Oct. 22, 1940. J. J. MADDEN 2,219,014

CLAMPING MEANS

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Fig. 1.

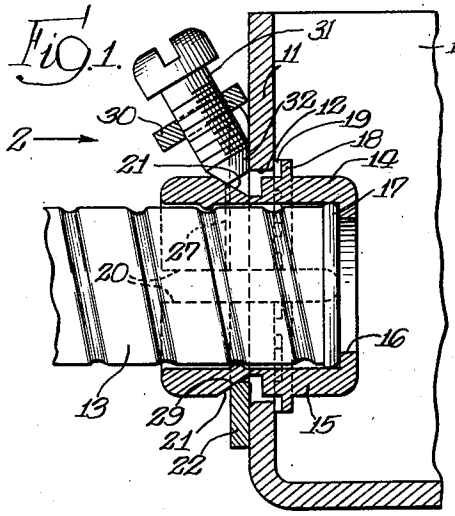


Fig. 2.

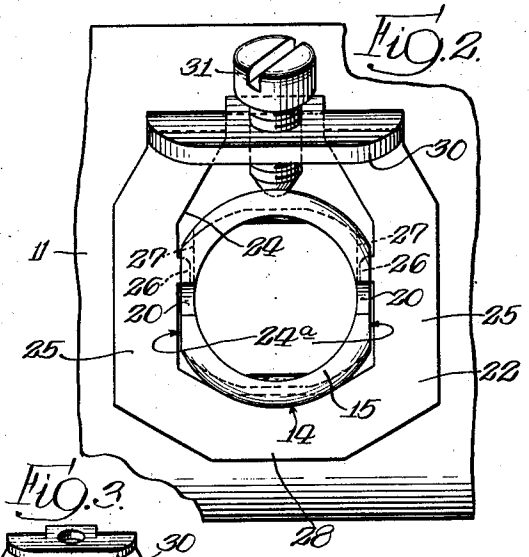


Fig. 3.

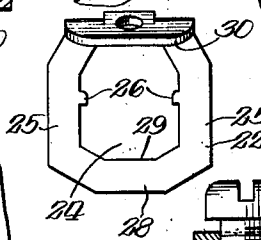


Fig. 4.

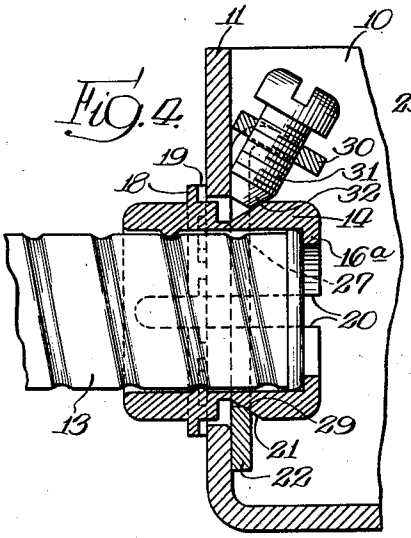
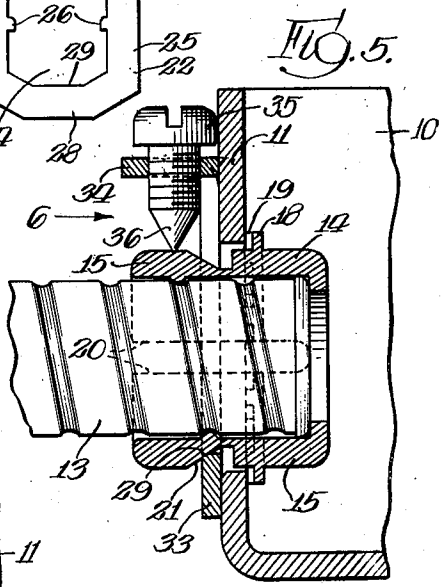


Fig. 5.



