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EDITORIAL NOTICE

Street railway news, and all information regarding changes of officers, new equipments, extensions, financial changes and new enterprises will be greatly appreciated for use in these columns.

All matter intended for publication must be received at our office not later than Wednesday morning of each week, in order to secure insertion in the current issue.

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Our Convention Report

In this issue will be found all of the papers and reports presented on Friday, Oct. 11, before the Street Railway Accountants' Association of America at its recent session in New York, together with the notable report of the committee on standards of the American Street Railway Association, which was also presented to the association on Friday. Accompanying the latter is the valuable set of drawings which formed part of the report as submitted by the committee. These drawings, for the convenience of our readers, are published in insert form, so that if desired the reader can cut them out of the paper and lay them aside, or post them up for ready reference. With this issue our report and review of the two conventions in New York closes, with the exception that a critical and analytical discussion on the work and proceedings of the Street Railway Accountants' Association of America, from the pen of A. O. Kittredge, will be published in our issue of next week.

Our report of the conventions just closed has been the most complete of any published, and gives to those who did not have an opportunity to be present an excellent idea of the proceedings, social entertainments and the exhibits. In fact, it would have been impossible for one person, in the three days during which the exhibition was open, to have seen all of the interesting appliances shown in the Convention Hall with the thoroughness with which they have been described, and also to have attended the meetings of either association. We believe, therefore, that even to many of those who attended the convention, the descriptions published in this paper will be a revelation of the large number of interesting features connected with the meeting which they missed while in New York.

In this connection, it may not be amiss to call attention to the service which the STREET RAILWAY JOURNAL has given its readers during the past two months. During the four issues in October, including this, we have printed the enormous number of over 300 reading pages, a record which, we believe, has never been equalled by any other paper, technical or popular. Not only this; during the past two months, that is, in the eight issues in September and October, we have given each of our subscribers a total of 450 reading pages. During this time we have also reported three conventions, that of the American Street Railway Association, that of the Street Railway Accountants' Association of America, and that of the New York State Street Railway Association, while in our foreign issue we have, in addition, published the proceedings of the German Street Railway Association at its meeting in Stuttgart during September. In each case the report has been in the hands of our readers in the shortest possible time consistent with the insuring of accuracy. The exhibits at New York and at Rochester have been very fully described, and each of the principal papers at these conventions has been accompanied in the same issue in which it was printed by running editorial comments, partly analytical and partly critical, which have represented the opinions of the editors on the subjects discussed, and have, we believe, been of assistance in bringing out the salient features of the several papers. In addition, we have published descriptive articles of current engineering progress in the street railway field, have given the latest news weekly in the departments of street railway finance and construction, and have informed our readers of all the important developments at home and abroad in the broad industry in which they are interested. We mention this record as the STREET RAILWAY JOURNAL, like the industry of which it is the representative, is an example of the same American enterprise and methods which are now receiving the highest recognition throughout the industrial world.

Size Limitations

In our issue of Oct. 12 was printed the admirable paper by Capt. B. McCulloch, read before the recent national convention, reviewing the past and forecasting the future of the art of street railway traction; and at the same time we ventured to comment on some of the points made by the able and veteran manager. The paper

is indeed one that can be returned to frequently, and can always be taken up again with profit. In our previous remarks we pointed out that while street railway officials have built longer cars, have run at higher speeds, have laid heavier rails, have constructed bigger power plants, have adopted greater transmitting pressures, the same kind of ability has been demanded right along from the beginning, and the whole process has been evolutionary. The call for a rare class of ability will ever be heard in the industry, whose growing responsibilities will never find any man "too big for his job;" but we have wondered, perhaps a bit casually, how far the size of the units that belong to the art can be pushed. It is evident that there must be a limit somewhere as to the size of the car put upon a street, a limit to speed in a city, a limit to the weight of rail, a limit to the working voltage of current, a limit to the amount of power put under a car in the motors. What are the scientific bounds to the increase in size indicated by Capt. McCulloch's thoughtful review? It is said that the developments of steam locomotion are already being sharply defined by the bearing capacity of bridges, the height of tunnels, and by other conditions, to change which would involve an entire reconstruction of the "way" of modern railroads. In steamship work final limitations appear again in the increasing cost of coal burned for every extra knot of speed, in the depths of harbors, the size of docks, or the width and curvature of rivers. Thus, it would seem, the possible developments along certain lines in street railway work should forecast themselves. We have, for example, as Capt. McCulloch notes, run up in the length of cars from 10 ft. to 60 ft., "and still we have not reached the limit." Agreeing with him, it is for us, at least, an interesting conjecture, what is that limit, and what are some of the other limits referred to above? The success of many of the younger men will doubtless lie in early perception of the coming betterments as the street car rushes "down the ringing grooves of change."

Pension Funds

Elsewhere in these pages will be found in full the details of the plan proposed by the Union Railway Company, of Providence, R. I., for the insurance and pensioning of its employees. The subject is, of course, one of great interest and importance, and although similar plans have been adopted on leading steam railroads, such as the Pennsylvania, Grand Trunk and Baltimore & Ohio, this scheme, worked out by Miles M. Dawson, will doubtless come as a novelty to not a few of our readers, although the excellent work done by street railway benevolent associations may be regarded as more or less paralleling what is now attempted. In the adoption of such a plan as this many considerations must not be overlooked, and it may be taken for granted that at Providence they will be given full weight by both the company and its employees. Street railway companies are not formed primarily to engage in the insurance business, but anything that will knit a company and its men closer together is worth study, and this plan, it would seem, insures, for instance, to an employee of thirty-five years' standing, whose weekly wages for ten years have been \$15, a pension of \$10.50 per week. As a provision for old age, not offered as a charitable dole, but provided with the man's own assistance and thrift, such a sum is not to be lightly dismissed, any more than is the sum of \$1,000 in case of death and \$8 per week during accidental disablement. The amounts asked from the men are not large—the price of two or three beers—and are, in reality, so small as compared with the cost of insurance in regular companies as to tempt any prudent man to approve them and to enrol under the system. It will be remembered that in Germany this industrial provision of insurance has been worked out on a basis to which Prince Bismarck himself gave no small thought and care, with the object of preventing pauperization and senile distress; and it may well engage the best consideration of the great corporations which in street railway work are employing such great bodies of men, and playing such important public functions as to require the greatest stability of relationship between them and all who operate their systems.

Stand-Up Fares

If the public mind could once be disabused of the notion—so sedulously preached by journals which know better—that people stand up in street cars because there are not cars enough to provide seats for all, a more reasonable tone would pervade the debate over the modern problem of crowding. Probably the "stand up" question will never reach in this country the degree of aggravation that up to the present time has marked it in such cities as Paris, where for an hour at a stretch the weary waiting woman has the sign "complet" displayed to her agonized gaze as bus after bus or car after car rolls up, with every seat pre-empted, to the ticket bureau on the boulevard. As every exasperated American knows, who has undergone the ordeal, it was not a seat he wanted, but transportation. He got neither the one nor the other; while the company was in no sense a beneficiary from its enforced inability to carry him, inside or out, on its vehicles. How people can argue in favor of such conditions passes our comprehension; yet we have recently had the "no seat, no fare" craze in this city, and now Chicago has the spasm. One committee out there says, by way of accusation:

"The chief reason for the present disgraceful overcrowding of cars is to be found in the fact that there is more profit in crowding the cars than in providing plenty of seats for passengers. The most effective method of procedure, therefore, is that which will appeal most directly to the profit-making motives of the companies. This can be done by grading the rate of fare according to the accommodation furnished. If a company can furnish a passenger with a seat let it charge him 5 cents for his ride. But if the passenger must stand, let the company be satisfied with a 4-cent fare. If the company prefers the 5-cent fare to the 4-cent fare let it furnish the 5-cent service."

The appeal to the "profit-making motive" is good, in view of the experience in Paris and other cities in Europe now coming as quickly as they can to our American practice, and recognizing the fact that people who have been sitting all day care a good deal more about getting home by the first car they can catch than about sitting down again and waiting half an hour before a chance offers to do so. Even in *gendarmed* Paris the people have stormed the cars rather than wait for seats, and we would greatly like to see the restriction tried on an impatient American crowd.

The alternative or palliative proposed in Chicago of a "stand-up" fare is embodied in the following new section, 1723, of the revised code:

"But where a passenger shall be standing at the time of paying his fare, because of there being no unoccupied seat in such street car or other vehicle, then in all such cases the rate of fare to be charged for a continuous trip as aforesaid shall not exceed 4 cents for every such passenger over twelve years of age not supplied with a seat at the time of paying his fare."

That is simply idiotic. How would it work on a transfer ticket, for instance? If people chose to stand, would a company have to run its cars with all the seats empty? How many changes of rate; how many different ringings of the register; how much mental bookkeeping, or how much detective memorizing by the conductor, are to be permitted? Would a gentleman who had paid a 5-cent fare be allowed to give his seat to a feminine 4-cent tripper? Would a child paying nothing have the right to farm out its seat for candy or a cent, and thus intercept revenue on its way to the company's treasury? In short, difficulties of this nature are easier to imagine than solve, and Chicago will do well to settle its problem of street car overcrowding—if it can be settled in the rush hours—in some better way than insisting on two rates of fare.

Cheap Franchises

In these electioneering days it makes one very tired to read all the cheap oratory about cheap franchises. Anybody would think that public service companies did nothing but get a franchise and then sit down idly while wealth rolled into their laps. Franchises only have value as an opportunity to render available to the public

something that it wants, but which it cannot get unless the savings of some of its members can be invited to attempt the task, by way of guarantee, and possibly in some instances, by way of bonus on a rather precarious investment. There are mighty few street railway franchises in this country, or any other, that have not been burdened with conditions and exactions, the responsibility of which in every case had to be assumed by the recipient before it had been able to earn a prospective cent. No fact has been more plainly demonstrated in the industrial history of the last fifty years than the absolute impossibility to pledge capital for new public enterprises unless it is protected by the form of contract known by the name of "franchise;" yet the frothy socialist would have it believed that a franchise is mere plunder out of his empty pocket, rather than a process of "working on shares," in which the franchise holder puts up all the money at risk, and does all the work to boot. Those who jump all over public service corporations such as street railway companies forget, or choose to ignore, taxes on capital, taxes on real estate, taxes on cars, taxes on receipts, street paving requirements, lighting ordinances, transfer regulations, and half a hundred other ways in which the 5-cent fare is nibbled at until the company that earned every mill of it begins to wonder what it is in business for. We are glad to note the *Montgomery (Ala.) Journal* as one of the rare newspapers fair enough to acknowledge that a franchise is not all that it is made out to be. Discussing the situation in that city, where the late Charles J. Van Depoele made one of his earliest trolley experiments, it says:

The present owners of the street railway bought it when the cars were drawn by mules, giving \$70,000 for franchises and property. The new company sold the mules and the old mule or horse cars, together with the old rails, for about \$17,000. This made the actual cost of the franchise, all that was left, about \$53,000. Since the electric line has been thoroughly fitted up and new cars were purchased, the company has paid to the city of Montgomery about \$75,000 on account of street paving. The street car company is required to pave, not only between the tracks, but 2 ft. on each side of the tracks, and the cost of this to the railway has been \$75,000, the amount stated above, making a total cost of franchises to the present company about \$125,000. It may be contended by some people that this \$125,000 was not given to the city for the franchises and the city got no direct benefit from it. This can be said of the original \$50,000 the new company paid for the franchises, but certainly it cannot be said of the \$75,000 paid for street paving. If the street car company had not paid it, the money would have come directly out of the city treasury for the work, and if it had come out of the city treasury it would have come out of the pockets of the taxpayers. This tax was an indirect charge by the city for the street railway franchises, and the taxpayers of Montgomery, at least, have reaped that much benefit from the grant of the franchise to the Montgomery Street Railway. In addition to this, as the *Advertiser* recently said, the street railway has been a prime factor in building up the city.

In other words, in addition to assuming the risk, no mean one when it was made, of adopting the trolley in place of the mule, the stockholders of the Montgomery system have had to pay out large sums of money for their "franchise," in aid of the maintenance of the streets, which they did much to improve by banishing the mule. If they have made any return on their courageous investment warranting this exaction we have certainly never heard of it.

The Brooklyn Bridge Report

The recommendations made by Engineers Boller, Prout and Whinery, which are given in abstract in this issue, bring out in a very clear manner the large diversity of opinion which exists even among engineers of the proper methods to decrease the congestion idea obtaining at the Manhattan terminal of the New York and Brooklyn Bridge. The rare and curious development of the Brooklyn mind which could create the numerous ingenious, if impractical, solutions to the problem has been for some time a cause of facetious remark in the daily and technical press, and if the engineers who had the report to make had chosen to peruse the files of the papers for the past two or three years, they would

surely have become conversant with many plans to be avoided. In the propositions which they submit and the recommendations which they make there will be found both merit and good engineering practice; while, on the other hand, there are some "reforms" specified which not only fail to meet the requirements, but would give to the bridge traffic new sources of congestion. The first scheme, which provides for an elevated platform with extra stairways, does not seem to follow out one of the great features of surface operation, namely, avoiding ascending or descending from the street level. This introduction of an intermediate track level between the bridge cars proper and the so-called surface cars would perhaps aid somewhat in the distribution of the passengers, but would inconvenience the patrons of the road to a considerable extent and greatly increase the confusion, although the liberal distribution of signs might obviate this latter difficulty. The crossing of the trolley cars, as has been proven by the present conditions, is not attended with as much danger as the engineers seem to credit it with, but it possibly affects somewhat the "nervous shock to the weak, timid and aged." With the carrying of a total number of passengers of 300,000 per day over a bridge whose physical limitations are such as are pointed out in the report, the elimination of all anxiety on the part of the hysterical or confusion in the separation of the assembling crowds would be impossible under any circumstances. One has only to look at Park Row or City Hall Park about the evening rush hour to find a sufficient cause for dread among the nervous long before the converging streams have reached their point of junction at the terminal itself. While it is assuredly advisable to prevent the ingress and egress of the cars simultaneously, this result could be obtained as well by lateral extension of the bridge as by the proposed elongation of the distribution of tracks. As the conditions exist to-day, the cars can be loaded much more rapidly than the restrictions specified by the expert commission of 1897 will allow of their transmission across the bridge, and the necessity of two extra tracks at the terminal is not at once apparent; but the advantages offered by having more cars in the terminal and not compel the crowd to stand waiting for a particular car and then be bundled in in the shortest possible time is sufficient excuse for increasing the number even above the six recommended. An extension at the side, however, with a dividing fence, where the passengers could be unloaded, and which would leave the present width, or one nearly as great, for loading alone, would, we believe, prevent much of the confusion. The removal of the loops further from Park Row might also tend to increase the facility with which the elevated and surface crowds could be separated. Whether the introduction of a curbing between the trolley tracks and roadway proper is practicable may be questioned, although a division is probably intended which may be driven over should a blockade occur from the stalling of a vehicle. We are firmly convinced, on the contrary, that any narrowing of the roadway approaches should be avoided. The extension of the terminal station to the south is impossible on account of the position of the World Building, but there is nothing to prevent the acquisition of the property on the other side and the construction of a graceful curve which would discharge the vehicular traffic further up Park Row and allow ample room for unloading the surface cars. At the same time the plans for the extension of the elevated service through Centre Street and Vesey Street are to be commended, if permission could be obtained from the authorities for their carrying out. The intersection of the Vesey Street branch with both the Ninth and Sixth Avenue elevateds of Manhattan will make a much-needed connection between the West Side traffic and Brooklyn. On the whole, the report makes several most excellent suggestions, but that it will be accepted in its entirety is probably too much to expect. The work of the engineers, however, is to be highly commended, and the many interesting features of the situation which are included in the text are commended for the perusal of those in other cities who think that their terminal problems are of unnatural difficulty.

Report of the Committee on Standards of the American Street Railway Association*

Your committee on standardizing of street railway materials and equipments, appointed by the executive committee at its meeting, held in New York City, Feb. 28, 1901, respectfully presents the following report:

Three meetings of the committee have been held—Niagara Falls, June 3; New York, Sept. 14, and Boston, Sept. 18. At the first meeting the work was divided and assigned to the members of the committee, as follows:

Rails and wheels, axles, journals, journal brasses, oil boxes, etc., to N. H. Heft and F. G. Jones.
Car bodies to John R. Graham.
Electrical equipment to W. J. Hield.
Overhead equipment to C. F. Holmes.

TRACK RAILS

We recommend a T-rail as the most desirable under any conditions. The rail-head should be of the form and dimensions shown in Fig. 1.† With a rail-head of this form and dimensions, a car wheel having a 3-in. tread and a flange of $\frac{5}{8}$ -in. to $1\frac{1}{8}$ -in. depth, can be operated without interfering with the pavement in cities, and with safety on suburban roads, at a minimum cost for track maintenance.

We recommend for a grooved girder rail, one with a head 3 ins. wide, angle and groove as shown in Fig. 3. With a head of this form and dimensions, the same car wheel can be operated without interfering with pavements with safety on suburban roads, and with less cost for maintenance than the present form, due to increased surface of contact between wheel and rail and decreased wear on flange. This form of groove will decrease wear on side of rail-head and allow wheels to be pressed on axle further than in common practice at the present time, thereby decreasing wear on rails at curvatures and the liability to mount rail.

CAR WHEELS

We recommend a car wheel with a plate center and cast-chilled tire for all speeds up to 50 miles per hour, as shown in Figs. 4 and 5. When a greater speed is required we recommend a steel tire, as shown in Fig. 6; tread to be not less than 3 ins.; depth of flange, minimum, $\frac{3}{4}$ in., maximum, $1\frac{1}{8}$ -in.; strengthened on back of flange. For full dimensions see Fig. 7.

AXLES

We recommend the open-hearth steel axle, upset at point of gear wheel fit 1 in., to allow the cutting of key seat above the line of wheel fit of sizes, as shown in Figs. 8 to 12.

JOURNAL BRASSES

We recommend Master Car Builders' journal brasses of the type shown in Figs. 13 to 16.

BRAKE-HEAD AND SHOES

We recommend Master Car Builders' brake-head and shoes, as shown in Figs. 17 and 18.

JOURNAL BOXES

We recommend the Master Car Builders' journal boxes, as shown in Figs. 19, 20 and 21.

CAR BODIES FOR CITY AND SUBURBAN SERVICE

Your committee recommends a closed car body, mounted on a single truck, not to exceed 20 ft. in length, believing this to be the maximum length for a car body mounted on a single truck. The general dimensions of the car are shown by drawings herewith submitted. (Figs. 22 and 23.)

CAR BODIES FOR CITY SERVICE

A 25-ft. closed car body, 35 ft. over all, with concave sides, mounted on double trucks, as shown by drawings submitted.

CAR BODIES FOR SUBURBAN SERVICE FROM CENTER OF POPULATION

A 30-ft. straight sided closed car body, 40 ft. over all, mounted on double trucks, as shown by drawings herewith submitted and general dimensions thereto attached. (Figs. 24 and 25.)

OPEN-CAR BODY FOR CITY AND SUBURBAN SERVICE

A ten-bench open-car body, 30 ft. over all, mounted on a single truck, as shown by drawings herewith submitted and general dimensions thereto attached. (Fig. 26.)

A twelve-bench open-car body, 35 ft. over all, mounted on double trucks, as shown by drawings submitted.

* Report presented at the Convention of the American Street Railway Association, Oct. 11, 1901.

† All illustrations, except those of the 25-ft. closed car body and the twelve-bench open car, are contained on the accompanying insets.

OVAL ROOF

Your committee recommends for consideration the advisability of constructing all open cars with an oval, instead of a monitor, roof. We recommend this for consideration on the ground of economy in first cost and maintenance.

PAINTING

Your committee believes that a uniform system of painting can be adopted, but deems it advisable to obtain the views of the members of the association, as to their individual requirements, before submitting suggestions for a standard.

VENTILATION

Your committee realizes that the question of ventilation in all closed cars is very important, but we do not feel justified, at this time, in recommending any particular system, feeling that this question should be brought before the convention for a thorough discussion to assist any future committee in preparing its report.

ELECTRICAL EQUIPMENT

This is one of the most important subjects, and should be taken up more thoroughly than is possible at this time. The extent to which the standardizing of electrical equipment may be carried is limited to the general dimensions of the parts and their location, with reference to the other parts of the equipment. The work of standardizing should be carried out on the lines established by the present practice.

The subdivisions of the above report, dealing with these subjects respectively, are submitted as the report of the entire committee and not as the report of any individual member. All matters presented were discussed and agreed upon by the committee as a whole, and are presented as its joint action.

It is hardly necessary to say that the work in hand is of great magnitude and surrounded with many difficulties, owing to the varying conditions which exist on street railway systems, and that it cannot well be expected that in this, the first report of the committee, it will be possible to definitely decide on standards for all classes and kinds of equipments.

This report is submitted simply as suggestions, in order to fully bring the question of standardizing before the association. Your committee recommends that the work be continued through such committee as the association may deem wise to appoint.

JOHN R. GRAHAM, Chairman.
N. H. HEFT,
FRANK G. JONES,
WILLARD J. HIELD.

Dated, New York, Oct. 9, 1901.

