Sept. 9, 1941. E. J. McEACHRON ET AL 2,255,516

ELECTRICAL FLASHLIGHT

Filed Aug. 12, 1939

Fig. 1.

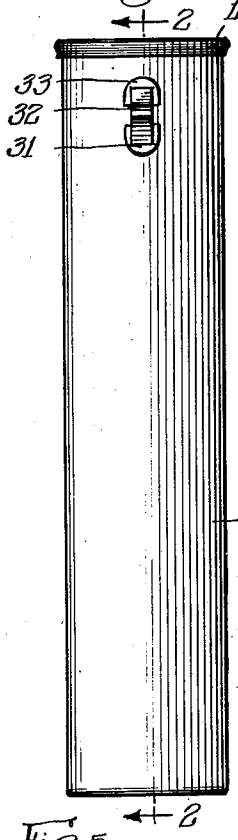


Fig. 2.

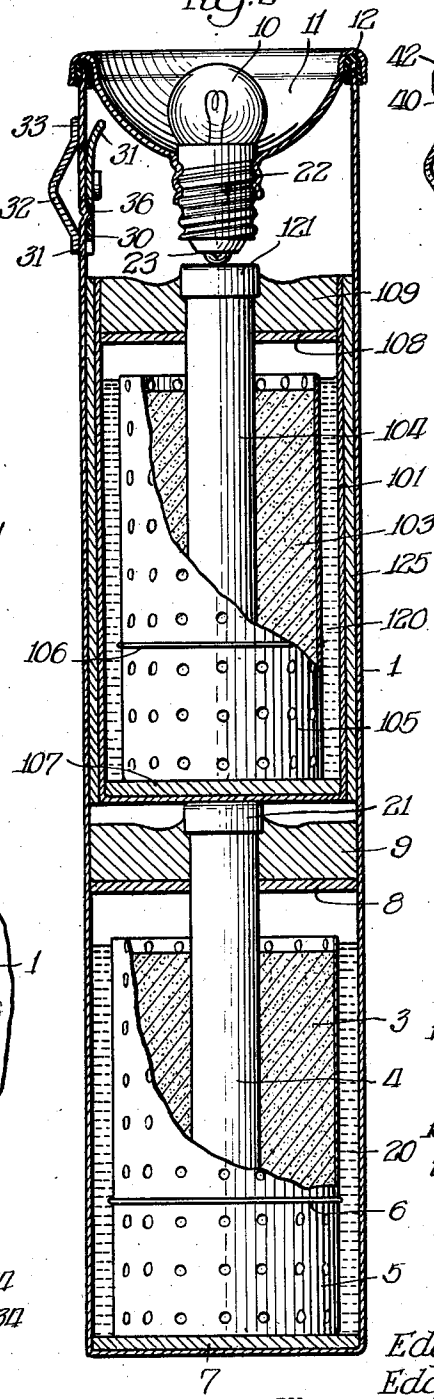


Fig. 3.

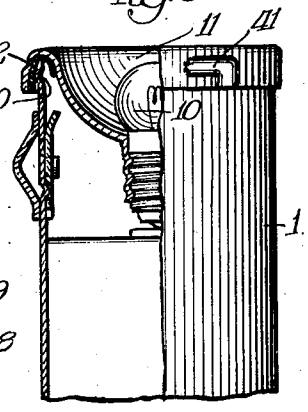


Fig. 4.

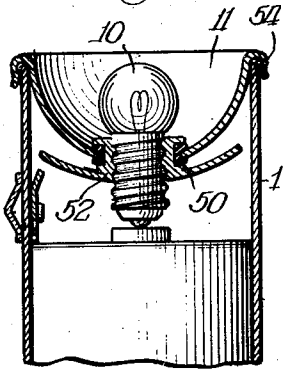


Fig. 5.

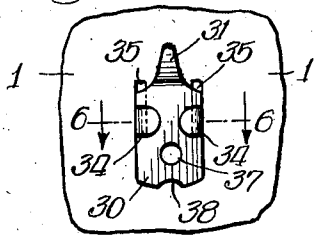


Fig. 6.

