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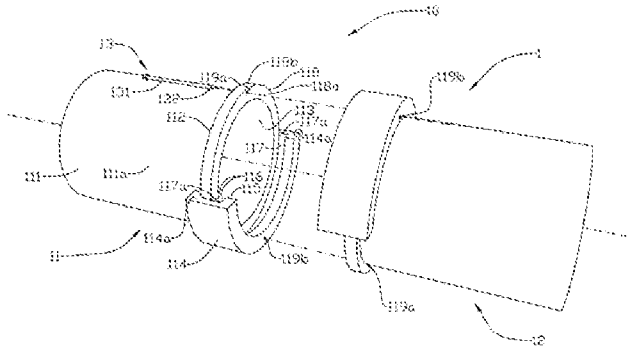
(54) Title **Coupling for fluid conduits**

(57) Abstract

A fluid conduit coupling comprising: a first and a second conduit element, each having a first and a second body defining a fluid passage, wherein a blocking portion defines a space in the receptacle element, and an engagement element includes a contact portion extending substantially in a radial direction of the engagement element, the engagement element of the second conduit element fitting into the space of the first conduit element and vice versa such that the contact portions are substantially engaged with the blocking portions when the engagement elements are engaged with the receptacle elements, wherein the space comprises a radial seal arranged to sealingly contact a seal contacting face defining a radial periphery of the engagement element.



COUPLING FOR FLUID CONDUITS

This invention relates to a coupling for a fluid conduit. More particularly, the invention relates to a coupling that allows a segment of a fluid conduit to be released from the conduit in a direction perpendicular to the direction of the conduit without twisting the segment and/or the coupling and without displacement of the conduit in the longitudinal direction. The segment is provided with a coupling half according to the invention in each end, and the conduit is provided with complementary coupling half to be connected to the coupling half of the segment. Sealing between adjacent coupling halves are arranged in a circumferential direction and not in a longitudinal direction to allow for that the release direction is perpendicular to the longitudinal direction of the conduit. The coupling according to the invention comprises two identical coupling halves.

A sectioned fluid conduit may comprise several elements releasably interconnected by couplings in the form of bolted flanges, claw couplings, bayonet couplings, etc. To obtain proper sealing, the couplings are provided with seals of some kind. In need of exchange of elements, either due to malfunctioning, wear and tear, installation or removal of an element provided with one or more instruments arranged for short-time use, the conduit must be broken by disconnecting one element from the conduit and inserting an element or a group of elements with same building length in the conduit. In most cases an axial displacement of the adjacent conduit portions is complicated or impossible, excluding some coupling types from being used (e.g. claw couplings, bayonet couplings), and a radial displacement of one element relative the adjacent conduit portions causes seals to be damaged (e.g. regular flange couplings), excluding other types of couplings from being used.

From US1739131A a hose coupling is known, the coupling comprising two identical coupling parts in the form of hose nipples, each provided with a body portion considerably larger in diameter than the nipple and is formed to embody a groove and a rib for engagement with the complementary member of the coupling. A semi-annular groove and an opposing semi-circular rib are arranged to allow the two members to slip together by a linear movement at right angles to the axis of the coupling. One or more locking mechanisms are provided to lock the two members in engaged assembly. A sealing washer is arranged in a circular groove formed adjacent the interior meeting faces of the two members, projecting slightly within the central bore of the coupling members.

EP3139078A1 discloses a connection mechanism for a hydraulic system comprising a first and a second component each defining an axial fluid passage. A receptacle element with a blocking portion defines a space in the receptacle element, and an engagement element including a contact portion extending substantially in a radial direction of the engagement element fits into the space defined by the blocking portion such that the contact portion is substantially engaged with the blocking portion when the engagement element is engaged with the receptacle element. The receptacle element is arranged on an axial end of the first component, and the engagement element is arranged on an axial end of the second component. The receptacle element inhibits axial movement of the engagement element when the engagement element is engaged with receptacle element. A seal is provided in a groove provided around the opening of a first passage such that the seal contacts on one axial end the first component and, when in the engaged position, on the other axial end the second component to provide a fluid-tight seal between the two components.

Similar connection mechanisms are disclosed in US2439254A and US3260539A. A gasket is interposed between the opposing flanges.

The invention has for its object to remedy or to reduce at least one of the drawbacks of the prior art, or at least provide a useful alternative to prior art.

