

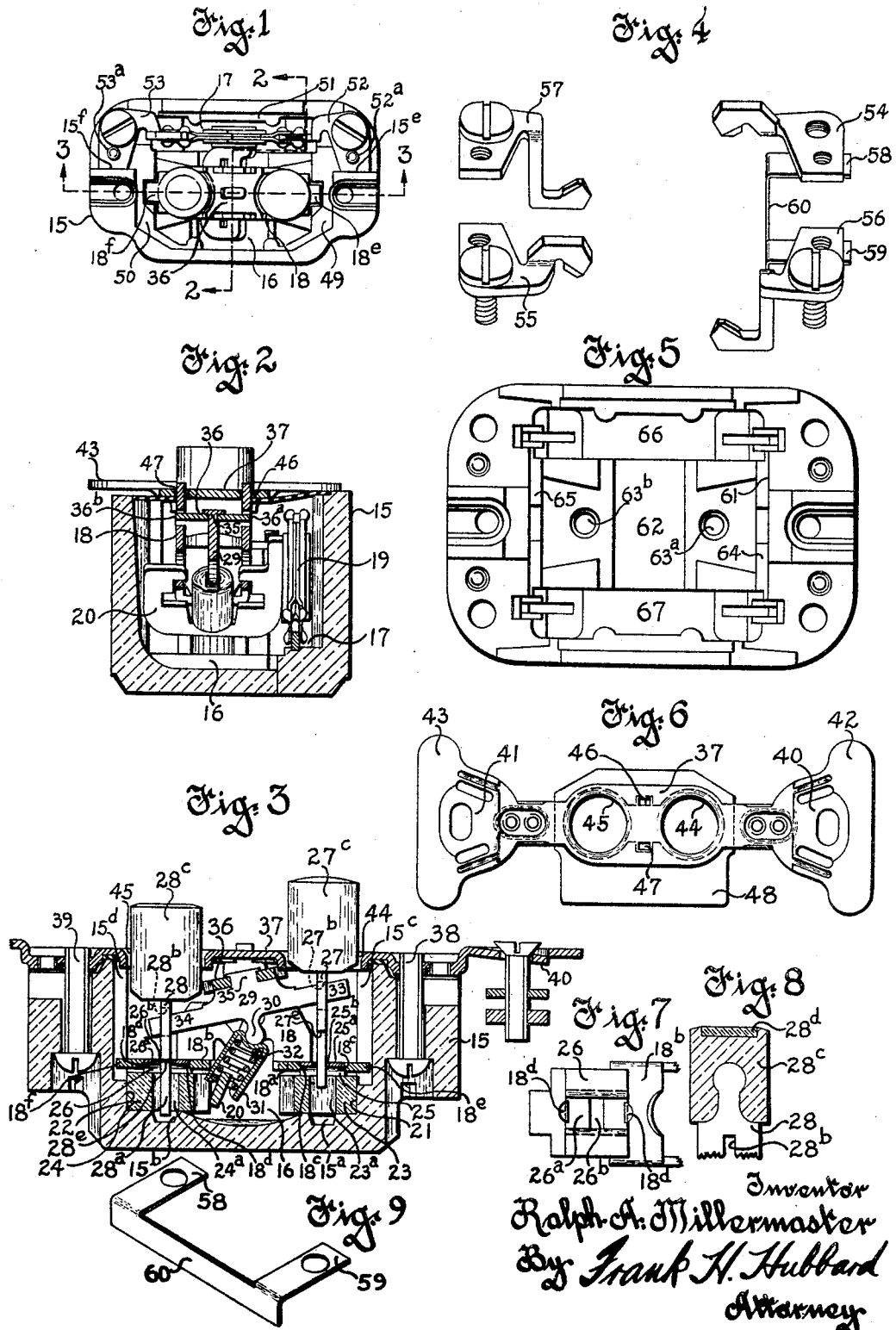
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ELECTRIC SNAP SWITCH OF THE PUSH BUTTON TYPE

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ELECTRIC SNAP SWITCH OF THE PUSH BUTTON TYPE

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This invention relates to improvements in electric snap switches of the push button type.

An object of the invention is to provide a rubber mounted snap switch of the push button type.

Another object is to utilize a switch frame and certain other switch parts which may be standard with respect to a snap switch of the toggle type, but wherein the base of the switch frame is modified in a simple manner for co-operation with the push button elements of the switch.

