



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
27.04.2016 Bulletin 2016/17

(51) Int Cl.:
H01R 4/48 (2006.01)

(21) Application number: **15382487.5**

(22) Date of filing: **07.10.2015**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

(71) Applicant: **Simon, S.A.U.**
08013 Barcelona (ES)

(72) Inventor: **BARBERO DOMEÑO, Javier**
08013 BARCELONA (ES)

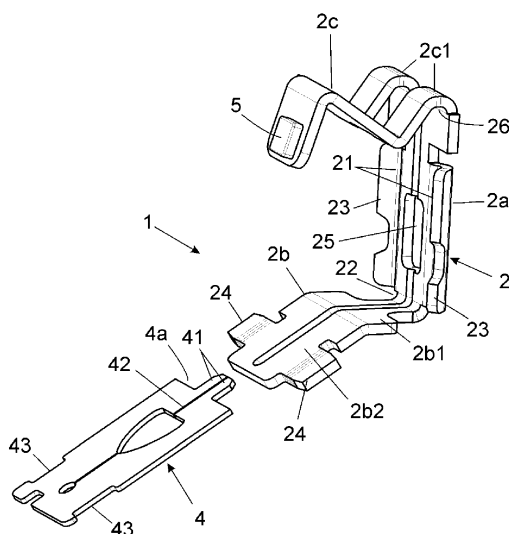
(74) Representative: **Espiell Volart, Eduardo Maria R. Volart Pons y Cia. S.L.**
Pau Claris, 77, 2.o, 1.a
08010 Barcelona (ES)

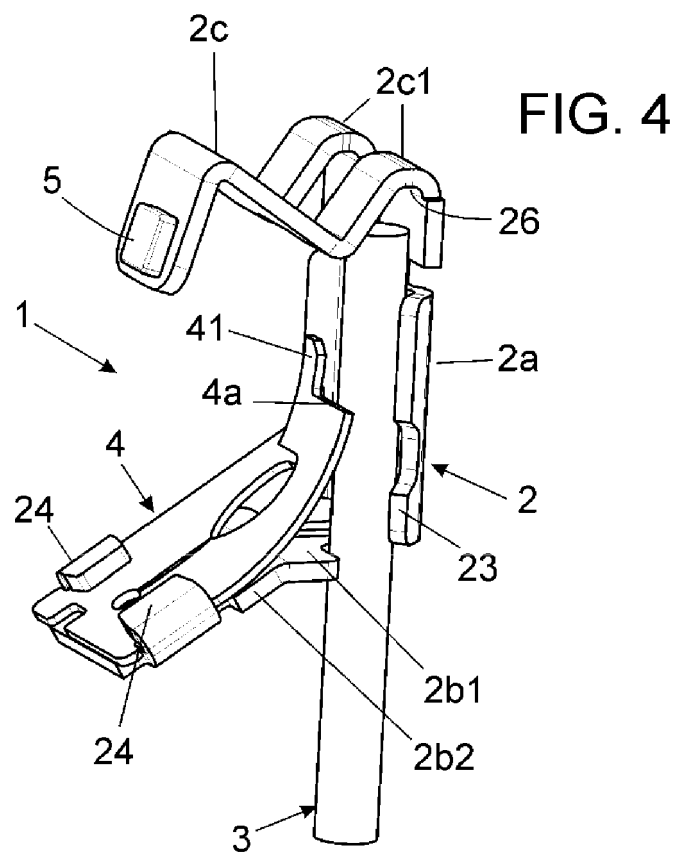
(30) Priority: **22.10.2014 ES 201431375 U**

