

Sept. 9, 1958

W. C. LINTON

2,851,558

FUSE HOLDER

Filed July 15, 1954

3 Sheets-Sheet 1

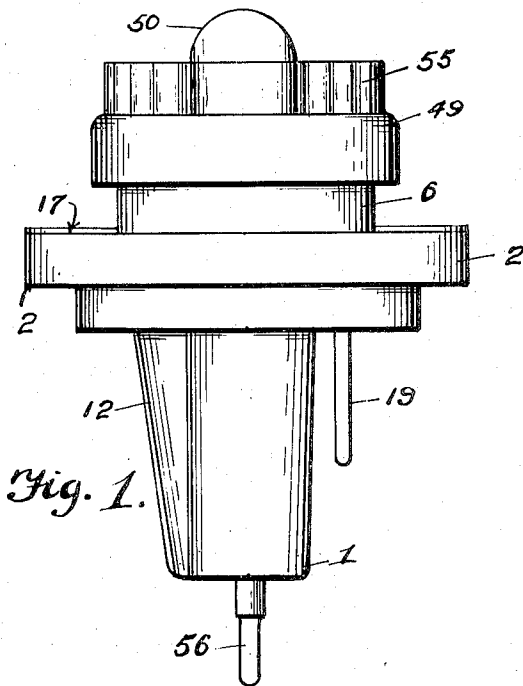


Fig. 1.

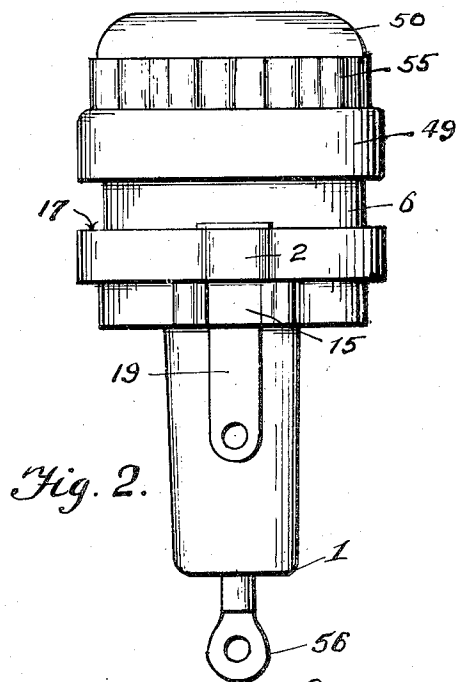


Fig. 2.

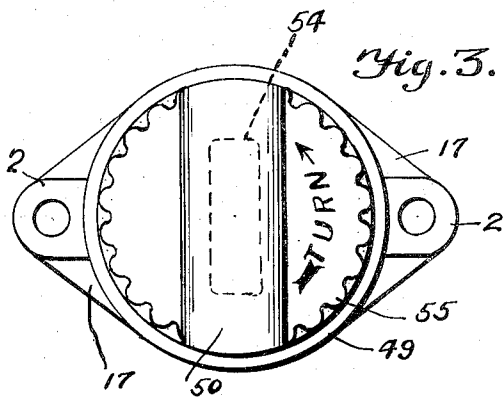


Fig. 3.

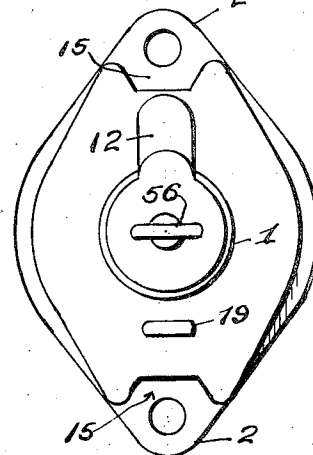


Fig. 4.

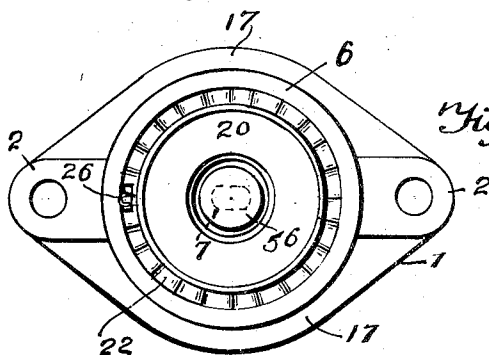


Fig. 5.

