Dec. 25, 1928. 1,696,720

A. S. LYHNE

FLASH LIGHT

Filed April 27, 1927

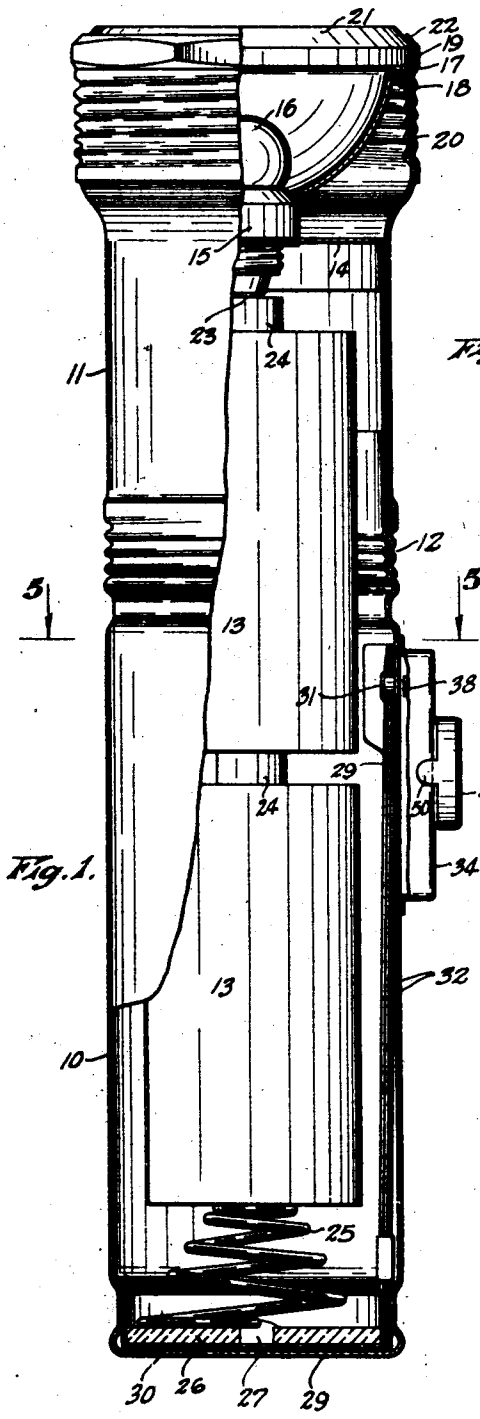


Fig. 1.

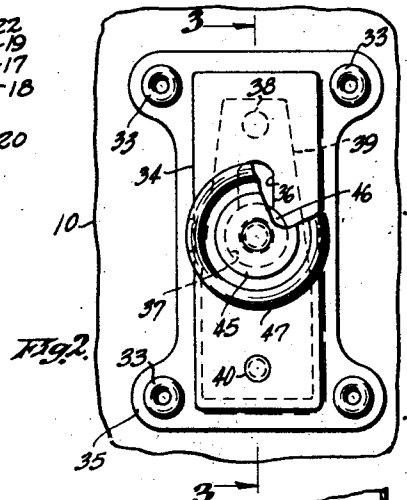


Fig. 2.

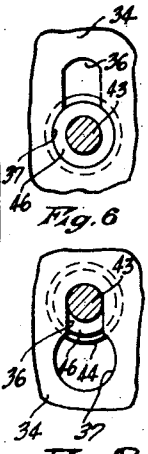


Fig. 6.

Fig. 7.

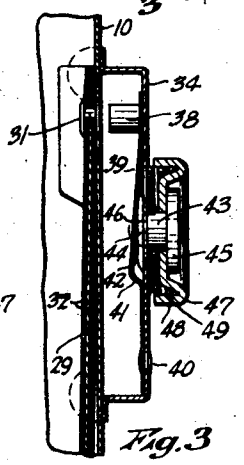


Fig. 3.

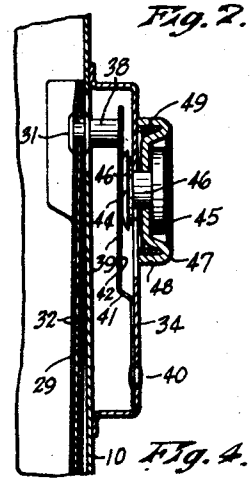


Fig. 4.

