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(12) # EUROPEAN PATENT APPLICATION

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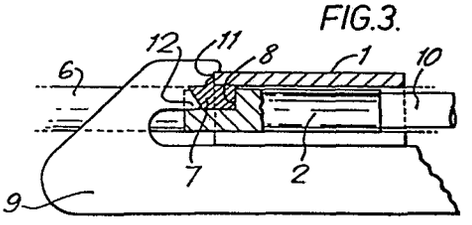
(54) **Improved wedge type electrical connector.**

(57) In an electrical connector of the kind comprising a wedge (2) adapted to trap wires between sides of the wedge (2) and complementary sides of a generally C-shaped receptacle (1), the wedge (2) at its leading end is formed with a weakened zone (8) adapted to allow penetration of a tool spike (12), on driving the wedge (2) into the receptacle (1), and deformation of metal at a side of the zone (8) to engage an end face of the receptacle (1) and thereby secure the wedge (2). This allows use of harder metals than the conventional copper or aluminium, e.g. aluminium or manganese bronze, which allow for interconnection of aluminium and copper cables without galvanic corrosion problems.

FIG.3.



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Improved Wedge Type Electrical Connector.

This invention relates to electrical connectors of the kind comprising a receptacle and a wedge shaped plug for trapping wires between surfaces of the plug and receptacle.

In our UK patent specification 1,030,058 we have disclosed a method of using such a connector in which a portion of the wedge is deformed to engage an end face of the receptacle to prevent withdrawal or release of the wedge due, for example, to temperature variation or under vibration.

Such connectors have been successfully used according to this method for some years, the connector parts being made, for example, of aluminium or copper, and being used for connecting aluminium or copper conductors, but problems of tool wear arise due to high forces developed on the spike of the tool arranged to deform the wedge.

It is an object of the invention to enable connections to be made with reduced tool wear and to enable wedges of harder material than hitherto to be used.

In a connector of the kind specified, according to the invention, the wedge at its leading end is formed with a weakened zone adapted to allow penetration of a tool spike and deformation of metal at a side of the zone to engage an end face of the receptacle.

The weakened zone may, for example, comprise an aperture, open at the leading end of the wedge with side wall portions arranged for lateral deformation.

In an alternative embodiment the weakened zone is formed by an insert of metal which is soft relative to the metal of the wedge.

Suitably the insert is of dovetail form and is contained within a dovetail shaped aperture at a side of the wedge leading end, the narrow ends of the dovetails being disposed at the wedge leading end.

The wedge and the receptacle are suitably of a metal or alloy of metals lying between copper and aluminium on the electro potential scale so that the connector can be used to interconnect copper and aluminium conductors with reduced risk of galvanic erosion.

Preferably the wedge is of maganese bronze or aluminium bronze, and if used with an insert of relatively soft metal, a suitable metal is copper.

The invention will now be described, by way of example with reference to the accompanying diagrammatic drawings, in which:-

Figure 1 is a perspective view of a wedge and receptacle prior to engagement;

Figure 2 is a perspective view of a connection between an aluminium and a copper conductor after formation;

Figure 3 is a fragmentary section of the connection being formed in a tool;

Figure 4 is a side elevation of a wedge of the connector of Figure 1;

Figure 5 is a plan view of the wedge of Figure 4;

Figure 6 is a side elevation of an alternative form of wedge, and

Figure 7 is a view of the wedge of Figure 6 taken from the leading end.

The connector of Figure 1 comprises a C-shaped receptacle 1 for receiving a wedge shaped plug 2, the receptacle tapering towards one end in complementary manner to the wedge, and having arcuate bights 3 complementary to arcuate recesses 4 in opposite sides of the wedge 2.

As shown in Figure 2, the wedge is inserted into the receptacle to trap an aluminium conductor 5, at one side,

and a copper conductor 6 at the other side between sides of the wedge 2 and the bights 3 of the receptacle 1. The leading end of the wedge 2 projects beyond the receptacle 1, and adjacent the closed side of the receptacle, a portion 7 is deformed to engage the leading end of the receptacle and resist withdrawal.

