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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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Contents of this Issue

Consolidation of Southern Jersey Companies

On Sept. 1 the consolidation of the Camden Gas Light Company, Camden Gas & Fuel Company, Camden & Burlington Gas & Electric Company, East Side Gas Company, the Gloucester Electric Company, the Consumers' Gas Company, of Woodbury, Woodbury Electric Light & Power Company, and the Camden, Gloucester & Woodbury Electric Railway Company was completed as the South Jersey Gas, Light & Traction Company. Among those interested in the new company are: Anthony Kuser, Thomas N. McCarter, Jr., David Beard, William J. Thompson, John J. Burleigh and Charles H. Watson.

Sale of Fort Worth Roads

The sale of the City Railway and the Fort Worth Street Railway, of Fort Worth, Texas, to the Coffenberry-Bishop syndicate, of Cleveland, O., is announced. It is said that $400,000 was paid for the properties. The combined systems have 19 miles of track and thirty-two cars. The Coffenberry-Bishop syndicate is also interested in the Dallas & Fort Worth Electric Railway, which is now constructing a line between Dallas and Fort Worth. With the city lines in Fort Worth and the interurban line between Dallas and Fort Worth, they will have a very complete system. R. S. Vivian, of Chicago, completed the negotiations for the transfer.

Land Owners' Road Rights

Judge Landis, of Lancaster, Pa., has just rendered a decision in which he holds that electric railway companies cannot force themselves into neighborhoods where they are not wanted, and that the owners of land control a thoroughfare to its middle. In rendering his decision the judge holds that, the principle having been settled that the right of the soil of a highway resides in the properties of the land over which it has been laid, the plaintiff controls one side of the road, on which the company may not build, but they may build on the other half, if the owner of abutting property does not object, and no damage is done the plaintiff's property.

The G. A. R. Reunion and Chicago Traffic

The G. A. R. reunion held in Chicago last week was responsible for an increase in the street railway traffic such as has not been experienced by the roads for some time. No official figures of the number of passengers transported are obtainable, but the cars were taxed to their utmost capacity at all times. The companies had early realized that there would be some difficulty in handling the crowds, and had every available car in commission. However, it is not expected that the companies could meet the sudden demand made by such a big event, and considering all things there was no cause for complaint. The crowds were handled as expeditiously as could be expected under the existing circumstances.

Justifiable Profanity

Judge Mills, of Washington, D. C., has created somewhat of a sensation by discharging a prisoner arraigned before him on the charge of using blasphemous language, saying that the defendant was justified in using profane language, and that the act was praiseworthy. Swearing is against the law in Washington, and those arrested on a charge of this kind are usually convicted and punished. The prisoner, when arraigned, said that the recent changes in the transfer system of the lines of the Washington Traction & Electric Company had led him to swear, and freely admitted that he had used rather harsh language. The judge said that the changes in the system had resulted in many complications, and, after a lengthy rehearsal of the facts by the prisoner, finally discharged him, saying that the act was justifiable in his case.

Railway Suggestions Invited by Mail

After careful consideration the Chicago Street Railway Commission has decided to invite suggestions by mail from the residents of the city on the traction situation. A number of questions are now being prepared by the commission, on which it especially desires the public at large to express its opinion. The object is to obtain the popular side of this absorbing topic, and this was considered the most expeditious way to obtain it. Among the questions to be asked are the following:

Do you want the city to own and operate the street railways, or would it be more satisfactory for the municipality to hold title in

the rails and lease their use to the different companies which may desire to furnish accommodation to the people?

How would a subway system equipped with all the conveniences known to modern engineering suit you?

In the event of the city authorities extending the franchises of the companies what term would you fix as the limit?

Chicago Companies Deny Right of the City to Compel the Lowering of Tunnels

The Chicago Union Traction Company, West Chicago Street Railway Company and the North Chicago Street Railway Company have filed a general denial in the Circuit Court of the right of the city to compel the lowering of the street railway tunnels beneath the river. Petitions asking the enforced lowering of the three tunnels, at Van Buren, Washington and La Salle Streets, sought the issuance of the order on the ground that the use of the river as a natural highway was being obstructed by the tunnels. Changes in the draft of vessels in the lake carrying trade making a water depth of at least 21 ft. necessary were advanced in support of the proposition to compel the lowering of the tunnels. The jurisdiction of the city to clear the river of all obstructions was declared to be absolute, and the ordinance of March, 1900, was quoted commanding the lowering of the tunnels. The answers of the three companies deny that the tunnels are an obstruction; that the city has no jurisdiction, and that the ordinance is void and in violation of the clause of the Federal Constitution, which declares that no State shall pass any law impairing the obligation of contracts.

Accident Fakir Cleverly Trapped

A systematic attempt to swindle street railway companies throughout the country was made public Sept. 1, when Frank Lieblang, of Cleveland, was arrested in Harper Hospital, Detroit, on the charge of obtaining money under false pretenses. Joseph A. Hosman, a detective in the employ of the Cleveland Electric Railway Company, was engaged to shadow Lieblang and set a trap to catch him. Lieblang's plan was to fall from a moving car and claim to receive serious injuries, his claims being substantiated by a physician who was in the plot. Lieblang owns a saloon in Cleveland, and Hosman gained his confidence by hiring out as a bartender. Later Hosman entered into a plot to swindle a Detroit railway. Last Tuesday he fell from a car in Detroit, and although he states that he received no other injuries than a sprained wrist, he managed through tricks shown him by Lieblang to deceive the surgeons into believing he was badly injured. He was taken to a hospital, and Lieblang conducted negotiations with the street car company, and obtained $200 as a settlement. He was arrested when he went to the hospital to divide the money with Hosman. Hosman says they tried the accident game in New York, but failed. Lieblang has a suit for $10,000 damages pending against the Cleveland company. Last winter he is said to have secured a verdict against the city of Cleveland for $5,555 for injuries suffered by falling into a hole. The Cleveland company has sent H. J. Latimer to Detroit to assist in the prosecution of Lieblang.

International Tramway Congress

The programme of the International Tramway Congress, to be held at Paris Sept. 9-13, has been made public by the executive committee. The list of papers to be presented at the congress was published in the Street Railway Journal for March, page 258. The social programme is as follows:

On Sunday, Sept. 9, at 9 o'clock in the evening, there will be a social meeting of the delegates at the Continental Hotel. The first regular session of the congress will be held on Sept. 10, at 10 a. m., at which the papers by Messrs Géron and Pirch will be presented. At 2 o'clock in the afternoon a visit will be made to the Metropolitan underground road, and a trip will be taken to the Vincennes Exposition. Return will be made by electric tramway cars. The second regular session of the congress will be held on Sept. 11 at 9 a. m., at which the papers of Messrs. Gunderloch, Thonet, d'Hoop, Van Vloten and Fischer-Dick will be presented. At 3 o'clock in the afternoon a reception will be extended to the delegates at the City Hall by the municipal authorities, after which a trip will be made to the electrical subway of the Orleans Railroad Company. The session on Thursday, Sept. 12, will be called to order at 9 o'clock in the morning, and papers will be presented by Messrs. Broca, Johannet, de Burlet and Ziffer. The afternoon will be devoted to a visit to the compressed-air station of the General Omnibus Company, and the electric-power station of the West Parisian road at Moulineaux. On the morning of Friday, Sept. 13, the final papers and schedules for the congress will be presented by Messrs. Macloskie and Monmerqué. In the afternoon a visit will be made to Saint Germain, and in the evening a banquet will be held at the Palais d'Orsay.

The officers and official delegates to the congress are as follows:

HONORARY PRESIDENT

Baudin, Pierre, Minister of Public Works.

GENERAL COMMITTEE

President

Janssen, Léon, general manager of the Société anonyme les Tramways Bruxellois, Brussels.

Members

Messrs. Aigoin, president of the Compagnie generale parisienne de Tramways, Paris.

Broca, manager of the Compagnie des Tramways de Paris et du Department de la Seine, Paris.

Cuvinot, Senator and president of the Compagnie generale des Omnibus, Paris.

Fuster, secretary of the Union des Tramways de France, Paris.

Géron, manager of the Société des Tramways de Cologne, Cologne.

Guary, manager of the Compagnie generale francaise de Tramways, Paris.

Kessels, manager of the Société generale de chemins de fer economiques, Brussels.

Köhler, manager of the Grosse Berliner Strassenbahn Gesellschaft, Berlin.

Lavalard, associate manager of the Compagnie generale des Omnibus, Paris.

Monmerque, chief engineer of Bridge and Highways, chief engineer of the Compagnie generale des Omnibus, Paris.

Radice, president Italian Tramway Association. Milan.

Röhl, manager of the Société des Tramways of Hamburg.

Ziffer, president of several railway companies in Austria, Vienna.

General Secretary

Nonnenberg, F., manager of several street railway companies, Brussels.

Secretary

Janssen, Albert, manager of the Société des Tramways Bruxellois, Brussels.

DELEGATES APPOINTED BY DIFFERENT GOVERNMENTS

Austria

Edler von Leber, Max, ministerial councillor, Vienna.

Strzizek, Franz, chief engineer, Vienna.

Freund, Ludwig, imperial councillor and chief engineer of the State railways of Austria.

Belgium

Janssen, L., general manager of the Tramways Bruxellois, Brussels.

Nonnenberg, F., manager of several tramway companies, Brussels.

Janssen, A., manager of the Tramways Bruxellois, Brussels.

Nyst, F., engineer at Liége.

Canada

Mavor, James, professor of political economy at the University of Toronto, and commissioner general of Canada at Paris.

France

Plazen, appointee of the Minister of Agriculture, Paris.

Holland

Van Leuwen, J., engineer of the State Railways, the Hague.

Hungary

Kadar, G., technical councillor, Buda-Pest.

Monaco

Bergés, P. A., manager of public works, Monaco.

Roumania

Remush, A., forestry engineer, Paris.

Russia

Redel, Commissioner General of Russia at Paris.

Siam

Hoeylaert, H., Consul General of Siam at Brussels.

Rolin, E., Consul General of Siam at Brussels.

Sweden

Fränckle, Member of the Industrial Chamber, Stockholm.

Spain

Pedro Garcia Faria, Commissioner General of Spain at Paris.

United States

Colonel Truesdell, G., president of the Capital Traction Company, Washington.

