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(54) **CONNECTOR, MATING CONNECTOR AND CONNECTOR COMBINATION**

(57) A connector (10) comprises a first main body (11); a first electrical connection (16) portion mounted on the first main body; a pressing ring (13) formed by protruding from a periphery of a first engagement end of the first main body; and a rotation engagement portion (14) rotatably mounted on the first main body at an outside of the pressing ring. A mating connector (20) comprises a second main body (22); a second electrical connection portion (26) mounted on the second main body, for electrically connecting with the first electrical connection portion of the connector; an insertion portion (23) formed on a second engagement end of the second main body and

partly inserted into the pressing ring; an elastic seal ring (24) provided on the insertion portion to be pressed radially by the pressing ring; and a fixing engagement portion (25) fixed on the second main body, and constructed to engage with the rotation engagement portion by rotating the rotation engagement portion with respect to the fixing engagement portion. When the connector and the mating connector are engaged with each other, the elastic seal ring is pressed radially by the pressing ring, thereby improving waterproof performance of the connector combination.

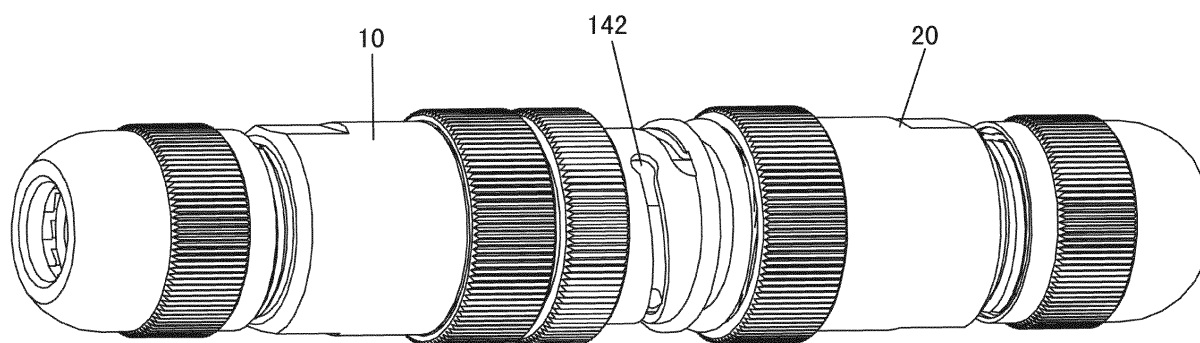


Fig. 9

Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of Chinese Patent Application No. 201410168129.3 filed on April 24, 2014 in the State Intellectual Property Office of China, the whole disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention relates to a connector, more particularly, relates to a connector, a mating connector for mating with the connector and a connector combination capable of realizing a sealing engagement.

Description of the Related Art

[0003] In the transmission process of electrical signals, a coaxial connector combination is commonly used to realize electric connection between two electronic devices. For instance, in a wireless communication system, a coaxial plug connector and a coaxial socket connector are commonly used to realize the transmission of electrical signals between a wireless transceiver, such as an antenna, and an electronic device, such as a TV, a vehicle positioning device, a vehicle navigation device and the like. In this way, a shield to the electrical signal for ensuring a small signal distortion, as well as an easy connection, is realized.

[0004] In the coaxial connector combination appreciated by the inventors, a seal ring is provided within the plug connector and/or the socket connector. As the plug connector and the socket connector are thread-engaged together by relative rotation, the seal ring is compressed in the axial direction so as to function as a seal. However, during the thread-engagement process, the rotary forces applied by different operators are different from each other, and the resultant screw-up effects are different from each other, which in turn affects the water-proof effect of the seal ring.

SUMMARY OF THE INVENTION

[0005] In order to overcome or alleviate the above mentioned technical problems or other technical problems of the prior art, embodiments of the present invention provide a connector, a mating connector and a connector combination, when the connector and the mating connector are engaged with each other, an elastic seal ring is pressed radially by a pressing ring, thereby improving waterproof performance of the connector combination.

[0006] A connector, embodiments of the present invention further provide a mating connector and a con-

nector combination, an reliable engagement between the connector and the mating connector may be realized by double locking devices.

[0007] According to a further aspect of the present invention, there is provided a connector, comprising: a first main body having a substantially cylinder shape; a first electrical connection portion mounted on the first main body, for electrically connecting with a mating connector; a pressing ring formed by protruding from a periphery of a first engagement end of the first main body; and a rotation engagement portion rotatably mounted on the first main body at an outside of the pressing ring.

[0008] In the above connector, the rotation engagement portion is provided with at least one spiral groove, a terminal end of the spiral groove being provided with a holding groove recessed in the axial direction.

[0009] The above connector further comprises an axial engagement portion extending from an outer periphery of the pressing ring, the axial engagement portion being provided with at least one engagement arm formed with a first holding portion.

[0010] In the above connector, the axial engagement portion is provided with a first fool-proofing portion.

[0011] The above connector further comprises a restoring device configured to elastically prevent the axial engagement portion from separating from axially move in a direction away from the first main body.

[0012] In the above connector, the restoring device comprises: a first block ring formed by protruding outward from an outer wall of the first main body; a second block ring formed by protruding inward from an end of the axial engagement portion; and a spring mounted between the first block ring and the second block ring.

[0013] The above connector further comprises a first fastening portion provided at another end of the first main body opposite to the first engagement end to electrically connect with a first cable.

[0014] According to the embodiment of a further aspect of the present invention, there is provided a mating connector, comprising: a second main body having a substantially cylinder shape; a second electrical connection portion mounted on the second main body, for electrically connecting with a connector; an insertion portion formed on a second engagement end of the second main body; an elastic seal ring provided on the insertion portion; and a fixing engagement portion fixed on the second main body.

[0015] In the above mating connector, an outer wall of the fixing engagement portion is provided with at least one engagement projection.

[0016] In the above mating connector, an annular groove is provided on an outer wall of the insertion portion in the vicinity of an insertion end, the elastic seal ring being providing within the annular groove.

[0017] In the above mating connector, an outer wall of the insertion portion is provided with at least one second holding portion.

[0018] In the above mating connector, a second fool-

proofing portion is provided on an outer wall of the insertion portion.

[0019] The above mating connector further comprises a second fastening portion provided at another end of the second main body opposite to the second engagement end to electrically connect with a second cable.

[0020] According to the embodiment of a still further aspect of the present invention, there is provided a connector combination, comprising a connector and a mating connector. The connector comprises: a first main body; a first electrical connection portion mounted on the first main body; a pressing ring formed by protruding from a periphery of a first engagement end of the first main body; and a rotation engagement portion rotatably mounted on the first main body at the outside of the pressing ring. The mating connector comprises: a second main body; a second electrical connection portion mounted on the second main body, for electrically connecting with the first electrical connection portion of the connector; an insertion portion formed on a second engagement end of the second main body and partly inserted into the pressing ring; an elastic seal ring provided on the insertion portion to be pressed radially by the pressing ring; and a fixing engagement portion fixed on the second main body, the fixing engagement portion being engaged with the rotation engagement portion by rotating the rotation engagement portion with respect to the fixing engagement portion.

[0021] In the above connector combination, the rotation engagement portion is provided with at least one spiral groove and an outer wall of the fixing engagement portion is provided with at least one engagement projection, the engagement projections being engaged with the spiral grooves and sliding within the spiral grooves, respectively.

[0022] In the above connector combination, a terminal end of the spiral groove is provided with a holding groove recessed in the axial direction, and the engagement projection is constructed move into the holding groove so as to prevent the rotation engagement portion from rotating with respect to the fixing engagement portion.

[0023] In the above connector combination, an annular groove is provided on an outer wall of the insertion portion in the vicinity of an insertion end, the elastic seal ring being providing within the annular groove and the annular groove along with the elastic seal ring being inserted into the pressing ring.

[0024] In the above connector combination, the connector further comprises an axial engagement portion extending from an outer periphery of the pressing ring to the space between the fixing engagement portion and the insertion portion of the mating connector, the axial engagement portion is provided with at least one engagement arm formed with a first holding portion, and an outer wall of the insertion portion is provided with at least one second holding portion. Each of the first holding portions is engaged with the respective second holding portion through axial sliding movement to prevent the axial en-

gagement portion from separating from the insertion portion.

[0025] In the above connector combination, a first fool-proofing portion is provided at the inside of the axial engagement portion, and a second fool-proofing portion mating with the first fool-proofing portion is provided on the outer wall of the insertion portion.

[0026] In the above connector combination, the first fool-proofing portion is a guide key formed by protruding from the inner wall of the axial engagement portion, and the second fool-proofing portion is a guide groove formed by extending in the axial direction on the outer wall of the insertion portion, the guide key being slidable within the guide groove.

[0027] In the above connector combination, the connector further comprising a restoring device configured to elastically prevent the axial engagement portion from axially move in a direction away from the first main body.

[0028] In the above connector combination, the restoring device comprises: a first block ring formed by protruding outward from an outer wall of the first main body; a second block ring formed by protruding inward from an end of the axial engagement portion; and a spring mounted between the first block ring and the second block ring.

[0029] In the above connector combination, the connector is a coaxial plug connector, and the first electrical connection portion comprises at least one pin mounted on the first main body; the mating connector is a coaxial socket connector, and at least one second electrical connection portion is mounted within the second main body, the pins being inserted into the second electrical connection portions to electrically connect with the second electrical connection portion, respectively.

