

Dec. 15, 1964

W. C. LINTON
MULTIPLE FUSE PLUG

3,161,748

Filed Aug. 17, 1960

2 Sheets-Sheet 1

FIG. 1.

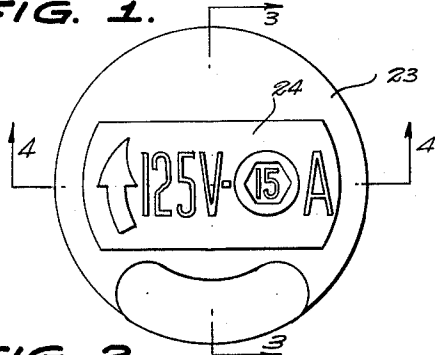


FIG. 6.

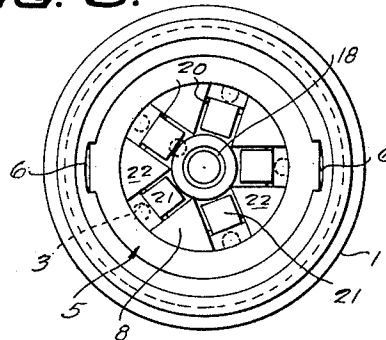


FIG. 2.

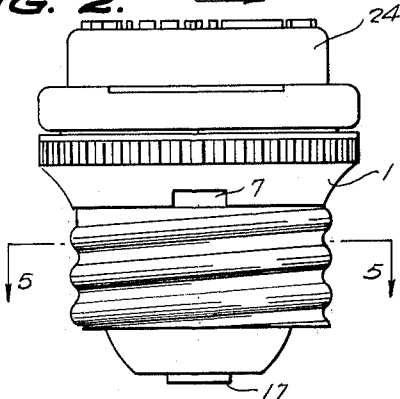


FIG. 3.

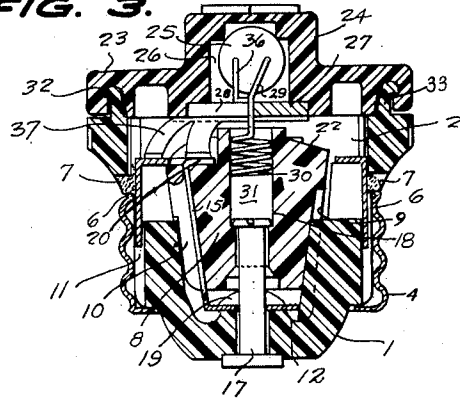


FIG. 4.

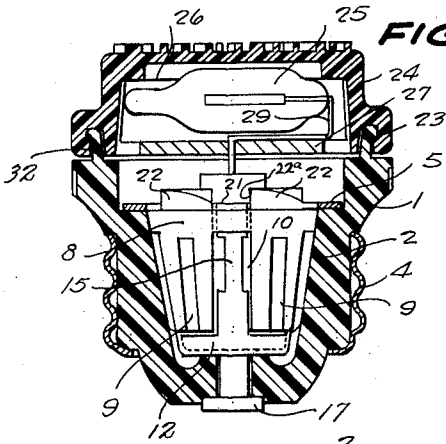


FIG. 7.

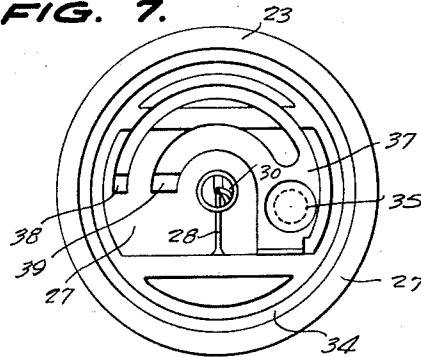
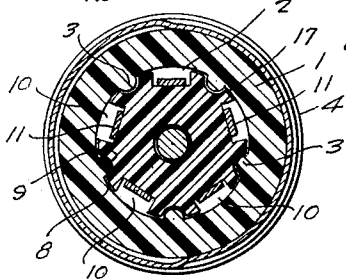


FIG. 5.



