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W. J. SHORE

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FUSE TESTING DEVICE

Filed Oct. 27, 1927

Fig. 1

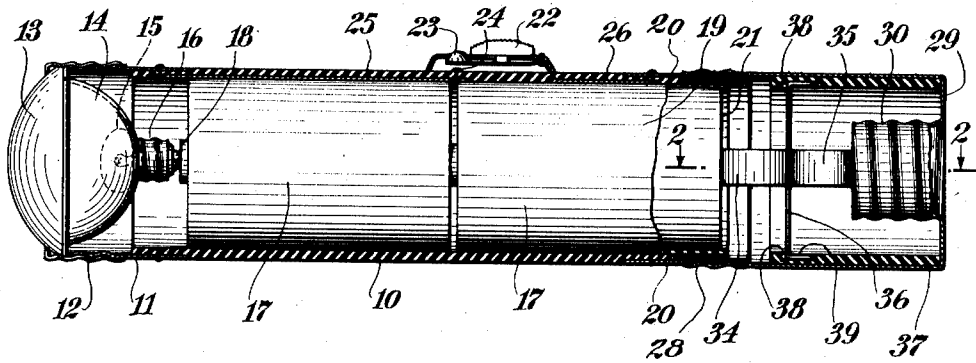


Fig. 2

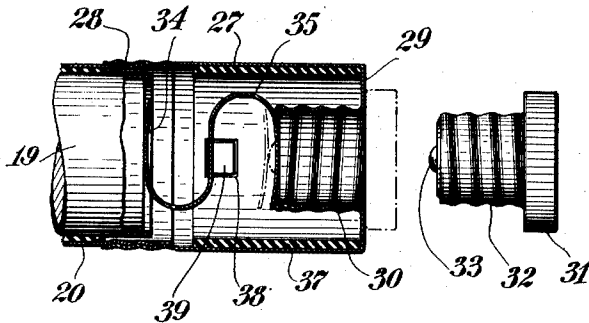


Fig. 3

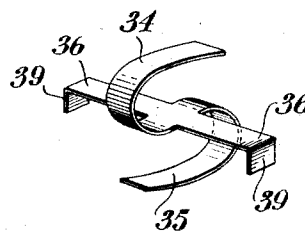
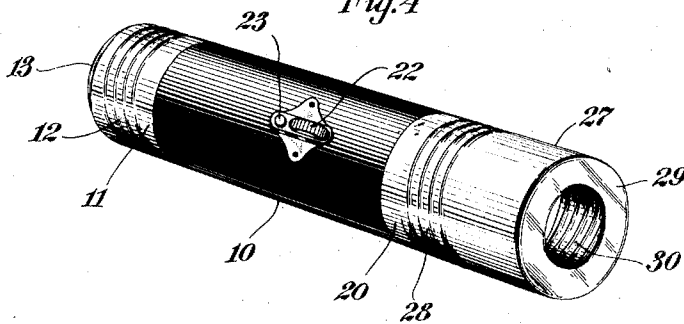


Fig. 4



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FUSE-TESTING DEVICE.

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My present invention relates generally to electrical testing devices, and has particular reference to a device for testing electrical fuses.

5 Although I have illustrated and shall hereinafter describe a device designed primarily for the testing of fuses wherein one terminal is threaded, nevertheless it will be understood that as to certain phases of my invention such an application is not essential.

10 One object of my invention is to provide a device for easily and efficiently testing a series of fuses to ascertain which, if any, is defective. More particularly, it is an object to provide a device which is so constructed and so utilizable that it may be held in one hand of a user while his other hand removes the fuse from its operative position and applies it to the testing device, the device being so constructed and designed that no manipulation other than this is necessary in order to receive an indication as to the condition of the fuse.

25 Another object of my invention is to provide a device of this character in conjunction with an electric bulb indicating device, and more particularly, one wherein the bulb may be retained in constantly and continuously lit condition until a defective fuse is located.

30 Another object is to provide a device which may be normally employed as an ordinary flashlight and which is so constructed as to require no manipulation or adjustment in order to render it immediately usable for fuse-testing purposes.

35 From one aspect, therefore, my invention lies in the provision of a flashlight having the usual electric bulb and manually operable switch, the construction being such that when the flashlight is held in one hand, a series of fuses may be successively applied thereto in a particular manner with the other hand to determine in an instant whether the fuses are defective or good.

40 It is a particular feature of my invention to provide a construction wherein the normal utilization of the flashlight remains con-

tinuously unimpaired, both as to efficiency 50 and method of operation, even during the testing of successive fuses, provided that the fuses are not defective. In accordance with my invention, a defective fuse, when applied, will immediately indicate its defectiveness by causing the flashlight bulb to become momentarily extinguished.

