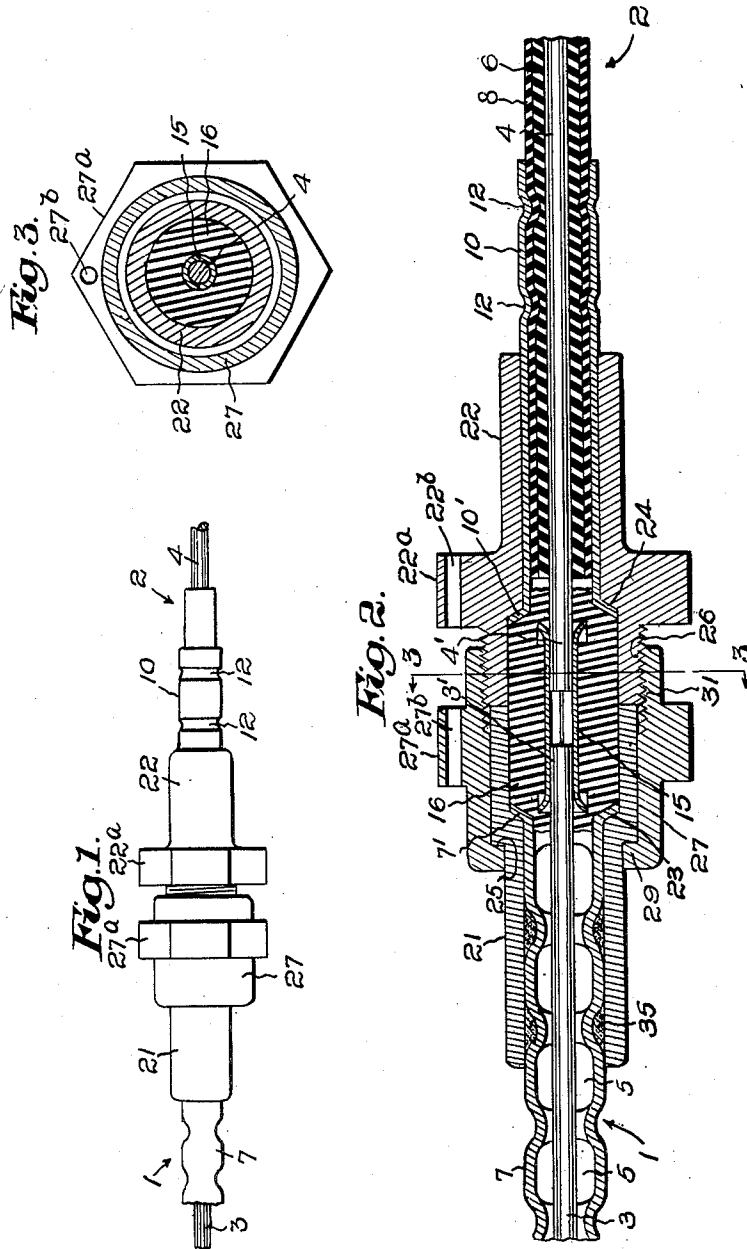


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CONDUCTOR AND COMPRESSIBLE INSERT
CONNECTOR MEANS THEREFOR
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CONDUCTOR AND COMPRESSIBLE INSERT
CONNECTOR MEANS THEREFOR

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1 Claim. (Cl. 173—328)

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My present invention relates to connectors and especially detachable electrical connector means. It aims to provide efficient, simplified and otherwise improved means for the purpose stated.

In the drawing, illustrating one embodiment of the invention by way of example:

Fig. 1 shows in elevation a connector assembly installed;

Fig. 2 is a longitudinal sectional view of the joint and connector means of Fig. 1, on a larger scale; and

Fig. 3 is a cross-section as on the line 3—3 of Fig. 2.

