Jan. 10, 1956 E. E. MILLER 2,730,688

FASTENER FOR RETAINING A CASING IN A PANEL

Filed Feb. 5, 1954

FIG. 1.

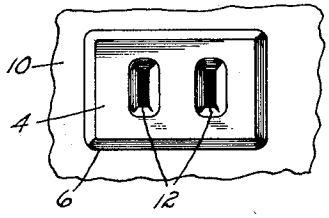


FIG. 2.

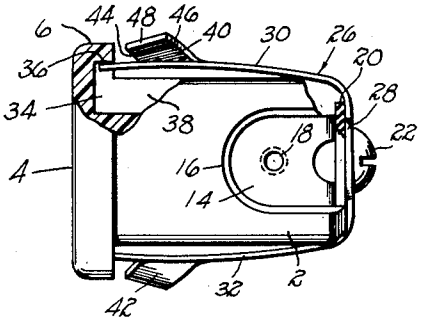


FIG. 3.

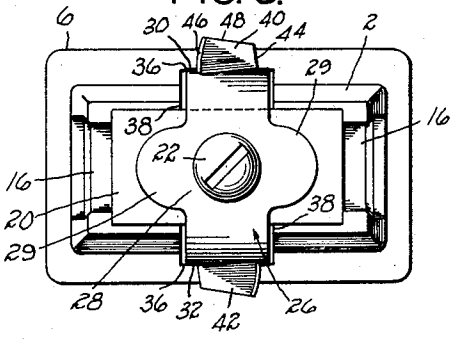


FIG. 4.

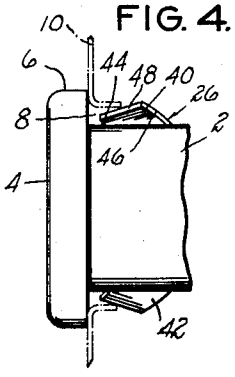
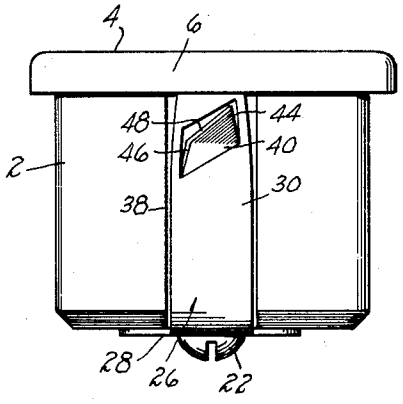


FIG. 5.



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FASTENER FOR RETAINING A CASING IN A PANEL

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3 Claims. (Cl. 339—128)

The present invention relates to means for supporting and retaining devices such as electrical receptacles, switches, or the like, in the installed position in thin panels, such as the control panels of electrical appliances or the like.

The principal object of the present invention is to provide an improved retaining or clamping arrangement for use with various devices adapted to be installed in suitable apertures in thin panels and the like, such as are found on electrical appliances.

Another object is to provide an improved article retaining means which permits the device with which it is used to be simply installed or removed, yet holds it in snugly seated relation with the panel when installed.

Another object is to provide a fastener for electrical receptacles and like accessories for installation in the panel of an electric range or the like which is particularly adaptable for installation in panels of widely varying thickness with a firm fit, free from objectionable play, and can be both installed and removed without the exertion of large forces likely to dent or mar the 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 claims.

In the drawing:

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

Figure 2 is a side view, to an enlarged scale, of the receptacle shown in Figure 1, with a portion broken away to show the fastening means of the present invention;

Figure 3 is a rear view to an enlarged scale of the structure of Figure 1;

Figure 4 is a 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.

The present invention is depicted, by way of example, as applied to a receptacle or female electrical fitting. Such a receptacle conventionally includes a casing **2** of non-conducting material such as plastic or the like, having a generally rectangular shape. The front wall **4** of the casing is enlarged to provide a lip or flange **6**, which is adapted to seat against the periphery of a rectangular aperture **8** in the panel **10** in which the outlet is installed. Thus, after installation, only the front wall **4** of casing **2** is evident, as shown in Figure 1.

