



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
23.08.2000 Bulletin 2000/34

(51) Int Cl.7: **H01R 4/36**

(21) Application number: **00660017.5**

(22) Date of filing: **02.02.2000**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventors:
• **Söderholm, Henrik**
06100 Porvoo (FI)
• **Harttunen, Jarmo**
01900 Nurmijärvi (FI)
• **Kortelainen, Veijo**
06100 Porvoo (FI)

(30) Priority: **16.02.1999 FI 990311**

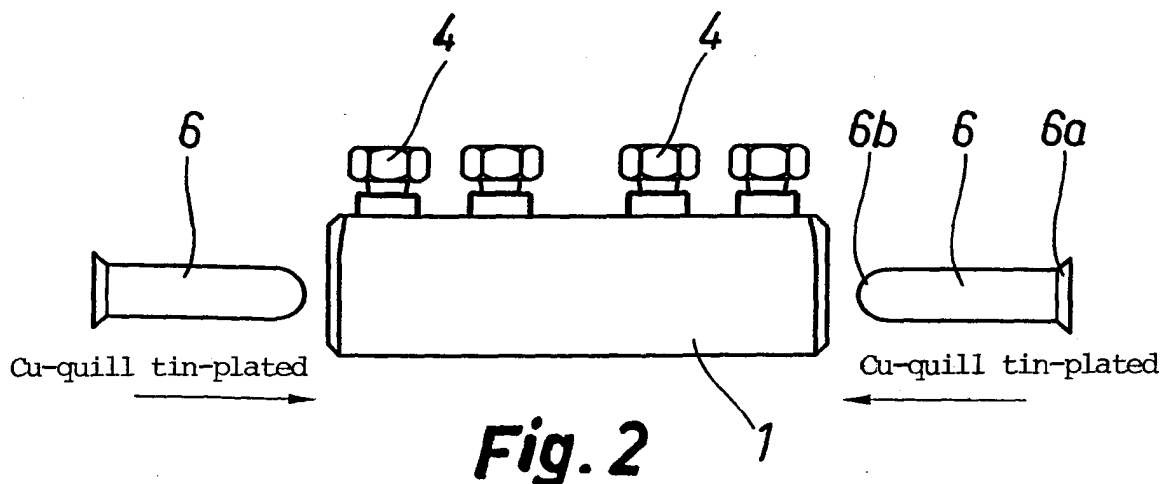
(71) Applicant: **Ensto Sekko Oy**
06100 Porvoo (FI)

(74) Representative: **LEITZINGER OY**
Ruoholahdenkatu 8
00180 Helsinki (FI)

(54) **Joining sleeve or connector for splice or branch connections in electric cables**

(57) The invention relates to a joining sleeve provided with moment screws for splice connections in electric cables, or to a connector for a branch wire. The ends of wires to be connected are received in spaces

(5) which are fitted with loose quills (6), the ends of wires or cables to be connected being insertible therein. The loose quills (6) are preferably made of annealed copper which has a tin coating.



Description

[0001] The present invention relates to a jointing sleeve provided with moment screws for splice connections in electric cables, said jointing sleeve comprising a housing, both ends of which are provided with quill-shaped spaces for receiving the ends of cables to be connected.

[0002] This type of jointing sleeve is known e.g. from the Applicant's patent publication GB-2,266,628. It has proved to be a problem with such jointing sleeves that the softness or hardness of metals used in cables to be connected varies over such a wide range that the tightening torque of a moment screw for a secure and sufficient contact may cause an excessive size reduction in the cross-section of a soft wire (the wire to be connected is nearly severed).

[0003] It is a principal object of the invention to provide an improved jointing sleeve, capable of substantially alleviating the above problem in such a way that the moment screw delivering a torque for a secure and sufficient contact does not sink too deep even within a soft cable material.

[0004] This object is achieved by means of the invention on the basis of the characterizing features set forth in the annexed claim 1.

[0005] The invention relates also to a branch-wire connector, comprising a housing provided with reception slots for wires, one or more C-shaped clamping pieces, the ends of which are in line with the slots of the housing, and one or more clamping screws for tightening the clamping piece or pieces toward the housing, the wires thereby pressing against the walls of the slots.

