March 8, 1960 H. W. BROWN 2,927,983

ELECTRICAL SWITCHES

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Fig. 1

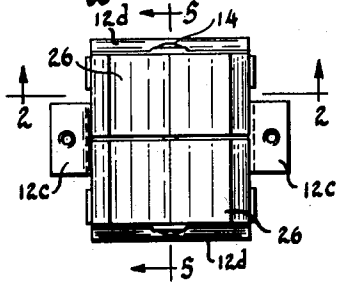


Fig. 2

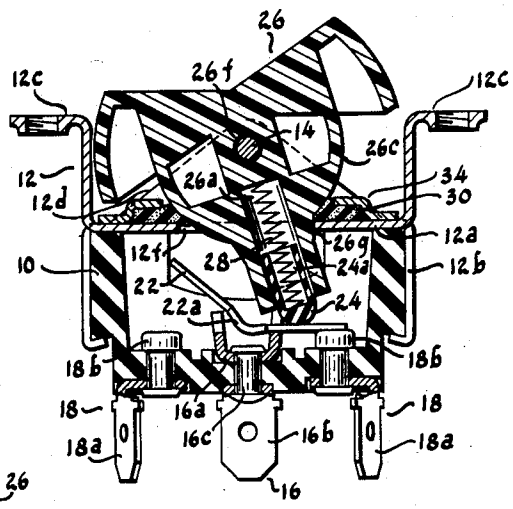


Fig. 3

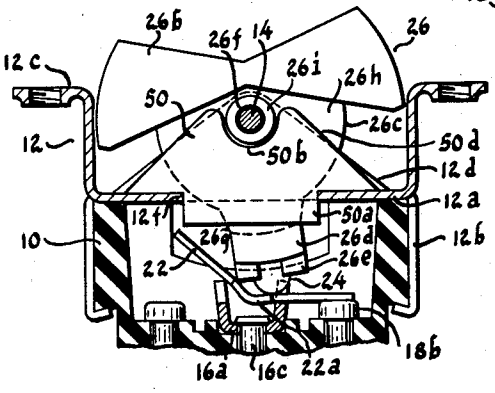
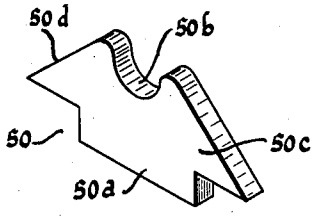


Fig. 4



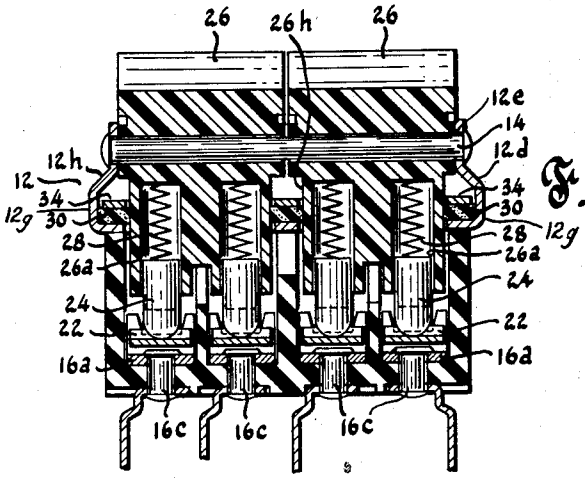


Fig. 5

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ELECTRICAL SWITCHES

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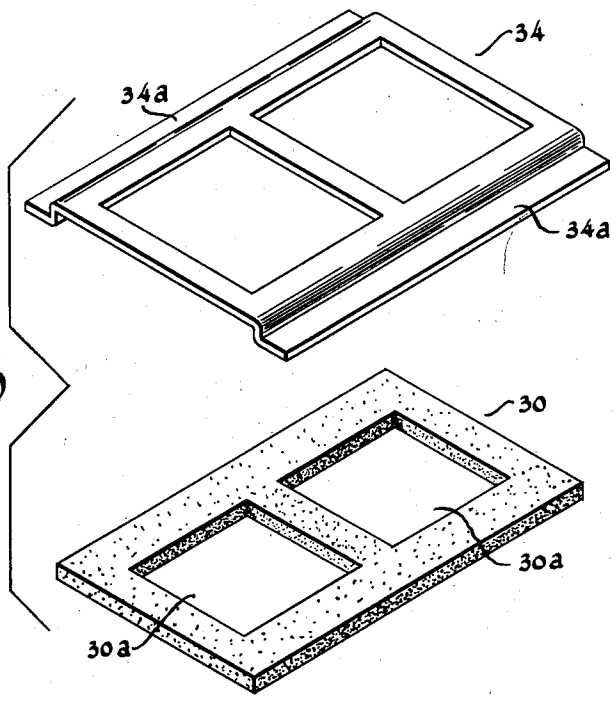


