

June 2, 1970

W. A. DE SMIDT

3,515,423

LOCKING DEVICE FOR ENCLOSURE FOR SWITCHES AND THE LIKE

Filed May 9, 1968

2 Sheets-Sheet 1

Fig. 1

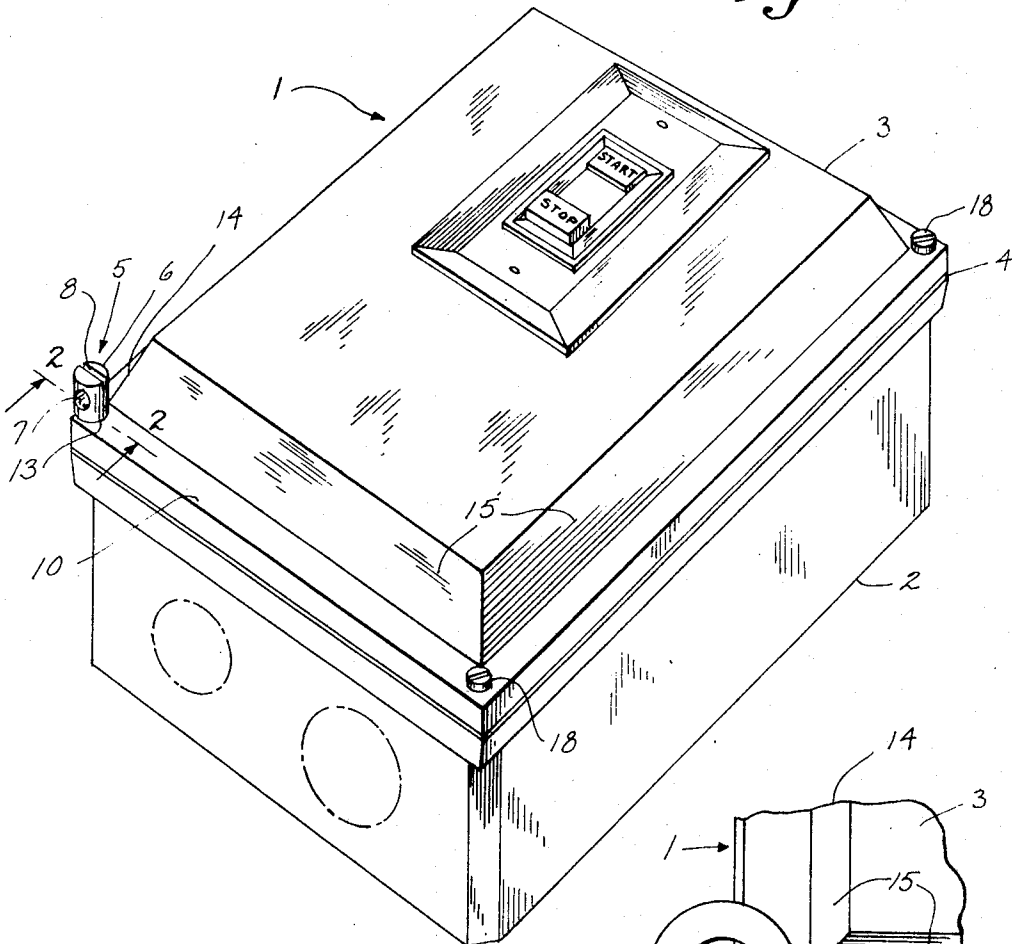


Fig. 2

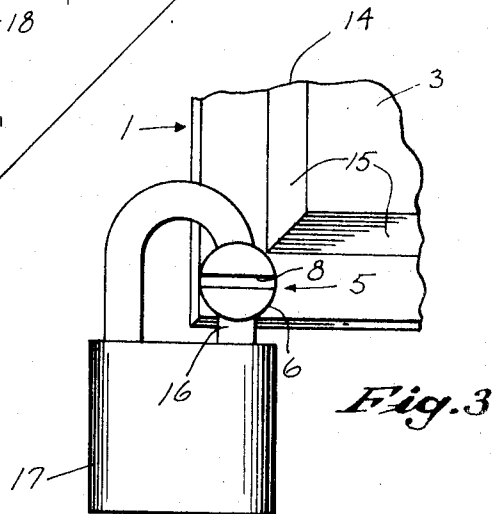
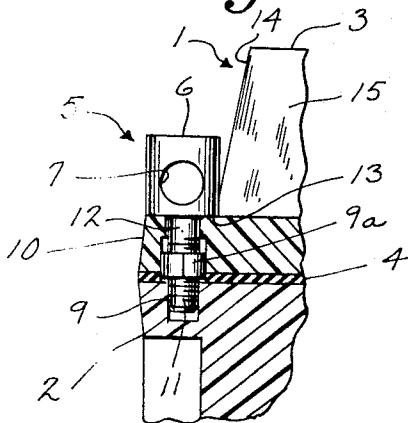


