United States Patent

[11] 3,614,712

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[73] Assignee **Essex International, Inc.**

[54] **APPLIANCE MOUNTING APPARATUS**
6 Claims, 11 Drawing Figs.

[52] **U.S. Cl.** **339/127**
[51] **Int. Cl.** **H01r 13/32**
[50] **Field of Search** ..... 339/127, 188, 55, 34, 217, 127, 59 T, 17 C, 205, 145, 88

[56] **References Cited**

UNITED STATES PATENTS

1,634,405	7/1927	Douglas	339/188
2,638,575	5/1953	Winkelmeyer et al.	339/127
2,712,120	6/1955	Cochran	339/61 X
3,012,159	12/1961	Druesedow	339/217 X
3,497,865	2/1970	Heath	339/127

FOREIGN PATENTS

465,239	5/1950	Canada	339/55

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ABSTRACT: Apparatus for mounting an electrical appliance, such as a lamp, in a panel having an aperture located adjacent the perimeter of a center hole in the panel. The apparatus includes an inner shell that is movably mounted within a bore defined by an outer shell. A radial flange is connected to the outer shell and is adapted to engage a first side of the panel. A lug is connected to the inner shell and is adapted to fit through the aperture, so that it may engage a second side of the panel. A coil spring is retained between the outer shell and a retainer member that releasably engages the inner shell so that the apparatus is resiliently held in place on the panel. The electrical appliance is held within the inner shell by a socket.

