No. 613,794. Patented Nov. 8, 1898.

W. M. BROWN.

ELECTRIC RAILWAY.

(Application filed Jan. 22, 1898.)

(No Model.)

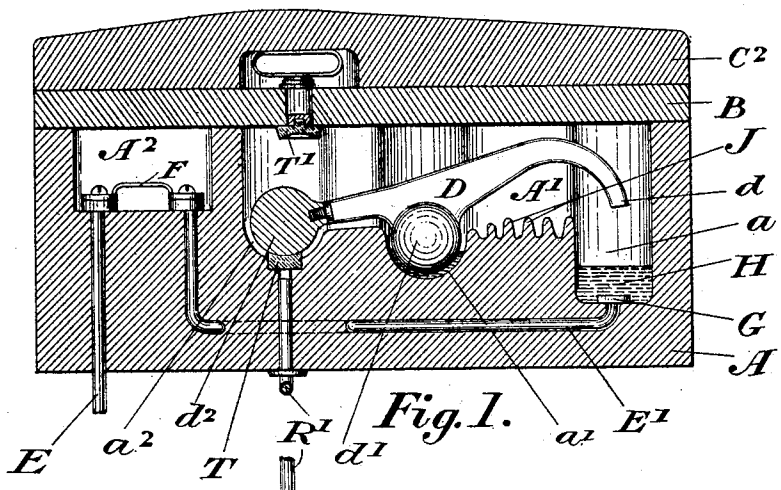


Fig. 1.

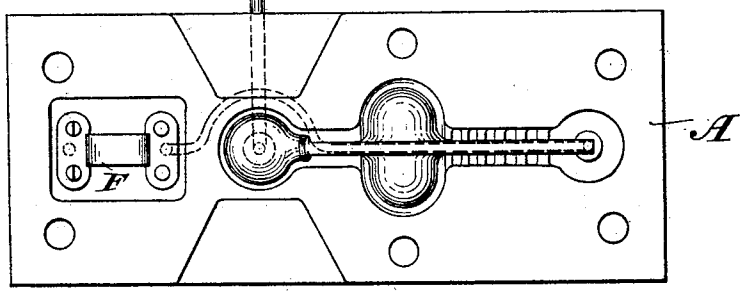


Fig. 2.

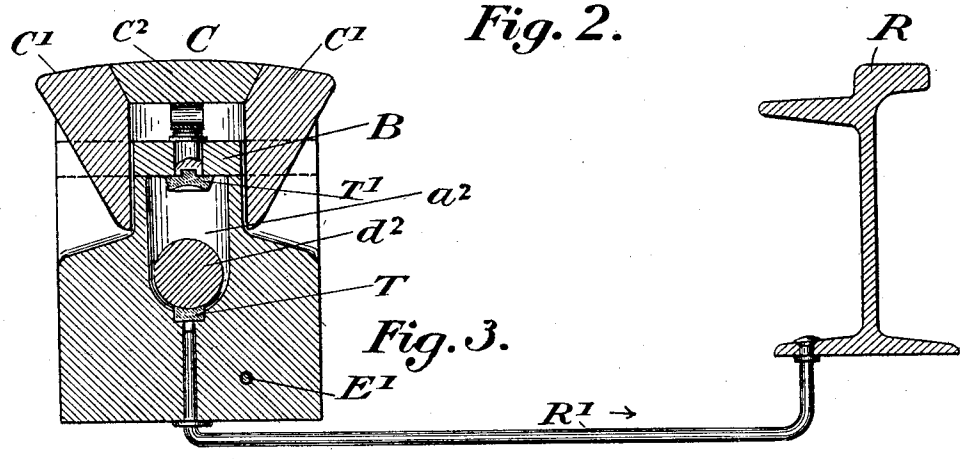


Fig. 3.

WITNESSES:

Myrtle E. Sharpe.

H. C. Stitt.

INVENTOR

W. Milt. Brown

BY

Richard Eyre

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM MILTON BROWN, OF JOHNSTOWN, PENNSYLVANIA, ASSIGNOR TO THE JOHNSON COMPANY, OF LORAIN, OHIO.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 613,794, dated November 8, 1898.

