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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 connection portion (12), characterized in that the connection portion (12) comprises:

- a bottom (13) that defines a lower contact region,
- two opposite lateral containment walls (14, 15)
- a cover (16) that defines an upper contact region, the cover (16) comprising a frame (17) from which the following extend:

- at least one cantilevered elastic contact tab (18), contoured to protrude into the interspace (20) between the bottom (13) and the cover (16), intended to contain a male contact,
- and a corresponding flexing limiting lamina (21), which extends from the frame (17) until it affects the free end (23) of the respective at least one cantilevered elastic tab (18).

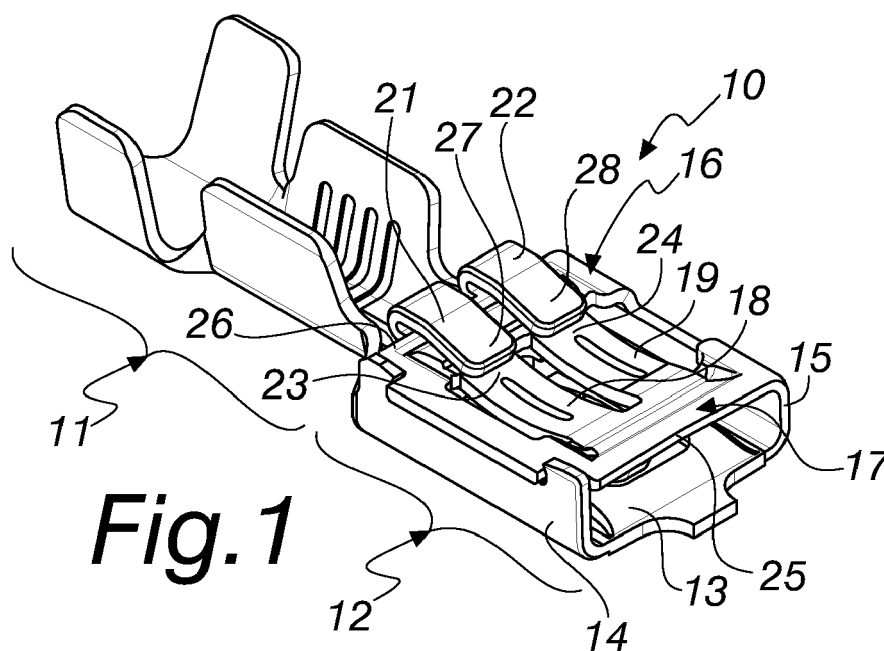


Fig. 1

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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 shape 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, because they are free to bend upon the passage of the male terminal, are not always capable of ensuring optimal contact with the male terminal; 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 plastically deform at the bending point and are no longer capable of ensuring stable contact against the male terminal.

[0004] 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.

[0005] 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.

[0006] 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.

[0007] Another object of the present invention is therefore to provide a female terminal in which the cantilevered contact tabs are not subject to permanent plastic deformation that compromises their correct elasticity.

[0008] Another object of the present invention is to provide a female terminal that can be easily produced in the manner of conventional female terminals.

[0009] 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.

[0010] Further characteristics and advantages of the invention will become better apparent from the detailed description of a preferred, but not exclusive, embodiment of the female electrical terminal according to the invention, which is illustrated for the purposes 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 side view of the female terminal in the preceding figures;

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

Figure 5 is a longitudinal cross-sectional view of the female terminal according to the invention, taken along the line V-V of Figure 3;

Figure 6 is a transverse cross-sectional view of the female terminal according to the invention, taken along the line VI-VI of Figure 2;

Figure 7 is a variation of embodiment of the female terminal according to the invention;

Figure 8 is an additional variation of embodiment of the female terminal according to the invention.

[0011] With reference to the figures, a female terminal for electrical connections according to the invention is generally designated with the reference numeral 10.

[0012] The female terminal 10 is of the type comprising a crimping portion 11, for connecting an electric wire, and a connection portion 12.

