

(19)



(11)

EP 3 836 311 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

16.06.2021 Bulletin 2021/24

(51) Int Cl.:

H01R 13/502 (2006.01)**H01R 13/52** (2006.01)**H01R 13/58** (2006.01)(21) Application number: **20212452.5**(22) Date of filing: **08.12.2020**

(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**KH MA MD TN**

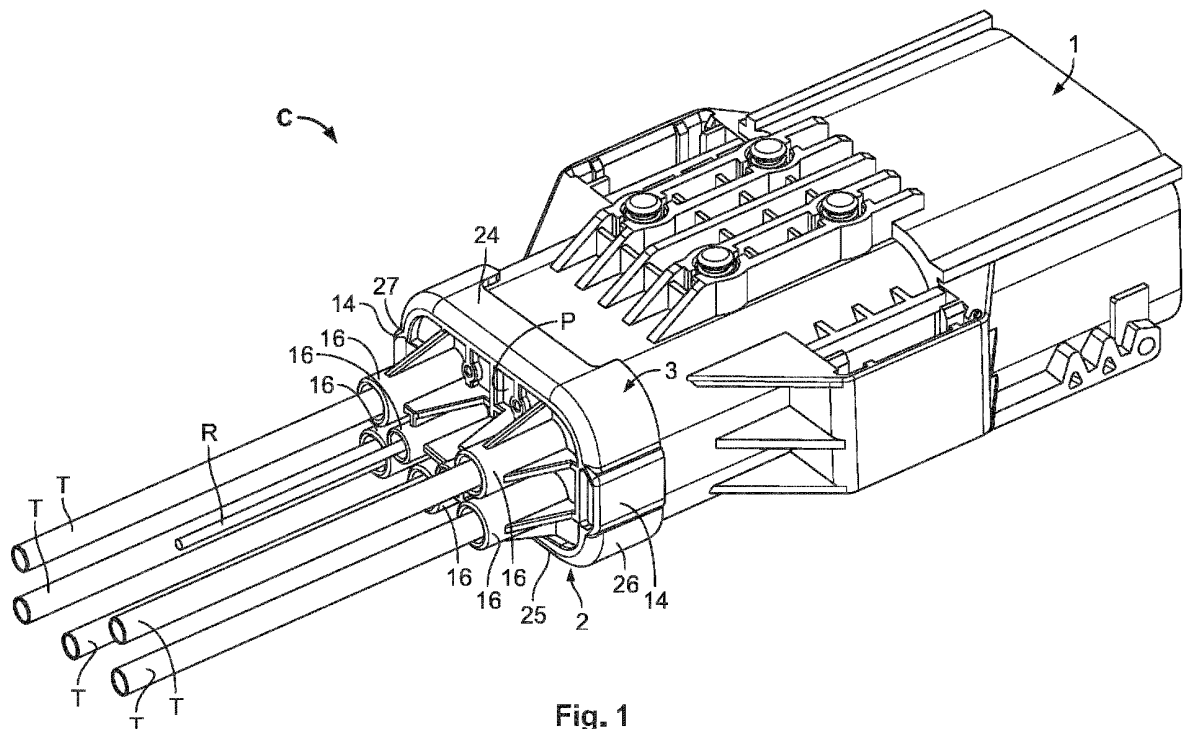
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10093 Collegno (TO) (IT)**(54) AN ELECTRICAL CONNECTOR WITH A SEALING SYSTEM TO AVOID WATER INFILTRATION**

(57) An electrical connector (C) includes a contact-carrying body (1) and a cover assembly (2) for guiding electrical connection cables (T). The cover assembly (2) comprises a cover element (3) having a main wall (P) that defines a receiving seat (S), and a sealing element (4) arranged within the receiving seat (S). The cover assembly (2) also comprises a locking element (5) designed

to lock the sealing element (4) in position, so that, in the assembled condition, the sealing element (4) is interposed between the main wall (P) and the locking element (5). The cover element (3) also includes a plurality of annular ribs (10), in such a way that the cover assembly (2) creates a sealing system to prevent water infiltration into said contact-carrying body (1).

**Fig. 1****EP 3 836 311 A1**

Description

Field of the invention

[0001] The present invention relates to an electrical connector including:

- an electrical contact-carrying body, carrying a plurality of electrical terminals,
- a cover assembly for guiding electrical connection cables, coupled to said contact-carrying body and having a plurality of inlet ports for receiving the electrical connection cables.

Prior art

[0002] Electrical connectors of the type indicated above are made to electrically connect two or more electrical components, by means of respective power and signal cables. In the field of electrical connectors that can be mounted on board a motor-vehicle, the need to simplify and make the electrical connection between the various components reliable has become an essential requirement for manufacturers, in particular following the widespread use of motor-vehicles powered by electric motors.

Object of the invention

[0003] The object of the present invention is to propose an electrical connector that is simpler and more functional than known solutions, while at the same time guaranteeing an effective sealing system to avoid water infiltrations, so as to be extremely reliable in use.

[0004] A further object of the present invention is to propose a method for assembling this electrical connector, which simplifies the complexity of the assembly operations with respect to conventional methods.

Summary of the invention

[0005] In order to achieve one or more of the aforesaid objects, the present invention relates to an electrical connector including:

- an electrical contact-carrying body, carrying a plurality of electrical terminals,
- a cover assembly for guiding electrical connection cables, coupled to said contact-carrying body and having a plurality of inlet ports for receiving the electrical connection cables.
- said cover assembly for guiding electrical connection cables comprising:
- a cover element having a main wall that defines an inner face facing towards said contact-carrying body, said cover element further comprising an upper wall, a lower wall and opposite side walls that protrude from said inner face, so as to define a receiving seat,

- a sealing element arranged within said receiving seat against said inner face,
- a locking element provided for locking said sealing element in position, wherein said locking element includes hooking means for the mutual coupling with respective fastening members formed at the inner face of the cover element, in such a way that, in the assembled condition, said sealing element is interposed between said inner face and said locking element,
- said inlet ports being defined by a first series of passages obtained on the main wall of said cover element, a second series of passages obtained on said sealing element and a third series of passages obtained on said locking element, wherein, in the assembled condition, the passages of said first, second and third series are, respectively, aligned to allow the passage of the electrical connection cables,
- said cover element further comprising a plurality of annular ribs formed at said inner face, each arranged around a respective passage of said first series, said annular ribs being embossed with respect to said inner face,
- in such a way that said cover assembly for guiding electric cables provides a sealing system to avoid water infiltration into said contact-carrying body.

[0006] In accordance with a preferred embodiment, each passage of said second series includes a plurality of annular sealing lips arranged at the inner surface of a respective passage, in order to obtain a sealed contact with the insulating material of the respective electrical connection cable.

[0007] Preferably said cover element includes a series of protruding tubular portions which protrude from said main wall in the opposite direction with respect to the contact-carrying body, the tubular portions defining respective extension portions of the inlet ports, for receiving the electrical connection cables.

[0008] Preferably, the locking element is shaped like a plate with two opposite faces, wherein one face is in contact with the sealing element.

[0009] According to a concrete embodiment, said fastening members, in the assembled condition, each pass through a respective auxiliary passage formed at the sealing element, so as to protrude in the direction of the locking element.

