Sept. 13, 1966 E. A. ERICSON 3,272,372

BUSWAY PLUG ENCLOSURE WITH MOUNTING MEANS

Filed May 18, 1964 2 Sheets-Sheet 1

FIG. 1.

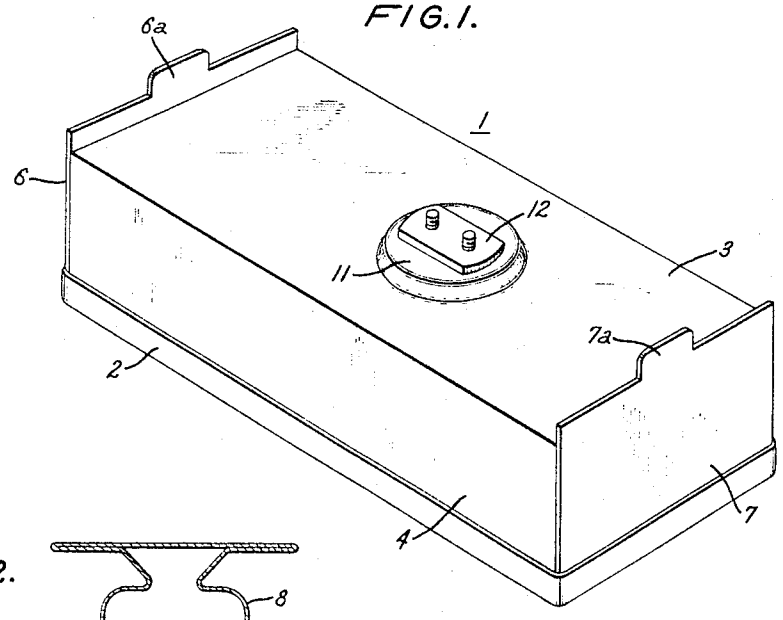


FIG. 2.

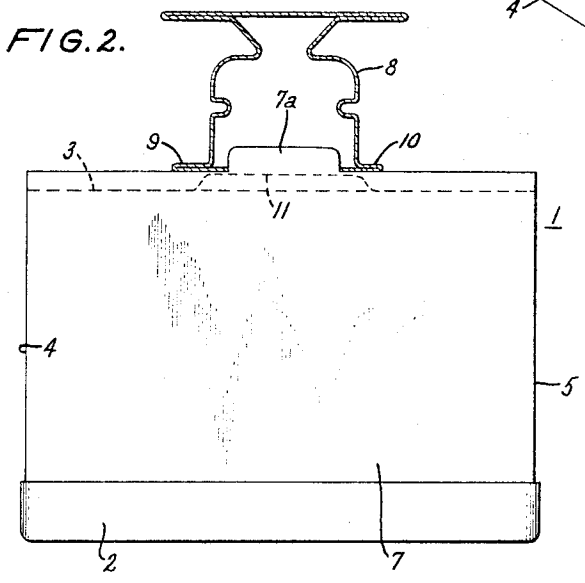


FIG. 3.

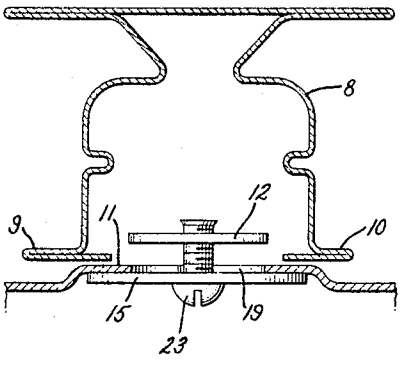
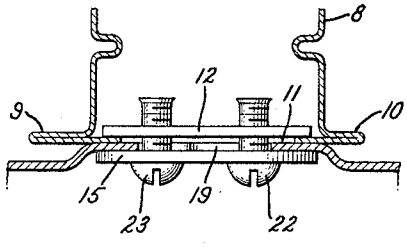


FIG. 4.



