Jan. 16, 1962 E. DENT 3,017,502

FLASHLIGHT CONSTRUCTION

Filed Oct. 27, 1959 3 Sheets-Sheet 1

FIG. 1

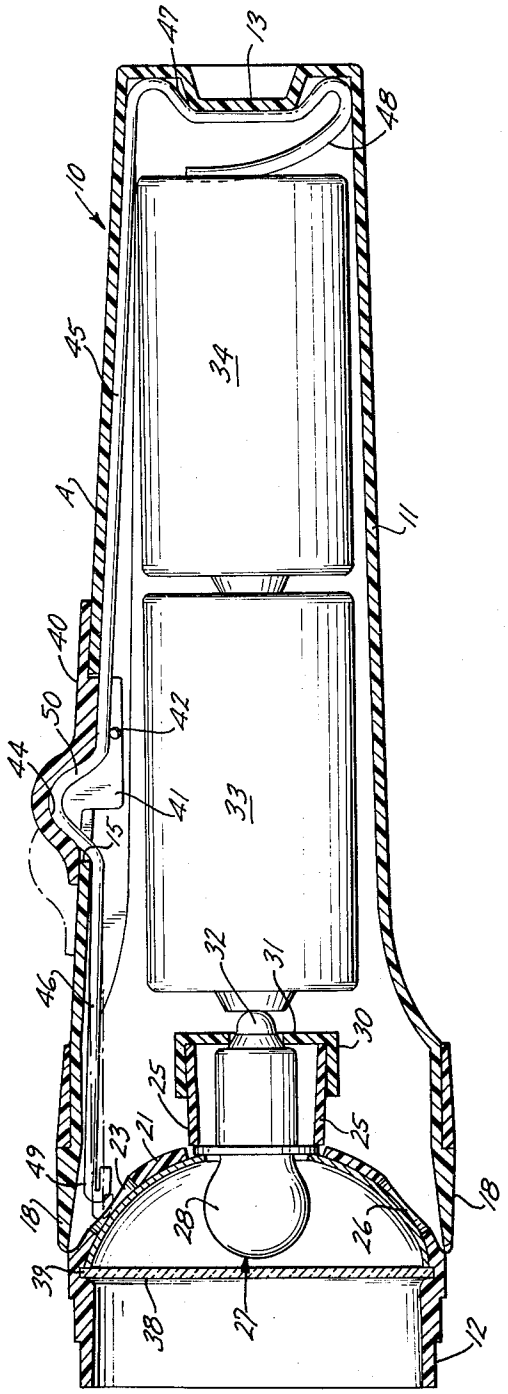
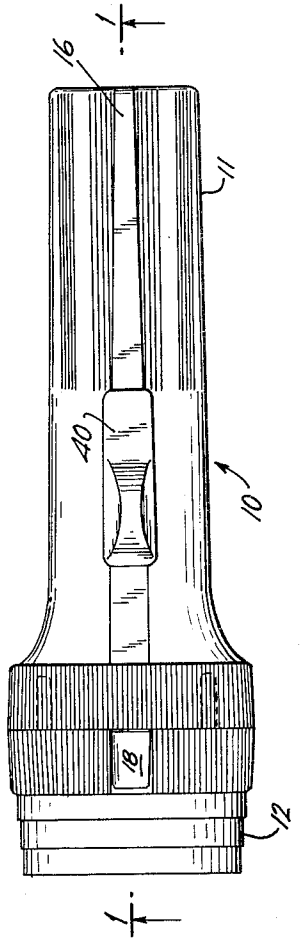


