(No Model.)

M. W. DEWEY.

ELECTRIC HEATING APPARATUS FOR ELECTRIC RAILWAY SYSTEMS.

No. 418,911. Patented Jan. 7, 1890.

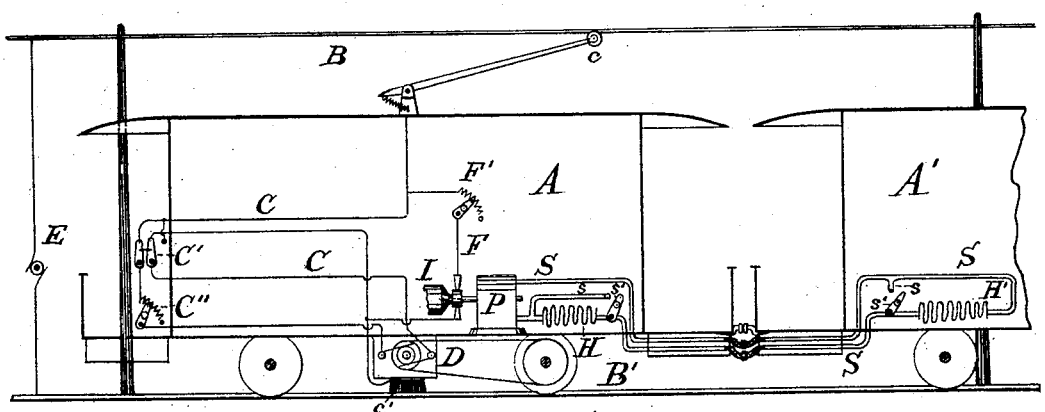

Fig. 1.

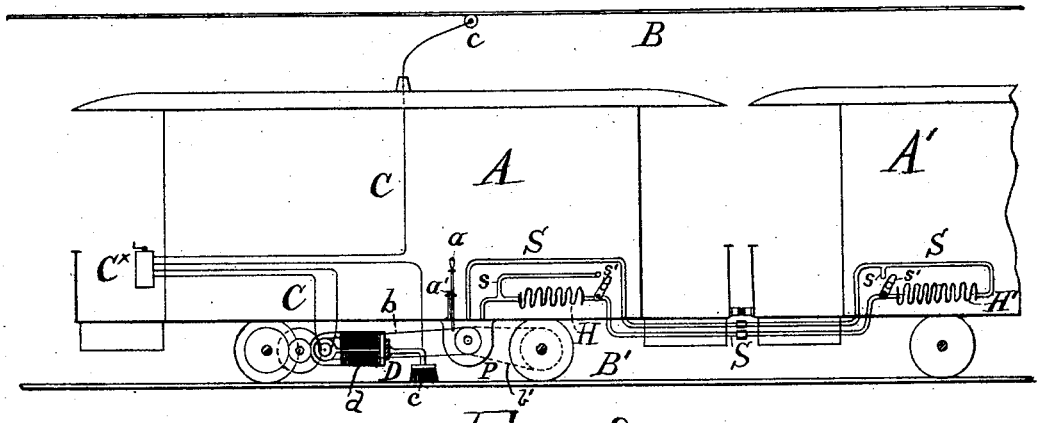

Fig. 2.

WITNESSES:

A. F. Walz

C. L. Bendixon

INVENTOR

Mark W. Dewey

BY

Duell, Laas & Duell

his ATTORNEYS

UNITED STATES PATENT OFFICE.

MARK W. DEWEY, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE DEWEY CORPORATION, OF SAME PLACE.

ELECTRIC HEATING APPARATUS FOR ELECTRIC-RAILWAY SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 418,911, dated January 7, 1890.

Application filed August 19, 1889. Serial No. 321,194. (No model.)

To all whom it may concern:

Be it known that I, MARK W. DEWEY, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Electric Heating Apparatus for Railway Systems, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention has reference to electric railways; and it consists in certain improvements herein set forth, and shown in the accompanying drawings.

My invention relates particularly to heating apparatus for electric railways similar to that shown and described in my prior patents, No. 401,482, dated April 16, 1889, and No. 406,890, dated July 16, 1889.

