April 18, 1944. T. W. DRURY 2,346,831

ELECTRIC CONNECTION MEANS

Filed June 15, 1943

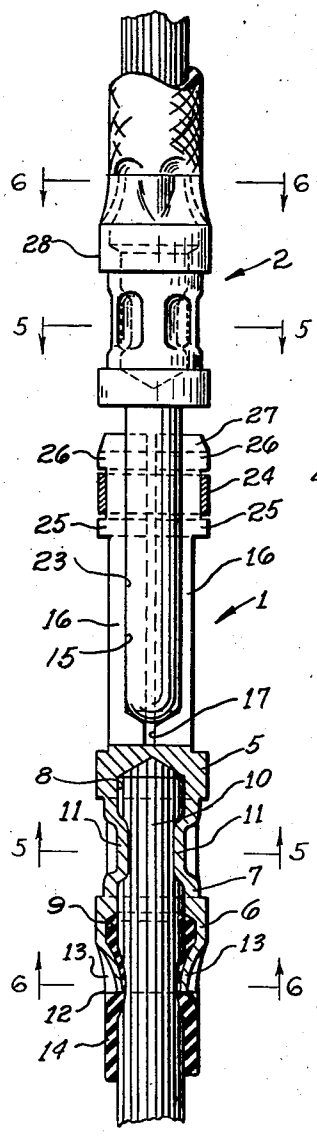


FIG.-1.

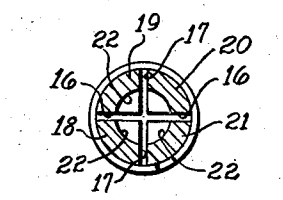


FIG.-4.

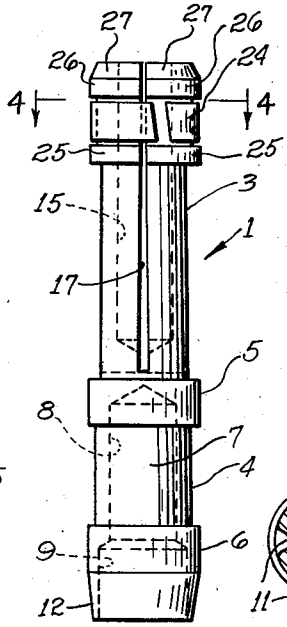


FIG.-2.

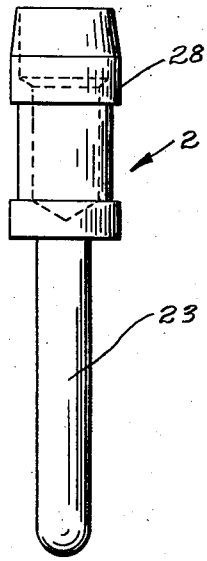


FIG.-3.

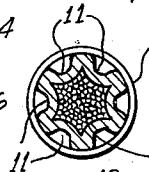


FIG.-5.

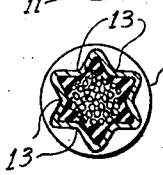


FIG.-6.

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## ELECTRICAL CONNECTION MEANS

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Application June 15, 1943, Serial No. 490,927

2 Claims. (Cl. 173—363)

This invention relates generally to electrical connection means and more particularly has to do with means for detachably connecting together a pair of conductors.

One important object of the invention is to provide a terminal receptacle having a plurality of elongated longitudinally extending resilient portions, which portions are adapted to engage terminal means throughout substantially its entire length.

Another object is to provide auxiliary resilient means for urging the longitudinally extending portions toward each other so as to improve the gripping upon the terminal means.

A further object is to provide the receptacle means with means whereby the resilient means above referred to may be easily assembled with the receptacle means, and so that the resilient means is locked in position.

A still further object of the invention is to provide each of the receptacle means and terminal means with corresponding tubular means for receiving conductors in a manner whereby the conductors may be desirably secured thereto.

Other objects and advantages of the invention will be apparent after considering the description hereinafter set forth in conjunction with the drawing annexed hereto.

In the drawing:

Figure 1 is a side view of the receptacle means and terminal means with certain parts in section in order to better illustrate certain of the principles of design and construction;

Figure 2 is a side view of the receptacle means illustrated in Figure 1;

Figure 3 is a side view of the terminal means illustrated in Figure 1;

Figure 4 is a section taken substantially on line 4—4 of Figure 2 illustrating certain details of construction and the relation of the resilient means with the receptacle means; and

Figures 5 and 6 are sections taken substantially on lines 5—5 and 6—6 of Figure 1 disclosing the manner in which the terminal means and receptacle means are adapted to be permanently secured to the conductors.

