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Kaye et al.

[11] **3,737,650**

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[54] DISPOSABLE FLASHLIGHT

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

[51] **Int. Cl.**.....**F211 15/00**

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

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Primary Examiner—Joseph F. Peters, Jr.
Attorney—Robert Levine

[57] **ABSTRACT**

A flashlight comprising a hollow shell housing, for two cells and a lamp, with the housing initially of two parts, each part serving as a collecting tray for components during manufacture, so the two shells when closed, with the components in place, constitute the finished flashlight; and a mounting clip on the flashlight is movable to a selected one of three available positions, to serve as a switch to put the flashlight in "off," "intermittent" or "full on" operation.

16 Claims, 10 Drawing Figures

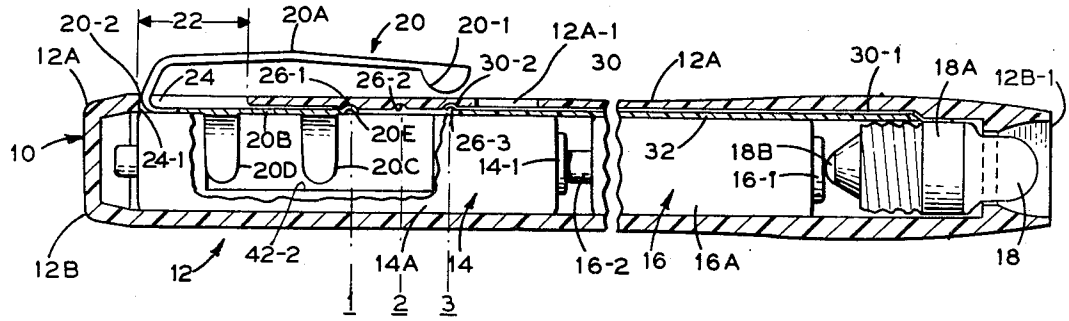


FIG. 1

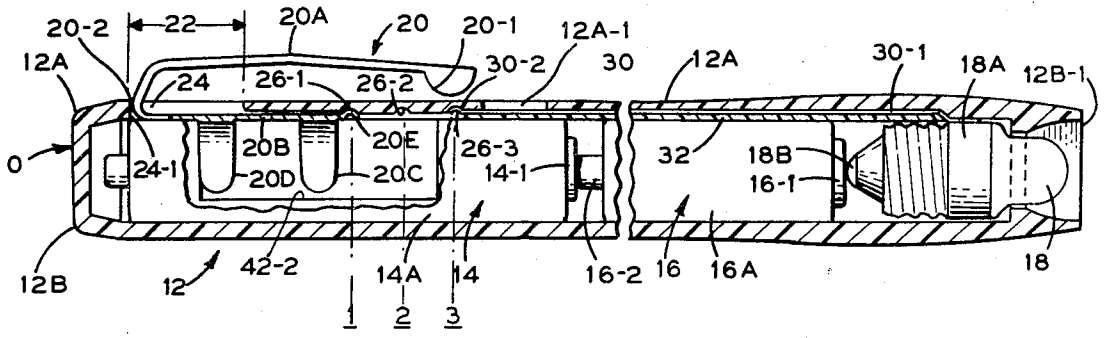


FIG. 2

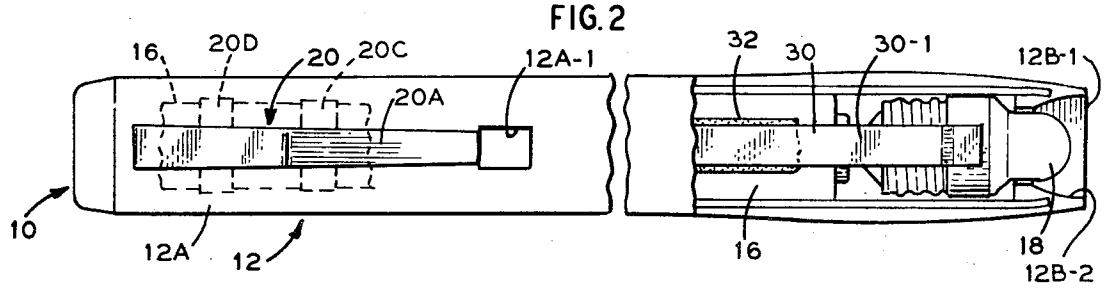


FIG. 3

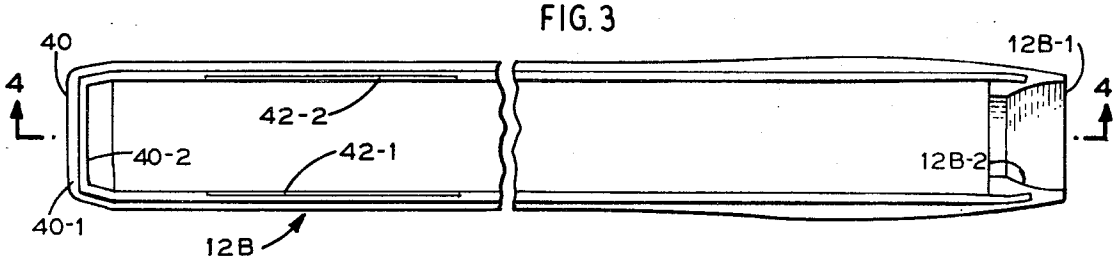


FIG. 4

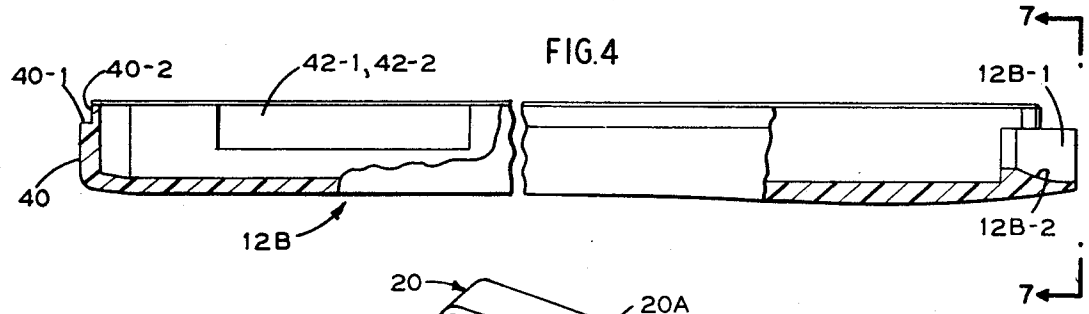


FIG. 1A

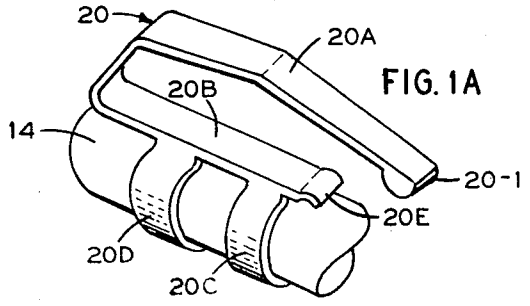


FIG. 7

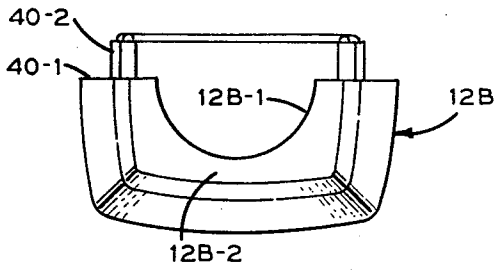


FIG. 8

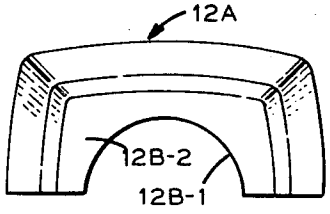


FIG. 9

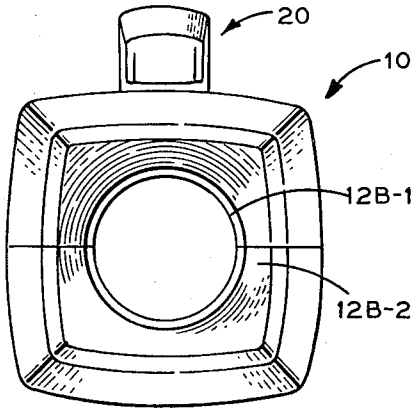


FIG. 6

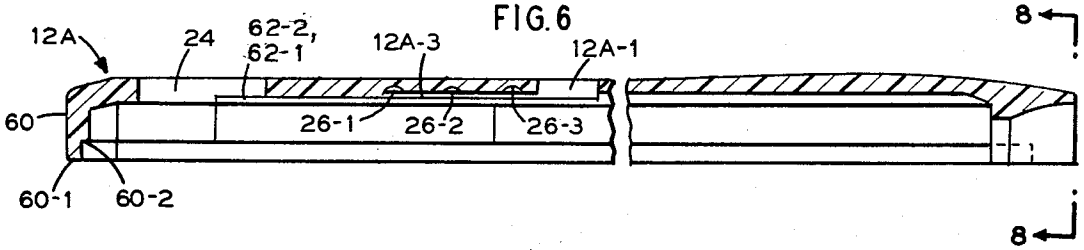
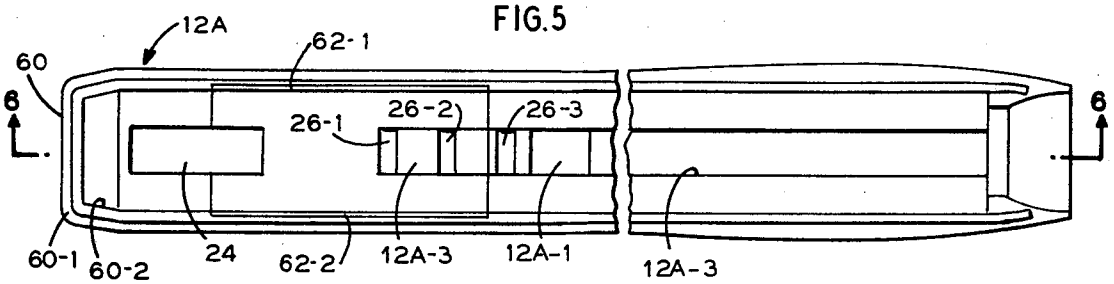


