This invention relates to an elevating mechanism for electric devices mounted within an enclosure.

The primary object of the invention is the provision of an elevating mechanism of improved construction for electric devices mounted within enclosures therefor.

Another object is the provision of an elevating mechanism having a mounting pan which is mounted for adjustment in the enclosure without, however, directly engaging said enclosure.

Another object is the provision of an elevating mechanism having a mounting pan which is adjustably movable relative to the enclosure cover in response to the operation of a member free of similar movement.

A further object is to provide improved means for mounting the pan for movement toward and away from the front of the enclosure and for limited movement to positions oblique to the plane of the front of the enclosure to compensate for variations in the planar positions of the cover especially when the enclosure is disposed for flush mounting in a wall, for example when the outer surface of the wall is not precisely parallel to the plane of the front of the enclosure which in the flush mounting is disposed rearwardly of said wall surface.

A further object is the provision of an elevating mechanism of generally simplified construction and improved operation.

The above and other objects, features and advantages of the present invention will be more fully understood from the following description considered in connection with the accompanying illustrative drawings.

In the drawings:

Fig. 1 is a front elevation of the enclosure, a portion of the door in the front cover being broken away to show the electric devices;

Fig. 2 is a view similar to Fig. 1, on a larger scale, with the front cover removed, a portion of one of the electric devices being broken away;

Fig. 3 is a sectional view, on a larger scale, on the line 3--3 of Fig. 1;

Fig. 4 is a sectional view, on a larger scale, on the line 4--4 of Fig. 1; and

Fig. 5 is a detail sectional view on the line 5--5 of Fig. 3.

Referring to the drawings, there is illustrated the electric device enclosure box 10 preferably formed of metal and which, as here shown, is of the type adapted for mounting on a supporting surface, the rear wall 12 thereof being provided with the integral projections or bosses 14 centrally apertured, as at 16, for receiving suitable means to mount said box on said surface. Said box is provided with the opposing end walls, 18, 18 and the opposing side walls 20, 20, which are provided, at their upper ends, with the integral peripheral flange 22 at the front of said box. A front cover 24 secured to said flange 22 by screws 25 engaged in threaded apertures 27, is provided with a depressed trim portion 28 extending into the interior of said box, and with a door 30 overlying said trim portion. Said door is hinged as at 32, and is provided with a pull member 34.

The elevating mechanism mounted in the enclosure comprises a mounting pan or plate 36, a guide and spacer member 38, and an operating member 43. The mounting pan 36 is preferably formed of metal and, as here shown, is provided with the struck-up hooked portions 42 adjacent the opposite ends 44, 44 thereof. Said pan is also provided, centrally thereof, with the aligned pairs of struck-up guide parts 46, 46, and 48, of the companions guide parts of each of said spares having an aperture 50 therebetween.

The guide and spacer member 38 is preferably formed of metal and is provided with a base portion 52 having the upwardly diverging pairs of arms 54--55, 54--55, and the centrally aligned, integral, upwardly extending guide elements 58, each of which extends between the companion arms 54--55 of each of said pairs. Said base portion 52 is also provided with a slotted portion 50 which is open, as at 62, between the arms 55 of each of said pairs, and which extends transversely of said base portion to intersect a line extending between said guide elements 58. The guide member 53 is fixedly mounted in a centrally disposed, depressed portion 64 in bottom wall 60 of the enclosure box, said portion being provided with an enclosed slot 65 which underlies slot 60 and cooperates therewith to provide a keyhole opening for operating member 40, as will presently appear.

The operating member 40 is provided with a shank 68 having at the top thereof, a screw head 70 for screw-driver adjustment thereof and a knurled portion 72 for manual adjustment thereof. A threaded portion 74 is integral at one end thereof with shank 68 and has a larger diameter than the shank which is provided with an insulation sleeve 76 which is retained on said threaded portion. At its other end, said threaded portion 74 is provided with a narrowed neck 78 which carries a circular head 80 of greater diameter than said neck. Neck 78 is dimensioned to be engageable in slot 60 of guide member 38 and
head 60 is dimensioned to be engageable in slot 66 of bottom wall portion 64 of the enclosure box, as illustrated in Figs. 3 and 4. Referring to Fig. 5, it will be understood that head 60 is positionable in slot portion 62 of slot 66, which is not superimposed by slot 60, and, as member 40 is moved toward slot 60, neck 78 thereof will engage in said latter slot and the adjacent portions of base 52 will be disposed between the threaded portion 74 and head 60, as illustrated in Figs. 3, 4, and 5, to retain member 40 against displacement in a direction perpendicular to bottom wall 12 and the front cover while permitting the rotation of said member.

