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WEEKLY NEWS ISSUE

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EDITORIAL NOTICE.

The news issues of the Street Railway Journal are devoted primarily to the publication of street railway news and current happenings related to street railway interests. All information regarding changes of officers, new equipments, extensions, financial changes and new enterprises will be greatly appreciated for use in its 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 Issue

Owing to the size of our monthly October issue and the additional labor in preparing and printing it, we have decided to date the magazine number this month on the second Saturday in October, instead of the first Saturday, as is our usual custom. The present number is therefore of the small weekly size, while the large number will be issued next week.

The Johnsons' English Enterprises

A special dispatch from Detroit quotes John G. Honecker, who has been the representative of the Johnsons in England for the past seven months, as authority for the statement that $1,000,000 will probably be spent by them in the construction of electric railways in England. The principal lines projected are those to connect with the Manchester & Liverpool Electric Railway. The latter is to be a high-speed line, with no stop between Manchester and Liverpool, and the Johnson lines will act as feeders, extending into the suburbs.

Compressed Air Cars in Rome

Rome, N. Y., has the distinction of being the first city in the United States to have a street car system operated wholly by compressed air. The compressed air cars were placed in operation Sept. 22, and the first car was run at 11 a. m. Robert Hardie, of the Compressed Air Company, of New York, was in charge of the car. The Mayor, officers of the company and a number of special guests were on the car. The trial trip was a very successful one, and the system has been pronounced a success. A detailed description of the system of the Compressed Air Company will be found in the STREET RAILWAY JOURNAL for Aug. 4, 1900.

From Boston to New York by Trolley

Robert H. Derrah, of Boston, the originator of Boston to New York by trolley, and a party of twenty-three persons left Boston for New York at 8:45 a. m., Sept. 24, intending to make the entire trip by trolley so far as practicable. The route, as mapped out, lay through Newton, Natick, South Framingham, Marlborough, Worcester, Springfield, Hartford, New Britain, Meriden, New Haven, Bridgeport, Norwalk and Stamford. Dinner was taken at Worcester Sept. 24. The party stopped over night at Springfield. On Sept. 25 the tourists left Springfield at 8 o'clock a. m., and took dinner at New Britain. They passed the night at New Haven, which was left the following morning at 8 a. m. They then journeyed to Stamford, where dinner was taken. The party arrived in New York late Wednesday afternoon, Sept. 26.

Forty Years' Service in One City

Superintendent of Construction Edwin Duty, of the Cleveland Electric Railway Company, of Cleveland, Ohio, whom President Everett, of the company, is in the habit of introducing as the father of the street railways of Cleveland, celebrated the fortieth anniversary of his work as superintendent on Sept. 12. Mr. Duty was the superintendent of the first street car line in Cleveland, and with the advent of electricity mastered that method of operation as he had mastered the running of the horse car lines. There is probably no man in the country with a longer unbroken career as a street railway superintendent, and his recollections of the early days of Cleveland's street railway system are most interesting. Mr. Duty has superintended the construction of every foot of track ever laid by the company, and, despite his long and hard service, is in good health.

Eight Years' Electric Service in Montreal

The first electric car of the Montreal Street Railway was run Sept. 19, 1892, and two days later the road was placed in regular operation. During the eight years that have passed the number of passengers carried have more than quadrupled, the figures being, in 1892, 11,631,000, and for this year it is estimated over 45,000,000 will be moved. The gross receipts of the company in 1892 were $564,406, and in 1899, $1,660,775. The operating expenses in 1892 were $466,647, and in 1899, $912,949. The net earnings of the road in 1892 amounted to $97,761, and in 1899, $747,826. The longest trip a passenger can take on the company's route without a transfer is 7 miles. The time of service is stated by the road's authorities to average one car for every two to two and one-half minutes on all the independent lines during the working day, which lasts from 6 a. m. to 8 p. m. From 2:30 a. m. until 4 a. m. only are there no cars run.

Chicago Elevated Changes

The Metropolitan Elevated Railroad has officially announced a number of important changes in its train service. On and after Oct. 1 special trains will run every six minutes on the Humboldt Park branch in addition to the regular service. There will be improved train service and faster time on all lines. Trains will run every five minutes from 9 a. m. to 5 p. m., instead of every six minutes. Extra service will be given on all lines during the rush hours and special trains will run to and from Canal Street morning and evening. New platforms and rail terminals have been put in at Canal Street on the Logan Square-Humboldt Park tracks of the main line for the convenience of persons whose business is entirely west of the river. The alternate trains leaving the loop during the rush hours on express schedule to Marshfield Avenue will provide for those who have hitherto taken surface lines rather than face the crowds going to or returning from the loop. An equal number of additional trains will start from the Canal Street terminal. It is estimated that the Canal Street service increases the company's net earnings $20,000 a year.

The Annual Meeting of the Pennsylvania Street Railway Assso= ciation

The ninth annual meeting of the Pennsylvania Street Railway Association will be held in the parlors of the Mansion House, Reading, Wednesday and Thursday, Oct. 10 and 11. The convention will be called to order Oct. 10 at 2 p. m. Addresses will be delivered, and papers on scientific subjects of interest to the association will be read and discussed, as well as the interests and welfare of the business generally considered. The business meeting of the association will follow the presentation of the different papers, and officers will be elected for the ensuing year.

On the evening of Oct. 10 those in attendance at the meeting will be tendered a complimentary banquet by the United Traction Company, of Reading, at Rajah Temple. The entertainments for Thursday include an excursion over Neversink Mountain at 10 a. m.; a trip over Mt. Penn Gravity road at 12 m., and a trolley ride to Womelsdorf at 2 p. m.

All members of the association, as well as representatives of other street railway companies and supplymen not members of the association, are cordially invited to attend with as many representatives as possible, and participate in the exercises and entertainments of the association.

English Views of Mr. Yerkes' London Deal

The recent purchase of the franchise of the Charing Cross, Euston & Hampstead Railroad by Charles T. Yerkes, and the subsequent announcement that probably $16,000,000, all American money, will be expended in promoting the enterprise, has called forth considerable comment by the English press. The *Daily Telegraph* and the *Sunday Special* have been foremost in discussing the plans of the Americans, and in recent issues of these papers are found two intensely interesting articles. The *Telegraph* voices itself thus:

"Further developments in connection with electric traction are talked of by Mr. Yerkes, but by far the most startling development is the change which such events as the building of an underground road in London with American capital proves to have taken place in the economic conditions of the United States. Until the last few years Europe had to supply a large part of the capital needed for the development of American industries. In 1895 it was foreign capital that saved her from disaster. Now her capitalists are not only subscribing to English war loans and exchequer bonds and German treasury bills, but an American syndicate declares its intention of spending several millions in order to build a railway in London on which, at best, the profit can be but moderate." The *Sunday Special* says: "This is a striking instance of the aggressive progress of American enterprise. Formerly European capital was supplied to the United States, and it helped to build most of the American steam railroads. To-day American capitalists, not content with supplying money to the governments of Great Britain and Germany, are beginning to compete with English enterprise in that branch of electrical activity which promises the largest return, namely, local electric railways. This cannot but be favorable. If America helps us to develop and to make up-to-date our system of electric traction, she will confer as great a benefit upon us as we did upon her in providing the capital for her steam railroads."

Tunnel to Brooklyn

At a meeting of the New York Rapid Transit Board, held Sept. 28, the routes and plans of construction for a rapid transit tunnel from New York (Manhattan) to Brooklyn were adopted by the board. The plan is to extend the Broadway tunnel to Bowling Green and under Whitehall Street to the East River. Crossing under the river, the tunnel will reach the Brooklyn shore at the foot of Joralemon Street between Furman Street and the shore line, run under Joralemon Street to City Hall, where there will be a station; then under Fulton Street to Flatbush and Atlantic Avenues, where for the present will be the terminus. The river part of the tunnel with its approaches, from Bowling Green on the New York side to near the City Hall in Brooklyn will consist of cast iron tubes of 15-ft. inside diameter, forming practically a separate tunnel for each track. Two loops will be built at the Brooklyn City Hall, one below the other. One of these will be used for New York trains. The other will be constructed with a view to the future when the extension of the tunnel further into Brooklyn will necessitate the running of local trains within that borough. The simultaneous building of the two superposed loops will mean a saving of money. The approaches to the loops, from Henry Street on one side and from Smith and Jay Streets on the other, will be wide enough to leave room for four tracks. The plans also provide for an additional loop on the New York side, beginning under Broadway, somewhere near Exchange Place, and running under Bowling Green, State Street, Battery Park and Whitehall Street back to Broadway. Different grades will be provided for trains turning into this loop and the through Brooklyn trains. It is estimated that the length of the extension will be 4¼ miles, of which distance 7500 ft. will have cast iron tubing. The estimated time required for the trip from one City Hall to the other is eight minutes. The extension may be completed within two years from the time work is begun on it.