FIG. 5



DISPOSABLE FLASHLIGHT

This invention relates to a disposable flashlight, with dimensions comparable to those of an ordinary pencil or thin pen, and provided with a clip which serves the double purpose of supporting the flashlight on a pocket flap, and of serving as a manually operable switch for closing the circuit to the flashlight from an enclosed battery cell, to cause the light to be energized and to function as a light source, for selected intermittent operation, or for fixed continuous operation.

There are many applications where a small portable flashlight is desirable for limited usage, and as a relatively small light source, and sufficiently inexpensive to be disposable and discardable in its entirety when the energy of the electric cell of the flashlight is used up.

In order to contribute to the low cost of such a flashlight, so that it may be considered as disposable when the cell is used up, the flashlight is made of a simple inexpensive formed plastic shell, with a small inexpensive lamp at one end and a single cell, or two-cell battery, supported within the hollow shell, and a supporting clip is included that serves also as a switch for the flashlight. The supporting clip is applied as a sliding element, that is easily and readily assembled on the body shell, in such manner as to be longitudinally slidable upon the shell in a limited path of travel, from an insulating position at its outer end of travel path to two effective positions towards the inner end of travel path, one where the clip may then serve as a thumb-operated switch to close the electric circuit temporarily between the cell and the lamp to energize and light the lamp, and in the second position where the switch stays closed.

In order to keep the cost of such disposable flashlight unit at a low cost, the flashlight is made to be assembled with very simple assembly operations, with the parts designed to be interfitted in such manner as to eliminate the need for fastening devices, which would normally require many manual handling operations to apply anchoring fittings.

The primary object of this invention is to provide a disposable flashlight constructed of component elements that may be easily and readily assembled in such interfitting relationship as to eliminate the need for anchoring and fastening devices.

Another object of the invention is to provide a flashlight of such design construction as to permit all components and elements to be directly assembled in ultimate position within two separate half parts of the enclosure housing, as hollow half-cylinder boats that initially serve as manufacturing assembly carriers for those components and elements, so that the final assembled structure may be formed by coupling the two separate parts to close them, and then to secure them in closed form, with a simple sealing operation between the two coupled halves of the casing or shell which houses the elements of the flashlight.