In the example of the drawing the connector means is shown joining conductors of different types and size, designated generally at 1 and 2. That at the left is represented as a fire detector cable such as that of my Patent No. 2,275,873, dated March 10, 1942. It comprises an inner conductor or wire 3, spacer means 5 of nonconductive material and an outer conductive tubing 7. The other conductor or cable 2 is illustrated as a conventional insulated type comprising a central conductor element or wire 4, a surrounding layer 6 which may be fibre-glass or other material, sometimes incorporating shielding or conductive means such as stranded copper wire, and an insulating cover 8 such as a saturated fibre-glass or other sleeving.

In forming the joint the conductors are prepared by exposing end portions of the central conductive elements 3 and 4 as indicated at 3', 4', in Fig. 2. The tubing 7 of the conductor 1 is given a flare as at 7'. The other conductor 2, in this case smaller, is inserted through an adapter element comprising a length of tubing 10 of metal or other supportive material as for example aluminum or an aluminum or other alloy, this tubing being flared at the end adjacent the bared conductor section 4', as at 10'. This tubular adapter 10 and the enclosed conductor 2 are firmly crimped together as at 12, 12. These crimped portions may be applied in the field as by special pliers for the purpose. The described formations including the flares 7', 10' and the crimped portions 12, 12 are comprised in the illustrated assembly and serve to strengthen it as a whole and to resist axial forces on the conductors as well as to anchor the conductor 2 in the adapter 10.

The connector means of the invention further comprises a conductive union shown as a split metallic sleeve 15. This sleeve member 15, herein disposed centrally of the device as a whole, is formed of a good electrical conductive material

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which desirably also is sufficiently resilient or yieldable to afford the sleeve capacity for reception of different conductors and for radial compressive surface engagement laterally with the received conductors. Suitable materials include certain copper alloys, which if desired may be silver plated for enhanced electrical contact. The ends of the sleeve 15 preferably are flared substantially as illustrated for ready insertion of the bared ends 3', 4' of the conductor elements 3 and 4 to be joined. The flared ends of the sleeve as shown are turned on themselves for reinforcement and to aid retention of the sleeve in embedded position in the resilient body, plug or pellet 16 of nonconducting material of rubber or rubber-like composition such as one of the synthetic rubbers as for instance Buna N.

The resilient body 16, generally cylindrical, is adapted for reception in like-shaped opposed cavities at the adjacent ends of a pair of tubular connector elements comprising members 21 and 22. Either of these may be placed on either conductor to be joined. The normal free or unstressed diameter of the body or plug-like element 16 is made somewhat less than that of the common receiving cavity in parts 21 and 22, and the length of element 16 is greater than the length of the cavity when parts 21 and 22 are in contact with each other. At the opposite end portions of the cavity are annular shoulders 23 and 24 on the respective members 21, 22, against which the corresponding flares 7', 10' abut.

The connector member 21 has an enlargement at its inner end presenting an external radial shoulder 25 or like abutment. Rotatable on the member 21 is a sleeve-like coupler 27 with an intumed radial flange 29 adapted to abut the shoulder 25 of member 21 and having at its inner end a female threaded portion 31. This coupler 27 and the member 21 together form one of an interengageable pair of main elements for the connector assembly. The other element of this pair is the unitary part or member 22 already referred to, having at its inner end a male threaded portion 26.

The two cooperatively threaded elements 21—27 and 22 define approximate halves of the connector body as a whole. The male connector element 22 and the female coupler member 27 of the other body element are each provided with a hex or other non-round formation 22a and 27a respectively for application of wrenches or other suitable tools in making or releasing the connection. These formations, illustrated as hex

flanges, desirably are drilled as at 22b, 27b for receiving a pin, wire or like means to lock the connector assembly against vibration. When either or both of the coaxial cables or tubular conductors to be joined are of an externally grooved or corrugated nature as herein shown for the outer tubing 7 of conductor 1 space between such tubing and the inner wall of the surrounding connector part 21, 22 or 10 desirably is filled with a metal-bonding cement as indicated at 35 in association with the fitting member 21, thus securing the cable in and to the latter and also blocking entrance of water or other foreign matter between them.

