

July 16, 1963

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3,097,799

BATTERY BULB CONNECTION FOR FLASHLIGHTS

Filed July 16, 1959

Fig. 1

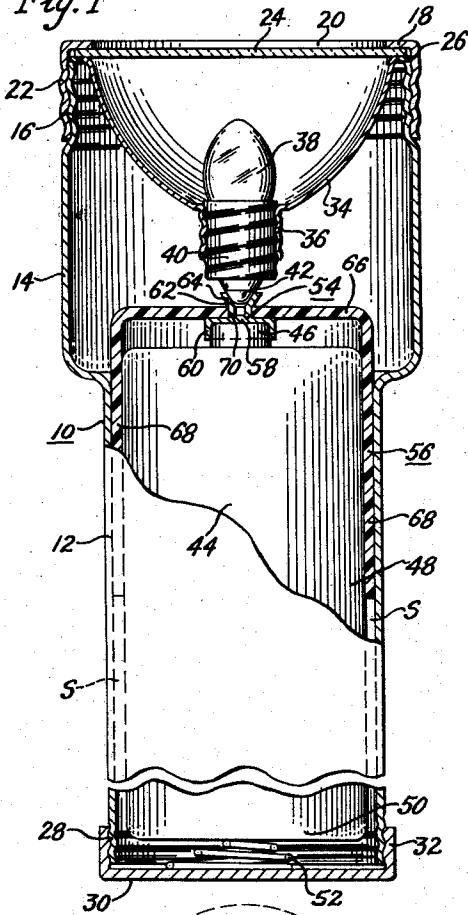


Fig. 4

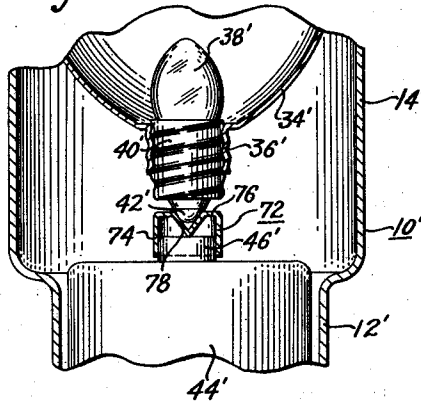


Fig. 5

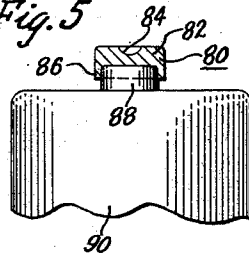


Fig. 2

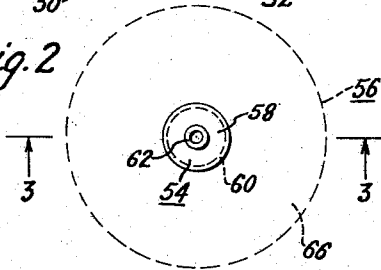


Fig. 3

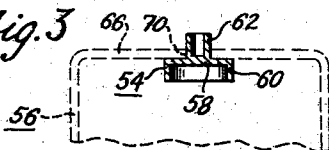
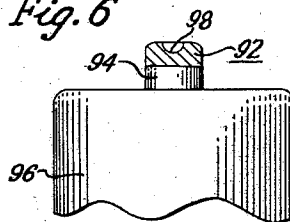


Fig. 6



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3,097,799 BATTERY BULB CONNECTION FOR FLASHLIGHTS

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Filed July 16, 1959, Ser. No. 827,471

2 Claims. (Cl. 240—10.66)

This invention relates generally to portable dry cell battery-powered flashlights, and more particularly to improved battery bulb connections in such flashlights.

In most known dry cell battery-powered flashlights, the usual flashlight bulb has a central terminal which is in engagement with the flat top of a terminal of the usual dry cell battery, and the battery is rather loosely received in the flash light casing. When these flashlights are transported in an automobile or truck, as they frequently are, particularly when placed on the floor thereof or some other flat surface therein, they have a tendency to slide or roll around during movement of the vehicle and this causes lateral shifting of the battery. As a result of this action, the central terminal of the bulb is subjected to harmful abrasion from the battery terminal and this ultimately incapacitates it. In addition to such undesirable abrasive action, the bulb's central terminal is likely to slide off the battery terminal and thereby disrupt the circuitry. In either event, the flashlight is rendered inoperative, and this is bothersome and a distinct deficiency in known dry cell battery-powered flashlights.

