Nov. 15, 1932. F. G. STIMSON 1,888,204

FLASH LIGHT SWITCH

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FIG.1.

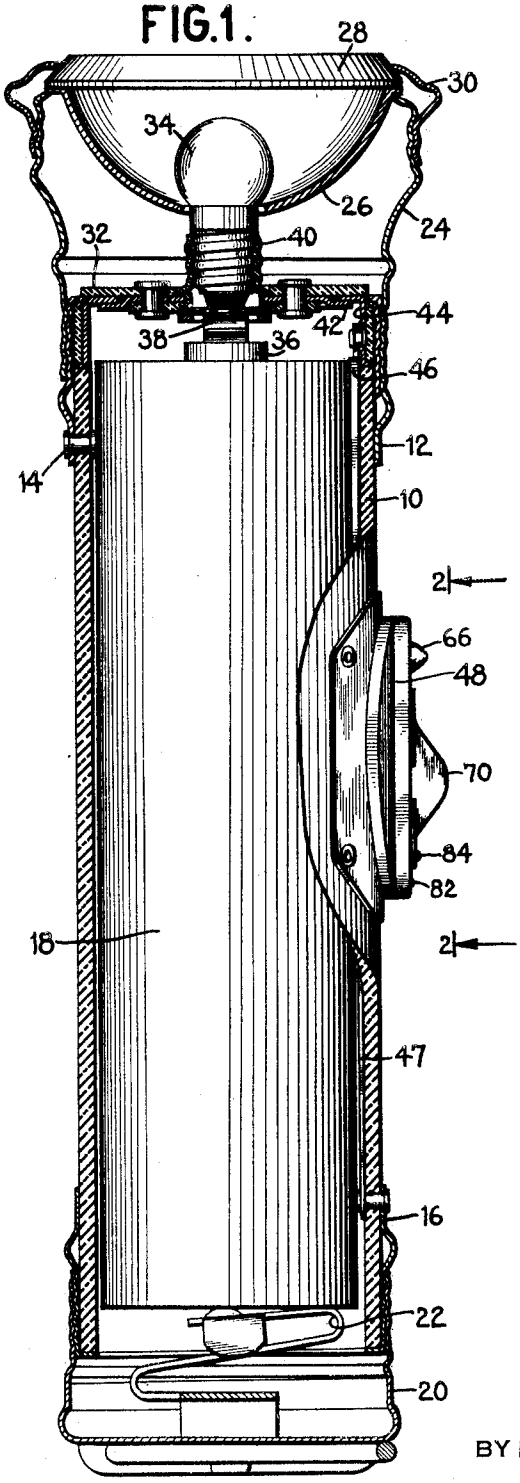


FIG.2.

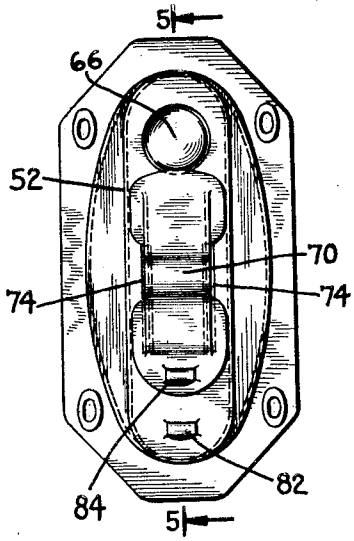
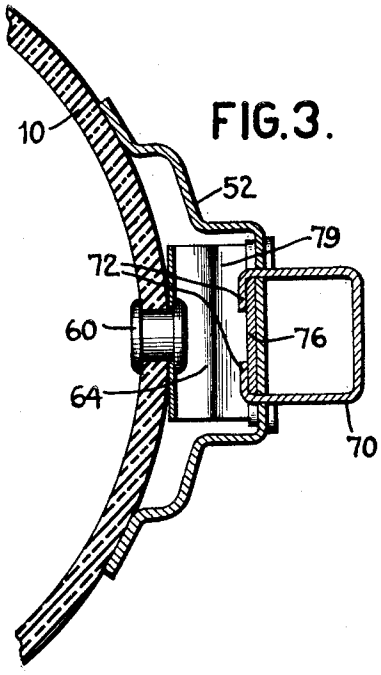


FIG.3.



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FIG.4.

