

12

EUROPEAN PATENT APPLICATION

21 Application number: 79301322.8

51 Int. Cl.³: **H 01 R 4/24**
H 01 R 23/66

27 Date of filing: 09.07.79

43 Date of publication of application:
14.01.81 Bulletin 81 2

84 Designated Contracting States:
AT BE CH DE FR GB IT NL SE

71 Applicant: **AMP INCORPORATED**
Eisenhower Boulevard
Harrisburg, Pennsylvania(US)

72 Inventor: **Hopkins, John Root**
120 Primrose Drive
Hershey, Pennsylvania 17033(US)

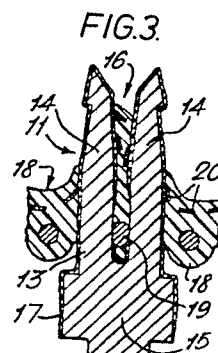
72 Inventor: **Stape, William Joseph**
R.D. No. 1
Lewisberry, Pennsylvania 17339(US)

72 Inventor: **Weber, Robert Ney**
29 S, Railroad Street
Hummelstown, Pennsylvania 17036(US)

74 Representative: **Stuart-Prince, Richard Geoffrey et al,**
20 Queensmere
Slough, Berkshire SL1 1YZ(GB)

54 Electrical connection to multilayer cable.

57 A connection between a terminal (11) having a pair of spaced insulation piercing blades (14) defining between them a wire-receiving slot (16) and a multilayer cable (18) in which a wire (19) in the first conductive layer is jammed in the slot (16) to establish electrical connection with the terminal (11) and portions of the blades (14) penetrating the second conductive layer (20) are coated with insulation (17) to prevent inadvertent connection with the terminal (11).



Electrical connection to multilayer cable.

The invention relates to an electrical connection between a multilayer cable comprising a first layer of elongate conductors located in spaced parallel relation and a second conductive layer, spaced from the first layer, both layers being completely embedded in insulating material.

The second conductive layer may constitute a shield and comprise a mesh or series of relative fine, conductive strands or a conductive foil.

A problem arises in terminating the cable as the second layer is very close to the first layer. It had previously been considered necessary to remove the second conductive layer adjacent regions where connection is made to the first layer to prevent inadvertent electrical connection between the second conductive layer and terminals connected to the first layer.

However, this is a time consuming and relatively expensive procedure which also may result in deterioration of the electrical characteristics of the cable as a result of shield removal.

An electrical connection between a terminal and a multilayer cable comprising a first layer of elongate conductors located in spaced, parallel relation and a second conductive layer, spaced from the first layer, both layers being completely embedded in insulating material, the terminals having a contact portion and a conductor-connecting portion at respective opposite ends, the conductor-

connector portion comprising a pair of insulation
penetrating blades defining between them a
conductor-receiving slot and being pointed at
their free ends, the conductor-connecting portion
5 having been forced into the cable so that a
conductor of the first layer is jammed in the slot
with the edges of the blades defining the slot
establishing electrical connection to the
conductor, according to the invention is
10 characterised in that the blades have an insulating
coating adjacent their free ends which penetrate
the second conductive layer, the insulating coating
ensuring that there is no electrical connection
between the second conductive layer and the terminal.

15 Thus, the need to remove the shield is
obviated with consequential saving in applied cost
and the electrical characteristics of the cable
remain substantially unimpaired.

In one example of the invention, the entire
20 surface of the blades has been coated with
insulation, portions of which have been rubbed from
the edges of the blades defining the slot by
movement of the conductor into the slot.

Examples of the invention will now be described
25 with reference to the accompanying drawings, in
which:-

Figure 1 is a perspective view of a terminal
used in the connection;

Figure 2 is a perspective view of a multilayer
30 flat cable connected to terminals of Figure 1;

Figure 3 is a cross-sectional view taken
along line 3-3 of Figure 2 showing an individual
connection; and

Figure 4 is a perspective view of a second
35 example of terminal for use in the connection.

