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(54) **PUMP BODY ASSEMBLY, COMPRESSOR AND AIR CONDITIONER**

(57) A pump body assembly, a compressor and an air conditioner are provided. The pump body assembly includes a cylinder assembly (30), which is connected to a first flange (10) and a second flange (20) respectively and is disposed between the first flange (10) and the second flange (20); a rotation shaft (40), which is provided and passes through the first flange (10), the cylinder assembly (30) and the second flange (20) in sequence, and which is provided thereon with sliding vane grooves (41); and a sliding vane (50), which is provided inside the sliding vane groove (41) and fits the cylinder assembly (30) to form a working cavity in the cylinder assembly (30). The first flange (10) is provided thereon with an exhaust channel (11) which is in communication with the working cavity, and the second flange (20) is provided thereon with a gas flow balance portion. When the working cavity is in an exhaust state, a gas flow in the cylinder assembly (30) generates a force of a torque (F) at the gas flow balance portion, and the force is applied to an end of the sliding vane (50) away from the exhaust channel (11), so that the sliding vane (50) does not tilt during a working process of the working cavity. In this case, an overturning of the sliding vane (50) is avoided, thereby ensuring reliable operation of a compressor, and effectively reducing a vibration and noise of the compressor.

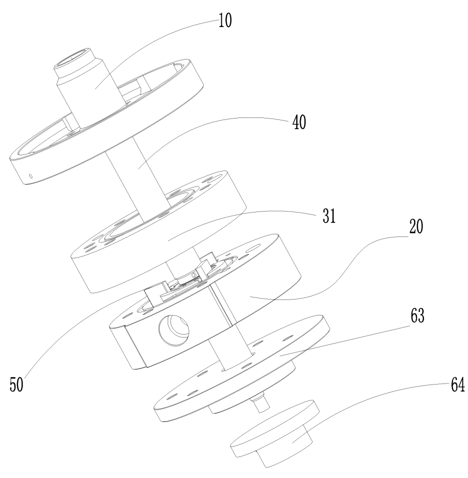

FIG. 2

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Description

TECHNICAL FIELD

[0001] The present invention relates to a field of air conditioner equipment technology, and more particularly, to a pump body assembly, a compressor and an air conditioner.

BACKGROUND

[0002] In the related technology, in order to ensure a uniform exhaust speed of a compressor prototype, exhaust ports are generally arranged in staggered positions. In addition, due to an influence of special forms of the exhaust ports and a structure of the compressor itself, forces exerted on a sliding vane 50' will be affected to a certain extent at a time of exhausting. Specifically, as shown in FIG. 1, the sliding vane 50' is subjected to two forces F1 and F2 in different directions. The two forces generate a rotating torque. The sliding vane will overturn under an action of the rotating torque, which will cause the sliding vane 50' to collide with end surfaces of an upper flange and a lower flange, and a cylinder, thus reducing service life of the sliding vane 50', and reducing usage reliability of the compressor.

SUMMARY

[0003] A main objective of the present disclosure is to provide a pump body assembly, a compressor and an air conditioner, to solve a problem of low reliability of the compressor in the related technology.

[0004] In order to achieve the above objective, according to an aspect of the present disclosure, a pump body assembly is provided and includes: a first flange; a second flange; a cylinder assembly connected to the first flange and the second flange respectively, and the cylinder assembly being disposed between the first flange and the second flange; and a rotation shaft provided and passing through the first flange, the cylinder assembly and the second flange in sequence, and a sliding vane groove being provided on the rotation shaft; and a sliding vane provided inside the sliding vane groove, and the sliding vane fitting the cylinder assembly to form a working cavity inside the cylinder assembly; where an exhaust channel is provided in the first flange and is in communication with the working cavity, and a gas flow balance portion is provided on the second flange; when the working cavity is in an exhausting state, a gas flow in the cylinder assembly generates a force of a torque (F) at the gas flow balance portion; the force is applied to an end of the sliding vane, and the end of the sliding vane is away from the exhaust channel; and the sliding vane does not tilt during a working process of the working cavity.

[0005] Further the gas flow balance portion is disposed at a position of the second flange, and the position of the second flange is opposite to the exhaust channel.

[0006] Further the gas flow balance portion is a groove; the groove is provided on a surface of the second flange; and the surface of the second flange faces the exhaust channel.

[0007] Further a projection of the exhaust channel on the second flange coincides with the groove.

[0008] Further the gas flow balance portion is an exhaust through hole; the exhaust through hole is provided in and passes through the second flange; and the exhaust through hole is arranged opposite to the exhaust channel.

[0009] Further a cross-sectional profile line of the exhaust through hole is identical with a cross-sectional profile line of the exhaust channel.

[0010] Further an annular protrusion is provided on a part of outer peripheral surface of the rotation shaft, and the annular protrusion is disposed inside the cylinder assembly; the sliding vane groove is provided on the annular protrusion, and extends along a radial direction of the annular protrusion.

[0011] Further a plurality of the sliding vane grooves are provided, and the plurality of sliding vane grooves are arranged at intervals along a circumferential direction of the annular protrusion; a plurality of sliding vanes are provided, and the plurality of sliding vanes are arranged to correspond to the plurality of sliding vane grooves one-to-one; and the plurality of the sliding vanes divide an inside of the cylinder assembly into a plurality of independent working cavities.

[0012] Further the cylinder assembly includes: a cylinder; a rolling member provided inside the cylinder and sleeved on the rotation shaft, the sliding vane grooves fitting an inner wall surface of the rolling member to divide space between the inner wall surface of the rolling member and the rotation shaft into the working cavities; and a bearing sleeve sleeved on the rolling member, at least a part of the bearing sleeve being located between an inner wall surface of the cylinder and an outer peripheral surface of the rolling member, and a rolling body being provided between the rolling member and the bearing sleeve.

[0013] Further a cross section of the exhaust channel is in a shape of a rhombus. According to another aspect of the present disclosure, a compressor is provided and includes a pump body assembly. The pump body assembly is the pump body assembly described above.

[0014] According to another aspect of the present disclosure, an air conditioner is provided and includes a pump body assembly. The pump body assembly is the pump body assembly described above.