The electrical connection means includes among other things receptacle means generally designated 1 and plug conductor terminal means generally designated 2 which are adapted to be permanently affixed to the conductor wires.

The receptacle means generally designated 1 is provided with an elongated receptacle 3 at one extremity and with a tubular extremity 4. The tubular extremity 4 includes a pair of annular portions or abutments 5 and 6 of substantially the same diameter and an intermediate cylindrical restricted portion 7. The extremity 4 is provided with a cylindrical bore 8 which is countersunk at 9. The bore 8 extends substantially throughout the entire length of the extremity 4 and is adapted to receive the bared end 10, of a stranded conductor and the countersink 9 the covering or insulation about the conductor.

The outside diameter of the bared end of the conductor wire is preferably slightly less than the diameter of the bore 8, so that the bared end is snugly received within the bore. The wall defining the intermediate restricted portion 7 is preferably swaged at 11, as illustrated in Figures 1 and 5. Six swages have proven very satisfactory to obtain a good electrical and mechanical bond between the receptacle means and the conductor wire but any number may be employed. Each of the swages 11 preferably takes the form of an indented longitudinally extending channel portion.

The free end or skirt portion 12 of the extremity 4 of the receptacle means is preferably slightly tapered and swaged or crimped at 13 in a plurality of places, preferably six, as illustrated in Figures 1 and 6 in a manner whereby to compress the insulation or covering 14 about the wire and at the same time reduce the wire to a smaller diameter. The tapered skirt has been found very satisfactory because it can be fashioned to accomplish the desired results. The swages 13 provide means whereby to alleviate any strain that may be placed on the electrical and mechanical connection established by the swages 11. Also, since the bore 8 is closed at its inner end the swages 13 provide a fluid tight connection which functions to seal and protect the connection formed by the swages 11.

The receptacle 3 is preferably of a length somewhat greater than one-half the length of the receptacle means generally designated 1 and is preferably generally tubular and cylindrical in shape. The receptacle 3, among other things, is constructed from round bar stock and is fashioned by first providing the same with an elongated cylindrical bore 15 and the cylindrical wall formed thereby is then split by providing the same with a pair of longitudinally extending narrow aligned slots or kerfs 16 and a similar pair of aligned slots 17, all of which are of a length substantially corresponding to the length of the receptacle 3. Each pair of slots is diametrically disposed and arranged substantially at right angles with respect to each other. The

receptacle 3 is thus comprised of four elongated longitudinally extending generally sectoral portions 18, 19, 20, and 21, each of which is more or less trough or channel shaped in cross-section whereby to provide a relatively smooth arcuate contact surface 22; which surfaces are adapted to yieldably bear against the outer surface of the cylindrical terminal or prong portion 23 of the terminal means generally designated 2.

The receptacle means generally designated 1 is made from resilient stock and as a consequence the longitudinally extending portions 18 through 21 are sufficiently flexible or resilient to yieldably grip the terminal portion 23 of the terminal means 2, but in order to improve the gripping action the free end of the receptacle 3 is provided with resilient means 24, in the form of a split annular ring, generally rectangular in cross-section, which surrounds the receptacle in a manner whereby the extending portions 18 through 21 are urged toward each other or centripetally, so that the free extremities of the extending portions are held closer together than at any other point throughout the length of the receptacle. More specifically, the contact surfaces 22 taper or converge toward the free extremity of the receptacle 3 as clearly illustrated in Figure 2. Moreover, due to the fact that the ends or bases of the slots 16 and 17 terminate at points beyond the end of the bore 15, those portions of the longitudinally extending portions which engage the terminal prong 23 are made resilient throughout their entire lengths. In other words, none of the portions of the receptacle 3 which engage the prong are static.

The resilient means 24 may be held in place about the receptacle in any desirable manner but as herein illustrated each of the longitudinally extending portions 18 through 21 is provided with an outwardly extending flange 25, which flanges form a generally annular enlargement. Each of the portions 18 through 21 is also provided with an outwardly extending flange 26 spaced from the flange 25. The flanges 26 also form a generally annular enlargement of a diameter substantially corresponding to that of the enlargement formed by the flanges 25, including the annular portions 5 and 6. As the consequence, the receptacle is provided with a generally cylindrical restricted portion between the enlargements formed by the flanges 25 and 26. The restricted portion between the annular enlargements formed by the flanges or abutments 25 and 26 is of a diameter substantially corresponding to the diameter of the restricted tubular portion 7 and that portion of the receptacle means between the portion 5 and the flanges 25 is preferably of a diameter slightly less than that of the portion 7.

