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FASTENER FOR RETAINING CASINGS IN PANELS

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Fig. 1.

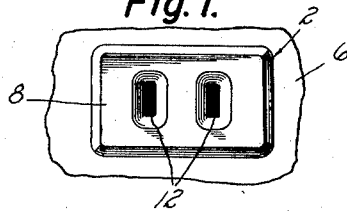


Fig. 2.

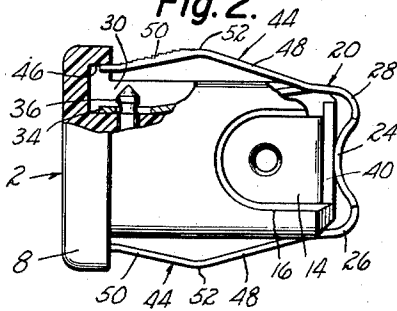


Fig. 3.

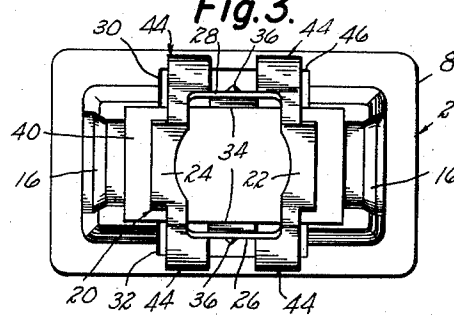


Fig. 4.

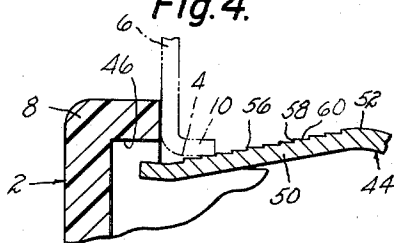
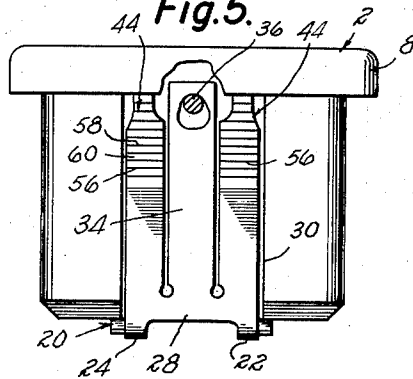


Fig. 5.



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FASTENER FOR RETAINING CASINGS IN PANELS

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1 Claim. (Cl. 248—27)

This invention relates to improvements in fasteners for retaining an electric switch or receptacle or the like in a panel, such as the control panel of an electric range or the like where the casing of the electrical switch, etc. is inserted through an opening in the panel.

Casings for switches, etc. of the type with which the present invention is concerned generally have a flange at their front ends which seats against the front of the panel adjacent the periphery of the opening therein, and are provided with means for engaging the rearward side of the panel when the casing is installed for the purpose of retaining the flange in firmly seated relation against the panel and thereby supporting the casing in installed position. The disadvantage of fasteners of the type heretofore used is that a single type and size of fastener usually cannot be used with panels having a wide variety of thicknesses with the result that in a particular installation the fastener may engage a panel with insufficient clamping force to hold the front flange of the casing in properly seated engagement with the panel, causing objectionable looseness or play of the casing, as well as detracting from the appearance of the installation. Attempts have been made to avoid this difficulty in the past by using fasteners of different sizes with panels of different thicknesses, and by the use of adjustable fasteners which can be tailored during installation to provide the desired exactness of fit. However, use of fasteners of different sizes requires the costly maintenance of a large inventory, and fasteners of the adjustable type are expensive to make and relatively inaccessible for adjustment when once installed, so that neither of these expedients has provided an entirely satisfactory solution to the problem.

One object of the present invention therefore is to provide a fastener for retaining a casing in a panel which is adaptable for use with panels of widely varying thicknesses without adjustment of any kind, and which will hold an installed casing in firmly seated and securely supported relation in a panel.

Another object is to provide such a fastener which is simplified in construction and inexpensive to manufacture, and which facilitates easy and convenient installation or removal of a casing from a panel.

Other objects will be in part obvious, and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claim.

In the drawings:

Figure 1 is a front view of an exemplary casing of the type to which the fastening means of the present invention is particularly suited, namely, the casing of an electrical receptacle, showing its appearance as installed in a panel;

Figure 2 is a side view to an enlarged scale of the re-

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ceptacle shown in Figure 1 with a portion broken away; Figure 3 is a rear view to an enlarged scale of the casing shown in Figure 1;

Figure 4 is a further enlarged view of a portion of the structure shown in Figure 2, showing its relation to the panel in which installed; and

Figure 5 is a top view of the structure shown in Figure 3.

Referring to the drawings, a preferred embodiment of the present invention is shown by way of example as applied to an electrical receptacle or female electrical fitting, the receptacle including a generally rectangular casing 2 of plastic or other suitable non-conducting material, which in installed position is adapted to extend through an opening 4 in a panel 6 such as the panel of an electric range or the like. The casing has a peripheral flange 8 at its front end forming rearwardly facing shoulders which are adapted to seat against the front of the panel 6 adjacent the periphery of the opening 4, so as to conceal the opening and assist in supporting the casing. The panel may be a plain flat sheet, or may be formed with a lip 10 about its opening 4, as shown in Figure 4, in which case of course the effective thickness of the panel is determined by the dimensions of the lip.

In the front wall of the casing is the usual pair of openings 12 into which the prongs of an electrical plug may be inserted to make electrical contact with terminal members 14 in the casing, the terminal members being exposed at their rearward ends by slots 16 in the sides of the casing to permit the connection of suitable wiring.