Front wall **4** of the casing is provided with a pair of rectangular slots **12** properly spaced to receive the pronged connecting plug of the cord of an electric appliance or the like. In the slots **12** are retained flexible

terminal members **14**, of copper or the like, which are supported so as to be resiliently self-biased for wiping contact with the respective prongs of a plug inserted in the receptacle.

The rearward portion of each side wall of casing **2** is cut away as at **16** to expose the rearward end of each terminal **14**. In the portion of each terminal thus exposed is provided a threaded hole **18** which is adapted to receive a binding post screw for securing to the terminals the conductors of a cable for connecting the receptacle to a suitable power source. The terminals **14** are retained in the casing by a rectangular plate **20** of non-conducting material which is accommodated in a rectangular recess in the back side of the casing and secured therein by a screw **22** threaded into the casing.

The improved means for retaining the receptacle in the panel **10** includes a clamp **26**, which permits insertion of the receptacle into its panel, or withdrawal therefrom, without use of undue force, yet holds the outlet in firmly and snugly seated relation in the panel when installed. The clamp **26** consists of a generally U-shaped strip, preferably of thin spring metal, having a center portion **28** secured to the back side of casing **2** outside plate **20** by means of screw **22**. Center portion **28** has wings **29** which contact plate **20** and reinforce the same. Clamp **26** has upper and lower resilient arms **30**, **32**, which extend forwardly from adjacent the top and bottom edges of plate **20** along the top and bottom sides of casing **2**. The flange **6** is recessed to form pockets **34** having shoulders **36**, one of which is shown in Figure 2, which retain the forward ends of the arms **30**, **32**. Resilient arms **30**, **32** of clamp **26** are preferably so formed that, when relaxed, their forward ends are spaced apart slightly more than the spacing of shoulders **36**. Hence the arms **30**, **32** are retained in a slightly compressed together condition by shoulders **36**.

The top and bottom walls of casing **2** are provided with centrally disposed rectangular slots **38** extending the entire length thereof, which slots are deep enough to accommodate the arms **30**, **32** when the arms are flexed inwardly and also prevent rocking of clamp **26** sideways. Plate **20** and the center portion **28** of clamp **26** are wider than the distance between the bottoms of slots **38** so that they extend outwardly beyond the bottoms of slots **38**, with the result that arms **30**, **32** normally do not contact the casing **2**, except at their front ends.

Adjacent its forward end each arm **30**, **32** is provided with a forwardly and outwardly inclined ear **40**, **42**, struck up therefrom. Ears **40**, **42** are identical in shape, and therefore only ear **40** will be described in detail. As best shown in Figure 5, ear **40** has forwardly extending sides **44**, **46** and a front edge **48** disposed on the bias or inclined diagonally relative to flange **6**. The ears **40**, **42** extend outwardly sufficiently so that the spacing of their high points normally exceeds the size of the panel aperture **8**, and thus as casing **2** is inserted rearwardly through aperture **8** during installation of the recepacle, the ears **40**, **42** engage the top and bottom edges of aperture **8** and by camming action compress the arms toward each other.

When the arms are compressed together, the entire length of arms **30**, **32** is received in slots **38**, which are deep enough to accommodate ears **40**, **42** also. These slots thus permit the arms to be compressed without striking any part of casing **2**, and thereby avoid the necessity for any twisting of arms **30**, **32** or ears **40**, **42**, or for the exertion of the large force required to accomplish such twisting, when the arms are compressed. Since the arms are elongate strips of preferably thin stock, and are free to bend in a cantilever fashion when ears **40**, **42** engage the sides of aperture **8**, it will be appreciated that

the receptacle can be slipped into panel 10 quickly and easily, with the exertion of only light pressure.

As best shown in Figures 3 and 4, the side 44 of each ear adjacent the forwardmost corner of its front edge 48 is bent outwardly from its arm a smaller amount than the other side 46, and hence the front edge 48 of each ear is inclined outwardly from its arm in two directions, i. e. from front to back and from side to side. As shown in Figure 3, front edge 48 of each ear is so positioned with respect to flange 6 that, as the high points of the ears pass through and rearwardly of the panel aperture 8, these rearwardly and outwardly inclined edges 48 are urged against the back edge of aperture 8 by the resilient arms 30, 32, thus tending to cam or snap the receptacle into place with flange 6 firmly seated against panel 10.

