

Dec. 2, 1930.

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1,783,636

ELECTRIC SNAP SWITCH

Filed Aug. 15, 1929

2 Sheets-Sheet 1

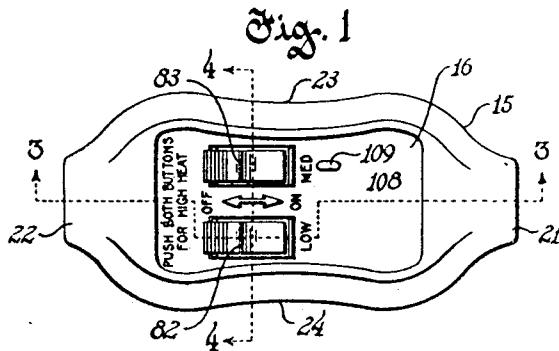
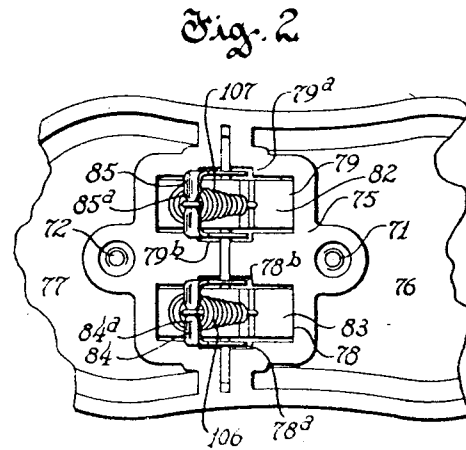
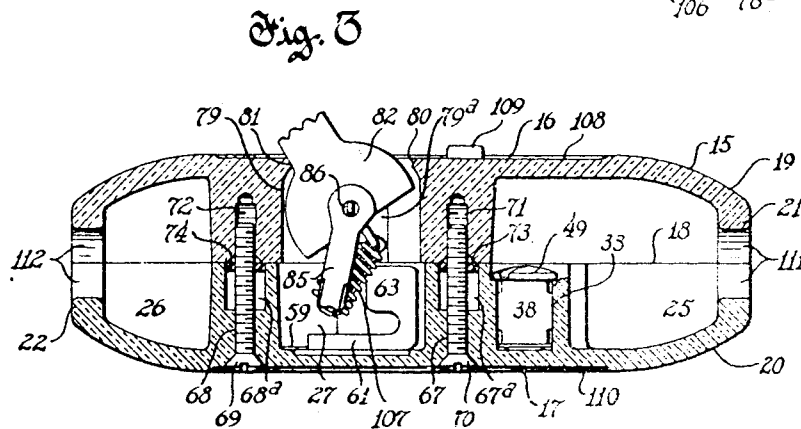
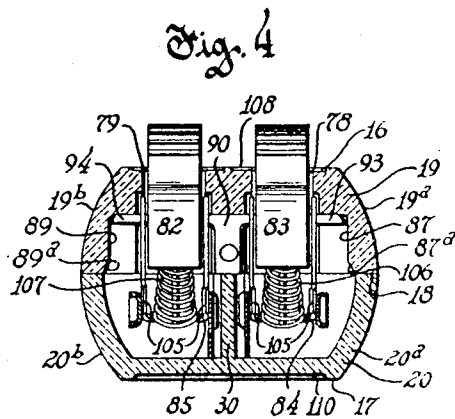
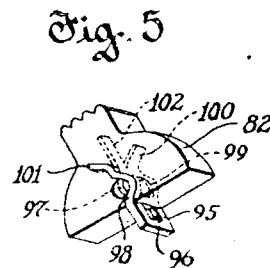


Fig. 8

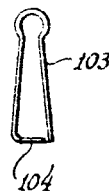


Fig. 6

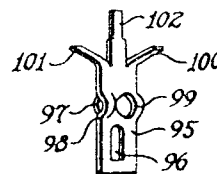
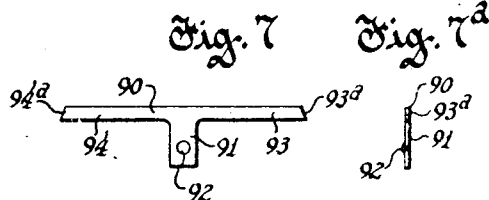
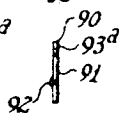


