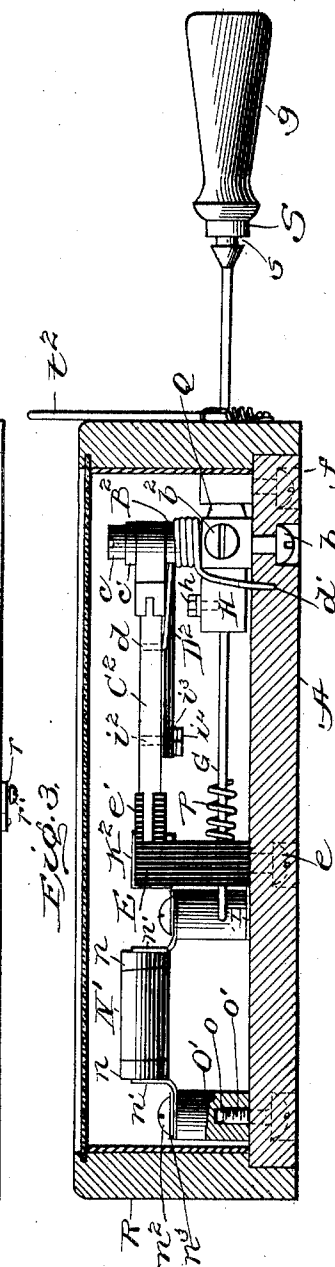


APPLICATION FILED MAY 20, 1907. RENEWED FEB. 10, 1911.

Patented Nov. 21, 1911.

2 SHEETS—SHEET 1.



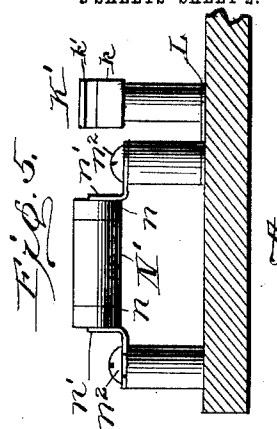
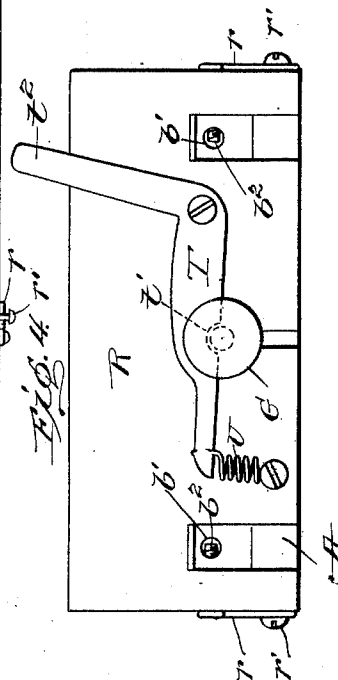
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UNITED STATES PATENT OFFICE.

WILLIAM HENRY CHAMBERS, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-HALF
TO ALEXANDER HAMILL, OF BALTIMORE, MARYLAND.

ELECTRIC SWITCH.

1,009,648.

Specification of Letters Patent.

Patented Nov. 21, 1911.

Application filed May 20, 1907, Serial No. 374,624. Renewed February 10, 1911. Serial No. 607,872.

To all whom it may concern:

Be it known that I, WILLIAM H. CHAMBERS, citizen of the United States of America, residing at Baltimore, Maryland, have
5 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
10 it appertains to make and use the same.

My invention relates to improvements in mechanical switches for electric systems.

The object of my invention is to provide a snap-switch which will be efficient and
15 durable while at the same time being very simple and therefore economical in construction.

With this general object in view and some others which will be obvious to those skilled
20 in the art from the description hereinafter, my invention consists in the features, details of construction and combination of parts which will first be described in connection with the accompanying drawings
25 and then particularly pointed out in the claims.

In the drawings: Figure 1 is a plan view of one form of switch embodying my invention, the switch being open and the casing
30 broken away; Fig. 2 a similar view showing the switch closed; Fig. 3 a longitudinal section on the line 3—3 Fig. 1, Fig. 4 an end elevation, and Fig. 5 a detail side elevation of the fuse device.

Referring to the drawings, A is a base of any suitable material, for example, slate or marble or other refractory insulating
35 material provided with suitable holes for the reception of screws or bolts by which it may be attached to a wall or other support, such holes, being indicated, for example,
40 at *a*.

At one end of the base are arranged two standards or posts B¹, B², which are suitably
45 secured to the base A, as for example by screws, *b*, passing upward through holes in the base and having countersunk heads.