Customers' Accounts of Electric Lighting Companies*

BY S. E. MOORE

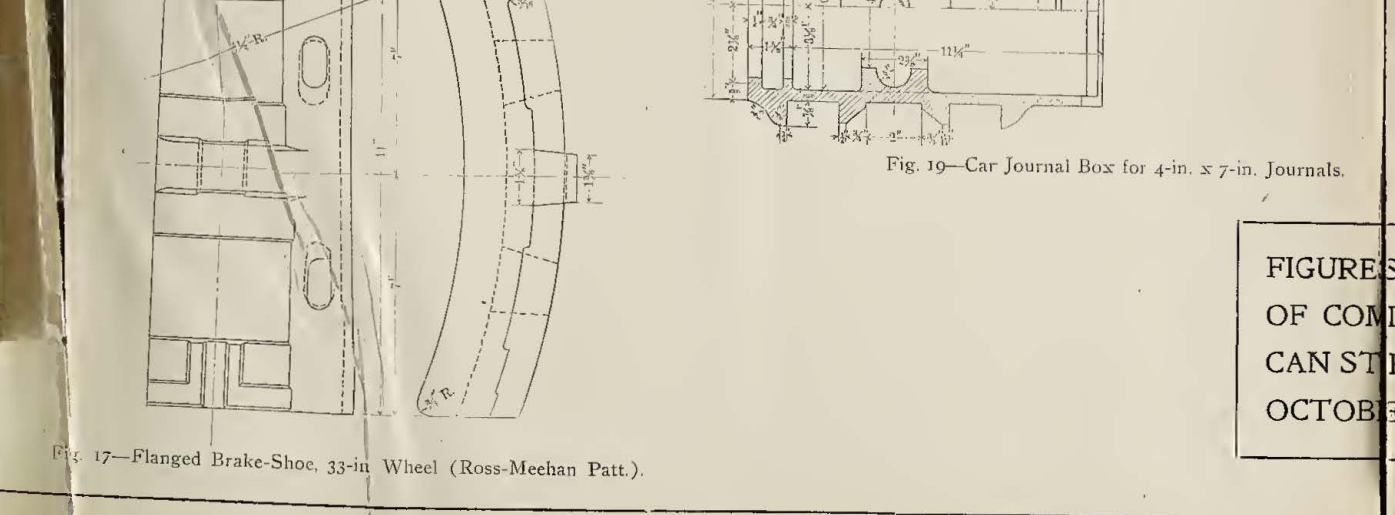
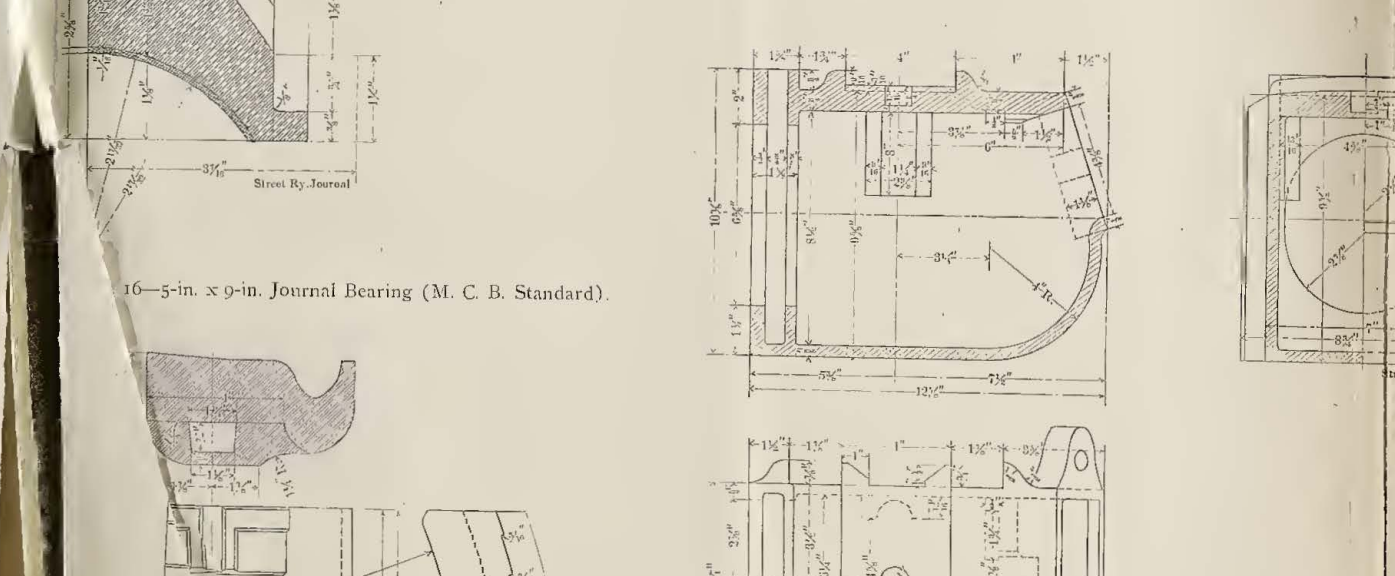
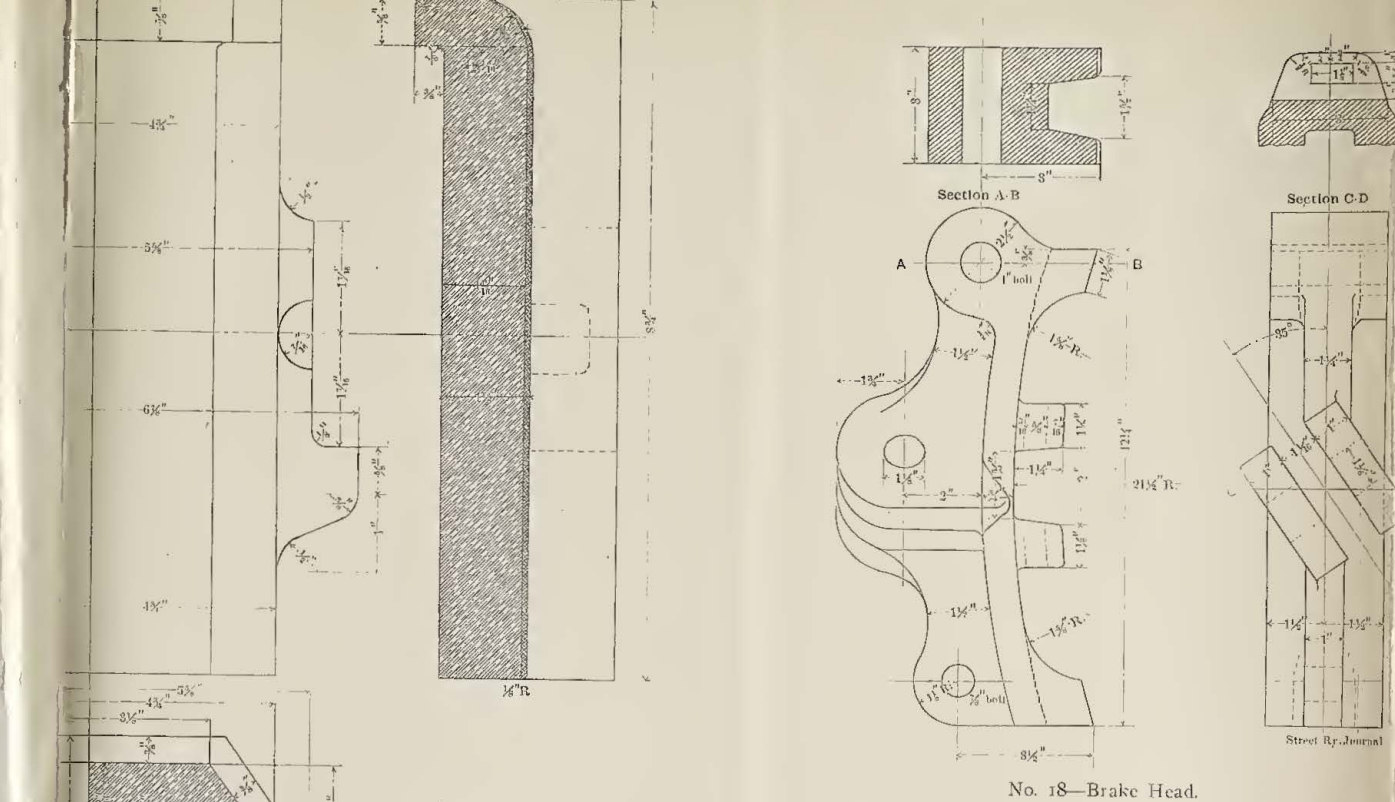
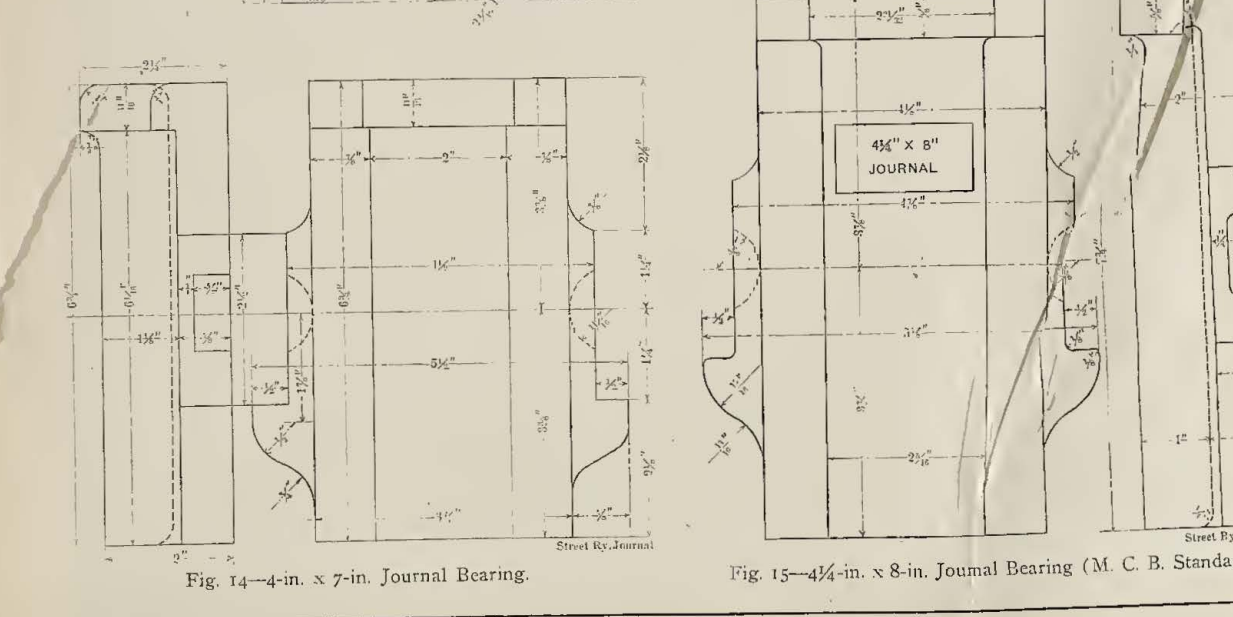
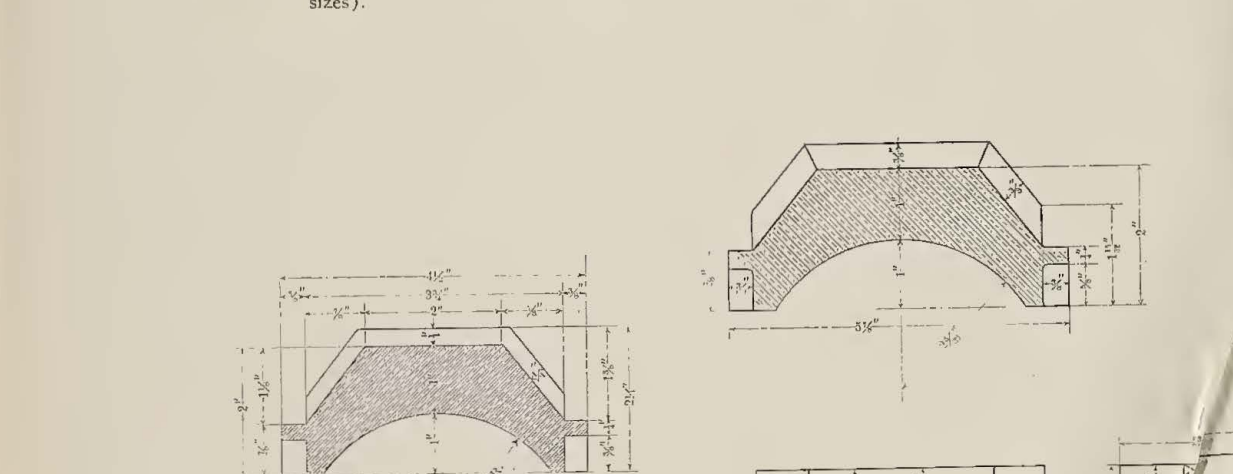
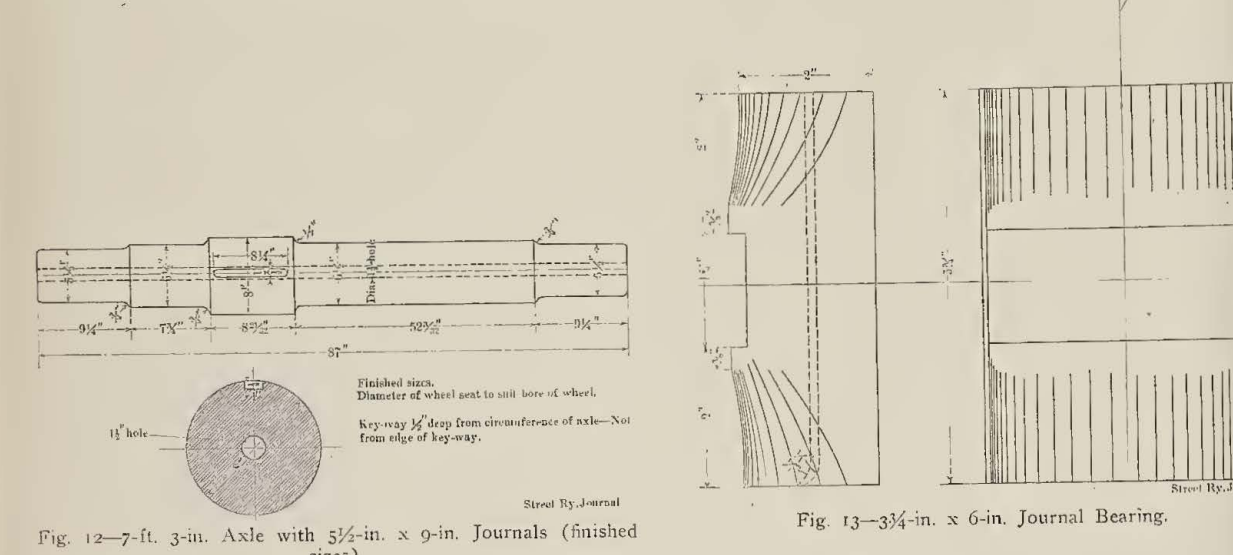
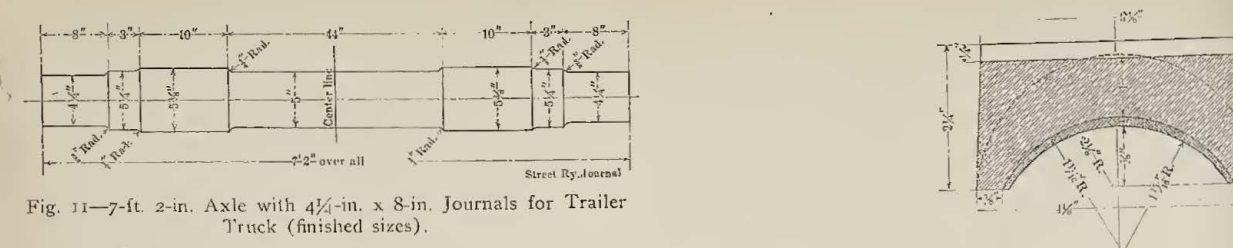
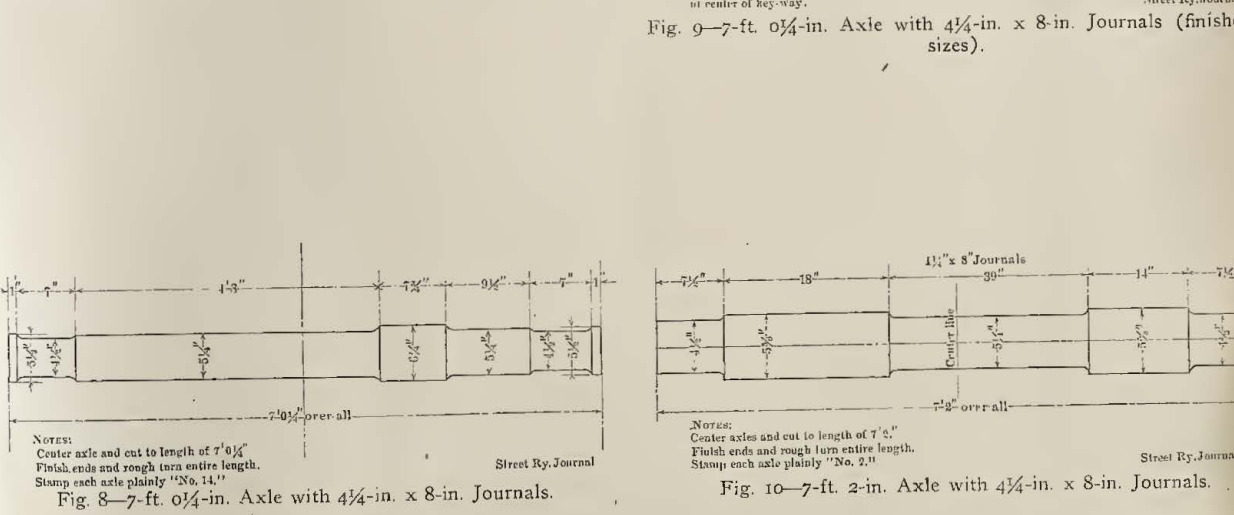
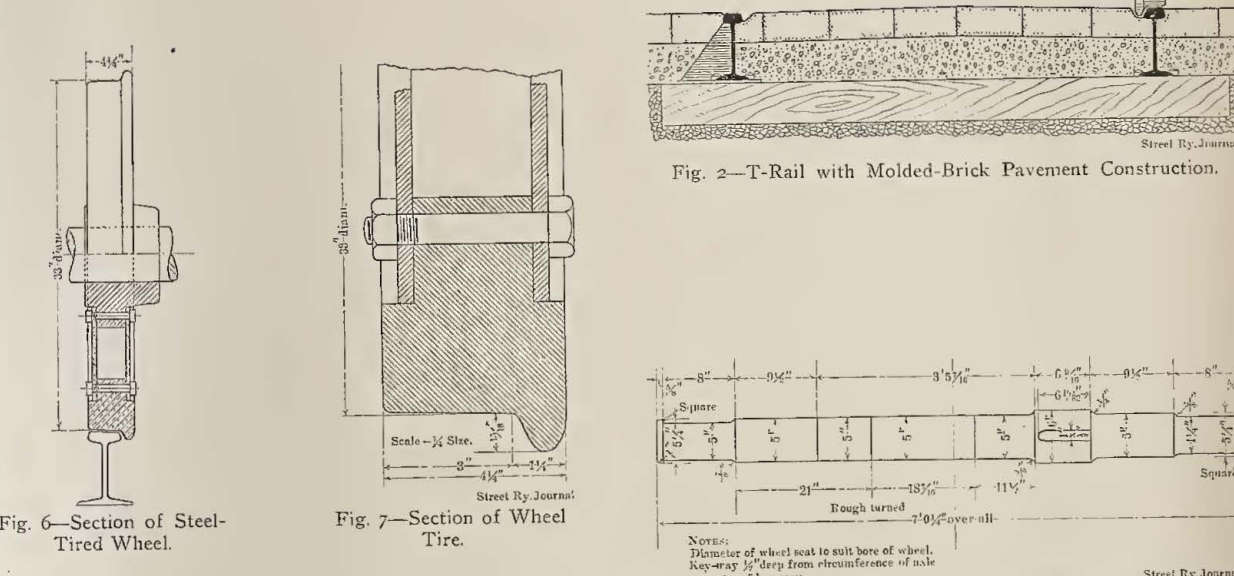
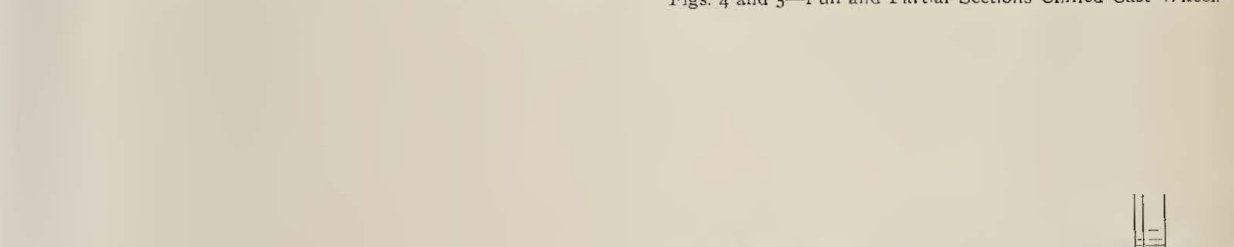
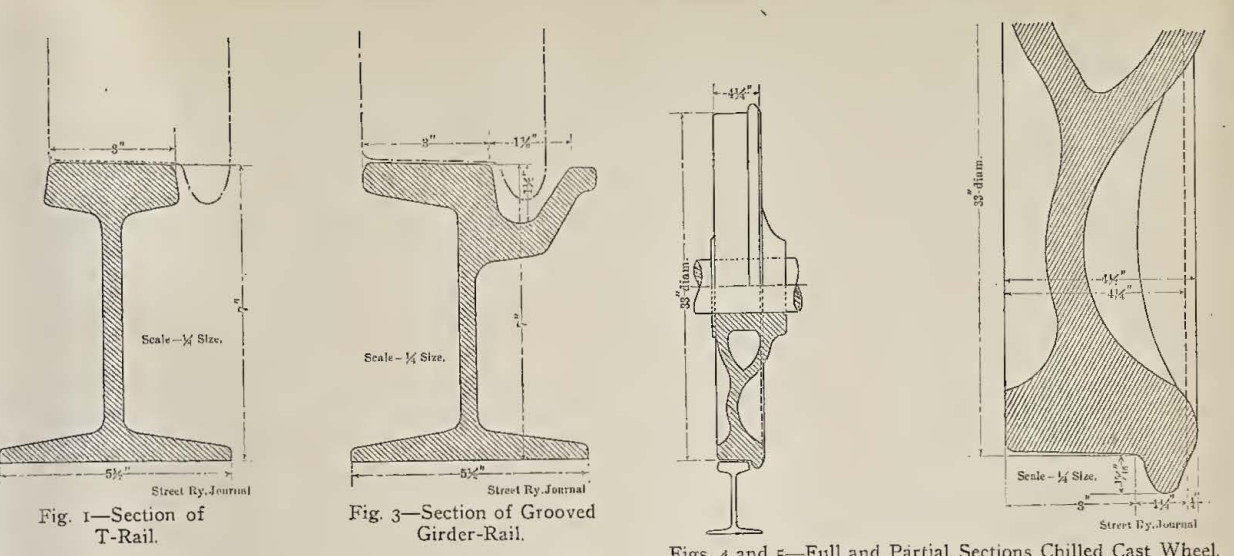
Controller, Consolidated Traction Company, Pittsburgh, Pa.

That the consumer of electric current may have no good reason to do otherwise than cheerfully pay the bills rendered from time to time by the company furnishing the same, it is important that nothing shall have been left undone, or slouched over, under the contract covering the service agreed to therein. The converter should be properly placed and the current turned on promptly on date specified; complaints as to insufficient light should be investigated immediately after they are made, and if the company is at fault the remedy should be at once applied. Meters should be read regularly on a certain day of the month, and the bill for current used should be in the consumer's hands the next day thereafter.

When the contract (which should be in duplicate—one copy for the company, the other for the consumer) has been properly concluded, it should, after being numbered and registered in the contracting department of the company, be forwarded to the officer in charge of the operating department, and a letter of advice, showing date, number, name and location of the consumer, should be furnished to the accounting department. In case the contracting agent had made it a condition of the contract that the consumer should pay a deposit in advance, such fact, evidenced by the treasurer's receipt covering the amount paid, should appear upon the face of the company's copy of the contract, as well as upon that of the consumer's, and should also be noted upon the letter of advice to the accounting department.

The territory to be supplied with current should be divided into meter-readers' districts, each district to include the work of one meter-reader for one day; thus, if there were 5000 consumers to be called upon in twenty-five working days, and one meter-reader could average 200 calls per day, then there would be twenty-five districts. For each district there should be at hand in the account-

* Paper read at the convention of the Street Railway Accountants' Association of America, Oct. 11, 1901.



FIGURES 1 TO 21 ACCOMPANYING REPORT OF COMMITTEE ON STANDARDS OF AMERICAN STREET RAILWAY JOURNAL PRESENTED OCTOBER 11, 1901.

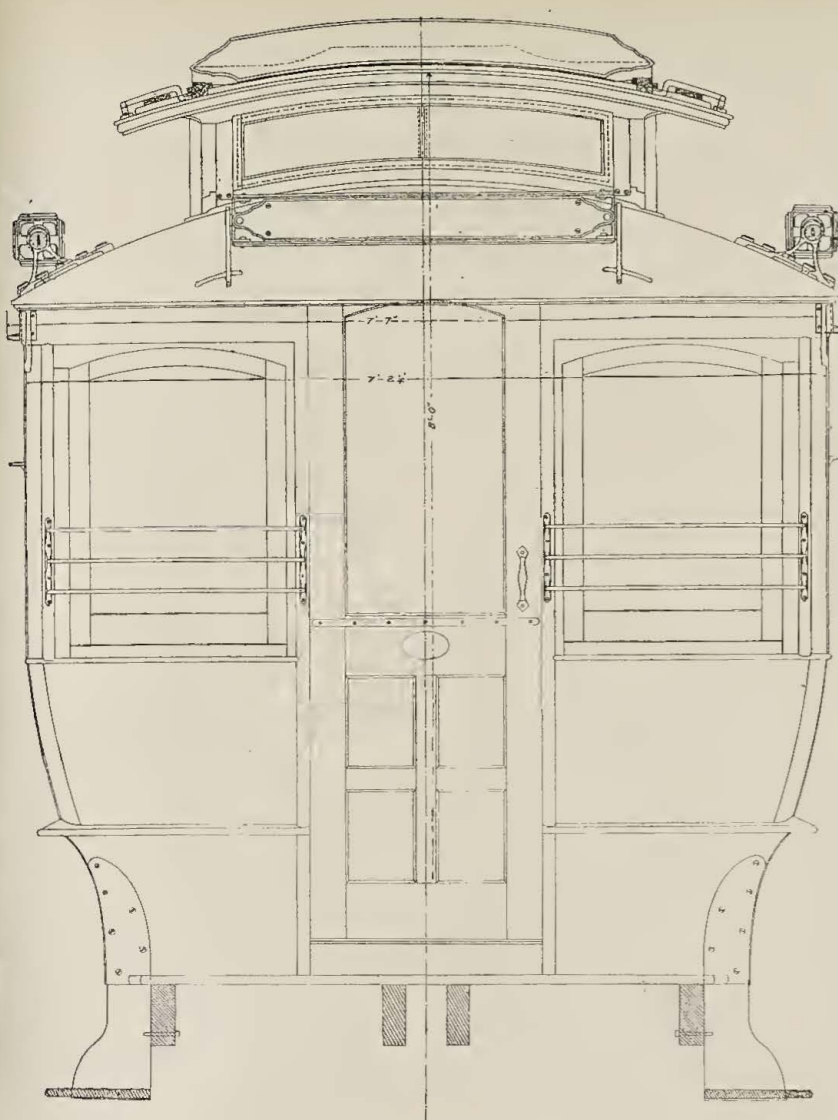


Fig. 22—End Elevation, 20-ft. Box Car.

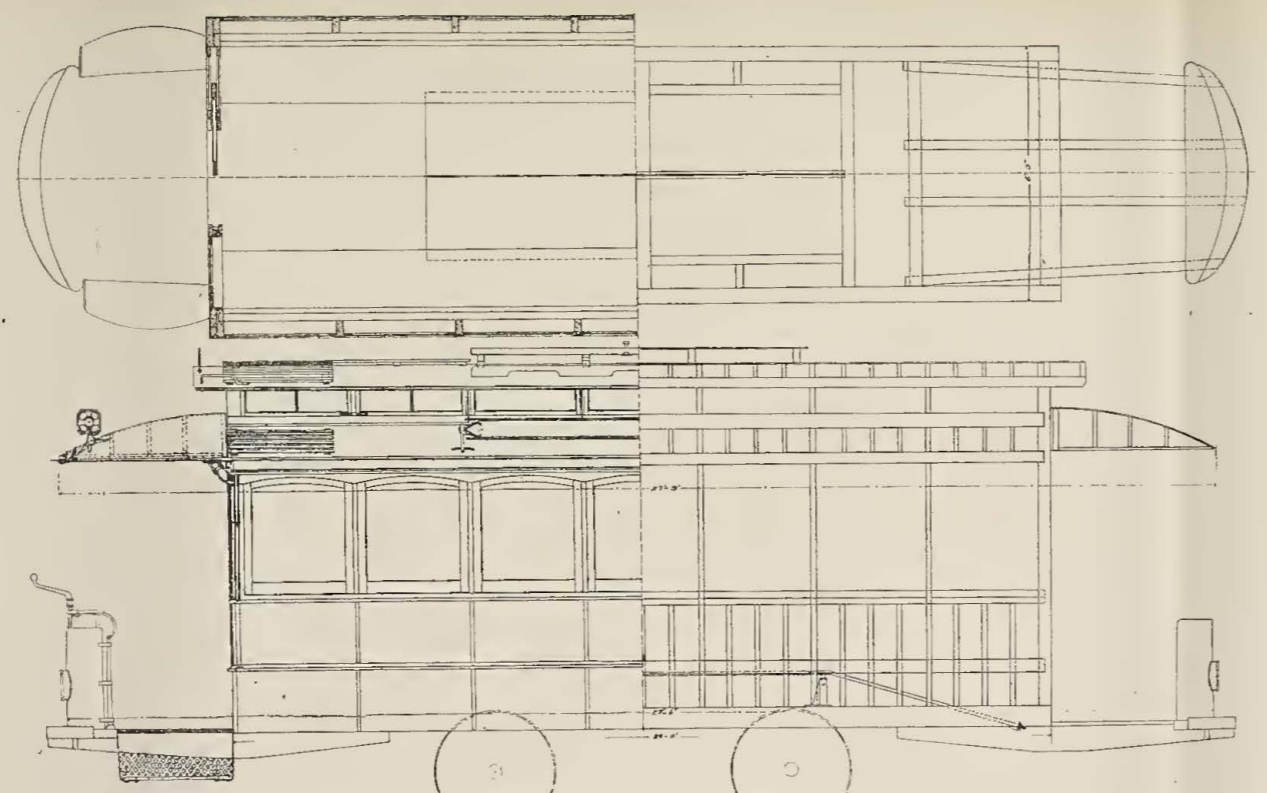


Fig. 23—Plan and Half-Side Elevation and Section of 20-ft. Box Car.