55 Briefly, my invention resides in the provision of an electric circuit which includes a normally closed yet breakable portion, the latter being so constructed and arranged that the mere application thereto of a fuse will automatically cause a breaking of said circuit portion and a substitution therefor of the fuse itself.

60 It is an object generally to provide a device which is extremely simple in construction and hence inexpensive from a manufacturing standpoint, and the employment of which requires no lengthy manipulation or adjustment whatsoever.

65 For the attainment of the foregoing objects and such other objects as may hereinafter appear or be pointed out, I have illustrated one form of my invention in the accompanying drawings in which—

70 Fig. 1 is a longitudinal cross-section through my flashlight fuse-testing device;

75 Fig. 2 is a longitudinal cross-section taken at right angles to Figure 1 and illustrating only the rear portion of the device, a fuse to be tested being shown in exploded relationship to the device;

80 Fig. 3 is a perspective view of one element of the device; and

85 Fig. 4 is a perspective view of the complete device.

90 The main portion of my apparatus is substantially similar to the well known flashlights which comprise a cylindrical casing having a bulb and a reflector in the forward portion, a manually operable switch along the side of the casing, and a removable cap at the rear end which normally seals the opening through which battery cells are insertable. For illustrative purposes, I have shown a device of this character wherein a cylindrical tube 10 of suitable insulating

material is provided at its forward end with a metallic threaded skirt 11 adapted to receive a complementary threaded member 12 designed to hold a lens or the like 13. Immediately beneath the lens 13 is a metallic reflector or the like 14 in which is mounted an electric bulb 15 extending rearwardly therethrough. The lateral or threaded terminal 16 of the bulb is constantly in electrical connection through the reflector 14 and the member 12 with the metallic skirt 11.

Within the tube 10, battery cells 17 are positioned in a well-known manner, the positive or central terminal of the forward one establishing a constant electrical connection with the rear or central terminal 18 of the lamp 15. Each battery cell is provided with a cardboard sheath 19 as is customary.

At the rear end of the tube 10 a metallic skirt 20 is provided similar to the skirt 11 and threaded to receive a removable rear cap which will be presently described. The cap is so constructed that constant electrical connection is established between the rear surface or negative pole 21 of the rear battery cell and the metallic skirt 20.

A manually operable switch 22 of any suitable construction is provided upon the side of the device. In the device illustrated, a movable spring contact 23 is normally spaced from a fixed contact 24, the latter establishing connection with the skirt 11 by means of a strip of conducting material 25 lying along the inner surface of the tube 10. Similarly, the contact 23 is in electrical connection with the skirt 20 by means of a strip of conducting material 26 lying along the inside of the rear portion of the tube 10. Obviously, when the movable contact 23 is brought down upon the fixed contact 24 by means of manual adjustment of the switch, a complete circuit will be established through the battery cells and the electric bulb, thereby causing the latter to light; and when the contact 23 is released, the circuit will be broken and the lamp will be extinguished.

The removable rear cap with which the salient features of my invention are associated is one which normally and continuously establishes the necessary electrical connection between the rear surface 21 of the battery and the skirt 20. Accordingly, my device is from one aspect a flashlight device, and may be used as such in the usual and well known manner. It is therefore of particular value in the testing of fuses, because when a fuse chamber requires inspection and replacement of fuses, it is almost always in total darkness for this very reason.

In the rear fuse-testing cap or adaptor, for this cap may be independently applied to any of the well known flashlights already in use, a metallic sleeve or tubular portion 27 is threaded at its forward end 28 so as to be applicable to the threaded portion of

the skirt 20 in a well-known manner. Projecting inwardly from the rear surface 29 of the cap or adaptor is a metallic neck 30, threaded to accommodate a fuse of the character shown in Figure 2. This fuse comprises a head 31, a lateral or threaded metallic terminal 32, and a central or forward terminal 33. When the fuse is applied to the fuse-testing device, it is simply screwed into the neck 30, an operation which may be performed in an instant with one hand, while the other hand holds the testing device.

Within the cap I provide a spring which extends between the rear surface of the battery and the forward edge of the internally projecting neck 30, and which is normally positioned in this way so that constant electrical connection, as mentioned before, is established between the skirt 20 and the rear surface of the battery. The spring which I provide is therefore in its essence the equivalent, under normal conditions, of the well-known coil spring which is usually provided in the rear removable cap of the ordinary flashlight.

