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Method for building a raw water riser

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METHOD FOR BUILDING A RAW WATER RISER

The present disclosure relates to building a raw water riser for an offshore platform and particularly to a construction method for a raw water riser.

5 BACKGROUND

Offshore platforms, e.g. such platforms used for petroleum operations, often have a need for water, for example for cooling purposes. A common option to provide such water is to use a so-called raw water riser, which is suspended from the offshore platform into the sea and is coupled with a pump to provide raw water from the sea. The construction of this raw water riser may be carried out from an installation structure, such as a scaffolding frame, on the platform, which typically features a central hole for lowering the raw water riser and a structure which enables access to all sides of the raw water riser. Building or dismantling such raw water risers can have HSE risks, since it may be necessary for personnel to move around a suspended pipe, and at an exposed location. Climbing around a frame structure and simultaneously working on the raw water riser, e.g. for connecting multiple sections of the raw water riser, can have high HSE risks.

This disclosure aims at providing an improved, or at least an alternative, raw water riser and method of constructing a raw water riser, to facilitate efficient and safe construction or deconstruction.

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SUMMARY

In an embodiment, there is provided a method for building a raw water riser from an offshore rig, the method comprising: providing a plurality of riser sections, wherein each riser section has upper and lower interlock connectors operable to engage a locking ring; suspending a first riser section, the first riser section being one of the plurality of riser sections, from the offshore rig; bringing a second riser section, the second riser section being one of the plurality of riser sections, into a position where it is adjacent and coaxially aligned above the suspended first riser section; locking the second riser section to the suspended first riser section by operating a locking ring to provide a rigid connection between the first and second riser sections.

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The detailed description and appended claims below outline further embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other characteristics will become clear from the following description of illustrative embodiments, given as non-restrictive examples, with reference to the attached drawings, in which:

- 5 Fig. 1 illustrates an offshore platform comprising raw water riser.
- Fig. 2 illustrates an assembly platform with a raw water riser being in construction.
- Fig. 3 illustrates construction steps for building a raw water riser.
- Figs 4 and 5 illustrate components for connecting riser sections.
- Figs 6 and 7 illustrate connection components in different assembly states.

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DETAILED DESCRIPTION

The following description may use terms such as “horizontal”, “vertical”, “lateral”, “back and forth”, “up and down”, “upper”, “lower”, “inner”, “outer”, “forward”, “rear”, etc. These terms generally refer to the views and orientations as shown in the drawings and that are associated with a normal use of the invention. The terms are used for the reader’s convenience only and shall not be limiting.

The disclosed invention relates particularly to the creation of a raw water riser, especially the assembly of a raw water riser for an offshore platform from multiple sections. The assembly of a raw water riser on an offshore rig is usually carried out on a platform, wherein the riser is constructed, while it hangs of the platform, close to the ledge of said platform. To assemble the raw water riser from various sections, each section has to be connected to another section. Therefore, a cage structure around the construction site of the raw water riser is often built, allowing access to all sides of the raw water riser sections to fasten the connections between each section, such as bolts. The disclosed invention provides a method to construct the raw water riser without needing the cage, possibly facilitating the construction of the raw water riser with respect to both the working conditions and the required time and resources.

Figure 1 shows an offshore platform 10, herein a drilling rig, which comprises an assembly platform 11, at which raw water riser 12 is suspended off the offshore platform 10 and extends into the sea 13. The offshore platform 10 may alternatively be, for example, a service platform, a production or process facility, a swimming dock or another offshore installation having a need for raw water supply. The raw water riser 12 is constructed from

several riser sections 20, preferably having a size which facilitates the handling of the riser sections 20, more preferably having the same shape to facilitate assembly of the sections into the raw water riser string. The offshore platform 10 may also comprise means 14 for handling the riser sections 20, e.g. cranes, lifts or conveyor belts.

5 Figure 2 shows the assembly platform 11 and the construction of the raw water riser 12 in more detail. The assembly platform 11 may comprise means 14 for handling, moving and/or assembling the raw water riser 12 from the riser sections 20, e.g. cranes, assembly aids or guiding rails. Shown is also a constructed riser section 200, which is suspended off the assembly platform 11, being held by holding means 15. The constructed riser section 200
10 consists of multiple riser sections 20, which are interlocked by locking rings 30 with their respective adjacent section(s) 20. In Figure 2 the constructed riser section 200 contains a first riser section 201, a second riser section 202 and a locking ring 30, with interlocks the first and second riser section 201,202. It will be understood that for the start of the construction of the raw water riser 12 no connection is needed, but only hanging off the first
15 riser section 201 from the assembly platform 11. The first riser section 201 may typically have a sea water pump arranged therein, for pumping water into and up the raw water riser 12, when assembled. The first connection is made when connecting the second riser section 202 to the first riser section 201. Further sections 20 are successively added to build the raw water riser 12 to the desired length into the sea 13.

