

[54] **JUNCTION SHELL**

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[51] **Int. Cl.** **H01r 13/58**

[58] **Field of Search**... 339/107, 103 R, 103 M, 104, 339/105

[56] **References Cited**

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[57]

ABSTRACT

An electrical connector junction shell comprising a housing having an opening therein through which a cable extends. A first clamp engages the cable inside the housing. A second clamp is provided for clamping the cable outside of the housing in a position at a right angle to the axis of the opening. Thus, the cable may extend either straight or at a right angle with respect to an electrical connector mounted in the shell. The clamps may be self-locking cable ties.

4 Claims, 10 Drawing Figures

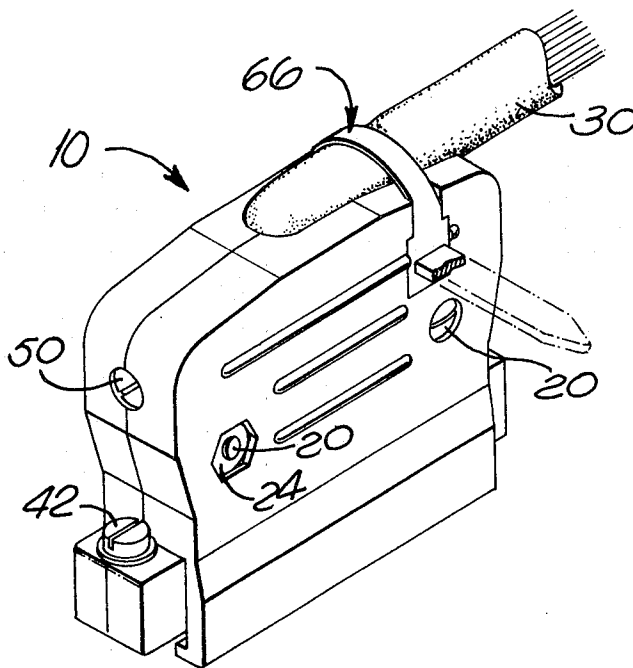


Fig. 2.

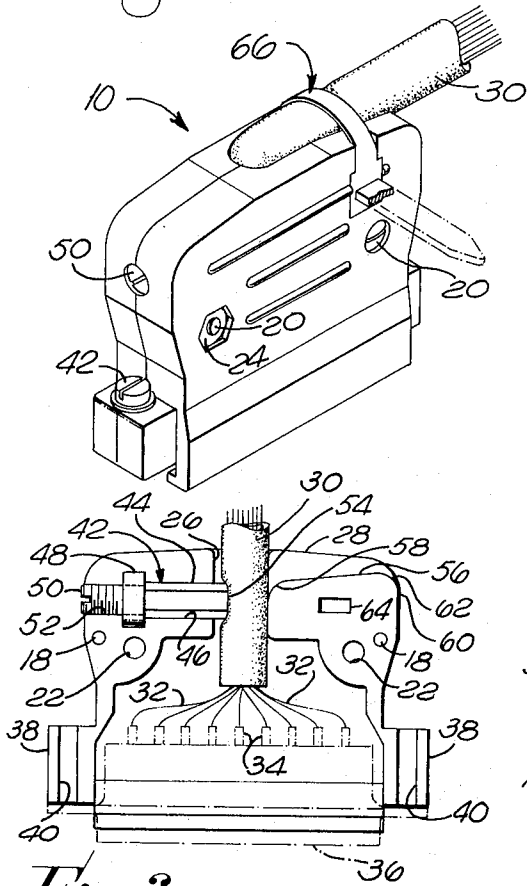


Fig. 1.

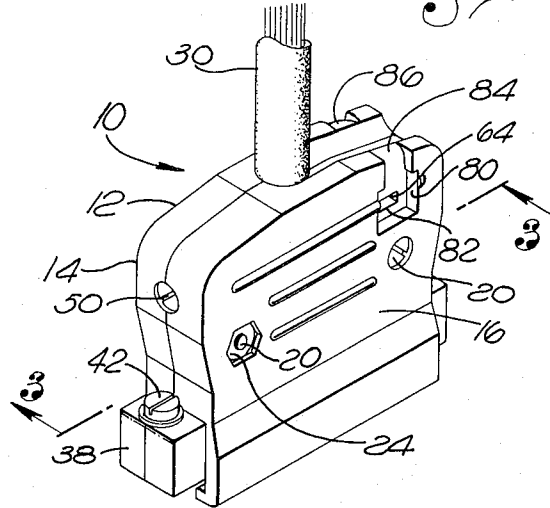


Fig. 3.

