

April 23, 1935.

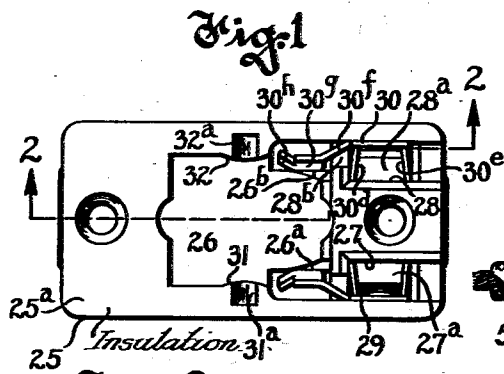
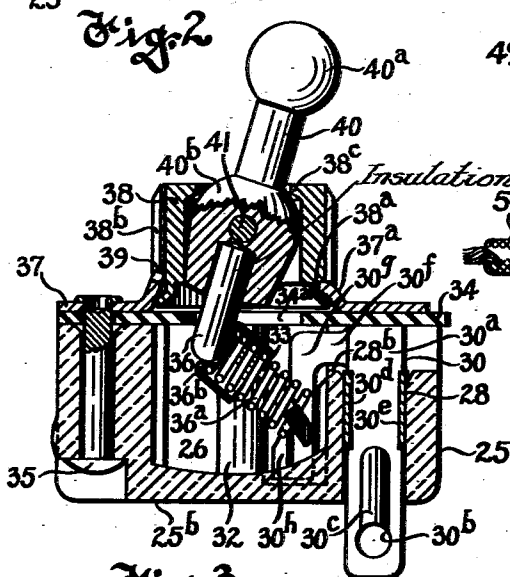
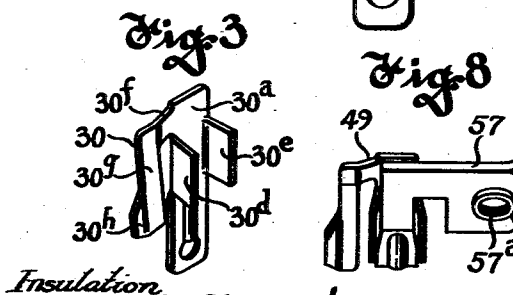
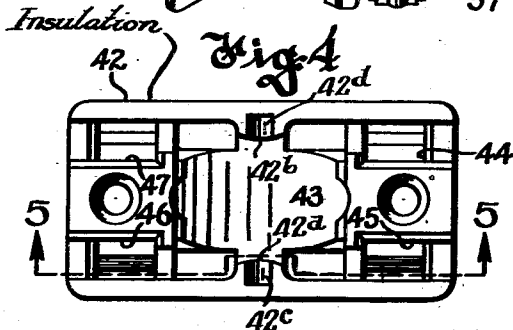
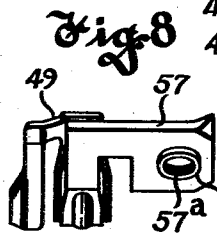
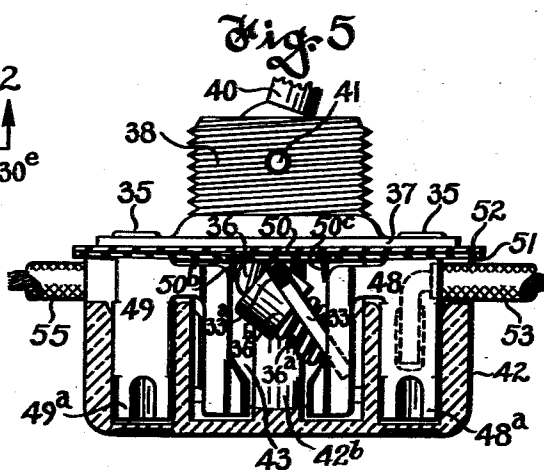
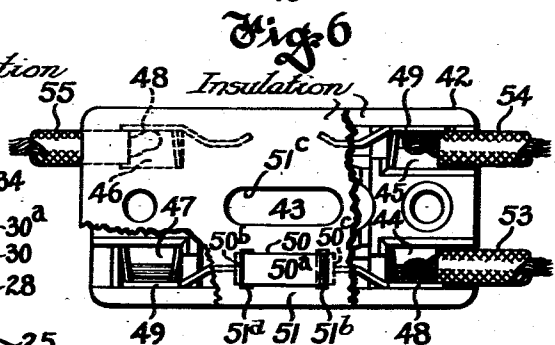
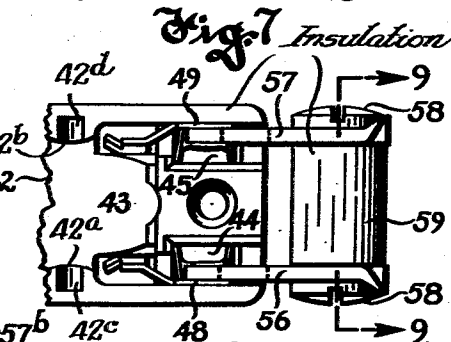
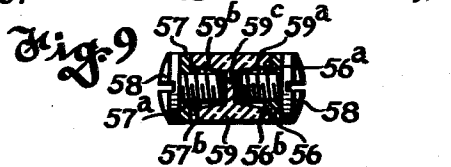
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1,998,962

