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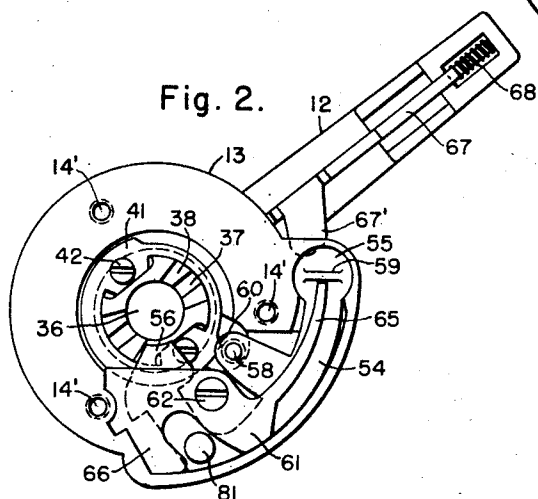
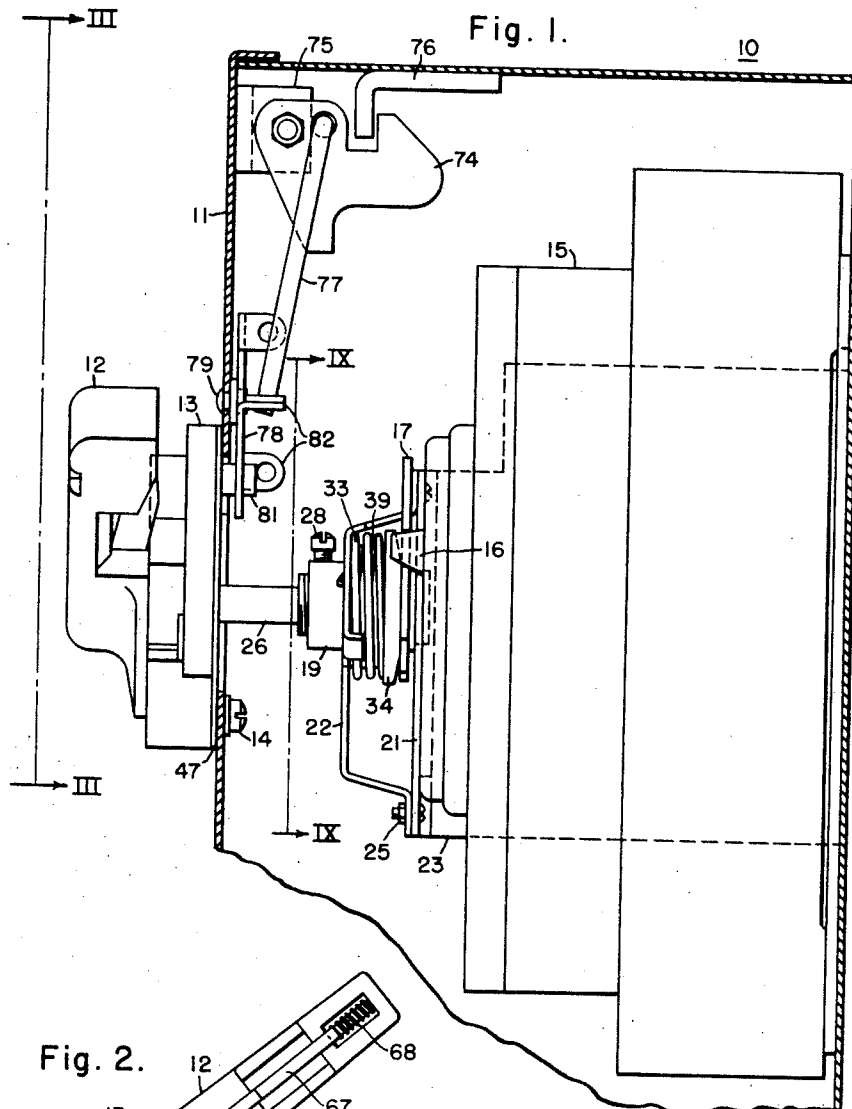
J. O. REXROAD

