



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
26.05.2021 Bulletin 2021/21

(51) Int Cl.:
D06F 37/22 (2006.01) D06F 39/08 (2006.01)

(21) Application number: **20207237.7**

(22) Date of filing: **12.11.2020**

(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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(30) Priority: **21.11.2019 TR 201918205**

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(54) **A ROTARY JOINT FOR WHITE APPLIANCES**

(57) The rotary joint (D) according to the present invention which, in household appliances (A) having a body (A1) and a chamber (A2) rotatably mounted in the body (A1), enables a fluid received from a source to be supplied into the chamber (A2) comprises: a main body (1) having a first inlet (1a) through which fluid from the source passes and a first outlet (1b) through which fluid exits; a placement compartment (1d) provided at the main body (1), wherein the first outlet (1b) is located at the placement compartment (1d); a fluid passage (1c) which has an "L" form, connected to the first inlet (1a) and to the placement compartment (1d), and directs the fluid received from the first inlet (1a) towards the first outlet (1b); a sealing element (2) located at the placement compartment (1d) and having a first hole through which fluid from the fluid passage (1c) can pass; a bearing (3) which is located at the placement compartment (1d) such that the sealing element (2) remains between the bearing (3) and the fluid passage (1c), the bearing (3) having a second hole through which fluid from the fluid passage (1c) can pass; and a shaft (4) inserted through the first hole and the second hole into the placement compartment (1d) and having therein a channel through which fluid from the fluid passage (1c) passes, wherein one end of the shaft (4) is connected to the fluid passage (1c) and another opposite end thereof is connected to the first outlet (1b).

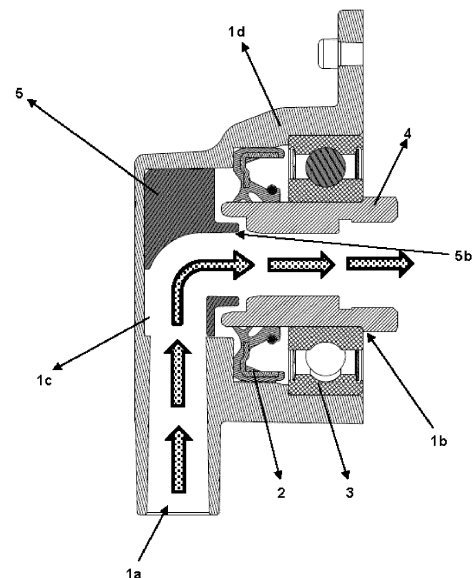


Figure - 5

Description

Technical Field

[0001] The present invention relates to rotary joints enabling fluid intake into chambers, which are rotatably mounted in a body, such that the rotary joints do not prevent such rotational movement of the chamber.

Background of the Invention

[0002] Especially, household appliances that have a chamber capable of performing rotational movement in a body, such as washing and/or drying devices, are widely used today in order to facilitate daily work, increase efficiency, minimize time loss and save energy. In such household appliances, a fluid such as a washing liquid or drying air may be required to be supplied into the chamber in order for the household appliance to perform its function. However, since the chamber is connected to the body in a rotatable manner, such a supplying process should be performed both in a sealed manner and in such a way that other components are prevented from being damaged as a result of the rotational movement.

[0003] In particular, these chambers rotatable around a horizontal axis are connected to the body at a rear side thereof, from where water supply into the chamber is carried out. An example of said application is disclosed in the patent application US2005092032A1, wherein the chamber described as a drum is connected to the body by means of a rotary joint. However, in the application disclosed in this document, since quite complex structures are used to supply the fluid, labour and production costs increase accordingly. Furthermore, using complex structures increases the risk of malfunction and increases service costs that may occur afterwards.

[0004] In addition, double bearing and axial seals are used in rotary joint applications in the known art, which leads to an increase in production costs. Further, pressure loss occurs in the water supply due to the structure of rotary joints. This may lead to a decrease in efficiency of the household appliances, especially the ones using water jet, and decrease in the working performance of the household appliance.

Brief Description of the Invention

[0005] The rotary joint according to the present invention which, in household appliances having at least one body and at least one chamber mounted in the body rotatable around an axis, enables a fluid received from a source to be supplied into the chamber comprises:

- at least one main body having at least a first inlet through which fluid from the source passes and at least a first outlet through which fluid received from the first inlet exits;
- at least one placement compartment provided at the

main body, wherein the first outlet is located at the placement compartment;

- at least one fluid passage which is located in the main body, has an "L" form, connected on one side to the first inlet and on another side to the placement compartment, and directs the fluid received from the first inlet towards the first outlet;
- at least one sealing element located at the placement compartment to fit in an inner surface of the placement compartment, the sealing element having at least a first hole through which fluid from the fluid passage can pass;
- at least one bearing which is located at the placement compartment such that it fits in an inner surface of the placement compartment and the sealing element remains between the bearing and the fluid passage, the bearing having at least a second hole through which fluid from the fluid passage can pass; and
- at least one shaft inserted through the first hole and the second hole into the placement compartment and having therein at least one channel through which fluid from the fluid passage passes, wherein one end of the shaft is connected to the fluid passage and another opposite end thereof is connected to the first outlet.