Fig. 3

INVENTOR
WOODROW A. DE SMIDT

BY *Joseph D. Bizzano, Jr.*

ATTORNEY

June 2, 1970

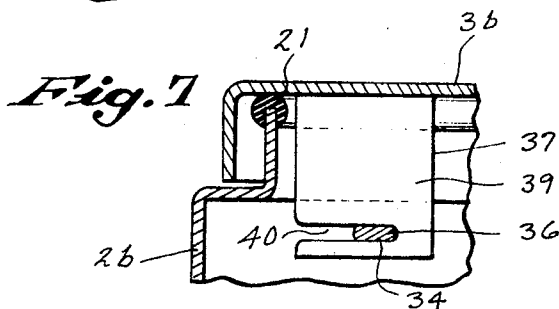
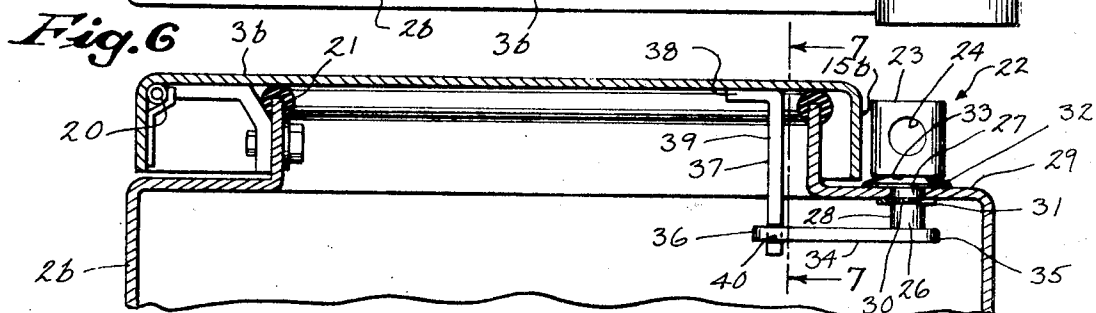
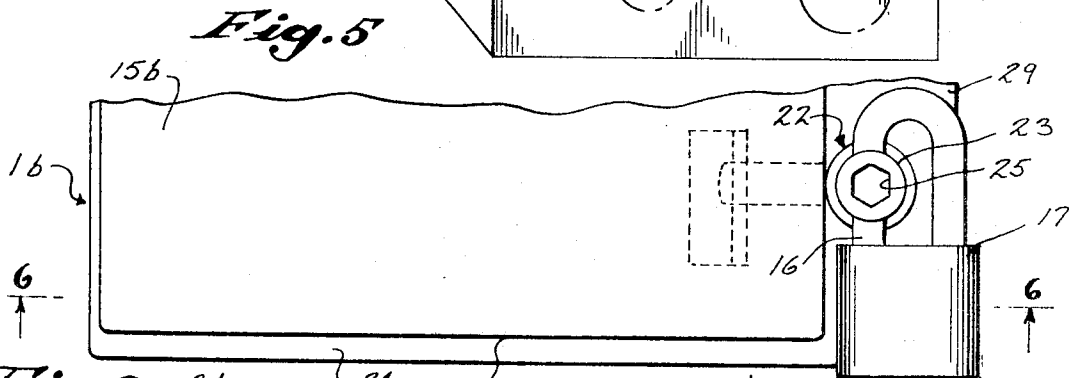
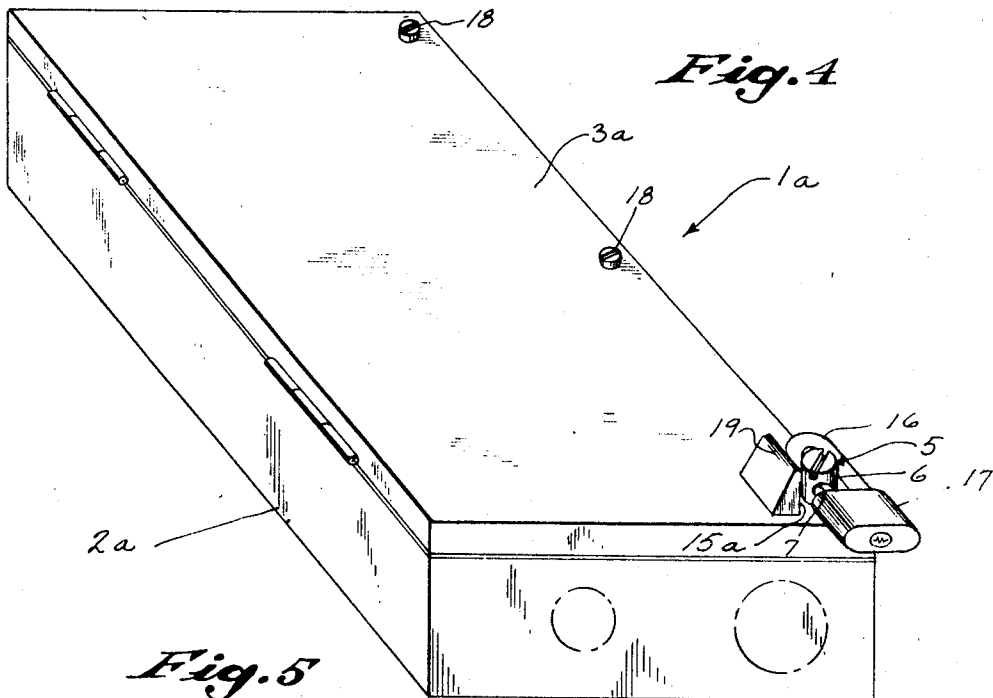
W. A. DE SMIDT

