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Naylor et al.

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[54] **POCKET FLASHLIGHT**

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[21] Appl. No.: **467,784**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 347,639, April 4, 1973, abandoned.

[52] **U.S. Cl.** **240/10.66;** 240/10.68

[51] **Int. Cl.** **F21l 7/00;** H01r 25/08

[58] **Field of Search** 240/10.66, 10.68

[56] **References Cited**

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[57] **ABSTRACT**

A pocket flashlight including a tubular body comprising an outer cylindrical barrel configured to house a voltage source in operative engagement with a light source, a conductive sleeve means operatively coupled to the light source and switch means in operative engagement with the voltage source, the switch means including a movable switch member having a first and second position and switch bias means attached to the switch member, the switch bias means engaging the tubular body to bias the switch means in the first position, the switch means arranged relative to the conductive sleeve means such that when in the first position the switch member is separated from the conductive sleeve means to form an open circuit and when the switch means is in the second position the switch member engages the conductive sleeve means to close the circuit and activate the light source.

5 Claims, 11 Drawing Figures

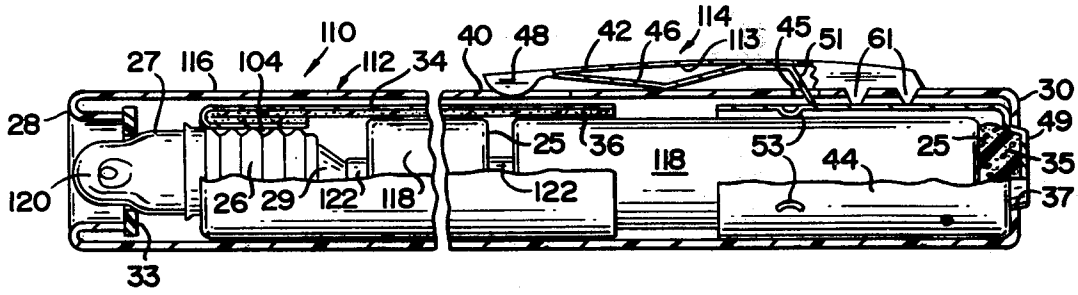
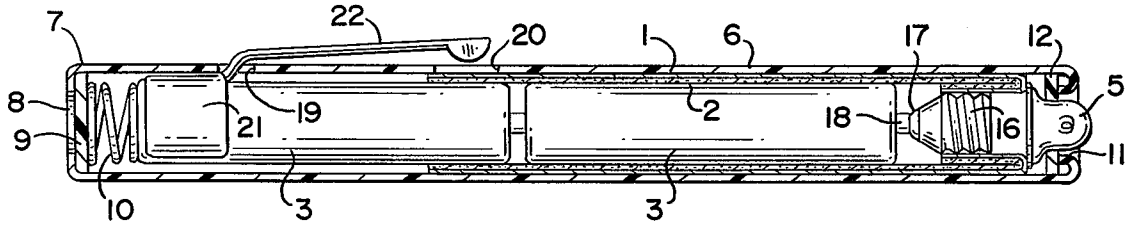