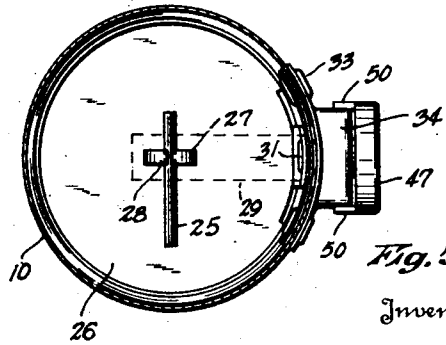


Fig. 5.

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UNITED STATES PATENT OFFICE.

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FLASH LIGHT.

Application filed April 27, 1927. Serial No. 186,872.

This invention relates to flashlights, especially of the type that may be carried in the hand and has a small electric lamp at one end operated by batteries within the shell or casing, and particularly to the control switch for controlling the lamp.

It has for an object to provide a structure of this type which is simple in construction and will be reliable in operation, and particularly to a construction in which the liability of the switch being accidentally closed and thus exhausting the batteries when the light is placed in a tool kit or laid on a support is reduced to a minimum.

With the foregoing and other objects in view, I have devised the construction shown in the accompanying drawing as illustrating my invention. In this drawing,

Fig. 1 is a partial side elevation and partial longitudinal section of the flash light showing my invention applied thereto.

Fig. 2 is a plan view of the switch mechanism.

Fig. 3 is a longitudinal section thereof substantially on line 3—3 of Fig. 2 showing the switch in the open position.

Fig. 4 is a view similar to Fig. 3 showing the switch in closed position.

Fig. 5 is a transverse section substantially on line 5—5 of Fig. 1.

Fig. 6 is a detail showing the switch operating element in the position corresponding to Figs. 2 and 3, and

Fig. 7 is a similar view showing the element in the position corresponding to Fig. 4.

The shell or casing in the present construction is made of sheet metal and comprises two sections 10 and 11 secured together by any suitable means, such as screw threads 12, whereby the sections may be separated for insertion and removal of batteries 13. In the upper section 11 is a transverse wall 14 carrying a socket 15 for an incandescent lamp bulb 16. A sheet metal cap 17 is threaded onto the end of this section and carries a ring 18 against which an outwardly extending flange 19 of a curved reflector 20 is seated. A lens 21 rests against this flange and is held in position by a rolled over edge 22 of the cap. Therefore, the reflector and the lens are permanently mounted in the cap and are movable with it. The central lamp contact 23 engages the central electrode 24 of the upper battery while the outer lamp contact is grounded on the casing through the supporting wall 14. The central electrode of the lower battery engages the lower end or zinc shell of the upper battery as is common in this class of devices.

In the lower end of the casing is a spring 25 engaging the lower end of the lower battery and forming electrical connection with the zinc casing thereof. This spring is mounted on an insulating disc 26 by means of a rivet 27 extending through the disc and clamped about one end of the spring as shown at 28. This rivet also forms electrical connection between the spring and a flat conductor strip 29, the rivet still further serving to secure this strip to the disc 26. An insulating fibre cup 30 surrounds the disc 26 and the spring 29 to prevent grounding of the strip on the casing. At the side of the casing this strip extends longitudinally to a position adjacent the control switch and carries a stationary contact 31. The strip is surrounded by insulating members 32 to prevent grounding on the casing which at their upper ends are secured to the inner surface of the casing by means of rivets 33, thus permanently mounting the stationary contact 31.

The control switch is mounted in a guide and support 34 secured to the outer surface of the casing by means of the rivets 33 extending through suitable ears 35 on the guide and support. The body of this support is substantially box shaped as shown, and, of course, is grounded on the casing as it is in direct contact therewith. In its outer wall it has a slot or opening having two portions 36 and 37 of different widths, the wider portion 37 being preferably substantially circular. The movable switch element comprises a contact portion 38 secured on the free end of a spring support 39 permanently secured either to the casing or the guide and support 34. In the present instance it is secured to the outer wall of this guide by means of a rivet 40. This spring portion of the switch is offset, as shown at 41, so as to provide an inclined camming portion 42 adjacent the opening 36—37 in the outer wall of the guide 34.

