

Feb. 12, 1935.

F. G. STIMSON

1,990,504

FLASH LIGHT

Filed June 3, 1933

2 Sheets-Sheet 1

FIG. 1.

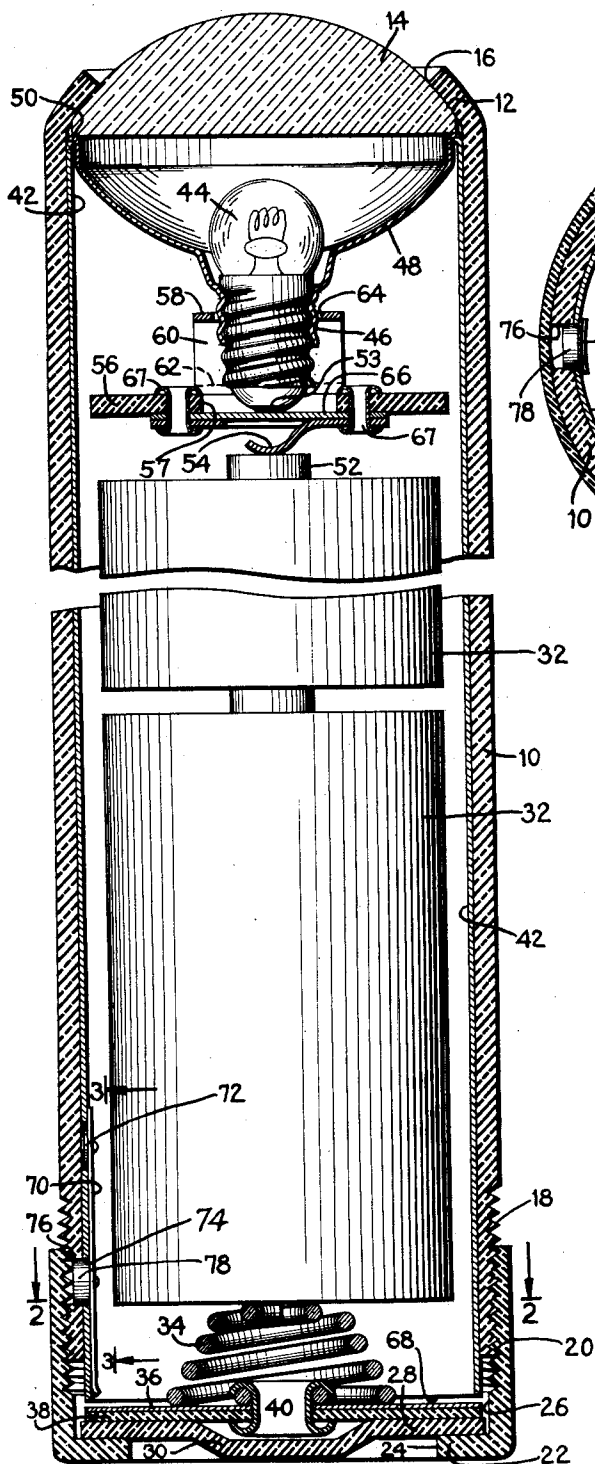


FIG. 2.

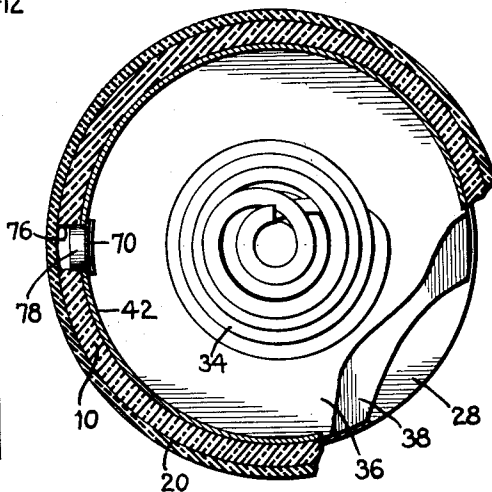
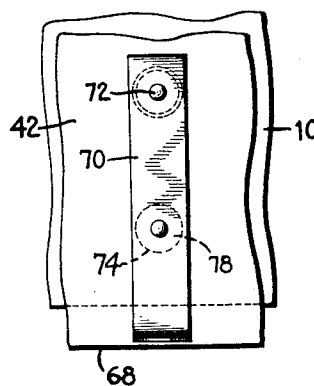


FIG. 3.