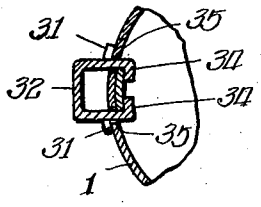


Fig. 7.

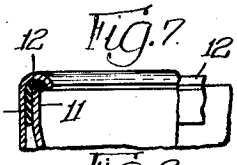
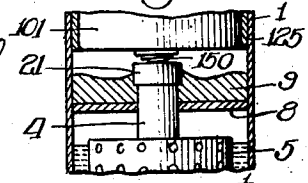


Fig. 8.



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2,255,516

ELECTRICAL FLASHLIGHT

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Application August 12, 1939, Serial No. 289,782

11 Claims. (Cl. 240—10.61)

This invention relates to improvements in electrical flashlights and is characterized as comprising a simple and inexpensive construction which combines into one unitary construction the necessary elements constituting a battery for generating current and the elements constituting the flashlight, such as the reflector and a socket for holding the lamp or bulb in association with the cell elements. This invention is further characterized as having all of its component elements housed within a single casing, a portion of which constitutes the container for one of the cells of the battery and serves as one of the electrodes for such cell.

It is an object of this invention to provide an improved, simplified construction for electrical flashlights which is extremely inexpensive and which, in fact, compares favorably in manufacturing costs with the usual commercial cells now used for flashlights.

It is a further object of this invention to provide a flashlight which embodies in its construction all the necessary features of the battery and flashlight as one unitary device, whereby in use, when the battery is exhausted, the bulb may be removed and the battery and reflector parts discarded and replaced by a new assembly into which the bulb is screwed to provide a complete and renewed flashlight construction.

This invention is an improvement upon the construction of electrical flashlights disclosed in the copending application Serial No. 250,282, filed on January 11, 1939, for the invention of Alois J. Koshollek and Walter H. Thom. The flashlight of this invention embodies in part the improvements constituting the invention of said copending application but differs therefrom in that it provides for a battery of two or more cells which may be connected in series so as to increase the voltage of the current supply and the brightness of the lamp employed for the flashlight.

These and other objects not specifically enumerated are contemplated for this invention, as will readily appear to one skilled in the art as the following description proceeds.

Certain specific embodiments of this invention will now be described in detail by reference to the accompanying drawing, in which—

Figure 1 is an elevational view of a flashlight constructed in accordance with this invention.

Figure 2 is an enlarged cross sectional view, taken on the line 2—2 of Figure 1, and looking in the direction of the arrows.

Figure 3 is a fragmentary elevational view, partly in cross section, showing a modified construction.

Figure 4 is a still further modification of this invention.

Figure 5 is an enlarged elevational view of the switch mechanism used on the flashlight disclosed in Figures 1 and 2, as seen from the inside.

Figure 6 is a cross sectional detail view taken on the line 6—6 of Figure 5 and looking in the direction of the arrows; and

Figures 7 and 8 are fragmentary cross sectional views showing still further modifications of this invention.

By referring to the drawing, it will be noted that the particular embodiment of the invention illustrated in Figures 1 and 2, comprises a zinc or similar cam 1, which is preferably of cylindrical shape and of the type usually employed in the manufacture of so-called dry cells. This can serves as the outer electrode of the bottom cell of the battery as well as providing a casing or receptacle in which the other cell or cells are contained. These zinc cans have sufficient mechanical strength to serve as a satisfactory container for the other cell or cells as well as the parts constituting the flashlight. As illustrated in Figure 2, this can is of greater height than that required for housing the bottom cell parts, and, accordingly, the upper portion is adapted to serve as a housing for one or more additional cells and parts for completing the flashlight and mounting such parts in association with the battery elements.