Mounted on this guide is a switch operating element having a stem 43 extending through the opening 36—37 and the inner end carrying a head 44 engaging the camming surface 42 of the spring supporting portion 39 of the switch member. The stem 43 also carries outside the guide 34 a head 45, and adjacent the inner head 44 is an enlarged portion 46 which is wider than the narrower

portion 36 of the opening in the guide but may extend into the wider portion 37 of this opening, as shown in Figs. 2, 3 and 6. Surrounding the portion of the operating element outside the guide is a guard 47. This guard is cupped to receive and surround the head 45 of the switch operating member, and the bottom of the cup portion has an opening through which the stem 43 extends. The rim of the cup is bent backwardly upon itself to form a flange 48 which may engage the outer surface of the guide, and encloses a coil spring 49 which engages the surface of the guide and tends to force this guard outwardly to hold the bottom of the cup against the under side of the head 45, and also tends to force the switch operating member outwardly to hold the enlargement 46 in the wider portion 37 of the opening in the guide. The inner edge of the flange 48 is provided with guide lugs 50 extending on opposite sides of the guide member 34 to assist in guiding this guard in its movements on this support. The height of the flange 48 and the depth of the cup is sufficient so that if when the switch is in the open position the guard is forced inwardly without moving the switch operating member 43, the rim of the cup is at least even with the outer end of the switch operating member or its head 45, but it is preferably somewhat higher than this head so that the head is protected against accidental contact with another object should the flashlight be placed in a tool kit or laid on a support.

The operation is as follows: The elements are normally in the position of Figs. 2, 3 and 6 in which position the switch is open as the contact 38 of the switch is out of engagement with the stationary contact 31. In this position the spring action of the support 39 and the spring 49 retains the switch operating member with the enlargement 46 in the wider portion 37 of the opening in the outer wall of the guide 34. This operating member is, therefore, locked in this position against accidental sliding movement longitudinally of the support to force the switch to closed position. If it is desired to close the switch to light the light, pressing inwardly on the head 45 will force the switch contact inwardly and close the circuit. Release of the pressure on the head will allow it to swing back and open the switch. This action is, therefore, a temporary switch operation using the light as a flash lamp for short time illumination as the lamp operates only so long as the button or head 45 is depressed. If it is desired to retain the lamp lighted, after the operating member is forced inwardly by the pressure on the head 45 it may slide longitudinally of the guide 34 to the position shown in Figs. 4 and 7. In moving to this position the inner head 44 rides along the cam surface 42 and holds the switch closed. It will be noted that when in the position of Fig. 3 inward pressure on the head 45 forces the enlargement 46 out of the opening 36, and therefore, releases this member and it may then be slid longitudinally to the position of Figs. 4 and 7. In this position the stem 43 is in the narrowest portion 36 of the opening and as the enlargement 46 cannot pass into this portion of the opening it holds the member in its inner position and retains the switch closed. Also when the operating member is forced inwardly from the position of Fig. 3 the cupped guard 47 moves inwardly with it against the action of the spring 49 and this movement is limited by engagement of the inner edge of the flange 48 with the outer wall of the guide 34. Also when the operating member is slid longitudinally to the positon of Figs. 4 and 7 this guard slides on the surface of the member 34 and is guided thereon by the lugs 50. If it is desired to put out the light all that is necessary is to place the thumb on the head 45 and guard 47 and slide them downwardly or in the opposite direction to move the stem 43 from the opening 36. Then when released the elements will be forced by the springs 39 and 49 to the position of Figs. 2, 3 and 6 to open the switch.

It will be apparent from an inspection of Figs. 3 and 4 that as the rim of the cupped guard 47 is as high or higher than the head 45 of the switch operating member, and therefore, if the light is placed in a tool kit or on a support the liability of other objects engaging the head 45 and forcing it inwardly to close the switch and exhaust the batteries is very small because these articles will engage the rim of the cupped guard, and although the pressure of these articles might force this guard inwardly the cup is of sufficient depth that it will move inwardly to engage the wall of the guide 34 without permitting the article to engage the head 45 of the switch operating member sufficiently to close the switch. The guard, however, in no way interferes with the operation of the switch by the thumb or finger of the user. This guard, therefore, protects the switch against accidental manipulation but does not interfere with the desired operation thereof. It will also be apparent that when the elements are in the position of Figs. 2, 3 and 6 the enlargement 46 is in the opening 37 and these elements are locked against longitudinal sliding movement in the member 34. Therefore, pressure on the side of the guard cannot move it to close the switch. Before the guard can be shifted laterally there must first be a pressure inwardly on the switch operating member to unlock it, and then a lateral pressure may shift it to the position of Figs. 4 and 7. If the guard is slid in the opposite direction or downwardly from the position of Figs. 4 and 7 the enlargement 46 is forced into the opening 37 by the springs and auto-

matically locks the elements with the switch in the open position. As indicated above, however, if the switch operating member 43—45 is forced inwardly without the lateral shifting movement it closes the switch for a temporary operation of the light.