2,806,099

OPERATING MECHANISM FOR ENCLOSED CIRCUIT BREAKERS OR SWITCHES

Filed April 19, 1955

3 Sheets-Sheet 1



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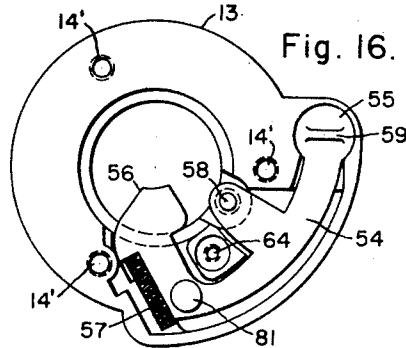
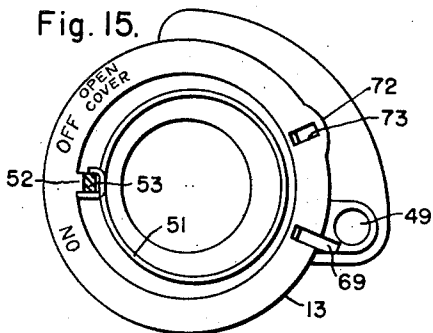
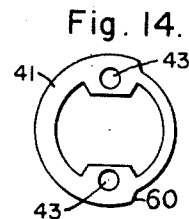
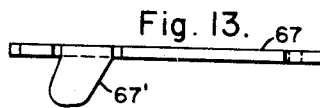
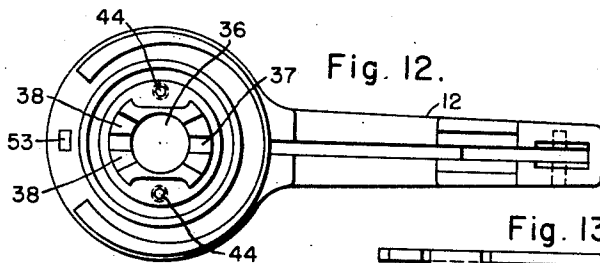
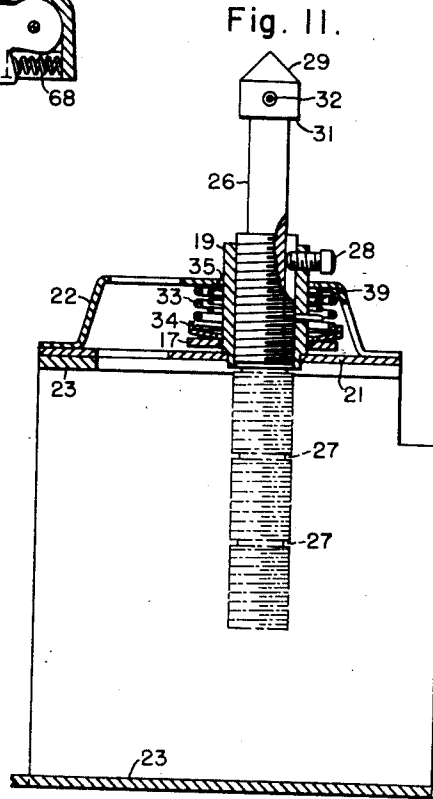
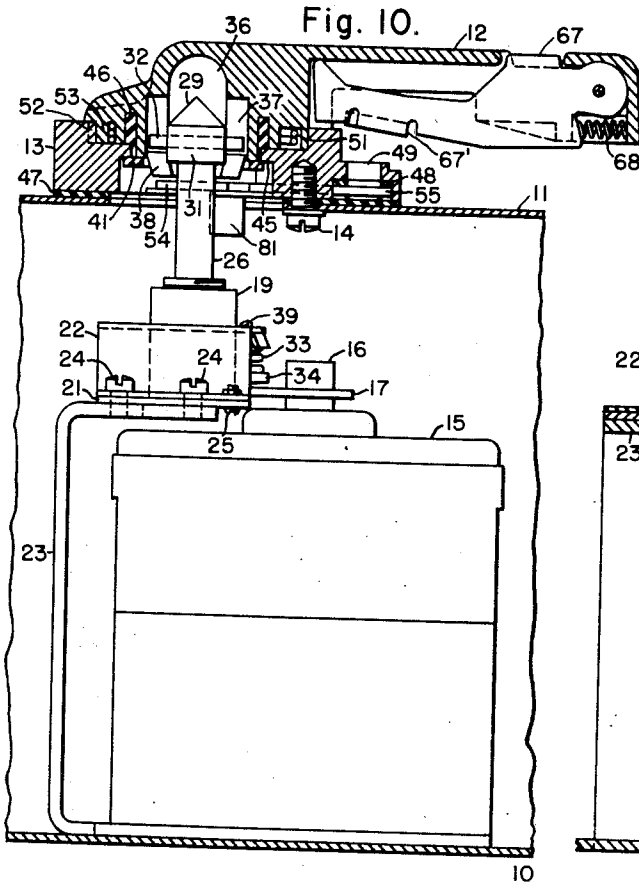
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3 Sheets-Sheet 3

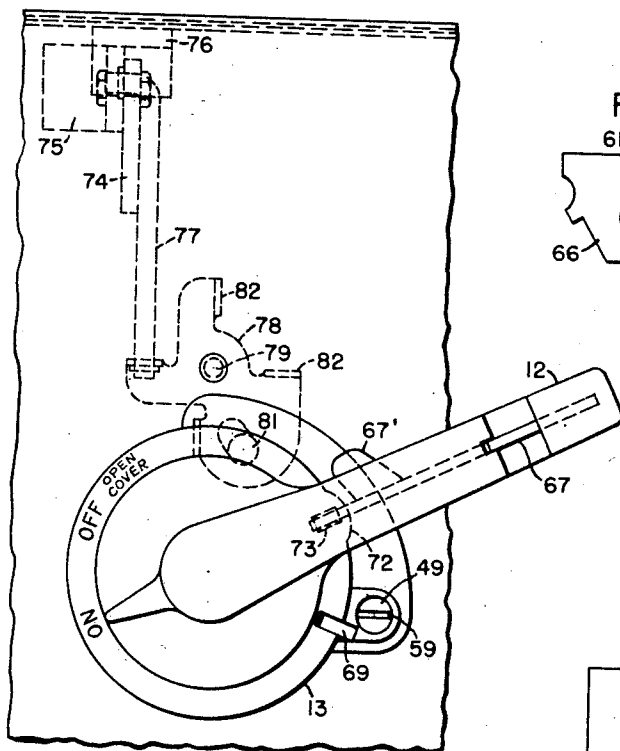


Fig. 3.