[0015] In the technical solutions of the present invention, since the working cavity includes an intake cavity and a compression cavity, a part of high-pressure gas remains in the exhaust channel during an exhausting process of the working cavity. When the sliding vane is about to sweep through the exhaust channel, the high-pressure gas stored in the exhaust channel communicates with the intake cavity of the working cavity. Because a pressure of the part of the high-pressure gas is higher than that of the sucked gas, an over-expansion phenomenon will occur in the working cavity, and an gas flow direction in the working cavity points to the intake cavity, which causes a resultant force exerted on an intake side of the sliding vane to point to an end of the sliding vane away from the exhaust channel. Under actions of these two resultant forces, the sliding vane will be subjected to a rotating torque. Under an action of this torque, the sliding vane will turnover, and then it will collide with fine finished surfaces of the first flange and the second flange to generate an impact. Since this impact changes the force exerted on the sliding vane, it will also cause the sliding vane to hit the cylinder, thus generating negative vibration and noise of the compressor. By arranging the exhaust channel in the first flange and arranging the gas flow balance portion on the second flange, the rotating torque opposite to the torque generated at the exhaust channel of the first flange is generated at the gas flow balance portion to balance the torque generated at the exhaust channel of the first flange, so that after the rotating torque of the sliding vane is balanced, the forces exerted on the sliding vane will be in a balanced state, thereby preventing the sliding vane from overturning, ensuring reliable operation of the compressor, and effectively reducing the vibration and noise of the compressor.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The accompanying drawings attached to the specification form a part of the present invention and are intended to provide a further understanding of the present invention. The illustrative embodiments of the present invention and the description thereof are used for explanations of the present invention, and do not constitute improper limitations of the present invention. In the accompanying drawings:

FIG. 1 is a schematic diagram illustrating forces exerted on a sliding vane in the related technology during an exhausting process;
FIG. 2 shows an exploded structure diagram of a pump body assembly according to an embodiment of the present invention;
FIG. 3 is a schematic diagram illustrating forces exerted on a sliding vane of a pump body assembly during an exhausting process according to the present invention;
FIG. 4 shows a schematic structural view of the pump body assembly from a first view angle according to a first embodiment of the present invention;
FIG. 5 shows a schematic structural cross-sectional view in an A-A direction in FIG. 4;
FIG. 6 shows a schematic structural cross-sectional view in a B-B direction in FIG. 4;
FIG. 7 shows a schematic structural view of a pump body assembly from a second view angle according to a second embodiment of the present invention;
FIG. 8 shows a schematic structural cross-sectional view in a C-C direction in FIG. 7;
FIG. 9 shows a schematic structural view of a second flange of a pump body assembly according to an embodiment of the present invention.

[0017] The above figures include the following reference numerals:

10, first flange; 11, exhaust channel;
20, second flange; 21, groove;
30, cylinder assembly; 31, cylinder; 32, rolling member; 33, bearing sleeve; 34, rolling body;
40, rotation shaft; 41, sliding vane groove; 42, annular protrusion;
50, sliding vane;
61, baffle; 62, valve sheet; 63, cover plate; 64, oil pump.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0018] It should be noted that the embodiments in the present invention and the features in the embodiments can be combined with each other if no conflicts occur. The present invention will be described in detail below with reference to the accompanying drawings in combination with the embodiments.

[0019] It should be noted that terms used herein are only for the purpose of describing specific embodiments and not intended to limit the exemplary embodiments of the invention. The singular of a term used herein is intended to include the plural of the term unless the context otherwise specifies. In addition, it should also be appreciated that when terms "include" and/or "comprise" are used in the description, they indicate the presence of features, steps, operations, devices, components and/or their combination.

[0020] It should be noted that the terms "first", "second", and the like in the description, claims and drawings of the present invention are used to distinguish similar objects, and are not necessarily used to describe a specific order or order. It should be appreciated that such terms can be interchangeable if appropriate, so that the embodiments of the invention described herein can be implemented, for example, in an order other than those illustrated or described herein. In addition, the terms "comprise", "have" and any deformations thereof, are intended to cover a non-exclusive inclusion, for example, a process, a method, a system, a product, or a device that includes a series of steps or units is not necessarily limited to explicitly list those steps or units, but can include other steps or units that are not explicitly listed or inherent to such a process, a method, a product or a device.

[0021] For convenience of description, spatially relative terms such as "above", "over", "on a surface of", "upper", etc., may be used herein to describe the spatial position relationships between one device or feature and other devices or features as shown in the drawings. It should be appreciated that the spatially relative term is intended to include different directions during using or operating the device other than the directions described in the drawings. For example, if the device in the drawings is inverted, the device is described as the device "above other devices or structures" or "on other devices or structures" will be positioned "below other devices or structures" or "under other devices or structures". Thus, the exemplary term "above" can include both "above" and "under". The device can also be positioned in other different ways (rotating 90 degrees or at other orientations), and the corresponding description of the space used herein is interpreted accordingly.

[0022] Now, the exemplary embodiments of the invention will be further described in detail with reference to the accompanying drawings. However, these exemplary embodiments can be implemented in many different forms and should not be construed as only limitation of the embodiments described herein. It should be appreciated that the embodiments are provided to make the present invention disclosed thoroughly and completely, and to fully convey the concepts of the exemplary embodiments to those skilled in the art. In the accompanying drawings, for the sake of clarity, the thicknesses of layers and regions may be enlarged, and a same reference sign is used to indicate a same device, thus the description thereof will be omitted.

[0023] As shown in FIGS. 2-9, according to an embodiment of the present invention, a pump body assembly is provided.

[0024] Specifically, the pump body assembly includes a first flange 10, a second flange 20, a cylinder assembly 30, a rotation shaft 40 and a sliding vane 50. The cylinder assembly 30 is connected to the first flange 10 and the second flange 20 respectively. The cylinder assembly 30 is disposed between the first flange 10 and the second flange 20. The rotation shaft 40 is provided and passes through the first flange 10, the cylinder assembly 30 and the second flange 20 in sequence. A sliding vane groove 41 is provided on the rotation shaft 40. The sliding vane 50 is disposed inside the sliding vane groove 41. The sliding vane 50 fits the cylinder assembly 30 to form a working cavity inside the cylinder assembly 30. An exhaust channel 11 is provided in the first flange 10 and is in communication with the working cavity, and a gas flow balance portion is provided on the second flange 20. When the working cavity is in the exhausting state, a gas flow in the cylinder assembly 30 generates a force of a torque F at the gas flow balance portion, and the force is applied to an end of the sliding vane 50, which is away from the exhaust channel 11, so that the sliding vane 50 does not tilt during a working process of the working cavity.

[0025] In this embodiment, since the working cavity includes an intake cavity and a compression cavity, a part of high-pressure gas remains in the exhaust channel during an exhausting process of the working cavity. When the sliding vane is about to sweep through the exhaust channel, the high-pressure gas stored in the exhaust channel communicates with the intake cavity of the working cavity. Because a pressure of the part high-pressure gas is higher than that of the sucked gas, an over-expansion phenomenon will occur in the working cavity, and a gas flow direction in the working cavity points to the intake cavity, which causes a resultant force exerted on an intake side of the sliding vane to point to an end of the sliding vane away from the exhaust channel. Under actions of these two resultant forces, the sliding vane will be subjected to a rotating torque. Under an action of this torque, the sliding vane will turnover, and then it will collide with fine finished surfaces of the first flange and the second flange to generate an impact. Since this impact changes the force exerted on the sliding vane, it will also cause the sliding vane to hit the cylinder, thus generating negative vibration and noise of the compressor. By arranging the exhaust channel in the first flange and arranging the gas flow balance portion on the second flange, the rotating torque opposite to the torque generated at the exhaust channel of the first flange is generated at the gas flow balance portion to balance the torque generated at the exhaust channel of the first flange, so that after the rotating torque of the sliding vane is balanced, the forces exerted on the sliding vane will be in a balanced state, thereby preventing the sliding vane from overturning, ensuring reliable operation of the compressor, and effectively reducing the vibration and noise of the compressor.

