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INDICATOR FOR FUSES

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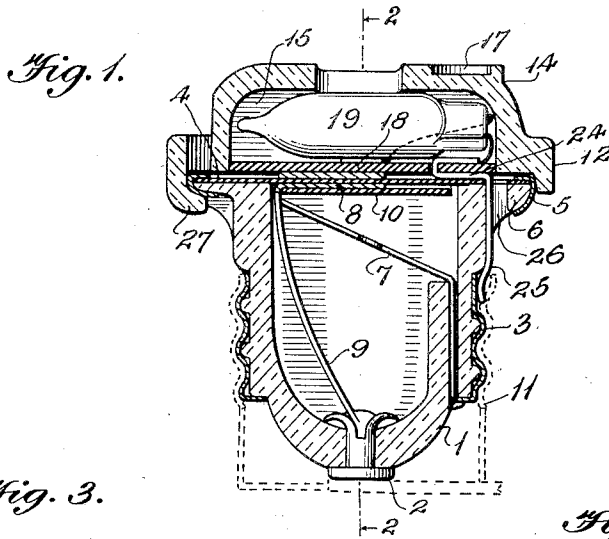


Fig. 3.

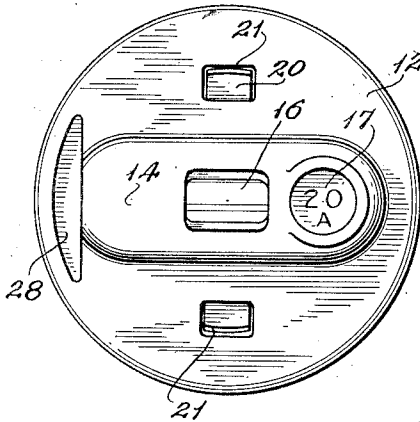


Fig. 2.

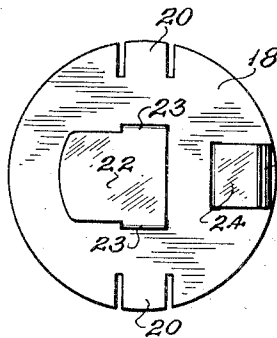
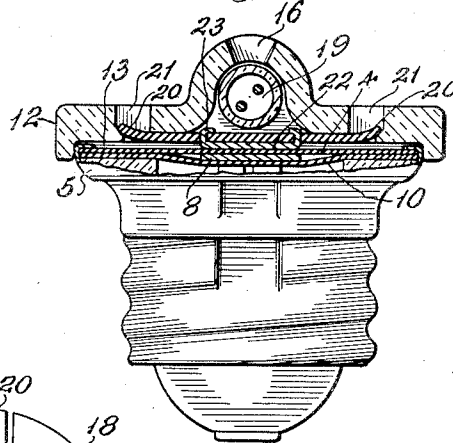
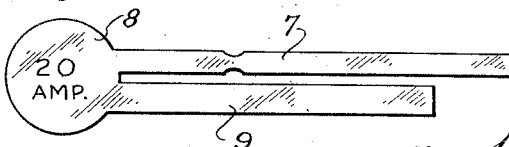


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE

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INDICATOR FOR FUSES

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4 Claims. (Cl. 200—121)

The present invention relates to means for visibly indicating the operating condition of electrical circuit breakers and more particularly to a fuse integrity indicator for fuses of the plug type.

The visible indicator employed consists of a small neon glow lamp containing a low potential mixture of inert gases and a pair of spaced electrodes capable of being electrically connected to alternating or direct current circuits. These glow lamps will strike between 50 and 90 volts but having an essentially constant voltage drop regardless of current values, it is necessary to employ a very high impedance so that they will continue to glow through capacity effect even after the circuit to which they are applied is opened. To connect indicators of this type to a conventional plug fuse, it has been heretofore necessary to materially change the design and construction of the fuse casing and therefore, it is an object of the present invention to provide an indicator attachment for a standard plug fuse which may be easily and readily connected thereto or removed therefrom when the fuse becomes blown or ruptured in order that the indicator may be reused.

A still further object of the present invention is to provide a combined fuse and fuse integrity indicator of the refillable type which will have substantially the same external dimensions as that of a standard refillable plug fuse without materially increasing the cost thereof in order to render the same commercially desirable.

And still a further object of the present invention is to provide a combined fuse and fuse integrity indicator therefor whereby the fuse may be used with or without the indicator and the indicator may be readily connected to the terminals of the fuse when used in conjunction therewith and when applied within the threaded socket of the cut-out base, the indicator will be retained upon the fuse in a locked condition so that the indicator cannot be removed from the fuse until after it has been removed from its cut-out base.