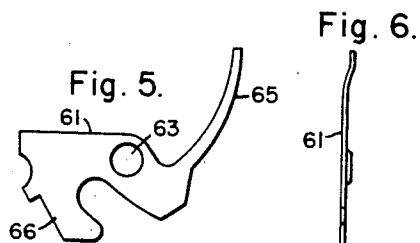


Fig. 5.

Fig. 6.

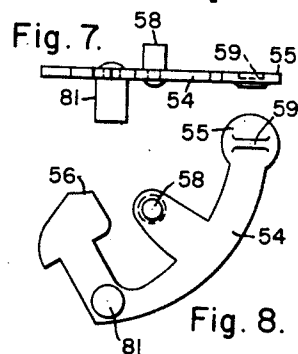


Fig. 7.

Fig. 8.

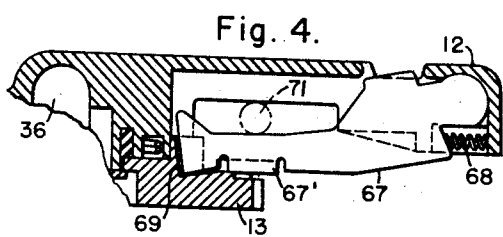


Fig. 4.

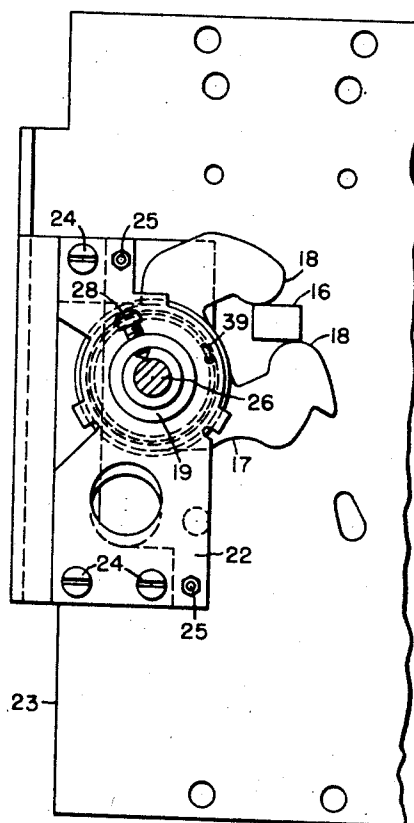


Fig. 9.

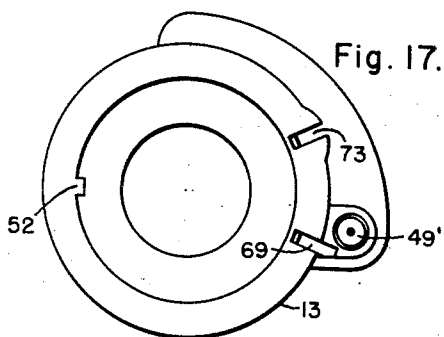


Fig. 17.

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2,806,099

OPERATING MECHANISM FOR ENCLOSED CIRCUIT BREAKERS OR SWITCHES

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Application April 19, 1955, Serial No. 562,465

18 Claims. (Cl. 200—50)

My invention relates, generally, to operating mechanisms for circuit interrupters, such as automatic circuit breakers and manually operable switches, which are mounted inside enclosing cabinets and, more particularly, to mechanisms having an operating handle mounted on the cover of the cabinet.

An object of my invention, generally stated, is to provide an operating mechanism for an enclosed circuit interrupter which shall be simple and efficient in operation and which may be economically manufactured and installed.

A more specific object of my invention is to provide an operating mechanism which may be readily adapted to enclosures of various depths.

Another object of my invention is to provide an operating mechanism for an enclosed circuit interrupter which does not require accurate alignment of the parts of the mechanism for satisfactory operation of the mechanism.

A further object of my invention is to provide an operating mechanism having an external handle which is self-aligning with the position of the interrupter handle inside the cover.

Still another object of my invention is to provide a simplified and improved cover interlocking device which does not require adjustment to maintain satisfactory operation after being installed.

A still further object of my invention is to provide means for releasing the cover interlock except when the switch is locked in the "off" position.

Yet another object of my invention is to provide an operating mechanism having the following features:

(a) The cover is slam-proof; that is, it may be slammed closed without damaging the circuit interrupting device.

(b) The cover cannot be closed without the external handle giving a positive indication of the position of the device handle.

(c) A cover interlock is supplied which does not require adjustment. The interrupting device must be "off" to open the cover, except as noted in (d).

(d) A means of defeating the cover interlock is available if the feature is desired.

(e) The external handle will not operate the interrupting device before the cover interlock is engaged.

(f) The device can be locked "off" with a number of padlocks having hasps of different sizes.

(g) When the device is locked "off" the cover is also locked closed and the cover interlock defeating means is covered by the handle.

(h) A means of locking the device "on" is available if desired.

(i) The mechanism can be mounted on covers of different thicknesses without special adapters or adjustment.

(j) The mechanism can be adapted for use with special cover latches for large cabinet doors where it is desirable to latch at the edges.

(k) Provision is made for complete gasketing against the entrance of oil, etc. into the enclosure.

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Other objects of my invention will be explained fully hereinafter or will be apparent to those skilled in the art.

