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(54) **Female electrical terminal with soft coupling**

Elektrische Kontaktbuchse mit weicher Kupplung

Borne électrique femelle avec raccord souple

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(56) References cited:
US-A- 2 600 190
US-A- 2 768 361
US-A- 2 770 792
US-A- 2 996 026
US-A- 4 534 613

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Description

[0001] The present invention relates to a female electrical terminal with soft coupling.

[0002] A conventional soft-coupling female electrical terminal comprises a flat metal body, usually obtained from blanked and stamped plate, that is connected at one end to pairs of foldable clamping flaps for an electrical wire.

[0003] The clamping portion is aligned to the body or lies at right angles thereto.

[0004] The body is laterally provided with two longitudinal wings that are folded so as to form a semitubular profile and provide, together with said body, an electrical contact seat for the flat strip of a male terminal.

[0005] The body is furthermore transversely crossed by slots which form, between them, flexible regions, from at least one whereof a stud protrudes, towards the electrical contact seat, that is accommodated in a corresponding hole of the strip of the male terminal.

[0006] From US-A-2,770,792 an electric connector member is known, as defined in the preamble of claim 1.

[0007] Although they have been manufactured and used for many years, soft-coupling female terminals of the above-described type are not free from drawbacks, bearing in mind that the trend is to provide ever softer coupling while maintaining constant the applicable current load.

[0008] This could be achieved by increasing the flexibility of the region where the stud is located, but no action in this sense is possible, since it is not possible to lengthen the slots because they are already arranged transversely so as to affect the entire body, and likewise it is not possible to move the slots closer to each other due to the presence of the stud.

[0009] A principal aim of the present invention is to provide a new soft-coupling female terminal that truly achieves a reduction in the load to be applied for coupling to the male terminal without changing the applicable current load.

[0010] Within this aim, an object of the present invention is to provide a female terminal that can be subjected to a large number of insertions and disengagements without compromising the electrical contacts.

[0011] Another object is to provide a female terminal that can be mass-manufactured with conventional equipment and facilities.

[0012] This aim, these objects, and others which will become apparent hereinafter are achieved by a female electrical terminal as defined in claim 1.

[0013] Further characteristics and advantages of the invention will become apparent from the following detailed description of two embodiments thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a perspective view of the terminal in a first embodiment;
figure 2 is a partially sectional plan view of the terminal of figure 1;
figure 3 is a longitudinal sectional view of the terminal of figure 1;
figure 4 is a transverse sectional view of the terminal of figure 1, taken along the plane IV-IV of figure 2;
figure 5 is a plan view of the terminal according to the invention in a second embodiment.

[0014] With reference to figures 1 to 4, a female electrical terminal according to the invention, in a first embodiment, comprises a flat metal body 10, obtained from blanked and stamped plate, which is connected at one end to a tab 11 from which two pairs of foldable flaps, respectively 12 and 13, protrude for accordingly clamping an electrical wire, not shown in the figures, the stripped end whereof is appropriately placed between said flaps so as to rest on the tab 11.

[0015] The metal body 10 is laterally provided with two longitudinal wings 14 that are folded so as to assume a substantially semitubular shape and form, together with said body 10, an electrical contact seat 16 for the flat strip of a known male terminal, which is not shown.

[0016] According to the invention, the body 10 is longitudinally crossed by two parallel slots 17 which form, between them, a flexible region 18 that is provided with a stud 19 that protrudes towards the electrical contact seat 16.

[0017] The slots 17 are substantially crescent-shaped and the stud 19 has a substantially triangular longitudinal profile, with the higher region on the opposite side with respect to the one where the male terminal is inserted.

[0018] The region 18 is wider and higher in the median region than at the lateral ends.

[0019] Furthermore, the two longitudinal wings 14 have lateral studs 20 that protrude towards the electrical contact seat and are adapted in particular to reduce the lateral play between the male terminal and said female terminal once insertion has occurred.

[0020] Finally, it should be noted that in the upper part of the wings 14 there are two transverse aligned slots 21 adapted to weaken their structure and thus to further facilitate the insertion of the male terminal.

