Oct. 18, 1932. W. C. TREGONING 1,883,128

ELECTRIC SNAP SWITCH

Filed Nov. 13, 1930

Fig. 1

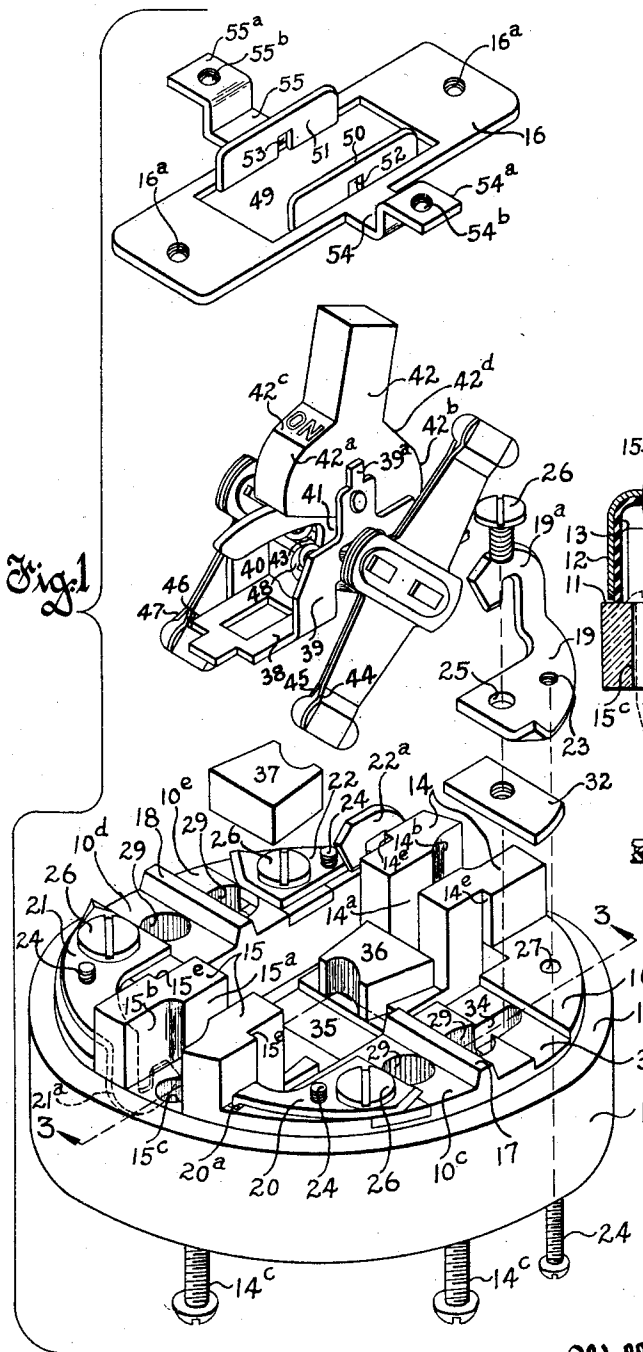


Fig. 2

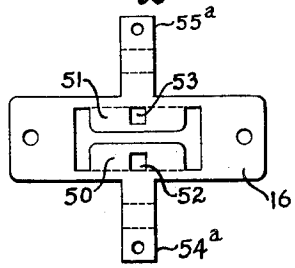


Fig. 3

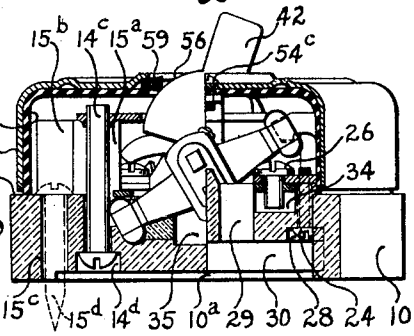


Fig. 4

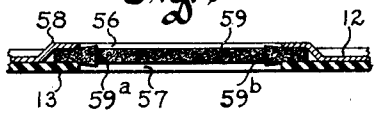
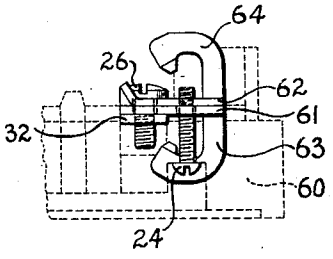


Fig. 5



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Patented Oct. 18, 1932 1,883,128

UNITED STATES PATENT OFFICE

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ELECTRIC SNAP SWITCH

Application filed November 13, 1930. Serial No. 495,387.

This invention relates to improvements in electric snap switches, and while not limited thereto the invention relates more particularly to toggle snap switches adapted for surface mounting.

