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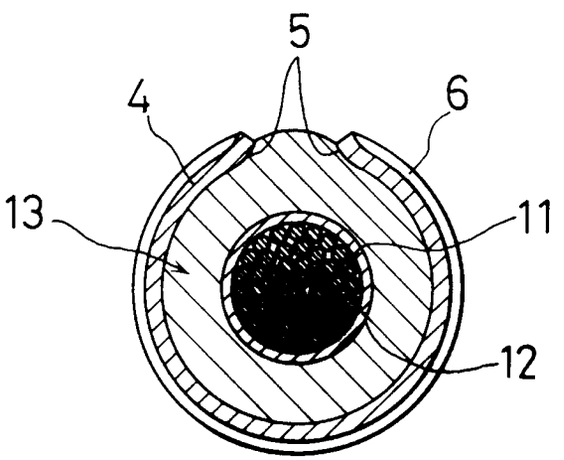
(54) **Electric terminal piece.**

(57) An electric terminal piece (21) provided with a clinching portion (4) for fastening a wire (10) to the terminal piece (21) over the insulation cover member (12) of the wire (10) and a waterproofing rubber seal member (13), edge portions (5, 6) of the clinching portion (4) being turned outward so that the edge portions (5, 6) do not damage the members (12, 13) when the clinching portion (4) of the terminal piece is clinched to fasten the wire (10) and the rubber seal member (13).

FIG. 4



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Background of the Invention

Field of the Invention

This invention relates to an electric terminal piece provided with clinching portions for fastening a wire to the electric terminal piece.

Description of the Prior Art

Conventionally, an electric terminal piece provided with a first and a second clinching portions for fastening an insulator-coated wire to the terminal piece is known. The first clinching portion of the electric terminal piece is to fasten and electrically connect the wire to the terminal piece at an end which is exposed, while the second clinching portion is to fasten the insulator-coated wire over the insulation coating of the wire at another part near the exposed end. A waterproofing rubber seal or plug may be attached to the portion of the wire, and in this case, the insulator-coated wire may be fastened at the portion through the waterproofing rubber seal.

Every clinching portions is generally annular and has a slit, so that the clinching portion of the terminal piece is clinched easily to fasten the wire. When the second clinching portion is clinched to fasten the wire over the insulation coating or the rubber seal, lower edges of the second clinching portion of the terminal piece are pressed against the rubber seal or the insulation coating. The edges sometimes cut or damage the insulation coating or the waterproofing rubber seal, in particular when the insulation coating or the rubber seal receives external forces and/or thermal stresses. Repeated forces and stresses make the cuts in the insulation coating and the rubber seal larger and deeper, and as a result, insulation of the wire, or waterproofness of the seal is broken.

The object of the present invention is to provide, with due consideration to the drawback of such a conventional device, an electric terminal piece provided with a clinching portion for fastening a wire over a member made of soft material covering the wire, such as an insulation coating of the wire, and a rubber seal for sealing the wire, without damaging the member.

Summary of the Invention

An electric terminal piece of the present invention is provided with a clinching portion for fastening a wire to the terminal piece, over a member of soft material covering the wire, namely an insulating member of the wire, a sealing member of the wire, or the like, wherein an edge of the clinching portion turns in a direction opposite to a direction in which the clinching portion is clinched.

Accordingly, the member is not damaged by the edge of the clinched portion, and therefore insulation and waterproofing of the wire is maintained.

Brief Description of the Drawing

Fig. 1 is a perspective view showing an electric terminal piece of the present invention fastening an insulator-coated wire.

Fig. 2 is a perspective view showing another electric terminal piece of the present invention fastening an insulator-coated wire, on an enlarged scale.

Fig. 3 is a vertical sectional view showing a clinching portion of the electric terminal piece of Fig. 1 or Fig. 2, fastening the wire over a member.

Fig. 4 is a sectional view taken along line IV-IV in Fig. 3.

Description of the Preferred Embodiments

Figs. 1 and 2 show respectively a male and a female electric terminal pieces 1 and 21 of the present invention. The male terminal piece 1 shown in Fig. 1 has a bar-shaped plug 2 which is received by a socket of a female terminal piece (not shown).

The female terminal piece 21 shown in Fig. 2 has a socket 22 which receives a mail plug (not shown). The structure of the other parts is almost the same between the male and the female terminal pieces 1 and 21.

The terminal piece 1 or 21 also has a first and a second clinching portions 3 and 4. The clinching portions are annular and formed with a slit as conventionally known, so that the clinching portions are easily clinched. Edge portions 5, 6 of the second clinching portion 4 turn upward or outward.