The standards are arranged to serve as terminals for line wires, preferably by making
50 them as binding posts, each standard having a transverse hole *b*¹, at right angles to which is a binding screw *b*², arranged to clamp the end of the line wire, as will be fully understood by those skilled in the art.

The standards B¹, B², each have their upper
55 ends reduced in diameter to serve as fulcrums for contact levers C¹, C², these levers being held in place by screws *c* and washers *c*¹, the screws being threaded into the upper ends of their respective standards. 60

That part of each standard below the levers C¹, C² is surrounded by a coiled spring, these springs being indicated at
65 D¹, D², each spring having one of its ends secured to its contact lever, for example, by bending it upward and inserting it into a
70 hole in such lever, as indicated at *d*, while its other end is secured to the base A as for example by bending it downward and inserting it into a hole in the base, as indicated at *d*'. The tendency of these helical
75 springs is to turn the contact levers C¹, C² about their pivots in a direction toward a post E, fixed to the base A by means of a screw *e* inserted upward through a hole in
80 the base and threaded into the bottom of said post, the head of the screw *e* being countersunk. The post E has an arm projecting toward the standards B¹ B² and provided with rabbets on opposite edges to
85 receive the ends of the contact levers C¹, C², a central rib *e*' being thus formed between the two rabbets, which rib *e*' prevents the ends of the levers C¹ C² from coming into contact with each other.

The post E is made of insulating material, for example, hard rubber or vulcanized fiber. At the end of the base A near the standards B¹ B² and about half-way between them is
90 a post F fixed to the base by a screw *f* in the same manner as is the post E already described. The posts E and F are provided with holes in line with each other, in which
95 holes is slidably mounted an operating rod G. Upon this rod is mounted a block, H, fixed to the rod by a set screw *h* and provided with a pivot post *h*' whose upper end
100 is reduced in diameter and projects through holes in two ends of toggle arms or levers I¹, I², the said arms being held to the pivot post *h*' by a washer *h*² and nut *h*³. The opposite ends of the toggle arms I¹, I² are pivotally connected to the contact levers C¹, C²,
105 as for example, by stud bolts *i*¹, *i*² threaded into the respective contact arm and provided with washers *i*³ and nuts *i*⁴. The toggle arms are made of suitable insulating material, for example, vulcanized fiber. At

each side of the central post E is located a contact post, these posts being indicated at K^1 , K^2 . Each contact post is provided on top with an enlarged head k and a spring jaw, these jaws being indicated at k^1 , k^2 and each arranged to receive and make an electrical contact with its corresponding contact lever C^1 , C^2 . The ends of the levers C^1 , C^2 are preferably somewhat reduced in thickness to enter the respective spring jaws k^1 , k^2 .

The contact posts K^1 , K^2 are mounted on plates L of conducting material, which also support posts M^1 , M^2 , connected at the upper ends to fuses N^1 , N^2 , whose opposite ends are secured to posts O^1 , O^2 , which serve as binding posts, being provided with holes o and set screws o' for this purpose. The posts K^1 , K^2 , M^1 , M^2 and O^1 , O^2 are secured to the base A in any suitable way, as for example, by screws passing upward through holes in the base and threaded into the respective posts.

The fuses N^1 , N^2 attached to the upper ends of the posts M^1 , M^2 , O^1 , O^2 are preferably of the non-arcng type having metallic caps n at the ends, to which are suitably connected, as by soldering, suitable angle pieces, n^1 , of conducting material, each of which is detachably secured to the top of the respective posts by a screw n^2 and washer n^3 as shown in the drawings. By this construction not only are the fuses held in good contact with the posts, but in case of necessity the ordinary fuse wire can be used as a fuse by placing its ends beneath the washers n^3 and clamping it down by means of the screws n^2 .

A coiled spring P surrounds the operating rod between the block H and the guide-post E, for a purpose hereinafter specified. Also, an elastic ring Q may surround the rod between the block H and the guide post E to serve as a buffer.

The apparatus thus far described is arranged to be inclosed by a casing R which is secured to the base A by hooks r which engage suitable devices such as screws r^1 projecting laterally from the base.

The operation of the device thus far described is as follows. When the operating rod G is pushed in, the contact levers C^1 , C^2 are swung outward through the medium of the toggle levers, until the ends of said levers enter the corresponding spring jaws, k^1 , k^2 and thus close the circuit. In order to hold the operating rod and the contact levers in this position, a suitable latch mechanism is provided which in the present example is constructed as follows: The operating rod is provided with a conical sleeve S having a groove s and upon the adjacent end of the casing is mounted a bell crank latch lever T pivoted at t and normally held against the conical sleeve S by a spring U.

