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(12) # EUROPEAN PATENT APPLICATION

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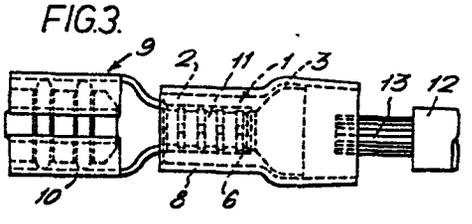
(54) **Electrical connector comprising a crimping ferrule.**

(57) An electrical connector comprises an electrical terminal (9) having a contact end (10) and a crimping ferrule (11) for connection to an electrical conductor (12, 13), the crimping ferrule (11) being received in a metal sleeve (1) which extends beyond the end of the crimping ferrule (11) in the direction away from the contact end (10) of the terminal (9), the metal sleeve (1) in turn being received in an outer sleeve (8) of electrically insulating material. The metal sleeve (1) is a seamless member having a relatively thick wall over the portion (2) overlying the crimping ferrule (11), and a relatively thin wall over the portion (3) extending beyond the end of the crimping ferrule (11). The different thicknesses of the two portions of the metal sleeve ensure reliable crimping of the connector to an insulated conductor at these two positions.

FIG.3.



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TITLE MODIFIED
see front page

Electrical connector.

This invention relates to an electrical connector.

An electrical connector is known which comprises an electrical terminal having a contact end and a crimping ferrule for connection to an electrical conductor, the crimping ferrule being received in a metal sleeve which extends beyond the end of the crimping ferrule in the direction away from the contact end of the terminal, the metal sleeve in turn being received in an outer sleeve of electrically insulating material.

For use of such a connector, a bared end portion of the conductor of an insulated electrical conductor is inserted into the crimping ferrule of the terminal through the metal sleeve, with an insulated portion of the conductor positioned in the portion of the metal sleeve which extends beyond the crimping ferrule of the terminal.

The crimping ferrule is then crimped onto the conductor through the overlying outer insulating sleeve and the metal sleeve, both of which are also permanently deformed by such crimping, and the portion of the metal sleeve which extends beyond the crimping ferrule is crimped about the insulation of the conductor through the overlying outer insulating sleeve which is also permanently deformed by this crimping.

Such an electrical connector has the advantages that the terminal can be made from relatively thin stock material thereby to ensure necessary spring properties for the contact end thereof, the metal

sleeve serving to increase the thickness of metal at the crimping ferrule of the terminal, thereby to ensure reliable crimping of the terminal to the conductor.

However, difficulties still arise with such connectors since if the metal sleeve is made sufficiently thick to ensure satisfactory crimping at the crimping ferrule, then it is often too thick for satisfatory crimping of the portion thereof overlying the conductor insulation to be easily carried out.

According to this invention an electrical connector comprising an electrical terminal having a contact end and a crimping ferrule for connection to an electrical conductor, the crimping ferrule being received in a metal sleeve which extends beyond the end of the crimping ferrule in the direction away from the contact end of the terminal, the metal sleeve in turn being received in an outer sleeve of electrically insulating material, is characterised in that the metal sleeve is a seamless member having a relatively thick wall over the portion overlying the crimping ferrule, and a relatively thin wall over the portion extending beyond the end of the crimping ferrule.

The connector of this invention has the advantage that the two portions of the metal sleeve inherently have the necessary characteristics to enable the connector to be easily and reliably crimped to an insulated conductor.

Similar connectors are known in which the metal sleeve is formed from sheet metal, and has a longitudinally extending open seam, the thick wall portion of the metal sleeve being formed by turning a portion of the sheet metal back on itself.

Such known connectors are difficult to

manufacture, and are not always reliable in use since in view of the open seam, the metal sleeve can relax.

An electrical connector according to this invention will now be described by way of example with reference to the drawings, in which:-

Figure 1 is a side elevational view, partly in cross-section, of a metal sleeve of the connector;

Figure 2 is a sectional plan view of the sleeve of Figure 1 received in an outer insulating sleeve of the connector; and

Figure 3 is a plan view of the complete connector.

Figure 1 shows a seamless circular cross-section metal sleeve 1 having a relatively thick wall portion 2 and a relatively thin wall portion 3. Such a metal sleeve can be formed by conventional metal working techniques.

Between the portions 2 and 3 is an intermediate portion 4 providing a funnel entry 5 from the portion 3 into the portion 2. The intermediate portion 4 also provides a shoulder 6 facing into the portion 2.

The free end 7 of the portion 3 is flared outwardly to provide a funnel entry thereto.

Referring now to Figure 2, this shows the metal sleeve 1 received in an outer sleeve 8 of electrically insulating plastics material, which outer sleeve 8 extends beyond the free end 7 of the portion 3 of the sleeve 1.

Figure 3 shows the complete connector which includes an electrical terminal 9 having a receptacle contact end 10 for mating with a flat tab (not shown) and a crimping ferrule 11 of known form for connection to an electrical conductor, the crimping ferrule 11 being received in the portion 2 of the metal sleeve 1 with its insertion limited by the shoulder 6 therein.

For use of the connector, the insulation 12 is stripped from a portion at the end of an insulated electrical conductor 13, and the end portion is then inserted into the free end of the outer sleeve 8 with the end of the conductor 13 being guided into the crimping ferrule 11 by the funnel entry 5 of the metal sleeve 1, which funnel entry 5 also serves to limit insertion of the conductor by engagement of the insulation 12 on the conductor with the funnel entry 5. The crimping ferrule 11 is then crimped down onto the conductor 13 through the outer sleeve 8 and the portion 2 of the metal sleeve 1, and the portion 3 of the metal sleeve 1 can be crimped down onto the insulation 12 of the conductor through the outer sleeve 8, in known manner.