The object is achieved through features, which are specified in the description below and in the claims that follow.

A coupling for a fluid conduit is provided. Each of a first and a second conduit element comprises a first body and a second body arranged in at least one axial end portion of the first body. The first body and the second body are forming a through fluid passage.

The second body includes a semi-circular receptacle element, i.e. an element with an angular extent of 180°. The receptacle element includes a blocking portion, the blocking portion defining a semi-circular groove-formed space in the receptacle element, and a semi-circular engagement element including a contact portion extending substantially in a radial direction of the engagement element. The engagement element of the second conduit element fits into the space defined by the blocking portion of the first conduit element and vice versa such that the contact portion is substantially engaged with the blocking portion when two adjacent conduit elements is connected, i.e. is in the fully engaged position.

The engagement element is engageable with the receptacle element by a translational movement of the first and the second conduit elements relative to one another. The translational movement is a linear movement in a substantially radial direction relative to the axial direction of the first and second conduit elements. The receptacle elements of a coupling inhibit axial movement of the engagement elements when the engagement elements are engaged with respective receptacle elements.

A radial seal is provided in a bottom portion of the groove, arranged to sealingly contact a peripheral seal contacting face of the engagement element.

The invention is defined by the independent patent claim. The dependent claims define advantageous embodiments of the invention.

More specifically, the invention relates to a coupling for a fluid conduit comprising:

a first conduit element and a second conduit element, each having

a first body,

a second body being integrated in a body end,

the first body and the second body defining a fluid passage in an axial direction for delivering fluid there through,

the second body forming a semi-circular receptacle element including a blocking portion defining a space in the receptacle element, and an engagement element including a contact portion extending substantially in a radial direction of the engagement element, the engagement element of the second conduit element fitting into the space defined by the blocking portion of the first conduit element and vice versa such that the contact portions are substantially engaged with the blocking portions when the engagement elements are engaged with the receptacle elements,

the engagement elements being engageable with the receptacle elements by a translational movement of the first conduit element and the second conduit element relative to each other, the translational movement being linear in a substantially radial direction relative to the axial direction of the first and/or second conduit element, or along a curved path ending in a substantially radial direction relative to the axial direction of the first and/or second conduit element, and wherein the receptacle elements inhibit axial movement of the engagement elements when the engagement elements are engaged with respective receptacle elements, wherein

the space comprises a radial seal arranged to sealingly contact a seal contacting face defining a radial periphery of the engagement element.

The centre axes of the first conduit element and the second conduit element may substantially coincide when the receptacle elements and the engagement elements are engaged. An effect of this is that the fluid resistance of the flow in the conduit is minimized.

A first locking element bore may be provided in the engagement element, and a second locking element bore may be provided in the receptacle element, wherein centre axes of the first and second locking element bores coincide when the receptacle elements and the engagement elements are engaged, said bores being arranged to receive a locking element. An effect of this is that the coupling is lockable using simple means.

The locking element may sealingly contact the receptacle element. An effect of this is leakage through the bore of the receptacle element is inhibited.

A seal end may extend above an end face of the receptacle element. An effect of this is that the risk of leakage bypassing the seal ends is minimized.

In the following is described an example of a preferred embodiment illustrated in the accompanying drawings, wherein:

Fig. 1 shows in perspective view end portions of two adjacent conduit elements forming a coupling according to the present invention;

Fig. 2 shows an axial view of portions of the connected conduit elements;

Fig. 3 shows in larger scale an axial view of a section of the coupling;

Fig. 4 shows in a scale equivalent to figure 2 an end view of a conduit element; and

Fig. 5 shows in smaller scale a side view of a portion of a fluid conduit during a removal or replacement of a conduit element.

Any positional indications refer to the position shown in the figures.

In the figures, same or corresponding elements are indicated by same reference numerals. For clarity reasons, some elements may in some of the figures be without reference numerals.

A person skilled in the art will understand that the figures are just principal drawings. The relative proportions of individual elements may also be distorted.

In figure 1, 2 and 3 a portion of a fluid conduit 1 is shown, wherein a first conduit element 11 and a second element 11a are connected by a conduit coupling 10 according to the present invention.

Each conduit element 11, 11a is provided with a tubular first body 111, wherein a ring-shaped second body 112 is provided in a body end 111a of the first body 111, a centre plane of the second body 112 being perpendicular to a centre axis of the first body 111. An opposite body end (not shown) of each conduit element 11, 11a is provided with a corresponding second body with identical angular orientation.

