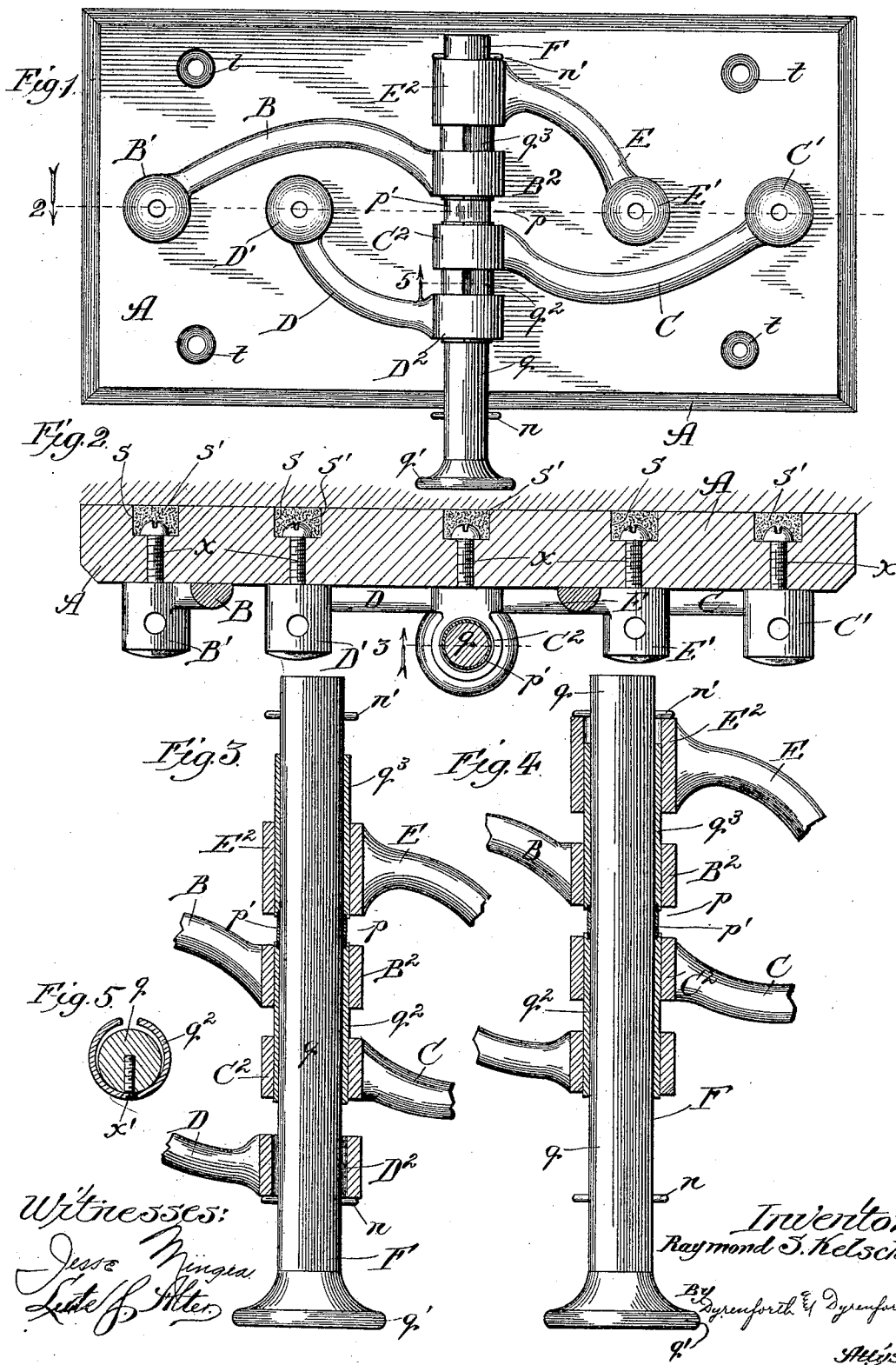


(No Model.)