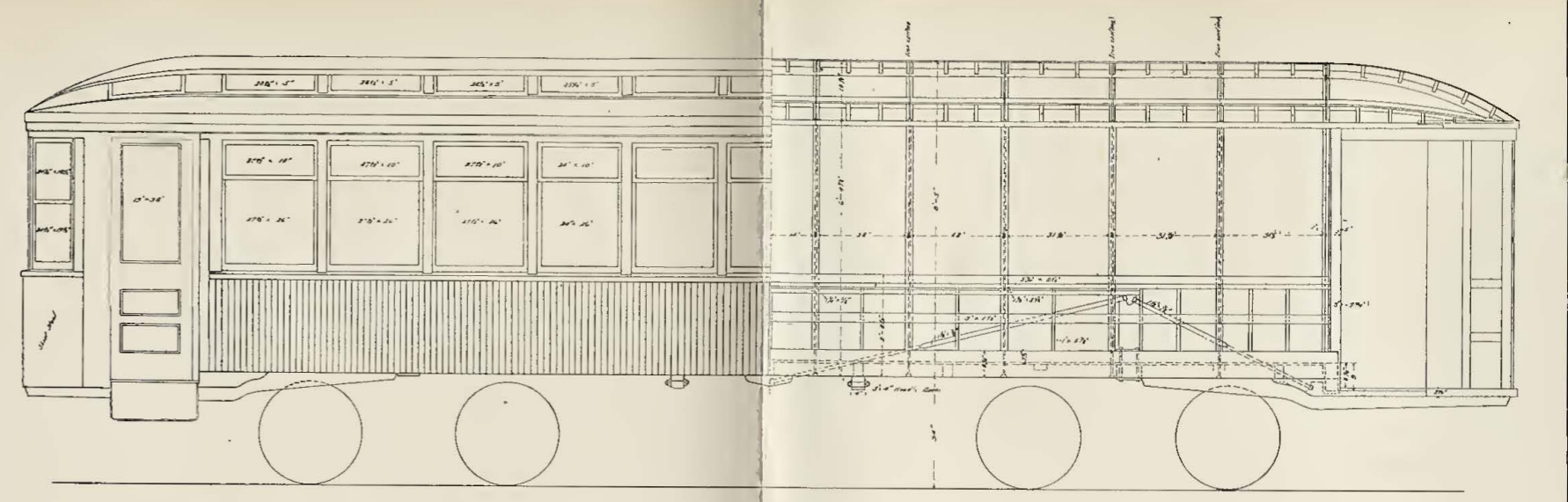


Fig. 25—Plan and Half-Side Elevation and Section of 30-ft. Box Car with Straight Sides.

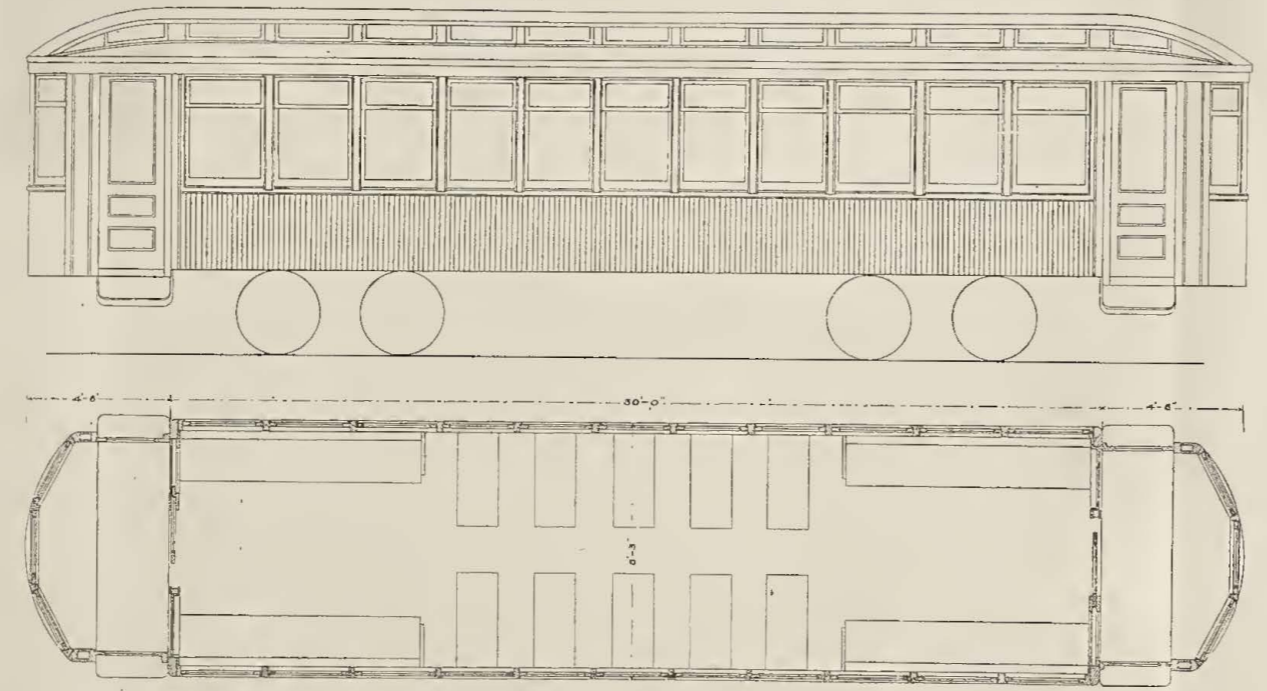


Fig. 24—30-ft. Box Car with Straight Sides.

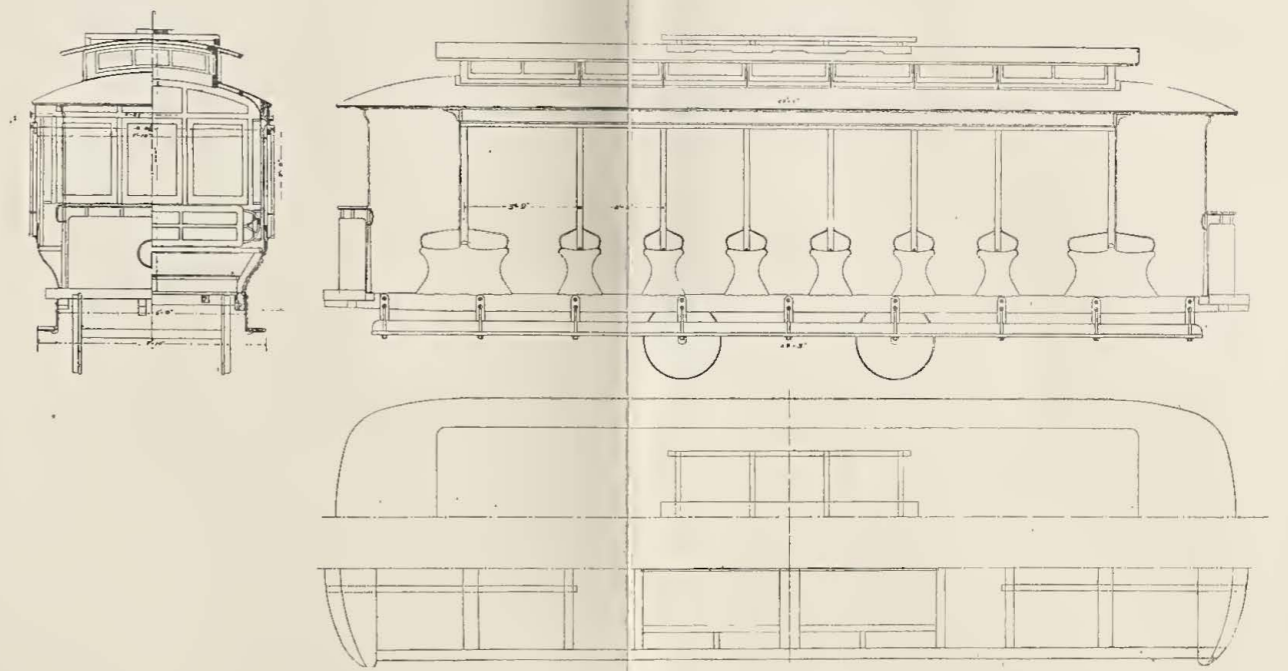


Fig. 26—30-ft. Ten-Bench Open Car.

FIGURES 22 TO 26 ACCOMPANYING REPORT OF COMMITTEE ON STANDARDS OF AMERICAN STREET RAILWAY ASSOCIATION PRESENTED OCTOBER 11, 1901.

ing department upon the morning of each day of the month, ready for the current day's work, a locked loose-leafed book, which should have in place in the order of the situation of the premises a leaf for every location at which the meter-reader should call to gather and record the readings shown upon the meter indexes. As each day's work is finished and the books in regular turn are handed in to the accounting department, regularity in the reading of meters is established and data for comparison are compiled which are oftentimes valuable in settling claims for overcharge or being used in cases where competition with other illuminants is concerned. And as bills covering each day's work would be made up and sent out upon the day following the reading of the meters, the revenue derivable from sales of current should flow into the treasury continuously, and not spasmodically, as is the case where bills are sent out once, twice or thrice a month.

For companies who have less than 5000 consumers upon their books, certain days most convenient for their financial requirements could be fixed for reading of meters, and for companies with more than 5000 consumers, either a greater number of readings per day per man or additional meter-readers would be necessary. The meter-reader should report and be subordinate to the accounting office, and he should not be permitted to announce to any customer the result of his reading of the meter, nor indicate in any way to a consumer what the amount, either exact or probable, of the bill to be rendered will be, and in case inquiries of this kind are made, he must state that he cannot give out such information, and politely refer the customer to the office. The meter-reader's duties are few, and, simply stated, are as follows: To present a cleanly appearance and keep his uniform in good condition; to be courteous, polite and gentlemanly when in uniform, and to attend strictly to his business; to carefully read all meters and make correct entry in his book of the reading of each. To make special report upon memoranda, separate from his book, of all premises kept in unsanitary, filthy and unhealthy condition, and to "Beware of the dog."

In the accounting department there should be a general utility man, who should, in addition to other duties, be competent to re-read and verify or correct meter readings which are claimed by consumers to be excessive or incorrect, to collect data relating to arc lamps, and to installations for power furnished by special contract, and to check up police reports as to "lamps out" each night on municipal lighting contracts.

As the form and style of bills rendered and the method of their delivery to consumers are matters which each company has no doubt its own selection in use, the writer will merely submit copy of postal card form of bill which has been proven by many companies who are using it to be very satisfactory. One of the excellent features of this form of bill is the coupon on right-hand side. It takes but a moment for the cash receiver to mark upon it the exact amount paid by the consumer, and when passed through the stamping machine, which not only stamps the receipt upon the body of the card but upon the coupon, and cuts off the coupon, which it drops through a slot into a locked drawer. It serves as a direct check against the receiver, whose actual cash must balance with the tabulated total of coupons, to which the treasurer only has access. The original contract, which (as hereinbefore shown) has passed from the contracting agent to the operating department, finally reaches the accounting department, having attached thereto a report showing the installation made at the premises, the date meter was set, the time current was turned on, and the reading of the meter as shown by the index at that time. From this information the loose leaves necessary for the meter-readers' books are made up. Cancellations of contracts and cut-outs of current are treated in the same manner, and under this method the meter-readers' books show leaves only for live contracts, the dead ones being filed among the records of the company in loose-leaf books numbered exactly as those are which are in current use. The contracts, as they reach the accounting department, are checked up with the letters of advice previously received from the contracting agent, and are then properly indexed and filed in numerical order. Sample copies of contracts, etc., as used by the Allegheny County Light Company, of this city, are herewith appended, as follows:

Lighting Contracts.

Page of Contracting Agent's Record of Contracts.

Memorandum to Read Meter.

Form of Order to Test Meter.

Letters of Advice to Accompany Contract from Contracting to Operating Department.

The routine work of the accounting department, in so far as consumers' accounts are concerned, is as follows:

First—To post into meter record the credit for cash paid in during the previous day.

Second—To take up bills covering all readings of previous day and to post to the debit of each consumer's account in meter record the net amount of the bill to be mailed out.

Third—To tabulate all bills made up so that report may be made daily to executive officers, showing revenue earned and giving such other information as is called for.

Fourth—To make pink "dun cards" covering accounts which are delinquent after the date at which discount is allowed. Sample cards herewith (Exhibits E-1, E-5). These must be mailed in sealed envelopes or delivered by hand.

Fifth—To transfer to summary at end of meter record the totals of each page of the same as it becomes completed, in order that at the end of the month no delay may be had in getting grand totals from which to make journal entries covering revenue as it should appear in general ledger.

Sixth—To make journal entries covering credit allowed on claims for error adjusted through contracting department.

Seventh—To make new leaves for meter-readers' books for each new customer's account, to adjust and file all canceled and lapsed contracts, to keep indexes of all books up to date.

Eighth—To audit treasurer's books, post general books, and make up all statements required by executive or other officers.

At the close of each day's business the treasurer assort coupons into lots covering domestic consumers, arc lighting, city lighting, current for power and meter rentals, respectively. These comprise the various revenue accounts which are shown on the general ledger. The treasurer passes tabulated lists of coupons, together with the coupons themselves to the accounting department, and receives receipt for the actual number so delivered by him. The clerks in the accounting department post the payments into the meter record direct from the coupons, which are afterward filed for future reference.

All bills other than those made on postal cards should be copied by letterpress and postings made direct from copy to journal.

Outside banks or mercantile houses at whose places of business payments of bills can be made should be furnished with a receipting machine (which costs about \$2.50 and can be procured at Toledo, Ohio), which will, in addition to the dating and receipting stamp, show certain letters which will distinguish their collections from those made at the company's office. These collecting agencies should also be furnished with addressed and stamped envelopes, in which not only the original coupons but a report of the collections made by them should be sent daily to the treasurer. Each collection agency should be dealt with separately as to its remuneration for the service rendered. This, however, is not generally much of an expense, as stores are quite satisfied to attend to collections for the advertising it brings them, while banks, except old-established ones, usually require that a certain amount of the funds collected shall remain permanently on deposit with them.

In conclusion, I believe that to secure a complete history of the sale of electric current for lighting and power, and to follow the transaction from time of sale until its value has been paid into the company's treasury or otherwise accounted for, will necessitate quite a little of what in times past was termed "red tape," but which is now recognized as systematic accounting, which saves in time and money much more than it costs.

Proper reference maps should be possessed by every company whose business it is to distribute electric current to consumers, and these maps should show all of the streets, lanes and alleys within the company's territory, as well as the location of every house along each street upon which poles and overhead lines or underground conduits for the distribution of current have been or are intended to be placed. The poles, as well as all the lamps for public lighting, should be numbered, and the respective numbers of each placed upon the map, whose index should give clear and explicit reference to streets, poles and lamp locations. The lines and circuits should be identified by differently colored inks, and the character of wiring and also of meter necessary for each location should be noted upon the maps. The fire insurance companies have in use maps of this character, and copies of the same can be procured from the publishers. Upon these copies all data necessary to the proper handling of the electric lighting business can be added, and from tracings of the original as many blue prints can be made as will equip each department whose duties are in line with the sale and distribution of current with this necessary and valuable information. The maps must be kept up to date, else their usefulness will be badly impaired.

In the contracting department, where all applications for supply of current shall be made, where all contracts shall be concluded and registered, and where all complaints from consumers shall be received and given prompt attention, there should be kept a complete record of all locations along the company's lines of service which are wired for the use of current, whether the same are in service or not. This record, the use of which is more specifically referred to above, can be in the shape of loose-leaf ledgers or of the card system, and no matter which method is adopted it can be divided up as is most convenient, either alphabetically as to customers' names or street names, into districts or according to meter-readers' routes.

Report of Committee on a Standard Unit of Comparison

In pursuance of the resolution passed at the last convention, your committee submits the following report:

Whereas, It has been shown conclusively that, in every case where the car-hour unit has been given a fair trial by our members, it has demonstrated its practicability and great value, and has received their indorsement.

Therefore, We recommend its adoption as a standard unit of comparison, and offer the following resolution:

Resolved, That this association recommends the adoption of the car-hour as a standard unit of comparison.

H. C. MACKAY, Chairman,

Comptroller, Milwaukee Electric Railway & Light Company,
Milwaukee, Wis.

F. E. SMITH,

Auditor, Chicago Union Traction Company, Chicago, Ill.

A. H. FORD,

General Manager, New Orleans & Carrollton Railway, New Orleans, La.

Report of Standing Committee on a Standard System of Street Railway Accounting*

BY C. N. DUFFY, CHAIRMAN

Your committee on "A Standard System of Street Railway Accounting" beg leave to submit the following report:

We recommend that the classification of construction and equipment accounts, the classification of operating expense accounts, and the forms of monthly and annual reports as adopted at the Chicago convention in 1899 remain unchanged, unless this convention directs otherwise. The Standard System of Street Railway Accounting of this association is the recognized and accepted standard.

Our worthy and progressive ex-president, J. F. Calderwood, who kindly volunteered to assist the Director of Census in the compiling of statistics concerning street railways in connection with the census report of 1900, is to have the privilege of suggesting to the Director of Census certain forms to be used in the work. Under date of Sept. 11, 1901, the Director of Census addressed Mr. Calderwood a letter, as follows:

CENSUS OFFICE, WASHINGTON, D. C., Sept. 11, 1901.

Dear Mr. Calderwood:—

I returned to Washington yesterday, and find yours of the 21st of August. Please pardon the delay in replying.

I learn that your name is already on the list for all bulletins, so that you are advised of what we are doing up to this time. We shall not consider the question of street railway statistics for some time yet. I shall be glad to consult with you before we do anything.

Very truly yours,
(Signed) W. R. MERRIAM, Director.

J. F. Calderwood, Esq., Minneapolis, Minn.

This association was officially represented at the national convention of Railroad Commissioners, held in San Francisco, June, 1901, by a committee of three, consisting of the chairman of this committee, H. C. Mackay and F. E. Smith.

The business transacted of importance to the Street Railway Accountants' Association was:

1. The committee on classification of construction and operating expenses of electric railways submitted a report recommending that the president of the Association of Railroad Commissioners appoint a committee to formulate a standard form of report that electric railways are to use in making reports in their respective States to the Boards of Railroad Commissioners, this committee to co-operate and confer with a committee from the Street Railway Accountants' Association of America. The report was unanimously adopted by the convention.

2. A constitution and by-laws were adopted, the Association of Railroad Commissioners never having had them before. This constitution prescribes that the Street Railway Accountants' Association of America and the American Railway Accounting Officers' Association shall constitute a part of the body of the association, to be represented on the floor of the convention by three members from each association.

3. The next annual convention of the Association of Railroad Commissioners will be held at Charleston, S. C., Feb. 11, 1902; the Street Railway Accountants' Association of America is expected to send three delegates to represent this association.

Unquestionably, these conventions are of great benefit in promoting an acquaintance and a better feeling between the railways and those who exercise supervision over them. This is true of

street railways, and especially of those who make reports to their respective Boards of Railroad Commissioners.

The Street Railway Accountants' Association of America and the Convention of Railroad Commissioners have certainly been brought much closer together than they ever were before. The accountants' classification of accounts having been officially adopted by the Railroad Commissioners at a prior convention, the next logical step is to formulate a standard form of report that will be uniform and go hand in hand with the classification of accounts. By the action of the San Francisco convention this is the work that will now be undertaken by representatives of the two associations, and should be productive of great good to all interests involved.

Conductors' Accounts*

BY ELMER M. WHITE

The first step is to provide the conductor with a day card that will give the receiving department all the necessary information and at the same time be plain and simple. The less complicated a day card is, the fewer mistakes the conductors will make. The result is that the receiving department will find its work easier, for there is no harder or more unsatisfactory work than correcting errors.

It has been our aim to make our day cards as simple as possible and not require the conductor to do anything that could be done better in the office. Our latest change in this line has been to have only one column for tickets; formerly we had three or four columns for different kinds; we cut that down to two, *i. e.*, "Revenue" and "Free," but at last we are down to the one, *i. e.*, "Tickets." We found many times in issuing a new ticket it was necessary to make quite an extended notice for the conductor, explaining what column this particular ticket should go. If it happened to be a land sale ticket, on which was printed Free Ticket, but for which we received full revenue, it was rather hard for some of our conductors to remember that a ticket on which was printed "Free Ticket" was to go into the "Revenue Column." The present method saves the conductors from making any errors of entering in wrong column, and the time spent by the ticket counters in separating the various kinds is not as much as time formerly spent in correcting errors.

We use three different kinds of day cards. "A" is our regular city day card, and is used when the fare is only 5 cents. "Trips From—To" is used for mileage numbers. Our central starting point (City Hall) is "O." We have a table of distances figured from "O" and other prominent points, so that our mileage is very easily figured. The mileage numbers are painted on the poles at all switches and crossovers and ends of lines, so that a conductor on a new run has no trouble in giving us his destination, although he may be obliged to turn back before reaching the end of the line.

I copy the following in relation to the report of car mileage from our instruction book:

"Conductors will designate on day card the starting point and ending point of each trip by numbers known as 'Car Mileage Numbers'; these numbers are on the trolley poles in red figures.

"It is necessary that the correct mileage of each car be recorded, and to accomplish this conductors must use care in making out report of trips run and be sure that car mileage numbers are down for the beginning and ending of each trip.

"A trip shall be known as the run between any two points, and shall end when the car is ready to return to its starting or some other point. One trip shall occupy one line on day card; the first trip will always begin on first line."

"Starting Time" and "Number of Car" are familiar to all. "Not Registered," "Transfer, Employee and Police." Transfers. Although a few roads continue to register transfers, we have found it better practice to discontinue this registration. Employees and police ride free on their uniform. A detail of "Not Registered" will be found on the back of the day card. Transfer tickets when collected are put in envelopes and deposited every two trips with a collector who is stationed at a central point. "Fares Registered" includes all passengers not mentioned before, and each trip shows the number on register when it is reset. The tickets are entered by trips, but cash fares are only entered as a total.

"B" is a day card used on our suburban lines where three 5-cent fares are collected. This is done separately, and the register is reset at each limit. On this day card the conductor fills out "Fares Registered," and the ticket counter "Ticket Summary."

"C" is a day card used on the Newington division, our line running to New Britain part of the distance over the tracks of the Connecticut Railway & Lighting Company. As we receive their

* Report read at the Convention of the Street Railway Accountants' Association of America, Oct. 11, 1901.

* Paper read at the Convention of the Street Railway Accountants' Association of America, Oct. 11, 1901.

tickets and transfers a different day card is required; in "Summary," however, the conductor fills out only the cash fares.

The conductor makes up report of day's work, putting cash, tickets and day card in a numbered canvas bag and deposits it in a safe provided for that purpose. This safe opens into the receiving room.

The receiving room is open at 8 o'clock in the morning. First, the money counters take the canvas bag, empty it, counting cash, and if correct, putting their initial on the day card, which is folded so that the amount is outside and no unfolding is necessary. The tickets are folded inside and held in by a rubber band. If cash is not correct it is counted by a second counter, then a short or over slip is made out.

Day cards now pass to the ticket counter, who checks the number of tickets and separates them into "free" "2½-cent" and "5-cent," entering them in place provided on day card.

Day cards are now separated into lines, and checked for trips from a list of the number of trips run on each line made out by the car house foreman.

The next step is the checking of registers. The register we use is one of our own make, and differs from any other in that it prints the fares registered whenever set back to "o," as you can see on the register slip. As nothing can be printed except what is visible, it is easy to see that if the conductor does not put down on his day card what the register calls for, he can blame no one but himself when he gets called up to settle for a short; he knows that it is up to him, as no one else has made any record. By comparing the day card and register slip you can see how readily it is checked up, first the regular then the relief. There is no need of any total when you can check up each trip. We very often find it convenient to know what the register reading actually was on some particular trip, not what someone said it was.

The day cards are now ready to prove; "fares registered" are first added; that total, less the tickets, gives the cash fares; any correction in fares registered is made with colored pencil (each one checking having a different color), but cash fares and cash are always corrected in red ink; a short or over slip is made for these errors. The amount on day card after it is corrected is the amount entered as receipts for the day.

The various short or over slips are entered on one sheet, which is sent to the assistant superintendent each day for settlement with conductors. The conductors sign this sheet whether they are short or over. We mean to be perfectly fair with our conductors, and as willingly send them back when they have overpaid as we look for a cheerful settlement when the mistake is the other way.

The receiver has a fund to draw from when the short and overbalance is on the wrong side, so that we deposit what the corrected day cards call for.

The day cards are now ready to enter by lines, each conductor separately; as soon as all are entered and added the totals of cash are taken and the deposit is made ready for the bank. This is made by the receiver, and agrees with the total cash receipts.

After cash is out of the way the transfer envelopes are checked with day cards, and any differences are reported to assistant superintendent for settlement.

The totals of various lines are now copied on a sheet which includes Car Mileage, Car Hours, Transfers, Free Tickets, Ticket Fares, Cash Fares, Total Passengers, Cash Receipts, Ticket Value and Total Earnings. On this sheet is a record in detail of the cash deposited.

For year ending June 30, 1901, we carried 14,835,939 paying passengers and 3,122,550 transfer passengers. The expenses of the receiving department to handle cash and tickets was approximately 1 cent for every hundred passengers. Our daily service calls for seventy-one regular cars, with 147 conductors.

I, for one, realize that frequent discussion of prevailing methods and constant watchfulness of details are necessary in the accomplishment of economies, and that free discussion will lead to greater perfection.

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Standard System of Accounting for Electric Light Companies *

BY G. E. TRIPP

When President Ham assigned to me a paper on a standard system of accounts for electric lighting companies he suggested that I present the report read before the National Electric Light Association at Niagara Falls in May of this year. I then wrote to George F. Porter, secretary of the association, asking permission to do so. Mr. Porter kindly consented, asking me to give due credit to the

* Paper read at the Convention of the Street Railway Accountants' Association of America, Oct. 11, 1901.

Electric Light Association. Under these circumstances I submit the following report:

Your committee on uniform accounting, in submitting its report for your consideration, presents the following explanatory notes in a manner as brief as is consistent with clearness.

The classification is divided into three parts:

First—Classification of income (receipts).

Second—Classification of construction (installation and equipment accounts).

