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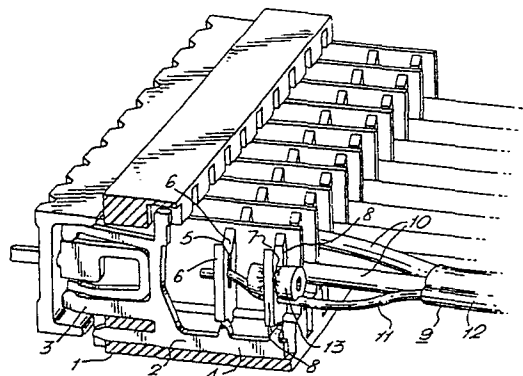
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54 Method of terminating shielded electrical cable and an assembly comprising an electrical connector terminating such cable.

57 The uninsulated drain wire (11) of a shielded electrical cable (9) is connected to an insulation displacement terminal (2) of a multi-terminal connector, the terminal (2) being identical to those used for insulated conductors (10) of the cable (9), with the drain wire (11) being received in the conductor-connection slot (5) of the terminal (2) and being wedged in the associated strain-relief slot (7) of the terminal (2) by means of a plug (13) of resilient material.



EP 0 027 696 A1

Method of terminating shielded electrical cable and an assembly comprising an electrical connector terminating such cable.

This invention relates to a method of terminating
5 so-called shielded electrical cable, that is cable
comprising one or more insulated conductors contained
within a common outer insulating jacket together with
an uninsulated conductor known as the drain wire, and a
metal foil shield surrounding the insulated conductors
10 and the uninsulated conductor within the outer jacket,
and in contact with the drain wire, and to an assembly
comprising an electrical connector terminating such
cable.

A type of electrical connector in common use is
15 one using so-called insulation displacement terminals,
such terminals having a conductor-connection portion
comprising a pair of arms together defining a slot into
which an insulated electrical conductor can be forced
transversely of its axis, such that the edges of the
20 slot penetrate the insulation of the conductor and
establish an electrical connection to the conductive
core thereof. The advantages arising from the use of
such terminals are well known, and will not therefore
be discussed in this specification. Such insulation
25 displacement terminals often have an integrally formed
second portion comprising a pair of arms together
defining a second slot aligned with the slot of the
conductor-connection portion, and into which the insulated
conductor is forced as it is forced into the conductor-
30 connection portion slot. However, this second slot is

wider than the conductor-connection slot such that the insulation of the conductor is merely gripped but not penetrated up to the conductive core of the conductor. This second portion thus provides strain relief for the connection between the conductive core of the conductor and the conductor-connection portion slot, from forces applied to the conductor.

A difficulty which arises when such a connector using such insulation displacement terminals is to be used to terminate shielded cable as set out above, is that while the insulated conductors of the cable can be satisfactorily terminated by individual terminals each having a conductor-connection slot at which a connection is made to the conductive core of the conductor and a strain relief slot at which the insulation of the conductor is gripped, the uninsulated drain wire, while being satisfactorily gripped by the conductor-connection slot of its associated terminal, will be loose in the strain relief slot of the associated terminal if, as is desirable from a connector manufacturing point of view, all of the terminals of the connector have similar conductor-connection portions. Thus, the connection between the drain wire and the associated terminal will not have any strain relief facility, and the connection can be easily broken or the drain wire damaged.

According to this invention there is provided a method of terminating shielded electrical cable as herein defined, using an electrical connector having insulation displacement terminals each with a conductor-connection portion comprising a pair of arms together defining a slot into which an insulated electrical conductor can be forced transversely of its axis such that the edge of the slot penetrate the insulation of the conductor and establish an electrical connection to the conductive core thereof, and an integrally formed

strain relief portion comprising a pair of arms together defining a slot aligned with the conductor-connection slot and into which the insulated conductor is forced as it is forced into the conductor-connection slot, the strain relief slot being wider than the conductor-connection slot such that the insulation of the conductor is gripped but not penetrated up to the conductive core of the conductor by the edges of the strain relief slot, characterised in that the drain wire of the cable is connected to a terminal of the connector by forcing the drain wire into the conductor-connection slot of the terminal to be gripped thereby with the drain wire extending through the strain relief slot of the terminal, and then forcing a plug of resilient material into the strain relief slot of the terminal over the drain wire therein such that the plug and drain wire become wedged in the strain relief slot of the terminal.

