations. Pamphlets for distribution among civic organizations, outdoor advertising and window displays are other methods used. One of the largest factors in acquainting the public with the problems concerning the railways, as well as advertising the service, has been through addresses by the various officers appearing at every opportunity before clubs and community organizations throughout the Pittsburgh district.

We have reasons for thinking that we have not done our broadcasting in vain. The public in general has taken a great interest in what we are doing, and by its co-operative attitude is making it possible for us to do more. The traffic division of the Police Department, realizing that the public represented by the car rider is greatly affected by its activities, has done its utmost to facilitate the operation of cars. The traffic division heads are doing everything possible to improve conditions for the 80 per cent of the passenger traffic in and out of the downtown business district handled by the street cars. Fire chiefs have acted with full co-operation to relieve car riders from unnecessary delays by removing hose from car tracks when not actually in use.

MEASURING THE ACCOMPLISHMENTS

As we saw it, the big job was to get the public to realize the value of the street railway to the community and to make the facility more useful and more appreciated. That this has been accomplished may be realized by comparison with the figures of last year and of the last year of the receivership, 1923.

In 1923, 330,000,000 rides were taken by the street car patrons of the Pittsburgh district. In 1926, more than 400,000,000 rides were taken. To carry these 70,000,000 additional passengers it has been necessary to operate 1,500,000 more car-miles in 1926 than in 1923. However, the most significant point is that for these 70,000,000 more rides in 1926 the passengers paid $800,000 less money. This is a practical demonstration of what it has meant to increase the usefulness of a public utility and at the same time decrease fares.

The average car ride in the Pittsburgh district for 1926 cost 5.35 cents, while in 1923 it was 7.6 cents. At first glance, this would seem to indicate that the Pittsburgh Railways is playing a losing game, but along with the policy of increased usefulness at decreased fares, there has also been the policy of increased economy and elimination of waste. Through the efforts of the trainmen, shopmen and other workers a reduction of costs has resulted despite the large number of additional miles operated.

The greatest contributing agency to reduced rates, however, has been the weekly pass. This pass permits patrons to ride an unlimited number of times on all cars within the first fare zone for $1.50 each week. Its main features for gaining popularity are its transferability and its elimination of the bother of buying car checks, asking for transfers, and making change. Its sales have grown steadily from a start of about 35,000 in June, 1925, until now they have mounted to more than 60,000 each week. In practical "popularizing" of the street cars, I think that this weekly pass deserves more credit than any other single factor.

In spite of all that has been done in the past three years, however, the greatest problem still lies unsolved; that of filling the empty seats in the cars, and utilizing the empty cars that are stored in carhouses during off-peak hours. If more money could be secured

*Abstract of a paper presented before the Midwest Electric Railway Association, Tulsa, Okla., Jan. 7, 1927.

COMING MEETINGS OF *Electric Railway and Allied Associations*

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

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

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

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

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

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

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

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

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

from additional traffic to justify additional operations, these operations in turn would develop traffic through greater frequency of service. It is in the solving of this problem that ultimate welding of the good will of the public will be accomplished by the railway management, and the greatest opportunity to gain this end lies in the achievement of a maximum usefulness of the properties.

After all, understanding on the part of the patrons, public officials and railway workers means everything. We might adjust fares to a scientific nicety or build a car which is more economical, efficient and comfortable than any ever designed, but unless we understand each other enough to work shoulder to shoulder, unless we of the railways can convince the public of our sincerity and honesty of purpose, then all the efficiency in the world will not secure for us the friendly public relations which we desire, and which we must have if we are to go forward instead of backward.

Motor Vehicles Feed Rails, World Congress Is Told

GROWTH of the automotive industry, its problems, and its relation to electric railways, steam railroads and waterways was the subject of discussion at the third World Motor Transport Congress held in New York, Jan. 10-11, under the auspices of the National Automobile Chamber of Commerce. More than 400 delegates from 52 countries attended.

Thomas H. MacDonald, chief of the United States bureau of public roads, told of the service rendered by motor transportation in feeding the rail lines of the country. "Out of 125,000 communities in the United States," he said, "some 45,000 are still actually not on rail lines, but motor transportation has placed them in direct touch with these. Thus motor transportation has not only linked together all the communities of this country but it has made immediately available to one-third of them rail transportation that they had never enjoyed before."

J. Walter Drake, Assistant Secretary of Commerce, declared that motor transport "by linking remote communities with rail lines had enormously increased the business of both electric and steam railways." Much the same idea was voiced by Cyrus McCormick, Jr., vice-president International Harvester Company, who declared that rail and motor transport were "complementary methods of transportation rather than competitive."

Co-ordination of facilities as a means of solving the city traffic problem was urged by John A. Ritchie, president Yellow Truck & Coach Manufacturing Company, in a speech prepared by him and read in his absence by Frederick T. Wood, president Fifth Avenue Coach Company, New York. "In the study of traffic problems," he said, "nothing has impressed me so greatly as the extraordinary complexity of interests involved." All of these, he declared, must be co-ordinated in unselfish co-operative effort, or there can be no solution. Fact-finding bodies must first be appointed, he said, to approach the problem without political prejudice and their work should not be allowed to become weakened by consideration of suggestions entirely experimental in their nature.

Traffic congestion is being held responsible by some automotive manufacturers for a noticeable falling off in private automobile sales in certain cities, according to R. H. Grant, vice-president Chevrolet Motor Company, who presided at one session and furnished introductory remarks preceding Mr. Ritchie's paper.

Entertainment at C.E.R.A. Meeting—Constitution Changes

PLANS for entertainment at the winter meeting of the Central Electric Railway Association, which will be held at the Commodore Perry Hotel, Toledo, Ohio, have been announced by James H. Drew, chairman hotel and arrangements committee.

On Thursday, Feb. 5, there will be a sightseeing bus trip for the ladies, starting from the hotel at 10:30 a.m. After luncheon there will be a matinee at one of the local theaters.

It is also expected that all visiting ladies will attend the annual dinner to be held at the Commodore Perry Hotel on Feb. 3, beginning at 6:45 p.m. The dinner will be followed by dancing.

The entertainment will be in charge of H. R. Roudebush, secretary and treasurer of the Community Traction Company, and a committee of local ladies.

The manager of the Commodore Perry Hotel states that rates for rooms will range from $3.50 to $7 for one person in a room, $5.50 for two persons in a room with full-sized double bed and $8 and $9 for two persons in a room with twin beds.

Consideration of two amendments to the constitution and one amendment to the bylaws of the association will be given at the annual meeting. The amendment to Article IV, Sec. 1, of the constitution has the purpose of expanding the membership of the executive committee, while the amendment to Article X deals with the method of adopting amendments to the constitution. Article IV, Sec. 2, of the bylaws would be amended to make the dues of supply members $15 per year, effective with the calendar year 1927.

New York Meeting and Dinner on Jan. 25

SPEAKERS at the dinner of the New York Electric Railway Association on Jan. 25 will be the Governor of New Jersey, Hon. A. Harry Moore, and Dr. W. Warren Giles, a constructive humorist. Dr. Giles spoke at a meeting of the New York association two or three years ago and impressed his hearers most favorably with his wisdom and humor.

The committee in charge of the program for the day sessions has provided an added attraction, besides the papers announced last week, by the acceptance of L. S. Storrs to give some observations of his recent European tour. The committee also announces the formal discussions to follow the paper by H. K. Bennett on "Accident Prevention" by the gentlemen named below:

F. B. Wright, director publicity New York Railways.

A. L. Hodges, assistant to vice-president and general manager Brooklyn City Railroad.

C. P. Segard, assistant secretary Third Avenue Railway.

A. D. Brown, claim agent New York State Railways, Syracuse, N. Y.

R. R. Hadsell, general superintendent transportation New York State Railways, Rochester, N. Y.

Discussion on the paper by Samuel Porcher on "A Modern Inventory and Purchasing Methods" will be by R. C. Harris, general storekeeper Pennsylvania Railroad.

The meeting is at the Commodore Hotel, New York City.

American Association News

Unification of Car Design

DECISION was reached as to the work to be undertaken by the committee on unification of car design during the coming year and a preliminary report was drafted at a meeting held at association headquarters, New York City, on Jan. 6. Those present at the meeting were H. H. Adams, chairman; J. A. Brooks, C. A. Burleson, A. L. Kasemeier, John Lindall, Victor Willoughby, W. L. Barclay, Jr., representing W. J. Clardy and C. W. Squier, representing Charles Gordon.

Replies received from numerous railway officials commenting on the report of the committee on essential features of car design which was sent out in June, 1926, were gone over in considerable detail by the committee. It appeared that to further the use of the car design submitted it is desirable for the committee to act as a clearing house for questions and for solving problems which would come up in trying to adopt the general dimensions proposed to specific cases where new equipment was being purchased. The committee decided to extend its services in this connection. Various railway officials who are considering purchase of new cars are invited to submit their problems to the association, and the work will then receive special attention by the committee.

It also appeared desirable to use some standard designation for the designs of cars submitted by the committee on essential features of car design. The committee recommended that cars covered in the report be designated as A.E.R.A. city car design and A.E.R.A. interurban car design. A progress report that was drafted by the committee will be sent through the regular channels so as to be distributed as soon as possible.

The News of the Industry

Suggestion Offered for Seattle Railway's Solvency

Several suggestions for placing the Seattle Municipal Railway, Seattle, Wash., on a solvent basis are offered in a report to the City Council by W. J. Clardy, railway engineer, employed by the Westinghouse Electric & Manufacturing Company, which recently offered to finance Mr. Clardy's survey of the municipal railway situation. He suggests operating the street railway either as an industry in which the car riders, who provide the revenue, are given first consideration, according to fundamental principles of business, or operate it for the convenience of all citizens whether they are car riders or not, but not attempting to do both. He further recommends placing the railway department under centralized management to eliminate the conflicting functions of the superintendent, the Mayor and the City Council.

Mr. Clardy's recommendations for operation methods coincide with plans already recommended by D. W. Henderson, superintendent of the railway, and Clark R. Jackson, superintendent of the utilities department, and include rerouting of cars as put into effect recently. Other suggestions include installation of loading platforms at heavy loading points and providing better means of marking all safety zones, putting into effect a "pay-enter" inbound and a "pay-leave" outbound fare collection system to decrease the time required to collect fares, and promoting the sale of tokens by local business institutions to reduce change-making on cars. Of the financial phase, Mr. Clardy declares that the railway is not handling a sufficient number of passengers per car-mile.

St. Louis Seeks 8-Cent Fare Suspension

Suspension of the 8-cent street car fare schedule for the United Railways, St. Louis, Mo., which Receiver Rolla Wells has notified the Missouri Public Service Commission will be put into effect on Feb. 7, has been asked by the city of St. Louis in a petition filed with the Public Service Commission. The city's counsel contends that an audit of the company's books and records ordered by the commission on June 14, last, soon will be completed and that the commission should not permit any increase in fares until the results of the audit are known. "The audit is very material to a proper and final determination of the issues," the city's petition states, "and the city believes the commission cannot reach a fair and intelligent decision in this matter until it has before it the results of operation and of the additions to the property as they will be revealed in the audit."

Receiver Rolla Wells on Jan. 8 notified the state commission of his determination to increase the fares for adults from 7 cents to 8 cents effective Feb. 7. Should the state commission suspend the schedule as the city requests, the company may either await the results of the commission's decision when the results of its audit are revealed or it can go into the federal court pleading that the present rate of fare amounts to confiscation of its property. Should Receiver Wells take the latter course the city will make the defense that the case is in the hands of the state commission, from which an early decision is expected.

The first petition of Receiver Wells for increased fares was filed with the state commission on June 14. The company seeks to charge an 8-cent basic fare, but plans to sell two tokens for 15 cents. The city in opposing the increase has contended that the company is operating its city lines profitably and that the city car riders should not be expected to carry the burden of maintaining certain unproductive lines which are operated by the company in St. Louis County.

Committee Hearings on Chicago Settlement Plans

Corporation Counsel Thinks Blair Billion-Dollar Plan Impossible of Consummation—Further Action on It Unlikely Now—Messrs. Lisman and Harlan Discuss the Lisman Plan

WITH the six months extension of the expiring Chicago Surface Lines franchises approved by the local transportation committee and company officials and practically certain of acceptance by the sole remaining arbiters, the federal court for the north side lines and the City Council for the city, sessions of the local transportation committee during the week ended Jan. 21 were devoted almost entirely to scrutinizing the three traction settlement plans now before it.

Because the tremendous financial burdens which it would place upon the city would entail amendments to laws and possibly to the state constitution, the $1,000,000,000 unified transit plan recently made public by Henry A. Blair, president of the Chicago Surface Lines and co-receiver of the north and west side lines, was declared to be practically impossible of fulfillment by Corporation Counsel Francis X. Busch, when the plan came up for initial hearing at the local transportation committee meeting on Jan. 17.

Cost to City Considered Staggering

Differing from the pending surface and elevated line ordinance by virtue of its greater scope, the Blair plan, an abstract of which appears elsewhere in this issue, proposes to extend the existing surface, elevated and bus systems of the city into a single gigantic corporation, representing by 1950 a gross investment of $1,003,626,000. Of this huge total, the company would invest $563,274,000, while the city would be required to invest approximately $440,000,000 for subways and elevated lines. The average fare under the scheme would be 7.35 cents, with a maximum fare of 7.71 cents in 1933 and a minimum fare of 7.06 cents in 1950.

Some of the flaws in the financial plan were pointed out by Mr. Busch, when E. J. McIlraith, surface lines engineer, who explained the Blair proposal to the Aldermen, intimated that it was based on the assumption that of the total costs for subways and elevated lines to be built by the city under special assessment, 75 per cent would be raised by special assessments of the property owners and 25 per cent supplied by the city by general taxation as public benefits.

In support of his belief that this assumption is fallacious, Mr. Busch referred to other public improvements in which the city's share almost invariably had exceeded 60 per cent of the total cost. He said:

> Even if we could carry out the program on a 50-50 basis the city would have to raise $220,000,000. Under the present debt incurring limitation, which is now virtually exhausted, it would be impossible for the city to raise the $440,000,000 necessary to defray its share of the costs under the proposal.

Mr. McIlraith's answer to this objection was to urge that the assessed valuation of property be increased.

It was also brought out during the hearing that no compensation to the city nor rentals for subways built by the city had been taken into consideration in reckoning rates of fare. This additional outlay, it was indicated, would further increase the rate of fare contemplated.

Mr. Busch concluded his indictment of the plan with the assertion that the new organization would want a 7½ per cent rate of return, while the return to the elevated lines is now less than 3 per cent and that to the surface lines just a trifle over 6 per cent.

Although no direct statements were made by traction or bank officials who attended the meeting as to the status of negotiations toward consolidation of properties involved in the discussions, Weymouth Kirkland, attorney for Mr.

Blair, told the committee that the rate of return to the new company as well as the type of franchise to be offered by the city must first be determined before consolidation could be agreed upon. The plan would require enabling legislation, he said, first, to permit the surface and elevated lines to consolidate; second, for authority to issue terminable permits and, lastly, to enlarge the city's power over special assessments.

Asked by Alderman Donald S. McKinlay why the two systems could not tentatively agree to consolidate, Albert W. Harris, president of the Harris Trust & Savings Bank and member of one of the Surface Lines bondholders' protective committees, declared that "there must first be an agreed valuation and rate of return." "On Feb. 1 the bondholders will assume control of the Chicago Railways," he said. "The quickest way to get a merger is a foreclosure and sale."

