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(12) # EUROPEAN PATENT SPECIFICATION

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(54) **Connector with free plug and socket for electric cables.**

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(56) References cited :
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(73) Proprietor : **ILME S.p.A.**
Via Marco Antonio Colonna, 9
I-20149 Milan (IT)

(72) Inventor : **Percio, Andrea**
Via M.A. Colonna, 9
I-20149 Milan (IT)
Inventor : **Zago, Giovanni**
Via Guanella, 26
I-20128 Milan (IT)

(74) Representative : **Dr. Ing. A. Racheli & C. S.r.l.**
Viale San Michele del Carso, 4
I-20144 Milano (IT)

EP 0 353 539 B1

Description

The present invention relates to the free connectors equipped with cable clamping devices, such connectors normally used as trailing sockets and plugs. The aim of the cable clamping device is to clamp the cable to the plug or socket, preventing it from being unintentionally extracted owing to traction being exercised on it, either as the result of a mistake in operation or in the case of an accident.

Connectors including cable clamping devices are known from e.g. DE-A-2433347

The cable clamping devices prevent the connecting terminals from being subjected to traction and prevent the cable itself from being disconnected from the terminal plate of the connector, thereby causing serious trouble.

Cable clamping devices made of plastic material are well-known where two tongues of the same material extend from the periphery of the terminal plate and, at the opposite end with respect to the terminal plate, broaden into two coupling brackets, inside which the electric cable is inserted. After the cable is inserted, the clamps are locked one against the other by means of a pair of screws, with their respective nuts, thus carrying out fixing of the cable inserted between them.

The device described has some disadvantages, such as:

a) wiring is difficult, since the space on the terminal plate where the cable must be inserted and clamped is partly occupied by the cable clamping device;

b) costs are relatively high;

c) it is impossible to use the same terminal plates which are used for the corresponding fixed plugs and sockets if the cable clamping device is in one piece with the terminal plate.

Aim of the present invention, therefore, is to produce a clamping device for trailing sockets and plugs which is able to avoid the difficulties mentioned above, that is one which facilitates cable connections, allows an identical terminal plate to be contructed for stationarily mounted and trailing sockets and plugs, and facilitates installation.

This aim has been achieved by providing an electrical connector according to Claim 1 comprising a terminal plate and a clamping device which are integral with said terminal plate during use, in which said clamping device and said terminal plate consist of two separate elements, each equipped with a reciprocal engaging means, said connector characterized in that

said engaging means consists, as regards the clamping device, of a pair of arms integral with said device,

the arms being integral with just one of the two coupling brackets suitable for receiving the electric cable between them,

at least one of the two arms having an enlarged head at its free end, capable of locking into a hole provided on the terminal plate.

One arm can also be equipped with a seat capable of being received into a peripheral slot provided on the terminal plate, provision being made in this case for the rotation of the engaging means of the other arm with respect to the terminal plate. In this case the seat ends in a collar which prevents the arm from escaping.

The clamping of the cable into the clamping device is performed preferably by inserting the jagged wings of one bracket inside the corresponding openings of the other bracket, one wall of which is defined by a tongue suitable of cooperating with said jagged wings. The connection is detachable by operating upon resilient wings which allow said tongue to disengage from the jagged wings.

Preferably the two brackets are joined together during moulding by a metal strip.

The present invention will now be described more clearly in the following description of a preferred embodiment which is illustrated in the enclosed drawings, where:

Figure 1 shows a side view of the cable clamping device;

Figure 1a shows a section of one of the brackets making part of the clamping device, taken along the line a-a in fig. 1;

Figure 2 shows a top view of the terminal board being part of the connector device;

Figure 3 shows an enlarged partial section view of the terminal board, taken along the line 3-3 in figure 2;

Figure 4 shows a schematic perspective view of a connector with the cable assembled.

Referring now to figure 1, it can be seen how the clamping device comprises a clamping bracket 3 and a bracket 1 equipped with two equal symmetrical wings 2a and 2b. The two brackets 1 and 3 are joined together by means of a narrow strip 4. The wings 2a and 2b of the bracket 1 are jagged on their inner side.