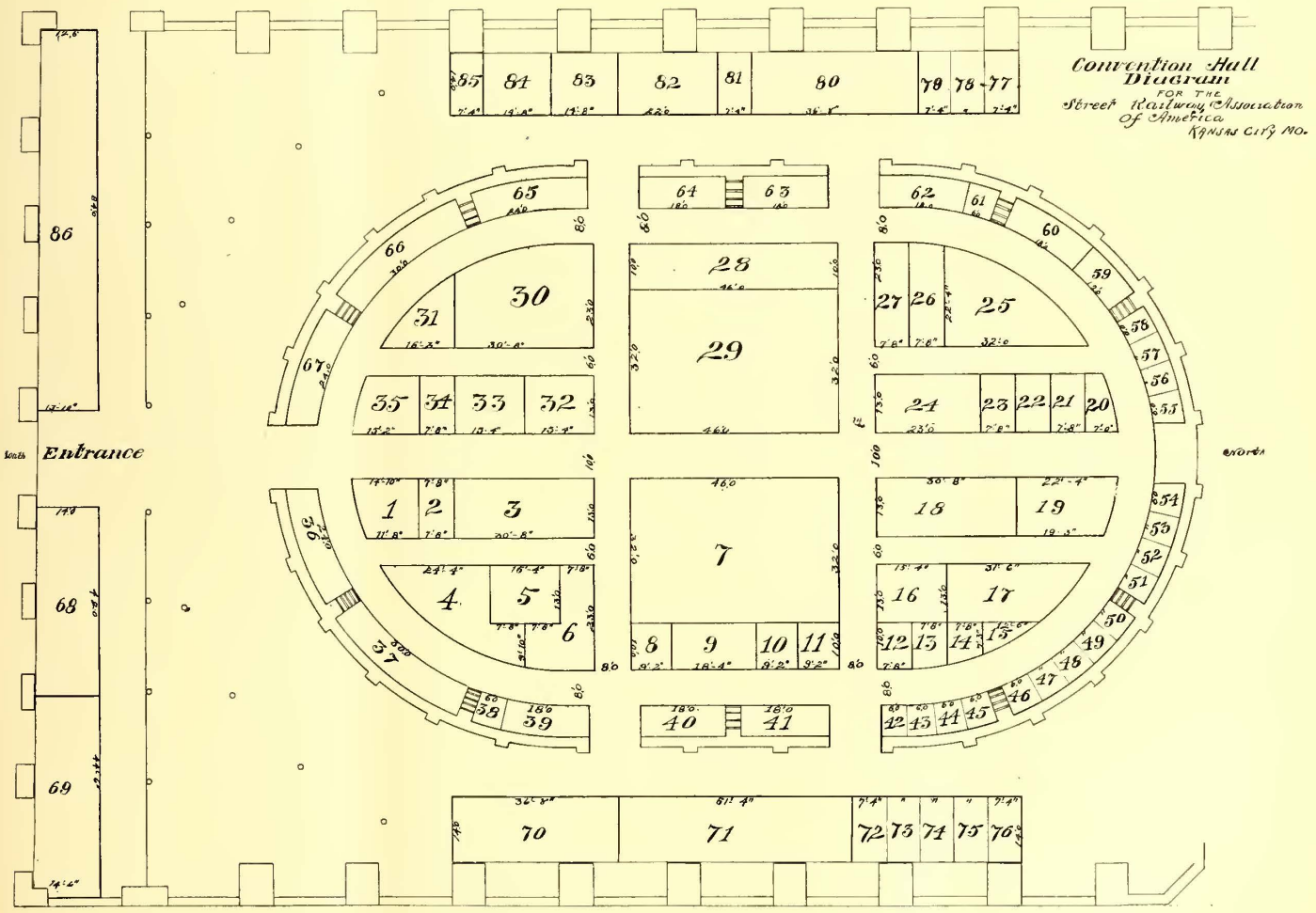
Professor Wilkins, F. S., professor of civil engineering, University of Alabama and assistant in department of transportation.

Allen, W., secretary Massachusetts State Commission.

Assignment of Exhibit Space for American Street Railway Association Convention

A plan showing the exhibit space in Convention Hall, at Kansas City, together with the names of exhibitors and the number of square feet engaged by each, is presented herewith. This is up to date, and leaves only a few spaces not yet taken:

No. of Space	Name of Exhibitor	No. Sq. Ft.
16	Atlas Railway Supply Company	200
22	American Railway Supply Company	100
33	Garton-Daniels Company	200
19	Gold Street Car Heating Company	300
29	General Electric Company	1,500
9	Garl Electric Company	200
25 and 26	Hipwood-Barrett Manufacturing Company	620
66	International Register Company	200
3	K. C. Car & Foundry Company	400
86	Lorain Steel Company	1,000
20	Leschen, A., Sons Rope Company	100
24	McGill, Porter & Berg	300
27	Manville Covering Company	200
36	McRoy, John T.	160
83	Merritt Electric Air Brake Company	200
85	Magann, G. P., Air Brake Company	100
23	National Lead Company	100
65	New Haven Car Register Company	160
42 to 45	Nuttall, R. D., Company	160
4	Ohio Brass Works	400
60	Ohmer Car Register Company	120
67	Pittsburgh Reduction Company	160
68	Peckham Truck Company	500



5	Adams & Westlake Company	200
28	American Car & Foundry Company	500
13	American Brake Shoe Company	100
18	Brown, Harold P.	400
63	B. R. Electric Company	120
10	Bierbaum & Merrick Metal Company	100
6	Curtain Supply Company	300
17	Chisholm & Moore Manufacturing Company	400
30	Christensen Engineering Company	800
62	Chicago Mica Company	120
32	Consolidated Car Heating Company	200
15	Continuous Rail-Joint Company	50
31	Cutler Hammer Manufacturing Company	150
80	Compressed Air Company	500
84	Creaghead Engineering Company	200
37	Dixon, Joseph, Crucible Company	200
12	Diamond State Steel Company	100
51, 52 and 53	Dearborn Drug & Chemical Company	120
34	Electrical Review Publishing Company	100
59	Pomeroy & Fisher	80
8	Pantasote Company	100
55 to 57	Partridge Carbon Works	120
40	Ridlon, Frank, Company	120
1	Street Railway Review	200
35	Street Railway Journal	200
64	Scott, Charles, Spring Company	120
21	Standard Paint Company	100
11	Standard Underground Cable Company	100
54	Spiral Journal Bearing Company	40
69	Taylor Electric Truck Company	500
39	Trojan Button Fastener Company	120
82	Wharton, William, Jr., & Company	300
41	Wood, Charles N.	120
7	Westinghouse Electric & Manufacturing Company	1,500
71	Westinghouse Air Brake Company	700
14	Weber Railway Joint Manufacturing Company	100
2	Western Electrician	100
81	Wheel-Truing Brake Shoe Company	100

Notes From Germany

[*From Our Regular Correspondent.*]

A new telegraph law went into force this year permitting the postal department to utilize public roads for the stringing of telegraph and telephone wires. The effects of these new rights are now being slowly felt. Because the departments could in the past demand payment from individuals or companies who interfered with their lines or caused disturbances therein, Parliament was reluctant to pass the new law. The municipalities claimed that in case they wanted to build roads themselves, they would not even be masters of their own highways. Parliament finally decided that the postal department could demand payment for damages done by private parties, but not by the owners of the highways, *i. e.*, the municipalities. Should the road be purchased by a private party, then the latter must pay for any expense incurred by the department in protecting its lines. This law is of great importance to municipalities, as they can now build roads more cheaply. Formerly the expense of removing telegraph and telephone lines was frequently greater than the building of the road itself, as, for example, in the case now existing at Wiesbaden.

The fact that the State government has, within recent times, frequently granted an extension of franchises to private companies without referring the matter to the municipalities which own the highways, has induced the various city governments to adopt resolutions plainly showing to the State authorities that in the future they will build electric roads themselves. It is, however, not the intention of the cities to operate small, unprofitable roads in connection with an established city railway system, but they want to embody the condition that every party to whom a franchise is granted must have operated a road before. At the same time the cities are gaining valuable experience in the running of roads and the training of employees, but to anybody trained in electric railway practice it is clear that they do not fully realize what is required of a capable superintendent. The cities of Berlin, Charlottenburg and Breslau have adopted such resolutions.

On several much frequented streets of Berlin, such as on Leipziger Strasse, the police department had forbidden the use of trailers, on the ground that the length of motor car and trailer greatly interferes with the traffic. This action was firmly supported by the cab proprietors, who were jealous of the cheap transportation furnished to people by the trailer system, and based their complaints on the doubtful assertion that the trailers were very dangerous. Recent statistics in regard to accidents, however, prove that more accidents are due to motor cars than to trailers, and this has induced the police department to reverse its decision and permit trailers on all streets. This is of importance, as all the large lines connecting the east with the west of Berlin must pass through Leipziger Strasse, and a direct and uninterrupted traffic is thus afforded. In Germany the cost of running a trailer is about one-half of that required to operate a motor car.

As in America, it is found in Germany, that the suburban electric car lines seriously affect the traffic of the heavy steam roads. This is evidenced by frequent notices posted by the railway companies, of which the following is an example: "On account of the recent opening of the electric road, it has been observed that the traffic has been considerably reduced on our suburban trains. On the first two trains there are, on an average, fourteen passengers, and on the last two trains thirteen, so that we feel justified in discontinuing these trains on week days."

The recent trial trips on the Wannsee electric road have induced the military authorities to continue the experiments on the military road, which connects Berlin and Mariendorf with the artillery proving grounds at Zossen. The trials are being conducted by a Berlin company devoted to high-speed electric roads, called the Studien Gesellschaft. Siemens & Halske and the Allgemeine Elektricitäts Gesellschaft will each furnish a motor car which has to meet the following requirements: The cars are 26 ft. long, seat sixty people, and weigh 70 tons. Three-phase current is furnished by the central station at Oberspree at a pressure of 12,000 volts. In the cars themselves this is reduced by means of transformers to 1000 volts. It is desired principally to show by these trials that the desired speed of 200 km per hour can be attained.

The electric omnibus line which began operations in Berlin a few weeks ago may be considered a formidable competitor of the electric street car lines. On the opening day a number of invited guests were met at 7 o'clock at the charging station in front of the Stettiner depot, by Director Meyer, of the company, who welcomed them and invited them to enter a gaily decorated bus. Several streets were traversed and the line then declared open. The eight buses followed at a headway of nine minutes. In equipment the buses resemble those of the already existing line. The fare over the entire line is 10 pfennigs; but certain distances may be traveled over for 5 pfennigs.

The Grosse Berliner Strassenbahn, which had already consolidated with it the South and West Berlin suburban lines, as well as the new Berlin horse-car line, has recently purchased the majority of the shares of the accumulator road from Berlin to Charlottenburg. This was accomplished so secretly that nothing was known of it until the deal was completed. The scarcity of money recently induced a banking house owning most of the shares to sell the same to the Grosse Berliner Strassenbahn. The Berlin-Charlottenburg road paid last year a 3 per cent dividend and a 5½ per cent dividend in the previous year. The transfer price is 142 per cent, so that the stock is being well paid for. It should be remarked in addition that the purchased company's franchise was also extended until 1950, which, for German conditions, is a very long time. The capital stock of the Berlin-Charlottenburg road is M.9,000,000. It possesses one hundred cars, while the Grosse Berliner road has 2000.

