No. 745,383. PATENTED DEC. 1, 1903.

W. B. POTTER.

SECTIONAL THIRD RAIL SYSTEM.

APPLICATION FILED APR. 23, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

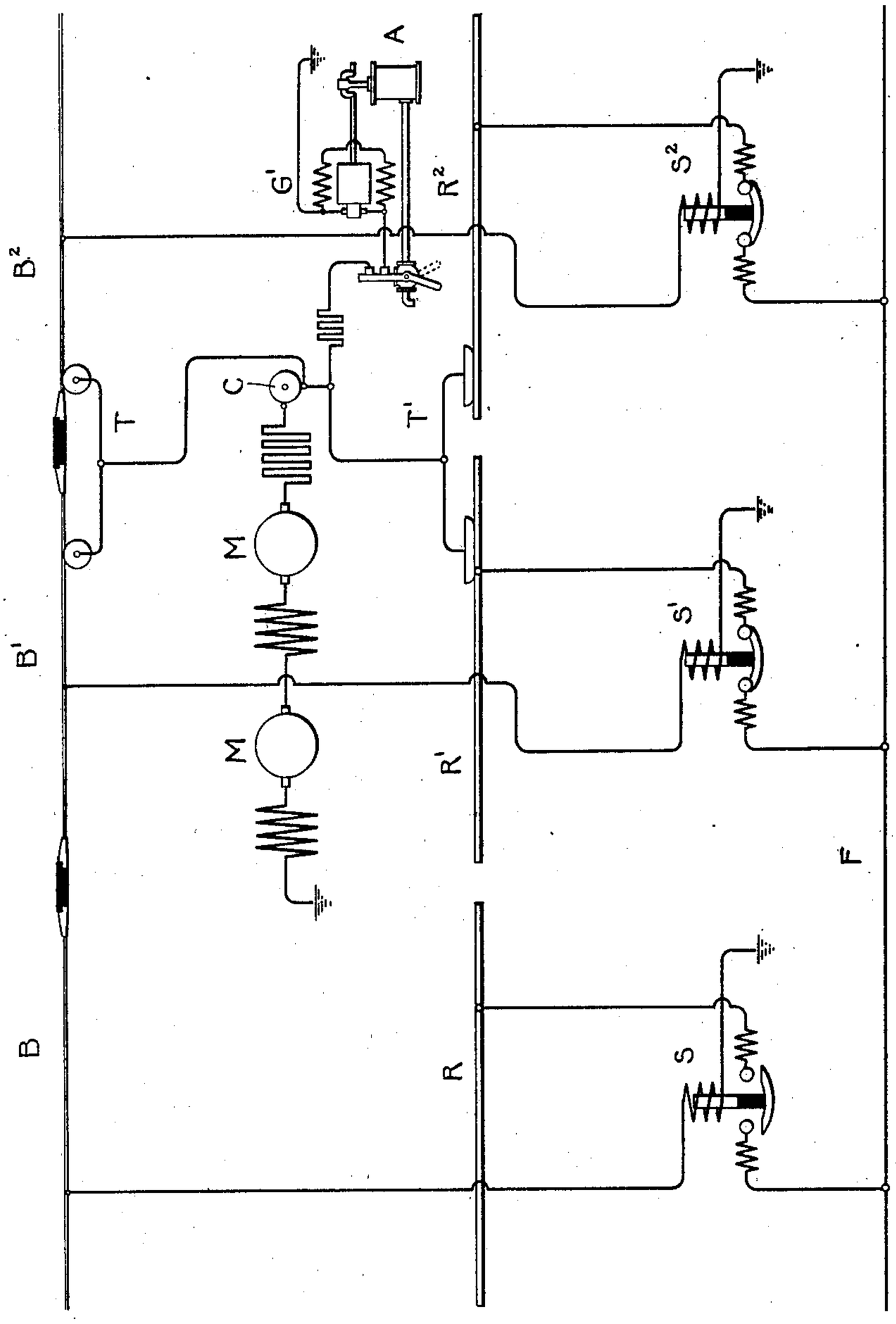

Fig. 1.

Witnesses.
J. E. Glenn.
Helen Orford

Inventor.
William B. Potter.
by Albert G. Davis
Atty.

