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W. C. LINTON

2,206,786

INDICATING PLUG FUSE

Filed March 6, 1939

Fig. 1.

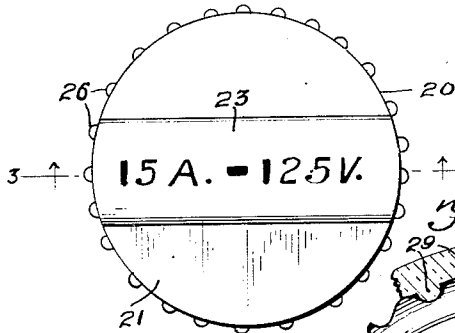


Fig. 2.

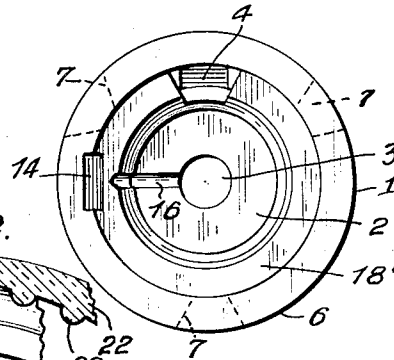


Fig. 12.

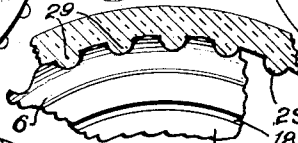


Fig. 3.

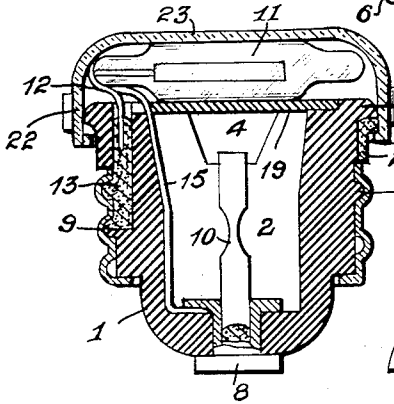


Fig. 5.

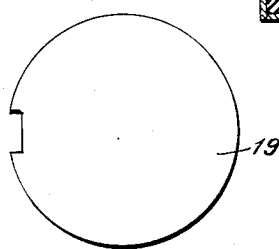


Fig. 4.

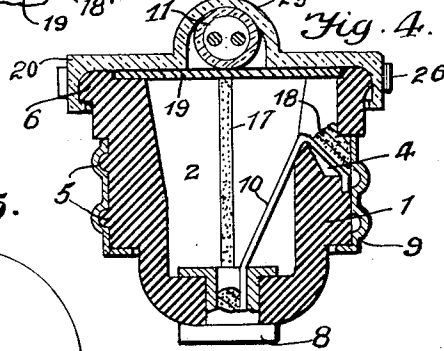


Fig. 7.

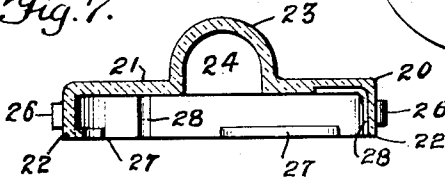


Fig. 8.

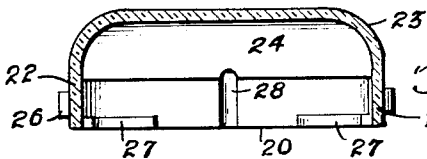
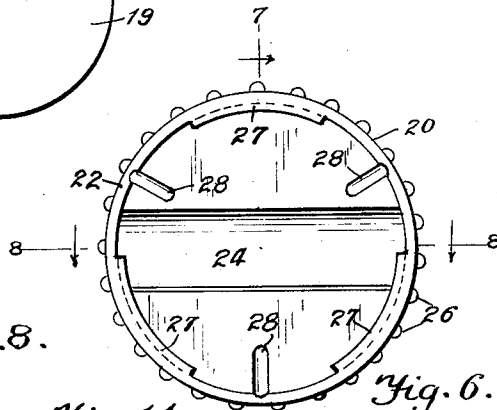


Fig. 6.

Fig. 11.

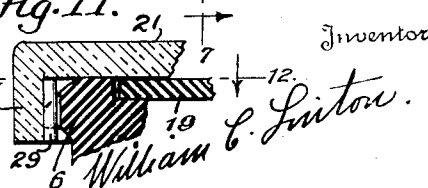


Fig. 9.

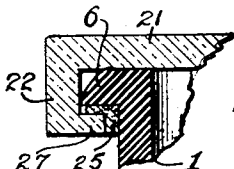
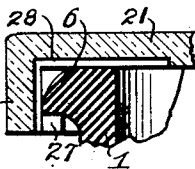


Fig. 10.