20 The connection between two adjacent riser sections 20 is formed by engaging a locking ring 30. Figure 3 shows the interlock procedure for a first 201 and a second 202 riser section. Each riser section 201,202 has an upper interlock connector 311 and a lower interlock connector 312 configured to engage the respective lower or upper connector part of a locking ring 30. Advantageously, the locking ring 30 may be attached to the second riser section 202
25 when bringing the first and second riser sections 201 and 202 together. More advantageously, the locking ring 30 and the interlock connector 312 of the second riser section 202 are configured to be attached to each other while enabling mating with the interlock connector 311 of the first riser section 201. The second riser section 201 with the interlock connector 312 may then be placed on the first riser section 201 and the connection
30 may be interlocked by engaging the locking ring 30, e.g. by rotating the locking ring 30 into a locking position.

Alternatively, the locking ring 30 may be placed on the first riser section 201 with the second riser section 202 being lowered onto the locking ring 30 and the connection being interlocked afterwards by engaging the locking ring 30, e.g. by rotating the locking ring 30 in a locking
35 position, by tightening a clamp or by adding screws to fix the connection.

Alternatively, the locking ring 30 may be added after bringing the first and second riser section 201,202 directly adjacent each other, whereby the locking ring 30 is positioned between the sections 201,202 prior to interlocking the connection.

5 Figs 4 and 5 illustrate a connector portion between two sections 20. The interlock connector 312 comprises locking members 312a, such as locking dogs, arranged about the outer circumference of the connector 312. The locking members 312a can be engaged by corresponding locking members 30a, such as locking dogs, arranged about the inner circumference of the locking ring 30. Similarly, the interlock connector 311 comprises locking members 311a arranged about the outer circumference of the connector 311. The locking members 311a can be engaged by corresponding locking members, such as locking dogs, arranged about the inner circumference of the locking ring 30 (see the lower locking members visible inside the locking ring 30 on Fig. 4. By bringing the two sections together with the locking ring 30 in position between the connectors 311,312, the locking ring can be turned to make up the connection by bringing the locking members into engagement with each other. The locking ring 30 may subsequently be secured, for example, with a locking pin or the like, if desirable or required. A tool can be used, for example a moment tool which engages the outer surface or a profile on the locking ring 30 to turn the ring and provide the necessary force/moment to make up the connection. Similarly, when dismantling the raw water riser 12, the connection can be released in the same way, and individual sections be removed successively from the raw water riser 12.

Fig. 6 illustrates the locking ring 30 being arranged on the connector 312 and ready for engagement with connector 311, i.e. the situation illustrated in Fig. 3b. Fig. 7 illustrates the locking ring 30 engaged and the connection between two sections made up, as in the illustration in Fig. 3c.

25 Advantageously, the interlocking of the first and second riser section 201,202 according to the present disclosure can be done by engaging the locking ring 30 while accessing the raw water riser 12 from one side only, particularly from the assembly platform 11. This enables interlocking without having to access the locking ring 30 from another side of the raw water riser 12, for example to make up bolts circumferentially around a connection, which may reduce the need for operations on the raw water riser 12 while not standing on the assembly platform 11, but rather while climbing at a commonly used cage like structure (not shown), which spans around the raw water riser 12.