In accordance with one embodiment of my invention, an operating handle is rotatably mounted in a hub which is attached to the outer surface of the cover for a cabinet which encloses a circuit interrupting device. Actuating means for opening and closing the circuit interrupter is mounted inside the cabinet and connected to the handle by means of a shaft, one end of which enters a recess in the handle when the cover is closed. The other end of the shaft is spring mounted to permit universal movement of the end which enters the handle. A spring-biased interlocking latch is pivotally mounted in the hub and engages a shoulder on the shaft to prevent opening the cover except when the handle is in the "open cover" position. A locking lever is pivotally mounted in the handle and padlocks may be fastened on the handle to lock the handle in the "off" position by means of the locking lever. A projection on the locking lever prevents access to cover releasing means when the handle is locked in the "off" position.

For a better understanding of the nature and objects of the invention, reference may be had to the following detailed description, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a view, partly in side elevation and partly in section, of a cabinet and mechanism for operating a circuit interrupting device mounted inside the cabinet, the handle of the operating mechanism being shown in the "on" position;

Fig. 2 is a view, in bottom plan, of the operating handle and mounting hub with the handle in the "open cover" position;

Fig. 3 is a view, in front elevation, taken along the line III—III in Fig. 1;

Fig. 4 is a view, in section, of a portion of the handle assembly, the handle being locked in the "off" position;

Figs. 5 and 6 are views, in plan and side elevation, respectively, of a spring for retaining the interlocking latch in the hub;

Figs. 7 and 8 are views, in elevation and plan, respectively, of the interlocking latch;

Fig. 9 is a view, partly in section and partly in front elevation, of the actuating mechanism for actuating the operating member of the circuit interrupter, the section being taken along the line IX—IX in Fig. 1;

Fig. 10 is a view, partly in section and partly in plan, of the handle assembly and actuating mechanism, the handle being midway between "off" and "on" positions;

Fig. 11 is a view, in section, of the actuating mechanism and its supporting frame;

Fig. 12 is a view, in bottom plan, of the external operating handle;

Fig. 13 is a view, in bottom plan, of the locking lever;

Fig. 14 is a view, in bottom plan, of a combined retaining washer and cam;

Fig. 15 is a view, in top plan, of the hub for the external operating handle;

Fig. 16 is a view, in bottom plan, of the hub shown in Fig. 15; and

Fig. 17 is a view similar to Fig. 15, showing modifications in the hub structure.

Referring to the drawings, and particularly to Fig. 1, the structure shown therein comprises a sheet metal cabinet 10 having a cover 11 attached to the cabinet by means of hinges (not shown). An external operating handle 12 is rotatably mounted in a hub 13 which may be attached to the cover 11 by screws 14 inserted in tapped holes 14' in the hub 13. As will be more fully described hereinafter, the handle 12 is utilized for oper-

ating the switch or circuit breaker 15 mounted inside the cabinet 10.

The circuit breaker 15 may be of the type described in Patent No. 2,047,739, issued to H. J. Lingal, July 14, 1936, and assigned to the assignee of the present invention. The circuit breaker 15 is provided with contact members (not shown) and an operating mechanism for opening and closing the contact members by means of an operating member 16. As described in the aforesaid patent, the circuit breaker is also provided with a tripping mechanism which is operable in response to predetermined overload currents to effect automatic opening of the contact members.

As previously mentioned, the contact members of the circuit breaker may be manually opened and closed by oscillatory movement of the operating member 16 which is actuated by movement of the external operating handle 12. As indicated in Fig. 3, the operating handle 12 may be moved to an "on" position to close the contact members of the circuit breaker 15. The handle 12 may be moved to an "off" position to open the contact members of the circuit breaker. The handle 12 is automatically moved to a position substantially midway between the "off" and the "on" positions when the contact members of the circuit breaker are opened by the overload tripping mechanism.

As will be described more fully hereinafter, the handle 12 may be moved to an "open cover" position in order to permit the opening of the cover 11 of the cabinet 10. The handle 12 may also be moved to, or slightly, beyond the "open cover" position and then to the "on" position in order to reclose the contact members of the breaker after they have been opened by the tripping mechanism.

As shown most clearly in Figs. 9, 10 and 11, the operating member 16 of the circuit breaker 15 is actuated by an actuating plate 17 having spaced arms 18 for engaging the member 16. The actuating plate 17 is secured to a sleeve 19 by welding or other suitable means. The lower end of the sleeve 19 is rotatably mounted in a bearing plate 21. The bearing plate 21 and a bracket 22 are attached to a generally U-shaped frame 23 by screws 24. The plate 21 may also be attached to the bracket 22 by bolts or rivets 25. As shown in Fig. 10, the frame 23 may be attached to the bottom wall of the cabinet 10. This may be done by utilizing the breaker mounting screws which may extend through clearance holes in the frame 23.

As shown most clearly in Fig. 11, a shaft 26 is threaded into the bearing sleeve 19. As shown by the broken lines, the shaft 26 is scored at predetermined intervals 27 when it is manufactured to permit portions of the shaft to be removed to obtain approximately the desired length when the operating mechanism is installed in the housing 10. Thus, the shaft may be utilized in housings having various depths. The surplus portion of the shaft must be removed before it is threaded into the sleeve 19. The shaft may be adjusted longitudinally by means of the threaded sleeve, thereby securing the proper height of the upper end of the shaft for engagement by the handle 12 when the cover 11 is fully closed to insure proper operation of the actuating mechanism. After the shaft 26 is properly adjusted, it is retained in the correct position by means of a set screw 28. The upper end of the shaft 26 has a conically-shaped end 29 and a shoulder 31 below the conical portion 29. A pin 32 is inserted transversely through the shaft 26.

