Sept. 17, 1940. G. R. RUNKE ET AL 2,215,299

ELECTRIC SWITCH ENCLOSURE

Filed Feb. 28, 1935

Fig. 1.

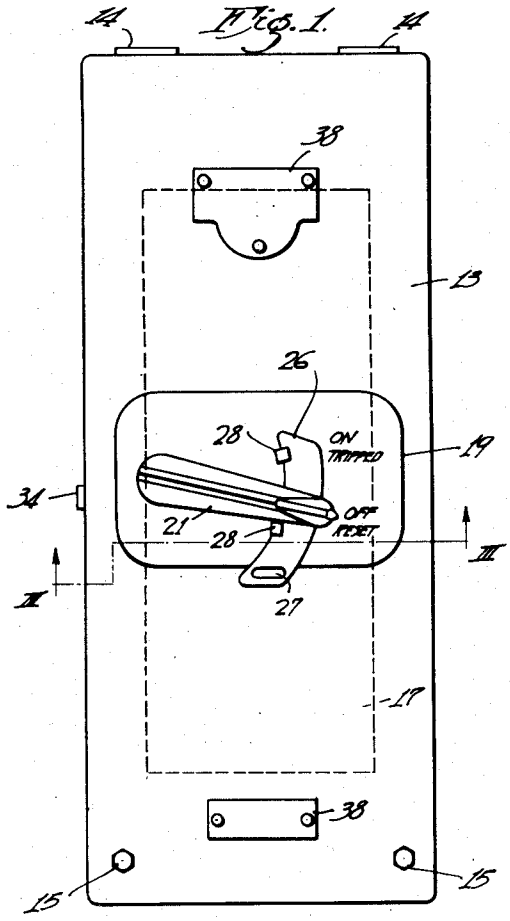
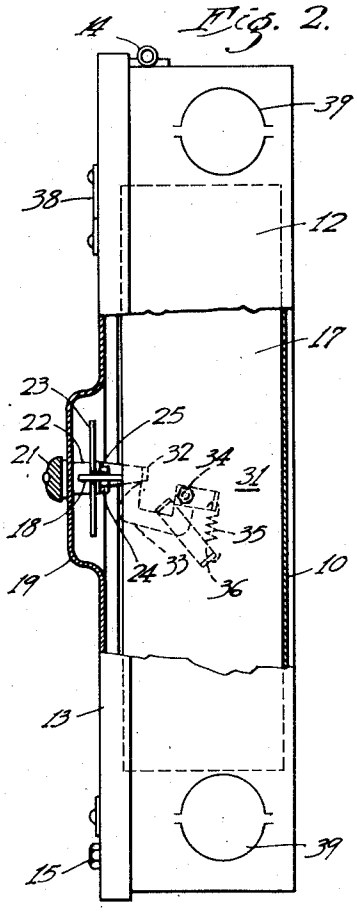


Fig. 2.



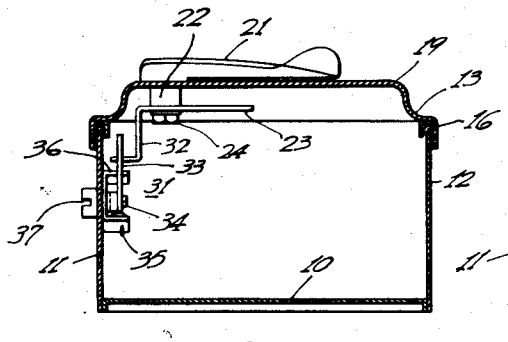


Fig. 3.

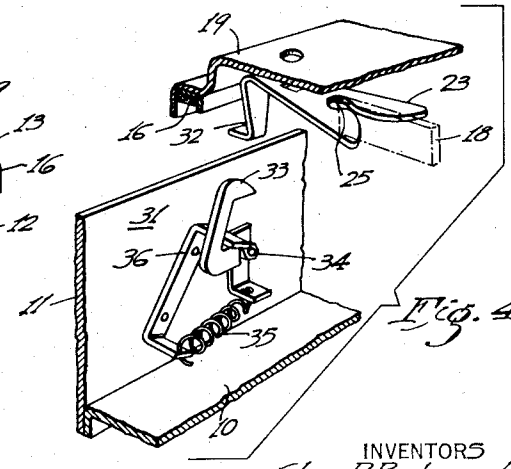


Fig. 4.