[0030] In the above connector combination, the connector further comprises a first fastening portion provided at another end of the first main body opposite to the first engagement end and configured to electrically connect the first electrical connection portion with a first cable, the mating connector further comprises a second fastening portion provided at another end of the second main body opposite to the second engagement end and configured to electrically connect the second electrical connection portion with a second cable.

[0031] In the above connector combination, a fastening ring is provided at an outside of the free end of the rotation engagement portion.

[0032] In the connector, the mating connector and the connector combination according to various embodiments of the present invention, when the connector and the mating connector are engaged with each other, the elastic seal ring is pressed radially by the pressing ring, thereby improving waterproof performance of the connector combination; in further, the relative rotation and the relative sliding movement in the axial direction between the connector and the mating connector can be prevented by the double locking devices, realizing the reliable engagement between the connector and the mating connector.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033] The above and other features of the present invention will become more apparent by describing in detail exemplary embodiments thereof with reference to the accompanying drawings, in which:

Fig. 1 is an illustrative perspective view of a connector according to an exemplary embodiment of the present invention;

Fig. 2 is an axial section view of the connector of Fig. 1;

Fig. 3 is a side view of the connector of Fig. 1;

Fig. 4 is an illustrative perspective view of a mating connector according to an exemplary embodiment of the present invention;

Fig. 5 is an axial section view of the mating connector of Fig. 4;

Fig. 6 is a side view of the mating connector of Fig. 4;

Figs. 7-9 are illustrative perspective views showing operation processes of connecting the connector of Fig. 1 with the mating connector of Fig. 2 so as to form the connector combination of the embodiment of the present invention, wherein, Figs. 7 and 8 don't show a rotation engagement portion;

Fig. 10 is a partial sectional plan view of the connector combination of Fig. 8;

Fig. 11 is an enlarged view of the A portion of Fig. 10;

Fig. 12 is an illustrative perspective view of the connector combination of the embodiment of the present invention;

Fig. 13 is a plan view of the connector combination of Fig. 12;

Fig. 14 is an axial section view of the connector combination of Fig. 13; and

Fig. 15 is an enlarged view of the B portion of Fig. 14.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

[0034] Exemplary embodiments of the present disclosure will be described hereinafter in detail with reference to the attached drawings, wherein the like reference numerals refer to the like elements. The present disclosure may, however, be embodied in many different forms and should not be construed as being limited to the embodiment set forth herein; rather, these embodiments are provided so that the present disclosure will be thorough and complete, and will fully convey the concept of the disclosure to those skilled in the art.

[0035] In the following detailed description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the disclosed embodiments. It will be apparent, however, that one or more embodiments may be practiced without these specific details. In other instances, well-known structures and devices are schematically shown in order to simplify the drawing.

[0036] A connector combination 100 according to an exemplary embodiment of the present invention may be used to realize the electrical connection between two electronic devices. For instance, in a wireless communication system, the connector combination 100 may be used to realize the transmission of electrical signals between a wireless transceiver, such as an antenna, and an electronic device, such as a TV, a vehicle positioning device and a vehicle navigation device and the like, or realize the rapid electrical connection between two cables.

[0037] The connector combination 100 according to an exemplary embodiment of the present invention comprises a connector 10 and a mating connector 20 mated with the connector. Fig. 1 is an illustrative perspective view of a connector according to an exemplary embodiment of the present invention; Fig. 2 is an axial section view of the connector of Fig. 1; Fig. 3 is a side view of the connector of Fig. 1. With reference to Figs. 1-3, a connector 10 comprises a substantially cylindrical first main body 12 made of insulated material; a first electrical connection portion 16 mounted on the first main body 12; a pressing ring 13 formed by protruding from a periphery of a first engagement end of the first main body; and a rotation engagement portion 14 rotatably mounted on the first main body at a radial outside of the pressing ring.

[0038] In an exemplary embodiment, the rotation engagement portion 14 is provided with two spiral grooves 141 penetrating through the cylindrical side wall of the rotation engagement portion 14, wherein a starting end 1411 of each spiral groove 141 is provided on an edge of a free end of the rotation engagement portion 14, and starting ends 1411 of two spiral grooves 141 are provided by an interval of 180° at a periphery of the free end of the rotation engagement portion 14. The starting ends 1411 each has a predetermined distance in the axial direction so as to allow a fixing engagement portion 25 of the mating connector (which will be described in detail hereafter) to move through the predetermined distance in the axial direction with respect to the rotation engagement portion 14 before entering the spiral groove 141. Furthermore, a fastening ring 145 is provided at the outside of the free end of the rotation engagement portion 14 so as to retain the free end of the rotation engagement portion 14 as a closed circular shape.

[0039] Fig. 4 is an illustrative perspective view of a mating connector according to an exemplary embodiment of the present invention; Fig. 5 is an axial section view of the mating connector of Fig. 4; Fig. 6 is a side view of the mating connector of Fig. 4. As shown in Figs. 4-6, the mating connector 20 comprises: a substantially cylindrical second main body 22 made of insulated material; a second electrical connection portion 26 mounted on the second main body 22, for electrically connecting with the first electrical connection portion 16 of the connector 10; a substantially cylindrical insertion portion 23 formed on a second engagement end (the proximal end of Figs. 4 and 5) of the second main body to partly insert into the

pressing ring 13 of the connector 10; an elastic seal ring 24 provided on the insertion portion 23, for being pressed radially by the pressing ring 13 when the connector 10 and the mating connector 20 are engaged with each other (see Fig. 15); and a fixing engagement portion 25 fixed on the second main body 22, for engaging with the rotation engagement portion 14 by rotating the rotation engagement portion with respect to the fixing engagement portion. In this way, engagement projections 251 formed on the fixing engagement portion 25 may each slide within the spiral grooves 141 through the rotation engagement portion 14 so as to drive the rotation engagement portion 14 to approach the fixing engagement portion 25 and bring about the pressing ring 13 to compress radially the elastic seal ring 24, such that the connector 10 and the mating connector 20 are hermetically engaged with each other.

[0040] As shown in Figs. 5, 11 and 15, the rotation engagement portion 14 is provided with at least one spiral groove 141. Correspondingly, an outer wall of the fixing engagement portion 25 is provided with at least one engagement projection 251. When the connector 10 and the mating connector 20 are engaged with each other, the engagement projections 251 are engaged with the spiral grooves 141, respectively, and may slide therein.

[0041] According to the connector combination of a further embodiment of the present invention, as shown in Figs. 12 and 13, an end of the spiral groove 141 is provided with a holding groove 142 recessed in the axial direction. When the connector 10 and the mating connector 20 are finally engaged with each other, the engagement projection 251 may be moved into the holding groove 142 so as to prevent the rotation engagement portion 14 from rotating with respect to the fixing engagement portion 25, and realize the locking engagement between the connector 10 and the mating connector 20.

[0042] As shown in Fig. 5, 11 and 15, an annular groove 231, in which an elastic seal ring 24 is provided, is formed on an outer wall of the insertion portion in the vicinity of the insertion end (the right end of Figs. 11 and 15). When the connector 10 is finally engaged with the mating connector 20, along with the elastic seal ring 24, the annular groove 231 may be inserted into the pressing ring 13 and be pressed radially by the pressing ring 13. In this way, the elastic seal ring 24 realizes a full seal between the pressing ring 13 and the insertion portion 23 in the radial direction, such that foreign substances, such as water and moisture, cannot pass through any portion between the pressing ring 13 and the insertion portion 23 and cannot come into contact with the first electrical connection portion 16 of the connector 10 and the second electrical connection portion 26 of the mating connector 20, maintaining the electrical performances of the connector 10 and the mating connector 20 and realizing the good electrical connection therebetween.

[0043] According to the connector combination of a further exemplary embodiment of the present invention, as shown in Figs. 2, 5, 7, 8, 11 and 15, the connector 10

also comprises a axial engagement portion 15 extending from the outer periphery of the pressing ring 13 to the space between the fixing engagement portion 25 and the insertion portion 23 of the mating connector 20. Moreover, the axial engagement portion 15 is provided with at least one engagement arm 151 formed with a first holding portion 152. Correspondingly, the outer wall of the insertion portion 23 is provided with at least one second holding portion 232. Each of the first holding portions 152 is engaged with the respective second holding portion 232 through axial sliding movement so as to prevent the axial engagement portion 15 from separating from the insertion portion 23 in the axial direction.

[0044] In an exemplary embodiment, the first holding portion 152 comprises a notch formed on the engagement arm 151, and the second holding portion 232 comprises a projection formed on the insertion portion 23. When the axial engagement portion 15 is slid at the outside of the insertion portion 23, the projection 232 on the insertion portion 23 is inserted into the notch of the engagement arm 151 in a snap-fit manner so as to prevent the axial engagement portion 15 from separating from the insertion portion 23 in the axial direction and realize another locking engagement between the connector 10 and the mating connector 20. In further, a slot 252 is provided on the fixing engagement portion 25 at the position corresponding to the engagement arm 151, such that the engagement arm 151 may be moved radially outward during the period that the projection 232 on the insertion portion 23 is inserted into the notch on the engagement arm 151.

