Feb. 23, 1965 J. A. HERRMANN 3,170,997

INTERLOCK FOR SWITCH ENCLOSURES

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FIG. 1a.

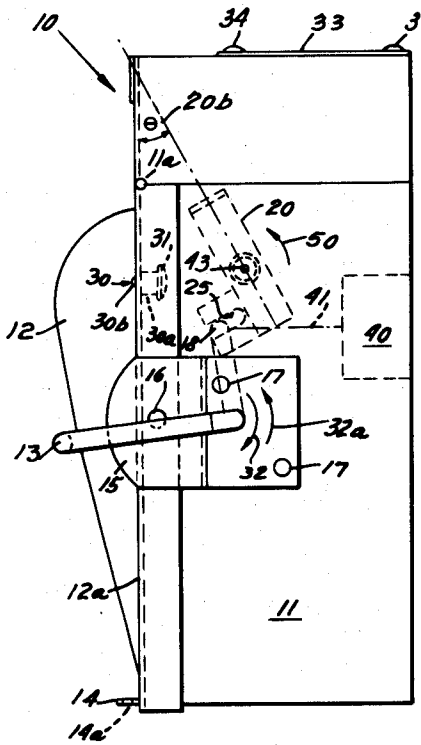
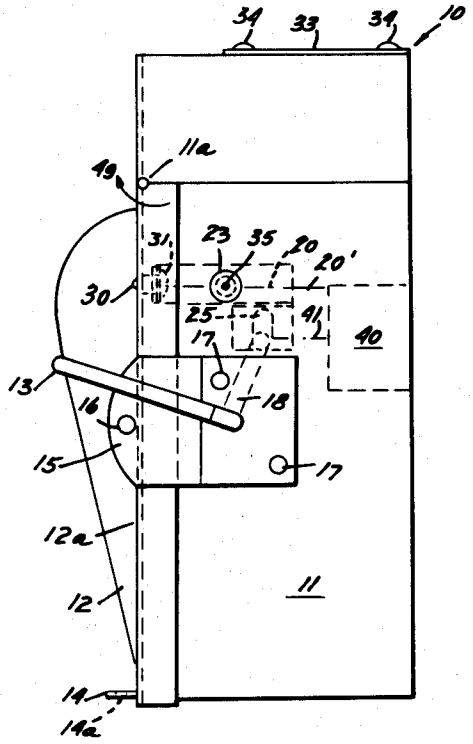


FIG. 1b.



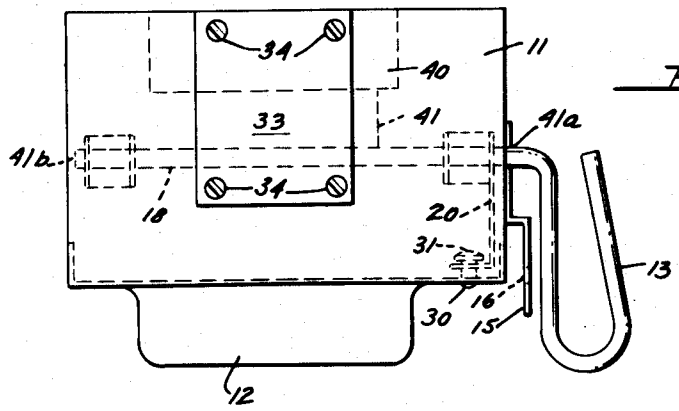


FIG. 1c.

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FIG. 2.

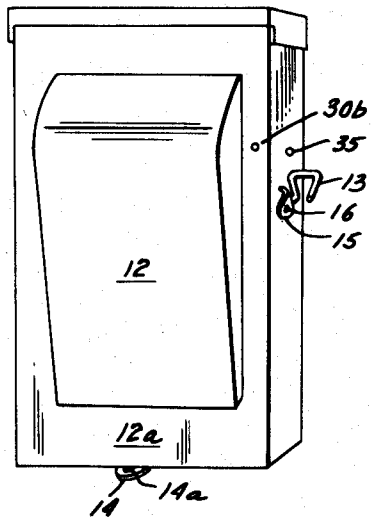


FIG. 3.