INVENTOR:
ERIC A. ERICSON,

Sept. 13, 1966 E. A. ERICSON 3,272,372

BUSWAY PLUG ENCLOSURE WITH MOUNTING MEANS

Filed May 18, 1964 2 Sheets-Sheet 2

FIG. 5.

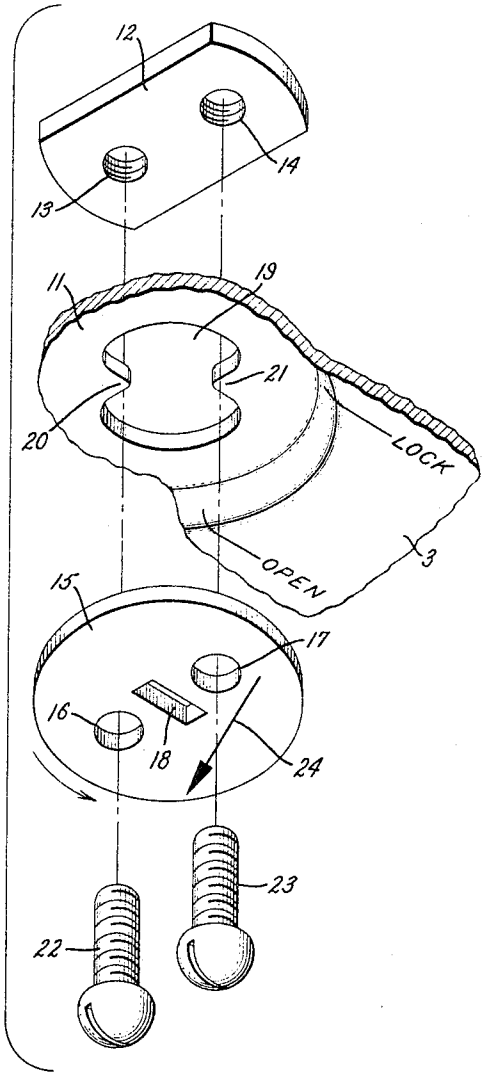


FIG. 6.

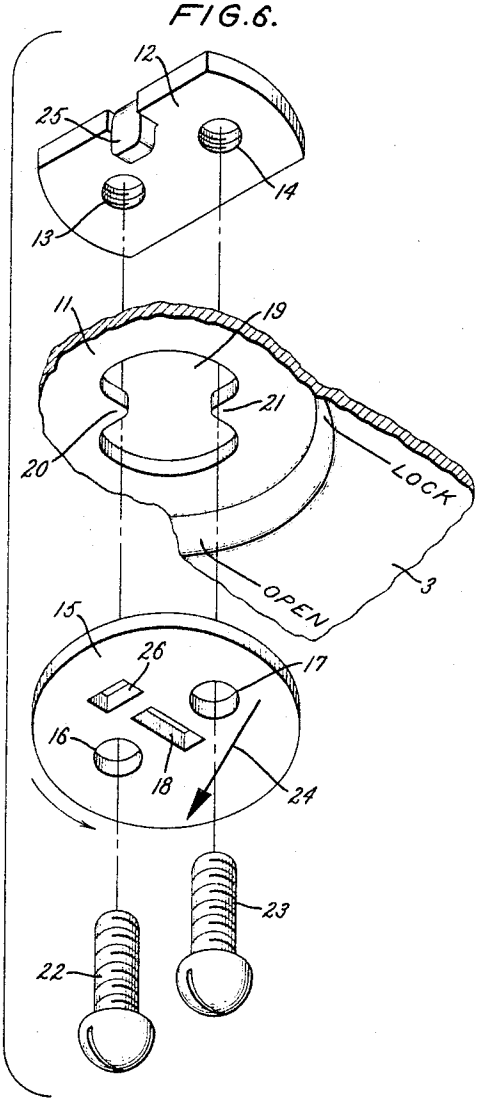


FIG. 7.