The rear portion of the spring, together with the forward surface or edge of the neck 30 with which the spring is in normal contact, constitutes a normally closed yet breakable circuit portion which is of such a character and construction that when a fuse to be tested is applied to the neck 30, this mere application of the fuse may be made to automatically break this circuit portion and substitute the fuse itself therefor.

In Figure 3 I have illustrated a satisfactory construction of the spring referred to. It is substantially S-shaped, having a forward or upper resilient arm 34 and a rearward or lower resilient arm 35. Extending laterally from the midportion of the S are two supporting arms 36 which serve no other function than to retain the spring in proper position within the device. Thus, I have shown a sleeve 37 of insulating material positioned within the cap and resting against the inner surface of the rear end 29. In the sleeve 37, and diametrically opposite each other, I have provided recesses 38 which are adapted to receive therein the bent ends 39 of the arms 36.

The spring positions itself normally in the position shown in both Figures 1 and 2, the forward arm 34 yieldably pressing against the rear surface 21 of the battery, and the rear arm 35 yieldably bearing against the forward edge of the neck 30. By virtue of the insulating sleeve 37, the spring is insulated from the walls of the cap except by virtue of the contact between the rear portion 35 of the spring and the forward edge of the neck 30. In this normal position, it will be obvious that the device is in perfect condition for normal usage as a

flashlight. When a fuse is applied to the neck 30, however, the forward terminal 33 thereof will encounter the resilient arm 35 of the spring and press it forwardly as indicated by dot and dash lines in Figure 2.

By doing this, the circuit established by the direct contact between the arm 35 and the neck 30 will be momentarily broken and at the same time simultaneously re-established through the fuse itself. Accordingly, if the fuse which is inserted and which presses the arm 35 away from the neck 30 is a good fuse, the normal utility of the device as a flashlight will remain unimpaired. This means that if the switch 22 has been closed so as to light the bulb 15, then the application of an undefective fuse will have absolutely no effect upon the bulb and the latter will remain lit. Moreover, the fuse may be removed and another one substituted therefor without any impairment of the flashlight usage; for as soon as the terminal 33 releases the arm 35, the latter will spring back into its normal contacting relationship with the forward end of the neck 30. In this way, the normal usage of the flashlight will remain absolutely unimpaired in all respects even during the successive application of fuses, provided that such fuses are not defective.

As soon as a defective fuse is applied, the circuit will be broken and the light momentarily extinguished as soon as the forward terminal of the defective fuse encounters the arm 35 and pushes the latter away from the neck 30. The light need not be left in this extinguished condition for more than an instant, however, because the mere fact of its extinguishment has indicated that the fuse is defective, and the latter may be immediately withdrawn and discarded.

It will thus be seen that I have provided a device which is not only extremely simple in its structural nature but which is also of an extremely efficient and valuable character. Its utilization is not limited to fuse testing, and the purchase of batteries therefore is not a waste of money since they may be employed constantly by using the device as a flashlight. Nor is its employment as a fuse tester accompanied by any complicated readjustments or manipulations. The user (for example, the superintendent of a building) will simply go to the fuse chamber or box, furnishing himself with light by normal usage of the device. While holding the lit device in his left hand, he may successively remove the fuses from the chamber and apply them into the neck 30. So long as he applies undefective fuses, his work is continued under unimpaired illumination. The instant he applies a defective fuse, i. e., the one which he is hunting for, the light will extinguish momentarily. He then discards the defective fuse, replaces it with a

good one, and his work is completed. No readjustment is then necessary to render the device continuously and at once usable thereafter as an ordinary flashlight.

It will be understood that the particular construction of the main portion of the device is not a matter which is of essential importance to the present invention, and I do not mean to limit myself to the structure illustrated in the drawings. Similarly, the particular type of spring employed in the removable cap need not be of the S-shaped construction illustrated, but may be of any similar character which fulfills the same functions in the same efficient manner. Furthermore, although I have illustrated a device which is particularly applicable to the testing of threaded fuses of the type illustrated, nevertheless it will be obvious that slight modifications may adapt the device to fuses of different structure, the essence of my invention being directed to a normally closed yet breakable circuit portion which is so constructed that the mere application thereto of a fuse will automatically break said circuit portion and substitute the fuse itself therefor.

In brief, many of the details herein described and illustrated for the purpose of explaining the nature of my invention may be changed by those skilled in the art to suit varying requirements without departing from the spirit and scope of the invention as expressed in the appended claims. It is therefore intended that these details be interpreted as illustrative and not in a limiting sense.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is—

1. As a new article of manufacture, for employment with a flashlight having a removable cap forming part of the electric circuit thereof, a substitute fuse-testing cap provided with means for removably applying it to the flashlight in lieu of the usual cap, said fuse-testing cap having a threaded neck extending thereinto and adapted to receive the threaded terminal of a fuse to be tested, and said cap containing a spring contact yieldably bearing across the inner end of said neck and encounterable by the center terminal of said fuse, said spring contact comprising an S-shaped resilient element medially supported by the walls of the cap.