Before contracts for construction can be let, the proposition must, first of all, go before the Municipal Assembly. If it is approved by that body the consent of the property owners must be obtained, which may require a whole year.

The New Power House of the Northern Ohio Traction Company

The Northern Ohio Traction Company, of Akron, is about ready to begin operating its new plant in that city, superseding the old lighting and railway plants. The object of combining the plants was to centralize the power, and at the same time to make the service more efficient. The new plant is one of the largest and most complete in Ohio, and the new lighting system will be one of the first in the State embodying the use of series alternating are lamps. The plant will furnish power for the city lighting and city railway lines, and for a portion of the Akron, Bedford & Cleveland line of the Northern Ohio Traction Company.

The boiler room will be equipped with eight Sterling boilers, four of which will be equipped with mechanical stokers, while the other four will be hand-fired. The boilers will be supplied with feed-water from six duplex pumps. In the engine room there will be three horizontal cross-compound condensing engines of the Cooper-Corliss type, two being directly connected to the railway generators and to an alternating-current generator. The railway engines are capable of developing 1800 hp, running at 90 r. p. m., with 140 lbs. of steam. The other engine will develop 750 hp. These engines are directly connected to Westinghouse 500-volt railway generators, one 800-kw capacity, and one 400-kw capacity. The railway service will be further strengthened by the addition of a 200-kw generator, making a total of 1400 kw capacity. The lighting end of the equipment will be cared for by one engine, directly connected to a 500-kw alternating-current generator.

The switchboard is 46 ft. long, and made of marble slabs of blue Vermont marble, 2 ins. thick. The railway switchboard consists of three machine panels, one load panel, one blank, and four circuit panels. The machine panels are each equipped with switches, ammeters, rheostats and circuit-breakers. The load panel is equipped with a 4000-amp. ammeter and a swinging differential voltmeter, this meter being used for operating only two machines in parallel. The circuit panels are each provided with a single-pole knife-switch, one ammeter and a brush type circuit-breaker at the top of the boards. The lighting switchboard consists of eleven panels, as follows: One double exciter panel, one 200-kw machine panel, one 500-kw machine panel, one blank, four incandescent panels of two circuits each, and three arc panels, panels of three circuits each.

The A. S. R. A. Convention

As previously announced, the nineteenth annual meeting of the American Street Railway Association will be held at "Convention Hall," Kansas City, Mo., Oct. 16, 17, 18 and 19, 1900.

Papers will be read on the following subjects:

"Consolidation of Street Railways and Its Effect upon the Public," by Daniel B. Holmes, counsel, Metropolitan Street Railway Company, Kansas City, Mo.

"A Comparison of the Various Systems of Electrical Distribution for Street Railways," by C. F. Bancroft, electrical engineer, Massachusetts Electric Companies, Boston, Mass.

"Painting, Repainting and Maintenance of Car Bodies," by F. T. C. Brydges, superintendent of car shops, Chicago Union Traction Company.

"The Store Room and Store-Room Accounts," by N. S. Hill, Jr., general manager, Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C.

"Double-Truck Cars; How to Equip Them to Obtain Maximum Efficiency Under Varying Conditions," by N. H. Heft, president, Meriden Street Railway Company, Meriden, Conn.

Friday, Oct. 19, has been set apart as a day for the examination of the exhibits. No session of the association will be held on that date, so that all may have plenty of time to view the exhibits. It is earnestly requested that managers have their heads of departments present on that day.

The annual banquet will be held at the Coates House, Friday evening, when the officers elect will be installed.

The headquarters of the association will be at the Midland Hotel. The principal hotels in Kansas City and their rates are as follows:

Midland, American, $3 to $6 per day; European, $1 to $5 per day.

New Coates, American, $3 per day and up; European, $1 per day and up.

Savoy, American, $2.50 to $6 per day; European, $1.50 to $3.50 per day.

Baltimore, American, $3 to $5 per day; European, $1.50 to $3 per day.

All are first class and in close proximity to the hall.

The executive committee advises all who desire rooms to apply at once.

The passenger associations have, as usual, granted a rate of one and one-third fare, on the certificate plan, provided one hundred or more tickets are purchased. All persons intending to attend the convention are cautioned to get certificates when they purchase their tickets and to deposit these certificates with clerk upon arrival at the hall. He will have them signed, and will return them, on application, on Thursday, Oct. 18. Under this plan no one can get a return ticket at reduced rates if he fails to secure a certificate when he purchases his ticket, so the importance of this is evident.

The managers of the Kansas City railway systems have arranged a most attractive programme for the entertainment of the delegates, and a very large attendance is indicated.

The Storage Battery—Its Use in Railway Plants

BY THOMAS HENNING

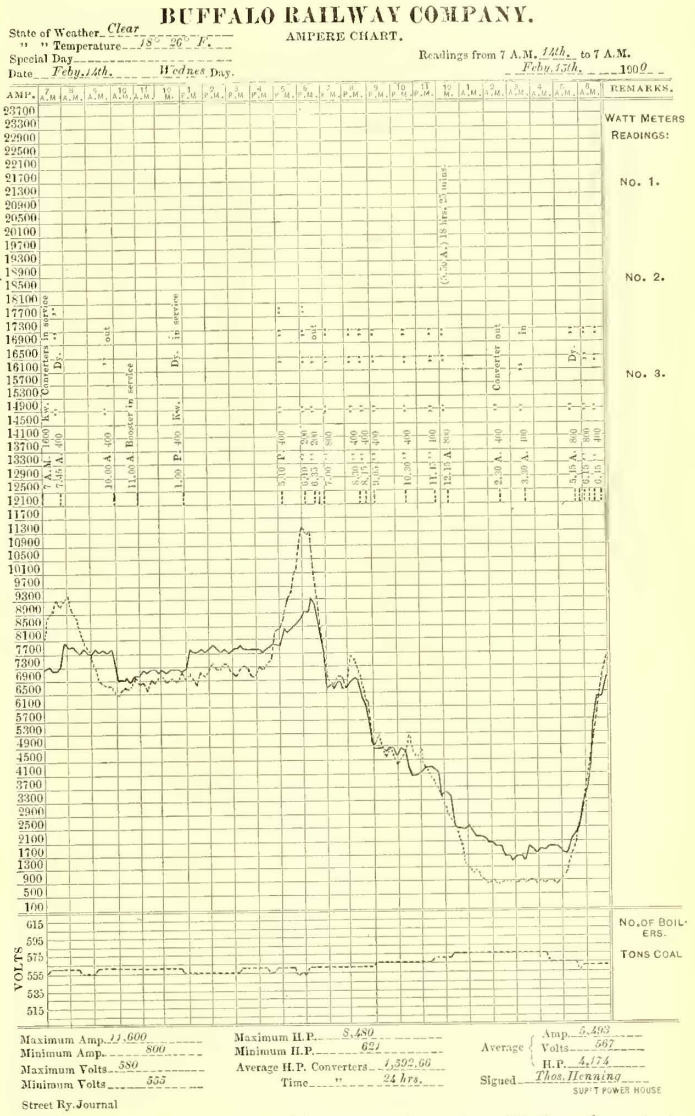
Of the many factors involved in the construction and maintenance of railway power stations, I know of none more prominently identified therewith than the storage battery. The storage battery, however, resembles any mechanical or electrical appliance in this, that it cannot after installation be left to the care of Divine Providence. If attended to, regularly and intelligently, it will require but little care; if neglected, it will require more care, and at the same time it will have low efficiency.

The application of the storage battery to electric railway work has to do largely with the variations of load. If a load were absolutely constant throughout the twenty-four hours, the utility of the battery would be confined to emergency work in case of accident to the machinery, etc.

Variations of load in railway work are of two kinds: first, momentary fluctuations; second, peaks which extend over a length of time from half an hour to four or five hours. Under this latter head must be considered not only those portions of the load which are above the average, but also the very light loads between midnight and morning.

In most railway loads, peaks and fluctuations are combined; in the small systems the fluctuations predominate, while in the larger plants the peaks are more prominent, the fluctuations, while large, being small compared with the total load. Power house machinery attains its maximum efficiency under a steady sustained load equal to its full capacity, while the efficiency of the battery is greatest under rapidly fluctuating loads or short period discharges if heavy, or under light loads if prolonged. It will be seen that in order to produce the variable output required for electric railway service, with highest economy, the combination of machinery and battery, properly proportioned, forms the ideal arrangement, each taking that portion of load which it is best adapted to handle.

