CARTRIDGE FUSE HOLDER AND INDICATOR WITH ECCENTRICALLY MOUNTED CONTACT
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This invention relates to a new and useful screw plug type cartridge fuse holder and indicator adapted to be screwed or otherwise rotatably engaged into a socket such as a fuse socket or lamp-type socket. This is a continuation-in-part application of my application filed November 13, 1959, Serial No. 852,914, now United States Patent 3,047,695.

The fuse holder and indicator of this invention serves a number of purposes. It serves to hold and support a cartridge-type fuse so that when the holder is screwed into a socket, the fuse socket and holder serve the same purpose as an ordinary screw plug type of fuse. Also, the subject of this invention serves as an indicator to indicate when the cartridge-type fuse has been blown. This is accomplished by providing the fuse holder with a small neon bulb and appropriate electrical connections to the blown condition of the cartridge-type fuse. The cartridge-type fuse may be readily removed when blown or when it is desired to replace it with a different type of fuse. Thus, the fuse holder and indicator of the present invention is a permanent item, the life of which is only dependent on the life of the neon bulb which is good for many thousands of hours of operation. Since the neon bulb glows or is in operation only when the fuse is blown, it will be seen that the holder and indicator has an indefinite life for practical purposes.

Fuse holders of the type described above contain a central axially extending well for the reception of the cartridge-type fuse. A detachable setscrew contact is threaded into the inner end of the fuse holder, and this contact engages one end terminal of the cartridge-type fuse, holding the same in place in the fuse holder. Whenever an overload condition occurs, blowing the cartridge-type fuse, the setscrew contact may become fused to the central contact in the socket which receives the fuse holder. Accordingly, when the fuse holder is unscrewed from the socket after this condition occurs for replacement of the cartridge-type fuse, the small setscrew contact remains in the socket. This separation of the setscrew contact from the fuse holder occurs even if a threaded connection is used between it and the fuse holder, since rotation of the holder during its removal merely results in unscrewing the setscrew contact from its seat in the inner end of the fuse holder. Whenever this small setscrew contact becomes fused to the socket, a long shut-down period is required before this contact can be removed. This results in long delays and inefficient operation of the system of which the fuse is a component part.

Quite often the setscrew contact itself is damaged during its removal from the socket necessitating replacement of this part or the discarding of the entire cartridge fuse holder. Also, this fusing of the contact creates a hazardous condition for those responsible for correcting the situation.

Accordingly, it is a principal object of this invention to provide a cartridge fuse holder and indicator having means for ensuring a positive separation of the setscrew contact from the fuse holder socket during removal of the fuse holder after an overload condition has occurred.

Another object of this invention is the provision of a screw plug type cartridge fuse holder and indicator of the kind described which is foolproof, versatile in use, and formed of mass produced, low-cost components which may be readily assembled.
shell contact 9 by a conductor 20 which is attached to the conductor 15 by a soldered connection 21.

It may be desirable to place a resistor 22 in a series circuit relationship in the conductor 19. These miniature resistors 22 may be obtained commercially at any desired rating, such as between 50,000 and 250,000 ohms. If the cartridge fuse holder and indicator 1 is to be used in circuits where the voltage does not exceed 24 volts, for example, it will usually be unnecessary to provide a resistor 22. The use of a miniature neon bulb 17 of a type that will have a long life at such voltages is all that is required. On the other hand, if the cartridge fuse holder and indicator is to be used in circuits where the voltage is, say 115 or 220 volts, then it will usually be more economical to insert a miniature resistor 22 of the proper rating in the conductor 19 thereby protecting the neon bulb and obtaining the full life thereof.

It will be seen that all of the components of the fuse holder and indicator of this invention may be mass produced at low cost. In fact, such a component as the screw shell contact 9, the female support 12, the contact 13, the neon bulb 17, the resistor 22 and the cartridge fuse 7 are standard components or items which can be procured on the open market. Therefore, the body 2 and the washer 11 are the only special parts, and these parts may be readily manufactured with little expense as by injection molding in multiple-cavity molds from a suitable plastic such as polystyrene, phenolformaldehyde, etc.