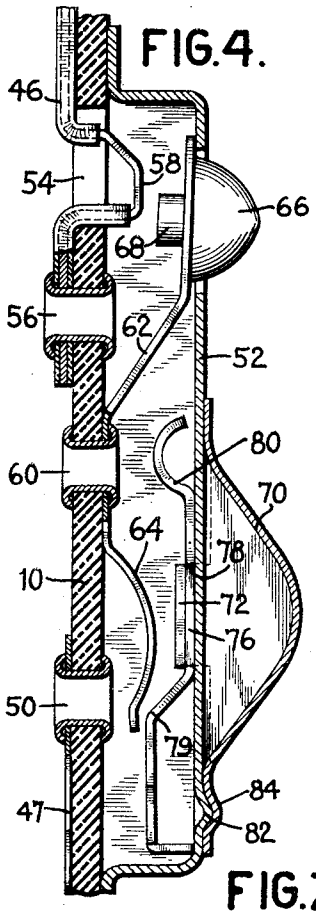


FIG.5

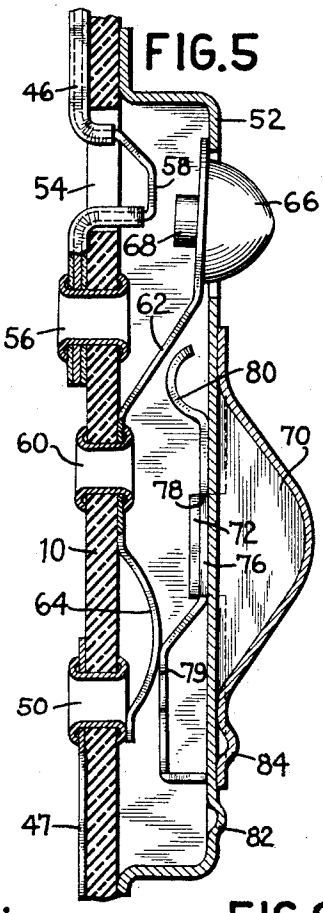


FIG.6.

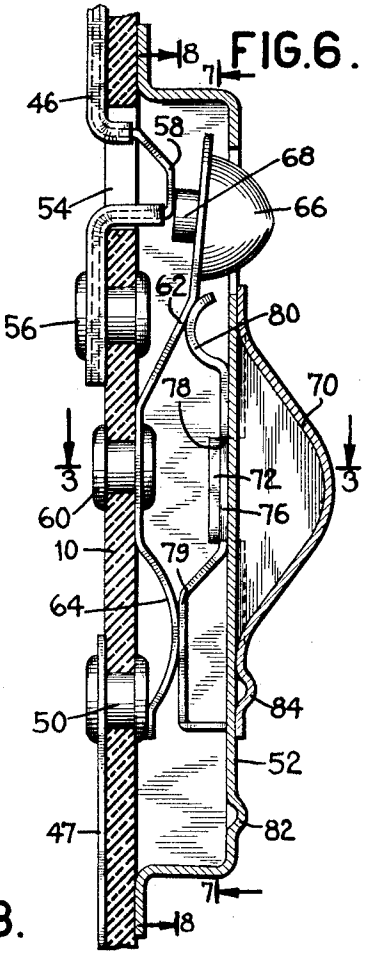


FIG.7.

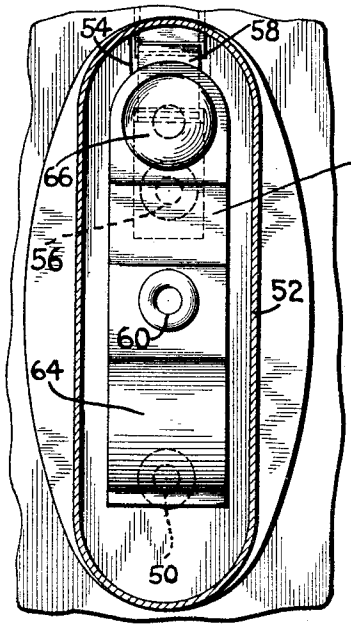
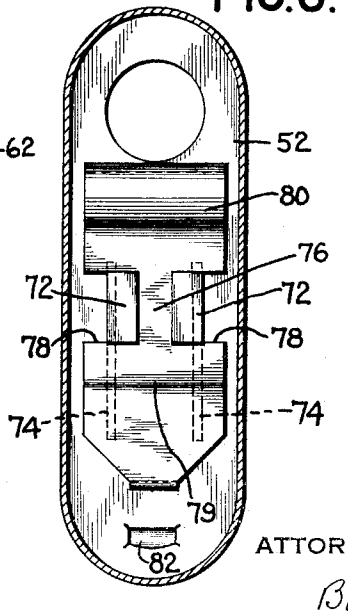


FIG.8.