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INVENTOR
WOODROW A. DE SMIDT

BY

Joseph D. Bizzaro

ATTORNEY

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LOCKING DEVICE FOR ENCLOSURE FOR SWITCHES AND THE LIKE

Woodrow A. De Smidt, Milwaukee, Wis., assignor to Allen-Bradley Company, Milwaukee, Wis., a corporation of Wisconsin

Filed May 9, 1968, Ser. No. 727,804

Int. Cl. B65d 45/30

U.S. Cl. 292—256.71

4 Claims

ABSTRACT OF THE DISCLOSURE

A locking device for enclosures for switches and the like. There is an enclosure body and a removable cover that fits over the body to enclose the interior, and a locking post is provided that has an exposed apertured head which is positioned alongside a surface of the cover. The post connects the cover with the body, so that the cover cannot be removed, and when a shaft, such as the shank of a padlock, is inserted in the apertured head the cover surface alongside the head blocks rotation of the post and shaft, so that the cover cannot be removed from the enclosure body. Hence, the enclosure is locked closed until the shaft is removed and the post then rotated to disconnect the cover from the body.

BACKGROUND OF THE INVENTION

This invention relates to a locking device for enclosures suitable for housing electrical switches and similar devices, the purpose being the prevention of unauthorized access to the interior of such enclosures.

Heretofore, locking devices of the general class in which the present invention resides mainly have been constructed of specially formed flat metal projecting tongues on the enclosure body and the removable cover, each tongue being provided with an aperture or a slot. The tongues align with one another when the cover is closed in such manner that a shank from a padlock extending through one or both apertured projections prevents removal of the cover. Thus, unauthorized access to the interior of the enclosure is prohibited. The flat metal projecting tongues usually employed in the prior art locking devices are esthetically unattractive in appearance, lacking in functional flexibility, and not particularly suitable for use with enclosures made of a molded synthetic material.

The problem of providing both a reliable and an economically constructed locking device for an enclosure which is esthetically attractive in appearance, and which is advantageously suitable for molded plastic enclosures for the most part has not been fully solved.

SUMMARY OF THE INVENTION

In the present invention there is provided a highly effective locking device for enclosures having a pleasing appearance which can be reliably constructed, offers greater flexibility in employment thereof, and is admirably suitable for use with molded plastic enclosures. This is accomplished by providing a locking post for an enclosure having an enclosure body and a removable cover that has an exposed head positioned alongside a surface of the cover. The post connects the cover with the enclosure body and must be rotated to disconnect and open the cover. A shaft extending through a suitable opening in the post head precludes turning of the post, due to the blocking position of the cover surface, but upon removal of the shaft the post can be turned and the cover freed for opening.