The plug can be applied as a separate individual member, but is preferably cut from a strip of material, such as a tube or solid strip of plastics material, and inserted into the strain relief slot simultaneously with connection of the drain wire and the insulated conductors of the shielded cable to their respective terminals of the connector by means, for example, of an automatic or semi-automatic machine.

The method of this invention has the advantage that the plug, by wedging the drain wire in the strain relief slot of the terminal connected thereto, provides strain relief for the connection between the drain wire and the conductor-connection slot of the terminal.

Also according to this invention there is provided an assembly comprising an electrical connector terminating shielded electrical cable as herein defined, the connector having insulation displacement terminals all with identical conductor-connection portions, each such

portion comprising a pair of arms together defining a slot in which an insulated electrical conductor of the cable is received transversely of its axis with the edges of the slot having penetrated the insulation of the conductor to establish an electrical connection to the conductive core thereof, and an integrally formed strain relief portion comprising a pair of arms together defining a slot aligned with the conductor-connection slot and in which the insulated conductor is received, the strain relief slot being wider than the conductor-connection slot such that the insulation of the conductor is gripped but not penetrated up to the conductive core of the conductor by the edges of the strain relief slot, characterised in that the drain wire of the cable is received in the conductor-connection slot of a terminal of the connector and is gripped thereby, the drain wire extending through the strain relief slot of the terminal with a plug of resilient material received in the strain relief slot of the terminal over the drain wire therein, the plug and drain wire being wedged in the strain relief slot of the terminal.

This invention will now be described by way of example with reference to the drawing which is a sectioned perspective view of an electrical connector having a shielded cable connected thereto by the method of this invention.

The drawing shows an electrical connector comprising a housing 1 moulded of electrically insulating plastics material and carrying a row of electrical terminals 2 each having a receptacle portion 3, shown mated with a terminal of another connector, and a conductor-connection portion 4. This connector is described in detail in British Patent Specification No. 1527035 and will not therefore be described in detail herein.

Each terminal 2 is stamped and formed from sheet

metal, and the conductor-connection portion 4 comprises a conductor-connection slot 5 defined by a pair of arms 6 and into which an insulated conductor can be forced transversely of its axis such that the edges of the slot 5 penetrate the insulation of the conductor and establish an electrical connection to the conductive core thereof, and a strain relief slot 7 aligned with the slot 5 and also defined by a pair of arms 8, the slot 7 being wider than the slot 5 and receiving a portion of an insulated conductor forced into the slot 5, the slot 7 merely gripping the insulation of the conductor without penetrating up to the core thereof.

The drawing also shows a shielded electrical cable 9 comprising two insulated conductors 10 and an uninsulated drain wire 11 contained within a common insulating jacket 12, the conductors 10 and 11 being surrounded by an aluminium foil (not shown) also contained within the jacket 12 and in contact with the drain wire 11.

The insulated conductors 10 are connected to individual terminals 2 of the connector in known manner, and the drain wire 11 is also connected to an individual terminal 2 of the connector. The drain wire 11 is received and gripped in the conductor-connection slot 5 of the associated terminal 2, and passes through the strain relief slot 7 of the terminal 2.

By the method of this invention a plug 13 in the form of a short length of plastics material tubing is forced into the strain relief slot 7 of the terminal 2 associated with the drain wire 11, over the drain wire 11 therein, forcing the drain wire 11 to the bottom of slot 7, thus wedging the drain wire 11 and the plug 13 in the strain relief slot 7 thereby to provide strain relief for the connection between the drain wire 11 and the conductor-connection slot 5 of the associated

terminal 2.

