United States Patent

[11] **3,571,782**

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[73] Assignee **Pulse Communications, Inc. Falls Church, Va.**

[54] **MOISTURE AND DUST PROOF COVER FOR AN ELECTRICAL CONNECTOR AND TOOL FOR APPLYING SAME**
3 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **339/116,** 339/211
[51] **Int. Cl.** **H01r 3/02**
[50] **Field of Search** 339/26, 60, 116, 211

[56] **References Cited**

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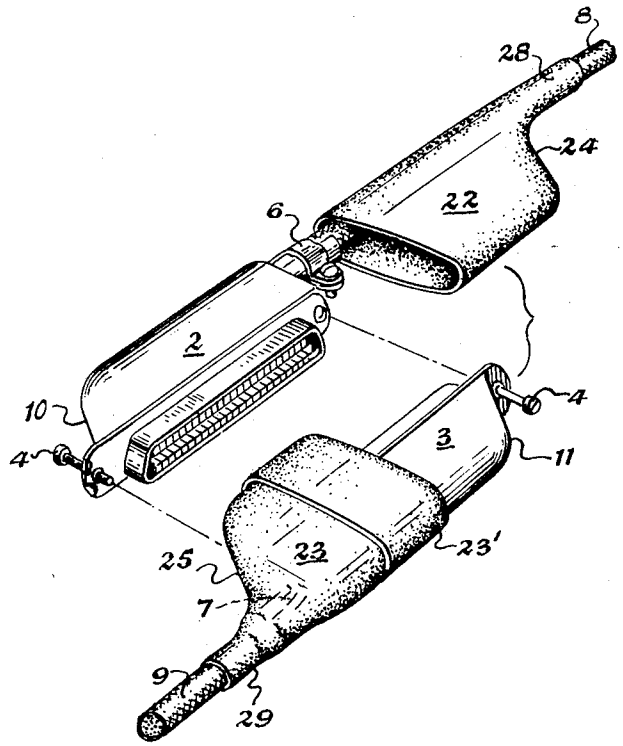
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Primary Examiner—Ernest R. Purser
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ABSTRACT: A cover for a two part electrical connector including a pair of open ended elastic film sleeves each adapted to be stretch drawn over one of the connector parts, such that when the connector parts are assembled the sleeves may be overlapped to form a moisture and dustproof sealing cover.



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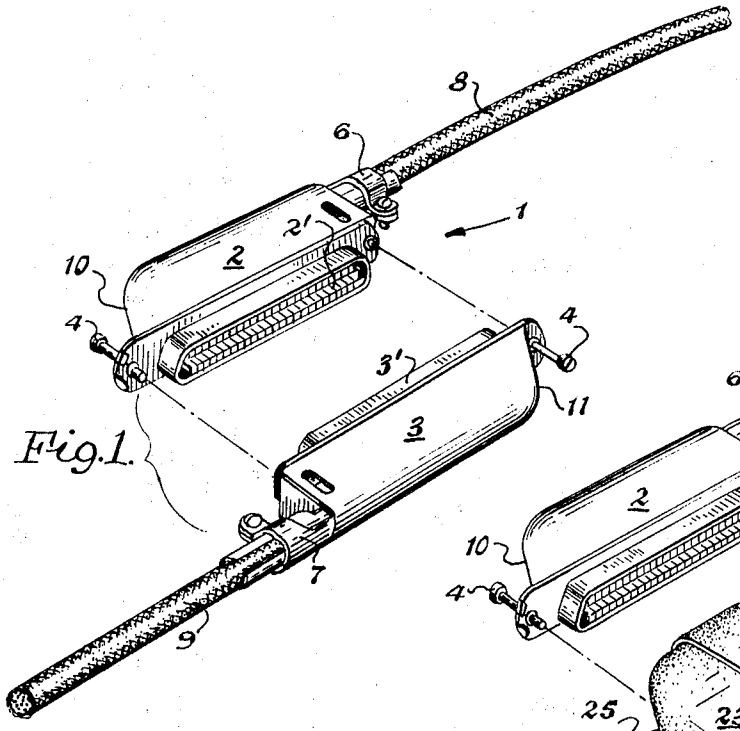


Fig.1.

