(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 057 579**
**A2**

# (12) EUROPEAN PATENT APPLICATION

(21) Application number: **82300451.0**

(51) Int. Cl.³: **H 01 R 4/24**

(22) Date of filing: **28.01.82**

(30) Priority: **30.01.81 GB 8102850**

(43) Date of publication of application: **11.08.82**
**Bulletin 82/32**

(84) Designated Contracting States: **AT BE CH DE FR IT LI LU NL SE**

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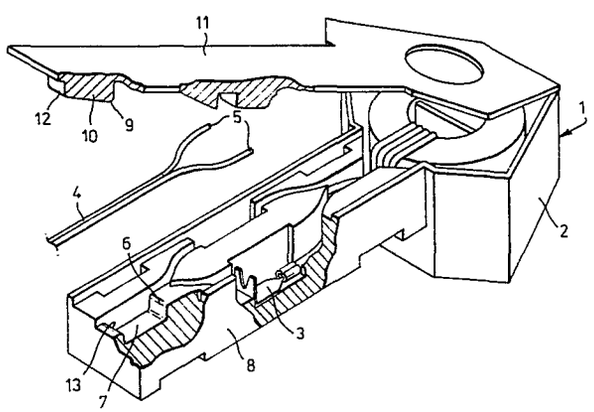
## (54) Electric connectors.

(57) An electric connector (1) comprising a two-part housing (2) of insulating material which has at least one insulation piercing contact (3) mounted in one of the parts (8) of the housing for connection to a respective insulated conductor (5), and conductor clamping means (6, 9) formed by or carried on the two parts (8, 11) of the housing spaced lengthwise from the insulation piercing contact or contacts, the arrangement being such that, when the two parts of the housing are moved together to force the conductor onto its respective insulation piercing contact to make an electrical connection to the contact, said clamping means clamps the insulated conductor in such a way that substantially no tensile force is applied to that part of the conductor extending between the clamping means and the insulation piercing contact.

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# ELECTRIC CONNECTORS

This invention relates to electric connectors.

Electric connectors having a two-part housing with at least one insulation piercing contact mounted in one part of the housing for connection to a respective insulated conductor, and conductor clamping means formed by or carried on the two parts of the housing spaced lengthwise from the insulation piercing contact or contacts are known (for example, as shown in UK Patent Specification No. 1462920).

According to the present invention, in an electric connector comprising a two-part housing of insulating material which has at least one insulation piercing contact mounted in one of the parts of the housing for connection to a respective insulated conductor, and conductor clamping means formed by or carried on the two parts of the housing spaced lengthwise from the insulation piercing contact or contacts, the conductor clamping means is of such a form that, when the two parts of the housing are moved together to force the conductor onto its respective insulation piercing contact to make an electrical connection to the contact, said clamping means clamp the insulated conductor in such a way that substantially no tensile force is applied to that part of the conductor extending between the clamping means and the insulation piercing contact.

Preferably, when the two parts of the housing are moved together, a tensile force is applied to that part of the conductor on the side of the clamping means

remote from the contact or contacts in such a direction as to cause that part of the conductor to move towards the clamping means. By this arrangement, the clamping means can also serve as a stress relief device for the electric connector.

The conductor clamping means preferably comprises a first shoulder on one part of the housing which co-operates with a second shoulder on the other part of the housing in such a way that, as the two parts of the housing are moved together, the insulated conductor is distorted at two longitudinally spaced positions along its length so that the insulated conductor is gripped between the two shoulders as the conductor is forced onto its respective contact. Preferably, also, the connector has two similar co-operating shoulders, one on each part of the housing, positioned on the side of the clamping means remote from the contact or contacts, which shoulders similarly grip the conductor and serve with said first and second shoulders as a strain relief device.

The or each insulation piercing contact preferably has two cutting edges between which the insulated conductor is forced, the cutting edges piercing the insulation on the conductor to mkae the electrical connection between the conductor and its contact. Alternatively, the or each insulation piercing contact can comprise a spike which pierces the conductor insulation to make the electrical connection.

Preferably, the arrangement of the electric connector is such that there is one insulation piercing contact for each insulated conductor. Alternatively, there may be two or more insulation piercing contacts for each insulated conductor.