An object of the invention is to generally improve and simplify the details of construction and the manner of assembling the switch parts.

Another object is to provide novel means for retaining the switch mechanism in assembled relation to the insulating base.

Another object is to provide novel means for anchoring the combined contact and terminal members to the base.

Another object is to provide improved means for attachment of the switch cover.

Another object is to provide means associated with the cover to render the latter substantially dust-proof.

Other objects and advantages of the invention will hereinafter appear.

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

In the drawing, Figure 1 is an enlarged perspective view of a toggle operated surface snap switch constructed in accordance with my invention,—certain of the parts being shown in separated relation, and the cover member being omitted for purposes of illustration.

Fig. 2 is a plan view of the metal blank from which the combined switch-retaining and cover-attaching yoke member may be formed.

Fig. 3 is a vertical sectional view, on the broken line 3—3 of Fig. 1, with the cover member in position, and showing the actual size of a twenty ampere switch as constructed in accordance with my invention.

Fig. 4 is a fragmentary sectional view of the cover member and the insulating lining therefor, showing the manner of securing the dust-proofing pad therebetween, and

Fig. 5 is a fragmentary phantom view illustrating the manner of attaching upper and lower contacts and their terminal portions to a slightly modified form of insulating base.

The switch mechanism herein disclosed is in general of the character described and claimed in the patent of Ralph A. Millermaster, No. 1,796,854 dated March 17, 1931.

Referring to the drawing, the numeral 10 designates a base molded from any suitable insulating material. Base 10 is provided with an annular ledge 11 against which the lower edge of the insulating lining 13 of an inverted cup-shaped cover member 12 is adapted to seat. Formed integrally with base 10 and extending upwardly therefrom at diametrically opposite points are pairs of projections 14 and 15, upon the flat upper ends of which a punched and stamped sheet metal yoke or retaining member 16 is adapted to seat. The projections 14 and 15 of the respective pairs are separated by relatively narrow channels 14^a and 15^a and relatively wide channels 14^b and 15^b, respectively.

Channels 14^b, 15^b provide clearance for the heads of suitable screws or bolts which pass through alined openings provided in the base, one of said openings being shown at 15^c and one of said screws being shown in dotted lines at 15^d in Fig. 3, whereby base 10 may be attached to a suitable support. Channels 14^a, 15^a provide clearance for the shanks of screws 14^c which respectively take into tapped openings 16^a in member 16. The heads of screws 14^c are preferably located in countersunk recesses 14^d in the upwardly offset lower surface 10^a of base 10.

The upper surface of base 10 is divided into four sections or segments by the projections 14, 15 and the barriers 17, 18 arranged at right angles thereto. The sections 10^b, 10^c, 10^d and 10^e of said surface are preferably located in a common plane, and the same have mounted thereon the terminal portions of the one-piece combined contact and terminal members 19, 20, 21 and 22, respectively. All of the members 19 to 22 are preferably formed from identical blanks, the members 19 and 22 having the contact portions 19^a and 22^a bent upwardly at right angles to the terminal portions thereof, and the members 20 and 21 hav-

ing the contact portions 20[a] and 21[a] bent downwardly at right angles to the terminal portions thereof. The outer end of each terminal portion is bent upwardly as shown to provide a guard or wiring purposes.

As best illustrated in connection with member 19, each of the terminal portions of members 19 to 22 is provided with a tapped opening 23 for cooperation with a securing screw 24, and each is also provided with a relatively larger opening 25 to provide clearance for the shank of a binding screw 26. Screws 24 penetrate base 10 through suitable passages or opening 27 (Fig. 1) and the heads of said screws are located in recesses 28 (Fig. 3) in the lower surface of said base. Wire receiving passages 29 lead from suitable recesses 30 (Fig. 3) in the lower surface of base 10 to the upper surface of the latter adjacent to the respective terminal portions of members 19 to 22.

Each of the sections 10[b], 10[c], etc., of the upper surface is provided with a channel or recess 31 adapted to receive a nut or plate 32 having a tapped opening 33 adapted for cooperative engagement by the shank of one of the binding screws 26,—base 10 having recesses 34 (Figs. 1 and 3) to provide clearance for said binding screws. The screws 24 thus provide for rigidly attaching the members 19 to 22 to the upper surface of the base, and the nuts 32 cooperate with said screws 24 to anchor said members against lateral movement relatively to the base. It will also be noted that the contact portions of members 19 to 22 fit snugly against the outer side walls of projections 14 and 15,—said projections being suitably notched or cut away, as indicated at 14[e] and 15[e] to provide clearance for the movable contactors of the switch mechanism.