ELECTRIC SNAP SWITCH

Filed June 15, 1933

2 Sheets-Sheet 1



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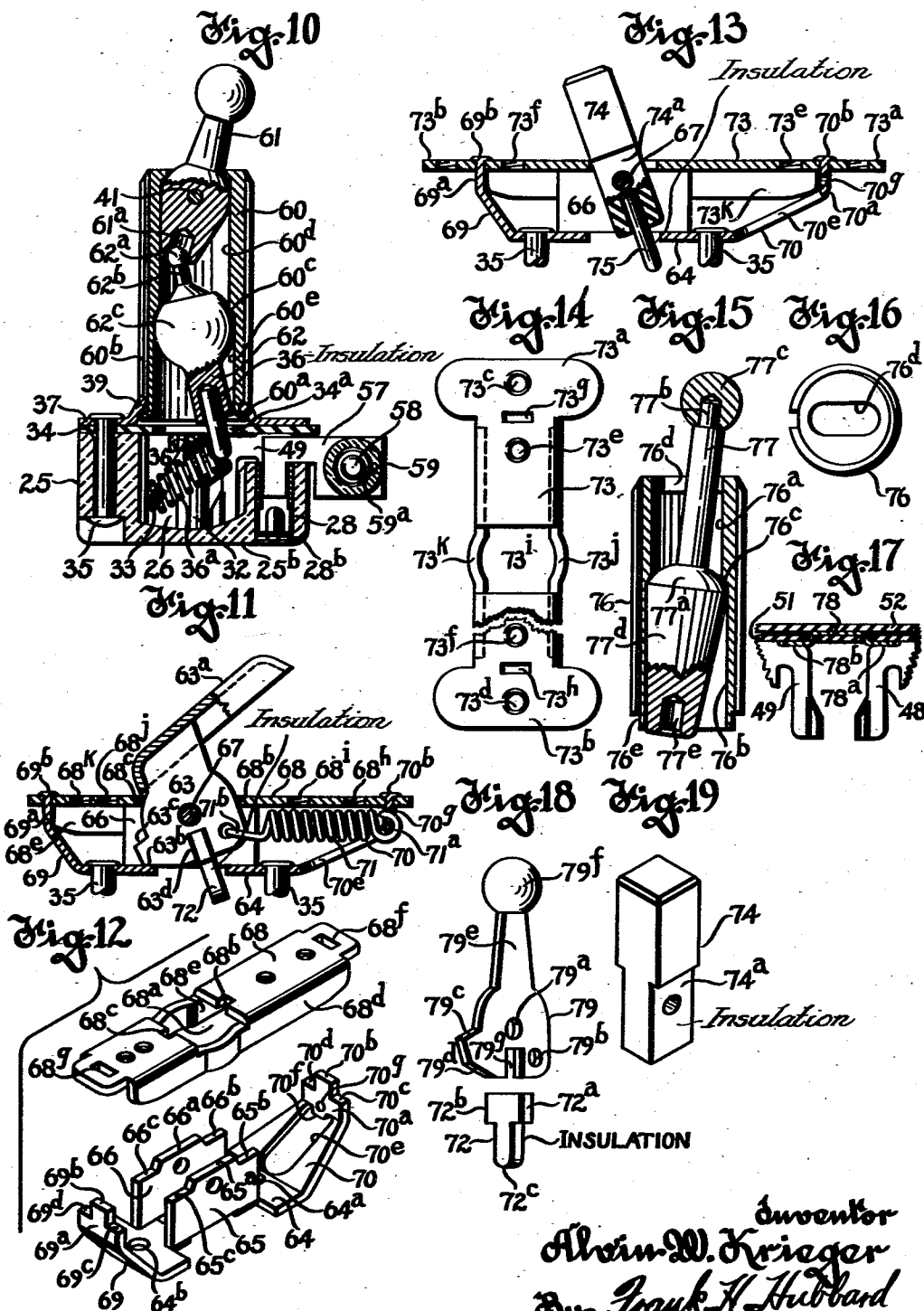
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ELECTRIC SNAP SWITCH

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

1,998,962

ELECTRIC SNAP SWITCH

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Application June 15, 1933, Serial No. 675,949

15 Claims. (Cl. 200—67)

This invention relates to improvements in electric snap switches.

An object of the invention is to improve the construction and arrangement of the parts of switches of the aforementioned character.

Another object is to provide a novel form of combined contact and terminal members for the switch.

Another object is to provide a novel form of molded insulating supporting base cooperable with the terminal elements to provide for bottom, end or concealed wiring of the switch.

Another object is to effect a novel arrangement of parts to provide a switch of the three-point type.

Another object is to provide novel forms of supporting means to adapt the switch for flush mounting in an outlet box of standard size, or for concealed mounting in a tool handle or the like.

Another object is to provide novel means for insulating and reinforcing the end wiring terminals of the switch.

Another object is to provide improved forms of actuating elements for the switch.

Other objects and advantages of the invention will hereinafter appear.

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

The switches illustrated are in general of the character disclosed in my Patent No. 1,905,914, to which reference may be had for a more detailed description of certain features thereof which are common to the present devices.

In the drawings, Figure 1 is a top plan view of the molded insulating base of an electric snap switch embodying my invention,—the one-piece combined contact and wiring terminal elements being shown in assembled position with respect thereto.