Other objects of the invention will be in part obvious and in part pointed out hereinafter.

In order that the invention and its mode of operation may be readily understood by persons skilled in the art, I have in the accompanying illustrative drawing and in the detailed following description based thereupon, set out an embodiment of the same.

In the drawing:

Figure 1 is a vertical section through my improved fuse and fuse integrity indicator.

Figure 2 is a side elevation of the same showing a portion thereof in section.

Figure 3 is a top plan view of the indicator attachment.

Figure 4 is a bottom plan view of the separator or supporting plate of the indicator, and

Figure 5 is a plan view of the combined fusible element and conductor illustrating its design and construction before being applied to a fuse.

Referring now more particularly to the accompanying drawing wherein like and corresponding parts are designated by similar reference characters throughout the several views, the numeral 1 indicates the fuse casing which is an open ended shell molded from suitable insulating material such as porcelain having a rivet 2 secured in the lower portion thereof, which provides a central contact terminal of the fuse. The other contact terminal of the fuse consists of the conventional threaded brass shell 3 which extends about the casing 1 in the usual manner. The upper opened end of the fuse casing is closed by means of a mica window 4 and this mica window is retained in place thereupon by means of the usual brass ring 5 which is crimped about the annularly extending shoulder or bead 6 of the fuse casing 1.

The fusible element 7 has one end connected to the terminal 3 and its opposite end connected or formed with an enlarged disc 8. A branch 9 is also formed with the disc 8 and has its free end connected in the usual manner to the rivet 2 whereby the circuit will be completed between the terminals 2 and 3 and should an overload or short circuit occur in the electrical circuit to which the fuse is applied, the fuse element 7 will become blown or ruptured in the usual manner for breaking the electrical circuit. The parts indicated by the numerals 7, 8 and 9 may all be stamped from a single piece of zinc or other fusible material in the manner as shown in Figure 5 of the drawing but the conductor member 9 should be of greater width than that of the fuse link 7 in order that the fuse link 7 may become blown or ruptured and yet permit the conductor 9 to remain intact.

In order to retain the disc 8 closely adjacent the underside of the mica window 4, I support the same by means of a support 10 preferably made of mica and which latter extends across the opened upper end of the casing 1 and secured thereto by means of the crimped fastening element or ring 5. A fuse constructed in

accordance with the above is of the conventional type with the exception of supporting one portion of the fuse link adjacent the underside of the mica window 4 and accordingly, it may be used as a circuit breaker when applied within the threaded socket 11 of the standard cut-out base.

When it is desired to use a visible indicator for plug fuses of the aforesaid type, I provide an attachment therefor which comprises a casing preferably molded from Bakelite or similar insulating material. This casing consists of a base portion 12 which is preferably of a circular construction having a recess 13 in the underside thereof which is capable of being placed over the outer upper end of the fuse. An enlarged dome-shaped portion 14 is also formed with this casing, extending diametrically across the center thereof and forming an elongated recess 15 which establishes a lamp compartment and in this dome-shaped portion 14 is formed a sight opening 16 which latter communicates with the lamp compartment 15. The upper face of this dome-shaped portion 14 may have a recess 17 formed therein in which may be arranged suitable markings for the attachment such as the rating in amperes and volts of the fuse to which the indicator attachment is to be applied.

A fibre disc 18 is also employed which provides a support for the lamp 19 and retains the latter within the lamp compartment 15. In order to effect a connection between this disc 18 and the indicator casing, I strike from the marginal edges thereof the tongues 20 which are capable of being seated within the recesses or openings 21 formed within the casing.

A contact plate 22 is positioned upon the underside of this disc 18 and has a pair of lip projections 23 which extend through the disc 18 and crimped thereupon in order to retain this contact plate 22 upon the underside of this disc. Another contact member 24 is employed which has one end secured to the disc 18 by crimping in the manner as better illustrated in Figure 1 and its opposite end 25 extending downwardly from the disc 18. One of the electrodes of the lamp 19 is connected to the plate 22 whereas the other electrode of the lamp is electrically connected to the spring clip 25. The only material change required in the fuse casing 1 in order that this attachment may be applied thereto is the drilling of an opening 26 therein through which may extend the spring contact member 25 so that the latter may have engagement or contact with the threaded contact terminal 3 of the fuse. A hook projection 27 is also formed with one edge of the casing 12 in order that it may have a locking engagement with the bead 6 of the fuse casing. An opening 28 is formed within the casing 12 in order that this hook 27 may be formed during the molding of the indicator casing. By this arrangement, it is quite obvious that by hooking the projection 27 over the beaded edge 6 of the fuse casing and inserting the spring contact 25 through the opening 26 of the casing that the indicator attachment may be secured to the fuse casing and yet be readily removed therefrom when desired. When placing the fuse within a standard threaded socket 11 of the cut-out base, the spring clip 25 is locked between the threaded shells 3 and 11 so as to prevent the indicator from being removed from the plug fuse when once applied to an electrical circuit in which the cut-out base is included, making it necessary to at all times require the operator to first remove the plug fuse

from its cut-out base before applying to or detaching the indicator from the fuse.