Another object is to provide a novel form of rubber mounting blocks for snap switches of the push button type.

Another object is to provide novel means for pivotally mounting the rock lever with respect to the switch frame.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawing illustrates certain embodiments of the invention which will now be described, it being understood that the embodiments illustrated are susceptible of modification in certain details of construction thereof without departing from the scope of the appended claims.

In the drawing, Figure 1 is a top plan view of an open-type single pole push button snap switch constructed in accordance with my invention, the supporting cross bar and the thin insulating cover plate or sheet being omitted for clarity of illustration.

Fig. 2 is an enlarged vertical section on the broken line 2—2 of Fig. 1, with the cross bar and cover plate in position.

Fig. 3 is a similar section on the line 3—3 of Fig. 1.

Fig. 4 is a perspective view of an arrangement of contact and terminal members to be used in a snap switch of the three-point type.

Fig. 5 is a top plan view of a cup-shaped molded insulating base to which the stationary contact and terminal members of Fig. 4 may be secured.

Fig. 6 is a top plan view of the supporting cross bar and the thin insulating cover plate for a single pole switch of the character illustrated in Figs. 1, 2 and 3.

Fig. 7 is a fragmentary bottom plan view

of the switch frame illustrating the manner of attaching the reducing plates thereto.

Fig. 8 is a fragmentary view showing in vertical section the manner of forming the "on" push button of a single pole or double pole switch, and

Fig. 9 is a perspective view of the bus bar or connection for a switch of the three-point type.

Referring to the drawing, the numeral 15 designates the cup-shaped base for a single pole push button snap switch adapted for flush mounting, said base being molded in one piece from insulating material of suitable character. Base 15 is recessed from its upper surface as shown at 16 and 17 to accommodate the switch frame 18 and the parts supported thereby, including the resilient or flexible bridging contactor elements 19. The switch frame 18 may be formed from a sheet metal blank identical with that disclosed in my Patent No. 1,796,854, dated March 17, 1931. The flat punched sheet metal carrier 20 of bail form may likewise be identical with the single pole carrier illustrated in my patent aforementioned, and the contactor elements 19 may be attached thereto but insulated therefrom in the manner disclosed in said patent.

The bottom of the base 15 is provided with shoulders forming dovetail recesses 21 and 22 within which the correspondingly shaped rubber blocks or cushions 23 and 24 are adapted to seat, the flat upper ends of said blocks extending above said shoulders to provide rests for the opposite end portions 18^a and 18^b of the flat base of frame 18.

While it is desirable from the production viewpoint to employ a switch frame 18 which is standard with respect to a toggle type snap switch of the character disclosed in my aforementioned patent, it is preferred to employ some means for reducing the size of the openings adjacent to the opposite ends of the frame base. Such means, as shown, may comprise a pair of plates 25 and 26 of relatively thin sheet metal, the upwardly offset portions 25^a and 26^a of which fit snugly within the standard size openings in the frame base, said upwardly offset portions

having openings 25^b and 26^b the walls of which cooperate with the reduced lower ends 27^a and 28^a of the punched sheet metal push button elements 27 and 28 to assist in guiding the latter for reciprocating movements in parallel relation to each other.

Moreover, it will be noted that the rubber blocks 23 and 24 are provided with passages 23^a and 24^a to provide clearance for said shanks 27^a and 28^a, the bottom wall of base 15 being provided with relatively shallow depressions or recesses 15^a and 15^b for a like purpose.

The lever or rock-bar 29 of the switch consists of a flat sheet metal punching the rounded intermediate projection 30 of which engages the indented upper end of a notched cylindrical spring enclosing member 31, the spring which engages an abutment on carrier 20 being shown at 32 in Fig. 3.

The opposite end portions of plates 25 and 26 are adapted to underlie the respective end portions 18^a and 18^b of the frame base, and said plates are rigidly and permanently secured to the frame base by upsetting the opposite end walls of the openings in the latter to provide integral lugs 18^c and 18^d which respectively underlie the upwardly offset portions 25^a and 26^a of said plates.

The oppositely extending arms 33 and 34 of lever 29 have interlocking or cooperative engagement with the push button members 27 and 28 by extending through suitable openings 27^b and 28^b provided in the latter (see Figs. 3 and 8).