Fig. 2 is a vertical sectional view, on the broken line 2—2 of Fig. 1,—but showing all of the switch parts in assembled relation.

Fig. 3 is a detail perspective view of a one-piece combined contact and wiring terminal member constructed in accordance with my invention.

Fig. 4 is a top plan view of a modified form of molded insulating base adapted to provide a switch of the single-pole, double-throw type, or a switch of the three-point type as illustrated in Figs. 5 and 6.

Fig. 5 is a vertical sectional view, on the broken line 5—5 of Fig. 4, showing parts arranged to provide a switch of the three-point or multiple-circuit-controlling type.

Fig. 6 is a top plan view of certain of the switch parts shown in Fig. 5,—the lower insulating cover plate being partly broken away to illustrate certain of the combined contact and terminal members, and one manner of attaching the circuit wires.

Fig. 7 is a fragmentary top plan view of a base with a special form of terminal elements to provide for end wiring of the switch.

Fig. 8 is a detail perspective view of one of the contact and wiring terminal assemblies shown in Fig. 7.

Fig. 9 is a sectional view, on the line 9—9 of Fig. 7.

Fig. 10 is a vertical sectional view of a switch having combined contact and terminal members like those illustrated in Figs. 7, 8 and 9, but having a relatively long bushing and a special form of actuating means.

Fig. 11 is a view, partly in vertical section and partly in side elevation, showing a modified form of operating lever, together with a special arrangement of sheet metal parts for supporting the same.

Fig. 12 is a perspective view, in separated relation, of certain of the sheet metal parts shown in Fig. 11.

Fig. 13 is a view similar to Fig. 11, but showing a modified form of operating lever, and a top plate to provide for flush mounting the switch in an outlet box of usual form.

Fig. 14 is a top plan view of fragments of the top plate shown in Fig. 13.

Fig. 15 is a view, partly in vertical section and partly in side elevation, of another form of relatively long bushing and the operating lever associated therewith.

Fig. 16 is a top plan view of the bushing shown in Fig. 15.

Fig. 17 shows a modified form of connector or bus for use in a three-point switch of the character illustrated in Figs. 5 and 6.

Fig. 18 is a detail perspective view of a lever in general like that shown in Fig. 11, but with a modified form of operating knob or handle, and

Fig. 19 is a detail perspective view of the operating lever shown in Fig. 13.

Referring first to Figs. 1 and 2, the numeral 25 designates a base molded from a suitable insulating material. I prefer to employ material of the phenol-formaldehyde condensation type, 55

such as that sold under the trade name of "bakelite". Base 25 is provided with a relatively large substantially rectangular recess 26 and a pair of relatively smaller substantially rectangular recesses 27 and 28,—all of said recesses opening to the upper surface 25^a of said base. Recesses 27 and 28 have portions of different depths whereby horizontal shoulders 27^a and 28^a are provided,—the relatively deeper portions of said recesses 27 and 28 having bottom walls located closely adjacent to the bottom surface 25^b of base 25, whereby relatively thin insulating diaphragms are formed integrally with the base (as best illustrated at 28^b in Fig. 10). These diaphragms may be readily removed by broaching to accommodate bottom wiring terminal elements of the one-piece combined contact and wiring terminal members 29 and 30 shown in Figs. 1 and 2.

Said members 29 and 30 may be formed right-hand and left-hand from blanks of identical form. Left-hand member 30 comprises a substantially flat terminal portion 30^a, having an opening 30^b formed therein to facilitate attachment of a circuit wire, an elongated boss or bead 30^c being formed on said terminal portion to provide for a relatively close fit thereof within the opening formed by broaching as aforescribed. Formed integrally with portion 30^a are a pair of lug 30^d and 30^e which are bent into approximate parallelism with respect to each other, thus providing a section of channel form which is adapted for a snug fit within recess 28. The lower horizontal edges of lugs 30^d, 30^e are adapted to seat against the shoulder 28^a (Fig. 1) to insure proper positioning of element 30^a within said recess 28. Formed integrally with element 30^a and offset downwardly from the upper end of the latter is a connecting portion 30^f,—the contact element 30^g being formed integrally with said connecting portion 30^f and depending from the latter in a plane substantially parallel to element 30^a. The enlarged lower end 30^h of element 30^g is bent or flared outwardly to facilitate engagement thereof by the movable contactor of the switch.

Recess 28 communicates with recess 26, as by means of notch 28^b,—the latter providing clearance for the connecting portion 30^f aforementioned. Member 29 is formed as shown from a blank identical with that employed for member 30. The lower ends of the contact elements are spaced upwardly from the bottom wall of recess 26 (as indicated in dotted lines in Fig. 2),—said ends being biased toward each other, but the same are normally held in spaced relationship as by means of a pair of vertical shoulders 26^a, 26^b. Ribs 31, 32 are provided in the opposed walls of recess 26,—the upper ends of said ribs being provided with open bearings 31^a, 32^a to accommodate the integral pivot lugs of a substantially U-shaped flat punched sheet metal contactor 33,—one of the lugs being shown at 33^a in Fig. 5. Said contactor may be of the form illustrated more in detail in my Patent No. 1,905,914 aforementioned. Also as shown in said patent the switch assembly comprises a flat punched plate 34 of insulating material,—said plate having openings to accommodate the rivets (one of which is shown at 35), and a relatively narrow straight-sided slot 34^a to act as a guide and provide clearance for the insulating pin or actuating element 36. A punched and stamped sheet metal top plate 37 is adapted to overlie and clampingly engage the insulating plate 34 when the rivets 35 are upset over the former.