[0006] Such connectors for branch wires are known to have a problem in terms of corrosion, particularly when connecting branch wires of copper with main cables of aluminium. Thus, the connector, which is typically made of aluminium, must be tin-plated. The same problem applies also to the above-mentioned jointing sleeve connections.

[0007] It is an object of the invention to apply the invention used in relation to a jointing sleeve connection, also to a branch-wire connector in order to avoid the above corrosion problem, and possibly to omit the tin-plating process of a connector itself.

[0008] This object is achieved by means of the invention on the basis of the characterizing features set forth in the annexed claim 2.

[0009] The non-independent claims disclose preferred embodiments for the invention.

[0010] The invention will now be described in more detail by way of exemplary embodiments, with reference to the accompanying drawings, wherein:

fig. 1 shows a perspective view of a jointing sleeve, to which the invention can be applied;

fig. 2 shows a jointing sleeve in a side view prior to

inserting loose quills of the invention inside the jointing sleeve; and

fig. 3 shows the same jointing sleeve with loose quills 6 inserted in place inside a jointing sleeve 1.

Fig. 4 shows an end view of a branch-wire connector, applying the same invention of loose quills as that applied in the jointing sleeve of figs. 1-3.

[0011] The jointing sleeve shown in fig. 1 is manufactured from a streamline tubing, both ends of which are provided with quill-shaped spaces 5 for receiving the ends of electric cables to be connected as extensions of each other. In the middle of the jointing sleeve 1 is a pressure-proof partition 2, which is made from a loose disc whose middle section is pressed (flattened by pressing) after the insertion, such that the disc rims have expanded tightly against the inner surface of the sleeve aperture.

[0012] On either side of the partition 2 there are two pieces of tapped holes 3 for moment screws 4. As the moment screw 4 is driven against the end of a wire or cable present within the sleeve, the head of the moment screw 4 breaks off upon reaching a sufficient tightness. If the metal of a wire to be connected is soft, the end of a moment screw deforms the wire and displaces some of the wire material, whereby the cross-section of the wire may become too small.

[0013] This problem is avoided by using loose quills 6 shown in figs. 2 and 3, which are inserted from both ends of the jointing sleeve into the quill-shaped spaces 5. The material, hardness, and wall thickness of the loose quills 6 must be selected in such a way that the end of the moment screw 4 is capable of deforming the material of the quill 6 for a sound and secure contact, yet prevents the moment screw from penetrating too deep into the actual wire material. Practical tests have indicated that the best result is achieved by means of a thin tin-plated copper tube after softening the copper by annealing. The tube has a wall thickness within the range of 0,2-0,5 mm, most preferably within the range of 0,3-0,4 mm. As the quill 6 is tin-plated, the tin-plating of the housing 1 and the screws 4 can be possibly omitted without deteriorating the joint through a corrosion hazard.

[0014] However, another possible material for the loose quill 6 can be aluminium or soft annealed brass, which has a tin coating.

[0015] The loose quill 6 has a bottom 6b which is preferably solid for further protection against corrosion. The quill 6 may have a conically flaring mouth 6a for facilitating the insertion of the end of a wire into the quill 6.

[0016] The branch-wire connector shown in fig. 4 comprises a housing 7, which is provided with reception slots 8 for wires and to which is secured one or more C-

shaped clamping pieces 9 by using one or more clamping screws 11. The clamping piece 9 has its ends 10 in line with the housing slots 8, the ends of wires to be connected or branched pressing against the walls of the slots 8 as the clamping piece 9 is tightened toward the housing 7 by means of the clamping screw 11.

[0017] If the question is e.g. about connecting a copper wire to an aluminium main cable, a loose quill 6' is fitted around the end of the copper wire, and the wire end, along with its loose quill 6', is placed in the slot 8. Thus, a proper material selection for the loose quill 6' can be used for eliminating corrosion without having to tin-plate the entire connector. If the connector is made of aluminium and used as a connector between two copper wires, the loose quill 6' is placed in both slots 8 around the ends of wires to be connected.