Objects of the present invention are: to provide improvements in locking device constructions for enclosures

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for electrical switches and the like; to provide an improved locking device structure which is highly reliable; to provide an improved locking device structure which has an esthetically pleasing appearance; to provide a locking device structure which is easy to operate by the user in the field; to provide a locking device structure which offers flexibility in the employment thereof; and, in general, to provide a locking device for enclosures for switches and the like having the several cited features and advantages which is sturdy, reliably constructed and readily adaptable to various enclosure structures while still being relatively simple and inexpensive to manufacture and assemble. Other objects and advantages will become apparent from the following description, in which there is shown by way of illustration and not of limitation preferred embodiments of the invention. Reference is made to the claims at the end of this specification for determination of the scope of the invention.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view in perspective of an enclosure for electrical switches having a locking device embodying the invention,

FIG. 2 is a fragmentary view in section and on an enlarged scale of the enclosure and locking device taken on the plane 2—2 indicated in FIG. 1,

FIG. 3 is a fragmentary plan view on the same scale as and of the structure shown in FIG. 2, this view further showing a padlock inserted in the locking device,

FIG. 4 is a view in perspective of another form of enclosure having a locking device embodying the invention,

FIG. 5 is a fragmentary plan view of still another form of enclosure having a locking device embodying the invention,

FIG. 6 is a side view in section of the enclosure and locking device shown in FIG. 5 taken on the plane 6—6, and with the padlock deleted, and

FIG. 7 is a fragmentary view in section of the enclosure of FIGS. 5 and 6 taken on the plane 7—7 indicated in FIG. 6.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings, there is shown in FIG. 1 an enclosure 1 for an electrical switch which includes an enclosure body 2 and a removable cover 3 that fits over the top edges of the body in a closed position. The body 2 and the cover 3 can be made from a number of suitable materials including metal, molded plastic such as a phenolic, or the like. To provide a seal against water or corrosive atmospheric contaminants, a gasket 4 made of rubber or other suitable material can be fitted between the body 2 and cover 3.

As shown in FIGS. 1—3, the enclosure 1 is provided with a locking post 5. The post 5 includes an exposed head 6 which has an aperture 7 adapted to receive a shaft such as the shank of a padlock. The top surface of the head 6 is also provided with a slot 8 which is adapted to receive a tool or instrument to effect a turning movement of the post 5.

Referring now to FIG. 2, the locking post 5 includes a shank 9 integral with the head 6 that extends downward through the cover flange 10 and into the enclosure body 2. The lower portion 11 of the shank 9 that projects into the enclosure body 2 is threaded, and hence is rotatably securable with the enclosure body 2 upon a turning movement of the post 5. The upper portion 12 of the shank 9 which is not threaded passes through the cover flange 10 with a fairly close, but still loose fit.

There is also shown in FIG. 2 a retainer ring 9a fitted about shank 9 approximately between the lower portion 11 and upper portion 12 thereof. The ring 9a serves to

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prevent any inconvenient separation of the post 5 from the cover 3 after the cover is removed from the body 2.

The under surface 13 of the post head 6 is engageable with the cover 3 upon a turning movement of the post 5, whereby the cover 3 is held closed when the post 5 is turned down tightly in the body 2.

As can be seen best in FIGS. 1 and 3, the cover 3 has an elevated center portion 14 which in effect defines the flange 10. The elevated center increases the interior space to accommodate the switch that is housed in the enclosure 1. The center portion 14 is also elevated to present surface areas 15 that extend closely alongside the apertured post head 6 when the cover 3 is in closed position. When a shank 16 of a padlock 17 is inserted through the aperture 7, as shown in FIG. 3, the presence of the cover surface 15 precludes turning of the padlock 17, thus prohibiting removal of the post 5 from the enclosure body 2. Consequently, unauthorized access to the switch within the enclosure 1 can be prohibited.

Referring back to FIG. 1, the cover 3 is secured to the enclosure body 2 by means of conventional threaded bolts 18 positioned at three of the four corners of the enclosure 1. The locking post 5 secures the remaining corner, and, in conjunction with a padlock or a similar device, prevents the afordescribed unauthorized removal of the cover 3.

