Oct. 3, 1939. H. G. GRAUBNER ET AL 2,174,877

SWITCH

Filed July 2, 1935

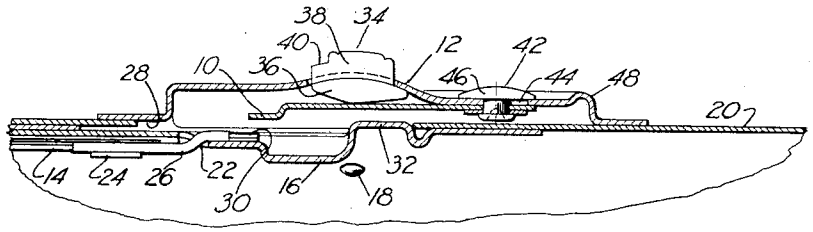


Fig. 1.

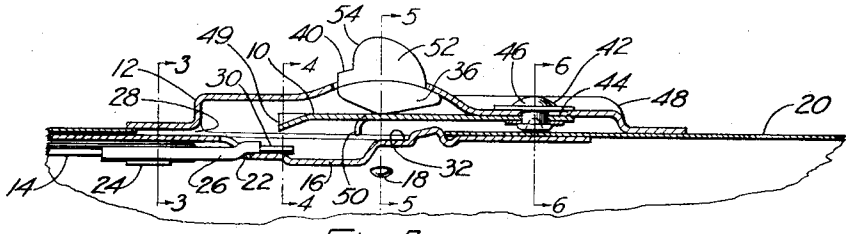


Fig. 2.

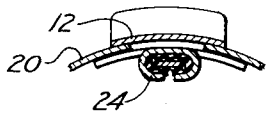


Fig. 3.

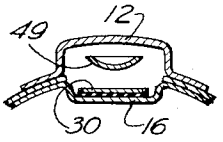


Fig. 4.

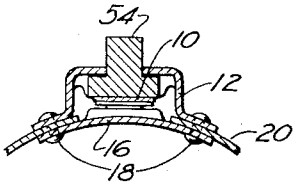


Fig. 5.

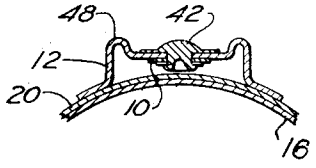


Fig. 6.

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SWITCH

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Application July 2, 1935, Serial No. 29,458

9 Claims. (Cl. 200—60)

The invention pertains to switches in general and more specifically to switches especially adapted for flashlights and similar self-contained battery operated light projecting devices.

In flashlights the containing casing often forms part of the conductor for an electric circuit through which the battery current flows to energize the lamp bulb, and a separate conductor insulated from the casing conducts the current from the switch to one terminal of the lamp bulb. In such flashlights the switch may complete the electrical gap in the circuit betwen the casing and the insulated conductor.

Many switches have been proposed for this purpose but they are not entirely satisfactory because they are difficult to operate and the useful life of their rather complicated structure is comparatively short. Such switches have also been provided with means for latching or locking the operating structure in open circuit position, but they have likewise been unsatisfactory because ordinary operative manipulations when performed in an improper sequence often injured the switches or rendered them inoperative.

Therefore, the more important objects of the invention are to provide a switch that is easy to operate, simple in structure, long in life, pleasing in size and contour, and free from liability of injury from operation. These and other objects and novel features will be more fully illustrated in the following description and the acompanying drawing, in which:

Fig. 1 is a longitudinal sectional view of one example of a switch embodying the invention;

Fig. 2 is a similar view of another example of a switch embodying the invention;

Fig. 3 is a sectional view along line 3—3 of Fig. 2 showing the structure for securing the insulated conductor to the switch;

Fig. 4 is a sectional view along line 4—4 of Fig. 2 showing the relative position of the switch blade and the insulated conductor;

Fig. 5 is a sectional view along line 5—5 of Fig. 2 showing the form of the switch button; and,

Fig. 6 is a sectional view along line 6—6 of Fig. 2 showing the structure for securing the switch blade to the switch.

The invention shown by the drawing may be embodied in a switch comprising a switch blade 10 mounted within a housing 12 in operative relation with a cooperating conductor 14 secured to a base plate 16 that is fixed to the housing 12 and forms a part thereof.