[0006] Thanks to the rotary joint according to the present invention, in household appliances having a chamber rotatably mounted in the body, fluid transfer into the chamber can be enabled in a way that rotational movement of the chamber is not prevented. In addition, simple structure of the rotary joint decreases both labour and production costs, as well as achieving a long-lasting and reliable rotary joint by minimizing the risk of malfunction.

Object of the Invention

[0007] An object of the present invention is to provide a rotary joint enabling fluid intake into chambers, which are rotatably mounted in a body, such the rotary joint does not prevent such rotational movement of the chamber.

[0008] Another object of the present invention is to provide a rotary joint by which both labour and production costs are decreased.

[0009] A further object of the present invention is to provide a rotary joint suitable for use in household appliances especially having a water jet application.

[0010] Yet another object of the present invention is to provide a rotary joint minimizing pressure decrease that may occur during fluid supply.

Description of the Drawings

[0011] Exemplary embodiments of the rotary joint according to the present invention are illustrated in the attached drawings, in which:

Figure 1 is a sectional view of a use of the developed rotary joint in a household appliance that is exemplified as a washing machine.

Figure 2 is a perspective view of the developed rotary joint.

Figure 3 is a perspective view of the developed rotary joint in a disassembled state.

Figure 4 is a side-sectional view of an embodiment of the developed rotary joint.

Figure 5 is a side-sectional view of another embodiment of the developed rotary joint.

[0012] All the parts illustrated in figures are individually assigned a reference numeral and the corresponding terms of these numbers are listed below:

Household appliance	(A)
Body	(A1)
Chamber	(A2)
Rotary joint	(D)
Main body	(1)
First inlet	(1a)
First outlet	(1b)
Fluid passage	(1c)
Placement compartment	(1d)
Sealing element	(2)
Bearing	(3)
Shaft	(4)
Shaft body	(4a)
Connection portion	(4b)
Directing element	(5)
Second inlet	(5a)
Second outlet	(5b)
Connection member	(5c)
Connection element	(6)

Description of the Invention

[0013] Household appliances such as washing and/or drying devices have a body and a chamber mounted in the body rotatable around an axis. A fluid such as a washing liquid or drying air is supplied into the chamber so that a respective function (e.g. washing, drying) of the household appliance is carried out in the chamber. Said fluid supply is generally performed at the part where the chamber is connected to the body. However, it is necessary to prevent rotation of the chamber from adversely affecting this fluid supplying process (for example, preventing the components which perform the supplying process from deforming, not preventing rotation of the chamber, etc.), and for this purpose, in the known art, the chamber is enabled to be connected to the body by using parts called rotary joints. However, rotary joint applications in the known art may include complex connection structures or the known rotary joints may comprise

too many components in terms of their structural properties. This can lead to an increase in production and labour costs as well as an increase in the probability of malfunction. In addition, said applications may lead to a pressure loss especially in household appliances having a water jet application, in which case the working performance of household appliances may decrease. Accordingly, with the present invention, there is provided a rotary joint for solving said problems.

[0014] The rotary joint (D) according to the present invention, as illustrated in figures 1-5, which, in household appliances (A) (e.g. washing and/or drying device) having at least one body (A1) and at least one chamber (A2) (e.g. a drum) mounted in the body (A1) rotatable around an axis preferably extending in the horizontal axis, enables a fluid received from a source (e.g. from the mains or for example from the chamber (A2) by means of a pump for recirculating the fluid) to be supplied into the chamber (A2) comprises: at least one main body (1) having at least a first inlet (1a) through which fluid from the source passes and at least a first outlet (1b) through which fluid received from the first inlet (1a) exits (e.g. is directed into the chamber (A2)). The rotary joint (D) also comprises at least one placement compartment (1d) preferably having a circular section and provided at the main body (1), wherein the first outlet (1b) is located at the placement compartment (1d); at least one fluid passage (1c) which is located in the main body (1), has an "L" form, connected on one side to the first inlet (1a) and on another side to the placement compartment (1d), and directs the fluid received from the first inlet (1a) towards the first outlet (1b); at least one sealing element (2) (e.g. a radial felt) preferably having a circular section and located at the placement compartment (1d) to fit in an inner surface of the placement compartment (1d), the sealing element (2) having at least a first hole through which fluid from the fluid passage (1c) can pass; at least one bearing (3) (preferably, a ball bearing) which is located at the placement compartment (1d) such that it fits in an inner surface of the placement compartment (1d) and the sealing element (2) remains between the bearing (3) and the fluid passage (1c), the bearing (3) having at least a second hole through which fluid from the fluid passage (1c) can pass; and at least one shaft (4) preferably having a cylindrical form, inserted through the first hole and the second hole into the placement compartment (1d) and having therein at least one channel through which fluid from the fluid passage (1c) passes, wherein one end of the shaft (4) is connected to the fluid passage (1c) and another opposite end thereof is connected to the first outlet (1b) (preferably, extending outwards from the first outlet (1b)).