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FIG. 8.

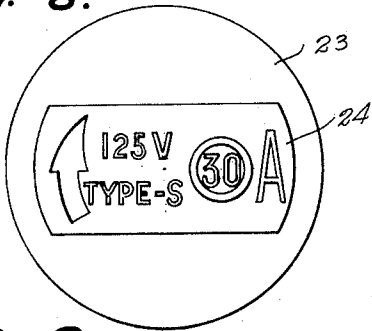


FIG. 12.

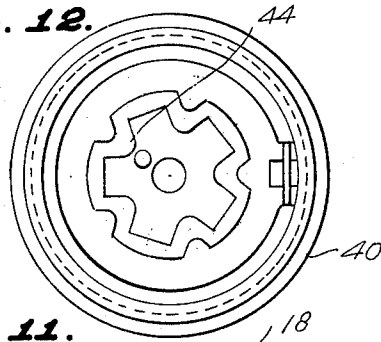


FIG. 9.

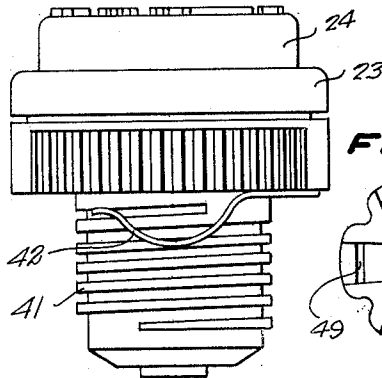


FIG. 11.

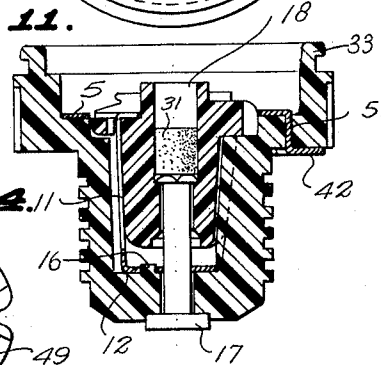


FIG. 14.

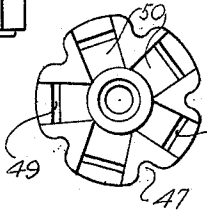


FIG. 10.

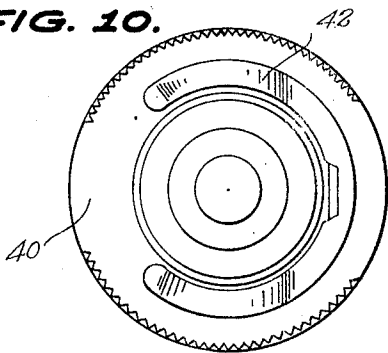


FIG. 15.

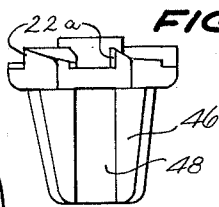


FIG. 16.

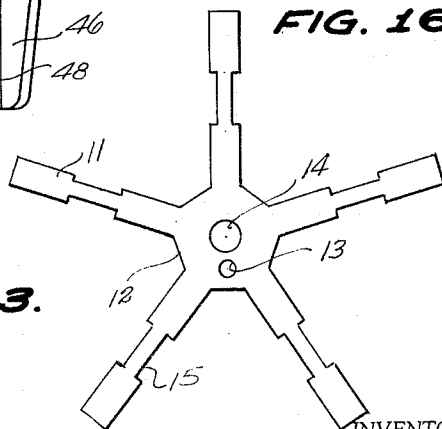
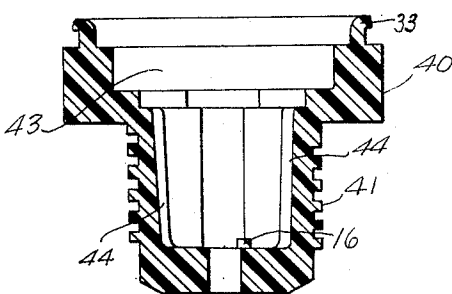


FIG. 13.