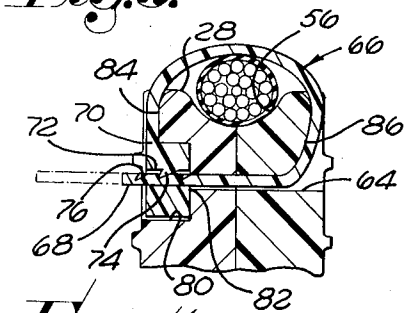


Fig. 6.

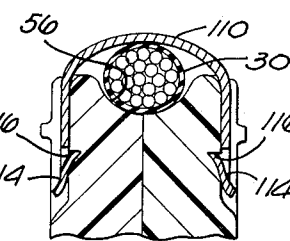


Fig. 5.

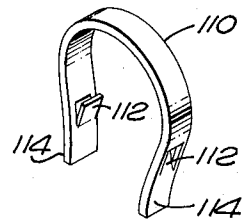


Fig. 4.

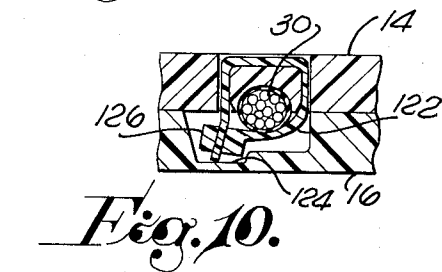


Fig. 8.

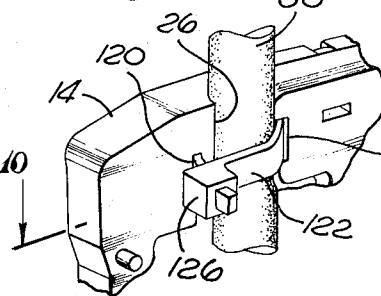


Fig. 7.

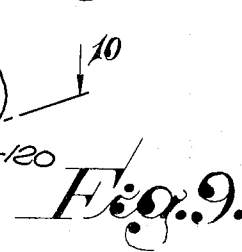
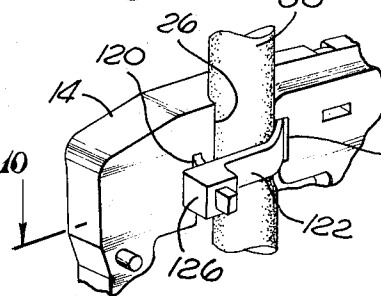


Fig. 9.



JUNCTION SHELL

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

The present invention relates generally to an electrical connector junction shell and, more particularly, to such a shell which allows a cable extending therefrom to be clamped in two positions angularly displaced from one another.

2. DESCRIPTION OF THE PRIOR ART

Present electrical connector junction shells allow the cables which are mounted therein to be held in only one position with respect to the electrical connectors mounted in the shells. Typically, the cable extends either straight from the connector or at a right angle with respect thereto. As a compromise, some shells are designed so that the cable extends at a 45° angle with respect to the connector. Since the prior art shells permit the cables to extend in only a single direction from the shells, it has been necessary to provide different shells depending upon the particular direction in which it is desired to have the cables extend. Thus, what is desired and constitutes the principal object of the present invention is a novel junction shell which allows the cable therein to be held in more than one position, preferably straight and at right angles with respect to the electrical connector mounted in the shell.

SUMMARY OF THE INVENTION

According to the principal aspect of the present invention, there is provided an electrical connector junction shell comprising a housing having an opening therein through which a cable is adapted to be extended. First clamping means is provided which is engageable with the cable inside the housing for clamping the cable thereto. A second clamping means is provided for clamping the cable outside the housing, if desired, in a position at an angle to the axis of the opening in the housing. Preferably, such angle is 90° with respect to such axis. Thus, the cable may be extended either in a straight direction or at a right angle with respect to the electrical connector mounted in the shell. Hence, a single junction shell may be employed for providing either straight or right angle cable connections to the connector.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of one embodiment of the junction shell of the present invention with the cable extending straight therefrom and the outside clamp removed;