[0015] In an exemplary embodiment of the invention, the household appliance (A) may be a washing machine as exemplified in Figure 1. In this case, the chamber (A2) is a drum and is rotatable around an axis parallel to the ground on which the household appliance (A) is provided. The chamber (A2) is also connected to the body (A1) of

the household appliance (A) at a rear part thereof so that it can rotate on said axis. The rotary joint (D) according to the present invention is used while realizing said connection, wherein the rotary joint (D) is connected to a fluid source from the first inlet (1a), preferably via a transmission element such as a hose, and the first outlet (1b) of the rotary joint (D) is connected to another transmission line (e.g. to the drum shaft) which transfers fluid (e.g. washing liquid) into the chamber (A1). As exemplified in Figure 4, fluid from the source enters the fluid passage (1c) through the first inlet (1a) and passes therefrom to the channel in the shaft (4). The fluid moving through the channel exits through the first outlet (1b) and passes to the transmission line which transfers the fluid into the chamber (A2). Thanks to the bearing (3) of the rotary joint (D) according to the invention, rotation of the chamber (A2) is not prevented while the fluid is transferred from the source into the chamber (A2). Moreover, thanks to the sealing element (2) between the bearing (3) and the fluid passage (1c) and due to the fact that the shaft (4) is located at the placement opening (1d) by passing through the first hole and the second hole, fluid in the main body (1) can be prevented from leaking out the main body (1) and/or shaft (4) until the fluid is transferred into the chamber (A2). Therefore, both the other components of the household appliance (A) outside the main body (1) and the bearing (3) in the rotary joint (D) can be protected from the fluid, and a long-lasting rotary joint (D) can be achieved by minimizing the corrosion that may occur because of the fluid. Further, thanks to the simple structure of the rotary joint (D), both labour and production costs are decreased and the risk of malfunction can be minimized.

[0016] In a preferred embodiment of the invention, the shaft (4) comprises at least one shaft body (4a) preferably having a cylindrical form, connected on a first side to the fluid passage (1c), and at which the channel is provided; and at least one connection portion (4b) for connecting the shaft (4) and hence the rotary joint (D) to said chamber (A) and which is located on a second side of the shaft body (4a) opposite to the first side thereof. Therefore, the rotary joint (D) can be easily connected to the chamber (A2). The connection portion (4b) is preferably in the form of a nut.

[0017] In another alternative embodiment illustrated in Figure 3 and Figure 5, the rotary joint (D) according to the invention preferably comprises at least one directing element (5) which is located at the elbow part of the fluid passage (1c) in the main body (1), wherein an upper corner of the directing element (5) facing the first inlet (1a) is curved, and wherein the fluid coming from the first inlet (1a) to the fluid passage (1c) passes through the directing element (5) and is directed into the channel in the shaft (4). Thanks to the directing element (5), a possible pressure decrease can be prevented by softening the 90-degree fluid orientation in the fluid passage (1c) of the main body (1) (especially in the elbow part of the "L" form). The directing element (5) preferably comprises at least

a second inlet (5a) through which fluid coming from the first inlet (1a) into the fluid passage (1c) enters into the directing element (5); and at least a second outlet (5b) through which fluid in the directing element (5) is directed into the channel in the shaft (4) and which is attached to the channel (preferably located in the channel). In the part where the second outlet (5b) is attached to the channel, the shaft (4) preferably comprises at least one connection slot formed as a recess from the inner surface of the shaft (4) towards the outer surface thereof. Thus, a smoother fluid passage with minimized leakage possibility can be achieved by preventing a height difference between the channel in the shaft (4) and the second outlet (5b). Also, in this way, the pressure to which the sealing member (2) is subjected due to the fluid can be reduced. The directing element (5) preferably comprises at least one connection member which is preferably in the form of a protrusion and located at the elbow part of the "L" form of the fluid passage (1c), thus enabling the directing element (5) to be located in the main body (1) in a more stable and immobile way. The rotary joint (D) according to this embodiment also preferably comprises at least one connection element (6) which is preferably in the form of a screw and enables the directing element (5) to be fixed in the main body (1).

