(No Model.) 2 Sheets—Sheet 1.

A. NORMAN.

ELECTROMAGNETIC SWITCH RAILWAY.

No. 605,970. Patented June 21, 1898.

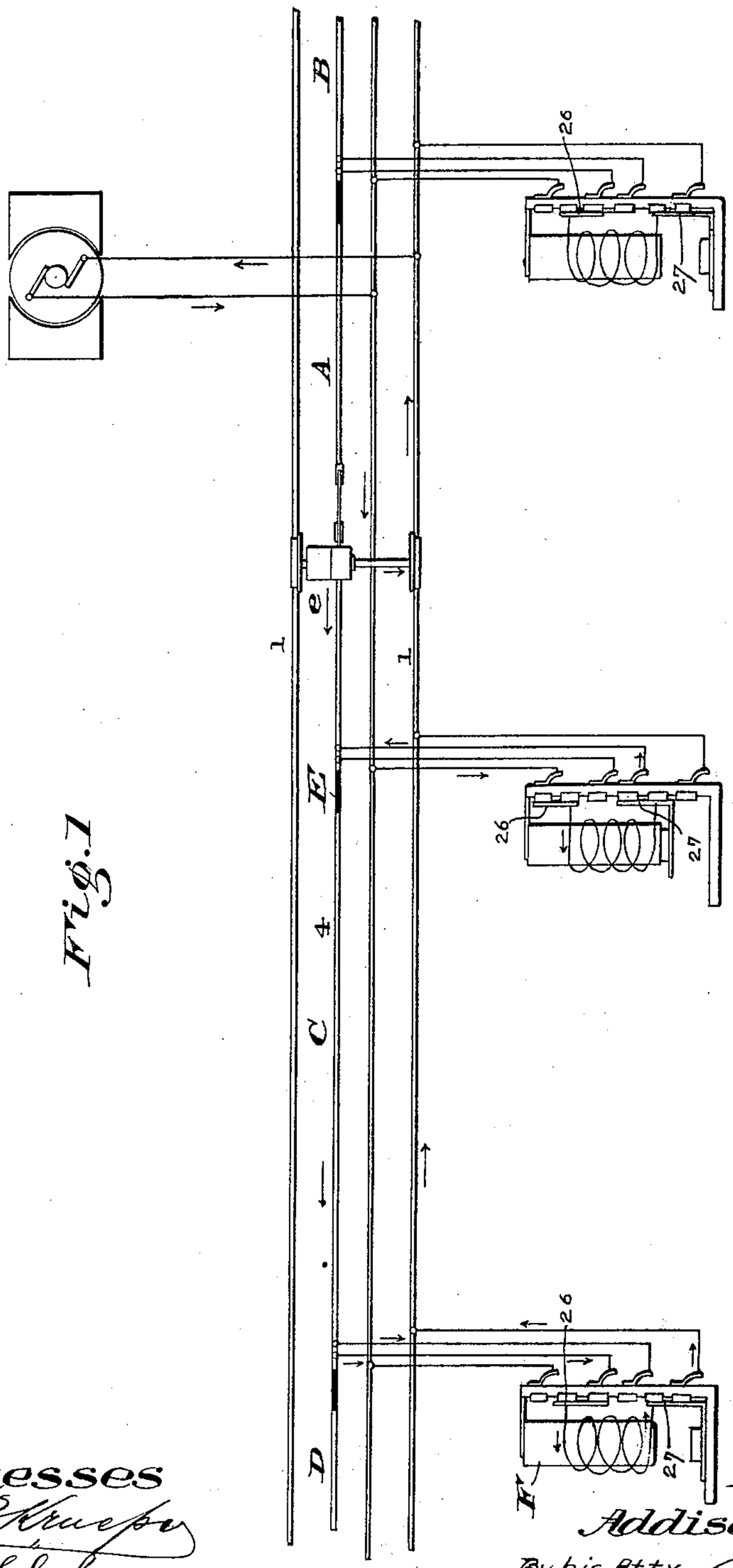

Fig. 1.

Witnesses
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(No Model.) 2 Sheets—Sheet 2.

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ELECTROMAGNETIC SWITCH RAILWAY.