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3,161,748

MULTIPLE FUSE PLUG

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Filed Aug. 17, 1960, Ser. No. 50,192
6 Claims. (Cl. 200-125)

The standard for overcurrent plug type fuses adapted by the National Electrical Code are the Edison-Base Type and Type S non-tamperable and the object of the present invention is to convert these standard single time plug fuses into multiple fuses wherein the fusible elements or links thereof can be successively connected in series with the terminals of the fuse without materially increasing the physical over-all size as compared with that of both standard plug type fuses.

Another object of the invention is to design a new and unique multiple indicating plug type wherein the several fusible links are separately enclosed and completely insulated from one another whereby when one fuse link blows or becomes ruptured the remaining fusible links will be retained intact and yet may be manufactured at a sufficiently low cost so as to enable competitive marketing thereof with respect to the standard single time Edison-Base type and Type S plug fuses.

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

In the drawings:

FIG. 1 is a top plan view illustrating the invention as applied to a standard Edison-Type plug fuse.

FIG. 2 is a side elevation of the same.

FIG. 3 is a vertical sectional view taken on the line 3-3 of FIG. 1 in the direction the arrow points.

FIG. 4 is a similar sectional view taken on the line 4-4 of FIG. 1 in the direction the arrow points.

FIG. 5 is a horizontal sectional view taken on the line 5-5 of FIG. 2 in the direction the arrow points with the insulating insert and fusible element in elevation.

FIG. 6 is a top plan view of the plug with the cover removed.

FIG. 7 is a bottom plan view of the cover.

FIG. 8 is a top plan view of the Type S non-tamperable plug fuse embodying the present invention.

FIG. 9 is a side elevation thereof.

FIG. 10 is a bottom plan view.

FIG. 11 is a vertical sectional view of the body or plug thereof with the cover removed.

FIG. 12 is a top plan view of the body or plug before being assembled.

FIG. 13 is a vertical transverse sectional view of the same.

FIG. 14 is a plan view of the insulating insert used with the Type S plug fuse.

FIG. 15 is a side elevation of the same; and

FIG. 16 is a plan view of the fusible links used with both the Edison-Base and Type S plug fuses.

Referring now more particularly to FIGS. 1 to 7, inclusive, of the drawings, wherein I have illustrated the invention as applied to the conventional Edison-Base type plug fuse, the body or plug 1 is preferably made of porcelain or it may be molded from other plastic insulating materials which are at least the equivalent of porcelain with respect to resistance to tampering. This body 1 has an open end recess or cavity 2 formed therein with the vertically extending ribs 3 the purpose of which will be set forth as the description continues. The outer wall of the body does not have the usual molded threads for retaining the standard screw shell terminal 4 thereto as the cost of molding the body 1 without threads is less expensive than with threads. A contact ring 5 is seated on the supporting ledge formed with the cavity 2 of the body and

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is provided with two diametrically opposite legs 6 which are soldered as at 7 to the screw shell 4. Epoxy cement connects the screw shell 4 with the outer smooth surface of the body which together with the connected legs 6 of the contact ring 5 retains this screw shell thereupon so as to prevent the turning when the fuse plug is inserted within the standard Edison-Base type receptacle.

The cam insert 8 is preferably molded from the same plastic materials as that of the body 1 and has formed in its outer periphery a plurality of equally spaced and vertically extending recesses 9 so that when the cam insert is inserted within the cavity of the body the ribs 3 of the latter will be received thereby for not only retaining the cam insert against turning, but establishing a seal therebetween. Also formed in the cam insert are vertically extending compartments 10 preferably five in number as shown.