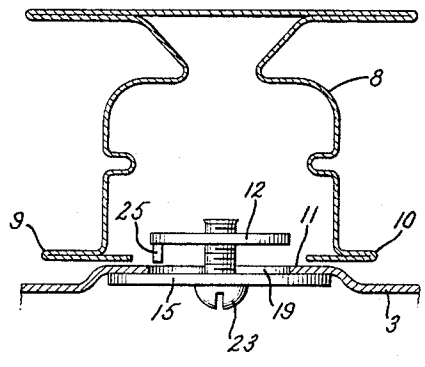
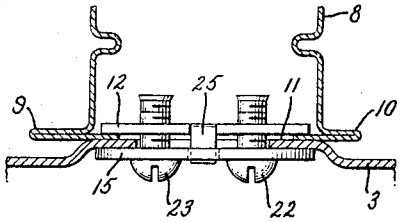


FIG. 8.



INVENTOR:
ERIC A. ERICSON,

United States Patent Office 3,272,372 Patented Sept. 13, 1966

3,272,372
BUSWAY PLUG ENCLOSURE WITH MOUNTING MEANS

Eric A. Ericson, Plainville, Conn., assignor to General Electric Company, a corporation of New York

Filed May 18, 1964, Ser. No. 368,122
5 Claims. (Cl. 220—3.9)

This invention relates to fastening devices, more particularly to devices for fastening electric apparatus enclosures to a busway and it has for an object the provision of a single, reliable and inexpensive fastening device of this character.

Many installations, such as busway distribution systems, include a device such as a tap box which is to be attached to the housing of a busway by fastening means having a locked position and an unlocked position.

It is desirable that the fastening device employed for such purpose have a minimum number of inexpensive parts which are capable of rapid assembly to the apparatus enclosure without requiring special knowledge and tools and when once assembled are captively mounted on the wall of the enclosure that, in the attached state, lies adjacent to and faces a wall of the busway housing. In the attached state of the enclosure such adjacent wall of the enclosure is in physical contact with the wall of the busway housing. Between the busway housing and the apparatus enclosure insufficient space is available for manipulating the locking and unlocking member of a fastening device. Consequently, such fastening device should be capable of effecting locking engagement of the enclosure and the busway by simple actuation of a member disposed within the enclosure on the inside surface of the wall on which the latching means is mounted.

Accordingly, an important object of the invention is the provision of a fastening means that comprises a minimum number of inexpensive parts which are readily assembled to the wall of an apparatus enclosure without special knowledge or tools and which, when assembled, are thereafter held captive to the wall of the enclosure.

A more specific object of the invention is the provision of an improved fastening means for mounting on the wall of an enclosure which incorporates a latch outside the enclosure with means inside the enclosure for moving the latch between locked and unlocked positions by simple actuation of a part inside the enclosure.

In carrying the invention into effect in one form thereof, a fastening device is provided for attaching an apparatus enclosure to a busway housing having a pair of spaced apart longitudinally extending flanges. In the wall of the enclosure that is to be positioned adjacent the busway housing there is provided a generally circular opening having diametrically opposite disposed abutments that extend radially toward each other. The fastening device comprises an oblong latch plate disposed on the outside of the enclosure wall and provided with a pair of spaced apart threaded holes. On the opposite side of the enclosure wall is a washer having a pair of holes spaced apart the same distance as the holes in the latch plate and also having an opening that provides for insertion of a tool to be moved endwise into engagement with the latch plate. A pair of screws pass through corresponding holes in the washer and through the opening in the enclosure wall on opposite sides of the diameter on which the abutments are located. Each screw is threaded into a corresponding one of the threaded holes in the latch plate.

For a better and more complete understanding of the invention reference should now be had to the following specification and to the accompanying drawings of which:

FIG. 1 is a view in perspective of an apparatus enclosure provided with a fastening device embodying the invention for securing the enclosure to a busway;

FIG. 2 is a sectional view of a busway housing with an apparatus enclosure in position to be fastened thereto by means embodying the invention;

FIG. 3 is a sectional view of a busway housing together with a fastening device embodying the invention shown in the unlocked position on the housing;

FIG. 4 is a fragmentary view of the embodiment illustrated in FIG. 3 but with the fastening means illustrated in the locked position on the housing;

FIG. 5 is an exploded view in perspective of the parts embodied in one form of the invention; and

FIG. 6 is an exploded view in perspective of a modification;

FIG. 7 is a sectional view of a busway housing illustrating the fastening device of the FIG. 6 modification in the unlocked position; and

FIG. 8 is a view similar to FIG. 7 illustrating the fastening device of the FIG. 6 modification in the locked position.