[0010] Preferably, said fastening members are defined by a plurality of pins having a respective coupling seat, at their ends, configured for mutual engagement with the hooking means of the locking element. These hooking means are arranged on one face in contact with the sealing element, and include a plurality of rod-like coupling formations configured for engagement with the coupling seats.

Detailed description of an embodiment of the invention

[0011] Further characteristics and advantages of the present invention will become apparent from the description that follows with reference to the attached drawings, provided purely by way of non-limiting example, wherein:

- Figures 1 and 2 illustrate a preferred embodiment of an electrical connector according to the invention, according to a perspective view and a cross-sectional view, respectively,
- Figure 3 is an exploded perspective view of a cover assembly forming part of the invention,
- Figure 4 is a perspective view of a component illustrated in the previous figure,
- Figure 5 is a cross-sectional view of a portion of the electrical connector according to the invention, and
- Figures 6-12 are perspective views illustrating assembly steps of the cover assembly illustrated in Figure 3.

[0012] In the following description, various specific details are illustrated aimed at a thorough understanding of examples of one or more embodiments. The embodiments can be implemented without one or more of the specific details, or with other methods, components, materials, etc. In other cases, known structures, materials, or operations are not shown or described in detail to avoid obscuring various aspects of the embodiments.

[0013] The reference to "an embodiment" in the context of this description indicates that a particular configuration, structure or characteristic described in relation to the embodiment is included in at least one embodiment. Therefore, phrases such as "in an embodiment", possibly present in different places of this description do not necessarily refer to the same embodiment. Moreover, particular conformations, structures or characteristics can be combined in a suitable manner in one or more embodiments and/or associated with the embodiments in a different way from that illustrated here, for example, a characteristic here exemplified in relation to a figure may be applied to one or more embodiments exemplified in a different figure.

[0014] The references illustrated here are only for convenience and do not therefore delimit the field of protection or the scope of the embodiments.

[0015] It is also specified that below - in the present description - only the elements useful for understanding the invention will be described, assuming - for example - that the connector according to the invention includes all the elements known per se necessary for its operation.

[0016] In the attached drawings, the reference C indicates a preferred embodiment of an electrical connector according to the invention. The electrical connector C is configured to be mounted on board a motor-vehicle, with the object of carrying out the function of electrical connection between two or more components, such as, for example, a charging unit and a battery pack arranged on

a motor-vehicle powered by an electric motor.

[0017] As shown in the perspective view of Figure 1 and in the cross-sectional view of Figure 2, the electrical connector C includes a contact-carrying body 1 of a substantially prismatic shape, carrying a plurality of portions of electrical connection cables T including respective electrical terminals T1. The contact-carrying body 1 includes a receptacle portion configured to make a connection with a corresponding counterpart (not shown in the drawings). Preferably, the contact-carrying body 1 is made of plastic material, in particular polycarbonate.

[0018] According to an essential characteristic of the invention, the electrical connector C includes a cover assembly 2 for guiding the electrical connection cables T, coupled to the contact-carrying body 1. The cover assembly 2 includes a plurality of inlet ports, each arranged to receive respective end portions of the electrical connection cables T. The details relating to these inlet ports are indicated in the following description. In the example illustrated in the drawings, the cover assembly is configured to receive different types of electrical connection cables, having different diameters and different functions, such as, for example, power cables and signal cables (the latter indicated with the reference R).

[0019] According to the concrete embodiment illustrated in the drawings, the cover assembly 2 is coupled to the contact-carrying body 1 at an opposite rear portion to a connecting portion, configured to be arranged within a respective receptacle (not illustrated in the drawings). For this reason, reference will be made in the following description to a "rear cover assembly 2".

[0020] Figure 3 illustrates an exploded perspective view of the cover assembly 2 illustrated in the previous figures. The cover assembly 2 includes a cover element 3 having a main wall P spaced perpendicularly with respect to the terminal portions of the electrical connection cables T. This main wall P defines an inner face 6 facing the contact-carrying body 1. The cover element 3 further comprises an upper wall 24, a lower wall 25 and opposite side walls 26,27, which include engagement members configured for coupling with the contact-carrying body 1.

[0021] The terms "upper and lower" refer to a mounted condition of the rear cover assembly 2, as illustrated in Figure 1.

[0022] In one or more embodiments, as well as in the one illustrated in the drawings, the engagement members configured for coupling with the contact-carrying body include two locking seats 14, each arranged at a respective side wall 26,27 of the cover element 3. These locking seats 14 are mounted by interference with respective raised side portions carried by the contact-carrying assembly 1.

[0023] Still with reference to the illustrated embodiment, the cover element 3 also includes a protruding tooth 15 obtained on the lower wall 25 of the cover element 3, designed to prevent incorrect assembly of the cover assembly 2.

[0024] As illustrated in particular in the perspective

view of Figure 4, the upper 24, lower 25 and opposite side walls 26,27 of the cover element 3 protrude from the inner face 6 in the direction of the contact-carrying body 1, so as to define a receiving seat S.

[0025] In one or more embodiments, as well as in the one illustrated in the drawings, the cover element 3 includes a series of tubular portions 16 projecting from the main wall P in the opposite direction with respect to the contact-carrying body 1, which define respective extension portions of the inlet ports for the electrical connection cables T. Preferably, each tubular portion 16 includes a plurality of reinforcing fins, so as to strengthen the rear cover assembly 2 in an area particularly subject to stress during assembly and exercise.

[0026] According to an essential feature of the invention, the rear cover assembly 2 includes a sealing element 4 arranged within the receiving seat S, against the inner face 6 of the cover element 3. The sealing element 4 is a plate-shaped gasket, defining a first face 13 in contact with the inner face 6 of the cover element 3 and a second opposite face 28 facing the contact-carrying body 1.

[0027] As illustrated, in particular, in Figures 3,6-8, the sealing element 4 has a shape and dimension corresponding to those of the inner face 6 of the cover element 3, so as to guarantee a seal that avoids water infiltrations inside the contact-carrying body 1. The sealing element 4 includes a protruding side edge 12 arranged along the perimeter of the sealing element 4, configured to be arranged against the upper, lower and side walls 24,25,26,27 of the cover element 3. The protruding edge 12 is equipped with outer lips 32, in order to ensure the maximum sealing effect achieved by the sealing element 4.

[0028] As will be evident from the following description, also thanks to this characteristic, the cover assembly 2 creates a sealing system to prevent water infiltration inside the contact-carrying body 1.

[0029] Again with reference to the exploded view of Figure 3, the rear cover assembly 2 includes a locking element 5 configured to lock the sealing element 4 in position against the inner face 6 of the cover element 3. In the assembled condition, illustrated in particular in Figures 2,5,12, the sealing element 4 is interposed between the inner face 6 of the cover element 3 and the locking element 5. Preferably, the locking element 5 is shaped like a plate, thus defining two opposite faces.

[0030] To carry out the assembly of the components, the locking element 5 includes hooking means for mutual coupling with respective fastening members 21 obtained at the inner face 6 of the cover element 3. The details relating to these hooking means are indicated in the following description.

[0031] As previously indicated, the rear cover assembly 2, coupled to the contact-carrying body 1, includes a plurality of inlet ports configured to receive respective end portions of electrical connection cables T. As illustrated - in particular - in the exploded view of Figure 3, in

the case of the invention, the aforesaid inlet ports are defined by a first series of passages 7 obtained at the main wall 6 of the cover element 3; a second series of passages 8 arranged on the sealing element 4; and a third series of passages 9 arranged on the locking element 5. In the assembled condition, the series of passages 7,8,9 are respectively aligned, to allow the passage of the electrical connection cables T inside the contact-carrying body 1. The passages of each series are circular in shape and can be made with different diameters, so as to be able to receive electrical connection cables with different diameters and functions.