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2 Sheets-Sheet 2

FIG. 6.

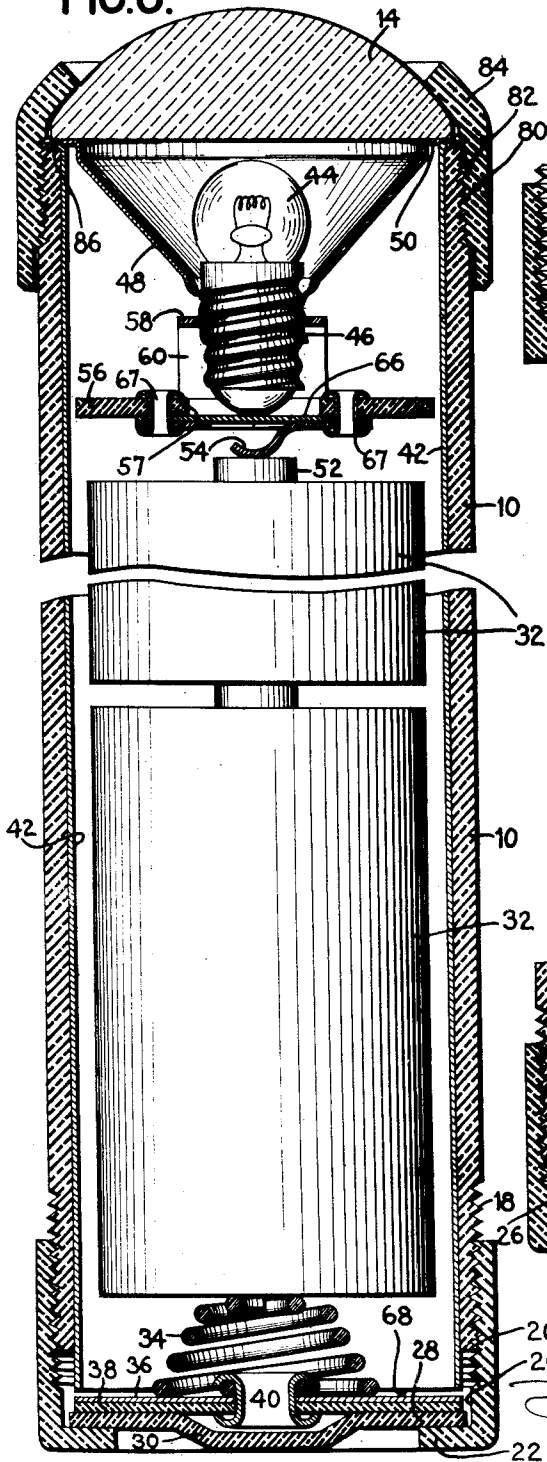


FIG. 4.

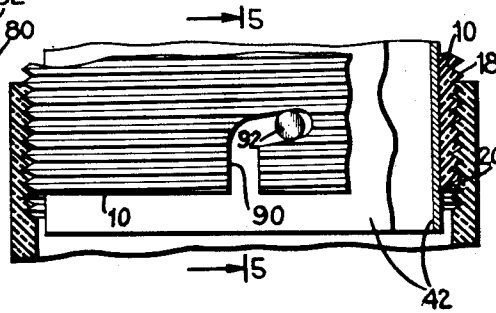


FIG. 5.

