Oct. 26, 1926. 1,604,191

G. E. PALMER ET AL

EXTERNALLY OPERATED FUSE AND CUT-OUT MECHANISM

Filed Feb. 21, 1923 2 Sheets-Sheet 1

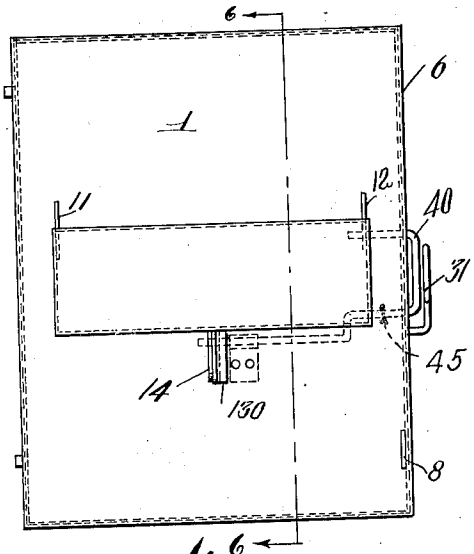


Fig. 1.

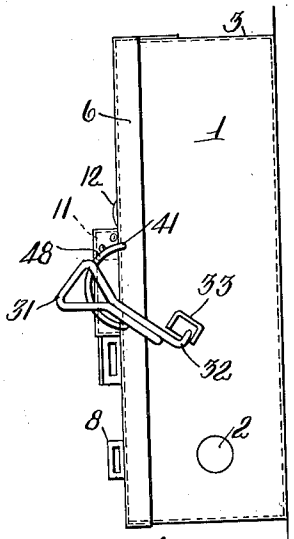


Fig. 2.

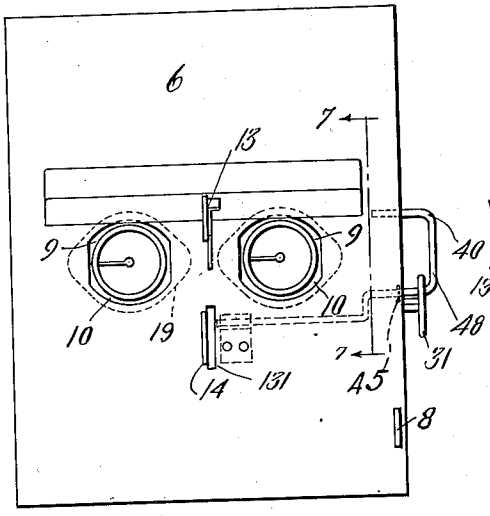


Fig. 3.

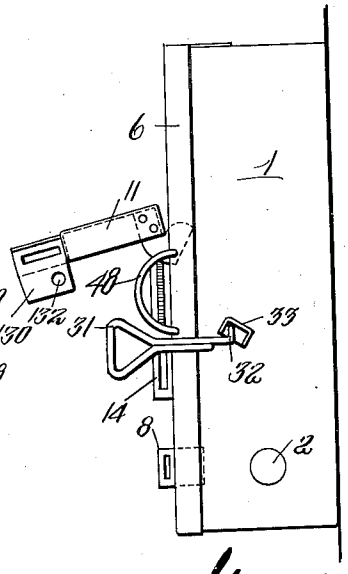


Fig. 4.

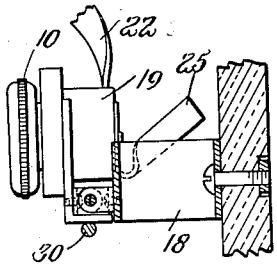


Fig. 5.

Inventors:
Granville E. Palmer,
Ernest G. Johnson.
by Wright Brown Quinby & May
Atty's.

Oct. 26, 1926. 1,604,191

G. E. PALMER ET AL

EXTERNALLY OPERATED FUSE AND CUT-OUT MECHANISM

Filed Feb. 21, 1923 2 Sheets-Sheet 2

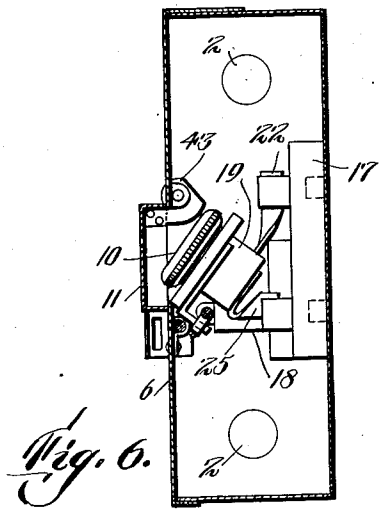


Fig. 6.

