(No Model.)

W. D. SWART.

ELECTRIC RAILWAY SWITCH.

No. 432,095. Patented July 15, 1890.

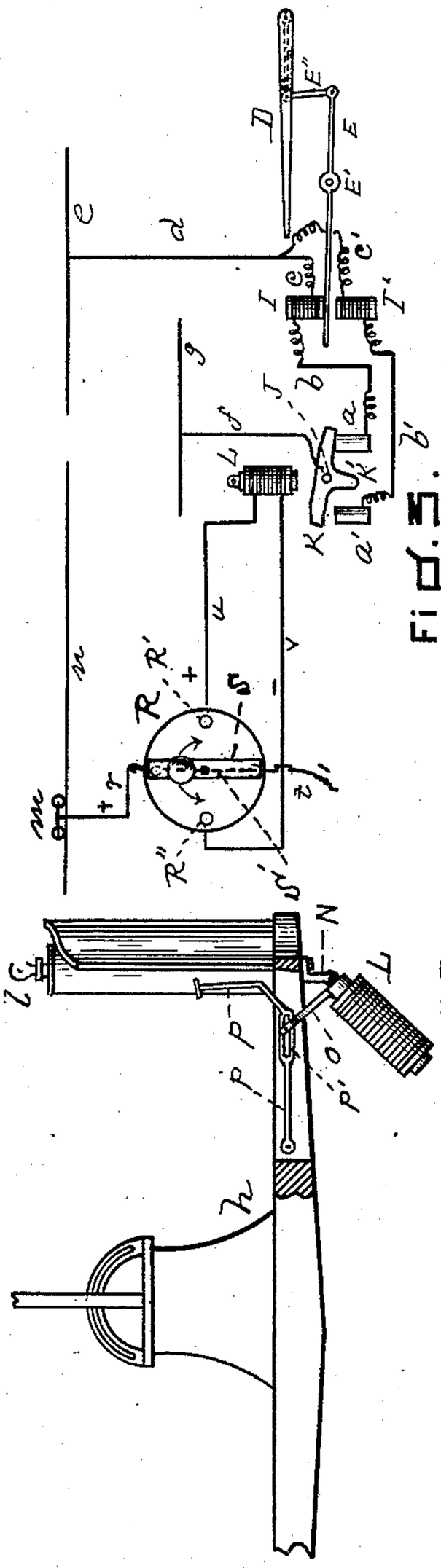

Fig. 3.

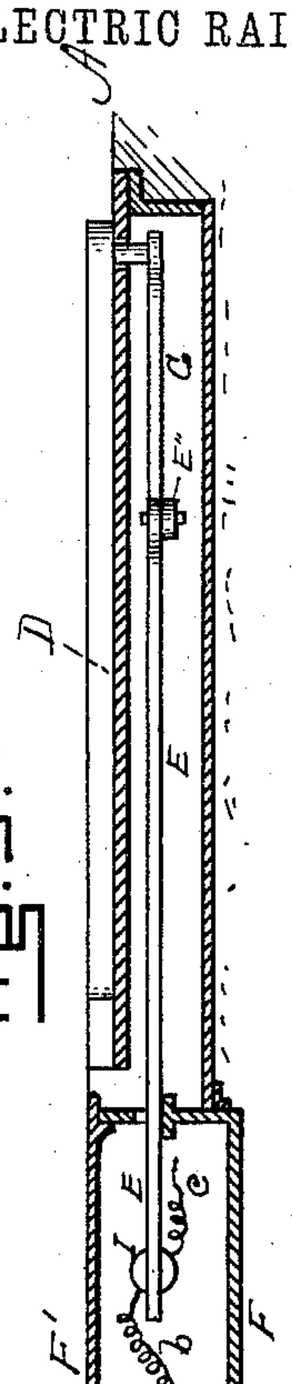

Fig. 1.