Top plate 37 is provided with a boss 37^a (Fig. 2) having a substantially circular opening formed therein to accommodate the reduced lower end 38^a of an externally threaded hollow metal bushing 38,—said lower end 38^a being upset over the lower face of plate 37 to secure said parts against relative longitudinal movement. As shown in Fig. 2, bushing 38 is provided in one side thereof with a key-way or vertical slot 38^b, the primary purpose of which is to insure proper positioning of the usual "on" and "off" indicating disk or plate (not shown) to be associated with the switch. I utilize the slot 38^b for the additional purpose of receiving a lug 39 (Fig. 2) formed integrally with plate 37, whereby the bushing and plate are positively secured against relative rotation.

The actuating lever 40 of the switch is preferably provided with an integral knob 40^a which may be inserted upwardly through the opening defined by the inwardly extending flange 38^c at the upper end of the bushing. The enlarged portion 40^b of said lever is adapted to substantially close said opening to prevent entrance of dust and other foreign matter. Said portion 40^b and the walls of bushing 38 are provided with aligned openings to accommodate the pivot pin 41 whereby said lever is mounted for pivotal movement in a single plane. Bushing 38 is adapted to be provided with the usual nut or nuts (not shown) whereby the same may be clamped to a perforated panel, plate or similar support.

As shown in Fig. 2, the insulating plate 34 is adapted to clampingly engage the upper ends of the terminal portions of members 29, 30 to rigidly secure the latter in assembled relation to base 25. Interposed between the lower end of insulating pin 36 and contactor 33 is a coiled compression spring 36^a,—a stamped sheet metal member 36^b being fitted onto the upper end of said spring,—said member having a concavity in its upper end to provide a proper abutment for said pin. Spring 36^a acts to effect snap movements of contactor 33 to opposite extreme positions upon corresponding movements of the actuating lever 40.

In Figs. 4, 5 and 6 I have shown a molded insulating base 42 of substantially the same width but of greater length than that shown in Figs. 1 and 2,—said base having an intermediate substantially rectangular recess 43 and relatively smaller rectangular recesses 44, 45, 46 and 47 at the four corners thereof, respectively. Recesses 44 and 46 are adapted to receive with a press fit the terminal portions of right-hand combined contact and terminal members 48 of identical form, and recesses 45 and 47 are adapted to receive the left-hand combined contact and terminal members 49. Recess 43 is provided at opposite sides thereof with vertical ribs 42^a, 42^b, the upper ends of which ribs are respectively provided with open bearings 42^c, 42^d. Members 48 and 49 are like the members 29 and 30 aforescribed, except that the terminal portions 48^a, 49^a of the former are of a length to fit entirely within their respective recesses, as shown in Fig. 5. Circuit wires may be attached, as by brazing, spot-welding or soldering, to each of the four terminal elements, to provide a multiple-circuit-controlling switch.

In Figs. 5 and 6, however, I have shown means for providing a multiple-circuit-controlling switch of the three-point type. Said means may comprise a conducting bus or strip metal member 50 having a flat portion 50^a to be superimposed

upon a punched plate 51 of insulating material,—said member having downwardly bent ends 50^b, 50^c adapted to penetrate spaced openings 51^a, 51^b in said plate whereby the same will electrically connect the contact portions of one longitudinally aligned pair of members 48, 49. A second insulating plate 52 is employed to retain member 50 in proper position and to insulate the latter from top plate 37. Lead-wires 53, 54 and 55 may be attached to three of the terminal elements, as best illustrated in Fig. 6; this form of "concealed" wiring being effected prior to assembly of the switch parts. Plates 51 and 52 are provided with registering slots to provide clearance for pin 36,—one of said slots being shown at 51^c in Fig. 6. The other parts of the switch are identical with the parts shown in Figs. 1 and 2 and have been given like characters of reference.

In Fig. 7 I have shown a modification to provide for end wiring of the switch. Thus the members 48 and 49 have attached to the terminal portions thereof, as by spot-welding, brazing or soldering (soldering thereof being illustrated), a pair of right-hand and left-hand punched and stamped sheet metal members 56 and 57,—the form thereof being best illustrated in Fig. 8. Members 56 and 57 are provided with tapped openings 56^a, 57^a to accommodate the shanks of wiring terminal screws 58,—said members having flanges 56^b, 57^b surrounding said openings. Interposed between members 56, 57 is an insulating member 59 of cylindrical form, said member 59 having aligned recesses 59^a, 59^b formed in opposite ends thereof to provide clearance for the shanks of screws 58 and to receive the flanges 56^b, 57^b to provide for support of said member by the latter. As will be noted, the inner ends of recesses 59^a, 59^b are spaced from each other as by means of a diaphragm 59^c formed integrally with the member 59. When the switch parts are completely assembled the member 59 acts not only to properly insulate the screws 58 from each other, but also as a reinforcing strut for the members 56 and 57 jointly. By this arrangement the screw heads may be drawn tightly into clamping engagement with the circuit wires (not shown) without danger of bending or distorting the terminal members.