As all the cases which arose out of the recent Berlin strike are about settled, it is found that 150 years in prison is the total punishment for the offenders. Aside from these, however, there is still a civil case to be settled, which is of more than usual interest. The advertising window panes in the cars belonging to a certain firm were destroyed by the mob. The firm now demands, in view of a certain law which holds the city responsible for property at the time of a public riot, that the city authorities pay for the damaged panes. The latter refused the demand, and pointed to an agreement between the city and the railway company which stated that the city cannot be held responsible for damage done to the company's property, if the same is caused by riots. The firm claims, however, that this private agreement does not have any bearing on the case, and the company claims that it is responsible for damage done to its own property but not to that of others. The decision is awaited with a great deal of interest.

The annual meeting of the "Verein Deutscher Strassenbahn und Kleinbahn Verwaltungen" will be held at Wiesbaden on Sept. 6, 7 and 8, 1900. The programme is as follows: Sept. 5, in the evening, general reception of the delegates. Sept. 6, at 9. a. m., general business, reading of papers and discussion; at 1 p. m., lunch; in the afternoon, sightseeing; in the evening, a dinner. Sept. 7, at 9 a. m., reading of papers and discussion; at 1 p. m., lunch, in the afternoon, short trips, and in the evening, the official dinner. Sept. 8, in the morning, a trip to Rüdesheim by special steamer; from there to Cologne. On Sept. 9, the trip is continued by the delegates to the international congress at Paris, which takes place from Sept. 10 to 13

The papers to be read at the meeting and the discussions are as follows: (1) Annual report. (2) Report on the accidents during 1899. (3) Brakes for electric street cars. (4) Construction of cars suitable for suburban and city tracks. (5) Report on the recommendations of the Elektrotechnische Verein in regard to safety appliances for electric street cars. (6) The wages movement of the employees. (7) Calculations in regard to cost of operation of two and four-axle motor cars and trailers. (8) The taxation of right-of-way agreements. (9) The adherence to the limits imposed by the small-roads law and the working of section 96. (10) Report on the transportation facilities at the Paris Exposition. (11) Report of the literary committee. (12) Discussion in regard to the possibility of the society gathering statistics in regard to German street railways, as suggested by the Imperial Minister of Public Works. (13) Report on the question in regard to the removal of snow and ice during the winter of 1899-1900. (14) Planning the society's work for 1900-1901. (15) Choice of the next meeting place.

The walls of the power station for the electric elevated and underground road of Berlin are finished. When completed the lower portion of the station will contain the machinery. This consists of three large steam engines of 900 hp each, having a speed of 115 r. p. m., and three direct-current generators, each having a capacity of 800 kw. On the upper stories are the boilers. Above these the coal pockets are located, which are supplied with coal by means of Hunt conveyors. The boilers and engines are now being installed. The chimney is completed, and has a height of 80 m (262 ft.).

A most emphatic protest against the free and frequently unnecessarily large use of oil at railway curves has been recently entered by the bicycle clubs and owners of automobiles, having pneumatic tires. The effect of the oil on the rubber of the tires is most injurious. It is quite probable that the ordinance demanding the use of expensive lubricants will soon be abolished, especially as it also proved to be a good insulation between wheel and rail, and greatly hampered the climbing of grades.

Experiments With Electric Traction on Trunk Railways*

BY N. H. HEFT
(Chief of electrical department, New York, New Haven and Hartford Railroad Company)

(Continued from page 788.)

Can trains be shifted at stations and yards as quickly?

Yes. When operated by third rail, motor cars can be run around train without turntable or other delay. When operated by overhead trolley a slight delay is caused by the necessary shifting of the trolley.

Can trains be run over frogs and through yards at same speed?

Yes, when operated with third-rail system. With overhead trolley system, provided the trolley is looked after and kept on the wire when passing through overhead frogs.

Can coaches be economically heated, and how would cost compare?

No. Experience has shown in the New England States, during the average winter weather, that a coach 60 ft. in length will require from 6 kw to 12 kw, and figured at the rate of 1 cent per kw-hour, costs from 6 cents to 12 cents per hour. With the temperature at zero the cost would be 18 cents per hour. From the best data received, the cost of heating the same coach with steam from locomotive in ordinary weather would be 2 cents per hour; zero weather, 3 cents per hour.

Can coaches be satisfactorily lighted, and how would cost compare with oil or gas?

Yes. The New York, New Haven & Hartford Railroad Company places thirty lamps of 16 cp in a 60-ft. coach. These lamps would consume 1500 watt-hours or 1½ kw-hours. At 1 cent per kw-hour the cost would be 1½ cents per hour, and, taking into consideration the cost of necessary attention, with oil or gas, would be fully as economical and more desirable.

Will the use of electric traction increase or decrease wear on tracks per train-mile run.

With electric locomotives or motor cars of equal weight, the wear on service rails would be less, due partially to the rotary application of the power and partially to the fact that with electric motors no dead weight need be carried outside of weight on driving wheels necessary for traction.

How will passenger receipts be affected by more frequent service of lighter trains?

The receipts will be increased, as shown by a comparison of the number of passengers carried by the New York, New Haven & Hartford Railroad Company on the Nantasket Beach, Highland, Berlin and New Canaan branches, with steam trains, and electric trains with more frequent service.

	Steam	Electric
Nantasket Beach	304.292	702.419
Highland division	387.695	1,060.617
Berlin branch	267.936	241.207
New Canaan branch	98.302	184.728

What kind of coach will be most satisfactory to the traveling public?

The local conditions govern as to the most desirable coach. For summer travel the open car is most desirable, provided speed does not exceed 20 miles per hour; for spring, fall and winter travel the closed coach with cross seats, center aisle, toilet room and water coolers.

On lines traversing the seashore the open coach is most desirable. The ideal coach is one that can be changed at will from an open to a closed coach. To meet the views of President Clark, who has long been a believer in the use of coaches of less weight for suburban and branch lines, and of such a design as would make the same available for both summer and winter service, the New York, New Haven & Hartford Company has designed such a coach for service on its Providence, Warren & Bristol branch, now being equipped for electric traction.

Maximum speed at which to run open cars?

Not to exceed a train schedule of 14 miles to 15 miles, including stops, with a maximum speed of 20 miles per hour between stations.

Will electric traction on main lines between towns and cities, with frequent service, higher speed, and equal fare, be more attractive than the street railways which parallel the steam lines, cover the same terminals, take up and leave passengers at their own doors, but consume more time?

Yes. Experience on two main steam railroads shows that after the substitution of electric traction they have not only regained the lost travel, but have made monthly gains during the last two years, showing that the passenger will travel by the shortest route, even when other conditions are not equal.

What is the maximum distance that power can be transmitted economically by direct current?

Ten miles to 15 miles under ordinary conditions on main lines.

What is the maximum voltage allowable in the working conductor when using direct current?

Experience with third-rail systems has demonstrated that 700 volts can be maintained on the working conductor without giving trouble. With voltage exceeding 700, arcs and short circuits are hard to prevent. Owing to difficulties of motor insulation and commutation with voltages much higher than 700, the same limit may be taken for all forms of working conductors.

Can freight trains be operated?

Yes. The Baltimore & Ohio Railroad Company operates all passenger and freight trains passing east and west through the city of Baltimore over its main trunk line, and the writer is advised that the service operated is satisfactory from every standpoint.

The Erie Railroad Company leased its branch line between Buffalo and Lockport to the Buffalo & Niagara Falls Electric Railway, which has been operating a freight service with special electric locomotives. The management reports that this service is operated, in connection with passenger, mail and express, most satisfactorily.

There are several other railways operating a freight service with equal success.

For weights of trains operated by the Baltimore & Ohio Railway Company, see their answers, Appendix. Trains of fifteen to twenty cars, each loaded with 30,000 lbs. of freight, are operated on the Buffalo & Lockport line.

What should be the location and equipment of motor car house?

The motor car houses should be located at the most central point, preferably close to the power station; this will allow the use of either steam or electricity for power required in the maintenance of motors and cars. The design should provide for the repair shop being placed under house tracks, provided with power hoists, so arranged that motor cars can be run over them. Power jacks should be provided to lift coach body from trucks, to permit cables and brakes to be quickly disconnected and allow the dropping of the trucks into the repair room below. The motors and trucks being interchangeable, this arrangement allows the replacing of motors or trucks with a minimum loss of time. The repair shop should be provided with tools for making repairs only, it having been found to be in the line of economy to purchase repair parts from the manufacturers.

Are motors satisfactory?

Experience in the use of heavy railway motors is limited to the past five years, and there are but few distinct types. The first motors followed the light railway practice by the adoption of four poles instead of two. These motors were so wound as to produce two salient and two consequent poles. The motor frame completely enclosed the armature, and no provision was made for ventilation. The bearings were insufficient in size, the journal brasses or linings were badly designed, and the methods of lubrication were crude. The air gap, or distance between the armature and the pole faces, was so small that a slight wear on the armature-bearing brasses was sufficient to allow the former to drop down and come in contact with the lower pole face, which immediately disabled the motor by burning out the armature. The experience of the railway managements, operating these motors, quickly developed the above defects, and their demands upon the manufacturers resulted in the design of a motor with increased power, with four salient poles, a much larger air gap, greatly improved journal boxes, and a method of lubrication which is satisfactory. In the method of ventilation, and the general design of the gear cases, there is room for radical improvement. These motors are geared to the axles by a single pair of gears, but in the heaviest type of electric locomotives the armatures are mounted directly upon the axle.

The experienced gained in the operation of heavy electric railway motors shows that the work that they are called upon to perform is even more severe than that required of steam locomotives. They are required to attain an equal if not greater schedule speed. The number of miles run per day is from 200 to 400, which is much more than is required of any steam locomotive in regular service. With such conditions existing, it is evident that the strictest care must be exercised in the design of the mechanical details of motors and in their maintenance.

Are motor trucks satisfactory?

In the design of a motor truck, special attention should be paid to strength of frame, size and composition of wheels, dimensions of axles, springs, brakes and the motor suspension. A motor truck carrying two heavy motors in some cases weighs 25,000 lbs.

* Abstract of paper to be presented at the International Railway Congress, Paris, Sept. 20-29.