CLAIMS

1. A method for building a raw water riser (12) from an offshore rig (10), the method comprising:
 - providing a plurality of riser sections (20,201,202), wherein each riser section has upper and lower interlock connectors (311,312) operable to engage a locking ring (30);
 - suspending a first riser section (201), the first riser section being one of the plurality of riser sections, from the offshore rig (10);
 - bringing a second riser section (202), the second riser section being one of the plurality of riser sections (20,201,202), into a position where it is adjacent and coaxially aligned above the suspended first riser section;
 - locking the second riser section to the suspended first riser section by operating a locking ring to provide a rigid connection between the first and second riser sections.
2. A method according to claim 1, further comprising:
 - lowering the connected first and second riser sections into the sea (13) and suspending the connected first and second riser sections from the offshore rig (10);
 - bringing a third riser section, the third riser section being one of the plurality of riser sections (20,201,202), into a position where it is adjacent and coaxially aligned above the suspended first and second riser section;
 - locking the third riser section to the suspended first and second riser sections by operating a locking ring to provide a rigid connection between the third riser section and the connected first and second riser sections.
3. A method according to any preceding claim, wherein the step of bringing the second riser section (202) into a position where it is adjacent and coaxially aligned above the suspended first riser section (201) comprises bringing the second riser section into the position together with the locking ring (30) and with the locking ring (30) pre-arranged on the second riser section.
4. A method according to any preceding claim, wherein the step of locking the second riser section to the suspended first riser section comprises:
 - operating the locking ring (30) to bring first locking members (30a) arranged on an inner surface of the locking ring (30) into locking engagement with second locking members (312a) arranged on an outer surface of a lower interlock connector (312) on the second riser section (202), and

operating the locking ring (30) to bring third locking members arranged on the inner surface of the locking ring (30) into locking engagement with fourth locking members (311a) arranged on an outer surface of an upper interlock connector (311) on the first riser section.

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5. A method according to any preceding claim, comprising providing the locking ring (30) as a separate part.

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6. A method according to any preceding claim, wherein the step of suspending the first riser section (201) from the offshore rig (10) comprises suspending the first riser section (201) outside a peripheral side of the offshore rig (10).

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ABSTRACT

A method for building a raw water riser (12) from an offshore rig (10), the method comprising: providing a plurality of riser sections (20,201,202), wherein each riser section has upper and lower interlock connectors (311,312) operable to engage a locking ring (30); suspending a
5 first riser section (201) from the offshore rig (10); bringing a second riser section (202) into a position where it is adjacent and coaxially aligned above the suspended first riser section; locking the second riser section to the suspended first riser section by operating a locking ring to provide a rigid connection between the first and second riser sections.

(Fig. 2)