[0018] The loose quills 6 or 6' are manufactured in a plurality of diametral sizes to comply with the diameters of standard dimensioned wires, such that the wire can be readily inserted inside the quill 6 or 6'. The loose quill 6, 6' has a length which covers a necessary connection zone and, e.g. in the case of fig. 4, extends over the entire length of the slot 8, and preferably slightly beyond the end edges of the slot 8, in order to avoid a direct contact between the connector and the wire.

Claims

1. A jointing sleeve provided with moment screws (4) for splice connections in electric cables, said jointing sleeve comprising a housing (1), both ends of which are provided with quill-shaped spaces (5) for receiving the ends of cables to be connected, **characterized** in that the quill-shaped spaces (5) are fitted with loose quills (6), the ends of cables to be connected being insertible therein.
2. A branch-wire connector, comprising a housing (7) provided with reception slots (8) for wires, one or more C-shaped clamping pieces (9), the ends (10) of which are in line with the slots (8) of the housing, and one or more clamping screws (11) for tightening the clamping piece or pieces (9) toward the housing (7), the wires thereby pressing against the walls of the slots (8), **characterized** in that at least one of the slots (8) is fitted with a loose quill (6'), the end of a wire to be connected being insertible therein.
3. A jointing sleeve or a connector as set forth in claim 1 or 2, **characterized** in that the loose quill (6, 6') is made of copper which has a tin coating.
4. A jointing sleeve or a connector as set forth in claim 3, **characterized** in that the copper comprises soft annealed copper.
5. A jointing sleeve as set forth in claim 1 or a connector as set forth in claim 2, **characterized** in that the loose quill (6, 6') is made of aluminium.
6. A jointing sleeve as set forth in claim 1 or a connector as set forth in claim 2, **characterized** in that the loose quill (6, 6') is made of soft annealed brass which has a tin coating.
7. A jointing sleeve or a connector as set forth in any of claims 1-6, **characterized** in that the loose quill (6, 6') has a wall thickness which is within the range of 0,2-0,5 mm, most preferably within the range of 0,3-0,4 mm.
8. A jointing sleeve or a connector as set forth in any of claims 1-7, **characterized** in that the loose quill (6, 6') has a solid bottom (6b).
9. A jointing sleeve or a connector as set forth in any of claims 1-8, **characterized** in that the loose quill (6, 6') has a conically flaring mouth (6a).
10. A jointing sleeve as set forth in any of claims 1 or 3-9, **characterized** in that the housing (1) is constituted by a streamline tubing, one of its sides being provided with four tapped holes (3) for four moment screws (4), the individual loose quill (6) extending to the working zone of two moment screws (4), and that the quill-shaped spaces (5) in the housing (1) are separated from each other by a partition (2).

