Sept. 25, 1928.

1,685,500

G. J. MEUER

ELECTRIC SWITCH

Filed Nov. 1, 1926

Fig. 1.

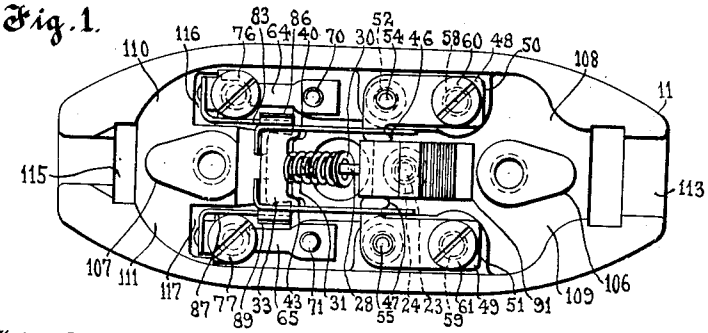


Fig. 2.

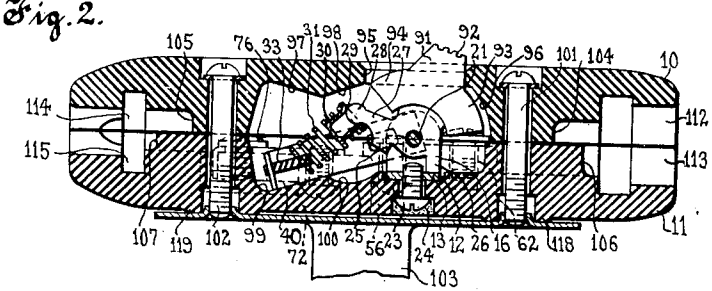


Fig. 3.

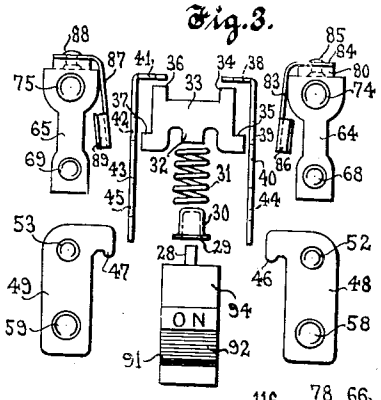


Fig. 4.

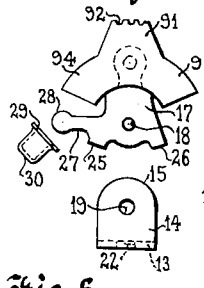


Fig. 4a

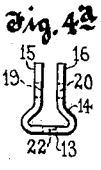


Fig. 5.

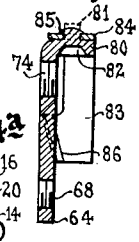
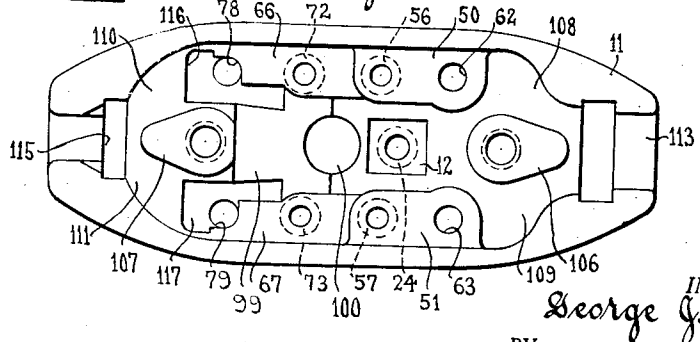


Fig. 6.



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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

Application filed November 1, 1926. Serial No. 145,570.

This invention relates to improvements in electric switches, and more particularly to improvements in the so-called feed-through snap switches.

An object of the invention is to improve and simplify the structure and assembly of switches of the above character.

Another object is to provide a snap switch having novel features of construction and operation.

Another and more specific object is to provide a switch casing having improved means for attaching the same to a suitable support.

Another object is to provide novel switch mechanism having parts arranged to facilitate wiring thereof.

Other objects and advantages of the invention will appear in the course of the following description.

The accompanying drawing illustrates one embodiment of the invention, and the same will now be described, it being understood that various changes in the details of construction and operation of the device may be made without departing from the spirit and scope of the invention as defined in the appended claims.

In the drawing, Figure 1 is a top plan view of my improved switch, with one section of the insulating casing removed for purposes of illustration.

Fig. 2 is a longitudinal vertical section through the switch structure.

Figs. 3 and 4 are top plan and side elevational views, respectively, showing certain of the switch parts in separated relation.