The mounting pan 36 is carried by the operating member 40 being threadedly engaged, at a centrally disposed aperture 84 thereof, with the threaded portion 74 of said member. Said aperture 84 is aligned between the previously mentioned guide openings 50, the guide elements 55 of guide member 35 being in sliding engagement with the pan in said apertures 59 and being guided by the companion guide ports 46, 46 and 48, 46, respectively, said guide elements retaining said mounting pan against rotation. It will be understood that the manipulation of operating member 40, which is retained against bodily movement, i.e., perpendicular movement relative to bottom wall 12 and front cover 24, as described, will result in the perpendicular movement of said mounting pan relative to said bottom wall and front cover, and axially of said guide elements, due to the fact that the latter retain said pan against rotation. Rotation of operating member 40 in one direction will carry said mounting pan toward bottom wall 12 until it abuts the pairs of arms 54—56 of guide member 35. Rotation of said operating member in an opposite direction will carry said pan toward the trim portion 28 of the front cover, it being noted that said portion is centrally apertured at 66 and that operating member 40 extends through said aperture whereby access is had to said member for the operation thereof when the door 30 is open.

It will be observed that pan 36 can be tilted slightly in relation to studs 55 to positions somewhat oblique to the plane of the cover or trim to compensate for small variations in the planar positions of the latter when the enclosure is disposed for flush mounting in a wall having an outer surface which is not precisely parallel with the plane of the front of the enclosure to which the door and trim is secured.

As here shown, the mounting pan 35 is provided with contact-block units 83 secured transversely thereof, in end-to-end relation, in a suitable manner, and provided with the companion arcuate portions 89 which together form a substantially circular opening 91 in which the operating member 40 is disposed. Said contact block units may be of the type described in the co-pending application, Ser. No. 123,432, filed November 15, 1949 by Thomas M. Cole and myself, and assigned to the assignee hereof. As there described, each of said contact blocks is provided with a terminal member 90 for connection to a power line (not illustrated) and with the contact terminals 92. The electric devices 94, as illustrated herein, are circuit breakers which may be adapted for engagement with said contact-block units. As illustrated and described in said application, each circuit breaker is provided, at one end, with a stab-contact or plug-in terminal member which is engageable in a contact terminal 92 and, at its other end, said circuit breaker is provided with a recessed casing portion 95 in which the hook 63 is engaged for retaining the circuit breaker in position thereon. As illustrated, each contact-block unit 88 accommodates four circuit breakers which are mounted in end-to-end disposition perpendicular to said block-unit.

The trim portion 28 of the front cover of the enclosure provided with the scored parts 96, each of which, when removed, provide an aperture 100 which is aligned with the handle or manual operating member 102 of a device 94, said handle entirely projecting through said aperture when pan 40 is elevated so that the upper portions 104 of the casing of said device abut the inner surface of trim portion 28.

From the foregoing description, it will be apparent that applicant has provided an enclosure for electric devices which can be mounted and wired on the mounting pan of said enclosure while the latter is in its retracted position. The cover can then be attached to the enclosure and the operating member then rotated until the tops of said devices abut the inner surface of said cover. It will be apparent that since the operating member is retained against perpendicular movement relative to the door, the mounting pan can accommodate longer or shorter electric devices, said pan being moved closer to or farther away from the trim portion, depending on the size of said devices, and said door always closing since the screw-head 70 is fixedly spaced therefrom, in the closed condition of said door, regardless of the elevation of the mounting pan.

While the invention has been illustrated and described in connection with contact-block units 88, and plug-in circuit breakers 94, it will be understood that other types of electric devices, such as, for example and not by way of limitation, switches or fuses, may be mounted on said pan and that the electric devices may be otherwise connected to power lines than through said contacting-block units. It will also be understood that the elevating mechanism of the invention is adapted for use with an enclosure of the flush type, such as is usually mounted in a wall opening.

While I have shown and described the preferred embodiment of my invention, it will be understood that various changes may be made in the present invention without departing from the underlying idea or principles of the invention within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. In combination, an enclosure for an electric device, a front cover for said enclosure, a support for said device mounted within said enclosure for movement relative to said cover, and a single operating member, retained against axial movement, for effecting said movement of said support.

2. In combination, an enclosure for an electric device, a front cover for said enclosure, a support for said device mounted within said enclosure for movement relative to said cover, and a single operating member, retained against axial movement, for effecting said movement of said support, said support being in threaded engagement with said operating member and free of engagement with said enclosure.

3. In combination, an enclosure for an electric device, a front cover for said enclosure, a support for said device mounted within said en-
5. In combination, an enclosure for an electric device, a front cover for said enclosure, a support for said device mounted within said enclosure for movement relative to said cover, a single operating member for effecting said movement of said support, and means retaining said operating member against similar movement and retaining said support against rotation.

6. In combination, an enclosure for an electric device, a front cover for said enclosure, a support for said device mounted within said enclosure for movement relative to said cover, a single operating member in threaded engagement with said support, a part mounted in said enclosure in opposition to said front cover, said operating member being retained by said means against movement in the direction of said path.

