Dec. 9, 1941. J. G. JACKSON ET AL 2,265,233

ELECTRIC CIRCUIT CONTROLLING AND PROTECTIVE DEVICE

Filed Dec. 24, 1937 3 Sheets-Sheet 1

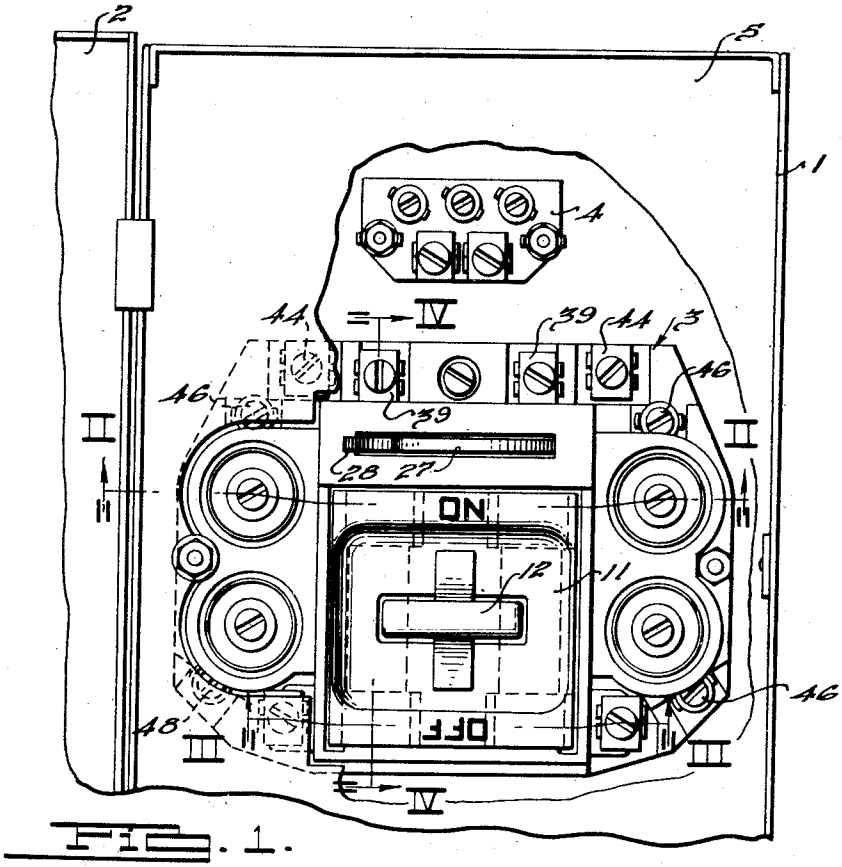

Fig. 1.

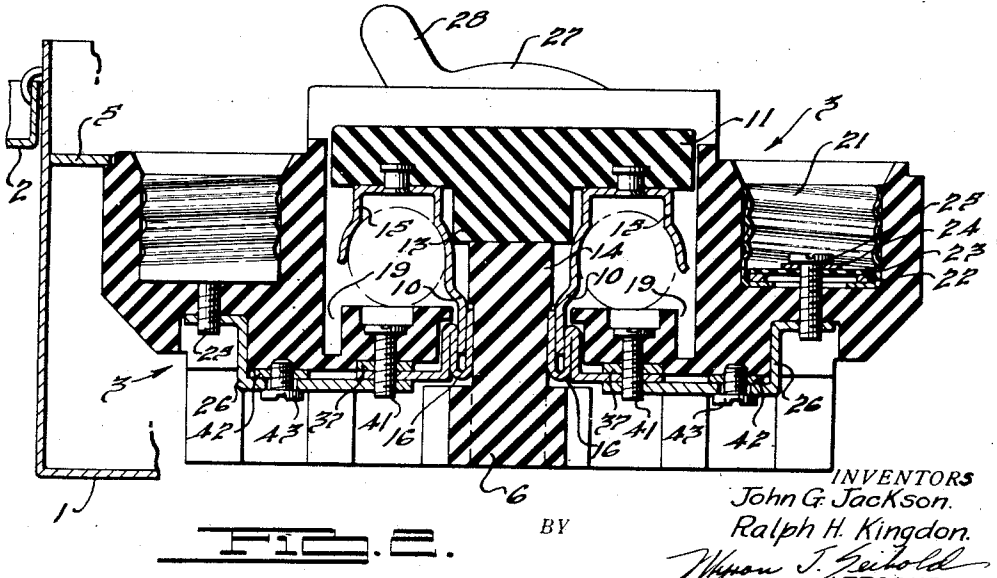

Fig. 2.