[0032] With reference to the embodiment illustrated in the drawings, each series of passages 7,8,9 comprises five passages with a larger diameter, to receive respective power cables T, and two passages with a smaller diameter, to receive respective signal cables R. The passages for the signal cables R are arranged at a central portion of the respective main walls of the cover element 3, of the sealing element 4 and of the locking element 5.

[0033] In order to make a sealed contact with the insulating material of the respective electrical connection cable T, R, the passages 8 of the series obtained at the sealing element 4, include a plurality of annular sealing lips 11 arranged at the inner surface of each passage 8 (Figures 2,3,5,7).

[0034] In order to create a sealed system to prevent water infiltration into the contact-carrying body 1, even if the final application for the connector C envisages that some inlet ports do not receive a respective electrical connection cable T, the passages 7 of the first series are configured to receive respective sealing members O provided with a plurality of annular sealing lips 01 (Figure 5).

[0035] In accordance with an important characteristic of the invention, the cover element 3 includes a plurality of annular ribs 10 formed on said inner face 6 and each arranged around a respective passage 7 of the first series of passages (Figure 4). The annular ribs 10 are arranged raised with respect to the inner face 6, while the first face 13 of the sealing element 4, in contact with the inner face 6 of the cover element 3 and with the ribs 10, is configured flat, so as to avoid any gap with the face 6 and its annular ribs 10, and thus ensure the maximum sealing effect.

[0036] In Figure 5, which illustrates a cross-sectional view of a portion of the electrical connector C at its rear cover assembly 2, the arrows F, F1 indicate the paths taken by possible infiltrations of water into the cover assembly 2, during the exercise. In the illustrated condition, one of the inlet ports is not occupied by a respective electrical connection cable T, so that, in order to avoid an easy entry of water (indicated by the arrows F1) through the free port, a sealing member O equipped with sealing lips 01 is arranged within the free passage 7 and its extension portion 16. It will therefore be appreciated that, thanks to the sealing member O, the water indicated with the arrows F1 cannot flow inside the contact-carrying assembly 1, and come into contact with the electrical terminals T1, causing operating anomalies.

[0037] Again with reference to Figure 5, the reference F indicates some arrows which represent a further path of water infiltrations that can pass along the tubular portions 16, despite being occupied by the respective electrical connection cables T, until reaching the main wall P and the inner face 6 of the cover element 3. The sealing lips 11 arranged at the passages 8 of the second series allow blocking of the horizontal path of the infiltrations of water F, along the passages 8,9 adjacent to the electrical connection cable T. Thanks to the arrangement of the annular ribs 10 and to the corresponding flat surface of the sealing element 4, the water cannot reach the free passage 8 aligned with the passage 7 occupied by the sealing member O, thus preventing the water - indicated by the arrows F - from freely continuing its path through this free passage 8, until it enters the contact-carrying body 1 and damages the connector C.

[0038] Thanks to the characteristics indicated above, the rear cover assembly 2 creates a sealing system to prevent water infiltration inside the contact-carrying body 1, integrated with a guide system for the electrical connection cables T, which is effective even in the case wherein at least one or more inlet ports do not receive a respective electrical connection cable T.

[0039] Below in the present description the characteristics that allow the assembly of the rear cover assembly 2 are indicated, so that the sealing element 4 is interposed between the cover element 3 and the locking element 5.

[0040] As illustrated in Figures 6,7, the cover element 3 includes at least one centering pin 17 protruding from the inner face 6, arranged for coupling with a respective reference hole 18, obtained on the first face 13 of the sealing element 4.

[0041] As indicated above, to carry out the assembly of the components, the locking element 5 includes hooking means for mutual coupling with respective fastening members 21 obtained at the inner face 6 of the cover element 3. Figure 8 illustrates the sealing element 4 mounted within the receiving seat of the cover element 3. In this configuration, the fastening members 21 pass through respective auxiliary passages 29, obtained on the sealing element 4, in a manner quite similar to the passages 8 of the aforesaid second series. It will therefore be appreciated that the number of passages 8,29 obtained on the sealing element 4 will be greater in number than the number of passages 7,9 of the first and third series, since the auxiliary passages 29 are only provided on the sealing element 4. The auxiliary passages 29 are also provided at their inner surface with annular sealing lips 11.

[0042] Preferably, the fastening members 21 are a plurality of pins having a respective coupling seat 22, at their ends, configured for mutual engagement with the hooking means of the locking element 5, arranged on its face 30 in contact with the sealing element 4.

[0043] Preferably, these hooking means of the locking element include, on its face 30 in contact with the sealing

element 4, a plurality of rod-like coupling formations 19 configured for engagement within the seats 22 (Figure 9).

[0044] With reference to the concrete embodiment illustrated in the drawings, two pairs of pins 21 are arranged at the inner face 6, symmetrically with respect to a central plane of symmetry of the cover element 3. In the following description, reference will be made to an upper pair - located near the upper wall 24 of the cover element 3 - and a lower pair - arranged near the lower wall 25 of the cover element 3.

[0045] Each coupling seat 22, obtained on the end of a respective pin 21, is defined by a recess having a T-shaped cross-section, shaped to avoid a separation of the respective rod-like coupling formations 19, also having a corresponding T-shaped profile (Figures 6,8,9).

[0046] In the vicinity of a pair of rod-like coupling formations 19 - intended for engagement with the upper pair of pins 21 - a pair of coupling lances 20 are also provided, configured - in the assembled condition - to abut against the outer surface of respective pins 21 and prevent separation of the locking element 5 from the cover element 3.

[0047] Preferably, the locking element 5 includes a central protrusion 31 arranged between the coupling lances 20 and configured axially projecting, in the mounted condition, in the direction of a central recess 23 obtained on the upper wall 24 of the cover element 3. This central protrusion 31 is designed to interfere with the protruding tooth 15 in the event that an attempt is made to assemble the cover assembly 2 incorrectly, in particular with the central protrusion 31 protruding in the direction of the lower wall 25.

[0048] With reference to Figures 6-12, the assembly steps of the rear cover assembly 2 are indicated in the remainder of the present description.

[0049] First of all, it is necessary to align the sealing element 4 with the cover element 3, respecting the respective references for assembly (centering pin 17 and reference hole 18) (Figures 6,7). Once the sealing element 4 has been aligned with the inner face 6 of the cover element 3, it is necessary to press the sealing element 4 against the inner face 6 of the cover element 3, so that the pins 21 pass through the auxiliary passages 29, and the first face 13 is arranged against the inner face 6 and the ribs 10 of the cover element 3 (Figure 8).

[0050] Secondly, it is necessary to proceed with the assembly of the locking element 5, pressing the locking element 5 against the sealing element 4, in such a way that the face 30 of the locking element 5 is in contact with the face 28 of the sealing element 4, and the central protrusion 31 protrudes from the central recess 23 of the cover element 3 (Figures 9,10). In this configuration, the rod-like coupling formations 19 are decoupled from the respective seats 22 and the passages 9 of the third series are misaligned with respect to the passages 7,8 of the first and second series (Figure 10).

