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[54] FLASHLIGHT CONSTRUCTION

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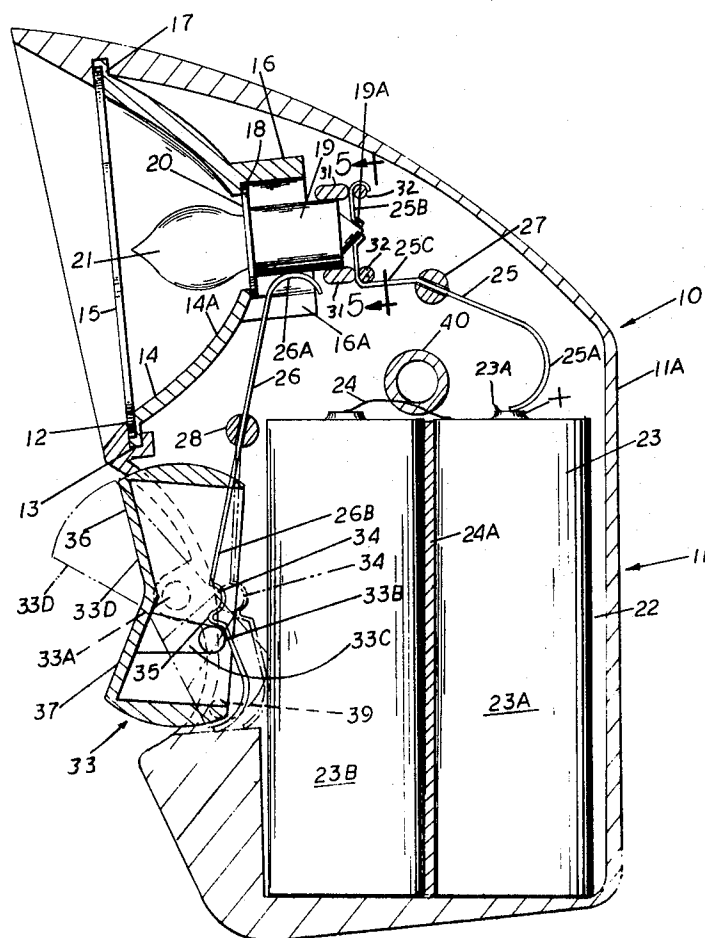
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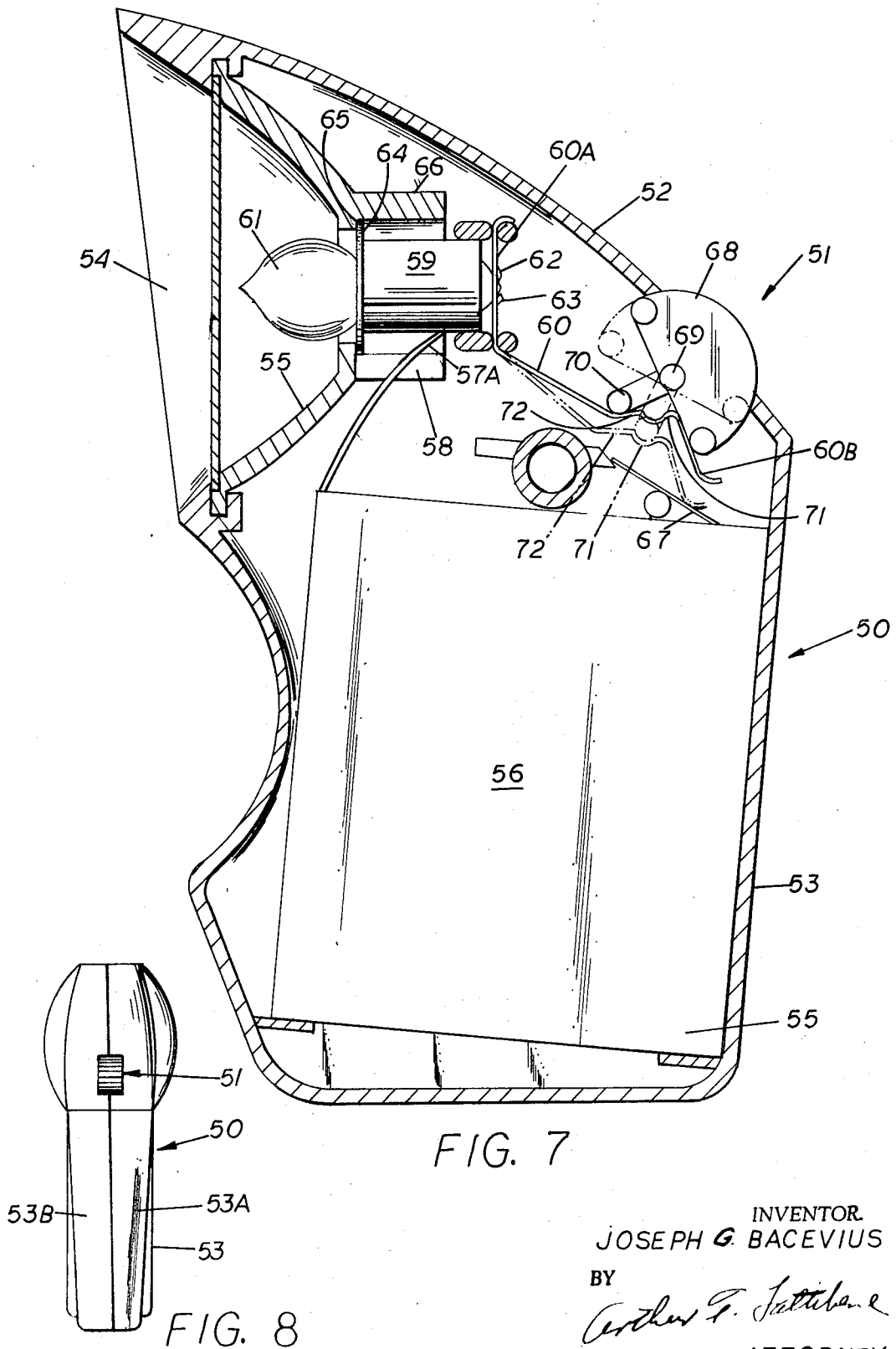
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[57] ABSTRACT