The relatively thick wall of the portion 2 of the metal sleeve 1 ensures reliable crimping of the connector 1 onto the conductor 13 even when the material from which the terminal 9 is made is relatively thin as may be necessary to ensure the necessary spring properties for the receptacle end 10 thereof, while the relatively thin wall of the portion 3 of the metal sleeve 1 allows for easy crimping of this portion onto the insulation 12 of the conductor. Further, the absence of a seam in the metal sleeve 1 ensures that the metal sleeve 1 will not relax after crimping as could occur if the metal sleeve 1 had a longitudinally extending open seam as found in some known connectors.

Claims:

1. An electrical connector comprising an electrical terminal having a contact end and a crimping ferrule for connection to an electrical conductor, the crimping ferrule being received in a metal sleeve which extends beyond the end of the crimping ferrule in the direction away from the contact end of the terminal, the metal sleeve in turn being received in an outer sleeve of electrically insulating material, characterised in that the metal sleeve (1) is a seamless member having a relatively thick wall over the portion (2) overlying the crimping ferrule (11), and a relatively thin wall over the portion (3) extending beyond the end of the crimping ferrule (11).

2. A connector as claimed in Claim 1, characterised in that the metal sleeve (1) has an intermediate portion (4) between the relatively thick wall and relatively thin wall portions (2 and 3), the intermediate portion (4) providing a funnel entry from the thin wall portion (3) into the thick wall portion (2).

3. A connector as claimed in Claim 2, characterised in that the intermediate portion (4) provides a shoulder (6) facing into the thick wall portion (2).

4. A connector as claimed in Claim 2 or Claim 3, characterised in that the free end (7) of the thin wall portion (3) of the metal sleeve (1) is flared outwardly to provide a funnel entry thereto.

FIG.1.

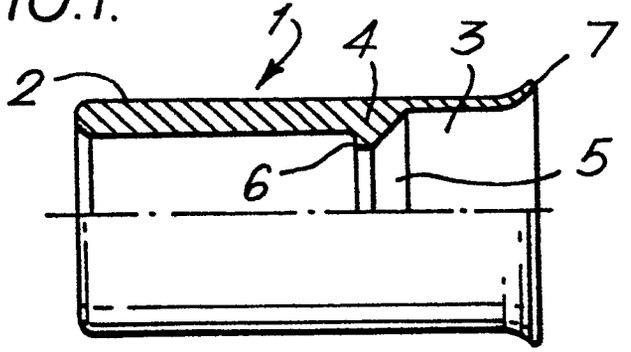


FIG.2.

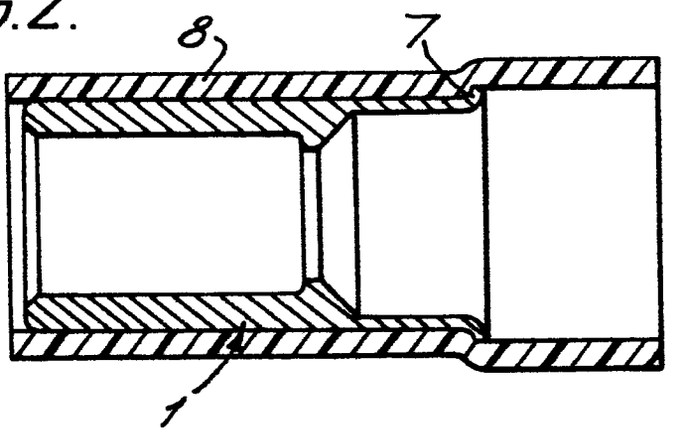
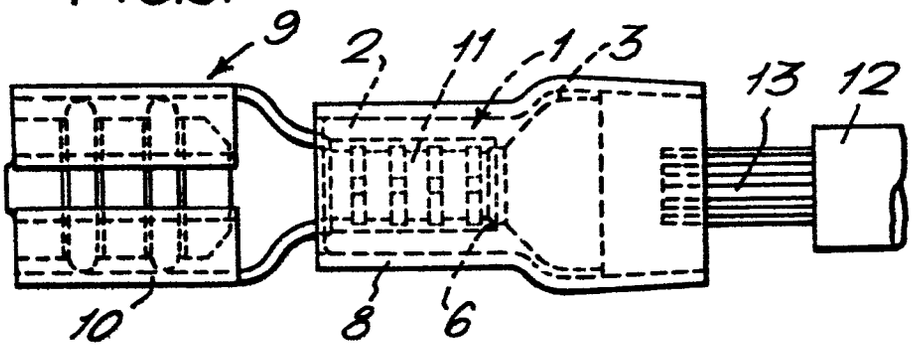


FIG.3.



European Patent Office

EUROPEAN SEARCH REPORT

0004146
Application number
EP 79 30 0267

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
A	GB - A - 885 233 (GENERAL ELECTRIC) * Page 2, lines 7-81; figures *	1
A	US - A - 3 844 923 (SANDROCK) * Column 2, lines 33-52; figures 2-5 *	1
A	US - A - 2 958 723 (THOMAS & BETTS) * Column 3, lines 63-75; figures *	1,4
A	US - A - 3 356 987 (AMP) * Figures *	2,3
A	FR - A - 2 048 467 (LUCAS) * Figures *	1,2
A	FR - A - 925 224 (BRITISH INSULATED) * Figures *	1

CLASSIFICATION OF THE APPLICATION (Int. Cl.³)

H 01 R 13/35

TECHNICAL FIELDS SEARCHED (Int.Cl.³)

H 01 R 13/36
13/38
5/08
5/10
5/00

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28-05-1979	RAMBOER

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