(54) **QUICK-CONNECTION TERMINAL DEVICE FOR ELECTRICAL CONNECTIONS**

(57) Comprising at least one metal body (2) incorporating one elastic element for the quick connection of one cable (3). Said elastic element consists of a flat strip (4) arranged obliquely of about 30° degrees with respect to the straight section (2a) of the metal body (2). The metal body (2) consists of a bent in C-shaped comprising a central straight section (2a), with one channel (21) wherein the cable is inserted (3), a lower section (2b), wherein the flat strip (4) is fixed being oblique to the central straight section (2a) with a longitudinal section (42), which allows to receive two cables (3), one on each side and an upper section (2c) just as hole (25) wherein a projection (41) is inserted allowing to press with a tool. The lower section (2b) has a first lower initial section (2b1) perpendicular to the central straight section (2a), and a second lower distal section (2b2) that is oblique to the former one and wherein the flat strip (4b) is fixed in a coplanar manner. On the second lower distal section (2b2) of the lower section (2b) by means of folded flaps (24). The broken upper section (2c) of the metal body (2) has a bend at an acute angle (2c1) which, inferiorly, defines a convergent housing (26) for receiving the end of the cable (3). The channel (21) presents a recess (22) in the first lower initial section (2b1) a curved side edge (23) in the central straight section (2a).

FIG. 1





Description

OBJECT OF THE INVENTION

[0001] The invention as expressed in the title of this specification refers to a quick-connection terminal device for electrical connections, which provides the function for which it is intended with various advantages and characteristics of novelty, which will be explained in detail below, which are an improvement over the current state of the art in its scope.

[0002] The object of the present invention focuses specifically on a quick-connection terminal device essentially comprising of a metallic element whose obvious purpose is to provide a mean of a quick attachment of a cable to the terminal connector in an electrical connection without using a screw, said device having a simplified and innovative structural configuration that incorporates a flat elastic element specially designed to, among other advantages, facilitate such attachment while ensuring optimum and extensive cable contact with the metal surface of the device to ensure electrical conduction.

SCOPE OF THE INVENTION

[0003] The scope of the present invention is encompassed in the industrial sector dedicated to the manufacture of appliances, electrical devices and mechanisms particularly in the area of the connecting elements.

BACKGROUND OF THE INVENTION

[0004] As a reference to the current state of the art it is noted that while various quick-connection terminal mechanisms and devices are known, i.e. to connect a cable directly to the terminal connector without using screws or other additional fixing means, the applicant at least is not aware of any that present a similar technical, structural and constitutive features to those of the device claimed herein.

[0005] In this regard, examples of the aforementioned prior art include patent ES419361A1, referring to an arrangement of a screwless terminal connector for electrical conduction, which essentially comprises a contact bridge arranged in a housing of insulating material and retaining spring supported thereon, that is, forming with the bridge, at least one fastening place for conductors, or also patent ES2193312T3, which discloses a connector terminal for electrical conductors, which is essentially configured based on a casing of insulating material in which a metal contact element is housed with at least two clamping points, which are always formed between a leaf spring and a current rod common to all the clamping points.

[0006] Both solutions, however, differ considerably in terms of technical, structural and constitutive features from the device of the invention, highlighting, among others, the increased complexity and number of elements

that comprise compared to the simplicity of the device proposed by the present invention.

EXPLANATION OF THE INVENTION

[0007] The invention consists of a terminal connection device for electrical connections which is essentially constituted by a metallic body incorporating at least one elastic element for quick and screwless fixing, of at least, one conductor cable, with the particularity that said elastic element is a flat strip and the metal body is a bent and mechanized piece with a configuration specifically designed to accommodate the cable end ensuring perfect securing thereof with the flat strip and maximizing the area of contact of said cable with the metal surface of said body to provide optimal connectivity. All of this, with a metal body and a flat strip of very simplified construction and easy to assemble making the device a simple and cheap component to manufacture.

[0008] For all this, and going into greater detail, the metal body forming the device has an approximately C-shaped configuration which highlights a central straight section where the cable is inserted, an oblique lower section where the flat strip is incorporated oblique to the central section and therefore to the cable to lock on it, and a broken upper section acting as the cable stop and wherein there is at least one contact point for connecting the device with another similar device or with some other external element.

[0009] Based on this configuration, the metal body has at least one channel in the central straight section for receiving the cable which, introduced via the bottom of said central section, it engages with the upper edge of the flat strip, as said upper edge is facing said central section and is raised by the cable itself. Thus the upward cable penetration, i.e. from the bottom of the metal body, determines the bending of the strip, as it tends to return to its naturally flat position, it is locked onto the cable fixing it. Moreover, any attempt to pull the cable down, further strengthens its fixation with the strip.