[0045] In further, as shown in Figs. 3 and 6, a first fool-proofing portion 153 is provided at the inside of the axial engagement portion 15 of the connector 10. Correspondingly, a second fool-proofing portion 233, mated with the first fool-proofing portion 153, is provided on the outer wall of the insertion portion 23 of the mating connector 20. More particularly, the first fool-proofing portion 153 is a guide key formed by protruding from the inner wall of the axial engagement portion 15, and the second fool-proofing portion 233 is a guide groove formed by extending in the axial direction on the outer wall of the insertion portion 23. When the insertion portion 23 is inserted into the axial engagement portion 15 in the axial direction, the guide key may slide within the guide groove. It can be understood that if the guide key doesn't be aligned with the guide groove, the insertion portion 23 may not be inserted into the axial engagement portion 15, thus, the guide key together with the guide groove has realized a fool-proofing function between the connector 10 and the mating connector 20. In an alternative exemplary embodiment, the guide key may provided on the outer wall of the insertion portion 23, and the guide groove may provided on the inner wall of the axial engagement portion 15.

[0046] As shown in Figs. 2, 11 and 15, the connector of a further exemplary embodiment of the present invention also comprises a restoring device configured to elas-

tically prevent the axial engagement portion 15 from being axially moved in a direction away from the first main body (toward left direction in Figs. 11 and 15). More specifically, the restoring device comprises: a first block ring 121 formed by protruding outward from the outer wall of the first main body 12; a second block ring 143 formed by protruding inward from the end (the right end of Figs. 11 and 15) of the axial engagement portion 15, which is connected with the first main body; and a spring 144 mounted between the first block ring 121 and the second block ring 143. The first main body 12 is provided with a third block ring 112 at the outside of the second block ring 143 for limiting the distance that the rotation engagement portion 14 moves in the axial direction of the first main body 12.

[0047] According to an exemplary embodiment of the connector combination 100 of the present invention, the connector 10 is a coaxial plug connector, and the first electrical connection portion 16 comprises at least one pin mounted on the first main body 12. Correspondingly, the mating connector 12 is a coaxial socket connector, and at least one second electrical connection portion 26 is mounted within the second main body. The pins are inserted into the second electrical connection portions 26 so as to be electrically connected with the second electrical connection portion 26, respectively.

[0048] According to an exemplary embodiment of the connector combination 100 of the present invention, the connector 10 also comprises a first fastening portion 11 provided at another end of the first main body 12 opposite to the first engagement end thereof and configured to electrically connect the first electrical connection portion 16 with a first cable (not shown). The specific structure for fastening the first cable to the first fastening portion 11 has already been described in many prior arts and will not be described in the present invention. Furthermore, the mating connector 20 also comprises a second fastening portion 21 provided at another end of the second main body 22 opposite to the second engagement end thereof and configured to electrically connect the second electrical connection portion with a second cable (not shown). The specific structure for fastening the second cable to the second fastening portion 21 has already been described in many prior arts and will not be described in the present invention.

[0049] The person skilled in this art should understand that each of the connector 10 and the mating connector 20 is not limited to connect with the cable. In an alternative embodiment, at least one of the connector 10 and the mating connector 20 may be directly mounted on the mounting frame provided with connection terminals. For example, the mating connector 20 may be mounted on a wall, a TV, a set-top box for the TV, whereas the connector 10 is connected to the cable through the first fastening portion 11. In this way, the quick and steady engagement between the cable and the mating connector may be realized by the electrical connection between the connector and the mating connector.

[0050] The operation of assembling the connector combination 100 of the present invention will be described hereinafter with reference to Figs. 7-15.

[0051] Firstly, with reference to Fig. 7, moving the connector 10 and the mating connector 20 to make the engagement ends thereof close to each other, and aligning the guide key of the first fool-proofing portion 153 of the connector 10 with the guide groove of the second fool-proofing portion 233 of the mating connector 20; inserting the mating connector 20 into the connector 10, during the process of insertion, although not shown in Fig. 7, the engagement projections 251 on the fixing engagement portion 25 of the mating connector 20 are pushed to enter into the starting ends 1411 of the rotation engagement portion 14 and move within the starting ends 1411 in the axial direction.

[0052] As shown in Fig. 8, after the fixing engagement portion 25 moving axially with respect to the rotation engagement portion 14 by a predetermined distance, the projection acted as the second holding portion 232 is engaged into the notch acted as the first holding portion 152, such that the connector 10 and the mating connector 20 are connected together preliminarily in the snap-fit manner, and the first locking between the connector 10 and the mating connector 20 is realized. At this time, as shown in Fig. 10 and 11, the elastic seal ring 24 is partly pressed by the pressing ring 13, and a complete seal has not yet been realized. In the situation of Fig. 8, although not shown in Fig. 8, the engagement projections 251 on the fixing engagement portion 25 of the mating connector 20 are pushed into the starting ends 1411 of the rotation engagement portion 14.

[0053] As shown in Fig. 9, in the state of Fig. 8, the rotation engagement portion 14 and the fixing engagement portion 25 are held by the operator so as to produce the relative rotation therebetween, and the spiral movement of the engagement projections 251 within the spiral grooves 141 results in a further relative movement between the rotation engagement portion 14 and the fixing engagement portion 25; meanwhile, with reference to Figs. 11 and 15, the pressing ring 13 gradually presses radially the elastic seal ring 24, such that the spring 144 is pressed and applies spring restoring force to the rotation engagement portion 14.

[0054] As shown in Figs. 12 to 14, when the engagement projections 251 are moved into the holding grooves 142 located at the ends of the spiral grooves 141, the rotation engagement portion 14 and the fixing engagement portion 25 cannot continue to rotate with respect to each other. Due to the spring restoring force the spring 144, the engagement projections 251 are pushed into the holding grooves 142 extending in the axial direction so as to prevent the rotation engagement portion 14 from counter-rotating with respect to the fixing engagement portion 25, such that the second locking between the connector 10 and the mating connector 20 is realized.

[0055] The connector 10 and the mating connector 20 according to various above embodiments of the present

invention may be both substantially cylinder-shaped and both used as coaxial connectors. In a further embodiment, the connector 10 may be a coaxial socket connector, whereas the mating connector 20 may be a coaxial plug connector.

[0056] In the connector, the mating connector and the connector combination according to various above embodiments of the present invention, when the connector and the mating connector are engaged with each other, the elastic seal ring is pressed radially by the pressing ring, such that foreign substances, such as water and moisture, cannot pass through any portion between the pressing ring and the insertion portion and cannot come into contact with the electrical connection portions, so that the electrical performances of the connector and the mating connector are maintained, realizing the good electrical connection therebetween; in further, the relative rotation and the relative sliding movement in the axial direction between the connector and the mating connector can be prevented by the double locking devices, realizing the reliable engagement between the connector and the mating connector.

[0057] It should be appreciated for those skilled in this art that the above embodiments are intended to be illustrated, and not restrictive. For example, many modifications may be made to the above embodiments by those skilled in this art, and various features described in different embodiments may be freely combined with each other without conflicting in configuration or principle so as to realize many kinds of connector, mating connector and the connector combination on the basis of the solving the technical problems of the present invention.

[0058] On the basis of describing the best embodiments of the present invention in detail, it would be appreciated by those skilled in the art that various changes or modifications may be made in these embodiments without departing from the principles and spirit of the disclosure and the present invention is not limited to the exemplary embodiments described in the description. It should be noted that the word "comprising" or "comprise" doesn't exclude other elements or steps, and the word "a" or "an" doesn't exclude a plurality of elements. In further, any reference signs in the claims should not be interpreted to limit the scope of the present invention.

Claims

1. A connector, comprising:

a first main body having a substantially cylinder shape;
a first electrical connection portion mounted on the first main body, for electrically connecting with a mating connector;
a pressing ring formed by protruding from a periphery of a first engagement end of the first main body; and

a rotation engagement portion rotatably mounted on the first main body at an outside of the pressing ring.

2. The connector according to claim 1, wherein, the rotation engagement portion is provided with at least one spiral groove, a terminal end of the spiral groove being provided with a holding groove recessed in the axial direction.
3. The connector according to claim 1, further comprising an axial engagement portion extending from an outer periphery of the pressing ring, the axial engagement portion being provided with at least one engagement arm formed with a first holding portion.
4. The connector according to claim 3, wherein, the axial engagement portion is provided with a first fool-proofing portion.
5. The connector according to claim 3, further comprising a restoring device configured to elastically prevent the axial engagement portion from axially move in a direction away from the first main body.
6. The connector according to claim 5, wherein, the restoring device comprising:
 - a first block ring formed by protruding outward from an outer wall of the first main body;
 - a second block ring formed by protruding inward from an end of the axial engagement portion; and
 - a spring mounted between the first block ring and the second block ring.
7. The connector according to claim 1, further comprising a first fastening portion provided at another end of the first main body opposite to the first engagement end to electrically connect with a first cable.
8. A mating connector, comprising:
 - a second main body having a substantially cylinder shape;
 - a second electrical connection portion mounted on the second main body, for electrically connecting with a connector;
 - an insertion portion formed on a second engagement end of the second main body;
 - an elastic seal ring provided on the insertion portion; and
 - a fixing engagement portion fixed on the second main body.
9. The mating connector according to claim 8, wherein, an outer wall of the fixing engagement portion is provided with at least one engagement projection.