Third—Classification of expenditures.

The classification herewith submitted aims to reduce the number of accounts and so to classify same that it will be feasible for the smaller companies to use the classification as submitted, and equally possible, by a further subdivision of the accounts herein named, for the larger companies to conform to and follow the lines laid down.

Your committee has endeavored to arrange those accounts that are in common with street railways, such as Operation, Power Stations, etc., to conform with the general system of street railway accounting as adopted by the Street Railway Accountants' Association, the principal reason for so doing being that there is a constant and growing marked tendency throughout the country toward a consolidation of street railway and electric lighting enterprises in the same towns or cities; and as the number of these consolidated or combined companies is constantly on the increase, it has become necessary to consider a classification of the expenses of an electric lighting company that should conform in the principal essential matters with the classification of expenses of a street railway company.

Your committee recognizes the fact that a classification of accounts can be arrived at by a committee of operating officers with, if not more, perhaps as much intelligence as is possible by a committee of accounting officers, and your committee believes the classification herewith submitted to be promulgated as much from the standpoint of the practical operating official as from the standpoint of the practical accountant, with, possibly, the added feature that in the classification herewith submitted your committee has gone a little further than would the practical officer, in so far that your committee has considered a classification that would adapt itself to a simple and direct method of accounting, as well as commend itself to the practical operating official.

Your committee also considered at some length the requirements that are likely to exist for information as to the cost of the Maximum Demand System of Charges, but has thought it best not to include in this report the consideration of a classification in connection with the Maximum Demand System, but to consider same at some later date.

Your committee, in deciding upon the means and methods to be used in the accounting branch of the business, was confronted by a great array of blank forms, an examination of which showed that not only did the blanks themselves differ as between different companies, but that some companies had carefully prepared blanks to cover information that other companies seemed to provide for without any blanks whatever; but upon a careful consideration your committee thought it wiser to confine the present report simply to a classification, as the committee felt that more progress would be made by taking up one step at a time rather than submitting a report that would possibly defeat its very object by being too voluminous in its scope and intention, it being thought wiser to leave the question of forms and methods either to a subsequent committee or to further action of the same committee, or whatever may be the pleasure of the association.

Your committee has also borne in mind the value and necessity of a classification that would be well adapted to meet the demands made upon it in the compiling and computation of statistics such as costs and incomes per kilowatt-hour, etc.

A standard system of blanks and bookkeeping methods is a subject that should receive very careful attention, and should be the consensus of opinion resulting from a broad discussion of the subject. Each particular step is one to be carefully considered and from many different viewpoints, and in submitting to the convention a report on a Standard System of Bookkeeping Methods, your committee, owing to a change in its personnel, has not had the time to consider the subject as carefully as a report on the same would warrant.

In connection with this report, your committee wishes to acknowledge the obligation furnished it by the report of the committee on a Standard System of Street Railway Accounting.

CLASSIFICATION OF INCOME

Municipal light	{	Incandescent*
	}	Arc*
Commercial light	{	Incandescent*
	}	Arc*

Municipal power service
 Commercial power service
 Railway service
 Merchandise sales and job work billed (net profits)
 Rentals
 Miscellaneous receipts

* The subdivisions of light into incandescent and arc are not made general headings, because a great many companies connect both incandescent and arc lamps on same meter, thus rendering such a separation of output and income impossible.

LIST OF CONSTRUCTION ACCOUNTS

Account A—Organization

Includes all expenses incurred in effecting organization, and such capital exploit expenses as may be properly connected therewith, including such legal expenses as are directly incurred by reason of the organization of properties or the acquirement of properties.

Account B—Royalties, Franchise and License

Includes all royalties or licenses paid to licensors and the amounts represented or paid for in connection with city, town and other franchises.

Account C—Real Estate and Buildings

Includes all land, buildings, sheds, docks, wharves and fences, together with brick stacks, traveling cranes, elevators, and such investment costs as can be considered a part and parcel of the building.

Account D—Water Power Plant

Dams, canals, tail races, head gates, penstocks, wheel gates, wheel governors, water-wheels, etc.

Account E—Steam Plant

(a) Includes boilers with settings, and steel stacks belonging with boilers, provided such stacks can be easily removed without injury to the building.

(b) Includes engines with settings.

(c) Pumps, heaters, condensers, tanks, piping, etc., shafting, belting, conveyors and economizers.

Account F—Electrical Generating Plant

Includes dynamos, switchboards with instruments, and all other electrical equipments located in generating stations, together with station wiring.

Account G—Sub-station installation (Storage Battery, Rotary Transformers, etc.)

Includes all installation of storage batteries, motor generators, step-up and step-down transformers, tub transformers, rotary converters, including regulators and switchboards, together with equipment directly connected with same, which can in any way be considered a part and parcel of the sub-station plant.

Account H—Street and Service Installation (Overhead)

Includes poles, wires, cross arms, mast arms, and all installation expense connected with overhead main lines or services in connection therewith.

Account I—Street and Service Installation (Underground)

Includes conduits, cables, underground conductors, junction boxes, manholes, and all installation connected with underground mains or services.

Account J—Arc Light Installation

Includes only the actual cost of arc lamps, globes, nets, arresters, hoods and rods installed. (No labor to be charged to this account.)

Account K—Meter, Meter Appliances and Line Transformer Installation

Includes actual cost of meters, meter appliances, transformers installed on outside lines. (No labor to be charged to this account.)

Account L—Tools and Instruments

Includes boilerroom tools, engineroom tools, linemen's tools, meter, arc lamp and other repair tools, tools for maintenance of dams, and all portable testing instruments. All tools bought to replace worn out tools, implements and testing instruments, should be charged to the proper operating or maintenance account.

Account M—Office Furniture and Fixtures

Includes all desks, letter files, record cases, typewriting machines, and all such equipment as may be considered a part and parcel of the furniture and fixtures in the general offices of the company.

LIST OF EXPENSE ACCOUNTS

Cost of Manufacture (Generating)

To this account should be charged the wages of engineers, firemen, handlers of coal after it is unloaded, dynamo attendants, oilers, men wheeling and handling ashes, and watchmen. It covers wages for all kinds of work in the station that has to do with *manufacture*, as distinguished from *repairs* and *increase to plant*.

When regular station men do small repairs, etc., it is not necessary to subdivide the wage charge; but where extra help is hired, or where employees work principally on repairs, the expense should be charged directly to the account benefited.

No. 2—Fuel for Power

To this account should be charged the cost of coal, wood, oil and gas used as fuel, and the cost of removal of ashes, including freight, hauling and cost of loading or unloading.

No. 3—Water for Power

To this account should be charged water used in boilers, for condensing, etc. It does not include water power purchased.

No. 4—Lubricants and Waste for Power Plant

To this account should be charged the cost of engine oil, dynamo oil, blower oil, cylinder oil, shaft grease, graphite, and waste or any other kind of wipers used in the station. It does not include oil for transformers, grease for wagons or oil for lanterns.

No. 5—Miscellaneous Supplies and Expenses for Power Plant

To this account should be charged all expenditures for the operation of power plant not otherwise provided for.

No. 6—Hired Power

Charge to this account all expenditures for power purchased from other companies or power plants.

No. 7—Reserved for Future Development

No. 8—Maintenance of Boilers

To this account should be charged all repairs to boilers, foundations and settling, gates, stokers, smoke flues and iron stacks, damper regulators and safety valves, and gage cocks.

(Where the stacks are of brick, repairs on these should be charged to maintenance of buildings and fixtures.)

No. 9—Maintenance of Engines

To this account should be charged all repairs to engines, or replacements of parts worn out or destroyed. It covers also repairs on foundations and settings of engines.

No. 10—Maintenance Electric Plant

To this account should be charged repairs to dynamos, armatures, fields, commutators, rheostats, switchboards and instruments, and all wiring in the station, including repairs to motors (except those driving cranes, pumps, etc.)

No. 11—Maintenance Miscellaneous Station Equipment

To this account should be charged repairs and maintenance of condensers, pumps, injectors, heaters, economizers, hot wells, tanks, piping, pipe covering, separators, purifiers, drains, oil and grease cups, tools and instruments, coal and ash conveyors, belting, shafting, clutches, pulleys, scales, etc.

No. 12—Maintenance Buildings and Fixtures

To this account should be charged all kinds of repairs to the station or power plant buildings or foundations of same, brick stacks, docks and wharves, elevators, traveling cranes, fences surrounding property, sidewalks and pavements adjoining the building, tool closets, toilet rooms, and all plumbing connected with the power or station buildings. This account refers only to power station buildings.

No. 13—Maintenance Dams, Canals and Tail-Races

To this account should be charged repairs and maintenance of dams, canals, tail-races, etc., including filling in or repairing embankments, removing obstructions on ice, maintaining a boat to care for dam.

No. 14—Maintenance of Gates, Wheels and Governors

To this account should be charged repairs and maintenance of head gates, penstocks, wheel gates, wheel governors, water-wheels, and all connections with governors up to the line shaft.

No. 15—Reserved for Future Development

No. 16—Operating Arc Lamps

To this account should be charged all wages and expenses of trimmers, patrolmen, inspectors' wages, inner and outer globes and carbons and cleaning of same, and the cost of all labor and sundries account of installing, removing or exchanging of arc lamps.

No. 17—Operating Meters

To this account should be charged the expense of reading meters and the cost of all labor and sundries in regard to installing, removing, replacing or exchanging meters, together with the wages and expenses incidental to the inspection of same.

No. 18—Renewal of Incandescent Lamps

To this account should be charged the cost of all first free installations and all renewals of incandescent lamps, together with testing and cleaning expenses in connection with same.

No. 19—Operating Sub-Stations

To this account should be charged the cost of all labor and material for the operating of storage battery, static or rotary transformer, or motor-generator sub-stations.

No. 20—Miscellaneous Distribution Operating Expenses

To this account should be charged the cost of all new horses, wagons and harnesses to replace others worn out. It should also include the feed for horses, and shoeing, wages of stablemen, repairs to wagons, harness, automobiles, bicycles, etc., and all miscellaneous expenses not properly chargeable to accounts No. 14, 15 and 16; also the rentals of poles, lines or conduits may be properly a charge against this distribution operating account.

No. 21—Reserved for Future Development

No. 22—Maintenance Underground System

This account includes all cost for labor and material for maintaining and repairing all manholes, conduits, underground and submarine cables, both feeders and mains, together with services in connection with same.

No. 23—Maintenance Overhead System

To this account should be charged all labor and material for maintaining and repairing poles, cross arms, mast arms, arc suspensions, brackets, insulators, pins, wire and transformers, lightning arresters, fuses and other cut-outs outside of station.

No. 24—Maintenance Arc Lamps

This account includes cost of all repairs and replacements, and repair parts in connection with same.

No. 25—Maintenance Meters

To this account should be charged the cost of all repairs, renewals and replacements and all incidental expenses for the proper operation of the mechanical work in connection with the meter department.

No. 26—Customers' Repairs and Renewals

Includes all repairs or small renewals or petty services or connection made on the premises of light and power customers for which the lighting company should bear the expense, either labor or material, such charges as are not properly chargeable to the customers, including free wiring of all descriptions, for the benefit of the customer and all expenses from transformer or end of main line service to be charged against this account and *not to Investment*.

No. 27—Maintenance of Sub-Stations

Includes all repairs and small renewals made on sub-station building or apparatus, including batteries, rotaries, transformers, regulators, motor-generators, switchboard, etc.

No. 29—Salaries of General Officers

Charge to this account salaries of president, vice-president, secretary, treasurer, auditor, general manager, assistant general manager, general superintendent, purchasing agent and all other officers whose jurisdiction extends over the entire system.

No. 30—Salaries of Clerks

Charge to this account the salaries of bookkeepers, cashiers, collectors, paymasters, stenographers and clerks, employed in the general office or elsewhere.

No. 31—Printing and Stationery

Charge to this account all expenditures for printing, stationery and stationery supplies, except as hereinafter provided. The cost of printing briefs and other legal papers should be charged to Account No. 35. The cost of printing signs, posters and other advertising matter should be charged to Account No. 33.

No. 32—Storeroom Expenses

Charge to this account all salaries and expenses in connection with storeroom, including cost of sending material and supplies from general storeroom to branch storerooms, and the collecting of scrap material.

No. 33—Advertising, Canvassing and Soliciting

This account to include salary of contract agent and soliciting agents, together with all compensation for the procurement of central station business, including the cost of advertising of every description, including printing handbills, dodgers, posters, folders, etc., the expense of distribution and displaying of same.

No. 34—Miscellaneous General Expense and Office Sundries

Charge to this account the cost of office supplies, repair and renewals of office furniture, wages of janitors, porters and messengers, the cost of public telephone service, maintaining and operating private telephone system, telegrams, subscriptions and donations, traveling expenses of general officers and others connected with general office, and contingent expenses connected with the general management not otherwise provided for.

The cost of printing, stationery and stationery supplies should be charged to account No. 31, except as otherwise provided.

No. 35—Legal Expenses and Loss and Damage

Includes salaries and traveling expenses of attorneys, and fees, court costs, whatever the cause of litigation may be, and all expenditures on account of property damaged and persons killed or injured; salaries and expenses of claim agents, investigators, adjusters and others engaged in the investigation of accidents and adjustment of claims; salaries, fees and expenses of surgeons and doctors, nursing, hospital attendance, medical and surgical supplies, fees and expenses of coroners and undertakers, fees of witnesses, and others.

No. 36—Rents and Maintenance of Offices

The cost of printing, stationery and stationery supplies should be charged used in the operation of the company, and operation and maintenance expense of separate office buildings or company's offices.

No. 37—Insurance

To this account should be charged the cost of insuring the property against fire, all accident insurance and steam boiler or employers' liability insurance.

No. 38—Taxes

Includes all taxes on personal property or real estate.

It is practically universally conceded by the latest authorities that taxes should be considered as a separate expense account under the heading of general expense, and not as a fixed charge.

A fixed charge is properly a guaranteed return on invested capital, being specifically represented (first) by interest on mortgage bonds, and (second), by guaranteed interest return on any other class of interest-bearing securities, said interest return being always in the nature of a fixed or guaranteed percentage such as interest on debentures or interest on certain classes of preferred stock.

In conclusion, a fixed charge is any guaranteed interest on securities issued, which interest must be paid and deducted from net earnings, thereby leaving net profits, out of which net profits regular stock dividends can be paid.

The report to the National Electric Light Association was signed by G. E. Tripp, W. M. Anthony and W. F. Ham.

The Brooklyn Bridge Terminal Report

The report of the board of expert engineers appointed by the Bridge Commissioner of New York City to suggest improvements for the Manhattan terminal of the New York and Brooklyn Bridge was made public last week. An abstract of this report is given herewith, together with two of the three plans showing the improvements. The board consisted of Alf. P. Boller, H. G. Prout and S. Whinery, engineers.

The board states that in considering the situation the following controlling principles were reached:

(1) The required capacity of the terminal is measured by the capacity of the bridge itself. Nothing would be gained by enlarging the terminal beyond the capacity of the bridge.

(2) The traffic capacity of the present bridge has been nearly reached, and it cannot be greatly increased without making radical changes in, or rebuilding, the structure, which it would not be practicable to undertake until the completion of bridges Nos. 2 and 3.

(3) No satisfactory permanent relief for the congestion at the terminal of the bridge can be provided or hoped for, except through the completion of the new bridges, now under way; these when opened and properly connected with the downtown district will divert travel from the old bridge, and thus reduce the burden it now carries.

(4) Any general plans for relieving the present conditions should contemplate not only improving and increasing the capacity of the present Manhattan terminal, but should make it possible and practicable to diminish the pressure at the terminal by extending the bridge car and elevated tracks so that a part of the mass of people can be handled at stations other than the bridge terminal.

(5) The greatest measure of utility in serving the public and relieving the present bridge will be secured by connecting it with bridges Nos. 2 and 3 in such a manner that the bridge trains may operate in both directions in a circulating system embracing the three bridges.

(6) Pending the opening of the new bridges measures should be taken to utilize, as far as possible, the full capacity of the old bridge, and to make such improvements at its terminal as will relieve the congestion and discomfort to the greatest possible extent.

(7) To relieve the congestion at the terminal, dependence must be placed, not so much on increasing its capacity as on diverting from it a part of the travel to other stations, thus virtually converting it from a terminal to a way station. The circulating system of bridge trains having way stations on the connecting roads will be an important factor in accomplishing this purpose.

(8) Since a large part of the crowds that now use and will continue to use the bridge and terminal come from the dense business district south of the bridge, some provision should be made for intercepting and handling a part of this travel before it reaches the present terminal.

(9) In connecting the three bridges and providing other stations for handling a part of the people who now use and will continue to use the present bridge, regard should be had to making suitable connections or transfer points with the north and south transportation lines of Manhattan, to supplying some crosstown facilities in the downtown district, and to a connection with the more important of the North River ferries.

(10) No system of local loops for handling the bridge cars west of the present platform would materially improve or increase the present bridge car service.

(11) The terminal of the trolley car service over the bridge must for the present remain in the Manhattan terminal. The trolley car tracks cannot be extended across Park Row and its existing surface tracks. These tracks are now burdened to their full capacity, and to cross or cut into them would result in serious obstruction to both systems, and would increase the congestion at that point.

(12) The terminal trolley tracks should be so spaced as to provide ample platforms between them; passengers should be prevented from crossing tracks at grade, and incoming and outgoing passengers should be separated.

(13) Any changes at or enlargements of the Manhattan terminal should, so far as possible, be of such a character that they may be carried out without serious interruption to travel.

(14) Any changes at or enlargements of the Manhattan terminal should, so far as possible, be of such a character that they may be carried out without serious interruption to travel.

(15) These changes should be of such a character that substantial benefit may be realized in the shortest possible time.

(16) While the existing conditions at the Manhattan terminal are such as to justify, if necessary, the expenditure of a large sum of money to provide a remedy, economy must not be disregarded,

particularly since the question of arranging the finances so that the work may proceed without delay is of the utmost importance.

RECOMMENDATIONS

Briefly stated, the recommendations of the board are as follows:

(1) That an elevated road be built from the Manhattan terminus of the New York and Brooklyn Bridge along Center Street and Marion Street to Spring Street and thence along Spring Street and Delancy Street to the terminus of bridge No. 2; and that a branch of this Center Street line be built on Canal Street to the terminus of bridge No. 3. That the first named portion be completed by the time bridge No. 2 shall be completed, and the Canal Street branch be completed by the time bridge No. 3 shall be opened for travel. That that portion of this elevated road from the bridge terminal along Center Street to Canal Street be constructed with four tracks, the remainder to be double-track road. That the portion of the proposed elevated road from the existing bridge terminal to a point on Center Street north of Worth Street be built at once, and a commodious station be built at Worth Street, with sidings and switches north of this section for tail-switching and returning trains.

(2) That a double-track elevated road be built as soon as practicable from the Manhattan terminus of the New York and Brooklyn Bridge southward along Park Row and across Broadway to Vesey Street; thence westward along Vesey Street, crossing the Sixth Avenue and Ninth Avenue Elevated roads above grade to West Street, and southerly along West Street to the vicinity of the Cortlandt Street ferry on North River. That the terminus on West Street be provided with a suitable station and such extra sidings and switches as will enable trains to be returned to the bridge. That a commodious station be placed on Vesey Street, between Church Street and West Broadway, with connections by stairs and platforms to both the Sixth Avenue and Ninth Avenue Elevated roads. This Vesey Street line is regarded as very important, and it is strongly recommended; but it is independent of the Center Street line, and its omission would not affect the other improvements recommended.

(3) That the present gallery floor (second floor) of the Manhattan terminal building be converted into, and be used exclusively for, a trolley car terminal, the loop tracks to be wide apart and each track to be reached by two separate stairs from the ground floor, one for outgoing and one for incoming passengers.

(4) That a commodious stairway entrance to the terminal be made at Rose Street. This will not only accommodate a large number of people in that vicinity, but will tend to reduce the crowd that now enters at Park Row. Plans for these stairs are already completed by the Chief Engineer and Superintendent.

(5) That the present stairway leading from William Street up to the first floor of the terminal be widened materially and made straight, and that a corresponding stairway opening into William Street be built in the north side of the building. The William Street stair is now one of the most crowded places about the terminal, and its capacity is entirely inadequate.

(6) That the trolley tracks and the roadway be separated from each other by curbs placed between them over the whole length of the bridge, thus preventing vehicles from using the trolley tracks.

(7) That some plan for cleaning the roadway of the bridge shall be devised that will not interfere with the free moving of the trolley cars and trains; and that repair work which may interfere with the travel of any kind on the bridge be done during the hours of minimum travel.

(8) Until the Center Street line can be ready for operation to the Worth Street station the board recommends that the present system of operating the bridge cars be unchanged. No practicable temporary changes there that the board has been able to devise will increase materially the present capacity of the bridge trains.

ESTIMATE OF COST

Cost of the Center Street elevated extension, complete, including three stations and property damages.....	\$1,773,000
Cost of the Park Row, Vesey Street and West Street elevated extension, including two stations and property damages.....	722,900
Cost of all changes and additions to the Manhattan terminal.....	200,000
Cost of curb between trolley tracks and roadway entire length of bridge, and widening roadway at the existing offsets.....	6,500
Grand total.....	\$2,702,400

Of the two maps shown, Fig. 1 gives the location of the elevated railroad extension from the terminal of the New York and Brooklyn Bridge, recommended by the board, and Fig. 2 shows the Manhattan terminal of the present New York and Brooklyn Bridge, reconstructed as recommended by the board.

THE TROLLEY CAR TERMINAL

This was found the most difficult part of the problem with which the board had to deal, and they devoted to it the most careful consideration. It seemed to them that no project which does not radically reform the present situation can be satisfactory. Notwithstanding the fact that under the present plan of operation remarkably few accidents have occurred, they feel that it is wrong and dangerous, and that no plan that necessitates massing people into small spaces, crossing tracks in front of moving cars, and opposing currents of incoming and outgoing passengers, will satisfy reasonable requirements.

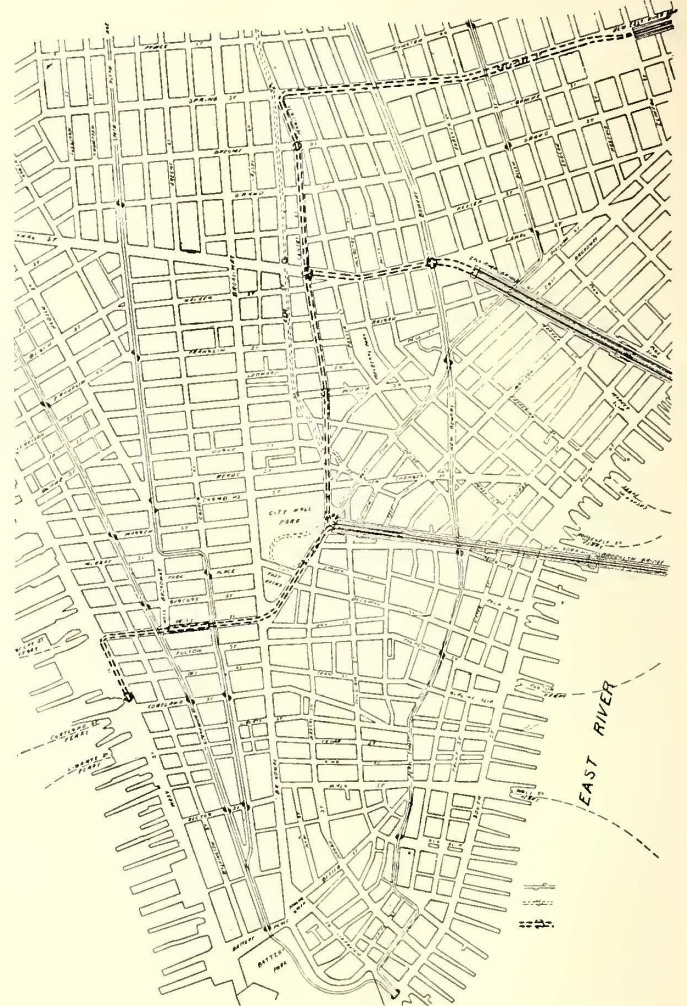


FIG. 1.—ELEVATED RAILROAD EXTENSION, MANHATTAN

No plan entirely free from objections for dealing with this trolley car travel in the Manhattan terminal has occurred to or has been suggested to them, but the one recommended seems, on the whole, decidedly the best.

As outlined briefly above, it contemplates the use of the gallery, or second floor, of the present building for a trolley car terminal. Fig. 2 shows the general features of this plan. It will be necessary to lower the gallery floor about 4 ft. in order to provide the necessary head room of 12½ ft. for the trolley cars, and to reconstruct it with greater strength than at present. Upon this floor the trolley car tracks will be placed, using a system of loops similar to those now in use. To reach these elevated loops the trolley track will leave the grade of the bridge roadway at a point about 140 ft. west of the east end of the terminal building, and will ascend on a grade of 2 per cent to the level of the loop tracks. The general arrangement of the track plan will be similar to the present, except that the tracks from the point named, where they leave the roadway grade, will be supported upon a steel structure, and the loops at the terminal would be wider apart and differently located.

Referring to Fig. 2, it will be seen that six trolley loops are provided, the most westerly of which is placed between the second and third transverse row of columns, and that the other tracks are located easterly, between each alternate row of columns, except that one space is skipped between the third and fourth tracks to allow of stair connections at that point with the bridge tracks above.

To supply each trolley track there are two pairs of stairs from the street-level floor to the trolley floor—one for passengers going to and one for passengers alighting from the cars. It is in-

tended that the cars shall stop at the northerly end of the loops to discharge their loads and will then move to the southerly ends of the loops to take on their loads, as they usually do now. The tracks will be separated by fences, and a longitudinal fence will separate incoming from outgoing passengers, as shown on the plans. At the foot of the stairs will be signs indicating those lines or routes which may be reached by that particular stair. Placing the tracks in each alternate bay will give ample platform room, so that crowding will be largely avoided.

The advantages which this general plan offers, and the objections to it, may be briefly stated:

ADVANTAGES

(a) It will become possible to separate entirely the incoming and outgoing passengers. Experience has proved that this is necessary to the successful handling of great crowds. The satisfactory working of the bridge car system at the terminal is largely due to the employment in a very admirable manner of this expedient.

