(No Model.) 2 Sheets—Sheet 1.

W. MITCHELL.

ELECTRIC SWITCH.

No. 453,888. Patented June 9, 1891.

Fig. 1.

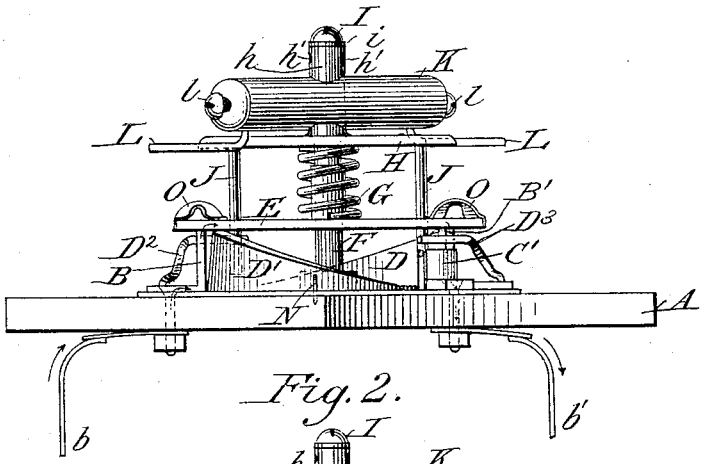


Fig. 2.

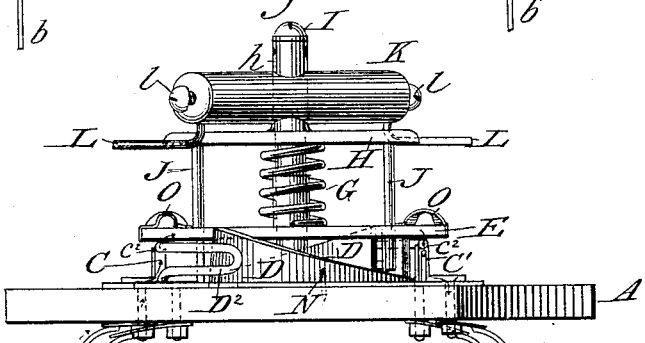
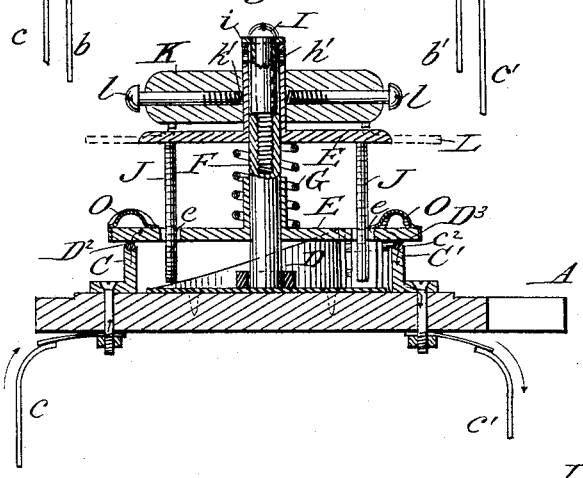


Fig. 3.



Attest:

J. H. Schott

W. Harvey Muzzy

Inventor

Willis Mitchell

by

W. H. Babcock

Attorney.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

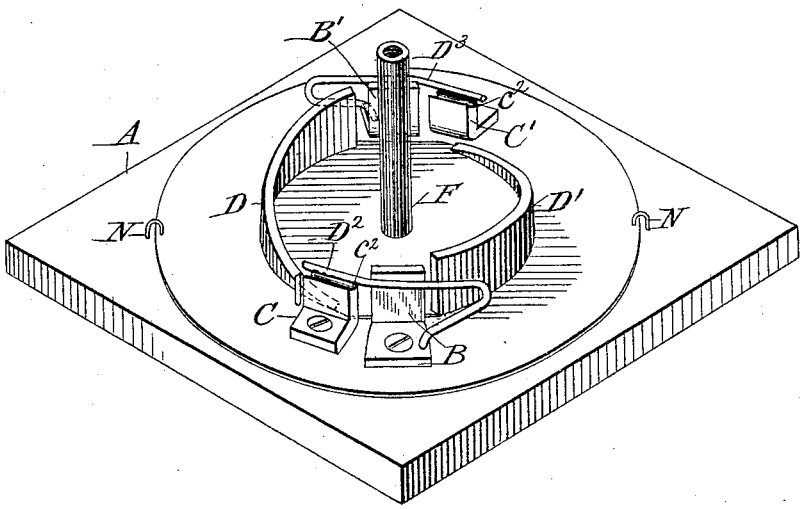


Fig. 5.