FIG. 1



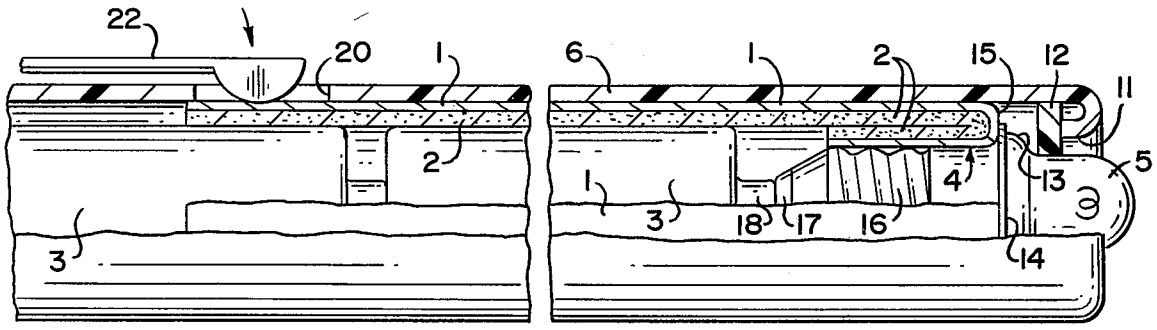


FIG. 2

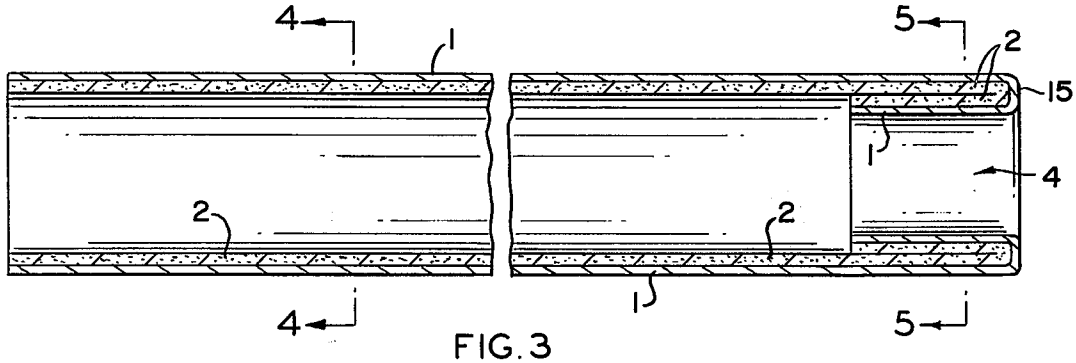


FIG. 3

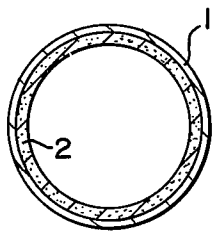


FIG. 4

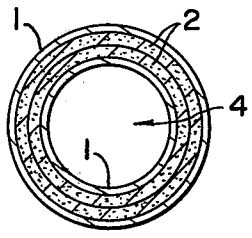


FIG. 5

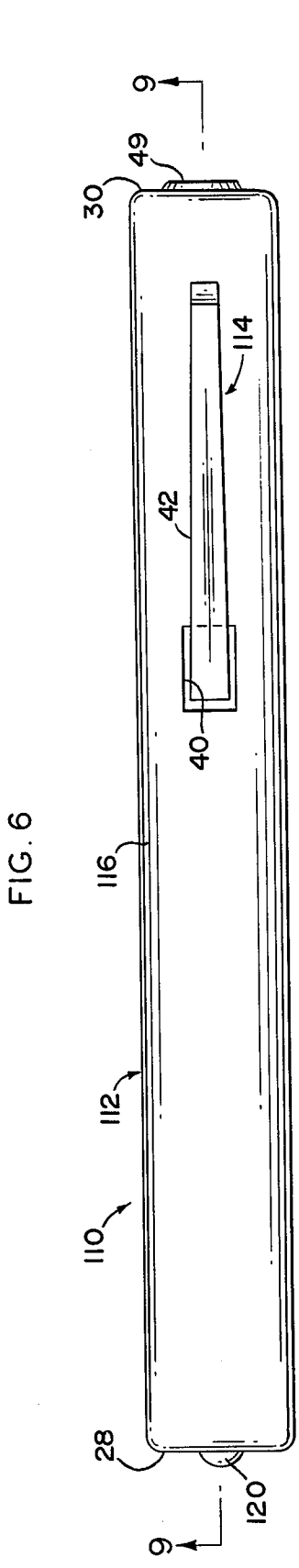


FIG. 6

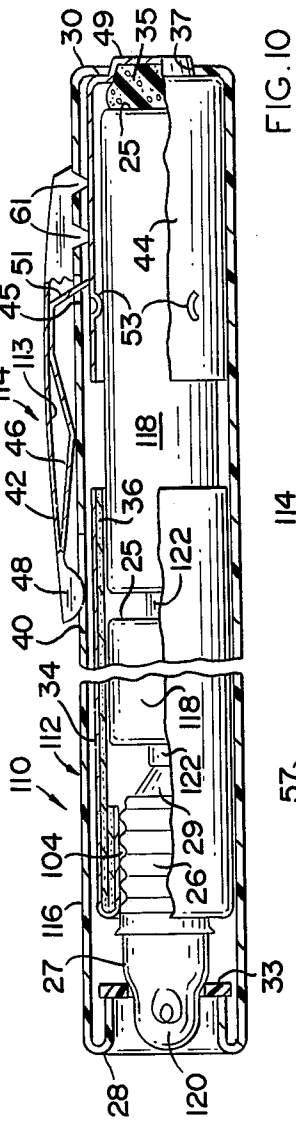


FIG. 10

FIG. 9

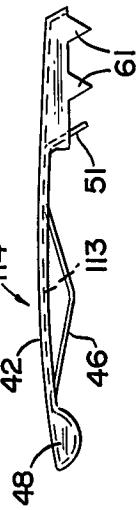


FIG. 11

FIG. 8

FIG. 7

POCKET FLASHLIGHT

This is a continuation-in-part of application Ser. No. 347,639 filed Apr. 4, 1973, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

A pocket flashlight comprising an outer cylindrical barrel housing a voltage source in operative engagement with a light source and a switch means having a bias means formed thereon to hold the switch means in the normally open position.

2. Description of the Prior Art

A number of disposable pocket flashlights have been developed for use in the medical profession and similar endeavors. Generally, these pocket flashlights comprise a current or voltage source in combination with a light bulb and switch means to actuate/deactuate the flashlight to provide an inexpensive light source which may be easily carried on the person.

Commonly, the switch means comprises a plunger type switch similar to those used in mechanical pencils and ball point pens. In this configuration, the switch means is axially aligned with the power source and light bulb to move the power source into and out of operative engagement with the light source itself. As is readily apparent on inspection, this type of switch means requires several working parts with attendant manufacturing and assembly costs. In addition, the plunger type switch means is subject to wear and malfunction rendering the device inoperable.

A second type of switching means comprises a clip-like member attached to or between the voltage/current source and a conductive member operatively coupled to the bulb. The clip-like member has a first and second position such that the member may be moved into and out of closed and open circuit configuration. Unfortunately, these clip-like members are easily moved to the closed position causing inadvertent current or voltage drain from the energy source. As a result, the life of the flashlight is significantly reduced. This is particularly important where the flashlight is designed for disposal after use in that the entire cost of the flashlight is absorbed over this shortened life.

Thus, there is a need for a relatively simple, efficient device including a switching means that is relatively inexpensive to manufacture and avoids inadvertent current/voltage drain when not in use.