(b) It provides liberal platform room for each track. The available area of platform space for each track is about 2000 sq. ft. This may be permanently divided evenly between the incoming and outgoing passengers, or, by making the longitudinal separating fence readily movable, the platform space assigned for loading and unloading may be varied at different hours of the day, to better accommodate the varying crowds.

(c) It can be carried out on the present property of the city, and within the present terminal building. The purchase of additional real estate in the immediate locality in quantities that would allow any practicable enlargement of the terminal would be very expensive, and probably a long time would be required to get possession of it.

(d) It leaves the ground floor of the terminal unobstructed by tracks, and after the necessary stairways are built there will remain ample room for commodious passageways to and from all parts of the bridge.

(e) It effectually prevents passengers from getting off or on cars on the roadway alongside the terminal station. This is now so serious an evil that a large number of police officers are constantly on duty during the evening rush hours to prevent it. With this plan in operation most of these police officers would not be required.

(f) In short, this plan seems to provide an efficient remedy for all the more objectionable and dangerous features of the present plan. It makes unnecessary and impossible the crossing of tracks and the crowding of all the trolley travel into a limited space, obviates nervous shock to the weak, timid and aged, and avoids the principal sources of danger incident to the present plan.

OBJECTIONS

(a) It confines the track loops to their present dimensions, with curves of present radius. Longer loops, with easier curvature, would be desirable from the operating point of view, but no practicable plan has been found that would greatly improve this feature. The present plan of tracks has, however, worked quite satisfactorily, and this objection is not regarded as serious.

(b) The carrying out of the plan will reduce the width of the roadways at the terminal to that necessary for a single line of vehicles. Practically the same condition prevails now. The cars occupy the tracks so continuously during the greater part of the day that it is impossible for vehicles to use any part of them.

(c) The elevation of the trolley tracks to the second floor will prevent physical connection between these tracks and the surface tracks on Park Row. No plans have yet been formulated by anyone that would make the interchange of trolley cars between the surface tracks of Manhattan and Brooklyn Boroughs practicable. The different systems of operation employed—overhead trolley in Brooklyn and underground trolley in Manhattan—make such interchange impossible now and improbable in the future. Park Row now carries about all the trolley car traffic it can accommodate, and breaking into it with a cross line delivering a large number of cars would be impracticable.

(d) The new construction work on the tracks would probably make it necessary to suspend vehicular travel over the bridge for a few days. The inconvenience of this is obvious, but the actual commercial loss would not be serious, since the vehicles could temporarily use the ferries.

(e) It has been objected to this plan that as each line, or group of lines, has its separate track, reached by separate stairs, and communication between the tracks at grade is prevented by fences, passengers who by mistake ascend the wrong stair, or who might find cars on the route they desire to take stopped, would be compelled to retrace their steps downstairs and ascend another stair to reach a different line. This is true, but it is not believed to be a matter of much importance; regular patrons would make

no mistake in selecting the right stairway to reach their car, and if there are two or more lines serving the same general territory, either of which a passenger could use to reach his destination, these lines should be run on the same loop. If the stairs were properly marked by signs indicating the lines they serve those unacquainted with the location could, after inquiring what line they should take (which they must do in any event), then readily find the stair leading to their car.

(f) It is said that the public would strongly object to being compelled to climb stairs to reach trolley cars, and that it would in preference cross a number of tracks, as is necessary at present. The average lift of these trolley car stairs would be about 12½ ft. only, not much greater than that of ordinary residence stairs, and the exertion involved would not be great. Even if people preferred to incur the dangers of the present situation rather than to climb stairs, they should not be allowed the choice. Appliances to insure the safety of the public are often inconvenient to some, but they are, nevertheless, enforced, as they should be.

(g) It is objected that the spreading of the tracks over so wide a space will prevent the construction of as many stairways to the bridge cars above as would be desirable when the train platforms shall be extended to the full length of the building. The greatest length of these platforms that would be without stairs is 140 ft., and with stairs of liberal width, such as the plan provides for, it is not believed that this objection will be found serious.

The desirability of a greater number of loop tracks than six has been suggested, but it is thought that number will be sufficient. Even with the four loops now in use there is no difficulty in unloading and loading the cars as fast as they can be despatched across the bridge. Assuming that 300 cars per hour could be handled, the six tracks would allow an average of one and one-fifth minutes for each car to make the necessary stops, unload, load and get out of the loop, which, judging from present experiences, is an ample allowance.

AN ALTERNATIVE TROLLEY TERMINAL PLAN

Of the other projects considered for the improvement of the trolley car terminal is one which may be regarded as a possible alternative to the plan recommended. Its general features are: The retention of the trolley tracks on the ground floor, moving them further eastward and spreading them by placing a track in each alternate bay or bent of the building. The advantages which this plan would offer are, briefly: The trolley tracks would remain at the surface of the roadway, so that teams could use them in case of opportunity or necessity, and so that they could be extended to a physical connection with the Manhattan surface roads; structural changes required would not be so great or so costly as in the plan recommended; stairs to reach the trolley tracks would be avoided, and people would be left free to move over and among the tracks, taking whatever line or car they choose.

Other serious objections are, that incoming and outgoing passengers are not separated, and that all foot passengers over the bridge must cross the trolley tracks at grade, and that passengers are not prevented from getting on or off the cars upon the roadway while the cars are outside the terminal.

SOME GENERAL CONSIDERATIONS

A brief review of the conditions now found at the Manhattan terminal of the bridge seems important for the more perfect understanding of the recommendations.

Volume of Travel.—An accurate count of the travel both ways on the bridge trains and on the trolley cars during twenty-four hours on Oct. 31, 1900, gave the following result:

Number of people carried by bridge trains.....	146,214
Number of people carried by trolley cars.....	129,609
Total	275,823

If to this is added a reasonable estimate of the number crossing by the carriageway and by foot (neither of which were counted), it is safe to conclude that on that day not less than 290,000 people crossed the bridge, and therefore passed through the Manhattan terminal. So far as can be judged the travel on that day was only normal for that period of the year, and there were doubtless many days when that number was exceeded in the regular course of travel.

It is safe to say that no other bridge or railroad terminal in the world handles half as many people daily or yearly as does the Brooklyn Bridge. The number of people handled at the Grand Central station at Forty-Second Street in the year 1899 is stated to have been 14,000,000, which is less than one-seventh of the number handled at the bridge during the year 1900.

In the absence of an actual count, the volume of travel carried daily by the bridge during the present month of October may be

conservatively estimated as follows (exclusive of employees and drivers):

Carried by bridge cars.....	150,000
Carried by trolley cars.....	135,000
Carried by other vehicles.....	2,500
Foot passengers.....	12,500

Total per day..... 300,000

The difficulty of making proper provisions for this enormous travel is greatly increased by the circumstance that a large part of the daily travel is concentrated into a few hours during the day. Thus of the 275,823 people who crossed by the bridge and trolley cars on Oct. 31, 1900, 72,000, over 26 per cent of the whole, crossed between the hours of 7 a. m. to 8 a. m. and 6 p. m. to 7 p. m., or in two hours, and 138,000 people, or about 50 per cent, crossed during the four busiest hours of the day. In other words, nearly one-half the daily travel over the bridge is concentrated into one-sixth of the twenty-four hours.

In view of these facts, the congestion of travel at the bridge terminal is not surprising, and great credit is due to the management for the skill with which the enormous crowds are handled with comparative safety, with facilities inadequate for the purpose.

Capacity of the Bridge.—It may be accepted as a fact that the maximum safe carrying capacity of the bridge has about been reached. The chief engineer and superintendent of the bridge states that the maximum load that can safely be imposed upon the bridge will be reached when the hourly service over the bridge amounts to 300 trolley cars in each direction at a speed of about 8 miles an hour, and 320 bridge and elevated cars in each direction at a speed of 12 miles an hour, in addition to the usual roadway vehicles and the foot passenger service.

The present service over the bridge during the rush hours amounts to about 260 bridge cars and 240 trolley cars per hour in each direction. It will be seen, therefore, that the bridge car and trolley car service cannot be increased more than 24 per cent without overburdening the bridge. But, owing to the inherent difficulties of operation under conditions, some of which are necessary to secure a proper and safe distribution of the loads upon the bridge, it is doubtful if this maximum capacity can be reached and maintained.

Since these limiting conditions determine the car capacity of the bridge and thus practically fix the required capacity of the terminal, it is proper to briefly review them here.

Limits of Trolley Car Movement.—To reach the maximum service of trolley cars stated above (300 cars per hour each way) requires that the time interval between cars shall be twelve seconds.

The expert commission, composed of Messrs. Bogue, Buck and Thomson, appointed to report upon the strength of the bridge and the feasibility and practicability of the elevated railroad cars and the surface railroad cars, or either of them, crossing the bridge, in their report dated Feb. 8, 1897, fixed the safe space limit between trolley cars on the suspended structure of the bridge at 102 ft., and their speed at 7 miles an hour. To pass over this space of 102 ft., plus the length of one car, say 34 ft., in the time limit of twelve seconds, requires a speed of 11.5 ft. a second, or about 7.84 miles an hour. It is, therefore, theoretically possible to attain the limit of 300 cars an hour without materially exceeding the speed allowed, but it has not so far been found possible to reach in regular practice this limit, although the records show that it is occasionally reached, and even exceeded, for single hours. While the spacing of the cars, as recommended by the expert commission, has been insisted upon and has been very well complied with, practically no restriction has been placed upon the speed of the cars. In other words, the operating company has been allowed to run the cars, particularly during the rush hours, as fast as was found possible; but experience has proved that under present conditions, even if no delays occur, the best average speed that can be maintained does not much exceed 8 miles an hour, and the average speed, with the usual delays, is very much less.

The inability to operate regularly at the maximum rate of 300 cars an hour may be traced to several causes, the most potent of which is delay to the cars in their progress across the bridge. The delays are principally due to the following causes:

1. Irregularity of speed. If the several cars were attached to a cable in such a manner as to give a clear space of 102 ft. between them and were moved by the cable at any speed across the bridge, the speed of the cars would be absolutely uniform with regard to each other, and the required separating space absolutely maintained. In practice, where each car is propelled by a separate motor, this ideal condition cannot be maintained. If for any reason one car is stopped, or its speed reduced, all cars behind it must stop or their speed must be reduced accordingly to prevent

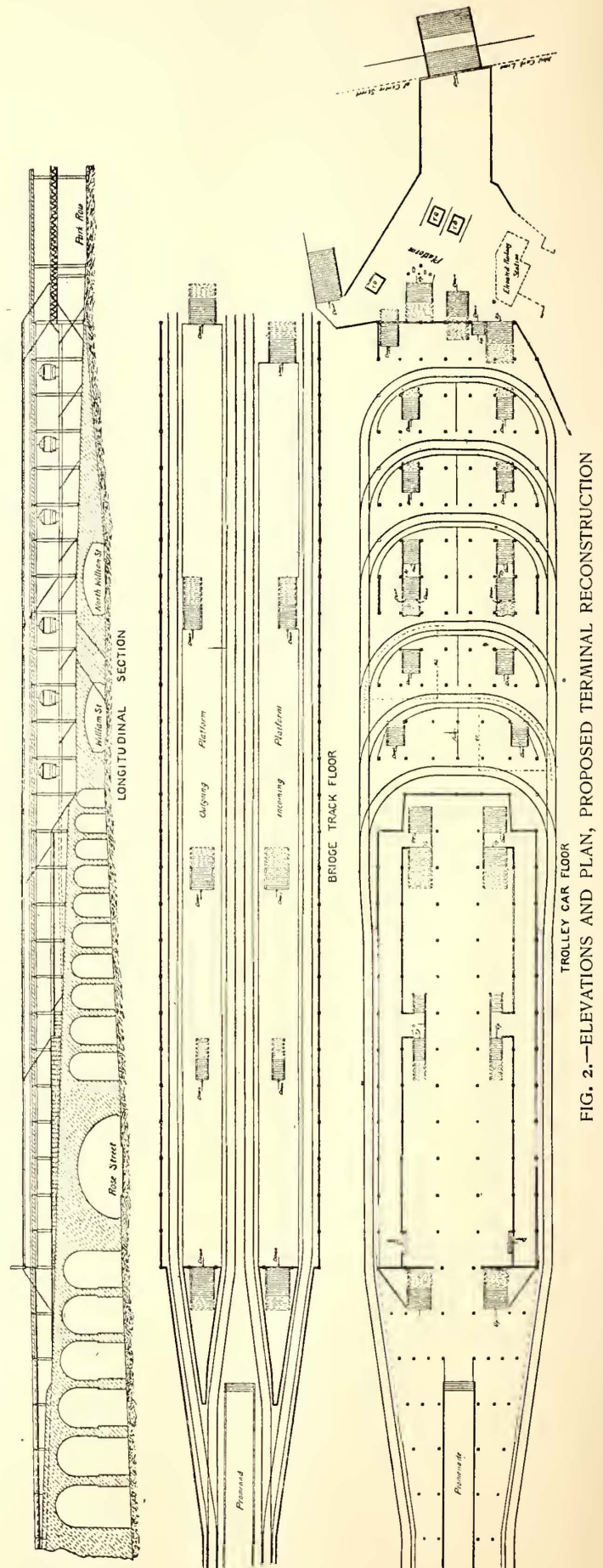


FIG. 2.—ELEVATIONS AND PLAN, PROPOSED TERMINAL RECONSTRUCTION

encroachment on the stipulated clear space between them. This would require that the power be cut off and the brakes be applied simultaneously and with the same force on all the cars following the one delayed, which, under the conditions, is impossible. The practical result is that motormen who are careful not to encroach on the prescribed space will hold their cars in check, and give themselves some leeway in which to bring their cars to a stop, if necessary, after observing the checking of speed of the car immediately in front. Again, when the car originally delayed resumes its speed, it is practically impossible for all the following cars to apply power at the same instant and to the same degree, and the inevitable result is that, even if the cars are exactly 102 ft. apart at the beginning of the starting operation, there will be a perceptible time interval between the starting of each successive car, which will have the effect of increasing the clear space between them. It must be obvious that the general effect will be that the average operating distance between the cars must materially exceed the minimum distance to which they are restricted, and consequently the capacity of the tracks cannot be reached or maintained. Even if there are no actual causes of delay the irregularities of speed, which cannot be obviated, will have the same effect, though to a less degree.

The board then points out some of the main causes for delay, these being principally obstruction of tracks by roadway vehicles. Much delay is occasioned by the present practice of cleaning the roadway during the day, making repairs to the carriageway floor during the daytime, delays caused by the breaking or disarrangement of trolley wires and track, and to car equipment, etc. Suggestions are made as regards reducing these.

Brakes in Railroad and Street Car Service*

BY F. M. NELLIS

In presenting this paper the author does not wish to be held as presuming to advise or dictate to railroad officials what they shall do in the matter of air brake practice, or to lay down hard and fast rules for the guidance of employees; but instead, he offers gratuitously for what it is worth, this practical experience of a specialist to the consideration of the officer and employee seeking information on the subject of railroad and street car brakes. So far as is possible to make it, the paper has followed lines in the nature of a resumé of some of the things seen by the writer while serving in the capacity of traveling inspector and instructor for the Westinghouse Air Brake Company on the different railroad and street car lines of the country, in yards, shops, roundhouses, and while riding on locomotives, cars and in cabooses. The experiences herein given are those resulting from being brought into close contact with men of all the different operating departments who have to do in any way with brakes, from the general manager down to the repair man in the shop and the inspectors in the yard and in the roundhouse. A person who has thus enjoyed the unusual advantages in this field and been placed in a position to learn other people's opinions, observe their methods and practices, will learn and see things which contribute to an experience that another individual not a specialist could not soon acquire. It is believed that the citing of actual happenings, which may, properly, be called object lessons, will attract more attention and leave a more lasting impression than could a mere exposition of logical beliefs, be they ever so sound and persuasive. Therefore effort has been made to have this paper follow more nearly the lines of a running narrative of actual occurrences than of an expository essay.

It has been generally conceded for some time past that the railroads of the East are somewhat tardy and behind those of the far West in air brake maintenance. This is only natural and to be expected when we recollect that the freight train brake had its introduction on the mountain grades in the far West nearly ten years before it was seen to any extent in the East. Necessarily these Western roads were early obliged to provide for the maintenance of the brakes upon which they soon learned to become dependent for controlling their trains down heavy mountain grades. The East, not having these conditions, was later in applying air brakes to freight trains, and also tardy in making systematic preparations for maintaining air brakes. Of course, more or less has been done by Eastern roads in air brake maintenance, but not in as systematic and organized manner as is now being contemplated.

Much money can be squandered on air brake maintenance, and will not bring the desired net results if it be spent in a promiscu-

ous, intermittent or spasmodic manner. The returns will be meager and unsatisfactory. Efforts improperly directed, though well meant, are analogous to the working of a machine of low efficiency—the intake is maximum and the output minimum; and the machine is therefore discouragingly and, perhaps, ruinously extravagant and expensive. Some roads, in a false feeling of security, believe their air brake practice and methods of maintenance are complete and satisfactory because they do not receive in the manager's office any reports derogatory to their methods; but should a close investigation be made of air brake doings in testing and repair yards, roundhouses and shops, a large number of roads would find that their machine of air brake practice and maintenance is working at very low efficiency. What is first and more needed than anything else, perhaps, is a candid recognition of the fact that the air brakes in freight train service to-day are not receiving the attention they should.

An honest appreciation of this condition, and an organized and systematic effort to better look after the road practice and air brake maintenance will result in a wonderfully improved showing, as well as increased safety and a better movement of trains in heavy traffic. This may seem idle and dogmatic argument, but it is a true statement, and is made only after actual and deliberate observation of the facts.

An instance to illustrate this case may be cited of a certain so-called New York road which, six years ago, had no air brake organization. Every shop and terminal point had its own individual and strongly asserted opinions, ideas and methods of air brake maintenance and practice. The air brake results obtained were quite similar to those general results had some few years ago on roads where each division master mechanic was permitted to build such locomotives as he saw fit to design. There was no system, no uniformity, no co-operation in air brake matters—only each man following after his own peculiar ideas, which practice did not seem to result in much good, but served rather to set up a petty, selfish competition against neighboring terminal points, very much to the detriment of the railroad company's interests. One terminal point seemed to strive to establish a certain kind of superiority of its own by degrading its neighbors' methods and practices rather than by attaining a higher standard for itself. Yet this road sought to pose as having a thoroughly established system for care of air brakes. Gradually, however, it was brought to see that the pot-pourri of ideas and practices was not singly or collectively the best, and that something much better could be had for less money. The pleasing assurance is here given that this road, ever since its conversion, has had one of the best systems of air brake practice and maintenance of any of the roads running into Jersey City. It might be added that this illustrated case is not at all an exceptional or isolated one, but only one of many actually observed by the writer in his travels.

The question may be asked: What are we to do to better our air brake service, which we are so candidly informed is not up to the highest standard? How are we to give more attention than we have been accustomed to give this single branch of the many under our charge which go to make up the great whole in modern railroading? The details of railroad operation are becoming so numerous nowadays as to prohibit a close study and supervision of all of them! How are we to give any more of our already over-taxed attention to any single branch, no matter how important that branch may be? These questions have oftentimes been asked, are answerable, and are unmistakable symptoms of a healthy spirit which shows appreciation of actual conditions and a readiness to strive for improvement. The reply to these answers may be summed up in a few words, namely, procure the services of a first-class general air brake inspector, give him full authority in everything pertaining to air brakes, and hold him responsible, having him report directly to the superintendent of motive power or the general superintendent. In this way the machine will be made to work at its full efficiency. The man selected for the position, however, must be the right man in the right place. In regard to brake inspection and maintenance the greatest stress should be laid. No pains should be spared to see that the valves and cylinders are in good condition, and that only the best grease is used, while cleaning and testing should be done in the most approved manner.

Perhaps one of the strongest appealing features in air brake practice to the railroad manager, and one which speaks intelligibly and forcibly in a language of dollars and cents, is that of slid-flat wheels. The removal of a pair of slid-flat wheels, pressing the wheels from the axle and replacing them with newly fitted wheels, is quite an expensive operation and is well understood and appreciated by railroads.

The causes of slid-flat wheels are not entirely due to the poor handling of brakes by the engineer, or the neglected condition of the triple valve, as is generally supposed to be the case. Many wheels coming from foundries, upon examination, will be found

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to be eccentric in form. Recently, while passing through a prominent railroad shop, the writer observed a pair of wheels mounted on centres in a lathe, where revolving emery wheels were turning down the periphery of the newly mounted car-wheels on the axle. The emery wheel failed to touch or clean up one side of the periphery, but was grinding off nearly three-eighths of an inch from the opposite side. Had this wheel gone into service before being trued up it certainly would have been flattened. Again, many wheels are not bored centrally, due to the faulty condition of the boring mill, and perhaps the condition of the cast wheel coming from the foundry. On wheels that are out of round and that are eccentric the brake-shoe will catch and hold, as can readily be seen, thereby causing the slid-flat spots, which, when once started, are bound to increase and grow longer. Some new wheels when sent from the foundry are found to be shelled out on the periphery, and after running a short time will develop a flat spot without ever having been slid.

Another prolific source of flat wheels is that of the bad condition of the rail in foggy, frosty or snowy weather, thus reducing the adhesion between the wheel and the rail when brakes are applied. A number of prominent roads throughout the country have been able to largely avoid trouble under these conditions by issuing an order that the engineer in applying brakes shall make two applications of the brake in making a stop—the first a heavy application to check the speed of the train, and the final application, a lighter one, to bring the train to a standstill. This practice has been found very effective.

Sometimes slid-flat wheels are caused by disordered air brake apparatus, defective parts of the triple valve, etc., and improper proportion of leverage. The defective parts of the air brake must be sought out and their disorders corrected. The calculations of leverage, however, is a little more difficult, and is not within the ability of all men having to do with air-braked cars to figure. The following rule will be of assistance to anyone wishing to calculate the brake leverage on a car:

$$W = \frac{P \times a}{b}, \text{ where}$$

W = the work done by the lever.

P = the power giving the energy to the lever.

a = that part of the lever in inches between the points of power and fulcrum.

b = the distance in inches on the lever between fulcrum and work points.

This rule holds good regardless of whether the levers be first, second or third class. In fact, classes of levers should not necessarily enter into the computations of levers for cars.

Hard brake-shoes which wear for too long a time do not give as good actual braking service as do softer and shorter-lived shoes. However, the Master Car Builders' recommendations in this respect may be profitably and advantageously adopted. In substance they are: A brake-shoe which has a reasonable life and good holding quality. There are some brake-shoes on cars throughout the country which give almost as little retarding force to the wheels as if one smooth surface of glass were rubbed upon another. A prominent private car owner in one of our large Western terminals, when approached by a brake-shoe representative, replied that it was a matter of supreme indifference to him whether the brake-shoes on his cars had any retarding power or not so long as they kept their place on the brake-beams and passed inspection in yards. It was found that the brake-shoes on this owner's cars were of the hardest kind purchasable, and furnished an exceedingly low coefficient of friction. Otto Best, the general air brake inspector of the N. C. & St. L. Railway at Nashville, Tenn., made a characteristic remark that the brakes on his locomotive tenders always held. He said he knew this because the brake-shoes always wore out rapidly. This is but reasonable, for we must expect that if we are to receive benefits from anything in mechanics, there must be an equivalent output and that all will not be profitable return without outlay.

Speeds of electric cars have greatly increased over the old horse cars of several years ago. In this fast-moving age we scarcely realize the significance of urban and interurban street car speeds. Not until we have some occasion to compare the fast modern electric car with the belated, slow horse car which seems to painfully crawl along do we realize the increase in speeds which electric street cars have attained in the past ten years. It is not an unusual thing at all for trolley cars in city service to reach speeds of 20 and 25 miles per hour, and not at all unusual for electric cars in suburban and interurban service to reach as high as 35 and 40 miles per hour. When we realize that a car moving at 30 miles per hour covers 44 ft. in one second, and, with its load, represents a mass of surprising moving energy to be reduced and annulled, it becomes apparent that such cars should be equipped with high-grade brakes

of some kind. Power brakes, of the character used on steam roads, naturally present themselves to one's mind when considering this problem.

Successful and sufficient street car brakes, of whatever type they be, must have at least three essential, strong points: First, the brake must be unerringly able and always in condition to stop the car. Second, it must have a capacity for stopping the car in the shortest possible distance in emergency cases. Third, it must perform its work with minimum shock to passengers and danger of sliding wheels. It has been very wisely and truthfully said that brakes on street cars should really be of a higher grade than those

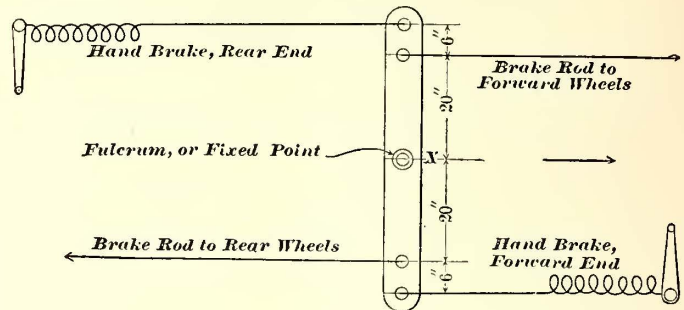


FIG. 1

on steam cars, inasmuch as street cars are quite frequently loaded to their fullest capacity with loads double the light weight of the car with persons who are entirely helpless in case of an occasion demanding the stopping of the car almost instantly to prevent accident. Besides having sufficient braking force to stop the car in ordinary service work, an ample reserve should be held to be instantly and substantially drawn upon for emergency contingencies.