The wedge, as seen in Figures 4 and 5, is formed at one side, at its leading end with a metal insert 8, for example, of copper, which is softer than the metal of the wedge 2 which is, for example, of aluminium bronze or manganese bronze. The insert 8 is of tapered dovetail form, fitting into a complementary recess in the side of the wedge 2.

In use the wedge 2 is fitted within the receptacle 1 with the insert 8 adjacent the closed side of the receptacle, initially loosely to trap the conductors 5 and 6, and the connection is assembled in a tool having a frame 9 supporting a slideable ram 10. The frame is formed with an anvil 11 engaging the end of the closed side of the receptacle 1, and with a sharp projection 12, engaging the insert 8. The ram engages the near end of the receptacle. On driving the ram, for example by explosive force, the wedge 2 is driven into the receptacle 1 to clamp the conductor wires 5 and 6, and the projection 12 deforms or peens the insert 8 over the leading end of the closed side of the receptacle.

In the embodiment of Figures 6 and 7 a wedge 20 is formed at its leading end with an aperture 21 of rectangular form extending through a substantial height of the wedge to define relatively narrow sidewall portions 22 adapted to be deformed laterally on penetration of a tool spike into the aperture, to engage an end face of the complementary receptacle.

Claims:-

1. An electrical connector of the kind comprising a metal receptacle and a wedge for trapping wires between surfaces of the wedge and receptacle characterised by the wedge (2), at its leading end, being formed with a weakened zone (8) adapted to allow penetration of a tool spike (12) and deformation of metal (7) at a side of the zone (8) to engage an end face of the receptacle.

2. A connector as claimed in claim 1, characterised in that the weakened zone comprises an aperture (21), open at the leading end of the wedge (20) and having sidewall portions (22) arranged for lateral deformation to engage the end face of the receptacle.

3. A connector as claimed in claim 1, characterised in that the weakened zone (8) is formed by an insert of metal which is soft relative to the metal of the wedge (2).

4. A connector as claimed in claim 3, characterised in that the insert (8) is of dovetail shape and is contained within a dovetail shaped recess at a side of the wedge (2) leading end, narrow ends of the dovetails being disposed at the wedge (2) leading end.

5. A connector as claimed in any preceding claim characterised in that the receptacle (1) and wedge (2) are of metal, or alloy of metals, lying between copper and aluminium on the electro potential scale.

6. A connector as claimed in claim 5, characterised in that the receptacle (1) and wedge (2) are of manganese bronze or aluminium bronze.

7. A connector as claimed in claim 6 and claim 3 or claim 4, characterised in that the insert (8) is of copper.

FIG.1.