Referring to FIG. 3, a source of alternating current, such as 115 volts, is indicated at 25 with a pair of conductors 26 and 27 leading therefrom to a load diagrammatically indicated at 28. The cartridge fuse holder and indicator 1 of FIGS. 1 and 2 is indicated in circuit relationship in conductor 27. That is, the cartridge fuse is indicated at 7 and the neon bulb indicated at 17. As long as the fuse 7 is not blown, it provides a shunt or short across the neon bulb 17 so that no potential is impressed across the grids or electrodes within the gas filled envelope. Hence, the bulb does not glow. However, if the cartridge fuse 7 blows or fails for any other reason, a potential will be impressed on one of the grids and the gas within the bulb will be ionized and glow with the ions draining off to the ground through an opposite grid electrode. The glowing of the neon bulb 17 then tells one that the cartridge fuse 7 has blown and that the same requires replacement.

As mentioned above, when an overload condition occurs in the circuit blowing the cartridge-type fuse, the set-screw contact of the fuse holder may become fused to the contact which is part of the socket that receives the fuse holder. In other words, the exposed end of the contact 13 becomes adhered to the contact in the fuse holder socket. In the fuse holder of this invention the contact 13 is eccentrically mounted with respect to a central axis extending through the cylindrical plug body. Accordingly, when the plug body 2 is rotated for removal of the same from its socket, the contact 13 itself will rotate in a circular path about the central axis of the cylindrical plug body. This movement provides a shearing force producing a clean separation between the exposed end of the contact 13 and the contact 13 in the fuse holder socket. It should be realized that it is not necessary to provide a threadable connection between the female support member 12 and the setscrew contact 13. A simple frictional engagement between the two members is satisfactory. Because of the eccentric mounting of the contact 13, there is no tendency for it to remain in the fuse holder socket upon removal of the fuse holder from the same.

Thus it will be seen that by this invention a fuse holder and indicator has been provided which will ensure a positive separation of the setscrew contact from the fuse holder socket during removal of the fuse holder after an overload condition has occurred. The device is inexpensive to manufacture and is quite durable in operation.

While the invention has been shown in but one form it will be obvious to those skilled in the art that it is not so limited, but rather it is susceptible of various changes and modifications without departing from the spirit and scope of the appended claims.

What is claimed is:

1. A screw plug-type cartridge fuse holder comprising, a generally cylindrical hollow plug body formed of insulating material and having one end thereof closed, a screw shell contact secured to the other end of said body, means at said other end of said body for substantially closing the same, a cylindrical contact supported by said means with the longitudinal central axis of the contact in eccentric relation with the longitudinal central axis of said body, a fuse in said body in axially extending relation therewith, said contact having the inner end thereof in engagement with one end of said fuse for holding the latter in said body and said contact having the outer end thereof exposed for engagement with a conducting member in a fuse holder socket, the outer end of said contact being substantially circular and in concentric relation with the longitudinal central axis of the contact, whereby said contact is caused to orbit upon rotation of said body about its longitudinal central axis.

2. A screw plug-type cartridge fuse holder comprising, a generally cylindrical hollow plug body formed of insulating material and having one end thereof closed, a screw shell contact secured to the other end of the body and having an inwardly extending annular flange, an insulating washer secured over the other end of said body by said annular flange, which washer has an opening therein with the central axis of the opening in eccentric relation with the longitudinal central axis of said body, a fuse axially disposed in said body in alignment with said fuse opening, an internally threaded sleeve fitted in said opening, and a cylindrical contact threadingly secured in said sleeve, which contact has the inner end thereof in engagement with one end of said fuse for holding the latter in said body and which contact has the outer end thereof exposed for engagement with a conducting member in a fuse holder socket, the outer end of said contact being substantially circular and in concentric relation with the longitudinal central axis of the contact, whereby said contact is caused to orbit upon rotation of said body about its longitudinal central axis.

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BERNARD A. GILHEANY, Primary Examiner,