[0026] The gas flow balance portion is disposed at a position of the second flange 20, and the position is opposite to the exhaust channel 11. This arrangement can further improve the stability and reliability of the compressor.

[0027] Preferably, the gas flow balance portion is a groove 21, and the groove 21 is provided on a surface of the second flange 20, which faces the exhaust channel 11. This arrangement enables the gas flow in the working cavity to generate a torque at the groove 21 and apply the torque to the sliding vane during the exhaust process of the working cavity, so that the sliding vane is always in an equilibrium position and does not tilt. The working cavity includes a compression cavity and an intake cavity. The working cavity performs suction simultaneously performs compression. The first flange can be an upper flange, and the second flange can be a lower flange. Of course, the first flange can also be a lower flange, and the second flange can also be an upper flange.

[0028] In order to enable the torque generated at the groove 21 to counteract the torque generated at the exhaust channel, a projection of the exhaust channel 11 on the second flange 20 coincides with the groove 21. It should be noted that the "coincide" used herein means that a shape and a size of the projection of the exhaust channel 11 are exactly the same as a shape and a size of the groove.

[0029] Further, the gas flow balance portion is an exhaust through hole; the exhaust through hole is provided in and passes through the second flange 20; and the exhaust through hole is arranged opposite to the exhaust channel 11. This arrangement also plays a role of balancing the sliding vane. Further, a cross-sectional profile line of the exhaust through hole is identical with a cross-sectional profile line of the exhaust channel.

[0030] An annular protrusion 42 is provided on a part of outer peripheral surface of the rotation shaft 40, and the annular protrusion 42 is disposed inside the cylinder assembly 30. The sliding vane groove 41 is provided on the annular protrusion 42, and extends along a radial direction of the annular protrusion 42. A plurality of sliding vane grooves 41 are provided, and the plurality of sliding vane grooves 41 are arranged at intervals along a circumferential direction of the annular protrusion 42. A plurality of sliding vanes 50 are provided, and the plurality of sliding vanes 50 are arranged to correspond to the plurality of sliding vane grooves 41 one-to-one. The plurality of sliding vanes 50 divide an inside of the cylinder assembly 30 into a plurality of independent working cavities. This arrangement can improve the performance of the compressor.

[0031] Further, the cylinder assembly 30 includes a cylinder 31, a rolling member 32 and a bearing sleeve 33. The rolling member 32 is arranged inside the cylinder 31 and sleeved on the rotation shaft 40. The sliding vane grooves 41 fit the inner wall surface of the rolling member 32 to divide space between the inner wall surface of the rolling member 32 and the rotation shaft 40 into the working cavities. The bearing sleeve 33 is sleeved on the rolling member 32; at least a part of the bearing sleeve 33 is located between an inner wall surface of the cylinder 31 and an outer peripheral surface of the rolling member 32; and a rolling body 34 is provided between the rolling member 32 and the bearing sleeve 33.

[0032] The above-mentioned embodiments can also be used in a technical field of compressor equipment, that is, according to another aspect of the present invention, a compressor is provided. The compressor includes a pump body assembly, which is the pump body assembly of any one of the above embodiments.

[0033] The above embodiments can also be used in a technical field of air conditioner equipment, that is, according to yet another aspect of the present disclosure, an air conditioner is provided, and includes a pump body assembly, which is the pump body assembly of any one of the above embodiments.

[0034] Specifically, the gas flow balance portion is provided on the lower flange opposite to the exhaust channel, thus balancing a pressure fluctuation at an exhaust port of the upper flange, reducing a pressure disturbance to the sliding vane, and weakening an impact of the sliding vane on the upper and lower flanges and on the bearing. A vibration and noise level of a sliding vane compressor is effectively improved. In this embodiment, the cross-sectional profile line of the exhaust through hole is the same as the cross-sectional profile line of the exhaust channel 11. A ratio of a length to a width of the exhaust channel 11 is less than or equal to 4. Preferably, the cross section of the exhaust channel 11 is in a shape of a rhombus.

[0035] When the compressor is operating, the motor drives the rotation shaft to rotate, and under the action of a centrifugal force, the sliding vane extends from the sliding vane groove and contacts an inner wall surface of an inner ring of the rolling member. Along with a smooth operation of the compressor, the sliding vane starts to perform a reciprocating motion in the sliding vane groove, and a head of the sliding vane contacts the inner wall surface and drives the inner ring to rotate. Three sliding vanes are provided, and the three sliding vanes and the inner ring of the rolling member divide the entire crescent cavity into three independent cavities. These three cavities are periodically enlarged and reduced to realize the intake and exhaust of the compressor. During the movement of the compressor, the sliding vane and the sliding vane groove form a closed space, which is called a sliding vane back pressure cavity. There are also three sliding vane back pressure cavities, and as the compressor operates, the back pressure cavities are periodically enlarged and reduced. An oil pump is provided on a lower part of the pump body assembly and immersed in an oil pool disposed at a bottom of the compressor. The rotation shaft rotates to drive the oil pump to rotate. The oil pump is a positive displacement pump. In addition to providing lubricating oil for friction pairs of the pump body, the oil pump also provides the sliding vane back pressure cavities with oil of a certain pressure.

[0036] As shown in FIGS. 4 to 6, the position of the sliding vane when the compressor is exhausting is shown. At this time, the compressor is exhausting, and the gas at the exhaust port has an exhaust pressure Pd. At this time, the direction of the gas flow is from the inside of the cylinder to the outside of the flange, and gas is exhausted towards the upper part of the sliding vane. Due to the high speed of the gas flow at the exhaust port, according to the principle of dynamic and static energy conversion, the pressure at the exhaust port is low, while the pressure at the lower part of the sliding vane is high, therefore the direction of the resultant force exerted on the exhaust side of the sliding vane is upward.

[0037] As shown in FIGS. 7 and 8, the position of the sliding vane after the compressor exhausts is shown. At this time, the sliding vane will sweep through the exhaust port of the exhaust channel. After the compressor exhausts, a part of the high-pressure gas will remain at the exhaust port. However, when the sliding vane is about to sweep the exhaust port, the high-pressure gas stored at the exhaust port also communicates with the intake cavity. Because the pressure of this part of the high-pressure gas is much higher than that of the sucked gas, the over-expansion phenomenon will occur, and the gas flow direction points to the intake cavity, thus the resultant force exerted on the intake side of the sliding vane will point to the lower part of the sliding vane. The schematic diagram of the forces exerted on the sliding vane is shown in FIG. 1. In this case, under the action of these two resultant forces (F1, F2), the sliding vane will be subjected to a rotating torque. Under the action of this rotating torque, the sliding vane will turnover, and then will collide with the fine finished surfaces of the upper and lower flanges to cause an impact. Since this impact changes the forces exerted on the sliding vane, it will also cause the sliding vane to hit the cylinder, thus generating negative vibration and noise of the compressor.