Fig. 7a



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2 Sheets-Sheet 2

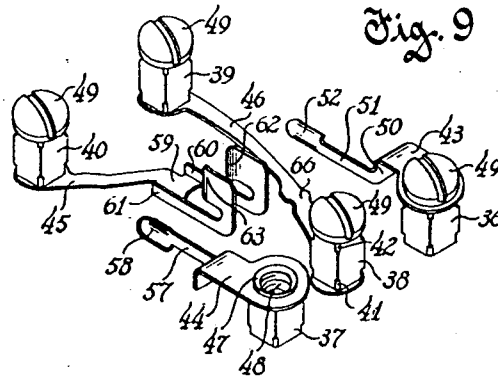


Fig. 10

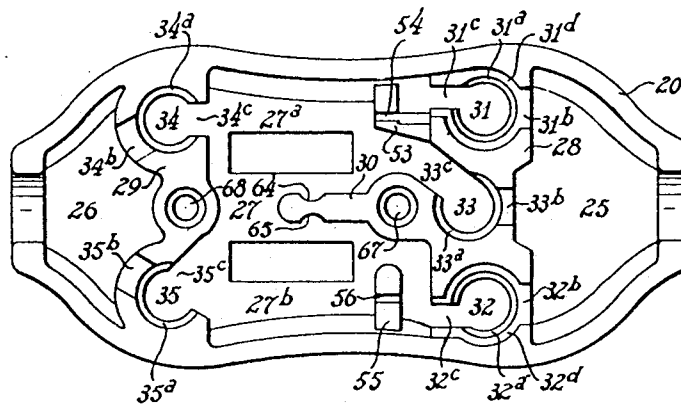
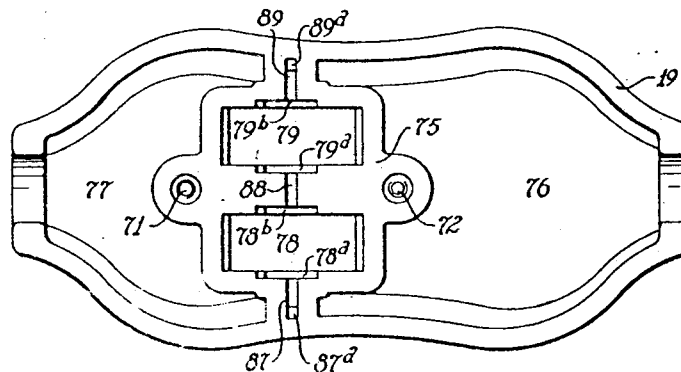


Fig. 11



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ELECTRIC SNAP SWITCH

Application filed August 15, 1929. Serial No. 386,146.

This invention relates to improvements in electric snap switches, and more particularly to improvements in feed through switches of the multiple circuit controlling type.

An object of the invention is to provide a switching mechanism of the aforementioned character the parts of which are of simple construction, reliable in operation and adapted to be quickly and inexpensively assembled.

Another object is to provide novel supporting means for the stationary and movable contacts of the switching mechanism.

Another object is to provide a novel arrangement of the actuating elements of the switching mechanism with respect to the enclosing casing whereby manipulation of such elements is facilitated.

Another object is to generally improve the details of construction and operation of switches of the aforementioned character.

Other objects and advantages of the invention will hereinafter appear.

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

In the drawings, Figure 1 is a plan view of a feed through snap switch mechanism embodying my invention.

Fig. 2 is an enlarged fragmentary plan view of the under side of the upper casing section, showing the manner in which the movable elements of the switching mechanism are supported.

Fig. 3 is a sectional view, on the broken line 3—3 of Fig. 1.