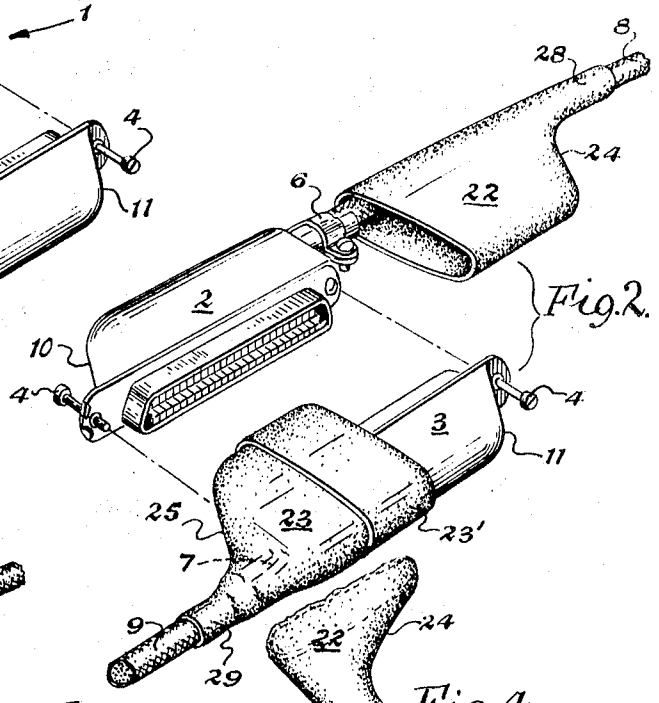


Fig.2.

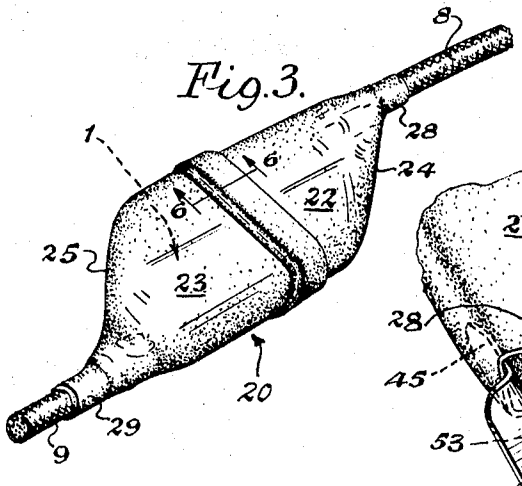


Fig.3.

Fig.4.

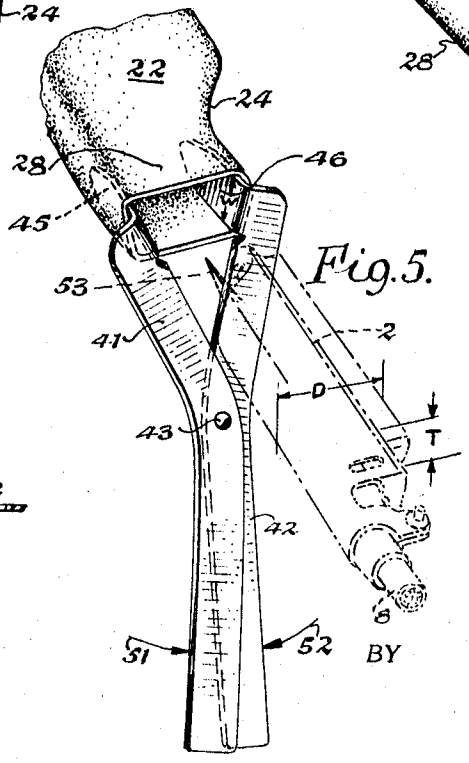
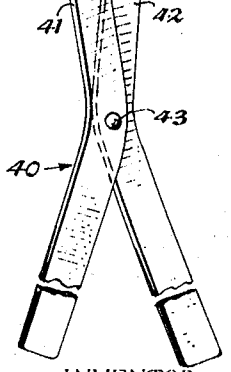


Fig.5.



Fig.6.



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MOISTURE AND DUST PROOF COVER FOR AN ELECTRICAL CONNECTOR AND TOOL FOR APPLYING SAME

SUMMARY OF THE INVENTION

The present invention is broadly directed to a moisture and dustproof cover which may be applied to an electrical connector on the job without requiring the respective parts of the connector to be disconnected from previously attached cables, lead wires or the like. More specifically, the cover of the present invention is particularly adapted for use with amphenol connector-plug assemblies associated with key telephone sets and call directors in situations, where high moisture conditions adjacent the assembly, such as would result from a floor mopping operation, would otherwise render associated telephones vulnerable to an out-of-service condition.

The cover includes a pair of open ended elastic film sleeves, which when in a nonstretched condition, generally conform to the outer configuration of parts of an electrical connector to which they are to be applied. The individual sleeves are of sufficient length to permit them when applied to overlap each other and to snugly grip the cables attached to the respective parts of the connector.

The present invention is also directed to a special applicator tool in the general form of a reverse opening pair of pliers, which is adapted to be used to stretch the cover parts and assist in drawing same over the connector parts.

