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CONNECTING DEVICE FOR USE WITH STRANDED METAL CABLES

Filed June 23, 1931

Fig. 1.

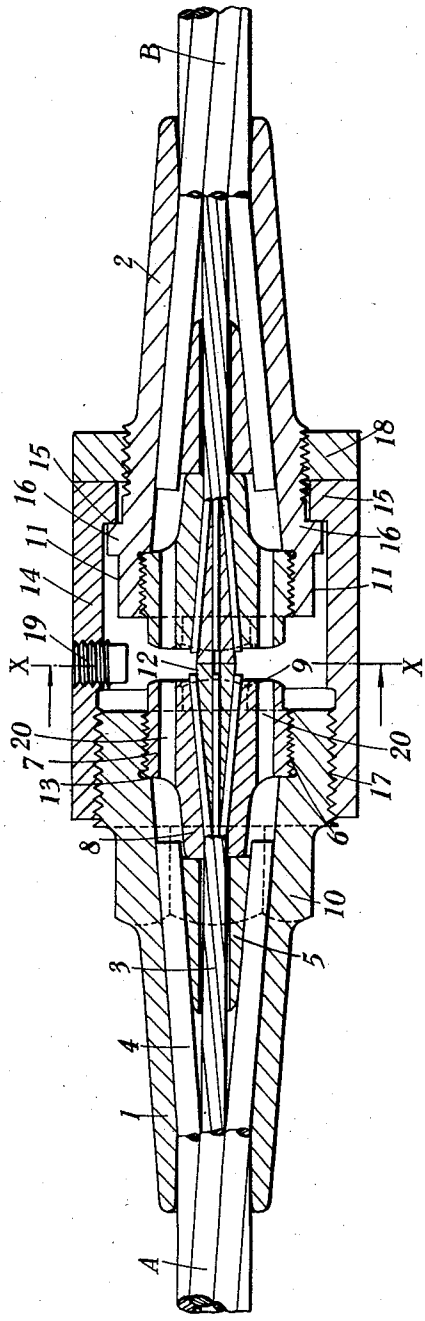
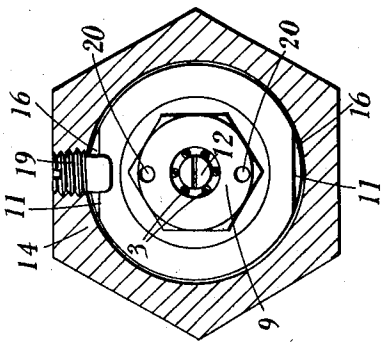


Fig. 2.



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UNITED STATES PATENT OFFICE

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CONNECTING DEVICE FOR USE WITH STRANDED METAL CABLES

Application filed June 23, 1931, Serial No. 546,329, and in Great Britain July 5, 1930.

This invention relates to devices for making connection between a length of cable and some other member which may be another length of cable or may be a solid bar or eye or other body. It deals particularly with the case where the cable consists of two concentric groups of wires or of an outer group of wires and of a single central wire. Where these two groups are of different metals (for instance a steel centre group and an aluminium outer group) it has been recognized as desirable that the method of connection should provide a certain amount of independence between the connections of the two groups.

My improved arrangement is of a type in which this condition is realized by the use of clamping actions obtained by the relative displacement of inner and outer cones between each pair of which the wires of a single group are engaged.

I make use of an outer conical member for the outer group of wires of considerably greater length than the inner conical member for that group and I mount the outer conical member for the inner group within the extended end of that outer cone. In an arrangement of this kind it is of course necessary to make the clamping action for the outer group of wires effective before putting the clamping cones for the inner group of wires into position and it is accordingly necessary to force the inner cone for the outer group tightly against the inner surface of that group of wires. Owing to the extension of the outermost cone at the outside and the projection of the inner group of wires at the centre it is necessary to use an annular member which should surround the inner group of wires and can be forced against the end of the inner cone for the outer group of wires and drive this cone into position.

Hitherto it has been the practice to use a short length of pipe or other annular punch to transmit the blows of a hammer to the end of the inner cone for the outer group of wires. By the present invention I avoid the use of this annular tool and simplify the forcing in of the cone and make more accurate the adjustment of the clamping grip exerted by it.

I provide the outer cone for the inner group of wires with an external thread working in a correspondingly threaded portion of the large end of the outer cone for the outer group of wires and I use the first of these two threaded members to press against the larger end of the inner cone for the outer group of wires so that as I screw the outer cone for the inner group of wires into position I force the inner cone for the outer group of wires into correct relationship with the outer cone for that group to exert the necessary initial clamping effect. After this has been done the inner cone for the inner group of wires is driven into position, for instance by a hammer, striking on its outer end.

By this method of adjustment of the clamping it is found possible to provide the correct initial relationship for the outer group of wires for such a material as aluminium to permit the further movement to take place of this outer group of wires when the tension load comes on the cable, which movement I have found to be practically essential in order to obtain a proper distribution of the tensile load over the two groups of wires when the inner one is of steel.