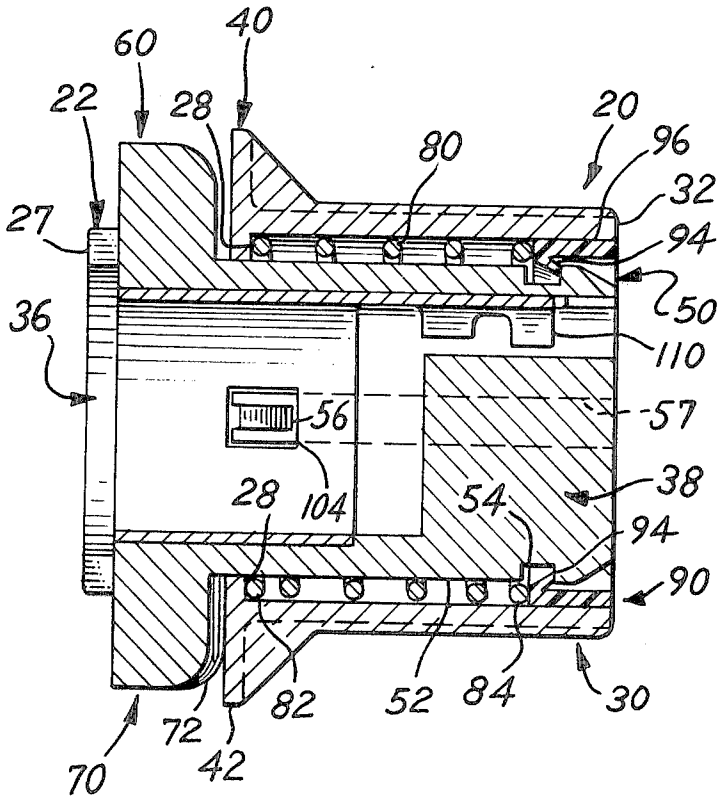


Fig. 1

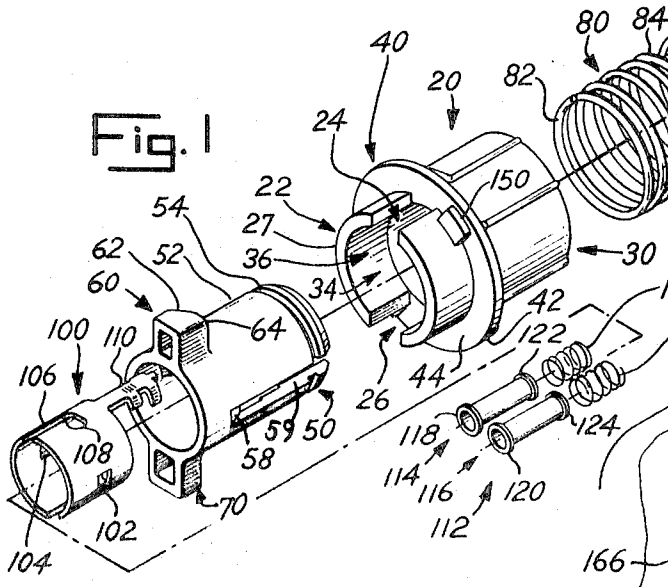


Fig. 2

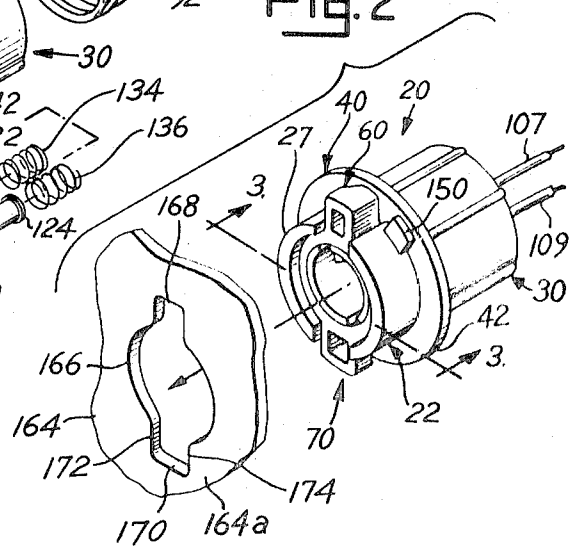


Fig. 3

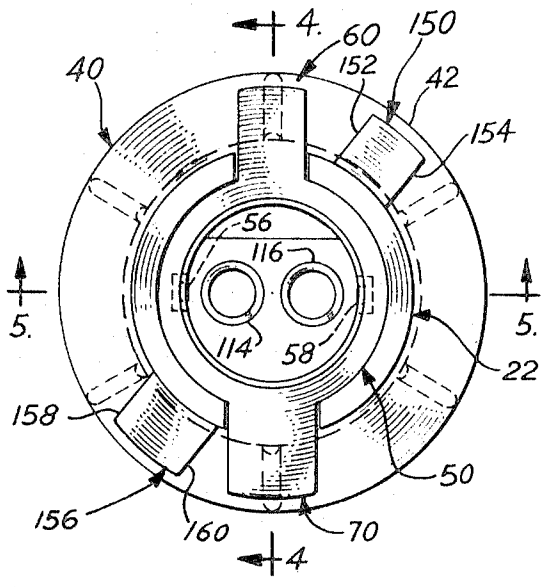
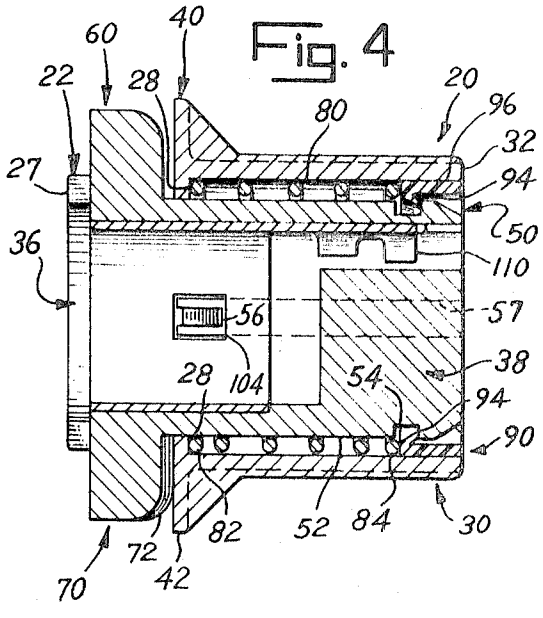