Each second body 112 is forming a semi-circular receptacle element 114 and a radially opposing, semi-circular engagement element 118. The receptacle element 114 is provided with a blocking portion 115 defining a groove-formed space 116. The engagement element 118 is forming a contact portion 118a extending in a radial direction of the engagement element 118.

A semi-circular radial seal 117 is provided in the space 116, filling a bottom of the groove-formed space 116.

A seal contacting face 118b is forming a radial periphery of the engagement element 118.

The engagement element 118 of the first conduit element 11 is engageable with the receptacle element 114 of the second conduit element 11a by a translational movement of the first and the second conduit elements 11, 11a relative to one another. The translational movement is a linear movement in a substantially radial direction relative to the axial direction of the first and second conduit elements 11, 11a. The receptacle elements 114 of a coupling inhibit axial movement of the engagement elements 118 when the engagement elements 118 are engaged with respective receptacle elements 114.

When engaged, the seal contacting face 118b of each engagement element 118 is sealingly contacting the radial seal 117 of the respective receptacle elements 114. Faces of seal ends 117a of the adjacent radial seals 117 of the coupling 10 remains in sealing contact throughout the engagement of the coupling 10.

Preferably, the seal ends 117a are slightly raised above the level of corresponding receptacle element end faces 114a (see figures 1 and 4) to ensure proper sealing of the seal ends.

When engaged, the centre axes of the first and second conduit elements 11, 11a are substantially in line.

If required, the coupling 10 may be locked by a pin-formed locking element 13 being inserted in in-line bores 119a, 119b provided in at least one of the receptacle elements 114 and the corresponding engagement element(s) 118 of the coupling

10. The locking element 13 is here shown as a headed pin 131 being secured by a securing element 132 inserted in a transversal bore in an end portion extending from the receptacle element 114. The bores 119a, 119b are preferably arranged parallel to the centre axes of the conduit elements 11, 11a.

Figure 4 shows an end view of a conduit element 11.

It is now referred to figure 5. When a conduit element 11a of a fluid conduit 1 is to be removed and replaced with another one, any locking elements are removed and said conduit element 11a is translational moved away from the adjacent conduit elements 11, 11b, the engagement elements 118 of the corresponding couplings 10 sliding away from the spaces 116 of the respective receptacle elements 114. Due to the seals 117 contacting the radial periphery of the engagement elements 118 only, the translational movement of the engagement elements 118 relative the receptacle elements 114 does not involve any risk of damaging the seals 117 while removing and replacing the conduit element 11a.

It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that those skilled in the art will be able to design many alternative embodiments without departing from the scope of the appended claims. In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim. Use of the verb "comprise" and its conjugations does not exclude the presence of elements or steps other than those stated in a claim. The article "a" or "an" preceding an element does not exclude the presence of a plurality of such elements.

The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage.

C l a i m s

1. A coupling (10) for a fluid conduit (1) comprising:

a first conduit element (11) and a second conduit element (11a), each having

a first body (111),

a second body (112) being integrated in a body end (111a),

the first body (111) and the second body (112) defining a fluid passage (113) in an axial direction for delivering fluid there through,

the second body (112) forming a semi-circular receptacle element (114) including a blocking portion (115) defining a space (116) in the receptacle element (114), and an engagement element (118) including a contact portion (118a) extending substantially in a radial direction of the engagement element (118), the engagement element (118) of the second conduit element (11a) fitting into the space (116) defined by the blocking portion (115) of the first conduit element (11) and vice versa such that the contact portions (118a) are substantially engaged with the blocking portions (115) when the engagement elements (118) are engaged with the receptacle elements (114),

the engagement elements (118) being engageable with the receptacle elements (114) by a translational movement of the first conduit element (11) and the second conduit element (11a) relative to each other, the translational movement being linear in a substantially radial direction relative to the axial direction of the first and/or second conduit element (11, 11a), or along a curved path ending in a substantially radial direction relative to the axial direction of the first and/or second conduit element (11, 11a), and wherein the receptacle elements (114) inhibit axial movement of the engagement elements (118) when the engagement elements (118) are engaged with respective receptacle elements (114),

c h a r a c t e r i s e d i n that

the space (116) comprises a radial seal (117) arranged to sealingly contact a seal contacting face (118b) defining a radial periphery of the engagement element (118).

