Sept. 20, 1938. M. D. BERGAN 2,130,825

WIRE CONNECTER

Filed April 18, 1936

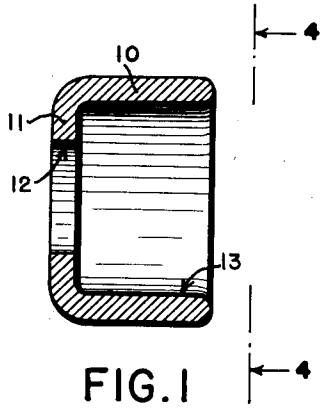


FIG. 1

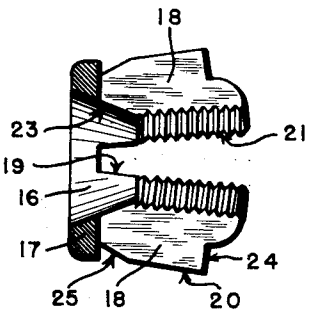


FIG. 2

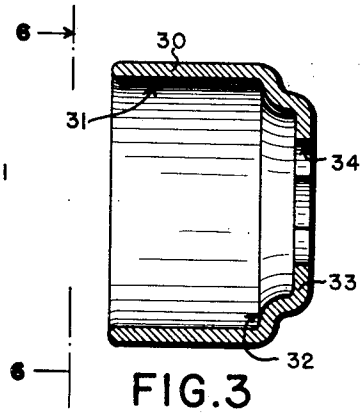


FIG. 3

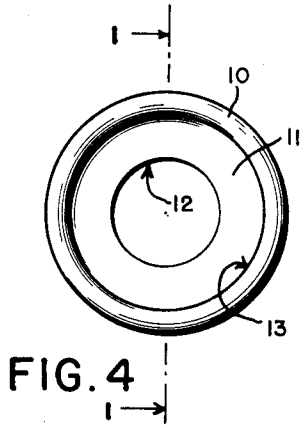


FIG. 4

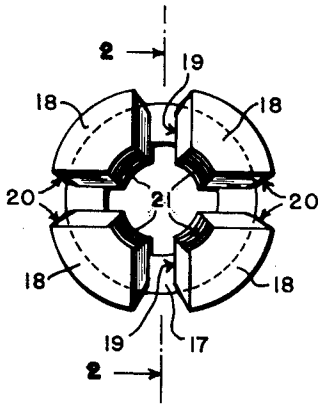


FIG. 5

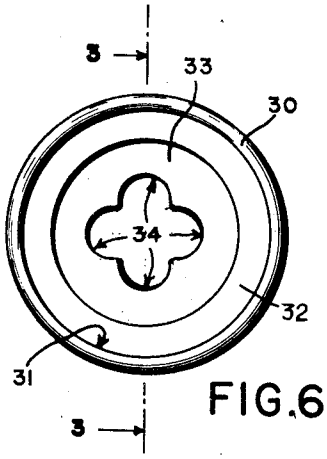


FIG. 6

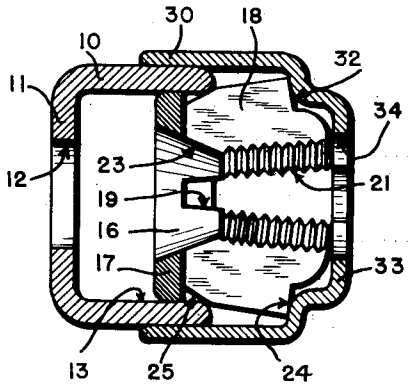


FIG. 7

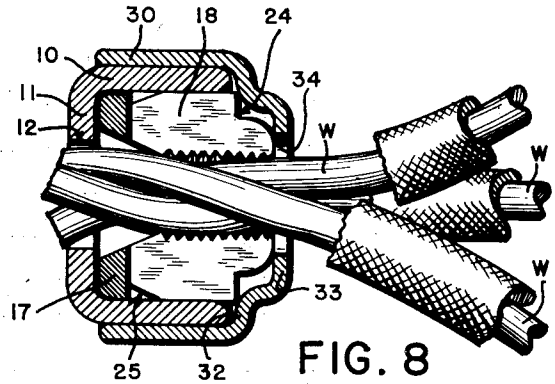


FIG. 8

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WIRE CONNECTER

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Application April 18, 1936, Serial No. 75,047

6 Claims. (Cl. 173—263)

The invention relates to a wire connecter for securing a wire therein or for securing two or more wires together in physical and electrical contact. In one aspect of the invention a single sleeve may be used with a clamping member of a particular form and in another aspect two sleeves and a contractile clamping member having an exterior tapering surface provide the parts of the wire connecter.