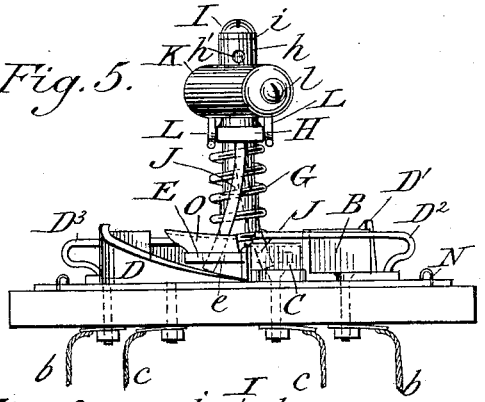
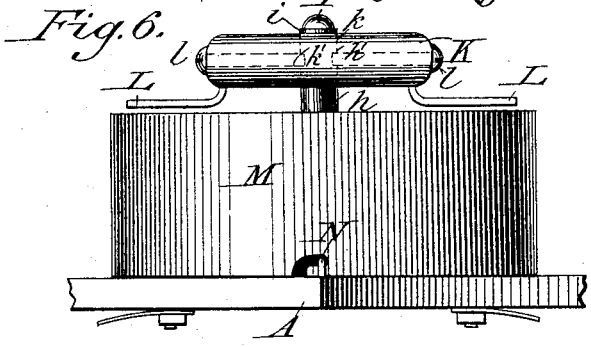


Fig. 6.



Attest:

J. H. Schott

W. Harvey Muzzy

Inventor

Willis Mitchell

by Wm. H. Babcock

Attorney

UNITED STATES PATENT OFFICE.

WILLIS MITCHELL, OF MALDEN, ASSIGNOR OF THREE-FOURTHS TO EDWARD JEWELL, OF BOSTON, AND LEVI L. PARSONS AND ARTHUR B. SMITH, OF SAUGUS, MASSACHUSETTS.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 453,888, dated June 9, 1891.

Application filed January 8, 1891. Serial No. 377,072. (No model.)

To all whom it may concern:

Be it known that I, WILLIS MITCHELL, a citizen of the United States, residing at Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Electric Switches; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The principal object of this invention is to provide electric switches with means for promptly extinguishing the sparks or arcing of the current caused by breaking the circuit. It also provides improved means for increasing the strength of an electrical current by combining two currents at will in one circuit. These ends are effected by the devices hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a side elevation of a switch embodying my invention. Fig. 2 represents a similar view closing both circuits together. Fig. 3 represents a vertical section of Fig. 2, taken longitudinally through the bridge. Fig. 4 represents a perspective view of the base and attachments. Fig. 5 represents an elevation at right angles to Figs. 1 and 2, the circuit being broken; and Fig. 6 represents a perspective view of the switch with the casing on.

A designates the base of the switch, which is preferably of slate or other electrically-non-conducting material. On this base are fastened two pairs of raised contact-plates B B′ and C C′, which have electrical connection below said base with circuit-wires *b b′* and *c c′*. Each plate C or C′ is shorter than the neighboring plate B or B′ and has a groove c^2 in its top. This groove is adapted to receive a part of a bent spring D^2 or D^3, attached to said neighboring contact-plate B or B′.

In the spaces between the two pairs of contact-plates B C and B′ C′, I locate raised cam-flanges D D′, each having its lesser end toward one of the plates C or C′ and its larger end toward the plate B or B′ of the opposite pair.