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Fig. 2

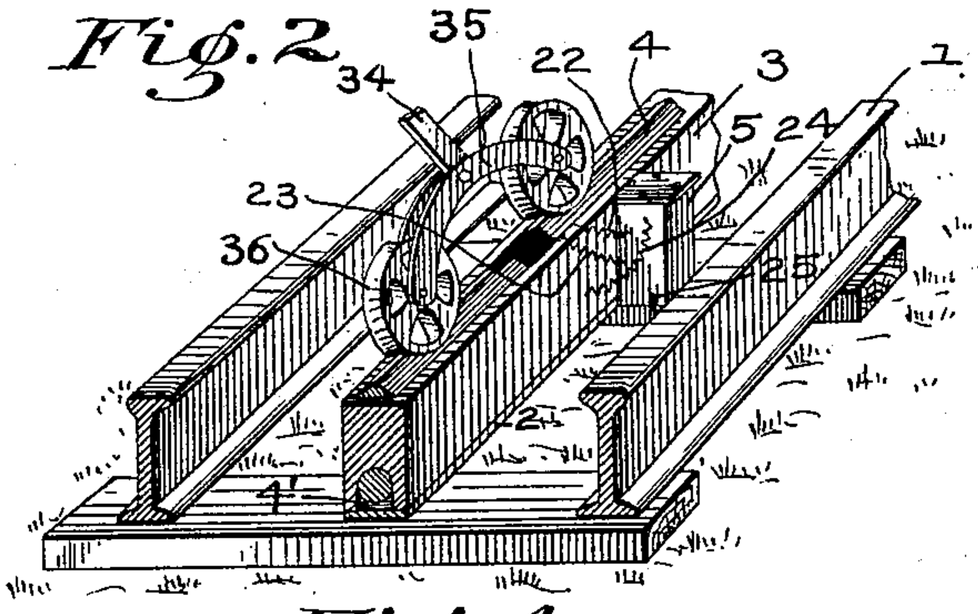


Fig. 3

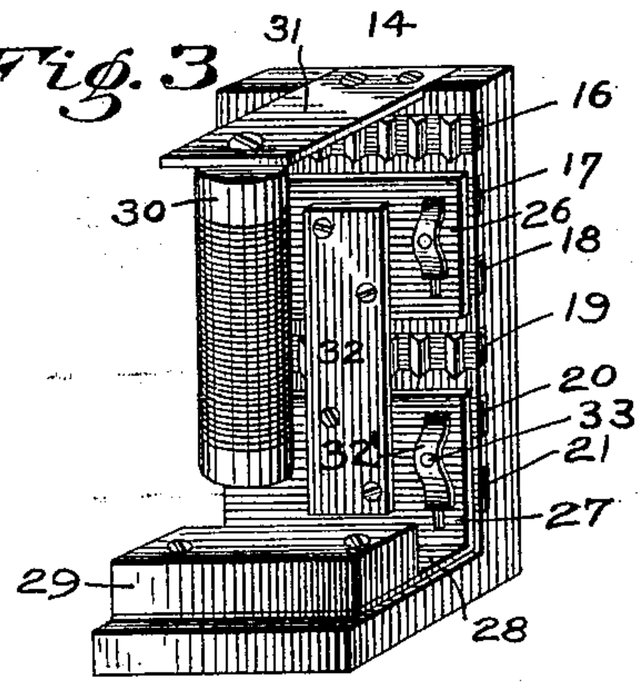


Fig. 4

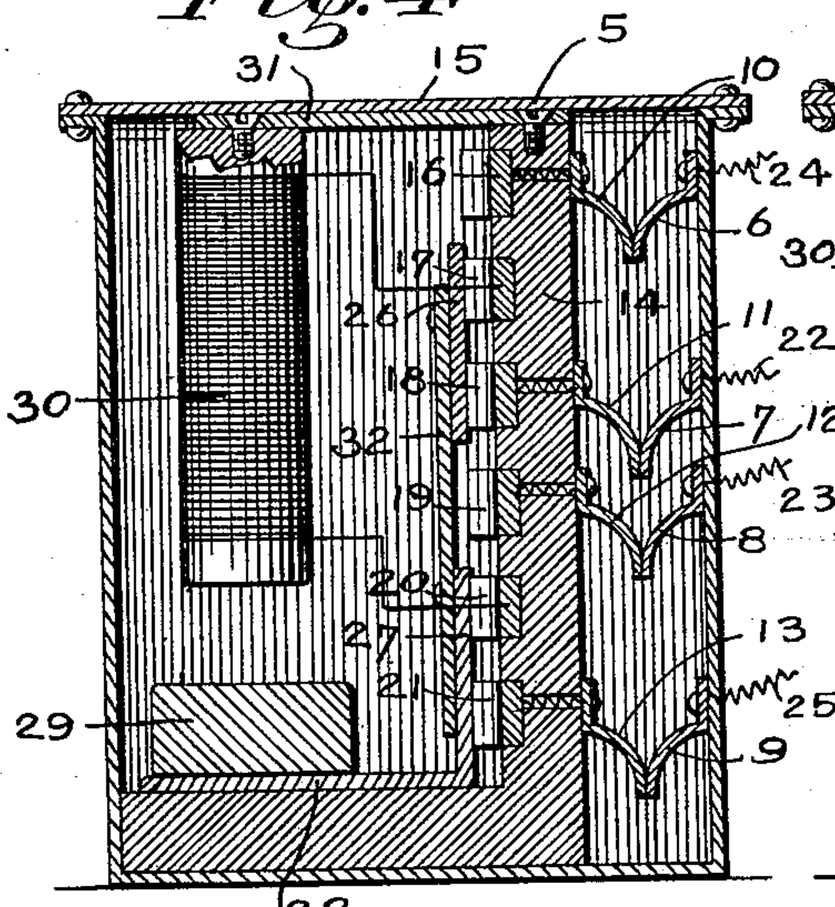


Fig 5

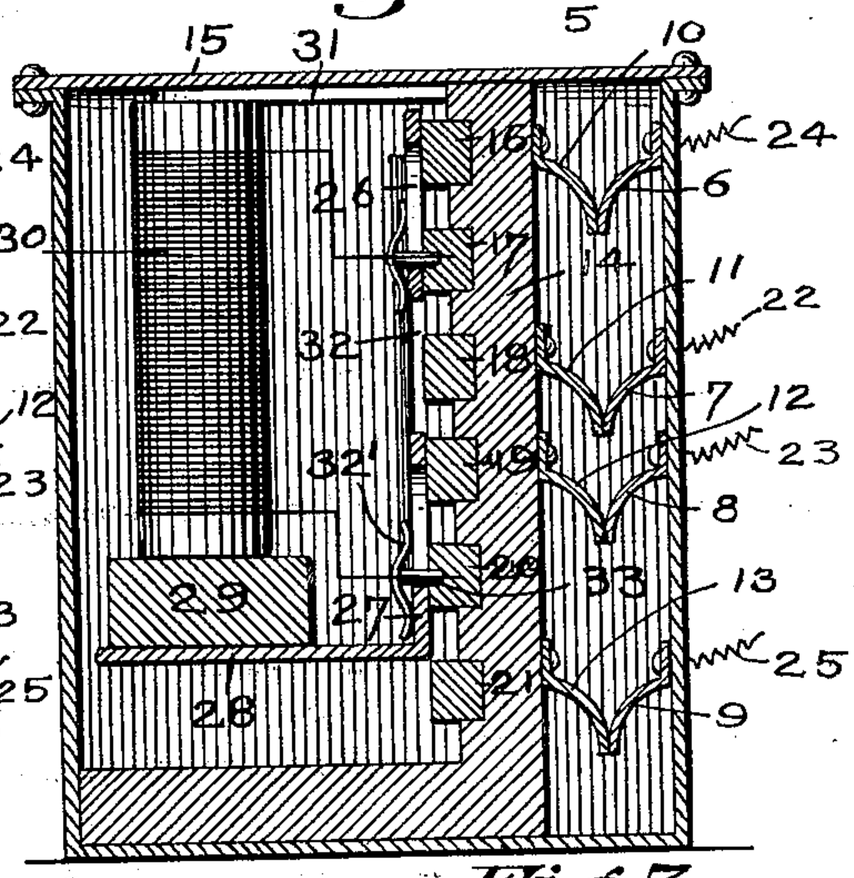


Fig. 6

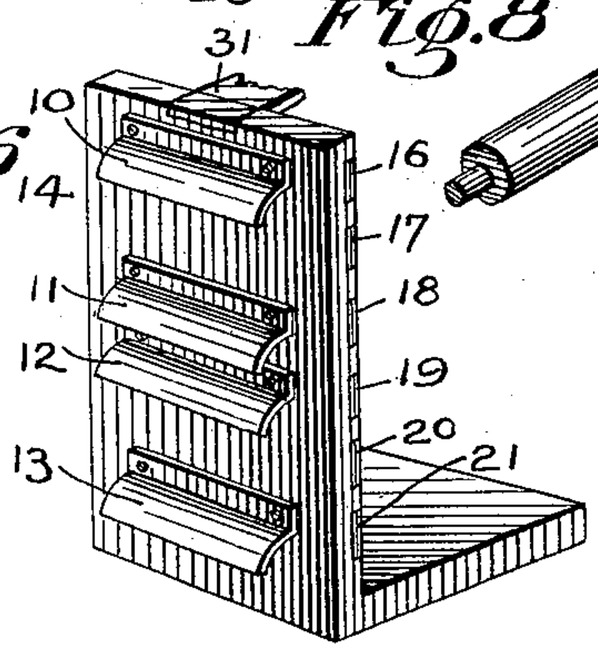


Fig. 8

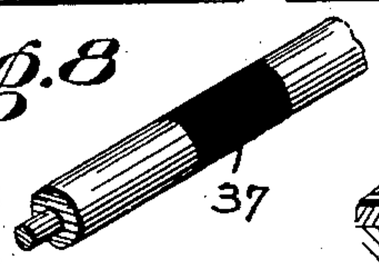
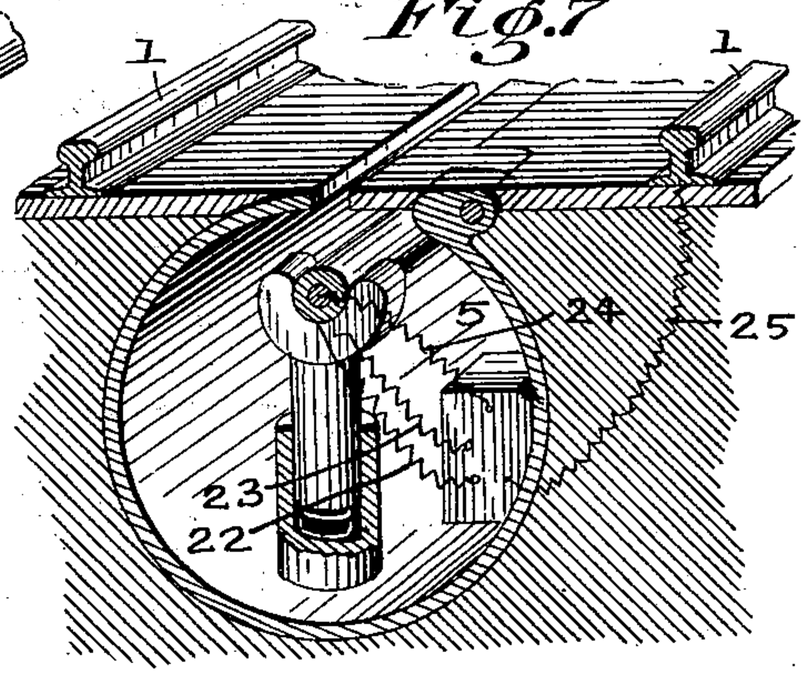


Fig. 7



Witnesses:

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UNITED STATES PATENT OFFICE.

ADDISON NORMAN, OF TORONTO, CANADA.

ELECTROMAGNETIC-SWITCH RAILWAY.

SPECIFICATION forming part of Letters Patent No. 605,970, dated June 21, 1898.

Application filed July 3, 1897. Serial No. 643,469. (No model.)

To all whom it may concern:

Be it known that I, ADDISON NORMAN, a citizen of Canada, residing at Toronto, county of York, Province of Ontario, Canada, have invented certain new and useful Improvements in the Application of Electricity to Railways; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it belongs to make and use the same.

