

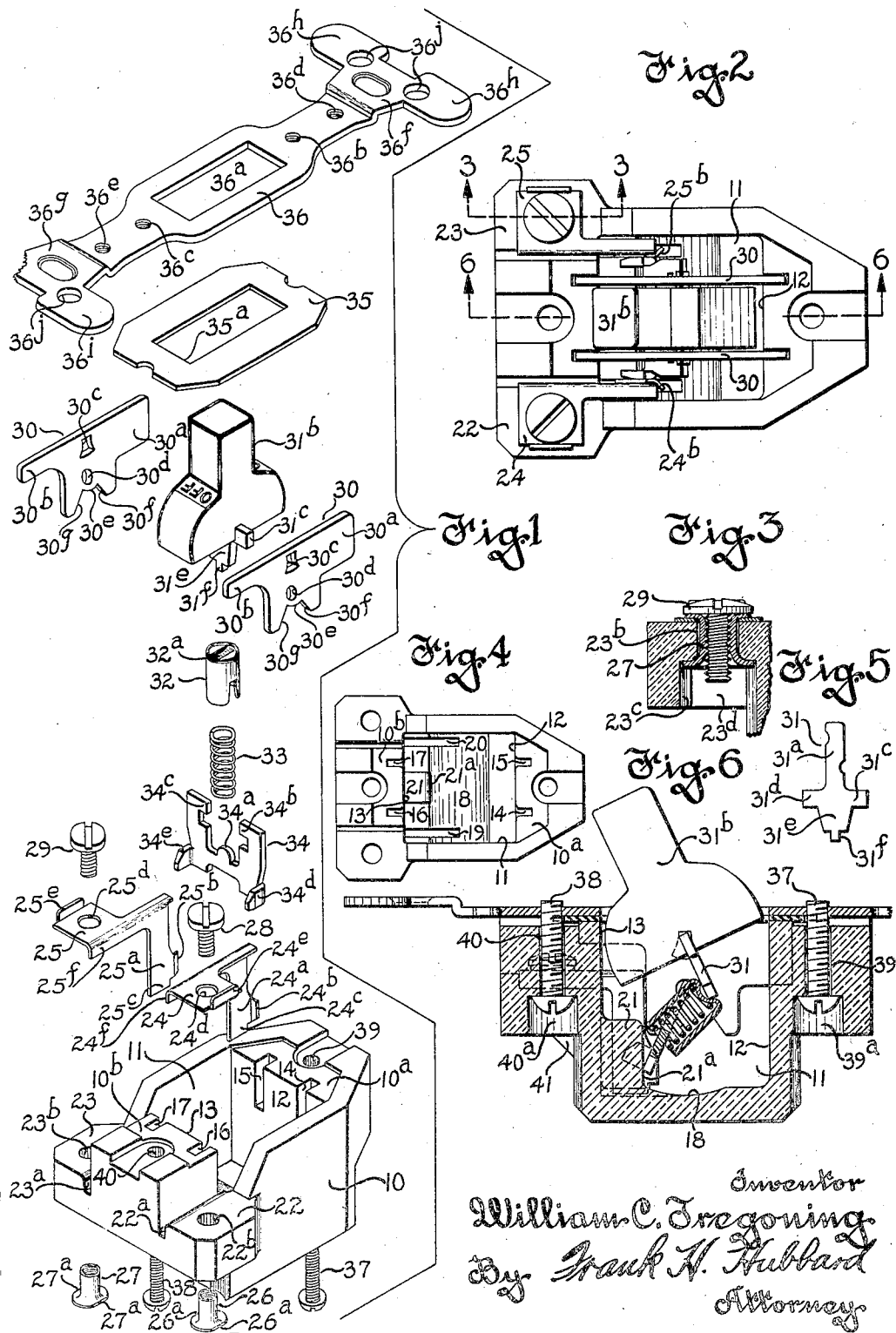
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ELECTRIC SWITCH

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1,924,818

## ELECTRIC SWITCH

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9 Claims. (Cl. 200—67)

This invention relates to improvements in electric switches, and although certain features are not limited thereto the invention relates more particularly to improvements in toggle-type snap switches adapted for flush mounting.

An object of the invention is to generally improve and simplify the details of construction, assembly and operation of electric switches of the aforementioned character.

Another object is to provide a novel interlocking arrangement of the frame parts and the movable elements of the switch mechanism whereby the same may be inserted as a unit within a suitably recessed insulating base.

