

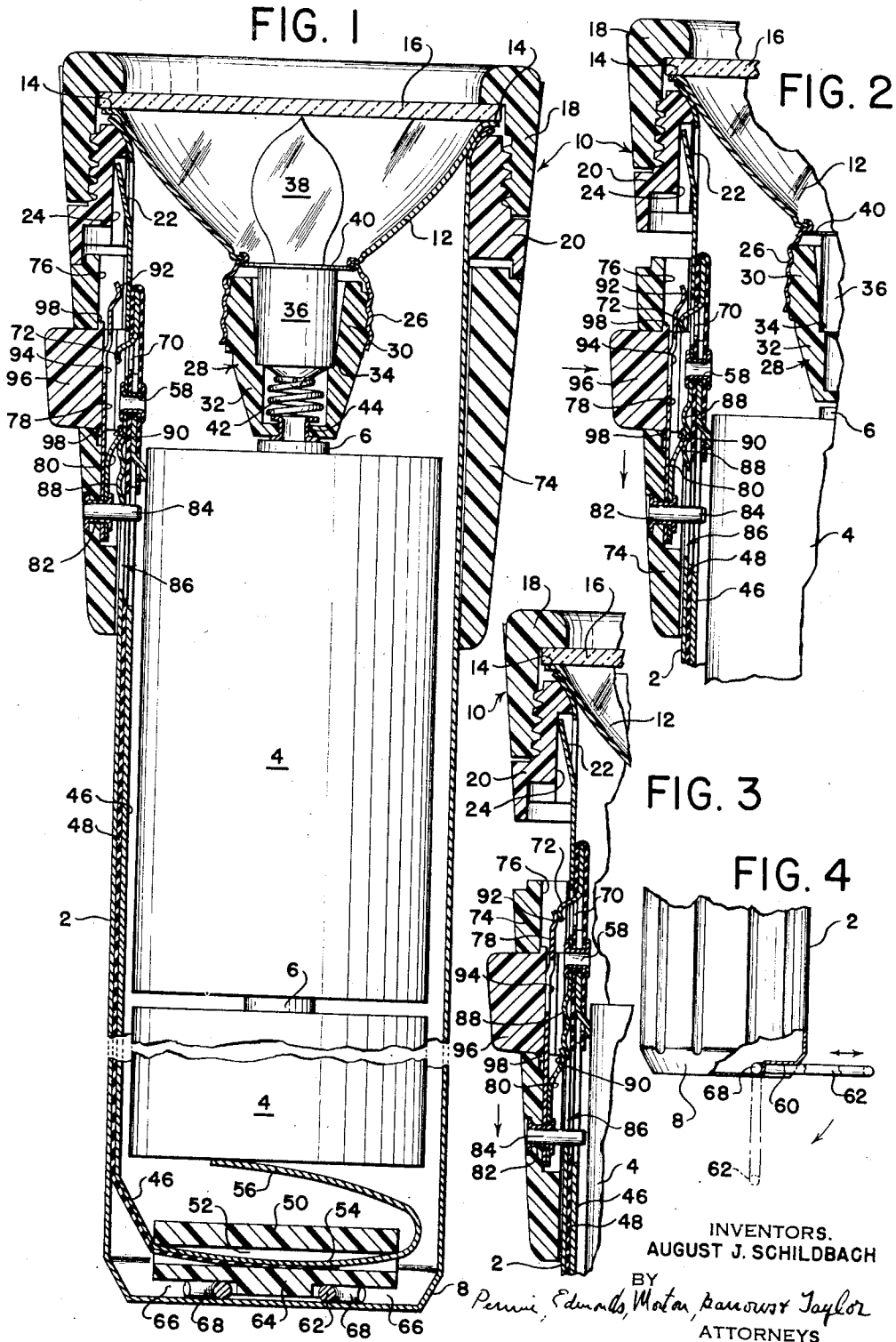
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A. J. SCHILDBACH

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FLASHLIGHT SWITCH

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FLASHLIGHT SWITCH

August J. Schilbach, Woodmont, Conn., assignor to Olin Mathieson Chemical Corporation, New Haven, Conn., a corporation of Virginia

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This invention relates to flashlight construction and more particularly to an improved switch mechanism. A further feature of the invention is an improved contact spring strip member, which serves as a spring between the bottom of the flashlight casing and the bottom of the lower cell to properly hold the cells in place in the casing.

