

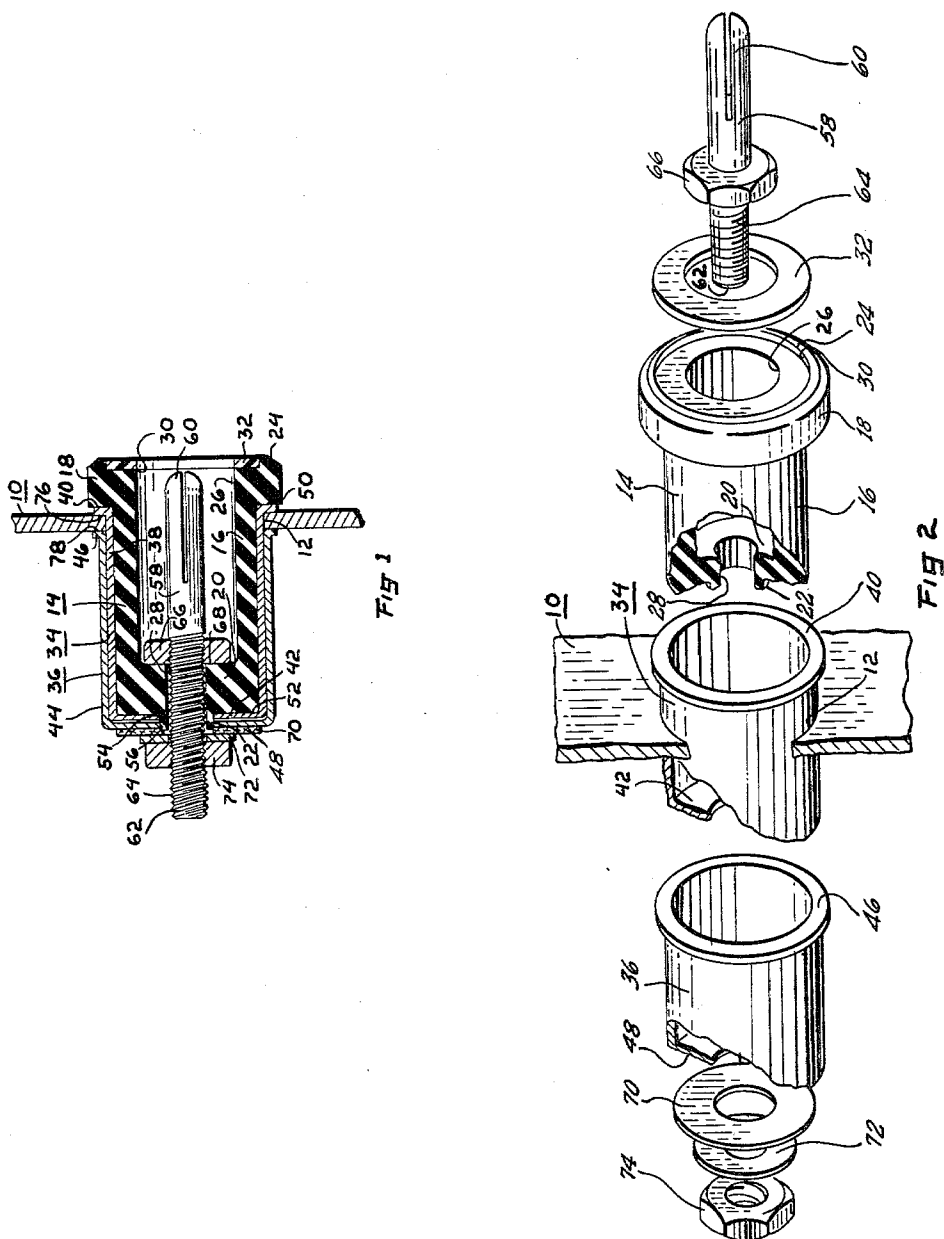
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INSTRUMENT PANEL-MOUNTED ELECTRICAL JACK OR RECEPTACLE

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INSTRUMENT PANEL-MOUNTED ELECTRICAL JACK OR RECEPTACLE

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This invention relates to electrical instruments having detachable electrical cables, and particularly to instrument control panels and the mounting of electrical jacks or receptacles thereto.