Another object is to provide a novel form of bridging contactor for the switch.

Another object is to provide a novel form of insulating base for the switch mechanism.

Another object is to provide novel means for supporting and alining the switch mechanism in flush relation to a wall or other support.

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 invention is susceptible of embodiment in other forms without departing from the scope of the appended claims.

In the drawing, Figure 1 is a perspective view showing the several parts of the switch in separated relation.

Fig. 2 is a top plan view of the switch, with the supporting and insulating plates removed for purposes of illustration.

Fig. 3 is an enlarged fragmentary sectional view, on the line 3—3 of Fig. 2, showing the manner of securing the wiring terminal elements in position on the base.

Fig. 4 is a top plan view of the insulating base with the switch parts omitted.

Fig. 5 is an elevational view of the punched sheet metal actuating lever of the switch, and

Fig. 6 is a vertical sectional view, on the line 6—6 of Fig. 2, the insulating and supporting plates being shown in position.

Referring to the drawing, the numeral 10 designates a molded insulating base, preferably porcelain, which is provided with a relatively deep substantially rectangular main recess 11 opening to the upper surface thereof. The opposite end walls 12 and 13 of recess 11 are provided with pairs of notches or recesses 14, 15 and 16, 17,—the pairs of notches 14, 16 and 15, 17 being longitudinally alined with each other, and all of said

notches opening to the upper surface of base 10 to provide for vertical insertion of the switch frame plates as hereinafter set forth.

The bottom wall of recess 11 is provided with a concavity 18 intermediate the ends thereof to insure proper clearance for the oscillating contactor of the switch. Said bottom wall is also provided at one end thereof with a pair of parallel grooves or recesses 19 and 20 for a purpose to be described. Located between the grooves 19 and 20 and formed integrally with the end wall 13 and the bottom wall of recess 11 is a barrier or projection 21. The vertical surface 21<sup>a</sup> of projection 21 is preferably glazed or otherwise smoothed to reduce or minimize friction between the same and certain of the movable parts of the switch.

Base 10 is provided with a pair of downwardly offset ledges 22 and 23, and the terminal portions 24 and 25 of a pair of combined contact and terminal members are adapted to overlie said ledges as best illustrated in Fig. 2). The contact portions 24<sup>a</sup> and 25<sup>a</sup> are initially bent downwardly at angles substantially less than ninety degrees with respect to terminal portions 24 and 25; said contact portions having tips 24<sup>b</sup> and 25<sup>b</sup> flared outwardly with respect to each other, and the same are also provided with bottom lugs 24<sup>c</sup> and 25<sup>c</sup> to fit within the grooves 19 and 20, respectively, said bottom lugs being normally biased into engagement with the adjacent vertical walls of said grooves to insure proper spacing of the contact portions 24<sup>a</sup> and 25<sup>a</sup>.

Also bent downwardly from the terminal portions 24 and 25 are flanges 24<sup>d</sup>, 25<sup>d</sup>,—the base 10 being provided adjacent to the ledges 22 and 23 with grooves or recesses 22<sup>a</sup>, 23<sup>a</sup> to accommodate said flanges. Ledges 22 and 23 are provided with openings 22<sup>b</sup>, 23<sup>b</sup>, the lower ends of which open to upwardly countersunk recesses, one of which is shown at 23<sup>c</sup> in Fig. 3. Also as indicated at 23<sup>d</sup>, in Fig. 3 said recesses are provided with parallel walls for cooperation with the parallel edges 26<sup>a</sup>, 27<sup>a</sup> of the flanges upon hollow metal eyelets 26 and 27, whereby rotation of said eyelets within said openings is prevented.

The shanks of said eyelets project upwardly through openings 22<sup>b</sup>, 23<sup>b</sup> and through the respective registering openings 24<sup>d</sup>, 25<sup>d</sup> in terminal portions 24 and 25 and are upset over the latter as shown in Fig. 3 to rigidly and permanently secure said parts to base 10. Said eyelets are interiorly threaded as shown for cooperation with the usual binding screws 28 and 29. Terminal portions 24 and 25 may be provided with lugs 24<sup>e</sup>, 25<sup>e</sup> bent upwardly at right angles therefrom to

act as guards for the ends of the circuit wires, not shown. As will be apparent the combined contact and terminal members are formed right- and left-hand from blanks of identical shape.