Fig. 4 is a sectional view, on the line 4—4 of Fig. 1,—both switching units being shown in "on" position.

Fig. 5 is a perspective view of one of the toggle actuating levers of the device.

Fig. 6 is a perspective view of the metal stamping forming part of the lever shown in Fig. 5.

Fig. 7 is a side elevation of the metal

stamping which forms the common pivotal support for the movable elements of the switch mechanism.

Fig. 7^a is an end elevation of the part shown in Fig. 7.

Fig. 8 illustrates one of the cotter pins which may be employed to retain and guide the respective toggle springs.

Fig. 9 is a perspective view of the stationary contacts and the several wiring terminals in assembled relation to each other,—the insulating casing being omitted for purposes of illustration.

Fig. 10 is a plan view of the lower casing section prior to assembly of the stationary contacts and terminals therewithin, and

Fig. 11 is a view similar to Fig. 2, but with the movable switching elements and the common supporting member therefor removed for purposes of illustration.

In the drawings, the numeral 15 designates in general a molded casing of any suitable insulating material, such as the phenol-formaldehyde condensation product sold under the trade name of "bakelite"; said casing 15 having upper and lower substantially flat faces 16 and 17, respectively, and being divided longitudinally, as indicated at 18, in a plane parallel to said upper and lower faces. In other words, the casing is composed of an upper section 19 and a lower section 20 whereby molding of the casing and assembly of the switch mechanism therewithin is facilitated.

As best illustrated in Fig. 4 the sections 19 and 20 are coextensive at their meeting edges,—the sides 19^a, 19^b and 20^a, 20^b being slightly bowed or convex between the aforementioned faces 16 and 17; whereas said faces 16, 17 and sides 19^a, 19^b, 20^a, 20^b merge into the tapered or reduced ends 21 and 22 of the casing. The casing is also preferably of reduced width at an intermediate point in its length, as indicated by the inward curvature of the sides at 23 and 24 in Fig. 1 to facilitate handling or manipulation of the switch as hereinafter described.

By employment of insulating material of the character aforementioned the walls of the casing may be made relatively thin to minimize the weight of the casing and the amount

of insulating material required while providing adequate space within the casing for the various parts of the switch mechanism.

Thus as shown in Figs. 3 and 10 the casing section 20 is provided with end cavities 25 and 26 to accommodate the insulated wires of the conductor cord and the usual strain relieving knots in the cord. Said cavities 25 and 26 are separated from an intermediate and relatively larger cavity 27 by means of transverse barriers 28 and 29 which are molded integrally with the casing section 20 and extend substantially flush with the upper surface of the latter. Also a barrier 30 extends at right angles from barrier 28 into the cavity 27 to substantially divide the latter into smaller cavities 27^a and 27^b.

Within the barrier 28 and adjacent to the opposite side walls of the casing section 20 are a pair of substantially cylindrical recesses 31 and 32 respectively and intermediate said recesses is another cylindrical recess 33. Within the barrier 29 and adjacent to the opposite side walls of the casing section are a pair of cylindrical recesses 34 and 35. All of the aforementioned recesses 31 to 35, inclusive, are of like diameter, and each is provided at the upper end with an outwardly diverging or flared portion, as indicated at 31^a to 35^a, respectively; each is provided with a slightly depressed wiring channel 31^b to 35^b, respectively, leading thereto; and each is also provided with a side wall opening 31^c to 35^c, respectively, extending throughout the depth thereof. Also the upper ends of the recesses 31 and 32 are preferably slightly enlarged beyond the flared portions 31^a, 32^a, as indicated at 31^d, 32^d, respectively.

Adapted for a press or frictional fit within the respective recesses 31 to 35 are a corresponding number of bushings 36 to 40, respectively; each of said bushings being of angular form (preferably square) in cross section, and the major cross sectional dimensions of said bushings are slightly greater than the diameter of the respective recesses. Thus when the bushings are pressed into the respective recesses the corners formed by the converging sides of the former will bite or cut into the walls of the recesses, with the result that the bushings are tightly wedged in assembled relation to the casing section 20.