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UNITED STATES PATENT OFFICE

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INDICATING PLUG FUSE

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Application March 6, 1939, Serial No. 260,161

5 Claims. (Cl. 200—121)

The present invention relates to plug type fuses for electrical circuits capable, upon the rupture of the fuse link or elements thereof, of giving or emitting a visible signal or indication and an object of the invention is to provide a cap or cover for housing such indicators which may be easily and economically applied to the casings of many of the conventional plug type fuses for reducing the cost associated with the manufacture and assembly thereof and when applied, will readily designate the amperage ratings of the fuse and yet permit the signal to be rendered visible when the fuse link or elements blow or become ruptured due to a short circuit within the electrical circuit.

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 drawing and in the detailed following description based thereupon, set out an embodiment of the same.

In the drawing:

Fig. 1 is a top plan view of the fuse embodying the present invention.

Fig. 2 is a top plan view of the fuse casing.

Fig. 3 is a vertical transverse section taken on the line 3—3 of Fig. 1 in the direction of the arrow points.

Fig. 4 is a vertical transverse section of the fuse taken at right angles to that shown in Fig. 3.

Fig. 5 is a plan view of the separator disc.

Fig. 6 is a bottom plan view of the cap or cover for the fuse.

Fig. 7 is a vertical transverse section through the cap taken on the line 7—7 of Fig. 6 in the direction of the arrow points.

Fig. 8 is another vertical transverse section of the cap or cover taken on the line 8—8 of Fig. 6 in the direction of the arrow points.

Fig. 9 is an enlarged detail section illustrating a connection between the cap or cover and the fuse casing.

Fig. 10 is another detail section.

Fig. 11 is a detail section illustrating a slightly modified form of a connection that may be employed between the cover and the fuse casing, and

Fig. 12 is a detail section taken on the line 12—12 of Fig. 11 in the direction of the arrow points.

Referring now more particularly to the drawings wherein like and corresponding parts are designated by similar reference characters

throughout the several views, there is herein shown a cup-shaped casing 1 molded from porcelain or other insulating material having an explosive chamber 2 formed therein with its upper end open and its lower end communicating with an opening 3. A vent opening 4 is formed within the casing having communication with this explosive chamber 2 and the outer side or face of the casing. Molded with the outer surface of the casing are screw threads 5 and an annular flange 6. The lower edge of this annular flange 6 has the equally spaced recesses 7 formed therein.

Seated within the opening 3 is a rivet 8 forming the central contact terminal of the fuse and engaging the threads 5 is a threaded contact shell 9. A fuse link 10 has one end soldered to the rivet 8 and its opposite end extending through the vent opening 4 where its extremity is retained in electrical contact with the shell 9.

A conventional plug type fuse for lighting systems of other electrical circuits, as above described, usually employs a mica disc for covering the upper opened end of the casing 1, providing a window, whereby, upon close examination, one may look through such mica disc to determine the condition of the fuse link 10 housed within the fuse casing 1. In order to more readily and positively determine the condition of this fuse link 10, I employ a miniature neon glow lamp which is connected in series with the terminals 8 and 9 but in parallel with the fuse link 10 so that in normal operation, the current will flow through the fusible link 10, but should this link 10 become blown or ruptured, the current will pass through the lamp 11, causing the latter to emit a visible signal for announcing the inoperative condition of the fuse link.

This lamp rests horizontally upon the upper outer face of the casing 1 and has a lead wire 12 connected to the contact shell 9 by means of a leak resistance 13. This leak resistance 13 preferably consists of a plastic composition inserted within a cavity 14 formed within the casing 1. The other lead wire 15 of the lamp is seated within a groove 16 formed in the casing 1 and has its outer extremity electrically connected to the rivet 8. This wire conductor 15 is covered by means of plastic cement 17 in order that the same may be retained within the groove 16 and further be protected from the molten metal that is sometimes given off by the blowing of the fuse link 10, which would likely damage the wire 15 and thereby interfere with the successful

operation of the lamp. Also, a small amount of plastic cement may be inserted within the vent opening 4 as at 13 for sealing the same against dust, lint and the like entering the explosive chamber 2 of the fuse casing, which would likely cause damage to the fuse when the fusible link blows.

The upper end of the casing 1 is provided with an annular groove 18' in which is loosely seated a disc 19 of fiber or other suitable material having fire-resisting qualities and which disc acts as a separator as well as a protector for the lamp 11 against the molten metal or hot gases given off by the blowing of the fuse link 10, which would likely discolor the glass tube of the lamp or in any other manner interfere with the operation thereof.

