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P. O. BOLLING
WIRE CONNECTOR UNIT
Filed April 2, 1965

3,283,061

FIG. 1

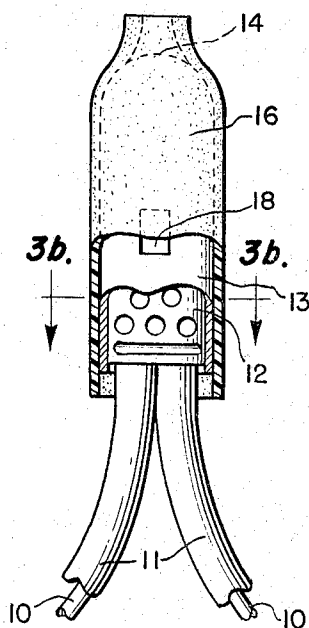


FIG. 2

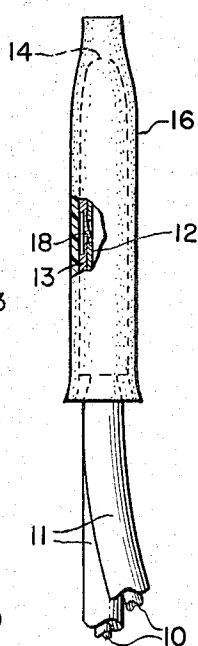


FIG. 3a

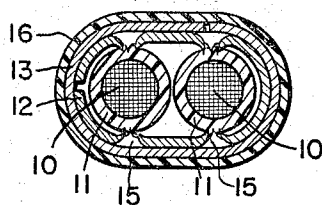


FIG. 3b

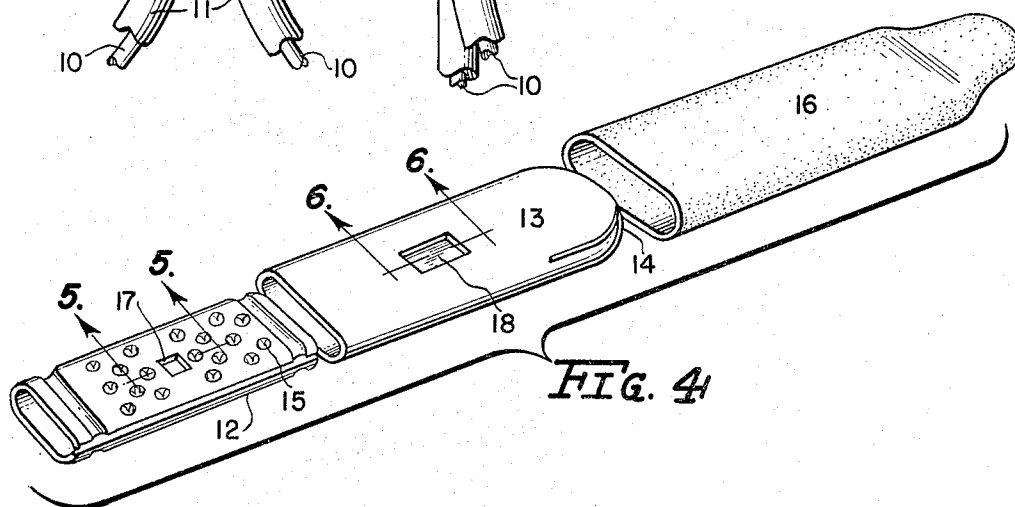
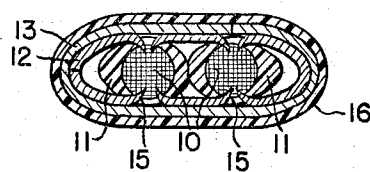


FIG. 4

FIG. 5

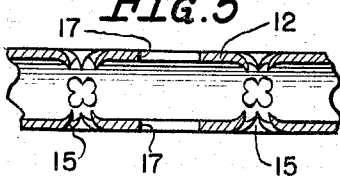


FIG. 6

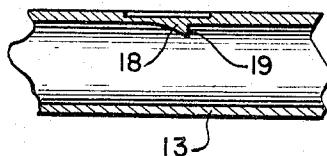
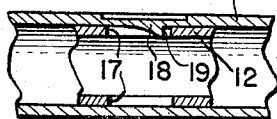