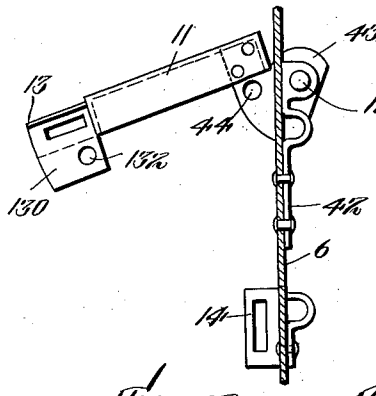


Fig. 7.

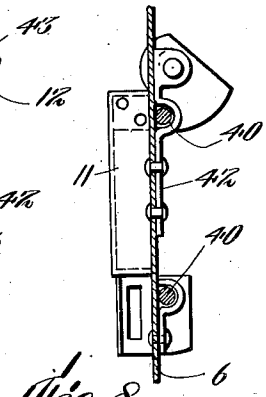


Fig. 8.

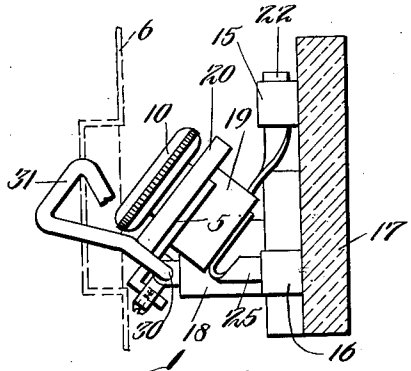


Fig. 9.

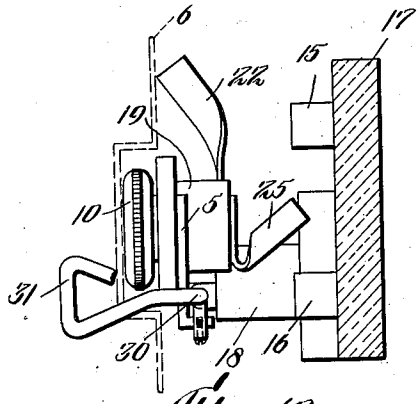


Fig. 10.

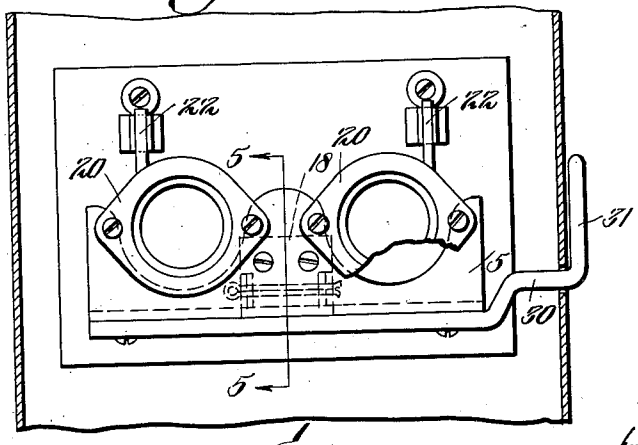


Fig. 11.

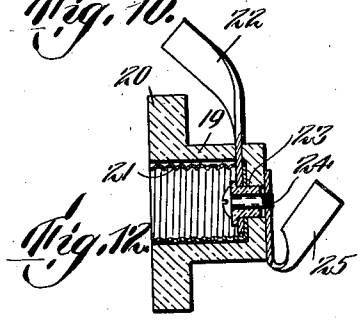


Fig. 12.

Inventors:
Granville E. Palmer,
Ernest G. Johnson
by Wright Brown Quinby & May
Attys.

Patented Oct. 26, 1926. 1,604,191

UNITED STATES PATENT OFFICE.

GRANVILLE E. PALMER, OF BROOKLINE, AND ERNEST G. JOHNSON, OF BOSTON, MASSACHUSETTS, ASSIGNORS TO THE PALMER ELECTRIC AND MANUFACTURING COMPANY, OF CAMBRIDGE, MASSACHUSETTS, A CORPORATION OF MAINE.

EXTERNALLY-OPERATED FUSE AND CUT-OUT MECHANISM.

Application filed February 21, 1923. Serial No. 620,331.

This invention relates to fuse and cut-out mechanisms of that type wherein all of the electrical current carrying parts are in an enclosure which by construction provides either limited or complete access to the members which normally form a part of the electrical conductor.