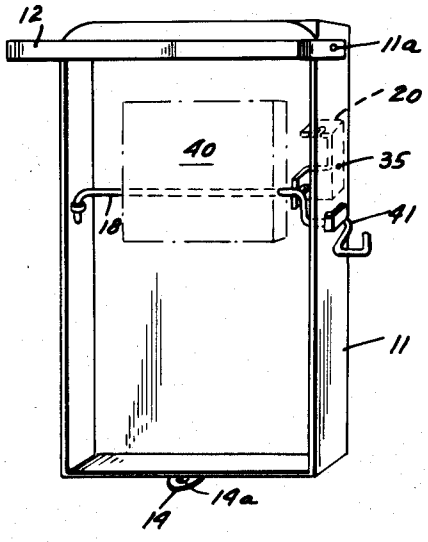


FIG. 4a.

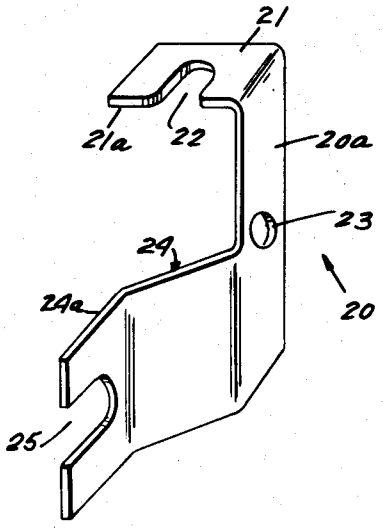
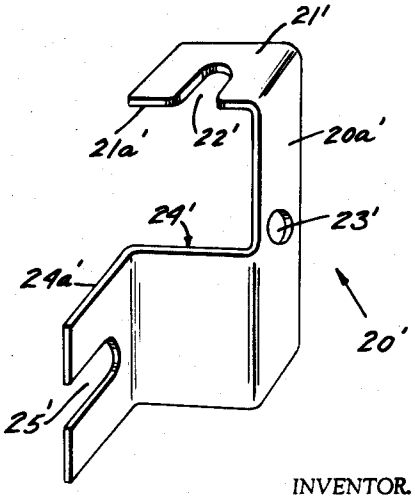


FIG. 4b.



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INTERLOCK FOR SWITCH ENCLOSURES

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4 Claims. (Cl. 200—50)

This invention relates to a circuit protective device housing arrangement and more particularly to a housing arrangement incorporation novel interlock means which is so adapted as to prevent lifting of the housing hinged cover when the circuit protective equipment housed therein is in the ON position.

Circuit protective devices which find widespread use for the protection of low and medium capacity circuits are quite often vertically mounted both interiorly and exteriorly of establishments such as homes, industrial buildings, and so forth. Since breakers mounted in this fashion may quite easily be tampered with, it is well known to employ circuit protection equipment housings in which the circuit breakers are mounted wherein said housings have exteriorly mounted manually operable handles for moving the protective equipment contained therein to its ON and OFF positions.

Prior art housings of this type, however, fail to provide means for preventing the lifting of the housing hinged covers when the protective equipment contained therein is placed in the ON position. This is important since an uninformed party may open such a circuit breaker housing and come into contact with the energized portion contained within the housing.

The instant invention provides a novel interlock arrangement for preventing the lifting of the housing hinged cover means when the circuit protective equipment contained therein is placed in the ON position and which is further provided with disengageable means for defeating the interlock function when desired, which member may be removed by qualified personnel and may only be removed when the hinged cover member is in the open position.

The instant invention is comprised of an interlock member which is pivotally mounted to one wall of the protective equipment housing and in close proximity to the exteriorly mounted protective equipment operating handle. A first end of the pivotally mounted interlock member is adapted to make slidable engagement with the protective equipment operating bail which is under direct control of the exterior mounted operating handle. Thus the interlock means may be pivoted between a first and second position under control of the operating bail which likewise moves the protective equipment between its ON and OFF position.