Mounted within the base of the cam is the usual type of compressed core 3, including an embedded carbon pencil 4, preferably made up in the usual way in cylindrical form composed of the usual constituents for depolarizing mixtures. This core may be unwrapped or may be enclosed in a suitable wrapping of paper or cloth 5, which in this instance is illustrated as perforated paper held in position by means of an elastic band 6. The core rests upon an insulating disc of waxed cardboard or other suitable material 7, positioned in the bottom of the can, which serves as a spacer between the bottom of the can and the bottom of the core. The core is of less diameter than the internal diameter of the can, whereby an annular space is provided between the walls of the can and the core when the core is properly centered. This space is filled with a suitable electrolyte 20 which preferably extends to the height of the top of the core.

As illustrated in Figure 2, the carbon pencil 4

preferably extends upwardly to an appreciable extent above the top of the core and is held centrally of the can 1 by means of an insulating spacing washer 8 which engages the pencil adjacent the upper end thereof and also engages at its outer edge with the inside wall of the can. The upper edge of the carbon pencil is preferably provided with a brass or other suitable metal cap 21 pressed thereon in the usual way. The cell is then preferably closed in accordance with the conventional practice by any suitable means, such as the sealing compound 9, which is poured when in a fluid state on top of the insulating washer 8 to the desired depth and allowed to harden and solidify around the upper end of the pencil, but so as to leave the upper surface of the brass or other metal cap 21 exposed.

It is to be noted that the construction thus far described, except for the extension of the can, is substantially the same as conventional cell constructions of the type which are now used in flashlights and which, in use, are inserted into a suitable flashlight casing to supply the electrical current required to light the bulb. However, by extending the zinc can 1 upwardly a sufficient distance to provide a housing for one or more additional cells and a reflector and bulb, a unitary construction is provided which entirely eliminates the necessity for a separate flashlight housing. By this construction, the housing is provided as an integral part of the bottom cell, and thus a construction results which is so simple and inexpensive that very little additional cost is involved over the cost of constructing the cells themselves.

As shown in Figure 2, the can 1 extends upwardly to an appreciable extent above the top of the sealing material 9 of the bottom cell so as to provide a space for housing a second cell. This second cell comprises a zinc or similar can 101 which is of usual construction but is of slightly less diameter than the internal diameter of the zinc can 1. This can is mounted within the zinc can 1 and spaced therefrom by means of an annular insulating liner 125 which prevents accidental electrical contact between the two zinc cans. The inner can 101 is so positioned in the outer can 1, however, that the bottom thereof rests upon and forms electrical contact with the metal cap 21 on the top of the carbon pencil 4 of the lower cell. Within the can 101 is the usual type of compressed core 103, including an embedded carbon pencil 104, preferably made up in the usual way in cylindrical form composed of the usual constituents for depolarizing mixtures. Like the core of the lower cell, this core may be unwrapped or may be enclosed in a suitable wrapping of paper or cloth 105 which, in this instance, is illustrated as perforated paper held in position by means of an elastic band 106. The core rests upon an insulating disc 107 of waxed cardboard or other suitable material which is positioned in the bottom of the can and which serves as a spacer between the bottom of the can and the core. The core 103 is of less diameter than the internal diameter of its associated can 101, whereby an annular space is provided between the walls of the can and the core when the core is properly centered. This space is filled with a suitable electrolyte 120 which preferably extends to the height of the top of the core. An insulating disc 108 is provided in the upper end of the can 101 to serve as a spacer between the carbon pencil 104 and the sides of the can, and a suitable sealing compound 109 is applied on top of the insulating disc to close the upper cell in the usual manner. The upper end of the carbon pencil 104 is equipped with an exposed metal cap 121 which is preferably pressed thereon to serve as one of the electrodes of the upper cell.

As further shown in Figure 2, the upper edge of the can 1 is preferably provided with an annular strip of insulating material 12 which overlies and protects the upper edge of the zinc can 1, and on top of this insulating material there is crimped the outer edge of a reflector member 11. The reflector 11 may be made of metal or other suitable material and has a reflecting inner surface provided by a smooth or polished surface thereon. Such a finish may be produced by using a bright, smooth metal, or by any other means which is relatively simple and inexpensive to obtain. The bottom of the reflector terminates in a cylindrical sleeve 22 which is impressed with suitable threads adapted to receive, in substantially the manner shown in Figure 2, an electric light bulb 10.