R. S. KELSCH.
ELECTRIC SWITCH.

No. 527,177.

Patented Oct. 9, 1894.



UNITED STATES PATENT OFFICE.

RAYMOND S. KELSCH, OF CHICAGO, ILLINOIS.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 527,177, dated October 9, 1894.

Application filed May 28, 1894. Serial No. 512,768. (No model.)

To all whom it may concern:

Be it known that I, RAYMOND S. KELSCH, 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 Electric Switches, of which the following is a specification.

My invention relates to improvements in switches or cut-outs for electric circuits generally.

My object is to provide an improved electric switch or cut-out which shall be of a simple and durable construction, easy of manipulation, and produce when operated such gradual making and breaking of the circuit, or cutting in or out of a loop or branch circuit as to obviate all danger of flashing or sparking between the contacts and render the cut-out action positive and absolute. While, as stated, my invention is intended for general use wherever cut-outs are employed, it is especially desirable for series systems of arc-lighting.

In the drawings, I show my invention applied to the supporting plate or hanger-board of an electric arc-lamp for cutting the lamp into and out of the circuit.

Figure 1 is a plan view of the hanger-board with my improvements in their preferred form; Fig. 2, a section taken on line 2 of Fig. 1, and viewed in the direction of the arrow; Figs. 3 and 4, enlarged broken sections on line 3 of Fig. 2, and showing the switch in its two positions; and Fig. 5, an enlarged section on line 5 of Fig. 1.

A is a support or hanger-board base, preferably of stone, marble, slate or other non-conductive and incombustible material, provided with screw-holes t at which to fasten it in place.

B, C, and D, E, are metal conductors, formed at one end with binding-posts B' C' D' and E' respectively, and at their opposite ends with contacts in the form of tube-sections B^2 C^2 D^2 and E^2 respectively. The conductors are preferably of the form shown, with flat sides to bear against the base A, the conductors B and C being of the same length and longer than the conductors D and E which are also of the same length. The conductors are so placed that their tube-sections are in a central transverse line across the base, and

they are fastened in place by means of screws x passing through the board into the binding-posts and tube-sections. The conductors are thus held with great security to the board, and the heads of the screws are countersunk in sockets s in the top or back of the base, the sockets being filled with a non-conducting cement s' which covers the heads. The openings through the tube-sections of the conductors are all of the same size, and in a straight line.

F is a sliding switch-rod, comprising a cylindrical body-portion q provided with a knob or handle q' , and two conducting surfaces or contacts preferably in the form of split ferrules q^2 and q^3 . The body-portion and handle of the switch-rod are of insulating material, preferably hard rubber, and the ferrules are of metal, preferably spring-brass or bronze. The ferrules are separated from each other by a space p , and are secured in place by means of pins or screws x' passing through openings in the ferrules and into the body-portion q ; their heads extending flush with the surfaces of the ferrules. The tendency of the ferrules is to open, as shown in Fig. 5, and the tube-section openings are just large enough to admit the rod F when the split edges of the ferrules are pressed toward each other and against the body-portion q . The rod F extends through the openings of the contacts of all the conductors, and is provided with stops n and n' , which limit the movement of the switch-rod by impinging respectively against the tube-sections D^2 and E^2 . The break or space p between ferrules, is about equal to or slightly less in extent than the distance between the contact B^2 , and the contacts C^2 E^2 ; and the ferrules are of a length approximating the distance through the contacts B^2 C^2 , and C^2 D^2 . When the rod F is moved to the position shown in Figs. 1 and 4, the ferrule q^3 engages the contacts E^2 B^2 , the ferrule q^2 engages the contacts C^2 D^2 , and the break p extends between the contacts B^2 C^2 . When the rod F is moved to the position shown in Fig. 3, the ferrule q^3 engages only the contact E^2 , the break p extends between the contacts E^2 B^2 , the ferrule q^2 is out of engagement with the contact D^2 , and engages the contacts B^2 C^2 .