2. The coupling (10) according to claim 1, wherein

centre axes of the first conduit element (11) and the second conduit element (11a) substantially coincide when the receptacle elements (114) and the engagement elements (118) are engaged.

3. The coupling (10) according to claim 1, wherein

a first locking element bore (119a) is provided in the engagement element (118), and

a second locking element bore (119b) is provided in the receptacle element (114),

centre axes of the first and second locking element bores (119a, 119b) coincide when the receptacle elements (114) and the engagement elements (118) are engaged, said bores (119a, 119b) being arranged to receive a locking element (13).

4. The coupling (10) according to claim 1, wherein

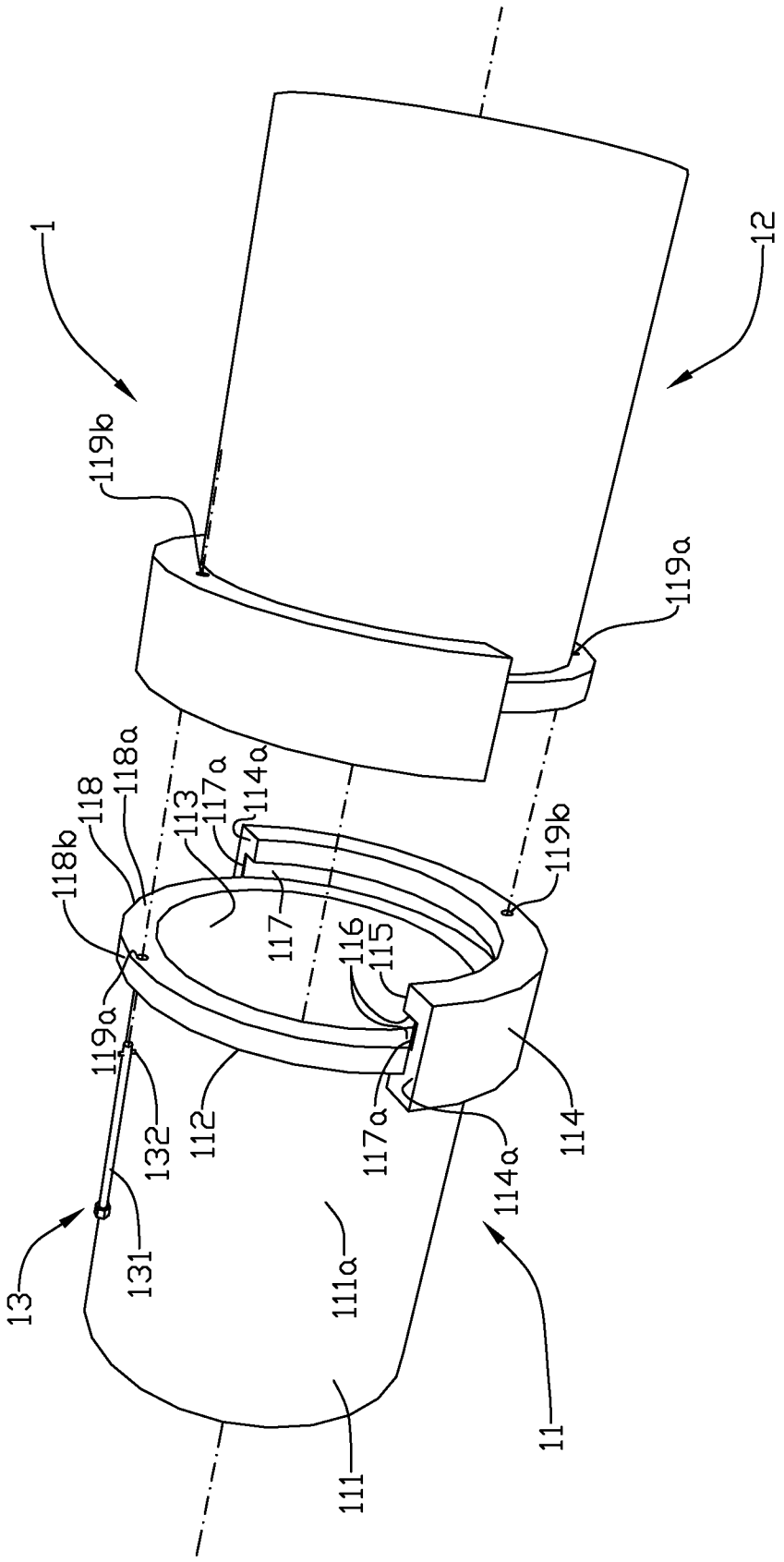
a first locking element bore (119a) is provided in the engagement element (118), and

a second locking element bore (119b) is provided in the receptacle element (114),

centres axes of the first and second locking element bores (119a, 119b) coincide when the receptacle elements (114) and the engagement elements (118) are engaged, said bores (119a, 119b) being arranged to receive a locking element (13) sealingly contacting the receptacle element (114).