[0010] In an optimal embodiment, the inclination of the strip with respect to the horizontal, or perpendicular line to the central straight section of the metal body, is about 30° degrees.

[0011] In order to achieve the tilting of the flat strip, the lower section of the metal element has a first initial section, which is perpendicular to the central straight section, thus obtaining a greater channel length with the same height of the metal body, and a second distal section that is oblique to the former section and tilted at 30° with regard to the same, wherein by means of a fixing means the flat strip is fixed and which achieves the tilting of the flat strip with regard to the perpendicular to the straight section.

[0012] The coplanar fixation between the flat strip with the oblique distal section of the lower section of the metal body, while it determines the tilting of the flat strip, it provides a safer fastening and fixing of said flat strip when

working for cable insertion.

[0013] On the opposite side, the flat strip has an upper edge which is partially straight, and which locks on the cable, as this is inserted into the device, having a projection which provides a fulcrum to facilitate disengagement of the strip when the cable is to be released. This projection, when there is no cable, is inserted into a hole provided for this purpose in the central straight section of the metal body and the extraction of the cable is achieved by simply pressing on said projection through said hole.

[0014] Preferably, the flat strip, in its upper interlocking side is divided into two, providing two top interlocking edges, and the central straight section of the metal body is also configured to receive two cables, one on each side thereof, so each of them is fixed with one of the upper edges of the flat strip and they can work independently in both the locking and unlocking of the conductors.

[0015] Furthermore, importantly said central straight section, presents a curved edge laterally defining an interior channel longitudinally embracing the cable providing an increase of the area of contact between said cable and said metal body along the entire central straight section, whereby the connection efficiency is improved.

[0016] Finally, on top of the metal body, the broken section referred to in this part has a bend at an acute angle, which inferiorly determines a converging housing for receiving the cable end once introduced along the central straight section. This angled housing acts as a stop to limit the introduction of the cable, serving for different cable diameters through the converging configuration.

[0017] The described quick-connection terminal device for electrical connections is therefore an innovative structure of characteristics unknown until now for the purpose for which it is intended, reasons which linked to its practical usefulness, provide sufficient grounds for obtaining the privilege of exclusivity requested.

DESCRIPTION OF THE DRAWINGS

[0018] To complement the description being made and in order to aid a better understanding of the characteristics of the invention, this descriptive specification is accompanied, as an integral part thereof, by a set of drawings wherein by way of example and without limiting the scope of the invention, the following is shown:

Figure 1 shows a perspective view of an example of embodiment of the quick-connection terminal device for electrical connections, which is the object of the invention, shown exploded with the metal body before entering the flat strip, allowing to assess the parts and elements comprised as well as the configuration and arrangement thereof;

Figures 2 and 3. show respective perspective views,

Figures 4 and 5

front and rear respectively of the device of the invention, according to the same example shown in Figure 1, here represented once assembled and with a cable at the point of initiating its insertion; and again show respective perspective views; front and rear, of the assembled device, in this case incorporating a cable already introduced into it, thus showing its attachment with the flat strip and its coupling and contact the metal body

PREFERRED EMBODIMENT OF THE INVENTION

[0019] In view of the mentioned figures and according to the adopted numbering, shown is an example of preferred embodiment, but not limited thereto, of the quick-connection terminal device for electrical connections of the invention, which comprises the parts and elements which are indicated and described in detail below.

[0020] Thus, as seen in said figures, the device (1) in question, comprises at least one metal body (2) incorporating at least one elastic element for the quick-connection of at least one cable (3).

[0021] The metal body (2) is a bent and mechanized C-shaped piece having in its central portion a straight section (2a) which receives and makes contact with an end portion of the cable (3) fixing it with an elastic element, which consists of a flat strip (4) disposed obliquely with respect to said straight section (2a), and such that, upon insertion of the cable (3), the upper edge (4a) of the strip folds and locks and fixes said cable (3), as shown in Figure 4, the tilting of the flat strip (4) being of about 30° degrees with regard to the perpendicular to said straight section (2a).