In the switch of Fig. 10 the base 25 is of the character shown in Figs. 1 and 2,—the parts in Fig. 10 being drawn to a scale about two and one-fifth times actual size of the article. End wiring terminals of the character shown in Figs. 7, 8 and 9 are employed. Parts of the character heretofore described have been given like characters of reference. In Fig. 10, however, I have shown an externally threaded hollow metal bushing 60 of relatively great length,—such length being desirable when the switch is to be mounted upon a relatively thick panel or similar support. Said bushing is provided at its lower end with the reduced portion or flange 60^a which is upset over the lower face of top plate 37,—the vertical slot 60^b being adapted to receive lug 39 for the purpose heretofore stated. An actuating lever 61 is pivotally supported at the upper end of bushing 60, as by means of pivot pin 41. The lower end of lever 61 is provided with a recess 61^a the walls of which are engageable with the ball-shaped end 62^a of a projection 62^b at the upper end of a second lever member 62,—said member 62 having a spherical enlargement 62^c adapted to bear against the correspondingly shaped shoulder 60^c formed between the upper bore 60^d and the relatively larger lower bore 60^e of bushing 60. The lower end of member 62 is

provided with a recess to accommodate the pin 36,—the latter being adapted to cooperate with the other parts of the switch in the manner aforesaid. As will be apparent, upon movement of lever 61 to the left the same will act through the medium of member 62 and the associated parts to effect snap movement of contactor 33 to the right. Spring 36^a acts through pin 36 to maintain member 62 in bearing engagement with shoulder 60^c, and the straight sides of slot 34^a act through pin 36 to limit the lower end of member 62 to movement in a single plane. In like manner, the upper end of member 62 is limited to movement in such a plane by reason of the connection between the same and lever 61, which has a fixed pivot.

In Fig. 11 I have shown a modified form of actuating lever, 63, and novel supporting means therefor,—the parts illustrated being adaptable for use with any of the insulating base members shown herein. Thus, as shown in Figs. 11 and 12 I provide a metal member having a flat portion 64 provided with openings 64^a, 64^b to receive the shanks of rivets 35 which may be upset thereover (Fig. 11) to clamp the insulating plate or plates (not shown) in position,—member 64 in this respect being equivalent to the top plate 37 aforesaid. Member 64 is provided with intermediate upstanding parallel arms 65 and 66 between which the flat punched sheet metal actuating lever 63 is positioned,—said arms and said lever having registering openings to freely receive the pivot pin 67. A punched and stamped sheet metal top plate 68 is provided with an opening 68^a to provide assembling clearance for the knob or trigger portion 63^a of lever 63,—and communication with opening 68^a are aligned notches 68^b, 68^c the side walls of which are adapted to straddle lever 63 (see Fig. 11) to prevent sidewise displacement of the latter. Top plate 68 is provided with integral downwardly extending parallel flanges or projections 68^d, 68^e,—said flanges being adapted to overlap the arms 65, 66 of member 64 and the opposite ends of pin 67 to prevent endwise displacement of the latter. As shown the arms 65, 66 are provided with reduced upper ends 65^a, 66^a which extend upwardly into opening 68^a in top plate 68, whereby the latter is adapted to rest upon the horizontal shoulders 65^b, 65^c and 66^b, 66^c thus provided on arms 65, 66.

Member 64 is provided at one end with an upwardly angled arm 69 having a vertically extending portion 69^a the end of which is reduced, as at 69^b, whereby horizontal shoulders 69^c, 69^d are provided. Member 64 is provided at its other end with a relatively longer upwardly angled arm 70 having a vertically extending portion 70^a the end of which is reduced, as at 70^b, whereby horizontal shoulders 70^c, 70^d are provided. Arm 70 is punched out to provide an opening 70^e and a lug 70^f, the latter being provided with an opening 70^g to accommodate the hooked end 71^a of a coiled tension spring 71,—the other hooked end 71^b of said spring being attached to lever 63 as shown in Fig. 11. Lever 63 is thus biased to one of its extreme positions to effect opening of the switch contacts (not shown).

Top plate 68 is provided with openings 68^f, 68^g to accommodate the reduced ends 70^b, 69^b, respectively, aforesaid, whereby said top plate is also adapted to rest upon the horizontal shoulders 70^c, 70^d and 69^c, 69^d. Said ends 70^b, 69^b are then upset or riveted over the upper surface of top plate 68, as shown in Fig. 11, to rigidly and

permanently secure said parts in assembled position. Lever 63 is provided with a projection the lower edge 63^b of which is engageable with member 64 and the upper edge 63^c of which is engageable with top plate 68, whereby movement of said lever in opposite directions is limited. The knob or trigger portion 63^a is preferably stamped from sheet metal to the form shown,—the same being spot-welded, brazed, or otherwise rigidly secured to lever 63 in the relation illustrated in Fig. 11.

Lever 63 is provided in its lower edge with a rectangular notch 63^d to accommodate the upper end of a flat punched insulating plate 72 of substantially T-shape,—the ends 72^a, 72^b being movable between the inner faces of arms 65, 66 of member 64 to prevent sidewise displacement of plate 72 with respect to lever 63. The lower end 72^c of plate 72 is rounded to engage a spring abutment, such as the member 36^b aforedescribed.

