June 25, 1940. W. M. JAMES 2,205,477

FLASHLIGHT AND ELECTRICAL TESTER

Filed Sept. 8, 1939

Fig. 1

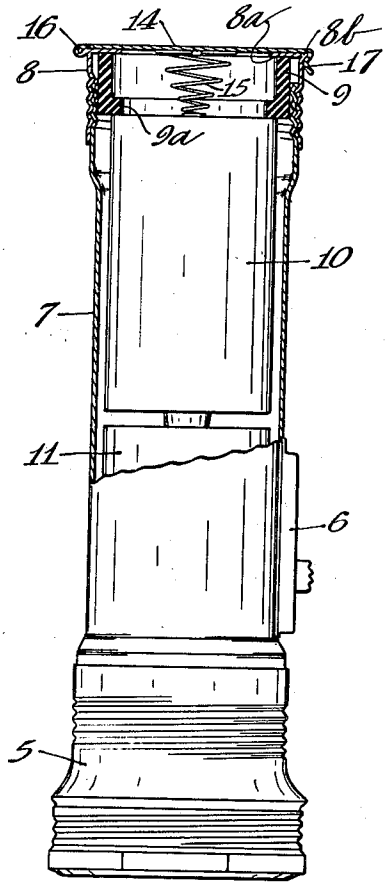


Fig. 3

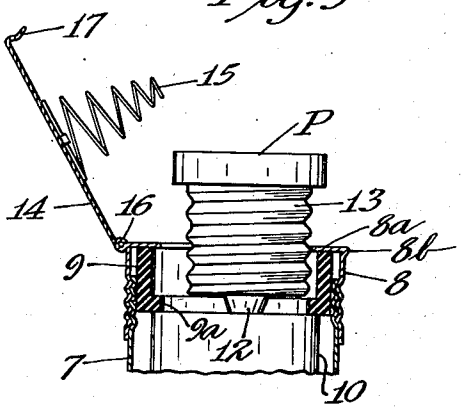


Fig. 4

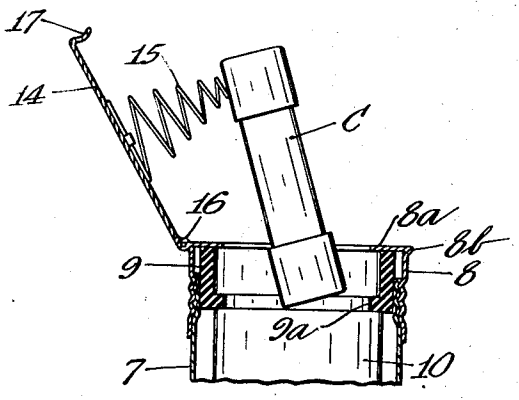
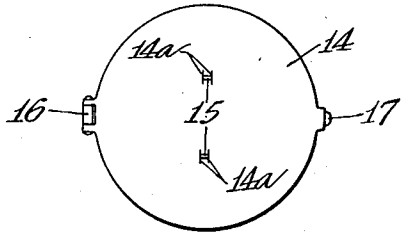


Fig. 2



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FLASHLIGHT AND ELECTRICAL TESTER

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10 Claims. (Cl. 175—183)

My invention relates to flashlights and particularly to flashlights including means for electrical continuity testing.

Many combined flashlight and electrical continuity testing devices have been designed for use in testing fuses and other electrical circuit elements. Most of these devices have, however, been of impractical, expensive or undersirable construction. Some have been of intricate or unreliable construction. Others have been constructed with outwardly projecting parts or with electrical contact elements so exposed that accidental contact with tools or other metallic objects cause unnecessary and undesirable draining of the batteries of the devices.

An object of my invention is to provide an electrical device usable either as a continuity tester for fuses and the like and as a flashlight.

Another object is to provide such a device wherein the entire flashlight with the exception of the cap at the rear end thereof may be of standard or conventional design such as found in the usual tubular flashlight structure.

Still another object is to provide such a device which is free of projections on the exterior and wherein the test contacts are concealed and inaccessible from the exterior when the device is placed in condition for use as a flashlight or for storage or transporting of the device.

Yet another object is to provide such a device capable of use for continuity tests of either plug fuses or cartridge fuses and also capable of use in connection with any electrical circuit element connected to an ordinary Edison type screw plug.

A further object is to provide such a device of simple, light, compact, rugged, reliable and inexpensive construction.

These and other objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawing, wherein like reference characters refer to the same parts throughout the views, and, in which:

Fig. 1 is a partially broken away, partially sectional view of a tubular flashlight wherein an embodiment of my invention is incorporated;

Fig. 2 is a rear view of a closure plate associated with the rear end of the device;

Fig. 3 is a sectional partial view having plug fuse operatively associated therewith to be tested thereby; and

Fig. 4 is a sectional partial view showing a cartridge fuse associated with the device for being tested thereby.