My present invention consists in the following improvements over said patents, viz: The heating-current is primarily generated on the vehicle or train, thereby dispensing with an inductional transformer and allowing a current of any required strength and volume to be generated. In order to derive an economical heating-current from the current supplying the motive power for the vehicle it was necessary, according to my prior patents, to transform the current by a secondary electric generator. This necessitated the employment in some cases of a pulsator to pulsate the current when it was of a continuous direct nature. I propose now to generate the heating-current, or current of great volume and low electro-motive force, directly by a primary electric generator or dynamo-generator constructed to produce a current or currents of great volume. This dynamo is located on a vehicle or car or one of the cars of a train, and is driven or operated by the same source of energy that moves the car. In some cases a separate motor from the propelling-motor drives the dynamo. In other cases the propelling-motor drives it. The heating-circuit leading from the dynamo is of very low resistance and includes one or more electric heating devices described in the patents above referred to. When the apparatus is required to heat a train of cars, the dynamo is located upon one of them, and the heating-circuit extends from said dynamo to the other cars or one or more of them, each having electric heating devices to heat the interior.

In the accompanying drawings, Figure 1 represents a sectional elevation of an electrically-propelled car and a portion of another coupled to it, showing circuits thereon and receiving the current by a movable contact on an overhead-line working-conductor, and a movable contact on the track, which in this case forms the return-conductor. Fig. 2 is a modification of the same, showing dynamo operated by the same motor that propels the train.

Referring specifically to the drawings, A represents the motor-car; A′, the car coupled to it; B and B′, the supply or line working-conductors arranged along the path of the vehicle; C, the vehicle-conductor or electrical connection on the car connected movably to the line-conductors; and E denotes the source of electricity or energy. I do not limit myself to the location of the said line-conductors, as they may be contained in a suitable conduit beneath the road-bed, overhead, or alongside of the track; neither do I limit myself to the form of contacts traveling on the said conductors.

The motor D is preferably designed to have the direction of rotation of its armature reversed by reversing the current through the same, the direction of the current through the field-magnet *d* remaining the same. It will be obvious, however, that other well-known methods of reversing the movement of the vehicle may be employed, if desirable.

C′ represents the current-reverser for reversing the direction of the current in the armature of the motor D, and C″ an adjustable resistance in the conductor C for controlling the speed of the motor.

F in Fig. 1 is a shunt-circuit connected with the motor-circuit C in proximity to the traveling contacts *c* and *c′*, or around the motor D and its controlling devices C′ and C″.

I is an electric motor connected in the shunt-circuit F for operating or driving the dynamo-generator on the car.

F′ is an adjustable rheostat and circuit

maker and breaker in said shunt-circuit for regulating the current flowing therein, and thereby controlling the speed of the motor I and dynamo.

P is a primary generator of heating-currents or a dynamo-generator, constructed to generate currents of great volume and small electro-motive force, driven, preferably, by the motor I, as shown in Fig. 1. I do not limit myself to this plan, however, as the said dynamo may be driven by the same motor that propels the car or train, as shown in Fig. 2. If it is desired to produce heat in this case while the car is at rest, as may be necessary if the car makes long stops, it will only be necessary to mount the gear-wheel loosely on the car-axle and employ in connection therewith any suitable and well-known clutch mechanism for tying and releasing the said gear-wheel to and from the axle, (not necessary to be here illustrated;) and, further, if it is not necessary to generate heat when the car is at rest, as when said car makes short stops, or when heat is stored while the car is moving to be given out when it is at rest, the dynamo-generator of heating-currents may be coupled to the axle of the car, as hereinafter described, and indicated in Fig. 2.

In Fig. 2 the dynamo P is shown connected to the propelling-motor by a belt or chain *b*, but may be connected in any other suitable manner.

b' indicates in dotted line the belt or connection of the dynamo to the axle of the car that may be employed when it is desired to drive said dynamo only when the vehicle or car is in motion.

a represents a lever pivoted at *a'* on the car and reaching to and on each side of the belt *b* to shift the same, when desired, to a loose pulley on the dynamo-shaft to stop the dynamo or generation of heating-currents.