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UNITED STATES PATENT OFFICE

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FLASH LIGHT SWITCH

Application filed May 8, 1931. Serial No. 535,873.

This invention relates to circuit closers of the kind known as safety switches. It has particular application to circuit closers for flashlights although it is not restricted to such use.

In flashlight constructions, it is customary to employ a slidable switch actuating member which is adapted to so engage a protruding lug as to effect a closing of the switch and consequently a closing of the electric circuit through, say, the flashlight lamp. The protruding lug is often, when the flashlight is not in use, accidently or otherwise depressed and maintained in circuit closing position a sufficient length of time to destroy the activity of the flashlight battery and thus render the same useless. It has, therefore, heretofore been proposed to maintain the circuit open even though the aforesaid protruding lug became accidentally or otherwise depressed while the slidable switch actuating member was maintained in a normal or inoperative position. In accomplishing this proposal, a safety switch was provided having resilient main and auxiliary circuit closers in series connection in the electric circuit, and a reciprocable structure moved in one direction to progressively move such circuit closers to circuit closing position and moved in an opposite position to permit such circuit closers to progressively move to circuit opening position.

Difficulty has been experienced with the aforesaid construction in that, in use, the slidable switch actuating member has become loosened because of the upward thrust thereon occasioned in coming against the protruding lug on the main circuit closure in depressing the same.

One object of the present invention is, therefore, to provide means for depressing the main circuit closer so that the thrust will be taken up by the switch housing or box instead of on a slidable structure carried thereby.

Another object of the invention is to provide a switch particularly adapted to be used in connection with a flashlight which is simple in construction, reliable in operation and inexpensive to manufacture.

These and other objects of the invention and the means for their attainment will be more apparent from the following detailed description, taken in connection with the accompanying drawings, illustrating one embodiment by which the invention may be realized, and in which:—

Figure 1 is a central longitudinal sectional view through a flashlight showing, in section, the several co-operative features thereof with the circuit closer of this invention in side elevation.

Figure 2 is a plan view of the circuit closer looking from the right in Figure 1.

Figure 3 is a transverse vertical sectional view of the circuit closer, taken in the plane indicated by the line 3—3 in Figure 6 and looking in the direction of the arrows.

Figures 4, 5 and 6 are longitudinal vertical sectional views taken in the plane indicated generally by the line 5—5 of Figure 2 and looking in the direction of the arrows; Figure 4 showing the switch in open circuit or safety position; Figure 5 showing the switch in flash position whereby the circuit may be closed by manually depressing the contact lug; and Figure 6 showing the circuit closer in position of steady light.

Figure 7 is a sectional view taken in the plane indicated by line 7—7 of Figure 6 and looking in the direction of the arrows.

Figure 8 is a sectional view taken in the plane indicated by the line 8—8 of Figure 6 and looking in the direction of the arrows.

In the drawings, wherein for the purpose of illustration the circuit closer of this invention is shown as applied to a flashlight, the casing of the flashlight is indicated at 10 as composed of non-metallic material and of generally cylindrical shape. The flashlight casing carries at its upper end a threaded hood collar 12, secured in any convenient fashion as by a rivet 14 or the like and at its other end is provided with a threaded bottom cap collar 16, similarly secured to the casing. Obviously, the casing may be of the usual metallic type in which the metallic conductor 46, the housing 52 and the circuit closer 62, 64 are insulated from the casing, the metallic conductor 47 is eliminated and the

auxiliary circuit closer end 64 is allowed to make contact directly with the casing. At the lower end, the casing 10 carries the removable bottom cap 20 containing suitable resilient battery positioning means 22. At the upper end of the casing is shown the hood 24 carrying a suitable reflector 26 and lens 28 held in place by lens ring 30. Removably mounted upon the end of the casing is a lamp socket support 32 carrying the lamp 34 within the reflector. The carbon pole 36 of the battery is electrically connected with the central terminal of the lamp 34 by a suitable contact means 38, the circuit being completed from the other terminal of the lamp through the socket 40, metallic disc 42 of the lamp socket support, bushing 44 carried with the casing 10 and conductor 46 connected thereto and to one terminal 58 of the circuit closer which is indicated as a whole by the numeral 48. The circuit from the zinc terminal of the battery includes the battery positioning element 22, the metallic bottom cap 20, bottom cap collar 16 and a conductor strip 47 leading therefrom to the other terminal 50 of the circuit closer 48.