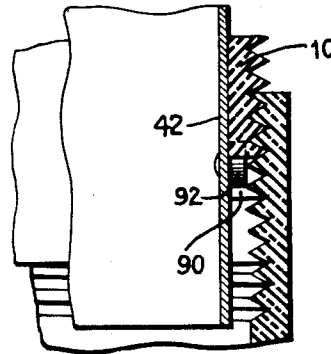
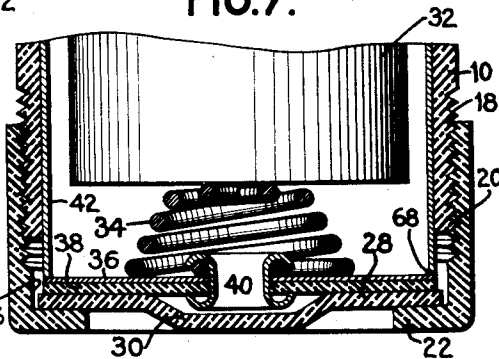


FIG. 7.



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FLASH LIGHT

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13 Claims. (Cl. 240—10.66)

This invention relates to flashlights of the kind in which all exposed portions are of non-conductive material. Such flashlights are particularly applicable in situations where it is sought to avoid the accidental short-circuiting of electrical instrumentalities by inadvertently bringing a metallic part on a flashlight into contact therewith as when a mechanic is working on a telephone switchboard, for instance, or splicing a cable, and is using a flashlight to illuminate his work.

The primary object of the present invention is a flashlight in which all exposed parts are of insulating material and which can be manufactured in a practical and inexpensive manner. In carrying the invention into effect, there is provided a tubular flashlight casing of insulating or non-conductive material, such as hard rubber, which is adapted to carry, at one end, a lens through which the light rays pass and, at the other end, a removable bottom cap, also of insulating or non-conductive material by which the batteries and other parts of the flashlight may be inserted.

In accordance with the present invention, the circuit closing means may be actuated by relative movement of a portion, at least, of the bottom cap, means being provided to complete the electrical circuit between the circuit closer at the bottom of the flashlight and the lamp at its upper end. More particularly, the circuit closer in accordance with this invention comprises generally a disc of conductive material electrically connected with a battery positioning spring and normally held by said battery positioning spring in spaced relation with an annular contact in electrical connection with the lamp by means comprising a conducting portion. Relative movement of this disc serves to open and close the electrical circuit.

Another object of the invention is a simplification of flashlight construction by the provision of conductive means which may be readily removed and inserted in a flashlight casing of non-conductive material and which will serve as one element of a circuit closer. It is also an object of the invention to provide conductive means of the character described which is adapted to universally cooperate, on the one hand, with the lamp socket support means, in this instance, the reflector, and on the other hand, with the circuit closer. This, in the interest of rapid and convenient assembly during manufacture and in use. In accordance with these aspects of the invention, a tubular member of conducting material is disposed within the flashlight casing and

extends from the upper end thereof to the lower. The edges of the tubular member at each end provide continuous contacts on the one hand for the lamp support and on the other hand for the circuit closer.

It is a further object of the invention to provide convenient means for readily and quickly securing and releasing the conductive means from the exterior non-conductive casing.

The invention also seeks a lamp socket support and conductive means therefor whereby the circuit is completed between the one terminal of the lamp and a terminal of the battery.

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 various embodiments by which the invention may be realized and in which:

Figure 1 is a view, in vertical section, showing one modification of a flashlight in accordance with this invention, the battery and lamp being in elevation;

Figure 2 is a transverse sectional view taken in the plane indicated by the line 2—2 of Figure 1 looking in the direction of the arrows and showing particularly the interengaging connections between the conducting means and the non-conductive casing;

Figure 3 is a fragmentary view taken in the vertical plane indicated by the line 3—3 of Figure 1, looking in the direction of the arrows and showing the releasable means;

Figure 4 is a fragmentary view showing the lower end of the flashlight casing and a modification of the interconnection between the metallic conducting member and the non-conducting casing;

Figure 5 is a fragmentary sectional view taken in the plane indicated by the line 5—5 of Figure 4, and looking in the direction of the arrows;

Figure 6 is a view similar to Figure 1, but showing a modified form taken by the invention; and

Figure 7 is a fragmentary view illustrating the position of the circuit closer in position to permanently close the circuit for steady light.