Substantially all electrical conductors supplying light and power are provided with fuses or thermal cut-outs located at one or more points in the premises in which the electric light or power is supplied. These conductors are normally enclosed except at the fuse from either intentional or accidental access for the purpose of protecting the occupants of the premises from the hazards present where electrified conductors may be touched. But as it may be the business of a user of electric power to inspect or replace the fuse, this part of the conductor must by intention be made accessible and the design of the apparatus embodied in this invention is to provide means whereby in its normal assembled condition an operator is permitted to have access to the fuse only when it is disassociated from the conductor, the construction of the device being also such that by partial disassembly an operator presumably skilled in handling electrified conductors may have access to the entire mechanism when electrified.

It may be the business of those who are unskilled in handling electrified conductors to inspect or replace electrical fuses and it may be the business of those skilled in handling electrified conductors to examine and if necessary repair electrified fuse mechanisms to correct conditions affecting the operation thereof and by the application of those construction details which are embodied in this invention as hereafter described, it will be evident to those skilled in the art that it provides means which when intact permit inspection or replacement of fuses only when they are disassociated from all electrified connections that have a difference of potential from earth, and also so constructed that by a partial disassembly the entire mechanism may be inspected when electrified and operative.

We prefer to designate the device as a cut-out mechanism to distinguish it from switching mechanisms which operate to isolate the fuse from one portion of the electrical conductor, as, in the device of this application, the fuse is disassociated from all parts of the electrical conductor when made accessible with the device in complete assembly as will be understood from a more complete description of an embodiment thereof disclosed in the accompanying drawings.

Figures 1 and 2 are front and side elevations, respectively, of the mechanism, the fuses being in operative relation to the conductors.

Figures 3 and 4 are similar views showing the fuses disassociated from the conductors and exposed.

Figure 5 is a sectional detail on line 5—5 of Figure 11, showing the fuse mounting.

Figure 6 is a section on line 6—6 of Figure 1.

Figure 7 is a detail section on line 7—7 of Figure 3.

Figure 8 is a similar view, but showing the parts in different positions.

Figures 9 and 10 are detail side elevations of the fuses in circuit associated and disassociated position, respectively, the positions of certain portions of the casing being indicated by dotted lines.

Figure 11 is a front elevation of the fuse carriers and related parts in disassociated position, the casing being shown in section.

Figure 12 is a sectional detail of a fuse carrier.

Referring to these figures at 1 is indicated a casing having side walls which may be provided with knock-outs as shown at 2 through which conductors (not shown) may be passed to and from the mechanisms within the casings. The casing may also be provided with an opening 3 in one side thereof which may house the terminal portion of the meter. The particular details of this part of the mechanism, however, are unimportant to the present invention, since they form no part thereof. The forward face of the casing 1 is normally closed by a cover 6 which as shown is provided with a perforation for the reception of a lug 8 projecting from one side of the casing 1 and which is perforated for the reception of a seal of any suitable description to prevent the unauthorized removal of the cover from the casing. This cover 6, however, is provided with one or

more apertures 9 of suitable size to permit the passage therethrough of fuses 10, which in the present instance are shown as of the plug type. These openings 9 are normally bridged and closed by a closure or auxiliary cover member 11 which as shown is hinged at 12 to the cover 6. When the auxiliary cover is closed, the fuses 10 are beneath the same and inaccessible. This closure 11 may, if desired, be provided with a perforated extension 13 which when the closure is in closed position mates a similar projection 14 carried by the cover 6 and through which a padlock may be placed so that the closure 11 may be retained in closed position to be opened only by persons authorized to renew fuses and the like, but who may not necessarily be authorized to remove the seal to open the cover 6.