Fig. 4ª is an end view of one of the elements illustrated in Fig. 4.

Fig. 5 is an enlarged sectional view of one of the terminal plates with the contact attached thereto as shown in Fig. 3, and

Fig. 6 is a top plan view of the insulating section illustrated in Fig. 1,—the switch parts being omitted.

Referring to the drawing the numerals 10 and 11 designate the upper and lower sections, respectively, of the switch casing; said sections being formed of any suitable insulating material, such as a molded fibrous plastic composition. The lower section 11 of the casing is adapted to provide a support for all elements of the switch mechanism, whereas the section 10 is provided with suitably formed cooperating recesses and an opening through the top surface thereof to accommodate a manually operable switch lever,—all as hereinafter more particularly set forth.

Thus the section 11 is provided with a recess or depression 12 of substantially rectangular shape into which the correspondingly shaped bottom portion 13 of a yoke 14 is adapted to fit. The arms 15 and 16 of said yoke preferably extend inwardly and then upwardly in a parallel relation to each other, as best shown in Fig. 4ª, to receive an operating lever 17 therebetween. Lever 17 is provided with an opening 18 adapted to register with openings 19 and 20 in arms 15 and 16, respectively, through which openings a pivot pin 21 (Fig. 2) is inserted and the end or ends thereof upset to secure said parts in assembled relation. Said bottom portion 13 of the yoke is provided with a tapped opening 22 adapted to receive a securing screw 23, the head of which engages in a countersunk opening 24 in section 11.

Lever 17 is provided with projections 25 and 26 adapted to alternately engage the portion 13 of the yoke to positively limit the degree of oscillating movement of said lever; whereas the latter is also provided with an integral angularly extending lever 27 adapted to effect actuation of the movable parts of the switch. The end 28 of lever 27 is of substantially circular contour whereby the same is adapted to engage the flared open end 29 of a substantially tubular member or eyelet 30,—the latter being adapted to fit into one end of a spiral compression spring 31, as shown in Figs. 1 and 2.

The other end of spring 31 surrounds a projection 32 on an insulating plate 33,—said plate being also provided with pairs of projections 34, 35 and 36, 37 arranged at substantially right angles to each other. Projections 34 and 35 are adapted for an interlocking fit with cooperating openings 38 and 39, respectively, in a movable contactor 40; whereas projections 36 and 37 are likewise adapted for an interlocking fit with openings 41 and 42, respectively, in a movable contactor 43. Contactors 40 and 43 are respectively provided with elongated openings indicated in dotted lines at 44 and 45 (Fig. 3), whereby said contactors may be hooked over the projecting ends 46 and 47 of terminal plates 48 and 49, respectively, for pivotal engagement therewith.

Terminal plates 48 and 49 are adapted to rest upon shoulders 50 and 51 formed on the

insulating section 11, said plates being provided with tapped openings 52 and 53 adapted to receive the threaded shanks of securing screws 54 and 55, respectively, the heads of the latter being adapted to engage with countersunk openings 56 and 57 (Figs. 2 and 6). Terminal plates 48 and 49 are also respectively provided with tapped openings 58 and 59 adapted to receive binding screws 60 and 61 (Fig. 1),—shoulders 50 and 51 being likewise provided with recesses 62 and 63, respectively, to accommodate the shanks of said screws.

Terminal plates 64 and 65 are longitudinally spaced from the terminal plates 48 and 49, the former being adapted to rest upon shoulders 66 and 67 preferably located in a plane slightly lower than that of shoulders 50 and 51. Plates 64 and 65 are respectively provided with tapped openings 68 and 69 adapted to receive the threaded shanks of securing screws 70 and 71, the heads of the latter being adapted to engage with countersunk openings 72 and 73 (Figs. 2 and 6). Said plates are also respectively provided with tapped openings 74 and 75 adapted to receive binding screws 76 and 77 (Fig. 1),—said shoulders 66 and 67 being cut away, as indicated at 78 and 79 (Fig. 6) to accommodate the shanks of said screws.

As best shown in Fig. 5 the terminal plate 64 is provided with a portion 80 bent downwardly at substantially a right angle thereto, an integral pin being formed thereon, as indicated in dotted lines at 81, preferably by locally pressing outwardly the body of the material as indicated at 82. A resilient contact member 83 is provided with an angularly bent portion 84 having an opening to receive said pin,—the latter being thereupon upset or riveted as indicated at 85 to firmly secure said parts together. Contact member 83 is provided with an integral angularly extending lug 86 to insure proper engagement of contactor 40 therewith. A resilient contact member 87 is adapted to be secured to terminal plate 65 in a like manner, as indicated at 88,—said contact member also having an integral angularly extending lug 89 for the purpose aforedescribed.