DRAWING

The structure and mode of operation of the electrical connector cover of the present invention will now be more fully described in the following detailed description taken with the accompanying drawings in which:

FIG. 1 is a perspective view of a two part electrical connector with parts separated;

FIG. 2 is a view similar to FIG. 1, but showing the cover parts in various stages of application;

FIG. 3 is a perspective view showing the cover applied to an assembled connector;

FIGS. 4 and 5 are views illustrating use of the applicator tool in various stages of cover application; and

FIG. 6 is a sectional view taken generally along the line 6–6 of FIG. 3.

DETAILED DESCRIPTION

In FIG. 1 there is illustrated an amphenol connector-plug assembly 1, of the type conventionally associated with key telephone sets and call directors, not shown. It will be understood that the specific construction of assembly 1 forms no part of the present invention and that it is shown only for purposes of illustration as including cooperation male part 2 and female part 3, which are adapted to have their mating surfaces 2', 3' maintained in assembled relationship by screw type fasteners 4. Connector parts 2 and 3 are formed with suitable clamps 6, 7, for the purposes of securing to the parts, cables, lead wires or the like 8, 9, respectively.

It will be noted in the construction illustrated, the ends of the outside housings for parts 2 and 3 are tapered, as at 10, 11, so as to provide unobstructed access to screws 4. Thus, when parts 2 and 3 are assembled, the connector becomes of a general rhomboidal configuration, wherein cables 8 and 9 are arranged in a spaced, parallel relationship and connected into opposite ends of the connector.

In FIG. 3 connector assembly 1 is shown as having applied thereto a cover 20 formed in accordance with the present invention. Cover 20 includes a pair of cover parts 22, 23, which are in the form of open ended sleeves formed of a suitable elastic material, such as latex. The cover parts may be fabricated in any desired manner, such as by a dip-molding operation.

Preferably, the cover forming material is at least semitransparent, so as to facilitate visual identification of the connector without the need for removing the cover or providing markings thereon.

It is also preferable to form cover parts 22, 23 such that they, as best shown in the case of part 22 in FIG. 2, generally conform to the configuration of the assembly to be covered, when in nonexpanded or stretched condition. This facilitates both application of the cover parts and proper sealing thereof with respect to each other and to cables 8 and 9 as will hereinafter be described. Thus, cover parts 22, 23 are tapered inwardly from one side thereof as at 24, 25 in order to generally conform to the respective ends of assembly 1, and to define small mouth neck portions 28, 29, which are aligned with cables 8, 9, respectively, at their points of attachment to the connector.

The main body portions or large mouth ends of cover parts 22, 23 and neck portions 28, 29 are dimensioned so as to snugly grip assembled connector parts 2, 3 and cables 8, 9, respectively, when stretched thereover as shown in FIG. 3.

While in the embodiment illustrated, cover parts 22, 23 are of identical construction, it will be understood that such parts may be dissimilar, particularly in an instance wherein the assembly to be protected is not symmetrical in design.

Cover 20 may be readily applied to assembly 1 by an applicator tool, generally designated as 40. Tool 40 is in the general form of a reverse opening pair of pliers and includes a pair of identically configurated handle elements 41, 42 of generally V-shaped design, which are pivotally connected adjacent the apexes thereof by pivot pin 43. A pair of guide or expansion fingers 45, 46 are formed integrally with or otherwise affixed to the upper ends of the handle elements 41, 42 at an angle of 90° thereto, such that when the handle elements are in their inoperative or open position, as shown in FIG. 4, the facing surfaces of the fingers are disposed in abutting engagement. Preferably, the free ends of fingers 45', 46' are smoothly tapered or curved to facilitate entrance thereof into either of cover part neck portions 28, 29.

Referring particularly to FIG. 5, it will be understood that for proper functioning of applicator tool 40, it is necessary for fingers 45, 46 to be of a width W, which is equal to or greater than the thickness T of the individual connector parts, and for handle elements 41, 42 to be shaped, such that when pivoted in the direction indicated by arrows 51, 52 towards their operative or closed position, the spacing between facing surfaces of fingers 45, 46 is equal to or greater than the depth D of the individual connector parts. It will also be understood that handle elements 45, 46 are fully closed when the lowered ends thereof are disposed in aligned overlying relationship.

