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2,638,575

APERTURED PANEL SOCKET MOUNT

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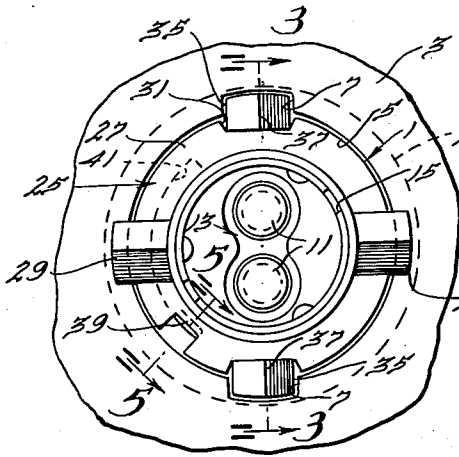


FIG. 1.

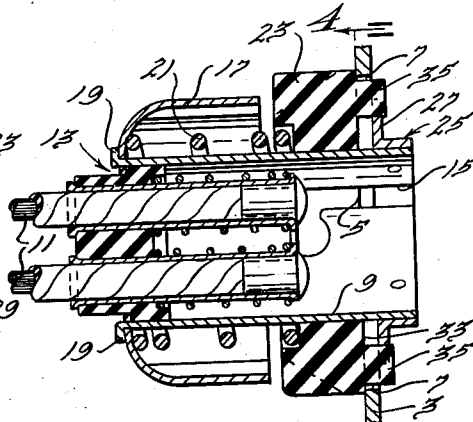


FIG. 3.

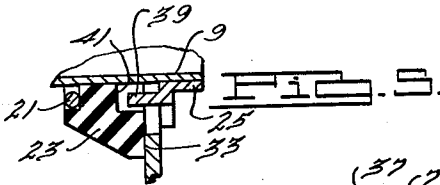


FIG. 5.

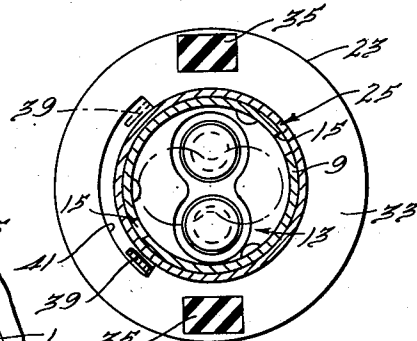


FIG. 4.

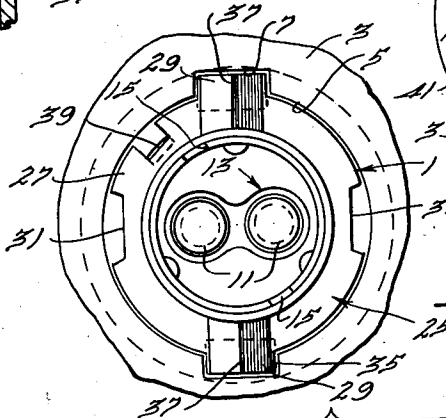


FIG. 2.

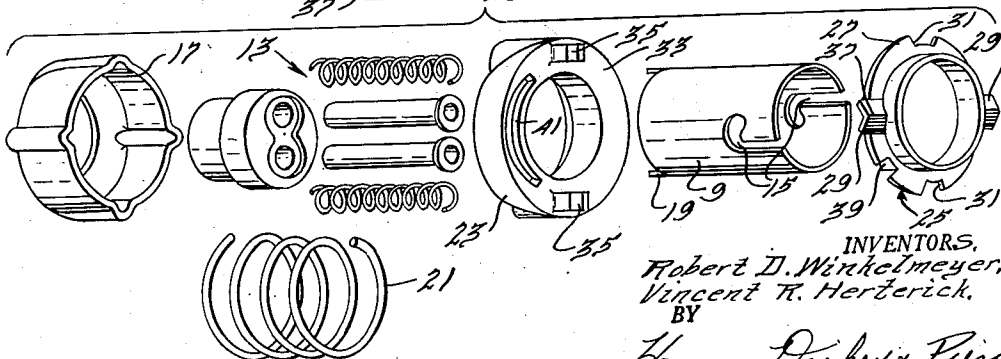


FIG. 6.

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APERTURED PANEL SOCKET MOUNT

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This invention relates to removable panel attachments and is particularly, though not exclusively, concerned with socket-type electrical connectors that are adapted to be releasably secured to control panels.

Socket connectors of the specific type to which the present invention is herein applied, for the sake of illustration, ordinarily include a socket member having a radial flange thereon and a second member mounted on the socket member also having a radial flange that is urged by a spring into yieldable contact with the socket flange. One of these flanges is adapted to pass through a keyed aperture in a panel but the other is not. The adapted flange, however, can pass through the aperture only when properly aligned therewith and, after insertion, angular movement or rotation thereof prevents it from being removed through the aperture in the direction from whence it was inserted. After insertion and rotation, the adapted flange therefore engages one side of the panel and the other flange engages the opposite side of the panel and, since these two flanges are spring pressed toward each other, they provide the connector with a yieldable but tight and positive axial grip on the panel. It will be recognized, however, that the construction so far described provides no more than a frictional rotary grip on the panel; that is, if sufficient torque is applied to the connector to overcome the friction resulting from the axial grip on the panel, the connector will be rotated relatively to the panel. This is, of course, undesirable inasmuch as vibrations of the panel and the like may in time cause disengagement of the connector from the panel.