Fig. 6

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2,927,983

ELECTRICAL SWITCHES

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Application August 29, 1958, Serial No. 758,125
6 Claims. (Cl. 200—67)

This invention relates to electric switches, and more particularly to switches of the rocker button actuated type.

A primary object of the invention is to improve and simplify the details of construction and assembly of the parts and the operating characteristics of the aforementioned type of switches.

A more specific object is to provide a novel and simple form of manually operable switch of the rocker button type wherein the rocker button actuator is of a one-piece construction.

Another specific object is to provide a switch of the aforementioned type wherein the rocker button actuator is formed to cooperate with a movable contactor to insure positive breaking of engagement of the contactor from the stationary contacts.

A further specific object is to provide a seal for actuator openings in switch casings which will permit easy and proper operation of a rocker button type actuator.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawings illustrate preferred embodiments of the invention which will be hereinafter described in detail, it being understood that the embodiments illustrated are susceptible of various modifications without departing from the scope of the claims.

In the drawings:

Figure 1 is a top plan view of a rocker button actuator switch constructed in accordance with my invention;

Fig. 2 is a vertical sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a view, partly in vertical section and partly in side elevation of a modified form of switch;

Fig. 4 is a perspective view showing details of a part of the switch shown in Fig. 3;

Fig. 5 is a sectional view taken on line 5—5 of Fig. 1; and

Fig. 6 is a perspective view illustrating the construction of a sealing gasket and retaining plate used in the switch shown in Figs. 1, 2 and 5.

Referring to the drawings, the electric switch shown includes a casing consisting of a box like insulated switch base 10 and a punched and stamped sheet metal switch frame 12. Switch frame 12 is provided with a cover portion 12*a* overlying and substantially closing the cavity in base 10. The switch frame 12 also has portions 12*b* bent downwardly to provide securement of the frame to base 10. Upwardly and outwardly bent portions 12*c* of the switch frame 12 provide switch mounting brackets, and generally triangular portions 12*d* bent upwardly and in parallel with the side walls of base 10 have alined apertures 12*e* to accommodate the end portions of a pivot pin 14.

The switch mechanism comprises a fixed common terminal assembly 16 secured midway of the longitudinal dimension of the bottom wall of the base 10, fixed terminal assemblies 18 on opposite sides of the common terminal assembly 16, a tiltable bridging contactor 22, a bridging contactor operating plunger 24 and a manually operating rocker button actuator 26. Each of the terminal assemblies 18 includes a lug 18*a* which is riveted to the outside of the bottom wall of the base 10. A rivet having an upset head 18*b* is seated against the inner surface of the bottom wall of the base 10 and

serves as a stationary contact tip. The common terminal assembly 16 includes a U-shaped pivot member 16*a* and a lug 16*b* which are electrically interconnected and secured to the upper and lower surfaces, respectively, of the bottom wall of the base 10 by a rivet 16*c*. The upwardly extending arms of the U-shaped member 16*a* are slotted to accommodate the bridging contactor 22 and to provide a double pivot for the latter; said contactor having laterally extending wing portions 22*a* located between said upwardly extending arms of members 16*a* to prevent substantial endwise displacement of said contactor upon rocking or tilting of said contactor.

As thus far described, the switch mechanism resembles that disclosed in the Krieger Patent 2,248,362.

The bridging contactor operating plunger 24 is slidably disposed in a downwardly opening recess 26*a* in a rocker button actuator 26. The plunger 24 is provided with an upwardly opening recess 24*a* and is biased into engagement with the bridging contactor 22 by a coiled compression spring 28. The latter is held under compression between the top of recess 26*a* and the bottom of recess 24*a*.