FIG. 2



INVENTOR.
Eric Dent

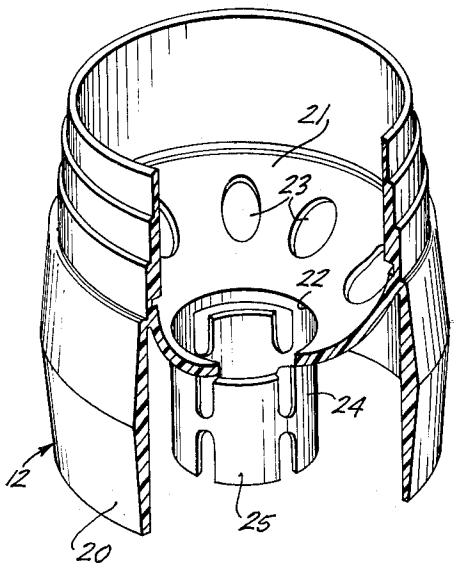
BY
Michael S. Striker
Attorney

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FLASHLIGHT CONSTRUCTION

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FIG. 3



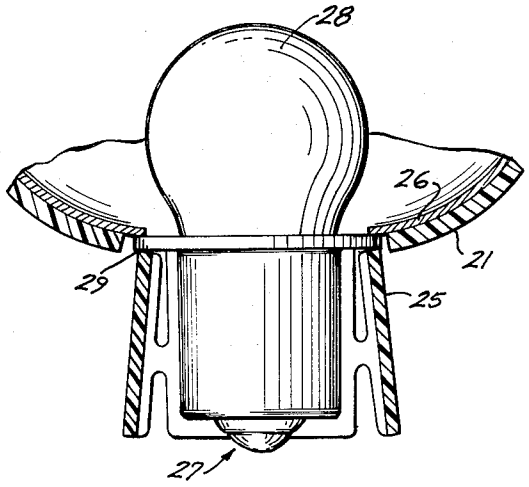


FIG. 4

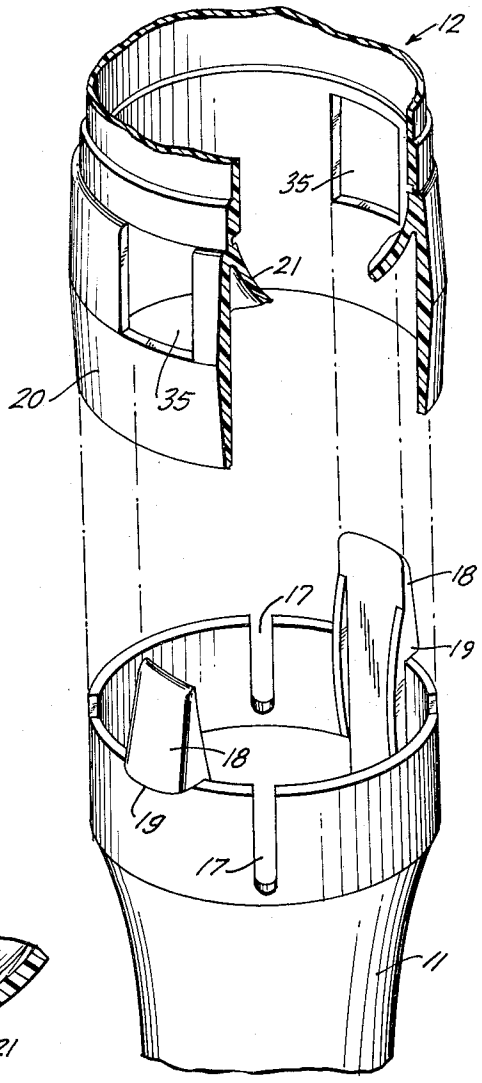


FIG. 5

INVENTOR.
Eric Dent
BY
Michael S Striker
Attorney

Jan. 16, 1962 E. DENT 3,017,502

FLASHLIGHT CONSTRUCTION

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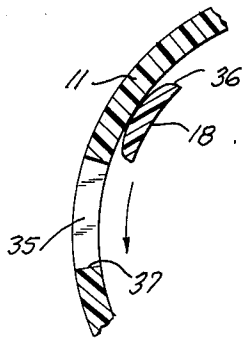


FIG. 6

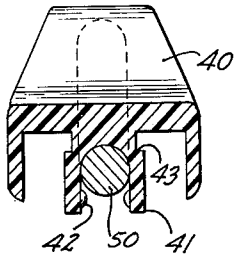


FIG. 7

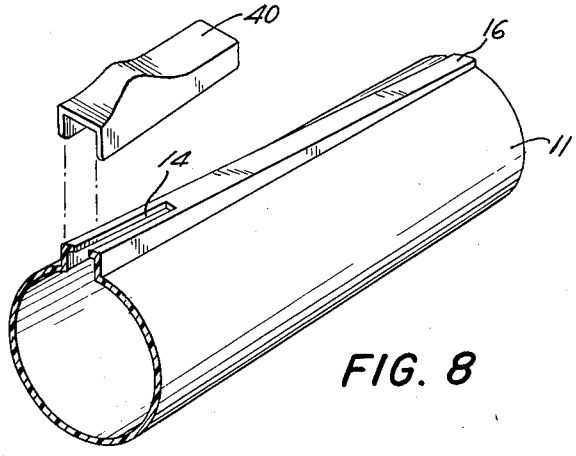


FIG. 8

INVENTOR.
Eric Dent
BY
Michael S. Striker
Attorney

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3,017,502

FLASHLIGHT CONSTRUCTION

Eric Dent, 526 Bay St., Toronto, Ontario, Canada

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3 Claims. (Cl. 240—10.68)

The present invention relates to flashlights.