[0013] The connection portion 12 comprises:

- a bottom 13 that defines a lower contact region,
- two opposite lateral containment walls 14 and 15,
- a cover 16 that defines an upper contact region, the cover (16) comprising a frame (17) from which the following extend:
 - two cantilevered elastic contact tabs, 18 and 19, contoured to protrude into the interspace 20 between the bottom 13 and the cover 16, intended to contain a male contact, the latter not shown for the sake of simplicity,
 - and a corresponding flexing limiting lamina 21 and 22 respectively, which extends from the frame 17 until it affects the free end 23 and 24 of the respective cantilevered elastic tab 18 and 19, as can clearly be seen in Figure 4.

[0014] The female terminal 10 comprises a front portion, which is the part where the male terminal is introduced into the connection portion 12, and a rear portion, which is the crimping portion 11.

[0015] 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.

[0016] There are therefore two flexing limiting laminas, 21 and 22, and they extend from the rear portion 26 of the frame 17.

[0017] 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.

[0018] 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.

[0019] The 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 adapted to engage with a corresponding hole in the male terminal; these details are clearly visible in Figures 4, 5 and 6.

[0020] The cantilevered contact tabs 18 and 19 are arc-shaped, with the concavity directed outward.

[0021] In the central region these tabs have a longitudinal contact ridge 33 and 34 respectively, which extends into the interspace 20.

[0022] In a variation of embodiment, shown in Figure 7 and designated therein with the reference numeral 110, the female terminal 110 has two laterally adjacent cantilevered tabs 118 and 119, a first one 118 of which extends from the rear portion 126 of the frame 117 of the cover 116, and the second 119 from the front portion 125.

[0023] By contrast, a first one 121 of the flexing limiting lamina 121 and 122 extends from the front portion 125 of the frame 117, and the second 122 from the rear portion 126.

[0024] In an additional variation of embodiment, shown in Figure 8 and designated therein with the reference numeral 210, the female terminal 210 according to the invention has two laterally adjacent cantilevered tabs 218 and 219 which extend from a rear portion 226 of the frame 217 of the cover 216, while the flexing limiting lamina 221 and 222 extend from the front portion 225 of the frame 217 proper.

[0025] It should be understood that the female terminal 10, 110 and 210 is made in a single piece from stamped and folded metal sheet.

[0026] In practice it has been found that the invention fully achieves the intended aim and objects.

[0027] 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 flexing limiting lamina which prevent the cantilevered contact tabs from flexing outward excessively, retaining them stably against the inserted male terminal.

[0028] What is more, with the invention a female terminal has been devised 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.

[0029] Moreover, with the invention a female terminal has been devised that can be easily produced in the manner of conventional female terminals.

[0030] 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.

[0031] 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.

[0032] The disclosures in Italian Patent Application No. 102016000051872 (UA2016A003625) from which this application claims priority are incorporated herein by reference.

[0033] 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 connection portion (12), **characterized in that** said connection portion (12) comprises:
 - a bottom (13) that defines a lower contact region,
 - two opposite lateral containment walls (14, 15),
 - a cover (16) that defines an upper contact region, said cover (16) comprising a frame (17) from which the following extend:
 - at least one cantilevered elastic contact tab (18), contoured to protrude into the interspace (20) between the bottom (13) and said cover (16), intended to contain a male contact,
 - and a corresponding flexing limiting lamina (21), which extends from said frame (17) until it affects the free end (23) of the respective at least one cantilevered elastic tab (18).
2. The female terminal according to claim 1, **characterized in that** it has two laterally adjacent cantilevered tabs (18, 19) which extend from a front portion (25) of the frame (17) of the cover (16).
3. The female terminal according to one or more of the preceding claims, **characterized in that** it comprises two flexing limiting lamina (21, 22) that extend from the rear portion (26) of said frame (17).
4. The female terminal according to one or more of the preceding claims, **characterized in that** said flexing limiting lamina (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).