[0038] As shown in FIG. 9, a groove is provided on the lower flange. The position of the groove is symmetrically arranged with the upper flange, but the groove does not penetrate the lower flange. According to analysis of the forces relationship, a rotating torque opposite to the torque generated at the exhaust port of the upper flange will be generated to balance the torque generated at the exhaust of the upper flange. In this case, after the rotating torque of the sliding vane is balanced, the forces exerted on the sliding vane will be balanced, thereby avoiding the overturning of the sliding vane, ensuring the reliable operation of the compressor, and reducing the vibration and noise of the compressor.

[0039] Where, the pump body assembly also includes a baffle 61, a valve sheet 62 and a cover plate 63. Where, the oil pump 64 is connected to the cover plate 63.

[0040] In addition to the above description, it also should be noted that "one embodiment", "another embodiment", "an embodiment" and the like in the description refer to that a specific feature, a structure or a characteristic described in combination with the embodiment is included in at least one embodiment of the general description of the present invention. The same expression in various locations in the specification does not necessarily refer to the same embodiment. Furthermore, when a specific feature, a structure, or a characteristic are described in combination with any embodiments, what is claimed is that other embodiments which are combined to implement such a feature, a structure, or a characteristic are also included in the scope of the present invention.

[0041] In the above embodiments, the descriptions of the various embodiments have different emphases, and any portions that are not detailed in a certain embodiment can be seen in the related descriptions of other embodiments.

[0042] The above descriptions are merely the preferred embodiments of the present invention, and are not intended to limit the present invention. For those skilled in the art, various modifications and changes can be made for the present invention. Any modifications, equivalent substitutions, improvements, etc., made within the spirits and the principles of the present invention are included within the scope of the present invention.

Claims

1. A pump body assembly, **characterized by** comprising:

   a first flange (10);
   a second flange (20);
   a cylinder assembly (30) connected to the first flange (10) and the second flange (20) respectively, and the cylinder assembly (30) being disposed between the first flange (10) and the second flange (20);
   a rotation shaft (40) provided and passing through the first flange (10), the cylinder assembly (30) and the second flange (20) in sequence, and a sliding vane groove (41) being provided on the rotation shaft (40); and
   a sliding vane (50) provided inside the sliding vane groove (41), and the sliding vane (50) fitting the cylinder assembly (30) to form a working cavity inside the cylinder assembly (30);
   wherein an exhaust channel (11) is provided in the first flange (10) and is in communication with the working cavity, and a gas flow balance portion is provided on the second flange (20); when the working cavity is in an exhausting state, a gas flow in the cylinder assembly (30) generates a force of a torque (F) at the gas flow balance portion; the force is applied to an end of the sliding vane (50), and the end of the sliding vane (50) is away from the exhaust channel (11); and the sliding vane (50) does not tilt during a working process of the working cavity.

2. The pump body assembly according to claim 1, **characterized in that** the gas flow balance portion is disposed at a position of the second flange (20), and the position of the second flange (20) is opposite to the exhaust channel (11).

3. The pump body assembly according to claim 1 or 2, **characterized in that** the gas flow balance portion is a groove (21); the groove (21) is provided on a surface of the second flange (20); and the surface of the second flange (20) faces the exhaust channel (11).

4. The pump body assembly according to claim 3, **characterized in that** a projection of the exhaust channel (11) on the second flange (20) coincides with the groove (21).

5. The pump body assembly according to claim 1 or 2, **characterized in that** the gas flow balance portion is an exhaust through hole; the exhaust through hole is provided in and passes through the second flange (20); and the exhaust through hole is arranged opposite to the exhaust channel (11).

6. The pump body assembly according to claim 5, **characterized in that** a cross-sectional profile line of the

exhaust through hole is identical with a cross-sectional profile line of the exhaust channel (11).

7. The pump body assembly according to claim 1, **characterized in that** an annular protrusion (42) is provided on a part of outer peripheral surface of the rotation shaft (40), and the annular protrusion (42) is disposed inside the cylinder assembly (30); the sliding vane groove (41) is provided on the annular protrusion (42), and extends along a radial direction of the annular protrusion (42).

8. The pump body assembly according to claim 7, **characterized in that** a plurality of the sliding vane grooves (41) are provided, and the plurality of sliding vane grooves (41) are arranged at intervals along a circumferential direction of the annular protrusion (42); a plurality of sliding vanes (50) are provided, and the plurality of sliding vanes (50) are arranged to correspond to the plurality of sliding vane grooves (41) one-to-one; and the plurality of the sliding vanes (50) divide an inside of the cylinder assembly (30) into a plurality of independent working cavities.

9. The pump body assembly according to claim 8, **characterized in that** the cylinder assembly (30) comprises:

   a cylinder (31);
   a rolling member (32) provided inside the cylinder (31) and sleeved on the rotation shaft (40), the sliding vane grooves (41) fitting an inner wall surface of the rolling member (32) to divide space between the inner wall surface of the rolling member (32) and the rotation shaft (40) into the working cavities; and
   a bearing sleeve (33) sleeved on the rolling member (32), at least a part of the bearing sleeve (33) being located between an inner wall surface of the cylinder (31) and an outer peripheral surface of the rolling member (32), and a rolling body (34) being provided between the rolling member (32) and the bearing sleeve (33).

10. The pump body assembly according to claim 1, **characterized in that** a cross section of the exhaust channel (11) is in a shape of a rhombus.

11. A compressor, comprising a pump body assembly, **characterized in that** the pump body assembly is the pump body assembly of any one of claims 1 to 10.

12. An air conditioner, comprising a pump body assembly, **characterized in that** the pump body assembly is the pump body assembly of any one of claims 1 to 10.