[0021] Finally, it should be noted that the external dimensions have been maintained with respect to conventional female terminals, so that it is possible to use, for this new terminal, the known clamping devices and the same plastics connectors; this is done to minimize investment costs concerning equipment and componentry.

[0022] With particular reference to figure 5, a female electrical terminal according to the invention, in a second embodiment, is generally designated by the reference numeral 100.

[0023] The terminal 100 is of the L-shaped type and is different from the terminal related to the first embodiment, to which reference is made for a detailed descrip-

tion of the clamping flaps and of the body with the corresponding electrical connection seat, in that said clamping flaps, generally designated by the reference numeral 101, are arranged at right angles to the body, designated by the reference numeral 102.

[0024] In practice, it has been observed that the intended aim and objects of the present invention have been achieved.

[0025] The provision of the slots 17 in a longitudinal direction has in fact allowed to extend the elastic region and thus reduce the pressure required to perform the movement of the stud 19 which, when the male terminal is inserted, must move downwards before entering the corresponding seat of said male terminal.

[0026] The other provisions are meant, as stated in the above description, to further optimize the product.

[0027] In practice, the materials employed, so long as they are compatible with the contingent use, as well as the dimensions, may be any according to the requirements.

[0028] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A female electrical terminal with soft coupling comprising a flat metal body (10; 102), obtained from blanked and stamped plate, that is connected at one end to pairs of foldable clamping flaps (12, 13; 101) for an electrical wire and is laterally provided with two longitudinal wings (14) that are folded so as to assume a substantially semitubular shape and form, together with said body, an electrical contact seat (16) for the flat strip of a male terminal, said body (10; 102) being longitudinally crossed by two slots (17) that form, between them, a flexible region (18) that is provided with a stud (19) protruding towards the electrical contact seat (16), said slots (17) being crescent-shaped, characterized in that said slots have an outline which presents concavities which are faced one towards the other, said stud having a substantially triangular longitudinal profile with a higher region thereof on an opposite side with respect to the one where said male terminal is to be inserted, and in that said longitudinal wings of said body have transverse slots which extend from the inner side of said wings.

2. A terminal according to claim 2, characterized in that said flexible region (18) has ends that are narrower than the median region thereof.

3. A terminal according to claim 1, characterized in that said wings (14) join to the bottom of said body (10) with a rounded connection.

4. A terminal according to claim 1, characterized in that said body (10) has a slanted draft region and in that said longitudinal wings (14) have a bevelled front region, to facilitate the insertion of said male element.

5. A terminal according to claim 1, characterized in that said longitudinal wings (14) of said body have lateral studs (20) protruding towards the electrical contact seat (16) and adapted to reduce play with respect to said male terminal inserted in said female element.

6. A terminal according to claim 1, characterized in that said pairs of foldable clamping flaps (12, 13) extend from a tab that is connected to said body (10) at the end lying opposite to the coupling end, said tab being aligned or perpendicular to said body.

Patentansprüche

1. Elektrische Kontaktbuchse mit weicher Kupplung umfassend einen flachen Metallkörper (10, 102), hergestellt aus vorgeschmiedetem und gestanztem Blech, der an einem Ende mit Paaren faltbarer Klemmenklappen (12, 13, 101) für ein elektrisches Kabel verbunden ist und seitlich mit zwei Längsflügeln (14) versehen ist, die gefaltet sind, so daß sie eine im wesentlichen halbrohrförmige Form annehmen und zusammen mit dem Körper einen elektrischen Kontaktsitz (16) für den Bandstreifen eines Steckers ausbilden, wobei der Körper (10, 102) längs von zwei Schlitzen (17) durchkreuzt ist, die zwischen sich einen flexiblen Bereich (18) ausbilden, der mit einem Zapfen (19) versehen ist, der zum elektrischen Kontaktsitz (16) vorsteht, wobei die Schlitze (17) halbmondförmig sind, dadurch gekennzeichnet, daß die Schlitze einen Umriß aufweisen, der Austiefungen darstellt, die zueinander weisen, wobei der Zapfen ein im wesentlichen dreiekkiges Längsprofil aufweist mit einem höheren Bereich auf einer Seite, die der Seite, wo der Stecker eingesetzt werden soll, gegenüberliegt, und dadurch, daß die Längsflügel des Körpers Querschlitze aufweisen, die sich von der Innenseite der Flügel erstrecken.

