

April 24, 1951

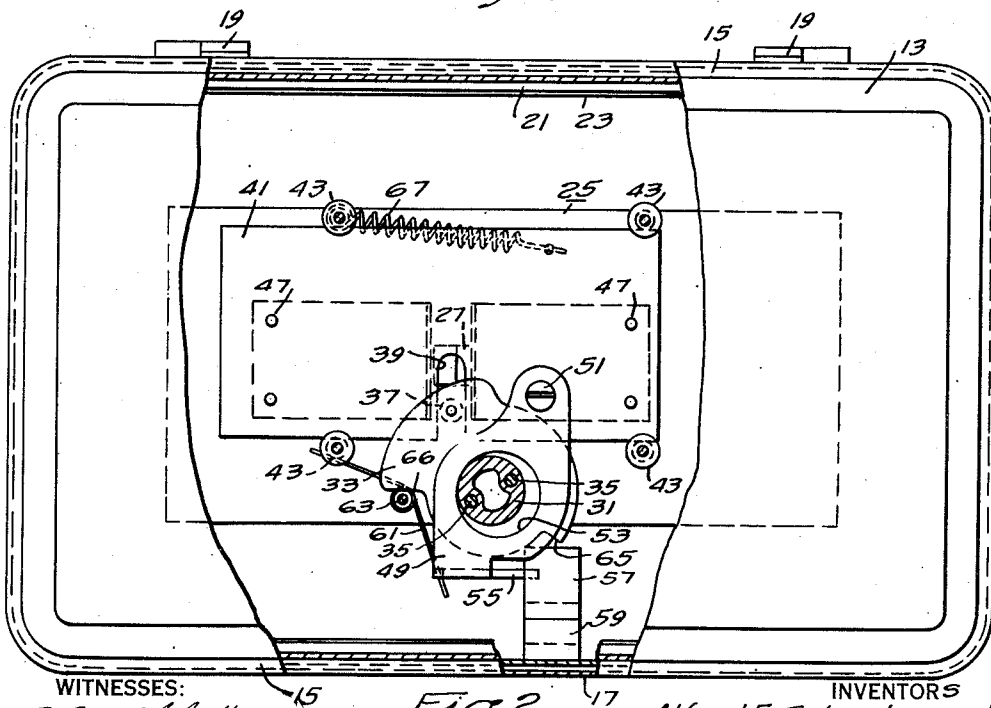
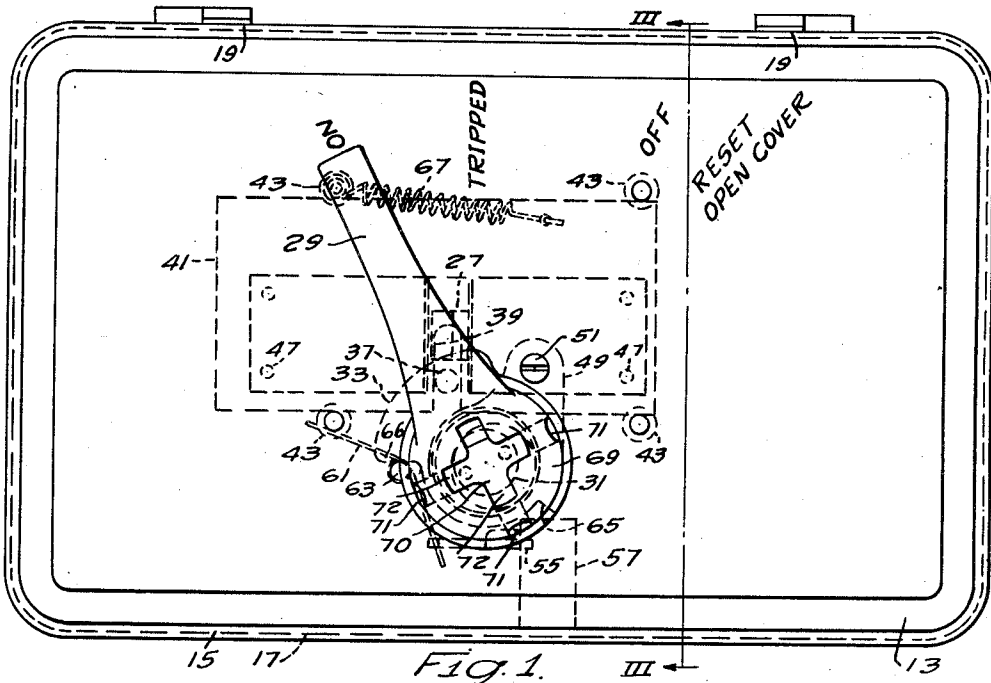
A. E. SCHUELER ET AL

2,550,125

ENCLOSED CIRCUIT INTERRUPTER

Filed July 31, 1947

2 Sheets-Sheet 1



WITNESSES:

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Fig. 2.