The wheels should be standard, with steel tires. It should not be forgotten that, as these trucks are to do the work of a steam locomotive, the axles should be of proportional strength. Experience on the New York, New Haven & Hartford Railroad with light axles, considered to be of ample dimensions for the required service, demonstrated to the management that the motor axles must be increased in size. The standard axle adopted by this company for motor trucks is 8 ins. in diameter at gear wheel hub, and 6½ ins. at motor bearing and wheel fit with journals 5½ ins. x 9 ins. These axles are oil tempered and have 1½-in. hole through the center.

The brakes should be arranged without a brake beam, for convenience in inspecting motors.

The form of motor suspension is of great importance. The ordinary method used on heavy roads is to hang the rear end of the motors in journals on the axles, while the front end is supported by springs attached to the bolster of the truck. This method has serious disadvantages. The truck springs, having to support half the weight of the motors, as well as the coach body, are necessarily made larger and heavier than usual. The uneven strain on these springs, in addition to their being unnecessarily heavy for the coach body, produces a rigidity, causing the coach to ride with discomfort when partially loaded. The motor suspension now used by the New York, New Haven & Hartford Railroad Company differs from the above in that the motors are supported entirely by the axles, no part of their weight being carried by the truck frame or the springs supporting the coach body. This is accomplished by the use of two equalizing suspension bars, which extend from one axle to the other beneath, and on each side of, the motors. These bars are supported at their ends by links, which are held by lugs cast on the motor frames, directly under the motor axle bearings.

With the present railways motors, it has been demonstrated that either heavy or light trains can be operated over the same tracks, and can perform any service required of the steam locomotive. These motors can be mounted on trucks, as with either one or two motors on each truck. The coach then becomes the locomotive. Its whole weight is available for traction, and, in addition, it has a seating capacity equal to any coach operated with the steam locomotive. A coach such as is used on the Highland division of the New York, New Haven & Hartford Railroad, having a seating capacity of seventy passengers, equipped with two motors on one truck placed under one end, and using a standard passenger truck on the other end, can be used as a single car during the hours when travel is light, with trail coaches added, as required, during the hours of heavy travel. Two coaches in addition to motor car used on this line, make a train weighing 161,000 lbs., and operating a train schedule of 30 miles per hour, including stops. The seating capacity of such a train is 174 passengers. With two motors on each truck placed under such a coach, we have a locomotive with 100,000 lbs. on drivers, and a total weight, including pasengers, of 110,500 lbs. available for traction, when carrying seventy passengers.

A comparison with a standard steam locomotive designed for suburban service is of interest. It shows the total weight to be 166,000 lbs., with 72,000 lbs. on drivers, leaving 94,000 lbs. as dead weight, and not providing any passenger seating capacity.

The results obtained with electric traction on main line railroads demonstrate that the present application of this power is no longer experimental; that it will rapidly supersede steam on lines where travel is heavy and congested, and where, for economy in operation and increased passenger receipts, a frequent service is necessary.

This mysterious and silent power will undoubtedly continue to grow in popularity, taking an advanced position among the known motive powers of the world.

APPENDIX

In the series of answers given below:

A stands for Plymouth division of N. Y., N. H. & H. R. R., Nantasket Junction to Pemberton; Braintree to Cohasset.

B stands for Highland and Hartford divisions of N. Y., N. H. & H. R. R., Berlin to New Britain.

C stands for New York division, Stamford to New Canaan, of same road.

D stands for Pennsylvania Railroad Company, Bordentown and Mount Holly branch.

E stands for Baltimore & Ohio Railroad Company, Baltimore Belt Line.

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1. Do you use electric traction? As an experiment? Or in regular service?

A. Yes. No. Yes. *B.* Yes. In regular service. *C.* Yes. No. Yes. *D.* Yes. In regular service. *E.* Regular service.

2. Describe in a general way the system or systems you have adopted?

A. Nantasket Junction to Pemberton, overhead trolley; center bracket construction; double track. Braintree to Cohasset, third-rail construction, overhead trolley at stations. *B.* Third rail, direct-current system. *C.* Overhead trolley construction, flexible brackets on octagonal wood poles (30-ft. x 10-in. butt x 8-in. top), supporting 000 and 0000 round wire. *D.* Westinghouse. *E.* Overhead trolley—using an iron conductor made up of two Z bars 3 ins. x 3 ins. x ⅜ in. covered with 12-in. x ¼-in. plate.

3. On what lines are they in use and how long have they been in operation?

A. Plymouth division, summer months. Nantasket Junction to Pemberton, five years; Nantasket Junction to East Weymouth, four years; Nantasket Junction to Braintree, via East Weymouth, two years; extension from Nantasket Junction to Cohasset, one year. During Summer months only. *B.* Highland division, Hartford to Bristol, Hartford division, Berlin to New Britain, two years three months. *C.* New Canaan branch on New York division. Has been in operation since 1898. *D.* Burlington branch, Camden and Burlington County Railroad, Amboy division, Pennsylvania Railroad Company. Since July, 1895. *E.* Used on the Philadelphia division of Baltimore & Ohio Railroad. Have been in operation nearly four years.

LINE OR TRACK

4. Give the length of the different lines operated by electricity?

A. Nantasket Junction to Pemberton, 7.0 miles; Braintree to Cohasset, 10.5. Pemberton service continued from Nantasket Junction to Braintree over same tracks. *B.* Hartford to Bristol, 18 miles; Berlin to New Britain, 3 miles. *C.* 7.66 miles. *D.* 7.1 miles. *E.* Belt line, 4 miles in length.

5. The type of rails used and their weight per yard?

A. Nantasket Junction to Pemberton, 76-lb. T; Braintree to Cohasset, 100 lbs., 6 ins. *B.* Steel T-rail, 74 lbs. per yard. *C.* 4¾-in. T-rail, 72 and 74 lbs. per yard. *D.* T-rail 56 to 70 lbs. *E.* A. S. C. E. standard, 85 lbs. to the yard.

6. Single or double track?

A. Double throughout. *B.* 18 miles single, 3 miles double. *C.* Single with turnouts. *D.* Single track. *E.* Double.

7. Give the maximum grade and curvature?

A. Maximum grade on Pemberton section, 1.07 per cent; on Braintree section, 0.687 per cent. maximum curvature at Braintree, 15 degrees; maximum curvature on Pemberton section, 10 degrees. *B.* 65 ft. per mile; 10 degrees. *C.* Maximum grade, 52.8 ft. per mile, 1 per cent; maximum curvature, 7 degrees. *D.* Maximum grade, 80 ft. to mile; 310-ft. radius at Mt. Holly. *E.* Maximum grade, 1.5 per cent; curvature, 10 degrees.

8. Gage of track?

A. 4 ft. 8½ins. *B.* 4 ft. 8½ ins. *C.* 4 ft. 8½ ins. *D.* 4 ft. 8½ ins. *E.* 4 ft. 8½ ins.

9. Character of ballast used?

A. Gravel and sand. *B.* Gravel. *C.* Gravel. *D.* Cinder and gravel. *E.* Stone.

10. Wood or metal ties?

A. Wood. *B.* Wood. *C.* Wood. *D.* Wood. *E.* Wood.

11. Describe the type of rail-joint?

A. Standard angle bar fastened with four ¾-in. bolts. *B.* Four-bolt and six-bolt angle spliced bar, suspended joints. *C.* Standard angle bars fastened by four ¾-in. bolts. *D.* Angle splice bar. *E.* Continuous.

12. Give number of highway crossings at grade?

A. Pemberton section, 9; Braintree section, 27. *D.* Twelve. *E.* None.

POWER STATIONS

13. Give the number of power stations for each line?

A. One. *B.* One for all. *C.* One. *D.* One. *E.* One.

14. The position of the power stations relative to the line?

A. One mile from Nantasket Junction on line toward Pemberton. *B.* At the outer end of the 3-mile line joining the center of the 18-mile line. *C.* At Stamford end. *D.* East end of line. *E.* At one end.

15. Their rated capacity in kilowatts?

A. 1100 kw. *B.* 1700 kw. *C.* 600 kw. *D.* 200 kw equal to 266 hp to switchboard at 100-lb. steam pressure. *E.* Between 800,000 and 900,000 kw-hours per month.

16. The number of power units in each station and the output of each unit?

A. Two. 550-kw generators. *B.* Two. 850-kw each. *C.* Two. 300-kw generators. *D.* One. Output as above. *E.* 5 units, 500 kw each.

17. The number and type of boilers in each station and the horse-power rating of each?

A. Eight horizontal return fire tube cylindrical of 125 hp each. *B.* Ten steel return tubular boilers, 125 hp nominal each. *C.* Six horizontal return fire tube. 125 hp. *D.* One. Climax. 300 hp.

18. The number of boilers in use during ordinary traffic?

A. Four to six. *B.* Four. *C.* Two. During winter months a third boiler is used for heating New York division coaches. *D.* One. *E.* Eleven.

19. What is the fuel used?

A. Sparks collected from extension fronts of locomotives. *B.* Locomotive sparks. *C.* Sparks collected from smoke fronts of locomotives in round houses. *D.* Bituminous coal. *E.* Cumberland coal run of mine. Bituminous.

20. Give the weight of fuel consumed per kw-hour produced at the switchboard?

A. 6 lbs. when clean. *B.* 7 to 8 lbs. per kw-hour when clean. *D.* Thermal units: Quarter load, 2.7; half load, 3.75; full load, 4.8. *E.* 4.53 lbs.

21. Number of pounds of water evaporated per pound of fuel?

A. About 4½. Equivalent for coal, 9 lbs. *B.* About 4.9. Equivalent for coal, 9.8 lbs. *C.* 4.9. Equivalent for coal, 9.8 lbs. *D.* 6.14 to 9.42 lbs. *E.* Average between 9 and 10 lbs.

22. Do you use forced draft?

A. "Argand" steam blowers in ash-pit fronts to ignite sparks, and for use under abnormal loads. *B.* Yes. *C.* Yes; to ignite sparks, and during excessive loads. *D.* No. *E.* Induced.

23. What steam pressure is used?

A. 120 lbs. per sq. in. *B.* 120 lbs. *C.* 100 lbs. to 120 lbs. *D.* 130 lbs. *E.* 125 lbs.

24. Give dimensions of smoke-stack?

A. Height above grates, 112 ft.; diameter of bore, 6 ft. 6 ins. *B.* 7½-ft. flue. 123 ft. high, above grates. *C.* Height above grates 113 ft.; diameter of bore, 6 ft. 6 ins. *D.* 40 ins. diameter; height 70 ft. above grate. *E.* 8 ft. diameter projecting only above roof,

25. What is the general plan of piping used to secure dry steam? Percentage of moisture in steam?

A. Copper bends rise from boilers into 16-in wrought iron header in boiler room. Engine connections made of wrought iron bends tapped into risers from header. Percentage moisture in steam is 1 per cent and less. *B.* Boilers below engines. Pipes rise from boilers to main header and fall to engines. *C.* Copper bends rise from boilers into 16-in. wrought iron header in boiler room. Engine connections made of wrought iron bends tapped into steam header. Percentage moisture in steam, 1 per cent and less. *D.* Straight line from boiler to engine, with steam trap attached leg of same. 3.4 per cent to 4.7 per cent. *E.* Separators, Lox and Holly drips.

