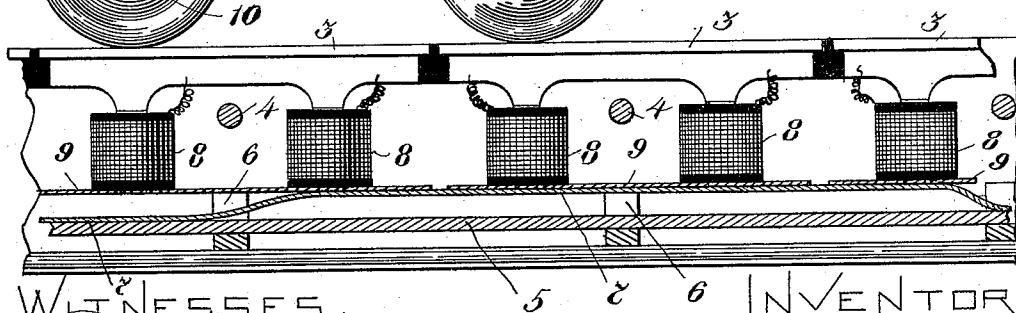
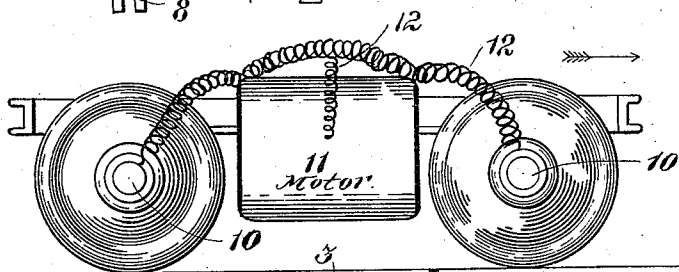
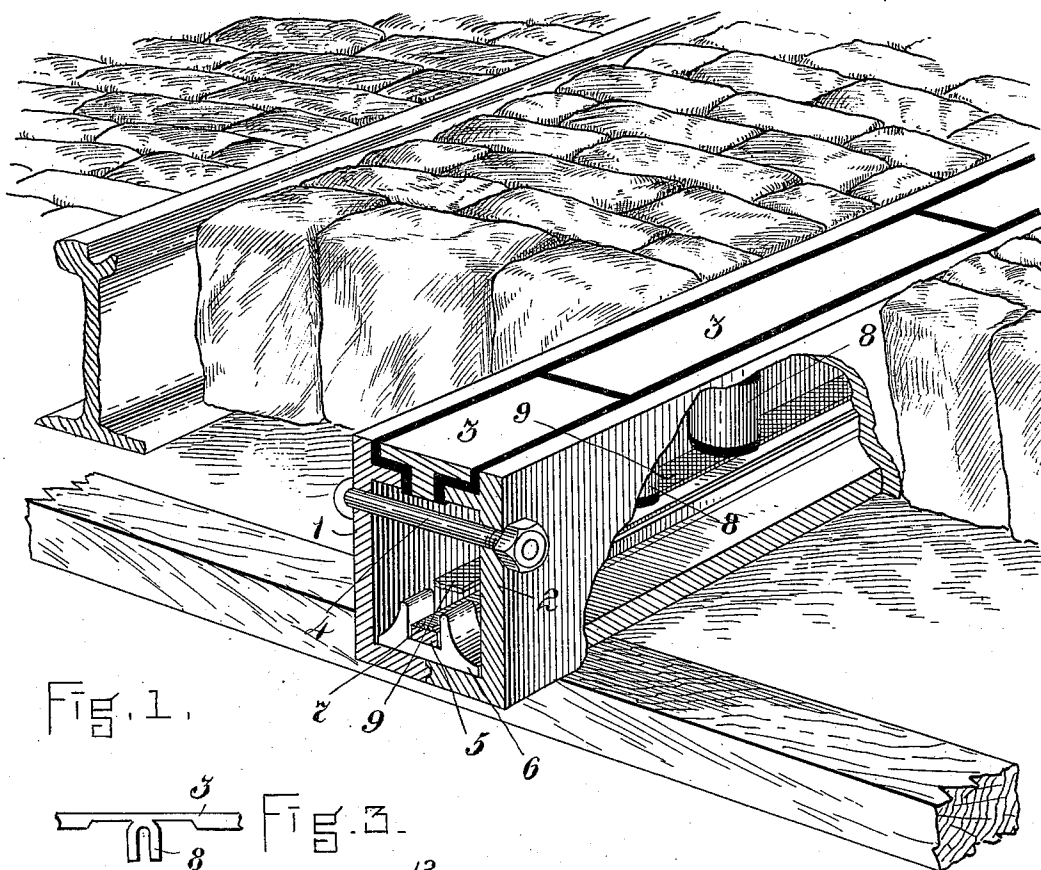


L. DION.
ELECTRIC RAILWAY.

Patented Jan. 12, 1897.



