United States Patent

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[54] **PLUG-IN FLASHLIGHT EXTENSION**
10 Claims, 6 Drawing Figs.

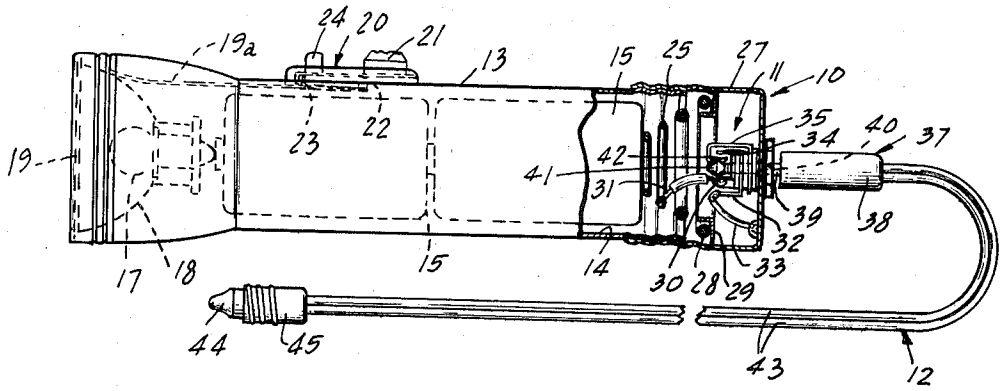
[52] **U.S. Cl.** **240/10.6,** 136/181, 240/2.18, 324/53
[51] **Int. Cl.** **F21l 7/00**
[50] **Field of Search** 240/2.18, 6.4, 10.5, 10.6, 10.66, 10.67, 10.68, 10.65, 10.69; 136/181; 324/53

[56] **References Cited**
UNITED STATES PATENTS

1,528,709	3/1925	Trimble	240/6.4 UX
2,302,248	11/1942	Olson	240/10.6 X
2,427,051	9/1947	Goudreau	240/2.18
2,536,355	1/1951	Cox	240/2.18
2,607,829	8/1952	Tipperman	240/10.6
2,818,498	12/1957	Foch	240/10.66
3,225,186	12/1965	Duncan	240/10.64
3,227,948	1/1966	Cheshire	324/53

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ABSTRACT: A plug-in flashlight extension embodies an extension cord having a plug which is removably insertable in a jack carried by a flashlight assembly and connected in circuit with a switch carried by the flashlight casing and which may be the conventional digitally operable reciprocably slidable or button switch with which flashlights are equipped and which operate on the principle of connection to one pole of the battery or batteries through the flashlight casing where it is metal or through a conductor in or on the casing, and the opposite pole of the battery or batteries through a conductor insulated from the casing or the first-mentioned conductor. In one desirable arrangement, the jack is provided with means to disconnect the switch circuit from the conventional front-end light bulb socket. In another arrangement the jack is adapted to replace the front-end lamp bulb socket. A storage compartment is optionally provided for the extension cord when not in use. A probe light extension is optionally provided for the extension cord.