It is an object of the invention to provide an improved flashlight wherein the above set forth deficiency of known flashlights of this type is eliminated.

The object of the invention is accomplished in one form by providing in a dry cell battery-powered flashlight an improved connection between the usual central terminal of the flashlight bulb and the usual battery terminal. The principal distinguishing aspect of the improved connection resides in the utilization of means for the battery terminal which includes a recess that cooperatively receives the central terminal of the bulb and cooperates therewith to the end of eliminating any lateral movement of the battery relative to the bulb's central terminal.

The above and other objects and further details of that which I believe to be novel and my invention will be clear from the following description and claims taken with the accompanying drawings, wherein:

FIG. 1 is a side elevational view with portions broken away and shown in section for clarity, of a flashlight which incorporates one form of the invention;

FIG. 2 is a top plan view of one of the parts of the improved connection showing an associated part in dotted lines at one stage in assembly;

FIG. 3 is a sectional view taken substantially on line 3—3 of FIG. 2;

FIG. 4 is a fragmentary sectional view taken centrally through a flashlight which incorporates another form of the invention;

FIG. 5 is a fragmentary partial side elevational view and partial sectional view of a dry cell battery and another form of improved connection, and

FIG. 6 is a fragmentary partial side elevational view and partial sectional view of a dry cell battery and another form of improved connection.

In FIG. 1 there is illustrated a dry cell battery-powered flashlight which is generally indicated by reference numeral 10 and which incorporates the preferred form of the invention. Except for the improved connection between the central terminal of the flashlight bulb and the battery terminal, flashlight 10 may take any conventional form. Some conventional elements of known flashlights

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are not illustrated, such as the details of the circuitry and the switch, for the sake of convenience. It is intended that the improved bulb central terminal and battery terminal connection be utilized in any suitable known flashlight, and therefore, any omitted conventional elements should be assumed to be included in the disclosure.

The flashlight 10 comprises a generally tubular casing 12 having a radially enlarged head 14 which is threaded at its upper extremity 16 (as viewed in FIG. 1). Detachably secured to the threaded casing end 16 is a top cap 18 which includes a large central opening 20, through which light may pass, and a threaded skirt 22 which cooperates with the threaded casing end 16 to detachably mount the top cap on the casing. The top cap 18 captures a disk-like lens 24, which may be glass or plastic, in operative position between the upper end edge of the casing 12 and the top cap, and the stress of this connection is absorbed by annular resilient gasket 26. The lower end 28 of the casing 12 (as viewed in FIG. 1) is threaded and detachably receives a base cap 30 which includes a threaded skirt 32 which cooperates with the threaded casing end 28 to detachably mount the base cap on the casing.

Within the casing 12 in the head 14 thereof there is positioned a dome-shaped reflector 34 having a threaded central collar 36. A flashlight bulb 38 having the usual threaded base 40 and central terminal 42 is detachably threadedly mounted in the collar 36. A dry cell battery 44 having a terminal 46 in the form of a projecting post is disposed within the casing 12. The battery 44 may be of the conventional dry cell type which includes a cylindrical body 48. Although only one battery is illustrated, it should be clearly understood that flashlights which include a plurality of batteries may have my invention incorporated into them. The flat base 50 of the battery 44 is contacted by a coiled battery-positioning spring 52 which conventionally is rigidly secured to the bottom cap 30 and usually functions to bias the flashlight battery into contact with the central terminal of the flashlight bulb.