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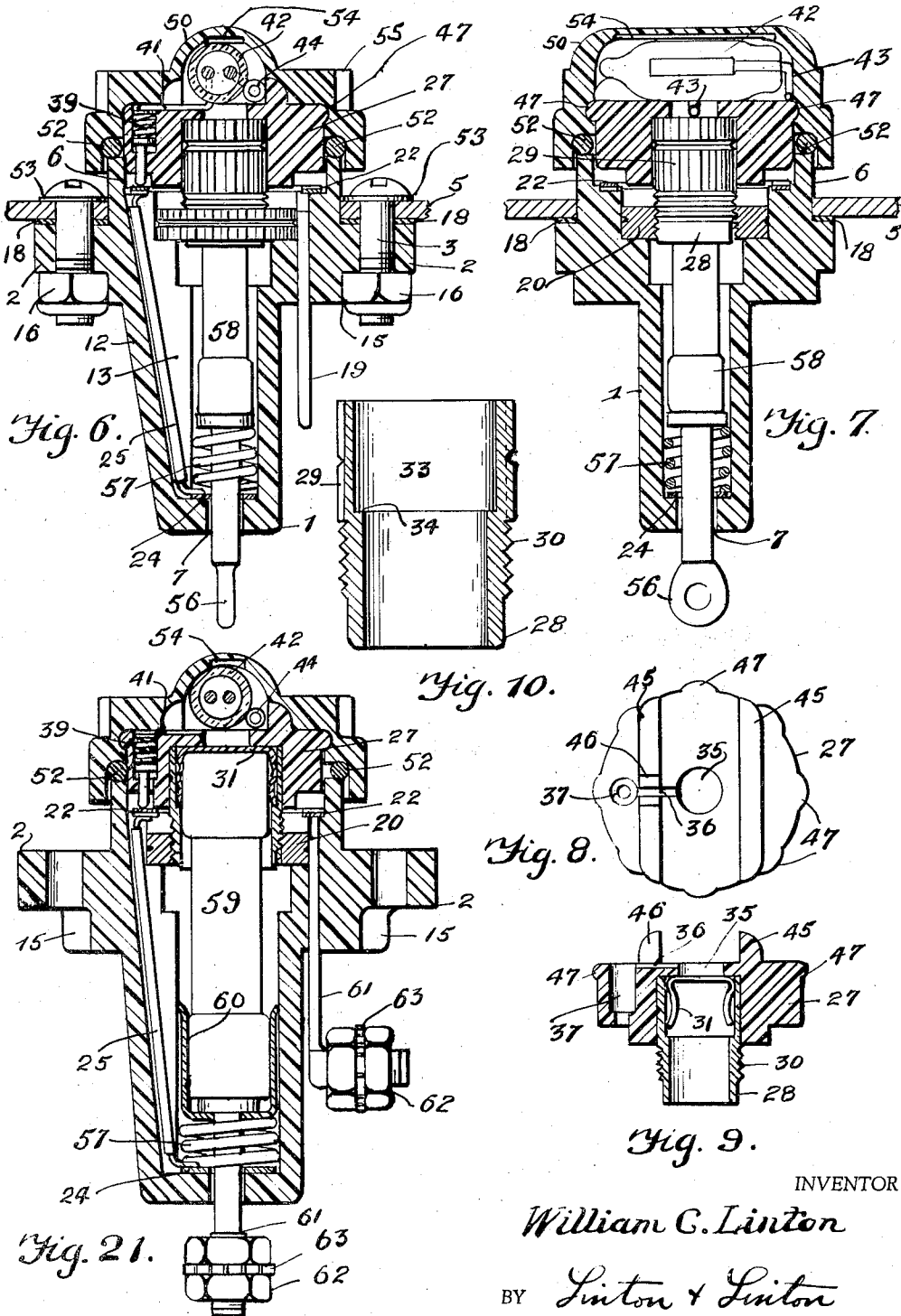
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Fig. 14.

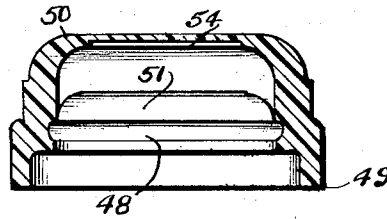
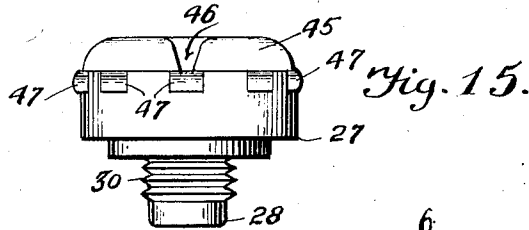


Fig. 16.

