United States Patent

[11] 3,601,780

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[21] Appl. No. **27,041**
[22] Filed **Apr. 9, 1970**
[45] Patented **Aug. 24, 1971**

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[54] **THREE-POINT CONTACT ELECTRICAL CONNECTOR ASSEMBLY**
4 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** ..... **339/192,** 339/198 R
[51] **Int. Cl.** **H01r 33/72**
[50] **Field of Search** ..... 339/196 A, 198, 242, 276 F, 14, 185, 190, 192, 193 VS; 310/71

[56] **References Cited**

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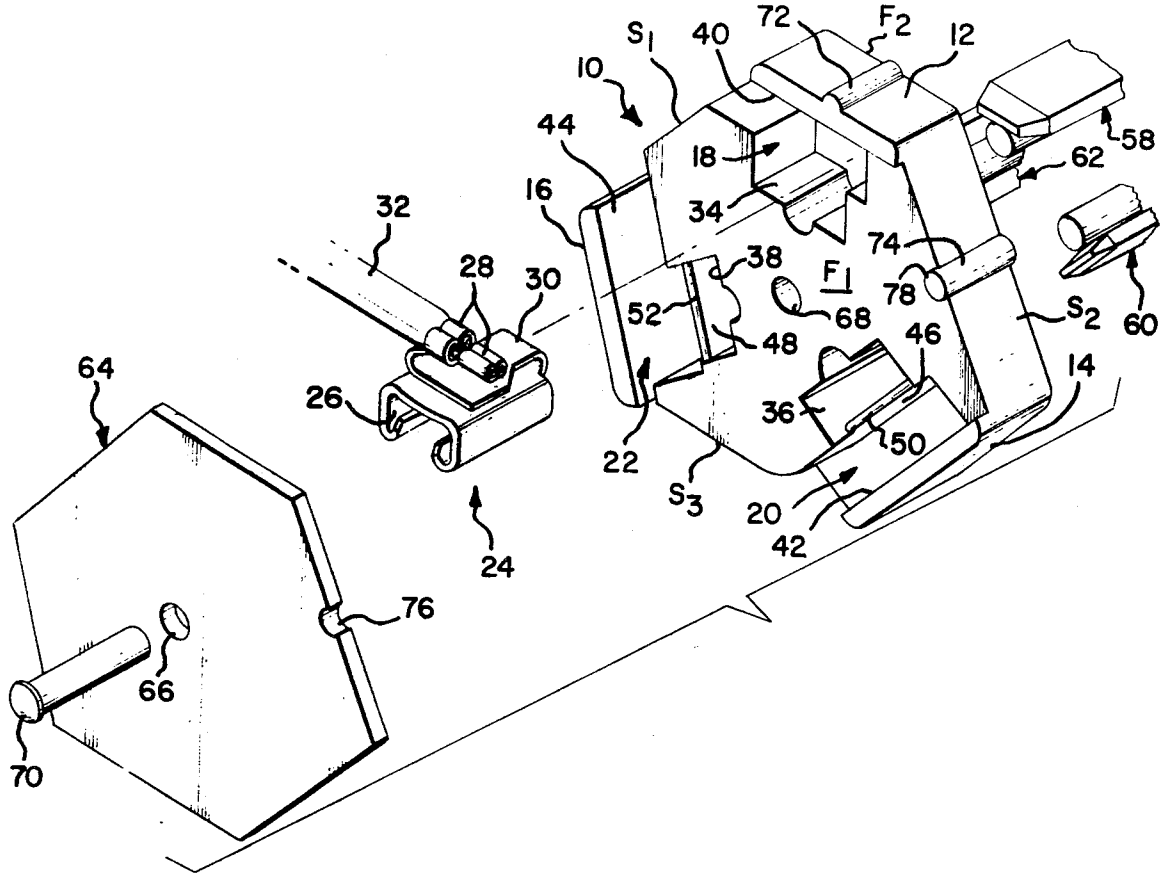
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ABSTRACT: Disclosed is an electrical connector assembly having three receptacle connectors located therein for mating contact with a three-terminal male connector hermetically mounted in a motor housing or the like. One of the receptacle connectors is retained in the triangular-shaped housing in a reversed position relative to the other two receptacle connectors so that the wire conductor connected thereto exits the housing toward the other two wire conductors to form a Y-configuration.