[0022] In addition, the metal body (2) has a lower section (2b), where the flat strip (4) is incorporated being oblique to the central straight section (2a) and at 30 degrees to the perpendicular, and an upper broken section (2c) that acts as a stop for the cable (3) and which has at least one contact point (5), for the connection of the device (1) with a similar device or another external element.

[0023] To achieve the tilting of the flat strip (4), the lower section (2b) of the metal element has a first lower initial section (2b1) which is perpendicular to the central straight section (2a) and thus obtaining a greater channel (21) length with same height of the metal body (2), and a second distal section (2b2) that is oblique and inclined at 30 degree with regard to the same, wherein the flat strip (4) is fixed and which achieves the tilting of the flat strip (4) relative to the perpendicular to the straight section (2a).

[0024] As shown in Figures 2 and 3, in this second distal section (2b2) the underside of the flat strip (4) is incorporated in a coplanar manner, as fastening means

the respective fins (24) bent inwardly which provided for this purpose press against the side of the underside of the flat strip (4) in coincidence with the respective coupling points (43). Thus, the coplanar fixation of the flat strip (4) with the lower distal section (2b2) of the lower oblique section (2b) of the metal body (2) while determining the tilting of the flat strip (4) provides greater safety in the fastening and fixing of said flat strip (4) when working when bending due to cable (3) insertion.

[0025] The metal body (2) has, in the central straight section (2a), with at least one channel (21) to receive and accommodate the cable (3) making contact with the same throughout the length of the straight section (2a), which is determined by the existence of the circular recess (22) in the first lower initial section (2b1) and the existence of a curved side edge (23) in the central straight section (2a).

[0026] Upon insertion of the cable (3) in said channel (21), from the bottom of the straight section (2a) of the metal body (2), the upper edge (4a) of the flat strip (4) rises, causing its fixing and prevents it from coming out by pulling the cable in the opposite direction to the input direction.

[0027] Importantly, the top edge (4a) of the flat strip (4) is partially straight, to lock onto the cable (3), when the cable is inserted via the bottom of the central straight section (2a) of the metal body (2), having a projection (41) which provides a fulcrum to facilitate its unlocking and allow removal of the cable (3).

[0028] This projection (41), as shown in Figures 3 and 5, when the cable (3) is not inserted, protrudes through a hole (25) provided for this purpose in the central straight section (2a) of the metal body and through which it is possible to introduce a tool or other element with the same purpose for accessing said protrusion (41) and pushing it to unlock the cable (3).

[0029] Preferably, the flat strip (4) has a longitudinal section (42) which divides it into two by its upper side, determining the existence of a double upper locking edge with two projections (41), and in parallel, and the central straight section (2a) of the metal body also has two channels (21) to receive two cables (3), one on each side thereof, so that each is fixed to one of the upper edges of the flat strip (4).

[0030] Finally, the broken upper section (2c) of the metal body (2) has a bend at an acute angle (2c1) that inferiorly, determines a converging housing (26) to receive the end of the cable (3) once introduced along the central straight section (2a), adapting to different cable diameters (3), thanks to this convergent configuration.

[0031] Having sufficiently described the nature of the present invention, as well as how to implement it, it is not considered necessary to extend its explanation for anyone skilled in the art to understand its scope and the advantages derived from it.

[0032] It is also noted that, within its essence, the invention may be implemented in other embodiments which differ in detail from that indicated by way of exam-

ple, and which are also covered by the protection claimed provided its fundamental principle is not altered, changed or modified.