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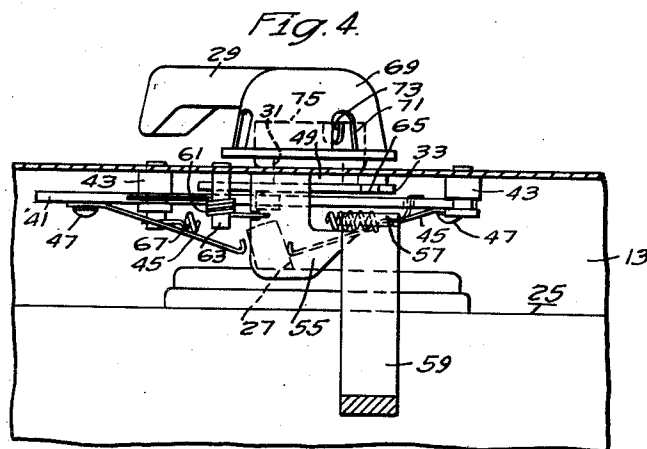
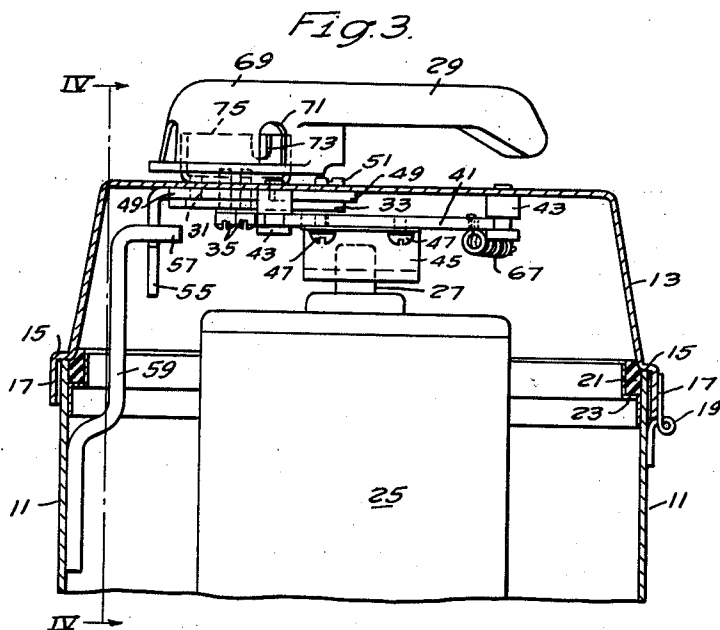
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WITNESSES:

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2,550,125

ENCLOSED CIRCUIT INTERRUPTER

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tion of Pennsylvania

Application July 31, 1947, Serial No. 765,030

15 Claims. (Cl. 200—50)

This invention relates to enclosed circuit interrupters and more particularly to devices for operating switches or circuit breakers which are enclosed in cabinets.

An object of the invention is to provide an improved operating device for a circuit interrupter which is enclosed in a cabinet, without the necessity for close tolerances or adjustments in manufacture and assembly, and which is not affected by minor manufacturing variations.

Another object of the invention is to provide an operating device for operating a circuit interrupter enclosed in a cabinet, which will prevent breakage of the interrupter handle when the cover is moved to closed position even though the operating handle on the cover and the interrupter handle are displaced relative to each other, and which will cause automatic reconnection between the two handles when the handle on the cover is moved.

Another object of the invention is to provide means for locking the cover of the cabinet closed in all closed positions of the operating handle except when the handle is moved to an "open cover" position different from the "off" position.

Another object is to provide an enclosed circuit interrupter having the above-mentioned features, without mounting any parts on the switch or circuit breaker within the casing, since such switches or circuit breakers usually have an enclosure of molded insulating material which is liable to become broken if parts subject to substantial stress are mounted thereon.

Another object of the invention is to provide means for operating the locking means which is accessible only when the handle is in the "on" position.