In urging the passage of terminable permit legislation, Mr. Harris remarked that the poor market for electric railway securities today is primarily due to the short-term franchise.

While no criticism was offered on the physical features of the Blair proposition, as a result of these unexpected obstacles and disagreements over financial details, many of the Aldermen bitterly denounced the belated effort to rush through a settlement. For this reason, it is unlikely that any further action will be taken in the matter for some time to come.

Revised Lisman Draft Discussed

The Lisman plan, a revised draft of which was presented to the Aldermen in the form of an ordinance on Jan. 10, likewise came in for some unfavorable criticism by Corporation Counsel Busch at a committee hearing on Jan. 15.

Mr. Busch pointed out that while the Lisman ordinance was not contingent upon legislation as is necessary to make the surface-elevated lines ordinance valid, many of its provisions might be changed or nullified by the Illinois Commerce Commission.

Chief among these provisions which might come under the jurisdiction of the commission, which it has been sought to avoid, are the plans for amortization of the properties, the barometer funds for fares and the rates of return, he declared.

A clause in the ordinance providing for the immediate expenditure of $55,000,000 for track extension, the funds to be obtained by a bond issue for that amount, was condemned on the ground that the commission might exercise its legal right to disapprove the bond issue.

In replying to this charge in a formal statement made public the following day, Frederick J. Lisman, author of the plan, said that he was fully cognizant of the power of the Illinois commission to pass on security issues and other matters and that he did not propose to request their approval of anything which was "improper or unreasonable." He explained that under the Lisman plan car riders would be asked to provide only about 6 per cent on a reasonable valuation, while the average return permitted utility companies by the courts and commissions is at least 8 per cent on the capital invested. He added that with a charge so moderate "we have nothing to fear in the way of unfavorable rate decisions."

Final action on the Lisman ordinance has been postponed to give Mr. Harlan an opportunity to submit a brief on its advantages and a detailed financial set up.

Service Survey Started in Philadelphia

Transit Company Says City-Center Congestion Is Limiting Factor Fixing What It Can Do

The Philadelphia Rapid Transit Company, Philadelphia, Pa., in a letter to Public Service Commissioners Beamish and Benn, in charge of the Public Service body's investigation of transportation facilities in Philadelphia, has acknowledged that its service had become "increasingly deficient," but attributed that condition to city-center traffic congestion. The letter was written by Thomas E. Mitten, chairman of the executive committee. It reads as follows:

P.R.T. welcomes the investigation of its service now being undertaken here under the direction of your experts, headed by Dr. Snow, because it will afford the greatly desired opportunity to have the real causes of the interrupted—and consequent unsatisfactory—service impassionately analyzed, with adequate remedies recommended to be forthwith made effective.

P. R. T. has all along acknowledged its present service to be becoming increasingly deficient, but claims the causes to be beyond its power of control and that its present service is necessarily limited by the number of cars it can get through the city-center district during the hours of most congested traffic.

This is a matter which can be made subject to determination through the investigation now under way, as is also the truth or falsity of the charge that P. R. T. did actually decrease its street car service to drive its prospective passengers into its higher-fare motor buses and taxicabs.

Observing persons already know, from what they see every day while riding on the cars, that regularity of service is made impossible by the use of city streets as now allowed in way of motor parking and other permitted forms of traffic interruption, but the charge that P. R. T. so misuses its powers as to drive its passengers from the street car to the motor bus and taxicab—for sake of the higher fare—is a falsehood that is not easily overcome and one which we would, therefore, respectfully ask that your examining experts give first attention.

The commission, in reply, said:

The Public Service Commission today (Jan. 13) commenced its co-ordinated investigation of the services being rendered by the P. R. T. and buses for these services. This investigation will, from time to time, call upon the officers and employees of the P. R. T. for information and records. The commission acknowledges your tender of co-operation.

At the outset of the survey Commissioner Beamish invited every individual car rider or business organization with suggestions to make with respect to service to mail their ideas to the commission.

It is planned to have the physical survey well under way before the arrival of Charles C. McChord, former chairman of the Interstate Commerce Commission, who has been engaged by the state body to study and submit recommendations on the legal and policy phases of the survey.

Petitions for Commutation in Schenectady

Public Service Commissioner George R. Lunn on Jan. 7 held a hearing on the petition of the Schenectady Railway for permission to issue an additional commutation ticket based on the rate now in effect in interurban territory, by adding the local fare rate in Schenectady, Albany and Troy, N. Y., to the rate from the first interurban point outside the cities. The new commutation will be optional with the purchaser, the one in use at present being continued, by which the user pays his fare by commutation ticket to a city line and a cash fare within a city.

If he desires to save himself the bother of paying a cash fare he can purchase the new commutation ticket, which will permit him to ride within the three cities without paying the cash fare. Tickets are good for 50 rides within 30 days and unused or partially used tickets will be redeemed by charging full rate for the number of tickets used.

It is proposed to issue two forms of commutation tickets, one as at present, good from interurban points to a city line, not including the city fare, and the other good from interurban points to include the city fare with the interurban fare. The purchase of either ticket is optional to the passenger.

183 Trains in Chicago Loop in Rush Hour

What is believed to be a world's record in movement of cars past a given point was established by the Chicago Rapid Transit Company on Saturday morning, Jan. 8, when a total of 1,017 cars, comprising 183 trains, entered the Loop during the rush hour.

This is the third time in the past three months that the Rapid Transit Lines have set new records in transporting the throngs of workers to the Loop during the morning rush period.

On Oct. 7 a total of 989 cars arrived in the Loop during the morning rush hour. This number was raised to 992 on Dec. 4 and to 996 on Dec. 31.

Bernard J. Fallon, vice-president in charge of operation, said that the company would continue its efforts to better "the world's record."

Would Advance Centralia Rates

The Centralia & Central City Traction Company and the Centralia Traction Company of Centralia, Ill., have filed schedules with the Public Service Commission in which it is proposed to advance railway rates. Under the new scheme the rates would be as follows:

Adult Cash Fares: Single cash fare, 10 cents.

Ticket Fares: Three tokens or tickets 25 cents.

Children's Fares: All children under six years of age may ride free when accompanied by an adult.

Cash Fares: Children six to twelve years of age, single cash fare, 5 cents.

Ticket Fares: Six tokens or tickets for children from six to twelve years of age, 25 cents.

The present rate for adults is 6 cents and for children 3 cents. Transfers would be issued from one line to the other as under the present arrangements.

Discussion Continues in New York

Nothing Tangible on Transit Has Been Done Lately in New York, Not Even on Buses

There has been no diminution recently in the discussion of transit matters in New York. Chairman Dahl of the Brooklyn-Manhattan Transit Company has issued several more open statements on the matter, Mayor Walker has reiterated his previous stand with respect to the bus matter and men prominent in public life have discussed the matter, notably before the National Republican Club. This last forum was held on Saturday afternoon, Jan. 15, and the remarks were broadcast over the radio.

The latest of Mr. Dahl's letters are known as Nos. 9, 10, 11 and 12. They go into various matters in detail, but letter No. 12 deals more particularly with the matter of the repetition of early mistakes in the prosecution of the city's present transit policy, the matter of why competitive methods fail and the possibility of the city saving $150,000,000 by proper regard for co-ordination and the utilization of facilities not now effectively used. The other communications by Mr. Dahl include a letter to the editor of the *World* and a report on the rapid transit situation in New York by George F. Swain and Parsons, Klapp, Brinckerhoff & Douglas, in which they express the belief that "the best unified transportation system should include not only subway and elevated lines but surface lines and buses as well." "Many large cities are unifying their transportation systems." say the engineers, "but only New York City appears to be following the opposite policy."

Mayor Has Just Begun His Fight

On Jan. 20 the Mayor indicated that he had just begun his fight to put buses on the streets as quickly as possible. To that end he has postponed indefinitely his projected trip to Cuba, on which he was to have started on Jan. 22, and announced his intention of getting a vote at next week's regular meeting of the Board of Estimate on the question of having the Board of Transportation prepare contracts for bus franchises for Manhattan, the Bronx, Brooklyn and Queens. The Mayor indicated after the meeting of the board on Jan. 20, at which he failed in a similar attempt, that he expected to have a majority of the votes on the board to pass his resolution next week, but was still short of the twelve votes necessary for the actual award of the franchises.

The speakers at the meeting before the National Republican Club were Colonel Sheppard and Messrs. MacAneny, Curran and Quackenbush.

Mr. MacAneny, former chairman of the Transit Commission, said that the lack of settlement of the transit problem has held back the growth of the city for many years. The traffic today was double what it was in 1913. Even the subways as they are today have increased the value of property 50 per cent. The extensions of the old lines were more important than the building of new disconnected units. At the present time the branch lines were developed to better advantage than the trunks. The city was suffering from a lack of trunks. At present there were seventeen branches or streams of traffic flowing through the two existing trunks north and south on Manhattan. While these were used to capacity and sometimes to more than capacity, the branch lines were used not to exceed 65 per cent at the rush hour and some as low as 35 per cent.

The Transit Commission was formed by the act of 1921 and four months after it began to function proposed a plan opposed by former Mayor Hylan. Instead, the old administration went ahead with an independent system, one unit of which on 53d Street, according to the present plans, would cost $112,000,000 and would be utterly useless without the extension to Jamaica, and no immediate plans had been developed for this extension. Therefore it will be most improvident to construct this short unit. The independent lines were estimated to cost $625,000,000. The construction of the Eighth Avenue subway so far was such that it can be linked into the other tubes and be made an additional trunk unit. If the remaining contracts were granted the city would be committed to an independent system, much of the cost of which will have been wasted if the line is not co-ordinated with the present systems.

By co-ordinating the transit lines with the existing systems $150,000,000 can be saved in subway construction and an additional $150,000,000 for equipment would be transferred from city funds to company funds, since the companies are obligated to furnish this equipment when the tubes are leased.

Mr. Quackenbush, who is general counsel for the Interborough Rapid Transit, said the first mistake was made when the two systems were started. The present Interborough Rapid Transit Company for ten years has performed an enormous task without adequate funds. The 5-cent fare of 1913 has depreciated to a 3-cent fare today. The travel on the system has increased tremendously and in one 24-hour period just previous to Christmas 3,933,000 passengers were handled in one day.

No Parking Passes in Philadelphia

The City Council of Philadelphia, Pa., passed unanimously on Jan. 13 the drastic ordinance banning parking in the central section of the city, and later it was signed by Mayor Kendrick. Director of Public Saftey Elliott explained that he would carry out his promise that the measure should be taken as of an experimental nature. He said he would meet the public safety committee of the Council once a month and report on the progress of the ban. If after a reasonable time it was demonstrated that enforcement was not possible, he would then ask the Council to amend the law.

The provisions of the bill were outlined in the ELECTRIC RALIWAY JOURNAL, issue of Jan. 8, page 93, and are referred to elsewhere in this issue.

Denver Fare Case Argued

Supreme Court Hears Contentions of Appellee and Appellant in Question of City Regulation of Fares

Questions involved in the regulation by a city of fares to be charged by an electric railway are before the Supreme Court of the United States in the case of City and County of Denver, Appellant, vs. E. Stenger, as receiver of the Denver Tramway, Appellee, No. 112.

Argument was commenced on Jan. 11, 1927, by Thomas H. Gibson for the appellant and was continued on Jan. 12 by Mr. Gibson and Mr. May. Gerald Hughes argued the case for the appellee.

The appellee contends that this is a suit which is in essence a rate suit, involving an averment of confiscation and the deprivation of property without due process of law. Appellant contends that, instead, the petition filed by the receiver "concerning fares and operating conditions" was an ex parte proceeding which sought the advice and direction of the trial court and prayed that it might instruct and authorize the petitioner to assert certain rights which he claimed to exist in the tramway and himself as receiver.

It was said the only theory on which the appellee based any claim to right to an increased fare was that of an alleged confiscation of the property of the tramway in violation of the Fourteenth Amendment of the Federal Constitution and similar sections of the Constitution of Colorado, and that this theory is based upon the following assumptions:

1. That the ordinances upon which the only alleged property rights of the Tramway which the appellee claims to have been violated are based do not amount to contracts in respect of fares.
2. That even if they were contracts they had been waived by the City Council in attempting to aid the tramway company in allowing increased fares in time of stress.
3. That the mutual obligations of the parties have been destroyed by the regulatory power exercised by the city.

It was contended for the appellant that the trial court was without jurisdiction to enter any other than a decree of dismissal. It was averred that the court erred in rejecting the city's expert testimony on valuation, thereby sustaining the company's exceptions and objection to the competency and qualifications of the city's chief expert witness.

The position of the appellee was that the final decree of the District Court, so far as the questions of jurisdiction, of confiscatory fares and other matters passed upon by the District Court of Appeals are concerned, is based on and follows the mandate and opinion of the Circuit Court of Appeals and that this court is without authority on this appeal to review the pending case in such respects.

And further it was stated that if the question of a 5-cent contract were before the Supreme Court as one of first review, independent of the Circuit Court of Appeals' decision, that the Supreme Court must hold that there never was such an enforcible contract which would justify confiscation and that subsequent regulation by the city has in any event displaced such alleged contracts.

Increased Fares in Watertown

The Public Service Commission on Dec. 31 granted the petitions of the Black River Traction Company and the Watertown Transportation Company for permission to increase electric railway and bus fares in Watertown, N. Y., and discontinue the sale of round-trip tickets between Watertown and Glen Park.

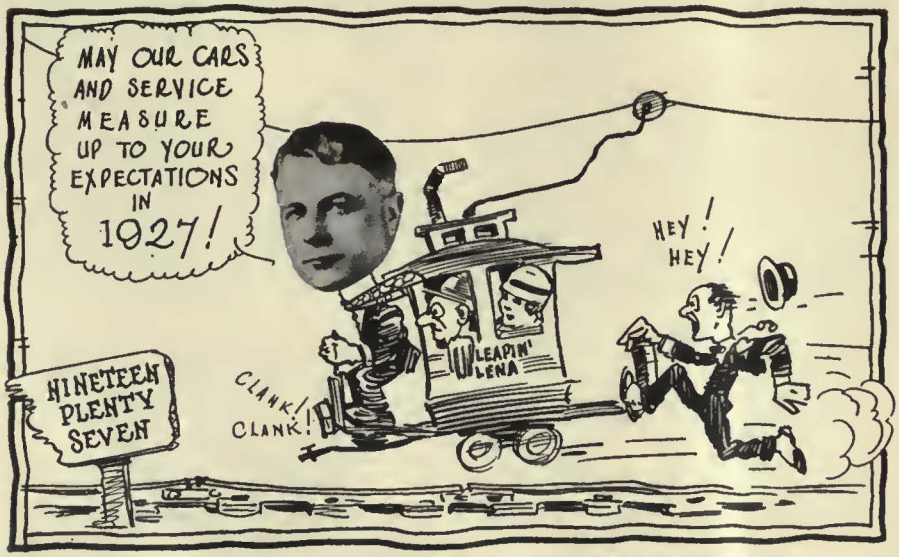
Fares are now 7 cents with sixteen commutation tickets for $1. Fare to Glen Park is 10 cents and round-trip tickets 15 cents. The orders provide that a cash fare of 10 cents may be charged for a continuous ride within the city until Dec. 1, 1927; also that commutation tickets shall be sold at the rate of seven for 50 cents, making the ticket fare 7⅛ instead of 6¾ cents and entitling the holder to the same privileges as cash fare except a transfer charge of 3 cents to the Washington and Franklin Streets and the Arsenal and Mill Street lines. At State and High Streets transfers will be given to the High and Pearl Streets line without charge. The order relating to the Glen Park line authorizes the discontinuance of round-trip tickets, making the fare 10 cents each way.