This invention relates to improvements in electromagnetic-switch railways of that character wherein a sectional conductor is employed, the sections being progressively charged by the bridging from one section to another by the trolley, and the invention more especially pertains to a switch for progressively charging the sections.

The invention therefore consists in the parts shown in the drawings, described in the specification, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a diagrammatic view of an electromagnetic-switch-railway system embodying the elements and principle of my invention. Fig. 2 is a sectional perspective view of a railway equipped with my system, illustrating the supply-conductor, sectional conductor, the rails, a switch-box, and the connections from the switch-box to the several parts enumerated. Fig. 3 is a perspective view of the working parts of the switch detached from the box. Fig. 4 is a sectional view of the switch-box, taken at a point substantially midway the width of the same of the switch-box and contents. Fig. 5 is a like view taken at a point near the side of the same. Fig. 6 is a perspective view of the rear side of the L-plate which carries the working parts of the switch-box. Fig. 7 is a sectional perspective view similar to Fig. 2 illustrating a modification comprising the elements and principles of my invention embodied in an underground-conduit system. Fig. 8 is a detail view of the supply and sectional conductor utilized in the construction shown in Fig. 7.

1 designates the rails of the roadway, which are connected with the dynamo and are consequently utilized as a return-conductor, as is now usual in electric-railway systems.

Secured upon the ties or sleepers is a plank 2, upon which is arranged a stringer 3, preferably midway between the rails, said stringer having a longitudinal groove 4′ in its under side of a size to receive the supply-conductor, which is fed from the dynamo by a conductor in the manner now usual. The stringer is secured upon the plank preferably by cement in order to exclude the entrance of water and to insulate the supply-conductor to prevent leakage of the current. Secured upon the stringer is the working conductor 4, which is formed of sections insulated from each other.