The disposable flashlight, as constructed in accordance with this invention, comprises an elongated hollow shell, initially consisting of two separate semicylindrical hollow sections, within which the components are assembled One half-section serves as an assembly cradle to receive the lamp and two cells of a battery, placed in coaxial arrangement, with an elongated metal conducting strip disposed along, and insulated from, the cells, with one end of the metal strip disposed to engage a side wall terminal of the lamp while the axial terminal of the lamp engages one end of one

of the cells, and comprises, further, a clip consisting of a relatively U-shaped metal element disposed with one arm threaded through an opening in the other half shell and with the second arm provided with sliding guides to engage a cell nesting in the other half shell; and after assembly, the two half-shells are fitted together, as controlled by suitably designed pilot ribs, after which the engaging surfaces of the two half shells are sealed to provide a sealed seam that joins the assembled parts into a unitary flashlight structure.

The design and construction of the flashlight of this invention is described and shown in more detail in the following specification and in the accompanying drawings, in which

FIG. **1** is a longitudinal view, partially in section and partially in elevation, of the flashlight of this invention;

FIG. **1A** is a perspective view of the clip on a cell in the flashlight, for guidance;

FIG. **2** is a plan view of the flashlight, with a portion of the casing partially broken away;

FIG. **3** is a plan view of the bottom half-shell;

FIG. **4** is a side view, partially in section, taken along line **4—4** of FIG. **3**;

FIG. **5** is a plan inside view of the top half-shell;

FIG. **6** is a sectional side view, taken along line **6—6** of FIG. **5**;

FIG. **7** is an elevational view of the front end of the bottom half-shell;

FIG. **8** is an elevalional view of the front end of the top half-shell; and

FIG. **9** is a front elevational view of the final flashlight.

As generally shown in the drawings, the flashlight of this invention comprises an elongated shell as a housing, for containing one or more electric cells and a small filament lamp, with electric circuit between the cell or cells and the lamp, the circuit being controlled by a metallic clip which functions as a switch when the flashlight is to be operated, and the clip also functions as a retaining clip when the flashlight is not to be operated but is to be supported, for example, on a pocket flap of the wearer.

As illustrated in FIG. **1**, a flashlight **10** of this invention is shown as comprising an elongated hollow shell or housing **12** containing two electric energy cells **14** and **16** for supplying energy to light an electric lamp **18**, when a circuit between the two cells and the lamp **18** is closed by an electric switch, whose operation is controlled by a clip **20** which serves as part of the switch and also as a mounting element for supporting the flashlight on a pocket flap of the wearer.

The clip is movable on the shell or housing through a short path **22** defined by a window slot **24** in the upper half shell **12A** of the housing **12.** The clip **20** is of metal to be electrically conducting, and is substantially U-shaped, and embodies an outer clip arm **20A** and an inner sliding arm **20B**, which latter is supported for longitudinal movement, and is kept from skewing, during such movement, by two pairs of guide lugs **20C** and **20D** that straddle the cell **14** and that are movable on that cell with an easy slip fit. The inner arm **20B** of the clip is provided with a front rounded tip **20E** that serves as a detent to hold the clip **20** in a selected position, by registering into one of three selectible detent grooves **26-1, 26-2** or **26-3.** Those grooves are formed in spaced relation on the inner surface of the top half-

cylinder as transverse flutes shown more fully in detail in FIG. 5.

The flashlight is constructed to enable the clip to serve selectively, either as an intermittent switch subject to the control of the operator, or as a fixedly closed switch to stay closed to keep the light shining without requiring the continued pressure by the operator.

That control feature is achieved by the provision of an electrically conductive strip **30**, having its front end **30-1** engaging a side-wall electrode surface **18A** of the filamentary lamp **18** and extending back to and into the transverse detent groove **26-3** where the back end **30-2** of the strip is formed into a semi-cylinder for nesting and seating in the transverse detent groove **26-3**. The wall of the upper half shell **12A** is provided with a longitudinal window opening **12A-1**, under which the conducting strip **30** passes and is exposed for engagement by the downwardly moved head end **20-1** of the clip **20** which engagement is possible only when the clip detent **20-E** has been moved to intermediate position to nest and seat in detent slot **26-2**.

The clip is movable to three positions, indicated by the numerals **1, 2** and **3** at the grooves identified by the numerals **26-1, 26-2** and **26-3**, representing the positions of the detent **20E** of the clip **20**. The outer clip head **20-1** will then occupy corresponding positions identified by the functions "Off," "Intermittent," and "On."