The front edges 48 of ears 40, 42 are inclined sufficiently relative to flange 6 so that clamp 26 is adapted to engage panels of widely varying thickness in the manner above described. Preferably each front edge 48 is disposed at an angle of approximately thirty degrees to flange 6 before the car is struck up from its arm. Thus the receptacle is universally adaptable for easy installation in a wide variety of panels, yet will be securely held with flange 6 in firmly seated position when installed, and free from objectionable looseness or play.

The upward slope of front edges 48 of the ears in a front-to-back direction is not steep. Hence, though the wedging action of ears 40, 42 firmly holds the receptacle in seated position, the arms 30, 32 need not be compressed an excessive amount to withdraw the receptacle from panel 10 when desired. Since in the arrangement described, arms 30, 32 are capable of flexing inwardly along their entire length, cantilever fashion, in response to inward pressure on ears 40, 42, it will be apparent that only light force on arms 30, 32 is necessary to compress them sufficiently to withdraw the receptacle, and thus the likelihood of injury to the panel is materially reduced.

While the invention has been depicted and described above as applied to an electrical receptacle, it will be appreciated that this particular application is by way of illustration. It is obvious that the clamping arrangement shown is equally well suited for the clamping and retaining of many different articles 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 claims 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:

1. Fastening means for a casing of the type adapted to be installed in an aperture in a thin panel and having a flange on the front of the casing adapted to seat against the periphery of an aperture in the panel, comprising a clamp for removably retaining said casing in firmly seated position in said panel comprising a U-shaped member secured to the back of said casing and having resilient arms extending forwardly along opposite sides thereof, outwardly inclined ears on said arms having a lateral spacing when said arms are relaxed greater than the width of said aperture and adapted to engage the edges of said aperture to flex said arms together when said casing is inserted through said aperture, and a rearwardly and outwardly inclined diagonal front edge on each of said ears, said inclined front edges being engageable with the peripheral edge of said aperture in the seated position of said flange to cam said casing rearwardly into firmly seated position.

2. Fastening means for a casing of the type adapted for installation in an aperture of a thin panel and having an outwardly extending peripheral flange on the forward side of said casing adapted to seat against said panel adjacent the periphery of said aperture, comprising a U-shaped clamp for removably securing said casing in said panel, means securing said clamp at its center to the back of said casing, spaced resilient arms on said clamp extending forwardly along opposite sides of said casing, transversely faced shoulders at the front of said casing retaining the forward ends of said arms in slightly compressed together relation, upstanding ears adjacent the front ends of the arms having a lateral spacing when said arms are relaxed greater than the width of said aperture and adapted to engage the panel at the periphery of said aperture and cam said arms together to permit insertion of said casing rearwardly into said panel, and a diagonal front edge on each of said ears having an outward slope from its front corner to its back corner, said front edges extending rearwardly a distance in excess of said panel thickness at said aperture and being in engagement with the rearward edge of said aperture when said flange is seated to wedge said casing into firmly seated position in said panel.

3. In a device for installation in a thin panel and having a rectilinear casing adapted to be inserted rearwardly into an aperture in said panel, an outwardly extending peripheral flange on the forward side of said casing adapted to seat against said panel adjacent the periphery of said aperture, means for removably securing said casing in said panel comprising a U-shaped clamp having a center portion secured to the back of said casing and upper and lower resilient arms on said clamp extending forwardly along opposite sides of said casing perpendicular to said center portion, pockets in said flange receiving the forward ends of said arms to retain said arms in slightly compressed together relation, a forwardly and outwardly sloping ear struck up from each arm adjacent its front end and adapted to engage said aperture and compress said arms together during insertion of said casing therethrough, slots in the top and bottom walls of said casing having a depth exceeding the height of said ears to permit compression of said arms together, said ears having sides cut from said arms parallel to the sides of said arms and diagonal front edges, each of said front edges being inclined rearwardly relative to said flange at an angle of approximately thirty degrees and being outwardly inclined to said casing from its front corner to its back corner, whereby when said casing is installed said arms resiliently urge said front edges against the periphery of said aperture to hold said casing firmly in place and said front edges cam said arms together to permit withdrawal of said device from said panel.

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