Claims

1. Quick-connection terminal device for electrical connections which, comprising at least one metal body (2) incorporating at least one elastic element for the quick connection of at least one cable (3) is **characterized in that** said elastic element consists of a flat strip (4).
2. Quick-connection terminal device according to claim 1, **characterized in that** the metal body (2) consists of a bent and mechanized piece having a straight section (2a) which receives and makes contact with an end section of the cable (3) fixing it with the elastic element (4).
3. Quick-connection terminal device according to claim 2, **characterized in that** the flat strip (4) is arranged obliquely with respect to the straight section (2a) of the metal body (2).
4. Quick-connection terminal device according to claims 1 to 3, **characterized in that** the flat strip (4) has a tilting of about 30° degrees with regard to the perpendicular to said straight section (2a) of the metal body (2).
5. Quick-connection terminal device according to any of claims 1 to 4, **characterized in that** the metal body (2) has an approximately C-shaped configuration comprising a central straight section (2a), wherein the cable is inserted (3), a lower section (2b), wherein the flat strip (4) is fixed being oblique to the central straight section (2a) and an upper section (2c).
6. Quick-connection terminal device according to claim 5, **characterized in that** the lower section (2b) of the metal body (2) has a first lower initial section (2b1) which is perpendicular to the central straight section (2a), and a second lower distal section (2b2) that is oblique to the former one and wherein the flat strip (4b) is fixed in a coplanar manner.
7. Quick-connection terminal device according to claim 6, **characterized in that** the underside of the flat strip (4) is fixed on the second lower distal section (2b2) of the lower section (2b) by means of folded flaps (24) that provided for this purpose press against the sides of said lower side of the flat strip (4).
8. Quick-connection terminal device according to any of claims 5 to 7, **characterized in that** the broken

upper section (2c) of the metal body (2) has a bend at an acute angle (2c1) which, inferiorly, defines a convergent housing (26) for receiving the end of the cable (3) once introduced along the central straight section (2a), adapting to different cable diameters (3). 5

9. Quick-connection terminal device according to any of claims 1 to 8, **characterized in that** the metal body (2) has, in the central straight section (2a), at least one channel (21) to receive and embrace the cable (3). 10

10. Quick-connection terminal device according to claim 9 **characterized in that** said channel (21) is determined by the existence of a recess (22) in the first lower initial section (2b1) and by the existence of a curved side edge (23) in the central straight section (2a). 15

11. Quick-connection terminal device according to any of claims 1 to 10, characterized on that the upper edge (4a) of the flat strip (4) there is a projection (41) which provides a fulcrum to facilitate its unlocking and allow extraction of the cable (3). 20 25

12. Quick-connection terminal device according to claim 11 **characterized in that** the straight section (2a) of the metal body (2) has a hole (25) wherein the protrusion (41) is inserted when there is no cable (3) and that when there is a cable, it allow to insert a tool to press on said projection (41) to remove the cable (3). 30

13. Quick-connection terminal device according to any of claims 1 to 12, **characterized in that** the flat strip (4) has a longitudinal section (42) which divides it into two by its upper side, determining the existence of a double upper interlocking edge and in parallel and the central straight section (2a) of the metal body (2) also allows to receive two cables (3), one on each side thereof, so that each of them is fixed with one of the upper edges of the flat strip (4). 35 40