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ELECTRIC SWITCH ENCLOSURE

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6 Claims. (Cl. 200—50)

Our invention relates, generally, to inclosing boxes or cabinets, and particularly, to cabinets for inclosing electric switches and automatic circuit breakers.

An object of our invention, generally stated, is to provide an inclosing cabinet for electric switches which shall be simple in operation and which may be economically manufactured.

A more specific object of our invention is to provide a dust-tight enclosure for an automatic circuit breaker unit.

Another object of our invention is to provide an inclosing cabinet having an external handle for operating a circuit breaker unit disposed within the cabinet.

A further object of our invention is to so interlock the door of a cabinet for inclosing a circuit breaker unit that the door of the cabinet cannot be opened when the circuit breaker is in the closed position.

Still another object of our invention is to provide an interlocking mechanism for the door of a circuit breaker cabinet which may be released from the exterior of the cabinet.

A still further object of our invention is to provide for locking the operating device for a circuit breaker unit in a predetermined position.

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

According to the preferred embodiment of our invention a metal cabinet for inclosing a circuit breaker unit is provided with a dust tight door which is pivotally secured to the cabinet. When the door is closed, an operating plate, disposed on the innerside of the door, engages the handle of the circuit breaker to operate the breaker. The operating plate is actuated about a pivot point by an operating handle, mounted on the outside of the door and secured to the operating plate. An interlocking latch is provided on the inside of the cabinet, and disposed to engage a portion of the operating plate in such a manner that, normally, the door of the cabinet cannot be opened when the circuit breaker is closed. However, a means is provided whereby an authorized person can release the interlocking device and open the door while the circuit breaker is closed in order to inspect the breaker.

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

Figure 1 is a view, in front elevation, of a circuit breaker cabinet embodying our invention;

Fig. 2 is a view, in side elevation, of the cabinet shown in Fig. 1, a portion of the cabinet being cut away to more clearly show the interlocking mechanism;

Fig. 3 is a view, in section, taken along the line III—III of Fig. 1, the circuit breaker being omitted from the cabinet; and

Fig. 4 is an exploded view, in enlarged perspective, of portions of the cabinet, showing the interlocking mechanism.

Referring now to the drawing, the cabinet shown comprises a back wall 10 and side walls 11 and 12, which may be joined to the back wall in any suitable manner. A door 13 may be secured to the top of the cabinet as by hinges 14 and secured in position at the bottom by a pair of screws 15. A felt pad 16 is provided between the door 13 and the edges of the cabinet in order to exclude dust from the inside of the cabinet, which is designed to protect electric switches and circuit breakers when they are utilized in certain industrial mills and the like where the air may contain a large amount of dust and dirt.

In the embodiment of the invention illustrated, an automatic circuit breaker 17 is inclosed within the cabinet. The circuit breaker 17 is preferably of the type fully described in the copending applications of H. J. Lingal, Serial Nos. 600,624 and 637,749, filed March 23, 1932 and October 14, 1932, now patents Nos. 2,047,739 and 2,083,305, respectively, and assigned to the Westinghouse Electric & Manufacturing Company. However, any suitable circuit breaker or electric switch unit may be utilized. The circuit breaker 17 is provided with a rectangularly shaped handle 18 for operating the breaker mechanism.

As shown, the door 13 of the cabinet is provided with a dome 19 into which the handle 18 of the circuit breaker projects. An operating handle 21 is mounted on the exterior surface of the dome 19. The handle 21 is provided with a shaft which extends through a bushing 22 provided in the door 13 and an operating plate 23 is secured to the shaft inside of the housing by means of a nut 24 on the end of the shaft.