[0018] In another exemplary embodiment, the rotary joint (D) according to the invention preferably comprises at least a first holding slot which is located at the placement compartment (1d), formed as a recess from the inner surface of the main body (1) towards the outer surface thereof, and in which the sealing element (2) is placed. The rotary joint (D) according to the invention also preferably comprises at least a second holding slot which is located at the placement compartment (1d), formed as a recess from the inner surface of the main body (1) towards the outer surface thereof, and in which the bearing (3) is placed. In this embodiment, preferably, the second holding slot and the first holding slot are located side by side to form a step.

[0019] Thanks to the rotary joint (D) according to the present invention, in household appliances (A) having a chamber (A2) rotatably mounted in the body (A1), fluid transfer into the chamber (A2) can be enabled in a way that rotational movement of the chamber (A2) is not prevented. In addition, simple structure of the rotary joint (D) decreases both labour and production costs, as well as achieving a long-lasting and reliable rotary joint (D) by minimizing the risk of malfunction.

Claims

1. A rotary joint (D) which, in household appliances (A) having at least one body (A1) and at least one chamber (A2) mounted in the body (A1) rotatable around an axis, enables a fluid received from a source to be supplied into the chamber (A2) and comprises at least one main body (1) having at least a first inlet

(1a) through which fluid from the source passes and at least a first outlet (1b) through which fluid received from the first inlet (1a) exits, the rotary joint (D) **characterized by** comprising:

- at least one placement compartment (1d) provided at the main body (1), wherein the first outlet (1b) is located at the placement compartment (1d);
 - at least one fluid passage (1c) which is located in the main body (1), has an "L" form, connected on one side to the first inlet (1a) and on another side to the placement compartment (1d), and directs the fluid received from the first inlet (1a) towards the first outlet (1b);
 - at least one sealing element (2) located at the placement compartment (1d) to fit in an inner surface of the placement compartment (1d), the sealing element (2) having at least a first hole through which fluid from the fluid passage (1c) can pass;
 - at least one bearing (3) which is located at the placement compartment (1d) such that it fits in an inner surface of the placement compartment (1d) and the sealing element (2) remains between the bearing (3) and the fluid passage (1c), the bearing (3) having at least a second hole through which fluid from the fluid passage (1c) can pass; and
 - at least one shaft (4) inserted through the first hole and the second hole into the placement compartment (1d) and having therein at least one channel through which fluid from the fluid passage (1c) passes, wherein one end of the shaft (4) is connected to the fluid passage (1c) and another opposite end thereof is connected to the first outlet (1b).
2. A rotary joint (D) according to claim 1, **characterized in that** the sealing element (2) is a radial felt.
 3. A rotary joint (D) according to claim 1, **characterized in that** the bearing (3) is a ball bearing.
 4. A rotary joint (D) according to claim 1, **characterized in that** the shaft (4) comprises at least one shaft body (4a) connected on a first side to the fluid passage (1c) and at which the channel is provided; and at least one connection portion (4b) for connecting the shaft (4) and hence the rotary joint (D) to said chamber (A) and which is located on a second side of the shaft body (4a) opposite to the first side thereof.
 5. A rotary joint (D) according to claim 4, **characterized in that** the connection portion (4b) is in the form of a nut.

6. A rotary joint (D) according to any of the preceding claims, **characterized by** comprising at least one directing element (5) which is located at the elbow part of the fluid passage (1c) in the main body (1), wherein an upper corner of the directing element (5) facing the first inlet (1a) is curved, and wherein the fluid coming from the first inlet (1a) to the fluid passage (1c) passes through the directing element (5) and is directed into the channel in the shaft (4).
7. A rotary joint (D) according to claim 6, **characterized in that** the directing element (5) comprises at least a second inlet (5a) through which fluid coming from the first inlet (1a) into the fluid passage (1c) enters into the directing element (5); and at least a second outlet (5b) through which fluid in the directing element (5) is directed into the channel in the shaft (4) and which is attached to the channel.
8. A rotary joint (D) according to claim 7, **characterized in that** the shaft (4) comprises at least one connection slot formed as a recess from the inner surface of the shaft (4) towards the outer surface thereof in the part where the second outlet (5b) is attached to the channel.
9. A rotary joint (D) according to claims 6 to 8, **characterized in that** the directing element (5) comprises at least one connection member (5c) which is located at the elbow part of the "L" form of the fluid passage (1c).
10. A rotary joint (D) according to claims 6 to 9, **characterized by** comprising at least one connection element (6) which enables the directing element (5) to be fixed in the main body (1).
11. A rotary joint (D) according to any of the preceding claims, **characterized by** comprising at least a first holding slot which is located at the placement compartment (1d), formed as a recess from the inner surface of the main body (1) towards the outer surface thereof, and in which the sealing element (2) is placed.
12. A rotary joint (D) according to any of the preceding claims, **characterized by** comprising at least a second holding slot which is located at the placement compartment (1d), formed as a recess from the inner surface of the main body (1) towards the outer surface thereof, and in which the bearing (3) is placed.
13. A rotary joint (D) according to claim 12, **characterized in that** the second holding slot and the first holding slot are located side by side to form a step.
14. A rotary joint (D) according to any of the preceding claims, **characterized in that** the source is mains.