26. Is the condensation in piping returned to the boilers?

A. Yes. *B.* Yes. *C.* Yes. *D.* No. *E.* Yes.

27. If so, how?

A. By Holly gravity return system. *B.* Holly gravity return system. *C.* By Holly gravity return system. *E.* Holly and Lox drips.

28. How is the feed-water heated?

A. By exhaust from engines in two horizontal Berryman heaters, and by condenser and feed pump exhausts in one auxiliary vertical Berryman heater in boiler room. *B.* By exhaust from engines through primary and auxiliary heaters of Berryman type. *C.* By exhaust steam from engines passing through Berryman horizontal heater. *D.* Vertical type. Goubert feed-water heater. Exhaust steam from engine circulating around water tubes. *E.* Warren Webster feed-water heater.

29. What is the temperature of the feed-woter upon entering the boilers?

A. 180 degs. to 212 degs. F. *B.* About 200 degs. F. *C.* 190 degs. to 212 degs. F. *D.* 194 degs. to 200 degs. F. *E.* About 210 degs. F.

30. Describe make and type of engines used in each station?

A. Engines tandem-compound condensing of "Greene Improved" type. *B.* 28 ins. and 48-in. x 48-in. Greene cross-compound engines. *C.* Greene improved; simple, non-condensing. *D.* Westinghouse, Kodak type, direct-connected. *E.* One Greene, four Allis-Corliss. All tandem compound.

31. Give diameter of cylinders, length of stroke, revolutions per minute, length and diameter of shaft, and weight and diameter of fly-wheel?

A. Horse-power cylinder, diameter, 20 ins.; L. P. cylinder, diameter, 38 ins.; stroke, 48 ins.; revolutions per minute, 106; length of shaft, about 10 ft. between bearings; diameter of shaft at center, 18 ins.; weight of fly-wheel, 60,000 lbs.; diameter of fly-wheel, 18 ft. *B.* 28 ins. and 48 ins. diameter, 48-in. stroke, 100 r. p. m.; shaft 18 ins. x 2.16 ft.; fly-wheel, 55 tons; diameter, 18 ft. *C.* Diameter, cylinder, 26 ins.; length stroke, 48 ins.; revolutions per minute, 100; length shaft between journals, about 9 ft. 6 ins.; diameter of shaft, 16 ins.; weight of fly-wheel, 45,000 lbs.; diameter of fly-wheel, 18 ft. *D.* High, 18 ins.; low, 30 ins.; stroke, 16 ins.; revolutions per minute, 250; diameter of shaft, 8 ins.; weight of fly-wheel, 3000 x 6700 lbs.; diameter, 13½ ft. *E.* Allis, 24 ins. x 40 ins. x 42 ins.; 100 revolutions; length of shaft, 15 ft. 6 ins.; diameter of shaft, 16 ins.; weight of fly-wheel, about 18 tons; diameter of fly-wheel, 18 ft.

32. If condensing, describe the type of condensers used?

A. "Deane" jet condenser, jet condensing chamber mounted directly on water end of single steam circulating pump; no separate air pump. *B.* Deane independent horizontal condensers. *D.* Non-condensing. *E.* Don't condense.

33. Are the generators direct-connected or belted?

A. Direct-connected. *B.* Direct-connected. *C.* Direct-connected. *D.* Direct-connected. *E.* Direct.

34. How many of the stations generate direct current?

A. One. *C.* One. *D.* One.

35. What is the voltage at the station at full load? At no load?

A. Full load, 700 volts; no load, 650 volts. *B.* 700-650. *C.* 550 volts at full load, 500 volts at half load. *D.* 550 volts; 500 volts. *E.* 750 volts at all times.

36. Are so-called "boosters," or any apparatus for raising the voltage of a porticular feeder or feeders used in the station?

A. No. *B.* No. *C.* No. *D.* No. *E.* Yes.

37. If so, haw are they driven?

E. Motor-driven.

38. What apparatus is used to protect the generators from lightning discharges?

A. Shunt arresters of type G. E. M. D. placed in station, and arresters of type G. E. M. D. on pole line, one opposite station. *B.* G. E. Shunt lightning arresters. *C.* Arresters in station of type G. E. M. D. and four arresters on pole line of type G. E. M. D. *D.* Lightning arresters and tank arrester. *E.* General electric lightning arresters.

39. Has any damage from lightning occurred in those stations operating a third rail only, where no overhead conductors are used?

A. No. *B.* No.

40. Are storage batteries used?

A. No. *B.* Yes, for lighting only. *C.* For lighting only. *D.* No. *E.* No.

41. If so, describe the apparatus used to charge them?

B. Motor generator transforming direct current from 650 volts to 150 volts. Also directly through a rheostat in small plants. *C.* Motor generator of 25-kw capacity. Direct-connected. *D.* Not used.

42. Is any of the power of the station used for other purposes, such as supplying electric lights at the depots along the line or driving stationary motors for ventilation, heating or other power purposes?

A. One circuit of series arc lamps in power station, and incandescent lamps in car house, power station, and one station on line. *B.* Yes. To light passenger stations, freight houses, etc., and for lighting and heating cars. *C.* Yes. For lighting the Stamford passenger station and the freight houses; also during winter months one boiler is used for heating New York division coaches. *D.* Used for electric lights at power house and at Mt. Holly station. *E.* Yes.

CONDUCTORS

1.—The Positive Conductors

43. Give the position of the working conductor relative to the track?

A. Pemberton section, overhead. Braintree section, on blocks between rails of tracks. Overhead span construction at stations. *B.* In the center of the track on the ties. *C.* Overhead not divided into insulated sections *D.* Overhead. *E.* Overhead.

44. Of what metal does it consist?

A. Pemberton section, copper. Braintree section, steel. *B.* Steel, 100 lbs. per yard. *C.* Round, No. 000 and No. 0000, B. & S. copper wire. *D.* Copper. *E.* Iron with copper feeders.

45. If overhead, how is it supported and insuloted?

A. Pemberton section, supported by mechanical clip hangers mounted on angle iron cross-arms bolted to poles between tracks. On steel trusses in yards where poles are outside of roadway. *C.* On brackets made up with flexible span. *D.* Cross suspension. *E.* Supported by catinaries attached to vertical columns. Cone insulators used.

46. If overhead, describe the poles used, their spocing, and the method of placing in the ground?

A. Poles of square Georgia pine, 30 ft. long, 12-in. x 14-in. butt, 10-in. x 12-in. top. Set 90 ft. apart on straight and 60 ft. to 90 ft. on curved line. Set in boxes 6 ft. deep, 3 ft. x 4 ft. across, filled with cement concrete. *C.* Poles of Georgia pine, machined octagonal, 10-in. butt, 8-in. top, 30 ft. long, set in ground; where ground is soft, set in barrels filled with stone, or grouted with cement concrete. *D.* Chestnut poles, 12-in. butt, 8-in. top, set 100 ft. apart and sufficiently high to give trolley wire a clearance of 22 ft. Poles as described in article 68. Concreted ground.

47. What meons are used for protecting the line from lightning?

A. Lightning arresters on poles of type G. E. M. D. *C.* Four-pole lightning arresters. *D.* Lightning arresters. *E.* Lightning arresters at half-mile intervals.

48. If the working conductor is not averhead, give its position relative to the service rails?

A. On Braintree section, third rail of A section, 93 and 100 lbs. per yard is laid on creosoted wooden blocks between service rails. Blocks spiked to ties. Rails not fastened. *B.* Midway between the rails and projecting 1 in. above them.

49. Give the shape of its cross section and its area in square inches?

A. A shape, cross section of 9.3 and 10 sq. ins. *B.* Inverted V with flat top 10 sq. ins. area.

50. If of any other metal, give its conductivity as compared with copper?

A. Steel, 56 to 80 per cent carbon; conductivity, 1.8 to 1.9 that of copper. *B.* About 1.8 of that of copper of same area.

51. State how it is supported and insulated?

A. Laid without fastening on creosoted wooden blocks spiked to ties between service rails. *B.* Supported and insulated upon creosoted hardwood blocks fastened to the ties.

52. Describe the speciol arrangements used at grade crossings, switch-points, cross-overs, etc.

A. At grade crossings gaps in rail are bridged by bare copper cable (2,800,000 cm to each rail), laid in residuum compound-filled creosoted wood tubes laid in boxes filled with compound. Same done at switch-points. Overhead cable and trolley used at stations. *B.* The conductor rail ends at each side of a grade crossing, switch, and heavy copper conductors connect its ends, passing underground in an insulated wooden conduit.

53. Is it divided into sections automatically connected to the supply current by the motor car, or is it continuous throughout its length?

A. No. *B.* Continuous.

54. If sectional, what are the lengths of the sections?

55. Describe the automatic switches and the methods of operating them?

56. What is the method of bonding the conductor rail? Describe the bonds?

A. Bonds of tinned copper 4 ins. x 12 ins. x ⅛ in. inserted on each flange of A-shaped rail between underside of flange and splice plates. Splice plates, 4 ins. x 12 ins. x ⅝ in. Contact surface of bonds, 82 sq. ins. *B.* The bonds consist of two rectangular copper washers, tinned, 4 ins. wide by 12 ins. long, held by similar iron washers ⅜ in. thick underneath and 16 bolts. Contact surface, 82 sq. ins. *E.* Chicago bond.

57. Are these bonds equal in conductivity to the rail, or is there a loss in the joints?

A. Yes. No loss in joints. *B.* Yes, there is practically no loss. *E.* Equal.

58. State the leokage per mile in amperes in wet and dry weather?

A. About 4 amps. per mile in wet, and ½ amp. per mile in dry weather. *B.* One-half amp. per mile in dry weather; 4 amps. in wet. *C.* When new and in damp weather, 1-1000 amp. *E.* One-half amp. per mile.

59. If feeders are used, give their position and the metal of which they are mode?

A. Third rail on Braintree section fed from the power station at Nantasket Junction (1 mile) by overhead bare copper cables of 800,000 and 500,000 cm area, supplemented by feeder made up of old rail, laid at side of roadway. *C.* None used. *C.* Bare copper feeders on glass insulators on cross-arms. Feeders of 300,000 cm and 500,000 cm area, and of 0000 bare soft-drawn copper wire. *E.* Copper laid on top of conductor.

