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(71) Applicant: **INARCA S.p.A.**
35010 Vigodarzere (PD) (IT)

(72) Inventor: **PIOVESAN, Gianni**
35010 Cadoneghe PD (IT)

(74) Representative: **Modiano, Micaela Nadia et al**
Modiano & Partners
Via Meravigli, 16
20123 Milano (IT)

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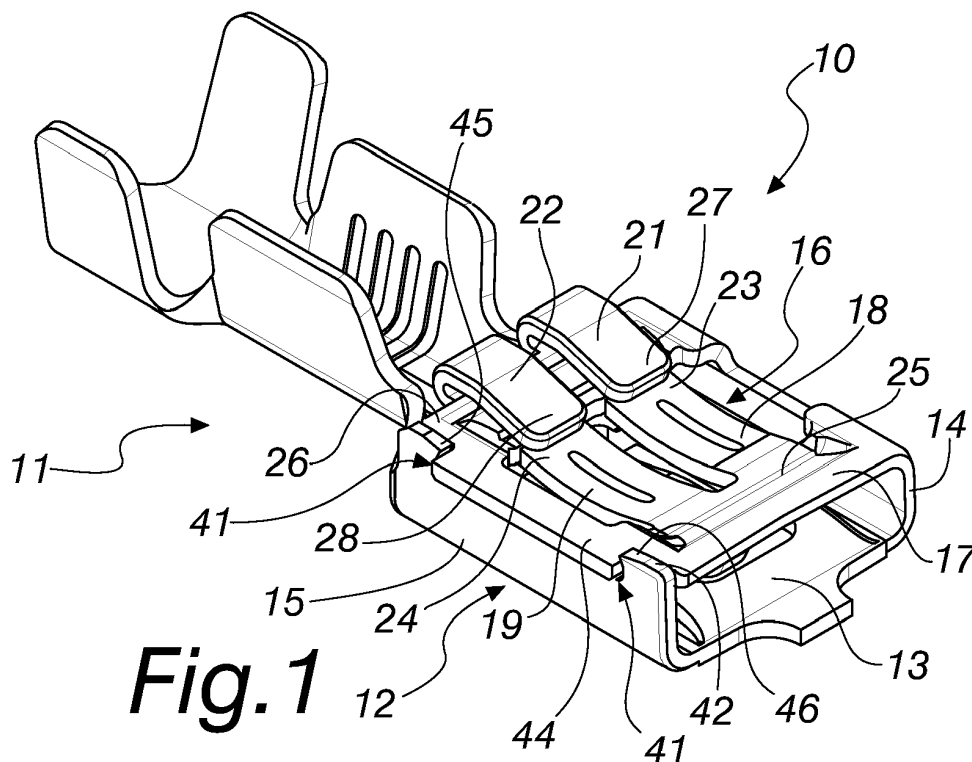
(54) FEMALE TERMINAL FOR ELECTRICAL CONNECTIONS

(57) A female terminal (10) for electrical connections, of the type comprising a crimping portion (11) and a box-like connection body (12), characterized in that the box-like connection body (12) comprises:

- a bottom (13) that defines a lower contact region,
- two opposite lateral containment walls (14, 15), which extend from the bottom (13),
- a cover (16), which extends from a first one of the lateral

walls (14, 15) and defines an upper contact region, the cover (16) comprising a frame (17) with at least one cantilevered elastic contact tab (18), which is contoured to protrude into the interspace (20) between the bottom (13) and the cover (16), intended to contain a male contact,

- the cover (16) having a first free edge (40) that is fixed with fixing means (41) to a corresponding second free edge (42) of the second lateral wall (15).

**Fig. 1**

Description

[0001] The present invention relates to a female terminal for electrical connections.

[0002] Nowadays female terminals for electrical connections are known and widespread, of the type comprising a crimping portion and a connection portion. The connection portion has a box-like body that comprises in turn, either inside or forming part of the walls of the box-like body, at least one cantilevered elastic contact tab, which is contoured to press against a male contact inserted into the box-like body of the connection portion.