That arm of the bell-crank lever which is arranged to engage the conical sleeve is provided with a semicircular notch, as indicated at t^1 , the edge of which is arranged to enter the groove s in said conical sleeve. The other arm of the bell-crank projects beyond the face of the casing, as indicated at t^2 to serve as a handle by which the latch lever may be operated. The operating rod G is provided with suitable means whereby it may be operated, as for example, the handle g .

When the rod is pushed inward to swing the contact-levers into engagement with the spring jaws k^1 , k^2 , the conical sleeve S comes into contact with the coating edge of the latch lever, and forces the same in the direction away from the rod, the said latch lever thus riding up the conical sleeve until it reaches the peripheral groove s , whereupon it enters said groove and thereby latches the rod to hold the contact-levers in engagement with the spring jaws, against the action of the springs D^1 and D^2 which tend to swing the contact-levers inward.

The spring P which is compressed between the block H and the post E toward the end of the inward movement of the operating rod, serves to prevent the shock which would otherwise be given to the hand of the operator on suddenly closing the switch, also to aid in opening the switch levers and finally to aid in starting the toggle-levers in their proper direction, viz., downward.

When the circuit is closed by the switch and it is desired to open the same, it is only necessary to open the latch lever by moving the handle t^2 to the right, whereby the latch lever is pulled out of the groove in the conical sleeve and thereby the rod, toggle-levers and contact-levers are free to move to the open position of the switch, under the influence of the springs D^1 , D^2 , thus quickly opening the switch so as to reduce the dangers of arcing. In other words, the switch opens as a snap-switch, although closing only as a manual switch.

It will be noted that the arrangement of the toggle-levers is such that as the contact-levers near the spring jaws k^1 , k^2 , the power exerted by the toggle-levers is greatest and thereby pushes the switch levers to their seats in the spring jaws with relatively great force, although not requiring any greater force from the hand of the operator. Furthermore, in the latched position of the device, the springs D^1 , D^2 which tend to move the contact-levers to open the circuit cannot transmit as much of their power to the operating rod as they can when the switch is open, whereby there is less strain on the latch mechanism, and the latch can be tripped without the use of undue force. At the same time, by employing the spring P which surrounds the operating rod, the

amount of pressure on the latch can be predetermined by the use of a spring of the desired resistance.

It will be observed that the contact levers C^1 C^2 are parallel when in the circuit closing position so that an economy of space is effected by the arrangement of the parts. It will also be noted that the combined length of the toggle levers exceeds the distance between the contact levers when the latter are parallel so that the force applied through the toggle levers will cause the contact levers to make a perfect and intimate contact with the jaws k and at the same time will leave the toggle levers in such a position that there will be no dead centers to overcome when the switch is to be opened.

Having thus fully described my invention, what I claim as new is:

1. The combination, with a pair of contact-levers, each pivoted at one end, means for making an electrical connection with the pivotal end of each contact-lever, a pair of contact-devices arranged to coact with the respective contact levers, means for making an electrical connection with said contact device, and a pair of toggle-levers having their outer ends connected to the respective contact-levers, of a post against which the contact-levers rest when the circuit through the contact-devices is broken, yielding means for maintaining the levers in this position, a longitudinally movable operating rod guided by said post and provided with means en-

gaging the common pivotal point of said toggle-levers, a spring intermediate the said means and the post and acting to force the rod outward, and a latch-device arranged to hold the operating rod in its inward position.

2. The combination, with a pair of contact-levers pivoted at one end, means for making an electrical connection with the pivotal end of each contact-lever, a pair of spring jaws arranged to be engaged by the respective contact-levers in one position of the latter, means for making an electrical connection with said spring jaws, and a pair of toggle-levers having their free ends connected to the respective contact-levers, of a post of insulating material against which the switch levers rest when the circuit is open, yielding means for maintaining the switch-levers against said post, a longitudinally-movable rod guided by said post and pivoted to the common pivotal ends of the toggle levers, a conical sleeve upon said rod, and provided with a groove, a casing inclosing the switch mechanism, and a latch-lever pivoted to the casing and arranged to enter the groove in the conical sleeve when the rod is pushed in.

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

WILLIAM HENRY CHAMBERS.

Witnesses:

ALEXANDER HAMILL,
WILLIAM T. HALL.