The proportion between the capacities of machinery and battery will evidently depend upon the characteristics of the load curve. As the size of the battery for continuous peak work increases with the length of time it is called upon to discharge, as well as with the rate of such discharge, it is desirable, in order to avoid excessive first cost, to plan to utilize the battery up to its one-hour rate. On this basis, the cost of the battery will be approximately the same as the equivalent capacity of machinery, including boilers, engines, generators, etc., installed.



(The dotted line shows the actual load on station; the solid line, the output of the generators.)

SAMPLE DAILY SHEET OF OUTPUT, BUFFALO

On almost any railway load diagram it will be possible to draw a horizontal line, such that all that portion of the load above this line can be carried by a battery working occasionally up to its one-hour rate. This will usually determine the best proportion between battery and machinery.

At the Niagara Street station of the Buffalo Railway Company, we have a battery of 270 cells, sixty-three plates in each cell, capacity 2000 hp-hours. The battery is in series, with a booster, the latter having a capacity of 3000 amps. at 70 volts. The shunt coils

of this booster are attached to a contrivance in the shape of a switch and rheostat combined, by which the potential may be lowered, raised, or the direction reversed.

The battery and booster are in parallel with the dynamos or converters, as the case may be, and by the manipulation of the switch and rheostat above mentioned, the battery may be charged by a 550-volt machine as high as 620 volts, or it can be discharged when the voltage of the battery proper is below that of the dynamo or converter.

The booster and battery being in series, a movement of this switch in a stated direction will have the effect of giving the booster say 50 volts, opposing the battery voltage. Thus, if the battery voltage be 595, and the booster 50 volts in the opposite direction, the difference of potential between the mains will be 545 volts, thus permitting a 550-volt machine to charge the battery. By reversing the polarity of the booster we reverse the operation. Battery voltage being low, say 505 volts, plus booster, 50 volts, permits the battery to discharge on a 550-volt bus-bar.

This battery has been in service since April, 1898. The length of time that a battery has been in service and the work performed by it have a bearing upon the care required, for the reason that as sediment is deposited in the cells, it reaches a point where care is required to prevent the sediment connecting the plates temporarily, and thus rendering a part of the battery inoperative.

Notwithstanding the length of time this battery has been in service, one man working ten hours per day does all that is necessary, and at times has three or four hours to spare for other duties. However, when the sediment reaches this stage, the better plan will be to have it removed entirely, choosing a convenient time for this work.

Immediately after this battery had been placed in service, I adopted a system of readings of battery charge and discharge from which curves can be traced, and the average work of the battery shown graphically. Copies of these charts accompany this paper and will be understood at a glance. In addition to acting as a regulator during part of the day, it has at times discharged from two to four peaks during twenty-four hours, the base of one of these peaks covering an interval of from three to five hours, the maximum output being 2500 amps., and at times more than this.

It is not necessary in order to secure the highest efficiency that the curve of the generator load shall be represented by a horizontal line of uniform output throughout the twenty-four hours, indicating no change in the number of units in operation, but it is desirable that whatever machinery is running at any time shall be fully loaded. The diagram of generator load will thus consist of a number of rectangular steps.

The element of uncertainty in a railway load, as to time and amount, makes the battery particularly adapted to this class of work, combining, as it does, the ability to stand momentary excessive overloads with its readiness to pick up its load at a moment's notice.

I have endeavored during the past year to obtain some facts bearing upon the length of time the plates will last. I confess that I am no nearer a solution than I was a year ago. After seeking industriously, I have arrived at the conclusion that the present form of battery has, as yet, presented an unbroken front; in other words, that since its adoption no plates have been worn out. If so, I have been unable to locate them. There are no visible indications of the plates of this battery giving out at an early day.

The gases from these batteries have a deleterious effect upon matter in the same apartment. I have found that a coating of silica-graphite paint of so-called natural color prevents any bad effects. These gases after leaving the building I believe to be harmless.

On the 23d of last June, at the suggestion of President Ely, I placed pieces of metal outside of a roof ventilator, at distances from the ventilator varying from 2 ins. to 4 ft., and up to the present time I find no indications of the metal being attacked by the gases. In conclusion, permit me to say that if a battery is a good thing in a large station, its usefulness increases in small stations inversely as the load. When one sees small units in service with no load, and 50 per cent overload, each reading following the other in rapid succession, the use of a battery in small stations will readily suggest itself.

Rotary Transformer Stations*

BY R. E. DANFORTH

The largest utilization of water power for street railway purposes in the world is that of the lines owned by the International Traction Company, of Buffalo, N. Y. This company controls the Buffalo Railway Company and other concerns operating in and between Buffalo and the neighboring cities. The consolidated companies now operate all lines in Buffalo, Tonawanda, Lockport, Niagara Falls, N. Y., Niagara Falls, Ont., and Queenstown, as well as the electric interurban lines between these points, with the exception only of the Gorge Road and of three small suburban lines which feed the Buffalo system. The lines operated by these allied companies have an aggregate length of about 300 miles of track, and are traversed by about 400 electric cars.

The International Traction Company possesses one of the most perfect steam power stations in the country, the famous Niagara Street station, with a capacity of 7500 hp in large units, driven by condensing engines, supplied from boilers with complete labor-saving devices, such as stokers, coal and ash handling mechanism, etc. In this station there were installed in the fall of 1896 two 400-kw rotary converters, and accompanying transformers, built by the General Electric Company, these machines being designed to take some of the 25-cycle polyphase power transmitted to Buffalo from Niagara Falls, and convert it into 600-volt direct current, suitable for street railway use. These machines were duplicated a year later, giving a total converter capacity of 1600 kw. These converters, with the engines, assisted by a 3000-amp. storage battery, operated the lines in Buffalo until 1899, when increased generating capacity, or improved power distribution, became necessary. The operation of the rotary converters in the Niagara Street station, as well as that of others serving lines of the allied companies in Lockport, Niagara Falls and Tonawanda, had proved so satisfactory and economical that the company decided to get this increased capacity by an enlargement and distribution of its converter system rather than by any additions to its steam-driven equipment. The rotary converter system has now been extended until it is capable of supplying the whole demand without assistance from the steam plant except during load peaks.

In addition to the lower cost of power derived from a rotary converter system, supplied by a hydraulic plant, as compared with a steam-driven station, the former system possesses the advantage that the converters may be distributed in a number of sub-stations scattered through the territory to be supplied with power and advantageously located to carry the heaviest loads with short feeders. Having no boilers or engines, the location of the sub-stations is not influenced by considerations of fuel supply or condensing water. Having no objectionable features, such as smoke stacks or exhaust steam, the sub-stations can be located anywhere without impairing the value of neighboring property. Requiring but a small area per kw-capacity, they can be put in where property is expensive.

Full advantage of these possibilities has been taken by the International Traction Company, which has divided its new equipment into four sub-stations, scattered through the city, giving, with the Niagara Street station, five sources of direct current in the city of Buffalo, in addition to the sub-stations in neighboring cities. The effect has been to materially reduce the amount of copper needed, as well as to reduce the drop and loss in the overhead feeders and in the track return. Better voltage is maintained at the cars, allowing them to make fast schedules without overheating of the motors.

The sub-stations have in all cases been located in existing car houses. Each contains either two or three rotary converters, all of which are of the same size, and, as the sub-stations are very similar to each other, a description of one will serve for all.

In general, each sub-station consists of a room about 30 ft. x 50 ft. in size, along one side of which are ranged the rotary converters, and along the other side the transformers, the switchboard being placed across one end of the room. Each sub-station is served by a hand crane.

Power is received in the form of three-phase currents at 10,500 volts from an underground three-conductor cable of the Cataract Power & Conduit Company, one branch cable running to two of the new sub-stations. At each sub-station the power enters through a Form H oil switch, operated by hand, by means of which the whole station can be instantly cut off from the high-tension supply cable in case of an emergency. From this oil switch the power passes through automatic circuit-breakers, actuated by an overload time element relay. This relay actuates the breakers only in case the overload drawn through it continues for a predetermined time, such as three or five seconds. In case a short-circuit exists on the direct-current side it is quickly removed by the direct-current breakers, which do not allow it to exist long enough to actuate the time element relay and circuit-breakers in the alternating current supply connection. Thus these breakers are not tripped, and the rotaries are not thrown out of synchronism with the supply system each time a severe overload or short-circuit comes upon the direct-current lines. In case, however, a short-circuit occurs in the station, and lasts through the period of the time element re-

* Paper read before the New York State Street Railway Association Sept. 18-19, 1900.

lay, this instrument will operate and throw out the high-tension circuit-breakers, cutting the supply off from the sub-station.