From the above description, it will be apparent that the reflector 11 is insulated, by means of the insulator 12, from the zinc can 1 and, therefore, no electrical connection is ordinarily possible between the outer electrode or can 1 and the threaded cylindrical shell of the lamp base.

For the purpose of completing the electrical circuit for lighting the lamp, a switch is provided in the upper portion of the can which may be of any suitable construction and which may consist simply of a depressible tongue struck from the side of the can as shown in said copending application. As here illustrated, however, it comprises a metallic contact member 30 having a contact finger 31 at its upper end bent slightly inwardly to bring it to a position to readily contact the under surface of the reflector 11. This metallic contact member is placed in engagement with the zinc can 1 whereby when it is in lifted position, so that the finger 31 engages the reflector 11, the electrical circuit is completed and the filament of the lamp is thereby caused to become incandescent. The switch member 30 is adapted to be moved up and down by the actuating member 32, which may be of non-metallic or metallic material and suitably shaped for engagement by the thumb or finger of the operator. This actuating member is preferably equipped with shoes 33 which adapt it for sliding engagement with the outside surface of the can 1 and with inwardly extending fingers 34 which extend through slots 35 provided in the walls of the can. These slots are of greater height than the fingers, whereby the actuator and the switch member are permitted to have a slight longitudinal movement so as to move the contact finger 31 into and out of engagement with the reflector 11. As shown in Figures 5 and 6, the fingers 34 extend inwardly and are bent over the switch member 30 so as to hold it in intimate engagement with the inner surface of the zinc can 1.

As shown in Figure 2, a slight depression 36 is preferably provided in the wall of the can adjacent the switch member 30 so as to be received in the opening 37 or the semi-circular recess 38, as the case may be, for locking the switch, respectively, in the "off" and "on" positions. The fingers 34 may be made of metal which will have some resilience, whereby the switch means may be snugly held in position against accidental movement but at the same time be free to slide

when forced by the operator into the "on" and "off" positions.

By means of the switch member, a direct electrical connection will be made between the zinc can 1 and the reflector, which, in turn, is connected with the outer cylindrical shell of the lamp base by means of the screw-threaded engagement therewith. When this occurs, the lamp will become lighted because the current is permitted to flow through the filament by virtue of the fact that the base connector 23 of the lamp is at all times maintained in mechanical and electrical contact with the cap member 121 of the carbon pencil 104. It will thus be seen that a complete flashlight is provided by merely adding the upper extension on the can of the lower cell and adding one or more cells connected in series and the socketed reflector, plus, of course, a flashlight lamp which is held in proper association with the reflector and the elements of the battery.

When the battery is exhausted, it is merely necessary to unscrew the flashlight lamp and discard the battery and reflector and replace the same by a new battery and reflector assembly, into which the lamp bulb may be screwed.

In practice, it is found that the additional cost of manufacturing this flashlight construction (without the bulb) compares so favorably with the cost of manufacturing merely the battery alone that it is possible to make this novel flashlight construction, minus the bulb, for a cost exceeding the cost of the battery alone only by a small amount. Thus, instead of using separate cells or batteries, which are discarded when exhausted, in connection with a flashlight casing—which is an expensive item in itself—this invention contemplates the combining of flashlight mechanism within the construction of the battery and discarding the entire unit except the bulb and replacing the same after the original battery has been exhausted.