FIG. 7



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3,283,061

WIRE CONNECTOR UNIT

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5 Claims. (Cl. 174-87)

This invention relates to a connector unit for electrically connecting insulated wires wherein said unit includes a metallic sleeve adapted to be deformed into crimping engagement with the conductor cores of the wires inserted in said sleeve via inwardly extending teeth formed in said sleeve which are forced through the insulation layer of said wires when the sleeve is so deformed. In connector units of this type forces to deform the sleeve into such crimping engagement with the cores of the wires therein is transmitted thereto via a tubular metallic sheath in which the sleeve has a snug slide fit and an outer coating of insulating material having physical characteristics of transmitting such forces to said sheath and said sleeve without rupturing said coating.

It is an object of the present invention to provide novel means for permanently retaining the sleeve within the sheath so as to overcome stresses which may be applied to the wires contained in the sleeve tending to cause withdrawal of the sleeve from the sheath.

Other objects of the present invention will become apparent from the description to ensue which, taken with the accompanying drawing, will disclose a preferred mode of carrying the invention into practice.

FIG. 1 is a view illustrating a connector unit embodying the features of the present invention wherein said unit is shown as applied to a pair of wire conductors and in a final deformed state.

FIG. 2 is a view showing the unit as it appears when turned about its longitudinal axis through an angle of 90 degrees relative to its position as shown in FIG. 1.

FIG. 3^a is an enlarged transverse section through the connector unit wherein said unit is shown as applied to a pair of wire conductors and preparatory to deformation.

FIG. 3^b is a sectional view taken along line 3^b-3^b of FIG. 1.

FIG. 4 is an exploded view in perspective of the connector unit of this invention.

FIG. 5 is a fragmentary longitudinal section taken along line 5-5 of FIG. 4.

FIG. 6 is a similar section taken along line 6-6 of FIG. 4.

FIG. 7 is a similar section showing the elements appearing in FIGS. 5 and 6 when in operatively assembled relation.

Referring more particularly to the drawing, numeral 10 designates the electrical conductor core of a pair of wire leads each having a covering 11 of insulating material in connection with which a connector unit embodying the features of this invention is operative to establish a conductively joined assembly.

A split open-ended sleeve 12 is defined by a blank of relatively thin tempered sheet metal stock folded upon itself. The sleeve 12 is of uniform generally ovate transverse cross-sectional contour so as to present a pair of relatively flattened wall areas at opposite sides of a central plane containing the maximum transverse dimension of the sleeve. A split metallic sheath 13 preferably formed of sheet metal stock having a thickness of four times the thickness of the metal stock of the sleeve 12 provides an outer tubular member of such matching cross-sectional contour as to accept the sleeve 12 therein in either of two 180-degree apart turned positions about the longitudinal axis of the sleeve 12 via an entrance at one end of said sheath and to provide for a relatively snug slide fit between the sleeve and the sheath. A wall 14

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closing the end of the sheath 13 opposite the entrance to the area within the sheath serves as a seat or stop against which the innermost end of the sleeve 12 bears to fix the inwardmost position of the sleeve in the sheath. When thus seated within the sheath, the sleeve 12 is totally within the confines of the sheath.

Openings formed in spaced apart areas of the sleeve 12 each have burred edges which define teeth 15 that extend inwardly of the area within the sleeve. As shown in FIG. 3^b the teeth 15 are forced through the insulation 11 of the wire leads inserted in the sleeve through pressure applied externally against the sheath 13 and the sleeve 12 in response to which the sleeve is deformed into crimping engagement with the wire leads and the sheath 13 and the sleeve 12 thereby establish an electrically conductive connection between the cores 10 of said wire leads via said sleeve 12 and sheath 13.

The sheath 13 is tightly enclosed within a layer 16 of insulating material such as nylon or the like which is capable of withstanding the compression force applied to the sheath 13 and the sleeve 12 to effect deformation thereof without rupturing said coating 16.