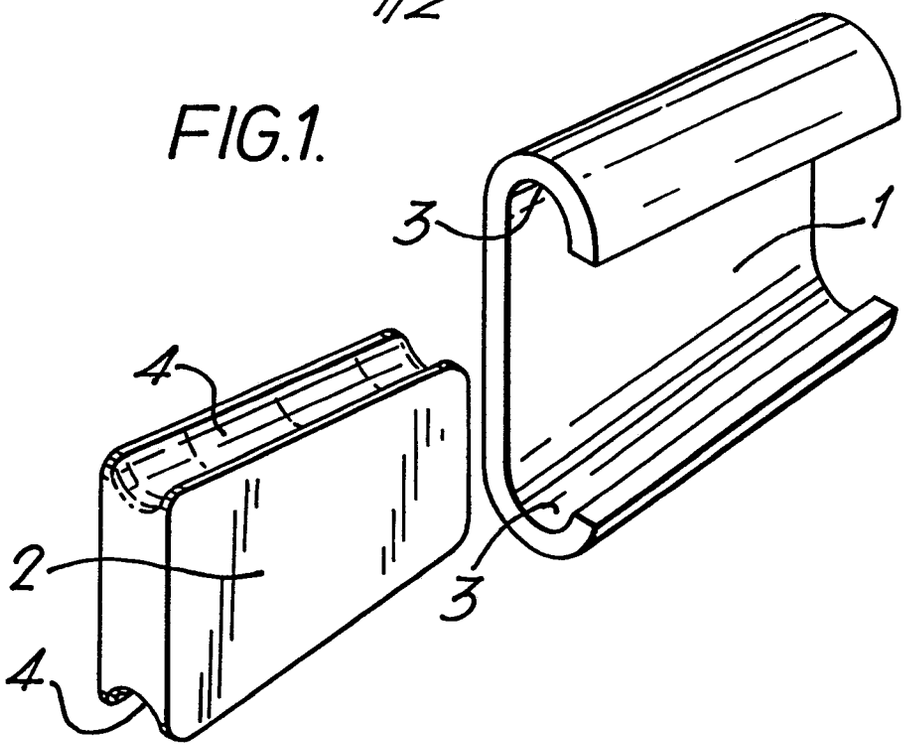


FIG.2.

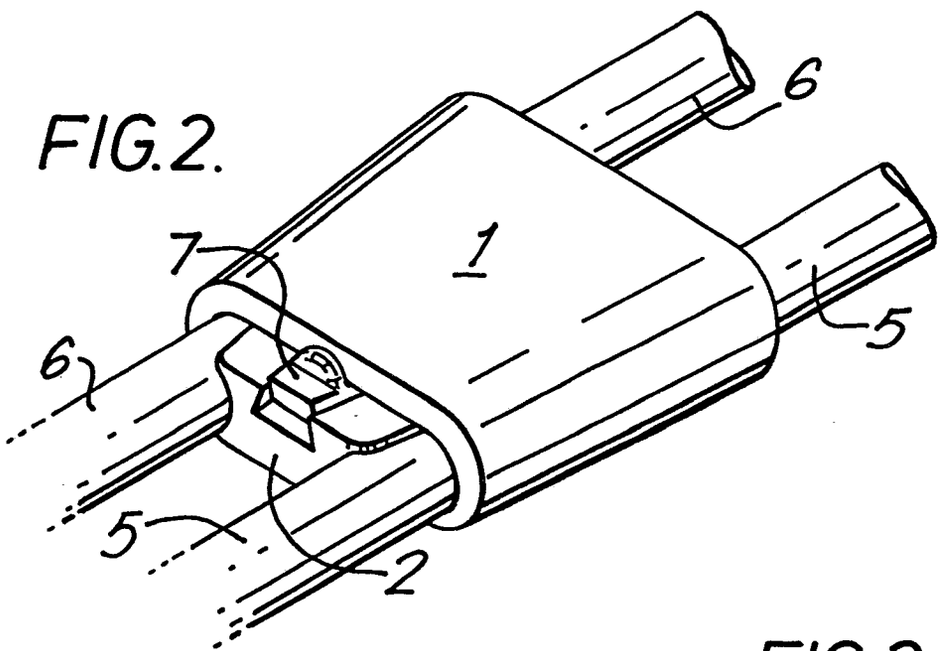


FIG.3.