An insulation-coated wire 10 is to be fastened to the terminal piece 1 or 21 through the clinching portions 3 and 4. An exposed end 11 of the wire 10, at which an insulation coating 12 has been peeled, is fastened by the first clinching portion 3 to obtain good electric contact between the wire 10 and the terminal 1 or 21, and the wire 10 is also fastened by the second clinching portion 4 at another portion near the exposed end 11 over the insulation coating 12.

A rubber seal 13 for waterproofing may be disposed around the portion of the insulation-coated wire 10, as shown in the drawings. In this case, the wire is fastened at the portion by the second clinching portion of the wire through the rubber seal 13. The waterproofing rubber seal 13 has a round projected part 14 through which the rubber seal 13 is fastened by the second clinching portion 4 of the terminal piece 1 or 21, and one or more

sealing ribs 15. When the projected part 14 of the rubber seal 13 is fastened by the second clinching portion 4 of the wire 10, the wire 10 is fastened to the terminal piece 1 or 21 through the rubber seal 13 as mentioned above, and waterproofing between the rubber seal 13 and the wire 10 is maintained.

As shown in Fig. 1, the male terminal piece 1 connected to the wire 10 is to be inserted in a female terminal (not shown) in a connecting chamber 17 formed in a connecting housing 16. In the connecting chamber 17, the sealing rib 15 of the rubber seal 13 is pressed against a wall of the connecting chamber 17. Hence, waterproofing between the chamber 17 and the wire 10 is maintained. Similarly, the female terminal piece 21 shown in Fig. 2 is connected to a male terminal piece (not shown) in a connecting chamber of a connecting housing, and waterproofing between the chamber and the wire 10 is maintained.

Figs. 3 and 4 shows the second clinching portion 4 which is clinched to securely hold the insulation-coated wire 10 through the projected portion 14 of the rubber seal 13. If the terminal piece 1 or 21 was a conventional terminal piece mentioned above, edges of the clinched portion 4 would contact and enter into the projected portion 14 of the rubber seal 13 and might damage the projected portion 14, in particular when the rubber seal 13 receives external forces or thermal stresses.

If the conventional terminal piece fastened the wire 10 over the insulation coating 12, edges of the clinched portion 4 of the terminal piece might damage the insulation coating 12 similarly.

In the terminal piece 1 or 21 of the present invention, however, the clinching portion 4 of the terminal piece 1 or 21 dos not cause the damage to the insulation coating 12 and the rubber seal 13 since the edge portions 5, 6 of the clinching portion 4 turn outward or in a direction opposite to a direction in which the clinching portion 4 is clinched.

Claims

1. An electric terminal piece provided with a clinching portion for fastening a wire to the terminal piece over a member covering the wire, wherein an edge portion of the clinching portion turns in a direction opposite to a direction in which the clinching portion is clinched.