In order to seal the upper opened end of the casing 1 and properly retain the lamp 11 thereupon, I provide a cap or cover 20 which consists of a transparent or translucent material whereby the light rays from the lamp 11 may be projected therefrom and rendered visible from the exterior of the cover.

This cover is preferably molded from thermo-setting molding materials such as Bakelite but could be molded from other transparent materials such as glass and Pyrex or from thermoplastic molding materials such as casein, cellulose acetate derivatives, polymerized derivatives of methacrylic acid and the like.

This cover comprises a disc-shaped body portion 21 having depending from its outer edges an annular flange 22 and a bulged portion 23 extending diametrically across the body portion 21, which latter provides a compartment 24 in which is housed the lamp 11. The lower face of the disc portion 21 of the cover rests upon the upper outer face of the annular flange 6 of the casing 1 and the flange portion 23 of the cover extends about the outer side wall of the flange 6 and may be connected thereto by means of a plastic cement 25. This plastic cement 25 is inserted between the flange 23 and the outer face of the flange 6 of the casing 1 at several points, whereby, a portion of the plastic material will also be seated within the recesses 7 formed in the underside of the flange 6, thereby preventing the rotation or removal of the cover 20 from the casing 1. This plastic material being applied only at spaced intervals between the recesses 7 permits the gases under pressure to escape from the explosive chamber 2 between the cover and the casing at such points where the plastic cement is not applied.

The outer face of the bulged portion 23 of the cover may have molded or otherwise placed thereupon the volt and amperage ratings of the fuse to which the cover is applied such as designated by 15 a.—125 v. Also, the outer face of the flange 22 of the cover has formed therewith serrations 26 or other suitable projections which would facilitate the turning of the fuse into and out of its fuse socket.

This cover 20 is preferably formed from transparent or translucent materials in order that the rays of light from the lamp may project there-through and these transparent or translucent materials may be prepared in various colors so that a colored top may be employed for designating the particular amperage rating of the fuse and, further, a colored light will be visible when the fuse link 10 blows for not only signalling the blown condition of the fuse, but for visibly designating the amperage rating of the fuse. The

separator disc 19 being opaque, hides from view the interior of the casing as well as the fuse link 10 but the upper face of this disc 19 may have a suitable reflecting surface, especially that portion thereof which is placed directly below the lamp 11.

In the event the vent opening 4 is closed by means of the plastic cement 18 and the fuse link 10 is blown, the gases under pressure arising from the blown fuse will cause the disc 19 to be raised from its seat or groove 18', whereby the gases may escape by the disc and between the cover and the annular flange 6 of the casing to the atmosphere. This retarded exit of the gases under pressure or the flame given off by the blowing of the fuse link 10 will prevent any inflammable material that may be placed about the fuse from becoming ignited.

In addition to fastening the cover upon the fuse casing by means of the plastic cement 25, I employ a snap fit between the cover and the casing to which it is applied by forming with the lower edges of the flange 22 of the cover inwardly projecting ribs 27. In the drawing, I have illustrated three inwardly projecting ribs 27 but a single rib may be employed and which rib or ribs may be forced over the upper bevelled face of the annular flange 6 until they pass below the lower edge of the flange 6 where they will snap by this lower edge and be seated below the lower face of the flange 6, thereby preventing the cover from being withdrawn from the casing 1. By the application of the plastic cement between the flange 22 of the cover and the recesses 7 of the casing, the cover will be prevented from rotating upon the casing. When the casing is molded from plastic molding materials, it has sufficient resiliency to permit the flange 22 of the casing to give, in order that the ribs 27 may be forced over the outer face of the flange 6 of the casing 1. The inner face of the disc portion 21 and flange 22 of the cover may have L-shaped grooves 28 formed therein which act as vents for permitting the gases under pressure arising from the explosive chamber 2 to escape in a retarded manner by the cover into the atmosphere.

In the modification as illustrated in Fig. 11 of the drawing, the outer wall of the annular flange 6 of the casing 1 has formed therein a plurality of vertically extending grooves or recesses in which are seated correspondingly formed ribs 29 projecting from the inner face of the flange 22 of the cover, in order that the cover, when being applied to the casing, will be prevented from rotating thereupon, due to the geared connection that is effected by the ribs 29 extending through the recesses formed within the annular flange 6.