A second end of the interlock means opposite the first end of said interlock means is adapted to move into close proximity to the protective equipment housing cover when the housing cover is moved to the closed position and when said operating handle is rotated to the ON position. A fastening means having one end secured to the cover member and having its other end projecting inward and towards said interlock means is adapted so as to be slidably engaged by the interlock means second end so as to prevent lifting of the hinged cover means when the operating handle is in the ON position.

A threadedly engaged member which is a part of the fastening means assembly may be removed from the fastening means assembly when the hinged cover is lifted so as to defeat the interlock function although the operating handle is placed in the ON position with the cover member in the closed position, thus permitting a defeating of the interlock function by qualified personnel. Since the removable member threadedly engages the fastening means assembly interiorly of the protective equipment housing, it may not be tampered with when the housing hinged cover is in its closed position.

A bracket means is provided for preventing movement of the operating handle from the ON to the OFF position when cooperatively linked with a locking member, such as a padlock, so that in this position the hinge cover may be lifted only when the operating handle is moved to the OFF position and, since this movement is prevented by the presence of the padlock member, no tampering of any form may occur.

Therefore, one object of this invention is to provide a novel interlock means for protective equipment housings which operate under control of an exteriorly mounted operating handle to prevent lifting of the housing cover when the operating handle is in its ON position.

Another object of this invention is to provide interlock means for circuit protective equipment housings which is so adapted as to prevent operating of the housing cover when the protective equipment is in the ON position and which further includes removable means adapted to defeat the interlock function when removed from the protective equipment housing assembly.

Another object of the instant invention is to provide novel interlock means for protective equipment housings which is pivotally mounted to one wall of the protective equipment housing and which is slidably engageable with fastening means mounted to the housing cover when the protective equipment operating handle is moved to the ON position.

Still another object of my invention is to provide novel interlock means for protective equipment housings which is pivotally mounted to one wall of the protective equipment housing and which is slidably engageable with fastening means mounted to the housing cover when the protective equipment operating handle is moved to the ON position and wherein the fastening means which is secured to the cover member has a removable element which upon its removal defeats the interlock and further is mounted interiorly of said protective equipment housing so that it may be removed only upon lifting of the housing hinged cover.

These and other objects of this invention will become apparent when considering the accompanying description together with the drawings in which:

FIGURE 1*a* is a side view of the protective equipment housing showing the operating handle in the OFF position.

FIGURE 1*b* is a side elevation view of the housing of FIGURE 1*a* showing the operating handle in the ON position.

FIGURE 1*c* is a top plan view of the protective equipment housing shown in FIGURES 1*a* and 1*b*.

FIGURE 2 is a perspective view of the protective equipment housing shown in FIGURES 1*a* through 1*c*.

FIGURE 3 is a perspective view of the protective equipment housing showing the hinged cover of the housing in its lifted position.

FIGURES 4*a* and 4*b* are perspective views of two preferred embodiments of interlock members which may be used in protective equipment housings of the type shown in FIGURES 1*a* through 1*c*, 2 and 3.

Referring now to the drawings and especially to FIGURES 2 and 1*a* through 1*c* the protective equipment housing **10** is comprised of a shell member **11** which may be mounted either horizontally or vertically to any supporting means in any well-known fashion for the purpose of fixedly securing the housing **10** for permanent use thereof. A cover member **12** is hinged to the substantially rectangularly shaped shell **11** at a pivot point **11***a* by any well-known hinging means.

A removable plate **33** is secured to the top of shell **11**

by fastening means 34 for the purpose of covering an aperture (not shown) positioned immediately beneath cover member 33 which may be employed for the purpose of fastening a hub member thereto in order to permit entrance of lead conductors therethrough to be connected to the protective equipment 40 in any well-known manner.

A projection 14 extends outward from the shell 11 through a slot (not shown) in cover 12. The projection 14 is provided with an eyelet 14*a* for the insertion of locking means such as a padlock (not shown), for the purpose of locking cover member 12 to shell 11 so as to prevent any lifting thereof. A substantially Z-shaped member 15 is secured to the side wall of shell 11 adjacent operating handle 13 by fastening means 17. An eyelet 16 is provided in Z-shaped bracket 15 for receiving a padlock member of the type mentioned above so as to prevent movement of the operating handle 13 in either the ON or OFF position shown in FIGURES 1*a* and 1*b* respectively, preventing movement of the operating handle 13 from either of these positions.