As shown in Fig. 4 the upper end of lever 17 has molded thereabout a finger-piece 91 to facilitate manual operation thereof the top surface of said finger-piece being grooved or otherwise roughened as indicated at 92. The finger-piece 91 is provided with arcuate extensions 93 and 94 which may be marked with suitable legends to indicate on and off positioning of the switch. As aforeindicated, section 10 is provided with an opening 95 through which finger-piece 91 extends, and is of a size to permit oscillating movement of the latter; the arrangement being such that one or the other of the extensions 93 or 94 is exposed upon movement of finger-piece 91 to its extreme positions respectively. Section 10 is suitably recessed, as indicated at 96 (Fig. 2), to permit such movement of the finger-piece. Said section is also recessed as indicated at 97 and 98 to permit oscillating movement of contactors 40 and 43 and their actuating elements, whereas section 11 is likewise recessed as indicated at 99 and 100 for a like purpose.

In Fig. 2 I have shown means comprising bolts 101 and 102 for securing sections 10 and 11 to each other and to a suitable support, such as the bracket indicated at 103, said bracket having flexible arms to be clamped around a vacuum cleaner handle or the like in an obvious manner. Said bolts pass through cooperating abutments 104, 105, and 106, 107 on the respective sections. Abutments 106 and 107 likewise serve to provide separate wire passages 108, 109 and 110, 111 leading to the respective terminal plates, whereas abutments 104 and 105 on section 10 serve to provide wire passages complementary to those aforedescribed, as will be obvious. Sections 10 and 11 are provided with relatively large complementary passages 112 and 113 adapted for interlocking engagement with the usual coiled wire cord guard or protector, not shown. Said sections are likewise provided with relatively smaller complementary passages at the opposite end of the casing, complementary grooves 114 and 115 being provided to cooperate with a suitable washer or strain relief, not shown. As shown in Figs. 1 and 6, the section 11 is provided with suitably shaped recesses 116 and 117 to accommodate the downwardly bent portions of terminal plates 64 and 65 and to permit flexure of the contactors 83 and 87.

The casing section 11 is preferably provided with a projecting annulus around each of the securing bolt openings as indicated at 118 and 119, to compensate for possible warping or other inequality in the casing. Moreover, said securing bolt openings are preferably countersunk at each end thereof, whereby suitable clamping bolts and nuts may be employed to clamp the casing sections together independently of the bracket or other support.

The manner of assembling the switch parts will be apparent from the foregoing description, whereas such assembly is greatly facilitated by the provision of the various interfitting and interlocking connections as described.

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

1. In a snap switch mechanism, the combination with a pair of stationary contacts, of a plurality of separately pivoted contact members adapted for movement simultaneously into and out of engagement with said stationary contacts, means for effecting such movement with a snap action, said means

comprising a bell-crank lever pivoted eccentrically with respect to said contact members, an insulating abutment interlocked with the free ends of said contact members, a switch actuating arm on said lever, a freely flexible spiral compression spring interposed between said abutment and said actuating arm, and a manually operated arm on said lever arranged at substantially right angles to said actuating arm.

2. In electric switch mechanism, the combination with a plurality of stationary contacts, of a plurality of separately pivoted contactor elements adapted for movement simultaneously into and out of engagement with said contacts, means for effecting such movement of said elements with a snap action, said means comprising an insulating member loosely interlocked with the free ends of said elements, a pivoted actuating lever, and a freely flexible spiral compression spring interposed between said lever and said insulating member.

3. In electric switch mechanism, the combination with an insulating base, of a metallic yoke secured thereto, a lever pivoted to said yoke and cooperating means on said yoke and said lever for limiting the pivotal movement of the latter, said lever having jointed connection with one end of a spiral compression spring, an insulating member having an abutment to be engaged by the other end of said spring, terminal plates secured to said insulating base, a pair of contactors loosely pivoted to certain of said terminal plates, the free ends of said contactors being loosely interlocked with said insulating member stationary contacts carried by other of said terminal plates and adapted to cooperate with said contactors, and means for limiting the pivotal movement of the latter.

4. In an electric switch, the combination with a divided insulating casing, of switch mechanism to be supported by one of said sections, said mechanism comprising a yoke, a bell crank lever pivotally supported by said yoke for movement in a plane at right angles to the line of division of said casing, contactors respectively pivoted on opposite sides of said lever, an insulating member interlocked with the free ends of the respective contactors, an abutment on said insulating member, a freely flexible spiral compression spring interposed between said abutment and the end of one arm of said lever, and stationary contacts respectively adapted to cooperate with said contactors.