The original franchises granted these companies contained limitations as to fare within the city. These limitations were waived by the Common Council on Oct. 18, 1926, permitting an increase until Dec. 1, 1927.

Commissioner Van Voorhis in his memorandum accompanying these and other representing all walks of life orders said that it appeared from the financial statement that there had been a falling off of the gross revenue of the company for the past three years of approximately $26,000.

Greetings from Grand Rapids

Favorable comment has reached L. J. DeLamarter, vice-president and general manager Grand Rapids Railway, Grand Rapids, Mich., on his novel New Year's card, "The Skipper of the Town Trolley Says," the idea behind which is shown in the illustration reproduced herewith. The letters of commendation received from the newspaper men, city officials and others representing all walks of life reflect a spirit of good will and cooperation toward the railway in its efforts to give Grand Rapids a modern transportation system. When Mr. DeLamarter sent out about 2,500 of these cards as a personal greeting it was his idea to get a "little kick" out of an old subject. The card is to be reproduced in "Trolley Topics."



A Fantastic New Year's Card from an Imaginative Man

New Blanket Franchise in Danville

The City Council of Danville, Ill., has adopted an ordinance granting the Illinois Power & Light Corporation a franchise to operate street cars and buses over the streets of the city. This was done after the length of the franchise had been changed from 30 to 20 years and made to specify that the company may abandon railway service and substitute buses only on the consent of the Council. Under the new franchise the entire system is included in one ordinance. Heretofore there have been separate franchises and grants for the different lines.

Terms of General Franchise Draft for Kansas City Approved

The City Council of Kansas City, Mo., has approved the general plan proposed by the special franchise committee of the Council for a basis for drafting a new franchise for the Kansas City Public Service Company. The vote on the plan was unanimous.

Discussion has arisen as to the question of valuation of the properties of the company. The proposed grant does not mention a definite valuation figure, but infers a valuation of $25,000,000, by allowing a $2,000,000 yearly income. This is 8 per cent on $25,000,000. This difficulty will probably be settled when the franchise committee starts work on the new draft.

The question of depreciation was clarified by A. N. Gossett, chairman of the committee. He stated that it is the intention of the committee to provide that depreciation shall be taken out of the net income of $2,000,000. Under the old franchise depreciation is regarded as part of operating expenses.

Pacific Electric Seeks Higher Fares

The Pacific Electric Railway has applied to the California Railroad Commission for permission to increase its passenger rates and fares throughout its system in southern California, alleging that its present rates are inadequate to provide a fair return upon its investment in its property. The applicant alleges that the valuation of its interurban and local railway lines and coach and bus lines is in excess of $85,000,000 and that its operating income for the first nine months of 1926 was $495,318 less than that for the first nine months of 1925. The operating income of the applicant, after deducting operating expenses for the year 1921, 1922, 1923, 1924, 1925 and 1926, was as follows:

1921	$3,192,424
1922	3,542,207
1923	4,463,751
1924	3,714,350
1925	2,356,581
Jan. 1 to Sept. 30, 1925	1,906,170
Jan. 1 to Sept. 30, 1926	1,410,852

The petitioner requests the commission to increase its fares as follows:

INTERURBAN SCALE

Kind of Fare	Present Rate per Mile	Proposed Rate per Mile
One-way fares	$0.0275	$0.03
Round-trip fares	.0225	.025
Ten-ride commutation	.02	.0225
Thirty-ride family tickets	.0175	.0175

(It is proposed to change the form of this ticket from 30-ride with 90-day limit to 20-ride with 60-day limit.)

46-ride school tickets; week-day tickets, calendar month tickets and 60-ride tickets reduced 20 per cent.

LOCAL AND MISCELLANEOUS FARES

Kind of Fare	Present Rate	Proposed Rate
Local within cities	$0.06	$0.07
Minimum interurban	.06	.07
L. A. between zone	.10	.12
Minimum L. A. interurban O.W.	.10	.12
40-ride school	.03	.03½
Strip tickets—Glendale	.05	.06½

Ten-Cent Rate in Rome

Under an order of the Public Service Commission, the New York State Railways, effective on one day's notice, will establish a ticket rate of three tickets for 25 cents in the city of Rome, N. Y. There will be a 10-cent rate for passengers who do not purchase the three tickets. The new rates are effective for six months and thereafter until the commission shall otherwise order.

Evidence submitted before Commissioner Lunn showed the New York State Railways was operating in Rome at a loss, the average deficiency each year from 1920 to 1925, inclusive, being $18,954. Commissioner Lunn in a memorandum with the order showed that since November, 1921, when the company was directed to make certain improvements to its track and system in Rome, it had expended $134,129 in improving the service.

The commissioner said that service in the new residential districts of Rome would not warrant extension of existing lines and the question of the present service was considered unfavorable in view of the fact that new equipment was necessary.

Under the new rate additional revenue of $19,000 is expected. This is based on 80 per cent of the Rome riders using the tickets and 20 per cent paying the cash fare.

Rochester Men Receive Insurance Policies for Safety Records

Insurance policies have been issued to 350 motormen and conductors of the Rochester lines of the New York State Railways as a result of an accident prevention contest conducted under the supervision of Leon R. Brown, safety director, during the year 1926. These men operated the whole year without an accident and received the policies as a reward.

The policy is in the form of group insurance issued by the Travelers' Insurance Company and pays $10 a week compensation in case of sickness. The same amount is paid for disability due to non-occupational accidents and $1,000 in case of accidental death occurring outside working hours.

The company is continuing this practice of rewarding careful employees this year and at the end of 1927 a larger crop of men with spotless accident records is looked for. In a safety contest conducted among the different divisions, which closes May 1, members of the winning team will receive new uniforms.

Fitkin Utility Managers Convene

More than 225 managers and department heads of the Fitkin Utilities convened in New York and Asbury Park for their sixth annual convention on Jan. 18. After a jollification and reunion party held on the evening of Jan. 18, the entire convention moved in a special train to Asbury Park, where they made headquarters at the Berkeley-Carteret Hotel. Here, separated from the turmoil of the big city, the utility managers were free to discuss in an intimate manner the problems of their properties and learn of the policies and plans of the Fitkin management.

The utilities in this large group are combined under the leadership of A. E. Fitkin and are managed by the General Engineering & Management Corporation of New York, of which T. R. Crumley is president. This organization has had a spectacular growth in the last few years, and controls properties that today serve a thousand communities in sixteen states. The combined valuation of all the properties in this group is approximately $205,000,000 which is in the service of 500,000 customers. It is estimated that 1,750,000 people are served by the eight electric railways in this group.

While the reunion meeting on Jan. 18 was entirely informal and consisted of a buffet supper and entertainment features, A. E. Fitkin spoke a word of welcome. During the Asbury Park sessions several prominent men spoke, among whom were Senator William A. Stevens of New Jersey; Harold G. Hoffman, Congressman-elect from South Amboy, N. J.; Thomas J. Walsh of E. H. Rollins & Son, New York; A. K. Baylor of the General Electric Company, New York City; Ralph J. Ritchie, operating manager of the General Engineering & Management Corporation; Gen. Guy E. Tripp, chairman of the board, Westinghouse Electric & Manufacturing Company; Francis H. Sisson, vice-president of the Guaranty Trust Company, and R. F. Pack, president of the National Electric Light Association. The business sessions were divided into functional groups of accounting, engineering, customer ownership, and new business, and into the sectional groups of railways, gas, ice, electric and new properties.

Among the railway men present were J. J. Coleman, vice-president and general manager Scranton Railways; S. S. Crane, vice-president and general manager Altoona & Logan Valley Railway; V. A. Redfield, general manager Citizens Traction Company, Oil City; E. O. Shryock, general manager Youngstown & Suburban Railway, Youngstown, Ohio; B. E. Waltz and W. M. Willett, Aurora, Ill., and J. E. Wayne, vice-president and general manager York Railways, York, Pa.

News Notes

More Safety Cars Installed.—Safety cars have just been assigned to two more Atlanta, Ga., lines of the Georgia Railway & Power Company, the River and Soldiers' Home lines, bringing the total number of Atlanta lines using one-man safety cars up to eleven. With the placing of safety cars on these two lines, the number of such cars now in use in Atlanta has reached 100, and it is hoped that even more one-man cars can be added to the system later. The cars being installed are of the most modern type.

Outdoor Garage Plan Condemned.—The parking of automobiles at an angle from the curb on widened thoroughfares has been condemned by Director of Streets and Sewers Brooks of St. Louis, Mo., and he has urged the defeat of a proposed ordinance that would permit such practice on Delmar Boulevard and on De Baliviere Avenue. "Why widen our streets if we propose to make them public garages?" he has asked members of the Board of Aldermen. He has pointed out that it is folly for the city to compel taxpayers to pay for costly improvements designed to speed up traffic along the streets if such work is to be nullified through the passage of ordinances which will reduce the roadway capacity of such streets for moving vehicles at least 50 per cent.

Baltimore Has Thermostats.—The United Railways & Electric Company, Baltimore, Md., has completed the installation of thermostats in all the street cars. This action was taken under revised regulations adopted by the Maryland Public Service Commission and agreed to by the railway. A temperature of 45 deg. will be maintained automatically in all the cars at all times.

Gold Stars for No Accidents.—Gold stars were presented to 53 trainmen of the Jacksonville Traction Company, Jacksonville, Fla., on Jan. 7 for remarkable accident records. These trainmen included two who operated cars for twelve years without having an accident charged against them. Each of these men has covered 324,000 miles of the tracks in Jacksonville. Tribute was paid to the gold star men by Manager Ingle at a banquet held in their honor. Mr. Ingle presented the gold stars and acted as toastmaster. Mayor Alsop said that the record established by these men showed the careful manner in which street cars were operated and also the efficiency of the Jacksonville Traction Company. Trainmen of the company are now engaged in a three-months safety contest for prizes amounting to more than $1,000.

Employees to Write Plays.—Women employees of public utility companies are invited by Zilla R. McClure, Milwaukee, chairman of the women's committee of the Wisconsin Utilities Association, to participate in a playwriting contest. The sketch must deal with some human interest phase of the utility business and must not take more than twenty minutes for presentation. Copy must be submitted to Mrs. McClure before March 1. First prize will be an electrical appliance valued at $25 and second prize will be a $15 electrical appliance.

Wants Two-Cent Fare Increase.—The Citizens Railway, Clarksville, Tenn., has petitioned the Tennessee Railroad and Public Utilities Commission to increase its cash fare from 5 cents to 7 cents. The company operates 5 miles of line.

Fares Increased.—The Public Utilities Commission of Maine has granted the petition of the York Utilities Company to increase fares, effective at once. The changes affect the zone from Johnson's Crossing, Sanford, Me., to Springvale, Me., where the fare is increased from 5 cents to 10 cents, or ten tickets for 80 cents. Student rates remain the same.

Wages Reduced in St. Petersburg.—A reduction in wages of motormen and maintenance men of the Municipal Railway, St. Petersburg, Fla., amounting to approximately 5 cents an hour for a nine-hour day was announced recently by R. E. Ludwig, Director of Public Utilities. effective on Jan. 7. By this action the wage scale reverts to its status before July 1, 1926, when a 5-cent increase went into effect. The cut will affect about 70 men. Motormen formerly received 65 cents an hour.

Changes Advertising Tactics.—The Oklahoma Railway recently announced that instead of using company advertising on car cards and the white street cars it will utilize this space for advertising Oklahoma City, Okla., during the coming year. This, the company believes, will make a favorable impression upon thousands of visitors to the capital city.

Sues City in Damage Case.—The Eighth & Ninth Avenue Railway, New York, N. Y., recently consolidated, served Corporation Counsel Nicholson on Jan. 10 with a summons and complaint in a $2,700,000 damage suit against the city. The papers allege damages to the surface line on Eighth Avenue by construction of the Eighth Avenue-Washington Heights subway. It is alleged that subway construction caused injury to public tracks and to other property estimated at $2,500,000 and has caused delays in operations which have resulted in a $200,000 loss in revenue.

Recent Bus Developments

Injunction Sought in Louisville

Railway Proceeds Against Threatened Competitor — Bus Manufacturer Cancels Contracts for Vehicles

Suit to enjoin the People's Transit Company from operating passenger buses on the streets of Louisville, Ky., in competition with the Louisville Railway was filed in Chancery Court recently, but as the prayer of the petitioner does not seek a temporary restraining order the case will be assigned to one of the chancery divisions in the regular course of business and will then be set for a hearing at an agreed date.

It is alleged in the petition that the defendant company is threatening to exercise certain franchise rights to which it is not entitled, and that it should be enjoined from exercising this privilege until it has acquired such franchise in accordance with the provisions of the laws of the State of Kentucky and ordinances of the city of Louisville.

Company Not Entitled to Right

The petition further sets out that the acts threatened by the defendant company, which it will commit unless restrained and enjoined by the court, "will deprive the plaintiff of a great amount of revenue arising out of the transportation of passengers, and will thus impair the value of the plaintiff's property, its rights and franchises, and will necessitate the raising of the rate of fare to be charged by the plaintiff for the transportation of passengers on all the plaintiff's lines within the limits of the city of Louisville, in order that the plaintiff may receive a reasonable return, for adequate service to the public."

The petition further avers that the railway is required, under the terms and conditions of its franchise obligations, to continue to give service to the public in the transportation of passengers over all lines operated by it, whereas the defendant, if permitted to operate under a mere annual license, as it is threatening to do, will, unless enjoined by the court, pick out the most profitable routes in the city for its operation and be at liberty to discontinue any or all of its operations any time it sees fit.

Company's Attitude Stated

The attitude of the company has been stated by James P. Barnes, president of the railway, as follows:

> The Louisville Railway has heretofore announced its policy to develop a homogeneous transportation system for the entire city of Louisville through the co-operation of street cars and buses. The co-ordinated operation has already been several months in force and the policy of its continuation and extension will be followed in line with the original announcement.
>
> It stands to reason that a general and comprehensive transportation system serving all parts of the city is better than congestion and over-service in some parts of the city and insufficient or entire lack of service in other parts.
>
> Therefore, it is our best judgment based on the whole history of transportation, that the best possible service, at the lowest possible cost, can be rendered only by a complete co-ordinated system under proper governmental regulation.

The plan of the People's company was to operate on Broadway, Market Street and other main thoroughfares in competition with the Louisville Railway, and in furtherance of its plan the bus company ordered seven buses from the Mack company through B. J. Brumleve, Louisville manager of the Mack-International Truck Company. This order, however, was rejected because of the unfair competitive condition involved.

Competition Started on Broadway

The People's Transit Company finally got its line started on Broadway on Jan. 17, or a month and two days later than it had expected to start service. After the Mack truck interests canceled the contract the People's Transit Company announced that it would secure other buses and go ahead. It arranged to install Reos. Tickets are sold at four for 25 cents, or sixteen for $1. The cash fare is 7 cents, the same as that of the railway. The line runs from Shawnee to Cherokee Park, a distance of close to 10 miles. Service is from 5:30 a.m. to 12:30 midnight. The company plans other lines on leading streets of the city.