The fusible elements or links 11 are cut from a single sheet of zinc or other fusible material and each are connected at their inner ends to a central section 12 having a rivet receiving opening 14 for the rivet 17 and an aligning opening 13 formed therein for receiving the stud 16. Each fuse link 11 is provided with a drop-out section 15. The center portion 12 of the fusible element is seated within the bottom of the body cavity 2 and the aligning opening 13 has therein a stud 16 formed with the base for retaining the links 11 in proper position whereby they may be received by the compartments 10 of the cam insert when the latter is inserted within the cavity 2 of the body.

A terminal rivet 17 extends through the body, the opening 14 of the fusible elements and into the elongated open end recess 18 formed within the cam insert, whereas, its inner end is spun over for permanently retaining the cam insert within the cavity of the body 1.

In the assembly the rivet 17 is first inserted within the body and then the fusible links and are arranged in place about the rivet, whereupon, they are soldered together as at 19. In the cavity is then poured a mixture of water and kalon to a level slightly above the lower end of the cam insert 8. The cam insert is then arranged within the cavity of the body 1, whereupon, the fusible links 11 extend through the compartments 10 of the cam insert. The cam insert when in place will force the mixture of water and kalon entirely around the lower ends of the fuse links 11, but below the drop-out sections 15 and when this mixture is allowed to dry it will completely insulate the lower ends of the links 11 from one another and also the terminal rivet 17, except where they are soldered together as at 19.

The upper ends of the fusible links 11 will, as the cam insert is arranged within the cavity 2 of the body, pass through the openings 20 and their extremities 21 are then bent over so as to be seated within the recesses formed in the outer upper face of the cam insert.

The upper face of the cam insert 8 has the cam surfaces 22 formed therewith, one each being arranged between the recesses receiving the ends 21 of the fusible links.

The cover 23 is preferably molded from transparent nylon or similar arc-resisting and burning material, with a rectangular-shaped knob section 24 upon which is molded the usual voltage and ampere designations, together with an arrow indicating the direction of rotation of the cover. Formed within the cover is a lamp 25 receiving cavity 26 with its lower open end closed by means of an insulating panel 27. This panel 27 has a laterally extending slot 28 formed therein through which extends the lead wire 29 of the lamp. The extremity of this lead wire 29 is formed into the coil 30 which rests upon the upper end of the resistor 31, placed within the recess 18 of the cam insert, and the opposite or lower

end thereof rests upon and is retained in contact with the rivet terminal 17.

An annular flange 32 is formed with the upper end of the body 1 and terminates with an annular ledge or knob 33. The cover 23 is provided with an annular recess 34 which receives the flange 32 and knob 33 in a snap-fit so that when the cover is applied to the body it cannot be removed therefrom without breaking the cap or cover, but at the same time permits the cover to freely rotate upon the body 1.

Secured to the panel 27 by means of the rivet 35 is the other lead wire 36 and a snap switch blade 37. The outer or free end of this switch blade terminates in two sections, one of which has a flat contact end 38 riding upon the contact ring and the other or inner section has a flat contact end 39 that rides upon the cams 22 and contacts the exposed ends 21 of the fusible links 11. As the cover is rotated in a clockwise direction or that indicated by the arrow in FIG. 1, the contact end 39 will ride upon a cam 22 which latter moves the same out of contact with a fuse link end 21 and after passing over the cam the contact end 39 will snap upon the next succeeding fusible link end 21 thereby completing a connection between the ring 5 and the fusible link. As each cam 22 terminates at its high side with a straight wall 22a the contact end 39 will abut thereagainst for preventing the cover from being turned in an anti-clockwise direction.

From the foregoing it will be apparent that as one fusible link 11 is connected in series with the terminal 17 and screw shell terminal 4, the lamp 25 and its series resistor 3 will be connected in parallel to said fusible element, whereby when the latter blows the lamp will glow to indicate the blown or ruptured condition of the fusible element.