FIG. 2 is a perspective view similar to FIG. 1 showing the outside clamp holding the cable at a right angle;

FIG. 3 is a vertical sectional view taken along line 3—3 of FIG. 1, with an electrical connector shown in phantom in the shell;

FIG. 4 is a fragmentary vertical sectional view taken through the outside clamp illustrated in FIG. 2;

FIG. 5 is a perspective view of a modified form of the outside clamp of the present invention;

FIG. 6 is a sectional view similar to FIG. 4 showing the clamp illustrated in FIG. 5 holding the cable in a right angle position;

FIG. 7 is a perspective view of still a further form of the outside clamp of the present invention;

FIG. 8 is a sectional view similar to FIG. 4 illustrating the clamp shown in FIG. 7 holding the cable in a right angle position;

FIG. 9 is a fragmentary perspective view of one half of the shell of another embodiment of the present invention wherein a self-locking cable tie is utilized to clamp the cable inside the shell housing; and

FIG. 10 is a horizontal sectional view taken along line 10—10 of FIG. 9 with both halves of the shell housing being shown.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1-4, in detail, wherein like reference characters designate like parts through the various views, there is illustrated one form of the junction shell of the present invention, generally designated 10. The shell 10 comprises a vertically split housing 12 providing two half sections 14 and 16. Preferably, the sections 14 and 16 are injected molded plastic parts. A pair of alignment pins 18 are formed on the inside face of the housing section 14 for engagement in suitable apertures, not shown, formed in the inside face of section 16. Screws 20 extend through a pair of openings 22 in the housing. A nut 24 is threaded upon each screw to secure the two sections of the housing together.

A vertically extending opening 26 extends through the upper wall 28 of the housing 12. An electrical cable 30 extends through this opening and the conductors 32 thereof are connected to contacts 34 extending from the upper surface of an electrical connector 36, shown in phantom, positioned in the bottom of the shell.

Flanges 38 are formed at opposite ends of the lower portion of the housing 12. Vertically extending passages 40 are formed in the flanges which receive screws 42 which serve to mount the shell to the connector 36.

An inside clamp, generally designated 42, is provided in the shell 10 for holding the cable 30 against the wall of the opening 26. This clamp comprises a clamp bar 44 which is slidably mounted in a horizontally extending passage 46 which opens at the wall of the vertical opening 26. A square nut 48 is mounted in a suitable square cavity formed in the housing 12 behind the passage 46. A set screw 50 is positioned in a passage 52 behind the nut 48 and concentric with the passage 46. Threading of the set screw 50 into the nut 52 shifts the clamp bar 44 in a rightward direction as seen in FIG. 3 to bring the end 54 of the clamp bar into firm engagement with cable 30 so that the cable is tightly clamped between the bar 44 and the wall of the opening 26. As seen in FIGS. 1 and 3, with the cable clamped by means of the inside clamp 42 only, the cable extends vertically from the upper wall 28 of the shell 10. Thus, as described so far, the invention provides what is termed in the art as a straight junction shell.

According to the invention, the shell is designed so that the cable may be held at a right angle, as illustrated in FIG. 2, to provide a right angle junction shell. To this end, a concave elongated channel 56 is formed in the upper wall 28 of the housing 12. The surface of this channel extends at a generally right angle to the axis of the opening 26 which receives the cable 30. A relatively smooth convex surface 58 joins the bottom of the channel 56 to the wall of the opening 26 to avoid any sharp edges which might damage the cable 30. The

other end of the channel 56 extends to the edge 60 of the housing wall. Preferably, the junction of the channel 56 and the edge 60 is curved as indicated at 62.