It is an object of the invention to construct a wire connecter that is suitable for securing one wire within the connecter for establishing electrical contact therewith and preferably may be used for securing two or more wires together in the connecter so that these wires are not only secured together, but also establish good electrical contact between the wires secured therein.

Another object of the invention is to construct a wire connecter in which all parts are assembled with the clamping member in open position and the parts are retained in assembled relation ready for use. The clamping action is then obtained merely by axially squeezing together the parts of the connecter which accomplishes contraction of the clamping member or means so that one or more wires are firmly gripped therein.

Another object of the invention is to construct a wire connecter utilizing a new and novel contractile clamping member.

A still further object of the invention is the construction of a wire connecter utilizing two axially movable sleeves with a contractile clamping member having tapering axially extending arms.

Other objects of the invention will be more apparent from the following description taken in connection with the accompanying drawing, illustrating the preferred embodiment of the invention, in which:

Figure 1 is a longitudinal section of a first sleeve which is used for contracting the contractile clamping member of the wire connecter.

Figure 2 is a longitudinal section through the contractile clamping member which grips a wire or wires within the connecter.

Figure 3 is a longitudinal section through a second sleeve forming a third member of the wire connecter.

Figures 1, 2 and 3 show the parts of the wire connecter in exploded relation with each other and in the position in which they will be assembled to form the wire connecter.

Figure 4 is an end view of the first sleeve shown in section in Figure 1.

Figure 5 is an end view of the contractile clamping member shown in section in Figure 2, taken from the large end thereof so that it shows the outwardly projecting ends of the contractile clamping arms.

Figure 6 is an end view of the second sleeve shown in section in Figure 3 and shows the indentations or projections for receiving and guiding the wires to be gripped therein.

Figure 7 is a longitudinal section through the wire connecter with the parts assembled in preliminary assembled relation and ready for the insertion of a wire or wires into the connecter to be gripped thereby.

Figure 8 is a longitudinal section through the parts of the wire connecter assembled and with the sleeves forced axially upon each other which has forced the contractile clamping member into the first or inner sleeve whereby it is contracted and grips the three wires shown therein.

Wire connecters as heretofore constructed generally consisted of separate parts which are assembled by a workman or electrician as part of the operations necessary to grip a wire in the connecter. Frequently parts are dropped by a workman which delays the work of electrical wiring. Again, the manipulation of several connecter parts in addition to the wire or wires and a tool is difficult and inconvenient. In the construction to be described herein the parts are held together in assembled relation and all that a workman has to do is to insert the wire or wires into the connecter and then squeeze the parts together, whereupon the wire or wires are firmly gripped in the connecter. If more than one wire has been inserted into the connecter, these wires are also gripped in the connecter and in tight contact with each other so that good electrical contact is established between the wires.

The wire connecter comprises a first sleeve 10 which preferably has an inwardly directed shoulder or flange 11 forming a stop so that a contractile clamping member will not be pushed too far into the sleeve. The shoulder or flange has an opening or bore 12 through which the ends of the wires may project and when they do project, the workman will know that each wire will be gripped fully by the clamping member.

A contractile clamping member 16 is shown in Figure 2 which has a ring-like portion 17, the outer diameter of which is preferably such that it provides a light press fit with the bore 13 of the first sleeve 10. Projecting from the ring-like portion 17 is a plurality of contractile arms 18 which are formed by the slots 19. The outer surface 20 of the arms 18 is tapered or practically conical, the taper of which is such that the small diameter is at the ring-like portion 17 and the free ends of the arms project outwardly.

The contractile clamping member 16 has a wire receiving bore 21 which preferably carries serrations in order to more firmly grip the wire or wires received therein and to more effectively establish electrical contact with the wire or wires. Preferably one end of the wire receiving bore has

a conical bore 23 so that the flexible arms, which substantially hinge at the point of juncture of the arms and the ring-like portion 17, are rendered more flexible thereby and some degree of contraction throughout the length of the wire receiving bore may be obtained. Preferably a circumferential groove 25 is provided adjacent to the solid portion 17 which also assists in increasing the flexibility of the arms and further provides a shoulder which tends to dig or scrape into the inner wall of the first sleeve 10 and thereby assists in preventing the parts of the connecter from being vibrated loose. The end of each contractile arm 18 is indented to form an abutment or shoulder 24.

A second sleeve 30 is provided with a bore 31, the diameter of which is substantially the same as the outside diameter of the first sleeve 10 so that the first sleeve will fit within the second. Preferably too, the diameters are such that a light press fit is provided between these two sleeves. The second sleeve 30 will fit over the contractile clamping member 16 so that the latter is concealed therein and assisted in being retained within the first sleeve 10 by being surrounded thereby. The second sleeve 30 has an inwardly directed abutment 32 which engages the abutment 24 upon the contractile clamping member 16.