The rocker button actuator 26 comprises a generally T-shaped integral member having a top portion 26*b* formed by the intersection of two flat surfaces at a substantially obtuse angle, a generally semicircular intermediate stem portion 26*c*, and an integral depending shank portion 26*d* having downwardly depending lug portions 26*e* extending from the lower side of said shank portion and situated on opposite sides of the downwardly opening recess 26*a*. The generally semicircular portion 26*c* of the rocker button actuator 26 is provided with a pivot aperture 26*f* of circular cross section. A pivot pin 14 extends through the aligned apertures 12*e* and 26*f* to provide for pivotal support of actuator 26. The rocker button 26 is formed of a suitable insulating material such as thermo-plastic or thermal setting plastic.

In the assembled relation shown, the shank portion 26*d* of rocker button 26 extends downwardly into base 10 through a centrally located rectangular opening 12*f* in the overlying cover portion 12*a* of switch frame 12. When the rocker button actuator 26 is rotated about pivot pin 14 to its extreme counterclockwise position as shown in Fig. 2, marginal ends of the opening 12*f* in the cover portion 12*a* of switch frame 12 engage the filleted portion 26*g* of the shank portion 26*d* of the rocker button actuator 26 to provide a positive stop.

As the rocker button actuator 26 begins to rotate clockwise about pivot 14 as shown in Fig. 3, plunger member 24 slides along on bridging contactor 22 and is displaced upwardly into recess 26*a* in the shank portion 26*d* of the rocker button actuator 26 against the bias of the spring 28. The upward displacement of the plunger 24 compresses spring 28 thereby maintaining continuous engagement of plunger 24 and the bridging contactor 22 as the plunger 24 slides along on the bridging contactor 22. As the plunger 24 begins to engage with the center portion 22*a* of the bridging contactor 22, the right-hand portion of the bridging contactor is pivoted upwardly about the upwardly extending right-hand arm of member 16*a* thus disengaging the bridging contactor from contact 18*b*. To insure positive breaking action of the bridging contactor 22 and contact 18*b* upon rotation of the rocker button actuator 26, the integral lug 26*e* depending from the shank portion 26*d* of actuator 26 engages the upwardly extending left-hand portion of the bridging contactor 22 (Fig. 3) before the plunger 24 engages with the center portion 22*a* of the contactor to pivot the latter to a position substantially horizontal to the bottom wall of switch base 10. Thus, the impact created by lug 26*e* engaging the bridging contactor 22

forcibly lifts the contactor sufficiently to positively break occasional electrical welds between the contactor **22** and the contact **18***b*.

As the actuator is further rotated in a clockwise direction, the plunger **24** slides on the left-hand portion of the bridging contactor **22** causing said portion of said contactor to tilt downwardly into engagement with the left-hand stationary contact **18***b*. The integral filleted portion **26***g* of the actuator **26** engages the opposite marginal end of the rectangular opening **12***f* in the cover portion **12***a* of the switch frame **12** to stop the pivotal movement of the rocker button actuator **26** thereby preventing the plunger **24** from sliding over the end of the bridging contactor **22**.

As best illustrated in Fig. 5, a modified form of switch has a sealing gasket **30** of resilient material such as felt or soft rubber. As shown in Fig. 6, the gasket **30** is generally rectangular in shape and is provided with rectangular openings **30***a*. The gasket **30** is disposed about the rectangular opening **12***f* in switch frame **12** and is held in place by a punched and stamped retaining plate **34**. The retaining plate **34** substantially overlies the sealing gasket **30** to prevent displacement thereof and flanges **34***a* of the plate are secured to the switch frame **12** as by spot welding. The rectangular openings **30***a* in the gasket **30** are provided with inner dimensions such that, in assembled relation on switch frame **12**, the marginal surfaces in the openings **30***a* of the gasket **30** are compressed snugly against the outer margins of the shank portions **26***c* and **26***d* of the rocker button actuators **26**, as the actuators are pivoted about pivot pin **14**, thereby continuously providing a seal to prevent dust or other foreign matter from entering through the opening in the top of the swtich base **10**.

To provide a lateral offset **12***g* for placement therein of the side portions of gasket **30** and retaining plate **34**, the upwardly extending spaced arms **12***d* of the switch plate **12** are bent inwardly at an angle at an intermediate point **12***h* of the spacer arms.