The type S plug fuse as best illustrated in FIGS. 8 to 15, inclusive, of the drawings, comprises a body or plug 40 molded from suitable insulating materials with an exterior design substantially the same as that of standard type S plug fuses in that the threads 41 are formed therewith and the side contact terminal 42 is of the standard leaf spring type. The threads 41 are one size for 0-15 amperes fusible links, and another size for 16-30 amperes fusible links, and of such a design that a fuse other than this type S fuse cannot be used in a fuseholder or adapter designed therefor. The design of the spring contact 42 is circular in form, extends approximately three-quarters of the way around the fuse body, and is depressed on either side so as to provide a double contact with the fuseholder or adapter therefor.

The open end recess or cavity 43 formed within the body 40 is substantially of the same design as that of the cavity 2 of the Edison-Base type body 1, but the side ribs 44, as best illustrated in FIG. 12, are somewhat of a different design than that of the rib 3 of the body 1, due to the fact that the portion of the cavity 43 where the ribs 44 appear is somewhat limited compared with the cavity 2 of the body 1.

The plastic cam insert 45 is substantially of the same design as that of the cam insert 8 with the exception of its lower portion 46 where the vertically extending recess 47 appears for the reception of the ribs 44. The fusible links compartments 48 communicate with the openings 49 in the top portion of this cam insert, whereby the upper free ends of the fusible links may rest within the recesses 50.

The contact ring 5 has only one leg 51 which lower end is connected to the spring contact 42.

A cylindrical carbon resistor 31 is placed within the cavity formed in the cam insert having contact with the upper end of the center rivet contact terminal 17.

The upper end of the body 40 has formed therewith the annular flange of the same size and design as that 32 of the body 1 for receiving and having attached to the body 40 the cover or cap 23. From this it will be understood

that the lamp indicating caps or covers 23 are identical and can be interchanged with both types of fuses.

In the assembly of the cap or cover 23, the lamp 25 and snap-switch 37 are first mounted upon and connected to the panel 27 and the latter has a press fit with the recess provided in the cap or cover, whereof the opposite extremities of the panel ride upon the upper face of the body so as to be retained in the cap or cover. After the cap or cover is assembled, it is only necessary when applying the same to the fuse body to just insert the coil 30 within the cavity of the cam insert so as to have contact with the resistor 31 and then by manually pressing down on the cap it will snap over the flange 32 so as to have rotatable permanent connection therewith without any separatable fastening elements.

The compact arrangement of the several parts of these plug fuses makes it possible to produce a multiple indicating plug fuse of approximately the same size as that of the non-indicating Edison-Base Type and Type S standard fuse plugs.

I claim:

1. A multiple plug type fuse comprising an insulating body having an open end cavity formed therein, ribs provided upon and extending longitudinally of said body and extending within the cavity thereof, an insulating cam insert extending within the cavity of said body and having recesses provided in and extending longitudinally of the outer periphery thereof mating with said ribs provided on said body for preventing rotation of said cam insert therein, fusible link compartments provided within said cam insert and each being arranged between the longitudinally extending recesses thereof, with said longitudinally extending ribs provided on said body separating and enclosing each fusible link compartment from the others, a center contact terminal rivet extending through said body and within one end of said cam insert and retaining the latter within the open end cavity thereof, cams provided upon the opposite end of said cam insert, a fusible link mounted within each compartment of said cam insert having one end connected to said center contact terminal between said body and said cam insert and its opposite end positioned on said cam insert between a pair of said cams of said cam insert, a side contact terminal mounted on and extending into said body adjacent to, but spaced from said fusible link opposite ends, a cover rotatably connected to said body open end cavity, means retaining said cover from movement from said body and a resilient blade carried by said cover and having two contacts with one contact capable of riding over said cams of said cam insert for successively contacting each of the opposite ends of said fusible links and the other contact slideably engaging said side contact terminal.