Base 10 is provided in its upper surface with a relatively large substantially rectangular recess designated in general by the numeral 35. Seated in suitable notches of dovetail form on the bottom wall of recess 35 are a pair of soft rubber blocks or cushions 36 and 37, which are preferably of the form illustrated. Adapted to seat upon the blocks 36, 37 is a punched and stamped sheet metal frame 38 of substantially U-shape in cross section,—the parallel upstanding arms 39 and 40 of said frame being adapted to pivotally support an oscillating actuating lever 41 therebetween,—said lever having a handle portion 42 of insulating material molded thereon.

Also pivotally supported by arms 39 and 40 and adapted to embrace the latter is a flat punched sheet metal carrier 43 of substantially bail form, said carrier having pairs of resilient contactor elements 44, 45 and 46, 47 rigidly secured thereto but insulated therefrom. Suitable spring means 48 (including a spring enclosing cup or cylinder) is interposed between the actuating lever and the carrier. The frame 38 and the movable parts carried thereby may be constructed and assembled in the manner described in the aforementioned patent of Ralph A. Millermaster, and hence further description thereof is deemed unnecessary herein. It may be noted, however, that the contactor elements 44, 45 and 46, 47 are of greater dimensions herein to provide a switch of relatively high current carrying capacity.

The retaining member 16 as shown is provided with a substantially rectangular opening 49, at opposite sides of which are parallel upstanding lugs 50 and 51 which act to aline or guide the insulating handle portion 42 of the actuating lever. Lugs 50 and 51 are respectively provided with openings 52 and 53 which are arranged as shown to provide notches for reception of the reduced and shouldered upper ends (see 39[a]) of arms 39 and 40. Plate 16 thus acts to firmly hold the switch frame to the rubber blocks or cushions 36, 37, and the notches 52, 53 restrain the switch frame from upward or lateral movement relatively to base 10. The opposite reduced ends of the base portion of frame 38 are adapted to enter the channels 14[a], 15[a] to further assist in holding the switch mechanism against substantial lateral movement. On the other hand, the slight amount of lateral movement permitted by the arrangement illustrated is extremely advantageous, inasmuch as it insures proper engagement of the bridging contactor elements with the stationary contacts of the switch.

Formed integrally with plate 16 and extending laterally therefrom are a pair of arms 54 and 55, said arms having the end portions 54[a] and 55[a] thereof offset upwardly and provided with tapped openings 54[b] and 55[b] for cooperative engagement by the cover attaching screws, one of which is shown at 54[c] in Fig. 3.

The metal cover member 12 of inverted cup-shape is provided with a rectangular opening 56 to provide clearance for the handle portion 42,—the insulating lining 13 being provided with an opening 57 of corresponding size and shape. A portion of the top surface of cover member 12 surrounding opening 56 is offset upwardly as indicated at 58 to provide a panel or recess within which a pad 59 of felt or other loose-fiber material is adapted to fit, said pad being clamped in position by the insulating lining 13. Pad 59 is provided with an opening which is of smaller dimensions than the alined openings 56, 57 in the cover member 12 and lining 13, whereby the portions 59[a], 59[b] of the pad are adapted to bear against the surfaces 42[a], 42[b] of the switch handle to prevent entry of dust or other foreign matter into the switch casing. The switch handle may be provided with suitable legends on the surfaces 42[c], 42[d] thereof to

indicate "on" and "off" positioning of the switch parts.

In Fig. 5 I have illustrated an arrangement of contact and terminal members to be employed in constructing a surface snap switch of the three-point, four-way or other multiple circuit controlling type. In this form the insulating base, shown in dotted lines at 60, is slightly modified by downwardly offsetting the two sections of the upper surface of the base at one side of the latter. Superimposed one upon the other and upon said offset sections of the upper surface are the terminal portions 61 and 62 of a pair of combined contact and terminal members, the contact portion 63 of one of said members extending downwardly and the contact portion 64 of the other member extending upwardly. The upper terminal portion 62 is provided with a tapped opening for cooperation with securing screw 24, and the lower terminal portion 61 is provided with an opening to provide clearance for such screw. The anchoring nut 32 aforedescribed is employed, and each of the terminal portions 61 and 62 is provided with a clearance opening for the shank of binding screw 26 which takes into the tapped opening in nut 32. The arrangement of the stationary contact and terminal members at the other side of the switch base may correspond with the arrangement of members 19 and 22 aforedescribed, to provide a switch of the three-point type; and auxiliary contacts may be secured to the bottom of the recess 35 beneath the contact portions 19^a, 22^a if a four-way switch is desired,—suitable cross connections being provided between said auxiliary contacts (not shown) and the contact portions 19^a, 22^a.