Top plate 68 is provided with a plurality of suitably spaced tapped openings 68^a, 68^b, 68^c and 68^d, said openings being adapted for utilization in pairs to register with the variously spaced openings provided in tool handles now on the market.

In the modification illustrated in Fig. 13, the member 64 is identical with that employed in Fig. 11. However, the top plate 73 of Figs. 13 and 14 is made relatively longer than the top plate 68 aforedescribed. Plate 73 is provided with enlarged ends 73^a, 73^b the same having tapped openings 73^c, 73^d to provide for securement of the plate to an outlet box by means of suitable screws (not shown). Plate 73 is also provided with a pair of tapped openings 73^e, 73^f to cooperate with the screws of a flush- or cover-plate of usual form. The openings 73^e, 73^f are adapted to receive the ends 76^b, 69^b, and the openings 73ⁱ is adapted to provide clearance for an insulating actuating lever 74, said lever having a lower portion 74^a of reduced width (see Fig. 19) to fit between the upstanding arms of member 64 (one of which arms is shown at 66). Flanges 73^j and 73^k are provided to prevent endwise displacement of pivot pin 67. Lever 74 is provided at its lower end with a recess to accommodate the insulating pin 75,—whereas obviously if desired said pin 75 or its equivalent might be formed integrally with said lever.

In Figs. 15 and 16 I have shown a modified form of externally threaded hollow metal bushing 76 having an upper bore 76^a and a relatively larger lower bore 76^b with a curved shoulder 76^c formed therebetween to provide a socket or bearing for the enlarged hemispherical portion 77^a of a relatively long lever 77. Lever 77 is insertable upwardly through a straight sided slot 76^d provided at the upper end of said bushing,—the straight sides of said slot 76^d acting to limit said lever to oscillatory movement in a single plane. The upper end of lever 77 is reduced, as shown at 77^b, and said end is adapted to have driven thereonto the recessed ball or knob 77^c. The lower end portion 77^d of said lever is of inverted frusto-conical shape as shown whereby oscillatory movement thereof is limited. Said lower end portion is provided with a recess 77^e to receive an insulating pin or abutment member of the character aforedescribed. Bushing 76 is provided at its lower end with the reduced portion or flange 76^e for the purpose heretofore stated.

In the fragmentary view of Fig. 17 the parts 48, 49, 51 and 52 correspond with those parts shown in Figs. 5 and 6. The bus or connector 78, however, has its ends 78^a, 78^b bent flatwise against the lower surface of insulating plate 51

whereby said ends are arranged to be clamped in engagement with the upper horizontal edges of the contact elements or portions of the combined contact and terminal members 48 and 49.

In Fig. 18 I have shown a lever 79 in general similar to that shown at 63 in Fig. 11. Thus lever 79 is provided with an opening 79^a for the pivot pin, an opening 79^b for the spring end, and a notch 79^c to accommodate the insulating plate 72. A projection on lever 79 provides abutments or shoulders 79^d, 79^e to limit oscillatory movement thereof in the manner aforedescribed. The portion 79^f of said lever is preferably provided with a reduced upper end (not shown) onto which the recessed ball or knob 79^f is adapted to be driven.

The manner in which the various parts shown herein may be substituted for each other to provide numerous other complete switch combinations will be apparent to those skilled in the art, and hence specific showing of the many possible modifications is deemed unnecessary.

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 relatively large recess opening to the upper surface thereof, said base also having a pair of relatively smaller recesses at one end thereof, said last mentioned recesses being spaced from each other and from said first mentioned recess, but communicating with the latter below the upper surface of said base, each of said second mentioned recesses being initially closed at the lower end thereof by a relatively thin insulating diaphragm formed integrally with said base, whereby the latter may be utilized for a switch adapted for end wiring, and said diaphragms being readily removable by broaching, whereby said recesses may accommodate terminal elements extending downwardly through the base to provide a switch adapted for bottom wiring.

2. In an electric snap switch, in combination, a molded insulating base having a relatively large substantially rectangular recess opening to the upper surface thereof, said base also having a pair of relatively smaller substantially rectangular recesses at one end thereof, said last mentioned recesses being spaced from each other and from said first mentioned recess, but communicating with the latter below the upper surface of said base, each of said second mentioned recesses having portions of different depths whereby a shoulder is provided intermediate the length thereof, the bottom wall of each deeper portion being closely adjacent to the outer surface of the bottom wall of said base, whereby a relatively thin but integral insulating diaphragm is initially provided which may be readily removed by broaching, and a pair of one-piece combined contact and terminal members, the contact and terminal portions of which are arranged in substantial parallelism, the contact portions of said members extending downwardly into said first mentioned recess, and the terminal portions thereof extending downwardly into said second mentioned recesses, respectively.