[0003] Such female terminals usually have one or more cantilevered elastic contact tabs, which are free to bend upon the passage of the male terminal, ensuring contact with the latter.

[0004] The box-like body inside which the one or more tabs protrude is generally made, together with the rest of the terminal, by folding a previously-stamped metal sheet.

[0005] The two opposite free edges of the stamped metal sheet, which are arranged facing each other with the folding, for the sake of simplicity and economy of production are not mutually joined.

[0006] Such a solution may not be capable of ensuring an optimal contact between the connection portion of the female terminal and the male terminal, since the lack of a join between the facing free edges allows the walls of the box-like body to which the free edges belong to bend outward; an example of this is a situation where the insertion of the male terminal along an unsuitable direction causes an excessive bending of the tabs to the point that they entrain and bend the entire part of the box-like body from which they extend, with consequent deformations of the terminal and risk of its imperfect operation.

[0007] Another limitation of conventional female terminals is the fact that even if the male terminal is correctly inserted into the female terminal, the cantilevered contact tabs may not be capable of exerting a contact pressure such as to ensure a stable and constant contact even under conditions of knocks, vibrations or other, similar critical situations.

[0008] The aim of the present invention is to provide a female terminal for electrical connections that is capable of overcoming the above mentioned drawbacks of conventional female terminals.

[0009] Within this aim, an object of the present invention is to provide a female terminal that is always capable of ensuring an optimal contact with the male terminal, stably, precisely and continuously.

[0010] Another object of the present invention is therefore to provide a female terminal in which the parts of the box-like body are not subject to deformations that are such as to compromise the stability of contact.

[0011] Another object of the present invention is to provide a female terminal that can be easily produced in the manner of conventional female terminals.

[0012] This aim and these and other objects which will

become better evident hereinafter are achieved by a female terminal for electrical connections according to claim 1.

[0013] Further characteristics and advantages of the invention will become better apparent from the description of a preferred, but not exclusive, embodiment of the female terminal according to the invention, which is illustrated by way of non-limiting example in the accompanying drawings wherein:

Figure 1 is a perspective view of a female terminal according to the invention;

Figure 2 is a plan view from above of the female terminal according to the invention;

Figure 3 is a cross-sectional side view of the female terminal taken along the line III-III of Figure 2;

Figure 4 is a cross-sectional view taken along the line IV-IV of Figure 2;

Figure 5 is a side view of the female terminal according to the invention;

Figure 6 is a longitudinal cross-sectional view of the female terminal according to the invention, taken along the line VI-VI of Figure 5.

[0014] With reference to the figures, a female terminal for electrical connections according to the invention is generally designated with the reference numeral 10.

[0015] The female terminal 10 comprises a crimping portion 11 and a boxlike connection body 12.

[0016] The boxlike connection body 12 comprises:

- a bottom 13 that defines a lower contact region,
- two opposite lateral containment walls 14 and 15, which extend from the bottom 13,
- a cover 16, which extends from a first one of the lateral walls, for example from the first lateral wall 14, which defines an upper contact region; the cover 16 comprises a frame 17 with two cantilevered elastic tabs 18 and 19, which are contoured to protrude into the interspace 20 between the bottom 13 and the cover 16, intended to contain a male contact,
- the cover 16 has a first free edge 40 that is fixed with fixing means 41 to a corresponding second free fixing edge 42 of the second lateral wall 15.

[0017] In such embodiment, the fixing means 41 comprise a recess 43 and a corresponding tab 44 which is contoured to arrange itself in the recess 43, one being defined on either the first free edge 40 or the second free edge 42 and the other being defined on the remaining one of either the first free edge 40 or the second free edge 42, as can clearly be seen in Figures 3 and 4.

[0018] In particular, the recess 43 is defined on the second free edge 42 and is open on the same side of the second free edge 42.