As shown in Figure 4, the conductor strip 47 leading from the negative terminal of the battery is secured by a rivet 50 to the casing, which rivet extends, of course, to the outside of the casing and within the housing or box 52 secured outwardly thereof, and enclosing the parts of the switch, as will be understood. Also within the box 52, the casing 10 is apertured as at 54 and a portion of the upper conductor strip 46, which is secured at its end, say, by a rivet 56, is bare at least at that point and is bent as at 58 to extend through the aperture 54 into the box 52. The rivet 50, therefore, serves as one switch contact or terminal and the bent portion 58 of conductor 46 serves as another contact or terminal. The switching device, according to this invention, serves to connect these two contacts when the light is to be illuminated.

Mounted intermediate the contacts 50 and 58 as by a rivet 60, is a contact spring having free ends serving, respectively, as a main circuit closer 62 and an auxiliary circuit closer 64. These free ends 62 and 64 are normally bent away from the terminals and so maintained, as shown in Figure 4, by their inherent resiliency. The main circuit closer 62 carries, if desired, a thumb piece or lug 66 and conveniently a contact member 68 adapted, when the lug 66 is depressed, to be brought into contact with the bent portion 58 of the upper conductor member 46. The extremity of the auxiliary circuit closer 64 lies over the eyelet 50 so that when depressed, it will contact therewith and close the circuit. It will thus be seen that when the auxiliary and main circuit closers 64 and 62, respectively, are both depressed, that the circuit is completed between the lower conductor strip 47 and upper conductor strip 46 and current is permitted to flow through the lamp to illuminate it.

The means for depressing the main and auxiliary circuit closers will now be described. Upon the housing 52, there is arranged an accessible switch actuating slide 70 provided with oppositely disposed ears 72, Figure 8, extending through parallel slots 74 formed in the housing 52. These ears 72 serve not only as means for retaining the slide 70 in position upon the housing 52, but function also as means for connecting the slide with a cam member 76 disposed within the housing and movable with the slide 70 when the same is actuated. As shown in Figure 8, the slide 76 is provided with oppositely disposed notches or the like 78 adapted to receive the ears 72 when the switch is assembled, the ears 72 being passed through the slots 74 and bent beneath the slide 76 so that both the slide and the cam member move together.

The cam member 76 comprises generally a downwardly extending auxiliary cam surface 79, adapted to engage the auxiliary circuit closer 64 and depress it into contact with the eyelet contact 50 when the slide is moved from fully retracted position, shown in Figure 4, either to the flashing position shown in Figure 5, or to the steady light position shown in Figure 6. When the slide 70 is moved to the position shown in Figure 5, the auxiliary circuit closer 64 is depressed into contact with eyelet terminal 50 thereby closing the auxiliary contacts and enabling the circuit to be closed when the main circuit closer 62 is depressed, as by pressure of the finger on thumbpiece 66.

To maintain a steady light, the slide is advanced still further to the position shown in Figure 6, cam surface 79 remaining in contact with the auxiliary circuit closer 64, although sliding with respect thereto, to keep those contacts closed. The advanced position of the slide 70 brings an additional camming surface referred to herein as the main cam member 80 into contact with the main circuit closer arm 62, depressing the same as shown in Figure 6 to bring the main circuit closer or the contact 68 thereon into contact with the bent terminal portion 58 of the upper conductor strip 46. Thus in the position shown, the main circuit closer may be held in circuit closing position by the main cam member 80 so long as the slide 70 remains, by the friction of the parts, in advanced position.

It is to be noted that the cam member 76 bears against and moves along the underneath side of the top of the housing 52. Thus any upward thrust against either auxiliary or main cam portions resulting from their engagement with the circuit closers in depressing them is taken up by the housing.