60. If of steel and near the trock, how are they supported and insulated?

A. 2.60 lb. steel rails bolted with flanges together and set on posts about 24 ins. high set every 10 ft. on side of roadway. Conductor boxed over with creosoted planks.

61. Stote where they top the working conductor?

A. At Nantasket Junction, 1 mile from power station. *C.* About every 1000 ft one 500,000-cm feeder running 6 miles to feed grade.

62. What is the resistance per mile of the working conductor?

A. 0.044 ohms. *B.* 0.042 ohms.

2.—The Negative or Return Conductors.

63. Does the ground form an appreciable aid to the return circuit?

A. No. *B.* No. *C.* No. *D.* Yes. *E.* No.

64. Describe the bonds used and the method of bonding the service rails?

A. Bonds of leaf copper, made up with heads of drop-forged copper, expanded into holes in rail flange by taper pins driven into bond heads from above. Bonds inserted in holes in flange from below. Four bonds per joint. 24½ ins. long; 210½ ins. long. Total cross-section, 1,100,000 cir. mil. Also, older form of bond made up of No. 0000 copper cable (two per joint), with ⅝-in.

heads riveted into rail flanges from beneath. *B.* Bonds are four in number, of leaf copper, flexible and attached to the base of rails by lugs on bonds passing through holes in base. Lugs are then expanded in the hole by steel pins passing through a smaller hole in lugs. *C.* Rail joints bonded with two leaf copper bonds 4½ ins. long and two leaf copper bonds 10½ ins. long, made with 1-in. heads expanded into holes in base of rail by wedge-shaped or tapered steel plugs driven from above. Bonds underneath rail. Total cross section, 1,100,000 cir. mil. *D.* No. 0000 copper bonds. No. 00 copper cross bonds. *E.* Chicago bond, two No. 0000.

65. Are these bonds equal in carrying capacity to the rails they connect?

A. Yes. *B.* Yes. *C.* Yes. *D.* No.

66. What is the total cross section in square inches of return conductors?

A. Pemberton section, 30.4 sq. ins; Braintree section, 40.0 sq. ins. *B.* Single track about 14 sq. ins.; double, 28. *C.* 14.4 to 14.8 sq. ins. *D.* Outside of the rail, ¼ in. sq.

67. Are any special negative conductors used to supplement the service rails?

A. No. *B.* No. *C.* No. *D.* Yes.

68. If so, describe them?

D. One No. 0 return wire and cross-bond. *E.* 1-1,000,000 cir. mil copper.

69. What is the maximum drop in line voltage at the most distant point from the power station during maximum load?

A. Momentary drop of 350 volts at Braintree. *B.* About 50 per cent. *D.* 55 per cent.

70. What is the proportion of drop in the positive and negative during the above conditions?

A. Drop in negative about 50 per cent of drop in positive on Braintree section. *B.* Two-thirds in positive, one-third in negative.

71. What is the averoge efficiency of the line?

A. Average efficiency during maximum loads of Braintree section, 70 per cent. Average efficiency during the maximum loads of Pemberton section, 75 per cent. *B.* About 75 per cent. *D.* Good.

ROLLING STOCK

72. Are electric locomotives or passenger-carrying motor cars used? Are trailers used? If so, how many?

A. Passenger-carrying motors. Yes. One to four 12-ton open trailers and one to three 27-ton coaches, and one to three 30-ton coaches. *B.* Passenger-carrying motor cars and trailers. From one to four. *C.* Passenger and baggage carrying combination cars. Trailers are used. One and two. *D.* Passenger-carrying motor cars. Trailers are used. One or two. *E.* Locomotives, three.

73. How many motor cars or locomotives are in use? Give their weight empty, and the number of passengers they seat?

A. Regular service between Braintree and Pemberton, six open 33-ton motors; Braintree and Cohasset, two 48½-ton four-motor combination cars. Open 33-ton motors seat ninety-six passengers; four-motor combination cars seat forty-five to fifty passengers. *B.* Four at one time. Open motors weigh 66,350 lbs. Seat ninety-six. Closed motors weigh 81,000 lbs. Seat about seventy. *C.* Two. Weight, total, 50,000 lbs. Seating capacity, forty. *D.* Three. Weight, 52,000 lbs. Fifty passengers. *E.* Three. Weight 97 tons each.

74. Give the rated horse-power of the locomotives or motor cars?

A. Two motor equipments (open cars), 350 hp; four motor equipments (combination car), 700 hp. *B.* 350 hp. *C.* Rated horse-power, 320. *D.* 200 hp. *E.* 1000 hp each.

75. What is the general arrangement of the mechanism? i. e., the type and number of motors per car. The power of each motor, its revolutions per minute at normal speed, and its weight?

A. Two "G. E. 55" motors on one truck of two motor cars, and on each truck of four motor cars. Rating of G. E. 55 motors, 175 hp at 550 volts. Revolutions per minute, 700 to 1000. *B.* Two motors per car. G. E. 55. Both on one truck. Rated 175 hp. Each weighs 5000 lbs. and runs about 1000 r. p. m. at normal speed. *C.* Two motors on one truck, of type G. E. 55. Each motor rated at 160 hp at 500 volts. Normal speed, 760 r. p. m. Weight with gears and gear covers, 5415 lbs. *D.* Westinghouse special. One car has four 50-hp motors, one on each axle, and two have two 100-hp motors each, one on each truck. 1000 r. p. m. at speed. Weight, about 3500 lbs. *E.* Four motors per locomotive, 250 hp each.

76. The number of trucks and the number and diameter of wheels under the car and the number of wheels used for traction?

A. Two. Eight 36-ft. wheels. Two motor equipment four wheels, four motor equipment eight wheels. *B.* Two trucks. Eight 37-in. wheels, four of which are used for traction. *C.* Two trucks. Diameter of wheels, 36 ins. Number of driving axles, 2; number of driving wheels, 4. *D.* Two trucks. Eight 36-in. wheels. Car with four 50-hp. motors uses every wheel. Other use one pair in each truck. *E.* Two trucks. Diameter of wheels, 62 ins. All wheels used for traction.

77. Are the motor armatures mounted directly upon or geared to the axles?

A. Single reduction gearing. *B.* Geared. *C.* Geared. *D.* Geared to the axles. *E.* Mounted on axles.

78. Give diameter of driving axles?

A. 6½ ins. *B.* Gear fittings 8 ins. diameter; wheel fittings and motor journals, 6½ ins.; journals, 5½ ins. x 9 ins. *C.* Diameter of driving axles, 6½ ins. *D.* 5¼ ins. *E.* 8 ins.

79. Give total weight on driving wheels, i. e., weights available for traction?

A. Two motor equipments, 38,500 lbs.; four motor equipments, 97,000 lbs. *B.* 39,600-lb. open cars; 47,000-lb. closed cars. *C.* 36,000 lbs. *D.* About 52,000 lbs. *E.* 97 tons.

80. Describe the winding of the motors?

A. Series wound. Armatures, 1 turn; field spools, large, two of 62 turns each; small, two of 29 turns each. *B.* Four-pole series drum winding. *C.* Motor series wound four field coils in series. Armature, 1 turn; large field spools, 62 turns each; small field spools, 29 turns each. *D.* Westinghouse special.

81. Are the motors supported in any manner by the truck frames?

A. No. *B.* No. *C.* Motors are supported on spring nose plates, resting on independent equalizer bars, spring suspended from motor frames beneath axle journals. *D.* Yes. *E.* Yes.

82. Describe the motor suspension?

A. Motors are supported on spring nose plates resting on independent equalizer bar springs suspended from the motor castings under the axle journals. (See Fig. 14.) *B.* Two heavy bars supported by links at each end attached to motor frame at axles, extending from one axle to the other. Back of motors rest on these bars. *D.* The back of the motor is supported by the cross frame of the truck, and the front of the motor by the axles. *E.* Springs and cushions.

83. Are any special facilities provided for in the design of the motors or trucks for rapid exchanging of parts, such as replacing an armature or other repair work?

A. Truck frame may be lifted clear of the motors, wheels and motor equalizer bars; or motors may be lifted out of the truck after rolling out from under cars. *B.* Truck frame can be lifted off, leaving wheels, axles and motors with the suspension free to be exchanged for others or repaired. *C.* Body of truck may be lifted off, leaving motors on independent equalizer. Motor with its pair of wheels may be readily detached, or motor lifted out independently. *D.* Casings are divided in two parts, one part lowering to allow armature to be taken out. *E.* No.

84. What provision is made for ventilating the motors?

A. Gauze covers are in trial. In hot weather motors are run with covers removed. *B.* Three hand-holes with covers of wire netting. Also large cover over commutator with netting. *C.* Motors are run with screen ventilating covers, or with covers removed. *D.* Usual ventilating holes. *E.* Nothing unusual.

85. What is the system of control?

A. Series parallel. *B.* Series parallel. *C.* Series parallel. D. Westinghouse special controllers. *E.* Series parallel.

86. Describe the controlling apparatus?

A. A series parallel controller of type G. E. L. 2 is placed on each platform, and connected with motors and resistance boxes under cars. *B.* G. E. L. 2 controller. *C.* A series parallel controller of type G. E. L. 2 on each end of car, in vestibule. *D.* As above. *E.* Contacts mounted on revolving cylinder; blow-outs (magnetic) on side.

87. What is the form and material of resistance?

A. Resistance boxes built up of wrought-iron tape stampings of type P. R., G. E. Co. are used. *B.* Packed iron ribbon. G. E., P. R. resistance. *C.* Resistance boxes of iron tape; type P. R., G. E. Co. *D.* Diverters. *E.* German silver strip.

88. What system of braking power is used? Is it satisfactory?

A. Westinghouse automatic air, using Christensen motor-driven compressor and compressor controller. It is satisfactory. *B.* Westinghouse automatic air. Independent motor compressor. Yes. *C.* Westinghouse brake cylinder and triple valve; Christensen engineer's valves; "automatic air." *D.* Westinghouse air. Yes. *E.* Westinghouse air-brake system. Satisfactory.

89. Describe the alarm signals used—whistles or bells, and how operated?

A. Gongs of standard locomotive bell weight are attached to hand rails on ends of cars, and three-note chime whistles blown by air. *B.* Large 18-in. gong, worked by the foot. Large chime whistle, blown with 80 to 90 lbs. compressed air. *C.* Gongs of standard locomotive bell weight, and air whistles of three-note chime. *D.* Engine bell on top of car. *E.* Whistles operated pneumatically. Bells used, pulled by hand.