5. The coupling (10) according to claim 1, wherein

a seal end (117a) is extending above an end face (114a) of the receptacle element (114).


10
1
12
119b
119a
118a
118
118b
113
117a
114a
119b
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116
115
119a
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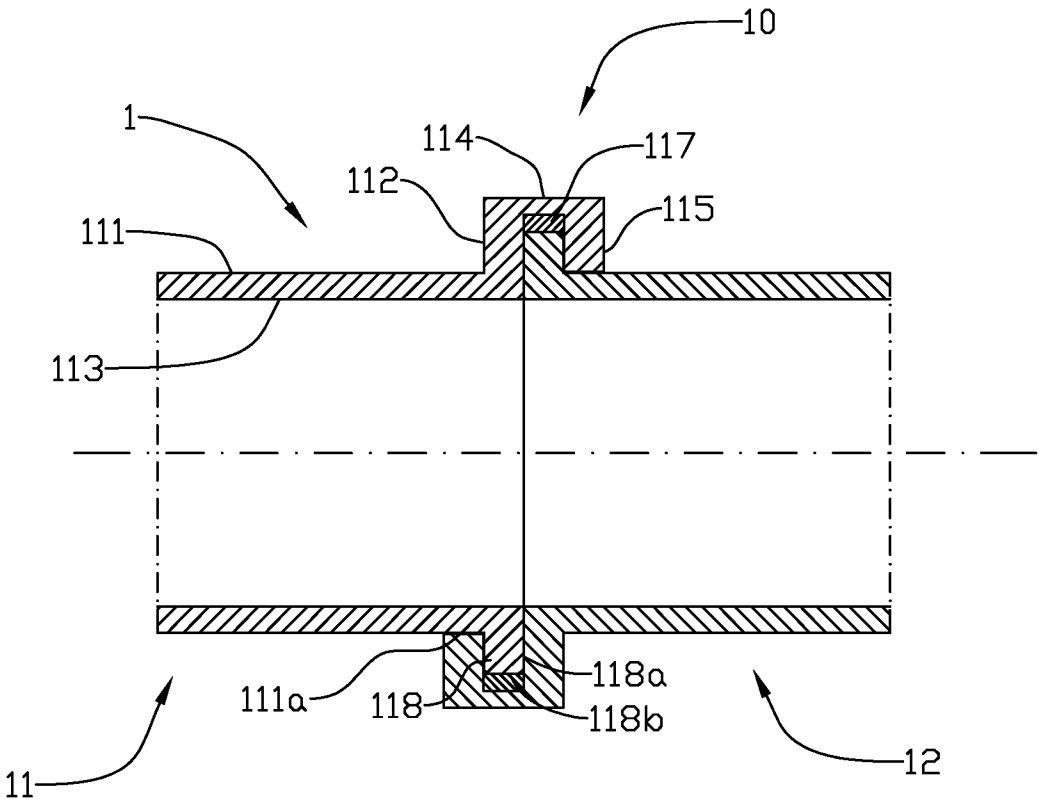
131
13
112
117a
114a
114
111a
111
11

Fig. 1


10
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114
117
112
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118a
118b
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Fig. 2

