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ELECTRIC SNAP-ACTION SWITCH

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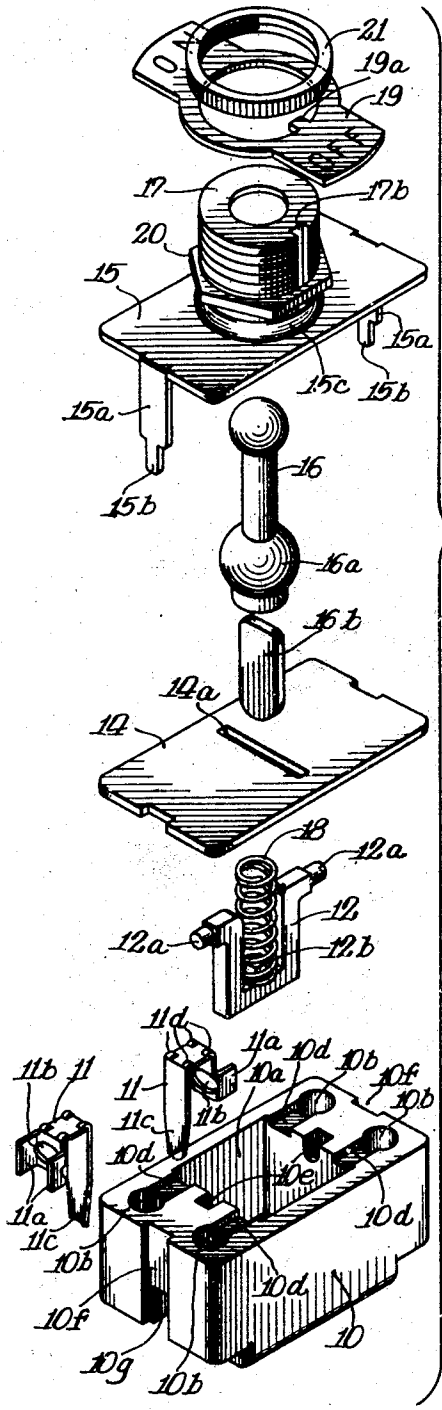


Fig. 1.

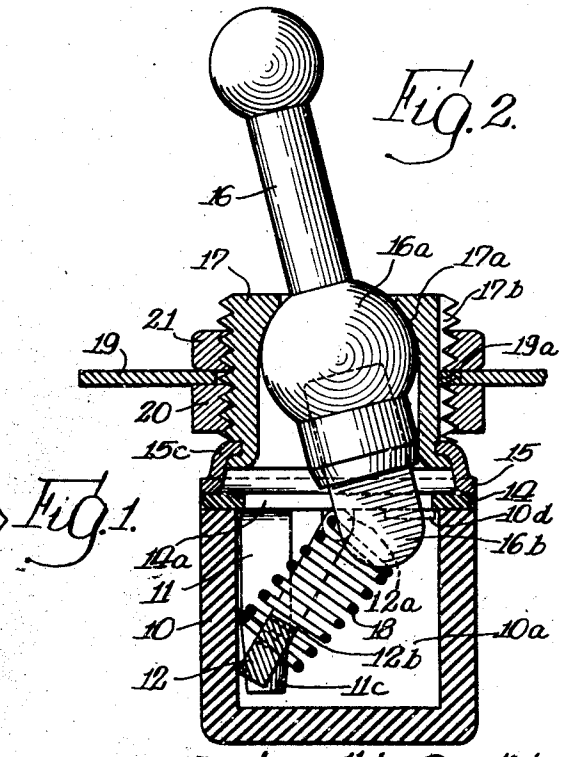


Fig. 2.

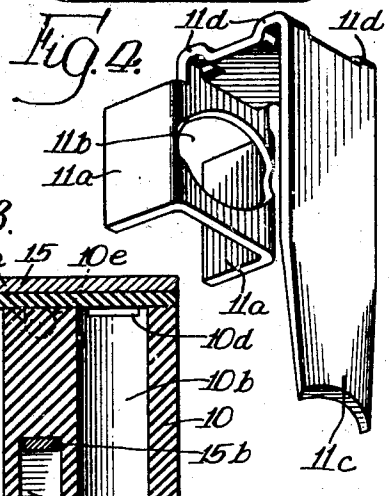


Fig. 4.