At the present time flashlights suffer from the fact that they are relatively expensive. If a truly inexpensive flashlight could be made available flashlights would be used far and wide to a much greater extent than is presently the case since the bulbs and batteries are extremely inexpensive and if the rest of the flashlight were correspondingly inexpensive the general use of flashlights would increase greatly.

The fact is, however, that except for the batteries and bulbs present day flashlights require an assembly of a relatively large number of parts and the cost is therefore more than what most people would consider a trifling amount. Thus, a conventional flashlight will require in its battery casing assembly a rear closure member which must be screwed on and off for replacing the batteries and which includes a spring assembly for urging the batteries forwardly toward the reflector. In addition, the conventional battery casing includes a relatively complex switch assembly generally moved axially by the operator. Furthermore, the reflector assembly itself is quite complex.

It is therefore a primary object of the present invention to provide a flashlight which is of exceedingly simple and inexpensive construction made up of a number of components far smaller than the number of components required by a conventional flashlight and of a far simpler construction than the components of a conventional flashlight.

It is a further object of the present invention to provide a flashlight wherein all parts are made of plastic with the exception of those parts which are required to conduct electricity.

It is also an object of the invention to provide a flashlight wherein the different flashlight components are held together not by conventional fasteners but by plastic portions of the components themselves.

An additional object of the present invention is to provide a flashlight wherein the flashlight components can be assembled and disassembled very quickly without the use of any screw threads.

Still another object of the present invention is to provide a flashlight with an exceedingly simple circuit closing and opening structure.

With the above objects in view the present invention includes in a flashlight a one-piece plastic tubular battery casing open at its front end and having a rear end wall, and this casing cooperates with a reflector casing of the flashlight of the invention, the reflector casing having a rear end portion which overlaps a front end portion of the battery casing, one of these end portions being provided with an opening and the other being provided with a springy tongue located in this opening with a shoulder of the tongue engaging an edge of the opening so as to releasably hold the casings together. A switch member is axially movable along the battery casing and cooperates with an elongated springy wire in the interior of the casing for tilting this wire to and from a circuit closing position, and this wire has a leg extending across the rear end wall of the battery casing and having a springy free end portion engaging a battery in the casing for urging the battery forwardly toward the reflector assembly.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a sectional elevation of a flashlight constructed according to the present invention, the section of FIG. 1 being taken along the line 1—1 of FIG. 2 in the direction of the arrows;

FIG. 2 is a top plan of the structure of FIG. 1;

FIG. 3 is a partly broken away perspective illustration of the reflector casing of the invention;

FIG. 4 is a fragmentary sectional illustration of how the bulb is supported in the flashlight of the invention;

FIG. 5 illustrates the manner in which the reflector casing and battery casing cooperate;

FIG. 6 is a fragmentary sectional illustration of a detail in the cooperattion of the reflector and battery casings;

FIG. 7 is a transverse sectional illustration of a switch member of the invention;

FIG. 8 is a fragmentary transverse perspective of the battery casing showing the guide rib and slot thereof.

Referring now to the drawings, there is shown in FIGS. 1 and 2 a flashlight **10** according to the present invention, this flashlight including an elongated hollow battery casing **11** and an elongated tubular reflector casing **12**.

The battery casing **11** is made in one piece of a suitable plastic such as polyvinyl chloride, styrene, or the like. As is apparent from FIG. 1 the battery casing **11** tapers and has its largest cross section at its front end which is located at the left in FIGS. 1 and 2. The battery casing **11** has a rear end wall **13** which may, if desired, be formed with perforations. Intermediate its front and rear ends the battery casing **11** is formed with an axial slot **14** (FIG. 8) and the front end **15** of this slot is indicated in FIG. 1.

The slot **14** is formed in an elongated hollow guide rib **16** of the battery casing **11**, this hollow guide rib extending axially along the casing **11**.