If desired, an insulating material (not shown) may be applied to the outside surface of the can to cover and protect the same. This covering may extend all the way to the bottom of the can 1 so as to provide a finished surface of desired characteristics and appearance. It will be found in practice that a cellulosic product in the form of a cellulose film, which can be applied wet and allowed to shrink into place, serves well as a tough, flexible covering for the casing. This material can be applied in various colors and gives a very new and finished outer surface appearance. This cellulose film product can now be purchased on the market under the trade-name "Cel-O-Seal." Furthermore, when this type of material is employed, it may be allowed to extend upwardly a sufficient distance beyond the upper edge of the can so that it may be turned inwardly and, when dried, it will be sufficiently flexible to serve as an insulation material between the reflector and the upper edge of the can. In other words, the flexible covering may be extended upwardly so as to displace the insulation material 12, as illustrated in the figures of the drawing.

In the form shown in Figure 7, the outer can 1 is flanged inwardly over the upper edge or lip of the reflector 11, with the insulating material 12 placed therebetween. Thus, in this form, the material constituting the can is flanged inwardly to make the joint instead of the material of the reflector being flanged outwardly to make the joint.

In the form of the invention shown in Figure 8, the construction is the same as that shown in Figure 2, with the exception, however, that a small coil spring or like contact member 150 may be placed between the upper end 21 of the carbon pencil 4 and the bottom of the container for the upper cell 101. This construction assures at all times a good electrical connection between these parts and at the same time serves mechanically to adjust the position of the upper cell between the contact 23 of the lamp bulb and the lower cell so that slight inaccuracies in the height of the outer container 1 or the height of the carbon pencils will not interfere with the easy assembly of the lights with good electrical contacts at all times. By this construction, an inspection operation during manufacture, which may otherwise be required, may be eliminated altogether.

In the modified form of the invention illustrated in Figure 3, it is contemplated that the reflector 11 shall be removable from the upper edge of the can 1 and re-used with the bulb 10; so, instead of removing the bulb from the reflector and cell construction, the bulb and reflector are removed from the upper edge of the can. Any suitable means for removably attaching the reflector and its bulb may be utilized, but in the particular form here illustrated, the upper edge of the can is provided with one or more outwardly extending lugs 40 spaced peripherally around the circumference thereof. These lugs are adapted to be engaged with L-shaped receiving grooves 41, which, in cooperation with the lugs 40, in effect form a bayonet connection for holding the reflector in fixed position on top of the extension of the can.

As shown in Figure 3, suitable insulating material 42 is positioned between the upper edge of the can 1 and the overturned edge of the reflector so that the reflector is insulated from the upper edge of the can and has no electrical connection therewith except through the manually operable switch member. This insulating material 42 may be in the form of sheet material or material applied as paint or otherwise, as may be convenient in manufacturing practice. The L-shaped grooves may be formed by merely depressing outwardly the metal of the overhanging flange of the reflector so that by placing the reflector on the edge of the can with the vertical portion of the grooves fitting over the lugs 40 and then turning the reflector circumferentially with respect to the can, the reflector thereby becomes removably locked onto the upper end of the can by virtue of the fact that the lugs 40 occupy the ends of the horizontal portions of the groove. The insulating material may be formed into the inner side of the groove, as shown in Figure 3, so that notwithstanding the removable connection afforded by the lugs and grooves, good insulation is at all times maintained. Of course, any other suitable form of connection may be employed.

It is also contemplated that the insulation may be positioned at some other suitable location in the construction other than between the reflector and the upper edge of the zinc can, for instance, insulation 58 may be provided between the socket member 52 of the removable and reusable reflector 11 and the shank of the bulb, as shown in Figure 4, provided only that a suitable switch is provided whereby direct connection may be effected between the can and the outside pole of the lamp. A switch mounted on

the side of the can in substantially the manner illustrated in Figure 2 is adapted for this purpose and will serve to contact the metallic member 52 which is in contact with the shank of the lamp but insulated from the reflector 11. In this illustration, the reflector is removably held on the upper edge of the can by a snap-on connection 54.

It is to be noted that in the invention as here illustrated, no closing glass or lens is provided over the lamp, but, of course, any such glass or lens could be used if desired. Such a glass or lens could be snapped over the upper edge of the can and removed and added to the replacement construction with the bulb. It has been found, however, that the reflector gives very good results without the use of a glass or lens and that, accordingly, very satisfactory flashlights may be provided by the construction illustrated in the drawing.