7. In combination, an enclosure for an electric device, a front cover for said enclosure, a support for said device mounted in said enclosure for movement in a path perpendicular to said cover, a single operating member in threaded engagement with said support, a part mounted in said enclosure in opposition to said front cover, said member being retained by said part against movement in the direction of said path, and guide means carried by said part in sliding engagement with said support for retaining the latter against rotation relative to said operating member.

8. In combination, an enclosure for an electric device, said enclosure having a back wall and a front cover, a support for said device mounted in said enclosure for movement in a path perpendicular to said cover, a single operating member having a threaded portion in engagement with said support, a support provided with a slotted portion mounted on said back wall, said back wall having a slotted portion defined therein underlying said first mentioned slotted portion to form a keyhole opening therewith, said operating member having a narrowed portion engaged in said keyhole opening therewith, and said support for retaining the latter against rotation relative to said operating member.

9. In combination, an enclosure for an electric device, said enclosure having a back wall and a front cover, a support for said device mounted in said enclosure for movement in a path perpendicular to said cover, a single operating member having a threaded portion in engagement with said support, a part provided with a slotted portion mounted in said back wall, said back wall having a slotted portion defined therin underlying said first mentioned slotted portion to form a keyhole opening therewith, said operating member having a narrowed portion engaged in said keyhole opening therewith, said support for retaining the latter against rotation relative to said operating member.

10. In combination, an enclosure for an electric device, a front cover for said enclosure, a support for said device mounted in said enclosure for movement in a path perpendicular to said cover, a single operating member in threaded engagement with said support, a part mounted in said enclosure in opposition to said front cover, said member being retained by said part against movement in the direction of said path, guide means carried by said part in sliding engagement with said support for retaining the latter against rotation relative to said operating member, and upwardly extending arms on said part for spacing said support from said back wall.

11. Elevating means for an electric device contained within an enclosure, said means comprising a support for said device, a single operating member in threaded engagement with said support, a part for moving the latter within said enclosure, and means in said enclosure for retaining said operating member against movement with said support, said support being free of engagement with said enclosure.

12. Elevating means for an electric device contained within an enclosure, said means comprising a support for said device, a single operating member in threaded engagement with said support, a part for moving the latter within said enclosure, and means for retaining said operating member against movement with said support, said latter means being a part mounted in said enclosure and defining a keyhole opening therewith, said operating member having a portion engaged in said keyhole whereby said operating member is retained against movement away from said part.

13. Elevating means for an electric device contained within an enclosure, said means comprising a support for said device, a single operating member in threaded engagement with said support, and means for retaining said operating member against movement with said support, said latter means being a part mounted in said enclosure and defining a keyhole opening therewith, said operating member having a portion engaged in said keyhole whereby said operating member is retained against movement away from said part.

14. Elevating means for an electric device contained within an enclosure, said means comprising a support for said device, a single operating member in threaded engagement with said support, a part for moving the latter within said enclosure, and means for retaining said operating member against movement with said support, said latter means being a part mounted in said enclosure and defining a keyhole opening therewith, said operating member having a portion engaged in said keyhole whereby said operating member is retained against movement away from said part.
said part being provided with a guide element slidably engageable with said support for retaining the latter against rotation and with portions engageable with said support for spacing the latter from said enclosure.

15. In combination, an enclosure for an electric device, a front cover for said enclosure, a support for said device mounted in said enclosure for movement in a path perpendicular to said cover, a single operating member in threaded engagement with said support, a part mounted in said enclosure in opposition to said front cover, said member being retained by said part against movement in the direction of said path, and guide means carried by said part in sliding engagement with said support for retaining the latter against rotation relative to said operating member, said support having a loose fit on said guide means whereby said support is tiltable in relation to said guide means to positions oblique to the plane of said cover.

16. In combination, an enclosure for an electric device, a front cover for said enclosure, a support for said device mounted in said enclosure for movement from a retracted position therein to an elevated position in which said device abuts said front cover, a single operating member in threaded engagement with said support, one end of said member being accessible through said cover for the manipulation thereof, and means in said enclosure engaging the other end of said member for retaining said member against movement with said support, said operating member being disposed centrally of said support, and said means having a pair of guide elements extending therefrom and engaging said support at opposite sides of said operating member, respectively, for retaining said support against rotation relative to said operating member.

17. In combination, an enclosure for an electric device, a front cover for said enclosure, a support for said device mounted in said enclosure for movement from a retracted position therein to an elevated position in which said device abuts said front cover, a single operating member in threaded engagement with said support, one end of said member being accessible through said cover for the manipulation thereof, and means in said enclosure engaging the other end of said member for retaining said member against movement with said support, said operating member being disposed centrally of said support, and said means having a pair of guide elements extending therefrom and engaging said support at opposite sides of said operating member, respectively, for retaining said support against rotation relative to said operating member, said support having a loose fit on said guide elements whereby said support is tiltable in relation to said guide elements to positions oblique to the plane of said cover.

PAUL M. CHRISTENSEN.

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