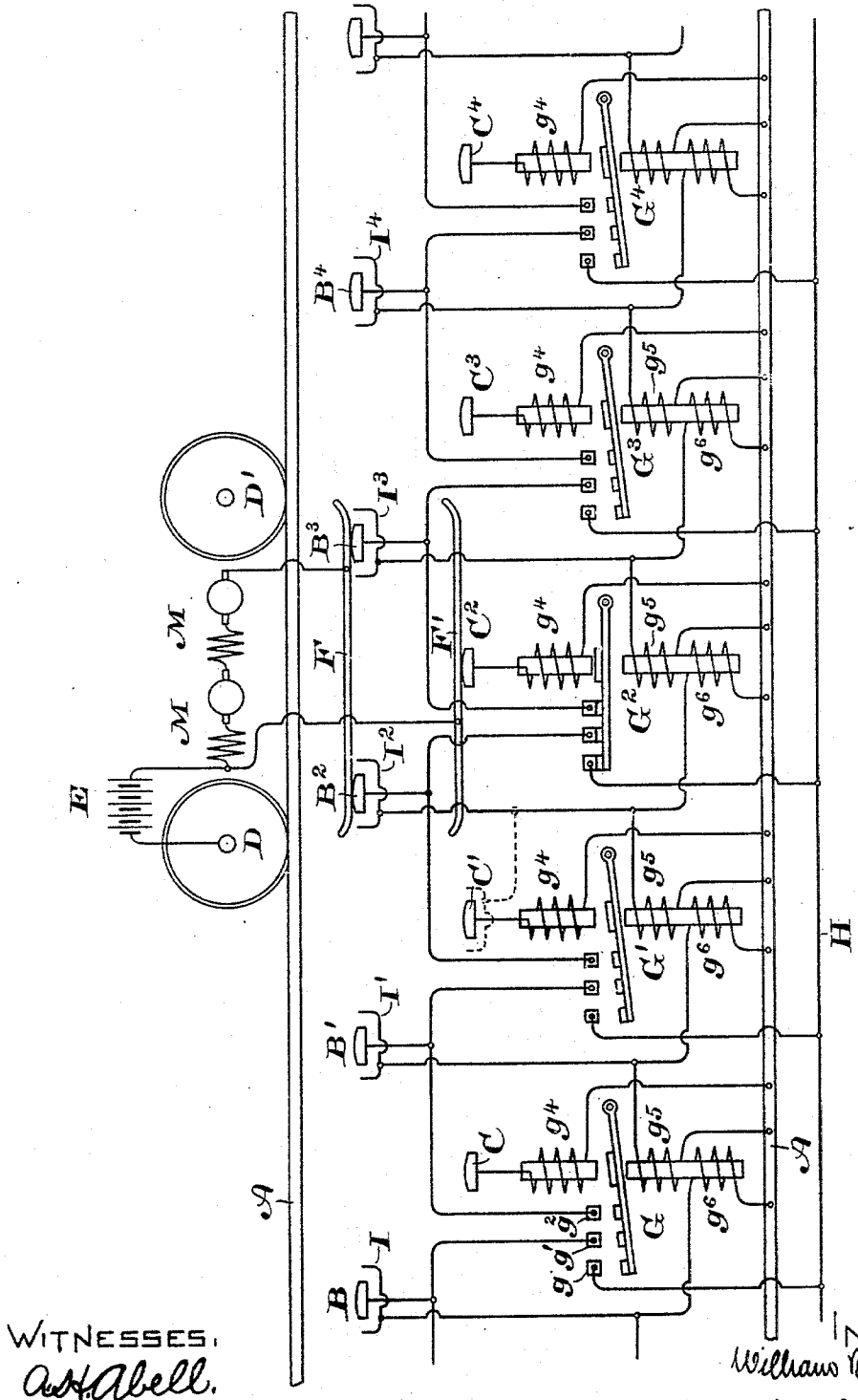
(No Model.)

W. B. POTTER.

CLOSED CONDUIT ELECTRIC RAILWAY.

No. 589,792. Patented Sept. 7, 1897.



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

UNITED STATES PATENT OFFICE.

WILLIAM B. POTTER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF NEW YORK.