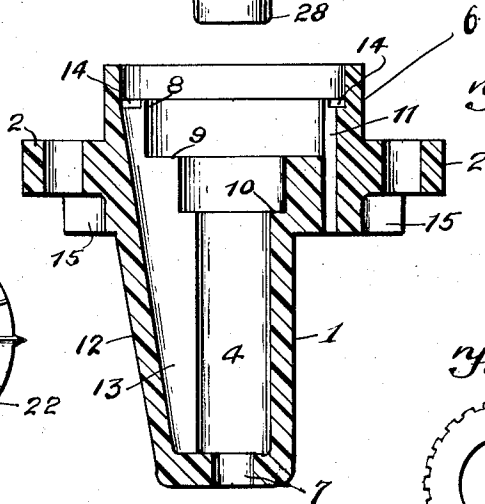


Fig. 17.

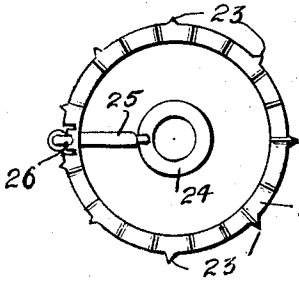


Fig. 19.

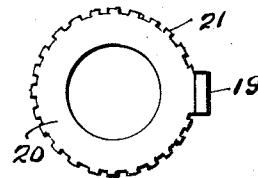


Fig. 18.

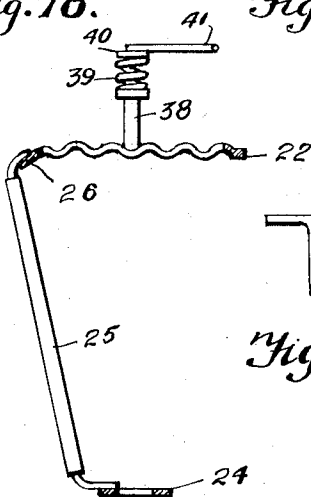


Fig. 11.

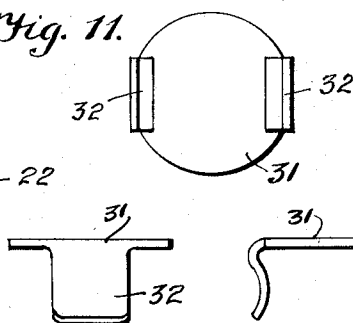


Fig. 12.

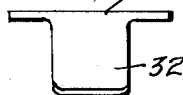


Fig. 13.

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2,851,558

FUSE HOLDER

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Application July 15, 1954, Serial No. 443,520

10 Claims. (Cl. 200—133)

The present invention relates to fuse holders with lamp type blown fuse indicators capable of being mounted upon almost any panel board in order to give to the latter the commonly known dead front appearance.

An object of the invention is to provide a holder of the above characteristics in which may be housed the various sized standard enclosed cartridge fuses and electrically connected so as to meet the required tests as to dielectric strength, insulation resistance, short circuit, vibration and high impact shock, yet be comparatively light in weight, small in physical size and waterproof from the outside of the panel board upon which it is mounted.

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

In the accompanying drawings:

Fig. 1 is a side elevation of a complete fuse holder.

Fig. 2 is an opposite side view.

Fig. 3 is a top plan view.

Fig. 4 is a bottom plan view.

Fig. 5 is a plan view with the knob or cap assembly removed.

Fig. 6 is a vertical sectional view of a fuse holder embodying the invention as mounted upon a panel board and housing a standard small cartridge type enclosed fuse.

Fig. 7 is a similar view taken at right angles to that as shown in Fig. 6.

Fig. 8 is a plan view of the plug assembly.

Fig. 9 is a vertical sectional view of the same.

Fig. 10 is an enlarged vertical section through the fuse retainer or socket.

Fig. 11 is a bottom plan view of the fuse clip to be supported within the fuse socket in the manner as best shown in Fig. 9.

Fig. 12 is a side elevation of the same.

Fig. 13 is an opposite side elevation of the fuse clip.

Fig. 14 is a vertical sectional view through the cap or lens.