Another object of the invention is to provide an enclosed circuit breaker with an improved operating mechanism mounted on the openable cover that is simple and comprises relatively few parts, is reliable in operation and inexpensive to manufacture.

The novel features that are considered characteristic of the invention are set forth in particular in the appended claims. The invention itself, however, both as to structure and operation, together with additional objects and advantages thereof will be best understood from the following detailed description of a preferred embodiment thereof when read in conjunction with the accompanying drawings.

In said drawings:

Fig. 1 is a plan view of a cabinet and operating device for a circuit interrupter, constructed in

accordance with the invention, the interrupter operating handle being shown in the "on" position.

Fig. 2 is a plan view of the cabinet with the openable cover partly broken away to more clearly show the operating mechanism.

Fig. 3 is a vertical sectional view through the cabinet taken on line III—III of Fig. 1 and looking in the direction of the arrows.

Fig. 4 is a vertical sectional view taken on line IV—IV of Fig. 3 and looking in the direction of the arrows.

Referring to the drawings, the enclosing cabinet shown comprises a rectangular metal casing 11, only a portion of which is shown in Figs. 3 and 4, and a cooperating openable cover 13 also of metal. The cover 13 is provided with a rim 15 which seats against the edges of the side and end walls of the casing 11 in the closed position of the cover, and has a downwardly extending edge 17 which overlaps the edges of the casing 11. The cover 13 is mounted on one wall of the casing 11 by means of a pair of hinges 19 which permit the cover to be moved to open and closed positions. A sealing gasket 21 supported in an angular bracket 23 is engaged by the rim 15 of the cover in the closed position of the cover to exclude dust and dirt from the interior of the cabinet, which is adapted to house an electrical switch or circuit breaker for industrial applications when the atmosphere may contain unusual amounts of dust.

In the illustrated embodiment of the invention, a conventional circuit breaker 25 having a pivoted handle 27 for operating the breaker mechanism (not shown), is enclosed in the cabinet and is suitably mounted on the back wall of the casing 11. The circuit breaker 25 is preferably of the type fully disclosed 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 25 is provided with separable contact means (not shown) and an operating mechanism (also not shown) for opening and closing the contact means by movement of the breaker operating handle 27. The circuit breaker described in the above mentioned patent, is also provided with a current responsive trip device (not shown herein) which is operable in response to predetermined overload currents to effect automatic separation of the contact means.

The circuit breaker 25 is adapted to be manually opened and closed by oscillatory movement of the handle 27 between an "open" position and a "closed" position. Also, in order to reclose the

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contacts following an automatic opening operation, it is first necessary to reset the mechanism. This is accomplished by movement of the handle 27 to a "reset" position beyond the "off" position after which the handle may be moved to the "on" position to close the contact means. The circuit breaker mechanism and trip device are fully disclosed in the above mentioned patent to which reference may be had for the details of the construction and operation of the circuit breaker.

While a particular type of circuit breaker is briefly described, it will be understood that any suitable circuit breaker or switch provided with an oscillatable operating handle may be mounted in the casing 11.

In order to manually operate the circuit breaker 25 when the cover 13 is closed, an external operating handle 29 is rotatably mounted on the exterior of the cover. The handle 29 is attached to a short shaft 31 which may be made integral with the handle and which is rotatably supported in an opening in the cover 13. Rigidly mounted on the inner end of the shaft 31 for rotation therewith is a cam-shaped plate forming an actuating member 33. The actuating member 33 is secured to the shaft 31 by means of screws 35 and carries a pin or an anti-friction roller 37 which engages in a slot 39 in a sliding plate 41. The plate 41 is slidably supported in grooved studs 43 mounted on the inside of the cover 13. Carried by the plate 41 are two spring arms 45, the outer end of each arm being secured by means of screws 47 to the plate, the other end of each spring arm being free and bent away from the sliding plate 41 with a space between the opposing ends of the spring arms 45 as clearly shown in Fig. 4. The handle 27 of the circuit breaker is normally disposed between the free ends of the spring arms 45 in the operative position of the handle 29 when the cover 13 is closed.

As viewed in Figs. 1 and 2, clockwise rotation of the handle 29 from the "on" position to the "off" position rotates the actuating member 33 in the same direction. This movement of the actuating member 33, acting through the pin and slot connection 37-39, slides the plate 41 toward the right (see also Fig. 4). During this movement the left hand spring arm 45 engages and rotates the breaker handle 27 in a clockwise direction (Fig. 4) from the breaker "on" position to the breaker "off" position to effect opening of the breaker contact means.