The second sleeve 30 preferably has an inwardly directed flange 33. The flange has a bore therethrough which preferably comprises two or more circular indentations 34 forming two or more wire spacing or positioning projections which assist in locating and holding each wire opposite one of the arms or jaws 18 of the contractile clamping member 16. There are four such indentations 34 illustrated in Figure 6, but it is to be understood that the bore may be circular or without indentations, or may have any number of indentations. The number of indentations preferably corresponds with the number of contractile arms or jaws 18 provided upon the contractile clamping member 16. The flange 33 also provides an abutment, in addition to the abutment 32, for engaging the end of the clamping member 16. This abutment may function when the clamping member has been contracted, although the abutment 32 is so proportioned in the illustrated embodiment that it serves as the sole abutment for engaging the clamping member 16.

The wire connecter, as preferably constructed, is assembled for sale and distribution by pressing the contractile member 16 into the bore 13 of the first sleeve far enough to hold the same therein, but not far enough to contract the arms or jaws 18 of the contractile clamping member 16. The second sleeve 30, shown in Figure 3, is then pressed onto the first sleeve 10 far enough so that the abutment 32 engages or is slightly spaced from the abutment 24. When so assembled, the parts of the connecter are retained in assembled relation and ready for use.

An electrician, desiring to secure one or more wires within the connecter, removes enough of the insulation on the insulated wires W so that the wires will project through the bores 34 and 12. This avoids any possibility of the ends of the wires interfering with axial pressing together of the sleeves 10 and 30 by the end of the wire abutting against the flange 11. The end or ends of the wire or wires are inserted through the bore 31 with the wires positioned in the indentations 34 after which a pair of ordinary pliers, or a special pliers provided for that purpose, presses the two sleeves axially together. The abutment 32 of the outer or second sleeve 30 engages the abutment 24 on the contractile clamping member 16 and forces the clamping member into the bore 13 of the first sleeve 10. The walls of the bore 13 engage the conical or tapered outer surfaces of the contractile jaws 18 and contract the same upon the wires inserted in the connecter. The extent to which the contractile clamping member 16 is forced into the bore 13 of the first sleeve 10 depends upon the number and diameter of the wires projected thereinto. After the wires have been firmly gripped in the wire connecter, the ends thereof preferably are twisted and cut off close to the end of the connecter. This makes a clean finished connection as shown in Figure 8.

It will be observed that the first sleeve contracts the jaws of the contractile clamping member and in that contraction firm frictional contact is established between the bore 13 of the first sleeve 10 and the tapered surface 20 of the contractile clamping member 16. The edge formed by the circumferential groove 25 digs into the bore 13 of the inner sleeve 10 and aids in holding the parts together against vibrating loose. The outer or second sleeve 30 by its frictional engagement with the outer surface of the first sleeve 10 also assists in holding the parts together against being vibrated loose. The outer or second sleeve 30 also reenforces the inner or first sleeve 10 so that it will not expand under the pressure exerted by the contractile clamping member. It will be observed that if any expansion of the first sleeve 10 occurs, it would be when the pressure is greatest or only after the contractile clamping member has been substantially completely pressed thereinto, which expansion would tend to expand the outer sleeve adjacent the abutment 32 and thereby further assist in locking the parts in assembled relation. The end of the contractile arms 18 may also abut the inwardly directed flange 33 and in this way assist in forcing the contractile clamping member into the bore 13 of the first sleeve 10.

It should also be noted that a wire connecter which will remain in preliminary assembled relation is obtained if a press fit is provided only between the sleeves 10 and 30, and the press fit may be dispensed with, if desired, between the first sleeve 10 and the clamping member 16 because these latter two parts are held in assembled relation by the press fit between the inner sleeve 10 and the outer sleeve 30. The press fit between the first sleeve 10 and the clamping member 16 does, however, aid initial assembly of the wire connecter.

Various modifications will occur to those skilled in the art in the configuration, composition and disposition of the component elements going to make up the invention as a whole, as well as in the selective combination or application of the respective elements, and no limitation is intended by the phraseology of the foregoing description or illustrations in the accompanying drawing.

What is claimed is:

1. A wire connecter comprising a contractile clamping member having a smooth exterior surface and a bore through the contractile portion of the member to receive one or more wires therein, the clamping member having a conical exterior surface, a first sleeve having a smooth and approximately cylindrical bore which is substantially the diameter of the small end of the clamping member so that the latter will fit therein and the clamping member will be contracted upon being forced therein, and a second sleeve having

a smooth bore which has a diameter providing a press fit with the smooth outer surface of the first sleeve so that the parts are held together in preliminary assembled relation including means engaging the end of the contractile clamping member so that upon forcing the two sleeves axially together the clamping member is pressed into the first sleeve and contracted into a substantially cylindrical form which will not vibrate loose, the clamping member being contracted to grip a wire or wires therein.