Referring now to the drawings and particularly to FIGS. 1 and 2 there is shown an enclosure **1** for housing electrical apparatus. For example, it may be the enclosure of a tap box in which electrical devices such as fuses or circuit breakers are enclosed. For the purpose of making electrical connections between such electrical devices and bus bars within the busway housing the enclosure **1** is provided with a plug device. Such plugs have stab contacts which make contact with the bus bars and terminals which are connected to the terminals of an electrical device within the enclosure. The bus bars in the housing and the plug do not constitute part of the invention. Consequently they are omitted from the drawing. The enclosure is provided with a cover **2**, a base wall **3**, side walls **4** and **5** and end walls **6** and **7**.

As illustrated in FIG. 2, the enclosure **1** is to be fastened to the housing **8** of a busway which housing has two longitudinally extending flanges **9** and **10** that are spaced apart to provide a continuous longitudinally extending opening. The end walls **6** and **7** of the enclosure are provided with anti-turn tabs **6***a* and **7***a* which project into the continuous opening between the housing flanges **9** and **10** when the enclosure **1** is fastened to the housing to prevent the enclosure from rotating.

An outwardly extending circular protuberance **11** is formed in the base wall **3** of closure **1**. Its diameter is greater than the width of the opening between the flanges **9** and **10** of the busway housing so that its external flat surface will rest against the lower external surfaces of the flanges when the enclosure is fastened to the housing.

The means for fastening the enclosure to the busway housing comprises an elongated latch plate **12** which in the position illustrated in FIGS. 1 and 3 will pass through the continuous opening between the busway flanges. When turned 90° from this position to the position illustrated in FIG. 4, the elongated latch plate will overlap the flanges. The latch plate is provided with two spaced apart threaded holes **13** and **14**.

Cooperating with the latch plate **12** is a washer **15** which is provided with a pair of unthreaded holes **16** and **17** which are separated from each other the same distance as the distance between holes **13** and **14** in the latch plate. This makes it possible to position the latch plate relative to the washer with threaded holes **13** and **14** in register with holes **16** and **17** in the washer. Between the holes **16** and **17** the washer is provided with a rectangular slot **18** through which the end of a tool, e.g., the blade of a screwdriver may be inserted.

A generally circular opening **19** is provided in the circular protuberance **11** on the base wall of the enclosure **1**. Preferably the opening **19** and the protuberance **11**

are concentric. The generally circular circumference of opening **19** is configured to provide diametrically oppositely disposed abutments **20** and **21** which serve to limit the rotation of the latch plate **12** and washer **15** when they are joined together by the tightening screws **22** and **23**. The latching means is assembled with the latch plate **12** on the outside of the enclosure **1** and the washer **15** on the inside. The two screws **22** and **23** are passed through the unthreaded holes **16** and **17** in the washer, through the opening **19** in the wall **3** of the enclosure on opposite sides respectively of the diameter on which abutments **20** and **21** are located, and their threaded ends are threaded into the threaded holes **13** and **14** of the latch plate. The ends of the screws are then peened over to prevent their being unscrewed and removed from the latch plate.

Indicia on the inside surface of the base wall **3** in conjunction with an index mark such as arrow **24** on the washer may be used to indicate whether the latch means assembly is in the LOCKED or in the OPEN position.