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Fig. 3.

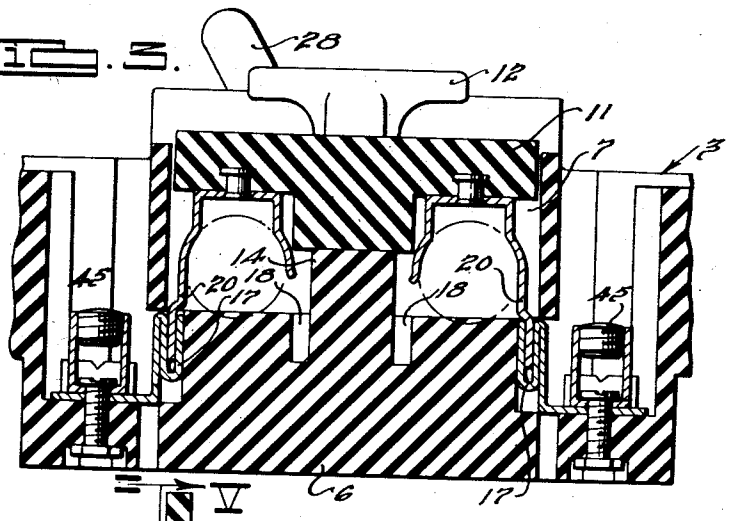
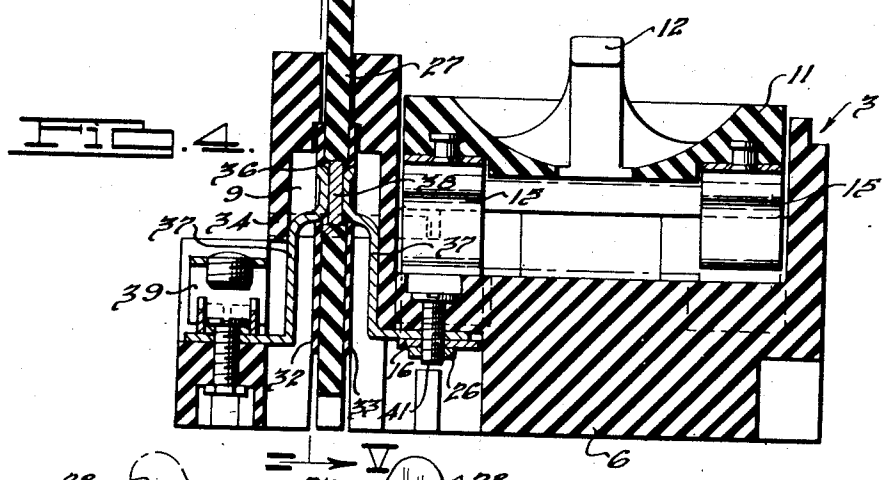


Fig. 4.



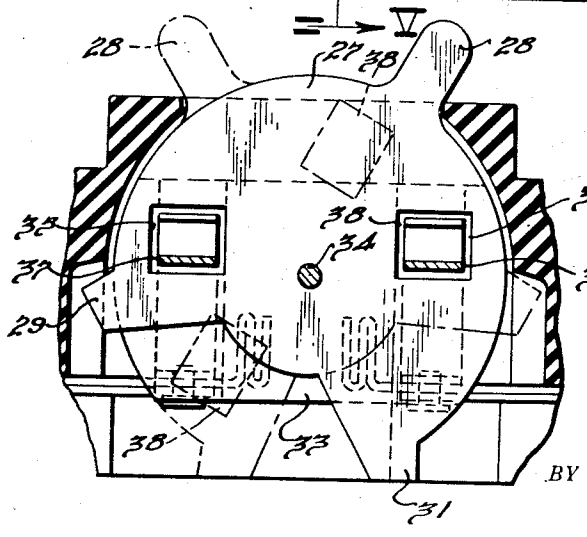


Fig. 5.