There is thus no tendency of the slide 70 to be loosened from the housing since no strain is put upon it.

If desired, the slide 70 may be retained in one or more of its positions as by locking devices such as lug 82 pressed outwardly from the housing 52 to cooperate with a similarly outwardly pressed portion or recess 84 on the slide. Thus, as in Figure 4, when the slide is in wholly retracted position and the main and auxiliary contact members are in open position, the respective deflected portions 82 and 84 of the housing 52 and slide 70 are in engagement and the slide is prevented from displacement.

With the several elements of the circuit closer positioned as shown in Figure 4, it is obvious that if the lug 66 is depressed so as to move the arm 62 into engagement with the conductor 46, the circuit through the lamp 34 will not be closed because the auxiliary contacts 64, 50 are still open. But if the slide 70 is so moved as to bring the cam member 79 into contact with the auxiliary arm 64, so as to cause a depression of that arm into engagement with the lower conductor 47, the circuit through the lamp 34 will be completed. The circuit, when once closed as a result of the movement of the slide 70, will be maintained in such a condition until the slide 70 is retracted to its safety position shown in Figure 4. If the slide 70 is so moved as to bring the main cam member 80 into contact with the main circuit closer 62 in order to depress the same into contact with the upper conductor 46, and hold it there, the cam 79 maintains the auxiliary circuit closer 64 in circuit closing position and the circuit when once closed will be maintained in such condition until the slide 70 is retracted to its normal or safety position shown in Figure 4, when it releases the main circuit closer 62 and at the same time permits the auxiliary arm 64, due to its inherent resiliency, to retract from engagement with the contact 50.

It is to be understood that while there has been shown and described a circuit closer embodying the invention in connection with a flashlight, the container of which is constructed of non-metallic material, the flashlight container may be constructed of metal, in which case the housing 52 need merely be insulated from the container as must also the conductor strips 46, 47.

Various modifications will occur to those skilled in the art in the configuration, composition and disposition of the various component elements going to make up the invention as a whole, as well as the application thereof to various purposes and no limitation is intended by the phraseology of the foregoing description or illustrations in the accompanying drawings except as indicated in the appended claims.

What is claimed is:—

1. A safety switch comprising a resilient circuit closer member having main and auxiliary circuit closers adapted for series connection in an electric circuit, a housing for said circuit closer member, a slide slidably mounted upon said housing outwardly thereof for manual movement, a cam member mounted within said housing, means to connect said slide and cam member for bodily movement of the cam member with the slide, said cam member comprising an auxiliary camming surface adapted to be brought into engagement with the auxiliary circuit closure to effect movement thereof to circuit closing position upon movement of the slide from open circuit position and a main camming surface adapted to be brought into engagement with the main circuit closer to effect movement thereof to circuit closing position upon movement of the slide to steady light position.

2. A safety switch comprising a resilient circuit closer member having main and auxiliary circuit closers adapted for series connection in an electric circuit, a housing for said circuit closer member, a slide slidably mounted upon said housing outwardly thereof for manual movement, a cam member mounted within said housing, means to connect said slide and cam member for bodily movement of the cam member with the slide, said cam member comprising an auxiliary camming surface at one end adapted to be brought into engagement with the auxiliary circuit closure to effect movement thereof to circuit closing position upon movement of the slide from open circuit position and a main camming surface at the other end adapted to be brought into engagement with the main circuit closer to effect movement thereof to circuit closing position upon movement of the slide to steady light position.

3. A safety switch comprising a resilient circuit closer member having main and auxiliary circuit closers adapted for series connection in an electric circuit, a housing for said circuit closer member, a slide slidably mounted on the exterior of said housing for manual movement, a cam member comprising a single flat strip of sheet metal offset at one end to form an auxiliary camming surface, the end of said strip being bent upwardly as a flange and the other end of said strip being bent downwardly in curvilinear form as a main camming surface, and means to connect said strip intermediate the camming surface with the slide for bodily movement thereof with the slide, said auxiliary camming surface being adapted to be brought into engagement with the auxiliary circuit closer to effect movement thereof to circuit closing position from open circuit position, said flange bearing against the inner side of the housing and said main camming surface

being adapted to be brought into engagement with the main circuit closer to effect movement thereof to circuit closing position upon movement of the slide to steady light position.

In testimony whereof I affix my signature.

FRANK G. STIMSON.