From the high-tension circuit-breakers the power passes to the high-tension bus-bars, from which it is drawn by the step-down transformers.

Each 400-kw converter is permanently connected to its own group of three 150-kw step-down transformers, with no intermediate switches or bus-bars in the low-tension A. C. circuits. Thus each transformer-converter unit is handled on its A. C. side by the high-tension switches, through which it receives its power from the high-tension bus-bars. Form F oil switches are used for this purpose, three single-pole switches being connected in the three-phases, going to the primaries of the step-down transformers. These three switches are located in separate brick chambers, with brick barriers between them to prevent a burn-out of one switch from spreading to the others. All of the high-tension switches, as well as all high-tension instrument transformers, are located on a gallery above the switchboard.

The switchboard attendant can handle all switches and read all instruments from the floor below, the switches being mechanically connected down to handles on the A. C. panels with insulating joints in the connections, the instruments being connected to transformer secondaries only. Thus there is no high potential on the operating board, either front or back, and no necessity for the attendants to visit the high potential gallery in the ordinary course of operations.

The risk of shock to the attendants is thereby reduced to a minimum. The step-down transformers are of the air-blast type, and are mounted in a row over a forced draft chamber, on each end of which is placed a centrifugal fan, direct-driven by a 500-volt D. C. motor. Each fan is capable of supplying sufficient air for all the transformers. Thus a duplicate source of draft is provided.

Mounted also over this forced draft chamber, and cooled by air taken from it, are three-phase reactive coils of the air-blast type. There is one of these for each rotary converter, and they are connected between the secondary coils of the transformers and the collector rings of the rotaries. Their purpose is to allow the voltage delivered by the rotary to be varied by adjusting the field rheostat and compounded by the use of a series field.

An alternating-current motor, driving a direct-current generator, will obviously accomplish the work of converting A. C. current into D. C. currrent at 600 volts, and such machines have frequently been used for the purpose, but experience has shown that the motor generator is, as a rule, inferior to the rotary converter, since the latter combines both an alternating-current motor and direct-current generator in one dynamo-electric machine, with only one field magnet structure and one armature, and therefore the latter method is here described. It may be stated at this point that the rotary has a higher efficiency and a lower first cost, occupies less floor space, requires no more attention, and gives no more trouble than the motor-generator, making it the preferable machine, except in some few special cases where unusual conditions call for motor generators.

The rotary converter resembles closely, both in appearance and performance, a direct-current generator. Since it is self-driven and is therefore not coupled to any prime mover with speed limitations, it is designed more on the lines of a belted than a direct-coupled generator, and, indeed, bears a striking likeness to the former. The only apparent difference is the omission of the pulley and the addition of a set of collector rings, through which the alternating-current supply enters the armature. There is only one winding on the armature, and this winding is exactly like that of a direct-current generator, with the sole exception that in addition to being connected to the commutator in the usual way, the winding is also connected at suitable points to the collector rings. Thus the alternating currents enter the same winding from which the direct currents leave. An idea of the way in which both currents can exist simultaneously in the same armature conductors can be given as follows: As is well known, any armature coil or set of coils is the seat of an alternating electromotive force when the machine is in operation, and it is only by commutation that these alternating e. m. f.'s are changed into a steady direct pressure. These alternating e. m. f.'s act as the counter e. m. f.'s opposing the incoming alternating currents which enter through the collector rings, and therefore reach the armature windings uncommutated. The same internal e. m. f.'s rectified by the commutator give the direct-current pressure. This partial neutralization between the incoming and outgoing currents gives the machine a large output per pound of weight and a high efficiency.

DETAILS OF CONSTRUCTION

The rotary converters, built by the General Electric Company, have many of the same features of structural detail that distinguish the direct-current generators of the same make. The external yoke of the field frame is made of cast iron, and its upper half is fastened to the lower half by bolts hidden completely within recesses cored in the side supports, thus doing away with unsightly projections and improving thereby the appearance of the machine. The poles also embody the same features as those of the generators, being solid steel castings, bolted to the yoke ring, so that any pole can be removed for the repair of its winding without disturbing the yoke ring. This construction is particularly advantageous in the case of trouble with any field coil on the lower half of the ring, the removal of such a coil from a machine with poles solidly fastened to the yoke requiring that the armature be lifted out of the bearings.

The lower half of the yoke ring is cast separately from the bed-plate, so that in large machines the whole field ring may be moved along the bed-plate in the direction of the shaft, to give access to the armature. The field ring or the bearing pedestals may be shimmed up, and the field ring may be moved laterally to render the armature concentric with the poles, and this adjustment may be readily changed at any time as the bearings wear.

The poles have extending tips, which distribute the magnetism over a great number of armature teeth, and thereby reduce the density, the iron losses and heating in this part of the machine. The fields may be shunt or compound-wound, to obtain the desired regulation, and the effect of the series-coil may be adjusted by a variable shunt exactly like that used on direct-current generators.

The armatures, like those of the generators, are designed to give forcible ventilation, and thereby keep all parts cool. The spokes have wings or vanes cast to them, these wings being enclosed by deep end flanges, so that a powerful centrifugal fan action is set up, blowing air between the armature laminations, across the armature windings and around the field poles. The armatures are, as a rule, bar-wound, the upper bars being connected to the lower bars by soldered clips on the collector ring end of the armature, so that an upper bar can be removed without disturbing any other coil, and a lower bar can be removed without disturbing more than one-half as many coils as must be disturbed for the removal of one bar of an armature in which the complete turn is made of one piece.

The armature winding is held in the slots by wooden retaining wedges, the end connections being fastened by binding bands, these details being the same as those of generators.

The connection of the winding to the collector rings serves incidentally the same purpose as the equalizer rings used on parallel-wound generators, equalizing the field strength under all poles and improving commutation.

The commutators of rotary converters are of the same design as those of D. C. generators. The collector rings are separated from each other by wooden insulating rings, which rise above the collector ring surface to such a height that if an arc is started accidentally between collector rings it will not continue and become a short-circuit. The collector rings are cut away at the sides to allow the brushes to bear upon them over their full width, thus preventing the brushes from leaving shoulders beside their tracks in the center of the rings. Carbon brushes in solid shank brush holders of the standard D. C. type are used on the commutator, while laminated copper leaf brushes are used on the collector rings.

On the small machines the brush-holder rings are supported on the bearing pedestals. On the larger machines the D. C. brush holders are supported by a latticed cast-iron ring, fitting a seat in the field-magnet yoke; the A. C. brush holders being mounted on a platform bracketed to the bed-plate. The A. C. brush-holder rings are conveniently jointed and swiveled to allow easy access to all parts.

To distribute the wear on the commutator and collector rings, and to prevent the brushes from wearing grooves in these parts, all rotary converters made by the General Electric Company have automatic oscillators, or end-play devices, which, at frequent and regular intervals, give the armatures a slight motion back and forth in the direction of the length of the shaft.

All converters with a capacity of 500 kw, or more, are made six-phase instead of three-phase, in order to increase the efficiency by reducing the losses in the armature winding. The larger number of phases causes the alternating currents more nearly to balance the direct current in the winding, distributes more uniformly the remaining losses, and provides more equalizing connections, thus improving the commutation.

The six-phase converters are supplied by three single-phase transformers, the only difference in structure and connections being the use of six collector rings and six conductors from the transformers to the converter in place of three.

THE STARTING OF ROTARY CONVERTERS

When running at full speed the manipulation and operation of a rotary converter are exactly the same as those of a direct-current generator, but, there being no steam engine, water-wheel or other

outside source of power for bringing a converter from standstill up to speed, the converter must in some way be made self-starting. If there is available in the sub-station some other source of direct current the converter may be started as a direct-current shunt-wound motor. If there is no other source of direct current than the converter itself, it must be made self-starting from the alternating-current circuits, since it will not deliver direct current until it has reached full speed. The rotary converters made by the General Electric Company are so designed as to be self-starting without any special starting device, such as a separate starting motor. The alternating currents are simply switched into the windings of the converter itself, and the machine comes up to the proper speed.

The rotary converters are six-pole machines, and hence, with 25-cycle-current, run at 500 r. p. m. They are fitted with magnetic oscillators, which give the shaft an endwise pull at regular intervals of a few seconds, thus preventing the brushes from wearing tracks in commutators or collector rings. The machines are compound-wound, and fitted with equalizer switches, mounted on the field yokes. They are so placed that the commutators face the central passageways of the sub-stations, the collector ring ends being turned to the wall.

