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W. R. FRANCIS

2,869,094

ADJUSTABLE PANEL MOUNTING FOR CORD CONNECTOR

Filed May 1, 1957

FIG. 1.

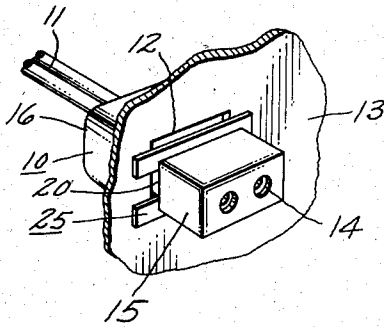


FIG. 2.

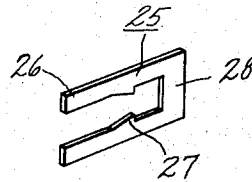


FIG. 3.

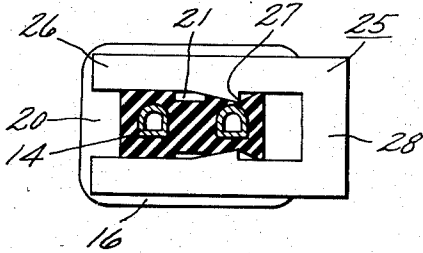


FIG. 4.

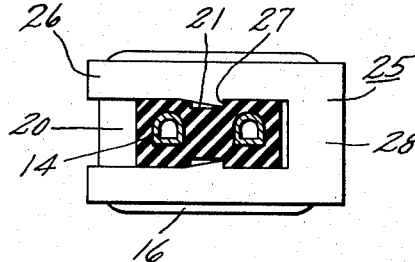
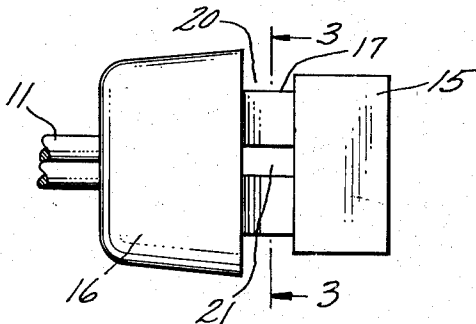


FIG. 5.



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ADJUSTABLE PANEL MOUNTING FOR CORD CONNECTOR

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2 Claims. (Cl. 339—59)

The present invention relates to means for adjustably mounting a body member in an opening in a thin panel, and particularly to a connector of an electrical cord.

This invention is particularly useful for the power supply cords of radio and television receivers. It should be understood, however, that the present invention is readily adaptable to resilient bushings and grommets as well as to electrical connectors. Such connectors are either supplied with female contacts or male prongs but for purposes of this invention they will be described broadly as contacts.

Television and radio receivers are being produced with back panels that must be removed in order to service the sets. It is always well to disconnect the sets from the power supply before touching any of the electrical components which comprise the chassis. Rather than post elaborate warnings on the panel, it has been common practice to fasten the connector of the power supply cord to the panel so that it will be automatically disconnected from the chassis when the panel is removed. A typical example of the prior art is the Francis et al. Patent No. 2,756,403 which is assigned to the same assignee as is the present invention.

One difficulty that has been experienced in recent years is that of assembling the chassis in a precise location so that the connector mounted in the back panel will accurately engage in the chassis. A disproportionate amount of time and expense has been incurred in trying to hold the manufacturing tolerances within a certain range in order to eliminate this difficulty. A better solution is found in the present invention where the connector is adjustably mounted in an opening in the panel member so that the connector may be moved the necessary amount to engage with the chassis.

The principal object of this invention is to provide an adjustable mounting for a body member in an opening in a thin panel.

A further object of this invention is to provide a novel clip member for an electrical connector so that the connector may be inserted into an opening in a panel member and locked therein by means of the clip.

A still further object of this invention is to provide an adjustable mounting means for an electrical connector in an opening in a panel member so that the effective locking features of either the clip or the connector must be destroyed in order to disassemble the connector.