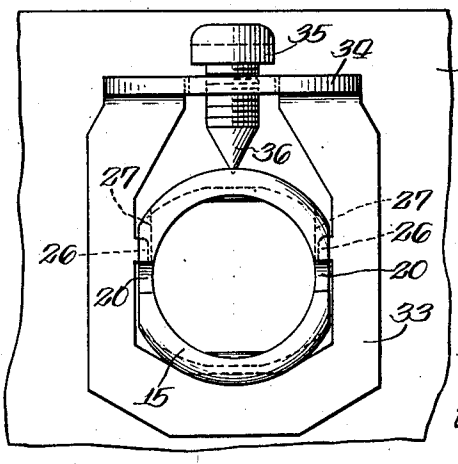


Fig. 6.

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Fig. 7.

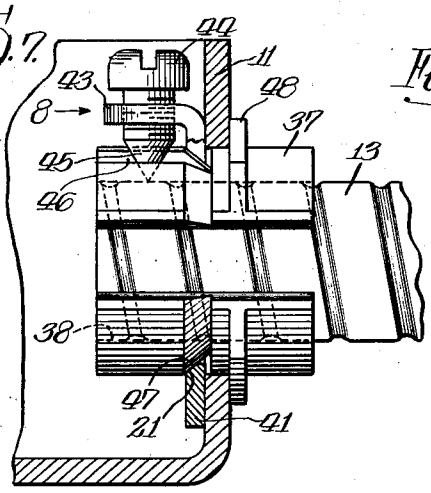


Fig. 8.

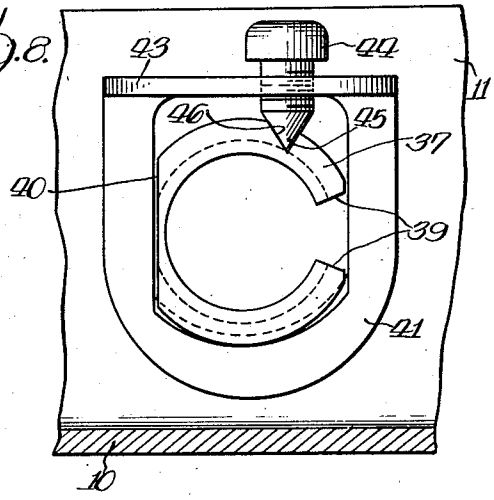


Fig. 9.

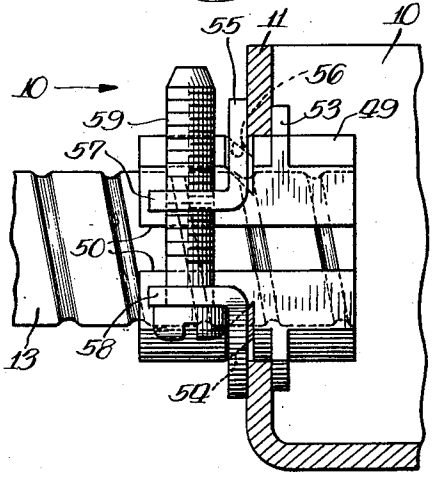
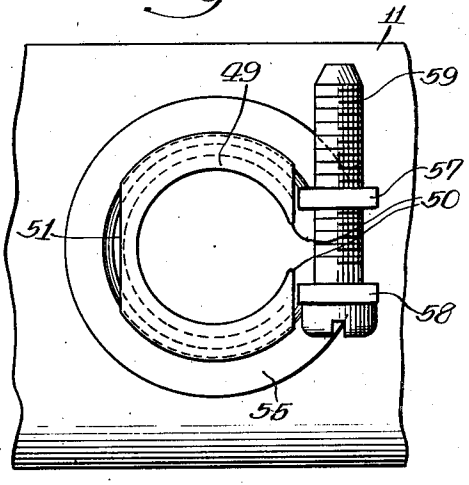


Fig. 10.



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UNITED STATES PATENT OFFICE

2,219,014

CLAMPING MEANS

James J. Madden, Aurora, Ill., assignor to All-Steel-Equip Co., Aurora, Ill., a corporation of Illinois

Application September 12, 1938, Serial No. 229,503

3 Claims. (Cl. 285—35.2)

The present invention relates to improvements in clamping means.