Within the casing is housed the terminal block and fuse carrier. At 15 and 16 are shown stationary conductor terminals made fast to a terminal block or base of insulation 17 fixed to the rear face of the casing 1. Extending from this base 17 is a post 18, at the forward end of which is pivoted a carrier 5 to which are fixed fuse blocks 19. Each block 19 has a flange portion 20 on its forward face which in one position of the carrier 5 bridges one of the openings 9 of the cover 6. It constitutes an internal closure therefor and, when closed, prevents access therethrough to the live parts within the casing. This internal closure is thus moved toward and from the front wall or cover of the casing as the switch is opened or closed. Each block 19 as shown is provided with a plug socket consisting of a metallic threaded element 21 within which a plug fuse may be screwed, this element 21 having in electrical connection therewith an arm 22 forming a movable terminal contact cooperating with the fixed contact 15. Through the rear end of the block and centrally of the sleeve 21 is passed an insulating sleeve 23 through which is passed a screw 24 which forms an electrical connection through the center of the sleeve 21 with an arm 25 which constitutes the movable terminal contact cooperating with the fixed contact 16. Each sleeve 21 and screw 24 form fuse terminals for a fuse 10. By rocking the block 19, the arms 22 and 25 may be thrown into and out of engagement with the fixed contacts 15 and 16 to interpose or entirely remove the fuses from the electric circuit respectively and thus to make or break electrical connection between the conductors 15 and 16. For swinging the carrier 5 an oscillating rock shaft 30 fixed thereto has been provided, which extends outwardly of one end of the casing 1 and is there bent or formed into an operating lever handle 31. In order to limit the rocking motion of this handle, it is formed with an extension 32 which is bent out of plane thereof to form a stop co-operating with a U-shaped retaining member 33 made fast to the end wall of the casing 1. The portion 32 extends between the arms of the member 33 and is limited in its motion by these arms in a manner which will be evident by comparison of Figures 2 and 4 in which the handle 31 is shown in its fuse associated and disassociated positions, respectively. When the carrier is moved to fuse connected position the plug fuses 10 carried by the blocks 19 are retracted from the openings 9, but when the fuses are in disconnected position and so are electrically isolated, the fuses are projected through the openings 9 where they are housed by the closure 11. If the closure 11 is then opened, the fuses project beyond the cover 6 where they may be grasped and turned so as to be removed from the block 19 and new fuses substituted therefor without the necessity of the hand extending within any portion of the casing.

The fuses should be inaccessible for renewal when in connected position. For this purpose a locking means for the closure 11 has been provided, such means comprising a U-shaped latch member 40 sliding in a direction parallel to the axes of said auxiliary cover and the switch actuating means and interlocking with said auxiliary cover and handle 31. This member is slidable through perforations 41 in one side wall of the cover 6 and is retained on the rear face thereof by means of a bracket 42 made fast thereto. The inner side of the handle 3 when the switch is closed lies in the path of the latch member 40 so as to obstruct its movement and hold it in closure locking position. The closure 11 has fixed thereto an arm 43 which projects through a slot in the cover 6 and has therein a perforation 44 through which the upper arm of the member 40 may be projected when the closure is in closed position as shown in Figure 8. The portion 13 is also provided with an extension 130 which when the closure 11 is closed projects into the casing through a slot 131 in the cover 6, and is provided with a perforation 132 through which the lower arm of member 10 passes when the upper arm is projected through the perforation 44. When the member 40 is retracted from the perforations 44 and 132 the closure 11 is free to be swung outwardly about its pivot 12, but when it has been so swung an imperforate portion of the member 43 is in alinement with the latch so that this latch may not be thrown into locking position. To prevent removal of the latch 40 from the cover 6 one of the arms thereof may be perforated and receive therethrough a cotter pin 45. As shown the outer end of the latch member 40 is curved forwardly to form a handle portion 48 by which it may be readily grasped. This handle

portion 48 moves in a path intersecting the path of the handle 31 in such manner that the handle 48 may be pulled outwardly to release the latch member only when the handle 31 is in the position at one end of its path shown in Figure 4 when the fuses are disconnected from the conductors and are projected through the openings 9. If now the handle 48 is pulled outwardly as shown in Figure 3 to release the closure, the latch extends across the path of the handle 31 so as to prevent the fuses from being thrown into connected position. The fuses therefore can not be connected with the conductors as long as the latch 40 is in closure unlocked position and this latch may not be moved inwardly out of the way of the handle 31 until the closure 11 has been brought down into position to house the fuses and render them normally inaccessible. When it has been so brought down the latch 40 may be moved to the end of its path to locking position whereupon the handle 31 may be thrown to connect the fuses to the conductors. In this position, however, the latch 40 may not be moved to release the closure 11 the handle 31 lying across its path.

It should be noted, however, that by breaking the seal fixing the cover 6 in position, this cover may be removed carrying with it the closure 11 and the latch member 40 without in any way affecting the relation of the fuses to the conductors. The entire electrical mechanism is thus exposed for the purpose of inspection or repair to one authorized to break the seal who is presumably competent to properly treat electrified mechanism, and it may be operated in the normal manner to connect or disconnect the fuses from the conductors.

Having thus described an embodiment of this invention it should be evident to those skilled in the art that many changes and modifications might be made therein as defined by the appended claims.

We claim:

1. In a safety switch, the combination of a casing having side walls, a main cover sealable thereon and having an opening, a hinged auxiliary cover for said opening and a latch both mounted on said main cover and removable therewith, a switch within said casing, a fuse and fuse terminals beneath said auxiliary cover when closed, and oscillating means extending through a side wall of said casing for actuating said switch, said means comprising a lever handle external to said casing, said latch being movable independently of both said auxiliary cover and said handle and interlocking therewith so that when either is locked the other is free and when either is free the other is locked, said cover when locked being closed and said switch when said handle is locked being open.