10. The mating connector according to claim 8, wherein, an annular groove is provided on an outer wall of the insertion portion in the vicinity of an insertion end, the elastic seal ring being providing within the annular groove.
11. The mating connector according to claim 8, wherein, an outer wall of the insertion portion is provided with at least one second holding portion.
12. The mating connector according to claim 8, wherein, a second fool-proofing portion is provided on an outer wall of the insertion portion.
13. The mating connector according to claim 8, wherein, further comprising a second fastening portion provided at another end of the second main body opposite to the second engagement end to electrically connect with a second cable.
14. A connector combination, comprising:
- a connector, comprising:
 - a first main body;
 - a first electrical connection portion mounted on the first main body;
 - a pressing ring formed by protruding from a periphery of a first engagement end of the first main body; and
 - a rotation engagement portion rotatably mounted on the first main body at an outside of the pressing ring; and
 - a mating connector, comprising:
 - a second main body;
 - a second electrical connection portion mounted on the second main body, and constructed to be electrically connected with the first electrical connection portion of the connector;
 - an insertion portion formed on a second engagement end of the second main body and partly inserted into the pressing ring;
 - an elastic seal ring provided on the insertion portion to be pressed radially by the pressing ring; and
 - a fixing engagement portion fixed on the second main body, and constructed to engage with the rotation engagement portion by rotating the rotation engagement portion with respect to the fixing engagement portion.
15. The connector combination according to claim 14, wherein, the rotation engagement portion is provided with at least one spiral groove, and an outer wall of the fixing engagement portion is provided with at least one engagement projection, which is constructed to engage with the spiral grooves and slide within the spiral grooves, respectively.
16. The connector combination according to claim 15, wherein, a terminal end of the spiral groove is provided with a holding groove recessed in the axial direction, and the engagement projection is constructed move into the holding groove so as to prevent the rotation engagement portion from being rotated with respect to the fixing engagement portion.
17. The connector combination according to claim 14, wherein, an annular groove is provided on an outer wall of the insertion portion in the vicinity of an insertion end, the elastic seal ring being providing within the annular groove, and the annular groove along with the elastic seal ring being inserted into the pressing ring.
18. The connector combination according to claim 14, wherein, the connector further comprising an axial engagement portion extending from an outer periphery of the pressing ring to the space between the fixing engagement portion and the insertion portion of the mating connector, the axial engagement portion is provided with at least one engagement arm formed with a first holding portion, and an outer wall of the insertion portion is provided with at least one second holding portion, and wherein each of the first holding portions is engaged with the respective second holding portion through axial sliding, so that the axial engagement portion is prevented from separating from the insertion portion.
19. The connector combination according to claim 18, wherein, a first fool-proofing portion is provided at the inside of the axial engagement portion, and a second fool-proofing portion mated with the first fool-proofing portion is provided on the outer wall of the insertion portion.
20. The connector combination according to claim 19, wherein, the first fool-proofing portion is a guide key formed by protruding from the inner wall of the axial engagement portion, and the second fool-proofing portion is a guide groove formed by extending in the axial direction on the outer wall of the insertion portion, the guide key being slidable within the guide groove.
21. The connector combination according to claim 14, wherein, the connector further comprising a restoring device configured to elastically prevent the axial engagement portion from axially move in a direction away from the first main body.

22. The connector combination according to claim 21, wherein, the restoring device comprising:

a first block ring formed by protruding outward from an outer wall of the first main body; 5
 a second block ring formed by protruding inward from an end of the axial engagement portion; and
 a spring mounted between the first block ring and the second block ring. 10

23. The connector combination according to claim 14, wherein, the connector is a coaxial plug connector, and the first electrical connection portion comprises at least one pin mounted on the first main body; 15
 the mating connector is a coaxial socket connector, and at least one second electrical connection portion is mounted within the second main body, the pins being inserted into the second electrical connection portions to electrically connect with the second electrical connection portion, respectively. 20

24. The connector combination according to claim 14, wherein, the connector further comprising a first fastening portion provided at another end of the first main body opposite to the first engagement end and configured to electrically connect the first electrical connection portion with a first cable, 25
 the mating connector further comprising a second fastening portion provided at another end of the second main body opposite to the second engagement end and configured to electrically connect the second electrical connection portion with a second cable 30

25. The connector combination according to claim 15, wherein, a fastening ring is provided at an outside of the free end of the rotation engagement portion. 35

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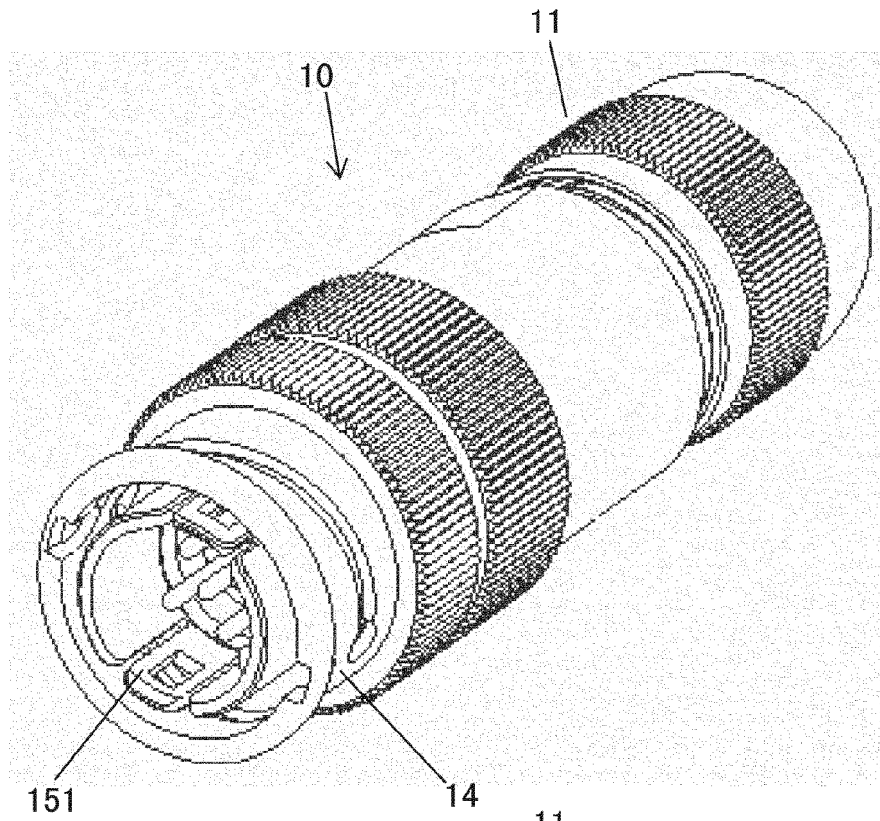