In many electrical instruments, such as laboratory or testing instruments, large control panels on which electrical jacks and/or receptacles are mounted are provided, and the jacks and/or receptacles are arranged to receive cooperating detachable connectors on cables that are to be attached to the control panel. In these instances, there exists the task of properly mounting the jacks and/or receptacles to the panel in an effective, durable and safe manner. The panel ordinarily comprises a sheet metal plate-like panel on the front of the instrument on which the jacks or receptacles are mounted. As is known in this art, the jacks and receptacles include electrical contacts accessible from the front of the panel that have electrical wiring connected to them on the interior of the instrument at the rear of the panel. Said contacts are accessible from the exterior of the instrument panel for the purpose of having the electrical contact of an associated detachable cable connector selectively detachably secured thereto.

It has been the practice in the art to effect the mounting of such jacks and receptacles on a panel by providing a two-part plastic housing having cooperating threaded and shouldered portions which enable the mounting of the housing on a panel by having one part inserted through an opening in the panel from the rear of the panel, that is, internally of the instrument, and the other part inserted from the front of the panel and threadedly connected to the first part to effectuate a gland-like connection of the two housing parts by having their shouldered portions clamp about the rim portion of the opening in the panel. The housing part that is disposed on the interior of the instrument carries an appropriate electrical contact that is accessible from the front of the instrument panel through the part on the exterior thereof, and which includes a terminal at the rear of the panel where it is wired.

A number of serious problems have developed and exist in connection with the prior art types of panel jack and receptacle mountings: (1) the jack or receptacle assembly can be disassembled from the front of the panel, and therefore, is subject to unauthorized tampering, and such tampering results in the possibility of rendering the instrument unsafe. As instruments including prior art mountings are frequently utilized in school environments as educational devices, the danger created by tampering is a real problem; (2) as the entire load including both the weight of the jack or receptacle assembly and any strains or stresses imposed thereon by the wiring within the instrument or the cable that is connected to the assembly contact at the front of the panel, particularly during connection and disconnection, is borne by the plastic housing, the latter is subject to physical cracking and destruction, and (3) in view of the fact that in most applications of prior art mountings it is necessary to color-code the various jacks and receptacles mounted on the panel so as to facilitate the attachment of proper mating cable connectors, it has been the practice to make the entire two-part prior art plastic housings of different

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colors, and this requires the maintenance of a large inventory of housings of different colors in order to have properly colored housings available to effectuate the desired color code.

In one form of the invention, the above noted deficiencies of the prior art mountings are eliminated by the provision of a unitary plastic housing that is made of a basic color and arranged to readily receive washer inserts of different colors in the face thereof to economically effect color coding by eliminating the need to carry a supply of housing of different colors; which has associated with it a pair of metal sleeves which cooperate to both mount the unitary housing on the panel and relieve all structural stresses and strains thereon, thereby avoiding structural failure of the housing, and wherein dismounting of the assembly of housing and sleeves and associated elements can be effected only from the rear of the panel at the interior of the instrument and thereby precludes tampering from the front of the panel.

Other objects and further details of that which we believe to be novel and our invention will be clear from the following description and claims taken with the accompanying drawings, wherein:

FIG. 1 is a vertical sectional view taken through a panel jack mounting installed on a panel which incorporates the invention, and

FIG. 2 is an exploded view thereof.

In the drawings, in FIG. 1 the invention is illustrated as being incorporated into a panel jack mounting; however, it will be understood that it is also readily adaptable into panel receptacle mountings. The panel is illustrated as being in the form of a plate-like member 10 having a circular aperture 12 formed therein. It will be appreciated by those skilled in the art that a plurality of such openings are formed in the usual instrument control panel, each adapted to receive a separate jack or receptacle. In the drawings, for convenience, the area to the left of the panel 10 will be arbitrarily considered as the interior side thereof and the area to the right thereof as the exterior side thereof.