Referring now to FIG. 4, a second form of enclosure 1a is illustrated that has an enclosure body 2a and a hinged cover 3a. Unlike the cover 3 shown in FIGS. 1-3, the cover 3a is flat across its entire top surface, and does not provide a distinct elevated portion. The cover 3a is provided with securing bolts 18 and a locking post 5 along its right-hand margin. In order to provide a surface 15a that blocks rotation of a padlock shank 16 extending through the apertured post head 6, a short rib 19 is provided on the cover 3a. If a molded plastic material is used to make the cover 3a, the rib 19 can be molded integrally therewith. If a metal is used to make the cover 3a, a rib 19 can be spot welded or otherwise secured to the top of the cover. It will be appreciated, however, that the portion of the enclosure cover against which the shank of a lock can strike can have any suitable shape or configuration, so long as it will limit movement of said shank.

Turning now to FIGS. 5-7, these figures illustrate a third embodiment of the locking device of the invention. Typically, an enclosure of the type shown in FIGS. 5 and 6 can be employed to house combination motor starters equipped with disconnect switches, fuse blocks, or circuit breakers. Similarly to the enclosures described hereinbefore, this third type of enclosure 1b has an enclosure body 2b and a removable cover 3b that fits over the body in a closed position. The cover 3b is hingedly connected to the body 2b by means of a hinged construction indicated generally by the numeral 20. As can be seen in FIG. 6, gaskets 21 made of a rubber or other suitable material are provided on the enclosure body 2b in such manner that they will engage the cover 3b when it is in closed position, thus serving to seal and protect the interior of said enclosure 1b as well as the components contained therein from any damaging corrosive contaminants or water.

In accordance with the invention, the third embodiment of the locking device shown in FIGS. 5-7 includes a locking post 22 having an exposed head 23. The post head 23 is provided with an aperture 24 suitable for receiving the shank 16 of a lock such as a padlock 17. On top of the post head 23 there is provided a hexagonal-shaped cut-out portion 25 for receiving a tool or instrument such as an Allen wrench that provides for turning of the locking post 22 in the absence of a shank 16.

As shown in FIG. 6, locking post 22 includes a shank 26 integral with the head 23 that extends downward into the enclosure body 2b. The shank 26 has an upper portion 27 and a lower portion 28. The upper portion 27 of shank 26 passes through a top wall 29 of body 2b with a fairly close, but still loose fit, and is rotatably secured to said body 2b. Circumferential groove 30 is provided

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on the upper portion 27 immediately adjacent the interior surface of said body wall 29. A C-type snap-in washer 31 is received in groove 30 for the purpose of retaining post 22 in place. To frictionally hold locking post 22 from freely rotating at will, a spring washer 32 is fitted about the upper portion 27 of shank 26 extending between the under surface 33 of exposed post head 23 and the exterior surface of body wall 29.

Referring again to FIG. 6, the lower portion 28 of said shank 26 is provided with a latch arm 34 which is integral therewith and extends at a right angle thereto, one end 35 of arm 34 being connected to lower portion 28. The free end 36 of latch arm 34 is engageable and disengageable on the turning of post 22 with a catch 37, said catch 37 rigidly depending from the cover 3b. The catch 37 is of an inverted L-shaped configuration having a foot 38 connected to an interior surface of cover 3b, and a leg 39 extending downwardly from a heel of the foot 38 a distance sufficient to intersect with the free end 36 of latch arm 34. A slot 40, shown best in FIG. 7, is provided on the leg 39 in such position as to be able to receive the free end 36 of latch arm 34 upon the turning of locking post 22. Suitably, the slot 40 should be so positioned and of such depth as to preclude the inadvertent and/or unauthorized freeing of the latch arm 34, and consequent opening of cover 3b, upon possible limited turning of locking post 22, notwithstanding the presence of a padlock shank 16 through its apertured post head 23.

As in the case of the enclosures hereinbefore described, a surface 15b on the cover 3b extends closely alongside the apertured post head 23 to block rotation of a padlock shank 16 extending through the post head 23. Thus, disengagement of latch arm 34 from the cover 3b is prohibited, as is consequent unauthorized access to the interior of enclosure 1b. It will be appreciated by those skilled in the art that other equivalent engageable and disengageable connections between the locking post 22 and the cover 3b can be devised for enclosures of the type similar to enclosure 1b.