The interior diameter of the flange 22 should be slightly less than the exterior diameter of the annular flange 6 in order that a wedged connection can be effected between the cover and the casing, thereby eliminating the necessity of plastic cement or similar fastening elements or composition between the cover and the casing. Before applying the cover to the casing, it may be slightly heated in order to render flange 22 somewhat plastic or more flexible, as would permit it to freely pass over the outer face of the flange 6 and when the cover is allowed to cool, it will be shrunk tightly upon the flange, thereby permitting the withdrawal of the cover from the casing and the geared connection consisting of the grooves or ribs 29 will prevent the rotation of the cover upon the casing. When employing thermo-setting molding materials and the like

where it is impossible to render the cover again plastic or flexible, I employ a casing 1 made of porcelain and subject this porcelain casing to a low temperature sufficient to shrink the casing and, particularly, its annular flange 6, whereby the cover may be inserted over such shrunk casing and when the latter returns to normal atmospheric temperatures, it will expand, thereby effecting a wedged connection between the flange 22 of the cover and the annular flange 6 of the casing. I reduce the temperature of the porcelain casing 1 by simply placing dry ice upon the flange 6 of the casing during the assembling operations of the fuse. The vertical grooves within the outer face of the annular flange 6 may be of different depths in order that several of the ribs 29 may not completely close several of these grooves, whereby, the gases under pressure from the explosive chamber 2 may pass therebetween and escape to the atmosphere or the form of cover shown in Fig. 11 may have venting grooves corresponding to the L-shaped grooves 16, as better shown in Figs. 6 and 10 of the drawing, whereby the gases under pressure escape from the explosive chamber 2. When not employing such ventilating means between the casing and the cover therefor, the plastic cement 18 may be removed from the vent opening 4 whereby the gases from the explosive chamber 2 may escape through this vent opening 4 in the customary manner.

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 indicating fuse comprising a casing having a pair of contact terminals and an explosive chamber formed therein, a fuse link arranged within said chamber and connected to said terminals, a glow lamp and leak resistor connected in series with said terminals but in parallel to said fuse link, a transparent cover for housing said lamp, a depending and flexible flange formed with said cover, projections formed with the lower end of said depending and flexible flange, an annular flange formed with said casing and arranged within said depending and flexible flange of said cover whereby when the flange of said cover is forced over said annular flange said projections will pass thereover and engage with the lower face of said annular flange to prevent the removal of said cover from said casing and means for preventing the rotation of said cover upon said casing.

2. An indicating fuse comprising a casing having a pair of contact terminals and an explosive chamber formed therein, a fuse link arranged within said chamber and connected to

said terminals, a glow lamp and leak resistor connected in series with said terminals but in parallel to said fuse link, an annular flange formed with said casing, a cover having a bulged portion for receiving said lamp, the walls of said bulged portion of the cover being transparent whereby the rays of light from said lamp may pass therethrough, an annular depending flange formed with said cover and extending about said annular flange formed with said casing, and means for connecting said depending flange of the cover to the annular flange of said casing.

3. An indicating fuse comprising a casing having a pair of contact terminals and an explosive chamber formed therein, a fuse link arranged within said chamber and connected to said terminals, a glow lamp and leak resistor connected in series with said terminals but in parallel to said fuse link, an annular flange formed with said casing having a plurality of recesses formed therein, a cover for housing said lamp, a plurality of projections formed with said cover and arranged within the recesses formed within said annular flange and means for connecting said cover to said casing.

4. An indicating fuse comprising a casing having a pair of contact terminals and an explosive chamber formed therein, a fuse link arranged within said chamber and connected to said terminals, a glow lamp and leak resistor connected in series with said terminals but in parallel to said fuse link, an annular flange formed with said casing having a plurality of vertically extending recesses formed within the outer wall thereof, a partition arranged within said casing, a cover for housing said lamp and retaining the latter upon said partition, a flange formed with said cover, a plurality of projections formed with said flange of the cover and fitted within the recesses of said annular flange and means for preventing the withdrawal of said cover from said casing when seated thereupon.

5. An indicating fuse comprising a casing having a pair of contact terminals and an explosive chamber formed therein, a fuse link arranged within said explosive chamber and connected in series with said terminals, a glow lamp and leak resistor connected in series with said terminals but in parallel to said fuse link, said casing being formed from a material having a relatively high temperature coefficient of contraction, a cover for housing said lamp and leak resistor, a flange formed with said cover having an interior diameter less than that of the normal exterior diameter of said casing whereby when said casing has been contracted, said flange may fit thereover and means for establishing a wedged connection between said cover and casing.

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