SUMMARY OF THE INVENTION

This invention relates to a disposable pocket flashlight of the type which may be easily carried in the pocket of a shirt or the like. More specifically, the flashlight includes a tubular body configured to house a voltage source in operative engagement with a light source and a switch means operatively attached to the tubular body to selectively actuate the flashlight.

The tubular body comprising an outer cylindrical barrel including retaining means formed at each end thereof to retain the voltage and light sources therein. The voltage source and light source are held in operative engagement within the cylindrical barrel by means of a biasing spring acting against the inner surface of one of the retaining means and the light source. Disposed within the cylindrical barrel is a conductive sleeve means extending substantially the length thereof. The conductive sleeve is operatively connected to the light source while insulated from the voltage source.

The switch means comprises a switch member connected to the voltage source by a switch attachment means formed on one end thereof. The switch bias means disposed between the switch member and the outer cylindrical barrel is attached to the inner surface of the switch member such that the switch member is biased in a first or normally open position. An aperture is formed in the sidewall of the cylindrical casing such that when the switch means is moved from the first position to a second position by depressing the switch member the switch member contacts the conductive sleeve means completing the electric circuit as more fully described hereinafter.

When not in use, the disposable pocket flashlight is generally clipped to the shirt pocket such that the switch bias means holds the switch member out of operative contact with the conductive sleeve means. To operate, the operator removes the flashlight from the pocket and merely depresses the switch member to the second position completing the circuit between the light source and the voltage source such that current flows from the voltage source to the light source and returns through the conductive sleeve means, switch member means and switch attachment means back to the voltage source.

By this unique combination of elements, a highly reliable, relatively inexpensive pocket flashlight is provided.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a longitudinal section through a flashlight construction such as a pocket or pencil light.

FIG. 2 is an enlarged partial section of the same.