In practice the electric line-wires are fas-

tened to the binding-posts B' and C', and the wires of the loop or branch circuit in which the arc-lamp is interposed are fastened to the binding-posts D' and E'.

5 When the switch-rod F is in the position shown in Fig. 3, wherein the stop *n* engages the contact D², the lamp is cut out, and the current from the line-wire, at the binding-post B', will pass through the conductor B, ferrule *q*², and conductor C to the line-wire at C'. Movement of the switch-rod to the position shown in Figs. 1 and 4, wherein the stop *n*' engages the contact E², switches the lamp into circuit, the current passing through the conductor B, ferrule *q*³, and conductor E to the lamp; and from the lamp through the conductor D, ferrule *q*² and conductor C. In the movement of the rod to switch in the lamp or cut it out there is a period during which the break *p* is in the tubular-section B² and the latter contacts with both ferrules. During this period the current may pass both by the direct route, through the conductors B, C, and through the lamp. Thus, for example, in the movement of the switch-rod to switch in the lamp, as the area of contact of the ferrule *q*² with the conductor B decreases, increasing the resistance between the conductors B, C, the areas of the contacts between the ferrule *q*³ and conductor B and ferrule *q*² and conductor D, increases, so that before the break *p* passes the contact B² the current is divided passing through both the shorter and the longer circuits, and gradually increases through the longer circuit as it diminishes through the shorter, so that when the final cutting off of the current through the shorter circuit takes place, all danger of the formation of an arc between the contacts *q*² B², is obviated and no flashing or sparking will occur. The cutting-out of the lamp is brought about in the same gradual manner, in the passage of the break *p* through the contact B², and there will be no danger of the formation of an arc, as the contact *q*² approaches the contact B².

The friction, due to the pressure of the split-ferrules against the inner surfaces of the tubular sections, while not sufficient to make sliding of the switch-rod difficult, will hold the rod with desired firmness in either adjusted position.

In the space or break *p* between the contacts *q*² *q*³ I prefer to provide a thin covering *p*' of mica or other non-conducting and incombustible material about the rubber body-portion *q*. While under all ordinary circumstances such a covering would be unnecessary, there is a possibility, in the event of the lamp being defective and offering undue resistance to the passage of the current, that an arc may form, in the movement of the switch-rod, and burn or char the rubber body-portion at the break, thereby lessening the non-conductive properties of the rubber at that point. The mica or like covering *p*' will prevent the arc from doing any injury to the switch-rod.

The switch-rod may be of any other desired form in cross-section than that shown, and the sleeve or ferrules and contact tube-sections made to correspond. Thus the rods may be triangular, square or of any other suitable form, and the ferrules and contacts shaped accordingly. It is not necessary that the ferrules should completely surround the rod or that the tube-sections should be closed. It is desirable however to have the contacts envelop the rod sufficiently to hold it in place.

While I prefer to construct my improvements throughout as shown and described, they may be modified in the matter of details without departing from the spirit of my invention as defined by the claims; and when employed in other connections than as a cut-out for arc-lamps, any changes desirable to adapt the invention to the particular connection will readily suggest themselves.

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

1. In an electric-switch or cut-out, a pair of main-line contacts and a pair of loop-line contacts, the members constituting one said pair being adjacent to each other and intermediate of the other said pair, and a sliding switch-bar provided with longitudinally extending conducting surfaces separated from each other by an insulating space, the bar being mounted to move between positions, wherein it extends at its insulating space at opposite sides of one of the said intermediate contacts, whereby in one position it engages with one of its conducting surfaces the two intermediate contacts, and in the other position each of its conducting surfaces engages an intermediate and an outer contact, substantially as and for the purpose set forth.

2. In an electric-switch or cut-out, the combination of a support, a pair of loop-line conductors, and a pair of main-line conductors, secured to the support, the members constituting one of said pairs being adjacent to each other and intermediate of the other said pair, and all the conductors presenting contact openings in line with each other, and a switch-bar extending through said openings, having conducting surfaces separated by an insulating space, the bar being movable in the said openings, to operate substantially as described.

