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

(11) Publication number: **0 623 974 A2**

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **94106656.5**

(51) Int. Cl.[5]: **H01R 13/58**

(22) Date of filing: **28.04.94**

(30) Priority: **03.05.93 SE 9301508**

(43) Date of publication of application:
09.11.94 Bulletin 94/45

(84) Designated Contracting States:
DE ES FR GB IT

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(54) **Connector for an electric cable with a tensile strain relieving device.**

(57) The invention relates to a connector for an electric cable with a tensile strain relieving device, for example an extension cord socket, a plug or the like. The strain relieving device in the connector comprises a clamping member (6) which consists of a bottom part (8) and an upper part (9), which in open position are interconnected through a foldable spacing piece (10) serving as a joint. The parts (8,9) of the clamping member are designed such that, when being folded over the cable (12), they enter into locking engagement with each other. The strain relieving device (6,7) is connected to the terminal block (2) of the connector and can advantageously be integrated with said terminal block (2).

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The invention relates to a connector for an electric cable with a tensile strain relieving device according to the precharacterising part of claim 1.

The connector comprises a housing which encloses an insulating terminal block with a number of contact members, to which the conductors of a cable, insertable into the housing through an entry opening, can be connected. The connector is provided with a special tensile strain relieving device, such that any tensile strain in the cable is transferred directly to the terminal block and need not be taken up by the screwed connection between the cable conductors and the contact pins or sleeves, which would be unsuitable both from an electrical and a mechanical point of view.

A frequently used design of a tensile strain relieving device of the above-mentioned kind consists of a plane or clamp-shaped cap washer, which by means of two screws presses the cable against a seat on one side of the connection housing. In this design, the cable has to be fixedly pressed in an eccentric position in relation to the longitudinal axis of the connector. This may entail difficulties, especially in the case of coarse and relatively stiff connection cables. The eccentric position of the cable may also result in leakage in the cable entry opening of the housing.

The above-mentioned drawback is avoided in a tensile strain relieving device described in SE-A-399 338, which comprises two clamping members pivotally attached to the terminal block and compressible by means of clamp screws. This design has the additional advantage that the two parts of the strain relieving device can be easily removed from the terminal block when mounting the cable conductors to the contact members of the connector. In this way, the connection is not prevented by any projecting attachments or the like. However, the device is relatively expensive to manufacture and mount since it consists of a plurality of parts.

Other types of cable clamping devices are disclosed in DE-A-1 665 200, EP-A-O 353 539 and US-A-5 280 746.

The invention aims at developing a connector for an electric cable with a tensile strain relieving device of the above-mentioned kind which is simpler and less expensive than the devices described in the above-mentioned publications.

To achieve this aim the invention suggests a connector for an electric cable with a tensile strain relieving device according to the introductory part of claim 1, which is characterized by the features of the characterizing part of claim 1.

Further developments of the invention are characterized by the features of the additional claims.

According to the invention the clamping member of the strain relieving device is designed with a bottom part, which is connected to an upper part via a foldable spacing piece serving as a joint. The two parts are adapted, when being folded together over the cable, to automatically enter into locking engagement with each other. The clamping member is connected to the terminal block of the connector via a bendable strip and can advantageously be made integral with the terminal block.

A strain relieving clamp of the above-mentioned kind is very simple to handle during mounting, both in an automatic mounting device and during normal use by electricians.

By way of example, the invention will now be described in greater detail with reference to the accompanying drawings showing in

Figure 1
an axial section through a plug connector according to the invention,
Figures 2 and 3
in a side view and a plane view, respectively, the terminal block of the connector with an integrated tensile strain relieving device according to a first embodiment of the invention,
Figure 4
an end view of the clamping member of the strain relieving device, in open position,
Figure 5
an end view of the same clamping member, in its engaged position around a cable,
Figures 6 and 7
the features surrounded by the circles A and B, respectively, in Figure 5, on an enlarged scale,
Figures 8 and 9
in a side view and a plane view, respectively, the terminal block of the plug connector with an integrated tensile strain relieving device according to a second embodiment of the invention,
Figure 10
an end view of the clamping member of the strain relieving device shown in Figures 8 and 9, in its engaged position around a cable,
Figure 11
the features surrounded by the circle C in Figure 10, on an enlarged scale.