Application filed January 22, 1898. Serial No. 667,522. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MILTON BROWN, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented a new and useful Improvement in Electric Railways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to electric railways of that class which employ a bared conductor in disconnected sections or isolated spots to convey the current from the source of supply to the collecting devices of the moving vehicle. In this class of railways a switch or current-conveyer is placed between the feeders which are connected with the high-potential side of the circuit and each of the said conductor-sections. This switch is normally open, but is so arranged that it will be closed when the moving vehicle is directly over the particular conductor-section connected with said switch. This closure may be effected by a traveling magnet carried by the vehicle, by an underground magnet receiving its energizing-current on account of the presence of the vehicle, by mechanical devices carried by the vehicle, or by other means known to those skilled in the art.

My invention is applicable to railways of this general class; but it has been designed with special reference to that type of railways which employ a traveling magnet to act upon the current-conveying switch. The specific structure which I show is more particularly adapted for use with a railway such as is shown and described in my prior patent, No. 558,151, dated April 14, 1896. At the same time I do not limit myself to the use of my invention upon this particular type of railway, as I believe that it has broadly novel features which are adapted for use with many widely-varying types of railways. In railways in which these current-conveying switches are used difficulty has often been experienced because of the occasional failure of the switch to properly open. This may occur from leaks from the conductor-section to the rail or return side of the circuit or from other causes.

The central object of my invention is to minimize this danger to the utmost possible degree by providing a switch which simultaneously breaks the circuit at two comparatively distant points and which is so arranged that if any arc is maintained at these two points a new circuit is formed which will cut the conductor-section out of the main circuit.

Other objects of my invention are the provision of a switch which will have as small a degree of friction as possible, in which the danger of moisture leaks is reduced to a minimum, and which will be simple and efficient in construction and operation. To achieve the aforesaid objects, I provide as the movable member of the aforesaid switch an arm which in its normal position is in connection with the return side of the circuit, but which when magnetically actuated is in connection at one end with the conductor-section and at the other end with the high-potential side of the circuit, and I provide a novel construction, arrangement, and combination of parts the functions and advantages of which will more fully appear hereinafter.

Referring to the drawings, Figure 1 is a vertical section taken longitudinally through the center of an electric contact-box containing a switch embodying the features of my invention. Fig. 2 is a plan view of the same with the upper portions of the box removed. Fig. 3 is a transverse section through the center of the same, showing also the connections with the rail or return side of the circuit.

A is the base of the box, preferably formed of fire-brick.

C is the cover, which is formed of two sides C′ of magnetic material and a center C^2 of non-magnetic material. This center is the conductor-section of the system. Between the cover C and the base A is an insulating-slab B, which separates the metallic cover from the base and serves to prevent moisture-leaks between the switching apparatus and the said cover C.

In the base A are the cavities A′ and A^2. In the cavity A^2 is a fuse F, connected by a conductor E with the feeders connected to the high-potential side of the circuit. A conductor E′ passes through a suitable passage in the base and terminates at G within a body

of mercury or other electrical conducting liquid H. This mercury rests in a small recess a in the cavity A'. A second recess a^2 of the cavity contains a terminal T, connected by a conductor R' with the rail R, constituting the return side of the circuit. A third recess a' in the same cavity also contains mercury. The movable member of the switch is represented by the arm D, which seesaws about a center d', which center floats in mercury contained in the recess a', thus forming an almost frictionless bearing for the said arm. One end d^2 of this arm, which is here shown to be globular in shape, normally rests on the concave return-terminal T. The other end d of the arm is normally maintained in a position a little above the mercury H in the recess a.

The particular contact-box shown is intended for use in combination with a traveling magnet having two parallel longitudinal poles. Such a magnet has been shown and described in the aforesaid Letters Patent. These poles in their movement over the contact-box pass over the sides C' of the top C. As C^2 is non-magnetic, the magnetic lines of force will therefore pass downward through the sides C' (see Fig. 3) and lift the globular end d^2 of the arm D. On lifting this end of the arm the globular end d^2 will break contact with T and will then make contact with T', which is a concave terminal in connection with the conductor-section C^2, by means of a plug passing through the slab B. Simultaneous connection will be made between the other end d of the arm D and the mercury H. By this seesaw movement of the arm D, therefore, the conductor-section C^2 is put into direct electrical connection with the high-potential side of the circuit through the arm D, mercury H, fuse F, and conductor E. After the magnet has passed from over the top of the contact-box the weight of d^2 causes the arm D to again move to the position shown in Fig. 1, simultaneously breaking the circuit at each of its ends, thus at once reducing any tendency toward maintaining an arc. If, however, in spite of the double breakage of the circuit an arc is maintained across the opened terminals T' and d^2, connection will be made from the high-potential side of the circuit through E to mercury H, thence through one of the arcs to d, thence to the terminal T, and thence to the rail R, providing such a direct short circuit for the current from the arm D to the rail that the arc between T' and d^2 will quickly extinguish. The contact-section will therefore no longer be connected by means of the circuit T' and d^2 to the high-potential side of the circuit, for this arc has been extinguished by the short circuit established between T' and T. Thus the section is cut out of circuit even if no fuse be provided or even if for some reason it is slow or defective in operation. Normally, however, the instant the short circuit is established the fuse is melted and the whole device open-circuited.