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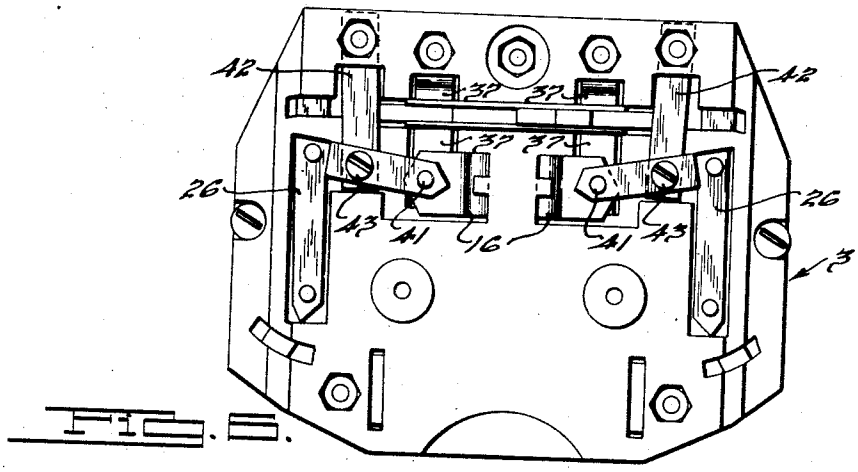

FIG. 5.

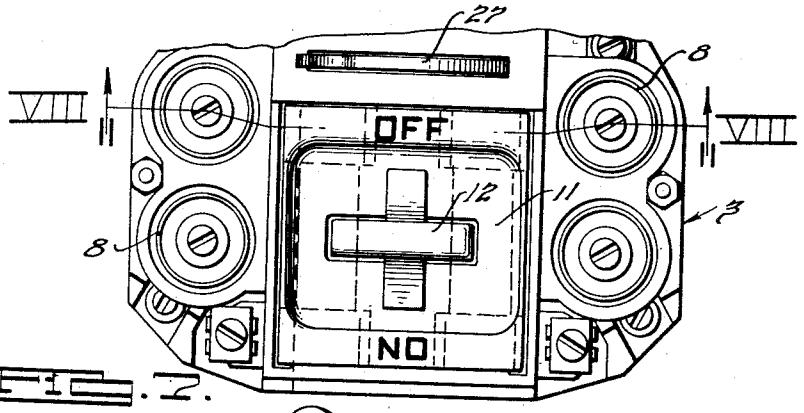

FIG. 7.

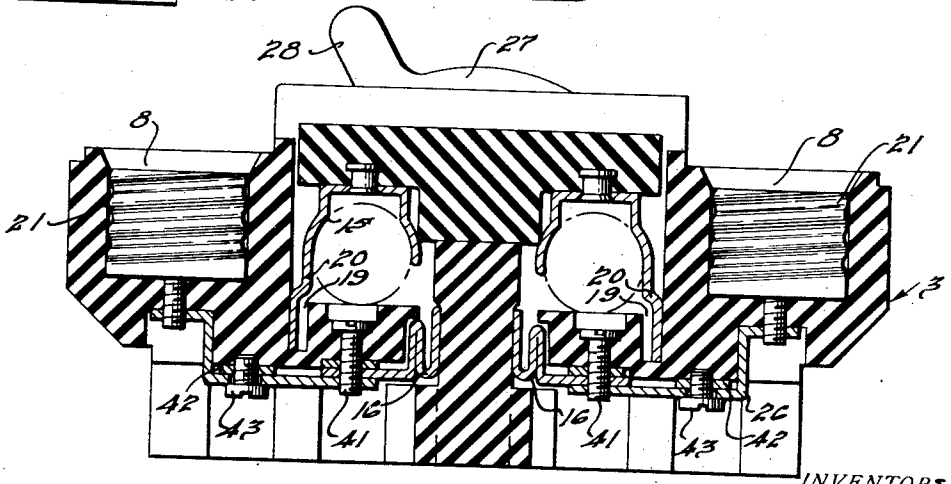

FIG. 8.

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UNITED STATES PATENT OFFICE

2,265,233

ELECTRIC CIRCUIT CONTROLLING AND PROTECTIVE DEVICE

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Application December 24, 1937, Serial No. 181,636

9 Claims. (Cl. 200—114)

This invention relates to an electric circuit controlling and protective combination and has for its object the provision of a new and improved form of such device of simplified and economical form.

Another object of the invention is to provide an improved electric circuit controlling and protecting apparatus including a main switch device and load circuit protective devices of both the cartridge and plug fuse type.