In order to permit universal movement of the upper end of the shaft 26, a compression spring 33 is disposed around the sleeve 19 between the plate 17 and the bracket 22. A cup-shaped washer 34 is provided for holding the lower end of the spring 33. An opening 35 in the bracket 22 for the sleeve 19 is of a larger diameter than the sleeve 19. Thus, the upper end of the shaft 26 may move a predetermined amount from a vertical position to

permit the upper end of the shaft to enter a recess 36 in the handle 12, even though the recess 36 is out of alignment with the lower end of the shaft. A slot 37 is provided in the handle 12 for receiving the pin 32. As shown in Figs. 10 and 12, sloping surfaces 38 are provided in the handle 12 for guiding the pin 32 into the slot 37 as the shaft enters the recess 36. In this manner, a certain amount of misalignment is permitted between the shaft 26 and the handle 12, thereby facilitating the installation of the operating mechanism in cabinets having small manufacturing errors.

A torsion spring 39 is also provided around the sleeve 19. One end of the spring 39 is connected to the bracket 22 and the other end is connected to the sleeve 19 to bias the handle 12 toward the "on" position when the cover is closed. In this manner, the weight of the handle 12 is counteracted when the cabinet is mounted in the vertical position shown in the drawings, thereby keeping the handle in the full "on" position when the circuit breaker or switch is closed.

As previously stated, the handle 12 is rotatably mounted in the hub 13 which is attached to the outer surface of the cover 11 by screws 14. The handle 12 is retained in the hub 13 by means of a washer 41 which also functions as a cam to release an interlocking device as well be explained more fully hereinafter. The washer 41 is attached to the handle 12 by means of screws 42 which extend through openings 43 in the washer into tapped holes 44 in the handle 12. As shown in Fig. 10, the washer 41 engages a shoulder 45 on the hub 13 to retain the handle 12 in position. A gasket 46 may or may not be provided around the opening in the hub 13 for the handle 12, thereby preventing dirt and other foreign matter from entering the cabinet around the handle when it is used. A gasket 47 may be provided between the hub 13 and the cover 11. A gasket 48 is also provided for around an opening 49 in the hub 13 which is provided for defeating the interlocking device, as will be described hereinafter.

As shown most clearly in Fig. 15, a torsion spring 51, which is mounted in the handle 12 as shown in Fig. 10, is disposed in the hub 13 when the handle and the hub are assembled together to bias the handle 12 to a position substantially midway between the "on" and the "off" positions when the cover 11 is open, and the cabinet is mounted vertically as shown in Fig. 1. The torsion spring 51 engages a projection 52 on the hub 13 and a projection 53 on the handle 12 to overcome the weight of the handle and bias the handle to its mid position. In this manner, the handle is retained in its mid position when the cover is open, thereby causing the pin 32 in the shaft 26 to engage the sloping surfaces 38 in the handle and guide the pin into the slot 37 as the cover is being closed. Thus, breakage of any of the parts by slamming the cover with the handle in an improper position is prevented. When the cover is closed, the handle is actuated by the pin 32 to its proper position in accordance with the position of the breaker handle 16 or the operating member of the switch. If the cabinet is to be mounted horizontally, a double-acting spring may be substituted for the single-acting spring 51.

As previously explained, an interlocking device is provided to normally prevent opening the cover 11 except when the handle 12 is actuated to the "open cover" position. As shown most clearly in Fig. 16, an interlocking latch 54 is pivotally mounted in the hub 13. One end 55 of the latch 54 pivots in a recess in the hub 13. The other end 56 of the latch 54 is biased by a spring 57 to a position underneath the shoulder 31 on the shaft 26 when the cover is closed.

Thus, the end 56 of the latch 54 engages the shoulder 31 on the shaft 26 to prevent opening the cover 11 when the handle 12 is in the "on" position and the contact members of the breaker are closed. The latch 54 still engages the shoulder 31 when the handle is in the "off" position

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and the contact members of the breaker are open. However, when the handle 12 is actuated to the "open cover" position, a cam portion 60 on the washer 41 engages a pin 58 on the latch 54 to release the latch from engaging the shoulder 31, thereby permitting the cover to be opened.

As explained hereinbefore, the latch 54 may be released by an authorized person to defeat the interlock when the handle is in the "on" position and the breaker is closed, thereby permitting inspection of the equipment inside the cabinet. This may be accomplished by inserting a screwdriver or other tool through the opening 49 into a groove 59 provided in the latch 54 and turning the screwdriver. Thus, the latch may be actuated to disengage the shaft 26 and permit the cover to be opened.

The latch 54 is retained in the hub by a spring 61 which is attached to the hub by a screw 62 inserted through an opening 63 in the spring and threaded into a tapped hole 64 in the hub 13. The spring 61 has an arm 65 which engages the latch 54 to retain the latch in the hub 13. The spring 61 has another arm 66 which covers the spring 57 to retain it in position in the hub 13. The spring 61 is shown in detail in Figs. 5 and 6. The latch 54 is shown in detail in Figs. 7 and 8 of the drawings. The camming washer 41 is shown in detail in Fig. 14.