The operating plate 23 is provided with a slotted opening 25 for receiving the handle 18 of the circuit breaker, as shown in Figs. 2 and 4. In this manner the circuit breaker 17 may be operated from the exterior of the cabinet by actuating the handle 21 about its pivot point which causes the operating plate 23 to actuate the breaker handle 18, thereby operating the

circuit breaker. In order to reduce the friction between the operating plate 23 and the handle 18, and also to reduce the torque exerted on the breaker handle, the edges of the plate 23 which engage the handle 18 are rounded, as shown in Fig. 4.

In order to prevent breaking the handle 18 of the circuit breaker by actuating the handle 21 too far in either direction, the operating plate 23 is made of sufficient width that the travel of the handle 21 is limited by the edges of the plate 23 striking the dome 19. Because of the width of the operating plate it is also impossible to close the door 13 without the handle 18 being in the slot 25, thereby insuring that the breaker may be properly operated after the door is closed.

The exterior surface of the dome 19 is marfked, as shown in Fig. 1, to indicate the posit'on of the breaker handle and of the contact members of the circuit breaker. The operating handle 21 and the breaker handle 18 are both shown in the "off" position. The circuit breaker may be closed by moving the handle 21 to the "on" position, as indicated. In case the circuit breaker is tripped automatically, the handle 21 is actuated to the "tripped" position, thereby indicating that the breaker has been tripped by an overload condition in the circuit which it controls.

In order that the operating handle 21 may be locked in the "off" position to prevent the closing of the circuit breaker, a curved locking plate 26 is secured to the bottom side of the operating arm of the handle 21. As shown, the locking plate 26 is provided with a slot 27 into which a padlock may be inserted to engage the lower edge of the dome 19, thereby preventing the handle 21 from being actuated to the "on" position to close the circuit breaker. In case it is desired to lock the handle in the "on" position, a hole may be drilled in the end of the plate 26 opposite the slot 27 and a lock inserted to engage the upper edge of the dome 19. Guide members 28 are provided on the exterior surface of the dome 19 for the locking plate 26 to prevent it and the handle 21 from being forcibly raised from the dome 19.

With a view to preventing the door 13 of the cabinet from being opened while the circuit breaker is in the closed position, an interlocking device 31 is disposed on the side wall 11 of the cabinet to engage an inwardly extending arm 32 on the operating plate 23 to prevent the opening of the door 13. The interlocking device 31 comprises a latch 33 which is pivotally mounted on the side wall 11 by means of a bolt 34. The latch 33 is normally biased by a spring 35 to a position in which it will engage the arm 32, on the plate 23, unless the handle 21 is actuated to the "off" position to open the circuit breaker. A stop member 36 is secured to the side wall 11 to limit the movement of the latch 33 toward the arm 32. Thus the arm 32 is released when the handle 21 is moved to either the "off" or the "reset" positions and the door 13 can be opened, provided the screws 15 have been removed.

In order that the interlocking device 31 may be released by an authorized person to permit the door 13 to be opened while the circuit breaker is in the closed position for inspection of the breaker, the head of the bolt 34, which supports the latch 33, is provided with a slot 37. Thus the bolt 34 may be turned by means of a screw driver to disengage the latch 33, which is secured to the bolt 34, from the arm 32 and release the interlocking mechanism. Assuming that the screws 15 have previously been removed, the door 13 can then be opened while the circuit breaker is in the closed position. It will be noted that there is nothing on the cabinet which indicates that the interlocking mechanism can be released in the foregoing manner, therefore, only persons who are authorized to make an inspection of the equipment need to know how to release the interlocking mechanism to open the cabinet.

The usual nameplates 38 are provided on the cabinet to afford space for the proper marking of the apparatus. As shown, the cabinet is provided with knockouts 39 which may be removed to permit the necessary electrical conductors to be connected to the circuit breaker unit.

From the foregoing description it is apparent that we have provided a cabinet suitable for inclosing an electric switch or a circuit breaker mechanism and protecting it from the dust and dirt frequently encountered in various industrial mills. We have also provided a simple and efficient mechanism for operating the circuit breaker and for properly interlocking the cover of the cabinet with the operating mechanism.

