No. 861,679. PATENTED JULY 30, 1907.

J. L. SCHUREMAN.

MAGNETIC SWITCH.

APPLICATION FILED MAY 22, 1905.

2 SHEETS—SHEET 1.

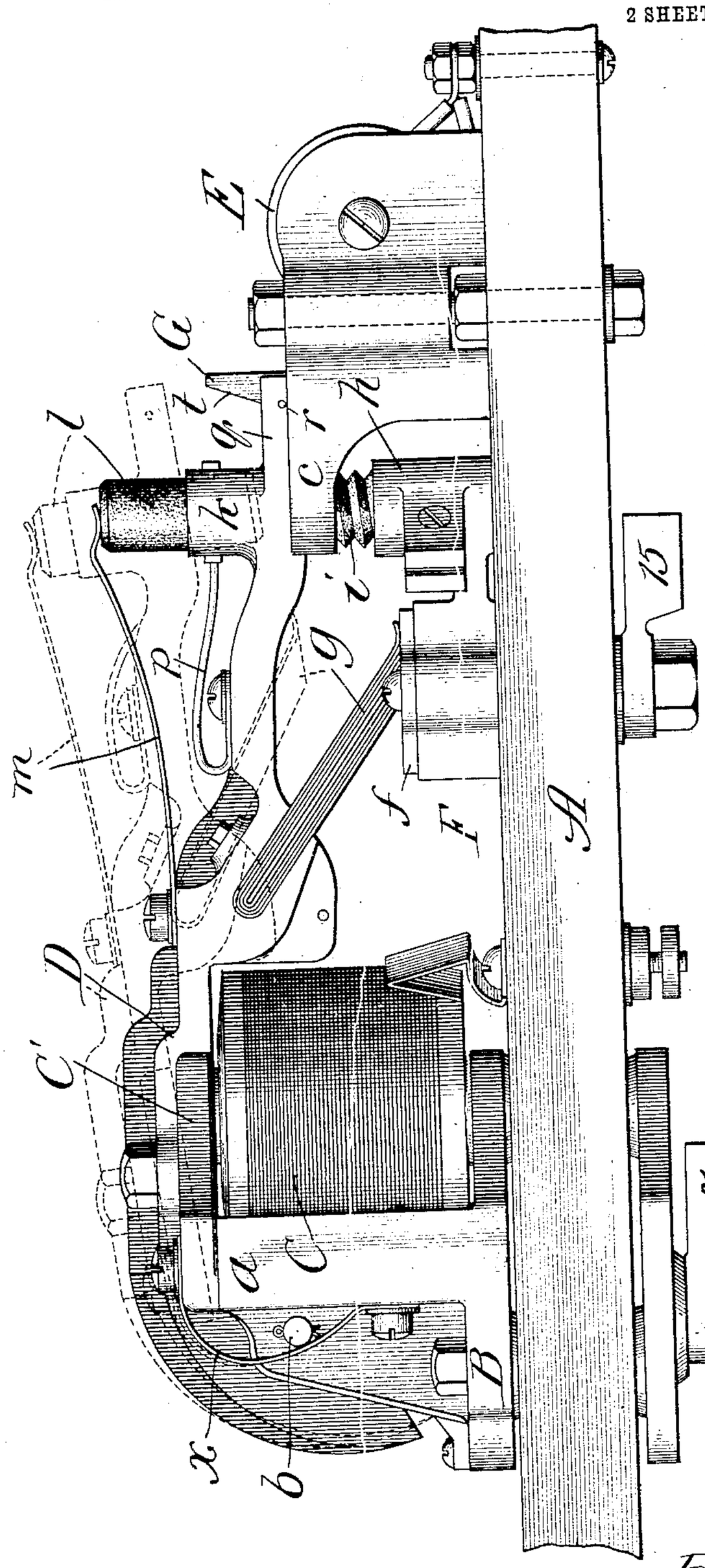

Fig. 1.

Witnesses:
Chas. E. Gaylord.
Chas. A. Bull

Inventor:
Jacob L. Schureman,
By Dyrenforth, Dyrenforth & Lee
Attys.

No. 861,679. PATENTED JULY 30, 1907.

J. L. SCHUREMAN.

MAGNETIC SWITCH.

APPLICATION FILED MAY 22, 1905.