In no class of brake work in which the writer has had experience are there more inefficient and grotesque designs of foundation brake gear than those appearing on the old horse cars, and, strange as it may seem, on many of the electric cars still coming from the shops of some of the leading manufacturers. One of the most common kind found on four-wheeled horse cars, and existing still on a number of four-wheeled, and even eight-wheeled electric cars, is that shown in Fig. 1. Here the "equalizing lever" is fulcrumed to a bracket on the car at the point X. At the further ends of the lever are chains and rods running to the hand brake. At the intermediate points are the connecting rods which go to the brake-beams on the wheels. It will be seen that should a new brake-shoe be added to one pair of wheels, or the brake-shoes on one pair wear faster, the greater portion of the brake power would be thrown to the other wheels, thereby causing them to slide. This defective gear has evidently been recognized by either the car-builder or the road operator, and an attempt made to overcome it by adopting the modification shown in Fig. 2. Here the lever is slotted at the middle point in order that it may "adjust" or "equalize" the power sent to the two pairs of wheels. However, this modification does not improve the defect, but is fully as faulty as the original design; for as soon as the brake is applied by the motorman on the forward end of the car, the lever assumes the position shown in Fig. 3, thus giving two lever arms of unequal lengths, the greater force being thrown on the rear wheels. Should the car be going in the opposite direction, and the brake applied from the other end, the lever will assume the opposite position, and the wheels on the other end would slide, due to the greater pressure being exerted thereon. It will therefore be seen that instead of this slotted lever "equalizing" the stresses, the fixed fulcrum allows the slotted lever to settle itself in a position which gives a greater pull on one truck than on the other.

During the last six months the writer had occasion to apply an air brake to an interurban electric street car, and found this type of foundation brake-gear on the car; it was only after much urging that the manager of the road could be persuaded to change the type, although he had numerous slid-flat wheels on his cars. The motormen, conductors and shop inspectors had observed that it was always the wheels under the rear end of the car that slid. A change to a modification of the ordinary Stevens form of brake-gear, similar to that used on freight cars, proved a very creditable brake on this car, and no flat wheels have been reported since.

Fig. 4 shows another modification of this type of brake-gear, which actually does equalize through the medium of the pulleys on both ends of the lever. As will be observed, the lever is fixed at the fulcrum point X to the car, and has two sheaves or pulleys on which runs the chain reaching to the connecting rods to the trucks. Thus each truck or pair of wheels is given an equal

braking power. The degree of braking power in this type of brake is determined by the length of the lever arm between the fixed X fulcrum and the outer end where the hand-brake chain connects. This is a simple and quite effective form of brake.

Hand brakes on electric cars, having followed closely in the path of those on the old horse cars, necessitate a great deal of handle movement to wind up the slack in the chain and bring the brake-shoes against the wheels. This slack motion in the gear increases as the brake is designed to be more powerful; and some suitable arrangement should be made to hold the brake-shoes as near as possible to the wheels while not doing duty, in order that the least possible winding motion of the brake staff shall be necessary to apply the brake as quickly as possible in emergency cases. It is not an unusual thing, on some suburban electric lines, to see the motorman, after he has shut off his current, make two or three revolutions of his brake crank and staff before any retarding effect manifests itself. When we recollect that a car running at a speed of 30 miles per hour covers 44 ft. in one second, we will be ready to appreciate the fact that the brake chain and foundation rigging slack should be as little as possible, and that the car should be brought to a stop as quickly as possible in emergency cases after the motorman begins to apply his brake.

There are other forms of street car brakes which may be classed as part hand brakes and part power brakes. That is, a brake which is set in operation by a movement of the ordinary brake crank in the hands of the motorman, and, by the employ-

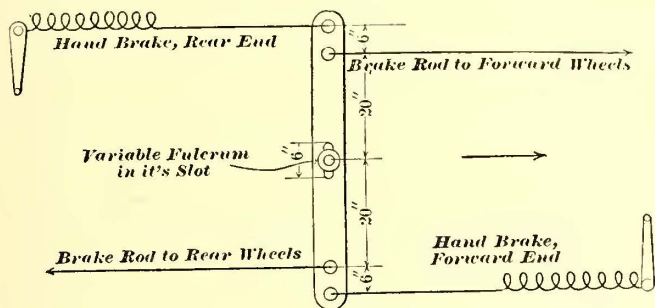


FIG. 2

ment of a revolving drum or disc on the car axle, the brake chain is wound up, and the inertia of the car thereby converted into the motive power which stops the car. This type usually consists of the ordinary foundation brake gear, which is pulled to its place by a revolving drum or disc on the axle which winds up a chain and gives a pull to the rigging. This system is not wholly without faults, inasmuch as the degree of braking force varies suddenly and widely, and is not entirely under the control of the motorman or any other regulating power. A great many flat wheels have resulted from systems of this kind. Another form of brake, not altogether without faults, is the track brake. When the motorman wishes to bring his car to a stop, he lowers the friction-shoe to the rail, lifts the weight of the car and its load off the wheels, and throws it on to the shoe, which drags on the rail, and thereby produces the retarding effect.

With the advent of the heavy electric car, the question of power brakes naturally followed, inasmuch as conditions more nearly approached those on steam roads. The first kind of power brake to present itself was the straight air brake, where the pressure for braking purposes was carried in a tank. When it was desired to set the brakes the pressure was let into the brake cylinder, thereby producing the motive power for operating the foundation brake gear, bringing the brake-shoes against the wheels and stopping the car. So far, the field of power brakes has almost entirely been occupied by the simple, straight air brake, the automatic brake being regarded as too complicated and expensive for trolley car service. There are a number of cars equipped with the straight air brake now running on electric lines throughout the country and giving satisfactory results. Some of these are supplied with pressure by an axle pump, and others by motor-driven pumps. However, when we consider the extreme crudeness of the old form of hand brake on horse cars, and which has apparently followed, to a very large degree, the development of the electric car, we can but realize that any form of a power brake, no matter how crude or partially efficient, would be required to supplant the old form of hand brake. The writer's experience in applying power brakes to street cars has been that the motorman will gladly herald any form of power brake which relieves him from the manual operation of the old brake staff, and wherever the straight air form of air brake has been applied to cars motormen are loud in praise of it.

Thus far the necessity for using some kind of power brake on electric cars in urban and interurban service has been recognized as manifestly desirable and necessary by street railway managers, but no power brake seems to have possessed all the desirable features and at the same time shown itself free of the shortcomings and defects of the older and primitive designs. Shorter stops have been made in some instances with power brakes, but only at the expense of slid-flat wheels; in some instances these brakes

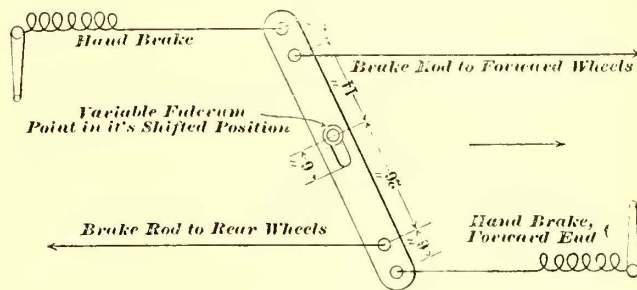


FIG. 3

were so unreliable in their application that they could not be depended upon. The first consideration with a street car manager in the matter of car brakes is that the brake shall be positive in its action. This is a more valuable feature than maximum power. A brake which will throw too much pressure on the wheels, slide them, and allow the car to skid ahead into a wagon, truck or person is not a successful and reliable brake for street car service.

The type of brake known as the electromagnetic brake seems to possess many meritorious points. The brake is a combination track and wheel-shoe brake. The middle part of the double track shoe is an electromagnet. When current is sent through the coil the brake-shoes are attracted to the rail, causing them to drag back on the car, at the same time thrusting back against a lever, which throws the rear brake-shoe against the wheel, where a fulcrum is thereby provided, and further energy goes to the upper connecting thrust rod, which pushes the forward shoe against the wheel. Thus a braking power is derived in a double measure, from the track shoes and the wheel shoes. The current used to magnetize the shoe is supplied by the motors of the car, which, when the line current is shut off, become generators and send current to the electromagnetic track shoes. A proper system of resistance is supplied, which permits the motorman to graduate the braking power as he sees fit.

It will be seen that at high speeds the current generated by the revolving armature is high, and will more highly magnetize the shoe, thereby furnishing greater retardation than when the speed

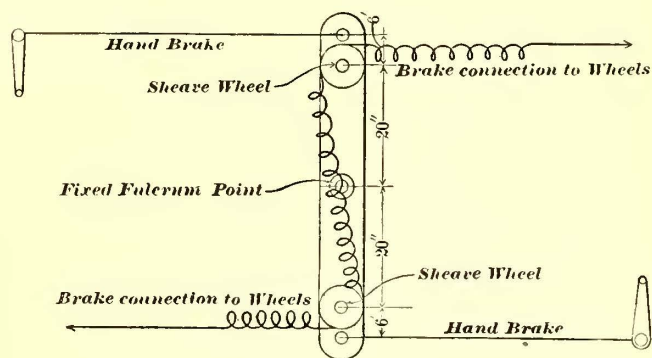


FIG. 4

of the car is slow. Thus a very heavy braking force may be had at high speeds, gradually reducing as the speed of the car and the revolutions of the armature reduce, until finally, when the car approaches a standstill, the current sent to the electric magnet gradually grows less, ultimately dying out altogether. This seems to be an ideal brake feature, and one which insures the maximum brake force at high speeds, when it is needed, and which gradually and automatically reduces as the speed of the car reduces, thereby eliminating all chance for slid-flat wheels. Thus the brake is able to regulate the braking force to existing conditions, such as bad rails produced by mud, fog, humidity, frost and snow, insuring safety from slid-flat wheels. The hand brake is retained on cars thus equipped, so the car may be held on a grade without use of line current, and to hold the car on side and shop tracks, as is the custom on air-braked cars of steam railroads.

In addition to the current from the armatures of the motors supplying motive power to the brake, the heat due to the resistance in both starting and braking is used to heat the car. No line current is used for either braking or heating. On a very cold day a year ago last winter, while the writer was riding on a car equipped with this magnetic brake and heater, the car proved much more comfortable than others ridden in on that day that were heated with coal and coke stoves and line current.

One of the most interesting experiences with this car was an offer to allow it to run away down a 4 per cent grade. The brake handle was put in first service notch, and the car permitted to start. It proceeded but a few feet when the current sent out by the armature of the motor as a generator sufficiently magnetized the shoe to render the brake operative, and the car came to a standstill. It had scarcely stopped before it started forward again down the grade, but the current generated by the armature of the motor as a generator again magnetized the brake-shoe, set the brake, and stopped the car. This operation continued for nearly a mile, and was given as an exhibition to show the impossibility of the car running away on a down grade when the brake is applied.

DISCUSSION

The discussion of the portion of this paper relating to street railway brakes occurred at a meeting of the club held at 12 West Thirty-First Street, Oct. 17. The discussion was opened by George L. Fowler, who referred to certain tests which he had made on the cars of the North Jersey Street Railway Company to determine the quickness of application of the brakes; that is, the interval elapsing between the movement of the brake handle and the contact of the shoes with the wheels. The apparatus employed was electric, and by it very close readings could be obtained. Quite a difference in quickness of application was noticeable between the different types of brakes tested, the time varying from half a second to one second and a half.

Mr. Merritt, of the Merritt Air Brake Company, then described his air brake system, and paid particular attention to the automatic motor controller. The type of power brake employed by the Metropolitan Street Railway Company was then described by Thomas Millen, master mechanic of the company, who also gave some interesting particulars of the number of stops made by the different cars on this road. On the lines mentioned by Mr. Millen these stops averaged between twenty and thirty to the mile. The discussion closed with some remarks offered by Mr. Parke, of the Westinghouse Air Brake Company, who gave particulars of the improved electric brake.

The Pittsburgh Consolidation

The agreement between the principal interests identified with the Philadelphia Company and those identified with the Consolidated Traction Company, of Pittsburgh, for the merging of the Consolidated Traction Company into the Philadelphia Company, has been approved, and the stockholders of the Philadelphia Company will vote Dec. 4, 1901, on a proposition to authorize the issuance of stock and bonds necessary to complete the merger. According to the terms stockholders of the Consolidated Traction Company depositing their stock with the City Trust Company, of Pittsburgh, or the Land Title & Trust Company, of Philadelphia, before Nov. 1 will, in the event of ratification of the scheme, receive one share of Philadelphia common stock for two of Consolidated common stock, and \$50 in mortgage bonds, \$7.50 in Philadelphia Company preferred stock, \$2.50 in Philadelphia common stock and \$3 in cash for each share of preferred Consolidated Traction stock. The 999 years' lease of the Mellon lines to the Philadelphia Company has been arranged.

Pensions and Insurance for Employees

The Union Railroad Company, of Providence, R. I., has announced that it is about to inaugurate a system whereby the old employees of the company will be pensioned. According to the announcement the company not only intends to pension the older men, but also is about to inaugurate a system of insurance that will be preferable to insurance in a regular company. The plan for the regulation of the pension department has been prepared, and submitted to the company, and a like report for the beneficial department is expected to be completed shortly. A committee of the company was appointed April 16, 1900, and has been at work since that date collecting information and statistics to guide in preparing plans, and for months past the committee has been comparing the plans in use by other companies in this country and

abroad, and has been calculating the cost and value of the benefits.

The pension plan which was submitted embraces: A weekly pension, beginning at age seventy, and continuing until death, of the following percentages of the average weekly wages received by the employee during the ten years previous to attaining age seventy.

First—If his employment has continued for thirty-five years or more, then 2 per cent of such average weekly wages for each year of such employment, the total, however, not to exceed 100 per cent.

Second—If the employment has been for thirty years, but not so long as thirty-five years, then $1\frac{3}{4}$ per cent of such average weekly wages for each year of such employment.

Third—If the employment has been for twenty-five years, but not so long as thirty years, then $1\frac{1}{2}$ per cent of such average weekly wages for each year of such employment.

Fourth—If the employment has been for twenty years, but not so long as twenty-five years, $1\frac{1}{4}$ per cent of such average weekly wages for each year of such employment.

Fifth—If the employment has been for less than twenty years, then 1 per cent of such average weekly wages for each year of such employment.

Thus if an employee has been employed thirty-five years and his average weekly wages for ten years has been \$15, his pension is 70 per cent thereof, or \$10.50 per week, equivalent to \$546 per annum.

As a result of the adoption of this system several of the employees will go immediately upon the pension list, and a large number will enter upon their pensions within the next few years. The entire cost of these pensions is, under the plan submitted, to be borne by the company.

The plan for mutual insurance for employees which has been agreed upon, and the details of which are now being worked out, is as follows:

First—In the cases of all employees receiving less than \$9 per week, and insurance of \$500, in case of death, and \$4 per week during total disablement by accident or sickness, and if the employee is rendered incapable by accident or sickness of following any gainful occupation, then this payment of \$4 per week will be continued until the age of seventy years, at which time the employee will be put on the pension list until death. The life insurance may be continued at the option of the employee, if he has a wife dependent upon him, his weekly contribution of 10 cents to the insurance fund, as explained later, being deducted from the weekly pension payment.

Second—In the cases of all employees whose wages are \$9, but less than \$12 per week, an insurance of \$750 in case of death, and \$6 per week during total disablement by accident or sickness, and if the employee is rendered incapable by accident or sickness of following any gainful occupation, then this payment of \$6 per week will be continued until the age of seventy years, at which time the employee will be put on the pension list until death. The life insurance may be continued at the option of the employee, if he has a wife dependent upon him, his weekly contribution of 15 cents to the insurance fund, as explained later, being deducted from the weekly pension payment.

Third—In the cases of all employees whose wages are \$12 or more per week, an insurance of \$1,000 in case of death, and \$8 per week during total disablement by accident or sickness, and if the employee is rendered incapable by accident or sickness of following any gainful occupation, then this payment of \$8 per week will be continued until the age of seventy years, at which time the employee will be put on the pension list until death. The life insurance may be continued at the option of the employee, if he has a wife dependent upon him, his weekly contribution of 20 cents to the insurance fund, as explained later, being deducted from the weekly pension payment.

Thus the disablement benefits run to age seventy, if disablement continues so long, instead of for only twenty-six weeks, as is customary in companies and societies; then the pension benefits begin.

Time during which an employee is receiving pay for disablement is counted in the term of service entitling him to pension.

The company contributes toward the insurance fund as follows: First—\$100 of each \$500 payable at death; \$150 of each \$750 payable at death; and \$200 of each \$1,000 payable at death.

Second—In addition to this, one-fourth as much as the total contributions of the employees. Therefore, under this provision, almost as much more is contributed by the company toward payments at death.

Third—All the expenses of operation.

Fourth—Any additional deficiency in the funds.

The total contributions of the company, including for pensions, are estimated to more than equal the total contributions of em-

ployees on the average. The contributions of the employees will be as follows:

Employees receiving wages less than \$9 per week, 10 cents per week.

Employees receiving \$9 and less than \$12, 15 cents per week.

Employees receiving \$12 or more, 20 cents per week.

The company guarantees to pay all expenses of operation and makes the liberal contributions above stated because the payments of the employees are insufficient to make the death and beneficial payments, and, as will be seen, are much less than would be required to secure similar benefits through insurance companies or societies.

In the beneficial department, 20 cents per week secures insurance as follows: Against death, \$1,000; against disability, \$8 per week.

The disability benefit is payable during the continuance of the disability up to age seventy, when the pension begins.

These benefits would, if purchased from a reliable stock company on an annual premium basis, cost: Life insurance for \$1,000, age thirty-seven, per week, 50 cents; accident insurance, \$8 a week, per week, 9 cents; sickness insurance, \$8 a week, per week, 16 cents. Total cost per week, 75 cents.

The accident benefits would be for fifty-two weeks only and the sickness benefits for twenty-six weeks only. The cost quoted above is 1-52d part of the lowest annual rates for such insurance. Weekly payment rates are always much higher because of the additional expense.

Thus, the lowest cost on weekly payments in reliable stock companies would be as follows: Life insurance for \$1,000, age thirty-seven, per week, 95 cents; accident insurance, \$8 a week, per week, 9 cents; sickness insurance, \$8 a week, per week, 16 cents. Total cost per week, \$1.20.

In this, figures of accident and sickness insurance premiums are given as 1-52d part of annual rates because such insurance in reliable stock companies cannot be had on weekly payments at all.

The cost of these benefits in mutual societies is variable, and such insurance is also frequently unreliable. The cost might average about as follows: Life insurance for \$1,000, age thirty-seven, 30 cents; accident and sickness insurance, \$8 a week, 20 cents; total cost per week, 50 cents.

This is on the basis of payments being made monthly as in the lodges; weekly payments would surely come higher. The accident and sickness benefits are usually for fifty-two weeks only, or else continue for reduced amounts.

The foregoing pension and insurance benefits are under this plan to be given to the present employees of the company, without regard to age or physical condition, the company accepting responsibility for the additional hazard. Hereafter, however, all new applicants for employment will be required to pass a physical examination, and none will be accepted who are more than thirty-five years of age.

The Boston Elevated Begins Cambridge Surveys

The engineering department of the Boston Elevated Railway Company has begun surveys in Cambridge preparatory to extending the elevated structure to the vicinity of Harvard Square. Work has been pushed along this line for about three weeks, and the district to be immediately covered is that lying between Putnam Avenue and the new West Boston Bridge, via Main Street. The survey at present consists in taking levels and measurements, and as soon as the entire route has been covered plans will be made showing the precise location of the elevated bents.

It is probable that at least two years will elapse before trains can be operated on the Cambridge division, if the construction of the line is carried forward without effective opposition. The new West Boston Bridge is still far from completion, and the company is not obliged to apply for its franchise at Cambridge until six months after the bridge is thrown open to the public.

The present plans provide for a tapped extension of the Tremont Street Subway from Scollay Square through Bowdoin Square and up Cambridge Street to a point near North Russell Street, from whence the elevated structure will start, proceeding over the new bridge, along Main Street, across private land, into Green Street, and thence to a point near Harvard Square.

Considerable opposition is expected from real estate dealers in Cambridge, in view of the claims advanced by them that an elevated structure in that city will lower the value of adjoining property. The strength of this opposition is yet to be determined, but it is likely that a subway will be proposed by the Cambridge people as an alternative proposition. That rapid transit between Cambridge and Boston is an imperative necessity is certain, when the present crowded car lines over Harvard Bridge, with their running time of 26 minutes between Harvard Square and Park Street Sub-

way, and the Bowdoin Square-Harvard Square surface line time of 22 minutes is compared with a probable time of 14 minutes on the Cambridge Elevated division. The congestion on Boylston Street, Back Bay, is one of the most serious problems in the Boston transportation system, and the new elevated line to Cambridge will undoubtedly materially relieve this crowding. Over 250 cars per hour are now operated on Boylston Street in the rush. The details of the elevated connection at Scollay Square are yet to be arranged; but the operation of the East Boston tunnel renders this connection important. Scollay Square is now one of the busiest traffic points on the system, with the Boston and Northern Loop terminal centering there, besides the regular north and south elevated tracks.

The operation of the elevated trains is constantly growing smoother and more reliable. Steel construction is being rapidly pushed at the new Thompson Square station in Charleston, and the regular train interval through the day has been extended to 3 minutes. The delay at Scollay Square north bound, caused by trains standing in the block at Adams Square, has been cut down to about 1½ minutes minimum interval by the construction of an electric signal line between the two stations, while train spacing at the Charleston drawbridge is vastly improved by permitting subway trains to draw up close together on the Causeway Street tracks whenever the draw is opened. The draw is seldom open over 8 or 9 minutes at a time, which enables trains to proceed through the subway much as usual, on a 3-minute interval. Before this arrangement was made the drawbridge congestion frequently extended as far south as Scollay Square. Time is also saved at Haymarket Square north bound by an electric signal which notifies the platform men that the preceding train is ready to leave North Station. Service on the Atlantic Avenue loop is in the main regular and satisfactory. Advance signals placed at Scollay Square and Park Street, indicating the state of the following block, aid the motorman in making a quick start when leaving the station. The public is slowly beginning to realize that rapid transit is not entirely a function of train equipment, and there is a gratifying improvement in the manner and speed of boarding and leaving trains. The surface car connections at Sullivan Square terminal are still somewhat unsatisfactory, the stub-track arrangement being inferior to the looped tracks at Dudley Street. The signal system is working very satisfactorily, and the public opinion that the road had gone to unnecessary lengths in its safety devices has given way in the face of the smoothing down of the service and the freedom from accidents which has characterized the elevated from the start. Subway congestion is much relieved in rush hours by running express trains light from Sullivan Square to Pleasant Street via Atlantic Avenue, and the delays at stations are now less, passengers being allowed to enter and leave trains by both end and middle doors of cars in the hours of heavy traffic. Altogether, the service shows marked improvement, and in considering the tremendous obstacles which had to be overcome, the result is highly satisfactory to both the company and the discriminating public.

New Engine Works

The Quincy Engine Works, of Quincy, Ill., have been incorporated with a capital of \$250,000. The company will build the Williams vertical engine, especially designed for electric light and power plants, and its plant is now under construction at Quincy, Ill. The equipment will comprise heavy tools, traveling cranes and whatever is necessary for first-class work of all descriptions in the engine line. Thomas Hill, formerly of the Smith-Hill Elevator Company, of Quincy, is president of the company; George Wells, vice-president; Edward C. Wells, secretary and treasurer; E. T. Williams, formerly with the Lake Erie Engineering Works and designer of the engine exhibited by that company at the World's Fair in the Intramural Power House, engineer.

Trolley Theater Service in Brooklyn

The Brooklyn Heights Railroad Company has commenced the operation of two parlor cars during the evening for the benefit of theatergoers. The cars are run over different lines, so that a large section of Brooklyn is reached by the service, which has already proved very popular. The schedule on which the extra cars run is so timed that they reach the theater district at the time for the theaters to commence, returning about the time of letting out. An extra fare is, of course, charged, but no one is allowed to stand, and the addition is cheerfully paid by the pleasure seekers for the extra comfort.

An Electromechanical Switch and Signal for Suburban Stopping Places

On suburban trolley roads expediency makes desirable some way of not only signalling the cars at night to stop, but having a light at stations while passengers are waiting. Of course this can be done as it is in some instances by having the



FIG. 1.—LITTLE GIRL OPERATING THE SIGNAL.

This magnet is 1 in. x 2 ins., and wound with No. 26 wire. When it is in shunt with 500-volt railway current passing through five 16-cp lamps, in series as shown, there is only a difference of potential of 3 volts across its terminals. The short-circuiting device on the trolley which resets the switch after it has served its purpose is shown in Fig. 3. By reference to the wiring diagram (Fig. 2) it will be seen how the device operates. A wire from the trolley leads to one end of the magnet in the switch box. The other end is made fast to the frame and magnet core. It will now be seen that the circuit is broken until the armature is raised

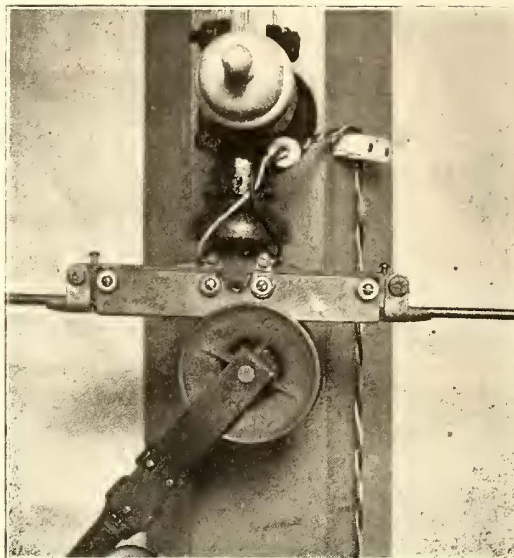


FIG. 3.—SHORT CIRCUITING DEVICE

conductor turn the light on at stopping places at dusk by a switch and allow it to burn until morning. To do this at every stopping place on suburban railways the cost would be so much in the way of current to operate them that the companies could not afford to do it except in a few places where the travel is great enough to pay for the outlay. To overcome this objection and make it possible to have every station lighted, both large and small, for the passengers' comfort, Gwynne E. Painter, of Baltimore, Md., has lately patented what he terms an electromechanical switch; that is, a switch operated by the passenger and electrically reset by a passing car. He claims for the device that it can be installed by the railway companies for what it costs them a year for current to light a cluster all night. After once his device is in use, it practically costs nothing to operate it, as it uses current only when in actual use, constituting, in addition, an easily-discernible signal for the car to stop, and so offering a double advantage over lights continuously lighted. He also claims the device is so simple that a small child can operate it, as all one has to do is to follow the directions on the switch: "To stop cars at night, push down handle." When this handle is pushed down, the lights above are lit. This gives light for the passenger while waiting, and also a signal to the motorman to stop. Once the light is lit it cannot be put out again

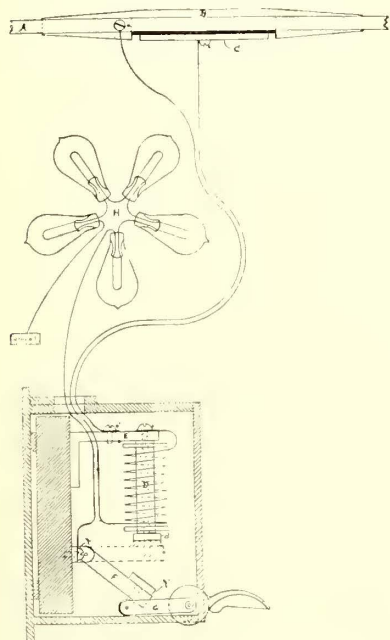


FIG. 2.—DIAGRAM OF CIRCUIT

except by the car itself. The illustration (Fig. 1) shows a little girl operating one of these signals on one of the lines of the United Railway & Electric Company, of Baltimore.