From the foregoing in connection with the drawing it will be evident that the respective connector halves or body elements 21—27 and 22 are placed on the conductors to be joined and the bared ends of the central wires or conductors proper 3', 4' are inserted into the sleeve 15 centrally held in the resilient plug 16. The threaded portions of the members 22 and 27 are interengaged. In completing the coupling operation the opposed body elements are forced together by rotatably turning up the coupler 27 onto the connector part 22. By reason of the separable coupler 27 turnable on and relative to the connector part 21 and also relative to the opposed connector part 22, there need be little or no relative turning movement as between either of the connector parts 21 and 22 and any contacting surface of the joined conductors or of the resilient body 16. Thus undesirable twisting stress on the conductors proper is avoided, such as might tend to disturb the electrical connection.

In the described coupling operation the resilient body or plug 16 is compressed, the unstressed volume of this body as previously noted being somewhat more than the final receiving space for it in the adjustable connector parts 21 and 22. The pressure thus built up acts in all directions within the resilient material and tends to force it into any available space at the juncture of the connector parts 21, 22 and about the terminals of the split sleeve 15. At the same time the compressive pressure transmitted to the sleeve in which the conductor ends are inserted insures intimate surface contact as between the sleeve and the inserted conductor ends, promoting a good electrical connection. Simultaneously the compressive forcing of the rubberous material of the body 16 into the joint between the connector parts 21, 22, also between the flared adapter sleeve 10 and the connector part 22, as well as at the corresponding joint between the flared conductor tubing 7 and the connector part 21 effects a tight seal for excluding water, oil or other foreign matter.

The connector means of the invention is applicable for the joining of cables and conductors of numerous different types, sizes and structures, including for example radio-frequency cables, the joined electrical conductor cables being identical or otherwise. In some instances the joined axial elements either in addition to or alternatively to their electrical conductive function may be in the nature of fluid-bearing conduits or conductors.

Among the numerous advantages of the present invention are the capacity for rapid attachment of the connector assembly in the tight and positive manner as described in connection with the drawing, and in such fashion that excellent

electrical contact is assured together with ample insulation resistance at the joint, the connection being at the same time impervious to entrance of foreign matter. The cooperative parts of the connector device specially avail of the confined mass of resilient insulative material so as automatically to stress it in making up the connection and thereby provide an effective external seal and internal closure. The improved connector means additionally is simple in structure and light in weight yet rugged in service, and is relatively easy and inexpensive to manufacture.

My invention is not limited to the particular embodiment thereof as herein illustrated and described, its scope being pointed out in the following claim.

I claim:

For electrically and mechanically joining electric cables which have bared conductors projecting centrally from flare-ended outer metal tubing, a connector assembly comprising a longitudinally split sleeve of yieldable conducting material receiving such conductors at its opposite ends, a cylindrical rubberous mass encompassing the sleeve and of a length making endwise abutitive contact with and partial entrance into the flare ends of cables when the central conductors thereof are fitted into said sleeve, opposed cylindrical connector body members having each a cable-receiving bore and having mating recesses defining a cavity contactively enclosing and confining the rubberous mass, said cavity including end walls engaging the flares of the tubing ends opposite the abutitive contact thereof with said mass in the installed position of the assembly, one of said body members being externally threaded, and a sleeve-like coupler having threaded engagement with said threaded body member and having longitudinal abutitive engagement with the other body member so as to draw together and abutively interconnect said members, said rubberous mass in the free unstressed state being oversized with respect to said cavity so that it is subjected to both lengthwise and radial compressive stress in and by said members upon such interconnection thereof, thereby sealing the joint in all directions and simultaneously insulating and compressing the sleeve and promoting the electrical union thereof with the received conductor ends.

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