2. In a safety switch, the combination of a casing having side walls, a main cover sealable thereon and having an opening spaced away from the top and bottom thereof, a hinged auxiliary cover for said opening and a movable latch both mounted on said main cover and removable therewith, a switch within said casing, a fuse and fuse terminals beneath said auxiliary cover when closed, and oscillating means extending through a side wall of said casing for actuating said switch, said means comprising a lever handle external to said casing and located opposite one end of said auxiliary cover and having its inner side in the path of said latch when said switch and cover are closed, said latch interlocking with said auxiliary cover and handle so that when either is locked the other is free and when either is free the other is locked, said cover when locked being closed and said switch when said handle is locked being open.

3. In a safety switch, the combination of a casing having side walls, a main cover sealable thereon and having an opening, a hinged auxiliary cover for said opening and a transversely slidable latch both mounted on said main cover and removable therewith, a switch within said casing, a fuse and fuse terminals beneath said auxiliary cover when closed, and oscillating means extending through a side wall of said casing for actuating said switch, said means comprising a lever handle external to said casing, said latch interlocking with said auxiliary cover and handle so that when either is locked the other is free and when either is free the other is locked, said cover when locked being closed and said switch when said handle is locked being open.

4. In combination with a casing having an opening therein, a closure for said opening, conductors and a fuse in said casing movable into and out of electrical connection with said conductors, of a rocking member outside of said casing for moving said fuse, and a latch movable into and out of position to hold said closure in closed position, said rocking member lying in the path of motion of said latch to prevent unlocking of said closure except when said rocking member is in position to retain said fuse out of connection with said conductors.

5. In combination with a casing having an opening therein, a closure for said opening, conductors and a fuse in said casing, of a rocking member outside of said casing for moving said fuse into and out of electrical connection with said conductors, and a latch movable into and out of position to hold said closure in closed position, said rocking member lying in the path of motion of said latch to prevent unlocking of said closure except when said rocking member is in position to hold said fuse out of connec-

tion with said conductors, and said latch projecting into the path of motion of said rocking member to prevent said rocking member being moved to position to hold said fuse in connection with said conductors except when said latch is in locking position.

6. In combination with a casing having an opening therein, a closure for said opening, conductors and a fuse in said casing movable into and out of electrical connection with said conductors, of a rocking member outside of said casing for moving said fuse, a latch movable into and out of position to hold said closure in closed position, said rocking member lying in the path of motion of said latch to prevent unlocking of said closure except when said rocking member is in position to hold said fuse out of connection with said conductors, and said latch projecting into the path of motion of said rocking member to prevent said rocking member being moved to position to hold said fuse in connection with said conductors except when said latch is in locking position, and means for preventing said latch from being moved to locking position except when said closure is closed.

7. In combination with a casing having an opening, a closure for said opening, conductors and a fuse in said casing, of a movable member for holding said closure in closed position, and a movable member for moving said fuse into and out of electrical connection with said conductors, the paths of movement of said members intersecting in such manner that each may be moved only when the other is positioned at one end of its path.

8. In combination with a casing having an opening, a closure for said opening, conductors and a fuse in said casing, of a movable member for holding said closure in closed position, and a movable member for moving said fuse into and out of electrical connection with said conductors, the paths of movement of said members intersecting in such manner that said holding member may be moved only when said actuating member is in position to retain said fuse out of connection with said conductors and said actuating member may be moved only when said holding member is in position to retain said closure closed.

9. In combination with a casing having an opening, a closure for said opening, conductors and a fuse in said casing, of a movable member for holding said closure in closed position, and a movable member for moving said fuse into and out of electrical connection with said conductors, both of said members being accessible from without said casing, the paths of movement of said members intersecting in such manner that said holding member may be moved only when said actuating member is in position to hold said fuse out of connection with said conductors and said actuating member may be moved only when said holding member is in position to retain said closure closed.

10. In combination with a casing having an opening, a closure for said opening, conductors and a fuse in said casing, of a movable member for holding said closure in closed position, and a movable member for moving said fuse into and out of electrical connection with said conductors, the paths of movement of said members intersecting in such manner that said holding member may be moved only when said actuating member is in position to hold said fuse out of contact with said conductors and said actuating member may be moved only when said holding member is in position to retain said closure closed, and means for preventing movement of said holding member except when said closure is in closed position.

In testimony whereof we have affixed our signatures.

GRANVILLE E. PALMER.
ERNEST G. JOHNSON.