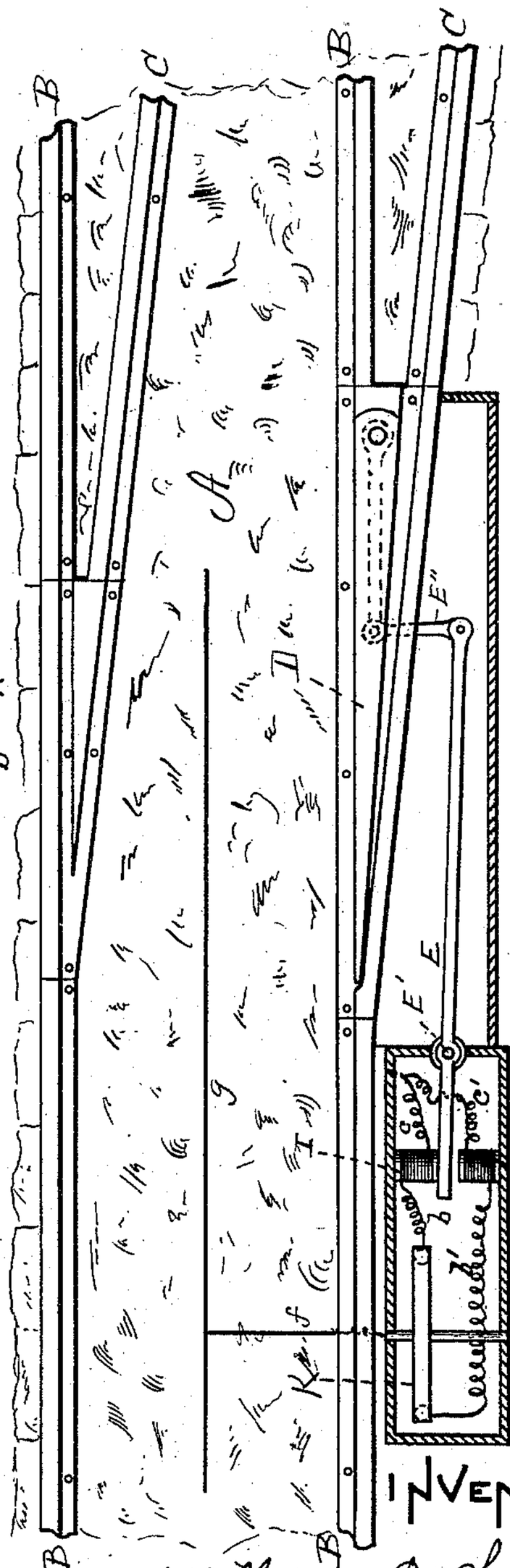

Fig. 2.

WITNESSES.

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WILLIAM D. SWART, OF BOSTON, MASSACHUSETTS.

ELECTRIC-RAILWAY SWITCH.

SPECIFICATION forming part of Letters Patent No. 432,095, dated July 15, 1890.

Application filed November 13, 1889. Serial No. 330,218. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. SWART, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Electric-Railway Switches, of which the following is a specification.

This is an electrically-operated switch especially adapted for use in connection with street-railroads where the cars are propelled by electrical power. A permanent magnet is pivotally supported near the track beneath the surface of the road-bed, its opposite ends being over contact-posts which are electrically connected with two electro-magnets on opposite sides of a lever which operates the tongue of a switch. An electro-magnet supported by the car is adapted to be lowered at will, so as to influence the said permanent magnet and cause it to turn on its pivot and through the said electro-magnets move the lever between them, and hence the switch-tongue. The electro-magnet supported by the car may, by reversing the electrical current, attract or repel the end of the pivoted permanent magnet which is being approached, and thus open or close the switch, as desired.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a sectional view taken longitudinally with the track, showing the construction of my switching mechanism and a portion of a car. Fig. 2 is a plan view with the cover of the box containing the magnets removed. Fig. 3 is a diagram showing the operation of the electrical connections.

A represents the road-bed, B the main track, C the switch-rails, and D the tongue of of the switch, all of a street-railway.

E is a horizontal lever pivotally secured at E′ in an end of the box F, set in the earth and provided with the cover F′ slightly below the surface of the ground. One end of this lever E is pivotally connected by the link E″ with the lever G, which directly operates the tongue D, and the other end extends between the electro-magnets I I′.

Thus far I claim nothing new in the device. The electro-magnets I I′ are connected, respectively, with the contact-posts *a a′* by the wires *b b′*, and by the wires *c c′* with the wire *d*, and thence to the overhead wire *e*, which connects with the source of electricity.