Fig. 4



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Fig. 6

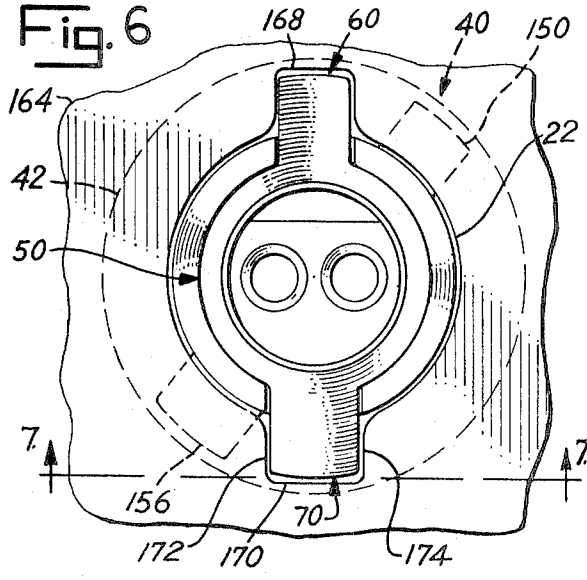


Fig 5

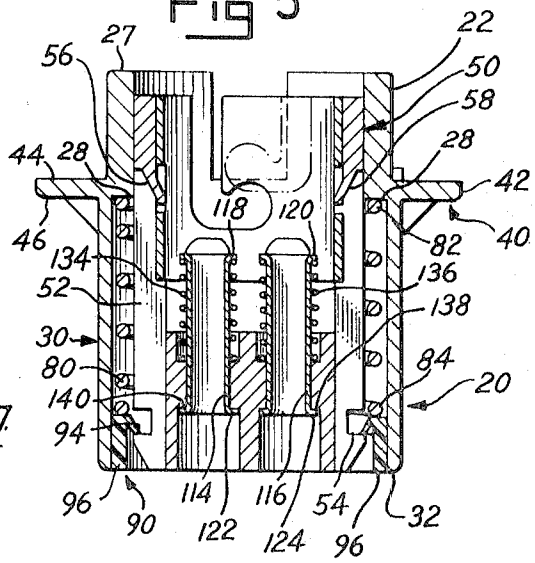


Fig. 7

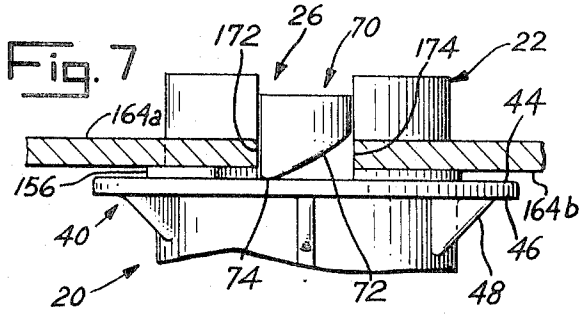
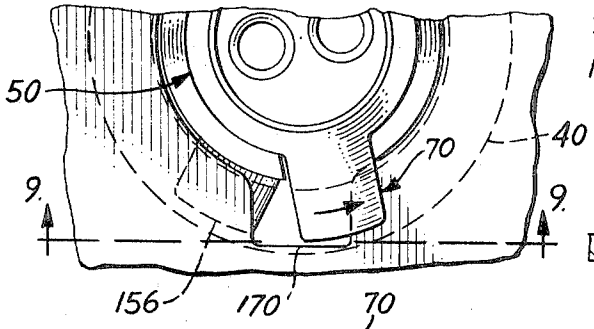


Fig. 8



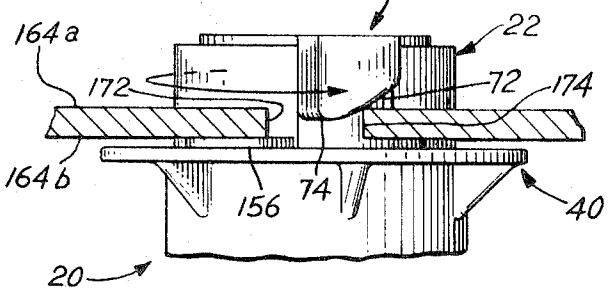
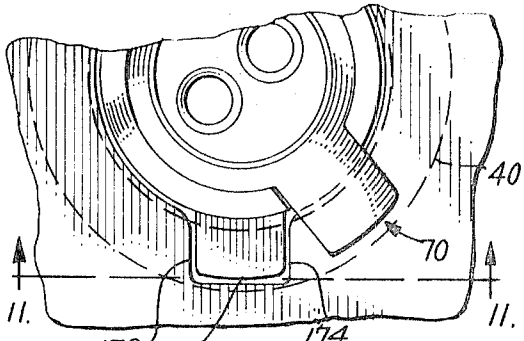