The bracket 3 consists of a central part 5 suitable for receiving the cable, and of two equal openings 6a and 6b, inside which two elastic tongues 7a and 7b are provided respectively, which are equal and symmetrical and suitable for engaging with the jagging teeth of the wings 2a and 2b. As can be noted in fig. 1a, the tongues 7a and 7b are each provided with a wing 7c and 7d, respectively, which is resilient and projects in a perpendicular direction with respect to the tongues 7a and 7b themselves. The central part 5 of the bracket 3 in which the electric cable is housed is equipped with four projecting elements 8a, 8b 8c and 8d, having a conical shape with a rounded top, to ensure a better grip on the cable.

Referring again to figure 1, it will be noted how two arms, 9 and 10 respectively, leave from the brack-

et 3, being substantially perpendicular to the latter. The arm 9 ends in a head 12 above which an abutment 12a is provided. The arm is also equipped with a collar 11 for acting as a further ledge which can serve as a stop during wiring. The arm 10 ends in a seat 13 comprised between two collars, one of them, 14, located at the end and the other, 13a, more internally.

Referring now to figure 2, the terminal plate 21, to which the trailing socket, plug or such is connected, is equipped, as is already known, with holes 24a, 24b, and 24c respectively, into which the wires will be inserted to carry out the connection. The terminal plate is further equipped with fixing holes 22a and 22b and possibly with a notch 23.

The terminal plate 21 is equipped with a further throughhole 25, along its periphery. This hole is internally provided with four equal projections 26a, 26b, 26c and 26d, which extend into the plug- or socket housing. The configuration of the walls of the hole 25 can be better seen in figure 3, where two of the projections, in particular 26c and 26d, are to be seen.

Finally, there is a slot 27 cut out on the periphery of the terminal plate 21, said slot being obliquely cutout into said terminal plate 21 and rounded at its end in a semicircle. This semicircle is located at a distance from the throughhole 25 which corresponds to the distance between the two arms 9 and 10. In addition the slope of the slot 27 corresponds to the tangent of the circle which has the hole 25 at its centre.

Now the connection of the cable clamping device to the terminal plate 21 will be described: the arm 9 (see figure 1) of the clamping device is positioned over the hole 25; the foremost part of the arm 9 with its hemispherical head 12 is then inserted into the hole 25. The heads 12 slides within the projections 26a, 26b, 26c and 26d, and finally protrudes from the hole 25. In this way, the projections 26a, 26b, 26c and 26d rest on the lower base of the head 12, where the diameter of the arm 9 is narrower and prevents the arm 9 from being extracted from the terminal board 21.

The other arm 10 of the bracket 3 is made to rotate relatively to the arm 9 and positioned in correspondence with the slot 27. Then the arm 10 is pressed into the slot 27, slides along it and comes to abut against the semicircular rounded form at the terminal end of the slot.

In this way the bracket 3 is near to the cable which, in order to be clamped, has only to be gripped by the other bracket 1 whose wings 2a, 2b, are made to penetrate the openings 6a and 6b.

If it is desired to disconnect bracket 1 from bracket 3, in order to release the cable, it is sufficient to slightly push on the wings 7c and 7d, by hand or by means of a tool, bringing said wings nearer to each other. In this way, the tongues 7a and 7b disengage from the jagging teeth of the wings 2a and 2b, which can be withdrawn from openings 6a and 6b.

In this way a connector device used as plug or socket has been produced which is capable of avoiding the drawbacks previously mentioned, in fact:

a) wiring is much simpler and quicker, in that the holes 24a, 24b and 24c are not hindered in any way during the said operation;

b) by constructing the device in two pieces, the parts obtained are much simpler and easier to manufacture; what is more, they can be supplied separately;

c) the terminal board produced for the device being the object of the invention can also be used for fixed plugs; by standardizing this component in such a way, an appreciable economic advantage is achieved.

