(No Model.)

E. M. HEWLETT.

SWITCH.

No. 573,146. Patented Dec. 15, 1896.

FIG. 1.

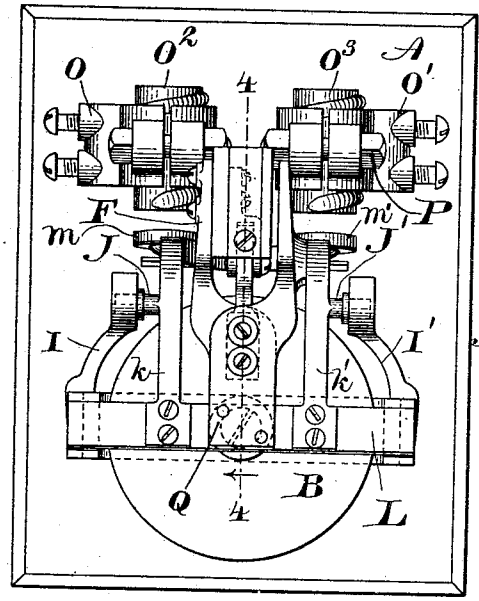


FIG. 2.

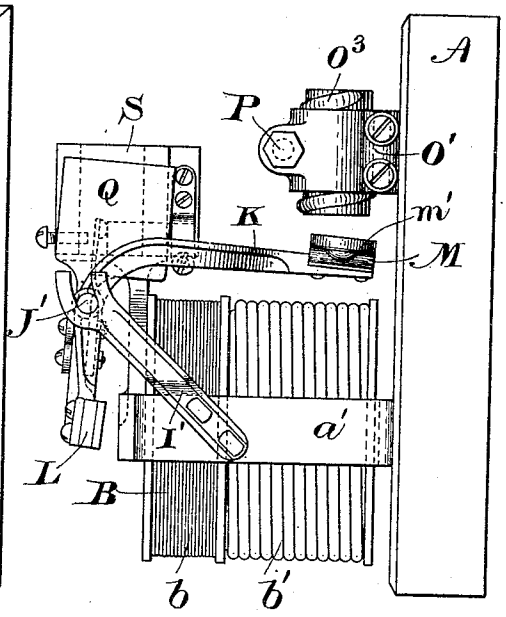


FIG. 3.

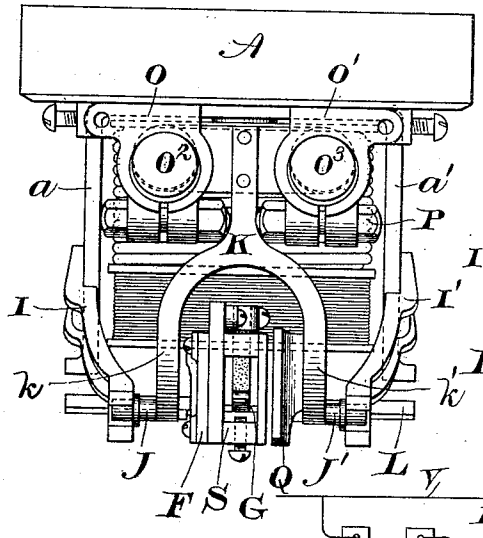


FIG. 4.

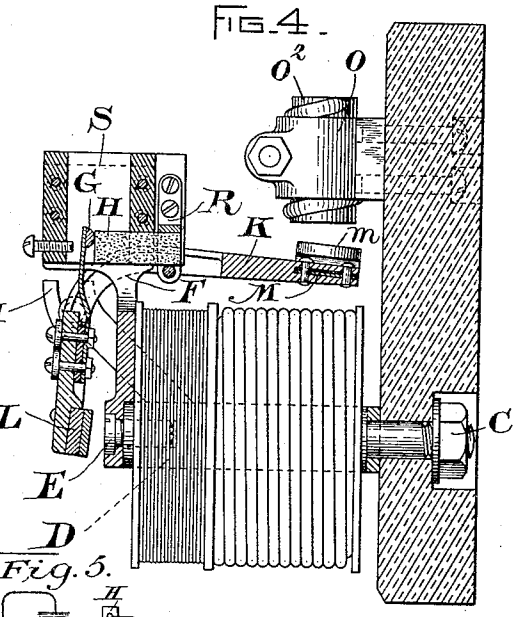
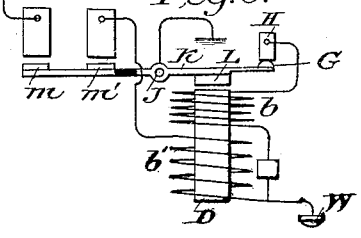


Fig. 5.