As shown in Figs. 3 and 9 the four corners of the respective bushings are slightly cut away at each end of the latter, as indicated at 41 and 42, whereby either end of each bushing may act in conjunction with the flared upper end of each recess to facilitate assembly of the bushings with respect to casing section 20. Also as shown, each bushing is provided at at one end with an integral tubular projection which is adapted to penetrate a corresponding perforation in the terminal portions of the respective stationary contact members 43, 44 and 45 and the bus member

46; the respective projections being then spun over or riveted as indicated at 47 (Fig. 9) to rigidly and permanently secure the parts together.

It will be noted that contact members 43 and 44 are secured to the bushings 36 and 37 at the upper ends of the latter, whereas contact member 45 and bus member 46 are secured to the lower ends of the bushings 40 and 38, 39, respectively. In other words, all of the bushings are of identical form, but are reversible according to whether it is desired to have the stationary contact or bus members extend from the upper or lower ends thereof. Similarly each of the bushings is tapped as indicated at 48 (Fig. 9) to receive the usual binding screw 49 at either end thereof.

The contact member 43 comprises a blank of suitable resilient metal bent as shown to provide the portion 50 extending downwardly at right angles to the terminal end portion of the contact and the portion 51 extending longitudinally of casing section 20 in a vertical plane,—the tip 52 of said contact being provided with a rearwardly curved edge to insure proper engagement thereof by the bridging contactor, as hereinafter described. As shown in Fig. 10 the barrier 28 is provided with an integral extension 53 having a vertical notch 54 to receive and properly position the portion 51 of the contact member 43. The contact member 44 is made from a blank identical with that just described, but the same is reversely bent with respect to contact member 43, as will be apparent. The casing wall (Fig. 10) is provided with an integral projection 55 having a notch 56 to receive the vertical portion 57 of contact member 44 whereby the tip 58 of said contact is held in proper position.

The contact member 45 extends from the lower end of bushing 40 toward the barrier 30, and is provided with a bifurcated portion 59, the upwardly bent sides 60 and 61 of which are provided with contact tips 62 and 63 which are bent toward each other and into the respective vertical notches 64 and 65 in barrier 30.

The bus member 46 extends along the bottom of casing section 20 between the lower ends of the bushings 38 and 39, said bus member being preferably provided with a slight kink or bend 66 to compensate for any variation in the contemplated distance between the cylindrical recesses 33 and 34 due to possible shrinkage or expansion of casing section 20 after molding thereof.

As will be apparent from the foregoing description, all of the five individual pieces or combinations of elements (including a binding screw for the bushing 37) as shown in Fig. 9 are preassembled in the manner set forth, whereby the same may be readily inserted within the casing section 20,—a suit-

able pressing tool or machine being preferably employed for driving the bushings into the respective recesses.

Casing section 20 is further provided with a pair of spaced perforations 67 and 68 to receive the screws 69 and 70 which take into tapped recesses 71 and 72 in the casing section 19 whereby the casing sections are rigidly secured to each other. The perforations 67 and 68 are preferably of increased diameter for a portion of their length, as indicated at 67^a, 68^a (Fig. 3) to accommodate the small fiber washers 73, 74 which engage the screws and prevent dropping thereof from section 20 prior to assembly of the casing sections.

The upper casing section 19 is provided with a transverse barrier designated in general in Figs. 2 and 11 by the numeral 75; a relatively large cavity 76 being provided between the barrier and one end of said casing section, and a relatively smaller cavity 77 being provided between said barrier and the other end of said section.

Within the contour of the barrier 75 are the aforementioned tapped recesses 71 and 72, and located symmetrically between said recesses and the side walls of section 19 are a pair of substantially rectangular recesses or passages 78 and 79 the surrounding walls of which extend flush with the lower edge of section 19, and the upper slightly constricted ends of which recesses open through the face 16 of the casing,—said open ends being flared slightly (as indicated at 80, 81, Fig. 3) to provide angular stops for limiting movement of the respective toggle actuating levers 82, 83 in opposite directions.