The switch, which is operated by the passenger, is encased in an iron box and thoroughly insulated. It consists of only one magnet and an armature. The circuit of the device is shown in Fig. 2.

up and touches the core, and when it is the current will then pass through this armature to the cluster of lamps and thence to the ground, completing the circuit. At the same time it causes the magnet to hold the armature to itself, causing the lights to stay lit. When the car arrives and the passenger is on, the trolley wheel runs on this short-circuiting device. This will short-circuit the magnet so that it will not hold the weight of armature, and it drops back to its original position, thereby opening the circuit and putting out the lights.

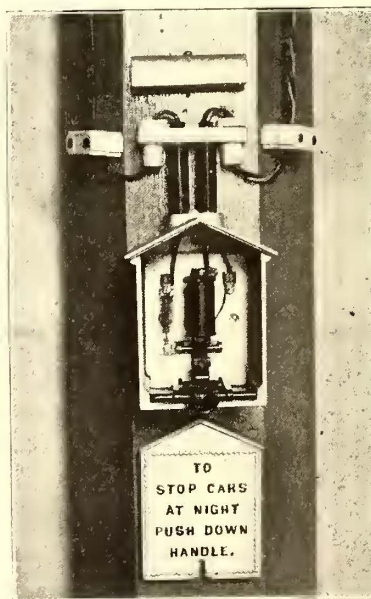


FIG. 4.—THE SIGNAL MAGNET BOX OPEN

The drawing shows the contacts on the armature and magnet in the form of screws, so they can be renewed when they become injured from arcing, when circuit is broken. In practice this was found unnecessary, as the magnet acts as a "magnetic blow-out," and there is hardly a perceptible arc. The trolley wire is not cut in replacing this resetting device, nor has it any moving parts to get out of order, and since, as before stated, there is never more than a difference of 3 volts between the two parts of the device, there is, of course, no danger from ice, rain, etc., from getting on it and causing any trouble. All the moving parts of the switch are reset by gravity, so that it is not likely to get out of order. The cluster furnished with this device is unique in simplicity and results. Fig. 4 shows the signal magnet box open.

It is said that the Boland syndicate will next year build an electric railway from Albion to Concord, Mich., a distance of about 8 miles.

A New St. Louis Car

The St. Louis Car Company recently built the car shown in the accompanying engraving for suburban service. It is 32 ft. long inside, not including the vestibule platforms, and has a seating capa-

holdings of the bonds of the Michigan Traction Company at a satisfactory profit, and the loan of \$300,000, which was arranged for with the Investment Company, of Philadelphia, has been paid off.

"There will be submitted to you at a special meeting a proposition to reduce the capital stock from \$1,500,000 to \$1,200,000. This reduction is the result of a revision of the balance sheet of the company, and places a valuation upon the assets more in accord with the practical results shown by the operations for the past year, reducing the valuation of the bonds of subsidiary companies from \$655,000 to \$509,000, and reducing the valuation of the capital stock of subsidiary companies from \$449,708 to \$250,301.

"No prior securities will be issued and the reduction falls with equal ratio upon every stockholder.

"If the proposed reduction is authorized,

the company will be in a position to distribute the surplus earnings in the shape of dividends; if not, the only alternative will be to offset the existing impairment in the capital until the entire amount is charged off."

The report of the company for the fiscal year ending June 30, 1901, shows:

The net income of the company for the fiscal year, derived from interest on bonds of subsidiary companies was \$50,626

The expenses were as follows:
Salaries, rent, etc., and taxes.....\$10,230
Interest on floating debt..... 10,065

Total 20,295

Making net income for the year..... \$30,330

The company had in its treasury at the close of the fiscal year, cash amounting to..... 321,919

And there was due from subsidiary companies on account of loans and accounts payable..... 72,693

Making quick assets on June 30, 1901.....\$394,613

The general balance sheets shows:

Assets	
Cash	\$321,919
Loans to subsidiary companies.....	45,800
Accounts due from subsidiary companies.....	12,949
Interest due from subsidiary companies paid after June 30	13,944
Furniture and fixtures.....	284
Bonds of subsidiary companies.....	655,000
Capital stock of subsidiary companies.....	449,709
Capital stock Railways Company General in the treasury	42,500
Unpaid stock subscriptions.....	32,500
Bills receivable in payment of stock subscription.....	2,500
	\$1,577,107

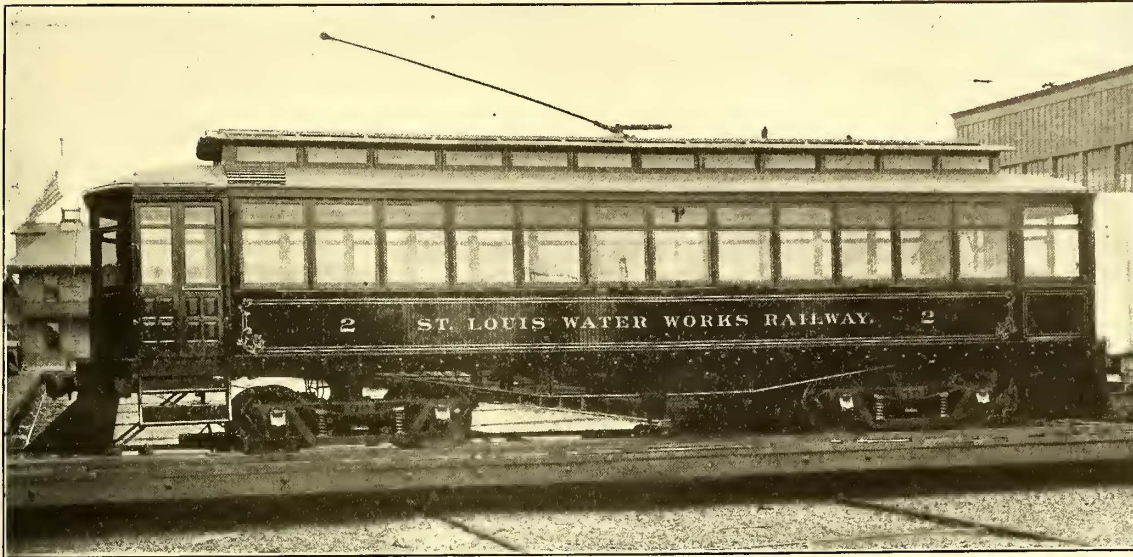
Liabilities

Capital stock	\$1,500,000
Balance in reserve to complete contracts.....	42,235
Unpaid vouchers	132
Profit and loss	34,739
	\$1,577,107

The net earnings shown in the report, \$30,330, are 2½ per cent on the reduced capitalization.

The directors were re-elected by a vote of 187,719 shares, and the plan to reduce the capital of the company has since been unanimously adopted.

Work has been begun on the electric railway between Halle and Merseburg, permission for the construction of which was granted by the Prussian Government several months ago. The line will be 10 miles long.



LONG CAR FOR SUBURBAN SERVICE

city of forty-eight passengers. The length of the car body over the corner posts is 32 ft. 8 ins. Its length over the vestibule fronts is 42 ft., and over the bumpers 43 ft. The platforms are 5 ft. long. The width of the car body over posts at the sash-rails is 8 ft. 3½ ins. The aisle in the center of the car is 24 ins. wide. From the under side of the sills to the top of the car roof is 9 ft. 1 in., the height inside from floor to ceiling being 8 ft. 1⅞ ins. The finish of the interior is natural cherry. As seen, the car is equipped with a locomotive pilot or cowcatcher at each end. The trucks are intended for a 50-hp motor on each truck, which truck is one of the St. Louis Car Company's No. 23. The seats are of rattan with canvas backing, twelve seats being placed on each side of the aisle. There are twelve sash on each side of the car. Guard wires are placed over the side windows and the window guards are of heavy bronze tubing. The trimmings of the car are of the best quality bronze, and the curtains are pantasote. The ceiling is three-ply bird's-eye maple veneer.

A New Transfer Punch

On many roads a large number of transfer tickets are used and a considerable amount of time is wasted by the conductor in punching out the day of the month and other data, which are the same on all transfers distributed by him. In order to relieve him of this unnecessary work and to facilitate the rapidity with which he can issue transfers, the firm of Southworth Brothers, of Portland, Maine, has put on the market an ingenious punch which will perforate a pad of transfer tickets in the desired manner at one operation, leaving nothing for the conductor to do but indicate with his punch the street and hour. The Southworth Brothers' punch is a compact affair and very durably made, it being so designed that but little effort is required to punch a large pad of transfers, and the parts being of extremely strong construction. An automatic foot holds the bunch of tickets in position while the handle is being brought down to operate the punch. Gages are provided so that when the pad of tickets is placed in position against the sides of the gage the exact location desired for perforation is brought under the punching pin. One hundred transfer tickets are easily punched in a moment. The device has been in successful operation on numerous roads, and besides the time saved by the conductors, it is found that the lessened wear on their punches has been quite remarkable, the expense for repairing conductors' broken punches having fallen off to a considerable degree.

Annual Report of the Railways Company General.

The annual report of the Railways Company, Philadelphia, has recently been made public. The report says:

"Since the last annual meeting the company has disposed of its

Circular Loom in Railway Work

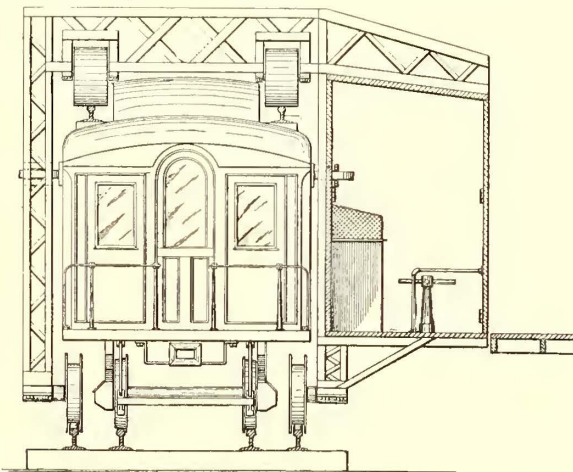
In electric railroading there are many places where it is necessary to use a flexible conduit. This condition arises both in the power house and in the car wiring, and the serviceability of circular loom as made by the American Circular Loom Company, of Chelsea, Mass., is being more and more appreciated by street railway engineers. It is a flexible conduit that may be used with the greatest advantage and economy in protecting wires and cables subjected to wear or weather, so that it answers the somewhat rigid requirements which are present in all electric railroading in a most excellent fashion. Among the numerous locations where circular loom has been used to advantage on surface cars may be mentioned the covering of controller cables running from one controller to another, on cables from controllers to motors, on lead wires from the trolley down to the lighting circuit cut-outs, from the trolley to the main cut-out and fuse boxes, etc., and on elevated roads or others using third-rail operation, it forms a particularly efficient protection to the wires extending from contact-shoes to car body and from car body to bottom of resistance box, as well as to wires running under, through or over the sills on the bottom of the car, or passing through the transoms on double trucks, or in any other close proximity to ironwork. In the power station it is very useful for covering dynamo cables in ducts under the power house, and short lengths of cable exposed to abrasion, and for car house, repair shop and power house wiring for lighting and power circuits it is of the greatest value and very extensively employed. Wherever insulation is in danger of abrasion, exposed to the weather or subjected to the many conditions which militate against insulating qualities such as are found throughout the whole range of electric railway work, circular loom has been used to great advantage, and its introduction on large roads is rapidly increasing. In neatness of appearance, long life, and efficient protection it is unsurpassed, and it meets exactly the requirements which obtain in street railway practice.

Street Railway Patents

[This department is conducted by W. A. Rosenbaum, patent attorney, 177 Times Building, New York.]

UNITED STATES PATENTS ISSUED OCT. 15, 1901

684,408. Trolley Attachment; T. J. Burke, New Orleans, La. App. filed July 1, 1901. To enable one trolley to pass another on the same wire, one of them carries a bridge underneath it, over which the other passes.



PATENT NO 684,693

684,478. Braking Apparatus; J. A. Trimble, New York, N. Y. App. filed June 11, 1901. Improvements in the ratchet connection between the handle and the spindle.

684,558. Switch Operating Device; C. W. Tanner, Columbus, Texas. App. filed June 8, 1901. A lever adapted to the thrust downward from the car to engage a switch-throwing projection is provided with a loop encircling the coupling-head of the car, so that it will not interfere with the coupling of cars.

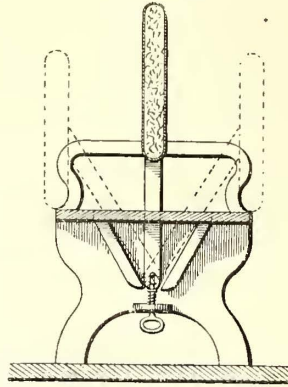
684,559. Brake-Shoe; G. O. Vair, Corning, New York. App. filed Feb. 4, 1901. The shoe comprises a soft, cast-iron body portion, with hard metal tips at each end.

684,581. Momentum Car Brake; T. E. McCollum, Toronto, Canada. App. filed Dec. 8, 1900. Details of construction.

684,600. Electric Rail-Bond; I. B. Chantler, Sewickley, Pa. App. filed Jan. 16, 1901. A spiral spring surrounds the bolts hold-

ing the fish-plate, and bears against the rail and the plate to maintain the electrical connection.

684,693. Railway System; J. W. Jenkins, New York, N. Y. App. filed Jan. 31, 1901. The purpose of this invention is to enable passengers to be loaded on and unloaded from a train without stopping it, and it is proposed to employ a number of saddle cars,



PATENT NO. 684,747

dropped from the moving train, which are successively taken up and through the medium of which passengers may enter or leave the train without interfering with the progressive movement thereof.

684,731. Emergency Car Brake; W. S. Smith, East Liverpool, Ohio. App. filed Jan. 19, 1901. A lever pivoted on the car and having downwardly bent ends to act as a drag. The motorman can force the drag against the roadbed or rail by means of a hand-wheel and screw.

684,747. Car Seat; C. E. Cole, Saco, Maine. App. filed Nov. 15, 1899. The back of the seat can be shifted to either edge of the seat cushion, or locked in the middle position to double the capacity of the seat.

PERSONAL MENTION

MR. C. A. COFFIN, president of the General Electric Company, has just returned from Europe.

MR. WILLIAM C. PHELPS, who has been connected with the Cleveland City Railway Company, of Cleveland, Ohio, for a number of years, has been appointed purchasing agent for the company. This is a newly-created office.

MR. DAVID BRUCE, formerly of Seattle, Wash., has been appointed superintendent of the Haverhill division of the Boston & Northern Railroad, the northern portion of the system of the Massachusetts Electric Company.

MR. LYMAN L. GRIFFITH, formerly manager of the Hamilton City Railway Company, of Hamilton, Ont., Can., died on Oct. 13. Mr. Griffith was in the employ of the Hamilton City Railway Company for a long time. Mr. Griffith was the father of J. B. Griffith, the present purchasing agent of the Cataract Power Company, of Hamilton.

MR. KELSEY SCHOEPEF, of Pittsburgh, who has been chairman of the executive committee of the Cincinnati Traction Company, of Cincinnati, Ohio, since the street railways of that city passed into the hands of that company, has been made president of the company. H. J. McGowan, of Indianapolis, who has been president of the company, succeeds Mr. Schoepf as chairman.

MR. H. W. UMNEY, formerly an assistant to Prof. Bovey at McGill University, Montreal, but who has since applied his professional knowledge to industrial and commercial expansion, particularly in the development of electric railway service in England, is now in Canada on his wedding tour. Mr. Umney is associated with large firms both in England and in the United States, and has been most successful in securing contracts for the electrical equipment of many horse tramway systems. At present Mr. Umney is engaged in the organization of a syndicate which will construct another "tuppenny tube" in London. Mr. Umney represents Dutilh-Smith, McMillan & Co.

MR. JOHN W. McNAMARA has succeeded Mr. Robert C. Prunyn as president of the United Traction Company, of Albany, N. Y. Mr. Prunyn retires from the presidency to become chairman of the board of directors and of the executive committee of the company, and to occupy an advisory position in the management of the affairs of the company. Mr. McNamara, who has been second vice-president of the company since its organization, and prior to that time held a similar office under the Albany Railway Company, is also general manager of the company. Mr. Prunyn, in his capacity as chairman of the board of directors, will perform practically the same duties with respect to the meetings of that board that he has heretofore exercised. He will preside at its meetings, and at the meetings of the executive committee, and will advise in the administration of the company as heretofore.

FINANCIAL INTELLIGENCE

THE MARKETS

The Money Market

WALL STREET, Oct. 23, 1901.

The continued rise in sterling exchange is the principal development of the week in the money market. Demand sterling is quoted now nearly 2 cents higher than a month ago, and is actually halfway between the gold import and gold export points. Buying back bankers' bills sold "short" sixty and ninety days ago is the principal cause of the rise, but these purchases have been effective mainly because of the delay in the cotton movement, and the consequent scarcity of exchange drawn against exports of the staple. Not only has all idea of gold imports been abandoned, but discussion has already been started as to the possibility of gold being exported to Europe later on in the season. It would seem, however, that this talk is premature, if, indeed, it is worthy of serious notice. Such a movement could not occur in the present straightened condition of the home money market, unless an acute need were to arise abroad. It will be remembered that just such a contingency developed in the early winter of 1899, when in the face of a severe stringency in this city, the local banks were compelled to ship a large quantity of gold abroad. Two years ago, however, it was the sudden exigency of the Boer war which caused Europe to make its frantic appeal for capital; there is no parallel for this situation now. The copper difficulties at Paris are purely transient, and the resources of the banks of England and France are ample to relieve the distress in the German and Austrian money markets if occasion demands. Our market, accordingly, is pretty certain to be left during the remainder of the autumn to work out its own destiny. The heavy falling off in the government revenue surplus during the present month is perhaps the most encouraging feature of the immediate outlook. It has served to reduce the routine credit of the New York Sub-Treasury at the bankers to a sum small enough to be offset by the arrivals of gold at the Pacific ports. This leaves the Southern cotton-moving demands as the only real source of drain upon local resources. The surplus reserve was \$15,400,000 on Oct. 19, compared with a corresponding total of only \$2,900,000 a year ago and of only \$1,400,000 two years ago. It thus appears that the banks are better situated to meet the strain of the next six weeks, even though it may be greater, than they were in the preceding years.

Money on call is quoted on the Stock Exchange at 3@3½ per cent. Time loans are unchanged for the week at 4½ per cent for all periods.

The Stock Market

The conditions noted in the money market are the first consideration in the present security dealings. Two weeks ago there was some fear of a possible money stringency, which served to depress the market. But this fear has ceased now. The influence from this quarter has become merely negative, checking speculation by raising the doubt whether bank resources will be adequate during the new two months to allow any considerable expansion of speculative credits. It is a common view that the leading financial interests are opposed to another forward movement at this time, and even that they are prepared to check such a movement on the ground that it would upset the money market. Nevertheless, the outcome of the past week's trading inspired more confidence in speculative circles and the tendency of prices has been perceptibly upward. The copper scare has fairly subsided, the pessimism aroused by the bad showing of numerous industrial companies finds a counterpoise in the universal maintenance of the increase in railroad earnings, and the reports from all branches of American industry, particularly from the premier iron trade, are most encouraging. If the money position did not interpose obstacles, the rise in the stock market would no doubt be more decided, but, as it is, even this restriction may lose its force. So far as the actual dealings of the last seven days are concerned, they have not accomplished many changes in the price list. Some of the high-priced railroad stocks have advanced sharply and bonds have been comparatively active—both of which reflect a partial revival of the investment demand. Heavy buying has occurred at times also in the Vanderbilt and affiliated stocks, and in the issues which are involved more or less directly in the settlement of the Northwestern railway muddle. In the first instance, the talk of a closer association, financial and administrative, has accompanied the rise; in the second instance the inspiration has come from the seemingly good prospect of an early and final solution of the problem which last spring's immense purchases of Northern Pacific shares oc-

casioned. The market outside these particular quarters has remained dull and motionless.

The local traction stocks have shared in the general idleness, but relatively have ruled stronger than they did a week ago. Apparently a short interest of some magnitude accumulated in this group during the recent decline, and has by no means covered yet. Hence they have yielded rather more easily to the tendency to advance than the majority of the list. Recognition of what was pointed out here last Wednesday, that the franchise tax decision is still a long ways off, is superficially accountable for the improvement in prices. In the case of Metropolitan it is also contended that the present quotation is not excessive, even for a 6 per cent stock, so that the possibility of a reduction in the dividend rate has been pretty fully measured in the market. The powerful support accorded to Brooklyn Rapid Transit seems for the time being to have been effectual. Manhattan needs no such support; it has enough friends outside the speculative clique upon whom it can always rely.

Philadelphia

In common with the dullness manifested elsewhere, business in the Philadelphia market has amounted to scarcely anything during the week. Practically nothing has been done outside Union Traction and Consolidated of Pittsburgh, and even in these active specialties the volume of trading has been insignificant. Union Traction, with sales averaging barely more than 100 shares a day, has kept stationary at 27¾ and 27⅞. Pittsburgh Traction common kept up around 24 until Friday, when it dropped off to 23⅞, and since then has receded a trifle further. Nothing new in the consolidation deal has developed during the week. In Philadelphia Traction the dealings amounted altogether to less than 100 shares, all of which went at 96. Fifty shares of Railways Company General sold on Friday at 2¼, a half-point down from the previous transaction. Electric-Peoples Traction 4s have again held first place among the street railway bonds; they were well taken at 97½, and at one time reached 97¾. Other small sales were reported in Indianapolis Railway 4s at 83½ up to 84½, Citizen Passenger of Indianapolis 5s at 110¼ and 110½, Newark Passenger 5s at 118½, Consolidated of New Jersey 5s at 109¾, and Wilmington & Chester Traction 5s at 105½.

Chicago

Trading in Chicago street railway issues has been light during the past week, but prices have been firm. The strength of Union Traction shares reflects the steady increase in the company's earnings. Officials say that gross receipts for the first fortnight of October went ahead of all previous increases recorded since competition with the Northwestern Elevated began. Fractional lots of Chicago City are selling at 201, which is 9 points lower than the stock sold immediately after the stock issue was increased and the dividend reduced to correspond. All the elevated shares have been notably firm during the week, but with no decided change in prices. Northwestern common was bought moderately at 40¾, and Metropolitan common at 40. It is announced that the agreement for the lease of the St. Paul's Evanston branch to the Northwestern Elevated has at length been reached. A new issue of bonds will be made to take up the lease and to elevate the tracks on Wilson Avenue running to Evanston. Traffic on all the elevated roads continues to make an excellent showing. The South Side expects the most profitable October in its history, and Lake Street officials are estimating an increase of 6 per cent in their total business for the year.

Other Traction Securities

The active demand for St. Louis Transit, both in St. Louis and on the New York curb, which was a feature a week ago, has subsided. The stock has reacted fractionally to 26, but United Railways bonds and the preferred stock are firm at 89⅞ and 81 respectively. New Orleans common and preferred have advanced in their local market, the former to 31 and the latter to 105½. No news has developed, however, regarding the new interests which recently appeared in the property. Columbus common is dull around 45, and the same quotations, with no business, are reported for Louisville common at 110 and Indianapolis at 45. Consolidated Traction of New Jersey is weak, and 65¾ is the best bid for the stock on the New York curb, although no sales have occurred at the low figure. Of the two Boston specialties, Massachusetts Electric preferred has been fairly active, selling up to 93, but the common is unchanged. Boston Elevated has declined a point on desultory sales to 166.

Stock Quotations

The following table shows present bid quotations for the leading traction stocks, and the active bonds, as compared with a week ago; also the high and low since Jan. 1, 1900:

	Jan. 1, 1900		1901	
	To Date		Closing Bid	
	High	Low	Oct. 15	Oct. 22
American Railways Co.....	48¾	27	40½	40
Boston Elevated	192	b95	167½	166
Brooklyn R. T.....	88¾	47½	59¾	61¼
Chicago City	†285	200	201	201
Chicago Union Tr. (common).....	..	..	17½	17½
Chicago Union Tr. (preferred).....	..	..	58	58½
Columbus (common)	48	20	45½	45
Columbus (preferred)	104	80	101¼	101
Consolidated Traction of N. J.....	69½	57	67	65½
Consolidated Traction of N. J. 5s.....	110	..	109½	109¾
Consolidated Trac. of Pittsburgh (common).....	30¾	20¼	23¾	23
Indianapolis Street Railway.....	48¾	15	45	45
Lake Street Elevated	16¼	6½	11½	11¾
Manhattan Ry.....	131¾	84	120¼	121
Massachusetts Elec. Cos. (common).....	43¼	15	36	36
Massachusetts Elec. Cos. (preferred).....	96	70	91	91
Metropolitan Elevated, Chicago (common).....	40	24½	39½	40
Metropolitan Elevated, Chicago.....	98½	70	90	90
Metropolitan Street	182	143¾	157¾	157½
Nassau Electric 4s.....	97½	..	97½	97½
New Orleans (common).....	33½	18¼	29	31
New Orleans (preferred).....	108	90	104½	105½
North American	*106	*74	98	95
North Jersey	36	21	22½	22½
Northwestern Elevated, Chicago (common).....	52	..	40¾	39
Northwestern Elevated, Chicago (preferred).....	97½	..	86	85
Rochester	31½	12	30	30
St. Louis Transit Co. (common).....	35	16½	26	25½
South Side Elevated (Chicago).....	119	93	108	108
Syracuse (common)	25	10½	25	25
Syracuse (preferred)	b65	25	60	63
Third Ave.	135½	45¼	117	118
Twin City, Minneapolis (common).....	105¼	58½	100	99¾
United Railways, St. Louis (preferred).....	82½	..	81	81
United Railways, St. Louis, 4s.....	91½	..	89¼	89
Union Traction (Philadelphia).....	40¾	24¼	28	27¾
United Traction (Providence).....	110	107	109	108½

a Asked. b Bid. * Quotation of new stock. † High quotation previous to the issue of new stock.

