

(No Model.)

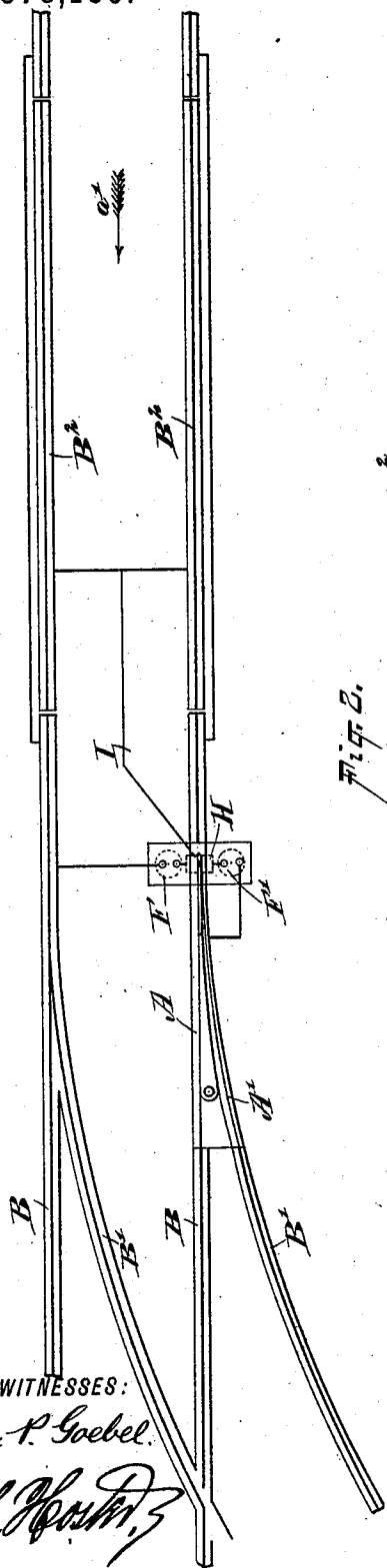
3 Sheets—Sheet 1.

W. W. DOTY & J. A. MACKNIGHT.
ELECTRIC SWITCH.

No. 578,139.

Patented Mar. 2, 1897.

Fig. 1.



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Fig. 2.

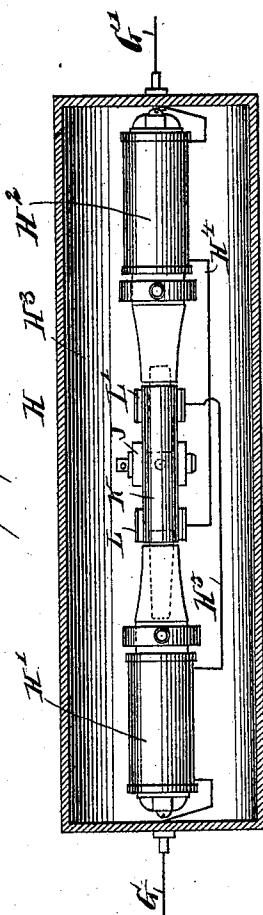
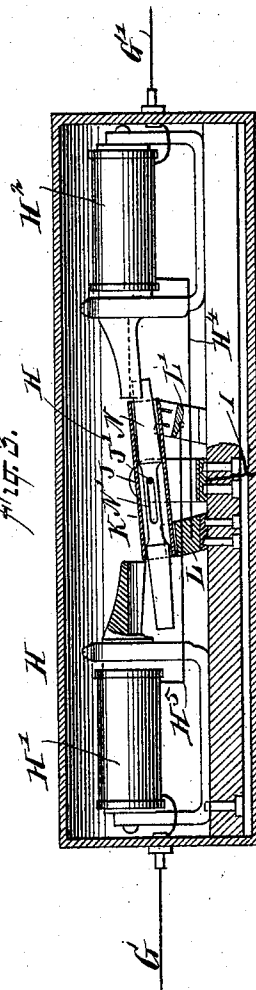


Fig. 3.