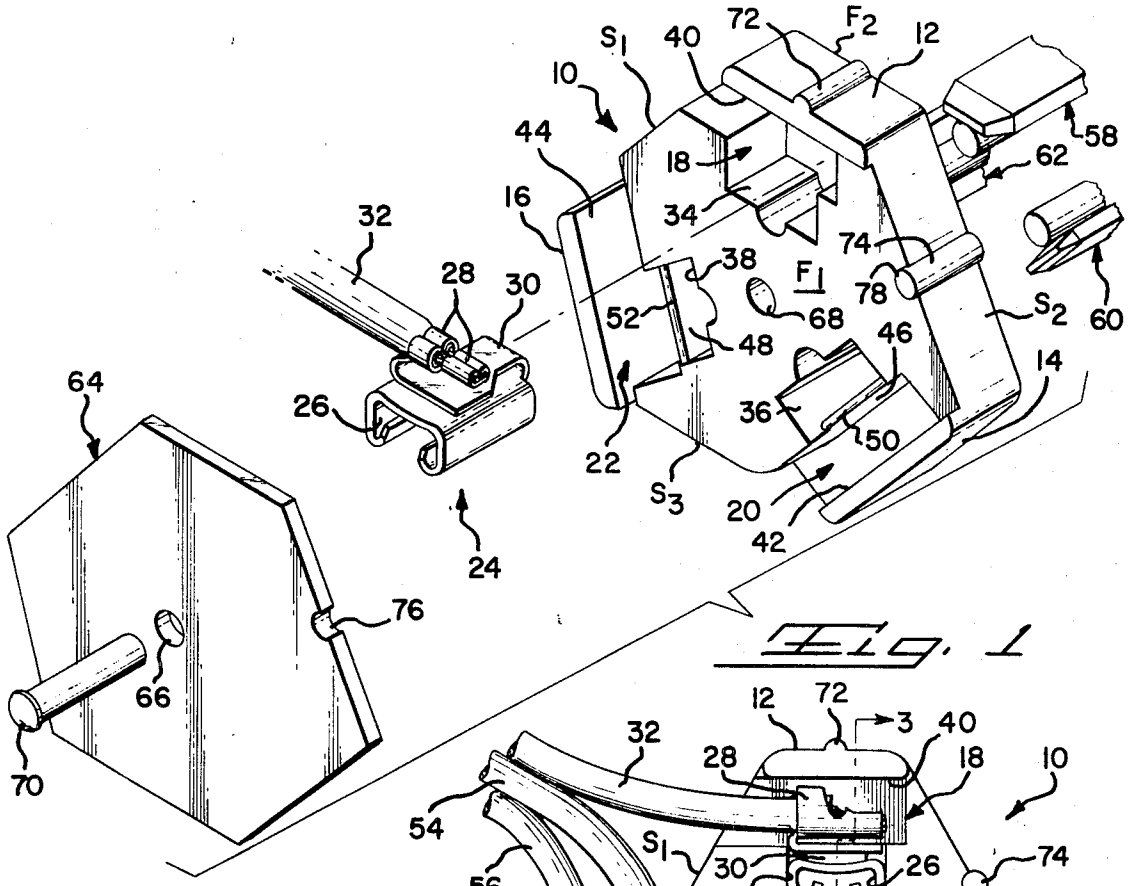


Fig. 1

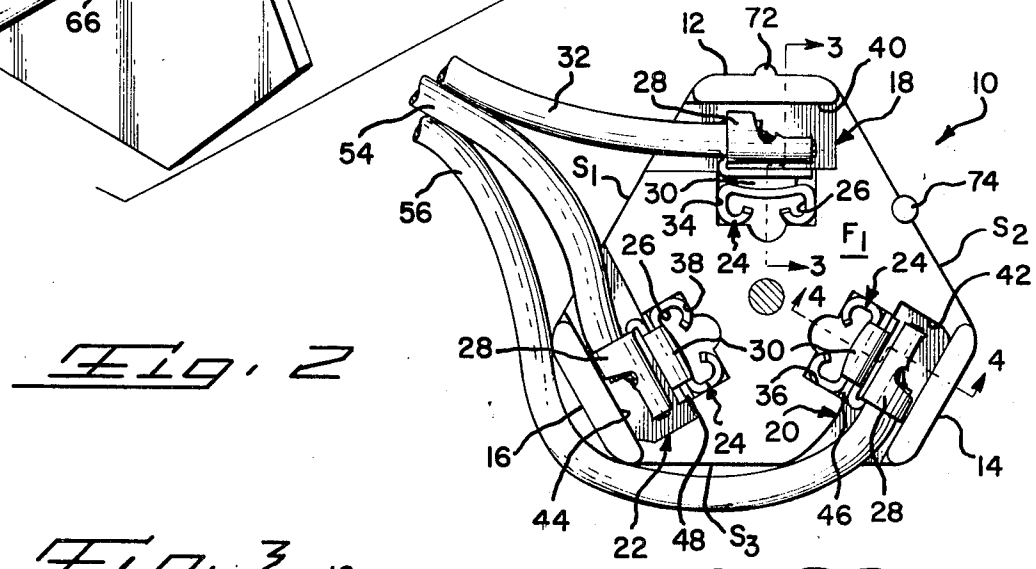
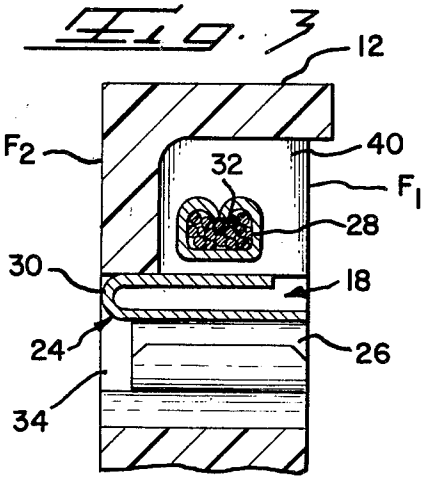