2. A multiple indicating plug type fuse comprising in combination an insulating body having an open top cavity formed therein, a translucent insulating cover rotatably mounted upon said body closing the open top cavity thereof, means retaining said cover on said body against relative longitudinal movement, an indicating lamp, an insulating panel supporting said lamp below said cover, a snap-switch secured to said insulating panel having one lead wire of said lamp connected thereto, a coil spring formed with the other lead wire of the lamp and extending from said insulating panel, an insulating cam insert retained within the open top cavity of said body and having compartments provided longitudinally therein, a fusible link mounted within each compartment of said cam insert, a center contact terminal extending through said body and having one end of each fusible link connected thereto between said cam insert and said body, cams provided on said cam insert with the opposite end of each fusible link being arranged between each pair of said cams of said cam insert, a contact ring mounted on said body, a side contact extending through said body and connected to said contact ring, said snap-switch being capable of riding upon said cams and said contact ring and suc-

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cessively connecting each of said fusible links with said contact ring upon rotation of said cover, said cam insert having an open end recess formed therein with said coil spring extending therein, and a resistor mounted within the open end recess of said cam insert being in contact with said coil spring and said center contact terminal, with said resistor and lamp being connected in series with said contact terminals, but in parallel to each fusible link as they are connected in series with said contact terminals.

3. A multiple indicating plug S type fuse, comprising an insulating body having an open end cavity provided therein, screw threads being a part of the outer periphery of said body, a center contact terminal extending through said body into said cavity, a spring contact terminal positioned exteriorly of and connected to said body, an insulating cam insert positioned within the open end cavity provided within said body and having a plurality of compartments extending longitudinally therein, a fusible link extending through each compartment and each having one end connected to said center contact terminal, a translucent cover rotatably mounted upon and connected to said body closing the open end cavity thereof, a snap-switch connected to said cover for rotating therewith and connected to said spring contact terminal, an indicating lamp carried by said cover having one lead wire thereof connected to said center contact terminal and its other lead wire connected to said snap-switch, and means carried by said cam insert for causing said snap-switch to engage each of the opposite ends of said fusible links separately upon rotation of said cover for successively connecting each fusible link in series with said contact terminals.

4. A multiple plug type fuse comprising an open top insulating body, a plurality of spaced-apart fuse links positioned within said body, a central terminal extending through said body and connected to one end of said links, a second terminal extending through said body, an insulating cover closing said body open top, a switch carried by said cover for successively connecting the other end of each of said links to said second terminal, said body having an annular flange of an L-shape cross-sectional configuration and said cover having an annular recess of an L-shaped cross-sectional configuration with said body flange slidably positioned therein rotatably con-

necting said cover to said body and retaining said cover and body against relative longitudinal movement.

5. A multiple plug type fuse as claimed in claim 4, wherein said cover is of a resilient material capable of a snap fit over said body flange.

6. A multiple plug type fuse comprising an insulating body having an open end stepped cavity having a top portion of a larger diameter than a lower portion with a shoulder therebetween, spaced apart ribs provided upon and extending longitudinally of said body within said cavity lower portion, an insulating cam insert having recesses provided in and extending longitudinally of the outer periphery with said ribs on said body mating with said cam insert recesses and said cam insert mating with and closing said body cavity lower portion, said cam insert having longitudinal slots positioned between said cam insert recesses providing fuse link compartments separated from each other by the mated body ribs and cam insert recesses, a plurality of fuse links joined together at one end between said body and said cam insert and each extending lengthwise of one of said fuse link compartments, a plurality of cams provided on said cam insert positioned between said fuse link compartments and within said body cavity top portion, and end of each of said fuse links being positioned between a pair of said cams, a side contact terminal mounted on said body cavity shoulder and exteriorly of said body, a cover rotatably mounted on said body closing said body cavity upper portion, a resilient switch blade carried by said cover and having two contacts with one contact sliding on said side contact terminal and the other contact positioned for riding over said cams and the ends of said fuse links therebetween upon the rotation of said cover and a center contact terminal extending through said body and connected to the joined ends of said fuse links.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 23,414	Holmes -----	Oct. 2, 1951
2,492,301	Linton -----	Dec. 21, 1949
2,579,623	Stanley -----	Dec. 25, 1951

FOREIGN PATENTS

544,246	France -----	June 16, 1922
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