The two parts of the housing are preferably hinged together. Alternatively, the two parts can be separately formed but capable of being interlocked together.

The invention has the advantage that because no tensile force is applied to that part of the conductor extending between the clamping means and the insulation piercing contact when the two parts of the connector housing are moved together, risk of tearing the conductor and bending of the insulation piercing contact is substantially reduced.

The invention will be further illustrated by a description, by way of example, of a preferred electric connector, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of an electric connector in accordance with the invention; and

Figure 2 (a), (b) and (c) are cross-sectional views of the connector in Figure 1 showing the clamping means and stages of clamping.

The electric connector 1 of part of an electrical detonator circuit shown in Figure 1 comprises a two-part housing 2, two insulation piercing contacts 3 (only one is visible) and clamping means. An electric

cable 4 comprising two insulated conductors 5 is shown ready to be fitted to the connector 1. The clamping means comprises an upstanding shoulder 6 of groove 7 in one part 8 of the housing 2 and a co-operating downwardly projecting shoulder 9 of rib 10 on the other part 11 of the housing 2. The two parts 8, 11 of the housing 2 are hinged together.

The arrangement is such that when the two parts 8, 11 of the housing 2 are moved together, the cable 4 is clamped at point A (Figure 2) between the co-operating shoulders 6, 9 as the conductors 5 are forced onto the insulation piercing contacts 3. Clamping of the cable 4 at point A is so effected that further movement together of the two parts 8, 11 of the housing 2 apply substantially no tensile force to those parts of the conductor 5 extending between point A and the insulation piercing contacts 3, and that a tensile force is applied to that part of the cable 4 on the side of point A remote from the contacts 3 to cause that part of the cable to move in the direction X towards point A. Rib 10 has a second shoulder 12 which moves into groove 7 to co-operate with a second shoulder 13 on the groove which grips the cable 4 to form the stress relief device. Both the clamping means and the stress relief device distort the cable through an angle of substantially 90° at two spaced positions.

Although this invention is described with respect to a connector for part of an electrical detonator circuit this invention is not restricted to

such an arrangement, and is obviously suitable for other similar electric connectors.

CLAIMS

1. An electric connector (1) comprising a two-part housing (2) of insulating material which has at least one insulation piercing contact (3) mounted in one of the parts (8) of the housing for connection to a respective insulated conductor (5), and conductor clamping means (6, 9) formed by or carried on the two parts of the housing (8, 11) spaced lengthwise from the insulation piercing contact or contacts, characterised in that the conductor clamping means is of such a form that, when the two parts of the housing are moved together to force the conductor onto its respective insulation piercing contact to make an electrical connection to the contact, said clamping means clamps the insulated conductor in such a way that substantially no tensile force is applied to that part of the conductor extending between the clamping means and the insulation piercing contact.

2. An electric connector as claimed in Claim 1, wherein the conductor clamping means is also of such a form that, when the two parts of the housing are moved together, a tensile force is applied to that part of the conductor on the side of the clamping means remote from the contact or contacts in such a direction as to cause that part of the conductor to move towards the clamping means.

3. An electric connector as claimed in Claim 1 or Claim 2, wherein the conductor clamping means comprises a first shoulder (6) on one part (8) of the housing which co-operates with a second shoulder (9) on the other part (11) of the housing in such a way that, as the two

parts of the housing are moved together, the insulated conductor is distorted at two longitudinally spaced positions along its length so that the insulated conductor is gripped between the two shoulders as the conductor is forced onto its respective contact.

4. An electric connector as claimed in Claim 3, wherein each part (8, 11) of the housing has another shoulder (13, 12) positioned on the side of the clamping means remote from the contact, said other shoulders co-operating with one another in such a way that, as the two parts of the housing become fully engaged, the insulated conductor is distorted at two longitudinally spaced positions along its length so that the insulated conductor is clamped between the second pair of shoulders.

5. An electric connector as claimed in any one of the preceding claims, wherein the or each insulation piercing contact has two cutting edges between which the insulated conductor is forced, the cutting edges piercing the insulation on the conductor to make the electrical connection.