This disclosure is directed to a flashlight construction having a minimum of component working parts so as to render it readily adaptable as a relatively inexpensive, low cost, disposable unit. It comprises a housing having a reflector assembly with bulb socket for loosely receiving a bulb, and a battery connected in electrical circuit with the bulb by means of spring leaf type contacts or conductors, and having a toggle switching means operatively associated with one of the spring conductors for energizing and de-energizing the bulb.

12 Claims, 8 Drawing Figures





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FLASHLIGHT CONSTRUCTION

PROBLEM AND PRIOR ART

Heretofore numerous flashlight constructions are known. However, most of the known flashlights include relatively complex mechanisms which do not render the flashlight construction economically feasible as a disposable or readily expendible throw-away unit when the battery source of power has exhausted. Recently, efforts have been made toward the construction of a truly disposable unit; i.e., one having a built-in battery source which is rendered expendible when the battery source has ceased to function. The known flashlights which are featured as being readily disposable units are known to have a relatively large number of individual component parts requiring a relatively large number of manual operations to effect the assembly thereof. As a result, the amount of time, labor and material needed to effect the assembly of such units rendered the unit cost thereof sufficiently high so as to severely limit the ultimate sale of such type units.

OBJECTS

It is therefore an object of this invention to provide a flashlight construction having a minimum of component parts constructed and arranged so that they can be readily assembled with a minimum of time, effort and/or manual operation.

Another object of this invention is to provide a flashlight construction having an improved reflector assembly to facilitate the positioning of a bulb therein to further minimize the amount of time and labor needed to assemble.

Another object of this invention is to provide a flashlight construction having an improved toggle switching arrangement which can be latched in either the operative or inoperative position.

Another object of this invention is to provide a reflector and bulb assembly wherein the bulb is maintained in position under spring tension.

Another object of this invention is to provide a flashlight construction in which a pair of spring leaf type contacts are utilized for connecting the bulb in circuit with the battery source wherein one of the spring contacts is operatively associated with the switching arrangement for effecting the making and breaking of the circuit.