Fig. 9

Fig. 10



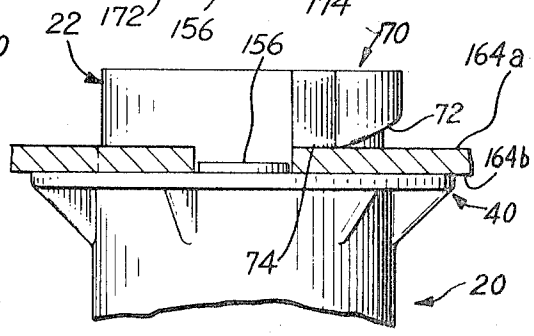


Fig. 11

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APPLIANCE MOUNTING APPARATUS

BACKGROUND OF THE INVENTION

This invention relates to electrical mounting apparatus, and is more particularly directed to apparatus designed to be mounted in connection with a panel.

Apparatus for conveniently and securely mounting an electrical appliance in a panel has long been desired by various industries. Although apparatus of this general type has been produced in the past, it has exhibited certain deficiencies with regard to ease of assembly, mounting, and reliability that have limited its usefulness.

Typical prior art mounting apparatus is illustrated in U.S. Pat. No. 2,595,994 (Thomas—May 6, 1952) and U.S. Pat. No. 2,715,213 (Barbour—Aug. 9, 1955). The Thomas patent discloses socket-supporting apparatus comprising a stirrup, a supporting cup mounted on the stirrup, tabs, bosses, and a double coil spring that interconnects the various parts of the apparatus. The Barbour patent describes a socket assembly comprising a barrel, a base, a hanger bale including downwardly projecting fingers, and a coil spring that interconnects the various parts thereof. Each of the foregoing prior art devices comprises a relatively large number of parts that are difficult to assemble. In addition, the prior art devices are difficult to mount in a panel since they must be simultaneously twisted and pushed toward (or away from) the panel.

SUMMARY OF THE INVENTION

In order to overcome the deficiencies of the prior art apparatus, applicants have developed new techniques for mounting an electrical appliance, such as a lamp, in a panel having an aperture located adjacent the perimeter of a center hole. The techniques work equally well when applied to panels having various thicknesses. In its fundamental aspect, the apparatus includes an inner shell that is movably mounted within a bore of an outer shell. The outer shell is connected to a radial flange that is adapted to engage a first side of the panel, and the inner shell is connected to a lug that is adapted to engage a second side of the panel. A coil spring is held between the outer shell and a retainer member that is coupled to the inner shell so that the apparatus is resiliently held in place on the panel between the lug and the radial flange. The lamp is held by a socket that is mounted in the inner shell.

In a preferred form of the invention, the retainer member is resiliently engageable with the inner shell. In this embodiment, the entire apparatus is assembled by merely moving the coil spring between the inner and outer shells and by snapping the retainer member into its engaged relationship with the inner member so that the coil spring is secured. Due to the unique arrangement of the parts described herein, the entire apparatus may be assembled with a degree of ease and efficiency heretofore unattainable with analogous prior art devices.

In another form of the invention, the lug comprises a beveled portion that rides against a side of the aperture during mounting. This feature produces a camming action that enables the apparatus to be mounted without applying any force toward or away from the panel. In other words, the apparatus may be mounted by merely twisting the outer shell. This feature eliminates many of the difficulties encountered while attempting to mount prior art devices.

In addition to the foregoing advantages, the subject apparatus comprises fewer parts than analogous prior art devices, and therefore results in a device that is extremely rugged and reliable. As a result, the apparatus is not likely to be dislodged or moved from its assigned position once it is securely mounted in the panel.

Another aspect of the present invention relates to a unique technique for securing a lamp socket within a shell. According to this aspect of the invention, the shell is fabricated from a resilient material, such as nylon. Resilient, deformable fingers are formed inside the shell, and are adapted to extend through corresponding openings in the socket. By using apparatus of the described type, the socket may be quickly fitted into or removed from the shell by deforming the fingers. However, after the socket is properly fitted into the shell and a lamp is installed, the socket is rigidly held in its position by the extension of the finger members through the openings.