Movement of the handle 29 in a counterclockwise direction (Fig. 1) from the "off" position to the "on" position reverses the direction of movement of the parts just described and moves the plate 41 toward the left to the "on" position. During this movement the right hand spring arm 45 engages and moves the breaker handle 27 in a counterclockwise direction (Fig. 4) to the "on" position to close the breaker contact means.

A locking means is provided for normally locking the cover 13 to prevent opening thereof. The locking means is effective to lock the cover closed in all positions of the operating handle 29 except when the handle is moved beyond the "off" position to a "reset" or "open cover" position. The locking means comprises a locking member 49 pivotally mounted by means of a screw 51 rigidly secured to the locking member for movement therewith. The screw 51 extends through an opening in the cover 13, which opening forms a bearing for the screw. The locking member 49 is disposed between the actuating member 33

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and the inner surface of the cover 13 and is retained in place by the actuating member. A clearance opening 53 (Fig. 2) is provided in the locking member 49 to permit movement thereof relative to the short shaft 31. The locking member 49 is provided with a downwardly extending latching projection 55 (Figs. 3 and 4) which is adapted to engage under a formed over portion 57 of a locking bracket 59 which extends downwardly and is secured, as by welding, to the inner side wall of the casing 11. The locking member 49 is biased to locking position by means of a spring 61 coiled about a pin 63 mounted on the cover 13 and having one end thereof bearing in a recess in the locking member 49 and the other end bearing against one of the grooved studs 43.

The actuating member 33, which is secured to and movable with the operating handle 29, is provided with a shoulder 65 which is adapted to engage the locking member 49, when the handle 29 is moved clockwise beyond the "off" position to the "open cover" position, and moves the locking member about its pivot 51 to the unlocking position. It will thus be seen that it is necessary to move the handle 29 beyond the "off" position to the "open cover" position before the cover may be opened. This insures that the circuit breaker 25 is normally operated to the "off" position before the cover can be opened.

It will be noted that, with the outer handle 29 and the breaker handle 27 in the "on" position, the roller 37 and slot 39 are to the left of the pivot for the handle 29 and moves to a position to the right of the pivot for the handle 29 in moving to "off" position so that the maximum movement of the breaker handle 27 takes place for a given movement of the outer handle 29 between the "on" and "off" positions, but in moving from the "off" position to the "open cover" or "reset" position the "in toggle" action of the roller 37 and slot 39 permits a large movement of the outer handle 29 for the small movement of the breaker handle 27 beyond the "off" position to reset the breaker mechanism. This also makes possible a relatively large movement of the outer handle 29 to release the cover latch which obviates the need of extreme accuracy in the positioning of the cover latch. This feature is especially important on large control cabinets where the doors or covers may sag or otherwise become distorted.

The movement of the actuating member 33 and of the handle 29 to the "on" position is limited by a shoulder 66 (Fig. 2) thereon engaging the pin 63, and is limited in its movement to the "reset" or "open cover" position by engagement of the inner wall of the locking member 49 with the short shaft 31. This positively limits the movement of the mechanism in each direction and prevents excessive movement or stress being transmitted to the circuit breaker handle 27 which is usually of molded insulating material and subject to breakage.

When the cover 13 is opened, the spring arms 45 separate from the breaker handle 27 and, upon release of the handle 29, the plate 41 together with the spring arms is returned to the "on" position by means of a spring 67. The spring 67 has an end hooked in an opening in the plate 41 and the other end is attached to one of the grooved studs 43 so as to bias the plate toward the left (Figs. 1, 2 and 4) or to the "on" position. Movement of the plate 41 to the

"on" position under the influence of the spring 67 by means of the pin and slot connection 37—39 rotates the actuating member 33 and the handle 29 from the "open cover" position to the "on" position. The spring 67 thus acts to counterbalance the weight of the handle 27 and sliding plate 41 when the device is mounted in its normal vertical position. Another and important advantage of this construction is that when the cover 13 is opening and the handle 29 is released, it is automatically moved to the "on" position thereby serving as a warning should the cover be closed with the handle 29 in a different position from the breaker handle 27. That is, the outer handle 29 never indicates "off" when the breaker is in the "on" position which could easily result in injury to a person working on the circuit controlled by the breaker.