15. A rotary joint (D) according to any of the preceding claims, **characterized in that** the source is the chamber (A2) in which the fluid therein is recirculated by means of a pump.

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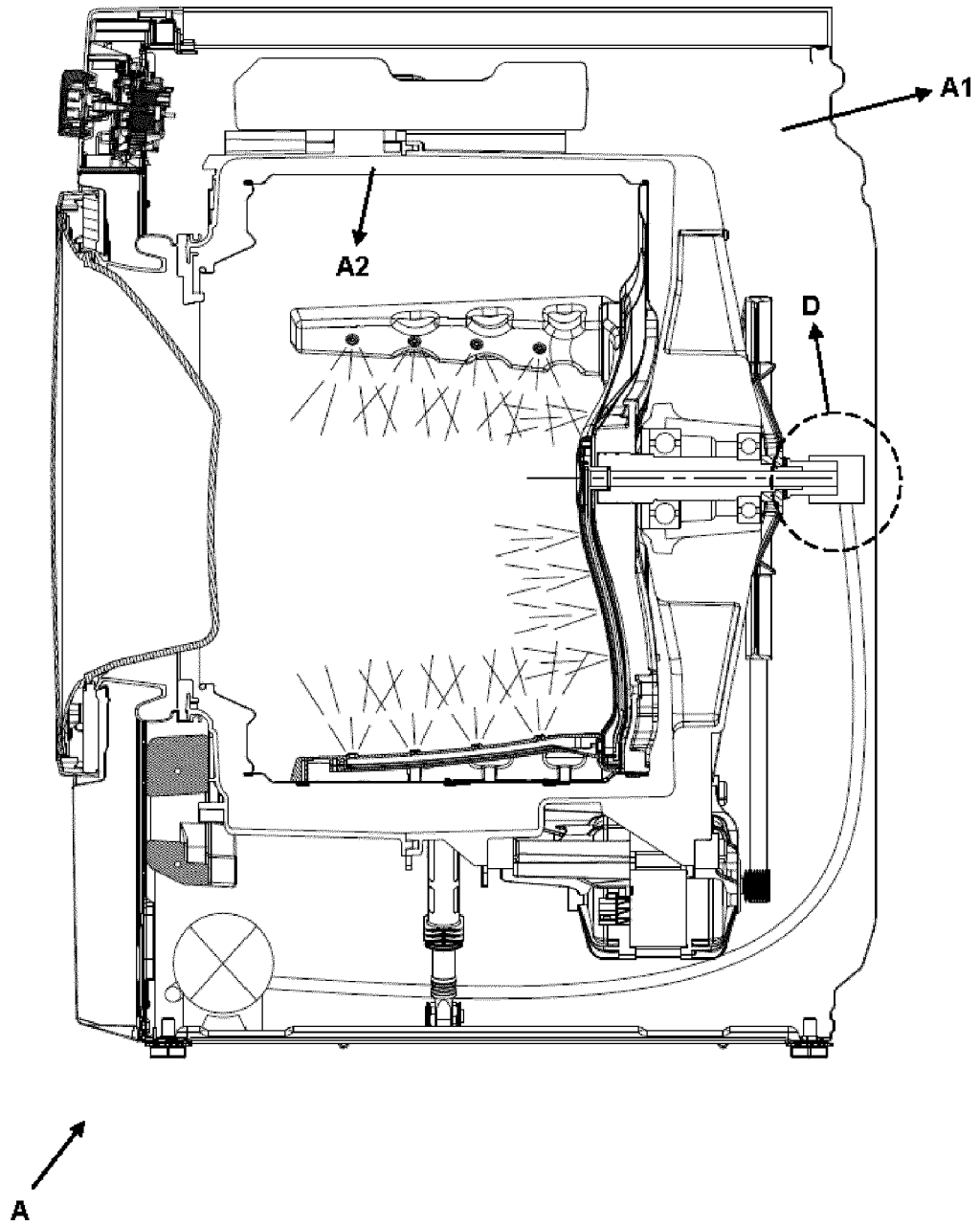