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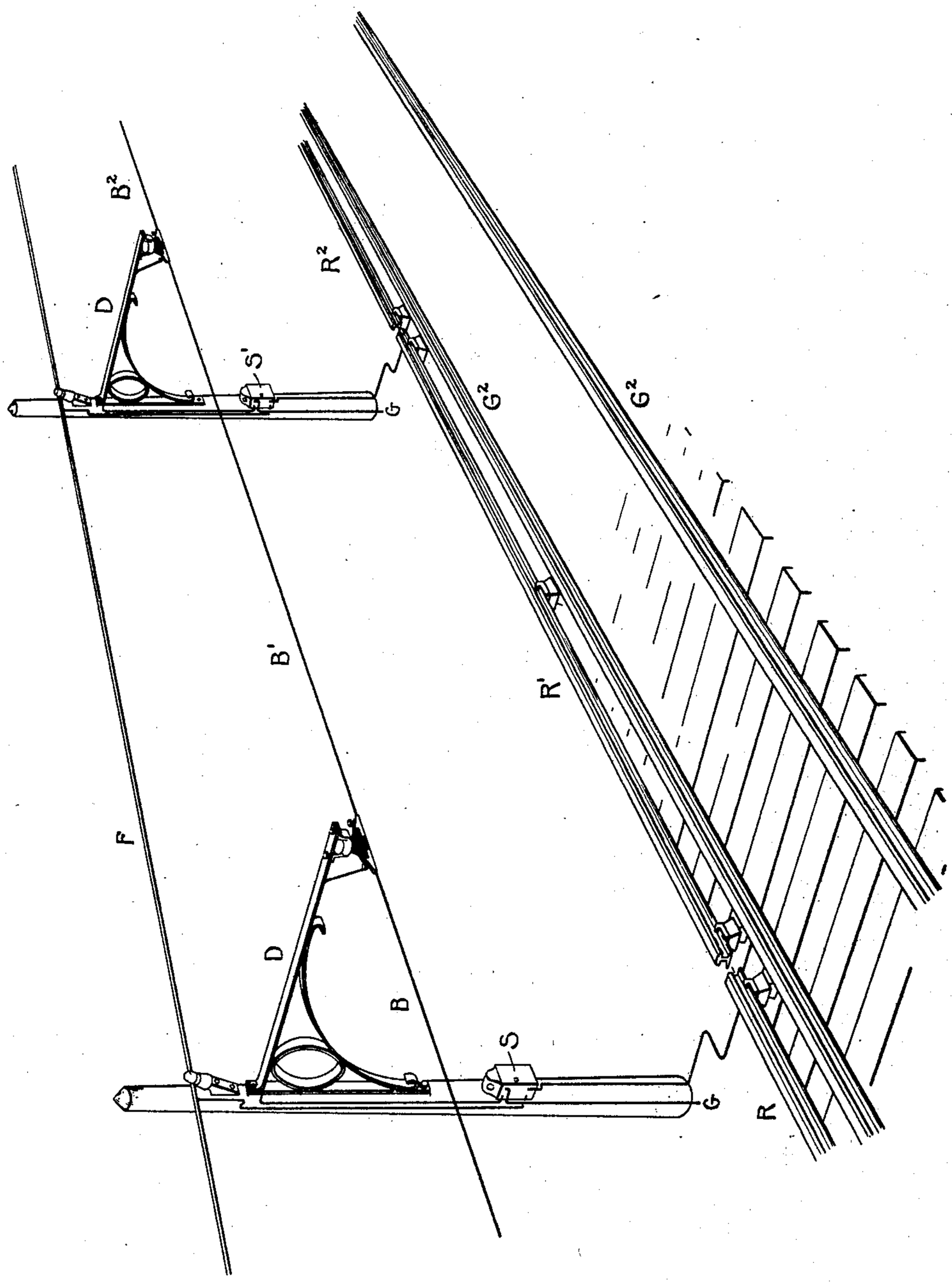

Fig. 2.

Witnesses.
J. E. Glenn.
Helen Orford

Inventor:
William B. Potter.
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UNITED STATES PATENT OFFICE.

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

SECTIONAL THIRD-RAIL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 745,383, dated December 1, 1903.

Application filed April 23, 1902. Serial No. 104,275. (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, county of Schenectady, State of New York, have invented certain new and useful Improvements in Sectional Third-Rail Systems, of which the following is a specification.

My invention relates to sectional third-rail or contact systems of the type employing electromagnetic switches for connecting the sectional third rail to a main feeder leading from the source of supply. In such systems as heretofore constructed it has been customary to mount both the working conductor or third rail and the pick-up conductor, through which the electromagnetic switches are actuated along the roadway adjacent to the track-rails, the sections of the two conductors being insulated from each other and from ground. In these systems great difficulty has been experienced in properly insulating the sectional conductors, so as to prevent leakage-current from flowing from the supply or working conductor through the switch-operating or pick-up conductor and holding the electromagnetic switch in its closed position after the car has left the section. Moreover, on account of its position along the roadway it has been necessary to make the pick-up conductor of great cross-section for mechanical reasons, whereas if the only consideration determining its size were its capacity to carry the necessary current for picking up the switches it might be made of very small cross-section.

My invention has for its main object to so construct a sectional third-rail system that there will be absolutely no possibility of leakage from the working conductor affecting the operation of the switches. Also in the system which I have devised it is possible to make use of a small light-weight conductor for supplying current to actuate the switches.