FIG. 3 is a broken longitudinal section through the composite tube, per se.

FIG. 4 is a transverse section taken at line 4—4 of FIG. 3.

FIG. 5 is a transverse section taken on line 5—5 of FIG. 3.

FIG. 6 shows a top view of a disposable pocket flashlight.

FIG. 7 shows an end view of the disposable pocket flashlight taken from the bulb end.

FIG. 8 shows an end view of the disposable pocket flashlight taken from the top end.

FIG. 9 shows a cross sectional side view of the disposable pocket flashlight taken along line 9—9 of FIG. 6.

FIG. 10 shows a cross-sectional side view of an alternate embodiment of the disposable pocket flashlight.

FIG. 11 is a detailed side view of a switch means of the present invention in the form of a conductor clip.

Similar reference characters refer to similar parts throughout the several views of the drawings.

DETAILED DESCRIPTION

The present invention is directed to a flashlight struc-

ture primarily of the type used as a disposable flashlight and referred to as a pocket-type or pencil-type flashlight.

The structure of one embodiment of the present invention specifically set forth in the drawings comprises a composite conductor tube of improved construction which, according to the form illustrated, comprises an inner tube or cylinder of dielectric material and an outer tube or cylinder of electric conducting material such as a metallic foil or the like.

Referring to FIGS. 1 through 5 of the drawings, the composite conductor tube comprises an outer cylinder or conductive sleeve of conductive material 1 and an inner cylinder or insulating sleeve of dielectric material 2 closely associated or actually adhered together throughout the length of the conductive sleeve. This structures forms together a receptacle for the power source means which may be in the form of one or more battery cells 3 in series relation. The forward portion of the composite tube is inturned upon itself to provide a socket means 4 at the forward end immediately adjacent the light bulb or light source 5. This inturned or folded back portion of the combined conductive sleeve 1 and composite sleeve 2 form an electrically conductive annulus in which the shank portion 16 of bulb 5 is located so as to be positioned both in electrical engagement with the annulus and with the contact 18 of battery 3.

The flashlight casing 6 comprises a cylindrical configuration formed at its rear end 7 to provide an annular inturned flange 8 for supporting the disc 9 against which one end of the compression spring 10 is seated. The opposite end of the spring exerts a force of compression against the base or negative terminal of the rear battery cell 3, as shown. The opposite or forward end of the casing is rolled inwardly to provide an annular flange 11 against which a washer or apertured member 12 is engaged when the flashlight is fully assembled.

The flashlight bulb is retained and placed in the restricted chamber by shoulder 13 in engagement with the member 12 and a washer 14 behind the shoulder which annularly overlies the inturned end wall 15 of the composite tube. The shank 16 of the bulb is formed of conductive material and is in electrical contact with the turned in end portion or annulus as indicated above.

The outer casing 6 is provided with longitudinally aligned apertures 19 and 20 designed to engage and accommodate a conductive clip having a flange portion 21 configured into a substantially annular surface for the purpose of embracing at least a portion of the outer conductive surface of the power source or battery 3. A resilient contact arm 22 which projects through the opening 19 and forwardly along the outside of the casing 6 is positioned to be aligned over aperture 20 and also is specifically configured to be arranged in spaced relation to the casing 6 and/or conductive sleeve 1.

It will, of course, be noted that the conductor sleeve 1 underlies the opening 20 at its rear end portions and when the arm 22 is depressed towards the sleeve 1 immediately opposite the opening 20 and brought into contact with the conductive sleeve as shown in FIG. 2, an electrical circuit is completed through the batteries to thus activate the bulb 5.

Since the flashlight construction illustrated is extremely inexpensive to produce and is permanently self-contained, it is feasibly disposable after use.

The preferred embodiment of the present invention is best shown in FIGS. 6 through 11 and the disposable pocket flashlight is generally indicated as 110 and comprises a tubular body 112 and a switch means 114. The tubular body 112 comprises an outer cylindrical casing 116 configured to hold a voltage source and a light source in operative engagement with each other. As depicted, the voltage source comprises one or more dry cell batteries 118 disposed in series with the light source comprising a light bulb 120. The batteries are aligned in end to end contact such that the central terminal post 122 of one battery 118 engages the base 25 of the next adjacent battery 118. The terminal post 123 of the battery 118, located adjacent the light source, engages terminal 27 of light bulb 120.