[0019] Corresponding extraction-preventing protrusions 45 and 46 extend toward each other from the opposite ends of the recess 43 and are adapted to prevent

the exit of the tab 44, which protrudes from the first free edge 40, from the recess 43.

[0020] By virtue of the extraction-preventing protrusions 45 and 46, the tab 44 can be rapidly and easily interlocked in the recess 43, thus producing a structural stability of the box-like body 12 that is such as to prevent the contact pressure between the cantilevered contact tabs 18 and 19 and the male terminal from failing.

[0021] In a variation of the invention, the tab 44 is fixed in the recess 43 by way of soldering spots or regions.

[0022] The female terminal 10 according to the invention is also characterized in that it comprises a corresponding flexing limiting lamina, 21 and 22 respectively, for each one of the cantilevered contact tabs 18 and 19.

[0023] The flexing limiting laminas 21 and 22 extend from the same frame 17 until they affect the free end 23 and 24 of the respective cantilevered elastic tab 18 and 19, as can clearly be seen in Figure 1.

[0024] The female terminal 10 comprises a front portion, which is the part where the male terminal is introduced into the connection body 12, and a rear portion, which is the crimping portion 11.

[0025] In the present embodiment, the female terminal 10 according to the invention has two laterally adjacent cantilevered tabs 18 and 19 which extend from a front portion 25 of the frame 17 of the cover 16.

[0026] There are therefore two flexing limiting laminas, 21 and 22, and they extend from the rear portion 26 of the frame 17.

[0027] The flexing limiting laminas 21 and 22 are each constituted by a flat tab that extends from the rear portion 26 of the frame 17 and is folded in a U-shape toward the center of the cover 16.

[0028] The free ends 27 and 28 of the limiting laminas 21 and 22, by lying above the free ends 23 and 24 of the respective cantilevered tabs 18 and 19, prevent the tabs from flexing outward excessively when the male terminal enters the connection portion 12, affecting the movement of the free ends 23 and 24.

[0029] The bottom 13 of the connection portion 12 has a central opening 30, visible in Figures 4 and 6, within which a cantilevered bridge 31 extends which has an engagement protrusion 32 adapted to engage with a corresponding hole in the male terminal.

[0030] The cantilevered contact tabs 18 and 19 are arc-shaped, with the concavity directed outward.

[0031] In the central region these tabs have a longitudinal contact ridge 33 and 34 respectively, which extends into the interspace 20.

[0032] It should be understood that the female terminal 10 is made in a single piece from stamped and folded metal sheet.

[0033] In practice it has been found that the invention fully achieves the intended aim and objects.

[0034] In particular, with the invention a female terminal has been devised that is always capable of ensuring an optimal contact with the male terminal, stably, precisely and continuously, by virtue of the fixing between

the free edges of the cover and wall which prevents the outward bending of the cover, bottom and walls of the box-like body to which those free edges belong.

[0035] The optimal contact with the male terminal, stably, precisely and continuously, is also ensured by virtue of the flexing limiting laminas which prevent the cantilevered contact tabs from flexing outward excessively, retaining them stably against the inserted male terminal.

[0036] What is more, with the invention a female terminal has been provided in which the cantilevered contact tabs are not subject to permanent plastic deformation that compromises their correct elasticity, since the contact tabs are not permitted to bend to the extent that yielding is induced, even in the event of incorrect insertion of the male terminal along a direction that could damage the tabs.

[0037] Moreover, with the invention a female terminal has been provided that can be easily produced in the manner of conventional female terminals.

[0038] The invention, thus conceived, is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. Moreover, all the details may be substituted by other, technically equivalent elements.

[0039] In practice the materials employed, provided they are compatible with the specific use, and the contingent dimensions and shapes, may be any according to requirements and to the state of the art.

[0040] The disclosures in Italian Patent Application No. 102016000051879 (UA2016A003626) from which this application claims priority are incorporated herein by reference.