Referring first to Figure 1, a tubular casing 10 of non-conductive or dielectric material, such as hard rubber, has what may be considered its upper end constricted or turned inwardly at an angle, as shown at 12, to retain a lens 14 of spherical shape, the end 12 forming an inwardly directed flange or lens retaining ring and defining a light opening 16. At the lower end, the tubular

casing 10 is threaded, as at 18, to receive the bottom cap.

The bottom cap is also formed of dielectric or insulating material. It is formed with a tubular inwardly threaded portion 20 and an inwardly directed flange 22 defining an opening 24, and the interior surface 26 proximate the flange 22 is cylindrical in form to provide a cylindrical way or bearing for a relatively movable bottom 28 also of insulating or dielectric material. This bottom 28 is illustrated as disc-like in shape and normally rests upon the flange 22. For convenience in manufacture, the central portion of the disc 28 is convex, as at 30, and the outer margin thereof lies in substantially the plane of the outer margin of the flange 22 so as to be readily accessible for depression in actuating the circuit closer. This convexity also serves as a recess to receive the eyelet 40 hereinafter described.

The battery 32, composed of one or more dry cells, is positioned and urged upwardly in the casing by means of a battery positioning member, illustrated as a coil spring 34 resting upon a metallic disc 36 of substantially the same or slightly less diameter than the movable bottom 28. The metal disc 36 serves as the movable element of a circuit closer and rests upon, preferably, a non-metallic or fibre disc 38, the discs 36 and 38 being secured together and to the coil spring 34 by means of an eyelet 40 to form a unitary assembly readily removable and insertable in the flashlight.

A conductive member 42 is provided between the bottom end of the casing 10 and the upper end thereof. This is adapted to form a portion of the circuit between the negative terminal of the battery and one terminal of the lamp 44.

In the illustrated embodiment, the lamp socket 46 is formed directly on the reflector 48, the peripheral flange 50 of which rests on the conductive member 42 and is supported thereby and in turn supports the lens 14. When the lamp is disposed in the lamp socket 46, obviously the positive terminal 52 could be brought directly into contact with the central terminal of the lamp base being urged in that direction by the bottom spring 34. It is preferred, however, to support the battery yieldingly between resilient terminal members to provide shock absorbing features protecting the lamp from any shock or jar should the flashlight be dropped. Accordingly, a resilient contact 54 is carried upon a removable support. This is illustrated as a disc or annulus 56 of insulating material formed with a central aperture 57 and to the upper end of which is connected a bridge member formed of a flat upper surface 58 and spaced vertical supporting walls 60 terminating below in outwardly directed flanges 62 which are secured in any convenient fashion, as by rivets, not shown, to the insulatory annulus 56. The flat bridge piece 58 is apertured, as at 64, and the aperture is distorted in thread-like form, so as to be screwed onto the outside of the lamp socket 46. Bridging the aperture 57 below the annulus 56 is a conducting member 66 to which is secured, in electrical connection, a downwardly directed resilient contact tongue 54, these being secured together and to the annulus 56 by means of rivets 67 insulated from the bridge member by the disc 56. When the lamp 44 is screwed into the socket 46 and the bridge member 58 screwed onto the socket, the terminal 53 of the lamp base is brought into contact with the bridge member 66, thus completing a circuit between the terminal 52 of the battery through the resilient contact 54, the bridge piece 66 and the lamp terminal 53, as

will be understood. The electrical circuit from the other terminal of the lamp base is through the socket 64 and comprises the reflector 48 and flange 50.

In order that an electrical connection may be made universally at all times between the reflector 48 and the conductive member extending lengthwise of the casing irrespective of the relative positions of the reflector and the conductor, the conductive member 42 is formed in cylindrical shape so that its upper edge serves as an annular contact on which the flange 50 is supported. Similarly, the lower edge 68 of the annular member 42 serves as an annular contact with which the movable switch contact member 36 will always engage irrespective of the relative position thereof in the casing.