The resilience of spring arms 45 permits the cover 13 to be closed regardless of the respective positions of the handle 29 and the breaker handle 27, without damage thereto even if the cover is slammed shut, because the spring arms 45 yield upon engaging the end of the breaker handle 27 if not in corresponding operative positions. The spring arms 45 will automatically ride over and engage the breaker handle in the space between them as soon as the handle 29 is moved sufficiently.

In order to permit the cover 13 to be opened by an authorized person without first opening the breaker 25, the screw 51 which forms the pivot for the locking member 49 is rigidly secured to the locking member. The screw 51 is so located on the cover that it is covered by the operating handle 29 when the handle is in the "off" position. When the operating handle is in the "on" position, the screw 51 is uncovered and an authorized person may, by means of a screw driver or other suitable tool, turn the screw and thereby move the locking member 49 to unlocking position to permit opening of the cover without opening the circuit breaker.

Means is provided for locking the operating handle 29 in the "off" position by the use of a plurality of padlocks. The operating handle 29 is channel-shaped in section and is provided with a hub portion 69, having a cross-shaped depression 70 (Fig. 1) therein. The hub 69 is provided with a plurality of spaced apertures 71 in the side of the hub and corresponding apertures 72 extending into the cross-shaped depression which are adapted to be aligned with apertures 73 in the periphery of a cup-shaped locking member 75 secured to the cover 13 beneath the hub 69.

When the operating handle 29 is in the "off" position, the apertures 71 and 72 in the hub 69 register with the apertures 73 in the cup-shaped locking member 75 so that a plurality of padlocks may be inserted in the apertures. A single padlock inserted in one pair of apertures 71—73 is sufficient to lock the operating handle in the "off" position and to prevent movement of the handle in either direction from the "off" position.

When the handle 29 is moved away from the "off" position, the apertures 71 are moved out of alignment with the apertures 73 in the locking member 75 making it impossible to insert the padlocks in any position of the operating handle 29 other than the "off" position. There are no other apertures on the device in which a padlock may be placed so that an electrician working on the electric circuit controlled by the device is assured that if a lock has been placed on the

device, the handle is in the "off" position and cannot be moved to energize the circuit. The interlock 55—57 is then engaged to lock the cover closed so that the single padlock in the apertures 71—73 also locks the cover closed and prevents anyone from opening the cover and moving the breaker handle 27 to energize the circuit. The fact that the screw 51 is also covered by the handle 29, when locked in the "off" position, prevents turning of the screw to defeat the locking of the cover closed. Thus, the man working on the circuit is fully protected against the circuit breaker being turned "on" while he is working on the circuit and might be killed if the circuit were energized.

The invention provides a circuit breaker enclosed in a cabinet having an improved operating device mounted on the openable cover of the cabinet for operating the breaker within the cabinet. A locking device of simple construction is provided which locks the cover closed in all positions of the operating handle except when the handle is moved beyond the "off" position to a "reset" or "open cover" position. Provision is also made for inserting a plurality of padlocks to lock the handle in the "off" position. Means is accessible when the handle is in the "on" position for disengaging the locking means so that the cover may be opened by an authorized person when the breaker handle is in the "on" position.

While the invention has been disclosed in accordance with the provisions of the patent statutes, it is to be understood that various changes in the structural details thereof may be made without departing from the spirit of the invention.

We claim as our invention:

1. An enclosed circuit interrupter having a member movable to operate said interrupter, a casing in which said interrupter is mounted, an openable cover for said casing, a slidable operating member mounted on said cover and having opposed portions thereon for engaging and moving said movable member, said slidable member having a slot therein, said opposing portions being resiliently mounted and movable toward the plane of said slidable operating member, an operating handle rotatably mounted on the cover and movable to a position in which said interrupter is closed and to two positions in which said interrupter is open, an actuating member having a stud thereon engaging said slot and operable by said operating handle for moving said slidable member, a locking member normally locking said cover in its closed position in the position of said handle in which said interrupter is closed and in one of the positions of said handle in which said interrupter is open, said actuating member engaging and moving said locking member to unlocking position only when said operating handle is moved to the other position in which said interrupter is open, and spring means for operating said slidable member to automatically return said operating handle to the position in which said interrupter is closed upon opening of said cover and release of said handle.