45

50

55

FIG. 1

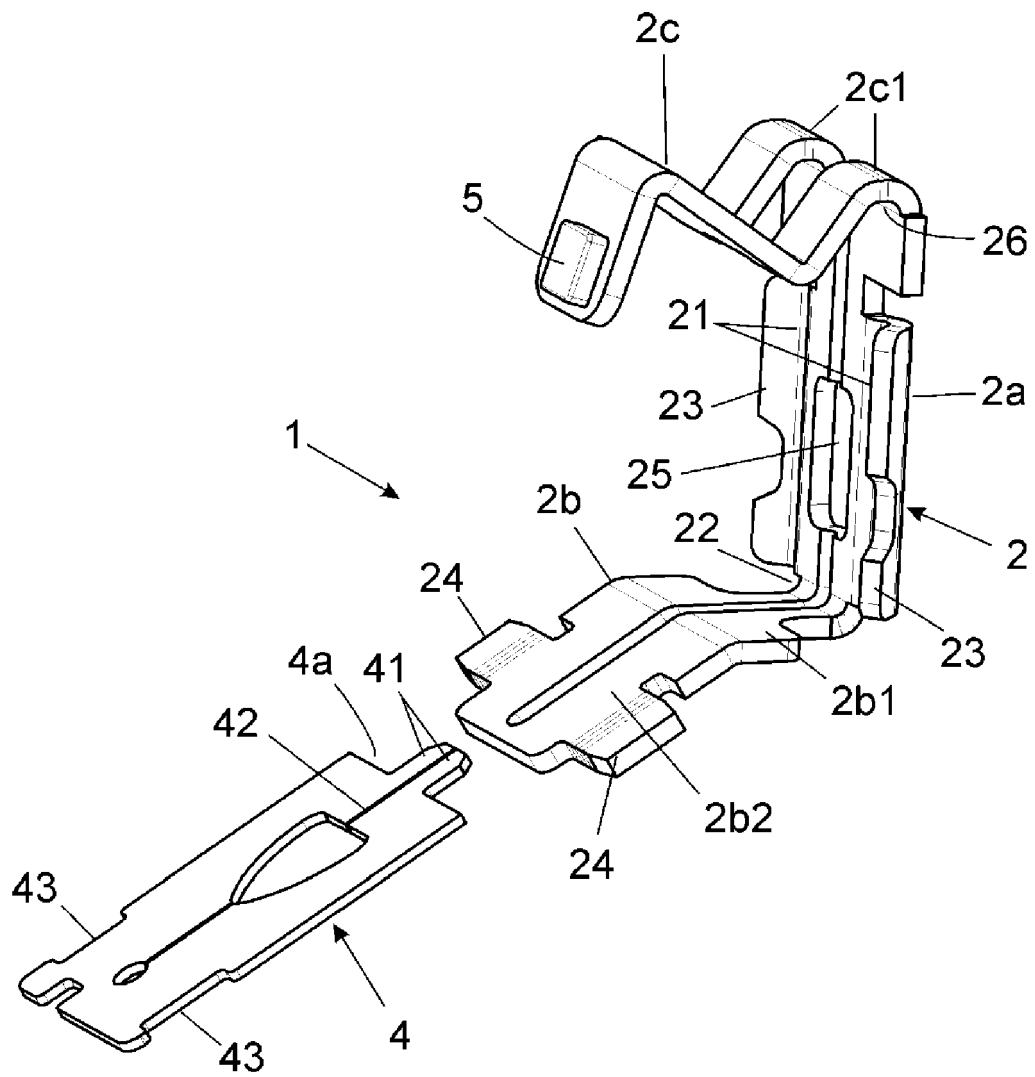


FIG. 2

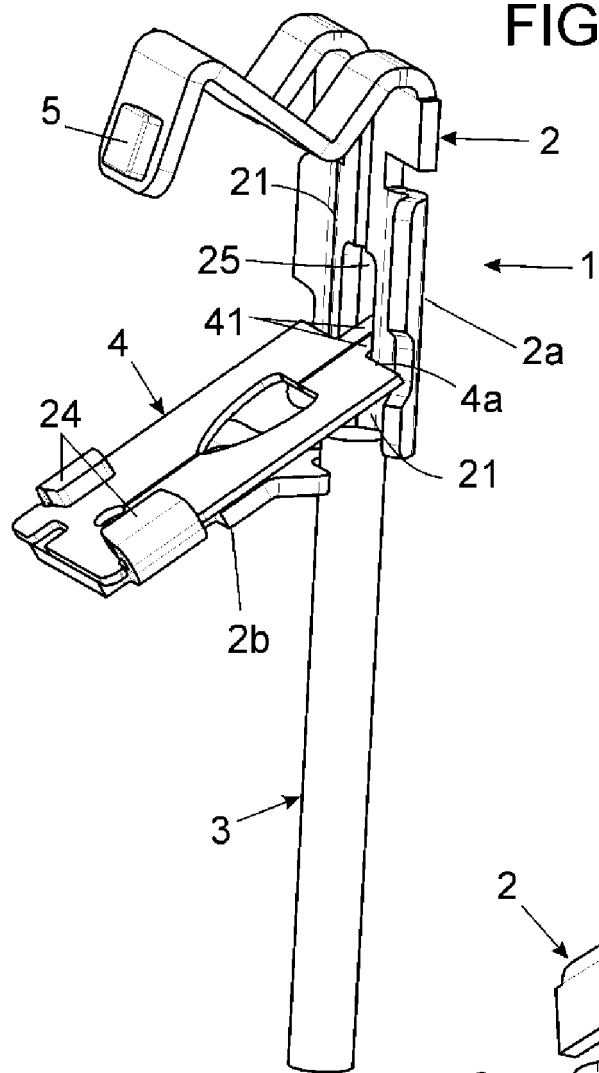