As is shown most clearly in FIG. 5, the casing **11** is formed at its front end with a plurality of notches **17** so that the front periphery of the casing **11** is resiliently yieldable, and at its front end the casing **11** also has a pair of springy tongues **18** formed integrally therewith. It will be noted from FIG. 5 that the tongues **18** are diametrically opposed and tapered toward their upper tips, as viewed in FIG. 5. Thus, the tongues **18** are substantially wedge-shaped cross section in an axial direction, and the tongues **18** have below their upper tips rearwardly directed shoulders **19**.

The reflector casing **12** is also made in one piece of a plastic which may be of the same material as the battery casing **11** and of the same or of a different color. As is apparent from FIG. 3 the reflector casing **12** has an outer wall **20** of tubular configuration open at its opposite ends, and between its ends the casing **12** includes a transverse dished wall **21** formed with a central opening **22** and with at least one additional opening **23** located between the central opening **22** and the outer periphery of the dished wall **21**. Actually a plurality of openings **23** are distributed around the dished wall **21**, and the dished wall **21** has a front concave face directed toward the front end of the tubular wall **20**.

The dished wall **21** has an integral tubular projection **24** substantially coaxial with the outer tubular wall **20** and extending rearwardly from the central opening **22**. The tubular projection **24** has a pair of diametrically opposed springy tongues **25** which have front free ends located adjacent to the opening **22** and rear free ends accessible to the operator for a purpose pointed out below.

As may be seen from FIGS. 1 and 4, the dished wall **21** carries at its front concave face a dished reflector **26**

made of a thin metal such as aluminum, for example, and having a front reflecting face directed toward the front end of the outer wall 20 of the reflector casing 12. If desired, the front concave surface of the dished reflector 26 may be tinned, for example, so as to be rendered highly reflecting. The reflector 26 covers the openings 23 and is formed with a central opening aligned with and smaller than the central opening 22 so that the reflector 26 has an inner periphery extending inwardly beyond the edge of the opening 22 and surrounded by the edge of the opening 22, as is particularly apparent from FIGS. 1 and 4.

The bulb 27 shown in FIG. 4 has its envelope 28 surrounded by the reflector 26, and next to the envelope 28 the bulb has an outwardly directed flange 29 which engages the reflector 26 at its rear surface adjacent to the central opening of the reflector 26. As is apparent from FIGS. 1 and 4 the front ends of the tongues 25 engage the flange 29 to maintain the latter against the reflector 26. The bulb 27 extends rearwardly through the tubular projection 24, and a plastic cap 30 is maintained with a friction fit on the tubular projection 24 and is formed at its rear end with an opening 31 through which the rear end of the bulb 27 extends with the contact 32 of the bulb exposed and engaging the central pole of the battery 33 shown in FIG. 1, this battery being connected in series with the battery 34 in a well known way simply by engagement of the front central pole of the battery 34 with the pole formed by the rear wall of the battery 33. As is well known, by completing a circuit between the rear wall of the battery 34 and the flange 29 of the bulb the latter will become energized.

The reflector casing 12 is formed in its outer tubular wall 20 with a pair of openings 35 which are diametrically opposed and which are adapted to receive the tongues 18. As is particularly apparent from FIG. 5, to assemble the battery casing 11 with the reflector casing 12, the rear end portion of the latter is slipped on to the front end portion of the casing 11 externally surrounding the latter, and during this movement the springy tongues 18 as a result of their wedge-shaped configuration will simply yield inwardly toward each other and will upon alignment with the openings 35 snap through the latter to the position illustrated in FIG. 1 where the shoulders engage the rear edges of the openings 35 so as to maintain the parts assembled.

Of course, in order to disassemble the battery casing 11 and the reflector casing 12, it is only necessary to move the springy tongue 18 toward each other so as to release the shoulders 19 from the rear edges of the openings 35 and then the casing parts 11 and 12 can be axially separated. In order to facilitate this separation there is provided in accordance with the invention, a pair of bevelled side edges 36 on each tongue 18 (FIG. 6), so that by turning the casings 11 and 12 one with respect to the other along their common axis in either direction the bevelled edges 36 will act to depress the tongues 18 inwardly toward the common axis of the casings and thus enable the latter to be very easily separated.

The reflector assembly described above includes a transparent disc 38 which can simply be snapped into an annular groove 39 in the interior of the tubular casing 12 so that the disc 38 holds the reflector 26 against the concave front face of the dished wall 21. The disc 38 can be made of glass since the plastic will yield to permit the disc 38 to snap into the groove 39, so the disc 38 can be made of any suitable transparent plastic.