A light shield **50** composed of a thin sheet of suitable heat resistant material such as fiber, plastic or metal is disopsed between two adjacent rocker button actuators **26** mounted coaxially on a pivot pin **14**. The light shield **50** has a thickness approximately twice the depth of a shallow indented portion **26***h* located in that side of rocker button actuator **26** which abuts the surface of light shield **60**. As shown in Fig. 4, the light shield **50** is generally triangular and has a depending rectangular shank **50***a* and a generally semicircular notch **50***b* at the apex to accommodate a boss **26***i* surrounding a pivot aperture **26***f*. When in the assembled relation with abutting rocker button actuator **26** mounted coaxially on pivot pin **14** shown in Fig. 3, the rectangular portion **50***a* of the shield **50** is positioned in the opening **12***f* in the overlying cover portion **12***a* of switch frame **12** and extends downwardly into the base **10**. The ears **50***c* formed by the opposite angles of the triangular shield overlie the cover portion **12***a* to prevent the shield **50** from dropping into the base **10**. The slope of the sides **50***d* of the shield is great enough to provide clearance between the shield **50** and the underside of the top portion **26***b* of the rocker button actuator as the rocker button is operated into either of its opposite extreme positions. Since the rectangular shank portion **50***a* of the light shield **50** is disposed in the opening **12***f* in the cover portion **12***a* between the rocker button actuators **26**, arcing between contacts **18***b* and the bridging contactor **22** which might be visible between adjacent rocker buttons during operation of the switch is effectively shielded from the operator's view.

I claim:

1. In an electric switch, in combination, an insulating base, a plurality of spaced stationary contacts carried by said base, a tiltable contactor loosely and pivotally supported by one of said stationary contacts, a one-piece rocker button type actuating lever having an integrally formed portion extending into said insulating base, said rocker button having a normal position and an operating position and means for pivotally supporting said actuating lever and said integrally formed portion carrying plunger means for continuously biasing said contactor toward said stationary contacts and a projection adjacent said plunger means for forcibly and non-resiliently tilting said contactor out of bridging engagement with one of said stationary contacts before said plunger means becomes operative to produce the aforesaid tilting action.

2. The combination according to claim 1, wherein said plunger means comprises a spring biased plunger slidably carried by the integrally formed portion of said lever for continuously engaging said contactor, and wherein said integrally formed portion has a plurality of depending lugs adjacent said plunger for forcibly tilting said contactor upon rocking of said rocker button actuating lever.

3. The combination according to claim 1, wherein said rocker button actuating lever is generally T-shaped and has a top rocker button portion and an integral depending shank portion, said shank portion having a longitudinal downward opening recess to slidably accommodate a spring biased plunger and also having a transverse opening therethrough to accommodate a pivot member having its extremities supported on said supporting means, said shank portion also having a plurality of integral lugs adjacent to and on opposite sides of said recess and depending downwardly therefrom, said lugs non-resiliently engaging and forcibly tilting said contactor out of engagement with one of said stationary contacts before said rocker button actuating lever is operated to its normal position.

4. The invention defined in claim 1, together with a resilient sealing member having a central opening extending therethrough and overlying said sheet metal member, said sealing member engaging along the margins of said openings with the outer surfaces of said intermediate portion of said rocker button actuating lever, means overlying said sealing member to cause the latter to compressively engage said intermediate portion of said actuating lever as said actuating lever is pivotally moved and to secure said sealing member on said sheet metal member.

5. The combination according to claim 4, wherein said sealing member comprises a rectangular gasket formed of soft rubber having a rectangular opening extending therethrough, and wherein the last specified means comprises a rectangular metal plate having a rectangular opening extending therethrough registering with the opening in said gasket, said plate having its end portions secured to said sheet metal member.

6. In an electric switch having an insulating base, a plurality of spaced stationary contacts carried by said base, a tiltable contactor loosely and pivotally supported by one of said stationary contacts, an actuating lever piovtally supported above said insulating base and extending into said insulating base comprising means for tilting said contactor to bridge said one stationary contact and another of said stationary contacts upon movement of said actuating lever, the improvement comprising non-resilient means for positively breaking a weld between said contactor and said stationary contacts upon pivoting of said actuating lever, said means comprising a plurality of depending integral portions of said actuating lever engaging with said contactor to forcibly pivot said contactor about said one stationary contact thereby positively lifting said contactor out of welded engagement with another of said stationary contacts.

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