The plug shown in Figure 1 comprises a housing 1, preferably of insulating material, enclosing an insulating terminal block 2, to which four contact pins 3 for phase and neutral conductors and one somewhat coarser protective ground pin 4 are fixed.

The rear part of the plug housing has a cable entry opening provided with a sealing sleeve 5. In a space between the sealing sleeve 5 and the terminal block 2 there is a tensile strain relieving device consisting of a clamping member 6 which is connected to the terminal block 2 by way of a bendable strip 7. In the embodiment shown, the strain relieving device is designed integral with the terminal block.

As is best shown in Figures 3 and 4, the clamping member 6 comprises a bottom part 8 and an upper part 9, which are interconnected through a foldable spacing piece 10 in the form of a thin plastic film, serving as a joint.

At the end portion located nearest the spacing piece 10, the upper part 9 is provided with a hook-shaped locking member 11 which, when folding the clamping member over a cable 12, passes through a hole 13 in the bottom part 8 and hooks into the rear side (Fig. 7). At the same time, a lock catch 14, arranged on the outer end portion of the upper part, snaps over a locking edge 15 on the bottom part 8 such that the clamping member cannot open again (Fig. 6).

In its engaged position, the shown strain relieving clamp is very stable and secures the cable in a reliable manner. The design also provides a possibility of further securing that the clamping member is kept in compressed position by mounting a screw 16 into a hole 17 through the clamping member and/or by providing the plug housing 1 (Fig. 1) with a guide 18 for the clamping member, arranged adjacent the entry opening.

The shown strain relieving device can be used for cables with cross-sectional dimensions which may vary within the limits prescribed in current standards for the respective connector.

The embodiment shown with reference to Figures 8-11 differs from that described above in that the locking members 14, 15 are replaced by a locking screw 19 with a round head 20, mounted in the bottom part 8, as well as a recess 21 provided in the outer end portion of the upper part 9 and adapted to the locking screw. When folding the clamping member, the lock catch 11 of the upper part will pass through the hole 13 in the bottom part 8 and hook onto the rear side, in the same way as with the embodiment described above (Fig. 7). At the same time, the end portion of the upper part snaps over the screw head 20 (Fig. 1) and can be pressed onto the cable with the aid of the screw 19.

The invention is not limited to the embodiments shown, but several modifications are possible within the scope of the claims.

Claims

1. Connector for an electric cable with a tensile strain relieving device, preferably an extension cord socket, a plug or the like, comprising a housing (1) which encloses an insulating terminal block (2) with a number of contact members (3,4) which are adapted to be connected to the conductors of a cable (12) insertable into the housing through an entry opening, a cable tensile strain relieving device being arranged in the housing (1) and comprising a clamping member (6) consisting of a bottom part (8) and an upper part (9), said parts, in the open position of the clamping member (6), being interconnected through a foldable spacing piece (10) serving as a joint, and said parts (8,9) being adapted, when being folded over the cable (12), to enter into locking engagement with each other, **characterized** in that one (9) of the parts (8,9) of the clamping member, at its end portion located nearest the spacing piece (10), is provided with a hook-shaped locking member (11) which is adapted, when folding the clamping member, to fit into a locking hole (13) in the other part (8) for force resistant interconnection of the two parts (8,9).

2. Connector according to claim 1, **characterized** in that the bottom part (8) of the clamping member is connected to the terminal block (2) via a bendable or foldable strip (7).

3. Connector according to any of claims 1 or 2, **characterized** in that the tensile strain relieving device (6,7) is an integral part of the terminal block (2).

4. Connector according to any of the preceding claims, **characterized** in that one (9) of the parts (8,9) of the clamping member, at its end portion located furthest away from the spacing piece (10), is provided with a lock catch (14), which is adapted, when folding the champing member, to snap in over a locking edge (15) on the other part (8).