A locking lever 67 is pivotally mounted in the handle 12 in order that the handle may be locked in the "off" position, thereby preventing the closing of the circuit breaker or switch. As shown in Fig. 10, the lever 67 is normally biased to its uppermost position by a compression spring 68. When the handle 12 is in the "off" position, the lever 67 may be depressed into a slot 69 in the hub 13. As shown in Fig. 4, a hasp 71 of a padlock may be installed around the handle 12 between the lever 67 and the handle to retain the lever in the slot 69. Thus, the handle may be locked in the "off" position to prevent closing the circuit breaker or switch. As previously explained, the cover 11 cannot be opened when the handle 12 is in the "off" position. Therefore, access cannot be gained to the inside of the cabinet to close the circuit breaker.

As shown most clearly in Fig. 13, the lever 67 has a laterally extending projection 67' which covers the opening 49 in the hub 13 when the handle 12 is in the "off" position. Therefore, a screwdriver or other tool cannot be inserted into the opening 49 to release the interlocking latch 54 to permit opening the cover 11. Accordingly, the interlock cannot be defeated when the handle 12 is locked in the "off" position. In this manner, a workman or other person who installs his padlock on the handle 12 to lock the switch "off" is assured that the switch cannot be closed while his padlock is installed. It will be noted that space is provided for the installation of several padlocks on the switch handle at the same time. Therefore, each one of a group of workmen can lock the switch "off" with his own padlock.

Provision for locking the switch in the "on" position may be made by removing a small amount of metal 72 from the hub 13 to permit the lever 67 to enter a slot 73 provided in the hub 13. The open slot 73 is shown in Fig. 17. As previously explained, the cover 11 is normally retained closed by the interlocking latch 54 when the handle 12 is in the "on" position. However, the interlocking latch 54 may be released by means of a screwdriver as previously explained. The opening 49 is not covered by the projection 67' on the locking lever 67 when the handle 12 is in the "on" position. If the interlocking release is not desired, a knock-out 49' may be left in the hub 13, as shown in Fig. 17, thereby leaving the opening 49 closed and preventing operation of the latch 54 from the exterior of the cabinet.

While the invention has been described using the designations "on" and "off" and "open cover" for the positions as shown in Figs. 3 and 15, it is to be understood

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that other nomenclature could be used. For example, the position marked "open cover" is also an "off" position and could be so marked. Then, the position marked "off" could be marked "lock" meaning that the switching device is to be locked off and the cover is locked closed in that position.

When the operating mechanism is utilized on cabinets having unusually long covers, additional means may be provided for locking the ends of the cover closed. As shown most clearly in Fig. 1, a latch 74 is pivotally mounted on a bracket 75 attached to the cover 11. The latch 74 is disposed to engage an angle member 76 attached to one end of the cabinet 10 to retain the cover closed. The latch 74 is actuated to permit the cover to be opened by means of a link 77 which is connected to a lever 78 rotatably mounted on a rivet 79 in the cover 11. The lever 78 is actuated by a pin 81 secured to the interlocking latch 54. Thus, the latch 74 is actuated to permit the cover 11 to be opened when the interlocking latch 54 is actuated to disengage the shaft 26. As shown, the lever 78 is provided with several arms 82 to permit the operation of additional latches similar to the latch 74 if it is desired to install additional latches. In this manner, the ends of long covers are prevented from being pried open to gain access to the interior of the cabinet.

It will be noted that the frame 23 and the actuating mechanism supported by the frame may be mounted in the cabinet independently of the circuit breaker unit 15. Thus, the breaker may be removed without it being necessary to remove the actuating mechanism. Furthermore, the parts of the actuating mechanism comprising the plate 17, the shaft 26, the bearing sleeve 19, the springs 33 and 39, and the washer 34 may be assembled in the bearing plate 21 and the bracket 22 as a unit. This unit may be attached to the frame 23 after the frame 23 is installed in the cabinet 10. The handle assembly comprising the hub 13 and the handle 12 may be installed on the lid of the cabinet by means of the screws 14 as previously explained. As also previously explained, the shaft 26 may be adjusted longitudinally to permit the mechanism to be installed in cabinets of various depths. The shaft should be so adjusted that the pin 32 is past the sloping surfaces 38 and in the slot 37 when the cover 11 is fully closed.

Furthermore, universal movement of the upper end of the shaft is permitted by the spring 33 to obtain satisfactory operation of the mechanism without accurate alignment between the shaft 26 and the handle 12. The thickness of the cover 11 will not affect the operation of the mechanism. With extremely thick covers, it may be necessary to provide longer screws 14 for attaching the hub 13 to the cover. The longitudinal adjustment of the shaft 26 will compensate for variations in the thickness of the cover 11. The proper engagement of the interlocking latch 54 with the shoulder 31 is obtained by making the distance from the shoulder 31 to the centerline of pin 32 correct when they are manufactured. When the cover is being closed, latch 54 engages before there is enough engagement between pin 32 and sloping surfaces 38 to allow the breaker to be operated to the "on" position by movement of the handle 12.

From the foregoing description it is apparent that I have provided a mechanism for operating enclosed circuit breakers or switches which is relatively simple in construction. The mechanism provides all the safety interlocking features considered desirable in such a mechanism. The present mechanism is particularly suitable for installation in cabinets or housings which are not supplied by the manufacturer of the circuit breakers or switches and the handle operating mechanism. As explained, the mechanism may be installed in cabinets of various depths, and close manufacturing tolerances do not have to be maintained in order to secure proper operation of the mechanism.