Different embodiments of a locking device for an enclosure have been shown and described. In each embodiment there is an enclosure body and a cover that can be removed or opened which fits over the body to enclose the interior. A locking post is provided to connect the cover with the body on rotation of the post so that the cover cannot be removed or opened. This is accomplished by means of either (1) a part of the post projecting through the cover and into threaded engagement with the body, with another part of the post bearing on the cover when the post is turned down tightly in the body, or (2) a latch arm on the post which can be rotated on turning of the post into engagement with a catch extending from the cover. The locking post includes an exposed apertured head which is positioned closely alongside a surface of the cover. When a shaft, such as a padlock shank, is inserted in the apertured head, the cover surface alongside the head blocks any significant rotation of the shaft and post. Thus, the enclosure is locked in closed position until the shaft is removed and the post then rotated to open or remove the cover from the body.

It can be seen that the locking device of this invention is especially suitable for use with molded plastic enclosures not only with regard to appearance but also ease of manufacture. Certain molded plastic materials, such as phenolic resins, or high impact resins, are useful where highly corrosive operating conditions obtain. Of course, it is contemplated that in such situations, the locking post also will be made of a corrosion-resistant material such as stainless steel.

It is contemplated that enclosure and locking device arrangements other than the particular ones shown in the drawings can be used in the construction of a locking device for enclosures embodying this invention. Al-

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though specific structural forms of this invention have been illustrated and described, the invention is not limited thereto and it is expected that those skilled in the art may be able to devise changes in or alternatives to the disclosed structural features while still practicing this invention. It is to be understood, therefore, that it is intended to cover all changes and modifications of the illustrated embodiments of this invention herein disclosed, as well as other embodiments not disclosed, which do not constitute a departure from the true spirit and scope of this invention.

I claim:

1. In an enclosure for switches and the like having an enclosure body and a removable cover that fits over the body in a closed position, the combination thereof with of:

a locking post having an exposed apertured head and a shank concentric with the head that is received in and is rotatably securable with said enclosure body by a turning motion about a longitudinal axis thereof, the aperture in said head extending transversely therethrough and intersecting said longitudinal axis;

means on said post engageable and disengageable with said cover upon a turning movement of the post about said axis that restricts opening of said cover when so engaged; and

an elevated portion of said removable cover set back from the side of the enclosure body that presents a surface that extends in the direction of said longitudinal axis and that is at the height of the opening of said apertured head, which surface also is closely alongside said apertured post head when said cover is in said closed position and said post is engaged with said cover, whereby a shaft extending through said apertured post head is blocked by said surface of said cover portion from turning upon attempted rotation of said post, thereby prohibiting disengagement of said post from said cover.

2. The combination of claim 1 wherein:

said locking post shank extends through said cover and has a lower portion in threaded engagement with said enclosure body.

3. The combination of claim 1 wherein:

said cover has a latch receiving catch on its interior side,

said locking post shank has an upper portion and a lower portion,

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the upper portion of said shank extending through and rotatably received by said enclosure body, and the lower portion of said shank including a latch arm engageable and disengageable with said catch upon turning movement of the post that restricts opening of said cover when so engaged.

4. In a switch enclosure the combination of:

an enclosure body with top edges and a threaded hole in one of the edges that is separate from the switch enclosing interior of the body;

a removable cover with a flange that fits over the top edges of said enclosure body to enclose the interior thereof, said flange having an opening that aligns with said threaded hole in the enclosure body, and said cover further having an elevated center portion with a surface area rising upward from a position closely adjacent the opening;

a locking post having a threaded shank extending through the aperture in said cover flange and projectible into said threaded hole for threaded engagement therewith when said cover is placed upon the enclosure body, and an exposed apertured head integral with and of larger cross section than said shank, such head being disposed closely alongside said surface of said cover and being positioned above and in contact with said flange whereby a turning of the locking post brings the head tight against the cover to retain the same in place; and

whereby a shaft extending through said apertured post head is blocked by said cover surface from turning upon an attempted rotation of said locking post, to thereby prohibit disengagement of the post from said enclosure body.

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MARVIN A. CHAMPION, Primary Examiner

E. J. MCCARTHY, Assistant Examiner

U.S. Cl. X.R.,

220—55; 292—205