FIG. 1

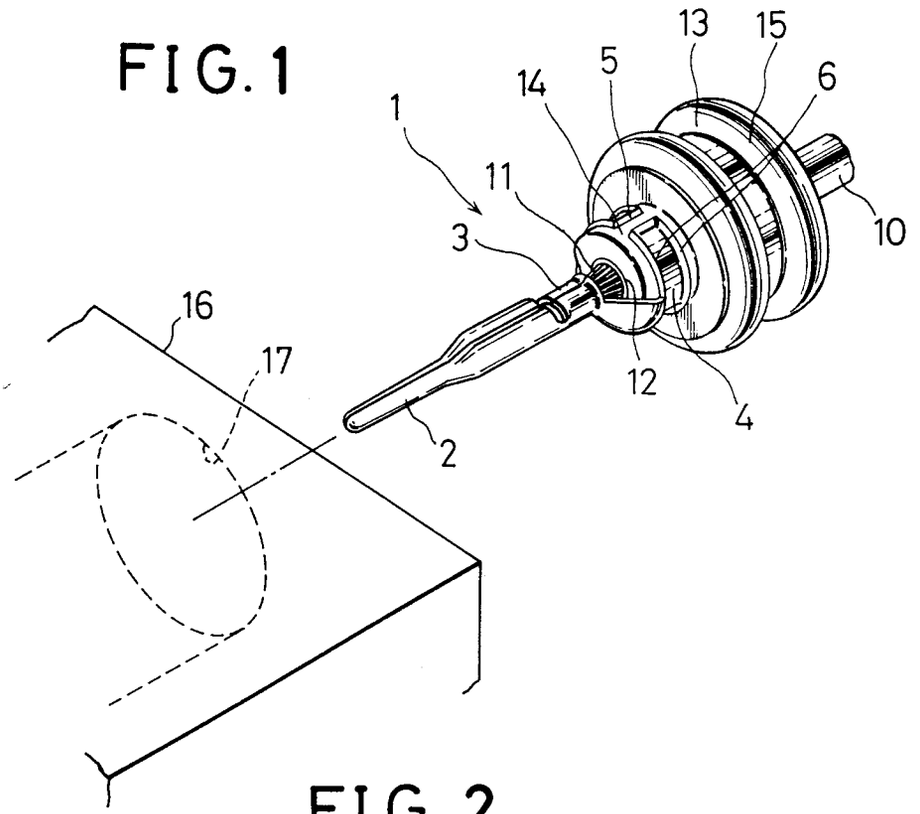


FIG. 2

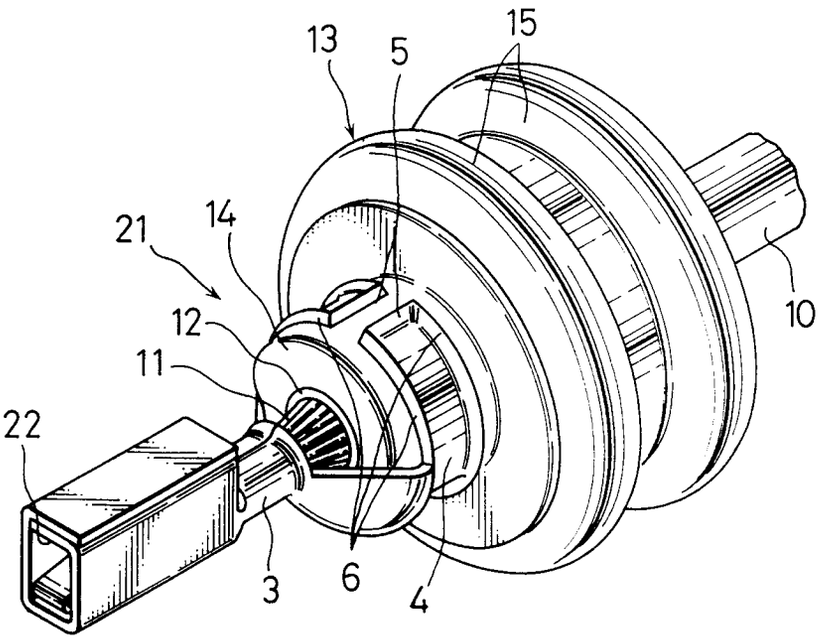


FIG. 3

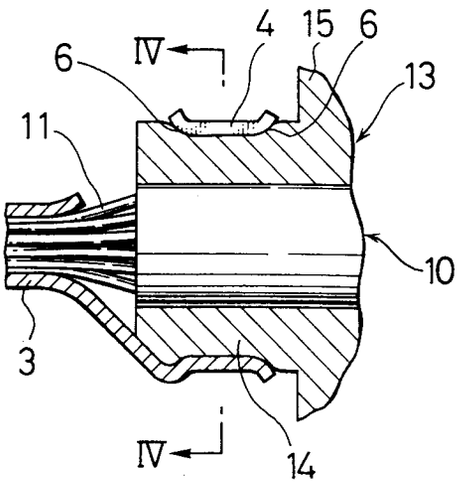
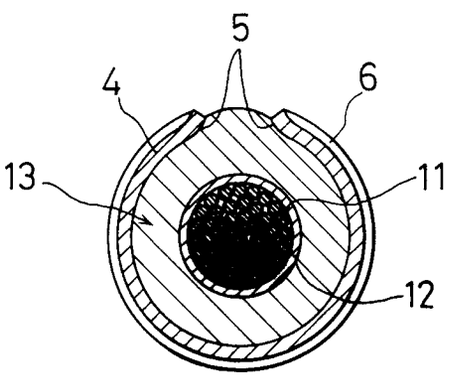


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number

EP 92 11 0123

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	US-A-3 605 077 (AMP INC.) * column 1, line 20 - line 27 * * column 1, line 36 - line 38; figures 3-5 * ---	1	H01R4/18
A	WO-A-9 007 807 (AMP INC.) * the whole document * ---	1	
A	US-A-4 174 880 (GENERAL MOTORS CORP.) * figures 5-6 * -----	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24 SEPTEMBER 1992	SIBILLA S.

CATEGORY OF CITED DOCUMENTS

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