CLOSED-CONDUIT ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 589,792, dated September 7, 1897.

Application filed November 18, 1896. Renewed June 30, 1897. Serial No. 643,008. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. POTTER, 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. 460,) of which the following is a specification.

My invention relates to surface-contact systems of supply for electric railways, and has for its object to provide for such systems a safety device by which any leakage-current will serve to open a switch which may by accident have remained closed, instead of increasing (as in other systems) the danger of the switch sticking.

To accomplish the purposes of my invention, I surround the contact-studs or sectional conductors with a metallic box or inclosing band and connect the band or box to the wire or return circuit through a differential coil upon the pick-up magnet of the switch. Any leakage-current seeking ground through the box and its lead will pass through the coil and demagnetize and open the switch.

It is immaterial in the practice of my invention which one of the sets of sectional conductors I prefer to employ is provided with the device mentioned. It is possible in most cases to use the high-potential studs, or the negative studs or conductors may also be employed, or, if it be desired, both may be so protected. So, also, the coil furnishing safety to each contact may be upon the core of its own switch alone or the box may be grounded through coils upon more than one of the switches. These are all immaterial variations not affecting the material essence of my invention. Where several coils are thus arranged upon one switch, it is preferred that they should have separate grounds, so that the breaking of the common ground connection would not serve to cripple the device.

The accompanying drawing shows my invention, it being a diagram of the safety device and its connections.

A A are the track-rails; B B′ C C′, the sectional conductors or contacts; H, the feeder.

G G′ are the pick-up switches, provided with operating-coils g^4 and contacts g g' g^2, by which the connection from the feeder H to the positive studs B B′ is completed. A motor-car provided with motors M M and a storage battery E, also sliding contacts F F′, travels upon the line of way.

At I I′, surrounding but insulated from the positive contacts B B′, are indicated, diagrammatically, the safety, grounds, consisting of metal boxes connected each through coils g^5 g^6, respectively, upon the switches G G′ to ground. Each of these contacts is thus connected to one of the switches and any leakage-current from the box will open the switch.

The system of connections for operating the switches shown in this case I have not claimed, as it is covered in my application, Serial No. 607,998, filed October 6, 1896.

In dotted lines I have shown the safety device applied to the negative sectional conductor C′, being grounded, as in the case of the studs B, through the differential coil g^5 upon each of the switches G. As before, any leakage-current which ordinarily would reach the stud C and by passing through the coil g^4 pick up the switch is now intercepted by the box I, passes through the differential coil g^5, and serves to hold the switch open or to open it if it should be stuck. The power of the coils is of course to be proportioned to the work to be done, and ordinarily the auxiliary coils serving to demagnetize and open the switch would have less power than the pick-up coil, inasmuch as the leakage-current would necessarily be of comparatively small volume and moderate potential, while the pick-up coil would carry full current.

I have used the term "differential" in describing my invention, meaning thereby to describe the action of the leakage-current in opening the switch as distinguished from closing it, rather than in its technical sense. Ordinarily I prefer that the winding should be, as illustrated, upon a separate core, acting to open the switch, and not differentially wound upon the same core as the pick-up coil, as the latter arrangement is not so reliable.

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

1. In a surface-contact system of supply for electric railways, a safety device comprising

an independent "ground" adjacent to the sectional conductors having included in its circuit a coil upon the pick-up switch.

2. A safety device for a surface-contact system of supply, composed of a metal box or sheath intermediate between and insulated from the sectional conductors, the box or sheath grounded through a coil upon the pick-up switch.

3. In an electric railway, the combination of a distributing-circuit composed of a positive feeder and ground-return, with two sets of sectional conductors, switches for connecting one set of sectional conductors with the positive feeder, electromagnets connected to ground and to the second set of sectional conductors for closing said switches, circuits for leakage-current arranged to intercept current tending to leak from the first to the second set of sectional conductors, and magnets in said last-named grounded circuits for opening the circuit between the positive feeder and the sectional conductors.

In witness whereof I have hereunto set my hand this 4th day of November, 1896.

WILLIAM B. POTTER.

Witnesses:
B. B. HULL,
C. L. HAYNES.