To attach the enclosure **1** to the busway, the enclosure is positioned on the housing with the two antiturn end tabs **6***a* and **7***a* inserted in the opening between the base flanges **9** and **10** as illustrated in FIG. 2 and with the latch plate in the open position as illustrated in FIGS. 1 and 3. The two screws **22** and **23** are turned back as far as their peened ends will permit. The end of a tool such as the blade of a screwdriver is then inserted and passed through the slot **18** in washer **15**. Endwise movement of the screwdriver brings its end to bear against the latch plate and pushes it through the opening between the flanges **9** and **10** of the housing to a position as far away from the base wall **3** of the enclosure as the lengths of the screws **22** and **23** permit. In this position, as illustrated in FIG. 3 the latch plate **12** will clear the flanges **9** and **10** and the screwdriver can be turned to rotate the latch assembly 90° to the locked position illustrated in FIG. 4. In this position, the screws **22** and **23** engage the abutments **20** and **21** and prevent further rotation of the latch means assembly. In the locked position of the latch means, the screws **22** and **23** may be tightened to cause the latch means to clamp the enclosure **1** against the busway flanges.

To remove the enclosure from the busway, the screws **22** and **23** are loosened, i.e., they are unscrewed, and the latch assembly is rotated to the open position.

The modification of FIG. 6 is very similar to the modification of FIGS. 1 to 5 inclusive and differs therefrom only in the provision of a bent up anti-turn tab **25** on the latch plate and a cooperating aperture **26** in the washer. The anti-turn tab is centrally located on one longitudinal edge of the latch plate **12**. The location of the aperture is such that when the latch plate and washer are connected by screws **22** and **23** the tab **25** and aperture **26** are in positional register. When the latch assembly is in either the "open" position illustrated in FIG. 7 or the "lock" position illustrated in FIG. 8, and the screws **22**, **23** are tightened, the tab **25** enters the opening **19** adjacent the abutment **20** and assists the screws to prevent rotation of the latch assembly in either direction.

When the screws are backed off to their full extent, the tab is pushed back beyond the plane of the abutments in the enclosure opening so that the assembly can be rotated 90° from its open position to its locked position where the screws may again be tightened to bring the tab into its locking position on the other side of the abutment.

The length of the tab **25** is such that when the screws are tightened, the end of the tab is approximately flush with the nonadjacent surface of the washer, i.e., the surface that is remote from the wall of the enclosure.

To provide a visible indication that the latch is properly tightened, the end of the tab may be given a contrasting color.

Although a particular embodiment of the invention has been shown and described, changes and modifications will readily suggest themselves to persons skilled in the art without departing from the invention. In the appended claims it is aimed to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A fastening device for securing an enclosure to a housing having a pair of spaced apart flanges, one wall of said enclosure being provided with a generally circular opening having diametrically oppositely disposed abutments extending radially toward each other, said fastening device comprising:
   (a) an oblong latch plate disposed on one side of said wall having a pair of spaced apart threaded holes extending therethrough perpendicular to the general plane thereof, the length of said plate being greater than the distance separating said flanges and the width of said plate being less than said distance,
   (b) a washer disposed on the opposite side of said wall and having a pair of holes spaced apart the same distance as the holes in said latch plate and having an aperture providing for insertion of a member therethrough into engagement with said latch plate, and
   (c) a pair of screws passing through corresponding holes in said washer and through said opening on opposite sides of said diameter adjacent said abutments and each being threaded into a corresponding one of said threaded holes in said latch plate.

2. A fastening device for securing an enclosure to a housing having a pair of spaced apart flanges with one wall of said enclosure facing the plane of said flanges, said wall being provided with a generally circular opening having opposing abutments disposed on a diameter of said opening and extending radially toward each other, said fastening device comprising:
   (a) an oblong latch plate disposed on one side of said wall having a pair of spaced apart threaded holes extending therethrough perpendicular to the general plane thereof,
   (b) a washer disposed on the opposite side of said wall and having a pair of unthreaded holes spaced apart a distance equal to the distance between said threaded holes and having an aperture between said unthreaded holes,
   (c) a pair of screws passing through corresponding holes in said washer and through said opening on opposite sides of the diameter through said abutments and each being threaded into a corresponding one of said threaded holes in said latch plate,
   (d) said aperture opening providing for insertion of a tool therethrough into engagement with said latch plate to move it away from said wall and to effect rotation of said latch plate between locked and unlocked limits defined by said abutments.