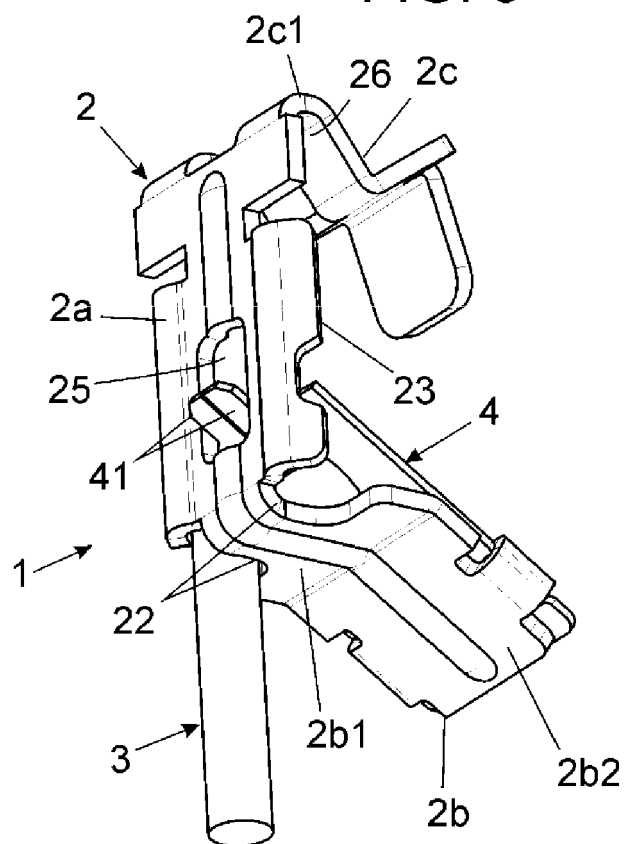
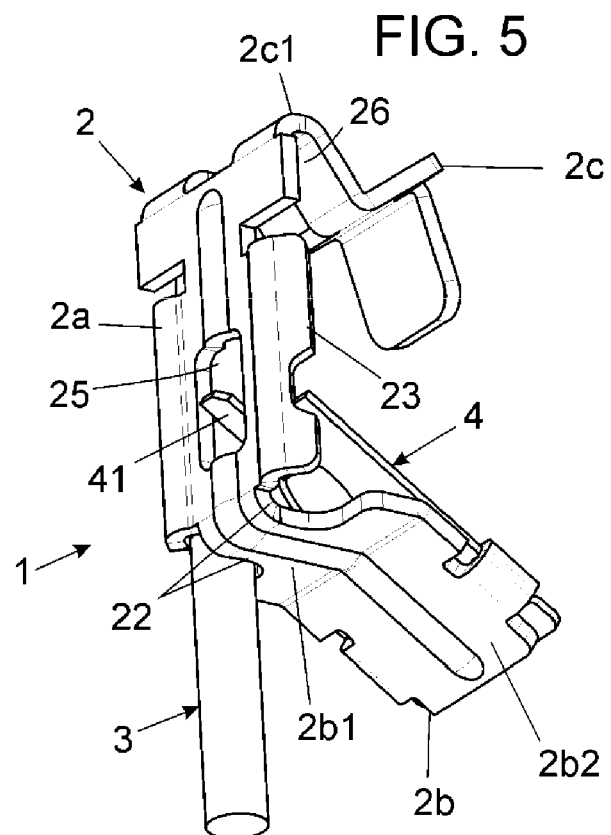
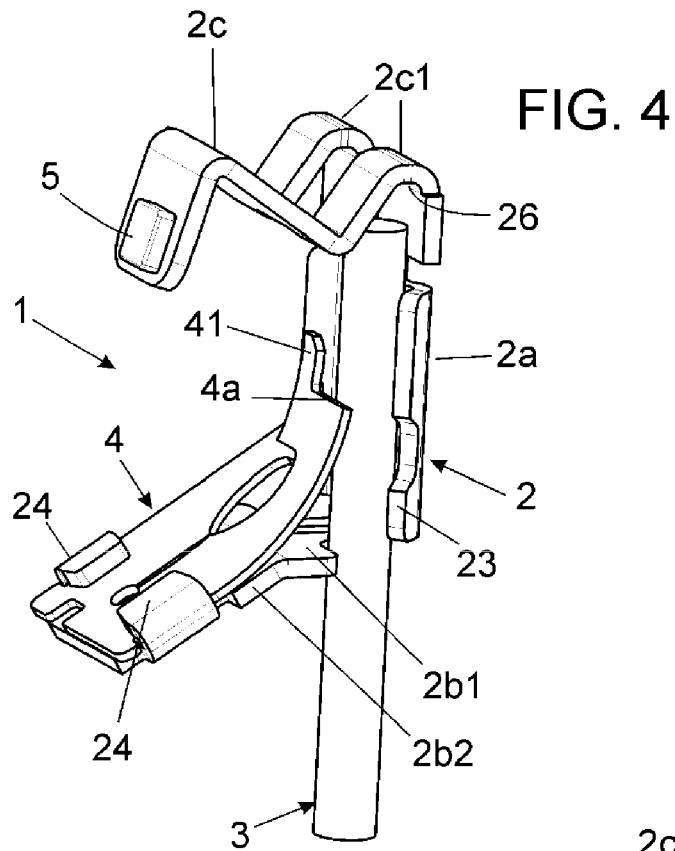