Claims

1. A connector in the form of a plug or socket, comprising a terminal plate (21) and a clamping device (1, 3) which is integral with said terminal plate (21) during use, said clamping device (1, 3) and said terminal plate (21) consist of two separate elements, each one having a reciprocal engaging means, characterized in that said reciprocal engaging means comprising a pair of arms (9, 10) integral with said clamping device (1, 3) and having shaped ends, at least one arm (9) being equipped with an enlarged head (12) at its free end, capable of being locked into a throughhole (25) provided on the terminal plate (21), said arms (9, 10) being both integral with only one (3) of the two coupling brackets (1, 3) forming the clamping device.

2. A connector according to claim 1 characterized in that the arm (10) has a seat (13) at its free end capable of being received into a peripheral slot (27) provided on the terminal plate (21), the arm (10) externally being confined by a stop collar (14), provision being made for the rotation of the other engaging means (9) with respect to the terminal plate (21).

3. A connector according to claim 1 or 2, characterized in that one of the brackets (1) is equipped with jagged wings (2a, 2b) and the other (3) with corresponding openings (6a, 6b), one wall of which is defined by a tongue (7a, 7b) suitable for cooperating with said jagged wings (2a, 2b), said tongue (7a, 7b) being provided with a resilient wing (7c, 7d), capable of allowing the tongue (7a, 7b) to be disengaged from the jagging teeth of the wings (2a, 2b).

4. A connector according to anyone of the preceding

claims characterized in that the two brackets (1, 3) are joined to each other during moulding by a metal strip (4).

Patentansprüche

1. Stecker- und buchsenförmiger Verbinder bestehend aus einer Endplatte (21) und einer Klemmvorrichtung (1, 3), die während der Verwendung ein einteiliges Stück mit der gesagten Endplatte (21) bildet, die genannte Klemmvorrichtung (1, 3) und die gesagte Endplatte (21) aus zwei getrennten Elementen bestehend, wobei jedes mit einem gegenseitigen Verbindungsmittel versehen ist, dadurch gekennzeichnet, daß die genannten gegenseitigen Bindemittel ein paar Arme (9, 10) beinhalten, welche ein einteliges Stück mit der gesagten Klemmvorrichtung (1, 3) bilden und geformte Endteile aufweisen, wobei mindestens ein Arm (9) an seinem freien Endteil mit einem vergrößerten Kopf (12) ausgestattet ist, der in ein Durchlaufloch (25) gesperrt werden kann, das an der Endplatte (21) vorgesehen ist, da beide genannte Arme (9, 10) mit nur einer (3) der beiden Kupplungsbügel (1, 3) ein einteliges Stück bilden, welche die Klemmvorrichtung darstellen.

2. Verbinder nach Anspruch 1 dadurch gekennzeichnet, daß der Arm (10) an seinem freien Endteil mit einem Sitz (13) versehen ist, der in einem vorgesehenen Peripherhohlraum (27) der Endplatte (21) aufgennomen werden kann, da der Arm (10) außenseits durch ein Anschlagbund (14) begrenzt ist, insoweit eine Drehung des anderen Verbindungsmittels (9) gegenüber der Endplatte (21) vorgesehen ist.

3. Verbinder nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß einer der Bügel (1) mit Zahnflügeln (2a, 2b) und der andere (3) mit entsprechenden Öffnungen (6a, 6b) versehen ist, wobei eine Seite derselben durch eine Lasche (7a, 7b) bestimmt ist, die mit den genannten Zahnflügeln (2a, 2b) zusammenarbeiten kann, da die genannte Lasche (7a, 7b) mit einem Spannflügel (7c, 7d) versehen ist, der das Ausschalten der Lasche (7a, 7b) aus der Zahnung der Flügel (2a, 2b) und die nachfolgende Herausnahme der Flügel (2a, 2b) aus den Öffnungen (6a, 6b) erlaubt.

4. Verbinder nach einen jeglichen der bevorstehenden Ansprüchen, dadurch gekennzeichnet, daß beide Bügel (1, 3) während des Gesenkschmiedens durch ein Metallband (4) verbunden werden.