5. The female terminal according to one or more of the preceding claims, **characterized in that** said free ends (27, 28) of the limiting laminas (21, 22), by lying above the free ends (23, 24) of the respective cantilevered tabs (18, 19), prevent said tabs from flexing outward excessively when the male terminal enters the connection portion (12), affecting the movement of the free ends (23, 24). 5
6. 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) adapted to engage with a corresponding hole provided in a male terminal. 10 15
7. The female terminal according to one or more of the preceding claims, **characterized in that** said cantilevered contact tabs (18, 19) are arc-shaped, with the concavity directed outward. 20
8. The female terminal according to one or more of the preceding claims, **characterized in that** in the central region said cantilevered contact tabs (18, 19) have a longitudinal contact ridge (33, 34) that protrudes into the interspace (20). 25
9. 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. 30

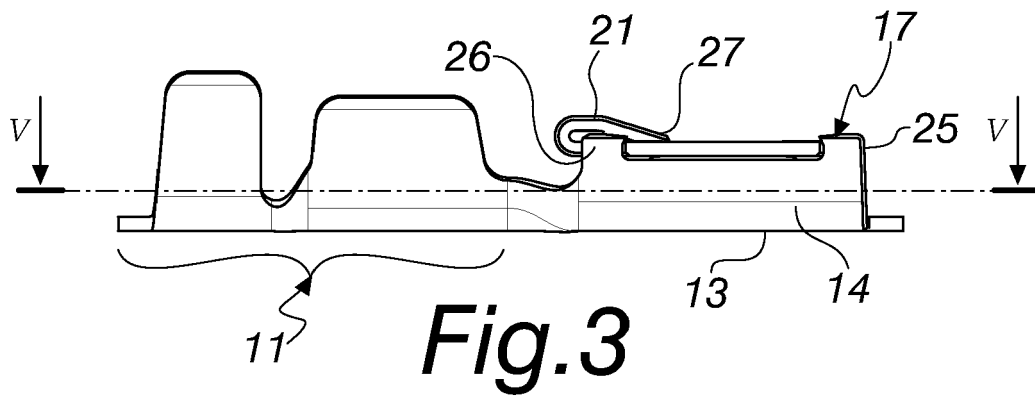
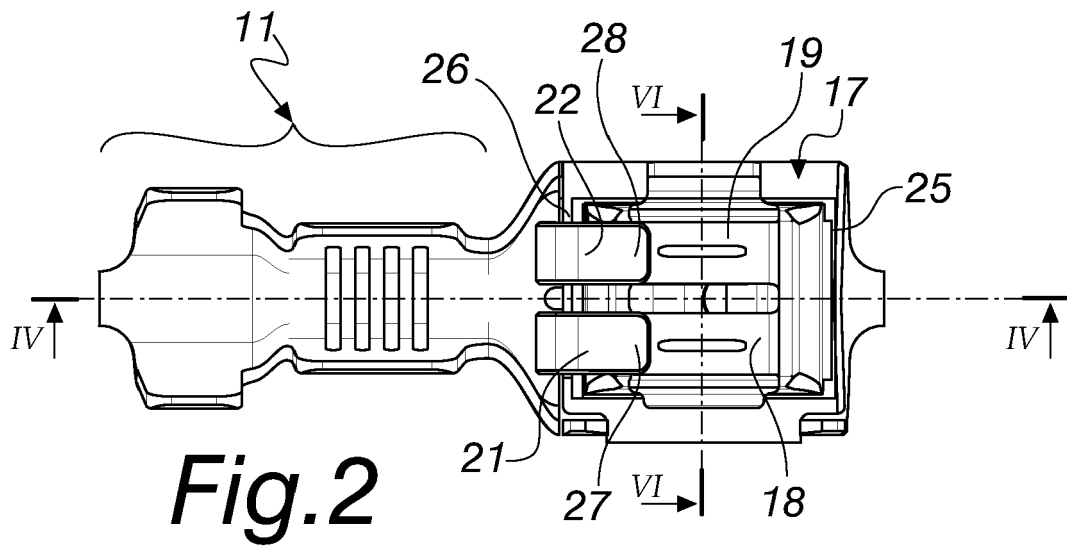
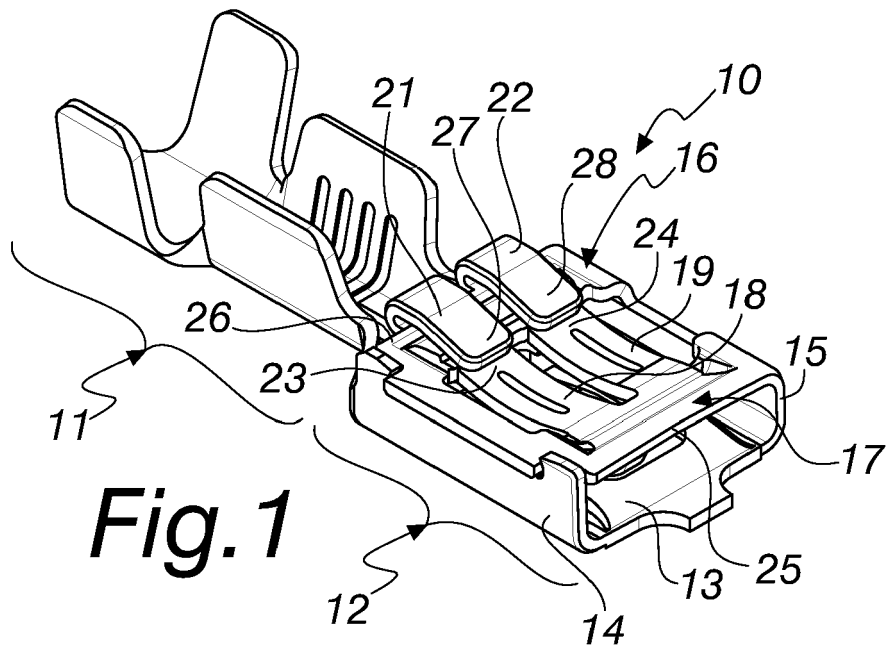
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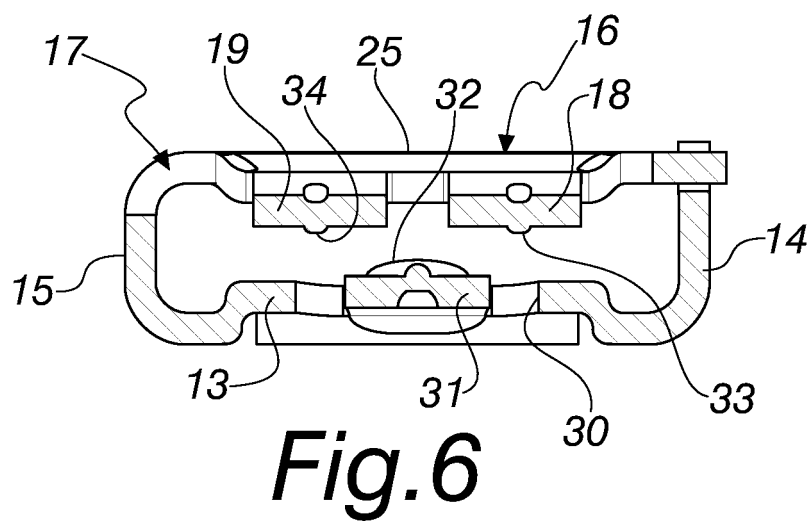
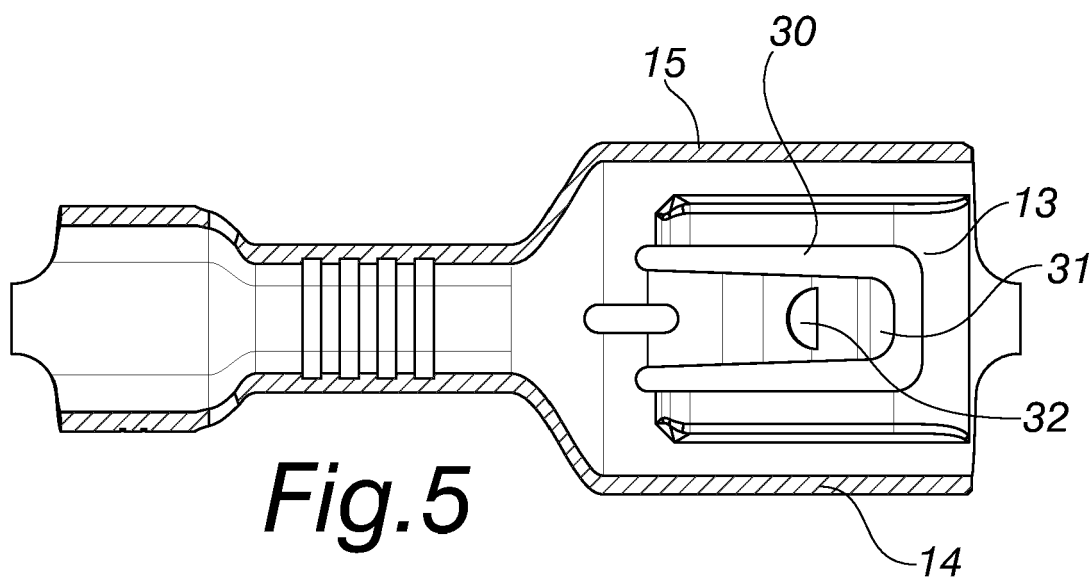
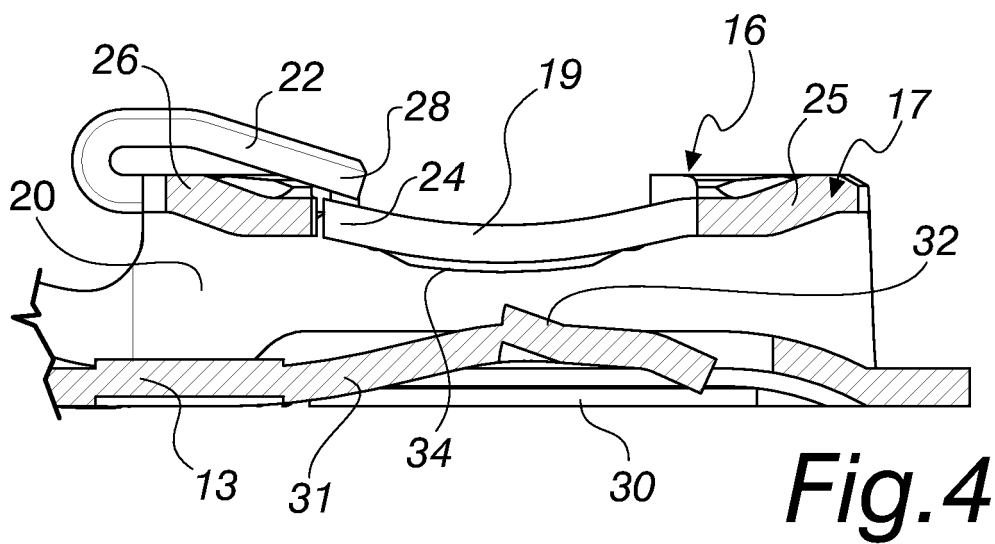