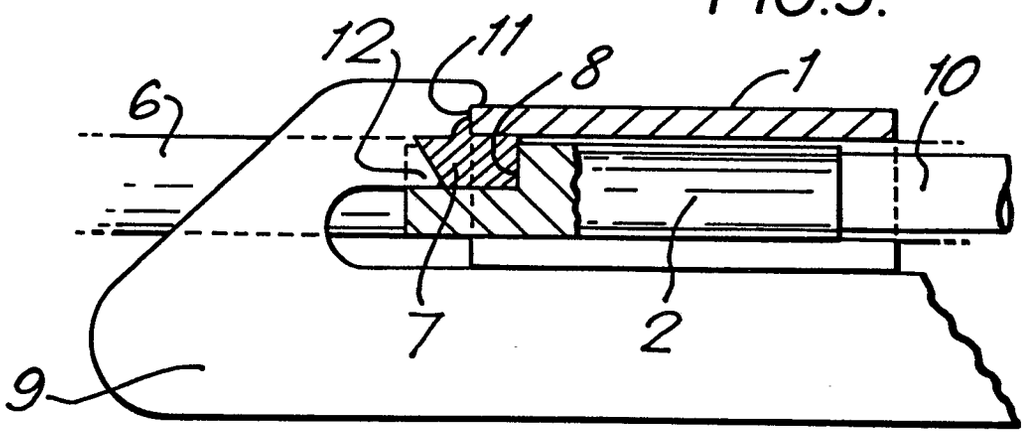


FIG.4.

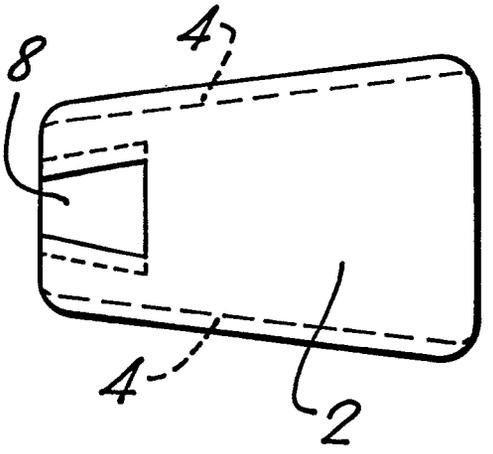


FIG.5.

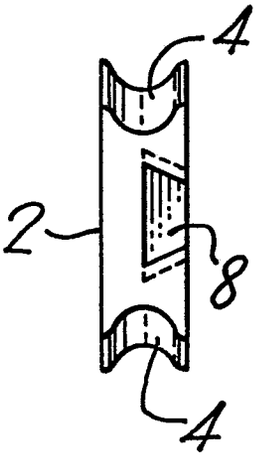


FIG.6.

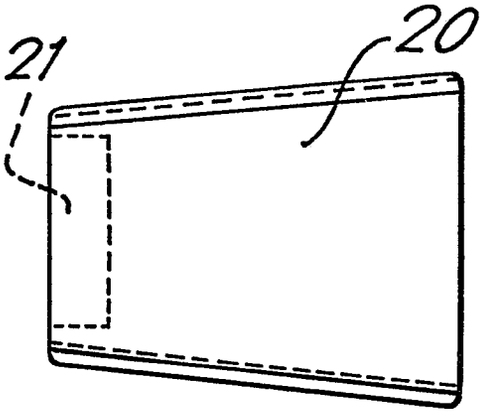
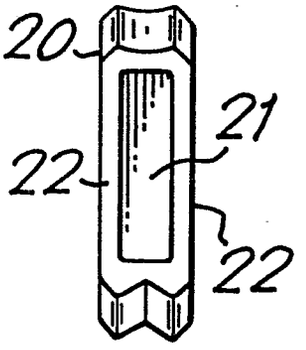


FIG.7.



European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 81 30 4854

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
D,Y	GB - A - 1 030 058 (AMP) * figures *	1
Y	DE - C - 374 103 (WIRSCHITZ) * page 1, lines 46-50; figures *	1,2
A	US - A - 1 859 561 (HAWORTH) * page 2, lines 7-19; figures *	1,2
A	CH - A - 217 595 (VONTOBEL) * the entire document *	5,6

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

H 01 R 4/50

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

H 01 R 4
F 16 B 2
F 16 G 11
H 01 R 43

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same category
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: earlier patent document, but published on, or after the filing date
D: document cited in the application
L: document cited 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	24-02-1982	RAMBOER