In order to assist in assembling the annular resilient ring 24 with the receptacle 3 the generally annular enlargement formed by the flanges 26 is chamfered as indicated at 27. The free end of the receptacle 3 is thus more or less frustro-conical in shape.

Referring now more in detail to the terminal means 2, the same is preferably constructed from round rod stock of some desirable material. One extremity is reduced in size to provide the prong or terminal portion 23 above referred to, which terminal portion 23 is preferably of a uniform diameter throughout its entire length. It is adapted to be snugly received between the longitudinally extending portions 18 through 21 which form the receptacle 3. More specifically, the arcuate contact surfaces 22 of the extending portions 18 through 21 are adapted to frictionally engage the cylindrical surface of the terminal prong 23. It will be noted that when the prong 23 is seated in the receptacle 3 the extending portions, particularly the free extremities thereof, will be moved outwardly to a position whereby they are arranged substantially in parallel relation; or in other words, the contact surfaces 22 engage the cylindrical surface of the prong 23 throughout their entire lengths. By this arrangement a plurality of contacting surfaces are uniformly pressed into intimate contact with the prong 23 whereby to provide a good electrical and mechanical connection between the means generally designated 1 and 2.

The terminal prong 23 of the terminal means 2 is preferably of a length somewhat greater than the length of the bore 15 of the receptacle 3 and as a consequence the rounded end of the prong 23 is adapted to engage the end of the bore 15 to limit inward movement of the terminal means 2. The rounded end also assists in piloting the prong 23 into the bore 15 or passage formed by the extending portions 18 through 21.

The terminal means 2 is provided with a tubular extremity 28 which corresponds with the tubular extremity 4 of the receptacle means 1 and therefore, a further description in this connection is not deemed necessary. It will also be manifest that except for those portions of the receptacle means and terminal means to which the conductors are connected, the receptacle means and terminal means engage each other throughout their entire lengths.

Accordingly, it will be evident that means have been provided whereby to provide a good detachable electrical and mechanical connection.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of the invention; and, therefore, I do not wish to be understood as limiting myself to the exact form, construction, arrangement, and combination of parts herein shown and described.

I claim:

1. Terminal receiving means, said means being constructed from a solid bar or stock material, said material being substantially cylindrical throughout its length and provided with a pair of annular abutments adjacent each extremity which abutments extend outwardly with reference to the remainder of the material between the two pairs of abutments, one extremity of said means having an inwardly extending first bore so that the extremity between one pair of abutments is made tubular to receive the bared end of an insulated conductor wire, said first bore being countersunk to receive the insulation on the wire, a second bore extending inwardly from the other extremity of the means, said means being split longitudinally at said other extremity and to a point beyond the end of said second bore and terminating in close proximity to the innermost abutment at the said one extremity whereby the wall defining the second bore is divided into four resilient corresponding sections of substantially uniform thickness between said innermost abutment and the innermost abutment of the other pair of abutments, and means surrounding the said other extremity between the abutments thereat functioning to normally hold the sections in converging relation and thereby assist in clamping the sections about an elongated terminal adapted to be projected between the sections.

2. Terminal receiving means, said means being

constructed from a solid bar or stock material, said material being substantially cylindrical throughout its length and provided with a pair of annular abutments adjacent each extremity which abutments are substantially of the same diameter and extend outwardly with reference to the remainder of the material between the two pairs of abutments and between each pair of abutments, one extremity of said means having an inwardly extending first bore so that the extremity between one pair of abutments is made tubular to receive the bared end of an insulated conductor wire and permit the wall or material between the abutments to be distorted into the wire, said first bore being countersunk to receive the insulation on the wire, the free end portion of said one extremity being tapered so that same may be crimped onto the insulation, a second bore extending inwardly from the other extremity of the means, said means being split longitudinally at said other extremity and to a point beyond the end of said second bore and terminating in close proximity to the innermost abutment at the said one extremity whereby the wall defining the second bore is divided into four resilient corresponding sections of substantially uniform thickness between said innermost abutment and the innermost abutment of the other pair of abutments and the outside diameter of the wall is less than the outside diameters of the material or stock between each pair of abutments, and means surrounding the said other extremity between the abutments thereat functioning to normally hold the sections in converging relation and thereby assist in clamping the sections about an elongated terminal adapted to be projected between the sections.

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