2. An enclosed circuit interrupter having a movable member for operating said interrupter, a casing in which said interrupter is mounted, an openable cover for said casing, a slidable operating member mounted on said cover and having means resiliently mounted thereon for engaging and moving said movable member to operate the interrupter, said slidable member be-

ing provided with a slot, an operating handle rotatably mounted on the cover and movable to a position wherein said interrupter is closed and to two positions wherein said interrupter is open, means at all times biasing said slidable member and said operating handle toward the position in which said interrupter is closed, an actuating member having a pin thereon engaging said slot and operable by said operating handle for moving said slidable member, a locking member normally locking said cover in its closed position in the position of said handle in which the interrupter is closed and in one of said positions of said handle wherein said interrupter is open, and a shoulder on said actuating member for engaging and moving said locking member to unlocking position only when said operating handle is moved to the other position wherein said interrupter is open.

3. An enclosed circuit interrupter having a movable member, a casing in which said interrupter is mounted, an openable cover for said casing, a slidable member mounted on the inside of said cover and having means resiliently mounted thereon for engaging and moving said movable member to operate said interrupter, an operating handle on said cover having a shaft extending through said cover, said operating handle having one position in which said interrupter is closed and two positions in which said interrupter is open, an actuating member secured to said shaft inside said cover for moving said slidable member, a movable locking member mounted on said cover and disposed inside said casing for normally locking said cover to prevent opening thereof in the position of said handle in which said interrupter is closed and in one of said positions of said handle in which said interrupter is open, said actuating member engaging and operating said locking member to unlocking position only when said handle is moved to the other of said positions in which said interrupter is open to permit opening of said cover, spring means for returning said slidable member and said operating handle to said position in which said interrupter is closed upon opening of said cover, a pivot for said locking member rigidly secured thereto, said pivot being rotatably mounted in said cover and operable from outside said casing to directly operate said locking member to the unlocking position to permit opening of said cover when the handle is in the position in which the interrupter is closed, said pivot being inoperable from outside said casing when the operating handle is in either of said two positions in which said interrupter is open.

4. An enclosed circuit interrupter having a movable member for operating said interrupter, a casing in which said interrupter is mounted, an openable cover for the casing, a slidable member mounted on the inside of said cover and having means thereon for engaging and moving said movable member, said means being resiliently mounted on said slidable member and movable toward the plane of said slidable member to engage said interrupter handle, an operating handle mounted on the cover movable to a position in which said interrupter is closed and two positions in which said interrupter is open and having a shaft extending through said cover, an actuating member on said shaft for operating said slidable member, a movable locking member supported on said cover between said actuating member and said openable cover for normally locking said cover in the closed position in the

position of said handle in which said interrupter is closed and one of said positions of said handle in which said interrupter is open, a pivot for said locking member comprising a screw rigidly secured to said locking member, said screw being pivotally mounted in and extending through said openable cover, said actuating member having a shoulder thereon for engaging and operating said locking member to unlocking position when said operating handle is moved to the other position of said handle in which said interrupter is open to permit opening of said cover, and spring means operable upon opening of said cover and release of said operating handle to move said operating handle to said position in which said interrupter is closed, said pivot being operable from outside the cover only when the operating handle is in the position in which said interrupter is closed to directly move said locking member to the unlocking position.

5. An enclosed circuit interrupter having a movable member for operating said interrupter, a casing in which said interrupter is mounted, an openable cover for said casing, an operating member mounted on the inside of said cover having means resiliently mounted thereon for engaging and operating said movable member, an operating handle mounted on said cover and movable to an "on" position and "off" position and to "reset" position, a shaft on said operating handle extending through said cover, an actuating member secured to said shaft inside said cover for moving said operating member, biasing means operable to automatically move said operating member and said operating handle to the "on" position upon opening of said cover, a movable locking member mounted on said cover between said actuating member and said openable cover for normally preventing opening of said cover, a pivot for said locking member rotatably mounted in and extending through said cover, said pivot being operable from outside said cover only when the handle is in the "on" position to directly move said locking member to unlocking position, and a shoulder on said actuating member for engaging and moving said locking member to unlocking position only when said operating handle is moved to the "reset" position.

6. An enclosed circuit interrupter having a movable member for operating said interrupter, a casing in which said interrupter is mounted, an openable cover for said casing, a reciprocable member on said casing for operating said movable member, an operating handle mounted on the cover and movable to a position in which said interrupter is closed and to two positions in which said interrupter is open, an actuating member mounted on said handle inside said cover and operable by said handle to move said reciprocable member, a movable locking member pivotally mounted on the inside of said openable cover for normally latching said cover closed when said operating handle is in the position in which said interrupter is closed and in one of said positions in which said interrupter is open, said actuating member when said operating handle is moved to the other position in which said interrupter is open engaging and moving said locking member to unlocking position to permit opening of said cover, spring means for automatically returning said operating handle to said position in which said interrupter is closed upon opening of said cover, locking means comprising a member fixedly mounted on said cover and having an opening therein coinciding with an opening in said han-

dle only when said handle is in said one position in which said interrupter is open to receive a padlock to thereby lock the handle in said one position in which said interrupter is open, and means rigidly secured to said movable locking member operable from outside the cover to directly move said locking member to unlocking position only when said operating handle is in said position in which said interrupter is closed.