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

1. In an electric snap switch, in combination, a molded insulating base having a recess formed in the upper surface thereof, a plurality of one-piece combined contact and terminal members the terminal portions of which are secured to said base and the contact portions of which extend into said recess, a plurality of soft rubber blocks seated upon the bottom wall of said recess, a U-shaped sheet metal frame having the flat base portion thereof seated upon said rubber blocks, a carrier pivotally supported by said frame, contactors secured to but insulated from said carrier, an actuating element pivotally supported by said frame, spring means interposed between said actuating element and said carrier, and a punched and stamped sheet metal plate extending across said recess and secured at its opposite ends to said base, said plate having an intermediate opening and parallel upstanding lugs on each side of said opening, said lugs having openings at the lower edges thereof providing notches the walls of which are adapted for engagement with the arms of said frame to retain the latter in assembled relation to said base.

2. In an electric snap switch, in combination, a molded insulating base having a recess formed in the upper surface thereof, a plurality of one-piece combined contact and terminal members the terminal portions of which are secured to said base and the contact portions of which extend into said recess, a plurality of soft rubber blocks seated upon the bottom wall of said recess, a U-shaped sheet metal frame having the flat base portion thereof seated upon said rubber blocks, a carrier pivotally supported by said frame, contactors secured to but insulated from said carrier, an actuating element pivotally supported by said frame, spring means interposed between said actuating element and said carrier, a punched and stamped sheet metal plate extending across said recess and secured at its opposite ends to said base, said plate having an intermediate opening and parallel upstanding lugs on each side of said opening, said lugs having openings at the lower edges thereof providing notches the walls of which are adapted for engagement with the arms of said frame to retain the latter in assembled relation to said base, and a pair of arms formed integrally with said plate and having end portions offset upwardly in a plane parallel thereto, said end portions having tapped openings therein, a cover member for the switch, and screws penetrating said cover member and engaging said tapped openings to secure the cover member to said insulating base.

3. In an electric snap switch, in combination, a molded insulating base having a recess formed in the upper surface thereof, a one-piece combined contact and terminal member having a contact portion thereof located within said recess and a terminal portion thereof superimposed upon said base, said terminal portion having a tapped opening, a single screw penetrating said base and engaging said opening to secure said member to the base, said base having a recess underlying said terminal portion, a nut having flat sides fitting snugly within said recess, and a binding screw having threaded engagement with said nut, said terminal portion having an opening providing clearance for the shank of said binding screw.

4. In an electric snap switch, in combination, a molded insulating base having a recess formed in the upper surface thereof, a pair of one-piece combined contact and terminal members, the terminal portions of said members being superimposed one upon the other and upon said surface of the base, the contact portions of said members being bent in opposite directions at right angles to the respective terminal portions thereof, the upper of said terminal portions having a tapped opening, a single screw penetrating said base

and said lower terminal portion and engaging said tapped opening to secure said members to said base, said base having a recess underlying said terminal portions, a nut of polygonal form fitting snugly within said recess and flush with said surface of the base, said terminal portions having clearance openings, and a binding screw extending through said openings and having threaded engagement with said nut, said nut and said securing screw being arranged to positively prevent movement of said contact and terminal members relatively to said base.

5. In an electric snap switch, in combination, a combined contact and terminal member having a terminal portion adapted to be fixed to a suitable base by means of a single fastening screw, said terminal portion being substantially flat and having a nut of polygonal form located thereunder, and a binding screw and shank of which is adapted to freely penetrate said terminal portion for engagement with said nut, said nut being adapted for engagement with the walls of a suitable recess in the base whereby said member is anchored to said base at a multiplicity of angularly spaced points against relative lateral movement.

6. A retaining yoke member for rubber mounted toggle snap switches adapted for surface mounting, said member comprising a punched and stamped sheet metal plate adapted to be secured at opposite ends thereof to a suitable insulating base, said plate having an intermediate substantially rectangular opening, parallel lugs formed integrally with said plate at said opening and extending upwardly at right angles thereto to provide a guide for a switch actuating lever, said lugs having openings providing notches for engagement with a switch frame to retain the latter in a given operative position, and a pair of arms formed integrally with said plate and extending laterally therefrom, said arms having end portions offset upwardly in a plane parallel to the main body of said plate and adapted for cooperation with suitable cover attaching means.

In witness whereof, I have hereunto subscribed my name.

WILLIAM C. TREGONING.

CERTIFICATE OF CORRECTION.

Patent No. 1,883,128. October 18, 1932.

WILLIAM C. TREGONING.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 5, for "or" read "for" ; and line 14, for "opening" read "openings"; page 4, line 21, claim 5, for "and" read "the"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 11th day of April, A. D. 1933.

M. J. Moore,

(Seal) Acting Commissioner of Patents.