2. Buchse nach Anspruch 1, dadurch gekennzeichnet, daß der flexible Bereich (18) Enden aufweist, die schmaler sind als der mittlere Teil.

3. Buchse nach Anspruch 1, dadurch gekennzeichnet, daß die Flügel (14) zum Boden des Körpers (10) mit

einer gerundeten Verbindung zusammenlaufen.

4. Buchse nach Anspruch 1, dadurch gekennzeichnet, daß der Körper (10) einen abgeschrägten Bereich aufweist, und daß die Längsflügel (14) einen konischen Frontbereich aufweisen, um das Einsetzen des Steckers zu erleichtern.

5. Buchse nach Anspruch 1, dadurch gekennzeichnet, daß die Längsflügel (14) des Körpers seitliche Zapfen (20) aufweisen, die zum elektrischen Kontaktsitz (16) vorstehen und geeignet sind, in Bezug auf den in die Kontaktbuchse eingesetzten Stecker Spiel zu reduzieren.

6. Buchse nach Anspruch 1, dadurch gekennzeichnet, daß die Paare faltbarer Klemmenklappen (12, 13) sich von einem Ansatz erstrecken, der mit dem Körper (10) an dem Ende verbunden ist, das dem Kupplungsende gegenüberliegt, wobei der Ansatz mit dem Körper ausgerichtet oder senkrecht dazu ist.

Revendications

1. Borne électrique femelle à accouplement doux comprenant un corps métallique plat (10 ; 102), obtenu à partir d'une plaque découpée et poinçonnée, qui est relié, à une extrémité, à des paires de volets de serrage pliables (12, 13 ; 101) pour un câble électrique, et qui est pourvu latéralement de deux ailettes longitudinales (14) qui sont pliées de façon à prendre une forme sensiblement semi-tubulaire et à former, de pair avec ledit corps, une embase de contact électrique (16) pour la bande plane d'une borne mâle, ledit corps (10 ; 102) étant traversé longitudinalement par deux fentes (17) qui forment, entre elles, une zone souple (18) qui est pourvue d'un appendice (19) faisant saillie en direction de l'embase de contact électrique (16), lesdites fentes (17) étant en forme de croissants, caractérisée en ce que lesdites fentes ont un contour qui présente des concavités qui sont orientées l'une face à l'autre, ledit appendice ayant un profil longitudinal sensiblement triangulaire, une zone plus élevée de celui-ci étant du côté opposé par rapport à celui où ladite borne mâle doit être insérée, et en ce que lesdites ailettes longitudinales dudit corps comportent des fentes transversales qui s'étendent depuis le côté intérieur desdites ailettes.

2. Borne selon la revendication 2, caractérisée en ce que ladite zone souple (18) possède des extrémités qui sont plus étroites que sa zone médiane.

3. Borne selon la revendication 1, caractérisée en ce que lesdites ailettes (14) sont unies au fond dudit corps (10) par une connexion arrondie.

4. Borne selon la revendication 1, caractérisée en ce que ledit corps (10) comporte une zone de dépouille inclinée et en ce que lesdites ailettes longitudinales (14) comportent une zone frontale biseautée, de façon à faciliter l'insertion dudit élément mâle.

5. Borne selon la revendication 1, caractérisée en ce que lesdites ailettes longitudinales (14) dudit corps comportent des appendices latéraux (20) faisant saillie en direction de l'embase de contact électrique (16) et propres à réduire le jeu par rapport à ladite borne mâle insérée dans ledit élément femelle.

6. Borne selon la revendication 1, caractérisée en ce que lesdites paires de volets de serrage pliables (12, 13) s'étendent depuis une patte qui est reliée audit corps (10) à l'extrémité se trouvant à l'opposé de l'extrémité de raccordement, ladite patte étant alignée ou perpendiculaire audit corps.