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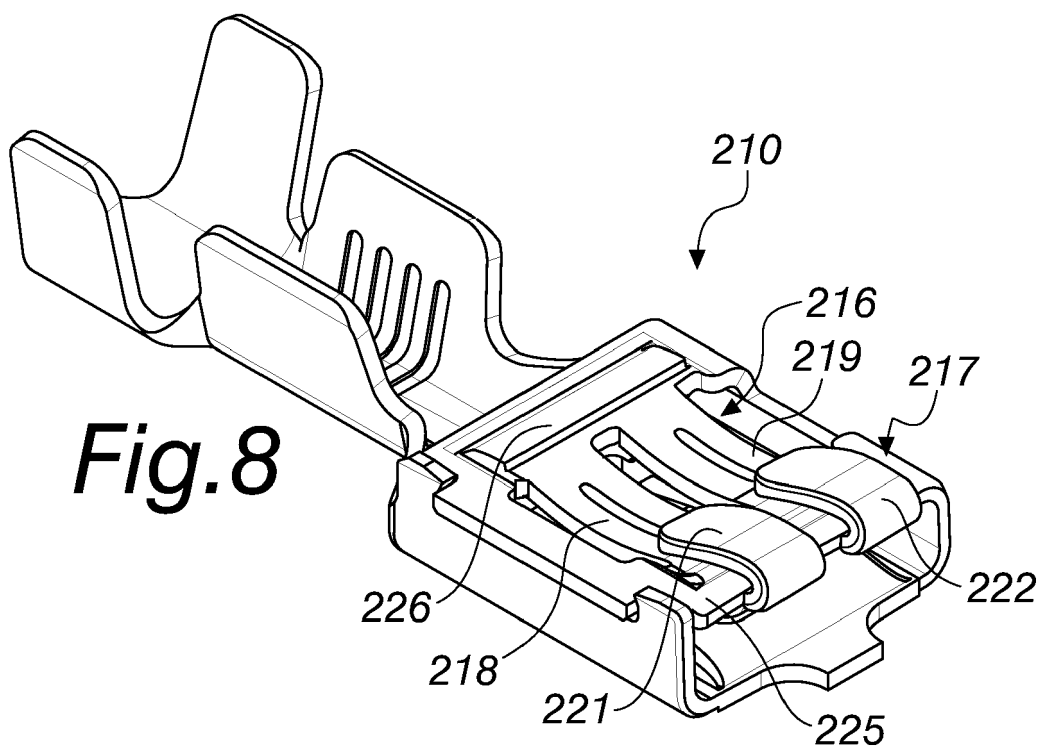
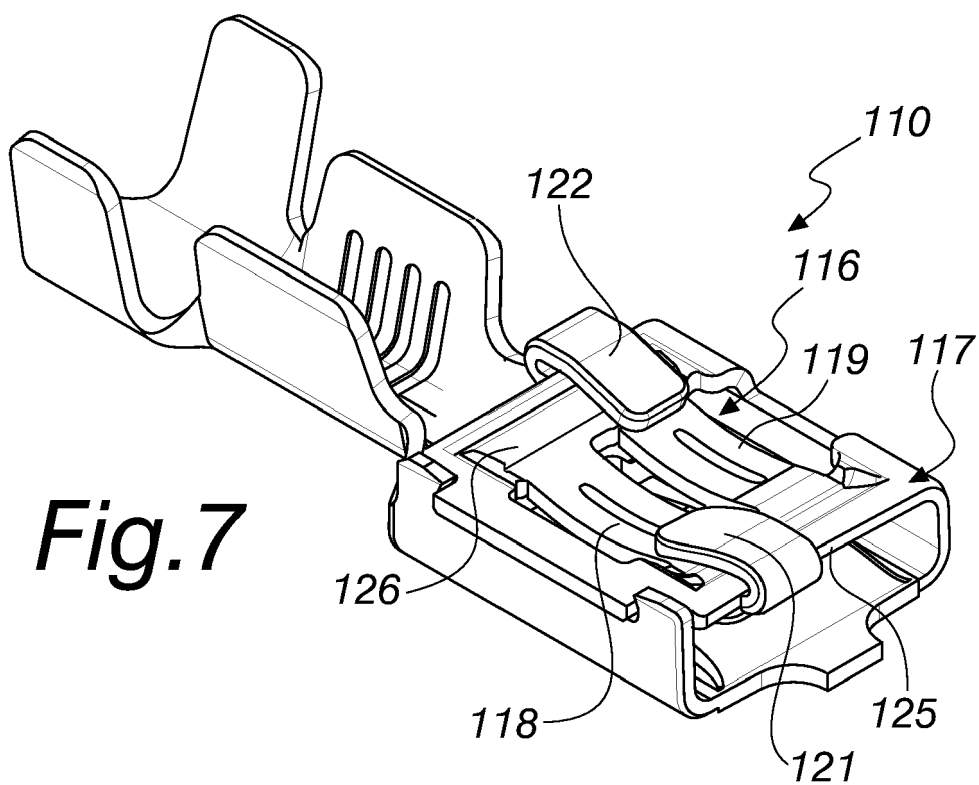
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EUROPEAN SEARCH REPORT

Application Number
EP 17 17 1342

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Place of search The Hague		Date of completion of the search 16 August 2017	Examiner López García, Raquel
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