In the present invention I provide a switch that is capable of being positioned in the three normal positions of a flashlight switch, that is, the "off" position, the "flash" position when the light can be intermittently lighted and extinguished, and the steady "on" position. I further provide such an arrangement in a ring type switch. A switch of this type has many advantages over conventional forms of switches. It can be actuated by moving the ring member axially of the casing, and can therefore be more easily manipulated in the dark than a switch member consisting of a button or slide located at only one point in the circumference of the flashlight casing.

The ring which is movable axially of the casing and which carries the switch mechanism can be attractively made of plastic or other dielectric material, and can thus add to the appearance of the flashlight. The switch is also of rugged construction and very unlikely to get out of order or fail to operate when desired.

In the usual flashlight construction, the cells are arranged in tandem. The central terminal of the upper cell engages a contact on the bulb holder through which the central terminal of the bulb is connected to the battery. The bottom of the zinc can of the lower cell is electrically connected to the end cap and to a conducting strip which extends along the inner wall of the casing to the switch member. This connection is usually formed by a coil spring which urges the cells of the battery toward the head end of the flashlight and thus assures a good contact between the bulb holder and the central electrode of the upper cell. In place of the usual coil spring I provide a conducting strip mounted in a supporting block in the bottom of the casing and having its end disposed to exert an upward pressure on the bottom of the lowermost cell.

In the accompanying drawings, I have shown one embodiment of the invention. In this showing:

Fig. 1 is a vertical, longitudinal, sectional view, on an enlarged scale, of a flashlight casing showing the invention applied, with the switch in the "off" position;

Fig. 2 is a similar view of a portion of the casing, with the switch in the "flash" position;

Fig. 3 is a similar view, with the switch in the "on" position; and

Fig. 4 is a detailed view of the bottom portion of the casing.

Referring to the drawings the case 2 may be formed of metal or other suitable material. It is preferably cylindrical and of a proper length to receive the desired number of cells 4 with the uppermost cell positioned so that its central terminal 6 will engage a terminal of the lamp bulb or of a bulb holder arranged in the head end of the lamp. In the form of the invention illustrated in the drawings, the rear end or bottom 8 of the case is closed

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and the parts are inserted from the head end. This end of the case is outwardly flared as at 10.

A reflector 12 is mounted in the case, the reflector being provided with an annular flange 14 by means of which the reflector is secured between the flared end of the case and the lens 16. Lens 16 is, in turn, held in place by an end cap 18, the cap being internally threaded to engage the external threads of a plastic ring 20. Ring 20 is placed in position from the rear end of the case. As it and end cap 18 are brought together, its axial movement is limited by the flared end of the case. It is held against rotation on the case by a tongue 22 formed in the wall of the case, and received in a groove 24 of the ring. A threaded bushing 26 is secured to the inner end of the reflector. This bushing receives a bulb holder 28 formed of insulating material.

The bulb holder 28 has a central bore, the upper portion 30 of the bore being of slightly larger diameter than the lower portion 32. The shoulder 34 thus formed receives the lower end 36 of lamp bulb 38. Bushing 26 is reduced in diameter at its upper end where it is secured to the reflector, and this reduced portion is engaged by flange 40 on the stem of the lamp bulb. The bulb is urged forward by a spring 42 which is positioned between the bottom of the bulb and an eyelet 44 in the bottom of the bulb holder. Eyelet 44 forms electrical contact with the central electrode 6 of the upper cell, and the current is thus conveyed through spring 42 to the base terminal of bulb 38.