The recesses 78 and 79 are respectively provided on opposite sides thereof with relatively shallow notches or cavities 78^a, 78^b and 79^a, 79^b to accommodate the arms of a pair of substantially U-shaped bridging contactors 84 and 85,—the upper ends of said arms being respectively provided with pivot openings, as shown at 86 in Fig. 3.

Alined with each other and opening into the cavities 78^a, 78^b, 79^a, 79^b are a plurality of relatively narrow notches 87, 88 and 89, said notches being adapted to receive the substantially T-shaped metal punching 90 (Fig. 7) in the manner best illustrated in Fig. 4, the vertical arm 91 of said punching being provided with a relatively sharp pointed projection or boss 92 which provides a tight or wedge fit of member 90 within the notch 88. The arms 93 and 94 of member 90 are preferably provided with beveled ends 93^a and 94^a to cooperate with the beveled ends 87^a, 89^a of notches 87, 89 to facilitate insertion of member 90 and to frictionally engage the straight end walls of said notches 87, 89.

Each of the toggle actuating levers preferably comprises a metal blank 95 having a perforation 96 adjacent to the lower end thereof. Said blank is also provided with

a pair of angular slits between which the metal is arcuately offset on one side of the plane of the blank, as indicated at 97, and on opposite sides of which slits the metal is arcuately offset on the other side of the plane of the blank, as indicated at 98 and 99, whereby a pivot opening or bearing is provided. Blank 95 is further provided with branches or arms 100, 101 bent in opposite directions from the plane of the intermediate arm 102 to provide proper engagement between said blank and the insulating portion of the toggle lever when the latter is molded thereabout, as shown in Fig. 5.

Looped through the perforation 96 in each toggle lever is a cotter pin 103, the longer arm 104 of which is bent at substantially right angles as shown to engage the notched or reduced portions 84^a and 85^a (Fig. 2) of the lower ends of bridging contactors 84, 85, respectively. Said lower ends are preferably of channel or arc-shape in cross section to increase the strength thereof, and the side edges of the contactor arms may be swaged inwardly to a slight extent adjacent to said lower ends of the contactors as indicated at 105 to further insure proper engagement thereof with the stationary contacts.

Surrounding the cotter pins 103 are compression springs 106 and 107,—said springs being preferably coiled to frusto-conical shape, with the relatively large lower ends bearing against the respective contactors and the relatively small upper ends bearing against the metal blanks 95 of the actuating levers. Springs so shaped are of particular utility in an arrangement of the character herein contemplated, since the possibility of fouling thereof with respect to the parts engaged thereby is practically eliminated.

The flat face 16 of section 19 is preferably provided with a slightly depressed portion or panel 108, whereby suitable legends or wording to indicate the manner of operating the switch mechanism may be molded in relief and flush with the aforementioned face 16 (see Figs. 1, 3 and 4). A projection 109 which extends above the face 16 is also preferably provided to indicate to the touch the proper manner in which to grasp the casing when it is desired to operate the switch mechanism. The face 17 of section 20 may be similarly paneled, as indicated at 110 in Figs. 3 and 4. The casing sections 19 and 20 are complementally grooved at the respective ends thereof to provide the usual cord openings 111, 112.

The manner of connecting the circuit wires and the manner of operating the switch mechanism will be apparent from the foregoing description. It may be pointed out, however, that the switch mechanism is primarily of the "three-heat" control type, wherein the electric power supply lines are

to be connected to terminals 39 and 40,—a resistor of predetermined value to provide a relatively low heat when connected in series with the supply lines is connected to the terminals 37 and 38,—and a resistor adapted to provide a relatively higher heat when connected in series with the supply lines is connected to the terminals 36 and 38.