FIG. 3







EUROPEAN SEARCH REPORT

Application Number
EP 15 38 2487

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 26 37 456 A1 (INTER CONTROL KOEHLER HERMANN) 23 February 1978 (1978-02-23) * pages 4, 5; figures 1-4 *	1-13	INV. H01R4/48
X	EP 2 082 455 A2 (ITW IND COMPONENTS SRL [IT]) 29 July 2009 (2009-07-29) * paragraphs [0018] - [0021], [0028] - [0030]; figures 1-5 *	1-7	
X	DE 35 03 370 A1 (MERTEN GMBH & CO KG GEB [DE]) 7 August 1986 (1986-08-07) * column 2, lines 43-68, column 3, lines 1-7; figures 1, 2 *	1-6,9,10	
X	EP 0 828 314 A1 (ELEKTROKONTAKT AS [NO]) 11 March 1998 (1998-03-11) * columns 2, 3; figures 1, 2 *	1-8	
X	GB 751 675 A (ARROW ELECTRIC SWITCHES LTD) 4 July 1956 (1956-07-04) * page 1, lines 63-98, page 2, lines 1-28; figures 1-6 *	1-5,9-11	TECHNICAL FIELDS SEARCHED (IPC) H01R
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 12 February 2016	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	

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 38 2487

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-02-2016

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 2637456	A1	23-02-1978	NONE
EP 2082455	A2	29-07-2009	BR PI0715768 A2 16-07-2013 CN 101512841 A 19-08-2009 EP 2082455 A2 29-07-2009 ES 2539129 T3 26-06-2015 RU 2009118946 A 10-12-2010 US 2009258549 A1 15-10-2009 WO 2008047225 A2 24-04-2008
DE 3503370	A1	07-08-1986	NONE
EP 0828314	A1	11-03-1998	EP 0828314 A1 11-03-1998 HU 9701490 A2 29-06-1998 NO 301567 B1 10-11-1997 PL 321998 A1 16-03-1998
GB 751675	A	04-07-1956	NONE

15

20

25

30

35

40

45

50

55

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- ES 419361 A1 [0005]
- ES 2193312 T3 [0005]