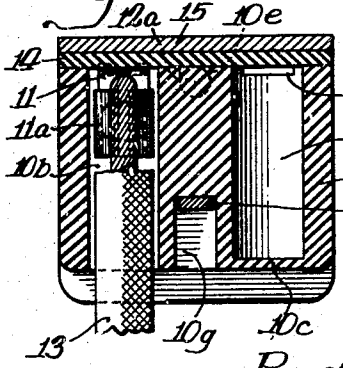


Fig. 3.

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ELECTRIC SNAP-ACTION SWITCH

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This invention relates to electric snap-action switches and, while it is of general application, it is particularly useful for embodiment in such switches of the miniature type suitable for controlling relatively low power electrical appliances.

Heretofore there have been proposed numerous snap-action or so-called "toggle" type switches suitable for the control of relatively low power electrical appliances, such as domestic appliances of all kinds, electrical hand tools, etc. In general, such switches are provided with a small cylindrical bushing which projects only slightly from the interior of the appliance housing and is held in place by a knurled threaded ring or nut. A small pivoted operating lever extending from the bushing for actuating the switch is substantially the only protuberance and as a result the switch is very inconspicuous.

Such switches of the prior art, particularly those designed for lower-cost appliances, have left something to be desired from the standpoint of sturdiness, reliability and service life. Conversely, those switches designed to incorporate these desirable characteristics have been very complicated in their design and costly to manufacture.

It is an object of the invention, therefore, to provide a new and improved electric snap-action switch of extreme simplicity, and therefore of low cost, which at the same time does not sacrifice the desired sturdiness, reliability and extended service life.

In accordance with the invention, an electric snap-action switch comprises an elongated base member of insulation material having a relatively large, generally rectangular, recess opening into the upper face thereof and a plurality of small lead-in conductor recesses also opening into the upper face thereof, at least one of such conductor recesses being disposed at each end of the base member. The switch also includes a plurality of identical stationary spring contact elements at least one at each end of the base member, each of such contact elements extending from one of the conductor recesses into the rectangular recess, and a bridging contact element pivotally supported in the rectangular recess about an axis longitudinal of the base member and adapted to bridge a pair of the spring contact elements. The switch also is provided with an insulation cover means for the recesses in the base member and a snap-action operating mechanism for the bridging contact element including an actuating lever extending through the cover means.

For a better understanding of the invention, together with other and further objects thereof,

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reference is had to the following description taken in connection with the accompanying drawings while its scope will be pointed out in the appended claims.

Referring now to the drawings, Fig. 1 is an exploded perspective view of an electric snap-action switch embodying the invention; Fig. 2 is an enlarged cross-sectional view of the switch of Fig. 1; Fig. 3 is a cross sectional view of the switch of Fig. 1 through the lead-in conductor recesses; while Fig. 4 is an enlarged perspective view of one of the stationary spring contact elements of the switch.

Referring now to the several figures of the drawings, there is illustrated an electric snap-action switch comprising an elongated base member 10 of insulation material, such as a molded thermosetting resin or other plastic material, having a relatively large, generally rectangular recess 10*a* opening into the upper face of the member. The base member 10 also is provided with a plurality of small lead-in conductor recesses 10*b* also opening into the upper face thereof. Preferably, the conductor recesses 10*b* are vertical and are disposed at least one at each end of the base member 10, preferably one at each corner thereof, as illustrated. The bottom of each of the conductor recesses 10*b* as are not to be used is closed by a thin diaphragm 10*c*, Fig. 3, these recesses being included solely to reduce the amount of material required for the base member 10.

The switch also includes a plurality of identical stationary spring contact elements 11, at least one being disposed at each end of the base member. Each of the contact elements 11 extends from one of the conductor recesses 10*b* into the rectangular recess 10*a*, bridging the portion of the base member 10 therebetween. As shown in Fig. 1, the barrier portion separating the rectangular recess 10*a* from the conductor recesses 10*b* is slightly cut away to form a plurality of recesses 10*d* at the upper face of the base member 10 in which the contact elements 11 are seated. The number of spring contact elements will depend upon the circuit-controlling connections desired; for example, if a simple on-off switch is desired, as indicated by the drawings, two contact elements 11 will be provided disposed in aligned recesses 10*b* at opposite ends of the base member 10. On the other hand, if a two-position switch or a two-way three-circuit control is desired, a contact element 11 will be disposed in each of the four conductor recesses 10*b*, in the latter instance the two contact elements at one