A preferred embodiment of an electrical connector having my invention is illustrated in the accompanying drawing. It includes a body of resilient material that contains a pair of female contacts joined to the conductors of an electrical cord. The connector has a front portion, an enlarged abutment portion and a reduced central portion that separates the front from the abutment portion. A panel member that is usable with this invention would contain an opening only slightly larger than the cross-section of the front portion of the connector. A recess is formed in the reduced central portion on opposite sides of the connector and between the

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contacts for reasons which will be discussed hereinafter. A clip member of flat construction is used to straddle the central portion of the connector and lock the connector in the opening of the panel. The panel is then confined between the abutment portion and the clip. It is necessary to permanently hold the clip on the connector and this is accomplished by a pair of inwardly turned locking tongues on the arms of the clip at the mid-height thereof to engage in the said recesses. These locking tongues have an inclined surface to facilitate the insertion of the clip on the connector, but which make it impossible to disconnect the clip without destroying either the clip or the connector.

My invention will be better understood from the following description taken in connection with the accompanying drawing and its scope will be pointed out in the appended claims.

Figure 1 is an isometric view of a portion of a thin panel member having an electrical connector containing my invention adjustably mounted therein.

Figure 2 is an isometric view of the U-shaped clip member that is used to lock the connector in the panel.

Figure 3 is a cross-sectional view taken on the lines 3—3 of Figure 5 through the reduced central portion of the connector showing the clip member partially assembled thereto.

Figure 4 is a cross-sectional view similar to that of Figure 3 after the clip member is finally assembled to the connector.

Figure 5 is a plan view of an electrical connector embodying my invention as it is mounted on the end of a cord.

Referring in detail to the drawing, and in particular to Figure 1, there is shown an electrical connector 10 forming one end of a two-conductor cord 11, and mounted in an opening 21 in the thin panel member 13. Two female contacts 14 are first crimped, soldered or otherwise fastened to the two conductors of the cord 11. Then the connector body is molded over the contacts to insulate them from each other as well as to provide a hand-hold for assembling and disconnecting the connector.

A better understanding of the connector 10 may be had with relation to the plan view of Figure 5. The connector may be considered as containing three segments, namely, the front portion 15, the abutment portion 16 at the back of the connector, and the reduced central portion 17 that separates the front from the abutment portion. The front portion 15 is generally rectangular in cross-section in order to conserve the amount of material needed to mold the connector. Also, the opening 12 in the panel member 13 is slightly larger than the cross-sectional shape of the front portion 15 to allow the connector to be inserted through the opening until the abutment portion 16 engages the outer surface of the panel. The opening 12 is larger than the front portion 15, but smaller than the abutment portion 16 so that the connector may not extend completely through the opening.

The next consideration is to fasten the connector in the panel opening so that it is necessary to destroy the connector or the fastening means before the connector may be removed from the panel. First, it is well to study the nature of the reduced central portion 17. It forms an annular groove 20 with the front portion 15 and the abutment portion 16. This groove extends completely around the connector and below the surface of the cross-sectional outline of the front portion 15. It will then be understood that the amount of adjustability of the connector in the panel opening 12 is governed by the dimensional differences between the central portion 17 and the panel opening 12. Since the opening 12 is substantially

coextensive with the cross-sectional configuration of the front portion 15, a quick estimate of this adjustability may be had by comparing the size of the front portion 15 with that of the central portion 17.

A recess 21 is made in the central portion 17 between the contacts 14 and on both the top and bottom sides as best seen in the cross-sectional view of Figure 3. These recesses are provided to cooperate with a clip member 25 of U-shape that is cut from flat stock. The two parallel arms 26 of the clip are each provided with an inwardly turned locking tongue 27 adjacent the mid-height thereof for engagement in the recesses 21 of the connector. Each locking tongue 27 is in the form of a right triangle with the hypotenuse of each triangle converging toward the connecting base 28 of the clip when the locking tongues are considered as a pair. The hypotenuse or inclined portion of the locking tongue 27 serves to compress the resilient material of the connector as the clip is forced to slide over the central portion until the locking tongues 27 are confined in the recesses 21. The clip member 25 is not made to operate with a spring action but, on the contrary, is made rigid so that the resilient material will be compressed by the inwardly facing locking tongues 27 as the clip member is installed. This provides a more dependable fastening means which may not be removed from the connector without destroying the effective locking features of either the clip or the connector. The entire purpose of a disconnect means such as this would be defeated if it were possible for the average person to remove the clip member and replace it at will. In this event the connector would become an accident hazard and it would no longer serve as a fool-proof disconnect means.