Another object of this invention is to provide a truly disposable or expendible flashlight construction which is relatively simple in construction, inexpensive to manufacture, and positive in operation.

BRIEF SUMMARY OF THE INVENTION

The foregoing objects and other features and advantages of this invention are attained by a flashlight construction comprising a housing which is preferably formed of substantially two similar half sections which in the assembled position define a closed housing having a lens opening therein. A reflector having a bulb socket is disposed adjacent the lens opening. The arrangement is such that the bulb is fitted into the socket without threading or screwing.

The lower portion of the housing is provided with a chamber for receiving a battery pack or means. A pair of leaf spring conductors are operatively associated

with the battery means and bulb to define the circuit for energizing and de-energizing the bulb at will.

One of the spring conductors is specifically constructed so as to exert a spring bias contact with the bulb for maintaining the bulb in seating relationship within the bulb socket. One spring conductor is also formed with a movable end arranged so as to be disposed under the influence of a switching means actuator to effect the energizing and de-energizing of the circuit to the light bulb whenever the switch actuating means is operated. Complementary latching or locking means are formed on the switch actuating means and the adjacent movable spring conductor for effecting the latching of the switching means in either the energized or de-energized position.

In one embodiment the switching means is located on the front portion of the housing, and in a modified form of the invention the switching means is located on the top portion of the housing.

FEATURES

A feature of this invention resides in an improved reflector and bulb assembly constructed and arranged so as to loosely receive a bulb therein so as to minimize the assembly procedure.

Another feature of this invention resides in the provision wherein a pair of spring conducting members are operatively associated with the bulb for maintaining the bulb seated within its socket, and wherein one of the spring conductors has a movable end portion operatively associated with a switch actuating means for making and breaking the circuit to the bulb.

Another feature of this invention resides in a toggle switching arrangement operatively associated with a spring conductor wherein the switching means and associated spring conductor are provided with complementary means for effecting the latching or locking of the switching means in either an energizing or de-energizing position.

Another feature of this invention resides in the provision of a flashlight housing formed of complementary shell or housing sections which are constructed so as to enable the housing to be optionally formed for use either as a housing which can be readily separated for use as a reusable unit, or assembled to form a readily disposable or expendible unit.

Other features and advantages will become more readily apparent when considered in view of the drawings and specifications in which

FIG. 1 illustrates a side view shown in section, of a flashlight construction embodying the present invention.

FIG. 2 illustrates a rear end view of the flashlight construction of FIG. 1.

FIG. 3 illustrates a detail rear end view of the reflector assembly.

FIG. 4 illustrates a detail perspective view of the switch actuator having portions thereof broken away and shown in section.

FIG. 5 is a detail sectional view taken along line 5—5 on FIG. 1.

FIG. 6 is an end view of the detail of construction shown in FIG. 5.

FIG. 7 illustrates a side sectional view of a modified form of the invention.

FIG. 8 is the rear end view of the modified form of the invention of FIG. 7.

DETAILED SPECIFICATION

Referring to the drawings, FIGS. 1-6 there is shown a flashlight 10 embodying the construction of the present invention. The flashlight 10 comprises a housing 11 formed of two complementary shell sections 11A, 11B disposed in abutting relationship. The respective complementary sections 11A, 11B of the housing 11 are preferably formed of a moldable plastic and the abutting seam defined thereby is fused or bonded to form an integral or unitary housing construction. As will be hereinafter described, the respective complementary sections 11A, 11B may be optionally assembled so as to render them readily separable, in which case, the flashlight may be optionally used at the will of the user either as a disposable unit or as a reusable unit.

As shown in FIG. 1, the respective housing sections 11A, 11B are formed so that in the assembled position, an opening 12 is provided at the front. A circumscribing groove 13 is integrally formed in the respective complementary sections 11A, 11B to define a seat for accommodating a bulb reflector 14 and the associated lens or transparent cover 15.