7. An enclosed circuit interrupter having a movable member for actuating said interrupter, a casing in which said interrupter is mounted, an openable cover for said casing, an operating member mounted on said cover having means resiliently mounted thereon for actuating said movable member, an operating handle pivotally mounted on said cover and movable to a position in which said interrupter is closed and to two positions in which said interrupter is open, a shaft on said operating handle extending through said cover, an actuating member secured to said shaft inside said cover for moving said operating member, a movable locking member disposed between said actuating member and said openable cover normally locking said cover in closed position in the position of said handle in which said interrupter is closed and in one of said positions of said handle in which said interrupter is open, pivot means for said locking member comprising a screw rigidly secured to said locking member and disposed eccentric to said shaft, said screw extending through said openable cover, means comprising a shoulder on said actuating member for engaging and operating said locking member to unlocking position only when said operating handle is moved to the other position in which said interrupter is open to permit opening of said cover, means automatically returning said operating handle to said position in which said interrupter is closed upon opening of said cover, said pivot being rotatably mounted in said cover and operable from outside said cover when said operating handle is in the position in which said interrupter is closed to directly move said locking member to unlocking position.

8. An enclosed circuit interrupter having a movable member for actuating said interrupter, a casing in which said interrupter is mounted, an openable cover for said casing, an operating member mounted on said cover for actuating said movable member, an operating handle pivotally mounted on said cover and movable to a position in which said interrupter is closed and to two positions in which said interrupter is open, a shaft on said operating handle extending through said cover, an actuating member secured to said shaft inside said cover for moving said operating member, a movable locking member disposed between said actuating member and said openable cover normally locking said cover in closed position in the position of said handle in which said interrupter is closed and in one of said positions of said handle in which said interrupter is open, pivot means for said locking member comprising a screw rigidly secured to said locking member and disposed eccentric to said shaft, said screw being pivotally mounted in and extending through said openable cover, means comprising a shoulder on said actuating member for engaging and operating said locking member to unlocking position only when said operating handle is moved to the other position in which said interrupter is open to permit opening of said cover, means for automatically returning said operating handle to said position in which said interrupter is

closed when said cover is opened, said pivot being operable from outside said cover when said operating handle is in said position in which said interrupter is closed to directly move said locking member to unlocking position, and locking means for locking said handle in said one position in which said interrupter is open comprising a member fixedly mounted on said cover and having an opening therein coinciding with an opening in said operating handle only when said handle is in said one position in which said interrupter is open to receive a padlock.

9. An enclosed circuit interrupter having a movable member for operating said interrupter, a casing in which said interrupter is mounted, an openable cover for said casing, a slidable operating member mounted on said cover and having means resiliently mounted thereon for engaging and moving said movable member, said slidable member having a slot therein, an operating handle having a hub rotatably mounted on the cover and movable to a position in which said interrupter is closed and two positions in which said interrupter is open, an actuating member operable by said operating handle, a pin on said actuating member engaging said slot to move said slidable member, means for automatically moving said operating handle to said "on" position upon opening of said cover and release of said operating handle, a locking member normally locking said cover in its closed position in the position of said operating handle in which the interrupter is closed and in one of said positions of said handle in which said interrupter is open, a shoulder on said actuating member for engaging and moving said locking member to unlocking position only when said operating handle is moved to the other position in which said interrupter is open, and locking means for locking said operating handle in said one position in which said interrupter is open comprising a member fixedly mounted on said cover and having an opening therein coinciding with an opening in the hub of the operating handle only when said handle is in said one position in which said interrupter is open to receive a padlock.