The circuit for the lamp depends upon the fact that the cell housing **14A** and **16A**, in each case, is metallic and a good current conductor. Therefore, the metal guide fingers **20D** and **20C** provide good metallic contact and good electrical conduction from the metallic housing **14A** through the clip fingers **20-C** and **20-D** to the lower arm of the clip, thence up to the upper arm to the clip head **20-1**, which may be easily depressed in intermediate positionnumber **2**, because of the cantilever mouning of the clip head, to permit the clip head **20-1** to enter into the window **12A-1** at the top of the housing, to engage the metallic strip conductor **30**, through which the circuit is then carried to the front end of the conductor **30-1** and to the lamp terminal **18A**, through the lamp terminal **18A** to the central cell electrode terminal **16-1** and back through the cell to the rear terminal **16-2** to the central cell terminal **14-1**, thereby to complete the electric circuit from the two cells to and through the electric lamp **18**.

In order to insulate the conductive metallic strip **30** from the two cells **14** and **16**, a layer of thin insulating paper **32** is disposed between the conductive metallic strip **30** and the two cell housings **14A** and **16A**.

When the clip is moved to position **2**, where the clip head may be intermittently pressed downward to engage the conductive strip **30**, to complete the circuit through the lamp, the inherent resilience in the clip will normally keep the clip head disengaged from metallic conducting strip **30**, so operation of the clip by the operator is necessary to complete the circuit to light the lamp.

When operation of the flashlight is desired continuously, so the operator's attention will not be needed to hold the clip switch closed, the clip may then be moved to position **3**, at which the inner clip detent **20E** will be moved into number **3** position, where the detent **20E** will nest and seat in and on the curved end **30-2** of the metallic strip **30** that is seated and nested in groove **26-3**, which will then hold the clip against undesired casual displacement while continued operation of the lamp is desired.

When use of the lamp is not wanted or needed, the clip is then moved all the way back in slot **24** through the indicated path to the backward limit position **1**, at which the clip bail **20-2** engages the rear wall **24-1** of the opening **24**, that serves as a stop to limit the backward movement of the clip **20**. Thus, when the flashlight is disposed in an operator's pocket, the clip will be in its furthermost backward position, and the detent **20E** on the inner arm will be nesting in or detented by the groove **26-1** in the corresponding location **1** in the top wall of the cylindrical shell **12A**.

FIGS. **3, 4** and **5** and **6** are shown in some detail, in order to illustrate the construction of the two half-shells which serve, during manufacturing assembly, as cradles to hold the components together during such assembly, and the shells then serve in the final assembly to constitute the enclosed housing for the flashlight, as a finished complete unit.

As shown in FIG. **3**, the bottom half shell **12B** is an elongated hollow semi-cylindrical shell, closed at the back end **40**, except for an external mating step **40-1** adjacent a pilot guide strip **40-2** to permit the upper shell **12A** to be properly fitted in the final assembly of the two half-shells, to complete the assembly and manufacture of the flashlight. Upon referring to FIG. **1**, it will be noted that the two pairs of guide tabs **20-C** and **20-D** must necessarily extend radially beyond the peripheral surface of the cell **14**. In order to provide space for free longitudinal movement of those guide tabs **20C** and **20D**, two recesses **42-1** and **42-2** are provided in the horizontally opposite wall portions of the lower half shell **12B**, as indicated in FIGS. **3** and **4** and as also shown in FIG. **1**.

Similarly, two upper recesses **62-1** and **62-2** are provided in the side walls of upper half-shell **60**, as shown in FIGS. **5** and **6**. The two sets of recesses match, **42-1** with **62-1**, and **42-2** with **62-2**, to provide free space for the guide tabs **20C** and **20D** to move when the clip is adjustably positioned.

The reason for the needed space of those recesses **41** and **42** becomes apparent upon reference to FIG. **1A**. The seating space for the cells **14** and **16** is made such as to receive the cells in a relatively snug fit. Consequently some relief space is necessary for the guide tabs **20C** and **20D** to move in when the clip **20** is axially shifted to one of the three positions **1, 2** and **3**, as determined by the location of the three detent grooves **26-1, 26-2** and **26-3**.

The two views of the upper half shell **12A** are shown in FIGS. **5** and **6**. As there shown, the upper half shell **12A** is an elongated semi-cylindrical shell similar to the bottom shell FIG. **3** and is closed at the back end **60**, and is provided with an external mating apron **60-1** to fit onto the mating step **40-1** of the bottom half shell **12B** of FIG. **4**. The upper half shell is also provided with an upper shoulder **60-2** to seat on the pilot guide strip **40-2** of the bottom half shell **12B** of FIG. **4**.