The switchboards contain both A. C. and D. C. panels in one continuous row. To one end are the A. C. panels, one per rotary, next to them come the D. C. panels of the rotaries, next to which is the main D. C. panel, beyond which are the D. C. feeder panels. Each A. C. panel contains the handle of the high-tension switch on the gallery above, in addition to one A. C. ammeter and voltmeter, and synchronizing receptacle and lamp. An induction wattmeter is mounted on one panel, and connected to a current transformer in the high-tension A. C. bus-bars so as to record the total input of the sub-station. Mounted on the sub-base of one of the A. C. panels is the time element relay, and on the same panel is a push-button, by which the relay circuit can be closed by hand to trip the A. C. breakers in case of necessity or for testing.

Each D. C. rotary panel is of the General Electric standard railway generator type, containing two main switches, an astatic ammeter, circuit-breaker, field rheostat and so forth.

The only apparatus required for rotary converters and not required for generators is two switches mounted on the sub-base of the panel. These are used in starting the converter as a direct-current shunt motor.

Mounted on the sub-base of the main panel is a rheostat switch, which can be used for starting any rotary, being transferred from one rotary to another by means of a transfer switch on the sub-base of each D. C. rotary panel. In addition to this transfer switch there is a field switch, by means of which the field may be excited from the bus-bars while starting the machine.

The main panel also contains a main recording wattmeter for measuring the total sub-station output of direct current, and an astatic main ammeter and voltmeter, the latter being connected to receptacles on the converter panels, so that it may be made to read the voltage of any machine. The main ammeter and voltmeter are mounted double-deck fashion on a bracket, so that they may be swung around to face in any desired direction.

The outgoing feeder panels are equipped as usual.

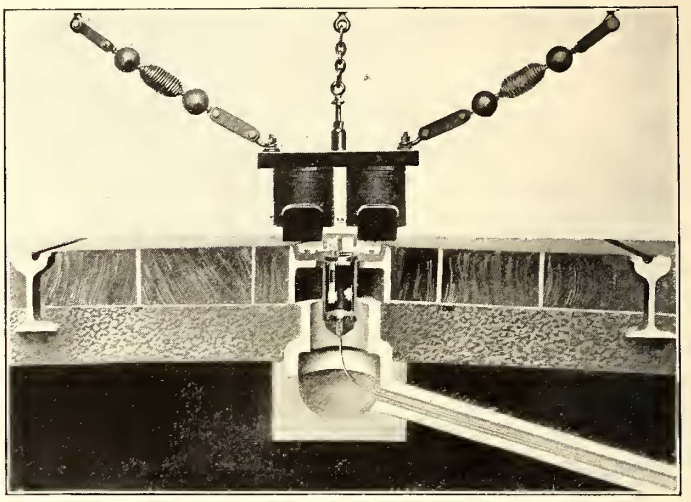
Provision is made in all cases to start the rotary converters by means of direct current. Two of the new sub-stations contain storage batteries, from which the rotaries may be started; the other two are fitted with motor generator sets. Each set consists of a 20-kw, 500-volt generator, coupled to a 30-hp induction motor, which is supplied from the high-tension lines by means of suitable step-down transformers. This induction motor is started by simply closing the high-tension side of its step-down transformers to the incoming line. When up to speed the generator is excited, and by means of it any one of the rotary converters may be started as a direct-current motor, and accurately synchronized by adjusting its field strength.

Each sub-station is operated with only one attendant, and the amount of attention required by the machines is so small that this one attendant is idle or available for other work a large part of the time. The starting of these sub-stations has greatly improved the service by reducing the amount of feeder copper needed, by raising the efficiency of 500-volt distribution, and by steadying the voltage throughout the network.

Electric Traction at the Paris International Electrical Congress

At the International Electrical Congress, held in Paris Aug. 18-25, the subject of electric traction assumed a prominence apparently not anticipated by those who drew up the programme of the congress. Originally the electric railway was included in Section II., dealing with electric lighting and the production and the chemical utilization of electricity. It was soon seen that this section had a scope too wide, and it was finally divided into three sub-sections of which one had sole cognizance of electric traction.

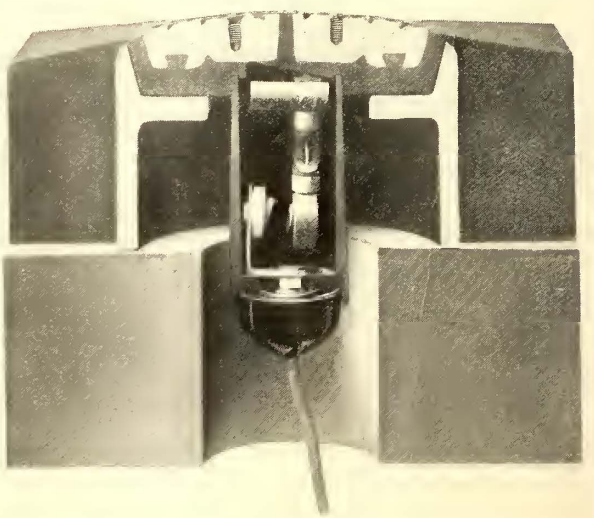
The proceedings in the electric traction sub-section were at times enlivened by the cross-examination of inventors of rival systems. Few of the papers read in this section were printed, and most of the subjects on the programme were expounded off-hand, many points being brought out or elucidated by questions from



GENERAL SECTION OF TRACK EQUIPMENT IN THE DOLTER SYSTEM

the audience. Almost the entire time of the sittings was taken up by expositions of the Dolter, Diatto, Vedovelli and Bede systems of surface contact railways, the inventor in each case acting as spokesman.

The Bede system is employed on an experimental line in Brussels, about 1200 ft. in length. The conductor is placed in an iron conduit located alongside of one of the rails, from which it is separated by a groove about 1 in. wide. A plow or shoe travels in this groove, and spaced every 3 ft. are contact buttons, by means of which current is obtained for the motor. The contact device consists of a button-headed rod which, when depressed, makes contact with a portion of the cable at a point at which the



SECTION OF CONTACT BOX DOLTER SYSTEM

insulation has been removed. This contact piece is held in a rubber stopper or plug, the function of which is, first, to support the contact piece; second, to seal the conduit containing the conductor, and third, to act as a spring to break the current when the plow passes away. Normally the contact device is ⅛ in. distant from the conductor. Mr. Bede stated that the trial of the system has shown the insulation is well maintained, the passing of carriages has no adverse influence, no difficulty is found in keeping the groove clean and there has been no accident to man or beast. The entire conduit rests on the ties.

Prof. Blondin, for Mr. Dolter, described an electric railway surface-contact system now being operated over a line a ¼ mile long in the outskirts of Paris, and known as the Dolter system. This surface-contact system is worked magnetically. The car

magnet or shoe is excited by the current operating the car or from a small storage battery on the car. In passing over a box this magnet draws up a cylinder of iron constituting one of the arms of a knuckle joint, and the other arm then brings into contact two carbon discs of which one is connected to the feeder and the other to the surface plate of the contact box—the latter thus becoming active and delivering current to the shoe and motor. One feature of the system is that one of the disc leads contains a fuse, which will blow in case of a short circuit between the contact knob and the rails. The general arrangement of the system is shown in the accompanying engravings.

The Diatto system, which is also a magnetic system, was described in full in the STREET RAILWAY JOURNAL for July, 1899. It is in use on a short section of line at Tours, France.

Mr. Claude also read a paper on electrolysis from railway return currents, giving a resumé of the more important literature to date. His conclusions are that the ill effects of electrolysis are eliminated by an observance of the 5-volt drop rule, or even by limiting the drop to 1 2/5 volts per mile, for the reason that either limits to 1.5 volts the pressure between rails and piping. As this is the real criterion, Mr. Claude considers that the regulations should consist of this provision, *i. e.*, a limit of this pressure to 1.5 volts, and also that the connection of piping with rails should not be allowed.

Mr. Leon Gerard described the system of electric traction employed on the canal from Brussels to Charleroi. Three-phase currents are used, part of the energy of the line being devoted to lighting and power along the canal. The line is 48 miles long, and serves two sub-stations, one 17 miles from Brussels and the other 6 miles from Charleroi. There are three generating units of 150 hp each, producing current at 6000 volts. Part of the current is used along the line for power and lighting. The haulage is performed by means of motors on four-wheel cars, which do not run on rails, but on the canal bank formerly used in horse traction. In places where traction by the motor cars becomes difficult, as in narrow passages at quays, etc., the boats are towed by electric launches receiving current from the line. The speed of haulage is 2.4 miles per hour for boats loaded, and 4.8 miles for empty boats. The efficiency of the generator is 93 per cent, and of the transformers 97 per cent. The efficiency between the dynamo and the boat towed is 27.5 per cent. The price of towing is one-tenth cent per ton. The system has been operating regularly since October, 1899, and moves 600,000 tons annually.