- 5 The switch frame comprises a pair of flat punched sheet metal plates 30 of identical form, said plates being provided with straight upper edges as shown to lie flush with the surfaces 10<sup>a</sup>, 10<sup>b</sup> which are offset downwardly to a slight extent  
10 with respect to the upper surface of base 10. Plates 30 are preferably of different widths at opposite ends thereof, as indicated at 30<sup>a</sup> and 30<sup>b</sup>,—the notches 14, 15 and 16, 17 being of different depths to accommodate said ends respective-  
15 ly. Each plate 30 is provided at substantially the mid-point of its length and adjacent to the upper edge thereof with an opening 30<sup>c</sup>, said opening as shown having a relatively short horizontal upper edge, a relatively longer arcuate lower edge, with  
20 angular edges extending therebetween. Vertically alined with each opening 30<sup>c</sup> is a relatively smaller substantially circular opening 30<sup>d</sup>, the material of the plate being cut away below the opening 30<sup>d</sup> to provide an arcuate edge 30<sup>e</sup> and  
25 outwardly divergent angular edges 30<sup>f</sup> and 30<sup>g</sup>.

- The actuating lever of the switch comprises a flat punched sheet metal plate of substantially the form shown at 31 in Fig. 5. Said plate is provided with a relatively narrow upper end 31<sup>a</sup>  
30 which is preferably of irregular contour, the same having molded thereabout an insulating knob or handle 31<sup>b</sup> of usual form. Formed integrally with plate 31 and projecting outwardly on opposite sides of knob 31<sup>b</sup> are a pair of lugs 31<sup>c</sup> and 31<sup>d</sup>  
35 the upper edges of which are adapted to pivotally engage the upper edges of openings 30<sup>c</sup>. Located between lugs 31<sup>c</sup>, 31<sup>d</sup> and extending downwardly with respect thereto is a portion 31<sup>e</sup> the lower end of which is provided with a relatively narrow  
40 projection 31<sup>f</sup>. Projection 31<sup>f</sup> is adapted to fit within an arcuate depression 32<sup>a</sup> of corresponding width at the upper end of a cup-shaped member 32 which is adapted to substantially enclose the coiled compression spring 33. The lower end  
45 of spring 33 is adapted to engage the abutment 34<sup>a</sup> formed upon the flat punched sheet metal member 34, which is preferably of substantially U-shape as shown. The inner edges of the arms of said member are notched adjacent to the upper  
50 ends thereof to provide lugs 34<sup>b</sup>, 34<sup>c</sup> which bear within the openings 30<sup>d</sup> in the frame plates,—the portions of said arms below said notches being adapted for engagement with the aforementioned edges 30<sup>f</sup> and 30<sup>g</sup> to limit movements of said  
55 member 34 in opposite directions respectively. Member 34 is provided at the opposite lower ends thereof with tips 34<sup>d</sup> and 34<sup>e</sup> bent inwardly at substantially right angles thereto,—the outer sides of said tips being swaged or otherwise  
60 beveled as indicated to facilitate engagement thereof with the stationary contact portions 24<sup>a</sup>, 25<sup>a</sup> as described.

In practice the frame plates 30, actuating lever 31, 31<sup>b</sup>, member 32, spring 33 and member 34 are assembled with respect to each other, and said assembly is then inserted as a unit within the recess in base 10,—the combined contact and terminal members having previously been attached to said base. The parts will then be arranged as shown in Fig. 2. A punched plate 35 of insulating material is then seated upon the depressed surfaces 10<sup>a</sup> and 10<sup>b</sup> of the base,—said plate having an opening 35<sup>a</sup> to provide clearance for the knob 31<sup>b</sup> of the actuating lever. Superimposed upon plate 35 is a punched sheet metal

supporting plate 36, said plate 36 having a similar opening 36<sup>a</sup> to accommodate the actuating lever of the switch. Plate 36 is provided with tapped openings 36<sup>b</sup>, 36<sup>c</sup> to accommodate the shanks of screws 37 and 38 which extend upwardly through suitable openings 39 and 40 at the opposite ends of base 10. The lower ends of said openings may be countersunk, as indicated at 39<sup>a</sup> and 40<sup>a</sup> in Fig. 6; and when the parts are completely assembled in the manner as described said countersunk recesses 39<sup>a</sup>, 40<sup>a</sup> may be filled with a suitable wax (not shown) to prevent accidental loosening of the screws.