2. For employment with a flashlight having a casing and a battery therein, a fuse-testing cap provided with means for removably attaching it to the said casing, said cap comprising an externally accessible fixed contact for the accommodation of one terminal of an exteriorly applied fuse, and a spring contact within said cap and encounterable by the other terminal of said ap-

plied fuse, said spring contact normally pressing against said fixed contact and being adapted to press against the rear surface of said battery when the cap is attached to said casing.

3. A portable flashlight having combined therewith a testing device, comprising a casing, a light bulb, a battery, and a pair of relatively movable contacts normally held together, all of said members being in circuit in series and mounted in fixed relation to each other, whereby insertion of a fuse between said pair of contacts so that the terminals of the fuse contact respectively with the said contacts separates the said contacts and inserts the fuse in said circuit, whereby the flashlight may be operated as such when no fuse is inserted or when an undefective fuse is inserted, and whereby insertion of a defective fuse prevents operation of the flashlight and thereby indicates the defect.

4. A portable flashlight having combined therewith a testing device, comprising a casing, a light bulb, a battery, a switch, and a pair of relatively movable contacts normally held together, all of said members being in circuit in series and mounted in fixed relation to each other, whereby insertion of a fuse between said pair of contacts so that the terminals of the fuse contact respectively with the said contacts separates the said contacts and inserts the fuse in said circuit, whereby the flashlight may be operated as such by manipulation of said switch when no fuse is inserted or when an undefective fuse is inserted, and whereby insertion of a defective fuse prevents operation of the flashlight and thereby indicates the defect.

5. A fuse testing flashlight comprising the usual flashlight casing, a battery and light bulb within said casing, a switch, all in a series circuit openable and closeable by said switch, an opening in said casing, two normally contacting and spreadable contacts within said casing and easily accessible from the outside of said casing at said opening for contacting with the terminals of the conducting part of the fuse to be tested, said spreadable contacts normally forming a part of said circuit when no fuse is inserted between them and adapted to be spread by the insertion of a fuse to be tested between them, whereby the flashlight may be operated as such by operation of said switch when no fuse is inserted in said opening and when an undefective fuse is inserted therein but not when a defective fuse is inserted therein.

6. A fuse testing flashlight comprising the usual flashlight casing, a battery and light bulb within said casing, all in a series circuit, an opening in said casing, two normally contacting and spreadable contacts with-

in said casing and easily accessible from the outside of said casing at said opening for contacting with the terminals of the conducting part of the fuse to be tested, said spreadable contacts normally forming a part of said circuit when no fuse is inserted between them and adapted to be spread by the insertion of the fuse to be tested between them, whereby the flashlight may be operated when no fuse is inserted in said opening and when an undefective fuse is inserted therein but not when a defective fuse is inserted therein.

7. A fuse testing flashlight comprising the usual flashlight casing, a battery, a light bulb within said casing, and a switch, all in a series circuit openable and closable by said switch, an opening in said casing, a receptacle within said casing for mechanically and electrically accommodating a fuse to be tested and easily accessible from the outside thereof at said opening, said receptacle comprising one of two normally contacting and spreadable contacts for contacting with the terminals of a fuse to be tested, said spreadable contacts forming a part of said circuit when no fuse is inserted in said receptacle and adapted to be spread by the insertion of a fuse in the receptacle, whereby the flashlight may be operated as such when no fuse is within the receptacle and when an undefective fuse is therein but not when a defective fuse is therein.

8. A fuse testing flashlight comprising the usual flashlight casing, a battery, and a light bulb within said casing all in a series circuit, an opening in said casing, a receptacle within said casing for mechanically and electrically accommodating a fuse to be tested and easily accessible from the outside thereof at said opening, said receptacle comprising one of two normally contacting and spreadable contacts for contacting with the terminals of a fuse to be tested, said spreadable contacts normally forming a part of said circuit when no fuse is inserted in said receptacle and adapted to be spread by the insertion of a fuse in the receptacle, whereby the flashlight may be operated as such when no fuse is within the receptacle and when an undefective fuse is therein but not when a defective fuse is therein.

9. For use with an ordinary flashlight having the usual casing and removable cap portion forming parts of a series circuit which includes the usual bulb and battery; a fuse testing device adapted to be substituted mechanically and electrically for said cap portion and comprising a container attachable to the flashlight casing in lieu of the removable cap portion thereof, an opening in said container, a normally closed yet breakable circuit portion within said container and at said opening easily accessible from the outside of said container and

which is so constructed and arranged that the mere application of a fuse thereto will automatically break said circuit portion and substitute the fuse itself therefor.