Colonel Renard discussed the formula given by Mr. Ernest Gerard for the resistance of a motor car—

$$f = 1.8 + .04\ V + \frac{.0415\ V^2}{T}$$

Expressing V in meters per second, and not kilometers per hour, the formula becomes—

$$f = 1.8 + .144\ V + \frac{.54\ V^2}{T}$$

Colonel Renard shows that the last term, which refers to the resistance of air, is in remarkable accord with the general results of experiments on plane surfaces. He also spoke of the importance of the shape of the fore and after parts of cars for high speeds.

Annual Meeting of the Railways Company General

The first annual meeting of the Railways Company General was held at Camden, N. J., Sept. 17. Directors were re-elected as follows: Evans R. Dick, R. H. Rushton, J. Ogden Hoffman, Jay Cooke, 3d., George S. Graham, W. W. Gibbs, J. R. McAllister, S. B. Vrooman and R. I. McKinstry. President Evans R. Dick presented the following report:

The company was organized under the laws of New Jersey in August, 1899. President Evans R. Dick in presenting his report said, in part: "As the properties owned by the Railways Company General were acquired from time to time during the year, and as their business was to a very large extent construction work, no statement of earnings can be furnished that will render a fair account of the company's business. The company owns first mortgage 5 per cent bonds secured upon electric roads amounting to $1,325,000, as well as stocks in various electric roads, electric lighting and other corporations amounting at par value to $1,055,750, and valued by the previous board of directors at $444,500. During the month of July, through the purchase of a large block of stock of the Railways Company General, the management was changed, and since then the work of arranging the finances of the company and readjusting its accounts has proceeded, and, in due time, when the earning power of the property becomes more established, the assets of the company will be revalued and a new balance sheet issued by your present board. It is well to say in this connection that the system of roads owned and controlled by your company (omitting the Newtown Electric Railway, which is not controlled) earned $22,203 gross for July, and $26,999 for August. The general manager of the company believes that the system of roads can be operated at 50 per cent. As the result of these various roads for the ensuing year is a matter of conjecture, your management prefers to make no predictions as to the amount of money that will be earned, although it would appear that the interest upon the first mortgage bonds should be earned with a safe surplus besides. Since the present management came into office, an arrangement was made with the Investment Company of Philadelphia for an advance of $300,000, which was used in paying off various liabilities incurred for construction, etc., and also providing the company with funds enabling the various subsidiary companies to place their roads and equipment in condition for the most economical management. The annexed balance sheet as of June 30, 1900, is hereby respectfully submitted, as well as a brief description of the assets of the company:

Trial balance June 30, 1900

Capital stock		$1,500,000
First mortgage bonds	$1,325,000	
Stocks owned	444,500	
Interest account	123	
Mortgage		100,000
Bills receivable	3,500	
Furniture and fixtures	1,473	
Bills payable		121,648
Accounts receivable	187,843	
Accounts payable		173,000
Cash	407	
Due to companies and individuals		92,363
Sundries	24,163	
	$1,987,011	$1,987,011

LIST OF BONDS OWNED BY THE RAILWAYS COMPANY GENERAL

	Par value
Michigan Traction Company, first mortgage 5 per cent bonds	$600,000
Newtown Electric Street Railway 5 per cent bonds	200,000
Elmira & Seneca Lake Railway 5 per cent bonds	300,000
Lewisburg, Milton & Watsontown Passenger Railway 5 per cent bonds	150,000
Montoursville Electric Street Railway 5 per cent bonds	75,000
	$1,325,000

LIST OF STOCKS OWNED BY THE RAILWAYS COMPANY GENERAL

	Par value
Lewisburg, Milton & Watsontown Passenger Railway Company	$150,000
Milton Electric Light & Power Company	27,750
Montoursvillle Passenger Railway Company	75,000
Montoursville Electric Light Company	10,000
Elmira & Seneca Lake Railway	153,000
Michigan Traction Company	400,000
American Engineering Company	200,000
Newtown Electric Street Railway	40,000
	$1,055,750

Annual Meeting of the American Railways Company

The annual meeting of the American Railways Company was held at Camden, N. J., on Sept. 20. The reports of both the president and secretary were received and filed, and directors were re-elected as follows: John S. Bioren, Samuel G. DeCoursey, William F. Harrity, A. A. McLeod, Edward J. Mathews, Clarence Miller, Silas W. Pettit, Samuel R. Shipley, J. J. Sullivan and William H. Shelmerdine. The report of the president covers the period dating from the incorporation of the company, April 21, 1899, to June 30, 1900, a period of about fourteen months. The surplus earnings are given at $94,736. A portion of the period under report was spent largely in conducting negotiations for the purchase of properties, and it is set forth in the report that payments on stock subscriptions have averaged only about eight months prior to July 1, 1900, so that the $94,736 surplus represents net earnings on the entire $3,750,000 capital for eight months only, or at the rate of 4 per cent per annum.

In addition to the payment of the dividends and interest upon the securities owned by the American Railways Company, the several companies controlled by the company earned a surplus of $74,892. This sum is equal to an additional earning for the eight months at the rate of nearly 3 per cent, showing aggregate earnings of over 6 per cent per annum.

The American Railways Company has not owned all the companies which it now controls for the entire year, so that the entire yearly income of these companies was not received by the American Railways Company, and the following figures, covering the period from July 1, 1899, to June 30, 1900, give an idea of the earning capacity of the company, had the company operated its entire system for the full period named:

Gross		$603,606
Expenses		320,573
Net		283,093
Taxes and interest		101,701
To which should be added:		
Interest on bonds owned by the A. R. Co.	$31,500	
Dividend on preferred stock Chicago Union Traction Company	25,000	$56,500
		$237,892

The treasurer's report from April 21, 1899, to June 30, 1900, is as follows:

Income		
Interest on bonds owned by the company	$36,749	
Dividend on stocks owned by the company	107,331	
Gross income		$144,081
Deductions from income		
General expenses	$16,188	
Printing and registration of stock, stamp, tax	6,090	
Balance interest account	16,784	
Expense, legal	2,514	
Charter and expense of incorporation	5,024	
Taxes	2,500	
Depreciation of office furniture and fixtures and of engineering department instruments	312	
Total deductions from income		49,344
Surplus		94,736

General balance sheet of June 30, 1900, shows:

Assets	Total Issue	Owned by A. R. Co.	Cost
Springfield Railway Company first mortgage 6 per cent	$500,000	$500,000	$500,000
Springfield Railway Company inc. 5 per cent	100,000	98,748	78,998
Springfield Railway Company capital stock	1,000,000	949,100	57,228
Bridgeton Electric Company	25,000	25,000	25,000
Bridgeton & Millville Traction Company	200,000	200,000	230,689
People's Railway Company	1,100,000	1,095,700	1,316,386
Springfield Light & Power	200,000	200,000	190,203
Joliet Railroad Company	600,000	597,700	498,807
Chicago Union Traction	Pref. 500,000 / Com. 250,000		500,000
			$3,397,313
Total cost of stocks and bonds			
Bills receivable, accounts receivable, etc.			272,793
Tax on capital stock paid from July 1 to Dec. 31, 1900			2,500
Bridgeton Electric Co., new power station			62,018
Bridgeton & Millville Traction Co., new car house			255
Springfield Railway Company			9,853
Chicago & Joliet construction			91,563
Cash on hand			37,639
			$3,873,939
Liabilities			
Capital stock			$3,750,000
Bills audited, but not paid			9,268
Accident insurance fund			5,221
Balance due sub-companies			14,465
Accounts payable			247
Profit and loss, surplus as per operating report			94,736
			$3,873,939

Annual Reports of the Chicago Elevated Railroad Companies

The annual reports of the Chicago elevated railroad companies for the year ending June 30 have just been made public. They show an appreciable increase in both gross and net earnings over last year's operation, and are generally considered satisfactory. The increase per cent in gross earnings of the Metropolitan is 19.5; of the South Side, 18.5; of the Lake Street, 11.4. The reports compare as follows as to earnings from operation:

	1899	1900
Metropolitan	$667,799	$868,321
South Side	421,332	527,544
Lake Street	333,281	343,216
Northwestern	.....	39,152
Total	$1,422,412	$1,778,233

The percentage of operating expenses to gross receipts on the Metropolitan was 55.6; on the South Side, 56.6; on the Lake Street, 66.1.