Revendications

1. Connecteur en forme de fiche ou prise comprenant une plaque terminale (21) et un dispositif de serrage (1, 3) qui pendant l'utilisation résulte solidaire à ladite plaque terminale (21), ledit dispositif de serrage (1, 3) et ladite plaque terminale (21) sont composés de deux éléments séparés, chacun doté d'un moyen d'engagement réciproque, caractérisé par le fait que lesdits moyens d'engagement réciproque comprennent une paire de bras (9, 10) solidaires au susdit dispositif de serrage (1, 3) et ayant des extrémités profilées, étant au moins un bras (9) doté à son extrémité libre d'une tête grossie (12) indiquée pour se bloquer dans un trou passant (25) prévu dans la plaque terminale (21), étant lesdits bras (9, 10) tous les deux solidaires à un seul (3) des deux étriers (1, 3) pouvant être accouplés formant le dispositif de serrage.

2. Connecteur d'après la revendication 1 caractérisé par le fait que le bras (10) a à son extrémité libre un siège (13) indiqué pour être reçu dans une rainure (27) périphérique prévue dans la plaque terminale (21), le bras (10) étant limité extérieurement par un collier d'arrêt (14), étant prévue la rotation de l'autre moyen d'engagement (9), par rapport à la plaque terminale (21).

3. Connecteur d'après la revendication 1 ou 2, caractérisé par le fait qu'un des deux étriers (1) est doté d'ailes dentelées (2a, 2b) et l'autre (3) d'ouvertures correspondantes (6a, 6b) dont une paroi est définie par une languette (7a, 7b) indiquée pour collaborer avec les susdites ailes dentelées (2a, 2b), étant ladite languette (7a, 7b) dotée d'une ailette (7c, 7d) élastique, indiquée pour permettre le désengagement de la languette de la dentelure des ailes (2a, 2b) et l'extraction des ailes (2a, 2b) des ouvertures (6a, 6b) qui s'ensuit.

4. Connecteur d'après une quelconque des revendications précédentes caractérisé par le fait que deux étriers (1, 3) sont unis l'un à l'autre dans la phase d'estampage par un ruban métallique (4).

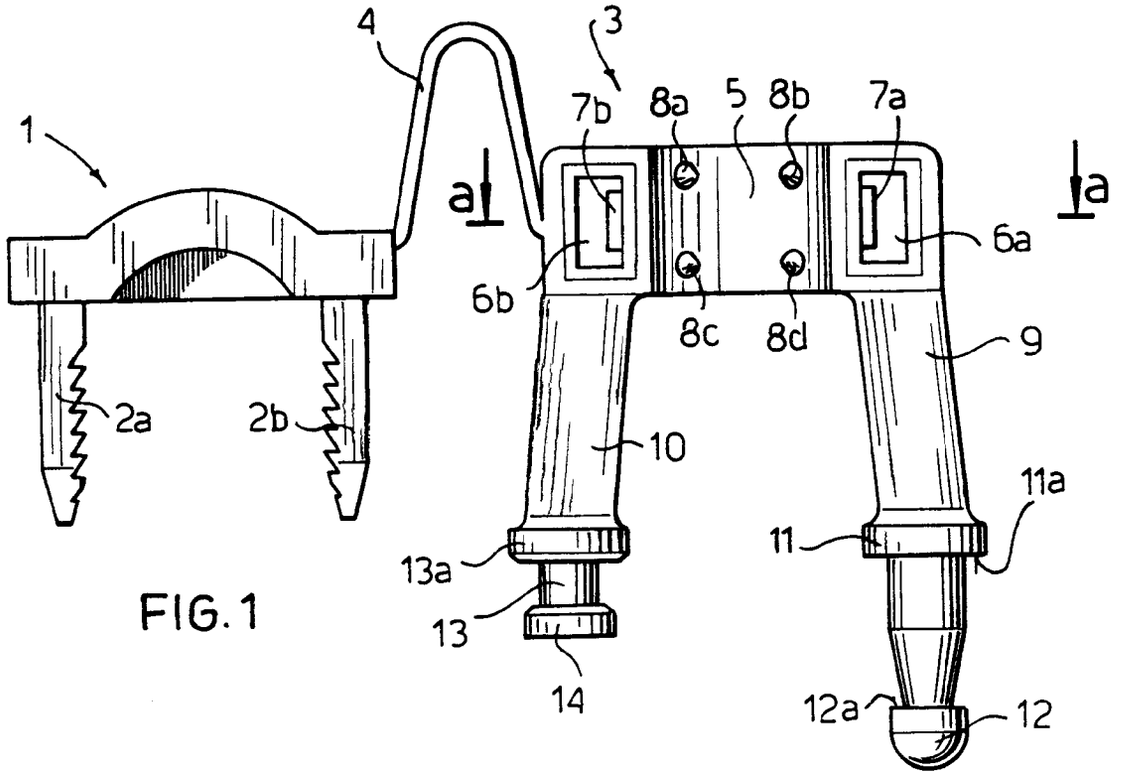
4
3
1
7b
8a
5
8b
7a
a
a
6a
6b
8c
8d
9
2a
2b
10
11a
11
13a
13
14
12a
12