Thus, assuming both toggle levers 82 and 83 to be in "off" position as shown in Figs. 1 and 3, obviously upon movement of lever 82 to "on" position the resistor between terminals 37 and 38 will be connected in series to the source of power supply to provide a heating effect of relatively low value. If lever 82 is in the "off" position and lever 83 is moved to "on" position, the resistor between terminals 36 and 38 will be connected in series with the source of power supply to provide a heating effect of higher value than that aforementioned; whereas if both levers are moved to "on" position the resistors will obviously be connected in parallel with each other to provide a heating effect of still higher value.

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

1. A feed through snap switch mechanism comprising, in combination, a molded insulating casing having top and bottom flat sides, said casing comprising sections meeting in a plane parallel to said sides, a plurality of sets of stationary contacts arranged in lateral alinement on opposite sides of the longitudinal center line of one of said casing sections, a plurality of laterally alined bridging contactors pivotally supported by the other casing section, means for moving said contactors selectively into or out of engagement with their cooperating contacts, said means comprising independently operable pivoted levers projecting upwardly through said last mentioned casing section, and spring means interposed between each of said levers and the contactor to be actuated thereby.

2. A feed through snap switch mechanism comprising a longitudinally divided molded insulating casing having flat sides parallel to the plane of division thereof, a plurality of switching units enclosed within said casing, said switching units comprising cooperating stationary and movable contacts carried by the casing sections respectively, one of said casing sections having laterally alined openings arranged on opposite sides of the longitudinal center thereof, and pivoted actuating levers for said movable contacts, said levers extending upwardly through said openings and adapted for movement independently of each other to provide for engagement or disengagement of the contacts of said switching units selectively.

3. A feed through switch mechanism of the multiple circuit controlling type comprising, in combination, a longitudinally divided two-

part insulating casing having upper and lower flat faces substantially parallel to the plane of division of the casing, a plurality of sets of stationary contact and terminal members frictionally secured within corresponding recesses in the lower casing section, a plurality of oscillatable bridging contactors, supporting means for said contactors frictionally secured within corresponding recesses in the upper casing section, said last mentioned section having openings arranged on opposite sides of the longitudinal center line thereof, actuating levers for said contactors, said levers extending upwardly through said openings and adapted for oscillation independently of each other longitudinally of said casing, and means for securing said casing sections to each other.

4. A feed through switch mechanism of the multiple circuit controlling type comprising, in combination, a longitudinally divided two-part insulating casing having upper and lower flat faces substantially parallel to the plane of division of the casing, a plurality of sets of stationary contacts each extending longitudinally of the lower casing section and arranged in substantially parallel planes, terminal members for said contacts, each of said terminal members having a wedge fit within a corresponding recess in said lower casing section and certain of said terminal members being common to a plurality of said contacts, a plurality of bridging contactors, common supporting means for said contactors comprising a pivot member having a wedge fit within corresponding recesses in the upper casing section, said last mentioned section having openings arranged side by side laterally of the casing, actuating levers pivotally connected with said common supporting means and extending upwardly through said openings whereby said levers may be oscillated independently of each other longitudinally of the casing, and means comprising screws penetrating the lower casing section and engaging tapped recesses in the upper casing section to secure all of said parts in assembled relation.

5. Snap switch mechanism comprising in combination, a molded insulating part having parallel substantially rectangular perforations, integral insulating walls surrounding said openings, said walls having alined notches, a pivot member adapted to enter said notches with a press fit, oscillatable contactors each supported by said pivot member in alinement with the respective openings and projecting below the aforementioned walls of the latter, actuating levers projecting upwardly through said openings and also supported by said pivot member, and spring means interposed between said levers and said contactors to effect snap movements of the latter independently of each other

upon corresponding movements of the respective levers.

6. In a feed through snap switch mechanism of the multiple circuit controlling type, the combination with a longitudinally divided insulating casing, one of the casing sections having a plurality of recesses and a corresponding number of terminal members frictionally secured within said recesses, stationary contacts rigidly secured to certain of said terminal members and held thereby within said casing section, and a bus bar rigidly secured to other of said terminal members, said terminal members being of like shape and dimensions and the same being reversibly insertable within the respective recesses, for the purpose set forth.