[0041] 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 terminal (10) for electrical connections, of the type comprising a crimping portion (11) and a boxlike connection body (12), **characterized in that** said boxlike connection body (12) comprises:

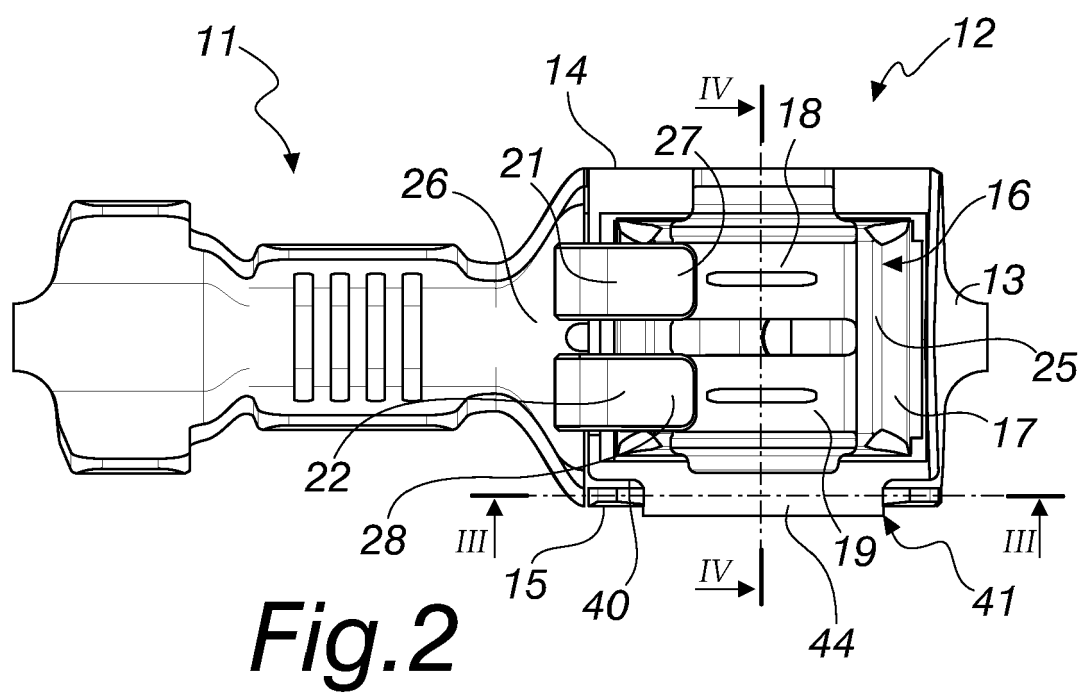
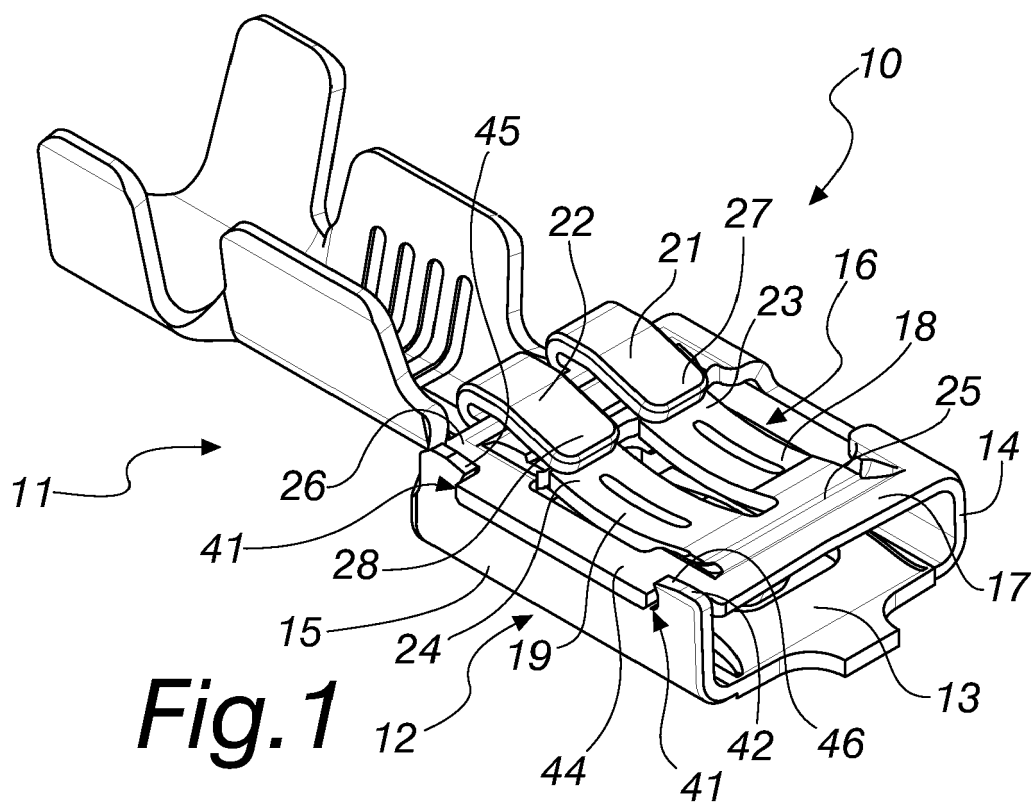
- a bottom (13) that defines a lower contact region,
- two opposite lateral containment walls (14, 15), which extend from said bottom (13),
- a cover (16), which extends from a first one of said lateral walls (14, 15) and defines an upper contact region, said cover (16) comprising a frame (17) with at least one cantilevered elastic contact tab (18), which is contoured to protrude into the interspace (20) between the bottom (13)