Fig. 1

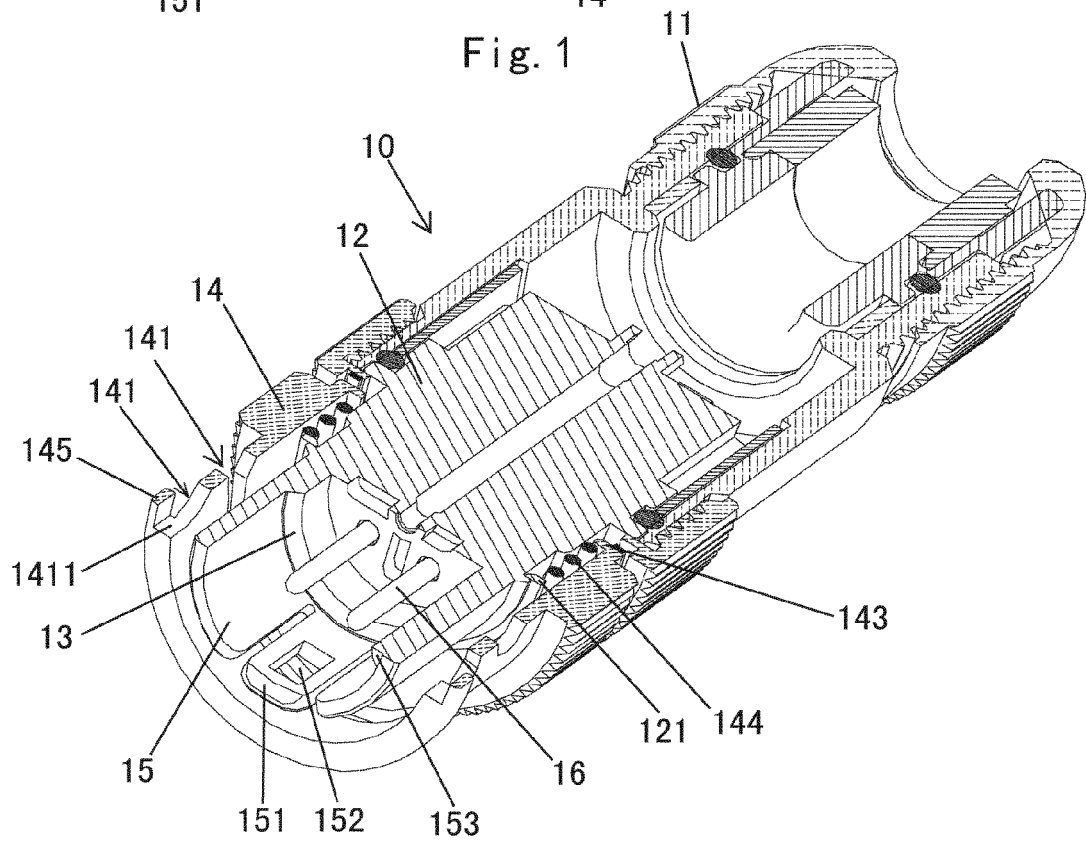
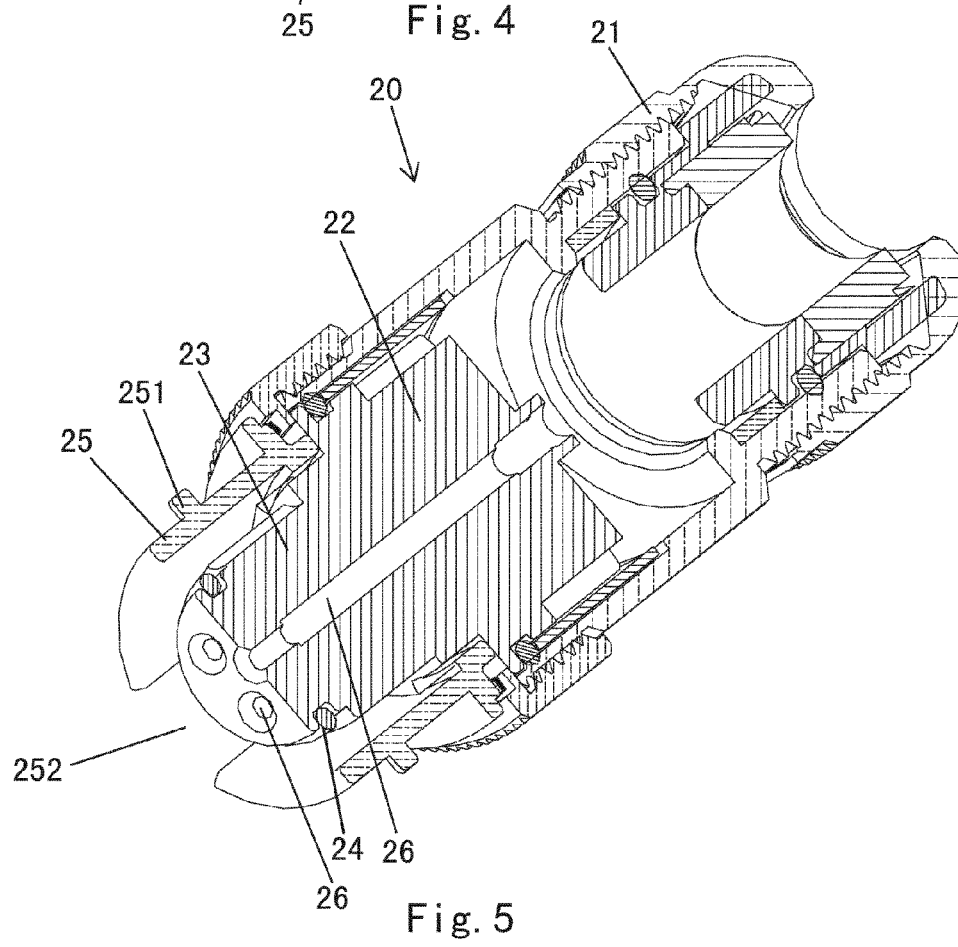
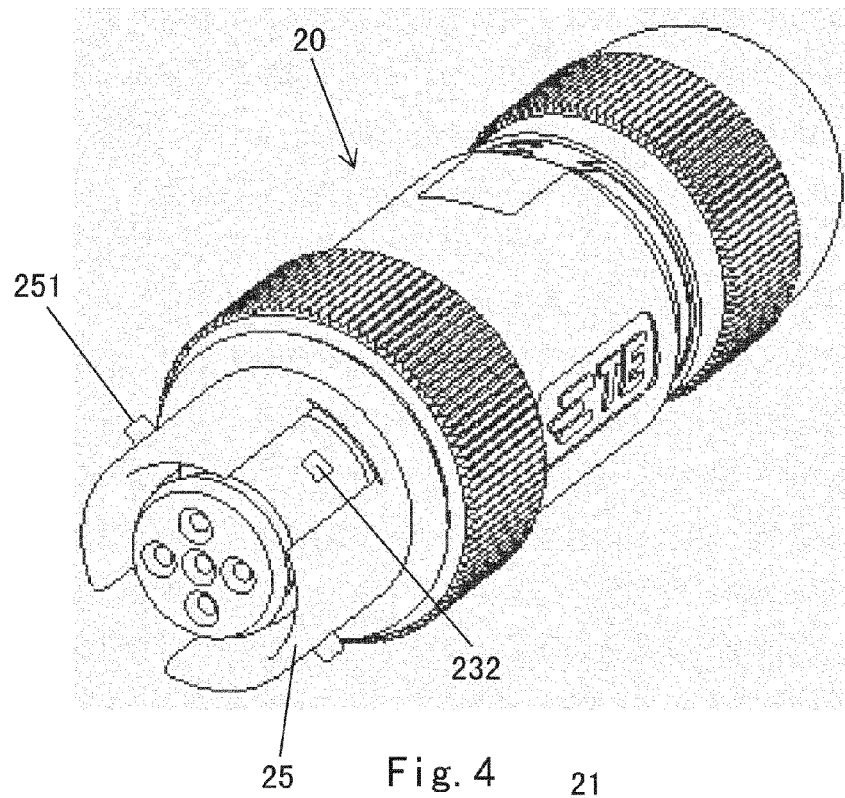