2 SHEETS—SHEET 2.

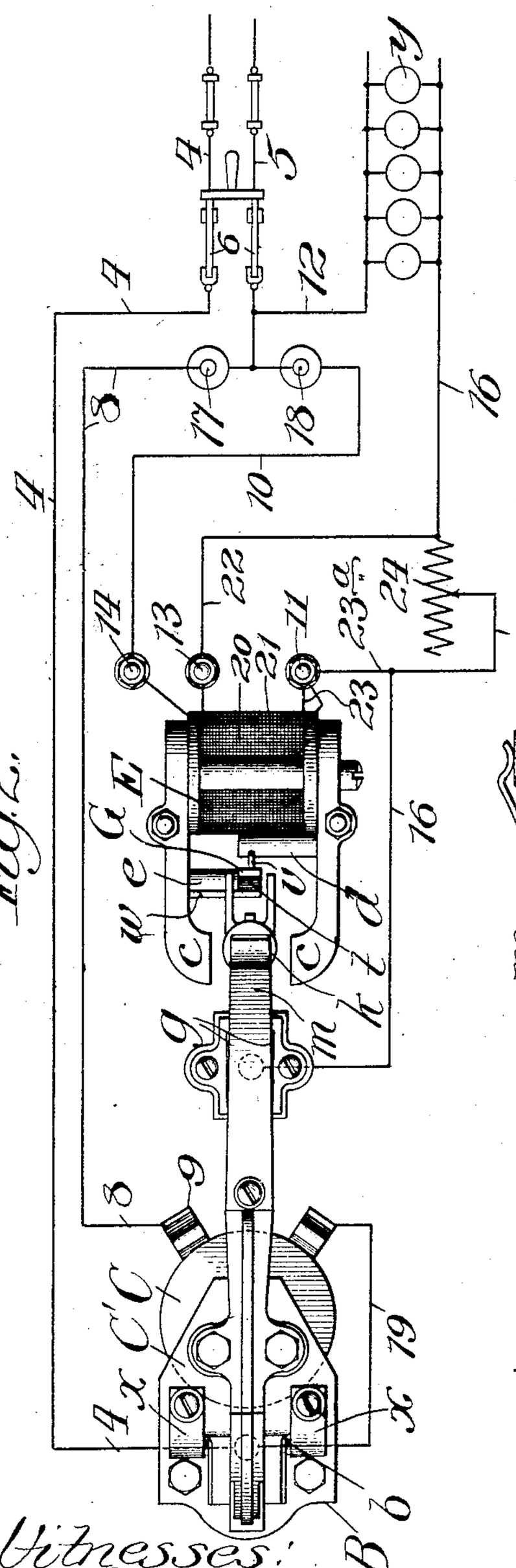

Fig. 2.

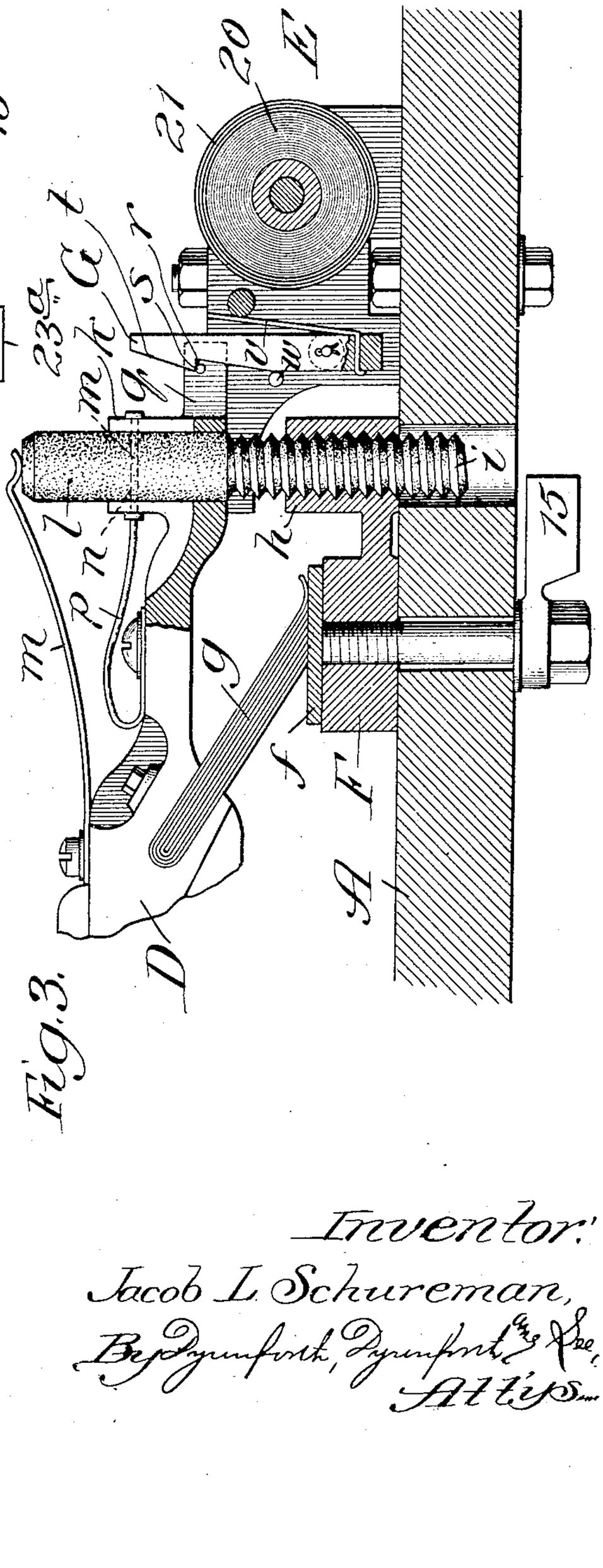

Fig. 3.