[0051] Subsequently, it is necessary to proceed with the assembly by pushing the locking element 5 downwards in the direction of the lower wall 25 of the cover

element 3, so that the rod-like coupling formations 19 with a T-profile engage within the respective seats 22 with a T cross-section of the pins 21. The coupling lances 20 engage against respective surfaces of the upper pair of pins 21 (Figures 11,12).

[0052] Thanks to the characteristics indicated above, the electrical connector according to the invention guarantees an extremely reliable sealing effect, to avoid water infiltration inside the electrical connector, while maintaining a simple and functional structure.

[0053] The present invention is also directed at an assembly method for assembling the electrical connector C, comprising the following steps:

- aligning the sealing element 4 with the cover element 3 respecting the reciprocal references for the assembly,
- pressing the sealing element 4 towards the main wall P of the cover element 3, up to make contact against the inner face 6 of the cover element 3, the fastening members 21 passing through the respective auxiliary passages 29,
- positioning the locking element 5 against the sealing element 4, so that the central protrusion 31 protrudes from the central recess 23 of the cover element 3, aligning the rod-like coupling formations 19 with the fastening members 21, thus providing a pre-assembled configuration of the locking element 5,
- pushing the locking element 5 towards the lower wall 25 of the cover element 3, so that the rod-like coupling formations engage with the respective fastening members 21,
- assembling the cover assembly 2 onto the electrical contact-carrying body of the electrical connector C.

[0054] Of course, without prejudice to the principle of the invention, the details of construction and the embodiments may vary widely with respect to those described and illustrated purely by way of example, without departing from the scope of the present invention.

Claims

1. An electrical connector (C) including:

- an electrical contact-carrying body (1), carrying a plurality of electrical terminals (T1),
- a cover assembly (2) for guiding electrical connection cables (T), coupled to said electrical contact-carrying body (1), said cover assembly (2) having a plurality of inlet ports for receiving the electrical connection cables (T),
- said cover assembly (2) for guiding electrical connection cables (T) comprising:
- a cover element (3) having a main wall (P) that defines an inner face (6) facing towards said contact-carrying body (1), said cover element

(3) further comprising an upper wall (24), a lower wall (25) and opposite side walls (26,27) that protrude from said inner face (6), so as to define a receiving seat (S),

- a sealing element (4) arranged within said receiving seat (S) against said inner face (6),
- a locking element (5) provided for locking said sealing element (4) in position, wherein said locking element (5) includes hooking means for the mutual coupling with respective fastening members (21) formed at the inner face (6) of the cover element (3), in such a way that, in the assembled condition, said sealing element (4) is interposed between said inner face (6) and said locking element (5),
- said inlet ports being defined by a first series of passages (7) formed at the main wall (P) of said cover element (3), a second series of passages (8) formed on said sealing element (4) and a third series of passages (9) formed on said locking element (5), wherein, in the assembled condition, the passages of said first, second and third series (7,8,9) are respectively aligned to enable passing of the electrical connection cables (T),
- said cover element (3) further comprising a plurality of annular ribs (10) formed at said inner face (6), each arranged around a respective passage (7) of said first series, said annular ribs (10) being embossed with respect to said inner face (6),
- in such a way that said cover assembly (2) for guiding electric cables (T) provides a sealing system to avoid water infiltration into said contact-carrying body (1).

2. An electrical connector (C) according to claim 1, **characterized in that** each passage (8) of said second series includes a plurality of annular sealing lips (11) arranged at the inner surface of a respective passage (8), in order to obtain a sealed contact with the insulating material of the respective electrical connection cable (T).

3. An electrical connector (C) according to claim 1 or 2, **characterized in that** said sealing element (4) has a shape and dimension corresponding to those of said inner face (6), said sealing element (4) comprising along the perimeter thereof, a lateral sealing edge (12) including outer lips (32), provided for ensuring an effective sealing.

4. An electrical connector (C) according to any of the previous claims, **characterized in that** said sealing element (4) includes a first face (13) arranged in contact with the inner face (6) of the cover element (3), said first face (13) of the sealing element (4) being configured flat, so as to avoid any gap with the inner

face (6) of the cover element (3) and the annular ribs (10).

5. An electrical connector (C) according to any of the previous claims, **characterized in that** said upper wall (24), said lower wall (25) and said opposite side walls (26,27) of the cover element (3), include engagement members (14) arranged for coupling with respective engagement portions located on the contact-carrying body (1) . 5
6. An electrical connector (C) according to any of the previous claims, **characterized in that** said cover element (3) includes a series of protruding tubular portions (16) that protrudes from said main wall (P) in the opposite direction with respect to the contact-carrying body (1), the tubular portions (16) defining respective extension portions of the inlet ports, for receiving the electrical connection cables (T). 10
7. An electrical connector (C) according to claim 6, **characterized in that** said cover element (3) includes a centering pin (17) projecting from the inner face (6) and arranged, in the assembled condition, within a reference hole (18) obtained at said first face (13) of the sealing element (4). 15
8. An electrical connector (C) according to any of the previous claims, **characterized in that** said locking element (5) has a plate-like shape, with two opposite faces. 20
9. An electrical connector (C) according to claim 8, **characterized in that** each fastening member (21) formed at said inner face (6) of the cover element (3), in the assembled condition, passes through a respective auxiliary passage (29) formed on the sealing element (4), so as to project towards the locking element (5). 25
10. An electrical connector (C) according to claim 9, **characterized in that** said fastening members (21) include a plurality of pins having a respective coupling seat (22) at their ends configured for mutual engagement with the hooking means of the locking element (5), arranged on a face (30) of the locking element (5) in contact with the sealing element (4). 30
11. An electrical connector (C) according to claim 10, **characterized in that** said hooking means of the locking element (5) include a plurality of rod-like coupling formations (19) configured for engaging within the seats (22) . 35
12. An electrical connector (C) according to claim 11, **characterized in that** each coupling seat (22) is defined by a recess having a T-shaped cross-section, and the rod-like coupling formations (19) have cor- 40

responding T-shape profiles.

13. An electrical connector (C) according to claim 11 or claim 12, **characterized in that** said hooking means also include a pair of coupling lances (20) configured, in the assembled condition, to abut against the outer surface of a respective fastening member (21). 45
14. An electrical connector (C) according to any of the previous claims, **characterized in that** the passages (7) of said first series are configured to receive respective sealing members (O) provided with a plurality of annular sealing lips (01), said sealing members (O) being arranged within respective passages (7), in the case that the final application of the connector (C) envisages that some inlet ports are not engaged with a respective electrical connecting cable (T). 50
15. A method for assembling an electrical connector (C) according to any of the previous claims, comprising the following steps: 55
 - aligning the sealing element (4) with the cover element (3) respecting the reciprocal references for the assembly,
 - pressing the sealing element (4) towards the main wall (P) of the cover element (3), up to make contact against the inner face (6) of the cover element (3), the fastening members (21) passing through the respective auxiliary passages (29),
 - positioning the locking element (5) against the sealing element (4), aligning the hooking means with respect to the fastening members (21), so that the central protrusion (31) protrudes from the central recess (23) of the cover element (3), thus providing a pre-assembled configuration of the locking element (5),
 - pushing the locking element (5) towards the lower wall (25) of the cover element (3), so that the hooking means engage with the respective fastening members (21),
 - assembling the cover assembly (2) onto the electrical contact-carrying body (1) of the electrical connector (C).