It is to be understood that the flashlights contemplated by this invention are not to be limited in size as it is intended to apply the principles of this invention to all convenient and commercial sizes of battery cells which are now or may hereafter be made.

It is further contemplated that any desired form of dry cell construction may be employed, and the invention is not to be restricted to the particular forms here illustrated. For instance, cells of the commonly known "paper lined" construction could be employed, if desired, as well as any other suitable cell construction.

It will be noted from the foregoing that the flashlight of this invention provides a very simple construction by virtue of the fact that the casing for the flashlight and battery is provided by a continuation of the zinc can of the bottom cell of the battery. It will be further noted that the upper cell or cells of the battery will be of slightly less diameter and, in order to maintain the same capacity as the bottom cell as now generally employed, the upper cell may be slightly increased in height so as to provide substantially the same volume.

It is to be understood that this invention is not limited to the number of cells to be added to the bottom cell construction, as obviously the same inventive principle will be involved in a flashlight including any number of added cells. By virtue of this construction, the voltage of the battery may be increased to any desired extent through the series connection of the individual cells, and as a result lamp bulbs of much higher design voltage may be employed.

It is further apparent that this invention utilizes the desirable features of construction disclosed in the copending application Serial No. 250,282 above referred to, and at the same time avoids the limitation of the construction there disclosed of having a limited voltage for a single cell.

It is to be understood that the above description of the forms of the invention shown in the drawing is merely by way of illustration and is not to be construed as limiting the invention other than as required by the terms of the appended claims.

What is claimed is:

1. An electric light comprising a cell having a can serving as one electrode thereof, a carbon pencil, a depolarizing mixture and an electrolyte located in said can, means closing said cell disposed below the top edge of said can and providing a space above said closing means, a second cell in said space, and a reflector and lamp holder mounted in association with the top of said can above said second cell, said second cell having its can in electrical contact with the carbon pencil of said first cell and means insulating the can of said second cell from the can of said first cell.

2. An electric light comprising a cell having a can serving as one electrode thereof, a carbon pencil, a depolarizing mixture and an electrolyte located in said can, means closing said cell disposed below the top edge of said can and providing a space above said closing means, a second cell mounted in said space having its electrode of opposite polarity in electrical contact with said carbon pencil and means for insulating said second cell from said can, a reflector and lamp holder mounted in association with the top of said can and above said second cell, means insulating said lamp holder from said can, and other means for selectively effecting contact therebetween.

3. An electric light comprising a can, a partition intermediate the height of said can, means including a central electrode constituting with said can the components of a cell located in the space below said partition, a second cell in said can in the space above said partition having its electrode of opposite polarity in electrical contact with said central electrode and means for insulating said second cell from said can, and a reflector and lamp holder mounted in the upper portion of said can and above said second cell.

4. An electric light comprising a can, a partition intermediate the height of said can, means including a central electrode constituting with said can the components of a cell located in the space below said partition, a second cell in said can in the space above said partition having its electrode of opposite polarity in electrical contact with said central electrode and means for insulating said second cell from said can, a reflector and lamp holder mounted in the upper portion of said can and above said second cell, and means for insulating the reflector and lamp holder from said can.

5. An electric light comprising a can, a partition intermediate the height of said can, means including a central electrode constituting with said can the components of a cell located in the space below said partition, a second cell in said can in the space above said partition having its electrode of opposite polarity in electrical contact with said central electrode and means for insulating said second cell from said can, and a reflector and lamp holder mounted in the upper portion of said can and above said second cell, said reflector and lamp holder being detachably connected to said can and having means for holding a lamp in electrical contact with one of the terminals of said second cell.

6. An electric light comprising a can, a partition intermediate the height of said can, means including a central electrode constituting with said can the components of a cell located in the space below said partition, a second cell in said can in the space above said partition having its electrode of opposite polarity in electrical contact with said central electrode and means for insulating said second cell from said can, a reflector and lamp holder mounted in the upper portion of said can and above said second cell, said reflector and lamp holder being detachably connected to said can and having means

for holding a lamp in electrical contact with one of the terminals of said second cell, and switch means for electrically connecting said can and the other terminal of said lamp.