3. In an electric snap switch of the toggle type, in combination, a molded insulating base having a relatively large substantially rectangular recess opening to the upper surface thereof, said base also having a pair of relatively smaller substantially rectangular recesses at one end thereof, said last mentioned recesses being spaced from

each other and from said first mentioned recess, but communicating with the latter below the upper surface of said base, each of said second mentioned recesses having portions of different depths whereby a shoulder is provided intermediate the length thereof, the bottom wall of each deeper portion having an opening formed therein, a pair of one-piece combined contact and terminal members, the contact and terminal portions of which are arranged in substantial parallelism, the contact portions of said members extending downwardly into said first mentioned recess, the terminal portions thereof extending downwardly into said second mentioned recesses, respectively, and said terminal portions having ends extending downwardly through said openings beyond the lower surface of said base, said ends having means to facilitate bottom wiring of the switch.

4. In an electric snap switch, in combination, a molded insulating base having a relatively large substantially rectangular recess opening to the upper surface thereof, said base also having a pair of relatively smaller substantially rectangular recesses at one end thereof, said last mentioned recesses being spaced from each other and from said first mentioned recess, but communicating with the latter below the upper surface of said base, each of said second mentioned recesses having portions of different depths whereby a shoulder is provided intermediate the length thereof, the bottom wall of each deeper portion being closely adjacent to the outer surface of the bottom wall of said base, whereby a relatively thin but integral insulating diaphragm is initially provided which may be readily removed by broaching, and a pair of one-piece combined contact and terminal members, the contact and terminal portions of which are arranged in substantial parallelism, the contact portions of said members extending downwardly into said first mentioned recess, the terminal portions thereof extending downwardly into said second mentioned recesses, respectively, said terminal portions each having parallel lugs formed integrally therewith and adapted to bear against the respective shoulders aforementioned whereby said contact and terminal portions may be definitely positioned within the respective recesses, and means comprising an insulating plate secured to the upper surface of said base and adapted to clampingly engage the upper ends of said terminal portions to retain said members in assembled position relatively to said base.

5. In an electric snap switch, in combination, a molded insulating base having a relatively large recess opening to the upper surface thereof, said base also having at least one pair of substantially smaller rectangular recesses spaced from each other and from said first mentioned recess but communicating with the latter by means of notches opening to said upper surface, and said second mentioned recesses being adapted to accommodate wiring terminal elements to provide for enclosed, bottom, or end wiring of the switch, the bottom walls of said recesses being initially relatively thin to provide for broaching thereof prior to insertion of the bottom wiring terminal elements.

6. In an electric snap switch, in combination, a molded insulating base having a centrally located recess of substantially rectangular contour, opposed walls of said recess having pivot bearings formed therein, a contactor oscillatably supported in said bearings, four relatively smaller substantially rectangular recesses located at the

respective corners of said central recess and communicating with the latter by means of notches opening to the upper surface of said base, four one-piece combined contact and wiring terminal members, the contact portion of each member extending downwardly into said central recess and the terminal portion of each member extending downwardly to a greater degree into one of said relatively smaller recesses, each of said terminal portions having a pair of substantially parallel lugs to provide for a press fit thereof within its respective recess, an insulating plate having clamping engagement with the upper ends of the respective terminal portions, a metal top plate having clamping engagement with said insulating plate, an externally threaded hollow metal bushing secured to said top plate, an operating lever pivotally supported within said bushing, and a coiled compression spring interposed between said lever and said contactor to effect snap movements of the latter from each extreme position thereof to the other.

7. In an electric snap switch, in combination, a molded insulating base having a centrally located recess of substantially rectangular contour, one pair of opposed walls of said recess having pivot bearings formed therein, a flat punched sheet metal contactor oscillatably supported directly by said bearings, four relatively smaller substantially rectangular recesses located at the respective corners of said central recess, said base having notches to provide for communication between said central recess and the corner recesses respectively, four one-piece combined contact and terminal members, the contact portion of each member extending downwardly into said central recess and the terminal portion of each member extending downwardly to a greater degree into one of said relatively smaller recesses, an insulating plate overlying the upper surface of said base and adapted for clamping engagement with the upper ends of said terminal portions, said plate having a pair of openings spaced longitudinally thereof, a resilient metal strip having a flat portion adapted to overlie said plate and having bent end portions adapted to penetrate said openings and resiliently engage a longitudinally aligned pair of contact portions, whereby a common circuit connection may be provided for the latter, a second insulating plate overlying said first mentioned plate, and a metal cover member overlying said second plate and secured to said base to retain all of said parts in assembled relation.

8. In an electric snap switch of the three-point type, in combination, a molded insulating base having a relatively large substantially rectangular recess and relatively smaller recesses respectively located adjacent to the four corners of the latter, all of said recesses opening to the upper surface of said base, resilient stationary contact elements positioned within said first mentioned recess at each of the four corners of the latter, combined supporting and wiring terminal elements respectively formed integrally with said contact elements and each adapted for a press fit within the corresponding corner recesses, circuit wires individually connected to one longitudinally aligned pair of terminal elements, a third circuit wire connected to one terminal element of the other longitudinally aligned pair, a strip metal bus member, the end portions of the latter being adapted to resiliently engage the edge portions of the pair of contact elements associated with said last mentioned pair of ter-

5 minal elements, and a pair of insulating plates with which said bus member is engaged for support thereby, said plates being adapted to overlie the upper ends of said terminal elements and being secured to said base to retain all of said parts in assembled position.