The first example of terminal 11 is similar to that described in U.S. Patent No. 3,820,055 and is stamped from sheet metal to provide a contact portion 12 and a conductor-connecting portion 13 at respective opposite ends of a body portion 15. The conductor-connecting portion 13 comprises a pair of insulation penetrating blades 14 pointed at their free ends and defining between them a conductor-receiving slot 16. The conductor-connecting and wire-receiving portions are coated with insulation 17.

The multilayer cable 18 is of conventional construction and comprises a first layer of elongate wires 19 located in spaced, parallel relation and a second conductive layer 20 of relatively fine wires spaced from the first layer, both layers being completely embedded in insulating material.

Connection between a conductor 19 and a terminal 11 is effected by urging the cable and terminal relatively together so that the blades penetrate the cable insulation and the conductor is forced into the slot 16. During the final stages of movement into the slot, the conductor 19 rubs away portions of the insulation 17 at the slot edges enabling electrical connection to be established between the terminal and the conductor. As shown in Figure 3, although the blades 14 penetrate the second conductive layer or shield 20, the terminal insulation 17 prevents undesirable electrical connection between the terminal and the shield.

In an alternative example, shown in Figure 4, only portions adjacent the free ends of the blades 21 of the terminal 22 are coated with insulation 23.

It will be appreciated that, in practice, the terminals will be mounted in an insulating housing for application to the cable as described in the above-mentioned specification.

5 The terminals may be coated with one of several materials including polyesters, vinyls, urethane, enamels, acrylics, metallic oxides, nylon epoxy and epoxy phenolic resins. The coating may be made using one of several methods
10 including dipping, spraying, passing through a fluidized bed of powdered material, plating and electrodeposition.

15

20

25

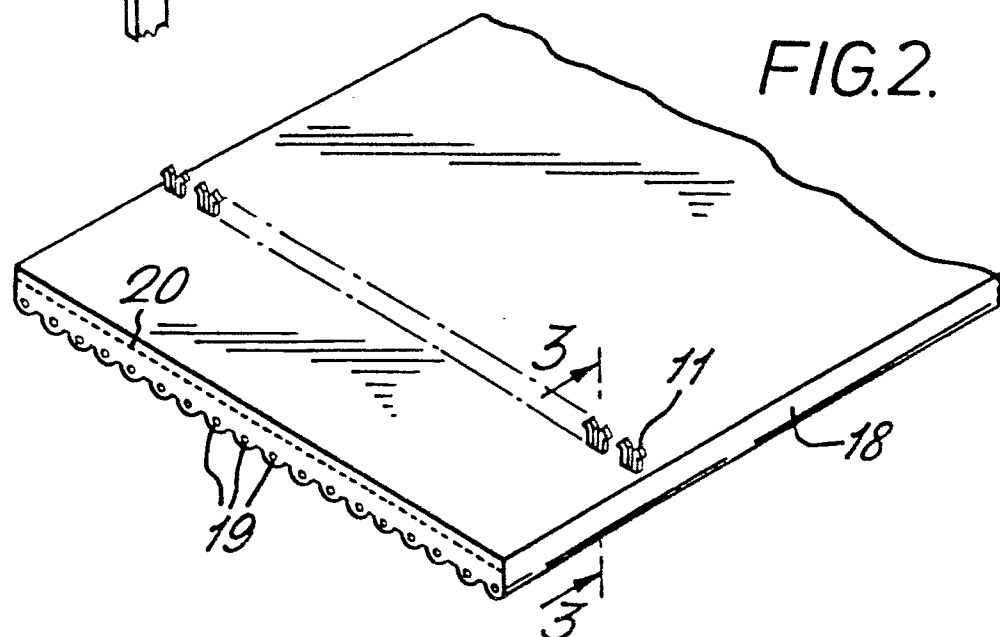
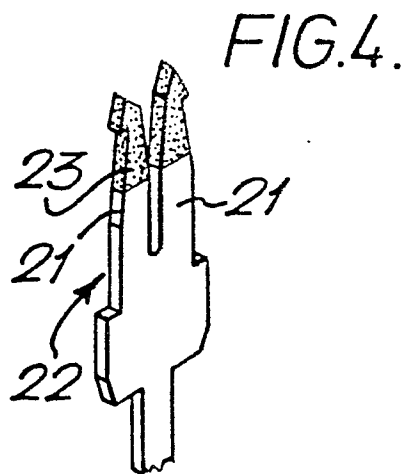
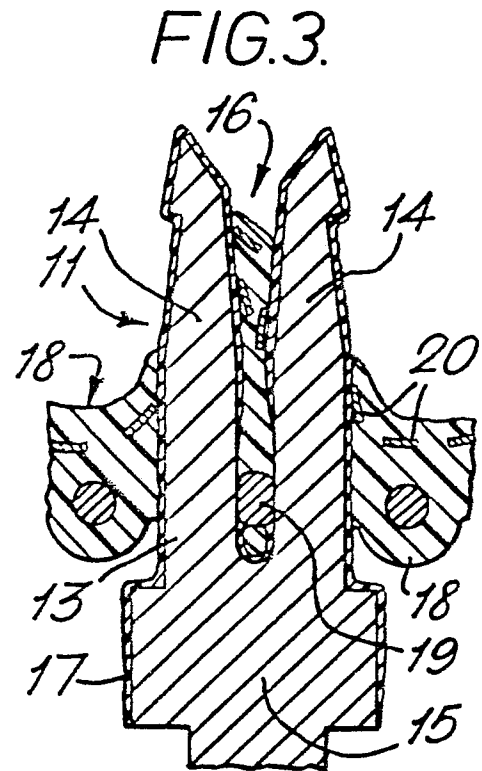
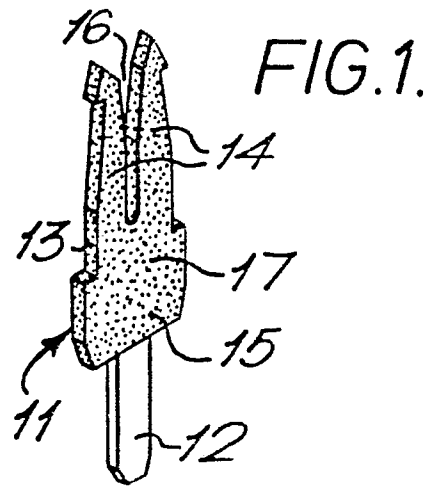
30