The flashlight of the invention also includes an elongated switch member 40 made in one piece of a plastic material which may be the same as the material of the battery casing 11. As is apparent from FIG. 7, the switch member 40 is of channel-shaped cross section and thus receives in its interior the hollow rib 16 of the casing 11 so that this hollow rib guides switch member 40 for axial movement whenever the operator wishes to slide the switch member 40 along the rib 16.

Between its outer side walls the switch member 40 is formed with a pair of inner parallel springy walls 41 (FIG. 7) and these inner walls 41 are respectively provided with a pair of small aligned projections 42. The pair of parallel walls 41 extend through the slot 14 into the interior of the casing 11 and are actually located within the hollow rib 16, and at their outer faces the walls 41 are formed with longitudinal shoulders 43 which snap outwardly beyond the sides of the slot 14 into engagement with the inner surface of the rib 16 so that the switch member 40 is guided for movement along the rib 16 but cannot be separated from the latter.

As is particularly apparent from FIG. 1, the switch member 40 is formed with a recess 44 which extends forwardly from and communicates with the space between the walls 41.

The flashlight of the invention is completed by an elongated springy wire member 45. As may be seen from FIG. 1 the member 45 is of substantially L-shaped configuration and has a long leg 46 and a short leg 47. The long leg 46 extends axially along the inner surface of the battery casing 11 in the hollow rib 16 thereof, while the short leg 47 extends transversely across the rear wall 13 of the casing 11, and the leg 47 has a springy free end portion 48 bent back upon itself and engaging the rear wall of the battery 34 to be connected electrically with the latter so as to urge the battery 34 and thus also the battery 33 forwardly along the axis of the casing 11. Thus, the springy free end portion 48 maintains all of the parts including the batteries in proper axial positions and in engagement with each other.

The long leg 46 of the springy wire 45 terminates in a free end 49 which may be curved as shown in FIG. 1, and this free end 49 is aligned with one of the additional openings 23 of the dished wall 21 of the one-piece plastic reflector casing 12.

In accordance with the present invention the long leg 46 of the wire 45 is provided with a substantially U-shaped jog 50 extending radially away from the axis of casing 11 through the slot 14 thereof and received in the recess 44 of the switch member 40. This jog 50 is located directly next to the front end 15 of the slot 14.

The above-described flashlight structure of the invention is used in the following manner:

The casings 11 and 12 can at any time be separated from and joined to each other in the manner described above. A bulb 27 is assembled with the reflector casing 12 simply by being passed forwardly along the axis of the tubular projection 24 through the rear end of the latter until the envelope 28 is surrounded by the reflector 26 and the flange 29 engages the reflector 26, and during this forward movement of the bulb the springy front ends of the tongues 25 will snap behind the flange 29 so as to maintain the bulb in its operating position. Whenever it is necessary to replace the bulb, the reflector assembly is removed from the casing 11 in the manner described above and shown particularly in FIG. 6, and then the rear free ends of the tongues 25 are moved toward each other by the operator so as to spread the front ends of the tongues 25 away from each other to a distance greater than the diameter of the flange 29 so that the bulb can now move rearwardly beyond the front ends of the tongues 25, and once the flange is located rearwardly of the front ends of the tongues 25, the bulb can be axially removed from the tubular projection 24 and replaced by another bulb in the manner described above.

The springy wire 45 is placed into the hollow casing 11, before batteries are placed therein and before the casing 12 is joined thereto, and in placing the springy member 45 within the casing 11 the operator simply presses the leg 46 between the walls 41 so as to snap behind the projections 42 which become located between

the wire 45 and the axis of the casing 11 so as to maintain the wire 45 assembled with the switch member 40. Of course, during this assembly of wire 45 with switch member 40 the jog 50 becomes located within the recess 44 and of course the leg 47 becomes located next to the rear wall 13 of the casing 11. The batteries 33 and 34 are now slipped into the casing 11, and during the joining of the casing 12 to the casing 11, the batteries 33 and 34 will be moved rearwardly to press the springy free end 48 toward the rear wall 13 so that the cooperation of the shoulders 19 of tongues 18 with the rear edges of openings 35 maintains the springy free end portion 48 pressing against battery 34 and in a position different from that which it assumes when unstressed.