As shown in FIG. 5, opposite walls of the sleeve 12 within a central area separating the areas containing the teeth 15 is provided with a recess 17. When the sleeve 12 is fully seated within the sheath 13, according to the rotated position of the sleeve 12 relative to the longitudinal axis thereof, a projection 18 formed in the sheath 13 (as shown in FIG. 6) presents a shoulder 19 which engages an edge portion of the recess 17 to thereby obstruct relative movement of the sleeve 12 in a direction toward the entrance to the sheath 13. Thus the projection 18 on the sheath and the cooperating recess 17 of the sleeve 12 furnish retaining means effective to prevent withdrawal of the sleeve 12 from the sheath 13 under stresses applied to the wires contained in the sleeve which otherwise tend to cause such release of the sleeve from the sheath. It will be observed from FIG. 7 that the projection 18 presents an inwardly inclined surface or ramp in the direction of movement of the sleeve toward a seated position within the sheath so as to facilitate sliding movement of the sleeve over said surface incident to entry of the sleeve within the confines of the sheath. By thus providing for the retention of the sleeve against withdrawal from the sheath, the sheath may be oversized sufficiently to assure easy entry to the sleeve within the sheath and thereby the problem of maintaining extremely close tolerances is greatly reduced. The appreciably greater thickness of the material forming the body of the sheath in relation to the thickness of the material of the sleeve provides added resistance to any subsequent deformation of the sleeve while the sleeve and the sheath are operatively interlocked via the projection 18 and the recess 17. It will also be apparent that under the compressive force applied to deform the sheath and the sleeve into crimped engagement with the wires to effect a conductive junction of the cores of said wires via the teeth 15 of the sleeve 12, the projection 18 and the recess 17 containing said projection will likewise be further brought into positive engagement to thereby assure maximum resistance to withdrawal of the sleeve from an installed position within the sheath.

While a certain specific embodiment of this invention has been illustrated and described, it will be understood that this is by way of illustration only, and that certain changes and modifications may be made within the contemplation of this invention and within the scope of the following claims.

What is claimed is:

1. A wire connector unit for electrically connecting two insulated wires, said connector unit including a sleeve of

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deformable metal composition, a tubular sheath of deformable metal composition in which said sleeve is disposed with snug slide fit, said sheath having an open end through which said sleeve has entry to the area within said sheath and having a closed end against which said sleeve is seated to establish a fully confined position of said sleeve within said sheath, said sleeve having two areas thereof spaced apart lengthwise of its longitudinal axis provided with inwardly extending teeth which cut through the insulation of a pair of insulated wires inserted in said sleeve to engage the conductor core of said wires when said sleeve is deformed into engagement with said wires, an inwardly extending projection on said sheath, a recess in said sleeve in which said projection is received, said recess presenting an edge which engages said projection to prevent withdrawal of said sleeve from said fully confined position within said sheath, and a coating of insulation material enclosing said sheath except for the open end thereof, said coating being composed of material having the quality of transmitting forces therethrough to deform said sheath and said sleeve without rupture of said coating.

2. A wire connector unit according to claim 1 wherein said sheath has a wall thickness of approximately four times the wall thickness of the sleeve.

3. A wire connector unit according to claim 1 wherein

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said sleeve is of uniformly ovate cross-sectional contour throughout substantially the full length thereof and said sheath is of such cross-sectional contour throughout a portion of its length commensurate with the full length of the sleeve as to accept said sleeve therein in only either of two 180 degree apart turned positions about the longitudinal axis of the sleeve.

4. A wire connector unit according to claim 1 wherein said recess in the sleeve occupies an area of the wall of said sleeve intermediate the areas containing said teeth, and midway of opposite ends of the sleeve.

5. A wire connector unit according to claim 1 wherein said recess in the sleeve occupies an area of one wall of said sleeve midway of opposite ends of the sleeve and a like recess occupies an area of the other wall directly opposite said first recess.

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DARRELL L. CLAY, *Examiner*.