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CONTROLLING AND INDICATING DEVICE

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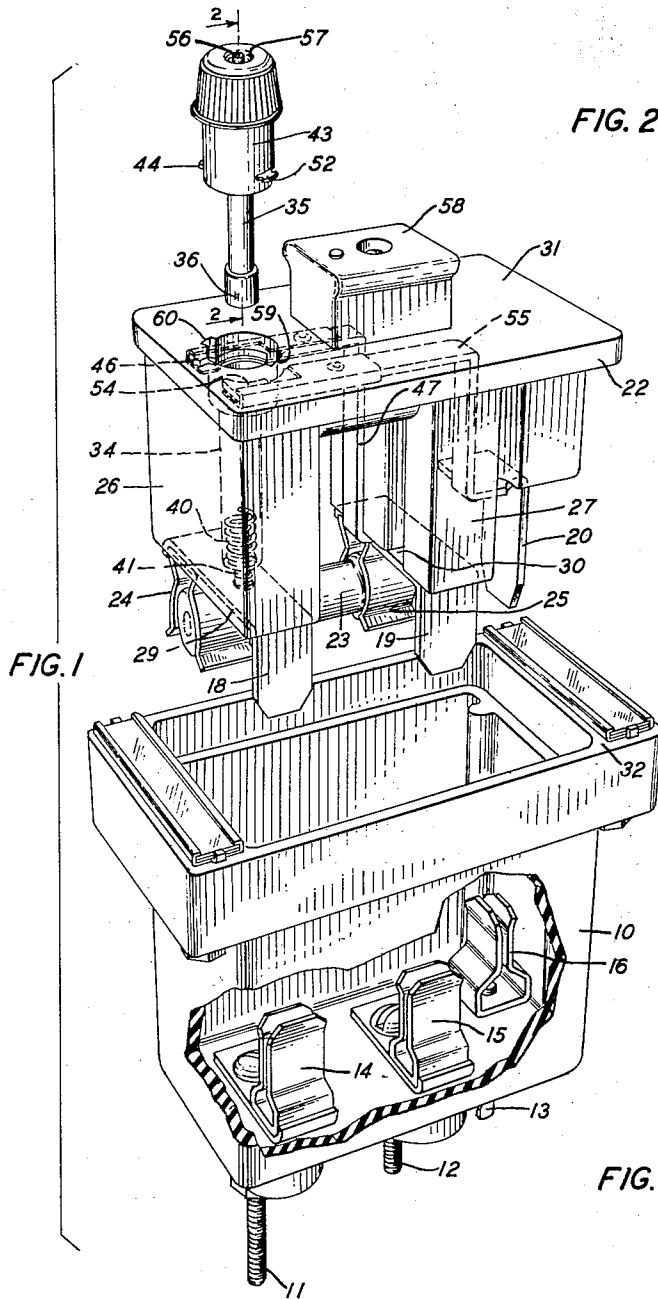


FIG. 2

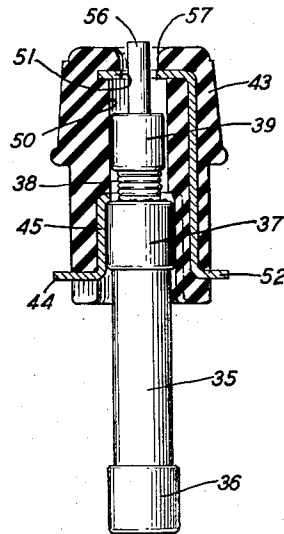


FIG. 3

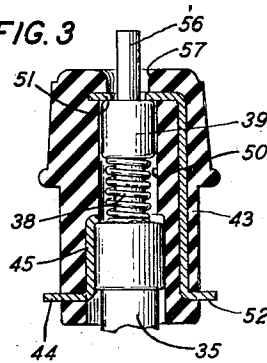
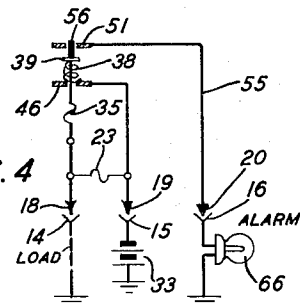


FIG. 4



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CONTROLLING AND INDICATING DEVICE

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5 Claims. (Cl. 200—114)

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This invention relates to circuit controlling devices and more particularly to circuit protectors having associated indicators and alarm circuits.

One object of this invention is to obtain a simple, cheap and compact circuit controlling device including a cut-out and an associated alarm actuating means which are readily accessible and are fully insulated from an operator when the elements are connected to the source of power.