The improved mounting comprises a generally cylindrical housing 14 made of a material which is an electrical insulator, such as any of the known suitable plastic materials. It comprises a cylindrical main portion 16 of some axial extent, a radially outwardly extending circular flange 18 at its front axial end, and a radially inwardly extending circular flange 20 at its other axial end which terminates in a short cylindrical axially extending hollow hub 22. The front face 24 of the housing 14 is generally flat and the interior thereof is formed by a bore 26 that extends from the front of the housing to the flange 20 where it communicates with a counter-bore 28 of smaller diameter that extends completely through the flange 20 and the hub 22. In the front face 24 spaced about the rim of bore 26 there is formed a thin cylindrical recess 30 which is arranged to receive a ring-like washer 32 of any desired color, as by having it cemented therein to the housing flange 18 in any known manner. It will, therefore, be appreciated that the housing 14 may be made, as by molding, of a suitable material of a basic color and yet may be color-coded by having a washer of an appropriate color attached thereto. Therefore, only a supply of housings of a single color need be maintained with a supply of different colored washers.

Associated with the housing 14 to mount the latter on a panel is a pair of cup-like metallic sleeves 34 and 36, which may be conveniently made of a suitable steel. These sleeves are similarly formed, except for their dimensions, each comprising a main cylindrical portion

of some axial extent, a radially outwardly extending flange at one axial end, and a radially inwardly extending flange at the other axial end having a central opening, all of which will be subsequently specifically identified by reference numerals. However, for a rapid understanding of their construction, the foregoing general description of the sleeves should be borne in mind with the further knowledge that sleeve 34 is dimensioned to snugly nest within sleeve 36, that is, to be capable of being telescopically slid therein, so as to have its main cylindrical portion received within the main cylindrical portion of sleeve 36 and when so fully slid therein, to have its radially inwardly extending flange disposed adjacent to the radially inwardly extending flange of the sleeve 36, and the radially outwardly extending flanges on the sleeves axially spaced apart a distance slightly less than the thickness of the panel 10 on which the assembly is to be mounted. The main cylindrical portion of the sleeve 34 is designated 38, the radially outwardly extending flange thereof 40 and the radially inwardly extending flange thereof 42; the main cylindrical portion of the sleeve 36 is designated 44, the radially outwardly extending flange thereof 46, and the radially inwardly extending flange thereof 48. The sleeves 34 and 36 are dimensioned so that they nest as previously described, and the main cylindrical portion 38 of the sleeve 34 (the radially inner sleeve) has an internal diameter which is slightly greater than the external diameter of the main cylindrical portion 16 of the housing 14, and its axial length is such that it may be telescopically slid thereon. When the sleeve 34 is fully mounted on the housing 14, its flange 40 is arranged to be contiguous with the flat annular rear shoulder 50 on the housing flange 18, and its radially inwardly extending flange 42 is arranged to be contiguous with the flat annular rear shoulder 52 of the housing flange 20 at the rear side thereof around the hub 22. The sleeves 34 and 36 have coaxial circular openings 54 and 56 in their flanges 42 and 48, respectively, which have an internal diameter that is slightly larger than the external diameter of the housing hub 22 and which seat thereon when the sleeves are mounted on the housing but do not take up the full axial extent of the hub, as illustrated in FIG. 1.

An elongated rod-like contact pin 58, which may be of brass, is arranged to be rigidly supported by the housing 14. Pin 58 has a slotted male contact portion 60 formed at one end and disposed within the housing bore 26 where it is accessible from the front thereof, and its other end portion is threaded from its other end 62 to approximately the mid-point of the pin to receive means for clamping the contact on the sleeves-housing assembly and the latter on the panel. When so disposed, as illustrated in FIG. 1, the threads 64 on the pin extend from the rear side of the housing and sleeves through the counterbore 28 and into the bore 26 at which point a nut 66, which may be of brass, is threadedly mounted thereon and arranged to contact the shoulder 68 formed at the front of the housing flange 20 where the housing bore and counterbore meet. At the rear side of the housing-sleeves assembly the contact end 62 projects through the counterbore 28 beyond the hub 22, and the following elements are mounted in sequence on the contact end portion as follows: a thin ring-like washer 70 made of a fibrous electrical insulating material; a thin ring-like washer 72 of smaller diameter and made of a metallic material, such as brass, and a nut 74 which is also made of a metallic material, such as brass, and threaded onto the threads 64 at the pin end 62. As can be best seen in FIG. 1, the washers 70, 72 and the nut 74 are arranged to be slid over the pin end 62, and the internal diameter of the washer 70 is approximately that of the openings 54, 56 of the sleeve flanges 42, 48, respectively, and arranged to partially seat on the housing hub 22 but to slightly axially overlap beyond the hub.