With the foregoing conventional arrangement, in the absence of my invention, the battery terminal 46 would normally be biased into direct contact with the bulb's central terminal 42 by the battery-positioning spring 52. Also, in the absence of my invention, the battery 44 is likely to be very loosely received in casing 12 so that an annular space, which is indicated in FIG. 1 by reference character S, is formed between the battery body and the casing. As was pointed out in the introduction to this specification, in this conventional setting, during use of the flashlight, particularly in environments where it is likely to roll or slide about, the flashlight battery has a tendency to shift laterally and cause undesirable abrasion of the bulb's central terminal and/or sliding of the battery terminal off of the bulb's central terminal. The latter ultimately results in incapacitation of the flashlight and is a serious deficiency.

My invention eliminates this deficiency in known flashlights by providing an improved connection between the bulb's central terminal 42 and the battery terminal 46. In the preferred FIG. 1 form of the invention, the improved connection is effected by utilizing a connector 54 alone or along with a spacer 56. The connector 54 comprises a metallic electrical conducting member having a central disk-like portion 58 with an axially extending peripheral flange 60 formed on one side thereof and an axially extending central tubular collar 62 formed on the other side thereof. The tubular collar 62 is flared outwardly to form a tapered seat 64 for receiving the bulb's central terminal 42. As can best be seen in FIG. 1, the flange 60 telescopes over the battery terminal 46; the flange 60 preferably has a frictional fit with the battery ter-

terminal 46. Also, as can be seen in FIG. 1, the bulb's central terminal 42 is disposed in the seat 64 and is in contact with collar 62. In this regard, the contact between the terminal 42 and collar 62 is firm as a result of the bias between these parts caused by the spring 52.

Use of the connector 54 alone results in substantial elimination of the deficiency of known flashlights set forth above, for it will be observed that with the battery 44 biased by the battery positioning spring 52 in the direction of and against the bulb 38, a firm contact between the bulb's central terminal 42 and the connector seat 64 results which substantially precludes the possibility of lateral shifting of the battery relative to the bulb. If the connector 54 is utilized alone, it is formed and mounted as illustrated in FIG. 1, but the spacer 56 is eliminated.

If it is desired to further enhance the connection between the bulb and battery by entirely eliminating all possibility of lateral shifting of the battery 44 relative to the casing 12, the spacer 56 may be utilized. The spacer 56 comprises an inverted cup-shaped member that is made of a suitable plastic or other electrical insulating material. Spacer 56 includes a disk-like flat wall 66 and a peripheral cylindrical axially extending portion 68. When the flashlight is fully assembled, as illustrated in FIG. 1, the spacer 56 has an opening 70 which surrounds a portion of the collar 62 of the connector 54 and a portion of the spacer's flat wall 66 is contiguous with the disk-like portion 58 of the connector 54. When the flashlight is fully assembled, the portion 68 of the spacer 56 is disposed in the space S and substantially fills up this space. When both the connector 54 and spacer 56 are utilized as illustrated in FIG. 1, a superb connection between the bulb's central terminal and the battery terminal is effected. However, if desired, only the connector 54 need be employed.

To assemble the connector 54 and spacer 56, if both are utilized, the connector is originally provided, as can be seen in FIGS. 2 and 3, without the flare on the tubular collar 62. At this stage of assembly, the collar 62 is cylindrical. The cylindrical collar 62 is passed through the opening 70 in the spacer wall 66, and thereafter expanded to form the flare illustrated in FIG. 1 thereby forming a unitary spacer-connector sub-assembly. After the spacer-connector sub-assembly is made, it is telescoped over the top of the battery casing 48 so as to have the connector flange 60 frictionally telescoped on the battery terminal 46 prior to inserting the battery 44 into the flashlight casing 12. The telescoped battery and spacer-connector sub-assembly is then inserted into the flashlight casing 12 through the open casing end 28 and the cap 30 is secured to the casing in the usual manner, resulting in the FIG. 1 orientation of parts.