Another object of the invention is to provide an improved form of circuit protective and controlling device of the plug type including a cup-shaped receptacle and cover means therefor carrying contacts and cartridge fuse receiving means on its back face.

Other objects and features of the invention will be apparent to those skilled in the art from the following specification and the appended drawings illustrating certain preferred embodiments of the invention in which:

Figure 1 is a front elevational view of the device according to the present invention with certain parts broken away.

Figure 2 is a horizontal sectional view on the line II—II of Figure 1.

Figure 3 is a horizontal sectional view on the line III—III of Figure 1.

Figure 4 is a vertical sectional view on the line IV—IV of Figure 1.

Figure 5 is a sectional view on the line V—V of Figure 4.

Figure 6 is a back elevational view.

Figure 7 is a partial front elevational view with the cartridge fuse carrying element in its contacts disengaged position.

Figure 8 is a horizontal sectional view on the line VIII—VIII of Figure 7.

The embodiment of applicants' invention herein specifically illustrated and described comprises an outer enclosing box 1 having an openable cover 2 within which is disposed the circuit controlling and protective device generally indicated at 3 and a terminal plate 4 for the attachment of the neutral circuit conductor. A front plate 5 is provided within the box covering all parts of the interior except the manipulable portions of the device, the front plate 5 thus preventing accidental access to the terminals of the instrumentality and of the connection plate 4 while affording free access to the fuses and switch of the device. The circuit controlling and protective device indicated at 3 comprises a unitary base 6 having in its front face a generally centrally disposed cup-shaped recess 7 for the reception of the cartridge fuses and cover to be hereinafter described and, as here shown, four recesses 8 for the reception of plug fuse receiving means, the recesses 8 being disposed on opposite sides of the centrally disposed recess 7. The base 6 is further provided with an upper recess 9 opening toward the back of the base for the reception of the switching parts to be hereinafter described. A cover 11 having a grip handle 12 is provided to be received within the recess 7 and the cover 11 and the base 6 are provided with cooperating projecting portions 13 and 14 which divide the interior of the recesses into separate compartments for the reception of the individual cartridge fuses. At the back face of the cover 11 and adjacent the corners thereof are disposed jaws 15 for the reception of the ferrules of the cartridge fuses. The jaws at one end of the cover have the adjacent legs extended as at 10 to form terminal blades and at the opposite end of the cover the remote jaw legs are extended as at 20 to form contact blades. This construction may be readily seen from an inspection of Figures 2 and 3 which show respectively upper and lower sections through fuse jaws and the contacts with the cover in closed circuit position. On the base 6 and in communication with the recess 7 through openings therein are disposed contact jaw elements, those adjacent the top of the recess 7 being disposed adjacent and on opposite sides of the central dividing wall 14 as at 16. At the bottom of the recess 7 and at opposite extreme sides thereof are found contact jaws also in communication with the recess through openings thereinto as at 17. The cover 11 is adapted to be inserted into the recess 7 with the cooperating contact blades and jaws out of cooperating relation and for this purpose suitable slots for the reception of the contact blades are provided within the recess. These are represented adjacent to and on opposite sides of the dividing wall 14 as at 18 on the bottom portion of the block and at the opposite walls of the recess as at 19 at the top of the recess. With the cover 11 in the position shown more particularly in Figures 1, 2 and 3 the circuit is established through the cartridge fuses within the jaws 15 by the cooperation of the blades 10 in the jaws 16 and of the blades 20 in the jaws 17. When the cover is pulled out and rotated in a vertical plane through 180° to place the blades 20 at the top of the recess and the cover reinserted thereinto the blades 20 will be received within the recesses 19 and the blades 10 will be received within the recesses 18. In this position while the cover is in assembled posi-

tion within the recess the blades are out of contact with conducting parts and accordingly the circuits through the cartridge fuses are broken.