5 10. For use with an ordinary flashlight having the usual casing and removable cap portion forming parts of a series circuit which includes the usual bulb, battery, and switch; a fuse testing device adapted to be substituted mechanically and electrically for
10 said cap portion and comprising a container attachable to the flashlight casing in lieu of the removable cap portion thereof, an opening in said container, a normally closed yet
15 breakable circuit portion within said container and at said opening and easily accessible from the outside of said container and which is so constructed and arranged that the mere application of a fuse thereto will
20 automatically break said circuit portion and substitute the fuse itself therefor.

11. For use with an ordinary flashlight having the usual casing and a removable portion forming parts of a series circuit
25 which includes the usual bulb and battery; a fuse testing device adapted to be substituted mechanically and electrically for said removable portion and comprising a container attachable to the flashlight casing in lieu
30 of said removable portion, an opening in said container, two normally contacting and spreadable contacts within said container and easily accessible from the outside of said container at said opening for contacting with
35 the terminals of the fuse to be tested, said spreadable contacts normally forming a part of said circuit when no fuse is inserted between them and adapted to be spread by the insertion of a fuse therebetween, whereby
40 the flashlight may be operated as such when no fuse is inserted within the receptacle and when an undefective fuse is inserted therein, but not when a defective fuse is inserted therein.

45 12. For use with an ordinary flashlight having the usual casing and a removable portion forming parts of a series circuit which includes the usual bulb and battery; a fuse testing device adapted to be substituted mechanically and electrically for said removable
50 portion and comprising a container attachable to the flashlight casing in lieu of said removable portion, an opening in said container, a receptacle within said casing for mechanically and electrically accommodating
55 a fuse to be tested and easily accessible from the outside thereof at said opening, said receptacle comprising one of two normally contacting and spreadable contacts for contacting with the terminals of a fuse to be
60 tested, said spreadable contacts forming a part of said circuit when said testing device is applied to the flashlight and when no fuse is inserted in said receptacle, said spreadable
65 contacts being adapted to be spread by the

insertion of a fuse in the receptacle, whereby the flashlight may be operated as such when no fuse is within the receptacle and when an undefective fuse is therein, but not when a defective fuse is therein.

13. For employment with a flash light comprising a casing and a battery therein, a fuse testing portion provided with means for removably attaching it to said casing, said portion comprising an externally accessible fixed contact for the accommodation of one terminal of an exteriorly applied fuse, and a spring contact within said portion and encounterable by the other terminal of said applied fuse, said spring contact normally pressing against said fixed contact and being adapted to press against the rear surface of said battery when said portion is attached to said casing.

14. A combined flashlight and fuse tester, comprising a casing, an electric lamp, a source of electric energy, a circuit closer, a circuit including said casing, lamp, source, and circuit closer, a member adapted to receive and hold a device to be tested serving normally to complete said circuit when said circuit closer is actuated, said member serving to break the circuit between said source of electric energy and said casing, and to establish a circuit connection between said source of electric energy and said casing through said device to be tested when the latter is disposed within said member, substantially as specified.

15. A combined flashlight and fuse tester, comprising a casing, an electric lamp, a source of electric energy, a circuit closer, a circuit including said casing, lamp, source, and circuit closer, means serving normally to complete said circuit when said circuit closer is actuated, and to receive and hold a device to be tested; said device serving to break the circuit between said source of electric energy and said casing and to establish through said device a circuit connection between said source of electric energy and said casing, substantially as specified.

16. A combined flashlight and fuse tester, comprising a casing, an electric lamp, a source of electric energy, a circuit closer, a circuit including said casing, lamp, source, and circuit closer, a member mounted in said casing serving normally to complete said circuit when said circuit closer is actuated, and adapted to receive and hold a device to be tested, said device serving to break the normal circuit between said source of electric energy and said casing, and to establish through said device a circuit connection between said source of electric energy and said casing, substantially as specified.

17. A combined flashlight and fuse tester, comprising a casing, an electric lamp, a source of electric energy, a circuit closer, a circuit including said casing, lamp, source,

and circuit closer, and a member mounted in said casing normally forming an electric connection between said source of electric energy and said casing, said member being adapted to receive and hold a device to be tested, said device engaging electrically with said source of electric energy and said member and serving to break the normal electrical connection existing between said source of electric energy and said member, substantially as specified. 10

In witness whereof I have signed this specification this 24 day of October, 1927.

WILLIAM J. SHORE.