It is also sought by this invention that the flashlight parts be retained in position even though the bottom cap be removed for the insertion of a fresh battery. To this end, the tubular conductive member 42 is adapted to be held in position within the dielectric casing 10. Thereby are the lamp, reflector and lens also held against displacement at such time. At the same time, the parts must be capable of disassembly for ready replacement at the convenience of the user.

In Figures 1, 2 and 3, the tubular conducting member 42 is illustrated as removably secured to the dielectric casing 10 by means of a catch which takes the form of a resilient member or leaf spring 70 secured at its upper end, as by a rivet 72 or the equivalent, to the conductor 42 and extending downwardly substantially to the lower edge 68 of the conductor 42. Registering apertures 74 and 76 are provided in the conductive member 42 and in the dielectric casing 10, respectively, at a point normally covered by the bottom cap 20. Secured to the leaf spring 70 is a locking lug 78 which is movable in the aperture 74 and into and out of the aperture 76, urged by the inherent resiliency of the leaf spring carrier 70. Thus, when the locking lug 78 is in the aperture 76, the conductive member 42 is retained in position in the dielectric casing 10, but the conductor 42 is removable at will to permit access to the parts at the upper end.

Figures 4 and 5 show a modification of the securing means at the lower part of the flashlight casing which may be adopted in lieu of that shown, for instance, in Figure 4. The dielectric casing 10 may be formed in its lowermost part, with a bayonet slot 90 and the conductive casing 42 may be provided on its outer surface with a boss or pin 92. Thus, when the tubular conductive casing 42 is inserted in the dielectric casing 10, the pin 92 is entered in the slot 90 and a turn of the tubular conductor removably locks the parts together.

Figure 6 illustrates a modification of the invention insofar as the manner of retaining the lens in position is concerned. The remaining elements shown in this figure are similar to those heretofore described and corresponding parts are marked with like reference characters.

The upper end of the casing 10, instead of being formed with the inwardly directed lip 12, is of constant diameter and is threaded, as at 80, to receive the threaded portion of a lens retaining ring of insulating or non-conductive material. The ring has a cylindrical interiorly threaded portion 82 to engage with the threads 80 and an inwardly directed flange 84 similar in shape to the portion 12 of progressively decreasing diam-

eter in the modification of Figure 1. In this instance, the conductive cylindrical member 42 is provided with an outwardly directed flange 86 at its upper end, which rests upon the top edge of the casing 10. As before, the flange 50 of the reflector rests upon the upper end of the tubular conducting member 42, in this case the flange 86, and supports the lens 14 thereon. The lens ring is then slipped over the lens and threaded onto the threaded end of the dielectric casing 10 to hold the parts in assembled relation. With this modification, the tubular conductive member 42 is secured in the casing by means of the flange 86 clamped by the lens retaining ring and thereby are the parts held in position when a fresh battery is inserted. At the same time, by means of the lens ring, the flashlight parts in the upper portion of the flashlight casing can be readily removed for replacement, say, of the lamp 44.

The operation of the device will be apparent from the foregoing description. Figures 1 and 6 illustrate the flashlight with the circuit closer in off position, the movable contact being held away from the annular contact member 42 by the battery positioning spring 34. If the bottom is pressed inwardly with the finger or thumb, the disc 36 is brought into contact with the conductive member 42 and so long as it is held in contacting position, the circuit is closed through the lamp and the lamp illuminated. So soon as pressure is relieved, the spring 34 moves the disc 36 away from the tubular conductive member 42 thus interrupting the circuit. To close the circuit permanently, that is, to afford a steady light without necessitating constant pressure of a finger, the bottom cap is screwed further on to the casing, as shown in Figure 7, thereby compressing the spring 34 and bringing the movable contact 36 into contact with the contact edge 68, and holding it there.