The outer diameter of the washer 70 is approximately that of the main cylindrical portions of the sleeves 34, 36.

When fully mounted on a panel, the elements of our improved jack or receptacle mounting are structurally associated as illustrated in FIG. 1, and the following should be noted: the rear side of the flange 40 of sleeve 34 is disposed in surface contact with an annular rim portion 76 at the front side of panel 10 about the opening 12, and the main cylindrical portion 38 of this sleeve extends rearwardly through said opening to the rear side of the panel where a major portion of it rearwardly projects. The front side of the flange 46 of the sleeve 36 is disposed in surface contact with an annular rim portion 78 at the rear side of panel 10 about the opening 12. Therefore, when the sleeves are so mounted relative to the panel 10, their flanges 40 and 46 make firm surface contact with the annular front and rear rim portions of the panel around the opening 12. In this regard, the main cylindrical portions of sleeves 34, 36 are dimensioned so as to slightly space their flanges 42, 48 from each other in order to insure a tight fit of the flanges 40, 46 on the panel at this time with the sleeves so mounted.

It should be noted that in order to effectuate this mounting of the sleeves on the panel, sleeve 34 must be inserted through the opening 12 from the front of the panel 10, and sleeve 36 must be slid onto the main cylindrical portion 38 of the sleeve 34 from the rear of the panel until the sleeve flanges 40, 46 make firm surface engagement with opposite sides of the panel 10, it being noted in this regard that these flanges have a larger diameter than the opening 12, and that the main cylindrical portion of sleeve 34 has an outer diameter that is slightly less than that of said opening. At this time, the housing 14 is slid into the sleeve 34 from the front of the panel until the rear shoulder 50 on its flange 18 engages the front side of flange 40 of the sleeve 34, at which time, due to the dimensioning of the housing, its hub 22 projects axially through and to the rear of the aligned openings 54, 56 of the flanges 42, 48 of the sleeves. The contact pin 58, with the clamping nut 66 threadedly mounted thereon on its thread 64 in the approximate position which it will finally occupy, shown in FIG. 1, has its rear end 62 inserted from the front of the panel into the housing through the bore 26 into the counter-bore 28 and therethrough to project axially rearwardly into the interior of the instrument until the clamping nut 66 makes firm surface contact with the shoulder 68 on the housing flange 20. At this time, the washers 70, 72 and clamping nut 74 are sequentially mounted from the rear end 62 of the contact pin 58 in that order and moved into their final position illustrated in FIG. 1. At this time, clamping nut 74 is axially adjusted to axially force the housing, sleeves and washers 70, 72 together between the clamping nuts 66 and 74 on the contact pin; during such action, the washer 70 axially compresses. It should be particularly noted that the contact pin 58 and all its associated elements which are made of electrical conducting material, namely, the clamping nuts 66, 74 and washer 72, are electrically isolated from the metallic mounting sleeves 34, 36 and the panel 10.

In view of the foregoing, it will be apparent that we have provided an improved mounting for an electrical jack or receptacle on an instrument panel wherein: a unitary plastic housing is employed that may be made of a basic color and have color-coded washer inserts readily attached to the front thereof so as to be visible from the front of the instrument panel; a pair of strong metal sleeves are associated with the housing and the panel so as to mount the housing thereon and relieve it of all structural strain and stress, and once the sleeves-housing assembly is mounted on the panel, it normally is dismountable solely from the rear of the panel. Our im-

proved mounting produces an arrangement wherein: failure of the plastic housing is substantially eliminated, as contrasted with prior art mountings wherein this is likely; disassembly cannot be effected from the front of the panel, and therefore, the mounting is safer than prior art arrangements, and color-coding may be effected economically and readily by utilizing housings of the same basic color with color-coded washer inserts, thereby eliminating the necessity which existed in prior art arrangements of having at all times a rather large supply of housings of different colors.