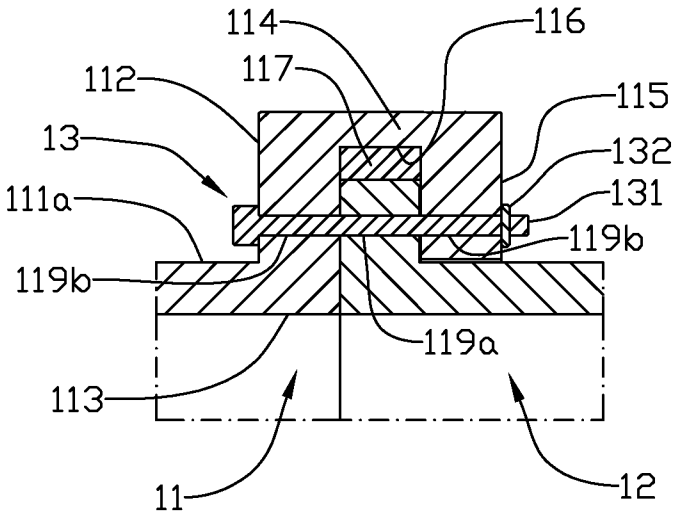
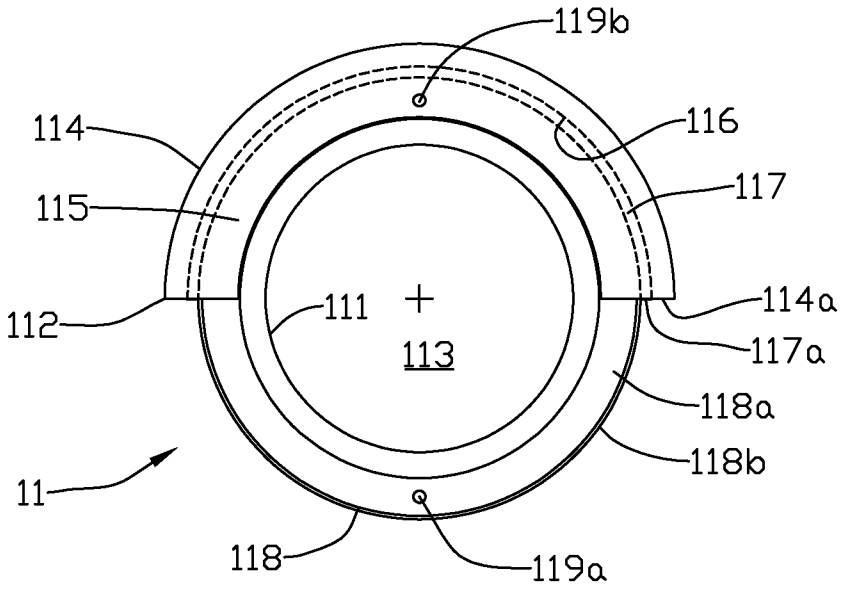

114
116
117
112
115
13
132
111a
131
119b
119b
119a
113
11
12

Fig. 3


119b
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116
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119a

Fig. 4

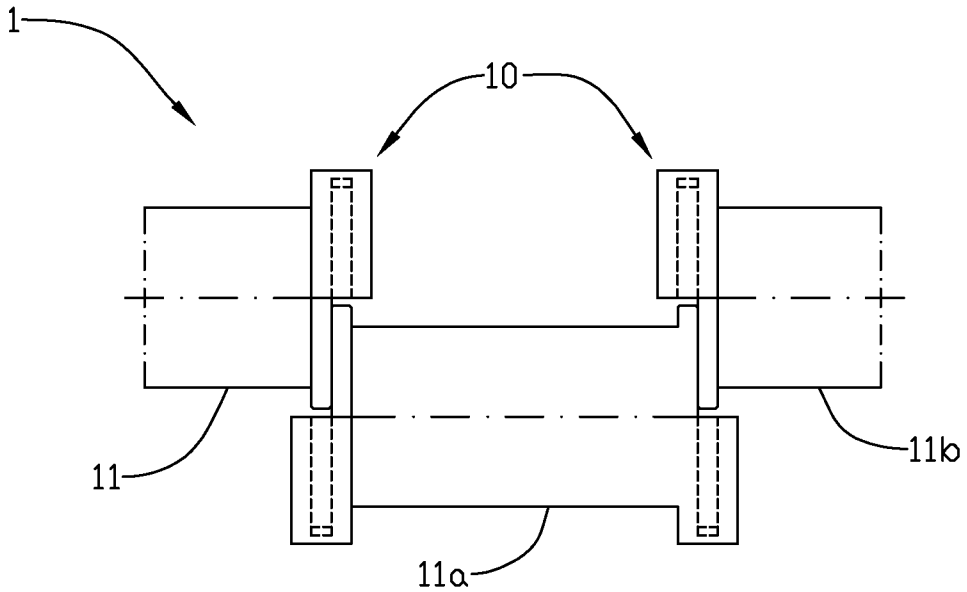
1
10
11
11b
11a

Fig. 5