It will thus be seen that a flashlight has been provided in which all exposed parts are formed of dielectric material and in which the component elements of the flashlight, such as the reflector, lamp socket and conductive portions are normally retained in position even though the bottom cap is removed for the purpose of inserting a new battery. The circuit closing element is an integral construction which may be assembled outside and inserted when the flashlight is assembled.

Various modifications will occur to those skilled in the art in the composition, disposition and configuration of the component elements going to make up the invention as a whole, as well as in the selection and combination of individual elements found in the several modifications and no limitation is intended by the phraseology of the foregoing specification or illustrations in the annexed drawings.

What is claimed is:

1. In a flashlight, in combination, a dielectric tubular casing having lens retaining means at one end and formed with threads at the other end, a tubular conductive member disposed within and concentric with the casing and of a length to support a reflector at its one end, a reflector supported on the end of the tubular member, means to removably secure the conductive member in the dielectric casing, a bottom cap of dielectric material threaded on to the threaded end of the casing and formed with an aperture, a movable wall of dielectric material disposed within the aperture and a contact carried with the

wall and movable into electrical engagement with the conductive member.

2. In a flashlight, in combination, a dielectric tubular casing having lens retaining means at one end and formed with threads at the other end, a tubular conductive member disposed within and concentric with the casing and of a length to support a reflector at its one end, a reflector supported on the end of the tubular member, means to removably secure the conductive member to the dielectric casing comprising a pin carried with an end of the conductive member, and pin receiving means carried with the dielectric casing, a bottom cap of dielectric material threaded on to the threaded end of the casing and formed with an aperture, a movable wall of dielectric material disposed within the aperture and a circuit closing contact carried with the wall and movable into electrical engagement with the conductive member.

3. In a flashlight, in combination, a dielectric tubular casing member having lens retaining means at one end and formed with threads at the other end, a tubular conductive member closely fitting within and concentric with the casing and of a length to support a reflector flange at its one end, a reflector supported on the end of the tubular member, means to removably secure the conductive member in the dielectric casing comprising a spring pressed pin carried with one tubular member and a pin receiving slot carried with the other tubular member and a bottom cap of dielectric material threaded on to the threaded end of the casing and formed with an aperture, a movable wall of dielectric material disposed within the aperture and a circuit closing contact carried with the wall and movable into electrical engagement with the conductive member.

4. In a flashlight, in combination, a dielectric tubular casing member having lens retaining means at one end and formed with threads at the other end, a tubular conductive member closely fitting within and concentric with the casing and of a length to support a reflector flange at its one end, a reflector supported on the end of the tubular member, means to removably secure the conductive member to the dielectric casing comprising a leaf spring, a pin carried thereon proximate one end, means to secure the other end to the conductive member, said conductive member being formed with an aperture for the passage of the pin and a pin receiving opening in the dielectric casing and a bottom cap of dielectric material threaded on to the threaded end of the casing and formed with an aperture, a movable wall of dielectric material disposed within the aperture and a circuit closing contact carried with the wall and movable into electrical engagement with the conductive member.

5. In a flashlight, in combination, a dielectric tubular casing member having lens retaining means at one end and formed with threads at the other end, a tubular conductive member closely fitting within and concentric with the casing and of a length to support a reflector flange at its one end, a reflector supported on the end of the tubular member, means to removably secure the conductive member to the dielectric casing comprising a pin carried with one tubular member, the other member being formed with a bayonet slot and a bottom cap of dielectric material threaded on to the threaded end of the casing and formed with an aperture, a movable wall of dielectric material disposed with-

in the aperture and a circuit closing contact carried with the wall and movable into electrical engagement with the conductive member.

6. In a flashlight, in combination, a dielectric tubular casing having an inwardly directed lens retaining means at one end and formed with threads at the other end, a tubular conductive member disposed within and concentric with the casing, a reflector formed with a peripheral flange engaging the end of the conductive member, a lens carried by said flange within the lens retaining means, means to removably secure the conductive member to the dielectric casing, a bottom cap of dielectric material comprising a tubular inwardly threaded portion formed with an aperture in its bottom, a disc-like portion of dielectric material disposed within the aperture and a circuit closing contact comprising a metallic disc adapted to contact with the conductive member, a dielectric disc, a battery positioning spring and a rivet securing the two last named discs and spring together.