5. A connector according to any of the preceding claims, **characterized** in that the two parts (8,9) of the clamping member, at their end portions located furthest away from the spacing piece (10), are provided with holes (17) for a locking screw (16).

6. A connector according to any of claims 1-3, **characterized** in that the bottom part (8) of the clamping member, at its end portion located furthest away from the spacing piece (10), is provided with a locking screw (19) with a round head (20), and that the corresponding end portion of the upper part exhibits a recess (21) adapted to said locking screw, such that said end portion of the upper part, when folding the clamping member, is adapted to snap in over the screw head (20).

Fig 1

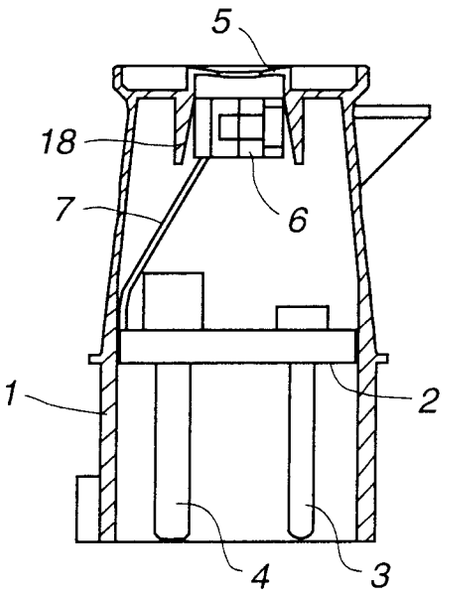

Fig 2

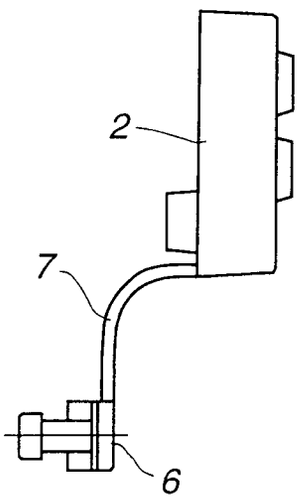

Fig 3

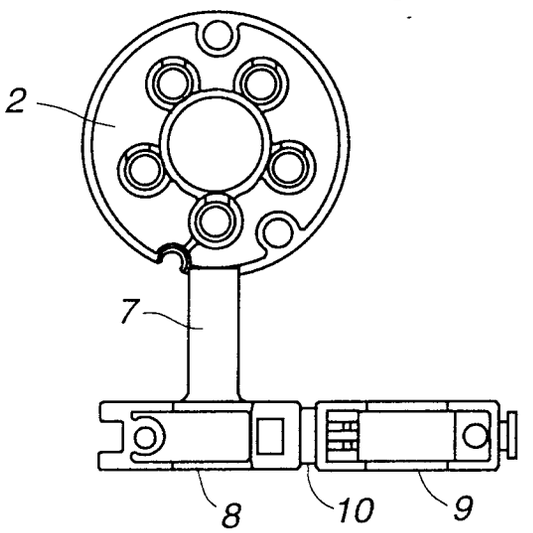

Fig 4

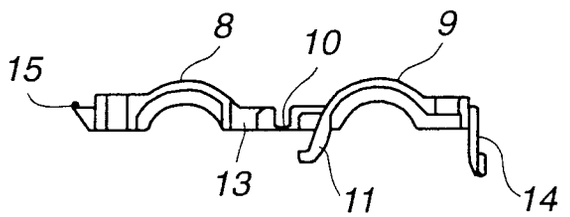

Fig 5

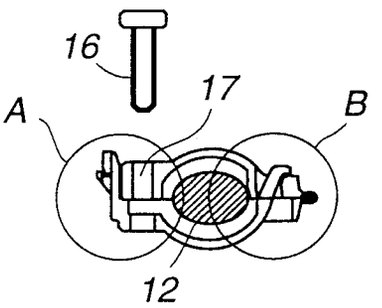

Fig 6

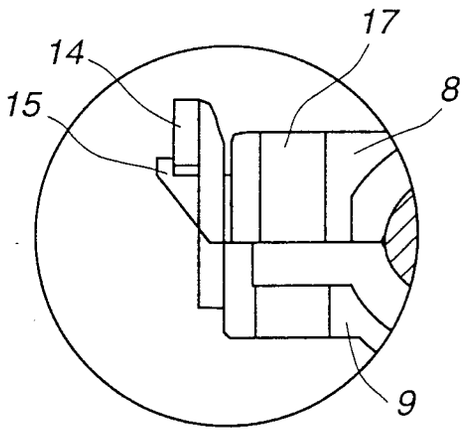

Fig 7

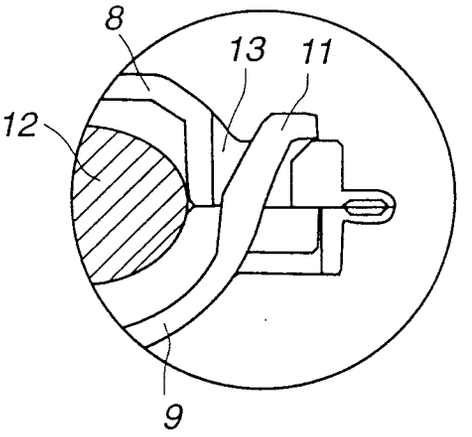

Fig 8

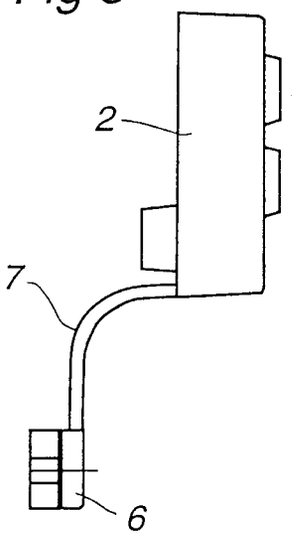

Fig 9

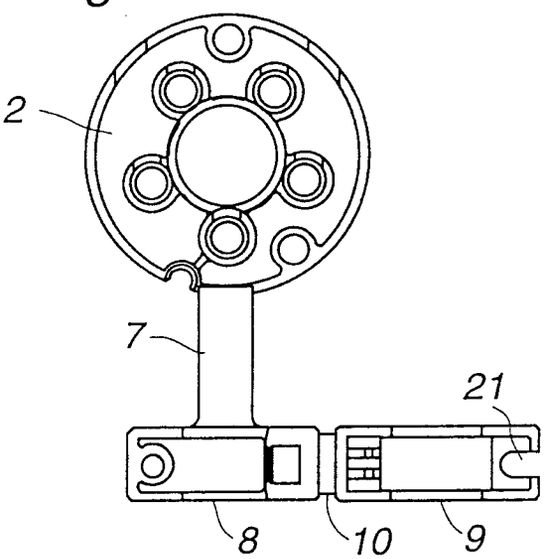

Fig 11

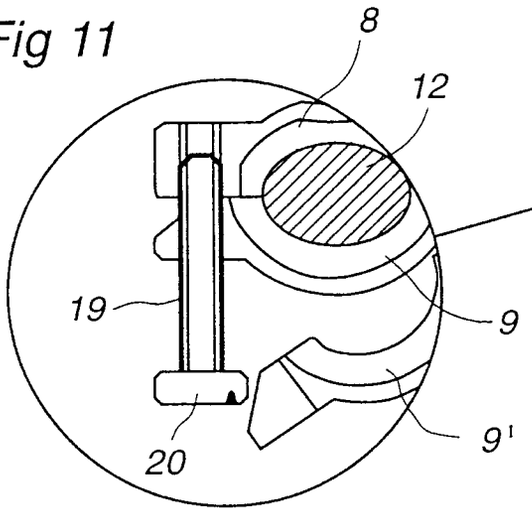

Fig 10