7. In a feed through snap switch mechanism of the multiple circuit controlling type, in combination, a molded insulating base having a plurality of recesses adjacent to each end thereof, a plurality of terminal members each comprising a tapped bushing having a press fit within one of said recesses, said terminal members being located in a common plane, and resilient contacts rigidly secured to certain of said terminal members, certain of said contacts extending from the upper ends of their respective terminal members and other of said contacts extending from the lower end of another of said terminal members.

8. In a feed through snap switch mechanism of the multiple circuit controlling type, in combination, a molded insulating base having a plurality of recesses adjacent to each end thereof, a plurality of terminal members each comprising a tapped bushing having a press fit within one of said recesses, said terminal members being located in a common plane, resilient contacts rigidly secured to certain of said terminal members, certain of said contacts extending from the upper ends of their respective terminal members, other of said contacts extending from the lower end of another of said terminal members, and a connecting bus member rigidly secured to other of said terminal members and extending between the lower ends of the latter.

9. In an electric snap switch, in combination, a molded insulating base having a substantially cylindrical recess the wall of which extends flush with the upper surface of said base, said wall being interrupted throughout the length thereof at one side of said recess, said recess having a flared upper end, a terminal member comprising an internally threaded bushing of angular form in cross section, said terminal member being formed to facilitate insertion of one end thereof into said recess, certain of the cross sectional dimensions of said member being slightly greater than the diameter of said recess whereby the former is adapted to en-

gage the wall of the latter with a press fit, a resilient contact member rigidly secured to one end of said terminal member and projecting outwardly through the interrupted wall of said recess, and a binding screw having threaded engagement with said terminal member, the head of said screw being adapted to lie within the flared end of said recess.

10. Snap switch mechanism comprising in combination, a molded insulating part having parallel substantially rectangular perforations, integral insulating walls surrounding said openings, said walls having aligned notches, a pivot member adapted to enter said notches with a press fit, oscillatable contactors each supported by said pivot member in alinement with the respective openings and projecting below the aforementioned walls of the latter, actuating levers projecting upwardly through said openings and also supported by said pivot member, compression springs of substantially frusto-conical shape interposed between the respective levers and their cooperating contactors to effect snap movements of the latter independently of each other upon corresponding movements of the levers, and cotter pins having looped engagement with the ends of said levers and said contactors, said cotter pins acting to retain and guide said compression springs.

11. In an electric snap switch mechanism of the feed through type, in combination, a molded insulating base having a recess the wall of which extends substantially flush with the upper surface of said base, said wall being interrupted throughout the length thereof at one side of said recess, said recess having a flared upper end, a terminal member comprising an internally threaded bushing, one end of said terminal member being formed to facilitate insertion thereof into said recess, the cross sectional dimensions of said member being slightly greater than the corresponding dimensions of said recess whereby the former is adapted to engage the wall of the latter with a press fit, a resilient conducting member riveted to the lower end of said terminal member and projecting outwardly through the interrupted wall of said recess, said conducting member having a bifurcated portion the arms of which are bent upwardly into substantial parallelism to provide two stationary contacts of the switch mechanism, said base having a barrier interposed between said contacts, the tips of the latter being bent toward each other and into corresponding notches in said barrier, and a binding screw having threaded engagement with said terminal member, the head of said screw being adapted to lie within the flared end of said recess.

12. In an electric snap switch mechanism of the multiple circuit controlling type, in combination, a sheet metal punching of substantially T-shape, a substantially U-shaped

contactor and an actuating lever therefor pivotally supported on each of the horizontal arms of said punching, compression springs interposed between the respective levers and contactors to effect snap movements of the latter independently of each other upon corresponding movements of the former, an insulating casing section having notches to receive said T-shaped punching with a press fit with the aforementioned elements assembled thereon, and a second insulating casing section having a part to engage the vertical arm of said punching to positively retain the latter in assembled relation to the first mentioned casing section.

In witness whereof, I have hereunto subscribed my name.

WILLIAM C. TREGONING.

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