Since numerous changes may be made in the above described construction, and different embodiments of the invention may be made without departing from the spirit and scope thereof, it is intended that all matter con-

tained in the foregoing description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. In combination, a circuit interrupter having a movable operating member for opening and closing the interrupter, a cabinet in which the interrupter is mounted in a fixed position, an openable cover for the cabinet, an external operating handle rotatably mounted on the cover, actuating means disposed inside the cabinet separately from the interrupter and operated by said handle to actuate the operating member of the interrupter, a rotatable shaft interconnecting said actuating means and said handle, said shaft having one end engaged by said handle when the cover is closed, spring means at the other end of the shaft to permit universal movement of the end engaged by the handle, and said shaft being adjustable in length for use in cabinets of various depths.

2. In combination, a circuit interrupter having a movable operating member for opening and closing the interrupter, a cabinet in which the interrupter is mounted in a fixed position, an openable cover for the cabinet, an external operating handle rotatably mounted on the cover, actuating means disposed inside the cabinet separately from the interrupter and operated by said handle to actuate the operating member of the interrupter, a rotatable shaft interconnecting said actuating means and said handle, said shaft having one end engaged by said handle when the cover is closed, and spring means at the other end of the shaft to permit universal movement of the end of the shaft engaged by the handle.

3. In combination, a circuit interrupter having a movable operating member for opening and closing the interrupter, a cabinet in which the interrupter is mounted in a fixed position, an openable cover for the cabinet, an external operating handle rotatably mounted on the cover, actuating means disposed inside the cabinet and operated by said handle to actuate the operating member of the interrupter, a rotatable shaft interconnecting said actuating means and said handle, said shaft having one end engaged by said handle when the cover is closed, supporting means fixed in the cabinet for supporting the other end of the shaft, and said shaft being adjustable longitudinally in said supporting means.

4. In combination, a circuit interrupter having a movable operating member for opening and closing the interrupter, a cabinet in which the interrupter is mounted in a fixed position, an openable cover for the cabinet, an external operating handle rotatably mounted on the cover, actuating means disposed inside the cabinet and operated by said handle to actuate the operating member of the interrupter, a rotatable shaft interconnecting said actuating means and said handle, said shaft having one end engaged by said handle when the cover is closed, supporting means fixed in the cabinet for supporting the other end of the shaft, and spring means surrounding the end of the shaft at said supporting means to permit lateral movement of the end of the shaft engaged by the handle.

5. In combination, a circuit interrupter having a movable operating member for opening and closing the interrupter, a cabinet in which the interrupter is mounted in a fixed position, an openable cover for the cabinet, an external operating handle rotatably mounted on the cover, actuating means disposed inside the cabinet and operated by said handle to actuate the operating member of the interrupter, a rotatable shaft interconnecting said actuating means and said handle, said shaft having one end engaged by said handle when the cover is closed, supporting means fixed in the cabinet for supporting the other end of the shaft, said supporting means permitting lateral movement of the end of the shaft engaged by the handle, and a torsion spring for biasing said shaft to counteract the weight of the handle when the handle engages the shaft.

6. In combination, a circuit interrupter having a mov-

able operating member for opening and closing the interrupter, a cabinet in which the interrupter is mounted in a fixed position, an openable cover for the cabinet, an external operating handle rotatably mounted on the cover, actuating means disposed inside the cabinet and operated by said handle to actuate the operating member of the interrupter, a rotatable shaft interconnecting said actuating means and said handle, said shaft having one end engaged by said handle when the cover is closed, supporting means fixed in the cabinet for supporting the other end of the shaft, and threaded means for adjusting said shaft longitudinally in said supporting means.

7. A mechanism for operating a circuit interrupter mounted inside a cabinet having an openable cover comprising a hub for attaching to the cover, a handle rotatably mounted in the hub, actuating means for mounting inside the cabinet to actuate the circuit interrupter, a rotatable shaft interconnecting said actuating means and said handle, said handle having a recess therein for receiving one end of said shaft when the cover is closed, an interlocking latch pivotally mounted in said hub to engage the shaft to prevent opening the cover, and cam means movable with the handle for actuating said latch to permit opening the cover when the handle is in a predetermined position.

8. A mechanism for operating a circuit interrupter mounted inside a cabinet having an openable cover comprising a hub for attaching to the cover, a handle rotatably mounted in the hub, actuating means for mounting inside the cabinet to actuate the circuit interrupter, a rotatable shaft interconnecting said actuating means and said handle, said handle having a recess therein for receiving one end of said shaft when the cover is closed, an interlocking latch pivotally mounted in said hub and biased by a spring to engage the shaft to prevent opening the cover, and a washer attached to said handle to retain the handle in said hub, said washer having a cam surface for actuating said latch to permit opening the cover when the handle is in a predetermined position.

9. A mechanism for operating a circuit interrupter mounted inside a cabinet having an openable cover comprising a hub for attaching to the cover, a handle rotatably mounted in the hub, actuating means for mounting inside the cabinet to actuate the circuit interrupter, a rotatable shaft interconnecting said actuating means and said handle, said handle having a recess therein for receiving one end of said shaft when the cover is closed, an interlocking latch pivotally mounted in said hub to engage the shaft to prevent opening the cover, and cam means movable with the handle for actuating said latch to permit opening the cover when the handle is in a predetermined position, releasing means in the hub accessible from outside the cabinet for actuating said latch independently of said cam means, and means movable with the handle for preventing access to said releasing means when the handle is in a predetermined position.