Fig. 2



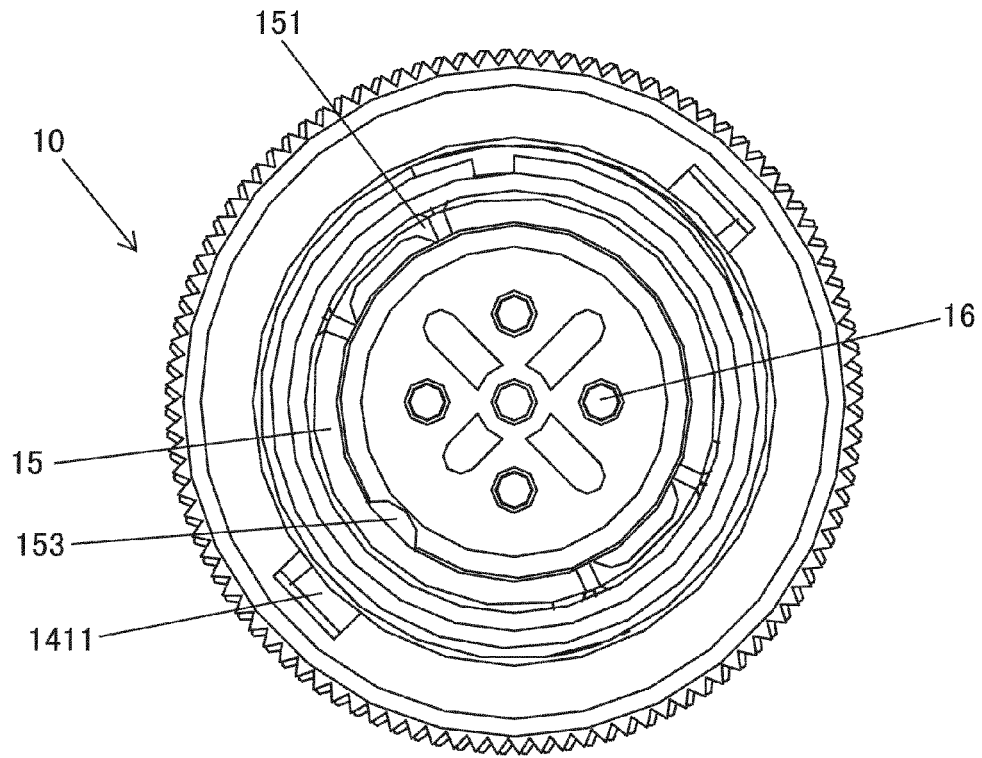


Fig. 3

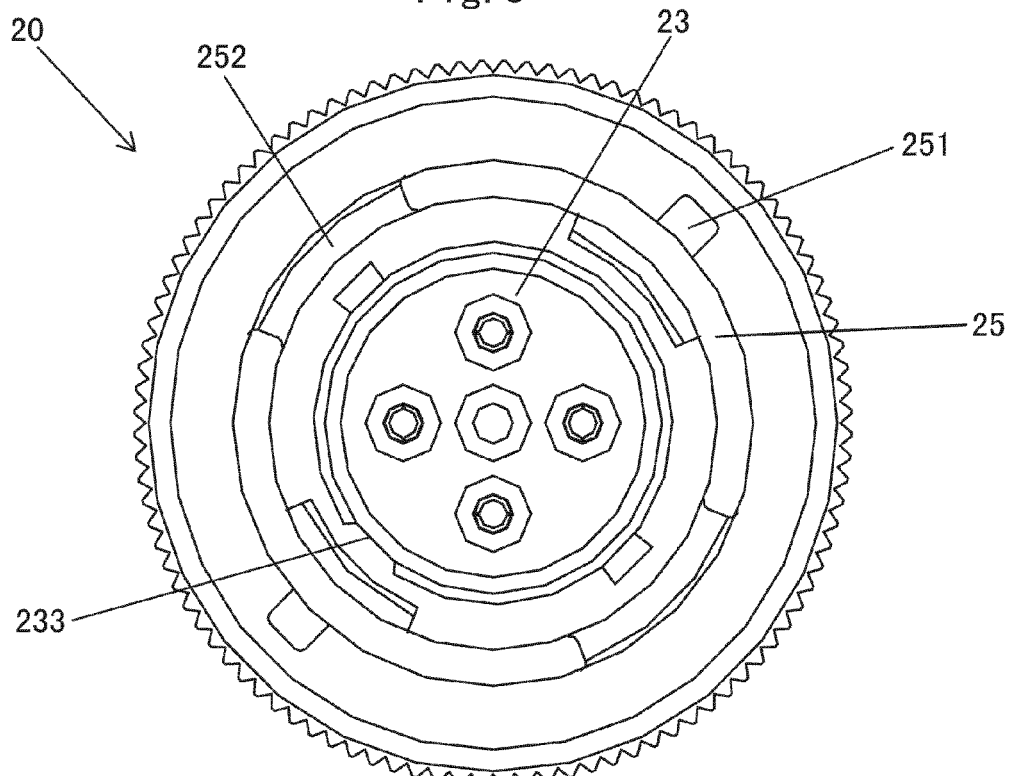
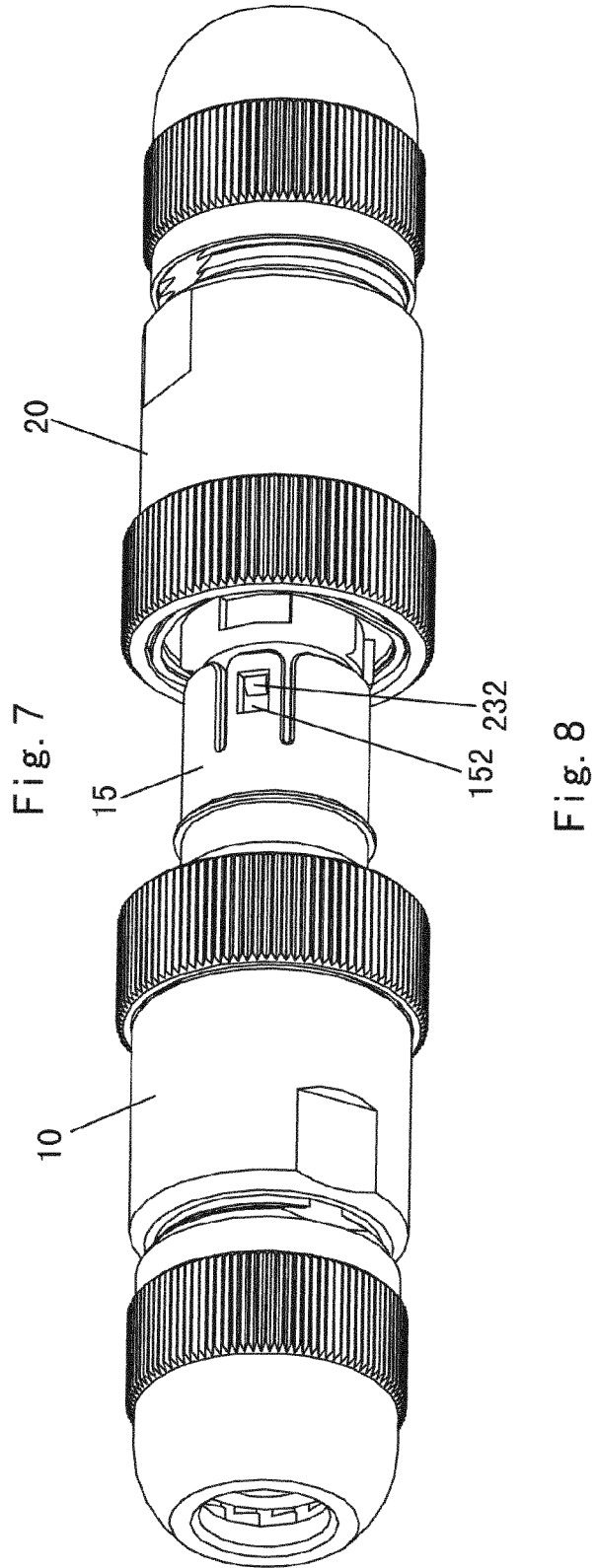
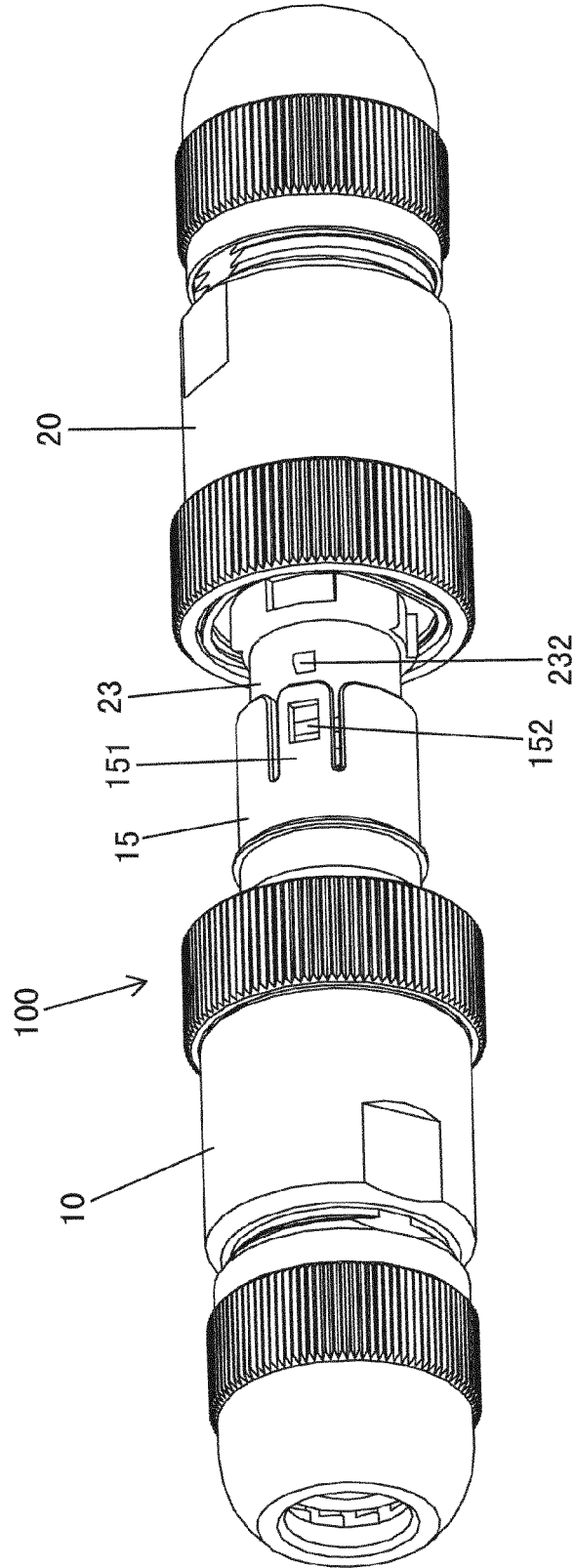