Each of the two half shells, that is, the bottom half shell **12B** and the top half shell **12A**, will have disposed therein and thereon the elements and the components that make up the flashlight. The two cells **14** and **16** will be seated in the bottom half shell **12B** together with the lamp **18** and the backwardly extending strip **30**. The clip **20** will be inserted into the space **24** to fit into the inside of the upper half shell. The two half shells are

then fitted together and sealed along their mating surfaces by a suitable sealing agent or bonding action such as a diaelectric heating action established by supersonic frequency.

When the two half shells are thus assembled, the guide tabs **20C** and **20D** supported on the clip will be forced down over the side of the rear cell **14,** as shown in FIG. 1A, and the detent groove **26-3** will seat and press down on the conductive strip **30** in such manner that the detent shaped end **30-2** of the strip will seat in the detent groove **26-3.**

The lamp is now assembled and ready for use, according to the position to which the clip **20** will be moved. As shown in FIGS. **3** and **4,** and as previously shown in FIGS. **1** and **2,** the front end of the bottom half shell **12B** is provided with a half circular opening **12B-1** which is preferably provided with a substantially parabolic reflecting surface **12B-2** which will mate with a corresponding upper reflecting surface on the upper half shell **12A,** to provide a substantially parabolic reflecting surface with respect to the lamp filament. as a light source, in the lamp **18,** to control the direction and concentration of the light beam. The view shown in FIGS. **7** and **8** represent the front ends of the two half shells before assembly. The assembled figure in FIG. **9** shows the matching of the two half shells with the lamp space **12B-1** surrounded by a paraboloid surface **12B-2** to reflect the light from the lamp.

It will be clear that the maximum economy is achieved in the disclosed manner of manufacture of the lamp, since the two half shells serve as the transporting cradles for the elements in their ultimate positions, in such manner that when the two shells are assembled to form the complete enclosure, all the elements are in their working position and the step of assembling the half shells with their components, constitutes the completion step in forming the flashlight.

Since all of the elements are relatively inexpensive, the entire flashlight may be readily and economically discarded when the full use of the cells has been obtained.

The invention is not limited to specific details of construction or relative dimension, since all of those details may be modified without departing from the spirit and scope of the invention as defined in the claims.

What is claimed is:

1. A flashlight comprising:

an elongated hollow cylindrical shell, said shell consisting of two initially hollow half-cylinder shells originally each with mating pilot edge ribs to match and fit with the other to form a closed cylinder, when the two half-shells are coupled;

an electric lamp supported at the front end of said shell;

electric cell means disposed in said shell with an electrode terminal of one polarity providing voltage to one terminal of said lamp;

an elongated electrically conductive strip disposed to engage one end against the second electrode terminal of said lamp, and extending backward along the inner surface of the wall of the body of the cylindrical shell to a middle region of said shell; and

a clip on said shell for mounting the shell on an external support, for example, such as a pocket flap; said clip engaging said cell means to derive a voltage of the second polarity, and being movable to engage and to disengage said conducting strip as a switch to control the energization of said lamp by applying said second polarity voltage to said conducting strip.

2. A flashlight for disposable use comprising an outside peripheral hollow casing, electric battery means placed therein, said battery having a metal sleeve, a switch for said flashlight having an integrally formed end portion formed as an external gripping means, a slot formed in a wall of said hollow casing, said switch slideable along the length of said slot, battery surface conforming guide means integrally joined and slideable with said switch, said guide means thus enabled to move on said metal shell of said battery while making electrical contact therewith, operational denoting and detent means for said slideable switch, an electric bulb having electric terminals placed at the front of said hollow casing of said flashlight, a metal strip connected to said operational means engaging one terminal of said lamp, another terminal of said lamp connected to a terminal of said included battery, whence the lighting of said bulb occurs when the slideable movement of said switch completes the electric circuit necessary to energize said lamp through said swtich, said metal strip, and said battery terminal.

3. A flashlight, as in claim **1,** in which

said shell consists of a hollow lower half-cylinder shell to support said cell means and said lamp and said conducting strip in assembled array; and

said shell consists, further, of a hollow top half-cylinder shell having a longitudinal slot in the cylindrical wall near the back end of the shell; and

said clip has and outer cantilever gripping element, and an inner holding element, and extends through said slot in said top half shell, with said inner holding element serving as a support for said cantilever element of said clip.