2. A wire connecter comprising a contractile clamping member having a smooth exterior surface and a bore through the member to receive one or more wires therein and having contractile arms extending from a ring-like portion, the arms having a conical exterior surface extending outwardly from the ring-like portion, a first sleeve having a smooth outer surface and a substantially cylindrical bore providing a press fit with the small end of the conical clamping member so that the latter will be retained in preliminary assembled relation therein and the arms of the clamping member will be contracted upon being forced farther therein, and a second sleeve having a smooth bore providing a press fit with the outside surface of the first sleeve including means engaging the end of the contractile clamping member so that upon forcing the two sleeves axially together the clamping member is pressed into the first sleeve and the clamping arms are contracted into a cylindrical form so that the clamping member will not vibrate loose, the clamping arms being contracted to grip a wire or wires therebetween.

3. A wire connecter comprising a contractile clamping member having a bore therethrough to receive one or more wires therein, the exterior surface of the clamping member being conical; a first sleeve having a bore which is cylindrical substantially the diameter of the small end of the contractile clamping member so that the latter will fit therein and the clamping member will be contracted thereby; and a second sleeve having a bore which has a diameter substantially the same as the outside diameter of the first sleeve including means engaging the end of the contractile clamping member so that upon forcing the two sleeves axially together the clamping member is pressed into the first sleeve and contracted thereby into a cylindrical form so that it will not vibrate loose, the clamping member being contracted to grip a wire or wires, and a flange carried by the second sleeve having a bore therethrough with inwardly directed projections to position the wires passing therethrough.

4. A wire connecter comprising a contractile clamping member having a bore therethrough to receive one or more wires therein and having contractile arms extending from a ring-like portion, the arms having a conical exterior surface extending outwardly from the ring-like portion, a first sleeve having a bore which is cylindrical and substantially the same diameter as the small end of the conical clamping member so that the latter will fit therein and the arms of the clamping member will be contracted upon being forced therein, a second sleeve having a bore which has a diameter substantially the same as the outside diameter of the first sleeve including means engaging the end of the contractile clamping member so that upon forcing the two sleeves axially together the clamping member is pressed into the first sleeve and the clamping arms are contracted into a cylindrical form so that the contractile member will not vibrate loose, the clamping arms being contracted to grip a wire or wires therebetween, and a flange carried by the second sleeve having a bore therethrough with inwardly directed projections to position a plurality of wires passing therethrough with respect to the arms of the clamping member.

5. A wire connecter comprising a contractile clamping member having a bore therethrough to receive one or more wires therein and having contractile arms extending from a ring-like portion, the arms having a conical exterior surface extending outwardly from the ring-like portion, a first sleeve having a bore which is cylindrical and providing a press fit with the ring-like portion of the conical clamping member so that the latter will be retained in preliminary assembled relation therein and the arms of the clamping member will be contracted upon being forced farther therein, an inwardly directed flange on the end of the first sleeve, a second sleeve having a bore providing a press fit with the outside diameter of the first sleeve including means engaging the end of the contractile clamping member so that upon forcing the two sleeves axially together the clamping member is pressed into the first sleeve and the clamping arms are contracted into a cylindrical form so that the clamping member will not vibrate loose, the clamping arms being contracted to grip a wire or wires therebetween, and a flange carried by the second sleeve having a bore therethrough with inwardly directed projections to position the wires passing therethrough with respect to the arms of the clamping member.

6. A wire connecter comprising a contractile clamping member including a ring-like portion, contractile arms extending axially from the ring-like portion, the arms being bent outwardly at their free ends to form a conical exterior surface extending outwardly from the ring-like portion, and a wire receiving bore extending between the arms and through the ring-like portion to receive one or more wires; a first sleeve having a smooth bore which is cylindrical and has a diameter providing a press fit with the ring-like portion of the contractile clamping member so that the latter will be retained in preliminary assembled relation therein and the arms of the clamping member will be contracted upon being forced farther therein, and a stop at the end of the first sleeve to prevent the clamping member from being forced too far therein; and a second sleeve having a bore providing a press fit with the outside diameter of the first sleeve, the second sleeve including means engaging the end of the contractile clamping member so that upon forcing the two sleeves axially together the clamping member is pressed into the first sleeve and the clamping arms are contracted into cylindrical form so that the clamping member will not vibrate loose, the clamping arms being contracted to grip a wire or wires therebetween, and a flange carried by the second sleeve having a bore therethrough with inwardly directed projections to position the wires passing therethrough with respect to the arms of the clamping member.

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