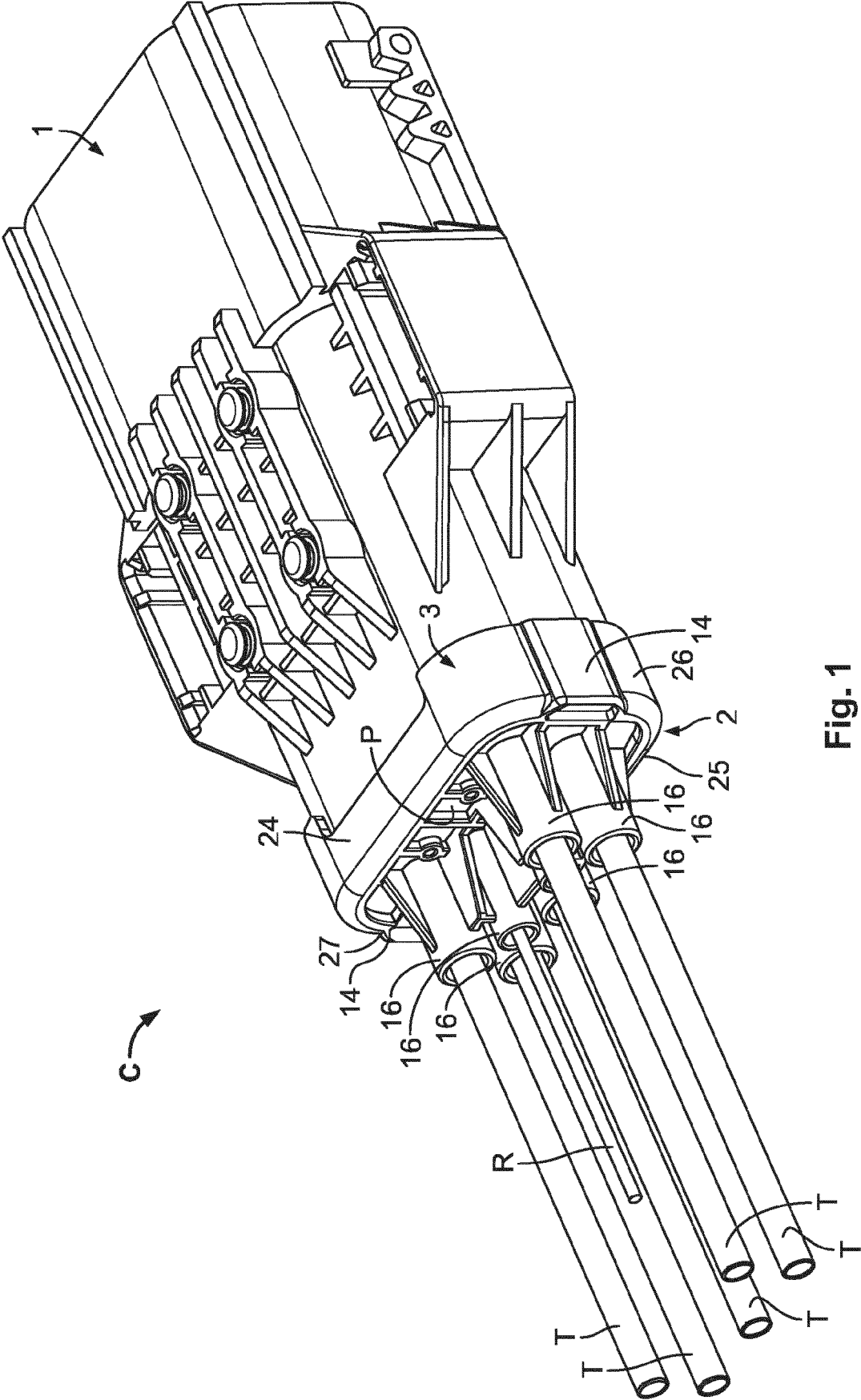


Fig. 1

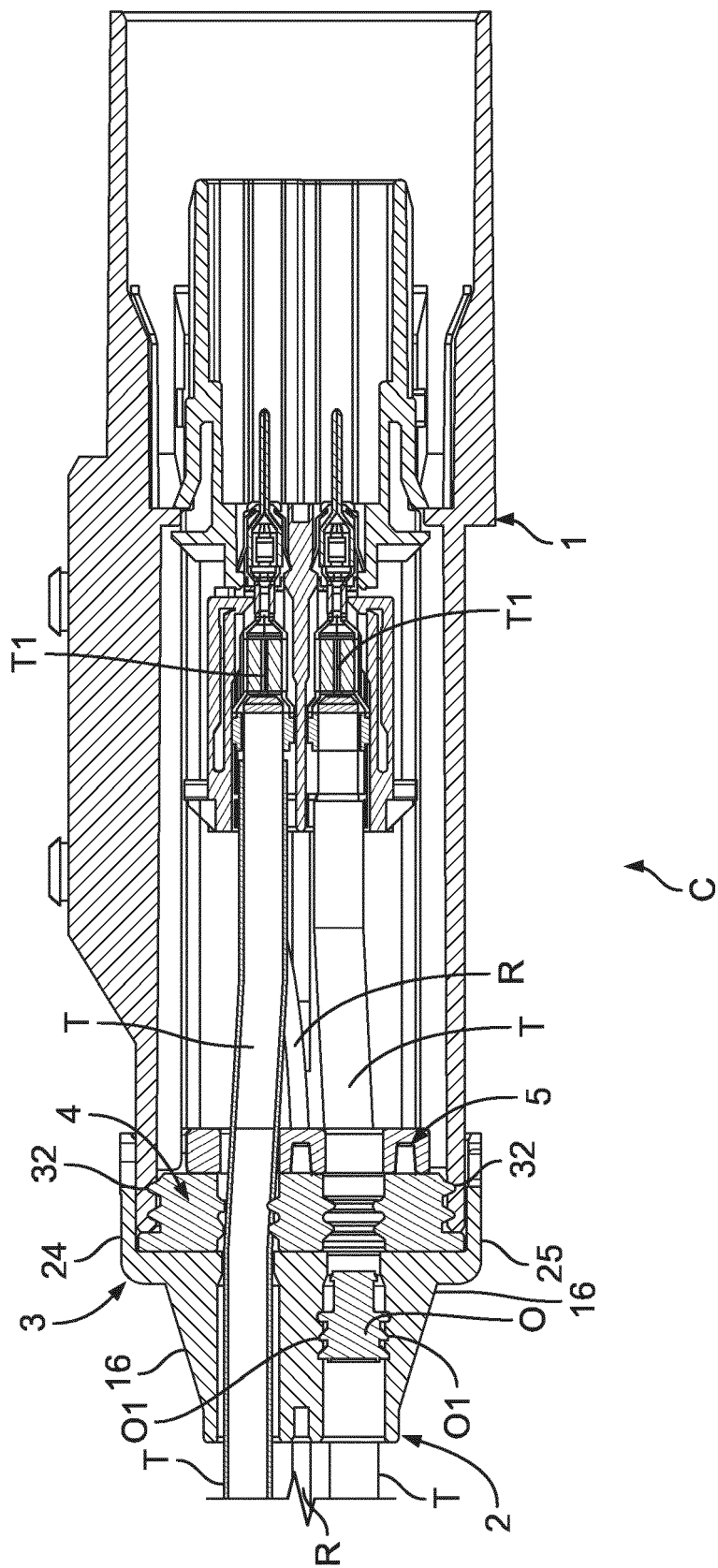


Fig- 2