Within each of the front recesses 8 is disposed a conducting threaded shell 21 adapted for the reception of a plug fuse and disposed against the bottom of the shell 21 is a forked conducting portion 22 having an insulating washer 23 thereabove. A metallic washer 24 and a conducting securing screw 25 may be provided to clamp the forked conductor into conducting relation with the shell 21 and to provide a central contact by the connection of the screw 25 into conductor 26. The electric switch according to the present invention comprises a plate or disc-like movable member 27 of arcuate form having a projecting handle portion 28. The front portion of the disc or plate 27 and the handle portion 28 extend through a slot in that portion of the front of the base 6 which forms the wall of the back opening recess 9. The disc or plate 27 is provided with a pair of projections 29 and 31 adapted to cooperate with suitable abutments on the base to limit the rotative movement of the disc. At opposite sides of the plate or disc 27 are disposed insulating sheets 32 and 33. The disc 27 and the sheets 32 and 33 are maintained in place and the disc is rotatively mounted by a shaft 34. The sheets 32 and 33 are provided with registering openings 35 and 36 through which extend the contact making ends of relatively resilient contact arms 37. The disc 27 is provided with suitable openings in which are disposed conducting bridging contact elements 38 adapted to bridge the opposed stationary contacts 37 in one extreme position of rotation of the disc. The structure and operation of this switch will be more readily apparent with respect to Figures 4 and 5 where in full line position is shown the "On" position of the switch and the "Off" position is represented by the dotted line position of Figure 5, the switching operation simply involving the rotating of the disc 27 in opposite directions so that the bridging element 38 is moved into and out of engagement with the stationary contacts 37. The two contacts 37 at the top of the base are mounted on a front ledge and have mounted thereon solderless connectors 39 for the reception of the line conductors. The lower stationary contacts 37 on the switch are connected by studs 41 to an extension on the contact jaws 16 and to the conductor 26. To the conductor 26 are attached conductors 42 as by means of studs 43 and the conductors 42 extend to the top of the base where they have mounted thereon terminal connectors 44 for tapping off behind the main switch. The contact jaws 17 at the bottom of the recess 7 are extended to ledges adjacent the bottom corners of the base 6 where they receive connectors 45 for the reception of load circuits extending through the cartridge fuses within the recess 7. The forked conductor 22 within the plug fuse recesses 8 are extended through openings thereinto to the exterior of the base where they terminate in connectors 46 adapted for the attachment of branch circuit conductors.

From the previous description the operation of the device will be obvious. By the operation of the handle 28 to its open extreme position the circuit is made and broken through the main switching element at the top of the base and this interrupts the circuit through all the fused instrumentalities. In addition the load circuit through the fuses carried by the cover 11 may be interrupted by the removal of this cover and after removal the cover may be again assembled with the circuits dead by rotating it 180° and again inserting it with the blades 10 and 20 in engagement with the recesses 18 and 19. The circuit controlling and protective device according to the present invention provides an extremely compact and economical construction providing the main switch with manipulable cartridge fuse circuits and plug fuse circuits fed therefrom, the parts being mounted together in a compact and efficient arrangement.

While certain preferred embodiments of the invention have been specifically disclosed, it is understood that the invention is not limited thereto as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims.

What is claimed is:

1. An electric circuit controlling and protective device comprising a unitary base having a plurality of recesses therein, an unfused main switching mechanism in one of said recesses, line terminals connected to one side of said switching mechanism, cartridge fuse carrying means disposable in another of said recesses and having their line side connected to the other side of said switching mechanism, other of said recesses containing receptacles for the reception of plug fuses and having their line side also connected to said other side of said switching mechanism, the load side of said plug fuse receptacles and cartridge fuse carrying means being connected to individual terminals on the base adapted for connection to load circuits.

2. An electric circuit controlling and protective device comprising a unitary base having a plurality of forward opening recesses and at least one back opening recess, a cover for one of said forward opening recesses having provision on the back face thereof for carrying cartridge fuses and having terminals thereon engageable with terminals mounted on the base, other of said forward opening recesses containing receptacle adapted to receive plug fuses, and an unfused switching mechanism mounted in said back opening recess and having an operating handle extending in front of said base, line terminals connected to one side of said switching mechanism, load terminals for one side of the plug fuse receptacles and the cartridge fuse connecting terminals on the base, and means connecting the other terminals of said plug fuse receptacles and the other cartridge fuse connecting terminal to the other side of said switching mechanism.