It is thus an object of the present invention to provide a connector which may be attached to a panel so that it is positively fixed against rotation as well as against excessive axial movement.

A further object is to provide an attachment of this type which may be easily and economically manufactured.

The features of construction whereby these and other objects of the invention are accomplished are shown by way of illustration of a preferred embodiment of the invention in the accompanying drawings wherein:

Figure 1 shows a socket connector in locked position on a panel as viewed from one side of the panel;

Fig. 2 shows the connector in unlocked position when viewed from one side of a panel;

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Fig. 3 is an axial section through the connector as taken on line 3-3 of Fig. 1;

Fig. 4 is a cross section taken on the line 4-4 of Fig. 3;

Fig. 5 is a partial section taken on line 5-5 of Fig. 1; and

Fig. 6 is an exploded perspective view of the connector.

The present attachment 1 is adapted for connection to the portion of a panel 3 surrounding an aperture 5 which has one or more radial slots 7, diametrically opposed slots being illustrated. The present embodiment is a socket-type connector having a central hollow socket member 9 in and to which the terminals of one or more electrical wires 11 (two wires 11 being shown) may be secured by suitable means indicated generally at 13. Other means (not shown) for securing other wires (not shown) or a bulb in the socket 9 in contact with terminals of wires 11 may be attached to the socket 9 through the medium of the bayonet slot 15 therein.

A cap or handle 17 is fixedly secured to one end of the socket member 9 by crimping, keying, clamping, or other suitable means as indicated at 19. The cap 17 also serves as a retainer for a compression spring 21 which surrounds the socket 9 and presses upon an annular locating-and-sealing ring 23 which is mounted on the socket 9 so that the two members are capable of relative axial and rotary motion. The ring 23 may be conveniently formed from plastic material such as phenolic Bakelite. The end of socket 9 opposite cap 17 has fixedly secured thereto by crimping or the like an annular plate 25 which is provided with a peripheral flange 27. This flange has diametrically opposed radial ears 29 thereon and angularly spaced from the ears by a predetermined amount, 90° in the present case, it has a pair of diametrically opposed radial slots 31.

Axially projecting from the radial end face 33 of the ring 23 are a pair of diametrically opposite radial key forming protuberances 35. The keys 35 coact with the slots 7 to prevent rotation of the ring 23 relative to the panel 3. Keys 35 also coact with the slots 31 to prevent rotation of the plate member 25 and socket 9 relative to the member 23 and, therefore, relative to the panel 3. The keys 32 are of about the same size and radial position as the ears 29 and these members may be beveled as shown at 37 so as to effect a detent connection tending to resist relative rotation of the member 23 and socket 9 when the keys 35 and ears 29 are in spring pressed engagement. When

in such engagement, the keys 35 and ears 29 may be passed through the panel slots 7 as shown in Fig. 2. The flange 27 is smaller than the panel opening 5 so that it may pass therethrough, but the radial face 33 of the member 23 is larger than the opening 5 and abuts one side of the panel.

When in this position, the connector 1 may be locked to the panel 3 by pushing upon the cap 17 and rotating it. Axial movement or pushing of the cap 17, moves the socket 9 and plate 25 axially with respect to the member 23 and panel 3 against the resistance of spring 21. This frees the ears 29 from their bevel detent connections 37 with the keys 35 so that torque on the cap 17 will cause the ears to rotate relative to the panel slots 7 and the member 23 which is rotarily fixed to the panel 3 by virtue of the connection of its keys 35 with the slots 7. Angular movement of the ears 29 carries them beyond the edges of the slots 7, so that they overlie the portion of panel 3 surrounding the opening 5. Thus, the connector 1 is positively secured to the panel 3 so far as axial movement is concerned by virtue of the abutment of the member 23 with one side of the panel and the plate 25 with the other.

During the initial stage of relative angular movement of the ears 29 and the keys 35, the outer edge of flange 27 rides upon the keys so that the face 33 and the ears 29 are axially spaced despite the pressure of spring 21. During the angular movement, the face 33 is, normally, lightly pressed against the rear face of the panel 3. Consequently, the above-mentioned enforced spacing between face 33 and ears 29 also maintains ears 29 out of contact with the inner face of panel 3, thereby protecting the surface of the latter. When this rotation reaches a predetermined point, 90° in this case, the slots 31 in the flange 27 reach the keys 35 and spring pressure forces the plate 25 and socket 9 toward the panel so that the keys 35 seat in the slots 31 to prevent rotation of any parts of the connector 1 relative to the panel. Thus, the connector is positively locked to the panel against either rotary or axial movement which might effect disengagement.