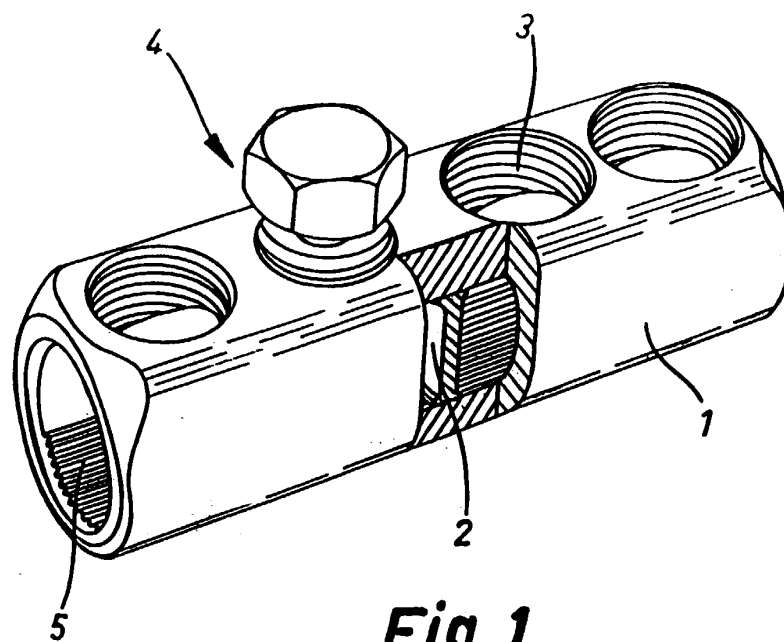


Fig. 1

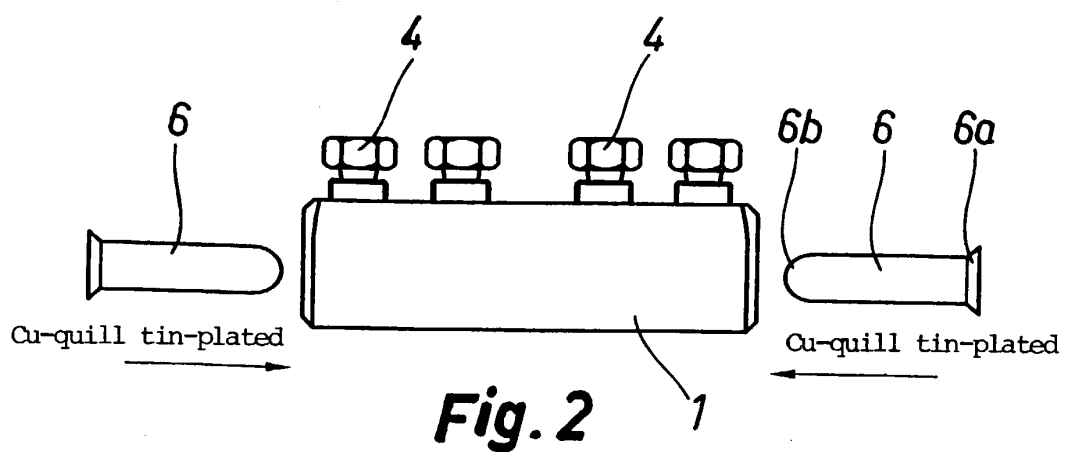


Fig. 2

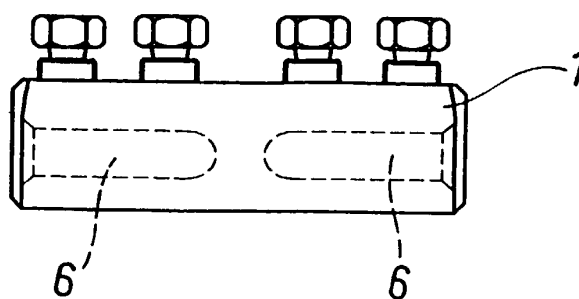


Fig. 3

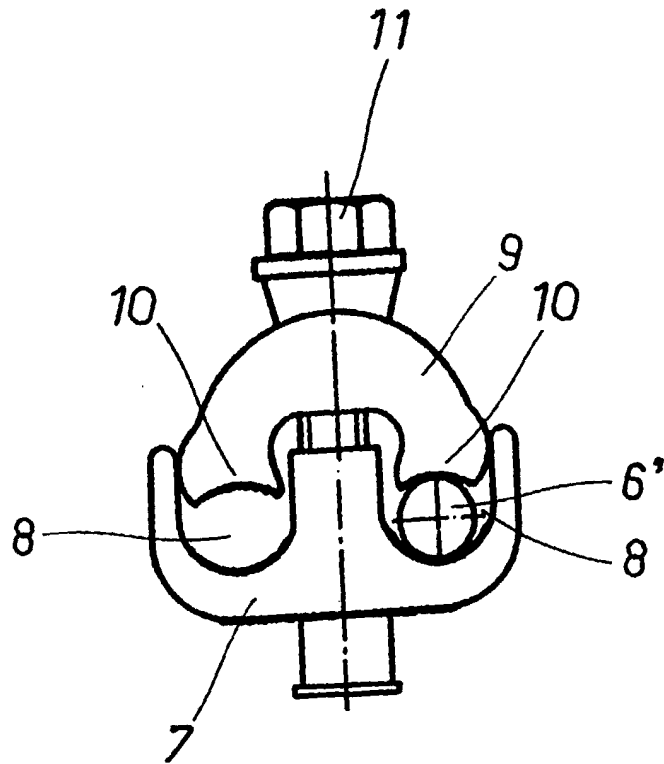


Fig. 4