The conductors 10 and the drain wire 11 are all simultaneously connected to their respective terminals 2 by use of a machine which also cuts the plug 13 from a strip of plastics material tubing and inserts the
5 plug 13 into the slot 7 simultaneously with the drain wire 11.

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Claims:

1. A method of terminating shielded electrical cable as herein defined, using an electrical connector having insulation displacement terminals each with a conductor-connection portion comprising a pair of arms together defining a slot into which an insulated electrical conductor can be forced transversely of its axis such that the edges of the slot penetrate the insulation of the conductor and establish an electrical connection to the conductive core thereof, and an integrally formed strain relief portion comprising a pair of arms together defining a slot aligned with the conductor-connection slot and into which the insulated conductor is forced as it is forced into the conductor-connection slot, the strain relief slot being wider than the conductor-connection slot such that the insulation of the conductor is gripped but not penetrated up to the conductive core of the conductor by the edges of the strain relief slot, characterised in that the drain wire (11) of the cable (9) is connected to a terminal (2) of the connector by forcing the drain wire (11) into the conductor-connection slot (5) of the terminal (2) to be gripped thereby with the drain wire (11) extending through the strain relief slot (7) of the terminal (2), and then forcing a plug (13) of resilient material into the strain relief slot (7) of the terminal (2) over the drain wire (11) therein such that the plug (13) and drain wire (11) become wedged in the strain relief slot (7) of the terminal (2).

2. A method as claimed in Claim 1, characterised in that the plug (13) is cut from a strip of material and inserted into the strain relief slot (7) simultaneously with connection of the drain wire (11) and the insulated conductors (10) of the shielded cable (9) to their respective terminals (2) of the connector.

3. A method as claimed in Claim 1 or Claim 2, characterised in that the plug (13) is a short length of plastics material tubing.

5 4. A method as claimed in Claim 1 or Claim 2, characterised in that the plug (13) is a short length of a solid strip of plastics material.

10 5. An assembly comprising an electrical connector terminating shielded electrical cable as herein defined, the connector having insulation displacement terminals all with identical conductor-connection portions, each such portion comprising a pair of arms together defining a slot in which an insulated electrical conductor of the cable is received transversely of its axis with the edges of the slot having penetrated the insulation of the conductor to establish an electrical connection to the conductive core thereof, and an integrally formed strain relief portion comprising a pair of arms together defining a slot aligned with the conductor-connection slot and in which the insulated conductor is received, the strain relief slot being wider than the conductor-connection slot such that the insulation of the conductor is gripped but not penetrated up to the conductive core of the conductor by the edges of the strain relief slot, characterised in that the drain wire (11) of the cable (9) is received in the conductor-connection slot (5) of a terminal (2) of the connector and is gripped thereby, the drain wire (11) extending through the strain relief slot (7) of the terminal (2) with a plug (13) of resilient material received in the strain relief slot (7) of the terminal (2) over the drain wire (11) therein, the plug (13) and drain wire (11) being wedged in the strain relief slot (7) of the terminal (2).

35 6. An assembly as claimed in Claim 5, characterised in that the plug (13) is a short length of plastics

material tubing.

7. An assembly as claimed in Claim 5, characterised
in that the plug (13) is a short length of a solid
strip of plastics material.