WITNESSES.

Henry Marsh.
Hass & Gooding.

INVENTOR

León Dion
by Fred Joy
July.

UNITED STATES PATENT OFFICE.

LÉON DION, OF NATICK, MASSACHUSETTS, ASSIGNOR TO THE MASSACHUSETTS ELECTRIC COMPANY, OF BOSTON, MASSACHUSETTS.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 575,053, dated January 12, 1897.

Application filed December 30, 1895. Serial No. 573,734. (No model.)

To all whom it may concern:

Be it known that I, LÉON DION, a citizen of the United States, residing at Natick, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Electric Railways, of which the following is a specification.

My invention relates to systems of electrical propulsion for railway-cars, and especially to that class or type of improvements in which the electrical conductors are placed in closed conduits.

In this invention I provide a closed conduit containing a main and auxiliary electrical conductor, the auxiliary electrical conductor being flexible and composed of a metal susceptible to magnetic attraction, the auxiliary conductor being normally in continuous contact with the main conductor, excepting at points throughout its length where it is lifted up by magnetic attraction, and brought into electrical connection with the insulated contact-plates forming the top of the conduit, all as shown in my former patents.

In my former patents I have picked up or lifted the auxiliary conductor by a magnet on the car, but this I find is objectionable, as the magnet thus exposed is continually getting loaded up with waste metal attracted and picked up in passing over the line.

My present invention consists in dispensing with the traveling magnet on the car, and in combining a series of electromagnets with the conduit and electrical conductors, and in so locating said magnets within the conduit and above the electrical conductors, with relation to the contact-plates forming the top of the conduit, as to positively insure establishing a continuous electrical connection between the electrical conductors and the motor in the car as said car is propelled along the line.

My invention also consists in other improvements, all of which I will now describe, and particularly point out in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 represents a detail perspective showing the construction of the conduit, which is broken away to show the electrical conductors, two of the electromagnets, and the non-magnetic plates attached thereto. Fig. 2 represents a detail lon-

gitudinal section of the conduit, its contact-plates, electromagnets, non-magnetic plates, and electrical conductors; also shows a side elevation of the traveling carriage and electric motor. Fig. 3 represents a detail modification of the contact-plate electromagnet-core.

As my present invention particularly relates to the conduit and its electromagnets, I do not consider it necessary to go into a complete description of all the parts, as the invention in general is analogous to that shown and fully described in my Patent No. 536,855, issued April 2, 1895.

In the drawings hereto annexed, in which like figures of reference indicate corresponding or similar parts in all the views, 1 and 2 are the two parts of the conduit, and 3 the contact-plates suitably insulated both longitudinally and transversely, the three parts composing the conduit being firmly clamped or fastened together by suitable bolts 4, thus forming a closed or tightly-sealed conduit. Within said conduit, in the lower part thereof, is located the main electrical conductor 5, preferably composed of metal not susceptible to magnetic attraction, but of good electrical conductivity, said conductor extending the length of the line and being suitably supported in insulating-chairs 6, which keep it from electrical contact with any part of the conduit.

Upon the upper surface of the main conductor 5, throughout its entire length, normally rests the flexible auxiliary electrical conductor 7, formed of a metal having suitable electrical conductivity and also susceptible to magnetic attraction without becoming permanently magnetic.

The contact-plates 3 are provided, preferably near each end thereof, with electromagnets 8, properly wired and insulated and connected to said plates and to non-magnetic plates 9, located beneath said electromagnets. The plates 9 are preferably of a length corresponding to the length of the contact-plates and are separated from each other, as shown in Fig. 2. The plates 9 are composed of metal of good electrical conductivity, but are not susceptible to magnetic attraction.

The wheeled contact-carriage 10 is provided

with a suitable electric motor 11, which is geared off or connected to one of the axles of the car.

The wheels are designed to travel along the contact-plates, and in so doing successively establish electrical and magnetic connection with said plates and convey the electric current to the motor through the connections 12, and from which it passes off through the ground-wire in the usual manner, it not being considered necessary to show said ground-wire or other means for the return current.

After the flexible conductor is once raised into contact with the electromagnet the magnets beneath the wheeled carriage 10 are energized by the main-line circuit passing through the coils of the magnets, the contact-plate, the wheels and connection 12, and finally to the ground-wire.

With my invention when the conduit is covered with mud, snow, or water, as it may at times be, it can effect no harm, nor would danger attend persons or animals walking thereon completely around the car, as the exposed contact-plates form no part of any circuit, since the only plates actually in circuit would be entirely under the car, as the wheeled contact-carriage is by preference placed under the center of the car.