Fig. 2

Fig. 3



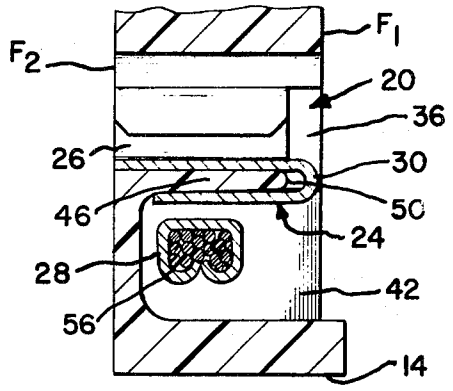


Fig. 4

THREE-POINT CONTACT ELECTRICAL CONNECTOR ASSEMBLY

This invention relates to a connector assembly having three electrical receptacle connectors therein for making contact with three similarly positioned contact pins. This type of assembly is adaptable for use in many electrical environments, but primarily intended for mating contact with the hermetically sealed connector of a refrigerant compressor motor. Such a connector should be small, take up a minimum of space, have wire conductors exiting thereof of minimum length, and of a configuration so as to eliminate the possibility of connecting the connectors contained therein to the wrong contact pins.

Accordingly, it is an object of the present invention to provide a connector assembly wherein minimum length wire conductors can be used.

It is an additional object to provide a connector assembly wherein the chance of improper connection due to improper orientation of the housing relative to the contact pins is eliminated when the minimum length wire conductors are used.

In accordance with the above objects, the connector assembly is of a generally triangular shape having three cavities located therein radially outward of the center towards the apexes of the housing. The cavities each have a receptacle receiving portion which generally straddles the line bisecting the respective angle or apex of the housing. Extending generally normal to said line is a wire barrel and wire conductor receiving portion which exits to the periphery of the housing to accommodate a wire conductor. Two cavities exit in one circumferential direction, for example, clockwise, and the third cavity exits in the opposite direction or counterclockwise. Such a cavity relationship allows for the wire conductors to exit the housing in a Y-configuration with two conductors exiting a common side of the housing. With these two conductors of a length that is the minimum required to achieve connection of the assembly, the housing cannot be rotated and an improper connection is prohibited. Centrally located of the housing is an aperture for receiving a screw or rivet, which in turn functions to secure a flat cover plate to the housing to cover that side of the housing from which the wire conductor and receptacle connectors are introduced.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there is shown and described an illustrative embodiment of the invention; it is to be understood, however, that this embodiment is not intended to be exhaustive nor limiting of the invention but is given for purposes of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

In the drawings:

FIG. **1** is an exploded isometric view of the preferred embodiment of the invention showing one of the three receptacle connectors and fragmentarily showing a three-terminal connector to which the assembly is connected;

FIG. **2** is an orthographic view of the rear face of the housing with the cover plate removed showing the positions of the three receptacle connectors and the Y-configuration of the exiting wire conductors;

FIG. **3** is a sectional view taken along lines **3—3** of FIG. **2**; and

FIG. **4** is a sectional view taken along lines **4—4** of FIG. **2**.

Turning now to FIG. **1**, the connector housing is generally indicated by the numeral **10**. The housing **10** is of a generally triangular shape with the three apexes being blunt and of a generally flat surface configuration, as indicated by the numerals **12**, **14** and **16**. These flat surfaces are generally normal to the bisecting line of each angle or apex of the triangular housing.

Located outwardly of the central portion of the housing toward each flat surface **12**, **14** and **16** are connector cavities **18**, **20** and **22**, respectively. Each cavity receives a connector **24**, one of which is shown in FIG. **1**. Each connector **24** has a receptacle portion **26**, a wire barrel portion **28**, and an interconnecting portion **30** which, in conjunction with the outer side of receptacle **26**, comprises a generally U-shaped web. As shown, the connector **24** has been crimped to a wire conductor **32**.