Witnesses:
Chas. E. Gaylord.
Chas. H. Buell.

Inventor:
Jacob L. Schureman,
By Dyrenforth, Dyrenforth & Lee,
Attys.

UNITED STATES PATENT OFFICE.

JACOB L. SCHUREMAN, OF CHICAGO, ILLINOIS.

MAGNETIC SWITCH.

No. 861,679. Specification of Letters Patent. Patented July 30, 1907.

Application filed May 22, 1905. Serial No. 261,585.

To all whom it may concern:

Be it known that I, JACOB L. SCHUREMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Magnetic Switches, of which the following is a specification.

My invention relates to improvement in magnetic switches of the class intended to be operated from a distance to open and close an electric circuit; my object being to provide certain improvements in the construction thereof whereby it will be positive in operation and especially durable and desirable for its purpose.

In carrying out my invention, I provide the switch with main and auxiliary circuit-opening and closing electrodes mounted upon relatively hinged frames. One of said frames carries a magnet and the other an armature, whereby when the magnet is excited the armature is attracted thereto to draw the frames together and close the circuit through the electrodes. Also, upon the frames is catch mechanism which operates automatically to hold the electrodes in contact after the operation described of bringing them together. Also, upon the frames is a second electro magnet operating, when excited, to release the said catch and permit the frames to separate under the action of a spring. The main electrodes are of material possessing the quality of high conductivity, while the auxiliary electrodes are of material possessing lower conductivity. In the separation of the frames producing opening of the switch the main electrodes separate, while the auxiliary electrodes are still in contact, thus directing the current through the electrodes of low conductivity. By reason of the fact that the main electrodes separate while the auxiliary electrodes are still in contact no arc will be formed in the separation of the main electrodes. The magnet aforesaid, which effects release of the catch mentioned, is provided with poles closely adjacent to the point of contact of the auxiliary electrodes and operates as a magnetic blow-out to prevent the formation of an arc in the separation of the auxiliary electrodes.

The accompanying drawings show a magnetic switch constructed to operate as described.

Figure 1 is a view in elevation, showing in full lines the position of parts when the switch is closed, and in dotted lines the position of parts when the switch is open; Fig. 2, a diagrammatic illustration showing a top plan view of the switch mechanism and an electric circuit to which the switch is applied; and Fig. 3, a partly sectional view of one end portion of the switch.

A is a base of insulating material on which the switch mechanism is mounted. On the base forming a part of the stationary frame portion of the switch is a block B having parallel standards *a*, and carrying an electro magnet C. Extending between the arms *a* is a pin, or shaft, *b* on which is pivotally mounted a swinging arm, or frame, D provided with an armature C^1 in position to be attracted by the magnet C. On the base A, and also forming a part of the stationary frame, of the switch, is an electro magnet E having a longitudinally extending bifurcated part forming magnet poles *c* in the position indicated. On one of the poles *c* is an inward extending pin *d* and on the other pole is an inward extending pin *e*, the pins *d* and *e* corresponding in polarity with the respective arms from which they extend. The magnet E is provided with a main coil 20 of relatively light wire having its terminals connected respectively with the binding posts 14, 11, and with a secondary separate coil 21 surrounding the main coil and formed of a relatively heavy wire of a gage and number of turns to require a given amount of current to excite the magnet E sufficiently to withdraw the catch, and having its terminal wire 22 passing through a binding post 13 and connecting with one of the terminals of a rheostat 24, the other terminal wire 23 of the coil 21 being connected with the binding post 11. The wire 23^a connects the binding post 11 with the movable arm of the rheostat 24.