10. A mechanism for operating a circuit interrupter mounted inside a cabinet having an openable cover comprising a hub for attaching to the cover, a handle rotatably mounted in the hub, actuating means for mounting inside the cabinet to actuate the circuit interrupter, a rotatable shaft interconnecting said actuating means and said handle, said handle having a recess therein for receiving one end of said shaft when the cover is closed, an interlocking latch pivotally mounted in said hub to engage the shaft to prevent opening the cover, cam means movable with the handle for actuating said latch to permit opening the cover when the handle is in a predetermined position, and a locking lever pivotally mounted in said handle for engaging said hub to retain the handle in a predetermined position.

11. A mechanism for operating a circuit interrupter mounted inside a cabinet having an openable cover comprising a hub for attaching to the cover, a handle rotatably mounted in the hub, actuating means for mount-

ing inside the cabinet to actuate the circuit interrupter, a rotatable shaft interconnecting said actuating means and said handle, said handle having a recess therein for receiving one end of said shaft when the cover is closed, an interlocking latch pivotally mounted in said hub to engage the shaft to prevent opening the cover, and cam means movable with the handle for actuating said latch to permit opening the cover when the handle is in a predetermined position, releasing means in the hub accessible from outside the cabinet for actuating said latch independently of said cam means, a locking lever pivotally mounted in said handle for engaging said hub to retain the handle in a predetermined position, and blocking means on said lever for preventing access to said releasing means when the handle is locked in a predetermined position.

12. A mechanism for operating a circuit interrupter mounted inside a cabinet having an openable cover comprising a hub for attaching to the cover, a handle rotatably mounted in the hub, actuating means for mounting inside the cabinet to actuate the circuit interrupter, a rotatable shaft interconnecting said actuating means and said handle, said handle having a recess therein for receiving one end of said shaft when the cover is closed, an interlocking latch pivotally mounted in said hub to engage the shaft to prevent opening the cover, cam means movable with the handle for actuating said latch to permit opening the cover when the handle is in a predetermined position, and additional latching means actuated by said latch to engage the cabinet.

13. A mechanism for operating a circuit interrupter mounted inside a cabinet having an openable cover comprising a hub for attaching to the cover, a handle rotatably mounted in the hub, actuating means for mounting inside the cabinet to actuate the circuit interrupter, a rotatable shaft connected to said actuating means and engaged by said handle when the cover is closed, an interlocking latch disposed to prevent opening the cover, cam means movable with the handle for actuating said latch to permit opening the cover when the handle is in a predetermined position, releasing means for actuating said latch independently of said cam means, and knock-out means removable from said hub to permit access to said releasing means from outside the cabinet.

14. A mechanism for operating a circuit interrupter mounted inside a cabinet having an openable cover comprising a hub for attaching to the cover, a handle rotatably mounted in the hub, actuating means for mounting inside the cabinet to actuate the circuit interrupter, a rotatable shaft connected to said actuating means and engaged by said handle when the cover is closed, an interlocking latch disposed to prevent opening the cover, said latch being disengaged to permit opening the cover when the handle is in a predetermined position, releasing means for actuating said latch at other positions of the handle, and knock-out means removable to permit access to said releasing means from outside the cabinet.

15. In combination, a circuit interrupter having a movable operating member for opening and closing the interrupter, a cabinet in which the interrupter is mounted in

a fixed position, an openable cover for the cabinet, an external operating handle rotatably mounted on the cover, actuating means disposed inside the cabinet and operated by said handle to actuate the operating member of the interrupter, said actuating means being unattached to the interrupter except by engagement with the operating member, a rotatable shaft interconnecting said actuating means and said handle, said shaft having one end engaged by said handle when the cover is closed and said shaft being adjustable in length for use in cabinets of various depths.

16. In combination, a circuit interrupter having a movable operating member for opening and closing the interrupter, a cabinet in which the interrupter is mounted in a fixed position, an openable cover for the cabinet, an operating handle externally mounted on the cover, actuating means disposed inside the cabinet and operated by said handle to actuate the operating member of the interrupter, interlocking means disposed to prevent opening the cover, said interlocking means being disengaged to permit opening the cover when the handle is in a predetermined position, releasing means for disengaging the interlocking means at other positions of the handle, and removable means for permitting access to said releasing means from outside the cabinet.

17. In combination, a circuit interrupter having a movable operating member for opening and closing the interrupter, a cabinet in which the interrupter is mounted in a fixed position, an openable cover for the cabinet, an operating handle externally mounted on the cover, actuating means disposed inside the cabinet and operated by said handle to actuate the operating member of the interrupter, interlocking means disposed to prevent opening the cover, said interlocking means being disengaged to permit opening the cover when the handle is in a predetermined position, releasing means for disengaging the interlocking means at other positions of the handle, and removable means for making said releasing means operable from outside the cabinet.

18. In combination, a circuit interrupter having a movable operating member for opening and closing the interrupter, a cabinet in which the interrupter is mounted in a fixed position, an openable cover for the cabinet, an operating handle externally mounted on the cover, actuating means disposed inside the cabinet and operated by said handle to actuate the operating member of the interrupter, interlocking means disposed to prevent opening the cover, said interlocking means being disengaged to permit opening the cover when the handle is in a predetermined position, releasing means for disengaging the interlocking means at other positions of the handle, and means accessible from outside the cabinet for changing the operativeness of said releasing means.

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