Fig. 6



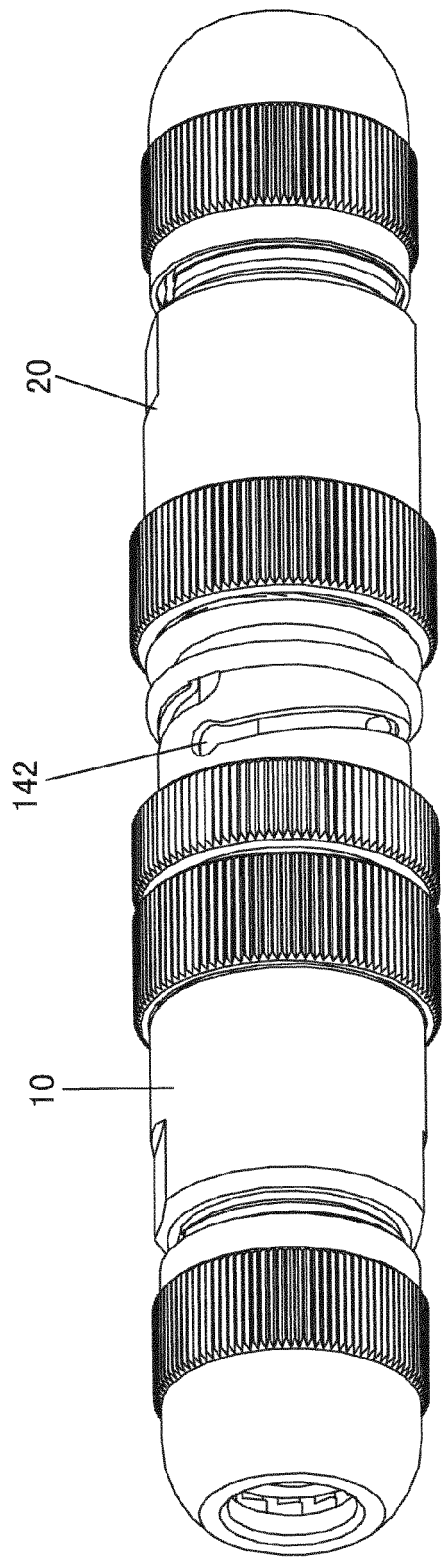


Fig. 9

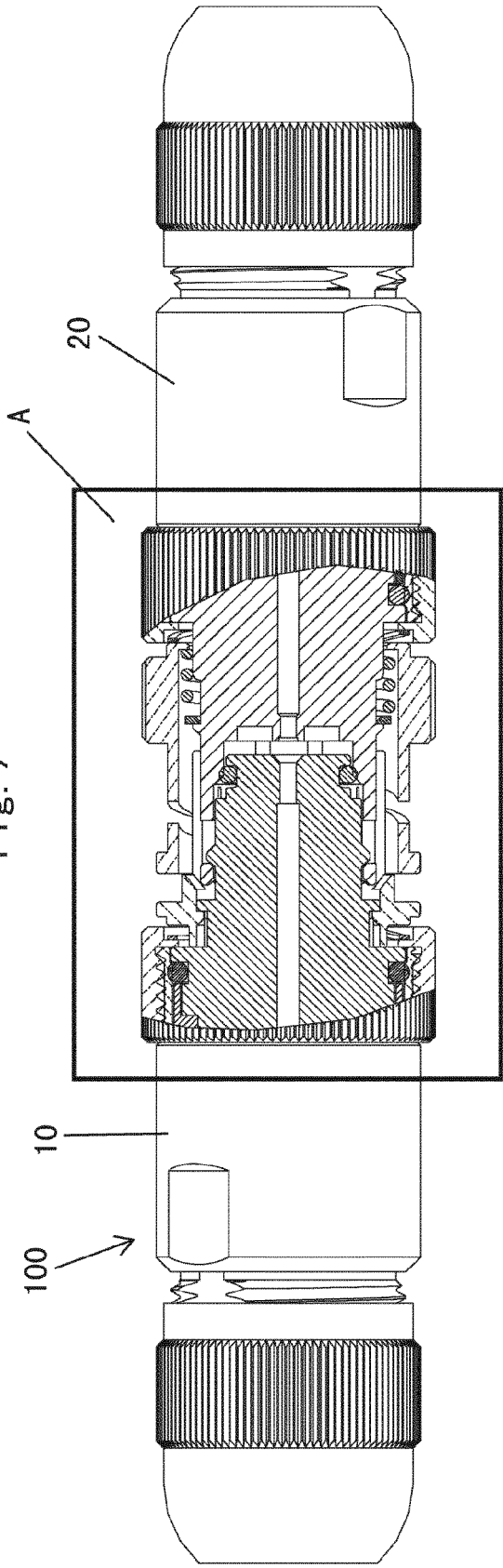


Fig. 10

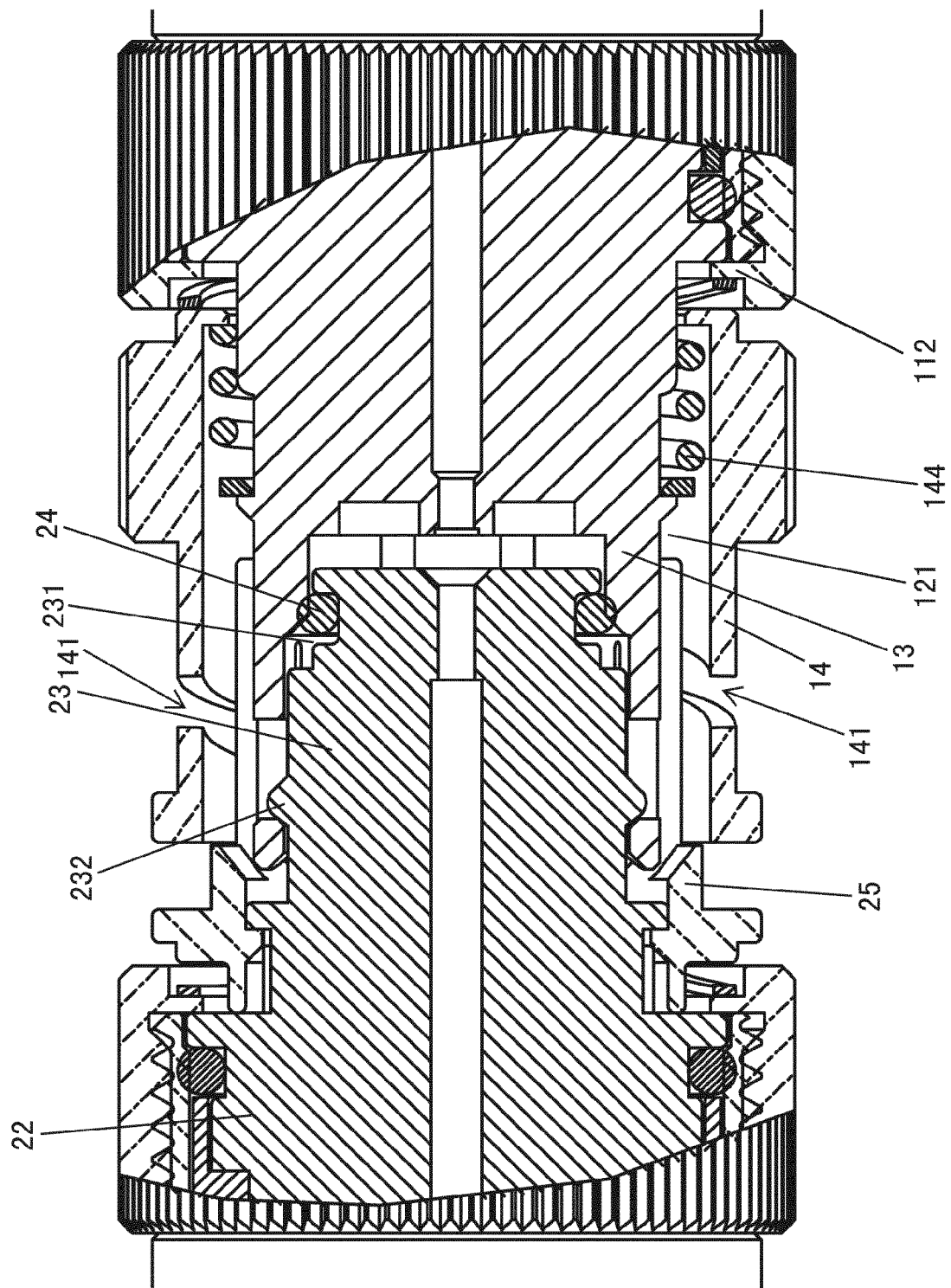


Fig. 11

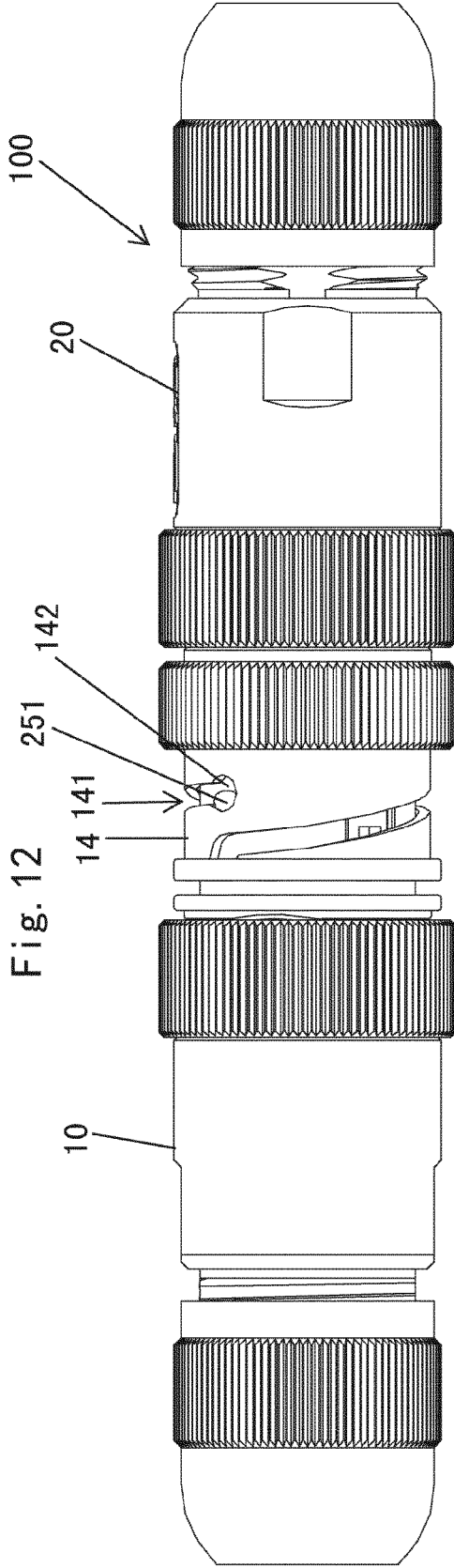
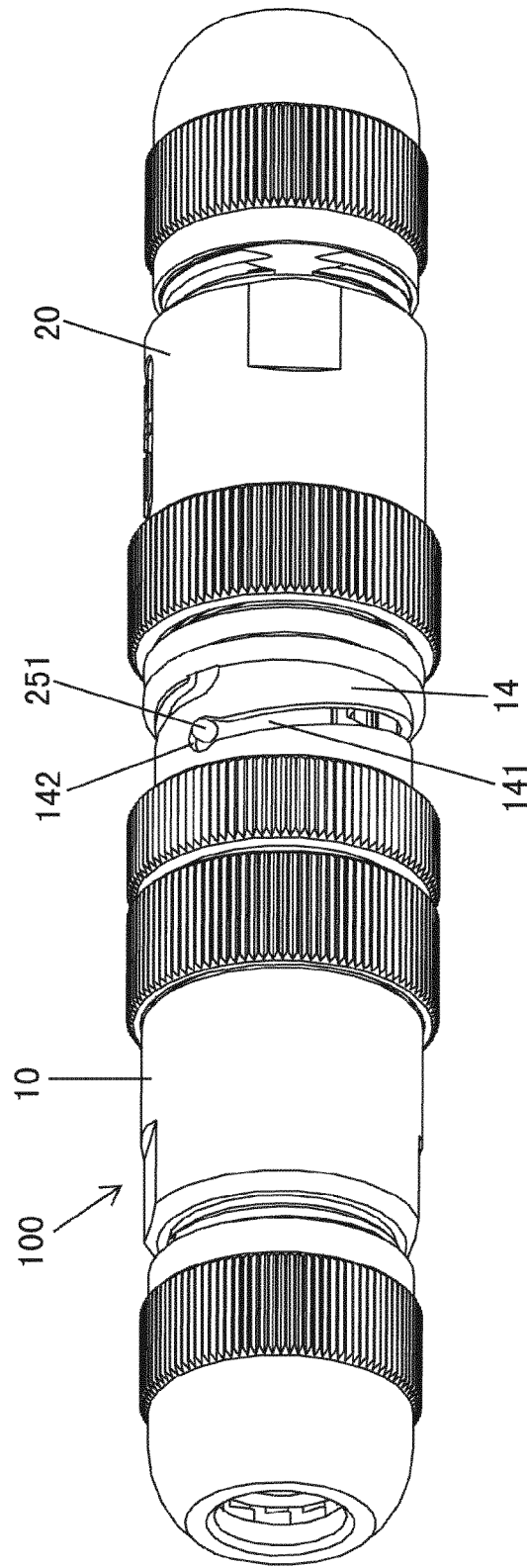