10. An enclosed circuit interrupter having a movable member for operating said interrupter, a casing in which said interrupter is mounted, an openable cover for said casing, a slidable operating member mounted on the inside of said cover and having means resiliently mounted thereon for engaging and moving said movable member of the interrupter, said operating member being provided with a slot, an operating handle having a hub rotatably mounted on the cover and having a position in which said interrupter is closed and two positions in which said interrupter is open, an actuating member operable by said operating handle, a pin on said actuating member engaging said slot to move said slidable member, means for automatically moving said operating handle to said "on" position upon opening of said cover and release of said operating handle, a locking member normally locking said cover in its closed position in the position of said operating handle in which said interrupter is closed and in one of said positions of said handle in which said interrupter is open, a shoulder on said actuating member for engaging and moving said locking member to unlocking position only when said operating handle is moved to the other position in which said interrupter is open, and locking means for locking said operating handle in said one position in

which said interrupter is open comprising a member fixedly mounted on said cover and having an opening therein coinciding with an opening in the hub of the operating handle only when said handle is said one position in which said interrupter is open to receive a padlock, all of said parts being mounted on said casing and cover independently of said interrupter.

11. An enclosed circuit interrupter having a member movable to operate said interrupter, a casing in which said interrupter is mounted, an openable cover on said casing, slidable operating means engageable with said movable member for operating said interrupter, an operating handle rotatably mounted on said cover movable to an "on," an "off" and an "open cover" position, an actuator movable by said operating handle for moving said slidable means, a locking member disposed to be engaged by said actuator and moved to unlocking position only when said handle is moved to said "open cover" position, a pin and slot connection comprising a pin on said actuator engaging a slot in said slidable means whereby a relatively greater movement of the operating handle is permitted for the small movement of the interrupter handle between the "off" position and the "open cover" position than between the "on" and "off" positions.

12. An enclosed circuit interrupter having a handle movable to "on" and "off" positions, said handle having a relatively small movement beyond said "off" position to an "open cover" position, a casing in which said interrupter is mounted, an openable cover for said casing, a slide guided for linear movement and having means thereon engaging said interrupter handle, said slide having a slot therein, an operating handle mounted on the outside of said cover, a crank arm disposed inside of said cover operable by said handle and having a pin thereon engaging the slot in said slide, means on said cover cooperating with said handle when said handle is in the "off" position to receive a lock, and said crank arm forming an obtuse angle with the line of movement of said slide when said operating handle is between the "off" and "open cover" positions whereby substantial angular movement of the operating handle is required for the relatively small movement of said slide and said interrupter handle.

13. An enclosed circuit interrupter having a handle movable to "on" and "off" positions, said handle having a relatively small movement beyond said "off" position to an "open cover" position, a casing in which said interrupter is mounted, an openable cover for said casing, a slide guided for linear movement and having means thereon engaging said interrupter handle, said slide having a slot therein, an operating handle mounted on the outside of said cover and provided with a hub, a crank arm disposed inside of said cover operable by said handle and having a pin thereon engaging the slot in said slide, means on said cover cooperating with said hub when said handle is in the "off" position to receive a lock, and said crank arm forming an obtuse angle with the line of movement of said slide when

said operating handle is between the "off" and "open cover" positions whereby substantial angular movement of the operating handle is required for the relatively small movement of said slide and said interrupter handle.

14. An enclosed circuit interrupter having a movable member for operating said interrupter, a casing in which said interrupter is mounted, an openable cover for said casing, a slidable operating member mounted on said cover and having opposed portions thereon for engaging and moving said movable member to operate said interrupter, said slidable member having a slot therein, said opposing portions being resiliently mounted and movable toward the plane of said slidable operating member, an operating handle rotatably mounted on said cover, an actuating member having means thereon engaging said slot and operable by said operating handle for moving said slidable operating member, a locking member normally locking said cover in its closed position, said actuating member engaging and moving said locking member to unlocking position to permit opening of said cover when said operating handle is moved to a predetermined position, and spring means for operating said slidable operating member to automatically move said operating handle to another predetermined position upon opening of said cover and release of said operating handle.

15. An enclosed circuit interrupter having a movable member for operating said interrupter, a casing in which said interrupter is mounted, an openable cover for said casing, a slidable operating member mounted on said cover and having means resiliently mounted thereon for engaging and operating said movable member of the interrupter, said slidable operating member being provided with a slot, an operating handle rotatably mounted on said cover, means at all times biasing said slidable operating member and said operating handle to a predetermined position, an actuating member having means thereon engaging said slot in said slidable operating member and operable by said operating handle to move said slidable operating member, a locking member normally locking said cover in its closed position, and a shoulder on said actuating member for engaging and moving said locking member to unlocking position only when said operating handle is moved to a second predetermined position.

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