The switch mechanism is arranged on the case, preferably adjacent the head end. A conducting strip 46 extends from the bottom of the case to the switch mechanism, the strip being insulated from the metal case by suitable insulating material 48. This conducting strip is constructed to make the electrical contact with the bottom of the zinc can of the lower cell 4 and eliminate the coil spring usually employed for this purpose. A block 50 of insulating material is secured to the conducting strip 46. As shown the block has a passage 52 and the strip is bent as at 54 to pass through this passage. Beyond the portion 54 the conductor strip is bowed or provided with a curved end 56. This forms the electrical connection to the bottom of the zinc can of the lower cell 4 and also exerts the necessary pressure to urge the cells toward the head end of the case. The conducting strip 46, the insulation 48 and the block 50 are assembled and inserted in the case. A rivet 58 passes through the wall of the case, the insulating strip and the conducting strip to hold these parts in place. These parts are so dimensioned that no compression is placed on the curved end 56 of the conducting strip when the flashlight is being assembled until after the threads of end cap 18 and ring 20 are in engagement.

Block 50 also supports the hanger ring carried at the bottom of the case. As shown in Fig. 4, a portion of the bottom 8 of the case is depressed, as at 60, an amount equal to or slightly greater than the thickness of the wire from which the hanger ring 62 is formed. Openings are provided at the inner ends of the sides of the depression 60. The block 50 is provided with a central portion 64 of greater thickness than the remainder, forming spaces 66 to each side of the depressed portion 60 of the bottom of the case. The end ring 62 is provided with out-turned ends 68. In assembly, after the conducting strip and block 50 have been placed in the case, the sides of the end ring are compressed toward each other, permitting the out-turned ends 68 to be inserted in the openings at the inner ends of the depression 60. The ring is of such size that when not in use, its inner ends are moved into the spaces 66 and the loop then is entirely within the depressed portion. When it is to be used, it is first moved outwardly to the full line position of Fig. 4, the out-turned ends 68

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limiting this outward movement. It may then be swung to the dotted line position and the ring used to support the flashlight from a hook, nail or other support.

The details of the switch mechanism whereby the second terminal of the lamp bulb 33 is connected to the zinc can of the lower cell through the contact strip 46 include an opening 70 in the wall of the case adjacent the rivet 58. The conducting strip is provided with a tongue 72 that is not covered by the insulation 48 and which extends through this opening. A switch ring 74 is arranged on the case over the tongue 72 of the conducting strip. As stated, this ring may be formed of any suitable non-conducting material. It is preferably formed of a plastic which may contribute to the attractiveness of the flashlight by being made of various colors and preferably it cooperates with the end cap 18 and retaining ring 20, in the design or overall appearance of the case. Thus, as illustrated, there may be a tapering of the thickness of these parts to produce an overall streamlined effect.

The ring 74 is provided with a groove 76 extending from its upper edge to a point adjacent its lower edge. In this groove a switch-spring 78 and a click-spring 80 are mounted. As shown, these springs, are secured to ring 74 adjacent their lower or rear ends by an eyelet 82. After the ring is placed on the case, a pin 84 is mounted in eyelet 82 and this pin is received in a slot 86 in the wall of the case to limit the movement of the ring 74. Between slot 86 and rivet 58 the wall of the case is provided with a pair of projections 88 which form three positions for the reception of the inwardly curved end 90 of the click-spring to retain the ring in either of the three positions illustrated in Figs. 1 to 3 as hereinafter described. The end 92 of switch-spring 78 is also curved inwardly to engage the exposed portion 72 of the conducting strip when the switch-ring is in one position. Adjacent the end 92 switch-spring 78 is provided with a cut-out portion 94. An opening is provided in ring 74 overlying the cut-out portion 94 of the switch-spring and this opening receives a button 96, also made of insulating material. The button may be provided with a flange 98 larger than the opening in the ring. The button is inserted from the inside before 78 and 80 are assembled in the groove 76, and the flange prevents the button from becoming misplaced.

The operation of the switch mechanism as shown in Figs. 1 to 3, will be apparent. Button 96 is for the purpose of flashing operation. But when the ring is moved to its forward or "off" position, as in Fig. 1, opening 94 in the switch-spring is in alignment with the tongue 72 of the conducting strip 46. If the button 96 is now depressed, tongue 72 merely contacts with the inner face of the button and the circuit remains open. At this time the curved end 90 of spring 80 is above the upper projection 88, and the spring is of such strength that accidental movement of the switch ring rearwardly on the case is prevented. But by a slight pressure, the user may move the ring to either of the positions shown in Figs. 2 and 3.