and said cover (16), intended to contain a male contact,

- said cover (16) having a first free edge (40) that is fixed with fixing means (41) to a corresponding second free fixing edge (42) of the second lateral wall (15).

adapted to engage with a corresponding hole provided in a male terminal.

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2. The female terminal according to claim 1, **characterized in that** said fixing means (41) comprise a recess (43) and a corresponding tab (44) which is contoured to arrange itself in said recess (43), one being defined on either said first free edge (40) or said second free edge (42) and the other being defined on the remaining one of either said first free edge (40) or said second free edge (42).
3. The female terminal according to claim 1, **characterized in that** said recess (43) is defined on said second free edge (42) and is open on the same side of the second free edge (42), corresponding extraction-preventing protrusions (45, 46) extending toward each other from the opposite ends of said recess (43) and being adapted to prevent the exit of the tab (44), which extends from the first free edge (40), from the recess (43).
4. The female terminal according to claim 2, **characterized in that** said tab (44) is fixed in said recess (43) by way of soldering spots or regions.
5. The female terminal according to one or more of the preceding claims, **characterized in that** it comprises a corresponding flexing limiting lamina (21), which extends from said frame (17) until it affects the free end (23) of a respective at least one cantilevered elastic tab (18).
6. The female terminal according to claim 1, **characterized in that** it is provided with two laterally adjacent cantilevered tabs (18, 19) which extend from a front portion (25) of the frame (17) of the cover (16).
7. The female terminal according to claim 1, **characterized in that** it comprises two flexing limiting laminas (21, 22) that extend from a rear portion (26) of said frame (17).
8. The female terminal according to claim 7, **characterized in that** said flexing limiting laminas (21, 22) are each constituted by a flat tab that extends from the rear portion (26) of the frame (17) and is folded in a U-shape toward the center of the cover (16).
9. The female terminal according to one or more of the preceding claims, **characterized in that** said bottom (13) of the connection portion (12) has a central opening (30) within which a cantilevered bridge (31) extends which has an engagement protrusion (32)
10. The female terminal according to one or more of the preceding claims, **characterized in that** it is made in a single piece from stamped and folded metal sheet.