The railway's suit was to have come up last week, but the hearing was delayed by the illness of a judge. Licenses for operation of the buses were issued just as any other auto license is issued.

Ottawa Joins Gray Line Owners

The Ottawa Electric Railway, Ottawa, Ont., has accepted an invitation to become a member of the Association of Gray Line Owners, an organization limited to companies operating the finest type of sightseeing motor coaches in the large cities of Canada and the United States.

In accordance with the terms of membership the motor coaches of the Ottawa Electric Railway will be painted one of the various shades of gray and will carry the association's diamond-shaped insignia bearing the words "The Gray Line."

The enrollment of the Ottawa Electric Railway in the Gray Line Association places Ottawa on the de luxe tourist map. The city will be advertised in all Gray Line literature throughout the United States and Canada as one of the cities worth visiting. Several pages in the association's sightseeing booklet, hundreds of thousands of which are distributed each year, will be devoted to the capital of Canada.

Montreal and Toronto are also members of the Gray Line Association and tourists when visiting these other cities will be routed by way of Ottawa.

Bus Does Well in Davenport

Three Months Operation by Tri-City Railway Proves Worth as Ally to Railway

The operation of motor coaches in Davenport, Iowa, for the last three months has brought out the fact that these vehicles were not only popular at their inception, but that their popularity has remained after the period of curiosity was past. Under the management of employees, who have been commended for the way they have taken hold of this new type of transportation, the motor coaches have proved safe and dependable in all sorts of weather.

Motor coach operation was started by the Tri-City Railway of Iowa in Davenport, on Oct. 3, 1926, over a route 4.76 miles long. This service replaced street car service on West Seventh Street, Le Claire Street and East Locust Street. In addition it provided a route extension into the residential district along Belle Avenue, which was the first extension of transportation service in the city of Davenport in ten years. Through the introduction of this motor coach line the company was also enabled to reroute the Oakdale service over a more direct and satisfactory line to the business district along Fifteenth Street and Brady Street, combining it with the Vander Veer Park line and making one of the best patronized rail routes in the city.

Upon the introduction of service on the motor coach line the company offered to furnish a fifteen-minute service throughout the day with four vehicles. In order to guarantee sufficient vehicles for regular service and provide for some additional tripper service, the company bought eight vehicles or twice the number used for regular service. Soon after the service was started two additional coaches were introduced to give a 7½-minute interval on the route from the business district to the east end from 4 to 6 o'clock in the afternoon. It was then found advisable, as the holiday trading season approached, to put on a ten-minute service throughout the route in the afternoon between 4 and 6 o'clock and in addition run enough extra units to make a five-minute interval to the east end. This required eight coaches in all, or the entire number available. Later a ten-minute service throughout the route in the morning hours from 6 to 8:30 was put in effect and on Dec. 18, which was the last Saturday before Christmas, a special 7½-minute service was given throughout the entire route from noon until 10 o'clock at night. Fourteen and one-half more vehicle-hours or 125 additional coach-miles a day are being provided than were contemplated at first.

The company's equipment consists of six 21-passenger coaches made by the Yellow Truck & Coach Manufacturing Company and two Mack 25-passenger, gas-electric motor coaches. The last two units named are of a special design, just recently brought out. All of the above units are provided with special genuine leather seats of the

most comfortable design. In addition to the above equipment one more Mack 29-passenger, straight gas-motor coach was purchased recently. A feature which shows the company's earnest desire to serve was the fact that this motor coach was unloaded at 2 p.m. Friday afternoon, Dec. 17, taken to the shops of the company, thoroughly inspected by the manufacturer's agents, cleaned, a register installed, the destination sign painted, dried and installed and the coach placed in operation during the evening rush in just two hours and 45 minutes.

The operation of the motor coach has been especially satisfactory from the standpoint of freedom from accidents and dependability in service. Injuries, of course, have been practically nil. In regard to dependability of service, coaches have completed their schedules at least 99 per cent of the time.

Even in so short a time the company has developed considerable revenue from chartering the coaches for special service. Trips have been made to Rockford, Peoria, Burlington, Peru and other cities, to say nothing of numerous charter trips around the Tri-Cities. The company is interested in securing this type of business, as a large amount will justify keeping a greater number of units on hand for use in the peak hours of city service.

Wants Rochester Buses Under Service at Cost Contract

The New York State Railways, Rochester Lines, has filed a petition with the Public Service Commission asking that all bus lines in the city of Rochester be placed under the provisions of the service-at-cost contract by which the electric railway system is operated.

The railways petitioned for transfer of the franchises of the Ridge Road and Dewey Avenue feeder bus lines from the Rochester Interurban Bus Company to the Rochester Railways Co-ordinated Bus Lines, Inc. Both are subsidiaries of the railway. The latter is to operate in the city only, under the terms of the service-at-cost contract between the railways and the municipality.

Railways Commissioner Charles R. Barnes said that the approval of the commission was sought in this step in order to segregate the city bus lines from the company's interurban routes operated by the Rochester Interurban Bus Company.

Public Service Commissioner Charles Van Voorhis, to whom the railway's petition was submitted, reserved decision.

Bus Development Noted in Oklahoma.—Co-ordination of railway and bus service under the management of electric railways progressed rapidly in Oklahoma during the past year, according to the Oklahoma Public Utility Information Bureau. This development included installation of many new bus routes in Oklahoma City serving as feeders to lines of the Oklahoma Railway, purchase of several bus lines in Tulsa by the Oklahoma Union Railway and conversion of the electric railway urban and interurban system at Shawnee into bus service lines.

Miami Commission Passes Jitney Ordinance

The ordinance which eliminates jitneys from the close-in business section of Miami, Fla., was passed by the City Commission on Jan. 3. It will become effective within a month. Recently representatives of the jitney lines protested passage of the ordinance and they were told to submit a plan which might permit them to retire from the field on an adjusted compensation basis. However, they informed the commission that it was the desire of most of them to continue. This will be possible only through legal defeat of the ordinance. Routes now being served by jitneys will not be deprived of transportation, as the commission demanded a guarantee from bus lines that wherever a jitney was removed it would be supplanted by one of the larger vehicles. The officials claim the new ordinance will relieve traffic congestion and represent a large saving annually to the taxpayers. The jitney ordinance was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 15, page 143.

Engineers Against Buses on Park Avenue, New York

Eighteen reasons why the city of New York should abandon its intention of establishing a bus route in Park Avenue are set forth in a report sent by Fisk & Roberts, consulting engineers, New York, to H. Gordon Duval, president of the Park Avenue Association, and made public recently.

The Board of Transportation has included a "Lafayette Street, Madison Avenue and Park Avenue" route in the proposed bus system for Manhattan, applications for a franchise for which are before the Board of Estimate. The report says that use of Park Avenue for a bus route is opposed by more than 99 per cent of 5,000 persons in the section canvassed. The engineers say:

> There is also a definite feeling on the part of residents that Park Avenue is already doing its share as a traffic artery. In addition to carrying a tremendous volume of vehicular traffic, it is also carrying under its surface the enormous passenger traffic of the New York Central and the New York, New Haven & Hartford Railroads.
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> It must be admitted that in providing public transportation on any highway which previously has been without it, there will be resultant disadvantages, as well as the very evident advantages. It is a common occurrence for persons living directly on streets devoted primarily to residential purposes to object to bus operation. Such objectors cite as reasons for their opposition the noise of engine exhausts, particularly during sleeping hours; the poisonous and unpleasant fumes from these exhausts, and the accident hazard created by the operation of public vehicles on a fixed schedule which drivers are expected by their employers to adhere to.
>
> However, Park Avenue is not an ordinary residential street. Most Americans will call it the finest residential street in New York City. Most New Yorkers will argue that it is the finest residential street in America. It is unnecessary here to describe its character in any detail.

Other disadvantages that would result to residents of Park Avenue, summarized by the report, are additional vibration from heavy buses because of the railroad tunnel underneath, a great increase in traffic congestion, reduction of speed of all vehicular traffic, decreasing use of Park Avenue by private automobiles, the mixing of high speed automobile traffic with low speed omnibus traffic, and probable injury to near-by surface lines on Madison and Lexington Avenues, which might prevent their rehabilitation. The report adds:

> A large part of the present bus traffic on Fifth Avenue will be diverted to the proposed Park Avenue route. This will be especially true if the fare on the Park Avenue route is 5 cents, as proposed by some of the franchise applicants. The diversion of this traffic from Fifth Avenue to Park Avenue will be of little or no assistance in solving the city's transportation problem and might be detrimental to business interests on Fifth Avenue.

Another Buffalo Grant to E. M. Howe

The City Council of Buffalo, N. Y., has approved the application of Ernest M. Howe, Detroit, representing the Buffalo Motor Coach Corporation, for a franchise to operate buses on three local lines in the city of Buffalo at an 8-cent fare with free transfers to connecting bus lines. Following the approval of the plan by the City Council and the granting of a five-year franchise Mr. Howe informed Mayor Frank X. Schwab that immediately he would petition the New York State Public Service Commission for a certificate of convenience and necessity. He promised 25 buses would be in operation on the three routes within 60 days after the consent of the state utilities board has been obtained.

Mr. Howe's franchise runs for a period of five years and provides that if the city becomes empowered to operate municipal buses the three lines of the Buffalo Motor Coach Corporation can be taken over by the city on six months notice.

Opposition to the franchise was voiced by counsel for the International Railway and its subsidiary, the International Bus Corporation. The International Bus Corporation told the City Council it stood ready to give additional service over new routes under applications tabled since last spring.

Mr. Howe obtained a franchise from the Buffalo City Council a year ago to operate 5-cent buses over thirteen routes in the city, but approval never was obtained from the Public Service Commission as Mr. Howe and the American National Omnibus Corporation, New York, lacked $300,000 of the necessary $1,500,000 paid in capital on the last day allowed by the state utilities board to complete its financing and appear before the commission for a hearing on its application for a permit.

New Route Opened.—The Boston Elevated Railway, Boston, Mass., recently put in operation three new bus routes. These serve territory not previously reached by railway service.

Buses Between Aurora and Elgin.—The Aurora, Elgin & Fox River Electric Company, operating an interurban service from Aurora to Elgin, Ill., has been granted a permit to install buses between those two cities, on routes on both the east and west Fox River roads. The new system, it is said, will not interfere with the present interurban service, but will act as feeder to the interurban line and reach a territory not in the interurban field.

Financial and Corporate

St. Paul Seeks Suggestions

Earnings of Lines There Fall $485,000 Below Amount to Which Company Is Entitled

The St. Paul City Railway, St. Paul, Minn., has asked the St. Paul City Council for advice. Under a ruling of the Minnesota Railroad and Warehouse Commission the railway is allowed to make 7½ per cent upon its investment. An agreement is on file that earnings of the Twin City Motor Bus Company, a subsidiary of the Twin City Rapid Transit Company, the parent organization for both companies, above 7 per cent will be turned over to the railway. The earnings of the bus company upon preliminary report seem to fall below this figure. These are to be filed in detail soon. At any rate the earnings of the St. Paul City Railway are about $485,000 in 1926 below the earnings to which the company is entitled, or $715,000 instead of $1,200,000.

Two alternatives present themselves. One is an advance in the rate of fare from 8 cents cash or six tokens for 40 cents. The other is an amendment to the city charter which will relieve the company of certain charges, such as paving between the tracks, as suggested by the state commission, when the fare rate was announced. Such an amendment failed to pass at the November election.

A letter from Horace Lowry, president of the Twin City Rapid Transit Company, reads:

On Jan. 1, 1926, under authority of the Minnesota Railroad and Warehouse Commission, there was put into effect in the city of St. Paul a railway rate of 8 cents cash with a token rate of six for 40 cents.

During the year 1926 both Minneapolis and St. Paul agreed with the commission and the railways on the property values and the rate of return, and entered into stipulations to the commission and the courts, so this problem no longer confronts us.

In its order the commission clearly states that unless St. Paul relieves the St. Paul City Railway of certain burdens of taxes, paving and special assessments it would be impossible for the property to earn a fair return on the established fair value of its property.

The St. Paul City Council and taxing authorities have already relieved the company of overtaxation as suggested by the commission, but nothing else has been accomplished.

At the November election there was submitted to the voters a charter amendment the purpose of which was to authorize the City Council to relieve the company of paving and certain other burdens, but this amendment was defeated because it was submitted at a general election instead of being made the subject of a special election at the general election, as we urged.

This is proved by the fact that a substantial majority of those voting on the question voted in favor of adopting the amendment.

There are other operating economies, some of which we have already suggested, which could be brought about by close co-operation between the company and the city.

In its order the commission stated that it had reason to believe that the city of St. Paul would give serious consideration to the situation within a reasonable time, but a year has now elapsed.

For your information, the 1926 operation of the St. Paul City Railway will be about as follows, although there may be some slight variation on account of the last part of the year being estimated (very closely, we believe):

Gross revenue	$4,592,000
Operating expenses, rentals, taxes, etc.	3,877,000
Available for return on the investment	$715,000

The commission, the city and court agreed that the company was entitled to earn more than $1,200,000 in order to give the company a fair return on the value of its property. It is therefore obvious that the company will be short about $485,000 during 1926 from what it is entitled to earn.

We wish to assure your honorable body that we want to do all in our power to avoid a higher rate of fare in St. Paul, but without your help and co-operation we cannot avoid it.

We sincerely hope you will give this your early consideration, and advise us of your suggestions as to how the necessary reduction in expenses can be accomplished.

Deficit in Cincinnati Due to Buses

Operation of buses by the Cincinnati Street Railway, Cincinnati, Ohio, has resulted in a loss in the earnings of the company, according to a report embodying the December figures of the company, which Walter A. Draper, president, recently submitted to Edgar Dow Gilman, Public Utilities Director. During December the report shows that the total of revenue passengers reached its peak on electric cars for the year, but there was a loss of $15,754 in operation of buses. In view of the fact that there is only $420,837 in the fare control fund, and judging from the earnings of the company during the past year, car riders, according to Mr. Draper, cannot expect a reduction in the rate of fare for at least the next two or three years. The present cash fare is 10 cents, with tickets sold in strips of three for a quarter. Mr. Draper explained that operating expenses also reflected the large amount that is being expended by the company in connection with track reconstruction.

Detroit Wants to Know

Councilman Propounds Questions Calculated to Fix Relative Earning Power of Railway and Bus Lines—Mayor Comments on Terms of Contract Under Which City Purchased System

A REAUDIT of the books of the Department of Street Railways at Detroit, Mich., for the year ended June 30, 1926, was asked in a resolution introduced in the City Council on Jan. 11. Two audits have already been made, one by William M. Hauser, D.S.R. auditor, and one by Price, Waterhouse & Company, and the resolution providing for a reaudit is the result of the fact that the audits were about $1,000,000 apart. The D.S.R. auditor's report showed net earnings of about $500,000 for the system, while the other audit showed a deficit of several hundred thousand dollars.

The third audit, requested by a unanimous resolution of the Council, was opposed by Mayor Smith. He stated that it will do no good, because where the last audits differ is in depreciation charges. The Mayor further cited that the D.S.R., in assuming such a heavy interest and debt charge at the time of its purchase, did something that no private company has ever done.