In one circuit controller illustrative of this invention, a fusible element and an alarm circuit closing device operable upon the fusing of the element are mounted on the cover of a receptacle in such a manner that the cover must be removed in order to obtain access to the elements of the device. The device also serves as a switch, the main and alarm circuits being opened by the removal of the receptacle cover.

This and other features of this invention will be understood more clearly from the following detailed description when read in conjunction with the accompanying drawings in which:

Fig. 1 is an exploded perspective of a circuit controller illustrative of this invention, a portion of the receptacle being broken away;

Fig. 2 is a sectioned elevation of a portion of the alarm details of the device in the unoperated condition;

Fig. 3 is a sectional elevation of the details of Fig. 2 in the operated condition with the fuse broken; and

Fig. 4 is a circuit diagram of the controller of Fig. 1.

Referring now to Fig. 1, the circuit controller including a receptacle or fuse block 10, which may be molded of a single piece of insulating material, is arranged for panel mounting. Bolts 11, 12 and 13 extend through the bottom of the receptacle 10 and provide terminals for the load, battery and alarm circuits, respectively. Brake jaws 14, 15 and 16 are supported within the base of the receptacle 10 and secured therein by the bolts 11, 12 and 13 to provide electrical connection to knife blades 18, 19 and 20 on the receptacle cover 22.

The receptacle cover 22 forms a fuse holder for a conventional cartridge fuse 23 which is mounted in the ferrule clips 24 and 25 on the ends of the depending legs 26 and 27 which are molded integral with the molded cover 22. Metal straps 29 and 30 extend from the knife blades 18 and 19 to the base of the ferrule clips 24 and 25 so that on mounting the cover with its face 31 flush with the face 32 of the receptacle, the blades enter the brake jaws 14 and 15 to complete a circuit as shown as shown in Fig. 4 from the battery 33 to terminal 12, brake jaw 15, blade 19, strap 30, clip 25, fuse 23, clip 24, strap 29, blade 18, brake jaw 14 and terminal 11 to the load.

An auxiliary alarm circuit controlling device

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and visual indicator in the form of a cartridge fuse 35 is mounted in a bore 34 in leg 26 on cover 22. The fuse 35 has its fusible element fixed to one ferrule 36 and electrically associated with the other ferrule 37 through a coil spring 38 which axially biases a conductive cap 39 away from the ferrule 37. A ferrule terminal in the form of a coil spring 40 is mounted in the bottom of the bore 34 and is electrically associated with the line ferrule clip 24 for the main fuse 23, as by the bolt 41. The ferrule 37 at the opposite end of the fuse 35 is located in the removable cap 43 which, as shown in Figs. 2 and 3, has a bayonet 44 as an integral portion of the ferrule clip 45. This bayonet serves the dual functions of retaining the cap on the cover 22 against the ejecting force of the compression spring 40 and of providing an electrical connection to the slotted plate 46, the undersurfaces of which it engages. Plate 46 in turn is connected to the battery 33 through the strap 47 which is secured to the battery ferrule clip 25 for the fuse 23 thus placing fuses 23 and 35 in parallel between battery 33 and the line.

As set forth above, fuse 35 is provided with a metal cap 39 mounted on the spring 38 and arranged to move axially away from the ferrule 37 upon rupture of the fusible element. The cap 43 has an axial bore 50 through which the cap 39 can move to engage the contact plate 51 molded therein. Integral with the contact plate 51 is a bayonet 52 which functions as a fastener for the cap 43 and as a portion of a conductive path as in the case of bayonet 44. Thus upon rupture of fuse 35 and movement of cap 39 along bore 50 to contact plate 51, a circuit is completed from battery to blade 19, through strap 47 to ferrule clip 45, to ferrule 37, spring 38, cap 39, to contact plate 51, bayonet 52 and thence to the slotted plate 54 which receives and engages the bayonet 52 when the cap 43 is mounted and is connected to an alarm circuit through strap 55 and knife blade 20 secured to the cover, knife blade 20 in turn engaging the brake jaw 16 connected to the alarm terminal 13 on the fuse block.

Upon overload or fault in the line, main fuse 23 and parallel fuse 35 both rupture removing the supply from the line and applying it to an alarm circuit represented in Fig. 4 by the lamp 66. It is to be understood that lamp 66 is merely representative and equivalent alarms may be used, for example, an audible alarm, some other form of visual alarm or a combination including an arrangement for switching an auxiliary circuit into use. In addition to the indication of trouble provided by the energization of an alarm circuit, as shown in Fig. 3, a visual indicator is provided by an extension 56 on the cap 39 which projects through aperture 57 in the end of cap 43 when the fuse is blown, thereby indicating immediately

to a maintenance man which fuses on the panel board require replacing.