Figure – 1

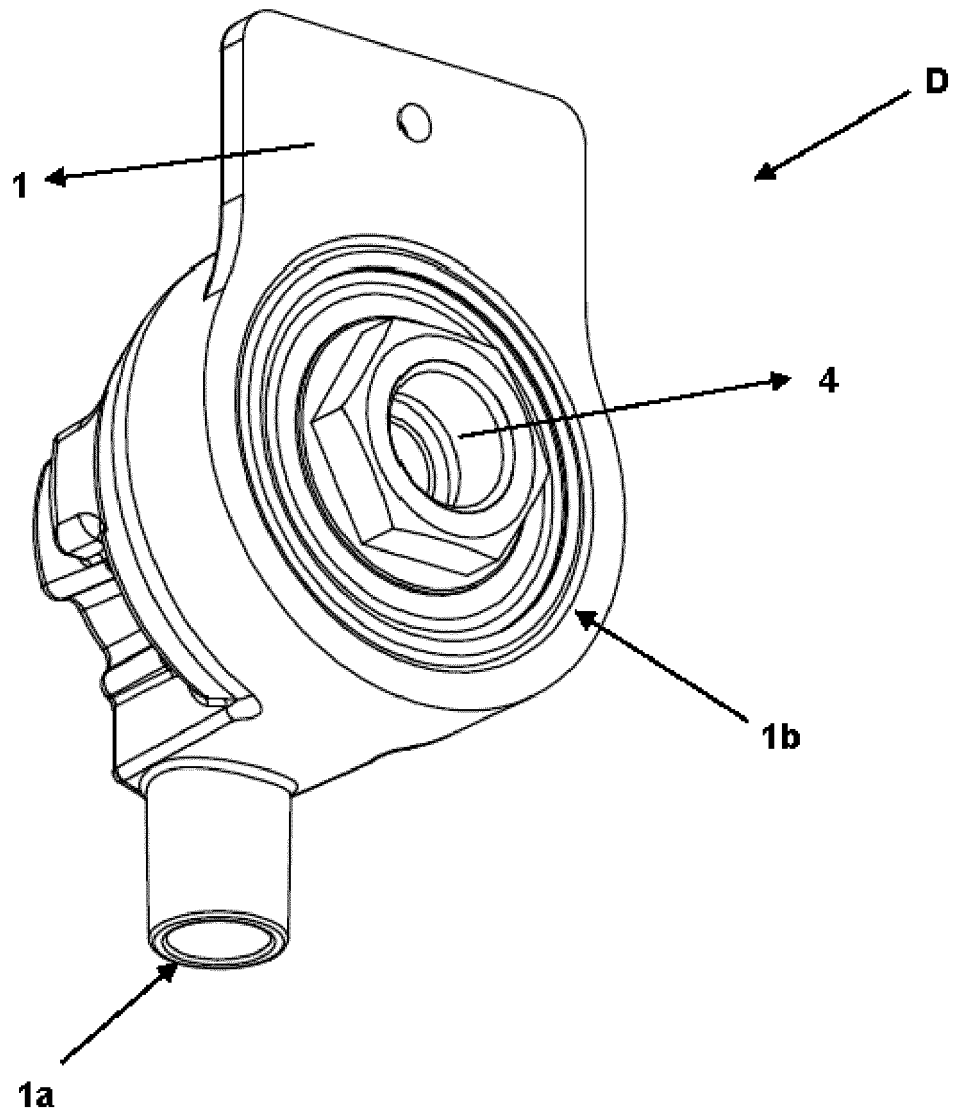


Figure – 2

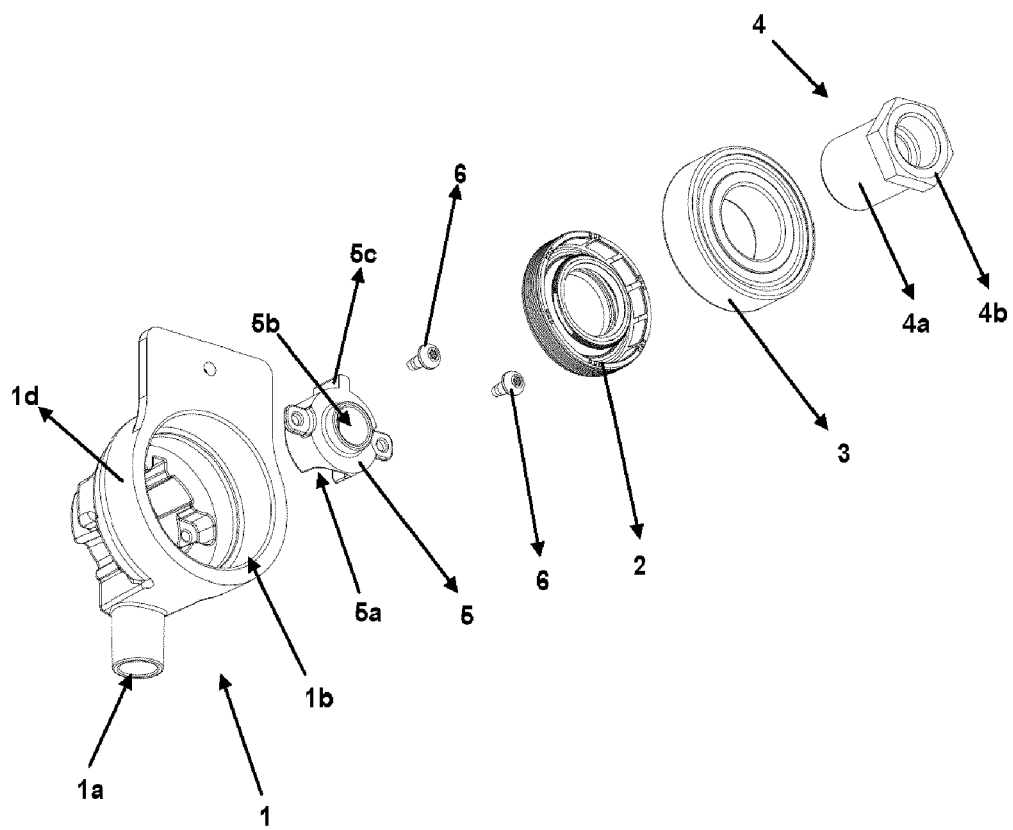


Figure - 3

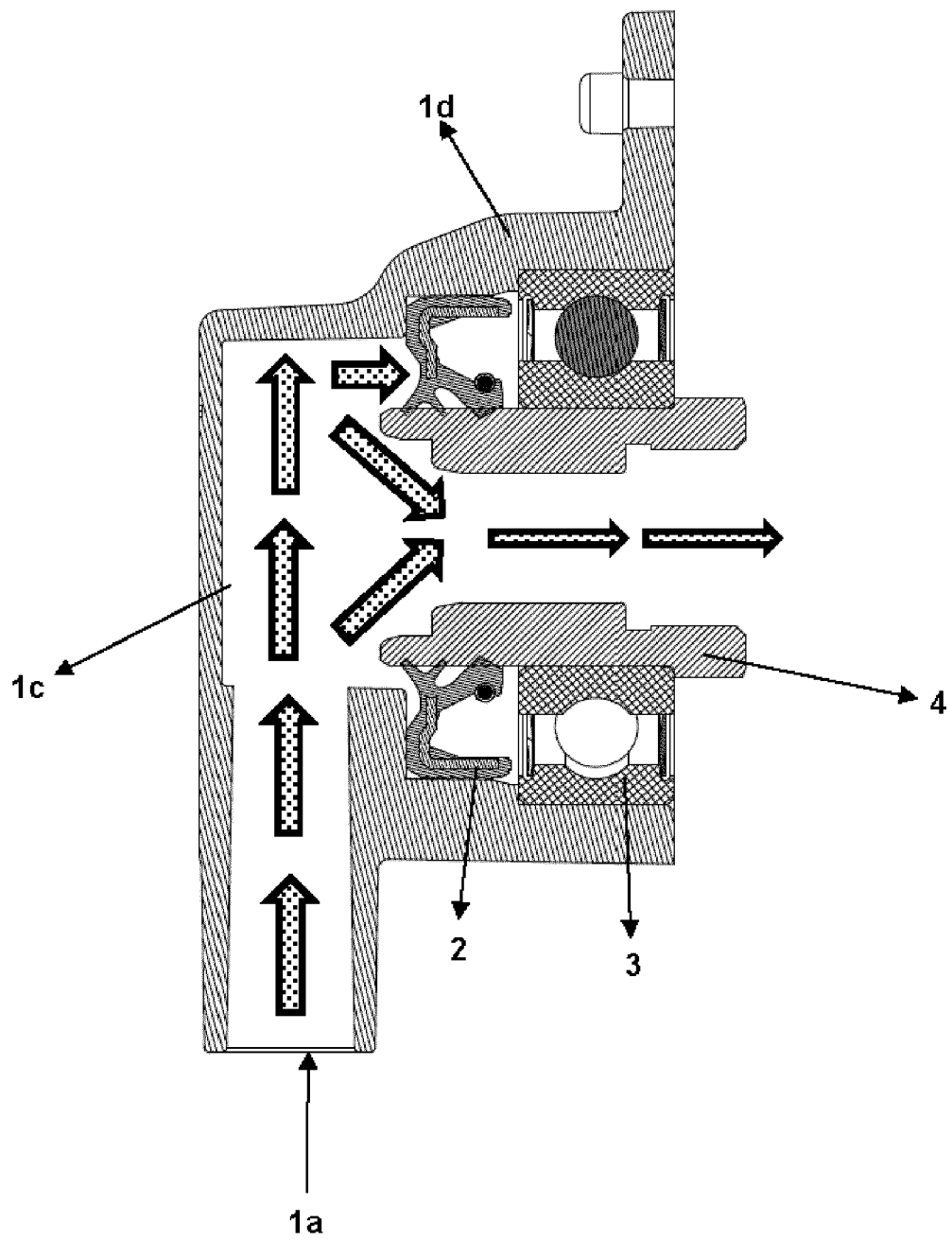


Figure – 4

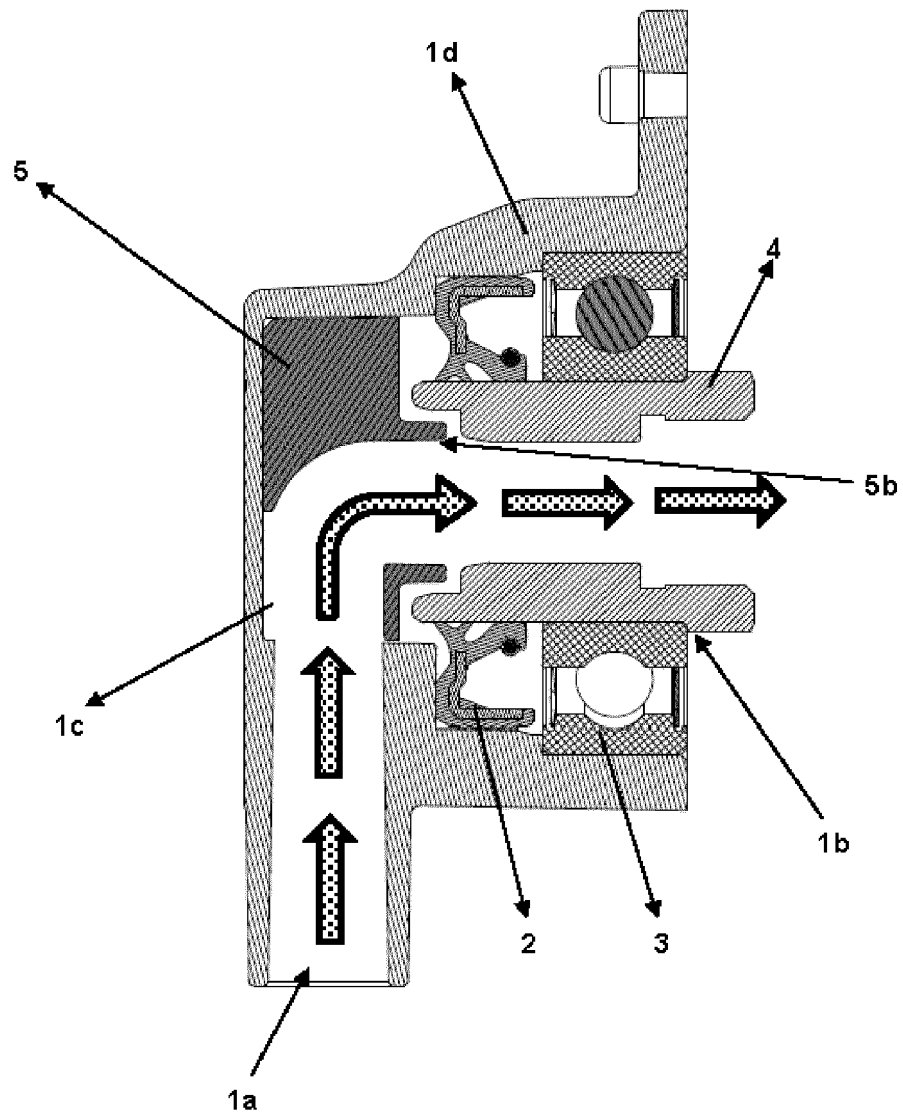


Figure - 5



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 20 7237

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			D06F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 March 2021	Examiner Stroppa, Giovanni
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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 EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 20 20 7237

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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