As seen in FIGS. 1 and 3 the reflector 14 comprises a concave reflector 14A having integrally formed therewith a bulb socket 16. The end of the reflector 14 is defined with a flange 17 which is received in groove 13. The inner end of the bulb socket 16 is defined by an internal shoulder or flange 18 to form a bulb seat. Also the bottom of the socket 16 is formed with a slot 16A. The arrangement is such that the casing 19 and circumscribing flange 20 of bulb 21 can be loosely received or fitted into the socket 16 as shown in FIG. 1.

The lower part of the housing 11 defines a cavity 22 sized to receive a battery pack or means 23. In the illustrated form of the invention of FIG. 1 the battery pack comprises a pair of dry cell flashlight type batteries 23A, 23B, e.g., 1½ volt; separated by an electrically insulated wall 24A. The respective batteries 23A, 23B are connected in series electrically, as for example by a suitable conductor 24 connecting the negative electrode of one battery to the positive electrode of the other battery. It will be understood however, that single larger batteries may be positioned in the battery cavity 22 in lieu of the connected batteries 23A, 23B to provide the source of electrical energy for energizing the bulb 21. The means for connecting the battery pack 23 in circuit with bulb 21 comprises a pair of leaf spring-like members 25, 26. As seen in FIG. 1, each of the respective spring conductors 25 and 26 are maintained in position within the housing 11 by means of a bifurcated boss 27 and 28 respectively which are integrally formed to one of the housing sections, e.g., 11A. One of the spring conductors 25 is constructed and arranged so that one end thereof 25A engages one of the electrodes of the battery 23A. The other end 25B of the spring contact 25 is angularly disposed or bent relative to the intermediate portion 25C so as to be disposed adjacent or contiguous to the end of the bulb casing or bulb contact 19A. As best seen in FIGS. 5 and 6, the end 25B of the spring conductor 25, disposed adjacent to the bulb contact 19A, is provided with a pair of spring fingers 29 and 30, blanked out of the plane of

the leaf spring conductor 25. The arrangement is such that the spring fingers 29 and 30 exert a spring bias on the bulb 21 so that the bulb is urged or spring loaded into firm seating position against the shoulder 18. To maintain the end 25B of the spring conductor 25 contiguous to the end of the bulb to maintain the bias on the bulb, paired fixed abutments 31, 32 are integrally formed on the housing section 11A to hold and straddle the conductor end 25B. The spacing between abutments 31, 32 is such so as to frictionally receive the conductor end 25B therebetween. With the construction illustrated, as described, it will be noted that the preformed spring conductor need only be inserted in the bifurcate of holding boss 27 with end 25B inserted in the space between abutments 31, 32. With the conductor 25 in this position the opposed ends are placed in proper electrical contact with both the bulb 21 and the battery means 23.

The other spring conductor 26 comprises an elongated leaf type spring member having one end 26A thereof adapted to extend into the bulb socket slot 16 to engage or make electrical connection with the other contact of the bulb. The spring conductor 26 is maintained in operative position relative to the bulb and the contact by bifurcated holding boss 28 integrally formed with the housing section 11A.

As best seen in FIG. 1 the other end 26B of the spring conductor 26 is movably mounted relative to the bifurcated boss 28 to pivot relative thereto. The arrangement is such that the movable end 26B is free to flex toward and away from the other electrode of the battery or negative side of the battery 23B so as to make and break the circuit to the bulb 21 as will be hereinafter described.

Operatively associated with the movable end 26B of the leaf spring conductor 26 is a switch actuating means in the form of a pivotally mounted actuator 33. Referring to FIGS. 1 and 4 the switch actuator 33 comprises a member which is adapted to be pivotally mounted about its pivot 33A to the respective housing sections 11A, 11B. Integrally formed with the actuating member 33 is a latching bar 33B, connected to the actuator member by a pair of projecting brackets 33C. The movable end 26B of the of the leaf conductor 26 is provided with a catch portion 34 adapted to accommodate the latching bar 33B in the operative or energizing position of the switching means. Adjacent the catch portion 34 the conductor 26 is provided with a camming node 35 which is adapted to normally bear against the latching bar 33B. The face portion 33D of the actuator is provided with angled portions 36 and 37 which are pressed to effect rotation of the actuator about its pivot 33A.