The housing 10 has fixedly secured to its interior protective equipment shown schematically by the block designated by numeral 40 which acts to protect the circuitry connected thereto against overload and short circuit conditions in a manner well known in the art. Since the circuit protective equipment 40 lends no novelty to the instant invention, any detailed description thereof has been omitted for the sake of brevity.

The circuit protection equipment 40 is operated between an ON and an OFF condition by a pivotally mounted bail 18 which is mechanically linked to the protective equipment 40 which linkage is shown schematically by the phantom line 41 between bail member 18 and protective equipment 40.

The bail member 18 is rotatably mounted at the points 41*a* and 41*b* along the side walls of the housing shell 11. The bail 18 is mechanically linked to exteriorly mounted manually operable handle 13 which is likewise pivoted at the right-hand pivot point 41*a* shown in FIGURE 1*c* of the drawings. The rotatable handle 13 is movable in both the clockwise and counterclockwise directions as shown by arrows 32 and 32*a* respectively, in FIGURE 1*a* of the drawings, in order to move the circuit breaker protective equipment 40 to its OFF and ON positions respectively.

An interlock bracket 20 (note also FIGURES 4*a* and 4*b*) is pivotally mounted by an interlock bracket rivet 43 to the wall of the housing shell 11 which rivet member 43 passes through an aperture 23 in the body 20*a* of interlock member 20. The interlock member 20 is positioned along the wall of the housing 11 so as to be positioned in close proximity to both bail member 18 and a cooperating interlock screw member, to be more fully described.

The lower end 24 of interlock member 20 is substantially L-shaped and has elongated notch 25 at its end-most flanged portion 24*a* which is so positioned as to slidably engage bail 18, as can best be seen in FIGURES 1*a* and 1*b*. This arrangement places the pivotal movement of interlock member 20 under control of bail 18 and consequently operating handle 13 of the housing assembly 10. Thus, as shown in FIGURE 1*a*, with the operating handle 13 in the position shown in this figure, the interlock member longitudinal axis (phantom line 20*b*) forms an acute angle θ_1 with the planar surface 12*a* of the hinged cover member 12.

In this position the upper flanged end of interlock member 20 which has a flared notch 22 along its edge 21*a* is at a position substantially remote from the inner surface of the cover means 12*a* as shown in FIGURE 1*a*.

A fastening assembly 30 which is comprised of a rivet member 30*a* and a cover rivet screw 31 is mounted to the planar surface 12*a* of cover member 11 at its end 30*b* so as to extend interiorly of the housing 10 substantially in the direction of interlock member 20. The diameter of the rivet member 30*a* is slightly less than the dimensions of the flanged notch 22 in interlock bracket 20 so as to be slidably engaged therewith. The outer dimensions of the head of cover rivet screw member 31, however, is greater than the dimensions of the flanged notch 22 in interlock bracket member 20 so as to prevent lifting of the hinged cover member 12 in the direction shown by arrow 49 of FIGURE 1*b*, as will be more fully described.

The operation of the interlock bracket member is as follows:

With the hinged cover member 12 in the position shown in FIGURE 1*a* the operating handle 13 is rotated clockwise as shown by arrow 32 in FIGURE 1*a* causing bail 18 to move in the direction shown by arrow 32 which urges interlock bracket member towards rotation in the direction shown by arrow 50 of FIGURE 1*a*. The bail member 18 which is mechanically hinged to the protective equipment 40 which linkage is shown schematically by phantom line 41 simultaneously operates to place the protective equipment in the ON position, that is, to place the protective equipment in the closed position so that the load circuitry connected thereto may draw current from the source (not shown) between which elements the protective equipment 40 is positioned.