Councilman Sastator, who introduced the resolution, cited that the City Charter provides that an unprejudiced audit of the books be made every year. He also prepared and submitted a list of nineteen questions relative to the municipal railway accounting methods, stating his belief that the railway lines are subsidizing the bus lines and that the cars, which carry the bulk of the passengers, are handicapped by the buses.

Among the questions propounded by Councilman Sastator and the data sought were the following:

Is bus operation such that the lines meet the costs, or are they actually being subsidized by the trolley division?

In bus data shown in monthly statements, are any costs included other than strictly maintenance and operating costs?

Is there any distribution of charges to bus operation for erection of new garages, alteration of carhouse, rental of space and equipment at carhouses or the pro rata cost of time of D.S.R. executives, claims, equipment, auditing, fare inspection, etc.

In what account is depreciation of bus equipment shown, and what is the rate on single-deck buses?

Is it the opinion that the single-decker will be fit for operation beyond 75,000 miles, except at prohibitive costs?

If not, what funds are available to replace the equipment?

How much paving tax has been paid to the city by the bus division and how many miles has division operated to date?

List number of buses, date placed in operation, total mileage to date and average miles a month for each vehicle, for last twelve months, or since going into service.

List the individual bus routes, date installed, length of route, number of buses at peak, revenue, revenue per mile first three months of operation and same figure for three months ended October, 1926, total miles operated for first three months, and for three months ended October, 1926.

Give the total number of bus claims filed against the department in the same period and claims allowed or litigation with amounts and names of plaintiffs. Show where this expense is represented in bus costs as printed in monthly statement, and where bus division is charged to build up its share of injuries and damage reserve.

Give number of "dead" miles operated monthly on each bus route, and percentage this represents of total route operation.

When were 50 double-deck Fageol coaches ordered?

What was delivery date, and how many have been delivered?

What funds are available to pay for these 50 coaches, other than money now in regular funded reserves of the trolley division, such as for injuries and damages reserve?

Give the trolley car revenue for each month, on Woodward Avenue and Jefferson Avenue, before installation of single-deck buses on these lines, and trolley revenue for 30 days after, installation of single buses.

Why is it not advantageous to keep bus costs entirely separate from trolley costs?

Why have figures from each division merged in your general accounts?

The questions were asked by Mr. Sastator as a member of the body which approves or disapproves contracts for the purchase of buses and street cars, so he could vote in the future with the facts before him, he stated.

Mr. Hauser's report in reply to the questions shows a falling off in the

earnings of the street cars on Woodward, Jefferson and Grand River lines from $401,443 in June, before bus lines were established on these streets, to $357,094 in August after they were established. The average daily income fell from $13,381 in June to $11,519 in August. He stated that coach operation is such that the lines as a whole meet the costs and they are not being subsidized by the street car rider.

The decrease in the average revenue per day on the three lines just mentioned, according to Mr. Hauser, cannot be attributed wholly to the installation of coach service on Jefferson, Grand River and Woodward Avenues. The general traffic was subject to a slump in August, 1926, compared with June, 1926. It is further cited that the competition between the D.S.R. facilities and those of the jitneys and the Detroit Motorbus Company was at its height. Arguments are presented in support of the view that none of such items as erection of garages, alterations to carhouses. and salaries of D.S.R. officials should be considered, and that none of the items should have been reflected in the bus operation cost figure.

Colorado Property to Be Sold

The Denver & Interurban Railroad, which for nineteen years operated between Denver and Boulder, Col., has been advertised for sale at auction. The auction is to be held at an old Interurban carhouse in Denver on Feb. 16 with John J. Morrisey, local attorney, special master in chancery. No upset price has been named for the property. The road is to be sold to satisfy a $1,250,000 claim covered by a mortgage in favor of the Guaranty Trust Company, New York, as trustee.

Readjustment Talk at Boston

Metropolitan Transit System Suggested as New Company to Succeed Boston Elevated

Many new plans and propositions are being developed for the future of the Boston Elevated Railway and are finding their way to the Massachusetts Legislature. The latest is a bill offered by Henry I. Harriman, chairman of the Metropolitan Planning Division, providing for the abolition of the Boston Elevated, the wiping out of its board of public trustees and the creation in its place of a new corporation to be known as the Metropolitan Transit System. This is the plan to which brief reference was made in ELECTRIC RAILWAY JOURNAL, Jan. 15, page 144.

Three public incorporators are to be appointed by the Governor, under the provisions of this bill, and they are to form the new company. The present Elevated Company is to sell its property to the new company and the new securities are to be 4½ per cent preferred stock and 5 per cent common stock. There is to be no money exchange in the transaction, for the road is to take one share of common stock at 5 per cent for one share of present common stock, which pays 6 per cent.

For the present first preferred stock, which pays 8 per cent, the new company would give new 4½ per cent preferred stock at $125; second preferred stock of the present company, paying 7 per cent, would be exchanged for the new 4½ per cent preferred at $110. The present special preferred stock would be converted into the new preferred at $105.

There is ample provision in the bill for non-assenting stockholders. The new arrangement would save $800,000 yearly in interest charges; of this sum the first $200,000 would be applied to a sinking fund for the purchase of preferred stock at par by the Commonwealth. The next $400,000 would be used to pay the present deficit to cities and towns which advanced money to the Elevated years ago, and the balance of $200,000 would be used to pay rental charges on new transit extensions.

Further, the bill provides for a 50-year extension of the public control, and during that period the state would acquire complete ownership of the corporation. The Supreme Judicial Court would be called upon to liquidate the present Boston Elevated Railway, winding up its affairs, and a board of trustees would be appointed by the Governor to operate the road, its chairman to receive $15,000 a year.

Conspectus of Indexes for January, 1927

Compiled for Publication in This Paper by
ALBERT S. RICHEY
Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Jan. 1927 **7.42**	Dec. 1926 **7.42**	Jan. 1926 **7.32**	Nov. 1926 **7.42**	May 1923 **6.88**
Electric Railway Materials* 1913 = 100	Jan. 1927 **156.0**	Dec. 1926 **159.2**	Jan. 1926 **154.3**	Sept. 1920 **247.5**	Oct. 1924 **148.5**
Electric Railway Wages* 1913 = 100	Jan 1927 **226.6**	Dec. 1926 **226.3**	Jan. 1926 **223.8**	Sept. 1920 **232**	Mar. 1923 **206.6**
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	Jan. 1927 **203.5**	Dec. 1926 **203.2**	Jan. 1926 **202.2**	July 1920 **256.4**	May 1922 **167.4**
Eng. News-Record Construction Cost (General) 1913 = 100	Jan. 1927 **211.5**	Dec. 1926 **210.8**	Jan. 1926 **207.2**	June 1920 **273.8**	Mar. 1922 **162.0**
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Dec. 1926 **147.2**	Nov. 1926 **148.1**	Dec. 1925 **156.2**	May 1920 **246.7**	Jan. 1922 **138.3**
Bradstreet Wholesale Commodities 1913 = 9.21	Jan. 1 1927 **12.82**	Dec. 1 1926 **12.78**	Dec. 1 1926 **14.01**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	Dec. 1926 **161.8**	Nov. 1926 **161.6**	Dec. 1925 **165.5**	July 1920 **219.2**	Mar. 1922 **138.7**
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	Dec. 1926 **168 4**	Nov. 1926 **168.2**	Dec. 1925 **171.4**	July 1920 **204.5**	Aug. 1922 **154.5**
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Dec 31 1926 **3.961**	Nov. 30 1926 **3 807**	Dec. 31 1925 **5.033**	July 31 1920 **11.118**	July 31 1924 **3.187**
Bank Clearings Outside N. Y. City (Billions)	Dec. 1926 **19.76**	Nov. 1926 **18.24**	Dec. 1925 **20 38**	Oct. 1925 **20.47**	Feb. 1922 **10.65**
Business Failures Number	Dec. 1926 **1987**	Nov. 1926 **1614**	Dec. 1925 **1628**	Jan. 1924 **2231**	Aug. 1925 **1353**
Liabilities (Millions)	**51.70**	**60.31**	**43 11**	**122.95**	**27.22**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 137 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Foreclosure Sale Postponed.—Sale of the Second Avenue Railroad, New York, under foreclosure has been postponed to June 23, according to Charles E. Chalmers, receiver for the company. The sale was set originally for Jan. 13. The terms of the reorganization were reviewed in the ELECTRIC RAILWAY JOURNAL for Dec. 18, page 1115.

New Director Elected.—H. Fairfield was elected a director of the Homestead & Mifflin Street Railway, Homestead, Pa., on Jan. 11.

Bonds Being Paid Off.—The $330,000 of 7 per cent bonds of the Springfield & Eastern Street Railway, Springfield, Mass., due Jan. 1, 1927, are being paid off at the office of the Springfield Safe Deposit & Trust Company. The Springfield & Eastern Street Railway is a subsidiary of the Springfield Railway.

Cash Fares Lower.—The Binghamton Railway, Binghamton, N. Y., carried a total of 13,369,577 revenue passengers in 1926. This shows a decrease of 1,001,582 cash fares since the close of 1925, when 14,371,159 passengers paid to ride on the cars. In spite of these figures the car-miles for 1926 were 2,214,850, compared with 2,216,881 for 1925, over a track mileage of approximately 50 for both years.

Traffic Increases.—A slight increase in the number of passengers carried by the United Railways & Electric Company, Baltimore, Md., for the first eleven months of 1926 is noted in comparison with similar period a year before. For the eleven months of the year just ended 205,273,813 passengers were carried, against 204,341,300 for the eleven months period ended November, 1925.

Net Income Increases.—For the six months period ended Dec. 31, 1926, the total operating revenues of the Brooklyn-Manhattan Transit Corporation and affiliated companies, Brooklyn, N. Y., was $23,329,938, against $22,463,954 in 1925. Total operating expenses increased from $14,546,414 for the six months period of 1925 to $14,967,150 in 1926. After the consideration of income deductions a net income of $3,310,883, remained for the six months period ended Dec. 31, 1926, against $2,994,524 for a similar period in 1925.

Personal Items

Schenectady Railway's New Head

Steam Railroad Official Who Started His Career in 1878 Succeeds the Late E. M. Walker

James H. Hustis, former president of the Boston & Maine Railroad and for a lifetime connected with railroads and electric railways in various capacities, has been called from a year's retirement to succeed the late Edwin M. Walker as president of the Schenectady Railway, Schenectady, N. Y. Mr. Hustis took office on Jan. 8. He brings with him a wealth of experience in railroading, and it is believed by the officials of the New York Central Railroad and the Delaware & Hudson Company, joint owners of the electric railway, that this background fits him excellently for the post at Schenectady.

The shocking suddenness of Mr. Walker's death on Dec. 30, caused by carbon monoxide poisoning in a closed garage, and the necessity of finding a successor in a short time, gave Mr. Hustis little opportunity to formulate plans or policies for his administration. At present he is making an intensive study of the situation. Aside from a few generalities in regard to electric railway conditions in the city of Schenectady he was unwilling to discuss his future work.

He said quite frankly that he had no knowledge of the physical make-up of the Schenectady property or of its particular problems or needs. On that account he was unable to discuss the subject of the Schenectady lines in any detail. He did say, however, that on the way to Schenectady he had an opportunity to look over the balance sheet of the property and to study some of the figures covering the results of operation.

"My entire life," said Mr. Hustis, "had been spent in the transportation business until last spring, when I retired from the presidency of the Boston & Maine Railroad. Transportation, whether steam or electric, is, and, for that matter, has been, an essential public service. This country is what it is because of its unequaled transportation facilities. For some years, due to causes that do not now need to be discussed, a feeling of antipathy existed between owners and users. This feeling was not confined to any locality or section, but was quite general. Fortunately, that feeling is gradually disappearing, at least so far as steam railroads are concerned, with the result that 1926 was, generally speaking, a prosperous year for railroads and a prosperous year for the users of the roads.

"The stocks of merchants and manufacturers, which represent a vast sum running into billions, was never so low as last year, due to the ability of railroads to make prompt deliveries. Similarly in the electric railway field the public is recognizing that the electric railways are rendering an essential public service and that good service is essential to any important community, regardless of the great increase in the use of motor cars."

On his retirement from the Boston & Maine Railroad a year ago Mr. Hustis decided that he needed a rest and made a tour of Europe. After his return he traveled extensively in the United States, and at the time of his appointment to the presidency of the Schenectady Railway he was considering a pleasure trip to California or Florida.

J. H. Hustis

Mr. Hustis entered railroading in the office of the general superintendent of the New York Central Railroad in 1878. His first executive appointment came in 1891, when he was made trainmaster of the Harlem division. By 1900 he had worked up to the superintendentship. For the next two years he was superintendent of the River division, but in 1903 went to the Rome, Watertown and Ogdensburg division. In 1907 he was appointed general superintendent of the Western division.

During the year 1907-1911 he held the position of assistant general manager of the New York Central in charge of the Boston & Albany, and in 1911 he was promoted to vice-president with the same charge. During the year 1913-1914 he was made president of the New York, New Haven & Hartford and on Aug. 15, 1914, was elected president of the Boston & Maine Railroad.

Mr. Hustis was born in New York City on Jan. 11, 1864.

California Commission Reorganizes—Personnel Changes

Upon its recent reorganization the California Railroad Commission, at the suggestion of Commissioner Harley W. Brundige, who has served as president of the commission during the last two years, started a new policy of rotating the presidency of the commission among the commissioners in the order of their seniority. It elected Commissioner Ezra W. Decoto as president for the year 1927. President Decoto was appointed to the commission in January, 1925, previous to which he served as District Attorney of Alameda County for six years. He has been active in civic affairs in the state and in Alameda County for many years, and has had a thorough training in public utility matters.

President Brundige, the retiring president, has served the commission in that capacity four years, having been president during 1921-22, and also during 1925-26. The commission reorganized, following the reappointment to office of Commissioners Brundige and Whitsell, whose terms expired Dec. 31, 1926. Both were reappointed by Governor Richardson for the full term.

In carrying out the new plan of rotating the presidency, Commissioner Leon O. Whitsell, who is next to President Decoto in seniority, will be elected as president during 1928, and Commissioner S. Louttit will serve as president during 1929.

In adopting this policy the commission follows the plan of the Interstate Commerce Commission under which every commissioner who serves a term will have acted as chairman of the commission for one year. The duties and responsibilities of the Railroad Commission have increased so rapidly in recent years and the volume of the work handled by the commission has grown so large that the office of president throws upon the incumbent a tremendous amount of added work and responsibility. It is the unanimous opinion of the commission that this work and responsibility should be shared by every member of the commission.

D. L. Fennell Elected to Highway Safety Association

D. L. Fennell, general superintendent of transportation of the Kansas City Public Service Company, Kansas City, Mo., has been elected a member of the board of governors of the Missouri Street and Highway Safety Association. Mr. Fennell's appointment to the directing group of this state body constitutes fitting recognition of his activity and interest in promoting street and highway safety. It marks another step in the country-wide movement by transportation officials to co-operate in and

identify themselves with the activities of public bodies working to better traffic regulation and promote public safety.

Changes on North Shore Line

C. Edward Thorney, former general passenger agent of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., has assumed his duties as assistant to Hal M. Lytle, vice-president in charge of public relations, to which position he was recently appointed. R. S. Ames, formerly assistant general passenger agent at Milwaukee, succeeds Mr. Thorney in the traffic department. Both Mr. Thorney and Mr. Ames are experienced railroad men, having served in various capacities with other railroad companies before joining the North Shore Line.