Fig. 15 is a side elevation of the plug assembly.

Fig. 16 is a vertical sectional view through the base or body.

Fig. 17 is a plan view of the lamp circuit assembly.

Fig. 18 is a vertical section of the same showing the spring pressed contact pin as carried by the plug in contact therewith.

Fig. 19 is a plan view of the side contact terminal assembly.

Fig. 20 is a side elevation of the same, and

Fig. 21 is a vertical sectional view of a fuse holder embodying the present invention having housed therein a standard midget size cartridge type enclosed fuse.

In these drawings the numeral 1 indicates the base or body of the fuse holder molded from suitable thermosetting plastic compounds having the required heat and arc resistance, electrical properties, dielectric strength and shock resistance. Formed with this base is an an-

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nually projecting ledge or flange terminating in two diametrically opposite apertured ears 2 through which latter extend the attaching bolts 3 of the hardware necessary for attaching the fuse holder to the rear face of a panel board 5. This body 1 has formed therein a recess 4 for receiving the cartridge type fuse and formed with the body but extending around the upper open end thereof is an annular flange 6 capable of extending through an opening within the panel board 5 in order that it may project from the outer face of the panel board. The lower end of the recess communicates with an elongated opening 7 extending through the body 1 and of the shape as best illustrated in dotted lines in Fig. 5 of the drawings. The diameter of the recess 4 is enlarged towards the upper end thereof so as to form the annular shoulders 8, 9, and 10. A vertically extending slot 11 having a rectangular cross section extends from the shoulder 8 through the annular extending ledge or flange of the base 1. A bead 12 is also formed with the outer face of the body providing a vertical groove 13 extending from the lower end of the recess 4 to the upper outer face of the shoulder 8. The upper face of the shoulder 8 has formed therein an annular groove 14 which communicates with the upper end of the groove 13. The lower face of the ledge or groove formed with the body 1 has arranged therein the recesses 15 for receiving and limiting the rotary movement of the elastic stop nuts 16 forming a part of the attaching hardware. The upper face 17 of this ledge or flange together with the ears 2 formed with the body 1 have seated thereupon a rubber gasket 18 which latter rests upon the inner face of the panel board 5 as to form a water tight seal therebetween.

The upper contact assembly consists of a terminal 19 having one end soldered or otherwise secured to the outer annular face of the internally threaded ring nut 20 and the outer face of this nut 20 is provided with serrations 21. As the body 1 comes from the mold and is still warm the terminal 19 is passed through the slot 11 of the body 1 and the nut is pressed within the recess formed in the latter until it rests upon the shoulder 9. As the body 1 is allowed to cool the molded composition will shrink about the serrations 21 of the nut for permanently retaining the latter within the body 1.

Seated within the annular recess 14 of the shoulder 8 is a corrugated contact ring 22 provided with pointed extensions 23. This ring is pressed down within the annular groove 14 of the shoulder 8 whereat the pointed extension 23 will engage the inner wall of the body as to prevent the ring 22 being removable from its groove 14. The apertured washer 24 has soldered thereto a covered extension wire 25 and the opposite end of this wire is soldered to a lip 26 formed with the ring 22. This connection 26 extends down within the upper open end of the groove 13 and thereby provides a stop for limiting any rotary movement of the ring 22. Before the upper contact terminal assembly, consisting of the nut 20 and the terminal 19, is pressed down within the body the assembly consisting of the ring 22, washer 24 and extension wire 25 is first inserted within the body as best shown in Figs. 6 and 21 whereat the washer 24 will rest within the lower portion of the recess 4 and the covered extension wire 25 seated within the vertically extending groove 13 of the body 1. The terminal 19 having a cross section similar to that of the slot 11 will when the nut 20 is pressed in position within the body prevent any rotary movement of the nut 20.

A plug 27 molded from the same composition as that of the body 1 has a centrally located opening in which the upper end of a fuse socket 28 may be pressed as the plug comes from its mold and still in a heated condition. The serrations 29 formed with the outer face of the

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fuse socket will receive the molded composition of the plug and as the latter is allowed to cool the fuse socket will be permanently attached to the plug due to the shrinkage of the molding composition. The outer face of the fuse socket is also provided with the threads 30 capable of having engagement with those of the nut 20 thereby effecting a detachable connection between the plug and body 1. The lower end of the fuse socket is provided with a plain outside surface, as shown, of less outside diameter than that of the threads so as to provide means which will facilitate the entrance of the fuse socket within the nut 20.