7. An electric light comprising a can, a closing partition below the upper edge of said can forming upper and lower compartments therein, a core of depolarizing material and a carbon pencil disposed in said lower compartment, an electrolyte disposed therearound and forming a cell with said core and can, the pencil of said core extending through said partition and having a portion thereof exposed in the space of said upper compartment, a second cell mounted in said upper compartment and having its electrode of opposite polarity in electrical contact with the exposed portion of said carbon pencil and means for insulating said second cell from said can, a lamp holder carried by said can and disposed in said upper compartment, a lamp in said holder in electrical contact with one of the electrodes of said second cell, and means for completing the electrical circuit between said can and said lamp.

8. An electric light comprising a can, a sealing partition below the upper edge of said can forming upper and lower compartments therein, a core of depolarizing material and a carbon pencil disposed in said lower compartment, an electrolyte disposed therearound and forming a cell with said core and can, the pencil of said core extending through said partition and having a portion thereof exposed in the space of said upper compartment, a second cell mounted in said upper compartment and having its electrode of opposite polarity in electrical contact with the exposed portion of said carbon pencil and means for insulating said second cell from said can, a reflector and lamp holding means mounted on the upper portion of said can and adapted to hold a lamp in said upper compartment in electrical contact with the pencil electrode of said second cell, and means for completing the electrical circuit for lighting said lamp.

9. An electric light comprising a can having a slidable metallic switch member mounted on the inside and adjacent the upper portion thereof, a sealing partition below the upper edge of said can forming upper and lower compartments therein, a core of depolarizing material and a carbon pencil disposed in said lower compartment, an electrolyte disposed therearound and forming a cell with said core and can, the pencil of said core extending through said partition and having a portion thereof exposed in the space of said upper compartment, a second cell disposed in said upper compartment with its electrode of opposite polarity in electrical contact with the exposed portion of said carbon pencil and means for insulating said second cell from said can, and a reflector and lamp holding means mounted on the upper portion of said can and adapted to hold a lamp in said upper compartment in electrical association with the pencil electrode of said second cell, said switch member being adapted to selectively contact said lamp holding means for making and breaking the electrical circuit for lighting said lamp.

10. An electric light comprising a can having a slidable metallic switch member mounted on the inside and adjacent the upper portion thereof, a sealing partition below the upper edge of said can forming upper and lower compartments therein, a core of depolarizing material and a carbon pencil disposed in said lower compartment, an electrolyte disposed therearound and forming a cell with said core and can, the pencil of said core extending through said partition and having a portion thereof exposed in the space of said upper compartment, a second cell disposed in said upper compartment with its electrode of opposite polarity in electrical contact with the exposed portion of said carbon pencil and means for insulating said second cell from said can, and a reflector and lamp holding means mounted on the upper portion of said can and adapted to hold a lamp in said upper compartment in electrical association with the pencil electrode of said second cell, said switch member being adapted to selectively contact said lamp holding means for making and breaking the electrical circuit for lighting said lamp, said reflector and lamp holding means being readily removable from the upper edge of said can so that the cells may be discarded and replaced by a new battery assembly.

11. An electric light comprising a can, a closing partition below the upper edge of said can forming upper and lower compartments therein, a core of depolarizing material and a carbon pencil disposed in said lower compartment, an electrolyte disposed therearound and forming a cell with said core and can, the pencil of said core extending through said partition and having a portion thereof exposed in the space of said upper compartment, a second cell mounted in said upper compartment, a spring establishing electrical contact between the electrode of said second cell and the exposed portion of said carbon pencil, means for insulating said second cell from said can, a lamp holder carried by said can and disposed in said upper compartment, a lamp in said holder in electrical contact with one of the electrodes of said second cell, and means for completing the electrical circuit between said can and said lamp.

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