6. An electric connector as claimed in any one of the preceding claims, wherein the or each insulation piercing contact comprises a spike which pierces the conductor insulation to make the electrical connection.

7. An electric connector as claimed in any one of the preceding claims, wherein there is one insulation-piercing contact for each insulated conductor.

8. An electric connector as claimed in any one of Claims 1 to 6, wherein two or more insulation-piercing contacts are provided for each insulated conductor.

9. An electric connector as claimed in any one of the preceding claims, wherein the two parts of the housing are hinged together.

10. An electric connector as claimed in any one of Claims 1 to 8, wherein the two parts of the housing are separately formed and can be interlocked together.

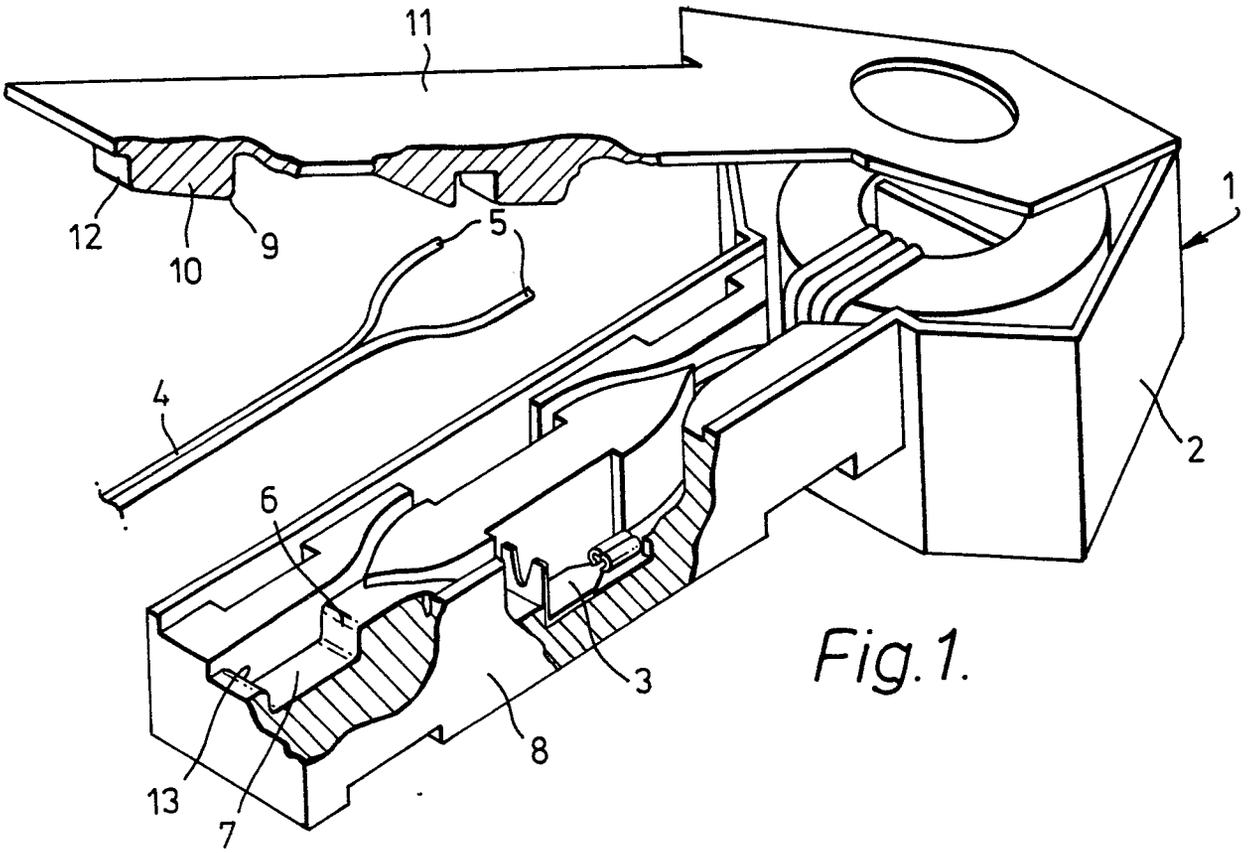


Fig.1.

Fig.2.