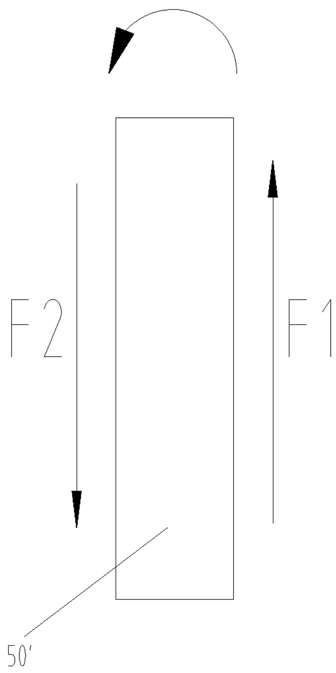

FIG. 1

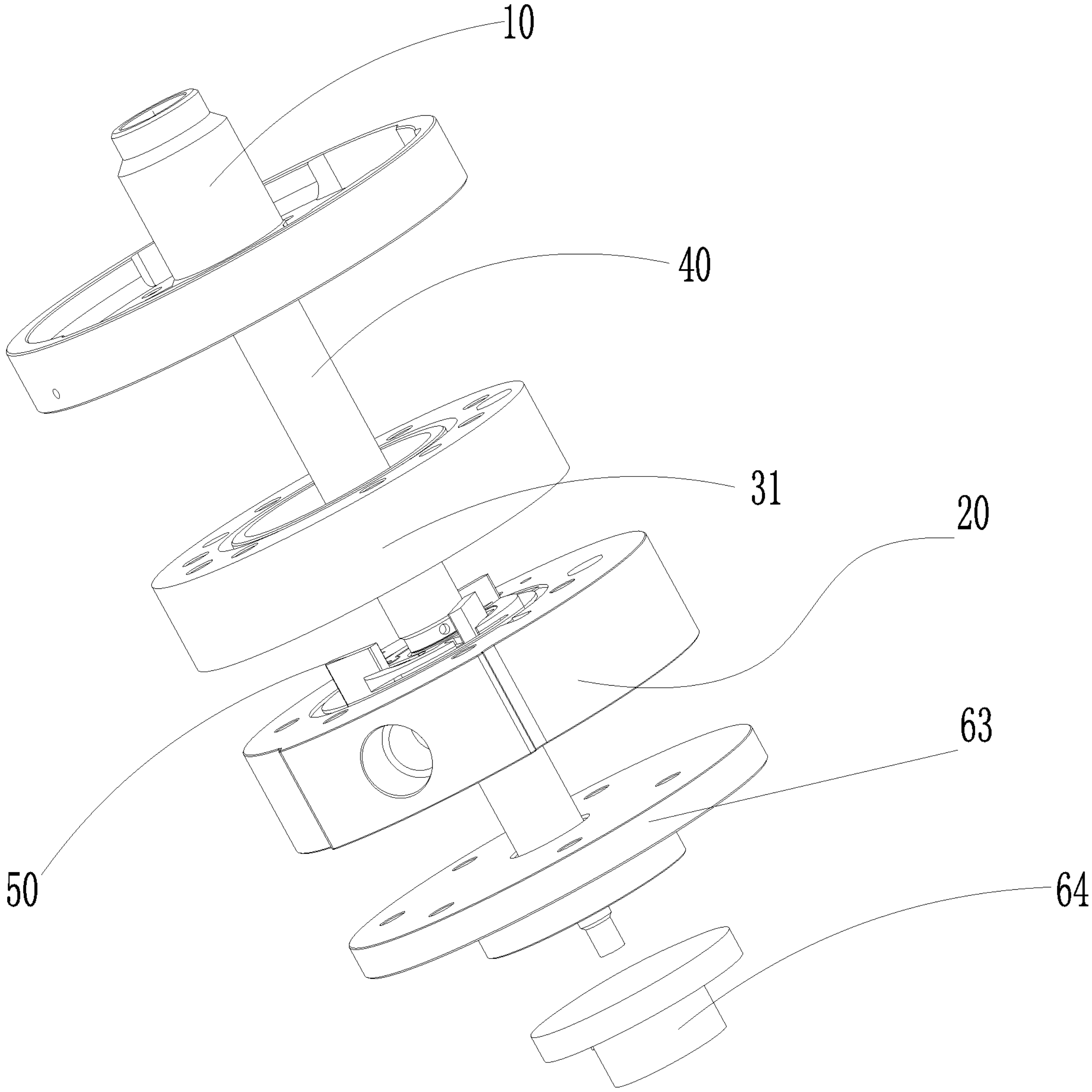

FIG. 2

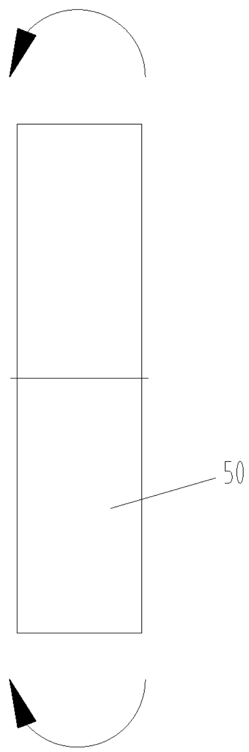

FIG. 3

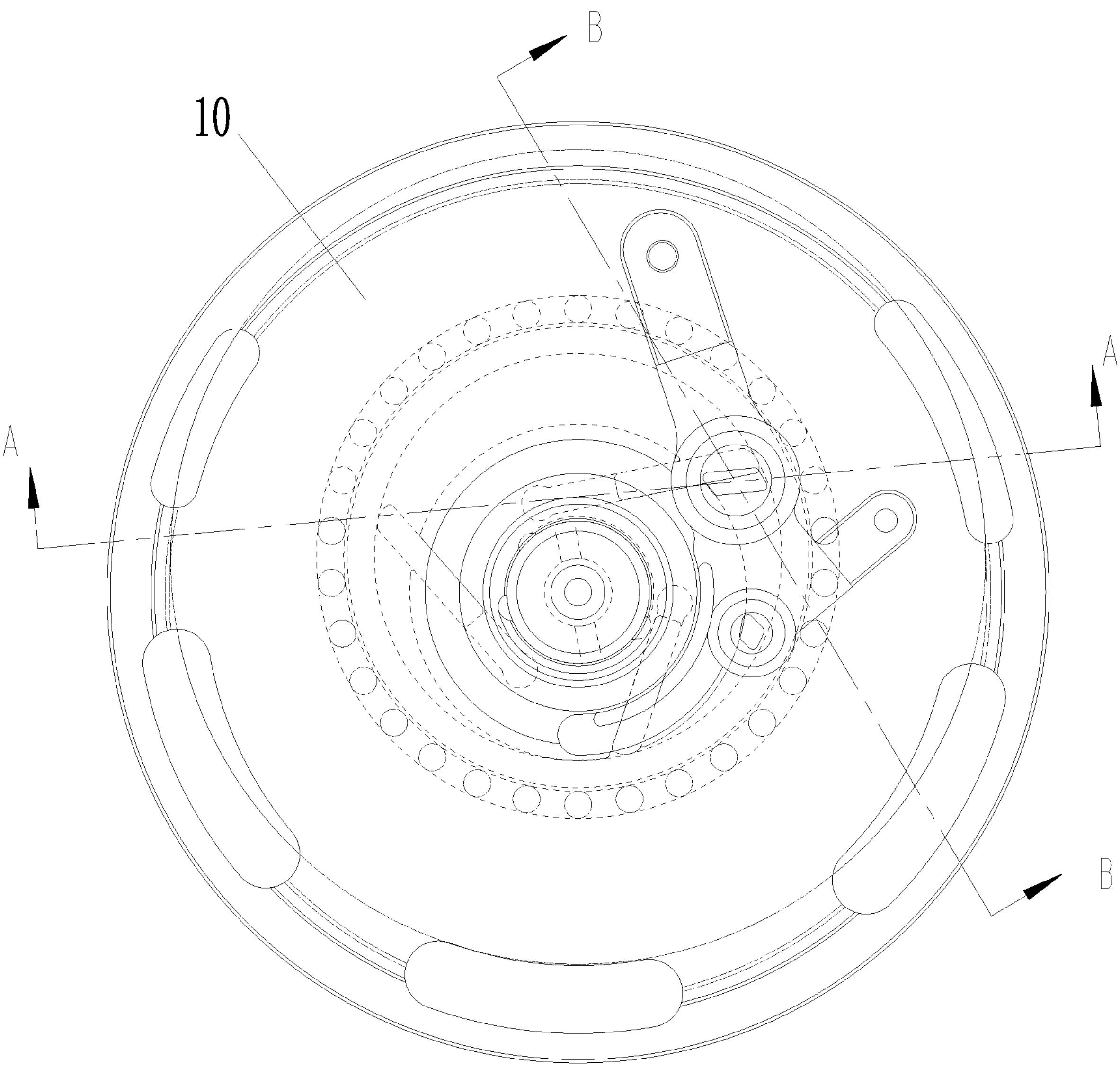

FIG. 4

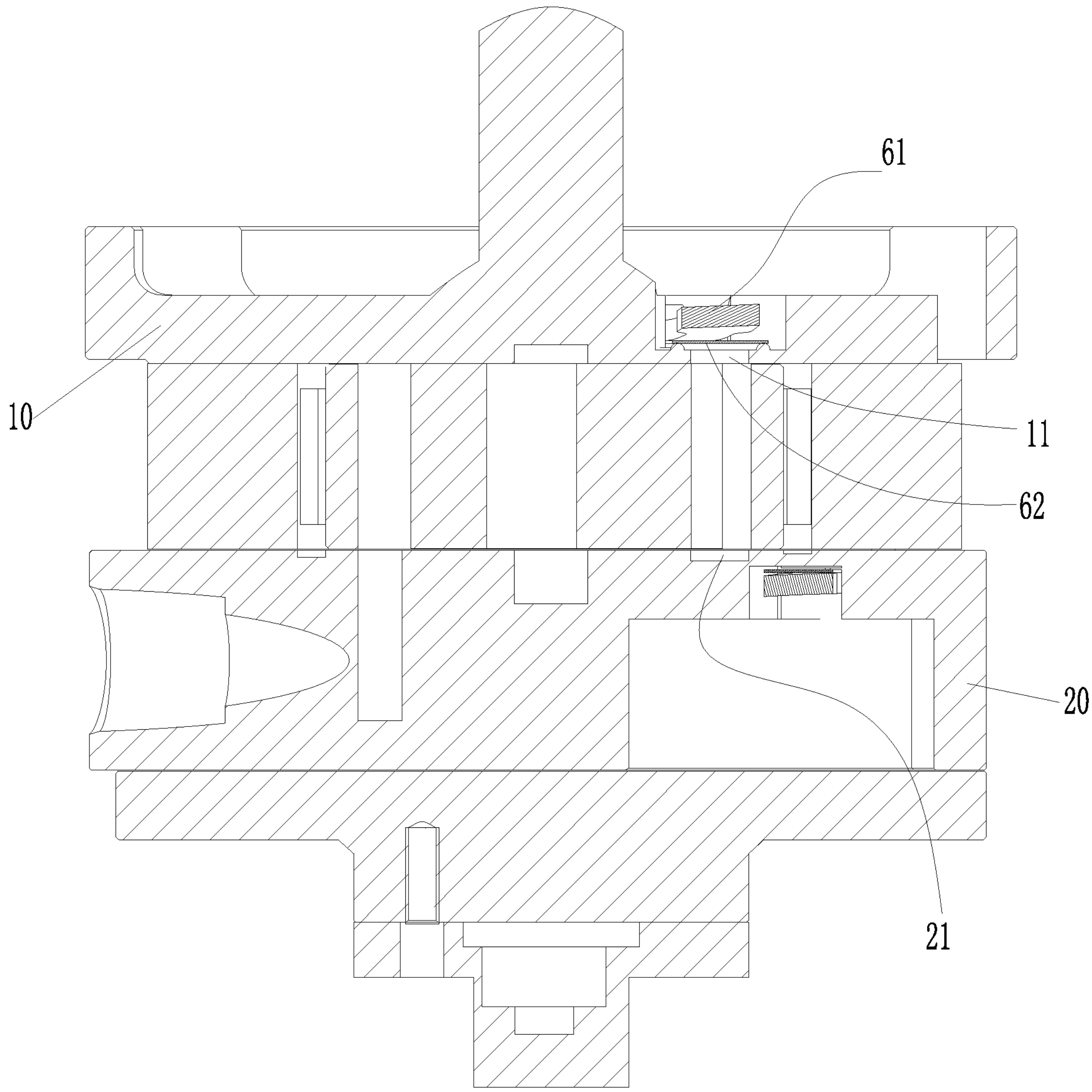

FIG. 5

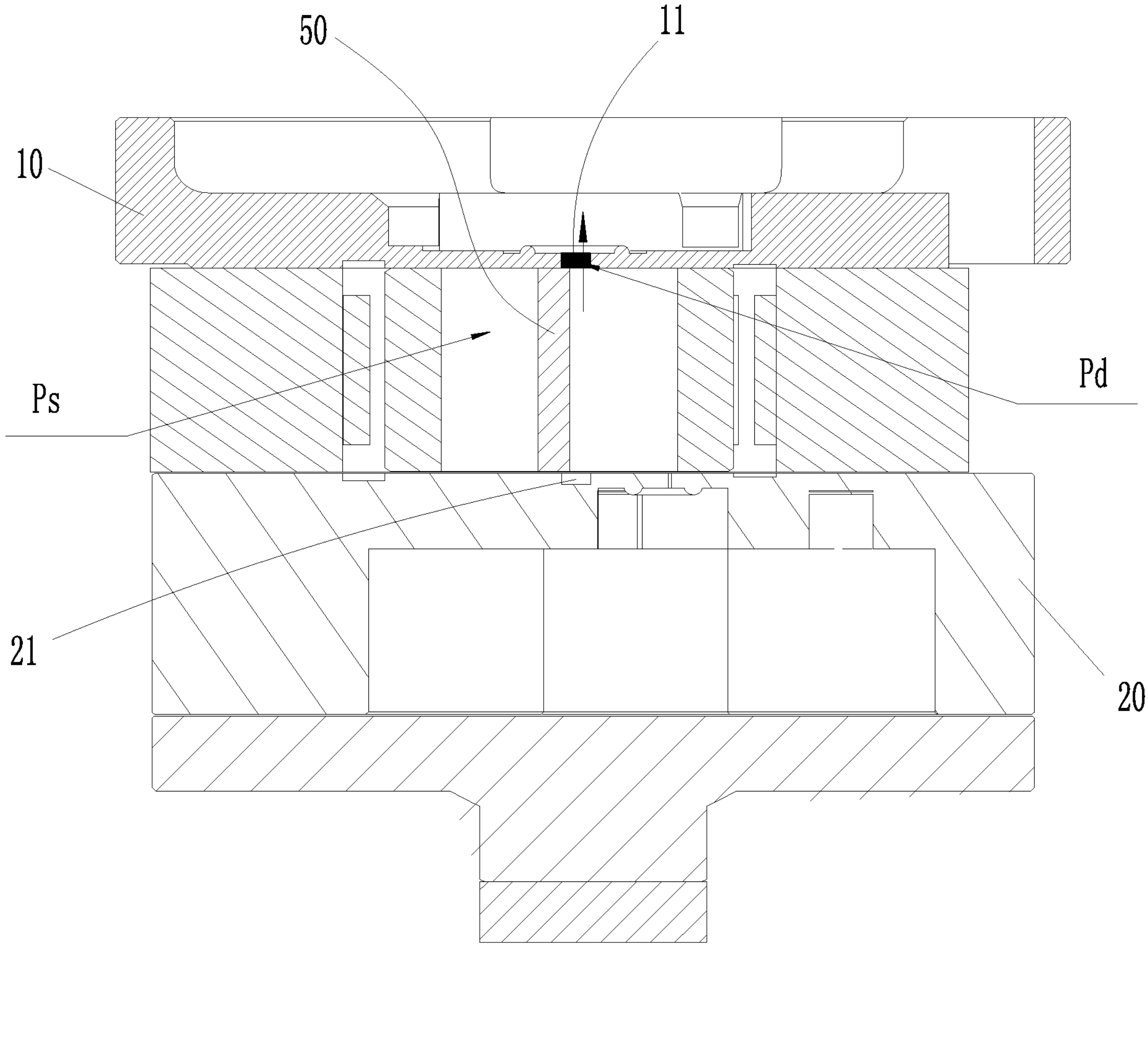

FIG. 6

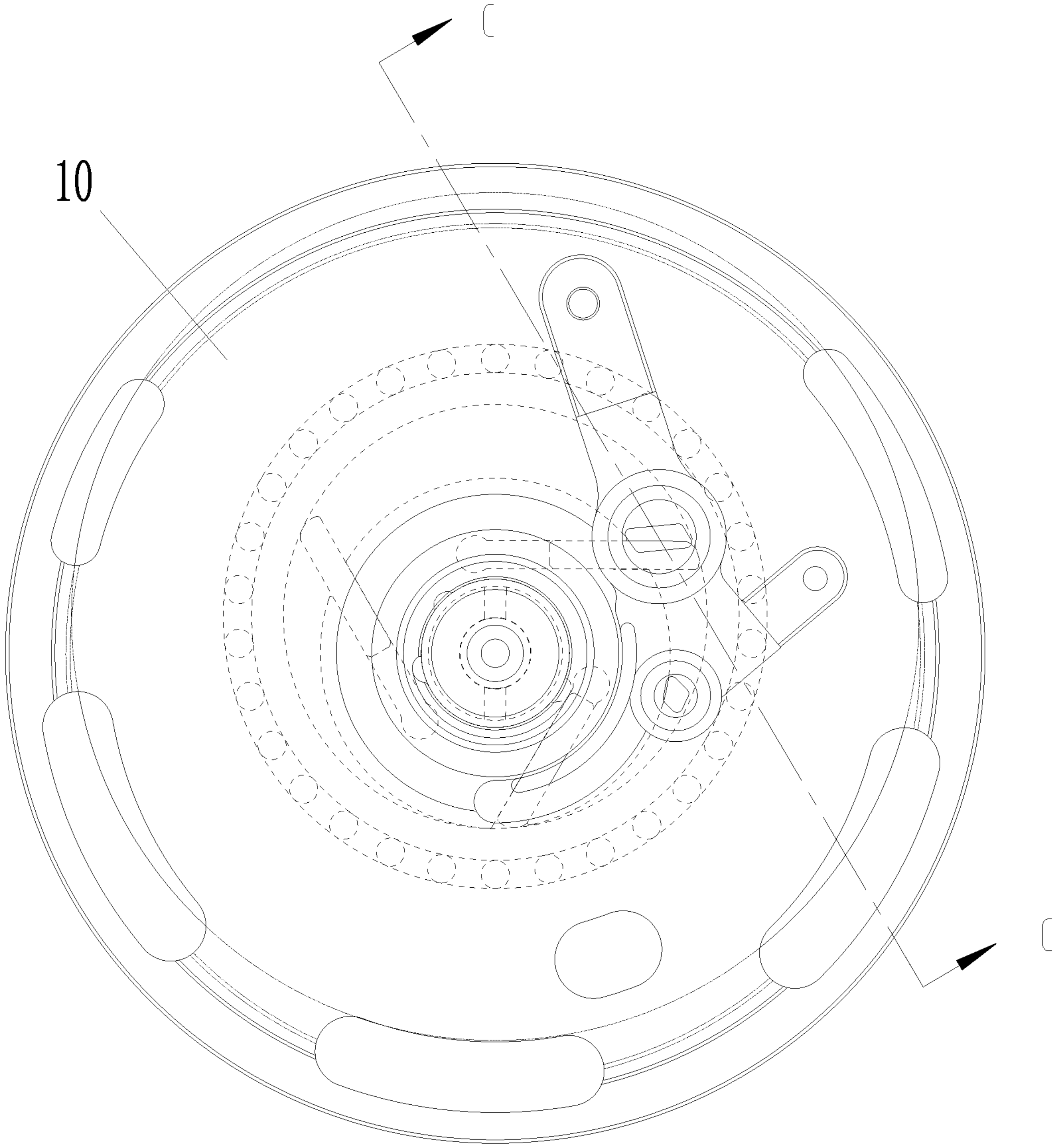

FIG. 7

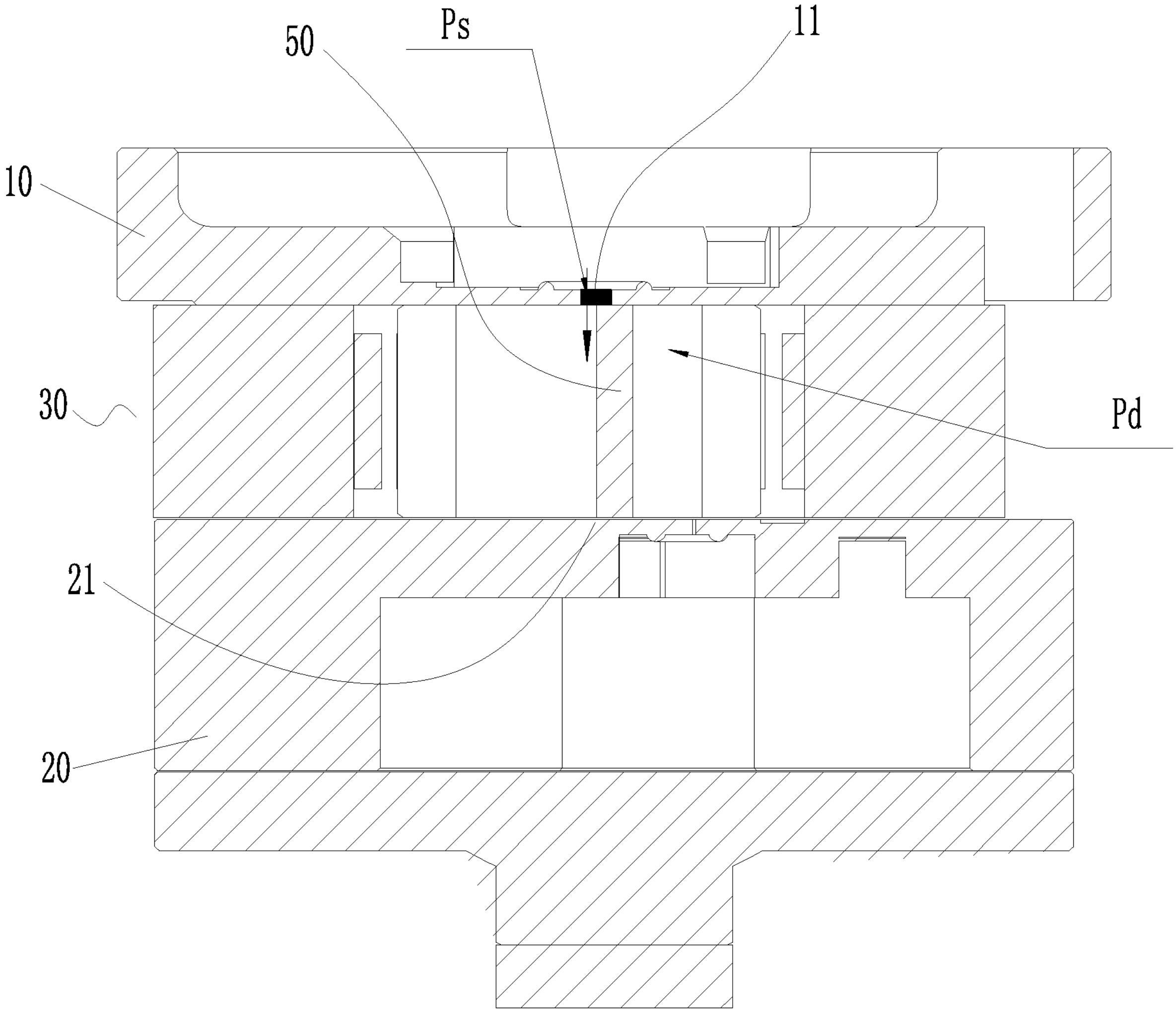

FIG. 8

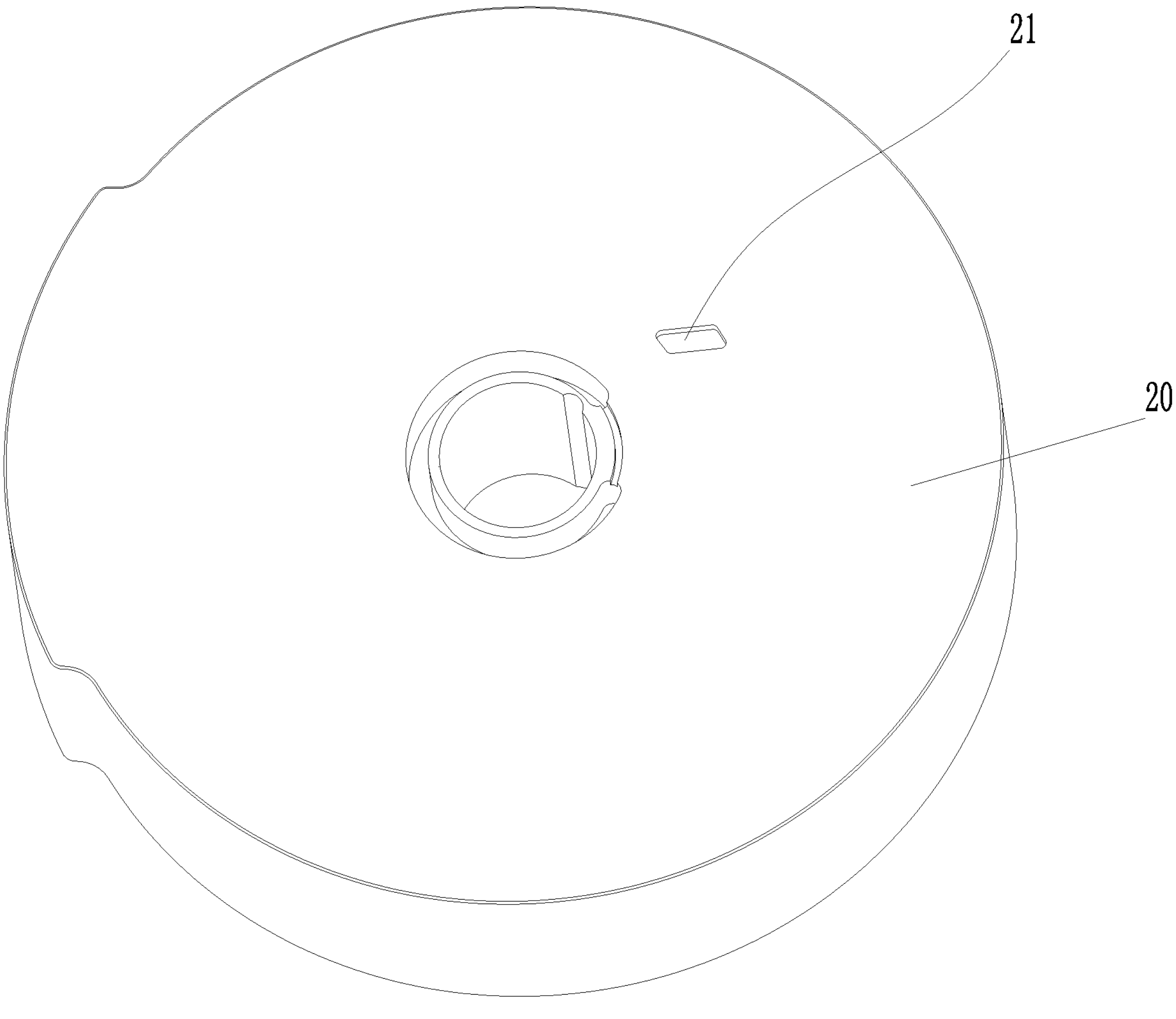

FIG. 9

INTERNATIONAL SEARCH REPORT

