

Oct. 27, 1942.

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2,299,787

ELECTRICAL CONNECTION MEANS

Filed March 17, 1939

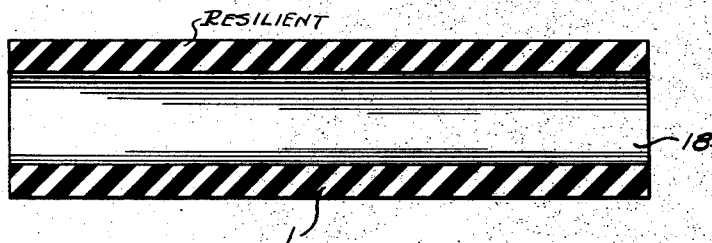


FIG. 1.

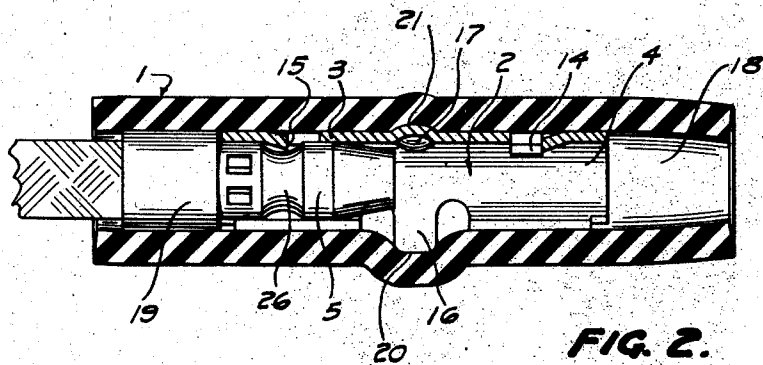


FIG. 2.

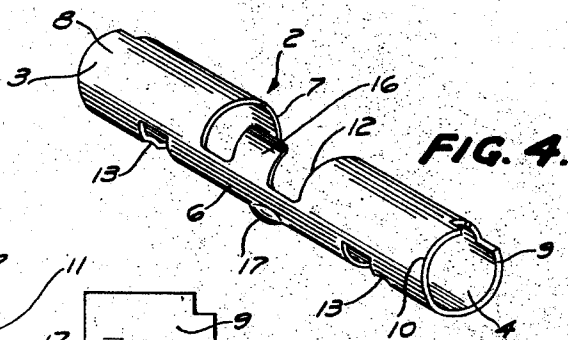
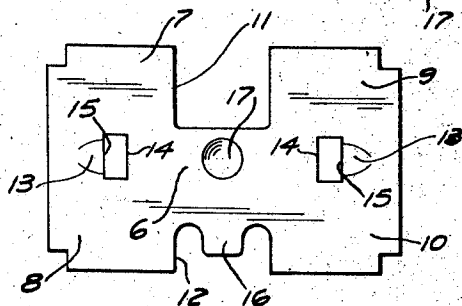


FIG. 4.

FIG. 3.



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2,299,787

ELECTRICAL CONNECTION MEANS

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Application March 17, 1939, Serial No. 262,472

4 Claims. (Cl. 173-328)

This invention relates generally to electrical connection means, known in the trade as line connectors, and particularly to connectors which are preferably adapted to be placed in an electrical circuit of a vehicle such as an automobile, and receive plug conductor terminals of the snap type.

The principal object of the invention is to provide a new and improved connector, and more particularly a connector preferably consisting solely of two members, an outer tubular sleeve of resilient insulating material, and an inner metallic insert or circuit continuing member which is adapted to receive plug conductor terminals.

Another object is to provide improved electrical connection means, including, a tube of resilient insulating material, a metal insert arranged within the tube for retaining conductor terminals, and means on the insert for pressing a portion of the tube outwardly to provide a seat for the said means whereby to lock the insert in position.

One particular object is to provide a device which can be economically manufactured on a commercial scale.

Other objects and advantages of the invention will appear hereinafter.

In the drawing accompanying this specification, and forming a part of this application, there is shown for the purposes of illustration the preferred form of the invention, and in the drawing:

Figure 1 is an enlarged longitudinal sectional view of the outer tubular sleeve of insulating material;

Figure 2 is an enlarged longitudinal sectional view showing the sleeve and circuit continuing member in assembled relation;

Figure 3 is a view on a reduced scale showing the development of the insert shown in Figure 4; and

Figure 4 is a perspective view showing the development of the insert shown in Figure 3, formed into the desired shape prior to its insertion into the sleeve member of insulating material.

Referring to the drawing, numeral 1 represents the outer tubular sleeve member constructed of some suitable insulating material, preferably of a resilient character, and 2 represents the insert or metallic circuit continuing member, which is also preferably tubular in form.

With respect to the insert, same is preferably generally cylindrical in form, and provided with resilient portions forming receptacles 3 and 4

adjacent its extremities whereby to detachably receive and resiliently retain plug conductor terminals of the snap type, such as 5, one of which is shown in Figure 2, as being secured within the receptacle 3.