Between the magnets C, E is a block F carrying a contact plate, or electrode, *f* of copper or similar metal of high conductivity in position to be engaged by an electrode *g* carried by the swinging frame, or arm, D. The electrode *g* may be formed of laminated copper, and it, and the part *f*, form the main electrodes or switch-closing contacts. Mounted in a threaded sleeve *h* on the block F is an adjustable electrode *i* which may be of carbon. The arm D is provided toward its free end portion with a slotted sleeve *k* to receive a carbon electrode *l* normally downward pressed by a flat spring *m* on the arm. The electrode *l* near its central portion is provided with a closely fitting pin *n* extending through the slot in the sleeve *k* and connected by a conducting wire *p* to the body of the arm. The object of the pin *n* is to insure at all times thorough electric contact between the arm and electrode in any position of the latter. Beyond the sleeve *k* the arm D is formed with a bifurcated extension *q* between the forks of which extend a pin *r*. G is a swinging catch pivotally mounted upon the pin *e* and having a shoulder *s* and a beveled end portion *t*. A spring *v* tends normally to press the catch G against a pin *w* into the path of the pin *r* as the switch is closed. Springs *x* fastened against the standard *a* and the upper side of the arm, or frame, D, tend normally to raise the said arm on its pivot *b*.

The diagrammatic illustration shows a main line circuit 4, 5 and switch 6. The wire 4 extends to a binding post 7 on the switch-device. From the wire 5 extends a branch wire 8 terminating at a binding post 9 on the switch-device. A branch wire 10 extends to a binding post 14 of the magnet E, and a main

branch wire 12 connects with the distant circuit which the switch-device is intended to open and close. One of the wires 16 of the distant circuit connects with the binding post 15. The distant circuit may contain lamps *y*, as indicated, or be for any other purpose. Interposed in the wire 8 is a spring push-button 17; and interposed in the wire 10 is a similar push-button 18. A wire 19 connects one of the binding posts of the magnet C with the binding post 7. The wires 22 and 23ª are each connected with the wire 16 which is separated between the wires 22 and 23ª by a rheostat of ordinary construction adjustable to shunt any portion of, or all, the main current through the outer magnet coil 21.

The operation is as follows: When it is desired to close the distant circuit containing the lamps *y* or the like, the push-button 17 is pressed to close a circuit through the wires 4, 8, causing the current to pass through the magnet C, and excite it to attract the armature C¹. This swings down the frame, or arm, D until the pin *r* is caught by the shoulder of the catch which, when the button 17 is released, holds the switch closed. In the closing movement of the arm D the electrode *l* first contacts with the electrode *h*, and thereafter the electrode *g* contacts with the electrode *f*. This causes the distant circuit to be closed, the whole or main portion of the current passing through the main electrodes *f*, *g*. When it is desired to open the distant circuit, the push-button 18 is pressed passing the circuit through the main coil 20 of the magnet E. When the push-button 18 is pressed the current passes through the wire 4, wires 16 and 23ª to the binding post 11, thence through the winding 20, binding post 14 and wire 10 to wire 5. The exciting of the magnet E causes the catch G to be drawn against the resistance of the spring *v* in the direction of the pole pin *d*, because of the magnetic attraction between the catch G, which forms an extension of the pin *e*, and the pole-extension *d*. In doing this it releases the pin *r* whereby the arm D is raised by its springs *x* to open the switch. As the electrode *l* is slidably mounted in the sleeve *k* to yield slightly against the resistance of the spring *m* when contacting with the electrode *i*, it remains in such contact during the initial movement of the arm D and separation of the electrodes *f g*. As before stated, separation of the electrodes *f g* while the auxiliary electrodes are in contact, prevents the formation of an arc between the said main electrodes as they separate. The close proximity of the magnetic poles *c* to the point of contact of the auxiliary electrodes prevents the formation of an arc at the latter as they separate, or blows out such an arc the instant it forms. When the distant circuit is closed the current in traversing the wire 16 also passes through the wires 22, 23, and 23ª outer coil 21 and rheostat 24. By providing a rheostat and outer coil in the distant circuit, as described, a portion of the current, varying with the positions of the lever of the rheostat, may be shunted through them, thus the amount of current to be passed through the outer coil 21 may be regulated, whereby the magnet E will not be operated to withdraw the catch until the current through the distant circuit exceeds the amonnt desired to be passed through the latter.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a magnetic switch-device, coöperating distant circuit-opening and closing electrodes, a switch-closing magnet, a separate switch-opening magnet provided with separate main and secondary coils, means for exciting said switch-closing magnet, means for exciting said switch-opening magnet through its main coil, and current shunting means interposed in the distant circuit and passing through said secondary coil, the switch-opening magnet being closely adjacent to the electrodes to operate as a magnetic blowout, substantially as set forth.

2. In a magnetic switch-device, coöperating distant circuit-opening and closing electrodes, a switch closing magnet, a separate switch-opening magnet, provided with separate main and secondary coils, means for exciting said switch-closing magnet, means for exciting said switch-opening magnet through its main coil, a rheostat interposed in the distant circuit adjustable to shunt a controlled proportion of the current through the said secondary coil, the switch-opening magnet being closely adjacent to the electrodes to operate as a magnetic blowout, substantially as set forth.

JACOB L. SCHUREMAN.

In presence of—
W. B. DAVIES,
J. H. LANDES.