Before pressing the fuse socket within the plug a fuse clip 31 is inserted within the open upper end thereof so that its oppositely opposed legs 32 will rest within the upper annular recess 33. The upper recess 33 is of a larger diameter than that of the lower recess forming a shoulder 34 which latter prevents the fuse clip from dropping out of the fuse holder. The upper face of the disc portion of the fuse clip 31 is registered with the opening 35 formed within the plug and this opening communicates with the one end of a groove 36 and the opposite end of this groove communicates with the upper end of a well 37 formed with the plug. Normally this fuse clip 31 is allowed to freely float or slide longitudinally within the recess 33, but when a ferrule of a cartridge fuse is inserted therein the opposed legs 32 thereof will be expanded and have spring contact with the inner wall of the fuse socket. The outside diameters of the ferrules of standard cartridge fuses greatly vary and by employing the spring contact clip 31 a good and constant electrical contact is at all times maintained between the cartridge fuse and fuse socket or retainer 28, no matter to what extent the fuse holder is subjected to vibrations or high impact shocks. The lengths of standard cartridge fuses also vary and the threaded detachable connection between the knob and fuseholder body retains the fuse socket at varying lengths from the center contact terminal of the fuseholder and therefore it is necessary to employ a coil spring 57 to keep the terminals of the fuse in electrical contact with the center contact and fuse socket. Under normal conditions such contacts are sufficient, but when a fuseholder is installed upon ships, vehicles and other moving conveyances, they are subjected to constant vibration and oftentimes severe shocks which cause the contact terminals of the fuse to be separated from the fuse socket and center contact terminal making undesirable repeated make and breaks in the electrical circuit to which the fuseholder is included. By providing the floating or sliding fuse clip 31 these vibrations and shocks are absorbed preventing such interruptions in the electrical circuit. Vertically movable within this well 37 is a headed pin 38 whereupon the lower end of this pin may ride upon the upper corrugated surface of the ring 22 as best illustrated in Fig. 18. A coil spring 39 is seated within this well 37 and has its upper end connected by a metal disc 40 to a wire conductor 41 of the indicating lamp 42. The other conductor 43 of this lamp may have a resistor 44 arranged in series therewith and this latter conductor 43 extends through the opening 35 of the plug for a soldered connection with a disc portion of the fuse clip 31. This lamp and the resistor rests upon the upper face of the plug between the flanges 45 formed therewith. One of these flanges is provided with a recess 46 through which the wire 41 may be inserted and caused to rest within the groove 36.

Formed with and projecting from the outer face of the plug adjacent the upper end thereof are a plurality of equally spaced knobs 47 capable of being seated within an annular groove 48 formed within a cap or lens 49 when the latter is placed over the plug. This cap 49 has an enlarged dome section 50 which fits over the lamp and resistor and further is provided with two parallel recesses 51 that receive the flanges 45 of the plug so as

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to prevent the rotation of the cap upon the plug. The cap when being placed over the plug is pressed down thereupon until the knobs 47 snap within the recess or groove 48 of the cap whereupon the latter is securely retained upon the plug without any separable fastening elements. This cap when snapped into position will rest upon the disc 40 so as to retain the coil spring 39 within the well 37 of the plug. An O ring 52 is inserted within the cap and extends about the plug 27 so that when the plug is connected to the nut 20 through the fuse socket this O ring will rest upon the upper face of the flange 6 of the body to insure a water tight seal between the cap and body. Washers 53 may also be placed between the heads of the bolts 3 and the outer face of the panel board 5 so as to effect a water tight seal therebetween.

The cap is provided in its dome section 50 with a comparatively thin wall 54 which latter is sufficiently translucent as to permit the light rays from the lamp 42 to pass therethrough and emit therefrom and still the wall 54 as well as the cap are sufficiently opaque as will prevent the lamp from being readily visible from the outside thereof, all of which is claimed in my Patent No. 2,575,821 dated November 20, 1951. This cap is also provided with the finger serrations 55 whereby one may better grip the same when inserting or withdrawing the fuse socket from the nut 20.

The outer contact terminal assembly consists of a headed terminal 56 insertable through the opening 7 of the body and having flattened surfaces so as to prevent this terminal 56 from turning within the base. A coil spring 57 is positioned between the head of this terminal and the washer 24.