WITNESSES.
Ast. Abell.
A. F. Macdonald.

INVENTOR.
Edward M. Hewlett, by
Geo. R. Blodgett, Atty.

UNITED STATES PATENT OFFICE.

EDWARD M. HEWLETT, OF SCHENECTADY, NEW YORK, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF NEW YORK.

SWITCH.

SPECIFICATION forming part of Letters Patent No. 573,146, dated December 15, 1896.

Application filed July 16, 1896. Serial No. 599,444. (No model.)

To all whom it may concern:

Be it known that I, EDWARD M. HEWLETT, 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 Switches, (Case No. 412,) of which the following is a specification.

The present invention relates to magnetically-operated switches, and is designed more particularly for use in closed-conduit railway systems, where a small current, such as that from a battery, is used for closing the switch, after which the battery-circuit is broken and the main current holds the switch in its closed position until the traveling vehicle ceases to take current, when the switch opens the main circuit and closes the battery-circuit in the switch.

One object of the present invention is to make a cheap and reliable switch adapted to rapidly make and break the circuit and one provided with means for disrupting the arc formed at the time the circuit is interrupted.

The invention further consists in utilizing the switch-operating coils for energizing the pole-pieces of the blow-out magnet.

The invention also relates to details of construction more fully pointed out hereinafter.

In the accompanying drawings, attached to and made a part of this specification, Figure 1 is a front elevation of a switch embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a plan, and Fig. 4 is a section on the line 4 4 of Fig. 1. Fig. 5 is a diagram of connections.

The base A is made of slate or other suitable insulating material, and is adapted to be secured to a support in the position shown. On the upper portion of the base are secured by means of screws two binding-posts O O′, the wire from the post O leading to the work-circuit and that from the post O′ to the coil b' and the supply-main. The binding-posts also furnish supports for the carbon contacts O^2 and O^3. These are adapted to be screwed up or down for the purpose of adjusting, and the bolt P is used to clamp them in place.

The actuating-coil B is composed of two separate coils b and b'. The former is intended to operate the switch by means of a small current, such as is given by a battery, while the latter, being in series with the source of supply and the work, carries all of the current when the circuit is closed between the contacts O^2 and O^3. The coils are provided with a common core D, Fig. 4, which at its inner end is secured to a U-shaped piece having arms a a', forming pole-pieces. On the outer end of the core is secured, by means of the screw E, a pole-piece F, which extends upward at right angles to the core D and is provided with an enlarged pole-face, which has its greatest width in a direction parallel to the arcing electrodes G and H. To secure the pole-pieces and energizing-coils to the base A, bolts C are employed.

Secured to the arms a a' are two supports I I′, provided at their outer extremities with slots which form bearings for the lugs J and J′ of the frame K. The frame K is made of non-magnetic material and is adapted to carry the spring M on its inner end and the armature L and pole-piece Q at the outer.

The lower end of the frame is bifurcated and the ends k and k' pass on the sides of the chute S, in which are located the contacts G and H and in a manner such that any arc formed between them will be restrained to its proper direction. The armature L extends across the front of the magnet B and is adapted to be attracted by the arms a a', which form a part of the magnetic system.

The pole-piece Q is secured at its base to the armature L and extends upward, where it terminates in an enlarged pole-face, which is parallel with that of the pole-piece F. The lines of force passing from Q to F tend to blow the arc formed between G and H upward, and it will be seen that they are in such a direction that when the pole-piece Q is moved, due to the action of the magnet B, the lines of force between Q and F will have no effect upon its movement, they being at right angles to those which attract the armature L.