The manner of applying cover 20 will be apparent by referring to FIGS. 2—6; FIG. 4 illustrating the first or initial stage wherein handle elements 41, 42 are arranged in their inoperative position and positioned in alignment with the neck portion of one of the cover parts, such as part 22. Thereafter, neck portion 28 is stretch-drawn over fingers 45, 46 sufficiently to permit the free ends of the fingers to extend inwardly of the large mouth end portion of the cover part. Handle elements 41, 42 are then manually squeezed together, as indicated by arrows 51, 52, in order to close the handle elements and effect spreading of fingers 45, 46. When fingers 45, 46 are in their spread condition, neck portion 28 is stretched sufficiently to permit passage of connector part 2 freely therethrough between fingers 45, 46, as indicated by arrows 53, inwardly of the large mouth end portion. Then, by manually gripping parts 2 and 22, the fingers may be pulled from neck portion 28 in order to permit the latter to contract into snug fluid-sealing engagement with cable 8. Preferably, before removing fingers 45, 46 care is taken to insure that connector part 2 is rotatably positioned with respect to cover part 22, such that when the connector parts are subsequently assembled, tapered portion 24 is aligned with the tapered housing wall 11 of connector part 3. Otherwise, the snug fit between neck portion 28 and cable 8 may prevent readily rotatable adjustment of the parts with the result that the cover 20 will be improperly fitted.

By referring to FIG. 2, it will be understood that the connector parts may be passed fully through the cover parts, as indicated in the case of part 2. Alternatively, as indicated in the case of connector part 3, such parts need only be inserted through a distance sufficient to permit neck portion 29 to grip cable 9 immediately adjacent clamp 7. The former practice is preferred, since connector part 2 is uncovered and thus immediately ready for assembly with part 3. In the latter practice, the applied cover parts must be folded back upon themselves to permit fastening of screws 4. connector and back folded upon itself as indicated at

The above procedure is repeated with cover part 23 and connector part 3, whereafter the connector parts are assembled by screws 4. After assembly, one of the cover parts, such as part 23 is stretch-drawn over the assembled connector and back folded upon itself as indicated at 23' in FIG. 2. Thereafter, cover part 22 is stretch-drawn over the other end of the assembled connector, such that its end is positioned in overlapping engagement with back folded portion 23'. An effective moisture and dust seal may now be obtained between the cover parts by back folding the overlapping portions of cover parts 22, 23 to form the five ply tortous path seal shown in FIGS. 3 and 6. Each time the cover parts are overlapped, they are further expanded or stretched with a resultant increase in the effectiveness of the seal formed therebetween. However, it will be understood that in most installations, the mere overlapping of adjacent marginal edges of the large mouth end portions of the sleeves will, without back folding, provide a satisfactory moisture and dust seal.

I claim:

1. A moisture and dust cover for an assembly including a two part electrical connector and cables attached one to each of the connector parts, said cover being adapted to be applied to said assembly while said cables are affixed to said connector parts, said cover comprising,

a pair of open ended elastic sleeves adapted to be stretch-drawn one over each of said connector parts and cables connected thereto, each said sleeve having a large mouth end portion and a small mouth neck end portion, said neck end portions being dimensioned so as to snugly engage one about each of said cables to form a fluid seal therebetween, said large mouth end portions being dimensioned such that when applied to the assembled connector parts said end portions are adapted to snugly engage thereabout, and said large mouth portions when applied being adapted to be overlapped along adjacent marginal edges thereof by folding to provide a five ply tortuous path seal therebetween.

2. A moisture and dust cover for an assembly including a two part electrical connector and cables connected thereto, said connector being characterized by having when assembled, a generally rhomboidal configuration with said cables being arranged in a spaced parallel relationship and connected one into each of said connector parts at opposite ends of said connector, and said connector parts being assembled along mating surfaces extending between said connector ends, said cover being adapted to be applied to said assembly while said cables are connected to said connector parts, said cover comprising;

a pair of open ended elastic sleeves adapted to be stretch-drawn one over each of said connector parts and cables connector thereto, each said sleeve having a large mouth end portion and a small mouth neck end portion, neck portions being dimensioned so as to snugly engage one about each of said cables to form a fluid seal therebetween, said large mouth portions being dimensioned such that when applied to the assembled connector parts said large mouth portions are adapted to snugly engage thereabout, and said large mouth portions when applied being adapted to be overlapped along adjacent marginal edges thereof at a point intermediate said connector ends to form a fluid seal therebetween.

3. A moisture and dust cover according to claim 2, wherein said sleeves when in nonexpanded condition taper inwardly from one sidewall thereof intermediate said end portions thereof, such that said sleeves generally conform to said connector configuration.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,571,782 Dated March 23, 1971

Inventor(s) Lee J. Colbert, deceased, by Dolores B. Colbert Executrix

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 47, "lowered" should read -- lower --. Column 3, lines 10 and 11, cancel "connector and back folded upon itself as indicated at". Column 4, line 24, before "neck second occurrence, insert -- said --.

Signed and sealed this 30th day of November 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Acting Commissioner of Paten