Considering more in detail the construction of the insert 2, and referring particularly to the development shown in Figure 3, the insert is preferably made rectangular in shape, and comprises a central body portion 6, having at one extremity, a pair of corresponding substantially rectangular oppositely disposed laterally projecting wing portions 7 and 8, and a pair of wing portions 9 and 10 corresponding substantially to the wing portions 7 and 8, adjacent its other extremity. The respective pairs of portions by reason of the cut-outs or notches 11 and 12 provide the receptacles 3 and 4, which are independently operable of each other. However, if desired, the wall structure of the insert may be made substantially continuous and not open adjacent its central portion.

In order to assist in holding terminals to the insert, a detent 13 is provided in each of the receptacles 3 and 4, preferably centrally with respect to each pair of wing portions. Each detent is preferably formed by striking out a portion of the material of the insert to provide an aperture, such as 14, and one marginal edge of the aperture is preferably struck outwardly with respect to the remaining material, whereby to provide a convex tapered projection or lip, the arris 15 of which is adapted to bite and engage the wall defining the groove or cove 26, provided in a terminal such as 5. Detents of a character other than those just described may be provided and otherwise located, and if found desirable may be entirely eliminated, but in any event it is desirable that the resilient wing portions forming the receptacles 3 and 4 function to effectively grip and retain terminals. Said receptacles are preferably made of a sufficient length to engage considerable surface area of the terminals in order to decrease as much as possible the millivolt drop between the insert and the terminals.

Intermediate the extremities of the insert, and preferably adjacent the notch 12, there is provided a curved transverse resilient projection or lug 16, and adjacent the center of the base portion 6, there is preferably formed a boss, such as 17, which extends outwardly with respect to said base.

Referring to the outer tubular sleeve or tube member, same is preferably made cylindrical in form and provided with a longitudinal cylindri-

cal aperture 18, which aperture is preferably of a diameter slightly less than the outside diameter of the insert 2. In view of the diameters, the tube resiliently resists expansion of the insert, and among other things, assists in retaining the terminals in the insert and the insert in the tube. The sleeve is preferably constructed of everlasting resilient material which will not cause corrosion or have any effect upon the electrical connections between the insert and terminals. A material such as Duprene has been found satisfactory, but in any event, it is desirable that the material be waterproof, and not vulnerable to oils, gasoline, and other elements which affect rubber.

To assemble the sleeve and insert, the insert member is forced, preferably by a suitable tool, into either end of the aperture 18 of the sleeve to the position shown in Figure 2, whereupon the projection 16 of the insert is struck outwardly into the wall of the sleeve to deform same and provide an offset seat 20 for the projection whereby to lock the members together; the boss 17 opposite the projection also assists in this respect by projecting into an extruded seat 21.

It is to be particularly noted that when terminals are properly secured within the connector, the extremities of the sleeve member project beyond the terminals a sufficient distance whereby to prevent the terminals from coming into contact with some metallic object and thereby avoid a short circuit. The sleeve is such that same contracts upon the insert, and particularly upon the rear cylindrical portion or skirt 19 of each terminal so as to provide, among other things, a seal, whereby to exclude the entrance of foreign matter, and also avoid corrosion with respect to the electrical connections established between the terminals and the insert.

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. Electrical connection means, including a substantially cylindrical tube of resilient material, a metal insert having an outside diameter

greater than the inside diameter of said tube arranged within the confines of said tube, a receptacle retaining a conductor terminal provided adjacent each extremity of said insert, each of said terminals being provided with a round portion extending free of each receptacle, said tube acting upon said insert and the round portions of said terminals to seal from the atmosphere the space between said round portions, a resilient seat provided on said tube and extending outwardly with respect to said tube, means between said receptacles projecting laterally from said insert, said seat pressing against said means for locking said tube and insert in assembly, and a recess provided in said insert substantially opposite said means receiving a portion of said tube whereby to further assist in locking the parts in assembly.

2. Electrical connection means, including a tube member of insulating material, a metal insert arranged within the confines of said tube, said insert having a receptacle adjacent each extremity for receiving a conductor terminal, a resilient seat provided on said tube, means projecting laterally of said insert and with respect to said receptacles, said seat pressing against said projecting means for locking the tube and insert in assembly, and a recess provided in said insert substantially opposite said means receiving a portion of said tube whereby to further assist in locking the parts in assembly.

3. Electrical connection means of the character defined in claim 2, including an additional projection on said insert, and a second resilient seat on said tube pressing against said additional projection whereby to further lock the tube and insert in assembly.

4. The method of securing metallic conducting means within a resilient tube of insulation, which consists in providing the conducting means with a recess in which a portion of material of which the tube is comprised may recede, and providing the conducting means with bendable means more or less opposite said recess so that when said conducting means is inserted into said resilient tube and the said projecting means is pressed outwardly a portion of the tube will be drawn into the recess whereby to secure said means within the tube.

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