In operation, it will be noted that when the bottom portion 36 of the actuator means is pressed inwardly to rotate in a counterclockwise direction about its pivot 33, as from the solid line showing to the dot-dash line position, the latching bar 33B is caused to cam over the camming node 35. In doing so the movable end 26B is toward the battery to make electrical contact therewith, as seen by the dot-dash position on FIG. 1. Upon the latching bar 33B overriding the camming node 35, the latching bar becomes recessed or locked in the catch 34 to maintain the spring conductor in energizing position against electrode of battery 23B

until the switching actuator is again operated. Thus with the construction described it is not necessary for the operator to hold the actuator in energizing position.

To de-energize the circuit, the upper portion 36 of the actuator means 33 is pressed in a clockwise direction about its pivot 33A. In doing so the latching bar 33B cammed out or is disengaged from the catch 34, thereby permitting the movable end of the leaf spring to be moved away from the battery to de-energize the circuit to the bulb 21. The movement of the end portion 26B away from the battery electrode is effected by the inherent resiliency of the contact 26. To limit the movement of the actuator 33, a stop 39 may be formed integral therewith.

With the construction described, the individual component parts of the flashlight are reduced to a minimum. Further each of the respective component parts can be readily assembled with a minimum of manual operation and effort thereby greatly reducing the amount of labor and cost in the construction of the unit. The bulb reflector 14 is formed so that bulb 21 can be loosely received within the associated bulb socket 16 and is maintained in position therein under the influence of the spring tension exerted thereon by spring conductors which also conduct the current between the battery and the light bulb. With the respective component parts located within one shell or portion 11A of the housing, as indicated in FIG. 1, the assembly can be readily completed by superimposing thereover the other complementary section 11B of the housing. To form the complete, integrally constructed flashlight assembly, which can be rendered readily disposable when the stored energy of the battery has been depleted, the respective shell sections 11A, 11B are suitably fused or bonded together.

However, in an alternate construction, instead of fusing and/or bonding the two complementary sections 11A, 11B together to form an integral flashlight assembly, the respective sections 11A, 11B may be detachably secured by a single fastener means, e.g., a screw, to maintain the respective housing sections 11A, 11B in a readily detachable assembly. This is attained by providing one of the housing sections 11B with an internally threaded boss 40 and having the other housing section provided with a complementary opening arranged to align therewith in the assembled position. A screw type fastener (not shown) is then inserted and threaded into the threaded boss 40 to secure the respective housing sections 11B, 11B in readily detachable, assembled position.

FIGS. 7 and 8 illustrate a modified flashlight construction 50. In this arrangement the switching means 51 has been relocated so as to be disposed in the top portion 52 of the housing 53. In this form the housing 53 is again formed of complementary sections 53A, 53B which can be readily disposed in abutting relationship to define the housing assembly. The housing 53 is formed with a lens opening 54 in the front thereof for accommodating the reflector 55 and associated bulb socket similar in detail to that hereinbefore described. The housing 53 is provided with a chamber 55 for accommodating a battery pack 56 which forms the source of electrical energy needed for energizing the light bulb.

In this arrangement the conducting means comprises a first spring contact 57 having one end electrically connected to one electrode of the battery, and having its other end 57A extending through the slot 58 formed in the bulb socket to make electrical contact with the bulb casing 59. The other conductor 60 is defined as a leaf spring member having one end thereof 60A angularly bent so as to be disposed in contiguous relationship to the end of the bulb 61 to exert a spring bias thereon as hereinbefore described with respect to FIG. 1. As described with respect to FIGS. 1, 5 and 6, the portion 60A of conductor 60 adjacent the end of the bulb 61 is provided with blanked out finger means 61, 62 arranged to accommodate the end of the bulb and to exert a thrust or bias thereon for maintaining the flange 64 of the bulb 61 in seating relationship to the internal shoulder 65 of the bulb socket 66. The other end 60B of the spring conductor 60 is rendered movably mounted for movement toward and away from the other electrode or battery contact 67 to make and break contact therewith.