There are several advantages in locating the locking tongues 27 adjacent the mid-portion of the arms 26 of the clip member. The parallel portions of the arms adjacent the free ends thereof serve the purpose of a guide when installing the clip so that the resilient material of the connector 10 will not be split or scored by the clumsy handling of the connector as it is forced over the connector body. Once the parallel free ends of the arms 26 straddle the side of the central portion 17, it is most difficult to angle the clip. This insures that the clip will be properly centered as the locking tongues 27 first begin their travel from the side of the connector to the recesses 21.

Having described above my invention of an adjustable mounting for an electrical connector in an opening in a thin panel member, it will be readily understood by those skilled in this art that I have provided a simple and inexpensive clip member of novel construction. A connector or other resilient body member may quickly be assembled in the panel opening and locked in place by the novel clip member in one easy operation using known mass production factory methods.

Modifications of this invention will occur to those skilled in this art, and it is to be understood, therefore, that this invention is not limited to the particular embodiments disclosed, but that it is intended to cover all modifications which are within the true spirit and scope of this invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In combination with a thin panel member having an opening therethrough, an electrical connector of resilient material that is adapted to be adjustably mounted in the opening, the connector comprising a front portion and an enlarged abutment portion, these portions being separated by a central section having the least cross-section, two of the opposite sides of the said section being substantially parallel, and a central recess formed in both of the two parallel sides, a rigid U-shaped clip member of flat construction having a pair of parallel arms, an inwardly-facing locking tongue on each arm near the mid-height, so that when the clip is made to straddle the reduced central section of the body the locking tongues will compress the resilient body material until they become confined in the said recesses where they are hidden from view, the parallel end portions of the arms serving to guide the clip onto the body, the said opening in the panel being slightly larger than the cross-section of the front portion of the connector so that the position of the connector in the opening may be adjusted by an amount that is determined by the size of the central section, the width of the section being substantially equal to the thickness of the panel plus the thickness of the clip member.

2. In combination with a thin panel member having an opening therethrough, an electrical cord having a connector of resilient material joined to one end, a pair of parallel contacts included in the connector and attached to the cord, the conductor having a front portion of generally rectangular cross-section and an enlarged abutment portion that is separated from the front portion by a peripheral groove that provides a reduced central portion of generally rectangular cross-section, a recess in the opposite sides of the central portion, the recesses being equally spaced from both of the underlying contacts, and a rigid U-shaped clip member of flat metal stock, each arm of the U member having an inwardly-facing locking tongue adjacent the mid-height of the arms and being substantially in the form of a right triangle, the hypotenuse of the triangle when considered with the other locking tongue converging inwardly toward the base of the U member, the clip member straddling the central portion with the locking tongue confined in the opposite recesses where they are hidden from view, the said groove being of such a width as to confine the panel member between the abutment portion of the connector and the clip member, the said opening in the panel being slightly larger than the cross-section of the front portion of the connector so that the position of the connector in the opening may be adjusted by an amount that is determined by the depth of the groove.

References Cited in the file of this patent

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,869,094

January 13, 1959

Wallace R. Francis

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 36, for "opening 21" read -- opening 12 --; column 4, line 31, for "conductor" read -- connector --; line 45, for "tongue" read -- tongues --.

Signed and sealed this 9th day of June 1959.

(SEAL)

Attest:

KARL H. AXLINE

Attesting Officer

ROBERT C. WATSON
Commissioner of Patents