The housing 12 and the base 16 may be secured in fixed relation by any suitable fastening such as an appropriate number of rivets 18, and the switch may be mounted upon a flashlight in any suitable way such as by interposing a portion of a flashlight casing 20 between the housing 12 and the base 16. The conductor 14 may extend into the switch through a suitable opening 22, and it may be secured to the switch by a suitable number of overturned ears 24 each extending from the base 16 partially around the conductor. The conductor may also be insulated from the switch by a suitable covering of dielectric material 26 interposed between the conductor and the switch.

The portion of casing 20 within the switch may be provided with an appropriate opening 28 through which the switch blade 10 may be moved into contact with an exposed portion 30 of conductor 14, and the housing may be provided with an upwardly extending and radially outwardly projecting portion 32 of base 16 to prevent the switch blade from being moved a distance sufficient to produce a permanent deformation therein.

The switch blade 10 may be moved or depressed into contact with the exposed portion 30 of conductor 14 by a switch button 34. This button may have an enlarged portion 36 within housing 12 in operative relation with the switch blade, and a reduced portion 38 extending outwardly through a suitable elongated opening in the housing. The narrow longitudinal operating portion 36 of the operating button 34 projects through and completely closes such opening in all positions of said button to protect the parts of the switch from extraneous matter. To facilitate operation the ends of the enlarged portion 36 may be spaced from the switch blade so that only a narrow transverse median portion engages the blade. The reduced portion 38 may extend outside of the casing sufficient to facilitate manual operation, and this portion may be provided with a shoulder 40 that may be latched against the inner surface of the housing, by depressing the button and then moving or rocking it forward, to hold the switch in closed position. To further facilitate operation, the inner surface of the upper portion of the housing 12 may be provided with a surface that is curved longitudinally outward, and the upper surface of the enlarged portion 36 of the button 34 may be provided with a similarly curved surface that conforms with the curved inner surface of the housing against which it is held by the resilient switch blade 10.

The switch blade 10 may be secured to the

housing 12 by appropriate means such as a rivet 42, and this rivet may be mounted in a suitable slot 44 in the housing and provided with an enlarged head 46 to facilitate movement of the switch blade to a rear position where it will not engage conductor 14 when depressed. This provides a safety open circuit position in which accidental depression of the button will not close the circuit. To guard against accidental movement of the switch blade the housing 12 may be provided with a wall 48 either surrounding or partially surrounding the enlarged head 46 of rivet 42 outside the housing.

The embodiment shown in Fig. 2 is of the same general construction as that shown in Fig. 1 although provided with improvements to facilitate operation. In this construction, the switch blade 16, may be provided with a downwardly extending portion 49 in position to engage the exposed portion 30 of conductor 14 when the switch blade 16 is in operative or forward position, and with a downturned depending tongue or projection 50 that engages abutment 32 when the switch blade 16 is in rear or inoperative position, and provides greater freedom of movement for the switch blade when it is in forward position.

When a flashlight, upon which this switch is mounted, is held in the hand and the switch button is manipulated by the thumb in the usual manner, the natural direction of pressure is downward and forward. In order to apply this natural operating movement more effectively, the elongated outwardly projecting portion 52 of button 54 may be formed so that the highest portion is near the front and the lowest portion near the rear. Also, the front portion may be curved outwardly and the rear portion may slant rearwardly in a descending curve that merges with the curved front portion and extends substantially to the outer surface of the housing at the rear end of the button.

When a person operates this switch the greatest pressure is naturally applied to the higher forward portion of the button and consequently the forward end is depressed first. As the front end moves downward the point of greatest pressure moves backwardly and this, together with the upward pressure of the rear end of the button against the adjacent upwardly curved portion of the casing, tends to move the button forwardly. Therefore, when the forward end of the button has been depressed until the blade 16 is in contact with conductor 14 the button moves forwardly and the shoulder 49 slides under the housing without conscious effort of the operator. To open the switch the button is simply moved backwardly and the resiliency of the blade 16 elevates the button to normal open circuit position.

In case the flashlight or switch is to be placed in inoperative condition the switch blade 16 may be moved to the rear out of operative relation with conductor 14 by moving rivet head 46, thereby moving the contact portion 49 of switch blade 16 out of operative relation with the exposed portion 30 of conductor 14, and tongue 50 of the switch blade into engagement with abutment 32 of housing 12. If the button 54 is depressed while the switch is in this position the engagement between the tongue 50 and the stop or abutment 32 prevents pressure in excess of normal operating pressure from bending the switch blade or otherwise injuring the switch.

Therefore, we have provided a switch that is simple, rugged, easy to operate, long of life, esthetic in appearance, and not subject to injury.

It is understood that the form and relative position of the parts may be different from that shown, and that similar and equivalent parts and materials may be substituted for those described.