E designates a circuit-closing metallic bridge, which turns on a standard or post F, raised centrally on said base, and is also movable up and down on the same. A spring G, surrounding said post above the said bridge, forces the latter down on one or the other pair of said contact-plates or on the said cam-flanges, according to the position of the said bridge. The spring at its upper end bears against the cross-bar H of a guide-frame, the said cross-bar being provided with an upward tubular extension *h*, surrounding the said post, and is clamped to the latter by a screw I, which enters a screw-tapped recess in the head of said post, a washer *i* on said screw being located just above the top of said tubular extension, so as to prevent said cross-bar from rising.

From the cross-bar H guide-rods J extend downward through openings *e* in circuit-closing bridge E near the ends of the latter. These rods compel the said bridge to turn with the said cross-bar, the bridge sliding up these guide-rods as its ends ride up the said cam-flanges. The said rods are curved in the direction of rotation to prevent the bridge from binding against them as its position thus changes, and also for an additional purpose, hereinafter stated. A handle K is provided with a transverse and also a vertical central opening *k*, whereby it is sleeved on said tubular extension *h* of guide-frame cross-bar H. Wire fingers L are bent down from the ends of this handle on opposite sides of said cross-bar, in order that the turning of the handle may turn the bridge also. The handle may be locked to the guide-frame by means of screws *l*, which extend in through openings *k′* at the ends of said handle to and through holes *h′* in tubular extension *h*. A casing M is provided for all the mechanism except this handle and the upper end of said post. This casing is applied when the switch is out of use, the said handle first being removed and afterward replaced outside of said casing, as shown in Fig. 7. Catches N serve to hold the said casing in place on the said base. When the bridge E is turned by turning said handle from left to right, the ends of the said bridge ride up the cam-flanges D D′ and pass from the upper ends

of the latter to the contact-plates B B′. The circuit is then through wire *b*, contact-plate B, bridge E, contact-plate B′, and wire *b*′. On turning the bridge farther in the same direction the ends of it are transferred from contact-plates B B′ to contact-plates C C′, making the circuit through wire *c*, contact-plate C, bridge E, contact-plate C′, and wire *c*′. When the bent springs D^2 and D^3 are used, as shown, the pressure of spring G forces them into the grooves c^2 of circuit-plates C C′, thus making electrical communication between plates B and C and also between plates B′ and C′. In consequence both currents will be turned into the shorter of the two circuits, thus increasing the strength of the current and the heating, lighting, or other desirable effect at will. When the bridge is turned still farther in the same direction, it passes beyond the contact-plates C C′, and is forced sharply downward by the spring G. When the circuit is thus broken, a spark or arc of light momentarily appears, the current having intensity enough to leap a slight interval. This undesirable phenomenon is common in switches. To do away with it I provide each end of said switch with an extinguisher O, arranged on top and transversely thereof and having approximately the shape of a half-funnel longitudinally divided, the large end being presented forward in the direction of motion. The guide-rods J by their forward curvature guide the bridge in this direction, when the spring G is free to move it, as stated, and the sharp obliquely forward and downward motion thus caused produces a backward draft of air through the extinguishers, which, being concentrated at their small ends, blows out the sparks or arcing.

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

1 In an electric switch, the combination of a movable circuit-closing bridge with hollow tapering extinguishers thereon and mechanism for directing the ends of said bridge obliquely forward and downward when contact is broken, for the purpose set forth.

2. In combination with a movable bridge and forward curved guide-rods for directing the motion of the same, a spring bearing on said bridge, contact-plates to make electrical connection therewith, and hollow tapering spark-extinguishers carried by the ends of said bridge, substantially as set forth.

3. In combination with a circuit-closing bridge and a spring bearing thereon, two pairs of contact-plates and their electrical connections, and electrical conductors attached to the contact-plates of one pair and arranged to be forced by said spring and bridge against the contact-plates of the other pair, thus uniting both currents in one circuit, substantially as set forth.

4. In combination with a circuit-closing bridge and a spring bearing thereon, a pair of contact-plates B B′, a pair of springs D^2 D^3, attached thereto, a second pair of contact-plates C C′, having grooves c^2 in their tops, adapted to receive the said springs, and the circuit-wires *b b*′ *c c*′, the springs D^2 D^3 being arranged to be forced into the grooves c^2 by the pressure of the bridge and its spring, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIS MITCHELL.

Witnesses:
W. P. CUTLER,
ROBERT W. SCOTT.