I have herein illustrated a small or little size standard cartridge type fuse 58. One ferrule of this fuse is first inserted within the fuse socket 27 whereat the fingers 32 of the fuse clip will securely grip the same as will hold the fuse and permit its insertion into and withdrawal from the recess 4 of the body. As the fuse is inserted within the body the threads of the fuse socket will engage those of the nut 20 and by turning the cap the opposite ferrule of the fuse will be pressed down upon the head of the terminal 56 against the tension of the coil spring 57 whereas an electrical connection will be established between the terminal 56 and the fuse. At the same time the lower end of the pin 38 will ride upon and establish contact with the ring 22. This contact between the pin and corrugations of the ring will suitably effect a check as will prevent the accidental turning of the cap and the plug connected thereto due to shock or jars which the fuse holder may be subjected to during its normal use.

In Fig. 21 of the drawings I have illustrated a midget size standard cartridge fuse 59 as housed within a fuse holder embodying this invention and it will be well understood that other size standard enclosed cartridge fuses as listed in the National Electrical Code may also be housed therein by simply enlarging the size of the fuse socket 27 and the body thereof so as to accommodate the increasing diameters and lengths of these standard enclosed cartridge fuses.

To remove a blown fuse from the fuse holder, it is necessary to turn the cap in the direction of the arrow as shown in Fig. 3 whereby the complete assembly comprising the plug and fuse socket may be removed from the recess 4 of the body and the fuse exposed for removal from its gripping clip 31.

As herein illustrated in Fig. 21, an auxiliary contact 60 may be employed for effecting a more positive contact between the lower contact terminal assembly and the fuse. The terminals 61 may have their outer ends enlarged and threaded so as to receive the nuts 62 and lock washers 63 whereby the line conductors may be attached thereto instead of effecting the conventional soldered con-

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nectors between the terminals 19 and 56 of the line conductors.

I claim:

1. An indicating fuse holder comprising a body having a recess therein for receiving the fuse, a spring pressed contact terminal extending within the recess of said body for contact with one end of the fuse, a corrugated ring mounted upon said body and having electrical contact with said spring pressed contact terminal, an internally threaded nut secured within said body having a contact terminal connected thereto, a fuse socket for receiving the opposite end of the fuse and having detachable threaded engagement with said nut whereby the fuse will be connected in parallel with said contact terminals, a plug connected to said socket, a spring pressed pin mounted within said plug and capable of having electrical contact with said corrugated ring, a lamp mounted upon said plug, a cap extending over said lamp and connected to said plug, one terminal of said lamp being connected to said socket and the other terminal of said lamp being electrically connected to said spring pressed pin whereby said lamp will be connected in series with said contact terminals.

2. An indicating fuse holder comprising a body having a recess formed therein and opening at one end thereof for receiving the fuse, a pair of lugs formed with said body, a bolt extending through each lug for attaching the same to a panel board, a spring pressed contact terminal extending within one end of said body for having contact with one end of the fuse, a nut mounted within said body and extending within the open end of the recess therein, a fuse socket capable of receiving the opposite end of the fuse having detachable connection with said nut, a corrugated ring mounted within said body and electrically connected to said spring pressed contact terminal, a plug connected to said socket, a lamp indicator carried by said plug having electrical contact with said socket and corrugated ring, cap for housing said plug and lamp indicator, an O ring mounted within said cap capable of having a sealing connection with said body, a gasket arranged between said body and the panel board, and sealing washers arranged about the bolts.

3. A combined fuse holder and blown fuse indicator comprising an opened end body capable of receiving a fuse, a center terminal contacting one end of the fuse, a side terminal, a ring nut secured within said body and connected to said side terminal, a contact ring mounted within the upper opened end of said body, said body having a recess therein, an extension wire mounted within said recess for connecting said center terminal with said contact ring, means for insulating said extension wire from said ring nut and fuse when inserted within said body, a rotatable plug for closing the opened end of said body and removably retaining the opposite end of the fuse in contact with said ring nut, a spring actuated pin engaging said contact ring, a lamp connected in series with said pin and ring nut and a translucent cap extending over said lamp.