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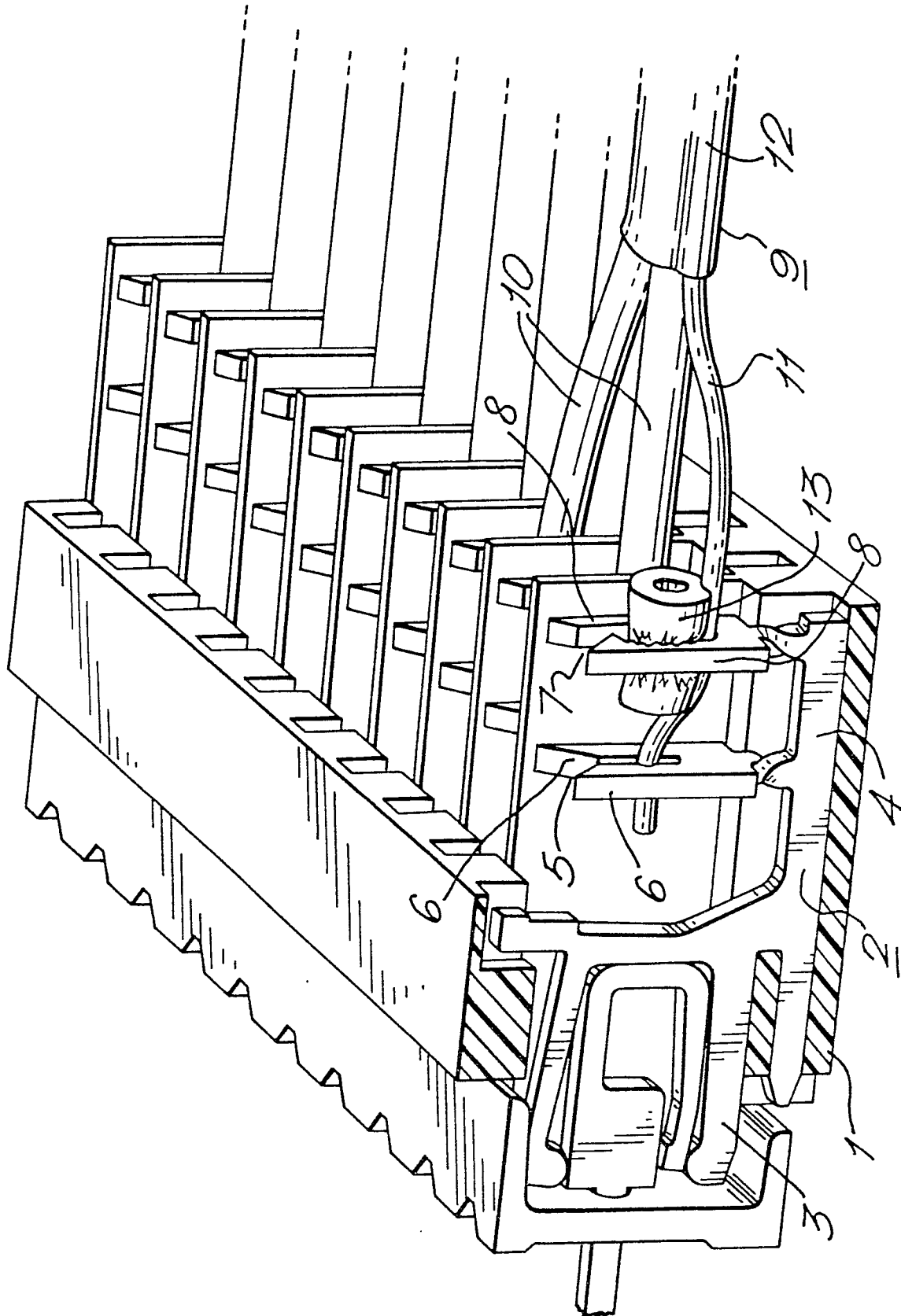
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DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	<u>US - A - 1 643 658</u> (F.F. HILLIX) * Page 1, lines 40-103; figures * --	1	H 01 R 13/58
A	<u>US - A - 3 920 301</u> (AMP) * Column 3, line 66 - column 4, line 69; figures * --	1,2,4	
A	<u>DE - A - 2 748 192</u> (TELEFONBAU) * Page 4, last paragraph - page 5, paragraph 1; figures * --	1	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
A	<u>DE - C - 628 372</u> (BREITLING) * Lines 31-45; figures * ----	1	H 01 R 13/58 4/24
			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	27-01-1981	RAMBOER	