When operating handle 13 has moved to the position shown in FIGURE 1b the protective equipment 40 is fully in the ON position and simultaneously therewith the interlock bracket 20 is moved to the position shown in FIGURE 1*b* so that its longitudinal axis 20*b* is perpendicular to the planar surface 12*a* of the hinge cover member 12. In this position the flared notch (see FIGURES 4*a* and 4*b*) slidably engages the body 30*a* of the rivet assembly 30 so that the head of the cover rivet screw 31 lies beneath the flanged portion 21*a*.

In this position (FIGURE 1*b*) any attempt to rotate the hinged cover member 12 about its pivot point 11*a* in the direction shown by arrow 49 is prevented by the fact that the head of cover rivet screw 31 abuts against flange 21*a* of interlock bracket 20 and since its dimensions are greater than the dimensions of the flanged notch 22, it will not pass through notch 22, thereby preventing lifting of the hinged cover member 12.

If, however, it is desired to arrange the protective equipment housing assembly 10 in such a manner as to defeat the interlock function performed by the interlock assembly, this may be done simply by removing the cover rivet screw member 31 being threadedly engaged with the rivet 30*a* which has a tapped aperture for receiving cover rivet screw member 31. It should be noted, however, the cover rivet screw 31 may be removed only when the hinged cover member 12 is rotated clockwise in the direction shown by arrow 49 in FIGURE 1*b*, towards the open position shown in FIGURE 3 since the cover rivet screw 31 is positioned interiorly in the housing assembly 10. This insures that no tampering with the cover rivet screw member 31 will occur due to its non-conspicuous positioning so that only qualified personnel will be aware of its significance.

The basic distinction between the two preferred embodiments shown in FIGURES 4*a* and 4*b* is such that the flanged portions 24, 24' respectively, are bent in at different angles in order to accommodate operating bails for protective equipment of differing capacities so as to provide a basic interlock bracket member 20 which is readily adaptable for a variety of protective equipment of the type found in the housing assembly of this invention simply by altering the angle which the flanged portion 24 is bent with respect to the main body 20*a* of the interlock bracket 20.

It can therefore be seen that the interlock arrangement of the instant invention provides a simple, reliable and relatively inexpensive interlock operation which, in addition to preventing lifting of the housing hinge cover means when the protective equipment is in the ON position, is further adapted to permit the defeat of the interlock function by qualified personnel when so desired.

Although I have described prefered embodiments of my novel invention, many variations and modifications will now be obvious to those skilled in the art, and I prefer therefore to be limited not by the specific disclosure herein but only by the appended claims.

The embodiments of the invention in which an exclusive privilege or property is claimed are defined as follows:

1. Interlock means for a circuit protective device housing having a hinged cover member and a manually operable switch handle assembly movable between an ON and an OFF position comprising an interlock bracket pivotally mounted to said housing at a main portion of said bracket and having a first end mechanically linked to said handle assembly, a second end of said interlock bracket being flanged from the main portion of the interlock bracket, said flanged portion being substantially parallel to a flat portion of said cover, said flanged portion member having a notch therein; fastening means fixed secured to said cover member and positioned at a point on said cover member in close proximity to said interlock bracket flanged portion; the end of said fastening means being received by said notch when said handle assembly is in said ON position to prevent lifting of said hinged cover member to prevent contact with elements disposed within said circuit interrupter housing; said fastening means being disposed outside of said notch when said handle assembly is in said OFF position.

2. An interlock means as recited in claim 1 in which the end of said fastening means adjacent said interlock bracket flanged portion is removable to defeat the interlock function of the interlock bracket when desired.

3. An interlock means as recited in claim 1 in which the handle assembly includes a rotatable handle mounted on the exterior of said circuit interupter housing, a bail pivotally mounted in the interior of said interupter housing and connected to said rotatable handle, the end of said interlock bracket opposite said flanged portion having an elongated notch which receives said bail for controlling the rotation of said interlock bracket under control of said rotatable handle.

4. An interlock means as recited in claim 3 in which the fastening means comprises a rivet fixedly secured to said cover member and mounted to extend towards the interiors of said interupter housing in the direction of said interlock bracket; and a cover rivet screw threadedly engageable with said rivet, the head of said screw having a diameter greater than the width of the notch in said flanged portion to prevent lifting of said hinged cover member when said handle assembly is in the said ON position.

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