In the art relating to protective devices for electric wiring it is common to provide boxes known as switch boxes, receptacle boxes, outlet boxes, junction boxes, or the like, which boxes receive the ends of electric wires. Such electric wires are commonly enclosed within metal sheathing which is grounded to the electrical system. Non-metallic materials are also used for this sheathing. The present invention is particularly applicable to means for clamping this sheathing to the wall of a box into which it enters.

An object of the present invention is to provide improved clamping means for rigidly securing the sheathing of electric wires to a switch box or the like.

A further object is to provide improved clamping means which may be readily manipulated to assemble or disassemble the clamping means from the sheathing and the switch box.

A further object is to provide a readily operable clamping means which may be located within a switch box or the like, whereby to be less easily tampered with.

A further object is to provide an efficient clamping means which may be manufactured economically.

A further object is to provide a readily operable clamping means which is well adapted to meet the needs of commercial service.

Further objects will appear as the description proceeds.

Referring to the drawings—

Figure 1 is a sectional view illustrating one embodiment of the present invention;

Figure 2 is an elevational view taken in the direction of the arrow 2 in Figure 1, the sheathing for the electric wires being omitted, however;

Figure 3 is a view in elevation of a wedging member forming part of the construction illustrated in the preceding figures;

Figure 4 is a sectional view of a modified construction quite similar to the structure shown in Figure 1 but showing the means for operating the clamping means disposed inwardly of a switch box or the like;

Figure 5 is a sectional view of another modification;

Figure 6 is an elevational view taken in the direction of the arrow 6 in Figure 5, the sheathing for the electric wiring being omitted;

Figure 7 is a sectional view illustrating a further modification;

Figure 8 is a view in elevation taken in the direction of the arrow 8 of Figure 7, the sheathing for the electric wiring being omitted;

Figure 9 is a sectional view showing a still further modification; and

Figure 10 is an elevational view taken in the direction of the arrow 10 of Figure 9.

Referring first to the structure illustrated in Figures 1, 2 and 3, the numeral 10 indicates a box provided with the wall 11, which wall 11 has an aperture 12 therein for the purpose of admitting electric conductors into the interior of the box 10. The numeral 13 indicates a sheathing for electrical conductors. This sheathing is commonly made of metal and is generally known in the trade as BX cable.

The numeral 14 indicates as a whole a metallic socket member having the cylindrical wall 15 provided at one of its extremities with the inwardly extending flange 16, which flange 16 is adapted to provide an abutment for the sheathing or cable 13. The flange 16 may be omitted, of course, if desired. Intermediate of its length the cylindricall wall 15 is provided with the external flange 18, which may be provided with the longitudinally extending teeth 19 adapted to engage against a side surface of the wall 11 to provide a good electrical contact between the socket member 14 and said wall 11. The socket member 14 is split preferably along a diameter at the region thereof opposite to the flange 16. The slots at the diametrically opposed split portions are indicated by the numeral 20. It will be noted that the slots 20 extend throughout most of the length of the socket member 14, whereby a considerable give will be provided in the split end of said member 14.

Intermediate of its length the exterior surface of the cylindrical wall 15 of the socket 14 is beveled out at opposed regions disposed substantially 90 degrees from the slots 20—20. The numerals 21—21 indicate these beveled out surfaces.