7. In a flashlight, in combination, a tubular dielectric casing threaded at each end, an inwardly threaded lens ring of dielectric material formed with an inturned lens retaining flange, a tubular member of conductive material having an outwardly directed flange to rest on the upper end of the dielectric casing, a reflector formed with a flange to rest on said conductive flange, a lens resting on said reflector, a bottom cap comprising a cylindrical portion formed inwardly with threads for engagement with the threaded lower end of the dielectric casing and an inwardly directed flange defining an aperture and a dielectric disc disposed inwardly of the flange and circuit closing means disposed between the battery and said dielectric disc.

8. In a flashlight, in combination, a tubular dielectric casing threaded at each end, an inwardly threaded lens ring of dielectric material formed with an inturned lens retaining flange, a tubular member of conductive material having an outwardly directed flange to rest on the upper end of the dielectric casing, a reflector formed with a flange to rest on said conductive flange, a lens resting on said reflector, a bottom cap comprising a cylindrical portion formed inwardly with threads for engagement with the threaded lower end of the dielectric casing and an inwardly directed flange defining an aperture and a dielectric disc disposed inwardly of the flange, circuit closing means disposed between the battery and said dielectric disc and comprising a metallic disc, a non-metallic disc, a battery positioning spring and a rivet uniting the said discs and spring together.

9. In a flashlight, in combination, a tubular dielectric casing threaded at each end, a lens ring of dielectric material, a tubular member of conductive material having an outwardly directed flange to rest on the upper end of the dielectric casing, a reflector resting on said flange, a lens resting on said reflector, a bottom cap comprising a cylindrical portion formed inwardly with threads for engagement with the threaded

lower end of the dielectric casing and an inwardly directed flange defining an aperture and a dielectric disc disposed inwardly of the flange and circuit closing means disposed between the battery and said dielectric disc.

10. In a flashlight, in combination, a dielectric tubular casing formed with threads at one end, a tubular conductive member disposed within and concentric with the casing and of a length to support a reflector at its one end, a reflector supported on the end of the tubular member, means to removably secure the conductive member in the dielectric casing, a bottom cap of dielectric material threaded on to the threaded end of the casing and formed with an aperture, a movable wall of dielectric material disposed within the aperture and a contact carried with the wall and movable into electrical engagement with the conductive member.

11. In a flashlight, in combination, a tubular dielectric casing threaded at each end, an inwardly threaded ring of dielectric material formed with an inturned retaining flange, a tubular member of conductive material having an outwardly directed flange to rest on the upper end of the dielectric casing, a reflector formed with a flange to rest on said conductive flange, a bottom cap comprising a cylindrical portion formed inwardly with threads for engagement with the threaded lower end of the dielectric casing and an inwardly directed flange defining an aperture and a dielectric disc disposed inwardly of the flange and circuit closing means disposed between the battery and said dielectric disc.

12. In a flashlight, in combination, a dielectric tubular casing having lens retaining means at one end and formed with threads at the other end, a tubular conductive member disposed within and concentric with the casing and of a length to support a reflector at its one end, a reflector supported on the end of the tubular member, means to removably secure the conductive member in the dielectric casing, a bottom cap of dielectric material threaded on to the threaded end of the casing and a contact in electrical connection with the battery and carried with the end cap and movable into electrical engagement with the conductive member.

13. In a flashlight, in combination, a dielectric tubular casing formed with threads at each end, an inwardly threaded annular lens retaining member of dielectric material formed with an internal lens retaining flange, a tubular member of conductive material having an outwardly directed flange to rest on an end of the dielectric casing, a lamp socket support carried with the tubular conductive member and comprising conductive means to rest on said flange on said tubular conductive member, a bottom cap of dielectric material threaded on to the threaded end of the casing and a contact in electrical connection with the battery and carried with the end cap and movable into electrical engagement with the conductive member.

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