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Fig-1

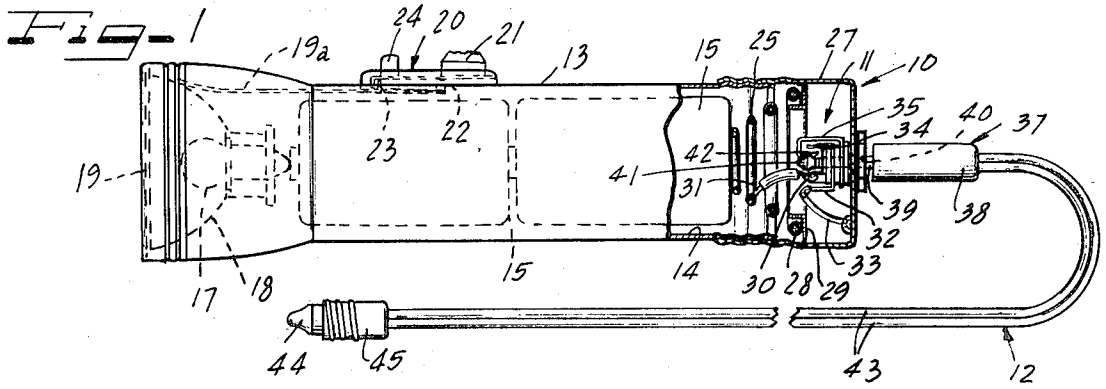


Fig-2

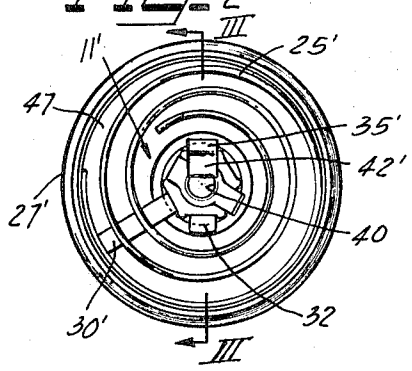


Fig-3

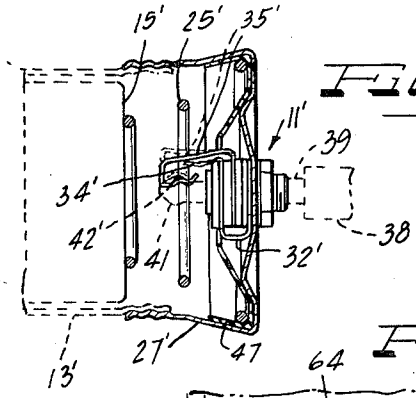
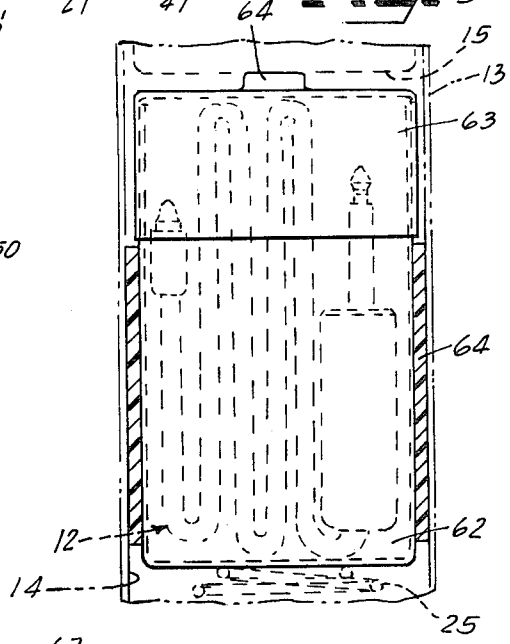


Fig-5



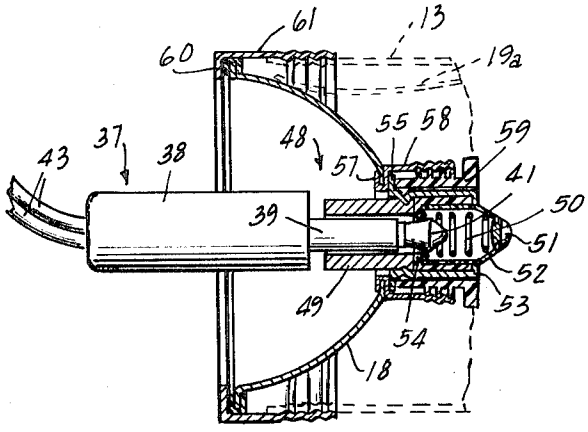


Fig-4

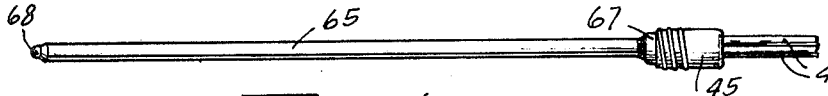


Fig-6

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PLUG-IN FLASHLIGHT EXTENSION

This invention relates to improvements in flashlight structures and is more particular concerned with a plug-in jack extension device.

Heretofore flashlights have been equipped with various types of probes and testing devices which employ the conventional front-end lamp in the circuit. Insofar as I am informed, there has not heretofore been provided or suggested a flashlight equipped to receive a plug-in lamp-equipped extension, and more particularly such an extension which can be energized to illuminate a lamp carried thereby alternatively to the conventional front-end lamp such as is commonly mounted in a socket behind a lens and in contact with the front-end battery pole.

A principal aim of the present invention is to provide such a plug-in lamp extension.

An important object of the present invention is to implement the provision of a plug-in lamp extension for flashlights.

Another object of the invention is to provide a lamp extension for flashlights adapted to be operated alternatively to the conventional lamp carried by a flashlight.

A further object of the invention is to provide a lamp extension for flashlights adapted to be controlled by the regular switch of the flashlight assembly.