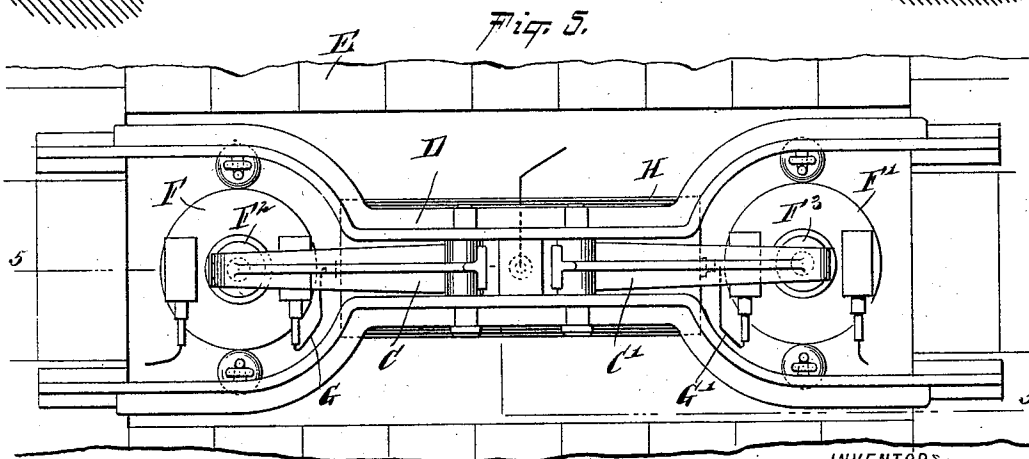
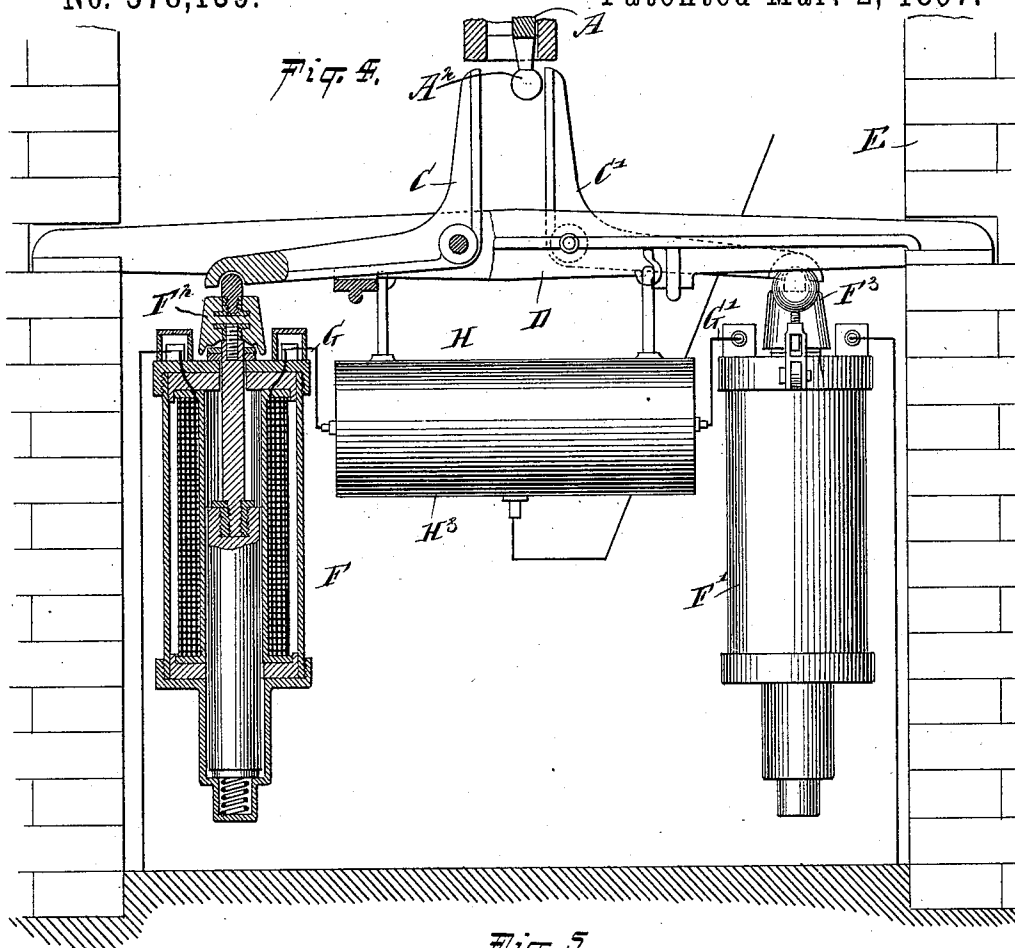
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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 578,139, dated March 2, 1897.

Application filed July 1, 1896. Serial No. 597,765. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM W. DOTY, of the city and county of New York, and JAMES A. MACKNIGHT, of Mount Vernon, in the
5 county of Westchester and State of New York, have invented a new and Improved Electrical Switch, of which the following is a full, clear, and exact description.