The cylindrical barrel 116 of tubular body 112 includes a retaining means comprising a pair of retaining members 28 and 30 integrally formed on opposite ends thereof respectively. As shown in FIG. 9, the base 25 of the lower battery 118 directly engages electrically conductive thimble 44 while light source 120 is biased against the terminal post 122 of the adjacently positioned battery 118 by biasing means 32, which may be in the form of a spring or the like acting against member 33 abutting retaining member 28 and the expanded portion 27 of bulb 120 or base 26 of light bulb 120. Alternately, a sponge, spring, or like elastic member 35 may be placed at the rear portion of the casing 116 and in direct engagement with base 25. In this alternate embodiment (FIG. 10) spring 32 as shown, is of course deleted.

A substantially tubular conductive sleeve means 34 is disposed within the cylindrical casing 116 in substantially surrounding concentric relationship to the batteries 118. Conductive means 34 is insulated from electrical contact with the outer surface of batteries 118 by means of a substantially tubular sleeve 36 made of dielectric material and extending substantially along the length of conductive sleeve 34 for a predetermined distance and on the interior thereof.

The forward portion 38 of the conductive sleeve 34 disposed adjacent light bulb 120 comprises a substantially U-shaped configuration which engages the base 26, as more fully described hereinafter, and defines a chamber 104 in which base 26 of bulb 120 is located.

As shown in FIGS. 9 and 10, the switch means generally indicated as 114 comprises a switch member in the form of conductor clip 42 mounted on casing 116. A plurality of apertures including apertures 40 and 45 are formed in casing 116 immediately adjacent contact means in the form of contact elements 48 and 51 correspondingly positioned relative to apertures 40 and 45 respectively.

A switch engagement means comprises a cylindrical thimble member 44 substantially surrounding the end of battery 118 adjacent retaining lip 30 (FIG. 9) or member 35 (FIG. 10). Thimble 44 is made of electrically conductive materials and is disposed in electrical contact with battery 118 as shown in FIGS. 9 and 10. Thimble 44 engages battery 118, positioned adjacent retaining lip 30, either in substantially flush relation thereto or alternately by means of detents 53, as shown in FIG. 10. Thimble 44 further includes base portion 49 positioned contiguous to lip 30 and disposed to at least partially extend out of the aperture 37 at the end of casing 116 and defined by lip 30.

More particularly, as best shown in FIGS. 9, 10 and 11, switch means 114 further includes a switch bias means 46 attached to or otherwise connected to the inner surface 113 of the switch means 114. In addition, contact element 51 is integrally or otherwise attached to switch bias means 46 and is disposed thereon to extend through aperture 45 into engagement and electrical contact with thimble 44. Due to the spring-like action of bias means 46, contact element 51 movably engages thimble 44 in somewhat of a "sliding" or "scratching" manner. This movable engagement occurs upon depression of clip 42 as generally indicated by directional arrow 57 (FIG. 9). This deliberate depression of clip 42 causes contact element 48 to pass into or through aperture 40 and into engagement and electrical contact with the conductor tube 34 located immediately therebeneath. For general purposes of explanation, an obvious advantage of the structure of switch means 114 and more particularly contact element 51 and 48 is the provision of an always clean metal to metal contact between the outer surface of the thimble 44 and the contact element 51. The movable engagement between contact element 51 and this outer surface of thimble 44 scratches, scraps or dislodges any corrosion or undesirable build up which would prohibit or deter a clean electrical contact or engagement between thimble 44 and contact element 51. For purposes of definition and clarity, contact element 51 and contact element 48 may be referred to as a first contact element and a second contact element respectively.

Clip mounting means in the form of integrally attached protrusion or barbs 61 are positioned to be attached to the outer tubular casing 116 as shown in FIGS. 9 and 10. These mounting elements may or may not be disposed into engagement and/or electrical contact with thimble 44 as desired to accomplish maximum efficiency in both fabrication and operation of the present invention.