Still another object of the invention is to provide a lamp extension assembly for flashlights involving a jack which is selectively operable in the regular flashlight circuit.

Still another object of the invention is to provide a new and improved flashlight equipped with a plug-in jack device at the rear end thereof.

A still further object of the invention is to provide a jack structure for a plug-in extension which is adapted to replace the conventional flashlight bulb.

It is also an object of the invention to provide new and improved means for storing a flashlight extension.

Among other objects of the invention is the provision of a versatile flashlight extension adapted to be equipped with a replaceable probe light.

Other objects, features and advantages of the invention will be readily apparent from the following description of certain preferred embodiments thereof, taken in conjunction with the accompanying drawing, although variations and modifications may be effected without departing from the spirit and scope of the novel concepts embodied in the disclosure, and in which:

FIG. 1 is a side elevational view, partially in section, showing a conventional flashlight equipped with a jack and plug-in extension embodying features of the invention;

FIG. 2 is a top or inside plan view of a modified arrangement of the jack;

FIG. 3 is a transverse sectional detail view taken substantially along the line III—III of FIG. 2;

FIG. 4 is a longitudinal sectional detail view, partially in elevation, showing a front-end jack adapter for the flashlight;

FIG. 5 is a vertical sectional and elevational view showing a storage compartment for the plug-in extension; and

FIG. 6 is an elevational view of a probe light adapter for use with the flashlight extension.

On reference to FIG. 1, a flashlight assembly **10** carries a jack **11** adapted to receive operatively a plug-in lamp-carrying extension **12**. In the form shown, the flashlight assembly **10** comprises an elongated tubular handle casing **13** providing therein a battery chamber **14** having therein one or more, and in this instance two, batteries **15** in tandem with their front-end poles connected in an electrical circuit through a lamp **17** the socket of which is mounted in a metallic reflector **18** which has a lens **19** across the front thereof and is insulated from the casing **13**. Connection of the reflector **18** in an electrical circuit with the casing **13** is through a leaf spring conductor **19***a* which is mounted in insulated relation on the inside of the casing adjacent to an electrical switch device **20** including a reciprocal digitally operable actuator **21** operating a contact which is free from a contact **23** of the conductor **19***a* in the open switch position and is in electrical engagement with such contact in the closed switch position. In addition, the contact **22** may be a leaf spring which is adapted to be moved into electrical engagement with the contact **23** by a switch button **24**.

Instead of the opposite poles of the batteries **15** being connected in the flashlight-operating circuit by means of an electrically conductive conical coiled compression spring **25** thrusting the batteries toward the base of the lamp **17** by seating within a metallic cap **27** screwed onto the back end portion of the casing **13** as is conventional, the spring **25** is insulated from the casing as by means of a piece of tubular insulation **28** into which the outer endmost or large coil of the spring is threaded so that it is thoroughly insulated from an annular thrust shoulder **29** on the cap **27**. Electrical connection between the spring **25** and the casing is effected through the jack **11** which for this purpose is mounted in insulated relation on the end wall provided by the cap **27** and has a terminal **30** which is electrically connected to the spring **25** as by means of a lead **31**, and a terminal **32** which is electrically connected as by means of a lead **33** to the electrically conductive cap **27** which by its threaded connection is electrically connected to the casing **13**. Normally the terminals **30** and **32** are electrically connected together by means of separable contacts **34** and **35**. With the contacts **34** and **35** in electrical engagement, closing of the switch **20** functions to close the electrical circuit through the lamp **17** to illuminate the same for normal flashlight operation. For such normal operation, the extension **12** will not have been connected to the jack **11**.

When it is desired to employ the extension **12**, a plug structure **37** at one end of the extension is manipulated through a handlelike base **38** to insert a single-prong, double-pole plug **39** into a receptacle bore **40** axially through the jack. This causes the rear end pole portion of the plug to make electrical contact with the battery casing through the connector **32** and the cap **27** to the battery casing. At the same time a front-end tip pole **41** on the plug engages a terminal head **42** on the contact **35** and springs this contact away from the contact **34** to break the connection between the terminals **30** and **33** and connect the terminal **30** with the plug head **41** through the terminal **35**. Thereby, respective electrical leads extending from the plug structure **37** are connected into the electrical circuit of the flashlight and electrically connect a lamp bulb **44** removably secured in a socket **45** at the opposite end of the extension **12** into the flashlight circuit. As a result, when the switch **20** is actuated from the open circuit to the close circuit position, the extension lamp **44** is illuminated instead of the front-end flashlight lamp **17**. Hence, by plugging in the extension **12**, the lamp **44** illuminates alternatively to the lamp **17** by operation of the switch, but when it is desired to employ the front-end lamp **17**, the extension must be unplugged.