Supporting plate 36 is also provided with the usual tapped openings 36<sup>d</sup>, 36<sup>e</sup> to accommodate the securing screws of a flush plate or the like. The usual lugs 36<sup>f</sup>, 36<sup>g</sup> are also provided to permit attachment of the device to an outlet box. Formed integrally with the respective lugs 36<sup>f</sup> and 36<sup>g</sup> and projecting in alinement with each other from the opposite outer ends thereof, and at substantially right angles to the longitudinal center line of plate 36, are pairs of wall- or plaster-engaging elements 36<sup>h</sup> and 36<sup>i</sup>. Each of said elements is provided at its inner end and between the sides thereof with an opening 36<sup>j</sup>, preferably circular in contour, whereby the elements may be readily detached individually from the respective lugs 36<sup>f</sup>, 36<sup>g</sup> by bending the former with respect to the latter. While the elements 36<sup>h</sup>, 36<sup>i</sup> are thus readily detachable at will, it will be noted that the resistance thereof jointly to bending strains is substantially equal to the bending resistance of all other parts of plate 36. Hence said elements will function properly to insure flush alinement of the electrical device supported by plate 36 with respect to a wall or other supporting surface.

The enlarged lower end of the molded knob 31<sup>b</sup> may be provided with suitable legends as shown to indicate the on and off positions of the switch. Also as will be noted the end of the base 10 carrying ledges 22 and 23 is of relatively less depth than the main body thereof, and if desired suitable fillets or reinforcements may be provided for said end portion, as indicated at 41 in Fig. 6.

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

1. In an electric snap switch, the combination with a one-piece molded insulating base having a substantially rectangular main recess therein opening to the upper surface thereof, said base also having a pair of relatively shallow supplemental recesses formed in the bottom wall of said main recess and arranged in parallel spaced relation to the side walls of the latter, downwardly offset ledges formed on said base at one end thereof, said base having parallel grooves formed therein adjacent to said ledges respectively, a pair of resilient one-piece combined contact and terminal members having the terminal portions thereof superimposed upon said ledges respectively, the contact portions of said members being bent downwardly with respect to said terminal portions at angles substantially less than ninety degrees, the lower ends of said contact portions being engaged with the respective adjacent vertical walls of said supplemental recesses to stress said contact portions and to normally maintain the same in definitely spaced relation, flanges formed on said terminal portions by the aforementioned bending operation, said flanges engaging the walls of said parallel grooves to assist in positioning said terminal portions, and a pair of metal eyelets penetrating said ledges and the

respective terminal portions and upset over the latter to rigidly and permanently secure the same to said base, said eyelets being tapped to accommodate suitable binding screws.

2. In an electric snap switch, in combination, a pair of separate flat punched sheet metal frame plates, each of said plates having a pair of vertically spaced bearing openings formed therein, an actuating lever comprising a flat punched sheet metal member having integral projections adapted to pivotally engage the upper openings in said plates respectively, a contactor consisting of a flat punched sheet metal member having integral projections adapted to pivotally engage the lower openings in said plates respectively, and a coiled compression spring interposed between the lower end of said lever and said contactor to effect snap movements of the latter in opposite directions respectively upon corresponding movements of the former, said spring acting to retain all of said parts in assembled relation to each other whereby the same may be inserted as a unit within a suitably recessed insulating base.

3. In an electric snap switch, in combination, a molded insulating base having a relatively deep recess formed therein and opening to the upper surface thereof, a plurality of resilient one-piece combined contact and terminal members secured to said base and having the contact portions thereof located within said recess, said base having two pairs of longitudinally aligned grooves opening to the upper surface thereof and to the end walls of said recess, a pair of separately formed flat punched sheet metal frame plates, each of said plates having a pair of vertically spaced bearing openings formed therein, an actuating lever comprising a flat punched sheet metal member pivotally engaging the upper openings in said plates respectively, a contactor comprising a flat punched sheet metal member pivotally engaging the lower openings in said plates respectively, a coiled compression spring interposed between the lower end of said lever and said contactor to effect snap movements of the latter in opposite directions respectively upon corresponding movements of the former, said spring acting to retain said frame and contactor parts in assembled relation to each other, said frame plates being thereby adapted for insertion jointly within the aligned grooves aforementioned in a relation substantially flush with the upper surface of said base, a support plate secured to said base and adapted to overlie said frame plates whereby the latter and the parts carried thereby are rigidly attached to said base, and an insulating member underlying said support plate to insulate the latter from said frame plates.