4. A cartridge fuse holder comprising a base having an open end and recess formed therein, a spring pressed contact terminal mounted within said base, a ring nut contact terminal permanently mounted within said base, a knob for closing the open end of the recess within said base, a fuse socket secured to said knob and having threaded engagement with said ring contact nut terminal for retaining the knob upon said base, said fuse socket having a longitudinally extending recess formed therein, a fuse clip slidably retained within the recess of said fuse socket, and engageable with one end of the fuse for effecting electrical contact between the latter and said fuse socket and said fuse socket retaining the opposite end of the fuse upon said spring pressed contact terminal when the knob is inserted within the recess of said base.

5. A fuse holder comprising an open end base, a removable and rotatable knob for closing the open end

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of said base, means for connecting said knob to said base by the rotation of such knob, a corrugated ring retained within said body, spring pressed means carried by said knob and said spring pressed means having contact with one face of the corrugations of said ring for limiting the accidental rotation of said knob.

6. A combined fuse holder and blown fuse indicator comprising an open end base for receiving the fuse, a pair of contact terminals mounted within said base, a rotatable plastic molded plug for closing the open end of said base and retaining the fuse in series with said contact terminals, a pair of spaced flanges formed with the outer face of said plug, a lamp indicator mounted upon said plug between said flanges formed therewith, means for connecting said lamp indicator in series with said contact terminal, but in parallel with the fuse retained in said base, a plurality of spaced knobs formed with and extending from the opposed sides of said plug, a translucent cap for housing said lamp indicator, an annular flange formed with said cap and having an annular groove formed therein for receiving the knob of said plug for permanently retaining said cap upon the latter and said cap having recesses formed therein for receiving said space flanges formed with the plug whereby said cap will be prevented from rotating upon said plug.

7. A dead front fuseholder comprising in combination a panel board having an opening therein, a base of insulating material having a recess therein, a projecting ledge formed with said base and secured to the rear face of said panel board, an annular flange formed with said base extending through the opening of said panel board and beyond the outer face thereof, a pair of contact terminals connected to said base extending beyond that side of the panel board to which is secured said annularly projecting ledge of said base, an internally threaded ring nut secured within said base and connected to one of said contact terminals, a rotatable knob, a fuse retainer having one end secured within said knob, a fuse clip arranged within said fuse retainer for engagement with one end of the fuse, a threaded projection formed with said fuse retainer and engageable with said threaded ring nut when insertable through said annular flange formed with said base, means for connecting the fuse with the other of said contact terminals when said fuse retainer is inserted through said annular flange of the base, said knob having an annular groove formed therein, an "O" ring seated within said annular groove of said knob and having sealing contact with the outer end of said annular flange formed with said base when the fuse retainer is inserted therethrough.

8. An indicating blown fuse holder comprising a fuse retainer molded from thermo-setting plastic compounds having an annular wall, a plurality of spaced knobs molded with and projecting from the annular wall of said retainer, an indicator mounted upon said retainer, a translucent cap molded from thermo-setting plastic compounds for housing said indicator, an annular flange molded with said cap and extending over the annular wall of said fuse retainer, said cap having an uninterrupted annular groove molded therein and the projecting portions of said knobs being seated within the groove of said cap for permanently retaining the latter upon said fuse retainer.

9. An indicating blown fuse holder comprising a fuse retainer molded from thermo-setting plastic compounds having an annular wall, a plurality of spaced knobs molded with and projecting outwardly from the annular wall of said fuse retainer adjacent the upper end thereof, said knobs each having a beveled outer face, an indicator mounted upon said fuse retainer, a cap molded from thermo-setting plastic compounds for housing said indicator, an annular flange molded with said cap and extending over the annular side wall of said fuse retainer, said annular flange having a groove molded therein, the groove of said flange having a cross sectional configuration substantially the same as that of the projecting por-

tions of said knobs whereby when said knobs are seated within the groove of said flange said cap will be permanently retained upon said fuse retainer.

10. The combination with a plug molded from thermo-setting plastic compounds having an annular side wall, a plurality of spaced knobs molded with and projecting outwardly from the annular side wall of said plug adjacent one end thereof, a cap seated upon said plug and molded from thermo-setting plastic compounds, an annular flange molded with said cap and extending about the annular side wall of said plug, said annular flange having an uninterrupted annular groove molded in and extending entirely around the inner wall thereof, whereby when said knobs are seated within the groove of said flange for permanently retaining said cap upon said plug, projections molded with and extending from said plug and said cap having recesses molded therein for receiving said projections whereby said cap will be prevented from rotating upon said plug.

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