At J, I show corrugations which are intended to prevent moisture-leaks from developing between the mercury H and the pivotal portion d' of the switch-arm.

I not only do not limit myself to any special type of railway, but I do not limit myself to the specific construction which I have shown, for I believe that my invention is far broader than the mere embodiment thereof which I have utilized for the purpose of illustrating and describing the said invention.

Having thus described my invention, what I claim, and desire to protect by Letters Patent, is—

1. The method of preventing a conductor-section from remaining in electrical connnection with the high-potential side by means of an arc between the said conductor-section and the current-conveying switch, which consists in breaking the circuit simultaneously between the switch and the conductor-section, and the switch and the terminal of the high-potential side of the circuit, and in providing a short circuit around the aforesaid arc to the low-potential side of the circuit.

2. A movable member normally connected with the low-potential side of the circuit but disconnected therefrom and forming a connection between the high-potential side of the circuit and the conductor-section when temporarily moved by the action of the passing car.

3. A current-conveying switch having a normal position in which it is connected with one side of the circuit and a temporary position in which it is connected with the opposite side of the circuit and with the conductor-section.

4. The combination of a terminal for one side of the circuit, a second terminal for the opposite side of the circuit, a contact-section and an electrode in communication therewith, and a switch member normally engaging one of said terminals, but movable so as to disengage therefrom, and connect with the other of said terminals and with the said electrode.

5. The combination of a terminal for one side of the circuit, a second terminal for the opposite side of the circuit, a contact-section and an electrode in communication therewith, and an arm having one end normally engaging said first-mentioned terminals and the other end disconnected from the circuit, but movable so that its two ends engage respectively the said electrode and the said second terminal.

6. The combination of a terminal for one side of the circuit, an arm having a heavy magnetizable end resting on said terminal, a contact-section and an electrode in communication therewith located in the path of upward movement of said magnetizable end, and a terminal in connection with the opposited side of the circuit, and located in the path of downward movement of the light end of the arm.

7. The combination of a body of mercury

in connection with the source of supply, a terminal in connection with the conductor-section, a second terminal in connection with the return side of the circuit, an arm, an armature constituting the heavy end of the same and resting on said second terminal, said arm electrically connecting the said body of mercury and the first-mentioned terminal when the said armature is lifted by magnetic attraction.

8. A movable switch member having two reciprocating contacts, in combination with a body of mercury in the range of movement of one of said contacts and in connection with one side of the main circuit, a pair of fixed terminals in the range of movement of the other of said contacts, connections from one of said terminals to a conductor-section, and connections from the other of said terminals to the opposite side of the main circuit.

9. In an electric contact-box, a tilting circuit-changing arm, and a cavity containing a heavy liquid supporting the central portion of said arm.

10. In an electric contact-box, the combination with a movable contact-carrying arm having an armature at one end, of a body of heavy liquid, said liquid forming a support for the central portion of the arm.

11. In an electric contact-box, in combination, a cavity, a recess therein containing a heavy liquid, a second recess containing a liquid-conductor in connection with one side of the circuit, a third recess containing one terminal in connection with the opposite side of the circuit and another terminal in connection with the conductor-section, and a movable connector comprising an end portion normally resting on the first-mentioned terminal, a central portion floating in said heavy fluid, and its other end portion normally above the said conducting fluid, but out of contact therewith.

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

WILLIAM MILTON BROWN.

Witnesses:
RICHARD EYRE,
MYRTLE E. SHARPE.