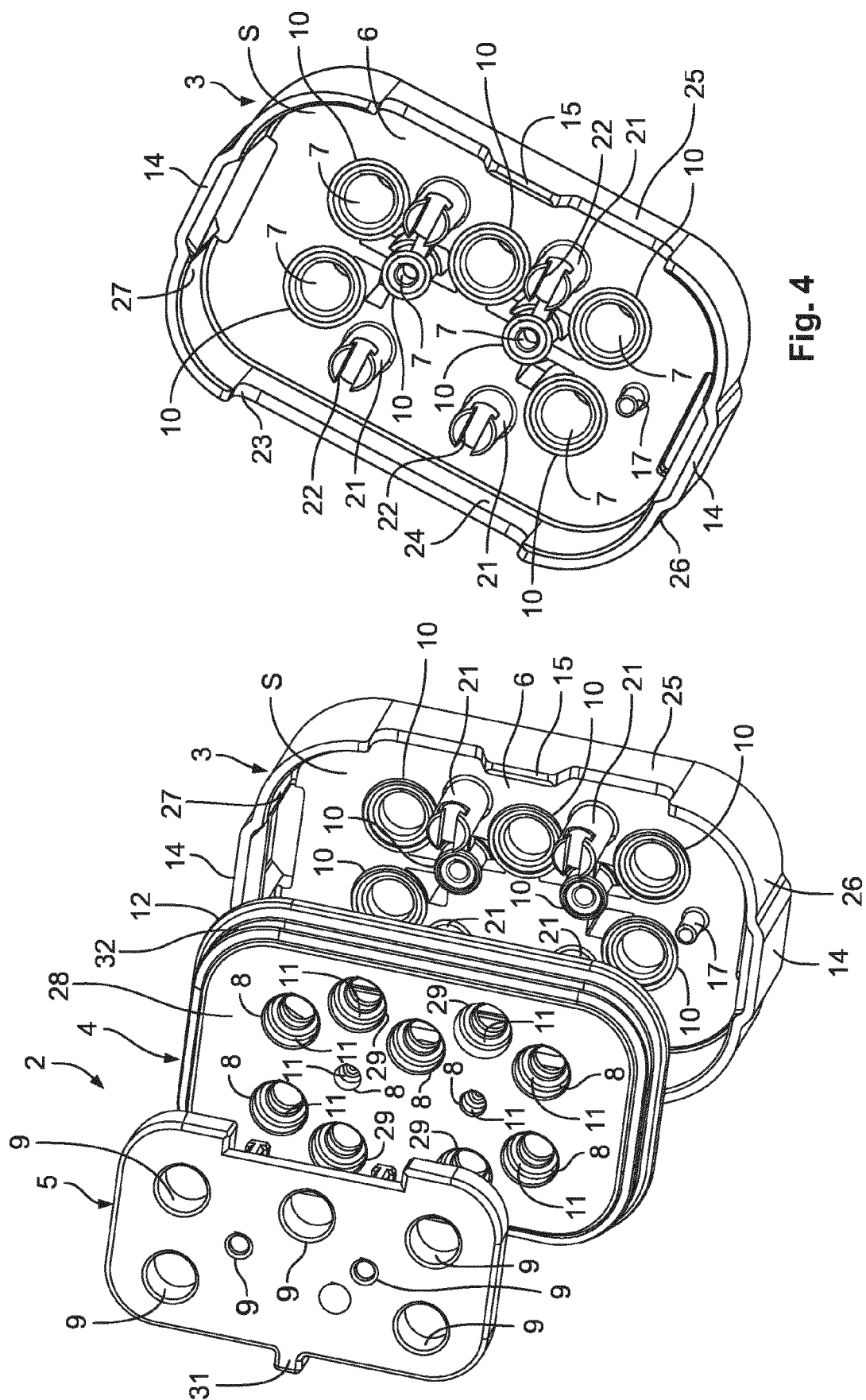


Fig. 4

Fig. 3

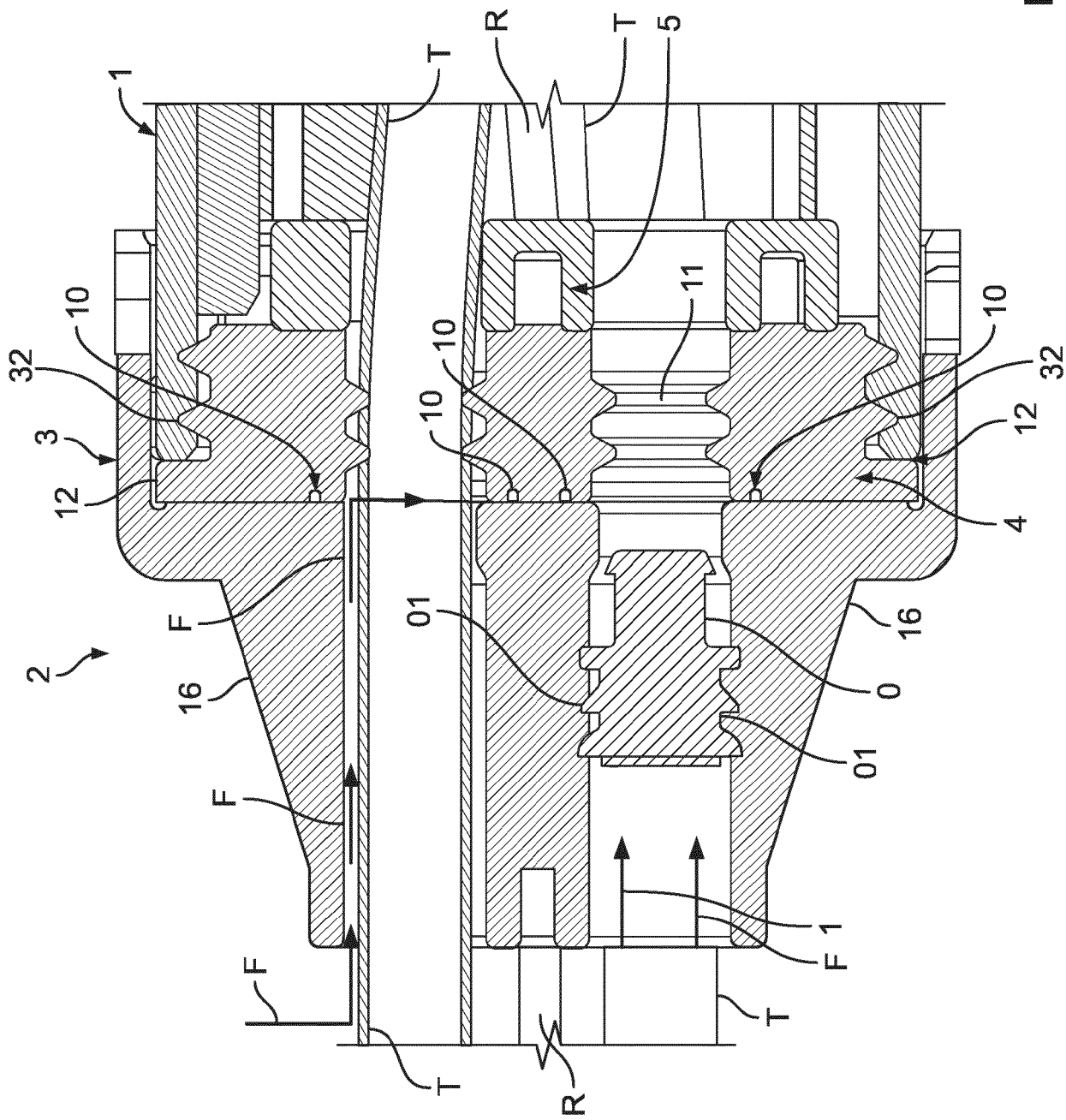