S is the low-resistance circuit of the dynamo P, and is formed of large wire or cable. The heating devices H and H' are included in said circuit in series.

s s indicate low-resistance shunt paths for the current around the heating devices, and may be closed by suitable switches or circuit-closers *s'* when it is desired to cut out of circuit one or more of the heating devices.

C in Fig. 2 indicates the controlling devices of the motor D.

The dynamo-generator P may be the same or similar to that shown and described in patent to Thomson, No. 385,386, dated July 3, 1888. This dynamo is constructed to generate directly a current of great volume suitable for heating purposes without a transformer of any kind.

What I claim is—

1. The combination, with an electrically-propelled vehicle, working-conductors supplied with currents along the path of said vehicle, a conductor on the vehicle in movable contact with the working-conductors, and the electric motor to propel the vehicle, of a dynamo-generator on the vehicle, operated by the same source of energy and constructed to generate currents of great volume, a circuit of low resistance connected to the dynamo, one or more electric heating devices included in the latter circuit, and means to control the movement of the dynamo independent of the movement of the motor.

2. In an electric railway, a line working-conductor, a traveling vehicle, an electric motor to propel said vehicle, a dynamo-generator on the vehicle, an electric circuit connected to the dynamo, one or more heating devices in the latter circuit, and an electrical connection carried by said vehicle and in movable contact with the working-conductor to supply electricity to propel the vehicle and operate the generator.

3. In an electric railway, a line working-conductor, a traveling vehicle, an electric motor to propel said vehicle, a dynamo-generator on the vehicle constructed to generate currents of great volume, a circuit of lower resistance than the line-conductor, connected to the dynamo and having one or more heating devices in the latter circuit, and an electrical connection carried by said vehicle and in movable contact with the working-conductor to supply electricity to propel the vehicle and operate the generator.

4. In an electric railway, a line working-conductor, a traveling vehicle, an electric motor to propel said vehicle, an electrical connection carried by said vehicle and in contact with the working-conductor, a dynamo-generator on the vehicle operated by or through the current passing through the said electrical connection, an electric circuit connected to the dynamo, and one or more heating devices in the latter circuit.

5. The combination of a vehicle, a line working-conductor, an electric motor on the vehicle, an electrical connection between said motor and working-conductor and in movable contact therewith, a dynamo-generator on the vehicle driven by said motor, an electric circuit connected to the dynamo, and one or more heating devices in the latter circuit.

6. The combination of a vehicle, a dynamo-generator on the vehicle constructed to generate directly currents of great volume and low electro-motive force, a source of energy to both move the vehicle and drive the dynamo, a circuit of low resistance connected to the dynamo, and one or more electric heating devices in the circuit.

7. The combination of a vehicle, a dynamo-generator on the vehicle constructed to generate directly currents of great volume and low electro-motive force, a source of energy to both move the vehicle and drive the dynamo, means to control the movement of the dynamo independent of the movement of the vehicle, a circuit of low resistance connected to the dynamo, and one or more electric heating devices in the circuit.

8. The combination of a train of cars, a

dynamo-generator on one of the cars, constructed to generate directly currents of great volume and low electro-motive force, a source of energy to both move the vehicle and drive the dynamo, a circuit of low resistance connected to the dynamo and extending to one or more cars in the train, and one or more heating devices in each of the cars in the circuit.

9. The combination of an electrically-propelled train of cars, a conductor on one of the cars, supplied with current, an electric motor connected with the conductor to move the train, a dynamo-generator on one of the cars driven by said motor and constructed to generate directly currents of greater volume than the current supplied, a circuit of low resistance connected to the dynamo and extending to one or more cars in the train, and one or more heating devices in each of the cars in the circuit.

10. The combination of a vehicle, a dynamo-generator on the vehicle, constructed to generate directly currents of great volume and low electro-motive force, a stationary source of energy to both move the vehicle and drive the dynamo, a circuit of low resistance connected to the dynamo, and one or more electric heating devices in the circuit.

In testimony whereof I have hereunto signed my name this 15th day of August, 1889.

MARK W. DEWEY. [L. S.]

Witnesses:
C. H. DUELL,
C. L. BENDIXON.