As will be evident from the foregoing description, certain aspects of our invention are not limited to the particular details of construction of the example illustrated, and we contemplate that various and other modifications and applications will occur to those skilled in the art. For example, the opening in the panel and cross-sectional shape of the sleeves and housing have been described as circular, which is the preferred form; however, other non-circular cross-sectional shapes could be employed. It is, therefore, our intention that the appended claims shall cover such modifications and applications as do not depart from the true spirit and scope of our invention.

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

1. In a panel-mounted electrical connector: a housing made of electrical insulation material and having an outwardly extending transverse flange at one end thereof; a pair of rigid sleeves configured and dimensioned to telescopically nest; each of said sleeves having an outwardly extending flange, which flanges are disposed at adjacent ends and spaced when the sleeves are nested so as to be disposable on opposite sides of a panel on which the connector is to be mounted by extending through an opening therein; said housing configured and dimensioned to nest within the inner of said sleeves and be supported thereby; an electrical contact member including a threaded portion extending through the assembly of said sleeves and housing; clamping nut means on said threaded portion on opposite sides of the assembly to thereby rigidly mount said contact member on the assembly and the entire assembly together and on the panel; and means for electrically isolating said contact member from said sleeves.

2. The device of claim 1 wherein said housing and sleeves are cylindrical and their flanges are circular, whereby the assembly is arranged to be mounted in a circular opening of the panel.

3. The device of claim 1 wherein the flange of said housing has a front face with a recess formed therein and a color-coded insert is mounted in said recess.

4. The device defined in claim 1 wherein said sleeves have adjacent inwardly extending flanges with aligned openings; said housing has an inwardly extending flange with an apertured hub on which the latter sleeve flanges seat and through which said contact member extends; a washer of resilient electrical insulating material is disposed adjacent the outermost of the latter sleeve flanges on said contact member; and one of said clamping nut means is disposed adjacent the side of the inwardly extending flange of said housing remote from said sleeve flanges and the other adjacent said washer.

5. The combination of: a plate-like panel having a circular opening and an electrical connector mounted on said panel in said opening, said connector comprising: a cylindrical housing made of a plastic electrical insulating material and having a main cylindrical portion of less diameter than said opening, a circular radially outwardly extending flange of greater diameter than said opening at one axial end, and a radially inwardly extending flange at the other end which terminates in a short apertured axially extending hub; a cylindrical metallic sleeve having a main cylindrical portion of slightly greater diameter than that of the main cylindrical portion of said housing but slightly less than that of said opening, a circular radially outwardly extending flange of greater diameter than said opening at one axial end, and a radially inwardly extending flange having a central opening of slightly greater diameter than said hub at the other end, whereby said sleeve is adapted to telescopically receive said housing in such manner that it nests within it with their flanges contiguous and said central opening disposed about said hub; the nested housing and sleeve adapted to be inserted through said opening with their radially outwardly extending flanges on one side of the panel, a second metallic sleeve similar in configuration to said sleeve but dimensioned to telescopically slide onto said sleeve from the other side of the panel and have its radially outwardly extending sleeve contact a rim portion of said opening at the other side of said panel and its radially inwardly extending flange seated on said hub adjacent the radially inwardly extending flange of said sleeve; an elongated contact member extending through said housing hub and having a securing means and a contact portion on one side of the radially inwardly extending housing flange, and an insulating washer and securing means on the side of the radially inwardly extending flange of said second sleeve, whereby said securing means are adapted to simultaneously mount said contact member on said housing and sleeves and mount the entire connector assembly on said panel by forcing the radially outwardly extending flanges of said sleeves into surface engagement with annular rim portions on opposite sides of said panel.

References Cited by the Examiner

UNITED STATES PATENTS

1,193,252	8/16	Freeman	339—130
1,514,457	11/24	Gross	339—130 X
1,565,313	12/25	Douglas	339—130
1,658,862	2/28	Slade	339—129
2,253,593	8/41	Warren	339—130 X
2,700,144	1/55	Flanagan	339—130 X
2,874,365	2/59	Woofter	339—128 X
2,938,109	5/60	Coleman	339—183

FOREIGN PATENTS

614,808	9/26	France.
61	11/13	Netherlands.

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