Referring to the drawing the embodiment of my invention illustrated therein is shown incorporated in a tubular flashlight having a lamp, reflector and lens containing head 5, a switch 6 and a tubular barrel 7 all of which are of conventional construction. Parts of the device wherein my invention lies are used in substitution for the ordinary rear end closure cap and battery engaging spring found in the conventional flashlight.

I provide a removable rear end cap 8 arranged for attachment to the barrel 7 in the same manner as the conventional cap which would otherwise be used on the rear end of the barrel 7. The rear or radially disposed wall of my cap is centrally apertured to leave an inwardly projecting annular flange 8a which constitutes an electrical contact element for use in testing as will be later described. The aperture formed in the rear wall of my cap 8 is of such diameter as to freely or loosely receive the screw threaded metal shell portion of a standard electrical plug fuse.

I provide electrical insulating means 9 arranged to be snugly interposed between the flange 8a and the marginal portion of the rear end of a flashlight cell 10 contained within the rear portion of the flashlight barrel 7. The insulating means 9 is preferably in the form of a ring or collar formed of suitable electrical insulating material. In any form which the insulating element 9 may take the insulating element is so made that the central portion of the rear end of the flashlight cell 10 is exposed for use as an electrical contact surface. Preferably I provide an inwardly projecting annular flange 9a in the insulating collar 9 at the end thereof nearest the flashlight cell. In assembling the device as, for example, after inserting the cell 10 and a second cell 11 in the case of a two cell flashlight, the insulating ring 9 is placed in the rear end of the shell 7 and the cap 8 is screwed on. The cap 8 is screwed on with just sufficient force to insure good electrical contact between the forward end of the cell 10 and the rear end of the cell 11 and between the forward end of the cell 11 and the electrical contact element with which the same is normally engaged.

The device as described above is suitable for use in testing fuses of the plug type. As illustrated in Fig. 3, the fuse plug P is inserted through the apertured central portion of the cap 8 and placed in a position wherein the center contact element 12 of the fuse engages the rear end of the cell 10 and the screw shell contact element 13 of the fuse engages the edge of the

flange 8a. With the switch 6 left in closed position, the lamp of the flashlight will light up if the fuse is good and will fail to light if the fuse is burned out or otherwise open circuited.

I provide means for establishing and opening an electrical connection between the rear end of the cell 10 and the cap 8 so that the device may be used as a flashlight with the connection closed and as a continuity test device with the connection open. For this purpose I provide an element 14 which is carried by the cap 8 and may be shifted into and out of a position wherein the element 14 traverses at least a portion of the apertured central part of the cap 8. The shiftable element 14 is provided with an electrical contact element 15 which is engaged with the rear end of the cell 10 when the element 14 is in the above mentioned position. Preferably the element 14 is made in the form of a closure plate for covering the apertured central portion of the rear wall of the cap 8. For electrical reasons the contact element 15 must be connected to the barrel 7, and this is best accomplished by making the closure plate 14 of electrically conductive material. The cap 8 will, of course, be preferably constructed of electrically conductive material so as to place the electrical contact flange 8a in electrical communication with the shell 7. The electrical contact element 15 is preferably in the form of a tapered helical spring as shown. This spring may be secured to the closure plate 14 by slitting the plate 14 as at 14a and bending the material between the slits 14a of the respective pairs thereof inwardly to form loops through which the rear or base portion of the spring 15 may be projected. The closure plate 14 is connected at one edge thereof to the cap 8 by means of any suitable form of electrically conductive hinge 16. For retaining the closure plate 14 in closed position the edge thereof diametrically opposite the hinge 16 is provided with a catch element 17 cooperating with a suitably formed portion 8b of the cap 8.

The closure cap 14 and electrical contact spring 15 when the closure cap 14 is in open position, as shown in Fig. 4, enables convenient continuity testing of small cartridge fuses such as the fuse C shown in Fig. 4. As illustrated one end ferrule of the fuse may be placed in contact with the rear end of the cell 10 and the remaining end ferrule may be placed in contact with the contact spring 15. For testing cartridge fuses of greater length than the fuse C, the device may be readily used for testing by bridging any convenient metallic tool or object between the spring 15 and the end ferrule of the fuse which would properly be electrically connected to the spring 15 for test purposes.

It is to be noted that when the device is in condition for use as an ordinary flashlight as illustrated in Fig. 1, the aperture of the cap 8 is covered, the spring 15 completes an electrical circuit between the rear end of the cell 10 and the cap 8, and all portions of the electrical circuit of the complete device with the exception of the barrel 7 and cap 8 are concealed so as to be protected from foreign materials and from accidental or undesired contact with metallic objects against which the flashlight may become placed. Also it is to be noted that the flashlight has no projecting parts additional to those of the conventional flashlight and has substantially the same external appearance as the conventional flashlight.