The invention relates to switches for street-
10 car and surface roads; and its object is to provide a new and improved electrical switch which is simple and durable in construction, not liable to get out of order, wholly automatic, and readily controlled by the operator
15 in charge of the approaching car to permit of readily setting the switch according to the intended direction of the car.

The invention consists principally of a pair of solenoids connected with the switch-point
20 and adapted to be alternately energized by a current under the control of the operator on the approaching car.

The invention also consists of certain parts and details and combinations of the same, as
25 will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of the improvement as applied. Fig. 2 is a sectional plan view of the controlling-switch. Fig. 3 is a sectional elevation of the same. Fig. 4 is an enlarged
30 cross-section of the improvement. Fig. 5 is a plan view of the same. Fig. 6 is a sectional side elevation of the same. Fig. 7 is a reduced plan view of a modified form of the improvement, and Fig. 8 is a side elevation
40 of the mechanism on the car for controlling the current going to the solenoids in the modified form shown in Fig. 7.

The switch-point A for opening and closing the main track B and the side-track B' is
45 pivoted at A' and is provided at its under side with a depending pin A², engaged at opposite sides by the vertical members of two bell-crank levers C and C', fulcrumed on a suitable framework D, arranged in a foundation
50 E, forming an opening in the track-body, as

plainly illustrated in Figs. 4, 5, and 6. The outer ends of the horizontal members of the said bell-crank levers C and C' are engaged by the vertically-disposed plungers F² and F³ of the solenoids F and F', respectively, of
55 any approved construction, and supported on the frame D. The solenoids F and F' have a ground connection and are also connected by wires G and G' with the electromagnets H' and H², respectively forming part of a con-
60 trolling-switch H, arranged in a casing H³, supported on the said frame D between the two solenoids F and F', as plainly illustrated in the drawings.

The electric current for the switch H passes
65 through a wire I to the switch, the said wire being connected with the insulated sections B² in the main track in advance of the switch-point A, as plainly indicated in Fig. 1.

Now when an approaching car passes onto
70 the section B² then the operator in charge of the car connects a current-generating device with the said sections B², so that a current passes through the wire I to the controlling-
75 switch H, which connects with either of the two solenoids F or F', so as to energize the same and cause the corresponding plunger F² or F³ to slide upward and impart a swinging motion to the corresponding bell-crank
80 lever C or C' to shift the switch-point A into an open or closed position to permit the car to either continue on the main track or pass
onto the side-track B', as the case may be.

It is understood that the current may be
85 furnished from a trolley-wire in case the railroad is equipped as such; otherwise a generating device located on the car will answer the purpose. In any event a current is sent
90 by the operator in charge to the wire I in case it is desired to change the switch-point A, that is, if the latter is not in position for the
car to proceed in the desired direction.

The wire I connects with a bracket J, insulated in the casing H³ and provided with
95 a pivot-pin J', on which swings a tubular lever K, adapted to make contact at its ends with the contact-plates L and L', likewise insulated in the casing K³ and connected by the wires H⁴ and H⁵ with the electromagnets
100 H² and H', respectively. In the tubular le-

ver K is fitted to slide an armature N for both electromagnets H' and H², the said armature being formed at its middle with an elongated slot N', through which passes the pivot-pin J'.

Now it is evident that when the several parts are in the position as shown in Figs. 2 and 3 and the left-hand end of the lever K makes contact with the plate L and the current is sent through the wire I to the bracket J then this current passes to the lever K, contact-plate L, and by wire H⁴ to the electromagnet H², connected by the wire G' with the solenoid F', so that the plunger F³ therein is caused to move upward to impart a swinging motion to the bell-crank lever C' and to shift the switch-point A from the side-track to the main track to close the latter and to open the side-track, so that the car can pass to the side-track in the desired direction.

Now when the electromagnet H² is energized by the current passing through the same then it attracts the armature N, so that the latter slides up the inclined lever K from the left to the right, and in doing so the right-hand end of this armature overbalances the left-hand end, and as soon as the current in the electromagnet H² ceases then the lever K is forced to swing with the right-hand end downward owing to the overbalancing weight of the right-hand end of the armature N. The lever K, in swinging in the manner described, breaks the contact at the plate L and makes contact at the plate L'. Now when the next car passes into the section B², and this car is designed to continue on the main track, then the current sent through the wire I passes to the bracket J, lever K, plate L', wire H³ to the electromagnet H' to energize the same and to continue through the wire G to the solenoid F, in which the plunger F² is forced upward to impart a swinging motion to the bell-crank lever C, so as to switch the switch-point A from the main track to the side-track to close the latter and make the main track open.