DESCRIPTION OF THE DRAWINGS

These and other features and advantages of the present invention will hereinafter be described for purposes of illustration, but not of limitation, in connection with the accompanying drawings in which like numbers refer to like parts throughout, and in which:

FIG. 1 is a perspective, exploded view of a preferred form of apparatus made in accordance with the present invention showing the manner in which various parts of the apparatus may be assembled;

FIG. 2 is a perspective view of the apparatus shown in FIG. 1 in its assembled form, together with an indication of the manner in which the apparatus may be mounted to a panel;

FIG. 3 is a top plan view of the apparatus taken along line 3—3 of FIG. 2;

FIG. 4 is a cross-sectional view taken along line 4—4 of FIG. 3;

FIG. 5 is a cross-sectional view taken along line 5—5 of FIG. 3;

FIG. 6 is a top plan view of the apparatus shown in FIG. 2 after it has been partially fitted into the panel;

FIG. 7 is a cross-sectional view of the panel taken along line 7—7 of FIG. 6, together with a side elevational view of the remaining apparatus shown in FIG. 6;

FIG. 8 is a top plan view showing the relative position of the apparatus shown in FIG. 6 as it is being mounted in the panel;

FIG. 9 is a cross-sectional view of the panel taken along line 9—9 of FIG. 8, together with a side elevational view of the remaining apparatus shown in FIG. 8;

FIG. 10 is a top plan view showing the relative position of the apparatus shown in FIG. 6 when the apparatus is fully mounted in the panel; and

FIG. 11 is a cross-sectional view of the panel taken along line 11—11 of FIG. 10, together with a side elevational view of the remaining apparatus shown in FIG. 10.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, a preferred form of apparatus made in accordance with the present invention comprises an outer shell 20, a radial flange 40, an inner shell 50, lugs 60 and 70, a coil spring 80, a retainer member 90, a socket 100, a tube assembly 112, and bosses 150 and 156. The foregoing apparatus can be mounted in a panel 164 having sides 164*a* and 164*b*. The panel defines a center hole 166 that has apertures 168 and 170 located adjacent the perimeter of the center hole. Aperture 170 has sides 172 and 174.

More specifically, outer shell 20 comprises a cylindrical upper member 22 that defines slots 24 and 26 in which lugs 60 and 70, respectively, are held. The upper member also includes an upper rim 27 and a lower rim 28 that provides means for retaining the upper end of the coil spring. Outer shell 20 also includes a cylindrical lower member 30 that abuts the radial flange and has a lower rim 32. The upper and lower members of the outer shell define a bore 34. More specifically, the cylindrical upper member defines an upper bore 36 and the cylindrical lower member defines a lower bore 38, the two bores together comprising bore 34.

Radial flange 40 is securely connected to the outer shell and comprises an outer rim 42, an upper surface 44 adapted to engage panel side 164*b*, and a lower surface 46. The flange is reinforced by ribs, such as exemplary rib 48 (FIG. 7), that are connected between lower member 30 and lower surface 46 of the flange.

As best seen in FIG. 1, the outer shell and radial flange are preferably integrally formed from a material such as plastic.

Inner shell 50 is movably mounted within bore 34 and comprises a cylindrical member 52 that defines a groove 54 in the

lower portion thereof. The groove extends around the circumference of member **52**. Inner shell **50** also comprises resilient, movable fingers **56** and **58** that are integrally formed with the shell. The areas below fingers **56** and **58** are removed to form slots **57** and **59**, respectively. The entire inner shell is preferably formed from a resilient material, such as a plastic.

Lug **60** is preferably integrally formed with inner shell **50** and comprises a beveled portion **62** and an edge portion **64** that is adapted to grip panel side **164***a* in a manner described hereafter.

Lug **70** is preferably integrally formed with inner shell **50** and comprises a beveled portion **72** that is connected to an edge portion **74**. Edge portion **74** is adapted to grip panel side **164***a* in a manner described hereafter.

Coil spring **80** has an upper end **82** and a lower end **84**. Upper end **82** rests against lower rim **28** of the outer shell, and lower end **84** rests against retainer member **90**.