9. In an electric snap switch, in combination, a molded insulating base, a pair of stationary switch contacts carried thereby, a pair of punched sheet metal terminal elements electrically connected with the respective contacts and extending in parallel relation to each other from one end of said base, said elements having tapped openings formed therein adjacent to the outer ends thereof, said elements also having flanges formed upon the adjacent faces thereof around the respective openings, an insulating member of substantially cylindrical form, said member having aligned recesses formed in opposite ends thereof to accommodate said flanges, whereby said member is retained in position upon assembly of said terminal elements with respect to said base, and a pair of wiring terminal screws having threaded engagement with said openings, the shanks of said screws being accommodated by the respective recesses.

10. In an electric switch, the combination with a pair of punched sheet metal terminal members, said members having tapped openings formed therein with flanges surrounding said openings, of a molded insulating member of substantially cylindrical form, said insulating member having aligned recesses formed in opposite ends thereof whereby an integral insulating diaphragm is provided therebetween, said flanges being engageable with the walls of said recesses whereby said insulating member is supported upon attachment of said terminal members to a suitable support in parallel relationship to each other, and a pair of wiring terminal screws the shanks of which have threaded engagement with said openings and are accommodated by the respective recesses, said insulating member serving to properly separate the shanks of said screws and also as a reinforcing strut for said terminal members jointly.

11. As an article of manufacture, a one-piece combined contact and terminal member for electric snap switches, the terminal portion of said member being substantially flat and having a pair of lugs formed integrally therewith intermediate the ends thereof, said lugs being bent into substantial parallelism to provide a portion of channel-shape in cross section, the contact portion of said member being of substantially inverted L-shape and having the short end thereof extending laterally from a side edge of said terminal portion at a point below the upper end of the latter, and the long end of said contact portion extending downwardly in a plane substantially parallel to said terminal portion, said portion of channel-shape being adapted to provide for a wedge fit thereof within a vertically recessed insulating base and being also adapted to facilitate electrical connection of a terminal wire with respect thereto.

12. In an electric snap switch, in combination, a relatively long externally threaded hollow metal bushing, said bushing having an annular inwardly extending flange at the upper end thereof, a lever having an integral actuating knob insertable upwardly through the opening defined by said flange, said lever having a spherical portion adapted to substantially close the upper end of said bushing, said bushing and said lever hav-

ing aligned openings and a pivot pin extending therethrough, said lever having a recess in the lower end thereof, said bushing having an upper bore and a lower bore of relatively greater diameter with a curved annular shoulder formed therebetween, a second lever having an enlarged portion of spherical contour adapted to bear against said shoulder, said second lever having an upward extension engageable by the walls of the recess in said first lever, whereby movements of the latter are transmitted to said second lever, an insulating pin projecting downwardly from the lower end of said second lever, and an insulating plate having a relatively narrow straight-sided slot through which said insulating pin is adapted to extend, the walls of said slot acting to limit said pin and said second lever to oscillatory movement in a single plane.

13. In an electric snap switch, in combination, an externally threaded hollow metal bushing, said bushing having an external straight-sided slot extending lengthwise thereof, said bushing also having a lower end portion of reduced diameter, a metal top plate having an opening of substantially circular contour adapted to accommodate said lower end portion, said top plate having a lug formed integrally therewith and extending upwardly and inwardly from the wall of said opening, said lug being engageable with the walls of said slot to prevent rotation of said bushing and said top plate relatively to each other, and said lower end portion of said bushing being upset over the lower face of said top plate whereby said parts are rigidly secured against relative longitudinal movement.

14. In an electric snap switch of the toggle type, in combination, a molded insulating base having a relatively large substantially rectangular recess opening to the upper surface thereof, said base also having a pair of relatively smaller substantially rectangular recesses located between said first mentioned recess and one end of said base, said second mentioned recesses each having aligned notches whereby the same respectively communicate with said first mentioned recess and said end wall of the base, whereby said base is adapted for use to alternatively provide a switch of the end-wiring or concealed-wiring type, said second mentioned recesses having openings in the bottom walls thereof respectively, whereby said base is also adapted for use to provide a switch of the bottom-wiring type, a plurality of different types of combined contact and terminal members alternatively removably insertable into said first mentioned and second mentioned recesses, an insulating cover plate secured to the upper surface of said base and adapted to retain said combined contact and terminal members in assembled relation to said base, and oscillatable contact means located within said first mentioned recess and movable with a snap action into and out of engagement with the contact portions of said combined contact and terminal members.

15. In an electric snap switch, in combination, a molded insulating base having a relatively large substantially rectangular recess opening to the upper surface thereof, said base also having a pair of relatively smaller substantially rectangular recesses located between said first mentioned recess and one end of said base, said second mentioned recesses each having aligned notches whereby the same respectively communicate with said first mentioned recess and said end wall of the base, whereby said base is adapted for use to al-

ternatively provide a switch of the end-wiring or concealed-wiring type, said second mentioned recesses having openings in the bottom walls thereof respectively, whereby said base is also adapted for use to provide a switch of the bottom-wiring type, said first mentioned recess having aligned pivot bearings formed in the opposed walls thereof and opening to the upper surface of said base, a flat punched sheet metal contactor pivotally supported by said bearings, and a pair of one-piece combined contact and terminal members, said members each having a wiring terminal portion of channel-form seated with a press fit in one of said second mentioned recesses, and said members each also having a resilient contact portion positioned within said first mentioned recess for cooperation with said contactor. 5

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