An example of the application of the invention is illustrated in detail by the accompanying drawing which shows an assembled connector joining two sections of a steel-cored aluminium stranded conductor.

Figure 1 is a longitudinal section through the centre of the joint in the plane of the conductor, and

Figure 2 is a transverse section on the line X—X in Figure 1 and viewed in the direction of the arrows.

Over the ends A and B of the two composite strands are threaded two aluminium

conical members 1 and 2 which are of similar internal construction but differ in respect to their external characteristics for reasons described below. The various components of the connector which are assembled within the conical members 1 and 2 are similar for each half of the joint, consequently a detailed description of the side A of the joint will also cover the side B.

The end of the composite stranded conductor is trimmed so that the steel core which constitutes the inner group of wires 3 project beyond the aluminium strands constituting the outer group of wires 4. A small aluminium conical member 5 is threaded over the inner group of wires 3 so that the outer group of wires 4 are spread out against the inner surface of the outer cone 1. The outer cone 1 is provided with an internally threaded portion 6 which is intended to receive the threaded portion of an outer steel conical member 7 for the inner group of wires 3. An extension 8 to the outer steel cone 7 makes contact with the larger end of the inner aluminium cone 5 so that the action of screwing the former into the outer aluminium cone 1 causes the extension 8 to press the inner aluminium cone 5 against the inside of the outer group of wires 4, thereby clamping them against the inside of the outer cone 1.

A hexagonal projection 9 upon the screwed portion of the outer steel cone 7 for the inner group of wires facilitates the screwing of this cone into position within the outer aluminium cone 1; the latter is made hexagonal in shape 10, or as in the case of the conical member 2, is provided with flats 11, as a means for engagement during screwing up.

To clamp the inner group of wires 3 against the conical inner surface of the steel cone 7, a small split steel cone 12 is driven into place by means of hammer blows. The barrel of this cone is provided with teeth or serrations which grip the central wire as the split sections close due to the cone being forced into the conical cavity formed by the steel cone 7.

In its final position the outer steel cone 7 abuts against a shoulder or seat 13 on the inside of the outer aluminium cone 1, which takes the tensile load and prevents it being borne by the threaded portion. This construction is particularly important in a case such as the example described where the outer cone is constructed of aluminium.

The diameter of the interior threaded portion of the other aluminium cone 1 is sufficiently greater than the diameter of the adjacent inner conical surface to allow the use of a reamer or similar tool to produce an accurate conical surface without damage to the screw threads.

The two adjacent ends A and B of the stranded conductors being fitted with the clamping arrangements as described, have to be drawn together by a sleeve member, of which there are several well known types. The figures illustrate a sleeve 14 provided with an inner shoulder 15 which bears against a shoulder 16 on the outer conical member 2; the inside of the other end of the sleeve 14 has a screw-thread which engages with a screw-thread 17 on the outer conical member 1. The action of screwing the sleeve 14 into place draws the two halves of the joint together until the inner steel cones meet as shown in Figure 1. The sleeve 14 is made hexagonal in section as shown in Figure 2 to facilitate the action of screwing it into place. A lock nut 18 is screwed on to the outer conical member 2 against the back of the sleeve 14 to prevent any tendency for the sleeve to unscrew due to vibration.

Another well known type of sleeve is provided with right and left hand screw-threaded portions which engage with corresponding threaded portions on the outermost conical members 1 and 2, or their equivalents, the two sections being drawn together by rotation of the sleeve.

To prevent deterioration of the exposed metal within the joint, arrangements are made which allow the cavities to be filled with a suitable compound. A screw plug 19 permits the compound to be poured into the joint, and longitudinal holes 20 are provided in the outer conical member 7 for the inner group of wires which permit the compound to flow into the cavities which accommodate the severed ends of the outer group of wires.

Where it is desired to join a length of cable to a solid bar or eye or such like body then only one half of the joint as described above is necessary. The solid member must be adapted to receive a sleeve member by means of which the joint may be closed in a manner similar to that described above.

What I claim as my invention and desire to secure by Letters Patent is:—

A device for connecting an end of a length of cable, comprising an outer group of wires and a core consisting of an inner group of wires or a single central wire, to another but possibly similar member, said device comprising means for engaging the said cable end, means for engaging the other member and a sleeve coupling these two engaging means together, the first of said engaging means comprising an inner clamping cone and an outer clamping cone for each group of wires, the inner clamping cone for the outer group of wires being located within the smaller end of the outer clamping cone for that group, the inner cone for the inner group being located at least in part, within the outer cone for that group, which latter cone is located within the larger end of the outer clamping cone of the outer group of wires so that it can press upon the inner clamping cone for the outer group

of wires when the cable end is engaged, the outer clamping cone for the outer group of wires having at its larger end an internal screw thread and the outer cone for the inner group of wires having a corresponding external thread working therein and also having an axial projection engageable by a tool whereby it may be screwed into the outer cone for the outer group and thereby be caused to press against and tighten up the inner cone for the outer group of wires when the cable end is engaged.

In testimony whereof I affix my signature.

JOHN WILLIAM ASTLEY.