We claim:

1. In a flashlight, a casing having an opening; a housing, having an aperture in its outer wall, secured externally to said casing and closing said opening; a base secured internally of said casing opposite said housing; a conductor having an end extending through an aperture in said base and terminating adjacent the opening in said casing; a resilient switch blade slidably secured at one end to said housing; means for moving said blade longitudinally of said casing into and out of a position wherein the end of said blade is above the end of said conductor; and an operating button extending outwardly through the aperture in said housing and slidable therein longitudinally of said casing, the inner portion of said button slidably engaging said switch blade for at times depressing the end thereof into contact with the end of said conductor.

2. A combination as defined in claim 1, in which said switch blade is formed with a depending tongue and said base is formed with a radially outwardly projecting abutment so located that said tongue will engage said abutment when said switch blade is moved out of the position wherein the end of said switch blade is disposed above the end of said conductor.

3. In a switch; a housing; a switch blade mounted in said housing and provided with a depending tongue; a conductor in said housing in operative relation with said switch blade; a button for operating said switch blade; means, independent of said button for moving said switch blade out of operative relation with said conductor; and a base for said housing having an abutment engageable by said tongue when said switch blade is in inoperative position to prevent excess pressure applied to said button from injuring said switch blade, and spaced longitudinally from said tongue when said switch blade is in operative association with said conductor.

4. A combination as defined in claim 1, wherein said operating button is formed with a shoulder engageable beneath said housing when said button is depressed to move said switch blade into engagement with said conductor, and said housing is formed with a wall surrounding said switch blade operating means to prevent accidental operation thereof.

5. In combination, a flashlight casing; a switch mounted thereon and including a housing, the outer wall of said housing having a portion which is curved longitudinally of said casing and being provided with an opening in said curved portion extending longitudinally of said casing; a resilient switch blade within said housing movable into circuit closing position; and an operating button mounted in said opening and provided with a curved surface conforming in shape with the inner surface of the curved portion of said housing, a narrow longitudinal operating portion projecting through and completely closing said opening in all positions of said button to protect the parts of said switch from extraneous matter, and a portion below said curved surface in operative engagement with said switch blade, whereby when said button is moved longitudinally in said opening it will rock about the axis of its curved surface to operate said switch blade.

6. A switch comprising a housing provided with an opening therein; a resilient switch blade

slidably mounted in said housing below said opening for movement between an operative and an inoperative position; an operating button mounted in said opening and provided with a narrow transverse median portion in operative engagement with said switch blade; and means independent of said operating button for moving said switch blade between an operative and an inoperative position.

7. A switch comprising a casing; a housing mounted on said casing and provided with an elongated opening therein; a conductor extending into said housing; a resilient switch blade mounted in said housing below said opening; means for moving said switch blade from a position adjacent said conductor to a position remote therefrom; and an operating button mounted in said opening in operative engagement with said switch blade, said operating button being movable longitudinally in said opening and movable vertically in all portions of said opening, and provided with a shoulder adapted to engage the inner surface of said housing beyond the forward end of said opening and hold said switch closed when said button is depressed and moved forward with respect to said housing.

8. In a flashlight, a switch comprising a housing; an inwardly projecting abutment in one wall of said housing; a conductor extending into said housing; an operating button mounted in said housing above said abutment; a resilient switch blade slidably secured at one end to the other wall of said housing, said switch blade extending between said button and said abutment and the opposite end thereof being normally disposed above said conductor; a contact portion on said opposite end of said switch blade; a tongue depending from said switch blade and longitudinally spaced from said abutment when said opposite end of the switch blade is above said conductor; means for moving said switch blade longitudinally of said housing to space said contact portion longitudinally from said conductor and said tongue above said abutment, whereby the inward movement of said switch blade is limited to prevent deformation thereof under excess pressure on said operating button.

9. A flashlight including a casing; a housing mounted on said casing, a portion of the outer wall of said housing being curved longitudinally of said casing and having an opening therein; a recess in the top portion of said housing at one end thereof; a base plate secured to said housing and having a depressed portion and an opening adjacent thereto; an abutment on said base plate extending into said housing; a first conductor extending through the opening in said base plate and secured to the upper side of said depressed portion; a second conductor slidably secured to the underside of the recess in said housing and adapted to at times engage said abutment; means for longitudinally moving said second conductor; and means movably mounted in the opening in said housing and having a portion in conforming engagement with said curved portion; said means being operative to at times cause engagement of said conductors.

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