The energizing of the electromagnet H' causes it to attract the armature N, so that the latter slides from the right to the left and carries the overbalancing-weight to the left hand, and so that the moment the current ceases the lever K swings back to the position shown in Fig. 3. The lever in doing so breaks the contact at plate L' and again makes contact at the plate L.

We do not limit ourselves to the special way of sending the electric current alternately to the solenoids, as it is evident that for railroads of different construction it is necessary to modify this particular device. For instance, as shown in Figs. 7 and 8, the electric controlling-switch H is entirely dispensed with, and the solenoids F⁴ and F⁵ have their wires I' and I² connected with short strips or rails I³ and I⁴, arranged between the track-rails and adapted to be engaged by a shoe O, formed or secured on a lever O', mounted to

swing on the under side of the car P and normally held in an uppermost position, as indicated in Fig. 8. The lever O' can be swung downward by the operator in charge of the car pressing a foot-piece Q, so as to cause the said shoe O to make contact with either of the strips I⁴ or I³ to send an electric current from the car through the lever O' and shoe O to the corresponding wire I' or I² to energize the corresponding solenoid F⁴ or F⁵. The operation of the latter is the same as above described, that is, the solenoid actuated shifts the switch-point to the other side to open or close the main track, as previously described.

Now it will be seen that the devices described are very simple and durable in construction and are not liable to get out of order, as moisture is not apt to interfere with the proper workings of the parts.

It will be further seen that the operator in charge of the car can readily change the position of the switch-point whenever the latter is not in the proper position for the car to travel in the desired direction, the operator simply manipulating the device on the car to cause a current of electricity to pass to the solenoid to shift the switch-point, as described.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. An electrical switch, provided with a pair of solenoids adapted to be energized by a current under the control of the operator in charge of an approaching car, and bell-crank levers connected with and operated by the said solenoids, and adapted to engage the switch-point on opposite sides, to shift the latter from the main track to the side-track or vice versa, substantially as shown and described.

2. An electrical switch, comprising a switch-point mounted to swing, bell-crank levers adapted to engage the said point on opposite sides, solenoids for operating the said bell-crank levers, and means substantially as described, for energizing either of the said solenoids to shift the switch-point into the desired position, as set forth.

3. An electrical switch, comprising a pair of solenoids adapted to shift the switch-point, and an automatic switch for controlling the current passing to the respective solenoid, said switch comprising a current-reversing bar which forms the armature of a solenoid and is moved endwise upon a fixed central pivot, substantially as shown and described.

4. An electrical switch, comprising an insulated track-section, an automatic controlling-switch connected with the said track-section, for sending current from the car through the said section to the said switch, a pair of solenoids controlled from the said automatic switch and bell-crank levers engaging the switch-point and actuated by said solenoids, substantially as shown and described.

5. An electrical switch, comprising a pair of solenoids bell-crank levers operated there-

by and adapted to shift the switch-point, an automatic switch for controlling the current passing to the respective solenoid, and means for sending a current to the said switch, as set forth.

6. An electrical switch, comprising an insulated track-section, an automatic controlling-switch connected with the said track-section, for sending current from the car through the said section to the said switch, a pair of solenoids for throwing the switch-point and controlled from the said automatic switch, and bell-crank levers engaging opposite sides of the switch-point and actuated from the said solenoids to shift the switch-point, substantially as shown and described.

7. An automatic electrical switch, comprising two electromagnets arranged opposite each other, a lever adapted to rock between the said electromagnets, and an armature-lever fitted to slide on the said rocking lever and adapted to be attracted by either electromagnet, substantially as shown and described.

8. An automatic electrical switch, comprising two electromagnets arranged opposite each other, a lever adapted to rock between the said electromagnets, an armature-lever fitted to slide on the said rocking lever and

adapted to be attracted by either electromagnet, and contact-plates connected with a source of supply and adapted to be alternately engaged by the ends of the said rocking lever, to connect the electromagnet with the corresponding contact-plates, substantially as shown and described.

9. An automatic electrical switch, comprising two electromagnets arranged opposite each other, a lever adapted to rock between the said electromagnets, an armature-lever fitted to slide on the said rocking lever and adapted to be attracted by either electromagnet, contact-plates connected with a source of supply and adapted to be alternately engaged by the ends of the said rocking lever, to connect the electromagnet with the corresponding contact-plate, and two solenoids having connection with the said electromagnets and actuated by the current passing through the corresponding contact-plate, armature and electromagnet, substantially as shown and described.

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