35

Claims:

1. An electrical connection between a terminal and a multilayer cable comprising a first layer of elongate conductors located in spaced, parallel relation, and a second conductive layer, spaced from the first layer, both layers being completely embedded in insulating material, the terminals having a contact portion and a conductor-connecting portion at respective opposite ends, the conductor-connecting portion comprising a pair of insulation penetrating blades defining between them a conductor-receiving slot and being pointed at their free ends, the conductor-connecting portion having been forced into the cable so that a conductor of the first layer is jammed in the slot with the edges of the blades defining the slot establishing electrical connection to the conductor, characterised in that the blades (14 or 21) have an insulating coating (17 or 23) adjacent their free ends which penetrate the second conductive layer (20), the insulating coating (17 or 23) ensuring that there is no electrical connection between the second conductive layer (20) and the terminal (11 or 22).
2. An electrical connection according to Claim 1, characterised in that substantially the entire surface of the blades (14) has been coated with insulation (17), portions of which have been rubbed from the edges of the blades (14) defining the slot (16) by movement of the conductor (19) into the slot (16).

1/1





European Patent
Office

EUROPEAN SEARCH REPORT

0022143

Application number

EP 79 301 322.8

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 - 3 976 350</u> (KEGLEWITSCH) * claim 1, column 3, lines 7 to 23; column 3, lines 46 to 68; fig. 1 to 4 * --		H 01 R 4/24 H 01 R 23/66
A	<u>US - A - 3 818 415</u> (EVANS et al.) * column 3, lines 3 to 60; column 4, lines 27 to 37; fig. 1 to 6 * --		TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
A	<u>DE - A1 - 2 644 296</u> (SIEMENS) * claims 1 to 3; fig. 1 to 6 * --		H 01 R 4/24 H 01 R 23/00
D, A	<u>US - A - 3 820 055</u> (HUFFNAGLE et al.) * complete document * ----		
			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
☒ The present search report has been drawn up for all claims			&: member of the same patent family, corresponding document
Place of search Berlin		Date of completion of the search 19-02-1980	Examiner HAHN