Lever 29 is provided at its upper end with a projection 35 which is adapted to penetrate a correspondingly shaped opening in a flat punched sheet metal pivot member 36, said projection 35 being upset or riveted over member 36 to rigidly secure said parts to each other. Member 36 is provided at opposite ends thereof with pivot projections 36^a and 36^b, and member 36 with lever 29 attached thereto is preferably assembled with respect to frame 18 by forcibly inserting said member 36 between and spreading the upstanding parallel arms of the frame so that the pivot projections 36^a and 36^b will enter the aligned pivot openings provided in said frame arms.

The opposite ends of the frame base are provided with lugs 18^c and 18^d which cooperate with suitable vertical notches or recesses 15^c and 15^d to assist in positioning the frame with respect to base 15.

Extending across the open end of base 15 is a punched and stamped sheet metal supporting bar 37 which is rigidly secured to the base, as by means of screws 38 and 39. Said bar is provided with lugs 40 and 41 to provide for attachment thereof to an outlet box or similar support, and said bar may be provided with plaster engaging portions 42 and 43 of known form.

Bar 37 is provided with two substantially circular openings 44 and 45 surrounding which are inwardly extending flanges as shown to accommodate the cylindrical molded insulation ends 27^c and 28^c of the push button members 27 and 28 to assist in guiding the latter for reciprocating movements thereof in parallel relation to each other. Bar 37 is further provided with a pair of openings 46 and 47 to receive the reduced and shouldered upper ends of the parallel arms of the switch frame. By this arrangement the switch frame is held at the desired degree of pressure against the soft rubber blocks 23 and 24, and proper cooperation of the movable and stationary switch parts is insured.

While the switch aforescribed is of the open type, I prefer to provide means for substantially closing the upper surface thereof to protect the switch parts from dust or other foreign matter. Said means as shown may comprise a relatively thin punched fiber sheet 48 having a contour corresponding with the composite periphery of the ledge portions indicated at 49, 50 and 51 (Fig. 1), said sheet being perforated in the manner best illustrated in dotted lines in Fig. 6 to accommodate the flanges surrounding openings 44 and 45 and to partially surround the reduced upper end portions of the frame arms. Thus when bar 37 is secured in position plate 48 is clamped between the latter and base 15 at opposite ends of the sheet and between said bar and the shoulders formed on the frame arms at the intermediate portion of said sheet. Clamping of the intermediate portions of sheet 48 between bar 37 and the shoulders formed on the arms of the switch frame is a particularly advantageous feature in a rubber mounted switch mechanism of the character herein disclosed, since thereby metal to metal contact between the cross bar and the switch frame is minimized, with consequent reduction in the degree of sound or noise incident to operation of the switch.

As shown in Fig. 8 the insulating portion 28^c of push button element 28 is preferably provided with means to indicate that depression of such member will result in closing of the circuit controlled by the switch. Said means may comprise a pearl disk 28^d or a disk of other light colored material which is molded in or adherent to a recess formed in said insulating portion. Push button elements 27 and 28 are preferably provided with shoulders 27^e and 28^e to limit downward movement thereof with respect to the frame base.

The one-piece combined stationary contact and terminal members 52 and 53 are preferably identical with the corresponding elements disclosed in my patent aforementioned,—the terminal portions of said members having straight edge portions as shown which fit

snugly against suitable vertical shoulders 15° and 15' formed on base 15 whereby said members may each be fixed in position upon base 15 by means of a single securing screw 52^a, 53^a.

The stationary contact and terminal members 54 and 55 illustrated in Fig. 4 may be formed from a blank identical with that employed for formation of the member 53 in Fig. 1, the contact portions of members 54 and 55, however, being bent in a reverse direction, as compared with the contact portion of member 53. Members 56 and 57 in Fig. 4 are identical in form. Thus by employing a carrier having bridging contactors angularly aligned at the respective ends thereof (the same as in a double-pole switch of the character described in my patent aforementioned) it follows that in one position of the switch parts the contacts of members 55 and 56 will be bridged, and in the other position thereof the contacts of members 54 and 57 will be bridged.