The Metropolitan report shows:

	1899	1900
Gross receipts	$1,291,697	$1,550,409
Operating expenses	623,898	682,088
Maintenance of way and structure	27,830	34,021
Maintenance of equipment	59,952	89,918
Conducting transportation	461,676	487,220
General	74,440	70,929
Earnings from operation	$667,799	$868,321
Receipts from other sources	45,102	53,052
Net income	$712,901	$921,373
Fixed charges	371,141	618,517
Interest	* 155,368	378,320
Rents	150,003	157,890
Taxes	56,275	52,000
Miscellaneous	9,495	30,309
Net earnings	$341,760	$302,856
Dividends	.....	217,952
Surplus	† $341,760	$84,904

* Part of year only. † Of this, $76,980 was the surplus of the new corporation, the Metropolitan West Side Elevated Railway Company, from the beginning of its operations, Feb. 2, 1899, to June 30, 1899.

The South Side Elevated report shows:

	1899	1900
Gross receipts	$1,026,270	$1,217,493
Operating expenses	* 604,938	689,949
Maintenance of way and structure	39,720	48,623
Maintenance of equipment	65,780	93,569
Conducting transportation	455,600	498,612
General	43,838	49,145
Earnings from operation	$421,332	$527,544
Receipts from other sources	37,476	40,886
Net income	$458,808	$568,430
Fixed charges	99,525	57,858
Interest	33,750	33,750
Taxes	26,108	22,332
Other	39,667	1,776
Net earnings	$359,283	$510,572
Dividends	103,238	361,333
Surplus	$256,045	$149,239

* Includes loop rental.

The Lake Street report shows:

	1899	1900
Gross receipts	$639,340	$713,475
Operating expenses	306,059	370,259
Maintenance of way and structure	10,741	11,608
Maintenance of equipment	25,481	31,803
Conducting transportation	240,104	290,336
General	29,733	36,512
Earnings from operation	$333,281	$343,216

Receipts from other sources	13,959	14,112
Net income	$347,240	$357,328
Fixed charges	341,649	373,957
Interest	261,444	262,769
Rents	66,753	100,009
Charges	13,452	11,179
Net earnings	$5,591	* $16,679

* Deficit.

The Northwestern report shows:*

Gross receipts	$65,487
Operating expenses	26,335
Maintenance of way and structure	627
Maintenace of equipment	1,318
Conducting transportation	21,590
General	2,800
Earnings from operation	$39,152
Receipts from other sources	.....
Net income	$39.152
Fixed charges	29.097
Interest (30½ days)	20.925
Rents	6.506
Taxes	1.666
Net earnings	$10.055

* From May 31 to June 30.

Train to the Kansas City Convention

The committee on transportation to the Kansas City Convention has issued the following revised circular regarding train accommodations:

SPECIAL NOTICE! REVISED CIRCULAR!

The committee begs to advise that they have arranged with the New York Central & Hudson River Railroad for the accommodation of delegates and others, attending the above convention, as follows:

Leave New York	N. Y. C.	10.00 A. M.	Sunday,	October	14th.
" Poughkeepsie	"	11.45 A. M.	"	"	"
Arrive Albany	"	1.20 P. M.	"	"	"
Leave Albany	"	1.30 P. M.	"	"	"
" Schenectady	"	2.00 P. M.	"	"	"
" Utica	"	3.40 P. M.	"	"	"
" Syracuse	"	5.05 P. M.	"	"	"
" Rochester	"	6.50 P. M.	"	"	"
Arrive Buffalo	"	8.35 P. M. (E. T.)	"	"	"
Leave Buffalo	L. S. M. S.	7.40 P. M. (C. T.)	"	"	"
" Erie	"	9.40 P. M.	"	"	"
" Cleveland	Big Four	12 10 A. M.	Monday,	October	15th.
" Indianapolis	"	8.00 A. M.	"	"	"
Arrive St. Louis	"	1.50 P. M.	"	"	"
Leave St. Louis	Wabash	2.15 P. M.	"	"	"
Arrive Kansas City	"	9.20 P. M.	"	"	"

The train will consist of baggage, smoking and Pullman vestibuled drawing room sleeping cars, and dining car serving meals through to Kansas City. A special representative of the New York Central will accompany the party to Kansas City.

RATES OF FARE

Special rate of one and one-third fare on the certificate plan has been made, and delegates, when purchasing tickets, should ask ticket agent for certificate which, on presentation at Kansas City, will secure one-third fare for the return trip. Sleeping cars at regular rates.

The committee in charge would respectfully urge that all who take the train at New York, or stations on the New York Central & Hudson River Railroad, communicate with Milton C. Roach, general Eastern pasenger agent, New York Central & Hudson River Railroad, 1216 Broadway, New York, stating exact accommodations required and from what point.

Reservations will be made in order as received, and prompt notification of assignment made to applicant.

TICKET AND SLEEPING CAR FARES TO KANSAS CITY

From	Ticket Rate, One Way	Berth, One Way
New York	$31.75	$7.50
Poughkeepsie	30.75	7.50
Albany	30.25	7.00
Schenectady	30.00	7.00
Utica	29.25	6.50
Syracuse	28.62	6.00
Rochester	27.02	5.50
Buffalo	26.00	5.50

Money can be remitted to Mr. Roach direct.

Members of the association and their friends, starting from Boston and points on the Boston & Albany Railroad, should arrange to take regular train leaving Boston at 10:45 a. m., Sunday, Oct. 14, reaching Kansas City early Tuesday morning.

Application for space should be addressed to J. L. White, passenger agent of the Boston & Albany Railroad, 366 Washington Street, Boston, Mass.

The committee would respectfully suggest that delegates and their friends should make early arrangements. Applicants should address or call on ticket agent, Wabash Railroad, at Kansas City, for the return trip.

H. H. VREELAND, Chairman.
JAMES H. MCGRAW,
CHARLES W. PRICE,
T. C. MARTIN,
Committee for New York.

CHAS. S. CLARK, Committee for Boston, 8 Oliver Street, Boston.

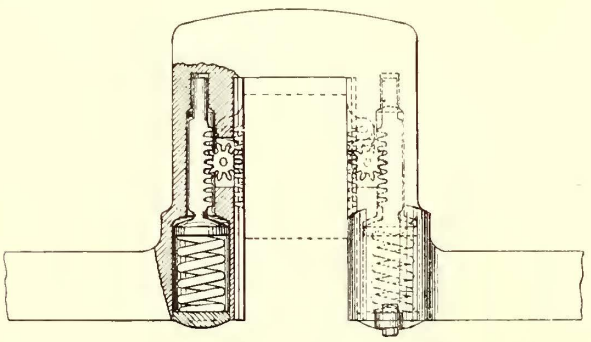
Street Railway Patents

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

ELECTRIC RAILWAY PATENTS ISSUED SEPT. 25, 1900

658,355. Railway Track Structure; T. C. Du Pont, Johnstown, Pa. App. filed Dec. 1, 1899. A cast-steel track structure having its rail members provided with a joint or extension piece, consisting of a length of rolled rail and cast-steel splice-bars cast to and uniting the rail member to the rolled-rail length.

658,356. Railway Track Structure; T. C. Du Pont, Johnstown, Pa. App. filed Dec. 1, 1899. Consists of a railway track structure composed of a plurality of rails or rail sections properly fitted together and placed to form the particular structure in view and united by a central portion of hardened cast-steel case in place between and through the rail sections, and having its upper surface provided with flangeways and gage lines which align with those of the rails.



PATENT NO. 658,390

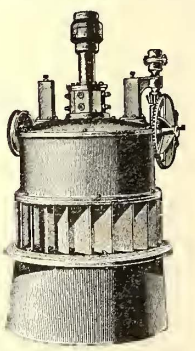
658,357. Rail Joint; T. C. Du Pont, Johnstown, Pa. App. filed Dec. 1, 1899. See preceding patent.

658,360. Railway Track Structure; E. B. Entwisle, Johnstown, Pa. App. filed March 19, 1900. Provides for removal and replacement of wear plates which are used to form the intersection portions of track crossings.

658,376. Railway Track Structure; C. F. Kress, Johnstown, Pa. App. filed March 19, 1900. See preceding patent.

658,388. Mechanism for Imparting Successive or Alternating Movements; E. Moore, Meductic, Canada. App. filed Nov. 15, 1899. Provides means for alternately shifting an electric current in order to operate the switch tongue of tramway switches.

658,390. Car Truck; E. G. Nicewaner, Johnstown, Pa. App. filed Jan. 8, 1900. Consists in seating the journal-box springs laterally of the journal boxes, and in so connecting them with



the said boxes that they receive by compression upward thrusts or movements of the boxes, and also the weight of the load, and thus cushion the effects thereof.

658,405. Railway Track Structure; P. G. Stormer, Johnstown, Pa. App. filed Dec. 1, 1899. See preceding patents on track structure.