In the second position the curved end 90 is between the two projections, as shown in Fig. 2. It will be noted that opening 94 is now out of alignment with tongue 72 and when button 96 is moved inwardly, the circuit is closed between conducting strip 46 and switch-spring 78. The circuit to the other terminal of the lamp bulb is completed in the conventional manner through the casing and the reflector.

To place the switch in the steady "on" position of Fig. 3, the switch ring is moved rearwardly causing the curved end 90 of click-spring to move to a position just below the lower projection 88. Further movement in this direction is prevented by engagement of pin 84 with the end wall of slot 86. This places switch-spring 78 in position where its inwardly curved end is in engagement with tongue 72, thus closing the circuit. The circuit will, of course, remain closed until the switch ring is moved to either of its other two positions.

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The conductor strip, as stated, performs the additional function of applying a force to the bottom of the lower cell to urge the cells forwardly and maintain electrical contact between the central electrode of the upper cell, and the contact at the lower end of the bulb holder.

The provision of the flat spring 56 on the end of conducting strip 46 to force the cells toward the head end of the case has many advantages over the conventional coil spring used for this purpose. The cells may be more easily inserted in the head end of the case, and they may be placed with the center terminals either up or down. The spring tension that is normally present in a flashlight and which resists assembly can be materially reduced permitting easy threading of the head assembly.

The appearance of the flashlight, with the switch in the "off" position, as shown in Fig. 1, is especially pleasing, producing a streamlined effect. As shown end cap 18, ring 20 and switch ring 74 blend into a single unit with no valleys or ridges. With the switch in its other two positions illustrated in Figs. 2 and 3, there is a gap between the rings 20 and 74, but at such time the flashlight is in use and the streamlined appearance is then of secondary importance.

I claim:

1. A flashlight switch comprising a case, a conducting member extending from the rear end of the case along the inside to a point adjacent the front end of the case, the case being provided with an opening, a tongue formed on the conducting member and extending through the opening, a ring switch member arranged on the exterior of the case over said tongue, a switch-spring having one end secured to the ring switch member, a depressible button formed of insulating material carried by the switch member, the button engaging the switch member to move it into contact with the tongue when the button is depressed, and means to prevent contact between the switch-spring and the tongue when the switch member is in one position.

2. A flashlight switch comprising a case, a conducting member extending from the rear of the case along the inside to a point adjacent the front end of the case, the conducting member having an exposed contact portion arranged exteriorly of the case, a ring switch member on the case overlying said exposed contact portion, a switch-spring carried by the ring switch member, the ring switch member being movable axially of the case to dispose the switch-spring in different positions with respect to the exposed contact portion of the conducting member, means for moving the switch-spring member inwardly to engage the exposed contact portion, and means to prevent engagement of the exposed contact portion and the spring-switch member when the spring-switch member is in one position.

3. A switch in accordance with claim 2 in which the means for moving the spring-switch member inwardly comprises a button carried by the ring switch member and engaging the spring-switch member.

4. A switch in accordance with claim 2 in which the spring-switch member is provided with a cut-out portion which aligns with the exposed contact portion of the conducting member when the ring switch member is in one position to prevent completion of a circuit between said members.

5. A flashlight switch comprising a case, a conducting member extending from the rear of the case along the inside to a point adjacent the front end of the case, the conducting member having an exposed contact portion arranged exteriorly of the case, a ring switch member on the case overlying said exposed contact portion, a switch spring carried by the ring switch member, the ring switch member being movably axially of the case to dispose the switch-spring in different positions with respect to the exposed contact portion of the conducting member, means for moving the switch-spring member inwardly to engage the exposed contact portion, means

to prevent engagement of the exposed contact portion and the spring-switch member when the spring-switch member is in one position, the spring-switch member having a curved portion which engages the exposed, portion of the contact member when the ring-switch member is in one position.

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