The fastening means for retaining the casing in the panel includes a generally U-shaped clip 20 of spring metal. The clip is of one-piece construction and has a bight portion including laterally spaced side strips 22, 24 which extend across the back of the casing and are connected at their ends by cross strips 26, 28. The cross strips are accommodated at the rearward ends of longitudinal grooves 30, 32 which extend forwardly to the flange 8 on opposite sides of the casing. The clip is secured to the casing by straps 34 which extend forwardly along the bottom of the grooves from the center of the cross strips 26, 28 and have apertured forward ends which hook over pins 36 embedded in the casing. The bight portion of the clip is insulated from the terminals by a rectangular plate 40 of non-conducting material which is retained on the back of the casing beneath the bight portion and also serves to maintain the terminal members in properly assembled position in the casing. As best shown in Figure 2, side strips 22, 24 are slightly bowed against plate 40 so as to engage the plate resiliently and hold the assembly in tightly clamped relation.

Extending forwardly from the ends of the cross strip on each side of the casing are a pair of resilient arms 44. The flange 8 is recessed at the forward end of each groove 30, 32 to form pockets 46 in which the forward ends of the arms 44 are received and by which the arms are held in a slightly inwardly flexed condition. Each of the arms is formed with a forwardly and outwardly extending portion 48 and a forwardly and inwardly extending portion 50 defining an apex or high point 52 spaced rearwardly from the casing flange 8. The spacing of the apices 52 on opposite sides of the casing is normally slightly greater than the size of the aperture in the panel, so that during installation of the casing as it is inserted rearwardly through the panel aperture the sides of the aperture cam the arms 44 inwardly, inward flexing of the arms being accommodated by the grooves 30, 32. As the apices of the arms pass behind the rearward edge of the panel aperture, which, in the embodiment shown in the drawing, is formed by the rearwardly extending lip 10 as shown in Figure 4, the arms

44 flex outwardly. The forwardly and inwardly inclined portion 50 of each arm thereby engages the rearward edge of the panel aperture and cams the casing rearwardly until the flange 3 is seated against the front of the panel.

In accordance with the invention, the forwardly and inwardly inclined portion 50 of each arm is provided with a series of serrations 56 arranged on its outer surface in the manner of a flight of steps. Each of the serrations has a forwardly facing surface 58 which extends transversely across the arm and is analogous to the riser of a step, and an outwardly facing surface 60 which extends across the arm and is analogous to the tread of a step. The forwardly and inwardly inclined portion 50 of each arm is so disposed that when engaged with a panel whose thickness is the mean or average of anticipated panel thicknesses it will make an angle of about 75° with the plane of the panel 6. Accordingly, the serrations are formed in the arms with the tread 60 of each serration disposed at an angle of about 15° to the plane of the portion 50 of the arm, so that the riser 58 of each serration will be approximately parallel to the plane of the panel and the tread 60 of each serration will be approximately normal to the plane of the panel when the casing is installed.

With this arrangement the casing is installed in the panel by simply pushing it rearwardly through the opening in the panel. The arms 44 cam through the panel opening and the serrations 56 ratchet over the rearward edge of the lip 10 until the flange 3 is finally seated against the panel. The serrations afford the arms a good purchase on the rearward corner of the lip 10 so that the casing will be securely retained in seated relation with the panel even though the outward force of the arms is relatively light, and thus the casing may be pushed easily into the panel without the exertion of large forces which might dent or injure the panel. The serrations will engage the panel substantially squarely so as to prevent slipping, precluding looseness and sloppy fit and enabling the fastener to maintain the flange 3 firmly and securely seated against the front of panels of widely varying thicknesses, even though the slope of each forwardly and inwardly inclined arm portion 50 is relatively mild. This in turn makes possible a substantial increase in the length of each arm portion 50 for a given spacing of the apices 52 on opposite sides of the casing, and thereby further increases the range of panel thicknesses with which the fastener may be employed. Once the casing has been inserted in the panel no further adjustments are necessary, the fastener itself automatically compensating for various panel thicknesses to insure a permanently tight and secure fit of neat and attractive appearance.

Thus there has been shown and described a fastener which is capable of holding a casing in securely and firmly seated relation, free of objectionable looseness or play, in panels of widely varying thicknesses. The fastener is of simple, one-piece construction so that it is in-

expensive to manufacture, and its camming surfaces 50 have a relatively mild slope so that it is convenient and easy to use and permits the installation or removal of a casing from a panel without requiring the application of large forces which might dent or injure the panel.

While the fastening means of the present invention has been depicted as applying to an electrical receptacle, it will be appreciated that this particular application is by way of illustration only, since the fastening means is manifestly suited for use with a variety of devices which are normally adapted to be installed in panels. It is therefore intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claim is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim:

A fastener for retaining in a panel a casing adapted to be installed in an opening in the panel and having a peripheral flange at one end forming a rearwardly facing peripheral shoulder engageable with the front face of the panel about the edge of the opening comprising a U-shaped clip having a bight portion extending across and resiliently engaging the rear of the casing and urging said clip rearwardly of said casing, said clip having a pair of spaced apart resilient arms extending from each end of said bight portion forwardly and outwardly of said casing on opposite sides thereof, a strap extending forwardly of said casing from said bight portion and disposed intermediate the arms in each of said pairs of arms, the free ends of said straps being engaged with said casing to limit movement of said clip rearwardly of said casing, each of said arms being redirected inwardly and forwardly of said casing intermediate the ends of said arms with the free ends of said arms being spaced outwardly of said casing, and a plurality of serrations disposed transversely of and longitudinally spaced along said inwardly inclined portions of the arms, each of said serrations having a forwardly facing surface engageable with the rear of said panel about the periphery of said opening and constructed to impede movement of said casing forwardly of said panel.

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