5 designates the switch-box, which comprises a box-like structure having secured through one of its walls four contact-springs 6, 7, 8, and 9, which at all times contact with four similar spring contact-arms 10, 11, 12, and 13, carried by an L-shaped arm 14, arranged within the box. The box is provided with a cover 15, which is tightly secured thereon to prevent the entrance of moisture, and consequently the leakage of the current. Arranged transversely of the upright portion of the arm 14 and secured thereto are a series of metallic bars 16 17 18 19 20 21, the bars 16, 18, 19, and 21 being connected with the arms 10, 11, 12, and 13, respectively, by means of suitable conductors, as shown more plainly in Fig. 4.

There is a switch-box provided for each working-conductor section, as shown in Fig. 1, the arms 7 and 8 each being connected with one end of a section 4 by two conductors 22 and 23, the arm 6 being connected with the supply-conductor by means of a conductor 24 and the rail 1 being connected with the arm 9 by means of the conductor 25.

Arranged transversely of the upright portion of the arm 14 and of a width to bridge the space between two of the bars 16 to 21 are two metallic plates 26 27, the plate 27 being bent at an angle at its lower edge, forming a foot 28, upon which is secured a block 29, which is in vertical alinement with an electromagnet 30, suspended from a plate 31, carried by the upper end of the arm 14.

The winding of the magnet connects, respectively, with the bar 17 and 20. The plates 26 and 27 are secured together to move in unison by a non-conducting connecting-strip 32, to

which they are secured, whereby when the magnet is excited, due to the current passing through the winding thereof, the block is drawn up, carrying therewith the plates 26 and 27, and when the current is discontinued the block drops to its normal position (shown in Fig. 4) by gravitation.

The bars 16 to 21 are preferably sunk into the upright of the block 14, as shown, and are provided with forwardly-V-shaped projections which form a contact with the plates 26 and 27, the plates being held in contact with the projections by means of leaf-springs 32′, the head of the bolt 33 being secured thereto and passing through vertical slots in the plate.

34 designates the trolley-arm, having a cross-head 35, in each end of which is journaled a trolley-wheel 36.

In operation, referring to Fig. 1, the section A of the working conductor is charged, the circuit being indicated by the arrows, in which event the winding upon the magnet 30 has excited the magnet, and the plates 26 and 27 are in a raised position, the sections B, C, and D not being charged, as the plates have dropped by gravitation and the circuits formed thereby are closed. Consequently as the trolley-wheels pass the insulation E, the car traveling in the direction of the arrow *e*, the trolley will bridge the sections A and C and there will be a circuit formed, as shown by the arrows in the left of Fig. 1, with the result that the section C is charged, which excites the magnet indicated at F, Fig. 1, causing the plates 26 and 27 to be drawn upward, when the circuit will be formed similarly to that indicated with the section C. As soon as the rear trolley-wheel leaves the section A the circuit in said section is destroyed, the magnet is demagnetized, and the plates dropped by gravitation, thus charging only one section of the working conductor at a time progressively with the movement of the car.

As shown in Figs. 7 and 8, I have illustrated a modification comprising an underground conduit in which the supply-conductor is surrounded by the working conductor, having an insulated section 37 interposed between the ends of the same, the connections and operation of this construction being the same, the only difference being that the supply-conductor in this construction need not be housed in the stringer, as heretofore described. The entire conductor and switch-box in this instance are housed within the conduit.

What I claim is—

1. In an electromagnetic-switch railway, a supply-conductor, a sectional working conductor, switch-boxes containing an L-shaped arm, four spring-arms carried by the box and the arm respectively having a contact with each other in pairs, and two plates and means for moving the plates vertically in an upward direction by the bridging of two of the sections of the working conductor and lowering the same by gravitation, substantially as described.

2. In an electromagnetic-switch railway, the combination of the rails, the supply-conductor and a sectional conductor, of switch-boxes, each containing four bars connected respectively with the rail, the supply-conductor and two of them with the working conductor, an electromagnet having a winding, each end connected with a similar bar, and plates adapted to form two alternate circuits, one from the sectional conductor in rear of the box to the rail, and another from the supply-conductor to the rail, substantially as described.

3. In an electric railway the combination of switch-boxes, each containing four springs which are attached to but insulated from them for the purpose of connecting up the electromagnetic switches, placed therein, with the rails and conductors and having wires attached to each spring, two of said wires passing to the working conductors and being secured to them, and one each in like manner to the rail and supply-conductor as set forth.

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