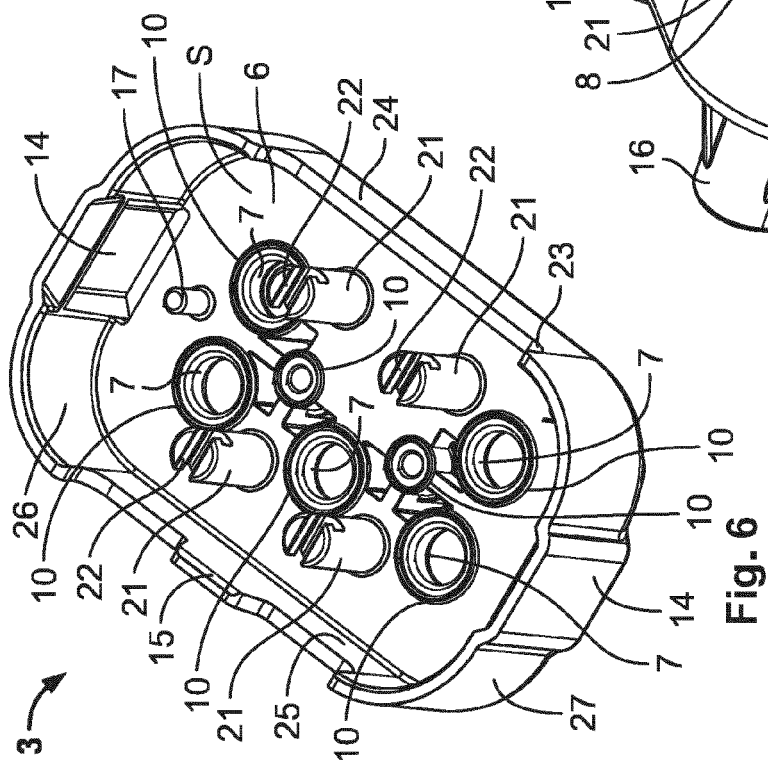
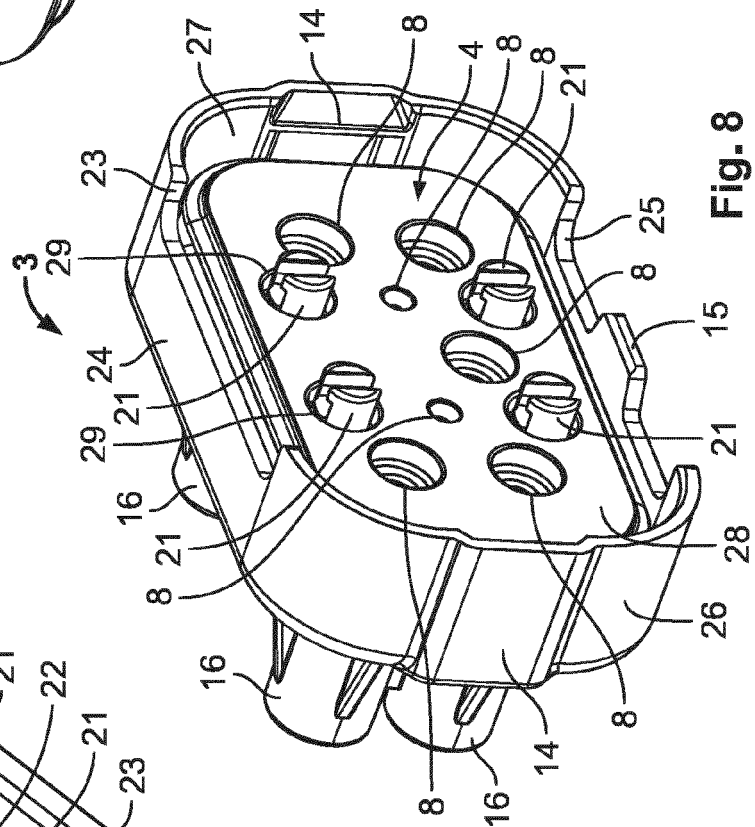
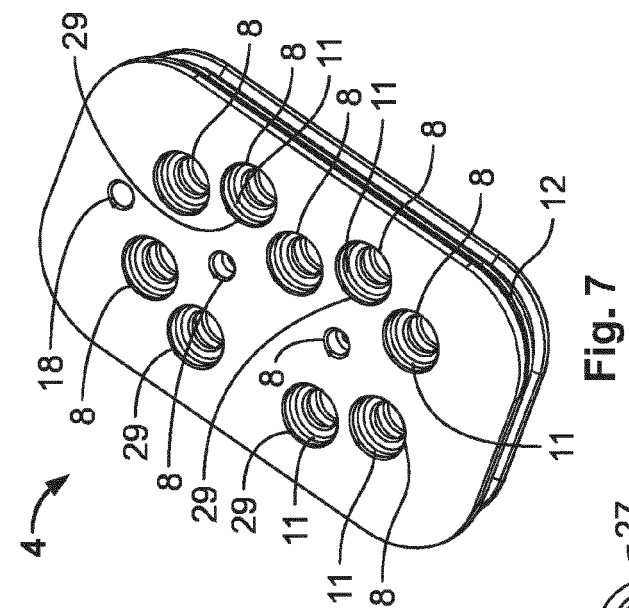