3. In an electric-switch or cut-out, the combination of a support, a pair of conductors terminating in contact tube-sections D² and E², a pair of conductors terminating in contact tube-sections B² and C² intermediate of and in line with the contacts D² E², one said pair being loop-line conductors and the other said pair main-line conductors, and a switch-bar F extending through said tube-sections, having conducting surfaces *q*² *q*³ separated by an insulating space *p*, the bar being movable in the said tube-sections, to operate substantially as described.

4. In an electric switch or cut-out, the combination with the support, of loop contact

tube-sections, main-line contact-tube-sections intermediate of the said loop contacts, and a sliding switch-bar movable in the said tube-sections and having conductor surfaces, separated by an insulating space, and fitting the said tube-sections, the bar being movable in the tube-section contacts between positions wherein it extends at its insulating-space at opposite sides of one of the said main-line contacts, whereby in one position it engages with one of its conducting surfaces the two main-line contacts, and in the other position each of its conducting surfaces engages a main-line and a loop contact, substantially as described.

5. In an electric switch or cut-out, the combination of a support, loop-line conductors D and E, and main-line conductors B and C, secured to the support, the main-line conductors being intermediate of the loop conductors, all the conductors presenting contact openings in line with each other, and a switch-bar F extending through said openings, having conducting surfaces q^2 q^3 separated by an insulating space, p , the bar being movable in the said openings, to operate substantially as described.

6. In an electric-switch or cut-out, the combination of a support, loop-line conductors terminating in contact tube-sections D^2 and E^2 , main-line conductors terminating in contact tube-sections B^2 and C^2 intermediate of and in line with the contacts D^2 E^2 , and a switch-bar F extending through said contacts and provided with ferrules q^2 q^3 , affording conductors fitting the contacts, and separated by an insulating space p , the bar being movable in said contacts, to operate substantially as described.

7. In an electric-switch or cut-out, the combination of a support, a pair of conductors, terminating in contact tube-sections D^2 and E^2 , a pair of conductors terminating in contact tube-sections B^2 and C^2 , intermediate of and in line with the contacts D^2 E^2 , one said pair being loop-line conductors and the other said pair being main-line conductors a switch-

bar F, extending through said contacts, and comprising a body portion q of insulating material, split-spring contact ferrules q^2 and q^3 of conducting material on the body portion, and separated by an insulating space p , and stops on the switch-bar, the bar being movable in said contacts a distance limited by engagement of the said stops with stops on the support, to operate substantially as and for the purpose set forth.

8. In an electric-switch or cut-out, the combination of a support, a pair of conductors terminating in contact tube-sections D^2 and E^2 , one said pair being loop-line and the other said pair being main-line conductors a pair of conductors terminating in contact tube-sections B^2 and C^2 intermediate of and in line with the contacts D^2 E^2 , and a switch-bar F extending through said contacts and provided with ferrules q^2 q^3 , affording conductors fitting the contacts, and separated by an insulating space p , provided with a covering p' of incombustible and non-conducting material, the bar being movable in said contacts, to operate substantially as described.

9. A cut-out for electric circuits comprising, in combination, a support, a pair of binding-posts D' E' communicating with contact tube-sections D^2 E^2 , a pair of binding-posts B' C' , communicating with contact tube-sections B^2 C^2 , the contacts B^2 C^2 being intermediate of and in line with the contacts D^2 E^2 , and a sliding switch-bar F, extending through said contacts, comprising a body-portion q of insulating material, split-spring contact-ferrules q^2 and q^3 of conducting material fastened upon the said body-portion and separated by an insulating space p , and stops limiting the movement of the switch-bar, the whole being constructed to operate substantially as described.

RAYMOND S. KELSCH.

In presence of—

M. J. FROST,
J. N. HANSON.