Retainer member **90** resembles a cylinder and comprises an upper edge **92** against which coil spring **80** is biased. The retainer member also comprises a lip **94** that is adapted to engage groove **54** and a body **96** that fits inside bore **34**. The retainer member is fabricated from a somewhat resilient material such as nylon. This feature of the invention greatly facilitates the assembly of the overall apparatus.

Socket **100** comprising openings **102** and **104** that are adapted to receive fingers **58** and **56**, respectively. Socket **100** also defines a slot **106** and a connected channel **108** that are adapted to receive a head of an electrical appliance, such as a lamp, in order to hold the lamp in position. The socket also defines a corresponding slot and channel that are shown in phantom in FIG. **5**. A tab **110** is integrally formed with the socket **100** and is adapted to receive an electrical conductor **107**. Of course, the socket is preferably made from an electrical conducting material, such as copper or brass.

Tube assembly **112** basically comprises brass tubes **114** and **116**. Tubes **114** and **116** have upper lips **118** and **120**, respectively, and lower lips **122** and **124**, respectively. Lower lips **122** and **124** are held in position adjacent rims **138** and **140**, respectively, of inner shell **50** (FIG. **5**). The tube assembly also comprises coil springs **134** and **136** that are mounted around tubes **114** and **116**, respectively. The upper ends of the coils rest against upper lips **118** and **120**, respectively, and the lower ends of the coils are held by portions of inner shell **50** (FIG. **5**). As a result, coil springs **134** and **136** normally hold the tubes in the position shown in FIG. **5**. However, when an electrical appliance is inserted in the socket, the tubes are moved downward from the position shown. The springs bias the tubes against the electrical appliance so that positive electrical contact is maintained. The tubes are hollow and are adapted to receive an electrical conductor, such as conductor **109**. For the operation of a lamp, only one of the tubes need be wired. However, for other types of electrical apparatus, both tubes may need to be connected to an appropriate conductor.

Boss **150** is integrally formed with radial flange **40** and rests on top of upper surface **44** in the position shown. The boss has sides **152** and **154** that fit within aperture **168**. Boss **156** is also integrally formed with radial flange **40** and rests against upper surface **44**. Boss **156** has sides **158** and **160** that fit within aperture **170**.

A preferred assembly and mounting method will now be described in connection with the apparatus shown in the drawings. The apparatus is assembled in the manner shown in FIGS. **1** and **2**. More specifically, conductor **107** is threaded through member **90**, spring **80**, bore **34**, and the interior of inner shell **50**, and is attached to tab **110**. Conductor **109** is threaded in the same manner and is attached to either tube **114** or **116**. Socket **100** is then lowered into inner shell **50** so that fingers **56** and **58** protrude through openings **104** and **102**, respectively. As the socket is being inserted into the inner shell, the fingers are deformed in order to allow convenient assembly. During normal usage, the fingers are held in the position shown in FIG. **5** by the presence of a lamp in socket **100**. As a result, the fingers cannot be deformed to a sufficient degree to allow the socket to be inadvertently removed. However, if the lamp is removed, the fingers may again be deformed in order to allow the socket to be taken from inner shell **50** for purposes of repair. Those skilled in the art will appreciate that the foregoing feature of the invention provides a unique means of holding the socket securely in place during normal usage and, at the same time, providing a technique for allowing removal of the socket without the use of any tools whatsoever.

After the socket is in place, inner shell **50** is inserted into bore **34** so that lugs **60** and **70** ride in slots **24** and **26**, respectively. Coil spring **80** is then inserted into the bore and retainer member **90** is snapped into groove **54** so that coil spring **80** is partially compressed in the position shown in FIGS. **4** and **5**. Those skilled in the art will appreciate that the foregoing method of assembly is remarkably simpler than the methods required to assemble prior art mounting apparatus. Once the conductors are connected to the socket, final assembly can be completed in a matter of seconds without the use of tools.