By referring to Fig. 2 it must be readily seen that as the forward wheel of the contact-carriage 10, in moving in either direction, passes over the insulation on to the next succeeding contact-plate it establishes a circuit through the overlapping auxiliary conductor to the adjacent non-magnetic plate 9, the adjacent electromagnet, contact-plate, and wheel aforesaid, and thence to the motor, and as the contact-carriage is propelled along over the line the electromagnets are successively energized and the lifted loop or contact portion of the flexible conductor is caused to follow along beneath said carriage in the direction of travel of the latter.

My invention is, of course, susceptible to some changes within the scope of electrical or mechanical skill without departing from the essential features and spirit of my invention, as, for instance, the connection and arrangement of the non-magnetic plates 9 and contact-plates 3 through the electromagnets 8 may be modified and varied in form and yet act in proper conjunction with the wheeled contact-carriage 10, as will be readily perceived by those skilled in the art to which my invention appertains.

If preferred, the auxiliary electrical conductor can be dispensed with and the main electrical conductor can be made flexible, so as to operate in place of the former, without changing or evading the scope of my invention.

Having thus fully described the nature and construction of my invention, I desire to secure by Letters Patent and claim—

1. In an electric railway, the combination

of the following instrumentalities, viz., a closed conduit along the line of track, a series of insulated contact-plates forming the top of said conduit, an electric motor and car or wheeled vehicle, a contact-carriage connected with said car or vehicle and adapted to travel on the contact-plates, main and auxiliary electrical conductors within said conduit, and a series of electromagnets within said conduit located between the electrical conductors and the contact-plates and arranged in a manner to establish an electric circuit between the main electrical conductor and the electric motor as the car is propelled along the line, substantially as herein set forth.

2. In an electric railway, the combination with a closed conduit having a top formed of insulated sections constituting contact-plates, a main electrical conductor within said conduit, and a flexible auxiliary electrical conductor superimposed on said main conductor, of a series of electromagnets within said conduit above said conductors, and in electrical connection with the contact-plates, whereby when an electric circuit is established by the passage of the traveling contact along the contact-plates, said electromagnets are successively energized in accordance with the travel of said contact, and magnetically pick up and pass along a raised portion of the flexible auxiliary electrical conductor, substantially as and for the purpose herein set forth.

3. In an electric railway, a closed conduit having insulated top sections forming contact-plates, electromagnets suspended from beneath, and in electrical connection with said contact-plates, in combination with non-magnetic plates interposed between said magnets and the electrical conductors and in electrical connection with said electromagnets, substantially as and for the purpose herein set forth.

4. In an electric-railway conduit, the combination, with the bottom and two sides thereof, of a series of top contact-plates, each plate having on its under side two or more electromagnets suspended therefrom and electrically connected therewith, and a non-magnetic plate corresponding in length to said contact-plate arranged parallel therewith and electrically connected to said electromagnets, substantially as and for the purpose herein set forth.

5. In an electric railway, the combination of a main electrical conductor, a flexible auxiliary electrical conductor, a series of insulated contact-plates along the line above said conductors, a series of electromagnets electrically connected to the bottom of said contact-plates, a series of non-magnetic plates above said conductors and electrically connected to the bottom of said magnets, a traveling contact-carriage on said contact-plates in circuit with said conductors, and a motor

for controlling the movement of said traveling contact, substantially as and for the purpose set forth.

5 6. In an electric railway, the contact-plate 3, and non-magnetic plate 9, parallel to each other, in combination with the electromagnets 8, clamped between said plates at the ends thereof, and one end of the wire coils of each magnet being attached to the contact-plate 10 and the other end to the non-magnetic plate, substantially as and for the purpose set forth.

15 7. In an electric railway, a closed tube or conduit, a main and auxiliary electrical conductor, and a series of electromagnets within the interior of said tube or conduit, in combination with a series of insulated exterior contact-plates, and a traveling contact-carriage on said contact-plates, substantially as and for the purpose herein set forth.

20 8. In an electric railway, in combination, the closed conduit having a series of insulated contact-plates, a contact-carriage adapted to travel thereon, a motor for propelling said carriage, a main and auxiliary electrical

conductor within said conduit, a series of non- 25 magnetic plates within said conduit above said conductors, and a series of electromagnets between said non-magnetic plates and the contact-plates, one end of the coils of said magnets being attached to the contact-plates 30 and the other end of said coils being attached to the non-magnetic plates, all substantially as and for the purpose herein set forth.

9. In an electric railway a closed tube or conduit in sections, insulated from each other, 35 with magnets therein, attached to the top of said tube or conduit, in combination with a non-magnetic main conductor and an auxiliary magnetic conductor superimposed thereon, said magnets lifting said auxiliary conductor, all as above described and for the purposes set forth. 40

In testimony whereof I affix my signature in presence of two witnesses.

LÉON DION.

Witnesses:

FRED JOY,

JOSEPH J. FEELY.