A passage 64 extends through the housing 12 at a position spaced from the opening 26 and generally normal to such opening and to the channel 56. After the cable 30 is bent at a right angle to lie in the channel 56 as seen in FIG. 2, a self-locking cable tie 66 is extended through the passage 64 and wrapped around the cable to hold the same in such right angle position. The cable tie 66 is of a type well known in the art and comprises a flexible plastic strip 68 which terminates at one end in a head 70. A passage 72 extend through the head 70 and an integral resilient finger 74 extends into the passage. This finger engages teeth 76 which are formed on one surface of the strip 68. The teeth 76 and finger 74 are designed so that strip 68 may be pulled through the opening 72 in the head 70 of the cable tie in one direction to close the loop of the tie but prevent withdrawal of the strip in the opposite direction. Preferably, a square recess 80 is formed in the outside of the housing section 16 adjacent the opening 82 of the passage 64 for receiving the head 70 of the cable tie so that the outer surface of the head is flush with the outer surface of the housing section 16. A groove 84 is formed in the outside wall of housing section 16 and extends from the cavity 80 to the upper surface of the upper wall 28 of the housing. A vertically extending groove 86 is also formed in the outside wall of the housing section 14 and extends from the passage 64 to the upper surface of the upper wall 28 of the housing. The strip 68 of the cable tie lies in these grooves. Thus, the resilient strip 68 of the cable tie may be firmly seated and retained in the housing 12 to securely clamp the cable 30 at a right angle with respect to the axis of the opening 26 in the housing.

It is preferred that when outside clamp 66 is employed, the inside clamp 42 is also used as a strain relief clamp for the cable.

FIGS. 5 and 6 illustrate a modified form of the outside clamp of the invention. In this embodiment the outside clamp, generally designated 90, comprises a pair of generally U-shaped metallic elements 92. The upper legs 93 of these elements are somewhat bowed and formed with vertical flanges 94 at their ends. Vertically extending tabs 98 are provided on the lower legs 100 of the elements 92. A recess 102 in the housing 12 opens at the upper surface of the passage 64 in the housing thereby providing a pair of vertical shoulders 104. The height of the passage 64 is sufficiently great to allow the lower legs 100 of the clamp elements 92 to be inserted into the passage. When the legs 100 are inserted in the passage, they are raised so that the tabs 98 engage the shoulders 104. A screw 105 passing through openings in the flanges 94 of the clamp elements 92 is threadably engaged into a nut 106 to pull the two sections 92 of the clamp together and thus exert a downward pressure upon the cable 30 thereby clamping the cable to the housing in a right angle position.

FIGS. 7 and 8 illustrate still further embodiment of the outside clamp of the invention. In this embodiment, the clamp, generally designated 110, comprises an inverted U-shaped spring element formed with inwardly extending tangs 112 on the legs 114 thereof. These tangs engage suitable recesses 116 formed in the outer surfaces of the housing sections 14 and 16 when the

spring clamp element 110 is forced over the upper wall of the housing 28. The clamp 110 holds the cable 30 in the channel 56.

FIGS. 9 and 10 show a modified form of an inside clamp which may be utilized in the junction shell of the invention. In this embodiment, the housing section 14 of the shell is formed with a pair of horizontally extending passages 120 positioned on opposite sides of the openings 26. A self-locking cable tie 122, similar to the element 66, is extended through the passages 120 and around the cable 30 to hold it in fixed position within the housing as seen in FIG. 9. A recess 124 is formed in the housing section 16 to receive the head 126 of the cable tie.

Although I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiments, it is recognized that departures may be made therefrom within the scope of my invention which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent structures and devices.

What is claimed is:

1. An electrical connector junction shell comprising: a vertically split hollow housing comprised of a pair of half sections, said housing defining an electrical connector receiving recess opening at the bottom thereof;

means for releasably securing said housing half sections together;

a vertically extending opening in said housing extending from said recess to the upper wall of said housing, said opening being adapted to receive a cable therethrough having conductors therein for connection to said connector, said opening being defined by complementary recesses formed in the opposed surfaces of said housing half sections;

first clamping means engageable with the cable inside said housing for clamping the cable to said housing;

said housing upper wall being formed with a concave channel extending from said opening to the edge of said wall, said channel being adapted to receive said cable when bent at a right angle with respect to said opening axis, a relatively smooth convex surface joining said opening and said channel, said channel being defined by complementary grooves formed in the opposed upper surfaces of said housing half sections; and

second clamping means for clamping said cable in said channel when bent at said right angle, said second clamping means extending transversely over said channel and being releasably attached to said housing.

2. A junction shell as set forth in claim 1 wherein at least one of said clamping means comprises:

a self-locking cable tie.

3. A junction shell as set forth in claim 1 wherein: a passage extends through said housing spaced from said opening and generally normal to said opening axis; and

said second clamping means extends into said passage.

4. A junction shell as set forth in claim 3 wherein: said second clamping means comprises a self-locking cable tie having a head at one end provided with a passage which receives the other end thereof.

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