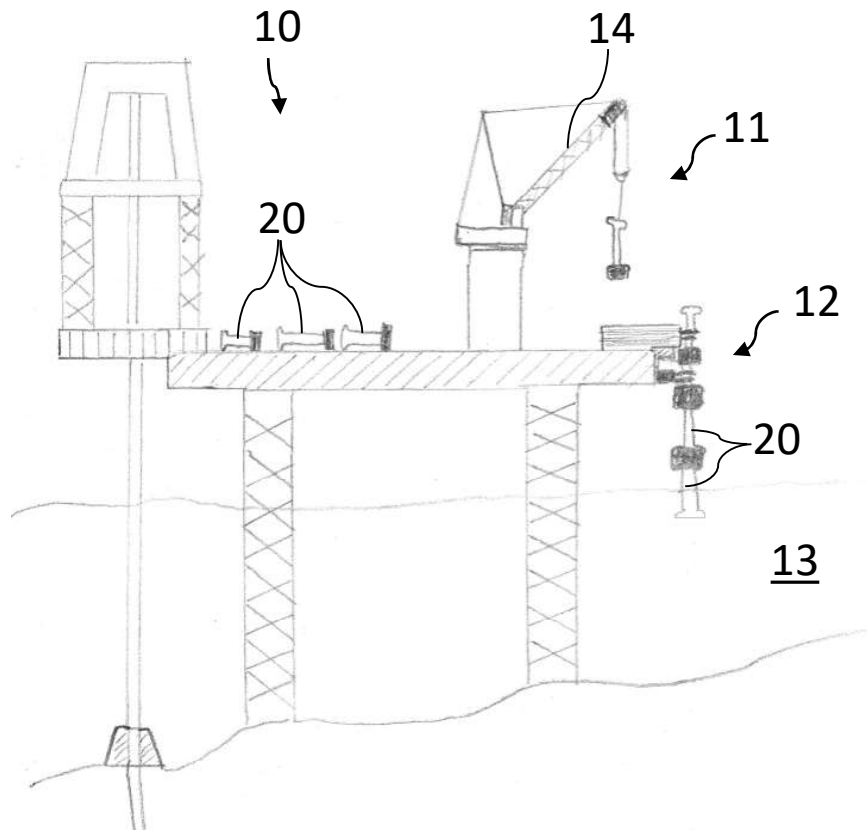


Fig. 1

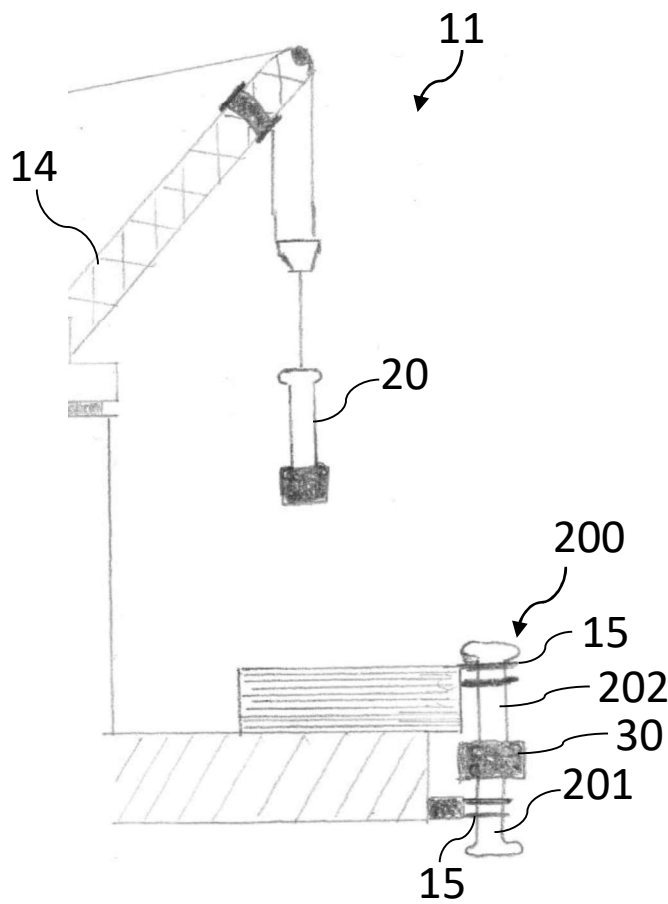


Fig. 2