Having thus set forth the nature of my invention, what I claim is:

1. In a flashlight, a casing, an insulated contact, means for electrically connecting said contact to one electrode of a battery, a movable switch contact adapted to engage the first contact, means for shifting said switch contact comprising an element extending outside the casing shiftable in a direction parallel to the casing and also transversely thereof, and a guard surrounding the exposed portion of said element and movable therewith in both directions and projecting from the surface of the casing an amount at least as great as that of the element.

2. In a flashlight, a casing, a movable switch element including a spring support, an operating member engaging said element and mounted for movement in a direction longitudinally thereof and also normal thereto, a portion of said member being exposed outside the casing, and a cup shaped guard about said exposed portion of said member projecting from the surface of the casing an amount at least as great as that of the member and movable therewith in both directions.

3. In a flashlight, a movable switch member, an operating member for the switch member comprising a head and movable longitudinally of its axis, a cupped guard surrounding the head and movable therewith longitudinally of its axis but disconnected therefrom, said head being within the cupped portion of said guard, and a spring tending to shift the guard outwardly.

4. In a flashlight, a casing, a movable switch member, an operating member for the switch member including a stem extending substantially normal to the wall of the casing and having a head portion outside the casing, a cupped guard surrounding said head and having an opening in the bottom of the cup for said stem, said guard and stem being movable longitudinally of the stem and independently of each other, and a spring tending to force the cup outwardly against the under side of said head.

5. In a flashlight, a casing, a movable switch member including a spring support, an operating member for said switch member mounted to slide and having a camming action on the switch to operate the same, a guide mount for said operating member having an opening through which the member extends, said operating member being also mounted for movement in the support in a direction normal to the surface thereof, and a cupped guard about the outer end of the switch operating member, said member having a stop element within the cup, and a spring tending to force the guard outwardly against said stop.

6. In a flashlight, a casing, a support on the casing having a key slot in its outer wall, a movable switch member mounted within said support, a switch operating member having a stem extending through said opening and of a size to move into the narrower part thereof, a head on the stem within the support, an enlargement adjacent said head adapted to extend into the larger part of said opening but of greater width than the narrower part thereof, a head on the stem outside said support, a cupped guard enclosing said head and movable inwardly independently of the head, and spring means tending to force said switch operating member outwardly.

7. In a flashlight, a casing, a box-like support and guide mounted on the outside of the casing, a movable switch element mounted within the guide, said guide having a key slot in its outer wall, a switch operating member extending through said slot and having portions of different diameters to fit in the different portions of said slot, said member being movable at right angles to the plane of the slot opening and laterally therein, a cupped guard on the outside of said support, a head on said operating member in the cup of said guard, guide lugs on opposite sides of the guard having guiding engagement with the walls of said support, and a spring tending to force said guard outwardly.

8. In a flashlight, a casing, a movable switch member mounted thereon, a switch operating member mounted for movements normal to the wall of the casing and parallel thereto, said member having a head outside the casing for operation by a thumb or finger, a cupped guard surrounding said head and of a depth at least equal to the thickness of the head, and means for guiding said guard for movement with the switch operating member in both directions.

9. In a flashlight, a casing, a box-like support mounted on the outer wall of said casing and having a key slot opening in its outer wall, a movable switch element including a spring support secured to said first support and having an inclined wall, a switch operating member having a stem in said opening and a head engaging said inclined wall, an enlargement on the stem adapted to seat in the larger part of said opening but wider than the narrower part thereof, a head on the operating member outside the support, a cupped guard surrounding said head and movable inwardly with the head and independently thereof, and a spring tending to force said switch operating member outwardly.

In testimony whereof I affix my signature.

ANKER S. LYHNE.