5. In an electric switch, an insulating base, an actuating lever pivotally supported on said base, conductor terminal plates arranged on opposite sides of said lever, contactors pivoted to the respective terminal plates, an insulating member interposed between and attached to the free ends of said contactors, a spring connection between said actuating lever and said insulating member, and a plurality of stationary contacts with which said contactors are respectively adapted to engage.

6. In an electric switch, the combination with a two-part insulating casing, of a snap switch mechanism carried by one or said parts, said mechanism comprising a pair of terminal plates and oscillatory contactors loosely pivoted thereon respectively, an insulating member having interlocking connection with the free ends of the respective contactors and adapted to maintain the same in spaced relation to each other, an abutment on said insulating member and a freely flexible compression spring one end of which is adapted to engage the said abutment, a pivoted actuating lever adapted to shift the opposite end of said spring to thereby effect movement of said contactors jointly with a snap action, and a second pair of terminal plates adapted to cooperate with said contactors to make or break circuit.

7. In a feed-through switch for electrical conductors, the combination with a divided insulating casing, of a pair of laterally spaced terminal plates secured to one section of said casing, hook-shaped projections on said terminals and contactors having openings adapted for pivotal engagement with said projections respectively, said contactors having inwardly bent perforated free end portions and a common insulating member adapted for interlocking engagement therewith, said insulating member having an abutment intermediate the ends thereof, a freely flexible spiral compression spring having one end thereof engaging said abutment, a flared open ended member fitted into the other end of said spring, a pivoted bell-crank lever one arm of which is provided with a substantially circular end adapted for engagement with said flared member, the other arm of said lever extending upwardly through an opening in said casing at right angles to the line of division of the latter and having an insulating knob attached thereto, a second pair of terminal plates secured to said first-mentioned casing section, and resilient contacts secured thereto and adapted for cooperation with the respective contactors to make or break circuit.

8. In a feed-through switch for electrical conductors, the combination with a casing comprising separate sections, switch mechanism carried by one of said sections, said switch mechanism comprising a pair of combined contacts and terminals and a pair of terminal plates longitudinally spaced therefrom, a pair of contacts loosely pivoted to the respective terminal plates and an insulating member interlocked with the free ends of said contacts, a spiral compression spring having one end thereof engaging said insulating member, a flared tubular member fitted into the other end of said spiral spring, a piv-

oted actuating lever having a rounded end adapted for engagement with the flared end of said tubular member, and an operating lever integral with said actuating lever and arranged at an angle thereto, said operating lever extending outwardly through an opening in the other of said casing sections.

9. In a feed-through switch for electrical conductors, the combination with an insulating casing comprising upper and lower sections, switch mechanism carried by said lower section, said switch mechanism comprising a pair of laterally alined combined contacts and terminals and a pair of laterally alined terminal plates longitudinally spaced therefrom, a pair of contacts loosely pivoted to the respective terminal plates and an insulating member interlocked with the free ends of said contacts, a spiral compression spring having one end thereof engaging said insulating member, a bearing member supported by the other end of said spiral spring, a pivoted actuating lever having a rounded end adapted for engagement with said bearing member, an operating lever integral with said actuating lever and arranged at substantially a right angle thereto, said operating lever extending outwardly through an opening in said upper section of the casing, and common means for securing said sections to each other and to a suitable support.

10. In a feed-through switch for electrical conductors, the combination with an insulating casing comprising separate sections, snap switch mechanism carried by one of said sections, said mechanism comprising a pair of combined stationary contacts and terminals and a pair of terminal plates longitudinally spaced therefrom respectively, a pair of contactors loosely pivoted to the respective terminal plates, an insulating member loosely interlocked with the free ends of said contactors, a spiral compression spring having one end thereof in engagement with said insulating member, and operating means for shifting the other end of said spring under compression to effect movement of said contactors jointly with a snap action into and out of engagement with said stationary contacts.

11. In a feed-through switch for electrical conductors, the combination with an insulating casing comprising separate sections, snap switch mechanism carried by one of said sections, said mechanism comprising a pair of combined stationary contacts and terminals and a pair of terminal plates longitudinally spaced therefrom respectively, a pair of contactors loosely pivoted to the respective terminal plates, an insulating member loosely interlocked with the free ends of said contactors, a spiral compression spring having one end thereof in engagement with said insulating member, operating means for shifting the other end of said spring under compression to effect movement of said contactors jointly with a snap action into and out of engagement with said stationary contacts, a supporting bracket, and common means for securing said casing sections to each other and to said bracket.

In witness whereof, I have hereunto subscribed my name.

GEORGE J. MEUER.