Fig. 5



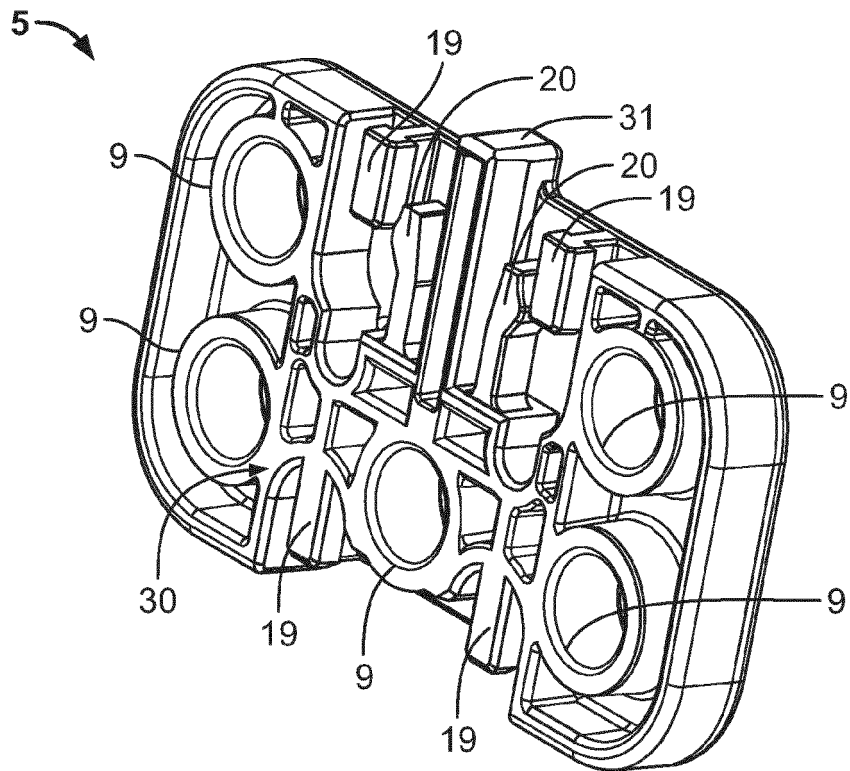


Fig. 9

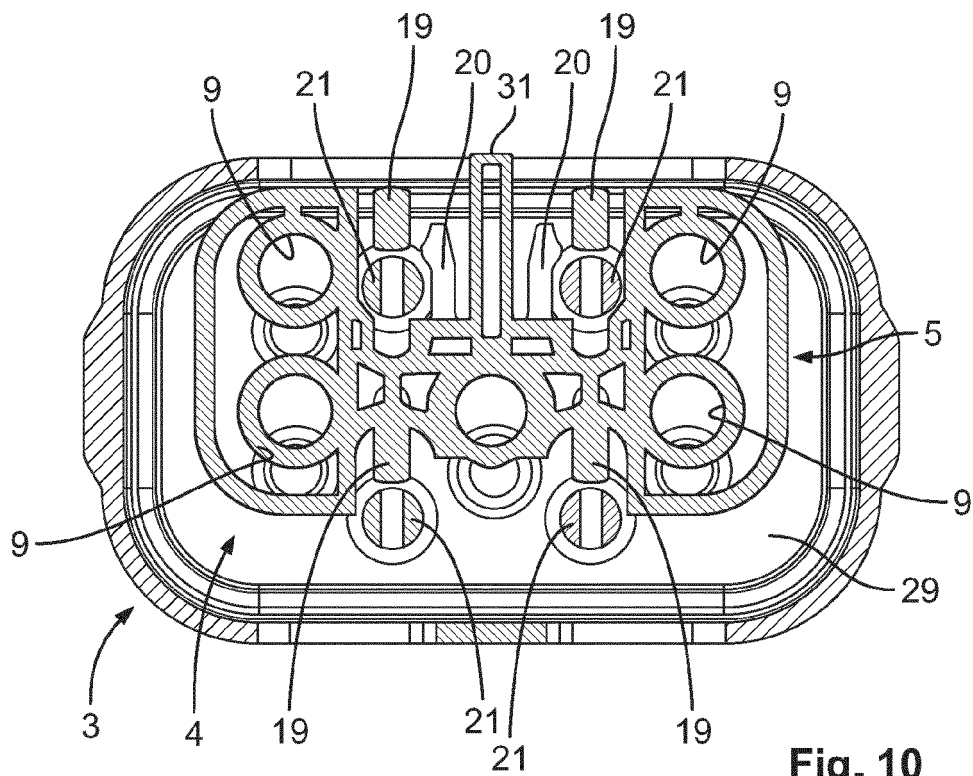


Fig. 10

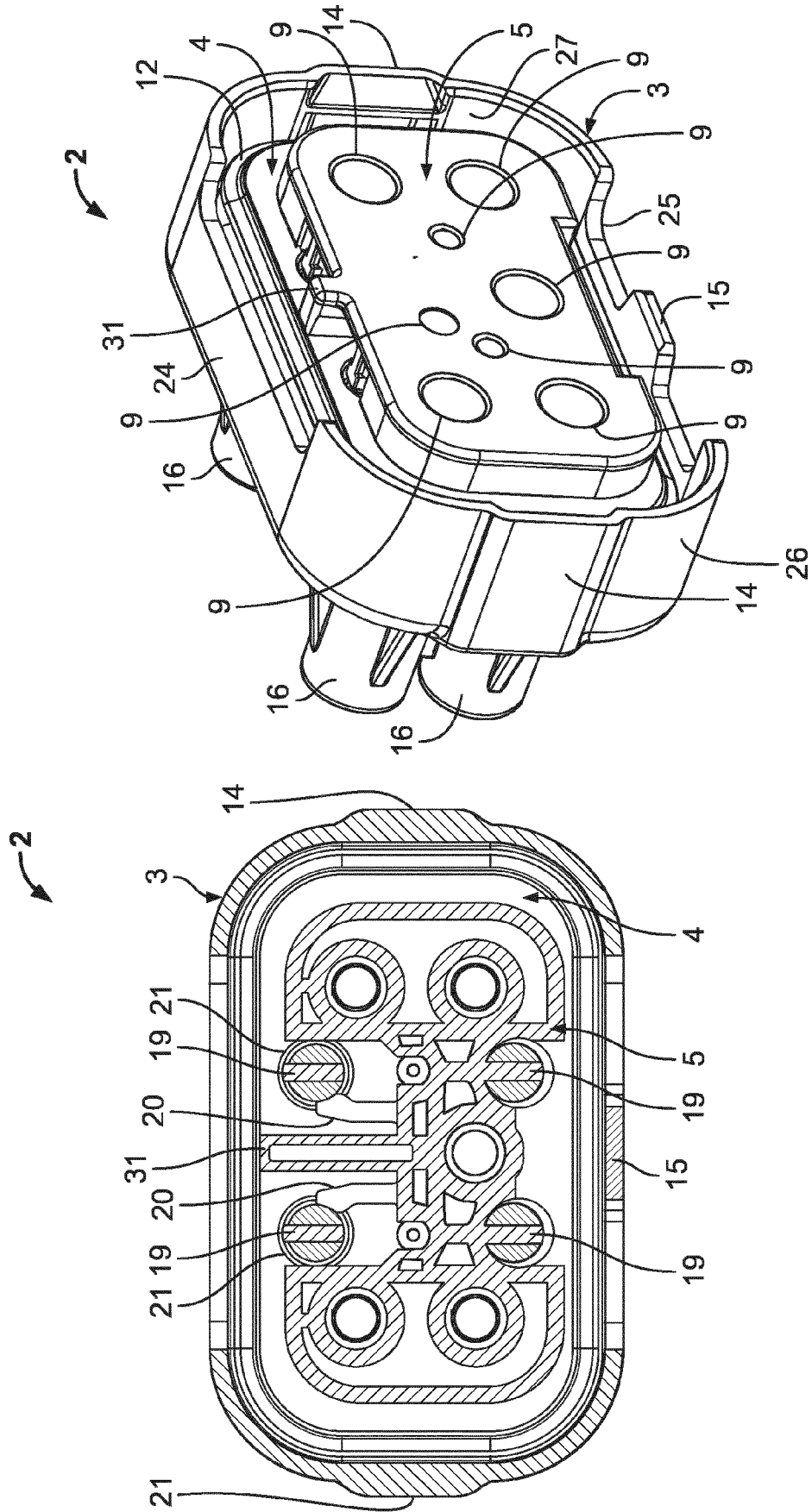


FIG. 12

FIG. 11



EUROPEAN SEARCH REPORT

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