90. Describe the current-collecting devices used on motor cars?

A. All motor cars are fitted each with two overhead trolleys and two third-rail shoes. Trolley poles of tapered steel tube are held up by spring tension of 28 to 30 lbs. Wheel is 5 ins. diameter, made up with composition body and steel flanges, giving square groove and flat tread. Shoes are of cast iron, supported by cast-iron links under each king-pin, giving a contact surface of 14 ins. x 2½ ins. and resting on rail of their own weight. *B.* Cast-iron shoes about 14 ins. long and weigh about 28 lbs., supported by links from an insulated support. Two per car. *C.* 15-ft. steel trolley arms carrying special 5-in. wheel made up with composition hub and steel flange: groove wide and straight; tread square. *D.* Trolley wheel and carbon brushes. *E.* Brass shoes, two in series, about 24 ins. long and 5 ins. wide, pointed at either end.

91. Describe the method of heating and lighting?

A. Heating during the months operating this system is unnecessary. All cars are lighted by 16-cp incandescent railway lamps, connected up in series groups of five or six lamps. *B.* Electric heaters of resistance wire embedded in enamel. Lights are 16-cp incandescent, wired, 6-in. series, twenty-four to thirty per car. *C.* Heating by "National" electric heaters. Lighting by 16-cp incandescent lamps. *D.* Electrical. *E.* No heat. Light taken from motor circuit.

92. Are any special devices used on motor cars for the removal of snow from the track, or snow and sleet from the conductor rail or trolley wire?

A. No. *B.* Snow plows under car platforms with rattan brushes on lower edge. Also steel brushes on conductor rail. *C.* No. *D.* Pilot of motor car and sleet wheel on wire. *E.* No.

OPERATION

93. Give the number and style of cars and total weight of each train in ordinary service?

A. Pemberton section, 33-ton, 16-bench, open 2-motor cars in regular half-hour service. Average weight of train of one open motor car and two open trailers, 60 tons. Braintree section, half-hour service, same as above. Heavy work, two trains of one 48½-ton motor car and two or three 30-ton coaches each. Average weight, 130 tons. *B.* Ordinary service, motor car and one trailer. Summer train weighs about 46 tons. Winter train, 70 tons. *C.* One motor car of 50,000 lbs. weight, one or two coaches of 29,000 lbs. weight each, one or two open trailers seating seventy passengers, of about 27,000 lbs. weight. *D.* Three motor cars. From 52,000 to 156,000 lbs., about. *E.* Ordinary freight train weighs about 1400 tons Standard car.

94. Give the time schedule and distance each train is run?

A. Pemberton to Braintree, 15.7 miles, schedule time 51 min.; Cohasset to

Braintree, 11.5 miles, schedule time, 34 min. *B.* Hartford to Bristol, 18 miles in 40 min., five stops. Berlin to New Britain, 3 miles, 7 min., no stops. *C.* Distance, 7.66 miles; schedule time, 17 to 20 min. *D.* About 20 min; 7.1 miles. *E.* No schedule. Trains run 4 miles.

95. The normal speed on the level and on grades?

A. 60-ton trains on level, about 40 miles per hour; 60-ton trains on grades, from 30 miles per hour up; 130-ton trains on level, 35 miles per hour; 130-ton trains on grades, 25 miles per hour up. *B.* On level, 35 to 40 miles per hour. Down grade, 50 to 60. Up, 15 to 20. *C.* 3 miles per hour on level; 25 to 30 per hour on grades. *D.* About 21 miles per hour. *E.* Speed on level, 15 miles per hour; on grade, 10.

96. The maximum number of motor cars or trains which can be run at one time?

A. Twelve trains of varying weight. *B.* About six ordinary trains. *C.* Two. *D.* Three. *E.* One.

97. The average amount of power consumed by each train at average speed, in kilowatts measured on the car?

A. 60-ton train, 75 kw-hours; 130-ton train, 150 kw-hours. *B.* 75 kw. *C.* Average 70 kw. *E.* No recording device.

98. The number of kw-hours per train mile measured on the car?

A. 60-ton train, 3.0 kw-hours; 130-ton train, 5.2 kw-hours. *B.* About 2½ kw-hours for the ordinary train. *C.* Stamford to New Canaan, 2.9; New Canaan to Stamford, 1.25. Average, 2.10 kw-hours. *E.* 14 approximate.

99. Watt-hours per ton mile?

A. 30-ton train, 50 watt-hours; 130-ton train, 40 kw-hours. *B.* 50 to 75. *C.* Stamford to New Canaan, 80; New Canaan to Stamford, 39. Average, 59.5 kw-hours. *E.* 36.6.

100. Give total cost of power per kw-hour?

A. 0.007575. *B.* 1 cent. *C.* $0.0119. *E.* Between 6 and 7 mills.

101. Give cost of fuel only per kw-hour?

A. 0.00260. *B.* $0.004. *C.* 0.00208. *E.* 2¾ mills.

102. Give cost of water only per kw-hour?

A. 0.000382. *B.* $0.0006. *C.* 0.00058. *E.* 1-3 mills.

103. Cost of labor at power station per kw-hour?

A. 0.00422. *B.* $0.0043. *C.* 0.00565. *E.* 3 mills.

104. Give cost of maintenance at power station per kw-hour?

A. 0.000373. *B.* $0.0015. *C.* 0.00290. *E.* 3-10 mill.

105. Cost of maintenance of motor cars per car mile?

B. 0.018. *E.* $0.08 approximate.

106. Cost of labor in operation of trains per mile?

A. 0.0728. *B.* 0.034. *C.* 0.0593.

107. How many hours per day is each power station in operation?

A. 18. *B.* 18 hours. *C.* 18 to 18½. *E.* 24 hours.

108. How many men are required to operate each station?

A. 8. *B.* 9. *C.* 6. *E.* 28.

109. Number of shifts?

A. 2. *B.* 2 (Firemen 3). *C.* 2. *E.* 2.

110. Number of men in each shift?

A. 4. *B.* 4. *C.* Four on day shift, two on night shift. *E.* Sixteen day, twelve night.

Street Railway Patents

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

UNITED STATES PATENTS ISSUED AUG. 28, 1900

656,635. Electric Motor Suspension; G. Gibbs, Philadelphia, Pa. App. filed Feb. 28, 1898. The motor is hinged upon the axle, the field magnet being arranged on one side thereof, and an extension from the frame projecting from the other side. A cradle supports the motor, a spring being inserted between the cradle and the projection.

656,636. Electric Motor Suspension; G. Gibbs, Philadelphia, Pa. App. filed May 11, 1900. A modification of the preceding patent.

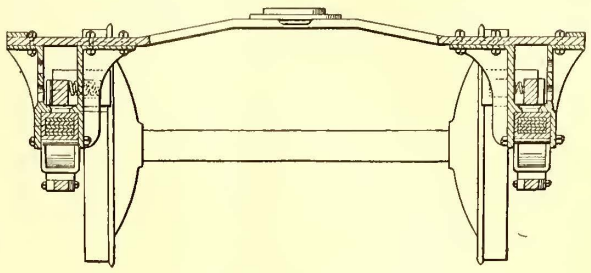
656,753. Railway; J. Sparrow, Reading, England. App. filed July 11, 1899. According to this invention cars can be moved from a double track onto a single track without the use of movable switches, the invention consisting in a special construction of rail flanges and shoulders.

656,878. Car truck; J. A. Brill, Philadelphia, Pa. App. filed May 15, 1899. Consists in a construction whereby the usual bolster-transoms which extend between the side frames are dispensed with, and said transoms formed by inwardly extending brackets either secured to or formed integrally with the side frame.

656,885. Radial Car Truck; J. P. Faye, Binghamton, N. Y. App. filed March 17, 1898. The axles and wheels are mounted in frames, which are connected together by toggle levers.

656,900. Car Truck; J. L. Levy, New York, N. Y. App. filed Sept. 14, 1897. This construction provides for extending the bolster suspension or spring base closely adjacent to the axle-box pedestals, in order to give a greater spring base for the support of the car body on the truck.

656,935. Fare Register; W. L. Brownell, Elizabeth, N. J. App. filed Nov. 12, 1897. The invention consists in an arrangement whereby the bell-hammer is protected against any disturbance whatever until after the return stroke of the pulling-pawl is fully completed, the bell hammer receiving the necessary impulse to ring the bell while the head of the pawl is in the act of dropping behind a newly advanced ratchet-tooth preparatory to the next registration, the object and effect being to render it both theoretically and practically impossible to ring the bell more than once for each registration of a fare.



PATENT NO. 656,878

656,986. Construction of Railroad Tracks; G. Lindenthal, New York, N. Y. App. filed July 20, 1899. Longitudinal sleepers for railroad tracks, consisting of successive sections and of splice plates joining the sections longitudinally, and having ends bent downward and transversely to the line of the longitudinal sleepers.

ENGINEERING SOCIETIES

CENTRAL RAILWAY CLUB.—The next regular meeting of this club will be held on Friday, Sept. 14, 1900, at 10 a. m., at the Hotel Iroquois, Buffalo, N. Y. The executive committee will meet at 9 a. m. Prof. Gaetano Lanza, of the Massachusetts Institute of Technology, will read a paper upon "Efficiency Tests of Locomotives." The following reports by special committees, submitted at the May meeting, will be discussed: "Best form of construction, and methods of ventilating, heating and general equipment of roundhouses." Committee: W. H. Marshall, chairman; George W. West, C. H. Potts. "Standard box cars; technical details of construction along the lines recommended by the committee on typical dimensions whose report was presented at the January meeting." Committee, L. T. Canfield, H. F. Ball.

PERSONAL MENTION

MR. H. S. COOPER has resigned as general manager of the Ithaca, N. Y., Street Railway, to take effect Oct. 1. Mr. Cooper was born in Isle of Wight, England, in 1856, and came to America in 1865. He was educated at Farum School, Beverly, N. J., and worked as clerk and salesman in Philadelphia from 1870 to 1876. In the latter year he engaged in the manufacture of agricultural machinery at Raleigh, N. C., and Jacksonville, Fla., and in connection with this had charge of the electrical work on two lines of steamers on the St. Johns River, and of considerable work in the two lighting stations in Jacksonville at that time. In 1893 he accepted the managership of the Schenectady properties of the Electrical Development Company, later the Schenectady Railway Company, which position he resigned in 1899.

NEWS NOTES

(Readers will confer a favor by sending us news for this department.)

MONTGOMERY, ALA.—The street car ordinance providing for the separation of the white and black passengers on street cars has caused an eruption here. The negroes have held mass meetings and have declared a boycott on the company.

SELMA, ALA.—W. R. Hall has been engaged to superintend the conversion of the Selma Street & Suburban Railway from a mule to an electric line. Mr. Hall is now looking over the routes and preparing an estimate of the cost of construction. Mr. Hall succeeds Mr. Marion as superintendent of the company, and the latter will go with the Birmingham, Selma & New Orleans Railroad, which owns the Selma property.