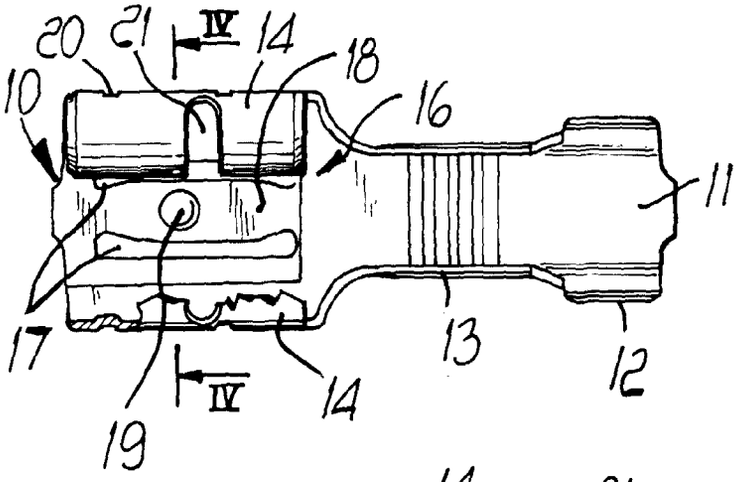

Fig. 2

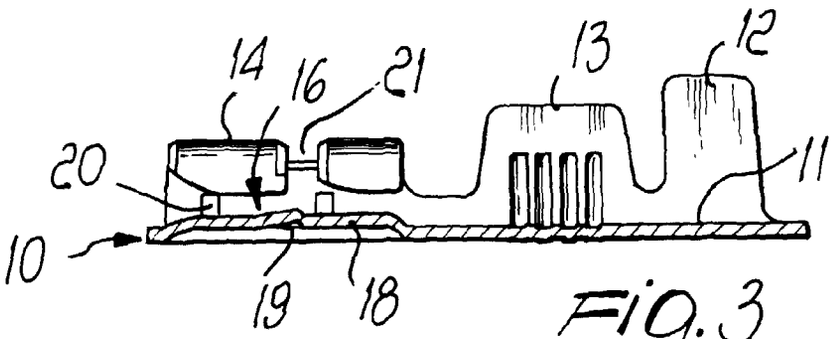

Fig. 3

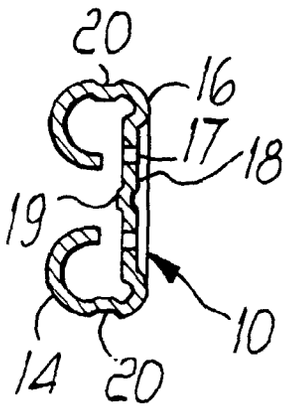

Fig. 4

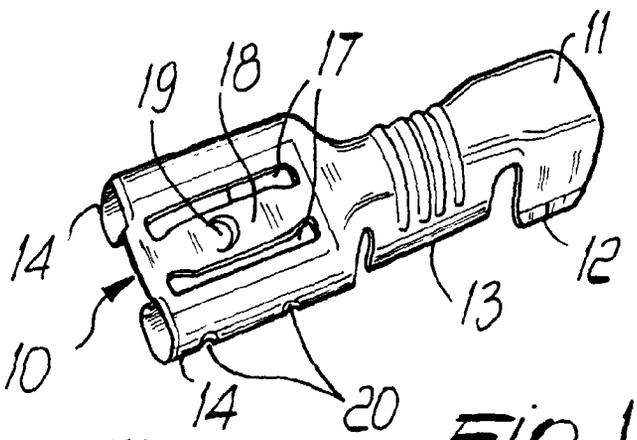

Fig. 1

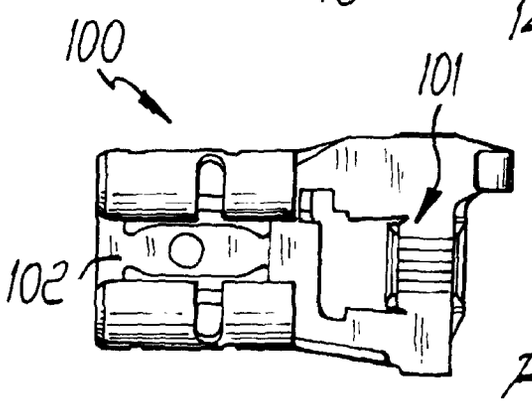

Fig. 5