Carried by the pole-piece Q, but suitably insulated therefrom, is the contact G, which is composed of a copper contact-button and is adapted to engage with an adjustable carbon contact H, secured in a suitable clamp R. The contact G being carried by the pole-

piece Q, as soon as the armature L is attracted the circuit of the fine-wire coil *b* is interrupted; but at that instant the spring M on the arm K closes the circuit between the carbon contacts O^2 O^3 by means of the copper contacts *m m'*, which are mounted on the spring M. This completes the circuit through the coil *b'*, which energizes the coil D and the arms *a a'*, the lines of force passing from the arms *a a'* to the armature L, thence upward through the pole-piece Q to the pole-piece F, disrupting any arc which may be formed between the electrodes G and H, thence to the core D, the latter forming the other pole of the magnet.

The chute S is made of insulating material and is secured by screws to the pole-piece F. The carbon-holder R is secured to the chute S and is made in such a manner that the carbon can be advanced as it burns or wears away. By providing a screw-thread adjustment for the carbon contacts O^2 and O^3 they may be accurately set, and the clamping-bolt P holds them in place.

The frame K is supported in such a manner that it can readily be removed in case it is desired to replace the contacts. The screws which hold the contact G in place are removed, and the frame with its other attachments can be lifted bodily.

Fig. 5 shows the connections of the circuit. V is the supply-main, and the coil *b'* is connected between it and the stationary carbon contact O^3. W is a contact located at any suitable point and is rendered active when the armature K, provided with the contacts *m m'*, bridges the space between the carbon contacts O^3 and O^3. The coil *b* is permanently connected through a resistance to the wire leading from the contact W at one end and to the ground through the contacts G and H at the other. If current is supplied to the contact W with the switch in its present position, the coil *b* will energize its core and attract the armature L, closing the circuit between O^2 and O^3 and interrupting it between G and H. The circuit will remain closed as long as the current continues to flow through coil *b'*, after which gravity will return it to the position shown.

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

1. In an electric switch, the combination of a stationary electrode, a movable electrode, a blow-out magnet provided with a movable pole-piece, and an armature adapted to actuate the movable electrode and the pole-piece.

2. In an electric switch, the combination of a stationary electrode, a movable electrode supported by a portion of the blow-out-magnet structure and insulated therefrom, and a pole-piece for the magnet adapted to move with the movable electrode.

3. In an electric switch, the combination of a plurality of stationary electrodes, a blow-out magnet provided with a movable pole-piece, a contact secured to the pole-piece, and an energizing-coil on the magnet for actuating the switch and blowing out the arc formed by the interruption of the circuit at the contacts.

4. In an electric switch, the combination of an energizing-coil, a core for the coil provided with pole-pieces, arms secured to the pole-pieces forming a support for a movable frame, an electrode moving with the frame, and a magnet-pole secured to the frame and adapted to blow out the arc formed between the electrodes.

5. In an electric switch, the combination of pole-pieces situated on the sides of the energizing-magnet, arms secured to the pole-pieces forming a support for a movable frame, a pole-piece secured to the core of the magnet, a chute supported by the pole-piece, and a pole-piece mounted on the movable frame.

6. In an electric switch, the combination of binding-posts secured to the base, adjustable contacts mounted in the posts, a contact-piece adapted to bridge the space between the contacts, a pivoted frame carrying the contact-piece, a chute in which a pair of contacts are located, and a blow-out magnet-pole carried by the moving frame.

7. In an electric switch, the combination of a blow-out magnet having a stationary pole-piece provided with an enlarged face, and a movable pole-piece also provided with an enlarged face, the two faces being so arranged that they are parallel to the direction of movement of the armature which actuates the moving pole-piece.

8. In an electric switch, the combination of binding-posts secured to the base, screw-threaded carbon contacts mounted in the posts, clamping-bolts for securing the contacts in place, copper contacts engaging with the carbon contacts, and a movable frame actuated by a magnet for closing the circuit between the carbon and copper contacts.

In witness whereof I have hereunto set my hand this 13th day of July, 1896.

EDWARD M. HEWLETT.

Witnesses:

B. B. HULL,

J. LED. LANGDON.