658,445. Electric Car; A. A. Ingraham, Lowell, Mass. App. filed Oct. 2, 1899. Details relating to gearing and motor support.

658,448. Car Truck; H. R. Keithley, Buffalo, N. Y. App. filed April 4, 1900. Details of a truck, the side frames of which are constructed mainly of pressed steel.

658,449. Car Truck; H. R. Keithley, Buffalo, N. Y. App. filed June 22, 1900. See preceding patent.

658,525. Platform Car; E. C. Huse, Somerville, Mass. App. filed May 31, 1900. Designed for use in suburban express service. A platform car is provided with pivoted runways at its ends, whereby a loaded express wagon may be steadily drawn on the car for transportation. The runways may then be swung over the body of the car and serve as trigs for the wheels of the wagon.

658,530. Combined Wheel Fender and Emergency Brake; E. L. Requard and E. S. Merryman, Baltimore, Md. App. filed July 14, 1900. A pivoted frame normally held up away from rails and wheels, carries a fender and wedge-shaped blocks of steel toothed on under surface. When released, frame carries fender to proper place and toothed blocks engage and bite into upper surface of rails.

658,659. Car Truck; J. L. Levy, New York, N. Y. App. filed Sept. 14, 1897. Consists in framing an extension of the truck bolster, supporting it on the truck frame by links and equalizing bars, the links having a compression and recoil spring, and pivotally uniting the links with the truck frame and the links of the equalizing bars, so that both links, bars and bolster can swing transversely in union with the movements of the car body.

658,702. Car Fender; J. L. Conner, Washington, D. C. App. filed May 16, 1900. Structural details.

PERSONAL MENTION

MR. B. J. ARNOLD, of Chicago, who has been making an extensive trip abroad, will sail for New York on the Majestic, leaving Oct. 10.

MR. A. KUNDIG, who is associated with Mr. Stephen D. Field in the reconstruction of the Genoa, Switzerland Street Railway system, was married Sept. 10.

MR. CHESTER P. WILSON, lately of Milwaukee, expects to spend the next few months in Europe on a business trip. Mr. Wilson will sail Oct. 6, and will make his headquarters in London.

MR. A. B. SHEPARD, manager of the Cleveland branch of the General Electric Company, was married to Miss Gertrude Robbins, of New York City, at St. George's Church, New York, on Sept. 18.

MR. MARTYN WELLS, resident manager of the Calcutta Tramways Company, of Calcutta, India, who has been in this country inspecting the electric railway lines and studying American practice, sailed for London Oct. 3, on the Oceanic.

ENGINEERING SOCIETIES

THE ENGINEERS' CLUB OF PHILADELPHIA.—A business meeting of this club will be held on Saturday, Oct. 6, 1900, at 8 o'clock, p. m. A communication will be presented from the Engineers' Society of Western New York requesting the co-operation of the club in the establishment of a joint congress and engineering exhibit at the Pan-American Exposition, to be held in Buffalo, N. Y., from May 1 to Nov. 1, 1901. The desirability of bringing together, upon some annual occasion, the members and friends of the club, and their families, has received the favorable consideration of the board of directors. The suggestion has been made that the annual celebration of the organization of the club, which occurred on Dec. 17, 1877, might be inaugurated, and that such an occasion would be most fitting for an annual reunion as above indicated. It has been further suggested that the second Saturday of December of each year might hereafter be denominated "Founders' Day"; that the stated meeting of that date be held in a hall suitable for the convention indicated; and that the programme for these celebrations and annual reunions might consist of popular lectures, or such other suitable exercises as may be determined upon from time to time. The plan above indicated will be submitted to the club for its judgment and action. Prof. Fred. W. Gordon will deliver a lecture on "Transmission of Gas and Air Through Pipes; and the Transmission of Power by Compressed Air."

NEWS NOTES

[News notes for this department are solicited.]

BOSTON, MASS.—A special from Boston says that the Railroad Commissioners have informally notified the counsel of the Lynn & Boston Street Railway Company and Nathan Matthews, Jr., representing C. S. Cummings & Company, that the Board would refuse to authorize the issue of $1,500,000 additional capital stock until it had made inquiries as to the value of the road, its financial condition and its management. The investigation has already been started and will shortly be completed by the Board inspector, Mr. McLean, and by Appraiser Hodges. The Board further stated that in case the additional issue was allowed it would not allow the same to be sold at less than $125 per share.

WORCESTER, MASS.—The Worcester & Blackstone Valley Street Railway Company will shortly apply to the Railroad Commissioners for permission to carry baggage and freight on its lines. There is a general desire among the farmers of the suburban district served by the company's lines to have their milk brought to town on the electric railways. It is believed that this alone would prove profitable.

DULUTH, MINN.—The City Council of Superior has instructed the City Attorney to take immediate steps for the annulment of the franchise of the Duluth & Superior Traction Company, operating there. The alleged reason is that the company has failed to keep its agreement as to improving its system. The action of the Council is not taken seriously.

UTICA, N. Y.—The City Council has just passed an ordinance compelling all street railway companies operating cars in the city to equip them with fenders. The ordinance stipulates that this must be done by Nov. 1, and that failure to comply with this provision will result in a fine of $25 for each violation.

SYRACUSE, N. Y.—The Archbold-Brady Company, of this city, has just been incorporated, with a capital stock of $50,000. The company will do a general contracting business, and will make a specialty of constructing street railways, lighting plants, etc. The directors of the company are: William K. Archbold, of New York; Paul T. Brady and Robert E. Drake, of Syracuse.

PHILADELPHIA, PA.—The J. G. Brill Company is now constructing seventy-five convertible cars for the International Traction Company, of Buffalo. It is expected that the cars will be ready for delivery in December.

SEATTLE, WASH.—The Seattle Electric Company will shortly concentrate its operating and office force, and has engaged offices in Holyoke Block, which it is now preparing to occupy. The company will occupy two floors and the basement of the building. The new transfer system, which was inaugurated on Sept. 5, has proved popular with the riding public.

SEATTLE, WASH.—Control of the Seattle-Tacoma Railway Company has passed into the hands of Jacob Furth, of Seattle; George B. Blanchard, of Tacoma, and Eastern capitalists. A new board of directors and new officers have been elected, the new officers being as follows: Jacob Furth, president; George B. Blanchard, vice-president and manager; W. C. Forbes, of Boston, treasurer. Mr. Furth states that it is the intention of the company as now organized to put engineers in the field with a view of examing the several routes that have from time to time been proposed, and that a careful examination will be made before finally determining on the route to be selected. Mr. Blanchard will have charge of the active work of the company, and he will begin examining the ground without delay. As soon as a definite route is decided on, construction will be resumed and prosecuted with as little delay as possible. The Seattle-Tacoma Railway Company was organized in the spring of 1899, Henry Bucey, of Tacoma, being the active organizer. With him were associated John Collins and Andrew Chilberg, of Seattle, and H. E. Knatvold and Samuel Wilkinson, of Tacoma.

CONSTRUCTION NOTES

[Information regarding the building of new roads, enlargements of power plants, extensions, etc., will be much appreciated.]

SAN FRANCISCO, CAL.—Plans looking toward the abolition of cable and the substitution of electricity on all the lines of the Market Street Railway Company in Western and Richmond districts, have been presented to the directors by Superintendent of Construction Henry J. Lynch, and will doubtless be accepted. Remodeling involves the expenditure of $500,000.

DES MOINES, IA.—The Des Moines Street Railway Company is replacing the old rails all over its lines in the business portion of the city with new and heavier rails. The company is also constructing a loop, which will run by the main entrance of the Union Depot, and over which all cars will run. The company has put extra cars on several of its lines this fall, in order to expeditiously handle the increase in traffic. It is said that the company proposes to begin the construction of the new line from Valley Junction to Greenfield at once.

HAVERHILL, MASS.—The Lowell, Lawrence & Haverhill Street Railway Company has just been granted a franchise for the extension of its lines from Ward Hill to the North Andover line.

BROCKWAY, MICH.—Gill R. Lovejoy, of Mount Clemens, and J. E. Weter, of Richmond, are here securing the right of way for the new Richmond & Sanilac Center Electric Railway, and will go north from Richmond, striking the following towns: Memphis, Emmet, Brockway, Yale, Speaker, Peck and Sanilac Center.

ALBION, MICH.—The City Council has granted the Kalamazoo Valley Electric Railway Company a thirty-year franchise. The franchise has been hanging fire for two years, and was recently passed by the Council, but vetoed by the Mayor. The present franchise compels the company to run the road through Main Street if grade crossings can be secured over the L. S. & M. S. and M. C. Railroad tracks.