Fig. 13

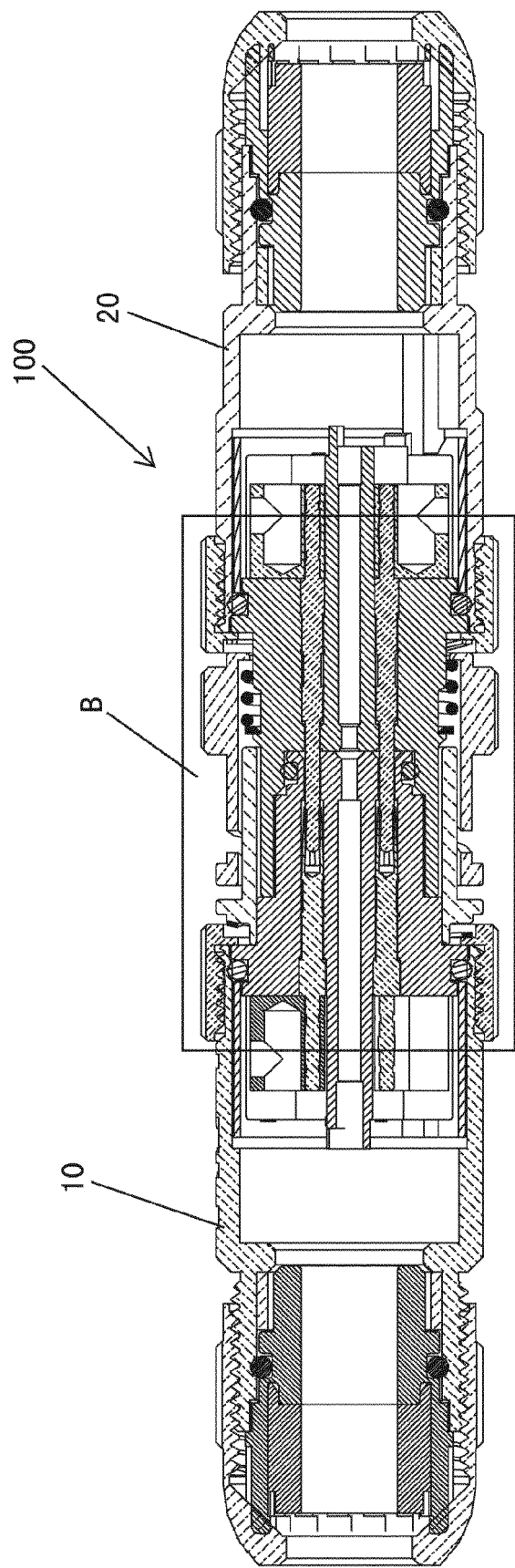


Fig. 14

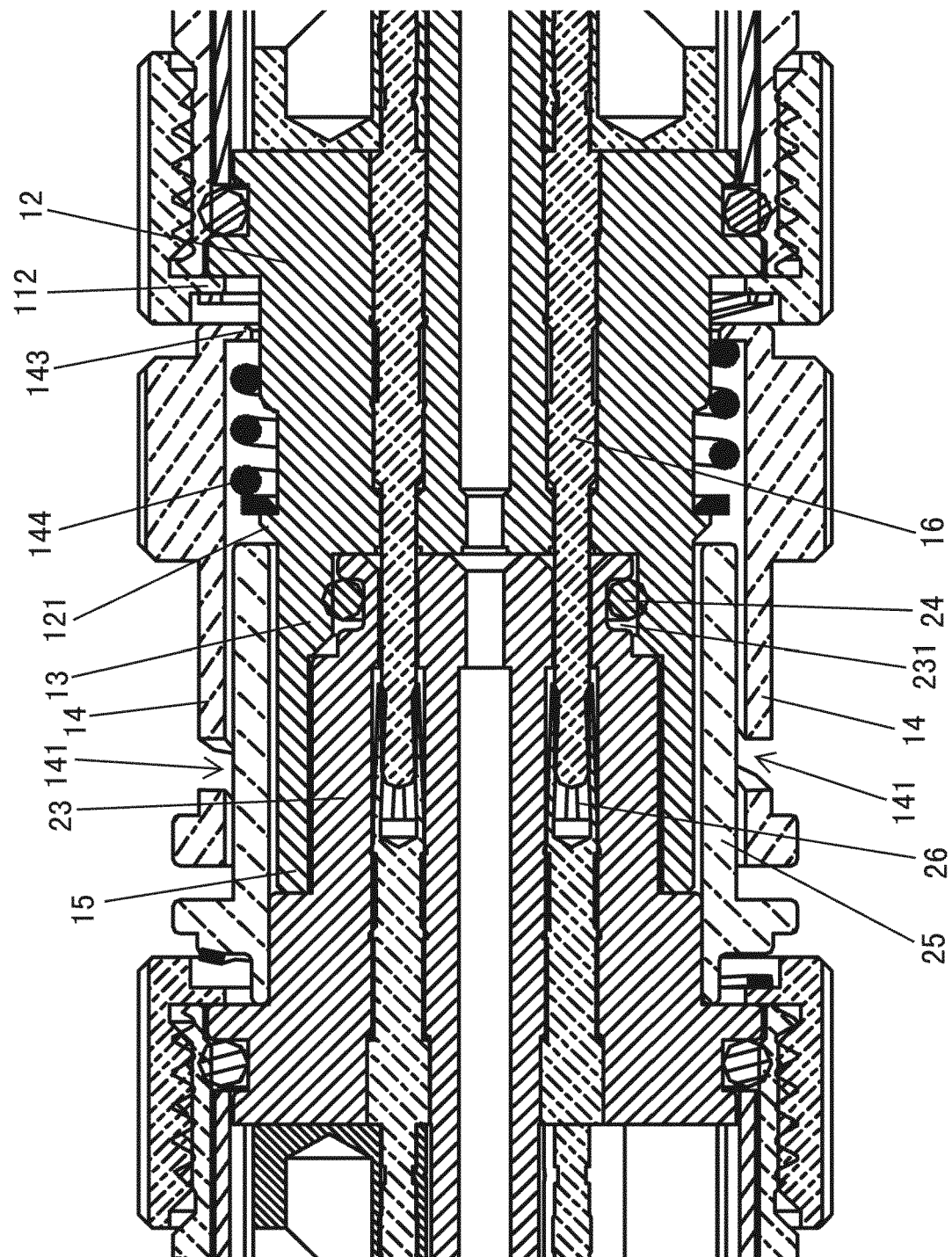


Fig. 15



EUROPEAN SEARCH REPORT

Application Number
EP 15 16 4607

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Y	* paragraph [0027] - paragraph [0042]; figures 1A-2B *	3,4,11, 18	ADD. H01R103/00 H01R105/00 H01R9/05 H01R13/641
X	WO 2012/138644 A2 (BELDEN INC [US]; HOLLIDAY RANDALL A [US]; PARKER ROBERT M [US]; HUANG) 11 October 2012 (2012-10-11)	1,2, 7-10,12, 14-17, 21-25	
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 3 September 2015	Examiner Vautrin, Florent
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