In FIGS. **2** and **3** another manner of connecting the jack disconnectably in the flashlight circuit is disclosed. In this instance the jack is identified as **11'** and is secured to the end wall provided by the screw-on cap **27'** which is adapted to be screwed onto the rear end portion of the flashlight casing **13'** within the chamber of which the battery **15'** is thrust forwardly by the spring **25'** seating against a generally cup-shaped insulator **47** with the base coil of the spring thrusting in electrical contact against the contact **30'** of the jack which is extended radially for interposition between the insulator and the spring. Electrical contact with the flashlight casing is effected by turning the contact element **32'** into clamped electrical engagement against the cap member **27'**. Otherwise the jack **11'** is the same as and functions the same as the jack **11** in FIG. **1**, namely, electrical connection to enable lighting of the front-end bulb by operation of the flashlight switch when the contacts **34'** and **35'** are in electrical engagement as shown in full line in FIG. **3**, while electrical connection with the extension is effected when the plug **39** is inserted into the jack and the plug head **41** separates the contacts **34'** and **35'** by thrusting laterally against the contact terminal **42'** as shown in dash outline.

Where preferred, the arrangement of FIG. 4 may be employed wherein a jack 48 replaces the customary lamp bulb, desirably as an optional alternate. To this end, the jack 48 comprises an electrically conducting socket body sleeve 49 into which the plug 39 of the extension plug structure 37 is adapted to engage, and which is of a length such that the shank pole of the plug is adapted to engage in electrically contacting relation therewithin while the head or tip pole 41 makes electrical contact with a contact structure desirably in the form of a coiled compression spring 50 thrusting at one end against or at least being electrically connected to a nib terminal 51 at the inner end of the jack and which makes electrical contact with the front-end pole of the contiguous battery. To adapt the jack 48 to assume the same position as a flashlight bulb or lamp, the contact nib 51 is supported by a shouldered generally cup-shaped holder 52 of dielectric material which is engaged by a flanged retaining ferrule 53 desirably of metal and which is engaged at its outer end about the inner end portion of the socket body 49 to which it is attached by means of crimping or the like. To provide a stop shoulder for the outer end of the spring 49, an insulating washer 54 is secured between the contiguous ends of the retainer 52 and the body 49. To enable operative mounting of the jack 48 in the manner of a flashlight bulb, the outer end of the ferrule 53 is provided with an annular radial flange 55 which is engaged in electrical contact with an annular shoulder 57 which faces inwardly at the connection of a threaded socket 58 with the reflector 18, whereby a dielectric, such as a hard plastic thrust sleeve member, threadedly engaged within the socket 58 secures the flange 55 against the shoulder 57 and thereby retains the jack 48 in place on the reflector bowl. In this instance the usual glass or plastic lens is omitted and the outer end of the electrically conductive reflector bowl 18 is electrically isolated by a dielectric insulator 60 from the customary flange shoulder provided by a securing ring 61 threadedly engaged with the dielectric casing 13, with the leaf spring conductor 19*a* engaging the reflector bowl 18 and leading to the flashlight switch in the customary manner. Through this arrangement, plugging in of the plug assembly 37 effects connection of the extension leads 43 with the battery through the spring 50 and with one pole of the switch through the body socket member 49. When it is desired to replace the conventional flashlight lamp, the jack 48 can be readily removed by unscrewing the thrust member 59 and inserting the lamp in place of the jack.

Means for conveniently storing the plug-in extension 12 may take the form of a container 62 (FIG. 5) comprising a generally cup-shaped body of electrically conductive material such as aluminum provided with a slip-on closure cap 63 also of dielectric material and provided with a central projection 64 simulating the projecting central pole of a battery. By having the container 62 and its cap of a diameter substantially similar to the diameter of the battery 15 and provided with an insulating sleeve 64 about the body of the container, and the overall length of the closed container about the same as that of the battery, the container can be mounted within the battery chamber 14 of the battery casing 13 as a replacement for one of the batteries 15. On the other hand, the length of the flashlight body housing or casing 13 may be increased sufficiently to accommodate the container 62 in tandem relation to a pair of the batteries 15. This arrangement assures that the plug-in extension will at all times be with the flashlight when the extension is not in use and keeps it ready at hand for use when needed.