It will be noticed that the annular body of the ring 23 is imperforate and overlies the edges of the opening in the panel 3. Ring 23 thus serves to completely close this opening.

In order to disconnect the attachment 1 from the panel 3, pressure is applied to the cap 17 to overcome resistance of the spring 21 and move the slots 31 beyond the ends of the keys 35. The cap 17 is then rotated until the ears 29 lie upon and engage the keys 35 whereupon the plate 25 may be passed through the aperture 5.

If desired, suitable means may be provided to control the amount and direction of relative rotation of the plate 25 and member 23. A preferred construction comprises an axial ear 39 struck from the flange 27 and which fits in an angular slot 41 that opens into the radial face 33 of the member 23. It is evident that the angle included between the ends of the slot 41 governs the amount of relative rotation and that this should be at least as large as the angle between the ears 27 and slots 31.

The foregoing construction has been shown merely to illustrate the principles of the invention and it will be apparent that various modifications therein may be made without departure from the spirit and scope of the invention.

What is claimed is:

1. In a removable attachment for panels hav-

ing circular apertures with a radial keyway opening therein, the combination of a member capable of passing through the circular aperture, a flange secured to the member of less than the diameter of the circular opening and having a radial ear of larger radius passable through the keyway whereby said flange may be inserted through the aperture, but upon rotation thereof so that the ear is not in alignment with the keyway may not be removed through the aperture, a spring pressed sealing member journaled on the member having an axial projection normally in yieldable engagement with said flange ear, said projection being receivable in the keyway of the panel aperture to prevent rotation of the sealing member, said sealing member having an imperforate body which overlies and seals the opening in said panel.

2. The invention as claimed in claim 1 including a detent connection between the ear and projection.

3. The invention as claimed in claim 1 wherein said axial projection engages said flange in all but certain rotative positions of said flange and maintains an axial spacing between said flange and said sealing member.

4. The invention as claimed in claim 1 including an axial ear on the flange and a segmental slot in the sealing member continuously receiving said ear and thereby defining the limits of relative rotation of said members.

5. The invention as claimed in claim 1 including a detent connection between the ear and projection, an axial ear on the flange and a segmental slot in the sealing member continuously receiving said ear and thereby defining the limits of relative rotation of said members.

6. In a removable attachment for panels having circular apertures with a radial keyway opening therein, the combination of a member capable of passing through the circular aperture, a flange secured to the member of less than the diameter of the circular opening and having a radial ear of larger radius passable through the keyway whereby said flange may be inserted through the aperture but upon rotation thereof so that the ear is not in alignment with the keyway may not be removed through the aperture, a spring pressed member journaled on the member having an axial projection normally in yieldable engagement with said flange ear, said projection being receivable in the keyway of the panel aperture to prevent rotation of the second member and having a portion of lesser radius than the outer periphery of the flange whereby said flange contacts the same and is spaced from the end face of the spring pressed member when the ear is angularly displaced from the projection by relative rotation of the members, and a slot angularly spaced from the flange ear in said flange and opening into the outer periphery thereof adapted to receive said projection whereby said projection is rendered ineffectual to separate the flange and spring pressed member and relative axial movement of the members toward each other under the influence of the spring can occur but relative rotation cannot.

7. The invention as claimed in claim 6 including a detent connection between the ear and projection.

8. The invention as claimed in claim 6 including an axial ear on the flange and a segmental slot in the spring pressed member receiving said ear and thereby defining the limits of relative rotation of said members.

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9. The invention as claimed in claim 6 including a detent connection between the ear and projection, an axial ear on the flange and a segmental slot in the spring pressed member receiving said ear and thereby defining the limits of relative rotation of said members.

10. The invention as claimed in claim 6 wherein the projection extends outwardly from the end face of the spring pressed member by an amount greater than the thickness of the panel.

11. In an attachment for a panel having an opening with a keyway extending outwardly from the opening, the combination of a pair of cooperating flanges relatively rotatable and relatively axially movable adapted to positively but tightly engage opposite sides of the panel around the opening, key means on one flange including a first portion of greater radius than said opening adapted to be operatively engageable with the keyway, an ear on the other flange of greater radius than said opening adapted to overlie said first portion and upon relative rotation of the flanges to engage the surface of the panel around the opening at points spaced circumferentially from the keyway, said key means having a second portion of less radius than the opening, said

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other flange having a slot of less radius than said opening spaced circumferentially from said ear and engageable and disengageable with said second portion upon relative axial and rotary movements of the flanges, said slot and second portion serving to prevent relative rotation of the flanges when they are engaged respectively with opposite sides of the panel.

12. The invention set forth in claim 11 wherein said second portion projects axially through the opening and said other flange rides thereon except when said second portion is received in said slot whereby said second portion serves to axially space said flanges.

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