Mr. Thorney was made general agent of the railroad at Milwaukee in November, 1925. Shortly after this he was appointed secretary of the company's Better Business Campaign, in which capacity he served until several months ago, when he was appointed to the position he held at the time of his most recent promotion.

Mr. Ames entered the service of the North Shore Line as general agent, passenger department, in Chicago in January, 1926. He was appointed to succeed Mr. Thorney as assistant general passenger agent at Milwaukee upon the latter's appointment to the Chicago office.

Indiana Commission Changes Announced

Formal appointment of Reid McCain of Delphi, Ind., as secretary of the Indiana Public Service Commission was announced on Jan. 1. Mr. McCain notified the commission of his acceptance and will take over his new duties immediately. He is a graduate of Franklin College and served two years as surveyor of Carroll County.

Appointment of Webb Gilbert as acting chief accountant to succeed John S. Powell, who resigned, also was announced by the commission.

A. P. Lewis, formerly connected with the Wichita Railway & Light Company, Wichita, Kan., has been named general superintendent of the Rockford, Beloit & Janesville Railway, Rockford, Ill., recently purchased by Milton Ellis, president of the Beloit Traction Company.

Judge L. D. Hill of Sparta, White County, Tenn., is now a member of the Tennessee Railroad and Public Utilities Commission. He was named in the November election as a Democrat and succeeded Julian H. Campbell, Republican, who received an appointment as United States Commissioner at Nashville.

A. F. Davey, manager of the Wisconsin Public Service Corporation's properties at Sheboygan, Wis., has been named manager of the Sheboygan-Manitowoc division of the company, under the recent plan placed into effect in a redistricting of the operating divisions. Mr. Davey will have jurisdiction over the operation of the electric railway and bus operations at Manitowoc and Two Rivers.

A. L. Fischer Made Purchasing Agent at Cincinnati

A. L. Fischer, assistant purchasing agent of the Cincinnati Street Railway, Cincinnati, Ohio, since its reorganization in November, 1925, has been appointed purchasing agent for the company. He had served the Cincinnati Traction Company as assistant purchasing agent since 1917, and when the Cincinnati Street Railway took over the operation of the street railway system last year he was retained in the same capacity.

Mr. Fischer, a native of Cincinnati, received the degree of bachelor of arts in 1896 at St. Xavier College at Cincinnati, and the degree of master of arts the following year from the same institution. He entered electric railway work in 1903 in the transportation department of the Cincinnati Traction Company. Mr. Fischer is a member of the committee of purchases and stores of the American Electric Railway Association.

© Bachrach

A. L. Fischer

The Glasgow Manager's Retirement

In accordance with the arrangement already reported, James Dalrymple retired from the post of general manager of the Glasgow Corporation Tramways on Dec. 31. He received various gifts from colleagues. Before he left he made an address to the staff of the department, in the course of which he said:

It is now 22 years since I was appointed general manager. These years have been very strenuous, but the work has been extremely interesting. I have been looking into our records and I find that there are 66 still on the staff who joined the department with me in 1894, and there are 1,014 still in the service who were here when I became general manager in 1904.

I leave the service with very great regret, as I have always been proud of being a member of the Glasgow tramways staff. You have made the Glasgow tramway system the envy of the whole tramway world. I thank you very sincerely for the loyal support you have given me during all these years, and I trust that, notwithstanding many difficulties, the Glasgow tramways will continue to flourish.

Mr. Dalrymple has received an offer by cable of the post of tramway adviser to the Johannesburg Corporation, South Africa. He has replied stating that he is willing to accept after the completion of his São Paulo engagement. The latter, it may be recalled, is for three months and is also an engagement in an advisory capacity.

On Dec. 22 the Glasgow Town Council accepted Mr. Dalrymple's resignation of the post of general manager of the tramways under circumstances which have already been outlined in these pages. The Council also adopted a recommendation by a committee that Mr. Dalrymple should be granted a retiring allowance of £832 11s. 2d. a year, being one-half of his average salary for the last seven years. This is the usual superannuation arrangement.

Obituary

M. H. Bronsdon

M. H. Bronsdon, Commissioner of Public Works in Providence, R. I., since 1924 and nationally known as an electric railway engineer, died on Jan. 15 in San Diego, Cal. Although already well known as a builder and operating engineer of electric railway lines, Mr. Bronsdon achieved his greatest prominence through his participation in the speedy rebuilding of the local railway lines in San Francisco following the earthquake and fire in 1906 as well as for his service as chief engineer of the Providence, R. I., electric railway system, with which he was connected for the greater part of the time from 1907 to 1915.

Mr. Bronsdon was a native of San Francisco. His father constructed the first electric railway between Boston and Charlestown and also built the first electric railway on the Pacific Coast. It was on the coast that he had his first experience in engineering work. This was during the construction of the cable road in Los Angeles. In 1889 he became superintendent of the Providence Cable Tramway. He later was chief engineer at the Eddy Street power plant in Providence, having charge of the installation there. He later went to Duluth as designing and construction engineer of the Duluth-Superior Traction Company, and was afterward appointed engineer for the Old Colony Street Railway, Boston, Mass.

His next engagement was with the United Railroads, San Francisco, where he remained until March, 1907. He next became chief engineer of the Rhode Island Company, at that time operating the electric railways in Providence, R. I. For five years he continued in that post and then resigned to return to his home in California. Two years later he returned to the employ of the company at Providence, but about a year after this he retired from the company to accept appointment to the newly created office of deputy commissioner of public works of the city of Providence. His acceptance of this office marked the end of his active connection with electric railway affairs.

Clifton Colburn, treasurer and an organizer of the Nahant & Lynn Street Railway, Lynn, Mass., died Jan. 5. He was connected with the Nahant & Lynn Street Railway since its organization.

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

Fifty Gas-Electric Coaches Being Delivered to Detroit Railways

Complete delivery of 50 a.c.f. gas-electric double-deck coaches for the Department of Street Railways of the City of Detroit is expected by Jan. 31.

These coaches embody several unusual features, including equipment for either one-man or two-man operation and a complete inclosed stairway and upper deck, with an over-all height of only 12 ft. 8 in. They are the first of a recently announced line built by the American Car & Foundry Motors Company to be put in service. A six-cylinder, 90-hp. Hall-Scott engine, with 4¼-in. bore and 5½-in. stroke, comprises the power equipment. The electric drive, made by the General Electric Company, is of the type used in previous gas-electric buses. It consists of a generator connected directly to the engine, which produces current to operate the two series-wound electric motors, one of which is geared to each of the rear wheels. Westinghouse air brakes operating low carbon shoes against high carbon drums are provided on all four wheels. Electric braking also is provided by introducing a resistance grid into the circuits with the current flowing in reverse.

Front and rear passenger doors are controlled independently by pneumatic door engines, making it possible for the driver to operate the vehicle without the aid of a conductor. Both front and rear doors have treadle controls. They are also fitted with an outside conductor's air valve so the bus may be loaded from both ends at terminal or congestion points.

The frame is made from heat-treated alloy steel, the side rail sections having the maximum dimensions of 11-in. web 3-in. flange. The material is ¼ in. thick and the frame is reinforced for several feet through the section of maximum stress by pressing a ⅜ in. reinforcement into the main rail, giving a maximum rail thickness of ⅝ in. Pressed-steed channel cross-members are used to reinforce the frame. The front springs are 4 in. x 49 in., and the rear springs 5 in. x 64 in. Rear springs are equipped with bumper springs whose tips contract progressively under deflection. It is claimed that the unusual length and width of these springs gives a riding quality which is much better than has heretofore been achieved in double-deck coaches.

One of the 50 Gas-Electric Coaches Which Are Being Delivered to the Detroit Street Railway System. They Are Designed for One or Two-Man Operation

Each coach has 60 seats, 27 passengers being accommodated on the lower deck in Brill type, leather-upholstered seats which are provided with spring units in the bottom and back. On the upper deck 28 out of the 33 seats face outward over the monitor. Two seats are placed at the forward end of the monitor section, and three passengers can be seated in folding taxi chairs.

By economical use of space, the builders have obtained 6 ft. 4 in. headroom in the lower deck and 5 ft. 10 in. on the upper level. Ample lighting is supplied by nineteen 21 cp. lamps, operated from a double battery of six cells each built up with 21 plates.

Cars Being Rebuilt for One-Man Operation at Hampton, Va.

An extensive reconstruction and painting program has been started by the Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va. The platforms of 45 two-man double-truck cars are being remodeled to provide for one-man operation. These cars are to be equipped with all of the modern National Pneumatic and Safety Car devices. After the reconstruction work is completed each car will be painted with the standard Fitkin combination of colors. When completed the property will be operating on a 100 per cent one-man basis.

New Financial Interests Back Brown Boveri

Action of the stockholders of the American Brown Boveri Electric Corporation on Jan. 5 in electing to the directorate representatives of Blair & Company, Inc., the Central Union Trust Company, the Equitable Trust Company and Curtis & Sanger is taken as indicative of new and important financial interests having become identified with the corporation. The new board consists of fourteen members, as follows:

Clifford Bucknam, Pynchon & Company; James I. Bush, vice-president Equitable Trust Company; Allen Curtis, Curtis & Sanger, Boston; William M. Flook, representing the Anthony N. Brady Estate; Edward N. Goodwin, representing Brown, Boveri & Company, Ltd., Switzerland; William V. Griffin, representing the Anthony N. Brady Estate; James Imbrie, president Imbrie & Company; William F. Ingold, Pynchon & Company; Henry Lockhart, Jr., vice-president Blair & Company, Inc.; John J. Rudolf, A. Iselin & Company; Theodore G. Smith, vice-president Central Union Trust Company; Elisha Walker, chairman of the board and president of Blair & Company, Inc.; Frank R. Warton, formerly vice-president of the Allied Packers Company, and Laurence R. Wilder, president American Brown Boveri Electric Corporation.

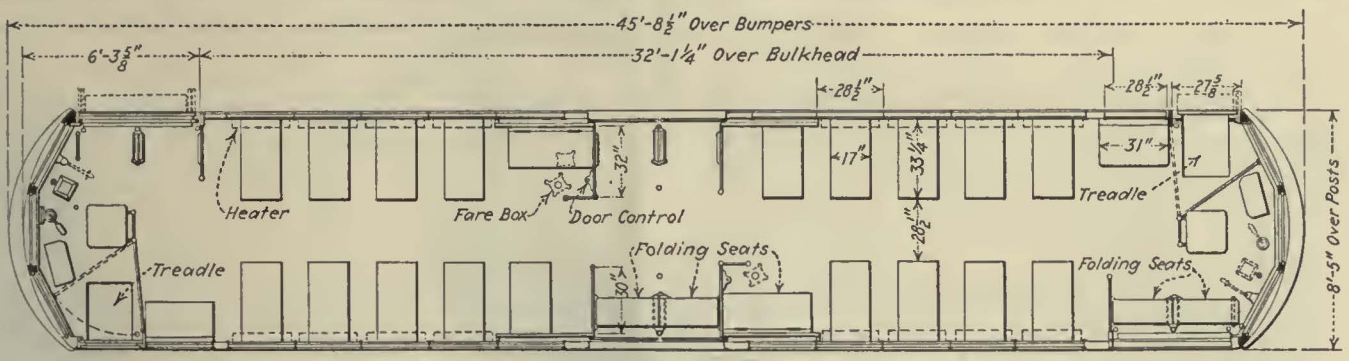
At the same meeting the following officers for the corporation were elected: Laurence R. Wilder, president; Clinton L. Bardo, Theodore Boveri, W. G. Groesbeck, Earl G. Hines and Frank R. Warton, vice-presidents; Norman R. Parker, comptroller, and J. T. Wickersham, secretary and treasurer.

Theodore Boveri, the son of the late Walter Boveri, one of the founders of Brown, Boveri & Company, Ltd., was for many years responsible for design and manufacture in the Baden, Switzerland, works of the company. His election as vice-president of the American Brown Boveri Electric Corporation in charge of engineering cements the working relations betwen the two interests.

New Standards Will Improve Lumber Trade

"Lumber stocks are as low as at any time in recent years," according to Wilson Compton, secretary and manager National Lumber Manufacturers Association. In spite of this Mr. Compton sees a bright outlook for 1927.

Writing in the *National Lumber Bulletin* Mr. Compton states that the national lumber trade extension program is not yet under way, but it is now expected to be on a scale of a minimum



Plan of Double-Truck Cars that Have Met with Much Favor in Dallas

of $1,000,000 a year for five years and will doubtless start during 1927.

"The consciousness of the lumber industry that it has at least reached such a degree of commercial intelligence and discipline that it is willing to inaugurate a great campaign for lumber is having an encouraging effect. The increasing observance and practice of American standards for lumber has paved the way for this campaign. The industry has put the manufacture, grading and merchandising of soft wood lumber, irrespective of species or region, upon a uniform basis, fair to the consumer, the distributor and producer. They indicate the dividing line between lumber manufactured from good timber, properly graded and sold for uses for which it is best fitted and lumber cut from inferior timber, roughly milled and poorly graded if at all."

New Cars Meeting with Good Response in Dallas

In May, 1926, an order was placed with the American Car Company, St. Louis, Mo., for 30 front-entrance, center-exit, double-truck cars to be used for city service on the Dallas Railway, Dallas, Tex. Delivery followed in approximately three months time, and since then the cars have been in regular operation, receiving very favorable comment from patrons of the company. They will accommodate 50 seated passengers, the front section being set aside for white passengers, while colored patrons use the rear. Treadle exits are provided at each end of the car.

The principal specifications are as shown in the following:

Bolster centers, length	26 ft. 11¾ in.
Length over all	45 ft. 8½ in.
Truck wheelbase	5 ft. 1½ in.
Width over all	8 ft. 5 in.
Height, rail to trolley base	10 ft. 7¾ in.
Body	All steel
Interior trim	Mahogany
Roof	Arch
Air brakes	General Electric
Armature bearings	Sleeve
Bumpers	4-in. channel
Car signal system	Faraday
Car trimmings	Statuary bronze
Center and side bearings	Brill
Compressors	General Electric
Conduits and junction boxes	Fabric duck
Control	K35-JJ, double end
Curtain fixtures	Curtain Supply Co.
Curtain material	Wyandasote DC 85-77-1
Destination signs	Hunter
Door-operating mechanism	National Pneumatic
Energy-saving device	Economy meters
Fare boxes	Johnson
Fenders or wheelguards	American Car Co.
Finish	R. F. Johnson's Krakno
Gears and pinions	General Electric
Hand brakes	American Car Co., drop handles
Heater equipment	16 Consolidated Car Heating Co., truss plank
Headlights	"Golden Glow" SM-95
Journal bearings	Brill plain
Journal boxes	General Electric
Lightning arresters	General Electric
Motors	Four GE-265-A, inside hung
Sanders	Nichols-Lintern
Sash and fixtures	Curtain Supply Co.
Seats	Brill "Winner"
Seating material	Wood slats
Step treads	Feralun
Trolley catchers	Keystone
Trolley base	U. S. No. 13
Trolley wheels	U. S.
Trucks	Brill 177-E-1
Ventilators	Eight Utility
Wheels	Rolled steel, 26 in.

Safety Council's Calendar in Mails

Suitable pictures and text characterize the 1927 calendar issued by the National Safety Council, Chicago, Ill. As usual, the pictorial features are about equally divided by the home and the factory. Special stress is laid in the text on the prevention of colds, local infections, heart disease, Bright's disease, headaches and the contagious diseases of childhood. Care of the eyes also is stressed.