FIG. 1

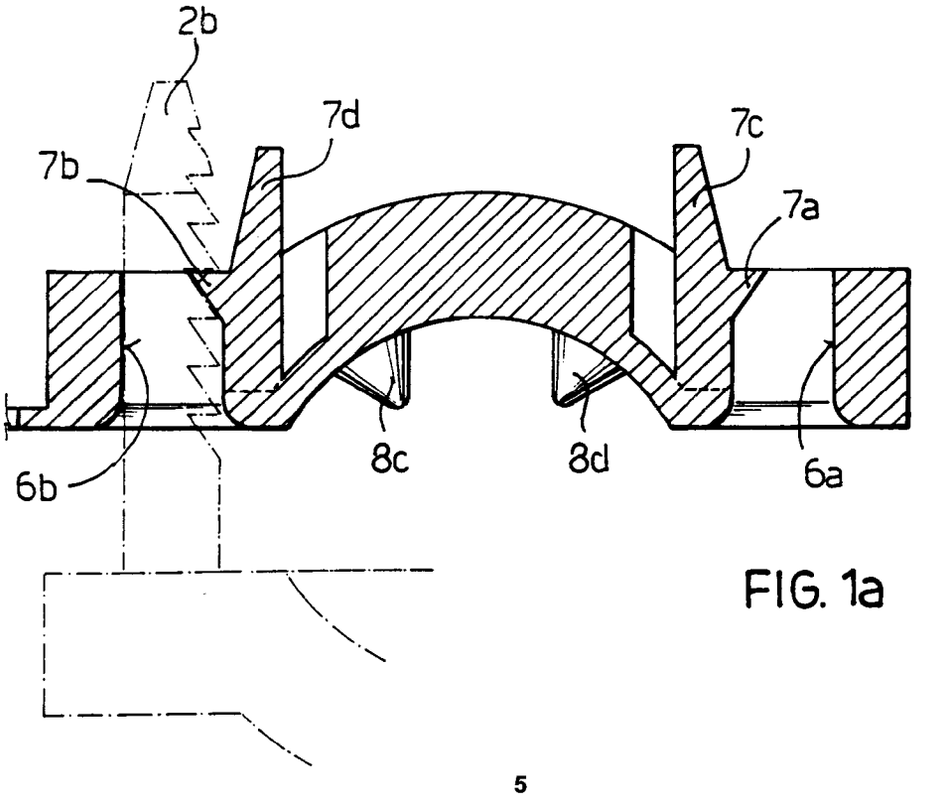
2b
7d
7c
7b
7a
6b
8c
8d
6a

FIG. 1a

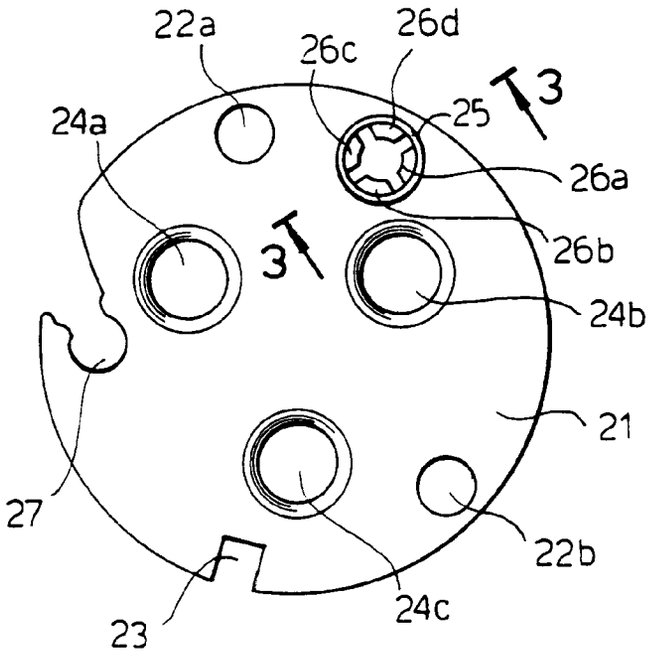