With the parts thus assembled, the operator need only move the switch member 40 forwardly in order to energize the lamp 27. During this forward movement of the member 40, the latter will have a tendency due to engagement with the jog 50 to move the leg 45 forwardly. However, since this leg 45 cannot move forwardly the recess 44 will advance forwardly with respect to the jog 50, and as a result the switch member 40 will engage the jog 50 to tilt the leg 45 downwardly, as viewed in FIG. 1, inwardly toward the axis of the casing 11, and, as shown in dot-dash lines in FIG. 1, this tilting will result in engagement of the free end 49 with the reflector 26 in the opening 23 with which the free end 49 is aligned, so that upon such engagement of the wire 45 with the reflector 26 the circuit is completed and the lamp is energized. Upon return of the switch member 40 by the operator to the position thereof illustrated in FIG. 1, the leg 45 due to its inherent resiliency will return to its illustrated position so that the end 49 is spaced from the reflector 26 to de-energize the lamp and the jog 50 is again located within the recess 44.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of flashlights differing from the type described above.

While the invention has been illustrated and described as embodied in plastic flashlights, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

I claim:

1. In a flashlight, in combination, an elongated hollow one-piece plastic battery casing having a rear end wall and being entirely open at its front end, said battery casing being formed with an axially extending hollow exterior rib and said rib being formed intermediate the ends of said casing with an axially extending slot; a one-piece plastic switch member of substantially channel-shaped cross section receiving said rib in its interior and guided by said rib for axial movement back and forth along said casing, said switch member having a pair of parallel springy walls extending through said slot into the interior of said casing and located within said hollow rib thereof, at least one of said parallel walls of said switch member having a projection extending toward the other of said parallel walls; and an elongated springy wire of substantially L-shaped configuration located in the interior of said battery casing and having a short leg extending across said rear wall of said casing and a long leg extending axially along the interior of said casing in said hollow rib thereof, said long leg being located between said parallel walls of said switch member with said projection located between said long leg and the axis of said casing so that said projection maintains said springy wire member assembled with said switch member, said wire member having a jog extending away from the axis of said casing through and adjacent a front end of said slot thereof, said switch member being formed with a recess receiving said jog, whereby said switch member is moved forwardly along said rib and said switch member will engage said jog to move the latter with respect to the front end of the slot radially toward said axis of said casing for placing said springy wire in a circuit-closing position.

2. In a flashlight as recited in claim 1, said jog of said wire being substantially U-shaped configuration.

3. A flashlight, comprising, in combination, an elongated hollow one-piece plastic battery casing having a front open end and having a rear end wall, said casing being formed intermediate its ends with an axial slot; a one-piece plastic hollow reflector casing connected with said front end of said battery casing and extending forwardly therefrom, said reflector casing having an open front end and including intermediate its ends a dished transverse wall having a forwardly directed concave face, said dished wall being formed with a central opening and at least one additional opening between said central opening and the outer periphery of said dished wall and said dished wall having a rearwardly extending tubular projection extending from said central opening thereof and provided with a springy tongue having a free end located adjacent said central opening of said dished wall; a dished reflector located against said concave face of said dished wall and having a reflector surface directed toward said front end of said reflector casing, said reflector having a central opening aligned with but smaller than said central opening of said dished wall and said reflector covering said additional opening of said dished wall, so that a bulb may be located with its front transparent envelope surrounded by said reflector and with its elongated rear end portion extending through and rearwardly beyond said tubular projection of said dished wall with a flange of said bulb engaging said reflector adjacent said central opening thereof and said tongue engaging said flange to hold said bulb assembled with and engaging said reflector; and an elongated springy wire of substantially L-shaped configuration located in said battery casing and having a long leg extending axially along said battery casing next to the wall thereof and a short leg extending transversely across the rear end wall of said battery casing, said short leg having a springy free end bent back upon itself for engaging a battery to urge the same forwardly toward said reflector assembly, the long leg of said springy wire extending along said slot and having a free end located adjacent said additional opening of said dished wall; and a one-piece plastic switch member axially movable along the exterior of said battery casing and having a pair of parallel springy walls extending through said slot into the interior of said casing, said long leg of said wire extending between said parallel walls of said switch member and one of said walls having a projection located between said wire and the axis of said battery casing to maintain said wire assembled with said switch member, said long leg of said wire having a substantially U-shaped jog extending radially away from the axis of said battery casing through said slot thereof and located adjacent the front end of said slot and said switch member being formed with a recess receiving said jog so that during forward movement of said switch member along said slot said switch member will tilt said long leg inwardly toward said axis so as to place the free end of said long leg in said additional opening in engagement with the portion of the reflector which covers said additional opening so as to close a circuit through the bulb when said switch member is thus moved forwardly.

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