International application No. **PCT/CN2018/120667**

A. CLASSIFICATION OF SUBJECT MATTER

F04C 18/344(2006.01)i; F04C 29/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F04C18 F04C29

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNABS; CNTXT; CNKI; VEN; WOTXT; EPTXT; USTXT: 格力, 滑片, 叶片, 倾斜, 倾覆, 力矩, 气, 平衡, 缸, 法兰, 轴承, 凹, 槽, vane?, blade?, inclin+, slant+, tilt+, lean+, slop+, force, torque, gas, balanc+, cylinder, flange, bearing, slot, concave, groove

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 107542658 A (GREE GREEN REFRIGERATION TECHNOLOGY CENTER CO., LTD. OF ZHUHAI) 05 January 2018 (2018-01-05) entire document	1-12
A	KR 20120021573 A (ASPEN COMPRESSOR LLC) 09 March 2012 (2012-03-09) entire document	1-12

☐ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed
- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 February 2019	**08 April 2019**

Name and mailing address of the ISA/CN	Authorized officer
National Intellectual Property Administration, PRC (ISA/CN) **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China**	
Facsimile No. **(86-10)62019451**	Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2018/120667

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	107542658	A	05 January 2018	CN	207349077	U	11 May 2018
KR	20120021573	A	09 March 2012	KR	101159455	B1	25 June 2012

Form PCT/ISA/210 (patent family annex) (January 2015)