3. A fastening device for securing an enclosure to a housing having a pair of spaced apart flanges with one wall of said enclosure adjacent and facing the plane of said flanges, said wall being provided with a generally circular opening having opposing abutments extending radially toward each other to restrict said opening along a diameter thereof, said fastening device comprising:
   (a) an oblong latch plate disposed outside said enclosure in parallel planar relationship with respect to said wall and having a pair of spaced apart threaded holes extending therethrough perpendicular to the general plane thereof,
   (b) a washer disposed within said enclosure in parallel planar relationship with said wall and said latch plate and having a pair of unthreaded holes in register with said threaded holes and having an aperture between said unthreaded holes,
   (c) a pair of screws passing through corresponding holes in said washer and through said opening on opposite sides of said diameter through said abutments and each of said screws being threaded into a corresponding one of said threaded holes in said latch plate,

(d) the length of said latch plate being greater than the distance between said flanges and the width of said latch plate being less than the distance between said flanges, and

(e) said aperture in said washer providing for the insertion of the blade of a screw driver to move said latch plate through the opening between said flanges and to effect rotation of said washer and said latch plate between unlocked and locked limits defined by said abutments.

4. In combination:

(a) a busway having a housing provided with longitudinally extending flanges spaced apart to provide an opening extending longitudinally of said housing,

(b) an enclosure having a first wall adjacent to and facing the plane of said flanges and provided with a generally circular opening having opposing abutments extending radially toward each other to restrict said opening along a diameter thereof,

(c) said enclosure also having end walls provided with anti-turn tabs extending through the opening between said flanges,

(d) an oblong latch plate disposed outside said enclosure in parallel planar relationship with respect to said first wall and having a pair of spaced apart threaded holes extending therethrough perpendicular to the general plane thereof, the length of said latch plate being greater than the distance between said flanges and the width of said latch plate being less than the distance between said flanges,

(e) a washer disposed within said enclosure adjacent to said first wall and in parallel planar relationship therewith and having a pair of unthreaded holes in register with said threaded holes and having an aperture in the region between said unthreaded holes,

(f) a pair of screws passing through corresponding holes in said washer and through said opening in said first wall on opposite sides of said diameter through said abutments and each of said screws being threaded into a corresponding one of said threaded holes in said latch plate,

(g) said aperture in said washer providing for the insertion of a tool therethrough into endwise engagement and the endwise movement of said tool to move said latch plate through said opening between said flanges and to effect rotation of said washer and said latch plate between unlocked and locked limits defined by said abutments.

5. A fastening device for securing an enclosure to a housing having a pair of spaced apart flanges, one wall of said enclosure being provided with a generally circular opening having diametrically oppositely disposed abutments extending radially toward each other, said fastening device comprising:

(a) an oblong latch plate member disposed on one side of said wall having a pair of spaced apart threaded holes extending therethrough perpendicular to the general plane thereof, the length of said plate being greater than the distance separating said flanges and the width of said plate being less than said distance,

(b) a washer member disposed on the opposite side of said wall and having a pair of holes spaced apart the same distance as the holes in said latch plate and having an aperture providing for the insertion of a member therethrough into engagement with said latch plate,

(c) a pair of screws passing through corresponding holes in said washer and through said opening on opposite sides of said abutments and each being threaded into a corresponding one of said threaded holes in said latch plate and

(d) anti-turn means for said latch plate and washer comprising a second aperture in one of said members and a tab on the other of said members extending into said second aperture when said screws are tightened.

References Cited by the Examiner

UNITED STATES PATENTS

2,853,203	9/1958	Evans	220—25
2,861,120	11/1958	Park	220—3.9 X
2,921,114	1/1960	Keen	220—25 X

THERON E. CONDON, *Primary Examiner.*

JAMES R. GARRETT, *Examiner.*