A toggle switching member or actuator 68 is operatively associated for effecting the movement of the movable end 60B of the conductor 60 into contacting position with the electrode or contact 67 of the battery. As shown the actuating means comprises an oscillating member which is mounted about a pivot 69 between the respective complementary sections 53A, 53B. A projecting latching bar 70 is operatively connected to the actuating member to rotate therewith. Formed in the movable end 60B of the spring conductor 60 is a catch recess 71 and a cooperating camming node 72 which is normally biased against the latching bar 70 by the inherent resiliency of conductor 60. When the actuating member 68 is rotated in a counterclockwise position to a position illustrated by the dot-dash line in FIG. 7, the latching bar 70 is displaced so as to cam over node 71 and latch in the catch recess in a manner similar to that hereinbefore described. In doing so the movable end 60B of the conductor is moved into electrical engagement with the electrode or contact 67 of the battery.

In rotating the actuating member 68 in the opposite or clockwise direction about pivot 69, the latching bar 70 is rotated to effect disengagement from catching recess 71. In doing so the inherent resiliency of the movable end 60B of the spring conductor 60 will cause it to be moved away from or out of electrical contact with the battery to deenergize the circuit.

In this form of the invention the respective housing sections 53A, 53B may likewise be fused or adhesively secured together so as to form an integral unit; or in the alternative, may be secured by a single fastener as hereinbefore described. The flashlight construction described can be readily utilized as a truly economic disposable unit, or in the alternative may be rendered reusable simply by making the respective housing sections 53A, 53B readily separable by means of a screw fastener.

From the foregoing it is to be noted that a minimum of movable parts are provided in which each part can be readily assembled with a minimum of manual effort and a minimum of time. When assembled the described construction will provide for positive operation. The construction of the flashlight is such that the assembly

of the parts can be readily attained within one section only, with assembly being completed simply by positioning the other section of the housing over the assembled section, and otherwise securing the respective sections together.

While the present invention has been described with respect to particular embodiments thereof, it will be understood that variations and modifications thereof may be made without departing from the spirit or scope of the invention.

What is claimed is:

1. A flashlight comprising:

means defining a housing,

a bulb reflector mounted on said housing,

said reflector including a bulb socket,

said bulb socket being defined by an inturned flange to form a bulb seat,

a light bulb adapted to be loosely received in said socket,

a battery means disposed within said housing,

conductor means operatively connecting said bulb in circuit with said battery means,

said conductor means including a spring contact acting on said bulb for maintaining said bulb in position within said socket,

and said conductor means including a first spring contact having one end portion electrically connected to one electrode of the battery means and having its other end portion spring loading said light bulb whereby said light bulb is firmly seated within said socket against said flange,

and a second spring contact having one end operatively connected in electrical contact with said bulb and having its other end movably mounted for engaging and disengaging with the other electrode of said battery means,

and switching means being operatively associated with said movable end for energizing and deenergizing the circuit to said bulb,

and including means for positioning spring loaded end portion of said first contact means adjacent the end portion of said socket, and

said spring loaded end portion of said first contact having a spring finger blanked out of the plane thereof,

said spring finger being adapted to spring load the end of said bulb for biasing said bulb against said flange.

2. The invention as defined in claim 1 including fixed abutments for positioning the spring loaded end portion of said first contact adjacent the end of said socket.

3. The invention as defined in claim 1 wherein said socket including a longitudinally extending slot formed therein, and said one end of said spring contact extending into said slot to engage said bulb.

4. A flashlight comprising:

means defining a housing,

a bulb reflector mounted on said housing,

said reflector including a bulb socket,

said bulb socket being defined by an inturned flange to form a bulb seat,

a light bulb adapted to be loosely received in said socket,

a battery means disposed within said housing,

conductor means operatively connecting said bulb in circuit with said battery means,

said conductor means including a spring contact acting on said bulb for maintaining said bulb in position within said socket,

and said conductor means including a first spring contact having one end portion electrically connected to one electrode of the battery means and having its other end portion spring loading said light bulb whereby said light bulb is firmly seated within said socket against said flange,

and a second spring contact having one end operatively connected in electrical contact with said bulb and having its other end movably mounted for engaging and disengaging with the other electrode of said battery means,

and switching means being operatively associated with said movable end for energizing and deenergizing the circuit to said bulb,

said switch means including

an actuator pivotally mounted on said housing,

and complementary latching means formed on said actuator and the movable end of said second spring contact for latching said movable end in electrical contact with said battery electrode in the operative position of said flashlight.