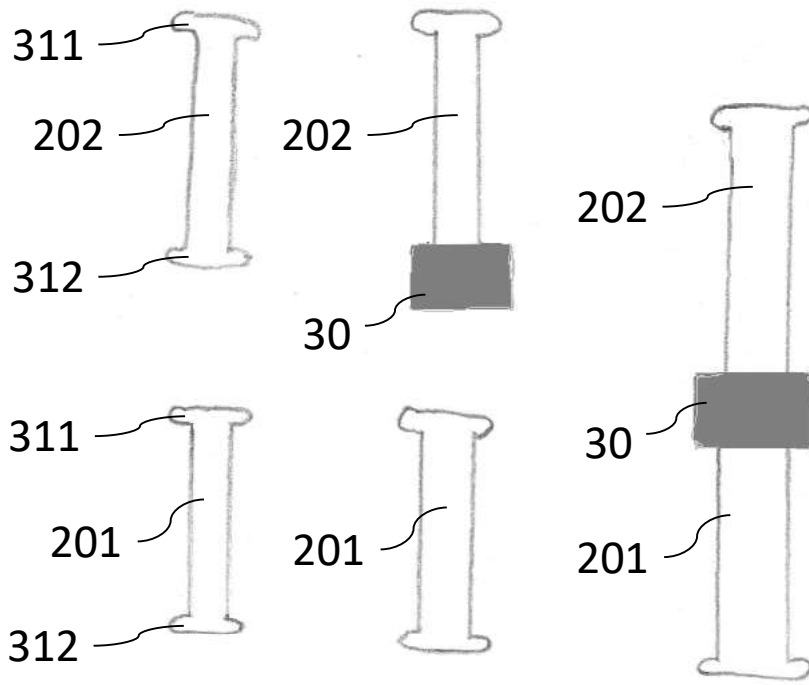


Fig. 3a

Fig. 3b

Fig. 3c

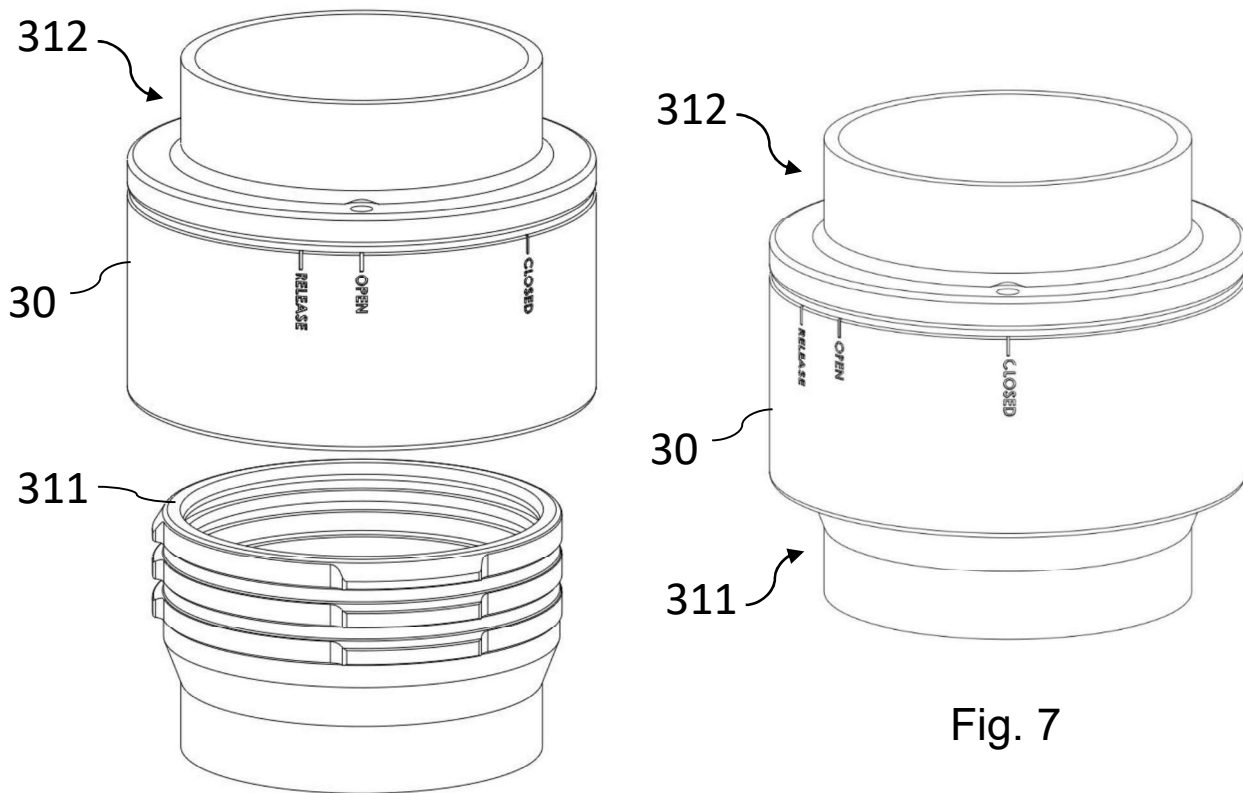


Fig. 6