To provide a common terminal connection for members 54 and 56 I employ a bus or conductor consisting of a substantially U-shaped punching the arms 58 and 59 of which are adapted to underlie the terminal portions of members 54 and 56 to be clamped in position by the securing screws (not shown) of the latter. The connecting portion 60 of said punching is bent downwardly at right angles to the arms 58 and 59 whereby the former is positioned closely adjacent to one of the end walls 61 of the recess 62 in base 63, suitable ledges 64 and 65 being provided to prevent any possibility of the switch frame coming in contact with portion 60 when the bus member is attached to either end of base 63.

Base 63 is otherwise generally similar to the base 15 of Fig. 1, except that the former is recessed, as at 66 and 67, on opposite sides of recess 62 to accommodate the double contactors of the switch and the opposite pairs of stationary contact and terminal members shown in Fig. 4. As will be apparent to those skilled in the art, the base 63 is adapted to be used for formation of a switch of the double pole type, by merely selecting the proper stationary contact and terminal members. For instance, by substituting for member 55 a member similar to member 57 but having the contact portion thereof bent in the reverse direction, and by substituting for member 56 a member similar to member 54 but having the contact portion thereof bent in the reverse direction, the contact arrangement for a double pole switch will be provided, it being necessary of course to omit the bus connection 58, 59, 60 and to provide a binding screw or other type of wiring element for member 54. The recesses 63^a, 63^b correspond in function to the recesses 15^a, 15^b of Fig. 3.

A punched sheet of insulation (not shown)

will likewise be employed in conjunction with a switch of the character illustrated in Figs. 4 and 5, such insulation sheet being similar to the sheet 48 (Fig. 6) but having a relatively wide wing on each side thereof to correspond with the relatively greater width of base 63.

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

1. In an electric snap switch, in combination, a punched sheet metal frame of substantially U-shape in cross section, the upstanding arms of said frame having aligned pivot openings, a flat punched sheet metal member interposed between said arms and having projecting end portions pivotally engaging the walls of said openings, said sheet metal member having an opening, a second flat punched sheet metal member having a projection penetrating said opening, said projection being upset to rigidly secure said members to each other, said second mentioned member having integral oppositely extending arms, and push button elements each comprising a flat punched sheet metal member having an opening whereby the same is adapted for interlocking engagement with one of said last mentioned arms, said push button elements having shank portions and said frame having openings to receive and guide said shank portions.

2. In an electric snap switch, in combination, a punched sheet metal frame of substantially U-shape in cross section, the upstanding arms of said frame having aligned pivot openings, a flat punched sheet metal member interposed between said arms and having projecting end portions pivotally engaging the walls of said openings, said sheet metal member having an opening, a second flat punched sheet metal member having a projection penetrating said opening, said projection being upset to rigidly secure said members to each other, said second mentioned member having integral oppositely extending arms, push button elements each comprising a flat punched sheet metal member having an opening whereby the same is adapted for interlocking engagement with one of said last mentioned arms, said push button elements having shank portions and said frame having openings to receive and guide said shank portions, and a pair of soft rubber blocks upon which said frame is adapted to rest, each of said rubber blocks having an opening to provide clearance for said shank portions of the respective push button elements.

3. In a push button snap switch, in combination, a punched sheet metal frame comprising a base portion having parallel upstanding arms formed integrally therewith, said arms having pivot openings formed therein, a flat punched sheet metal member having pivot projections formed on opposite ends thereof, said arms being sufficiently re-

silient to permit forcible insertion of said projections within said pivot openings whereby said parts are retained in assembled relation, and a switch actuating lever rigidly secured to said pivot member and depending from the same for oscillation in a plane substantially parallel to the arms of said frame, said lever having oppositely extending arms located within said plane.

4. In an electric snap switch, in combination, a cup-shaped molded insulating base, a pair of soft rubber blocks seated upon the bottom wall of said base, a sheet metal switch frame having a flat base portion seated upon said rubber blocks and having parallel arms the shouldered end portions of which extend upwardly beyond said base, a sheet metal supporting bar extending across the open face of said base and rigidly secured to the latter, said bar having openings to accommodate the end portions of said arms, a flat punched sheet of fibrous insulating material adapted to overlie the open face of said base, said sheet having end portions thereof clamped between said bar and the upper surface of said base, and said sheet also having intermediate portions thereof clamped between said bar and the shouldered end portions of said frame arms, whereby the metal to metal contact of said bar with said switch frame is minimized, for the purpose set forth.

In witness whereof, I have hereunto subscribed my name.

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