4. In an electric snap switch, in combination, a molded insulating base having a relatively deep recess formed therein and opening to the upper surface thereof, a plurality of resilient one-piece combined contact and terminal members secured to said base and having the contact portions thereof located within said recess, said base having two pairs of longitudinally aligned grooves opening to the upper surface thereof and to the end walls of said recess, a pair of separately formed flat punched sheet metal frame plates, each of said plates having a pair of vertically spaced bearing openings formed therein, an actuating lever comprising a flat punched sheet metal member pivotally engaging the upper openings in said plates respectively, a contactor comprising a flat punched sheet metal member pivotally engaging the lower openings in said plates re-

spectively, and a coiled compression spring interposed between the lower end of said lever and said contactor to effect snap movements of the latter in opposite directions respectively upon corresponding movements of the former, said spring acting to retain said frame and contactor parts in assembled relation to each other, said frame plates being thereby adapted for insertion jointly within the aligned grooves aforementioned in a relation substantially flush with the upper surface of said base.

5. In combination, a one-piece flat punched sheet metal frame plate for electric snap switches of the toggle type, said plate having a closed bearing formed therein adjacent to the upper edge thereof, said bearing having a relatively short horizontal upper wall and a relatively longer arcuate lower wall with angular side walls therebetween, said plate having a substantially circular bearing opening formed therein below said first mentioned bearing and vertically aligned with the latter, said plate having a notch formed therein below said second mentioned opening, said notch having an arcuate end wall arranged concentrically with respect to said second mentioned opening, said notch also having outwardly diverging side walls to act as abutments for the purpose set forth, and an insulating base, said base having shoulders formed thereon upon which said frame plate is directly and individually supported.

6. As an article of manufacture, a unitary flat punched sheet metal frame plate for electric snap switches of the toggle type, said plate having a closed bearing formed therein adjacent to the upper edge thereof, said bearing having a relatively short horizontal upper wall and a relatively longer arcuate lower wall with angular side walls therebetween, a substantially circular bearing opening formed in said plate below said first mentioned bearing and vertically aligned with the latter, a notch formed in said plate below said second mentioned opening, said notch having an arcuate end wall arranged concentrically with respect to said second mentioned opening, said notch also having outwardly diverging side walls to act as abutments, for the purpose set forth, and said plate having opposite end portions of different depth or size to fit within correspondingly dimensioned grooves or recesses in a suitable supporting base.

7. In combination, a one-piece flat punched sheet metal frame plate for electric snap switches of the toggle type, said plate having a closed bearing formed therein adjacent to the upper edge thereof, said bearing having a relatively short horizontal upper wall and a relatively longer arcuate lower wall with angular side walls therebetween, said plate having a substantially circular bearing formed therein below said first mentioned bearing and vertically aligned with the latter, said plate having a notch formed therein below said second mentioned opening, said notch having an arcuate end wall arranged concentrically with respect to said second mentioned opening, said notch also having outwardly diverging side walls to act as abutments, for the purpose set forth, said plate having opposite end portions of different depth or size, and a molded insulating base having a recess, the opposed walls of said recess having longitudinally aligned vertical grooves formed therein to directly support said frame plate with the upper edge of the latter in substantially flush relation to the upper surface of said base.

8. In an electric snap switch, in combination, a porcelain base having a substantially rectangular recess formed therein and opening to the upper face thereof, a barrier located within said  
5 recess and formed integrally with the bottom wall and one of the end walls of the latter, resilient stationary contacts positioned within said recess adjacent to said end wall and on opposite sides of said barrier, a substantially rigid contactor  
10 pivotally supported with respect to said base for movement into and out of bridging engagement with said contacts, an oscillatable actuating lever, a coiled compression spring interposed  
15 between said lever and said contactor, a metal cup substantially enclosing said spring to prevent excess buckling of the latter, said metal cup being engageable with a vertical face of said

barrier during movement of said lever from one extreme position to the other whereby movement of said contactor is positively initiated, and a glazed coating on said face of the barrier to minimize friction between the same and said cup. 80

9. As an article of manufacture, a molded porcelain base for electric snap switches and the like, said base having a relatively deep substantially rectangular recess formed therein and opening  
85 to the upper surface thereof, a barrier located within said recess and formed integrally with the bottom wall and one of the end walls of the latter and a glazed coating formed on one vertical face of said barrier, all other portions of  
90 said base being in unglazed condition.

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