Giant Order for Rectifiers Placed by Connecticut Company

The Connecticut Company has arranged for the purchase of mercury-arc rectifiers and all auxiliary equipment for its Bridgeport and Stratford 600-volt traction service substations. Orders for this material were placed with the American Brown Boveri Electric Corporation recently and were brought about by the decision of the company to shut down its power stations and secure energy from the New York, New Haven & Hartford Railroad, which operates an 11,000-volt, single-phase railroad between New York City and New Haven, Conn.

Installation at Bridgeport will comprise five manually controlled units, aggregating 6,000 kw. capacity. This is the largest mercury-arc rectifier installation both in number of units and total capacity in the United States. The Stratford substation will employ two full automatic units toaling 2,400 kw. capacity. A unique feature of this project is that all equipment is designed for operation at any of the following a.c. supplies: 13,900 volts, 60 cycles; 11,400 volts, 25 cycles; 6,600 volts, 60 cycles; and that the shifting from one to another may be accomplished with no appreciable equipment change.

It is claimed that the selection of this equipment has many advantages in that operating flexibility is provided without the heavy equipment replacement costs which would be necessary were other types of converting apparatus chosen; high efficiency over the entire working range characteristic of this type of conversion; and the economic light construction of substations is permitted by the low-weight, vibrationless equipment.

A Snappy Exterior Which Is Typical of the New Rolling Stock Delivered to Dallas Railway

Larger Buses in 1927 Forecast

In the opinion of Roy A. Hauser, manager bus department Mack Trucks, Inc., "the trend of bus development seems to be toward larger and more luxurious vehicles. With many of the smaller operators who were not financially able to take the risk of feeling the public's pulse retiring from the field, this is quite natural," said Mr. Hauser. "The big minds behind transportation systems have this courage, backed by financial ability; it is only natural, therefore, that the primary law of transportation, to the effect that cost per unit decreases with increase in number of units carried per vehicle, should assert itself."

Capper-Kelley Bill Denied Further Hearing

According to latest advices from Washington the Capper-Kelley bill, designed to permit the manufacturers of branded products to fix the resale price, has been denied further consideration by the committee on interstate and foreign commerce. "There is no probability," says the Washington report, "that anything further will be done on the bill at this session of Congress. While the measure has been strongly supported and has created considerable controversy for more than ten years, it has made no legislative progress in that time."

Miami Causeway Tracks Nearly Completed

Miami Beach Railway, Miami, Fla., through its president, A. L. Reynolds, announces completion of the double-track reconstruction work over the causeway from Miami to the plant of the Miami Beach Railway Company, east of Star Island. The remaining section of track covering the distance from the plant to the Miami Chamber of Commerce Building will be in operation in a short time. This reconstruction work was necessitated by the recent hurricane damage.

New York Car Wheel Company Disposes of Hammond Plant

The Hammond plant of the New York Car Wheel Company of Indiana has been purchased by the Southern Car Wheel Company of Pittsburgh, which is controlled by the Mellon interests. Negotiations for the sale were closed last week and the new management has already taken charge. The sale does not affect the Buffalo plant of the New York Car Wheel Company. No changes in the executive personnel of the wheel plant have been made.

Rolling Stock

Twin City Rapid Transit Co., Minneapolis, is including in its street railway expansion program the purchase of 25 new street cars of the noiseless type to cost $155,000. It is understood that the new equipment will be operated both in St. Paul and Minneapolis.

Metal, Coal and Material Prices

Metals—New York	Jan. 18, 1927
Copper, electrolytic, cents per lb	13.025
Copper wire, cents per lb	15.25
Lead, cents per lb	7.63
Zinc, cents per lb	6.88
Tin, Straits, cents per lb	66.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.325
Somerset mine run, Boston, net tons	2.575
Pittsburgh mine run, Pittsburgh, net tons	2.125
Franklin, Ill., screenings, Chicago, net tons	1.875
Central, Ill., screenings, Chicago, net tons	1.425
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$5.50
Weatherproof wire base, N. Y., cents per lb.	17.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.00
White lead in oil (100-lb. keg), N. Y., cents per lb	14.50
Turpentine (bbl. lots), N. Y., per gal	$0.81

Track and Line

Georgia Railway & Power Company was recently granted permission by the Council of Atlanta, Ga., to lay its tracks on Bell Street, thus connecting the Decatur and Hunter Streets lines. With this connection the company plans to improve service on its Soldiers' Home-English Avenue line, which is now compelled to operate in both directions by a single track on Grant Street, a thoroughfare that is not wide enough for a double-track line.

Trade Notes

Westinghouse Electric & Manufacturing Company has appointed James A. Davies general superintendent of the South Philadelphia Works. The promotion was announced by H. T. Herr, vice-president in charge of operations, and was effective as of Jan. 7. Mr. Davies, who has been assistant general superintendent for the past eight years, was appointed to fill the position made vacant by the death, at Atlantic City, of H. M. Giles. The new general superintendent has a service record of seventeen years in the employ of the Westinghouse organization.

National Pneumatic Company, New York City, manufacturer of door and step controlling mechanisms for street railway cars, will occupy quarters in the Graybar Building, which it is expected will be ready for occupancy April 1.

Frank Metzger, manager of sales of the Standard Steel Works Company, Philadelphia, Pa., has been elected vice-president to succeed Richard Sanderson, resigned. R. Nevin Watts succeeds Mr. Metzger as manager of sales, with headquarters at Philadelphia.

J. D. Elsom for twelve years with the Economy Electric Devices Company, will represent the Johnson Fare Company in sales in the Central Western states. Mr. Elsom has formed the Illinois Motive Equipment Company, with headquarters in the Pure Oil Building, Chicago.

Armco Culvert Manufacturers' Association is the new name for the Armco Culvert and Flume Manufacturers' Association of Middletown, Ohio, effective Jan. 1.

Shops and Buildings

Portland Electric Power Company, Portland, Ore., has just placed a contract with the Austin Company, Cleveland, Ohio, for a large garage to house its trucks. The new garage will be 100 ft. wide with all interior columns eliminated. The structure will be 240 ft. long with a clear height of 14 ft. The building will be modern in every respect. Usually industrial as well as other construction is of timber in the Northwest. In this case 120 tons of structural steel will be employed. All sash will be of the modern steel type with ventilating sections. Special repair and greasing pits will be installed, having a newly developed ventilating and lighting system which has been designed by Austin engineers.

Indiana Service Corporation, Fort Wayne, Ind., is drawing up preliminary plans for the construction of an office building and terminal station at Fort Wayne, Ind, to cost $250,000.

New Advertising Literature

Timken Roller Bearing Company, Canton, Ohio, is presenting in booklet form "Recent Developments in the Application of Tapered Roller Bearings in Machine Tools," a study recently read before the machine tool section of the A.S.M.E. by S. M. Weckstien, M. E., industrial equipment engineer of the company. Comprehensive text matter and illustrations make this study a valuable addition to the manufacturer's library. Copies of the paper may be obtained by addressing the industrial equipment division of the company.

D. P. Frampton & Company, Pittsburgh, Pa., has just issued an attractive bulletin outlining the Frampton tie plugs.

Driver-Harris Company, maker of special alloys, Harrison, N. J., is now distributing a single-month calendar for the New Year, which advertises their Nichrome wire. The calendar is decorated with a humorous drawing which drives home the advertising thought.

Carnegie Library, Pittsburgh, Pa., has issued a bibliography on manganese steel, which was assembled by E. H. McClelland and Victor S. Polansky. The bibliography is in booklet form and has a preface by Sir Robert Hadfield, the inventor of manganese steel.

Electric Railway Equipment Company, Cincinnati, Ohio, has issued a leaflet listing the advantages of "Elreco" tubular steel poles. These poles fulfill a three or fourfold purpose in supporting trolley span wires, ornamental lighting brackets, lighting circuit wires, and even traffic signals.

Hoyt Metal Co., St. Louis Mo., has issued a pamphlet giving complete babbitt metal data. It contains much information of value to users of babbitt metal, embodying as it does sections dealing with the selection and handling of the metal, considerations in the design of babbitt bearings and a table giving results of laboratory tests.

PEACOCK

Reg. U. S. Pat. Off.

STAFFLESS BRAKES

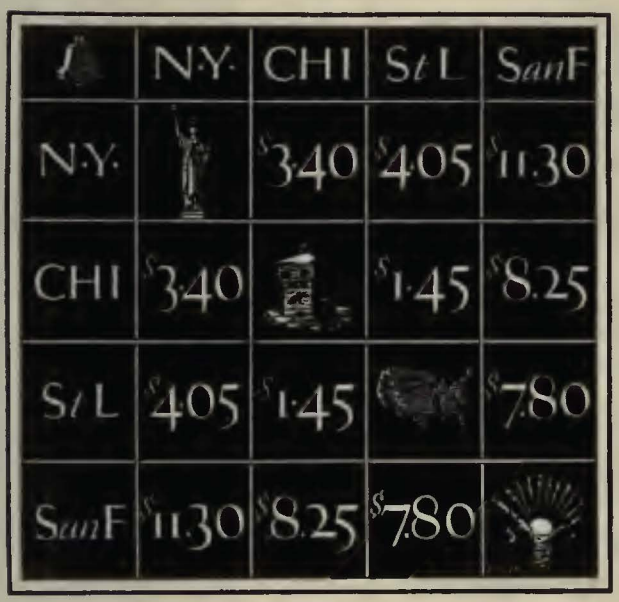
Merited confidence is the reason that Peacock Staffless Brakes are included in the specifications of nearly all modern cars. Confidence which is justified by many satisfactory years of service—by a brake that has three times the braking power of ordinary hand brakes—occupies minimum platform space—has almost unlimited chain-winding capacity—up to 144 inches, if necessary—low installation and maintenance costs—simple to operate and is liked by motormen!

We will gladly furnish you with facts and figures of what they have done for others and what they will do for your modern cars.

NATIONAL BRAKE CO., Inc.

890 Ellicott Square, Buffalo, N. Y.

A *saving of* $3,000,000 in long distance charges



BY THE RECENT READJUSTMENT in long distance rates, it is calculated that telephone users will save $3,000,000 annually. Interstate and intersectional rates are substantially lower. The greater the distance, the greater the reduction. Here are typical station-to-station day rates, old and new: New York to Pittsburgh, formerly $2.10; now $1.70. Chicago to Boston, $5.45—$3.95. Atlanta to San Francisco, $13.65—$9.40.

IN ADDITION TO THESE nation-wide rate changes, several new service conveniences are offered. The privilege of "reversing the charges," for example, formerly applied only to person-to-person calls. This has now been extended to include station-to-station calls —a substantial saving and a real convenience to thousands of business men.

Those who wish to take advantage of the lowest long distance rates of the twenty-four hours may now do so beginning at 8:30 P. M. From this hour to 4:30 A. M., station-to-station rates are about fifty per cent of day rates. Now, more than ever, long distance calls are useful in the development of business. Thousands now use the telephone nationally. By telephone you can make a week's trip in a few minutes. Is there a distant call that would clear up some troublesome transaction? It probably would cost less than you think. . . . *Number, please?*

BELL LONG DISTANCE SERVICE

AMERICAN TELEPHONE & TELEGRAPH CO. AND ASSOCIATED COMPANIES — BELL SYSTEM

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

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ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

ENGELHARDT W. HOLST
Consulting Engineer
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

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CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
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C. B. BUCHANAN, President — W. H. PRICE, JR., Sec'y-Treas. — JOHN F. LAYNG, Vice-President
BUCHANAN & LAYNG CORPORATION
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Phone: Hanover: 2142
NEW YORK
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VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

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INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROAWAY, NEW YORK
ENGINEERING CONSTRUCTION — YOUNGSTOWN, O. — FINANCING MANAGEMENT

WALTER JACKSON
***Consultant* on Fares and Motor Buses**
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

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

Byllesby Engineering & Management Corporation
231 S. La Salle Street, Chicago
New York San Francisco

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 VACANT

WELDING foreman for thermit and electric welding, grinding, and cutting on city and interurban track work. To handle gang of six or eight men. Straight time position. Start at $125 per month. Headquarters in large Middle Western city. Give age, education, previous experience and how soon you can report for work P-963, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

POSITIONS WANTED

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

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

SALESMAN AVAILABLE

LET ME put on your preferred stock customer ownership sale. Can successfully conduct campaign of any size and handle both sales and accounting details. Wide experience. Highest of references. SA-964, Electric Railway Journal, 7 So. Dearborn Street, Chicago, Ill.

REPRESENTATIVE AVAILABLE

Sales Representative

With several years successful sales experience in the steam and electrical railway field—desires change. Familiar with all mechanical, electrical, and automotive lines. Wide acquaintance, excellent character references, and can sell. Would like to hear from supply house, bus manufacturers, or sales company. RA-962, Electric Railway Journal, Tenth Ave. at 36th Street, New York.

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.

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.

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

ENGINES

and Miscellaneous Electrical Equipment

All in first class operating condition

1—Westinghouse Automatic Compound Engine, 200 hp., belt connected to one 150 kw. D.C. Generator, 550 volt, made by the National Electric Company.

1—Westinghouse Automatic Compound Engine, 350 hp., direct connected to Westinghouse 150 kw. D.C. Generator, 550 volt.

5—Feeder and Distribution Panels, Blue Vermont Marble, with Ammeters, Voltmeters, Circuit Breakers, Switches, etc. for above apparatus.

1—Rotary Converter, made by General Electric Company, 300 kw., 600 volts, 500 amps. D. C., A.C. side 60 cycle, 6 phase.

1—Commutator for Rotary Converter (New).

3—110 kw. Transformers 13,200/11,880 Primary, Secondary 430/286/143, together with Panels, Starting Switch and Reactance, Circuit Breaker, Ammeter, Voltmeter, Rheostat, etc.

Peekskill Lighting & Railroad Co.
Ossining, New York

2—Modern Rotary Converters—In Ohio

G. E. HCC, 600 volts D.C., 300 kw., 1200 r.p.m., Form P, 60 cycle, 3 phase, switchboard, outdoor transformers, 13200 volts primary, switching equipment. IN EXCELLENT OPERATING CONDITION.

Full details will be furnished promptly.

THE DAYTON, COVINGTON & PIQUA TRACTION CO.
Wirt Kessler, T. Russell Robinson, Receivers, Room 701 — 1 State Street, Boston, Mass.

If there is anything you want—

or something you don't want that *other* readers of this paper can supply—or use—advertise in the

SEARCHLIGHT SECTION

Somebody is always looking for something to meet certain business needs. Some men in charge of plant operations may be in the market for good used equipment—others may have just what they want, to sell. Some may require a man of unusual qualifications for a particular position—that man may be another reader of this paper!

Put the Searchlight Section to work for you under any of the following classifications—to fill your business needs.

Agencies Wanted
Agents Wanted
Auction Notices
Buildings For Sale
Business Opportunities
Civil Service Opportunities
Contracts To Be Let
Contracts Wanted
Educational Courses
Employment Agencies
Exchanges
For Rent Items
Franchises
Industrial Sites
Miscellaneous Wants
New Industries Wanted
Partners Wanted
Patents For Sale
Patent Attorneys
Plants For Sale
Positions Vacant
Positions Wanted
Property For Sale
Receivers' Sales
Representatives Wanted
Salesmen Wanted
Work Wanted
Etc., Etc., Etc.