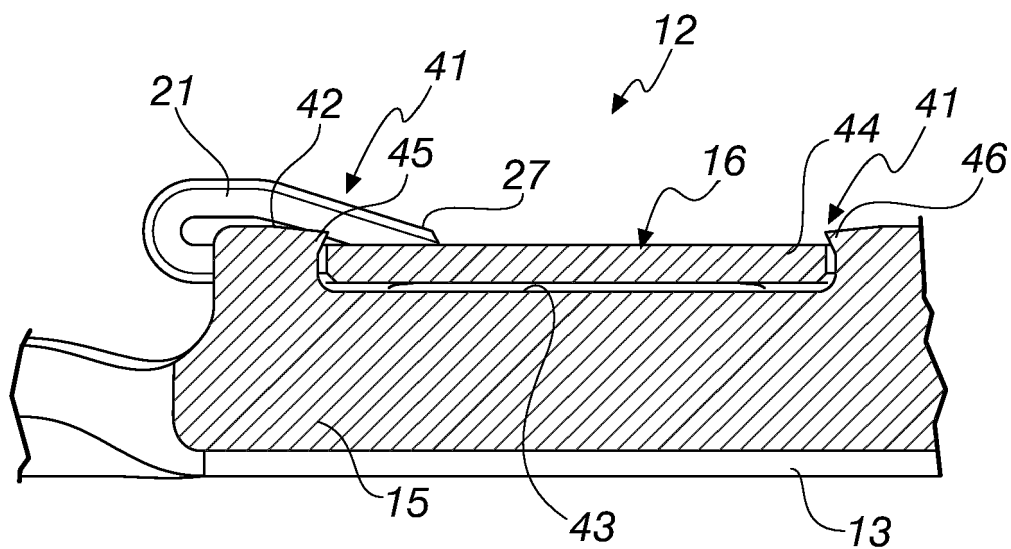


Fig.3

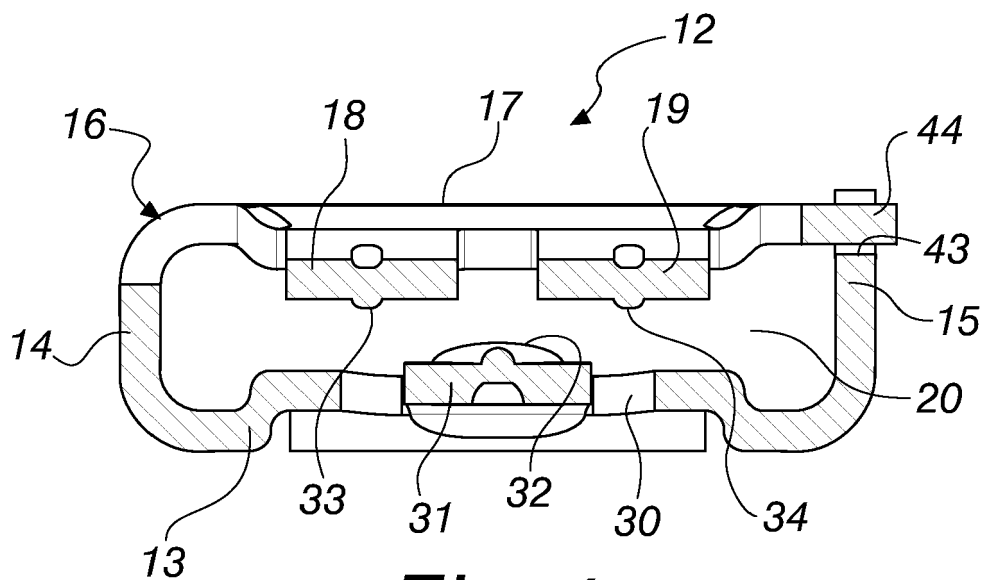


Fig.4

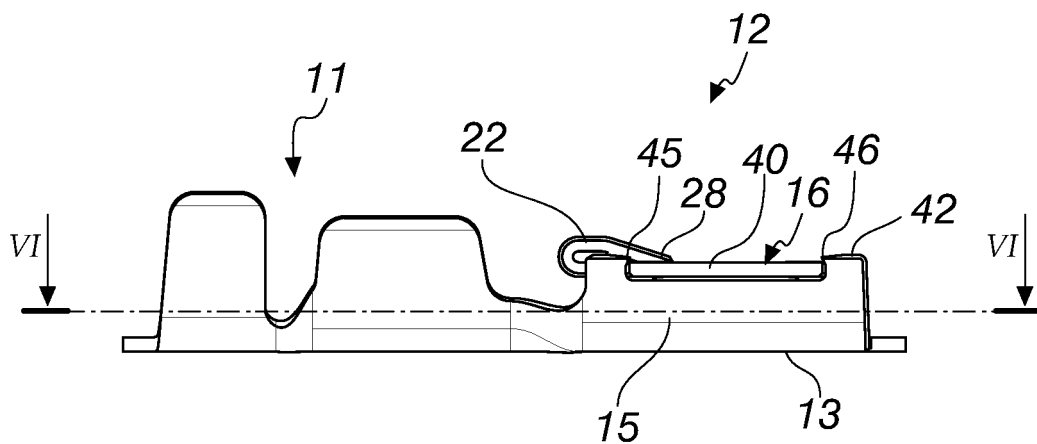


Fig. 5

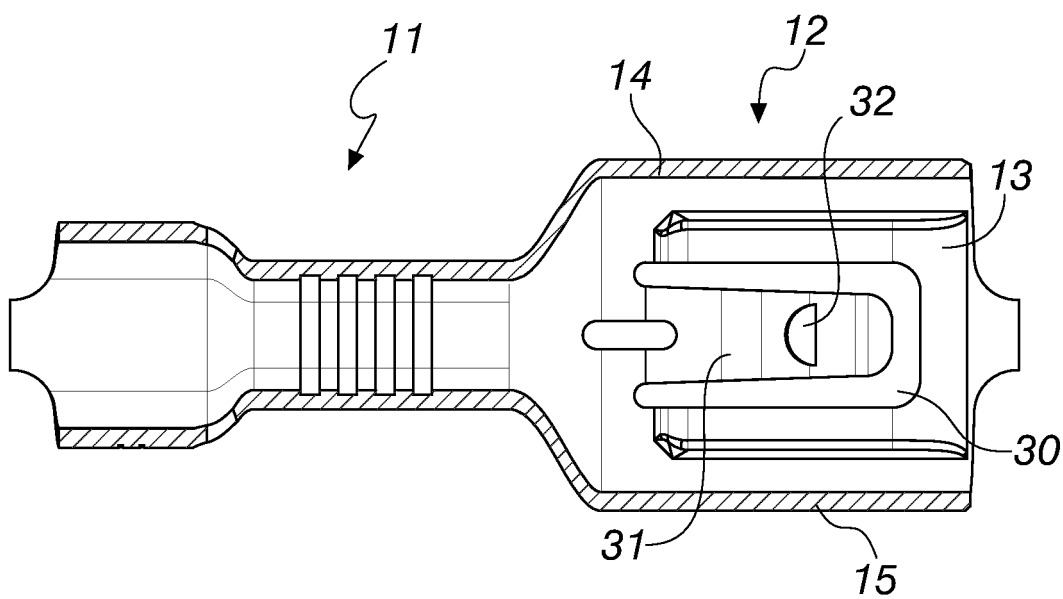


Fig. 6



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Application Number
EP 17 17 1344

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Y	* paragraphs [0023] - [0030], [0033]; figures 1-3 *	9	H01R43/16 H01R13/187
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			H01R
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 19 July 2017	Examiner López García, Raquel
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			

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