FIG. 2

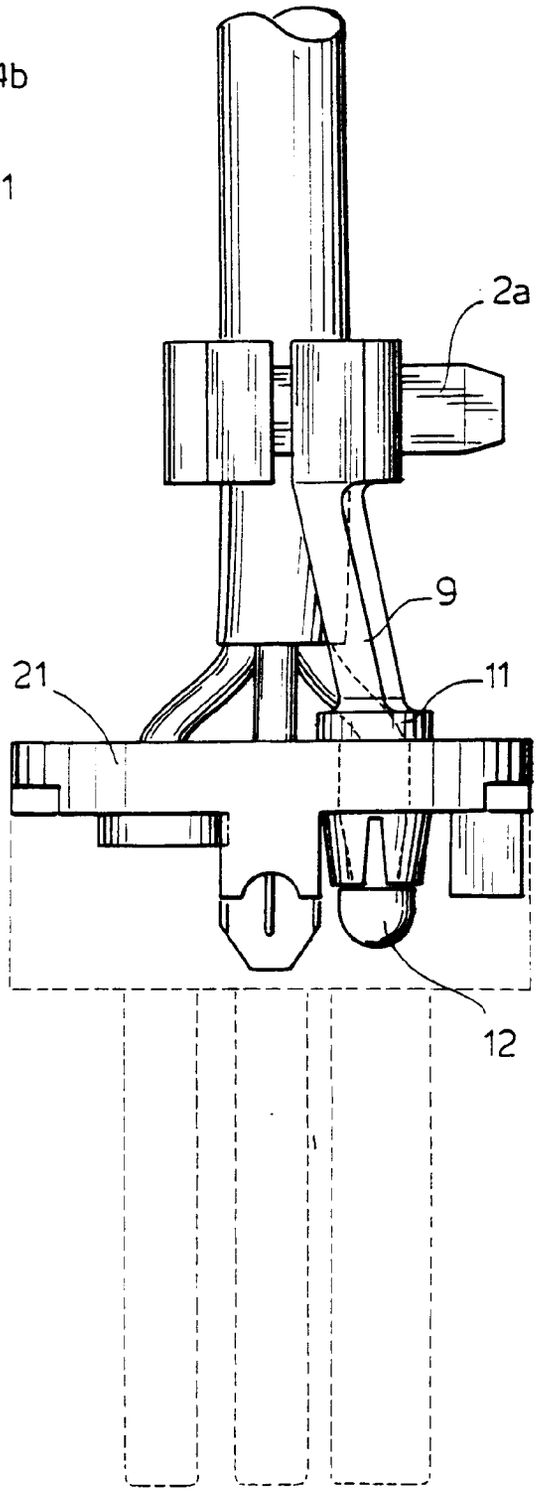

FIG. 4

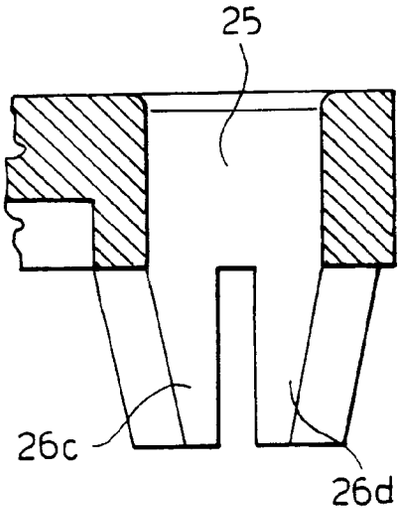

FIG. 3