After the apparatus has been assembled, it may be mounted in panel **164** as follows. Referring to FIGS. **2**, **6**, and **7**, the outer and inner shells are moved in relationship to center hole **166** so hat lugs **60** and **70** are aligned with and are moved through apertures **168** and **170**, respectively. When the apparatus has been moved in the manner indicated, bosses **150** and **156** abut surface **164***b* of panel **164** in the manner shown in FIG. **7**. The apparatus may then be locked in its final position by merely twisting outer shell **20** in the direction indicated in FIG. **9**. As the outer shell is twisted, beveled portion **72** of lug **70** rides upward along side **174** of aperture **170** (thus further compressing coil spring **80**). Of course, the beveled portion **62** of lug **60** is moved in an analogous manner with respect to a side of aperture **168**. When the apparatus has been moved to the position shown in FIGS. **8** and **9**, boss **156** becomes visible through aperture **170**. As the outer shell is further twisted, edge portions **64** and **74** of lugs **60** and **70**, respectively, come in contact with surface **164***a* of panel **164**. In addition, bosses **150** and **156** become aligned with apertures **168** and **170**, respectively, in the manner shown in FIGS. **10** and **11**. When the bosses are properly aligned, coil spring **80** biases radial flange **40** toward the panel so that upper surface **44** is rigidly held against surface **164***b* thereof. Thereafter, coil spring **80** continues to bias lugs **60** and **70** toward surface surface **164***a* and radial flange **40** toward surface **164***b* so that the apparatus is securely held. Moreover, since bosses **150** and **156** are held within the sides of the apertures, the apparatus may not be twisted in center hole **166**. In order to remove the apparatus from panel **164**, the outer shell is moved away from the panel (thus further compressing spring **80**) in order to free the bosses from their respective apertures. Thereafter, the outer and inner shells may be twisted to the positions shown in FIGS. **6** and **7** and removed.

Those skilled in the art will appreciate that the apparatus of the present invention enables panel mounting to be achieved with a degree of ease and convenience heretofore unattainable. The unique beveled portions of the lugs enable the entire apparatus to be locked in its final position by merely twisting the outer shell. As a result, no special tools are required and the entire mounting operation can be completed in a few seconds. Moreover, no force need be applied toward or away from the panel.

Those skilled in the art will also appreciate that the apparatus described herein is merely exemplary of the preferred practice of the invention, and that various modifications and changes may be made without departing from the spirit and scope thereof.

What is claimed is:

1. Apparatus for mounting an electrical appliance in a panel having an aperture located adjacent the perimeter of a center hole in said panel, said apparatus comprising in combination:

an outer shell having a bore adapted to receive a coil spring;

a radial flange connected to said outer shell for engaging a first side of said panel;

an inner shell movably mounted within said bore;

at least one lug unitary with said inner shell and adapted to fit through the aperture, said lug having an edge portion beveled to allow said lug to twistingly engage a second side of said panel;

socket means recessed within the inner shell for holding an appliance;

a coil spring having upper and lower ends fitted in said bore;

first means coupled to the outer shell for retaining the upper end of the coil spring so that the radial flange is urged against the first side of the panel;

second means coupled to the inner shell for retaining the lower end of the coil spring so that the lug is urged against the second side of the panel, said lug cooperating with said radial flange through the biasing of said coil spring to act as the sole means by which said apparatus is resiliently held in place on the panel.

2. Apparatus, as claimed in claim 1, wherein the second means comprises:

a retainer member movably mounted within the bore and adapted to retain the lower end of the coil spring; and

means located on the inner shell for engaging the retainer member so that the lug may be urged against the second side of the panel.

3. Apparatus, as claimed in claim 2, wherein the means located on the inner shell comprises a groove, and the retainer member comprises a resilient lip member adapted to engage said groove.

4. Apparatus, as claimed in claim 1, wherein the outer shell and the inner shell are cylindrically shaped.

5. Apparatus, as claimed in claim 1, and further comprising a rectangular-shaped boss mounted on said radial flange and adapted to fit in said aperture so that the outer shell is prevented from rotating with respect to the center hole in said panel.

6. Apparatus, as claimed in claim 1, and further comprising:

a panel having an aperture located adjacent the perimeter of a center hole in said panel;

a cylindrical upper member connected concentrically to the outer shell adjacent the radial flange, said upper cylindrical member being of a diameter slightly smaller than said center hole of said panel so as to fit rotatably into said center hole; and

sidewalls defining a slot in said upper cylindrical member, said slot being adapted to receive said lug.