COLORADO SPRINGS, COL.—The Colorado Springs Rapid Transit Railway Company has entered into a contract with the Colorado Springs Electric Company for obtaining power to operate its lines from the plant of the latter company for a period of five years.

NEW HAVEN, CONN.—The Fairhaven & Westville Railroad Company has reduced the fare to East Haven from 10 cents to 5 cents.

NEW HAVEN, CONN.—It is understood that the United Gas Improvement Company, of Philadelphia and New York, will apply next year for a franchise to extend the electric railway lines now terminating at Woodmont to Savin Rock and New Haven via either Davenport Avenue or Washington Street.

WASHINGTON, D. C.—The Washington & Gettysburg Electric Railroad Company, which was granted a franchise last September by the Board of Aldermen, of Frederick, Md., for the use of the streets of Frederick, has secured an extension of time in which to begin work on the road until April 30, 1901.

SAVANNAH, GA.—The Savannah, Thunderbolt & Isle of Hope Railway Company has petitioned the Council for permission to make a number of minor changes in the operation of its lines, and for permission to double-track one line for a short distance.

CHICAGO, ILL.—The street railway companies operating here have been notified to have their cars equipped with vestibules by Nov. 1.

CHICAGO, ILL.—Two bills will be presented at the next session of the Legislature looking to the protection of the city's interests, whether the present system of surface terminals in the downtown district is maintained or a subway scheme substituted. In each bill provisions will be made for the eventual control of at least the tracks and right of way by the city. The Street Railway Commission all along has shown no disposition to favor the scheme of owning the rolling stock, because of the immense amount of detail involved. The Aldermen have taken the position that with the proprietorship of the rails the city could eventually lease them to the highest bidder and stipulates as one of the conditions that poor service would be due cause for the abandonment of the contract.

KOKOMO, IND.—The City Council of Elwood has passed an ordinance granting the Central Traction Company, of Indiana, a franchise for the construction of an electric railway from Elwood to Tipton. The franchise is to run for fifty years, and the company is required to have the road in operation by Jan. 1, 1902.

INDIANAPOLIS, IND.—The Indianapolis, Greenwood & Franklin Electric Railway and the Indianapolis & Greenfield Rapid Transit companies have signed the interurban franchises submitted to them by the Board of Works, granting the right to operate over the lines of the Indianapolis Street Railway Company.

PARIS, KY.—Local capitalists have just been granted a franchise for the construction of an electric railway here. The franchise stipulates that construction work be begun within a year, and that the road be completed within two years. H. A. Power, of Paris, is interested in the enterprise.

ROCKVILLE, MD.—At the special election held here a few days ago the action of the Town Council in granting a right of way over Montgomery Avenue to the Washington & Rockville Electric Railway Company, was upheld.

PALMER, MASS.—A collision occurred on the Palmer & Monson Street Railway Aug. 26. Several persons were slightly injured.

LEXINGTON, MASS.—The Lexington & Boston Street Railway Company has made application to the Council for franchises for four lines—two between the Lexington and Lincoln lines, and two between the Lexington and Woburn boundaries.

LEXINGTON, MASS.—Both the Boston & Concord Street Railway Company and the Lexington & Boston Street Railway Company have applications for a franchise pending here, and there are prospects of a bitter fight in Council.

GRAND RAPIDS, MICH.—The Council has passed an ordinance granting the Grand Rapids, Spring Lake & Grand Haven Electric Railway Company a twenty-year franchise for the construction of an electric railway through the city.

ST. LOUIS, MO.—An entire new equipment of cars was placed on the Northern Central division of the St. Louis Transit Company Aug. 30.

ST. LOUIS, MO.—The smoke-stack on the power house of the St. Louis Transit Company at Park and Vandeventer Avenues was blown down during a wind storm last week. It was 155 ft. high and the tallest in the city.

ST. LOUIS, MO.—The St. Louis County Court has granted the St. Louis, Fenton & Southwestern Railway Company an extension of time, till Jan. 1, to begin work on its proposed railway. This is the fourth time an extension of time has been granted.

SYRACUSE, N. Y.—The office of the Syracuse, Lakeside & Baldwinsville Electric Railway Company was entered by thieves Aug. 28 and robbed of $6000 in bonds and about $300 in cash.

SYRACUSE, N. Y.—The extension of the lines of the Syracuse & Suburban Railroad from Edwards Falls through Delphi to Reruyter is again being agitated.

BUFFALO, N. Y.—Local manufacturers and merchants are discussing a plan for having the street railway company transport freight from the receiving yard in the regular freight car direct to its destination. It is not known whether the plan has been laid before the street railway managers, but it is deemed impracticable. The franchise held by the company at the present time contains no provision covering the operation of freight cars as mentioned, and there would be considerable interference with general traffic. This the public would not tolerate.

BROOKLYN, N. Y.—The Brooklyn Rapid Transit Company is testing a new style car for the purpose of securing more seating capacity and at the same time have more standing room for heavy traffic. The cars are provided with individual seats, two abreast. They are arranged in such manner that they both slant backward toward the center, forming the letter V. Thus an aisle through the center allows much standing room and enables fifteen more passengers to be seated than on an ordinary car.

KINGSTON, N. Y.—The Peckham Manufacturing Company, of Kingston, was incorporated Aug. 29, with a capital of $500,000, to manufacture motors, car trucks and wheels. The company is to succeed to the business of the Peckham Motor, Truck & Wheel Company. The directors are: James H. Everett, V. B. Van Wagonen and Hewitt Boyce, of Kingston; Frank M. Jeffrey, George H. Bowers, William E. Davis and William Wampler, of New York City.

ASHEVILLE, N. C.—The Asheville & Weaverville Electric Railway & Power Company has been reorganized and the following new directors elected: Don. J. Barnes, John R. Baird, John M. Ramsey, O. D. Revell, of Asheville; J. B. Lotspeich, Edward F. Vandiver and W. E. Weaver, of Weaverville. The company has a thirty-year franchise for the construction of an electric railway in Asheville.

CLEVELAND, OHIO.—The Cleveland Electric Railway Company is preparing to introduce an ordinance in the City Council for a franchise for a single-track line from Tod and Fremont Streets, westerly on Fremont Street to Skinner Street, and northerly on Skinner Street to Tod Street. This will give the company a complete loop, and will enable cars to pass Harvard Grove Cemetery.

FREMONT, OHIO.—The Toledo, Fremont & Norwalk Electric Railway Company has secured a private right of way alongside of the Lake Shore and the W. & L. E. R. R. tracks from the west line of Monroeville to where its line crosses the Bellevue & Monroeville road, just east of Bellevue.

MARION, OHIO.—Right of way is now being secured for the construction of an electric railway from Marion to Prospect. The line is to extend through Green Camp. Among those interested in the new enterprise are: O. Wollenweber, D. R. Crissinger, French Crow, F. E. Guthery, J. W. Scott and Charles Hofstetter, of Marion.

COLUMBUS, OHIO.—The Columbus, London & Springfield Traction Company has been granted a franchise for the construction of its proposed line through West Jefferson.

NEWARK, OHIO.—The Newark & Granville Street Railway Company has been incorporated under the laws of Delaware to construct an electric railway in Newark, Ohio. The capital stock of the company is $300,000.

COLUMBUS, OHIO.—The Columbus & Johnstown Traction Company has made application to the Council for a franchise granting the company permission to enter Columbus over the lines of the Columbus Railway Company. The ordinance contains provisions for a 5-cent fare, six tickets for 25 cents and twenty-five tickets for $1. The term of the franchise is to be twenty-five years.

SPRINGFIELD, OHIO.—S. L. Nelson, of Wichita, Kan., formerly manager of the Springfield Street Railway, has brought suit against the latter company for $72,750, with interest, for services rendered in negotiating the purchase of certain Dayton property. The suit was originally entered against the American Railway Company, which owns the local lines, the latter suit being merely a method to overcome certain technicalities.

ZANESVILLE, OHIO.—The County Commissioners of Muskingum County have granted the Zanesville, Adamsville & Coshocton Electric Railway Company a franchise authorizing the construction of an electric railway over the county roads from Zanesville to Coshocton by way of Sonora, East Greenwood, Adamsville, Otsego, Plainfield and West Lafayette. The company binds itself to build the line within two years, and to leave the highways in good condition. The preliminary survey will be made as soon as the franchises through the villages and into the cities are granted.

LORAIN, OHIO.—A lively electric railway war is on in this city. Some time ago the Council granted the Cleveland, Elyria & Western Electric Railway Company a franchise for a single-track electric railway on West Erie Avenue. The Sandusky & Interurban Railway was also given a franchise for a double-track road on the same street. At a meeting of the companies and the city officials no agreement could be reached as to which company should build the tracks and own them, or which should occupy the center of the street. Last week the Sandusky Company constructed a double-track road from the center of the city to the town line. The Cleveland, Elyria & Western Electric Railway Company then laid a third track at the side of the street. The City Council is trying to find a way out of the dilemma.

PITTSBURGH, PA.—The Southern Traction Company is now being organized by Matthew K. McMullin, C. L. Magee, William Flinn, T. H. Given, J. D. Calley, James H. Reed and Joshua Rhodes, to take over the West End Traction Company, which was recently purchased by Mr. McMullin. It is said that the ultimate intention of the company is to merge all the lines south of the Monongahela River.

MEDIA, PA.—The Delaware County Commissioners have granted the Philadelphia & Delaware Trolley Company and the Prospect Street Railway, of Chester, permission to build two bridges on the Island Road, along the river front, between Philadelphia and Chester. One of the bridges will be erected over Darby Creek, in Tinicum Township, and one will span Crum Creek, in Ridley Township. The former will be 480 ft. long and the latter 100 ft. Each will be 26 ft. wide and both will be draws. They will cost about $60,000.

PORTSMOUTH, R. I.—The Gibbs Electric Signal Company has recently been organized under the laws of Rhode Island, with a capital of $50,000, for the purpose of manufacturing and selling automatic block signals, semaphore telephone signals and telephones. Harry T. Gibbs, general manager of the company, was formerly with the General Electric Company at Boston.

PROVIDENCE, R. I.—The United Traction & Electric Company has completed and placed in operation its new line between Providence and East Greenwich.

EL PASO, TEXAS.—Frederick E. Smith and Francis Seiberling, of Akron, Ohio, are in El Paso negotiating for the purchase of a franchise held by local parties for the construction of an electric railway here. Mr. Smith is vice-president of the Second National Bank, of Akron. He has announced that should the franchise be secured, a road will be in operation within a year.