In FIG. 4 there is illustrated a flashlight which incorporates another form of the invention. Parts of the flashlight illustrated in FIG. 4 which correspond to parts illustrated in FIG. 1, are indicated by the same reference numerals with a prime (') added. In FIG. 4 the improved connection for the bulb's central terminal 42' and the battery terminal 46' is effected by a connector 72 which comprises a cap-like member that is formed out of sheet metal, that has a cylindrical flange 74 that telescopes over the battery terminal 46' and frictionally seats thereon, and that includes a flat wall 76 having a central depression 78 which defines a recess for receiving the bulb's central terminal 42'. The functioning of the connector 72 when fully assembled with the battery 44' in a flashlight is substantially the same as that of the connector 54 in the FIG. 1 form of the invention. If desired, the connector 72 may be substituted for the usual metallic cap which usually is mounted on the usual carbon post-like terminal of conventional dry cell batteries.

In FIG. 5 there is illustrated another form of connector which is contemplated by the invention. Connector 80 comprises a body 82 of metal having a recess 84

formed in one side thereof and a peripheral cylindrical flange 86 on the other side thereof which frictionally telescopes the terminal 88 of the battery 90. The recess 84 and flange 86 may be formed by cutting away material out of the body 82. The functioning of the connector 80 after its construction and assembly in the completed flashlight along with the battery 90 is substantially the same as that of the connectors 54 and 72 of the first two forms of the invention disclosed, it being understood in this connection that the connector recess 84 receives the central terminal of a flashlight bulb.

In FIG. 6 there is illustrated another form of connector which is contemplated by the invention. Connector 92 comprises a mass of metal, such as solder, which is built up on the terminal 94 of the battery 96. The connector 92 includes recess 98, which may be formed by a cutting operation, for receiving the central terminal of a flashlight bulb. It should be understood that the connector 92 functions in the same general manner as the connectors 54, 72 and 80 when the battery 96 is fully assembled in a flashlight.

In view of the foregoing it should be apparent that I have provided an improved connection between the central terminal of a flashlight bulb and a battery terminal which prevents relative lateral shifting of these parts and yet provides for their proper electrical connection. There have been disclosed several alternative structural forms of the invention. In this regard, it should be realized that spacers generally corresponding to the spacer 56 in the FIG. 1 form of the invention may be utilized with the FIGS. 4, 5, or 6 forms of the invention. It also should be understood that the connector 54 of the FIG. 1 form of the invention may be utilized alone or in combination with the spacer 56, as desired. All of the connectors are predicated on the same basic inventive concept of providing means including a recess in association with a conventional dry cell battery terminal for cooperation with the conventional central terminal of a flashlight bulb, which functions to provide an improved connection between the bulb and battery that eliminates relative lateral shifting of these components. The FIGS. 1, 4 and 5 forms of the invention possess the advantage that their connectors are separable elements which are operatively associated with existing batteries simply by sliding them on the existing battery terminal. In the FIG. 6 form of the invention, it is necessary to integrally form the connector on the battery terminal by deposition thereon, as by soldering.

As will be evident from the foregoing description, certain aspects of my invention are not limited to the particular details of construction of the examples illustrated, and I contemplate that various and other modifications and applications will occur to those skilled in the art. It is, therefore, my intention that the appended claims shall cover such modifications and applications as do not depart from the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A standard battery powered portable flashlight comprising: a conventional cylindrical casing; a conventional bulb disposed within and supported by said casing and having a central terminal; a conventional cylindrical battery in said casing having a terminal; means for biasing said battery terminal toward said central terminal; said terminals being disposed so as to be spaced within said casing out of contact with the inner walls thereof and mounted so that there is normally slight lateral play between them; a rigid unitary connector disposed within said casing out of contact with the inner walls thereof, made of electrical conducting material and interposed between and in direct contact with both of said terminals for at all times effecting electrical connection of said terminals, said connector having a recess for receiving

said central terminal; and a cup-shaped spacer made of electrical insulating material secured to said connector to form a separately handled unit therewith, said spacer having a cylindrical portion telescoped on said battery and disposed between and in substantial contact with said battery and the inner walls of said casing, whereby said connector and spacer unit is operative to prevent relative lateral movement of said terminals and thereby eliminate the play between them that would otherwise exist in the absence of the connector and spacer unit. 10

2. A flashlight as defined in claim 1 wherein said connector includes a cylindrical flange which telescopically fits on said battery terminal.

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