5. The invention as defined in claim 4 wherein said actuator comprises:

a toggle member,

said toggle member having a pivot intermediate the ends thereof about which said member pivots,

a latching member connected to said toggle member, and a complementary catch formed on the movable end of said second contact,

said catch being adapted to receive and lock said latch in the operative position of said flashlight whereby said movable end is maintained in electrical contact with the electrode of said battery.

6. The invention as defined in claim 5 wherein said second contact includes a camming node adjacent the catch portion so that said latch is riding over said camming node effects displacement of said movable end toward said battery electrode.

7. The invention as defined in claim 1 wherein said housing is integrally formed about said reflector and battery means to render said flashlight readily disposable.

8. A flashlight comprising

a housing,

a reflector mounted in one end of the housing,

said reflector having a bulb socket formed in the end thereof for loosely receiving a bulb,

said socket having a bulb seat defined by an internal flange, and

said socket having a longitudinal slot formed therein, a bulb adapted to be seated in said socket against said flange,

a battery means disposed in said housing,

a contact means connecting one of the electrodes of said battery means in circuit with said lamp,

said contact means including a spring contact portion for urging and maintaining said bulb against said flange whereby said bulb is wedged between said spring contact portions and said flange,

a second spring contact,

said second contact having an end portion adapted to extend into said slot to engage in electrical contact with said bulb,

said second contact having its other end remote from said bulb movably mounted for engaging and disengaging with the other electrode of said battery, and a switching means operatively associated with said movable end remote from said bulb for moving said remote end into engagement and disengagement with said other electrode of said battery means to make and break the circuit to said bulb whereby the mechanical activity of said switching means and associated movable end is away from said bulb.

9. A readily disposable flashlight comprising a housing having a lens opening, a reflector mounted in said housing adjacent said lens opening, said reflector having a bulb socket formed in one end thereof, a bulb seat formed in said socket, said socket having a slot formed therein, a bulb adapted to be loosely received in said socket, a battery means disposed in said housing, a pair of spring contact members connecting said battery means in circuit with said bulb, one of said spring contacts having an end portion for exerting a bias on said bulb for maintaining said bulb seated in said socket, and one of said spring contacts having a movable end portion remote from said bulb for engaging and disengaging said battery in circuit with said bulb, a switch means operatively associated with said movable end of said one spring contact whereby the mechanical activity therebetween is remote from said bulb, said switch means and movable end having complementary releasable latch and catch means for effecting the actuation of said flashlight as said switch means is operated to maintain said movable end in engaging position with said battery.

10. The invention as defined in claim 9 wherein one of said spring contacts has one end thereof biasing said bulb in its socket and having its other end movably

mounted to engage and disengage said battery means in circuit with said bulb.

11. The invention as defined in claim 10 wherein said switch means is pivotally mounted in the top portion of the housing adjacent the movable end of said one contact.

12. A flashlight comprising means defining a housing, a bulb reflector mounted in said housing, said reflector including a bulb socket, said socket having an intumed flange to define a bulb seat within said socket, a light bulb adapted to be loosely received within said socket, said light bulb having a bulb casing, a battery means disposed within said housing, a pair of conductors for operatively connecting said light bulb in circuit with said battery means, one of said conductors including a spring contact on one end thereof acting on said bulb for positively maintaining said bulb in position against said seat within said socket and having its other end adapted to contact with one electrode of the battery means, fixed abutments for positioning said spring contact end adjacent said bulb to define a predetermined spacing between said flange and said spring contact for snugly accommodating said bulb casing therebetween,

and the other of said spring conductors having one end operatively connected in electrical contact with said bulb and having its other end adapted to contact with the other electrode of said battery means,

one of said conductors having its electrode engaging end portion remote from the light bulb free to flex between a circuit and non-circuit position, and a switch means for energizing and de-energizing the circuit to said bulb,

said switch means being operatively associated with the remote flexing end of said one of said conductors.

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