Iron and Steel

Some idea of the enormous demand in the current iron market may be obtained from the information published this week that practically the entire November output of the "Valley" pig iron furnaces has already been contracted for. Deliveries are far behindhand in all the lines affected by the recent strike, and it will be months before normal conditions are restored in the tube, sheet and tin-plate branches of the industry. For this reason it will be impossible to gage accurately yet awhile what the normal consumption really is and how it is related to production. In structural material and steel rails the outlook for the first quarter of next year is already assured. Business in these quarters is nothing short of phenomenal.

Quotations are \$16 for Bessemer pig, \$26 for steel billets, and \$28 for steel rails.

Metals

Quotations are as follows: Copper, 16¾ cents; tin, 24¼ cents; lead, 4¾ cents, and spelter, 4¼ cents.

DENVER, COL.—The Denver City Tramway Company reports earnings as follows:

	1901	1900
September		
Gross receipts	\$133,633	\$116,568
Expenses and taxes	70,201	60,808
Earnings from operation	\$63,432	\$55,760
Fixed charges	32,579	32,016
Net earnings	\$30,853	\$23,744
Nine months		
Gross receipts	\$1,114,554	\$963,587
Expenses and taxes	608,609	541,029
Earnings from operation	\$505,945	\$422,558
Fixed charges	285,742	279,501
Net earnings	\$220,203	\$143,057
Dividend	100,000	.....
Surplus	\$120,203	.....

WILMINGTON, DEL.—The People's Railway Company was incorporated Oct. 23, with a capital stock of \$1,500,000. The new company is a merger of several of the most prominent electric railway companies of Wilmington, among which are the Brandywine Springs Railway, Elsmere & Wilmington Electric Railway Company, Park Railway Company and Citizens' Railway Company. All but one company operating in the city have been merged into the new company, and negotiations are said to be under way for acquiring this line.

WASHINGTON, D. C.—The certificates of deposit of the bonds of the Washington Traction & Electric Company, placed in the possession of the United States Mortgage & Trust Company, of New York, in accordance with the terms of the agreement for reorganization, have been listed by the Washington Stock Exchange. This is done so that the certificates can be dealt in, just as the bonds are, and until all the latter are deposited, both the bonds and the certificates will be on the market. As previously announced, it is stated by the committee on reorganization that 93 per cent of the \$13,400,000 of the bonds of the Washington Traction Company have already been deposited, and as the time for receiving them has been extended to the 31st inst., it is thought there is a good prospect that holders of the entire issue of bonds and stocks will agree to the plans as outlined in the agreement. Upon the expiration of this time it is expected the court will be asked to give authority for the sale of the property of the Washington Traction Company, which consists of the stocks of the various railroads owned by that company. Owing to the value of the property it is probable the court will direct that a notice of perhaps sixty days be given before the property is put up at auction. In such event the formation of a new company, as outlined in the plan of reorganization, cannot be effected until after the close of the present year.

CHICAGO, ILL.—The Northwestern Elevated Railroad reports earnings as follows:

	Year ending June 30, 1901	1900
Gross receipts	\$978,766	
Operating expenses	322,645	
Earnings from operation.....	\$656,121	
Charges and taxes.....	400,693	
Net earnings	\$255,428	
MINNEAPOLIS, MINN.—The Twin City Rapid Transit Company reports earnings as follows:		
September	1901	1900
Gross receipts	\$308,393	\$271,651
Operating expenses	123,131	106,559
Earnings from operation.....	\$185,262	\$165,092
Fixed charges	*75,375	*68,401
Net earnings	\$109,887	\$96,691
Nine months		
Gross receipts	\$2,340,164	\$2,102,029
Operating expenses	1,068,846	981,006
Earnings from operation.....	\$1,271,318	\$1,121,023
Fixed charges and taxes.....	503,273	474,901
Net earnings	\$768,045	\$646,122
Preferred dividend	157,500	152,250
Surplus	\$610,545	\$493,872

* Includes proportion of taxes and preferred dividend.

ST. LOUIS, MO.—The quarterly report of the St. Louis Transit Company and the St. Louis & Suburban Railway Company showing the number of trips made during the past three months and the number of passengers carried has just been made to the City Register. This report, when compared with that of the preceding quarter, shows that the company's cars made 88,120 less trips last quarter than they did during the three preceding months, but carried 692,046 more people. The statements for the last two quarters follow: St. Louis Transit Company, second quarter, 1,262,436 trips, 30,210,677 passengers; third quarter, 1,174,316 trips, 30,902,713 passengers. St. Louis & Suburban, second quarter, 72,698 trips, 4,005,693 passengers; third quarter, 72,890.5 trips, 4,021,925 passengers.

HELENA, MONT.—H. L. Walker, secretary of the Helena Power & Light Company, has been appointed receiver of the company. The appointment was made on the application of the Central Trust Company, trustee, under a mortgage of 1895, interest on which was in default.

DOVER, N. H.—Thompson, Tenney & Crawford, of Boston and New York, offer at 106½ and interest the entire issue of \$300,000 first mortgage 5 per cent sinking fund gold bonds of the Dover, Somersworth & Rochester Street Railway. The bonds are dated July 1, 1901, and are due July 1, 1921, and the American Loan & Trust Company, of Boston, is trustee. The principal and interest are unconditionally guaranteed by the Exeter, Hampton & Amesbury Street Railway Company, which operates the road under lease. The company is a consolidation of the Union Electric Railway, of Dover, and the Rochester Street Railroad, and connects by an electric railway Dover, Rochester and Somersworth.

ALBANY, N. Y.—The directors of the United Traction Company have declared the regular quarterly dividend of 1¼ per cent, payable Nov. 1.

WILMINGTON, N.C.—In pursuance of a decree of foreclosure sale made by Judge Thomas R. Purnell in the United States Circuit Court at the June, 1901.

term, in the case of Morton Trust Company of New York vs. the Wilmington Street Railway Company, the franchises, privileges, power house, cars and all other property of that company have been sold to Dr. Charles P. Bolles, Jr., in behalf of the banking house of Hugh MacRae & Company. The property was sold for \$101,500.

CLEVELAND, OHIO.—The past year has been the most prosperous in the history of the Cleveland City Railway Company, and it is believed that the net earnings will aggregate 8 per cent or 9 per cent. It is reported that the directors will retire the company's bonds, and thus clear off all its indebtedness, and that to this end about 3 per cent of the net earnings will be used as a sinking fund and the remaining dividend will be 6 per cent for stock. The directors have taken no action as outlined, and the matter will not be decided until the first of the year.

CANTON, OHIO.—Despite the statements of Henry A. Everett and Will Christy, of the Everett-Moore syndicate, to the effect that the Canton-Akron Railway has passed into their hands, Messrs. Welty, Kolp and Hoover, of Canton, directors in the company, claim they know nothing about the sale. They claim that if any such step has been taken it has been done without their consent by Tucker, Anthony & Company, of Boston, who own the controlling interest in the road. Mr. Hoover is president and Mr. Kolp, secretary of the company. Both claim they have not seen any documents relating to the sale of the road.

COLUMBUS, OHIO.—The Columbus, Grove City & Southwestern Railway Company has filed a mortgage for \$250,000 to the Continental Trust Company, of New York, covering a bond issue to that amount. The issued securities consist of 250 gold bonds to run twenty years, bearing interest at 5 per cent, interest payable semi-annually. The road is controlled by the Appleyard syndicate, of Boston.

DAYTON, OHIO.—The Dayton, Covington & Piqua Traction Company, formerly known as the Dayton & Stillwater Valley Traction Company, has increased its capital stock from \$50,000 to \$1,150,000, of which \$550,000 is to be 5 per cent preferred stock. Judge Dennis Dwyer is president of the company. The road is under construction.

BUCYRUS, OHIO.—The Ohio Central Traction Company, which operates an electric railway from Bucyrus to Galion, and which has an extension to Crestline partially completed, has been absorbed by the Pomeroy-Mandelbaum interests. The Pomeroy-Mandelbaum syndicate is building the Mansfield, Crestline & Galion Railway, which will be part of a through line to Columbus, and the routes of the two roads are close together between Crestline and Galion. It is announced that only the complete section of the Ohio Central Company's road will be operated, the intention being to abandon the extension.

COLUMBUS, OHIO.—The directors of the Columbus Railway Company have declared the regular quarterly dividend of 1¼ per cent on the preferred stock, payable Nov. 1 to stockholders of record Oct. 16.

OMAHA, NEB.—It is announced that the plan for the consolidation of the electric railway, lighting, water and gas systems of Omaha and Council Bluffs has been abandoned. A single corporation was to have been organized to take over the companies, and the plan included the construction of a gigantic new power plant from which the various consolidated properties were to be operated.

PITTSBURGH, PA.—The Consolidated Traction Company reports earnings as follows:

	1901	1900
Gross receipts	\$264,969	\$247,810
Operating expenses	126,041	104,939
Earnings from operation.....	\$138,928	\$142,871
Receipts from other sources.....	28,724	28,084
Gross income	\$167,652	\$170,955
Taxes, rentals on leased lines, interest on funded debt..	90,017	89,974
Net earnings	\$77,635	\$80,981
Dividends	60,000	60,000
Surplus	\$17,635	\$20,981
First six months of fiscal year		
Gross receipts	\$1,570,320	\$1,475,666
Operating expenses	752,234	689,445
Earnings from operation	\$818,086	\$786,221
Receipts from other sources.....	172,228	169,773
Gross income	\$990,314	\$955,994
Taxes, rentals on leased lines, interest on funded debt..	539,209	530,683
Net earnings	\$451,105	\$425,311
Dividends	360,000	360,000
Surplus	\$91,105	\$65,311

HOUSTON, TEX.—It is reported that a company is to be organized to absorb many of the existing and projected electric railways of the State. Texas is experiencing a boom in electric railway construction, leading all Southern States in the number of new lines projected, and it is probable that there will be important developments in the near future. The names of those identified with the project to form a company to absorb the roads are not given, but it is said that next week will witness the filing of incorporation papers for the company.

Tables of Recent Traction Earnings

NAME	Week or Month	LATEST GROSS EARNINGS		LATEST NET EARNINGS	
		1901	1900	1901	1900
American Rys. Co.....	Sep.	\$82,171	\$78,041	\$.....	\$.....
Binghamton Ry. Co.....	Sep.	18,456	15,767	8,470	6,704
Brooklyn R. T. Co.....	Aug.	1,139,611	1,061,804	379,528	399,606
Chicago & Mil.El.Ry.Co.	Aug.	24,042	20,702	16,563	14,644
Cincinnati, Newport & Covington Ry. Co....	June	72,201	73,965	42,452	42,700
City Elec. (Rome, Ga.)..	July	3,873	.....	e 260	.....
Clevel'd & Chagrin Falls	Sep.	5,350	4,790	3,137	1,743
Cleveland & Eastern....	Sep.	10,805	7,842	5,250	3,192
Cleveland El. Ry. Co....	Sep.	231,552	176,108	104,109	83,094
Cleve., Elyria & Western	Aug.	27,307	.....	14,936	.....
Cleve., Painesville & East	Sep.	18,822	14,495	9,174	9,325
Consolid. Tr. (Pittsburgh)	Sep.	293,693	274,894	167,652	170,955
Denver City Tramway...	Aug.	142,390	124,718	64,216	61,949
Detroit United Ry.....	Sep.	282,330	204,949	129,042	104,219
Duluth Superior Tr.....	Sep.	39,183	.....	19,241	.....
Elgin, Aurora & So. Tr..	Sep.	34,172	29,486	e16,734	e11,865
Herkimer, Mohawk, Ilion & Frankfort Ry. Co...	May	4,508	4,146	1,935	908
International Tr.....	Aug.	686,826	285,150	434,933	170,518
London St. Ry.....	Sep.	15,034	14,790	7,180	7,365
Montreal Street Ry.....	Sep.	182,584	161,526	.....	.....
Northern Ohio Traction..	Aug.	67,693	57,954	33,669	24,064
Olean St. Ry. Co.....	Sep.	4,940	4,188	2,745	1,831
Rapid Ry. (Detroit)....	Sep.	35,687	.....	14,111	.....
Richmond Traction Co..	Aug.	21,985	18,133	6,757	7,837
Rochester Ry. Co.....	Sep.	82,428	78,376	36,573	30,771
St. Louis Transit Co....	Aug.	509,048	505,728	.....	.....
Scranton Ry. Co.....	Aug.	63,763	57,647	30,019	27,713
Southern Ohio Trac. Co.	Sep.	34,156	30,791	18,312	17,656
Syracuse R. T. Ry. Co...	Sep.	53,992	45,993	24,300	20,613
Toledo Ry. & Lt. Co....	Sep.	114,667	103,434	64,155	55,083
Twin City Rapid Transit.	Sep.	308,394	271,652	185,262	165,093
United Tr. Co. (Albany).	Sep.	122,184	117,785	44,023	41,758

NAME	Period Ending	GROSS FROM JULY 1 TO LATEST DATE		NET FROM JULY 1 TO LATEST DATE	
		1901	1900	1901	1900
American Rys. Co..	Sep. 30	\$262,982	\$244,426	\$.....	\$.....
Binghamton St. Ry	Sep. 30	63,160	55,181	32,136	29,739
Brooklyn R. T. Co.	Aug. 31	2,343,372	2,206,993	e244,794	e274,147
Chic & Mil.E.Ry.Co	aAug.31	112,962	92,267	63,391	55,472
Cincinnati, Newport & Cov'g'n Ry.Co	aJune30	384,638	369,938	223,546	220,145
City El.(Rome,Ga.)	aJuly31	24,138	.....	e 2,970	.....
Clev. & Chag. Falls	dSep. 30	34,255	.....	11,141	.....
Cleveland & Eastern	aSep. 30	66,398	44,930	27,898	18,518
Cleveland El. Ry.Co	aSep. 30	1,705,634	1,506,701	762,651	684,248
Cleveland, Elyria & Western Ry. Co.	aAug.31	158,563	112,186	70,122	40,349
Cleveland, Painesville & Eastern ..	aSep. 30	124,185	106,187	60,941	56,207
Consolid. Tr. Co. (Pittsburg).....	dSep. 30	1,742,548	1,645,439	990,314	955,994
Denver City Tram.	aAug.31	980,891	847,019	442,484	366,798
Detroit United Ry..	aSep. 30	2,125,841	1,884,736	984,666	833,447
Duluth Superior Tr.	aSep. 30	335,268	.....	153,716	.....
Elgin, Aur. & So. Tr	aSep. 30	275,504	234,125	e122,560	e84,274
Herkimer, Mohawk, Ilion & Frankfort Ry. Co.....	May 31	48,895	47,026	20,247	21,063
International Tr...	Aug. 31	1,215,762	536,149	723,867	297,235
London St. Ry. ...	aSep. 30	106,709	88,384	40,791	25,945
Milwaukee El. Ry. & Lt. Co.....	dJune 30	918,104	830,674	426,071	389,333
Montreal Street Ry.	*Sep. 30	1,888,968	1,762,558	.....	.....
Olean St. Ry. Co....	Sep. 30	17,046	15,721	10,159	8,984
Rapid Ry. (Detroit)	Sep. 30	125,948	.....	62,792	.....
Richmond Trac.Co.	*Aug. 31	197,579	182,330	73,705	89,902
Rochester Ry.....	Sep. 30	262,885	245,827	120,599	101,749
St. Louis Transit Co	aAug.31	3,801,409	2,657,716	.....	.....
Scranton Ry. Co...	Aug. 31	127,958	116,243	62,318	55,507
Seattle Elec. Co...d	aMay 31	514,386	412,705	193,192	97,253
Southern Ohio Tr.	aSep. 30	252,892	218,846	114,568	106,824
Syracuse R. T. Ry.Co	Sep. 30	168,368	145,427	76,842	64,935
Toledo Ry. & Lt.Co	Sep. 30	360,171	317,778	202,693	158,525
Twin City R. T. Co.	aSep. 30	2,340,195	2,102,029	1,271,318	1,121,023
United Tr. Co. (Albany).....	Sen. 30	384,218	366,614	145,248	129,338

* Twelve months. † Caused by strike of employees. a From Jan. 1. b Three months. d Six months. e After deducting taxes.

NEWS OF THE WEEK

CONSTRUCTION NOTES

FLORENCE, ALA.—M. C. Buxbaum and his associates have been granted a franchise for the construction of an electric railway here and for the establishment of an electric plant to supply power for lighting and commercial purposes. Mr. Buxbaum, who represents Northern capitalists, is most enthusiastic over the project, and says that besides the local lines, an extension will be built to Sheffield and Tuscumbia.

RICHMOND, CAL.—Application has been made to the Board of Supervisors by E. S. Tewksbury, John Nicholl, E. E. Mintzer and John H. Nicholl for a franchise to construct and operate an electric street railway in Richmond. The proposed road is to be 5 miles in length, and will be operated on seven streets in Richmond and through private lands with the consent of the owners, terminating at the east yard of the Santa Fe Railroad station. A fifty-year grant is desired.

NEW HAVEN, CONN.—The New York, New Haven & Hartford Railroad Company, which has been having considerable difficulty in the operation of its third-rail line between Hartford and Bristol, owing to the inadequacy of current, is to make certain changes in its power station at East Berlin and its transmission line. It is reported that new sub-stations will be erected at Hartford and Bristol.

WASHINGTON, D. C.—There is talk of the revival of the project for the building of an electric railway between Washington and Baltimore. As will be recalled, it is proposed to connect the systems of the United Railways of Baltimore and the Washington Traction Company, of this city, by building a road between the present termini of these systems. Such a connecting link would extend from Ellicott City, Md., to Berwyn, Md.

DAHLONEGA, GA.—The construction of the Dahlonega & Gainesville Electric Railway has been begun. The line will be, when completed, the longest electric railway in Georgia. The main line will connect Gainesville and Dahlonega, and will be about 26 miles long. Then there will be branch lines in Gainesville, giving that city a good local service, and from Gainesville to New Holland and to the Chattahoochee River. The power for the main line will be generated at Leather's Ford Falls, in the Chestatee River, about 8 miles from Dahlonega. Work of building the dam in the river at this point has already been started.

BELLEVILLE, ILL.—The Bray Construction Company has commenced grading for the roadbed of the electric line which is to be extended by the St. Louis & Belleville Traction Company from French Village to Lebanon by way of O'Fallon.

CHICAGO, ILL.—The Chicago *Chronicle* is responsible for the story that the Chicago, Burlington & Quincy Railroad contemplates equipping some of its suburban lines with electricity.

OTTAWA, ILL.—The Illinois River Valley Electric Light, Power & Railway Company has been incorporated, with a capitalization of \$2,000,000, as the successor company to the Ottawa Railway, Light & Power Company, Illinois Valley Electric Railway Company, and Marseilles Land & Water Power Company. The new company will build a line between Ottawa and La Salle. The organization of the company will be perfected at an early date.

LOGANSPOUT, IND.—The Wabash River Traction Company, operating an electric railway between Wabash and Peru, has applied to the County Commissioners for a right of way in this county, announcing that it would at once extend the line from Peru to Logansport if its petition is granted and an entrance to this city is given.

KOKOMO, IND.—The Indiana Traction Company, which is to construct an electric railway from Kokomo, Howard County, by way of Elwood, Atlanta and Noblesville to Indianapolis, has awarded R. J. Kirkpatrick, of Anderson, the contract for grading that portion of its line between Noblesville and Atlanta.

PRINCETON, IND.—The plans of Edward J. Baldwin, who was recently granted a franchise for the construction of an electric railway here, are rapidly being matured, and a company is now being organized to build the new road. As previously mentioned, Mr. Baldwin's project is not confined to the construction of an electric railway in Princeton, but lines will be built to Evansville and Coat Springs, and power will be supplied for lighting and commercial purposes. It is reported that Coat Springs will be improved; that a pleasure park will be laid out, and that a large hotel will be erected.

MAYFIELD, KY.—The project for the construction of an electric railway from Mayfield to Paducah has been revived. It is said that the route now planned is for a line to touch Hickory, Viola, Boaz, Florence, Krebs and perhaps three other cities. The line will be about 22 miles in length.

LOUISVILLE, KY.—The Louisville, Anchorage & Pewee Valley Electric Railway Company, which is building an extensive system of electric railways extending from Louisville, has just been granted a franchise for the extension of its lines through Pewee Valley.

BATTLE CREEK, MICH.—The organization of the Battle Creek & Coldwater Electric Railway Company has been perfected, and it is now said that the company's proposed road will surely be built. The officers of the company are: N. S. Phelps, president; D. L. Merrill, of Battle Creek, vice-president; J. H. McCausey, of Union City, treasurer; Frank W. Clapp, of Battle Creek, attorney. The directors of the company are: N. S. Phelps, D. L. Merrill, J. H. McCausey, Frank W. Clapp, Frank H. Latta and Milo D. Campbell.

FLINT, MICH.—The Flint, Saginaw & Bay City Railway Company has been organized, with a capital stock of \$200,000, for the purpose of building an electric railway from Flint to Saginaw, a distance of about 34 miles, and connecting with the line running from Saginaw to Bay City. The officers of the company are: Michael Brennan, of Detroit, president; John A. Nolan, of Saginaw, vice-president; Robert Oakman, of Detroit, secretary; Alexander Monroe, of Detroit, treasurer.

SAULT STE. MARIE, MICH.—The Trans-St. Marie's Traction Company has been incorporated, with a capital stock of \$100,000, for the purpose of building an electric railway in the city of Sault Ste. Marie, and connecting at the international boundary line with a road to be built by a company organized under the laws of Canada. The stockholders of the company are: Francis H. Clergue, Horace M. Oren and H. von Schon, of Sault Ste. Marie.

BATTLE CREEK, MICH.—An electric railway is projected to run from Battle Creek to Grand Rapids via Hickory Corners, Gull Lake, Prairieville, Orangeville, Gunn Lake, Bowen's Mills and Green Lake. The proposed line is through a thickly settled and prosperous farming community; the lakes are all popular resorts, and such a line would undoubtedly prove a successful and popular one.

GRAND RAPIDS, MICH.—The Grand Rapids, Grand Haven & Muskegon Railway Company has completed its power house at Fruitport. The rails for the completion of the line are now on the ground, the rolling stock is reported completed and ready for shipment, and it is expected that the road will be completed and ready for operation in a very short time.

LANSING, MICH.—The Lansing, St. Johns & St. Louis Railway Company reports its line completed about 4 miles north of DeWitt. It also has all the material on the ground for its bridge over the Pere Marquette Railroad on Center Street in the city of North Lansing, and expects to make an agreement for the construction of the bridge within a few days.

MINNEAPOLIS, MINN.—It is now stated that the survey recently made for a railway line between Minnesota City, Minn., and St. Paul and Minneapolis, and which has caused much speculation in railway circles in the Northwest, is not in the interest of either the Chicago Great Western or the Chicago & Northwestern, as has been generally believed. The survey, it is stated, has been made for an electric railway to connect Minnesota City with the Twin Cities, touching many Minnesota towns which are without railway communications with either St. Paul or Minneapolis. The enterprise, it is said, is prompted by St. Paul and Minneapolis parties, and the money necessary to complete the line is to be furnished by Chicago and Philadelphia capitalists.

MINNEAPOLIS, MINN.—It is announced from an authoritative source that the Twin City Rapid Transit Company has secured the use of the right of way of the Northern Pacific Railroad from Mahtomedi to White Bear, and that an electric line will be in operation between these points as early as the summer excursions begin next year. The survey has been made and the material for the construction of the line has been ordered, it is said. This completes the arrangements for the electric railway company's contemplated improvements in its White Bear Lake service.

AVA, MO.—The Ava Northern Railroad Company has been organized by local interests to build an electric railway to connect Ava, Douglas County, and Cedar Gap, Wright County, on the Memphis division of the Frisco system. The line will be about 14 miles in length. The company has perfected its organization and elected the following officers: W. J. Turner, president; J. H. Murray, vice-president; J. A. G. Reynolds, treasurer; H. S. Wilson, secretary; A. H. Buchanan, auditor. The officers and S. B. West, M. C. Reynolds, J. M. Adams and B. J. Smith constitute the board of directors.

OMAHA, NEB.—J. J. Boucher, representing the Douglas County Railway Company, has applied to the County Commissioners of Douglas County for a franchise to operate an electric railway upon certain county roads for a term of fifty years, with the agreement that at the end of thirty years the county shall have the right to purchase the lines at a valuation to be assessed by a board of arbitration consisting of five members, two to be appointed each by the county and the company, and the fifth to be chosen by the four. Within six months from the granting of the franchise the company has agreed to select six routes in or through Douglas County, three of them running generally north and south and three of them east and west. The company has also agreed to begin work on one of the routes within two years, and agrees to build at least 5 miles of road each year until all are completed.

NEWBURGH, N. Y.—The Orange County Traction Company, a reorganization of the Newburgh Electric Railway Company, was incorporated Oct. 16, with a capital stock of \$325,000. The directors of the company are: F. H. Moffatt, of New Brighton; L. H. Clark, F. H. Pouch, P. D. Pouch and B. J. Bloodgood, of Brooklyn; A. B. Pouch, of Tompkinsville; J. B. Kilsheimer, of New York City; E. O. Aleya, of Newark, and W. C. Hascey, of Montclair, N. J.

GLOVERSVILLE, N. Y.—The Mohawk Valley Power Company has awarded the contract for the equipment of its new power station near Tribes Hill. The Allis-Chalmers Company has been awarded the contract for three 150-hp vertical cross-compound engines, together with pumps, etc. The General Electric Company has been awarded the contract for the electrical equipment, including three 1000-kw generators. The Springfield Boiler Company has been awarded the contract for a battery of ten boilers, aggregating 5500 hp. The Bromell, Schmidt & Steacy Company was awarded the contract for the economizers.