Cooperatively associated with the socket member 14 is the plate 22. This plate is non-rotatably associated with the socket member 14, and in the embodiment of the invention illustrated in Figures 1, 2 and 3 said plate is centrally apertured, as indicated by the numeral 24, for receiving the cylindrical wall 15. To provide this non-rotatable relationship between the socket member 14 and the plate 22, side portions of the cylindrical wall 15 of the member 14 may be flattened, as indicated by the numerals 24*a*—24*a*. The two side walls 25—25 of the plate 22 embrace said flattened sides 24*a*—24*a* loosely, but in a way to prevent rotation of the plate 22 relative to the

socket member 14. Extending inwardly from said side walls 25—25 are the opposed inwardly extending lugs 26—26 adapted to be located in slots 27—27 in opposite side portions of the cylindrical wall 15 of the socket member 14. Said lugs 26—26 are so proportioned relative to the slots 20—20 that the plate 22 may be entered upon the cylindrical wall 15 with the lugs 26—26 moving along the slots 20—20. When said lugs 26—26 have reached the region of the slots 27—27 the plate 22 may be moved transversely relative to the axis of the cylindrical wall 15, whereby said lugs 26—26 will be disposed within said slots 27—27 and limit movement of the plate 22 longitudinally of the socket member 14.

The lower wall 28 of the plate 22 is provided with an upper beveled surface 29 adapted to conform to the beveled surface 21 of the cylindrical wall 15 of the socket member 14. The upper extremity of the plate 22 is provided with the angularly disposed flange 30. Said flange 30 is disposed preferably at an angle of approximately 45 degrees relative to the remainder of the plate 22. Said flange 30 is screw-threaded for the reception of the bolt 31, the extremity of which is tapered in the shape of a truncated cone, as indicated by the numeral 32. Said tapered extremity 32 of the bolt 31 is adapted to wedge between the beveled out portion 21 and the adjacent wall 11 of the box 10.

It will be obvious without detailed explanation that the sheathing 13 may be readily secured to the box 10 as follows: The socket member 14 may be slipped through the aperture 12, the plate 22 may be located in position, and the bolt 31 may be lightly turned up, possibly merely by the operator's fingers, thereby securing the socket member 14 to the box 10 without exerting sufficient pressure to collapse the cylindrical wall 15 of the socket member 14. The operator will then insert the sheathing or cable 13, locating it against the flange 16, and may then apply the force necessary, by means of a screw driver or the like, to turn up the bolt 31 to cause the socket member 14 to grip the sheathing or cable 13 and to produce the wedging action of the plate 22 which clamps the box wall 11 between the annular flange 18 and the plate 22.

The structure illustrated in Figure 4 will be understood without detailed explanation. The structure in Figure 4 differs from that above described in connection with Figures 1, 2 and 3 in that the plate 22 and the operating screw 31 are disposed inwardly of the box. This construction has the advantage that the screw 31 may not be tampered with unless access is had to the box 10. In many cases such access is impossible, or at least difficult, to unauthorized persons. According to the structure shown in Figure 4, the flange 16*a* corresponding to the flange 16 of Figure 1 is located at the split end of the socket member 14. Said split end containing the flange 16*a* is disposed inwardly of the box 10. Assembly and disassembly may be readily accomplished in the manner described above in connection with Figures 1, 2 and 3.

The construction shown in Figures 5 and 6 is similar in many respects to that shown in Figures 1 to 3. In the embodiment illustrated in Figures 5 and 6 a plate 33 is provided which has the flange 34 extending at right angles therefrom. Said flange 34 is screw-threaded for the reception of a bolt 35, which may have the pointed extremity 36 for engagement with the adjacent split portion of the cylindrical wall 15 of the socket member 14. In the embodiment shown in Figures 5 and 6 the turning down of the bolt 31 will cause a wedging action between the beveled surface 29 of the plate 33 and the beveled portion 21 of the cylindrical wall 15, moving the teeth 19 into good electrical contact with the wall 11 of the box 10. Turning down of the bolt 35 will also result in the squeezing together of the split portions of the cylindrical wall 15, resulting in the tight gripping of the sheathing 13.