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.

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

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse E. & M. Co.

Axles, Front
Shuler Axle Co.

Axles, Steel
Carnegie Steel Co.

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

Barges, Steel
American Bridge Co.

Bearings
Ahlberg Bearing Co.

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

Bearings, Center and Roller Side
Cincinnati Car Co.
Columbia Machine Works
Stucki Co., A.

Bearings, Roller
Timken Roller Bearing Co.

Bells and Buzzers
Consolidated Car Heating Co.

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

Benders, Rail
Railway Trackwork Co.

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

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Bollers
Babcock & Wilcox Co.

Bond Testers
Electric Service Supplies Co.

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

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

Braces, Timber
Duff Mfg. Co.

Braces, Trench
Duff Mfg. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
American Bridge Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.

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

Brakes, Magnetic Rail
Cincinnati Car Co.

Bridges, Steel
American Bridge Co.

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

Brushes, Graphite
Morganite Brush Co.

Brushholders
Columbia Machine Works

Buildings, Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Steel
American Bridge Co.

Bus Wheels, Steel
Heywood-Wakefield Co.

Buses
Brill Co., The J. G.

Buses, Motor
Graham Bros.
Studebaker Corp. of America

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

Cables (See Wires and Cables)

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

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

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

Car Steps, Safety
Cincinnati Car Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

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

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

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

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.

Castings, Brass Composition or Copper
Cincinnati Car Co.

Castings, Gray Iron and Steel
American Brake Shoe & Fdry. Co.
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.

Castings, Malleable & Brass
American Brake Shoe & Fdry. Co.
Bemis Car Truck Co.

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

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Chairs, Parlor Car
Heywood-Wakefield Co.

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

Change, Trays
Cincinnati Car Co.

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

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

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

Clusters and Sockets
General Electric Co.

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

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

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

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

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

Condensor Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

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

Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

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

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Conveying & Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co.
Anaconda Copper Mining Co.

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

Cord, Bell, Trolley, Register
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works

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

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

Cranes, Hoists & Lifts
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

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

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

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

Crossings, Track (See Track Special Work)

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

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

Dealer's Machinery & Second Hand Equipment
Dayton, Covington & Piqua Traction Co.
Electric Equipment Co.
Hyman-Michaels Co.
Kessler, Wirt
Peekskill Lighting & R. R. Co.
Robinson, T. Russell
Van Loan Corp., Irving S.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

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

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

Doors, Folding Vestibule
National Pneumatic Co.

Drills, Track
Electric Service Supplies Co.
Ohio Brass Co.

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

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

Electric Grinders
Railway Trackwork Co.

Electric Transmission Towers
American Bridge Co.

Electrical Wires and Cables
Amer. Electrical Works.
John A. Roebling's Sons Co.

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

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

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

Engines, Gasoline
Waukesha Motor Co.

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

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Nat'l Ry. Appliance Co.
Perey Mfg. Co.

Fare Registers
Electric Service Supplies Co.
Ohmer Fare Register Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

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

Flaxlinum Insulators
National Railway Appliance Co.

Floodlights
Electric Service Supplies Co.

Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

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

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Furnaces, Electric, Steel Melting
American Bridge Co.

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

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas Producers
Westinghouse E. & M. Co.

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

Ganges, Oil and Water
Ohio Brass Co.

Gear Blanks
Brill Co., The J. G.

Gear Cases
Chillingworth Mfg. Co.
Electric Service Supplies Co
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
R. D. Nuttall Co.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

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

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders & Grinding Supplies
Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

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

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

Headlining
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

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

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

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

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Insulation Slots
Irvington Varnish & Ins. Co.
Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Interior Side Linings
Haskelite Mfg. Corp.
Interurban Cars (See Cars)
Jacks (See also Cranes, Hoists and Lifts)
Buda Co.
Duff Mfg. Co.
Elec. Service Supplies Co.
National Ry. Appliance Co.
Jacks, Automatic Lowering
Duff Mfg. Co.
Jacks, Ball Bearing, Screw
Duff Mfg. Co.
Jacks, Governor Controlled
Duff Mfg. Co.
Jacks, Horizontal
Duff Mfg. Co.
Jacks, Lifting
Duff Mfg. Co.
Jacks, Pipe Forcing
Duff Mfg. Co.
Jacks, Pole
Duff Mfg. Co.
Jacks, Push & Pull
Duff Mfg. Co.
Jacks, Special Purpose
Duff Mfg. Co.
Jacks, Track
Duff Mfg. Co.
Joints, Rail
(See Rail Joints)
Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Lamp Guards and Fixtures
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.
Lamps, Signal and Marker
Elec. Service Supplies Co.
Ohio Brass Co.
Letter Boards
Cincinnati Car Co.
Haskelite Mfg. Corp.
Lightning Protection
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Locking Spring Boxes
Wm. Wharton, Jr. & Co.
Locomotives, Electric
Cincinnati Car Co.
General Electric Co.
Westinghouse E. & M. Co.
Lubricating Engineers
Universal Lubricating Co.
Lubricants, Oil and Grease
Universal Lubricating Co.
Manganese Parts
Bemis Car Truck Co.
Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co.
Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.
Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Meters (See Instruments)
Mirrors, Inside & Outside
Cincinnati Car Co.
Motor and Generator Sets
General Electric Co.
Motor Buses (See Buses, Motor)
Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.
Motorman's Seats
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
Heywood-Wakefield Co.
Wood Co., Chas. N.
Nuts and Bolts
Bemis Car Truck Co.
Cincinnati Car Co.
Hubbard & Co.
Oils (See Lubricants)
Omnibuses (See Buses, Motor)
Packing
Westinghouse Traction Brake Co.
Paints and Varnishes (Insulating)
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.
Paints and Varnishes for Woodwork
National Ry. Appliance Co.
Panels, Outside, Inside
Haskellte Mfg. Corp.
Paving Guards, Steel
Godwin Co., Inc., W. S.
Paving Material
American Brake Shoe & Fdry Co.
Pickup, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.
Pinion Pullers
Duff Mfg. Co.
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.
Pinions (See Gears)
Pins, Case Hardened, Wood and Iron
Ohio Brass Co.
Westinghouse Traction Brake Co.
Pipe Fittings
Westinghouse Tr. Brake Co.
Planers (See Machine Tools)
Plates for Tee Rail Switches
Ramapo Ajax Corp.
Pliers, Rubber Insulated
Elec. Service Supplies Co.
Nat'l Ry. Appliance Co.
Plywood, Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.
Pole Line Hardware
Bethlehem Steel Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Pole Reinforcing
Hubbard & Co.
Poles, Metal Street
Elec. Ry. Equipment Co.
Hubbard & Co.
Poles and Ties Treated
Bell Lumber Co
Poles, Ties, Posts, Piling & Lumber
Naugle Pole & Tie Co.
Poles, Trolley
Elec. Service Supplies Co.
R. D. Nuttall Co.
Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Portable, Grinders
Buda Co.
Potheads
Okonite Co.
Okonite-Callender Cable Co., Inc.
Power Houses
American Bridge Co.
Power Saving Devices
National Ry. Appliance Co.
Pressings, Special Steel
Cincinnati Car Co.
Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.
Punches, Ticket
International Register Co.
Wood Co., Chas. N.
Rail Braces and Fastenings
Ramapo Ajax Corp.
Rail Grinders (See Grinders)
Rail Joints
Carnegie Steel Co.
Rail Joints, Welded
Lorain Steel Co.
Rail Welding
Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.
Rails, Steel
Carnegie Steel Co.
Railway Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
Rattan
Brill Co., The J. G.
Elec. Service Supplies Co.
Hale-Kilburn Co.
Rattan Car Seat Webbing
Heywood-Wakefield Co.
Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.
Reinforcement, Concrete
Bethlehem Steel Co.
Carnegie Steel Co.
Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.
Repair Work (See also Coils)
General Electric Co.
Westinghouse E. & M. Co.
Replacers, Car
Cincinnati Car Co.
Elec. Service Supplies Co.
Resistances
Consolidated Car Heating Co.
Resistance, Wire and Tube
General Electric Co.
Westinghouse E. & M. Co.
Retrievers, Trolley (See Catchers and Retrievers Trolley)
Rheostats
General Electric Co.
Westinghouse E. & M. Co.
Roofing, Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.
Roofs, Car and Bus
Haskelite Mfg. Corp.
Sanders, Track
Brill Co., The J. G.
Elec. Service Supplies Co.
Ohio Brass Co.
Sash Fixtures, Car
Brill Co., The J. G.
Cincinnati Car Co.
Sash, Metal Car Window
Hale-Kilburn Co.
Scrapers, Track (See Cleaners and Scrapers, Track)
Screw Drivers, Rubber Insulated
Elec. Service Supplies Co.
Seating Materials
Brill Co., The J. G.
Haskelite Mfg. Corp.
Heywood-Wakefield Co.
Pantasote Co., Inc.
Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.
Heywood-Wakefield Co.
Seats, Car (See also Rattan)
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
Second Hand Equipment
Dayton, Covington & Piqua Traction Co.
Electric Equipment Co.
Hyman-Michaels Co.
Kessler, Wirt
Peekskill Lighting & R. R. Co.
Robinson, T. Russell
Van Loan Corp., Irving S.
Shades, Vestibule
Brill Co., The J. G.
Cincinnati Car Co.
Shovels
Brill Co., The J. G.
Hubbard & Co.
Shovels, Power
Brill Co., The J. G.
Side Bearings (See Bearings Center and Side)
Signals, Car Starting
Consolidated Car Heating Co.
Elec. Service Supplies Co.
National Pneumatic Co.
Signal Systems, Block
Elec. Service Supplies Co.
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.
Signal Systems, Highway Crossing
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.
Slack Adjusters (See Brake Adjusters)
Sleet Wheels and Cutters
Cincinnati Car Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
R. D. Nuttall Co.
Smokestacks, Car
Nichols-Lintern Co.
Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Consolidated Car Fender Co.
Snow Sweeper, Rattan
J. G. Brill Co.
Heywood-Wakefield Co.
Soldering and Brazing Apparatus (See Welding Processes and Apparatus)
Spacer, Tie
Duff Mfg. Co.
Special Adhesive Papers
Irvington Varnish & Ins. Co.
Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.
Wm. Wharton, Jr. & Co.
Splicing Compounds
Westinghouse E. & M. Co.
Splicing Sleeves (See Clamps and Connectors)
Springs, Car and Truck
American Steel Foundries
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Sprinklers, Track and Road
Brill Co., The J. G.
Steel and Steel Products
Carnegie Steel Co.
Steps, Car
Brill Co., The J. G.
Cincinnati Car Co.
Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.
Storage Batteries (See Batteries, Storage)
Storage Tanks
S. F. Bowser Co.
Strain Insulators
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Strand
Roebling's Sons Co., J. A.
Street Cars (See Cars, Passenger, Freight, Express)
Superheaters
Babcock & Wilcox Co.
Sweepers, Snow (See Snow Plows, Sweepers and Brooms)
Switch Stands and Fixtures
Ramapo-Ajax Corp.
Switches and Switchboards
Consolidated Car Heating Co.
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Switches, Tee Rail
Ramapo-Ajax Corp.
Switches, Track (See Track Special Work
Tampers, Tie
Railway Trackwork Co.
Tapes and Cloths (See Insulating Cloth, Paper and Tape)
Tee Rail Special Track Work
Ramapo-Ajax Corp.
Telephones and Parts
American Telephone & Telegraph Co.
Elec. Service Supplies Co.
Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)
Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter
Ticket Choppers and Destroyers
Elec. Service Supplies Co.
Ties and Tie Rods, Steel
Carnegie Steel Co.
Godwin Co., Inc., W. N.
Ties, Wood Cross (See Poles, Ties, Posts, etc.)
Tongue Switches
Wm. Wharton, Jr. & Co.
Tools, Track & Miscellaneous
Elec. Service Supplies Co.
Hubbard & Co.
Railway Trackwork Co.
Ramapo-Ajax Corp.
Towers and Transmission Structure
Archbold-Brady Co.
Westinghouse E. & M. Co.
Track Grinders
Railway Trackwork Co.
Ramapo-Ajax Corp.
Track, Special Work
Buda Co.
Ramapo Ajax Corp.
Trackless Trolley Cars
Brill Co., The J. G.
Transfer, Tables
American Bridge Co.
Transformers
General Electric Co.
Westinghouse E. & M. Co.
Transmission Towers & Structures
American Bridge Co.
Treads, Safety Stair, Car Step
Cincinnati Car Co.
Tree Wire
Okonite Co.
Okonite-Callender Cable Co.
Trolley Bases
General Electric Co.
National Railway Appliance Co.
R. D. Nuttall Co.
Ohio Brass Co.
Trolley Bases, Retrieving
General Electric Co.
National Railway Appliance Co.
R. D. Nuttall Co.
Ohio Brass Co.
Trolley Buses
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.
Trolley Material, Overhead
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Trolley Wheel Bushings
Star Brass Works
Trolley Wheels (See Wheels-Trolley)
Trolley Wire
Amer. Electrical Works
American Brass Co.
Anaconda Copper Min. Co.
Roebling's Sons Co., J. A.
Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Truss Planks
Haskelite Mfg. Corp.
Tubing, Yellow and Black Flexible Varnish
Irvington Varnish & Ins. Co.
Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co.
Turnstiles
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.
Turntables
American Bridge Co.
Easton Car & Construction Co.
Elec. Service Supplies Co.
Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.
Varnished Papers and Silks
Irvington Varnish & Ins. Co.
Ventilators, Car
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Nat'l. Ry. Appliance Co.
Railway Utility Co.
Vestibule Linings
Haskelite Mfg. Corp.
Welded Rail Joints
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Welders, Portable Electric
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.
Welders, Rail Joint
Ohio Brass Co.
Railway Trackwork Co.
Welding Processes and Apparatus
General Electric Co.
Nat'l Ry. Appliance Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.
Welding Steel
Railway Trackwork Co.
Una Welding & Bonding Co.
Welding Wire
General Electric Co.
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Roebling's Sons Co., J. A.
Welding Wire and Rods
Railway Trackwork Co.
Wheel Guards (See Fenders and Wheel Guards)
Wheel Presses (See Machine Tools)
Wheels, Car, Steel & Steel Tire
American Steel Foundries
Bemis Car Truck Co.
Carnegie Steel Co.
Wheels, Trolley
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
R. D. Nuttall Co.
Star Brass Works
Wheels, Wrought Steel
Carnegie Steel Co.
Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.
Window Guards & Fittings
Cincinnati Car Co.
Wire Rope
Roebling's Sons Co., J. A.
Wires and Cables
American Brass Co.
American Electrical Works
Anaconda Copper Min. Co.
General Electric Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Roebling's Sons Co., J. A.
Westinghouse E. & M. Co

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Mounted on Brill 177-E trucks.

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A Superlatively Good Riding Truck

Forty years of truck development have produced such well known Brill features as solid-forged sideframes, Graduated Spring System, Bolster Guide, Oil-retaining Center Bearing and Half-ball Brake Hangers. All these devices, which contribute so much to the general efficiency of Brill trucks, are included in the No. 177-E type recently developed. It is a comparatively light-weight truck, particularly designed for light-weight modern cars, to which superlatively good riding action is so essential. Fully described in our Bulletin No. 306.

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THE J. G. BRILL COMPANY
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For Evansville
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GENERAL ELECTRIC