With reference again to the cavities, each has a receptacle receiving portion **34**, **36** and **38**, and a wire conductor and wire barrel receiving portion **40**, **42**, **44**. The portions **34**, **36** and **38** communicate between the opposite faces F_1 and F_2 of the housing as seen in FIGS. **1**, **3** and **4**, whereas portions **40**, **42** and **44** are open only to face F_1 and sides $S_1$and S_3. Side S_2 has no cavities communicating therewith whereas side S_1 has two cavities, **18** and **22**, communicating therewith. The cavities **20** and **22** have a wall **46**, and **48** separating the receptacle and wire barrel receiving portions of the respective cavities. Each wall has a recessed edge as at **50** and **52**. The walls with their recessed edges receive the U-shaped web as seen in FIGS. **2** and **4** and facilitate stabilizing the connectors within the cavities. Cavity **18** does not have such a wall since the connector **24** is placed in the cavity in a reversed position relative to the connectors in the other two cavities **20**, **22**. This reversed position, in cross section is shown in FIG. **3**.

With the relative positioning of the cavities and connectors as shown in FIG. **2**, a Y-configuration of exiting wire conductors is achieved. This positioning and configuration allows **32**, **54** and **56** to be of the least possible length to achieve a connection from a nearby point to the respective pin-tab terminals **58**, **60** and **62** of a three-terminal connector. With this arrangement the wire conductor **32** resists clockwise rotation, and the wire conductors **54**, **56** resist counterclockwise rotation of the housing **10** to such an extent that rotation in either direction is minimal and relatively nonexistent; it being obvious that rotation of the housing of 120° is required to achieve an improper connection. Adapted to cover face F_1 is a cover plate **64** having an aperture **66** generally centrally thereof. This aperture lines up with aperture **68** which communicates between faces F_1 and F_2. These two apertures **66**, **68** receive a screw or rivet **70** which secures the plate **64** to face F_1. Located on flat surface **12** and side S_2 are ribs **72**, **74** which cooperate with grooves (not shown) in the body (not shown) containing the pin-tab terminals and act as a polarizing means to prevent a housing not having a cover plate thereon from being plugged in from the wrong side. Because the distance from aperture **68** to surface **12** is slightly greater than the distances from aperture **68** to surfaces **14** and **16**, plate **64** has a notch **76** therein to align with tee extended portion **78** of rib **74** so that apertures **66** and **68** will always align.

Thus it is seen that applicants have provided a novel invention wherein the wire conductors, when of the proper length, will prevent improper orientation of the housing because of their Y-configuration.

It will, therefore, be appreciated that the aforementioned and other desirable objects have been achieved; however, it should be emphasized that the particular embodiment of the invention, which is shown and described herein, is intended as merely illustrative and not as restrictive of the invention.

We claim:

1. An electrical connector assembly for making a three-point connection to a three-terminal connector wherein each terminal comprises a post having a flat tab tangentially affixed thereto, said connector assembly comprising a dielectric housing of substantially triangular shape having opposed generally parallel faces, three cavities in said housing spaced radially outwardly from the center portion of said housing, an electrical connector disposed in each of said cavities, each connector including a receptacle for receiving said flat tab, a wire barrel for receiving a wire conductor, and a substantially U-shaped web interconnecting said receptacle and said wire barrel, said cavities each comprising a first portion for receiving said wire barrel and a second portion for receiving said recep-

tacle, said first portion being open to a first one of said opposed faces, and open to a peripheral side of said housing to accommodate said wire conductor, said second portion being open to both said opposed faces and communicating therebetween, two of said cavities having a wall separating said first and second portions, said wall having an edge recessed from said first face, said wall and edge receiving said U-shaped portion of said connector, the remaining cavity having unseparated first and second portions, said first portions of said remaining cavity and one of said two cavities being open to a common peripheral side of said housing.

2. An electrical connector as set forth in claim 1 wherein the connector in said remaining cavity is reversed in position relative to the other connectors, whereby conductors connected with such connector and one of said other connectors exit said housing in a common side thereof in a Y-configuration.

3. An electrical connector as set forth in claim 2 wherein the conductor of the second of said other connectors exits said housing in a second side thereof at an acute angle thereto in a path which lies adjacent the conductor of said one other connector.

4. An electrical connector as set forth in claim 3 wherein said first opposed face is covered by a cover plate, said cover plate and housing having commonly aligned apertures therethrough, and securing means located in said apertures securing said plate to said housing.