In the normally biased position shown in FIG. 10, conductor clip 42 and particularly second contact element 48 extends over aperture 40 such that contact element 48 is in open communication with the conductive sleeve means 34. More specifically, switch bias means 46 comprises a spring element connected to clip 114 so as to engage the outer surface of casing 116 immediately adjacent clip 114. This bias means is specifically dimensioned and configured and disposed to maintain second contact element 48 in normally biased position out of contact with conductive sleeve 34. As shown in FIG. 9, the switch means 114 is in the normally open position when not in use such that there is no return path for current thereby rendering the flashlight 110 inoperable. However, as pointed out above, when the conductive clip 42 is depressed inwardly relative to the casing 116, as shown by directional arrow 57, first contact element 51 operatively engages the conductive sleeve means 34 to provide a return current path to complete the circuit and actuate the light bulb 120.

When not in use, the disposable pocket flashlight 110 is normally carried in the shirt pocket or the like. The switch bias means 46 and outer surface of casing 112 engage the pocket therebetween to secure the flashlight 110 to the pocket. In this position, it should be noted that the conductor clip is held in the first or open position out of contact with the conductive sleeve means 34 to prevent illumination of the light bulb 120.

To operate, the flashlight 110 is removed from the pocket and the clip 42 is depressed inwardly relative to casing 116 to the second or closed position (FIG. 9) causing the second contact element 48 to pass through aperture 40 and engage the conductive sleeve means 34 such that current will flow from the batteries 118 into the terminal 27 and base 26 through the filament to the conductive sleeve means 34 through switch means 114 and to the base 24 of the lower battery 118 to illuminate the bulb 120. Since the second contact 48 is biased in the open position and switch bias means 46 and casing 116 cooperatively secure the flashlight 110 in place when not in use, inadvertent current drain is avoided.

It should be further noted that the entire tubular casing 116 comprises a single integral housing or enclosure with retainer members 28 and 30 such that no additional elements are necessary. Thus, a very inexpensive and highly reliable disposable flashlight is provided.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained, and since certain changes may be made in carrying out the above method and article without departing from the scope of the invention, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention, which, as a matter of language, might be said to fall therebetween.

Now that the invention has been described, what is claimed is:

1. A flashlight structure comprising: an outer casing, power source means mounted on the interior of said outer casing, a light bulb disposed at least partially in said housing in electrical contact with said power source, switch means mounted on said casing and including a clip element, said switch means further including conductive switch bias means connected to said clip element and disposed between said clip element and said outer casing and in engagement with said outer casing so as to bias said clip element outwardly from and in spaced relation to said outer casing, primary conductor means engaging said light bulb and disposed in communicating relation with said switch means; switch engagment means interconnected between said power source means and said switch means; said switch means further comprising a first contact element formed on said switch bias means and disposed in slidable engagement with said switch engagement means, said switch means comprises a second contact element electrically connected to said switch bias means, said second contact element being formed on said clip and disposed in movable, spaced relation from said primary conductor means, whereby the disposition of said switch bias means to said outer casing and siad clip element serves to dispose said second contact element outwardly relative to said outer casing.

2. A flashlight structure as in claim 1 wherein said switch engaging means comprises a thimble member having a continuous cylindrical, substantially tubular configuration, said thimble disposed in at least partially surrounding relation to said power source and spaced relative to said primary conductor.

3. A flashlight structure as in claim 1 further comprising at least one aperture formed in said outer casing in intercommunicating relation between said second swtich element and said primary conductor, whereby movement of said clip against the biasing force of said switch bias means causes sliding engagement between said thimble and positions said second switch element into electrical contact with said primary conductor means through said one aperture.

4. A flashlight structure as in claim 1 wherein said primary conductor means comprises a sleeve member mounted on the interior of said casing and formed from an electrically conductive material; an insulating sleeve disposed on the interior of said conductive sleeve and engaging the interior surface thereof, a socket means comprising both said conductive and insulating sleeve disposed in folded back relation relative to the remainder of said conductive and insulating sleeves, said fold back portion of said insulating sleeves disposed between a conductive annulus defined by the fold back portion of the conductive sleeve and the remainder of the conductive sleeve.

5. A flashlight structure as in claim 1 wherein said primary conductor means comprises a substantially continuous, cylindrical sleeve formed from a substantially flexible metal foil material.

* * * * *