Seating of the spherical enlargement 16a of the lever 16 in the spherical seat 17a of the bushing 17 provides a dust-tight pivotal joint for the lever 16. The construction of the insulation element 16b from a simple punching from a sheet of insulation material and its frictional engagement in the recess of the lower end of lever 16 provides an effective and extremely economical construction. The construction of the spring contact elements 11 from an elongated flat strip bent flatwise into a U-shaped configuration to bridge the ribs separating the rectangular recess 10a from the several conductor recesses 10b, together with their upstanding projections 11d engaged and pressed downwardly by the insulation cover element 14, facilitates the assembly of the contact elements 11 in the switch and at the same time assures that they are permanently held accurately in position without reliance upon the resilient engagement of the ribs in the base member by the contact elements. This arrangement for retaining the spring contact elements 11 also minimizes the effects of any inaccuracies in the molded base member 10 and of vibration or shock applied to the switch during use. Further, with this construction, the bends in the strip are across the "grain" of the metal, which is usually cold rolled or drawn, which minimizes cracking at the bends. It is noted that the contact elements 11 are universal; that is, all contact elements are identical, thus doing away with the requirement of right-hand and left-hand contact elements usually required in this type of snap-action switch. The use of such a universal contact element requires only a single forming die and reduces the cost of the apparatus.

It will be noted from Fig. 2 that the bridging contact element 12 passes completely over the lower portion of the convex or arcuate contact surfaces 11c during the opening and closing of the switch, thus providing a wiping or cleaning action during both operations, which increases the service life of the switch. Further, it is seen that by bringing the conductors 13 downwardly through the conductor recesses 10b, there is provided a support and protection for a substantial portion of the insulation of the conductor adjacent the exposed portion which is connected to a contact element 11, thereby minimizing the breaking or fraying of the conductor insulation at the switch and the breaking of the connection from the conductor 13 to its associated contact 11. The conductors, however, substantially fill said conductor recesses, thus keeping the interior of the switch mechanism substantially dust-proof.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit or scope of the invention.

What is claimed as new is:

1. In an electric switch, the combination of a generally rectangular base with a central walled cavity having a contact recess in each of two opposite walls thereof, a stationary contact element for each of such recesses, comprising a portion having a pair of ears adapted to engage and maintain a conductor secured therein, a second portion extending into said cavity and generally parallel to said ear portion having a convex cross section at the bottom portion thereof to provide a corresponding contact surface, and a third portion intermediate the first and second portions and upstruck to engage a cover for the switch to maintain the second portion of the stationary contact in position in the cavity, and each of said two opposite walls having a bearing socket therein adapted to support a bridging contact for pivotal movement to engage the second portion of each of said stationary contacts.

2. In an electric switch, the combination of a molded base with a central walled cavity therein having a contact recess in each of two oppositely disposed cavity walls lying in the largest dimension of the base, each of said two walls having a bearing socket therein adjacent the corresponding contact recess, and a stationary contact in each contact recess with each such stationary contact having a portion extending into the cavity, said two bearing sockets adapted to support a bridging contact which is swingable in an arc across the smallest dimension of the base for engagement with the stationary contact portions.

3. In an electric switch, an insulating base having a central walled cavity and a body portion integral with each of two opposite walls for said cavity, each of said body portions having an identical recess therein for receiving a stationary contact and such recess comprising a conductor portion extending entirely through such body portion and comprising a shallow portion intermediate the conductor portion and the cavity, a stationary contact in each recess, and each base body portion having a bearing socket therein adjacent a recess, said two bearing sockets adapted to support a movable contact therein for movement to engage the stationary contacts.

4. In an electric switch, an insulating base having a central walled cavity and a body portion integral with each of two opposite walls for said cavity, each of said body portions having an identical recess therein for receiving a stationary contact and such recess comprising a conductor portion extending entirely through such body portion and comprising a shallow portion intermediate the conductor portion and the cavity, a stationary contact in each recess, having a part thereof in the conductor portion and shallow portion of the corresponding recess and having a part with a contact face in the cavity, with said contact faces positioned opposite one another in said cavity, and each base body portion having a bearing socket therein adjacent a recess, with the two bearing sockets being adapted to support a movable contact therein which is movable to simultaneously engage the two oppositely disposed contact faces.

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