

(No Model.)

E. W. RICE, Jr.
CLOSED CONDUIT ELECTRIC RAILWAY.

No. 575,785.

Patented Jan. 26, 1897.

FIG. 1.

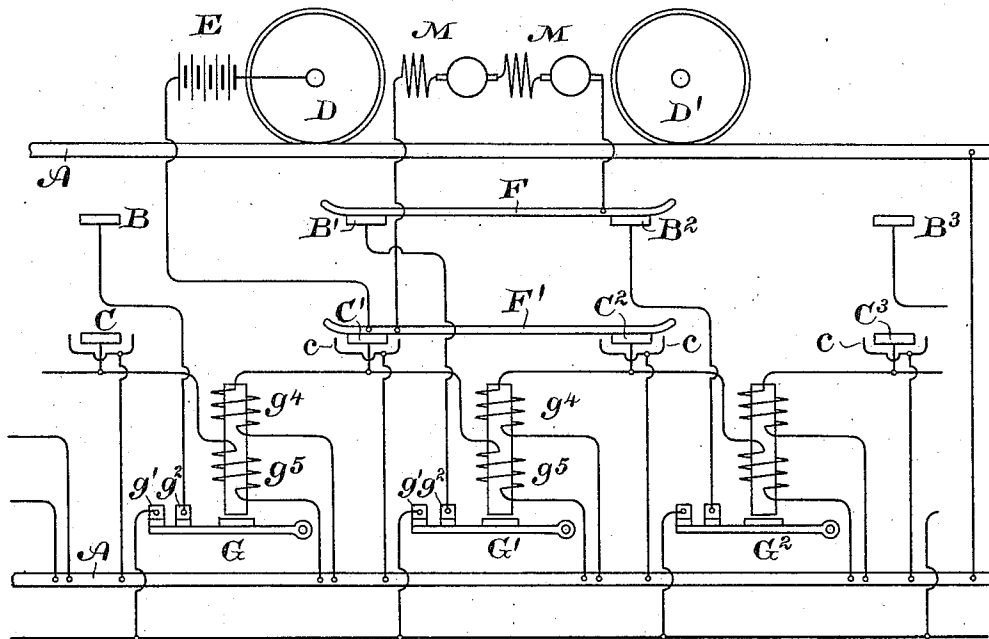
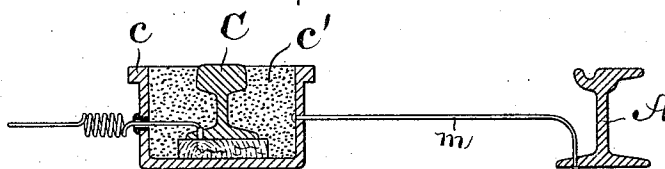


FIG. 2.



WITNESSES.

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UNITED STATES PATENT OFFICE.

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CLOSED-CONDUIT ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 575,785, dated January 26, 1897.

Application filed October 31, 1896. Serial No. 610,682. (No model.)

To all whom it may concern:

Be it known that I, EDWIN W. RICE, JR., a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Closed-Conduit Electric Railways, (Case No. 444,) of which the following is a specification.

My invention relates to surface-contact or closed-conduit systems of electric railways, and has for its object to provide a means of preventing the energizing of the street-contacts at a time when they are not covered by the car, and to thus prevent damage to persons and vehicles crossing the line of way.

One source of difficulty which engineers have sought to avoid has been leakage from the high-potential studs or contacts carrying the motor-current to the contacts which serve to pick up the electromagnetic switches commonly proposed. It is manifest that where leakage occurs in this way it will tend to hold up the switch and energize the contacts not covered by the car. By my invention this is prevented by interposing between the high-potential contacts a "ground" adjacent to and surrounding the low-potential stud, so that any current which may leak will not reach the stud, but will be diverted to ground, and the switch will be free to open in the usual way.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a diagram of circuits which may be employed, it being typical of any operative arrangement; and Fig. 2 is a section of the proper mechanical construction.

In Fig. 1, A A are the track-rails, upon which the car (represented by the wheels D D') moves. M M are the motors, connected between the sliding shoes or contacts F F', carried by the car. E is a storage battery connected between the ground and one of the shoes. The high-potential studs are lettered B B', &c., and serve to carry current to the motor by way of the shoe F. The low-potential studs, or those in circuit with the coils of the pick-up magnets, are lettered C C', &c., the coils themselves being lettered $g^4 g^5$. The pick-up magnets serve to close the switches G G' at the contacts $g^1 g^2$, energizing the high-

potential studs B, &c. It will be observed that each stud C is connected through coils on two switches to ground, so that energizing one stud picks up two switches. The high-potential and low-potential contacts or studs are "staggered," so that the switch is closed before the contact with the motor-circuit is made. The operation of these parts is as follows: As the shoe F' touches, in succession, the low-potential studs the switches pick up, energizing the high-potential studs and carrying current to the motors. The motor-current is carried directly through the low-potential studs and the coils on the pick-up magnets to ground. When, however, the current is cut off from the motors, all the switches fall, and when it is desired to start the car the current is passed from the storage battery through the low-potential studs with which the shoe F' happens to be in contact, picking up the switches, which will then be held up by the motor-current.

Adjacent to each of the studs C, I arrange a surrounding box provided with an independent ground connection. This is best seen in Fig. 2. In that figure, A is, as before, the track-rail. m is the ground connection to the rail from the metal box c , surrounding the low-potential stud C. The connection to the circuits is seen passing through the box, being protected by an insulating-bushing. The contact-stud itself is carefully insulated from the surrounding box by insulation c' .

It is manifest that my invention may take many forms. The one I have shown is well adapted to its exercise, and I aim to cover by my claims any arrangement furnishing an independent ground connection adjacent to and serving to protect the pick-up-magnet contacts, so that leakage-current would be intercepted before it reached the coils of the pick-up magnets. It is also manifest that the independent ground connection will sufficiently serve its purpose if it be interposed at any point between the high-potential stud and the pick-up magnet, it being of course necessary to insulate it from the high-potential stud, the fundamental feature of the device being a shunt-circuit to ground for leakage-currents, by which such currents are kept away from the coils on the pick-up magnets.

It is further manifest that the invention finds its utility in those cases in which the magnet-coils are grounded at one end.

What I claim as new, and desire to secure
5 by Letters Patent of the United States, is—

1. In a surface-contact or closed-conduit electric-railway system, an independent ground connection adjacent to the pick-up-magnet contacts and adapted to protect the
10 coils on the pick-up magnets from extraneous or leakage currents, substantially as set out.

2. In a surface-contact or closed-conduit electric-railway system, a metal box surrounding the low-potential pick-up-magnet contact
15 and insulated therefrom, with an independent ground connection from the box, the whole

adapted to protect the pick-up-magnet coils from extraneous or leakage current.

3. In a surface-contact or closed-conduit electric-railway system provided with sectional conductors and grounded coils upon the pick-up magnets connected to the sectional conductors, an independent shunt-circuit to ground for leakage-current, interposed between the high-potential studs and the con-
25 tacts connected to the magnet-coils.

In witness whereof I have hereunto set my hand this 26th day of October, 1896.

EDWIN W. RICE, JR.

Witnesses:

B. B. HULL,
E. W. CADY.