3. An electric circuit controlling and protective device comprising a unitary base having a plurality of forward opening recesses and at least one back opening recess, a cover for one of said forward opening recesses having provision on the back face thereof for carrying cartridge fuses and having terminals thereon engageable with terminals mounted on the base, other of said forward opening recesses containing receptacles adapted to receive plug fuses, an unfused switching mechanism mounted in said back opening recess and having an operating handle extending in front of said base, line terminals connected to one side of said switching mechanism, load terminals for one side of the plug fuse receptacles and the cartridge fuse connecting terminals on the base, means connecting the other terminals of said plug fuse receptacles and the other car-

tridge fuse connecting terminals to the other side of said switching mechanism, additional circuit terminals on said base, and means connecting said last mentioned terminals to the load side of the switching mechanism to provide a tap-off directly behind the switching mechanism.

4. An electric circuit controlling and protective device comprising a unitary base, an unfused main switch mounted on said base, a plurality of cartridge and plug fuse receptacles on said base, and means connecting the line side of said cartridge and plug fuse receptacles to the load side of said main switch to individually protect the load circuits through their individual fusing means while manually controlling all of the load circuits through said main switch.

5. An electric circuit controlling and protective device comprising a unitary base having a plurality of front opening recesses therein and at least one rear opening recess, a cover for a front opening recess having provisions on the back thereof for the reception of cartridge fuses and carrying terminals cooperating with terminals on the base to connect said cartridge fuses in their circuits while providing for removal thereof with said cover, other of said front opening recesses containing receptacles adapted for the reception of plug fuses, an unfused switching mechanism in said at least one rear opening recess, an opening in the front wall defining said rear opening recess and an operating handle for said switching mechanism projecting through said front opening to be forwardly accessible to perform the manual switching operation, and means connecting the load terminals of said switching mechanism to the line terminals of said plug fuse receptacles and cartridge fuse connecting terminals.

6. An electric circuit controlling and protective device comprising a unitary base having a rear opening recess adjacent the top thereof, a front opening recess beneath said rear opening recess, an opening in the front wall defining said rear opening recess, an unfused switching mechanism within said rear opening recess having an operating handle projecting through said front opening for manual operation of the switching mechanism, a cover for said front opening recess having cartridge fuse receiving clips on the back face thereof and terminal portions connected thereto, terminals on said base and engageable from the interior of said recess by said terminal portions, and means connecting the line terminals on said base to the load terminals on said switching mechanism, and terminals accessible from the front of the base and connected to the line terminals of said switching members and to the load terminals on the base.

7. An electric circuit controlling and protective device comprising a unitary base having a rear opening recess adjacent the top thereof, an unfused switching mechanism within said rear opening recess, a front opening recess beneath said rear opening recess, a cover for said front opening recess having cartridge fuse receiving means on the back face thereof and terminal members connected thereto, terminals accessible within said recess and connectable to said first mentioned terminals, other front opening recesses at opposite sides of said base and having terminals therein for the reception and connection of plug fuses, and means connecting the line terminals for said plug and cartridge fuses to the load terminals of the switching mechanism, a plurality of terminals accessible from the front of the base, and means connecting certain of said terminals to the line terminals of said switching mechanism and other of said terminals to the load terminals for said plug and cartridge fuses.

8. An electric circuit controlling and protective device comprising a unitary base having a forward opening recess, a cover for said recess having unitary spaced clips thereon for the reception of a cartridge fuse, one leg on each clip being extended to form a terminal blade, the extended legs being located at opposite sides of the longitudinal axis of the cartridge fuse when inserted in said clips, contact jaws on said base accessible within said recess in position to cooperate with said terminal blades in one inserted position of said cover, clearance openings within said recess and offset from the longitudinal axis of an inserted cartridge fuse similarly but oppositely to the offset location of said contact jaws, said cover being also insertable into the recess when rotated 180° to reverse top for bottom while facing in the same direction, with the terminal blades received in said clearance openings to maintain the parts assembled but with the circuit through the device broken.

9. An electric circuit controlling and protective device comprising a unitary base having a forward opening recess, a cover for said recess having unitary spaced clips thereon for the reception of cartridge fuses, said clips being arranged in side by side sets with the clips in each set located adjacent to the top and bottom of the cover, terminal blades on said clips formed by extensions of a single leg of each clip, the extensions in each set being located upon opposite sides of the longitudinal axis of a cartridge fuse when received within said set, contact jaws on said base and accessible within said recess and positioned to receive said terminal blades in conducting relation when the cover is inserted in one position, said cover being insertable into the recess in another position rotated 180° to reverse top for bottom while facing in the same direction, with the terminal blades out of contact with said contact jaws whereby the parts are maintained assembled but with the circuit through the device broken.

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