In carrying out my invention I mount the normally deënergized sectional switch-operating conductor overhead in the form of a small light-weight trolley-wire suitable for carrying the very small current which is required to operate the switches and make use of a sectional third-rail or working conductor mounted along the roadway adjacent to the track-rails.

My invention is especially applicable to systems in which a continuous third rail is used as a working conductor except at stations, cross-roads, &c., at which points the continuity of the third rail is interrupted and sectional working conductors substituted therefor.

My improved system readily adapts itself to tunnel construction and to any roads on which heavy locomotives using a large amount of current are operated. On such roads the use of an overhead trolley as a working conductor is open to objection, and great difficulties have been experienced in maintaining a proper contact between the trolley-wire and the collector when the locomotive is running at a moderate speed. The system which I have devised permits the placing of the working conductor along the roadway, where it can be rigidly mounted, so as to maintain a substantially even surface over which the collector-shoes may pass, and at the same time renders possible the use of a small light-weight pick-up conductor so mounted that there can be no leakage-current which will affect the operation of the pick-up switches.

In the accompanying drawings, attached to and made a part of this specification, Figure 1 is a diagrammatic representation of a sectional third-rail system embodying my invention; and Fig. 2 is a perspective view of the same, showing the relative position of the overhead switch-energizing conductors and the sectional third rail.

Referring now to Fig. 1, R R′ R², &c., represent the sections of the working conductor connected with the feeder F through the electromagnetic switches S S′ S², &c., respectively. The overhead sectional switch-energizing conductors (represented by B B′ B², &c.) are permanently connected through the actuating-coils of the switches S S′ S², &c., to ground, to the rail-return, or to a negative feeder, as desired. As shown in Fig. 1, current flows from the feeder through the switches S′ and S², conductor-rails R′ and R², collector T′, controller C, motors M to ground and also in a shunt around the motors through collector T, aerial switch-energizing conduc-

tors B′ and B², coils of switches S′ and S² to ground. The switches are primarily closed by an auxiliary source of power carried by the car—such as a generator G′, driven by an engine A, as shown in Fig. 1, a storage battery, or a motor-generator—and are maintained in their closed position by the current from the feeder until the car moves forward onto an advanced section. As the collectors T and T′ engage the advance sections the switches of said sections are energized by the shunt-current from the rear sections.

In Fig. 2 I have shown how the switches S S′, &c., may be mounted in boxes on poles along the track and connected to the working conductors R R′ R², &c, the switch-energizing conductors B B′ B², &c., and the feeder F. The track-rails are shown as G². The sectional switch-energizing conductors may be suspended from bracket-arms, such as D, or by any of the well-known means for supporting overhead trolley-wires.

The overhead construction may be very light, the conductors B B′ B², &c., of small wire, and the overhead collector T nothing more than a loop of wire carried by the car in preference to the ordinary form of trolley-wheel or sliding contact, if desired, since a very small current will flow through the overhead connections.

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

1. In an electric railway, a sectional working conductor mounted along the track, a feeder, electromagnetic switches for connecting said sectional conductor to said feeder, an overhead sectional switch-energizing conductor having its sections permanently connected to the actuating-coils of said switches and the return and normally disconnected from said feeder, and means carried by a car for connecting the said overhead conductor to a suitable source of current-supply to actuate said switches.

2. In an electric railway, a source of current-supply, a sectional working conductor mounted along the track, electromagnetic switches for connecting said sectional conductor to said source, an overhead sectional switch-energizing conductor connected permanently with the coils of said switches, and means for shunting part of the current which passes through said switches and working conductor through said overhead sectional switch-energizing conductor and the coils of said switches to operate said switches.

3. In an electric railway, a sectional working conductor mounted along the track, a feeder, electromagnetic switches for connecting said working conductors to said feeder, a normally deënergized aerial sectional conductor connected with the coils of said switches, a vehicle, and collectors carried by said vehicle adapted to connect said working conductor with said aerial conductor to supply an energizing-current to the sections of said aerial conductor.

4. In an electric railway, a sectional third rail of great current-carrying capacity mounted along the track, a feeder, electromagnetic switches for connecting said feeder with the sections of said third rail, an overhead sectional switch-energizing conductor, the sections of which are respectively connected to the coils of said switches, and means for connecting the corresponding sections of said third rail and said overhead switch-energizing conductor for the purpose of supplying an energizing-current to the latter conductor.

5. In an electric railway, a section of a third-rail working conductor, a feeder, an electromagnetic switch for connecting said feeder to said working conductor, a normally deënergized overhead conductor, means for supporting said overhead conductor and insulating the same from the ground, an electrical connection between the overhead conductor and the actuating-coil of said switch, collectors carried by the car adapted to coact with said working conductor and said overhead conductor respectively, and an electrical connection between said collectors.

In witness whereof I have hereunto set my hand this 21st day of April, 1902.

WILLIAM B. POTTER.

Witnesses:
BENJAMIN B. HULL,
HELEN ORFOND.