Figures 7 and 8 illustrate a modified construction. In this embodiment of the present invention a socket member 37 is provided having the cylindrical wall 38, which is split along only one side, as indicated by the numeral 39. The side of the socket member 37 opposite to the split 39 is flat, as indicated by the numeral 40, said flat surface 40 being preferably substantially at right angles to that diameter of the socket member 37 which bisects the split 39. The plate member 41 is quite similar to the plate member 33 illustrated in Figures 5 and 6, but omits, with their functions, the lugs 26 shown in said figures. Said plate member fits the flattened side surface 40 of the socket member 37 sufficiently closely to prevent relative rotation between said plate member and said socket member. Said plate member 41 is provided with the flange 43 disposed at right angles to the body of the plate member 41, which flange 43 is screw-threaded for the reception of the bolt 44, which bolt has the pointed extremity 45 adapted to engage in a corresponding recess 46 in the cylindrical wall of the socket member 37. The axis of the bolt 44 should be off center with respect to the cylindrical wall 37 and should be located in the chord intersecting said cylindrical wall in a region adjacent to the split 39. Said plate 41 is provided with the beveled edge 47 adapted to conform to the beveled portion 21 of the socket member 37.

Turning down of the bolt 44 will have the result of exerting an upward pull upon the plate member 41 as the parts are viewed in Figures 7 and 8, drawing the flange 43 into tight engagement with the wall 11 of the box 10. At the same time the turning down of the bolt 44 will exert a contracting force upon the split cylindrical wall of the socket member 37, urging the cylindrical wall into tight gripping engagement with the sheathing 13. The socket member 37 is readily contractible because, at the region opposite to the split 39, it is reduced in cross-section by reason of the flattened surface 40.

In the embodiment of the present invention illustrated in Figures 9 and 10 the socket member 49 is split along one side as indicated by the numerals 50—50. Said socket member has a flattened side 51 opposite to the split 50, whereby to be more readily contractible. Said socket member 49 is provided with the annular flange 53 adapted to engage against the wall 11 of the box 10. Spaced from the flange 53 are the beveled portions 54—54 located symmetrically with relation to the diameter which bisects the split 50, which taper toward the flange 53. A plate 55 is provided which is annular in form and has a beveled inner edge 56 adapted to conform with the beveled portions 54 of the socket member 49. The plate 55 extends through a circumference of somewhat less than 360 degrees, and the extremities of said annular plate are provided with the outstanding lugs 57 and 58. The lug 57 is screw-threaded for the reception of the bolt 59, the head of which bolt is adapted to engage against the outer surface of the lug 58.

It will be understood that when it is desired to clamp the sheathing **13** to the box **10** in the construction shown in Figures 9 and 10, said sheathing **13** will be inserted into the socket member **49**. The annular plate **55** will have been mounted upon the socket member **49**. The bolt **59** will be tightened, resulting in a wedging action between the beveled surface **56** of the annular plate **55** and the beveled surfaces **54—54** of the socket member **49**, drawing the flange **53** into tight engagement with the wall **11** of the box **10**. The same tightening movement of the bolt **59** will exert a compressive action upon the split socket member **49**, tightly gripping the sheathing **13**.

Though certain preferred embodiments of the present invention have been described in detail, many modifications will occur to those skilled in the art. It is intended to cover all such modifications that fall within the scope of the appended claims.

What is claimed is—

1. Clamping means comprising, in combination, a cylindrical member having an annular shoulder adapted to engage the wall of a box, a plate member disposed in encircling relationship with said cylindrical member and adapted to wedge said cylindrical member axially relative to said wall, and threaded means carried by said plate member adapted to exert a force against said cylindrical member to produce such wedging action.

2. Clamping means comprising, in combination, a cylindrical member split through at least a portion of its length, said cylindrical member having a flange adapted to engage the wall of a box, said cylindrical member having at least a portion of its circumference beveled, plate means adapted to engage the opposite side of said wall, said plate means being provided with a beveled portion adapted to cooperate with said beveled portion of said cylindrical member for drawing said flange into tight engagement with said wall.

3. Clamping means comprising, in combination, a contractible cylindrical member having an annular shoulder provided with teeth adapted to engage the wall of a box, a plate member disposed in encircling relationship with said cylindrical member and adapted to wedge said cylindrical member axially relative to said wall, and threaded means adapted to react against said plate member and said cylindrical member to produce such wedging action and to contract said cylindrical member.

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