Fig. 7

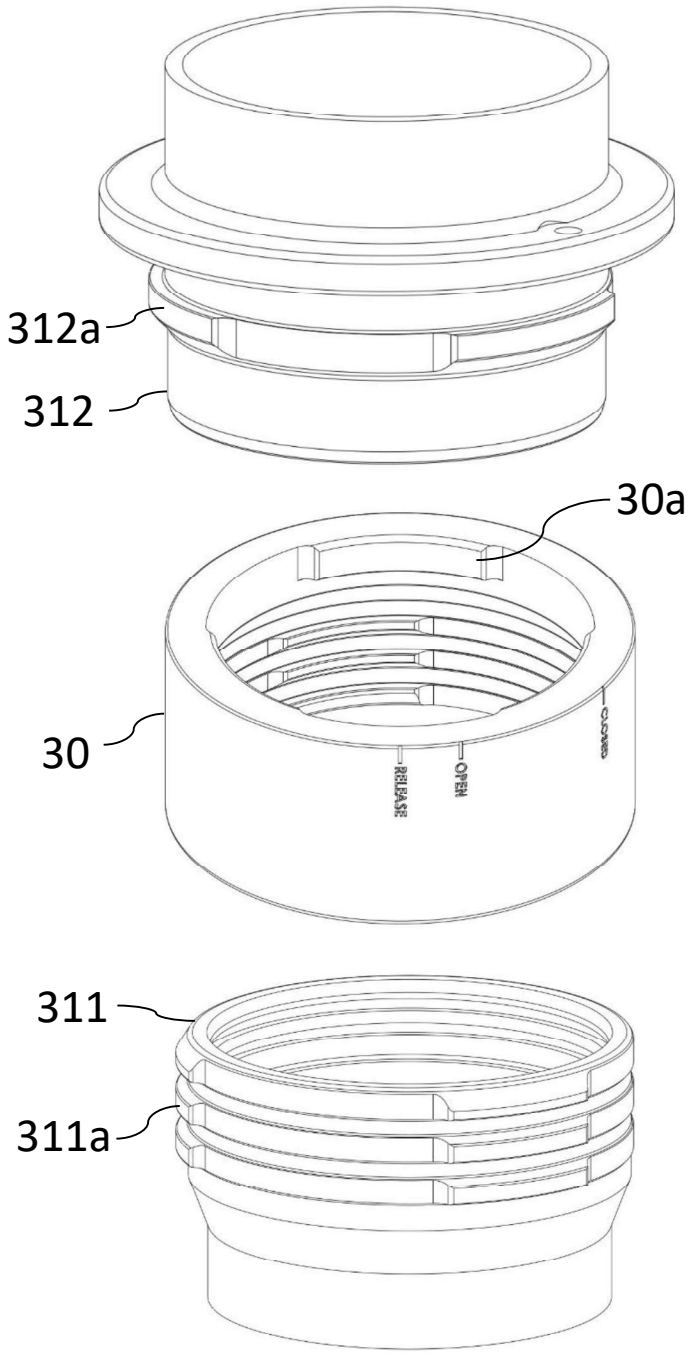


Fig. 4

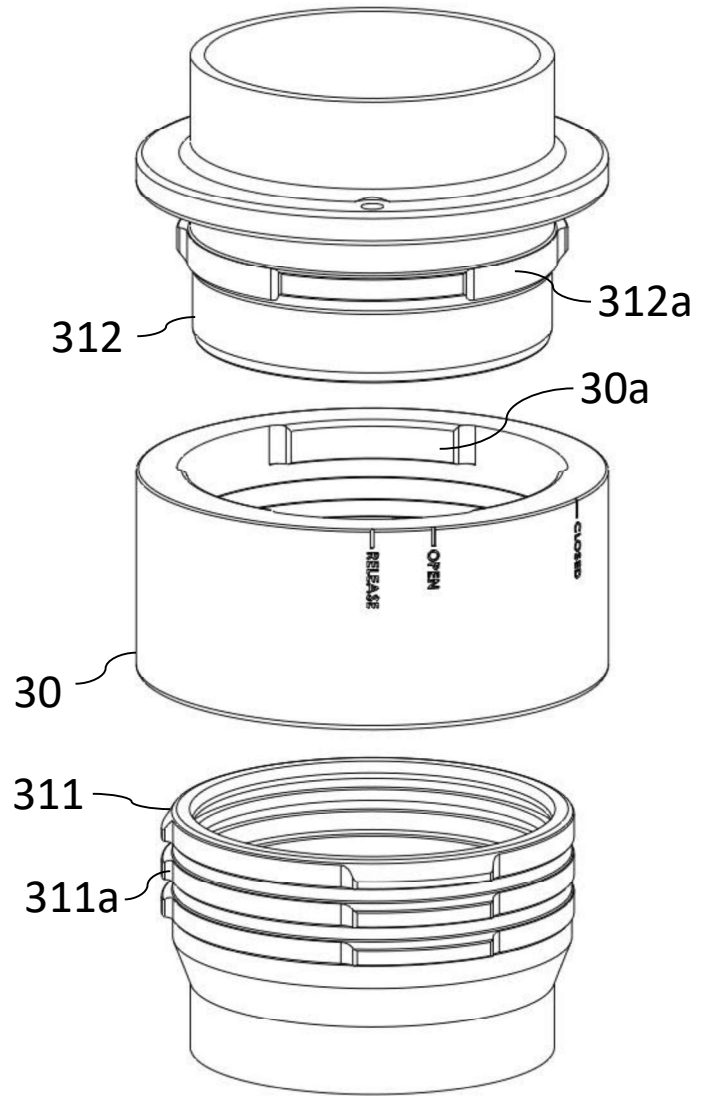


Fig. 5