When the indicator attachment is so applied to the fuse, the contact plate 22 is positioned directly above the contact disc 8 but the plate and disc are separated by means of the mica 4, thereby producing a small condenser of a separable construction, one part of which, that is, the plate 22 is carried by the indicator and the other separable parts, that is, the metal plate 8 and the dielectric 4 are carried by the fuse casing.

The capacity of this condenser of course is proportional to the area of the metal plates 8 and 22 and inversely proportional to the thickness of the dielectric 4, but in any event, the current leakage therethrough should be very nearly infinitesimal or only sufficient to cause the lamp 19 to glow and yet protect any delicate electrical appliances which may be included in the electrical circuit.

From the foregoing, it will be quite obvious that should a short circuit or overload occur in the electrical circuit as would cause the fuse link 7 to become blown or ruptured that sufficient current will be directed to the lamp 19 to first cause the same to strike or glow and due to the high impedance or condenser employed, this lamp will continue to glow and give off a visible indication that the electrical circuit has been rendered inoperative due to the blown condition of the fuse link 7.

When a fuse becomes blown or ruptured, it may be removed from its threaded socket 11 and the indicator detached therefrom. In detaching the indicator from the fuse, the operator may lift one edge thereof so as to withdraw the spring contact through the opening or slot 26 whereby the hook 27 may be released. The blown fuse may then be discarded and the indicator attached to a new or operative fuse by simply hooking the member 27 over the beaded upper edge of the fuse and inserting the spring contact 25 through the slot 26 until it engages or contacts the terminal 3. By placing this new fuse within the threaded socket 11, a new connection is established and if the spring clip 25 is wedged between the contacts 3 and 11, the indicator cannot be removed until the fuse plug is again removed from its threaded socket.

Manifestly, the construction herein shown is capable of considerable modification and such modifications as come within the scope of my claims, I consider within the spirit of my invention.

I claim:—

1. An indicator attachment for fuses comprising a casing having a lamp compartment formed therein, a partition for closing said lamp compartment, means for connecting said partition to said casing, a lamp carried by said partition and adapted to be arranged within said lamp compartment, a contact plate secured to and carried by said partition, a spring contact member carried by said partition, means for electrically connecting said spring contact member and said contact plate to said lamp and a hook member formed with said casing.

2. A combined plug fuse and detachable indicator therefor comprising a casing, a pair of spaced contact terminals carried by said casing, a fuse link arranged within said casing and connected to said terminals, a projection formed with said fuse link, a mica plate carried by said casing and extending over said projection, a metal plate removably supported upon said mica plate, a glow

lamp, means for electrically connecting said glow lamp with said removably supported metal plate and one of said contact terminals.

5 3. A fuse plug comprising a casing having an open ended recess formed therein, a pair of spaced contact terminals arranged about said casing, a fuse link supported within said casing and having its opposite ends connected to said contact terminals, a partition supported within
10 said casing, a projection formed with said fuse link and adapted to rest upon said partition, a mica window for closing the opened end of said recess and resting upon the extension formed with said fuse link, a glow lamp indicator hav-
15 ing a pair of electrodes, a metal contact plate electrically connected to one of said electrodes and capable of contacting said mica window directly above said extension formed with said fuse link and means for electrically connecting the
20 other of the electrodes of said lamp to one of said contact terminals.

4. A plug fuse comprising a hollow casing, a central contact mounted within said casing, a threaded contact shell surrounding said casing,

a fuse link arranged within said casing and being electrically connected to said central contact and said threaded contact shell, an annular bead formed with the opened upper end of said casing, an enlarged projection formed with said fuse
5 link, a partition arranged upon said annular bead of the casing and having the enlarged projection of said fuse link resting thereupon, a mica disc supported upon the annular bead of the fuse casing and contacting said enlarged projection
10 of the fuse link, an auxiliary casing, a hook formed with said auxiliary casing and capable of engagement about said annular bead, a glow lamp indicator arranged within said casing, a contact
15 plate carried by said auxiliary casing and adapted to rest upon said mica window directly above the enlarged projection of said fuse link, a spring clip carried by said auxiliary casing and adapted to extend through an opening formed within
20 said annular bead whereby it may contact said threaded contact shell and means for electrically connecting said glow lamp with said contact plate and said spring clip.

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