For purposes such as inspection within small-diameter workpiece bores in machine stops, or in tool and die shops, or elsewhere where it is necessary or desirable to provide illumination within a small opening or cramped area into which it would be inconvenient to introduce a flexible extension cord such as provided by the leads 43, a rodlike probe extension 65 (FIG. 6) may be provided having a screw-in base 67 at one end adapted to be operatively received within the lamp sockets 45, and carrying at the opposite end of the tubular probe rod a small electrical lamp 68 such as a wheat bulb which is electrically connected through the tubular rod 65 and the base 67 with the leads 43 of the plug-in extension.

It will be appreciated that the plug-in extension device of the present invention provides a convenient flexible extension with a cord of whatever desired length which will provide battery-powered illumination for conditions where a battery itself may be too bulky, heavy, unwieldy, or the like, to provide a convenient source of illumination from its customary front-end lamp. For example, where the lamp of the plug-in extension may be hung from a convenient support, extended into a cavity or space wherein illumination is desired, the battery casing can be laid on a supporting surface or attached to a stationary support while the extension cord can be freely maneuvered within the limits of its length to provide a convenient illumination source under the particular circumstances in which it is used.

It will be understood that variations and modifications may be effected without departing from the spirit and scope of the novel concepts of this invention.

I claim as my invention:

1. In a flashlight assembly including a tubular casing providing a battery chamber and having a digitally operable switch movable between open circuit and closed circuit positions to control a flashlight circuit between opposite poles of a battery in said chamber:

a jack mounted on the casing and having separate electrical connections with the casing and the battery; and

a lamp-carrying electrical extension having a plug with electrically separate poles separably engageable in said jack to bridge said electrical jack connections to enable controlling illumination of the extension lamp by operation of said switch between its open circuit and closed circuit positions.

2. A flashlight assembly according to claim 1, said casing being electrically conductive and having an electrically conductive rear end closure thereon, said jack being mounted on said closure, one of the jack connections being with said closure and through the closure with said casing, an electrically conductive spring bottomed on said closure and thrusting into electrical engagement with the adjacent end of a battery, and the other of said connections being with said spring.

3. A flashlight assembly according to claim 2, one of said connections comprising a pair of normally closed contacts connecting said connections to close the flashlight circuit controlled by said switch to enable operation of the switch to illuminate a front-end lamp of the flashlight assembly, said plug being operable to open said contacts.

4. A flashlight assembly according to claim 1, including a lamp mounted on a front end of the casing and connected in said circuit, means normally acting through said separate electrical connections to enable controlling illumination of said front-end lamp by means of said switch, and means controlled by said plug when inserted in said jack to disable said means for connecting said electrical contacts so that only the lamp of the extension will be illuminated when the switch is in the closed position.

5. A flashlight assembly according to claim 1, said casing having means at one end for supporting a conventional lamp to be controlled by said switch and having said jack mounted at the opposite end of the casing with a spring normally thrusting the battery toward the front-end lamp, means on said jack normally completing a circuit through the control circuit so that operation of the switch will control said front-end lamp, said means being disabled by engagement of said plug within said jack, said electrical connections comprising separate terminals on said jack, and respective leads connecting one of said terminals to said spring and the other of said terminals to said switch.

6. A flashlight assembly according to claim 1, including an electrically conductive end closure on one end of said casing carrying said jack, an electrically conductive spring between said end closure and said battery, an insulator between said

spring and said end closure, one of said electrical connections comprising a terminal in electrical contact with said spring between said spring and said insulator, and the other of said electrical connections comprising a terminal in electrical engagement with said end closure.

7. A flashlight assembly according to claim 1, in which said casing has a front-end lamp-supporting device, said jack being replaceably carried by said lamp-supporting device with one of said electrical connections being effected with a front pole of the battery, and the other of said electrical connections being effected through a conductor leading to said switch.

8. A flashlight assembly according to claim 1, one of said separate electrical connections being through a conductor leading to said switch, and the other of said electrical connections being with one pole of the battery.

9. A flashlight assembly according to claim 1, including an electrically conducting storage container for receiving the extension when disconnected from said jack and not in use, and constructed and arranged to be housed within the casing in tandem with the battery.

10. A flashlight assembly according to claim 1, in which said extension comprises a flexible lead cord provided at one end with said plug and at the opposite end with a lamp socket in which a lamp is removably receivable, and a rod probe extension having a base electrically receivable in said socket and provided at its opposite end with a lamp electrically connected through said base and said socket with said cord.

* * * * *