It is apparent that I have invented, a novel, light, compact, rugged, and inexpensive combination flashlight and electrical continuity tester wherein the only parts not of conventional construction are those replacing the conventional rear end cap and wherein when the device is placed in condition for use as a flashlight all electrical contact elements are protected against accidental contact with metallic objects.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of my invention.

What is claimed is:

1. An electrical testing flashlight including, in combination with a flashlight head, battery and barrel of conventional type, electrical insulating means for maintaining said battery in forwardly pushed condition, said insulating means being so constructed as to leave the central portion of the rear end of said battery exposed and the rear end of said barrel being open for access to said central portion, and an electrical contact element radially spaced from the axis of said barrel and rearwardly spaced from the read end of said battery, said contact element being electrically connected to the portion of said flashlight structure to which the rear end of the battery is connected in a conventional flashlight.

2. An electrical testing flashlight including, in combination with a flashlight head, battery and barrel of conventional type arranged for attachment of a removable closure cap to the rear end of said barrel, an electrically conductive cap constructed for being removably attached to the rear end of said barrel, the radial wall of said cap having a central aperture therein so as to leave an inwardly projecting annular flange, and an electrical insulating element snugly fitting between said flange and the marginal portion of the rear end of the battery of said flashlight.

3. An electrical testing flashlight including, in combination with a flashlight head, battery and barrel of conventional type arranged for attachment of a removable closure cap to the rear end of said barrel, an electrically conductive cap constructed for being removably attached to the rear end of said barrel, the radial wall of said cap having a central aperture therein so as to leave an inwardly projecting annular flange, and an annular electrical insulating element tightly interposed between said flange and the rear end of the battery of said flashlight.

4. The combination defined in claim 3 and said aperture being of lesser diameter than the internal periphery of said annular insulating element.

5. The combination defined in claim 3 and said annular insulating element having an inwardly projecting flange thereon at the end thereof adjoining said battery.

6. An electrical testing flashlight including, in combination with a flashlight head, switch, battery and barrel of conventional type arranged for attachment of a removable closure cap to the rear end of said barrel, an electrically conductive cap constructed for being removably attached to the rear end of said barrel, the radial wall of said cap having a central aperture therein so as to leave an inwardly projecting annular flange, an annular electrical insulating element tightly interposed between said flange and the rear end of the battery of said flashlight, and means selectively operable to establish and re-

move an electrical connection between said cap and the rear end of said battery.

7. An electrical testing flashlight including, in combination with a flashlight, head, switch, battery and barrel of conventional type arranged for attachment of a removable closure cap to the rear end of said barrel, an electrically conductive cap constructed for being removably attached to the rear end of said barrel, the radial wall of said cap being centrally apertured to leave an inwardly projecting annular flange, an annular electrical insulating element tightly interposed between said flange and the rear end of the battery of said flashlight, and an electrically conductive element carried by and electrically connected to said cap and shiftable relative thereto into and out of electrical contact with the rear end of said battery.

8. An electrical testing flashlight including, in combination with a flashlight head, switch, battery and barrel of conventional type arranged for attachment of a removable closure cap to the rear end of said barrel, an electrically conductive cap constructed for being removably attached to the rear end of said barrel, the radial wall of said cap being centrally apertured to leave an inwardly projecting annular flange, an annular electrical insulating element tightly interposed between said flange and the rear end of the battery of said flashlight, an electrically conductive element placeable in and removable from a position thereof wherein the same at least partially traverses said aperture, and an electrical contact element carried by said conductive element in such manner as to be in electrical contact with the rear end of said battery when said conductive element is in said position.

9. An electrical testing flashlight including, in combination with a flashlight head, switch, battery and barrel of conventional type arranged for attachment of a removable closure cap to the rear end of said barrel, an electrically conductive cap constructed for being removably attached to the rear end of said barrel, the radial wall of said cap having a central aperture therein so as to leave an inwardly projecting annular flange, an annular electrical insulating element tightly interposed between said flange and the rear end of the battery of said flashlight, a closure for said aperture movable into and out of closing relation therewith, and an electrical contact element carried by said closure, electrically connected to said cap and arranged to contact the rear end of said battery when said closure is in closing relation with said aperture.

10. An electrical testing flashlight including, in combination with a flashlight head, switch, battery and barrel of conventional type arranged for attachment of a removable closure cap to the rear end of said barrel, an electrically conductive cap constructed for being removably attached to the rear end of said barrel, the radial wall of said cap having a central aperture therein so as to leave an inwardly projecting annular flange, an annular electrical insulating element tightly interposed between said flange and the rear end of the battery of said flashlight, a closure for said aperture connected at one edge to said cap for inward and outward swinging movement relative thereto into and out of closing relation with said aperture, releasable means for holding said closure in said closing relation, and a resilient electrically conductive element mounted on and projecting outwardly of the central portion of the inner side of said closure for contact with the rear end of said battery when said closure is in closing relation with said aperture, said resilient element being electrically connected to said cap.

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