K is a permanent magnet pivotally supported upon the pivot J and provided with a central weight K′, preferably integral, whereby the magnet K is held normally in a horizontal position. The pivot J is supported by the walls of the box F, and is connected by the wire *f* with the ground-wire *g*.

It will readily be seen that should one pole of the permanent magnet K drop and be in contact with the contact-post *a*, as in Figs. 2 and 3, an electrical circuit would be established from the overhead wire *e*, through wires *d* and *c*, electro-magnet I, wire *b*, contact-post *a*, permanent magnet K, pivot J, and wire *f* to ground-wire *g* with the effect of making a true electro-magnet of I, and hence attracting the lever E, and by means of the intermediate mechanism operating the switch-tongue D. Should the opposite pole of the permanent magnet K drop and be in contact with the contact-post *a′*, an electrical circuit would be established from the overhead wire *e*, through wires *d* and *c′*, electro-magnet I′, wire *b′*, contact-post *a′*, permanent magnet K, pivot J, and wire *f* to ground-wire *g* attracting the lever E in the opposite direction, and hence turning the switch-tongue in the opposite direction; hence attracting either pole of the permanent magnet, and thus causing the other to drop onto the contact-post beneath it turns the switch accordingly. This I do from the car as it passes over the permanent magnet in the following manner: An electro-magnet, as L, is suspended from a portion of the car near the line of the permanent magnet in any desired manner, so long as said electro-magnet may be capable of being swung up, as in Fig. 1, or down. In the drawings it is pivotally secured to a bracket N fastened to the car *h*, and is provided with an arm or link O, whose upper end slides in a slot P′ in the lever P, which is adapted to be operated by the foot of the driver. It is evident that if the electro-magnet L is dropped down into a vertical position the permanent magnet, (which is placed very near the surface,) or that end of it next the approaching car, will be attracted; hence raised or repelled; hence lowered, according as the lowest pole of the electro-mag-

net is opposite or similar, and the switch-tongue thus operated accordingly by the driver.

The current of the electro-magnet L may of course be readily reversed by any well-known electric switching device. The electric switch-lever is shown at *l* in Fig. 1.

In the diagrammatic view shown in Fig. 3 a simple switching mechanism is shown. In this view, R is a plate, and S a bar pivoted centrally thereto and made of rubber or other non-conducting material. The broken line S′ indicates a conductor secured to the rear side thereof.

m is a trolley on the wire *n*, and is connected with the plate R by the wire *r*.

t is a wire leading to the motor. The loop *u* connects the contact-point R′ with one pole of the electro-magnet L, and the loop *v* connects the contact-point R″ with the other pole of the electro-magnet L. Turning the bar S to the right or left makes the lower end of the magnet positive or negative, with the well-known effect on the permanent magnet K.

The mechanism for raising and lowering the magnet L may be varied, as desired, as may also be the switching mechanism R S. The permanent magnet K may be placed at any point in the track most convenient, and the magnet L at any point on the car where it will most influence the permanent magnet, which is of course placed as near the surface as possible.

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

1. In an electrically-operated railway-switch, the combination of a permanent magnet pivotally placed beneath the surface of the road-bed, with its poles near contact-posts which are electrically connected with two electro-magnets placed on opposite sides of the actuating mechanism of the tongue of the switch, and an electro-magnet secured to the car in such a position as to influence the permanent magnet as the car passes over it, substantially as described.

2. In an electrically-operated railway-switch, in combination, a permanent magnet pivotally placed beneath the surface of the road-bed, with its poles near contact-posts which are electrically connected with two electro-magnets placed on opposite sides of the actuating mechanism of the tongue of the switch, an electro-magnet pivotally secured to the car and adapted to be lowered into position to influence the permanent magnet as the car passes over it, and switching mechanism to reverse the current in said electro-magnet, substantially as set forth.

3. In an electrically-operated railway-switch, in combination, the permanent magnet K, weighted at K′, placed in the road-bed, and horizontally balanced on the pivot J, which is connected by the wire *f* with the wire *g*, contact-posts *a a′*, wires *b b′*, electro-magnets I I′, and wires *c c′ d e*, lever E, actuating the switch-tongue mechanism, electro-magnet L, secured to the car and adapted to be raised and lowered by the driver, and switching mechanism for reversing the current in said electro-magnet, substantially as described.

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Witnesses:
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