Since many modifications may be made in the apparatus and arrangement of parts without departing from the spirit of our invention, we do not wish to be limited other than by the scope of the appended claims.

We claim as our invention:

1. An electric switch enclosing cabinet comprising back and side walls and a hinged door for enclosing an electric switch unit, an operating handle pivotally mounted on the exterior surface of the door and having a shaft extending through the door, an operating plate secured to the shaft inside of the cabinet, said plate having an opening therein for receiving the switch handle to operate the switch by means of the handle on the exterior of the cabinet, an interlocking latch disposed inside of said cabinet to engage a portion of said operating plate to prevent opening the door while the switch is in the closed position, and means extending through the cabinet to be operable from the exterior of the cabinet to release said latch thereby permitting opening the door to inspect the switch while in the closed position.

2. An electric switch enclosing cabinet comprising back and side walls and a hinged door for enclosing an electric switch unit, an operating handle pivotally mounted on the exterior surface of the door and having a shaft extending through the door, an operating plate secured to the shaft inside of the cabinet, said plate having an opening therein for receiving the switch handle to operate the switch by means of the handle on the exterior of the cabinet, a pivotally mounted latch disposed inside of said cabinet to engage a portion of said operating plate to prevent opening the door while the switch is in the closed position, and means extending through the cabinet to be operable from the exterior of the cabinet to disengage said latch.

3. An electric switch enclosing cabinet comprising back and side walls and a cover for enclosing a switch unit, said switch unit having a handle of substantially a rectangular shape and operable in a plane substantially perpendicular to said cover, an operating handle rotatably mounted on the exterior surface of the cover and having a shaft extending through the cover, a plate secured to the shaft inside of the cabinet and movable by said operating handle in a plane parallel to said cover, said plate having a slotted

opening therein for receiving the switch handle to operate the switch by means of the handle on the exterior of the cabinet, and arms on said plate extending from said opening a sufficient distance to prevent the cover of the cabinet from being closed without the switch handle being in said opening, said slotted opening having an enlarged portion to prevent twisting of the switch handle.

4. An electric appliance enclosing cabinet comprising back and side walls and a cover for enclosing a circuit breaker unit, said circuit breaker unit having a reciprocatable handle, an operating handle pivotally mounted on the exterior of the cover on a shaft extending through the cover and rotatable in a plane parallel to the cover, a plate disposed inside of the cabinet and operable by said shaft in a plane parallel to the cover, said plate having an opening therein for receiving the circuit breaker handle to operate the breaker by means of the handle on the exterior of the cabinet, the sides of said plate adjacent said opening extending over a sufficient area to permit closing of the cover of the cabinet only when the breaker handle is in said opening.

5. In an enclosed circuit interrupter, a cabinet including back and side walls and an openable cover, a circuit interrupter unit in said cobinet, said interrupter unit having a handle of substantially rectangular cross section mounted to be oscillated in a plane perpendicular to said cover for operating the interrupter unit, operating means for said rectangular interrupter handle including an outer handle pivotally mounted on a shaft extending through the cover and rotatable in a plane parallel to the cover, and an inner operating member movable in a plane parallel to the cover and moved by said shaft to actuate said rectangular handle when said cover is in closed position, said inner operating member having portions so engaging opposite sides of said rectangular interrupter handle that said outer handle definitely indicates the position of said interrupter handle, the engaging portions of the inner operating member being disposed to prevent the cover of the cabinet from being closed without the rectangular handle being between said portions.

6. An enclosed switch including a cabinet having back and side walls and an openable cover, a circuit breaker mounted in the cabinet and having a projection thereon, an operating handle movably mounted on the exterior of the cover having a portion extending through the cover, an operating member disposed inside of the cabinet and operable by said portion in a plane parallel to the cover, said member having an opening therein for receiving the projection on the circuit breaker to operate the breaker by means of the handle on the exterior of the cabinet, the sides of said member adjacent said opening being so wide as to permit the closing of the cover of the cabinet only when said projection is in said opening.

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