To replace the main fuse the cover is removed by grasping handle 58 and withdrawing the entire fuse carrier assembly 22 from the fuse block 10. Fuse 23 can then be removed and replaced without the use of any tools. The carrier is remounted by inserting it into the block thereby reconnecting the fuse across the terminals 11 and 12.

Alarm fuse 35 is easily replaced by turning the exposed portion of the cap 43 to release the bayonets 44 and 52 from their respective latching plates 46 and 54. The cap of the fuse can then be removed by withdrawing it from the bore 34. Since fuse 35 is held in clip 45 only by friction it can be readily withdrawn and replaced without tools. Cap 43 and fuse 35 are then inserted in the bore to mount them, the bayonets 44 and 52 being coded in order that they engage the proper circuit connectors. The form of coding illustrated comprises forming bayonet blade 52 wider than bayonet blade 44 and accommodating slot 59 for bayonet 52 in the cover plate wider than slot 60 for bayonet 44.

The device provides maximum safety for personnel, its face being entirely insulated from the conductors and the fusible element being completely enclosed thereby eliminating dangers from accidental contact of energized conductors, arcs and splattered hot metal upon rupture of the fuses. Further, maintenance is possible with a minimum of danger since the removal of the cover with the resulting separation of knife blades 18, 19 and 20 from brake jaws 14, 15 and 16 is necessary in order to obtain access to the main fuse. Also, since the clip 45 in cap 43 frictionally engages ferrule 37 and upon removal of the cap withdraws fuse 35 and disengages the ferrule 36 from the contact 40, no energized portions can be exposed and contact can only be made by the insertion of a conductor either into the bore 34 when the cover is mounted or into the receptacle when it is removed.

What is claimed is:

1. A circuit controlling device comprising a receptacle carrying contact members, closure means for said receptacle having a chamber therein, a main circuit fuse mounted on said closure means, an auxiliary circuit switching means operative upon the opening of said main circuit fuse mounted within said chamber, and contact members on said closure means associated with said main fuse and said auxiliary circuit switching means and electrically connected to said receptacle contact members only when said closure means is moved into the closed position.

2. A circuit controlling device comprising a receptacle, a pair of main circuit contacts and an auxiliary circuit contact within said receptacle, a complementary cover for said receptacle, a main circuit fuse carried on the inner side of said cover, a pair of contacts on said cover electrically associated with said main circuit fuse and engaging said main circuit contacts when said cover is mounted, a contact on said cover engaging said auxiliary circuit contact when said cover is mounted, and auxiliary circuit switching means electrically in parallel with said main circuit fuse and operative upon the rupturing thereof to connect one of said main circuit contacts to said auxiliary circuit contact.

3. A circuit controlling device comprising a receptacle, a pair of main circuit contacts and an auxiliary contact within said receptacle, a cover for said receptacle having a chamber therein extending from the exterior thereof, closure means for said chamber having an aperture therein, a main circuit fuse mounted on said cover, an auxiliary circuit switching means operative upon the opening of said main circuit fuse mounted within said chamber, an indicator associated with said auxiliary circuit switching means extending through said aperture when said means is operative, and contact members on said cover associated with said main fuse and said auxiliary circuit switching means and electrically connected to said receptacle contact members only when said cover is moved into its closed position.

4. A circuit controlling device comprising a receptacle, a pair of main circuit contacts and an auxiliary contact within said receptacle, a complementary cover for said receptacle, a main circuit fuse carried on the inner side of said cover, a pair of contacts on said cover electrically associated with said fuse and engaging said main circuit contacts when said cover is mounted, a contact on said cover engaging said auxiliary circuit contact, a second fuse connected in parallel with said first fuse, a contact electrically associated with the energy source for said first and second fuses and movable upon rupture of said second fuse, a stationary contact engageable by said movable contact and associated with said auxiliary circuit contact, and a member on said movable contact which projects from the face of said cover to provide visual indication of the rupture of said fuse.

5. A circuit controlling device comprising an insulating receptacle, a complementary insulating cover for said receptacle, a pair of inwardly projecting portions depending from said cover, one of said portions having a bore axial thereof and perpendicular to said cover, a first and second fuse contact mounted on said projecting portions, a cartridge fuse mounted on said contacts, a fuse contact in the end of the bore and electrically associated with said first fuse contact, a spring biased fusible element removably mounted in said bore, a cap for said bore, a clip on said cap resiliently engaging said fusible element and electrically associated with the second of said fuse contacts, a contact member on said fusible element axially movable thereof upon the rupture of said element, a second contact within said cap engageable by said movable contact, knife blades on said cover electrically associated with each of said fuse contacts and said second cap contact, and complementary knife blade clips within said receptacle connecting said first-mentioned fuse contacts to a main circuit and said second cap contact to an alarm circuit when said cover is mounted.

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