4. A flashlight, as in claim **3,** in which

said top half-shell is formed to have a window opening at a predetermined middle region position, through which the free end of the cantilever clip element may be depressed, as by thumb pressure, to engage an exposed area of said metal conducting strip in position below said window, to serve as a switch to control the circuit from said cell means to said lamp.

5. A flashlight, as in claim **3,** in which

said clip is longitudinally slideable in said longitudinal slot in said top half-shell and embodies a positioning detent for selectively positioning said clip in one of several operative positions along its path of permitted movement; and

said top half-shell embodies a plurality of detent grooves spaced along the path of permitted movement of said clip for receiving and holding the positioning detent of said clip against casual undesired displacement.

6. A flashlight, as in claim **5,** in which

said inner holding element of said clip embodies a pair of guide fingers to ride on the inner surface of the wall of the top half-shell.

7. A flashlight, as in claim **5,** in which

said inner holding element of said clip embodies a pair of guide fingers to straddle and slide on said electric cell means, to serve as an adjustable internal support for said clip.

8. A flashlight, as in claim **7,** in which

said top half-shell is provided with a longitudinal subsurface groove to accommodate said guide fingers in their movement along the electric cell means, as the clip is selectively positioned.

9. A flashlight, as in claim **5**, in which

said top half-shell has said detent grooves formed as transverse arcuate slots on the inner surface of the semi-circular wall of said half-shell.

10. A flashlight, as in claim **9**, in which

said detent grooves serve to position the clip in one of three predetermined positions, including position (1) as non-switching and fixed open-circuit position; in position (2) as normally switch-open and permitted to be thumb-operable to switch-closing position; and in position (3) with the clip switch held fixed in closed position.

11. A flashlight, as in claim **1**, in which

said clip is manually selectively movable to one of three predetermined positions, defined as: (1) fixed switch-open position; (2) intermittent manually operable switch position; and (3) fixed switch closed position.

12. A flashlight, as in claim **1**, in which

means on said cylindrical shell serve to detent said movable clip in a selected one of several predetermined positions; and

means electrically connected to said elongated conducting strip is positioned to be engaged by an element of said clip to complete the energizing circuit to said lamp.

13. A flashlight, as in claim **7**, in which

said clip and guide fingers are of metal and electrically conductive to complete an electric circuit from said cell means to said elongated conductive strip, to control the energizing circuit to said lamp of claim **1**.

14. A flashlight, as in claim **10**, in which

said conductive strip has an end portion shaped and positioned to nest in said detent groove for the number (3) position for closed clip switch position.

15. A flashlight for disposable use comprising a cylindrical hollow casing, electric battery means placed therein, said battery having a metal sleeve, a multi-positioned switch for said flashlight formed as an external gripping means, a slot formed in a wall of said hollow casing, said switch slideable along the length of said slot, battery surface conforming guide means integrally joined and slideable with said switch, said guide means thus enabled to move on said metal shell of said battery while making electrical contact therewith, condition denoting and detent means for said slideable switch, an electric bulb having electric terminals placed at the front of said hollow casing of said flashlight, a metal strip connected to said switch means engaging one terminal of said lamp, another terminal of said lamp connected to the other terminal of said included battery, the lighting of said bulb occurring when the slideable movement of said switch completes the electric circuit necessary to energise said lamp through said switch, said metal strip, and said battery terminal.

16. A flashlight for disposable use comprising an outside peripheral hollow casing, electric battery means having a metal shell placed therein, a multi-positioned switch for said flashlight having an integrally formed cantilever portion thereof formed as an external gripping clip, a slot cut in the wall of said hollow casing, said switch means slideably held within said slot, guide means having bowed bands integrally joined to said moveable switch, said guide means enabled to ride on the surface of said metal shell of said battery making electrical contact therewith, a condition denoting means connected to said battery casing, an electric lamp having electric terminals placed at the front of said hollow casing, a metal strip connected to said condition denoting means engaging one terminal of said lamp, the other terminal of said lamp engaging a terminal of said battery, where upon activation of said lamp occurs when slideable movement of said switch provides a complete electrical circuit to energize said lamp through said metal strip and battery.

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